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OILING DEVICE FOR TURBINE PUMPS.

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1,386,304. Patented Aug. 2, 1921.

Fig. 1

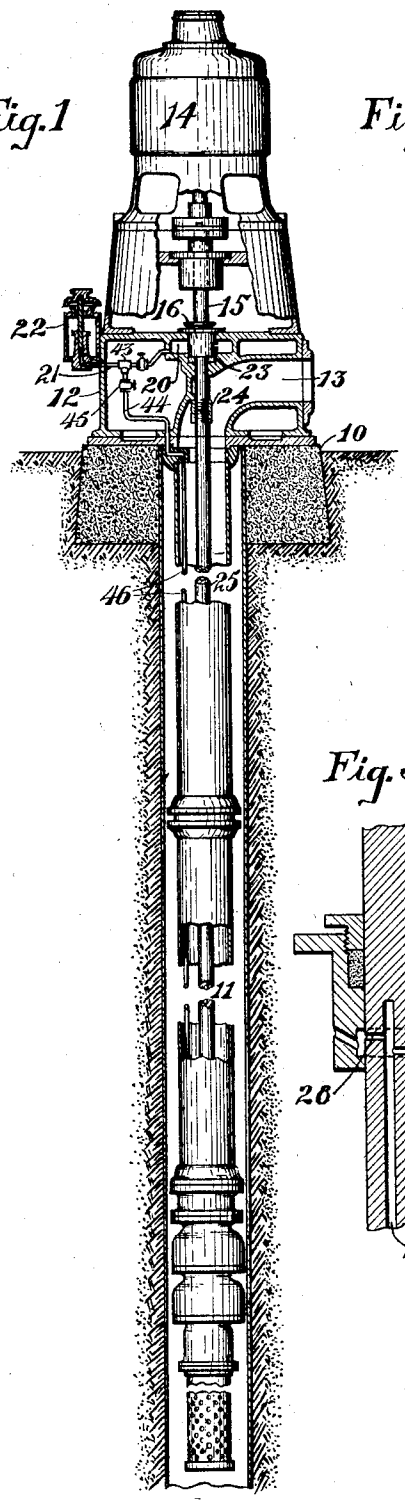


Fig. 2

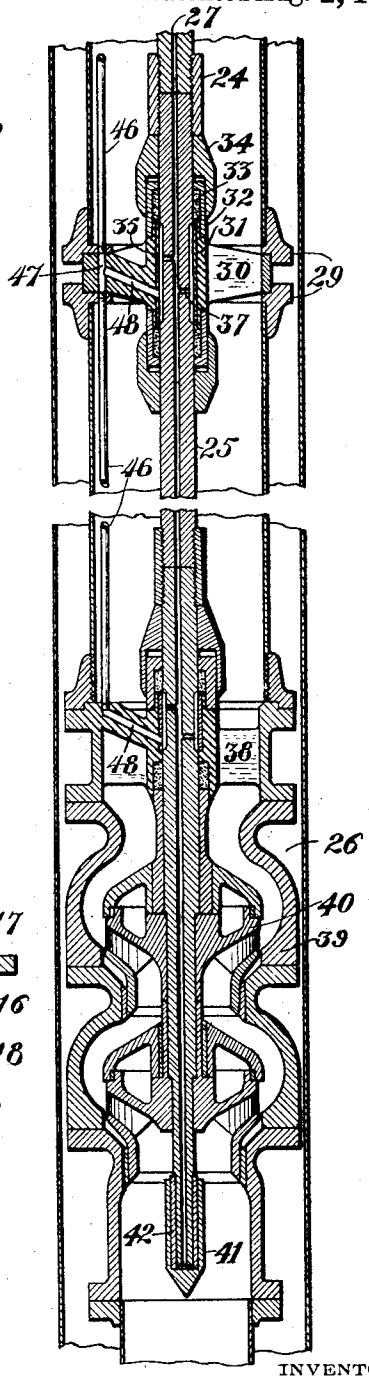


Fig. 3

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OILING DEVICE FOR TURBINE-PUMPS.

