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## (54) A safety device for a lock

(57) The present invention relates to a device for a lock including manoeuvring means capable of being connected to a lock for manoeuvring of the same, handle means arranged and designed to actuate the manoeuvring means, engagement means arranged between the manoeuvring means and the handle means arranged and designed to releasably connected the manoeuvring means with the handle means. The invention is characterised in connection/disconnection means arranged between the handle means and the manoeuvring means arranged and designed such that it is capable of connecting and disconnecting the handle means from the manoeuvring means via the engagement means, holding means arranged and designed to be able to hold the device in the disconnected state, and lock means arranged to the disconnecting means, whereby, when the device is in the disconnected state, manipulating of the lock means with an appropriate key means releases the holding means and re-connects the handle means with the manoeuvring means via the engagement means.

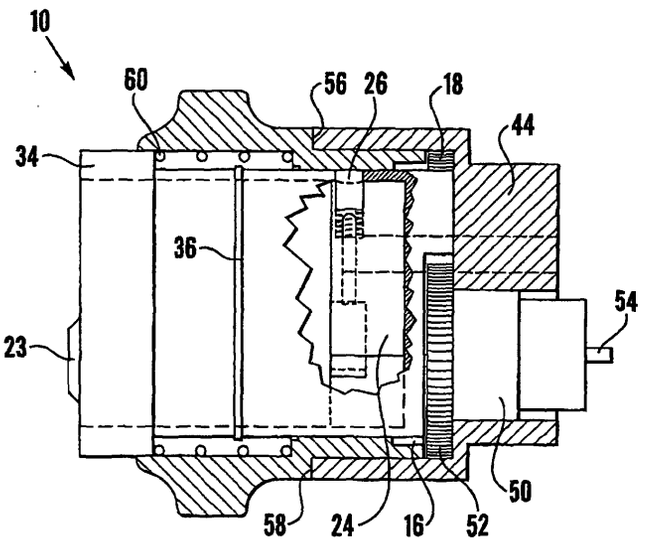


Fig.6

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## Description

### TECHNICAL AREA

**[0001]** The present invention relates to a safety device for a lock and in particular for preventing an intruder to open a door from the inside of for example a house or an apartment when the device is activated.

### TECHNICAL BACKGROUND

**[0002]** The lock industry has been striving during a number of years to increase the safety as regards preventing burglars from entering restricted premises such as buildings, apartments, houses and any confined space containing valuable items. There are numerous inventions regarding this. A common problem has however been that many premises such as houses or apartments have weak spots where an intruder might be able to enter, and these are in particular windows. If an intruder is determined to enter a building, he will break a window and climb inside.

**[0003]** Most locks on the market are resistant against break-in but can easily be opened from the inside. The reason for this is the convenience of those occupying the premises. It is often a desire to be able to lock and unlock the door from the inside in a simple manner. This is also very important in case of fire where it could be of vital importance that the door is opened easily. The most common solution is then to have a mere handle or knob on the inside that you can bolt the door with. The obvious drawback with such a solution is that an intruder easily can open the door and leave the premises with the stolen good through the door. If the intruder is forced to leave the premises, with the goods, which in many cases are rather bulky, like computers, TV-sets, VCR's, stereos and the like, through the broken window, he might be deterred from breaking in.

**[0004]** To this end, the most common solution is to have an auxiliary lock on the door, which is locked when the tenant leaves the premises, such as 7 or 9 lever tumbler locks. These types of locks are rather common in the Nordic countries as a complement to the ordinary lock. Many insurance companies either requests such auxiliary locks in order to insure the house or apartment or offers reduced insurance premiums.

**[0005]** One drawback with this solution is that two locks have to be fitted in the door, which is more costly and might reduce the strength of the door. Secondly, the tenant has to carry two keys in order to lock and unlock the door.

**[0006]** One solution to this drawback is to have one lock with two cylinders, one on the inside and one on the outside of the door. The only possibility to open the door is to use a key. This is however an inconvenience for the tenant in that he has to produce a key and use it every time he wishes to enter the door. The other alternative is then to have the key always in the lock. The key itself is however inferior as a knob and might cause problems to open the door for weak persons.
This also affects the fire escape aspect.

**[0007]** The known designs of this type of lock are furthermore rather complicated and tend therefore to be costly. As regards new buildings, this new type of lock has not gained much interest, mainly due to cost aspects, and the doors are still fitted with standard cylinder locks with a handle on the inside. It is then up to the tenant to arrange for additional locking means.

### BRIEF DESCRIPTION OF THE INVENTION

**[0008]** The aim of the invention is to provide a device which may be used together with most of the standard locks that are used on entrance doors today and which increases the safety aspect as regards preventing an intruder from escaping the premises through the door and at the same time offers the convenience of a standard lock with handles on the inside.

**[0009]** This aim is solved by the device of claim 1. Further aspects of the invention and embodiments thereof are found in the dependent claims.

**[0010]** According to a main aspect of the invention it is characterised by a device for a lock including manoeuvring means capable of being connected to a lock for manoeuvring of the same, handle means arranged and designed to actuate the manoeuvring means, engagement means arranged between the manoeuvring means and the handle means arranged and designed to releasably connected the manoeuvring means with the handle means. The invention is characterised in connection/disconnection means arranged between the handle means and the manoeuvring means arranged and designed such that it is capable of connecting and disconnecting the handle means from the manoeuvring means via the engagement means, holding means arranged and designed to be able to hold the device in the disconnected state, and lock means arranged to the disconnecting means, whereby, when the device is in the disconnected state, manipulating of the lock means with an appropriate key means releases the holding means and re-connects the handle means with the manoeuvring means via the engagement means.

**[0011]** Due to the design of the invention several advantages are obtained in comparison with the known devices. When the device is in the "normal" state, the handle means is in engagement with the manoeuvring means and the handle means acts as any normal handle or knob frequently used on the inside of a door. The tenant or user merely manoeuvres the handle means for opening the lock and thereby the door.

**[0012]** When the user wishes to ensure that the door cannot be opened from the inside, for example when leaving the apartment or house, and for preventing any eventual intruders from leaving the premises through the door, he or she activates the connection/disconnection means so that the engagement means is released,

whereby the handle means and the manoeuvring means are disconnected from each other. The holding means ensures that this disconnected state is maintained so that they cannot be reconnected by for example force. It is now impossible to manoeuvre the lock from the inside and subsequently the door cannot be opened by any normal means.

**[0013]** In order to reconnect the handle means with the manoeuvring means, an appropriate key means has to be used in the lock means. This may include a key for a cylinder lock, a card key or any other suitable key and lock combination arranged in the device. Normally the same key as for opening the door from the outside is used. The manipulation of the lock means releases the holding means, whereby the handle means and the manoeuvring means are reconnected via the engagement means. The reconnection is preferably done "automatically" by a suitable pressure or spring means that is capable of engaging the two.

**[0014]** With the present invention it is now possible to obtain the same level of security as is required by many insurance companies but without the need for fitting auxiliary locks or replacing existing locks, and with the same handling comfort as for standard door locks. This greatly reduces the costs for obtaining a higher level of security in that standard door locks can be used. The device according to the invention replaces the normal handle or knob that is used on the inside of the door, and a normally handy person can do this replacement.

**[0015]** These and other aspects of and advantages with the present invention will become apparent from the detailed description and the accompanying drawings.

