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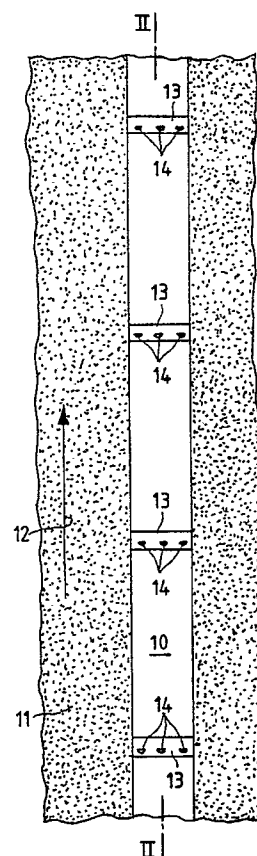
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(54) **Road signs having high refractive power.**

(57) Signalling stripes (10") on the roadway, realized with paint or similar material, include reflectors, or similar refracting objects, partly mixed up in said material at distances and with variable inclinations according to the type of roadway, the kind of signals, or other, in such a way to assure a good visibility of the stripes even in conditions of rainy or, generally, of poor visibility.

Fig.1



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" ROAD SIGNS HAVING HIGH REFRACTIVE POWER "

The present invention concerns road signs having high refractive power.

As well-known the road signs painted on the roadway include transversal, longitudinal signs and other signs.

The transversal and longitudinal signs consist of discontinuous and continuous stripes made with paint or other materials having the same efficacy; they must have such features to be well visible both by day and at night. It particular it is established that the traffic signs painted on the road surface which have to be visible during the night, must be refracting; to achieve such a purpose two different techniques are today employed, both using glass microballs which are premixed together with the paint or are sprayed on the wet painted stripes. The former of the said techniques is more economic than the latter but it does not offer the same efficacy; in fact the microballs come up on the surface of the stripes, only by degrees in the long run, owing to the continuous abrasive action of the road traffic. On the other hand, with the technique of the spray painting of the microballs, not only one has to support high costs but moreover the efficacy lowers rapidly because of the inevitable continuous removal of the microballs.

It is clear that the eventual combination of the two said techniques might produce good results in terms of wear and efficacy; but, besides having a higher cost, this last solution would not be suitable for guaranteeing the refraction of the incident rays, and so the visibility of the stripes, when it happens that these ones are under the thin layer of water which is present on the road when it rains or in conditions of high environment humidity.

As far as this problem, some solutions have been recently introduced and tested. They present some projections made transversally on the stripes, at regular intervals; these projections have enough height to emerge from said layer of water and so they are able to make the location of the signalling stripe right, since, like the stripe, they are made refracting by means of one of the above mentioned techniques.

However, the above seen problems pertinent to the continuous abrasive action of the traffic, to the consequent removal of the microballs and so to the loss of efficacy of the signal system in bad environment conditions remain also with this type of solution.

Therefore it is necessary to use further and expensive signalling refractive devices put at the side of the road or fastened on the roadway itself through adhesives or through plastic bulbs or similar devices directly fixed to the asphalt.

The purpose of the present invention is to propose a road signs painted on the road surface having high refractive power also in bad environment conditions and which maintain this particular efficacy for a long time.

Such a purpose is reached through signalling stripes, executed on the roadway with paint, or similar material having the same efficacy, characterized in that they comprise reflectors or similar refracting objects partly mixed in said paint or similar material at distances and with variable inclinations according to the type of roadway, the kind of signals or other, in such a way to reflect the luminous rays incident over it in the direction of coming of the vehicles on said roadway.

To understand better the features of the present invention non-limitative examples of realization are disclosed in the hereto- enclosed drawings, wherein:

Figure 1 shows a stretch of the signalling stripe according to the invention, seen from the above;

Figure 2 shows a view in section, realized according to the line II - II , of the stripe shown in figure 1;

Figure 3 shows an enlarged transversal part of the signalling stripe of figure 1;

Figure 4 shows an enlarged view in section, realized according to the line IV - IV of figure 3;

Figure 5 shows a view from the above of a second example of realization of a signalling stripe according to the invention;

Figure 6 shows a view from the above of a third example of realization of a signalling stripe according to the invention;

Figure 7 shows a different execution of the signalling stripe of figure 1;

Figure 8 shows an enlarged part of the signalling stripe shown in figure 7;

Figure 9 shows a further example of realization of a signalling stripe according to the invention, made transversally on the roadway instead of lengthwise like for examples shown in the figures from 1 to 8.

