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(54) Spacer for concrete reinforcing bars

(57) The invention relates to a spacer for concrete reinforcing bars (2,3), comprising a substantially solid body (4) for fixing against the reinforcing bars and a clip (6) manufactured from resilient material for clamping the body on the reinforcing bar, wherein the clip is partially embedded in the body, the clip is provided with hooks

(10,11) for hooking the body on the reinforcing bars at a distance from the body, the clip is formed by a single piece of wire, a hook is arranged on either side of the piece of wire for connection to the reinforcing bars and the hooks are each separated from the body by a leg (7,8), wherein the spacer is point symmetrical relative to its centre.

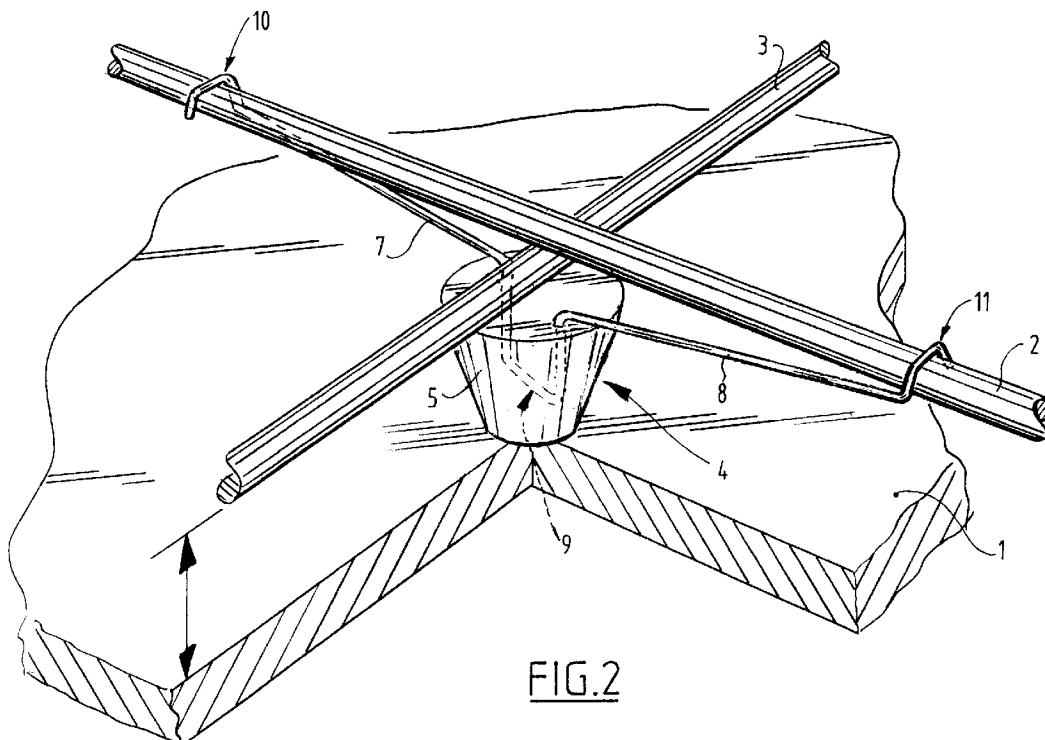


FIG. 2

Description

The invention relates to a spacer for concrete reinforcing bars, comprising a substantially solid body for fixing against the reinforcing bars and a clip manufactured from resilient material for clamping the body on the reinforcing bar, wherein the clip is partially embedded in the body, the clip is provided with hooks for hooking the body on the reinforcing bars at a distance from the body, the clip is formed by a single piece of wire, a hook is arranged on either side of the piece of wire for connection to the reinforcing bars and the hooks are each separated from the body by a leg.

Such a spacer is known from DE-A-2 144 093.

The spacer known from this prior art is provided with an asymmetrical clip which must be attached to the concrete reinforcing bars using two hands. This is awkward because a hand is usually also needed to hold the reinforcing bars.

The object of the invention is to provide such a spacer which is easier to manipulate.

This object is achieved in that the spacer is point symmetrical relative to its centre.

