

June 5, 1928.

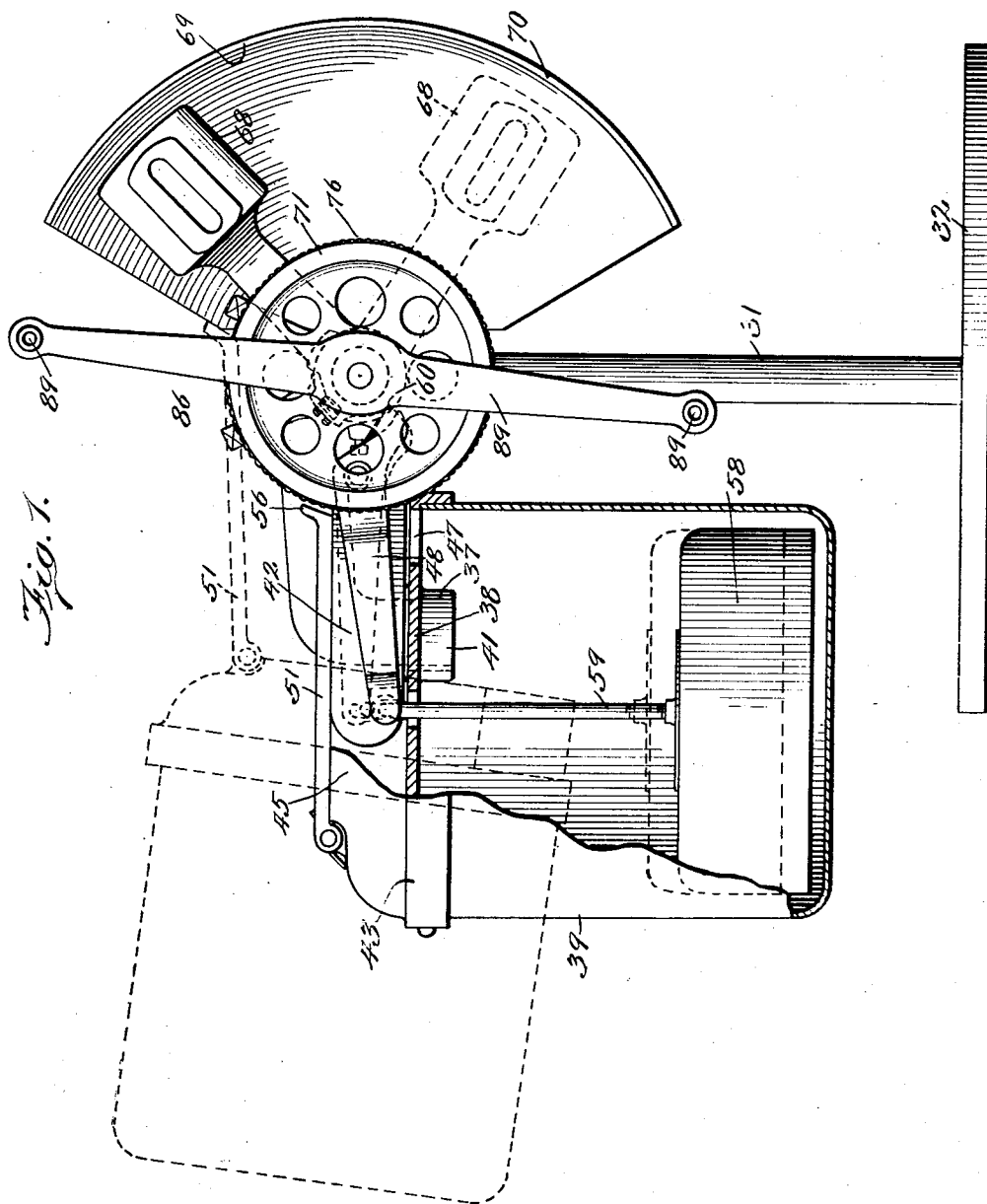
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R. D. McINTOSH

