



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.07.2004 Bulletin 2004/29

(51) Int Cl.7: **E04C 5/065**, E04B 5/32,
 E04C 5/18, E04C 5/06,
 E04C 5/16

(21) Application number: **03380309.9**

(22) Date of filing: **29.12.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
 HU IE IT LI LU MC NL PT RO SE SI SK TR**
 Designated Extension States:
AL LT LV MK

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(30) Priority: **13.01.2003 ES 200300069**

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(54) **Steel reinforcement frame for reinforced concrete**

(57) Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, in which the frame is formed of an upper longitudinal round rod (1), a lower longitudinal round rod (2) and a transverse frame formed by U-shaped elements (3), (3'), (3''), which join the upper and lower longitudinal round rods. This frame is positioned inside two

or more pieces which we call a supporting piece-separator. The shapes of these pieces are as follows: open trapezoidal (5), open trapezoidal but with the width at its lower base equal to the separation of the lightening elements (5'), open rhomboidal (6), closed trapezoidal (7), closed trapezoidal but with the width at its lower base equal to the separation of the lightening elements (7') and closed rhomboidal (8).

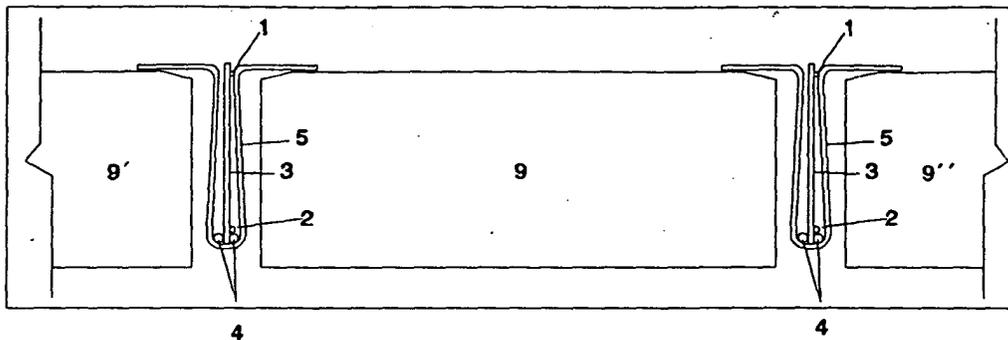


FIG 13

Description**OBJECT OF THE INVENTION**

[0001] This descriptive account relates to an application for Patent for Invention, corresponding to a type of steel reinforcement frame for the construction of unidirectional and bi-directional forgings which is a notable improvement on existing ones.

FIELD OF THE INVENTION

[0002] This invention is for application in the construction industry and more specifically in the construction of unidirectional and bi-directional forgings.

BACKGROUND TO THE INVENTION

[0003] Frames for the construction of unidirectional and bi-directional forgings for reinforced concrete are made for the most part manually, even on the worksite itself and are thus anti-economical and of a quality which cannot be guaranteed.

[0004] Those manufactured industrially are generally made by combining the basic frame for the construction of reinforced girders with the necessary strengthening added in the factory or on-site.

[0005] They require separators to ensure the overlap of the steel, they must be held in place during the concreting, and their method of manufacture means that the rib of the forging is too wide and uses more concrete and their handling in the workshop is very laborious and thus expensive.

[0006] Other types of frames which are made by joining the lower frame to traditional stirrups cannot be industrially manufactured and their handling on site is very costly.

[0007] The frame described in this account solves all the problems mentioned above, as it is manufactured industrially with a very economical method and with guaranteed quality.

DESCRIPTION OF THE INVENTION

[0008] The frame consists of a upper longitudinal round rod (1), a lower longitudinal round rod (2) and a transverse frame formed by U-shaped elements (3), (3'), (3''), which join the upper and lower longitudinal round rods. The U-shaped transverse elements stand out from the lower longitudinal round rod (2), so that on the part which stands out we can weld or join by any other method one or more longitudinal reinforcing round rods (4) of variable length, with the lengths determined by the sizing rules for the reinforced concrete.

[0009] When this frame is used for the construction of unidirectional and bi-directional forgings, it is positioned inside two or more pieces which we call a supporting piece-separator, generally made of steel, and whose

role is to separate the longitudinal reinforcing round rods (4) from the casing and prevent them from moving during the concreting. The shapes of these pieces are as follows: open trapezoidal (5), open trapezoidal but with the width at its lower base equal to the separation of the lightening elements (5'), open rhomboidal (6), closed trapezoidal (7), closed trapezoidal but with the width at the lower base equal to the separation of the lightening elements (7') and closed rhomboidal (8), as shown in figures (2), (3), (4), (5), (6) and (7). The longitudinal frame is positioned inside each of these pieces as indicated in figures (8), (8'), (9), (10), (11) and (12), between the lightening elements (9) and (9').