Referring to figure 1, it is indicated with 10 a signalling stripe put lengthwise on the roadway 11, near the right edge with regard to direction 12 of the traffic on the said roadway.

In this example, the stripe 10 represents a continuous stripe made with a yellow coloured paint, used to signal the border of the roadway, or to mark this one from the adjacent cycle tracks, from the sidewalks, from the laybies.

On said stripe 10, we can see some projections 13 put in a uniform way and arranged transversally on it; said projections are made up with the

same paint the stripe is painted with. Mixed up with the paint, corresponding to the projections 13, they are indicated some reflectors with 14, better illustrated in the following figures 3 and 4; said reflectors are lined up along the stripe 10, and they are turned, with their refracting part, towards the coming direction of the traffic along the roadway 11.

We can see the right inclination, both in the horizontal and the vertical plane, of reflectors 14 in the figures 3 and 4.

As well-known, the reflector 14 is formed by a biconvex spherical lens between two concentric surfaces 15 and 16, bent in such way that any incident ray over the benter surface, 15, reflects itself over the other surface, 16, which is silver, in such way to come back exactly to the going direction.

In the example shown in figure 4, the middle axis 17 of the reflector 14 is properly inclined up in such way that the angle of refraction of the reflector specified by the two lines, 18 and 19, passing through the common centre of bending 20 of the surfaces 15 and 16, affects the zone over the roadway 11.

In figure 3 we can also see that the said middle axis 17 lies on a plane whose horizontal trace, coinciding with the section line IV - IV, is inclined of an angle α compared with the direction of the stripe 10; even if it is not essential to the efficacy of the invention and even if it is not so useful as the vertical inclination shown in figure 4, it is preferable when the road traffic runs completely at the left of the stripe 10.

In particular, if the invention should be applied in situations where the road traffic runs only on a side of the signalling stripe, then it should be more useful to turn to the solution shown in figure 5, where one can note that the best position of the reflective angle of the reflectors is obtained not by the simple inclination of the reflectors themselves with respect to the stripe 10; in fact, it might be more immediate, and so cheaper, to put, during the realization of the stripe, the projections in an inclined position on it than to put each reflector in an inclined position on the projections 13. It can be obtained using a technique of production of the modulus type; in fact, maintaining the principle that according to the invention the reflectors are mixed up directly with the paint, the projections, with the reflectors, are, according to the said technique, prepared before and then, one dried, are put on the stripe during the making of this one or also, afterwards, glueing them.

For this reason, the above mentioned technique of production allows to realize easily signalling stripes in which the reflectors must be put according to some particular preferential directions.

A further example of these applications is

shown in figure 6, in which we can see that the projections 13 are put on the stripe 10 in turn in a perpendicular position and in an inclined one with respect to the direction of the stripes; such a disposition might be useful, for example, in the motor-way signalling system to signal the right margin of all the gangways for the usual road traffic, said margin being delimited by a yellow coloured continuous stripe and forming a boundary for a further emergency gangway situated at the right of said stripe which, for this reason, has to be visible from both the sides and with better efficacy of the side where the road traffic usually runs.

Other examples of the present invention, shown in the figures 7, 8, and 9, refer to the possibility to mix the reflectors, or the similar refracting objects, with the projections, 22, having a shape of half-spheres and disposed along the stripes 23 and 24; said projections 22 being made up with paint, or similar material, when the stripe is painted or preliminarily, like for the projections 13 above described.

The placing of the reflectors 14 into the material forming said projections 22 is made or when the stripe has being executed or when the projections themselves 22 are being produced.

It is very useful to employ spherical bowl projections 22 in the making of signalling stripes disposed transversally on the roadway; as well-known, they are situated near the cross-roads where there is no right of precedence and however they are situated where vehicles must stop, like in the entering areas to the motor-ways. Some projections 22, along the stripe, even if at regular intervals, would not be a great obstacle to the road traffic as some continuous projections, like projections 13, would be and they might contain a good whole of refracting reflectors according to the invention and in the meantime they would be a barrier of small obstacles useful to warn the driver when he gets over them.

Other examples of pratical embodiment of the present invention can be realized besides those above described.

This signalling system is very effective thanks to the use of devices with a great refracting power like the reflectors; moreover, it has the ability to maintain for a long time the said efficacy thanks to the fact that the reflectors themselves are well mixed up in the paint which constitutes the signal stripes; for this reason, we can have an economic cost of production compared with the signalling system in which are used projections or bulbs in a different material from the one used for the stripes.

