

Señores
DIVISIÓN DE NUEVAS CREACIONES
Superintendencia de Industria y Comercio
Ciudad.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 07-137965-00001-0000

Fecha: 2018-10-29 16:31:14 Dep: 2020 NULCRACION
Tra: 3 MODULO Eje: 1 REGOLPOSITO
Act: 538 PLICION Folios: 2

REFERENCIA: EXAMEN DE PATENTABILIDAD.

Expediente No.: 07 137965
Solicitante : NSP DE COLOMBIA S. A.
Invención: ESTOPEROL MODIFICADO PARA LA
SEÑALIZACIÓN DE VÍAS.

MARIBEL HERNÁNDEZ QUINTERO, mayor de edad, domiciliada y
residenciada en la ciudad de Bogotá D. C., identificada con la cédula de
ciudadanía No. 52.195.951 de Bogotá y tarjeta profesional No. 106.991 del
Consejo Superior de la Judicatura, en mi calidad de apoderada de la sociedad
NSP DE COLOMBIA S. A., por medio de este memorial solicito se practique el
examen de patentabilidad sobre la Patente de Modelo de Utilidad de la referencia.

Allego recibo de pago No. 98136640 por la suma de \$280.000

De la señora Jefe,

MARIBEL HERNÁNDEZ QUINTERO

C. C. 52.195.951 de Bogotá

T. P. No. 106.991 del C. S. de la J.

35

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800.76029-2

RECIBO OFICIAL DE CAJA : 08 - 85,734
FECHA : OCTUBRE 29 DE 2008

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 07-137965- -00001-0000

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***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
DR PROPIEDAD INDUSTRIAL	CONSIGNACION	BANCO DE BOGOTA	667754787	98136640	29/10/2008	324,000.00

***** CONCEPTO *****

CANT. REGISTRADO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	86 EXAMEN DE PATENTABILIDAD DE MODELO	280,000.00
	TOTAL :	\$ 280,000.00

SON: DOSCIENTOS OCHENTA MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXCOBLENTE No. _____

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No 07-137965

EXTRACTO DE LA PRESENTE SOLICITUD DE **MODELO DE UTILIDAD** FUE
PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No **594** DE FECHA
31 DE JULIO DE 2008 EL TERMINO HABIL SEÑALADO POR LA LEY EXPIRA
EL 15 DE SEPTIEMBRE DE 2008.

NOTA: Dentro del plazo de los tres (3) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 y en concordancia con el artículo 85 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____

NO X

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIRECCIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C.

Abogada
Maribel Hernández Q.
(Apoderada)

ASUNTO	Radicación	07 – 137 965
	Trámite	003
	Evento	001
	Actuación	430
	Oficio	0 9 1 9 6
	Folios	030

Patente de Invención

☐

Patente de Modelo de Utilidad

☒

Como resultado del examen de fondo, realizado con fundamento en el artículo 85 en concordancia con el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. De los documentos estudiados

<u>Descripción:</u>	Folios 3 a 8 como se radicó inicialmente
<u>Reivindicaciones:</u>	Folios 9 a 13 como se radicó inicialmente
<u>Dibujos:</u>	Folios 17 a 21 como se radicó inicialmente

2. Del objeto de la solicitud

Título de la solicitud: *Estoperol modificado para la señalización de vías*, folio 1

El objeto de la presente solicitud de patente de modelo de utilidad consiste en suministrar una señal de tráfico en forma de botón que se coloca sobre la superficie carretera y se fija mediante un adhesivo.

El problema planteado en esta solicitud es facilitar la fijación segura de las señales o balizas que se colocan sobre la superficie pavimentada de una carretera.

Para solucionar este problema técnico la solicitud en estudio proporciona una señal o baliza que tiene forma general de un casquete esférico. En la parte inferior tiene una serie de entrantes dispuestos simétricamente con relación al centro, con el objeto de alojar parte del adhesivo con el que se fija al pavimento. Al rededor de la periferia circular hay unas perforaciones circulares dipuestas espaciadamente y que atraviesan la baliza desde la superficie superior hasta la inferior.

3. De la solicitud de Patente de Modelo de Utilidad

Antes de entrar en detalles específicos, se le dan al solicitante ciertas indicaciones generales, algunas de las cuales son aplicables a este caso y todas deberán ser tenidas en cuenta en las eventuales modificaciones:

El título o nombre de la invención debe concordar con lo que se reclama en el capítulo reivindicatorio. Esto es, si en las reivindicaciones se reclama un producto, tal producto debe ser mencionado en el título, y si en las reivindicaciones se reclama un procedimiento o un sistema o un método, también debe ser mencionado allí. Normalmente, el título debe contener máximo diez palabras aunque eventualmente pueden ser más. El título no debe contener palabras cuyo significado no esté reconocido dentro del sector de la técnica de que se trate. Preferiblemente, deben ser palabras cuyo significado se encuentre en el Diccionario de la Real Academia Española (DRAE).

En Colombia, la máxima autoridad en cuestiones del lenguaje es la Academia Colombiana de la Lengua. En caso de duda sobre el significado de las palabras, se debe acoger la definición que trae el Diccionario de la Real Academia Española (DRAE).

En Colombia, es de uso obligatorio el Sistema Internacional de unidades. Esto implica, también, que la coma decimal es de uso obligatorio. Cuando aparezca algún valor con unidades diferentes a las exigidas, deberá incluirse su correspondiente conversión al Sistema Internacional.

La parte técnica de la solicitud se divide en tres secciones, debidamente separadas, preferiblemente en este orden: El capítulo descriptivo, el capítulo reivindicatorio y el juego de dibujos o figuras. Se prefiere que el texto se presente escrito de manera mecánica, en una sola columna. Ninguna de estas secciones podrá llevar membretes (encabezamientos o pies de página) ajenos al contenido técnico de la solicitud.

Por lo menos el capítulo descriptivo debe estar debidamente paginado y estar escrito a doble espacio, con el fin de facilitar la referencia a los apartados del texto. Se debe evitar, en lo posible, el uso de mayúsculas corridas, hay que recordar que ese empleo equivale a gritar en el lenguaje oral. Se pueden emplear las mayúsculas para resaltar ciertos apartados del texto, pero si todo el texto está escrito en mayúsculas, nada queda resaltado.

La terminología empleada en la descripción y en las reivindicaciones debe ser igual para designar las diferentes partes, piezas, elementos, detalles o aspectos de lo que se mencione en ellas; los cuales, a su vez, deben estar designados con números o signos de referencia.

Dentro del texto de la descripción y las reivindicaciones se aconseja encerrar entre paréntesis el número o signo de referencia cada vez que se mencione el detalle correspondiente, con el fin de distinguirlo de otros tipos de números o signos que eventualmente aparezcan allí. Estos números o signos de referencia deben aparecer dentro del juego de dibujos (preferiblemente, sin paréntesis, aunque pueden estar encerrados dentro de un círculo) siempre acompañados de líneas o flechas que señalen o indiquen a qué parte, pieza, elemento o aspecto se encuentran asociados.

Las reivindicaciones deben estar numeradas individual y consecutivamente (1, 2, ... 5, 6, etc.) El capítulo reivindicatorio no debe tener subtítulos.

Normalmente se pueden encontrar dos categorías de reivindicaciones: una, la de producto; y, la otra, de procedimiento.

En las reivindicaciones se deben definir los alcances de la protección que desea el solicitante. En consecuencia, las reivindicaciones forman un cuerpo aparte de la descripción y como tal debe ser redactado: la primera vez que se mencione un nombre dentro de las reivindicaciones debería estar acompañado de un artículo indeterminado; y, la inclusión -entre paréntesis- de un número de referencia no sustituye la definición del elemento o aspecto al que se refiere, simplemente sirve de información complementaria. Se debe entender que la descripción sirve para interpretar las reivindicaciones y, en consecuencia, si en una reivindicación se reclama un aparato, por ejemplo, no se deberían mencionar aspectos del funcionamiento del aparato dentro de la reivindicación, limitándose a definir únicamente los elementos que constituyen el aparato.

Para detectar si una definición de producto está bien hecha, se debe poder responder a la cuestión: ¿cómo es el producto reclamado? Si no se puede dar una respuesta razonable, es porque el producto está mal definido o no ha sido definido en absoluto. Otra prueba común es la de invertir el razonamiento: ¿son las características definidas -en determinada reivindicación- propias de un producto? Si la definición de una característica de un producto empieza por un verbo, muy seguramente no es una característica propia del producto.

Normalmente no se puede definir un producto por el procedimiento de su obtención, porque el producto, en la mayoría de los casos, es producido en cantidades industriales por una variedad de procedimientos, muchos de los cuales no dejan trazas o huellas que se puedan detectar satisfactoriamente en el producto terminado y puesto a disposición del público.

Por lo demás, los productos industriales son bienes tangibles, son algo concreto, tienen existencia física, y por tanto son susceptibles de definición mediante sus características físicas -en la mayoría de los casos- o físico-químicas en los restantes, aunque existen unas pocas excepciones -que pertenecen a ciertas tecnologías emergentes- en donde resulta más fácil su identificación por el procedimiento de obtención, pero éste no es el caso en la presente oportunidad.

Cada una de las figuras debe estar debidamente identificada, preferiblemente con un número consecutivo: Figura 1, figura 2, ...

Las figuras deben ser realizadas siguiendo las reglas del dibujo técnico.

Se prefiere que dentro de las figuras no se incluya ningún texto. Cada uno de los detalles ilustrados en las figuras deberá estar señalado con un número o signo de referencia, el cual será el mismo en todas las figuras en donde se encuentre el detalle en cuestión. Si en alguna figura no se encuentran números de referencia, se entiende que no se va a decir nada sobre ella dentro del texto de la descripción y, entonces, es preferible que se omita tal figura. Análogamente, si en una figura no se encuentra señalado algún detalle con el respectivo número de referencia, es preferible que se omita tal detalle.

La patente de **modelo de utilidad** no puede incluir los procedimientos, por definición. Si alguna de las reivindicaciones de una solicitud de patente de modelo de utilidad reclama un procedimiento, debe ser suprimida.

De la descripción (artículo 28 D. 486)

Durante el análisis del texto de la descripción y de las ilustraciones anexadas, se observaron los siguientes defectos:

- (1) En el título o nombre del modelo se encuentra el término *estoperol* cuyo, significado, según el Diccionario de la Real Academia Española (DRAE), no concuerda con el contexto. Por lo demás, lo que se anuncia en el título debe ser concordante con lo que se reclama en las reivindicaciones, y, en ellas, no se menciona que el *estoperol* sea modificado.
- (2) En la página 1, folio 3, aparece la expresión *Estos dispositivo de seguridad utilizadas en carreteras Las señalizaciones en relieve...* que carece de sentido.
- (3) En la misma página 1 aparecen las expresiones *Botts's dots*, *cat's eye* que deben ser traducidas.
- (4) En la misma página aparece por primera vez una expresión numérica [US3332327] que es defectuosa porque la sigla debe estar separada de la cifra y porque la cifra debe estar separada en grupos de tres números a partir de la derecha: US 3 332 327.
- (5) En la misma página 1 aparece la expresión *slots* que debe ser traducida al español.
- (6) En la página 2, folio 4, aparece la expresión *Los estoperoles... presentan un cuerpo... con perforaciones cónicas de sección circular en la base, estas características permiten...* en la cual se objeta, en primer lugar el término *estoperoles*; en segundo lugar el calificativo *cónicas* que no es evidente a partir de las ilustraciones -habría que hacer un corte de esta porción del dispositivo e ilustrarlo-; y, en tercer lugar, ¿cuáles son estas características?
- (7) En la relación de las figuras que aparece por primera vez en la página 3, folio 5, se designan *figura número 1*, *figura número 2*,... pero, es preferible la designación *figura 1*, *figura 2*,... para que no haya redundancia.
- (8) En la misma página 3, aparece la expresión *El estoperol se compone de adentro hacia afuera por tres anillos concéntricos: un primer anillo interior (1), un segundo anillo intermedio o de transición (2) y otro tercer anillo exterior (3)...* que, corregida, sería: *la parte inferior del dispositivo -que no estoperol- se compone de tres anillos concéntricos: un primer anillo (1), interior; un segundo anillo (2), intermedio o de transición; y, un tercer anillo (3), exterior...* porque se debe sustituir un término; suprimir ciertos términos, que resultan redundantes; y añadir signos de puntuación, para darle un sentido más claro a la expresión objetada.
- (9) En la misma página 3, donde aparece la expresión *una primera superficie simétrica circunferencial* se debería añadir un número de referencia -que, también, por supuesto, debería añadirse a la o las figuras en donde se ilustre-. Incidentalmente, se anota que si es circunferencial, necesariamente es simétrica.
- (10) En la misma página 3 aparece la expresión *de dicho primer anillo se desprenden siete prolongaciones triangulares (5)...* En la cual, en primer lugar, se objeta que se haya omitido el número de referencia para el *primer anillo*; y, en segundo lugar, se objeta que lo ilustrado en la figura 1 -no figura 01, como aparece-, folio 17, no coincide con lo anunciado en el texto.
- (11) En la página 4, folio 6, aparece, dos veces, la expresión *la primera de las dichas primeras seis estructuras (8)* que se objeta porque, dado que todas las *primeras seis estructuras* son iguales, no hay razón para distinguir una de ellas de las demás de su especie. Y, si fuese el caso, habría que señalarla con un número de referencia distintivo. Además, la expresión se objeta porque se debe utilizar el artículo definido *las* o la expresión verbal *dichas*, pero no ambas cosas, porque es redundante. Además, hilando más delgado, la expresión sería objetada, también, porque forma parte de otra expresión más amplia: *Sobre el eje meridional de la estructura circular se encuentra la primera de las dichas primeras seis estructuras (8)...* que es confusa por el empleo repetido del término *estructura(s)*. Se aconseja utilizar expresiones más o menos sinónimas para distinguir una y otras.
- (12) En la misma página 4 aparece la expresión *en su parte central -falta aquí asignarle un número de referencia- se encuentra dispuesta una perforación de sección rectangular (10)* que no coincide con lo que se ilustra en las figuras 1 y 4,

folios 17 y 20, respectivamente, ya que, si es una perforación, debería ser visible en la superficie superior, no sólo en la inferior, del dispositivo; y si es rectangular, debería tener sus lados dispuestos en ángulo recto.

(13) En la misma página 4 aparece la expresión *siguiendo la dirección de las manecillas del reloj* que no es clara: ¿sería en la dirección radial?, esto es, desde el centro hacia la periferia o ¿se trata de la dirección de giro de las manecillas? Por lo demás, sobra esta referencia, porque se trata de una construcción simétrica, da lo mismo observarla en un sentido de giro que en el opuesto.

