Nov. 11, 1941. W. W. BOLSER 2,262,489

HYDRANT

Filed Feb. 4, 1941

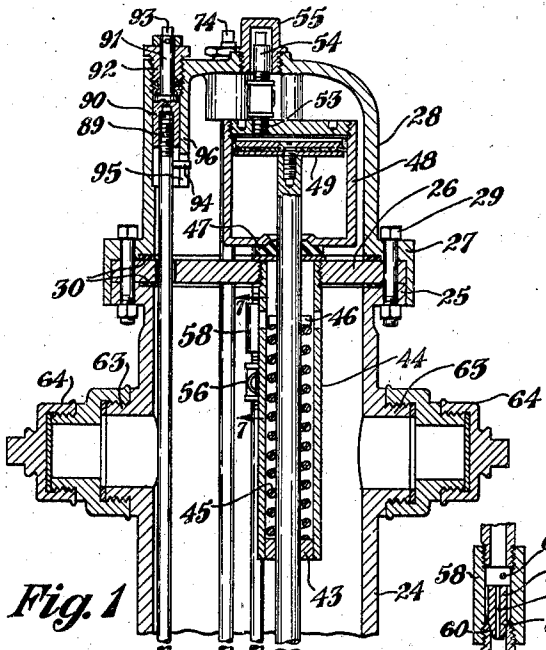


Fig. 1

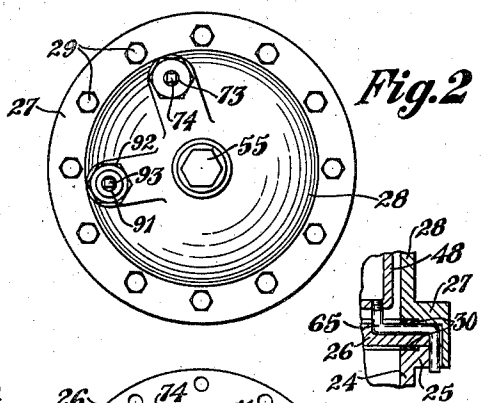


Fig. 2

Fig. 8

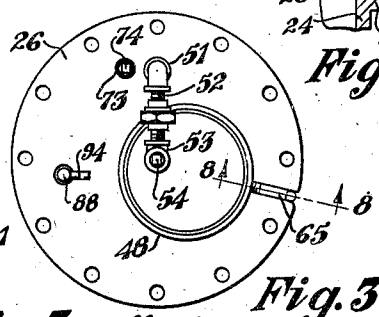


Fig. 3

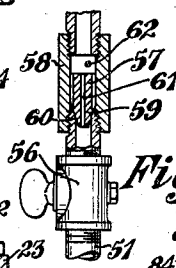


Fig. 7

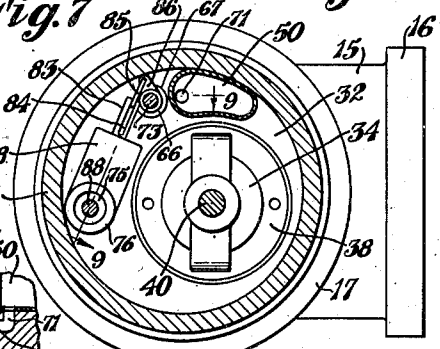


Fig. 4

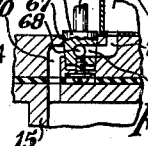


Fig. 6

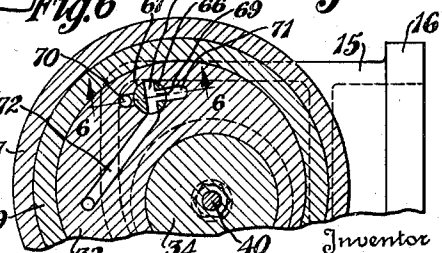


Fig. 5

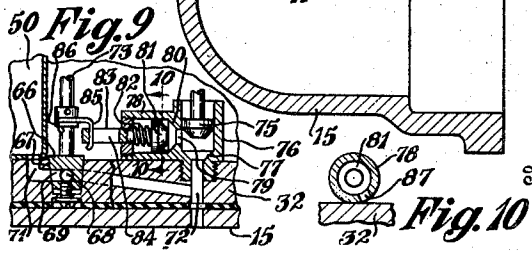


Fig. 9

Fig. 10

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HYDRANT

William W. Bolser, Canton, Ohio

Application February 4, 1941, Serial No. 377,331

10 Claims. (Cl. 137—13)

The invention relates to hydrants such as are used for the connection of fire hose, and more particularly to a hydrant in which the valve is operated by hydraulic pressure from the water main to which the hyrant is connected.

