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(54) **CONTROLLABLY OPERATING DRAUGHT EXCLUDER DEVICE**

KONTROLLIERBAR BEWEGLICHE DICHTUNGSVORRICHTUNG

DISPOSITIF DE JOINT AMOVIBLE CONTROLABLE

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Description

Field of the Invention

[0001] The present invention generally finds application in the field of heat and sound insulating devices for doors and windows, and particularly relates to a controllably movable draught-excluder device.

Background art

[0002] Draught-excluder devices have been long known to be used in door or window leaves for at least partially closing off any gap that may occur either between the leaf and the sill or between the door and the floor.

[0003] These known devices are generally known to be attached to the bottom edge of the door and comprise a seal, e.g. a strip made of a flexible material, which is designed to interact with the floor to restrict air passage.

[0004] A first drawback of these known arrangements is that the flexible strip constantly contacts the floor and tends to rub against its surface as the door is opened and closed, thereby generating friction and making it difficult the movement by the user.

[0005] A further drawback is that the flexible strip tends to undergo permanent deformation upon repeated rubbing against the floor, which will considerably reduce its air sealing effect.

[0006] In an attempt to at least partially obviate these drawbacks, draught-excluder devices have been developed, which are able to move between a raised position, in which they are held within a seat formed in the bottom edge of the door, and a lowered position in contact with the floor.

[0007] Namely, in these devices the flexible strip can only move from the raised position to the lowered position when the door is closed, and is thus prevented from rubbing as the door moves.

[0008] Draught-excluder devices generally comprise an actuator which projects out of the door and is conformed to interact with the fixed frame and control appropriate drive means, which are designed to promote automatic translation of the flexible strip from the raised position to the lowered position and vice versa.

[0009] In certain draught-excluder devices, delay means are interposed between the actuator and the drive means to cause the flexible strip to descend some time after the door has been closed.

[0010] GB616076 discloses a draught-excluder device in which the delay means comprise a hollow oil hydraulic cylinder which slidably supports an annular shaft acted upon by a spring driven by the actuator.

[0011] The movement of the actuator compresses the spring and allows the fluid to circulate within a conduit which is located fluidically downstream from the cylinder, for controlled descent of a pair of pistons associated with the flexible strip.

[0012] A first drawback of this arrangement is that the device requires a very complex manufacturing process, because the cylinder, the conduit and the shaft must be appropriately sized to maintain the fluid at a pressure above a predetermined minimum value sufficient to counteract the natural upward movement of the strip.

[0013] CH666719 discloses a draught-excluder device in which the actuator is connected to the drive means through a rigid arm extending through a oil hydraulic cylinder which defines a pair of chambers in fluid communication with each other through a hole.

[0014] The movement of the actuator displaces the rigid arm and consequently actuates the drive means with a damping effect caused by the flow of oil into the two chambers through the oil. This will cause delayed and progressive descent of the flexible strip to contact with the floor.

[0015] Nevertheless, these arrangements have the drawback that the flexible strip is raised some time after the door has been opened.

[0016] This is because the upward movement of the flexible strip is also controlled by the drive means, whose movement is delayed, by the fluid that flows in an opposite direction, with respect to the time at which the door has been closed.

[0017] Therefore, as the door is opened, the flexible strip rubs against the floor for a non-negligible time before being raised.

[0018] Furthermore, these prior art devices require appropriate adjustments to cause the descent of the flexible strip to occur with an acceptable, non excessive delay with respect to the time at which the door is closed.

[0019] Also, another important drawback of the above described arrangements is that these solutions have a limited durability and their manufacturing and installation complexity considerably increases maintenance and/or replacement times.

DE3935790 discloses an example of the prior art.

Disclosure of the invention

[0020] The object of the present invention is to obviate the above drawbacks, by providing a controllably movable draught-excluder device that is highly efficient and relatively cost-effective.

[0021] A particular object of the present invention is to provide a controllably movable draught-excluder device that allows the door to be easily opened and closed and promotes a high sealing effect irrespective of the conformation of the floor or sill.

[0022] A particular object of the present invention is to provide a controllably movable draught-excluder device that ensures instantaneous response as the door is opened.

[0023] Another object of the present invention is to provide a controllably movable draught-excluder device that has a simple manufacturing process.

[0024] Another object of the present invention is to pro-

vide a controllably movable draught-excluder device that has simple maintenance.

[0025] Yet another object of the present invention is to provide a controllably movable draught-excluder device that affords very simple adjustment of the delay with which the flexible strip is lowered, such delay being constant with time.

[0026] These and other objects, as better explained hereafter, are fulfilled by a controllably movable draught-excluder device for carts as defined in claim 1.

[0027] Advantageous embodiments of the invention are obtained in accordance with the dependent claims.

Brief Description of the Drawings

[0028] Further features and advantages of the invention will be more apparent from the detailed description of a preferred, non-exclusive embodiment of a controllably movable draught-excluder device according to the invention, which is described as a non-limiting example with the help of the annexed drawings, in which:

FIG. 1 is a broken-away side view of the draught-excluder device of the invention;

FIG. 2 is a front view of the device of Fig. 1, with the latter contacting a raised sill of a door or window leaf.

FIG. 3 is a perspective view of a first detail of Fig. 1 in a first configuration;

FIGS. 4 and 5 are broken-away side views of the first detail of Fig. 4 in two different operating positions;

FIGS. 6A, 6B, 7A, 7B, 11A, 11B, 12A and 12B are broken-away side and front views of the device 1 respectively, in different operating positions;

FIGS. 8, 10, 13 and 14 are broken-away side views of the first detail of Fig. 3, which is enlarged as compared with Figs. 6A, 7A, 11A and 12A respectively;

FIG. 9 is an enlarged broken-away side view of a second detail of Fig. 7A;

FIG. 15 is a broken-away side view of the first detail of Fig. 1 according to a second embodiment;

FIG. 16 is an enlarged view of a portion of the first detail of Fig. 15.

Detailed description of preferred embodiments

[0029] The above figures show a controllably movable draught-excluder device, generally designated by numeral 1, which is designed to be attached to the bottom edge B of a door P or a door or window leaf, the latter being hinged to a fixed frame T secured to an opening formed in a wall.

[0030] As is known per se, the frame T comprises a pair of vertical posts M, M', joined by a horizontal cross member. The door P may be hinged to one of these posts M' to pivot about a substantially vertical axis.

[0031] In the embodiment of FIG. 1, the draught-excluder device 1 comprises a box-like enclosure 9 which

is designed to be fitted into a longitudinal groove W formed in the bottom edge B of the door P and a seal 2 extending along a longitudinal axis L.

[0032] The seal 2 essentially consists of a strip 3 of a profile that is adapted to interact with the floor F to provide an at least partial air sealing effect.

[0033] Alternatively, as best shown in FIG. 2, the strip 3 may interact with a sill S, which is attached to the floor F and has a convex outer surface to prevent the passage of dirt or impurities.

[0034] The seal 2 is preferably made of a flexible material selected from the group comprising elastomers or polymeric materials and may have an upper portion 4 with at least one lower appendix 5 extending therefrom to interact with the sill S.

[0035] The device 1 further comprises drive means 6 which act upon the strip 3 to move it between a raised rest position, relative to the sill S or the floor F and a lowered operating position, in contact with the sill S or the floor F.

[0036] Proximate to one of the ends of the box-like enclosure 9, the device 1 comprises an actuator 7, which is operably associated with the drive means 6 to control actuation thereof.

[0037] Namely, the actuator 7 is adapted to move between an extended position, in which it does not interact with the frame T and a retracted position in which it contacts the frame T.

[0038] The box-like enclosure is designed to be located in the longitudinal groove W of the bottom edge B of the door P for the actuator 7 to be able to interact with a post M of the frame T. Namely, the actuator 7 will be in an extended position when the door P is open and in a retracted position when the door P is closed.

[0039] Delay means 8 are further provided, which act upon the drive means 6 to delay the movement of the strip 3.

[0040] The delay means 8 are adapted to interact with the drive means 6 to transfer motion from the actuator 7 to the strip 3 and to delay the movement of the strip 3 from the raised position to the lowered position as the door P is closed.

[0041] Thus, the lower appendix 5 of the strip 3 will gradually fit the particular shape of the sill S or floor F, thereby increasing its draught or air sealing effect.

[0042] Furthermore, the strip 3 will only move to its lowered position when the door P is closed, which will prevent it from rubbing against the sill S or floor F.

[0043] A peculiar feature of the invention is that the drive means 6 comprise at least one slide 10, which is connected to the strip 3 by means of one or more links 11.

[0044] First elastic means 12 are further provided between the actuator 7 and the slide 10.

[0045] Conveniently, the actuator 7 may comprise a tubular element 13 having a flat end portion 14 projecting out of the enclosure 9 and adapted for interaction with the post M of the frame T.

[0046] The tubular element 14 may be slidably mount-

ed to a longitudinal pin 15 located in the enclosure 9 and having one end 16 rigidly joined to the slide 10.