(14) En la misma página 4 se menciona por primera vez el término *proximal* que, por ser un término relativo, debe ser definido con relación a qué cosa resulta *proximal*. Y, lo propio es válido para el término opuesto: *distal*.

(15) En la misma página 4 aparece la expresión *Refiriéndonos al detalle de la figura 4 -no figura número 4-... claramente se observa una superficie... circunvalada por seis perforaciones (11)...* pero, en la figura 4, folio 20, se pueden observar claramente tres perforaciones (11) y, si acaso, dos más, para un total de cinco, no seis.

(16) En las páginas 4 y 5, folios 6 y 7, aparece la expresión *En la figura 5 -no figura número 5-... se puede observar ... una estructura o pestaña (13) -aquí, sobra lo de estructura- que circunvala a dicha estructura en forma de domo, dicha pestaña presenta una pluralidad de orificios (14)... dos perforaciones de sección circular (15)...* en la cual, obviamente, se trastocaron los números de referencia: donde dice (14) debería ser (15) y viceversa, como se puede observar en la figura 5, folio 21.

(17) En la página 5 aparece la expresión *un cuerpo en forma de domo con agujeros cónicos* que no son evidentes, a partir de la observación de las figuras anexadas. Se debería ilustrar un corte para señalar la conicidad y, además, se deberían añadir los números de referencia que sean del caso. En la página 6, folio 8, se mencionan *las perforaciones cónicas*. Si se trata de lo mismo, se debería utilizar una terminología uniforme, para fines de claridad, independientemente de que los términos usados sean más o menos sinónimos.

(18) En la misma página 5 aparece el término *termoajustable* que no tiene un significado reconocible.

(19) En la figura 3 -no figura 03, como aparece-, folio 19, se omitieron todos los números de referencia de los detalles ilustrados.

(20) Se reitera la necesidad de presentar una vista, por lo menos, de un corte del dispositivo objeto de la solicitud, en donde se puedan observar las formas cónicas o cónicas truncadas que se mencionan dentro de la solicitud.

La descripción no cumple con los requisitos de claridad y de completitud que exige el Art. 28 de la Decisión 486.

De las Reivindicaciones (artículo 30 D 486)

Durante el análisis del texto de las reivindicaciones se observaron los siguientes defectos:

1) En las reivindicaciones 1 a 26, folios 9 a 13, aparece el término *estoperol(es)* que fue objetado arriba, con relación al título o nombre del modelo de utilidad. Dependiendo de si se ha corregido dentro de la descripción lo referente a los términos *proximal* y *distal* se deberían hacer las aclaraciones en las reivindicaciones -en el caso de que ya se hayan hecho dentro de la descripción, no es necesario hacerlo en las reivindicaciones- ver, en especial, la reivindicación 16, folio 11.

2) En las reivindicaciones 2 a 26, folios 9 a 13, aparece la expresión *El estoperol de estructura circular utilizado en la delineación y señalización de vías y carreteras de la(s) reivindicación(es)...* que, en aras de la concisión, debería ser reducida a *El estoperol de la(s) reivindicación(es)...* porque en la reivindicación a la que se refiere sólo se menciona un único *estoperol*. Esta sugerencia no avala el uso del

término *estoperol* -que sigue siendo objetado- sólo lo incluye como referencia de qué es lo que se objeta en la expresión en comento.

3) En la reivindicación 1, folio 9, aparece la expresión *dicha superficie inferior presenta tres anillos concéntricos un primer anillo interior, un segundo anillo intermedio o de transición y otro tercer anillo exterior* que se objeta porque en ella no hay suficientes signos de puntuación. Además, se le sugiere al solicitante que incluya, entre paréntesis, los números de referencia de las partes, piezas, elementos, componentes o detalles que mencione en las reivindicaciones. Una expresión similar a la objetada se encuentra arriba, con relación a la descripción.

4) En la reivindicación 4, folio 9, aparece la expresión *...caracterizado porque en dicha superficie inferior se encuentra un primer anillo interior; dicho primer anillo interior...* en la cual se debe suprimir la expresión subrayada, porque algo así se había dicho en la reivindicación 1 y, en consecuencia, resulta redundante, afecta negativamente la concisión.

5) En la misma reivindicación 4 aparece la expresión *se dirigen radialmente hacia el centro interior* que es redundante.

6) En la reivindicación 5, folio 9, se reclama *el estoperol de estructura circular... definen también, siete estructuras* en donde lo que se define [estructura] se encuentra [siete estructuras] dentro de la definición, lo que no es aceptable. En la reivindicación 6, folio 9, se aumenta la confusión, porque en ella se definen las características de *dichas estructuras*.

7) En la misma reivindicación 6 aparece la expresión *dichas estructuras presentan fondo plano y forma cónica truncada* que no está debidamente soportada por el texto de la descripción o por las figuras.

8) En las reivindicaciones 5, folio 9; 10, 11 y 13, folio 10; 19, folio 11; 20, 23, 24, 25 y 26, folio 12; se encuentran algunas dependencias que no concuerdan con lo que se reclama en las reivindicaciones objetadas aquí. Así, por ejemplo, en la reivindicación 5, que depende de las reivindicaciones 1 y 4, aparece la expresión *caracterizado porque dichas siete prolongaciones...* pero, en la reivindicación 1 no se encuentra ninguna mención de *siete prolongaciones*, con lo que la reivindicación 5 'queda en el aire'. Lo análogo ocurre en las demás reivindicaciones objetadas.

9) En la reivindicación 12, se reclama: *El estoperol... de la reivindicación 11 caracterizado porque, en la parte central de dicha primera estructura...* pero, en la reivindicación 11 se había dicho: *la primera de las dichas primeras seis estructuras...* con lo que no se sabe a qué *primera estructura* se refiere la reivindicación 12. De nuevo, aquí se señala la conveniencia de, en primer lugar, utilizar números de referencia; y, en segundo lugar, utilizar terminologías uniformes a lo largo de la solicitud, reservando, por ejemplo, el término *estructura* para la disposición más general y utilizando otros términos apropiados para las partes, porciones, elementos, detalles o conjuntos de elementos que se encuentren dentro de la estructura.

10) En la reivindicación 13 aparece la expresión *en la dirección de las manecillas del reloj* que fue objetada arriba, con relación a la descripción. Lo propio se encuentra en la reivindicación 26, folio 12.

11) En la reivindicación 15, folio 11, aparece por primera vez la expresión *ancho regular* que es ambigua, subjetiva, porque dentro del texto de la descripción no se ha definido claramente qué se entiende por *regular* en este contexto.

12) Por lo demás, lo reclamado en las reivindicación 15 -y sus dependientes, si a eso vamos, en aras de la concisión- no tiene porqué ser algo independiente de lo reclamado en las reivindicaciones 1 a 14, simplemente, habría que aclarar: *El estoperol de las reivindicaciones 1 a 14, caracterizado, además, porque tiene una pestaña plana...* u otra expresión que se ajuste mejor a lo que el solicitante quiere decir; con lo que se reduciría sustancialmente el número de reivindicaciones.

Las reivindicaciones que dependen de una reivindicación objetada también se objetan por las mismas causas.

Las reivindicaciones no cumplen con los requisitos de claridad, de concisión y de sustento por la descripción que exige el Art. 30 de la Decisión 486.

Se deben presentar, entonces, nuevos capítulos descriptivo y reivindicatorio, ambos completos, junto con un nuevo juego de dibujos, donde se hayan corregido todas las objeciones que se han hecho arriba. Esto con el fin de evitar -cuando solo se presentan algunas páginas sueltas corregidas- que el lector tenga que desplazarse desde un sitio a otro de la solicitud y luego regresar a donde estaba antes sin perder la ilación de la lectura, porque esto produce confusión y afecta negativamente la claridad de dichos capítulos.

4. De la determinación del estado de la técnica

La fecha que se ha tenido en cuenta para determinar el Estado de la Técnica es la

Fecha de presentación de la solicitud nacional 2007-12-31

Durante la búsqueda de anterioridades se encontraron los siguientes documentos, que forman parte del estado de la técnica más cercano al objeto de la solicitud:

n.º	Documento	Título	Fecha de publicación
D1	Patente US 1 789 525, cuyo inventor es Adam H. Hoff	«Street traffic marker»(Una señal para tráfico urbano)	1931-01-20
*D2	Patente US 3 330 327, cuyo inventor es Sidney A. Heenan, quien le cedió sus derechos a la Elastic Stop Nut Corporation of America	«Pavement marker»(Señal para pavimento)	1967-07-25
D3	Patente US 3 575 092, cuyo inventor es Clarence S. Freeman	«Highway divider button»(Una baliza para dividir autopistas)	1971-04-13
*D4	Publicación GB 2 086 454 A, cuyo inventor es Ingo Debuschewitz, quien le cedió sus derechos a la H. Debuschewitz KG	«Road marker studs»(Unos tacos señalizadores para carretera)	1982-05-12
D5	Patente US 4 411 553, cuyo inventor es Ludwig Eigenmann	«Retro-reflecting globules for road surface marking»(Glóbulos que reflejan la luz para marcar la superficie de las carreteras)	1983-10-25
*D6	Patente US 4 618 281, cuyo inventor es Van R. Ajemian	«Raised pavement marker brace»(Un refuerzo protuberante para marcador de pavimento)	1986-10-21
D7	Patente US 5 662 430, cuyo inventor es Fang Ming Lee	«Universal ground marker»(Un marcador universal para el suelo)	1997-09-02
D8	Patente US 5 681 128, cuyos inventores son Noredin Morgan y Ernest P. Liporto, quien le cedió sus derechos a la Illinois Tool Works Inc.	«Surface marking systems»(Unos sistemas para marcado de superficies)	1997-10-28
D9	Patent Abstract JP 2000144655 A, cuyo inventor es Kazumi Saito quien le cedió sus derechos a la Nippon Mektron Ltd.	«Traffic sign»(Una señal de tráfico)	2000-05-26

n.º	Documento	Título	Fecha de publicación
D10	Patente US 6 079 899, cuyo inventor es John L. Green, quien le cedió sus derechos a la Winter Beaver, Inc.	«Raised road marker» (Un marcador protuberante para carreteras)	2000-06-27

*Documentos citados por el solicitante, ver página 1, folio 3. Se anexan copias de ciertas páginas pertinentes de estos documentos.

NOTAS: No se realizó una evaluación de los demás requisitos de patentabilidad, porque se objetó la claridad, la definición, la concisión y el sustento de las reivindicaciones; esto es, no se pudieron realizar las comparaciones de rigor, por ausencia de materia. Una vez hayan sido superadas las objeciones establecidas en este Concepto Técnico, se podrán hacer los exámenes correspondientes.

No obstante lo anterior, con base en los documentos encontrados hasta el momento, no se prevén objeciones respecto a la novedad del objeto solicitado.

5. De las conclusiones:

Los requisitos de patentabilidad de la presente solicitud se encontrarían afectados negativamente por la falta de claridad de la descripción y las reivindicaciones y por la falta de definición, de concisión y de sustento de estas últimas.

En cumplimiento del artículo 85 en concordancia con el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica al solicitante que debe dar respuesta dentro del término de treinta días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el artículo 8 de la resolución reglamentaria n.º 00210 del 15 de enero de 2001, advirtiéndole que contra él no procede recurso alguno en la vía gubernativa.


ALIX CARMENZA CÉSPEDES DE VERGEL
Directora de Nuevas Creaciones (C)

El anterior requerimiento fue notificado por fijación en lista, de fecha
22 JUL 2010

CONCEPTO TÉCNICO n.º 2493

EXAMINADOR TÉCNICO
Código n.º 202009

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D1

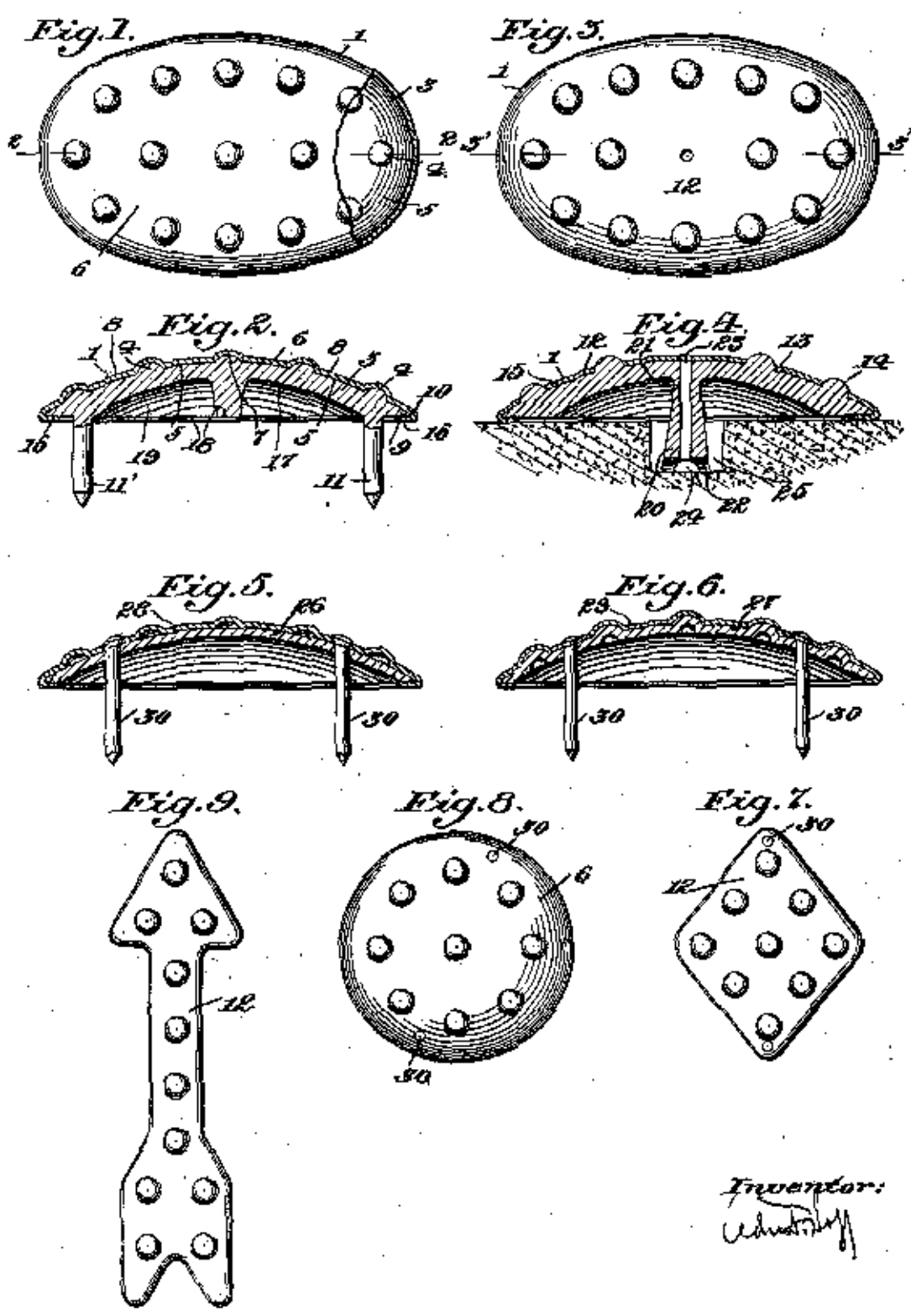
Jan. 20, 1931.

