

Industria y Comercio
SUPERINTENDENCIA

DELEGATURA DE PROPIEDAD INDUSTRIAL

División de Nuevas Creaciones

**SOLICITUD
PATENTE DE INVENCION**

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 14-139642- -00000-0000

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Act. 411 PRESENTACION Folios: 146

21. EXPEDIENTE No. _____

54. TÍTULO CUERPO DE UN CAMION

51. CLASIFICACIÓN INTERNACIONAL _____

71. SOLICITANTE GECKO TANKS PTY LTD

DOMICILIO WELSHPOOL, AUSTRALIA

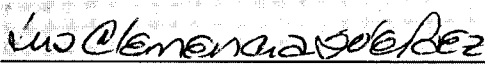
74. APODERADO LUZ CLEMENCIA DE PAEZ
C.C. 35.456.344 de Usaquén

22. BOGOTÁ, D.C., _____

 Industria y Comercio SUPERINTENDENCIA	SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO  No. 14-139642- -00000-0000 Fecha: 2014-06-27 16:52:52 Dep. 2020 DIR.NUEVASCR Tra. 11 PATENTEIYII Eve: 379 FASENACIONALII Act. 411 PRESENTACION Folios: 16/48
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DIRECCIÓN DE NUEVAS CREACIONES
SOLICITUD FASE NACIONAL -PCT

1	TIPO DE SOLICITUD	☒ Patente de invención ☐ Capítulo I	☐ Patente de Modelo de Utilidad ☒ Capítulo II
2	DATOS SOLICITUD INTERNACIONAL PCT (86)		
Solicitud Internacional No.		PCT/AU2012/001505	Fecha 2012/12/06
Publicación Internacional No.		WO 2013/082674 A1	Fecha 2013/06/13
3	TÍTULO DE LA INVENCIÓN		
CUERPO DE UN CAMION			
4	CLASIFICACIÓN INTERNACIONAL (CIP)		
B60P 003/024, B65D 090/000			
5	SOLICITANTE (S) ☐ Esta persona también es inventor. Para datos adicionales utilizar hoja de información complementaria		
APELLIDOS O RAZÓN SOCIAL		NOMBRE	IDENTIFICACIÓN TIPO
GECKO TANKS PTY LTD			
6	DATOS DEL SOLICITANTE		
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CIUDAD		Welshpool	CORREO ELECTRÓNICO clientes@cavelier.com
DEPARTAMENTO/ESTADO			NACIONALIDAD O LUGAR DE CONSTITUCIÓN
PAÍS DE RESIDENCIA		Australia	Australia
7	INVENTOR (ES) Para datos adicionales utilizar hoja de información complementaria		
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2. SIKIRICH		Steve	Australiano
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OTRO(S) SOLICITANTE(S) Y/O (OTRO(S) INVENTOR(ES)			
☐ Los demás solicitantes y/o (demás) inventores se indican en una hoja a continuación.			
9	☐ REPRESENTANTE LEGAL ☒ APODERADO		
APELLIDOS		NOMBRES	IDENTIFICACIÓN
De Páez		Luz Clemencia	C.C . 35.456.344 T.P . 23.555
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PAÍS	COLOMBIA		No. RADICACIÓN DE PROTOCOLO DE PODER GENERAL

10	DECLARACIONES DE PRIORIDAD ☒ SI ☐ NO			
(33) PAÍS DE ORIGEN		CÓDIGO PAÍS	(31) NÚMERO	(32) FECHA (AAAA/MM/DD)
AUSTRALIA		AU	2011905070	2011/12/06
11	DECLARACIÓN SOBRE USO DE RECURSOS GENÉTICOS O BIOLÓGICOS			
<i>Declaro que el objeto de la presente solicitud de patente fue obtenido a partir de recursos genéticos o biológicos de los que cualquiera de los países miembros de la Comunidad Andina es país de origen.</i>				
☐ SI ☐ NO				
Nota: En caso afirmativo deberá anexar copia del contrato de acceso de recursos genéticos o productos derivados, o certificado o número de registro, expedido por la Autoridad competente.				
12	DECLARACIÓN SOBRE USO DE CONOCIMIENTOS TRADICIONALES			
<i>Declaro que el objeto de la presente solicitud de patente fue obtenido a partir de conocimientos tradicionales de comunidades indígenas, afroamericanas o locales de países miembros de la Comunidad Andina.</i>				
☐ SI ☐ NO				
Nota: En caso afirmativo deberá anexar la licencia o autorización de uso de conocimiento tradicional, o certificado, o número de registro expedido por la Autoridad competente.				
13	REDUCCIÓN DE TASAS			
<i>Declaro que carezco de medios económicos para presentar la solicitud de patente.</i>				
☐ SI ☐ NO				
Nota: En caso de ser persona natural y carecer de medios económicos, y por lo tanto, aplique la reducción de tasas a que se refiere la resolución vigente en tarifas, debe firmar la presente solicitud bajo la gravedad de juramento.				
Micro, pequeñas y medianas empresas ☐				
Universidades públicas o privadas ☐				
Entidades sin ánimo de lucro ☐				
Debe aportar los documentos que se indican en el numeral 17 de anexos				
14	AUTORIZACIÓN DE NOTIFICACIÓN EN LÍNEA ☐ SI ☐ NO			
Manifiesto que he leído y entendido perfectamente los términos y condiciones de uso de medios electrónicos para las notificaciones en línea a través de Internet de los actos administrativos proferidos por la Superintendencia de Industria y Comercio que deben ser notificados personalmente y, en consecuencia, autorizo el servicio de notificación a través de internet.				
15	COMPROBANTE DE PAGO O PAGO ELECTRÓNICO	No. 14-0066540	Fecha: 2014/06/24	
16	FIRMA DEL SOLICITANTE, DEL APODERADO O DEL REPRESENTANTE LEGAL			
<i>Junto a cada firma, indicar el nombre del firmante y su calidad (si tal calidad no es obvia al leer el petitorio)</i>				
Nombre del Firmante LUZ CLEMENCIA DE PAEZ		Firma  TP#23555		
C.C 35.456.344 de Usaquén		Tarjeta Profesional 23.555		

17 ANEXOS	
Documentación Técnica Solicitud Internacional en castellano 1. ☒ Descripción N° de folios: <u>33</u> 2. ☒ Reivindicaciones N° Reivindicaciones: <u>37</u> 3. ☒ Dibujos y/o figuras N° folios: <u>15</u> 4. ☒ Resumen. 5. ☐ Certificado de depósito de material biológico si fuera el caso. 6. ☐ Listado de secuencias de nucleótidos y/o aminoácidos en forma digital si fuera el caso. 7. ☒ Arte final 12 x 12. 8. ☐ Anexo formato digital. ☒ Forma PCT/IPEA/409. Reporte Preliminar Internacional sobre Patentabilidad Capitulo II con su correspondiente traducción.	Documentación Jurídica 9. ☒ Poder de GECKO TANKS PTY LTD 10. ☒ Documento que legalmente prueba la cesión de los dos (2) inventores al solicitante o a su causante. 11. ☐ Copia del contrato de acceso de recursos genéticos o productos derivados, certificado o número de registro, si fuera el caso. 12. ☐ Copia de la licencia o autorización de Conocimientos Tradicionales, certificado o número de registro, si fuera el caso. 13. Reducción de tasas Micro, pequeñas o medianas empresas ☐ Copia simple de la declaración de renta del año inmediatamente anterior, o en su defecto prueba documental idónea. ☐ Documento de constancia de cumplimiento con lo establecido en la ley 905 de 2004. Universidades públicas o privadas ☐ Copia acto de reconocimiento institucional emitido por el Ministerio de Educación Entidades sin ánimo de lucro ☐ Copia de registro vigente en Cámara de comercio. ☐ Hoja de información complementaria. ☐ Otros, especificar 14. ☒ Comprobante de pago de la tasa de presentación de la solicitud por \$515.000. 15. ☐ Comprobante de pago por reivindicación de prioridad. 16. ☐ Comprobante de pago de la tasa por concepto de excedente de palabras en la publicación. 17. ☐ Comprobante de pago por reivindicación adicional a 10.

FIGURA CARACTERISTICA

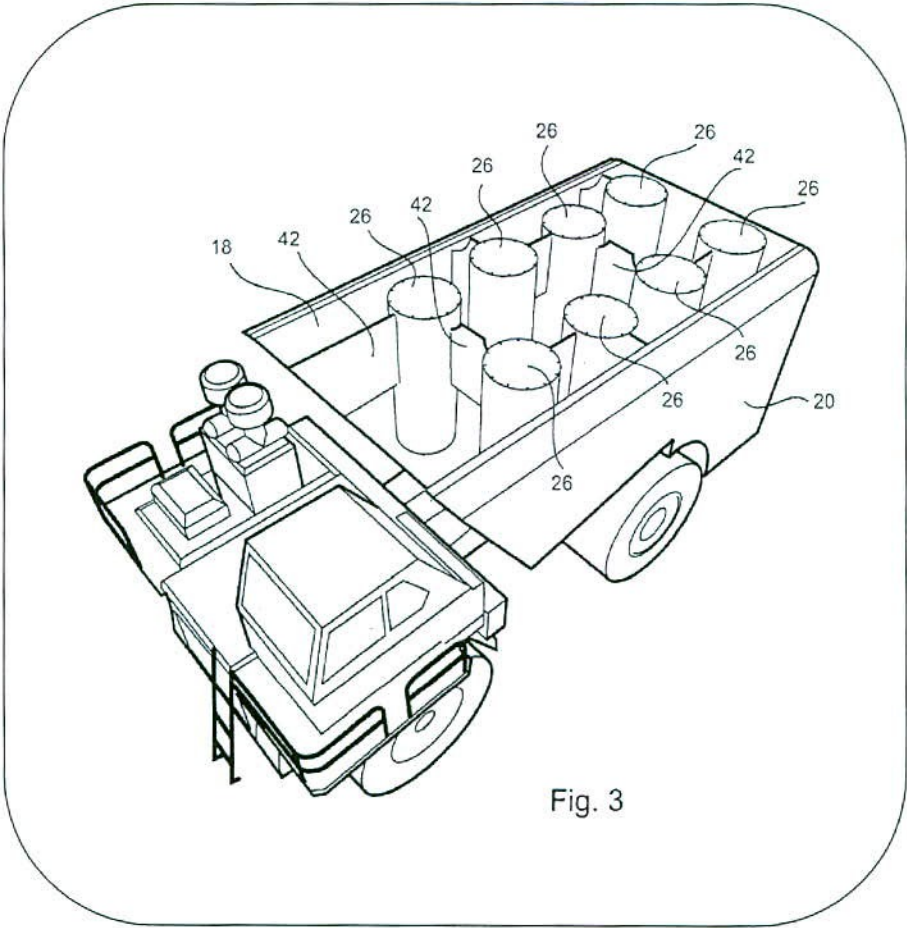


Fig. 3

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(81) Designated States (unless otherwise indicated, for every
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AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,
NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU,
RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

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(54) Title: TRUCK BODY

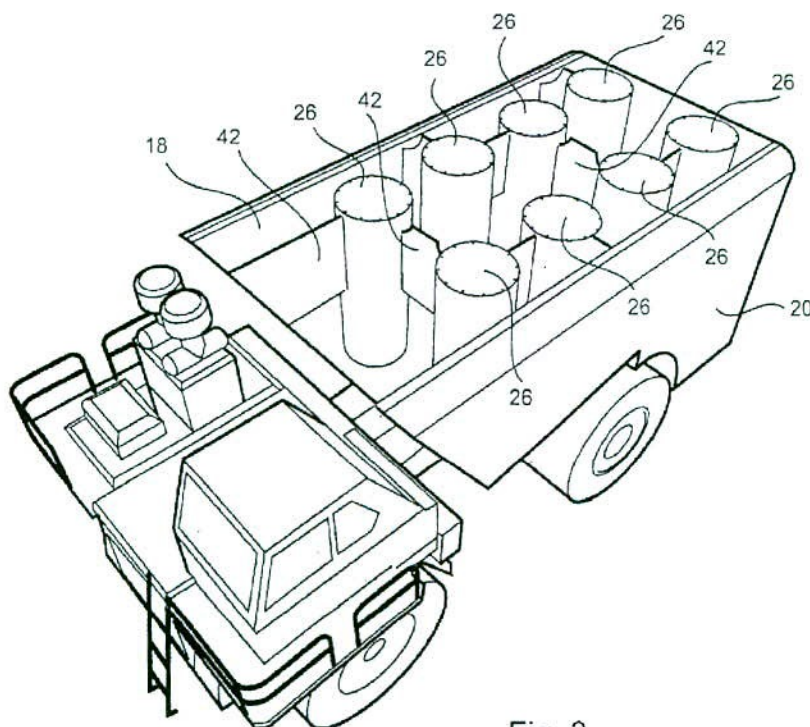


Fig. 3

(57) Abstract: A tank for storing at least one fluid comprising a main chamber and at least one sub-chamber having an exterior sur-
face defining an inner volume of the at least one sub-chamber, the at least one sub-chamber being arranged with respect to the main
chamber such that at least one first location of the exterior surface may be

[Continued on next page]

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accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber. There is also provided a method for manufacturing the tank.

MEMORIA DESCRIPTIVA

CAMPO TÉCNICO

[0001] La presente invención se refiere a un aparato y métodos para manejar fluidos.

[0002] La invención ha sido diseñada particularmente, aunque no necesariamente de manera exclusiva, en relación a tanques para almacenar, transportar y suministrar fluidos como combustibles, aceites y agua.

ANTECEDENTES DE LA TÉCNICA

[0003] La siguiente discusión de los antecedentes de la técnica está destinada solamente a facilitar la comprensión de la presente invención. La discusión no es un reconocimiento o admisión que cualquiera de los materiales a los que se hace referencia es o ha sido parte del conocimiento general común en la fecha de prioridad de la solicitud.

[0004] Habitualmente, la fabricación de tanques es un procedimiento engorroso que generalmente requiere áreas de trabajo relativamente grandes y una cantidad de personal relativamente grande. Lo anterior es particularmente cierto si se van a fabricar varios tipos diferentes de camiones. Por ejemplo, en ocasiones puede ser necesario fabricar tanques para almacenar y transportar un solo tipo de fluido. Un ejemplo de dicho tanque es un tanque de agua. En otras ocasiones, los tanques pueden comprender una pluralidad de cámaras para almacenar diferentes tipos de fluidos. Ejemplos de estos tanques son los incorporados en camiones de mantenimiento.

[0005] Cada uno de estos tipos diferentes de tanques se fabrican actualmente desde cero. Esto significa que con el fin de fabricar un tanque para almacenar un solo líquido, se necesita fabricar la cámara principal del tanque y luego adaptarse para que sea, por ejemplo, un tanque de agua. Si se requiere un tanque para un camión de mantenimiento, se necesita fabricar la pluralidad de cámaras del tanque. Luego, la pluralidad de cámaras necesita ser adaptada para convertirla en un tanque para un camión de mantenimiento.

[0006] La presente invención ha sido desarrollada contra este antecedente.

RESUMEN DE LA INVENCION

[0007] De acuerdo con un primer aspecto de la invención, se proporciona un tanque para almacenar al menos un fluido que comprende una cámara principal y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de la al menos una sub-cámara, donde la al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que al menos una primera ubicación de la superficie exterior puede accederse desde el interior de la cámara principal y al menos una segunda ubicación de la superficie exterior puede accederse desde una ubicación exterior a la cámara principal.

[0008] Preferentemente, la cámara principal comprende una superficie exterior que define un volumen interno que contiene la al menos una sub-cámara donde la superficie exterior comprende al menos una abertura adaptada para recibir la al menos una segunda ubicación de la superficie exterior de la al menos una sub-cámara.

[0009] Preferentemente, la al menos una sub-cámara comprende una cámara interna incorporada dentro de la cámara principal.

[0010] Preferentemente, la cámara interna tiene una configuración cilíndrica.

[0011] Preferentemente, la al menos una cámara interna está adaptada y dispuesta dentro de la cámara principal para reducir el movimiento del fluido durante el transporte del fluido dentro del tanque.

[0012] Preferentemente, la cámara interna está dispuesta dentro de la cámara principal de manera que esté rodeada en su totalidad por el fluido incorporado dentro de la cámara principal.

[0013] Preferentemente, el tanque está adaptado para proporcionar fluido a la al menos una cámara interna desde una fuente de fluido exterior a la cámara principal.

[0014] En una disposición, la al menos una primera ubicación de la superficie exterior comprende un puerto para permitir la comunicación de fluido entre la cámara principal y la al menos una sub-cámara.

[0015] En una disposición alternativa, la al menos una segunda ubicación de la superficie exterior comprende una abertura para permitir la comunicación de fluido entre una fuente de fluido exterior a la cámara principal y la al menos una sub-cámara.

[0016] Preferentemente, la al menos una cámara interna comprende un primer y segundo extremo, donde la al menos una cámara interna está dispuesta dentro de la cámara principal de manera que se pueda acceder al primer extremo y al segundo extremo desde el exterior de la cámara principal.

[0017] De acuerdo con un segundo aspecto de la invención, se proporciona un método para montar un tanque adaptado ya sea para incorporar un único fluido o para incorporar una pluralidad de fluidos, donde el método comprende los pasos de:

proporcionar una estructura de tanque que tiene una cámara principal y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de la al menos una sub-cámara, donde la al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que la al menos una primera ubicación de la superficie exterior pueda accederse desde el interior de la cámara principal y la al menos una segunda ubicación de la superficie exterior pueda accederse desde una ubicación exterior a la cámara principal y

proporcionar al menos una abertura dentro de la superficie exterior para permitir el acceso del fluido en la al menos una sub-cámara donde la al menos una abertura se puede proporcionar ya sea en la al menos una primera ubicación para permitir el acceso de fluido de la cámara principal en la sub-cámara de manera de permitir que el tanque incorpore un solo fluido o la al menos una segunda ubicación para permitir el acceso de fluido desde la fuente de fluido externo a la cámara principal de manera de permitir que el tanque incorpore una pluralidad de fluidos.

[0018] Preferentemente, el método comprende además fijar artículos prefabricados al tanque de manera de adaptar el tanque para que sea un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos.

[0019] En una disposición, los artículos prefabricados comprenden una barra prefabricada para la pulverización de agua.

[0020] En una disposición alternativa, los artículos prefabricados comprenden un colector prefabricado y un accesorio, donde el colector comprende una pluralidad de conductos adaptados para estar conectados de manera fluida con la al menos una segunda ubicación de la superficie exterior y donde el accesorio define una área de servicio adaptada para estar en comunicación fluida con el colector de manera de suministrar y recibir fluido.

[0021] De acuerdo con un tercer aspecto de la invención, se proporciona un tanque para almacenar al menos un fluido que comprende una cámara principal y al menos una sub-cámara que comprende un primer y segundo extremo donde la al menos una cámara interna está dispuesta dentro de la cámara principal de manera que se pueda acceder al primer extremo y al segundo extremo desde el exterior de la cámara principal.

[0022] Preferentemente, el primer y segundo extremo se cierran de manera desmontable para permitir la abertura del primer extremo y segundo extremo.

[0023] Preferentemente, el primer y segundo extremo están adaptados para abrirse simultáneamente. Esta disposición es particularmente útil debido a que facilita la limpieza de la al menos una cámara interna al permitir el suministro del fluido de limpieza a través del extremo superior de la cámara interna y la salida del fluido de limpieza a través del extremo inferior de la cámara interna.

[0024] Preferentemente, la al menos una sub-cámara tiene una configuración cilíndrica. Esto facilita la limpieza del interior de la al menos una sub-cámara.

[0025] Preferentemente, la cámara principal comprende un extremo superior y un extremo inferior, donde el primer extremo de la cámara interna está ubicado en el

extremo superior y el segundo extremo de la cámara interna está ubicado en el extremo inferior.

[0026] De acuerdo con un cuarto aspecto de la invención se proporciona un tanque para almacenar al menos un fluido que comprende una cámara principal y al menos una sub-cámara, donde la al menos una sub-cámara está incorporada en su totalidad en el interior de la cámara principal.

[0027] Preferentemente, la al menos una sub-cámara está adaptada para reducir el movimiento del fluido dentro de la cámara principal.

[0028] Preferentemente, el tanque comprende un medio para reducir el movimiento del fluido dentro de la cámara principal.

[0029] Preferentemente, el medio para reducir el movimiento del fluido dentro de la cámara principal comprende placas que unen la al menos una cámara con al menos una pared de la cámara principal.

[0030] Preferentemente, existe una pluralidad de sub-cámaras incorporadas dentro de la cámara principal.

[0031] Preferentemente, la pluralidad de sub-cámaras están fijadas entre sí y están fijadas a la pared que define la cámara principal a través del medio para reducir el movimiento del fluido dentro de la cámara principal.

[0032] Preferentemente, el medio para reducir el movimiento del fluido dentro de la cámara principal comprende placas dispuestas en diferentes ubicaciones con respecto a la altura de la pluralidad de sub-cámaras.

[0033] Preferentemente, las placas están fijadas de manera alterna a la parte superior y la parte inferior de las sub-cámaras.

[0034] Preferentemente, los medios para reducir el movimiento del fluido dentro de la cámara principal están adaptados para permitir el movimiento del personal de mantenimiento dentro del tanque.

[0035] De acuerdo con un quinto aspecto de la invención, se proporciona un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos, donde el tanque comprende una estructura del tanque que tiene una cámara principal y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de la al menos una sub-cámara, donde la al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que al menos una primera ubicación de la superficie exterior pueda accederse desde el interior de la cámara principal y al menos una segunda ubicación de la superficie exterior pueda accederse desde una ubicación exterior a la cámara principal y al menos una abertura dentro de la superficie exterior para permitir el acceso del fluido en la al menos una sub-cámara donde la al menos una abertura está ubicada ya sea en la al menos una primera ubicación para permitir el acceso de fluido de la cámara principal en la sub-cámara para permitir que el tanque incorpore un solo fluido o en la al menos una segunda ubicación para permitir el acceso de fluido desde una fuente de fluido externo a la cámara principal para permitir que el tanque incorpore una pluralidad de fluidos.

[0036] Preferentemente, el tanque comprende además artículos prefabricados para el tanque de manera de adaptar el tanque para que sea un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos.

[0037] Preferentemente, el artículo prefabricado comprende una barra prefabricada para la pulverización de agua.

[0038] Preferentemente, los artículos prefabricados comprenden un colector prefabricado y un accesorio, donde el colector comprende una pluralidad de conductos adaptados para estar conectados de manera fluida con la al menos una segunda ubicación de la superficie exterior y donde el accesorio define una área de servicio adaptada para estar en comunicación fluida con el colector de manera de suministrar y recibir fluido.

[0039] Preferentemente, los artículos prefabricados están configurados de manera que la pluralidad de conductos puedan estar conectados de manera fluida con la al menos segunda ubicación de la superficie exterior y el colector pueda estar conectado de manera fluida con el área de servicios a través de tubos, donde todos los tubos tienen la misma longitud.

[0040] Preferentemente, la longitud de los tubos es alrededor de 400 mm.

[0041] De acuerdo con un sexto aspecto de la invención, se proporciona un camión que incorpora un tanque de acuerdo con el primer, tercer a quinto aspecto de la invención.

[0042] De acuerdo con un séptimo aspecto de la invención, se proporciona un tanque para almacenar al menos un fluido que comprende una cámara principal que tiene una superficie exterior que define un volumen interno adaptado para recibir un primer fluido, y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno, donde la al menos una sub-cámara tiene al menos una primera y segunda ubicación, donde la primera ubicación está adaptada para desplazarse selectivamente entre una condición abierta y una condición cerrada ya sea para permitir o impedir el flujo del primer fluido en el volumen interno de la sub-cámara y donde la segunda ubicación es adaptada para desplazarse selectivamente entre una condición abierta y una condición cerrada para permitir el flujo de un segundo fluido en el volumen interno de la sub-cámara, donde la sub-cámara está dispuesta con respecto a la cámara principal de manera que se pueda acceder a la primera ubicación desde una ubicación dentro de la cámara principal y se pueda acceder a la segunda ubicación desde el exterior de la cámara.

[0043] De acuerdo con un octavo aspecto de la invención, se proporciona un tanque para almacenar al menos un fluido que comprende una cámara principal y al menos una sub-cámara, donde la cámara principal tiene una superficie exterior que define un volumen interno adaptado para recibir el fluido, donde la sub-cámara tiene una superficie exterior que define un volumen interno de la sub-cámara, donde la sub-cámara comprende un primer y segundo extremo adaptados para desplazarse selectivamente entre una condición abierta y una condición cerrada, donde la al menos una sub-cámara está dispuesta dentro del volumen interno de la cámara principal de manera que se pueda acceder al primer extremo y al segundo extremo desde el exterior de la cámara principal.

[0044] De acuerdo con un noveno aspecto de la invención, se proporciona un tanque para almacenar al menos un fluido que comprende una cámara principal que tiene una superficie exterior que define un volumen interno adaptado para recibir un primer fluido y al menos una sub-cámara que tiene una superficie exterior, donde la sub-cámara está contenida dentro del volumen interno de la cámara principal, donde la sub-cámara está

dispuesta dentro de la cámara principal de manera que la superficie externa de la sub-cámara está rodeada por el fluido incorporado dentro de la cámara principal.

[0045] De acuerdo con un décimo aspecto de la invención, se proporciona un tanque adaptado ya sea para incorporar un único primer fluido o para incorporar el primer único fluido y uno o más segundos fluidos, donde el tanque comprende una estructura del tanque que tiene una cámara principal que comprende una superficie externa que define un volumen interno adaptado para recibir el único primer fluido y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno adaptado para recibir ya sea el único primer fluido o el uno o más segundos fluidos donde la sub-cámara está dispuesta con respecto a la cámara principal de manera que al menos una primera ubicación de la superficie exterior de la sub-cámara se pueda acceder desde el interior de la cámara principal y al menos una segunda ubicación de la superficie exterior de la sub-cámara se pueda acceder desde una ubicación exterior a la cámara principal, donde la primera ubicación comprende al menos una primera abertura adaptada para desplazarse selectivamente entre una condición abierta para permitir el acceso del único primer fluido en la sub-cámara y una condición cerrada para impedir el acceso del único primer fluido y donde la segunda ubicación comprende al menos una segunda abertura adaptada para desplazarse selectivamente entre una condición abierta y una condición cerrada para permitir el acceso del fluido desde la fuente de fluido externa a la cámara principal de manera de permitir al tanque incorporar un fluido del uno o más fluidos.

BREVE DESCRIPCIÓN DE LOS DIBUJOS

[0046] Características adicionales de la presente invención se describen con mayor detalle en la siguiente descripción de diversas modalidades no limitantes de la misma. Esta descripción se incluye exclusivamente para fines de ejemplificar la presente invención. No se debería entender como una restricción en el resumen general, divulgación o descripción de la invención según se expone anteriormente. La descripción se hará con referencia a los dibujos adjuntos donde:

Figura 1 es una vista en perspectiva de un camión que incorpora un tanque en conformidad con una modalidad de la invención;

Figura 2 es una vista en perspectiva posterior del camión mostrado en la Figura 1;

Figura 3 es una vista en perspectiva superior del camión mostrado en la Figura 1 que representa el interior del tanque;

Figura 4 es una vista superior del interior del tanque incorporado en el camión mostrado en la Figura 1;

Figura 5 es una vista en perspectiva inferior de una primera disposición del tanque incorporado en el camión mostrado en la Figura 1;

Figura 6 es una vista inferior de una segunda disposición del tanque incorporado en el camión mostrado en la Figura 1;

Figura 7 es una vista en perspectiva inferior frontal de una segunda disposición del tanque incorporado en el camión mostrado en la Figura 1;

Figura 8 es una vista en perspectiva frontal de una segunda disposición del tanque incorporado en el camión mostrado en la Figura 1;

Figura 9 es una vista en perspectiva inferior transversal de una disposición particular del tanque incorporado en el camión mostrado en la Figura 1;

Figura 10 es una vista inferior del accesorio mostrado en la Figura 9 que incorpora el área de servicio 32;

Figura 11 es una vista lateral del accesorio mostrado en la Figura 9 que incorpora el área de servicio 32;

Figura 12 es una vista en perspectiva del accesorio del tanque incorporado en el camión mostrado en la Figura 1;

Figura 13 es una vista en perspectiva posterior del interior del tanque que muestra una disposición de deflector alternativa en conformidad con una modalidad de la invención;

Figura 14 es una vista en perspectiva frontal del interior del tanque que muestra una disposición de deflector alternativa mostrada en la Figura 13;

Figura 15 es una vista en perspectiva inferior de la disposición alternativa del tanque en conformidad con una modalidad de la invención;

Figura 16 es una vista en perspectiva inferior de otra disposición alternativa del tanque en conformidad con una modalidad de la invención;

Figura 17 muestra el proceso de ajustar el área de servicio a la parte inferior del tanque en conformidad con una modalidad de la invención;

Figura 18 muestra una vista de despiece de una cámara interna en conformidad con una modalidad de la invención; y

Figura 19 muestra una vista lateral de la cámara interna mostrada en la figura 18.

DESCRIPCIÓN DE LAS MODALIDADES

[0047] Figuras 1 a 3 muestran un camión 10 en conformidad con una modalidad de la invención. El camión 10 comprende una cabina 12 y un tanque 14. La cabina 12 y el tanque 14 están apoyados en un chasis del camión 10. La cabina 12 incluye el compartimiento para el conductor del camión 14. El motor está ubicado bajo la cabina 12. Se proporcionan dos pares de ruedas 16 para permitir el desplazamiento del camión 10.

[0048] La disposición particular del camión 10 mostrada en las figures 1 y 8 comprende escaleras 122 para facilitar el acceso a la superficie superior del tanque 14. Para esto, la pared frontal del tanque 14 comprende al menos un corte adaptado para recibir las escaleras 122. Figuras 15 a 16 muestran otra modalidad particular de un tanque 14. Según se muestra, por ejemplo, en la figura 15, la pared frontal del tanque 14 comprende una pluralidad de cortes 102 y 104. Los cortes 102 y 104 están adaptados para recibir insertos 120 (ver figura 8) para sostener, por ejemplo, un compresor (no mostrado) y las escaleras 122. La disposición muestra además una cubierta de cabina 106 que se extiende hacia fuera desde la pared frontal del tanque 14. La cubierta de la cabina 106 está adaptada para cubrir la cabina del conductor del camión.

[0049] Figuras 4 a 8 y las figures 15 y 16 muestran dos disposiciones del tanque 14 incorporado en el camión 10 mostrado en las figures 1 a 3. Como se describirá con

gran detalle, en conformidad con la presente modalidad de la invención, las dos disposiciones del tanque 14 pueden fabricarse usando el mismo tipo de estructura del tanque 84. Para esto, la estructura del tanque 84 está adaptada para ser personalizada para que sea cualquiera de las dos disposiciones del tanque 14. La estructura del tanque 84 también se adapta para recibir una pluralidad de partes prefabricadas con el fin de personalizar el tanque 14. Al aplicar partes prefabricadas específicas a la estructura del tanque 84, se puede fabricar cualquiera de las disposiciones del tanque 14. Lo anterior es particularmente ventajoso porque permite fabricar diferentes tipos de tanques 14 en un periodo de tiempo relativamente corto. Además, reduce el espacio de trabajo y la cantidad de personal requerido para fabricar los diferentes tipos de tanques 14.

[0050] Con referencia a las figuras 1 y 3, el tanque 14 comprende un área de almacenamiento 17. Según se describirá adicionalmente, una de las disposiciones del tanque incorpora un accesorio de mantenimiento 20. El área de almacenamiento 17 está adaptado para almacenar fluidos como aceite, combustibles o agua. La parte superior 22 del tanque 14 proporciona una plataforma rodeada por una barrera 24. El conductor y los usuarios del camión 10 pueden acceder a esta área desde la cabina 12.

[0051] Según se describirá con gran detalle, el área de almacenamiento 17 del tanque 14 comprende una cámara principal 18 y al menos una sub-cámara 26. La sub-cámara 26 comprende al menos una cámara interna 26 incorporada dentro de la cámara principal 18. En conformidad con la presente modalidad de la invención, la al menos una cámara interna 26 está contenida en su totalidad dentro de la cámara principal 18. En la disposición mostrada en las figuras, existen ocho cámaras internas 26. Las cámaras internas 26 tienen una configuración cilíndrica.

[0052] Las cámaras internas 26 comprenden un extremo inferior 38 y un extremo superior 40. Los extremos inferiores 38 están apoyados en la parte inferior de la cámara principal 18. Los extremos superiores 40 están adaptados para ser recibidos por aberturas de la parte superior del tanque 14. En esta forma, se puede acceder a los extremos superiores 40 desde la parte superior del tanque (ver figura 1). Los extremos inferiores 38 están adaptados para ser recibidos por hendiduras 60 de la parte inferior del tanque 14 (ver figura 5). Las figuras 18 y 19 muestran una disposición particular de una cámara interna 26 adaptada para ser sostenida dentro de las

hendiduras 60. El extremo inferior 38 está apoyado en una cuña 96. El hecho que las cámaras internas 26 estén apoyadas en una cuña 96 permiten que el eje longitudinal de las cámaras internas sea paralelo al eje vertical del tanque 14. Además, el anillo inferior 98 está fijado al extremo inferior de la cámara interna 26. El anillo inferior 98 está adaptado para recibir la puerta 39 que permite abrir y cerrar el extremo inferior 38 de la cámara interna 26. El extremo superior 40 de la cámara interna 26 comprende un anillo superior 100. El anillo superior 100 adaptado para recibir una puerta 41 permite abrir y cerrar el extremo superior 40 de la cámara interna 26.

[0053] El acceso a las cámaras internas 26 puede proporcionarse a través de los extremos inferior y superior 38 y 40. Para esto, el extremo inferior 38 y el extremo superior 40 comprenden, respectivamente, las puertas 39 y 41. Las puertas 39 y 41 están fijadas de manera desmontable en los respectivos extremos de las cámaras internas 26. Esto permite abrir y cerrar los extremos superior e inferior de las cámaras internas 26 para proporcionar acceso al interior de las cámaras 26.

[0054] En conformidad con la presente modalidad de la invención, la puerta 41 del extremo superior 40 comprende una placa que está atornillada en el anillo 100 del extremo superior 40 de la cámara interna 26 (ver, por ejemplo, figura 4).

[0055] Con referencia a la figura 6, la puerta 39 del extremo inferior 38 está atornillado en el anillo 98 del extremo inferior 38 de la cámara interna 26. En la disposición mostrada en la figura 6, la puerta 39 tiene una configuración semicircular. Así, solo una parte del extremo inferior 38 se cierra de manera desmontable mediante la puerta. Además, la puerta 39 comprende salida inferior y entradas inferiores 28 para permitir el llenado y vaciado de las cámaras cilíndricas 26. Además en la placa se proporciona una abertura 29. La abertura 29 está adaptada para recibir un medio sensor para medir la cantidad de fluido almacenado en la cámara interna 26.

