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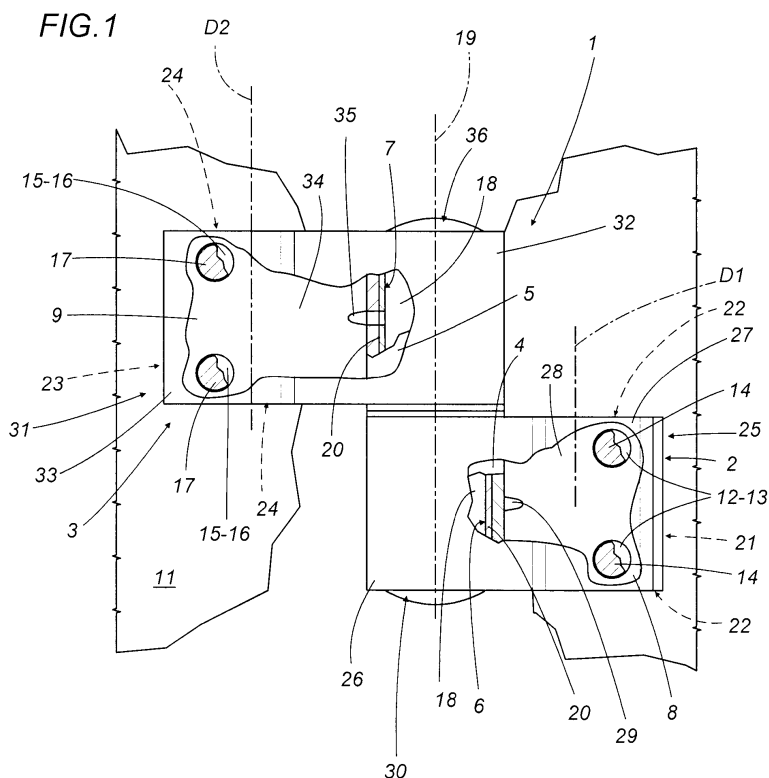
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(54) **A hinge for door or window frames**

(57) Described is a hinge for metal door or window frames where two hinge bodies (2, 3), each consisting of a tubular portion (4, 5) with a first hole (6, 7) through the centre of it and a flap (8, 9) for securing it to a mobile frame or fixed frame (10, 11), and a hinge pin (18) inserted coaxially in the first holes (6, 7). Each flap (8, 9) extends laterally from the respective tubular portion (4, 5) and has at least one second through hole (12, 15) in which an

element (14, 17) for securing the flap (8, 9) to the mobile frame or the fixed frame (10, 11) can pass. Each body (2, 3) of the hinge (1) is also equipped with a respective cap (25, 31) designed to hide the securing elements (14, 17) from view and having a first portion (26, 32) for covering the respective tubular portion (4, 5) and a second portion (27, 33) for covering the respective flap (8, 9), both these portions being joined as one in a single piece.



Description

[0001] This invention relates to a hinge for door or window frames, in particular, but without restricting the scope of the invention, for metal door or window frames.

[0002] A hinge made according to the present invention is particularly suitable for heavy or security door or window units, such as, for example, outside doors, gates and the like.

[0003] Prior art hinges for such door or window units normally comprise two hinge bodies, usually made of extruded aluminium, and a steel hinge pin inserted into respective through holes in the hinge bodies with centring bushings inserted between the bodies and the pin. Each of the through holes in the hinge bodies is made coaxially in a substantially cylindrical portion of the respective hinge body itself. One of the hinge bodies is designed to be attached to the mobile frame of the door or window unit, and the other to the fixed frame, and each of them has a flap by which it is secured to the respective door or window frame.

[0004] The flap, which extends laterally from the substantially cylindrical portion of the hinge body, normally has two through holes, crossed, perpendicularly to the hinge pin, by securing screws whose heads are normally accommodated in respective truncated-cone shaped or countersunk seats made in the hinge flaps themselves.

[0005] At present, the screw heads are hidden by special tamper-proof caps and, for this purpose, the free end of each flap has an L-shaped groove running parallel with the hinge pin and with which the cap is slidably coupled before being fixed to the hinge body by another screw that is accessible only when the door or window is open: the screw is housed in a suitable seat made in a part of the cylindrical portion of the hinge body which, during use, is in contact with the door or window unit or frame and, when the door or window is open, can be screwed into a threaded hole made in the tamper-proof cap which is thus secured to the hinge flap.