A. F. HOFF

1,789,525

STREET TRAFFIC MARKER

Filed Sept. 9, 1930



Inventor:
A. F. Hoff

UNITED STATES PATENT OFFICE

ADAM F. HOFF, OF BALTIMORE, MARYLAND

STREET-TRAFFIC MARKER

Application filed September 9, 1930. Serial No. 480,777.

My invention pertains to a street traffic marker, which replaces successfully the painting of traffic lanes commonly used to designate the movements of vehicular and pedestrian traffic.

The main object of my invention is to provide a practical traffic marker which will afford maximum visibility, and at the same time be durable and inexpensive to manufacture, and which will furnish a permanent marking means instead of the old way of painting such lines which need constant repainting and other upkeep.

Another object of my invention is to provide the lower face of the base member with a surface adapted to contact with the pavement throughout its entire lower face, or said face may be recessed so as to effect a saving of material thereby economizing in the cost of manufacture.

Another object of the invention is to provide a marker having a metal base member provided with a plurality of projections and recesses formed between said projections on its upper face, and a separable covering member of any suitable light alloy metal, or bright substance, said covering member having depressions in its lower face, said face being so formed as to fit over the upper face of the projections and over the face of said recesses, said base member and covering member constituting a unit independent of the pavement.

Another object of the invention is to provide a metal base member provided with a plurality of projections and recesses between the projections, a separable covering member secured thereto, said covering member being formed with a plurality of perforations formed therethrough adapted to be fitted around and through said projections to any suitable degree, and to cover the recessed portions of the upper face of the base member.

Further objects of the invention are to so construct my improved marking device that the covering member will always be maintained in a rigid position over the base member; to provide a downwardly extended prong integral with the lower face of the base

member especially designed for securely fastening the marker to concrete, stone or brick pavements; to provide a plurality of integral prongs depending from the lower face of the marker to serve as means for anchoring the device to an asphalt pavement or to pavements composed of flexible or resilient material, said prongs being suitably spaced apart and so disposed with relation to each other that they will be adapted to furnish a more positive and secure fastening means for the said marker.

The foregoing and such other objects as may appear from the ensuing description are accomplished by the construction, arrangement, location and combination of the several parts hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the claims appended, hereto, it being understood that slight changes in the precise shape, proportions and minor details of the construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming a part of this specification it will be seen that:

Figure 1 is a plan view of the upper face of my marker, where the covering is provided with a series of depressions.

Figure 2 is a cross section of the marker taken in the plane of the dotted lines 2-2, Figure 1.

Figure 3 is a plan view of the upper face of my marker, where the covering is provided with a series of perforations.

Figure 4 is a cross section of my marker taken in the plane of the dotted lines 3'-3', Figure 2.

Figures 5 and 6 show a modified construction of the shank of my marker.

Figures 7, 8, and 9 illustrate modified contours of my marker.

In the embodiment of my invention, as illustrated, it will be seen that numeral 1 designates my improved marker, having a base member 3 which is provided with projections 4 and recesses 5. The upper face of the base member is enveloped with a covering 6, which is provided with depressions 7 that fit over

United States Patent Office

3,332,327

Patented July 25, 1967

1

3,332,327

PAVEMENT MARKER

Sidney A. Heenan, Park Ridge, Ill., assignor to Elastic Stop Nut Corporation of America, Union, N.J., a corporation of New Jersey

Filed Oct. 23, 1964, Ser. No. 406,045

16 Claims. (Cl. 94-1.5)

ABSTRACT OF THE DISCLOSURE

In a pavement marker for establishing a marking visible from an oncoming vehicle on a generally horizontal roadway surface, a generally horizontal base adapted for engagement with the roadway surface, and a body of light-transmitting synthetic resin having an outer surface including an obverse light receiving and refracting face and an inner surface including reverse light receiving and reflecting face provided with a plurality of retrodirective reflector elements of the cube corner type for receiving light emanating from the oncoming vehicle and incident upon the obverse face in a generally horizontal direction of incidence and reflecting such light to return the incident light generally parallel to the direction of incidence. The obverse face makes an acute angle of at least 15° with the base to rise above the roadway surface upon which the pavement marker is to be installed for maintaining adequate optical effectiveness of the marker while allowing wiping of the obverse face by contact with the oncoming vehicle. The reflector elements each have a cube corner axis and the reflector elements are oriented such that each cube corner axis makes an acute angle with the normal to the obverse face in order to align the cube corners relative to the light refracted as a result of the acute angle of the obverse face for receiving such refracted light and reflecting the refracted light to return the incident light generally parallel to the direction of incidence after refraction of the reflected light at the obverse face.

The present invention relates generally to pavement markers and pertains more specifically to roadway traffic markers employing reflectors which are cleaned by the action of vehicular traffic on the roadway contacting the marker to maintain optical effectiveness during service.

Pavement markers of the reflecting type have enjoyed a high degree of acceptance in providing roadway markings visible from oncoming vehicles under nighttime conditions as a result of their ability to reflect light emanating from such vehicles. Experience has shown that the optical effectiveness of such markers will diminish rapidly during service as a result of the accumulation of dirt and other deposits which will form a film over the reflector system and inhibit the passage of light. Conventional pavement markers have sought to overcome the above difficulty by providing a variety of wiping mechanisms which are actuated by the contact of vehicular traffic with the marker structure to clean the reflector surfaces and maintain their optical effectiveness. Such conventional devices usually employ moving parts and generally demand relatively high installation costs due to the requirement that they be embedded within the pavement.

It is therefore an important object of the invention to provide a pavement marker having an effective reflector system which will maintain its optical effectiveness during service without requiring complex wiping mechanisms.

Another object of the invention is to provide a pavement marker of simplified design and construction which

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can be installed readily and economically upon a roadway surface and which will withstand the constant contact with road traffic inherent in such an installation.

Still another object of the invention is to provide a pavement marker employing a reflector system which will resist optical deterioration arising out of the accumulation of light transmission impeding film as well as mechanical abrasion by passing roadway traffic.

A further object of the invention is to provide a pavement marker of simplified, inexpensive construction having a minimum number of component parts and capable of ready installation upon the surface of the pavement.

A still further object of the invention is to provide a pavement marker of the reflecting type which is self-cleaning in that it makes use of normal contact with oncoming traffic to maintain optical effectiveness in the reflector system and does so with no moving component parts.

Another object of the invention is to provide a highly effective, self-cleaning reflecting type pavement marker fabricated of relatively inexpensive materials and capable of economical installation and maintenance.

The invention may be described briefly as providing, in a pavement marker for establishing a marking on a generally horizontal roadway surface, the marking being visible from an oncoming vehicle on the roadway, a body of light-transmitting synthetic resin having an outer surface including an obverse light receiving and refracting face and an inner surface including a reverse light receiving and reflecting face. A triple mirror reflex reflecting system is provided in the reverse face for receiving light emanating from the oncoming vehicle and incident upon the obverse face in a generally horizontal direction of incidence and reflecting such light generally parallel to the direction of incidence. The obverse face is so oriented as to make an acute angle with the horizontal and to rise above the roadway surface upon which the pavement marker is to be installed for maintaining adequate optical effectiveness of the reflex reflecting system during service, the acute angle being great enough to reduce optical deterioration of the obverse face arising out of contact with the oncoming vehicle while being small enough to allow adequate wiping of the obverse face by such contact. Additionally, the reflex reflecting system may include a plurality of light reflecting elements, each element having three planar surfaces arranged mutually at right angles and meeting at a common point remote from the obverse face to form a cube corner, the axis through the cube corner of each reflecting element being at an angle with the normal to the obverse face for allowing the reflecting elements to receive light emanating in a generally horizontal direction from the oncoming vehicle and refracted by the obverse face as a result of the acute angle and to reflect such light generally parallel to the direction of incidence of the light upon the obverse face after refraction of the reflected light at said obverse face.

The invention will be more fully understood and additional objects and advantages thereof will become apparent in the following detailed description of an embodiment of the invention illustrated in the accompanying drawings in which:

FIGURE 1 is a partially sectioned perspective view of a pavement marker constructed in accordance with the invention;

FIGURE 2 is a front elevational view of the pavement marker of FIGURE 1;

FIGURE 3 is a cross-sectional view taken along the line 3-3 of FIGURE 2;

FIGURE 4 is an enlarged detail of a portion of FIGURE 3; and

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71-04-13

United States Patent

(11) 3,575,092

[72] Inventor Clarence S. Freeman
Box 1204, Beaumont, Tex. 77704
[21] Appl. No. 826,799
[22] Filed May 22, 1969
[45] Patented Apr. 13, 1971

3,373,224 3/1968 Mesrobian..... 260/88.1X
3,404,134 10/1968 Rees..... 260/88.1X
3,428,514 2/1969 Greer..... 94/1.5X

Primary Examiner—Jacob L. Nackenoff
Attorney—Donald Gunn

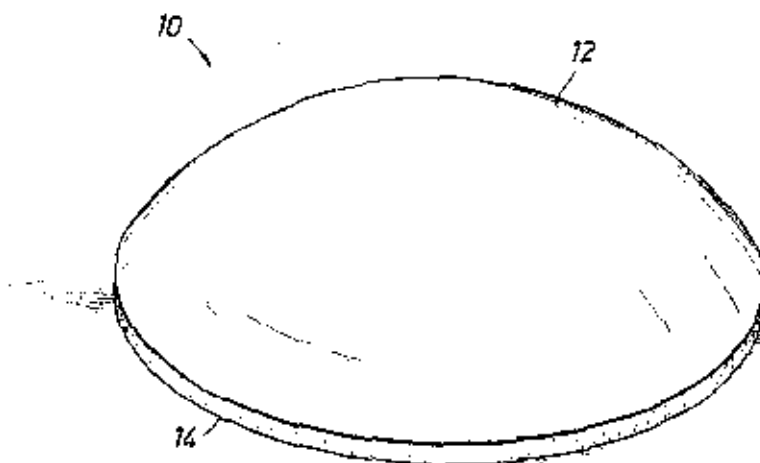
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[54] HIGHWAY DIVIDER BUTTON 10 Claims, 2 Drawing Figs.

[52] U.S. Cl..... 94/1.5
[51] Int. Cl..... E01c 23/16
[50] Field of Search..... 94/1.5;
260/88.1; 161/167, 406

[56] References Cited
UNITED STATES PATENTS
3,096,694 9/1963 Lynn..... 94/1.5
3,114,397 12/1963 Lee..... 94/1.5X
3,332,327 7/1967 Heenan..... 94/1.5
3,347,957 10/1967 Adomaltis..... 260/88.1X
3,373,223 3/1968 Armstrong..... 260/88.1X

ABSTRACT: For use along divider strips on highways, a button which is attached to the pavement to remind drivers to stay in divided lanes, the button preferably being comprised of an ionomer base which provides desirable abrasion-resistant and impact-resistant characteristics, the base having added thereto a suitable filler such as titanium oxide to impart a desired color thereto and being joined to the pavement through a preferably integral adhesive which is dry and nontacky at most temperatures, but which becomes adhesive at elevated temperatures to join the button to the pavement. The button, when joined to the pavement, is particularly advantageous in the absorption of impact or shock and does not transmit pavement-damaging shock to the pavement.



The foregoing described the preferred ionomer as being an ethylene/methacrylic acid copolymer. However, other ionomers may be adapted in accord with the teachings described above for the preferred ionomer. The preferred filler for the preferred invention is titanium dioxide, although barium sulfate, calcium carbonate, and other fillers are known. The titanium dioxide particularly imparts whiteness to the completed product, it being kept in mind that the pure ionomer chemical base provides an essentially clear highway button. Since noticeability of the button is of importance, the titanium dioxide is preferably added in some portion to obtain the desired whiteness. Of course, other colors can be achieved through the use of other fillers, an example being the addition of reflective fillers to achieve a product which has reflectivity after dark, and other color pigments for special applications.

The filler may range from 100 percent titanium oxide for a totally white product, to much lesser percentages in conjunction with less expensive fillers to reduce cost while still obtaining a white product.

The adhesive 14 shown in FIG. 1 should be considered next. The adhesive is exaggerated in thickness but preferably covers the entire bottom face of the product and is used to join the highway button 10 to the pavement. The preferred adhesive is a hydralized copolymer. Such a product is available under the trade name Elvon. The adhesive is applied to the molded or cast highway button and is firm at room temperatures and at most temperatures at the point of installation. The preferred integral adhesive described herein preferably is activated by the application of heat immediately prior to installation. For installation by hand methods, the highway button 10 may be hand held and an open flame briefly applied to the adhesive 14 to raise its temperature to a tacky or flowable consistency. At this juncture, the button 10 is simply pressed to the pavement and the bonding is completed. More automated installation techniques are suggested.

FIG. 1 illustrates the common circular highway button normally used. FIG. 2 discloses a highway button indicated by the numeral 20 which is one of the variations of the present invention. It is generally rectangular, although again, the edges, as presented to the tires of vehicles using the highway, are defined for purposes of this disclosure, as being rounded. Again, the lower side may be covered with the integral adhesive or an epoxy to join the button to the pavement. It will be noted that the button 20 incorporates several facets. One

use of the several facets is the implementation of reflective materials, colors, and the like. For instance, to warn drivers that they are proceeding the wrong way, one face may be treated to form a red reflective surface. The opposite face is treated with a white reflective surface. Of course, other variations in coloration, structure and shape may be adapted without departing from the scope of the present invention.

While the foregoing is directed to the preferred embodiments of the present invention, numerous variations and alterations may be adapted without departing from the scope of this disclosure; the claims appended hereto adopt the language of this specification and determine the scope thereof.

I claim:

1. A highway button comprising a curved rounded surface having an absence of sharp corners or edges and a lower face adapted to be contacted against the surface of a highway, the body of said highway button being comprised of a metal ion-neutralized copolymer which consists of ethylene and an acid selected from the group consisting of acrylic acid or methacrylic acid.