[0047] The first elastic means 12 comprises a bias spring 17 fitted on the longitudinal pin 15 whose ends 18, 19 interact with the actuator 7 and the slide 10 respectively. The slide 10 may interact with the actuator 7 to move in a longitudinal direction to a predetermined extent.

[0048] In the retracted position, the actuator 7 promotes compression of the bias spring 17. The latter may have a spring modulus K_1 selected to transfer a longitudinal force F_1 of not less than 230 N to the slide 10.

[0049] In the embodiment of the figures, the device 1 may comprise a pair of connecting rods 11, 11' with one end 20, 20' hinged to corresponding anchor elements 21, 21', which are designed to be removably secured to the upper portion 4 of the strip 3.

[0050] The other end 22 of one of the connecting links 11 is hinged to a slide 10, whereas the end 22' of the other connecting link 11' is hinged to a fixed support 23.

[0051] This connecting arrangement will provide a four-bar linkage 24 whose sides are formed by the slide 10, the connecting link 11, the strip 3 and the other connecting link 11' respectively.

[0052] The force F_1 applied by the bias spring 17 to the four-bar linkage 24 through the slide 10 will cause the strip 3 to move downwards, while remaining substantially parallel to the longitudinal axis L.

[0053] A further peculiar feature of the invention is that the slide 10 has an appendix 25 with end edge 26, preferably but without limitation having a flat shape, adapted to interact by contact with the delay means 8 when the actuator 7 contacts the post M, to thereby delay the movement of the strip 3 from the raised position to the lowered position as the door P is closed.

[0054] The end edge 26 is further adapted to be moved away from the delay means 8 to ensure quasi-instantaneous automatic movement of the strip 3 from its lowered position to its raised position as the door P is opened.

[0055] Conveniently, as best shown in FIGS. 3 to 5, 8, 10, 12 and 14, the delay means 8 may comprise a substantially longitudinal oil hydraulic shock-absorber 27 comprising second elastic means 28.

[0056] Preferably, the shock absorber 27 comprises an elongate body 29 having a substantially cylindrical longitudinal cavity 30 which defines at least one first chamber filled with incompressible oil O.

[0057] Particularly, a partition element 31 may be placed in the cavity 30 to define a first chamber 32 and a second chamber 33, with an axial passage 34 for fluid communication therebetween.

[0058] The elongate body 29 may in turn comprise a front portion 35 and a rear portion 36, which are joined together at one end 37, 28 and define the first chamber 32 and the second chamber 33 respectively.

[0059] Furthermore, the end 38 of the rear portion 36 may be fitted into an opening 39 formed in the end 37 of the front portion 35 to define the partition element 31.

[0060] The partition element 31 may have a pair of substantially flat faces 40, 41 facing the first chamber 32 and the second chamber 33 respectively.

[0061] Preferably, the fluid O that fills the cavity 30 may be an oil selected from the group comprising both natural and synthetic hydraulic oils.

[0062] Conveniently, the second elastic means 28 may comprise at least one first spring 42 held within the first chamber 32, and the second elastic means 28 may comprise a second spring 43 held within the second chamber 33.

[0063] Conveniently, the shock-absorber 27 may comprise a piston 44 having a rod 45 slidably fitted in an axial end hole 46 of the elongate body 29 and an enlarged head 47, slidably held within the first chamber 32 and interacts with one end 48 of the first spring 42.

[0064] Thus, the first spring 42 may act upon the enlarged head 47 with a longitudinal force F_2 directed opposite to the force F_1 exerted by the bias spring 17 on the slide 10, as best shown in FIGS. 7, 9 and 10.

[0065] Preferably, the axial end hole 46 will be formed in the front portion 35 of the elongate body 29 and the free end of the shaft 49 may project outwardly thereof when the first chamber 32 is at least partially filled with fluid O.

[0066] Furthermore, the shock-absorber 27 may comprise an annular element 50, which is slidably and sealably inserted in the second chamber 33.

[0067] The second spring 43 may interact with the annular element 50 to exert thereupon a longitudinal force F_3 in the same direction as the force F_2 exerted by the first spring 42 on the enlarged head 47, to promote compression of the fluid O in the second chamber 33.

[0068] The partition element 31 may have a seat 51 on the face 40 facing the first chamber 32, said seat communicating with the axial passage 34 and being adapted to accommodate a valve body 52 which is slidably movable against the biasing action of the first spring 42.

[0069] The valve body 52 may have a calibrated axial orifice 53 which is designed to restrict the flow of fluid O from the first chamber 32 to the second chamber 33, thereby damping the displacement t of the shaft 45.

[0070] Namely, the axial orifice 53 may face toward and be located at an end opening 54 of the axial passage 34, once the valve body 52 has been fully accommodated in the seat 51 due to the compression of the fluid O generated by the inward displacement of the rod 45.

[0071] Thus, the fluid O will be able to gradually flow from the first chamber 32 to the second chamber 33, thereby promoting a slower and substantially constant inward movement t of the rod 45.

[0072] In the embodiment as shown in FIG. 5, the seat 51 and the lateral surface 55 of the valve body 52 have substantially frustoconical complementary shapes, to create a substantially annular meatus therebetween, through which the fluid O is designed to flow from the second chamber 33 to the first chamber 32.

[0073] Namely, the clearance 56 will be formed as the

valve body 52 moves away from the seat 51 due to the force F_4 generated by the fluid O as it flows through the axial passage 34.

[0074] Also, the second spring 43 may interact with the annular element 50 to compress the fluid O in the second chamber 33 and promote backflow thereof into the first chamber 32 through the axial passage 34 and the clearer and 56.

[0075] As the fluid O flows from the second chamber 33 to the first chamber 32, it will cause the rod 45 to slide outwards, with its free end 49 projecting out of the end hole 46.

[0076] Advantageously, the edge 26 of the appendix 25 may compress the free end 49 of the rod 45 when the actuator 7 is in the retracted position.

[0077] Thus, the edge 26 of the appendix 25 will transfer the force F_1 generated by the bias spring 17 to the free end 49 of the rod 45 when the actuator 7 is in the retracted position and the door P is closed.

[0078] Therefore, in this state, the rod 45 will be pressed inwards and the drive means 6 will promote the delayed movement of the slide 10 and the flexible strip 3 from the raised position to the lowered position, in contact with the sill S.

[0079] On the other hand, the edge 26 of the appendix 25 may be moved away from the free end 49 of the rod 45 when the actuator 7 is in the extended position, thereby ensuring quasi-instantaneous movement of the slide 10 and the connecting link 11, and instantaneous upward movement of the strip 3 from the lowered position to the raised position, while maintaining an orientation substantially parallel to the longitudinal axis L.

[0080] In the alternative embodiment of the shock-absorber 27 as shown in FIG. 15, the cavity 13 has a single chamber 32, which houses the head 47 of the piston 44, acted upon by the end 48 of a single spring 42.

[0081] As shown in fig 16, a plurality of substantially axial calibrated through holes 57 are formed at the enlarged head 47 of the piston 44, allowing the fluid O in the first chamber 32 to flow through the head 47 as the piston 44 moves forward.

[0082] The spring 32 is designed to act upon the head 47 of the piston 44 to cause the free end 49 of the rod 45 to move back to the maximum distance from the end hole 46.

[0083] Furthermore, a cylindrical element 58 may be inserted in the chamber 32 upstream from the enlarged head 47, and have a corresponding central passage 59, for the rod 45 to slide therein and compensate for fluid O volume changes as the piston 44 moves.

[0084] FIGS. 6 to 14 sequentially show the steps of the operation of the draught-excluder device 1 as the door P is being closed/opened.

[0085] Namely, when the door P is open, the actuator 7 is in the extended position, and the strip 3 is in the raised position, at a distance from the sill S, as shown in FIG. 6.

[0086] In this operating step, the free end 49 of the rod

45 projects out of the end hole 46 of the cylindrical body 29 and contacts the edge 26 of the appendix 25, as shown in FIG. 8.

[0087] As the door P is closed, as shown in FIG. 7, the end surface 14 of the actuator 7 will contact the post M, thereby promoting the longitudinal translation t' of the actuator 7 to its maximum predetermined extent w , i.e. to its retracted position, and compressing the spring 17 to transfer the force F_1 to the slide 10 and the appendix 25.

[0088] In this particular state, the rod 45 of the shock-absorber 27 is initially still, as the force F_1 is initially counteracted and balanced by a force resulting from the sum of the compression of the fluid O in the first chamber 32, the force F_2 of the first spring 42 and the force F_3 of the second spring 43.

[0089] As the force F_1 is applied to the rod 45 of the shock-absorber 27 the valve body 52 will be displaced into the seat 51 formed in the partition element 31.

[0090] In the embodiment of figures 11 and 12, in which the shock-absorber has two inner chambers, pressure upon the rod 45 promotes circulation of the fluid O from the first chamber 32 to the second chamber 33 through the calibrated orifice 53, and causes the enlarged head 47 of the piston 44 to move back into the first chamber 32.

