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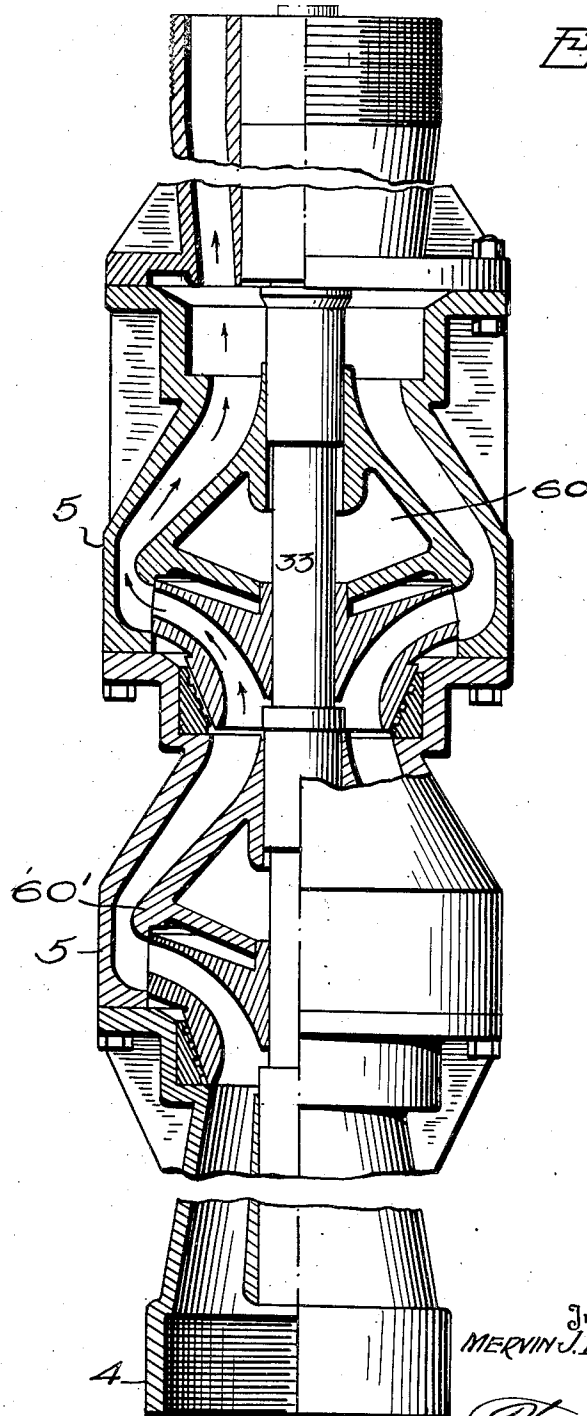
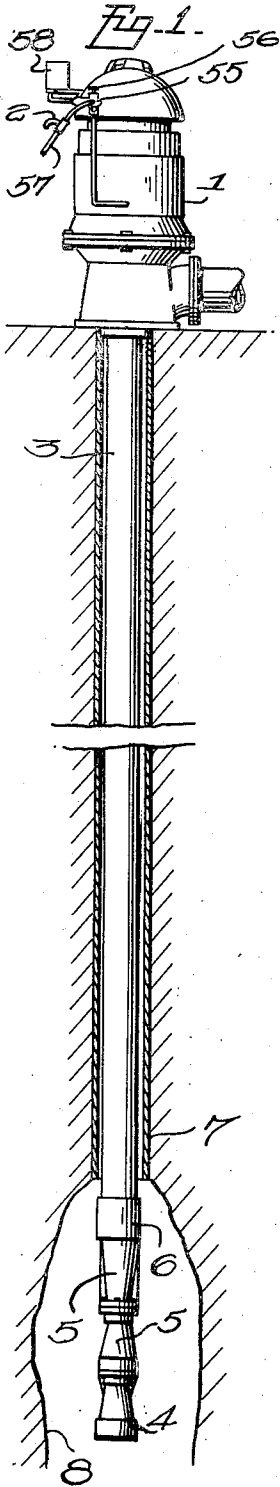
M. J. FULTON

