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(54) Shock-absorbing device for a walking or skiing pole

(57) A shock-absorbing device (6) for a walking or skiing pole (1) able to allow a shock-absorbing effect between a handgrip (2) of the pole and an elongate member (4) of the pole is disclosed. The shock-absorbing device comprises a cylinder (10) having an inner chamber (11) and designed to be made integral with the elongate member (4) of the pole, a piston (20) slidable within the chamber of the cylinder (10) and designed to be made integral with the handgrip (2) of the pole, stop means able to limit the sliding stroke of the piston (20) inside the chamber of the cylinder (10), and shock-absorbing means (8) disposed inside the chamber of the cylinder (10) between an abutment surface (18) of the cylinder (10) and an abutment surface of the piston (20).

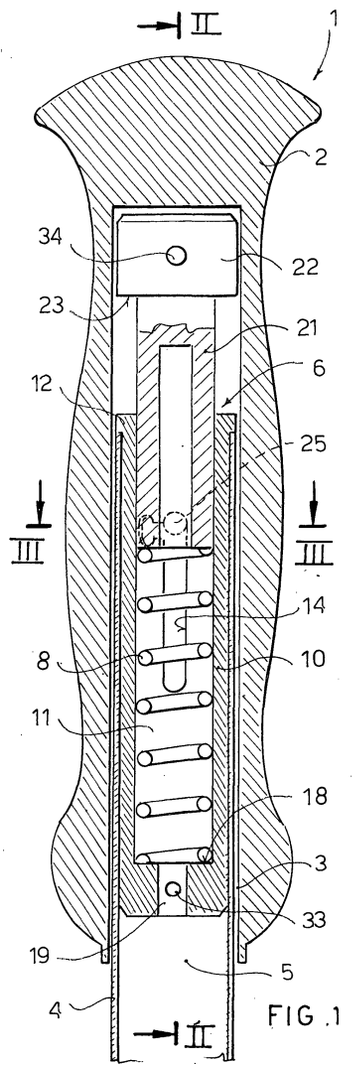

FIG .1

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Description

[0001] The present invention refers to a shock-absorbing device for a pole, particularly for hiking, downhill skiing, cross-country skiing and the like, as well as for orthopaedics and motor rehabilitation.

[0002] As is known, people who practise mountain hiking use one or two poles which each act as points of support and help balance and support the weight of the user's body during travel over steep and uneven terrain. A pole of this type has a handgrip destined for gripping by the user and an elongate member which has one end coupled to the handgrip and the other end of a suitable shape designed to come into contact with the ground.

[0003] To try and damp impact and vibration between the tip of the elongate member of the pole and the terrain, poles with shock absorption are known to the art which provide shock-absorbing means interposed between the elongate member and the handgrip. Such a shock-absorbing system, by absorbing part of the impact between the pole and the ground, makes use of the pole generally more pleasant and can avoid dislocation of the wrist, elbow or shoulder.

[0004] Poles are also known which, according to the user's requirements, can act as shock-absorbing poles or rigid poles. Said poles have means of enabling and disabling the shock-absorbing member.

[0005] In any case, poles according to the prior art have the shock-absorbing device integral with or formed in a single body with the handgrip and/or the end of the elongate member and for this reason the production and assembly procedure thereof proves considerably complex and costly.

[0006] The object of the present invention is to overcome the drawbacks of the prior art by providing a shock-absorbing device that can be adapted to various types of pole, so as to reduce times and costs for assembly and production of a pole with such a shock-absorbing device.

[0007] Another object of the present invention is to provide such a shock-absorbing device for poles that is able to ensure good reliability and a long life of the pole with such a shock-absorbing device.

[0008] These objects have been achieved in accordance with the invention with the characteristics listed in appended independent claim 1.

[0009] Advantageous embodiments of the invention are apparent from the dependent claims.

[0010] The shock-absorbing device for a pole according to the invention comprises a cylinder-piston coupling with shock-absorbing means interposed.

[0011] The cylinder has an inner chamber and is designed to be made integral with the elongate member of the pole. The piston is slidable inside the cylinder chamber and is designed to be made integral with the handgrip of the pole. The shock-absorbing means are disposed inside the chamber of the cylinder between an abutment surface of the cylinder and an abutment surface of the piston. Stop means able to limit the sliding stroke of the piston inside the chamber of the cylinder are provided in the cylinder and in the piston.