15 DESCRIPTION OF THE DIAGRAMS

[0010] To complement the description which has been made and with the object of helping to better understand the features of the invention, this descriptive account is accompanied, as an integral part of the same, by a set of plans which are illustrative and non-restrictive in character, and represent the following:

Figure number 1.- Represents an elevated longitudinal view of the frame in which number (1) is the upper longitudinal round rod, number (2) is the lower longitudinal round rod, numbers (3), (3') and (3'') the U-shaped transverse elements and number (4) the strengthening/reinforcing round rods.

Figure number 2.- Is an elevated view of the open trapezoidal supporting piece-separator, numbered with number (5).

Figure number 3.- Is a view of the open trapezoidal supporting piece-separator, the width of the lower base (5') of which is equal to the separation between lightening elements (9), (9').

Figure number 4.- Is an elevated view of the open rhomboidal supporting piece-separator, numbered with number (6).

Figure number 5.- Is an elevated view of the closed trapezoidal supporting piece-separator, numbered with number (7).

Figure number 6.- Is a view of the closed trapezoidal supporting piece-separator, the width of the lower base (7') of which is equal to the separation between lightening elements (9), (9').

Figure number 7.- Is a view of the closed rhomboidal supporting piece-separator, numbered with number (8).

Figure number 8.- Is a view of the longitudinal frame inside the open trapezoidal supporting piece-sepa-

rator (5) positioned on the lightening elements of the forging numbered with number (9) and (9').

Figure number 8'.- Is an elevated view of the longitudinal frame inside the open trapezoidal supporting piece-separator, the width of the lower base (5') of which is equal to the separation between lightening elements (9), (9'), positioned on the lightening elements of the forging numbered with numbers (9), (9').

Figure number 9.- Is an elevated view of the longitudinal frame inside the open rhomboidal supporting piece-separator (6) positioned on the lightening elements of the forging numbered with numbers (9), (9').

Figure number 10.- Is a view of the longitudinal frame inside the closed trapezoidal supporting piece-separator with the width of its lower base (7') equal to the separation between lightening elements (9'), positioned on the lightening elements of the forging numbered with numbers (9), (9').

Figure number 11.- Is an elevated view of the longitudinal frame inside the closed trapezoidal supporting piece-separator (7) positioned on the lightening elements of the forging numbered with numbers (9), (9').

Figure number 12.- Is an elevated view of the longitudinal frame inside the closed rhomboidal supporting piece-separator (8) positioned on the lightening elements of the forging numbered with numbers (9), (9').

Figure number 13.- Is an elevated view of two longitudinal frames inside two open trapezoidal supporting piece-separators (5) positioned on the lightening elements of the forging numbered with numbers (9), (9') (9').

Figure number 14.- Is a ground view corresponding to the previous elevated view in which it can be seen how the longitudinal frame enters the beam (10) by means of the upper and lower longitudinal round rods (1), (-2).

PREFERRED EMBODIMENT OF THE INVENTION

[0011] We will proceed with figures (13) and (14) which represent an elevated view and a ground view of two ribs of a unidirectional forging in which we have represented the open trapezoidal supporting piece-separators (5), but we could equally have used any other supporting piece-separator which is the object of this patent. The procedure is as follows: the open trapezoidal supporting piece-separators (5) are positioned resting on

the lightening pieces (9), (9') and the longitudinal frames (1), (2) are then positioned inside them.

[0012] If the supporting piece-separators were closed (7), (7') and (8) they would be inserted into the ends of the longitudinal frames (1), (2) and the whole would be supported on the lightening elements (9), (9').

