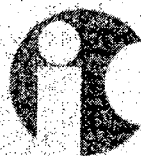


PCT



Industria y Comercio

SUPERINTENDENCIA

SOLICITUD

PATENTE DE INVENCION

10 - PCT 34532

EXPEDIENTE N° 10-034532

TITULO: DISPOSITIVO DE PULVERIZACIÓN
Y MÉTODO PARA UTILIZAR EL MISMO.

CLASIFICACION INTERNACIONAL: _____

SOLICITANTE: RECKITT & COLMAN (OVERSEAS)
LIMITED

DOMICILIO: REINO UNIDO

APODERADO: DARIO CARDENAS NAVAS

BOGOTÁ, D.C. _____

Ind. Com.
21-04-2010

PETITORIO



SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-034532- -00000-0000

Fecha: 2010-03-24 15:48:51 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 110

FORMULARIO UNICO DE SOLICITUD DE PATENTE PCT ENTRADA EN FASE NACIONAL

①

SOLICITUD DE:

☒

Patente de Invención

☐

Patente de Modelo de Utilidad

☒

Capítulo I

☐

Capítulo II

②

SOLICITANTE

Nombre: RECKITT & COLMAN (OVERSEAS) LIMITED

Dirección: 103-105 Bath Road Slough, Berkshire SL 1 3UH, Reino Unido

Nacionalidad o Domicilio: El Reino Unido

Lugar de Constitución: El Reino Unido

Teléfono: 3137800 Fax: 3122410

E-mail: general@cardenasycardenas.com

IDENTIFICACION

☐

NIT

☐

NIT

☐

Otro

☒

Otro

Cual
Número

③

REPRESENTANTE
O APODERADO

Nombre: DARIO CARDENAS NAVAS (Folios 114 y 115)

Dirección: Carrera 7 No 71-52 Torre B piso 9

Teléfono: 313 7800 Fax: 312 2410

E-Mail: general@cardenasycardenas.com

IDENTIFICACION

☒

C.C.

☐

NIT

☐

Otro

☐

Otro

Cual
Número 17066629 TP 1250

④

INVENTOR(ES)
(72)

Nombre: 1. Martin Butler
2. Steve Walsh

Dirección: 1. Dansom Lane Hull HU8 7DS, El Reino Unido
2. Dansom Lane Hull HU8 7DS, El Reino Unido

Nacionalidad o Domicilio: 1. El Reino Unido
2. El Reino Unido

⑤

PCT (86)

Solicitud Internacional No. PCT/GB2008/003212 Fecha 22.09.2008

Publicación Internacional No. WO 2009/037491 Fecha 26.03.2009

⑥

Título(54):

DISPOSITIVO DE PULVERIZACIÓN Y MÉTODO PARA UTILIZAR EL MISMO

⑦

Clasificación Internacional (51):

⑧

Prioridad

SI ☒ NO ☐

(33)País de Origen

El Reino Unido
Comunidad Europea

(32)Fecha

21.09.2007
16.04.2008

(31)N° de Solicitud

0718458.3
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⑨

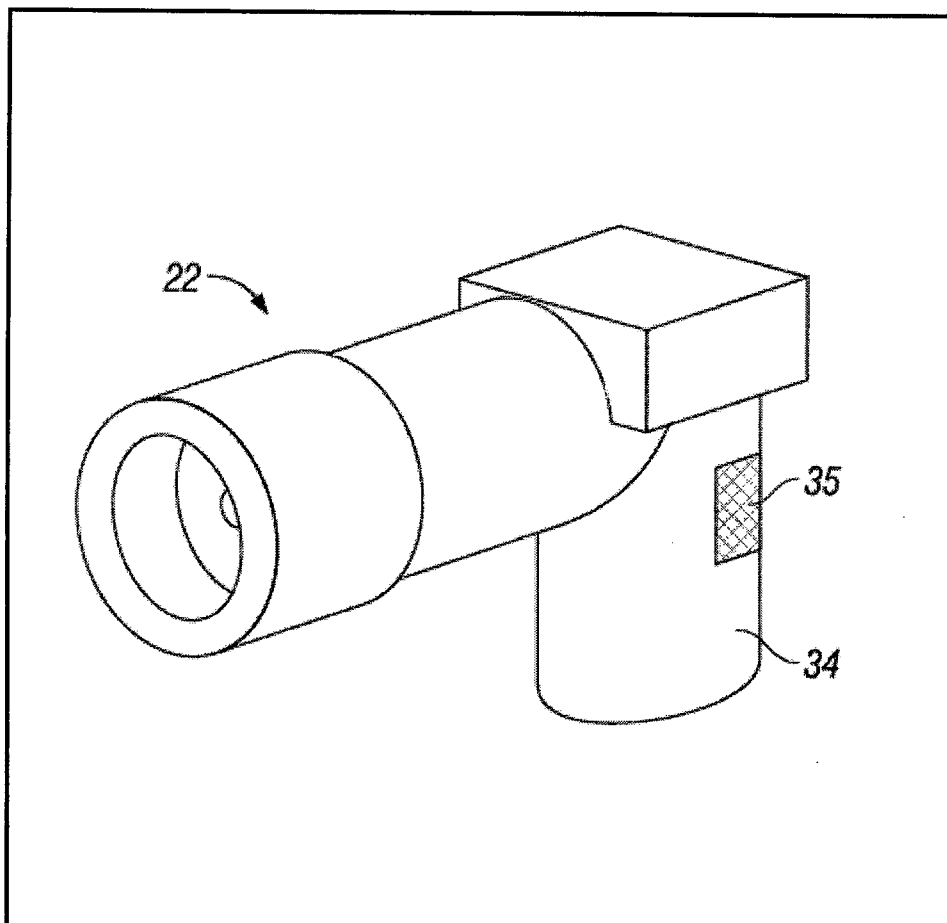
Comprobante de Pago No.: 10-21.910

Fecha Marzo 19, 2010

⑩ ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud.
- ☐ Documento que acredita la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☐ Poderes, si fuere el caso.
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☒ Traducción de la solicitud internacional al castellano (Resumen, descripción, reivindicaciones, dibujos)
- ☐ Copia del examen preliminar internacional efectuado por la Autoridad Internacional de Examen Preliminar (IPEA)
- ☐ Traducción del examen preliminar internacional efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☒ Arte final 12x12.
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☐ De ser el caso, modificaciones efectuadas a la solicitud internacional.
- ☒ Otros
 Prioridad 0718458.3 <http://www.wipo.int/pctdb/images4/PATENTSCOPE/92/8e/ac/028eac.pdf>
 Prioridad 08007448.7 <http://www.wipo.int/pctdb/images4/PATENTSCOPE/92/9b/22/029b22.pdf>

11 FIGURA CARACTERISTICA



12

Solicito la Concesión de la patente

NOMBRE: DARIO CARDENAS NAVAS

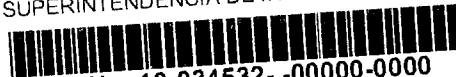
FIRMA:

C.C. 17066629 BTA TP.

19250
C.S.J.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-034532- -00000-0000

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Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 110

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 10 - 21,910
FECHA : MARZO 19 DE 2010

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CARDENAS Y CARDENAS P.I.	CONSIGNACION	BANCO DE BOGOTA	062754387	175533481	19/03/2010	5,271,500.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01	SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN
			TOTAL : \$ 554,000.00

SON: QUINIENTOS CINCUENTA Y CUATRO MIL PESOS

RESPONSABLE :

RECIBO DE CAJA APLICADO AL EXPEDIENTE No.

ABOGADOS

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

CERTIFICACION DE EXCEDENTE : 10 - 22,716
FECHA : MARZO 24 DE 2010

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-034532- -00000-0000

Fecha: 2010-03-24 15:48:51 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 110

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CARDENAS Y CARDENAS P.I.	CONSIGNACION	BANCO DE BOGOTA	062754387	354703904	24/03/2010	416,000.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-09	OTROS SERVICIOS DE PROPIEDAD I	99 OTROS SERVICIOS ADMINISTRATIVOS
			TOTAL : \$ 416,000.00

SON: CUATROCIENTOS DIEZ Y SEIS MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

ESTA CERTIFICACION DE EXCEDENTE DE PAGO SOLO PODRA SER UTILIZADA
COMO PARTE DE LA CANCELACION DE UNA TARIFA VIGENTE Y NO PODRA SER
SUSTITUIDA POR NINGUN RECIBO.



Industria y Comercio

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

DIVISION DE NUEVAS CREACIONES

TARJETA ARCHIVO PROPIETARIOS

PATENTE DE INVENCION ____ PCT X MODELO DE UTILIDAD ____ DISEÑO INDUSTRIAL ____

SUPERINTENDENCIA

(21) N° de solicitud:

(22) Fecha de solicitud:

(51) Clasificación Internacional:

(71) Solicitante(s) **RECKITT & COLMAN (OVERSEAS) LIMITED**

(72) Inventor(es)

Martin Butler; Steve Walsh

(74) Apoderado: **DARIO CARDENAS NAVAS**

(30) Prioridad

(31) **No. Prioridad**

(32) **Fecha**

(33) **País**

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Fecha: **26.03.2009**

Fecha de presentación de la solicitud: **22.09.2008**

N° publicación: **WO 2009/037491 A1**

No. de solicitud

PCT/GB2008/003212

(54) Titulo: **DISPOSITIVO DE PULVERIZACIÓN Y MÉTODO PARA UTILIZAR EL MISMO**



Industria y Comercio

SUPERINTENDENCIA

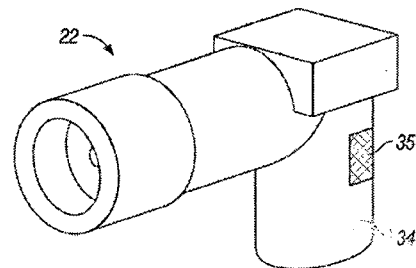
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

DIVISION DE NUEVAS CREACIONES

TARJETA ARCHIVO TEMATICO

PATENTE DE INVENCION ____ PCT X MODELO DE UTILIDAD ____ DISEÑO INDUSTRIAL ____

(21) N° de solicitud:		(22) Fecha de solicitud:	
(51) Clasificación Internacional:			
(71) Solicitante(s) RECKITT & COLMAN (OVERSEAS) LIMITED			
(72) Inventor(es)		Martin Butler; Steve Walsh	
(74) Apoderado: DARIO CARDENAS NAVAS			
(30) Prioridad	(31) No. Prioridad	(32) Fecha	(33) País
	0718458.3	21.09.2007	Reino Unido
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(86) Datos relativos a la presentación de la solíc. PCT		Fecha: 26.03.2009	
Fecha de presentación de la solicitud: 22.09.2008		No. Publicación WO 2009/037491 A1	
No. de solicitud PCT/GB2008/003212			



(54) Título: **DIPOSITIVO DE PULVERIZACIÓN Y MÉTODO PARA UTILIZAR EL MISMO**

(57) Resumen:

Se describe un dispositivo de pulverización, el dispositivo comprende una carcasa adaptada para recibir una recarga de fluido en éste y tiene una abertura adecuada para permitir, en uso, la pulverización de un fluido a través del mismo, el dispositivo comprende adicionalmente medios de accionamiento configurados para el accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados para distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre una cabeza pulverizadora de dicha recarga. También se describen métodos de operación de tal dispositivo de pulverización.

(21) N° de solicitud:				(51) Int Cl:
(22) Fecha de solicitud:				(71) Solicitante(s) RECKITT & COLMAN (OVERSEAS) LIMITED
(30) Prioridad	(31) No. Prioridad	(32) Fecha	(33) País	(72) Inventor(es)
	0718458.3	21.09.2007	Reino Unido	1. Martin Butler
	08007448.7	16.04.2008	Comunidad Europea	2. Steve Walsh
				(74) Apoderado: DARIO CARDENAS NAVAS
(85)	Fecha limite inicio fase nacional: 21.04.2010			(87) Publicación internacional
(86)	Datos relativos a la presentación de la solicitud PCT			Fecha: 26.03.2009
	Fecha de presentación de la solicitud: 22.09.2008			N° publicación: WO 2009/037491 A1
	No. de solicitud PCT/GB2008/003212			
(54) Titulo: DISPOSITIVO DE PULVERIZACIÓN Y MÉTODO PARA UTILIZAR EL MISMO				

Resumen:

Se describe un dispositivo de pulverización, el dispositivo comprende una carcasa adaptada para recibir una recarga de fluido en éste y tiene una abertura adecuada para permitir, en uso, la pulverización de un fluido a través del mismo, el dispositivo comprende adicionalmente medios de accionamiento configurados para el accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados para distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre una cabeza pulverizadora de dicha recarga. También se describen métodos de operación de tal dispositivo de pulverización.

Dispositivo de Pulverización y Método para Utilizar el Mismo

Campo de la Invención

La presente invención se relaciona con un dispositivo para pulverizar un fluido y particularmente, pero no exclusivamente con un dispositivo para pulverizar fluidos tal como fragancias, fluidos desodorantes y/o materiales de control de plagas o similares. La presente invención también se relaciona con un método para utilizar tal dispositivo.

Antecedente

Los dispositivos de la técnica anterior para pulverizar fragancias, agentes desodorantes y fluidos esterilizantes en una sala consisten generalmente de un dispositivo que contiene una fuente de fluido removible. Con tal disposición una vez la fuente de fluido se ha agotado completamente, la fuente se puede reemplazar y no reemplazar el dispositivo completo. Típicamente tales fuentes vienen en muchas formas, que incluyen recipientes, botellas, latas y cartuchos (generalmente, tales recipientes, botellas, latas, y cartuchos se denominarán aquí como "recargas"). Tales recargas pueden ser bombas para pulverización o aerosoles, que incluyen versiones medidas y no medidas de las mismas.

Los dispositivos de la técnica anterior comprenden típicamente una carcasa que tiene una abertura a través de la cual se pulveriza el fluido. Una parte de la carcasa se puede mover/remover para permitir que se introduzca una recarga y posteriormente se remueva del interior del dispositivo. El dispositivo comprende adicionalmente un brazo accionado mecánicamente o similar a este que se adapta para activarse periódicamente con el fin de presionar hacia abajo sobre una cabeza pulverizadora conectada a la recarga, lo que resulta en el paso del fluido del cuerpo de la recarga, a través de la cabeza pulverizadora y afuera de la abertura en la carcasa dentro del ambiente circundante.

La forma de una recarga se estandariza típicamente a un cierto grado, tal como, dispositivos de pulverización que pueden sin darse cuenta proporcionar una oportunidad para facilitar el vandalismo o comportamiento peligroso. Específicamente, los vándalos o similares pueden buscar insertar intencionalmente una fuente peligrosa de fluido pulverizable dentro de un dispositivo de pulverización. Por ejemplo, cuando el dispositivo es para pulverizar una fragancia y la recarga es un aerosol de un tamaño estándar, una forma de vandalismo y/o abuso intencional puede ser la inserción de un aerosol de pintura dentro del dispositivo. El daño resultante de tal abuso puede ser sustancial. Tal abuso se asociaría probablemente con un riesgo para la salud y seguridad significativo. Claramente sería deseable desde la perspectiva del usuario ser protegido de tal comportamiento peligroso y/o actos de vandalismo.

Es un objeto de la presente invención superar los aspectos y desventajas mencionados anteriormente.

Resumen de la Invención

5 De acuerdo con un primer aspecto de la presente invención se proporciona aquí por lo tanto un dispositivo de pulverización con una recarga de fluido en este, en donde la recarga comprende un cuerpo que forma un recipiente para el fluido y una cabeza pulverizadora ubicada en la parte superior de la recarga en comunicación fluida con el recipiente, y en donde el dispositivo comprende una carcasa adaptada para recibir la recarga en ésta y tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde un orificio de salida de la cabeza pulverizadora a través de la misma, el dispositivo comprende adicionalmente medios de accionamiento configurados para accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados para distinguir entre por lo menos un área de reflectancia inferior y por lo menos un área de reflectancia relativamente mayor de la cabeza pulverizadora de dicha recarga.

La reflectancia se refiere a la radiación que golpea una superficie, alguna se adsorbe y alguna se refleja. La reflectancia se expresa como una proporción sin unidades. Para salir de dudas, el término "menor reflectancia" se utiliza aquí como un término relativo con referencia al término "mayor reflectancia"; "menor" puede incluir áreas de cero o casi cero reflectancia.

El cuerpo de la recarga puede ser alargado, y el cuerpo puede estar provisto con un vástago de válvula en una porción superior alejado del cuerpo de la base del cuerpo. Por lo menos una porción del vástago de la válvula se puede conectar a la cabeza pulverizadora para permitir, en uso, que el fluido pase desde el cuerpo a la recarga, a través del vástago de la válvula y a través de la cabeza pulverizadora al orificio de salida en donde se pulveriza el fluido dentro del ambiente circundante.

Preferiblemente se proporciona una cabeza con un área de menor reflectancia y un área de relativamente mayor reflectancia.

Preferiblemente los medios de detección se configuran para operar para distinguir entre áreas de diferente reflectancia durante el movimiento de la cabeza pulverizadora.

Ventajosamente el dispositivo de acuerdo con la presente invención puede ser capaz de detectar cuando un usuario intenta utilizar el dispositivo con una recarga potencialmente peligrosa y, adicionalmente, el dispositivo se configura preferiblemente para evitar que los medios de accionamiento se activen y/o evitar la activación posterior

mientras tal una recarga se monta dentro del dispositivo para evitar y/o limitar cualquier daño que pudiera resultar del accionamiento de la recarga.

- 5 Una ventaja adicional de los dispositivos de la presente invención es que ellos pueden ser capaces de proporcionar una indicación mejorada del final de vida. En uso, cuando un dispositivo de acuerdo con la invención detecta por lo menos un área de menor reflectancia y por lo menos un área de
10 reflectancia relativamente mayor sobre la cabeza pulverizadora de la recarga ubicada en ésta, se puede accionar un mecanismo de conteo. El mecanismo de conteo se puede calibrar para permitir un número de accionamientos predeterminados de la recarga que corresponde a la cantidad
15 de fluido almacenado en una recarga. El mecanismo de conteo se puede operar en uso, y después el número de accionamientos predeterminado se ha alcanzado, para evitar que el dispositivo produzca accionamientos adicionales de aquella recarga hasta que un usuario reemplaza la recarga
20 y/o reconfigura el dispositivo. El dispositivo puede reconfigurarse automáticamente cada vez que se monta una recarga en el dispositivo. Esta indicación de final de vida puede ser ventajosa cuando el consumo de energía del dispositivo se reduzca, esto sería particularmente ventajoso
25 cuando el dispositivo se acciona por batería o similar.

El mecanismo de conteo puede estar ligado a un indicador que se adapta para comunicar al usuario del dispositivo que una recarga utilizada o gastada necesita ser reemplazada.

- 30 Preferiblemente el número de accionamientos predefinidos se calcula para que corresponda a la cantidad de fluido en la recarga.

- 35 Preferiblemente los medios de detección están en comunicación directa con los medios de accionamiento de tal manera que, en uso, los medios de detección pueden instruir a los medios de accionamiento para no activarse.

- 40 Alternativamente se pueden proporcionar unos medios de control que estén en comunicación directa con los medios de detección y los medios de accionamiento, dichos medios de control se pueden operar para recibir una entrada desde los medios de detección y estar en operación para instruir a los
45 medios de accionamiento para que se activen o no dependiendo de la entrada recibida.

- Se pueden proporcionar medios de control en la forma de un microprocesador, un circuito suministrado sobre un PCB o en
50 la forma de otros componentes convenientes.

- Preferiblemente los medios de accionamiento se puede operar para originar el accionamiento de la cabeza pulverizadora de recarga al impartir una fuerza sustancialmente hacia abajo
55 sobre la cabeza pulverizadora. Dicha fuerza sustancialmente

hacia abajo es preferiblemente suficiente para hacer que la cabeza pulverizadora se mueva en una dirección sustancialmente hacia abajo para abrir una ruta de fluido entre el cuerpo de la recarga y el orificio de salida de la cabeza pulverizadora para pulverizar una cantidad de fluido hacia afuera de la abertura en la carcasa en el ambiente circundante. Una vez se ha pulverizado una cantidad de fluido, el dispositivo se puede configurar de tal manera que la resiliencia inherente de la recarga y/o la presión interna es capaz de aplicar una fuerza sustancialmente hacia arriba sobre la cabeza pulverizadora suficiente para hacer regresar los medios de accionamiento a su posición de partida sin la necesidad de que se aplique energía a dichos medios.

Los medios de detección de la presente invención se adaptan, en uso, para distinguir entre áreas de diferente reflectancia sobre una cabeza pulverizadora de una recarga. Preferiblemente los medios de detección son capaces de distinguir como se mencionó al examinar la recarga. La cabeza pulverizadora de recarga puede ser evaluada por los medios de detección que emiten radiación hacia la cabeza pulverizadora y recolectar la radiación reflejada de tal manera que la cantidad de reflectancia se pueda atribuir específicamente o aproximadamente o generalmente a una o más porciones de la cabeza pulverizadora. Tal atribución puede permitir a los medios de detección directamente, o en combinación con una unidad de control, determinar si cualquier área de diferente reflectancia está presente en la cabeza pulverizadora. Si no hay áreas de diferente reflectancia sobre la cabeza pulverizadora de la recarga puede haber un nivel sustancialmente constante de radiación reflejada. Por lo tanto en una disposición alterna, la señal de evaluación de la recarga por los medios de detección puede permitir a los medios de detección detectar si por lo menos un nivel de radiación reflejada se detecta sin atribuir el nivel de reflectancia detectado a una porción específica de la cabeza pulverizadora. Tal detección puede permitir a los medios de detección directamente, o en combinación con una unidad de control, determinar si cualquier área de diferente reflectancia está presente sobre la cabeza pulverizadora.

Los medios de detección se pueden configurar para hacer una determinación de que existen diferentes niveles de reflectancia entre por lo menos dos porciones separadas de la cabeza pulverizadora cuando la reflectancia de una porción es de por lo menos 0.5 veces mayor que la porción separada de la cabeza pulverizadora, y preferiblemente por lo menos 2 veces mayor, y más preferiblemente por lo menos 5 veces mayor, aún más preferiblemente 10 veces mayor, y aún más preferiblemente todavía por lo menos 50 veces mayor, y más preferiblemente por lo menos 100 veces mayor.

Como se mencionó, es preferible que los medios de detección estén configurados para ser operables para distinguir entre áreas de diferente reflectancia durante el movimiento de la cabeza pulverizadora. Aún más preferiblemente los medios de detección se configuran para ser sólo operables durante el movimiento de la cabeza pulverizadora. Esto puede ser ventajoso debido a que esto permitiría a los medios de detección tener una ubicación fija dentro del dispositivo y no tener partes móviles, reduciendo así el costo de los medios de detección y haciendo menos probable que fallen durante la vida del dispositivo. Adicionalmente, con tal disposición los medios de detección pueden tener un campo predefinido de vista que permite al fabricante de la recarga parámetros más definidos para asegurar que la cabeza pulverizadora sea detectable de manera adecuada por los medios de detección. Existe una ventaja adicional cuando el dispositivo se energiza con batería ya que los medios de detección sólo se energizarán durante el accionamiento de la recarga.

Preferiblemente los medios pueden estar confinados a sólo ser operables para distinguir entre área de diferente reflectancia durante sustancialmente el movimiento hacia arriba de la cabeza pulverizadora, es decir el movimiento hacia arriba de la cabeza pulverizadora después del movimiento hacia abajo originado por los medios de accionamiento. En ésta disposición la resiliencia inherente y/o presión interna de la recarga pueden ser suficientes para hacer regresar los medios de accionamiento a su posición de partida sin que se aplique energía a dichos medios. Tal disposición puede ser particularmente ventajosa debido al movimiento sustancialmente hacia arriba de la cabeza pulverizadora que se puede alcanzar sin que se aplique energía a los medios de accionamiento, reduciendo así o eliminando el ruido eléctrico/interferencia producido por el dispositivo. La reducción en el ruido eléctrico/interferencia puede mejorar la capacidad de los medios de detección para distinguir áreas de diferente reflectancia sobre la cabeza pulverizadora, mejorando así la confiabilidad de los medios de detección aunque permite que se utilicen unos medios de detección relativamente menos costosos.

Los medios de detección se pueden operar para determinar si la recarga está montada en el dispositivo antes de ser operable para distinguir entre áreas de diferente reflectancia. En ésta disposición los medios de detección se pueden operar para examinar la ubicación dentro del dispositivo ocupado normalmente por una cabeza pulverizadora de una recarga cuando se monta en el dispositivo, si los medios de detección no detectan ninguna reflectancia, o un nivel predeterminado de reflectancia, ésta situación puede ser indicadora de la ausencia de una recarga en el dispositivo y los medios de detección evitarán que se activen los medios de accionamiento. Esta disposición

también puede ser ventajosa ya que evitaría que los medios de accionamiento se activen periódicamente después que un usuario ha removido una recarga gastada y antes de que se monte una nueva recarga en el dispositivo.

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Preferiblemente se suministran medios de detección con una ubicación fija dentro del dispositivo y, preferiblemente, tienen un campo de vista fija con respecto a la cabeza pulverizadora de una recarga o el área ocupada normalmente por la cabeza pulverizadora cuando se monta la recarga en el dispositivo.

