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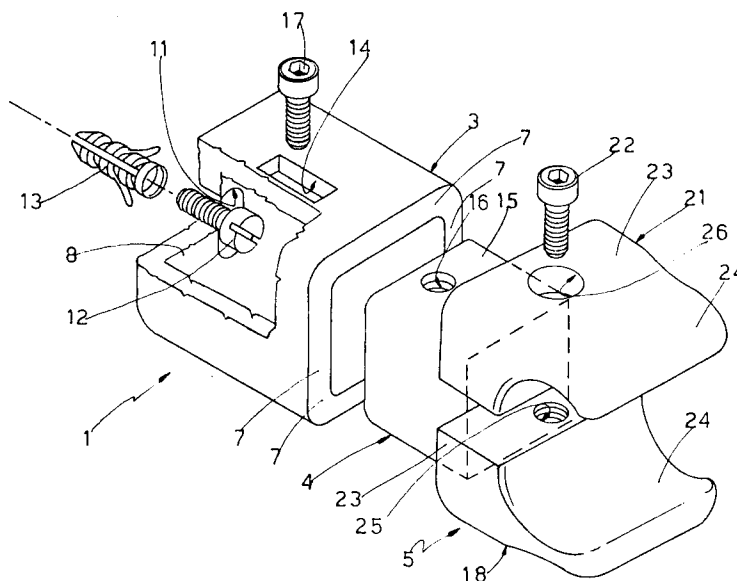
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54 **A clamp, particularly for supporting radiators.**

57 The clamp (1) includes;
a first body (3) fixed to a fixed structure (2);
a second body (4) with the same longitudinal axis as the first body (3) and fixed thereto; and
a vice (5) for clamping a bar (6) of the radiator,

defined by a first hooked jaw (18) carried by the second body (4) and a second hooked jaw (21) which is to clamp the bar (6) against the first jaw (18).

FIG.1



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The present invention relates to a clamp, particularly for supporting radiators.

It is known that hook-shaped clamps are currently used to support radiators and have several disadvantages such as the difficulty of fixing them to the wall of the building and the impossibility of adjusting their positions. The fixing of these clamps to the wall in fact requires the forming of a hole in the wall and the fixing of one end of the clamp in this hole by means of the injection of a quick-setting cement. Since at least two clamps are needed to support the radiator, it is clear that, with this type of attachment, it is impossible to adjust the relative positions of the clamps and hence that of the radiator to the wall correctly. Moreover it is also difficult to adjust the depth of fixing of the hooks and, hence, the distance of the radiator from the wall of the building for the same reasons. Finally it must be stressed that the hook-shaped clamps are not aesthetically pleasing which is in complete contrast to the current mode of operation of radiator manufacturers who are seeking to produce highly aesthetic radiators such as almost to be pieces of furniture in themselves.

The object of the present invention is to provide a clamp which does not have the aforesaid disadvantages and which is easy to fix to the wall and is provided with systems for the adjustment of its position.

Further objects and advantages of the present invention will become evident during the description which follows.

On the basis of the present invention, there is provided a clamp, particularly for supporting radiators, characterised in that it includes:

- a first body fixed to a fixed structure;
- a second body with the same longitudinal axis as the first body and fixed thereto; and
- a vice for clamping a bar of the radiator, defined by a first hooked jaw carried by the second body and a second hooked jaw which is to clamp the said bar against the first hooked jaw.

In order to provide a better understanding of the present invention a preferred embodiment will now be described, purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 is a perspective view of a clamp formed in accordance with the scope of the present invention;

Figure 2 is a partially-sectioned side view of the clamp of Figure 1 in use;

Figure 3 is a plan view of part of the clamp of Figure 1;

Figure 4 is a partially sectioned view of a clamp similar to that of Figure 1 but provided with a system which allows it a greater longitudinal extension;

Figure 5 is a partially-sectioned side view of part of the clamp of Figure 1 shaped differently from the corresponding one illustrated in Figures 1, 2 and 3; and

Figures 6 and 7 are side and plan views respectively of a clamp which differs from the clamp of Figure 1 in the different shaping of a portion thereof.