1,386,304. Specification of Letters Patent. **Patented Aug. 2, 1921.**

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To all whom it may concern:

Be it known that we, WILLIAM F. BARNICKOL and ALFRED W. ARCHER, citizens of the United States, residing at Stockton, in the county of San Joaquin and State of California, have invented new and useful Improvements in Oiling Devices for Turbine-Pumps, of which the following is specification.

This invention relates to a deep well turbine and particularly pertains to an oiling system therefor.

In that type of pump used within the casing of a deep well and operated from a remote power system above the ground, it is often a difficult problem to provide adequate lubrication for the driving shaft which extends down the well casing to the pump and the bearings of the moving parts of the pump itself.

It is the principal object of the present invention therefore, to provide simple means whereby a continuous flow of lubricant may be established to all of the bearing points of the shaft and pump irrespective of the remote position of these points in relation to the driving unit.

The present invention contemplates the use of a turbine pump formed in sections adapted to be lowered into a well casing and which pump is operated by a shaft connected at its upper end with a source of power supply, such as a vertical shaft, electric motor, said shaft being equipped with means whereby a continuous supply of lubricant may be conducted to the various bearing points therealong and to the pump.

The invention consists of the parts and the construction, combination and arrangement of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which:

Figure 1 is a view in vertical section and elevation showing fragmentary portions of a pump and its power plant and their relation to the well casing.

Fig. 2 is an enlarged view in central vertical section showing fragmentary parts of a well casing with the bearings of a pump and the oil conveying tube illustrated.

Fig. 3 is an enlarged fragmentary view in section showing the intake sleeve of the tubular shaft.

Referring more particularly to the drawings, 10 indicates a concrete base through which a well casing 11 extends. Mounted upon this base is an outlet block 12, having an angular eduction passage-way 13 leading therefrom and in communication with the mouth of the casing 11. The top of the block 12 forms a suitable sub-frame for an electric motor 14, which motor is equipped with a vertical drive shaft 15. This drive shaft extends downwardly through a bearing 16, more clearly shown in Fig. 3, and within which bearing a stuffing gland 17 is formed. Downwardly and inwardly extending passage-ways 18 are formed in the bearings 16 and communicate radially with a central lubricating chamber 19 surrounding the shaft 15. The bearing portion 16 extends through an oil reservoir 20 formed in the block 12 and which reservoir is provided with a feed pipe 21, leading to a mechanically or manually operated feed pump 22. The bottom wall of the reservoir 20 forms a guide bearing 23 through which the shaft 15 extends and by which it is supported for rotation while standing vertically.

A coupling sleeve 24 secures the lower end of the shaft 15 to a length 25 of the drive shaft which extends into the well and it will be understood that successive lengths may be disposed in longitudinal alinement and secured within the casing as dependent upon the depth of the well and the position of a pump 26 therein. The shaft section 15 is formed with the central longitudinal passage-way 27 as shown in Fig. 3. The upper end of this passage-way communicates with radial ducts 28 through which oil may flow from the surrounding chamber 19 into the central passage-way 27, and then gravitate down the interior of the shaft to be distributed in a manner to be hereinafter explained.

The pump casing 11 is formed with companion flanges 29 which have outwardly flaring portions and between which bearing spiders 30 may be secured. It will be understood that these spiders will be interposed between the lengths of the pump casings,

and it will be further seen by reference to Fig. 2 that these spiders support central tubular bearings 31. The shaft lengths 25 extend through these bearings and thus the entire length of the driving shaft is supported for rotation without permitting it to have lateral vibration. The upper and lower ends of the bearings are covered with caps 32, within which packing glands 33 are inclosed and by which the opposite ends of the bearings are practically sealed. Slipped over the caps 32 are conical shields 34 which flare outwardly and are fitted with flanged portions circumscribing the caps. These shields prevent foreign matter, such as sand and dirt, from passing into the bearings and grinding them.