2. The invention of claim 1 wherein said copolymer includes from about 5 to 20 percent of the acid.

3. The invention of claim 1 wherein the metal ions are selected from the group consisting of sodium, zinc, lithium, or potassium.

4. The invention of claim 1 including an adhesive on the lower face of said button which is inert and nontacky at room temperature, and becomes adhesive at elevated temperatures sufficient to make said adhesive tacky.

5. The invention of claim 4 wherein said adhesive is a hydralized copolymer.

6. The invention of claim 1 including a filler material comprising a portion of the body of said highway button.

7. The invention of claim 6 wherein said filler comprises about 40 percent to 60 percent by weight of said highway button.

8. The invention of claim 6 wherein said filler is titanium dioxide.

9. The invention of claim 6 wherein said filler is selected from the group consisting of titanium dioxide, barium sulfate, or calcium carbonate.

10. The invention of claim 1 including a reflective surface on the exterior of the body of said highway button.

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82-05-12

(12) UK Patent Application (19) GB (11) 2 086 454 A

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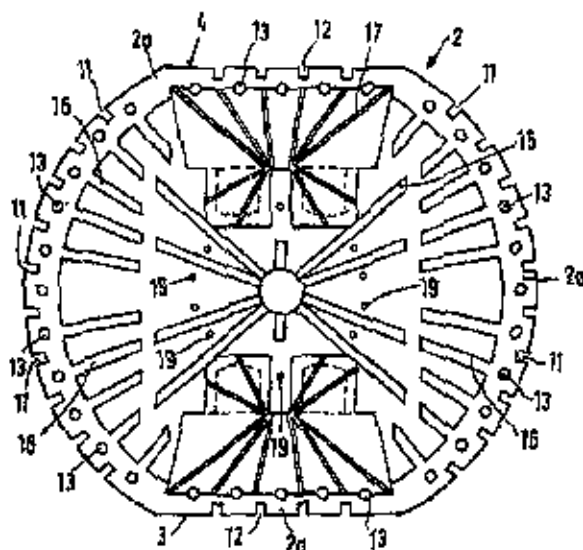
- (21) Application No 3127530
(22) Date of filing 11 Sep 1981
(30) Priority data
(31) 3040847
(32) 30 Oct 1980
(33) Fed Rep of Germany (GB)
(43) Application published
12 May 1982
(51) INT CL¹
E01F 3/08
(52) Domestic classification
E1G 41 44C1
(56) Documents cited
GB 1449826
GB 1243405
GB 1224027
GB 1182422
GB 1028832
GB 588111
GB 408488
(58) Field of search
E1G
(71) Applicants
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(72) Inventor
Ingo Debuschewitz
(74) Agents
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48 St. Vincent Street,
Glasgow G2 5TY

(54) Road marker studs

(57) The underside of a domed plastic road marker stud, shown carrying opposed reflectors, is provided around its marginal region (2a) with undercut apertures (13) and peripheral slots (12) for keying adhesive, the adhesive being applied as an annulus confined to the marginal region (2a).
The stud shown has stiffening ribs 15, 16, 17 and air-release apertures 19.

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FIG.3



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FIG.2

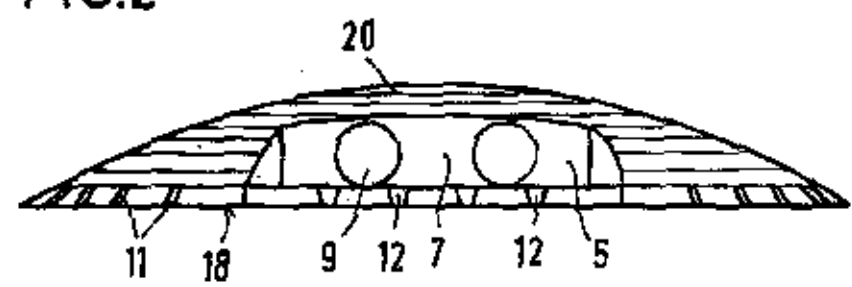
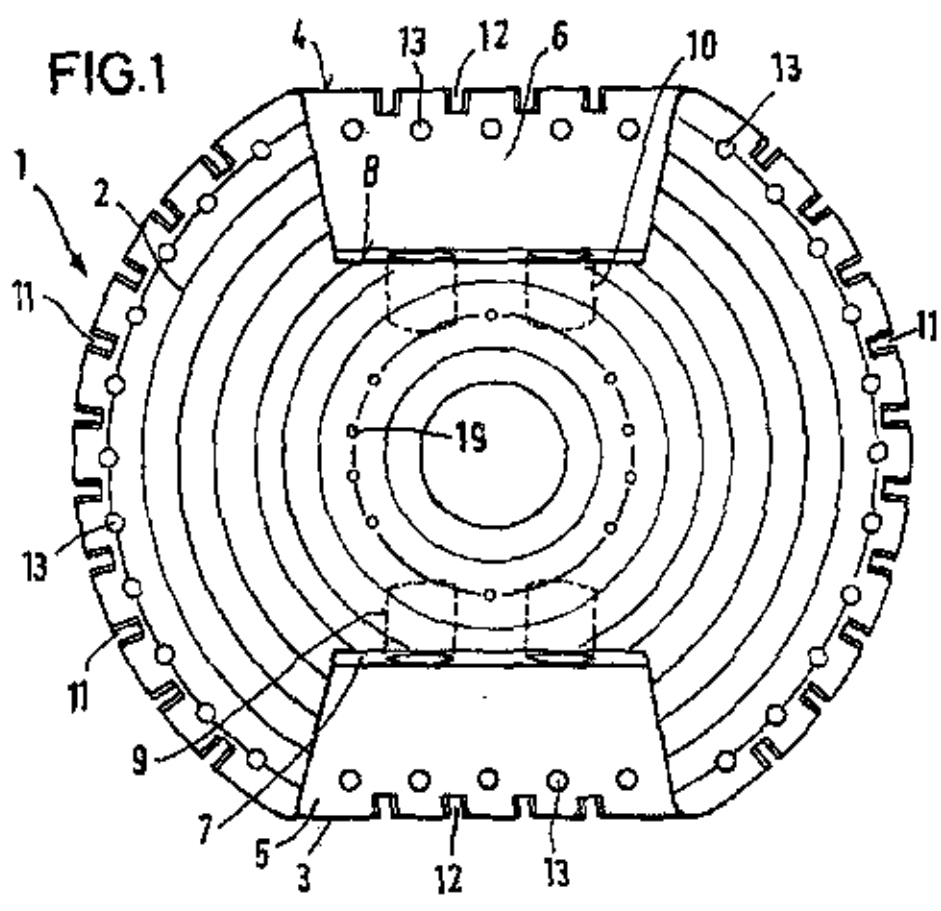


FIG.1



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United States Patent [19]

Eigenmann

[11] 4,411,553

[45] Oct. 25, 1983

[54] RETRO-REFLECTING GLOBULES FOR
ROAD SURFACE MARKING

[76] Inventor: Ludwig Eigenmann, POB 8, CH 6833
Vacallo, Switzerland

[21] Appl. No.: 265,231

[22] Filed: May 19, 1981

Related U.S. Application Data

[63] Continuation of Ser. No. 54,235, Jul. 2, 1979, abandoned.

[30] Foreign Application Priority Data

Jul. 5, 1978 [IT] Italy 25381 A/78

[31] Int. Cl. E01F 9/04

[52] U.S. Cl. 404/16; 350/105

[58] Field of Search 404/16, 14, 15, 13,
404/9; 116/63 R; 350/97, 103

[56] References Cited

U.S. PATENT DOCUMENTS

1,789,525	1/1931	Hoff	404/15
3,114,597	12/1963	Lee	404/15
3,240,132	3/1966	Wiswell	404/16
3,277,800	10/1966	Wiswell	404/16
3,575,092	4/1971	Freeman	404/14 X
3,964,821	6/1976	Eigenman	404/9 X
4,049,337	9/1977	Eigenman	404/9 X
4,069,281	1/1978	Eigenman	404/16 X
4,072,403	2/1978	Eigenman	404/6 X

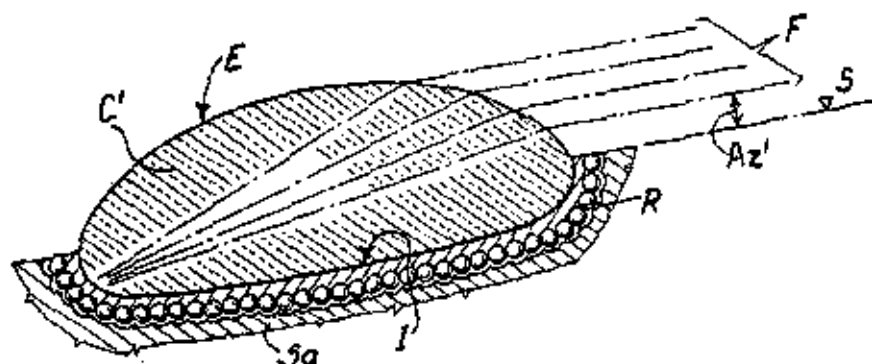
Primary Examiner—Nile C. Byers, Jr.

Attorney, Agent, or Firm—Michael J. Striker

[57] ABSTRACT

Improved retro reflecting globules of vertically asymmetrical configuration and of geometry such as to provide at least another asymmetry in plan view, to provide an optimum light response to light beams impinging under differing zenithal and azimuthal angles.

3 Claims, 6 Drawing Figures



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United States Patent [19]
Ajemian

[11] **Patent Number:** 4,618,281
[45] **Date of Patent:** Oct. 21, 1986

citada
p. 1, f. 3

D6

[54] **RAISED PAVEMENT MARKER BRACE**

[76] **Inventor:** Van R. Ajemian, 331 N. Vail Ave.,
Montebello, Calif. 90640

[21] **Appl. No.:** 688,066

[22] **Filed:** Dec. 31, 1984

[51] **Int. Cl.:** E01F 9/01

[52] **U.S. Cl.:** 404/16; 116/63 R

[58] **Field of Search:** 404/6, 9, 12, 14, 15,
404/16, 22-24; 116/63 R; D10/113; 340/114 R,
116; 248/205.3, 500

[56] **References Cited**

U.S. PATENT DOCUMENTS

D. 220,138	3/1971	Hedgewick	D10/113
D. 220,553	4/1971	Hedgewick	D10/113
D. 220,554	4/1971	Hedgewick	D10/113
1,839,276	1/1932	Taylor	340/116
3,332,327	7/1967	Heenan	404/16
3,427,933	2/1969	Taylor Myers	404/9
3,575,092	4/1971	Freeman	404/10
3,758,191	9/1973	Hedgewick	404/16 X
3,784,279	1/1974	Hedgewick	404/12
3,867,013	2/1975	Ashenfarb	404/13 X
3,971,623	7/1976	Hedgewick et al.	404/12 X
3,973,108	8/1976	Suhr et al.	404/16
4,237,191	12/1980	Horne	404/16 X

FOREIGN PATENT DOCUMENTS

1163751 10/1969 United Kingdom 116/63 R

Primary Examiner—Stephen J. Novosad

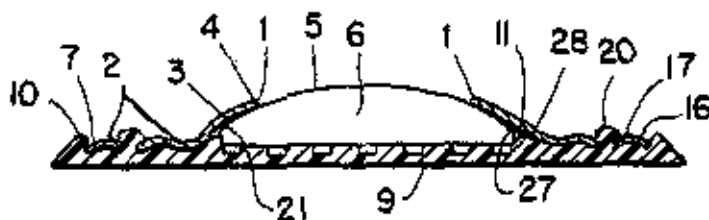
Assistant Examiner—John F. Letchford

Attorney, Agent, or Firm—Rupert Brady, Jr.

[57] **ABSTRACT**

A raised pavement marker brace for extension about a raised pavement marker having an upper and side surfaces, comprises a base portion configured to extend about the marker and to engage the surface of the pavement for securement by adhesive, the wall portion extending upwardly from the base portion to protect at least one side of the marker, and a retaining lip portion extending upwardly from the wall portion and extending over a portion of said upper marker surface. A top portion of the brace may extend over at least a portion of the upper surface of the marker to protect the surface. The brace may extend over a portion of the marker side surface and define an opening about a reflective portion of the marker side surface. The base portion may preferably define a plurality of openings for the extension therethrough of the adhesive during application of the adhesive, thus to provide adhesive portions extending from said openings onto the upper surface of the base portion to provide improved securement of the base portion to the pavement. The adhesive may preferably extend beyond the periphery of the base portion and upwardly from the pavement about a portion of the brace base portion for improved securement against movement of the brace. The brace and the marker preferably define sufficient space between them for the extension upwardly into the space of a ridge of adhesive for improved retention of the brace against movement relative to the pavement.

8 Claims, 15 Drawing Figures



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FIG. 1

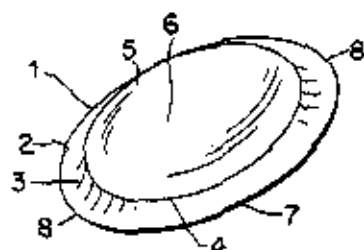


FIG. 5

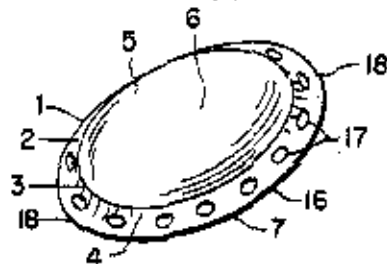


FIG. 2

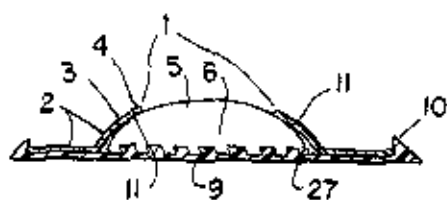


FIG. 6

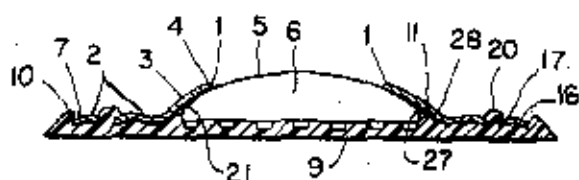


FIG. 3

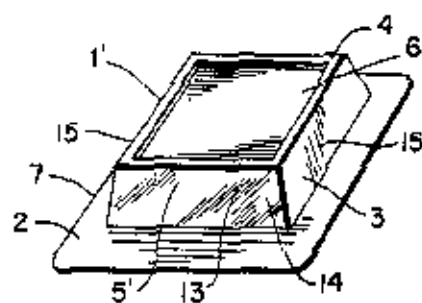


FIG. 7

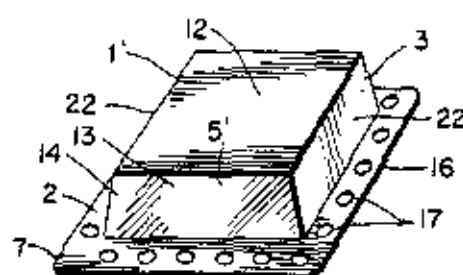


FIG. 4

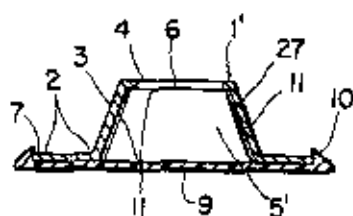


FIG. 8

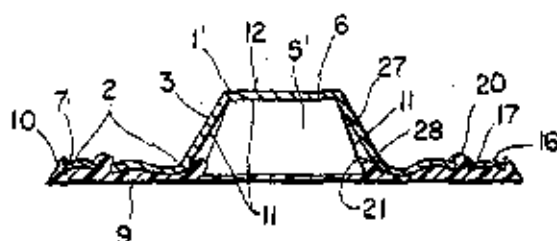


FIG. 10 is a cutaway side view of the portion indicated by section lines 23—23 in FIG. 9, with the adhesive added.