## BRIEF DESCRIPTION OF THE INVENTION

**[0016]** In the following detailed description of the invention, reference will be made to the accompanying drawings, of which

Figs. 1-5 show different components comprised in a first embodiment of the present invention,

Fig. 6 show the first embodiment assembled and in a "normal" operating state,

Fig. 7 show the first embodiment assembled and in a released "safety" state,

Fig. 8 shows a perspective view from the rear of a second embodiment partly disassembled,

Fig. 9 shows the embodiment of Fig. 8 from the front,

Fig. 10 shows the embodiment of Fig. 8 from the side,

Fig. 11 shows the embodiment of Fig. 8 assembled with parts cut away for simplicity,

Fig. 12 shows a slightly modified variant of the device according to the embodiment of Figs. 8 to 11 in a "normal" state,

Fig. 13 shows the variant of Fig. 12 in a "safety" state,

Fig. 14 shows a third embodiment of the device according to the invention in a "normal" state,

Fig. 15 shows the embodiment of Fig. 14 in a "safety" state,

Fig. 16 shows a further variant in a normal state, and

Fig. 17 shows the variant according to Fig. 16 in a "safety" state.

## DETAILED DESCRIPTION OF THE INVENTION

**[0017]** A first embodiment of the present invention will now be described. The device 10, Fig 6, is intended to be attached to a lock (not shown) fitted in a door in a known manner by for example screws in a known manner. The lock may be of any type suitable for locking/unlocking the door from the outside with a key or the like means, such as for example key cards.

**[0018]** The device includes a handle part 12, Fig. 1a and 1b with an outer grip 13 and a cylindrical through-hole 14, which comprises a ledge 15 and a circumferential groove 16 at the front end, to the right in Fig. 1. At the front surface a number of protrusions or teeth 18 are arranged, the function of which will be described below. The device further comprises a lock body 20, Fig. 2a and b, with a recess 22 for accommodating a cylinder lock 23, Fig. 6 and 7, in the embodiment a cylinder lock of the Scandinavian oval type. The recess is further arranged to accommodate a lock/release part 24, Fig. 5a and b, which is attached to the front end of the cylinder lock before fitting into the recess of the lock body. The lock/release part comprises a bolt 26. The lower part of the bolt is arranged with a shackle 28 with a lower part 30 onto which a dogging member arranged at the front end of the cylinder lock rests. With the Scandinavian type of cylinder locks the dogging member is in the form of a flat plate, Fig. 10, which rests on the lower part 30 of the shackle. Depending on the type of dogging member, it is to be understood that the shackle may have another suitable form or shape. A spring 32 is arranged in the lock/release part for forcing the bolt 26 upwards.

**[0019]** The lock body 20 further comprises an outer circumferential part 34 with an outer diameter that corresponds to the inner diameter or the rear part of the recess 14 of the handle part. The outer diameter of the rest of the lock body has a diameter substantially corresponding to the inner diameter of the handle part after

the ledge 15. A circumferential protrusion 36 is arranged on that part of the lock body. At the front end the lock body is arranged with holes 38 for attaching the lock/release part and the cylinder lock inside the lock body with screws or the like suitable fastening means (not shown).

**[0020]** The device also comprises an attachment sleeve 40, Fig. 3a and b, to be attached to the lock of a door. It comprises a first cylindrical part 42 into which the front end of the lock body fits, and a front wall 44 having holes 46 for attaching to the lock of the door and for attaching the cylinder lock and the lock/release part. It also comprises a larger hole 48 into which a shaft 50, Fig. 4a and b, fits rotatably. The rear end of the shaft is arranged with a wheel having teeth of protrusions 52 around its circumference, with a design and pitch that corresponds to the teeth 18 of the handle part 12. The front end of the shaft is arranged with a dogging means 54 adapted to engage and manoeuvre the lock of the door. Again the dogging means can be of any suitable form in order to be connectable to the lock in use.

**[0021]** Figures 6 and 7 show the device according to the first embodiment assembled and in use, where Fig. 6 shows the "normal" unlocked position. In this case the attachment sleeve 40 is attached to the lock of the door and the dogging means 54 of the shaft 50 fits into the lock of the door. The handle part 12 is in a forward position abutting with a ledge 56 against the rear edge 58 of the attachment sleeve. The handle part is held in this position by a spring 60 acting between the circumferential part 34 of the lock body and the ledge 15 of the handle part. In this position the protrusions 18 of the handle part are in engagement with the teeth 52 of the wheel. Thus, when the handle part is rotated the shaft is also rotated and the dogging member 54 operates the lock. The lock can thus be manipulated in the normal fashion by merely turning the handle part, in the same way as an ordinary lock with a handle or a knob.

**[0022]** When the tenant or the like is going to leave the apartment or house and wishes to secure the door from being opened from the inside, he or she then pulls the handle part 12 in the longitudinal direction of the device, to the left in Fig. 6 and 7. This causes the handle part to slide along the lock body 20 whereby the protrusions 18 of the handle part come out of contact with the teeth 52 of the wheel. When the outer circumferential protrusion 36 abuts the ledge 15 the circumferential groove 16 is in register with the bolt 26 of the release/lock part, whereby the bolt is forced into the groove by the spring 32. The handle part now turns freely without any connection with the rest of the device nor the lock of the door and cannot be pushed in again because of the bolt situated in the recess. It is therefore impossible to operate the lock of the door with the handle part.

**[0023]** In order to again be able to operate the lock of the door with the handle part, ie. return it to the normal "unlocked" state, a key has to be used. An appropriate key is inserted into the cylinder lock and is turned, whereby the dogging element 14 of the cylinder lock is turned. The dogging element acts on the shackle 28 against the spring force to cause the bolt 26 of the lock/release part to be moved downwards and the bolt is moved out of the groove 16 of the handle part. The spring 60 then forces the handle part to return to its original position whereby the protrusions 18 of the handle part are brought into engagement again with the teeth 52 of the wheel. The handle part can again be turned whereby the shaft 50 is turned and the lock is manipulated.

**[0024]** Figures 8-11 show a second embodiment 110 of the invention. It includes a cylinder lock 112, in the embodiment shown, a cylinder lock of the Scandinavian oval type, which is provided with a dogging element 114. The cylinder is fitted into a recess 116 of the same shape as the lock cylinder made in a lock body 118. It is to be understood that any suitable cylinder design may be used and with a corresponding shape of the recess. At the end of the cylinder lock a lock/release part 120 is attached, for example by a screw 122. It comprises a bolt 124 slidably arranged in the locking part and protruding over the upper surface of the locking part. The lower part 126 of the bolt is arranged with a shackle form with a lower part onto which the dogging member rests. A spring 128 is arranged in the locking part with one arm resting against a ledge of the bolt, thereby forcing the bolt upwards.

**[0025]** The lock body is further arranged with a circular cylindrical outer surface and an outer circumferential edge part 130, the function of which will be described below, and a through-hole, in which the bolt 124 fits. Outside the lock body a handle part 132 is arranged rotatably and slidably in the longitudinal direction of the device. The inner surface of the handle part is arranged with a circumferential ledge 134, Fig. 10, which ledge in one longitudinal position of the handle part is abutting the side surface of the edge part. The inner surface is further arranged with a circumferential recess 136, in which a compression spring 138 is arranged.

