

May 16, 1933.

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1,908,810

MECHANISM FOR OPERATING AND CONTROLLING WATER VALVES

Filed July 11, 1929

3 Sheets-Sheet 1

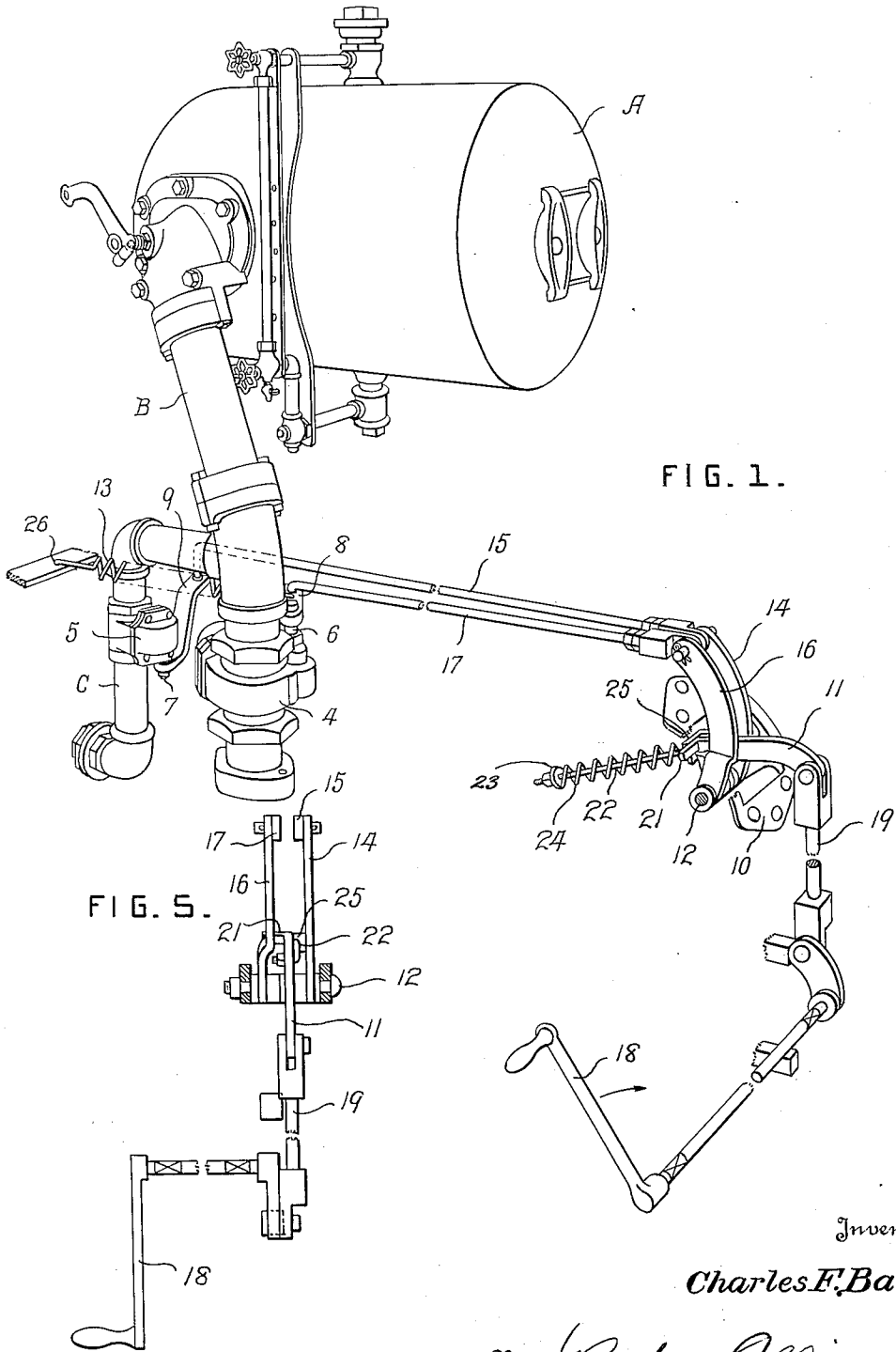


FIG. 1.

FIG. 5.