FIG. 11 is a perspective view of the present invention, showing additional variations contemplated as within the scope of the present invention, as configured and adapted to extend about a reflective marker of generally rectangular configuration.

FIG. 12 is a cutaway side view of the portion indicated by section lines 26—26 in FIG. 11, with the adhesive added.

FIG. 13 is an enlarged detail of a portion of either FIG. 1 or FIG. 4, with a heretofore unmentioned variation contemplated as within the scope of the present invention.

FIG. 14 is a perspective view of the present invention, in basic embodiment with one variation, as configured and adapted to extend about a nonreflective marker of curvilinear configuration.

FIG. 15 is a cutaway side view of the portion indicated by section lines 15—15 in FIG. 3, with one variation, and with adhesive added.

DESCRIPTION OF THE PRESENT INVENTION

Referring to FIG. 1, we see Raised Pavement Marker Brace 1, comprising base portion 2, wall portion 3 and retaining lip portion 4. The exposed upper surface 6 of a nonreflective marker 5 of curvilinear configuration is shown. Base portion periphery 7 of Brace 1 is also shown.

Referring to FIG. 2, a cutaway side view of Brace 1 and of marker 5 along section lines 8—8 is shown. Base 2, wall 3, lip 4, periphery 7, and surface 6 are shown. Adhesive 9 and adhesive ridge 10 are also indicated, as is unitary assembly area 11, and side surface 27 of Brace 1.

With reference to FIG. 3, we see Raised Pavement Marker Brace 1', comprising base 2, wall 3, lip 4, and periphery 7. The reflective portion 13 of a reflective marker 5' of generally rectangular configuration is exposed at opening 14 in Brace 1'.

With reference to FIG. 4, a cutaway side view of Brace 1' and of marker 5' along section lines 15—15 is shown. Base 2, wall 3, periphery 7, and lip 4 of Brace 1' are indicated, as are surface 6 and surface 27 of marker 5'. Adhesive 9, ridge 10, and area 11 are also shown.

Referring to FIG. 5, we see Brace 1, which has added thereto uneven underside 16 and openings 17, and marker 5.

Referring to FIG. 6, a cutaway side view of Brace 1 and of marker 5 along section lines 18—18 is shown. Underside 16, an opening 17 and space 21 are indicated, as are adhesive portion 20 and adhesive ridge 28.

With reference to FIG. 7, we see Brace 1', which has added thereto underside 16 and openings 17, and marker 5'.

With reference to FIG. 8, a cutaway side view of Brace 1' and of marker 5' along section lines 22—22 is shown. Underside 16, an opening 17 and space 21 are indicated, as are adhesive portion 20 and ridge 28.

Referring to FIG. 9, we see Brace 1 and marker 5. Brace 1 differs from the preferred embodiment in that the former has top 12', periphery 7' and openings 17'.

Referring to figure ten, a cutaway side view of Brace 1 and of marker 5 along section lines 23—23 is shown. Top 12', periphery 7', an opening 17' and adhesive portion 20' are in addition to those features shown in the cutaway side view of the preferred embodiment.

Referring to FIG. 11, we see Brace 1', which has added thereto top 12', declined eve 24, hole 25, periphery 7' and openings 17', differing from the preferred embodiment, and marker 5'.

Referring to FIG. 12, a cutaway side view of Brace 1' and of marker 5' along section lines 26—26 is shown. In addition to those features shown in the cutaway side view of the preferred embodiment, we see top 12', hole 25, periphery 7', openings 17' and adhesive portion 20', and marker 5'.

Referring to FIG. 13, we see a variation of base 2, showing base 2, base 2' and base 2'', as well as new locations for openings 17'. The effect of this base 2 variation upon ridge 10 is indicated by adhesive portion 10'.

With reference to FIG. 14, we see the basic embodiment of Brace 1 with marker 5, showing incisions 29 in base 2.

With reference to FIG. 15, we see the basic embodiment of Brace 1' with marker 5', showing inward elongation 30 in base 2.

OPERATION OF THE PRESENT INVENTION

The Raised Pavement Marker Brace can be configured and adapted for extension about any raised pavement marker, whether the marker be nonreflective and curvilinear, nonreflective and generally rectangular, reflective and curvilinear or reflective and generally rectangular. It is also within the scope of the present invention to be configured and adapted for extension about markers, the geometries of which are neither curvilinear nor generally rectangular. The drawings accompanying this application show the present invention being utilized with markers currently in use, but this should not be construed as a limitation on the present invention.

The Brace can be composed of one or more metals, one or more metallic alloys and/or one or more non-metals, as, for example, polyester. The greater the strength of the composition, the less thick the Brace can be, although a thickness of less than 0.05" may offer little advantage to markers.

The Brace takes better advantage of the adhesive and the cohesive qualities of the adhesive used to secure the markers, in order to enhance retention of the Brace against movement relative to the pavement, and, therefore, to prolong the usefulness of the marker upon or around which the Brace sits.

A raised pavement marker with adhesive on its underside is secured to pavement by a worker or a machine. The adhesive extends outward from the marker underside. A Brace is then extended about the marker, whereupon the Brace is secured by the extended adhesive to the pavement, as is shown in FIGS. 2, 4, 6, 8, 10 and 12.

Referring back to FIGS. 1 through 4, we see that enhanced retention of the Brace is enabled by securement of base 2 of the Brace to adhesive 9 and by the upward extension of ridge 10 about the periphery 7, this latter occasioned by pressing the Brace downward upon securement. Ridge 10 takes advantage of the adhesive's cohesive property; should adhesion of the Brace to the adhesive fail, the cohesive strength of the adhesive will aid to retain the Brace with respect to horizontal force applied to the Brace.

Many Brace features in FIGS. 5 through 13 show means by which to take advantage of the adhesive and cohesive properties of the adhesive. Openings 17 and

US005662430A

United States Patent [19]

Lee

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[54] UNIVERSAL GROUND MARKER

[76] Inventor: Fang Ming Lee, 11 E. California St.,
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[21] Appl. No.: 548,749

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[52] U.S. Cl. 404/15; 404/16

[58] Field of Search 404/9, 13, 14,
404/15, 16

[56] References Cited

U.S. PATENT DOCUMENTS

Re. 16,131 8/1925 Cretney .
 1,661,242 3/1928 Truxal .
 1,708,369 4/1929 Nater .
 1,878,691 9/1932 Foster .
 2,434,103 1/1948 Elliott .
 2,635,513 4/1953 Batterson .
 2,664,065 12/1953 Thompson .
 2,699,982 1/1955 Batterson .
 3,096,694 7/1963 Lynn .
 3,392,639 7/1968 Heenan .

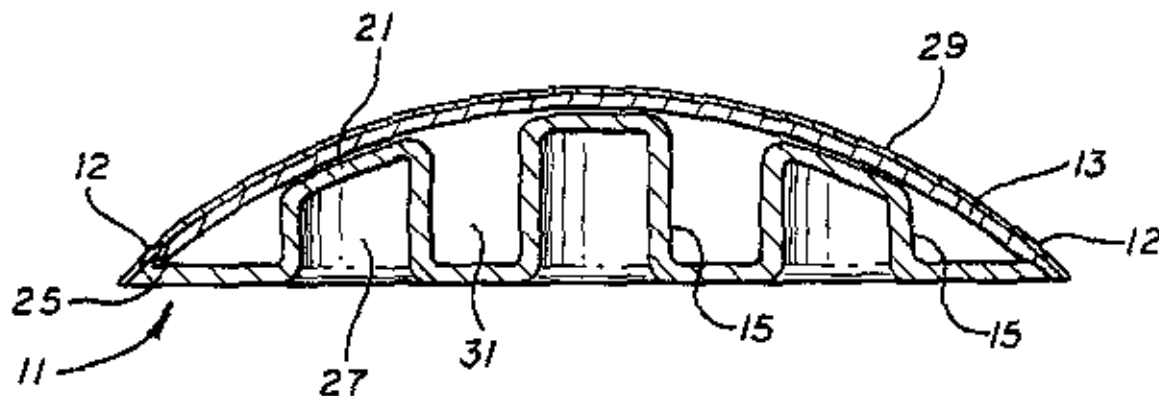
3,575,092 4/1971 Freeman 404/14 X
 3,901,583 8/1975 Schaefer .
 4,618,281 10/1986 Ajemian 404/16
 5,069,577 12/1991 Murphy 404/13 X
 5,104,256 4/1992 D'Avela .
 5,354,143 10/1994 Lindner .
 5,425,596 6/1995 Steere et al. 404/14
 5,449,244 9/1995 Sandino 404/14

Primary Examiner—James Lischors
 Attorney, Agent, or Firm—Ladas & Parry

[57] ABSTRACT

The invention is a ground marker that is durable and yet can be manufactured with ease and without great expense. The ground marker has a shell portion bonded to a support structure. A lip formed around the periphery of the support structure against which the shell rests maintains the shell in a secure position. The support structure has support posts that serve to buttress the shell which bears the weight of vehicles traveling thereon. Filler material disposed between the shell and support structure serves to provide further support. A coating of protectant, preferably ceramic, provides reflectivity and protection against the elements.

30 Claims, 4 Drawing Sheets



The support structure 11 has a plurality of support posts 15. In the preferred embodiment 10, the support posts 15 comprise a central support 17 and a number of outer supports 19 that are preferably arranged symmetrically around the central support 17. As can be seen in FIG. 1, the top plateau portion 21 of each support post 15 is tapered to conform to the inner curvature and height of the shell 13. The purpose of the support posts 15 is to provide buttressing support for the shell 13 which is exposed to constant, pounding downward forces exerted by vehicles traveling thereon. The support structure 11 has a flat base portion 23 and peripheral lip 25 at the support structure's outer perimeter. The support structure 11 is provided with a flat base portion 23 so that the ground marker 10 can be positioned on and bonded to a ground surface. The bonding to the ground surface can be achieved by the use of any suitable bonding agent. The openings 27, more clearly seen in FIG. 3, provided at the base of the support posts 15 enable a bonding agent to secure the ground marker 10 more effectively to the ground.

The shell 13 may be attached to the support structure 11 by any conventional bonding method. Welding is one such method and is the preferred method. A strong adhesive may also be used to cement the shell 13 to support structure 11. The lip 25 located on the perimeter of the support structure 11 serves two purposes: First it provides a structure onto which the shell 13 may be fitted. Second the lip 25 acts to provide additional support for the shell 13 to resist outward forces caused by the weight of vehicles traveling over the ground marker 10. Without the support of the lip 25, the constant lateral forces tend to cause the shell 13 to separate from the support structure 11.

FIG. 3 is a cross-sectional view of the invention through line 3-3 of FIG. 2. As can be clearly seen, shell 13 is seated firmly against lip 25 of support structure 11. A protective coating 29 has been applied to the outer surface of shell 13. The coating 29 is preferably of ceramic composition. Ceramic has been found to be high in durability and is excellent in eliminating rust and corrosion. Additionally, ceramic is reflective and maintains its reflectivity through time and harsh conditions. The major drawback of ceramic is that it is expensive. Another drawback of ceramic is that it is prone to cracking or fracturing apart when used in larger blocks. By producing a ground marker out of metal and coating it with ceramic, much of the expense of ceramic may be minimized, as well as its tendency to fracture. The protective coating can also be made from plastic, glass, polymer plastics, Teflon (a trademark of DuPont Corp.), or other suitable material however, Teflon is also useful because it is chemical-resistant and moisture-resistant.

The marker of the preferred embodiment of this invention can be easily and inexpensively manufactured. The shell 13 and the support structure 11, both preferably made of metal, can be formed either by molding or by stamping. The shell 13 and support structure 11 are then coupled and preferably welded 34 together.

To provide additional support for the ground marker, filling 31 can be injected through an opening 33. This is best viewed in FIG. 3A. The filling may be thermoplastic material, polymer plastic material, organic resinous, or any one of the materials known in the art, that is fluid in form when injected into the marker and hardens into a solid state with cooling or the passing of time. The filling 31 fills the space between the support structure 11 and the shell 13. When hardened, the filling 31 provides a solid mass that provides additional support for the shell 13 against the weight of vehicles. The support posts 15 in the filling 31 enable the filling 31 to resist cracking and breakage.

The dimensions of the marker of the present invention may vary. For highway use, the diameter of the support structure 11 may range from 10-15 cm and the thickness of the ground marker, i.e. the distance from the flat base portion 23 to the part of the shell 13 directly opposite thereof may be 1 to 3 cm. Ground markers for airport use may be somewhat larger for increased visibility.

The number and arrangement of the support posts 15 may also vary, depending on the size of the ground marker and the circumstances under which the ground marker may be used. FIG. 5 illustrates an alternative arrangement of support posts 15.

FIG. 6 illustrates another manner of coupling the support structure 11 with the shell 13. Here the shell 13 is fitted over the periphery of the support structure 11 and the two components are then bonded 12 together, preferably by welding 34, near the point of contact. The support structure 11 lacks the lips 25 as described earlier and therefore the resulting ground marker 35 is not quite as structurally sound as the preferred embodiment 10 of the invention. Nevertheless, ground marker 35 is durable, inexpensive to produce, highly utilitarian in view of the prior art, especially if welded.

A retro-reflecting device 41 (see FIG. 7) can also be fitted onto the shell 13 for those situations when it is desirable for light to be reflected back to its source. This can be seen in FIG. 6.