**[0026]** A sleeve 140 is further arranged on the lock body with an inner diameter corresponding to the outer diameter of the lock body. At the inner end of the sleeve, to the left in Fig. 10, a circumferential ledge 142 is arranged, the diameter of which corresponds to the depth of the recess of the handle part. The spring is arranged between the rear side wall of the recess 136, to the left in Fig. 10, and the rear surface of the ledge 142. The front surface of ledge 142 is arranged with a plurality of protrusions 144 evenly spaced around the circumference. The front edge of the sleeve is arranged with a cut-out 146. A locking ring 148 is attached to the front end of the handle part, for example by screws 150. On the inner surface of the locking ring a circumferential groove 152 is arranged. The inner surface of the locking ring is arranged with a plurality of recesses 154 with the same spacing as the protrusions 144 of the sleeve 140.

**[0027]** A lock driving element 156 is arranged at the

front end of the device. It comprises a front protruding part 158 with a configuration such as to fit into a follower located in a lock casing for manipulating the bolt of the lock. In the embodiment shown, the front protruding part is designed as a cross because the shape of the holes of the followers on Scandinavian locks often are such. It is however to be understood that other configurations are possible depending on the type of lock and shape of the follower. The lock driving element is further provided with a sideways protruding arm member 160, which fits into the cut-out 46 of the sleeve 140.

**[0028]** The device functions as follows. In the "normal" unlocked position, Fig. 12, the handle part 132 functions as a normal handle or knob. In this position the compression spring 138 urges the handle part backwards whereby the circumferential ledge 134 abuts the side surface of the edge part 130 of the lock body 118. Because the locking ring 148 with its recesses is attached to the handle part, the recesses are in engagement with the protrusions of the sleeve. When the handle part is turned, the sleeve is turned also due to the engagement between the protrusions and the recesses. The turning of the sleeve will cause the driving element 156 to turn because of the position of the arm member 160 in the cut-out 146 of the sleeve. The lock can thus be manipulated in the normal fashion by merely turning the handle part, in the same way as an ordinary lock with a handle or a knob.

**[0029]** When the tenant or the like is going to leave the apartment or house and wishes to secure the door from being opened from the inside, he or she then pushes the handle part 132 in the longitudinal direction of the device, to the right in the drawings. This movement causes the protrusions 144 of the sleeve 140 and the recesses 154 of the locking ring 148 to come out of engagement with each other and the spring 138 to be compressed. When the locking ring has moved a certain distance, its circumferential groove 152 comes in position above the bolt 124 of the lock/release part 120. The bolt is forced upwards due to the spring 128 in into the groove. This causes the handle part and the locking ring to be locked in this position out of engagement of the protrusions of the sleeve. Thereby the handle is no longer in contact with the driving element and the handle then rotates freely without the possibility to manipulate the lock.

**[0030]** In order to return to the normal "unlocked" state, a key has to be used. An appropriate key is inserted into the cylinder lock and is turned, whereby the dogging element 114 is turned. This causes the bolt 124 of the lock/release part to be moved downwards and the bolt is moved out of the groove of the sleeve. The compression spring then forces the handle part to return to its original position whereby the recesses and the protrusions are brought into engagement again. The handle part can again be turned whereby the driving element is turned and the lock is manipulated.

**[0031]** Figs. 12 and 13 show a somewhat different design of the device according to the invention. Here the recesses and protrusions have been replaced with teeth that are able to engage each other. Another variant of the engagement means, could be to have a spline-like configuration where one part of the spline was arranged on the outer surface of the sleeve and a corresponding design was arranged on the inner surface of the handle part, whereby the axial displacement of the handle part in relation to the sleeve would make the spline-parts come in and out of contact with each other.

**[0032]** Figs. 14 and 15 show another embodiment of the present invention. The same parts as described for the second embodiment have the same reference numerals. In the embodiment shown the lock body 118 is rotatably attached to a fastening body 118A which is secured to the lock with the help of screws (not shown). The sleeve 140 is also rotatably attached to the fastening body by flanges 140A. The cylinder lock 112 is on its inner surface arranged with a protrusion 1100 which has an inclined surface 1102. the cylinder lock has further a holding means 1104 in the form of a hook, which holding means is connected to the dogging element 114. the inside of the lock body is arranged with a recess 1106 for the hook to engage with. A bolt 124 is slidably arranged inside the lock body and has a protrusion 1108 at its lower end, which in turn has an inclined surface 1110. a number of holes are arranged in the sleeve and the handle part 132, through which holes the bolt projects by an appropriate spring means (not shown).

**[0033]** The embodiment functions as follows. When the device is in the "normal" state, Fig. 14, the bolt projects through the holes of the sleeve and the handle part and locks them together. To open the door from the inside, the user may then turn the handle part, whereby the sleeve also is turned, and as described above, the turning of the sleeve causes the driving element 156 to turn and affect the lock.

**[0034]** When the user wishes to secure the door from being opened from the inside, he or she then pushes the cylinder lock 112 into the device against the forces of the spring 138 until the hook 1104 engages with the groove 1106 and holds the cylinder lock in this position. The movement of the cylinder lock causes the inclined surfaces 1102, 1110 to act on each other whereby the bolt 124 will move downwards and release the connection between the handle part and the sleeve, Fig. 15. This release will make it impossible to manoeuvre the lock with the handle part since it rotates freely around the sleeve.

**[0035]** In order to return the device into its normal state, a key is inserted in the lock and the cylinder is turned, whereby the dogging element 114 is turned. This causes the hook 1104 to rotate and come out of engagement with the groove 1106. Thereby the cylinder lock is pushed back by the spring 138 and the inclined surfaces 1102, 1110 are drawn from each other. The bolt 124 may now move upwards again by its spring means and project through the holes of the sleeve 140 and the han-

dle part 132.

**[0036]** Lastly figures 16 and 17 show a variant with a kind of combination of the function of the first embodiment and the design of the variant shown in the figures 12 and 13. This variant also employs splines instead of protrusions and/or teeth but works in a way that the device is put in a "secure" state by pulling the handle part instead of pushing it towards the door. This way of operating the device may advantageous out of safety reasons in that it is more difficult to put the device in the safety position and in particular when there is an emergency. If the handle part is pushed in order to put it in the safety position, ie. unlocking it from the lock of the door, this may be done accidentally when a person rushes against the door and trying to grab the handle part. He or she might then accidentally push the handle part so that it unlocks and the person is then unable to escape the building unless he or she uses a key and puts the device in the normal position. On the other hand this may be minimized by arranging a spring that is rather strong so that it requires quite some force in order to release the handle part. The advantage with the pulling of the handle part in order to put the device in the safety position is that this is a more natural movement when leaving the building. A strong spring may also be advantageous for all embodiments in that it prevents children from being able to manipulate the device so that the handle part is released.

**[0037]** It is to be understood that the embodiment described above and shown in the drawings is only to be regarded as a non-limiting example and that the scope of protection is defined by the patent claims.

## Claims

1. Device for a lock including manoeuvring means capable of being connected to a lock for manoeuvring of the same, handle means arranged and designed to actuate the manoeuvring means, engagement means arranged between the manoeuvring means and the handle means arranged and designed to releasably connected the manoeuvring means with the handle means, **characterised in** connection/disconnection means arranged between the handle means and the manoeuvring means arranged and designed such that it is capable of connecting and disconnecting the handle means from the manoeuvring means via the engagement means, holding means arranged and designed to be able to hold the device in the disconnected state, and lock means arranged to the disconnecting means, whereby, when the device is in the disconnected state, manipulating of the lock means with an appropriate key means releases the holding means and re-connects the handle means with the manoeuvring means via the engagement means.