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Alternativamente o adicionalmente se pueden configurar los medios de detección para moverse con el fin de examinar la cabeza pulverizadora o el área normalmente ocupada por la cabeza pulverizadora. La detección se puede mover en una dirección sustancialmente horizontal y/o una dirección sustancialmente vertical y/o en por lo menos dos direcciones. Los medios de detección pueden ser capaces de girar alrededor de una única posición para realizar la pulverización. Los medios de detección se pueden proporcionar con un lente de ángulo amplio, tal como un lente ojo de pescado, para proporcionar un amplio campo de vista cuando se realiza la evaluación de la recarga.

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Los medios de detección pueden estar provistos en la forma de uno o más sensores. Los sensores se suministran preferiblemente con un emisor de radiación integrada que se adapta para emitir radiación y adicionalmente se suministra con una porción de recolección que se adapta para recolectar cualquier radiación reflejada. Alternativamente, el sensor puede comprender solo la porción de recolección, el emisor de radiación es un componente separado que se ubica de tal manera que sea capaz de emitir radiación hacia la cabeza pulverizadora de tal manera que por lo menos algo de la radiación reflejada pueda ser recolectada por la porción recolectora.

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Preferiblemente el sensor es un sensor óptico en la forma de un sensor Infra-Rojo, más preferiblemente un sensor Infra-Rojo pasivo. Alternativamente o adicionalmente, se puede proporcionar sensores ópticos en la forma de un sensor de luz o un sensor láser.

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Los medios de detección se pueden configurar para examinar un rango efectivo de hasta 100 mm, el rango efectivo es la distancia en que cualquier evaluación debe viajar una vez reflejada por la cabeza pulverizadora con el fin de ser detectada por los medios de detección, es decir, la distancia entre los medios de detección o fuente de la evaluación de la cabeza pulverizadora en adición a la distancia en que la evaluación reflejada debe viajar a los medios de detección para ser recolectados y detectados. Preferiblemente los medios de detección tienen un rango efectivo de hasta 50 mm, y más preferiblemente hasta 20 mm,

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y aún más preferiblemente de hasta 10 mm, y más preferiblemente hasta 5 mm.

De acuerdo con un aspecto alterno de la presente invención se proporciona aquí por lo tanto un dispositivo de pulverización con una recarga de fluido en éste, en donde la recarga comprende un cuerpo que forma un recipiente para el fluido y una cabeza pulverizadora ubicada en la parte superior de la recarga en comunicación fluida con el recipiente, y en donde el dispositivo comprende una carcasa adaptada para recibir la recarga en ésta y que tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde un orificio de salida de la cabeza pulverizadora a través de la misma, el dispositivo comprende adicionalmente medios de accionamiento configurados para accionamiento periódico de la recarga, en donde se suministra el dispositivo con medios de detección configurados, en uso, para examinar la cabeza pulverizadora para distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre la cabeza pulverizadora de dicha recarga, caracterizado porque la cabeza pulverizadora está provista con por lo menos una porción que tiene una forma para reflejar sustancialmente la evaluación de los medios de detección que regresan de nuevo hacia dichos medios y está provista con por lo menos una porción para reflejar sustancialmente la señal de evaluación de los medios de detección lejos de dichos medios.

En un aspecto alterno de la presente invención por lo menos un área de menor reflectancia está provista mediante por lo menos una porción de la cabeza pulverizadora que tiene forma para deflectar la evaluación de los medios de detección lejos de los medios de detección de tal manera que una cantidad menor de la evaluación (por ejemplo, la radiación) se detecta por dichos medios en comparación con la cantidad o evaluación detectada por los medios de detección cuando la evaluación de por lo menos una porción configurada para reflejar dicha evaluación hacia dichos medios, el área de mayor reflectancia.

De acuerdo con un aspecto alterno adicional de la presente invención se proporciona aquí por lo tanto un dispositivo de pulverización con una recarga de fluido en éste, en donde la recarga comprende un cuerpo que forma un recipiente para el fluido y una cabeza pulverizadora ubicada en la parte superior de la recarga en comunicación fluida con el recipiente, y en donde el dispositivo comprende una carcasa adaptada para recibir la recarga en ésta y tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde un orificio de salida de la cabeza pulverizadora, el dispositivo comprende medios de accionamiento configurados para accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados, en uso, para examinar la cabeza

pulverizadora para distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre la cabeza pulverizadora de dicha recarga, caracterizado porque la cabeza pulverizadora está provista con por lo menos una porción para refle-

5 sustancialmente la evaluación de los medios de detección de nuevo hacia estos y está provista con por lo menos una porción configurada o corte para evitar la evaluación de los medios de detección.

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En un aspecto alterno adicional de la presente invención se suministra por lo menos un área de menor reflectancia en por lo menos una porción de la cabeza pulverizadora que se configura o corta para evitar la evaluación de los medios de detección de tal manera que una cantidad menor o cero de evaluación se detecta (por ejemplo, la radiación) mediante dichos medios en comparación con la cantidad de la evaluación detectada por los medios de detección cuando el examen de por lo menos una porción se configura para

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reflejar dicha señal de evaluación hacia dichos medios, el área de mayor reflectancia.

De acuerdo con aún un aspecto alterno adicional de la presente invención se proporciona aquí por lo tanto un dispositivo de pulverización con una recarga de fluido en éste, en donde la recarga comprende un cuerpo que forma un recipiente para el fluido y una cabeza pulverizadora ubicada en la parte superior de la recarga en comunicación fluida con el recipiente, y en donde el dispositivo comprende una carcasa adaptada para recibir la recarga en ésta y que tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde un orificio de salida de la cabeza pulverizadora, el dispositivo comprende

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adicionalmente medios de accionamiento configurados para accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados, en uso, para examinar la cabeza pulverizadora para distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre la cabeza pulverizadora de dicha recarga, caracterizado porque señal de evaluación emitida de los medios de detección se configura para ser detectable sobre una distancia predefinida que es sustancialmente igual al rango efectivo, y en donde la cabeza pulverizadora está

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provista con por lo menos una porción configurada para reflejar sustancialmente la señal de evaluación de los medios de detección hacia dichos medios y está provista con por lo menos una porción configurada o con un corte relativo a la ubicación de los medios de detección.

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Como se discutió anteriormente, el rango efectivo se utiliza aquí para relacionarse con la distancia de cualquier señal de evaluación que debe viajar con el fin de ser detectada por los medios de detección, es decir, la distancia entre los medios de detección o fuente de la señal de evaluación

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de la cabeza pulverizadora en adición a la distancia de la evaluación reflejada que debe viajar una vez reflejada por la cabeza pulverizadora a los medios de detección a ser recolectados y detectados.

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En ésta disposición alterna adicional, al ajustar la distancia la evaluación es capaz de viajar de tal manera que es capaz de viajar la distancia entre la porción sin corte de la cabeza pulverizadora y regresar de nuevo después de reflejarse, es posible distinguir entre un área de menor reflectancia y un área de mayor reflectancia. Debido al ajuste de la señal de evaluación, la cantidad de la señal de evaluación recolectada por los medios de detección sería menor para la señal de evaluación reflejada de la porción de corte que de la porción no cortada de la cabeza pulverizadora, esta diferencia en la reflectancia se puede detectar por los medios de detección, indicando así dos áreas de diferente reflectancia. El ajuste de la distancia o la intensidad de la señal de evaluación que es capaz de viajar se puede hacer mayor o menor que la distancia mencionada anteriormente, lo que es importante es que la evaluación se ajuste de tal manera que la porción de corte de la cabeza pulverizadora produce una menor cantidad de señal de evaluación reflejada comparada con la porción de no corte que se puede recolectar y detectar por los medios de detección.

De acuerdo con un segundo aspecto de la presente invención se proporciona aquí por lo tanto un dispositivo de pulverización que comprende una carcasa adaptada para recibir una recarga de fluido en ésta y que tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde la recarga, el dispositivo comprende medios de accionamiento configurados para accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados para distinguir, en uso, entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre una cabeza pulverizadora de dicha recarga.

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De acuerdo con un aspecto alterno de la presente invención se proporciona aquí por lo tanto un dispositivo de pulverización adaptado para recibir una recarga de fluido en éste y que tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde la recarga, el dispositivo comprende adicionalmente medios de accionamiento configurados para accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados, en uso, para examinar una cabeza pulverizadora de la recarga, caracterizado porque el dispositivo se configura para examinar una recarga que tiene una cabeza pulverizadora en donde por lo menos una porción de la cabeza pulverizadora se configura para reflejar sustancialmente la señal de evaluación de los medios de detección hacia dichos medios y por lo menos una porción de la cabeza pulverizadora

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se configura para deflechar sustancialmente la evaluación de los medios de detección lejos de dichos medios de tal manera que, en uso, el dispositivo pueda distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia en la cabeza pulverizadora de dicha recarga.

De acuerdo con un aspecto alterno adicional de la presente invención se proporciona aquí por lo tanto un dispositivo de pulverización adaptado para recibir una recarga de fluido en éste y que tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde la recarga, el dispositivo comprende adicionalmente medios de accionamiento configurados para accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados, en uso, para examinar una cabeza pulverizadora de la recarga, caracterizado porque el dispositivo se configura para examinar una recarga que tiene una cabeza pulverizadora en donde por lo menos una porción de la cabeza pulverizadora se configura para reflejar sustancialmente la señal de evaluación de los medios de detección hacia dichos medios y por lo menos una porción de la cabeza pulverizadora se configura o corta para evitar la evaluación de los medios de detección de tal manera que, en uso, el dispositivo puede distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia en la cabeza pulverizadora de dicha recarga.

De acuerdo con aún un aspecto alterno adicional de la presente invención se proporciona aquí por lo tanto un dispositivo de pulverización adaptado para recibir una recarga de fluido en éste y que tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde un orificio de salida de la cabeza pulverizadora, el dispositivo comprende adicionalmente medios de accionamiento configurados para accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados, en uso, para examinar una cabeza pulverizadora sobre la recarga para distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre la cabeza pulverizadora de dicha recarga, caracterizado porque la señal de evaluación emitida desde los medios de detección se configura para ser detectable sobre una distancia predefinida que es sustancialmente igual al rango efectivo, y en donde la cabeza pulverizadora para uso con el dispositivo está provista con por lo menos una porción configurada para reflejar sustancialmente la señal de evaluación de los medios de detección hacia dichos medios, y está provista con por lo menos una porción configurada o cortada con relación a la ubicación de los medios de detección.

De acuerdo con un tercer aspecto de la presente invención se proporciona aquí por lo tanto un método para pulverizar un

- fluido desde un dispositivo, el método comprende las etapas de montar una recarga de fluido en un dispositivo de pulverización acuerdo con cualquiera de los primeros o segundos aspectos de la presente invención, colocar el dispositivo en un modo de operación, dicho modo se configura para realizar la activación de los medios de accionamiento, dichos medios de activación operan periódicamente para llevar contra una cabeza pulverizadora de la recarga y hacer el movimiento para la liberación de una cantidad de fluido desde la recarga, dicho fluido liberado se pulveriza desde el dispositivo a través de una abertura en la carcasa en el ambiente circundante, caracterizado porque los medios de detección proporcionados en el dispositivo se pueden operar en el modo de operación para detectar y distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre la cabeza pulverizadora de dicha recarga o dentro del área normalmente ocupada por dicha cabeza pulverizadora.
- Preferiblemente los medios de detección se pueden operar durante la activación de los medios de accionamiento y el movimiento de la cabeza pulverizadora de la recarga. Aún más preferiblemente los medios de detección sólo se pueden operar durante la activación de los medios de accionamiento. Más preferiblemente los medios de detección se configuran para sólo poderse operar durante sustancialmente el movimiento hacia arriba de la cabeza pulverizadora de la recarga, es decir, el movimiento hacia arriba de la cabeza pulverizadora después del movimiento hacia abajo originado por los medios de accionamiento.

El método puede comprender una etapa que precede antes de la activación de los medios de accionamiento en donde los medios de detección desarrollan una señal de evaluación inicial del área dentro de la carcasa ocupada normalmente por la cabeza pulverización de una recarga en donde se monta una recarga en el dispositivo. En ésta etapa precedente si los medios de detección no detectan ninguna reflectancia, o un nivel de reflectancia predeterminado, esto puede ser indicador de la ausencia de una recarga en el dispositivo y los medios de detección evitarán que se activen los medios de accionamiento.

El método del tercer aspecto de la presente invención se puede operar preferiblemente para evitar la activación de los medios de accionamiento si los medios de detección son incapaces de detectar y distinguir entre dichas por lo menos dos áreas de diferente reflectancia. Alternativamente el método del tercer aspecto de la presente invención se puede operar preferiblemente para evitar la activación adicional de los medios de accionamiento si los medios de detección son incapaces de detectar y distinguir entre dichas por lo menos dos áreas de diferente reflectancia. La prevención de activación o activación adicional se puede mantener hasta

que un usuario reconfigure el dispositivo y/o inicia un selector manual para prevención en curso.

Volviendo a la recarga a ser utilizada en los dispositivos o métodos mencionados anteriormente, las áreas de diferente reflectancia en la cabeza pulverizadora pueden estar provistas por áreas de diferentes colores. Combinaciones de color preferidas que proporcionan la diferencia requerida de reflectancia son combinaciones de un color de luz con un color oscuro, en donde el color claro suministra un área que posee un mayor nivel de reflectancia de radiación que el color oscuro que proporciona un área que posee una mayor tendencia a absorber la radiación es así un área de menor reflectancia. Una combinación particularmente preferible es aquella de un color sustancialmente blanco y un color sustancialmente negro. Más preferiblemente la cabeza pulverizadora está provista en un color sustancialmente blanco con una coloración sustancialmente negra (por ejemplo, una marca, un punto, un cuadrado, un rectángulo, un triángulo o similares) está provisto en el vástago de la cabeza pulverizadora. Por ejemplo, cuando una cabeza pulverizadora generalmente tiene forma de L, el vástago sería la parte más corta de la forma de L que se conecta al vástago de la válvula del cuerpo de recarga y dicha parte más corta tiene una marca sustancialmente negra sencilla sobre una porción hacia la parte trasera de la misma.

Las áreas de diferente reflectancia en la cabeza pulverizadora pueden estar provistas por áreas de diferente reflectancia Infrarroja (IR). Particularmente los medios preferidos para suministrar áreas de diferente reflectancia IR incluyen el uso de tintas/pinturas/barnices que son absorbentes o reflectores de la radiación IR y, preferiblemente, son invisibles a simple vista bajo condiciones de luz normales.

El sensor se puede operar para detectar longitudes de onda en el rango de 700-1350 nm. Preferiblemente el sensor se puede operar para detectar longitudes de onda en el rango de 800-1100 nm. Más preferiblemente el sensor se puede operar para detectar longitudes de onda en el rango de 850-1000 nm. Más preferiblemente el sensor se puede operar para detectar longitudes de onda en el rango de sustancialmente 940 nm.

Las áreas de diferente reflectancia se pueden aplicar a, o incorporar en, la cabeza pulverizadora mediante cualquier medio adecuado. Los métodos particularmente preferidos incluyen la aplicación inicial de por lo menos un área de reflectancia diferente a una etiqueta que se adhiere posteriormente a la cabeza pulverizadora. Alternativamente, por lo menos un área de diferente reflectancia se puede imprimir, grabar y/o aplicar directamente sobre la cabeza pulverizadora. Como una alternativa adicional, la cabeza pulverizadora se puede fabricar a partir de dos o más componentes, en donde por lo menos dos de dichas partes

están provistas con áreas externas de la misma que tienen propiedades reflectivas distinguibles con respecto una a la otra.

- 5 Típicamente la cabeza pulverizadora es opaca, sin embargo, en una disposición alterna la cabeza pulverizadora puede ser sustancialmente transparente y el vástago de la válvula de la recarga puede estar provista con un área de reflectancia diferente. Por ejemplo, el vástago de la válvula puede tener
10 una coloración oscura, y ésta puede crear una diferencia detectable para los medios de detección. Alternativamente, la cabeza pulverizadora puede estar provista con una ventana sustancialmente transparente en registro con el vástago de la válvula para permitir que el vástago de la válvula se vea por los medios de detección para proporcionar las áreas de
15 diferente reflectancia.

- La cabeza pulverizadora de una recarga tiene típicamente un perfil con forma de L, en donde la parte más corta de la forma de L engrana con el extremo libre del vástago de la
20 válvula. Preferiblemente la cabeza pulverizadora de la recarga para uso con dispositivo de la presente invención tiene generalmente forma de L con un ángulo de sustancialmente 90° entre la parte de la cabeza pulverizadora conectada al vástago de la válvula y la parte
25 de la cabeza pulverizadora que posee el orificio de salida; éste ángulo puede estar entre 60-120° sin embargo.

- En una disposición alterna, la cabeza pulverizadora puede tener una forma para deflectar cualquier señal de evaluación lejos de los medios de detección del dispositivo. En el dispositivo de la presente invención los medios de detección pueden estar provistos en una posición fija y, por lo tanto, sólo tendrán un campo de vista limitado de la cabeza
30 pulverizadora para examinar y sólo tendrán un campo limitado o área en el que serán capaces de detectar la señal de evaluación reflejada. Por lo tanto, la cabeza pulverizadora puede tener una forma tal que una porción de la cabeza pulverizadora se pueda ver por los medios de detección del dispositivo que tienen forma para reflejar sustancialmente la señal de evaluación de los medios de detección (por
35 ejemplo, al estar generalmente planos y sustancialmente paralelos con los medios de detección o curvados, preferiblemente con una curvatura leve) y por lo menos una porción de la cabeza pulverizadora se puede ver por los medios de detección del dispositivo que se forman para deflectar sustancialmente la señal de evaluación de los
40 medios de detección (por ejemplo, al estar en ángulo con relación a la dirección de la señal de evaluación y la ubicación de los medios de detección de tal manera que señal de evaluación reflejada se reflecta lejos de una parte de recolección de los medios de detección siendo así
45 sustancialmente indetectables o menos detectables).

En esta disposición alterna para la cabeza pulverizadora que tiene porciones deflectantes y reflectantes puede ser preferible para la porción inferior de la cabeza pulverizadora (la porción de la cabeza pulverizadora conectada al vástago de la válvula) ser la porción reflectante al tener una superficie generalmente plana y paralela o gentilmente curvada externa con relación a la ubicación fija de los medios de detección en el dispositivo de la presente invención para reflejar, en uso, la señal de evaluación hacia los medios de detección. En ésta disposición la porción deflectante sería preferiblemente una porción superior de ésta cabeza pulverizadora que tiene una superficie generalmente plana o gentilmente curvada externa en ángulo lejos de la ubicación fija de los medios de detección en el dispositivo de la presente invención para deflectar, en uso, la señal de evaluación lejos de los medios de detección. Por ejemplo, la superficie puede tener una forma para deflectar la señal de evaluación a 90° lejos de la normal, y preferiblemente para deflectar la señal de evaluación a $>90^\circ$ lejos de la normal. La porción de deflexión puede tener un perfil con forma de V alineada con una fuente de señal de evaluación para deflectar la señal de evaluación lejos en dos direcciones diferentes, ninguna de aquellas direcciones está hacia los medios de detección, preferiblemente está a 90° lejos de la normal, o más preferiblemente a $>90^\circ$ lejos de la normal.

La porción superior e inferior de la cabeza pulverizadora relacionada con ésta disposición alterna de la cabeza pulverizadora se utilizan intercambiabilmente, de hecho, la porción superior puede ser la porción reflectante y la porción inferior la porción deflectante y viceversa según se describe.

En una disposición alterna adicional, la cabeza pulverizadora puede estar provista con un corte para evitar la señal de evaluación, en uso, por medios de detección. Tal un corte se puede ubicar dentro del área de la cabeza pulverizadora que se interroga por los medios de detección de tal manera que los medios de detección puedan detectar la diferencia en la reflectancia de la señal de evaluación desde una porción (por ejemplo una porción reflectante) de la cabeza pulverizadora contra la ausencia de cualquier reflectancia en el corte. El corte puede estar provisto por la cabeza pulverizadora que tiene una forma no típica (es decir, no tiene forma de L) con el fin de proporcionar el mismo efecto que el corte. Por ejemplo, la cabeza pulverizadora puede comprender una sección sustancialmente vertical corta para enganchar el extremo libre del vástago de la válvula y tiene una sección sustancialmente horizontal corta para dirigir la pulverización del fluido a través de la abertura del dispositivo, y la cabeza pulverizadora puede tener una sección transversal más larga entre dichas secciones cortas. El resultado de ésta configuración inusual de la cabeza pulverizadora puede resultar en el mismo efecto que el corte, de tal manera que la exploración de los

medios de detección de la cabeza pulverizadora detecta la diferencia en la reflectancia de la sección vertical sustancialmente corta de la cabeza pulverizadora contra la ausencia de cualquier reflectancia por encima de la sección vertical sustancialmente corta.

En aún una disposición adicional alternativa, la cabeza pulverizadora puede estar provista con una porción de corte para proporcionar una mayor distancia para que la señal de evaluación reflejada viaje, en uso, a unos medios de detección en comparación con la distancia para que la señal de evaluación reflejada viaje desde una porción sin corte de la cabeza pulverizadora. En ésta disposición la señal de evaluación, dicha radiación emitida por los medios de detección, debe ser ajustada de tal manera que sea capaz de viajar la distancia entre la porción que no tiene corte de la cabeza pulverizadora y de regreso de nuevo después de reflexión, sin embargo, debido a que la distancia se incrementa la radiación es menos capaz de viajar la distancia incrementada. Debido al ajuste de la radiación, la cantidad de radiación que se recolecta por los medios de detección sería menor para la radiación reflejada desde la porción de corte que desde la porción que no tiene corte de la cabeza pulverizadora, ésta diferencia en reflectancia se puede detectar por los medios de detección, indicando así dos áreas de diferente reflectancia.

Las áreas de diferente reflectancia en la cabeza pulverizadora pueden estar provistas en la forma de por lo menos una línea de diferente reflectancia. Dicha una o más líneas es preferiblemente y sustancialmente perpendicular con relación a una sección de entrada de la cabeza pulverizadora; en otras palabras, en una dirección sustancialmente horizontal cuando la recarga se coloca sobre una superficie plana. Tal orientación de las líneas puede ser ventajosa debido a que ésta puede mejorar la probabilidad de que los medios de detección puedan distinguir entre líneas que tienen diferente reflectancia, particularmente en donde dichos medios de detección se pueden operar durante el movimiento de la cabeza pulverizadora.

Las áreas de diferente reflectancia en la cabeza pulverizadora pueden estar provistas en la forma de dos líneas de diferente reflectancia. Alternativamente, las áreas de diferente reflectancia en la cabeza pulverizadora pueden estar provistas en la forma de una pluralidad de líneas de diferente reflectancia. El uso de dos o una pluralidad de líneas puede ser ventajoso ya que éstas pueden ser capaces de operar como un código capaz de impartir información adicional al dispositivo más allá de si la recarga es una recarga segura o no.

Alternativamente las áreas de diferente reflectancia pueden estar provistas en la forma de uno o más patrones y/o una o más formas y/o una o más letras y/o uno o más números.

Tal información adicional puede incluir el tipo particular de recarga para permitir al dispositivo alterar su forma de operación. Por ejemplo, cuando la recarga contiene un
 5 insecticida, la frecuencia de pulverización puede ser deseablemente diferente a cuando el dispositivo está pulverizando un ambientador o similar.

Como otro ejemplo, la información adicional se puede
 10 relacionar con un periodo de final de vida específico para esa recarga particular. En ésta disposición el dispositivo puede ser capaz de ajustar el número de accionamientos predeterminado dependiendo de la cantidad de fluido almacenado en la recarga y el número de accionamientos que
 15 la cantidad de fluido permitirá, en donde el número predeterminado para ese tipo particular de recarga se almacena en dicha información adicional.

Alternativamente, las áreas de reflectancia pueden impartir
 20 dicha información adicional en donde los medios de detección se adaptan para reconocer la presencia de una propiedad reflectiva específica, dicha propiedad reflectiva específica se puede referenciar contra una memoria interna de tales propiedades con el fin de permitir al dispositivo reconocer
 25 la información adicional.

El dispositivo de cualquiera de los aspectos mencionados anteriormente puede estar provisto con un indicador en donde dicho indicador se puede operar para indicar información a
 30 un usuario. Tal información puede incluir: si la recarga se monta en el dispositivo es potencialmente peligrosa cuando no está destinada para uso con el dispositivo; si la recarga necesita ser cambiada; si la batería o baterías necesitan ser cambiadas (cuando el dispositivo se energiza con
 35 batería); y otra información potencialmente útil.

El indicador se puede operar para proporcionar una indicación visual y/o proporcionar una indicación audible.

Preferiblemente el indicador se configura para proporcionar una indicación visual al emitir luz desde una o más fuentes de luz, preferiblemente uno o más LED. Se puede adaptar una o más fuentes de luz para emitir un color de luz diferente para indicar la función actual que está realizando el
 45 dispositivo. Adicionalmente o alternativamente, uno o más fuentes de luces brillantes centellear para indicar la función actual que el dispositivo está desarrollando.

Se puede proporcionar un indicador visual en la forma de
 50 una pantalla LCD o similar en donde la pantalla se adapta para proporcionar un mensaje a un usuario, por ejemplo tales mensajes pueden incluir "ENCENDIDO", "INSERTADA RECARGA PELIGROSA", "CAMBIO DE RECARGA", "CAMBIO DE BATERÍAS", "NÚMERO DE PULVERIZACIONES RESTANTES", "VIDA DE LA RECARGA",
 55 "APAGADO".