[0056] Además, como se muestra en la figura 6, las salidas y entradas inferiores 28 están conectadas de manera fluida a los conductos 65. Los conductos 65 incluyen extremos 67 que se extienden paralelos a la placa. Según se describirá con mayor detalle en una etapa posterior, los extremos están adaptados para estar conectados de manera fluida con una fuente de fluido y un medio de suministro de fluido para recibir o proporcionar fluido en o contenido dentro de la cámara interna 26.

[0057] El tanque 14 comprende un par de vigas longitudinales 30 para permitir el montaje del tanque 14 al chasis del camión 10.

[0058] Además, el tanque 14 comprende un área de servicio 32 (ver figura 9). El área de servicios 32 está definida por el accesorio 20 que está ubicado en el extremo inferior posterior del tanque 14. Se puede acceder al área de servicio 32 se a través de aberturas 34 incorporadas en las paredes laterales 36 del accesorio 20.

[0059] Según se mencionó anteriormente, el tanque 14 comprende un cámara principal 18 y una pluralidad de cámaras internas 26 (las cámaras cilíndricas 26) para almacenar un fluido o diferente tipo de fluidos. En la disposición mostrada en la figura 3, el tanque 14 comprende una serie de ocho cámaras cilíndricas 26.

[0060] Los pares de cámaras cilíndricas 26 están dispuestos longitudinalmente dentro de la cámara principal 18. Cada cámara cilíndrica 26 está fijada vía placas 42 a su respectiva cámara cilíndrica adyacente 26. Además, cada cámara cilíndrica 26 se fija a través de una placa 42 a la superficie interna de la pared de la cámara principal 18. Lo anterior asegura las cámaras cilíndricas 26 dentro de la cámara principal 18.

[0061] Las placas 42 que fijan la cámara cilíndrica 26 entre sí y a la superficie interna de la pared están adaptadas y dispuestas de manera tal para reducir el movimiento del fluido dentro del tanque así como para facilitar el desplazamiento del personal dentro del tanque 14. De esta manera, las placas 42 actúan como deflectores. Las placas 42 tienen una altura que es una fracción de la longitud total de la cámara cilíndrica 26 a la que está fijada. Lo anterior permite que las placas 42 sean fijadas a la cámara cilíndrica 26 ya sea en la parte superior de la cámara cilíndrica 26 o la parte inferior de la cámara cilíndrica 26.

[0062] En conformidad con la presente modalidad de la invención, las placas 42 están dispuestas en diferentes ubicaciones con respecto a la altura de la pluralidad de sub-cámaras. Las placas 42 se fijan de manera alternativa a la parte superior e inferior de las cámaras cilíndricas 26. Como se muestra en la figura 4, el primer y tercer par de cámaras cilíndricas 26 están fijadas entre si por una placa 42 fijada a la parte superior de las cámaras cilíndricas 26. El segundo y cuarto par de cámaras cilíndricas 26 están fijados entre sí por una placa 42 fijada a la parte inferior de las cámaras cilíndricas 26.

(ver figura 9). Esta disposición es particularmente útil para reducir el movimiento del líquido dentro de la cámara principal 18.

[0063] Figuras 13 y 14 muestra una disposición alternativa de deflector con respecto a la mostrada en las figuras 3, 4 y 9. Como se muestra en las 13 y 14, la disposición de deflectores comprende deflectores 42a a 42h.

[0064] Los deflectores 42a y 42f están ubicados respectivamente en el frente y parte posterior del tanque 14. Estos deflectores 42a y 42f fijan las cámaras internas frontal y posterior 26 a las paredes frontal y posterior del tanque 14. Los deflectores frontales 42a incluyen aberturas 46 que permiten el paso de fluido así como del personal durante los procesos de mantenimiento del interior del tanque 14.

[0065] Los deflectores 42b a 42e fijan la cámara interna 26 a las paredes laterales del tanque 14. Hay dos tipos diferentes de deflectores 42 que fijan las cámaras internas 26 a las paredes laterales de los tanques 14. Los dos tipos diferentes de deflectores 42 son el primer tipo de deflectores 42b y 42d y el segundo tipo de deflectores; 42c y 42e

[0066] Los deflectores 42b y 42d comprenden una placa inferior 108 y una barra de soporte superior 110. La placa inferior 108 se extiende entre la cámara interna 26 y la pared lateral del tanque 14. La placa inferior 108 comprende aberturas 46 que permiten el paso del fluido. La barra de soporte 110 se extiende desde la parte superior de la cámara interna hacia la pared lateral del tanque 14. Una parte de la barra 110 se extiende paralela a la pared lateral del tanque 14. Esta disposición proporciona un espacio libre 112 sobre la placa inferior 108 que permite el paso de fluidos así como del personal de mantenimiento.

[0067] Los deflectores 42 c y 42e comprenden una placa superior 114 que tiene una abertura 46 que permite el paso de fluido. La abertura está ubicada en la esquina superior adyacente a la pared lateral del tanque 14. Una barra de soporte 116 que se extiende junto a la pared lateral del tanque 14 hacia el piso del tanque 14 y se extiende a lo largo del piso del tanque 14 hacia la cámara interna 26. Esta disposición proporciona un espacio libre 118 bajo la placa superior 114 que permite el paso de fluidos así como del personal de mantenimiento.

[0068] El primer tipo de deflectores 42b, 42d y el segundo tipo de deflectores 42c y 42e están dispuestos de manera alternativa dentro del interior del tanque 14. En esta manera, la disposición particular de deflectores (mostrada en las figuras 13 y 14) comprende placas 108 y 114 que se fijan de manera alterna a la parte superior e inferior de las cámaras internas cilíndricas 26. Las placas 108 están fijadas a la parte inferior de las cámaras internas 26. Las placas 114 están fijadas a la parte superior de las cámaras internas.

[0069] Además, la disposición de deflectores mostrada en las figuras 13 y 14 comprende además placas 42 que se fijan a la cámara interna 26 entre sí. Existe un conjunto de placas 42g y 42h. Las placas 42g están dispuestas perpendicularmente al eje longitudinal del tanque 14 y ubicado en el centro del tanque 14. Las placas 42h están dispuestas paralelas al eje longitudinal del tanque 14.

[0070] En la disposición particular mostrada en las figuras 13 y 14, las placas 42g están fijadas de manera alternativa a la parte superior e inferior de las cámaras internas cilíndricas 26. Hay dos placas 42h ubicadas en cada fila de cámaras internas 26. Las cámaras internas frontal y posterior 26 están fijadas a su cámara interna adyacente 26 a través de las placas 42h. Las placas 42h están ubicadas en la parte superior de las cámaras internas 26.

[0071] Las placas 42 que fijan las cámaras cilíndricas 26 a la pared del tanque 14 están fijadas además de manera alternativa a la parte superior e inferior de las cámaras cilíndricas 26. Como se muestra en la figura 4, el primer y tercer par de cámaras cilíndricas 26 están fijados a la pared del tanque 14 mediante una placa 42 fijada a la parte inferior de las cámaras cilíndricas 26. El segundo par y cuarto par de cámaras cilíndricas 26 están fijadas a la pared del tanque 14 mediante la placa 42 fijada en la parte superior de las cámaras cilíndricas 26. El par frontal de las cámaras cilíndricas 26 están fijadas a través de una par de placas frontales 42 que se extienden desde la circunferencia externa de la cámara cilíndrica 26 a la pared frontal del tanque 14. Las placas frontales 42 comprenden una abertura 46 para facilitar el desplazamiento del personal dentro de la cámara principal 18 del tanque 14. Las placas frontales 42 reducen el movimiento del líquido desde un lado del tanque 14 hasta el otro lado del tanque 14. El par posterior de las cámaras cilíndricas 26 está fijado a la pared posterior

del tanque 14 a través de placas posteriores 42. Las placas 42 aseguran las cámaras cilíndricas 26 dentro de la cámara principal 18.

[0072] Las cañerías internas 44 se incorporan en el tanque 14 para alimentar la cámara principal 18 del tanque 14 donde el fluido se almacena en la cámara principal 18. Las cañerías internas 44 comprenden una pluralidad de conductos 48, 49 y 50 que se extienden longitudinalmente dentro de la cámara principal 18. Un primer conducto 48 está adaptado para proporcionar fluido al extremo superior del tanque 14. Un par de segundos conductos 49 y 50 está adaptado para permitir el llenado y vaciado del tanque 14.

[0073] El primer conducto 48 se extiende diagonalmente dentro de la cámara principal 18. En esta manera, un primer extremo del conducto 48 está fijado en la parte inferior del tanque 14 y un segundo extremo (opuesto al primer extremo) está ubicado en una parte superior del tanque 14. Como se muestra en la figura 4, el conducto 48 comprende una sección 52 que se extiende perpendicularmente desde la sección principal del conducto 48. En esta manera, el segundo extremo está ubicado en la esquina del extremo frontal superior del tanque 14. La extensión 52 está adaptada para fijarse al medio de suministro de fluido montado en la parte superior del tanque. El medio de suministro de fluido puede comprender un cañón de agua.

[0074] El primer extremo del conducto 48 está conectado de manera fluida a una entrada 54 ubicada en el extremo inferior posterior del tanque 14 (ver figura 6). Lo anterior permite suministrar el fluido al medio de suministro de fluido. En una disposición, la entrada 54 está conectada de manera fluida con la cámara principal 18. Esto permite alimentar el medio de suministro de fluido con el fluido contenido en la cámara principal 18.

[0075] El par de segundos conductos 49 y 50 se extiende horizontalmente a lo largo de la superficie inferior de la cámara principal 18. Los primeros extremos de los conductos 49 y 50 están conectados de manera fluida a las entradas/salidas 58 y 59 ubicadas en el extremo inferior posterior del tanque 14. Los segundos extremos de los conductos 49 y 50 están ubicados en la región central frontal del tanque 14. Los segundos extremos de los conductos 49 y 50 están adaptados para recibir/suministrar el fluido contenido en el tanque 14 el suministro a la entrada/salidas 58 y 59. Lo anterior permite el vaciado o llenado de la cámara principal 18 del tanque 14. Para esto, las

salidas 58 y 59 están conectadas de manera fluida a mangueras 56 para permitir el suministro del fluido. Las mangueras 56 están incluidas en el área de servicio 32.

[0076] La Figura 5 muestra la parte inferior de la primera disposición del tanque 14. La parte inferior comprende una serie de hendiduras circulares 60. La serie de hendiduras circulares 60 está configurada en la misma manera que la serie de cámaras cilíndricas 26 incluida en el tanque 14. En esta manera, cada uno de los extremos inferiores 38 de las cámaras cilíndricas 26 puede estar ubicada sobre una de las hendiduras circulares 60. Esto permite el acceso a los extremos inferiores 60 de las cámaras cilíndricas 26 desde el exterior del tanque 14.

[0077] Las cámaras cilíndricas 26 están adaptadas para ser llenadas con fluido. En una primera disposición, la cámara cilíndrica 26 puede ser llenada con el fluido incluido en la cámara principal 18. En esta primera disposición, las cámaras cilíndricas 26 comprenden puertos 57 para permitir la entrada del fluido mientras la cámara principal 18 está siendo llenada con el fluido.

[0078] En una segunda disposición, las cámaras cilíndricas 26 pueden ser llenadas con fluido que no está contenido en la cámara principal 18. En esta segunda disposición, los extremos inferiores 38 de las cámaras cilíndricas 26 incluyen la pluralidad de entrada y salidas 28. El fluido es suministrado en la cámara cilíndrica 26 a través de las cañerías exteriores 62 ubicadas en la parte inferior del tanque 14 (ver, por ejemplo, figuras 6 y 7). Las cañerías exteriores 62 comprenden una pluralidad de conductos 64 conectados de manera fluida con las entradas y salidas 28 del extremo inferior 38 de las cámaras cilíndricas 26.

[0079] Según mencionó anteriormente, existen dos disposiciones del tanque 14 en conformidad con la presente modalidad de la invención. En una primera disposición, la cámara principal 18 y las cámaras cilíndricas 26 están conectadas de manera fluida a través de puertos 57 incorporados en las paredes laterales de la cámara cilíndrica 26. Así, las cámaras cilíndricas 26 se llenan durante el proceso de llenado de la cámara principal 18 con el fluido de la cámara principal 18. De manera alternativa, el tanque 14 puede ser llenado al abrir las puertas 41 de las cámaras internas 26 y suministrar el fluido a través de los extremos superiores 40 de las cámaras internas 26. Esto permite llenar las cámaras internas 26 simultáneamente con la cámara principal 18. La cámara principal 18 se llena a medida que el fluido ingresa en las cámaras internas 26 debido a

que, según se mencionó anteriormente, la cámara interna 26 comprende puertos 57 que conectan de manera fluida el interior de las cámaras internas 26 con la cámara principal 18.

[0080] En la segunda disposición, la cámara principal 18 no está conectada de manera fluida a las cámaras cilíndricas 26. En esta segunda disposición, las cámaras cilíndricas 26 y la cámara principal 18 se llenan con diferentes fluidos. Esta disposición permite llenar la cámara principal 18 con un fluido diferente al fluido o fluidos con el cual se están llenando las cámaras cilíndricas 26.

[0081] La figura 5 muestra la primera disposición del tanque 14 en conformidad con la presente modalidad de la invención. Según se mencionó anteriormente, en la primera disposición del tanque 14, las cámaras cilíndricas 26 están conectadas de manera fluida a la cámara principal 18. Cada una de las cámaras cilíndricas 26 comprende al menos un puerto para permitir la entrada en cada cámara cilíndrica 26 del fluido con el cual se está llenando la cámara principal 18. Los puertos 57 proporcionan la comunicación de fluido entre la cámara principal 18 y el interior de cada una de las cámaras cilíndricas 26. La primera disposición es particularmente ventajosa para almacenar y transportar un único fluido. Por ejemplo, la primera disposición del tanque 14 puede usarse como un tanque de agua 14. En esta disposición, el área de servicio 32 puede omitirse. En su lugar, una barra 90 que comprende al menos un pulverizador de agua 92 puede ser fijada al extremo posterior del tanque 14. Los pulverizadores de agua están conectados de manera fluida con la cámara principal 18. Esto permite suministrar el fluido contenido en la cámara principal 8 al los pulverizadores de agua para, por ejemplo, pulverizar sobre la tierra para reducir la presencia de polvo en el aire. La figura 15 muestra un tanque de agua 14 en conformidad con una disposición particular de la presente modalidad de la invención.

[0082] En la segunda disposición del tanque 14, la cámara principal 18 se llena con fluido independientemente de las cámaras cilíndricas 26. La cámara principal 18 se llena con cañerías exteriores 62 incluidas en la cámara principal 18. El fluido a almacenar en las cámaras cilíndricas 26 es suministrado en cada una de las cámaras cilíndricas 26 a través de cañerías exteriores 62 localizadas en la parte inferior del tanque 14 (ver, por ejemplo, figura 6). Las cámaras internas 26 también pueden ser llenadas con el fluido a través de los extremos superiores 40 de las cámaras internas.

[0083] Según se mencionó anteriormente, la segunda disposición permite llenar la cámara principal 18 independientemente de las cámaras cilíndricas 26. Esto permite llenar la cámara principal 18 con un fluido diferente al fluido con el cual se llenarán las cámaras cilíndricas 26. De manera similar, las cámaras cilíndricas 26 pueden ser llenadas independientemente con respecto a la otra. De esta manera, las cámaras cilíndricas 26 pueden llenarse con diferentes fluidos.

[0084] El hecho que las cámaras cilíndricas 26 puedan ser llenadas con diferentes fluidos con respecto a la otra es particularmente ventajoso. Por ejemplo, la cámara principal 18 puede ser llenada con combustible y las cámaras cilíndricas 26 pueden ser llenadas con diferentes tipos de fluidos como aceite para motores o fluidos hidráulicos. De esta manera, el tanque 14 en conformidad con la segunda disposición puede ser incorporado en camiones de mantenimiento 10 para proporcionar combustible y los diferentes tipos de fluidos, por ejemplo, a vehículos.

[0085] Según se menciona anteriormente, las cámaras cilíndricas 26 pueden ser llenadas al abrir las puertas 41 para suministrar el fluido a través de los extremos superiores 40 de las cámaras internas. De manera alternativa, el llenado de las cámaras cilíndricas 26 es realizado a través de cañerías exteriores 62 ubicadas en la parte inferior del tanque 14. Según se muestra en la figura 6, las cañerías exteriores 62 se extienden desde la parte posterior del tanque 14 hasta cada una de las cámaras cilíndricas 26. Las cañerías exteriores 62 están ubicadas entre las vigas de soporte 30 del tanque 14 y están centradas en la parte inferior del tanque 14. Las cañerías exteriores 62 comprenden un colector 69 que comprende una pluralidad de conductos 64. Los conductos 64 para una respectiva cámara cilíndrica 26 están conectados de manera fluida a la entrada y salidas inferiores 28 de la respectiva cámara cilíndrica 26.

[0086] Los conductos 64 se extienden longitudinalmente desde la parte posterior del tanque 14 hasta la respectiva cámara cilíndrica 26. En particular, para cada cámara cilíndrica 26 existen tres conductos 64 que se extienden entre las vigas de soporte 30 y se desvían perpendicularmente hacia el extremo inferior 38 de la respectiva cámara cilíndrica 26 (ver figura 6). Para esto, las vigas 30 incluyen aberturas 66 que permiten que los conductos 64 atraviesen las vigas 30 y extenderse en la respectiva hendidura 60 para conectarse con las entradas y salidas 28 de la cámara cilíndrica 26 a la cual los conductos 64 están fijados de manera fluida.

[0087] Ahora nos referimos a las figuras 9 y 10. Se debería tener en cuenta que las figuras 9 y 10 son solo esquemáticas. En la disposición particular mostrada en las figuras 9 y 10, los conductos 64 están conectados de manera fluida con cuatro cámaras internas 26. Sin embargo, otra disposición en conformidad con la presente invención puede incluir conductos 62 y 64 que están conectadas de manera fluida con todas las cámaras internas.

[0088] Como se muestra en las figuras 9 y 10, los conductos 62 y 64 se extienden hasta el lado interno de las vigas 30. En el lado externo de las vigas, opuesto a los conductos 62 y 64 están los conductos 65. En esta disposición, los conductos 65 están conectados de manera fluida con las cámaras internas 26 y con los conductos 64 y 62 del colector 69. Un extremo de los conductos 65 está conectado de manera fluida con la cámara interna 26 y otro extremo de los conductos 65 está conectado de manera fluida con los conductos 64 y 62. En las figuras 9 y 10, la conexión entre los conductos 64 y 62 con los tubos 67. Los tubos 67 atraviesan la viga 30 a través de las aberturas 66 de las vigas 30.

[0089] El colector 69 puede ser un colector prefabricado adaptado para fijarse al extremo inferior del tanque entre las vigas 30. Como se describirá con referencia al método para montar la segunda disposición del tanque 14, el hecho que el colector 69 sea prefabricado facilita el montaje de la segunda disposición del tanque 14.

[0090] Los conductos 64 permiten llenar y vaciar las cámaras cilíndricas 26 con fluido. Según se mencionó anteriormente, los conductos 64 están conectados de manera fluida a mangueras 56 que están ubicadas en el área de servicio 32. La conexión entre las mangueras 56 y los conductos 62 y 64 es realizada a través de un sistema de distribución 71. El sistema de distribución 71 está conectado de manera fluida con los conductos 64 a través de tubos 67 y el sistema de distribución 71 está conectado a las mangueras 56 a través de conductos 73. El sistema de distribución 71 está adaptado para distribuir el fluido desde las cámaras internas 67 hasta las mangueras 56 y vice versa.

[0091] En conformidad con la presente modalidad de la invención, los tubos 67 que se conectan fluidamente con los conductos 62 y 64 con los conductos 64 así como los conductos 62 y 64 con el sistema de distribución 71 tienen todos la misma longitud. Para que todos los tubos 67 tengan la misma longitud, la dimensiones del colector

(incluyendo los conductos 62 y 64) y de los conductos 73 están configurados de manera que después de instalar el colector 69 y los conductos 73 en conjunto con el sistema de distribución 71, la conexión fluida con estos elementos (conductos 62 y 64, sistema de distribución 71 y conductos 73) se realiza a través de tubos 67 que tienen todos la misma longitud. En una disposición particular de la presente modalidad de la invención, los tubos tienen una longitud de 400 mm.

[0092] En disposiciones alternativas de la presente modalidad de la invención, el sistema de distribución 71 puede omitirse. En su lugar, hay cuatro conductos adicionales 73 que en conjunto con los conductos 73 mostrados en la figura 10 definen un conjunto de 8 conductos 73 que están conectados de manera fluida con las mangueras 56 del área de servicio. En esta disposición particular, cada uno de los ocho conductos 73 está conectado de manera fluida a uno de los conductos 62 y 64 a través de los tubos 67. Según se mencionó anteriormente, los conductos 62, 64 y 73 están configurados de manera que los tubos 67 que conectan los conductos 62 y 64 con los conductos 73 sean todos del mismo tamaño. En una disposición particular de la presente modalidad de la invención, los tubos tienen una longitud de 400 mm.

[0093] El hecho que los tubos 67 sean todos de la misma longitud es particularmente ventajoso. Esto es debido a que el tamaño de los tubos para conectar fluidamente los conductos 62, 64 y 73 es estandarizado. Así, durante el mantenimiento y reparación, el personal solo necesita tener tubos que tienen el mismo tamaño. Esto facilita el procedimiento de mantenimiento y reparación en vista que no es necesario tener una pluralidad de tubos de diferente longitud y no se pierde tiempo al decidir qué tubo de longitud específica es apropiado para la conexión fluida con cualquiera de los conductos 62, 64 y 73 y el sistema de distribución 71 con respecto al otro.

[0094] El área de servicio 32 comprende una pluralidad de carretes 59 que incorpora las mangueras 56 (ver figura 11). Las mangueras 56 están adaptadas para conectarse fluidamente a los conductos 64 para permitir el llenado de las cámaras cilíndricas 26 del tanque 14 así como para suministrar el fluido almacenado en el tanque 14. Los conductos 92 permiten 92 permiten comunicar de manera fluida las mangueras 56 con las cámaras cilíndricas 26. El medio de filtración 94 puede proporcionarse para filtrar el fluido almacenado en el tanque 14. El área de servicio 32 comprende aberturas 34 que permiten el acceso al interior del área de servicio 32. Los carretes 59 para almacenar

las mangueras 56 están dispuestas de manera que las mangueras 56 puedan accederse desde las aberturas 34. El área de servicio 32 puede incluir además paneles de control 94 para controlar y monitorear el llenado y vaciado del tanque 14 y las cámaras internas 26 así como el suministro de fluidos a través de las mangueras 56 (ver figura 16).

[0095] Ahora en referencia a la figura 12, el área de servicio 32 está incorporada en un accesorio 20 adaptado para estar fijado al extremo posterior inferior del tanque 14. El accesorio 20 comprende un marco 68 cubierto por láminas 70 que definen el área de servicio 32. Las láminas 70 rodean el marco 68 de manera de definir el área de servicio 32. Hay una lámina frontal 72, dos láminas laterales 74 y una lámina posterior 76. Las láminas laterales 74 y la lámina posterior 76 incluye aberturas para proporcionar acceso al interior del área de servicio 32. Las aberturas pueden incluir puertas para sellar el interior del accesorio 20. La lámina frontal 72 tiene una configuración curva con el fin de poder ajustarse al extremo inferior posterior del tanque 14 para evitar interferencia con las ruedas 16 durante el movimiento del camión 10 que incorpora el tanque 14.

[0096] El accesorio 20 está adaptado para ser fijado a la parte inferior posterior del tanque 14 mostrado en la figura 13. Para esto, según se muestra en la figura 12, el marco 68 del accesorio 20 incluye una viga superior 78 a la que están fijadas las vigas longitudinales 30 (fijadas a la parte inferior del tanque 14, ver figura 5). La lámina frontal 78 del espacio incluye hendiduras 80 adaptadas para recibir las vigas longitudinales 30. Las partes curvas 82 se proporcionan en cada esquina superior del accesorio 20 adaptado para contactar los bordes redondos inferiores del tanque 14 durante el ajuste del accesorio 20 al extremo inferior posterior del tanque 14. En conformidad con la presente modalidad de la invención, el accesorio 20 es un accesorio prefabricado que puede ser fijado al extremo inferior del tanque 14 durante la fabricación de la segunda disposición del tanque 14. La figura 17 muestra el proceso de fijar el accesorio 20 a la parte inferior del tanque 14. Según se describirá con referencia al método para montar la segunda disposición del tanque 14, el hecho que el accesorio 20 sea prefabricado facilita el montaje de la segunda disposición del tanque 14.

[0097] Una modalidad de la invención incluye además un método para montar el tanque 14 en conformidad con la primera y segunda disposición del tanque 14.

[0098] EL método para fabricar la primera y segunda disposición del tanque 14 comienza proporcionando una estructura 84 del tanque 14 como se muestra en la figura 4. La estructura del tanque 84 comprende un cuerpo interior 86 que define la cámara principal 18. La pluralidad de cámaras cilíndricas 26 están incorporadas dentro del cuerpo interior 85 de la estructura del tanque 84 según se ha descrito previamente. La estructura del tanque 84 comprende las vigas de soporte longitudinales 30 para permitir la fijación del tanque 14 al chasis del camión 10.

[0099] Es particularmente ventajoso fabricar la estructura del tanque 84 según se describe en los párrafos anteriores. Esto es debido a que se puede usar el mismo tipo de estructura del tanque 84 para fabricar cualquiera de las disposiciones del tanque 14 en conformidad con la presente modalidad de la invención.

[00100] Con el fin de fabricar la primera disposición del tanque 14, las cámaras cilíndricas 26 necesitan adaptarse para permitir la entrada de fluido dentro de la cámara cilíndrica 26. Lo anterior se logra, por ejemplo, al cortar puertos 57 en las paredes laterales de las cámaras cilíndricas 26 (ver figura 9). Los puertos 57 permiten que el fluido ingrese a las cámaras cilíndricas 26 a medida que la cámara principal 18 es llenada con fluido. Luego de cortar los puertos 57 en la pared lateral, el tanque 14 se sella al ubicar la parte superior en el tanque 14.

[00101] En esta etapa, el accesorio de servicio 20 puede ajustarse al extremo inferior posterior del tanque 14. El accesorio 20 incluye los carretes 59 para sostener las mangueras 56 que están conectadas de manera fluida al interior del tanque 14. La conexión de fluido se logra al conectar las mangueras 56 a las entradas/salidas 58 y 59 de la cámara principal 18 del tanque 14. Las mangueras 56 permiten el llenado y extracción del fluido dentro de la cámara principal 18 y la cámara cilíndrica 26 del tanque 14.

[00102] Alternativamente, según se menciona anteriormente, una barra 90 que incorpora al menos un pulverizador de agua 92 puede estar fijado al extremo posterior del tanque 14. En esta disposición particular, las entradas/salidas 58 y 59 están conectadas de manera fluida a la barra que incorpora los pulverizadores de agua.

[00103] Para fabricar la segunda disposición del tanque 14, no se corta ningún puerto 57 en las paredes laterales de las cámaras cilíndricas 26. En su lugar, se cortan

entradas y salidas 28 en los extremos inferiores 38 de las cámaras cilíndricas 26. Luego que se han cortado las salidas y las entradas 28, las cañerías externas 62 son conectadas a la parte inferior del tanque 14 y conectadas de manera fluida a las cámaras cilíndricas 26 a través de las salidas y entradas 28. Según se mencionó anteriormente, las cañerías externas 62 incluyen un colector prefabricado 69 que está fijado entre las vigas 30 en la parte inferior del tanque 14. El hecho que el colector sea un colector prefabricado es particularmente ventajoso porque facilita y reduce el tiempo requerido para conectar las cañerías externas 62 a diferencia que si cada uno de los conductos 64 necesitara estar fijado separadamente al extremo inferior del tanque 14.

[00104] En esta etapa, el accesorio 20 que proporciona el área de servicio 32 está fijado al tanque 14 y las cañerías externas 62 están conectadas de manera fluida a las mangueras 56 dentro del área de servicio 32 (ver figura 17). Lo anterior permite la extracción del fluido desde las cámaras cilíndricas 26 o llenado de las cámaras cilíndricas 26 a través de mangueras 56. Además, las aberturas 54, 58 y 59 de la cámara principal 18 están conectadas de manera fluida a las respectivas mangueras 56 dentro del accesorio de servicio 20 para permitir el vaciado o llenado de la cámara principal 18. Entonces, el tanque 14 puede ser sellado al fijar la parte superior en la parte superior del tanque 14.

[00105] Con referencia a la figura 10, el colector 69 está conectado de manera fluida a los conductos 92 del área de servicio 32. En esta manera, el fluido puede ser suministrado a las cámaras internas 26 así como recibido desde las cámaras internas 26.

[00106] Luego de la fabricación de ya sea la primera o la segunda disposición del tanque 14, el tanque 14 es montado en el chasis del camión 10. En esta etapa se pueden agregar características adicionales como una barrera 24 que rodea la parte superior del tanque 14.

[00107] Es evidente que la presente modalidad de la invención proporciona un método útil y eficiencia para montar la primera y segunda disposición del tanque 14. El hecho que la estructura del tanque 84 comprenda al menos una cámara interna 26 (las cámaras cilíndricas 26) dentro de la cámara principal 18 del tanque 14 es particularmente ventajoso porque permite usar la estructura del tanque 84 ya sea para la primera o la segunda disposición.

[00108] Otra ventaja de la presente modalidad de la invención es que la inclusión de al menos una cámara interna 26 dentro de la cámara principal 18 reduce el movimiento del fluido ubicado dentro de la cámara principal 18 durante el transporte del fluido. Lo anterior debido a que las cámaras internas 26 actúan como obstáculos para el movimiento del fluido ubicado dentro de la cámara principal 18 a medida que el camión se mueve. Esto es particularmente cierto debido a que, en conformidad con la presente modalidad de la invención, las cámaras internas 26 están ubicadas en su totalidad dentro de la cámara principal 18 del tanque 24.

[00109] Otras ventajas son los hechos que el acceso a las cámaras internas 26 así como a las cañerías externas 62 se proporciona a través del fondo del tanque 14. En esta manera, el tanque 14 y los conductos externos 62 (en vista que los conductos 62 escondidos dentro del tanque 14) se les puede hacer mantenimiento desde el fondo del tanque. Así, no hay necesidad de acceder desde la parte superior del tanque 14. Así, se reducen los riesgos de lesión durante el mantenimiento del tanque 14.

[00110] Según se mencionó anteriormente, en conformidad con la presente modalidad de la invención, las cámaras internas 26 tienen una configuración cilíndrica. Proporcionar la cámara interna 26 con una configuración cilíndrica es particularmente ventajoso. Lo anterior debido a que la configuración cilíndrica proporciona mayor resistencia a las cámaras internas. Además, el hecho que las cámaras internas 26 tengan una configuración cilíndrica reduce el riesgo de contaminación cruzada de los fluidos ubicados dentro de las cámaras internas 26 y la cámara principal 18. Esto debido a que los cilindros no incluyen esquinas (como es el caso de las formas poligonales) que pueden romperse fácilmente.

[00111] Además, el hecho que las cámaras internas 26 tengan una configuración cilíndrica facilita la determinación de la cantidad de fluido contenido en las cámaras internas 26. De hecho, parece ser que un solo medio sensor es suficiente para medir la cantidad de fluido que ocupa una cámara cilíndrica.

[00112] Adicionalmente, es particularmente fácil para el personal moverse dentro de la cámara principal. Esto debido a que el interior de la cámara principal 18 que incorpora la al menos una cámara interna 26 está dispuesta y fija dentro de la cámara principal 18 de tal forma que el personal puede caminar dentro de la cámara principal 18 con relativa facilidad.

[00113] Además, según se mencionó anteriormente, las cámaras cilíndricas tienen extremos superior e inferior que pueden abrirse simultáneamente. Esta disposición es particularmente ventajosa debido a que permite el acceso al interior de las cámaras internas 26 desde su extremo superior y/o su extremo inferior. Acceder al interior de la cámara interna 26 desde el extremo superior es ventajoso porque permite llenar las cámaras internas 26 desde la parte superior del tanque 14. El hecho que los extremos superior e inferior de las cámaras internas 26 puede abrirse simultáneamente facilita la limpieza de las cámaras internas 26 porque permite introducir mangueras al interior de las cámaras internas 26 desde la parte superior del tanque hacia el extremo inferior de la cámara interna. La configuración cilíndrica de las cámaras internas 26 facilita además el fregado del interior de la cámara interna 26 porque no hay esquinas dentro de las cámaras internas 26.

[00114] Las modificaciones y variaciones que serían evidentes para aquellos expertos en la técnica se consideran dentro del ámbito de la presente invención.

[00115] Además, se debería apreciar que el ámbito de la invención no está limitada al ámbito de las modalidades divulgadas. Por ejemplo, en una disposición particular de la segunda disposición del tanque 14, una o al menos algunas de las cámaras cilíndricas pueden incluir puertos 57 para permitir el llenado con el fluido incluido en la cámara principal 18. Esta disposición es particularmente útil porque permite proporcionar tanques 14 donde las cámaras principales tienen diferentes volúmenes para almacenar el fluido. En ocasiones, se desea que la cámara principal 18 del tanque 14 almacene una cantidad de fluido mayor que la cantidad de fluido que puede ser almacenada en la segunda disposición del tanque 14. Para aumentar el volumen de la cámara principal 18, se cortan puertos 57 en cámaras cilíndricas específicas 26 (ver figura 9). Según se menciona anteriormente, los puertos 57 permiten que el fluido de la cámara principal 18 entre a las cámaras cilíndricas 26. Así, las cámaras cilíndricas 26 en las cuales se han cortados puertos 57 proporcionan un lugar de almacenamiento adicional que para el fluido que va a ser almacenado en la cámara principal. De esta manera, la cámara principal 18 de la segunda disposición del tanque 14 se puede agrandar.

[00116] Además, el ámbito de la invención no está limitada al manejo de fluidos. Otro tipo de materiales podría ser almacenado en la cámara principal 18 y las cámaras

internas 26. Además, la invención no está limitada a tanques adaptados para ser montados en camiones. La presente invención puede ser aplicada a cualquier tipo de contenedor para manejar cualquier tipo de material.

[00117] A lo largo de esta especificación y reivindicaciones, a menos que el contexto requiera lo contrario, la palabra “comprende” o las variaciones como “comprenden” o “que comprenden”, se entenderán que implican la inclusión de un número entero indicado o un grupo de enteros pero no la exclusión de ningún otro entero o grupo de enteros.