2. Device according to claim 1, **characterised in that** the connection/disconnection means includes a spring means capable of bringing the engagement means in engagement upon release of the holding means.

3. Device according to claim 1, **characterised in that** the manoeuvring means is designed as a sleeve arranged outside a body capable of being attached to the lock, that the handle means is designed as a sleeve outside the manoeuvring means and designed such that axial displacement of the handle means connects/de-connects the engagement means.

Fig. 1a

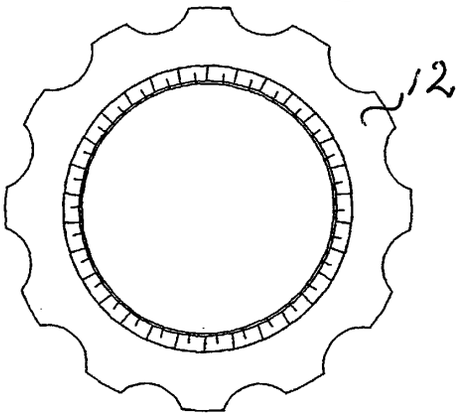
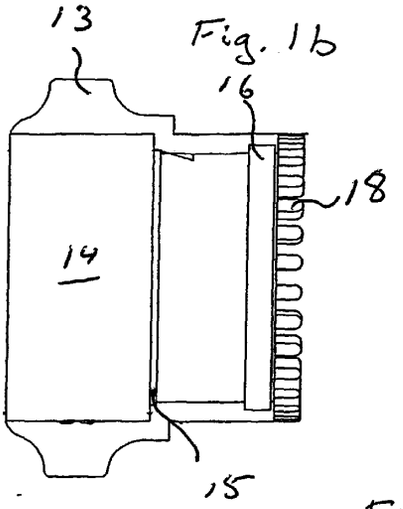