There are many disadvantages in the types of fire hydrants now commonly in use. In order to open the valve of such a hydrant, screw operated devices are provided which, even when in proper condition, require considerable time to open.

As these screw operated devices frequently become corroded, are frequently difficult and sometimes entirely impossible to open the valve making it necessary for fire apparatus to abandon the use of such a hydrant and move to another hydrant in the locality.

It also happens that in extremely cold weather the valve operating mechanism is frozen making it impossible to open the valve.

The object of the present improvement is to provide a hydrant having a quick opening valve operated by hydraulic pressure from the water main and adapted to be placed in operative condition by a slight movement of the valve controlling mechanism.

Another object of the invention is to provide a hydrant in which the valve is opened by means of a plunger or piston located within an oil cylinder, the oil being forced into the cylinder by hydraulic pressure from the water main.

A further object is to provide a hydrant of this character having a drain valve by means of which all moisture may be drained from the hydrant after the same has been used and by means of which moisture from the ground may be prevented from entering the hydrant.

A still further object is the provision of a hydrant having a valve arranged to be opened rapidly by hydraulic pressure from the water main and to be closed more slowly by spring pressure when the hydraulic pressure is cut off.

The above objects together with others which will be apparent from the drawing and following description, or which may be later referred to, may be attained by constructing the improved hydrant in the manner illustrated in the accompanying drawing in which

Figure 1 is a vertical longitudinal sectional view through a hydrant embodying the invention;

Fig. 2, a top plan view of the improved hydrant;

Fig. 3, a top plan view of the hydrant with the cap removed;

Fig. 4, a transverse sectional view through the improved hydrant taken as on the line 4—4, Figure 1;

Fig. 5, a fragmentary transverse sectional view through the hydrant taken as on the line 5—5, Figure 1;

Fig. 6, a fragmentary vertical sectional view taken as on the line 6—6, Fig. 5;

Fig. 7, an enlarged fragmentary sectional elevation of the check valve within the oil pipe between the oil reservoir and the oil cylinder, taken as on the line 7—7, Figure 1;

Fig. 8, a fragmentary vertical sectional view showing the drain for the cap portion of the hydrant taken as on the line 8—8, Fig. 3;

Fig. 9, a fragmentary vertical sectional view of the controlling valve and drain valve taken as on the line 9—9, Fig. 4; and

Fig. 10, a fragmentary sectional view taken as on the line 10—10, Fig. 9.

Similar numerals refer to similar parts throughout the several views.

The bottom casting 15 is provided with a neck portion 16 for connection to a water main in usual and well-known manner. This casting has at its upper end an outwardly offset upstanding peripheral flange 17 internally threaded as indicated at 18 to receive the threaded lower end of the lower or underground section 19 of the hydrant casing or stand-pipe.

This section 19 is adapted to extend to the ground level 20 where it is provided with a peripheral flange 21 adapted to be connected, as by the bolts 22, to a similar flange 23 upon the upper section 24 of the hydrant casing or standpipe.

An annular flange 25 is formed at the upper end of the section 24 and the annular portion of the top plate 26 is received thereon and clamped between said annular flange and the flange 27 of the cap 28, by means of bolts 29, gaskets 30 being located between the plate 26 and the flanges 25 and 27.

The lower end of the bottom section 19 is internally screw threaded as at 31 to receive the threaded periphery of the bottom plate 32 within which is formed the stepped valve seat 33 to accommodate the valve 34 which is provided with the steps 35 and 36 having gaskets 37 thereon for seating against the steps of the valve seat.

The upper step of the valve seat may be in the form of a ring 38 threaded into the bottom plate 32 so as to permit removal thereof.

The valve 34 is connected to the lower re-

duced end 39 of the valve stem 40 by means of a nut 41 which clamps the valve against the shoulder 42 upon the valve stem.

This valve stem extends the entire length of the hydrant being slidably located through the guide 43 at the lower end of the spring casing 44 within which is located a coil spring 45 having its lower end bearing against the guide 43 and its upper end against the pin or shoulder 46 upon the valve stem in order to normally urge the same upward to hold the valve in closed position as shown in Figure 1.

The upper end of this valve stem is slidably located through the packing gland 47 at the lower end of the oil cylinder 48, and is connected to the piston 49 mounted within said cylinder.