2,210,401

PUMPING MECHANISM

Filed June 9, 1936

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

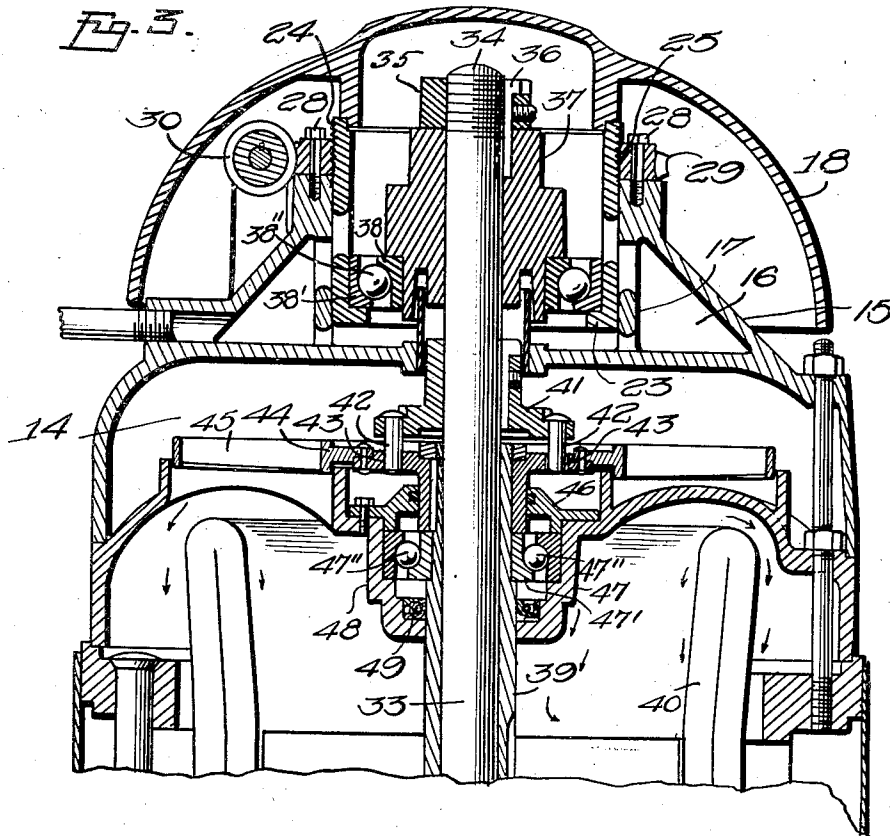
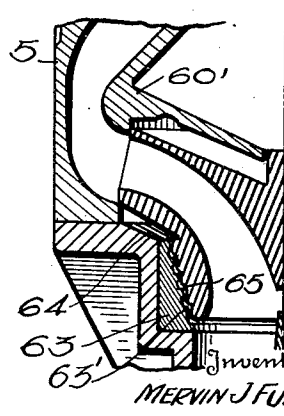
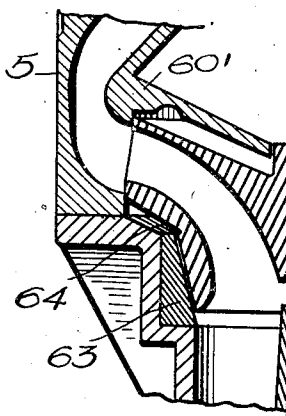
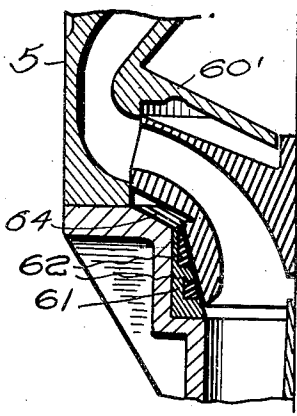