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3 Sheets-Sheet 2

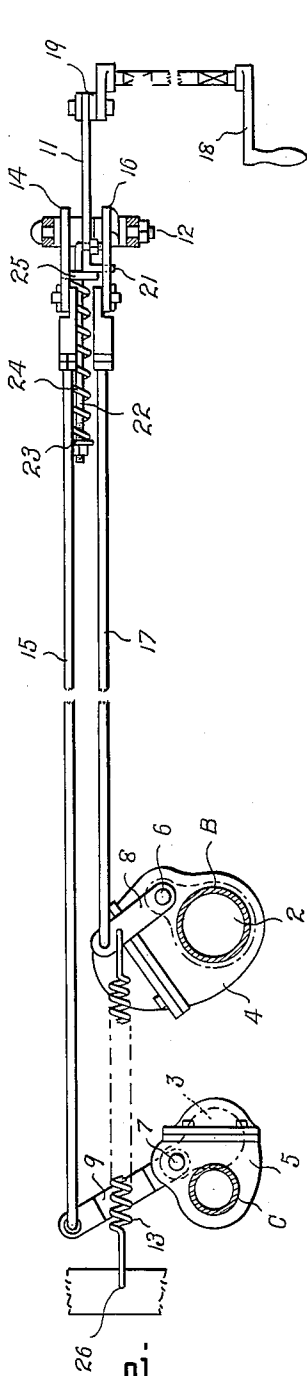


FIG. 2.

FIG. 3.

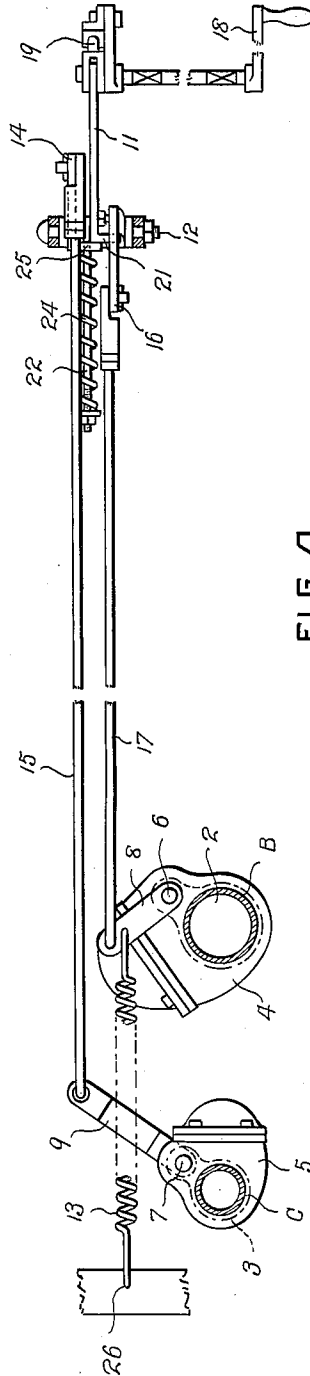
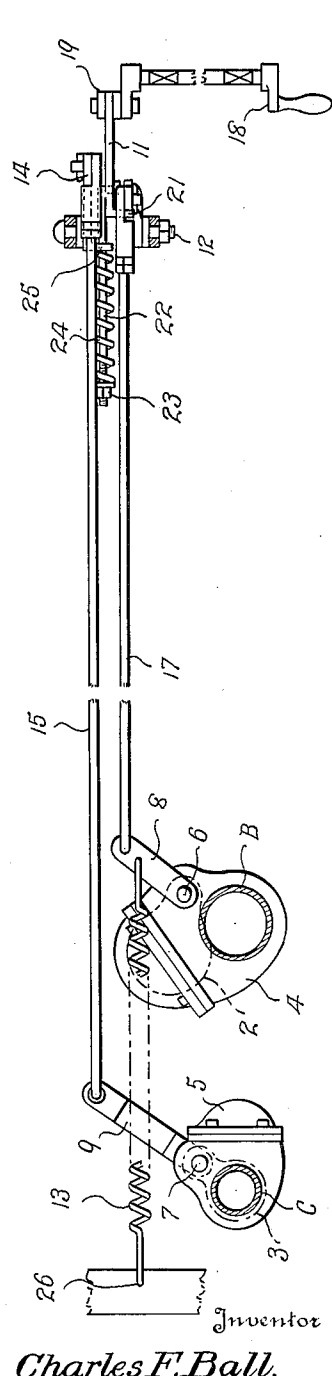


FIG. 4.



