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(71) Applicant:
aaa NE Italy made S.r.l.
San Giuseppe di Cassola (VI) (JP)

(72) Inventor: **Zen, Luigi**
San Giuseppe Di Cassola (VI) (IT)

(74) Representative:
La Ciura, Salvatore
Via Francesco Sforza, 3
20122 Milano (IT)

(54) Swinging supporting frame for a chair seat and back

(57) A swinging supporting frame for a chair seat and back, comprising:

- a sustantially horizontal arm (1) for fastening a chair seat;
- a telescopic rod (2) supporting the chair back and being hinged to said arm (1);
- one or more springs (40) acting on said vertical rod to push the chair back forward;
- a spacer (44) inserted between the walls (5) of said horizontal arm; and
- screw means (16) for pressing the walls of said telescopic rod (2) against the walls (5) of said arm (1) and against said spacer (44) to lock the chair back in position, wherein said springs (40) are helical springs inserted onto the hinge pin (6) which is fitted on said arm (1) and said telescopic rod (2), one of the ends of said springs acting directly against the wall of said arm (1) and the other spring end acting against said rod, in particular against said spacer (44) inserted on said clamping screw means.

A plurality of friction plates (10) are arranged between said spacer (44) and the walls of said arm (1), and in order to position and set up said plates (10), said frame includes a pair of teeth (8, 9) obtained in the walls (5) of said arm by blanking and drawing.

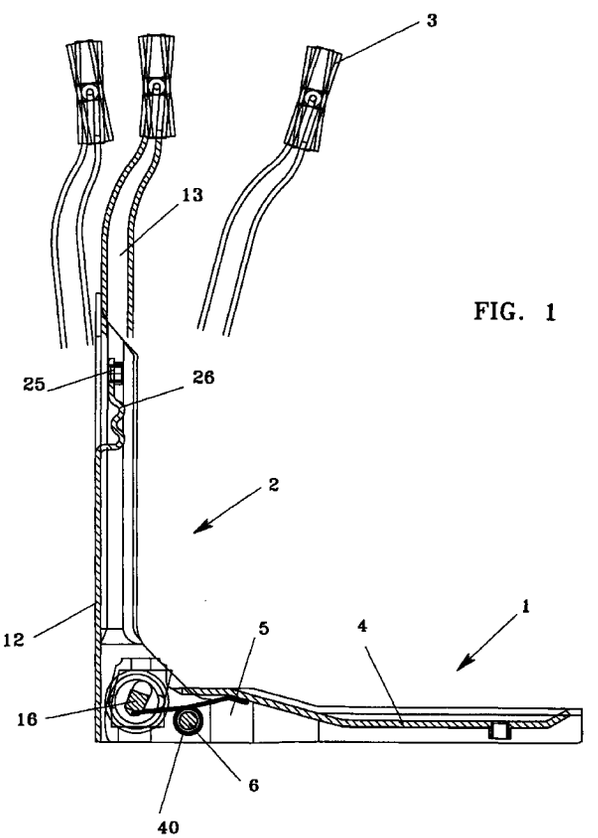

FIG. 1

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Description

[0001] The present invention provides a supporting frame for a chair seat and back, comprising a substantially horizontal arm to which the chair seat is fastened and a substantially vertical rod on which the chair back is fitted, said rod being hinged to said arm and being subject to the action of elastic means which push it forward to keep the chair back in contact with the user.

[0002] Hinged supporting frames for a chair seat and back are known generally comprising a substantially horizontal arm, to which the chair seat is fastened, and a telescopic rod being hinged to said arm at the back of the frame and subject to the action of a spring which tends to push the chair back against the user.

[0003] This telescopic rod usually consists of a pair of sections, for example C-shaped sections, each sliding inside the other to allow the height of the chair back to be adjusted, and devices are provided which lock the telescopic rod in the desired position.

[0004] Generally in prior art frames a pair of side walls are provided at the base of the telescopic rod which fit around the horizontal arm and wherein holes are provided for a pin passing therethrough, said pin forming the hinge around which the telescopic rod rotates, and for clamping screw means.

[0005] In the base arm of prior art frames a pin parallel to the hinge pin is provided in front of said hinge pin.