Naturally, the high of the projections, both the transversal bump type or the spherical bowl type, can be varied; in fact, the real dimensions of the reflectors can be inferior to the ones of the

reflector-14 illustrated in figure 4, here enlarged to show it well. The numbers of the reflectors, or the similar refracting objects having equal efficacy, can be inferior or superior to the ones of the shown examples according to the applications and the environment in which they are put.

The distance also between the projections which contain the above refracting objects can be varied so that it can clearly indicates the presence of the signalling stripe in any environment condition and whatever the speed of the vehicle which is going along the roadway may be. A further advantage derived from the technique of the present invention is the swiftness to execute the stripes with the refracting objects and so the less obstacle to the road traffic which on the contrary, derives from the existing methods.

Claims

1. Traffic signs on the road surface realized with paint, or similar material having equal efficacy, characterized in that they comprise reflectors partly mixed up directly in said paint, or similar material, in such a way to reflect the luminous rays incident on said reflectors in the coming direction of the vehicles on the roadway where said road signs are used.
2. Traffic signs according to claim 1, in which said reflectors are partly mixed up with projections disposed along the signal stripes realized on the roadway, said projections being made up with the same paint or similar material with which said stripes are realized.
3. Traffic signs according to claim 2, wherein said projections are of the bump type disposed transversally for all the width of said stripes, said reflectors being mixed up with said projections in such a way that the spherical surface at greater curvature of said reflectors comes out from said projections from the coming direction of the vehicles on said roadway.
4. Traffic signs according to claim 3, in which said spherical surface at greater curvature of said reflectors is included in a cavity obtained on the outer surface of said projections.
5. Traffic signs according to claim 3, in which the radius of curvature of the outline of said projections is very inferior compared with the radius of the wheels of the vehicle going along the said roadway, in such a way that the touch area between said wheels and said projections is situated around the-top of said projections.

6. Traffic signs according to one of the claims from 3 to 5, in which said projections are placed on said stripe in an inclined direction compared with the direction of said stripe.
7. Horizontal traffic signal according to claim 2, in which said projections have a shape of spherical bowls, said projections including at least a reflector or a similar refracting object.
8. Traffic signs according to one of the claims from 2 to 7, in which a first series of said projections are situated along a stripe in a perpendicular position compared with the direction of said stripe and a second series of projections are situated in an inclined position compared with said direction, the components of said first series of projections are alternating to the components of said second series of projections.
9. Traffic signs according to claim 2 and following characterized in that said projections are obtained along said signal stripes when said stripes are executed on the roadway.