[0006] The caps cover the whole of the large uncovered face of the hinge flaps and each forms a surface that smoothly connects with the substantially cylindrical portion of the respective hinge body, leaving this portion in view.

[0007] These tamper-proof caps, however, have several disadvantages.

[0008] A first disadvantage is due to the fact that each cap, however strong and however closely fitted to the substantially cylindrical portion of the respective hinge body may be tampered with by inserting a crowbar or similar tool between it and the cylindrical portion of the hinge in order to force the door or window open. Even if the attempt to break in is not successful, it inevitably damages the components of the hinge.

[0009] Another disadvantage is that since the cap only partially covers the hinge, the hinge itself is subjected to an additional machining process to prepare the L-shaped groove on the flap and requires a surface finishing treat-

ment, such as painting, that must also be performed on the caps: this complicates the hinge production process and increases the production cost, with obvious negative effects on the cost paid for the hinge by the end user.

[0010] One aim of the present invention is to provide a hinge for door or window frames with improved tamper-proof features.

[0011] Another aim of the invention is to provide a hinge for door and window frames that is simple and economical to produce.

[0012] In accordance with the above mentioned aims, this invention proposes a hinge for door or window frames comprising two hinge bodies, each consisting of a tubular portion with a first hole through the centre of it and a flap for securing it to a mobile frame or fixed frame, and a hinge pin inserted coaxially in the first holes; each flap extends laterally from the respective tubular portion and has at least one second through hole in which an element for securing the flap to the mobile frame or fixed frame can pass; each body of the hinge is also equipped with a respective cap designed to hide the securing elements from view and having a first portion for covering the respective tubular portion and a second portion for covering the respective flap, both these portions being joined as one in a single piece.

[0013] The claims dependent on claim 1 describe preferred, advantageous embodiments of the invention.

[0014] The advantages of the invention will become more apparent from the following detailed description provided by way of example with reference to the accompanying drawings which illustrate a preferred, non-restricting embodiment of the invention and in which:

- Figure 1 is a front view, with some parts in cross section and others cut away in order to better illustrate others, of a preferred embodiment of a hinge according to the present invention;
- Figure 2 is a perspective view of the hinge of Figure 1;
- Figure 3 is a perspective view of another embodiment of the hinge of Figure 1;
- Figure 4 is an exploded, perspective view of the hinge of Figure 2;
- Figures 5, 6 and 7 illustrate a step of applying an accessory to the hinge according to the invention, that is to say, a cap on one of the hinge bodies, Figures 5 and 6 in perspective views and Figure 7 in a side view; all three Figures having some parts cut away in order to better illustrate others.

[0015] With reference to the accompanying drawings, in particular Figure 1, the numeral 1 denotes in its entirety a hinge for door or window frames, in particular, but without restricting the scope of the invention, door or window frames made of metal. The hinge 1 is designed in particular for so-called heavy or security door or window frames, such as, for example, those of outside doors, gates and the like, and comprises two hinge bodies 2 and 3 both preferably made of extruded aluminium and

each having a substantially cylindrical tubular portion 4, 5 with a respective central through hole 6, 7, and a flap 8, 9 by which it is secured to a door or window frame 10, 11.

[0016] The door or window frame 10 to which the hinge body 2 is secured is a fixed frame, whilst the door or window frame 11 to which the hinge body 3 is secured is mobile.

[0017] According to an embodiment that is not illustrated, the fixed frame 10 may be absent and the hinge body 2 may be fixed directly to a load-bearing wall structure which in this case serves the same purpose as the fixed frame.

[0018] The flap 8 extends laterally from the tubular portion 4 and has two through holes 12, aligned along a direction D1 parallel with the axis of the hole 6. There are corresponding through holes 13 in the fixed frame 10 so that it can be connected to the flap 8 using two screws 14 at a right angle to the direction of alignment D1.