This provides the option of arranging the spacer with one hand. For this purpose the first hook of the spacer is initially hooked onto a piece of concrete reinforcing bar, while the other hook is then hooked onto the reinforcing bar by manoeuvring the body of the spacer, whereafter the body is placed at the correct position by further manoeuvring of the body. It will be apparent that only a single hand is required for this purpose; the other hand can be used to hold the bag with spacers or can be used to place the pieces of reinforcing bar into a manageable position.

A spacer for concrete reinforcing bars is otherwise known from NL-A-76 01430, wherein a point symmetrical construction of the clip is applied; however, the hooks of the clip are situated directly above the body, so that the advantages in manipulation of the present invention cannot be achieved. In addition, this spacer is only suitable for concrete reinforcing bars with limited variation in diameter, while it is equally unsuitable for attaching to reinforcing bars at the location of an intersection between two reinforcing bars. Experience has shown that it is precisely at these latter positions that it is desirable to apply the spacers.

According to a preferred embodiment the hooks comprise a substantially straight piece of wire which is bounded on either side by pieces of wire extending at an obtuse angle. This measure on the one hand increases the possibility of fixed hooking onto reinforcing bars of diverse diameters, while the hooks are also prevented from become mutually entangled when a large number of these spacers is carried for instance in a bag.

Arranging of the spacer is further facilitated by the measure that the projections of the legs onto the top surface of the body extend mutually parallel.

The measure that the projections of the legs extend

at a mutual distance also improves handling. This spacer can moreover be mounted in stable manner on single pieces of reinforcing bar as well as on mutually intersecting pieces of reinforcing bar.

According to yet another preferred embodiment the body is manufactured from concrete, the wire is formed by metal wire and the metal wire is embedded in the body during casting of the body.

It is otherwise possible to make use of materials other than concrete, for instance plastic, plaster and so on.

It will be apparent that forming the actual body from concrete achieves that after casting of the concrete round the reinforcement, for which purpose the spacer serves, the concrete of the spacer is embedded in the other concrete. The presence of another material in the concrete does not therefore occur, which presence could limit the structural strength of the concrete and could form the basis of processes having an adverse effect on the concrete.

A similar consideration applies for the use of metal wire; metal is of course widely present in the form of reinforcing bars. Casting of the metal wire into the concrete moreover facilitates the production of such spacers.

According to an embodiment the body comprises on its upper side a flat surface, the largest dimension of which is of the same order of magnitude in two perpendicular directions.

The fixing of two mutually intersecting concrete reinforcing bars at an intersection particularly results in a good positioning; due to its large dimensions the upper surface results in positioning in a first plane and the long legs between the body and the hooks on the one hand make it possible for the spacer to be connected to the piece of reinforcing bar lying above and on the other hand ensure positioning in the second direction.

According to another embodiment the body comprises on its underside a flat surface, the largest dimension of which is of the same order of magnitude in two perpendicular directions.

This results in a firm positioning of the spacer, wherein tilting is prevented. Particularly when formwork of soft material is used such as polystyrene, it is important in order to obtain the lowest possible surface pressure that the bottom surface is as large as possible and that it is accurately positioned. The surface pressure would otherwise become too high locally and could lead to compression.

The combination of the measures according to the two latter embodiments results in a large contact surface with the formwork, so that compression is prevented.

The present invention will be elucidated hereinbelow with reference to the annexed figures, in which:

figure 1 shows a perspective view of a spacer according to the invention, wherein it is arranged at an intersection of two pieces of concrete reinforcing bar;

figure 2 is a view corresponding with figure 1 of an alternative embodiment;

figure 3 shows a view of a reinforcement for concrete, wherein the concrete is broken away and wherein the use of the spacer according to the invention is elucidated;

figure 4 shows a perspective view of the piece of wire which is used in the spacer according to the invention; and

figure 5 shows a partly broken-away view of a casting mould for casting the body of the spacer according to the invention.

Figure 1 shows a base 1 of a formwork which must be filled with concrete. For this purpose a reinforcement is arranged comprising inter alia two mutually intersecting pieces of concrete reinforcing bar 2,3.

The reinforcement is otherwise shown in its entirety in figure 3.

The mutually intersecting pieces of reinforcing bar 2,3 are usually connected to each other at the location of the intersection, for instance by winding round iron wire, but this is less relevant to the application of the present invention. It will be apparent that the concrete reinforcing bars will have to be fully enclosed within the concrete for arranging round it, so that the reinforcing bars must be arranged at a distance from the formwork. Use is made for this purpose of the spacer according to the invention.