As illustrated in Figures 1, 2, and 3, a clamp generally indicated 1 is fixed to a wall 2 of a building to enable the support of a bar member such as, for example, a radiator. The clamp 1 has a system for adjusting its position relative to the wall 2 and a system for adjusting its longitudinal extension. The clamp 1 includes a first body 3 for fixing to the wall 2, a second body 4 intended to be connected mechanically at one end to the body 3 and at the other end having a vice 5 which will clamp a cylindrical bar 6 of the radiator.

With reference to Figures 1 and 2, the body 3 is cup-shaped and has four side walls 7 arranged in two parallel pairs and a base wall 8 which, in use, faces the wall 2. The wall 8 has a central through-slot 11 through which the threaded shank of a screw 12 may project into an expansion plug 13 arranged in the wall 2. The longitudinal axis of the slot 11 lies in a plane parallel to that defined by the face of the wall 2 whereby, by arranging this axis of the slot 11 in line with one of the two cartesian axes definable on the wall 2, it is possible to adjust the position of the body 3 along the selected cartesian axis. Clearly the adjustment is carried out before the screw 12 is screwed in completely. The central part of one side wall 7 is formed with a through slot 14 with its longitudinal axis parallel to the longitudinal axis of the body 3.

With reference to figures 1, 2 and 3, the body 4 includes a prismatic portion 15 which, in use, will be housed coaxially within the body 3. The portion 15 is formed with a threaded hole 16 perpendicular to the longitudinal axis of the portion 15 itself and in line with the slot 14. A screw 17 passes through the slot 14 and, when screwed into the hole 16, fixes the bodies 3 and 4 together mechanically. Clearly it is possible to adjust the axial position of the body 4 relative to the body 3 before the screw 17 is screwed in completely.

The vice 5 is constituted by two hooked jaws 18 and 21 of which the jaw 18 is formed integrally with the portion 15 and the jaw 21 is fixed to the jaw 18 by a screw 22. The jaws 18 and 21 have the same geometric conformation and, in particular, they include a thicker portion 23 by which the jaws 18 and 21 are fixed together, and a thinner portion 24 which clamps the bar 6. The portion 23 of the jaw 18 projects from an end face of the portion 15 or preferably, from a lower region of this face. The jaws 18 and 21 have substantially constant widths

along their longitudinal axes, this width being substantially equal to that of the body 3. The faces of the jaws 18 and 21 which face each other have a first part, defined by the portion 23, which lies in a plane perpendicular to the said end face of the portion 15, and a second part, defined by the portion 24, which describes a semi-cylindrical surface. The shape of the second part of these faces of the jaws 18 and 21 enables the vice 5 to define a clamping surface which is almost completely cylindrical and of a diameter substantially equal to the external diameter of the bar 6.

The flat face of the portion 23 of the jaw 18 is formed with a threaded blind hole 25 coaxial with a through hole 26 in the portion 23 of the jaw 21. The screw 22 passes through the hole 26 and is screwed into the hole 25 until its head comes to bear against a shoulder 27 formed in the hole 26. The flat face of the jaw 21 fits against the corresponding flat face of the jaw 18 just as the end face of the portion 23 of the jaw 21 fits against the upper part of the end face of the portion 15.

In use, a hole is first made in the wall 2 and the plug 13 is then placed in it. Subsequently the screw 12 is screwed in to a minimum extent so that the position of each body 3 relative to the wall 2 and to the other bodies 3 can be adjusted, taking account of the fact that several clamps 1 are used to support a radiator. The bar 6 is then clamped in the vice 5 by the initial placing of the bar 6 on the hooked jaw 18 and the subsequent fixing of the jaw 21 to the latter. Finally, the radiator being raised, each portion 15 is introduced into the corresponding body 3. It is now possible first to adjust the axial position of the body 4 relative to the body 3 and then to fix the two together by the screw 17.

