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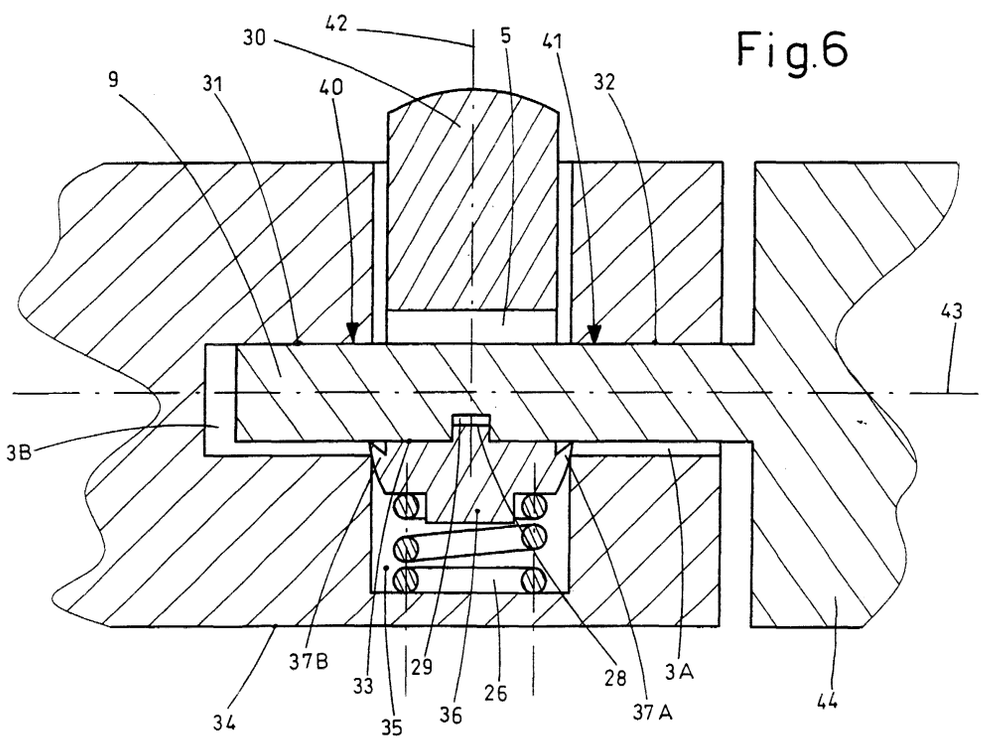
(54) Device with elastic gripping action for elastically locking constituent parts of compasses

(57) This device for elastically locking constituent parts of compasses has the characteristic of offering two fixed seats (3A,3B) rigid with the compass structure (1), for housing an elongate body (9) to be retained, they being spaced apart by a movable intermediate seat (5) substantially aligned with said fixed seats, the movable seat being present in a member of transverse axis which axially receives a thrust from elastic means (11) for creating a central transverse force on the elongate body to give rise to lateral reactions which produce a gripping effect, said elastic means being able to be subjected to a thrust in the opposite direction by a manual command, in order to nullify the gripping effect, as required for inserting or extractingly removing the elongate body.

Fig.6



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Description

[0001] This invention relates to a device with elastic gripping action for locking constituent parts of compasses. In using compasses the need often arises to interchange certain constituent accessory parts with others in order to obtain different functions. The use of compasses also involves the frequent manipulation of pencil leads or centering pins, either to interchange them or to position them correctly. These needs are currently satisfied by the use of screw tightening means associated with elastic retention seats; the accessory parts such as pencil leads, centering pins, support pins for other additional elements, etc., are inserted into these seats, which are located on the legs of a compass. It is however extremely uncomfortable to tighten said screw means because of the small dimensions of the knurled ring nuts in the form of small wheels which have to be operated manually, and which are a frequent cause of disappointment to the operator because they easily become mislaid during their loosening. In addition, said means make the aforedescribed operations slow to carry out. An object of the present invention is to define a device for locking constituent parts of compasses, which also enables them to be quickly released and removed. A further object is to obtain a device of the aforesaid type which is simple to construct. A further object is to obtain a device of the aforesaid type which is of low cost. A further object is to define a device of the aforesaid type which allows axial fixing with positive locking.

