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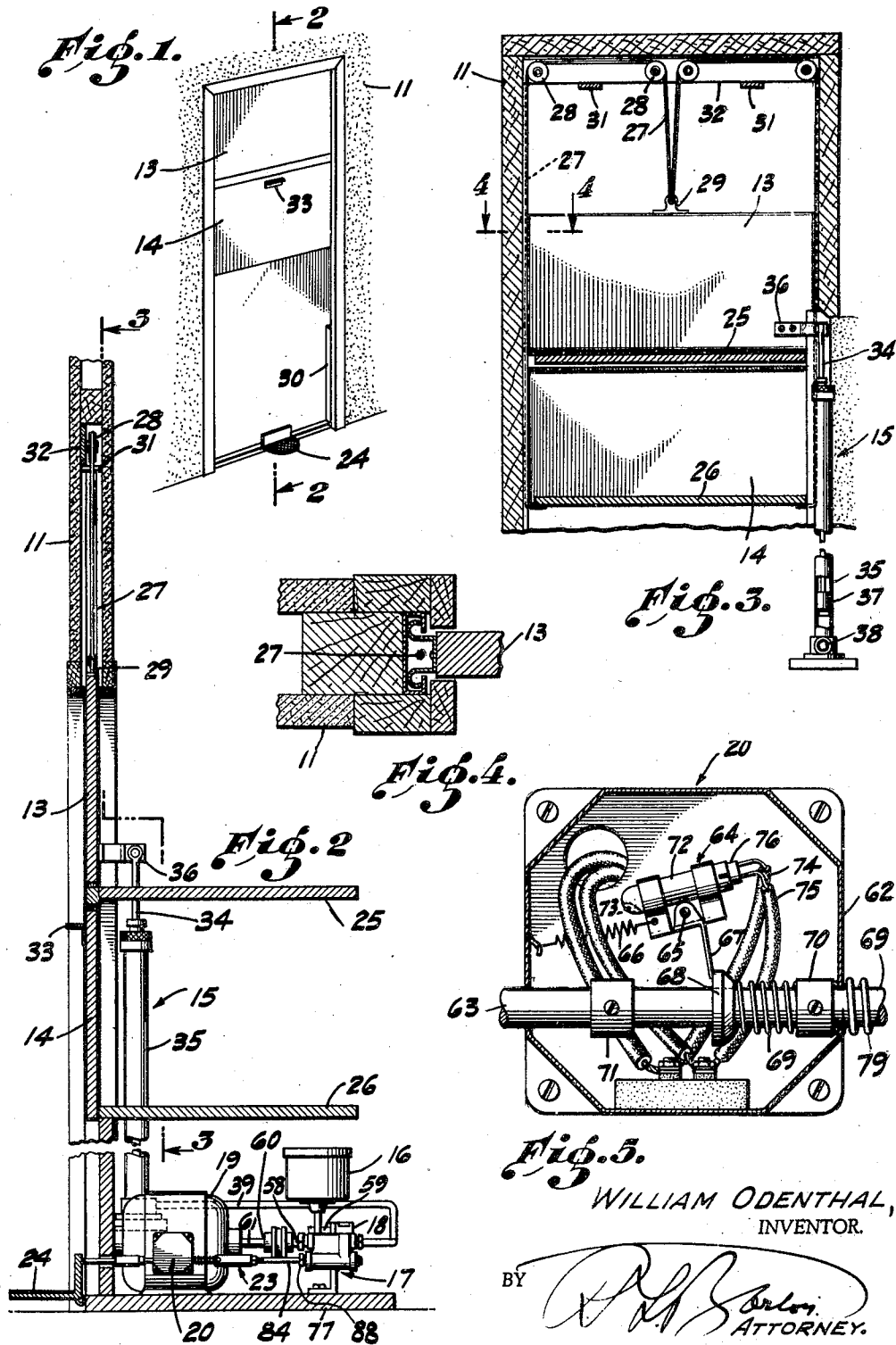
W. ODENTHAL

2,330,005

CLOSURE OPERATING MEANS

Filed Dec. 27, 1940

2 Sheets-Sheet 1



WILLIAM ODENTHAL,
INVENTOR.