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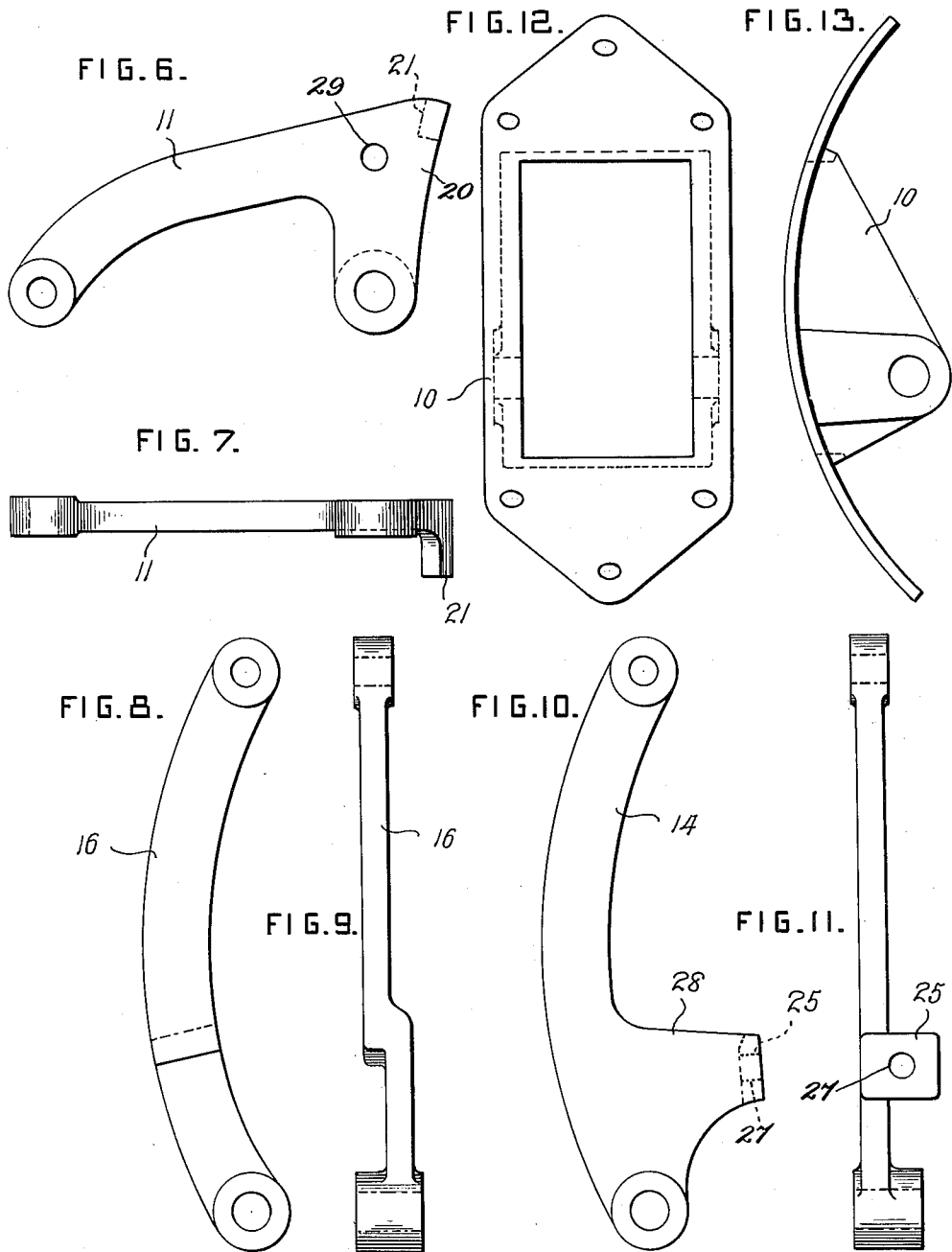
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MECHANISM FOR OPERATING AND CONTROLLING WATER VALVES

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3 Sheets-Sheet 3



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MECHANISM FOR OPERATING AND CONTROLLING WATER VALVES

Application filed July 11, 1929. Serial No. 377,557.

This invention relates to mechanism for controlling water valves, having been designed with especial reference to use in connection with concrete mixers.