[0002] These and further objects which will be seen to have been attained on reading the ensuing detailed description, which illustrates a device for elastically locking constituent parts of compasses having the characteristic of offering two fixed seats rigid with the compass structure, for housing an elongate body to be retained, they being spaced apart by a movable intermediate seat substantially aligned with said fixed seats, the movable seat being present in a member of transverse axis which axially receives a thrust from elastic means for creating a central transverse force on the elongate body, to give rise to lateral reactions which produce a gripping effect, said elastic means being able to be subjected to a thrust in the opposite direction by a manual command, in order to nullify the gripping effect, as required for inserting or extractingly removing the elongate body. The invention is illustrated by way of non-limiting example in the accompanying drawings, in which:

Figure 1 is a side view of a common compass;
Figure 2 shows a locking device served by an indirect manually operated transfer member;
Figure 3 shows a locking device during the gripping of an elongate body;
Figure 4 shows the locking device of Figure 3 during the release of said elongate body;
Figure 5 shows an anti-rotation fixing stem;
Figure 6 shows an internal spring-type locking device with positive axial fixing;
Figure 7 shows a locking device served by an indirect manually operated transfer member of hidden spring type.

[0003] With reference to the aforesaid figures, a common compass 1 (Figure 1) is composed of various parts, comprising a fixed basic structure 12A and a plurality of movable or interchangeable parts. These interchangeable parts are fixed to the structure 1A of the compass 1 by common locking devices in regions 2A, 2B, 2C. The device of the present invention is advantageously usable in these regions 2A, 2B, 2C. It consists of cylindrical fixed seats 3A, 3B prearranged in a terminal part 4 of a compass; these seats are dimensioned in relation to a diameter of an elongate body 9 (for example graphite leads of about 2 mm diameter) to be inserted into them. Between said fixed seats 3A, 3B there is provided an intermediate seat 5 of the same diameter. This intermediate seat 5 is provided through the interior of a member 6 having its axis 7 transverse to the extension of the seats 3A, 3B, 5. One end 8 of the member 6 projects from the terminal part 4 of the compass, to present a top of rounded, widened shape. This shape results from the need to be able to easily press it with one finger by compressing the head 21 with a finger tip 10. In this respect, between a ledge region 12, situated on a lower surface of the end 8, and a rear part 13 of the compass there is provided an elastic means 11 (for example a steel helical spring) arranged to generate on the member 6 an axial thrust 15. This thrust 15 exerts a constant action 16 on the lower part of the elongate body 9, which results in reactions 16A, 16B against the facing part of the fixed seats 3A, 3B: in this manner a gripping action arises such as to retain the elongate body 9 by friction in a manner which renders it rigid with the structure of the compass. On manually pressing the elastic means 11, this gripping action is nullified to enable the elongate body 9 to be extracted (Figure 4) from said three seats 3A, 5, 3B. In the absence of this latter the member 6 would be free to escape from its insertion seat 19, facilitated in this by the action exerted by the elastic means 11. To prevent this escape or detachment of the member 6 from the compass structure 1A, said member is assisted by retention means 17. Absence of the elongate body 9 causes the elastic means 11 to act only through a distance defined by contact of the retention means 17 against a surface 18 of the compass structure, so preventing any further expulsion. The retention means 17 yield elastically in only one direction such as to enable the member 6 to be stably inserted into its seat 19, which can be provided to house it loosely in any terminal part 4 of the compass structure 1A. The member 6 is shaped to enable it to be initially inserted through the seat 19 by virtue of said unidirectional flexibility of its retention means 17. In this respect, although said means 17 bend during insertion until they touch the member 6, when their correct operating position has been reached they