Fig. 1b



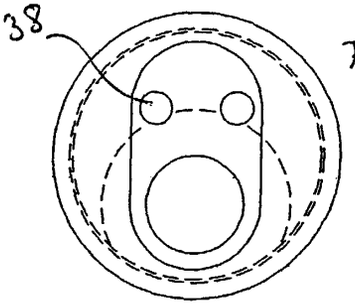




Fig. 2a

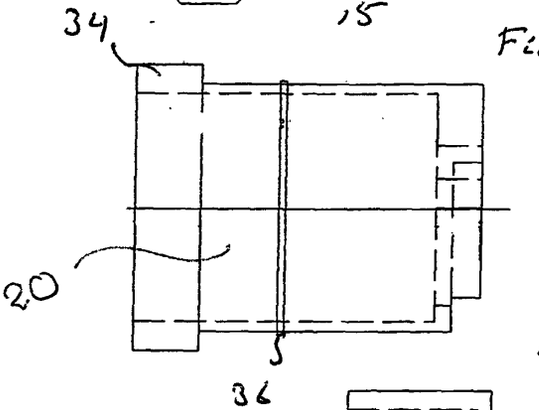



Fig. 2b

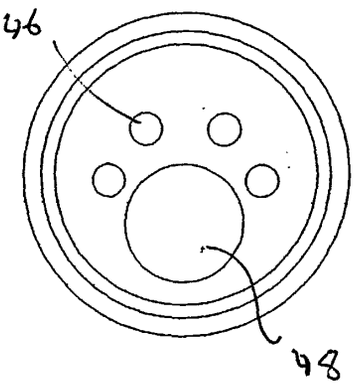



Fig. 3a

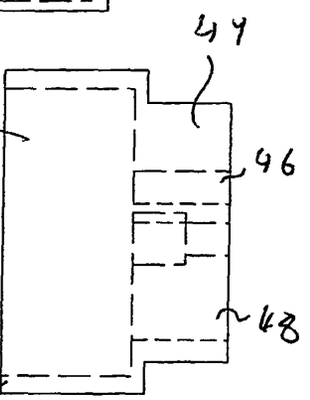



Fig.3b

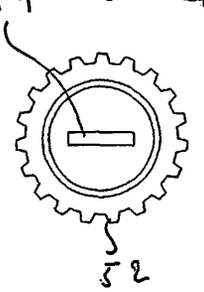



Fig. 4a

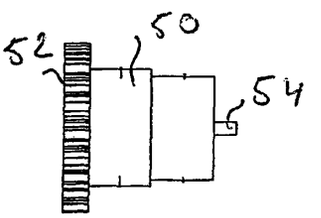