[00118] A lo largo de esta especificación, a menos que el contexto requiera lo contrario, la palabra “comprende” o las variaciones como “comprenden” o “que comprenden”, se entenderán que implican la inclusión de un número entero indicado o un grupo de enteros pero no la exclusión de ningún otro entero o grupo de enteros.

REIVINDICACIONES

1. Un tanque para almacenar al menos un fluido, CARACTERIZADO porque comprende una cámara principal y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de la al menos una sub-cámara, donde la al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que al menos una primera ubicación de la superficie exterior pueda accederse desde el interior de la cámara principal y al menos una segunda ubicación de la superficie exterior pueda accederse desde una ubicación exterior a la cámara principal.
2. Un tanque de acuerdo con la Reivindicación 1, CARACTERIZADO porque la cámara principal comprende una superficie exterior que define un volumen interno que contiene la al menos una sub-cámara donde la superficie exterior comprende al menos una abertura adaptada para recibir la al menos una segunda ubicación de la superficie exterior de la al menos una sub-cámara.
3. Un tanque de acuerdo con las Reivindicaciones 1 o 2, CARACTERIZADO porque la al menos una sub-cámara comprende una cámara interna incorporada dentro de la cámara principal.
4. Un tanque de acuerdo con la Reivindicación 3, CARACTERIZADO porque la cámara interna tiene una configuración cilíndrica.
5. Un tanque de acuerdo con las Reivindicaciones 3 o 4, CARACTERIZADO porque la al menos una cámara interna está adaptada y dispuesta dentro de la cámara principal para reducir el movimiento del fluido durante el transporte del fluido dentro del tanque.
6. Un tanque de acuerdo con cualquiera de las Reivindicaciones 3 a 5, CARACTERIZADO porque la cámara interna está dispuesta dentro de la cámara principal de manera que está rodeada en su totalidad por el fluido incorporado dentro de la cámara principal.
7. Un tanque de acuerdo con cualquiera de las Reivindicaciones anteriores, CARACTERIZADO porque el tanque está adaptado para proporcionar fluido a la al menos una cámara interna desde una fuente de fluido exterior a la cámara principal.

8. Un tanque de acuerdo con cualquiera de las Reivindicaciones anteriores, CARACTERIZADO porque la al menos una primera ubicación de la superficie exterior comprende un puerto para permitir la comunicación de fluido entre la cámara principal y la al menos una sub-cámara.
9. Un tanque de acuerdo con cualquiera de las Reivindicaciones anteriores, CARACTERIZADO porque la al menos una segunda ubicación de la superficie exterior comprende una abertura para permitir la comunicación de fluido entre una fuente de fluido exterior a la cámara principal y la al menos una sub-cámara.
10. Un tanque de acuerdo con cualquiera de las Reivindicaciones 3 a 5, CARACTERIZADO porque la al menos una cámara interna comprende un primer y segundo extremos, donde la al menos una cámara interna está dispuesta dentro de la cámara principal de manera que se pueda acceder al primer extremo y al segundo extremo desde el exterior de la cámara principal.
11. Un método para montar un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos, CARACTERIZADO porque el método comprende los pasos de:

proporcionar una estructura del tanque que tiene una cámara principal y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de al menos una sub-cámara, donde al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que al menos una primera ubicación de la superficie exterior pueda accederse desde el interior de la cámara principal y al menos una segunda ubicación de la superficie exterior pueda accederse desde una ubicación exterior a la cámara principal y

proporcionar al menos una abertura dentro de la superficie exterior para permitir el acceso del fluido en al menos una sub-cámara donde al menos una abertura se puede proporcionar ya sea en la al menos una primera ubicación para permitir el acceso de fluido de la cámara principal en la sub-cámara de manera de permitir que el tanque incorpore un solo fluido o la al menos una segunda ubicación para permitir el acceso de fluido desde una fuente de fluido externa a la cámara principal de manera de permitir que el tanque incorpore una pluralidad de fluidos.

12. Un método de acuerdo con la Reivindicación 11, CARACTERIZADO porque comprende además fijar artículos prefabricados al tanque de manera de personalizar el tanque para que sea un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos.
13. Un método de acuerdo con las Reivindicaciones 11 o 12, CARACTERIZADO porque el artículo prefabricado comprende una barra prefabricada para pulverizar agua.
14. Un método de acuerdo con las Reivindicaciones 11 o 12, CARACTERIZADO porque los artículos prefabricados comprenden un colector prefabricado y un accesorio, donde el colector comprende una pluralidad de conductos adaptados para estar conectados de manera fluida con la al menos una segunda ubicación de la superficie exterior y donde el accesorio define un área de servicio adaptada para estar en comunicación fluida con el colector de manera de suministrar y recibir fluido.
15. Un tanque para almacenar al menos un fluido, CARACTERIZADO porque comprende una cámara principal y al menos una sub-cámara, donde la sub-cámara comprende un primer y segundo extremo donde la al menos una cámara interna está dispuesta dentro de la cámara principal de manera que se pueda acceder al primer y segundo extremo desde el exterior de la cámara principal.
16. Un tanque de acuerdo con la Reivindicación 15, CARACTERIZADO porque el primer y segundo extremo se cierran de manera desmontable de manera de permitir la apertura del primer extremo y segundo extremo.
17. Un tanque de acuerdo con las Reivindicaciones 15 o 16, CARACTERIZADO porque el primer y segundo extremo están adaptados para abrirse simultáneamente. Esta disposición es particularmente útil debido a que facilita la limpieza de la al menos una cámara interna al permitir el suministro de fluido de limpieza a través del extremo superior de la cámara interna y la salida del fluido de limpieza a través del extremo inferior de la cámara interna.
18. Un tanque de acuerdo con las Reivindicaciones 16 o 17, CARACTERIZADO porque la al menos una sub-cámara tiene una configuración cilíndrica.

19. Un tanque de acuerdo con cualquiera de las Reivindicaciones 15 a 18, CARACTERIZADO porque la cámara principal comprende un extremo superior y un extremo inferior, donde el primer extremo de la cámara interna está ubicado en el extremo superior y el segundo extremo de la cámara interna está ubicado en el extremo inferior.
20. Un tanque para almacenar al menos un fluido, CARACTERIZADO porque comprende una cámara principal y al menos una sub-cámara, donde la al menos una sub-cámara está incorporada en su totalidad dentro de la cámara principal.
21. Un tanque de acuerdo con la Reivindicación 20, CARACTERIZADO porque la al menos una sub-cámara está adaptada para reducir el movimiento del fluido dentro de la cámara principal.
22. Un tanque de acuerdo con las Reivindicaciones 20 o 21, CARACTERIZADO porque el tanque comprende además un medio para reducir el movimiento del fluido dentro de la cámara principal.
23. Un tanque de acuerdo con la Reivindicación 22, CARACTERIZADO porque el medio para reducir el movimiento del fluido dentro de la cámara principal comprende placas que unen la al menos una cámara con al menos una pared de la cámara principal.
24. Un tanque de acuerdo con cualquiera de las Reivindicaciones 20 a 23, CARACTERIZADO porque existe una pluralidad de sub-cámaras incorporadas dentro de la cámara principal.
25. Un tanque de acuerdo con la Reivindicación 24, CARACTERIZADO porque la pluralidad de sub-cámaras están fijadas entre sí y están fijadas a la pared que define la cámara principal a través del medio para reducir el movimiento del fluido dentro de la cámara principal.
26. Un tanque de acuerdo con cualquiera de las Reivindicaciones 22 a 26, CARACTERIZADO porque el medio para reducir el movimiento del fluido dentro de la cámara principal comprende placas dispuestas en diferentes ubicaciones con respecto a la altura de la pluralidad de sub-cámaras.

27. Un tanque de acuerdo con la Reivindicación 26, CARACTERIZADO porque las placas están fijadas de manera alterna a la parte superior y la parte inferior de las sub-cámaras.
28. Un tanque de acuerdo con cualquiera de las Reivindicaciones 23 a 27, CARACTERIZADO porque los medios para reducir el movimiento del fluido dentro de la cámara principal están adaptados para permitir el movimiento del personal de mantenimiento dentro del tanque.
29. Un tanque adaptado ya sea para incorporar un único primer fluido o para incorporar una pluralidad de fluidos, CARACTERIZADO porque el tanque comprende una estructura del tanque que tiene una cámara principal y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de la al menos una sub-cámara, donde la al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que la primera ubicación de la superficie exterior pueda accederse desde una ubicación exterior a la cámara principal y al menos una abertura dentro de la superficie exterior para permitir el acceso de fluido en la al menos una sub-cámara donde la al menos una abertura está ubicada ya sea en la al menos una primera ubicación para permitir el acceso de fluido de la cámara principal en la sub-cámara de manera de permitir que el tanque incorpore un único fluido o en la al menos una segunda ubicación para permitir el acceso de fluido desde la fuente de fluido externo a la cámara principal de manera de permitir que al tanque incorporar una pluralidad de fluidos.
30. Un tanque de acuerdo con la Reivindicación 29, CARACTERIZADO porque comprende además artículos prefabricados para el tanque de manera de personalizar el tanque para que sea un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos.
31. Un tanque de acuerdo con las Reivindicaciones 29 o 30, CARACTERIZADO porque el artículo prefabricado comprende una barra prefabricada para pulverizar agua.
32. Un tanque de acuerdo con las Reivindicaciones 29 o 30, CARACTERIZADO porque los artículos prefabricados comprenden un colector prefabricado y un

accesorio, donde el colector comprende una pluralidad de conductos adaptados para estar conectados de manera fluida con la al menos una segunda ubicación de la superficie exterior y donde el accesorio define una área de servicio adaptada para estar en comunicación fluida con el colector de manera de suministrar y recibir fluido.

33. Un tanque de acuerdo con la Reivindicación 32, CARACTERIZADO porque, los artículos prefabricados están adaptados de manera que la pluralidad de conductos puedan estar conectados de manera fluida con la al menos una segunda ubicación de la superficie exterior y el colector pueda estar conectado de manera fluida con el área de servicios a través de tubos, donde todos los tubos tienen la misma longitud.
34. Un tanque de acuerdo con la Reivindicación 33, CARACTERIZADO porque la longitud de los tubos es alrededor de 400 mm.
35. Un camión, CARACTERIZADO porque incorpora un tanque de acuerdo con cualquiera de las Reivindicaciones 1, 15, 20 y 29.
36. Un tanque según se describe en la presente con referencia a las figuras de los dibujos adjuntos.
37. Un método para el montaje de un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos según se describe en la presente con referencia a las figuras de los dibujos adjuntos.

Resumen

Un tanque para almacenar al menos un fluido que comprende una cámara principal y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de la al menos una sub-cámara, donde la al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que al menos una primera ubicación de la superficie exterior puede accederse desde el interior de la cámara principal y al menos una segunda ubicación de la superficie exterior puede accederse desde una ubicación exterior a la cámara principal. Además se proporciona un método para la fabricación del tanque.

Título: Cuerpo de un Camión

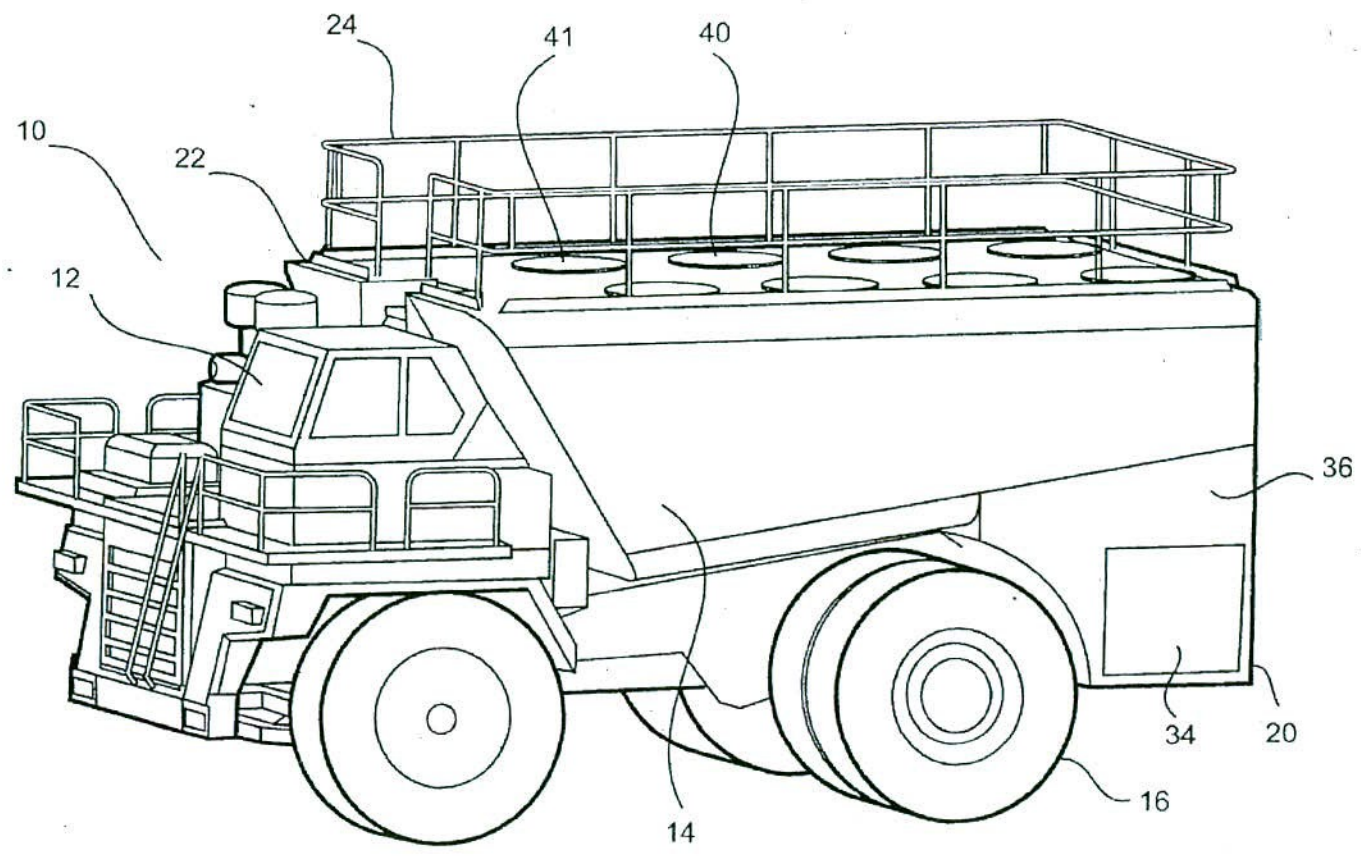


Fig. 1

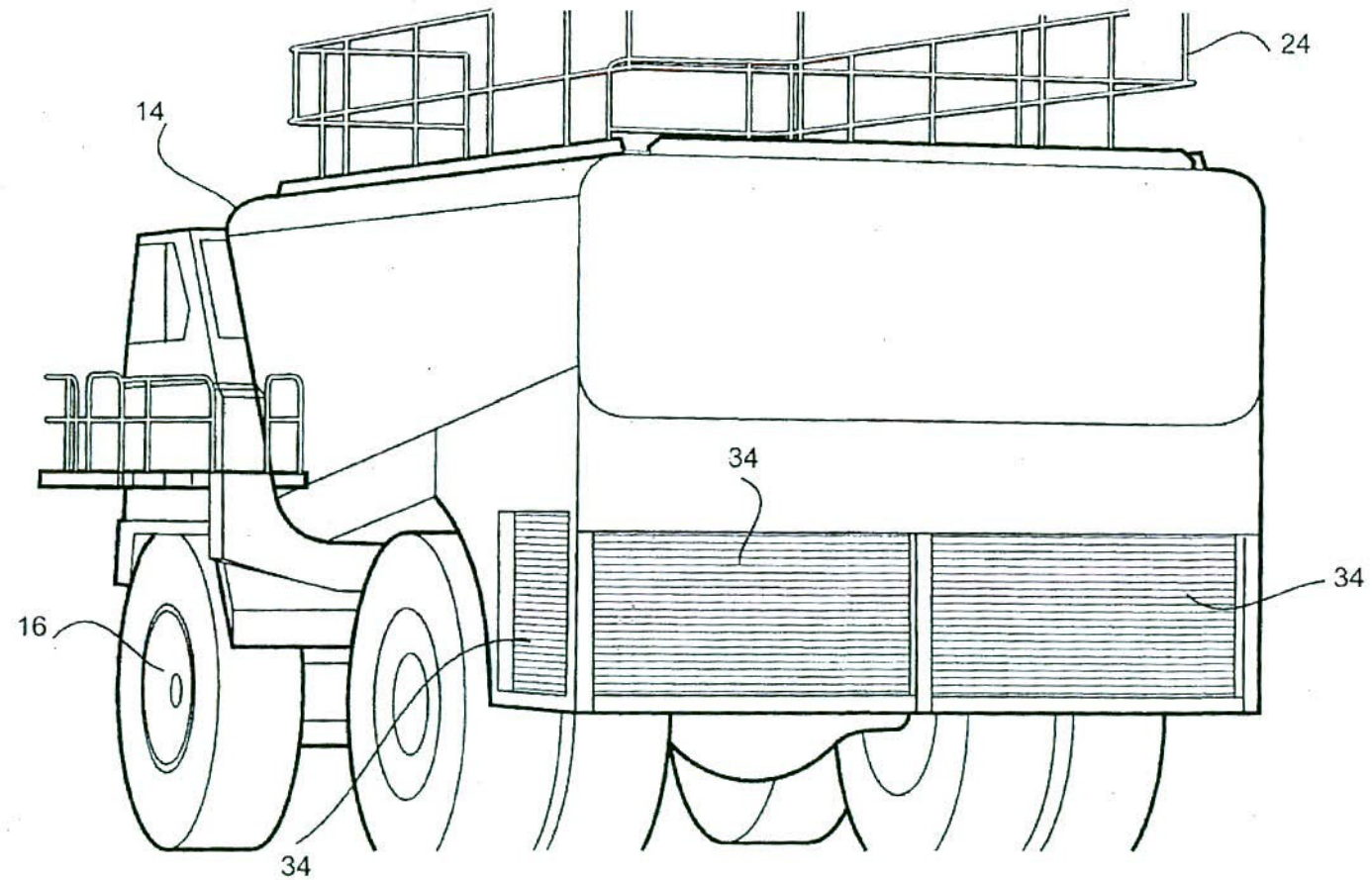


Fig. 2

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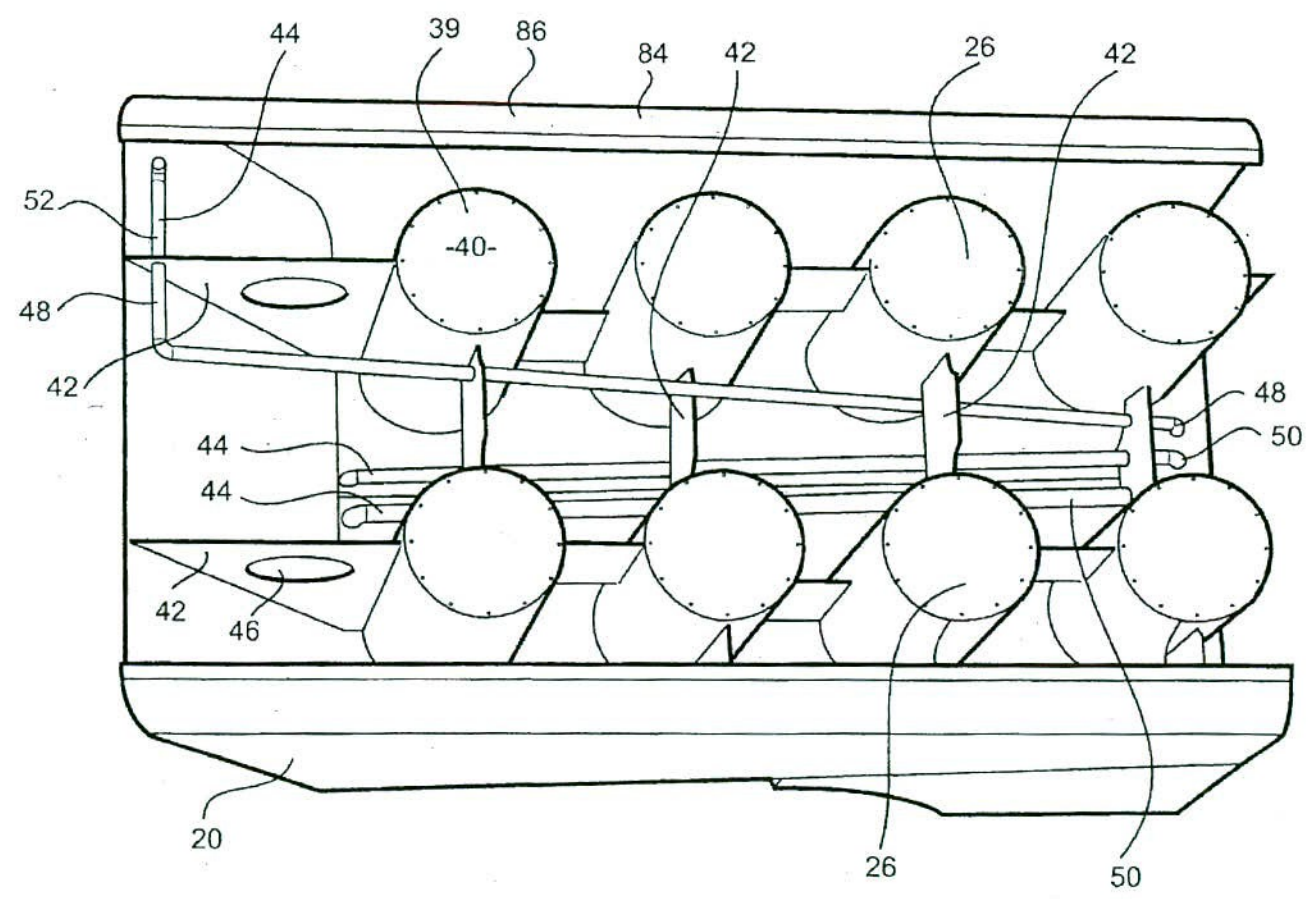


Fig. 4

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WO 2013/082674

PCT/AU2012/001505

5 / 15

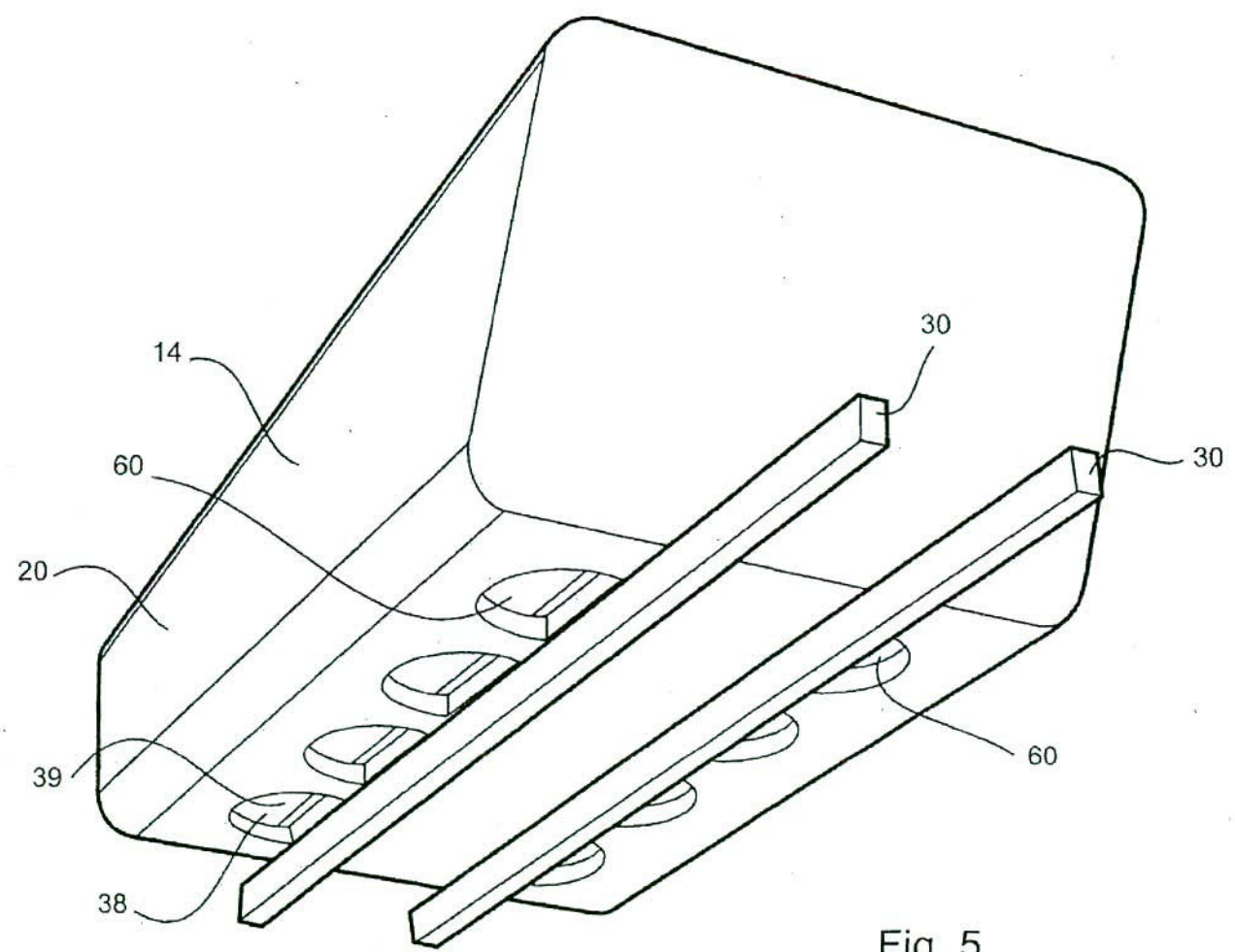


Fig. 5

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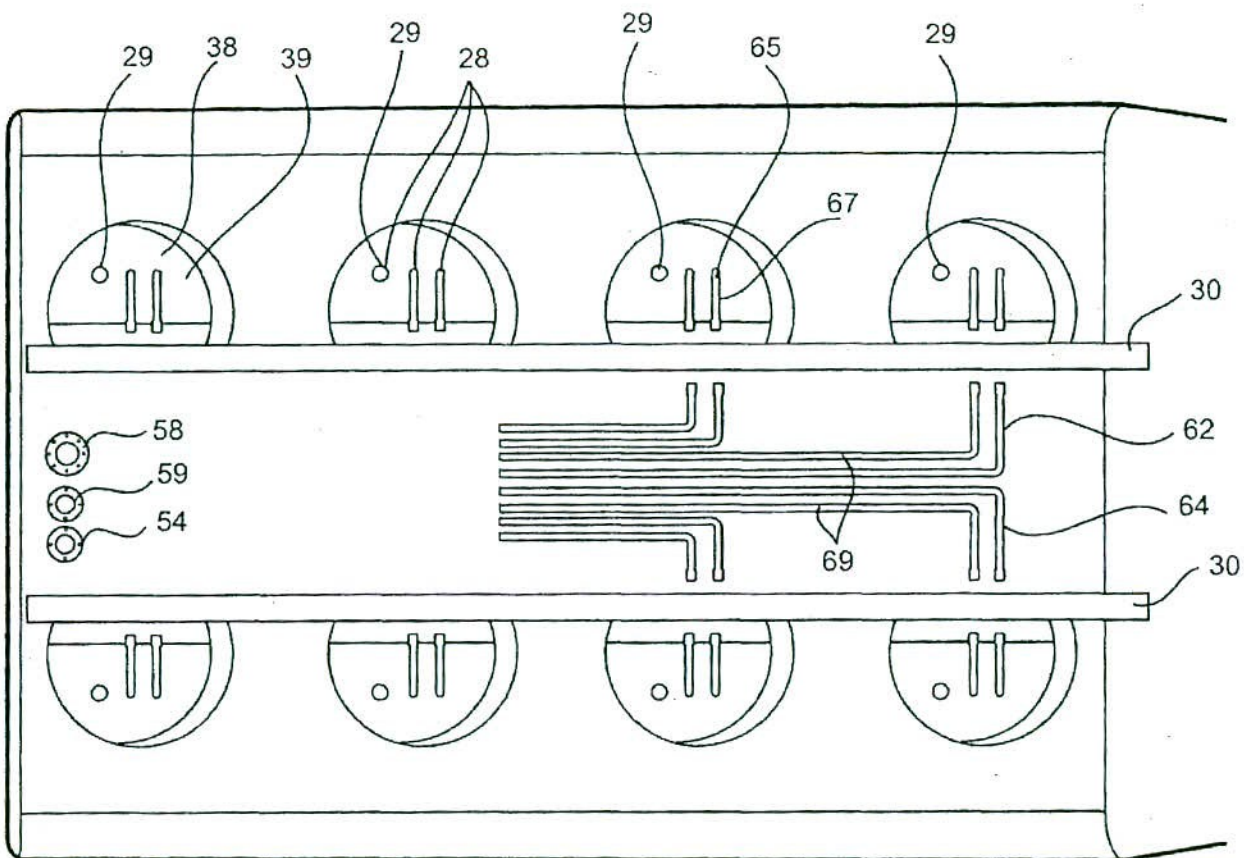
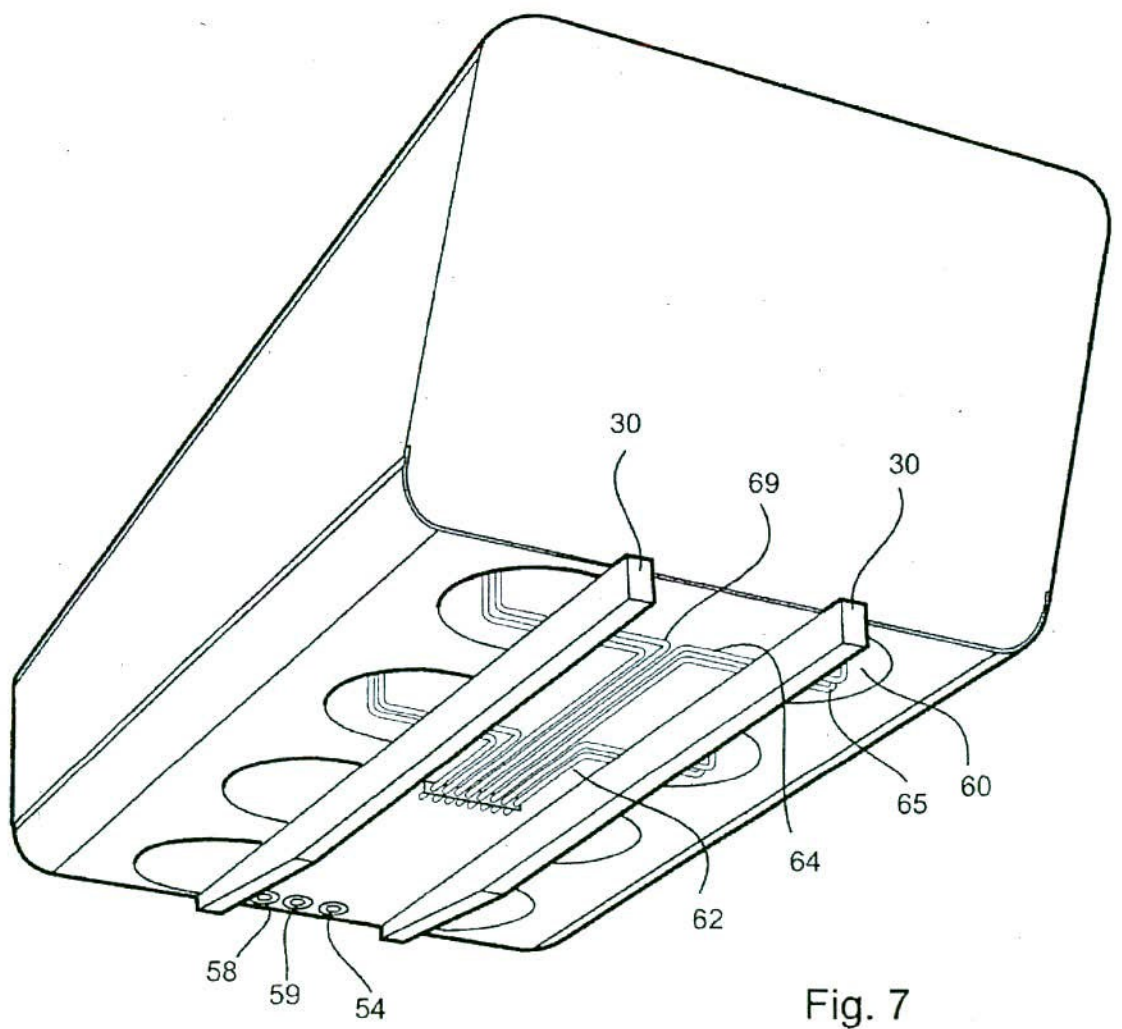