[0019] Similarly, the flap 9 extends laterally from the tubular portion 5 and has two through holes 15, aligned along a direction D2 parallel with the axis of the hole 7. There are corresponding through holes 16 in the mobile frame 11 so that it can be connected to the flap 9 using two screws 17 at a right angle to the direction of alignment D2.

[0020] In alternative embodiments, not illustrated, the flaps 8 and 9 and the respective frames 10 and 11 have a number of through holes other than two.

[0021] The rotation of the hinge bodies 2 and 3 relative to each other is permitted by a hinge 1 pin 18. Usually, but without restricting the scope of the invention, the hinge pin 18 is made of steel and is inserted coaxially into the holes 6 and 7 so as to enable the hinge body 2 to turn relative to the hinge body 3 about a central axis 19 of the pin 18 itself. In particular, the pin 18 is inserted in the holes 6 and 7 with two interposed centring bushings 20 of customary type.

[0022] In a non-restricting embodiment, the flap 8 is laterally delimited by an end face 21, located on the side opposite the tubular portion 4 and parallel with the axis of the hole 6, and by two sides 22, both at right angles to the wall 21.

[0023] Similarly, the flap 9 may be laterally delimited by an end face 23, located on the side opposite the tubular portion 5 and parallel with the axis of the hole 7, and by two sides 24, both at right angles to the wall 23.

[0024] The body 2, once fitted to the frame 10, is covered by a tamper-proof cap 25, preferably of metal, which, as shown in Figure 2, is shaped to follow the profile of the body 2 itself, with a clearly-defined edge between the tubular portion 4 and the flap 8. In particular, the cap 25, made in a single piece, has a first portion 26, shaped in such a way as to closely surround and fully cover the lateral surface of the tubular portion 4 except for a longitudinal strip adjacent to the flap 8, and a second portion 27, shaped in such a way as to closely surround and fully cover the portion of the flap 8 that is defined by the face

21, the sides 22 and an outside face 28 of it located on the side opposite the face by which the flap 8 is in contact with the frame 10, adjacent to the above mentioned longitudinal strip.

[0025] The cap 25 is fitted to the body 2 by sliding the portion 26 over the portion 4 in the direction of the axis 19, with the portion 27 positioned in a plane that is rotated with respect to the plane in which the frame 10 lies, and then turning the portion 27 until it is in contact with the frame 10. Once in the closed position, where it is in contact with the frame 10, the cap 25, which is stopped from sliding in the direction of the axis 19 by the sides 22, is fixed to the hinge body 2 by screws 41 which, with the frame 11 in the open position, are inserted into a hole 29 which passes through the portion 4 and the flap 8 and which is accessible from the above mentioned longitudinal strip (as described in more detail below).

[0026] The axial end of the portion 4 on the side opposite the body 3 is covered by a plug 30 that is fitted by pressing it into the axial end of the portion 4 itself or, in another embodiment, into the corresponding axial end of the portion 26. In yet another embodiment, the plug 30 may be integral, in a single piece, with the above mentioned axial end of the portion 26 (see Figure 3).

[0027] Similarly, the body 3, once fitted to the frame 11, is covered by a tamper-proof cap 31, preferably of metal, which, as shown in Figure 2, is shaped to follow the profile of the body 3 itself, with a clearly-defined edge between the tubular portion 5 and the flap 9. In particular, the cap 31, made in a single piece, has a first portion 32, shaped in such a way as to closely surround and fully cover the lateral surface of the tubular portion 5 except for a longitudinal strip adjacent to the flap 9, and a second portion 33 shaped in such a way as to closely surround and fully cover the portion of the flap 9 that is defined by the face 23, the sides 24 and an outside face 34 of it located on the side opposite the face by which the flap 9 is in contact with the frame 11, adjacent to the above mentioned longitudinal strip.

[0028] As may be clearly inferred from Figures 5, 6, and 7, the cap 31 is fitted to the body 3 by sliding the portion 32 over the portion 5 in the direction of the axis 19 (see arrow F) until it fully covers the portion 5 (see Figure 6) and with the portion 33 positioned in a plane that is rotated with respect to the plane in which the frame 11 lies, and then turning the portion 33 until it is in contact with the frame 11 (see arrow F1 in Figures 6 and 7).

