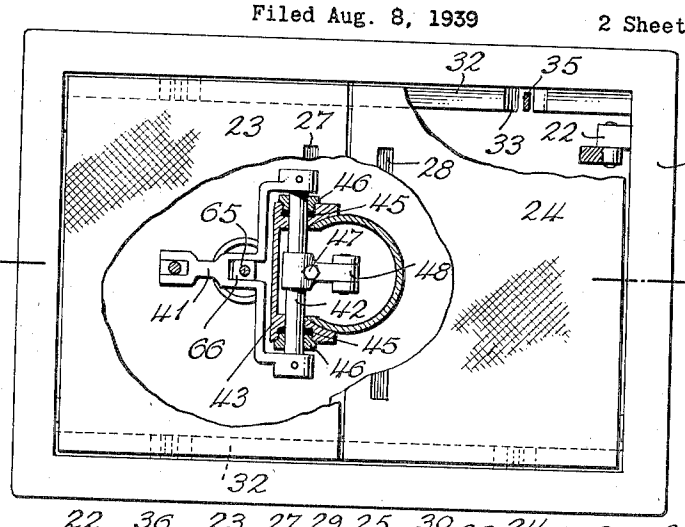
March 11, 1941. C. H. SCOTT ET AL 2,234,635

FLUSH TYPE FIRE HYDRANT

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Fig. 1.



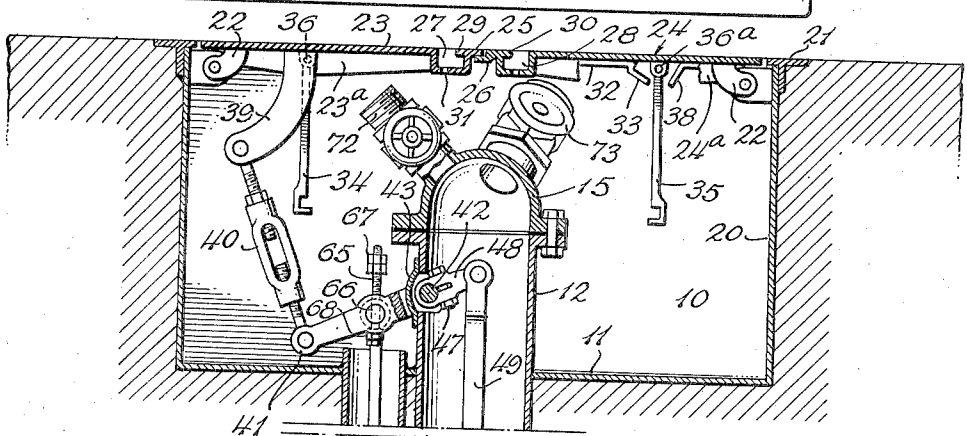


Fig. 5.

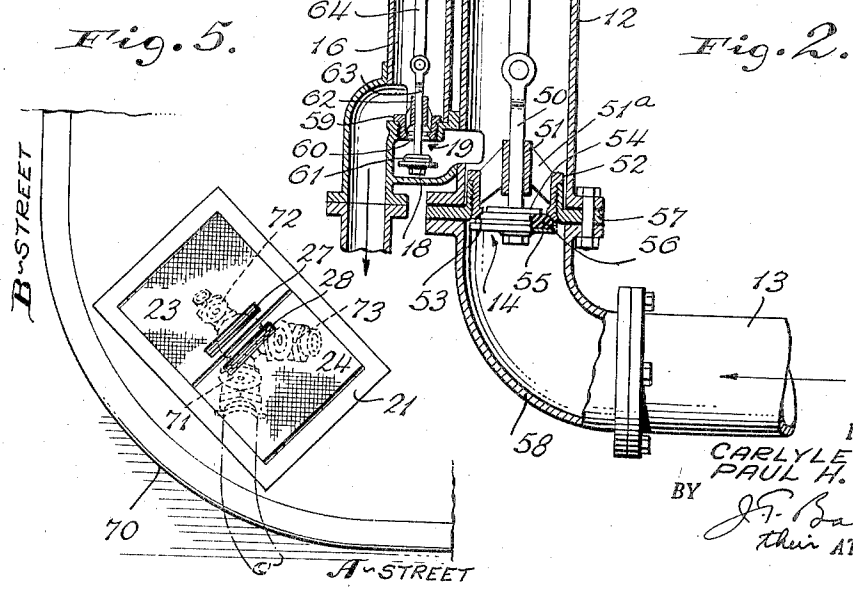


Fig. 2.