[0006] On the hinge pin a spiral spring is inserted, an end of which engages the front pin in the horizontal arm and the other end engages the lower edge of the telescopic rod, thus exerting a force which tends to rotate the telescopic rod forward. On the clamping screw, inside the horizontal arm, a plurality of friction sheets are inserted which are tightened between a spacer, inserted on said screw, and the arm wall.

[0007] The friction sheets are alternatively integral with the horizontal arm and the telescopic rod to increase the friction area.

[0008] However, this configuration has various drawbacks, among which, primarily, considerably difficult assembling.

[0009] As a matter of fact, in order to assemble the frame, it is necessary to fit up first the friction sheets, then the spring, then the two pins in the horizontal arm and finally the clamping screw means.

[0010] However, in order to position the various components a considerable force must be exerted to align the holes for the clamping screw in the arm and in the telescopic rod, by overcoming the force of the spring and keeping the various parts in position.

[0011] Another problem of prior art frames is the difficulty in preventing the rotation of the screw forming the steady pin when the knob for fastening the telescopic rod is tightened.

[0012] For this purpose in the wall of the horizontal arm an eyelet with substantially parallel sides is provided, inside which the polygonal end of the screw shank is inserted.

[0013] A gauged hole housing the screw head is provided in the wall of the telescopic rod.

[0014] If, when tightening the knob, the head acted directly on the wall of the telescopic rod, due to the structural inaccuracies of this kind of elements it would be impossible to have the friction sheets working properly.

[0015] The result of this is a complex accomplishment.

[0016] In order to obviate the above-described drawbacks, the present invention provides a swinging supporting frame for a chair seat and back, wherein the elastic force pushing forward the telescopic rod which supports the chair back is supplied by a spring which is fit on a pin in the horizontal arm and an end of which acts directly against said arm, whereas the other end acts against the clamping screw means.

[0017] This and other features of the present invention, as defined in the appandewd claims, will become more apparent from the following detailed description, provided, by way of non restrictive example, with reference to the accompanying drawings in which:

- figure 1 is a side view of an assembled frame according to the invention, showing the telescopic rod in its various possible positions;
- figures 2 and 3 are respectively a top view and a side view of the horizontal arm in a frame according to the invention;
- figure 3a is a perspective view of a particular of the orizontal arm, in a further preferred embodiment of the invention;
- figure 4 illustrates the plate from which the arm of the preceding figures is obtained and it shows the plate blanking and folding lines;
- figures 5, 6 and 7 are respectively a front view and two opposing side views of the telescopic rod in a frame according to the invention;
- figure 8 illustrates the plate from which the parts forming the telescopic rod are obtained and it shows the plate blanking and folding lines;
- figure 9 shows a friction plate in a frame according to the invention;
- figure 10 shows the clamping screw and a spacer inserted thereon;
- figure 11 shows the spring;
- figures 12 and 13 are a front view and a side view of the support for the chair back;
- figure 14 shows a plate for fastening the chair back;
- figure 15 is a plan view of the plate of figure 14;
- figure 16 is a sectional view of the plate of figure 14.

[0018] With reference to figure 1, the frame of the invention comprises a suybstantially horizontal arm, shown as a whole by numeral 1, to be fastened by means of a plate or the like to a chair seat, and a telescopic rod, shown as a whole by numeral 2, which is hinged to the arm 1 and at the upper end of which a

plate 3 is hinged to which the chair back is fastened.

[0019] The arm 1 is obtained by blanking and shaping a plate, for example a conveniently thick steel plate, to provide a central stiffening rib 4 (see figures 2 and 3) and a pair of side walls 5.

[0020] The side walls 5 have a hole for the insertion of a hinge pin 6 on which also one or more springs 40 (shown in fig. 11) are fitted up, acting on the telescopic rod 2.

[0021] An eyelet 7 is also provided in the side walls 5, to let a screw pass therethrough to lock the telescopic rod in the desired position.

[0022] The eyelet 7 has an elongated shape to allow the screw to shift and follow the swinging of the telescopic rod 2.

[0023] Above and beneath the eyelets 7 the side walls of the arm 1 have two pairs of teeth, shown by numerals 8 and 9 respectively, which are obtained directly in the plate wall by blanking and drawing. These teeth 8 and 9 act as a guide to position friction plates 10, which are shaped as shown in figure 9, with an eyelet which corrsponds to eyelet 7 in walls 5 of arm 1.