SHUT OFF VALVE FOR OIL BURNERS

Filed May 1, 1924

3 Sheets-Sheet 1



INVENTOR:

BY

Robert D. McIntosh

John Howard (McElroy)
his ATTORNEY

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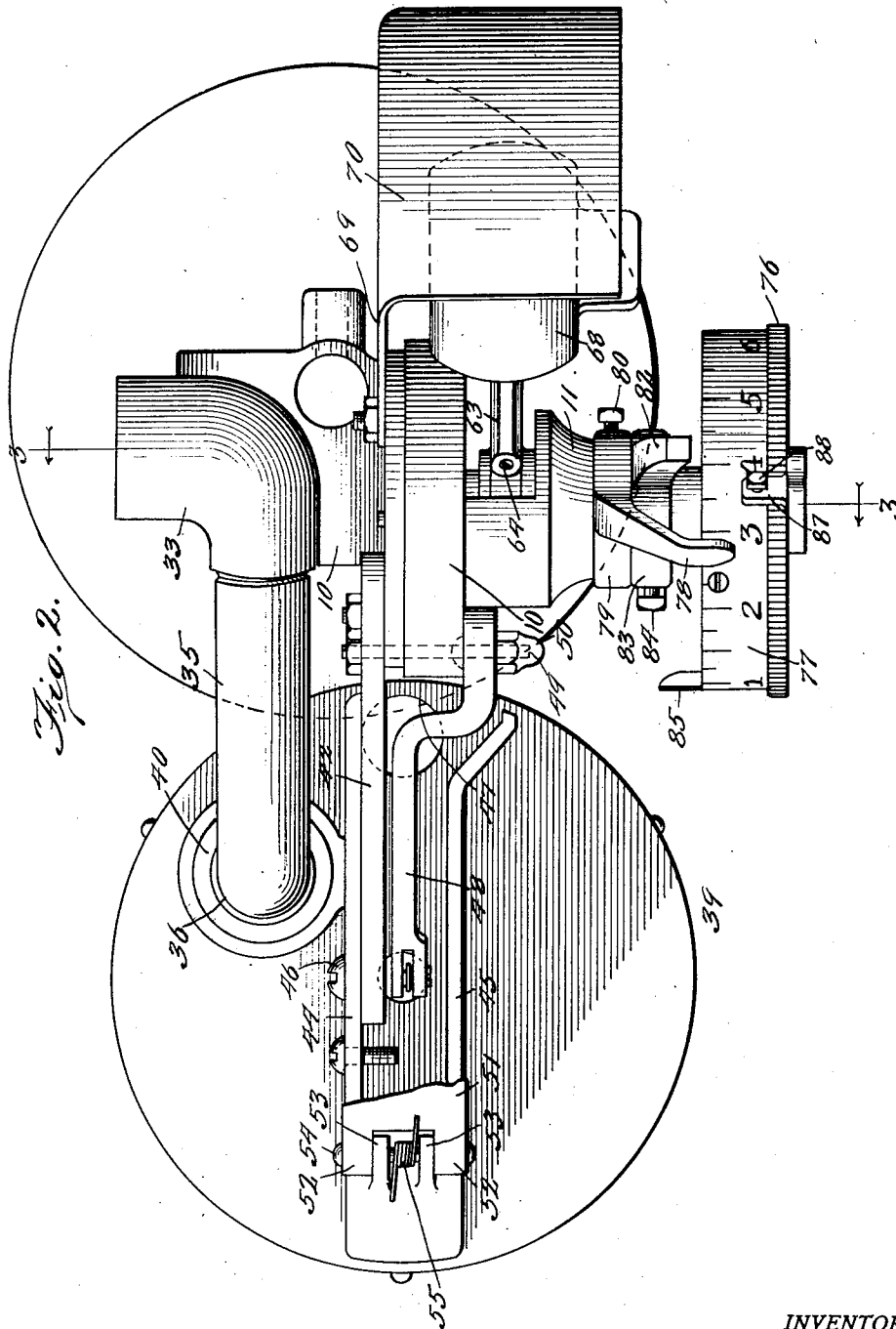