[0091] As the fluid letter O flows into the second chamber 33, the annular element 50 will slide in the longitudinal direction and the second spring 43 will be compressed.

[0092] In this state, the slide 10 will move longitudinally in the same direction as the force F_1 , thereby causing the connecting link 11 to rotate and the strip 3 to be progressively lowered to contact with the sill S.

[0093] Appropriate selection of the spring modulus of the springs 17, 42, 43 and of the sizes of the chambers 32, 33 and the axial orifice 53 will allow adjustment of the delay with which the strip 3 will reach the lowered contact position. For example, the complete descent of the strip 3 may occur with a delay of the order of 5 s.

[0094] Then, as the door P is opened, the compression of the bias spring 17 will be relieved on the actuator 7, thereby causing it to move back into its extended position, as shown in FIG. 13.

[0095] The actuator 7 will move the pin 15 outwards and the latter will cause instantaneous displacement of the slide 10 and the edge 26 of the appendix 25, as well as an instantaneous upward motion of the strip 3 from the contact position to the raised position.

[0096] Then, as shown in FIG. 14, the fluid O may circulate from the second chamber 33 to the first chamber 32 due to the compression exerted thereon by the second spring 43 through the annular element 50, which will cause the valve body 52 to move away from the seat 51 with a meatus 56 being formed thereby.

[0097] As the first chamber 32 is progressively filled with the fluid O, the enlarged head 47 of the piston 44 will slide outwards and the free end 49 of the rod 45 will come out of the end hole 46.

[0098] The piston 41 will stop sliding when the free end

49 of the shaft 45 will contact the edge 26 of the appendix 25, and the state of FIG. 6 will be restored.

[0099] Typically, the contact of the rod 45 with the appendix 25 may occur in about 2 s, whereupon the device 1 is ready for a new operating cycle.

[0100] The above disclosure shows that the draught-excluder device of the invention fulfills the intended objects, in that it allows the flexible strip to contact the floor with a predetermined delay after the door has been closed, and to be raised almost instantaneously as soon as the door is opened.

[0101] While the device has been described with particular reference to the accompanying figures, the numerals referred to in the disclosure and claims are only used for the sake of a better intelligibility of the invention and shall not be intended to limit the claimed scope in any manner.

Claims

1. A controllably movable draught-excluder device, for attachment to the bottom edge (B) of a door (P) or window hingedly connected to a fixed frame (T), which device comprises:

- a strip of a profile (3) made of a flexible material defining a longitudinal axis (L) and adapted to interact with a sill (S) to provide an air sealing effect;
- drive means (6) acting upon said strip (3) through at least one connecting rod (11) to move said strip (3) between a raised rest position and an active lowered position, in contact with the sill (S);
- an actuator (7) associated with said drive means (6) to control actuation thereof, said actuator (7) being adapted to move between an extended position, in which it is spaced from the frame (T) when the door (P) is open, and a retracted position in which it contacts the frame (T) when the door (P) is closed;
- delay means (8) acting upon said drive means (6) to delay the movement of said strip (3);
- said drive means (6) comprise at least one slide (10) connected to said strip (3) through said at least one connecting rod (11),
- said slide (10) having an appendix (25) with an end edge (26) adapted to contact engage said delay means (8) to delay the movement of said strip (3) from said raised position to said lowered position upon closure of the door (P),
- said end edge (26) being adapted to be spaced apart from said delay means (8) to ensure quasi-instantaneous automatic movement of said strip (3) from said lowered position to said raised position upon opening of the door (P);

characterized in that the device comprises first elastic means (12) having a bias spring (17) being interposed between said actuator (7) and said slide (10).

2. Device as claimed in claim 1, **characterized in that** said delay means (8) comprise an oil hydraulic shock-absorber (27) having an elongate body (29) with a substantially cylindrical longitudinal cavity (30) filled with an incompressible fluid (O) and defining at least one first chamber (32), said shock-absorber (27) further comprising second elastic means (28).
3. Device as claimed in claim 2, **characterized in that** said oil hydraulic shock-absorber (27) comprises a piston (44) with a rod (45) slidably fitted in an end hole (46) of said body (29) and an enlarged head (47) slidably housed within said at least one first chamber (32), wherein the free end (49) of said rod (45) projects outwardly of said end hole (46) when said at least one first chamber (32) is partially filled with fluid (O).
4. Device as claimed in claim 3, **characterized in that** said second elastic means (28) comprise at least one first spring (42) housed in said at least one first chamber (32) and having an end (48) that interacts with said enlarged head (47).
5. Device as claimed in claim 4, **characterized in that** said cavity (30) defines a single first chamber (32) and said second elastic means (28) comprise a single first spring (42), said enlarged head (47) having one or more calibrated through holes (57) for the passage of the fluid (O) as said piston (44) moves forward in said first chamber (32).
6. Device as claimed in claim 2, **characterized in that** said longitudinal cavity (30) has internally thereof a partition element (31) therein, which is adapted to define a first chamber (32) and a second chamber (33), said partition element (31) having an axial passage (34) for providing fluid communication between said first chamber (32) and said second chamber (33).
7. Device as claimed in claim 6, **characterized in that** said second elastic means (28) comprise a first spring (42) and a second spring (43), each being housed in one respective chamber (32, 33) of said longitudinal cavity.
8. Device as claimed in claim 7, **characterized in that** said partition element (31) has a seat (51) on the face (40) oriented forward said first chamber (32), said seat communicating with said axial passage (34) and being adapted to slidably accommodate a valve body (52) against the biasing action of said

first spring (42).

9. Device as claimed in claim 8, **characterized in that** said valve body (52) has a calibrated axial orifice (53) for delaying the circulation of the fluid (O) from said first chamber (32) to said second chamber (33), thereby damping the displacement of said rod (45), said axial orifice (53) facing an open end (54) of said passage (34). 5
10. Device as claimed in claim 8, **characterized in that** said valve body (52) has a frustoconical lateral surface (55) substantially complementarily shaped with respect to that of said seat (51) to define therewith a substantially annular meatus (56) when said valve body (52) is speed apart from said seat (51) to allow the fluid (O) to flow from said second chamber (33) to said first chamber (32). 10
11. Device as claimed in claim 8, **characterized in that** said oil hydraulic shock-absorber (27) comprises an annular element (50) which is slidably and sealably inserted in said second chamber (33), said second spring (43) being adapted to interact with said annular element (50) to compress the fluid (O) in said second chamber (33) and promote backflow thereof into said first chamber (32) through said axial passage (34) and said annular meatus (5). 15
12. Device as claimed in claim 1, **characterized in that** said drive means (6) and said delay means (8) are housed in a box-like enclosure (9) which is designed to be fitted into a longitudinal groove (W) of the bottom edge (B) of a door (P) or window. 20
13. Device as claimed in claim 1, **characterized in that** said actuator (7) comprises a tubular element (13) with an end portion (14) projecting out of said enclosure (9) and adapted to interact with an upright (M) of the fixed frame (T) said tubular element (13) being slidably mounted to a pin (15) having one end (16) rigidly joined to said slide (10) with said bias spring (17) interposed therebetween. 25
14. Device as claimed in claim 3, **characterized in that** said end edge (26) is designed to press the free end (49) of said shaft (45) to delay the movement of said slide (10) and said at least one connecting link (11), when said actuator (7) is in its retracted position, and to be moved away from said free end (49) when said actuator (7) is in the extended position, thereby allowing quasi-instantaneous movement of said slide (10) and said connecting rod (11). 30

Patentansprüche

1. Eine kontrollierbare, bewegliche Dichtungsvorrich-

tung zum Anbringen an die untere Kante (B) einer Tür (P) oder Fenster, die um ein Scharnier drehbar verbunden ist mit einem festen Rahmen (T), wobei die Vorrichtung umfasst:

- einen Streifen eines Profils (3), das hergestellt ist aus einem biegsamen Material, das eine longitudinale Achse (L) bildet und ausgebildet ist zum Zusammenwirken mit einer Schwelle (S), um eine Luft-Versiegelungswirkung bereit zu stellen,
- Antriebseinrichtungen (6), die auf den Streifen (3) wirken über mindestens eine Verbindungsstange (11), um den Streifen (3) zwischen einer angehobenen Ruhestellung und einer aktiven, abgesenkten Stellung zu bewegen in Anlage mit der Schwelle (S),
- ein Betätigungsglied (7), das verbunden ist mit den Antriebseinrichtungen (6), um deren Betätigung zu steuern, wobei das Betätigungsglied (7) ausgelegt ist für Bewegung zwischen einer erstreckten Stellung, in welcher es beabstandet ist von dem Rahmen (T), wenn die Tür (P) offen ist und einer zurückgezogenen Stellung, in welcher es anliegt an dem Rahmen (T), wenn die Tür (P) geschlossen ist,
- Verzögerungseinrichtungen (8), die auf die Antriebseinrichtungen (6) wirken, um die Bewegung des Streifens (3) zu verzögern,
- die Antriebseinrichtungen (6) mindestens eine Gleitschiene (10) aufweisen, die verbunden ist mit dem Streifen (3) über die mindestens eine Verbindungsstange (11),
- die Gleitschiene (10) mindestens einen Anhang (25) aufweist mit einer Abschlusskante (26), die ausgelegt ist in Anlage in die Verzögerungseinrichtungen (8) ein zu greifen, um die Bewegung des Streifens (3) zu verzögern von der angehobenen Stellung zu der abgesenkten Stellung nach Schließen der Tür (P),
- die Kante (26) ausgelegt ist von den Verzögerungseinrichtungen (8) Abstand zu haben, um nahezu sofortige automatische Bewegung des Streifens (3) zu gewährleisten von der abgesenkten Stellung zu der angehobenen Stellung nach Öffnen der Tür (P);

dadurch gekennzeichnet, dass die Dichtungsvorrichtung erste elastische Einrichtungen (12) aufweist mit einer vorgespannten Feder (17), die zwischen dem Betätigungsglied (7) und der Gleitschiene (10) angeordnet ist.

2. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Verzögerungseinrichtungen (8) einen Öl-Hydraulischen Stoßdämpfer (27) aufweisen, mit einem länglichen Gehäuse (29) mit einer im Wesentlichen zylindrischen, longitudinalen Öffnung

- (30), die gefüllt ist mit einem inkompressiblen Fluid (O) und mindestens eine erste Kammer (32) bildet, wobei der Stoßdämpfer (27) zudem zweite elastische Einrichtungen (28) aufweist.
3. Vorrichtung gemäß Anspruch 2, **dadurch gekennzeichnet, dass** der Öl-Hydraulische Stoßdämpfer (27) einen Kolben (44) aufweist mit einem Pleuel (45), das gleitend eingepasst ist in eine Endöffnung (46) des Gehäuses (29) und einem vergrößerten Kopf (47), der gleitend aufgenommen ist in der mindestens einen ersten Kammer (32), in der das freie Ende (49) des Pleuels (45) nach außen heraus ragt aus der Endöffnung (46), wenn die mindestens eine erste Kammer (32) teilweise gefüllt ist mit dem Fluid (O).
 4. Vorrichtung gemäß Anspruch 3, **dadurch gekennzeichnet, dass** die zweiten elastischen Einrichtungen (28) mindestens eine erste Feder (42) aufweisen, die in der mindestens einen ersten Kammer (32) aufgenommen ist und ein Ende (48) aufweist, das mit dem vergrößerten Kopf (47) zusammen wirkt.
 5. Vorrichtung gemäß Anspruch 4, **dadurch gekennzeichnet, dass** die Öffnung (30) eine einzelne erste Kammer (32) bildet und die zweiten elastischen Einrichtungen (28) eine einzelne erste Feder (42) umfassen, wobei der vergrößerte Kopf (47) ein oder mehrere klauartige Durchgangsöffnungen (57) aufweist für den Durchlass des Fluids (O) wenn der Kolben (44) sich vorwärts bewegt in der ersten Kammer (32).
 6. Vorrichtung gemäß Anspruch 2, **dadurch gekennzeichnet, dass** die longitudinale Öffnung (30) in ihrem Inneren ein Teilungselement (31) aufweist, das ausgelegt ist, eine erste Kammer (32) zu bilden und eine zweite Kammer (33), wobei das Teilungselement (31) einen axialen Durchlass (34) aufweist zum Bereitstellen von Fluidverbindung zwischen der ersten Kammer (32) und der zweiten Kammer (33).
 7. Vorrichtung gemäß Anspruch 6, **dadurch gekennzeichnet, dass** die zweiten elastischen Einrichtungen (28) eine erste Feder (42) und eine zweite Feder (43) aufweisen, die jede in einer jeweiligen Kammer (32, 33) der longitudinalen Öffnung aufgenommen sind.
 8. Vorrichtung gemäß Anspruch 7, **dadurch gekennzeichnet, dass** das Teilungselement (31) einen Sitz (51) aufweist auf der Seite (40), die vor die erste Kammer (32) gerichtet ist, wobei der Sitz in Verbindung ist mit dem axialen Durchlass (34) und ausgelegt ist gleitend ein Ventilgehäuse (52) aufzunehmen gegen die Wirkung aus der Vorspannung der ersten Feder (42).
 9. Vorrichtung gemäß Anspruch 8, **dadurch gekennzeichnet, dass** das Ventilgehäuse (52) eine kalibrierte, axiale Öffnung (53) aufweist zum Verzögern der Zirkulation des Fluids (O) von der ersten Kammer (32) in die zweite Kammer (33), wodurch die Verschiebung des Pleuels (45) gedämpft wird, die axiale Öffnung (53) ist gegenüber einem offenen Ende (54) des Durchlasses (34).
 10. Vorrichtung gemäß Anspruch 8, **dadurch gekennzeichnet, dass** das Ventilgehäuse (52) eine kegelförmige, seitliche Fläche (55) aufweist, die im Wesentlichen komplementär geformt ist mit Bezug zu der des Sitzes (51), um damit einen im Wesentlichen ringförmigen Kanal (56) zu bilden, wenn das Ventilgehäuse (52) Abstand aufweist zu dem Sitz (51), um dem Fluid (O) zu ermöglichen von der zweiten Kammer (33) in die erste Kammer (32) zu fließen.
 11. Vorrichtung gemäß Anspruch 8, **dadurch gekennzeichnet, dass** der Öl-Hydraulische Stoßdämpfer (27) ein ringförmiges Element (50) aufweist, das gleitend und dichtend eingesetzt ist in die zweite Kammer (33), wobei die zweite Feder (43) ausgelegt ist mit dem ringförmigen Element (50) zusammen zu wirken, um das Fluid (O) in der zweiten Kammer (33) zu komprimieren und dessen Rückfluss in die erste Kammer (32) zu fördern durch den axialen Durchlass (34) und den ringförmigen Kanal (56).
 12. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Antriebseinrichtungen (6) und die Verzögerungseinrichtungen (8) in einer kistenartigen Umhüllung (9) aufgenommen sind, die geformt ist in eine longitudinale Nut (W) der unteren Kante (B) einer Tür (P) oder Fenster.
 13. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das Betätigungsglied (7) ein rohrartiges Element (13) umfasst mit einem Endabschnitt (14), der aus der Umhüllung (9) ragt und ausgelegt ist mit einem Ständer (M) des festen Rahmens (T) zusammen zu wirken, wobei das rohrartige Element (13) gleitend montiert ist an einen Stift (15), der ein Ende (16) hat, das steif verbunden ist mit der Gleitschiene (10) mit der vorgespannten Feder (17), die dazwischen angeordnet ist.
 14. Vorrichtung gemäß Anspruch 3, **dadurch gekennzeichnet, dass** die Abschlusskante (26) ausgelegt ist das freie Ende (49) der Welle (45) zu drücken, um die Bewegung der Gleitschiene (10) und des mindestens einen Verbindungsglieds (11) zu verzögern, wenn das Betätigungsglied (7) in seiner zurück gezogenen Stellung ist und fort bewegt zu werden von dem freien Ende (49), wenn das Betätigungsglied (7) in der erstreckten Stellung ist, um dadurch nahezu sofortige Bewegung der Gleitschiene (10) und der

Verbindungsstange (11) zu ermöglichen.

Revendications

1. Dispositif de joint amovible contrôlable, à fixer au bord inférieur (B) d'une porte (P) ou d'une fenêtre relié par charnière à un châssis fixe (T), ledit dispositif comprenant :

- une bande profilée (3) en matériau flexible, définissant un axe longitudinal (L) et apte à entrer en interaction avec un seuil (S) pour un effet d'étanchéité à l'air ;

- des moyens d'entraînement (6) agissant sur ladite bande (3) à travers au moins une bielle (11) pour déplacer ladite bande (3) entre une position de repos saillante et une position active baissée, en contact avec le seuil (S) ;

- un actionneur (7) associé auxdits moyens d'entraînement (6) pour commander l'actionnement de ceux-ci, ledit actionneur (7) étant apte à se déplacer entre une position déployée, dans laquelle il est espacé du châssis (T) quand la porte (P) est ouverte et une position rétractée dans laquelle il est en contact avec le châssis (T) quand la porte (P) est fermée ;

- des moyens de retard (8) agissant sur lesdits moyens d'entraînement (6) pour retarder le mouvement de ladite bande (3) ;

lesdits moyens d'entraînement (6) comprennent au moins un coulisseau (10) relié à ladite bande (3) à travers ladite au moins une bielle (11), ledit coulisseau (10) comportant un appendice (25) avec un bord d'extrémité (26) apte à engager par contact lesdits moyens de retard (8) pour retarder le mouvement de ladite bande (3) de ladite position saillante à ladite position baissée dès que la porte (P) est fermée,

ledit bord d'extrémité (26) étant apte à être éloigné desdits moyens de retard (8) pour garantir un mouvement automatique quasi-instantané de ladite bande (3) de ladite position baissée à ladite position saillante dès l'ouverture de la porte (P),

caractérisé en ce qu'il comprend des premiers moyens élastiques (12) comportant un ressort de poussée (17) interposé entre ledit actionneur (7) et ledit coulisseau (10).

2. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens de retard (8) comprennent un amortisseur à huile (27) comportant un corps allongé (29) avec une cavité longitudinale sensiblement cylindrique (30) remplie d'un fluide incompressible (O) et définissant au moins une première chambre (32), ledit amortisseur (27) comprenant également des seconds moyens élastiques (28).

3. Dispositif selon la revendication 2, **caractérisé en ce que** ledit amortisseur à huile (27) comprend un piston (44) avec une tige (45) insérée coulissante dans un trou d'extrémité (46) dudit corps (29) et une tête élargie (47) logée coulissante à l'intérieur de ladite au moins une première chambre (32), dans lequel l'extrémité libre (49) de ladite tige (45) fait saillie vers l'extérieur dudit trou d'extrémité (46) lorsque ladite au moins une première chambre (32) est partiellement remplie de fluide (O).

4. Dispositif selon la revendication 3, **caractérisé en ce que** lesdits seconds moyens élastiques (28) comprennent au moins un premier ressort (42) logé dans ladite au moins une première chambre (32) et ayant une extrémité (48) qui entre en interaction avec ladite tête élargie (47).

5. Dispositif selon la revendication 4, **caractérisé en ce que** ladite cavité (30) définit une première chambre unique (32) et lesdits seconds moyens élastiques (28) comprennent un premier ressort unique (42), ladite tête élargie (47) comportant un ou plusieurs trous débouchants calibrés (57) pour le passage du fluide (O) lorsque ledit piston (44) avance dans ladite première chambre (32).

6. Dispositif selon la revendication 2, **caractérisé en ce que** ladite cavité longitudinale (30) comporte un élément de cloison (31) à son intérieur, qui est apte à définir une première chambre (32) et une seconde chambre (33), ledit élément de cloison (31) comportant un passage axial (34) pour réaliser une communication fluidique entre ladite première chambre (32) et ladite seconde chambre (33).

7. Dispositif selon la revendication 6, **caractérisé en ce que** lesdits seconds moyens élastiques (28) comprennent un premier ressort (42) et un second ressort (43), chacun logé dans une chambre respective (32, 33) de ladite cavité longitudinale.

8. Dispositif selon la revendication 7, **caractérisé en ce que** ledit élément de cloison (31) comporte un siège (51) sur la face (40) orienté vers ladite première chambre (32), ledit siège communicant avec ledit passage axial (34) et étant apte à loger de façon coulissante un corps de soupape (52) contre l'action de poussée dudit premier ressort (42).

9. Dispositif selon la revendication 8, **caractérisé en ce que** ledit corps de soupape (52) comporte un orifice calibré (53) pour retarder la circulation du fluide (O) de ladite première chambre (32) à ladite seconde chambre (33), amortissant ainsi le déplacement de ladite tige (45), ledit orifice axial (53) faisant face à une extrémité ouverte (54) dudit passage (34).

10. Dispositif selon la revendication 8, **caractérisé en ce que** ledit corps de soupape (52) comporte une surface latérale tronconique (55) de forme sensiblement complémentaire à celle dudit siège (51) pour définir avec celui-ci un dégagement sensiblement annulaire (56) lorsque ledit corps de soupape (52) est espacé dudit siège (51) pour permettre au fluide (O) de s'écouler de ladite seconde chambre (33) à ladite première chambre (32). 5
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11. Dispositif selon la revendication 8, **caractérisé en ce que** ledit amortisseur à huile (27) comprend un élément annulaire (50) inséré de façon coulissante et étanche dans ladite seconde chambre (33), ledit second ressort (43) étant apte à entrer en interaction avec ledit élément annulaire (50) pour comprimer le fluide (O) dans ladite seconde chambre (33) et favoriser le reflux de celui-ci dans ladite première chambre (32) à travers ledit passage axial (34) et ledit dégagement annulaire (56). 15
20
12. Dispositif selon la revendication 1, **caractérisé en ce que** lesdits moyens d'entraînement (6) et lesdits moyens de retard (8) sont logés dans une enceinte en forme de boîte (9), destinée à être insérée dans une rainure longitudinale (W) du bord inférieur (B) d'une porte (P) ou une fenêtre. 25
13. Dispositif selon la revendication 1, **caractérisé en ce que** ledit actionneur (7) comprend un élément tubulaire (13) avec une partie d'extrémité (14) faisant saillie de ladite enceinte (9) et apte à entrer en interaction avec un montant (M) du châssis fixe (T), ledit élément tubulaire (13) étant monté coulissant sur un goujon (15) ayant une extrémité (16) rigidement reliée audit coulisseau (10) avec l'interposition dudit ressort de poussée (17). 30
35
14. Dispositif selon la revendication 3, **caractérisé en ce que** ledit bord d'extrémité (26) est destiné à comprimer l'extrémité libre (49) de ladite tige (45) pour retarder le mouvement dudit coulisseau (10) et de ladite au moins une bielle (11), lorsque ledit actionneur (7) est dans sa position rétractée, et à être éloigné de ladite extrémité libre (49) lorsque ledit actionneur (7) est dans la position déployée, permettant ainsi un mouvement quasi-instantané dudit coulisseau (10) et ladite bielle (11). 40
45

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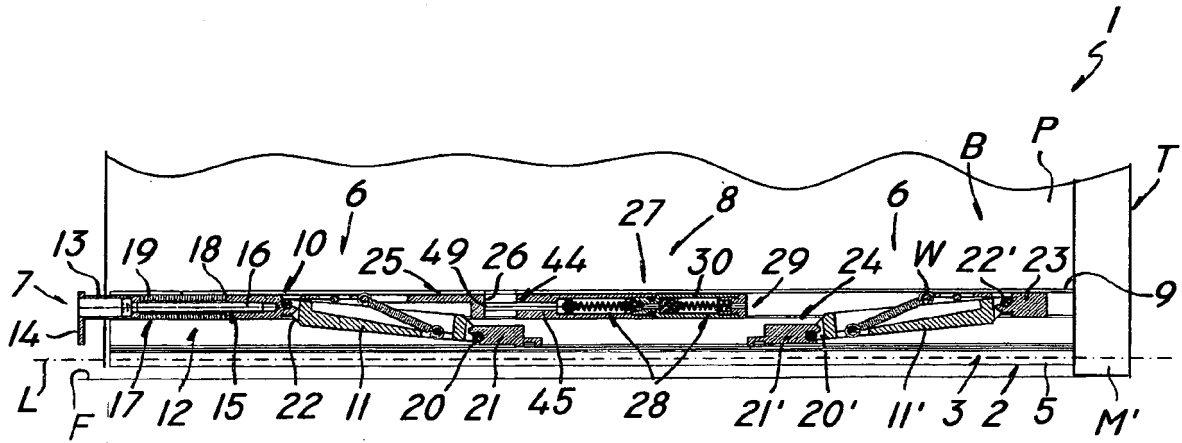