Fig. 4b

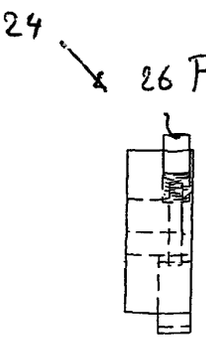



Fig. 5a

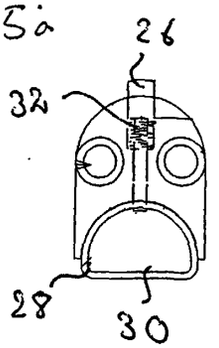



Fig. 5b

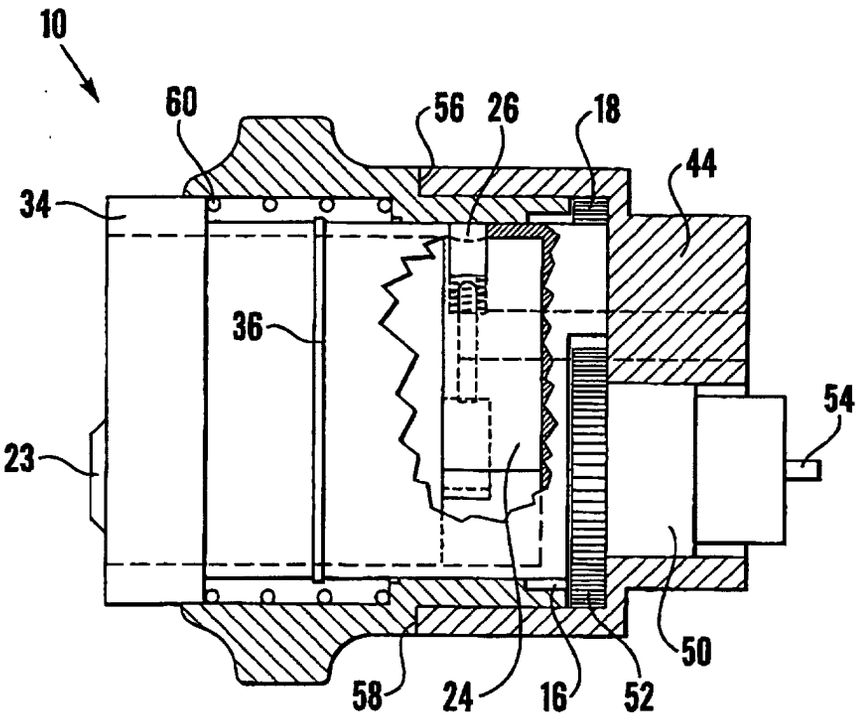



Fig.6

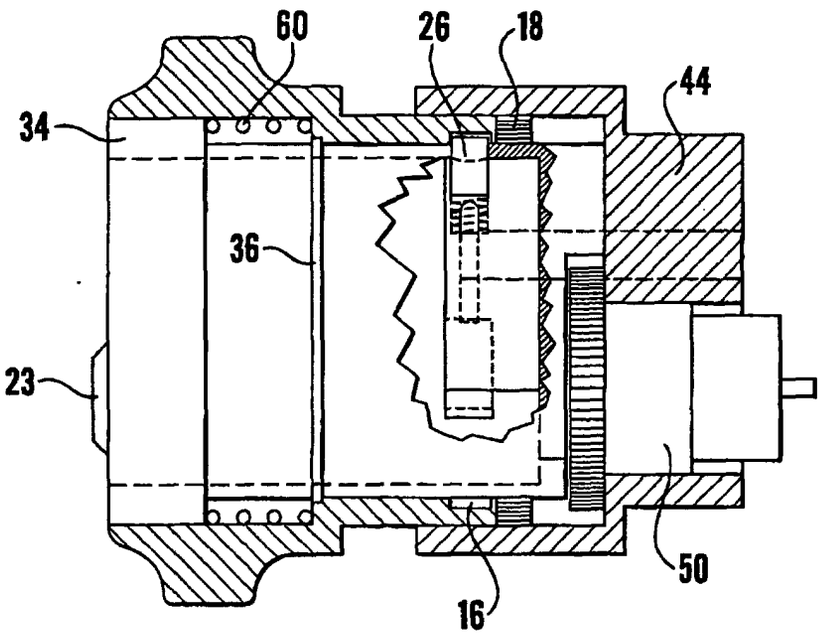



Fig.7

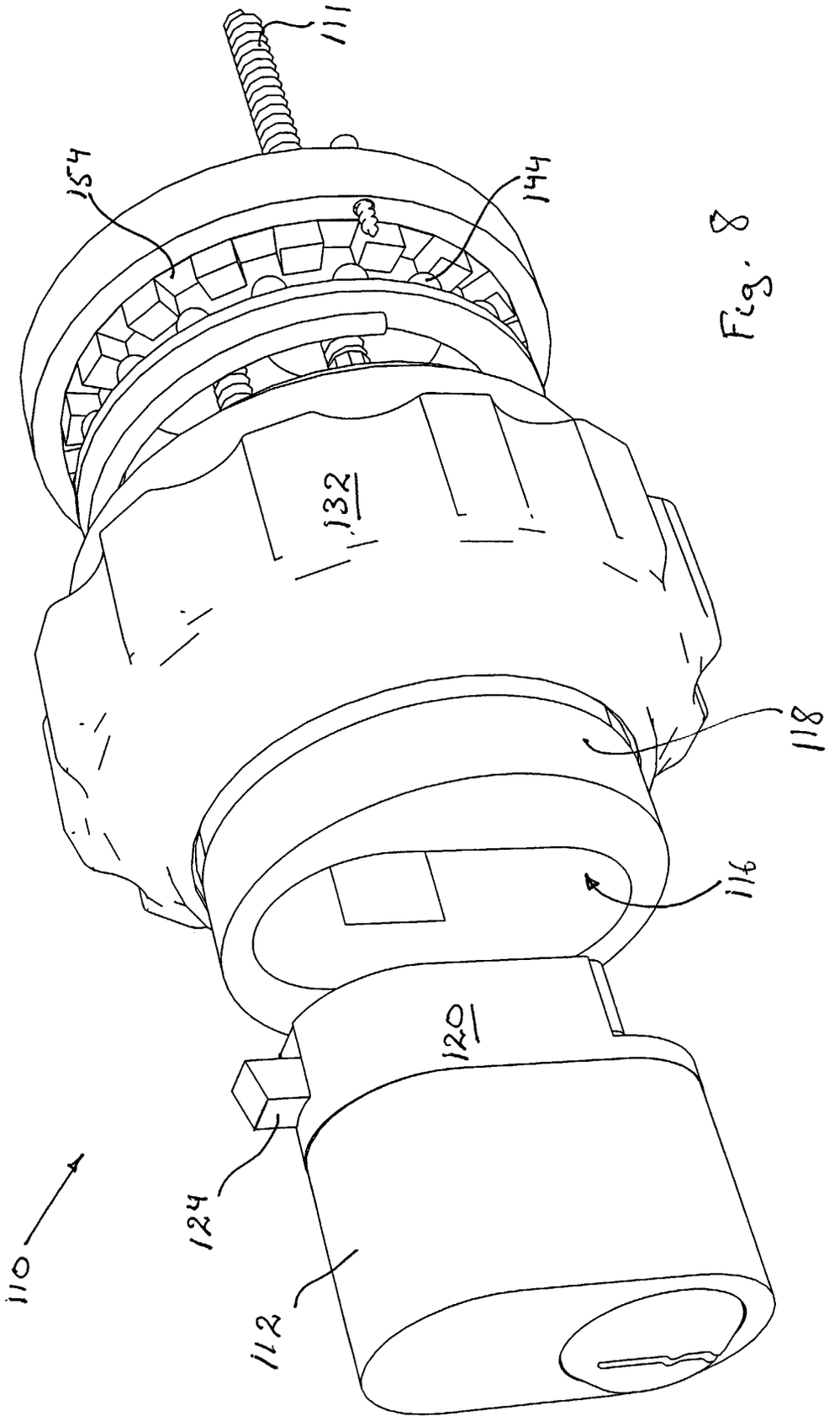



Fig. 8

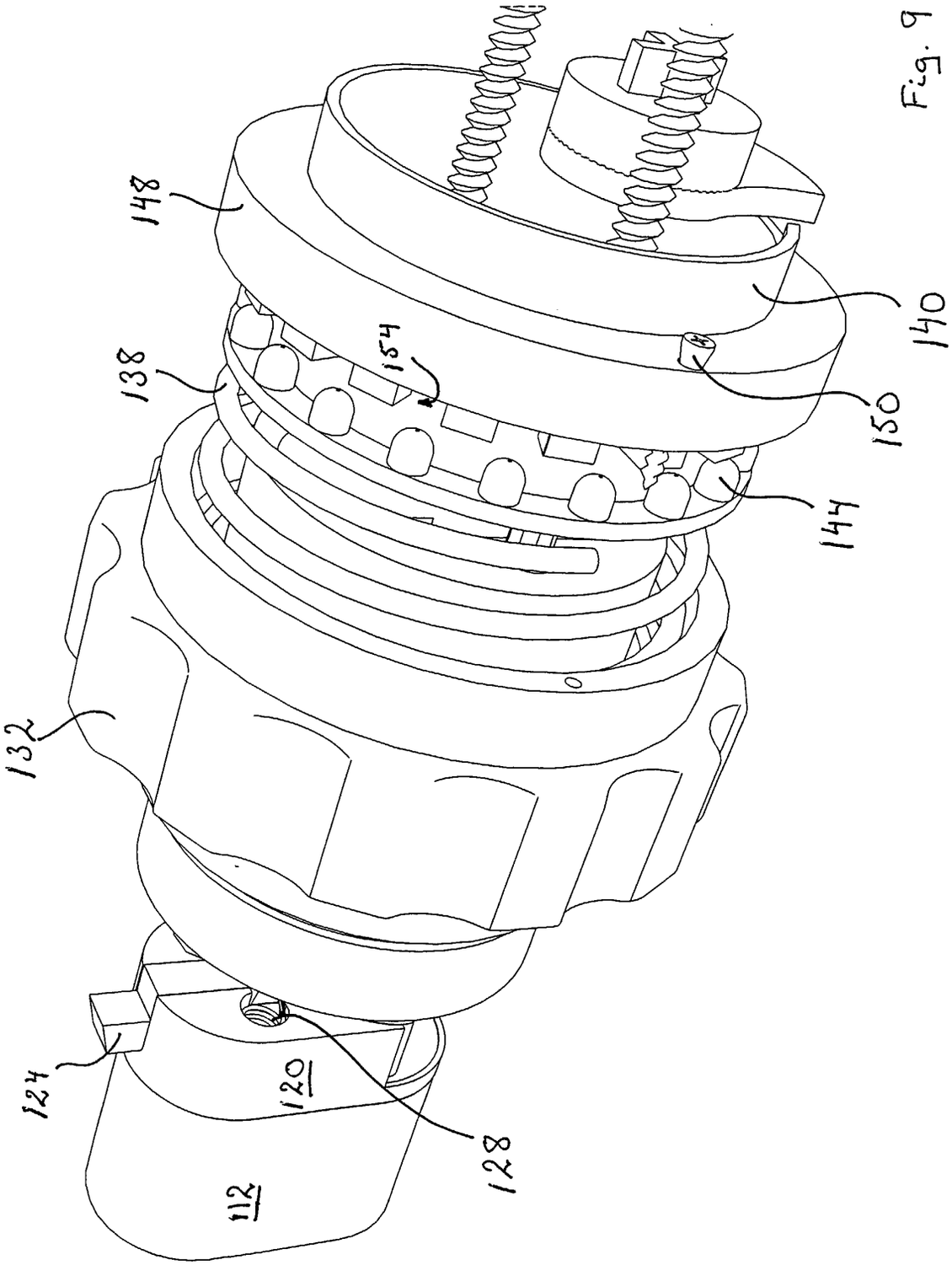



