

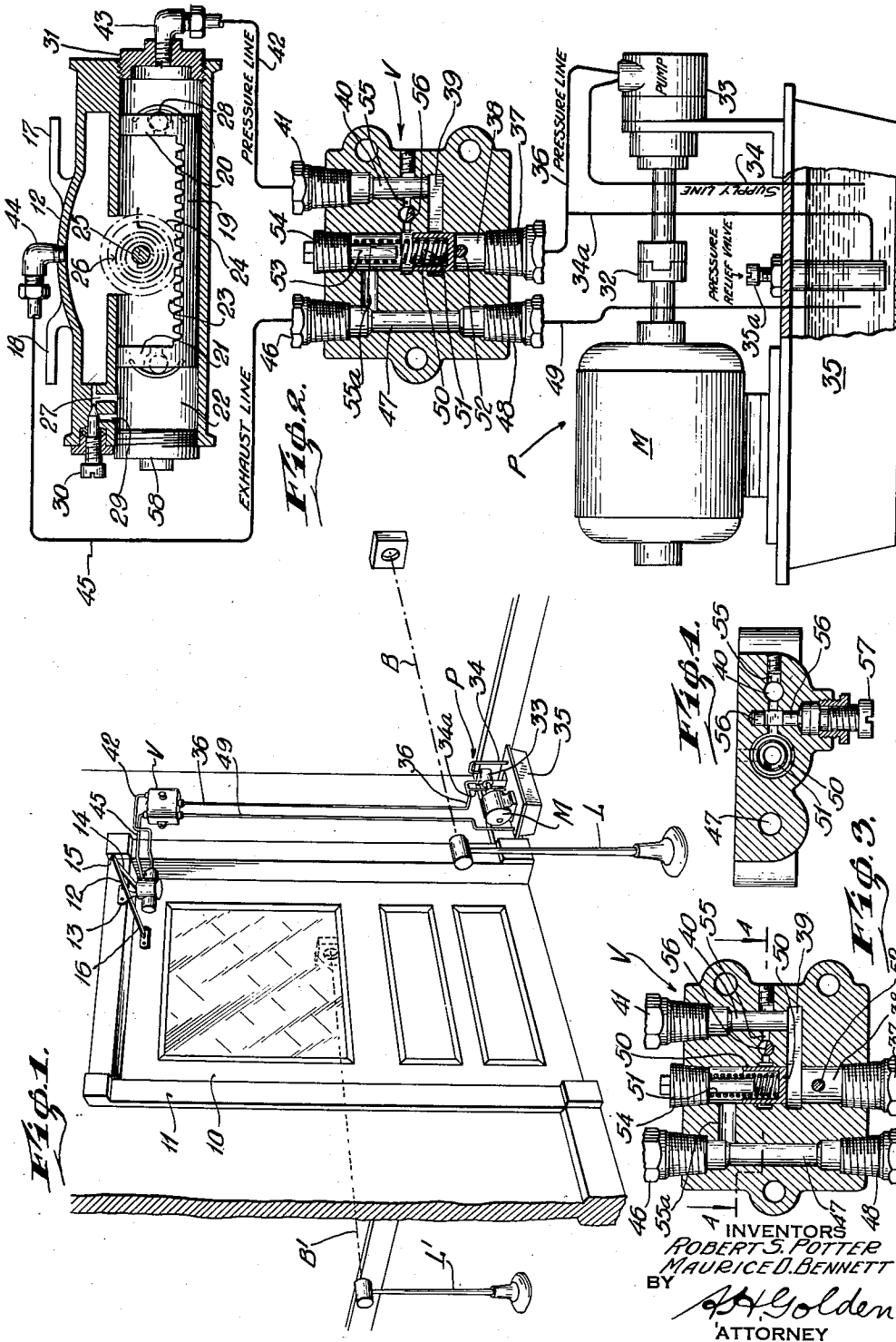
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DOOR OPERATOR

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DOOR OPERATOR

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This invention relates to a door opening and closing mechanism forming an improvement of the door opening and closing mechanism shown in our application Serial No. 188,512, filed in the United States Patent Office on February 3, 1938.

As in the said application, the important feature of our invention is the utilization of a commercial form of door closer such as is shown in the Potter Patent No. 1,926,554 and in the Norton Patent No. 1,152,339, to open the door to which the closer is attached through the application of fluid pressure to the checking piston. The application of this fluid pressure will reverse the usual action of the closer and cause it to open the door through the same means as are normally used for closing the door. It is a further feature of our invention that should the fluid pressure source cease to function, the door may be opened and closed in the same manner as though it were controlled by the usual type of commercial door closer.