[0024] Two washers, not illustrated in the drawings, are insertd on the clamping screw and operate in contact with said friction plates 10 and with the walls 5, to develop a friction that slows the movements of the rod 2.

[0025] When rod 2 oscillates, rotaing around the hinge pin 6, the washers slide in contact with the friction plates 10 and with walls 5, while plates 10 are locked by teeth 8 and 9.

[0026] The central rib 4 has a thickened portion 11 which is drilled and threaded to allow a screw to be tightened for fastening the chair seat and which has a hexagonal cavity for a nut or the like.

[0027] The fact that the rib 4 is rather deep, besides giving greater stiffness to the arm 1, also allows a shorter screw to be used for fastening the chair seat.

[0028] The telescopic rod (fig. 1) comprises a base 12 and a bar 13 supporting the chair back, said bar 13 sliding inside the base 12.

[0029] The base is substantially a C-shaped section having at its lower end a pair of side walls 14 which fit around the walls 5 at the back of the horizontal arm 1.

[0030] In these walls a hole is provided, in a location corresponding to the hole 6 in the arm 1, to let the hinge pin pass therethrough.

[0031] The seat for the screw fastening the telescopic rod, shown by numeral 16 in figure 10, is blanked in the walls 14.

[0032] According to the invention, in the walls 14 a pair of washers 17 and 18 are blanked, the former of which has a polygonal opening 19 and the latter has a circular port 20 (see figs. 6, 7).

[0033] The washers 17 and 18 are not blanked along the whole circumference, but banking is interrupted for a short length in order to form an extension 21 connecting the washers to the wall 14.

[0034] This configuration avoids the need to work this part of the frame precisely and, therefore, costly.

[0035] As a matter of fact, once the screw 16 has been inserted into the washers, it is prevented from rotating by the engagement between the polygonal portion of the shank and the port 19 of the washer 18, whereas the screw and its washer are prevented from moving by the extension 21 connecting the washers to the wall 14.

[0036] On the other hand, since the width of the extension 21 is limited, the force by which the screw is tightened, exerted along a short length, causes a slight local deformation of the wall 14, in particular of the extension 21, thus enabling the washers 17 and 18 to move forward with respect to the wall 14 to lean against the wall 5 of the horizontal arm, as shown in detail in figure 5.

[0037] According to a further preferred embodiment, the side walls 5 of arm 1 may have two upwardly bent wings 45, each having a slot 46 (fig. 3a).

[0038] A washer, inserted on the screw 16, may then be positioned between wall 5 and wing 45, to exert a frictinal force which opposes to the movements of rod 2.

[0039] In such a case, the plates 10 as well as teeth 8 and 9 are no more necessary.

[0040] The section 13, to which the chair back is hinged or fastened, fits into the base 12 of the telescopic rod 2, said base 12 having substantially a C-shaped cross-section.

[0041] The section 13 has, at its lower end, a central slot 22, which starts at the base and extends to a certain height.

[0042] Preferably the facing edges of the section 13 have a series of teeth 42 which engage one another, in order to prevent the two edges from sliding during work and provide greater structural stiffness.

[0043] A tongue 23 with a larger upper end 24 is blanked in the base section 12. In this upper end or head 24 a threaded hole 25 is provided, whereas the tongue 23 is bent to form one or more loops shown by numeral 26 in figures 6 and 7.

[0044] The shank of a knob for locking the section 13 at the desired height is screwed into the threaded hole 25 to adjust the height of the chair back.

[0045] As a matter of fact, the section 13 is inserted into the base 12 by fitting the slot 22 on the threaded shank of the knob (not shown), which is screwed into the head 24.

[0046] It is now sufficient to tighten the knob in order to press the tongue head 24 against the section 13 and the wall of the base 12 to lock the assembly in position.

[0047] The loops 26 help to move the head 24 downwards with respect to its initial position, in order to avoid that, by using a small knob, said knob can pass through the hole with which the head 24 was connected.

[0048] If preferred, the slot 22 may be provided in the base 12. In such a case, only a threaded hole for the knob will be provided in the section 13, and the knob will shift together with the section when adjusting the height of the seat back.

[0049] Finally, in view of the fact that on the upper por-

tion of the base 12 only the central area of the section is subject to stress, whereas the wall ends do not co-operate, according to the invention this end has been blanked so that the upper end of the section has sloping sides.