[0012] The peculiarity of the invention is represented by the fact that the shock-absorbing device can be produced and assembled separately from the pole. The shock-absorbing device according to the invention is subsequently interposed between the handgrip and the elongate member of the pole to ensure the shock-absorbing effect.

[0013] Such a shock-absorbing device proves extremely simple to make and assemble, thus reducing manufacturing costs of the pole.

[0014] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non limiting embodiment thereof, illustrated in the appended drawings, wherein

Figure 1 is an axial sectional view illustrating a pole with a shock-absorbing device according to the invention assembled, in which the elongate member of the pole is shown broken off and the piston of the shock-absorbing device is shown partially in full view;

Figure 2 is an axial sectional view of the pole with the shock-absorbing device according to the invention, taken along the plane of section II-II in Figure 1;

Figure 3 is a cross sectional view of the pole with the shock-absorbing device according to the invention, taken along the pane of section III-III of Figure 1;

Figure 4 is an axonometric view illustrating the shock-absorbing device according to the invention in an exploded view.

[0015] The shock-absorbing device for a pole according to the invention is described with the aid of the figures. Figures 1 and 2 show a pole designated as a whole with reference numeral 1.

[0016] The pole 1 comprises a handgrip 2 suitable to be gripped by a user and an elongate member 4, shown broken off, which has one end joined to the handgrip and the other end, not shown in the figures, designed to engage on the ground.

[0017] The handgrip 2 is open at one end and has an axial cavity 3, cylindrical in shape, suitable to receive the elongate member 4.

[0018] The end part of the elongate member 4, which engages in the cavity 3 of the handgrip, is formed by means of a tubular aluminium member, having an axial cylindrical cavity 5. Inside the cavity 5 of the end part of the elongate member a shock-absorbing member according to the invention, designated as a whole with reference numeral 6, is disposed.

[0019] As better shown in Figure 4, the shock-absorbing device 6 comprises a hollow cylinder 10, tubular in shape, defining a cylindrical chamber 11 within which shock absorbing means 8 and a piston 20 are disposed. The shock-absorbing means can be, for example, a spiral spring 8, or any other elastic or compressed gas shock-absorbing means.

[0020] The chamber 11 of the cylinder 10 is open at the top for insertion of the spring 8 and the piston 20 and has at the bottom an annular abutment surface 18 against which one end of the spring 8 abuts. The abutment surface 18 of the bottom part of the cylinder 10 has an axial hole 19 communicating with the outside for expulsion of the air from the chamber 11 of the cylinder 10.

[0021] The cylinder 10 has an outside diameter smaller than or the same as the inside diameter of the elongate member 4 and has a greater thickness than the thickness of the end part of the elongate member 4. The cylinder 10 has at its top end an annular collar 12 that protrudes radially outward. The collar 12 of the cylinder has an outside diameter greater than the diameter of the elongate member 4 and smaller than the inside diameter of the handgrip 2. In this manner the cylinder 10 can be inserted in the chamber 5 of the elongate member 4 and the collar 12 of the cylinder abuts against the end of the elongate member 4.

[0022] Two L-shaped apertures disposed in diametrically opposite positions are provided in the side wall of the cylinder 10. Each L-shaped aperture has an elongate vertical slot 14 and a horizontal slot shorter than the vertical slot. In a central position of the horizontal slot a tooth 15 is provided which divides the horizontal slot into a first seat 16 and a second seat 17 communicating with the vertical slot 14. The horizontal slot of the L-shaped aperture is disposed towards the collar 12 of the cylinder.

[0023] In the side wall of the cylinder 10, in the part distal to the collar 12, a radial through hole 13 is provided to receive a pin 33 for fixing of the cylinder 10 to the elongate member 4, as shown in Figure 2.

[0024] The piston 20 comprises a stem 21 and a head 22 with a larger diameter so as to define an annular abutment surface 23. The stem 21 of the piston has a smaller outside diameter than the inside diameter of the cylinder 10 so as to be able to slide in the chamber 11 of the cylinder 10. The head 22 of the piston has an outside diameter larger than the inside diameter of the cylinder 10 and smaller than the inside diameter of the cavity 3 of the handgrip 2, so as to be able to be housed inside the cavity 3 of the handgrip.

[0025] The head 22 of the piston has a radial through hole 24 to receive a pin 34 for fixing of the head of the piston to the handgrip 2.

