

Sept. 17, 1935.

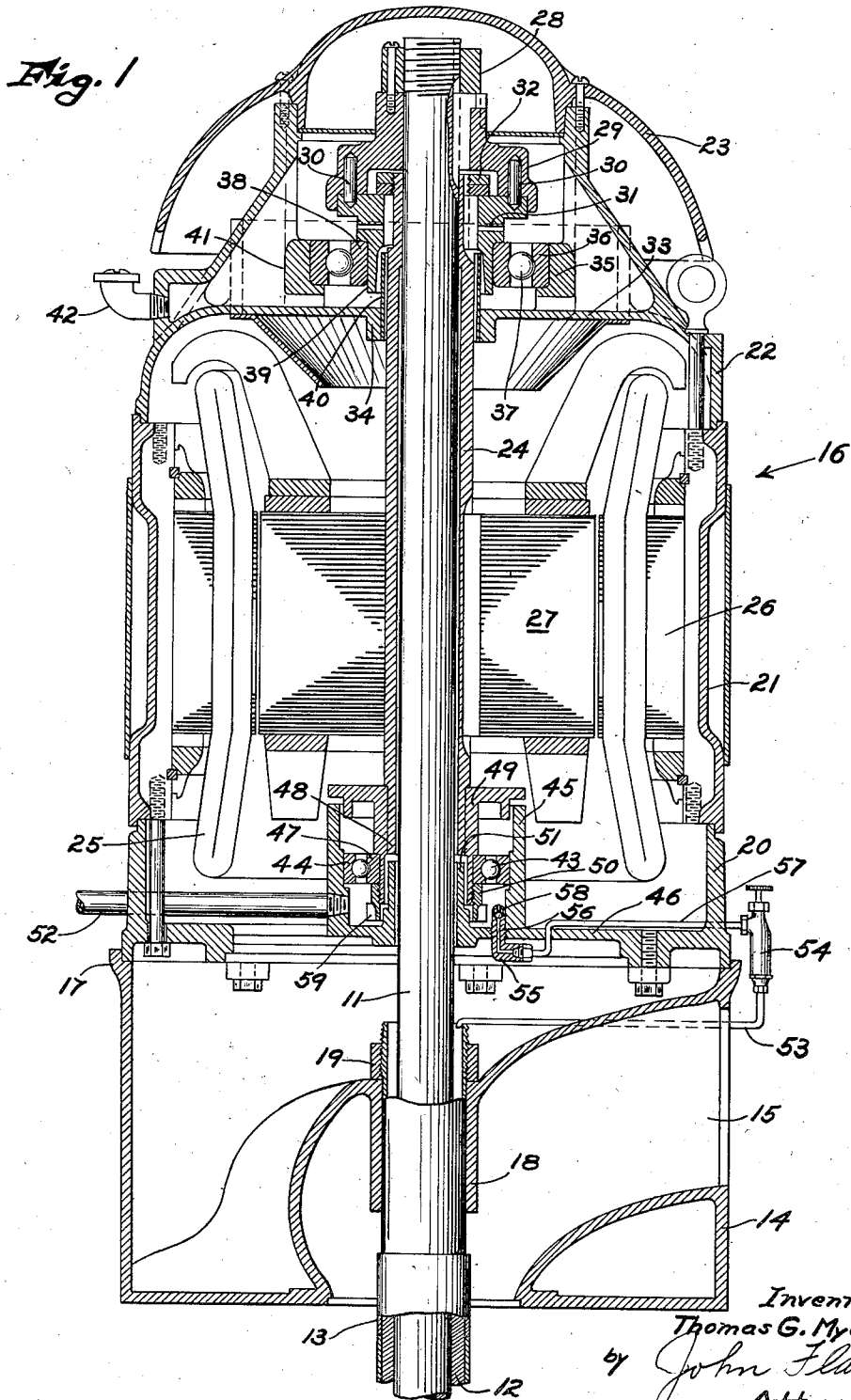
T. G. MYERS

2,014,661

OILING DEVICE FOR DEEP WELL PUMPS

Filed June 2, 1930

2 Sheets-Sheet 1



Sept. 17, 1935.