[0050] This allows the section to be made by simply blanking a plate according to the shape shown in figure 8, so that the whole plate width can be employed.

[0051] Thus, contrary to prior art systems, the need is avoided to use a wider plate and to provide a side extension with a plurality of elements for the connection to the various sections being blanked.

[0052] Preferably the lower end of the section 13 has two little projections or teeth 43 (fig. 12) which, though resiliently buckling and allowing the section to be fitted onto the screw of the locking knob, prevent the section 13 from being inadvertently drawn out of the base 12.

[0053] Finally, the upper end of the section 13 may be preferably folded to provide a sort of bar or arm on which the plate for fastening the chair back may be set, without any need to fit a small bar by welding, as it occurs with the prior art.

[0054] The assembly of the above-described device is considerably simplified.

[0055] The telescopic rod 2 is fitted onto the arm 1, then the sheets 10 are inserted between the teeth 8 and 9, after which the spacer is positioned inside the arm 5, and the screw 16 is inserted with the washers thereon, said screw 16 passing through the holes 19, 7 and 20 and the spacer 30, with the shank polygonal portion entering the port 19 of the washer 18.

[0056] Finally, the springs 40 and the hinge pin are positioned into the holes 15 and 6.

[0057] One of the spring ends leans against the arm 1 and the other spring end leans against the spacer 30 inserted on the screw 16.

[0058] It is then sufficient to push the spring slightly to position it correctly in connection with the holes and insert the hinge pin.

[0059] This easy assembly allows the whole apparatus to be automatically assembled.

[0060] At this point the section 13 is fitted into the base 12, and a knob is screwed into the threaded hole 25 of the head 24 of the tongue 23.

[0061] By tightening the knob the head 24 is pressed against the section 13 and against the wall of the base section 12, thus locking the support 13 of the chair back at the desired height.

[0062] The action exerted by the springs fitted on the hinge pin tends to push the telescopic rod 2 forward, in order to keep the chair back always in contact with the user.

[0063] In order to lock the telescopic rod in the desired position it is sufficient to tighten the knob which gets screwed on screw 16.

[0064] The engagement between the polygonal portion of the screw shank and the corresponding hole in the washer 18, which is connected to the wall 14 by means of the extension 21, prevents the rotation of the screw, thus allowing the knob to be tightened with one hand only.

[0065] By tightening the knob the force exerted on the washers 17 and 18 causes a slight deformation of the walls 14 (extension 21), enabling the washers to move forward with respect to the walls 14 and to lean against the walls 5 of the arm 1.

[0066] Thus, by conveniently tightening the knob, the telescopic rod 2 can be locked in position, whereas, by tightening the knob with less force the friction effect of the plates 10 can be exploited to slow down the movements caused by the spring.

[0067] According to an embodiment of the invention, the plate 3 has a central body 28 and a pair of flanges 29 which are connected to the body 28 by means of a pair of sloping walls 30 (figure 16).

[0068] The side walls 30 have a pair of holes 31 into which the arm 27 of the section 13 is inserted to provide a hinge support for the plate.

[0069] At the upper and lower sides of the plate 3 a pair of tabs 32 are also provided by blanking and folding the plate, which fit around the section 13 when the plate is set up in order to keep it centred on the telescopic rod and the arm 27.

[0070] The length of the arm is slightly greater than the distance between the holes 31 to allow the plate to be set up firmly when it is centred on its support and also to allow the arms to be slid from the plate by disengaging them from the holes 31 when the plate is pushed on one side or the other against the section 13.

[0071] This configuration allows the plate to be easily assembled with the chair back, without any need to use screws or the like.

[0072] As a matter of fact, it is sufficient to insert an end of the arm 27 into one of the holes 31, let then the plate slide along the arm 27 until the free hole gets past the other end of said arm, and then insert the second end of the arm into the second hole 31.

[0073] By taking the plate to the central position again, the arm ends will keep engaged in their seats.

[0074] In the working position the tabs 32 engage the section 13 to prevent the plate from sliding in one direction or the other, thus enabling said plate to swing with the chair back, but not to slide from its support.

[0075] If, on the contrary, the chair back has to be disassembled, it is sufficient to rotate it to disengage the tabs 32 from the section 13, after which the chair back with the plate is pushed laterally and the plate is disengaged from the arm 27.