The several features so far discussed by us are inherent in the construction shown in our application supra, the invention in this application being a modification whereby we simplify the valve and control mechanism of the door closer and opener so that it will better perform its operations.

We shall now describe the drawing wherein our invention is shown generally in a diagrammatic form. We have preferred to show the invention in diagrammatic form because the door closer is well known in the art, while the pumping mechanism is of a type which anyone skilled in the art could assemble quite readily. In addition, both the door closer and the pumping mechanism are more particularly described in our earlier application. We do show in considerable detail the actual structure of a valve body which forms an important part of our invention.

Referring now more particularly to the drawing, Fig. 1 is a diagrammatic view of our door closing and opening mechanism applied to a door. Fig. 2 is a diagrammatic view of the parts of Fig. 1 with certain of those parts enlarged to more accurately show their operation. Fig. 3 is a view of the valve body shown in Fig. 2, but with certain parts thereof in a different position. Fig. 4 is a section along lines 4—4 of Fig. 3.

Referring now more particularly to the drawing, reference numeral 10 designates a door which is mounted for opening and closing movement relatively to a frame 11. A door closer 12 of the type disclosed in our earlier application and

shown more particularly in the Norton and Potter patents supra, is secured through a bracket 13 to the door frame. It is connected through an arm 14, pivoted at 15 to an arm 16, to the door 11, all in a manner which is well known in the art. As a matter of fact, the door closer 12 may be secured to the door, and be connected by the arms 14 and 16 to the door frame. Those skilled in the art will fully appreciate the several different types of installations possible.

The door closer 12 is connected through the intermediary of a valve body designated by the reference letter V, to a source of fluid pressure, designated generally by the reference letter P, it being understood that when fluid under pressure is transmitted from the fluid pressure source P through the valve body V to the door closer 12, the door is opened through a reversal of the operation of the door closer.

The operation of the fluid pressure source P is controlled by suitable photo-electric equipment, designated by reference letters L and L'. Those skilled in the art will appreciate that with the provision of suitable electric circuits, shown in our earlier application, the interception of the light beams B and B' will bring about the actuation of the fluid pressure source P to force fluid under pressure into the door closer to open the door.

We shall now refer to Figs. 2, 3 and 4, where our invention is shown in greater detail and will be more readily understood. In Fig. 2, the door closer 12 is shown equipped with brackets 17 and 18 whereby it is readily secured to the main bracket 13. A checking piston 19 equipped with heads 20 and 21 slides in the cylinder 22 of the door closer, and has a rack portion 23 in engagement with a pinion 24 secured to the main shaft 25 of the closer. The shaft 25 is urged toward closed position by the usual spring 26, it being understood that upon opening of the door, the arms 14 and 16 act to wind the spring through the shaft 25 and to move the piston 19 to its extreme left hand position, which movement is substantially unopposed, since the liquid of the door closer will flow in the cylinder 22 from one side of the piston to the other through valve passages 27 and 29, and past the ball valve 28 carried by the piston head 20.

In the usual type of door closer, such as shown in the Potter and Norton patents, the right hand end of the closer is equipped as is the left hand end shown in Fig. 2; that is, there are present the passages 27 and 29, and a valve adjusting screw 30. Our door closer is modified by the

elimination of passages 27 and 29 and the valve screw 30 at the right hand, or high pressure end, of the cylinder 22.

It is apparent, therefore, that unless means are provided for allowing the escape of fluid between the piston head 20 and the cap 31 at the high pressure end of the cylinder 22, the door will be incapable of closing under the influence of the closer spring 26. We shall now describe the means whereby the said fluid may be moved by the piston head 20 relatively to the pressure end of the cylinder 22 to the low pressure end of the cylinder incidental to the closing of the door. In this same connection, we shall describe the means whereby the door closer action is reversed by the application of fluid against the piston head 20.