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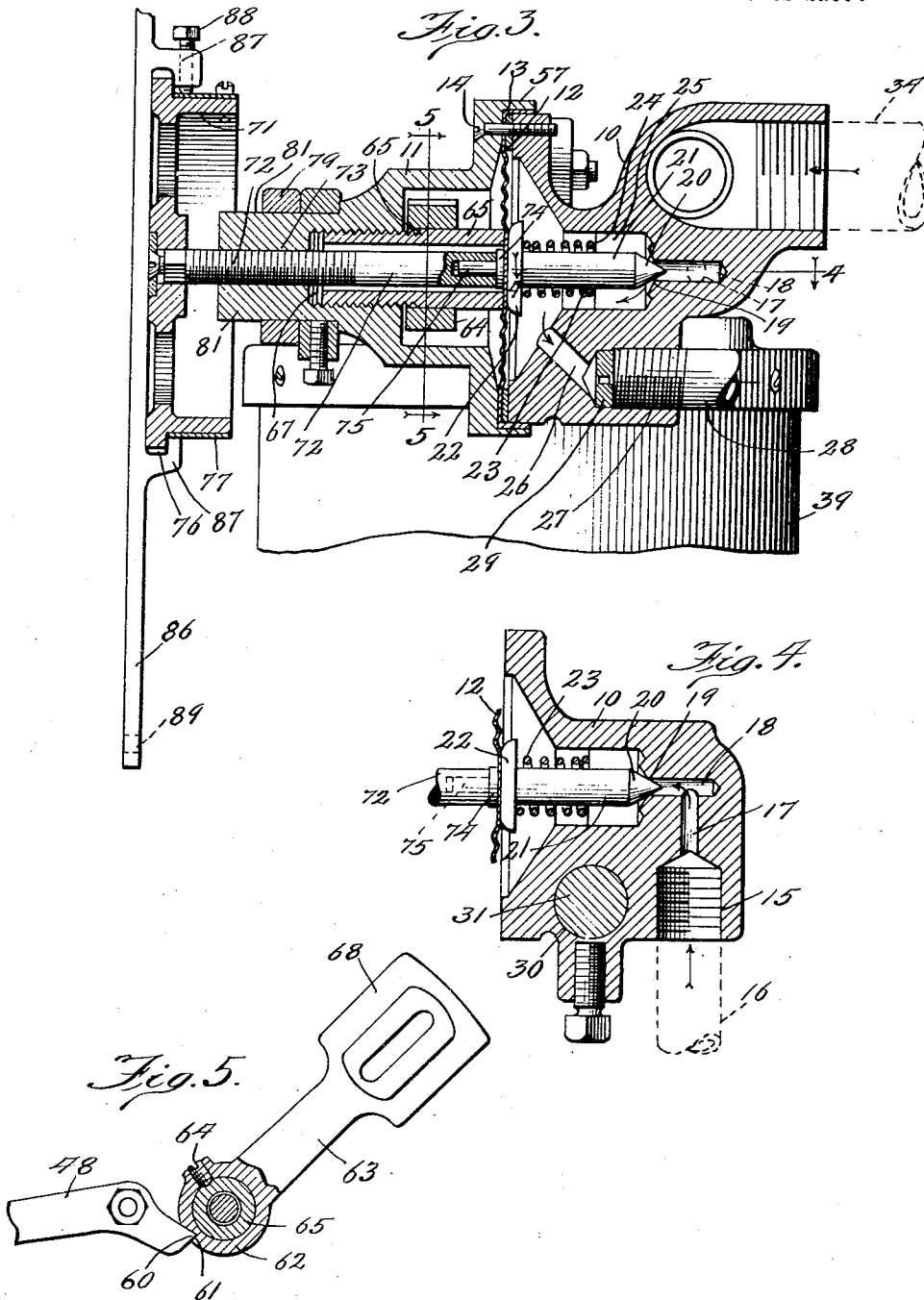


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

ROBERT D. MCINTOSH, OF RIVER FOREST, ILLINOIS, ASSIGNOR TO THE IMPERIAL BRASS MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHUT-OFF VALVE FOR OIL BURNERS.