[0026] In the side wall of the stem 21, in a distal position with respect to the head 22, two pins 25 which protrude radially outwards in diametrically opposite positions are provided. The two pins 25 of the piston 20 are able to engage in the two L-shaped apertures of the cylinder 10.

[0027] Consequently, when the pins 25 are respectively in the first seats 16 of the horizontal slots of the L-shaped apertures, vertical sliding of the piston 20 within the cylinder 10 is prevented, since the pins 25 of the piston are locked in the first seats 16. When the pins 25 are in the second seats 17 of the horizontal slots of the L-shaped apertures, vertical sliding of the piston 20 inside the cylinder 10 is allowed, since the pins 25 of the piston can slide for the whole length of the vertical slot 14 of the cylinder.

[0028] The bottom end and the top end of the vertical slot 14 respectively generate the lower end-of-stroke point and the upper end-of-stroke point for axial translation of the piston 20.

[0029] The spring 8 is interposed between the bottom end of the stem 21 of the piston and the abutment surface 18 of the cylinder 10. In this manner, when the pins 25 of the piston are respectively in the first seats 16 of the L-shaped apertures, the handgrip 2 is kept integral in translation with respect to the elongate member 4 and thus the shock-absorbing effect is rendered ineffective. In fact, the handgrip 2 is integral with the piston 20 and axial movements of the piston 20 with respect to the cylinder 10, which is integral with the elongate member 4, are prevented.

[0030] With reference to Figure 3, if the user performs a relative rotation of the handgrip 2 and of the elongate member 4 around its own axis, the pins 25 of the piston overcome the teeth 15 of the L-shaped apertures of the cylinder and are positioned in the second seats 17. In this condition, the handgrip can translate axially with respect to the elongate member 4 and the shock-absorbing effect imparted by the spring 8 is thus enabled. In fact, when the user pushes the handgrip axially downward, lowering of the piston 20 against the action of the spring 8, which is compressed, is also caused. This is due to the fact that the piston 20 can slide axially inside the cylinder 10, since the pins 25 of the piston can slide within the vertical slots 14 of the L-shaped apertures of the cylinder 10.

[0031] It should be noted that the shock-absorbing device 6 can be assembled separately and subsequently applied to the pole 1 by fixing the head 22 of the piston to the handgrip 2 and the cylinder 10 to the elongate tubular member 4.

[0032] The cylinder 10 and the piston 20 can be made by injection moulding of hard plastic material. To facilitate assembly of the shock-absorbing device 6, the cylinder 10 can be formed in two symmetrical half-shells which are assembled to each other, by welding, gluing or force fitting, so as to contain the spring 8 and the piston 20.

[0033] Numerous changes and modifications of detail, within the reach of a person skilled in the art, can be made to the present embodiment of the invention, without departing from the scope of the invention expressed in the appended claims.

Claims

1. A shock-absorbing device (6) for a pole (1) able to allow a shock-absorbing effect between a handgrip (2) of the pole and an elongate member (4) of the pole, **characterised in that** it comprises:

   - a cylinder (10) having an inner chamber (11) designed to be made integral with said elongate member (4) of the pole,
   - a piston (20) slidable inside said chamber of the cylinder (10) and designed to be made integral with said handgrip (2) of the pole,
   - stop means able to limit the sliding stroke of said piston (20) within said chamber of the cylinder (10), and
   - shock-absorbing means (8) disposed inside said chamber of the cylinder (10) between an abutment surface (18) of the cylinder (10) and an abutment surface the piston (20).

2. A shock-absorbing device (6) according to claim 1, **characterised in that** said piston (20) comprises:

   - a stem (21) designed to slide inside the chamber of the cylinder, and
   - a head (22) with a larger diameter than the stem (21) disposed outside the chamber of the cylinder .

3. A shock-absorbing device (6) according to claim 2, **characterised in that** said head (22) of the piston comprises a radial hole (24) to receive a pin (34) for fixing to said handgrip (2).

4. A shock-absorbing device (6) according to any one of the preceding claims,
   characterised in that said stop means comprise at least one aperture disposed longitudinally in the side wall of said cylinder (10) within which a pin (25) that protrudes radially outwards from the side wall of said piston (20) engages.

5. A shock-absorbing device (6) according to claim 4, **characterised in that** two apertures disposed in diametrically opposite positions are provided in said side wall of the cylinder (10) and that two pins disposed in diametrically opposite positions are provided in the side wall of the piston.

6. A shock-absorbing device (6) according to any one of the preceding claims, **characterised in that** means able to enable or disable the action of said shock-absorbing means (8) are provided.