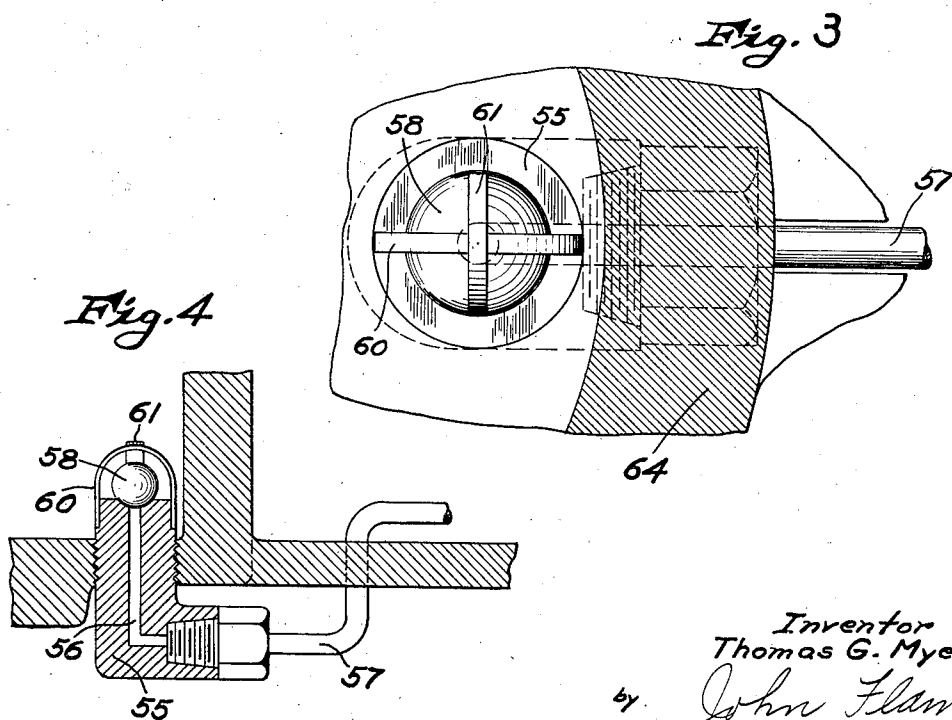
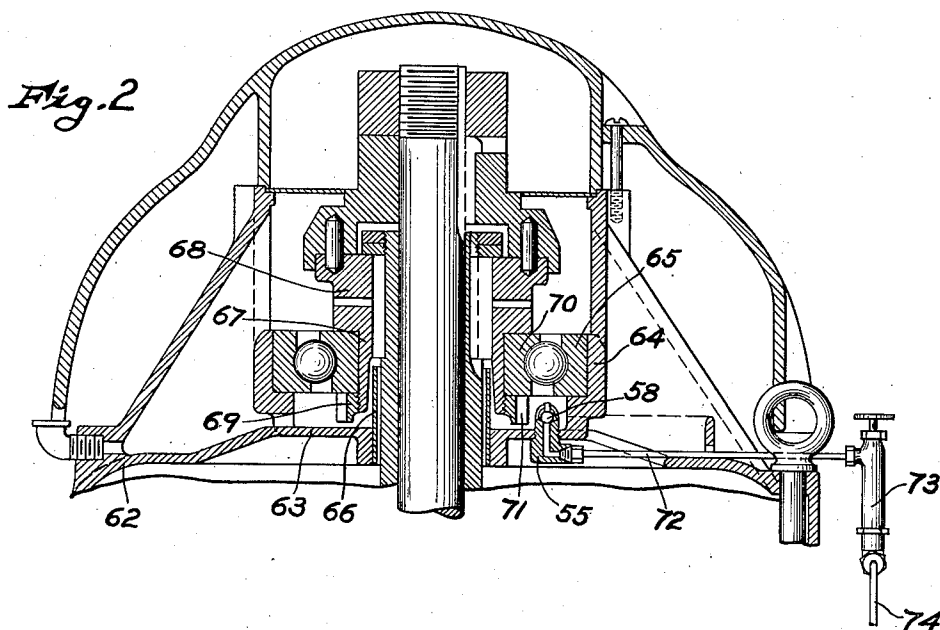
T. G. MYERS

