Nov. 25, 1941. W. L. STANTON 2,263,907

VALVE

Filed Dec. 13, 1938

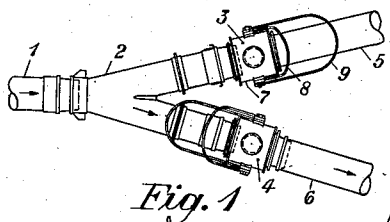

Fig. 1

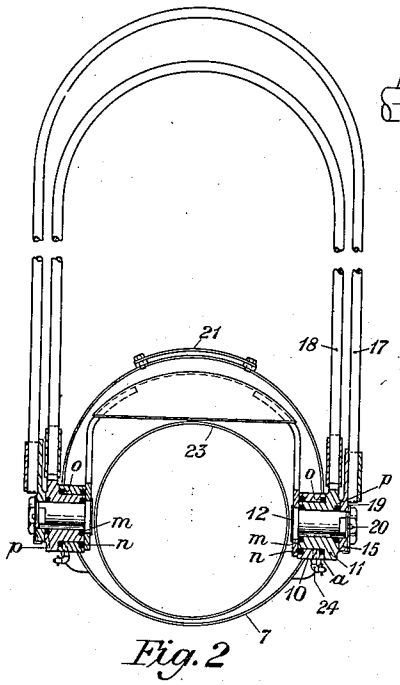

Fig. 2

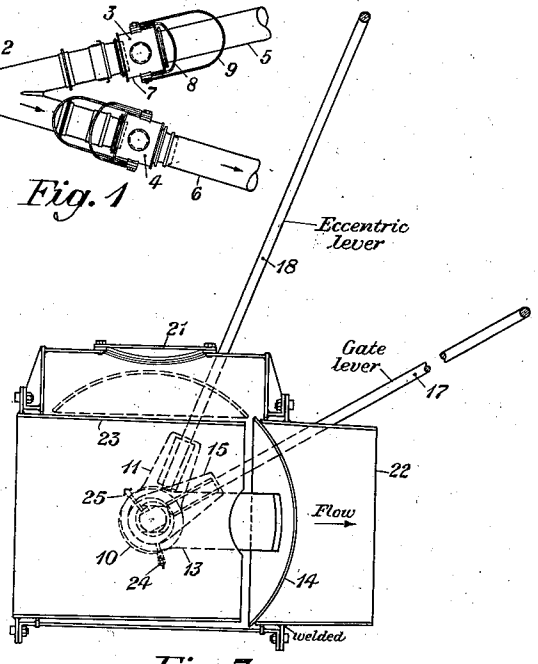

Fig. 3

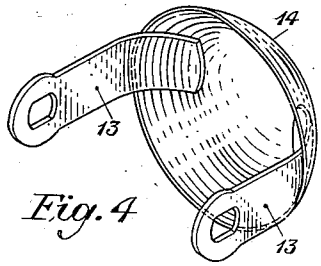

Fig. 4

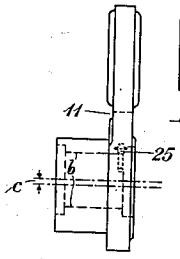

Fig. 5

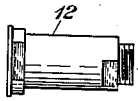

Fig. 6

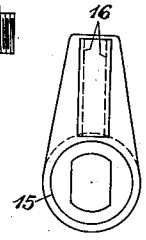

Fig. 7

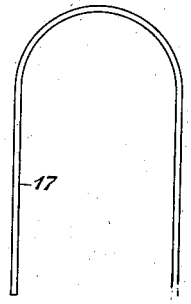

Fig. 8

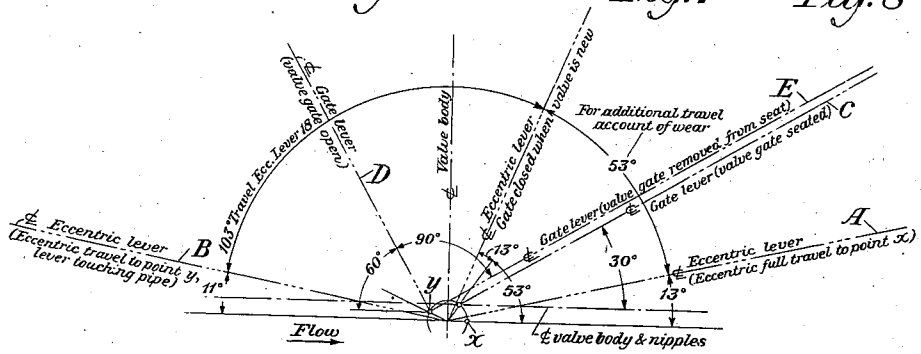

Fig. 9

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VALVE

Walter Lamar Stanton, Houston, Tex.

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1 Claim. (Cl. 251—18)

This invention relates to valves and particularly to those of the hinged gate type.

In the art of hydraulic dredging it is customary to convey the dredged material to the shore by a pipe line supported by pontoons, which pipe line is there connected to the land pipe which serves to distribute the dredged material over the area where the fill is to be made or the material is to be spilled. During the progress of the work it is sometimes necessary to shift the position of the land pipe or to add sections to it. To accomplish that result without shutting down the pump on the dredge, it is the practice to insert a Y connection in the land pipe with branch pipes connected to each arm of the Y and to place a valve in each branch. Normally the valve will be open in the branch leading to the place where the material is to be deposited, and the valve in the other branch will be closed. When it is necessary to add sections of pipe to the first mentioned branch or to change its location, the valve in the said other branch will then be opened so as to provide a path for the flow of material therethrough, and the valve in the said first mentioned branch will then be closed. Upon the completion of the making of the changes, the sequence of operation of the valves will be reversed, that is to say, the valve in the first mentioned branch will then be opened and the valve in the said other branch will be closed.