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Fig. 3.

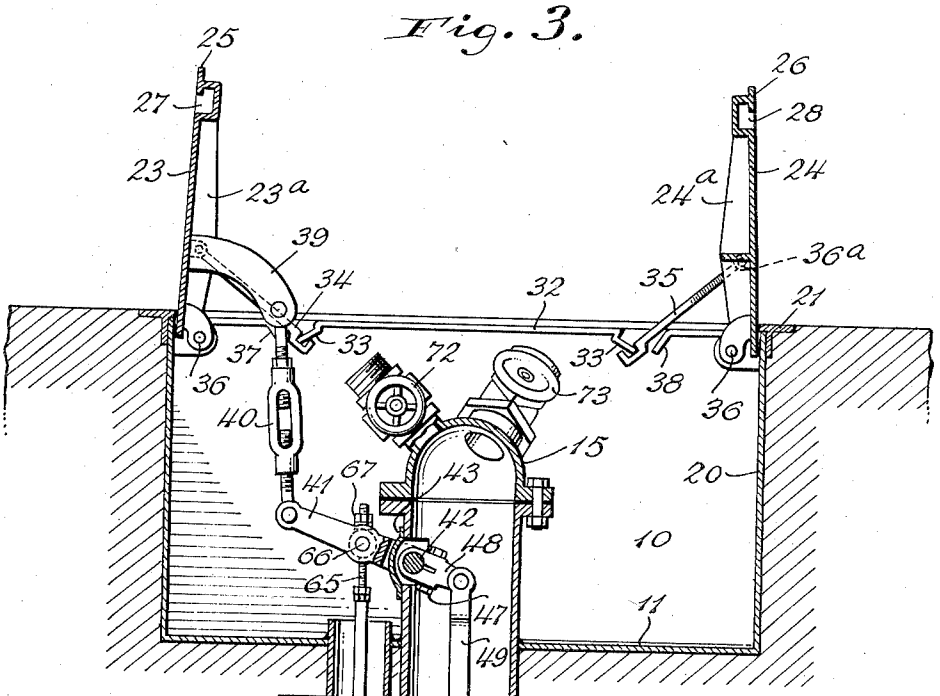


Fig. 4.

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UNITED STATES PATENT OFFICE

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FLUSH TYPE FIRE HYDRANT

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Application August 8, 1939, Serial No. 288,924

11 Claims. (Cl. 137—13)

This invention relates generally to fire hydrants, and more particularly to hydrants no portions of which extend above the level of the sidewalk, and which will hereinafter be referred to as flush type fire hydrants.

Our invention has for its aim to overcome the many disadvantages of the old style fire hydrant which projects above the sidewalk and thereby constitutes an obstruction which is a menace to pedestrians, and which is liable to damage by automobiles and is frequently so damaged. Due to their obstructive nature, these old style hydrants are located away from street corners, and thereby valuable parking space for automobiles is lost because of fire department regulations prohibiting parking near a fire hydrant, and again, since snow is frequently allowed to accumulate in these locations (that is, locations removed from street corners, at which corners snow is never allowed to accumulate), it frequently happens that the hydrant is covered by snow and is inaccessible when urgently needed. Another objection to an exposed hydrant is the danger of freezing.

It is therefore an object of our invention to provide, in a fire hydrant, a construction whereby its uppermost parts will be flush with the sidewalk or the street level while its bulk will be below the level of the sidewalk, so that it does not form an obstruction constituting a menace to pedestrians.

It is further an object of our invention to provide, in a fire hydrant, a construction that will assure adequate protection against the danger of freezing.

It is also an object of our invention to provide a fire hydrant construction that requires no wrenches or tools for its operation; and that is simple, compact, reliable, effective and economical.