prevent extraction of the member 6 from its seat 19 by rigidly opposing relative deformation in the opposite direction. The described device can be advantageously assisted by a transmission lever 20 (Figure 2). This variant offers the facility to unlock the elongate body 9 indirectly, i.e. by pressing on a region 22 instead of directly on the head 21 of the member 6; this makes the operation of the device easier and more ergonomic, as the region 20 can be shaped and dimensioned precisely for this purpose. Moreover, if constructed of a material of sufficient elasticity, the lever 22 considerably increases the action sensitivity during manual release of the device, by making this operation "softer". The lever shown in the figure is a first class or theoretically "neutral" lever; it can however be advantageously modified. In fact, by increasing the length of an arm 23 of the lever 20 about a pivoting region 14, the resistance of the elastic means 11 can be easily overcome. This could be essential if deciding to use an elastic means 11 of high resistance in order to obtain a considerable axial thrust 15 and increase the gripping effect. Although for simplicity the said elongate body 9 has been defined heretofore by the cylindrical form of a pencil lead or pin, it could be a usual metal stem defining the connector of usual compass accessories or parts. In this case the body could require a section which prevents it rotating about its insertion axis 24, or be provided with a longitudinal diametrical cut allowing its anti-rotation engagement with a peg 25 slidable transversely within said cut. With reference to the aforesaid Figure 6, two inventive aspects not present in the aforedescribed solutions can be noted, namely the fact that a spring 26 is hidden from view and the fact that the axial retention of an elongate body 9 occurs by positive engagement independently of the thrust exerted by said spring, in order to reduce operating forces. With regard to the first aspect, it should be noted that this is independent of the second aspect, i.e. the internal spring 26 is usable even without the positive axial engagement implemented by a small protuberance 28 housed in a matching seat 29. In this version of the internal spring 26 acting on the body of a pusher 30, the retention of the elongate body 9 is in fact entrusted to the axial friction deriving from the opposing gripping thrusts between two reaction surfaces 31 and 32 and a central thrust surface 33. Said configuration offers the advantage, over the aforeillustrated configurations, that the compressing action on the spring can be applied with the thumb and forefinger perfectly opposing; the pusher 30 in fact does not project from an opposite surface 34, i.e. it is not a through pusher. Although the spring 26 can be guidingly contained in a hole 35, said guiding could be achieved by a small column element 36. In this version, when the elongate body 9 is absent the pusher 30 is prevented from falling out by elastically yieldable projections 37A, 37B which, when at rest, offer their maximum bulk and can thus be provisionally housed in the fixed seats 3A, 3B and be retained by undercut regions 40 and 41 of these holes. In Figure 6 the yieldable projections 37A and 37B are shown as jutting points to clearly express the operational concept; in effect their shape could be different. What is essential is that these projections face the respective fixed seat 3B and 3A in order to be able to engage the said undercut regions 40 and 41 and perform an anti-expulion function. After being correctly inserted into its hole 35, the pusher 30 has its rotation about its axis 42 delimited angularly by the seating of the yieldable projections 37A and 37B. This fact could enable a pusher 30 with a round section to correctly operate. In this respect, although rotation about the axis 42 should theoretically be prevented by using a prismatic body in a matching prismatic seat, from a practical and constructional viewpoint this prevention of rotation of the pusher 30 is preferably to be achieved by the already described cylindrical shape provided with diametrically opposing yieldable projections 37A, 37B. This cylindrical shape in fact enables the hole 35 to be formed economically by a usual drill. In Figure 6 the elongate body 9 is shown as the stem of a usual compass accessory 44, such as a pencil lead holder, needle holder, extension bar, pen holder, etc. This type of stem, being generally metal and bulky, can be provided with a section preventing its rotation about its insertion axis 43, and with an overdimensioned resistant section able to accept the reduction created by the seat 29 for housing the protuberance 28. This seat could be a cylindrical hole, or a straight tangential groove, or a circumferential slot. The use of one or the other of these forms of the seat 29 depends on the function which the protuberance 28 is chosen to perform at the design stage, i.e. whether it is to provide a simple retention action in the direction of the axis 43, or whether it is to also perform an anti-rotation role about this axis, or whether it has to perform a role of axial retention in the direction of the axis 43 in any angular orientation about this axis.

[0004] With reference to Figure 7, the locking device is served by an indirect manually operated transmission member having its elastic return achieved by a spring 45 housed in a recess 46 provided transversely in a compass part 47. This spring acts below an operating arm 48 of a lever 49 pivoted on the compass part 47.

[0005] This pivoting can be achieved by various methods. In a first method, a pin 50 passes through the compass part 47 and engages two lateral flanges 51 of the lever; in a second method, a rear bearing fulcrum 52 (indicated by thin lines) cooperates with retention undercuts 53 located at the ends of the flanges 51 to provide the necessary elasticity for snap-mounting; in a third method a fulcrum-shaped central flange (similar to 52) is seated in a suitable central groove in the part 47. The "gripping" action for retaining an elongate body 9 is exerted by an end 54 of the lever 49 provided with a housing hole 55; said gripping action can however also be achieved without providing the hole, but instead by means of the upper surface alone, which could be shaped as a dihedron to facilitate centering. In this man-

ner the elongate body 9 is able to receive the reactions provided by the walls of two adjacent holes 56, 57. Said end 54 is in fact housed in a specific seat 58 present in the compass part 47. In Figure 7 the lever 49 is shown in one piece, however there is nothing to prevent it comprising more than one piece, the concept itself being able to be expressed by a plurality of design solutions of the known art.

