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MANIFOLD VALVE FOR SLUSH PUMPS
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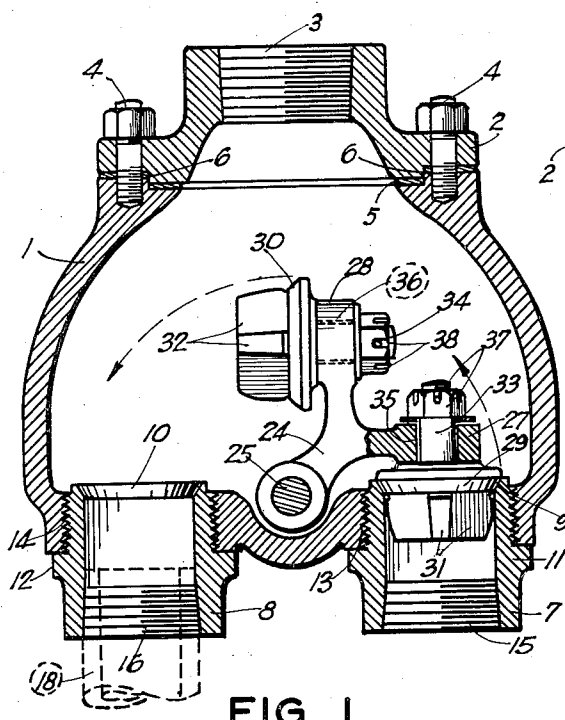


FIG. 1.

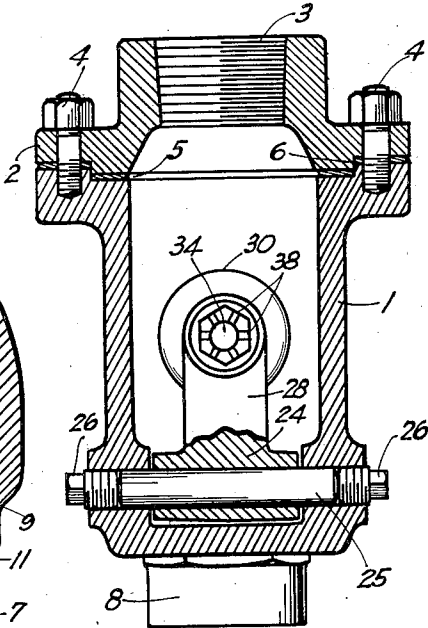


FIG. 2.

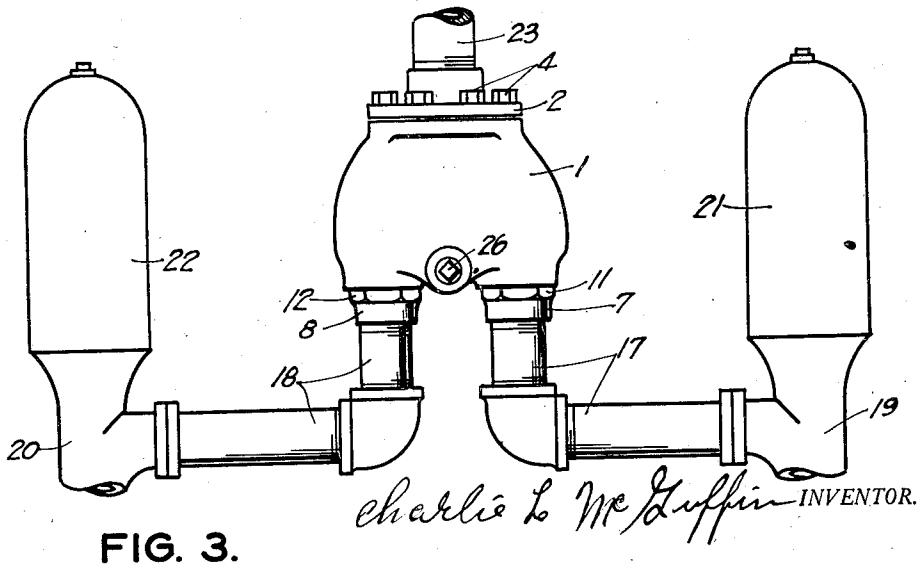


FIG. 3.

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UNITED STATES PATENT OFFICE

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MANIFOLD VALVE FOR SLUSH PUMPS

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1 Claim. (Cl. 277—20)

My invention relates to improvements in manifold valve for slush pumps especially adapted for use in drilling high pressure oil and gas wells.

The principal objects of my invention are to provide a device of this character which is positive in action, simple and inexpensive in construction; new, novel and easily operated; which is strong, durable, reliable and of evident utility; which cannot easily get out of order and is efficient for the purposes for which it is intended; to provide a valve having direct connection with two slush pumps by means of two renewable bushing members forming valve seats; to provide two valves so mounted upon a swinging arm that when one valve is seated and its axis is in a vertical plane the other valve will be unseated and its axis will be in a horizontal plane; to provide sufficient play in the mounting of the said valves on the said swinging arm so as to make positive the seating of the said valves; and to provide inexpensive, easily renewable repairs for the parts that wear out.