Heretofore, it has been the practice to employ vertical gate valves in the branches of the said Y connection. Owing to the relatively high pressure prevailing it is difficult to open or close such gate valves, the operation sometimes requiring the labor of three or four workmen.

The present invention resides in a valve of the hinged gate type having means to readily remove the gate from its seat and to swing the gate completely out of the path of flow of material through the said valve, the said operations being accomplished with relative ease and, in the case of a large valve, such as a 24 inch valve, with the labor of one workman.

The valve is further characterized by a construction that permits the ready replacement of those parts likely to be worn during the operation of the valve; and is also characterized by having the parts so proportioned as to minimize the friction loss in the flow of material through the valve and also to reduce the scouring effect of such flow, the manner of doing which will be hereinafter more fully described.

This invention will be understood from the following description, when read in connection with the attached drawing of which Figure 1 shows the valves inserted in the branches of the Y connection, in the manner employed in dredging; Fig. 2 is a transverse cross-sectional view of the valve where a plane passes through the bearings in the side walls thereof; Fig. 3 is a longitudinal cross-sectional view of the valve; Fig. 4 shows, in isometric form, the type of gate used in the valve; Fig. 5 is a rotatable member, having a hole bored therein, eccentric to the axis of the said member, for the reception of the pin, shown in Fig. 6; Fig. 6 is a side view of the pin 12; Fig. 7 is a socket for the lever shown in Fig. 8 for operating the gate of the valve; Fig. 8 is a side view of the lever 17; and Fig. 9 is a diagrammatic view of the levers 17 and 18 in different positions.