El dispositivo puede estar provisto un mecanismo de impulso. El mecanismo de impulso puede estar conectado a un interruptor operado por el usuario o botón o similar. En
 5 operación el mecanismo de impulso puede activar los medios de accionamiento para hacer el accionamiento inmediato de una recarga.

El dispositivo se puede energizar por la red de suministro de electricidad y/o ser alimentado con batería y/o ser
 10 alimentado por celdas solares ubicadas en el dispositivo. Más preferiblemente el dispositivo se acciona con batería.

De acuerdo con un cuarto aspecto de la presente invención se proporciona aquí por lo tanto una cabeza pulverizadora para una recarga de fluido para uso con un dispositivo o método de acuerdo con cualquier aspecto precedente de la presente invención en donde la cabeza pulverizadora comprende una
 15 sección de entrada y un orificio de salida, en donde la sección de entrada se adapta para conectarse con un vástago de la válvula de una recarga y el orificio de salida es capaz de dirigir una pulverización de fluido lejos del cuerpo de recarga, caracterizado porque la cabeza pulverizadora tiene una superficie externa que tiene por lo
 20 menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia.

De acuerdo con un quinto aspecto de la presente invención se proporciona por lo tanto aquí una recarga de fluido para uso con un dispositivo o método de acuerdo con cualquier aspecto
 30 precedente de la presente invención en donde la recarga comprende un cuerpo que contiene una cantidad de fluido y un vástago de la válvula con una cabeza pulverizadora conectada a ésta, la cabeza pulverizadora comprende una sección de entrada y un orificio de salida que define una ruta de fluido desde el cuerpo al orificio de salida, caracterizado porque la cabeza pulverizadora tiene una superficie externa que tiene por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia.

De acuerdo con un sexto aspecto de la presente invención se proporciona aquí por lo tanto un dispositivo de acuerdo con el primero o segundo aspecto de la presente invención configurado para operar de acuerdo con el método del segundo
 40 aspecto de la presente invención.

Para evitar dudas, todas las características descritas en ésta descripción y/o todas las etapas de cualquier método o proceso así descrito, se pueden combinar en cualquier forma, excepto combinaciones en donde por lo menos algunas de tales
 50 características y/o etapas sean mutuamente excluyentes. Cada característica descrita en ésta descripción se puede reemplazar por características alternas que sirven para el mismo propósito, o propósito equivalente o similar, a menos
 55 que se establezca expresamente otra cosa. Así, a menos que

se establezca expresamente otra cosa, cada característica descrita es sólo un ejemplo de una serie genérica de equivalentes o características similares.

5 Breve Descripción de los Dibujos

Las realizaciones de la invención se describirán ahora, sólo a forma de ejemplo, con referencia a los siguientes dibujos en los que:

10 La Fig. 1 ilustra una elevación lateral de un dispositivo de la presente invención con una recarga montada en éste;

La Fig. 2 ilustra una elevación frontal de un dispositivo de la presente invención con una recarga montada en éste, y

15 La Fig. 3A ilustra una vista en perspectiva de una primera realización de una cabeza pulverizadora de recarga;

20 La Fig. 3B ilustra una elevación trasera de una cabeza pulverizadora de la Fig. 3A;

La Fig. 4A ilustra una vista en perspectiva de una segunda realización de una cabeza pulverizadora de recarga;

25 La Fig. 4B ilustra una vista del plano de una cabeza pulverizadora de la Fig. 4A;

La Fig. 5A ilustra una vista en perspectiva de una tercera realización de una cabeza pulverizadora de recarga;

30 La Fig. 5B ilustra una elevación trasera de una cabeza pulverizadora de la Fig. 5A;

La Fig. 6A ilustra una vista en perspectiva de una cuarta realización de una cabeza pulverizadora de recarga; y

35 La Fig. 6B ilustra una elevación lateral de una cabeza pulverizadora de la Fig. 6A.

40 Descripción de una Realización

Como se muestra en las Figuras 1 y 2 un dispositivo de pulverización de fragancia 10 comprende una carcasa 12 con una sección delantera removible 12a a través de la cual hay una abertura 14. La sección delantera 12a puede tener una

45 bisagra para permitir el acceso al interior del dispositivo 10. Una recarga 16, en éste ejemplo una lata para pulverizar aerosol, se aloja dentro de la carcasa 12 sobre una plataforma 18. Un vástago de salida 20 de la lata para pulverización 16 es recibido en una abertura inferior de una

50 cabeza pulverizadora 22. Se ubican unos medios de accionamiento 24 por encima de la recarga 16 y poseen un brazo 24 que se pueden mover para aplicar presión sustancialmente hacia abajo sobre la cabeza pulverizadora 22 y realizar el accionamiento de la recarga 16. Durante el

55 accionamiento de la recarga, se mantiene el fluido dentro

del cuerpo 26 de la recarga 16 que es forzado a través del
vástago de la válvula 20, dentro de la cabeza pulverizadora,
saliendo de la cabeza pulverizadora a través de un orificio
de salida en la forma de una boquilla 28 al ambiente
5 externo. Los medios de accionamiento 26 están energizados
por baterías 30.

El dispositivo está provisto adicionalmente con unos medios
de detección 38 ubicados sustancialmente adyacentes a la
10 ubicación normal de una cabeza pulverizadora cuando se monta
una recarga en el dispositivo 10.

Aunque no se muestra, los medios de detección 38 incluyen un
sensor configurado para enfrentar la cabeza pulverizadora
15 22, el sensor se adapta para emitir radiaciones en ésta
realización, preferiblemente radiación IR, hacia la cabeza
pulverizadora 22 para examinarla. El sensor también es capaz
de recolectar radiación reflejada con el fin de distinguir
entre diferentes áreas de reflectancia en la cabeza
20 pulverizadora 22 con el campo de vista del sensor.

Los medios de detección 38 pueden estar en comunicación
directa con los medios de accionamiento 26 o,
alternativamente, en comunicación con una unidad de control
25 (no mostrada) que está en comunicación con los medios de
accionamiento 26. La comunicación entre los medios de
detección 38 y los medios de accionamiento 26, ya sea
directa o indirectamente a través de la unidad de control,
son esenciales para permitir al dispositivo ser capaz de
30 producir una respuesta cuando se monta una recarga peligrosa
y/o abusiva en el dispositivo 10.

En uso, la recarga 16 se coloca sobre la plataforma 18 y el
vástago de la válvula 20 se engancha en una entrada 34 de la
35 cabeza pulverizadora 22. La recarga 16 es un elemento
reemplazable y la cabeza pulverizadora 22 se suministra
típicamente con la recarga 16.

Cuando la recarga 16 se coloca en posición toma una ruta de
40 fluido para la fragancia para pulverización (u otro
material, tal como material esterilizante/material
insecticida/material bactericida o similar) desde la recarga
16 a través de la cabeza pulverizadora 22 y pasa a la
abertura 14 en la sección delantera de la carcasa 12a y
45 afuera al ambiente circundante.

Con el fin de originar la pulverización del fluido desde la
recarga 16, los medios de accionamiento se activan
originando que el brazo 24 se mueva hacia abajo sobre la
50 cabeza pulverizadora 22 y empujan la cabeza pulverizadora en
una dirección sustancialmente hacia abajo. El movimiento
hacia abajo de la cabeza pulverizadora 22 efectúa el
correspondiente movimiento hacia abajo del vástago de la
válvula 20 que abre la válvula y permite al fluido fluir a
55 través del vástago de la válvula, la cabeza pulverizadora y

hacia afuera a la abertura 14 dentro del ambiente circundante.

Los medios de accionamiento 26 tienen numerosas configuraciones seleccionables que un usuario puede seleccionar a través de unos medios de entrada de usuario 32. Los medios de entrada de usuario 32 se pueden operar para permitir a un usuario seleccionar si el dispositivo está encendido o apagado, el modo de operación específico del dispositivo tal como su frecuencia de pulverización, retraso del temporizador u otra de tales características. Las configuraciones de frecuencia preferidas serán la opción de fluido que se pulveriza de la recarga cada nueve minutos, o cada ocho minutos, o cada treinta y seis minutos.

Con referencia a la Fig. 3, se pueden ver las áreas de diferente reflectancia en la cabeza pulverizadora 22. Específicamente, la porción del cuello 34 de la cabeza pulverizadora 22 se cubre con una capa de tinta oscura/pintura/barniz 35 que es de una menor reflectancia que la restante del cuello 34 que no se cubre.

En una realización de la invención, los medios de detección 38 se pueden operar para detectar la presencia de la cabeza pulverizadora 22 y, adicionalmente, detectar si hay por lo menos un área de reflectancia baja y por lo menos un área de mayor reflectancia en la cabeza pulverizadora 22.

En primer lugar los medios de detección 38 se pueden operar para detectar si se monta una recarga 16 en el dispositivo al examinar el área ocupada normalmente por una cabeza pulverizadora 22 cuando se monta una recarga en éste. Antes de permitir que los medios de accionamiento 24 se activen, los medios de detección 38 pueden desarrollar un examen inicial de la ubicación dentro del dispositivo ocupado normalmente por una cabeza pulverizadora de una recarga cuando se monta en el dispositivo, si los medios de detección no detectan ninguna reflectancia, o un nivel de reflectancia predeterminado, ésta situación puede ser indicadora de la ausencia de una recarga en el dispositivo y los medios de detección 38 evitarán que los medios de accionamiento se activen, ya sea directamente al comunicarse con éstos o indirectamente a través de una unidad de control. Preferiblemente los medios de detección podrían examinar un área ocupada normalmente por la porción inferior del cuello de la cabeza pulverizadora, como se indica con la flecha 40 en la Fig. 3B.

Debido a que la presencia de una recarga 16 se detecta, los medios de detección se configuran adicionalmente para examinar porciones adicionales de la cabeza pulverizadora 22. Los medios de detección 38 pueden ser capaces de examinar la cabeza pulverizadora 22 al emitir radiación hacia la cabeza pulverizadora, tal como radiación IR, a través de una o más porciones de la misma, tal como a través

de un campo de vista como se indica por la flecha 42. Los medios de detección son capaces de recolectar radiación reflectada de tal manera que la cantidad de reflectancia recolectada se puede atribuir específicamente o
 5 aproximadamente o generalmente a una porción o porciones de la cabeza pulverizadora 22. Tal atribución puede permitir a los medios de detección 38 directamente, o en combinación con la unidad de control (no mostrada), determinar si cualquier área de diferente reflectancia está presente en la
 10 cabeza pulverizadora 22.

Alternativamente, la evaluación de la recarga por los medios de detección 38 puede permitir a los medios de detección detectar si por lo menos un nivel diferente de radiación
 15 reflectada se detecta sin atribuir el nivel detectado de reflectancia a una sección específica de la cabeza pulverizadora. Cualquiera de tales detecciones puede permitir a los medios de detección 38 directamente, o en combinación con la unidad de control (no mostrada),
 20 determinar si cualquier área de diferente reflectancia está presente en la cabeza pulverizadora o en el área normalmente ocupada.

Con cualquier forma de evaluación, si se detectan diferentes
 25 áreas de reflectancia los medios de detección 38 comunicarán directamente a los medios de accionamiento 26, o indirectamente a través de una unidad de control (no mostrada), para permitir a los medios de accionamiento 26 operar de acuerdo con el comando de entrada de usuario para
 30 originar la pulverización de fluido.

Por el contrario, si no se detectan diferentes áreas de reflectancia, es decir que se ha montado una recarga potencialmente peligrosa en el dispositivo, la comunicación
 35 directa o indirecta de los medios de detección 38 llamará a los medios de accionamiento 26 para que ingresen en un modo inactivo. Durante el modo inactivo los medios de accionamiento 26 no activarán y no harán la pulverización del fluido. El modo inactivo se mantendrá hasta que el
 40 usuario inicie una reconfiguración del dispositivo. La reconfiguración se puede facilitar por el usuario que monta una nueva recarga en el dispositivo y/o el usuario que opera el botón de reconfiguración o similares. Sin embargo, si un vándalo ha montado intencionalmente una recarga
 45 potencialmente peligrosa y ha reconfigurado el dispositivo, una vez los medios de detección 38 exploran la cabeza pulverizadora 22 y fallan en encontrar la reflectancia requerida, los medios de accionamiento 26 se ubicaran de nuevo en el modo de inactivación.

50 En una realización alterna, los medios de detección se pueden operar para detectar la presencia de la cabeza pulverizadora 22 y para detectar si hay por lo menos un área de reflectancia baja y por lo menos un área de mayor
 55 reflectancia en la cabeza pulverizadora 22 sólo durante el

movimiento de la cabeza pulverizadora 22 luego de la activación por los medios de accionamiento 26. Este movimiento permite a los medios de detección 38 la oportunidad de ver una proporción definida de la cabeza pulverizadora 22, fijando así el campo de vista de los medios de detección (por ejemplo, como se define por la flecha 42 en la Fig. 3B). Si durante la evaluación de la cabeza pulverizadora 22 las diferentes áreas de reflectancia se detectan por los medios de detección 38, estos medios comunicarán a los medios de accionamiento 26, directamente o indirectamente, para permitir a los medios de accionamiento 26 operar de acuerdo con el comando de entrada de usuario para hacer la pulverización del fluido. Por el contrario, si no se detectan diferentes áreas de reflectancia, es decir se ha montado una recarga potencialmente peligrosa en el dispositivo, potencialmente para efectuar vandalismo, la comunicación de los medios de detección 38 llamarán a los medios de accionamiento 26 para ingresar en un modo inactivo, como se discutió anteriormente.

Cuando se ha montado una recarga 16 en el dispositivo 10 y los medios de detección 38 han sido capaces de distinguir entre un área de menor reflectancia y un área de mayor reflectancia, los medios de control o similares pueden iniciar un mecanismo de conteo. El mecanismo de conteo se puede calibrar para permitir un número de accionamientos predeterminados de la recarga que corresponde a la cantidad de fluido almacenado en una recarga. El mecanismo de conteo se puede operar en uso, y después de un número de accionamientos predeterminados que se han alcanzado, para hacer que el dispositivo 10 ingrese al modo inactivo, evitando así acciones adicionales de esa recarga, hasta que un usuario coloca una recarga y/o reconfigura el dispositivo. El mecanismo de conteo se puede reconfigurar automáticamente cada vez que se monta una recarga en el dispositivo.

Las Figs. 3-6 ilustra varias realizaciones de cabezas pulverizadoras de recarga. Como se mencionó, la Fig. 3 ilustra una primera realización en donde la cabeza pulverizadora tiene un perfil generalmente con forma de L, en donde la parte más corta de la forma de L, la porción del cuello 34, engancha con el extremo libre del vástago de la válvula. El ángulo entre la parte de la cabeza pulverizadora conectada al vástago de la válvula y la parte de la cabeza pulverizadora que posee el orificio de salida se ilustra por ser sustancialmente de 90°, sin embargo este ángulo puede estar entre 60-120°, el aspecto clave es que el orificio de salida dirige el fluido pulverizado a través de la abertura 14 y lejos de la carcasa del dispositivo. La porción de cuello 34 de la cabeza pulverizadora 22 se cubre con una capa de tinta oscura/pintura/barniz 35 que es de menor reflectancia que la parte restante del cuello 34 que no está cubierta. De manera ideal la capa oscura es sustancialmente

negra y el resto de la cabeza pulverizadora, que incluye la porción restante del cuello 34, es sustancialmente blanca.

En la Fig. 3 la capa de tinta oscura/pintura/barniz está recubierta en la cabeza pulverizadora pero se puede aplicar o incorporar mediante cualquier medio adecuado, tal como la aplicación de una etiqueta, impresión, grabado o la cabeza pulverizadora se puede fabricar a partir de dos o más partes componentes que se fijan juntas.

En las Figs. 4 & 5 la cabeza pulverizadora 22 tiene una forma para desviar cualquier evaluación lejos de los medios de detección 38 del dispositivo. Los medios de detección para uso con la cabeza pulverizadora mostrada en la Fig. 4 tendrán una posición fija y un campo de visión limitado de la cabeza pulverizadora para el examen como se indica por la flecha 46. La flecha 48 muestra el campo de vista de detección que los medios pueden detectar para determinar si una recarga 16 se monta en el dispositivo al examinar el área normalmente ocupada por una cabeza pulverizadora 22 cuando se monta una recarga en ésta.

Los medios de detección se pueden operar para emitir la evaluación en la dirección de la flecha 44 y una porción con forma de V 50 de la cabeza pulverizadora tiene forma para desviar sustancialmente el examen de los medios de detección no hacia los medios de detección sino lejos de ellos en la dirección de las flechas 44'. En contraste a la porción de cuello 4 de la cabeza pulverizadora que se forma para reflejar sustancialmente la evaluación hacia los medios de detección a ser recolectados de tal modo. La desviación de la evaluación 44 por la porción con forma de V 50 puede tener forma para desviar la evaluación a 90° lejos de la normal o >90° lejos de la normal.

La cabeza pulverizadora ilustrada en la Fig. 5 es similar a aquella que se muestra en la Fig. 4 salvo para la orientación de 90° de la porción con forma de V 54, originando así, en uso, una dirección diferente de deflexión de la señal de evaluación 52 en la dirección de las flechas 52'.

En la Fig. 6 una disposición alterna adicional de la cabeza pulverizadora se ilustra la cual puede estar provista con una porción de corte para proporcionar una mayor distancia para que viaje la evaluación reflejada, en uso, a unos medios de detección en comparación con la distancia para que la evaluación reflejada viaje desde una porción sin corte de la cabeza pulverizadora. Los medios de detección para uso con la cabeza pulverizadora mostrada en la Fig. 6 tendrán una posición fija y un campo de vista limitado de la cabeza pulverizadora para examinar como se indica con la flecha 60. La flecha 58 muestra el campo de vista que los medios de detección puede detectar para determinar si la recarga se monta en el dispositivo al examinar el área normalmente

ocupada por una cabeza pulverizadora 22 cuando se monta una recarga en éste. En ésta disposición la evaluación, mostrada por las flechas 62,62', emitida por los medios de detección se debe ajustar de tal manera que sea capaz de viajar la distancia entre la porción sin corte de la cabeza pulverizadora y de regreso de nuevo después de la reflexión, sin embargo, esa distancia se debe incrementar, la radiación es menos capaz de viajar la distancia incrementada. Debido al ajuste de la radiación, la cantidad de radiación que se recolecta por los medios de detección a lo largo de la flecha 62 sería menos que la radiación que viaja a lo largo de la flecha 62', ésta diferencia en reflectancia se puede detectar por los medios de detección, indicando así dos áreas de diferente reflectancia.

Todas las características descritas en ésta descripción (que incluye cualquier reivindicación acompañante, resumen y dibujos), y/o todas las etapas de cualquier método o proceso también se describen, se pueden combinar en cualquier forma, excepto combinaciones en donde por lo menos algunas de tales características y/o etapas, sean mutuamente excluyentes. Cada característica descrita en ésta descripción (que incluye cualquier reivindicación acompañante, resumen y dibujos) se puede reemplazar mediante características alternas que sirven para el mismo propósito, o propósito equivalente o similar, a menos que se establezca expresamente lo contrario. Así, a menos que se establezca expresamente lo contrario, cada característica descrita es sólo un ejemplo de una serie genérica de características equivalentes o similares. La invención no se restringe a los detalles de las anteriores realizaciones. La invención se extiende a cualquiera novedosa, o cualquier combinación novedosa, de las características descritas en ésta descripción (que incluye cualquier reivindicación acompañante, resumen y dibujos), o a cualquier novedosa, o cualquier combinación novedosa de las etapas de cualquier método o proceso así descrito.

REIVINDICACIONES

- 5 1. Un dispositivo de pulverización con una recarga de fluido en esté, en donde la recarga comprende un cuerpo que forma un recipiente para el fluido y una cabeza pulverizadora ubicada en la parte superior de la recarga en comunicación fluida con el recipiente, y en donde el dispositivo comprende una carcasa adaptada para recibir una recarga en está y que

10 tiene una abertura adecuada para permitir, en uso, la pulverización del fluido desde un orificio de salida de la cabeza pulverizadora, el dispositivo comprende adicionalmente medios de accionamiento configurados para accionamiento periódico de la

15 recarga, en donde el dispositivo está provisto con medios de detección configurados para distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia en la cabeza pulverizadora de dicha recarga.

20
- 25 2. Un dispositivo de acuerdo con la reivindicación 1, en donde la cabeza pulverizadora está provista con un área de menor reflectancia y un área de relativamente mayor reflectancia.
- 30 3. Un dispositivo de acuerdo con la reivindicación 1 o 2, en donde los medios de detección se configuran para operar para distinguir entre áreas de diferente reflectancia durante el movimiento de la cabeza pulverizadora.
- 35 4. Un dispositivo de acuerdo con la reivindicación 1 o 2, en donde los medios de detección se configuran para operar para distinguir entre áreas de diferente reflectancia durante el movimiento de la cabeza pulverizadora.
- 40 5. Un dispositivo de acuerdo con la reivindicación 1 o 2, en donde los medios de detección se configuran para operar para distinguir entre áreas de diferente reflectancia solo durante el movimiento hacia arriba de la cabeza pulverizadora.
- 45 6. Un dispositivo de acuerdo con cualquier reivindicación precedente, en donde el dispositivo está provisto con una indicación de fin de vida en la forma de un mecanismo de conteo.
- 50 7. Un dispositivo de acuerdo con la reivindicación 6, en donde el mecanismo de conteo se calibra para permitir un número de accionamientos predeterminado de la recarga que corresponde a la cantidad de fluido almacenado en una recarga.

55

- 8 Un dispositivo de acuerdo con cualquier reivindicación precedente, en donde los medios de detección se configuran para examinar la cabeza pulverizadora al emitir, en uso, radiación hacia la cabeza pulverizadora y recolectar la radiación reflectada, y dichos medios atribuyen específicamente o aproximadamente o generalmente la cantidad de radiación reflectada a una o más porciones de la cabeza pulverizadora.
- 9 Un dispositivo de acuerdo con la reivindicación 8 en donde los medios de detección se configuran para hacer una determinación de que existen diferentes niveles de reflectancia en por lo menos dos porciones separadas de la cabeza pulverizadora cuando la reflectancia recolectada de una porción es por lo menos 0.5 veces mayor que la de una porción separada de la cabeza pulverizadora, y preferiblemente por lo menos 2 veces mayor, y más preferiblemente por lo menos 5 veces mayor, y aún más preferiblemente por lo menos 10 veces mayor, y aún más preferiblemente todavía por lo menos 50 veces mayor, y más preferiblemente por lo menos 100 veces mayor.
10. Un dispositivo de acuerdo con cualquier reivindicación precedente, en donde los medios de detección se suministran con una ubicación fija dentro del dispositivo y tienen un campo de vista fijo con respecto a la cabeza pulverizadora o al área normalmente ocupada por la cabeza pulverizadora cuando la recarga se monta en el dispositivo.
11. Un dispositivo de acuerdo con cualquier reivindicación precedente, en donde los medios de detección se proporcionan en la forma de uno o más sensores que tienen un emisor de radiación y una porción de recolección.
12. Un dispositivo de acuerdo con cualquier reivindicación precedente, en donde los medios de detección se configuran para examinar un rango efectivo de hasta 100 mm, y preferiblemente un rango efectivo de hasta 50 mm, y más preferiblemente hasta 20 mm, y aún más preferiblemente hasta 10 mm, y más preferiblemente hasta 5 mm.
13. Un dispositivo de pulverización que comprende una carcasa adaptada para recibir una recarga de fluido en ésta y que tiene una abertura adecuada para permitir, en uso, la pulverización del fluido de la recarga, el dispositivo comprende adicionalmente medios de accionamiento configurados para accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección

configurados para distinguir, en uso, entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre una cabeza pulverizadora de dicha recarga.

- 5 14. Un método para pulverizar un fluido desde un dispositivo, el método comprende las etapas de montar una recarga de fluido en un dispositivo de pulverización de acuerdo con cualquiera de los
10 primeros o segundos aspectos de la presente invención, colocar el dispositivo en un modo de operación, dicho modo se configura para hacer la activación de los medios de accionamiento, dichos medios de accionamiento operan periódicamente para
15 ponerse contra una cabeza pulverizadora de la recarga y hacer que el movimiento de ésta libere una cantidad de fluido desde la recarga, dicho fluido liberado se pulveriza desde el dispositivo a través de una abertura en la carcasa en el ambiente
20 circundante, caracterizado porque los medios de detección suministrados en el dispositivo se pueden operar en el modo de operación para detectar y distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente
25 mayor reflectancia sobre una cabeza pulverizadora de dicha recarga o dentro del área ocupada normalmente por dicha cabeza pulverizadora.
- 30 15. Un método de acuerdo con la reivindicación 14, en donde los medios de detección se pueden operar durante la activación de los medios de accionamiento y el movimiento de la cabeza pulverizadora de recarga.
- 35 16. Un método de acuerdo con la reivindicación 14, en donde los medios de detección sólo se pueden operar durante la activación de los medios de accionamiento.
- 40 17. Un método de acuerdo con la reivindicación 14, en donde los medios de detección se configuran para ser operables sólo durante sustancialmente el movimiento hacia arriba de la cabeza pulverizadora de recarga.
- 45 18. Una cabeza pulverizadora para una recarga de fluido para uso con un dispositivo o método de acuerdo con cualquier reivindicación precedente, en donde la cabeza pulverizadora comprende una sección de
50 entrada y un orificio de salida, en donde la sección de entrada se adapta para conectarse con un vástago de la válvula de una recarga y el orificio de salida es capaz de dirigir una pulverización de fluido lejos del cuerpo de recarga, caracterizado porque la cabeza pulverizadora tiene una superficie externa
55 que tiene por lo menos un área de menor reflectancia

y por lo menos un área de relativamente mayor reflectancia.