With these and other objects in view my invention consists of the construction, novel features and combination of parts hereinafter more fully described, illustrated in the accompanying one-sheet drawing and pointed out in the claim here-to appended. Various changes in the form, proportion, size, shape, weight and minor details of construction, within the scope of my invention may be resorted to without departing from the spirit or broad principle of my invention or yielding any of its benefits.

In the accompanying drawing Figure 1 is a side view of the device in section; Fig. 2 is an end view in section and Fig. 3 is an exterior view showing the connections to two pumps.

In the following description like reference numbers designate like parts in all the figures, and it is to be understood that the drawing is to be interpreted as being illustrative and not restrictive.

In the rotary method of drilling oil and gas wells, powerful pumps are employed to circulate the drilling, mud or slush down through the drilling stem or pipe to the cutting tools or cones attached to the bottom of said stem. The drilling fluid or mud is forced out of the stem at the bottom where it picks up the particles of rock, sand, etc., encountered by the cutting tools and carries these cuttings back up to the surface slush pits. The coarse cuttings settle in the slush pits and the mud or slush is circulated again and again. The valves and other parts of the slush pumps are continually wearing out due to the abrading action of

the grit contained in the mud being circulated, hence these valves need replacing at frequent intervals. If the circulation is stopped it is difficult, especially in wells a mile or more in depth, to start again so in order to insure continuous circulation two pumps are connected to the drill stem. Then when one is being repaired the other will be in service. It is necessary to switch instantly from one pump to the other. My improved manifold valve will accomplish this of itself. It is so constructed that the parts of said valve which are subject to wear can be replaced at little expense in labor and material and with only slight interruption to continuous service.

One embodiment of my invention is shown as follows: Manifold body 1 is closed at the top by flanged removable cover 2 having a threaded connection 3 for a pipe 23 leading to the goose neck for attachment to the drilling stem. Bolts 4 secure cover 2 to the body 1 and a gasket 5 is seated between said members 1 and 2, offset shoulder 6 insuring correct registration of the said parts. Two identical bushings 7 and 8 are screw connected to the bottom of body 1, having ground valve seats 9 and 10 formed at their upper ends. Each bushing is provided with a hexagonal flange 11 and 12 to form a tight connection between said bushing and body 1 by means of a wrench, external threads 13 and 14 seating in like threads in the said body 1. Internal threads 15 and 16 on said bushings 7 and 8 provide for pipe connections 17 and 18 to pumps 19 and 20, not fully shown in Fig. 3 except by air chambers 21 and 22. Pipe 23 seated in threads 3 of cover 2 connects the manifold valve to the goose neck leading to the drill stem.

As can best be seen in Figs. 1 and 2, swinging arm 24 is mounted upon pivot pin 25 adjustably held between plugs 26, screwed into the walls of body 1. Swinging arm 24 is provided with two 40 branches 27 and 28 to which are attached valves 29 and 30 respectively. Each valve is provided with a four-wing guide 31 and 32 for insuring the seating of the said valves in ground valve seats 9 and 10. Bolts 33 and 34 on said valves 29 and 30 are smaller than holes 35 and 36 in branches 27 and 28 in order to allow sufficient play to insure positive seating of said valves under all working conditions. Castle nuts and cotter keys 37 and 38 are seated on bolts 33 and 34 so as to allow slight axial play of said valves and further the positive seating of the valves.

In Fig. 1 is illustrated the position of the valves 29 and 30 when pump 19 is closed down and pump 20 is circulating the drilling fluid or mud through 55

the bushing 8, body 1 and out through cover 2 and pipe 23 and thence to the drilling stem. The drilling fluid passing through the body 1 is under several hundred pounds pressure in order to keep up the circulation and this internal pressure holds valve 29 securely in closed position while repairs and replacements are being made on pump 19. When pump 20 is closed down and pump 19 is opened up arm 24 and its attached valves will swing over automatically in the direction indicated by the arrows until valve 30 will be seated in ground valve seat 10, thus closing the connection to pump 20 and allowing any necessary repairs to be made thereon. The unseated valve, as 30 in Fig. 1, is out of the direct line of flow of the drilling mud and will be subject to very little wear. The valve seat 10 on bushing 8 is larger than the pipe 18 from pump 20, being equal to the external diameter of the said pipe 18 and will therefore not be subject to much wear. But should these members 8 and 30 or 7 and 29 wear out they may be easily replaced at very little expense in labor and material.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

A slush pump manifold valve of the class described, including a manifold body having a

flanged cover provided with a threaded connection for an outlet pipe; bolt and gasket means for holding and securing said cover to said body; offset shoulder means for registering said cover and body in proper alinement, the base of said body having two symmetrically placed threaded openings; bushings adapted for seating in said openings and having ground valve seats formed at their upper, inner ends; hexagonal flanges on said bushings for removably seating said bushings in said body; a swinging arm mounted upon a pivot pin centered between said bushings and in the plane of the said ground valve seats; adjusting plugs at both ends of said pivot pin; said swinging arm having two branches placed at right angles to each other, each of said branches having a hub opening for receiving a bolt of smaller diameter than said opening; a valve integral with said bolt and so secured to each of said branches by a castle nut and cotter key as to have some axial movement; a four wing guide on each of said valves for centering said valves in said valve seats, said swinging arm being adapted to automatically and alternately close the connection to one of said bushings by fluid pressure from the connection of the other of said bushings.

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