(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 895 073 A2

# (12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**05.03.2008 Bulletin 2008/10**

(21) Application number: **07114116.2**

(22) Date of filing: **09.08.2007**

(51) Int Cl.:
***E04G 5/00*** *(2006.01)* ***E06B 9/174*** *(2006.01)*
***E06B 9/50*** *(2006.01)* ***E06B 9/88*** *(2006.01)*

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

(30) Priority: **31.08.2006 IT BO20060621**

(71) Applicant: **M.K.M. S.r.l.**
**66016 Guardiagrele (CH) (IT)**

(72) Inventors:
- **CARAMANICO, Mauro**
  **66016, GUARDIAGRELE (CH) (IT)**
- **CARAMANICO, Massimiliano**
  **66016, GUARDIAGRELE (CH) (IT)**

(74) Representative: **Dall'Olio, Giancarlo**
**Invention S.r.l.**
**Via delle Armi, 1**
**40137 Bologna (IT)**

## (54) Device for the rotatable support of a shaft

(57) Device for the rotatable support of a shaft constituted by: a clamp 2, that couples removably with an upright M of a structure; at least one engagement element 3 removably coupling with said clamp 2 from one side and from the other side shaped to support, with substantially horizontal positioning, a reel B constituted by a band, with said engagement element 3 such as to be able to rotate with respect to its relative axis as a consequence of the winding or of the unwinding of said band, from and on said reel; a stabilisation means 4, 40, 400, 404, associated to said clamp 2, provided to stabilise the operative configurations of the engagement element 3 - reel B set and to contrast the rotation of said set in both directions.

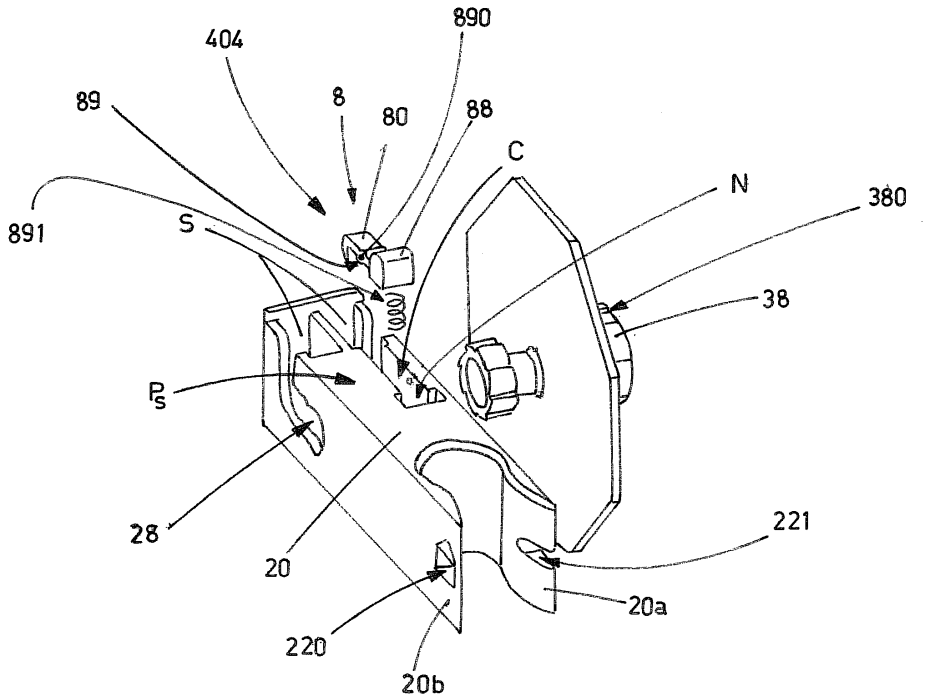



FIG. 6

EP 1 895 073 A2

## Description

DESCRIPTION OF THE INVENTION

**[0001]** The present invention relates to the devices for the rotatable support a shaft, e.g. a shaft supporting a reel.

**[0002]** In the construction industry, said reel, e.g. of net, fabric or the like, is used for lining structures, e.g. scaffolds, to involve the entire altimetric extension thereof and to prevent, during the construction, renovation, or refinishing of a building, the fall of fragments of material outside the net.

**[0003]** In the following known documents: DE22178-26; GB2355751; WO86/03538; W02004/065721 are described systems for lining scaffolds.

**[0004]** The object of the invention is to propose a device for the rotatable support of a shaft constructed in such a way as to couple with an upright of a structure without changing the technical-functional and safety characteristics required from the structure, and with no need to dismantle, and subsequently reassemble, parts thereof.

**[0005]** Another object of the invention is to propose a device for the rotatable support of a shaft obtained by simple means that allow for easy, rapid installation.

**[0006]** Yet another object of the invention is to propose a device shaped in such a way as to simplify both its mounting and dismounting to and from the structure.