It is further an object of our invention to so position our improved hydrant in relation to a sidewalk or other portion of a street that it will interfere little or not at all with the use of the street or sidewalk for other purposes, and further to position the hydrant in a place where snow is not allowed to accumulate.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, we make reference to the accompanying drawings, forming a part hereof, in which

Figure 1 is a plan view of our improved flush type fire hydrant, showing the covers and valves in closed position and portions being broken away to disclose the underlying construction;

Figure 2 is a transverse section substantially on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 2, but showing the covers and valves in open position;

Figure 4 is an elevational view illustrative of the connections of our improved fire hydrant to the water main and to the sewer system;

Figure 5 is a plan view illustrative of the preferred location of our improved hydrant relatively to the curb.

In the drawings we have shown at 10 a sump or well, through the bottom 11 of which extends a barrel or stock 12, the lower end of which is connected to the water main 13, and has mounted on it the inlet water valve 14, while its upper end carries a bonnet or head 15 provided with outlet or discharge openings and valves.

Also extending through the bottom 11 of the sump 10 is a drain pipe 16, leading into the sewer 17 (see Figure 4) and connected to the barrel 12 by a branch or by-pass 18, adapted to be closed by a valve 19.

The walls of the sump 10 are shown as constituted by a casing or box 20 open at the top and surrounded at its rim by a reinforcing frame 21, set flush into the sidewalk. Hingedly mounted on the upper rim of the casing 20, as at 22, are cover sections 23 and 24, (which may be suitably reinforced by ribs 23*a* and 24*a*, respectively), provided with overlapping portions 25 and 26, and also with grooves 27 and 28 having overhanging portions 29 and 30, which are adapted for the insertion of the hand or of a tool for the purpose of raising the cover sections 23 and 24, the portions 29 and 30 serving as abutments adapted to be engaged by the hands or by a tool. In order to prevent the accumulation of moisture and other matter in the grooves 27 and 28, we may provide drainage openings 31 therein, through which such matter may drain into the sump from which it will find its way through the pipe 16 into the sewer 17.

It will be observed that the cover sections, as well as the frame 21, are set flush with the sidewalk, whereby they offer no obstruction or menace to pedestrians. The grooves 27 and 28 are also preferably of such width that they will not constitute a source of danger to pedestrians.

In order to support the cover sections 23 and 24 in their positions flush with the sidewalk, we have provided lateral brackets 32, on which the cover sections may rest. At their ends the brack-

ets 32 are bent downwardly, as shown at 33, so as to be adapted to engage hooks 34 and 35, shown pivotally mounted, as at 36 and 36a on the respective cover sections 23 and 24, when the latter are raised, as shown in Figure 3. To retain the hooks 34 and 35 in such position of engagement, we provide brackets 37 and 38 which preferably are resilient, or at least have resilient nose portions and are mounted on the casing 20 and serve to keep the hooks in engagement with the parts 33.

From the foregoing description, it will be understood that when it is desired to open the sump, this will be done by raising the covers 23 and 24 from their position of Figure 2 into that of Figure 3. The hooks 34 and 35 during such raising will have been forced by the brackets 37 and 38 into engagement with the ends 33 of the bracket 32, so that said hooks and consequently said cover sections 23 and 24 are held in this position.

It will be observed that in Figure 3 the cover sections 23 and 24 are vertically disposed. This is a preferred position, because they then form obstructions serving to warn pedestrians that the sump is open, while at the same time they do not constitute a hazard, as they would if they were laid flat on the sidewalk, or occupied other intermediate positions in which they were not so readily visible.

Mounted on the cover section 23 is a bracket 39 that extends into the sump 10, and pivotally carries at its free end the turnbuckle 40, which at its other end is pivotally connected to a lever or arm 41, having its fulcrum at one end and constituted by a rock shaft 42, this end of the lever being shown forked and the two branches of the fork being connected to the respective ends of the rock shaft 42. The latter is journaled in a member 43 constituting a cover for an opening in the side of the barrel 12, and in order to prevent leakage, we have provided stuffing boxes at 44, having packing 45, held in place by glands 46 through which the rock shaft passes.

