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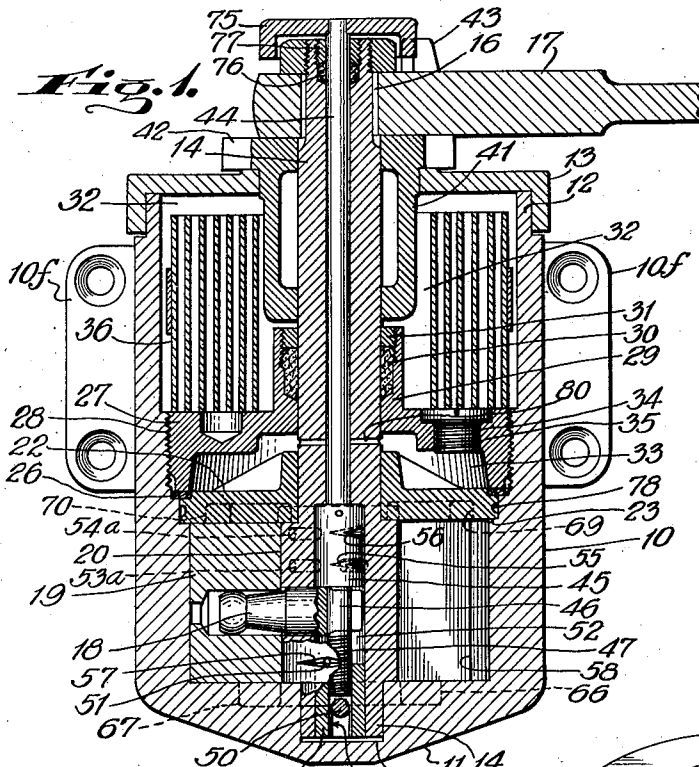
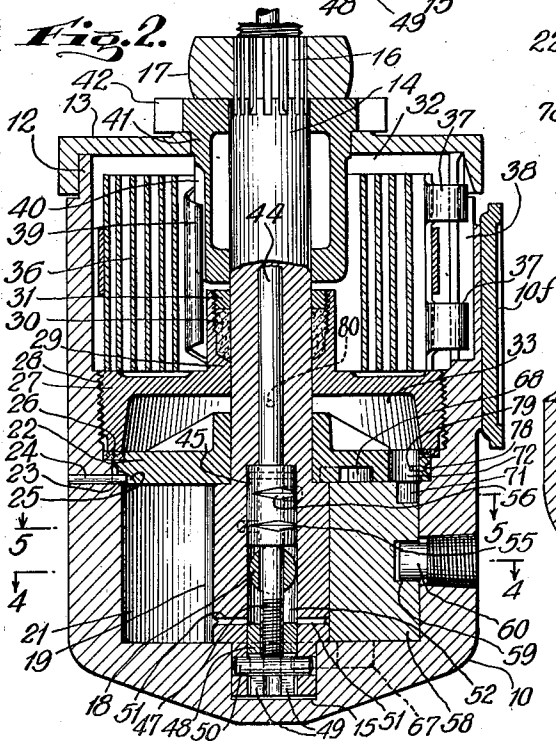
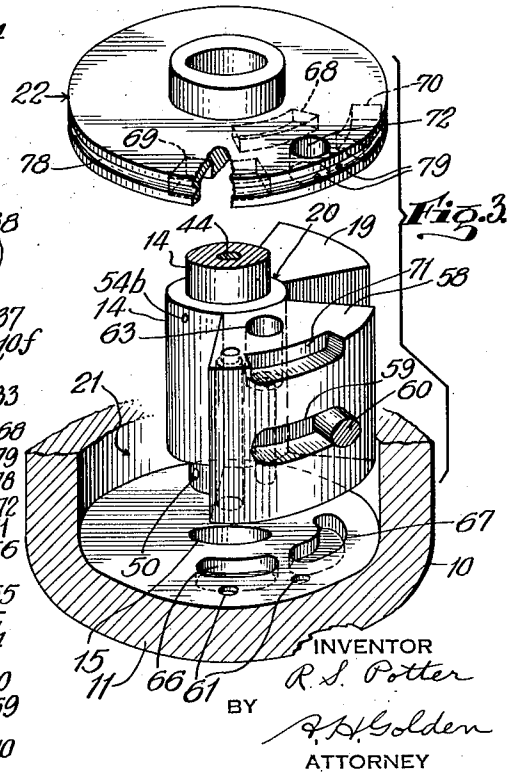
R. S. POTTER