2,014,661

OILING DEVICE FOR DEEP WELL PUMPS

Filed June 2, 1930

2 Sheets-Sheet 2



Inventor
Thomas G. Myers
by *John Flann*
Attorney

UNITED STATES PATENT OFFICE

2,014,661

OILING DEVICE FOR DEEP WELL PUMPS

Thomas G. Myers, Los Angeles, Calif., assignor,
by mesne assignments, to Food Machinery Cor-
poration, San Jose, Calif., a corporation of
Delaware

Application June 2, 1930, Serial No. 458,970

8 Claims. (Cl. 184—69)

This invention relates to deep well pumps, and especially to a device for supplying lubricant to the long vertical shaft that operates the pump in the well.

5 It is now common to provide a source of motion, such as a vertical motor at the top of the well for rotating the pump shaft. Such vertical motors of course can have their bearings readily supplied with oil, because they are easily available; but the pump shaft, extending deep into an earth bore, cannot be so readily treated. Attempts to pass oil continuously down along the shaft are not practicable; the oil thus supplied passes through into the bottom of the well and is wasted during periods of inaction of the pump. Of course, a manually operated oil dripper could be used to supply oil down the shaft only when the pump is operating; but it is obvious that the operator may forget or omit to operate such a device, and thus the shaft would be operated dry, with its attendant bad effects.

10 It is one of the objects of my invention so to arrange matters that the supply of oil takes place without manual interposition, and only when the pump is operating.

15 It is another object of my invention to secure these results by the aid of a simple and inexpensive device, that can be arranged to pass oil from either of the oil reservoirs at the top or bottom of the motor.

20 My invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideration of several embodiments of my invention. For this purpose I have shown a few forms in the drawings accompanying and forming a part of the present specification. I shall now proceed to describe these forms in detail, which illustrate the general principles of my invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of my invention is best defined by the appended claims.

Referring to the drawings:

25 Figure 1 is a sectional view of a pump head and electric motor in which my invention is incorporated;

Fig. 2 is a fragmentary sectional view of another form of my invention;

Fig. 3 is a fragmentary enlarged plan view of a portion of the structure shown in Figs. 1 and 2; and

Fig. 4 is an enlarged detail.

30 In Fig. 1 there is shown a shaft 11 which extends downwardly into an earth bore, and is guided by the aid of a series of bearing bushings 12,

secured to the inside of a pipe casing 13. Only a portion of a bushing 12 is shown, but it is to be understood that there are a number of such bushings spaced axially along the depending casing 13. The liquid pumped from the bore is passed through a pump head structure 14, having a discharge opening 15.

This head structure 14 can also conveniently serve to support a vertical motor structure 16 as by a flange 17. It can also support the top section 10 of casing 13, as by the aid of a hub 18, and a collar 19 threaded to the top of the casing 13.

Since my present invention is not concerned with the particular details of the motor structure, this structure will be merely generally outlined. It comprises a three part frame, including a base section 20, an intermediate section 21, and a top section 22. The top section 22 carries a cover 23 of bell form, to protect the motor against the weather when exposed. The motor windings 25 are shown as supported respectively in section 21 and on a rotatable sleeve 24. The stator windings 25 are appropriately supported in laminations 26 in section 21; and the rotor includes the laminations 27 keyed to sleeve 24.