[0029] Once in the closed position, where it is in contact with the frame 11, the cap 31, which is stopped from sliding in the direction of the axis 19 by the sides 24, is fixed to the hinge body 3 by screws 41 (according to a known method) which engage with a respective internal threaded hole 40 (see Figure 4) made in each cap 25 and 31.

[0030] Securing occurs when the frame 11 is in the open position using a hole 35 which passes through the portion 5 and the flap 9 and which is accessible from the above mentioned longitudinal strip.

[0031] The axial end of the portion 5 on the side opposite the body 2 is covered by a plug 36 that is fitted by pressing it into the axial end of the portion 5 itself (Figure 2) or, in another embodiment, into the corresponding axial end of the portion 32. In yet another embodiment, the plug 36 may be integral, in a single piece, with the above mentioned axial end of the portion 32 (see also Figure 3).

[0032] In the embodiment shown in Figure 3, preferred in terms of appearance, the caps 25 and 31 are shaped in such a way as to follow the profiles of the hinge bodies 2 and 3 without clearly-defined edges between the tubular portions 4 and 5 and the respective flaps 8 and 9. In other words, the large outside surfaces of the portions 26 and 27 of the cap 25 are substituted by a single, outwardly convex surface, forming a smoothly curved part between the portions 26 and 27; and, in the same way, the large outside surfaces of the portions 32 and 33 of the cap 31 are substituted by a single, outwardly convex surface, forming a smoothly curved part between the portions 32 and 33.

[0033] In this case, the inside surfaces of the portions 26 and 27 of the cap 25 are preferably shaped as in the embodiment described above, that is to say, in such a way as to closely surround the tubular portion 4 and the flap 8, respectively. Similarly, the inside surfaces of the portions 32 and 33 of the cap 31 are preferably shaped as in the embodiment described above, that is to say, in such a way as to closely surround the tubular portion 5 and the flap 9, respectively.

[0034] It will be understood that the caps 25 and 31 may have different shapes and designs to meet exterior design requirements. In all embodiments, however, and if necessary, in conjunction with the plugs 30 and 36, where the latter are not integral parts of them, the caps 25 and 31 entirely cover the hinge bodies 2 and 3 when these are in the reciprocally assembled position on the respective frames 10 and 11 and the latter are in the closed position.

[0035] This, on the one hand, reduces the production cost of the hinge 1 since the hinge bodies 2 and 3 do not need to be painted and can be left untreated on the surface, and, on the other hand, provides added security against burglary since they offer no surfaces or edges that can be used to easily pry off or break the caps 25 and 31.

[0036] Therefore, a hinge made in this way achieves the preset aims thanks to covering elements or caps that are extremely practical and easy to fit and that offer a high level of security and, at the same time, have an attractive appearance.

[0037] The use of this type of total cover permits a reduction in the overall production cost of the hinge since it eliminates the need to further machine the hinge flaps and to paint the hinge bodies. Thus, only the caps which totally cover the hinge need to be painted.

[0038] The invention described is suitable for evident industrial applications and may be modified and adapted in several ways without thereby departing from the scope

of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. A hinge for metal door or window frames of the type comprising two hinge bodies (2, 3), each consisting of a tubular portion (4, 5) with a first hole (6, 7) through the centre of it and a flap (8, 9) for securing it to a mobile frame or fixed frame (10, 11), and a hinge pin (18) inserted coaxially in the first holes (6, 7) to allow the hinge bodies (2, 3) to rotate relative to each other about a central axis (19) of the pin (18) itself; each flap (8, 9) extending laterally from the respective tubular portion (4, 5) and having at least one second through hole (12, 15) in which an element (14, 17) for securing the flap (8, 9) to the mobile frame or the fixed frame (10, 11) can pass; the hinge (1) further comprising, for each body (2, 3), a respective cap (25, 31) for covering at least the securing elements (14, 17), and being **characterised in that** each cap (25, 31) consists of a first portion (26, 32) for covering the respective tubular portion (4, 5) and a second portion (27, 33) for covering the respective flap (8, 9), both these portions being made as one in a single piece.
2. The hinge according to claim 1, **characterised in that** the first covering portion (26, 32) is shaped in such a way as to fully cover the lateral surface of the respective tubular portion (4, 5) except for a longitudinal strip adjacent to the respective flap (8, 9).
3. The hinge according to claim 2, **characterised in that** the first covering portion (26, 32) is shaped in such a way as to fully cover the axial end of the respective tubular portion (4, 5) located on the side opposite the other tubular portion (4, 5).
4. The hinge according to claim 2 or 3, **characterised in that** the first covering portion (26, 32) is shaped in such a way as to closely surround and fully cover the lateral surface of the respective tubular portion (4, 5) except for a longitudinal strip adjacent to the respective flap (8, 9).
5. The hinge according to any of the foregoing claims from 1 to 4, **characterised in that** the second covering portion (27, 33) is shaped in such a way as to fully cover the respective flap (8, 9) except for the face by which the flap (8, 9) itself is in contact with the respective frame (10, 11).
6. The hinge according to claim 5, **characterised in that** the second covering portion (27, 33) is shaped in such a way as to closely surround the respective