In Fig. 2, we have shown the source of fluid pressure P as including a motor M, which through a suitable coupling 32 drives a pump 33, whose supply line 34 extends from a tank 35. The pressure line of the pump is designated by reference numeral 36 and extends through a nipple 37 into the valve body V. Formed in this valve body is a passage 38 communicating with a further passage 39 which is in further communication with a passage 40. The passage 40 in turn leads to a nipple 41 which is connected to a pipe 42. The pipe 42 in turn leads through a nipple 43 into the cap 31, forming the pressure end of the door closer cylinder 22. In considering our invention, it will be well to note that the pipe 36, nipple 37, passages 38, 39, 40, nipple 41, pipe 42, and nipple 43, form what we call the pressure line leading from the pump to the door closer.

A nipple 44 is secured to the door closer, as shown in Fig. 2, on the low pressure side of the door closer piston, and is connected through the pipe 45 and nipple 46 with the passage 47 of the valve body V. In turn, the passage 47 is connected through nipple 48 and pipe 49 back to the tank 35 of the fluid pressure source P. Nipple 44, pipe 45, nipple 46, passage 47, nipple 48 and pipe 49 form what we term the exhaust line leading from the low pressure side of the door closer piston chamber to the fluid pressure source P.

A relief line 34a extends from the pressure line to the pressure relief valve 35a, so that the pressure of the fluid made available to the closer 12 may be controlled.

Mounted in the passage 38 is a piston 50 spring pressed by a spring 51 against a pin 52 so as to shut off all communication between passages 38 and 39 of the valve body. It will be noted that the spring 51 is supported and maintained in position by a pin 53 forming part of a screw plug 54 which closes the upper end of the passage 38. It will further be noted that leading from the passage 40 is a by-pass passage 55 which extends into the passage 38 and through said passage 38 communicates with a further by-pass passage 55a leading to the passage 47. An adjusting valve for varying the size of the passage 55 is designated by reference numeral 56. Functionally, we consider the passages 55 and 55a as forming with the passages 40 and 47, a by-pass passage around the fluid pressure source P.

In the position of the parts in Fig. 2, the piston 50 is spring pressed against the pin 52 so that while it shuts off communication between passages 38 and 39, it opens and allows full communication from the pressure line to the exhaust line through the by-pass passages 55 and 55a. Because of this relation of the parts, should the door have been opened manually and the spring wound as already described, if the door be then

released, it will be closed by the spring. The piston head 20 of piston 19 will move against the fluid and force it out of the pressure end of the chamber 22 through the pressure line into the valve body V, thence through by-pass passages 55 and 55a to the exhaust line and back through the nipple 44 into the low pressure end of the closer. The speed of movement of the fluid will of course depend upon the setting of the valve 56, and thereby the speed of closing of the door may be readily determined and adjusted.

We believe it will now be clear to those skilled in the art that the door 10 may readily be opened manually with practically no resistance of the fluid, due to the fact that the fluid will flow freely past passage 27 and past ball valve 28 in a manner well known in the art. It will be further appreciated that the door is closed in the usual way, but that the fluid instead of being forced through the usual valve passages such as 27 and 29 under the control of a screw valve 30, will be forced instead through the by-pass passage of the valve body V as controlled by the adjusting valve 56.

Fig. 3 shows the position of the parts in the valve body when fluid under pressure is applied from the fluid pressure source to the door closer through the intermediary of the valve body V. In that case, the control piston 50 is moved against the pressure of spring 51 into an upper position in which it shuts off the by-pass passage and opens up the pressure line through opening up communication between the passages 38 and 39. Pressure is then applied to the end of the piston head 20 which moves to the left in Fig. 2 to open the door and to wind the spring 26.

Incidentally, it will be interesting to note that in the final opening movement of the door, the piston head 21 will shut off passage 27, and thereafter, all fluid between the piston head 21 and the end cap 58 must escape through the passage 29 as controlled by the screw valve 30. By a proper setting of the screw valve 30, the movement of the piston 19 may be snubbed or checked so as to cushion the final opening action of the door.

As soon as pressure in the pressure line is relieved by the shutting off of the pressure from the fluid pressure source, the control valve piston 50 will move back to the position of Fig. 2, and the piston 19 will move toward the right in Fig. 2 under the influence of spring 26, causing the piston head 20 to move toward the pressure end cap 21 of the cylinder. This movement forces the liquid out through the pressure line and through the now open by-pass passages 55 and 55a past the adjusting valve 56 and through the exhaust line back to the low pressure side of the door closer chamber 22, bringing the door into closed position. It will be appreciated that this closing movement of the door takes place under exactly the same conditions as when the door is opened manually and released for closing.

Referring to Fig. 4, we show the adjusting valve 56 and the manner in which it is set by rotation of the screw head 57, all as is well understood by those skilled in the art.