25 In the present arrangement, shaft 11 is axially adjustable in sleeve 24 in which it is located, as by being threaded at its upper end. A nut 28 engages these threads and can be fastened to a member 29. This member is keyed to shaft 11 and is dowelled as by pins 30 to a flange 31 keyed to sleeve 24, and held tightly in place by clamp nuts 32.

The upper section 22 of the motor frame has a horizontal flange 33 provided with a central hub 34 that clears the sleeve 24. Supported on flange 33 is a ring support 35 for accommodating the outer, stationary race 36 of a ball bearing 37. The inner race 38 is fastened on a depending ring 39 of flange 31.

30 In order to provide an oil well for maintaining oil around the ball bearing 37, I secure a tube 40 into hub 34 and extending upwardly into ring 39 and to about the level of the oil to be maintained. Thus oil can be supplied to a space or well defined in general by this tube 40 and the outer wall 41 of the race support 36, and an oil pipe 42 can be used to supply oil to the space, through appropriate passageways leading into the oil well.

35 At the lower end of motor 16, another ball bearing, such as 43, can be provided. The stationary race 44 is supported in a tubular member 45, shown as formed integrally with the flange 46 that extends across the bottom frame

section 20. The inner race 47 is fastened to a depending ring 48 of a member 49 keyed to sleeve 24. This member 49 overlies the upper edge of member 45 so as to prevent any oil from
 5 spattering out. A nut member 50 is threaded on the ring 48 to keep race 47 tight against a shoulder on member 49.

In this case, an oil well or reservoir is formed by the tubular member 45, and a hub 51 formed
 10 integrally with flange 46. An oil inlet pipe 52 can be used to supply oil to this well. Hub 51 passes up into the depending ring 48 and above the oil level so as to prevent oil from passing down through the hub 51.

I arrange matters in such a way that the rotation of shaft 11 will serve to secure a supply of oil by gravity into the top of the casing 13, where it will distribute itself to the various bearing sleeves such as 12. I utilize gravity for this
 15 oil feed, through a pipe connection 53 extending to the top of casing 13, and including a manually set regulating valve 54 for controlling the rate of flow when conduit 56 is opened by the action of the motor. To produce the oil flow, I
 25 utilize a valve structure leading into the oil well and arranged to be normally closed when the pump is not operating, but which is open at least for part of the time when the shaft 11 rotates. This valve structure is preferably such that the momentum or friction of the oil in the well due
 30 to the motion of shaft 11, serves to unseat a valve closure, which reseats as soon as the motion ceases.

In order to accomplish this, I provide an oil
 35 valve structure 55 fastened in the bottom of the oil well, as by being threaded therein, and having a passageway 56, connected as by pipe 57 with the manual valve 54 and oil supply line 53. The top of this structure 55 forms a valve
 40 seat for a gravity valve closure 58 (Figs. 1 and 3) such as a ball valve. When the oil moves circularly in the oil well due to the rotation of shaft 11 and its associated parts, it produces a force sufficient to agitate the ball 58 and to allow
 45 oil to drop by gravity into the passageway 56. Although not absolutely essential, the swirling action of the oil can be enhanced by a series of depending paddles 59 on nut 50. A ball cage (Fig. 3) can be used to prevent the ball 58 from
 50 being carried laterally off its valve seat. This can be accomplished by providing a strap 60 that is fastened on the side of member 55, and a cross strap 61 fastened on top of strap 60 and depending over the ball 58.

The pipe 57 can be led out from section 29
 55 through appropriate passageways to the valve 54.

The operation of the device is apparent from the foregoing. While the pump is inactive, the ball 58 interrupts the flow of oil to the casing 19.
 60 When shaft 11 rotates, the ball 58 flutters on its seat, and permits a gravity flow from the oil well or reservoir. When the shaft ceases to rotate the ball seats itself by gravity, interrupting, or nearly interrupting, the flow of oil. If for any
 65 reason, it is desired to interrupt the oil flow permanently, as when repairs or removal are needed, valve 54 can be manipulated to accomplish this result.