Fig.1

Fig.2

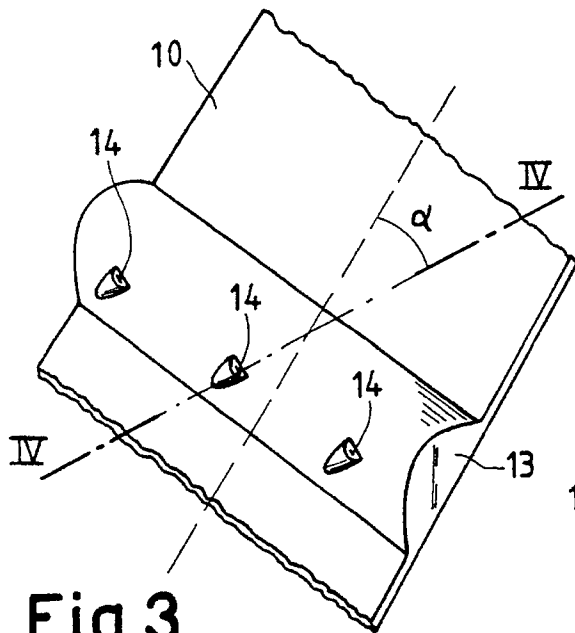


Fig.3

Fig.4

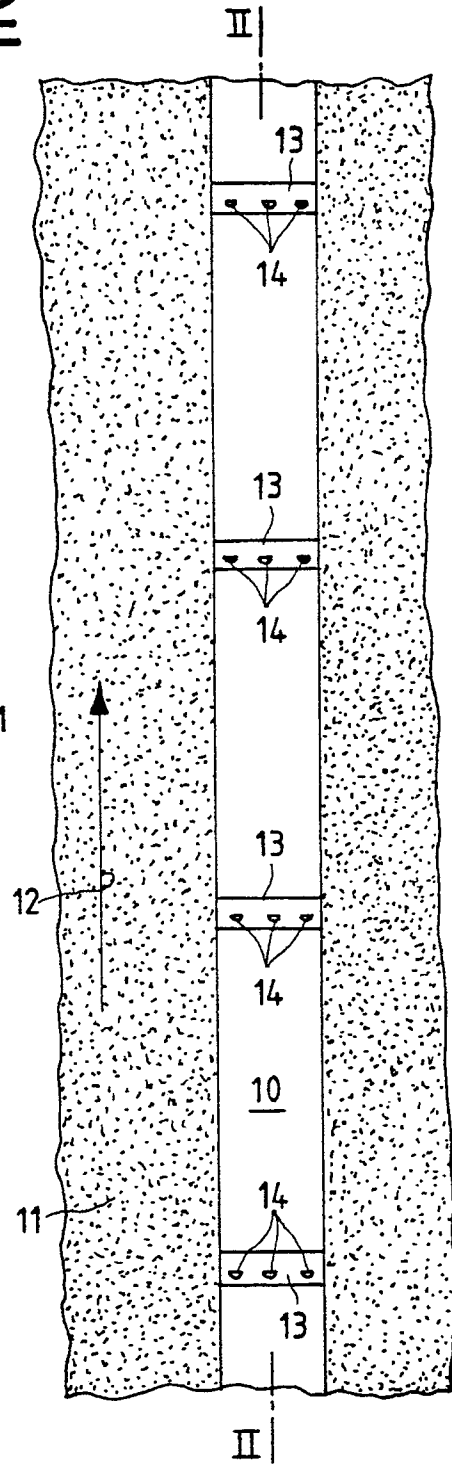
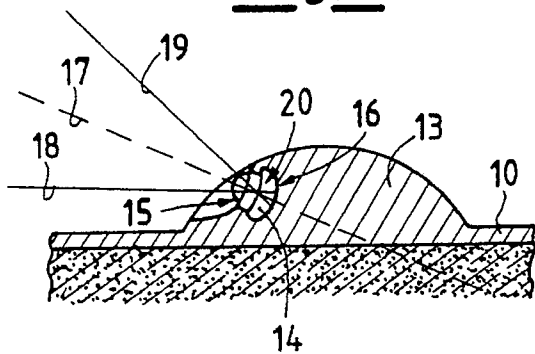