The spacer according to the invention is formed in the first instance by a body 4 which is preferably manufactured from concrete. The body is substantially frustoconical, wherein the smaller surface is adapted to rest on the formwork, while the larger surface is adapted to support a part of the reinforcing bars.

In the present embodiment a part of the body which is designated with 5 further takes a cylindrical form. In order to fix this spacer on the reinforcing bars the spacer is provided with a piece of wire 6, which is shown in its entirety in figure 4. The wire piece 6 is formed by two legs 7,8 which are connected by a part 9 bent into U-shape. In the example shown in figure 4, the legs 7,8 lie mutually in line; it is likewise possible to have these legs extending mutually parallel but not mutually in line. Attachment to single pieces of concrete reinforcing bar is hereby improved.

Each of the legs 7,8 is provided with a hook 10 respectively 11. Hook 10 is for instance formed by a straight piece of wire 12 which extends perpendicularly of leg 7 and is connected thereto by means of a connection piece 13 which in turn extends perpendicularly of leg 7 and is connected at an angle of 45° to wire piece 12. Finally, wire piece 12 is connected, once again at an angle of 45°, to a last wire piece 13.

During manufacture of the spacer according to the invention the whole piece of wire 6 is connected to spacer body 4 in that the U-shaped part 9 is cast into the concrete of body 4, as shown in figure 5.

The form of the hooks with the straight pieces of wire 11,12 serves to prevent the spacers according to the invention becoming mutually entangled with their hooks when they are tipped into a box or bag.

As stated, the relatively great length of legs 7,8 has the purpose of ensuring that the spacer can be fixed to concrete reinforcing bars of diverse form and diameter; the distance between the upper surface of body 4 and wire piece 11,12 is anyway variable to a large degree owing to the great length of legs 7,8.

The shape of the wire piece 11,12 likewise results in a good attachment being obtained to reinforcing bars of the most varying form.

Finally, the great length of the legs provides the possibility of attaching the spacer to concrete reinforcing bars at the position of intersections.

Manipulation of the spacer is further facilitated; body 4 can be picked up with one hand, wherein the first hook 10 can be hooked easily round the piece of reinforcing bar 2, whereafter the other hook can be arranged by manipulating body 4.

Figure 2 shows an embodiment wherein the configuration of the body is simplified; the body has a purely conical form.

Finally, figure 5 shows a casting mould 15 for casting the spacers; as shown in figure 5, a piece of wire 6 is herein initially placed in each of the cavities 16 in casting mould 15, whereafter cavity 16 can be filled with concrete. After sufficient curing the thus manufactured spacer can be removed.

It will be apparent that this can take place on large scale and can be largely automated; for this purpose a large number of cavities 16 will generally be arranged in the mould 15.

Claims

1. Spacer for concrete reinforcing bars, comprising a substantially solid body for fixing against the reinforcing bars and a clip manufactured from resilient material for clamping the body on the reinforcing bar, wherein the clip is partially embedded in the body, the clip is provided with hooks for hooking the body on the reinforcing bars at a distance from the body, the clip is formed by a single piece of wire, a hook is arranged on either side of the piece of wire for connection to the reinforcing bars and the hooks are each separated from the body by a leg, **characterized in that** the spacer is point symmetrical relative to its centre.
2. Spacer as claimed in claim 1, **characterized in that** the hooks comprise a substantially straight piece of wire which is bounded on either side by pieces of wire extending at an obtuse angle.
3. Spacer as claimed in claim 1 or 2, **characterized**

in that the projections of the legs onto the top surface of the body extend mutually parallel.