Fig. 6

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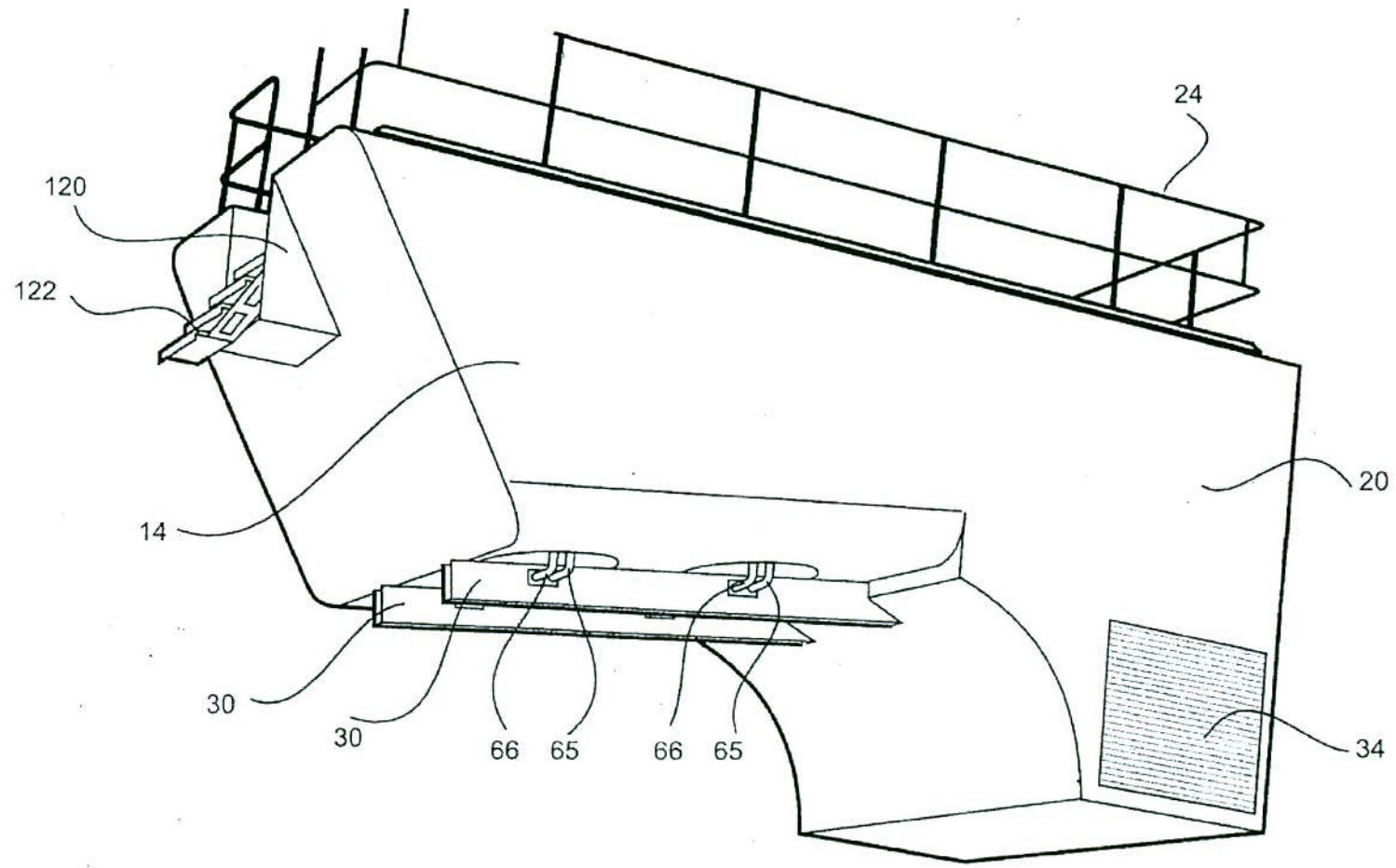


Fig. 8

49

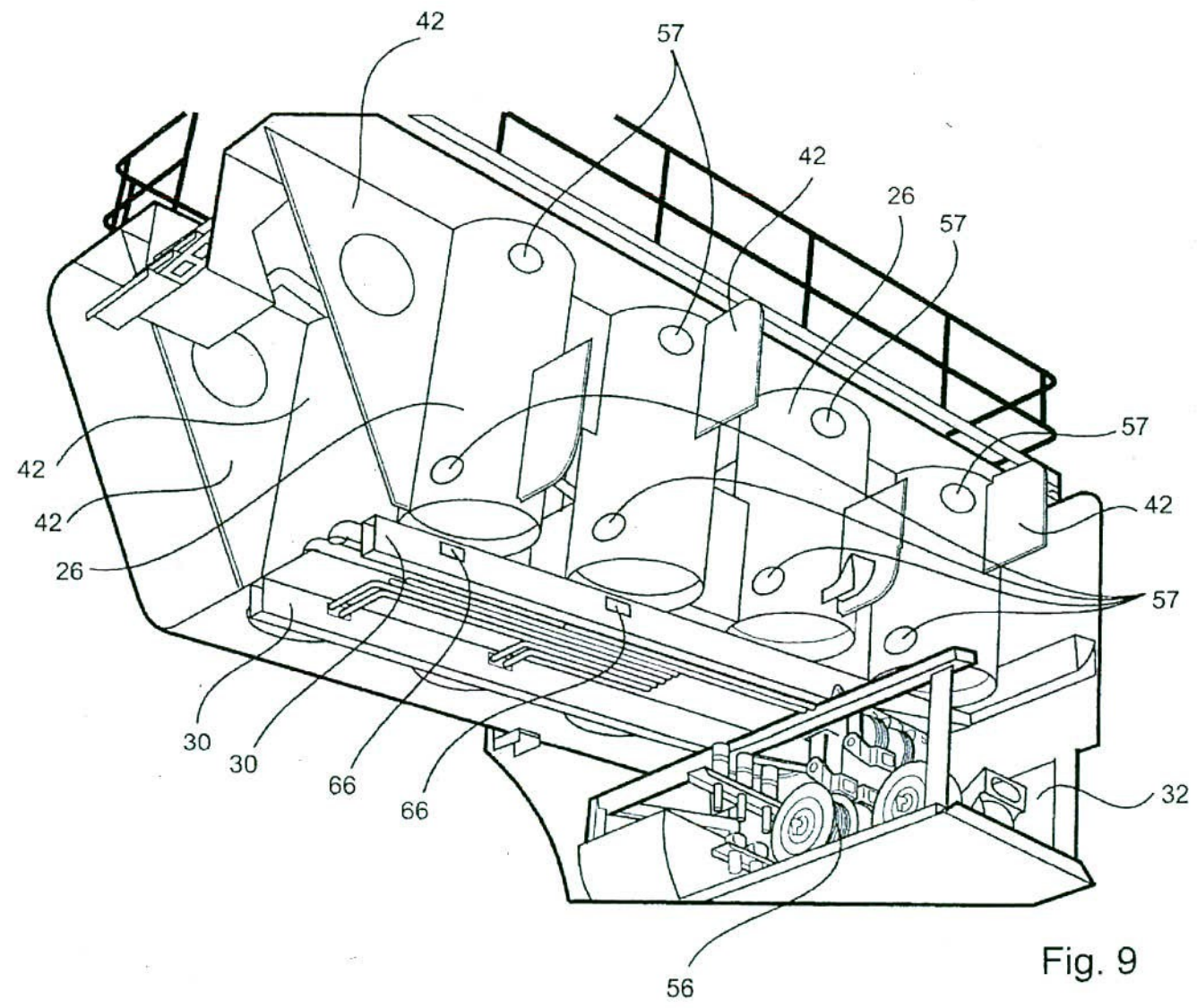


Fig. 9

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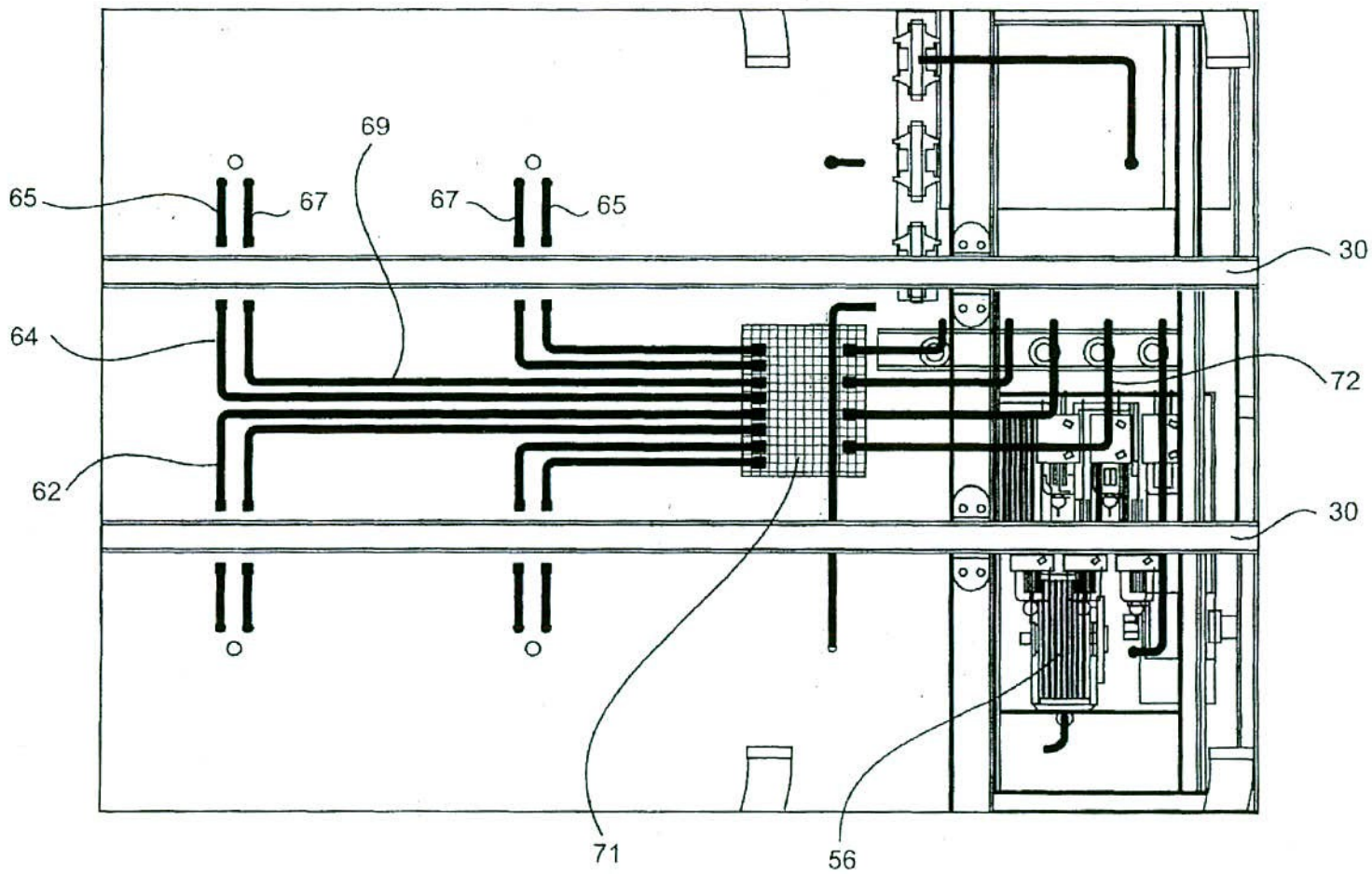


Fig. 10

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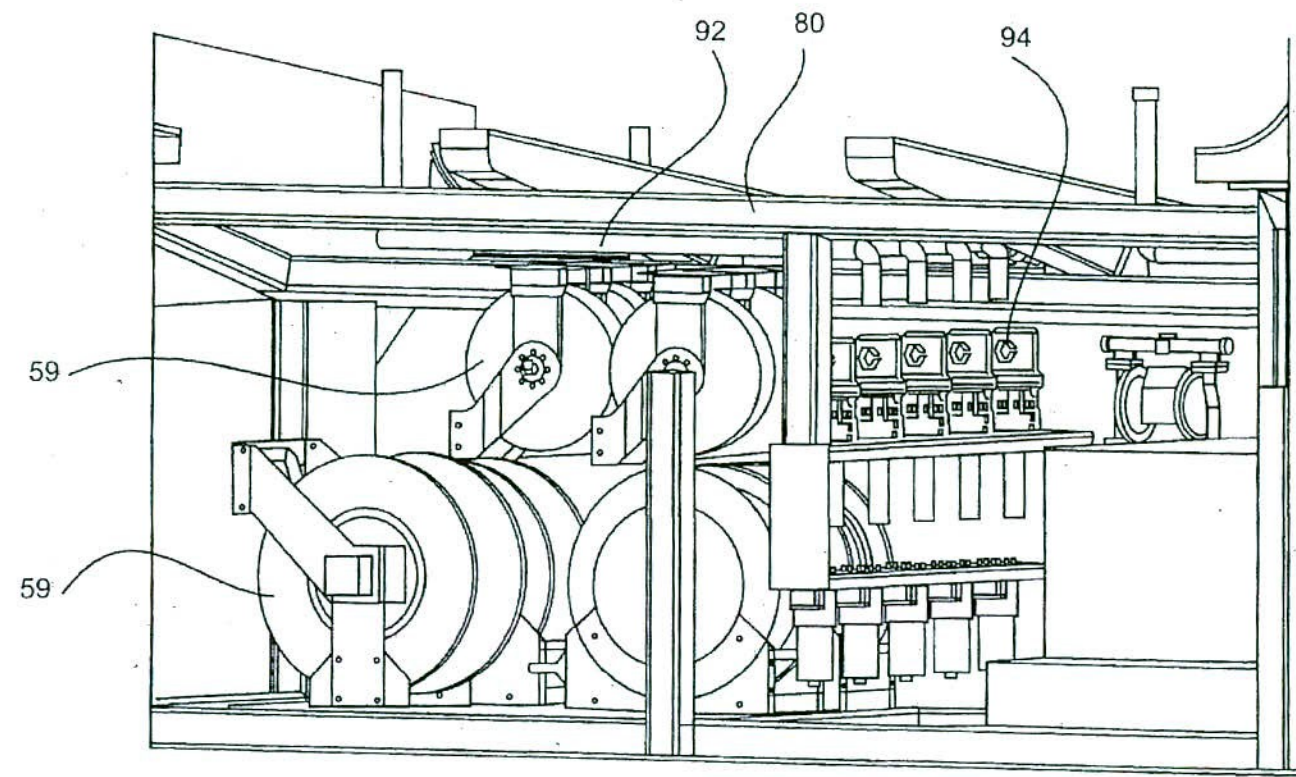


Fig. 11

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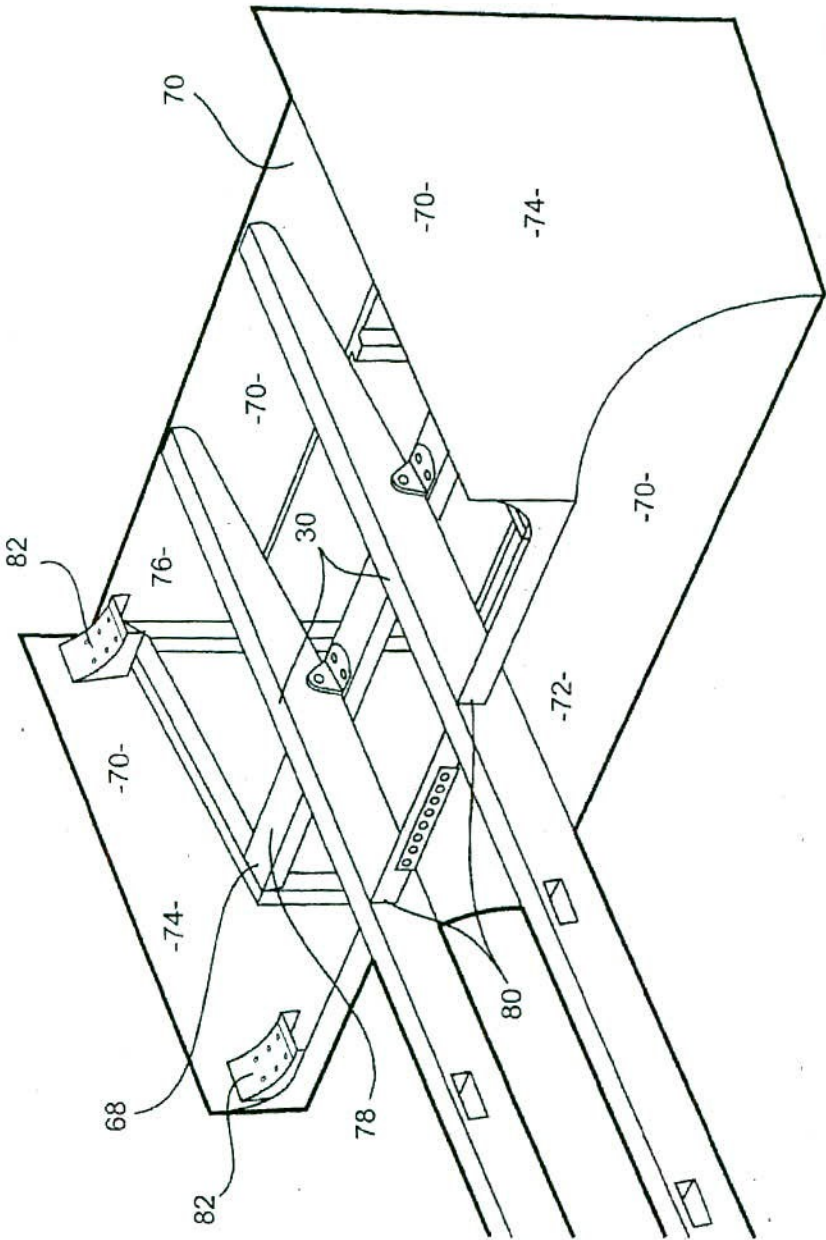


Fig. 12

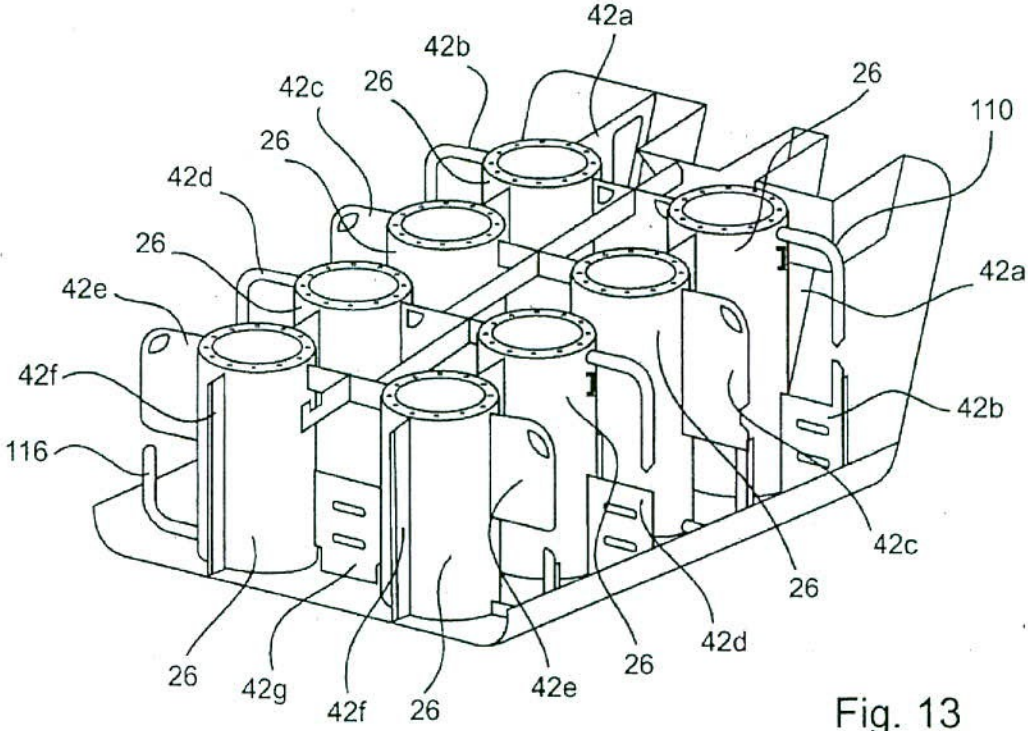


Fig. 13

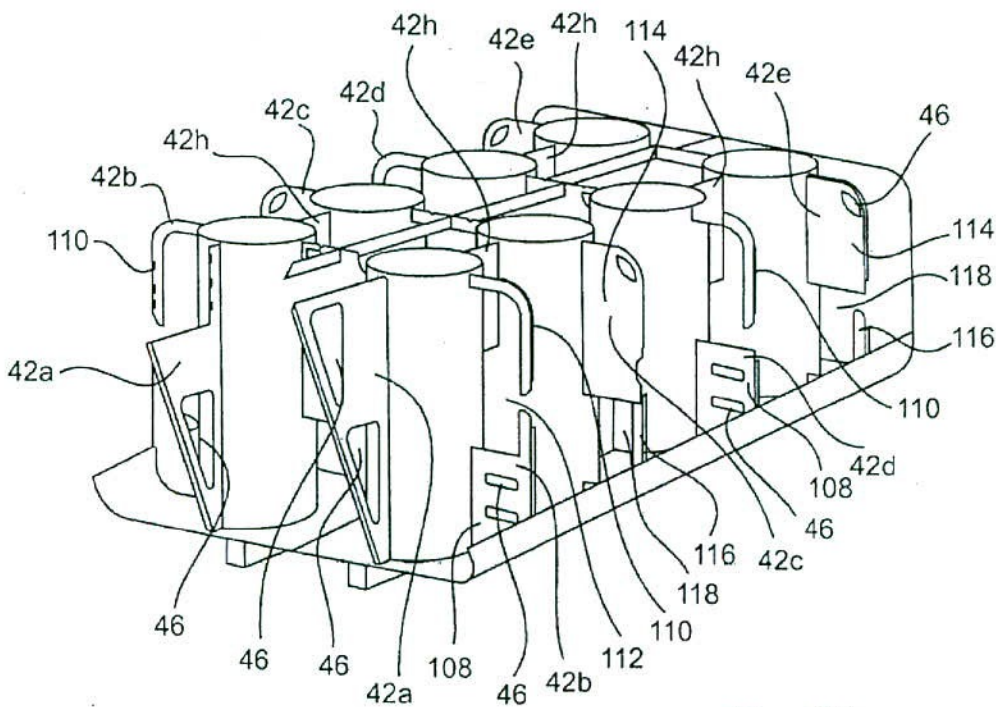


Fig. 14

14 / 15

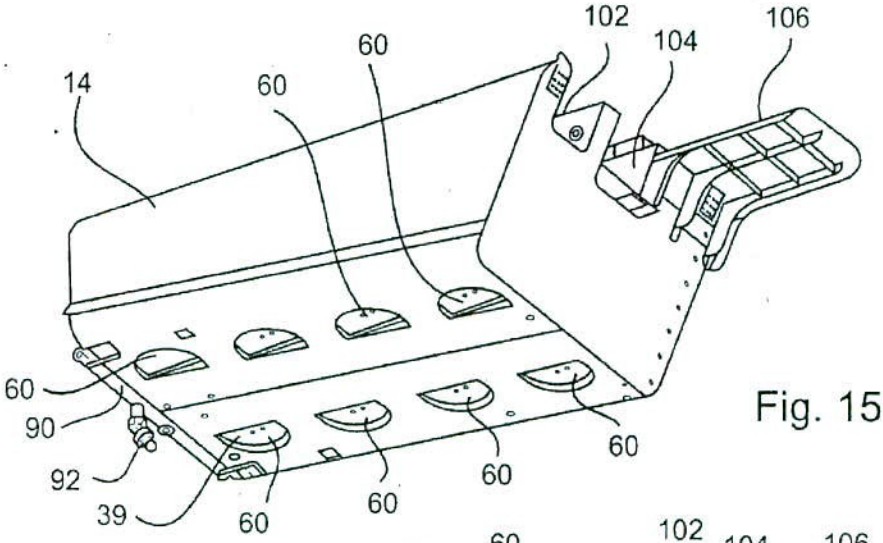


Fig. 15

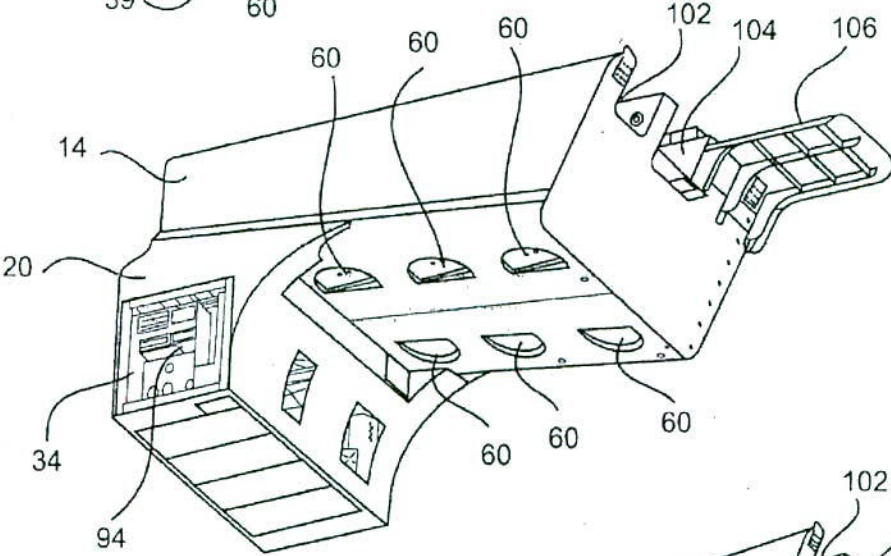


Fig. 16

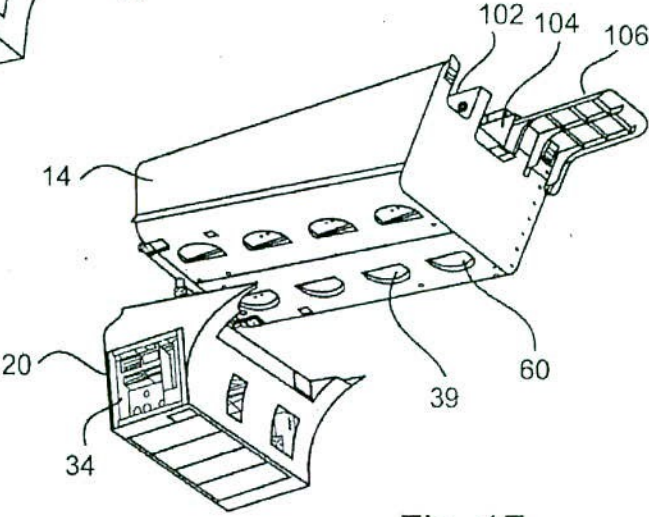


Fig. 17

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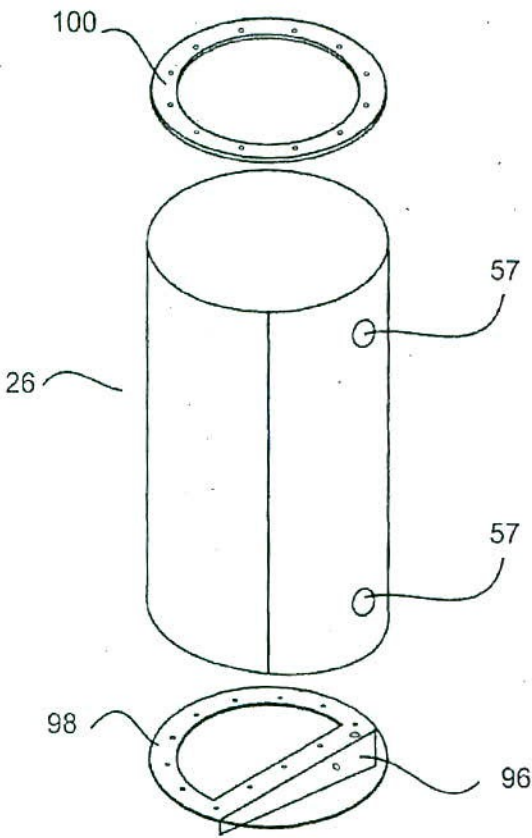


Fig. 18

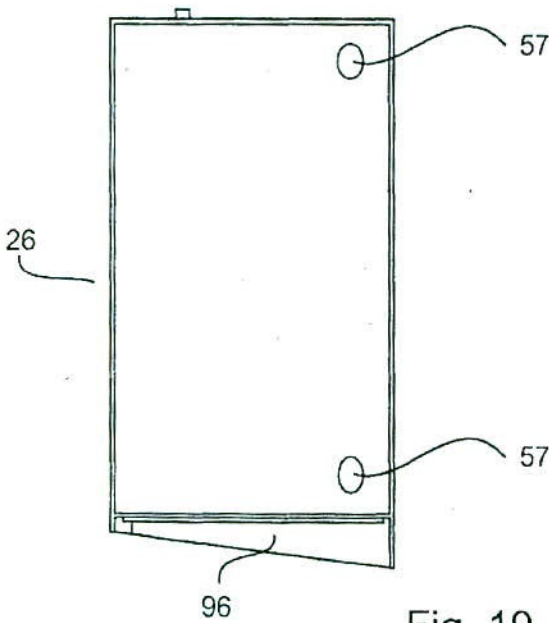


Fig. 19

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To: WRAYS Ground Floor 56 Ord Street , West Perth Western Australia 6005 Australia		PCT NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty) (PCT Rule 71.1)	
Applicant's or agent's file reference 209040		Date of mailing (day/month/year) 28 March 2014	
International application No. PCT/AU2012/001505		International filing date (day/month/year) 06 December 2012	Priority date (day/month/year) 06 December 2011
Applicant GECKO TANKS PTY LTD			

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustalia.gov.au	Authorised officer Hong Yu AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262837946
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514

PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
 (Chapter II of the Patent Cooperation Treaty)
 (PCT Article 36 and Rule 70)

Applicant's or agent's file reference 209040	FOR FURTHER ACTION		See Form PCT/IPEA/416																								
International application No. PCT/AU2012/001505	International filing date <i>(day/month/year)</i> 06 December 2012	Priority date <i>(day/month/year)</i> 06 December 2011																									
International Patent Classification (IPC) or national classification and IPC B65D 90/00 (2006.01) B60P 3/24 (2006.01)																											
Applicant GECKO TANKS PTY LTD																											
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 7 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ <i>(sent to the applicant and to the International Bureau)</i> a total of 70 sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications not taken into account by this Authority because they were not available at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ Superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ <i>(sent to the International Bureau only)</i> a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3bis of Annex C of the Administrative Instructions).																											
4. This report contains indications relating to the following items: <table style="width: 100%; border: none;"> <tr> <td style="width: 10%;">☒</td> <td style="width: 20%;">Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td>☐</td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td>☒</td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td>☒</td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td>☒</td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td>☐</td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td>☐</td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td>☐</td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>				☒	Box No. I	Basis of the report	☐	Box No. II	Priority	☒	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	☒	Box No. IV	Lack of unity of invention	☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement	☐	Box No. VI	Certain documents cited	☐	Box No. VII	Certain defects in the international application	☐	Box No. VIII	Certain observations on the international application
☒	Box No. I	Basis of the report																									
☐	Box No. II	Priority																									
☒	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability																									
☒	Box No. IV	Lack of unity of invention																									
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement																									
☐	Box No. VI	Certain documents cited																									
☐	Box No. VII	Certain defects in the international application																									
☐	Box No. VIII	Certain observations on the international application																									
Date of submission of the demand 07 October 2013		Date of completion of this report 28 March 2014																									
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustalia.gov.au Facsimile No.: +61 2 6283 7999		Authorised officer Hong Yu AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. 0262837946																									

58 68

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2012/001505

Box No. I	Basis of the report
1.	With regard to the language, this report has been established on the basis of: ☒ The international application in the language in which it was filed: ☐ A translation of the international application into , which is the language of a translation furnished for the purposes of : ☐ international search (under Rules 12.3(a) and 23.1 (b)). ☐ publication of the international application (under Rule 12.4(a)). ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a) and (b)).
2.	With regard to the elements of the international application, this report is based on <i>(replacement sheets which have been furnished to the receiving office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)</i>: ☐ the international application as originally filed/furnished ☒ the description: pages , as originally filed/furnished pages 1-24 , received by this Authority on 08 November 2013 with the letter of 08 November 2013 pages , received by this Authority on with the letter of ☒ the claims: pages , as originally filed/furnished pages , as amended (together with any statement) under Article 19, pages 25-30 , received by this Authority on 12 March 2014 with the letter of 12 March 2014 pages , received by this Authority on with the letter of ☒ the drawings: pages 1/15-15/15 , as originally filed/furnished pages , received by this Authority on with the letter of pages , received by this Authority on with the letter of ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3.	The amendments have resulted in the cancellation of: ☐ the description, pages ☐ the claims, Nos. ☐ the drawings, sheets/figs ☐ the sequence listing (specify):
4.	☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)): ☐ the description, pages ☐ the claims, Nos. ☐ the drawings, sheets/figs ☐ the sequence listing (specify):
5.	☐ This report has been established: ☐ taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)). ☐ without taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rules 66.4bis and 70.2(e)).
6.	☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45 bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded."

59 66

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2012/001505

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application
- ☒ claims Nos: **35-36**

because:

- ☐ the said international application, or the said claim Nos.
relate to the following subject matter which does not require an international preliminary examination (*specify*):
the subject matter listed in Rule 67 on which, under Article 34(4)(a)(i), an international preliminary examination [or written opinion, via the application of Rule 43bis.1(b)], is not required to be carried out, including:

- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos.
are so unclear that no meaningful report could be formed (*specify*):

- ☐ the claims, or said claims Nos.
are so inadequately supported by the description that no meaningful report could be formed (*specify*):

- ☒ no international search report has been established for said claims Nos. **35-36**

- ☐ a meaningful report could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

- ☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.
- ☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.
- ☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13ter.1(a) or (b) and 13ter.2.