**[0007]** Another object of the invention is to propose a device for the rotatable support of a shaft that is usable even by operators who are not particularly experienced.

**[0008]** An additional object is to propose a device for the rotatable support of a shaft that can be obtained at low costs.

**[0009]** The objects of the invention shall become more readily apparent in the description that follows of a preferred embodiment, in accordance with the contents of the claims and with the aid of the accompanying drawing tables, in which:

- fig. 1 shows a front schematic view of part of a structure;
- fig. 2 shows an enlarged exploded view of a device for the rotatable support of a shaft, object of the present invention;
- fig. 3 shows a top view of the device of the invention;
- fig. 4 shows the view of the section IV-IV of fig. 3;
- fig. 5 shows, in enlarged scale, the view of the section V-V of fig. 3;
- figs. 5A-5B show, in enlarged scale, the views of the section V-V of fig. 3 according to different embodiment;
- fig. 6 shows a perspective exploded view of the above mentioned device, according to an additional embodiment.

**[0010]** With reference to the accompanying drawing tables, the number 1 designates a device for the rotatable support of a shaft.

**[0011]** The device 1, as shown in figs. 2, 6, is constituted by: a clamp 2, that couples removably with an upright M of a structure; engagement elements 3, each of which supports a reel B constituted, for example, by a band, such as to be able to rotate with respect to the relative axis, as a consequence of the winding or of the unwinding of the band that constitutes the reel B; stabilisation means 4, 40, 400, 404.

**[0012]** The clamp 2, as shown in figs. 2, 6, is defined by: a body 20 so shaped as to identify at one end two specular jaws 20a, 20b tapered in the entry portion, traversed by corresponding through holes 22a, 22b, or, as shown in fig. 6, by a slot 221 and by a through hole 220, in which are received fastening means 23; seats S obtained in the body 20, accessible from corresponding openings 29 obtained in the upper portion Ps of the body 20, shaped slits 28 obtained symmetrically in the corresponding flanks F of the body 20 and communicating with the corresponding openings 29.

**[0013]** In the embodiment shown in figure 6, the upper portion Ps of the body 20 features a channel C communicating with the corresponding seat S and with a housing recess N obtained in the body 20, whose function shall be explained below.

**[0014]** Each engagement element 3 is constituted by: a vertical shoulder 30, e.g. of polygonal shape; a support 38, e.g. with polygonal section, integral perpendicularly to the inner face Fi of the shoulder 30, and involved by a guidance and stabilisation groove 380; a shaft 39 integral with the outer face Fe of the shoulder 30, to whose end is associated a circular head T, e.g. as shown in fig. 2, 5, 5B, involved circumferentially by a toothing.

**[0015]** The stabilisation means 4, as shown in fig. 5, is constituted by a tongue L provided internally to each seat S integrally by the base of the clamp 2.

**[0016]** The tongue L features a transverse throat G into which is inserted in snap-in fashion the toothing of the head T of the engagement element 3.

**[0017]** The stabilisation means 40, in a second embodiment shown in fig. 5A, is constituted by an elastic tongue 6 provided internally in the seat S buried in the base of the body 20 of the clamp 2.

**[0018]** The end of the metallic tongue 6 shapes a rounded projection 60 that couples in snap-in fashion with the recesses of the toothing of the heat T of the engagement element 3.

**[0019]** The stabilisation means 400, in a third embodiment shown in fig. 5B, is constituted by friction means R, provided internally in the seat S integrally with the upper surface of the base of the clamp 2, which abut against the edge of the aforementioned head T.

**[0020]** The stabilisation means 404, fig. 6, is defined by an engagement element 8 that centrally shapes a transverse enlargement 89, traversed by a through hole 890 in which is inserted a pin, not shown, that engages corresponding holes drilled in the walls of the channel C to define a hinge.

**[0021]** The ends of the engagement element 8 shape respectively a head portion 88 and a hook portion 80.

**[0022]** Said element is associated with the body 20 of the clamp 2 with the head portion 88 inserted in the housing recess N and the hook portion 80 received in the channel C: between the base of the recess N and the lower part of the head portion 88 are positioned elastic means 891.

**[0023]** The elastic means are appropriately loaded to maintain, in operative configuration, the engagement element 8 substantially in horizontal position and the hook portion 80 inserted in a recess of the toothing of the edge of the head T.

**[0024]** The device 1 for the rotatable support of a shaft is associated with an upright M of a structure, or of a scaffold P (fig. 1), or the like.

**[0025]** The clamp 2 is engaged to the upright M perpendicularly to the longitudinal development of the structure; the ends of the jaws 20a, 20b, as a result of their interception with the upright M spread elastically to envelop it.

