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EUROPEAN PATENT APPLICATION

21 Application number: 89500094.1

51 Int. Cl.⁵: E05B 73/00

22 Date of filing: 27.09.89

30 Priority: 28.09.88 ES 8803292
 08.08.89 ES 8902819

43 Date of publication of application:
 11.04.90 Bulletin 90/15

34 Designated Contracting States:
 AT BE CH DE FR GB GR IT LI LU NL SE

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54 Safety coupling.

57 Safety coupling, applicable to link solidly but separably two parts, of which at least one of them is capable of displacement on an essentially straight trajectory. It comprises a receiving socket part (1) and a plug part (2) adapted to being introduced in the receiving socket part and remaining locked in it. The socket part (1) is provided with a coaxial rod which comprises on its external end a protrusion (5) of spherical zone general shape. The plug part (1) is provided with retaining means of socket protrusion, as well as with locking means of this retaining means and with unlocking means of this locking means.

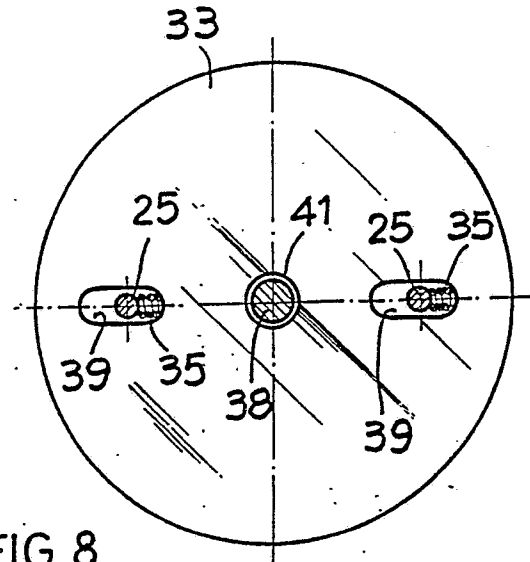


FIG. 8

SAFETY COUPLING

The present invention refers to a safety coupling, particularly applicable to link solidly but separably two parts, of which at least one of them is capable of displacement on an essentially straight trajectory.

This type of safety coupling can be used as a lock for instance in horizontally displaceable foldable lattice doors, in vertically displaceable rolling doors, in swinging doors and analogous systems. There are already many locks for vertically displaceable rolling doors known, but in the majority of them, they present the drawback that the part that has to be attached to the bottom frame of the door has to be necessarily protruding, thus constituting an obstacle over which any person could easily trip. To avoid this inconvenience, concealable rods have been designed, the concealment or elevation of which are not automatic and therefore need a specific concealment operation, which in the greater part of the cases is bothersome due to the fact that it has to be carried out at floor level.

Moreover, all the locking devices known of this type present the drawback that the closing operation is not automatic, but needs the manual locking by means of a key or similar element and on many occasions it is necessary to introduce additionally a bolt or analogous external element to complete the attachment between both parts to be coupled.

All these inconveniences are completely eliminated in the safety coupling which is the subject of the first type of materialisation of the present invention, and which is essentially characterised by one of said parts being solidly provided with a socket part, whilst the other part is also solidly provided with a plug part, capable of being introduced in the mentioned receiving socket part and remaining locked in it, this latter comprising an external tubular casing in which inside there is a coaxially arranged solidly fixed rod provided on its external end with a protrusion of spherical shape, whose top limiting plane is level with the mouthpiece of the tubular casing of the receiving part, said plug part comprising also an external tubular casing of external diameter somewhat smaller than the internal diameter of the casing of the receiving part, being adapted to introduce coaxially in the latter, and being equipped with some means of retaining the receiving part's protrusion inside the casing of the plug part, as well as some means of locking said means of retaining and some means of unlocking said means of locking.

According to another characteristic of the present invention, said means of retaining of the receiving part's protrusion arranged in the plug part, comprise an internal bushing solidly attached

to the internal face of the external casing, on which and tilting around the respective horizontal shafts, a plurality of identical levers have been arranged, which on their outside sections have been provided on their internal edges with corresponding notches of arched contour and which are adapted in such a way that on introducing the plug part in the receiving part, they tilt and couple adjustedly in their arched contour notches on the surface of the spherical zone of the protrusion of the receiving part, thus adopting a retention position of same, each lever being provided with a spring that impels it towards a resting position in which the external section provided of the mentioned notch of arched contour remains uncoupled from the protrusion of the mentioned receiving part. An internal bar coaxial with the external casing has been arranged in a longitudinally displaceable manner and has been submitted to the action of a spring that tends to maintain it in the outermost position possible, being provided on its internal end with one coaxial truncated cone-shaped cam, on which the internal ends of the tilting levers rest constantly, the whole adapted in such a way that on introducing the plug part in the socket part, the external end of the mentioned internal coaxial bar knocks against the top limiting plane of the protrusion of the coaxial rod of the socket part, for which reason the bar suffers a longitudinal displacement introducing itself into the plug part, and the cam tilts the levers until their notches are coupled on the surface of the spherical zone of the protrusion of the receiving part, thus reaching the retention position.

In accordance with another characteristic of the invention, the mentioned locking means of the retaining means comprise a locking ring arranged on the internal rim of the mouthpiece of the tubular casing of the plug part, with an external diameter slightly smaller than the internal diameter of the tubular casing and with an internal diameter slightly greater than the external diameter of the protrusion of the receiving part, said locking ring being provided with a circumferential internal stepped recess, adapted to interact with the appropriate stepped notches provided on the external edges of the tilted levers, said locking ring being submitted to the means of spring action that tends to apply it against the external ends of the levers, when these are not in the retention position, in such a way that on the said lever arriving to the mentioned retaining position, the mentioned stepped notches of the levers are faced towards the mentioned circumferential recess, activating the said means of spring action so as to displace the locking ring inside on a distance equal to the height of its recess, for which

reason the locking ring remains inserted into the notches of the levers, between these latter and the internal face of the tubular casing, thus impeding the tilting of the levers and locking them in the retaining position.