2,216,695

DOOR CLOSER

Filed July 1, 1939

2 Sheets-Sheet 1



INVENTOR

R. S. Potter

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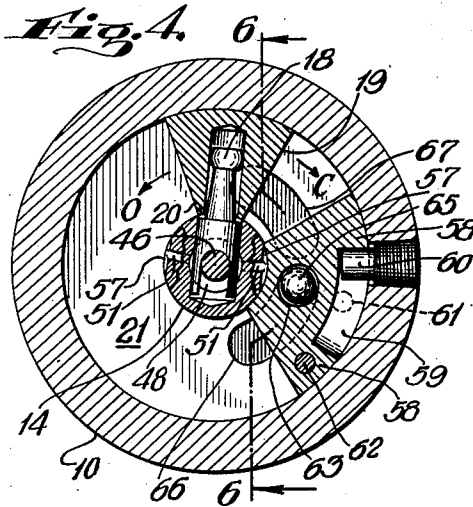
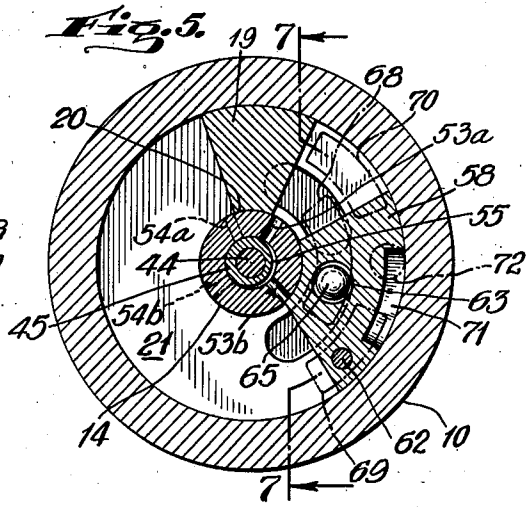
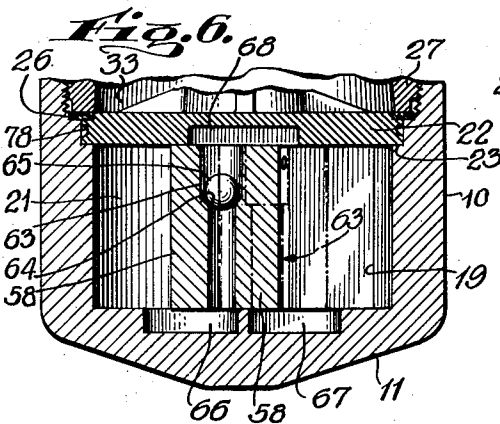
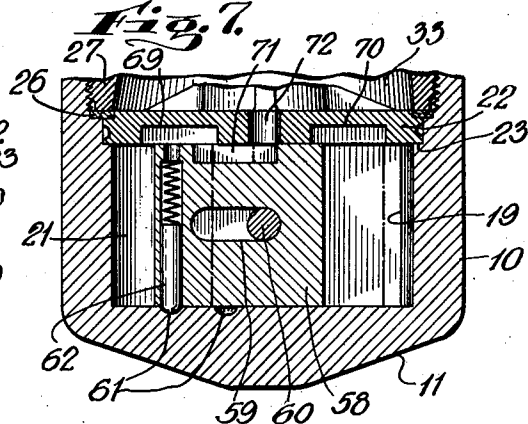
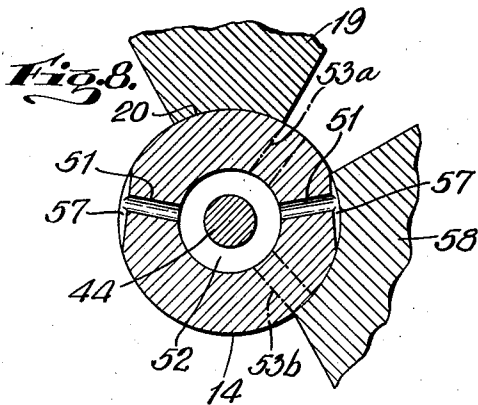
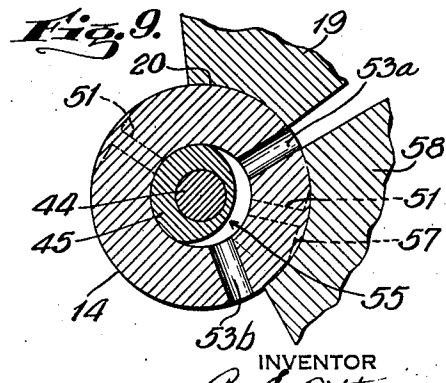
R. S. POTTER

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DOOR CLOSER

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,216,695

DOOR CLOSER

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Application July 1, 1939, Serial No. 282,381

21 Claims. (Cl. 16—58)

This invention relates to a door closer of the type in which a spring is wound during the opening movement of the door to which the door closer is attached, and in which fluid is moved through valves to slow down the closing movement of the door under the influence of the spring.

More particularly, my invention relates to a door closer of the type in which the mechanism is housed in a cylinder, so as to present an outward appearance considered more desirable than that of door closers now generally sold.

In the prior art, there have been developed door closers in which the mechanism is housed in a cylinder of much the same configuration as the door closer of my invention. Basically, my door closer presents an improvement over similar cylindrical door closers in that its internal construction is relatively simple, it is readily reversible, and in that the valve mechanism for controlling the closing movement of the door is especially simple and effective. Naturally, there are other features of importance which will appear presently.