[0076] According to a further feature of the invention, a small plate 33 made of a plastic material, preferably a tender and compressible plastic material which is divided into two overlapping areas of different thickness, is applied onto the plate 3.

[0077] The thickness of the small plate 33, which leans against the section 13 of the telescopic rod 2, defines the inclination of the chair back.

[0078] Since the holes 31 in the small plate are arranged at half height and the small plate is symmetric to both axes, it is possible to slide and set the small plate up again after having turned it upside-down, so as to lean against the section 13 the more or less thick portion of the small plate 33 and change the inclination of the chair back.

[0079] In order to fasten the chair back to the telescopic rod it is sufficient, as previously mentioned, to insert the arms 27 into the plate holes 31 with the chair back in a substantially horizontal position, after which, when the chair back is taken into an upright position, the tabs 32 engage the section 13, thus centering the plate and the chair back.

Claims

1. A swinging supporting frame for a chair seat and back, comprising:

   - a sustantially horizontal arm (1) for fastening a chair seat;
   - a telescopic rod (2) supporting the chair back and being hinged to said arm (1);
   - one or more springs (40) acting on said vertical rod to push the chair back forward;
   - a spacer (44) inserted between the walls (5) of said horizontal arm; and
   - screw means (16) for pressing the walls of said telescopic rod (2) against the walls (5) of said arm (1) and against said spacer (44) to lock the chair back in position,

   characterized in that said springs (40) are helical springs inserted onto the hinge pin (6) which is fitted on said arm (1) and said telescopic rod (2), one of the ends of said springs acting directly against the wall of said arm (1) and the other spring end acting against said rod, in particular against said spacer (44) inserted on said clamping screw means.

2. A frame according to claim 1, further comprising a plurality of friction plates (10) arranged between said spacer (44) and the walls of said arm (1), characterized in that, in order to position and set up said plates (10), said frame includes a pair of teeth (8, 9) obtained in the walls (5) of said arm by blanking and drawing.

3. A frame according to claim 2, characterized in that it comprises a pair of washers, inserted on said clamping screw means between said friction plates (10) and said wall (5) of said arm (1).

4. A frame according to any of the claims 1 to 3, characterized in that said telescopic rod (2) comprises a base section (12) hinged to said arm and a second section (13), sliding inside the first one and provided, at its lower end, with a longitudinal slot (22), said base section having a tongue, obtained preferably by blanking, with a free and larger upper end (25), said tongue being bent so that said end or head (25) is in a position lower than its initial position and at a certain distance from the wall of said base section, said head (25) being threaded to allow the knob to be screwed, said knob pressing said head against said sliding section and said base section.

5. A frame according to claim 4, characterized in that said base section (12) has a substantially C-shaped cross-section, the upper end of said section having downward sloping upper edges.

6. A frame according to claim 5, characterized in that the upper end of said sliding section is shaped to define a bar (27) for setting a plate (3) for fastening the chair back.

7. A frame according to any of the preceding claims, characterized in that it further comprises a pair of washers (18) with holes to let the clamping screw (16) pass therethrough, wherein one of said holes (19) has a polygonal cross-section, said washers being provided in the walls of the telescopic rod or of the arm and being connected to said telescopic rod or to said arm by means of an extension (21) which prevents them from rotating.

8. A frame according to claim 1, characterized in that the chair back is fastened to a plate (3) having a pair of holes (31) for the insertion of arms (27) provided in said telescopic rod, said plate comprising pairs of tabs (32) for engaging said telescopic rod to keep said plate centred with respect to said telescopic rod.

9. A frame according to claim 8, characterized in that a further small plate (33) of soft material is applied onto said plate, said small plate being placed between said plate (3) and said telescopic rod (2), said small plate having an upper and a lower areas of different thickness.

10. A frame according to claim 1, characterized by the fact of providing, in the side walls (5) of arm (1), two upwardly bent wings (45), each having a slot (46), a washer inserted on the screw (16), being positioned between wall (5) and wing (45), to exert a frictinal force which opposes to the movements of rod (2).