According to another characteristic of the invention, said means of spring action on the locking ring comprises a plurality of longitudinal rods, which are linked by one of their ends to the locking ring and which at the other end are firmly attached to a coaxial disc, submitted to the action of at least one spring which impels it towards the inside.

In accordance with another characteristic of the invention, the mentioned means of unlocking of said means of locking of the means of retention comprises a pushing element adapted to act on the coaxial disc solidly attached to the locking ring, in the sense of pushing the assembly of the disc and the ring towards the outside of the plug part, overcoming the means of spring action that act on the assembly, so as to release the ends of the lever from the interior part of the circumferential recess of the locking ring, thus allowing their tilting and uncoupling between the plug and socket parts.

According to another characteristic of the invention, the receiving part comprises a flat ring, coaxial with the external casing and submitted to the action of an internal compression spring, which tends to maintain it in the initial resting position, in which it closes completely the annular space comprised between the internal face of the casing wall and the external free rim of the rod protrusion, said flat ring being adapted to displacement parallel to itself towards the inside of the receiving part, on being pushed by the external edge of the plug part, when this is introduced into the socket part.

The first method of materialisation of the invention described, nevertheless presents the drawback that whilst the coupling, which is the subject of said patent remains in the open or uncoupled position, the means of unlocking of the means of locking have to be energised, which circumstance involves most frequently the fact that said means of unlocking be energised manually by direct or indirect action of a key, or that this latter has to remain in the lock and maintain it open or, that once the plug and socket part are separated, the means of unlocking must be locked in order to be able to pull out the key.

This compels the carrying out of a manual action on the key to be able to re-couple the plug and socket parts, which action is cumbersome.

The second type of materialisation of the present invention describes some improvements that suppress completely this drawback and that are essentially characterised by said discoidal coaxial part, of external diameter somewhat smaller than the internal diameter of the casing of the plug

part is made up by the loose superposition of three discs of sensibly the same contour, of which the two end discs are solidly connected to each other and the intermediate disc has been provided with oblong orifices through which the rods go and which enable it to side displacements in their own plane, said intermediate disc being submitted to the action of springs that tend to allow it to protrude laterally between both end discs, so that the rim of the protruding section of the intermediate disc is capable of introducing itself in an internal slot of the casing, thus determining the longitudinal immobilisation of the discoidal part, and therefore, that of the locking ring, in such a position as to permit the uncoupling between the plug and the socket parts, the plug parts being arranged to locate an axial rod, capable of being pushed by the protrusion of the socket part in the moment of the coupling between both parts and with its internal point-shaped end, said rod being adapted to introduce itself in a central countersunk orifice of the intermediate disc, thus compelling this latter to displace sidewise, overcoming the action of the springs that tend to maintain it in the laterally protruding position amongst the end discs, so as to enable the edge of the intermediate disc to come out of the internal slot of the casing and enabling the locking ring to be displaced longitudinally inside the casing to carry out its locking action.

According to another characteristic of the invention, the mentioned extreme discs are provided with respective central orifices, adapted to allow the passage of the point-shaped top end of the mentioned axial rod.

In the drawings enclosed, both ways of materialisation of the subject of the present invention are shown as an unlimiting example of eventual construction.

Fig. 1 is an elevation, in section, of the plug part, in a first way of materialisation of the invention;

fig. 2 shows an elevation, also sectioned, of the socket part;

fig. 3 shows both parts coupled in the retained position;

fig. 4 and 5 are drawings reproducing the elevation and sectional views of the plug part, corresponding to the coupling and uncoupling position with the socket part respectively in a second way of materialisation of the invention;

fig. 6 shows a ground view of an external disc of the discoidal part; and

figs. 7 and 8 show respectively, ground views of two positions of the intermediate disc of the discoidal part, corresponding to the positions shown in Figs. 5 and 4, respectively.

In said drawings, it can be shown that the coupling dealt with comprises a socket part 1 and a

plug part 2. The socket part 1 comprises an external tubular casing 3, inside which there is solidly arranged a coaxial rod 4 provided on its external end with a protrusion 5, shaped as a spheric zone, the top limiting plane of which is level with the mouthpiece 7 of the casing 3.

The plug part 2 is provided with a tubular casing 8 as well, of external diameter slightly less than the internal diameter of the casing 3 and adapted to be introduced coaxially in same.

Inside the casing 8 of the plug part 2, there are means of retaining the protrusion 5, as well as means of locking said means of retention and some means of unlocking said means of locking.

Said means of retention of the protrusion 5 comprise an internal bushing 9, provided with a protruding step 10 designed to rest on the corresponding recessed step 11 of the internal face of the casing 8 and retained by an elastic ring 12, so that said bushing 9 is solidly attached to the internal side of the casing 8.

On said bushing 9 a plurality of identical levers 14 have been arranged tilting around their respective horizontal shafts 13, which on their external section are provided on their internal edges with respective notches 15 of arched contour, adapted so that on introducing the plug part 2 into the socket part 1, they tilt and couple just with their notches 15 on the spherical zone section of the protrusion 5, adopting a retention position of same (Fig.3).

Every lever 14 is provided with a spring 16 that impels it towards a resting position (Fig.1), in which the external section provided with the mentioned notch is uncoupled from the protrusion 5.