**[0026]** The position of the clamp 2 is therefore stabilised with respect to the upright M is then stabilised inserting the fastening means 23 into the through holes 22a, 22b, or into the slot 221 and into the hole 220.

**[0027]** The support 38 of the engagement element 3 is inserted, as shown by way of example in the accompanying tables, into the core of the reel B, so that a protuberance provided therein is inserted into the groove 380 of the support 38 and the vertical shoulder 30 abuts against the flank of the core of the reel B, to define the engagement element 3-reel B set.

**[0028]** The engagement element 3 - reel B set is, successively, engaged to the clamp 2 in such a way as to be in substantially horizontal position; the head T of the engagement element 3 is inserted, on the basis of the positioning of the reel with respect to the upright M, into one of the openings 29, with the movement of the shaft 39 in the shaped slit 28, until the head T is coupled with the stabilisation means 4, 40, 400, provided in the seat S of the clamp 2.

**[0029]** In order to couple the head T to the stabilisation means 404, it is necessary to exert a pressure on the head portion 88 of the engagement element 8; the hook portion 80 rotates upwards, thus rising, to enable the insertion of the head T into the corresponding opening 29, with the motion of the shaft 39 in the shaped slit 28.

**[0030]** The elastic means associated with the engagement element 8, after the insertion of the shaft into the slit 28, concur to restore the initial position of the element 8 with the hook element 80 that goes to insert itself into a recess of the toothing of the head T.

**[0031]** The device 1 for the rotatable support of a shaft is particularly advantageous.

**[0032]** The fact that said device for the rotatable support of a shaft 1 is constituted by a clamp 2 and by engagement elements 3 enables its simple installation, without changing the technical-functional characteristics of the structure whereto it is associated and without violating the safety regulations required therefore.

**[0033]** The device 1 is associated to a structure positioning the clamp 2 at a predefined height along the upright of the structure and engaging it thereto as described previously.

**[0034]** The support 38 of the engagement element 3, in the illustrated embodiment, is coupled with the core of the reel B to define the engagement element 3 - reel B set that is then engaged to the clamp 2 with the insertion of the head T into the opening 29 and the coupling of the head T with the stabilisation means 4, 40, 400, 404.

**[0035]** The support 38 can, in a second engagement not illustrated herein, advantageously constitute the core of the reel B, thereby speeding up the operations for positioning and stabilising the engagement element 3 - reel B set.

**[0036]** The fact of providing a stabilisation means 4, 40, 400, 404 in the seat S of the clamp 2 is advantageous, because said means enables to stabilise the operative configurations of the engagement element 3 - reel B set and to contrast its rotation in both directions.

**[0037]** The polygonal shape of the vertical shoulder 30 of the engagement element 3 aids the operator during the manual unwinding or winding of the band from and onto the reel B.

**[0038]** The fact of providing two seats S in the clamp, each accessible from a corresponding opening 29 enables to use a single clamp to engage two reels B to the structure.

**[0039]** As a results of the positioning of the clamp perpendicularly to the longitudinal development of the structure, the head T of a first engagement element 3 - reel B set can be inserted into a seat S and the head of a second set can be inserted into the specular seat of the clamp, in such a way that the two sets are aligned and positioned parallel in overhanging with respect to the structure.

**[0040]** From the above, the positive characteristics of the proposed device are readily apparent: they enable to achieve all the prerogatives set out in the premise, offering the characteristics of reliability that are required for the construction of a device for the rotatable support of a shaft.

**[0041]** The above has been described by way of non limiting example, so any variations of a practical and application nature fall within the scope of protection as described above and as claimed below.

## Claims

**1.** A device for the rotatable support of a shaft

**characterised in that**
it includes: a clamp 2, that couples removably with an upright M of a structure; at least one engagement element 3 removably coupling with said clamp 2 from one side and from the other side shape to support, with substantially horizontal positioning, a reel B constituted by a band, with said engagement element 3 able to rotate with respect to its relative axis as a consequence of the winding or of the unwinding of said band, from and on said reel; a stabilisation means 4, 40, 400, 404, associated to said clamp 2, provided to stabilise the operative configurations of the engagement element 3 - reel B set and to contrast the rotation of said set in both directions.

**2.** Device as claimed in claim 1
**characterised in that**
said clamp is constituted by a body 20 shaping at one end two jaws 20a, 20b, which are specular and tapered in the corresponding entry portion and aimed, as a consequence of interception with said upright, at spreading elastically to envelop the aforementioned clamp, and
**in that**
said clamp 2 is provided with: at least one seat S accessible from an opening 29 made in the upper portion Ps of said body 20; at least one shaped slit 28 obtained in the flank F of the aforementioned body 20, communicating with the aforementioned opening 29.