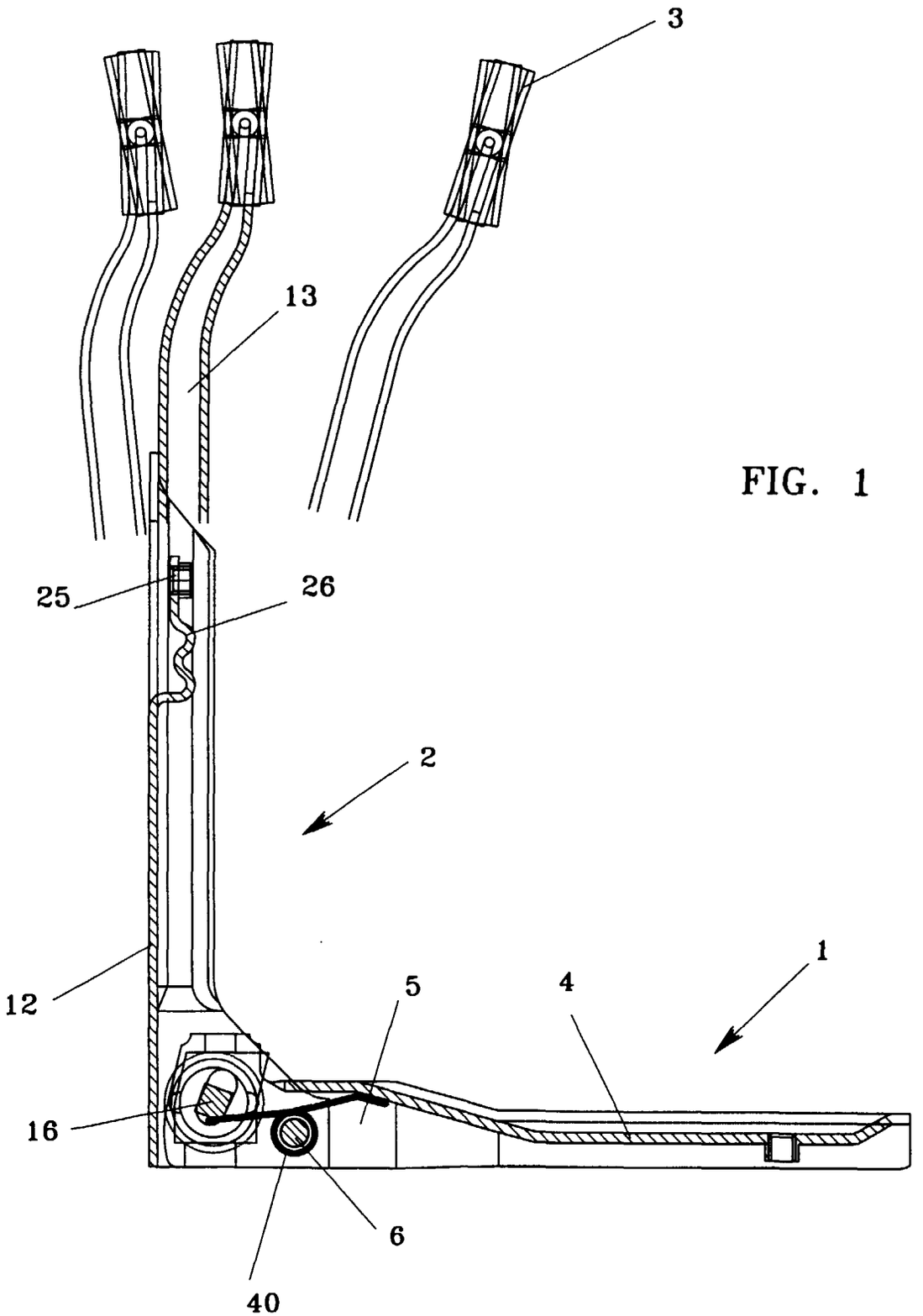

FIG. 1

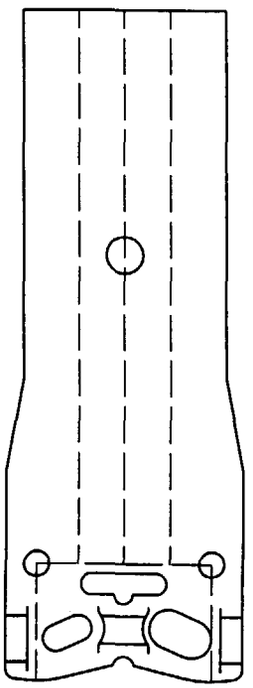

FIG. 4

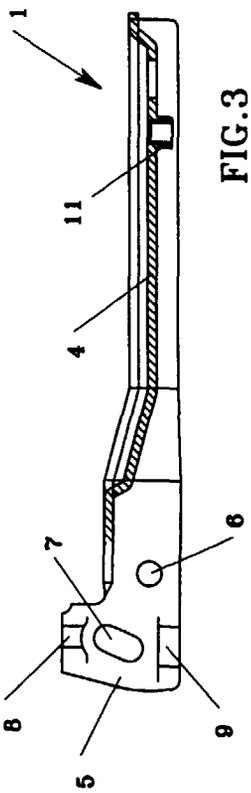

FIG.3

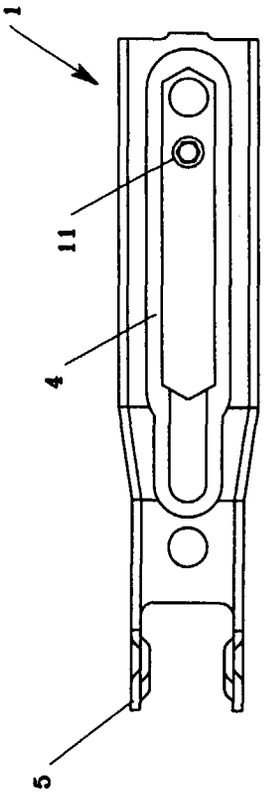

FIG. 2

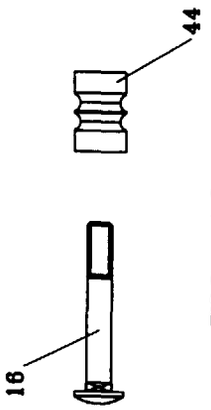

FIG. 10

FIG. 9