In the plug part 2, an internal coaxial bar 17 has been arranged, which is longitudinally displaceable, and submitted to the action of a spring 18 that tends to maintain it in the outermost possible position (Fig.1), being provided on its internal end with a cam of coaxial truncated cone shape 19, on which the internal ends 20 of the tilting lever 14 constantly rest.

All this has been adapted so that on introducing the plug part 2 into the socket part 1, the external end 21 of the mentioned bar 17, strikes against the top limiting plane 6 of the protrusion 5, so that the bar 17 is displaced longitudinally inside the plug part 2 and the cam 19 tilts the levers 14 until they couple their notches 15 on the spherical zone section of the protrusion 5, so that the retention position is attained (Fig.3).

The mentioned means of locking the means of retention comprise a locking ring 22 arranged on the internal rim of the tubular casing 8, with an external diameter slightly smaller than the internal diameter of the tubular casing 2 and with an internal diameter slightly greater than the external one

of the protrusion 5.

Said ring 22 has been provided with a circumferential stepped recess 23, adapted to engage with the corresponding stepped notches 24 arranged in the external edges of the levers 14.

The ring 22 is submitted to the action of some means of spring action that tends to apply it against the external ends of the levers 14, when these are not in the retention position.

When the levers 14 reach the retention position, the mentioned notches 24 are faced with the recess 23, said means of spring action then acting so as to displace the ring 22 inside up to a distance equalling the height of its recess 23, so that the ring 22, becoming engaged in the notch 24 of the lever 14, between these latter and the internal face of the casing 8, thus impeding the tilting of the levers 14 and locking them in the retention position (Fig.3).

Said means of spring action, acting on the ring 22 comprise a plurality of longitudinal rods 25, which on one of their ends are linked to the ring 22 and which on the other end are firmly attached to a coaxial disc 26, submitted to the action of several springs 27 that push it inside due to resting on a crosswise arranged disc 31 fixed to the casing 8.

The mentioned means of unlocking comprise a pushing organ, not shown in the drawing, that could consist for instance in the bit of a cylinder lock.

Said pushing organ is arranged to act on the coaxial disc 26 in the sense of pushing the assembly consisting of the disc 26, the rods 25, and the rings 22, outside the plug part 2, overcoming the action of the springs 27. In this case, the ends of the levers 24 are released from inside the circumferential recess 23, thus enabling the tilting of said lever 14 and the uncoupling of the plug part 2 from the socket part 1.

The socket part 1 comprises a flat ring 28, coaxial with the external casing 3 and submitted to the action of an internal compression spring 29 tending to maintain it in the initial resting position, in which it closes completely the annular space existing between the internal face of the casing wall 3 and the free external rim of the protrusion 5. Said ring 28 is adapted to be capable to displace in a parallel fashion to itself towards the inside of part 1 on being pushed by the external edge 30 of the plug part 2, when this latter is being introduced in part 1.

The assembly shown in Fig. 2 corresponding to the socket part 1 is preferably designed and adapted to be embedded in the floor, so that the mouth section 7 is level with the level of this latter, in the application of the safety coupling which is the subject of the invention to the locking of rolling doors that slide vertically.

In the second type of materialisation shown in

figs. 4 to 8, the discoidal coaxial part 26 is of external diameter somewhat smaller than the internal diameter of the casing 8, being made up of the superposition of three discs 32, 33, and 34, which are all of sensibly the same contour, and of which the two end discs 32 and 34 are solidly joined together.

The intermediate disc 33 is provided with oblong orifices 39 through which pass the rods 25. Said oblong orifices allow the disc 33 to displace sideways between the disc 32 and 34 (Fig.7), being submitted to the action of the spring 35 that tends to protrude it sideways between both discs 32 and 34.

Under such circumstances, the protruding edge 36 of the intermediate disc 33 can engage in an internal slot 37 existing in the casing 8, thus causing the longitudinal immobilisation of the discoidal part 26 and therefore, of the locking ring 22, in such a position as to allow the coupling between the plug part 2 and the socket part.

In the plug part 2 there is an axial rod 38, capable of being pushed by the protrusion 5 of the socket part 1 in the moment in which the coupling between both parts 1 and 2 takes place, contact taking place with its internal pointed end 40.

Said rod 38 is shaped so as to be capable of being introduced in a central countersunk orifice 41 of the intermediate disc 33, thus compelling same to displace itself sideways, overcoming the action of the springs 35 that tend to maintain it in the laterally protruding position between the end discs 32 and 34, so that the edge 36 of the intermediate disc 33 is able to come out of the internal slot 37 of casing 8 and enabling the locking ring 22 to be displaced longitudinally inside the casing 8 to carry out its locking action.

The mentioned end discs 32 and 34 are provided with corresponding central orifices 42 and 43, shaped to enable the passage of the pointed end 40 of the mentioned axial rod 38.

Once the nature of the invention has been sufficiently described as well as the manner of materialising it, it is stated that everything that would not alter, change or modify its fundamental principle, can be submitted to variations of detail, the essential aspects having been summarised in the following claims.

Claims

1.- Safety coupling, particularly applicable to link solidly but separably two parts capable of displacing themselves along an essentially straight line trajectory, characterised by being one of said parts solidly provided with a socket part, whilst the other part is also solidly provided with a plug part,

capable of being introduced into mentioned socket part and remaining in it impeded from going out of it, comprising this latter an external tubular casing, in whose interior a coaxial rod is solidly arranged, and provided on its external end with a protrusion in the shape of a spheric zone, the top limiting plane of which is level with the mouthpiece of the tubular casing of the socket part, and the mentioned plug part also comprising an external tubular casing of external diameter slightly less than the internal one of the socket part casing, being adapted to introduce coaxially in this latter, and having been arranged inside the casing of the plug part some means of retention of the protrusion of the socket part, as well as some means of locking said means of retention and some means of unlocking said means of locking.