Fig.6

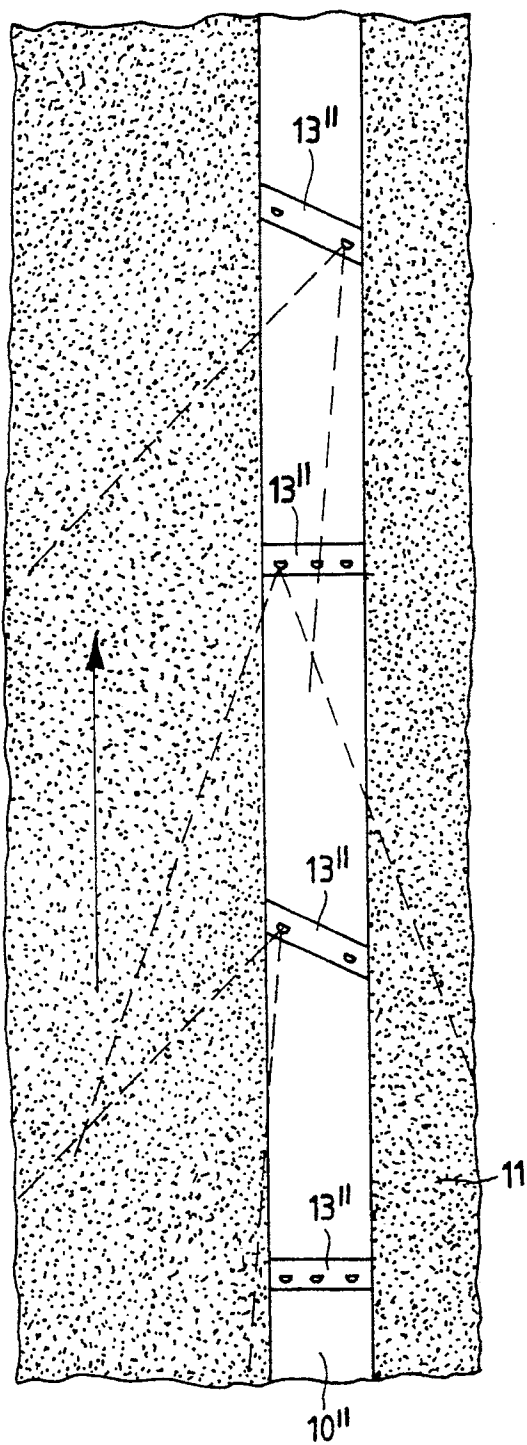
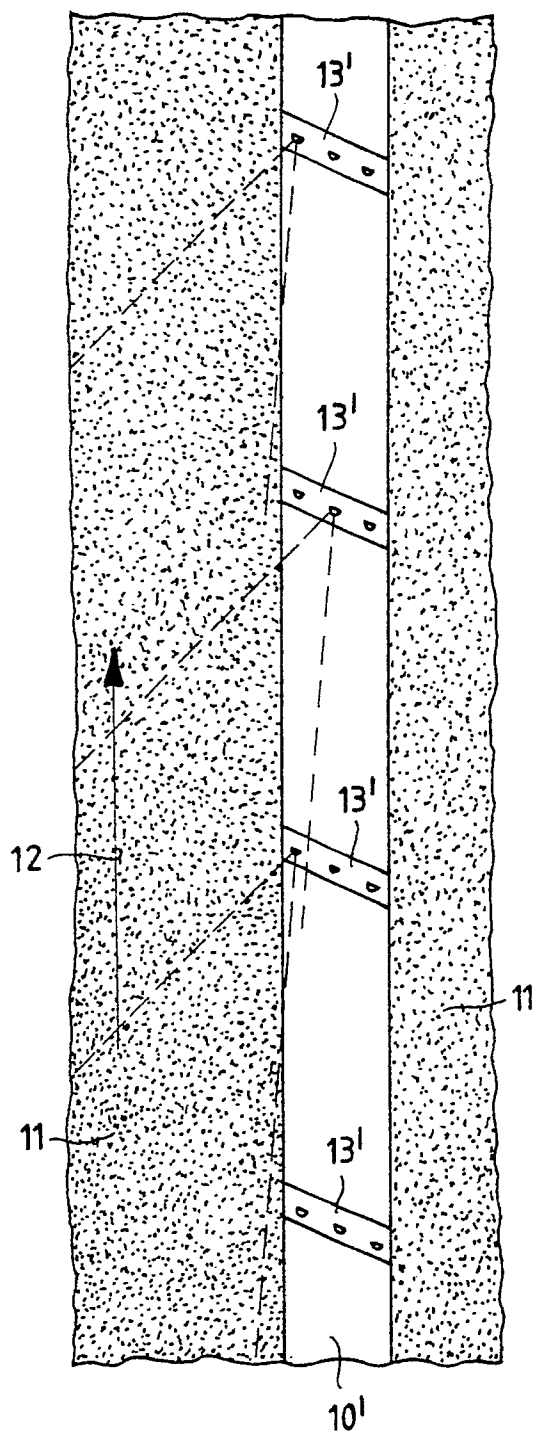


