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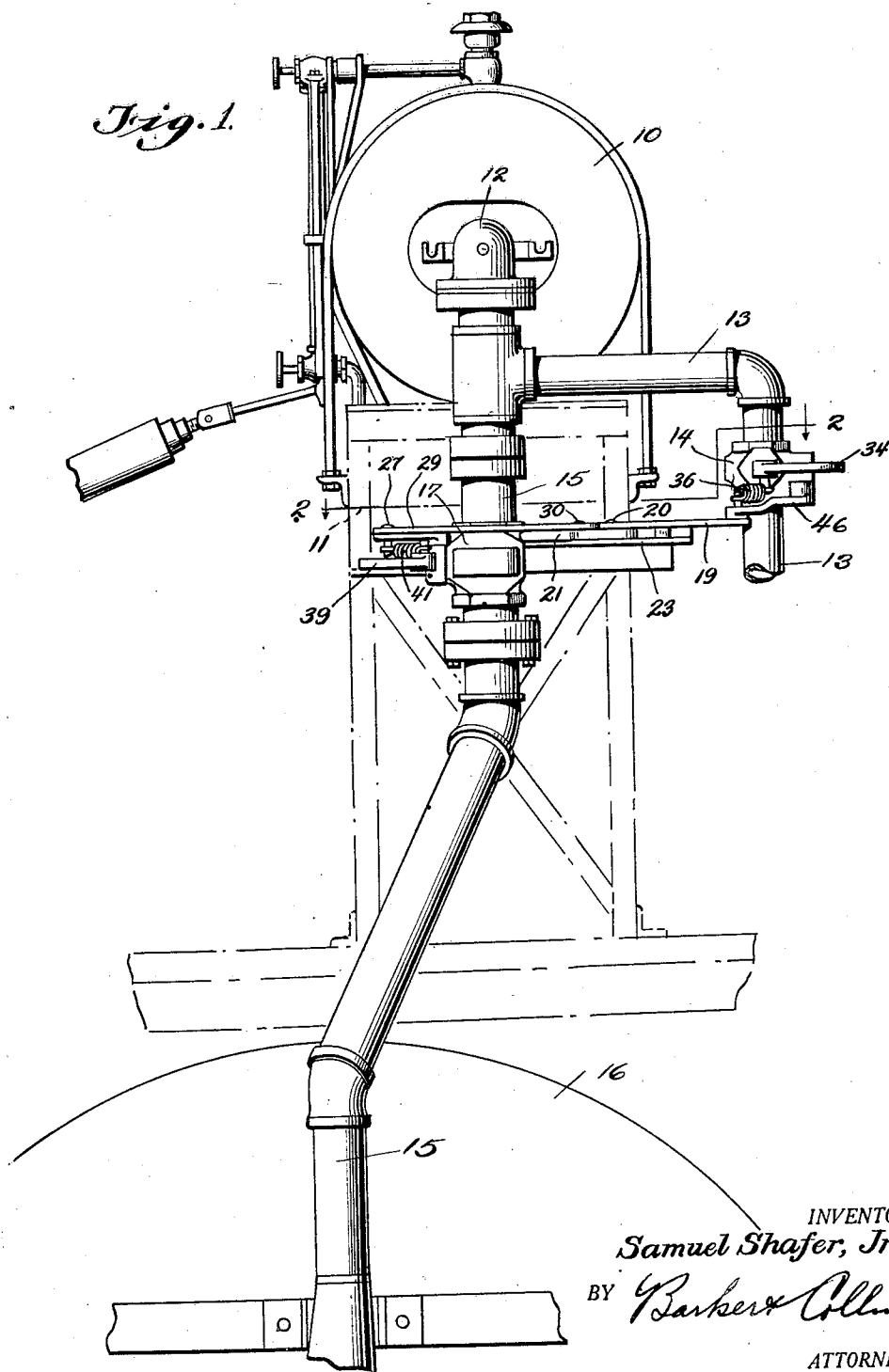
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1,839,807