It is now common practice to provide a concrete mixer with an elevated tank of a capacity suitable to hold a charge of water sufficient for the mixing of one batch of concrete, to connect such tank with a water supply system, to provide it with a discharge pipe through which the contents of the tank may be passed to the concrete mixer, and to provide valves for controlling the flow through these pipes, such valves being operated and controlled by a single mechanism arranged to insure that when one valve is opened the other is closed, the control mechanism being either manually or mechanically operated.

The invention has for its object to improve the means for controlling the flow of water to and from the measuring tank of a concrete mixer, as will be hereinafter pointed out.

Experience in connection with the use of concrete mixers, which are operated under very diverse conditions and are required to use water that is often heavily loaded with silt or other impurities, has demonstrated that a gate valve has especial advantages for controlling the flow of water both to and from the concrete mixer; and the present invention is particularly devised with reference to operations of this nature.

In operating such valves in connection with the water supply for a concrete mixer, where the valves must be repeatedly shifted at successively short intervals of time and in shifting must be rapidly moved, the tendency has been to throw the valves so quickly and forcefully to their closing positions that they frequently become stuck in their seats with incident delay in the operation of the machine of which they are a part and undue wear and tear upon the water control system. The invention has for its object to remove this latter source of trouble.

Referring to the drawings:

Figure 1 is a perspective view of an assembly to be used in connection with a con-

crete mixing machine in which the present invention is embodied.

Figs. 2, 3 and 4 are horizontal sectional views illustrating the valves of the apparatus shown in Fig. 1 and the parts that control and operate them, the several views representing the parts in three different positions.

Fig. 5 is an end view of the valve-operating mechanism.

Figs. 6, 7, 8, 9, 10 and 11 are detail views illustrating elements of the valve operating mechanism that will be later described.

Figs. 12 and 13 are detail views illustrating a support in which the parts illustrated in Figs. 6 to 11 are pivotally mounted.

Referring to the drawings, A indicates the measuring tank of a concrete mixing apparatus, B the flow pipe therefrom, through which water is delivered from the tank for use in the concrete mixer, and C, a water pipe from a street main or other source of supply, it being represented as connected with the pipe B at a point between the tank and the cut-off valve in the flow pipe. Each of pipes B and C is provided with its own individual cut-off valve and these, by means of the mechanism that will be described, are operated in proper sequence.

2 indicates the cut-off valve of the flow pipe B. It is represented as a gate valve operating within a casing 4, though the particular form of the valve may be varied. The valve, 3, that controls the supply pipe C is also represented as a gate valve, and this is located within a casing 5. These valves are supported respectively upon shafts or spindles 6 and 7, and connected with the said shafts are arms 8 and 9, through which the movements of the valves are controlled.

A spring 13 of any suitable construction operates to move the valve 2 into its closing position, a coiled spring being shown, connected at one end to the arm 8 and at its other end to a fixed support 26.

The valve 2 in the flow pipe is operated from a lever 16, Figs. 8 and 9, through a link 17 that connects such lever with the arm 8 of the valve; while the valve 3 of the supply pipe is operated by a lever 14, Figs. 10 and 11 through a link 15 connecting it with the arm

9 of valve 3. The two levers 14 and 16 are preferably supported side by side upon a common shaft 12 mounted in a bracket 10 such as represented in Figs. 12 and 13 that
 5 may be attached to a suitable part of the machine to which the invention is applied. They are supported so as to be free to turn independently one of the other upon the common supporting pivot or shaft 12, and upon this
 10 same shaft is supported a third lever 11, Figs. 6 and 7, through which the movements of the levers 14 and 16 are controlled. The lever 11 is preferably shaped and mounted so as to extend between the levers 14 and 16 and forwardly beyond the same, as is clearly represented in Figs. 1 and 2.

The parts which have been referred to are operated from a common source of power, represented as being a manually operated crank 18, that is suitably supported and connected with the lever 11 by a link 19. However, these parts may be operated automatically through mechanism that is connected with the link 19, such, for instance, as that
 20 described in the patent to C. F. Ball No. 1,608,831 dated November 30, 1926.

In Figs. 1 and 2 of the drawings the valves and the associated operating parts are represented as being in what may be termed their
 30 normal positions, that is with the valve 3 open, permitting the flow of water to the tank A, and the valve 2 closed, preventing flow of water to the concrete mixer. In Fig. 3 is represented the intermediate positions of the
 35 parts, that is with both valves closed, while in Fig. 4 is shown the positions assumed when a charge of water is being delivered from the tank through the flow pipe B to the concrete mixer of other place of use, the valve 2 being
 40 here shown as open and the valve 3 closed.