BY

[Signature]
ATTORNEY.

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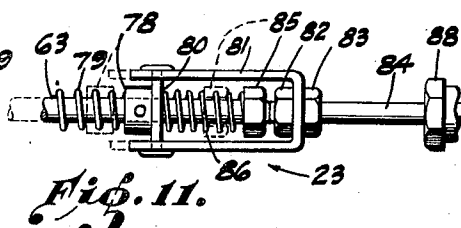
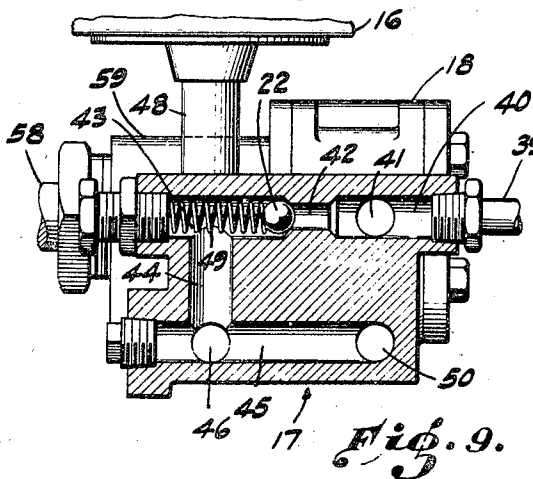
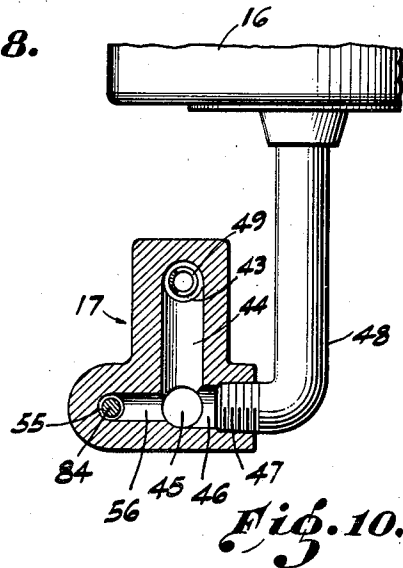
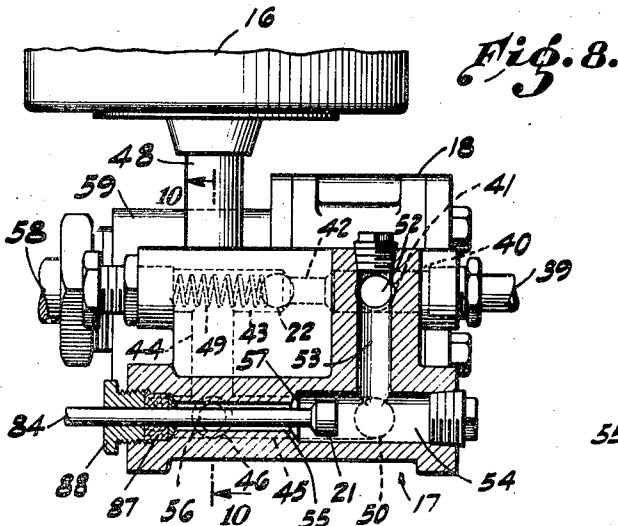
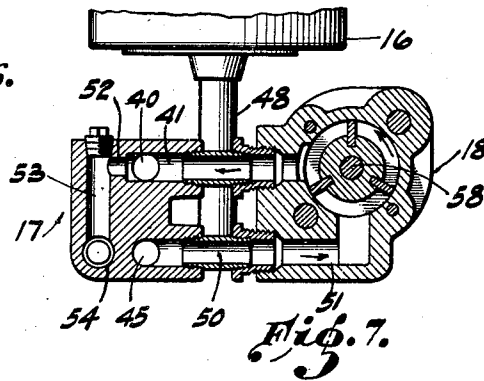
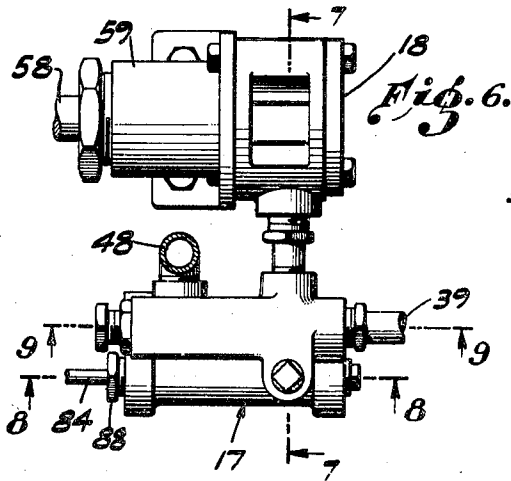
W. ODENTHAL