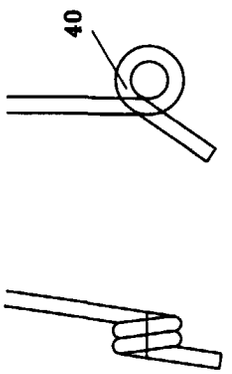

FIG. 11

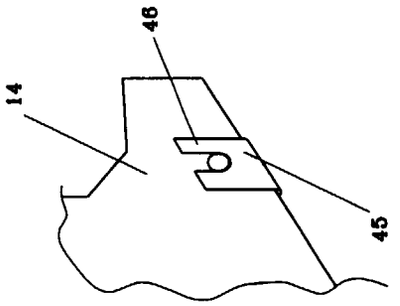

FIG. 3a

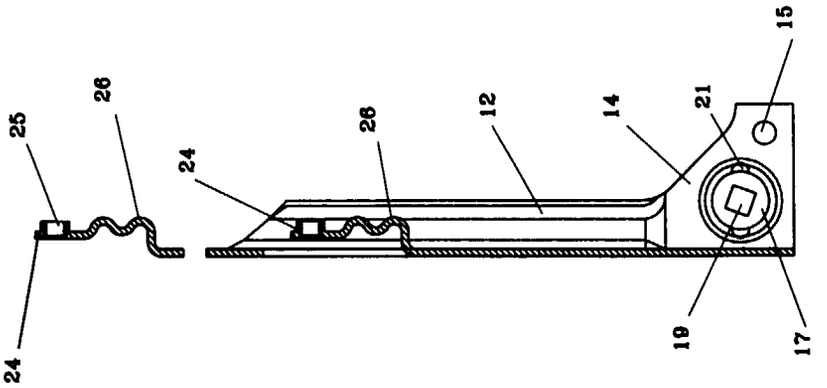

FIG. 7

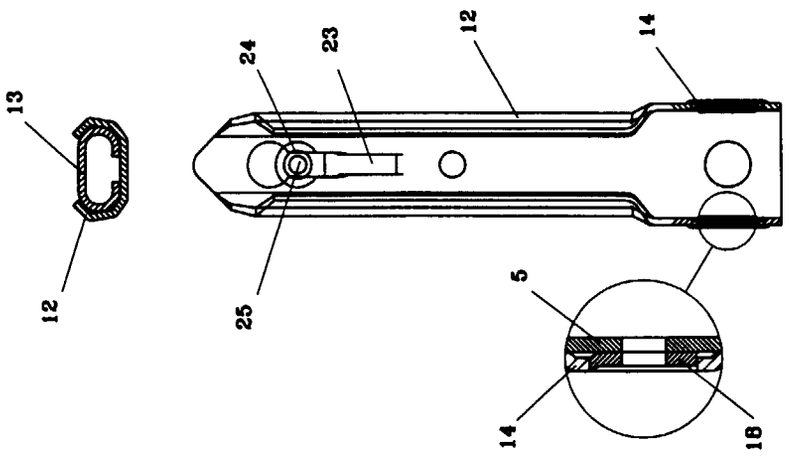

FIG. 5

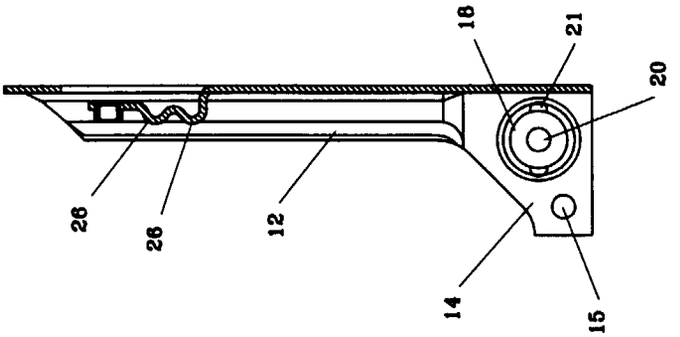

FIG. 6

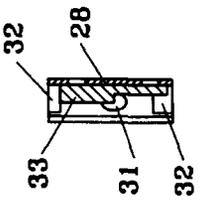