Claims

1. A device for elastically locking constituent parts of compasses (1) characterised by the presence of two fixed seats (3A, 3B) rigid with a structure (1A) of the compass, which are provided for housing an elongate body (9) to be retained, they being spaced apart by a movable intermediate seat (5) substantially aligned with said fixed seats (3A, 3B), the movable intermediate seat (5) being present in a member (6) of transverse axis (7) which axially receives a thrust (15) from elastic means (11) for creating a central transverse force (16) on the elongate body (9), to give rise to lateral reactions (16A, 16B) which produce a gripping effect.

2. A device as claimed in the preceding claim, characterised by the use of elastic means (11) able to be subjected to a thrust in the opposite direction by a manual command (10), in order to nullify the gripping effect.

3. A device as claimed in the preceding claim, characterised by the presence of a lever (20) for transmitting the manual command for indirectly releasing the gripping device.

4. A device as claimed in the preceding claims, characterised in that the elongate bodies are in the form of stems of usual interchangeable parts of compasses.

5. A device as claimed in claim 4, characterised in that said stems are provided with sections able to prevent their rotation about their own axis.

6. A device as claimed in claim 5, characterised in that the anti-rotation section is defined by a longitudinal diametrical cut in the stem, which cooperates with a peg present in the terminal seat (3B) of the housing for the elongate body.

7. A device as claimed in claim 5, characterised in that the anti-rotation section of the constituent stem of the elongate body is in the form of a longitudinal flattening of said body, intended to cooperate with a matching flattening present on the pressing region of the member 6.

8. A device as claimed in claim 5, characterised in that the anti-rotation section of the constituent stem of the elongate body is in the form of a longitudinal flattening of said body, intended to cooperate with matching flattenings present on the reaction regions (16A, 16B) of its housing seat (3A, 3B).

9. A device as claimed in the preceding claims, characterised in that the retention achieved by the gripping action is implemented by the positive engagement between a protuberance (28) projecting into the intermediate seat (5) traversing the operating pusher (30), and its matching seat (29) into which said protuberance is urged by a suitable spring (26).

10. A device as claimed in the preceding claims, characterised by elastic means (26) housed in the actual seat (35) which houses and guides the pusher (30).

11. A device as claimed in the preceding claims, characterised in that the seat (29) for the protuberance is cylindrical.

12. A device as claimed in the preceding claims, characterised in that the seat (29) for the protuberance (28) is a level or tangential groove.

13. A device as claimed in the preceding claims, characterised in that the seat (29) for the protuberance (28) is a circumferential groove.

14. A device as claimed in the preceding claims, characterised in that the base of the pusher (30) receiving the thrust of the spring (26) is provided with a small column element (36) for guiding the spring.

15. A device as claimed in the preceding claims, characterised in that the pusher (30) is provided with opposing elastically yieldable projections (37A, 37B) to prevent the escape of the pusher (30) in the absence of the elongate body (9), by retainingly engaging against undercut edges (40, 41) of the fixed seats (3A, 3B) intended to house the elongate body (9).

16. A device as claimed in the preceding claims, characterised by a gripping capacity deriving from a lever (49) receiving its tightening thrust from a spring (45) positioned below the arm of action (48) and pivoted at its centre (I50, 52), said gripping being achieved by virtue of an end (54) thereof provided with a hole (55) cooperating with holes (56, 57) present in the compass part (47) to retain within them the elongate body (9).

17. A device as claimed in the preceding claim, characterised by pivoting by means of a pin (50).

18. A device as claimed in claim 16, characterised in that the pivoting of the lever (49) is effected by its specific bearing means (52) and retention means (53).