- 5 19. Una recarga de fluido para uso con un dispositivo o
 método de acuerdo con cualquier reivindicación
 precedente, en donde la recarga comprende un cuerpo
 para contener una cantidad de fluido y un vástago de
 la válvula con una cabeza pulverizadora conectada a
 10 ésta, la cabeza pulverizadora comprende una sección
 de entrada y un orificio de salida que define una
 ruta de fluido desde el cuerpo al orificio de
 salida, caracterizado porque la cabeza pulverizadora
 tiene una superficie externa que tiene por lo menos
 15 un área de menor reflectancia y por lo menos un área
 de relativamente mayor reflectancia.
20. Un dispositivo, método, cabeza pulverizadora o
 recarga de acuerdo con cualquier reivindicación
 20 precedente, en donde las áreas de diferente
 reflectancia en la cabeza pulverizadora están
 provistas mediante una combinación de un color
 sustancialmente blanco y un color sustancialmente
 negro, preferiblemente una cabeza pulverizadora
 sustancialmente blanca con una coloración
 25 sustancialmente negra provista en ésta.
21. Un dispositivo, método, cabeza pulverizadora o
 recarga de acuerdo con cualquier reivindicación
 precedente, en donde la cabeza pulverizadora tiene
 30 un perfil generalmente en forma de L, en donde la
 parte más corta de la forma de L se configura para
 engranar con un extremo libre del vástago de la
 válvula de una recarga y dicha parte más corta tiene
 una marca negra sustancialmente sencilla sobre una
 35 porción hacia la parte trasera de la misma.
22. Un dispositivo, método, cabeza pulverizadora o
 recarga de acuerdo con cualquiera de las
 reivindicaciones 1-19, en donde la cabeza
 40 pulverizadora puede estar provista con una porción
 de corte para proporcionar una distancia mayor para
 que la señal de evaluación reflejada viaje, en uso,
 a unos medios de detección en comparación con la
 distancia para que la señal de evaluación reflejada
 45 viaje desde una porción sin corte de la cabeza
 pulverizadora.
23. Un dispositivo de acuerdo con cualquiera de las
 reivindicaciones 1-13 configurado para operar de
 50 acuerdo con el método de cualquiera de las
 reivindicaciones 14-17.
24. Un dispositivo de pulverización con una recarga de
 fluido en éste sustancialmente como se describe aquí
 55 y con referencia a los dibujos acompañantes.

5

25. Una cabeza pulverizadora para una recarga de fluido sustancialmente como se describe aquí y con referencia a los dibujos acompañantes.
26. Una recarga de fluido sustancialmente como se describe aquí y con referencia a los dibujos acompañantes.

Resumen**Dispositivo de Pulverización y Método para Utilizar el Mismo**

- 5 Se describe un dispositivo de pulverización, el dispositivo comprende una carcasa adaptada para recibir una recarga de fluido en éste y tiene una abertura adecuada para permitir, en uso, la pulverización de un fluido a través del mismo, el dispositivo comprende adicionalmente medios de accionamiento
- 10 configurados para el accionamiento periódico de la recarga, en donde el dispositivo está provisto con medios de detección configurados para distinguir entre por lo menos un área de menor reflectancia y por lo menos un área de relativamente mayor reflectancia sobre una cabeza
- 15 pulverizadora de dicha recarga. También se describen métodos de operación de tal dispositivo de pulverización.

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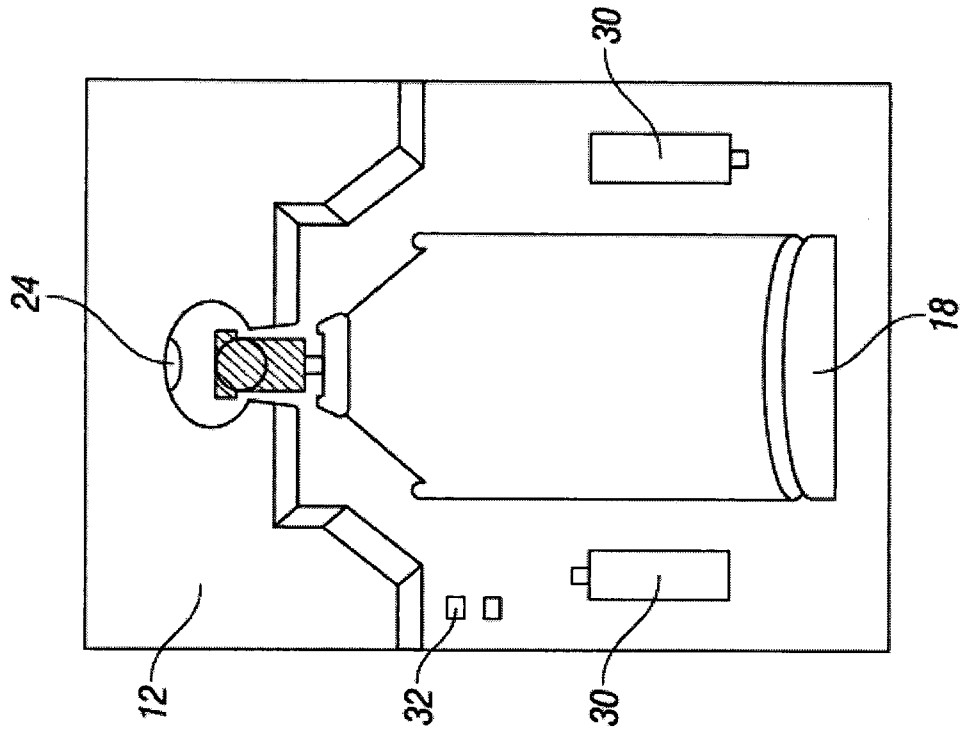


FIG. 2

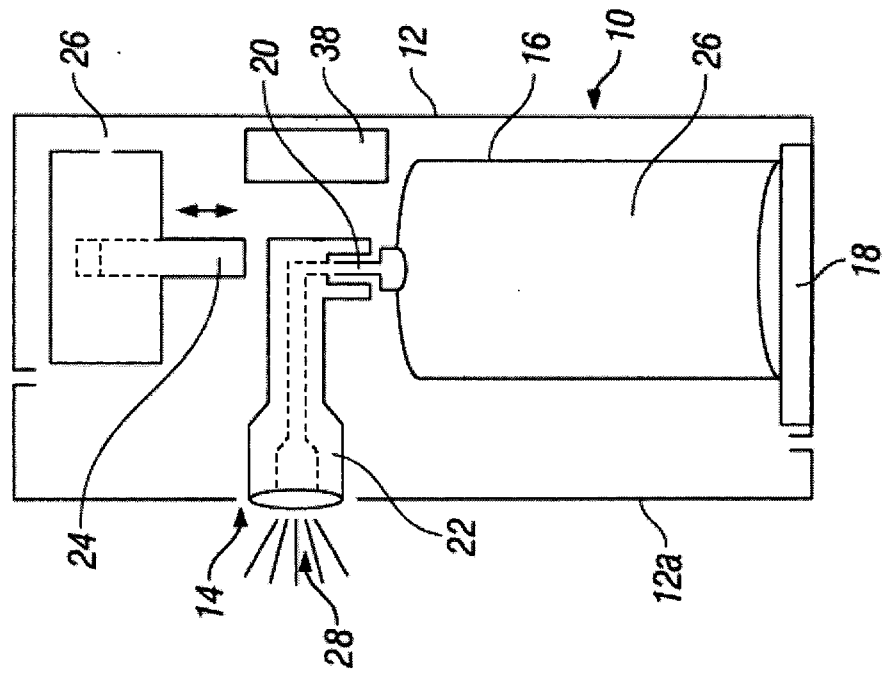


FIG. 1

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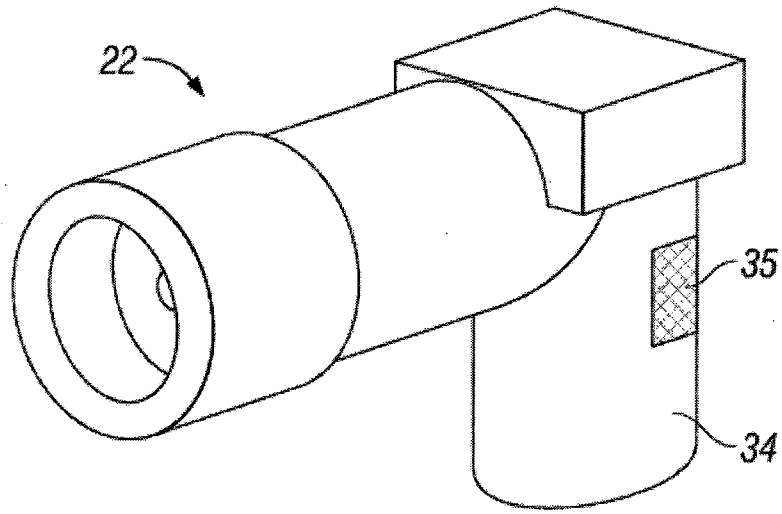


FIG. 3A

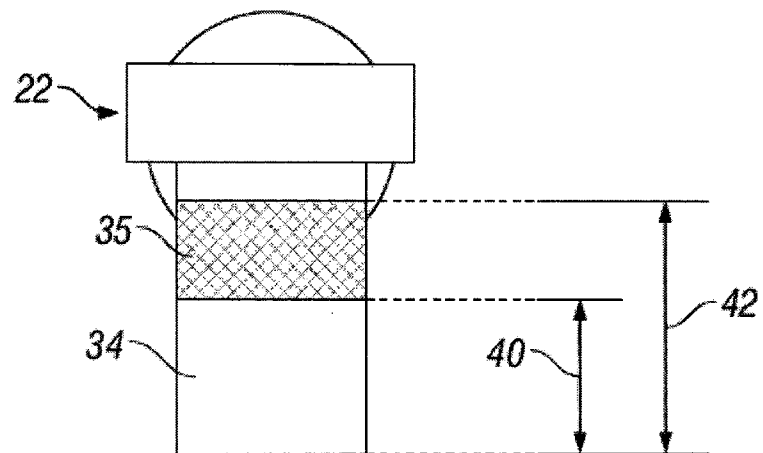


FIG. 3B

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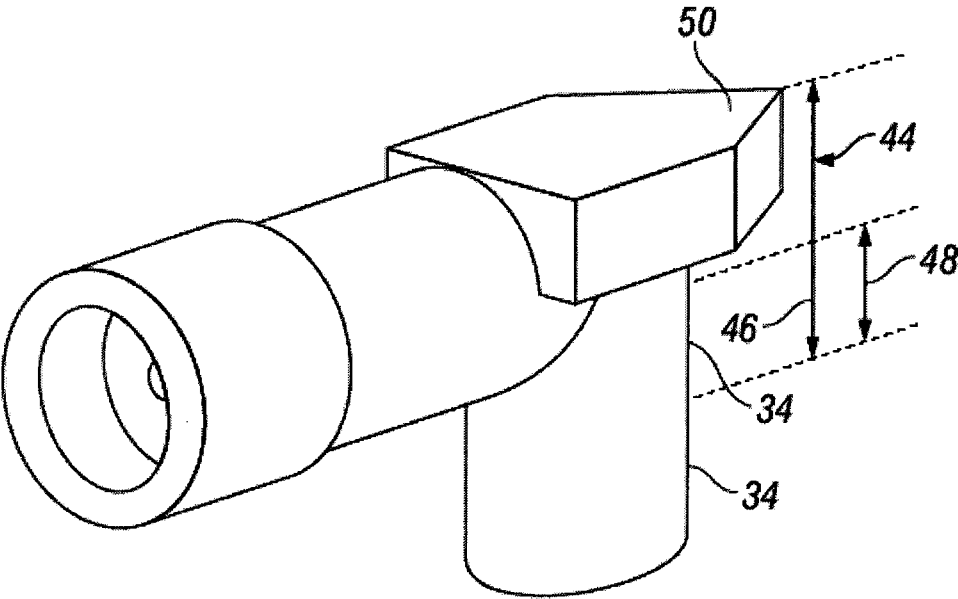


FIG. 4A

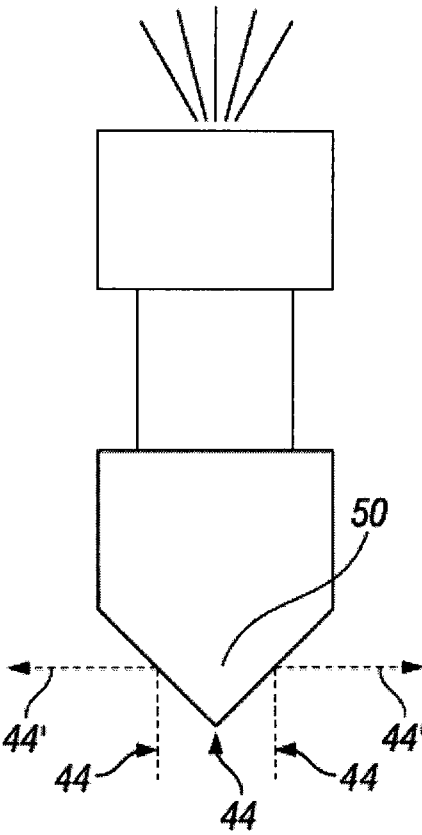


FIG. 4B

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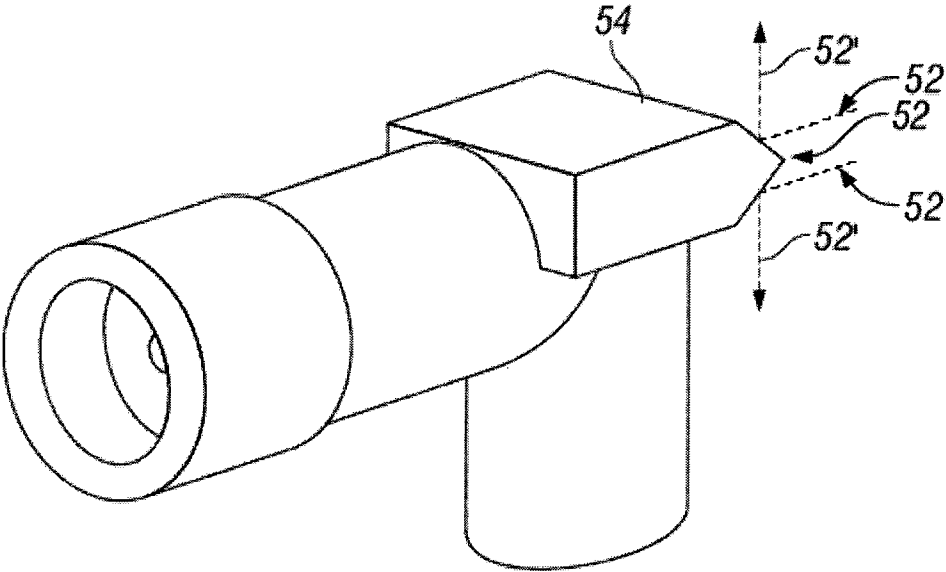


FIG. 5A

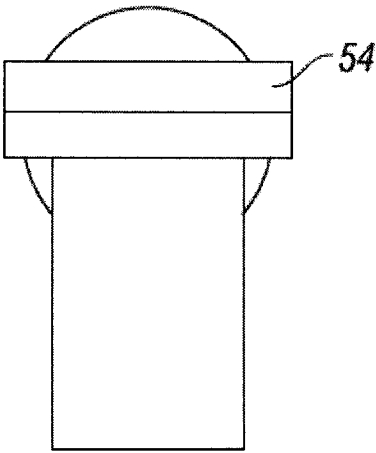


FIG. 5B

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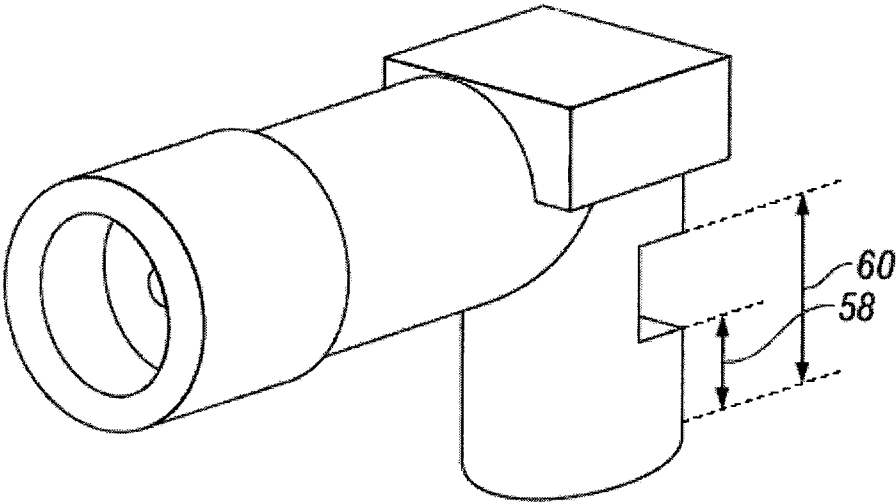


FIG. 6A

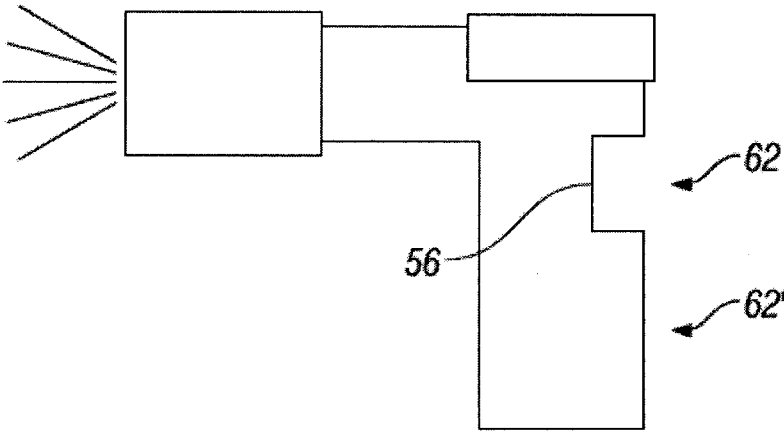


FIG. 6B

Spraying Device and Method of Using Same

Field of the Invention

The present invention relates to a device for spraying a fluid and particularly, but not exclusively to a device for spraying fluids such as fragrances, deodorizing fluids and/or a pest control materials or the like. The present invention also relates to a method of using such a device.

Background

Prior art devices for spraying fragrances, deodorising agents and sanitising fluids into a room generally consist of a device containing a removable source of fluid. With such an arrangement once the source of fluid has been completely exhausted, the source can be replaced rather than replacing the entire device. Typically such sources come in many forms, including containers, bottles, cans and cartridges (generically, all such containers, bottles, cans and cartridges hereinafter will be referred to as "refills"). Such refills can be pump sprays or aerosols, including metered and non-metered versions thereof.

Known prior art devices typically comprise a housing having an opening through which the fluid is sprayed. A part of the housing is movable/removable to permit a refill to be introduced and subsequently removed from the interior of the device. The device further comprises a mechanically actuated arm or the like therein which is adapted to periodically activate in order to press down on a spray head connected to the refill, resulting in fluid passing from the body of the refill, through the spray head and out of the opening in the housing into the surrounding environment.

The shape of a refill is typically standardised to a certain degree, as such, spraying devices may unwittingly provide an opportunity to facilitate vandalism or dangerous behaviour. Specifically, vandals or the like may seek to intentionally insert a dangerous source of sprayable fluid into a spraying device. For instance, where the device is for spraying a fragrance and the refill is an aerosol of a standard size, one form of vandalism and/or intentional abuse could be the insertion of a paint aerosol into the device. The resulting damage from such abuse could be substantial. Such abuse would likely be associated with a significant health and safety risk. Clearly it would be desirable from a user's perspective to be protected from such dangerous behaviour and/or acts of vandalism.

It is one object of the present invention to address the above mentioned concerns and disadvantages.

Summary of Invention

According to a first aspect of the present invention there is provided therefore a spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to

distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill.

Reflectance relates to radiation striking a surface, some of it is absorbed and some is reflected. Reflectance is expressed as a unitless proportion. For the avoidance of doubt, the term "lower reflectance" is used herein as a relative term with reference to the term "higher reflectance"; "lower" may include areas of zero or near zero reflectance.

The body of the refill may be elongate, and the body may be provided with a valve stem at an upper portion of the body remote from the base of the body. At least a portion of the valve stem may be connected to the spray head to permit, in use, fluid to pass from the body of the refill, through the valve stem and through the spray head to the exit orifice where the fluid is sprayed into the surrounding environment.

Preferably the spray head is provided with one area of lower reflectance and one area of relatively higher reflectance.

Preferably the detection means are configured to operate to distinguish between areas of differing reflectance during movement of the spray head.

Advantageously the device according to the present invention may be able to detect when a user attempts to use the device with a potentially dangerous refill and, further, the device is preferably configured to deny the actuation means from activating and/or deny subsequent activation whilst such a refill is loaded in the device to prevent and/or limit any damage that could result from actuating the refill.

A further advantage of the devices of the present invention is that they may be able to provide an improved end of life indication. In use, when a device according to the present invention detects the at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of the refill loaded therein, a counting mechanism may be triggered. The counting mechanism may be calibrated to allow a pre-determined number of actuations of the refill which corresponds to the quantity of fluid stored in a refill. The counting mechanism may be operable in use, and after the pre-determined number of actuations has been reached, to prevent the device from causing further actuations of that refill until a user replaces the refill and/or resets the device. The device may automatically reset every time a refill is loaded into the device. This end of life indication may be advantageous as the power consumption of the device will be minimised, this would be particularly advantageous where the device is battery powered or the like.

The counting mechanism may be linked to an indicator that is adapted to communicate to the user of the device that a used or spent refill needs to be replaced.

Preferably the pre-defined number of actuations is calculated to correspond to the quantity of fluid in the refill.

Preferably the detection means are in direct communication with the actuation means such that, in use, the detection means may instruct the actuation means not to activate.

Alternatively a control means may be provided that is in direct communication with both the detection means and the actuation means, said control means being operative to receive an input from the detection means and being operative to instruct the actuation means to activate or not depending on the received input.

The control means may be provided in the form of a micro processor, a circuit provided on a PCB or in the form of another convenient component(s).

Preferably the actuation means are operable to cause actuation of the refill spray head by imparting a substantially downward force on the spray head. Said substantially downward force is preferably sufficient to cause the spray head to move in a substantially downward direction to open the fluid pathway between the body of the refill and the exit orifice of the spray head to spray a quantity of fluid out of the opening in the housing into the surrounding environment. Once a quantity of fluid has been sprayed, the device may be configured such that the refill's inherent resilience and/or internal pressure is capable of applying a substantially upward force on the spray head sufficient to return the actuation means to its starting position without the need for power to be applied to said means.

The detection means of the present invention is adapted, in use, to distinguish between areas of differing reflectance on a spray head of a refill. Preferably the detection means is capable of distinguishing as mentioned by interrogating the refill. The refill spray head may be interrogated by the detection means emitting radiation toward the spray head and collecting reflected radiation such that the amount of reflectance can be attributed specifically or approximately or generally to one or more portions of the spray head. Such attribution may permit the detection means to directly, or in combination with a control unit, to determine whether any areas of differing reflectance are present on the spray head. If there are no areas of differing reflectance on the spray head of the refill there should be a substantially constant level of reflected radiation. Therefore in an alternative arrangement, the interrogation of the refill by the detection means may permit the detection means to detect whether at least one differing level of reflected radiation is detected without attributing the detected level of reflectance to a specific portion of the spray head. Such detection may permit the detection means to directly, or in combination with a control unit, determine whether any areas of differing reflectance are present on the spray head.

The detection means may be configured to make a determination that there are differing levels of reflectance between at least two separate portions of the spray head when the reflectance from one portion is at least 0.5 times greater than from the a separate portion of the spray head, and preferably at least 2 times greater, and more preferably at least 5 times greater, and even more preferably at least 10 times greater, and even more preferably still at least 50 times greater, and most preferably at least 100 times greater.

As mentioned, it is preferable for the detection means to be configured to be operable to distinguish between areas of differing reflectance during the movement of the spray head. Even more preferably the detection means is configured to only be so operable during the movement of the spray head. This may be advantageous since this would permit the detection means to have a fixed location within the device and have no moving parts, thus reducing the cost of the

detection means and rendering them less likely to fail during the life of the device. Additionally, with such an arrangement the detection means may have a predefined field of view allowing a refill manufacturer more defined parameters for ensuring the spray head is suitably detectable by the detection means. A further advantage exists where the device is to be battery powered as the detection means will only draw power during the actuation of the refill.

Preferably the detection means may be confined to only be operable to distinguish between areas of differing reflectance during the substantially upward movement of the spray head, i.e. the upward movement of the spray head after the downward movement caused by the actuation means. In this arrangement the inherent resilience and/or internal pressure of the refill may be sufficient to return the actuation means to its starting position without power being applied to said means. Such an arrangement may be particularly advantageous since the substantially upward movement of the spray head may be achieved without power being applied to the activation means, thus reducing or eliminating electrical noise/interference produced by the device. The reduction in electrical noise/interference may improve the ability of the detection means to distinguish areas of differing reflectance on the spray head, thus improving the reliability of the detection means whilst allowing a relatively inexpensive detection means to be used.