**3.** A device as claimed in claim 2
**characterised in that**
said engagement element 3 is constituted by: a vertical shoulder 30; a support 38, integral perpendicularly to the inner face Fi of said shoulder 30; a shaft 39 integral with the outer face Fe of said shoulder 30, with whose end is associated a circular head T co-operating functionally with the stabilisation means 4, 40, 400, 404, with said head T, as a result of the coupling between said engagement element 3 with the aforesaid clamp 2, traversing the opening 29 of the latter to be received and stabilised in the aforementioned seat S, and with said shaft 39 received in the aforementioned shaped slit 28.

**4.** A device as claimed in claim 3
**characterised in that**
said support 38 is aimed at coupling with the core of the aforesaid reel B to support it.

**5.** A device as claimed in claim 3
**characterised in that**
on said support 38 constitutes the core of said reel B.

**6.** A device as claimed in claim 3
**characterised in that**
said stabilisation means 404 is defined by an engagement element 8 that centrally shapes a transverse enlargement 89, hinged to the vertical walls of a channel C, obtained in the aforementioned body 20, on an axis perpendicular to said walls, with the respective ends of said engagement element 8 shaping a head portion 88, inserted in a housing recess N provided in said body 20, and a hook portion 80, inserted in said channel C, with said hook element 80 aimed at being inserted into a recess of a corresponding toothing provided on the edge of the aforementioned head T of said engagement element 3 to stabilise the operative configuration of the engagement element 3 - reel B set and to contrast the rotation of said set.

**7.** Device as claimed in claim 6,
**characterised in that**
it comprises elastic means 891 positioned between the base of said recess N and the lower part of the aforesaid head portion 88, appropriately loaded so as to maintain, in operative configuration, said engagement element 8 substantially in horizontal position and the end of said hook portion 80 inserted in a recess of the toothing of the edge of the aforementioned head T.

**8.** Device as claimed in claim 6
**characterised in that**
said transverse enlargement is traversed by a through hole 890 into which is inserted a pin that engages corresponding holes obtained in the walls of the channel C to define a hinge.

**9.** A device as claimed in claim 3
**characterised in that**
said stabilisation means 4 is constituted by a tongue L provided internally in the aforementioned seat S integrally with the base of said clamp 2, with said tongue involved by a transverse grove G into which is inserted in snap-in fashion a corresponding toothing provided on the edge of the aforementioned head T of said engagement element 3 to stabilise the operative configurations of the engagement element 3 - reel B set and to contrast the rotation of said set in both directions.

**10.** A device as claimed in claim 3
**characterised in that**
said stabilisation means 40 is constituted by an elastic tongue 6 provided internally in the aforementioned seat S buried in the base of said clamp 2, and shaping at its end a rounded projection 60 that couples in snap-in fashion with the recesses of a corresponding toothing provided on the edge of the aforementioned head T of said engagement element 3 to stabilise the operative configurations of the engagement element 3 - reel B set and to contrast the rotation of said set in both directions.

**11.** A device as claimed in claim 3
**characterised in that**
said stabilisation means 400 is constituted by friction means R provided internally in the aforementioned seat S integrally with the base of said clamp 2 and destined, as a result of the positioning of the head T of the aforementioned engagement element 3 into the seat S, to abut the edge of the aforementioned head T in order to stabilise the operative configurations of the engagement element 3 - reel B set and to contrast the rotation of said set in both directions.

**12.** A device as claimed in claim 3
**characterised in that**
on said support 38 is provided a longitudinal groove 380 in which a protuberance provided on the core of said reel B is slidably guided.

**13.** Device as claimed in claim 2
**characterised in that**
said jaws 20a, 20b, are traversed by corresponding through holes 22a, 22b, aimed, as a result of the positioning of the aforementioned clamp 2 for enveloping said upright M, at receiving fastening means 23 that stabilise the desired position of the clamp 2 on said upright M.

**14.** Device as claimed in claim 2,
**characterised in that**
said jaws 20a, 20b, are involved respectively by a slit 221 and by a through hole 220, aimed, as a result of the positioning of the aforementioned clamp 2 for enveloping said upright M, at receiving fastening means 23 that stabilise the desired position of the clamp 2 on said upright M.