Claims

1. Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, formed of an upper longitudinal round rod (1), a lower longitudinal round rod (2), a transverse frame formed by various U-shaped elements (3), (3'), (3''), which join the upper (1) and lower (2) longitudinal round rods and which stand out from the lower longitudinal frame to enable the welding or joining by any other means of one or more longitudinal round rods of variable length.
2. Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, according to the first claim **characterised** because the U-shaped elements (3), (3'), (3'') of its transverse frame are longer than the distance between the upper and lower longitudinal round rods to allow the welding of one or more strengthening frames (4) to it.
3. Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, which presents a trapezoidal-shaped open supporting piece-separator (5), made of steel or any other material, which is wider at its lower base to house the lower longitudinal round rod (2) and the strengthening round rods (4) and narrower in its upper part to hold the upper longitudinal frame in place, with two horizontal branches which allow it to rest on the lightening elements of the forging.
4. Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, which presents a trapezoidal-shaped open supporting piece-separator with a lower base (5') whose width is equal to the separation between lightening elements (9), (9') so that it is held in place between them, and narrower in its upper part to hold the upper longitudinal frame in place, with two horizontal branches which allow it to rest on the lightening elements of the forging (9), (9').
5. Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, which presents a rhomboidal-shaped open supporting piece-separator (6), made

of steel or any other material, with sufficient width at its lower base to house the lower longitudinal round rod (2) and the strengthening round rods (4), wider in its middle part so that it touches the lightning pieces (9), (9') and remains fixed between them, and narrower in its upper part to hold the upper longitudinal frame in place, with two horizontal branches which allow it to rest on the lightning elements (9), (9') of the forging.

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6. Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, which presents a trapezoidal-shaped closed supporting piece-separator (7), made of steel or any other material, wider at its lower base to house the lower longitudinal round rod (2) and the strengthening round rods (4) and narrower in its upper part to hold the upper longitudinal frame in place, with two horizontal branches which allow it to rest on the lightning elements of the forging.

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7. Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, which presents a trapezoidal-shaped closed supporting piece-separator with a width at its lower base (7') which is equal to the separation between lightning elements (9), (9') so that is held in place between them and narrower in its upper part to hold the upper longitudinal frame in place, with two horizontal branches which allow it to rest on the lightning elements of the forging (9), (9').

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8. Steel reinforcement frame for the construction of unidirectional and bi-directional forgings for reinforced concrete, which presents a rhomboidal-shaped closed supporting piece-separator (8), made of steel or any other material, with sufficient width at its lower base to house the lower longitudinal round rod (2) and the strengthening round rods (4), wider in its middle part so that it touches the lightning pieces (9), (9') and remains fixed between them, and narrower in its upper part to hold the upper longitudinal frame in place, with two horizontal branches which allow it to rest on the lightning elements (9), (9') of the forging.

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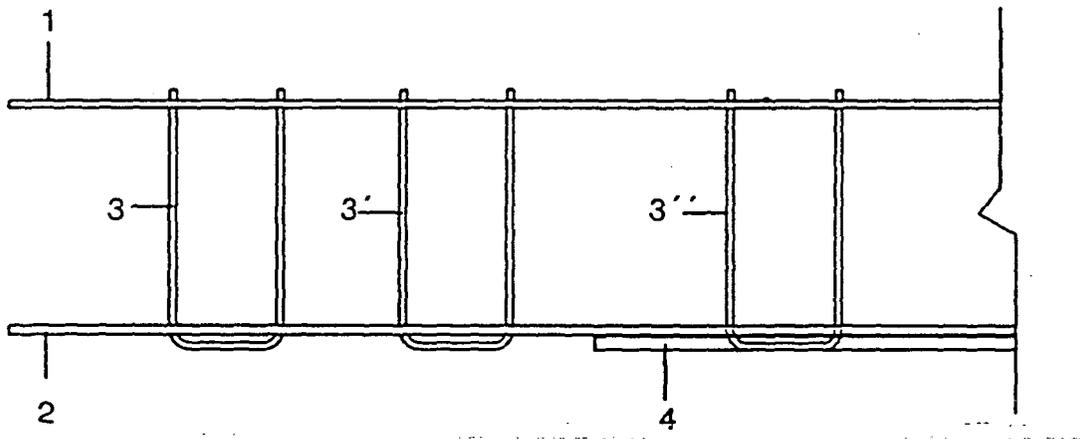