More particularly, the door closer of my invention utilizes what is known in the art as a wing piston operating against an abutment, with the feature that the abutment is readily movable to render the door closer reversible. A more detailed feature of my invention is the mounting of the abutment so that it is readily movable by application of pressure thereto through the wing piston, whereby reversing of the door closer is made extremely simple. The fluid passages and valves controlled by the abutment are so arranged that a simple movement of the abutment reverses the direction of the flow of the liquid of the closer, making possible the ready reversal of the closer without the changing of any valve mechanism.

As a further feature of my invention, I utilize a valve mechanism which controls the door closing movement during the first ninety degrees or so of closing, so that said movement will be at one speed, while allowing for a final adjustment during the last five to ten degrees of closing which will be at another speed. My closer also has the feature of a reservoir in which is stored liquid to replenish any liquid evaporating or otherwise leaving the main chamber. This reservoir is always in communication with the low pressure side of the closer as determined by the direction of closing, it being a feature of my invention that the movement of the abutment to

reverse the closer affects a reversal also of the connection between the reservoir and the then low pressure side of the closer.

Other features of particular value will be pointed out in the specification which follows, and will be included in the claims appended hereto. I do wish to indicate that I consider my invention relatively broad, and that I wish to obtain a monopoly which will prevent the utilization of the principles of my invention by others in a physical structure different from that shown here.

Referring now to the drawings, Fig. 1 is a vertical partial section through the center of my cylindrical door closer showing the operating mechanism. Fig. 2 is a view taken substantially at right angles to Fig. 1 showing other parts of the operating mechanism of my door closer. Fig. 3 is an exploded view of certain parts of my door closer operating mechanism. Figs. 4 and 5 are partial sections taken along approximately lines 4—4 and 5—5 of Fig. 2. Figs. 6 and 7 are sections taken along lines 6—6 and 7—7 of Figs. 4 and 5 respectively. Fig. 8 is a view of certain parts of Fig. 4 shown enlarged. Fig. 9 is a view of certain parts of Fig. 5 shown enlarged, and in a slightly different position than that presented in Fig. 5.

Referring now more particularly to the drawings, the casing of my door closer is designated by reference numeral 10, and is shown in the form of a cylinder having a tapered bottom 11 and an upper flange 12 about which is secured the cover plate 13. The door closer is secured to its door through suitable flanges 10f in a manner usual in this art. The main operating shaft of my door closer is designated by reference numeral 14, and is mounted in a shallow bore 15 in the part 11 of the casing 10 for rotation relatively to the casing 10. The upper portion of the main shaft 14 extends outwardly from the casing 10, and is splined as at 16 for the mounting thereon of the main door closer arm 17.

It will be appreciated that during the opening movement of the door, the arm 17 will rotate the main shaft 14 in a manner usual in this art, and that during the closing movement of the door, the main shaft 14 will rotate and will impart movement to the arm 17, so as to bring the door into closed position.

As is probably best illustrated in Figs. 1, 3 and 4, the main shaft 14 of the door closer has extending therefrom a mounting pin 18 on which is mounted the wing piston 19, this piston being machined so that its surface 20 will lie against

the peripheral surface of the main shaft 14, as is shown in Fig. 3, while its outer curved surface bears against the inner surface of the casing 10. Because of this mounting, the wing piston 19 will rotate integrally with the main shaft 14.

That portion within the casing 10 in which the wing piston 19 operates, is designated by me with reference numeral 21, and is termed the pressure chamber. This pressure chamber 21 is separated from the remainder of the space within the casing 10 by a seal plate 22 which fits against a shoulder 23 within the casing 10, and is particularly located relatively to the casing 10 by a location pin 24 fixed within the casing 10 and cooperating with a location slot 25 in the seal plate 22.

A seal washer 26 fits into cooperating slots formed in the casing 10 and seal plate 22, as best illustrated in Figs. 1 and 2. A sealing sleeve 27 is in screw threaded relation at 28 with the casing 10, and is adapted to be rotated so as to force the seal plate 22 into place and maintain the sealing washer 26 thereagainst. The sealing sleeve 27 forms also a center bearing 29 for the main shaft 14. Packing material 30 is inserted about the main shaft 14, and is held in place by a packing nut 31 so as to prevent the leakage of fluid from below the packing nut 31 into the upper chamber 32 of the casing 10, which upper chamber is termed by me a spring chamber.

It will be well to indicate at this time that the space defined by the seal plate 22 and the sealing sleeve 27 is termed by me a reservoir, and is designated by reference numeral 33. A screw 34, best shown in Fig. 1, closes a screw threaded opening 35 in the sealing sleeve 27, it being appreciated that by removing the screw 34, it is possible to insert fluid into the reservoir 33 and thereby into the pressure chamber 21, all as will be explained presently.

Mounted within the spring chamber 32 is a coil spring 36, one end of which has integral lugs 37 (Fig. 2) adapted to fit into a groove 38 formed in the casing 10. The inner end of the spring is curved as shown at 39, and is adapted to fit within a groove 40 of a spring winding sleeve 41 mounted about the main shaft 14.