The radiator may be fixed to a vertical wall, parallel thereto, or simultaneously to the vertical wall and to the floor like a flag. In the first case, depending on the vertical or horizontal disposition of the longitudinal axis of the slot 11, either the height of the clamp 1 relative to the floor or the distance between two clamps 1 at the same level can be determined by the adjustment of the body 3. In the second case, in which the clamps are disposed on the floor, depending on the disposition of the axis of the slot 11 along two horizontal cartesian axes, either the distance of the clamps 1 from each other and from an edge of the floor or the perpendicularity of the axis along which the clamps 1 are fixed relative to the vertical wall can be determined by the adjustment of the body 3. The adjustment of the axial position of the body 4 relative to the body 3 enables the distance of the radiator from the wall 2 to be determined.

With reference to Figure 4, a clamp 1 for supporting a radiator at a very large distance from the wall 2 will now be described. In this case, the

clamp 1 includes a spacer member 31 having a portion 32 of smaller longitudinal extent similar to the portion 15 in that it is introduced into the body 3, and a hollow portion 33 of larger longitudinal extent similar to the body 3 in that it accepts the portion 15 of the body 4 within it. The portion 32 is formed with a threaded blind hole 34 into which the screw 17 is screwed and thus fixes the member 31 to the body 3. A side wall of the portion 33 is formed with a hole 35 through which a screw 36 may be screwed into the hole 16 so as to fix the body 4 to the member 31.

With reference to Figure 5, a body 4 is described which differs from that illustrated in Figure 1 in the different internal conformation of the vice 5 because of the different peripheral profile of the section of the bar 6. This in fact has a section with a substantially elliptical profile whereby, in order to achieve the proper clamping thereof, the inner faces of the hooked jaws 18 and 21 of the vice 5 together define a semi-elliptical surface.

With reference to Figures 6 and 7, a clamp 1 is now described which is adapted to support a radiator having a bar 6 with a semi-ovoidal profile in section and having bars 41 which project perpendicularly from the bar 6 and which are a short distance apart. More particularly, the bar 6 has a rectangular section with two longer straight sides, a shorter straight side outside the vice 5 and a shorter side within the vice 5 which is formed as an arc of a circle. The inner faces of the portions 24 of the jaws 18 and 21 have a first semi-circular zone which will mate with a part of the said circular side and a second straight zone which will mate with the corresponding longer straight side of the section of the bar 6. Moreover each portion 24 has a free end 42 which is turned inwardly at right angles so as to embrace the bar 6 almost completely by fitting over a respective part of the shorter straight side of the section of the bar 6. Since the distance between the bars 41 is less than the width of the portions 24, these differ from those illustrated in Figure 1 in that they taper in width so that the said ends 42 can be disposed between the bars 41.

From what has been described above, the advantages achieved by the present invention will be clear.

More particularly, by the use of the clamps 1, it is possible to adjust not only the position of the radiator relative to the wall 2 but also its distance from the latter and these adjustments are easy to carry out. Moreover the clamps 1 are quick and easy to fix to the wall 2 since the fixing not involve complicated operations to be carried out on the latter, the positioning of an expansion plug being sufficient. The body 3 of the clamp 1 remaining fixed, it may present a body 4 with a vice adapted, by its shape, to clamp bars 6 of different sections.

Moreover the clamp 1 may be arranged, by means of the member 31, to support radiators at great distances from the wall 2. It should be stressed that the structural simplicity of the clamp 1 makes it cheap to produce. Finally, it may be stated that, compared with clamps currently in use, the clamp 1 is aesthetically pleasing since the various fixing screws are hidden in the corresponding slots or holes.