Fig. 9

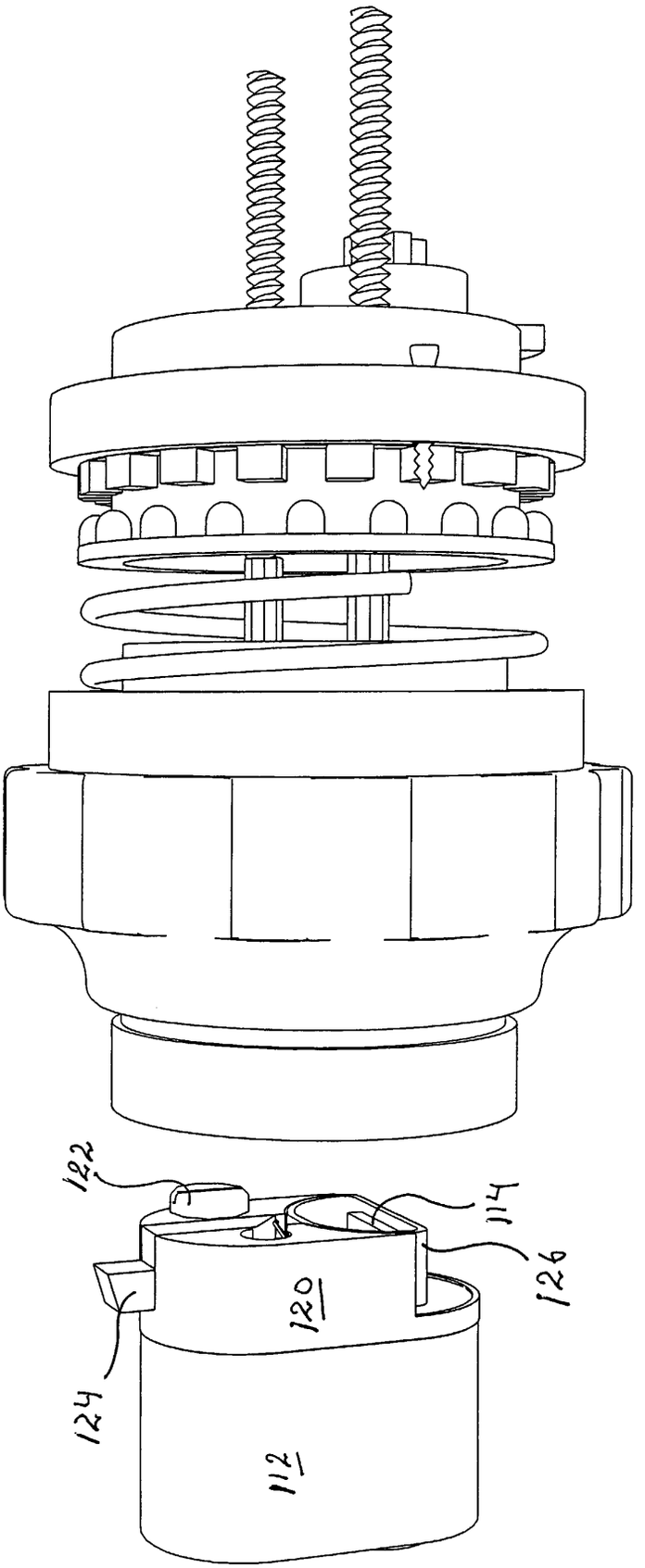



Fig. 10

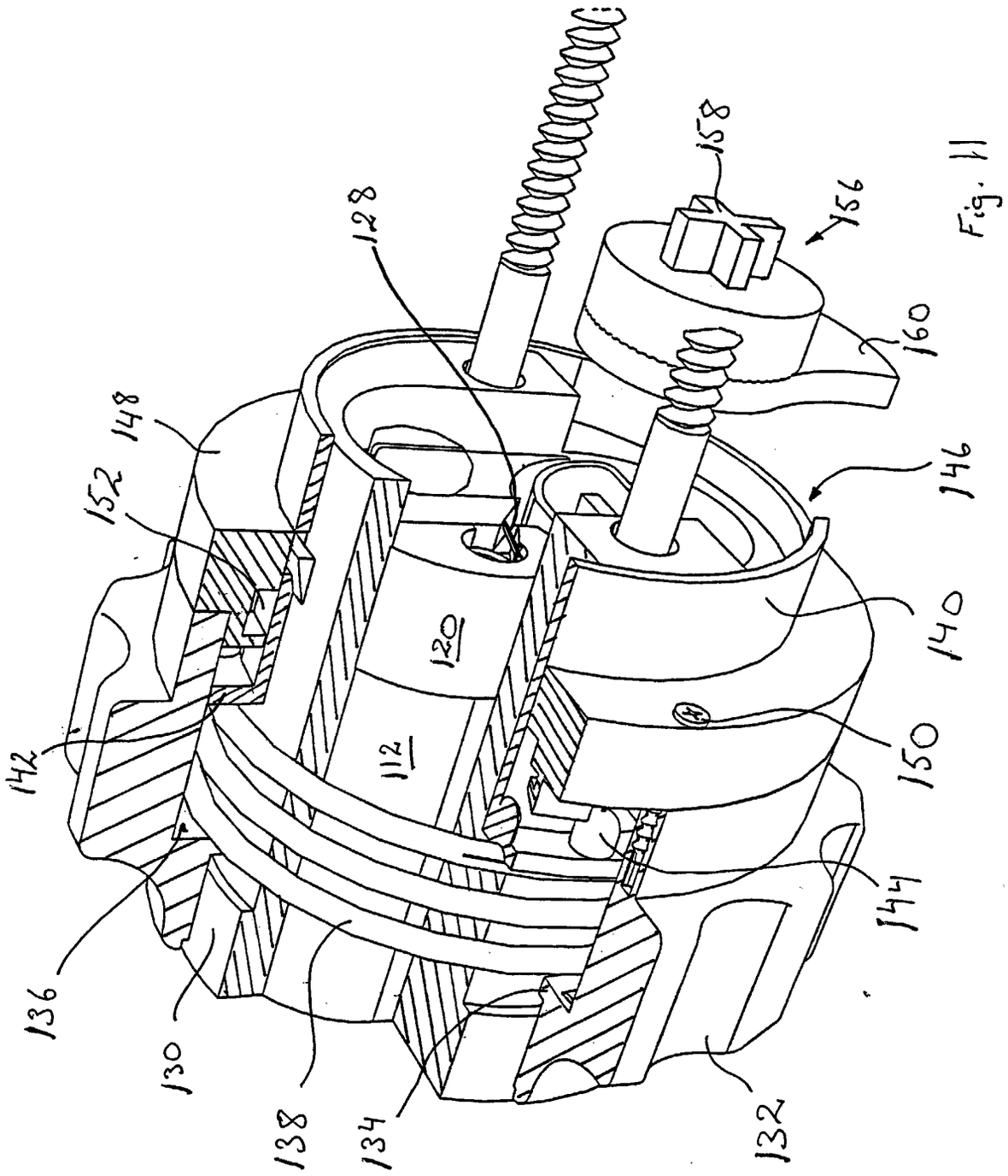

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Fig. 11

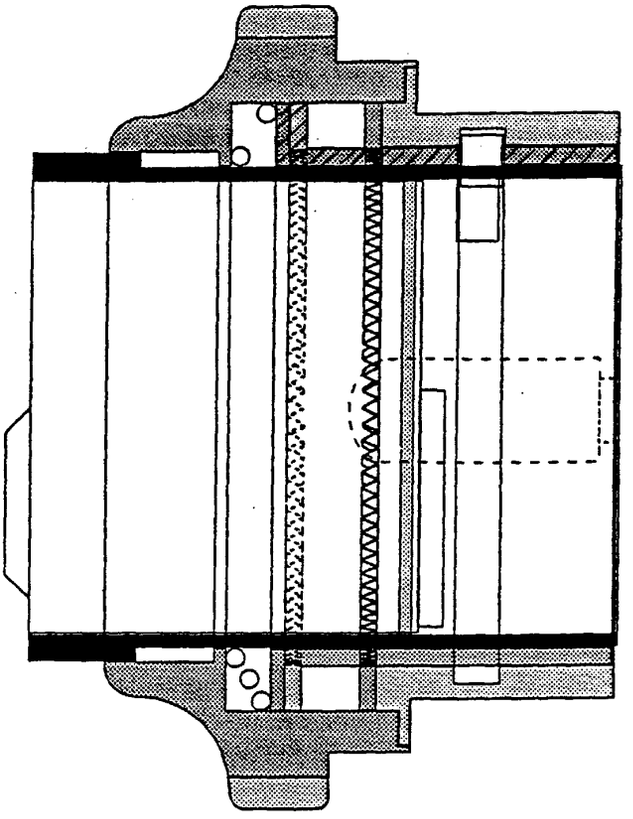


Fig. 13

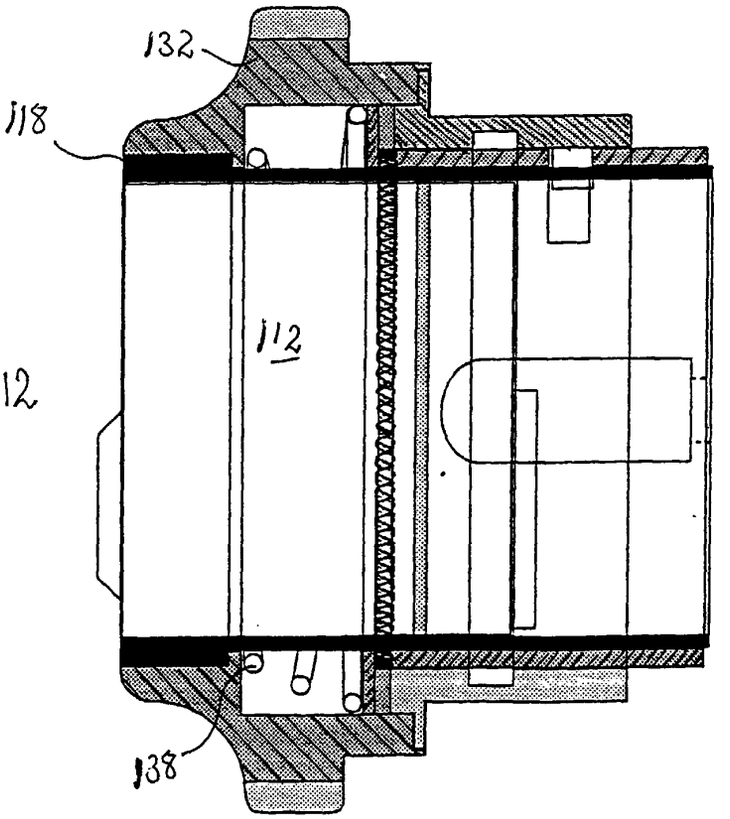
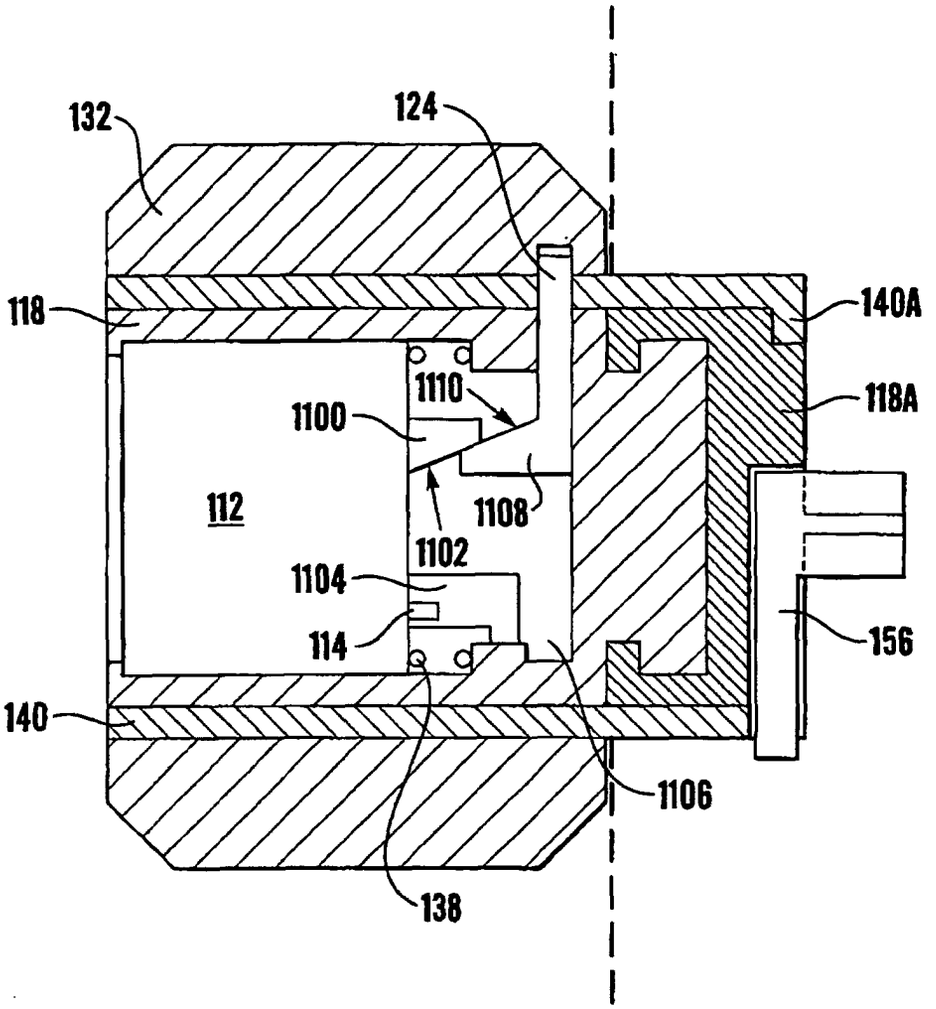