Fig. 5<sup>a</sup>

Fig. 5<sup>b</sup>

Fig. 5<sup>c</sup>



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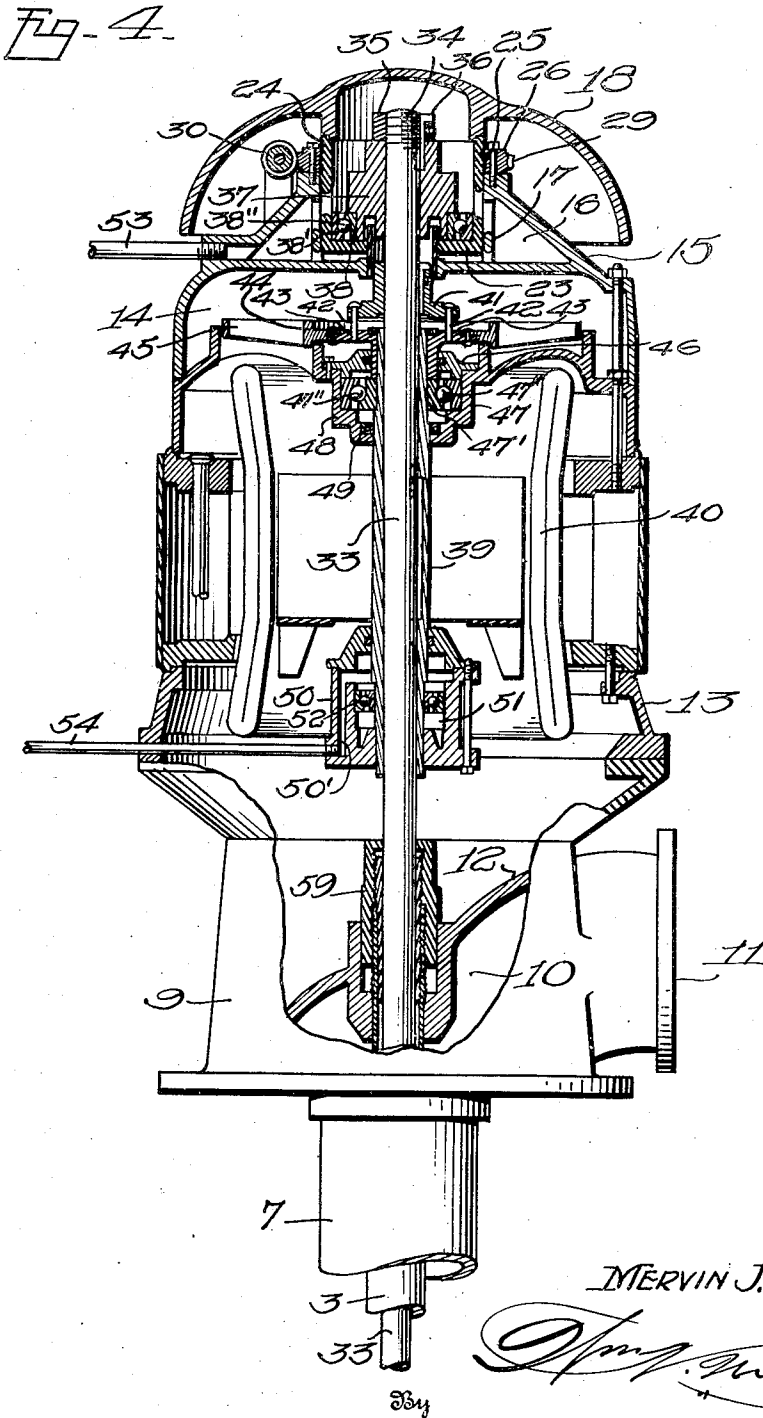
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Fig. 6.

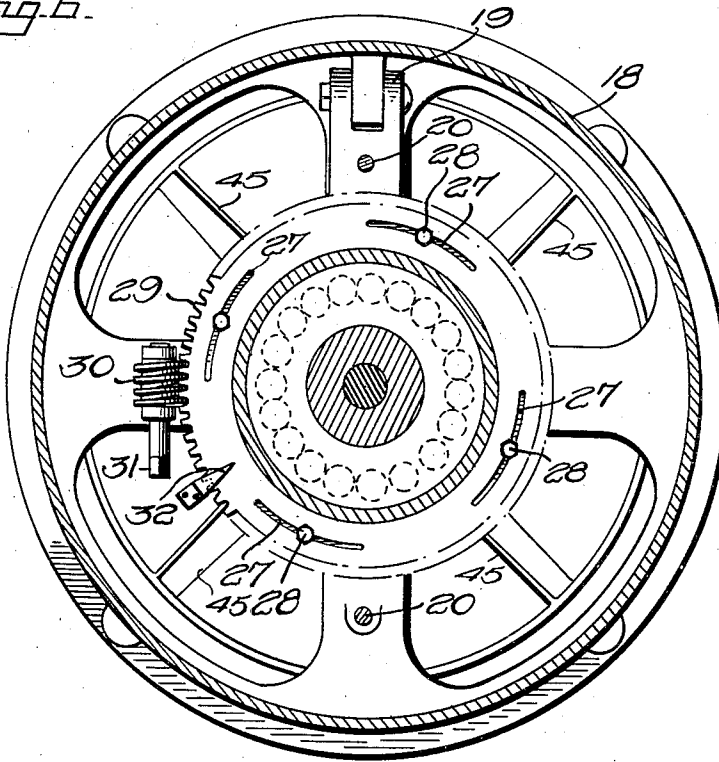


Fig. 7.