- ☐ See Supplemental Box for further details.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2012/001505

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees the applicant has, within the applicable time limit:
- ☐ restricted the claims
 - ☐ paid additional fees
 - ☐ paid additional fees under protest and, where applicable, the protest fee
 - ☐ paid additional fees under protest but the applicable protest fee was not paid
 - ☐ neither restricted the claims nor paid additional fees
2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:
- ☐ complied with.
 - ☒ not complied with for the following reasons:

See Supplemental Box

4. Consequently, this report has been established in respect of the following parts of the international application:
- ☒ all parts.
 - ☐ the parts relating to claims Nos.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY		International Application No. PCT/AU2012/001505
Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement	
1. Statement		
Novelty (N)	Claims 1-34	YES
	Claims none	NO
Inventive step (IS)	Claims 1-34	YES
	Claims none	NO
Industrial applicability (IA)	Claims 1-34	YES
	Claims none	NO
2. CITATIONS AND EXPLANATIONS:		
<u>CITATIONS</u>		
D1: CN 201525601 U (UNIV SHANDONG JIAOTONG) 14 July 2010		
D2: CN 2352806 Y (ZHONGYUAN PETROLEUM EXPLORATION BUREAU) 08 December 1999		
D3: FR 2797236 A1 (ETABLISSEMENTS MAGYAR) 09 February 2001		
D4: US 4435196 A (PIELKENROOD) 06 March 1984		
D5: WO 2009/114754 A1 (SOLUTIONS BIOMED, LLC) 17 September 2009		
D6: US 4874107 A (ARNAU-MUNOZ ET AL.) 17 October 1989		
<u>NOVELTY (N)</u>		
Claims 1-34 meet the criteria set forth in PCT Article 33(2) for novelty. The prior art documents published before the priority date do not disclose a tank for storing liquid and a method for assembling said tank, characterized by a sub-chamber having at least one first and second locations, the first location, which is accessible from within a main chamber, being selectively openable to allow flow of a first fluid in the main camber into the inner volume of the sub-chamber, and the second location, which is accessible from a location exterior to the main chamber, being selectively openable to allow flow of a second fluid into the inner volume of the sub-chamber, as currently claimed. None of the prior art documents discloses a tank for storing liquid, wherein the tank comprises a sub-chamber having an exterior surface and two ends adapted to be selectively displaced between open and closed conditions, said sub-chamber being arranged within an inner volume of a main chamber such that both two ends may be accessed from the exterior of the main chamber, as currently claimed. Furthermore, none of the prior art documents discloses a tank for storing liquid, characterized by a sub-chamber arranged within a main chamber such that external surface of the sub-chamber is surrounded by fluid within the main chamber, and means for reducing movement of the fluid in the main chamber, as currently claimed.		
<u>INVENTIVE STEP (IS)</u>		
Claims 1-34 meet the criteria set out in PCT Article 33(3) with regard to the requirement of Inventive Step because the prior art does not obviously suggest to a person skilled in the art a tank for storing liquid and a method of assembling the tank, characterized by a sub-chamber having at least one first and second locations, the first location, which is accessible from within a main chamber, being selectively openable to allow flow of a first fluid in the main camber into the inner volume of the sub-chamber, and the second location, which is accessible from a location exterior to the main chamber, being selectively openable to allow flow of a second fluid into the inner volume of the sub-chamber, as currently claimed. None of the prior art documents obviously suggests to a person skilled in the art a tank for storing liquid, wherein the tank comprises a sub-chamber having an exterior surface and two ends adapted to be selectively displaced between open and closed conditions, said sub-chamber being arranged within an inner volume of a main chamber such that both two ends may be accessed from the exterior of the main chamber, or characterized by a sub-chamber arranged within a main chamber such that external surface of the sub-chamber is surrounded by fluid within the main chamber, and means for reducing movement of the fluid in the main chamber, as currently claimed. The claimed invention is not obvious in the light of any of the cited documents nor is it disclosed in any obvious combination of them. It is also considered that it would not be obvious to a person skilled in the art in the light of common general knowledge either by itself or in combination with any of these documents.		
Form PCT/IPEA/409 (Box V) (July 2011)		

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY Supplemental Box	International Application No. PCT/AU2012/001505
Continuation of: Box IV This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. This Authority has found that there are different inventions based on the following features that separate the claims into distinct groups: Claims 1-14, 28-34 are directed to a tank for storing liquid, a method for assembling said tank, and a truck incorporating said tank. The feature of <u>a sub-chamber having at least one first and second locations, the first location, which is accessible from within a main chamber, being selectively openable to allow flow of a first fluid in the main chamber into the inner volume of the sub-chamber, and the second location, which is accessible from a location exterior to the main chamber, being selectively openable to allow flow of a second fluid into the inner volume of the sub-chamber</u> is specific to this group of claims. Claims 15-19 are directed to a tank for storing liquid. The feature of <u>a sub-chamber having an exterior surface and two ends adapted to be selectively displaced between open and closed conditions, said sub-chamber being arranged within an inner volume of a main chamber such that both two ends may be accessed from the exterior of the main chamber</u> is specific to this group of claims. Claims 20-27 are directed to a tank for storing liquid. The feature of <u>a sub-chamber arranged within a main chamber such that external surface of the sub-chamber is surrounded by fluid within the main chamber, and means for reducing fluid movement in the main chamber</u> is specific to this group of claims. PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art. When there is no special technical feature common to all the claimed inventions there is no unity of invention. In the above groups of claims, the identified features may have the potential to make a contribution over the prior art but are not common to all the claimed inventions and therefore cannot provide the required technical relationship. The only features common to all or part of the claimed inventions and which provide a technical relationship among them include <u>sub-chamber arranged within an internal volume of a main chamber, and sub-chamber having one area openable and accessible from the exterior of the main chamber</u>. However these features do not make a contribution over the prior art because they are disclosed in US 4435196 and CN 201525601 (see Figures). Therefore in the light of these documents the common features cannot be a special technical feature. Therefore there is no special technical feature common to all the claimed inventions and the requirements for unity of invention are consequently not satisfied <i>a posteriori</i>. Again the International Preliminary Examining Authority believes that a search and examination for the 2nd and 3rd inventions will not involve more than negligible additional search and examination effort over that for the first invention and so no additional search fee is required in order to search and examine that invention.	
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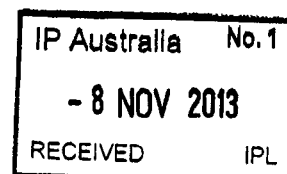
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8 November 2013

Commissioner of Patents
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Dear Madam

International Patent Application PCT/AU2012/001505
Gecko Tanks Pty Ltd
Truck Body
Our ref: 209040:PH:wm

We refer to the written opinion dated 12 February 2013 issued in respect of this application. Under Article 34, we file herewith replacement pages 1 to 27 of the specification and pages 28 to 34 of the claims, along with the marked-up copy showing the amendments made to the specification and claims.

The Examiner has objected to claims 1 to 37 of the subject patent application in view of the followings documents:

- CN 20152601 (D1)
- CN 2352806 (D2)
- FR 2797236 (D3)

We respectfully traverse the objections.

Claim Amendments

Independent claims 1, 15, 20 and 29 and dependent claims 10, 16 and 17 has been amended to clarify the subject matter to be claimed by these claims.

In particular:

Claim 1 has been redrafted to incorporate the fact that the first and second locations are adapted to be selectively displaced between an open condition and a closed condition to either allow or impede access of fluid into the sub-chamber.

Claim 15 has been redrafted to incorporate the fact that the sub-chamber has an exterior surface defining an inner volume of the sub-chamber, the exterior surface of the sub-chamber comprising first and second ends adapted to be selectively displaced

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between an open condition and a closed condition to either allow or impede access of fluid into the sub-chamber.

Claim 20 has been redrafted to clarify that the sub-chamber is arranged within the main chamber such that external surface of the sub-chamber is surrounded by the fluid incorporated within the main chamber.

Claim 29 has been redrafted to incorporate the fact the first and second openings are adapted to be selectively displaced between an open condition and a closed condition to either allow or impede access of fluid into the sub-chamber.

Minor formalities have been amended in claims 2, 5, 6, 7, 18, 23, 25,

The Present Invention

Claims 1, 15 and 29

An particular embodiment of the invention relates to a tank that comprises a main chamber and a sub-chamber incorporated within the main chamber.

The sub-chamber comprises at least one first location and at least one second location which are adapted to be selectively displaced between an open condition and a closed condition to either allow or impede access of a fluid into the sub-chamber.

In a particular arrangement, the first location in the open condition allows a fluid from the main chamber to enter the sub-chamber and the second location in the closed condition allows a fluid from a source external to the tank to enter the sub-chamber.

This arrangement is particularly useful because it allows to use the tank as either (1) a tank for carrying a single fluid or (2) a tank for carrying a plurality of fluids.

A tank for carrying a single fluid

In order for the tank to carry a single fluid, the first location of the sub-chamber is displaced to the open condition. In this condition the fluid is added to the tank to fill the main chamber and the sub-chamber. Thus, in order for the tank to carry a single fluid it is only necessary to allow fluid to enter the sub chamber by opening the first location.

A tank for carrying a plurality of fluids

In order for the tank to carry a plurality of fluids, the first location is displaced to the closed condition. This impedes the fluid within the main chamber to enter the sub-chamber. Thus, the sub-chamber may act as a separate chamber to contain another fluid which is different from the fluid which is contained within the main chamber. For this, the second location is opened to allow the another fluid to enter the sub-chamber.

Thus, in order for the tank to carry a plurality of different fluids it is only necessary to impede the fluid stored in the main chamber to enter the sub- chamber. This is accomplished by closing the first location and opening the second location of the sub-chamber. In this manner, the main chamber can be filled with one type of fluid and the sub-chamber can be filled with another type of fluid.

The above is explained in greater detail in the specification at paragraphs 75 to 82.

The particular arrangement is particularly useful because it permits - by using a single tank structure that acts as a "building block" to manufacture either (1) a tank for carrying a single fluid or (2) a tank for carrying a plurality of fluids. In other words, a single tank structure which acts as a "building block" can be used for manufacturing a variety of different tanks.

For example, to manufacture a tank for carrying a single fluid, the tank structure is modified by opening the first location of the sub-chamber. This allows filling the tank (the main chamber and sub-chamber) with a single fluid.

However, if a tank for carrying a plurality of fluid is required, the tank structure may be adapted for carrying a plurality of fluids. This is accomplished by displacing the first location to the closed condition. In this manner, the sub-chamber is not filled with the fluid contained in the main chamber.

Instead, the sub-chamber is filled with a fluid other than the fluid contained in the main chamber. This is accomplished to displace the second location to the open condition for filling of the sub-chamber.

The above is explained in greater detail in the specification at paragraphs 95 to 101.

This particular arrangement overcomes the drawbacks that exist currently during the manufacturing processes of tanks. Currently, the tanks for carrying a single fluid (such as water tanks) and for carrying a plurality of fluids (such as service tanks) are manufactured separately and from scratch. This means that in order to manufacture a tank for storing a single liquid the main chamber of the tank needs to be manufactured and then customized to become, for example, a water tank. If a tank for a service truck is required, the plurality of sub-chambers of the tank need to be manufactured separately from the main chamber. At a further stage, the tank is assembled by inserting the sub-chambers into the main chamber. The final stage consists in customising the tank to incorporate the accessories such as reels and pumps among others (see paragraph 5 of the specification).

Claim 20

The present arrangement has the additional advantage that the sub-chambers contained within the main chamber can act as means for impeding movement of the fluid contained within the main chamber.

Claim 15

Moreover, a particular arrangement facilitates maintenance of the internal chamber. In this particular arrangement, the sub-chamber comprises first and second ends. And, the sub-chamber is arranged within the inner volume of the main chamber in such a manner that the first end and the second end may be accessed from the exterior of the main chamber.

In a further arrangement, the first and second ends are adapted to be simultaneously maintained in the open condition. This arrangement is particularly useful because it facilitates cleaning of the at least one internal chamber by allowing delivery of cleaning fluid through the top end of the internal chamber and exiting of the cleaning fluid through

the bottom end of the internal chamber.

Novelty and Inventive Step objections

The examiner has considered that claims 1 to 5, 10, 15, 19-21, 24 and 35 are lacking novelty and that all claims lack inventive step in view of D1 to D3.

The applicant respectfully requests reconsideration of the objections.

None of the prior art documents disclose the subject matter claimed by amendment independent claims 1, 11, 15, 20 and 29.

As mentioned above amended independent claims 1, 15 and 29 disclose sub-chamber incorporated in a main chamber of a tank, wherein the sub-chamber comprises a location which is adapted to be selectively displaced between an open condition and a closed condition.

None of the prior art document discloses or suggest that a sub-chamber contained within the main chamber are adapted to allow fluid which is contained in the main chamber to enter the sub- chamber.

In fact, documents D1 to D3 discloses a tank divided into a plurality of internal compartments. None of these internal compartments include a location within the main chamber which is adapted to be selectively opened or closed.

D1 discloses a fluctuation-proof liquid-storing tank for transporting a vehicle. The tank has a plurality of internal compartments which are mutually sealed and isolated (see Abstract). Thus, D1 teaches away from disclosing internal compartments having locations within the tank which are adapted to be selectively open to allow entrance of fluid from neighbouring internal chambers.

D2 discloses a LNG storage and transportation tank. The tank comprises a main casing divided into three isolated cavities. There are an upper cavity, a lower cavity and a main cavity. The cavities are isolated by a heat insulation board which incorporates heat exchange tubes which are fluidly connected to the upper and lower cavity. There is also provided a reducing valve at the exterior of the tank which allows fluidly connecting the lower cavity with the main cavity. There is no disclosure or suggestion of any location within the tank which may be adapted to selectively be closed or opened to allow fluid flow between the internal compartments.

D3 discloses a series of internal compartments contained within a liquid transporting tank. The internal compartments are separated by double partition walls. Thus, D3 teaches away from fluids accessing the neighbouring internal compartments. In D3 each internal compartment has an upper port adapted to receive a fluid and the internal compartments are separated by double partition walls to impede transference of fluids between internal compartments.

Conclusion

Based on the above, we respectfully request the examiner to withdraw the novelty and inventiveness objections.

6875

Commissioner of Patents

8 November, 2013

Based on the above, the applicant respectfully requests reconsideration of the objections in light of the amendments to the claims and the arguments set out above.

Yours faithfully
WRAYS



Peter Hille
Associate

Encl: Marked up version of specification and claims
Clean version of Specification and claims

Truck Body**TECHNICAL FIELD**

[0001] The present invention relates to apparatus and methods for handling fluids.

[0002] The invention has been devised particularly, although not necessarily solely, in relation to tanks for storing, transporting and delivering of fluids such as fuels, oils and water.

BACKGROUND ART

[0003] The following discussion of the background art is intended to facilitate an understanding of the present invention only. The discussion is not an acknowledgement or admission that any of the material referred to is or was part of the common general knowledge as at the priority date of the application.

[0004] Manufacture of tanks typically is a cumbersome procedure which typically requires relatively large working areas and a relatively large number of personnel. This is particularly true if several different types of trucks are to be manufactured. For example, on occasions it may be necessary to manufacture tanks for storing and transporting a single type of fluid. An example of such a tank is a water tank. On other occasions, tanks may comprise a plurality of chambers for storing different type of fluids. Examples of these tanks are the ones incorporated onto service trucks.

[0005] Each of these different type of tanks are currently manufactured from scratch. This means that in order to manufacture a tank for storing a single liquid the main chamber of the tank needs to be manufactured and then customized to become, for example, a water tank. If a tank for a service truck is required, the plurality of chambers of the tank need to be manufactured. The plurality of chambers need then be customized to become a tank for a service truck.

[0006] It is against this background that the present invention has been developed.

SUMMARY OF INVENTION

[0007] According to a first aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber and at least one sub-chamber having an exterior surface defining an inner volume of the at least one sub-chamber, the at least one sub-chamber being arranged with respect to the main chamber such that at least one first location of the exterior surface may be accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber.

[0008] Preferably, the main chamber comprises an exterior surface defining an inner volume containing the at least one sub-chamber wherein the exterior surface comprises at least one aperture adapted to receive the at least one second location of the exterior surface of the at least one sub-chamber.

[0009] Preferably, the at least one sub-chamber comprises an internal chamber incorporated within the main chamber.

[0010] Preferably, the internal chamber is of cylindrical configuration.

[0011] Preferably, the at least one internal chamber is adapted and arranged within the main chamber to reduce movement of the fluid during transportation of the fluid within the tank.

[0012] Preferably, the internal chamber is arranged within the main chamber such that it is surrounded in its entirety by the fluid incorporated within the main chamber.

[0013] Preferably, the tank is adapted to provide fluid to the at least one internal chamber from a fluid source exterior to the main chamber.

[0014] In one arrangement, the at least one first location of the exterior surface comprises a port to allow fluid communication between the main chamber and the at least one sub-chamber.

[0015] In an alternative arrangement, the at least one second location of the exterior surface comprises an aperture to allow fluid communication between a fluid source exterior to the main chamber and the at least one sub-chamber.

[0016] Preferably, the at least one internal chamber comprises first and second ends, the at least one internal chamber being arranged within the main chamber such that the first end and the second end may be accessed from the exterior of the main chamber.

[0017] According to a second aspect of the invention there is provided a method for assembling a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids, the method comprising the steps of:

providing a tank structure having a main chamber and at least one sub-chamber having an exterior surface defining an inner volume of the at least one sub-chamber, the at least one sub-chamber arranged with respect to the main chamber such that at least one first location of the exterior surface may be accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber and

providing at least one opening within the exterior surface to allow access of fluid into the at least one sub-chamber wherein the at least one opening openings may be provided at either the at least one first location to allow access of fluid of the main chamber into the sub-chamber so as to allow the tank to incorporate a single fluid or at the at least one second location to allow access of fluid from the a fluid source external to the main chamber so as to allow the tank to incorporate a plurality of fluids.

[0018] Preferably, the method further comprises attaching pre-fabricated items to the tank so as to customise the tank to becoming a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids.

[0019] In an arrangement, the pre-fabricated items comprise a pre-fabricated water spraying bar.

[0020] In an alternative arrangement, the pre-fabricated items comprise a pre-fabricated manifold and an attachment, the manifold comprising a plurality of conduits being adapted to be fluidly connected to the at least one second location of the exterior surface and the attachment defining a service area adapted to be in fluid communication with the manifold so as to deliver and receive fluid.

[0021] According to a third aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber and at least one sub-chamber, the sub-chamber comprising first and second ends wherein the at least one internal chamber is arranged within the main chamber such that the first end and the second end may be accessed from the exterior of the main chamber.

[0022] Preferably, the first and second ends are releasably closed so as to allow opening of the first end and second end.

[0023] Preferably, the first and second ends are adapted to be opened simultaneously. This arrangement is particularly useful because it facilitates cleaning of the at least one internal chamber by allowing delivery of cleaning fluid through the top end of the internal chamber and exiting of the cleaning fluid through the bottom end of the internal chamber.

[0024] Preferably, the at least one sub-chamber is of cylindrical configuration. This facilitates cleaning of the interior of the at least one sub-chamber.

[0025] Preferably, the main chamber comprises a top end and a bottom end, the first end of the internal chamber being located at the top end and the second end of the internal chamber being located at the bottom end.

[0026] According to a fourth aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber and at least one sub-chamber, the at least one sub-chamber being incorporated in its entirety inside the main chamber.

[0027] Preferably, the at least one sub-chamber is adapted for reducing movement of the fluid within the main chamber.

[0028] Preferably, the tank comprises means for reducing movement of the fluid within the main chamber.

[0029] Preferably, the means for reducing movement of the fluid within the main chamber comprises plates joining the at least one chamber with at least one wall of the main chamber.

[0030] Preferably, there are a plurality of sub-chambers incorporated inside the main chamber.

[0031] Preferably, the plurality of sub-chambers are attached to each other and are attached to the wall defining the main chamber through the means for reducing movement of the fluid within the main chamber.

[0032] Preferably, the means for reducing movement of the fluid within the main chamber comprises plates arranged at different locations with respect to the height of the plurality of sub-chambers.

[0033] Preferably, the plates are alternately attached to the upper portion and the lower portion of the sub-chambers.

[0034] Preferably, the means for reducing movement of the fluid within the main chamber are adapted to allow movement of maintenance personnel within the tank.

[0035] According to a fifth aspect of the invention there is provided a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids, the tank comprising a tank structure having a main chamber and at least one sub-chamber having an exterior surface defining an inner volume of the at least one sub-chamber, the at least one sub-chamber arranged with respect to the main chamber such that at least one first location of the exterior surface may be accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber and at least one opening within the exterior surface to allow access of fluid into the at least one sub-chamber wherein the at least one opening is located at either the at least one first location to allow access of fluid of the main chamber into the sub-chamber so as to allow the tank to incorporate a single

fluid or at the at least one second location to allow access of fluid from the a fluid source external to the main chamber so as to allow the tank to incorporate a plurality of fluids.

[0036] Preferably, the tank further comprises pre-fabricated items to the tank so as to customise the tank to becoming a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids.

[0037] Preferably, the pre-fabricated item comprises a pre-fabricated water spraying bar.

[0038] Preferably, the pre-fabricated items comprise a pre-fabricated manifold and an attachment, the manifold comprising a plurality of conduits being adapted to be fluidly connected to the at least one second location of the exterior surface and the attachment defining a service area adapted to be in fluid communication with the manifold so as to deliver and receive fluid.

[0039] Preferably, the pre-fabricated items are configured such that the plurality of conduits can be fluidly connected to the at least one second location of the exterior surface and the manifold can be fluidly connected to the service area via tubes, wherein all of the tubes have the same length.

[0040] Preferably, the length of the tubes is about 400 mm.

[0041] According to a sixth aspect of the invention there is provided a truck incorporating a tank according to the first, third to fifth aspect of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0042] Further features of the present invention are more fully described in the following description of several non-limiting embodiments thereof. This description is included solely for the purposes of exemplifying the present invention. It should not be understood as a restriction on the broad summary, disclosure or description of the invention as set out above. The description will be made with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a truck incorporating a tank in accordance with an embodiment of the invention;

Figure 2 is a rear perspective view of the truck shown in figure 1;

Figure 3 is a top perspective view of the truck shown in figure 1 depicting the interior of the tank;

Figure 4 is a top view of the interior of the tank incorporated in the truck shown in figure 1;

Figure 5 is a bottom perspective view of a first arrangement of the tank incorporated in the truck shown in figure 1;

Figure 6 is a bottom view of a second arrangement of the tank incorporated in the truck shown in figure 1;

Figure 7 is a front bottom perspective view of the second arrangement of the tank incorporated in the truck shown in figure 1;

Figure 8 is a front perspective view of the second arrangement of the tank incorporated in the truck shown in figure 1;

Figure 9 is cross-section bottom perspective view of a particular arrangement of the tank incorporated in the truck shown in figure 1;

Figure 10 is a bottom view of the attachment shown in figure 9 incorporating the service area 32;

Figure 11 is a side view of the attachment shown in figure 9 incorporating the service area 32;

Figure 12 is a perspective view of the attachment of the tank incorporated in the truck shown in figure 1;

Figure 13 is a rear perspective view of the interior of the tank showing an alternative baffle arrangement in accordance with an embodiment of the invention;

Figure 14 is a front perspective view of the interior of the tank showing the alternative baffle arrangement shown in figure 13;

Figure 15 is bottom perspective view of the an alternative arrangement of the tank in accordance with an embodiment of the invention;

Figure 16 is a is bottom perspective view of a further alternative arrangement of the tank in accordance with an embodiment of the invention;

Figure 17 shows the process of attaching the service area to the bottom of the tank in accordance with an embodiment of the invention;

Figure 18 shows an exploded view of an inner chamber in accordance with an embodiment of the invention; and

Figure 19 shows a side view of the inner chamber shown in figure 18.

DESCRIPTION OF EMBODIMENTS

[0043] Figures 1 to 3 show a truck 10 in accordance with an embodiment of the invention. The truck 10 comprises a cab 12 and a tank 14. The cab 12 and the tank 14 are supported on a chassis of the truck 10. The cab 12 includes the compartment for the driver of the truck 14. The engine is located under the cab 12. Two pairs of wheels 16 are provided to allow displacement of the truck 10.

[0044] The particular arrangement of the truck 10 shown in figures 1 and 8 comprises stairs 122 to facilitate access to the upper surface of the tank 14. For this the front wall of the tank 14 comprises at least one cut out adapted to receive the stairs 122. Figures 15 to 16 show a further particular arrangement of a tank 14. As shown in, for example, figure 15, the front wall of the tank 14 comprises a plurality of cut outs 102 and 104. The cut outs 102 and 104 are adapted to receive inserts 120 (see figure 8) for supporting, for example, a compressor (not shown) and the stairs 122. The arrangement also shows a cabin hood 106 extending outward from the front wall of the tank 14, The cabin hood 106 is adapted to cover the tank driver's cabin.

[0045] Figures 4 to 8 and figures 15 and 16 show two arrangements of the tank 14 incorporated in the truck 10 shown in figures 1 to 3. As will be described in greater detail, in accordance with the present embodiment of the invention, the two arrangements of the tank 14 may be manufactured using the same type of tank structure 84. For this, the tank structure 84 is adapted to be customised to become either one of the two arrangements of the tank 14. The tank structure 84 is also adapted to receive a plurality of pre-fabricated parts in order to customise the tank 14. By applying specific pre-fabricated parts to the tank structure 84 any of the arrangements of the tank 14 may be manufactured. This is particularly advantageous because it allows manufacturing different types of tanks 14 in a relatively short period of time. Also, it reduces the working space and the number of personnel required for manufacturing the different type of tanks 14.

[0046] Referring to figures 1 and 3, the tank 14 comprises a storage area 17. As will be described further one of the arrangements of the tank incorporates a service attachment 20. The storage area 17 is adapted to store fluids such as oil, fuels or water. The top portion 22 of the tank 14 provides a platform surrounded by a barrier 24. This area can be accessed from the cab 12 by the driver and users of the truck 10.

[0047] As will be described in greater detail, the storage area 17 of the tank 14 comprises a main chamber 18 and at least one sub-chamber chamber 26. The sub-chamber 26 comprises at least one internal chamber 26 incorporated within the main chamber 18. In accordance with the present embodiment of the invention, the at least one internal chamber 26 is contained in its entirety within the main chamber 18. In the arrangement shown in the figures, there are eight internal chambers 26. The internal chambers 26 are of cylindrical configuration.

[0048] The internal chambers 26 comprise a bottom end 38 and top end 40. The bottom ends 38 are supported on the bottom of the main chamber 18. The top ends 40 are adapted to be received by openings of the top of the tank 14. In this manner, the top ends 40 can be accessed from the top of the tank 14 (see figure 1). The bottom ends 38 are adapted to be received by indentations 60 of the bottom of the tank 14 (see figure 5). Figures 18 and 19 shows a particular arrangement of an inner chamber 26 adapted to be supported within the indentations 60. The bottom end 38 is supported on a wedge 96. The fact that the inner chambers 26 are supported on a wedge 96 allows for the

longitudinal axis of the inner chambers to be parallel to the vertical axis of the tank 14. Further, a bottom ring 98 is attached to the bottom end of the inner chamber 26. The bottom ring 98 is adapted to receive gate 39 which allow opening and closing of the bottom end 38 of the inner chamber 26. The upper end 40 of the inner chamber 26 comprises an upper ring 100. The upper ring 100 is adapted to receive a gate 41 allow opening and closing of the upper end 40 of the inner chamber 26

[0049] Access to the internal chambers 26 may be provided through the bottom and top ends 38 and 40. For this the bottom end 38 and the top end 40 comprises, respectively, the gates 39 and 41. The gates 39 and 41 are releasable attached to the respective ends of the internal chambers 26. This allows opening and closing of the top and bottom ends of the internal chambers 26 to provide access to the interior of the chambers 26.

[0050] In accordance with the present embodiment of the invention, the gate 41 of the top end 40 comprises a plate which is screwed onto the ring 100 of the top end 40 of the internal chamber 26 (see, for example, figure 4).

[0051] Referring to figure 6, the gate 39 of the bottom end 38 is screwed onto the ring 98 of the bottom end 38 of the internal chamber 26. In the arrangement shown in figure 6, the gate 39 is of semi-circular configuration. Thus, only a portion of the bottom end 38 is releasably closed by the gate. Also, the gate 39 comprises bottom outlet and bottom inlets 28 to allow filling and emptying of the cylindrical chambers 26. An opening 29 is also provided in the plate. The opening 29 is adapted to receive sensing means for measuring the amount of fluid stored in the internal chamber 26.

[0052] Further, as shown in figure 6, bottom outlets and inlets 28 are fluidly connected to conduits 65. The conduits 65 include ends 67 which extend parallel to the plate. As will be described in greater detail at a later stage, the ends are adapted to be fluidly connected to a fluid source and fluid delivery means for receiving or delivering fluid into or contained within the internal chamber 26.

[0053] The tank 14 comprises a pair of longitudinal beams 30 to allow mounting of the tank 14 to the chassis of the truck 10.

[0054] Further, the tank 14 comprises a service area 32 (see figure 9). The service area 32 is defined by the attachment 20 which is located at the rear bottom end of the tank

14. The service area 32 may be accessed through apertures 34 incorporated in the side walls 36 of the attachment 20.

[0055] As mentioned before, the tank 14 comprises a main chamber 18 and a plurality of internal chambers 26 (the cylindrical chambers 26) for storing of a fluid or different type of fluids. In the arrangement shown in figure 3, the tank 14 comprises an array of eight cylindrical chambers 26.

[0056] Pairs of the cylindrical chambers 26 are arranged longitudinally within the main chamber 18. Each cylindrical chamber 26 is attached via plates 42 to its respective adjacent cylindrical chamber 26. Also, each cylindrical chamber 26 is attached via a plate 42 to the inner surface of the wall of the main chamber 18. This secures the cylindrical chambers 26 within the main chamber 18.

[0057] The plates 42 which attach the cylindrical chamber 26 to each other and to the inner surface of the wall are adapted and arranged in such a manner so as to reduce movement of the fluid within the tank as well as facilitating displacement of personnel within the tank 14. In this manner, the plates 42 act as baffles. The plates 42 have a height which is a fraction of the entire length of the cylindrical chamber 26 to which it is attached. This allows for the plates 42 to be attached to the cylindrical chamber 26 at either the upper portion of the cylindrical chamber 26 or the lower portion of the cylindrical chamber 26.

[0058] In accordance with the present embodiment of the invention, the plates 42 are arranged at different locations with respect to the height of the plurality of sub-chambers. The plates 42 are alternatively attached to the upper and bottom portion of the cylindrical chambers 26. As shown in figure 4, the first and third pair of cylindrical chambers 26 are attached to each other by a plate 42 attached to the upper portion of the cylindrical chambers 26. The second and fourth pair of cylindrical chambers 26 are attached to each other by a plate 42 attached to the lower portion of the cylindrical chambers 26 (see figure 9). This arrangement is particular useful for reducing movement of the liquid within the main chamber 18.

[0059] Figures 13 and 14 shows an alternative baffle arrangement with respect to the one shown in figures 3, 4 and 9. As shown in figures 13 and 14, the baffle arrangement comprises baffles 42a to 42h.

8087

[0060] The baffles 42a and 42f are located respectively at the front and rear of the tank 14. These baffles 42a and 42f attached the front and rear inner chambers 26 to the front and rear walls of the tank 14. The front baffles 42a include openings 46 which allow passage of fluid as well as of personnel during maintenance processes of the interior of the tank 14.

[0061] The baffles 42b to 42e attach the inner chamber 26 to the side walls of the tank 14. There are two different type of baffles 42 which attach the inner chambers 26 to the side walls of the tanks 14. The two different type of baffles 42 are the first type of baffles 42b and 42d and the second type of baffles 42c and 42e

[0062] Baffles 42b and 42d comprise a lower plate 108 and an upper support bar 110. The lower plate 108 extends between the inner chamber 26 and the side wall of the tank 14. The lower plate 108 comprises openings 46 which allow passage of fluid. The support bar 110 extends from the upper portion of the inner chamber towards the side wall of the tank 14. A portion of the bar 110 extends parallel to the side wall of the tank 14. This arrangement provides a clearance 112 above the lower plate 108 allowing passage of fluids as well of the maintenance personnel.

[0063] The baffles 42 c and 42e comprise an upper plate 114 having an opening 46 for allowing passage of fluid. The opening is located at the upper corner adjacent the side wall of the tank 14. A support bar 116 extends along side the side wall of the tank 14 towards the floor of the tank 14 and extends along the floor of the tank 14 towards the inner chamber 26. This arrangement provides a clearance 118 below the upper plate 114 allowing passage of fluids as well of the maintenance personnel.

[0064] The first type of baffles 42b, 42d and the second type of baffles 42c and 42e are arranged alternatively within the interior of the tank 14. In this manner, the particular baffle arrangement (shown in figures 13 and 14) comprises plates 108 and 114 which are alternatively attached to the upper and bottom portion of the cylindrical inner chambers 26. The plates 108 are attached at the lower portion of the inner chambers 26. The plates 114 are attached at the upper portion of the inner chambers.

[0065] Further, the baffle arrangement shown in figures 13 and 14 also comprises plates 42 which attach the inner chamber 26 to each other. There are a set of plates 42g and 42h. The plates 42g are arranged perpendicularly to the longitudinal axis of the tank 14

and located at the centre of the tank 14. The plates 42h are arranged parallel to the longitudinal axis of the tank 14.

[0066] In the particular arrangement shown in figures 13 and 14, the plates 42g are alternatively attached to the upper and bottom portion of the cylindrical inner chambers 26. There are two plates 42h located at each row of inner chambers 26. The front and rear inner chambers 26 are attached to their adjacent inner chamber 26 via the plates 42h. The plates 42h are located at the upper portion of the inner chambers 26.

[0067] The plates 42 that attach the cylindrical chambers 26 to the wall of the tank 14 are also alternatively attached to the upper and lower portion of the cylindrical chambers 26. As shown in figure 4, the first and third pair of cylindrical chambers 26 are attached to the tank 14 wall by a plate 42 attached to the lower portion of the cylindrical chambers 26. The second pair and fourth pair of cylindrical chambers 26 are attached to the tank 14 wall by the plate 42 attached on the upper portion of the cylindrical chambers 26. The front pair of cylindrical chambers 26 are attached via a pair of front plates 42 that extend from the outer circumference of the cylindrical chamber 26 to the front wall of the tank 14. The front plates 42 comprise an opening 46 to facilitate displacement of personnel within the main chamber 18 of the tank 14. The front plates 42 reduce movement of liquid from one side of the tank 14 to the other side of the tank 14. The rear pair of cylindrical chambers 26 are attached to the rear wall of the tank 14 via rear plates 42. The plates 42 secure the cylindrical chambers 26 within the main chamber 18.

[0068] Inner plumbing 44 is incorporated in the tank 14 to feed the main chamber 18 of the tank 14 with fluid to be stored in the main chamber 18. The inner plumbing 44 comprises a plurality of conduits 48, 49 and 50 extending longitudinally within the main chamber 18. A first conduit 48 is adapted to provide fluid to the top end of the tank 14. A pair of second conduits 49 and 50 is adapted to allow filling or emptying of the tank 14.

[0069] The first conduit 48 extends diagonally within the main chamber 18. In this manner a first end of the conduit 48 is attached to the bottom of the tank 14 and a second end (opposite to the first end) is located at an upper portion of the tank 14. As shown in figure 4, the conduit 48 comprises a section 52 extending perpendicularly from the main section of the conduit 48. In this manner, the second end is located at the

8289

upper front end corner of the tank 14. The extension 52 is adapted to be attached to fluid delivery means mounted on the top of the tank. The fluid delivery means may comprise a water cannon.

[0070] The first end of the conduit 48 is fluidly connected to an inlet 54 located at the rear bottom end of the tank 14 (see figure 6). This allows delivering the fluid to the fluid delivery means. In an arrangement, the inlet 54 is fluidly connected to the main chamber 18. This allows feeding the fluid delivery means with fluid contained in the main chamber 18.

[0071] The pair of second conduits 49 and 50 extends horizontally along the bottom surface of the main chamber 18. First ends of the conduits 49 and 50 are fluidly connected to inlets/outlets 58 and 59 located at the rear bottom end of the tank 14. Second ends of the conduits 49 and 50 are located at the front centre region of the tank 14. The second ends of the conduits 49 and 50 are adapted to receive/deliver the fluid contained in the tank 14 for delivery to the inlet/outlets 58 and 59. This allows emptying or filling of the main chamber 18 of the tank 14. For this, the outlets 58 and 59 are fluidly connected to hoses 56 to allow delivery of the fluid. The hoses 56 are included in the service area 32.

[0072] Figure 5 shows the bottom of the first arrangement of the tank 14. The bottom comprises an array of circular indentations 60. The array of circular indentations 60 is configured in the same manner as the array of cylindrical chambers 26 included in the tank 14. In this manner, each of the bottom ends 38 of the cylindrical chambers 26 may be located above one of the circular indentations 60. This allows access to the bottom ends 60 of the cylindrical chambers 26 from the exterior of the tank 14.