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CLOSURE OPERATING MEANS

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2 Sheets-Sheet 2



WILLIAM ODENTHAL,
INVENTOR.

BY

W. Barton
ATTORNEY.

UNITED STATES PATENT OFFICE

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CLOSURE OPERATING MEANS

William Odenthal, Los Angeles, Calif.

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13 Claims. (Cl. 103—42)

My invention in its broadest aspect relates to means for operating closures.

More specifically the invention may be said to relate to hydraulically actuated mechanism for operating closures.

In viewing the many objects of the invention there stand out prominently among the leading ones, the following:

The provision of a means for operating closures in "drive-in" eating establishments where it is the custom of the public, if desired, to eat in their automobiles and be serviced from the kitchens preparing the food and clearing the dishes wherein the food is served.

Usually the "drive-in" restaurants have their patrons park in the rear, whether or not they are to be served without alighting. For this reason the customers face the building and have a broad view of the deliveries to and from the building.

Furthermore, the view must not be unsightly and should preferably be made as attractive as possible. The handling of garbage must be kept out of sight as the swarming of flies thereabout is obnoxious, and above all the spirit and practice of sanitation should prevail.

In order to provide for the many objects whereby to offset the difficulties resulting from the several disturbing elements arising from the foregoing factors, the invention serves many useful purposes.

When the trays are returned to the kitchens, the invention makes possible the quick dispatch of the dishes to their respective automatic washers.

The invention provides for a quick automatic opening and closing of the closure.

Quickness of operation guards against the entrance of the flies and cold, the escape of kitchen fumes, and the chance to obtain an interior view.

One of the important objects of the invention is to provide an improved pump control unit.

Further important objects include the provision of an improved foot operated pedal for controlling a shut-off valve preliminary to actuating an electric switch whereby means are put into operation to set in motion the fluid to operate the closure; the provision of means to open the switch with the shut-off valve remaining passive; the provision of the safety feature in by-passing the fluid when desired operating pressure has been attained; and the provision of means for causing the automatic return of the several parts to normal position after the closure has been

operated for the intended purpose and the foot pedal released.

It is a still further object to simplify the construction by reducing and unitizing the number of parts to reduce costs, and to, in general improve upon the combination of elements whereby greater ease of operation is secured and less wear on parts and greater efficiency results.

Still other objects, features and advantages of invention will hereinafter appear.

Referring to the accompanying drawings wherein is shown a preferred embodiment of the invention as now reduced to practice and appearing in the trade,

Fig. 1 is a perspective view looking toward the outer portion of an establishment equipped with my invention.

Fig. 2 is a section taken on line 2—2 of Fig. 1 in a direction arrow indicated.

Fig. 3 is a section taken on line 3—3 in a direction in which the arrows point in Fig. 2.

Fig. 4 is a section taken on line 4—4 of Fig. 3.

Fig. 5 is an enlarged cross sectional view of the mercurial switch in the inoperative position.

Fig. 6 is a plan view of the pump and fluid transfer unit broken away from the associated parts.

Fig. 7 is a section taken on line 7—7 of Fig. 6.

Fig. 8 is a section taken on line 8—8 of Fig. 6 with the shut-off valve shown in the inoperative position.

Fig. 9 is a section taken on line 9—9 of Fig. 6.

Fig. 10 is a section taken on line 10—10 of Fig. 8, a portion of the liquid reservoir being shown in side elevation.

Fig. 11 is an enlarged plan view of a portion of the pedal operated mechanism for closing the operating valve and mercurial switch.