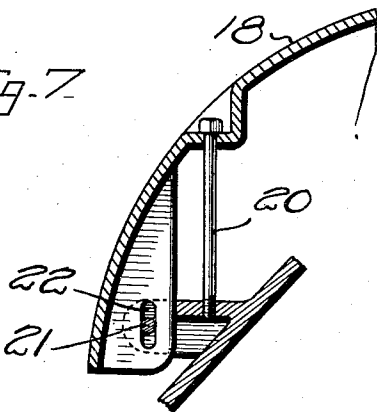
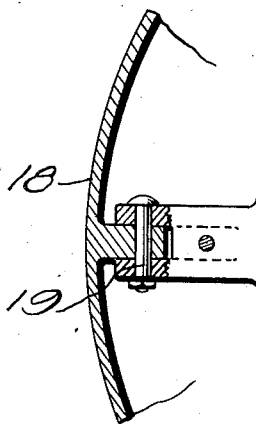


Fig. 8.



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## UNITED STATES PATENT OFFICE

2,210,401

## PUMPING MECHANISM

Mervin J. Fulton, Tulare, Calif.

Application June 9, 1936, Serial No. 84,368

2 Claims. (Cl. 103—87)

My invention relates to improvements in pumping mechanisms, and refers particularly to a pumping mechanism adapted for deep water well operations.

5 The present invention covers improvements upon the invention shown, described and claimed in the application for patent filed by me on October 28, 1935, Serial No. 47,194.

10 The aim or purpose of this invention is to insure a more useful, practical and efficient pumping mechanism with the same general objects in view disclosed in said application.

One of the main objects of my invention is the provision of a lateral adjustment mechanism 15 which will allow the adjustment of the impeller shaft, while said shaft is in motion, to raise or lower the impellers with reference to the seat for such impellers to allow dirt, sand, gravel or other foreign matter to be discharged before the flow 20 of pure water and thus prevent injury to the impellers and contiguous parts of the pump mechanism.

Another object of my invention is the provision of a lateral adjustment mechanism having means 25 for raising and lowering the shaft carrying the impellers without stopping the pump or interference with the general operation of the pump while pump is operating, thus saving a great amount of time, labor and money usually caused 30 by this operation.

Another object of my invention is the provision of a pumping mechanism which by reason of its ease of adjustment of the impeller shaft while it is in motion will save much wear and 35 tear upon the impellers and associated parts and thereby impart durability and long life to the working parts of the pump mechanism.

Another object of my invention is the provision of a pumping mechanism of the character stated 40 which will provide efficient lubrication of all working parts under all conditions and which mechanism in every respect will prove practical, desirable and efficient.

Another object of my invention is the provision 45 of a full floating lateral adjusting mechanism of character stated which will provide efficient cooling of the thrust bearing carrying the pump shaft on account of said thrust bearing being above the heat of the electric motor and which provides more air space around thrust bearing.

Another object of my invention is the provision 50 of a full floating lateral adjusting mechanism, that will indicate the amount of wear on the impellers by the location of the adjusting mechanism stated.

Another object of my invention is the provision of a full floating lateral adjusting mechanism of character stated which will provide for the lateral adjustment of the impeller shaft for the purpose 5 of taking up wear (without taking the pump apart or stopping the operation) between the face of deep well turbine pump impellers and the seat for the face of the impeller thereby preventing water from by-passing or short-circuiting between the face of the impellers and their seats. 10

Another object of my invention is the provision of a lateral adjusting mechanism which contains the main thrust bearing of the pump or impeller shaft independent of the electric motor which 15 relieves all hydraulic thrust and shaft weight off the motor, thereby making the motor more efficient and giving longer life to both motor and pump thrust bearings. The pump shaft thrust bearing in my invention could fail and no damage would be done to the motor due to said bearing 20 being independent of the motor. 30

With these objects in view my invention consists of a full floating lateral adjusting mechanism of the character and for the purposes stated embodying novel features of construction and 25 combination of parts, substantially as described and claimed and as shown in the accompanying drawings, in which:

Figure 1 represents an elevation of the complete pumping mechanism in position for operation. 30

Fig. 2 represents an enlarged sectional view of the inlet nozzle or element with the impellers shown in operative position.

Fig. 3 represents an enlarged sectional view of 35 the upper portion of the casing or housing and enclosed mechanism to clearly show details of construction.