The upper end of the spring winding sleeve 41 is ratcheted for cooperation with a dog 43 (Fig. 1) carried by the main arm 17, whereby rotation of the main arm 17 with the main shaft 14 rotates the winding disk 42 to wind the spring 36 through the spring portion 39. Further details regarding the relation of the dog 43 to the winding disk 42 and the spring 36 are eliminated here because they are common and are well known in the art, both as to operation and function. It will of course be appreciated that while the spring 36 is being wound through coaction of winding sleeve 41 with the spring portion 39, the lugs 37 hold the other end of the spring stationary, all as is standard in the art.

I shall now describe in detail the valve mechanism whereby the speed of closing by my door closer is regulated. Thereafter, I shall describe the abutment against which the piston operates, and the construction of the casing portion 11 and the seal plate 22.

The main shaft 14 is bored and counterbored for the reception of a valve stem 44, which valve stem has secured thereto an enlarged valve body 45 and terminates in a stem portion 43 screw threaded as at 47 for cooperation with a valve block 48. The valve block 48 is slotted as at 49,

whereby it fits over a pin 50 which is fixed to the main shaft 14. It will be readily appreciated that rotation of the valve stem 44 will cause the rotation of the screw threaded portion 47 thereof, which in turn will cause a vertical movement of the valve block 48 relatively to the pin 50, the valve block 48 being held against rotation by the cooperation of its slot 49 relatively to the pin 50.

The main shaft 14 has a pair of transverse bores 51 therethrough, which I shall for the sake of convenience consider as one bore which I call the main valve bore. It is quite apparent from Fig. 2 that as the valve block 48 moves vertically, its upper end acts to shut off the portions of the bore 51 which extend into the vertical bore 52 formed within the main shaft 14. By restricting the particular portions of the bore 51, movement of liquid through the said bore 51 is naturally controlled and limited, and this action is utilized to control the speed of closing of my door closing mechanism, as will be set forth hereinafter.

The main shaft 14 has, in addition to the main valve bore 51, two further pairs of bores. One pair is designated by reference numerals 53a and 53b, and are in one plane of the main shaft 14, the inner ends of the bores 53a and 53b extending into the central vertical bore 52 of the main shaft 14, as is probably best seen in Fig. 5. A second pair of bores 54a and 54b are formed within the main shaft 14 in a further common plane, and have the same relation to one another as do the bores 53a and 53b. The pairs of bores 53a, 53b and 54a, 54b are termed by me final closing bores, and are adapted to control the final closing movement of the door, that is, its movement during the last five to ten degrees of closing.

For controlling the pair of valve bores 53a, 53b, the valve body 45 carried by the valve stem 44 is equipped with a groove 55, best seen in Figs. 2, 5 and 9. For controlling the pair of valve bores 54a, 54b, the valve body 45 of the valve stem is equipped with a groove 56, functioning exactly as does the groove 55. It will be well at this time to point out that the surface of the main shaft 14 adjacent the ends of the main valve bore 51 is grooved, as is best shown at 57 in Figs. 1 and 8, this serving to give a smoother controlling action, as will be apparent later.

I shall now describe the abutment 58 against which the wing piston 19 operates. This abutment is of a shape best shown in Fig. 3, and is slotted as at 59 for mounting about a limiting and locating pin 60 extending from the casing 10, the pin 60 being secured to the casing 10 in a manner best illustrated in Figs. 2 and 4.

It may be well to indicate at this time that when the abutment 58 is positioned so that its slot 59 is in the relation shown in Figs. 2, 3 and 4 relatively to the pin 60, the door closer is adapted for closing operation in one direction, whereas when the pin is at the opposite end of the slot 59, the door closer is adapted for operation in reverse direction. As will be apparent, this reversal may be made easily by merely shifting the block 58 through rotation of the wing piston 19.

A pair of shallow indentations 61 formed within the bottom surface defining the pressure chamber 21 cooperate with a spring pressed pin 62 mounted within the abutment 58, as best shown in Fig. 7, for yieldingly maintaining the abutment in its position of Figs. 2, 3 and 4, or in a second position corresponding to a reverse operation of the door closer. It is conceivable that under particular conditions, the pin 62 and its cooperating indentations 61 may be dispensed

with, but I find them necessary from a practical view-point.

A bore 63 is formed within the abutment 58, as best illustrated in Figs. 3 and 6, and mounted therein on a seat 64 is a valve ball 65, it being understood that this ball will prevent the flow of fluid downwardly through the bore 63, but not upwardly, all for a purpose to be described hereinafter.

Valve slots 66 and 67 are formed in the bottom surface defining the pressure chamber 21, and are so arranged that the right hand end of the slot 66 lies directly under the bore 63 when the abutment is in its handed position shown in the several figures of this application. It will be appreciated that when the hand of my door closer is reversed, the bore 63 will lie directly over the left hand end of the slot 67. The seal plate 22 is formed with a valve slot 68 in its under surface, this valve slot cooperating with the bore 63 in either of the two possible positions of the abutment block 58.

Valve slots 69 and 70 are formed in the under surface of seal plate 22, and are arranged so that in the particular position of the abutment block herein shown, the slot 69 will cooperate with the low pressure side of the piston 19 and the abutment block 58 on the one side, as is best shown in Fig. 7, and with a groove 71 of the abutment block on the other side. A bore 72 is formed in the seal plate 22, and is adapted to cooperate with the groove 71 of the abutment block 58 in either of its two handed positions.