2.- Safety coupling according to claim 1, characterised by comprising said means of retention of the protrusion of the socket part, disposed in the plug internal face of the external casing, on which, tilting part, an internal bushing, solidly attached to the internal face of the external casing, on which, tilting around respective horizontal shafts, a plurality of identical levers have been arranged, which on their external section are provided on their internal edges, of respective notches of arched contour and which are adapted so that on introducing the plug part in the socket part, they tilt and couple engaging with their notches of arched contour on the surface of the spheric zone of the socket part's protrusion, adapting a retention position of same, each lever being provided with a spring that drives it toward a resting position in which the external section provided of the mentioned notch of arched contour remains uncoupled from the protrusion of the mentioned socket part, an internal bar coaxial to the external casing being arranged longitudinally displaceable, and submitted to the action of a spring that tends to maintain it in the outermost position possible and their internal end provided with a truncated-cone-shaped coaxial cam, on which the internal ends of the tilting levers are constantly resting, the whole adapted so that on introducing the plug part in the socket part, the external end of the mentioned coaxial internal bar, strikes against the top limiting plane of the protrusion of the coaxial rod of the socket part, therefore the bar displacing longitudinally inside the plug part and cam tilting the lever up to coupling their notches on the spherical zone surface of the protrusion of the socket part and thus reaching the retention position.

3.- Safety coupling according to claims 1 and 2, characterised by the mentioned means of locking the means of retention, comprising a locking ring arranged on the internal rim of the mouth of the tubular casing of the plug part, with an external

diameter slightly smaller than the internal diameter of the tubular casing and with an internal diameter slightly greater than the external one of the protrusion of the socket part, said locking ring being provided with an internal circumferential stepped recess, adapted to engage with its corresponding stepped notches, existing on the external edges of the tilting levers, said locking ring being submitted to a means of spring action that tends to apply it against the external ends of the levers, if these are not in the retention position, so that when the lever reaches the said retention position, the mentioned stepped notches of the levers face the mentioned circumferential recess, then activating said spring action so as to displace the locking rings inside up to a distance equalling the height of its recess, so that the locking ring becomes engaged in the notches of the levers, between these and the internal face of the tubular casing, impeding the tilting of the levers and locking them in their retention position.

4.- Safety coupling according to claim 3, characterised by said means of spring action on the locking ring, comprising a plurality of longitudinal rods that are joined by one of their ends to the locking ring and which at their other end are firmly attached to a coaxial disc, submitted to the action of at least one spring which drives them inside.

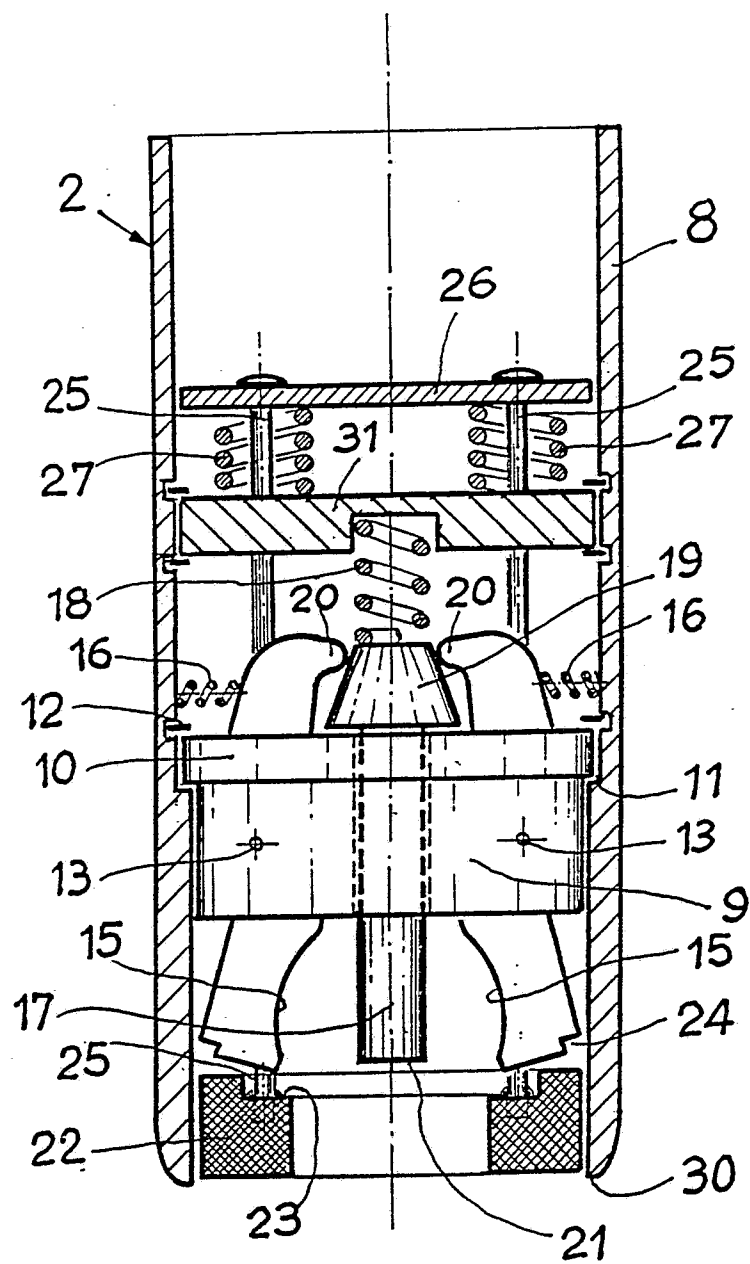
5.- Safety coupling according to claim 1 to 4, characterised by the mentioned means of unlocking of said means of locking of the means of retention, comprising a pushing element adapted to act on the coaxial disc attached to the locking ring, in the sense of pushing the assembly of the disc and the ring towards the external part of the plug part, overcoming the means of spring action on the assembly, so as to release the ends of the levers from the inside of the circumferential recess of the locking ring and enabling their tilting and uncoupling between the plug and the socket parts.