Fig. 4 represents a sectional view of the complete housing or casing and the enclosed mechanism. 40

Figs. 5a, 5b and 5c represent detail views of forms of seats for the impellers and the impellers in their relation to said seats.

Fig. 6 represents a horizontal sectional view 45 through the top section of the pump casing with the operating worm, shaft raising and lowering mechanism and indicator shown in plan.

Fig. 7 represents a detail view of a portion of the cover and the means for locking or retaining 50 said cover when closed, and

Fig. 8 represents a detail view of the hinge connection for the cover.

Referring by numeral to the drawings in which the same numerals of reference are used to denote 55

the same parts in all the figures of the drawings:

The numeral 1 designates the housing or casing of my pumping mechanism, 2 the lubricating means, 3 the supply pipe leading to the base of said casing, 4 the inlet member or nozzle having the pair of impeller cases 5, 6 the connecting sleeve or coupling between the inlet member and supply pipe and 7 the casing which fits in the well 8 and completely surrounds the said supply pipe 3 and serves as a protecting medium, all as shown in Figure 1 and being the general composition of my pumping mechanism as a whole.

The casing or housing comprises the lower section 9, having the conduit 10 leading to the discharge spout 11 and having the division wall 12, and upon this base section is mounted and secured the intermediate rotor enclosing section 13, which is surmounted by the lower chambered portion 14 of the top section 15, said top section 15 being formed with an oil chamber 16 and being further provided with a seating or guiding portion 17.

It will thus be noted that the housing or casing of my pumping mechanism comprises the lower or base section, the intermediate or rotor section, and the top section, and upon said top section is mounted the dome 18 through the medium of the hinge 19 at one side, while opposite said hinge connection the dome is retained in closed position by means of the rod 20 and pin 21, passing through slot 22, said slot permitting the use of a pin, or a flat key or wedge as found most desirable.

From this construction it will be noted that the dome surmounts the top section and is normally held in locked position by means of the rod 20 and the pin 21, but may be readily raised or lowered when required by releasing pin 20, and withdrawing pin 21, which allows the cover to be opened or closed on its hinge 19.

Mounted in the cylinder, seat or guide portion 17 is the inverted shell or cartridge 23 having on its outer upper edge screw threads 24 with which engage the screw threads 25 on the inner face of the ring 26 formed with the series of curved slots 27 in which fit the pins 28, and upon its outer edge said ring is formed with teeth 29 with which engage the worm 30 having a keyed stud 31 for the application of a suitable implement for imparting partial rotation to said ring and causing a vertical movement of the said shell or cartridge 23, which distance of movement is indicated by the pointer 32.

From this construction it will be noted that the shell or cartridge is mounted for vertical movement in the guide in the upper portion of the housing or casing to permit vertical adjustment of said shell or cartridge.

Passing entirely through the housing or casing is the rotary shaft 33 which has the upper threaded end 34 receiving a nut 35 and locked in position for set adjustment by means of the key 36 and this nut rests upon the head or block 37, which forms a support and said support carries the inner ball track 38 which cooperates with the outer ball track 38' and the ball bearings 38''.

Mounted to surround the shaft is the sleeve 39, which is rotated through the medium of the rotor 40, and upon said shaft is secured the upper flange plate 41 carrying pins 42 which slide in openings 43 of the hub 44, of the fan 45.

It will be noted that plate 44 is keyed to sleeve 39, and transmits power therefrom to shaft 33, through pins 42, and plate 41.

The fan 45 is thus located above the motor

and directs a current of air down to the motor and insures the motor being kept in a cool condition.

Leading to the oil compartment 16 of the upper or top section 15 is the lubricant supply pipe 53, while leading to the lubricating chamber 50' of the case 50 is the lubricating pipe 54. These lubricating pipes lead from the valve case 55 provided with the regulation valve 56 and to which leads the water cooling pipe 57 while the oil tank or feed element 58 is mounted in proper relation to feed the oil through the valve mechanism to the oil feed pipes 53 and 54.

The lubricating system of my pumping mechanism is of paramount importance as it insures the lubricant being supplied in the proper quantity, the supply governed or regulated and the temperature of the lubricant being of the proper fluid condition in all kinds of weather.

From this construction it will be evident that the oil is properly fed to the ball bearings at the upper end of the rotary shaft, intermediate and contiguous to the fan and rotor and to the lower portion of said shaft, which shaft passes down through the bearing 59 throughout the entire length of the supply pipe and at its lower end carries the duplicate or twin impellers 60 and 60', as most clearly shown in Fig. 2.