In Fig. 1 the discharge pipe 1 enters a Y connection in each of the branches of which is one of the applicant's valves 3 and 4, the direction of flow through the said branches being indicated by the arrows. The output side of each valve is connected to a branch of the land pipe, such as 5 or 6, by which the dredged material may be distributed over the area where the fill is to be made or the material is to be spilled. Each valve has a casing such as 7 and a pair of levers, 8 and 9, by which the gate within the valve is operated. In Fig. 1, the levers 8 and 9 of valve 3 are shown extended toward the right in the direction in which the flow through the valve would normally occur. Such position of the levers forces the gate against the seat at the output side of the valve and prevents such flow. In the case of the valve 4 in the lower branch of the Y, in which the levers are thrown to the left, the gate has been completely removed from the path of flow so as to permit the free passage of fluid therethrough, as indicated by the arrows

The manner by which that is accomplished will be apparent from considering Figs. 2 and 3 which show in greater detail the structure of the valve. Referring to Fig. 2, which is a transverse cross-sectional view through the valve, the casing 7 has therein, at each side, a bearing 10, which extends through the casing. This bearing is supported by welding it to the casing which also seals the joint between the bearing and the casing. Considering, for example, the structure at the right-hand side of the figure, the bearing 10 is so proportioned as to receive the member 11 which is shown in Fig. 5. The left-hand portion of that member, as it appears in that figure, has the proper diameter to fit within the bearing 10 of Fig. 2, and the diameter and length of that left-

hand portion is such as to bring the shoulder of the member 11 up against the outer surface of the bearing as indicated by *a* in Fig. 2. The member 11 has a hole *b* bored therein, as indicated in Fig. 5, which is eccentric with respect to the axis of the said member, the degree of eccentricity being indicated by the distance *c* between the axes of the hole and of the member 11.

Through the hole *b* in the member 11 is inserted the pin 12, the diameter of which is such as to permit the pin to rotate within the member 11 during the operation of the valve, as will be clearly described hereinafter. The pin 12, which is separately shown in Fig. 6 has a non-circular shoulder adjacent to its head, as shown at the left-hand side of that figure, and likewise has another non-circular portion at the right-hand end adjacent to the threads. As shown in Fig. 2, the pin is inserted in the bore in the member 11 in such fashion that the head of the pin is within the casing, and the threaded portion of the pin outside the casing.

The pin when being inserted in the bore of the member 11, is passed through the non-circular opening in an arm 13 of the gate 14 of the valve which is shown in Fig. 4. The gate 14 is in the form of a segment of a sphere, the arms being attached to the inner surface thereof by welding or other suitable methods. Near the rear end of each arm is the non-circular opening mentioned above of such size and shape as to fit snugly over the shoulder of the pin 12 so that the arms will be rotated by the pin and through the same angular distance.

Over the outer end of each pin, that is over the non-circular portion adjacent to the threads, is placed a gate lever socket 15, a cross section of which is shown in section Fig. 2 and a side view in Figs. 3 and 7. Referring to the latter figure it will be seen that the lower part of this device has in it a non-circular opening through which passes the non-circular part of the pin, viz., that part adjacent to the threads, the parts being so proportioned to provide a snug fit. The upper end of the member 15 has therein a socket 16 into which fits one of the arms of the lever 17 shown in Fig. 8. A similar lever 18 of slightly different proportions is intended to be fitted into the socket of the eccentric member 11 at each side of the valve. A washer 19 is placed over the pin and a nut 20 is then drawn up tightly. The structure at the left-hand side of Fig. 2 is similar to that just described, excepting that the parts are reversed in position.

The valve casing has therein a handhole 21 through which access may be had to the interior of the valve and through which mud or other foreign material may be removed. The casing is provided with suitable flanges by which the entrance nipple 23 and the discharge nipple 22 may be bolted to the casing, the entrance nipple projecting within the casing and the discharge nipple projecting therefrom as shown in Figs. 2 and 3; the sections of land pipe may be connected to the entrance and discharge nipples by forcing the tapered end of such pipe into or over the said nipples.