7. A shock-absorbing device (6) according to claim 6, **characterised in that** said means able to enable or disable the action of said shock-absorbing means (8) are associated with said stop means and comprise at least one L-shaped aperture, formed in said cylinder (10), inside which a pin (25) protruding radially from said piston (20) engages, said L-shaped aperture comprising a vertical slot (14) that extends longitudinally on the side wall of the cylinder (10) and a horizontal slot that extends circumferentially on the side wall of the cylinder.

8. A shock-absorbing device (6) according to claim 7, **characterised in that** provided in said L-shaped slot is a tooth (15) that divides it into a first seat (16) within which the pin (25) of the piston is constrained in axial movement and a second seat (17) communicating with the vertical slot (14) within which the pin (25) of the piston is free in axial movement along the vertical slot (14).

9. A shock-absorbing device (6) according to claim 7 or 8, **characterised in that** said means suited to enable and disable the action of said shock-absorbing means comprise two L-shaped apertures, formed in the side wall of said cylinder (10) in diametrically opposite positions.

10. A shock-absorbing device (6) according to any one of the preceding claims, **characterised in that** said shock-absorbing means comprise a spiral spring (8).

11. A shock-absorbing device (6) according to any one of the preceding claims, **characterised in that** in the bottom part of said cylinder (10) there is provided a radial through hole (13) able to receive a pin (7) for fixing to said elongate member (4) of the pole.

12. A shock-absorbing device (6) according to any one of the preceding claims, **characterised in that** said piston (20) and/or said cylinder (10) are made of hard plastic by injection moulding.

13. A shock-absorbing device (6) according to claim 12, **characterised in that in that** said cylinder (10) is formed in two half-shells which are subsequently assembled together, by means of welding, gluing, force fitting and the like.

14. A pole (1) comprising:

   - a handgrip (2) having an axial cavity (3) open at one end thereof, and
   - an elongate member (4) comprising an end part engaged slidably inside said cavity (3) of the handgrip,

   characterised in that it comprises a shock-absorbing device (6) according to any one of the preceding claims.

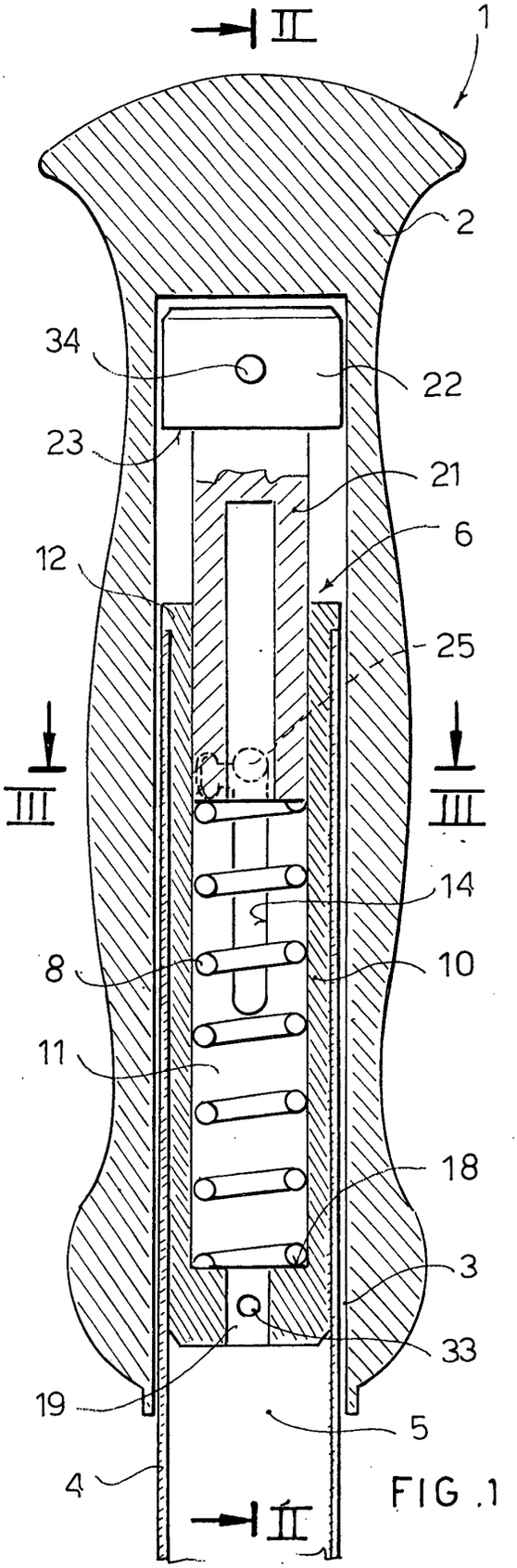
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FIG .1