Fixedly mounted on the rock shaft 42 so as to move therewith, as by means of the clamping arrangement 47 shown, is a crank arm 48, connected by a link 49 through a pivotal connection to the stem 50 of the valve 14. The latter is slidable in a guide 51, supported by webs 51a in a bushing 52 provided with a valve seat 53, shown as of conical conformation, on which the valve head of valve 14 is adapted to seat. The valve head is shown as comprising a collar 54, carried by the valve stem 50, and a flanged disk 55, between which is clamped in any suitable or preferred manner, a gasket 56 of compressible material, such as rubber or leather, which, when in engagement with the valve seat 53 will serve to make a leak-proof joint.

The bushing 52 is shown as threaded into the neck of a flange 57 that is interposed between the barrel 12 and the elbow 58 attached to the end of the water main 13. It will be observed that by applying a tool that engages the webs 51a of bushing 52, the latter may be removed, together with the valve 14, without disturbing the barrel 12, it merely being necessary to remove the bonnet 15 and to use a tool having a sufficiently long handle. The advantages of this construction for purposes of inspection will be at once apparent.

It will now be clear that when the cover section 23 is raised, the linkage system just described will cause the valve head to move down and away from the seat 53, thereby opening the valve and admitting water from the main 13 into the barrel 12.

The valve 19 comprises a bushing 59 provided with a valve seat 60 on which is adapted to seat the head 61 of the valve 19, which may be of a construction similar to that described for the head of the valve 14. The bushing 59 is also provided with a guide portion 62 for the valve stem 63 on which the valve head 61 is mounted, and these parts are removable without disassembling the hydrant by inserting a tool through the drain 16 in the manner described in connection with the valve 14.

Pivotally joined to the valve stem 63 is a link 64 having its upper end 65 passing slidably through a block 66, pivotally carried by the lever 41 at an intermediate point thereof. The sliding movement of the link end portion 65 relatively to the block 66 may be limited by means such as nuts 67 and 68 carried by the end portion 65, which is threaded for that purpose. The nuts 67 and 68 are shown arranged in pairs, whereby a locknut action is obtained.

It will now be clear that the arrangement just described may be used to permit a movement between predetermined limits of the lever 41 relatively to the link 64, but when these limits are exceeded they will move together. The purpose of this arrangement is to cause a lag in the operation of the valve 19 relatively to the valve 14 which is necessary to limit the time interval during which both valves are simultaneously open and the water main 13 discharges directly into the sewer.

For example, with the parts in the position of Figure 2, if the cover section 23 be raised, the valve 14 will be opened, but the valve 19 will not commence to move into its closing position until some time afterward, so that water from the main may flow through the by-pass 18 into the sewer for a brief interval of time. This will serve to clear away any ice that may have formed, and will prepare the hydrant for its operative position shown in Figure 3, in which the cover section 23 is in its vertical position and the valve 14 is open to its maximum extent, while the valve 19 is closed, without wasting too much water.

On moving the cover from its position of Figure 3 to that of Figure 2, the reverse action takes place, namely the valve 14 begins to move into its closed position while the valve 19 remains closed for a time and only opens as the valve 14 approaches its seat to cut off the water main 13. There is consequently again a brief flushing action before the valve 14 closes. When the latter event takes place it will be observed that the drain pipe 16 keeps the sump 10 drained, while the by-pass 18 will keep the barrel 12 drained, through its connection with the drain-pipe 16.

It is to be observed that our invention contemplates such dimensions for our fire hydrant that the valves 14 and 19 are positioned below the frost level. For example, if the maximum frost level is seven feet below the surface, the valves 14 and 19 may be located at least eight feet below the surface. The sewer drain pipe 16 may surround the barrel 12, in which case it would act as an insulator for the latter and serve as a protection against freezing.

While obviously our fire hydrant may be positioned with advantage almost anywhere, we have found the position shown in Figure 5 in plan to be particularly advantageous. In this

figure, 70 denotes the curb at a street corner, that is, at the intersection of two streets A and B, and the fire hydrant is positioned similarly in relation to both streets. This position at a street corner has the advantage that it does not take up space along the curb that might be used for parking, and has the further advantage since snow is never permitted to accumulate at a street corner, that the hydrant is always available for immediate use. Since no part of the hydrant extends above the sidewalk, there is no objection to such location on the ground of its obstructing the sidewalk.

Where the hydrant is provided with a high pressure nozzle, such as shown at 71, it is with advantage placed on the side facing the curb, as shown in Figure 5, while the hose nozzles 72 and 73 are disposed otherwise.