4. Spacer as claimed in claim 3, **characterized in that** the projections of the legs extend at a mutual distance. 5
5. Spacer as claimed in any of the foregoing claims, **characterized in that** the body is manufactured from concrete, the wire is formed by metal wire and the metal wire is embedded in the body during casting of the body. 10
6. Spacer as claimed in any of the foregoing claims, **characterized in that** the body comprises on its upper side a flat surface, the largest dimension of which is of the same order of magnitude in two perpendicular directions. 15
7. Spacer as claimed in any of the foregoing claims, **characterized in that** the body comprises on its underside a flat surface, the largest dimension of which is of the same order of magnitude in two perpendicular directions. 20

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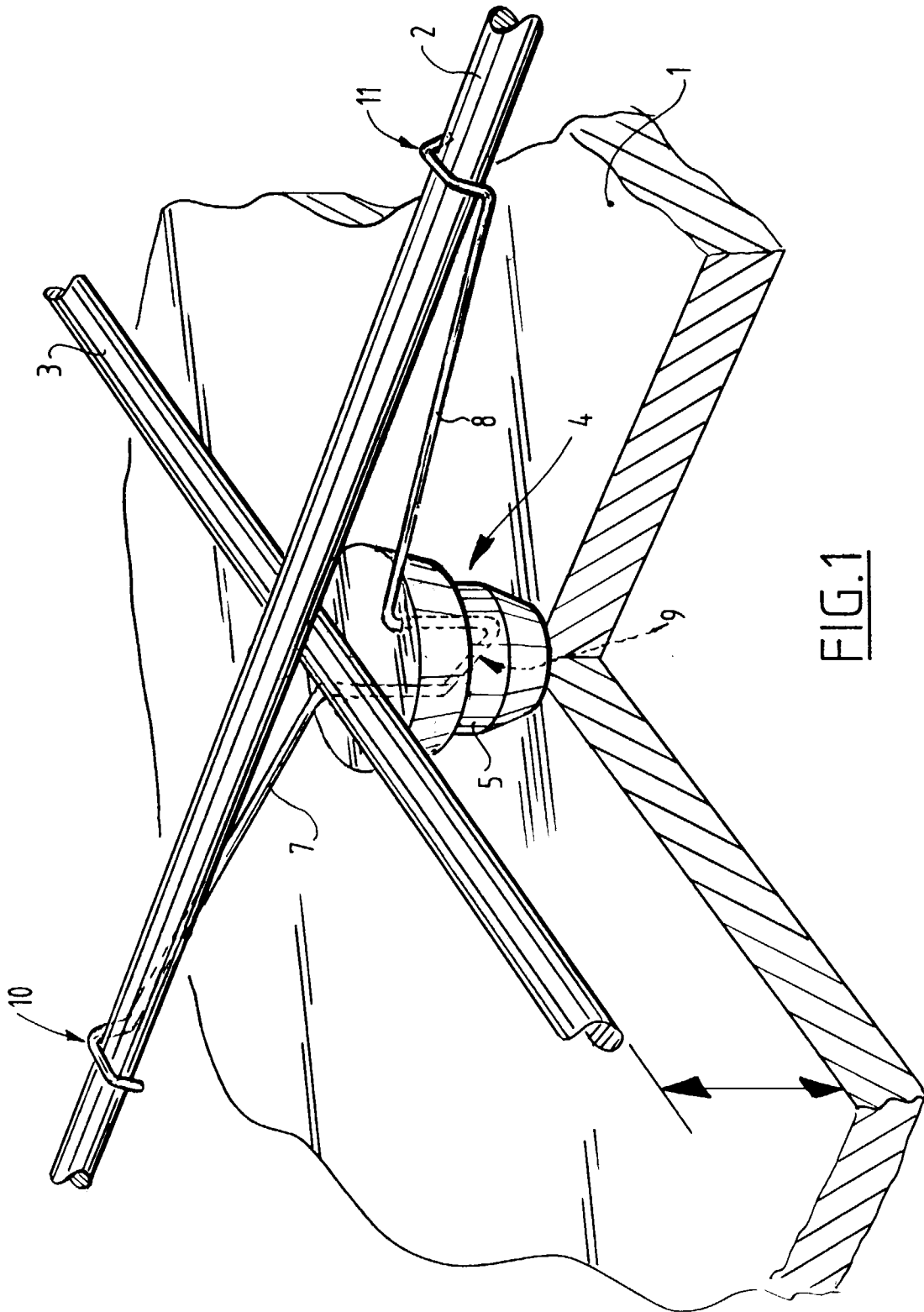