6.- Safety coupling according to claim 1, characterised by the socket part comprising a flat ring coaxial with the external casing and submitted to the action of an internal compression spring, that tends to maintain it in the initial resting position, in which it closes completely the annular space comprised between the internal face of the wall of the casing and the external free rim of the protrusion of the rod, said flat ring being adapted to be displaced in a parallel manner to itself towards the inside of the socket part, on being pushed by the external edge of the plug part when this is introduced in the socket part.

7.- Safety coupling according to claim 1, characterised by said coaxial discoidal part of external diameter slightly smaller than the internal diameter of the plug part casing, consisting of the loose superposition of three discs of sensibly the

same contours, of which the two end discs are solidly joined to each other whilst the intermediate disc is submitted to the action of some springs that tend to make it protrude sideways between both end discs, so that the rim of the protruding section of the intermediate disc being capable of introducing itself into an internal slot existing in the casing and causing in this way the longitudinal immobilisation of the discoidal part and, therefore, that of the locking ring, in such a position that it allows the plug part to be uncoupled from the socket part, an axial rod having been arranged in the plug part, capable of being pushed by the protrusion of the socket part in the moment of the coupling between both parts, and with its internal pointed end, said rod being shaped so as to be capable of introducing itself in a countersunk orifice centrally arranged in the intermediate disc, thus compelling this latter to a sideways displacement by overcoming the action of the springs that tend to maintain it in a sideways protruding position of the end discs, so that the edge of the intermediate disc can be taken out of the internal slot of the casing and the locking ring displaced longitudinally inside the casing to carry out its locking action.

8.- Improvements according to claim 7, characterised by the mentioned extreme discs being provided with corresponding central orifices, adapted to enable the passage of the top pointed end of the mentioned axial rod.