Finally, it is clear that the clamp 1 described and illustrated may be modified and varied without thereby departing from the protective scope of the present invention.

In particular, the clamp 1 may also be used for supporting objects other than radiators but, naturally, having a bar (whether solid or hollow) forming part of the structure of the object or defining it. The clamp 1 could be fixed to any fixed structure. The bar 6 may have a peripheral profile different from those described and illustrated. Moreover, the body 3 may have several slots 14 in the same wall 7 or in different walls 7, just as the portion 15 may have several holes 16 in the same face or in different faces; thus it is possible to modify the relative angular positions of the bodies 3 and 4. The portion 15 of the body 4 could also be hollow in order to achieve a saving in material. In this case it is also possible to vary the shape of the body 3 and of the portion 15 for example so that the portion 15 receives the body 3 within it; naturally, in this case, the slot 14 would be formed in one face of the portion 15 and the hole 16 would be formed in a wall 7 of the body 3. It is clear that the peripheral development of the body 3 and of the portion 15 illustrated are not limiting in that it is possible to define a different shape, for example cylindrical, therewith. The clamp 1 is preferably made of metal but the use of different materials, such as wood or plastics material for supporting less heavy objects is not excluded.

Claims

1. A clamp, particularly for supporting radiators, characterised in that it includes:
 - a first body (3) fixable to a fixed structure (2);
 - a second body (4) with the same longitudinal axis as the first body (3) and fixed thereto; and
 - a vice (5) for clamping a bar (6) of the radiator, defined by a first hooked jaw (18) carried by the second body (4) and a second hooked jaw (21) which is to clamp the said bar (6) against the first hooked jaw (18).
2. A clamp according to Claim 1, characterised in that it includes first means for adjusting the position of the first body (3) relative to the fixed structure (2).
3. A clamp according to Claim 2, characterised in that the first means include a first through slot (11) in a wall (8) of the first body (3) facing the fixed structure (2) and a first screw (12) which passes through the first slot (11) for screwing into the structure (2) in which, if this is constituted by a wall of the building, a plug (13), preferably an expansion plug, may conveniently be provided therein; the first body (3) being movable along the longitudinal axis of the said first slot (11) before the first screw (12) is screwed in completely.
4. A clamp according to at least one of the preceding Claims, characterised in that it includes second means for adjusting the axial position of one of the bodies (3 or 4) relative to the other; one of the bodies (4 or 3) being inside the other.
5. A clamp according to Claim 4, characterised in that it includes at least one second through slot (14) formed in the said outer body (3 or 4) with its longitudinal axis parallel to that of the bodies (3 and 4), at least a first threaded hole (16) formed in the inner body (4 or 3) in line with the said second slot (14), and a second fixing screw (17) for passing through the second slot (14) to be screwed into the first hole (16); the second body (4) being movable along its own longitudinal axis before the second screw (17) is screwed in completely.
6. A clamp according to a least one of the preceding Claims, characterised in that the first hooked jaw (18) is formed integrally with the second body (4) and in that the second hooked jaw (21) is fixed to the first jaw (18) by a third screw (22).
7. A clamp according to Claim 6, characterised in that the said hooked jaws (18 and 21) have substantially identical geometrical shapes and, in particular, they each include a first portion (23) of greater thickness in correspondence with which the mechanical connection between the jaws (18 and 21) is formed, and a second portion (24) of lesser thickness which achieves the clamping of the said bar (6).
8. A clamp according to Claim 7, characterised in that the faces of the hooked jaws (18 and 21) which face each other each have a first part, defined by the said first portion (23), which lie in a plane and a second part, defined by the

said second portion (24), which describes a surface substantially identical to the lateral surface of the part of the bar (6) to be clamped.