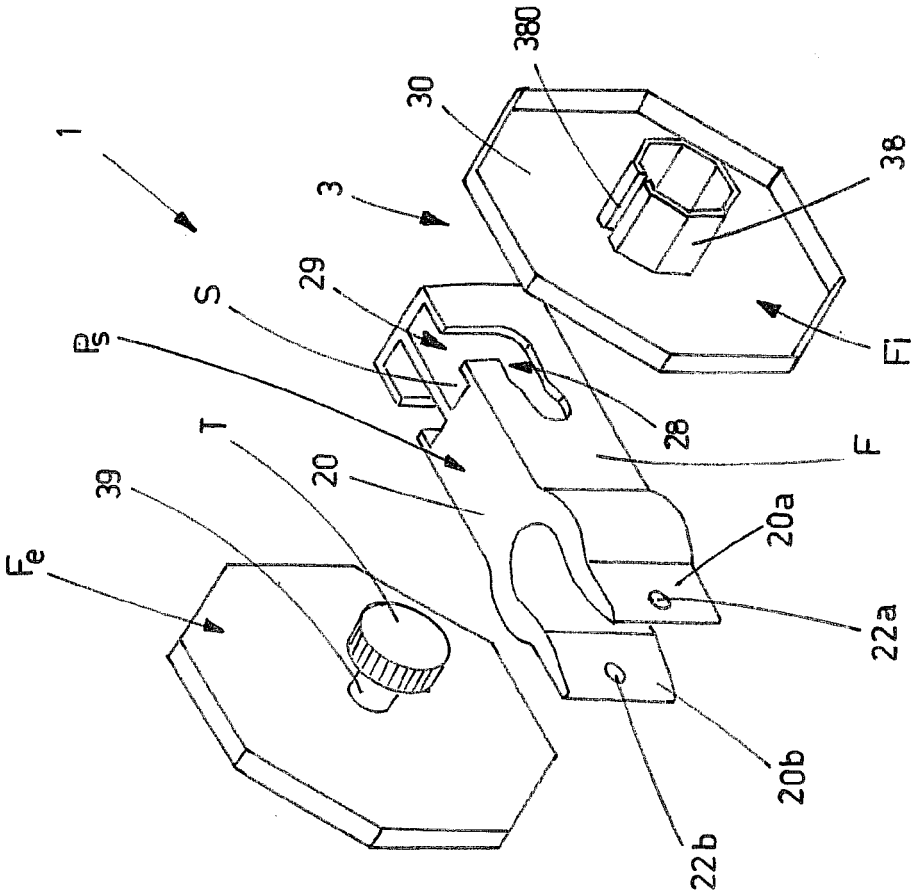



FIG. 2

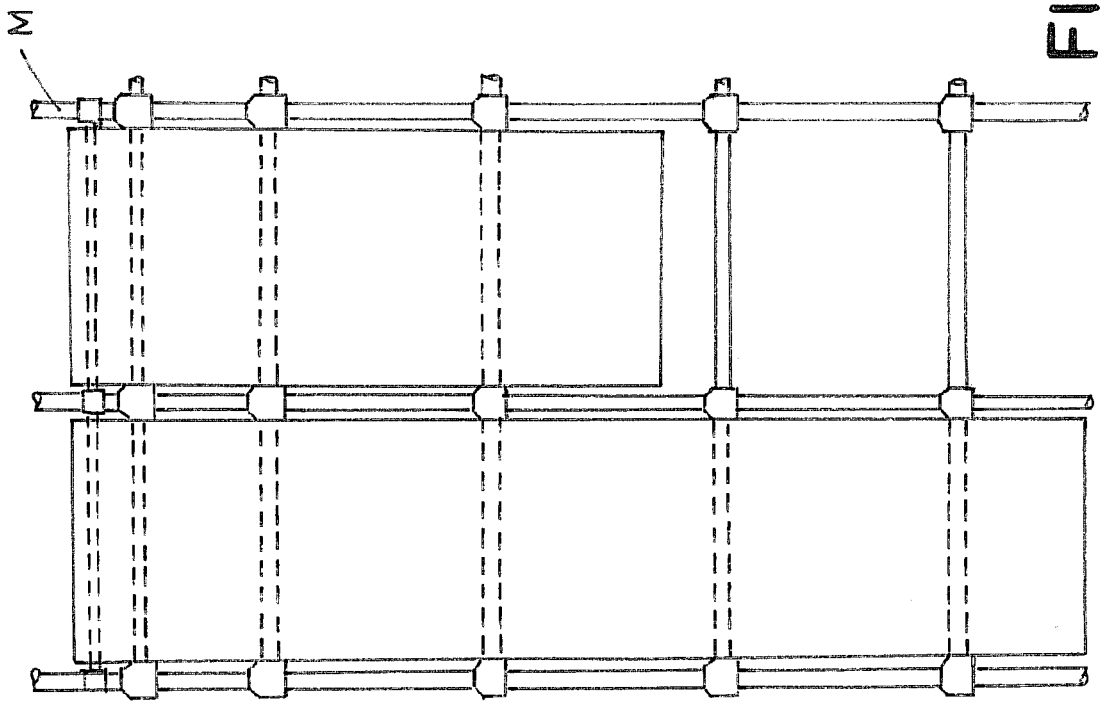