WATER VALVE CONTROL FOR CONCRETE MIXERS

Filed May 19, 1928

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 2

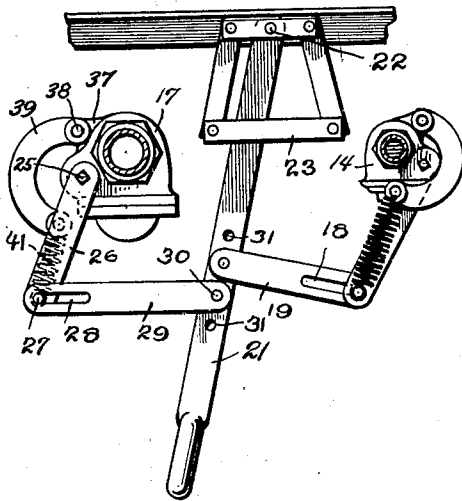


Fig. 3

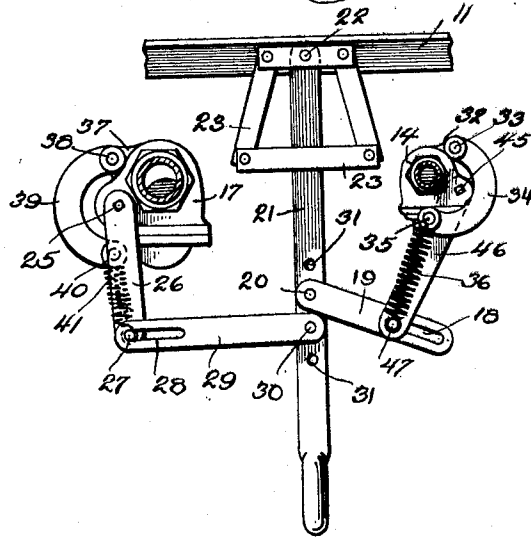


Fig. 4

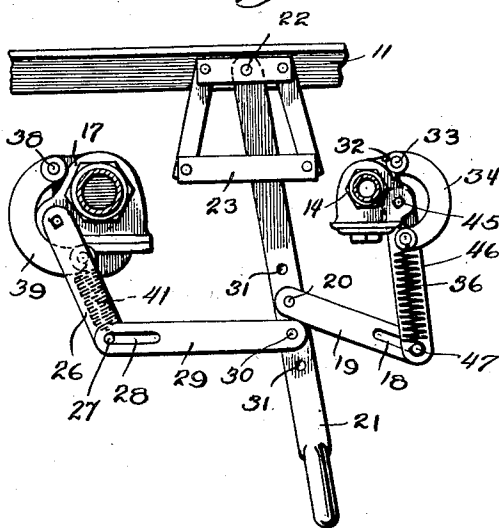
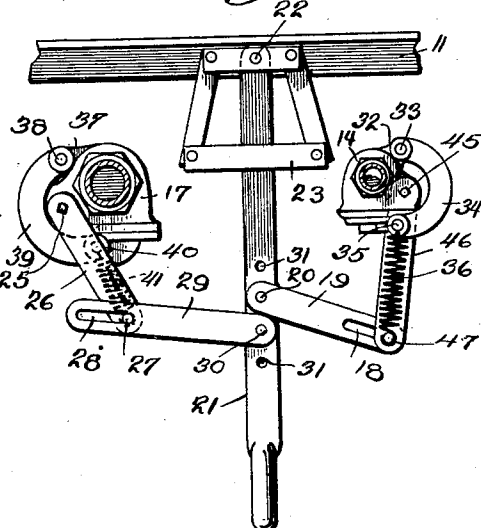


Fig. 5



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WATER VALVE CONTROL FOR CONCRETE MIXERS

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This invention relates to valve control mechanism for the water systems of concrete mixers, and has for one of its objects to provide an apparatus of this character which will be simple in construction, comparatively inexpensive to manufacture and install, and more efficient in use than those which have been heretofore proposed.

It is common practice today to provide concrete mixers with water-receiving tanks or receptacles which are supplied with water from any suitable source and measure predetermined quantities thereof which are introduced from time to time through a discharge pipe into the mixing drum or chamber. In some instances the supply of water to the tank, as well as the discharge therefrom, is controlled by a three-way valve suitably connected to the supply pipe, the discharge pipe and the tank. In other instances separate valves are provided in the supply pipe and in the discharge pipe, which valves may or may not be interconnected.

Under the recently advanced water-cement ratio theory of concrete mixing, which holds that the strength of concrete is primarily dependent upon the ratio of water to cement, it becomes of prime importance to accurately measure the quantity of water introduced into a mixing drum or chamber with each charge of cement and aggregates, since a very slight variation in the quantity of water relative to the amount of cement employed has quite a material effect on the strength of the resulting concrete.

In measuring water with the valves heretofore employed upon concrete mixers it has been found practically impossible to accurately gage the amount of water introduced into a mixing drum due to the fact that where three-way valves were employed, as above mentioned, there is a point in their movement during which both the supply and discharge pipes are opened simultaneously, with the result that some of the water from the supply pipe passes directly into the discharge pipe without entering the measuring tank. The same has been true to a greater or less extent where separate valves have been employed in the supply and discharge pipes and intercon-

nected; and the only way thus far developed by which accurate water measurements could be made has been through the use of independent valves in the supply and discharge pipes, which valves were independently manually operable. In employing a construction of this character it is, of course, possible to see that the supply valve is fully closed before the discharge valve is opened to admit water from the measuring tank to the drum, and likewise to see that the discharge valve is fully closed before the supply valve is opened to admit a fresh charge of water to the measuring tank. However, these independently operable valves are open to the objection that two independent manual movements are necessary for each charging and each discharging operation of the measuring tank with a consequent loss of time and slowing down of the whole operation of the mixer.