FIG 1

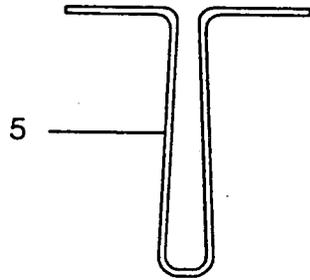


FIG 2

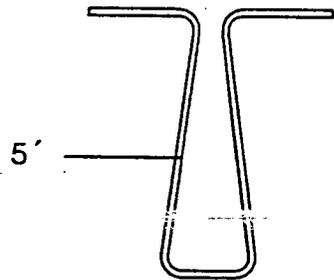


FIG 3

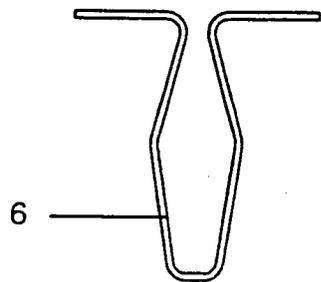


FIG 4

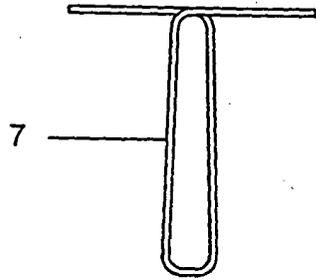


FIG 5

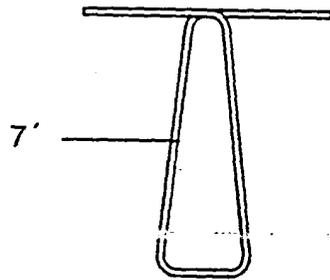


FIG 6

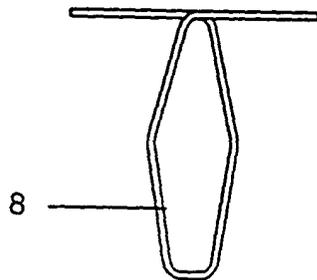


FIG 7

FIG 8

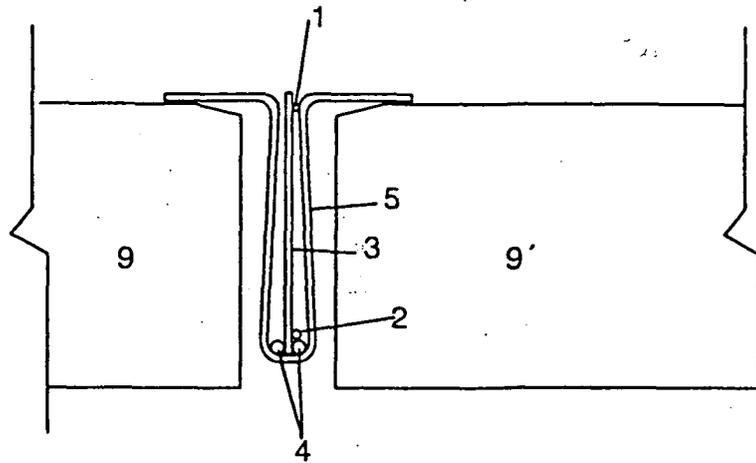


FIG 8'