flap (8, 9) except for the face by which the flap (8, 9) itself is in contact with the respective frame (10, 11).

7. The hinge according to any of the foregoing claims from 1 to 6, **characterised in that** each cap (25, 31) is made of metal and in a single piece. 5
8. The hinge according to any of the foregoing claims from 1 to 7, **characterised in that** each cap (25, 31) is shaped in such a way as to follow the profile of the respective hinge body (2, 3). 10
9. The hinge according to any of the foregoing claims from 1 to 7, **characterised in that** each cap (25, 31) has an internal threaded hole (40) designed to be engaged by screw means (41) which, when the door or window frame is in the open position, can be inserted into a hole (35) that goes through the tubular portion (4, 5) and the flap (8, 9) and can be accessed from the uncovered longitudinal strip. 15
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FIG. 1

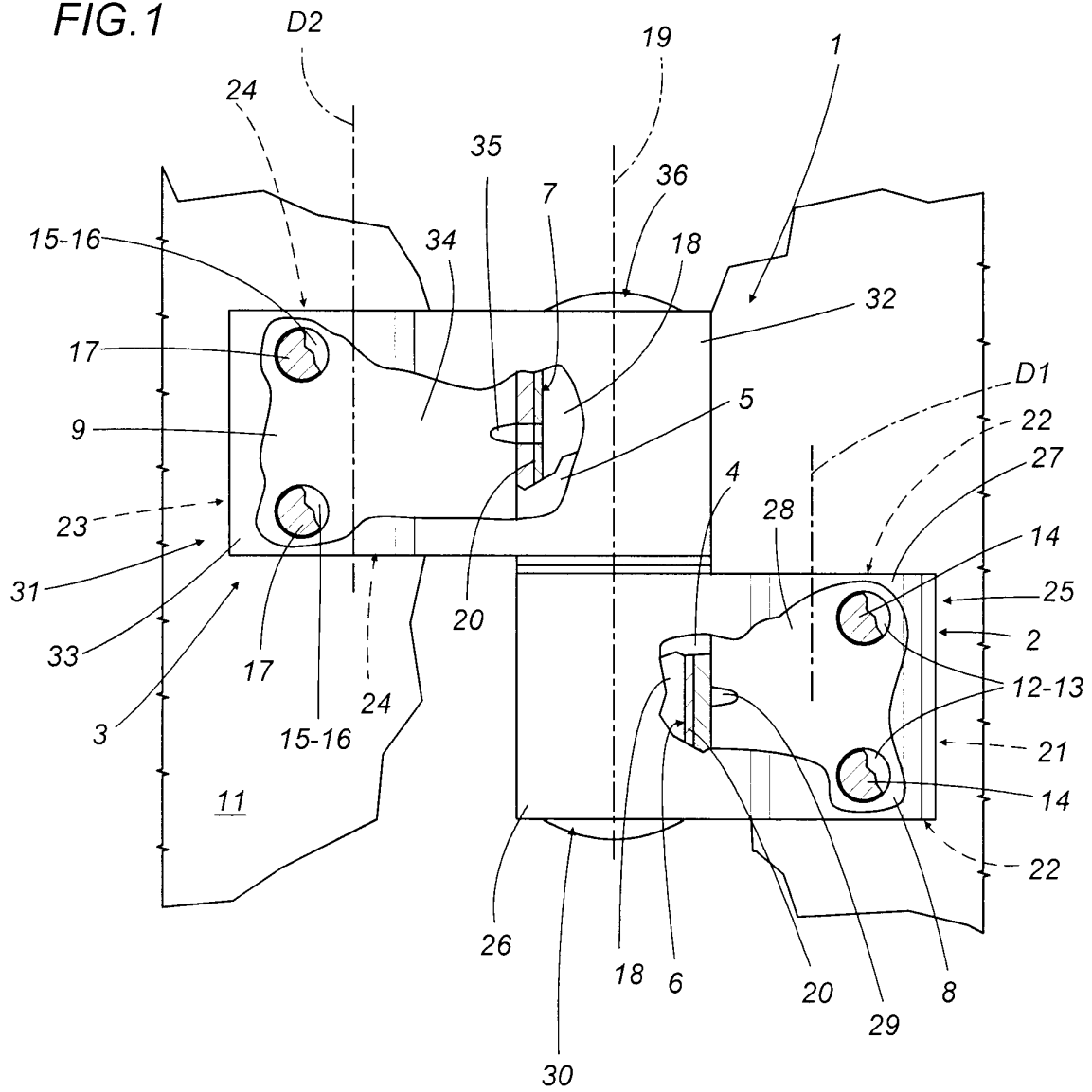


FIG.2

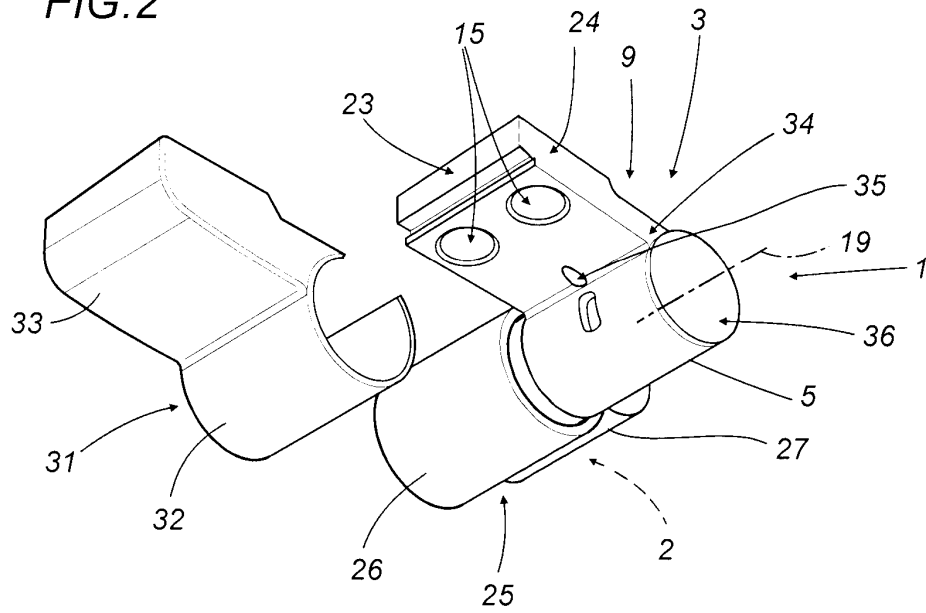


FIG.3

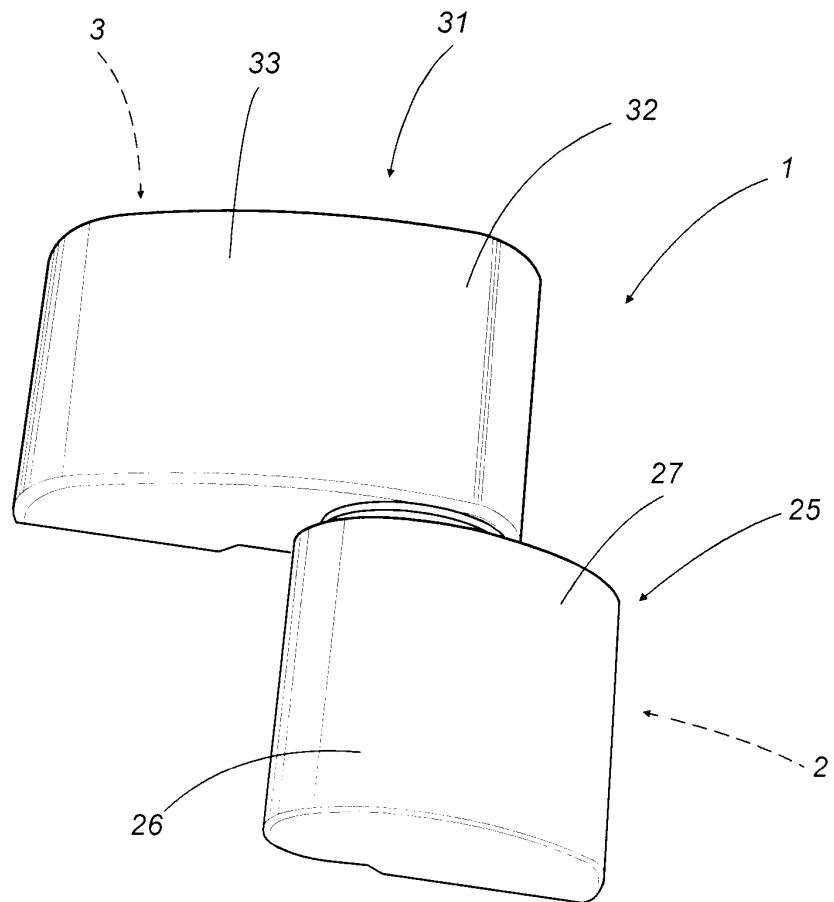


FIG.4

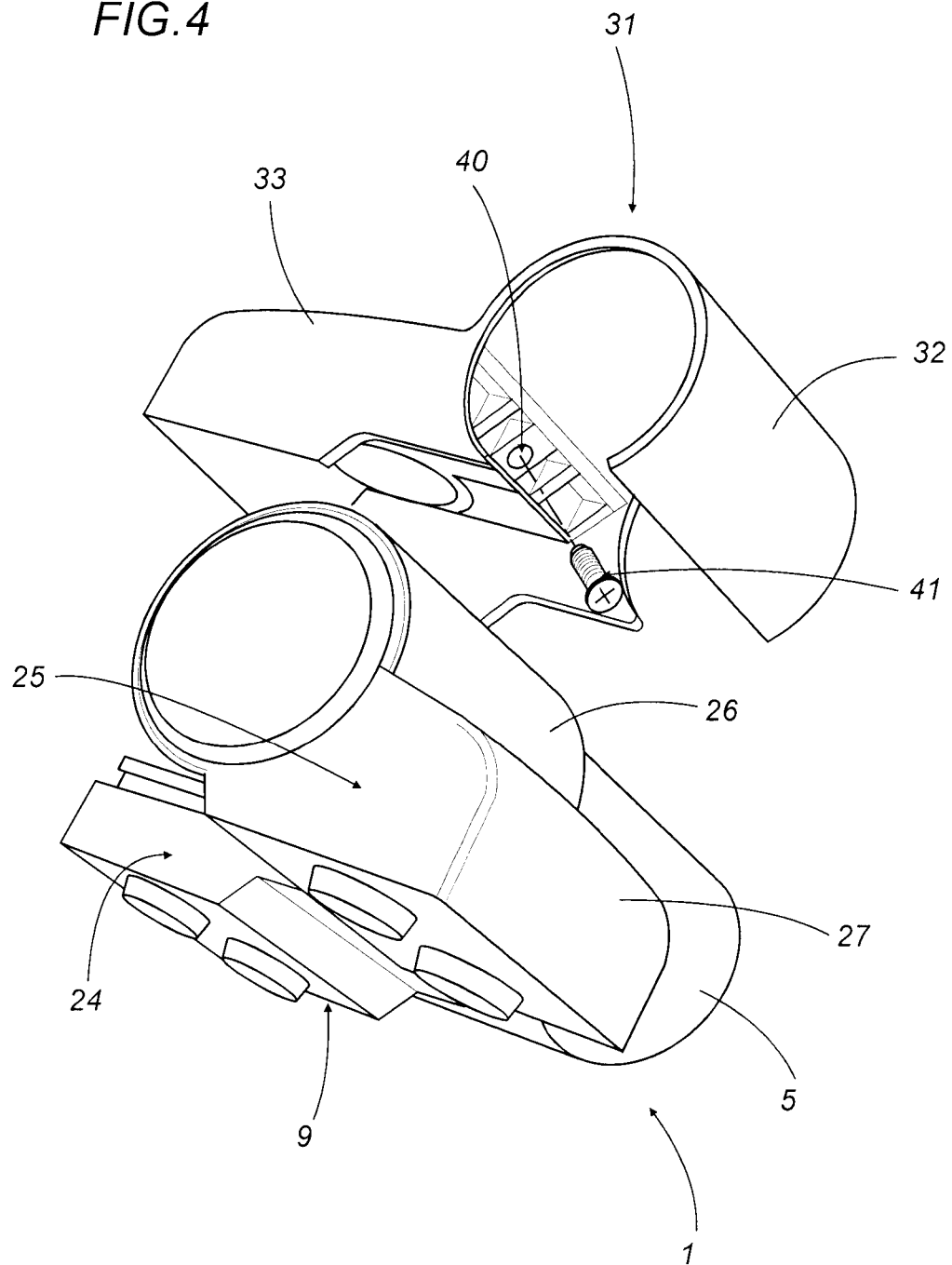


FIG.5

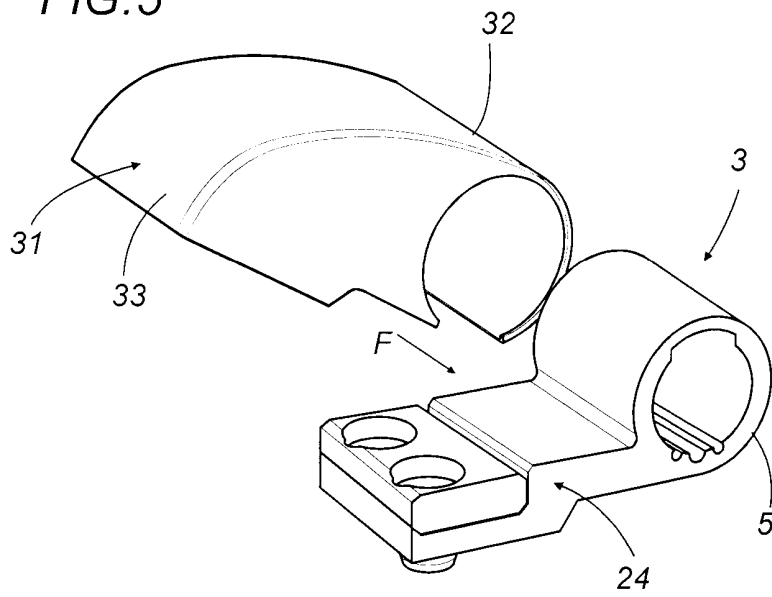


FIG.6

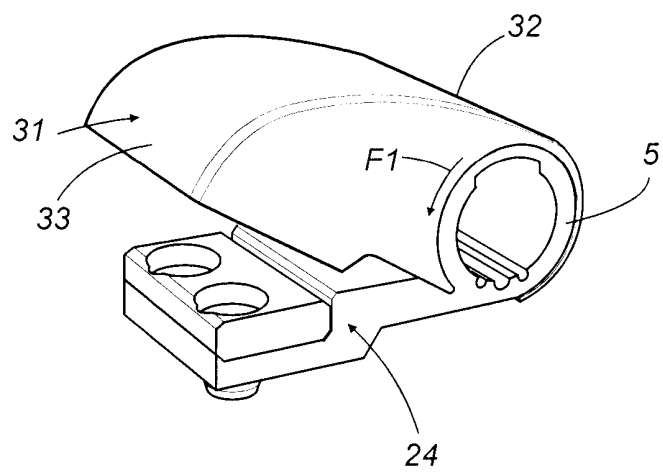


FIG.7