Speaking first of generalities, the invention as shown in the drawings, comprises in combination a portion of a building 11 having installed therein a closure consisting of two vertically disposed panels 13 and 14 operable in opposite directions to close and uncloze the openings which they cover; fluid actuated means 15 by which the panel 13 is operated; a reservoir 16 for containing a fluid; a fluid transfer unit 17; a pump 18 for circulating the fluid from the reservoir 16 through the fluid transfer to the fluid actuated means 15; an electric motor 19 for operating the pump 18; a mercurial switch 20 for closing an electric circuit whereby the motor is energized; a combined shut-off and by-pass valve 21; a pressure relief valve 22 contained in the fluid transfer unit; and means 23 operable by the pedal

24 to close the shut-off valve 21 and in turn after a slight inert period simultaneously actuate said mercurial switch 20.

Adjacent the opening covered by the panel 13 is a service shelf 25 for supporting glasses, and adjacent the opening covered by the panel 14 is a service shelf 26 for supporting dishes. Onto these shelves the attendant unloads his tray after servicing the public.

Panel 14 is counterweighted to panel 13 by means of cables 27 extending over pulleys 28 and through member 29 fastened to panel 13 so that when the panel 13 is elevated by the means 15, the panel 14 automatically lowers; stops 30, one of which is shown in Fig. 1, being provided to limit the downward travel of panel 14, and stops 31 fastened to the cross timber 32 being provided to limit the upward travel of the panel 13.

A handle 33 is located on the panel 14 whereby, if necessary, the panels 13 and 14 may be manually operated by hand.

Fluid actuating means 15 comprises a vertically, reciprocating piston rod 34 working fluid tightly in a cylinder 35. The outer end of said rod is connected to the panel 14 by means of a bracket 36 and the inner end has fastened to it a piston 37. Said piston is actuated in an upward direction to elevate the panel 13, and thereby automatically lower panel 14, by means of fluid admitted to the under side of the piston through the opening 38 in the lower end of the cylinder 35 (in Fig. 3) which communicates with the conduit 39 connected to the outer end of the discharge passage 40, shown in Fig. 9, in the fluid transfer unit 17.

Passage 40 communicates with a lateral passage 41 leading to the discharge side of the pump 18. Passage 40 also communicates with a restricted passage 42, and in turn with a passage-way 43. Passage-way 43 communicates with a downwardly extending vertical passage 44 which intersects with the bottom passage 45, and the latter passage in turn connects with a short passage 46 through which the fluid by-passes back to the mouth 47 of the pipe 48, and thence to the reservoir 16 when effective working pressure has been reached. Said restricted passage is normally closed by means of the ball valve 22 and the spring 49 opposes its opening under normal working conditions.

The cycle of passages leading from the mouth 47 of the reservoir 16 to the pump 18 comprise those of short passage 46, and bottom passage 45 already mentioned, together with the bottom lateral passage 50 communicating with passage 45 which opens into the intake passage 51 leading into the pump.

The passages through which the fluid flows back to the reservoir from the cylinder 35, by gravity augmented by the weight of panel 13, once the pedal 24 is relieved of manual foot pressure, consists of the short passage 52 which is a reduced continuation of passage 41 as seen in Fig. 7, said passage 52 leading into the vertical passage 53 which opens into the valve passage-way 54 wherein is contained the shut-off valve 21. Communicating with the latter passage-way 54 is a restricted passage 55, there being a lateral passage 56 opening into the passage 45, see Fig. 10, at a point adjacent the mouth 47 of the pipe 48.

Restricted passage 55, has formed at its intersection with passage 54, a valve seat 57 where-against the shut-off valve 21 rests when the foot pedal 24 has been depressed, to prevent back passage of the fluid to the reservoir, after the pump has been put in operation. After the sev-

eral passages have been drilled in the fluid transfer unit the several plugs shown are utilized to close their outer ends.

The pump 18 is operatively related to the fluid transfer unit in the manner shown and may be any one of several types of conventional rotary pumps now on the market and need not be described here, since per se it is not considered to form a part of the present invention.

Pump 18 is operated by means of a shaft 58, having a liquid tight seal in the stuffing box 59. Said shaft 58 is in turn connected to a flexible coupling 60, said coupling also being connected to a shaft 61 which is operated by the motor 19 upon the latter's actuation by the closing of the switch 20.