It is not essential that the lower oil well be
 70 used as a supply of oil to the lower portions of shaft 11. In the form shown in Fig. 2, the upper oil well is used for this purpose. In this form, the top frame section 62 of the motor carries a flange 63 forming the bottom of a well.
 75 The outer wall of the well, as before, can be

formed by the support 64 of the stationary race 65, and by the tube 66 projecting into the depending flange 67 of the rotating ball race support 68. The nut 69, holding the rotating race
 70 in place can, if desired, be provided with a number of paddles 71 to agitate the oil in the well to unseat the ball 58 on member 55. This
 5 member leads the oil by gravity through pipe 72 to a manual valve 73. Thence pipe 74 can be led downwardly into the top of shaft casing 13. 10

Another advantage of this type of oiler is that it may be made to permit a very light flow at all times as for example, a drop an hour when the shaft is not rotating, and permit a rapid flow
 15 when the shaft is rotating. The advantage of permitting a light flow when the motor is inactive is that the small flow of oil keeps the shaft from rusting, and the bearings have some lubrication when the motor is first started.

I claim:

1. In a device for supplying lubricant to bearings from a reservoir associated with a rotatable shaft and above the bearings, a conduit for the
 20 lubricant leading downwardly from the reservoir, and a ball valve in the reservoir checking the passage of lubricant from the reservoir to the conduit, and adapted to be unseated in response
 25 to the motion of the lubricant in the reservoir when the shaft is rotating.

2. In a device for supplying lubricant to bearings from a reservoir associated with a rotatable shaft and above the bearings, a conduit for the
 30 lubricant leading downwardly from the reservoir, means forming a valve seat in the reservoir for the conduit, and a gravity valve closure for the seat, for checking the passage of
 35 lubricant from the reservoir to the bearings, and arranged to be unseated by the momentum of the lubricant in the reservoir, which lubricant is moved by the operation of the shaft.

3. In a device for supplying lubricant to bearings from a reservoir associated with a rotatable shaft and above the bearings, a conduit for the
 40 lubricant leading downwardly from the reservoir, means forming a ball valve seat in the reservoir for the conduit, a ball valve closure operating by gravity and cooperating with the seat,
 45 for checking the passage of lubricant from the reservoir to the bearings, and means acting when the shaft is rotating, to set the lubricant in the reservoir into motion to unseat the valve.

4. In a device for supplying lubricant to bearings from a reservoir associated with a rotatable shaft and above the bearings, a conduit for the
 50 lubricant leading downwardly from the reservoir, and a mechanism in the reservoir, checking the flow of lubricant through the conduit from the reservoir, and active to permit flow
 55 of lubricant in response to the movement of the lubricant in the reservoir, set up by rotation of the shaft.

5. The combination as set forth in claim 1, with the addition of means operated by the shaft for producing a large movement of the
 60 lubricant in the reservoir.

6. The combination as set forth in claim 2, with the addition of means operated by the shaft for producing a large movement of the lubricant in the reservoir.

7. An apparatus for controlling the flow of oil comprising an oil chamber as a source of
 70 supply, a freely movable ball valve in said chamber and a plug and valve cage in an integral unit for controlling the position of said ball valve with rotary means for agitating said lubricant 75

to move said ball laterally from its seat and permit a flow of oil through said valve.

8. In a device for supplying lubricant to separated bearings along a shaft from a lubricant reservoir above said bearings and associated with and serving to lubricate said shaft, a conduit for the lubricant leading downwardly from the reservoir to the first bearing and a normally closed valve mechanism in the reservoir for controlling

the passage of the lubricant through the conduit, said valve mechanism including a closure member active to check the flow of lubricant during all periods when the shaft is stationary and having movement to permit the flow of lubricant when said lubricant is agitated by the rotating shaft. 5

THOMAS G. MYERS.