It will be well now to describe a complete operation of my door closer to show the movement of the fluid therein. It will first be well to indicate, however, that mounted within the pressure chamber 21 and the reservoir chamber 33 is a suitable fluid of the type in general use in the industry today. With this fluid within the two chambers, should the door be opened, the arm 17 will rotate, and will rotate therewith the main shaft 14 and the spring winding disk 42 to wind the spring 36 through its portion 39, and relatively to the two lugs 37 which hold the other end of the spring fixed relatively to the casing. Once the spring is wound up, a release of the door will allow the spring to unwind and to close the door in the opposite direction.

Opening movement of the door as above described, will not only wind the spring, but will also cause the piston 19 to move in the direction of the arrow "O" in Fig. 4 relatively to the abutment block 58. Referring now to Fig. 6, this movement of the wing piston 19 will force the fluid within the pressure chamber 21 to move through the exposed portion of the slot 66 in the bottom of the chamber 21, and then upwardly through the bore 63 of the abutment block 58, lifting the ball 65 from its seat 64, and allowing the fluid to flow through the valve slot 68 formed in the under surface of the seal plate 22. The fluid will move from the valve slot 68 to the other side of the abutment block 58 and against the high pressure side of the piston 19. This movement of the fluid in the pressure chamber 21 will be relatively free, so that it may be said that opening movement of the door will not be opposed in any way by the fluid, except, of course, by the hydraulic friction encountered.

It will be well at this point to refer to Fig. 7, wherein it will be seen that during the opening movement of the door, the low pressure side of the abutment block 58 remains exposed to the

left hand end of the valve slot 69 in the seal plate 22. The slot 69 is in turn in communication with the groove 71 of the abutment block 58, which in turn is in communication with bore 72 of seal plate 22. It is possible, therefore, for fluid to flow from reservoir chamber 33 through bore 72 in the seal plate 22, groove 71, and slot 69 into the pressure chamber 21. Thus, it will be appreciated that during the opening movement of the door, and in fact, in any position of the door, the low pressure side of the pressure chamber 21 is in communication with the reservoir 33, and any evaporation or other loss of the fluid within the pressure chamber 21 may be replenished by a flow of additional fluid from the reservoir 33. By maintaining the reservoir 33 filled at all times through the screw threaded bore 35 shown in Fig. 1, the amount of fluid in pressure chamber 21 may always be maintained at the necessary level. This is an extremely important feature of my invention from a practical operating view-point.

When the door is opened as set forth, and released, the main shaft 14 will of course be rotated under the influence of the spring 36, and will rotate therewith the wing piston 19 in the direction of the arrow "C" in Fig. 4. During this rotation, the fluid within the pressure chamber 21 will be forced by the piston 19 against the pressure side of the abutment block 58.

Referring to Fig. 6, it will be noted that fluid will tend to flow from the slot 68 formed in the under surface of the seal plate 22 through the bore 63 of the abutment block 58. Because the valve ball 65 will be against the seat 64, no fluid may flow in this particular direction. It will further be noted from Fig. 6 that fluid will attempt to move through the valve slot 67 formed in the bottom surface of the pressure chamber 21, but that flow of fluid in this direction will be prevented by the abutment block 58.

Referring now to Fig. 7, it will be appreciated that fluid will tend to flow into the valve slot 70 formed in the under surface of the valve plate 22, but that its movement in this direction will be prevented by the abutment block 58. It will appear, therefore, that the fluid cannot flow through any portion of the abutment block 58 or the valve slots formed in the seal plate 22 and in the bottom surface of the pressure chamber 21, during the closing movement of the piston 19. Fluid may, however, flow through the main valve bore 51 formed within the main shaft 14 of the door closer until the main shaft of the door closer reaches its position of Figs. 4 and 8, wherein the extended groove 57 of the right hand part of bore 51 is shut off by the abutment block 58. This is the position of the door reached when it is approximately five to ten degrees from its full closing position.

It will be appreciated that the rate of flow through the bore 51 will depend upon the position of the main valve block 48, which valve block 48 is adjusted by rotation of the valve stem 44. At this point, it will be well to indicate that the valve stem 44 extends upwardly through the main shaft 14, and has mounted thereon a cap 75. A suitable stuffing material 76, held in place by a stuffing nut 77, prevents leakage of fluid upwardly through the valve stem, as will be readily appreciated.

Fig. 8 shows enlarged the position of the main valve bore 51 relatively to the abutment block 58 when the parts are in the position of Fig. 4. In

dot and dash lines in Fig. 8, are shown the position of the bores 53a and 53b, which are the bores which control the closing during the last five to ten degrees. In Fig. 5, the bores 53a and 53b are shown in solid lines, and it will be noted that the bore 53b is about ready for exposure beyond the abutment block 58. It is intended that as soon as the groove 57 of the bore 51 is entirely covered by the abutment block 58, the bore 53b be exposed and ready for the passage of fluid therethrough.