The mercurial switch 20 has its interior construction shown in Fig. 5, the casing 62 having extending through it a shaft 63 forming a portion of the switch operating means. In the casing is a cradle 64 pivoted at 65 to operate from an inclined position in one direction to an inclined position in a different direction against the opposition of the spring 66 by means of an operating arm 67 having movable contact with an operating collar 68 slidably mounted upon the shaft 63 between the said arm 67 and a compressible spring 69 coiled about the shaft. The end of said spring 69 opposite to said collar abuts against a stop collar 70 which normally rests against one end of the casing to limit the travel of the shaft 63 in one direction. Stop collar 71 mounted on the shaft 63 when engaged by the adjacent portion of the casing limits the travel of the shaft 63 in the opposite direction.

The cradle 64 supports the tube 72 containing the mercury 73 and wires 74 and 75 terminating in plug 76 have their circuit completed to energize the motor in a well known manner when the mercury is shifted in the tube by rocking the cradle as stated wherein the mercury closes the gap between the terminals of the two wires.

Shaft 63 has its manually operable end connected to the pedal 24 which is pivotally mounted upon the floor 77.

The portion of the shaft which extends through the wall of the casing which is opposite the pedal end has mounted thereon stop collar 78 and between said collar 78 and the switch casing 62 is coiled thereabout a compression spring 79. Beyond said collar 78 the shaft 63 extends with a working fit through a diaphragm 80 which spans the open end of a clevis 81 fastened between the nuts 82 and 83 mounted upon the end of the shut-off valve stem 84. Upon the end of the shaft 63 which extends through the diaphragm into the clevis is screwed a nut 85 and coiled about the shaft 63 between said nut 85 and said diaphragm is a spiral compression spring 86. Stem 84 has a fluid tight working fit through the packing gland 87 and plug 88 which closes the outer end of the passage 55. Stem 84 is constructed of lesser diameter than passage 55 in order for the fluid to by-pass therearound in its passage back into the reservoir 16 when the shut-off valve is in the open position shown.

The combined shut-off valve and switch actuating mechanism just described is designed in the manner set forth to attain the following results.

In order to prevent the liquid being by-passed in an inoperative manner, it is necessary to close the shut-off valve 21 before the motor is started and the pump starts functioning. Therefore there must be a period of dwell or delay during the interim the shut-off valve is moved from the

inoperative position shown in Fig. 8 to the closed position in which the motor will remain inert. Furthermore it is desired to have as little stress as possible applied to the valve to prevent wear and leak on account of the innumerable times it must function. It is also expedient to stop the motor by slightly releasing the pressure on the pedal to open the switch but not the shut-off valve. Hence by varying the tensile strength of the springs 86, 79 and 69 and mounting them in the peculiar manner shown I attain these useful results.

When the pedal is depressed action takes place on the spring 86 to compress it so that when nut 85 has travelled to the dotted position the shut-off valve 21 has been properly closed. During this interval, however, spring 79 has remained inert but spring 69 has been functioning slightly due to the travel of the shaft and the slight pressure exerted against the collar 68 has started to unseat the mercury tube against the opposition of the spring 66. Continued pressure on the foot pedal in turn compresses spring 79 to store up energy to return the shaft 63 into a kissing position with the stem 84 as shown in Fig. 11 in full lines. When the stop collar 71 has reached the limit of its travel the terminals of the wires 74 and 75 will have been closed and the fluid pumped to the cylinder to open the panels. In order to save wear on the ball 22 when full pressure has been allowed to open the panels, instead of permitting the fluid to by-pass past it, the foot pressure may be slightly eased and the motor stopped without further pumping while the attendant is unloading his tray onto the shelves.

Thus not only wear on the valve is saved but loss of energy due to wasted motor power and electricity is prevented.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the subject matter claimed.