Application filed May 1, 1924. Serial No. 710,382.

My invention is concerned primarily with safety devices for oil burners, to prevent possible flooding if the flame is extinguished, accidentally or otherwise, without shutting
5 off the fuel supply, and is designed primarily to produce a device of the class described that will be simple in construction, and which will be safe under all conditions of operation.

10 In prior art devices of this kind, with which I am familiar, the desired tripping of the valve has been secured by tripping a catch, when a swinging bucket receiving the overflow has been filled to the desired extent,
15 thus making the action depend upon the weight of the oil acting effectively through the downward movement of the bucket, which might be unintentionally interfered with by something accidentally getting or
20 being placed beneath the bucket so as to prevent its downward movement.

To overcome this objection, I employ a stationary, covered bucket or container and place in it a float, the rising of which as the
25 bucket fills causes the catch to be tripped, and it will be obvious that nothing is likely to interfere with the rise of the float.

Another feature of my invention resides in the use of a swinging weight held by a catch
30 to actuate the valve, in place of the spring heretofore customarily employed.

Another feature resides in the use of a diaphragm through which the valve is actuated to obviate the necessity of packing about a
35 moving part.

In combination with a valve mechanism that is operated automatically to close it, as above explained, I employ an adjusting means which may be used to regulate the
40 normal rate at which the oil is supplied to the burner, or which may be connected to thermostatic mechanism automatically to regulate the amount of oil burned in a given period, and thereby the degree of heat.

45 To illustrate my invention, I annex hereto three sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

50 Fig. 1 is a side elevation with a portion broken away and in central vertical section, and with the position of the oil receptacle when it is being emptied shown in dotted lines;

Fig. 2 is a top plan view with a portion

of the swinging cover for the receptacle 55 broken away;

Fig. 3 is a vertical section on the line 3—3 of Fig. 2;

Fig. 4 is a detail in section on the line 4—4 of Fig. 3; and

60 Fig. 5 is a vertical section on the line 5—5 of Fig. 3.

The valve casing, which is the central feature of the apparatus, is preferably made up of a pair of castings 10 and 11, which have
65 the annular co-operating faces between which is clamped the periphery of a preferably metallic, circular diaphragm 12, having the packing annulus 13 between it and the annular surface of the casting 10. The
70 parts thus assembled are secured by a plurality of screws 14 passed through the circular flange of the casting 12, the periphery of the diaphragm, the packing ring 13, and threaded into the casting 10. The casting 10
75 is provided with the threaded opening 15, into which is screwed the oil supply pipe 16, and the opening 15 is connected by the passages 17 and 18 drilled in the casting, with the valve seat 19, with which co-operates the
80 conical end 20 of the valve body 21, which has the head 22 pressed against the center of the diaphragm 12 by the helically-coiled, expanding spring 23 confined between the head 22 and the shoulders 24 placed in the
85 opening 25 formed in the casting 10 outside of the valve seat 19. When the valve is open, the oil flows through the passages 17 and 18 into the opening 25, from which it flows through the diagonal passage 26 into
90 the outlet opening 27, which is threaded to receive the oil delivery pipe 28. To limit the rate at which the oil may be consumed, I preferably place in the bottom of the opening 27, so that it is held in place by the pipe
95 28, a disk 29 having a small, centrally-located aperture therein, the size of which determines the maximum rate of feed.