[0073] The cylindrical chambers 26 are adapted to be filled with fluid. In a first arrangement, the cylindrical chamber 26 may be filled with the fluid included in the main chamber 18. In this first arrangement, the cylindrical chambers 26 comprise ports 57 to allow entrance of the fluid as the main chamber 18 is being filled with the fluid.

[0074] In a second arrangement, the cylindrical chambers 26 may be filled with fluid which is not contained in the main chamber 18. In this second arrangement, the bottom ends 38 of the cylindrical chambers 26 include the plurality of inlet and outlets 28. The fluid is delivered into the cylindrical chamber 26 through exterior plumbing 62 located at

the bottom portion of the tank 14 (see, for example, figures 6 and 7). The exterior plumbing 62 comprises a plurality of conduits 64 fluidly connected to the inlets and outlets 28 of the bottom end 38 of the cylindrical chambers 26.

[0075] As mentioned before, there are two arrangements of the tank 14 in accordance with the present embodiment of the invention. In a first arrangement, the main chamber 18 and the cylindrical chambers 26 are fluidly connected through ports 57 incorporated in the side walls of the cylindrical chamber 26. Thus, the cylindrical chambers 26 are filled during the filling process of the main chamber 18 with the fluid of the main chamber 18. Alternatively, the tank 14 may be filled by opening the gates 41 of the internal chambers 26 and delivering through the top ends 40 of the internal chambers 26 the fluid. This allows filling of the internal chambers 26 simultaneously with the main chamber 18. The main chamber 18 is filled as the fluid enters the internal chambers 26 because, as mentioned before, the internal chamber 26 comprise ports 57 which fluidly connect the interior of the internal chambers 26 with the main chamber 18.

[0076] In the second arrangement, the main chamber 18 is not fluidly connected to the cylindrical chambers 26. In this second arrangement, the cylindrical chambers 26 and the main chamber 18 are filled with different fluids. This arrangement allows filling the main chamber 18 with a fluid different than the fluid or fluids with which the cylindrical chambers 26 are being filled.

[0077] Figure 5 shows the first arrangement of the tank 14 in accordance with the present embodiment of the invention. As mentioned before, in the first arrangement of the tank 14, the cylindrical chambers 26 are fluidly connected to the main chamber 18. Each of the cylindrical chambers 26 comprises at least one port to allow entrance into each cylindrical chamber 26 of the fluid with which the main chamber 18 is being filled with. The ports 57 provide the fluid communication between the main chamber 18 and the interior of each of the cylindrical chambers 26. The first arrangement is particularly advantageous for storing and transporting a single fluid. For example, the first arrangement of the tank 14 may be used as a water tank 14. In this arrangement, the service area 32 may be omitted. Instead, a bar 90 comprising at least one water sprayer 92 may be attached to the rear end of the tank 14. The water sprayers are fluidly connected to the main chamber 18. This allows delivery of the fluid contained in the main chamber 18 to the water sprayers for, for example, spraying onto the ground to

reduce the presence of dust in the air. Figure 15, shows a water tank 14 in accordance with a particular arrangement of the present embodiment of the invention.

[0078] In the second arrangement of the tank 14, the main chamber 18 is filled with fluid separately from the cylindrical chambers 26. The main chamber 18 is filled with the exterior plumbing 62 included in the main chamber 18. The fluid to be stored in the cylindrical chambers 26 is fed into each of the cylindrical chambers 26 via the exterior plumbing 62 located at the bottom of the tank 14 (see, for example, figure 6). The inner chambers 26 may be also be filled with fluid through the top ends 40 of the internal chambers.

[0079] As mentioned above, the second arrangement allows filling the main chamber 18 separately from the cylindrical chambers 26. This allows filling the main chamber 18 with a fluid different than the fluid with which the cylindrical chambers 26 are to be filled. Similarly, the cylindrical chambers 26 may be filled separately with respect to each other. In this manner, the cylindrical chambers 26 may be filled with different fluids.

[0080] The fact that the cylindrical chambers 26 may be filled with different fluids with respect to each other is particularly advantageous. For example, the main chamber 18 may be filled with fuel and the cylindrical chambers 26 may be filled with different type of fluids such as engine oils or hydraulic fluids. In this manner, the tank 14 in accordance with the second arrangement may be incorporated in service trucks 10 for providing fuel and the different type of fluids to, for example, vehicles.

[0081] As mentioned before, the cylindrical chambers 26 may be filled by opening the gates 41 for delivery of the fluid through the top ends 40 of the internal chambers. Alternatively, filling of the cylindrical chambers 26 is conducted through exterior plumbing 62 located at the bottom of the tank 14. As shown in figure 6, the exterior plumbing 62 extends from the rear portion of the tank 14 to each of the cylindrical chambers 26. The exterior plumbing 62 is located between the support beams 30 of the tank 14 and is centred at the bottom of the tank 14. The exterior plumbing 62 comprises a manifold 69 comprising a plurality of conduits 64. The conduits 64 for a respective cylindrical chamber 26 are fluidly connected to the bottom inlet and outlets 28 of the respective cylindrical chamber 26.

8592

[0082] The conduits 64 extend longitudinally from the rear of the tank 14 to the respective cylindrical chamber 26. In particular, for each cylindrical chamber 26 there are three conduits 64 which extend between the support beams 30 and divert perpendicularly towards the bottom end 38 of the respective cylindrical chamber 26 (see figure 6). For this, the beams 30 include openings 66 allowing the conduits 64 to traverse the beams 30 and extend into the respective indentation 60 to be connected to the inlets and outlets 28 of the cylindrical chamber 26 to which the conduits 64 are fluidly attached.

[0083] We refer now to figures 9 and 10. It should be noted that the figures 9 and 10 are schematic only. In the particular arrangement shown in figures 9 and 10 the conduits 64 are fluidly connected to four internal chambers 26. However, other arrangement in accordance with the present invention may include conduits 62 and 64 which are fluidly connected to all of the internal chambers.

[0084] As shown in figures 9 and 10, the conduits 62 and 64 extend up to the inner side of the beams 30. At the outer side of the beams, opposite to the conduits 62 and 64 are conduits 65. In this arrangement, the conduits 65 are fluidly connected to the internal chambers 26 and to the conduits 64 and 62 of the manifold 69. One end of the conduits 65 is fluidly connected to the internal chamber 26 and other end of the conduits 65 is fluidly connected to the conduits 64 and 62. In figures 9 and 10 the connection between conduits 64 and 62 with the tubes 67. The tubes 67 traverse the beam 30 through openings 66 of the beams 30.

[0085] The manifold 69 may be a prefabricated manifold adapted to be attached to the bottom end of the tank between the beams 30. As will be described with reference to the method for assembling the second arrangement of the tank 14, the fact that the manifold 69 is prefabricated facilitates assembly of the second arrangement of the tank 14.

[0086] The conduits 64 allow filling and emptying the cylindrical chambers 26 with fluid. As mentioned before, the conduits 64 are fluidly connected to hoses 56 which are located in the service area 32. The connection between the hoses 56 and the conduits 62 and 64 is conducted via a distribution system 71. The distribution system 71 is fluidly connected to the conduits 64 via tubes 67 and the distribution system 71 is connected

8693

to the hoses 56 via conduits 73. The distribution system 71 is adapted to distribute the fluid from the internal chambers 67 to the hoses 56 and vice versa.

[0087] In accordance to the present embodiment of the invention, the tubes 67 which fluidly connect the conduits 62 and 64 with the conduits 65 as well as the conduits 62 and 64 with the distribution system 71 are all of the same length. In order for the tubes 67 to be all of the same length the dimensions of the manifold (including the conduits 62 and 64) and of the conduits 73 are configured such that after installing the manifold 69 and the conduits 73 in conjunction with the distribution system 71 fluidly connecting these elements (conduits 62 and 64, distribution system 71 and conduits 73) is done via tubes 67 that have all the same length. In a particular arrangement of the present embodiment of the invention, the tubes have a length of 400 mm.

[0088] In alternative arrangements of the present embodiment of the invention, the distribution system 71 may be omitted. Instead there are an additional four conduits 73 which in conjunction with the conduits 73 shown in figure 10 define a set of 8 conduits 73 which are fluidly connected to the hoses 56 of the service area. In this particular arrangement, each of the eight conduits 73 is fluidly connected to one of the conduits 62 and 64 via the tubes 67. As mentioned, before, the conduits 62, 64 and 73 are configured such that the tubes 67 which connect the conduits 62 and 64 with the conduits 73 are all of the same size. In a particular arrangement of the present embodiment of the invention, the tubes have a length of 400 mm.

[0089] The fact that the tubes 67 are all of the same length is particularly advantageous. This is because the size of the tubes for fluidly connecting the conduits 62, 64 and 73 is standardised. Thus, during maintenance and repair the personnel only need to have tubes that have the same size. This facilitates the maintenance and repair procedure in view that it is not necessary to have a plurality of tubes of different length and no time is wasted by deciding which tube of specific length is appropriate for fluidly connecting the any of the conduits 62, 64 and 73 and the distribution system 71 with respect to each other.

[0090] The service area 32 comprises a plurality of reels 59 incorporating the hoses 56 (see figure 11). The hoses 56 are adapted to be fluidly connected to the conduits 64 to allow filling of the cylindrical chambers 26 of the tank 14 as well as to deliver the fluid stored in the tank 14. Conduits 92 allow fluidly communicating the hoses 56 with the

8799

cylindrical chambers 26. Filtering means 94 may be provided for filtering of the fluid stored in the tank 14. The service area 32 comprises apertures 34 which allow access to the interior of the service area 32. Reels 59 for storing the hoses 56 are arranged such that hoses 56 can be accessed from the apertures 34. The service area 32 may also include control panels 94 for controlling and monitoring the filling and emptying of the tank 14 and the inner chambers 26 as well as the delivery of the fluids via the hoses 56. (see figure 16.

[0091] Referring now to figure 12, the service area 32 is incorporated in an attachment 20 adapted to be attached to the bottom rear end of the tank 14. The attachment 20 comprises a frame 68 covered by sheets 70 defining the service area 32. The sheets 70 enclose the frame 68 so as to define the service area 32. There are a front sheet 72, two side sheets 74 and a rear sheet 76. The side sheets 74 and the rear sheet 76 include apertures to provide access to the interior of the service area 32. The apertures may include doors to seal the interior of the attachment 20. The front sheet 72 has a curved configuration in order to be able to be attached to the rear bottom end of the tank 14 to avoid interference with the wheels 16 during movement of the truck 10 incorporating the tank 14.

[0092] The attachment 20 is adapted to be attached to the rear bottom of the tank 14 shown in figure 13. For this, as shown in figure 12, the frame 68 of the attachment 20 includes an upper beam 78 to which the longitudinal beams 30 (attached to the bottom of the tank 14, see figure 5) are attached. The front sheet 78 of the space includes indentations 80 adapted to receive the longitudinal beams 30. Curved pads 82 are provided on each upper corners of the attachment 20 adapted to contact the bottom round edges of the tank 14 during fastening of the attachment 20 to the rear bottom end of the tank 14. In accordance with the present embodiment of the invention, the attachment 20 is prefabricated attachment which may be attached to the bottom end of the tank 14 during manufacture of the second arrangement of the tank 14. Figure 17 shows the process of attaching the attachment 20 to the bottom of the tank 14. As will be described with reference to the method for assembling the second arrangement of the tank 14, the fact that the attachment 20 is prefabricated facilitates assembling of the second arrangement of the tank 14.

[0093] An embodiment of the invention also includes a method for assembling the tank 14 in accordance with the first and second arrangements of the tank 14.

[0094] The method for manufacturing the first and second arrangement of the tank 14 initiates by providing a structure 84 of the tank 14 as shown in figure 4. The tank structure 84 comprises a housing 86 defining the main chamber 18. The plurality of cylindrical chambers 26 are incorporated within the housing 86 of the tank structure 84 as has been previously described. The tank structure 84 comprises the longitudinal support beams 30 to allow attachment of the tank 14 to the chassis of the truck 10.

[0095] It is particularly advantageous to manufacture the tank structure 84 as described in the previous paragraphs. This is because the same type of tank structure 84 may be used for manufacturing any of the arrangements of the tank 14 in accordance with the present embodiment of the invention.

[0096] In order to manufacture the first arrangement of the tank 14 the cylindrical chambers 26 need to be adapted to allow entrance of fluid within the cylindrical chamber 26. This is accomplished by, for example, cutting ports 57 into the side walls of the cylindrical chambers 26 (see figure 9). The ports 57 allow fluid to enter the cylindrical chambers 26 as the main chamber 18 is filled with fluid. After cutting the ports 57 into the side wall, the tank 14 is sealed by locating the top on the tank 14.

[0097] At this stage, the service attachment 20 may be attached to the rear bottom end of the tank 14. The attachment 20 includes the reels 59 for holding hoses 56 that are fluidly connected to the interior of the tank 14. The fluid connection is accomplished by connecting the hoses 56 to the inlets/outlets 58 and 59 of the main chamber 18 of the tank 14. The hoses 56 allow filling and extraction of the fluid within the main chamber 18 and the cylindrical chamber 26 of the tank 14.

[0098] Alternatively, as mentioned before, a bar 90 incorporating at least one water sprayer 92 may be attached to the rear end of the tank 14. In this particular arrangement, the inlets/outlets 58 and 59 are fluidly connected to the bar incorporating the water sprayers.

[0099] For manufacturing the second arrangement of the tank 14, no ports 57 are cut into the side walls of the cylindrical chambers 26. Instead, inlets and outlets 28 are cut

into the bottom ends 38 of the cylindrical chambers 26. After the outlets and inlets 28 have been cut, the external plumbing 62 is connected to the bottom of the tank 14 and fluidly connected to the cylindrical chambers 26 through the outlets and inlets 28. As mentioned before, the external plumbing 62 includes a pre-fabricated manifold 69 which is attached between the beams 30 at the bottom of the tank 14. The fact that the manifold is a pre-fabricated manifold is particularly advantageous because it facilitates and reduces the time required for connecting the external plumbing 62 in contrast if each of the conduits 64 needs to be attached separately to the bottom end of the tank 14.

[00100] At this stage, the attachment 20 providing the service area 32 is attached to the tank 14 and the external plumbing 62 is fluidly connected to the hoses 56 within the service area 32 (see figure 17). This allows extraction of the fluid from the cylindrical chambers 26 or filling of the cylindrical chambers 26 through the hoses 56. Also, the openings 54, 58 and 59 of the main chamber 18 are fluidly connected to the respective hoses 56 within the service attachment 20 to allow emptying or filling of the main chamber 18. The tank 14 may then be sealed by attaching the top on the upper portion of the tank 14.

[00101] Referring to figure 10, the manifold 69 is fluidly connected to conduits 92 of the service area 32. In this manner the fluid can be delivered to the internal chambers 26 as well as received from the internal chambers 26.

[00102] After manufacture of either the first or the second arrangement of the tank 14, the tank 14 is mounted to the chassis of the truck 10. Additional features such as a barrier 24 surrounding the top of the tank 14 may be added at this stage.

[00103] It is evident that the present embodiment of the invention provides an efficient and useful method for assembling the first and second arrangement of the tank 14. The fact that the tank structure 84 comprises at least one internal chamber 26 (the cylindrical chambers 26) within the main chamber 18 of the tank 14 is particularly advantageous because it allows using the tank structure 84 for either the first or the second arrangement.

[00104] Another advantage of the present embodiment of the invention is that the inclusion of at least one internal chamber 26 inside the main chamber 18 reduces the

movement of the fluid located within the main chamber 18 during transportation of the fluid. This is because the internal chambers 26 acts as obstacles to the movement of the fluid located within the main chamber 28 as the truck is moving. This is particularly true because, in accordance with the present embodiment of the invention, the internal chambers 26 are located in their entirety within the main chamber 18 of the tank 24.

[00105] Further advantages are the facts that access to the internal chambers 26 as well as to the external plumbing 62 is provided through the bottom of the tank 14. In this manner the tank 14 and the external conduits 62 (in view that the conduits 62 are not concealed within the tank 14) can be serviced from the bottom of the tank. Thus, there is no need to access the top of the tank 14. Thus, reducing the risks of injury during servicing of the tank 14.

[00106] As mentioned before, in accordance with the present embodiment of the invention, the internal chambers 26 are of cylindrical configuration. To provide the internal chamber 26 with a cylindrical configuration is particularly advantageous. This is because the cylindrical configuration provides greater strength to the internal chambers. Also, the fact that internal chambers 26 are of cylindrical configuration reduces the risk of cross-contamination of the fluids located within the internal chambers 26 and the main chamber 18. This is because cylinders do not include corners (as is the case in polygonal shapes) which may be easily ruptured.

[00107] Further, the fact the internal chambers 26 are of cylindrical configuration facilitates determining the amount of fluid contained in the internal chambers 26. In fact, it appears that a single sensing mean is sufficient to measure the amount of fluid occupying a cylindrical chamber.

[00108] Moreover, it is particularly easy for personnel to move within the main chamber 18. This is because, the interior of the main chamber 18 incorporating the at least one internal chamber 26 is arranged and fastened within the main chamber 18 in such a manner that personnel can walk within the main chamber 18 with relatively easiness.

[00109] Also, as mentioned before, the cylindrical chambers have top and bottom ends which may be opened simultaneously. This arrangement is particularly advantageous because it allows accessing the interior of the internal chambers 26 from

its top end and/or bottom end. Accessing the interior of the internal chamber 26 from the top end is advantageous because it allows filling the internal chambers 26 from the top of tank 14. The fact that the top and bottom ends of the internal chambers 26 may be opened simultaneously facilitates cleaning of the internal chambers 26 because it allows hosing the interior of the internal chambers 26 from the top of the tank towards the bottom end of the internal chamber. The cylindrical configuration of the internal chambers 26 also facilitates scrubbing of the interior of the internal chamber 26 because no corners are provided within the internal chambers 26.

[00110] Modifications and variations as would be apparent to a skilled addressee are deemed to be within the scope of the present invention.

[00111] Further, it should be appreciated that the scope of the invention is not limited to the scope of the embodiments disclosed. For example, in a particular arrangement of the second arrangement of the tank 14, one or at least some of the cylindrical chambers may include ports 57 to allow to be filled with the fluid included in the main chamber 18. This arrangement is particularly useful because it allows providing tanks 14 with main chambers having different volumes for storing the fluid. On occasions, it is desired that the main chamber 18 of a tank 14 stores an amount of fluid greater than the amount of fluid that can be stored in the second arrangement of the tank 14. To increase the volume of the main chamber 18, ports 57 are cut into specific cylindrical chambers 26 (see figure 9). As mentioned before, the ports 57 allow fluid of the main chamber 18 to enter the cylindrical chambers 26. Thus, the cylindrical chambers 26 in which ports 57 have been cut provide an additional storage place for the fluid that is to be stored in the main chamber. In this manner the main chamber 18 of the second arrangement of the tank 14 can be increased.

[00112] Also, the scope of the invention is not limited to the handling of fluids. Other type of materials could be stored in the main chamber 18 and the internal chambers 26. Moreover, the invention is not limited to tanks adapted to be mounted on trucks. The present invention may be applied to any type container for handling any type of materials.

[00113] Throughout the specification and claims, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be

understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

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Truck Body

TECHNICAL FIELD

[0001] The present invention relates to apparatus and methods for handling fluids.

[0002] The invention has been devised particularly, although not necessarily solely, in relation to tanks for storing, transporting and delivering of fluids such as fuels, oils and water.

BACKGROUND ART

[0003] The following discussion of the background art is intended to facilitate an understanding of the present invention only. The discussion is not an acknowledgement or admission that any of the material referred to is or was part of the common general knowledge as at the priority date of the application.

[0004] Manufacture of tanks typically is a cumbersome procedure which typically requires relatively large working areas and a relatively large number of personnel. This is particularly true if several different types of trucks are to be manufactured. For example, on occasions it may be necessary to manufacture tanks for storing and transporting a single type of fluid. An example of such a tank is a water tank. On other occasions, tanks may comprise a plurality of chambers for storing different type of fluids. Examples of these tanks are the ones incorporated onto service trucks.

[0005] Each of these different types of tanks are currently manufactured from scratch. This means that in order to manufacture a tank for storing a single liquid the main chamber of the tank needs to be manufactured and then customized to become, for example, a water tank. If a tank for a service truck is required, the plurality of chambers of the tank need to be manufactured. The plurality of chambers need then be customized to become a tank for a service truck.

[0006] It is against this background that the present invention has been developed.

SUMMARY OF INVENTION

[0007] According to a first aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber and at least one sub-chamber having an exterior surface defining an inner volume of the at least one sub-chamber, the at least one sub-chamber being arranged with respect to the main chamber such that at least one first location of the exterior surface may be accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber.

[0008] Preferably, the main chamber comprises an exterior surface defining an inner volume containing the at least one sub-chamber wherein the exterior surface comprises at least one aperture adapted to receive the at least one second location of the exterior surface of the at least one sub-chamber.

[0009] Preferably, the at least one sub-chamber comprises an internal chamber incorporated within the main chamber.

[0010] Preferably, the internal chamber is of cylindrical configuration.

[0011] Preferably, the at least one internal chamber is adapted and arranged within the main chamber to reduce movement of the fluid during transportation of the fluid within the tank.

[0012] Preferably, the internal chamber is arranged within the main chamber such that it is surrounded in its entirety by the fluid incorporated within the main chamber.

[0013] Preferably, the tank is adapted to provide fluid to the at least one internal chamber from a fluid source exterior to the main chamber.

[0014] In one arrangement, the at least one first location of the exterior surface comprises a port to allow fluid communication between the main chamber and the at least one sub-chamber.

[0015] In an alternative arrangement, the at least one second location of the exterior surface comprises an aperture to allow fluid communication between a fluid source exterior to the main chamber and the at least one sub-chamber.

[0016] Preferably, the at least one internal chamber comprises first and second ends, the at least one internal chamber being arranged within the main chamber such that the first end and the second end may be accessed from the exterior of the main chamber.

[0017] According to a second aspect of the invention there is provided a method for assembling a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids, the method comprising the steps of:

providing a tank structure having a main chamber and at least one sub-chamber having an exterior surface defining an inner volume of the at least one sub-chamber, the at least one sub-chamber arranged with respect to the main chamber such that at least one first location of the exterior surface may be accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber and

providing at least one opening within the exterior surface to allow access of fluid into the at least one sub-chamber wherein the at least one opening openings may be provided at either the at least one first location to allow access of fluid of the main chamber into the sub-chamber so as to allow the tank to incorporate a single fluid or at the at least one second location to allow access of fluid from the a fluid source external to the main chamber so as to allow the tank to incorporate a plurality of fluids.

[0018] Preferably, the method further comprises attaching pre-fabricated items to the tank so as to customise the tank to becoming a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids.

[0019] In an arrangement, the pre-fabricated items comprise a pre-fabricated water spraying bar.

[0020] In an alternative arrangement, the pre-fabricated items comprise a pre-fabricated manifold and an attachment, the manifold comprising a plurality of conduits being adapted to be fluidly connected to the at least one second location of the exterior surface and the attachment defining a service area adapted to be in fluid communication with the manifold so as to deliver and receive fluid.

[0021] According to a third aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber and at least one sub-chamber, the sub-chamber comprising first and second ends wherein the at least one internal chamber is arranged within the main chamber such that the first end and the second end may be accessed from the exterior of the main chamber.

[0022] Preferably, the first and second ends are releasably closed so as to allow opening of the first end and second end.

[0023] Preferably, the first and second ends are adapted to be opened simultaneously. This arrangement is particularly useful because it facilitates cleaning of the at least one internal chamber by allowing delivery of cleaning fluid through the top end of the internal chamber and exiting of the cleaning fluid through the bottom end of the internal chamber.

[0024] Preferably, the at least one sub-chamber is of cylindrical configuration. This facilitates cleaning of the interior of the at least one sub-chamber.

[0025] Preferably, the main chamber comprises a top end and a bottom end, the first end of the internal chamber being located at the top end and the second end of the internal chamber being located at the bottom end.

[0026] According to a fourth aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber and at least one sub-chamber, the at least one sub-chamber being incorporated in its entirety inside the main chamber.

[0027] Preferably, the at least one sub-chamber is adapted for reducing movement of the fluid within the main chamber.

[0028] Preferably, the tank comprises means for reducing movement of the fluid within the main chamber.

[0029] Preferably, the means for reducing movement of the fluid within the main chamber comprises plates joining the at least one chamber with at least one wall of the main chamber.

[0030] Preferably, there are a plurality of sub-chambers incorporated inside the main chamber.

[0031] Preferably, the plurality of sub-chambers are attached to each other and are attached to the wall defining the main chamber through the means for reducing movement of the fluid within the main chamber.

[0032] Preferably, the means for reducing movement of the fluid within the main chamber comprises plates arranged at different locations with respect to the height of the plurality of sub-chambers.

[0033] Preferably, the plates are alternately attached to the upper portion and the lower portion of the sub-chambers.

[0034] Preferably, the means for reducing movement of the fluid within the main chamber are adapted to allow movement of maintenance personnel within the tank.

[0035] According to a fifth aspect of the invention there is provided a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids, the tank comprising a tank structure having a main chamber and at least one sub-chamber having an exterior surface defining an inner volume of the at least one sub-chamber, the at least one sub-chamber arranged with respect to the main chamber such that at least one first location of the exterior surface may be accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber and at least one opening within the exterior surface to allow access of fluid into the at least one sub-chamber wherein the at least one opening is located at either the at least one first location to allow access of fluid of the main chamber into the sub-chamber so as to allow the tank to incorporate a single

fluid or at the at least one second location to allow access of fluid from the a fluid source external to the main chamber so as to allow the tank to incorporate a plurality of fluids.

[0036] Preferably, the tank further comprises pre-fabricated items to the tank so as to customise the tank to becoming a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids.

[0037] Preferably, the pre-fabricated item comprises a pre-fabricated water spraying bar.

[0038] Preferably, the pre-fabricated items comprise a pre-fabricated manifold and an attachment, the manifold comprising a plurality of conduits being adapted to be fluidly connected to the at least one second location of the exterior surface and the attachment defining a service area adapted to be in fluid communication with the manifold so as to deliver and receive fluid.

[0039] Preferably, the pre-fabricated items are configured such that the plurality of conduits can be fluidly connected to the at least one second location of the exterior surface and the manifold can be fluidly connected to the service area via tubes, wherein all of the tubes have the same length.

[0040] Preferably, the length of the tubes is about 400 mm.

[0041] According to a sixth aspect of the invention there is provided a truck incorporating a tank according to the first, third to fifth aspect of the invention.

[0042] According to a seventh aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber having an exterior surface defining an inner volume adapted to receive a first fluid, and at least one sub-chamber having an exterior surface defining an inner volume, the at least one sub-chamber having at least one first and second locations, the first location being adapted to be selectively displaced between an open condition and a closed condition to either allow or impede flow of the first fluid into the inner volume of the sub-chamber and the second location being adapted to be selectively displaced between an open condition and a closed condition to allow flow of a second fluid into the inner volume of the sub-chamber, wherein the sub-chamber is arranged with respect to the main chamber such that the

first location may be accessed from a location within the main chamber and the second location may be accessed from the exterior of the chamber.

[0043] According to an eighth aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber and at least one sub-chamber, the main chamber having an exterior surface defining an inner volume adapted to receive the fluid, the sub-chamber having an exterior surface defining an inner volume of the sub-chamber, the exterior surface of the sub-chamber comprising first and second ends adapted to be selectively displaced between an open condition and a closed condition, wherein the at least one sub-chamber is arranged within the inner volume of the main chamber in such a manner such that the first end and the second end may be accessed from the exterior of the main chamber.

[0044] According to a ninth aspect of the invention there is provided a tank for storing at least one fluid comprising a main chamber having an exterior surface defining an inner volume adapted to receive a first fluid, and at least one sub-chamber having an exterior surface, the sub-chamber being contained within the inner volume of the main chamber, wherein the sub-chamber is arranged within the main chamber such that external surface of the sub-chamber is surrounded by the fluid incorporated within the main chamber.

[0044][0045] According to a tenth aspect of the invention there is provided a tank adapted to either incorporate a single first fluid or to incorporate the single first fluid and one or more second fluids, the tank comprising a tank structure having a main chamber comprising an external surface defining an inner volume adapted to receive the single first fluid, and at least one sub-chamber having an exterior surface defining an inner volume adapted to receive either the single first fluid or the one or more second fluids, the sub-chamber being arranged with respect to the main chamber such that at least one first location of the exterior surface of the sub-chamber may be accessed from the interior of the main chamber and at least one second location of the exterior surface of the sub-chamber may be accessed from a location exterior to the main chamber, wherein the first location comprises at least one first opening adapted to be selectively displaced between an open condition to allow access of the single first fluid into the sub-chamber and a closed condition to impede access of the single first fluid and wherein the second location comprises at least second opening adapted to be selectively displaced between an open condition and a closed condition to allow access of fluid

from the a fluid source external to the main chamber so as to allow the tank to incorporate a fluid of the one of more fluids.

BRIEF DESCRIPTION OF THE DRAWINGS

[0042][0046] Further features of the present invention are more fully described in the following description of several non-limiting embodiments thereof. This description is included solely for the purposes of exemplifying the present invention. It should not be understood as a restriction on the broad summary, disclosure or description of the invention as set out above. The description will be made with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a truck incorporating a tank in accordance with an embodiment of the invention;

Figure 2 is a rear perspective view of the truck shown in figure 1;

Figure 3 is a top perspective view of the truck shown in figure 1 depicting the interior of the tank;

Figure 4 is a top view of the interior of the tank incorporated in the truck shown in figure 1;

Figure 5 is a bottom perspective view of a first arrangement of the tank incorporated in the truck shown in figure 1;

Figure 6 is a bottom view of a second arrangement of the tank incorporated in the truck shown in figure 1;

Figure 7 is a front bottom perspective view of the second arrangement of the tank incorporated in the truck shown in figure 1;

Figure 8 is a front perspective view of the second arrangement of the tank incorporated in the truck shown in figure 1;

Figure 9 is cross-section bottom perspective view of a particular arrangement of the tank incorporated in the truck shown in figure 1;

Figure 10 is a bottom view of the attachment shown in figure 9 incorporating the service area 32;

Figure 11 is a side view of the attachment shown in figure 9 incorporating the service area 32;

Figure 12 is a perspective view of the attachment of the tank incorporated in the truck shown in figure 1;

Figure 13 is a rear perspective view of the interior of the tank showing an alternative baffle arrangement in accordance with an embodiment of the invention;

Figure 14 is a front perspective view of the interior of the tank showing the alternative baffle arrangement shown in figure 13;

Figure 15 is bottom perspective view of the an alternative arrangement of the tank in accordance with an embodiment of the invention;

Figure 16 is a is bottom perspective view of a further alternative arrangement of the tank in accordance with an embodiment of the invention;

Figure 17 shows the process of attaching the service area to the bottom of the tank in accordance with an embodiment of the invention;

Figure 18 shows an exploded view of an inner chamber in accordance with an embodiment of the invention; and

Figure 19 shows a side view of the inner chamber shown in figure 18.

DESCRIPTION OF EMBODIMENTS

[0043][0047] _____ Figures 1 to 3 show a truck 10 in accordance with an embodiment of the invention. The truck 10 comprises a cab 12 and a tank 14. The cab 12 and the tank 14 are supported on a chassis of the

truck 10. The cab 12 includes the compartment for the driver of the truck 14. The engine is located under the cab 12. Two pairs of wheels 16 are provided to allow displacement of the truck 10.

[0044][0048]_____The particular arrangement of the truck 10 shown in figures 1 and 8 comprises stairs 122 to facilitate access to the upper surface of the tank 14. For this the front wall of the tank 14 comprises at least one cut out adapted to receive the stairs 122. Figures 15 to 16 show a further particular arrangement of a tank 14. As shown in, for example, figure 15, the front wall of the tank 14 comprises a plurality of cut outs 102 and 104. The cut outs 102 and 104 are adapted to receive inserts 120 (see figure 8) for supporting, for example, a compressor (not shown) and the stairs 122. The arrangement also shows a cabin hood 106 extending outward from the front wall of the tank 14, The cabin hood 106 is adapted to cover the tank driver's cabin.

[0045][0049]_____Figures 4 to 8 and figures 15 and 16 show two arrangements of the tank 14 incorporated in the truck 10 shown in figures 1 to 3. As will be described in greater detail, in accordance with the present embodiment of the invention, the two arrangements of the tank 14 may be manufactured using the same type of tank structure 84. For this, the tank structure 84 is adapted to be customised to become either one of the two arrangements of the tank 14. The tank structure 84 is also adapted to receive a plurality of pre-fabricated parts in order to customise the tank 14. By applying specific pre-fabricated parts to the tank structure 84 any of the arrangements of the tank 14 may be manufactured. This is particularly advantageous because it allows manufacturing different types of tanks 14 in a relatively short period of time. Also, it reduces the working space and the number of personnel required for manufacturing the different type of tanks 14.

[0046][0050]_____Referring to figures 1 and 3, the tank 14 comprises a storage area 17. As will be described further one of the arrangements of the tank incorporates a service attachment 20. The storage area 17 is adapted to store fluids such as oil, fuels or water. The top portion 22 of the tank 14 provides a platform surrounded by a barrier 24. This area can be accessed from the cab 12 by the driver and users of the truck 10.

[0047][0051] As will be described in greater detail, the storage area 17 of the tank 14 comprises a main chamber 18 and at least one sub-chamber chamber 26. The sub-chamber 26 comprises at least one internal chamber 26 incorporated within the main chamber 18. In accordance with the present embodiment of the invention, the at least one internal chamber 26 is contained in its entirety within the main chamber 18. In the arrangement shown in the figures, there are eight internal chambers 26. The internal chambers 26 are of cylindrical configuration.

[0048][0052] The internal chambers 26 comprise a bottom end 38 and top end 40. The bottom ends 38 are supported on the bottom of the main chamber 18. The top ends 40 are adapted to be received by openings of the top of the tank 14. In this manner, the top ends 40 can be accessed from the top of the tank 14 (see figure 1). The bottom ends 38 are adapted to be received by indentations 60 of the bottom of the tank 14 (see figure 5). Figures 18 and 19 shows a particular arrangement of an inner chamber 26 adapted to be supported within the indentations 60. The bottom end 38 is supported on a wedge 96. The fact that the inner chambers 26 are supported on a wedge 96 allows for the longitudinal axis of the inner chambers to be parallel to the vertical axis of the tank 14. Further, a bottom ring 98 is attached to the bottom end of the inner chamber 26. The bottom ring 98 is adapted to receive gate 39 which allow opening and closing of the bottom end 38 of the inner chamber 26. The upper end 40 of the inner chamber 26 comprises an upper ring 100. The upper ring 100 is adapted to receive a gate 41 allow opening and closing of the upper end 40 of the inner chamber 26

[0049][0053] Access to the internal chambers 26 may be provided through the bottom and top ends 38 and 40. For this the bottom end 38 and the top end 40 comprises, respectively, the gates 39 and 41. The gates 39 and 41 are releasable attached to the respective ends of the internal chambers 26. This allows opening and closing of the top and bottom ends of the internal chambers 26 to provide access to the interior of the chambers 26.