What is claimed is:

1. In a closure operating mechanism of the kind described, a reservoir for containing a body of liquid, a liquid transfer unit comprising a casting underlying said reservoir, there being a vertical passage leading downwardly from said reservoir into said casting, a lower horizontal passage leading from said casting and having a connection with a transversely extending channel communicating with the lower end of said vertical passage, one end of said lower passage being constructed with a channel of less diameter than the portion at its opposite end, thereby forming at the juncture of said channels an annular shoulder providing a valve seat, a shut-off valve provided with a stem; said valve normally occupying an open position in said lower passage's greater diameter channel, being of less diameter than the latter channel, and at times movable into registry with said seat; said stem extending beyond the end portion of the lower passage's smaller diameter channel, and being of less diameter than the latter channel whereby when said valve is in its unseated position to provide communication between said reservoir and the lower passage's greater diameter channel, a plug screwed into the end of said lower passage's smaller diameter passage, said plug having an opening through which said stem operates with a fluid tight working fit, a vertical

passage communicating with the lower passage's greater diameter channel, two vertically spaced horizontally extending passageways in said casting in a horizontally spaced parallel relation to said lower passage, the uppermost of said passageways being constructed with channels of unlike diameters each merging into the other, thereby providing at their juncture a pressure relief valve seat, the lowermost of said vertically spaced passageways communicating with said transverse channel, a vertical passageway placing said uppermost passageway in communication with said lowermost passageway, two vertically spaced passageways; the uppermost of the latter passageways extending at a right angle to and communicating with the uppermost of the first recited vertically spaced passageways; said second recited vertical passage, and the discharge end of a pump; the lowermost of the second recited vertically spaced passageways extending at a right angle to and communicating with the lowermost of the first recited vertically spaced passageways, and the intake end of said pump; a conduit communicating with said pump discharge passageway, and a pressure relief valve operatively related to said pressure relief valve seat and controlling communication between the third recited vertical passage and the pump's discharge passage.

2. The subject matter of claim 1 and, said pressure relief means remaining passive during the period said shut-off valve is closed until a predetermined fluid pressure has been reached in said conduit, said pressure relief means being automatically effective to maintain such predetermined fluid pressure constant by allowing an idle recirculation of the fluid through the pump when the fluid pressure exceeds the predetermined amount.

3. In a closure operating mechanism of the kind described, a reservoir for containing a body of liquid, a liquid transfer unit comprising a casting underlying said reservoir, there being a vertical passage leading downwardly from said reservoir into said casting, a lower horizontal passage leading from said casting and having a connection with a transversely extending channel communicating with the lower end of said vertical passage, one end of said lower passage being constructed with a channel of less diameter than the portion at its opposite end, thereby forming at the juncture of said channels an annular shoulder providing a valve seat, a shut-off valve provided with a stem; said valve normally occupying an open position in said lower passage's greater diameter channel, being of less diameter than the latter channel, and at times movable into registry with said seat; said stem extending fluidly tightly beyond the end portion of the lower passage's smaller diameter channel, and being of less diameter than the latter channel, a vertical passage communicating with the lower passage's greater diameter channel, two vertically spaced horizontally extending passageways in said casting in a horizontally spaced relation to said lower passage, the uppermost of said passageways being constructed with channels of unlike diameters each merging into the other, thereby providing at their juncture a pressure relief valve seat, the lowermost of said vertically spaced passageways communicating with said transverse channel, a vertical passageway placing said uppermost passageway in communication with said lowermost passageway, two vertically spaced passageways; the uppermost of

the latter passageways extending at a right angle to and communicating with the uppermost of the first recited vertically spaced passageways, said second recited vertical passage, and the discharge end of a pump; the lowermost of the second recited vertically spaced passageways extending at a right angle to and communicating with the lowermost of the first recited vertically spaced passageways, and the intake end of said pump; a conduit communicating with said pump discharge passageway, and a pressure relief valve operatively related to said pressure relief valve seat and controlling communication between the third recited vertical passage and the pump's discharge passage.

4. The subject matter of claim 3 and, a plug screwed into the end of said lower passage's greater diameter channel.

5. The subject matter of claim 3 and, said pressure relief means remaining passive during the period said shut-off valve is closed until a predetermined pressure has been reached in said conduit, whereupon said pressure relief means automatically opens to allow an idle recirculation of the fluid through the pump and thereby maintain said predetermined pressure constant.