Fig.5



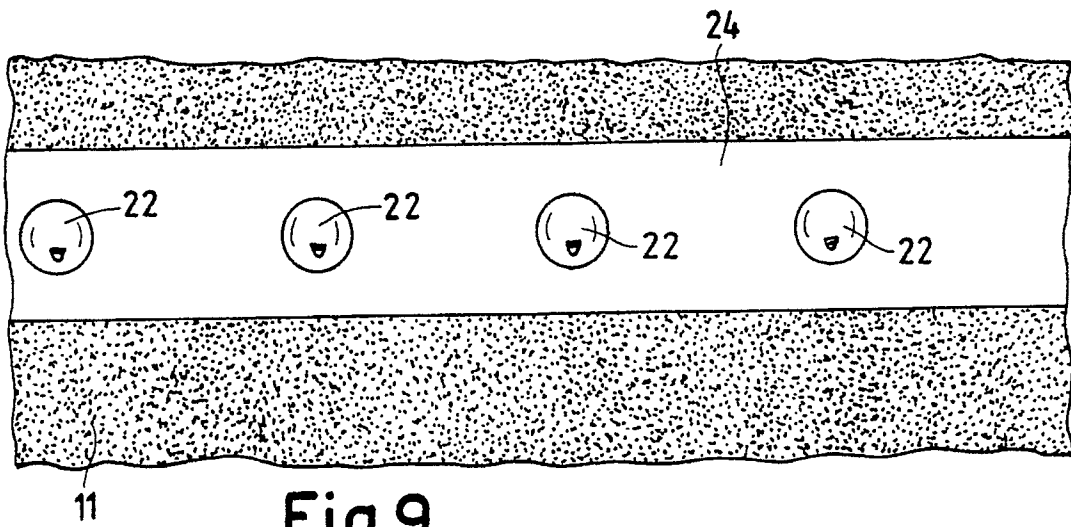


Fig. 9

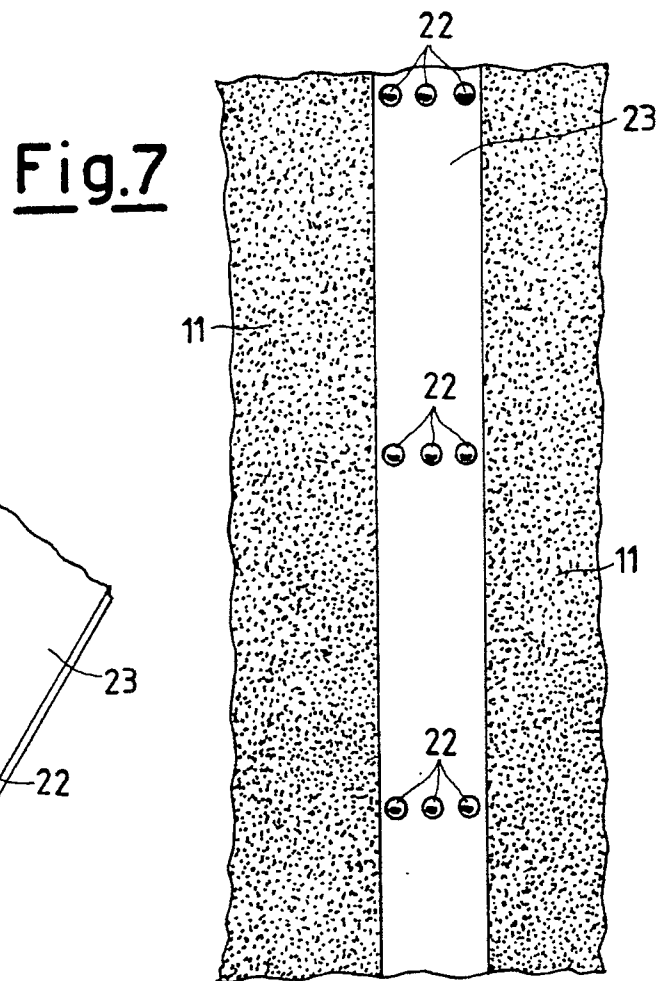


Fig. 7

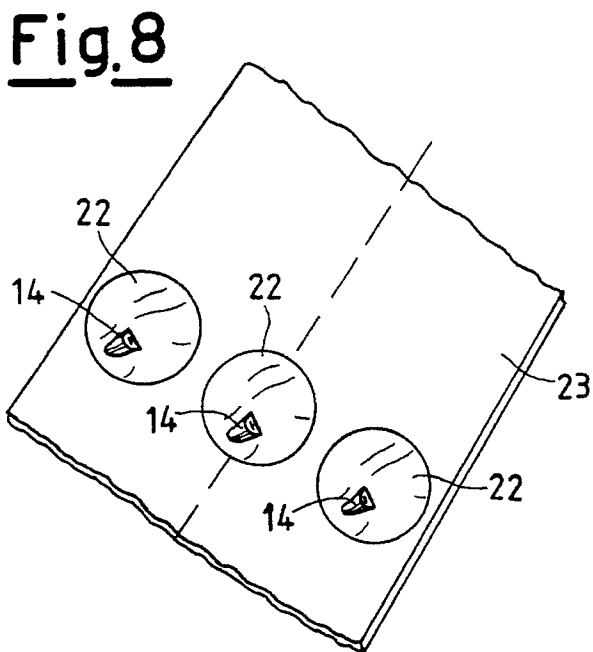


Fig. 8



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EUROPEAN SEARCH REPORT

Application Number

EP 90 20 3150

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 08 March 91	Examiner VERVEER D.
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document			



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Application Number

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
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The Hague		08 March 91	VERVEER D.
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 08 March 91	Examiner VERVEER D.
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