Fluid will now flow through the bore 53a, the groove 55 in the valve portion 45, and through the bore 53b to the low pressure side of the abutment block 58. This will cause a further movement of the piston 19 to the position of Fig. 9, which is approximately the fully closed position of the door. It will be understood, of course, that this final closing movement is entirely controlled by the position of the valve body 45 and its groove 55. In Fig. 9, the groove 55 is shown set for fullest opening.

It will be noted that full control of the final closing action is obtained in each 360° rotation of the valve stem 44 and its valve body 45, whereas each 360° rotation of the valve stem 44 contributes but a slight degree of movement and control of the main control block 48. Therefore, through a series of rotations of the valve stem 44, the main valve block 48 is adjusted, while in the final rotation required in the adjustment of the main valve block 48, the final closing action is adjusted through the valve body 45 and its groove 55, all as will now be apparent to those skilled in the art.

Seal plate 22 is grooved as at 78, whereby any fluid flowing past the shoulder 23 will flow into the groove 78, the groove 78 being in communication through a bore 79 with the bore 72, so that said fluid will merely enter the reservoir 33. The main shaft 14 is bored as at 80 so that any fluid flowing upwardly through the valve stem bore 52 and between the valve stem 44 and the main shaft 14 will merely flow through the bore 80 into the reservoir 33.

Those skilled in the art will readily appreciate that to reverse my door closer, it is merely necessary to remove and replace the spring 36 so that the end portion 39 thereof and the lug portions 37 are reversed in direction. Of course, the abutment portion 58 will also be moved by the piston 19 so that the left hand end of the slot 59 in Fig. 3 will cooperate with the pin 60. Thereafter, the operation will be identical with that previously described, except that the flow of fluid will be in a reverse direction both on the low pressure side and on the high pressure side. Thus, during opening of the door fluid will flow in Fig. 6 from one side of the abutment through slot 67, bore 63 and slot 68 to the other side. In Fig. 7, reservoir 33 will be in communication through groove 71 and slot 70 with the other side of abutment block 58.

During the closing action of the door, the fluid will flow in a reverse direction through the same main valve bore 51 as before, but the last few degrees of closing will be not through the bores 53a and 53b, but rather through the bores 54a and 54b. The flow through the bores 54a and 54b will be identically the same in principle and action as that previously described with regard to bores 53a, 53b, as is self-evident from Fig. 5. Thus, fluid will flow through the bore 54a and outwardly on the other side of the abutment through the bore 54b.

Since the operation and construction of my door closer should now be apparent, I claim:

1. In a door closer of the class described, a fluid chamber, a pressure abutment movable in said chamber into one or the other of two direction determining positions, a rotatable piston adapted to rotate in opposite directions relatively to said pressure abutment, means whereby said pressure abutment controls the flow of fluid in said chamber as the piston rotates relatively to said abutment and whereby said abutment when moved from one to the other of said two direction determining positions in said chamber changes the direction of the flow of fluid relatively to said abutment to change the hand of the door closer.

2. In a door closer of the class described, a fluid chamber, a pressure abutment movable in said chamber and adapted to rest in one or two direction determining positions, a rotating piston adapted to rotate relatively to said pressure abutment, fluid flow passages, and means whereby in one of said positions of said abutment fluid passes substantially freely through said passages from one side of said abutment to the other, while in the other position of said abutment said fluid passes substantially freely in a reverse direction relatively to said abutment.

3. In a door closer of the class described, a fluid chamber, a pressure abutment movable in said chamber and adapted to rest in one of two direction determining positions, a rotating piston adapted to rotate relatively to said pressure abutment, fluid flow passages in said chamber and abutment, and means whereby in one of said positions of said abutment fluid passes substantially freely through said passages and from one side of said abutment to the other, while in the other position of said abutment said fluid passes substantially freely in a reverse direction relatively to said abutment.

4. In a door closer of the class described, a circular fluid chamber, an abutment movable in said chamber from one to another of two extreme and opposite positions, passages in said chamber, a passage in said abutment, said abutment passage moving into particular alignment with certain of said passages of said chamber whereby fluid will flow freely from one side of the abutment to the other when the abutment is in one of said extreme positions, said abutment passage moving into particular alignment with certain passages of said chamber whereby fluid will flow freely in a reverse direction relatively to the abutment when the abutment is in the other of said extreme positions, whereby the low pressure and high pressure sides of said abutment are readily reversed.

5. In a door closer of the class described, a circular fluid chamber, a pressure abutment movable therein into direction determining positions therein, a rotating piston adapted to rotate relatively to said pressure abutment, directional flow passages formed in the walls defining said fluid chamber, the said abutment being movable in said chamber to control the flow through said passages, whereby in one direction determining position of said abutment fluid passes freely from one side of said abutment to the other, while in another direction determining position of said abutment fluid passes freely in a reverse direction relatively to said abutment, and regulating valved passages through which fluid flows when said piston moves against that side of the abutment wherefrom fluid will not

flow freely through said flow passages to the other side of the abutment.