In a further embodiment of the invention (see FIG. 8), the ground marker 50 may comprise a shell 53 with partial base 55. Shell 53 constitutes a one-piece enclosure into which filling 31 may be injected either in situ or at an alternative site of manufacture. Protective coating 51, again preferably of ceramic material, is applied to the exposed exterior portions of shell 53 to provide reflectivity and to protect the metal shell 53 against rust and corrosion. This ground marker 50 is simple and inexpensive to produce and yet is durable enough to withstand the elements.

In another embodiment of the invention 60, depicted in FIG. 9, a flat base 62 is coupled with the shell 63 with a separate support structure 61 contained within the chamber formed by the coupling of the shell 63 with the flat base 62. The lip 25 is formed on the flat base 62 rather than on the support structure 61 as in the previously described embodiments. Bonding 12 is applied to the area where the support structure 61 and flat base 62 couple together. If desired, filling 31 can be injected into the space between shell 63 and support structure 61 through aperture 65 which must extend through both flat base 62 and support structure 61. Embodiment 60 may be desired where a flat base is needed for the ground marker.

The drawings and the foregoing description are not intended to represent the only form of the invention in regard to the details of its construction and manner of operation. In fact, this apparatus and method can be adapted to a great many different situations. Changes in form and in the proportion of parts, as well as the substitution of equivalents, are contemplated as circumstances may suggest or render expedient; and although specific terms have been employed, they are intended in a generic and descriptive sense only and not for the purpose of limitation, the scope of the invention being delineated in the following claims:

The invention is claimed as follows:

1. A ground marker comprising:

a support structure, said support structure having an outer perimeter, a retaining lip disposed along said perimeter, a base portion, and a plurality of support posts which project from said base portion;

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UNITED STATES PATENT AND TRADEMARK OFFICE

US005681128A

United States Patent [19]

[11] Patent Number: 5,681,128

Morgan et al.

[45] Date of Patent: Oct. 28, 1997

[54] SURFACE MARKING SYSTEMS

[75] Inventors: Noredin Morgan, Billerica; Ernest P. Liporto, North Andover, both of Mass.

[73] Assignee: Illinois Tool Works Inc., Glenview, Ill.

[21] Appl. No.: 391,215

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[52] U.S. CL 404/12; 404/15; 156/330

[58] Field of Search 404/9-16, 77, 404/79, 94, 95; 156/330

[56] References Cited

U.S. PATENT DOCUMENTS

3,911,412	12/1961	Harrington et al.	94/1.5
4,146,633	3/1979	Eigenmann	428/283
4,185,132	1/1980	Gurney	427/137
4,195,945	4/1980	Heenan	404/16
4,203,878	5/1980	Bauer	260/18 EP
4,208,090	6/1980	Heenan	350/61

4,500,703	2/1985	Guthrie et al.	523/400
4,846,905	7/1989	Tarbutton et al.	525/65
5,001,193	3/1991	Golden	525/109
5,078,538	1/1992	Montalbano	404/9
5,277,513	1/1994	Flanagan	404/16
5,419,651	5/1995	Fei	404/14
5,453,450	9/1995	Kinzer et al.	522/18

Primary Examiner—James Lischora

Attorney, Agent, or Firm—Synthesivetti & Lechner

[57] ABSTRACT

Disclosed are surface markings systems and methods of producing such systems in which the marker is at once permanently and strongly affixed to the surface during normal use thereof but efficiently and economically removable from the surface during repair or recycling operations. The preferred systems utilize a reactive adhesive which, when cured, has a lap shear strength of at least about 1000 psi at about 25° C. and a lap shear strength of about 50 psi or less at least one temperature in the temperature range of from about 70° C. to about 180° C. The use of curable epoxy adhesives is described.

23 Claims, 3 Drawing Sheets

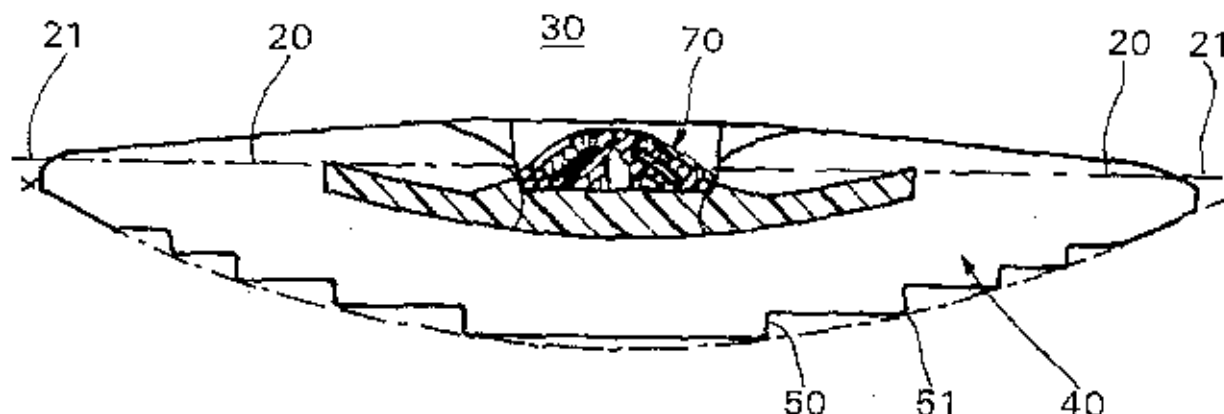


Fig. 1

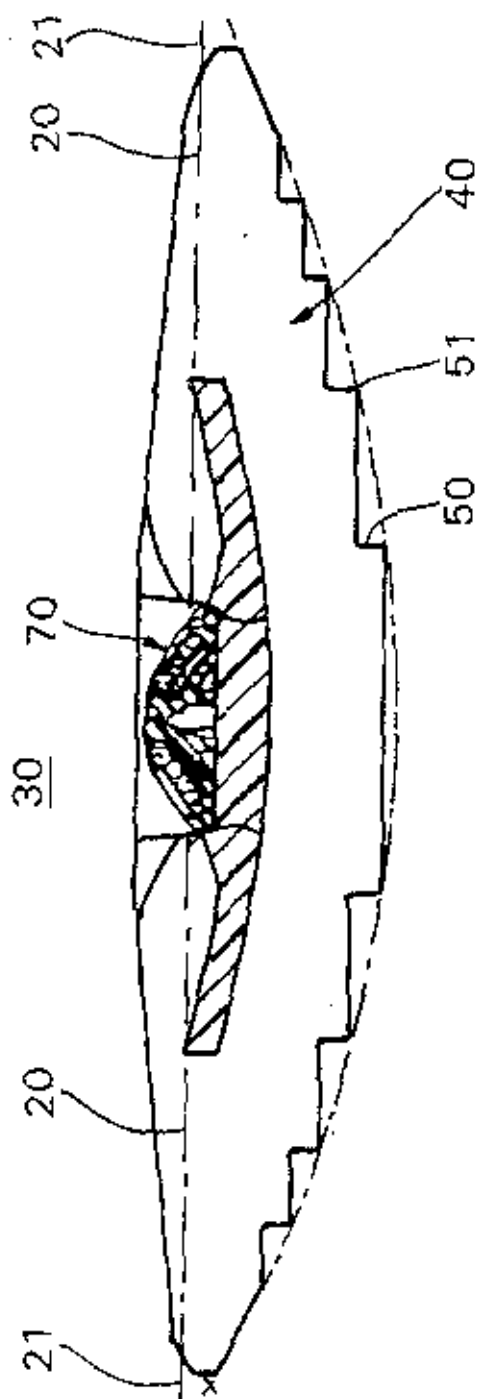
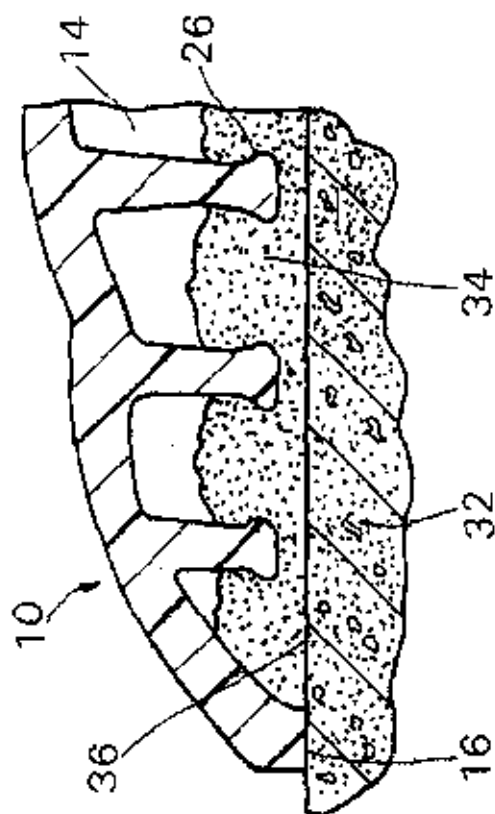


Fig. 2



be marked; a surface marker; and a cured adhesive composition bonding the marker to the surface. For the purpose of convenience, the features and characteristics of each of these components are described under separate topic headings below. It will be appreciated, however, that this form of presentation is for convenience only and that the scope and nature of the present invention resides in the combination of these components as defined by the claims appended hereto.

A. The Surface

In view of the disclosure and teachings contained herein, those skilled in the art will recognize that the present invention is readily adaptable for use in connection with a wide variety of surfaces to be marked. In general, however, the preferred surface comprises the surface of a relatively immobile structure. For example, the surface to be marked in accordance with the preferred aspects of the present invention includes both permanent and temporary roadway and walkway surfaces. In addition, it is contemplated that the present invention may be beneficially used in connection with the marking of construction barriers and the like.

The preferred surfaces of the present invention are surfaces formed from relatively hard, wear-resistant materials, such as asphalt, concrete, brick, wood, metal, plastic and the like.

B. The Markers

Surface markers having a wide variety of configurations and constructions, and formed from a wide variety of materials, are known and available to those skilled in the art, and it is contemplated that all such surface markers are adaptable for use in connection with the present invention. The present invention is especially well-adapted, however, for use in connection with road surface markers of the type which are at least partially embedded in the road surface. Such markers are commonly used in connection with the provision of snow plowable pavement markers of the type illustrated in FIG. 1 hereof. In use, the pavement marker 30 is fixedly embedded in the pavement 20 of a roadway so as to project above the pavement surface 21 and be visible from oncoming vehicles traveling in either direction along the roadway. Such a pavement marker includes a base member, generally designated as 40, which is formed of a relatively high strength material, such as prolitic ductile iron. The base member supports thereon a retro reflector, designated generally as 70. Snow plowable pavement markers of this type are described in detail in U.S. Pat. Nos. 4,195,945 and 5,277,513, each of which is incorporated herein by reference. The bottom surface of the marker 30 includes step portions 50 which define a plurality of tooth-like points 51 and which function to retard slipping or shifting of the base member 40 with respect to pavement 20 when installed with the adhesive component of the present invention. The adhesive (not shown for convenience of illustration) is located between the bottom portion of the marker base 40, and the surface of the cut-out portion of the roadway.

It is also contemplated that the present invention is adaptable for use in connection with roadway markers that are not embedded in the roadway pavement but rather are adhesively fixed directly to the traffic-bearing surface of the roadway. A marker of this type is illustrated in FIG. 2. The illustrated marker is exemplary of markers commonly used as temporary or construction zone markers intended to be installed for relatively short periods of time where rerouting of traffic may be required. Markers of this general type are described in detail in U.S. Pat. Nos. 4,208,090 and 5,078,538, each of which is incorporated in its entirety herein by reference.

The highway marker illustrated in FIG. 2, which is indicated generally as 10, includes downwardly depending

wall portions 14 adapted to accept the adhesive and increase contact between the marker 10 and the roadway surface 36. Each wall preferably includes outwardly displaced flanges 26 which assists in positive interlock between the highway marker 10 and the adhesive material 34.

C. The Reactive Adhesive An important and critical aspect of the systems in accordance with the present invention is the provision of a reactive adhesive having temperature-dependent strength properties that fall within certain preferred values. As used herein, the term "reactive adhesive" refers to adhesive compositions which develop bonding properties as a result of curing or some other form of reaction mechanism. By way of contrast, thermoplastic or "hot melt" adhesive compositions are not reactive adhesives as that term is used herein.

Applicants have discovered that cured adhesives can be formulated to have shear strength properties that enable the maintenance of a high strength, durable bond of the marker to the surface at operating temperatures while being debondable at moderately elevated temperature conditions. For embodiments in which the surface marking system comprises a roadway marking system, the preferred surface operating temperature range is from about -40° C. to about 50° C. As used herein, the term "moderately elevated temperature" refers to temperatures which are above about the upper end of the surface operating temperature range and preferably no greater than about 400 percent above the upper end of the surface operating temperature range. Applicants have found that the formulation and use of such reactive adhesive compositions makes it possible to form surface marking systems which perform exceptionally well in even the severest of normal use conditions while possessing the ability to debond effectively, efficiently and economically. It will be appreciated by those skilled in the art that while such a combination of properties is highly desirable, it has not been available in prior roadway marking systems.

Applicants have found that the use of a reactive adhesive having a lap shear strength of at least about 1000 psi at about 25° C. is generally capable of producing a bond between a roadway marker and the roadway surface that is sufficiently strong to ensure that the marker remains intact during normal use, including any required snow or ice removal operations. A surprising and unexpected aspect of applicants' discovery, however, is that such reactive adhesives can be formulated to undergo a substantial decline in strength properties in a temperature range of from about 70° C. to about 180° C. Such a property has exceptional advantage in connection with the present invention insofar as it provides the capability of using efficient and economical mechanisms and techniques to "debond" the adhesive such that the marker may be easily removed from the surface. More specifically, the reactive adhesives of the present invention are preferably characterized by a lap shear strength of at least about 1000 psi at about 22° C., and preferably over the entire range of temperatures of from about -40° C. to about 50° C., while also possessing a lap shear strength of less than about 500 psi, and even more preferably less than about 250 psi, at at least one temperature in the temperature range of from about 70° C. to about 180° C. Unless otherwise indicated herein, the reference to the strength properties of the reactive adhesive refers to the property of the adhesive after the adhesive has been cured. Furthermore and unless otherwise indicated, the lap shear strength values described and reported herein refer to the lap shear strength as determined in accordance with ASTM-D 1002.

(19)



JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

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(71) Applicant: NIPPON MEKTRON LTD

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(72) Inventor: SAITO KAZUMI

(54) TRAFFIC SIGN

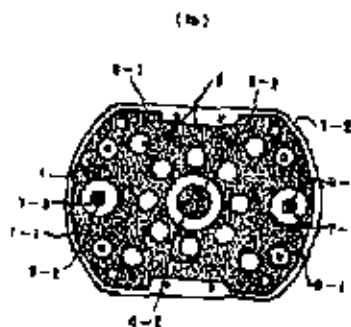
(57) Abstract:

PROBLEM TO BE SOLVED: To arbitrarily select between an adhesive fixing method and a bolting method in fixing a sign post to the road surface by clamping a lower flange part of the sign post by upper and lower bases provided with an adhesive reservoir and a bolt passing hole and fixing the same.