FIG. 1

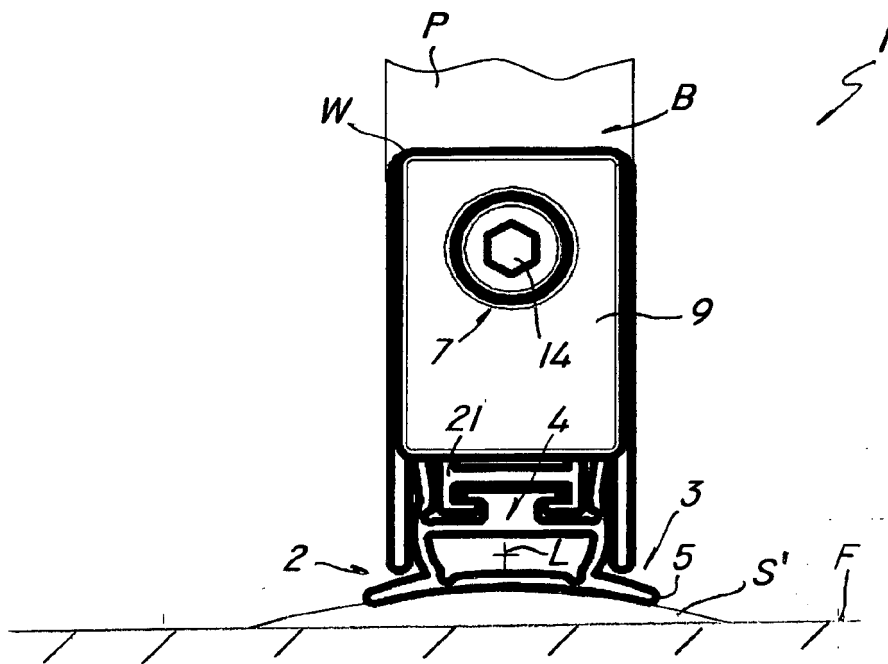


FIG. 2

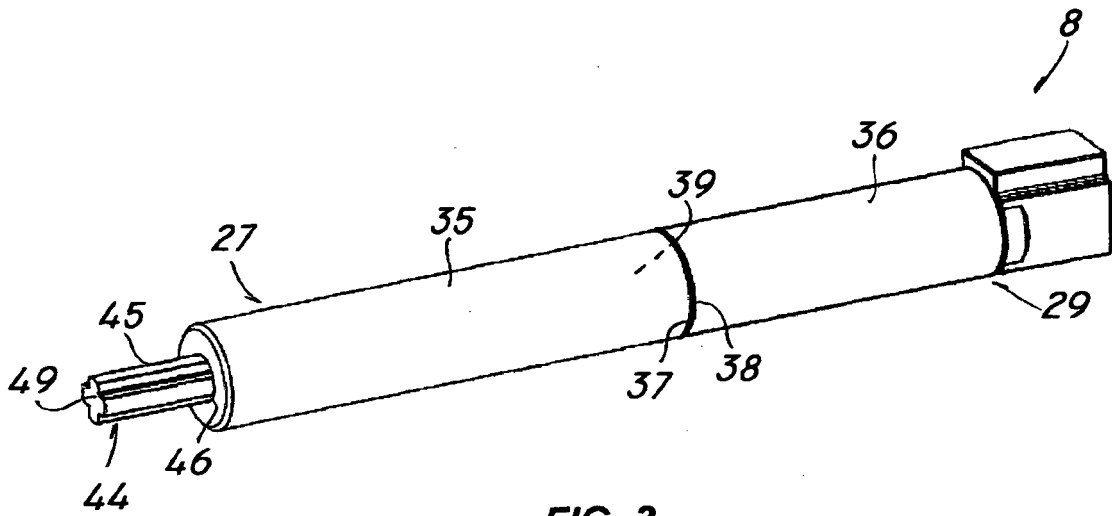


FIG. 3

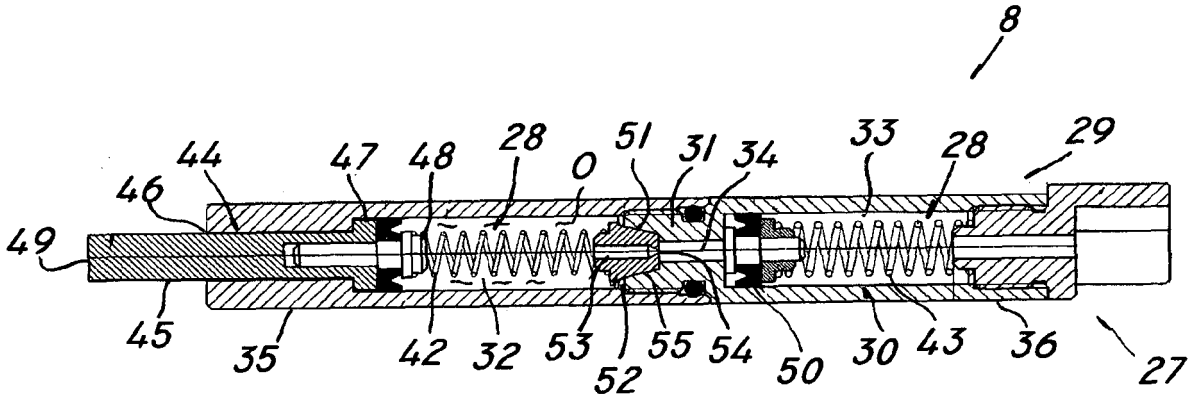


FIG. 4

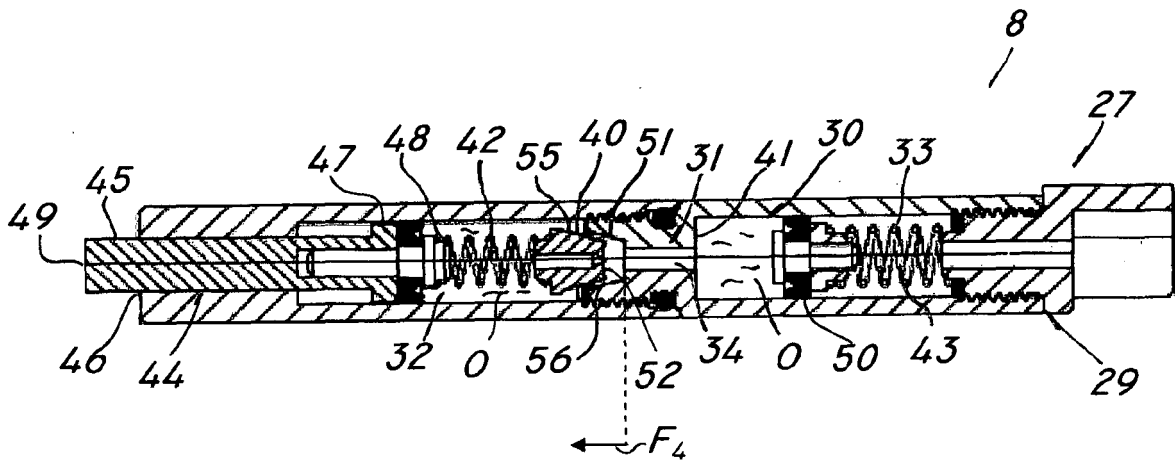


FIG. 5

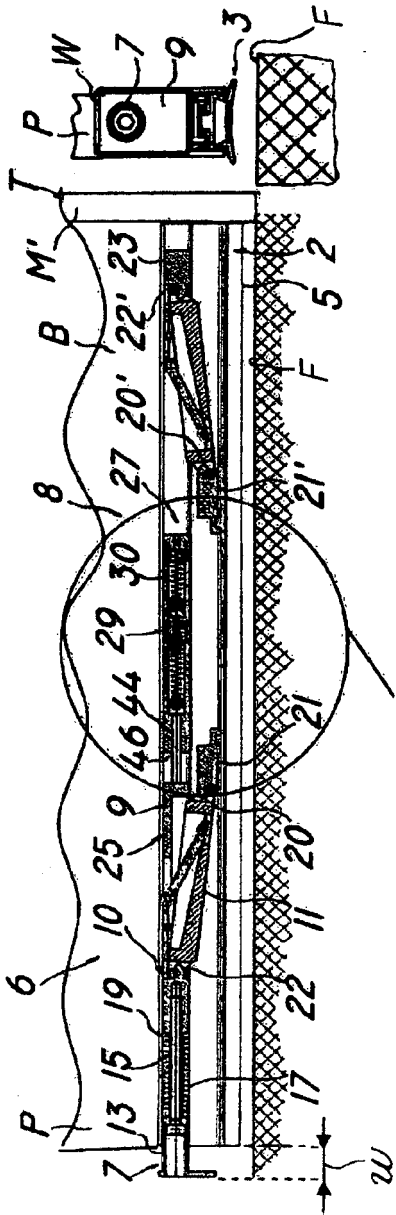


FIG. 6A

FIG. 6B

VIII

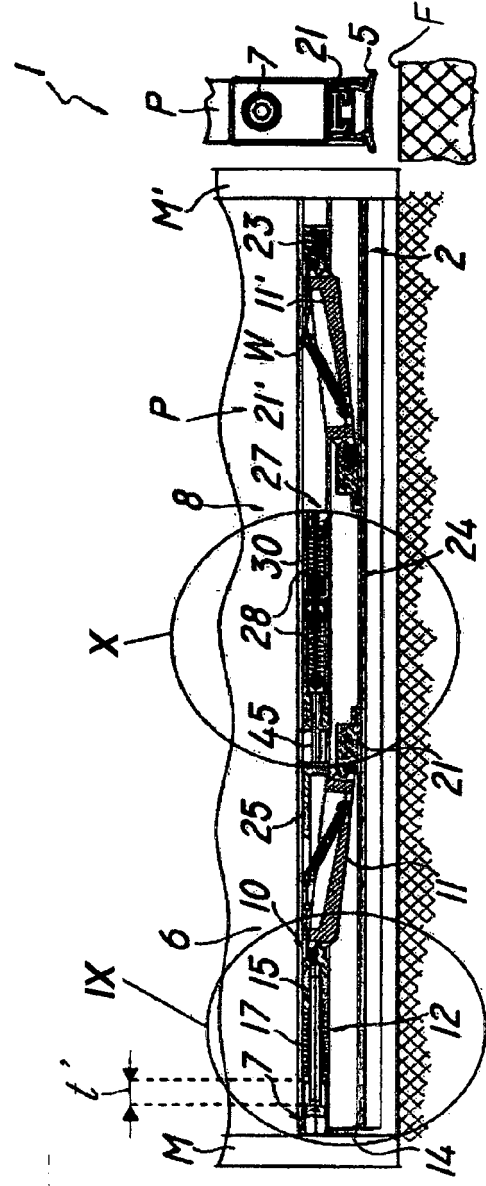


FIG. 7A