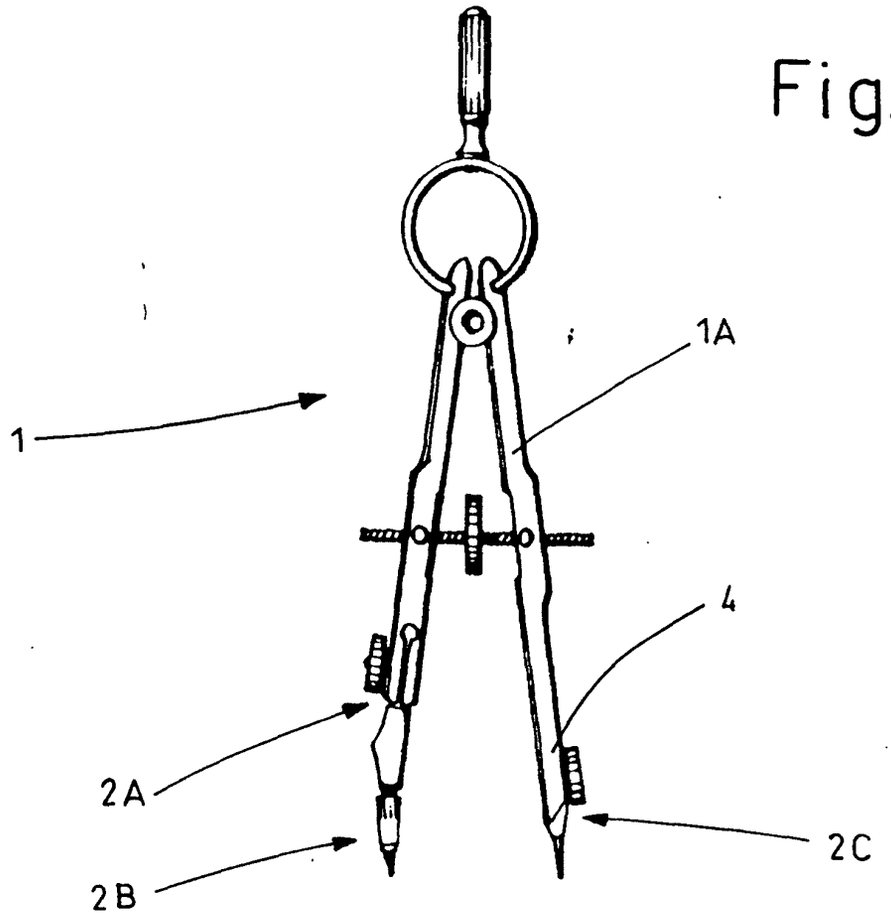

Fig.1

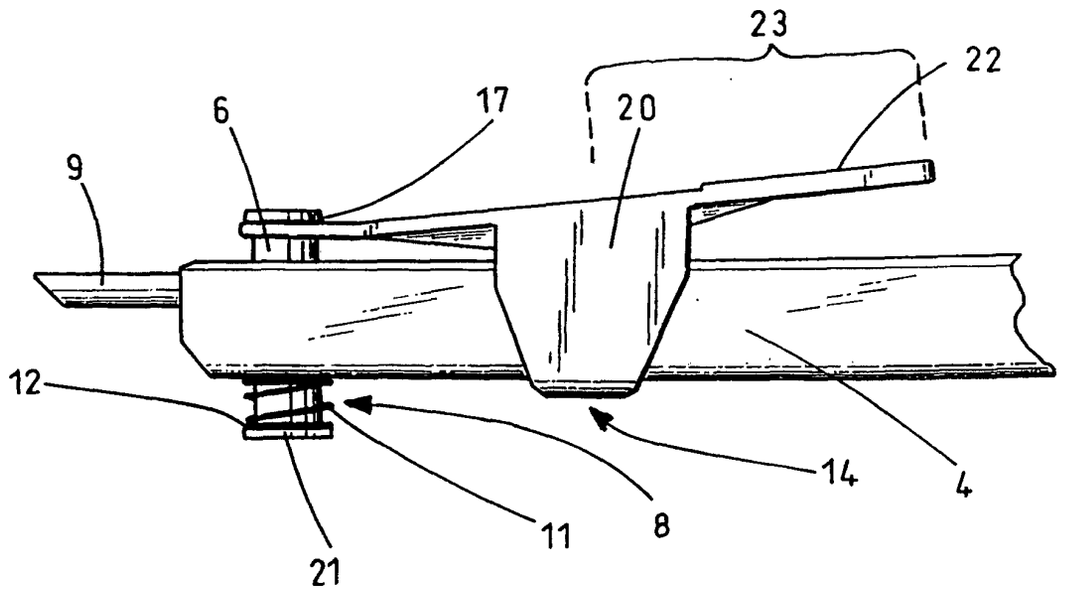