The manner in which the valve operates is as follows: Let it be assumed that the gate 14 is closed, as shown in Fig. 3. Under that condition, the gate presses against its seat which is the inner edge of the discharge nipple 22 and the gate lever 17 and the eccentric lever 18 will be in the position C and A, respectively, shown in Fig. 9. To open the valve it is essential to pull the gate 14 off its seat and then move it to the upper part of the casing. To accomplish that result first the eccentric lever 18 is moved in a counter-clockwise direction from the position A, shown in Fig. 9, to the position B. This rotates the member 11 through which passes the pin 12 which is eccentric to the member 11. The pin, whose position at various times is represented by the small circles of Fig. 9 moves along a curve around the axis of the valve body in the manner shown in that figure, moving from the point *x* to the point *y* when the lever 18 is moved from position A to position B. In moving backward from point *x* to point *y*, the pin pulls the gate 14 backward through the distance between *x* and *y* which affords ample clearance between the gate and the inner edge of the nipple 22 to enable the gate to be swung into its position in the upper part of the casing.

That step is accomplished by moving the gate lever 17 also in counter-clockwise direction. It will be remembered that the gate lever sockets 15 are fixedly connected to the pins to which also are fixedly connected the arms 13 of the gate. Consequently, the gate will be rotated by the movement of the gate lever and when the lever is in the position D, Fig. 9, the gate will be in the position at the top of the casing as indicated by the dotted lines in Fig. 3.

In order to close the gate the method is reversed. The gate lever 17 will be moved clockwise to the position E. Then the eccentric lever 18 will be moved clockwise from position B as far as it will go, represented by A of Fig. 9. The gate lever will then assume the position marked C. The gate 14 will then be pressed firmly against the edge of the nipple 22 and the flow through the valve will stop.

A valve of the type hereinbefore described is extremely economical in operation and maintenance. It may be opened or closed by a single workman whereas a valve of the same size but of the type heretofore employed in dredging operations requires the services of three or four workmen to operate it.

It is desirable to point out several features of importance shown on the drawing but not heretofore mentioned.

In order to increase the tightness of the joints between the several bearing surfaces and the rotating members, rawhide washers have been provided, as indicated by *m*, *n*, *o* and *p* upon Fig. 2. Those washers not only minimize the leakage of water through the joints but also serve the purpose of keeping between the bearing surfaces the lubricating grease that may be forced between such surfaces through the ducts to which the alemite fittings 24 and 25 shown in Figs. 2, 3 and 5 are attached.

Another feature of importance is the tapering of the input nipple 23 so that its diameter at its right-hand end will be substantially smaller than the diameter of the left-hand end of the output nipple 22, adjacent thereto. The result of such proportioning of the nipples is that the jet of fluid issuing from the input nipple 23 does not strike the edge of the output nipple 22. This not only reduces the abrasive effect upon the nipple 22 but also reduces the friction loss where the stream of fluid passes through the gate opening.

Various modifications may be adopted in place of those hereinbefore described. Thus while the gate has been shown in Fig. 4 as having spherical

form, it may also have the form of a flat plate. The use of a gate of the latter form would necessitate a cutting away of a portion of the forward end of the input nipple **23** so as to provide sufficient clearance for the gate when being swung into the space in the upper part of the valve casing.

While this invention has been described as having a certain form and proportion of parts, it is to be understood that it is capable of embodiment in other forms and to have other proportions without departing from the spirit and scope of the invention as defined by the appended claim.

What is claimed is:

In a valve, the combination with a substantially cylindrical casing having a handhole therein of an input nipple eccentrically positioned therein, the diameter of the said casing being substantially greater than that of the said nipple to provide space for the operating mechanism of the said valve, an output nipple of slightly larger diameter than the input nipple also attached to the said casing, a cylindrical bearing fixed in each side of the said casing, a rotatable member positioned in each bearing, said member having a hole extending therethrough parallel to and eccentric to the axis of the member, a rotatable pin for each of said holes, a gate having two arms each rigidly fastened to the inner end of one of the pins, a lever attached to each rotatable member, a second lever attached to each rotatable pin, the said bearings and the said rotatable members having means to supply lubricant to the adjacent moveable surfaces, and means at each end of the said surfaces to prevent the wastage of the said lubricant from those surfaces.

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