FIG. 7B

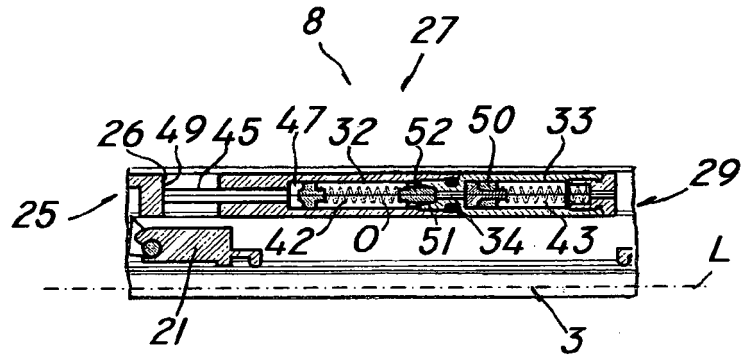


FIG. 8

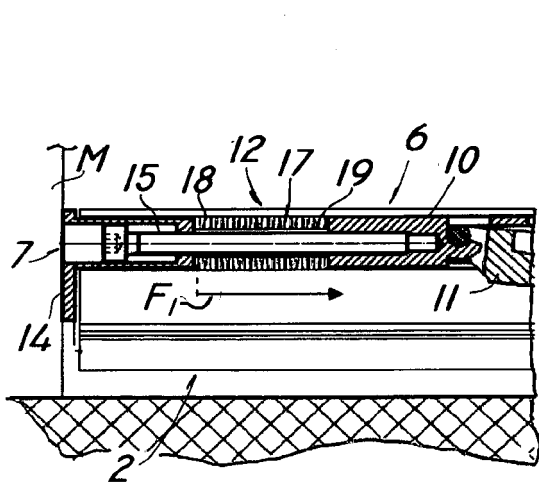


FIG. 9

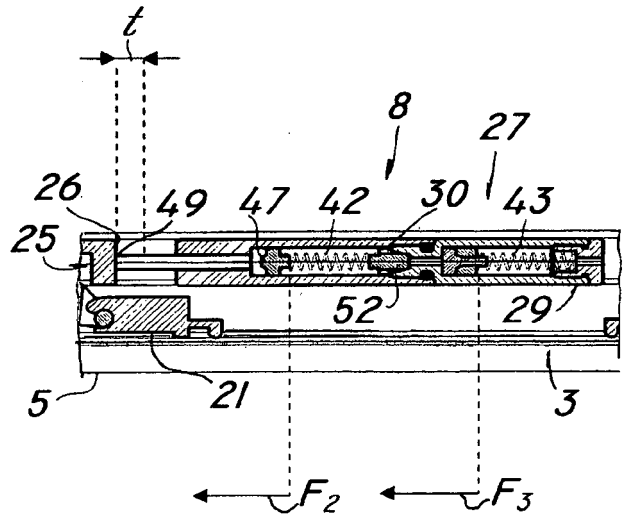


FIG. 10

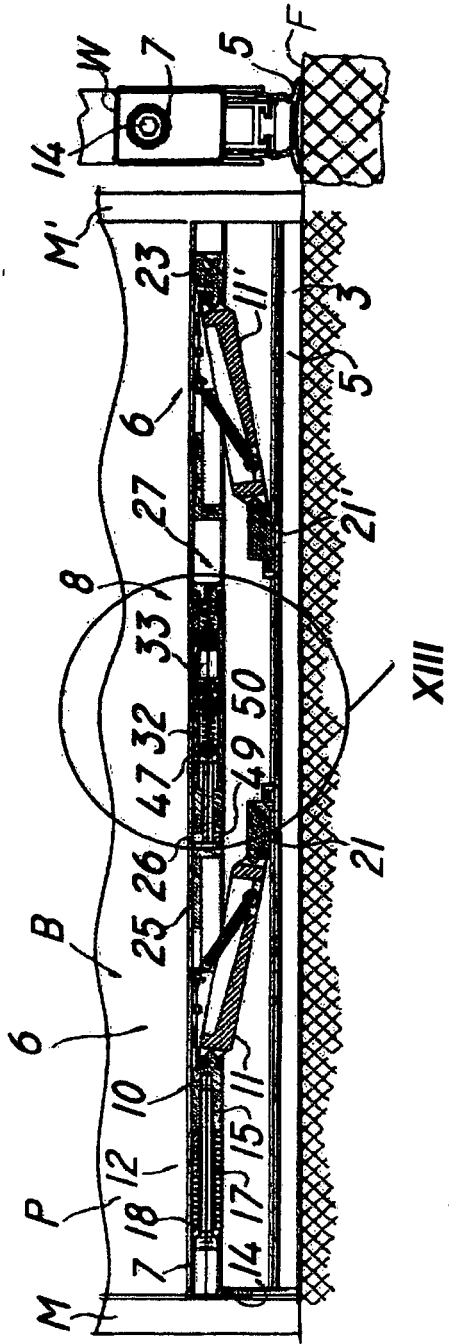


FIG. 11A

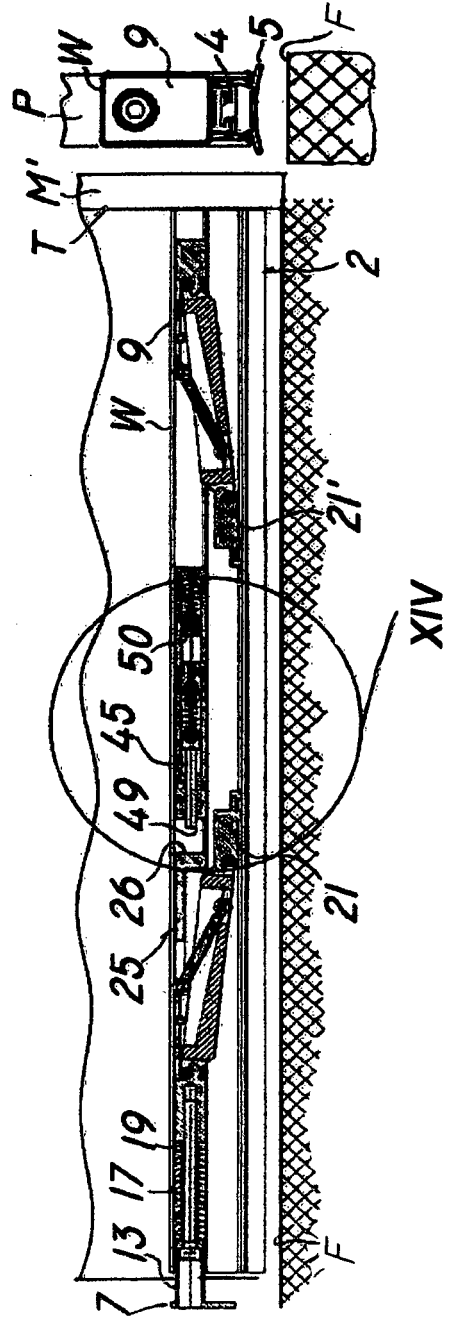


FIG. 12A

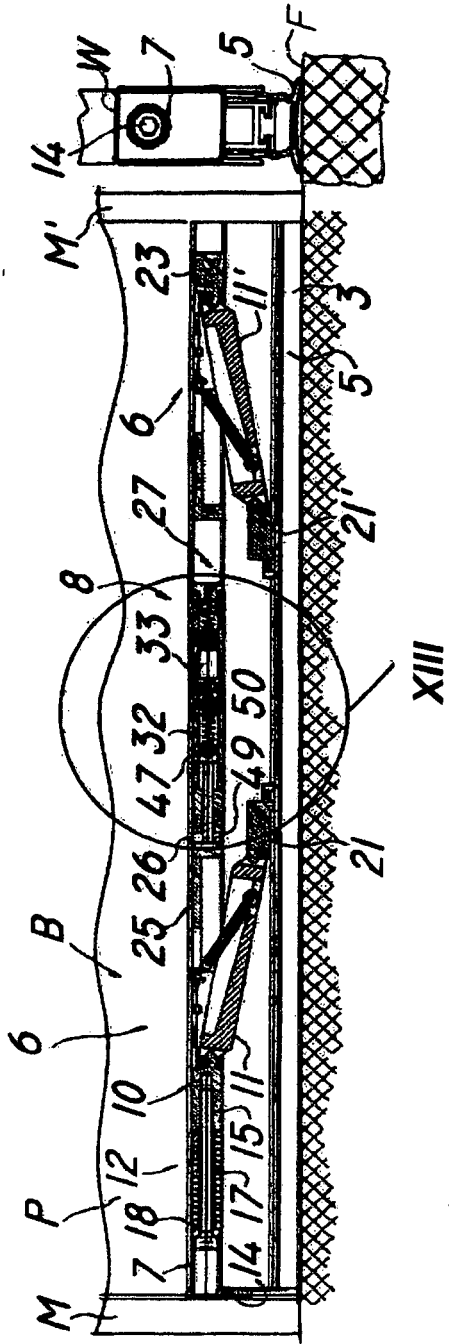


FIG. 11B