Our improved fire hydrant is preferably built of rust-resisting material with welded joints, so that great strength and durability are attained.

It will be understood also that the casing or box 10 need not be a single and integral construction but may be built up in parts or may comprise only a cover connected to the aperture for our device, with the walls formed from masonry, concrete or the like.

It will be further understood that though in our illustrated form of the invention, the cover has a section thereof connected by a linkage to the main line valve 14 and to the drain valve 16, this interconnection to obtain automatic positioning of the valves 14 and 18 upon movement of the cover section need not be resorted to, and that we consider as coming within the purview of our invention an independence of the cover section and valves whereby separate manual means may be employed to position the main line valve and drain line valve; also, though linkage means have been specifically illustrated for operation of the main line valve and drain line valve, other means, such as screw means, may be employed.

In such embodiment as contemplated by us for having an independence of action of the main line valve 14 and the drain line valve 18, as between the same and the cover section, it will be understood that we consider it as novel to have the header 15 removable, exposing the open ended barrel 12. By this construction substantial economies are effected as the cover sections 22 and 23 adequately protect the open end of the barrel and a simple number of headers carried by the fire department or the street cleaning organization may be quickly attached at the time that the water connections are necessary.

In such form of construction, though we have illustrated a header attached by bolts, it will be understood that rapid detaching coupling means may be employed. In this embodiment, where we make use of rapid coupling means for the header 15, it will be understood that the detachable header may extend above the cover line to make the directional position of the hoses convenient to the needs encountered. The detachable header may therefore have the hose couplings directed towards the building line or away from it or laterally in any direction.

It will also be understood that where the main line valve 14 and drain line valve 18 are independent of the operation of the cover, independence of each other by screw, lever or link operation means is contemplated by us. Thus, also, though we have mentioned a manual operation of the cover member 23 and the linkage connected thereto to operate the main valve or drain valve, screw means may be used to pivot the cover and augment the manual force necessary to set or open the valves.

It will therefore be observed that we have provided in a fire hydrant a construction that is simple, compact, reliable and effective, and requires no tools for its operation; that will not be liable to freezing, and will not form an obstruction on the sidewalk or other portion of a highway, and further one that permits of being positioned on a street corner in a position where it is readily accessible and where it will not interfere with the parking of automobiles and will be free from the danger of obstruction by snow.

It is to be understood that we do not intend that the various features of our invention are to be used conjointly in the exact relationships shown, but that they may be used in other relations and other combinations than those shown.

It is further to be understood that while we have herein disclosed one illustrative embodiment of our invention, that the same may be embodied in many other forms without departing from the spirit thereof, as will be obvious to those skilled in the art, and that the disclosure herein is by way of illustration merely and is not to be interpreted in a limiting sense, and that we do not limit ourselves other than as called for by the appended claims.

Having thus described our invention and illustrated its use, what we claim as new and desire to secure by Letters Patent, is:

1. A fire hydrant comprising a box sunk below the street level, at least one hinged cover section for said box, said cover section being substantially flush with the sidewalk, a vertical barrel having a bonnet provided with outlet valves positioned within said box and a valve at its lower end below the frost level and adapted to close the entrance to said barrel, said lower end being connected to a water main, a rock shaft pivotally mounted in the upper end of said barrel, said mounting being watertight, an arm fixedly mounted on said rock shaft, a linkage connecting said arm and said valve whereby said valve may be opened or closed, a second arm fixedly mounted on said rock shaft, and means connecting said arm and said cover section, whereby when said cover section is moved it will move the rock shaft and thereby move said valve, a drain connecting said box with a sewer, a by-pass connecting the lower end of said barrel with the drain, a valve adapted to close or open said by-pass, and a connection between said second arm and said by-pass valve, said connection permitting a predetermined limited movement of the second arm without operating the valve, whereby on moving said arm by means of the cover to close said valve in the barrel, said by-pass valve will first open, and a predetermined time thereafter the barrel valve will close, while when said cover is moved to open the barrel valve, said by-pass valve will close a predetermined time after said barrel valve has begun to open.