FIG. 1

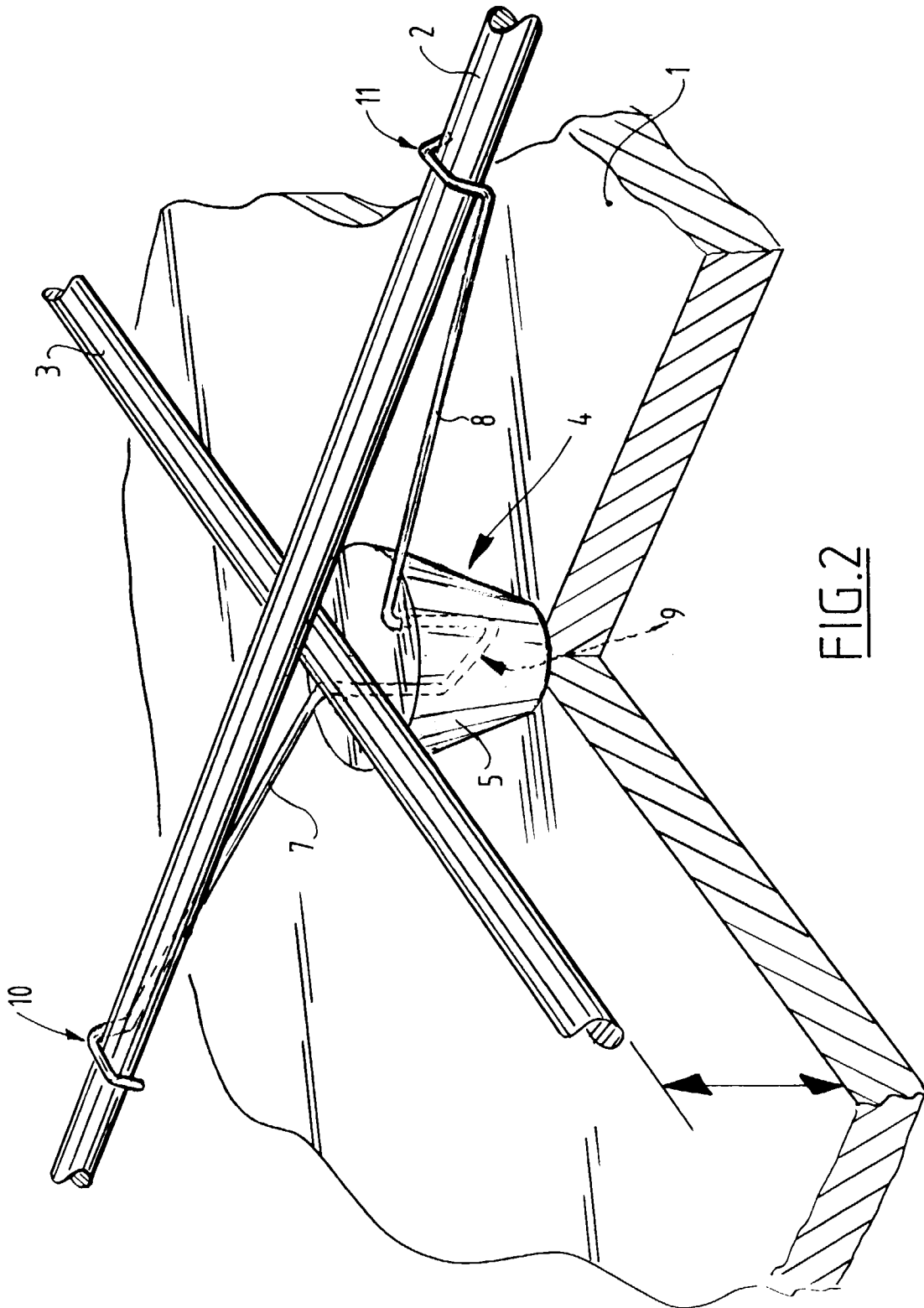


FIG. 2

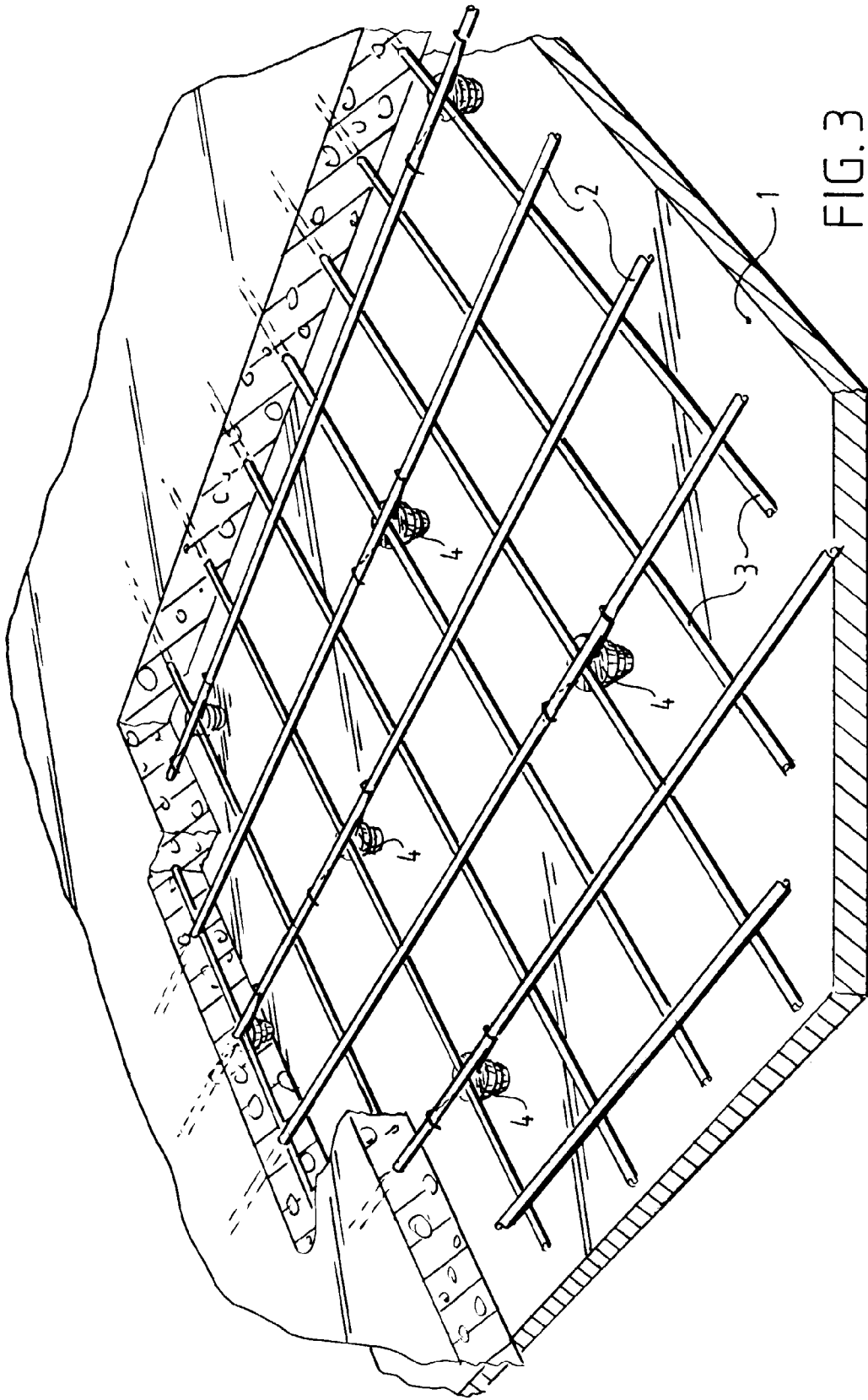


FIG. 3

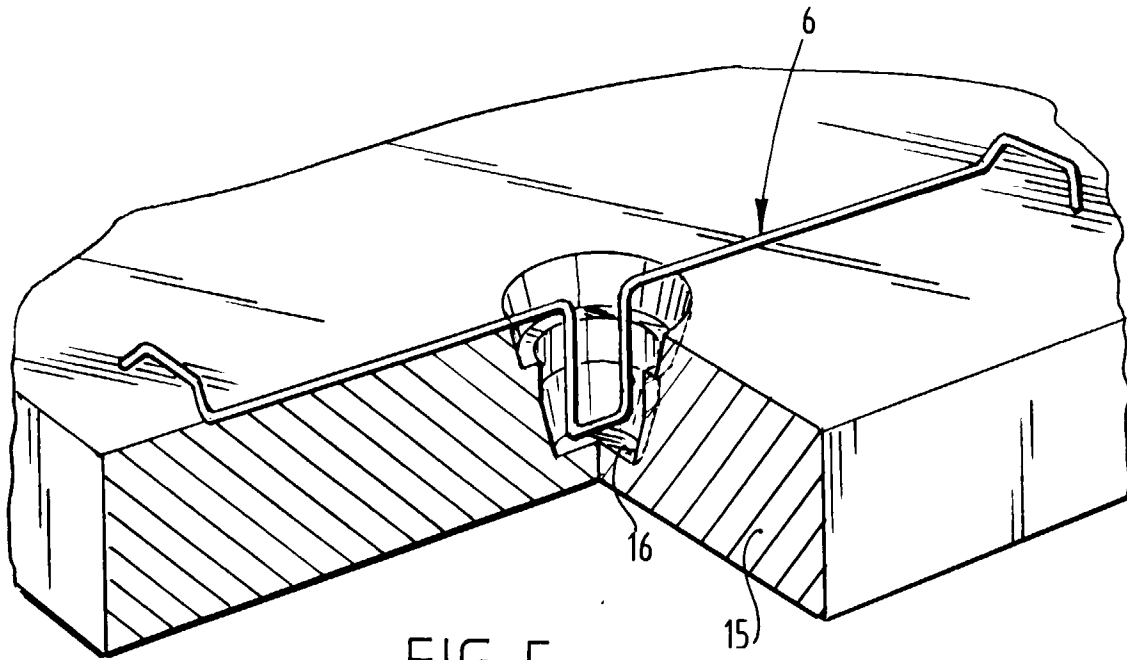


FIG. 5

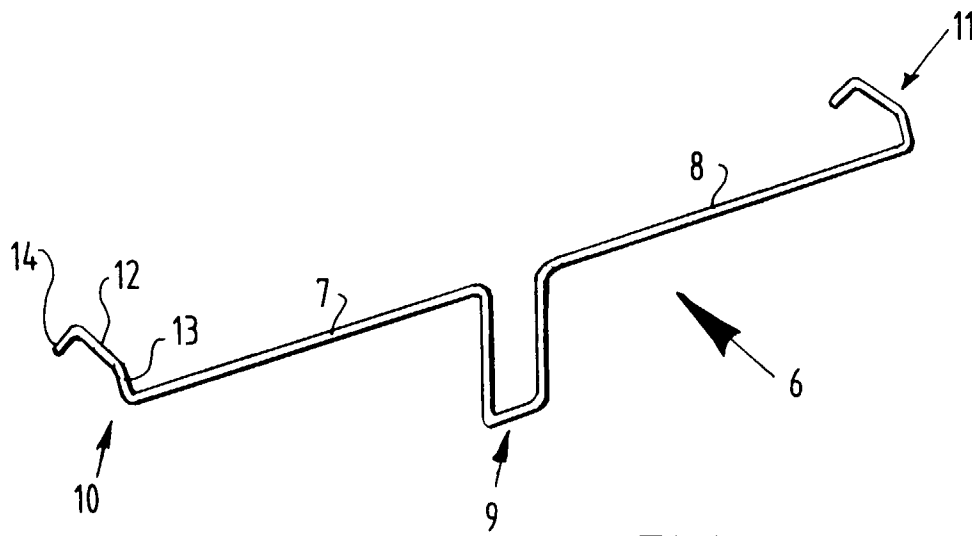


FIG. 4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 1242

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,Y A	DE 21 44 093 A (GANDER) 15 March 1973 * page 2, line 20 - page 4, line 21; figures * ---	1,5,6 2-4,7	E04C5/20
Y A	DE 23 08 765 A (JAUCH) 5 September 1974 * page 6, line 21 - page 7; figures * ---	1,5,6 2-4	
A	US 4 147 008 A (EISNER) 3 April 1979 * column 1, line 57 - line 61; figures * ---	1,3,5,6	
D,A	NL 7 601 430 A (HÜWA-WALTER) 24 August 1976 * figures * ---	1-7	
A	CH 619 018 A (CONSTRI) 29 August 1980 * abstract; figures * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E04C
Place of search	Date of completion of the search	Examiner	
THE HAGUE	21 August 1998	Righetti, R	
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