The casting 10 is preferably provided with a vertical opening 30 therethrough, through
100 which I pass the supporting rod or pipe 31 preferably supported by the large base 32, so that the apparatus does not depend for its support upon the pipes 16 and 28, and thus tend to bend them. The casting 10 is
105 provided on its upper face with an elbow 33, the larger end of which is interiorly threaded to receive the customary overflow

pipe 34 extending from the burner. The other end of the elbow has threaded therein the short pipe 35, which preferably terminates in another downwardly-extending elbow 36, which registers with an opening 37 formed in the top 38 of the oil receptacle 39, which is preferably in the form of a cylindrical, sheet-metal cup. The opening 37 is preferably surrounded above the top by the small, annular, upstanding flange 40, and on its under side by the downwardly-extending, annular flange 41, so that any overflow oil passing through the elbow 33 will necessarily reach the receptacle or bucket 39, which is pivoted to the arm 42, which is either secured to or formed rigidly with the casting 10. The cover 38 is provided with the downwardly-extending, annular flange 43 by which it is secured to the body portion 39, and also with the pair of upwardly-extending flanges 44 and 45, best seen in Fig. 2. The bucket is pivoted on the arm 42 by the screw 46 passed through an aperture in the flange 44 and threaded into the end of the arm 42, and when the bucket is to be emptied, it is turned about this pivot to the position shown in dotted lines in Fig. 1, where the oil can flow out through the circular aperture 47 formed in the top of the cover. The flange 45 serves to protect the trip lever 48, which is fulcrumed on the casting 11 by the pin 49 projecting from the casting 10, and upon which is threaded the retaining nut 50. Further to protect this trip lever and prevent the possibility of anything interfering with its operation, I provide the swinging cover 51, which is provided at its outer end with the ears 52 co-operating with the ears 53 formed on the cover casting at the end of the flanges 44 and 45. A rivet 54 passing through all four of the ears 52 and 53 forms the pivot, and the swinging cover 51 is held in place by the coiled spring 55 surrounding the rivet and having its ends engaging the cover 51 and the cover casting, respectively. When the receptacle 39 is tilted up as shown in Fig. 1, the free end of the cover, which has the flange 56 thereon, rides up on the curve formed by the annular flanged portion 57 of the casting 12.

The operation of the trip lever 48 is effected by a float 58, which preferably takes the form of an inverted sheet-metal bell, and is connected by the link 59 with the power arm of the trip lever 48, the other end of which is provided with the nose 60 which co-operates with the shoulder 61 formed in the hub portion 62 of a weight lever 63, the hub 62 of which is secured by a set screw 64 on the sleeve 65, which has its outer end 66 threaded by quick-acting threads into the circular recess 67 formed in the casting 11. The weight 68 secured on the arm 63 is prevented from being accidentally moved so as prematurely to release the catch lever 48 by

the segmental cover flange 69 having the flanged portion 70 overhanging the weight 68. The other end of the sleeve 65 engages the center of the diaphragm 12, and is so adjusted relative to the valve member 21 that when the weight 68 is elevated, as shown in full lines in Fig. 1, the valve 21 may be in its wide open position, but that before the weight 68 has reached the limit of its possible downward movement, as indicated in dotted lines in Fig. 1, the diaphragm 12, and consequently the valve 21, will have been forced inward so far as to engage with the seat 19 and completely close the valve, thus preventing any further delivery of the oil to the burner. When this occurs, of course the fire goes out, and when it is to be rekindled, the receptacle 39 is emptied, as previously explained, when the float 58 falls, so that when the weight 68 is raised again to its full-line position and the nose 60 catches on the shoulder 61, the parts are adjusted again for normal operation.

In connection with this automatic shut-off valve, I preferably provide a regulating means consisting of a preferably graduated disk or handle 71 secured upon the end of the shaft 72, which is threaded by a thread of ordinary pitch through the aperture 73 in the casting 11. The inner end of the shaft need not be threaded, and passes freely through the sleeve 65, so that its end can engage the center of the diaphragm 12, this engagement preferably being made by the head 74 of a pin 75 placed in the end of the shaft 72, so that the turning of said shaft 72 will not wear the center of the diaphragm 12. This disk 71 preferably has its extreme periphery roughened, as seen at 76, and it is also provided with a graduated ring 77, which ring is marked with graduations and numerals so that the extent to which the valve is normally opened may be regulated by moving said ring relative to a pointer 78, extending from a hub 79 which is secured by the set screw 80 upon the reduced end portion 81 of the casting 11. After the disk 71 is turned to completely close the valve, the pointer 78 is set so that it coincides with the zero graduation on the valve. I preferably provide also a maximum feed stop, which consists of a lug 82 extending from the hub 83, which can be secured in any desired position on the portion 81 by the set screw 84, and to co-operate with this lug 82, I provide the stop 85, which may form a part of the graduated ring 77, it being understood that when the disk has been turned to the limit of its open movement, said lug 85 will contact with the lug 82.