The present invention relates particularly to the type of water-control apparatus in which separate supply and discharge valves are employed, and has for its prime object the provision of interconnecting means for these valves whereby they may both be operated from open to closed position and vice versa by a single manual movement, while at the same time provision is made by which each valve will be fully closed before the other is opened, to the end that water may never pass directly from the supply pipe to the discharge pipe without entering the measuring tank. It thus results that a closer control of the amount of water supplied to each batch of cement and aggregates may be maintained, while at the same time the operating cycle is not lengthened in any respect and is maintained at a minimum.

With the above and other objects in view, which will appear as the description proceeds, the invention consists in the novel details of construction and combinations and arrangements of parts more fully hereinafter described and particularly pointed out in the appended claims.

Referring more particularly to the accompanying drawings forming a part of this specification in which like parts are design-

nated by like reference characters in all the views:

Fig. 1 is a fragmentary end elevational view of one form of concrete mixer, showing more particularly the water-measuring tank and the supply and discharge pipes therefor with their controlling valves, and a device constructed in accordance with the present invention for actuating said valves, and

Figs. 2, 3, 4 and 5 are horizontal sectional views taken approximately on the plane indicated by the line 2—2 of Fig. 1, looking down and showing the various successive positions of the parts through a cycle of operation of the valves.

Referring more particularly to the said drawings, 10 indicates a measuring tank or receptacle, of a well known form commonly employed upon concrete mixers, which is supported upon a framework 11, and which has at one end a combined supply and discharge manifold 12. Water is supplied to the said manifold 12 through a supply pipe 13, controlled by a valve 14, while water is discharged from the said manifold through a discharge pipe 15 which leads into the mixing drum or chamber 16 in a well-known manner. Said discharge pipe is controlled by a valve 17. The valves 14 and 17 may be of any preferred form, being here shown as comprising a well-known type of swinging gate valve.

The gate of the supply valve 14 is pivotally mounted upon a pin or shaft 45 to which is rigidly secured an operating lever 46 whereby the said gate may be swung from open to closed position in the ordinary manner. The outer end of the said operating lever 46 is provided with a pin 47, which is received in the elongated slot 18, provided at one end of a link 19, the other end of which is removably pivotally secured as at 20 to the manually operating lever 21. The said lever 21 is pivotally mounted as at 22 upon the mixer frame 11 and may be provided with suitable supporting and guiding means 23 substantially as shown.

In like manner the discharge valve 17 has its gate carried by shaft or pin 25 which also rigidly carries the operating arm 26, the outer end of which is provided with a pin 27, working in the elongated slot 28 provided in one end of a link 29, the other end of which is detachably and pivotally secured as at 30 to the manual operating lever 21. The said lever 21 is provided with a plurality of holes or apertures 31 which are adapted to receive the pivoting pins 20 and 30 of the links 19 and 29 respectively, whereby adjustments may be made to provide greater or less throw of the arms 16 and 26.

The casing of the valve 14 is provided with an ear 32 to which is pivotally secured, as at 33, one end of a curved link 34, the other end of which has secured to it as at 35 one

end of a coiled spring 36, the other end of which is secured to the pin 47 of the valve lever 46.

In like manner the housing of the discharge valve 17 is provided with an ear 37 to which is pivotally secured, as at 38, one end of the curved lever 39, the other end of which has secured to it as at 40 one end of a coiled spring 41, the other end of which is secured to the pin 27 carried by the arm 26.

The operation of the invention will be clear from reference to Figs. 2, 3, 4 and 5, which illustrate various successive steps in the valve cycle. In Fig. 2 the supply valve 14 is shown in its closed position, while the discharge valve 17 is shown in its open position, and assuming that in these positions the measuring tank 10 has been completely discharged the operation will be as follows:

The hand lever 21 is grasped by the operator and moved toward the right as viewed in Fig. 2, which movement will be transmitted through the link 29 and pin 27 to the operating arm 26 of the valve 17, which will start the valve gate from open to closed position. During this initial movement of the operating handle 21 the pin 47 of the operating arm 46 of valve 14 will ride from the extreme outer end to the inner end of the elongated slot 18 in link 19 so that no movement will be transmitted to the gate of the supply valve 14.

When the hand lever 21 has reached mid position illustrated in Fig. 3 the pin 47 will have reached the inner end of the elongated slot 18 and further movement of the hand lever 21 toward the right will then be transmitted to the operating arm 46 to cause the gate of valve 14 to begin its movement from closed to open position.