The detection means may be operable to determine whether a refill is loaded into the device before being operable to distinguish between areas of differing reflectance. In this arrangement the detection means may be operable to interrogate the location within the device normally occupied by a spray head of a refill when loaded into the device, if the detection means does not detect any reflectance, or a predetermined level of reflectance, this situation may be indicative of the absence of a refill in the device and the detection means will prevent the actuation means from activating. This arrangement may also be advantageous as it will prevent the actuation means from periodically activating after a user has removed a spent refill and before a new refill is loaded into the device.

Preferably the detection means are provided with a fixed location within the device and, preferably, have a fixed field of view with respect to the spray head of a refill or the area normally occupied by the spray head when a refill is loaded in the device.

Alternatively or additionally the detection means may be configured to move in order to interrogate the spray head or the area normally occupied by the spray head. The detection may be movable in a substantially horizontal direction and/or a substantially vertical direction and/or in at least two directions. The detection means may be able to pivot about a single position to perform the scan. The detection means may be provided with a wide-angle lens, such as a fish eye lens, to provide a wide field of view when performing the interrogation of the refill.

The detection means may be provided in the form of one or more sensors. The sensor(s) is preferably provided with an integrated radiation emitter that is adapted to emit radiation and further provided with a collecting portion that is adapted to collect any reflected radiation. Alternatively, the sensor may only comprise the collecting portion, the radiation emitter being a separate component that is positioned so that it is capable of emitting radiation toward the spray head such that at least some of the reflected radiation may be collected by the collecting portion.

Preferably the sensor(s) is an optical sensor in the form of an Infra-Red sensor, more preferably a passive Infra-Red sensor. Alternatively or additionally, the optical sensor(s) may be provided in the form of a light sensor or laser sensor.

The detection means may be configured to interrogate with an effective range of up to 100mm, the effective range being the distance any interrogation must travel once reflected by the spray head in order to be detected by the detection means, ie, the distance between the detection means or source of the interrogation to the spray head in addition to the distance the reflected interrogation must travel to the detection means to be collected and detected. Preferably the detection means with an effective range of up to 50mm, and more preferably up to 20mm, and even more preferably up to 10mm, and most preferably up to 5mm.

According to an alternative aspect of the present invention there is provided therefore a spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate the spray head to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill, characterised in that the spray head is provided with at least one portion shaped to substantially reflect the detection means interrogation back toward said means and is provided with at least one portion shaped to substantially deflect the detector means interrogation away from said means.

In the alternative aspect of the present invention the at least one area of lower reflectance is provided by the at least one portion of the spray head that is shaped to deflect the interrogation from the detection means away from the detection means such that a lower amount of the interrogation (be it radiation for example) is detected by said means in comparison to the amount of interrogation detected by the detection means when the interrogation of the at least one portion shaped to reflect said interrogation toward said means, the area of higher reflectance.

According to a further alternative aspect of the present invention there is provided therefore a spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate the spray head to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill, characterised in that the spray head is provided with at least one portion shaped to substantially reflect the detection means interrogation back toward said means and is provided with at least one portion shaped or cutaway to avoid the interrogation of the detector means.

In the further alternative aspect of the present invention the at least one area of lower reflectance is provided by the at least one portion of the spray head that is shaped or cutaway to avoid the interrogation from the detection means such that a lower or zero amount of the interrogation (be it radiation for example) is detected by said means in comparison to the amount of interrogation detected by the detection means when the interrogation of the at least one portion shaped to reflect said interrogation toward said means, the area of higher reflectance.

According to a yet further alternative aspect of the present invention there is provided therefore a spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate the spray head to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill, characterised in that the interrogation emitted from detection means is configured to be detectable over a predefined distance that is substantially equal to the effective range, and wherein the spray head is provided with at least one portion shaped to substantially reflect the detection means interrogation back toward said means and is provided with at least one portion shaped or cutaway relative to the location of the detection means.

As discussed above, the effective range is used herein to relate to the distance any interrogation must travel in order to be detected by the detection means, ie, the distance between the detection means or source of the interrogation to the spray head in addition to the distance the reflected interrogation must travel once reflected by the spray head to the detection means to be collected and detected.

In this further alternative arrangement, by tuning the distance the interrogation is able to travel such that it is capable of travelling the distance between the non-cutaway portion of the spray head and back again after reflection, it is possible to distinguish between one area of lower reflection and one area of higher reflection. Due to the tuning of the interrogation, the amount of interrogation collected by the detection means would be less for the interrogation reflected from the cutaway portion than from the non-cutaway portion of the spray head, this difference in reflectance being detectable by the detection means, thus indicating two areas of differing reflectance. The tuning of the distance or the intensity of the interrogation is capable of travelling could be made greater or smaller than the abovementioned distance, what is important is that the interrogation is tuned such that the cutaway portion of the spray head produces a lesser amount of reflected interrogation compared with the non-cutaway portion which is collectable and detectable by the detection means.

According to a second aspect of the present invention there is provided therefore a spraying device comprising a housing adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from the refill therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish, in use, between at least one

area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill.

According to an alternative aspect of the present invention there is provided therefore a spraying device adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from the refill therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate a spray head of the refill, characterised in that the device is configured to interrogate a refill having a spray head wherein at least one portion of the spray head is shaped to substantially reflect the detection means interrogation back toward said means and at least one portion of the spray head is shaped to substantially deflect the detector means interrogation away from said means such that, in use, the device can distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill.

According to a further alternative aspect of the present invention there is provided therefore a spraying device adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from the refill therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate a spray head of the refill, characterised in that the device is configured to interrogate a refill having a spray head wherein at least one portion of the spray head is shaped to substantially reflect the detection means interrogation back toward said means and at least one portion of the spray head is shaped or cutaway to avoid interrogation by the detector means such that, in use, the device can distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill.

According to a yet further alternative aspect of the present invention there is provided therefore a spraying device adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate a spray head on the refill to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill, characterised in that the interrogation emitted from detection means is configured to be detectable over a predefined distance that is substantially equal to the effective range, and wherein the spray head for use with the device is provided with at least one portion shaped to substantially reflect the detection means interrogation back toward said means and is provided with at least one portion shaped or cutaway relative to the location of the detection means.

According to a third aspect of the present invention there is provided therefore a method of spraying a fluid from a device, the method comprising the steps of loading a refill of fluid in a spray device according to any of the first or second aspects of the present invention, placing the device in an operation mode, said mode being configured to cause activation of the actuation means, said actuation means periodically operating to bear against a spray head of the refill and causing the movement thereof to release a quantity of fluid from the refill, said released fluid

being sprayed from the device through an aperture in the housing into the surrounding environment, characterised in that detection means provided in the device are operable in the operation mode to detect and distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill or within the area normally occupied by said spray head.

Preferably the detection means are operable during the activation of the actuation means and the movement of the refill spray head. Even more preferably the detection means are only operable during the activation of the actuation means. Most preferably the detection means are configured to only be operable during the substantially upward movement of the refill spray head, i.e. the upward movement of the spray head after the downward movement caused by the actuation means.

The method may comprise a preceding step before activation of the actuation means wherein the detection means performs an initial interrogation of the area within the housing normally occupied by the spray head of a refill when a refill is loaded in the device. In this preceding step if the detection means does not detect any reflectance, or a predetermined level of reflectance, this may be indicative of the absence of a refill in the device and the detection means will prevent the actuation means from activating.

The method of the third aspect of the present invention is preferably operable to prevent the activation of the actuation means if the detection means is unable to detect and distinguish between said at least two areas of differing reflectance. Alternatively the method of the third aspect of the present invention is preferably operable to prevent the further activation of the actuation means if the detection means is unable to detect and distinguish between said at least two areas of differing reflectance. The prevention of activation or further activation may be maintained until a user resets the device and/or initiates a manual override of the ongoing prevention.

Turning to the refill to be used in the aforementioned devices or methods, the areas of differing reflectance on the spray head may be provided by areas of different colours. Preferable colour combinations providing the required difference of reflectance are combinations of a light colour with a dark colour, wherein the light colour provides an area possessing a higher level of reflectance of radiation than the dark colour which provides an area possessing a greater tendency to absorb radiation thus an area of lower reflectance. A particularly preferable combination is that of a substantially white colour and a substantially black colour. Most preferably the spray head is provided in a substantially white colour with a substantially black colouration (eg. a mark, a dot, a square, a rectangle, a triangle, or the like) being provided on the stem of the spray head. For instance, where the spray head is generally L-shaped, the stem would be the shorter part of the L-shape which is connected to the valve stem of the refill body and said shorter part has a single substantially black mark on a rearward portion thereof.

The areas of differing reflectance on the spray head may be provided by areas of different Infra Red (IR) reflectance. Particularly preferred means of providing areas of differing IR reflectance include the use of inks/paints/lacquers that are absorbers or reflectors of IR radiation and, preferably, are invisible to the naked eye under normal light conditions.

The sensor may be operable to detect wavelengths in the range of 700-1350 nm. Preferably the sensor is operable to detect wavelengths in the range of 800-1100 nm. More preferably the sensor is operable to detect wavelengths in the range of 850-1000 nm. Most preferably the sensor is operable to detect wavelengths in the range of substantially 940 nm.

The areas of differing reflectance may be applied to, or incorporated in, the spray head by any suitable means. Particularly preferred methods include the initial application of the at least one area of differing reflectance to a label which is subsequently attached to the spray head. Alternatively, the at least one area of differing reflectance may be printed, engraved and/or applied directly on to the spray head. As a further alternative, the spray head could be manufactured from two or more component parts, wherein at least two of said parts are provided with external areas thereof having distinguishable reflective properties with respect to each other.

Typically the spray head is opaque, however, in an alternative arrangement the spray head may be substantially transparent and the valve stem of the refill could be provided with the area of differing reflectance. For instance, the valve stem could have a dark colouration, and this may create a detectable difference for the detection means. Alternatively, the spray head may be provided with a substantially transparent window in registration with the valve stem to permit the valve stem to be viewed by the detection means to provide the areas of differing reflectance.

The spray head of a refill typically has a generally L-shaped profile, wherein the shorter part of the L-shape engages with the free end of the valve stem. Preferably the spray head of the refill for use with the device of the present invention is generally L-shaped with an angle of substantially 90° between the part of the spray head connected to the valve stem and the part of the spray head possessing the exit orifice; this angle may be between 60-120° however.

In an alternative arrangement, the spray head could be shaped to deflect any interrogation away from the detection means of the device. In the device of the present invention the detection means may be provided in a fixed position and will, therefore, only have a limited field of view of the spray head to interrogate and will only have a limited field or area in which it will be able to detect reflected interrogation. Therefore, the spray head may be shaped such that one portion of the spray head viewable by the device's detection means is shaped to substantially reflect the detector means' interrogation (eg. by being generally flat and substantially parallel with the detection means or curved, preferably with a gentle curvature) and at least one portion of the spray head viewable by the device's detection means is shaped to substantially deflect the detector mean' interrogation (eg. by being angled relative to the direction of the interrogation and the location of the detection means such that the reflected interrogation is reflected away from a collection part of the detection means thus being substantially non-detectable or less detectable).

In this alternative arrangement for the spray head having reflecting and deflecting portions it may be preferable for the lower portion of the spray head (the portion of the spray head connected to the valve stem) to be the reflecting portion by having a generally flat and parallel or gently curved outer surface relative to the fixed location of the detection means in the device of the present invention to reflect, in use, interrogation toward the detection means. In this arrangement the deflecting portion would preferably be an upper portion of this spray head having a generally flat

or gently curved outer surface angled away from the fixed location of the detection means in the device of the present invention to deflect, in use, interrogation away from the detection means. For instance, the surface may be shaped to deflect the interrogation at 90° away from the normal, and preferably to deflect the interrogation at $>90^\circ$ away from the normal. The deflection portion may have a V-shaped profile aligned with a source of interrogation to deflect the interrogation away in two different directions, neither of those directions being toward the detection means, preferably being at 90° away from the normal, or more preferably at $>90^\circ$ away from the normal. Upper and lower portion of the spray head referred to for this alternative arrangement of the spray head are used interchangeably, indeed, the upper portion may be the reflecting portion and the lower part the deflecting portion and vice versa as described.

In a further alternative arrangement, the spray head could be provided with a cutaway to avoid interrogation, in use, by a detection means. Such a cutaway may be located within the area of the spray head that is interrogated by the detection means such that the detection means may detect the difference in the reflectance of the interrogation from a portion (eg. a reflecting portion) of the spray head against the absence of any reflectance in the cutaway. The cutaway may be provided by the spray head being shaped to have a non-typical shape (i.e. not an L-shape) in order to provide the same effect as the cutaway. For instance, the spray head may comprise a short substantially vertical section for engaging the free end of the valve stem and have a short substantially horizontal section for directing the spray of fluid through the aperture of the device, and the spray head may have a longer transverse section between said short sections. The result of this unusual configuration of the spray head may result in the same effect as the cutaway, such that the detection means' scan of the spray head detects the difference in the reflectance of the short substantially vertical section of the spray head against the absence of any reflectance above the short substantially vertical section.

In a yet further alternative arrangement, the spray head could be provided with a portion cutaway to provide a greater distance for reflected interrogation to travel, in use, to a detection means in comparison to the distance for reflected interrogation to travel from a non-cutaway portion of the spray head. In this arrangement the interrogation, say by radiation emitted from the detection means, should be tuned such that it is capable of travelling the distance between the non-cutaway portion of the spray head and back again after reflection, however, should that distance be increased the radiation is less capable of travelling the increased distance. Due to the tuning of the radiation, the amount of radiation being collected by the detection means would be less for the radiation reflected from the cutaway portion than from the non-cutaway portion of the spray head, this difference in reflectance being detectable by the detection means, thus indicating two areas of differing reflectance.

The areas of differing reflectance on the spray head may be provided in the form of at least one line of differing reflectance. Said one or more lines preferably being substantially perpendicular relative to an inlet section of the spray head; in other words, in a substantially horizontal direction when the refill is placed on a flat surface. Such orientation of the lines may be advantageous since it could improve the likelihood that the detection means could distinguish between lines having differing reflectance, particularly where said detection means are operable during the movement of the spray head.

The areas of differing reflectance on the spray head may be provided in the form of two lines of differing reflectance. Alternatively, the areas of differing reflectance on the spray head may be provided in the form of a plurality of lines of differing reflectance. The use of two or a plurality of lines may be advantageous as these may be able to operate as a code capable of imparting additional information to the device beyond whether the refill is a safe refill or not.

Alternatively the areas of differing reflectance could be provided in the form of one or more patterns and/or one or more shapes and/or one or more letters and/or one or more numerals.

Such further information could include the particular type of refill to permit the device to alter its mode of operation. For instance, where the refill contains an insecticide, the spraying frequency may desirably be different to when the device is spraying an air freshener or the like.

As another example, the further information may relate to a specific end of life period for that particular refill. In this arrangement the device may be able to adjust the pre-determined number of actuations depending on the amount of fluid stored in the refill and the number of actuations that quantity of fluid will permit, wherein the pre-determined number for that particular type of refill is stored in said further information.

Alternatively, areas of reflectance could impart said further information wherein the detection means is adapted to recognize the presence of a specific reflective property, said specific reflective property may be referenced against an internal memory of such properties in order to permit the device to recognize the further information.

The device of any of the above-mentioned aspects may be provided with an indicator wherein said indicator is operable to indicate information to a user. Such information may include: whether the refill loaded in the device is potentially dangerous as it is not intended for use with the device; whether the refill needs to be changed; whether the battery or batteries need to be changed (where the device is to be battery powered); and other potentially useful information.

The indicator may be operable to provide a visual indication and/or provide an audible indication.

Preferably the indicator is configured to provide a visual indication by emitting light from one or more light sources, preferably one or more LEDs. The one or more light sources may be adapted to emit a different colour of light to indicate the current function the device is performing. Additionally or alternatively, the one or more light sources may blink or flash to indicate the current function the device is performing.

A visual indicator may be provided in the form of an LCD screen or the like wherein the screen is adapted to provide a message to a user, for instance such messages could include "ON", "DANGEROUS REFILL INSERTED", "CHANGE REFILL", "CHANGE BATTERIES", "NUMBER OF SPRAYS REMAINING", "LIFE OF REFILL", "OFF".

The device may be provided with a boost mechanism. The boost mechanism may be linked to a user operated switch or button or the like. On operating the boost mechanism the actuation means may activate to cause the immediate actuation of a refill.

The device may be power by mains-supplied electricity and/or be battery powered and/or be powered by solar cells located on the device. Most preferably the device is battery powered.

According to a fourth aspect of the present invention there is provided therefore a spray head for a refill of fluid for use with a device or method according to any preceding aspect of the present invention wherein the spray head comprises an inlet section and an exit orifice, wherein the inlet section is adapted to connect with a valve stem of a refill and the exit orifice is capable of directing a spray of fluid away from the refill body, characterised in that the spray head has an external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance.

According to a fifth aspect of the present invention there is provided therefore a refill of fluid for use with a device or method according to any preceding aspect of the present invention wherein the refill comprises a body for containing a quantity of fluid and a valve stem with a spray head connected thereto, the spray head comprising an inlet section and an exit orifice defining a fluid pathway from the body to the exit orifice, characterised in that the spray head has an external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance.

According to the sixth aspect of the present invention there is provided therefore a device according to the first or second aspect of the present invention configured to operate in accordance with the method of the second aspect of the present invention.

For the avoidance of doubt, all of the features disclosed in this specification and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. Each feature disclosed in this specification may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

Brief Description of the Drawings

Embodiments of the invention will now be described, by way of example only, with reference to the following drawings in which:

Fig. 1 illustrates a side elevation of a device of the present invention with a refill loaded therein;

Fig. 2 illustrates a front elevation of a device of the present invention with a refill loaded therein; and

Fig. 3A illustrates a perspective view of a first embodiment of a refill spray head;

Fig. 3B illustrates a rear elevation of a spray head of Fig. 3A;

Fig. 4A illustrates a perspective view of a second embodiment of a refill spray head;

Fig. 4B illustrates a plan view of a spray head of Fig. 4A;

Fig. 5A illustrates a perspective view of a third embodiment of a refill spray head;

Fig. 5B illustrates a rear elevation of a spray head of Fig. 5A;

Fig. 6A illustrates a perspective view of a fourth embodiment of a refill spray head; and

Fig. 6B illustrates a side elevation of a spray head of Fig. 6A.

Description of an Embodiment

As shown in Figures 1 and 2 a fragrance spraying device 10 comprises a housing 12 with a removable front section 12a through which there is an opening 14. The front section 12a may be hinged to permit access to the interior of the device 10. A refill 16, in this example an aerosol spray canister, is held within the housing 12 on a platform 18. An outlet stem 20 of the spray canister 16 is received in a lower opening of a spray head 22. An actuation means 24 is located above the refill 16 and possesses an arm 24 that is moveable to apply substantially downward pressure on the spray head 22 and cause actuation of the refill 16. During actuation of the refill, fluid held within the body 26 of the refill 16 is forced through the valve stem 20, into the spray head, exiting the spray head via an exit orifice in the form of a nozzle 28 into the external environment. The actuation means 26 is powered by batteries 30.

The device is further provided with a detection means 38 located substantially adjacent to the normal location of a spray head when a refill is loaded into the device 10.

Although not shown, the detection means 38 includes a sensor configured to face the spray head 22, the sensor being adapted to emit radiation in this embodiment, preferably IR radiation, toward the spray head 22 to interrogate it. The sensor is also capable of collecting reflected radiation in order to distinguish between different areas of reflectance on the spray head 22 with the sensor's field of view.

The detection means 38 can be in direct communication with the actuation means 26 or, alternatively, in communication with a control unit (not shown) which is in communication with the actuation means 26. The communication between the detection means 38 and the actuation means 26, whether directly or indirectly via the control unit, being essential to permit the device to be capable of producing a response when a dangerous and/or abusive refill is loaded into the device 10.

In use, the refill 16 is placed on the platform 18 and the valve stem 20 is engaged in an inlet 34 of the spray head 22. The refill 16 is a replaceable item and the spray head 22 is typically supplied with the refill 16.

When the refill 16 is placed in position a fluid path for fragrance (or other material, such as sterilising material/insecticide material/bactericide material or the like) for spraying is formed from the refill 16 through the spray head 22 and past the opening 14 in the front section of the housing 12a and out into the surrounding environment.

In order to cause spraying of the fluid from the refill 16, the actuation means is activated causing the arm 24 to move down onto the spray head 22 and pushing the spray head in a substantially downward direction. The downward movement of the spray head 22 effects corresponding downward movement of the valve stem 20 which opens the valve and permits fluid to flow through the valve stem, spray head and out of opening 14 into the surrounding environment.

The actuation means 26 has numerous selectable settings which a user may select via a user input means 32. The user input means 32 can be operable to allow a user to select whether the

device is turned on or off, the specific operation mode of the device such as its spray frequency, timer delay or other such feature. Preferred frequency settings would be the option of the fluid being sprayed from the refill every nine minutes, or every eighteen minutes, or every thirty-six minutes.

Referring to Fig. 3, the areas of differing reflectance on the spray head 22 can be seen. Specifically, a portion of the neck 34 of the spray head 22 is coated with a layer of dark ink/paint/lacquer 35 which is of a lower reflectance than the remainder of the neck 34 which is uncoated.

In one embodiment of the invention, the detection means 38 can be operable to detect the presence of the spray head 22 and, further, detect whether there is at least one area of low reflectance and at least one area of higher reflectance on the spray head 22.

Firstly the detection means 38 may be operable to detect whether a refill 16 is loaded in the device by interrogating the area normally occupied by a spray head 22 when a refill is loaded therein. Prior to permitting the actuation means 24 to activate, the detection means 38 may perform an initial interrogation of the location within the device normally occupied by a spray head of a refill when loaded into the device, if the detection means does not detect any reflectance, or a predetermined level of reflectance, this situation may be indicative of the absence of a refill in the device and the detection means 38 will prevent the actuation means from activating, either directly by communicating therewith or indirectly via a control unit. Preferably the detection means would interrogate an area normally occupied by lower portion of the neck of the spray head, as indicated by arrow 40 on Fig. 3B.

Should the presence of a refill 16 be detected, the detection means is further configured to interrogate further portions of the spray head 22. The detection means 38 may be capable of interrogating the spray head 22 by emitting radiation toward the spray head, such as IR radiation, across one or more portions thereof, such as across a field of view as indicated by arrow 42. The detection means is capable of collecting reflected radiation such that the amount of reflectance collected can be attributed specifically or approximately or generally to a portion or portions of the spray head 22. Such attribution may permit the detection means 38 to directly, or in combination with the control unit (not shown), determine whether any areas of differing reflectance are present on the spray head 22.

Alternatively, the interrogation of the refill by the detection means 38 may permit the detection means to detect whether at least one differing level of reflected radiation is detected without attributing the detected level of reflectance to a specific section of the spray head. Any such detection may permit the detection means 38 to directly, or in combination with the control unit (not shown), determine whether any areas of differing reflectance are present on the spray head or in the area normally occupied thereby.

With either form of interrogation, if differing areas of reflectance are detected the detection means 38 will communicate directly with the actuation means 26, or indirectly via a control unit (not shown), to permit the actuation means 26 to operate in accordance with the user input command to cause the spraying of fluid.

Conversely, if differing areas of reflectance are not detected, i.e. a potentially dangerous refill has been loaded into the device, the direct or indirect communication from the detection means 38 will call for the actuation means 26 to enter a dormant mode. During the dormant mode the actuation means 26 will not activate and not cause the spraying of fluid. The dormant mode will be maintained until a user initiates a resetting of the device. The resetting may be facilitated by the user loading a new refill into the device and/or the user operating a reset button or the like. However, if a vandal has intentionally loaded a potentially dangerous refill and has reset the device, once the detection means 38 scans the spray head 22 and fails to find the required reflectance, the actuation means 26 will again be placed in the dormant mode.

In an alternative embodiment, the detection means can be operable to detect the presence of the spray head 22 and detect whether there is at least one area of low reflectance and at least one area of higher reflectance on the spray head 22 only during the movement of the spray head 22 following activation by the actuation means 26. This movement permits the detection means 38 the opportunity to view a defined proportion of the spray head 22, thus fixing the field of view of the detection means (eg. as defined by arrow 42 in Fig. 3B). If during the interrogation of the spray head 22 differing areas of reflectance are detected by the detection means 38, these means will communicate with the actuation means 26, either directly or indirectly, to permit the actuation means 26 to operate in accordance with the user input command to cause the spraying of fluid. Conversely, if differing areas of reflectance are not detected, i.e. a potentially dangerous refill has been loaded into the device, potentially to effect vandalism, the communication from the detection means 38 will call for the actuation means 26 to enter a dormant mode, as discussed above.

When a refill 16 has been loaded in the device 10 and the detection means 38 has been able to distinguish between one area of lower reflectance and once area of higher reflectance, the control means or the like may initiate a counting mechanism. The counting mechanism may be calibrated to permit a pre-determined number of actuations of the refill which corresponds to the quantity of fluid stored in a refill. The counting mechanism can be operable in use, and after the pre-determined number of actuations has been reached, to cause the device 10 to enter the dormant mode, thus prevent further actuations of that refill, until a user replaces the refill and/or resets the device. The counting mechanism may automatically reset every time a refill is loaded into the device.