If it is desired to employ a thermostat control in connection with this regulating valve, I provide a lever 86, which has a pair of diametrically-located, hooked ears 87, one of which is provided with a set screw 88, so that

the lever 86 can be adjusted in any desired position on the disk and the customary thermostat-control cords or chains connected to the apertures 89 formed in the ends of the lever 86.

The operation of the apparatus will be readily understood from the foregoing description, and while I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In a device of the class described, the combination with a valve casing having inlet and outlet ports for an oil supply, of a valve seat therein, a valve movable to and from the seat, automatic means tending to move the valve to its seat when said means are tripped, a receptacle for unconsumed oil stationary in operation but pivoted at its upper edge so that it can be swung about said edge through an angle of ninety degrees to empty its contents, and tripping mechanism actuated automatically by the deposit of oil in the receptacle.

2. In a device of the class described, the combination with a valve casing having inlet and outlet ports for an oil supply, of a valve seat therein, a horizontally movable valve co-operating with the seat, a spring tending to hold it unseated, a horizontally movable member having quick thread mountings in the casing adapted to move the valve, means to rotate the horizontally movable member, a diaphragm in the casing between the end of the valve and the adjacent end of the horizontally movable member, a weighted arm connected to the horizontally movable member, a catch lever for said arm, a receptacle for unconsumed oil, and means for operating the catch lever after a certain amount of oil has entered the receptacle.

3. In a device of the class described, the combination with a valve casing having inlet and outlet ports for an oil supply, of a valve seat therein, a horizontally movable valve co-operating with the seat, a diaphragm in the valve casing, a spring tending to hold the valve away from the seat and with its other end against the diaphragm, an adjusting screw threaded into the casing on the other side of the diaphragm and having its end engaging the center thereof, a sleeve surrounding the adjusting screw having its outer end threaded into the casing and its inner end engaging the diaphragm, and means for automatically rotating the sleeve.

4. In a device of the class described, the

combination with a valve casing having inlet and outlet ports for an oil supply, of a valve seat therein, a horizontally movable valve co-operating with the seat, a diaphragm in the valve casing, a spring tending to hold the valve away from the seat and with its other end against the diaphragm, an adjusting screw threaded into the casing on the other side of the diaphragm and having its end engaging the center thereof, a sleeve surrounding the adjusting screw having its outer end threaded into the casing and its inner end engaging the diaphragm, means for automatically rotating the sleeve, and a graduated disk on the outer end of the adjusting screw.

5. In a device of the class described, the combination with a valve casing having inlet and outlet ports for an oil supply, of a valve seat therein, a horizontally movable valve co-operating with the seat, a diaphragm in the valve casing, a spring tending to hold the valve away from the seat and with its other end against the diaphragm, an adjusting screw threaded into the casing on the other side of the diaphragm and having its end engaging the center thereof, a sleeve surrounding the adjusting screw having its outer end threaded into the casing and its inner end engaging the diaphragm, means for automatically rotating the sleeve, a graduated disk on the outer end of the adjusting screw, and an arm for a thermostat connection adapted to be secured to the disk.

6. In a device of the class described, the combination with a valve casing having inlet and outlet ports for an oil supply, of a valve seat therein, a valve movable to and from the seat, automatic means tending to move the valve to its seat when said means are tripped, a receptacle for unconsumed oil pivoted at its upper end so that it can be swung through an angle of ninety degrees to empty its contents, tripping mechanism actuated automatically by the deposit of oil in the receptacle, the top of the receptacle having a slot therein to permit its being swung as stated without interfering with the tripping mechanism, and a cover for said slot adapted to be raised by the tripping mechanism as the receptacle is tilted and to close automatically when it swings back.

