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VALVE MECHANISM

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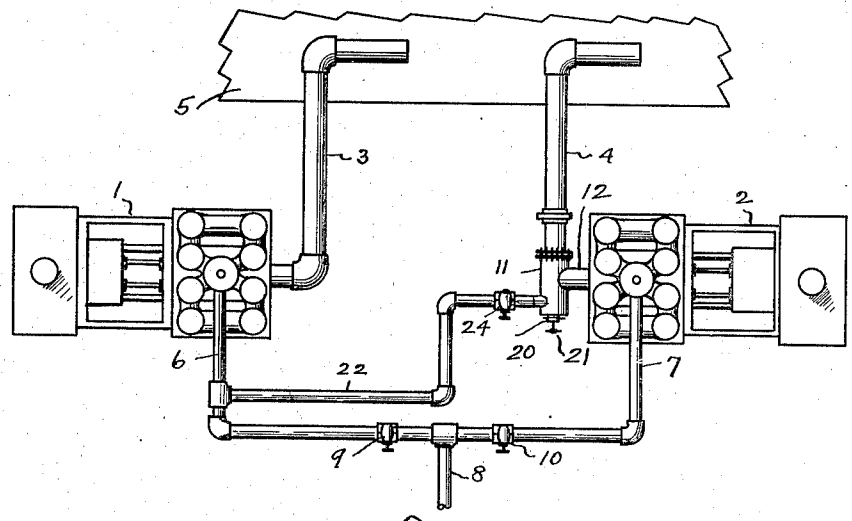


Fig. 1.

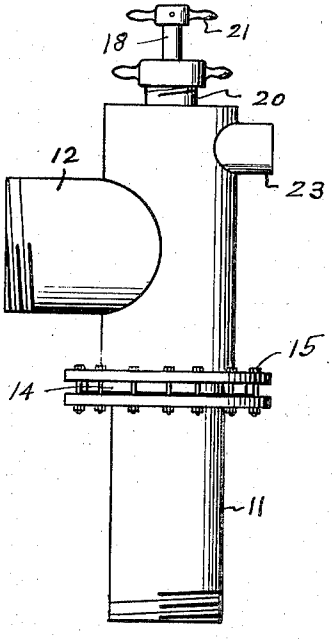


Fig. 2.

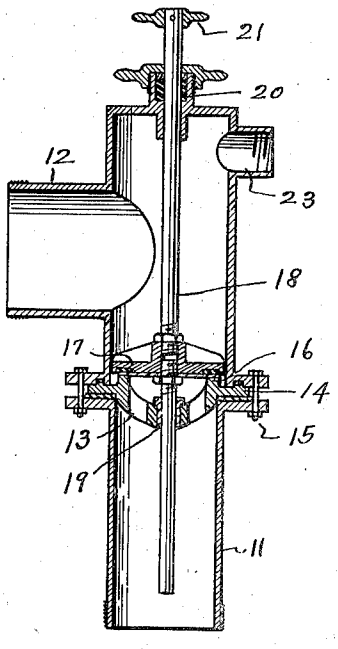


Fig. 3.

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VALVE MECHANISM

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2 Claims. (Cl. 251—22)

This invention relates to a valve mechanism.

An object of the invention is to provide a valve mechanism of the character described comprising a valve casing having a discharge outlet and also having separate inlets into the casing with a valve and seat in the casing, said valve being automatically movable by the pressure of the liquid flowing from either inlet into position to clear the outlet whereby the other inlet will be closed by the valve.

It is another object of the invention to provide a valve mechanism of the character described having two inlets, with an outlet between them and a valve mounted to be automatically moved by the pressure of the liquid to either side of the outlet whereby liquid under pressure may flow from one inlet through the casing to the outlet and be excluded from the other inlet.

The valve mechanism herein described has been specifically designed for use in compounding pumps, that is, for applying the combined pressure of a plurality of pumps to liquid flowing from one pump through a common discharge pipe.

In well drilling it is common practice to combine two slush pumps for taking drilling fluid from a pit or tank and forcing same down through the drill stem in the well. Usually only one of the pumps will operate at a time, the other being merely a stand-by pump for use in emergency, or in case of a break down of the other pump. At times, however, it may be found desirable to increase the pressure of the drilling fluid being forced down into the well and in such case the pumps are compounded, that is, the combined pressure of the pumps is applied to the drilling fluid for the purpose of increasing the pressure of the fluid which is forced into the well through the drill stem and returned to the ground surface through the bore outside of the drill stem.

It is the prime object of this invention to provide novel means for compounding pumps for the purpose stated.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawing, wherein:

Figure 1 shows a plan view of the pumps showing also a fragmentary view of the slush pit and showing the valve mechanism and the connecting pipes.