It will be noted, however, that in the position shown in Fig. 3 the pin 27, the pivot 38 and the gate shaft 25 are in substantial alignment and any further movement toward the right of the parts of valve 17 will have the effect of changing the pull of spring 41 from the left hand side of shaft 25 to the right hand side thereof, so that as soon as the lever 21 has been moved slightly further toward the right the spring 41 will act upon the right hand side of the shaft 25 and will serve to snap the gate of the valve 17 to closed position with the pin 27 riding to the inner end of the elongated slot 28 of link 29. It thus results that the valve 17 will be completely closed before the valve 14 has begun to open and therefore no water from the supply pipe 13 can be transmitted directly to the discharge pipe 15, but must enter the measuring tank 10.

Continued movement of the hand lever 21 toward the right will bring the parts into position shown in Fig. 4 in which the supply valve 14 is fully open and the discharge valve fully closed, during which time the measur-

ing tank 10 will be filled from the supply pipe. By reversing the movement of the hand lever 21 and moving it toward the left from the position shown in Fig. 4 to that shown in Fig. 5 its movement will be first transmitted through the link 19 and pin 47 to the operating arm 46 of valve 14, thereby starting the closing movement of the gate of this valve. During such initial movement of the hand lever 21 no motion will be transmitted to the discharge valve gate owing to the fact that the pin 27 of operating arm 26 will ride from the outer to the inner end of the slot 28, as will be readily understood from Figs. 4 and 5. When in the position shown in Fig. 5 the pin 47, pivot 33 and gate shaft 45 are in substantial alignment, and further movement of the parts toward the left will serve to transfer the pull of spring 36 from the right hand to the left hand side of gate shaft 45 with the result that the gate of supply valve 14 will be snapped to closed position, pin 47 riding from the outer to the inner end of slot 18. Further movement of hand lever 21 toward the left to the initial position shown in Fig. 2 will then be transmitted through link 29 and pin 27 to arm 26, whereby the gate of valve 17 will be moved from closed to open position and water from the tank 10 will be discharged through the discharge pipe 15 into the mixer drum.

It will be clear from the foregoing that, although the two valves are operable from a single manually operated means whereby they may both be moved through a single manual operation, their respective actions may be delayed so that both of them may not be open at the same time. As above pointed out it results from this construction that water can never pass directly from the supply pipe 13 to the discharge pipe 15, but must always pass first from the supply pipe 13 to the measuring tank 10, and it therefore follows that the amount of water supplied to the drum 16 may always be accurately measured.

While one form of the invention has been illustrated and described, it is obvious that those skilled in the art may vary the details of construction as well as the precise arrangement of parts without departing from the spirit of the invention, and therefore it is not wished to be limited to the above disclosure except as may be required by the claims.

What is claimed is:

1. In a valve control mechanism, the combination of supply and discharge valves; actuating means for opening and closing said valves; connections between said actuating means and each of said valves for initiating closing movement of one valve in advance of the starting of opening movement of the other valve; and additional means for completing such closing movements.

2. In a valve control mechanism the combination of supply and discharge valves; actuating means for opening and closing said valves; connections between said actuating means and each of said valves for initiating closing movement of one valve in advance of the starting of opening movement of the other valve; and additional snap-action means for completing such closing movements prior to the opening of said other valve.

3. In a valve control mechanism, the combination of supply and discharge valves; actuating means for opening and closing said valves; lost motion connections between said actuating means and each of said valves, adapted to initiate closing movement of each valve in advance of the starting of opening movement of the other valve; and additional resilient means for completing such closing movements prior to the opening of said other valve.

4. In a valve control mechanism, the combination of supply and discharge valves having operating arms, a manually operable lever; links connected to said lever; lost motion connections between said links and said arms; and spring means connected to said arms for snapping said valves to open and closed position.

5. In a valve control mechanism, the combination of supply and discharge valves having operating arms, a manually operable lever; slotted links pivotally connected to said lever; pins carried by said arms engaging said slots; springs connected to said pins; and curved links connected to said springs and the casings of said valves.

6. A non-bypass valve control mechanism for a pair of valves, one of which is open while the other is closed, comprising means for sequentially initiating movement of the open valve toward its closed position, and of the closed valve toward its open position; and additional means for completing said closing movement of the open valve before said opening movement of the closed valve is begun.

7. A non-bypass valve control mechanism for a pair of valves, one of which is open while the other is closed, comprising means for sequentially initiating movement of the open valve toward its closed position, and of the closed valve toward its open position; and additional means for completing said closing movement of the open valve before said opening movement of the closed valve is begun, both of said means being operable to move said valves in both directions.

In testimony whereof I affix my signature.
SAMUEL SHAFER, JR.