7. In a device of the class described, the combination with a valve casing having a chamber therein through which the oil passes, inlet and outlet ports for said chamber, a valve seat between said ports, a valve co-operating with said seat, a spring co-operating with said valve to hold it open in normal operation, a diaphragm having its central portion co-operating with said valve and serving to form one side of the chamber in which the oil is confined, a threaded member having one end bearing on the central portion of the other side of the diaphragm,

a support in which said member is threaded so that it can rotate therein, a weighted arm attached to said threaded member, and trip mechanism to release said weighted arm.

- 5 8. In a device of the class described, the combination with a valve casing having a chamber therein through which the oil passes, inlet and outlet ports for said chamber, a valve seat between said ports, a valve
10 co-operating with said seat, a spring co-operating with said valve to hold it open in normal operation, a diaphragm having its central portion co-operating with said valve and serving to form one side of the chamber
15 in which the oil is confined, a threaded member having one end bearing on the central portion of the other side of the diaphragm, a support in which said member is threaded so that it can rotate therein, a weighted arm
20 attached to said threaded member, a valve regulating member threaded inside of the threaded member and engaging the diaphragm, and trip mechanism to release said weighted arm.
- 25 9. In a device of the class described, the combination with a valve casing having a chamber therein through which the oil passes, inlet and outlet ports for said chamber, a valve seat between said ports, a valve
30 co-operating with said seat, a spring co-operating with said valve to hold it open in normal operation, a diaphragm having its central portion co-operating with said valve and serving to form one side of the chamber
35 in which the oil is confined, a threaded member having one end bearing on the central portion of the other side of the diaphragm, a support in which said member is threaded so that it can rotate therein, a weighted arm
40 attached to said threaded member, a valve regulating member having a loose abutment in the end thereof threaded inside of the threaded member and engaging the diaphragm, and trip mechanism to release said
45 weighted arm.

- 50 10. In a device of the class described, the combination with a valve casing having a chamber therein through which the oil passes, inlet and outlet ports for said chamber, a valve seat between said ports, a valve co-operating with said seat, a spring co-operating with said valve to hold it open in normal operation, a diaphragm having its

central portion co-operating with said valve and serving to form one side of the chamber 55 in which the oil is confined, a threaded member having one end bearing on the central portion of the other side of the diaphragm, a support in which said member is threaded so that it can rotate therein, a weighted arm 60 attached to said threaded member, a valve regulating member threaded inside of the threaded member and engaging the diaphragm, adjustable stops co-operating with the valve regulating member to limit the 65 amount of its movement, and trip mechanism to release said weighted arm.

11. In a device of the class described, the combination with a valve casing having inlet and outlet ports for an oil supply, of 70 a valve seat therein between said ports, a horizontally movable valve co-operating with said seat, a spring holding the valve open, a horizontally movable and rotatable member threaded into the valve casing by quick- 75 acting threads, a flexible member laterally movable at its center and separating said valve and said member so that the latter transmits its horizontal movement only to the valve, a swinging weighted lever at- 80 tached to the member having a catch thereon, a trip lever co-operating therewith, a receptacle for unconsumed oil, and means for operating the catch lever after a certain amount of oil has entered the receptacle. 85

12. In a device of the class described, the combination with a valve casing having inlet and outlet ports for an oil supply, of a valve seat therein between said ports, a horizon- 90 tally movable valve co-operating with the seat, a spring co-operating with the valve and tending to hold it unseated, a horizontally movable member having quick-thread mountings in the casing adapted to move the 95 valve, a weighted lever attached to the horizontally movable member to rotate it by the gravity of the weight, a catch for the lever, and a diaphragm in the casing confining the oil therein and having its central portion 100 located between the ends of the valve and of the horizontally movable member so that horizontal movement only of said member is transmitted to the valve.

In witness whereof, I have hereunto set my hand this 26th day of April, 1924.

ROBERT D. McINTOSH.