6. In a door closer of the class described, a circular fluid chamber, an abutment movable in said chamber from one to another of two extreme and opposite positions, passages in the surfaces of said chamber, a passage in said abutment and a one-way valve in said passage, said abutment passage moving into particular alignment with certain of said passages of said chamber whereby fluid will flow freely through said valve from one side of the abutment to the other when the abutment is in one of said extreme positions, said abutment passage moving into particular alignment with certain passages of said chamber whereby fluid will flow freely through said valve and in a reverse direction relatively to the abutment when the abutment is in the other of said extreme positions, whereby the low pressure and high pressure sides of said abutment are readily reversed.

7. In a door closer of the class described, a circular fluid chamber, an abutment movable in said chamber from one to another of two extreme and opposite positions, passages in the surfaces of said chamber, a passage in said abutment and a one-way valve in said passage, said abutment passage moving into particular alignment with certain passages of said chamber whereby fluid will flow freely through said valve from one side of the abutment to the other when the abutment is in one of said extreme positions, said abutment passage moving into particular alignment with certain passages of said chamber whereby fluid will flow freely through said valve and in a reverse direction relatively to said abutment when the abutment is in the other of said extreme positions, whereby the low pressure and high pressure sides of said abutment are readily reversed, a piston rotatable in said chamber and relatively to said abutment, and a valve passage through which fluid is forced when said piston rotates against that side of said abutment from which fluid will not flow freely through said passages to the other side of said abutment.

8. In a door closer of the class described, a circular fluid chamber and a movable pressure abutment therein, a rotating piston adapted to rotate relatively to said pressure abutment, directional fluid passages controlled by the positioning of said abutment and through which fluid will pass freely as said piston rotates from the pressure side of said abutment to the low pressure side thereof incidental to the opening movement of the door closer and when said abutment is in one position, said fluid passages preventing a reverse flow of fluid as said door closer functions to close the door and the piston moves against the high pressure side of the abutment, a control valve through which fluid is forced from between said piston and the pressure side of said abutment to control the speed of closing of the door, said directional fluid passages being formed so that movement of said abutment from said one position to another position reverses the direction of the free and controlled flow of said fluid whereby to reverse the hand of said closer.

9. In a door closer of the class described, a circular fluid chamber, an abutment movable in said chamber from one to another of two extreme and opposite positions, a piston rotatable in opposite directions in said chamber, fluid passages controlled by the positioning of said

abutment, whereby the abutment when it is in one extreme position allows free flow of fluid through said passages in one direction past said abutment and from its low pressure side to its high pressure side, while when it is in its opposite extreme position it allows free flow in the opposite direction whereby to reverse the low and high pressure sides of said abutment, said piston when moved against said abutment in the direction in which it forces the fluid freely through said passages being effective to move the abutment into its opposite extreme position, whereupon said piston moves freely in the reverse direction.

10. In a door closer of the class described, a circular fluid chamber, an abutment movable in said chamber from one to another of two extreme and opposite positions, a piston rotatable in opposite directions in said chamber, passages in the surfaces of said chamber, and means whereby the abutment when it is in one extreme position allows free flow of fluid through said passages in one direction past said abutment and from its low pressure side to its high pressure side, while when it is in its opposite extreme position it allows free flow in the opposite direction whereby to reverse the low and high pressure sides of said abutment, said piston when moved against said abutment in the direction in which it forces the fluid freely through said passages being effective to move the abutment into its opposite extreme position, whereupon said piston moves freely in the reverse direction, and two passages through said piston through which fluid is forced when said piston moves against the high pressure side of said abutment, one of said passages functioning when the high pressure side of the abutment is on one side, while the other passage functions when the high pressure side of the abutment is on the other side.

11. In a door closer of the class described, a circular fluid chamber and a movable pressure abutment therein, a rotating piston adapted to rotate relatively to said pressure abutment, directional fluid passages including a passage through said abutment through which fluid will freely pass through said abutment as said piston rotates from the pressure side of said abutment to the low pressure side thereof incidental to the opening of the door and when said abutment is in one position, said fluid passages preventing a reverse flow of fluid as said door closer functions to close the door and the piston moves against the high pressure side of the abutment, a control valve through which fluid is forced from between said piston and the pressure side of said abutment to control the speed of closing of the door, said directional fluid passages including said abutment passage cooperating to reverse the direction of the free flow of fluid when said abutment is moved into a second position in said chamber, said same control valve functioning to allow passage of fluid as the piston moves in a reverse direction against the changed high pressure side of said abutment.

12. In a door closer of the class described, a circular fluid chamber, an abutment movable in said chamber from one to another of two extreme and opposite positions, passages in the surfaces of said chamber, a passage in said abutment and a one-way valve in said passage, said abutment passage moving into particular alignment with certain passages of said chamber whereby fluid will flow freely through said valve from one side

of the abutment to the other when the abutment is in one of said extreme positions, said abutment passage moving into particular alignment with certain passages of said chamber whereby fluid will flow freely through said valve and in a reverse direction relatively to said abutment when the abutment is in the other of said extreme positions, whereby the low pressure and high pressure sides of said abutment are readily reversed, a piston rotatable in said chamber and relatively to said abutment, a main valve passage in said piston through which fluid is forced when said piston rotates against that side of said abutment from which fluid will not flow freely through said passages to the other side of said abutment, said main valve passage allowing flow therethrough in either direction of movement of said piston depending on the particular handed position of said abutment, said main valve being shut off by said abutment in a predetermined position of said piston relatively to said abutment, and two additional valve passages in said piston adapted for the passage of fluid therethrough after said main valve passage is shut off, said additional passages lying relatively to said abutment so that one passage is effective in one position of said abutment and with said piston rotating in one direction, while the other passage is effective in the other position of said abutment and with the piston rotating in the opposite direction.