2. A fire hydrant comprising a box sunk below the street level, at least one hinged cover section for said box, said cover section being substantially flush with the sidewalk, a vertical barrel having a bonnet provided with outlet valves positioned within said box and a valve at its lower end below the frost level and adapted to close the entrance to said barrel, said lower end being connected to a water main, a rock shaft pivotally mounted in the upper end of said barrel, said mounting being watertight, an arm fixedly mount-

ed on said rock shaft, a linkage connecting said arm and said valve whereby said valve may be opened or closed, a second arm fixedly mounted on said rock shaft, and means connecting said arm and said cover section, whereby when said cover section is moved it will move the rock shaft and thereby move said valve, a drain connecting said box with a sewer, a by-pass connecting the lower end of said barrel with the drain, a valve adapted to close or open said by-pass, and a connection between said second arm and said by-pass valve, said connection permitting a predetermined limited movement of the second arm without operating the valve, whereby on moving said arm by means of the cover to close said valve in the barrel, said by-pass valve will first open, and a predetermined time thereafter the barrel valve will close, while when said cover is moved to open the barrel valve, said by-pass valve will close a predetermined time after said barrel valve has begun to open, said system of means connecting said cover and said barrel valve being adjustable, so that closing of the valve simultaneously with the cover may be obtained.

3. A fire hydrant comprising a box sunk below the street level, at least one hinged cover section for said box, said cover section being substantially flush with the sidewalk, a vertical barrel having a bonnet provided with outlet valves positioned within said box and a valve at its lower end below the frost level and adapted to close the entrance to said barrel, said lower end being connected to a water main, a rock shaft pivotally mounted in the upper end of said barrel, said mounting being watertight, an arm fixedly mounted on said rock shaft, a linkage connecting said arm and said valve whereby said valve may be opened or closed, a second arm fixedly mounted on said rock shaft, and means connecting said arm and said cover section, whereby when said cover section is moved it will move the rock shaft and thereby move said valve, a drain connecting said box with a sewer, a by-pass connecting the lower end of said barrel with the drain, a valve adapted to close or open said by-pass, and a connection between said second arm and said by-pass valve, said connection permitting a predetermined limited movement of the second arm without operating the valve, whereby on moving said arm by means of the cover to close said valve in the barrel, said by-pass valve will first open, and a predetermined time thereafter the barrel valve will close, while when said cover is moved to open the barrel valve, said by-pass valve will close a predetermined time after said barrel valve has begun to open, said connection between said second arm and said by-pass valve being adjustable, whereby said predetermined limited movement of said second arm may be varied.

4. In combination with a sump below the level of the sidewalk, a hydrant having a barrel below the level of the sidewalk, the upper portion of said barrel extending into said sump and said barrel being connected to a water main, a cover for said sump flush with the sidewalk, an inlet valve in said barrel for controlling the flow of water from said main into said barrel, and means for controlling said valve by movement of said cover.

5. A sump below the level of a sidewalk, a cover for said sump flush with the sidewalk, a hydrant below the level of said sidewalk, said hydrant having a vertically extending barrel connected to a water main at its lower end, and having its upper end extending into said sump, a drain leading from said barrel into said sewer, and means for closing said drain, said means being operable by movement of said cover.

6. A sump below the level of a sidewalk, a cover for said sump flush with the sidewalk, a hydrant below the level of said sidewalk, said hydrant having a vertically extending barrel connected to a water main at its lower end, and having its upper end extending into said sump, a drain leading from said sump into a sewer, a by-pass leading from said barrel into said drain, and means operable by movement of said cover for closing said by-pass.

7. In a fire hydrant disposed below the level of a sidewalk, a barrel, a valve for controlling the entrance of water from a main into said barrel, a box provided with a cover surrounding the upper part of said hydrant and being adapted to collect leakage therefrom, means for draining off said leakage, a passage connecting said barrel with said draining means, a valve for closing said passage, and a single means adapted for controlling both of said valves whereby when one is closed, the other one will be open, said controlling means being operable by movement of said cover.