Figs. 3-6 illustrate various embodiments of refill spray heads. As mentioned, Fig. 3 illustrates a first embodiment wherein spray head has a generally L-shaped profile, wherein the shorter part of the L-shape, the neck portion 34, engages with the free end of the valve stem. The angle between the part of the spray head connected to the valve stem and the part of the spray head possessing the exit orifice is illustrated as being substantially 90°, however this angle may be between 60-120°, the key aspect is that the exit orifice directs the spray of fluid through the opening 14 and away from the housing of the device. The neck portion 34 of the spray head 22 is coated with a layer of dark ink/paint/lacquer 35 which is of a lower reflectance than the remainder of the neck 34 which is uncoated. Ideally the layer of dark is substantially black and the rest of the spray head, including the remainder of the neck portion 34, is substantially white.

In Fig. 3 the layer of dark ink/paint/lacquer is coated on to the spray head but this may be applied or incorporated by any suitable means, such as by application of a label, printing, engraving or the spray head could be manufactured from two or more component parts which are fixed together.

In Figs. 4 & 5 the spray head 22 is shaped to deflect any interrogation away from the detection means 38 of the device. The detection means for use with the spray head shown in Fig. 4 will have a fixed position and a limited field of view of the spray head to interrogate as indicated by arrow 46. Arrow 48 shows the field of view detection means may detect to determine whether a refill 16 is loaded in the device by interrogating the area normally occupied by a spray head 22 when a refill is loaded therein.

The detection means is operable to emit interrogation in the direction of arrow 44 and a V-shaped portion 50 of the spray head is shaped to substantially deflect the detector means' interrogation not back toward the detection means but away therefrom in the direction of arrows 44'. In contrast the neck portion 4 of the spray head is shaped to substantially reflect the interrogation back toward the detection means to be collected thereby. The deflection of interrogation 44 by the V-shaped portion 50 may be shaped to deflect the interrogation at 90° away from the normal or >90° away from the normal.

The spray head illustrated in Fig. 5 is similar to that as shown in Fig. 4 save for the 90° orientation of the V-shaped portion 54, thus causing, in use, a different direction of deflection of interrogation 52 in the direction of arrows 52'.

In Fig. 6 a yet further alternative arrangement of the spray head is illustrated could be provided with a portion cutaway to provide a greater distance for reflected interrogation to travel, in use, to a detection means in comparison to the distance for reflected interrogation to travel from a non-cutaway portion of the spray head. The detection means for use with the spray head shown in Fig. 6 will have a fixed position and a limited field of view of the spray head to interrogate as indicated by arrow 60. Arrow 58 shows the field of view detection means may detect to determine whether a refill is loaded in the device by interrogating the area normally occupied by a spray head 22 when a refill is loaded therein. In this arrangement the interrogation, shown by arrows 62, 62', emitted from the detection means should be tuned such that it is capable of travelling the distance between the non-cutaway portion of the spray head and back again after reflection, however, should that distance be increased the radiation is less capable of travelling the increased distance. Due to the tuning of the radiation, the amount of radiation being collected by the detection means along arrow 62 would be less than from the radiation travelling along arrow 62', this difference in reflectance being detectable by the detection means, thus indicating two areas of differing reflectance.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. Each feature disclosed in this specification (including any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated

otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features. The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill.
2. A device according to claim 1, wherein the spray head is provided with one area of lower reflectance and one area of relatively higher reflectance.
3. A device according to claim 1 or claim 2, wherein the detection means are configured to operate to distinguish between areas of differing reflectance during movement of the spray head.
4. A device according to claim 1 or claim 2, wherein the detection means are configured to operate to distinguish between areas of differing reflectance only during the movement of the spray head.
5. A device according to claim 1 or claim 2, wherein the detection means are configured to operate to distinguish between areas of differing reflectance only during the upward movement of the spray head.
6. A device according to any preceding claim, wherein the device is provided with an end of life indication in the form of a counting mechanism.
7. A device according to claim 6, wherein the counting mechanism is calibrated to allow a pre-determined number of actuations of the refill which corresponds to the quantity of fluid stored in a refill.
8. A device according to any preceding claim, wherein the detection means is configured to interrogate the spray head by emitting, in use, radiation toward the spray head and collecting reflected radiation, and said means attributing specifically or approximately or generally the amount of reflected radiation to one or more portions of the spray head.
9. A device according to claim 8 wherein the detection means are configured to make a determination that there are differing levels of reflectance between at least two separate portions of the spray head when the collected reflectance from one portion is at least 0.5 times greater than from the a separate portion of the spray head, and preferably at least 2 times greater, and more preferably at least 5 times greater, and even more preferably at least 10 times greater, and even more preferably still at least 50 times greater, and most preferably at least 100 times greater.

10. A device according to any preceding claim, wherein the detection means are provided with a fixed location within the device and have a fixed field of view with respect to the spray head or the area normally occupied by the spray head when a refill is loaded in the device.
11. A device according to any preceding claim, wherein the detection means are provided in the form of one or more sensors having a radiation emitter and a collecting portion.
12. A device according to any preceding claim, wherein the detection means configured to interrogate with an effective range of up to 100mm, and preferably with an effective range of up to 50mm, and more preferably up to 20mm, and even more preferably up to 10mm, and most preferably up to 5mm.
13. A spraying device comprising a housing adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from the refill therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish, in use, between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill.
14. A method of spraying a fluid from a device, the method comprising the steps of loading a refill of fluid in a spray device according to any of the first or second aspects of the present invention, placing the device in an operation mode, said mode being configured to cause activation of the actuation means, said actuation means periodically operating to bear against a spray head of the refill and causing the movement thereof to release a quantity of fluid from the refill, said released fluid being sprayed from the device through an aperture in the housing into the surrounding environment, characterised in that detection means provided in the device are operable in the operation mode to detect and distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill or within the area normally occupied by said spray head.
15. A method according to claims 14, wherein the detection means are operable during the activation of the actuation means and the movement of the refill spray head.
16. A method according to claims 14, wherein the detection means are only operable during the activation of the actuation means.
17. A method according to claims 14, wherein the detection means are configured to only be operable during the substantially upward movement of the refill spray head.
18. A spray head for a refill of fluid for use with a device or method according to any preceding claim, wherein the spray head comprises an inlet section and an exit orifice, wherein the inlet section is adapted to connect with a valve stem of a refill and the exit orifice is capable of directing a spray of fluid away from the refill body, characterised in that the spray head has an external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance.

19. A refill of fluid for use with a device or method according to any preceding claim, wherein the refill comprises a body for containing a quantity of fluid and a valve stem with a spray head connected thereto, the spray head comprising an inlet section and an exit orifice defining a fluid pathway from the body to the exit orifice, characterised in that the spray head has an external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance.
20. A device, method, spray head or refill according to any preceding claim, wherein the areas of differing reflectance on the spray head are provided by a combination of a substantially white colour and a substantially black colour, preferably a substantially white spray head with a substantially black colouration provided thereon.
21. A device, method, spray head or refill according to any preceding claim, wherein the spray head has a generally L-shaped profile, wherein the shorter part of the L-shape is configured to engage with a free end of the valve stem of a refill and said shorter part has a single substantially black mark on a rearward portion thereof.
22. A device, method, spray head or refill according to any of claims 1-19, wherein the spray head could be provided with a portion cutaway to provide a greater distance for reflected interrogation to travel, in use, to a detection means in comparison to the distance for reflected interrogation to travel from a non-cutaway portion of the spray head.
23. A device according to any of claims 1-13 configured to operate in accordance with the method of any of claims 14-17.
24. A spraying device with a refill of fluid therein substantially as described herein and with reference to the accompanying drawings.
25. A spray head for a refill of fluid substantially as described herein and with reference to the accompanying drawings.
26. A refill of fluid substantially as described herein and with reference to the accompanying drawings.

Abstract

Spraying Device and Method of Using Same

A spraying device is described, the device comprising a housing adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of a fluid therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill. Methods of operation of such a spraying device are also described.

Fig. 3

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(71) Applicant (for all designated States except US):
RECKITT BENCKISER (UK) LIMITED [GB/GB];
103-105 Bath Road, Slough, Berkshire SL1 3UH (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BUTLER, Martin**
[GB/GB]; Reckitt Benckiser (UK) Limited, Dansom Lane,
Hull HU8 7DS (GB). **WALSH, Steve** [GB/GB]; Reckitt
Benckiser (UK) Limited, Dansom Lane, Hull HU8 7DS
(GB).

(74) Agent: **CARLIN, G., Robert**; Reckitt Benckiser Corpo-
rate Services Limited, Legal Department - Patents Group,
Dansom Lane, Hull HU8 7DS (GB).

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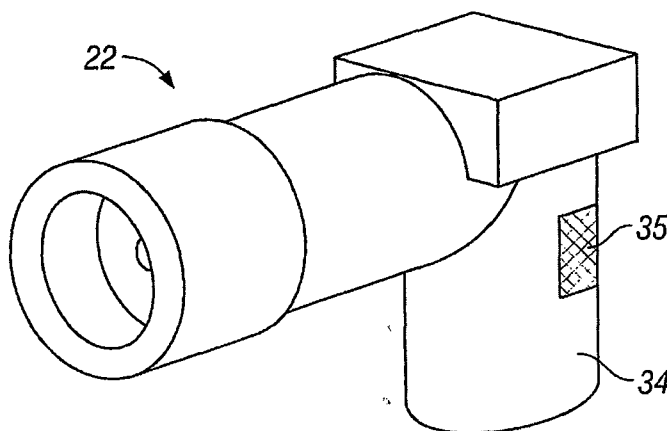


FIG. 3A

(57) Abstract: A spraying device (10) is described, the device comprising a housing (12) adapted to receive a refill (16) of fluid therein and having an aperture (14) suitable for permitting, in use, the spraying of a fluid therethrough, the device further comprising actuation means (24) configured for periodic actuation of the refill, wherein the device is provided with detection means (26) configured to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill. Methods of operation of such a spraying device are also described.

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Spraying Device and Method of Using SameField of the Invention

The present invention relates to a device for spraying a fluid and particularly, but not exclusively to a device for spraying fluids such as fragrances, deodorizing fluids and/or a pest control materials or the like. The present invention also relates to a method of using such a device.

Background

Prior art devices for spraying fragrances, deodorising agents and sanitising fluids into a room generally consist of a device containing a removable source of fluid. With such an arrangement once the source of fluid has been completely exhausted, the source can be replaced rather than replacing the entire device. Typically such sources come in many forms, including containers, bottles, cans and cartridges (generically, all such containers, bottles, cans and cartridges hereinafter will be referred to as "refills"). Such refills can be pump sprays or aerosols, including metered and non-metered versions thereof.

Known prior art devices typically comprise a housing having an opening through which the fluid is sprayed. A part of the housing is movable/removable to permit a refill to be introduced and subsequently removed from the interior of the device. The device further comprises a mechanically actuated arm or the like therein which is adapted to periodically activate in order to press down on a spray head connected to the refill, resulting in fluid passing from the body of the refill, through the spray head and out of the opening in the housing into the surrounding environment.

The shape of a refill is typically standardised to a certain degree, as such, spraying devices may unwittingly provide an opportunity to facilitate vandalism or dangerous behaviour. Specifically, vandals or the like may seek to intentionally insert a dangerous source of sprayable fluid into a spraying device. For instance, where the device is for spraying a fragrance and the refill is an aerosol of a standard size, one form of vandalism and/or intentional abuse could be the insertion of a paint aerosol into the device. The resulting damage from such abuse could be substantial. Such abuse would likely be associated with a significant health and safety risk. Clearly it would be desirable from a user's perspective to be protected from such dangerous behaviour and/or acts of vandalism.

It is one object of the present invention to address the above mentioned concerns and disadvantages.

Summary of Invention

According to a first aspect of the present invention there is provided therefore a spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill.

Reflectance relates to radiation striking a surface, some of it is absorbed and some is reflected. Reflectance is expressed as a unitless proportion. For the avoidance of doubt, the term "lower reflectance" is used herein as a relative term with reference to the term "higher reflectance"; "lower" may include areas of zero or near zero reflectance.

The body of the refill may be elongate, and the body may be provided with a valve stem at an upper portion of the body remote from the base of the body. At least a portion of the valve stem may be connected to the spray head to permit, in use, fluid to pass from the body of the refill, through the valve stem and through the spray head to the exit orifice where the fluid is sprayed into the surrounding environment.

Preferably the spray head is provided with one area of lower reflectance and one area of relatively higher reflectance.

Preferably the detection means are configured to operate to distinguish between areas of differing reflectance during movement of the spray head.

Advantageously the device according to the present invention may be able to detect when a user attempts to use the device with a potentially dangerous refill and, further, the device is preferably configured to deny the actuation means from activating and/or deny subsequent activation whilst such a refill is loaded in the device to prevent and/or limit any damage that could result from actuating the refill.

A further advantage of the devices of the present invention is that they may be able to provide an improved end of life indication. In use, when a device according to the present invention detects

the at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of the refill loaded therein, a counting mechanism may be triggered. The counting mechanism may be calibrated to allow a pre-determined number of actuations of the refill which corresponds to the quantity of fluid stored in a refill. The counting mechanism may be operable in use, and after the pre-determined number of actuations has been reached, to prevent the device from causing further actuations of that refill until a user replaces the refill and/or resets the device. The device may automatically reset every time a refill is loaded into the device. This end of life indication may be advantageous as the power consumption of the device will be minimised, this would be particularly advantageous where the device is battery powered or the like.

The counting mechanism may be linked to an indicator that is adapted to communicate to the user of the device that a used or spent refill needs to be replaced.

Preferably the pre-defined number of actuations is calculated to correspond to the quantity of fluid in the refill.

Preferably the detection means are in direct communication with the actuation means such that, in use, the detection means may instruct the actuation means not to activate.

Alternatively a control means may be provided that is in direct communication with both the detection means and the actuation means, said control means being operative to receive an input from the detection means and being operative to instruct the actuation means to activate or not depending on the received input.

The control means may be provided in the form of a micro processor, a circuit provided on a PCB or in the form of another convenient component(s).

Preferably the actuation means are operable to cause actuation of the refill spray head by imparting a substantially downward force on the spray head. Said substantially downward force is preferably sufficient to cause the spray head to move in a substantially downward direction to open the fluid pathway between the body of the refill and the exit orifice of the spray head to spray a quantity of fluid out of the opening in the housing into the surrounding environment. Once a quantity of fluid has been sprayed, the device may be configured such that the refill's inherent resilience and/or internal pressure is capable of applying a substantially upward force on the spray head sufficient to return the actuation means to its starting position without the need for power to be applied to said means.

The detection means of the present invention is adapted, in use, to distinguish between areas of differing reflectance on a spray head of a refill. Preferably the detection means is capable of distinguishing as mentioned by interrogating the refill. The refill spray head may be interrogated by the detection means emitting radiation toward the spray head and collecting reflected radiation such that the amount of reflectance can be attributed specifically or approximately or generally to one or more portions of the spray head. Such attribution may permit the detection means to directly, or in combination with a control unit, to determine whether any areas of differing reflectance are present on the spray head. If there are no areas of differing reflectance on the spray head of the refill there should be a substantially constant level of reflected radiation. Therefore in an alternative arrangement, the interrogation of the refill by the detection means may permit the detection means to detect whether at least one differing level of reflected radiation is detected without attributing the detected level of reflectance to a specific portion of the spray head. Such detection may permit the detection means to directly, or in combination with a control unit, determine whether any areas of differing reflectance are present on the spray head.

The detection means may be configured to make a determination that there are differing levels of reflectance between at least two separate portions of the spray head when the reflectance from one portion is at least 0.5 times greater than from the a separate portion of the spray head, and preferably at least 2 times greater, and more preferably at least 5 times greater, and even more preferably at least 10 times greater, and even more preferably still at least 50 times greater, and most preferably at least 100 times greater.

As mentioned, it is preferable for the detection means to be configured to be operable to distinguish between areas of differing reflectance during the movement of the spray head. Even more preferably the detection means is configured to only be so operable during the movement of the spray head. This may be advantageous since this would permit the detection means to have a fixed location within the device and have no moving parts, thus reducing the cost of the detection means and rendering them less likely to fail during the life of the device. Additionally, with such an arrangement the detection means may have a predefined field of view allowing a refill manufacturer more defined parameters for ensuring the spray head is suitably detectable by the detection means. A further advantage exists where the device is to be battery powered as the detection means will only draw power during the actuation of the refill.

Preferably the detection means may be confined to only be operable to distinguish between areas of differing reflectance during the substantially upward movement of the spray head, i.e. the upward movement of the spray head after the downward movement caused by the actuation means. In this arrangement the inherent resilience and/or internal pressure of the refill may be

sufficient to return the actuation means to its starting position without power being applied to said means. Such an arrangement may be particularly advantageous since the substantially upward movement of the spray head may be achieved without power being applied to the activation means, thus reducing or eliminating electrical noise/interference produced by the device. The reduction in electrical noise/interference may improve the ability of the detection means to distinguish areas of differing reflectance on the spray head, thus improving the reliability of the detection means whilst allowing a relatively inexpensive detection means to be used.

The detection means may be operable to determine whether a refill is loaded into the device before being operable to distinguish between areas of differing reflectance. In this arrangement the detection means may be operable to interrogate the location within the device normally occupied by a spray head of a refill when loaded into the device, if the detection means does not detect any reflectance, or a predetermined level of reflectance, this situation may be indicative of the absence of a refill in the device and the detection means will prevent the actuation means from activating. This arrangement may also be advantageous as it will prevent the actuation means from periodically activating after a user has removed a spent refill and before a new refill is loaded into the device.

Preferably the detection means are provided with a fixed location within the device and, preferably, have a fixed field of view with respect to the spray head of a refill or the area normally occupied by the spray head when a refill is loaded in the device.

Alternatively or additionally the detection means may be configured to move in order to interrogate the spray head or the area normally occupied by the spray head. The detection may be movable in a substantially horizontal direction and/or a substantially vertical direction and/or in at least two directions. The detection means may be able to pivot about a single position to perform the scan. The detection means may be provided with a wide-angle lens, such as a fish eye lens, to provide a wide field of view when performing the interrogation of the refill.

The detection means may be provided in the form of one or more sensors. The sensor(s) is preferably provided with an integrated radiation emitter that is adapted to emit radiation and further provided with a collecting portion that is adapted to collect any reflected radiation. Alternatively, the sensor may only comprise the collecting portion, the radiation emitter being a separate component that is positioned so that it is capable of emitting radiation toward the spray head such that at least some of the reflected radiation may be collected by the collecting portion.

Preferably the sensor(s) is an optical sensor in the form of an Infra-Red sensor, more preferably a passive Infra-Red sensor. Alternatively or additionally, the optical sensor(s) may be provided in the form of a light sensor or laser sensor.

The detection means may be configured to interrogate with an effective range of up to 100mm, the effective range being the distance any interrogation must travel once reflected by the spray head in order to be detected by the detection means, ie, the distance between the detection means or source of the interrogation to the spray head in addition to the distance the reflected interrogation must travel to the detection means to be collected and detected. Preferably the detection means with an effective range of up to 50mm, and more preferably up to 20mm, and even more preferably up to 10mm, and most preferably up to 5mm.

According to an alternative aspect of the present invention there is provided therefore a spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate the spray head to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill, characterised in that the spray head is provided with at least one portion shaped to substantially reflect the detection means interrogation back toward said means and is provided with at least one portion shaped to substantially deflect the detector means interrogation away from said means.

In the alternative aspect of the present invention the at least one area of lower reflectance is provided by the at least one portion of the spray head that is shaped to deflect the interrogation from the detection means away from the detection means such that a lower amount of the interrogation (be it radiation for example) is detected by said means in comparison to the amount of interrogation detected by the detection means when the interrogation of the at least one portion shaped to reflect said interrogation toward said means, the area of higher reflectance.

According to a further alternative aspect of the present invention there is provided therefore a spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit

orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate the spray head to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill, characterised in that the spray head is provided with at least one portion shaped to substantially reflect the detection means interrogation back toward said means and is provided with at least one portion shaped or cutaway to avoid the interrogation of the detector means.

In the further alternative aspect of the present invention the at least one area of lower reflectance is provided by the at least one portion of the spray head that is shaped or cutaway to avoid the interrogation from the detection means such that a lower or zero amount of the interrogation (be it radiation for example) is detected by said means in comparison to the amount of interrogation detected by the detection means when the interrogation of the at least one portion shaped to reflect said interrogation toward said means, the area of higher reflectance.

According to a yet further alternative aspect of the present invention there is provided therefore a spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate the spray head to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill, characterised in that the interrogation emitted from detection means is configured to be detectable over a predefined distance that is substantially equal to the effective range, and wherein the spray head is provided with at least one portion shaped to substantially reflect the detection means interrogation back toward said means and is provided with at least one portion shaped or cutaway relative to the location of the detection means.

As discussed above, the effective range is used herein to relate to the distance any interrogation must travel in order to be detected by the detection means, ie, the distance between the detection means or source of the interrogation to the spray head in addition to the distance the reflected interrogation must travel once reflected by the spray head to the detection means to be collected and detected.

In this further alternative arrangement, by tuning the distance the interrogation is able to travel such that it is capable of travelling the distance between the non-cutaway portion of the spray head and back again after reflection, it is possible to distinguish between one area of lower reflection and one area of higher reflection. Due to the tuning of the interrogation, the amount of interrogation collected by the detection means would be less for the interrogation reflected from the cutaway portion than from the non-cutaway portion of the spray head, this difference in reflectance being detectable by the detection means, thus indicating two areas of differing reflectance. The tuning of the distance or the intensity of the interrogation is capable of travelling could be made greater or smaller than the abovementioned distance, what is important is that the interrogation is tuned such that the cutaway portion of the spray head produces a lesser amount of reflected interrogation compared with the non-cutaway portion which is collectable and detectable by the detection means.

According to a second aspect of the present invention there is provided therefore a spraying device comprising a housing adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from the refill therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish, in use, between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill.

According to an alternative aspect of the present invention there is provided therefore a spraying device adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from the refill therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate a spray head of the refill, characterised in that the device is configured to interrogate a refill having a spray head wherein at least one portion of the spray head is shaped to substantially reflect the detection means interrogation back toward said means and at least one portion of the spray head is shaped to substantially deflect the detector means interrogation away from said means such that, in use, the device can distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill.

According to a further alternative aspect of the present invention there is provided therefore a spraying device adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from the refill therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is

provided with detection means configured, in use, to interrogate a spray head of the refill, characterised in that the device is configured to interrogate a refill having a spray head wherein at least one portion of the spray head is shaped to substantially reflect the detection means interrogation back toward said means and at least one portion of the spray head is shaped or cutaway to avoid interrogation by the detector means such that, in use, the device can distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill.

According to a yet further alternative aspect of the present invention there is provided therefore a spraying device adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured, in use, to interrogate a spray head on the refill to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill, characterised in that the interrogation emitted from detection means is configured to be detectable over a predefined distance that is substantially equal to the effective range, and wherein the spray head for use with the device is provided with at least one portion shaped to substantially reflect the detection means interrogation back toward said means and is provided with at least one portion shaped or cutaway relative to the location of the detection means.

According to a third aspect of the present invention there is provided therefore a method of spraying a fluid from a device, the method comprising the steps of loading a refill of fluid in a spray device according to any of the first or second aspects of the present invention, placing the device in an operation mode, said mode being configured to cause activation of the actuation means, said actuation means periodically operating to bear against a spray head of the refill and causing the movement thereof to release a quantity of fluid from the refill, said released fluid being sprayed from the device through an aperture in the housing into the surrounding environment, characterised in that detection means provided in the device are operable in the operation mode to detect and distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill or within the area normally occupied by said spray head.

Preferably the detection means are operable during the activation of the actuation means and the movement of the refill spray head. Even more preferably the detection means are only operable during the activation of the actuation means. Most preferably the detection means are configured to only be operable during the substantially upward movement of the refill spray head, i.e. the

upward movement of the spray head after the downward movement caused by the actuation means.

The method may comprise a preceding step before activation of the actuation means wherein the detection means performs an initial interrogation of the area within the housing normally occupied by the spray head of a refill when a refill is loaded in the device. In this preceding step if the detection means does not detect any reflectance, or a predetermined level of reflectance, this may be indicative of the absence of a refill in the device and the detection means will prevent the actuation means from activating.

The method of the third aspect of the present invention is preferably operable to prevent the activation of the actuation means if the detection means is unable to detect and distinguish between said at least two areas of differing reflectance. Alternatively the method of the third aspect of the present invention is preferably operable to prevent the further activation of the actuation means if the detection means is unable to detect and distinguish between said at least two areas of differing reflectance. The prevention of activation or further activation may be maintained until a user resets the device and/or initiates a manual override of the ongoing prevention.