FIG. 1

FIG. 4

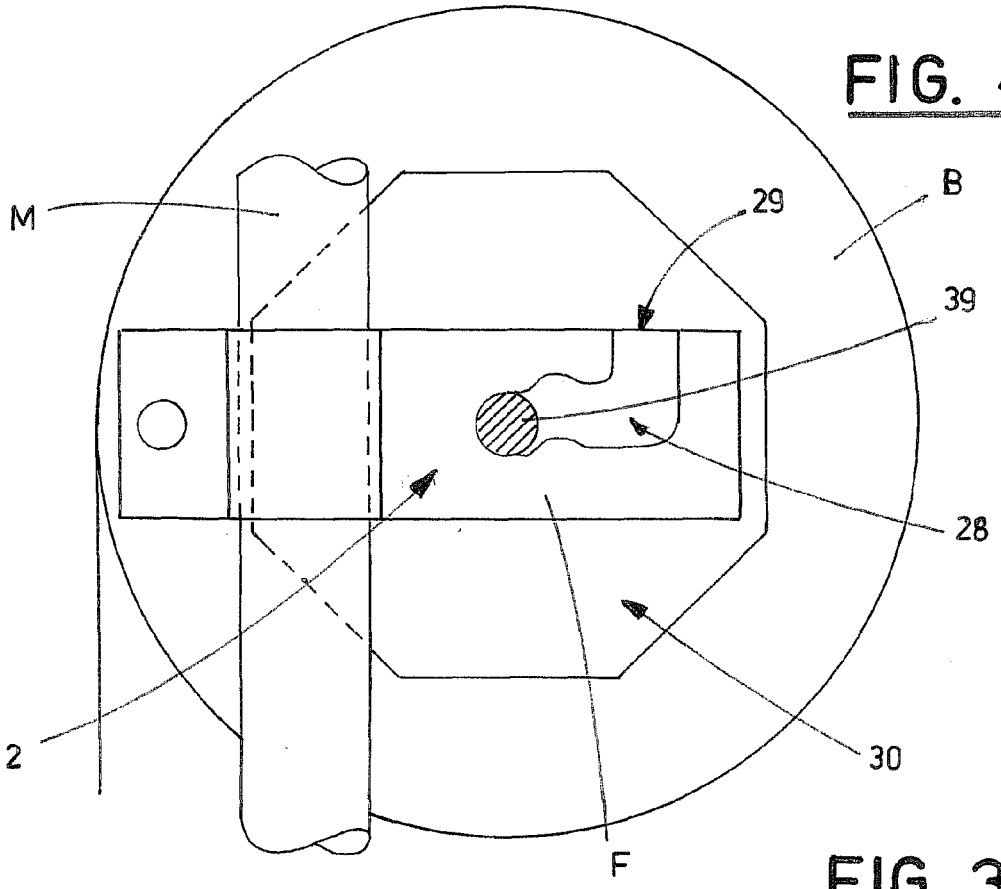
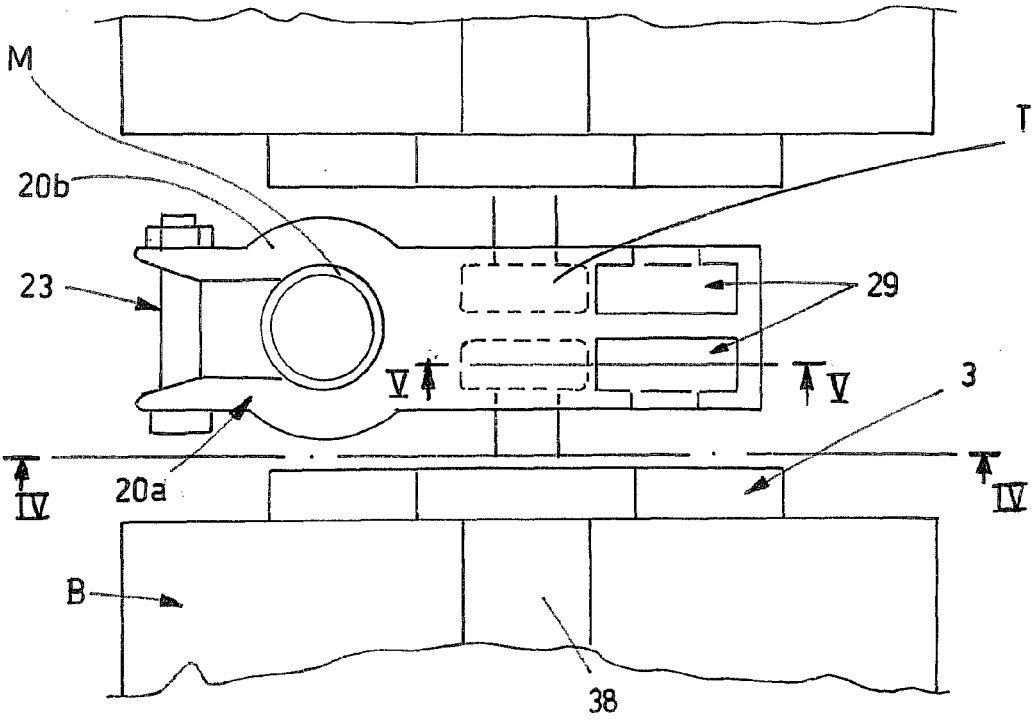