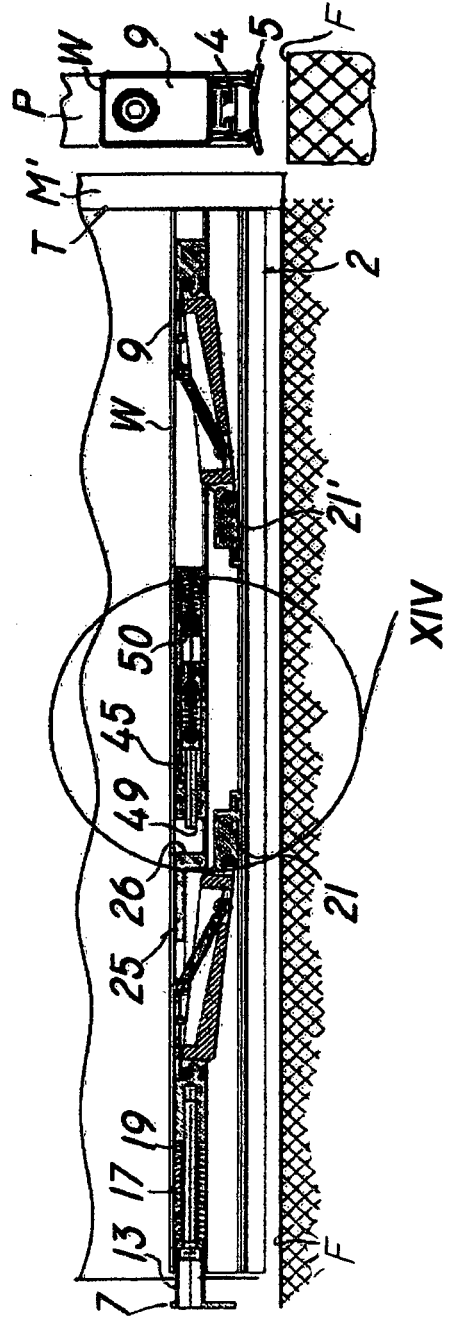


FIG. 12B

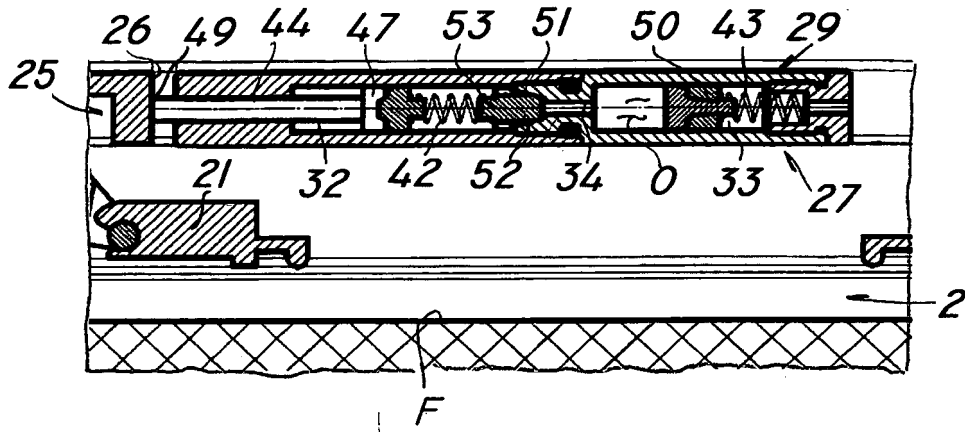


FIG. 13

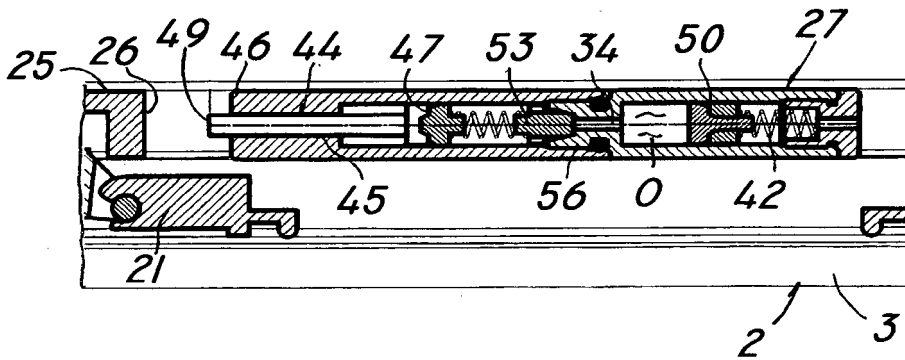


FIG. 14

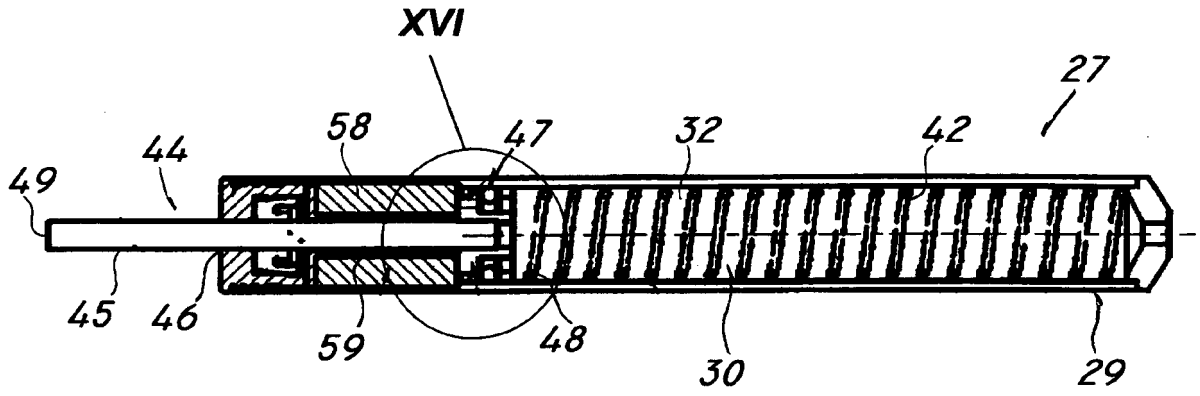


FIG. 15

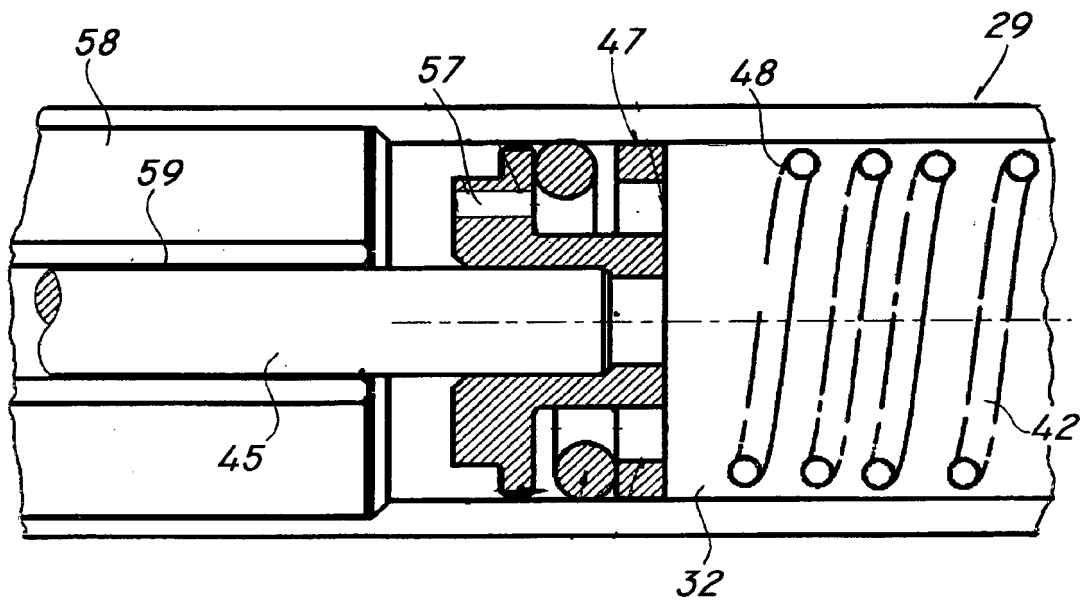


FIG. 16

REFERENCES CITED IN THE DESCRIPTION

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