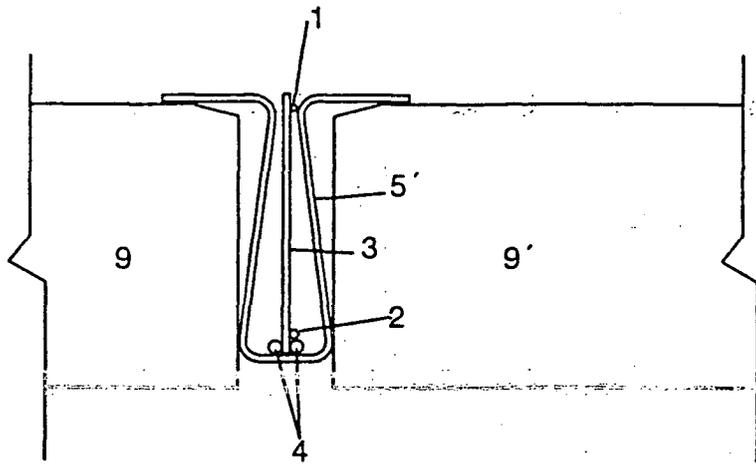


FIG 9

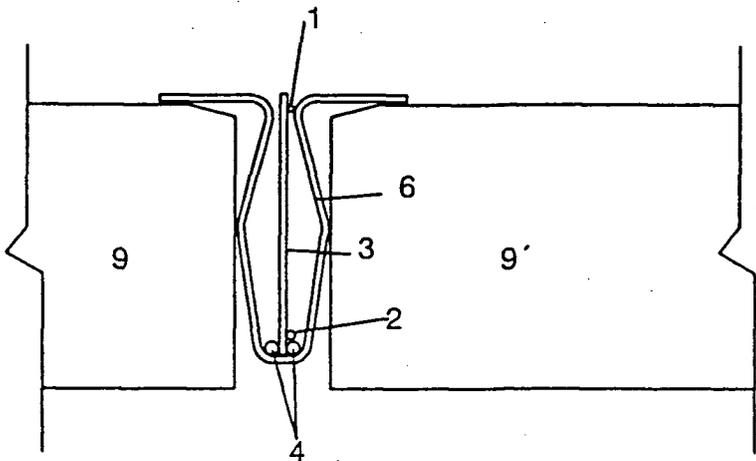


FIG 10

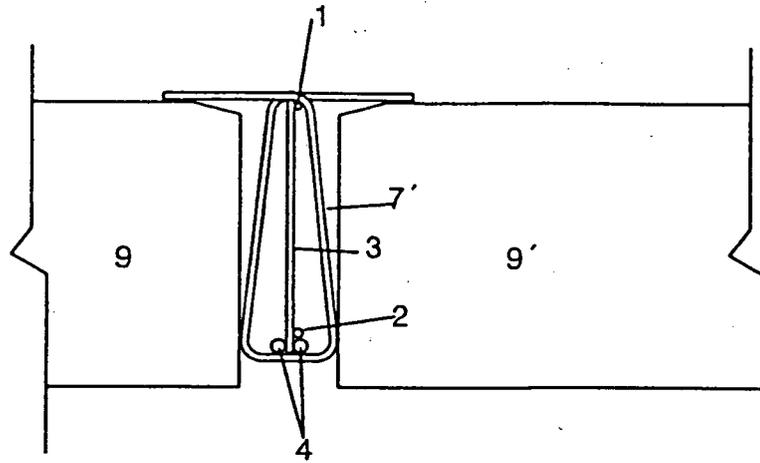


FIG 11

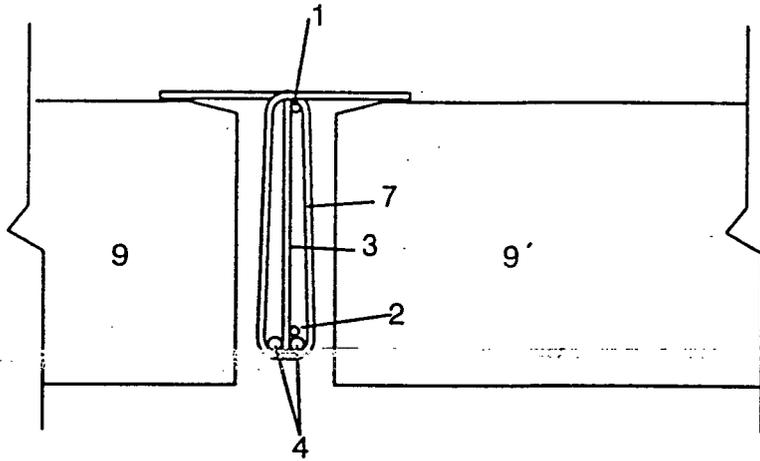
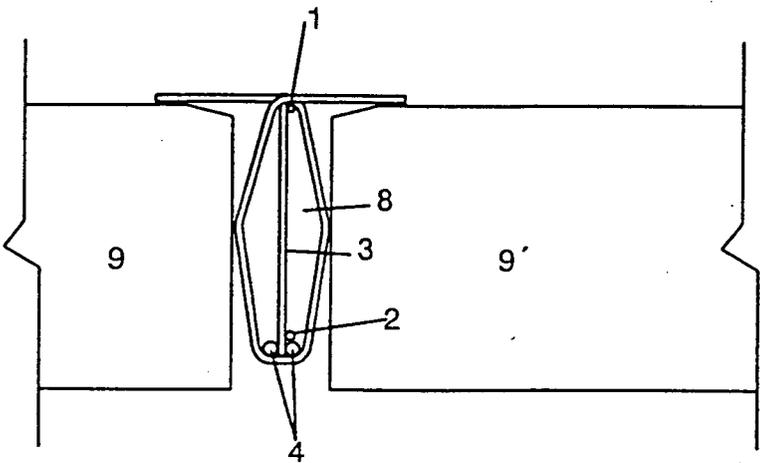