Fig. 12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1104
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1106
138

Fig. 14

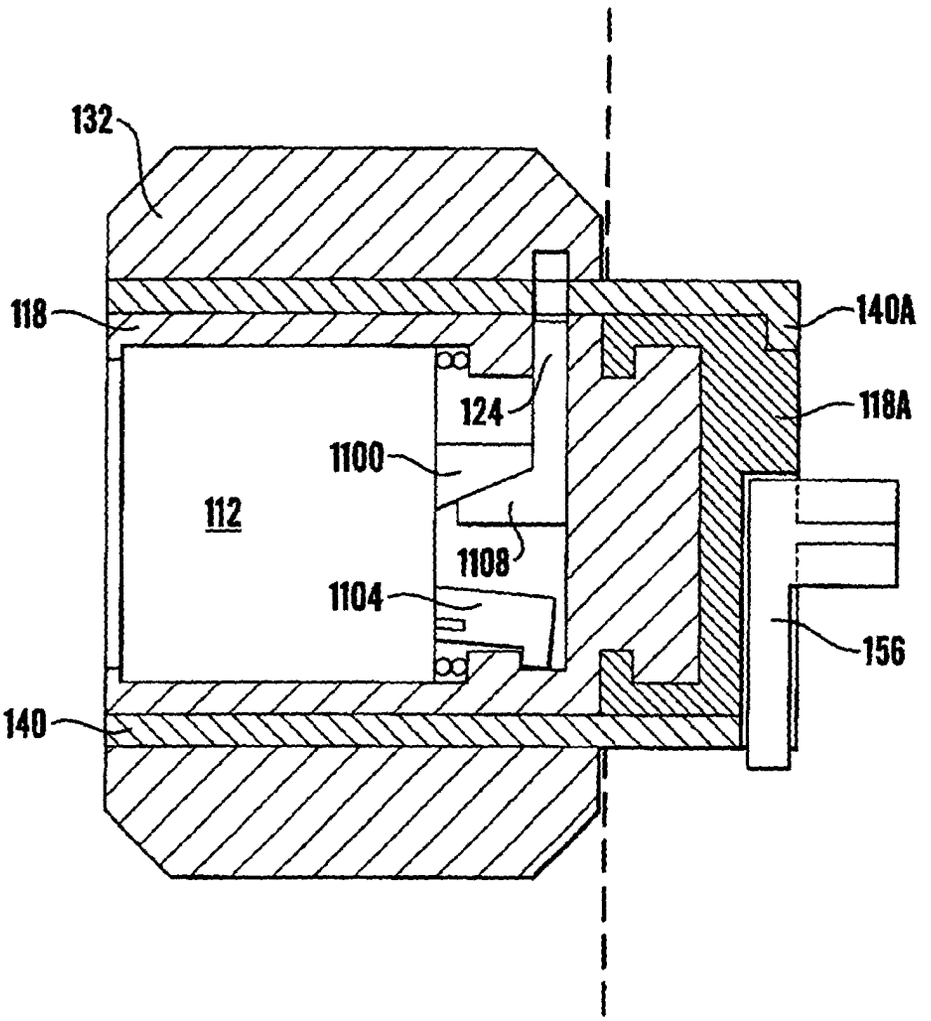


Fig. 15

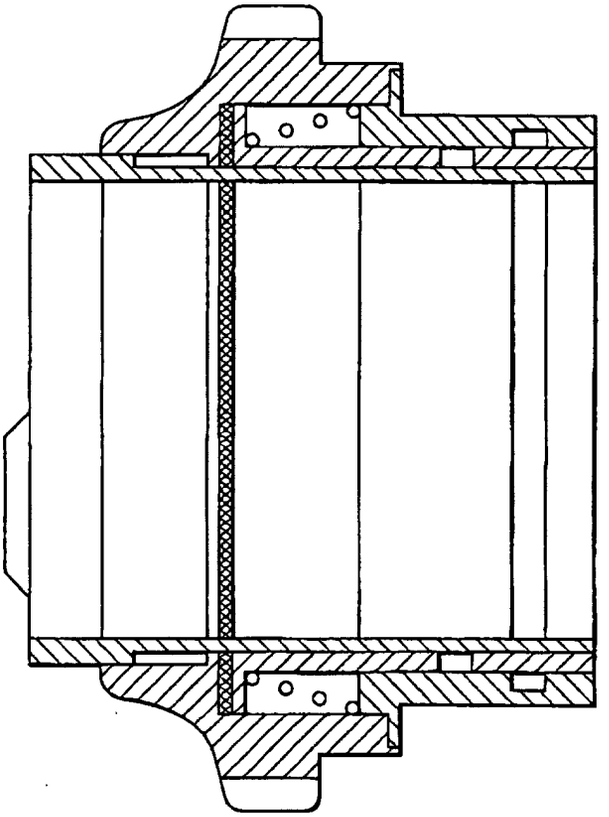

Fig.16

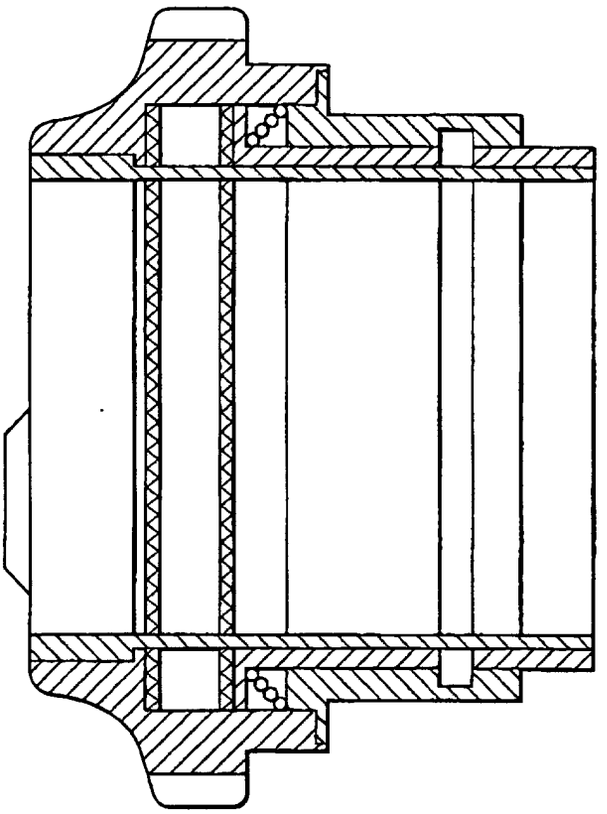

Fig.17