The oil reservoir 50 is located in the lower portion of the hydrant casing or stand-pipe and the vertical pipe 51 is connected to the upper end thereof and the upper end of said pipe 51 is connected to the horizontal pipe 52 which communicates with the short vertical pipe 53 communicating with the top of the oil cylinder 48.

For the purpose of adding oil to the system, a screw plug 54 may be provided in the vertical pipe section 53 and normally protected by a screw cap 55 in the cap portion 28 of the hydrant.

A stop cock 56 may be provided in the pipe 51 and above the stop cock is located a check valve 57 vertically movable within the valve casing 58.

This check valve has the tapered lower end 59 seating upon the conical valve seat 60 and is provided with a central bore 61 of small diameter.

A stop pin 62 in the valve casing limits the upward movement of the check valve.

Hose nipples 63 of any usual and well-known design are provided upon the casing section 24, preferably dual nipples of two sizes as shown with the usual cap 64 for closing the same.

As shown in Fig. 8, a breather pipe 65 is connected to the lower end of the oil cylinder 48 and leads to the outside of the hydrant casing so as to permit an exhaust from the cylinder when oil is forced into the top thereof.

The three-way valve is provided for operating the hydrant and is in the form of a conical plug 66 rotatable within a conical opening 67 and having the diametric port 68 located therethrough and communicating mid-way of its ends with the angular port 69.

This valve is normally in the position shown in Figs. 4, 5, 6, and 9, and in this position the inlet port 70, through the bottom plate 32 to the interior of the bottom casting 15 is cut off while the angular ports 69 of the valve plug communicates with the port 71 to the oil reservoir 50, and one end of the diametric port 68 communicates with the drain port 72 which communicates with the exterior of the hydrant.

The valve plug 66 is adapted to be rotated by means of a rod 73 extending throughout the length of the hydrant and having a squared head 74 located through the top of the cap 28 to receive a wrench or similar tool for rotating the rod.

The drain valve for the hydrant is in the form of a vertically movable valve 75 movable within the valve casing 76 and adapted to seat upon the valve seat 77 therein, the valve casing 76 communicating with the drain port 72.

An angular housing 78 communicates with the valve casing 76 through a port 79 adjacent to the valve seat 80 in said angular housing, upon which the valve 81 is adapted to seat.

A spring 82 around the stem 83 of the valve 81 normally urges the valve 81 toward the valve seat 80.

The valve stem 83 is slotted longitudinally as at 84 and receives the angular end of the link 85 carried by the lever 86 upon the rod 73.

The angular housing 78 has a port 87 in its lower portion communicating with the interior of the hydrant, between the port 79 and the valve 81, when said valve is in open position.

A rod 88 is connected to the valve 75 and extends upward through the hydrant casing and has its upper end screw threaded as at 89 and received within the internally threaded nut portion 90 of the rotatable spindle 91 which is journaled within the stuffing box 92 and provided with a squared upper end 93 adapted to receive a wrench or similar tool for rotating the same.

A pin 94 is fixed in one side of the rod 88 and located within the longitudinal slot 95 formed in the cylindric housing 96 located in the cap 28, so as to prevent rotation of the rod 88 when the spindle 91 is turned, therefore, causing the valve 75 to move down or up within the valve casing 76.

With the parts in the position shown in the drawing the main valve 33 is closed preventing water from the main from entering the hydrant and the valves 81 and 75 are open permitting drainage from the interior of the hydrant casing through the drain port 72 into the ground.

These valves normally remain in this position although in wet weather the valve 75 may be closed so as to prevent moisture from the ground from entering the hydrant casing.

With the parts in the position shown, if it is desired to use the hydrant, the three-way valve 66 is moved from the position best shown Fig. 5 to a position in which the diametric port 68 connects to ports 70 and 71, this being accomplished by giving the valve 67 substantially a quarter-turn in counterclockwise direction.

In this position of the valve 66 the oil reservoir 50 communicates with the water main through the intake port 70, the valve port 68 and the port 71 permitting water pressure to enter the oil reservoir 50 raising the oil therein and forcing the oil up through the pipe 51 and into the top of the oil cylinder 48 forcing the piston 49 downward and through the stem 40 moving the main valve 34 downward away from its seat permitting water to flow from the main into the hydrant casing.

One or more of the nipple caps 64 will, of course, have first been removed to connect the hose thereto if desirable.