Figure 2 shows an enlarged plan view of the valve mechanism, and

Figure 3 shows a sectional view thereof.

Referring now more particularly to the drawing, wherein like numerals of reference designate similar parts in each of the figures, the numerals 1 and 2 designate conventional slush pumps having the respective suction pipes 3, 4 whose inlet ends are to be submerged in the drilling fluid contained in the slush pit 5. These pumps have the discharge pipes 6, 7, which unite in a common delivery pipe which leads to the stand pipe, common to the usual well drilling rig. As is well known a hose leads from the stand pipe through a swivel to the upper end of the drill stem through which the fluid is forced down through the drill stem to the ground surface. The pipes 6, 7 are equipped with gate valves 9, 10 respectively on opposite sides of the delivery pipe 8.

The suction pipe 4 is connected into the inlet end of the valve casing 11 and leading out from this casing 11 there is the tubular nipple 12 which is connected into the suction chamber of the pump 2. Any conventional type of slush pump may be employed and a specific description thereof is not deemed to be necessary.

Between said inlet end of the casing 11 and the nipple 12 there is a spider 13 having an annular marginal flange 14 which is clamped between adjacent sections of the casing as shown in Figure 3, said adjacent sections having registering flanges which are secured together by means of the clamp bolts 15. The spider 13 is formed open to permit the ready passage of the drilling fluid but its side facing the discharge nipple 12 is formed with an annular valve seat 16. A disc valve 17 is arranged to cooperate with and close the seat 16. This valve is mounted on a stem 18 which works through a central bearing 19 of the spider 13 and which also works through a suitable stuffing box 20 mounted on the end of the casing 11 opposite the inlet end thereof. The stem 18 is slidable through said bearing and stuffing box and its outer end carries a grip member 21 for use in case it may be desired to manipulate the valve manually.

A bypass pipe 22 is connected at one end into the pipe 6 between the pump 1 and the valve 9 and the other end of this bypass pipe is connected into the casing 11 on the opposite side of the discharge nipple 12 from the valve seat 16, as at the point 23. This bypass pipe 22 is equipped with a gate valve 24 whereby said pipe may be opened and closed. During normal operations the valves 9 and 24 will be closed and the valve 10 will be open. The pump 2 will, in this instance, be in operation, and the pump 1 will be used merely as a stand-by pump for use in case of a break down

of the pump 2. The drilling fluid will be taken from the pit 5 through the suction line 4 and the valve 17 will be lifted from its seat into position to clear the discharge 12. This lifting of the valve will, under normal conditions be automatic and the drilling fluid will flow in through the casing 11 into the pump and will be discharged out through the line 7 and through the delivery pipe 8 into the well. Should it be desired to increase the pressure of the liquid being delivered into the well, the valve 24 may be opened and the pump 1 started. The drilling fluid will then be drawn in through the suction pipe 3 and forced through the pipes 6 and 22 into the casing 11 between the valve 17 and the closed end of said casing and this will force the valve 17 onto, and close, the seat 16 and the fluid under pressure will be delivered into the pump 2 which, at the same time, is operating and the liquid subjected to the combined pressure of both pumps will be forced out of the line 7 into and through the delivery line 8 and onto the standpipe and thence down through the drill stem to the bottom of the well and out as hereinabove explained.

The use of the valve mechanism herein described has been illustrated in connection with well drilling operations, but it may be employed for compounding pumps for delivering liquid under high pressure for any other similar purpose.

The drawing and description disclose what is now considered to be a preferred form of the invention by way of illustration only while the broad principle of the invention will be defined by the appended claims.

What we claim is:

1. A valve comprising a cylindrical valve casing which is closed at one end and provided with a flange pipe coupling at the other end, said body having an inlet adjacent the closed end, and a discharge outlet intermediate the ends thereof, a spider connected to the body by the flanges of said flange coupling, said spider having an axial valve stem bearing and a valve seat arranged transversely of the body, a valve stem reciprocable through the body, closed end, and bearing, a valve on the stem movable into one position to cooperate with said seat to close the end of the body and to allow fluid flow from the inlet to the outlet, and to another position to allow fluid flow from the outlet through the body and spider.

2. A valve comprising a cylindrical valve casing which is closed at one end and provided with a flange pipe coupling at the other end, said body having an inlet adjacent the closed end, and a discharge outlet intermediate the ends thereof, a spider connected to the body by the flanges of said flange coupling, said spider having an axial valve stem bearing and a valve seat arranged transversely of the body, a valve stem reciprocable through the body, closed end, and bearing, a valve on the stem movable into one position to cooperate with said seat to close the end of the body and to allow fluid flow from the inlet to the outlet, and to another position to allow fluid flow from the outlet through the body and spider, the outlet being larger in diameter than the thickness of the valve whereby fluid may be by-passed around the valve when the valve is opposite the outlet.

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