SOLUTION: A lower flange part 2-1 of a sign post 2 is clamped by an upper base 1-1 and a lower base 1-2 and fastened and fixed by a fastening screw. The base 1 is provided with an adhesive reservoir 4 and a rib 5 formed on the lower surface, a vertical passing hole 6 formed in the central area, and plural vertical passing holes 7 formed in the peripheral edge thereof. Thus, the adhesive reservoir 4 and the vertical passing holes 6, 7 are filled with an adhesive 9 to fix the traffic post 2 to the road surface R by adhesion, or without the adhesive 9, an anchor having a female screw is buried in the road surface R and a bolt is passed through the vertical passing hole 6 or 7 to fasten

and fix the sign post 2 to the road surface R. Accordingly, in fixing the sign post 2 to the road surface R, an adhesive fixing method or a bolting method may be arbitrarily selected.

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US006079899A

United States Patent [19]
Green[11] **Patent Number:** **6,079,899**
[45] **Date of Patent:** **Jun. 27, 2000**[54] **RAISED ROAD MARKER**[75] **Inventor:** John L. Green, Sedro Woolley, Wash.[73] **Assignee:** Winter Beaver, Inc., Olympia, Wash.[21] **Appl. No.:** 09/074,954[22] **Filed:** May 8, 1998**Related U.S. Application Data**[63] **Continuation-in-part of application No. 08/853,332, May 8, 1997.**[51] **Int. Cl.⁷** **E01F 9/06**[52] **U.S. Cl.** **404/12; 404/15; 116/63 P**[58] **Field of Search** **404/9, 12, 14, 404/15, 16, 10, 11; 116/63 C, 63 P**[56] **References Cited****U.S. PATENT DOCUMENTS**

1,789,525	1/1931	Hoff	
2,649,982	1/1955	Batterson	94/1.5
3,332,327	7/1967	Heenan	94/1.5
3,478,714	11/1969	Kents	116/63
3,575,092	4/1971	Freeman	404/10
3,836,275	9/1974	Fiach	404/13
4,232,979	11/1980	Johnson, Jr. et al.	404/16
4,340,319	7/1982	Johnson, Jr. et al.	404/16
4,498,733	2/1985	Flanagan	359/531
4,596,622	6/1986	Heenan et al.	156/275.5
4,653,955	3/1987	Racs	404/14
5,078,536	1/1992	Montalbano	404/9
5,104,256	4/1992	D'Avele	404/14
5,199,814	4/1993	Clark et al.	404/10
5,255,995	10/1993	Branning	404/14
5,310,279	5/1994	Lindner	404/14

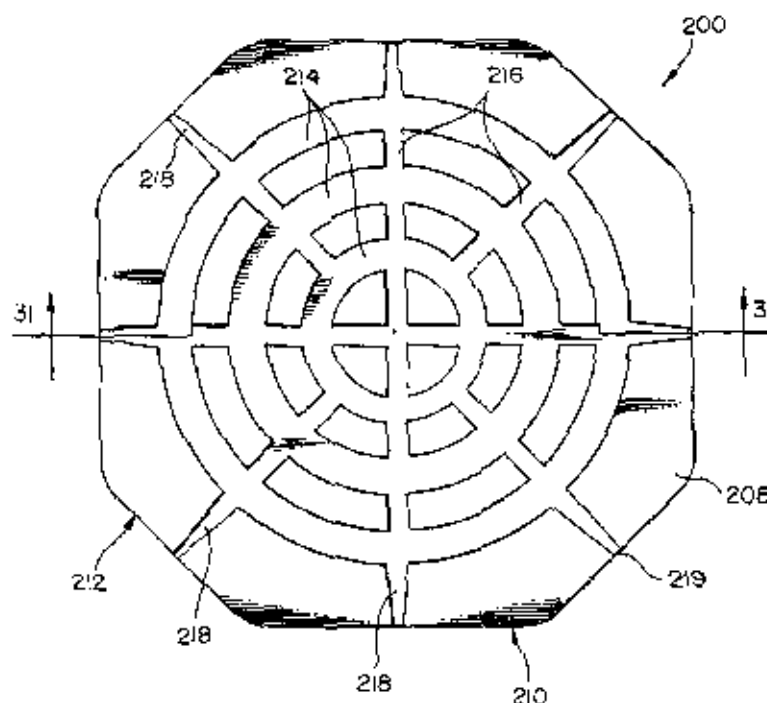
5,340,231	8/1994	Stecre et al.	404/14
5,354,143	10/1994	Lindner	404/9
5,392,728	2/1995	Speer et al.	116/63 R
5,397,617	3/1995	Chen	428/66
5,425,596	6/1995	Stecre et al.	404/14
5,449,244	9/1995	Sandino	404/14
5,451,118	9/1995	Wilkins et al.	404/6
5,470,170	11/1995	Lindner	404/9
5,529,429	6/1996	Pelegrin	404/9
5,662,430	9/1997	Lee	404/15
5,667,334	9/1997	Boyce	404/9
5,749,673	5/1998	Kulp et al.	404/10
5,853,263	12/1998	Green	404/94
5,888,016	3/1999	Ahn	404/10
5,908,262	6/1999	Ahn	404/9

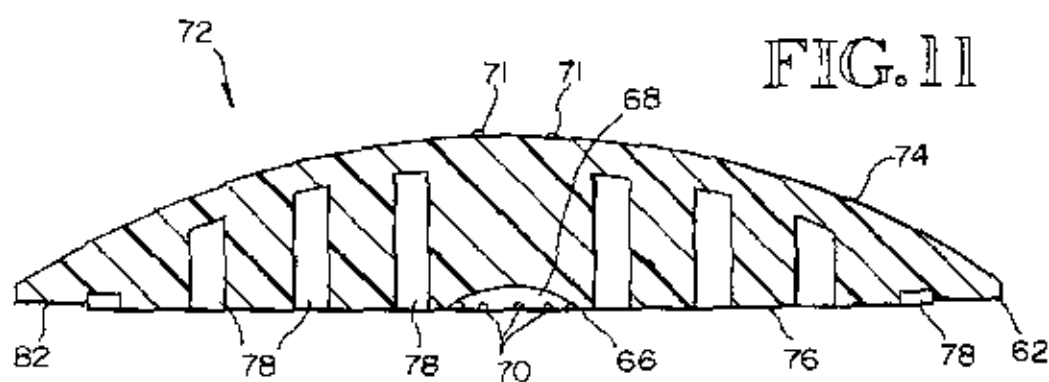
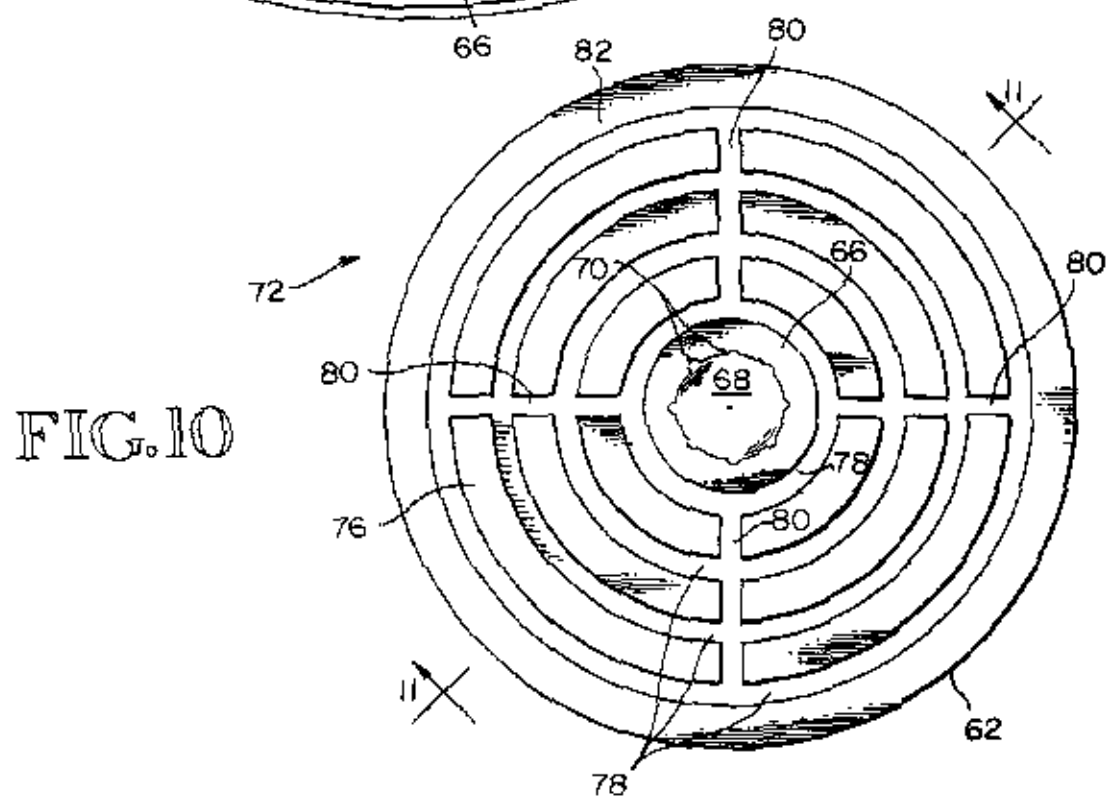
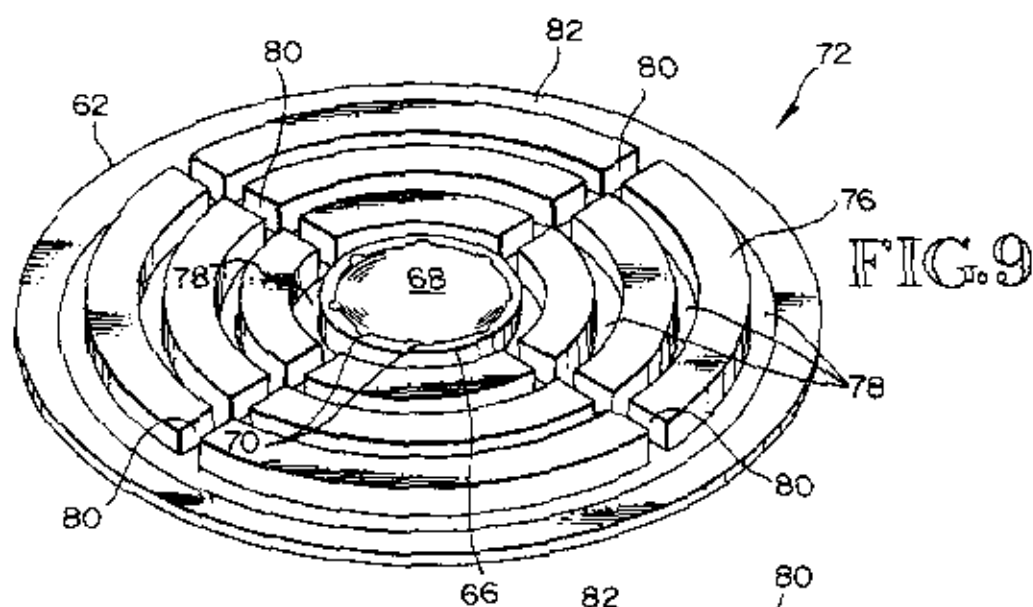
FOREIGN PATENT DOCUMENTS

2690468 10/1993 France.

Primary Examiner—James A. Lisehora
Attorney, Agent, or Firm—Joan H. Pauly[57] **ABSTRACT**

A raised road marker has a flat bottom surface with an outer periphery. At least one cavity opens onto the bottom surface laterally inwardly of the periphery and extends upwardly into the marker body. A venting groove extends along the bottom surface from the cavity to the periphery to provide a vent for air trapped in the cavity when the marker is urged into a pool of adhesive to secure the marker to a roadway. The venting of air provides a stronger bond between the marker and adhesive. Markers having a rounded top surface may be provided with a flat bottom portion with abutment surfaces to facilitate movement of a line of the markers in an automated system.

12 Claims, 12 Drawing Sheets



RAISED ROAD MARKER

RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 08/853,332, filed May 8, 1997, and entitled "Raised Road Marker".

TECHNICAL FIELD

This invention relates to raised road markers and, more particularly, to a marker having a bottom vent passageway to improve adhesive bonding to a roadway and abutment surfaces to facilitate use in an automated installation system.

BACKGROUND INFORMATION

The systems currently in use for installing raised road markers on a roadway have a number of serious drawbacks. These drawbacks include high labor requirements and thus high labor costs, slow speed of installation and consequent low productivity, and especially worker safety concerns. One of the primary sources of concerns for worker safety is the necessity of having a worker stationed in a position relatively exposed to traffic. The installation procedures currently in use are not automated or are incompletely automated. Therefore, a worker is commonly placed in a position adjacent to the roadway to permit the worker to manually place adhesive and/or markers onto the roadway. If, as commonly is the case, the roadway is not closed to traffic, traffic passes in close proximity to the worker. When hot melt adhesives are used, the worker is also subjected to the hazard of handling high temperature materials. In addition, the lack of automation is not conducive to accurate installation of markers because of the vulnerability of the procedures to human error.

The most common type of raised road marker currently in use is a round domed marker with a diameter of about four inches. This type of marker is popularly known as a "turtle". Turtle markers have been in use for a number of years and are usually installed by hand. The basic design of the turtle marker has remain unchanged. The goal of the invention is to provide an improved marker with improved functioning whether installed by hand or by an automated system, and further to provide a marker with improved features specifically adapted to automated systems.

SUMMARY OF THE INVENTION

According to an aspect of the invention, a raised road marker is provided with a venting groove. The marker comprises a body having a substantially flat bottom surface with an outer periphery. At least one cavity opens onto the bottom surface laterally inwardly of the periphery and extends upwardly into the body. The venting groove extends along the bottom surface from the cavity to the periphery to provide a vent for air trapped in the cavity when the marker is urged onto a pool of adhesive. As used herein, the term "pool of adhesive" refers to a deposit of adhesive on a surface, such as a roadway, for the purpose of securing a road marker to the surface. As is known in the art, such deposits typically cover a surface area slightly larger than the footprint of the marker to be installed and have a thickness sufficient to secure the marker to the surface when the adhesive cures.