8. A fire hydrant comprising a box sunk below the street level, a cover for said box substantially flush with the sidewalk, a vertical barrel having a bonnet adjacent its upper end provided with outlet valves positioned within said box and having a valve at its lower end below the frost level and adapted to close the entrance to said barrel, said lower end being connected to a water main, a rock shaft pivotally mounted in the upper end of said barrel, said mounting being watertight, an arm fixedly mounted on said rock shaft, a linkage connecting said arm and said valve whereby said valve may be opened or closed, a second arm fixedly mounted on said rock shaft, and means for operating said second arm whereby when said arm is moved it will move the rock shaft and thereby move said barrel valve and first arm, a drain connecting said box with a sewer, a by-pass connecting the lower end of said barrel with the drain, a valve adapted to close or open said by-pass, and a connection between said second arm and said by-pass valve whereby on moving said arm by said operating means therefor, said by-pass valve will first open, and a predetermined time thereafter the barrel valve will close, while when said arm is moved to open the barrel valve, said by-pass valve will close a predetermined time after said barrel valve has begun to open.

9. A fire hydrant comprising a box sunk below the street level, a cover for said box substantially flush with the sidewalk, a vertical barrel having a bonnet provided with outlet valves positioned within said box and a valve at its lower end below the frost level and adapted to close the entrance to said barrel, said lower end being connected to a water main, a rock shaft pivotally mounted in the upper end of said barrel, said mounting being watertight, an arm fixedly mounted on said rock shaft, a linkage connecting said arm and said valve whereby said valve may be opened or closed, a second arm fixedly mounted on said rock shaft, and means for operating said second arm whereby when said arm is moved it will move the rock shaft and thereby move said barrel valve and first arm, a drain connecting said box with a sewer, a by-pass connecting the lower end of said barrel with the drain, a valve adapted to close or open said by-pass, and a connection between said second arm and said by-pass valve,

whereby on moving said arm by said operating means therefor said by-pass valve will first open, and a predetermined time thereafter the barrel valve will close, while when said arm is moved to open the barrel valve, said by-pass valve will close a predetermined time after said barrel valve has begun to open, said system of operating means for connecting said second arm and said by-pass valve being adjustable so that closing of the barrel valve simultaneously with the operation of the first arm may be obtained while delaying the time of opening of said by-pass valve.

10. A fire hydrant comprising a box sunk below the street level, a cover for said box substantially flush with the sidewalk, a vertical barrel having a bonnet provided with outlet valves positioned within said box and a valve at its lower end below the frost level and adapted to close the entrance to said barrel, said lower end being connected to a water main, a rock shaft pivotally mounted in the upper end of said barrel, said mounting being watertight, an arm fixedly mounted on said rock shaft, a linkage connecting said arm and said valve whereby said valve may be opened or closed, a second arm fixedly mounted on said rock shaft, and means for operating said second arm whereby when said arm is moved it will move the rock shaft and thereby move said barrel valve and first arm, a drain connecting said box with a sewer, a by-pass connecting the lower end of said barrel with the drain, a valve adapted to close or open said by-pass, and a connection between said second arm and said by-pass valve, said connection permitting a predetermined limited movement of the second arm without operating the valve, whereby on moving said arm by said operating means therefor, said by-pass valve will first open, and a predetermined time thereafter the barrel valve will close, while when said first arm is moved to open the barrel valve, said by-pass valve will close a predetermined time after said barrel valve has begun to open, said connection between said second arm and said by-pass valve being adjustable, whereby said predetermined limited movement of said second arm may be varied.

11. A fire hydrant comprising a box sunk below the street level, a cover for said box substantially flush with the sidewalk, a vertical barrel having a bonnet adjacent its upper end provided with outlet valves positioned within said box and having a valve at its lower end below the frost level and adapted to close the entrance to said barrel, said lower end being connected to a water main, a rock shaft pivotally operable adjacent the upper end of said barrel, an arm fixedly mounted on said rock shaft, a linkage connecting said arm and said valve whereby said valve may be opened or closed, connecting means fixedly mounted on said rock shaft, and means for operating said connecting means whereby it will move the rock shaft and thereby move said arm and barrel valve, a drain connecting said box with a sewer, a by-pass connecting the lower end of said barrel with said sewer, a valve adapted to close or open said by-pass, and a connection between said connecting means of said rock shaft and said by-pass valve whereby on moving said operating means, said by-pass valve will first open, and a predetermined time thereafter the barrel valve will close, while when said arm is moved to open the barrel valve, said by-pass valve will close a predetermined time after said barrel valve has begun to open.

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