[0050][0054] In accordance with the present embodiment of the invention, the gate 41 of the top end 40 comprises a plate

which is screwed onto the ring 100 of the top end 40 of the internal chamber 26 (see, for example, figure 4).

[0054][0055] Referring to figure 6, the gate 39 of the bottom end 38 is screwed onto the ring 98 of the bottom end 38 of the internal chamber 26. In the arrangement shown in figure 6, the gate 39 is of semi-circular configuration. Thus, only a portion of the bottom end 38 is releasably closed by the gate. Also, the gate 39 comprises bottom outlet and bottom inlets 28 to allow filling and emptying of the cylindrical chambers 26. An opening 29 is also provided in the plate. The opening 29 is adapted to receive sensing means for measuring the amount of fluid stored in the internal chamber 26.

[0052][0056] Further, as shown in figure 6, bottom outlets and inlets 28 are fluidly connected to conduits 65. The conduits 65 include ends 67 which extend parallel to the plate. As will be described in greater detail at a later stage, the ends are adapted to be fluidly connected to a fluid source and fluid delivery means for receiving or delivering fluid into or contained within the internal chamber 26.

[0053][0057] The tank 14 comprises a pair of longitudinal beams 30 to allow mounting of the tank 14 to the chassis of the truck 10.

[0054][0058] Further, the tank 14 comprises a service area 32 (see figure 9). The service area 32 is defined by the attachment 20 which is located at the rear bottom end of the tank 14. The service area 32 may be accessed through apertures 34 incorporated in the side walls 36 of the attachment 20.

[0055][0059] As mentioned before, the tank 14 comprises a main chamber 18 and a plurality of internal chambers 26 (the cylindrical chambers 26) for storing of a fluid or different type of fluids. In the arrangement shown in figure 3, the tank 14 comprises an array of eight cylindrical chambers 26.

[0056][0060] Pairs of the cylindrical chambers 26 are arranged longitudinally within the main chamber 18. Each cylindrical chamber 26 is attached via plates 42 to its respective adjacent cylindrical chamber 26. Also, each cylindrical chamber 26 is attached via a plate 42 to the inner surface of the wall of the main chamber 18. This secures the cylindrical chambers 26 within the main chamber 18.

[0057][0061] The plates 42 which attach the cylindrical chamber 26 to each other and to the inner surface of the wall are adapted and arranged in such a manner so as to reduce movement of the fluid within the tank as well as facilitating displacement of personnel within the tank 14. In this manner, the plates 42 act as baffles. The plates 42 have a height which is a fraction of the entire length of the cylindrical chamber 26 to which it is attached. This allows for the plates 42 to be attached to the cylindrical chamber 26 at either the upper portion of the cylindrical chamber 26 or the lower portion of the cylindrical chamber 26.

[0058][0062] In accordance with the present embodiment of the invention, the plates 42 are arranged at different locations with respect to the height of the plurality of sub-chambers. The plates 42 are alternatively attached to the upper and bottom portion of the cylindrical chambers 26. As shown in figure 4, the first and third pair of cylindrical chambers 26 are attached to each other by a plate 42 attached to the upper portion of the cylindrical chambers 26. The second and fourth pair of cylindrical chambers 26 are attached to each other by a plate 42 attached to the lower portion of the cylindrical chambers 26 (see figure 9). This arrangement is particular useful for reducing movement of the liquid within the main chamber 18.

[0059][0063] Figures 13 and 14 shows an alternative baffle arrangement with respect to the one shown in figures 3, 4 and 9. As shown in figures 13 and 14, the baffle arrangement comprises baffles 42a to 42h.

[0060][0064] The baffles 42a and 42f are located respectively at the front and rear of the tank 14. These baffles 42a and 42f attached the front and rear inner chambers 26 to the front and rear walls of the tank

14. The front baffles 42a include openings 46 which allow passage of fluid as well as of personnel during maintenance processes of the interior of the tank 14.

[0064][0065]_____The baffles 42b to 42e attach the inner chamber 26 to the side walls of the tank 14. There are two different type of baffles 42 which attach the inner chambers 26 to the side walls of the tanks 14. The two different type of baffles 42 are the first type of baffles 42b and 42d and the second type of baffles 42c and 42e

[0062][0066]_____Baffles 42b and 42d comprise a lower plate 108 and an upper support bar 110. The lower plate 108 extends between the inner chamber 26 and the side wall of the tank 14. The lower plate 108 comprises openings 46 which allow passage of fluid. The support bar 110 extends from the upper portion of the inner chamber towards the side wall of the tank 14. A portion of the bar 110 extends parallel to the side wall of the tank 14. This arrangement provides a clearance 112 above the lower plate 108 allowing passage of fluids as well of the maintenance personnel.

[0063][0067]_____The baffles 42 c and 42e comprise an upper plate 114 having an opening 46 for allowing passage of fluid. The opening is located at the upper corner adjacent the side wall of the tank 14. A support bar 116 extends along side the side wall of the tank 14 towards the floor of the tank 14 and extends along the floor of the tank 14 towards the inner chamber 26. This arrangement provides a clearance 118 below the upper plate 114 allowing passage of fluids as well of the maintenance personnel.

[0064][0068]_____The first type of baffles 42b, 42d and the second type of baffles 42c and 42e are arranged alternatively within the interior of the tank 14. In this manner, the particular baffle arrangement (shown in figures 13 and 14) comprises plates 108 and 114 which are alternatively attached to the upper and bottom portion of the cylindrical inner chambers 26. The plates 108 are attached at the lower portion of the inner chambers 26. The plates 114 are attached at the upper portion of the inner chambers.

[0065][0069]_____Further, the baffle arrangement shown in figures 13 and 14 also comprises plates 42 which attach the

inner chamber 26 to each other. There are a set of plates 42g and 42h. The plates 42g are arranged perpendicularly to the longitudinal axis of the tank 14 and located at the centre of the tank 14. The plates 42h are arranged parallel to the longitudinal axis of the tank 14.

[0066][0070]_____ In the particular arrangement shown in figures 13 and 14, the plates 42g are alternatively attached to the upper and bottom portion of the cylindrical inner chambers 26. There are two plates 42h located at each row of inner chambers 26. The front and rear inner chambers 26 are attached to their adjacent inner chamber 26 via the plates 42h. The plates 42h are located at the upper portion of the inner chambers 26.

[0067][0071]_____ The plates 42 that attach the cylindrical chambers 26 to the wall of the tank 14 are also alternatively attached to the upper and lower portion of the cylindrical chambers 26. As shown in figure 4, the first and third pair of cylindrical chambers 26 are attached to the tank 14 wall by a plate 42 attached to the lower portion of the cylindrical chambers 26. The second pair and fourth pair of cylindrical chambers 26 are attached to the tank 14 wall by the plate 42 attached on the upper portion of the cylindrical chambers 26. The front pair of cylindrical chambers 26 are attached via a pair of front plates 42 that extend from the outer circumference of the cylindrical chamber 26 to the front wall of the tank 14. The front plates 42 comprise an opening 46 to facilitate displacement of personnel within the main chamber 18 of the tank 14. The front plates 42 reduce movement of liquid from one side of the tank 14 to the other side of the tank 14. The rear pair of cylindrical chambers 26 are attached to the rear wall of the tank 14 via rear plates 42. The plates 42 secure the cylindrical chambers 26 within the main chamber 18.

[0068][0072]_____ Inner plumbing 44 is incorporated in the tank 14 to feed the main chamber 18 of the tank 14 with fluid to be stored in the main chamber 18. The inner plumbing 44 comprises a plurality of conduits 48, 49 and 50 extending longitudinally within the main chamber 18. A first conduit 48 is adapted to provide fluid to the top end of the tank 14. A pair of second conduits 49 and 50 is adapted to allow filling or emptying of the tank 14.

[0069][0073]_____ The first conduit 48 extends diagonally within the main chamber 18. In this manner a first end of the conduit

48 is attached to the bottom of the tank 14 and a second end (opposite to the first end) is located at an upper portion of the tank 14. As shown in figure 4, the conduit 48 comprises a section 52 extending perpendicularly from the main section of the conduit 48. In this manner, the second end is located at the upper front end corner of the tank 14. The extension 52 is adapted to be attached to fluid delivery means mounted on the top of the tank. The fluid delivery means may comprise a water cannon.

[0070][0074] _____ The first end of the conduit 48 is fluidly connected to an inlet 54 located at the rear bottom end of the tank 14 (see figure 6). This allows delivering the fluid to the fluid delivery means. In an arrangement, the inlet 54 is fluidly connected to the main chamber 18. This allows feeding the fluid delivery means with fluid contained in the main chamber 18.

[0071][0075] _____ The pair of second conduits 49 and 50 extends horizontally along the bottom surface of the main chamber 18. First ends of the conduits 49 and 50 are fluidly connected to inlets/outlets 58 and 59 located at the rear bottom end of the tank 14. Second ends of the conduits 49 and 50 are located at the front centre region of the tank 14. The second ends the conduits 49 and 50 are adapted to receive/deliver the fluid contained in the tank 14 for delivery to the inlet/outlets 58 and 59. This allows emptying or filling of the main chamber 18 of the tank 14. For this, the outlets 58 and 59 are fluidly connected to hoses 56 to allow delivery of the fluid. The hose 56 are included in the service area 32.

[0072][0076] _____ Figure 5 shows the bottom of the first arrangement of the tank 14. The bottom comprises an array of circular indentations 60. The array of circular indentations 60 is configured in the same manner as the array of cylindrical chambers 26 included in the tank 14. In this manner, each of the bottom ends 38 of the cylindrical chambers 26 may be located above one of the circular indentations 60. This allows access to the bottom ends 60 of the cylindrical chambers 26 from the exterior of the tank 14.

[0073][0077] _____ The cylindrical chambers 26 are adapted to be filled with fluid. In a first arrangement, the cylindrical chamber 26 may be filled with the fluid included in the main chamber 18. In this first arrangement, the cylindrical chambers 26 comprise ports 57 to allow entrance of the fluid as the main chamber 18 is being filled with the fluid.

[0074][0078] _____ In a second arrangement, the cylindrical chambers 26 may be filled with fluid which is not contained in the main chamber 18. In this second arrangement, the bottom ends 38 of the cylindrical chambers 26 include the plurality of inlet and outlets 28. The fluid is delivered into the cylindrical chamber 26 through exterior plumbing 62 located at the bottom portion of the tank 14 (see, for example, figures 6 and 7). The exterior plumbing 62 comprises a plurality of conduits 64 fluidly connected to the inlets and outlets 28 of the bottom end 38 of the cylindrical chambers 26.

[0075][0079] _____ As mentioned before, there are two arrangements of the tank 14 in accordance with the present embodiment of the invention. In a first arrangement, the main chamber 18 and the cylindrical chambers 26 are fluidly connected through ports 57 incorporated in the side walls of the cylindrical chamber 26. Thus, the cylindrical chambers 26 are filled during the filling process of the main chamber 18 with the fluid of the main chamber 18. Alternatively, the tank 14 may be filled by opening the gates 41 of the internal chambers 26 and delivering through the top ends 40 of the internal chambers 26 the fluid. This allows filling of the internal chambers 26 simultaneously with the main chamber 18. The main chamber 18 is filled as the fluid enters the internal chambers 26 because, as mentioned before, the internal chamber 26 comprise ports 57 which fluidly connect the interior of the internal chambers 26 with the main chamber 18.

[0076][0080] _____ In the second arrangement, the main chamber 18 is not fluidly connected to the cylindrical chambers 26. In this second arrangement, the cylindrical chambers 26 and the main chamber 18 are filled with different fluids. This arrangement allows filling the main chamber 18 with a fluid different than the fluid or fluids with which the cylindrical chambers 26 are being filled.

[0077][0081] _____ Figure 5 shows the first arrangement of the tank 14 in accordance with the present embodiment of the invention. As mentioned before, in the first arrangement of the tank 14, the cylindrical chambers 26 are fluidly connected to the main chamber 18. Each of the cylindrical chambers 26 comprises at least one port to allow entrance into each cylindrical chamber 26 of the fluid with which the main chamber 18 is being filled with. The ports

57 provide the fluid communication between the main chamber 18 and the interior of each of the cylindrical chambers 26. The first arrangement is particularly advantageous for storing and transporting a single fluid. For example, the first arrangement of the tank 14 may be used as a water tank 14. In this arrangement, the service area 32 may be omitted. Instead, a bar 90 comprising at least one water sprayer 92 may be attached to the rear end of the tank 14. The water sprayers are fluidly connected to the main chamber 18. This allows delivery of the fluid contained in the main chamber 18 to the water sprayers for, for example, spraying onto the ground to reduce the presence of dust in the air. Figure 15, shows a water tank 14 in accordance with a particular arrangement of the present embodiment of the invention.

[0078][0082] In the second arrangement of the tank 14, the main chamber 18 is filled with fluid separately from the cylindrical chambers 26. The main chamber 18 is filled with the exterior plumbing 62 included in the main chamber 18. The fluid to be stored in the cylindrical chambers 26 is fed into each of the cylindrical chambers 26 via the exterior plumbing 62 located at the bottom of the tank 14 (see, for example, figure 6). The inner chambers 26 may be also be filled with fluid through the top ends 40 of the internal chambers.

[0079][0083] As mentioned above, the second arrangement allows filling the main chamber 18 separately from the cylindrical chambers 26. This allows filling the main chamber 18 with a fluid different than the fluid with which the cylindrical chambers 26 are to be filled. Similarly, the cylindrical chambers 26 may be filled separately with respect to each other. In this manner, the cylindrical chambers 26 may be filled with different fluids.

[0080][0084] The fact that the cylindrical chambers 26 may be filled with different fluids with respect to each other is particularly advantageous. For example, the main chamber 18 may be filled with fuel and the cylindrical chambers 26 may be filled with different type of fluids such as engine oils or hydraulic fluids. In this manner, the tank 14 in accordance with the second arrangement may be incorporated in service trucks 10 for providing fuel and the different type of fluids to, for example, vehicles.

[0081][0085] As mentioned before, the cylindrical chambers 26 may be filled by opening the gates 41 for delivery of the

fluid through the top ends 40 of the internal chambers. Alternatively, filling of the cylindrical chambers 26 is conducted through exterior plumbing 62 located at the bottom of the tank 14. As shown in figure 6, the exterior plumbing 62 extends from the rear portion of the tank 14 to each of the cylindrical chambers 26. The exterior plumbing 62 is located between the support beams 30 of the tank 14 and is centred at the bottom of the tank 14. The exterior plumbing 62 comprises a manifold 69 comprising a plurality of conduits 64. The conduits 64 for a respective cylindrical chamber 26 are fluidly connected to the bottom inlet and outlets 28 of the respective cylindrical chamber 26.

[0082][0086]_____The conduits 64 extend longitudinally from the rear of the tank 14 to the respective cylindrical chamber 26. In particular, for each cylindrical chamber 26 there are three conduits 64 which extend between the support beams 30 and divert perpendicularly towards the bottom end 38 of the respective cylindrical chamber 26 (see figure 6). For this, the beams 30 include openings 66 allowing the conduits 64 to traverse the beams 30 and extend into the respective indentation 60 to be connected to the inlets and outlets 28 of the cylindrical chamber 26 to which the conduits 64 are fluidly attached.

[0083][0087]_____We refer now to figures 9 and 10. It should be noted that the figures 9 and 10 are schematic only. In the particular arrangement shown in figures 9 and 10 the conduits 64 are fluidly connected to four internal chambers 26. However, other arrangement in accordance with the present invention may include conduits 62 and 64 which are fluidly connected to all of the internal chambers.

[0084][0088]_____As shown in figures 9 and 10, the conduits 62 and 64 extend up to the inner side of the beams 30. At the outer side of the beams, opposite to the conduits 62 and 64 are conduits 65. In this arrangement, the conduits 65 are fluidly connected to the internal chambers 26 and to the conduits 64 and 62 of the manifold 69. One end of the conduits 65 is fluidly connected to the internal chamber 26 and other end of the conduits 65 is fluidly connected to the conduits 64 and 62. In figures 9 and 10 the connection between conduits 64 and 62 with the tubes 67. The tubes 67 traverse the beam 30 through openings 66 of the beams 30.

[0085][0089] The manifold 69 may be a prefabricated manifold adapted to be attached to the bottom end of the tank between the beams 30. As will be described with reference to the method for assembling the second arrangement of the tank 14, the fact that the manifold 69 is prefabricated facilitates assembly of the second arrangement of the tank 14.

[0086][0090] The conduits 64 allow filling and emptying the cylindrical chambers 26 with fluid. As mentioned before, the conduits 64 are fluidly connected to hoses 56 which are located in the service area 32. The connection between the hoses 56 and the conduits 62 and 64 is conducted via a distribution system 71. The distribution system 71 is fluidly connected to the conduits 64 via tubes 67 and the distribution system 71 is connected to the hoses 56 via conduits 73. The distribution system 71 is adapted to distribute the fluid from the internal chambers 67 to the hoses 56 and vice versa.

[0087][0091] In accordance to the present embodiment of the invention, the tubes 67 which fluidly connect the conduits 62 and 64 with the conduits 65 as well as the conduits 62 and 64 with the distribution system 71 are all of the same length. In order for the tubes 67 to be all of the same length the dimensions of the manifold (including the conduits 62 and 64) and of the conduits 73 are configured such that after installing the manifold 69 and the conduits 73 in conjunction with the distribution system 71 fluidly connecting these elements (conduits 62 and 64, distribution system 71 and conduits 73) is done via tubes 67 that have all the same length. In a particular arrangement of the present embodiment of the invention, the tubes have a length of 400 mm.

[0088][0092] In alternative arrangements of the present embodiment of the invention, the distribution system 71 may be omitted. Instead there are an additional four conduits 73 which in conjunction with the conduits 73 shown in figure 10 define a set of 8 conduits 73 which are fluidly connected to the hoses 56 of the service area. In this particular arrangement, each of the eight conduits 73 is fluidly connected to one of the conduits 62 and 64 via the tubes 67. As mentioned, before, the conduits 62, 64 and 73 are configured such that the tubes 67 which connect the conduits 62 and 64 with the conduits 73 are all of the same size.

In a particular arrangement of the present embodiment of the invention, the tubes have a length of 400 mm.

[0089][0093]_____The fact that the tubes 67 are all of the same length is particularly advantageous. This is because the size of the tubes for fluidly connecting the conduits 62, 64 and 73 is standardised. Thus, during maintenance and repair the personnel only need to have tubes that have the same size. This facilitates the maintenance and repair procedure in view that it not necessary to have a plurality of tubes of different length and no time is wasted by deciding which tube of specific length is appropriate for fluidly connecting the any of the conduits 62, 64 and 73 and the distribution system 71 with respect to each other.

[0090][0094]_____The service area 32 comprises a plurality of reels 59 incorporating the hoses 56 (see figure 11). The hoses 56 are adapted to be fluidly connected to the conduits 64 to allow filling of the cylindrical chambers 26 of the tank 14 as well as to deliver the fluid stored in the tank 14. Conduits 92 allow fluidly communicating the hoses 56 with the cylindrical chambers 26. Filtering means 94 may be provided for filtering of the fluid stored in the tank 14. The service area 32 comprises apertures 34 which allow access to the interior of the service area 32. Reels 59 for storing the hoses 56 are arranged such that hoses 56 can be accessed from the apertures 34. The service area 32 may also include control panels 94 for controlling and monitoring the filling and emptying of the tank 14 and the inner chambers 26 as well as the delivery of the fluids via the hoses 56.(see figure 16.

[0094][0095]_____Referring now to figure 12, the service area 32 is incorporated in an attachment 20 adapted to be attached to the bottom rear end of the tank 14. The attachment 20 comprises a frame 68 covered by sheets 70 defining the service area 32. The sheets 70 enclose the frame 68 so as to define the service area 32. There are a front sheet 72, two side sheets 74 and a rear sheet 76. The side sheets 74 and the rear sheet 76 include apertures to provide access to the interior of the service area 32. The apertures may include doors to seal the interior of the attachment 20. The front sheet 72 has a curved configuration in order to be able to be attached to the rear bottom end of the tank 14 to avoid interference with the wheels 16 during movement of the truck 10 incorporating the tank 14.

[0092][0096]_____The attachment 20 is adapted to be attached to the rear bottom of the tank 14 shown in figure 13. For this, as shown in figure 12, the frame 68 of the attachment 20 includes an upper beam 78 to which the longitudinal beams 30 (attached to the bottom of the tank 14, see figure 5) are attached. The front sheet 78 of the space includes indentations 80 adapted to receive the longitudinal beams 30. Curved pads 82 are provided on each upper corners of the attachment 20 adapted to contact the bottom round edges of the tank 14 during fastening of the attachment 20 to the rear bottom end of the tank 14. In accordance with the present embodiment of the invention, the attachment 20 is prefabricated attachment which may be attached to the bottom end of the tank 14 during manufacture of the second arrangement of the tank 14. Figure 17 shows the process of attaching the attachment 20 to the bottom of the tank 14. As will be described with reference to the method for assembling the second arrangement of the tank 14, the fact that the attachment 20 is prefabricated facilitates assembling of the second arrangement of the tank 14.

[0093][0097]_____An embodiment of the invention also includes a method for assembling the tank 14 in accordance with the first and second arrangements of the tank 14.

[0094][0098]_____The method for manufacturing the first and second arrangement of the tank 14 initiates by providing a structure 84 of the tank 14 as shown in figure 4. The tank structure 84 comprises a housing 86 defining the main chamber 18. The plurality of cylindrical chambers 26 are incorporated within the housing 86 of the tank structure 84 as has been previously described. The tank structure 84 comprises the longitudinal support beams 30 to allow attachment of the tank 14 to the chassis of the truck 10.

[0095][0099]_____It is particularly advantageous to manufacture the tank structure 84 as described in the previous paragraphs. This is because the same type of tank structure 84 may be used for manufacturing any of the arrangements of the tank 14 in accordance with the present embodiment of the invention.

[0096][00100]_____In order to manufacture the first arrangement of the tank 14 the cylindrical chambers 26 need to be

adapted to allow entrance of fluid within the cylindrical chamber 26. This is accomplished by, for example, cutting ports 57 into the side walls of the cylindrical chambers 26 (see figure 9). The ports 57 allow fluid to enter the cylindrical chambers 26 as the main chamber 18 is filled with fluid. After cutting the ports 57 into the side wall, the tank 14 is sealed by locating the top on the tank 14.

[0097][00101] At this stage, the service attachment 20 may be attached to the rear bottom end of the tank 14. The attachment 20 includes the reels 59 for holding hoses 56 that are fluidly connected to the interior of the tank 14. The fluid connection is accomplished by connecting the hoses 56 to the inlets/outlets 58 and 59 of the main chamber 18 of the tank 14. The hoses 56 allow filling and extraction of the fluid within the main chamber 18 and the cylindrical chamber 26 of the tank 14.

[0098][00102] Alternatively, as mentioned before, a bar 90 incorporating at least one water sprayer 92 may be attached to the rear end of the tank 14. In this particular arrangement, the inlets/outlets 58 and 59 are fluidly connected to the bar incorporating the water sprayers.

[0099][00103] For manufacturing the second arrangement of the tank 14, no ports 57 are cut into the side walls of the cylindrical chambers 26. Instead, inlets and outlets 28 are cut into the bottom ends 38 of the cylindrical chambers 26. After the outlets and inlets 28 have been cut, the external plumbing 62 is connected to the bottom of the tank 14 and fluidly connected to the cylindrical chambers 26 through the outlets and inlets 28. As mentioned before, the external plumbing 62 includes a pre-fabricated manifold 69 which is attached between the beams 30 at the bottom of the tank 14. The fact that the manifold is a pre-fabricated manifold is particularly advantageous because it facilitates and reduces the time required for connecting the external plumbing 62 in contrast if each of the conduits 64 needs to be attached separately to the bottom end of the tank 14.

[00100][00104] At this stage, the attachment 20 providing the service area 32 is attached to the tank 14 and the external plumbing 62 is fluidly connected to the hoses 56 within the service area 32 (see figure 17). This allows extraction of the fluid from the cylindrical chambers 26 or filling of the cylindrical chambers 26 through the hoses 56. Also, the openings 54, 58 and 59 of the

main chamber 18 are fluidly connected to the respective hoses 56 within the service attachment 20 to allow emptying or filling of the main chamber 18. The tank 14 may then be sealed by attaching the top on the upper portion of the tank 14.

[00104][00105] Referring to figure 10, the manifold 69 is fluidly connected to conduits 92 of the service area 32. In this manner the fluid can be delivered to the internal chambers 26 as well as received from the internal chambers 26.

[00102][00106] After manufacture of either the first or the second arrangement of the tank 14, the tank 14 is mounted to the chassis of the truck 10. Additional features such as a barrier 24 surrounding the top of the tank 14 may be added at this stage.

[00103][00107] It is evident that the present embodiment of the invention provides an efficient and useful method for assembling the first and second arrangement of the tank 14. The fact that the tank structure 84 comprises at least one internal chamber 26 (the cylindrical chambers 26) within the main chamber 18 of the tank 14 is particularly advantageous because it allows using the tank structure 84 for either the first or the second arrangement.

[00104][00108] Another advantage of the present embodiment of the invention is that the inclusion of at least one internal chamber 26 inside the main chamber 18 reduces the movement of the fluid located within the main chamber 18 during transportation of the fluid. This is because the internal chambers 26 acts as obstacles to the movement of the fluid located within the main chamber 28 as the truck is moving. This is particularly true because, in accordance with the present embodiment of the invention, the internal chambers 26 are located in their entirety within the main chamber 18 of the tank 24.

[00105][00109] Further advantages are the facts that access to the internal chambers 26 as well as to the external plumbing 62 is provided through the bottom of the tank 14. In this manner the tank 14 and the external conduits 62 (in view that the conduits 62 are not concealed within the tank 14) can be serviced from the bottom of the tank. Thus, there is no need to access the top of the tank 14. Thus, reducing the risks of injury during servicing of the tank 14.

117

[00406][00110] As mentioned before, in accordance with the present embodiment of the invention, the internal chambers 26 are of cylindrical configuration. To provide the internal chamber 26 with a cylindrical configuration is particularly advantageous. This is because the cylindrical configuration provides greater strength to the internal chambers. Also, the fact that internal chambers 26 are of cylindrical configuration reduces the risk of cross-contamination of the fluids located within the internal chambers 26 and the main chamber 18. This is because cylinders do not include corners (as is the case in polygonal shapes) which may be easily ruptured.

[00407][00111] Further, the fact the internal chambers 26 are of cylindrical configuration facilitates determining the amount of fluid contained in the internal chambers 26. In fact, it appears that a single sensing mean is sufficient to measure the amount of fluid occupying a cylindrical chamber.

[00408][00112] Moreover, it is particularly easy for personnel to move within the main chamber 18. This is because, the interior of the main chamber 18 incorporating the at least one internal chamber 26 is arranged and fastened within the main chamber 18 in such a manner that personnel can walk within the main chamber 18 with relatively easiness.

[00409][00113] Also, as mentioned before, the cylindrical chambers have top and bottom ends which may be opened simultaneously. This arrangement is particularly advantageous because it allows accessing the interior of the internal chambers 26 from its top end and/or bottom end. Accessing the interior of the internal chamber 26 from the top end is advantageous because it allows filling the internal chambers 26 from the top of tank 14. The fact that the top and bottom ends of the internal chambers 26 may be opened simultaneously facilitates cleaning of the internal chambers 26 because it allows hosing the interior of the internal chambers 26 from the top of the tank towards the bottom end of the internal chamber. The cylindrical configuration of the internal chambers 26 also facilitates scrubbing of the interior of the internal chamber 26 because no corners are provided within the internal chambers 26.

[00110][00114] _____ Modifications and variations as would be apparent to a skilled addressee are deemed to be within the scope of the present invention.

[00111][00115] _____ Further, it should be appreciated that the scope of the invention is not limited to the scope of the embodiments disclosed. For example, in a particular arrangement of the second arrangement of the tank 14, one or at least some of the cylindrical chambers may include ports 57 to allow to be filled with the fluid included in the main chamber 18. This arrangement is particularly useful because it allows providing tanks 14 with main chambers having different volumes for storing the fluid. On occasions, it is desired that the main chamber 18 of a tank 14 stores an amount of fluid greater than the amount of fluid that can be stored in the second arrangement of the tank 14. To increase the volume of the main chamber 18, ports 57 are cut into specific cylindrical chambers 26 (see figure 9). As mentioned before, the ports 57 allow fluid of the main chamber 18 to enter the cylindrical chambers 26. Thus, the cylindrical chambers 26 in which ports 57 have been cut provide an additional storage place for the fluid that is to be stored in the main chamber. In this manner the main chamber 18 of the second arrangement of the tank 14 can be increased.

[00112][00116] _____ Also, the scope of the invention is not limited to the handling of fluids. Other type of materials could be stored in the main chamber 18 and the internal chambers 26. Moreover, the invention is not limited to tanks adapted to be mounted on trucks. The present invention may be applied to any type container for handling any type of materials.

[00113][00117] _____ Throughout the specification and claims, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

[00114][00118] _____ Throughout this specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a

stated integer or group of integers but not the exclusion of any other integer or group of integers.

#4
120

WRAYS

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12 March 2014

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Dear Madam

International Patent Application PCT/AU2012/001505
Gecko Tanks Pty Ltd
Truck Body
Our ref: 209040:PH:wm

We refer to the written opinion dated 13 March 2014 issued in respect of this application. Under Article 34, we file herewith replacement claims, along with the marked-up copy showing the amendments made to the claims filed with our response dated 8 November 2013.

Claim Amendments

Claim 7 has been amended to make dependent on claims 5 or 6. In this manner, the lack of antecedent basis for the term "internal chamber" has been corrected.

Claim 20 has been amended to include the content of former claim 22. Former claim 22 has been deleted. And, former claims 23 and 24 - now claims 22 and 23 - has been made dependent, respectively, on claims 20 or 21 and any one of claims 20 to 22.

Further, former claims 24 to 37 has been renumbered as claims 23 to 36 amending the dependency of any dependent claims accordingly.

No new matter has been added.

Novelty and Inventive Objections

The Examiner has objected to former claims 20, 21 and 24. But, the examiner has considered claim 22 novel and inventive.

Claim 20 has been amended to include the content of claim 22. Thus, amended claim 20 is novel and inventive as well as claims 21 and 24 in view of now being dependent on novel and inventive claim 20.

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Accordingly, we respectfully request the Examiner withdraw the objections in light of the above described amendments to the claims.

Yours faithfully
WRAYS .



Peter Hille
Associate

Encl: Replacement claims

121
122

CLAIMS

1. A tank for storing at least one fluid comprising a main chamber having an exterior surface defining an inner volume adapted to receive a first fluid, and at least one sub-chamber having an exterior surface defining an inner volume, the at least one sub-chamber having at least one first and second locations, the first location being adapted to be selectively displaced between an open condition and a closed condition to either allow or impede flow of the first fluid into the inner volume of the sub-chamber and the second location being adapted to be selectively displaced between an open condition and a closed condition to allow flow of a second fluid into the inner volume of the sub-chamber, wherein the sub-chamber is arranged with respect to the main chamber such that the first location may be accessed from a location within the main chamber and the second location may be accessed from the exterior of the chamber.
2. A tank according to claim 1 wherein the main chamber comprises an exterior surface defining an inner volume containing the sub-chamber wherein the exterior surface of the main chamber comprises at least one aperture adapted to receive the second location of the exterior surface of the sub-chamber.
3. A tank according to claims 1 or 2 wherein the at least one sub-chamber comprises an internal chamber incorporated within the main chamber.
4. A tank according to claim 3 wherein the internal chamber is of cylindrical configuration.
5. A tank according to claims 3 or 4 wherein the at least one internal chamber is adapted and arranged within the main chamber to reduce movement of the first fluid during movement of the tank.
6. A tank according to any one of claims 3 to 5 wherein the internal chamber is arranged within the main chamber such that the internal chamber is surrounded by the first fluid incorporated within the main chamber.
7. A tank according to claims 5 or 6 wherein the tank is adapted to provide the second fluid to the internal chamber from a fluid source exterior to the main chamber.

8. A tank according to any one of the preceding claims wherein the at least one first location of the exterior surface comprises a port to allow fluid communication between the main chamber and the at least one sub-chamber.
9. A tank according to any one of the preceding claims wherein the at least one second location of the exterior surface comprises an aperture to allow fluid communication between a fluid source exterior to the main chamber and the at least one sub-chamber.
10. A tank according to any one of claims 3 to 5 wherein the internal chamber comprises an exterior surface defining an inner volume of the internal chamber, the exterior surface comprising first and second ends adapted to be selectively displaced between an open condition and a closed condition, wherein the internal chamber is arranged within the inner volume of the main chamber such that the first end and the second locations may be accessed from the exterior of the main chamber.
11. A method for assembling a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids, the method comprising the steps of:

providing a tank structure having a main chamber and at least one sub-chamber having an exterior surface defining an inner volume of the at least one sub-chamber, the at least one sub-chamber arranged with respect to the main chamber such that at least one first location of the exterior surface may be accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber and

providing at least one opening within the exterior surface to allow access of fluid into the at least one sub-chamber wherein the at least one opening openings may be provided at either the at least one first location to allow access of fluid of the main chamber into the sub-chamber so as to allow the tank to incorporate a single fluid or at the at least one second location to allow access of fluid from the a fluid source external to the main chamber so as to allow the tank to incorporate a plurality of fluids.

123
174

12. A method according to claims 11 further comprising attaching pre-fabricated items to the tank so as to customise the tank to becoming a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids.
13. A method according to claims 11 or 12 wherein the pre-fabricated item comprises a pre-fabricated water spraying bar.
14. A method according to claims 11 or 12 wherein the pre-fabricated items comprise a pre-fabricated manifold and an attachment, the manifold comprising a plurality of conduits being adapted to be fluidly connected to the at least one second location of the exterior surface and the attachment defining a service area adapted to be in fluid communication with the manifold so as to deliver and receive fluid.
15. A tank for storing at least one fluid comprising a main chamber and at least one sub-chamber, the main chamber having an exterior surface defining an inner volume adapted to receive the fluid, the sub-chamber having an exterior surface defining an inner volume of the sub-chamber, the exterior surface of the sub-chamber comprising first and second ends adapted to be selectively displaced between an open condition and a closed condition, wherein the at least one sub-chamber is arranged within the inner volume of the main chamber such that the first end and the second end may be accessed from the exterior of the main chamber.
16. A tank according to claim 15 wherein the exterior surface of the sub-chamber comprises at least one opening adapted to be selectively displaced between an open and a closed condition to either allow or impede the fluid into the inner volume of the sub-chamber.
17. A tank according to claims 15 or 16 wherein the first and second ends are adapted to be simultaneously maintained in the open condition.
18. A tank according to claims 16 or 17 wherein the at least one sub-chamber is of cylindrical configuration.