6. In a closure operating mechanism of the kind described, a reservoir for containing a body of liquid, a liquid transfer unit comprising a casting underlying said reservoir, there being a passage leading downwardly from said reservoir into said casting, a pump having an intake and a discharge passage, an intake passageway in said transfer unit placing said pump intake passage in communication with said reservoir, a discharge passageway in said transfer unit placing said pump discharge passage in communication with said reservoir, a pressure-relief valve controlled by-pass passageway in said transfer unit placing said pump discharge passage in communication with said intake passage of the pump and said intake passageway of the transfer unit, a conduit communicating with said discharge passage of the pump and said discharge passageway of the transfer unit, a normally open combined shut-off and by-pass valve mounted in said discharge passageway of the transfer unit, a pressure relief valve mounted in said pressure relief valve controlled passageway, said pressure relief valve remaining passive during the period said shut-off valve is closed until a predetermined fluid pressure has been reached in said conduit, said pressure relief valve being automatically effective to maintain such predetermined fluid pressure constant by allowing an idle recirculation of the fluid through the pump when the fluid pressure exceeds the predetermined amount, and means connected to said combined shut-off and by-pass valve to selectively operate the latter valve whereby to throttle the liquid by-passing it to said reservoir to diminish at will the built up pressure in said conduit.

7. A reservoir, a liquid transfer unit comprising a casting connected by means of a conduit to said reservoir, a pump having an intake and a discharge passage, an intake passageway in said transfer unit placing said pump intake passage in communication with said reservoir, a discharge passageway in said transfer unit placing said pump discharge passage in communication with said reservoir, a pressure-relief valve controlled by-pass passageway in said transfer unit placing said pump discharge passage in communication

with said intake passage of the pump and said intake passageway of the transfer unit, a conduit communicating with the discharge passage of the pump, a normally open combined shut-off and by-pass valve mounted in said discharge passageway of the transfer unit, a pressure relief valve mounted in said pressure relief valve controlled passageway and opening at a predetermined liquid pressure to allow an idle recirculation of the liquid through the pump when the liquid pressure exceeds the predetermined amount, and means connected to said combined shut-off and by-pass valve to selectively operate the latter valve whereby to throttle the liquid by-passing it to said reservoir to diminish at will the built up pressure in said conduit.

8. The subject matter of claim 1 and, said pressure relief means remaining passive during the period said shut-off valve is closed until a predetermined fluid pressure has been reached in said conduit, said pressure relief means being automatically effective to maintain such predetermined fluid pressure constant by allowing an idle recirculation of the fluid through the pump, and means connected to said stem of said shut-off valve to selectively operate the latter valve.

9. The subject matter of claim 1 and, means connected to said stem of said shut-off valve to operate selectively the latter valve.

10. The subject matter of claim 3 and, a plug screwed into the end of said vertical passage which communicates with the lower passage's greater diameter channel.

11. The subject matter of claim 3 and, means connected to said stem of said shut-off valve to selectively operate the latter valve.

12. In a closure operating mechanism of the kind described, a reservoir for containing a body of liquid, a liquid transfer unit comprising a casting underlying said reservoir, a conduit leading downwardly from said reservoir and communicating with a short horizontal passage in said casting, a pump having an intake and a discharge passage, an intake passageway in said transfer unit placing said pump intake passage in constant communication with said short horizontal passage, two dual valve controlled discharge passageways in said transfer unit placing said pump discharge passage in common communication with both said short horizontal passage and said pump intake passage, a conduit communicating with said pump discharge passage and said two dual valve controlled discharge passageways, a normally open, combined shut-off and by-pass valve mounted in one of said two dual valve controlled discharge passageways and selectively operable to close communication between said pump discharge passage and said reservoir, and a pressure relief valve mounted in the other of said two dual valve controlled discharge passageways.

13. The subject matter of claim 12 and, said pressure relief valve remaining passive during the period said shut-off and by-pass valve is closed until a predetermined fluid pressure has been reached in said conduit, said pressure relief valve being automatically effective to maintain such predetermined fluid pressure constant by allowing an idle recirculation of the fluid through the pump when the fluid pressure exceeds the predetermined amount, and means connected to said shut-off valve to throttle the fluid passing it.

WILLIAM ODENTHAL.