Turning to the refill to be used in the aforementioned devices or methods, the areas of differing reflectance on the spray head may be provided by areas of different colours. Preferable colour combinations providing the required difference of reflectance are combinations of a light colour with a dark colour, wherein the light colour provides an area possessing a higher level of reflectance of radiation than the dark colour which provides a an area possessing a greater tendency to absorb radiation thus an area of lower reflectance. A particularly preferable combination is that of a substantially white colour and a substantially black colour. Most preferably the spray head is provided in a substantially white colour with a substantially black colouration (eg. a mark, a dot, a square, a rectangle, a triangle, or the like) being provided on the stem of the spray head. For instance, where the spray head is generally L-shaped, the stem would be the shorter part of the L-shape which is connected to the valve stem of the refill body and said shorter part has a single substantially black mark on a rearward portion thereof.

The areas of differing reflectance on the spray head may be provided by areas of different Infra Red (IR) reflectance. Particularly preferred means of providing areas of differing IR reflectance include the use of inks/paints/lacquers that are absorbers or reflectors of IR radiation and, preferably, are invisible to the naked eye under normal light conditions.

The sensor may be operable to detect wavelengths in the range of 700-1350 nm. Preferably the sensor is operable to detect wavelengths in the range of 800-1100 nm. More preferably the sensor is operable to detect wavelengths in the range of 850-1000 nm. Most preferably the sensor is operable to detect wavelengths in the range of substantially 940 nm.

The areas of differing reflectance may be applied to, or incorporated in, the spray head by any suitable means. Particularly preferred methods include the initial application of the at least one area of differing reflectance to a label which is subsequently attached to the spray head. Alternatively, the at least one area of differing reflectance may be printed, engraved and/or applied directly on to the spray head. As a further alternative, the spray head could be manufactured from two or more component parts, wherein at least two of said parts are provided with external areas thereof having distinguishable reflective properties with respect to each other.

Typically the spray head is opaque, however, in an alternative arrangement the spray head may be substantially transparent and the valve stem of the refill could be provided with the area of differing reflectance. For instance, the valve stem could have a dark colouration, and this may create a detectable difference for the detection means. Alternatively, the spray head may be provided with a substantially transparent window in registration with the valve stem to permit the valve stem to be viewed by the detection means to provide the areas of differing reflectance.

The spray head of a refill typically has a generally L-shaped profile, wherein the shorter part of the L-shape engages with the free end of the valve stem. Preferably the spray head of the refill for use with the device of the present invention is generally L-shaped with an angle of substantially 90° between the part of the spray head connected to the valve stem and the part of the spray head possessing the exit orifice; this angle may be between 60-120° however.

In an alternative arrangement, the spray head could be shaped to deflect any interrogation away from the detection means of the device. In the device of the present invention the detection means may be provided in a fixed position and will, therefore, only have a limited field of view of the spray head to interrogate and will only have a limited field or area in which it will be able to detect reflected interrogation. Therefore, the spray head may be shaped such that one portion of the spray head viewable by the device's detection means is shaped to substantially reflect the detector means' interrogation (eg. by being generally flat and substantially parallel with the detection means or curved, preferably with a gentle curvature) and at least one portion of the spray head viewable by the device's detection means is shaped to substantially deflect the detector mean' interrogation (eg. by being angled relative to the direction of the interrogation and

the location of the detection means such that the reflected interrogation is reflected away from a collection part of the detection means thus being substantially non-detectable or less detectable).

In this alternative arrangement for the spray head having reflecting and deflecting portions it may be preferable for the lower portion of the spray head (the portion of the spray head connected to the valve stem) to be the reflecting portion by having a generally flat and parallel or gently curved outer surface relative to the fixed location of the detection means in the device of the present invention to reflect, in use, interrogation toward the detection means. In this arrangement the deflecting portion would preferably be an upper portion of this spray head having a generally flat or gently curved outer surface angled away from the fixed location of the detection means in the device of the present invention to deflect, in use, interrogation away from the detection means. For instance, the surface may be shaped to deflect the interrogation at 90° away from the normal, and preferably to deflect the interrogation at $>90^\circ$ away from the normal. The deflection portion may have a V-shaped profile aligned with a source of interrogation to deflect the interrogation away in two different directions, neither of those directions being toward the detection means, preferably being at 90° away from the normal, or more preferably at $>90^\circ$ away from the normal. Upper and lower portion of the spray head referred to for this alternative arrangement of the spray head are used interchangeably, indeed, the upper portion may be the reflecting portion and the lower part the deflecting portion and vice versa as described.

In a further alternative arrangement, the spray head could be provided with a cutaway to avoid interrogation, in use, by a detection means. Such a cutaway may be located within the area of the spray head that is interrogated by the detection means such that the detection means' may detect the difference in the reflectance of the interrogation from a portion (eg. a reflecting portion) of the spray head against the absence of any reflectance in the cutaway. The cutaway may be provided by the spray head being shaped to have a non-typical shape (i.e. not an L-shape) in order to provide the same effect as the cutaway. For instance, the spray head may comprise a short substantially vertical section for engaging the free end of the valve stem and have a short substantially horizontal section for directing the spray of fluid through the aperture of the device, and the spray head may have a longer transverse section between said short sections. The result of this unusual configuration of the spray head may result in the same effect as the cutaway, such that the detection means' scan of the spray head detects the difference in the reflectance of the short substantially vertical section of the spray head against the absence of any reflectance above the short substantially vertical section.

In a yet further alternative arrangement, the spray head could be provided with a portion cutaway to provide a greater distance for reflected interrogation to travel, in use, to a detection means in

comparison to the distance for reflected interrogation to travel from a non-cutaway portion of the spray head. In this arrangement the interrogation, say by radiation emitted from the detection means, should be tuned such that it is capable of travelling the distance between the non-cutaway portion of the spray head and back again after reflection, however, should that distance be increased the radiation is less capable of travelling the increased distance. Due to the tuning of the radiation, the amount of radiation being collected by the detection means would be less for the radiation reflected from the cutaway portion than from the non-cutaway portion of the spray head, this difference in reflectance being detectable by the detection means, thus indicating two areas of differing reflectance.

The areas of differing reflectance on the spray head may be provided in the form of at least one line of differing reflectance. Said one or more lines preferably being substantially perpendicular relative to an inlet section of the spray head; in other words, in a substantially horizontal direction when the refill is placed on a flat surface. Such orientation of the lines may be advantageous since it could improve the likelihood that the detection means could distinguish between lines having differing reflectance, particularly where said detection means are operable during the movement of the spray head.

The areas of differing reflectance on the spray head may be provided in the form of two lines of differing reflectance. Alternatively, the areas of differing reflectance on the spray head may be provided in the form of a plurality of lines of differing reflectance. The use of two or a plurality of lines may be advantageous as these may be able to operate as a code capable of imparting additional information to the device beyond whether the refill is a safe refill or not.

Alternatively the areas of differing reflectance could be provided in the form of one or more patterns and/or one or more shapes and/or one or more letters and/or one or more numerals.

Such further information could include the particular type of refill to permit the device to alter its mode of operation. For instance, where the refill contains an insecticide, the spraying frequency may desirably be different to when the device is spraying an air freshener or the like.

As another example, the further information may relate to a specific end of life period for that particular refill. In this arrangement the device may be able to adjust the pre-determined number of actuations depending on the amount of fluid stored in the refill and the number of actuations that quantity of fluid will permit, wherein the pre-determined number for that particular type of refill is stored in said further information.

Alternatively, areas of reflectance could impart said further information wherein the detection means is adapted to recognize the presence of a specific reflective property, said specific reflective property may be referenced against an internal memory of such properties in order to permit the device to recognize the further information.

The device of any of the above-mentioned aspects may be provided with an indicator wherein said indicator is operable to indicate information to a user. Such information may include: whether the refill loaded in the device is potentially dangerous as it is not intended for use with the device; whether the refill needs to be changed; whether the battery or batteries need to be changed (where the device is to be battery powered); and other potentially useful information.

The indicator may be operable to provide a visual indication and/or provide an audible indication.

Preferably the indicator is configured to provide a visual indication by emitting light from one or more light sources, preferably one or more LEDs. The one or more light sources may be adapted to emit a different colour of light to indicate the current function the device is performing. Additionally or alternatively, the one or more light sources may blink or flash to indicate the current function the device is performing.

A visual indicator may be provided in the form of an LCD screen or the like wherein the screen is adapted to provide a message to a user, for instance such messages could include "ON", "DANGEROUS REFILL INSERTED", "CHANGE REFILL", "CHANGE BATTERIES", "NUMBER OF SPRAYS REMAINING", "LIFE OF REFILL", "OFF".

The device may be provided with a boost mechanism. The boost mechanism may be linked to a user operated switch or button or the like. On operating the boost mechanism the actuation means may activate to cause the immediate actuation of a refill.

The device may be power by mains-supplied electricity and/or be battery powered and/or be powered by solar cells located on the device. Most preferably the device is battery powered.

According to a fourth aspect of the present invention there is provided therefore a spray head for a refill of fluid for use with a device or method according to any preceding aspect of the present invention wherein the spray head comprises an inlet section and an exit orifice, wherein the inlet section is adapted to connect with a valve stem of a refill and the exit orifice is capable of directing a spray of fluid away from the refill body, characterised in that the spray head has an

external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance.

According to a fifth aspect of the present invention there is provided therefore a refill of fluid for use with a device or method according to any preceding aspect of the present invention wherein the refill comprises a body for containing a quantity of fluid and a valve stem with a spray head connected thereto, the spray head comprising an inlet section and an exit orifice defining a fluid pathway from the body to the exit orifice, characterised in that the spray head has an external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance.

According to the sixth aspect of the present invention there is provided therefore a device according to the first or second aspect of the present invention configured to operate in accordance with the method of the second aspect of the present invention.

For the avoidance of doubt, all of the features disclosed in this specification and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. Each feature disclosed in this specification may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

Brief Description of the Drawings

Embodiments of the invention will now be described, by way of example only, with reference to the following drawings in which:

Fig. 1 illustrates a side elevation of a device of the present invention with a refill loaded therein;

Fig. 2 illustrates a front elevation of a device of the present invention with a refill loaded therein; and

Fig. 3A illustrates a perspective view of a first embodiment of a refill spray head;

Fig. 3B illustrates a rear elevation of a spray head of Fig. 3A;

Fig. 4A illustrates a perspective view of a second embodiment of a refill spray head;

Fig. 4B illustrates a plan view of a spray head of Fig. 4A;

Fig. 5A illustrates a perspective view of a third embodiment of a refill spray head;

Fig. 5B illustrates a rear elevation of a spray head of Fig. 5A;

Fig. 6A illustrates a perspective view of a fourth embodiment of a refill spray head; and

Fig. 6B illustrates a side elevation of a spray head of Fig. 6A.

Description of an Embodiment

As shown in Figures 1 and 2 a fragrance spraying device 10 comprises a housing 12 with a removable front section 12a through which there is an opening 14. The front section 12a may be hinged to permit access to the interior of the device 10. A refill 16, in this example an aerosol spray canister, is held within the housing 12 on a platform 18. An outlet stem 20 of the spray canister 16 is received in a lower opening of a spray head 22. An actuation means 24 is located above the refill 16 and possesses an arm 24 that is moveable to apply substantially downward pressure on the spray head 22 and cause actuation of the refill 16. During actuation of the refill, fluid held within the body 26 of the refill 16 is forced through the valve stem 20, into the spray head, exiting the spray head via an exit orifice in the form of a nozzle 28 into the external environment. The actuation means 26 is powered by batteries 30.

The device is further provided with a detection means 38 located substantially adjacent to the normal location of a spray head when a refill is loaded into the device 10.

Although not shown, the detection means 38 includes a sensor configured to face the spray head 22, the sensor being adapted to emit radiation in this embodiment, preferably IR radiation, toward the spray head 22 to interrogate it. The sensor is also capable of collecting reflected radiation in order to distinguish between different areas of reflectance on the spray head 22 with the sensor's field of view.

The detection means 38 can be in direct communication with the actuation means 26 or, alternatively, in communication with a control unit (not shown) which is in communication with the actuation means 26. The communication between the detection means 38 and the actuation means 26, whether directly or indirectly via the control unit, being essential to permit the device to be capable of producing a response when a dangerous and/or abusive refill is loaded into the device 10.

In use, the refill 16 is placed on the platform 18 and the valve stem 20 is engaged in an inlet 34 of the spray head 22. The refill 16 is a replaceable item and the spray head 22 is typically supplied with the refill 16.

When the refill 16 is placed in position a fluid path for fragrance (or other material, such as sterilising material/insecticide material/bactericide material or the like) for spraying is formed from the refill 16 through the spray head 22 and past the opening 14 in the front section of the housing 12a and out into the surrounding environment.

In order to cause spraying of the fluid from the refill 16, the actuation means is activated causing the arm 24 to move down onto the spray head 22 and pushing the spray head in a substantially downward direction. The downward movement of the spray head 22 effects corresponding downward movement of the valve stem 20 which opens the valve and permits fluid to flow through the valve stem, spray head and out of opening 14 into the surrounding environment.

The actuation means 26 has numerous selectable settings which a user may select via a user input means 32. The user input means 32 can be operable to allow a user to select whether the device is turned on or off, the specific operation mode of the device such as its spray frequency, timer delay or other such feature. Preferred frequency settings would be the option of the fluid being sprayed from the refill every nine minutes, or every eighteen minutes, or every thirty-six minutes.

Referring to Fig. 3, the areas of differing reflectance on the spray head 22 can be seen. Specifically, a portion of the neck 34 of the spray head 22 is coated with a layer of dark ink/paint/lacquer 35 which is of a lower reflectance than the remainder of the neck 34 which is uncoated.

In one embodiment of the invention, the detection means 38 can be operable to detect the presence of the spray head 22 and, further, detect whether there is at least one area of low reflectance and at least one area of higher reflectance on the spray head 22.

Firstly the detection means 38 may be operable to detect whether a refill 16 is loaded in the device by interrogating the area normally occupied by a spray head 22 when a refill is loaded therein. Prior to permitting the actuation means 24 to activate, the detection means 38 may perform an initial interrogation of the location within the device normally occupied by a spray head of a refill when loaded into the device, if the detection means does not detect any reflectance, or a predetermined level of reflectance, this situation may be indicative of the absence of a refill in the device and the detection means 38 will prevent the actuation means from activating, either directly by communicating therewith or indirectly via a control unit. Preferably the detection means would interrogate an area normally occupied by lower portion of the neck of the spray head, as indicated by arrow 40 on Fig. 3B.

Should the presence of a refill 16 be detected, the detection means is further configured to interrogate further portions of the spray head 22. The detection means 38 may be capable of interrogating the spray head 22 by emitting radiation toward the spray head, such as IR radiation,

across one or more portions thereof, such as across a field of view as indicated by arrow 42. The detection means is capable of collecting reflected radiation such that the amount of reflectance collected can be attributed specifically or approximately or generally to a portion or portions of the spray head 22. Such attribution may permit the detection means 38 to directly, or in combination with the control unit (not shown), determine whether any areas of differing reflectance are present on the spray head 22.

Alternatively, the interrogation of the refill by the detection means 38 may permit the detection means to detect whether at least one differing level of reflected radiation is detected without attributing the detected level of reflectance to a specific section of the spray head. Any such detection may permit the detection means 38 to directly, or in combination with the control unit (not shown), determine whether any areas of differing reflectance are present on the spray head or in the area normally occupied thereby.

With either form of interrogation, if differing areas of reflectance are detected the detection means 38 will communicate directly with the actuation means 26, or indirectly via a control unit (not shown), to permit the actuation means 26 to operate in accordance with the user input command to cause the spraying of fluid.

Conversely, if differing areas of reflectance are not detected, i.e. a potentially dangerous refill has been loaded into the device, the direct or indirect communication from the detection means 38 will call for the actuation means 26 to enter a dormant mode. During the dormant mode the actuation means 26 will not activate and not cause the spraying of fluid. The dormant mode will be maintained until a user initiates a resetting of the device. The resetting may be facilitated by the user loading a new refill into the device and/or the user operating a reset button or the like. However, if a vandal has intentionally loaded a potentially dangerous refill and has reset the device, once the detection means 38 scans the spray head 22 and fails to find the required reflectance, the actuation means 26 will again be placed in the dormant mode.

In an alternative embodiment, the detection means can be operable to detect the presence of the spray head 22 and detect whether there is at least one area of low reflectance and at least one area of higher reflectance on the spray head 22 only during the movement of the spray head 22 following activation by the actuation means 26. This movement permits the detection means 38 the opportunity to view a defined proportion of the spray head 22, thus fixing the field of view of the detection means (eg. as defined by arrow 42 in Fig. 3B). If during the interrogation of the spray head 22 differing areas of reflectance are detected by the detection means 38, these means will communicate with the actuation means 26, either directly or indirectly, to permit the

actuation means 26 to operate in accordance with the user input command to cause the spraying of fluid. Conversely, if differing areas of reflectance are not detected, i.e. a potentially dangerous refill has been loaded into the device, potentially to effect vandalism, the communication from the detection means 38 will call for the actuation means 26 to enter a dormant mode, as discussed above.

When a refill 16 has been loaded in the device 10 and the detection means 38 has been able to distinguish between one area of lower reflectance and once area of higher reflectance, the control means or the like may initiate a counting mechanism. The counting mechanism may be calibrated to permit a pre-determined number of actuations of the refill which corresponds to the quantity of fluid stored in a refill. The counting mechanism can be operable in use, and after the pre-determined number of actuations has been reached, to cause the device 10 to enter the dormant mode, thus prevent further actuations of that refill, until a user replaces the refill and/or resets the device. The counting mechanism may automatically reset every time a refill is loaded into the device.

Figs. 3-6 illustrate various embodiments of refill spray heads. As mentioned, Fig. 3 illustrates a first embodiment wherein spray head has a generally L-shaped profile, wherein the shorter part of the L-shape, the neck portion 34, engages with the free end of the valve stem. The angle between the part of the spray head connected to the valve stem and the part of the spray head possessing the exit orifice is illustrated as being substantially 90°, however this angle may be between 60-120°, the key aspect is that the exit orifice directs the spray of fluid through the opening 14 and away from the housing of the device. The neck portion 34 of the spray head 22 is coated with a layer of dark ink/paint/lacquer 35 which is of a lower reflectance than the remainder of the neck 34 which is uncoated. Ideally the layer of dark is substantially black and the rest of the spray head, including the remainder of the neck portion 34, is substantially white.

In Fig. 3 the layer of dark ink/paint/lacquer is coated on to the spray head but this may be applied or incorporated by any suitable means, such as by application of a label, printing, engraving or the spray head could be manufactured from two or more component parts which are fixed together.

In Figs. 4 & 5 the spray head 22 is shaped to deflect any interrogation away from the detection means 38 of the device. The detection means for use with the spray head shown in Fig. 4 will have a fixed position and a limited field of view of the spray head to interrogate as indicated by arrow 46. Arrow 48 shows the field of view detection means may detect to determine whether a

refill 16 is loaded in the device by interrogating the area normally occupied by a spray head 22 when a refill is loaded therein.

The detection means is operable to emit interrogation in the direction of arrow 44 and a V-shaped portion 50 of the spray head is shaped to substantially deflect the detector means' interrogation not back toward the detection means but away therefrom in the direction of arrows 44'. In contrast the neck portion 4 of the spray head is shaped to substantially reflect the interrogation back toward the detection means to be collected thereby. The deflection of interrogation 44 by the V-shaped portion 50 may be shaped to deflect the interrogation at 90° away from the normal or >90° away from the normal.

The spray head illustrated in Fig. 5 is similar to that as shown in Fig. 4 save for the 90° orientation of the V-shaped portion 54, thus causing, in use, a different direction of deflection of interrogation 52 in the direction of arrows 52'.

In Fig. 6 a yet further alternative arrangement of the spray head is illustrated could be provided with a portion cutaway to provide a greater distance for reflected interrogation to travel, in use, to a detection means in comparison to the distance for reflected interrogation to travel from a non-cutaway portion of the spray head. The detection means for use with the spray head shown in Fig. 6 will have a fixed position and a limited field of view of the spray head to interrogate as indicated by arrow 60. Arrow 58 shows the field of view detection means may detect to determine whether a refill is loaded in the device by interrogating the area normally occupied by a spray head 22 when a refill is loaded therein. In this arrangement the interrogation, shown by arrows 62, 62', emitted from the detection means should be tuned such that it is capable of travelling the distance between the non-cutaway portion of the spray head and back again after reflection, however, should that distance be increased the radiation is less capable of travelling the increased distance. Due to the tuning of the radiation, the amount of radiation being collected by the detection means along arrow 62 would be less than from the radiation travelling along arrow 62', this difference in reflectance being detectable by the detection means, thus indicating two areas of differing reflectance.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. Each feature disclosed in this specification (including any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated

otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features. The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on the spray head of said refill.
2. A device according to claim 1, wherein the spray head is provided with one area of lower reflectance and one area of relatively higher reflectance.
3. A device according to claim 1 or claim 2, wherein the detection means are configured to operate to distinguish between areas of differing reflectance during movement of the spray head.
4. A device according to claim 1 or claim 2, wherein the detection means are configured to operate to distinguish between areas of differing reflectance only during the movement of the spray head.
5. A device according to claim 1 or claim 2, wherein the detection means are configured to operate to distinguish between areas of differing reflectance only during the upward movement of the spray head.
6. A device according to any preceding claim, wherein the device is provided with an end of life indication in the form of a counting mechanism.
7. A device according to claim 6, wherein the counting mechanism is calibrated to allow a pre-determined number of actuations of the refill which corresponds to the quantity of fluid stored in a refill.
8. A device according to any preceding claim, wherein the detection means is configured to interrogate the spray head by emitting, in use, radiation toward the spray head and collecting reflected radiation, and said means attributing specifically or approximately or generally the amount of reflected radiation to one or more portions of the spray head.

- 9 A device according to claim 8 wherein the detection means are configured to make a determination that there are differing levels of reflectance between at least two separate portions of the spray head when the collected reflectance from one portion is at least 0.5 times greater than from the a separate portion of the spray head, and preferably at least 2 times greater, and more preferably at least 5 times greater, and even more preferably at least 10 times greater, and even more preferably still at least 50 times greater, and most preferably at least 100 times greater.
10. A device according to any preceding claim, wherein the detection means are provided with a fixed location within the device and have a fixed field of view with respect to the spray head or the area normally occupied by the spray head when a refill is loaded in the device.
11. A device according to any preceding claim, wherein the detection means are provided in the form of one or more sensors having a radiation emitter and a collecting portion.
12. A device according to any preceding claim, wherein the detection means configured to interrogate with an effective range of up to 100mm, and preferably with an effective range of up to 50mm, and more preferably up to 20mm, and even more preferably up to 10mm, and most preferably up to 5mm.
13. A spraying device comprising a housing adapted to receive a refill of fluid therein and having an aperture suitable for permitting, in use, the spraying of the fluid from the refill therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish, in use, between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill.
14. A method of spraying a fluid from a device, the method comprising the steps of loading a refill of fluid in a spray device according to any of the first or second aspects of the present invention, placing the device in an operation mode, said mode being configured to cause activation of the actuation means, said actuation means periodically operating to bear against a spray head of the refill and causing the movement thereof to release a quantity of fluid from the refill, said released fluid being sprayed from the device through an aperture in the housing into the surrounding environment, characterised in that detection means provided in the device are operable in the operation mode to detect and distinguish between at least one area of lower reflectance and at least one area of relatively higher reflectance on a spray head of said refill or within the area normally occupied by said spray head.

15. A method according to claims 14, wherein the detection means are operable during the activation of the actuation means and the movement of the refill spray head.
16. A method according to claims 14, wherein the detection means are only operable during the activation of the actuation means.
17. A method according to claims 14, wherein the detection means are configured to only be operable during the substantially upward movement of the refill spray head.
18. A spray head for a refill of fluid for use with a device or method according to any preceding claim, wherein the spray head comprises an inlet section and an exit orifice, wherein the inlet section is adapted to connect with a valve stem of a refill and the exit orifice is capable of directing a spray of fluid away from the refill body, characterised in that the spray head has an external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance.
19. A refill of fluid for use with a device or method according to any preceding claim, wherein the refill comprises a body for containing a quantity of fluid and a valve stem with a spray head connected thereto, the spray head comprising an inlet section and an exit orifice defining a fluid pathway from the body to the exit orifice, characterised in that the spray head has an external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance.
20. A device, method, spray head or refill according to any preceding claim, wherein the areas of differing reflectance on the spray head are provided by a combination of a substantially white colour and a substantially black colour, preferably a substantially white spray head with a substantially black colouration provided thereon.
21. A device, method, spray head or refill according to any preceding claim, wherein the spray head has a generally L-shaped profile, wherein the shorter part of the L-shape is configured to engage with a free end of the valve stem of a refill and said shorter part has a single substantially black mark on a rearward portion thereof.
22. A device, method, spray head or refill according to any of claims 1-19, wherein the spray head could be provided with a portion cutaway to provide a greater distance for reflected

interrogation to travel, in use, to a detection means in comparison to the distance for reflected interrogation to travel from a non-cutaway portion of the spray head.

23. A device according to any of claims 1-13 configured to operate in accordance with the method of any of claims 14-17.

24. A spraying device with a refill of fluid therein substantially as described herein and with reference to the accompanying drawings.

25. A spray head for a refill of fluid substantially as described herein and with reference to the accompanying drawings.