The impellers are mounted on the line shaft 33, as clearly shown in Figure 2 in the impeller cases 5. As shown in Figure 5a, the cases have seated therein the rings or gaskets 61 in which fit the pair of rings 62, while in Figure 5b is seated a ring or gasket 63, and in Figure 5c is seated a ring or gasket 63, having a corrugated face 63', which coacts or fits in the corrugated face 65, of the impellers.

In all forms of the impellers as shown in Figures 5a, 5b and 5c wear rings 64 are employed and mounted above the rings noted, and all of said rings or gaskets are made of suitable material, such as rubber or soft lead, as found most practical and desirable in producing the water-tight joint.

From the foregoing description, taken in connection with the drawings, the operation of my pumping mechanism will be readily understood and it will be noted that the rotor imparts a rapid rotation to the shaft which carries the impellers and that such impellers are capable of being set and fixed initially in proper relation to the valve seats in the inlet member or nozzle, and that such impellers by raising of the supporting shell or cartridge will permit the discharge of any foreign matter preceding the flow of clear water, and that the vertical adjustment can be made to any degree to take up wear upon the faces of the impellers to bring such faces in proper relation to the faces of the seat rings to obtain the most efficient results.

It will be apparent that the placing of the fan in the desired relation to the rotor will insure a draft of cool air to the rotor and other enclosed mechanism to keep the moving parts of said mechanism in a proper cooled condition.

It will also be noted that my lubricating system ensures the supply of a proper amount of lubricant to the moving parts of my mechanism and that such lubricant under all conditions of weather will be supplied at the desired temperature to insure the most efficient results.

The many advantages of my pumping mechanism will be readily understood and appreciated by all skilled and acquainted with such mecha-

nism and further comment is deemed unnecessary.

The novel and most important feature of my pumping mechanism resides in the mechanism for adjusting the line shaft to set the impellers at the exact place desired in the bowls or cases, and the adjustment is effected with absolute accuracy while the pump is in operation.

The open top of the casing places the adjusting mechanism where it is in plain view and accessible for moving the shaft to adjust the impellers in their cases during the running of the pump and thus to perfectly regulate the flow of water through the outlet of the casing, or to shut off the flow.

The adjusting mechanism for the line shaft and impellers is capable of indicating the position of the impellers in the cases through the open top of the casing and the adjusting mechanism is only capable of moving the impeller the set space allowed in said impeller cases.

I claim:

1. A pumping mechanism of the character described, comprising a casing, composed of a base section provided with an outlet, an intermediate motor enclosing section and a top section, a supply pipe leading to the base section, impeller cases in said supply pipe, a line shaft passing through the supply pipe and casing, impellers on said line shaft located in said impeller cases, a motor on said line shaft for rotating said shaft and allowing a vertical movement of the shaft independent of the rotation thereof during the operation of said motor, a vertical cylindrical wall in the top section, a shell seated and vertically movable in said wall and forming the support for the upper end of said line shaft, threads on the upper outer edge of said shell above the

top edge of said cylindrical wall, a ring resting on said top edge of said cylindrical wall and having threads on its inner edge engaging the threads on the shell, teeth on the outer edge of said ring, a worm engaging said teeth to partially rotate said ring, a series of curved slots in said ring, and pins fitting in said slots and formed with heads to hold the ring in proper relation to the shell.

2. A pumping mechanism of the character described, comprising a casing, composed of a base section provided with an outlet, an intermediate motor enclosing section and a top section, a supply pipe leading to the base section, impeller cases in said supply pipe, a line shaft passing through the supply pipe and casing, impellers on said line shaft located in said impeller cases, a motor on said line shaft for rotating said shaft and allowing a vertical movement of the shaft independent of the rotation thereof during the operation of said motor, a vertical cylindrical wall in the top section, a shell seated and vertically movable in said wall and forming the support for the upper end of said line shaft, threads on the upper outer edge of said shell above the top edge of said cylindrical wall, a ring resting on said top edge of said cylindrical wall and having threads on its inner edge engaging the threads on the shell, teeth on the outer edge of said ring, a worm engaging said teeth to partially rotate said ring, a series of curved slots in said ring, pins fitting in said slots and formed with heads to hold the ring in proper relation to the shell, and means adjacent to said ring for indicating the position of the impellers in said cases.

MERVIN J. FULTON.