Fig.2

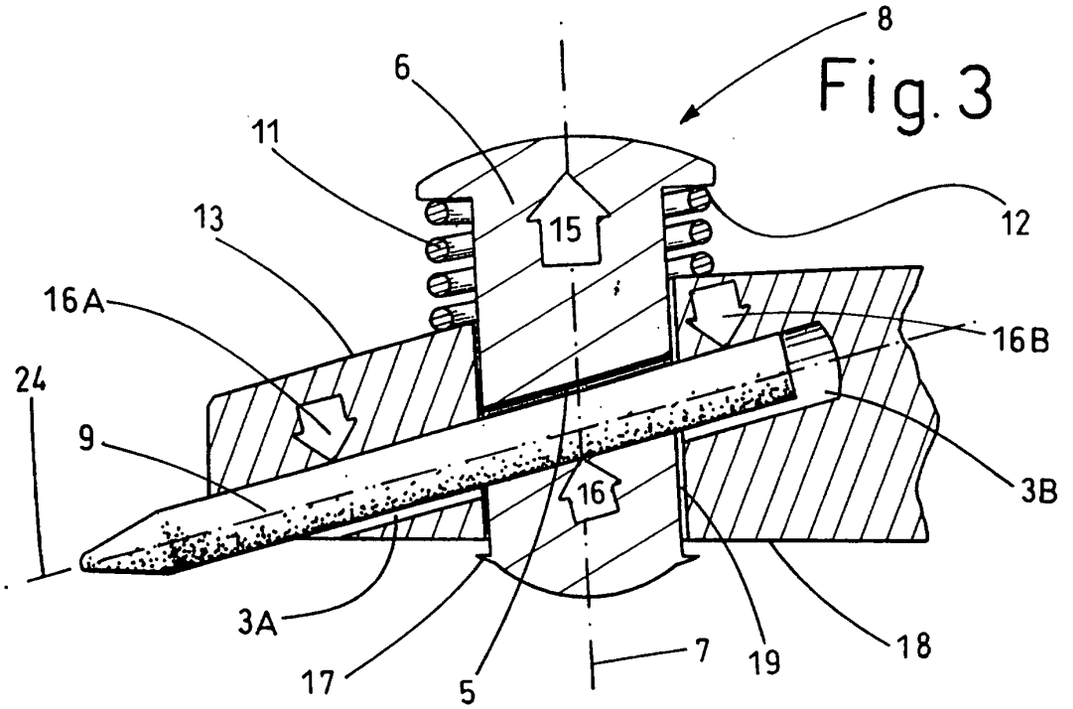

Fig. 3