13. In a door closer of the class described, a fluid chamber having a pressure abutment, a rotating piston adapted to rotate relatively to said pressure abutment, a reservoir chamber, and a passage leading from said reservoir through said abutment into the said fluid chamber.

14. In a door closer of the class described, a fluid chamber, a pressure abutment movable therein into one or the other of two direction determining positions, a rotating piston adapted to rotate relatively to said pressure abutment, the direction of rotating of said piston during closing movement of the closer determining the pressure side of said abutment, a fluid reservoir, and passages communicating with said reservoir controlled by the positioning of the abutment in one or the other of said direction determining positions to place the reservoir in communication with the low pressure side of said abutment in either of the two positions of said abutment.

15. In a door closer of the class described, a fluid chamber and a pressure abutment therein, a rotating piston adapted to rotate relatively to said pressure abutment, a central shaft from which said piston extends, a valve passage through said shaft through which fluid is forced by the movement of said piston relatively to said pressure abutment, said passage being shut off when said piston reaches a predetermined position near closing, and a second valve through said shaft through which fluid is forced during rotation beyond said predetermined position.

16. In a door closer of the class described, a circular chamber, an abutment in said chamber, a fluid passage allowing flow of fluid freely in one direction past said abutment, a main shaft rotatable in the center of said chamber, a wing piston extending from said shaft and rotatable with said shaft relatively to said abutment, a main valve bore through said shaft and through which the fluid is forced as said piston and shaft rotate against the abutment in a direction in which the fluid cannot be moved freely past said abutment, means whereby said main valve bore is blocked by said abutment at a particular rotated position of

said main shaft and piston, and a secondary valve bore through said shaft through which the fluid then flows.

17. In a door closer of the class described, a circular chamber, an abutment in said chamber, a fluid passage allowing flow of fluid freely in one direction past said abutment, a main shaft extending into and rotatable in the center of said chamber, a wing piston rotatable with said shaft relatively to said abutment, a main valve bore through said shaft and through which the fluid is forced as said piston and shaft rotate against the abutment in a direction in which the fluid cannot be moved freely past said abutment, means whereby said main valve bore is blocked by said abutment at a particular rotated position of said main shaft and piston, a secondary valve bore through said shaft through which the fluid then flows, a vertical bore through said shaft, and means in said vertical bore whereby said main valve bore and said secondary valve bore are adjustable.

18. In a door closer of the class described, a fluid chamber, a pressure abutment movable in said chamber and adapted to rest in one of two direction determining positions, and retaining means yieldingly retaining said abutment in either one of said two positions.

19. In a door closer of the class described, a fluid chamber, a pressure abutment movable in said chamber and adapted to rest in one of two direction determining positions, retaining means yieldingly retaining said abutment in either one of said two positions, an operating shaft extending into said chamber, a piston rotatable with said shaft, rotation of said shaft and piston against said abutment in a particular direction releasing said abutment from said retaining means and moving said abutment to the other of said direction determining positions.

20. In a door closer of the class described, a casing, having an upper spring housing chamber and a lower fluid containing chamber, a central shaft having a portion outside said casing and extending downwardly through said spring housing chamber and into said fluid containing chamber, a movable pressure abutment in said fluid containing chamber adapted for movement into one of two direction determining positions, means whereby said abutment determines the hand of the closer in each of its said positions, means retaining said abutment in either of said positions, a piston in said chamber rotatable with said shaft against said abutment, a spring in said spring housing chamber, means whereby rotation of said shaft in one direction winds said spring whereupon said spring rotates said shaft in a reverse or closing direction during which rotation said pressure abutment and piston cooperate to slow down the rotation of said shaft, said spring being adapted for ready disconnection and reversal relatively to said shaft, said shaft when disconnected from said spring being rotatable to release said abutment from said retaining means and thereafter move said abutment to the other of said direction determining positions.

21. In a door closer of the class described, a fluid chamber, a pressure abutment movable in said chamber into one or the other of two direction determining positions, a rotating piston adapted to rotate relatively to said abutment, the direction of rotation of said piston during closing movement of the closer determining the pressure side of the abutment, a fluid reservoir, passages

including a passage means in said abutment through which fluid flows from said reservoir to said chamber, said passage means being adapted for particular alignment with said passages to place the reservoir in communication with the chamber at the side of said abutment constituting the low pressure side thereof when the abutment is in one of said direction determining positions, said passage means being adapted for alignment also with said passages to place the reservoir in communication with the other side of the abutment constituting the low pressure side thereof when the abutment is in the other of its direction determining positions.

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