FIG. 3



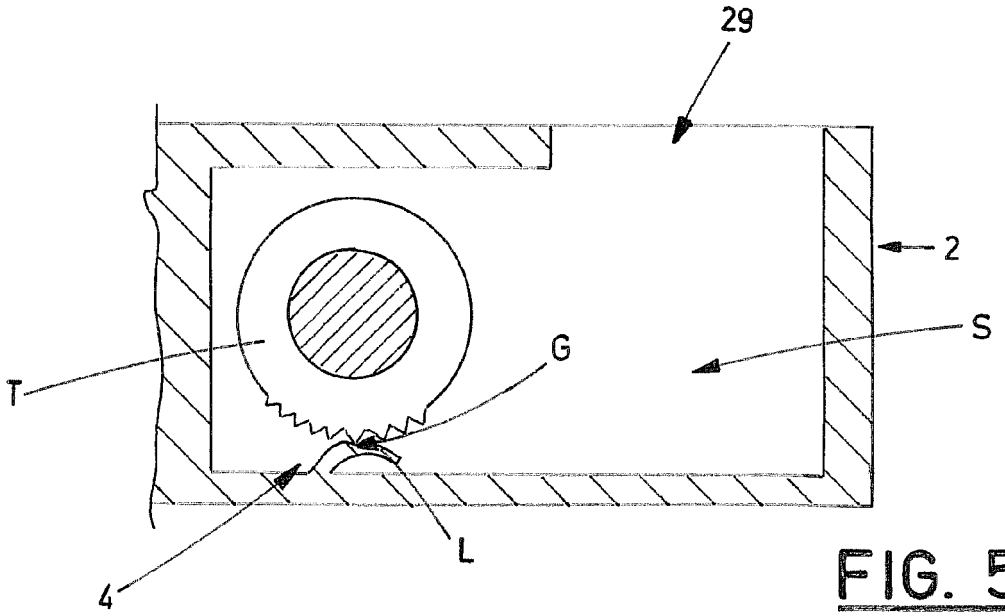



FIG. 5

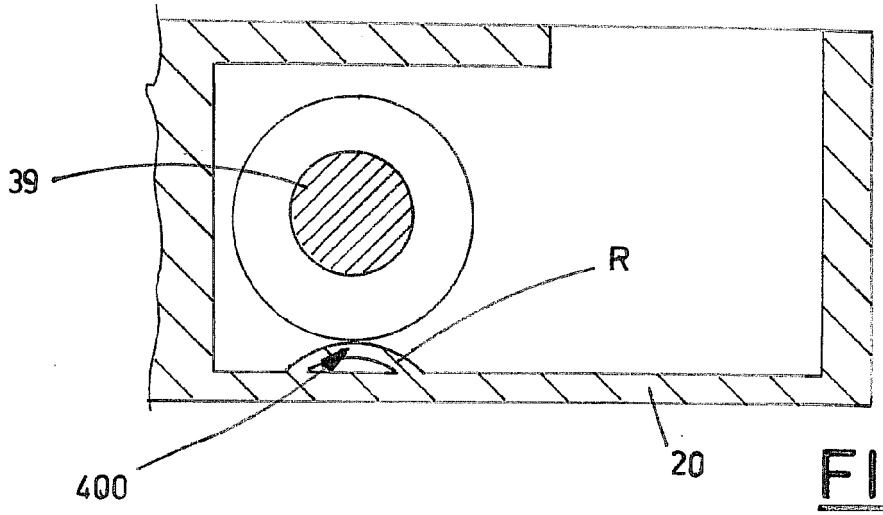



FIG. 5B

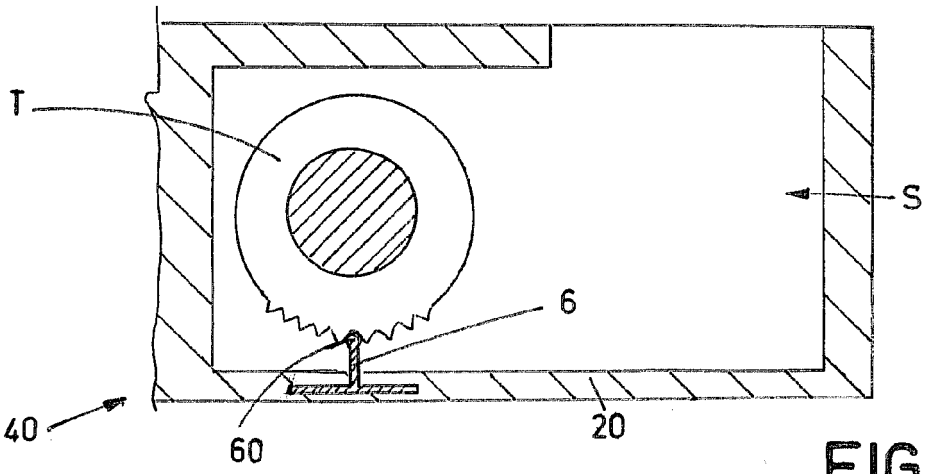



FIG. 5A

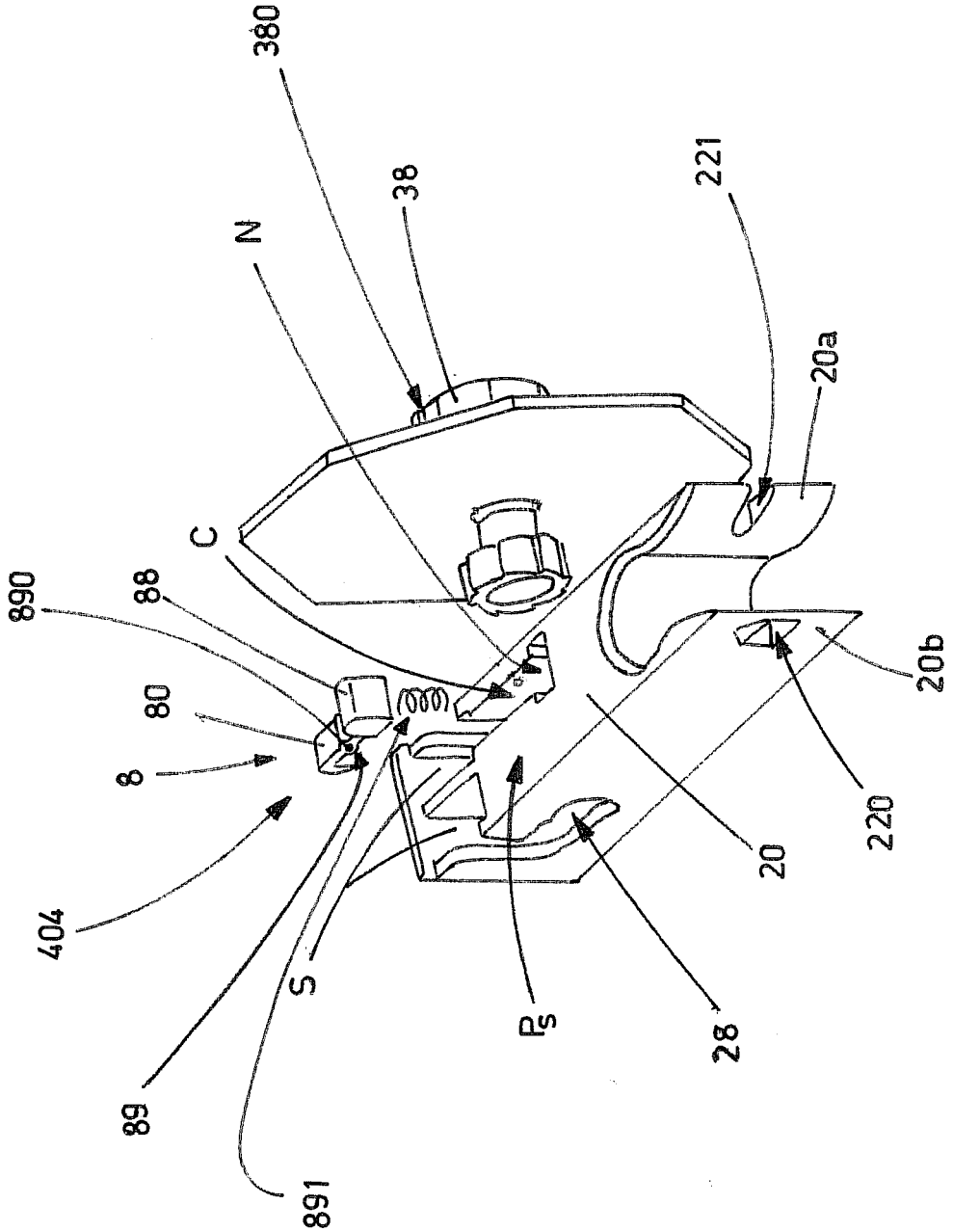



FIG. 6

## REFERENCES CITED IN THE DESCRIPTION

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

### Patent documents cited in the description


- DE 2217826 **[0003]**
- GB 2355751 A **[0003]**
- WO 8603538 A **[0003]**
- WO 2004065721 A **[0003]**