9. A clamp according to Claim 8, characterised in that it includes a second threaded hole (25) formed in the first portion (23) of the first hooked jaw (18) and a third through hole (26) formed in the first portion (23) of the second hooked jaw (21); the third screw (22) passing through the third hole (26) and being screwed into the second hole (25) until its head comes to bear against a shoulder (27) formed in the second hole (26). 5
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10. A clamp according to at least one of the preceding Claims, characterised in that the said hooked jaw (18 and 21) are of substantially constant width which is preferably equal to the width of the outer body (3 or 4). 20
11. A clamp according to at least one of Claims 1 to 9, characterised in that the hooked jaws (18 and 21) have a width which tapers towards their free ends. 25
12. A clamp according to any one of the preceding Claims, characterised in that the bodies (3 and 4) have a prismatic shape. 30
13. A clamp according to any one of Claims 1 to 11, characterised in that the bodies (3 and 4) have a cylindrical shape.
14. A clamp according to any one of the preceding Claims, characterised in that a spacer member (31) is provided between the bodies (3 and 4) and has a first portion (32) which is shaped like the second body (4) and is fixed in the same manner as the latter to the first body (3) and a second portion (33) shaped like the first body (3) and fixed in the same manner as the latter to the second body (4). 35
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FIG.1

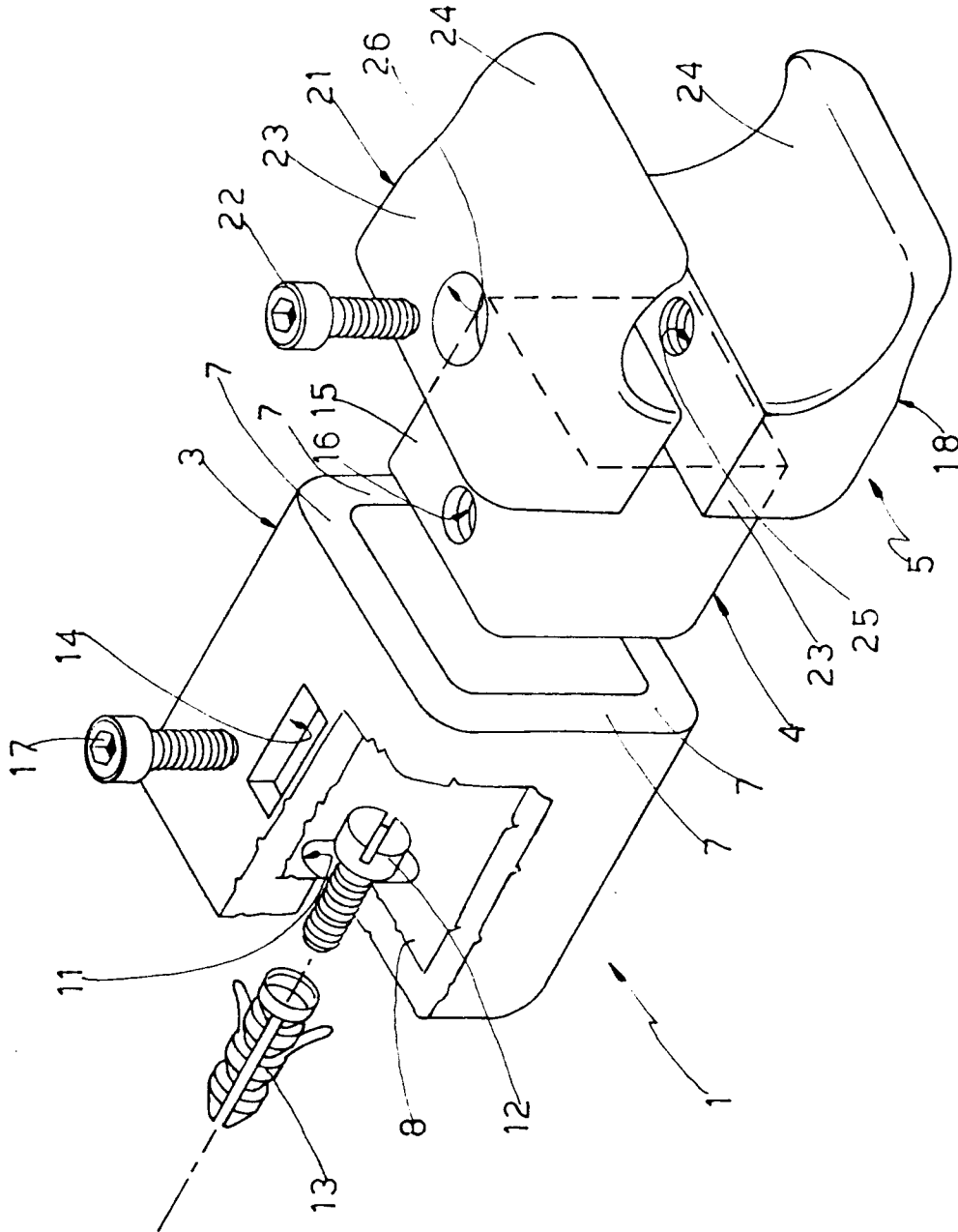


FIG.3

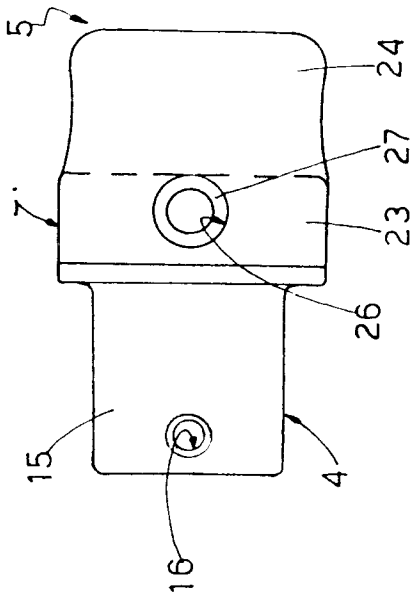


FIG.2

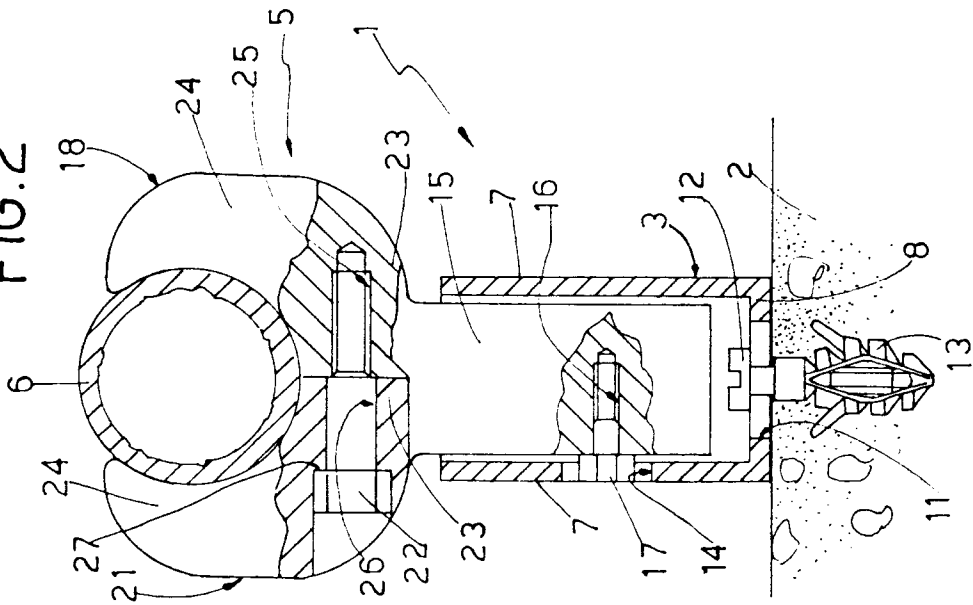
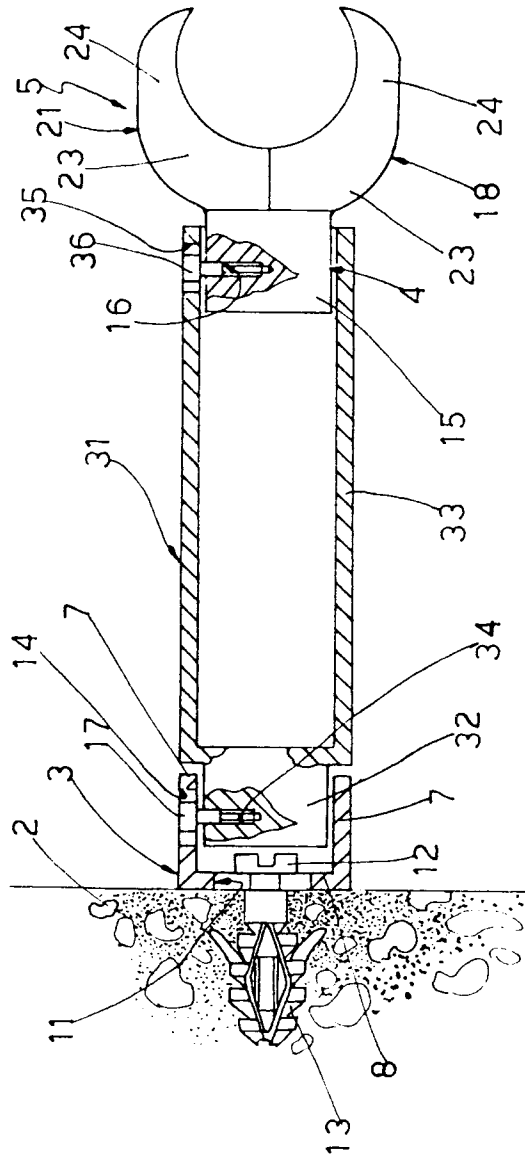