FIG 12



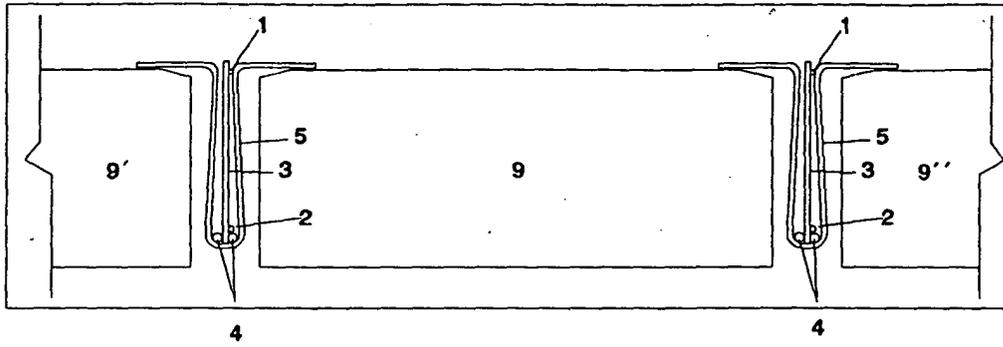


FIG 13

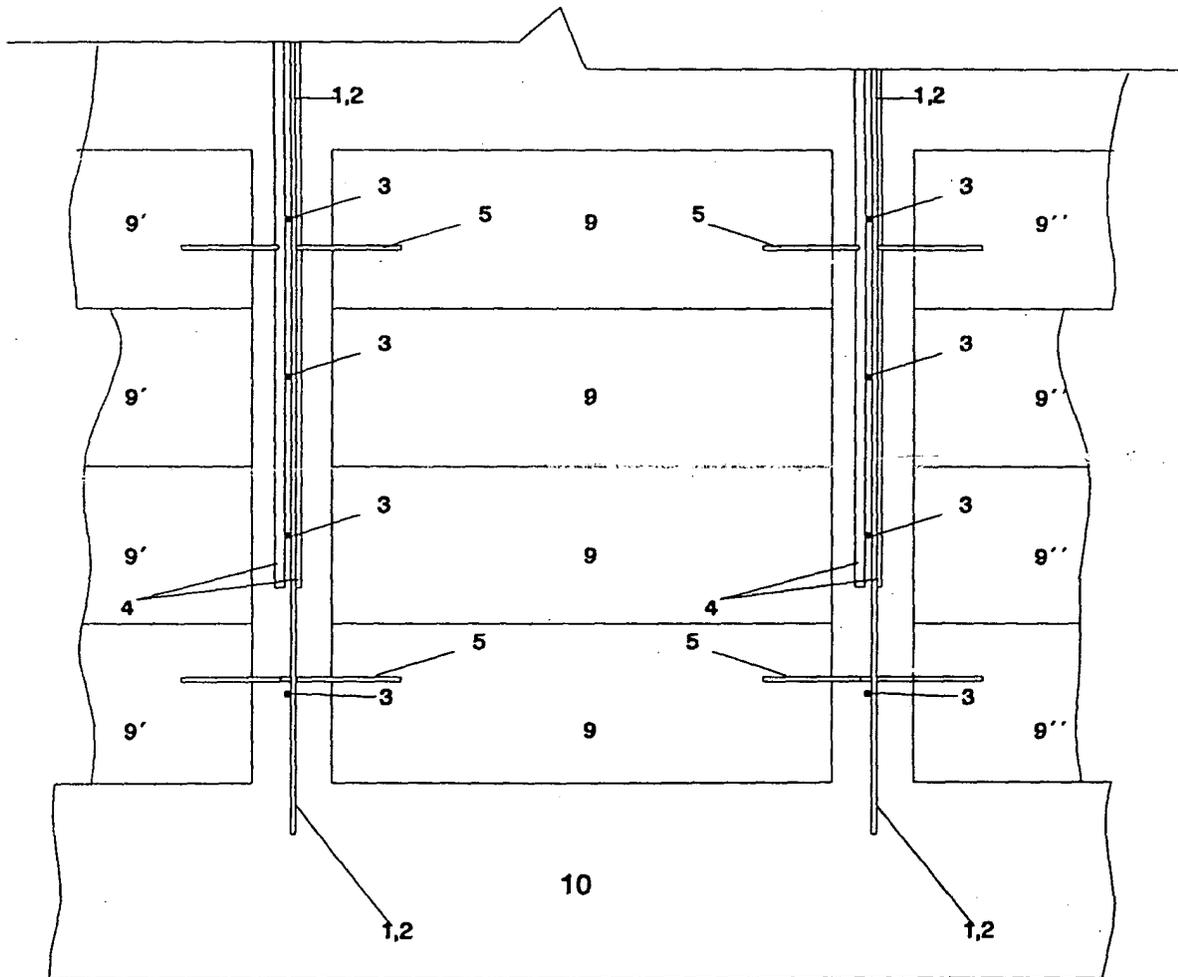


FIG 14