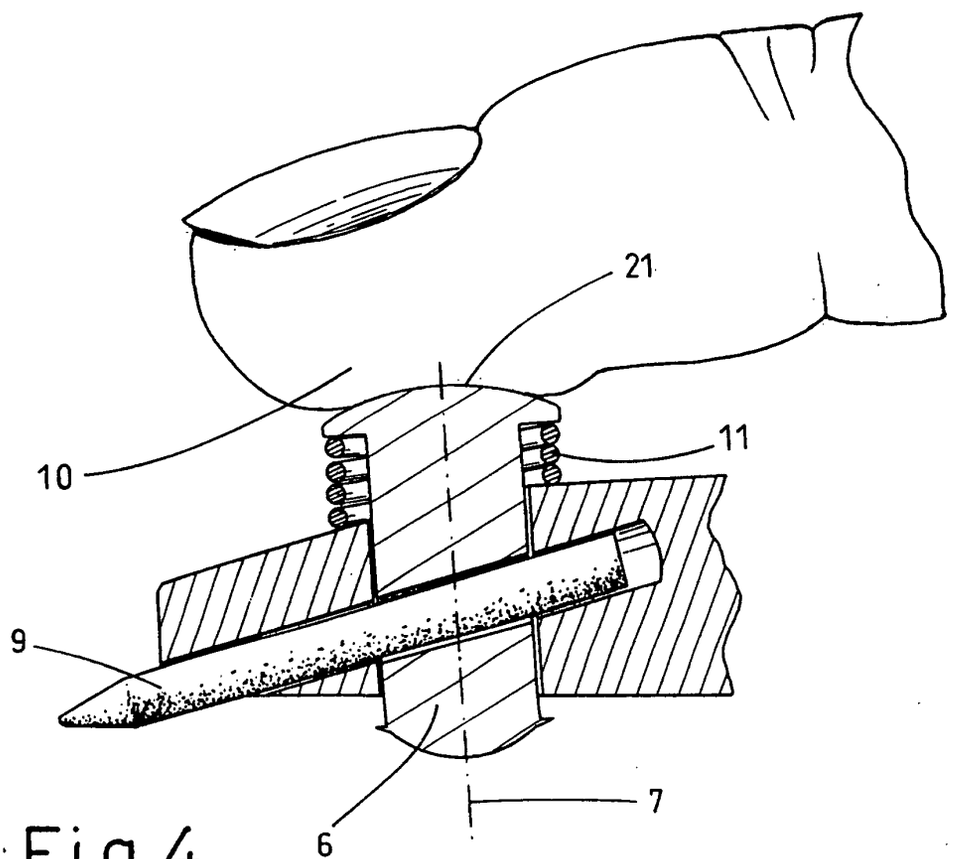

Fig. 4

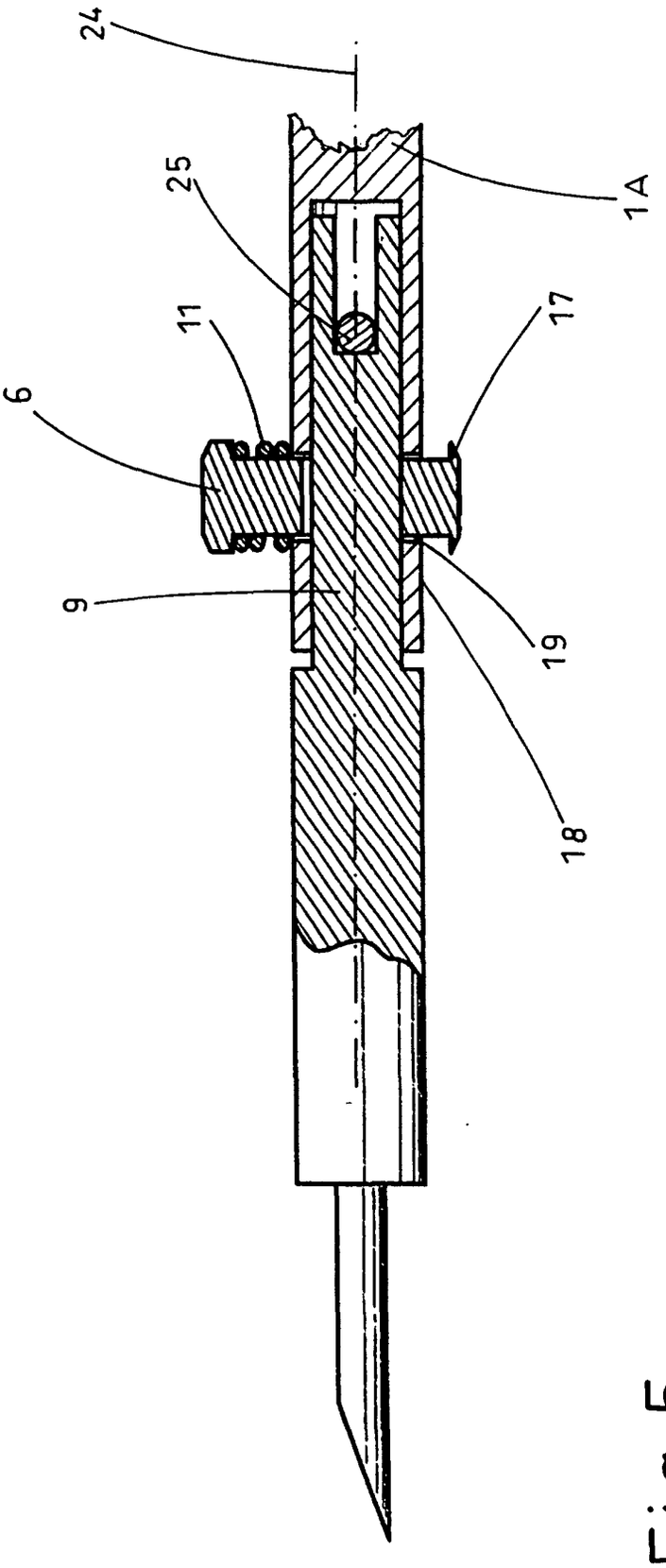