While we have thus described a particular detailed form in which our invention is preferably embodied, it will naturally be understood that those skilled in the art may embody our invention in other forms while still utilizing our contribution to the art.

We now claim:

1. In a combination of the class described, a

door closer having a cylinder, a piston movable in said cylinder, a fluid pressure source, a valve body, a pressure line leading from said fluid pressure source to said valve body and from said valve body to the high pressure end of said cylinder, an exhaust line leading from the low pressure end of said cylinder to the fluid pressure source, a pressure passage in said valve body forming a functional part of said pressure line, a by-pass passage in said valve body leading from the pressure passage to the exhaust line, means movable incidentally to the flow of fluid under pressure from said fluid pressure source to obstruct said by-pass passage while opening up said pressure passage for the flow of fluid therethrough into said cylinder, whereby said fluid acts against the piston to reverse the normal action of the door closer, said means moving to open said by-pass passage and to shut off said pressure passage incidental to the stoppage of the flow of fluid under pressure from said fluid pressure source, whereupon said piston forces said fluid from the high pressure end of said cylinder through said by-pass passage toward the low pressure end of said cylinder.

2. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a fluid pressure source, a valve body, a pressure line leading from said fluid pressure source to said valve body and from said valve body to the high pressure end of said cylinder, an exhaust line leading from the low pressure end of said cylinder to the fluid pressure source, a pressure passage in said valve body forming a functional part of said pressure line, a by-pass passage in said valve body leading from the pressure passage to the exhaust line, a regulating valve for adjusting the effective size of said passage, a valve piston in said valve body movable upon flow of fluid under pressure from said fluid pressure source to obstruct said by-pass passage while opening up said pressure passage for the flow of fluid therethrough into said cylinder, whereby said fluid acts against the door closer piston to reverse the normal action of the door closer, said valve piston moving to open said by-pass passage and to shut off said pressure passage incidental to the stoppage of the flow of fluid under pressure from said fluid pressure source, whereupon said piston forces said fluid from the high pressure end of said cylinder through said by-pass passage toward the low pressure end of said cylinder.

3. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a fluid pressure source, a valve body, a pressure line leading from said fluid pressure source to said valve body and from said valve body to the high pressure end of said cylinder, an exhaust line leading from the low pressure end of said cylinder to said valve body and from said valve body to the fluid pressure source, a pressure passage in said valve body forming a functional part of said pressure line, an exhaust passage in said valve body forming a functional part of said exhaust line, a by-pass passage in said valve body leading from the pressure passage to the exhaust passage, a regulating valve for adjusting the effective size of said passage, a valve piston in said valve body spring pressed into position to shut off said pressure passage and movable upon flow of fluid under pressure from said fluid pressure source to obstruct said by-pass passage while opening up said pressure passage for the flow of fluid there-

through into said cylinder, whereby to reverse the normal action of the door closer, said valve piston moving into position to block said pressure passage upon the stoppage of the flow of fluid under pressure from said fluid pressure source while opening said by-pass passage, and means for moving the door closer piston to force the fluid out of the high pressure end of the cylinder through said pressure line and by-pass passage and through the exhaust line to the low pressure end of the cylinder.

4. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while the piston slows down the closing action, a fluid pressure source, a valve body, a pressure line leading from said fluid pressure source to said valve body and from said valve body to the high pressure end of said cylinder, an exhaust line leading from the low pressure end of said cylinder to said valve body and from said valve body to the fluid pressure source, a pressure passage in said valve body forming a functional part of said pressure line, an exhaust passage in said valve body forming a functional part of said exhaust line, a by-pass passage in said valve body leading from the pressure passage to the exhaust passage, a regulating valve for adjusting the effective size of said by-pass passage, a valve piston in said valve body spring pressed into position to shut off said pressure passage and movable upon flow of fluid under pressure from said fluid pressure source to obstruct said by-pass passage while opening said pressure passage for the flow of fluid therethrough into said cylinder, whereby to reverse the normal action of the door closer to open the door, said valve piston moving into position to block said pressure passage upon the stoppage of the flow of fluid under pressure from said fluid pressure source while opening said by-pass passage, whereupon the said door closer will act to close the door with the door closer piston forcing the fluid out of the high pressure end of the cylinder through said pressure line and by-pass passage and through the exhaust line to the low pressure end of the cylinder, and means whereby fluid flows freely from the low pressure side of the door closer piston to the high pressure side thereof to permit easy manual opening of the door to which the door closer is applied.

5. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, and a by-pass passage for said fluid pressure source leading from said high pressure line to said low pressure line whereby when said spring closes the door, fluid is forced by said piston out of the pressure end of the cylinder and through said by-pass passage toward the low pressure end of said cylinder.

6. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a check valve in said piston to permit free passage of fluid when the door is opened manually, a fluid pressure source, a pressure line connecting said

fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said low pressure line, a regulating valve in said by-pass passage, means normally maintaining said by-pass passage open while maintaining closed said pressure line to said fluid pressure source, whereby said piston forces the fluid from the pressure end of the cylinder through said by-pass passage and regulating valve toward the low pressure end of the cylinder and in by-passing relation to said fluid pressure source during the closing movement of the door by said spring.

7. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, means for initiating the application of fluid from said fluid pressure source against said piston to reverse the action of the closer and to open the door, a by-pass passage for said fluid pressure source leading from said high pressure line to said exhaust line, a regulating valve in said passage, means normally maintaining said by-pass passage open while maintaining closed said pressure line to said fluid pressure source, whereby said piston forces the fluid from the pressure end of the cylinder through said by-pass passage and regulating valve toward the low pressure end of the cylinder during the closing movement of the door by said spring after the door has been opened by the application of fluid from said fluid pressure source against said piston, and means whereby fluid flows freely from the low pressure side of the door closer piston to the high pressure side thereof to permit easy manual opening of the door to which the door closer is applied.

8. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said low pressure line, a regulating valve in said passage, a spring pressed valve piston normally maintaining said by-pass passage open while maintaining closed said pressure line to said fluid pressure source, whereby said lines and passage will act to control the closing of the door through the forcing of fluid by the door closer piston from the pressure end of the cylinder through said by-pass passage and regulating valve to the low pressure end of the cylinder, said valve piston being movable upon the application of fluid under pressure from said fluid pressure source to open the pressure line while shutting off the by-pass passage whereby fluid under pressure will be admitted to said cylinder against the door closer piston to reverse the normal action of the door closer and to open the door.

9. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the

door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said low pressure line, a regulating valve in said passage, a spring pressed valve piston normally maintaining said by-pass passage open while maintaining closed said pressure line to said fluid pressure source, whereby said lines and passage will act to control the closing of the door through the forcing of fluid from the pressure end of the cylinder through said by-pass passage and regulating valve to the low pressure end of the cylinder, said valve piston being movable upon the application of fluid under pressure from said fluid pressure source to open the pressure line while shutting off the by-pass passage whereby fluid under pressure will be admitted to said cylinder against said door closer piston to reverse the normal action of the door closer to open the door, and means whereby fluid flows freely from the low pressure side of the door closer piston to the high pressure side thereof to permit easy manual opening of the door to which the door closer is applied.

10. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said low pressure line, a regulating valve in said passage, means normally maintaining said by-pass passage open while maintaining closed said pressure line to said fluid pressure source, whereby said lines and passage will act to control the closing of the door through the forcing of fluid from the pressure end of the cylinder through said by-pass passage and regulating valve to the low pressure end of the cylinder, said means being movable upon the application of fluid under pressure from said fluid pressure source to open the pressure line while shutting off the by-pass passage whereby fluid under pressure will be admitted to said cylinder against said door closer piston to reverse the normal action of the door closer to open the door, and means whereby fluid flows freely from the low pressure side of the door closer piston to the high pressure side thereof to permit easy manual opening of the door to which the door closer is applied.

11. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said low pressure line, a regulating valve in said passage, a spring pressed valve piston normally maintaining said by-pass passage open

while maintaining closed said pressure line to said fluid pressure source, whereby said lines and passage will act to control the closing of the door through the forcing of fluid from the pressure end of the cylinder through said by-pass passage and regulating valve to the low pressure end of the cylinder, said valve piston being movable upon the application of fluid under pressure from said fluid pressure source to open the pressure line while shutting off the by-pass passage whereby fluid under pressure will be admitted to said cylinder to reverse the normal action of the door closer to open the door, the said spring pressed valve piston moving back to its said normal position upon stoppage of the flow of fluid under pressure from said fluid pressure source, whereupon the said door closer will act to close the door with the door closer piston forcing the fluid out of the high pressure end of the cylinder through said pressure line and by-pass passage and through the exhaust line to the low pressure end of the cylinder.

12. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said low pressure line, a regulating valve in said passage, a spring pressed valve piston normally maintaining said by-pass passage open while maintaining closed said pressure line to said fluid pressure source, whereby said lines and passage will act to control the closing of the door through the forcing of fluid by the door closer piston from the pressure end of the cylinder through said by-pass passage and regulating valve to the low pressure end of the cylinder, said valve piston being movable upon the application of fluid under pressure from said fluid pressure source to open the pressure line while shutting off the by-pass passage whereby fluid under pressure will be admitted to said cylinder to reverse the normal action of the door closer to open the door, the said spring pressed valve piston moving back to its said normal position upon stoppage of the flow of fluid under pressure from said fluid pressure source, whereupon the said door closer spring will close the door with the door closer piston forcing the fluid out of the high pressure end of the cylinder through said pressure line and by-pass passage and through the exhaust line to the low pressure end of the cylinder, and means whereby fluid flows freely from the low pressure side of the door closer piston to the high pressure side thereof to permit easy manual opening of the door to which the door closer is applied.

13. In a combination of the class described, a door closer having a cylinder formed with a high pressure end and a low pressure end, a piston movable in said cylinder from the high pressure end to the low pressure end during opening movement of the door to which the closer is attached, and then to the high pressure end as the door closes, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure

end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said exhaust line, and means for directing the flow of fluid under the pressure of the piston from the pressure end of the cylinder through said by-pass passage and exhaust line to the low pressure end of the cylinder when said spring moves said door to closed position.

14. In a combination of the class described, a door closer having a cylinder formed with a high pressure end and a low pressure end, a piston movable in said cylinder from the high pressure end to the low pressure end during opening movement of the door to which the closer is attached, and then to the high pressure end as the door closes, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said exhaust line, a regulating valve in said by-pass passage, and means for directing the flow of fluid under the pressure of the piston from the pressure end of the cylinder through said by-pass passage and exhaust line to the low pressure end of the cylinder when said spring moves said door to closed position.

15. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said low pressure line, a regulating valve in said passage, means normally maintaining said by-pass passage open while maintaining closed said pressure line to said fluid pressure source, whereby said lines and passage will act to control the closing of the door through the forcing of fluid by the door closer piston from the pressure end of the cylinder through said by-pass passage and regulating valve to the low pressure end of the cylinder, said means being movable upon the application of fluid under pressure from said fluid pressure source to open the pressure line while shutting off the by-pass passage whereby fluid under pressure will be admitted to said cylinder against the said piston to reverse the normal action of the door closer and to open the door.

16. In a combination of the class described, a door closer having a cylinder, a piston movable in said cylinder, a spring adapted to close the door to which the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said exhaust line, a regulating valve in said passage, means normally maintaining said by-pass passage open while maintaining closed said pressure line to said fluid pressure source, whereby said lines and passage will act to control the clos-

ing of the door through the forcing of fluid by the door closer piston from the pressure end of the cylinder through said by-pass passage and regulating valve to the low pressure end of the cylinder, said means being movable upon the application of fluid under pressure from said fluid pressure source to open the pressure line while shutting off the by-pass passage whereby fluid under pressure will be admitted to said cylinder against the said piston to reverse the normal action of the door closer and to open the door, and means whereby fluid flows freely from the low pressure side of the door closer piston to the high pressure side thereof to permit easy manual opening of the door to which the door closer is applied.

17. In a combination of the class described, a door closer having a cylinder formed with a high pressure end and a low pressure end, a piston movable in said cylinder from the high pressure end to the low pressure end during opening movement of the door to which the closer is attached, and then to the high pressure end as the door closes, a spring adapted to close the door to which

the closer is secured while said piston serves to slow down the closing action, a fluid pressure source, a pressure line connecting said fluid pressure source with the pressure end of said cylinder, an exhaust line connecting the low pressure end of said cylinder with the fluid pressure source, a by-pass passage for said fluid pressure source leading from said high pressure line to said exhaust line, a regulating valve in said by-pass passage, means for initiating the application of fluid from said fluid pressure source against said piston for a predetermined period whereby to open said door, means for shutting said by-pass passage incidental to the said application of fluid against said piston and for opening said passage thereafter to permit the piston to force the fluid from the pressure end of the cylinder through said by-pass passage and exhaust line to the low pressure end of the cylinder when said spring moves said door to closed position.

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