FIG.4



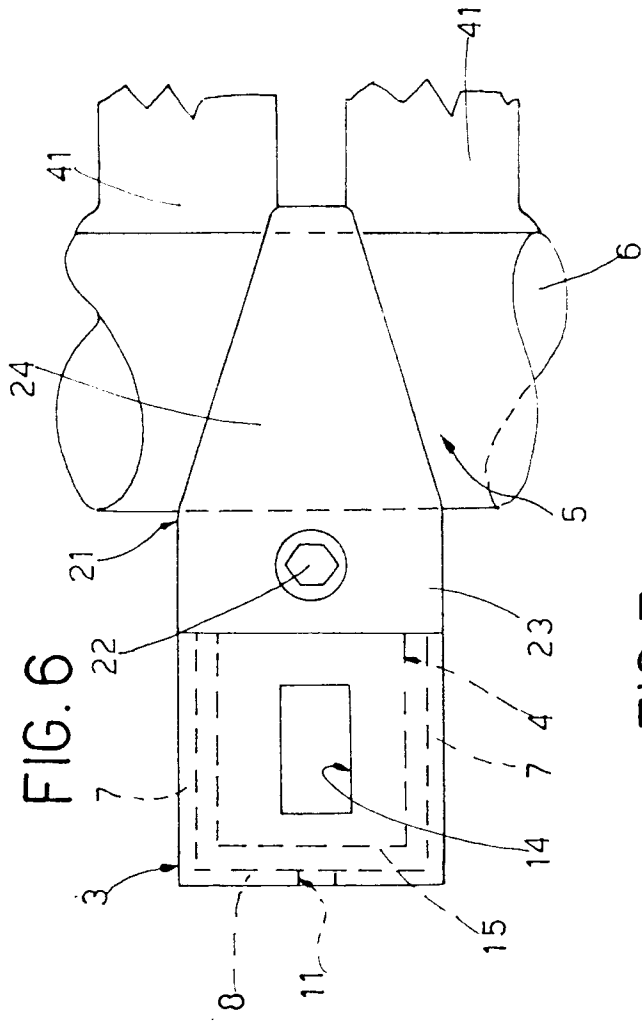


FIG. 6

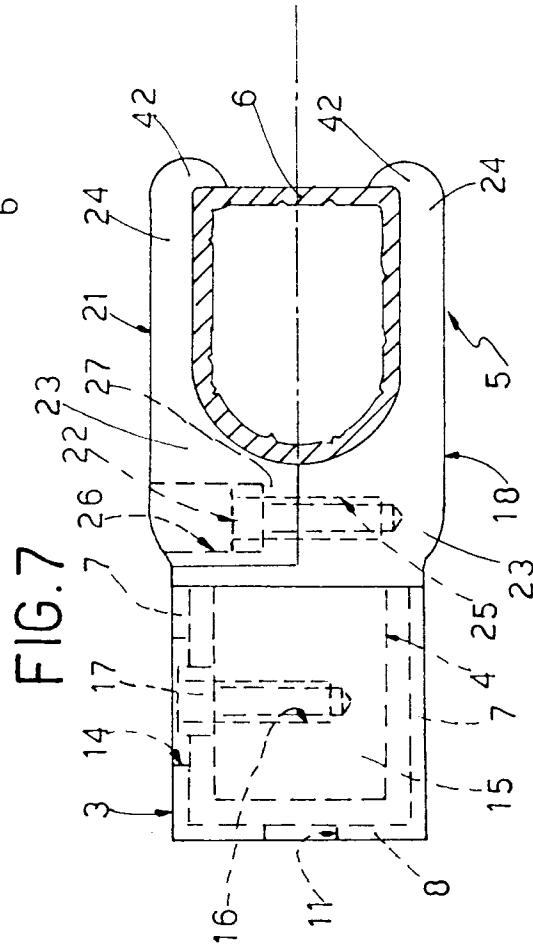


FIG. 7

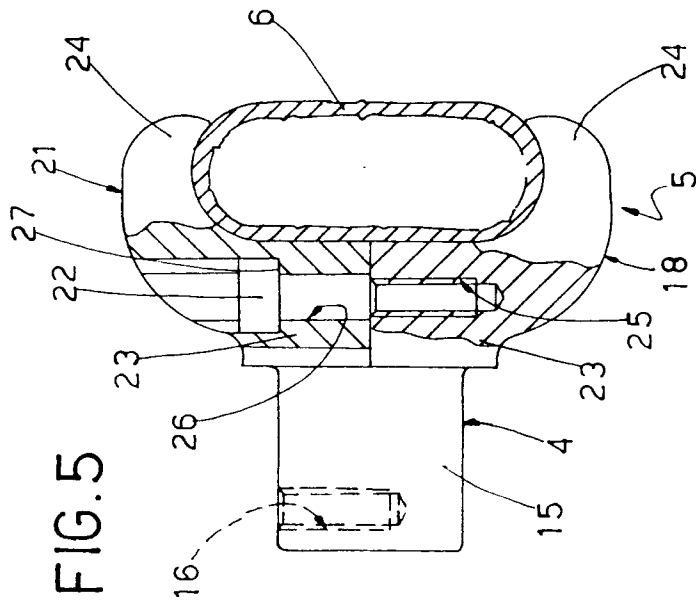


FIG. 5



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.5)
X	EP-A-0 386 301 (ZEHNDER-BEUTLER GMBH)	1-6, 13	F24D19/02
Y	* the whole document *	6-11	

Y	EP-A-0 191 924 (ROBERT BOSCH GMBH)	6-11	
	* figures *		

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 MAY 1992	Examiner VAN GESTEL H. M.
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	