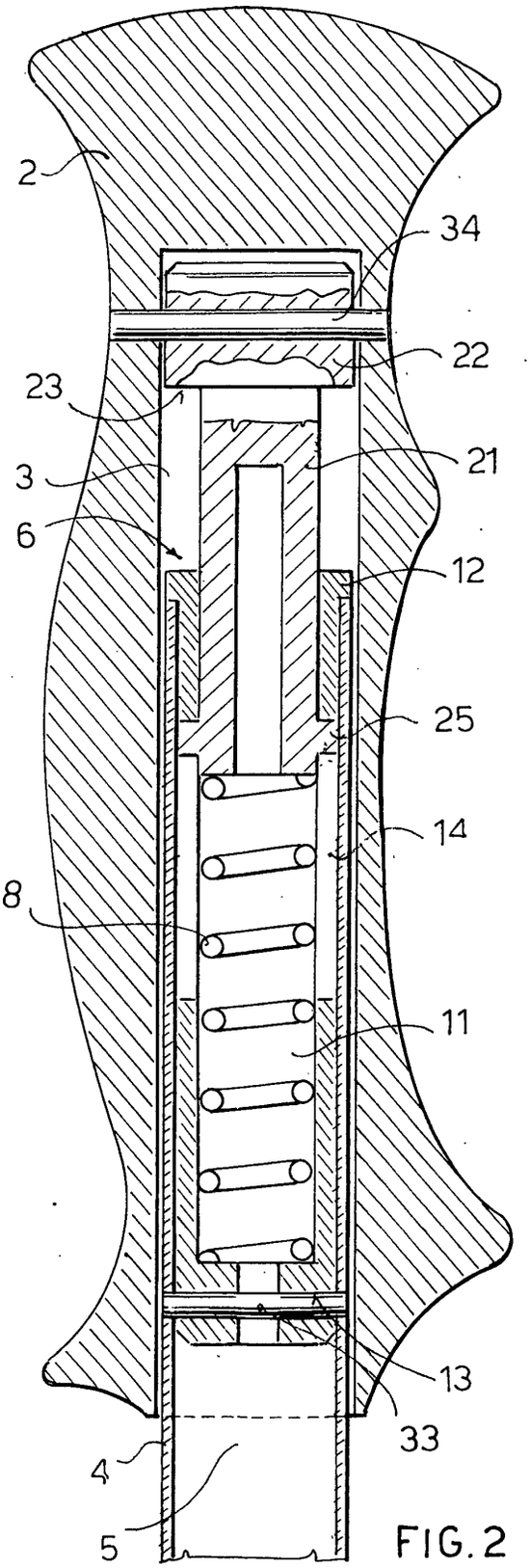
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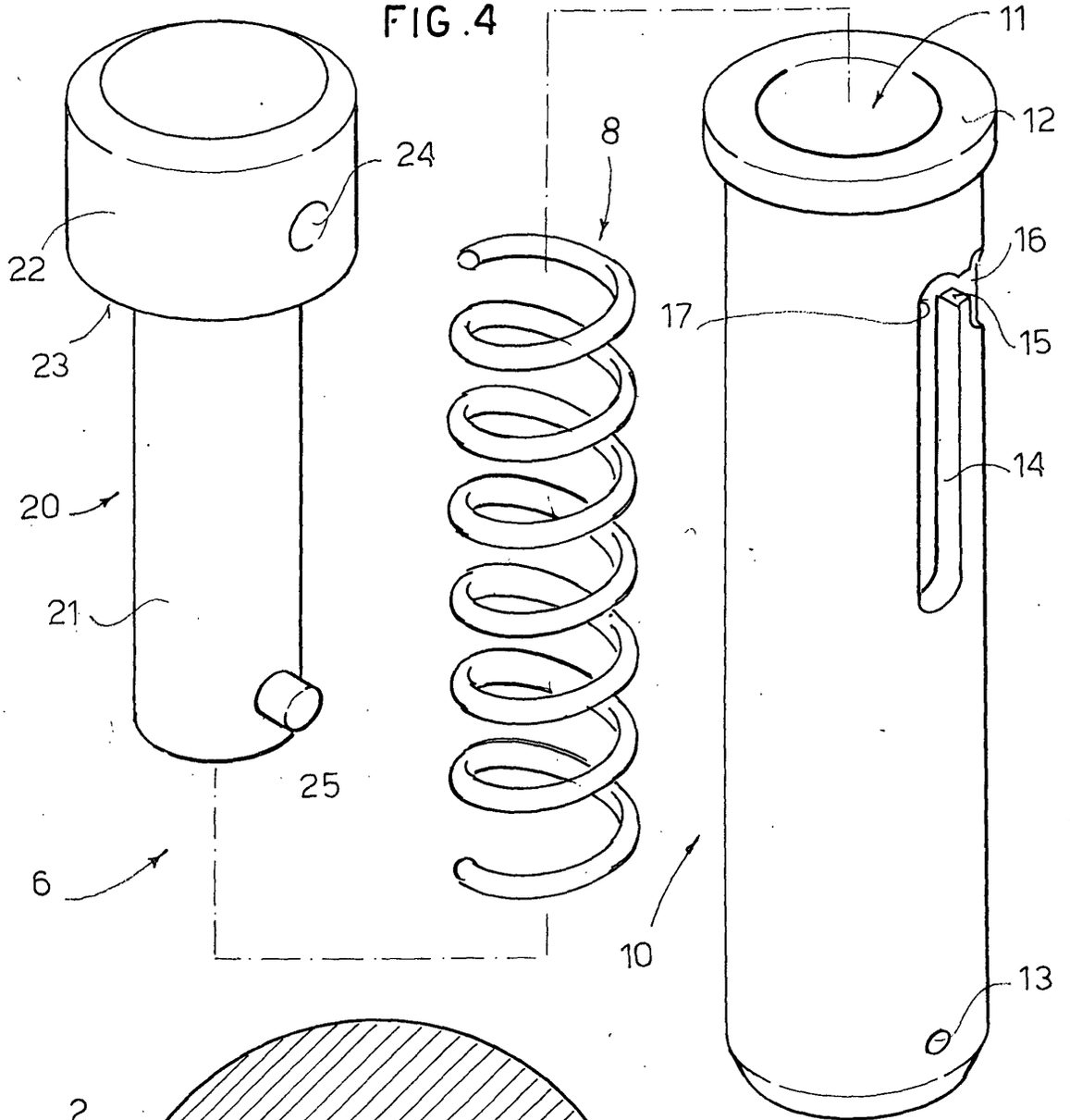
FIG. 2