26. A refill of fluid substantially as described herein and with reference to the accompanying drawings.

1/5

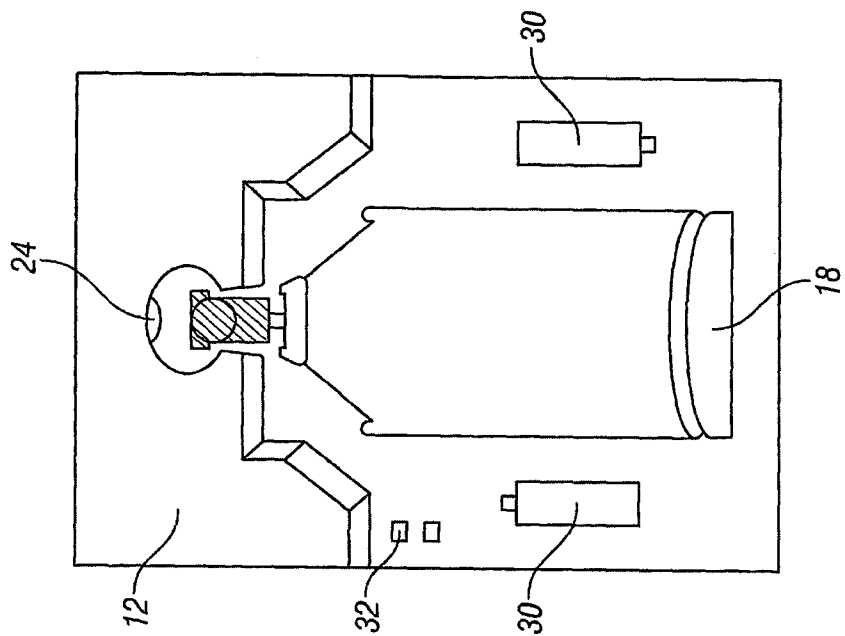


FIG. 2

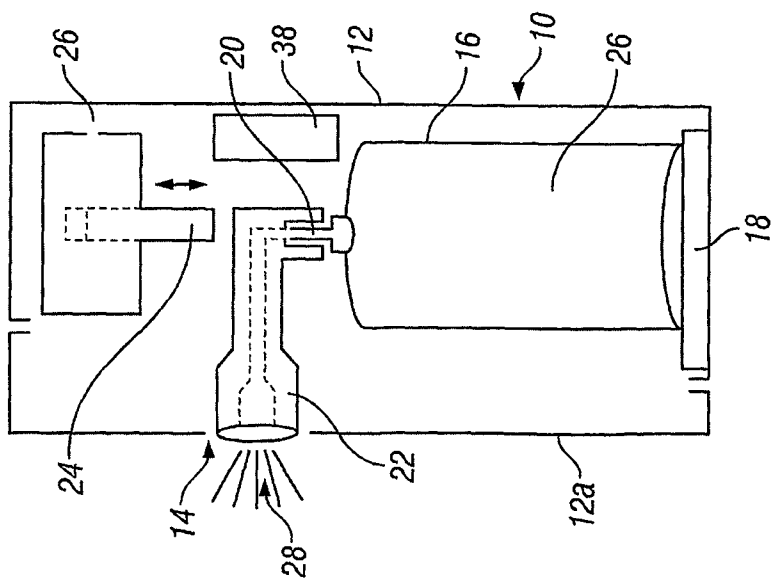


FIG. 1

2/5

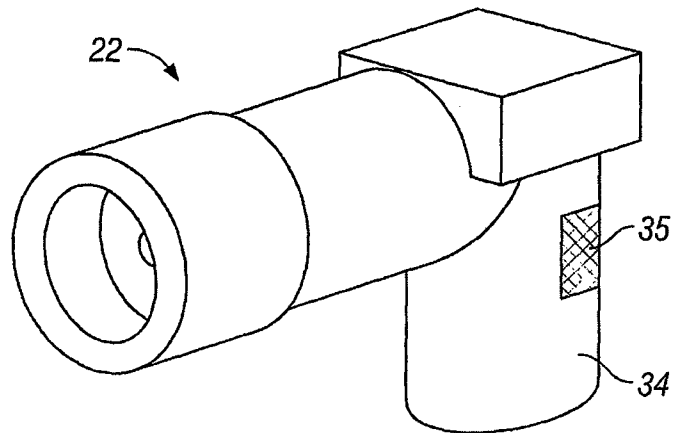


FIG. 3A

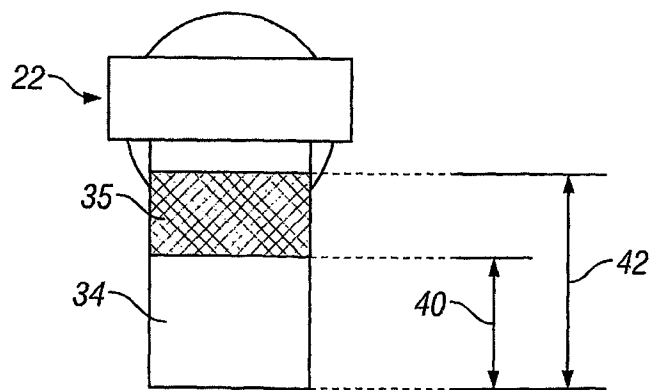


FIG. 3B

3/5

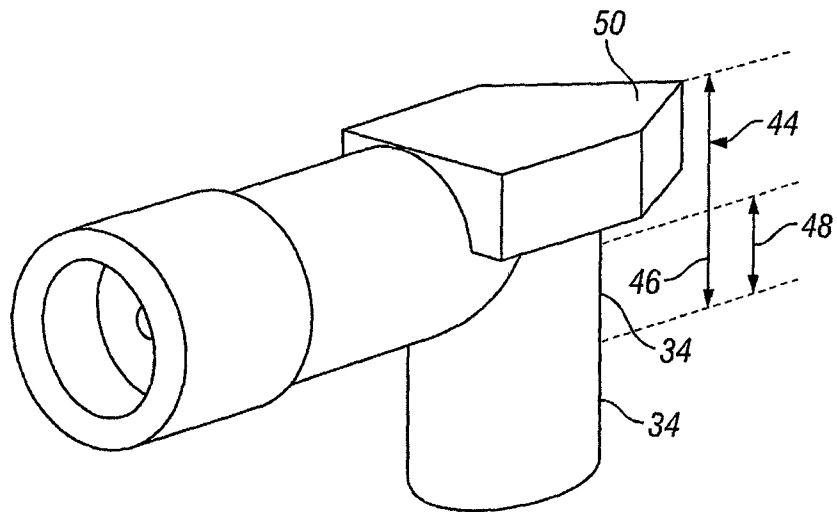


FIG. 4A

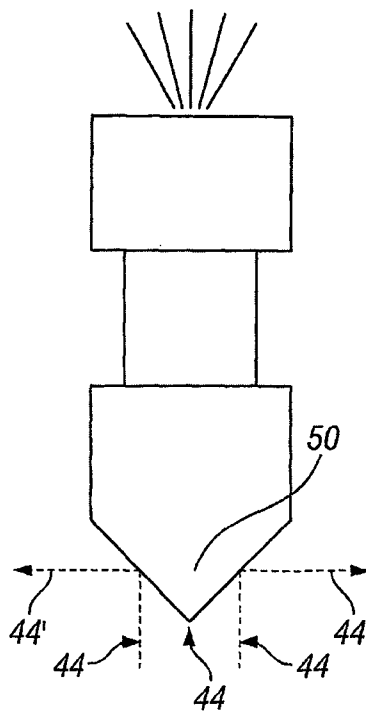


FIG. 4B

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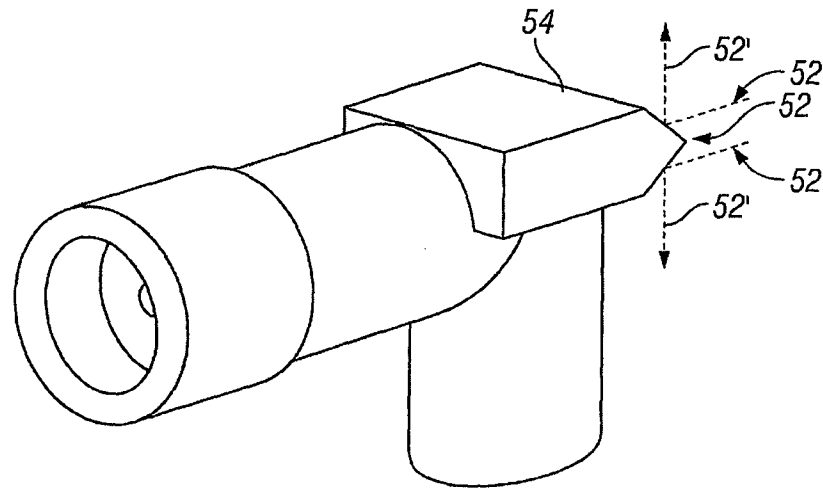


FIG. 5A

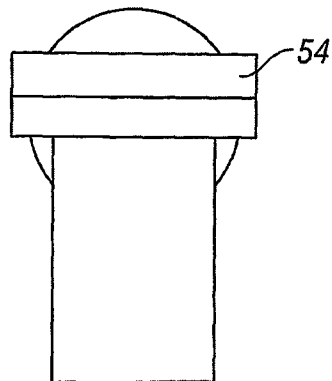


FIG. 5B

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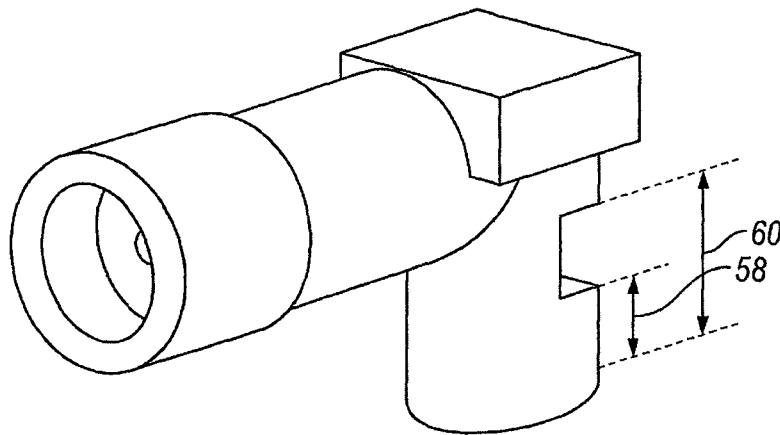


FIG. 6A

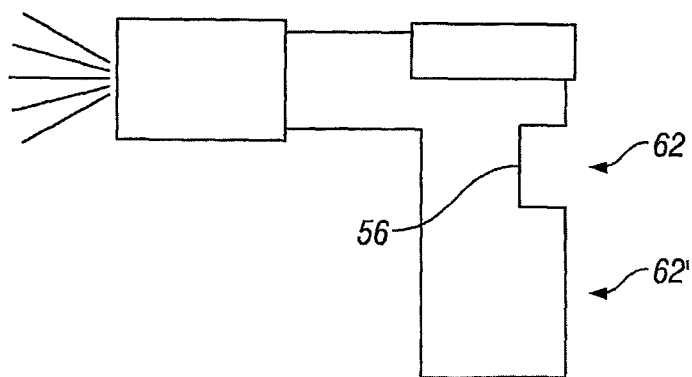


FIG. 6B

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/003212

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D83/16 B65D83/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D B05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 401 990 B1 (WALTERS PETER J [US] ET AL) 11 June 2002 (2002-06-11) paragraphs [0057], [0061] - [0063] figures	18-22, 24-26
X	US 3 586 243 A (JONES GERALD D) 22 June 1971 (1971-06-22) column 1, line 14 - line 38 column 2, line 14 - line 34 figures	18-26
A	WO 2005/113420 A (WATERBURY CO INC [US]) 1 December 2005 (2005-12-01) page 14 - page 15 figure 16	1-17, 23

-/--

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *8* document member of the same patent family

Date of the actual completion of the international search

20 January 2009

Date of mailing of the international search report

29/01/2009

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Roldán Abalos, Jaime

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/003212

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2005/009325 A (KOS LIFE SCIENCES INC [US]; DEATON DANIEL M [US]; RUCKDESCHEL THOMAS M) 3 February 2005 (2005-02-03) paragraphs [0048] - [0050] figure 5 -----	1-17,23

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2008/003212

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6401990	B1	11-06-2002	NONE	
US 3586243	A	22-06-1971	NONE	
WO 2005113420	A	01-12-2005	EP 1765679 A2 US 2005252930 A1	28-03-2007 17-11-2005
WO 2005009325	A	03-02-2005	AU 2004259032 A1 CA 2532868 A1 EP 1646415 A2 JP 2006528520 T MX PA05012695 A US 2005028815 A1	03-02-2005 03-02-2005 19-04-2006 21-12-2006 25-05-2006 10-02-2005

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2008/003212

International filing date (day/month/year)
22.09.2008

Priority date (day/month/year)
21.09.2007

International Patent Classification (IPC) or both national classification and IPC
INV. B65D83/16 B65D83/14

Applicant
RECKITT BENCKISER (UK) LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ 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 Rule 43bis.1(a)(i) with regard to novelty, inventive step or 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

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office - P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040 Tx: 31 651.epo.nl
Fax: +31 70 340 - 3016

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Roldán Abalos, Jaime

Telephone No. +31 70 340-2740



WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2008/003212

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion 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 (Rules 12.3(a) and 23.1 (b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2008/003212

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-17</u>
	No: Claims	<u>18-26</u>
Inventive step (IS)	Yes: Claims	<u>1-17</u>
	No: Claims	<u>18-26</u>
Industrial applicability (IA)	Yes: Claims	<u>1-26</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V.

1 Reference is made to the following documents:

- D1: US-B1-6 401 990 (WALTERS PETER J [US] ET AL) 11 June 2002 (2002-06-11)
- D2: US-A-3 586 243 (JONES GERALD D) 22 June 1971 (1971-06-22)
- D3: WO 2005/009325 A (KOS LIFE SCIENCES [US]) 3 February 2005 (2005-02-03)
- D4: WO 2005/113420 A (WATERBURY CO [US]) 1 December 2005 (2005-12-01)

2 INDEPENDENT CLAIM 18

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 18 is not new in the sense of Article 33(2) PCT.
Document D1 discloses (the references in parentheses applying to this document):

A spray head (40) for a refill of fluid, wherein the spray head comprises an inlet (62) section and an exit orifice (66), wherein the inlet section is adapted to connect with a valve stem (42) of a refill (fig. 6) and the exit orifice is capable of directing a spray of fluid away from the refill body, wherein the spray head has an external surface having at least one area of lower reflectance and at least one area of relatively higher reflectance (par. 57, different colours have different reflectance).

3 INDEPENDENT CLAIM 19

3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 19 is not new in the sense of Article 33(2) PCT.
Document D1 discloses (the references in parentheses applying to this document):

A refill of fluid, wherein the refill comprises a body for containing a quantity of fluid (par. 54, the container is a refill) and a valve stem (42) with a spray head (40, fig. 6) connected thereto, the spray head comprising an inlet section and an exit orifice defining a fluid pathway from the body to the exit orifice, wherein the spray head has an external surface having at least one area of lower reflectance and at least one

area of relatively higher reflectance (par. 57, different colours have different reflectance).

4 DEPENDENT CLAIMS 20-22

- 4.1 Dependent claims 20-22 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being that the unclear wording of the claims makes it impossible to ascertain the technical differences from the available prior art (see point VIII below). An applicant cannot rely on an unclear term to distinguish the claimed invention from the prior art (PCT Guidelines 5.34).

7 INDEPENDENT CLAIMS 1, 13 AND 14

- 7.1 Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parentheses applying to this document):

A spraying device with a refill of fluid therein, wherein the refill comprises a body forming a reservoir for the fluid and a spray head located at the uppermost part of the refill in fluid communication with the reservoir, and wherein the device comprises a housing adapted to receive the refill therein and having an aperture suitable for permitting, in use, the spraying of the fluid from an exit orifice of the spray head therethrough, the device further comprising actuation means configured for periodic actuation of the refill, wherein the device is provided with detection means configured to distinguish between at least one area of lower magnetism and at least one area of relatively higher magnetism on the spray head of said refill.

From this, the subject-matter of independent claim 1 differs in that:

Instead of magnetism the optical property of the reflectance is used to distinguish the spray head.

- 7.1.1 The subject-matter of claim 1 is therefore novel (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as:
choosing a material property easier to manufacture and handle for the known
interrogation means.

- 7.1.2 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

An optical coding means is easier to mount on the refill and do not interfere with the housing (metals therein could foul the magnetic detector). None of the documents cited disclose or hint using optical properties as coding means to interrogate that the correct refill was inserted.

- 7.1.3 Claims 2-12, and 15-17 are dependent on claims 1, 13 or 14 respectively and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VIII.

1. Claim 13 is unclear since it is defined by reference to an entity (the refill) not forming part of the invention, PCT Guidelines 5.37, Art. 6 PCT.
2. The wording of claim 14 "according to any of the first or second aspects of the invention" is unclear, Art. 6 PCT.
3. Claims 20-22 are unclear when depending on the device of claim 13 since the spray head dose not form part thereof PCT Guidelines 5.37, Art. 6 PCT.
4. Claims 20 and 21 comprise areas "substantially" black or white. This relative term leaves the reader in doubt as to the scope of the feature, thereby lacking the required clarity Art. 6, PCT Guidelines 5.34.
5. Claim 22 is unclear since the wording "could be provided" means that the only feature

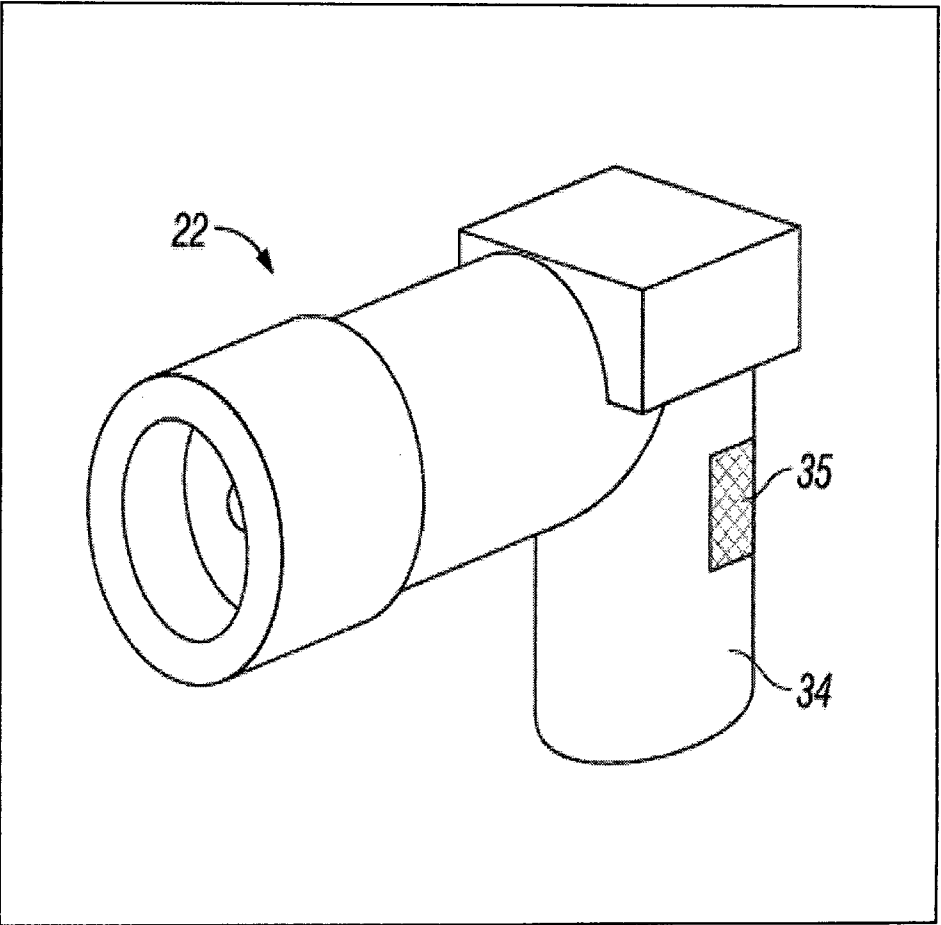
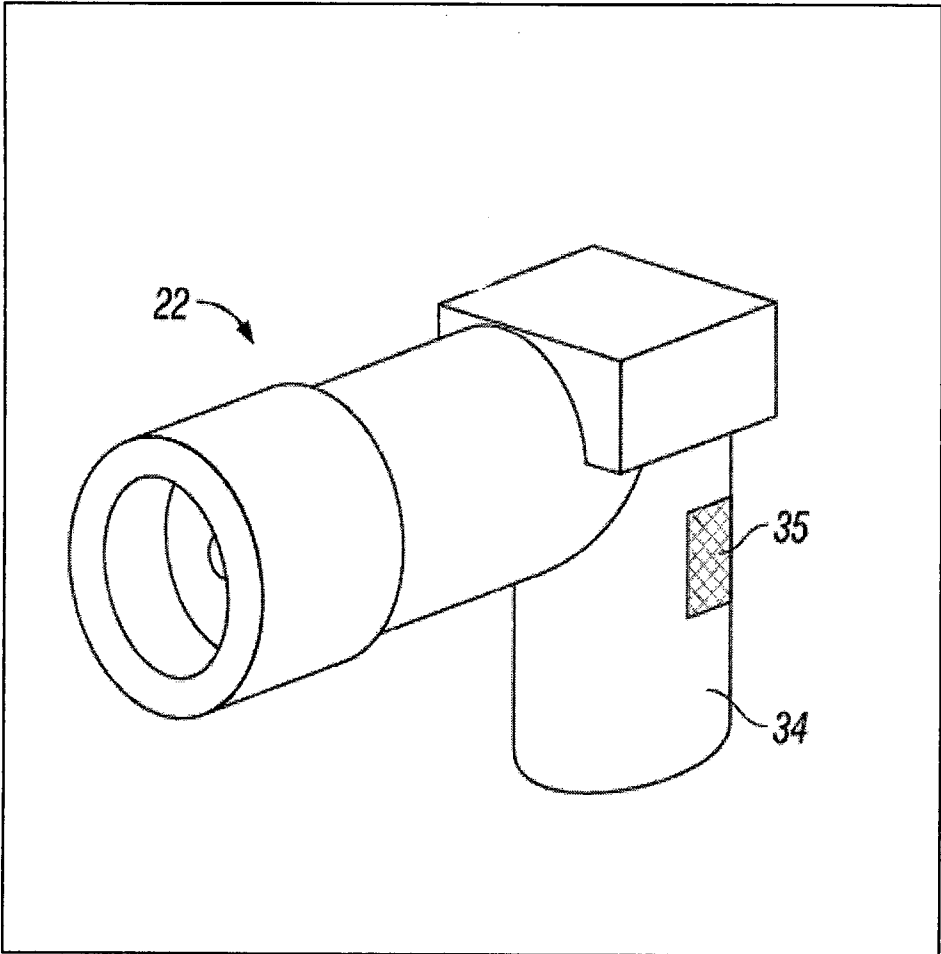
**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2008/003212

present in claim 22 is, in fact, optional.

5. Claims 24-26 violate Rule 6.2 PCT.





SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-034532- 00000-0000

Fecha: 2010-03-24 15:48:51 Dep. 2020 DIR.NUEVASCR
Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
Act. 411 PRESENTACION Folios: 110

PATENTE DE INVENCION ☐

MODELO DE UTILIDAD ☐

Art 33 Decisión 486/00

- ☐ Indicación que se solicita una patente.
 - ☐ Datos de identificación del solicitante o de la persona que presenta la solicitud
 - ☐ 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 ☐



Bogotá D.C.,
2020

Doctor(a)
CARDENAS NAVAS DARIO
Apoderado(a) y/o Representante de
RECKITT & COLMAN (OVERSEAS) LIMITED

REFERENCIA	Radicación No.	10 034532
	Solicitud internacional	PCT/GB2008/003212
	Fecha inicio fase nacional	21/04/2010
	Trámite	11
	Evento	378
	Actuación	430
	Oficio No.	 06369

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

1. La solicitud no contiene el poder debidamente otorgado, con el lleno de los requisitos exigidos por los artículos 63 y subsiguientes del Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante, cuando ésta fuere persona jurídica.

2. La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante, conforme a lo establecido por el artículo 26 literal k) de la Decisión 486 de la Comisión de la Comunidad Andina. Cuando se trate de documentos otorgados en el extranjero, estos deberán legalizarse de conformidad con lo dispuesto por los artículos 259 y 260 del Código de Procedimiento Civil. Cuando se trate de las declaraciones a que hace referencia la Regla 4.17 ii) del Tratado de Cooperación en Materia de Patentes PCT., el alcance de las tales declaraciones se determinará según indiquen claramente una cesión de derechos del inventor al solicitante o su causante, de conformidad con lo dispuesto en el numeral 5.2.15 del Capítulo Quinto, Título X de la Circular Única de Superintendencia de Industria y Comercio.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

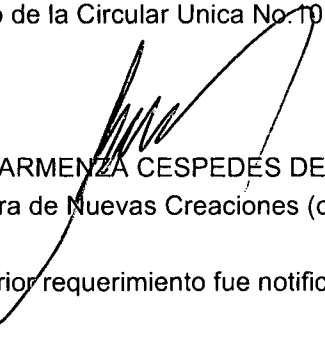
Continúa en la página siguiente...



Continuación radicado No: 10 034532


Industria y Comercio
SUPERINTENDENCIA

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Unica No.10 de 2001.


ALIX CARMENZA CESPEDES DE VERGEL
Directora de Nuevas Creaciones (c)

El anterior requerimiento fue notificado por fijación en lista de fecha
adpa11

14 MAYO 2010