The lever 11 is represented as formed with a mid-portion 20 from which extends a lateral projection 21. As has been stated the lever 11 is mounted upon the shaft 12, and
 45 between the levers 14 and 16, and the lateral projection 21 is arranged to bear against the back side of the lever 16, that is to say the side toward the valves in the arrangement illustrated in the drawings.

The lever 14 is formed with a web or plate portion 28 from which extends a flange or lateral projection 25 that, when the several levers are assembled as shown, lies behind the lateral projection 21 of the lever 11. Thus it
 50 will be seen the lever 11 is located between the levers 14 and 16, that is to say, the said parts are so disposed that when the lever 11 is moved, from the source of power 18, in one direction it will contact with the lever 14 and
 55 when moved in the opposite direction with the lever 16.

22 indicates a rod one end of which is pivotally connected with the lever 11, the mid-portion 20 of which is perforated at 29
 65 to receive the bent end of this rod. The rod

extends rearwardly passing through a perforation 27 in the flange 25 of the lever 14, and a coil spring 24 surrounds the rod 22 being located between the flange 25 and an adjustable nut 23 at the inner end of the rod. 70

The operation of my invention may be understood from the foregoing description taken in connection with the drawings.

It being assumed that the invention is applied to a concrete mixer, that the parts are at rest in their normal positions indicated in Figs. 1 and 2, and that the time has come to discharge the contents of the tank A into the concrete mixing drum; the following
 75 movements of the valves will take place: First the valve 3 will be moved to cut off the tank from the source of water supply, this position of the parts being indicated in Fig. 3; next, the valve 3 having come to rest in its closing or cutting-off position, the valve 2
 80 will be moved to open the pipe B and allow the contents of the tank to flow freely therefrom through such pipe. This position is represented in Fig. 4. The tank having discharged, the parts are restored to their normal positions shown in Fig. 1, the valves during such movements of restoration moving in inverse order from that just designated. 85 90

To operate the valves as just described the lever 11 is rocked, through the manually controlled means 18, or through automatically operating mechanical means such as has been referred to. The movements of the parts from the position indicated in Figs. 1 and 2
 95 to that of Fig. 3, carries the lever 11 in a direction to leave the lateral projection 25 of the lever 14, which is located directly behind the lever 11; but since the spring 24 is located between the rear face of the lateral projection 25 and the head 23 of the rod 22, which latter is connected to the lever 11, it follows that there is little if any initial separation between the lever 11 and the lateral projection of lever 14 until the valve 3 has
 100 been seated in closing position as represented in Fig. 3. The spring 24 is strong enough to cause the lever 14 and the valve 3 with which it is connected to be moved before it is compressed to any considerable degree, the result being that the two levers 11 and 14 move together from initial position until the valve 3 is closed. Thereupon the further movements of the lever 14 and its connected parts must cease, though the movement of
 105 lever 11 continues, the parts now changing position from that represented in Fig. 3 to that of Fig. 4. This further movement of the lever 11 since it carries with it the rod 22, puts the spring 24 under compression, without, however, moving the lever 14. 110 115

It will be observed by reference to the drawings that the lateral projection 21 of the lever 11, which stands behind the lever 16, is not in engagement therewith when the 120 125 130

parts are in their normal position of Figs. 1 and 2, and does not come into engagement therewith until the parts have moved to the positions shown in Fig. 3, when the said lateral projection 21 of the lever 11 comes into contact with the rear of the lever 16. Then when further movement from the position indicated in Fig. 3 to that shown in Fig. 4 takes place the lever 16 is moved along with lever 11, and the movement of lever 16 shifts the valve 2 from its closed position to its open position and in so doing puts the spring 13 under tension. The parts are now in the positions indicated in Fig. 4 and the movement of the lever 11 ceases, until the parts are to be restored.

The amount of force required to close the valve 3 is not great and hence the spring 24 does not have to be very stiff, and since the closing movements of the valve are transmitted through the spring the valve will be seated easily and without undesirable shocks even though the movements of the lever 11 be rapid.