The details of the configurations of the cavity and venting groove may be varied. Preferably, the venting groove comprises a plurality of spaced groove sections. The sections are tapered to create an increase in air pressure at the outer

periphery of the bottom surface as air exits the groove section. In one embodiment of the groove sections, the sections are arranged symmetrically on the bottom surface. Each section extends from the periphery toward a center portion of the bottom surface and is tapered from an inner portion of the section to the periphery to create the desired increase in air pressure at the periphery. In another embodiment, the groove sections are arranged in two pairs of collinear groove sections. The pairs are substantially perpendicular to each other. Each section extends to the periphery and is tapered from an inner portion to the periphery to create the increase in air pressure. Markers constructed according to the invention may include either the symmetrical arrangement of groove sections or the collinear arrangement, or may have groove sections that are both symmetrical and arranged in collinear pairs.

Currently, in the preferred embodiments, the cavity comprises a plurality of radially spaced concentric annular slots, and a plurality of radial slots interconnecting the annular slots.

According to another aspect of the invention, a raised road marker is provided with abutment surfaces. The marker comprises a body having a top portion and a bottom portion. The top portion has a rounded top surface and a substantially circular lower periphery. The top portion interfaces the bottom portion at the lower periphery. The bottom portion has a substantially flat bottom surface, and at least one pair of opposite substantially vertical abutment surfaces. Each abutment surface has at least two horizontally spaced collinear abutment areas.

Preferably, each abutment surface comprises a continuous substantially flat surface. The abutment areas are each part of the continuous substantially flat surface. In the currently most preferred embodiment of the domed marker, the bottom portion has an octagonal plan configuration, and two pairs of opposite substantially vertical abutment surfaces. Each abutment surface extends along a different side of the octagonal configuration. The pairs of abutment surfaces are perpendicular to each other. The marker with the abutment surfaces preferably also includes the cavity and venting groove combination described above.

The abutment surface feature of the domed marker allows the marker to be used more efficiently and reliably in various types of automated installation systems. In a system in which a plurality of markers are in abutting engagement and must be pushed along a linear path, the abutment surfaces help prevent the markers from deviating from the desired path. The abutment between each adjacent pair of markers has at least two spaced points of contact to prevent rotation of each marker with respect to the abutting marker. The abutment surface configuration also allows domed and square reflective markers to be combined in a single stack.

The tapered groove section feature of the invention both aids the automated installation of the marker and helps maximize the strength of the bond of the marker to a roadway. When the marker is ejected downwardly in an automated system, it falls toward the pool of adhesive on the roadway. As the air under the marker compresses, there is a tendency for the marker to tilt away from a horizontal orientation. Such tilting is undesirable. The tapered groove sections allow air to escape along the bottom of the marker. The tapering of the groove sections and the arrangement of the sections provides balanced side forces around the periphery of the marker to counteract the forces tending to tilt the marker. When the marker has contacted and moved downwardly into the pool of adhesive, the tapering of the groove

sections increases the pressure of the exiting air at the periphery to maximize the completeness of the expulsion of air in the cavity. Once the air has been expelled from the cavity, hot, still liquid adhesive is sucked into the ends of the groove sections by the vacuum created by the upward force of the adhesive on the marker when the downward force of the marker has been dissipated. This creates a complete seal around the periphery of the marker and a complete interlocking of the pool of adhesive around and under the marker and the adhesive that has entered the cavity. The adhesive in the cavity and the adhesive around and under the marker forms a continuous body to firmly anchor the marker onto the roadway.

The marker of the invention has a number of advantages. The venting feature of the marker of the invention improves the performance of installed markers, whether the markers have been installed by hand or by fully or partially automated systems. Prior art markers typically have cavities opening onto a flat bottom surface of the marker in order to facilitate and improve manufacturing procedures and help decrease the cost of the marker. Markers with cavities use less material and therefore tend to be less expensive to produce. The presence of the cavities provides even cooling of a molded marker body so that the molded body holds its shape during manufacture until it has fully cured. The resulting marker accurately retains the desired shape and is stronger than it would be with less even cooling.

With regard to conventional markers, the lower cavities have the unintended and undesirable effect of decreasing the strength of the bond between the marker and adhesive securing the marker to a roadway. Air trapped in the cavities when the marker is installed causes the center portion of the lower surface to adhere poorly. An accomplishment of the invention is the recognition of this problem and the provision of a solution to the problem. The venting groove of the invention allows air trapped in the cavities when the marker is urged into a pool of adhesive to escape from the cavities and exhaust out through the venting groove. As this occurs, the surface resistance of the adhesive pool is overcome and adhesive enters the cavities to fill the void created by the escaping air. The ultimate result is a much stronger adhesive bond in which the entire lower surface is strongly bonded to the adhesive and the adhesive that has moved up into the cavities interlocks the marker with the body of cured adhesive. This provides a highly reliable bond of the marker to the roadway. The increased reliability of the bond decreases the frequency with which markers need to be replaced and thereby helps decrease the overall cost of installing and maintaining markers on a roadway.

The improved bond of the marker to the roadway achieved by the invention results from the cooperative functioning of the cavity and the venting groove. In prior art markers with cavities but no venting groove, the cavities serve to reduce the strength of the bond. The addition of the venting groove not only prevents this negative functioning of the cavity but also allows the cavity to have a positive effect to increase the strength of the bond. Thus, the invention also can achieve improved bonding of markers with designs that previously have not included a bottom cavity. By providing such markers with the combination of the bottom cavity and the venting groove, the bonding of the marker is made stronger since the adhesive interlock with the cavity reinforces the adhesive bond to the lower surface.

These and other advantages and features will become apparent from the detailed description of the best modes for carrying out the invention that follows.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, like element designations refer to like parts throughout, and:

FIG. 1 is a schematic pictorial view of a trailer portion of a vehicle on which elements of automated marker installation apparatus are mounted.

FIG. 2 is a pictorial view of the installation head portion of the apparatus shown in FIG. 1 with foreground portions omitted and upper angled feed tubes added.

FIG. 3 is an enlarged pictorial view of the installation head shown in FIG. 2.

FIG. 4 is a pictorial view of the installation head floor and slide shown in FIG. 3, illustrating the setting rams and slide rams schematically.

FIG. 5 is a pictorial view of blocking members that may be used in the loading chamber.

FIG. 6 is a bottom plan view of a round marker incorporating a first embodiment of the invention.

FIG. 7 is like FIG. 6 but omits the indexing feature.

FIG. 8 is a cross-sectional view taken along the line 8—8 in FIG. 7.

FIG. 9 is a pictorial view looking toward the bottom of a second embodiment of the invention.

FIG. 10 is a bottom plan view of the marker shown in FIG. 9.

FIG. 11 is a cross-sectional view taken along the line 11—11 in FIG. 10.

FIG. 12 is a pictorial view looking toward the bottom of a third embodiment of the invention.

FIG. 13 is a sectional view taken along the line 13—13 in FIG. 12.

FIG. 14 is an exploded pictorial view of a fourth embodiment of the invention.

FIG. 15 is a sectional view taken substantially along the line 15—15 in FIG. 14 with potting material added.

FIG. 16 is a simplified pictorial view of a round marker illustrating a first embodiment of the indexing feature.

FIG. 17 is a top plan view of the marker shown in FIG. 16.

FIG. 18 is a bottom plan view of the marker shown in FIG. 16.

FIGS. 19 and 20 are like FIGS. 17 and 18 except that they show another embodiment of the indexing feature.

FIG. 21 is a top plan view of a modified form of a reflective square marker.

FIG. 22 is a sectional view of a modification of the marker shown in FIGS. 16—18.

FIG. 23 is a partially schematic sectional view of another modification of a round road marker and an associated feeding and indexing mechanism.

FIG. 24 is a bottom plan view of the marker shown in FIG. 23.

FIG. 25 is a sectional view of installation apparatus including a setting ram, with parts shown in elevation.

FIG. 26 is a bottom plan view of the setting ram head shown in FIG. 25.

FIG. 27 is an exploded pictorial view of orientating apparatus for use with indexed markers.

FIG. 28 is a pictorial view looking toward the top of a marker including the abutment surface feature of the invention.

FIG. 29 is a top plan view of the marker shown in FIG. 28.

FIG. 30 is a bottom plan view of the marker shown in FIGS. 28 and 29.

flush with the top of the floor 34 by the bomb bay doors 48. The bomb bay doors 48 support the marker until the setting ram 42 is activated to force the marker down through the bomb bay doors 48 and onto the pavement.

FIG. 6 illustrates a first embodiment of the marker 50. FIGS. 7 and 8 illustrate a modified form of the marker 50' shown in FIG. 6. As shown in FIGS. 7 and 8, the marker 50' lacks the indexing feature. Referring to FIGS. 7 and 8, the marker 50' has a round molded plastic body with a domed, i.e. rounded, top surface 52 and a flat bottom surface 54. In accordance with the invention, the marker 50' includes at least one cavity opening onto the bottom surface laterally inwardly of the outer periphery of the bottom surface. The cavity extends upwardly into the marker body and has the purposes discussed above. The marker 50' shown in FIGS. 7 and 8 has a plurality of cavities 56 arranged in a known checkered pattern. Each of the cavities 56 opens onto the bottom surface 54 laterally inwardly of the periphery 62 of the marker body and extends upwardly into the body. The cavities 56 are spaced apart. A plurality of connecting grooves 58 extend between adjacent cavities 56 to interconnect the cavities 56. As best seen in FIG. 8, the connecting grooves 58 are vertically shallow relative to the cavities 56.

An important feature of the invention is a venting groove that extends along the bottom surface of a raised marker from a laterally inward cavity or cavities to the periphery of the bottom surface. The venting groove provides a vent for air trapped in the cavity or cavities when the marker is urged onto a pool of adhesive. Referring to FIGS. 7 and 8, the venting groove in the embodiment shown therein comprises a plurality of spaced venting groove sections 64. Each section 64 extends from a different one of the cavities 56 to the outer periphery 62. The section 64 extends along a peripheral portion 60 of the bottom surface 54 surrounding the laterally inward portion onto which the cavities 56 open. Each of the cavities 56 has a substantially square cross section and is connected to each adjacent cavity by a connecting groove 58. Each cavity 56 in the center portion of the cavity pattern has four connecting grooves 58 extending therefrom and spaced apart 90°. This same pattern applies to each cavity 58 except those cavities that border on the peripheral portion 60. Each of the bordering cavities 56 has fewer than four connecting grooves 58 associated therewith but has at least one such connecting groove 58. The effect of the pattern is to interconnect all of the cavities 56 and connect each cavity 56 to the venting groove sections 64, to provide a vent for air trapped in each cavity 56.

As shown in FIGS. 7 and 8, the groove sections 64 are preferably arranged in two pairs of collinear groove sections 64. The pairs of grooves 64 are perpendicular to each other. In each pair, each of the two groove sections 64 extends along a common line from a cavity 56 to the peripheral edge 62. This provides a straight pathway for escaping air and helps to maintain a smooth nonturbulent flow of the air. As shown, the groove sections 64 are not evenly spaced around the circumference of the bottom surface 54 but are as evenly spaced as is possible in an arrangement of collinear pairs of venting groove sections and the known checkered cavity pattern. As can be seen in FIG. 8, the cavities 56 are relatively deep to maintain a substantially constant thickness of the marker body between the top surface 52 of the marker 50' and the inner ends of the cavities 56. The connecting grooves 58 have a constant relatively shallow depth, and the venting groove sections 64 are shallower than the connecting grooves 58. Preferably the venting groove sections 64 are tapered, as described below.

Referring to FIG. 6, the marker 50' shown therein further includes the indexing feature of the invention, described

further below. The indexing feature requires that the bottom surface 54' be modified. The bottom surface 54' includes a center flat 66 that is concentric with the bottom surface 54 and interrupts the center portion of the cavity pattern. The central portion of the flat 66 has a depression 68 formed therein. A plurality of circumferentially spaced depressions 70 are formed symmetrically around the perimeter of the central depression 68. When the marker 50' is placed in a stack of markers above another marker, the spaced depressions 70 accommodate complementary projections or "dimples" on the upper surface of the lower marker to interlock the two markers. The curvature of the upper surface of the lower marker is accommodated by the central depression 68.

FIGS. 9-11 illustrate a second embodiment of the marker 72. Referring to FIGS. 9-11, the marker 72 has a domed upper surface 74 and a flat bottom surface 76. The marker 72 differs from the marker 50' shown in FIG. 6 primarily in the cavity arrangement on the bottom surface 76 and the venting groove configuration. In the marker 72, the cavity comprises a plurality of, preferably four, radially spaced concentric annular slots 78. A plurality of radial slots 80 interconnect the annular slots 78. As shown, there are four radial slots 80 spaced around the bottom surface 76 at intervals of 90°. All portions of the annular slots 78 are interconnected by the radial slots 80 to provide full venting of the annular slots 78. The arrangement of annular and radial slots is the currently preferred configuration of the cavity because it provides greater resistance to shear forces.

The venting groove in the embodiment of FIGS. 9-11 takes the form of a peripheral groove 82 extending all the way around a peripheral portion of the bottom surface 76. The peripheral groove 82 extends radially outwardly from the radially outwardmost annular slot 78 to the outer peripheral edge 62 of the marker body. As can be seen in FIG. 11, the annular slots 78 are progressively shallower moving from the center of the bottom surface 76 toward the periphery. This arrangement is necessary because of the domed configuration of the upper surface 74. The peripheral venting groove 82 is shallower than the outermost annular slot 78, which it surrounds and intersects. The groove 82 may be tapered, as described below.

Like the marker 50' shown in FIG. 6, the marker 72 shown in FIGS. 9-11 has an indexing feature. This feature includes the center flat 66, central depression 68, and circumferentially spaced depressions 70 discussed above in connection with FIG. 6. It also includes a plurality of projections or dimples 71 on the top surface of the marker 72. The arrangement and interconnection of the spaced depressions 70 and dimples 71 are discussed further below in connection with FIGS. 19 and 20.

FIGS. 12 and 13 illustrate a third embodiment of the marker 84, which is currently one of the preferred embodiments for reflective markers. The marker 84 has a body that includes an upper plastic outer shell 85 and a lower portion. The shell 85 is hollow, and the flat bottom surface of the marker 84 is formed by the lower portion and includes the cavity opening onto the bottom surface discussed above in connection with the other embodiments. Like most currently known reflective markers, the marker 84 shown in FIGS. 12 and 13 has a square bottom surface with each side having a dimension of about 4 inches. Each side of the shell 85 tapers inwardly as it extends upwardly from its bottom edge. Two opposite tapered sidewalls are formed by reflectors 86. Each reflector 86 is secured to the main portion of the shell 85 in a known manner.

The lower portion of the marker 84 is formed by potting material 88 that fills the hollow shell 85 and is substantially