- 124
125
19. A tank according to any one of claims 15 to 18 wherein the main chamber comprises an upper end and a bottom end, the first end of the internal chamber being located at the upper end and the second end of the internal chamber being located at the bottom end.
 20. A tank for storing at least one fluid comprising a main chamber having an exterior surface defining an inner volume adapted to receive a first fluid, at least one sub-chamber having an exterior surface contained within the inner volume of the main chamber and means for reducing movement of the fluid within the main chamber, wherein the sub-chamber is arranged within the main chamber such that external surface of the sub-chamber is surrounded by the fluid incorporated within the main chamber.
 21. A tank according to claim 20 wherein the at least one sub-chamber is adapted to reduce movement of the fluid within the main chamber.
 22. A tank according to claims 20 or 21 wherein the means for reducing movement of the fluid within the main chamber comprises plates joining the at least one sub-chamber with at least one wall of the main chamber.
 23. A tank according to any one of claims 20 to 22 wherein there are a plurality of sub-chambers incorporated inside the main chamber.
 24. A tank according to claim 23 wherein the plurality of sub-chambers are attached to each other and are attached to the wall defining the main chamber through the means for reducing movement of the fluid within the main chamber.
 25. A tank according to any one of claims 20 to 24 wherein the means for reducing movement of the fluid within the main chamber comprises plates arranged at different locations with respect to the height of the plurality of sub-chambers.
 26. A tank according to claim 25 wherein the plates are alternatingly attached to the upper portion and the lower portion of the sub-chambers.

27. A tank according to any one of claims 20 to 26 wherein the means for reducing movement of the fluid within the main chamber are adapted to allow movement of the maintenance personnel within the tank.
28. A tank adapted to either incorporate a single first fluid or to incorporate the single first fluid and one or more second fluids, the tank comprising a tank structure having a main chamber comprising an external surface defining an inner volume adapted to receive the single first fluid, and at least one sub-chamber having an exterior surface defining an inner volume adapted to receive either the single first fluid or the one or more second fluids, the sub-chamber being arranged with respect to the main chamber such that at least one first location of the exterior surface of the sub-chamber may be accessed from the interior of the main chamber and at least one second location of the exterior surface of the sub-chamber may be accessed from a location exterior to the main chamber, wherein the first location comprises at least one first opening adapted to be selectively displaced between an open condition to allow access of the single first fluid into the sub-chamber and a closed condition to impede access of the single first fluid and wherein the second location comprises at least second opening adapted to be selectively displaced between an open condition and a closed condition to allow access of fluid from the a fluid source external to the main chamber so as to allow the tank to incorporate a fluid of the one of more fluids.
29. A tank according to claim 28 further comprising pre-fabricated items to the tank so as to customise the tank to becoming a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids.
30. A tank according to claims 28 or 29 wherein the pre-fabricated item comprises a pre-fabricated water spraying bar.
31. A tank according to claims 28 or 29 wherein the pre-fabricated items comprise a pre-fabricated manifold and an attachment, the manifold comprising a plurality of conduits being adapted to be fluidly connected to the at least one second location of the exterior surface and the attachment defining a service area adapted to be in fluid communication with the manifold so as to deliver and receive fluid.

- 126
127
32. A tank according to claim 31 wherein the pre-fabricated items are adapted such that the plurality of conduits can be fluidly connected to the at least one second location of the exterior surface and the manifold can be fluidly connected to the service area via tubes, wherein all of the tubes have the same length.
33. A tank according to claim 32 wherein the length of the tubes is about 400 mm.
34. A truck incorporating a tank according to any one of claims 1, 15, 20 and 28.
35. A tank as herein described with reference to the figures of the accompanying drawings.
36. A method for assembling a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids as herein described with reference to the figures of the accompanying drawings.

CLAIMS

1. A tank for storing at least one fluid comprising a main chamber having an exterior surface defining an inner volume adapted to receive a first fluid, and at least one sub-chamber having an exterior surface defining an inner volume, the at least one sub-chamber having at least one first and second locations, the first location being adapted to be selectively displaced between an open condition and a closed condition to either allow or impede flow of the first fluid into the inner volume of the sub-chamber and the second location being adapted to be selectively displaced between an open condition and a closed condition to allow flow of a second fluid into the inner volume of the sub-chamber, wherein the sub-chamber is arranged with respect to the main chamber such that the first location may be accessed from a location within the main chamber and the second location may be accessed from the exterior of the chamber.
2. A tank according to claim 1 wherein the main chamber comprises an exterior surface defining an inner volume containing the sub-chamber wherein the exterior surface of the main chamber comprises at least one aperture adapted to receive the second location of the exterior surface of the sub-chamber.
3. A tank according to claims 1 or 2 wherein the at least one sub-chamber comprises an internal chamber incorporated within the main chamber.
4. A tank according to claim 3 wherein the internal chamber is of cylindrical configuration.
5. A tank according to claims 3 or 4 wherein the at least one internal chamber is adapted and arranged within the main chamber to reduce movement of the first fluid during movement of the tank.
6. A tank according to any one of claims 3 to 5 wherein the internal chamber is arranged within the main chamber such that the internal chamber is surrounded by the first fluid incorporated within the main chamber.
7. A tank according to ~~any one of claims 3-5 to or~~ 3-5 to or 6 wherein the tank is adapted to provide the second fluid to the internal chamber from a fluid source exterior to the main chamber.

8. A tank according to any one of the preceding claims wherein the at least one first location of the exterior surface comprises a port to allow fluid communication between the main chamber and the at least one sub-chamber.
9. A tank according to any one of the preceding claims wherein the at least one second location of the exterior surface comprises an aperture to allow fluid communication between a fluid source exterior to the main chamber and the at least one sub-chamber.
10. A tank according to any one of claims 3 to 5 wherein the internal chamber comprises an exterior surface defining an inner volume of the internal chamber, the exterior surface comprising first and second ends adapted to be selectively displaced between an open condition and a closed condition, wherein the internal chamber is arranged within the inner volume of the main chamber such that the first end and the second locations may be accessed from the exterior of the main chamber.
11. A method for assembling a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids, the method comprising the steps of:
- providing a tank structure having a main chamber and at least one sub-chamber having an exterior surface defining an inner volume of the at least one sub-chamber, the at least one sub-chamber arranged with respect to the main chamber such that at least one first location of the exterior surface may be accessed from the interior of the main chamber and at least one second location of the exterior surface may be accessed from a location exterior to the main chamber and
- providing at least one opening within the exterior surface to allow access of fluid into the at least one sub-chamber wherein the at least one opening openings may be provided at either the at least one first location to allow access of fluid of the main chamber into the sub-chamber so as to allow the tank to incorporate a single fluid or at the at least one second location to allow access of fluid from the a fluid source external to the main chamber so as to allow the tank to incorporate a plurality of fluids.

12. A method according to claims 11 further comprising attaching pre-fabricated items to the tank so as to customise the tank to becoming a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids.
13. A method according to claims 11 or 12 wherein the pre-fabricated item comprises a pre-fabricated water spraying bar.
14. A method according to claims 11 or 12 wherein the pre-fabricated items comprise a pre-fabricated manifold and an attachment, the manifold comprising a plurality of conduits being adapted to be fluidly connected to the at least one second location of the exterior surface and the attachment defining a service area adapted to be in fluid communication with the manifold so as to deliver and receive fluid.
15. A tank for storing at least one fluid comprising a main chamber and at least one sub-chamber, the main chamber having an exterior surface defining an inner volume adapted to receive the fluid, the sub-chamber having an exterior surface defining an inner volume of the sub-chamber, the exterior surface of the sub-chamber comprising first and second ends adapted to be selectively displaced between an open condition and a closed condition, wherein the at least one sub-chamber is arranged within the inner volume of the main chamber such that the first end and the second end may be accessed from the exterior of the main chamber.
16. A tank according to claim 15 wherein the exterior surface of the sub-chamber comprises at least one opening adapted to be selectively displaced between an open and a closed condition to either allow or impede the fluid into the inner volume of the sub-chamber.
17. A tank according to claims 15 or 16 wherein the first and second ends are adapted to be simultaneously maintained in the open condition.
18. A tank according to claims 16 or 17 wherein the at least one sub-chamber is of cylindrical configuration.

19. A tank according to any one of claims 15 to 18 wherein the main chamber comprises an upper end and a bottom end, the first end of the internal chamber being located at the upper end and the second end of the internal chamber being located at the bottom end.
20. A tank for storing at least one fluid comprising a main chamber having an exterior surface defining an inner volume adapted to receive a first fluid, ~~and at least one sub-chamber having an exterior surface contained within the inner volume of the main chamber~~ and means for reducing movement of the fluid within the main chamber, wherein the sub-chamber is arranged within the main chamber such that external surface of the sub-chamber is surrounded by the fluid incorporated within the main chamber.
21. A tank according to claim 20 wherein the at least one sub-chamber is adapted to reduce movement of the fluid within the main chamber.
- ~~22. A tank according to claims 20 or 21 wherein the tank further comprises means for reducing movement of the fluid within the main chamber.~~
- ~~23-22.~~ A tank according to claims 20 or 21-22 wherein the means for reducing movement of the fluid within the main chamber comprises plates joining the at least one sub-chamber with at least one wall of the main chamber.
- ~~24-23.~~ A tank according to any one of claims 20 to ~~23-22~~ wherein there are a plurality of sub-chambers incorporated inside the main chamber.
- ~~25-24.~~ A tank according to claim ~~24-23~~ wherein the plurality of sub-chambers are attached to each other and are attached to the wall defining the main chamber through the means for reducing movement of the fluid within the main chamber.
- ~~26-25.~~ A tank according to any one of claims ~~22-20~~ to ~~25-24~~ wherein the means for reducing movement of the fluid within the main chamber comprises plates arranged at different locations with respect to the height of the plurality of sub-chambers.
- ~~27-26.~~ A tank according to claim ~~26-25~~ wherein the plates are alternatingly attached to the upper portion and the lower portion of the sub-chambers.

131
132

~~28-27.~~ A tank according to any one of claims ~~23-20~~ to ~~27-26~~ wherein the means for reducing movement of the fluid within the main chamber are adapted to allow movement of the maintenance personnel within the tank.

~~29-28.~~ A tank adapted to either incorporate a single first fluid or to incorporate the single first fluid and one or more second fluids, the tank comprising a tank structure having a main chamber comprising an external surface defining an inner volume adapted to receive the single first fluid, and at least one sub-chamber having an exterior surface defining an inner volume adapted to receive either the single first fluid or the one or more second fluids, the sub-chamber being arranged with respect to the main chamber such that at least one first location of the exterior surface of the sub-chamber may be accessed from the interior of the main chamber and at least one second location of the exterior surface of the sub-chamber may be accessed from a location exterior to the main chamber, wherein the first location comprises at least one first opening adapted to be selectively displaced between an open condition to allow access of the single first fluid into the sub-chamber and a closed condition to impede access of the single first fluid and wherein the second location comprises at least second opening adapted to be selectively displaced between an open condition and a closed condition to allow access of fluid from the a fluid source external to the main chamber so as to allow the tank to incorporate a fluid of the one of more fluids.

~~30-29.~~ A tank according to claim ~~29-28~~ further comprising pre-fabricated items to the tank so as to customise the tank to becoming a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids.

~~31-30.~~ A tank according to claims ~~29-28~~ or ~~30-29~~ wherein the pre-fabricated item comprises a pre-fabricated water spraying bar.

~~32-31.~~ A tank according to claims ~~29-28~~ or ~~30-29~~ wherein the pre-fabricated items comprise a pre-fabricated manifold and an attachment, the manifold comprising a plurality of conduits being adapted to be fluidly connected to the at least one second location of the exterior surface and the attachment defining a service area adapted to be in fluid communication with the manifold so as to deliver and receive fluid.

~~33-32.~~ A tank according to claim ~~31~~32 wherein the pre-fabricated items are adapted such that the plurality of conduits can be fluidly connected to the at least one second location of the exterior surface and the manifold can be fluidly connected to the service area via tubes, wherein all of the tubes have the same length.

~~34-33.~~ A tank according to claim ~~33-32~~ wherein the length of the tubes is about 400 mm.

~~35-34.~~ A truck incorporating a tank according to any one of claims 1, 15, 20 and ~~29-28.~~

~~36-35.~~ A tank as herein described with reference to the figures of the accompanying drawings.

~~37-36.~~ A method for assembling a tank adapted to either incorporate a single fluid or to incorporate a plurality of fluids as herein described with reference to the figures of the accompanying drawings.

**REIVINDICACIONES MODIFICADAS
PARA REALIZAR EL EXAMEN DE
PATENTABILIDAD**

REIVINDICACIONES

1. Un tanque para almacenar al menos un fluido, CARACTERIZADO porque comprende una cámara principal que tiene una superficie exterior que define un volumen interno adaptado para recibir un primer fluido y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno, donde la al menos una sub-cámara tiene al menos una primera y segunda ubicación, donde la primera ubicación está adaptada para ser selectivamente desplazada entre una condición abierta y una condición cerrada ya sea para permitir o impedir el flujo del primer fluido en el volumen interno de la sub-cámara y la segunda ubicación que está adaptada para ser selectivamente desplazada entre una condición abierta y una condición cerrada para permitir el flujo de un segundo fluido en el volumen interno de la sub-cámara, donde la sub-cámara está dispuesta con respecto a la cámara principal de manera que se puede acceder a la primera ubicación desde una ubicación dentro de la cámara principal y se puede acceder a la segunda ubicación desde el exterior de la cámara.
2. Un tanque de acuerdo con la Reivindicación 1, CARACTERIZADO porque la cámara principal comprende una superficie exterior que define que volumen interno que contiene la sub-cámara donde la superficie exterior de la cámara principal comprende al menos una abertura adaptada para recibir la segunda ubicación de la superficie exterior de la sub-cámara.
3. Un tanque de acuerdo con las Reivindicaciones 1 o 2, CARACTERIZADO porque la al menos una sub-cámara comprende una cámara interna incorporada dentro de la cámara principal.
4. Un tanque de acuerdo con la Reivindicación 3, CARACTERIZADO porque la cámara interna tiene una configuración cilíndrica.
5. Un tanque de acuerdo con las Reivindicaciones 3 o 4, CARACTERIZADO porque la al menos una cámara interna está adaptada y dispuesta dentro de la cámara principal para reducir el movimiento del primer fluido durante el movimiento del tanque.

6. Un tanque de acuerdo con cualquiera de las Reivindicaciones 3 a 5, CARACTERIZADO porque la cámara interna está dispuesta dentro de la cámara principal de manera que la cámara interna esta rodeada por el primer fluido incorporado dentro de la cámara principal.
7. Un tanque de acuerdo con cualquiera de las Reivindicaciones 3 a 6, CARACTERIZADO porque el tanque está adaptado para proporcionar el segundo fluido a la cámara interna desde una fuente de fluido exterior a la cámara principal.
8. Un tanque de acuerdo con cualquiera de las Reivindicaciones anteriores, CARACTERIZADO porque la al menos una primera ubicación de la superficie exterior comprende un puerto para permitir la comunicación de fluido entre la cámara principal y la al menos una sub-cámara.
9. Un tanque de acuerdo con cualquiera de las Reivindicaciones anteriores, CARACTERIZADO porque la al menos una segunda ubicación de la superficie exterior comprende una abertura para permitir la comunicación de fluido entre una fuente de fluido exterior a la cámara principal y la al menos una sub-cámara.
10. Un tanque de acuerdo con cualquiera de las Reivindicaciones 3 a 5, CARACTERIZADO porque la cámara interna comprende una superficie exterior que define un volumen interno de la cámara interna, donde la superficie exterior comprende un primer y segundo extremo adaptados para desplazarse selectivamente entre una condición abierta y una condición cerrada, donde la cámara interna está dispuesta dentro del volumen interno de la cámara principal de manera que se pueda acceder al primer extremo y a la segunda ubicación desde el exterior de la cámara principal.
11. Un método para montar un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos, CARACTERIZADO porque el método comprende los pasos de:

proporcionar una estructura de tanque que tiene una cámara principal y la al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de la al menos una sub-cámara, donde la al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que la al menos una primera ubicación de la superficie exterior pueda

accederse desde el interior de la cámara principal y la al menos una segunda ubicación de la superficie exterior pueda accederse desde una ubicación exterior a la cámara principal y

proporcionar al menos una abertura dentro de la superficie exterior para permitir el acceso del fluido en la al menos una sub-cámara donde la al menos una abertura se puede proporcionar ya sea en la al menos una primera ubicación para permitir el acceso de fluido de la cámara principal en la sub-cámara de manera de permitir que el tanque incorpore un solo fluido o la al menos una segunda ubicación para permitir el acceso de fluido desde una fuente de fluido externo a la cámara principal de manera de permitir que el tanque incorpore una pluralidad de fluidos.

12. Un método de acuerdo con la Reivindicación 11, CARACTERIZADO porque comprende además fijar artículos prefabricados al tanque de manera de personalizar el tanque para que sea un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos.
13. Un método de acuerdo con las Reivindicaciones 11 o 12, CARACTERIZADO porque el artículo prefabricado comprende una barra prefabricada para pulverizar agua.
14. Un método de acuerdo con las Reivindicaciones 11 o 12, CARACTERIZADO porque los artículos prefabricados comprenden un colector prefabricado y un accesorio, donde el colector comprende una pluralidad de conductos adaptados para estar conectados de manera fluida con la al menos una segunda ubicación de la superficie exterior y donde el accesorio define un área de servicio adaptada para estar en comunicación fluida con el colector de manera de suministrar y recibir fluido.
15. Un tanque para almacenar al menos un fluido, CARACTERIZADO porque comprende una cámara principal y al menos una sub-cámara, donde la cámara principal tiene una superficie exterior que define un volumen interno adaptado para recibir el fluido, donde la sub-cámara tiene una superficie exterior que define un volumen interno de la sub-cámara, donde la superficie exterior de las sub-cámara comprende un primer y segundo extremo adaptado para

desplazarse selectivamente entre una condición abierta y una condición cerrada, donde la al menos una sub-cámara está dispuesta dentro del volumen interno de la cámara principal de manera que se pueda acceder al primer extremo y al segundo extremo desde el exterior de la cámara principal.

16. Un tanque de acuerdo con la Reivindicación 15, CARACTERIZADO porque la superficie exterior de la sub-cámara comprende al menos una abertura adaptada para desplazarse selectivamente entre una condición abierta y una condición cerrada ya sea para permitir o impedir el fluido en el volumen interno de la sub-cámara.
17. Un tanque de acuerdo con las Reivindicaciones 15 o 16, CARACTERIZADO porque el primer y segundo extremo están adaptados para mantenerse simultáneamente en la condición abierta.
18. Un tanque de acuerdo con las Reivindicaciones 16 o 17, CARACTERIZADO porque la al menos una sub-cámara tiene una configuración cilíndrica.
19. Un tanque de acuerdo con cualquiera de las Reivindicaciones 15 a 18, CARACTERIZADO porque la cámara principal comprende un extremo superior y un extremo inferior, donde el primer extremo de la cámara interna está ubicado en el extremo superior y el segundo extremo de la cámara interna está ubicado en el extremo inferior.
20. Un tanque para almacenar al menos un fluido, CARACTERIZADO porque comprende una cámara principal que tiene una superficie exterior que define un volumen interno adaptado para recibir un primer fluido, donde al menos una sub-cámara tiene una superficie exterior contenida dentro del volumen interno de la cámara principal y un medio para reducir el movimiento del fluido dentro de la cámara principal, donde la sub-cámara está dispuesta dentro de la cámara principal de manera que la superficie externa de la sub-cámara está rodeada por el fluido incorporado dentro de la cámara principal.
21. Un tanque de acuerdo con la Reivindicación 20, CARACTERIZADO porque la al menos una sub-cámara está adaptada para reducir el movimiento del fluido dentro de la cámara principal.

22. Un tanque de acuerdo con las Reivindicaciones 20 o 21, CARACTERIZADO porque el medio para reducir el movimiento del fluido dentro de la cámara principal comprende placas que unen la al menos una sub-cámara con al menos una pared de la cámara principal.
23. Un tanque de acuerdo con cualquiera de las Reivindicaciones 20 a 23, CARACTERIZADO porque existe una pluralidad de sub-cámaras incorporadas dentro de la cámara principal.
24. Un tanque de acuerdo con la Reivindicación 24, CARACTERIZADO porque la pluralidad de sub-cámaras están fijadas entre sí y están fijadas a la pared que define la cámara principal a través del medio para reducir el movimiento del fluido dentro de la cámara principal.
25. Un tanque de acuerdo con cualquiera de las Reivindicaciones 22 a 25, CARACTERIZADO porque el medio para reducir el movimiento del fluido dentro de la cámara principal comprende placas dispuestas en diferentes ubicaciones con respecto a la altura de la pluralidad de sub-cámaras.
26. Un tanque de acuerdo con la Reivindicación 26, CARACTERIZADO porque las placas están fijadas de manera alterna a la parte superior y la parte inferior de las sub-cámaras.
27. Un tanque de acuerdo con cualquiera de las Reivindicaciones 23 a 27, CARACTERIZADO porque los medios para reducir el movimiento del fluido dentro de la cámara principal están adaptados para permitir el movimiento del personal de mantenimiento dentro del tanque.
28. Un tanque adaptado ya sea para incorporar un único primer fluido o para incorporar el único primer fluido y uno o más segundos fluidos, CARACTERIZADO porque el tanque comprende una estructura del tanque que tiene una cámara principal que comprende una superficie externa que define un volumen interno adaptado para recibir el único primer fluido y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno adaptado para recibir ya sea el único primer fluido o el uno o más segundos fluidos, donde la sub-cámara está dispuesta con respecto a la cámara principal

de manera que la al menos una primera ubicación de la superficie exterior de la sub-cámara se pueda acceder desde el interior de la cámara principal y al menos una segunda ubicación de la superficie exterior de la sub-cámara se puede acceder desde una ubicación exterior a la cámara principal, donde la primera ubicación comprende al menos una primera abertura adaptada para desplazarse selectivamente entre una condición abierta para permitir el acceso del único primer fluido en la sub-cámara y una condición cerrada para impedir el acceso del único primer fluido y donde la segunda ubicación comprende al menos una segunda abertura adaptada para desplazarse selectivamente entre una condición abierta y una condición cerrada para permitir el acceso de fluido desde la fuente de fluido externa a la cámara principal de manera de permitir al tanque incorporar un fluido del uno o más fluidos.

29. Un tanque de acuerdo con la Reivindicación 29, CARACTERIZADO porque comprende además artículos prefabricados para el tanque de manera de personalizar el tanque para que sea un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos.
30. Un tanque de acuerdo con las Reivindicaciones 29 o 30, CARACTERIZADO porque el artículo prefabricado comprende una barra prefabricada para pulverizar agua.
31. Un tanque de acuerdo con las Reivindicaciones 29 o 30, CARACTERIZADO porque los artículos prefabricados comprenden un colector prefabricado y un accesorio, donde el colector comprende una pluralidad de conductos adaptados para estar conectados de manera fluida con la al menos una segunda ubicación de la superficie exterior y donde el accesorio define una área de servicio adaptada para estar en comunicación fluida con el colector de manera de suministrar y recibir fluido.
32. Un tanque de acuerdo con la Reivindicación 32, CARACTERIZADO porque, los artículos prefabricados están adaptados de manera que la pluralidad de conductos puedan estar conectados de manera fluida con la al menos una segunda ubicación de la superficie exterior y el colector pueda estar conectado

de manera fluida con el área de servicios a través de tubos, donde todos los tubos tienen la misma longitud.

33. Un tanque de acuerdo con la Reivindicación 33, CARACTERIZADO porque la longitud de los tubos es alrededor de 400 mm.
34. Un camión, CARACTERIZADO porque incorpora un tanque de acuerdo con cualquiera de las Reivindicaciones 1, 15, 20 y 29.
35. Un tanque según se describe en la presente con referencia a las figuras de los dibujos adjuntos.
36. Un método para el montaje de un tanque adaptado ya sea para incorporar un solo fluido o para incorporar una pluralidad de fluidos según se describe en la presente con referencia a las figuras de los dibujos adjuntos.

REPRESENTACION

REPRESENTATION

Yo (nosotros), abajo firmado (s)/I (we), the undersigned

GECKO TANKS PTY LTD

domiciliado (s) 322 Treasure Road
en/of WELSHPOOL WA 6107

Por el presente nombramos a CAVELIER ABOGADOS, sociedad colectiva constituida de conformidad con las leyes de la República de Colombia, mediante Escritura Pública No. 6233 del 10 de septiembre de 1974, otorgada en la Notaría Sexta del Círculo de Bogotá, domiciliada en Bogotá D.C., con matrícula mercantil No. 00820237 y NIT 860041367-3, domiciliada en la Carrera 4a N° 72-35, Bogotá, Colombia, como nuestra representante en todos los asuntos de Propiedad Industrial e Intelectual, con facultad para recibir notificaciones y nombrar apoderados judiciales o extrajudiciales.

CAVELIER ABOGADOS también podrá representarnos, con las mismas facultades arriba indicadas, ante cualesquiera entidades o personas, ejerzan o no jurisdicción, autoridades administrativas o jurisdiccionales, tribunales de arbitramento, en asuntos de naturaleza civil, comercial, penal, constitucional, competencia, competencia desleal, administrativa, contencioso administrativa, protección del consumidor, variedades vegetales, nombres de dominio, oposiciones u observaciones, cancelación administrativa y judicial, nulidad, medidas cautelares, concesión de licencias, acciones de tutela, la protección de secretos industriales, derecho regulatorio y en general para que nos represente en cualesquiera acciones y procesos que promovamos o se nos promuevan.

La representante podrá, en nuestro nombre, designar apoderados para actuar ante autoridades administrativas y judiciales, por vía extrajudicial y también procesalmente en nuestro nombre, como demandantes, como demandados, como litisconsortes, como agentes oficiosos, como terceros, por llamamiento en garantía o como intervinientes ad excludendum. Dentro de esta autorización, la representante podrá facultar a los apoderados que ella designe para transigir, conciliar,

© CAVELIER ABOGADOS

Do hereby appoint CAVELIER ABOGADOS, a general partnership organized under the laws of the Republic of Colombia by means of Public Deed No. 6233 of September 10, 1974, granted at Notary Sixth of the Bogota Circuit, domiciled in Bogota D.C., with Mercantile Registration No. 00820237 and Taxpayer Identification Number 860041367-3, domiciled at Carrera 4a N° 72-35, Bogota, Colombia, as our representative for all Industrial and Intellectual Property matters with faculty to receive notifications and appoint attorneys in and out of Court.

CAVELIER ABOGADOS may also represent us, with the same faculties stated above, before any entities or persons, with or without jurisdiction, administrative or jurisdictional authorities, courts of arbitration, in civil, commercial, criminal, constitutional, competition, unfair competition, administrative, administrative contentious, consumer protection, plant varieties, domain names, opposition or observation matters, administrative and Court cancellation, nullity, precautionary measures, licensing, action for writ mandamus, protection of trade secrets, regulatory law and in general represent us in any actions and suits instituted by us or against us.

The representative may, in our name, designate attorneys to act before administrative and judicial authorities, through out-of-court channels, and also procedurally in our name as plaintiff, defendant, joint litigant, representative without power of attorney, third party, when summoned to appear in court or as intervener ad excludendum. Under this authorization, the representative may empower the attorneys appointed thereby to compromise, conciliate, admit the facts of the

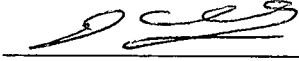
admitir los hechos del proceso, desistir, cancelar, recibir, renunciar y sustituir el poder que se le otorgue. Así mismo, la representante tendrá la facultad para revocar el poder así otorgado en el momento que considere pertinente. La representante en todo caso podrá ratificar los actos de agentes oficiosos.

case, desist, cancel, receive, resign and substitute the power of attorney granted thereto. Likewise, the representative shall have the faculty of revoking the power of attorney thus granted at any time it may deem convenient. The representative may in any case ratify the acts of representatives without a power of attorney.

Dado y firmado hoy/Given and signed this 28 MAY 2014

En/in PERTH, WESTERN AUSTRALIA

Por/by DOMENICO CAROLEO

Firma/Signature 

E. S. D.

Asunto :Solicitud de patente para
PCT/AU2012/001505
Solicitante :GECKO TANKS PTY LTD

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cavelier@cavelier.com

44
45

CESION

ASSIGNMENT

Yo, (nosotros) abajo firmado (s)

I (we), the undersigned

1. Caroleo, Domenic
2. Sikirich, Steve

1. Caroleo, Domenic
2. Sikirich, Steve

domiciliado(s) en

of

1. 322 Treasure Road
WELSHPOOL WA 6107
2. 12 Burke Drive
ATTADALE WA 6156

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2. 12 Burke Drive
ATTADALE WA 6156

declaro(amos) bajo juramento ser único(s) y verdadero(s) inventor(es)
de la invención:

state(s) under oath to be sole and true inventor(s) of the invention:

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declaro(amos) así mismo que cedo(emos) y transfiero(erimos), sin
limitación, a favor de la sociedad

state as well, that assign, without reservations or limitations in favour
of

GECKO TANKS PTY LTD

GECKO TANKS PTY LTD

constituida y existente de conformidad con las leyes de
Australia

a corporation constituted and existing in conformity with the laws of
Australia

domiciliada en

domiciled in

322 Treasure Road
WELSHPOOL WA 6107
Australia

322 Treasure Road
WELSHPOOL WA 6107
Australia

todos los derechos inherentes a dicha invención y que la citada
Compañía queda facultada para solicitar en su nombre la patente de
invención correspondiente en la República de Colombia.

all rights inherent to said invention and that the above mentioned
company hereby is enabled to apply, in its name, for the corresponding
patent invention, in the Republic of Colombia

Dado y firmado hoy/Given and signed this **28 MAY 2014**
en/in **PERTH WESTERN AUSTRALIA**

por/by **STEVE SIKIRICH**
DOMENICO CAROLEO

Firma/Signature



STEVE SIKIRICH

DOMENICO CAROLEO

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800.176.089-2

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*** Soporte del Pago ***

TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	VR PAGO
CONSIGNACION	BANCO DE BOGOTA	062754387	644039270	24/06/2014	10.660.000.00

*** Conceptos Pagados ***

CANT.	RENTISTICO	CONCEPTO	Vr. UNDITARIO	Vr. CONCEPTO
1	50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE INVENCIÓN	515.000.00	515.000.00
				\$515.000.00

SON: **QUINIENTOSQUINCE MIL PESOS MONEDA CORRIENTE**

Responsable: _____

Recibo de Caja Aplicado al Expediente No. _____

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 14-139642- -00000-0000

Fecha: 2014-06-27 16:52:52 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 379 FASENACIONALII
Act. 411 PRESENTACION Folios: 148

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SOLICITUD FASE NACIONAL PCT

(21) N° de solicitud: 22) Fecha de solicitud: (30) Prioridad (31) Prioridad (32) Fecha (33) País 2011905070 2011/12/06 AU	(51) Int Cl: B65D 090/000 (71) Solicitante(s) GECKO TANKS PTY LTD (72) Inventor(es) DOMENIC CAROLEO STEVE SIKIRICH (74) Apoderado: LUZ CLEMENCIA DE PAEZ
(85) Fecha limite inicio fase nacional: 2014/07/06 (86) Datos relativos a la presentación de la solicitud PCT Fecha de presentación de la solicitud: 2012/12/06 No. de solicitud PCT/PCT/AU2012/001505	(87) Publicación internacional Fecha: 2013/06/13 N° publicación: WO 2013/082674
(54) Titulo: CUERPO DE UN CAMION	

Resumen:

Un tanque para almacenar al menos un fluido que comprende una cámara principal y al menos una sub-cámara que tiene una superficie exterior que define un volumen interno de la al menos una sub-cámara, donde la al menos una sub-cámara está dispuesta con respecto a la cámara principal de manera que al menos una primera ubicación de la superficie exterior puede accederse desde el interior de la cámara principal y al menos una segunda ubicación de la superficie exterior puede accederse desde una ubicación exterior a la cámara principal. Además se proporciona un método para la fabricación del tanque.

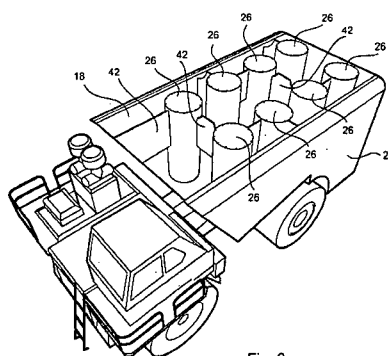


Fig. 3

PATENTE DE INVENCION ☐

MODELO DE UTILIDAD



No. 14-139642-00000-0000

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Tra. 11 PATENTEIYII Eve: 379 FASENACIONALII
Act. 411 PRESENTACION Folios: 146

☐	Indicación que se solicita una patente.
☐	Datos de identificación del solicitante o de la persona
☐	Descripción de la invención
☐	Dibujos de ser estos pertinentes
☐	Comprobante de pago de las tasas establecidas (De ser el caso formato de descuento)
Completa ☐	Incompleta ☐

PATENTE DE INVENCION PCT ☐ MODELO DE UTILIDAD PCT ☐ Art.33 Decisión 486/00, Circular Única

☐	Indicación que se solicita una PCT
☐	Copia de la solicitud en español, tal como fue presentada inicialmente (capítulo descriptivo, reivindicatorio, resumen)
☐	Dibujos de ser estos pertinentes
☐	Comprobante de pago de las tasas establecidas (de ser el caso formato de descuento)
Completa ☐	Incompleta ☐

DISEÑO INDUSTRIAL ☐

(Art. 119 Decisión 486/00)

☐	Indicación que se solicita Diseño industrial
☐	Datos de identificación del solicitante o de la persona que presenta la solicitud
☐	Representación gráfica y fotográfica del Diseño industrial o muestra del material que incorpora el diseño
☐	Comprobante de pago de las tasas establecidas
Completa ☐	Incompleta ☐

ESQUEMA DE TRAZADO ☐

(Art. 92 Decisión 486/00)

☐	Indicación que se solicita un esquema de trazado
☐	Datos de identificación del solicitante o de la persona que presenta la solicitud
☐	Representación gráfica de un esquema de trazado
☐	Comprobante de pago de las tasas establecidas
Completa ☐	Incompleta ☐