FIG.4



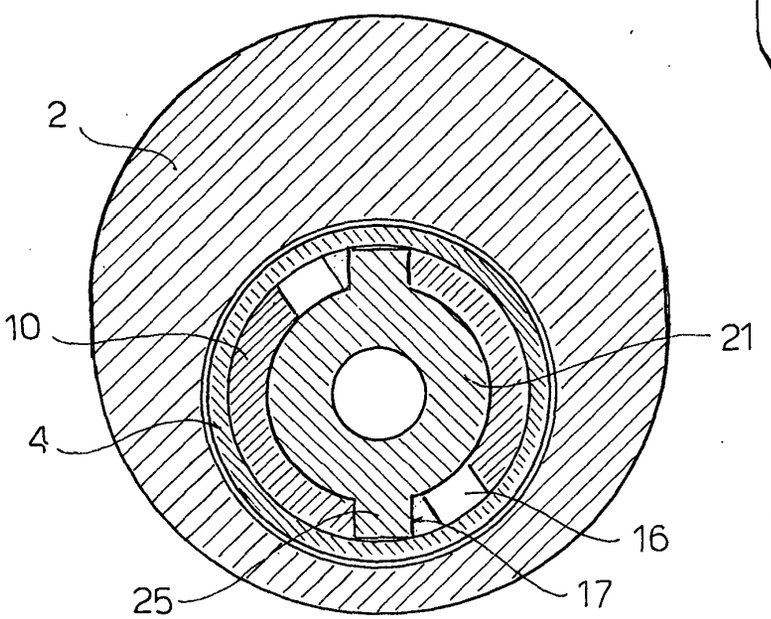


FIG 3

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EUROPEAN SEARCH REPORT

Application Number
EP 02 01 5835

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A63C
A45B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 April 2003	Verelst, P

CATEGORY OF CITED DOCUMENTS

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