FIG. 16

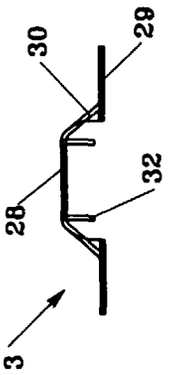

FIG. 15

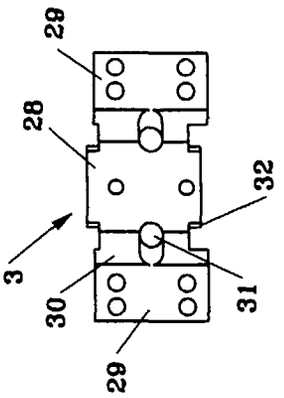

FIG. 14

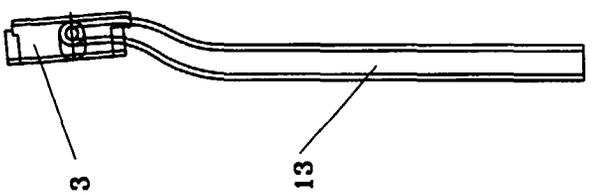

FIG. 13

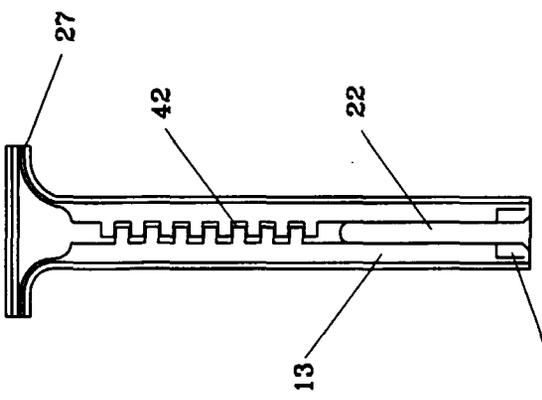

FIG. 12

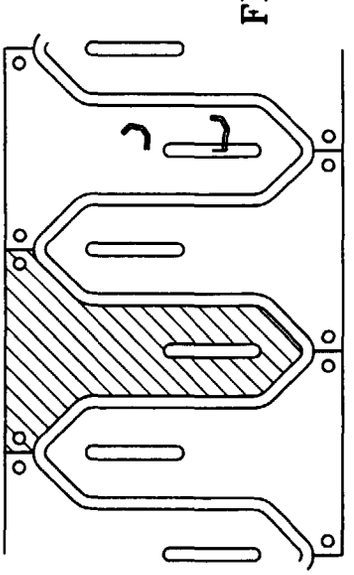

FIG. 8