When the parts are to be restored to normal position the control lever 11 is reversed and the valves are shifted in reverse directions and sequence from that just described, and as follows: the valve 2 is first restored to position to close the pipe B, being moved by the spring 13, and as the speed of movement of the valve is controlled by the lever 11, through the engagement of the lever 16 with the projection 25, the movement of the valve to its seat is gradual. When this valve is seated the lever 16 comes to rest, but the movement of the operating lever 11 continuing, the valve 3 begins to open and the parts finally come to their normal positions, as indicated in Figs. 1 and 2.

Upon the commencement of the return movements of the parts, starting from the positions indicated in Fig. 4, the spring 24 is under compression, holding the valve 3 to its seat, the projection 25 of the lever 14 being separated from the operating lever 11. As the latter is moved in an upward direction the rod 22 is carried to the left, being directly connected with the lever 11, and this relieves the tension of the spring 24, but not entirely, so that the valve 3 is held in its closing position until the lever 11 engages with the projection 25 of the lever 14, and when this occurs, the parts are in the position shown in Fig. 3. During the movements just described, the spring 13 moves the valve 2 from its open to its closed position, causing the lever 16 that is connected with the valve to follow the projection 21 of the lever 11. The parts being in the position represented in Fig. 3 a further movement of the lever 11 causes the valve 3 to be positively moved to an open position as shown in Fig. 2 by reason of the engagement of the lever 11 with the projection 25 of the lever 14, that is con-

nected with such valve. These movements do not affect the tension of the spring 24 since the two abutments thereof, 23 and 25, are then moving in the same direction and at the same speed. During this latter movement the valve 2 and the parts connected therewith remain at rest with the valve in closing position, the projection 21 of the operating lever 11 now leaving and moving away from the lever 16.

What I claim is:

1. The combination with two pipes and individual valves for closing them, of a common source of power for moving the valves, to close one and to open the other, a resilient connection through which motion is transmitted from the source of power to one valve and a lost motion connection through which motion is subsequently transmitted to the other valve, the resilient connection being put under additional compression after the valve with which it is connected comes to rest and the other valve is being moved, and operating to hold such valve seated on the reverse movement of the parts until the valve controlled by the lost motion connection is fully reversely moved.

2. The combination with two pipes and individual valves for closing them, of control means for moving the valves from normal positions to close one and to open the other, the said means including a relatively weak spring through which motion is initially transmitted from the control means to one valve, and a lost motion connection through which motion is subsequently transmitted to the other valve, whereby said valves are moved in sequence as the control means are moved in one direction, and a second spring for restoring one of the valves to normal position on the reverse movements of the control means.

3. The combination with two pipes and individual valves for closing them, of a pair of levers supported on a common pivot, respectively connected with the valves, an operating lever adapted to engage respectively with the said valve-connected levers to move one to shift the valve with which it is connected when the operating lever is moved in one direction, and to move the other when it is moved in the opposite direction, there being lost motion between the said levers, whereby the valves are moved in sequence as the operating lever is moved in each direction.

4. The combination with two pipes and individual valves for closing them, of a pair of levers supported on a common pivot, respectively connected with the valves, and operating lever arranged to engage respectively with the said pivoted levers to move them in opposite directions as the operating lever is moved oppositely, a spring connection between one of the levers and the operating

lever, and a lost motion connection between the operating lever and the other lever.

5 5. The combination with two pipes and individual valves for closing them, of a pair of arms supported on a common pivot respectively connected with the valves, an operating lever by which the said pair of arms are positively moved and constructed to engage respectively therewith—with one arm when
10 the control lever is moved in one direction and with the other when it is moved in the reverse direction, there being lost motion between the said valve-connected arms and the operating lever, and a spring acting to move
15 one of the valves to its normal position.

6. The combination with two pipes and individual valves for closing them, of a pair of levers, supported on a common pivot, linkage connections between such levers and the
20 respective valves, an operating lever supported between the valve-connected levers and arranged to engage with one of them only, when moved in one direction, and with the other valve-connected lever only, when moved in
25 the opposite direction, a spring arranged to move one of the valves and its connected lever to normal position and a second spring arranged between the operating lever and the other of the said valve-connected levers, such
30 spring being arranged to be put under compression by the operating lever as it moves the first mentioned of the said valves, and to maintain the valve with which it is associated in position during the time the said first mentioned
35 valve is making its return movement under the influence of its spring.

In testimony whereof I affix my signature.

CHARLES F. BALL.

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