Each of the bearings 31 is fitted with an inner bushing 35, while at the point of the bushing longitudinal glands 36 are formed in the face of the shaft 25 and act as distributers for lubricant passing out from the central opening 27 through ducts 37.

A lower length of shaft extends through a bearing spider 38, which is secured upon the upper unit of the pump casing, said unit being superimposed one upon the other and comprising an outer volute casing 39, within which a runner 40 may move. These runners are of course secured to the shaft 25 and act to elevate liquid from the bottom of the well to the eduction passage-way 13. The lower end of the shaft 25 rests within a bearing 41 which is equipped with a pressure chamber 42, permitting the lubricant to pass from the lower end of the shaft and to lubricate a bushing 42′ when the pressure of the lubricant within the shaft is in excess of a predetermined amount.

The feed pipe 21 is provided with a T 43 to which an auxiliary lubricating tube 44 is connected. This tube is fitted with a cut-off valve 45, by which a flow of oil may be maintained to the casing and directed down an oiling tube 46. This tube extends within the casing and is formed in sections terminating in the companion flanges of each casing section. The terminating ends of the tube 46 in the companion flanges are intended to register with vertical ducts 47 extending through the spider 13. These ducts are in communication with radially and downwardly extending glands 48 within which the lubricant may be pocketed and directed to the pump shaft. It will therefore be evident that the two modes of communication are provided, one carrying the lubricant down the center of the pump shaft and the other supplying it through the pump 46.

The operation of the present invention is as follows: The structure is assembled as indicated by Fig. 1 in the drawing, after which the motor 14 may be placed in action, oil may then supply the cylinder 22 and be forced into the reservoir 20 by a mechanically or manually operated pump, or if desired provision may be made for gravity flow of the lubricant to this reservoir. As the pump shaft rotates oil will be received by the ducts 28 of the shaft and conveyed down to passage-way 27, where it will be distributed through outlet ducts 37 to the various bearings of the shaft and the pump.

It will thus be seen that by employing a tubular drive shaft and providing means for continuously supplying a lubricant to the central passage-way thereof, an adequate lubricator of all the moving parts may be produced and thus an efficient operation of the pump maintained.

While we have shown the preferred form of our invention as now known to us, we wish it understood that various changes in the construction, combination and arrangement of parts may be made by those skilled in the art without departing from the spirit of the invention as claimed.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:—

1. An oiling system for deep well pumps, comprising a casing, a driving shaft having a bore extending the length thereof, bearings arranged along the lengths of the casings to support the shaft, and the shaft being provided with orifices extending between the bearing surfaces and bore of the shaft, a delivery tube extending down the well casing, and communicating with the bearing surfaces, and an oil supply connected with the bore at the upper end of the shaft and with the delivery tube.

2. An oiling system for deep well pumps, comprising a casing, a driving shaft having a bore extending the length thereof, bearings arranged along the lengths of the casings to support the shaft, and the shaft being provided with orifices extending between the bearing surfaces and bore of the shaft, a delivery tube extending down the well casing, and communicating with the bearing surfaces, an oil supply connected with the bore at the upper end of the shaft and with the delivery tube, a reservoir of oil connected with the bore at its upper end and means for forcing oil into the delivery tube.

3. An oiling system for deep well pumps comprising a passage - way extending through the drive shaft of the pump, in combination with an oil delivery tube extending down the well casing, radial ducts leading from said passage-ways at points within the bearings through which the shaft extends, a reservoir circumscribing the shaft and adapted to continuously deliver a liquid lubricant to the passage-way therein, and means for supplying lubricant to the reservoir and to the oil delivery tube.

4. An oiling system for deep well pumps

comprising a passageway extending longitudinally of the drive shaft of the pump, in combination with an oil delivery tube extending down the well casing, radial ducts leading from said passageways at points within the bearings through which the shaft extends, means for supplying lubricant to the passageway in the drive shaft and to the delivery tube, and longitudinal glands formed in the shaft adjacent its bearings and with which the radial ducts from the passageway of the drive shaft communicate.

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