Fig. 5

Fig.6

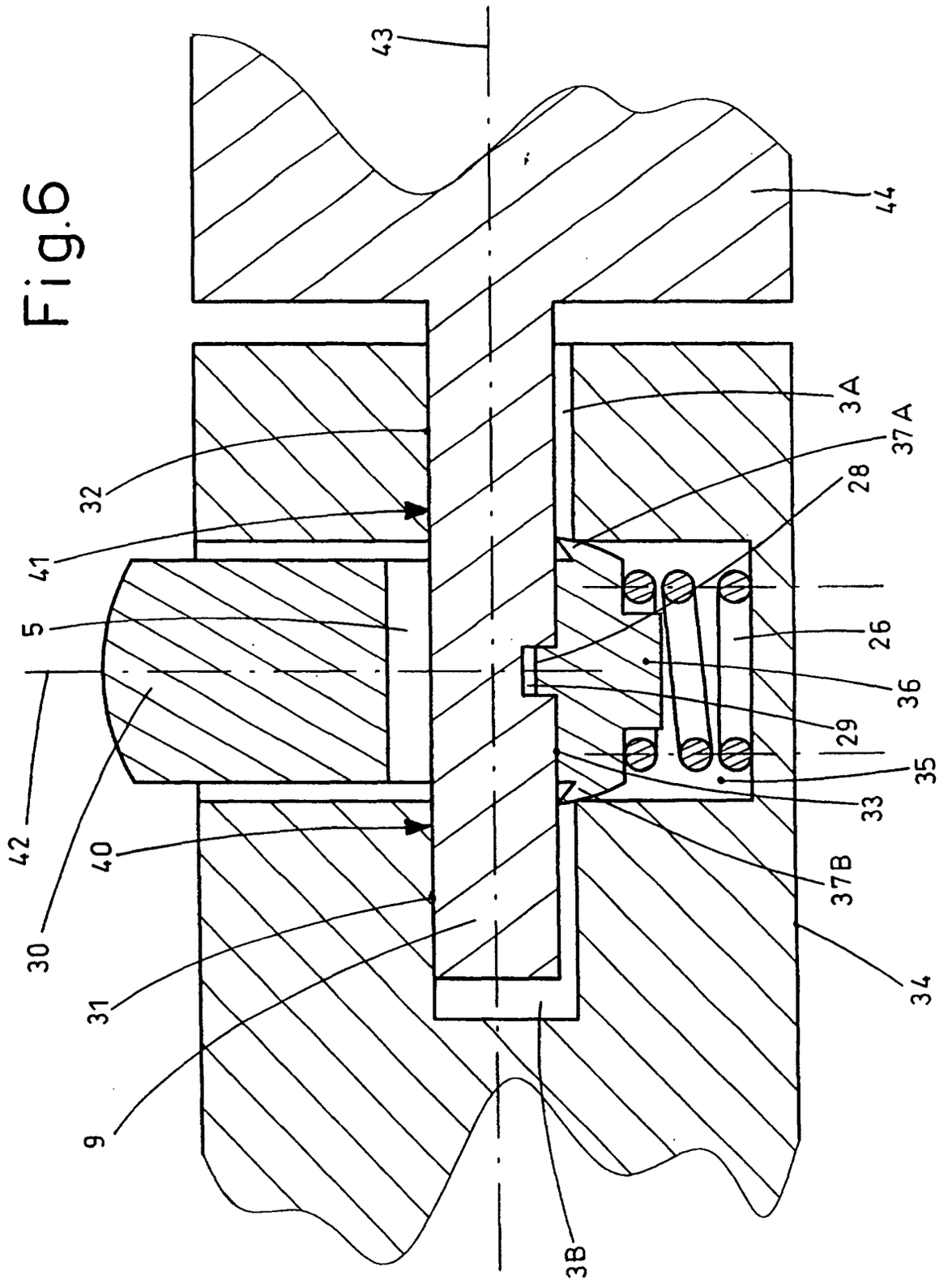

Fig.7