As the three-way valve is moved to the above mentioned position the lever 86 will move the link 85 inward through the slot 84 of the valve stem 83 permitting the spring 82 to move the valve 81 to closed position cutting off communication between the interior of the hydrant casing and the drain port 72.

When it is desired to shut off the hydrant, the three-way valve 67 is operated back to the position shown in Fig. 6, permitting the water to drain from the lower portion of the oil reservoir 50 through the ports 71, 68 and 72, and cutting off communication between the water main and the oil reservoir.

The spring 45 will slowly move the main valve 34 back to closed position as the oil is forced back

from the oil cylinder 48 through the pipe 51 to the oil reservoir 50.

When the water has been exhausted from the oil reservoir and the main valve 34 seated in closed position, the vacuum will prevent oil from draining from the oil reservoir.

As the three-way valve is thus moved back to position shown in Fig. 6, the lever 86 and link 85 will move the valve 81 to open position permitting the water in the hydrant casing to drain through the port 87 and housing 78 to the valve casing 76 and drain port 72 permitting all of the water in the hydrant casing to drain into the ground.

If it is desired to operate the hydrant with the main valve opened only partly, so as to obtain less than the maximum flow of water from the hydrant, it will be obvious that this may be accomplished by opening the three-way valve, as above described, and then turning the three-way valve half-way back to the normal or closed position as soon as the main valve has opened to the desired point.

When it is necessary to clean out the drain valve, the spindle 91 is removed, together with the rod 88 and drain valve 75, and a rod may then be inserted entirely through the hydrant casing and through the drain port 72, removing any dirt which may have closed the same.

I claim:

1. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable valve arranged to seat upon said valve seat, an upright valve stem connected to said valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, and means for admitting water pressure from the main to said oil reservoir to open said valve.

2. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable valve arranged to seat upon said valve seat, an upright valve stem connected to said valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, means for admitting water pressure from the main to said oil reservoir to open said valve, and spring means for closing the valve when the water pressure to the oil reservoir is cut off.

3. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable valve arranged to seat upon said valve seat, an upright valve stem connected to said valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, means for admitting water pressure from the main to said oil reservoir to open said valve, spring means for closing the valve when the water pressure to the oil reservoir is cut off, and means for draining water from the oil reservoir as the valve is moved to closed position.

4. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable main valve arranged to seat upon said valve seat, an upright valve stem connected to said main valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, and a three-way valve for admitting water pressure from the main to said oil reservoir to open said main valve.

5. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable main valve arranged to seat upon said valve seat, an upright valve stem connected to said main valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, a three-way valve for admitting water pressure from the main to said oil reservoir to open said main valve, and for draining water from the oil reservoir as the main valve is closed.

6. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable main valve arranged to seat upon said valve seat, an upright valve stem connected to said main valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, a three-way valve for admitting water pressure from the main to said oil reservoir to open said main valve, and spring means for closing the valve when the water pressure to the oil reservoir is cut off.

7. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable main valve arranged to seat upon said valve seat, an upright valve stem connected to said main valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, and a three-way valve for admitting water pressure from the main to said oil reservoir to open said main valve, a drain valve for the hydrant casing, and means operatively connecting said drain valve to the three-way valve.

8. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable main valve arranged to seat upon said valve seat, an upright valve stem connected to said main valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, a three-way valve for admitting water pressure from the main to said oil reservoir to open said main valve, for draining water from the oil reservoir as the main valve is closed, a drain valve for the hydrant casing, and means operatively connecting said drain valve to the three-way valve.

9. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable main valve arranged to seat upon said valve seat, an upright valve stem connected to said main valve, a piston upon the upper end of said valve

stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, a three-way valve for admitting water pressure from the main to said oil reservoir to open said main valve, a drain valve for the hydrant casing, means operatively connecting said drain valve to the three-way valve, and means for closing the drain valve independently of the three-way valve.

10. A hydrant including an upright casing, means for connecting a water main to the lower portion of the casing, a bottom wall in the casing having a valve seat therein, a vertically movable valve arranged to seat upon said valve seat, an upright valve stem connected to said valve, a piston upon the upper end of said valve stem, an oil cylinder in the casing enclosing said piston, an oil reservoir in the casing communicating with the oil cylinder, means for admitting water pressure from the main to said oil reservoir to open said valve, and a gravity operated check valve between the oil reservoir and the oil cylinder and arranged to permit a small amount of oil to pass therethrough when in closed position.

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