**FIG. 1**

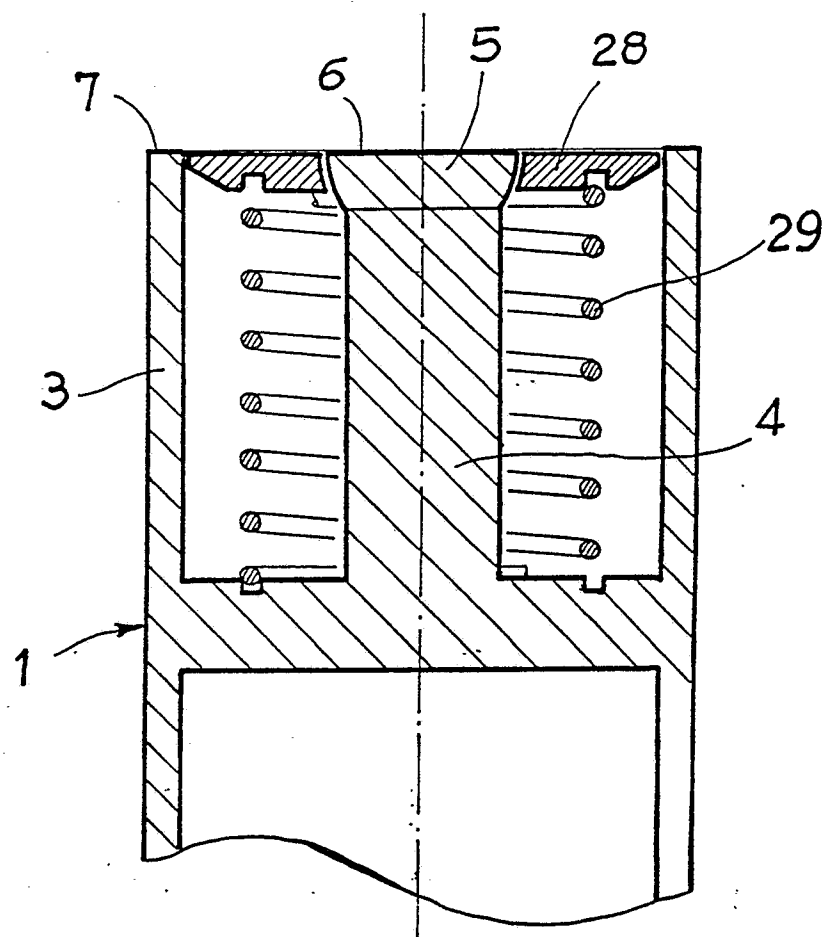


FIG. 2

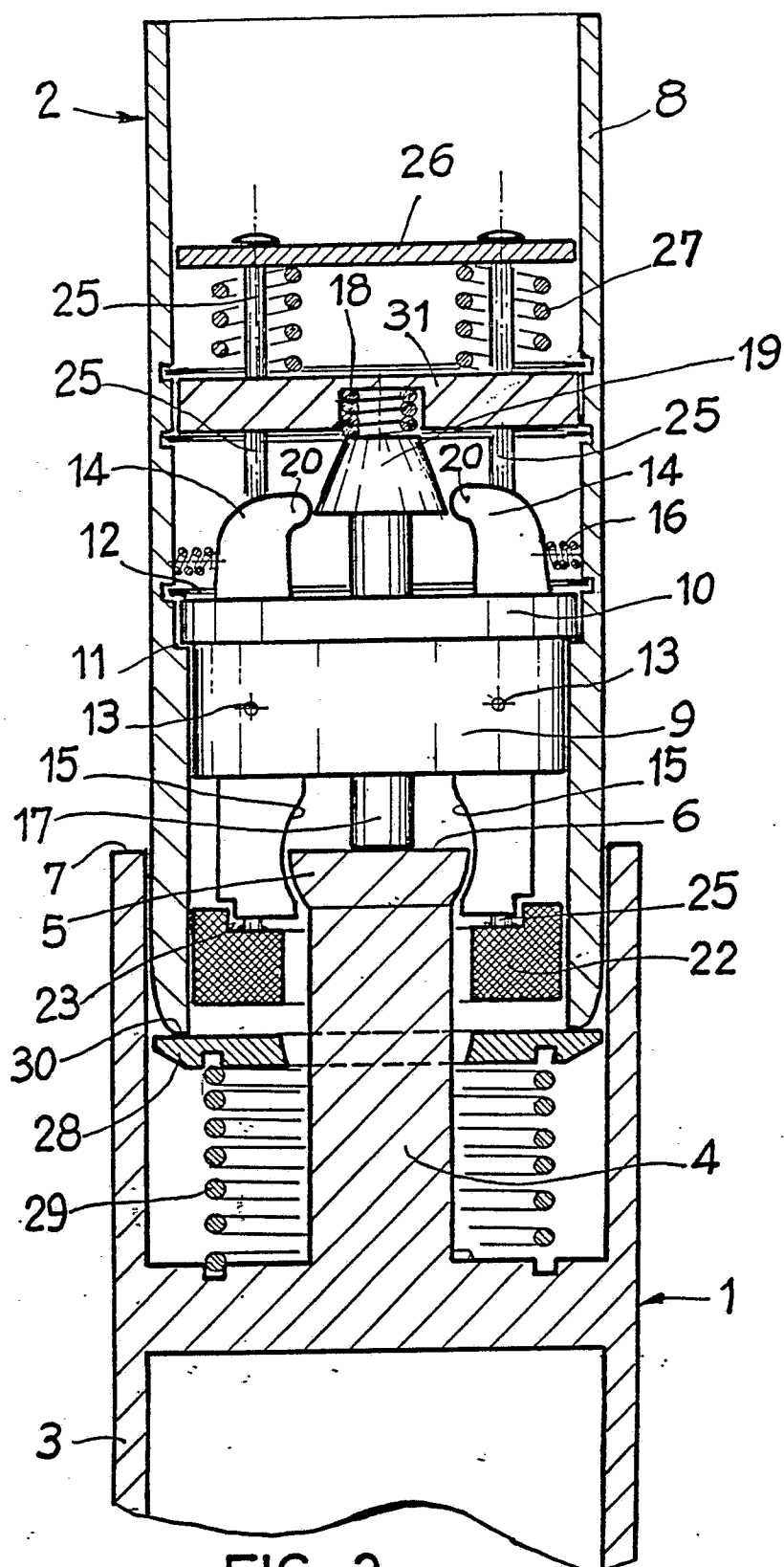


FIG. 3

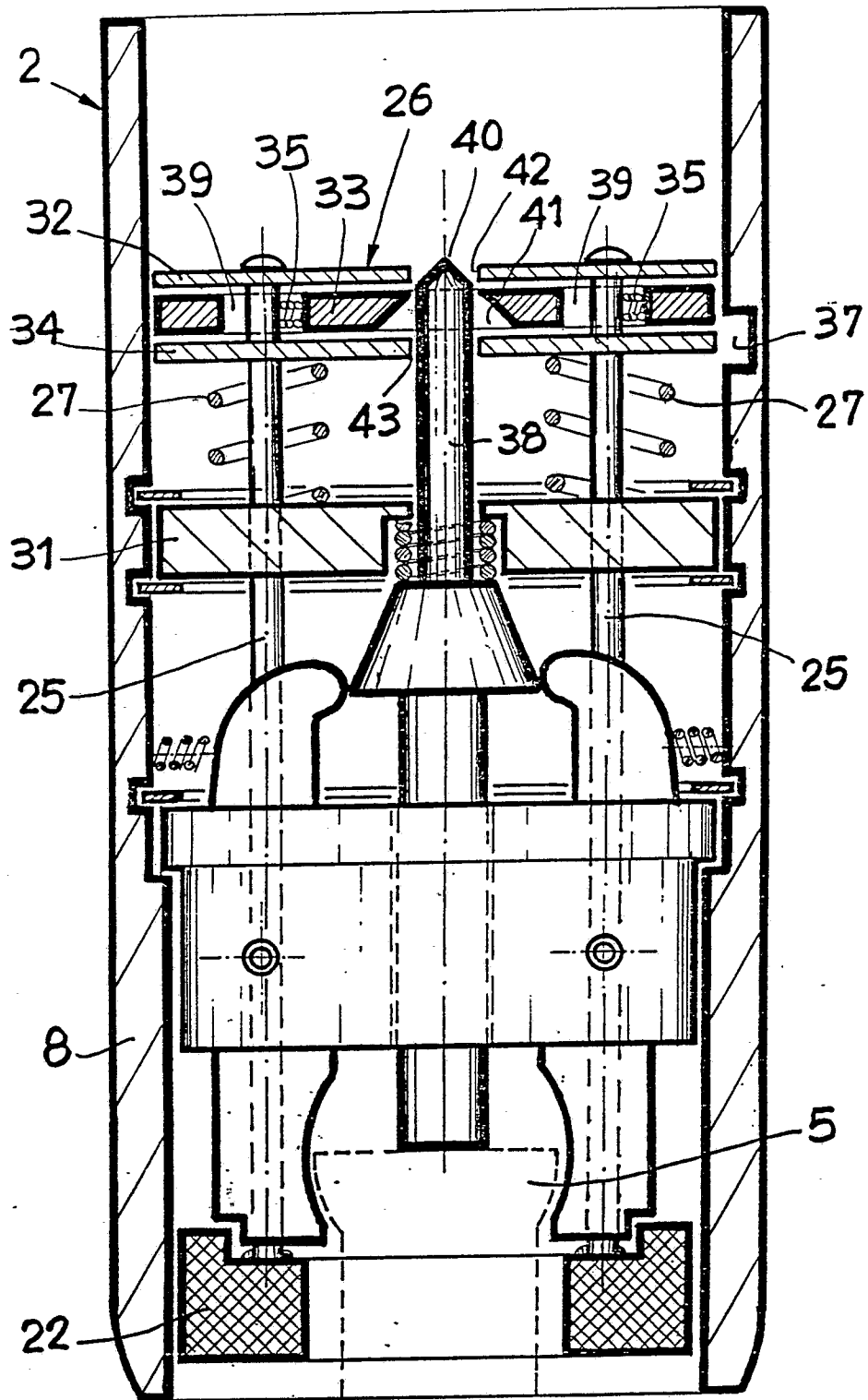


FIG. 4

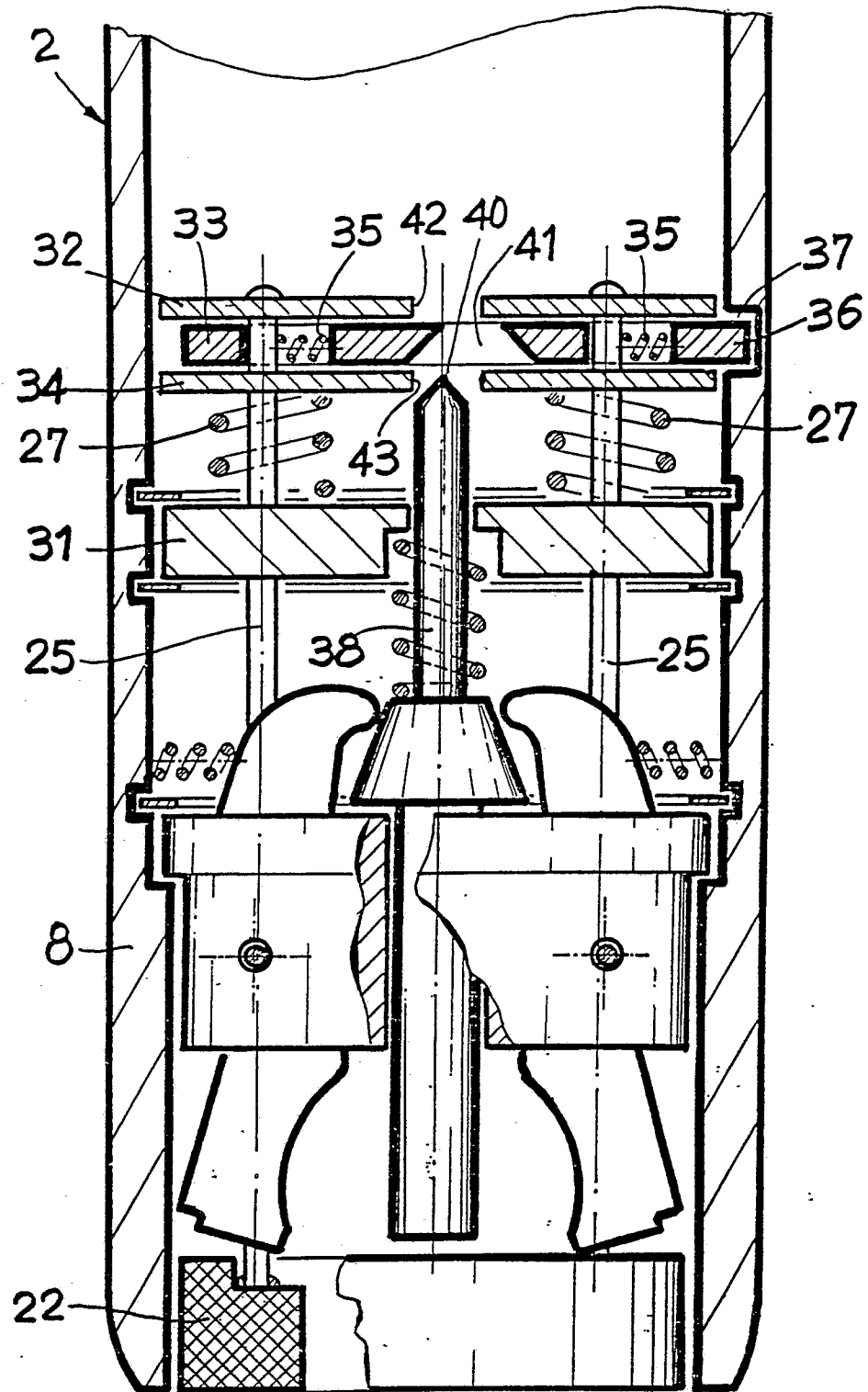


FIG. 5

FIG. 6

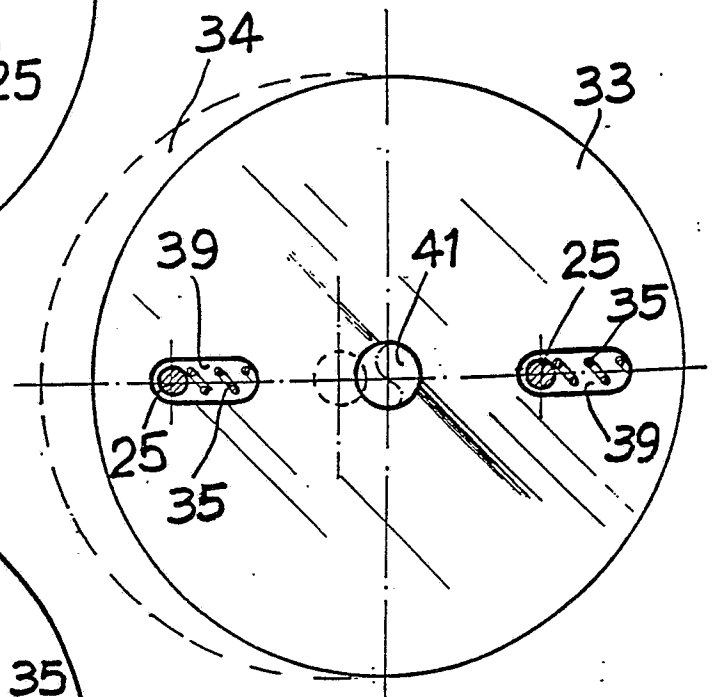
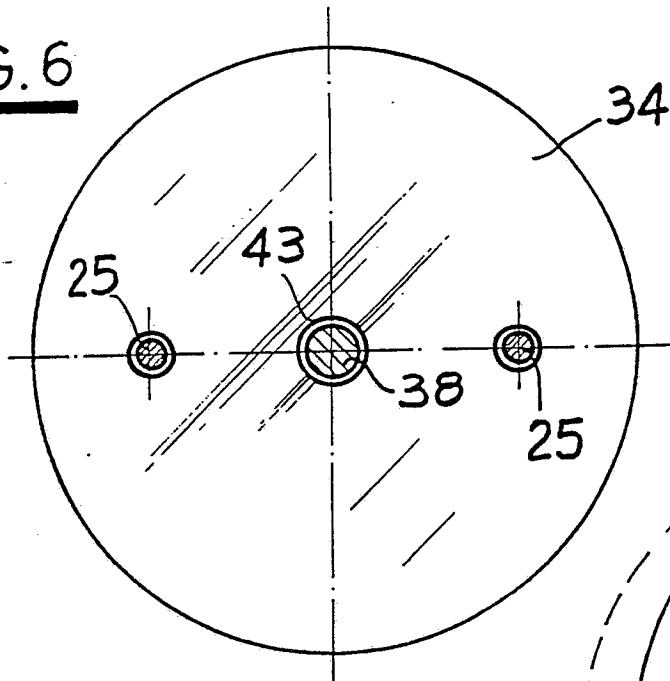


FIG. 7

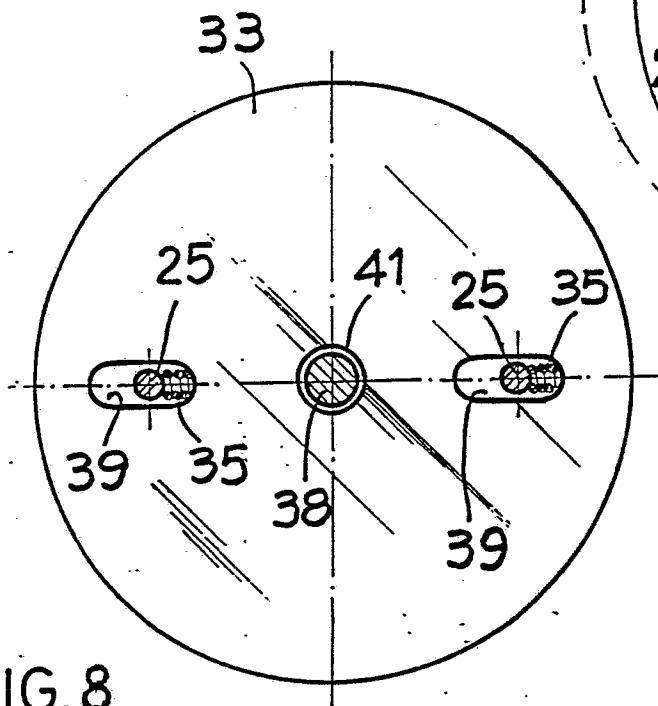


FIG. 8



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DOCUMENTS CONSIDERED TO BE RELEVANT														
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim												
A	US - A - 4 738 126 (HEBERLE) * Claims 1-8; fig. 1-7 * --	1-5												
A	US - A - 4 513 591 (CARLSON et al.) * Claims 1-18; fig. 1-11 * ----	1-8												
The present search report has been drawn up for all claims														
Place of search VIENNA	Date of completion of the search 24-01-1990	Examiner CZASTKA												
<table border="0"><tr><td>CATEGORY OF CITED DOCUMENTS</td><td></td></tr><tr><td>X : particularly relevant if taken alone</td><td>T : theory or principle underlying the invention</td></tr><tr><td>Y : particularly relevant if combined with another document of the same category</td><td>E : earlier patent document, but published on, or after the filing date</td></tr><tr><td>A : technological background</td><td>D : document cited in the application</td></tr><tr><td>O : non-written disclosure</td><td>L : document cited for other reasons</td></tr><tr><td>P : intermediate document</td><td>& : member of the same patent family, corresponding document</td></tr></table>			CATEGORY OF CITED DOCUMENTS		X : particularly relevant if taken alone	T : theory or principle underlying the invention	Y : particularly relevant if combined with another document of the same category	E : earlier patent document, but published on, or after the filing date	A : technological background	D : document cited in the application	O : non-written disclosure	L : document cited for other reasons	P : intermediate document	& : member of the same patent family, corresponding document
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CLASSIFICATION OF THE APPLICATION (Int. Cl. ~~5~~ 5)

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TECHNICAL FIELDS SEARCHED (Int. Cl. ~~5~~ 5)

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