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DEEP WELL PUMPING MECHANISM

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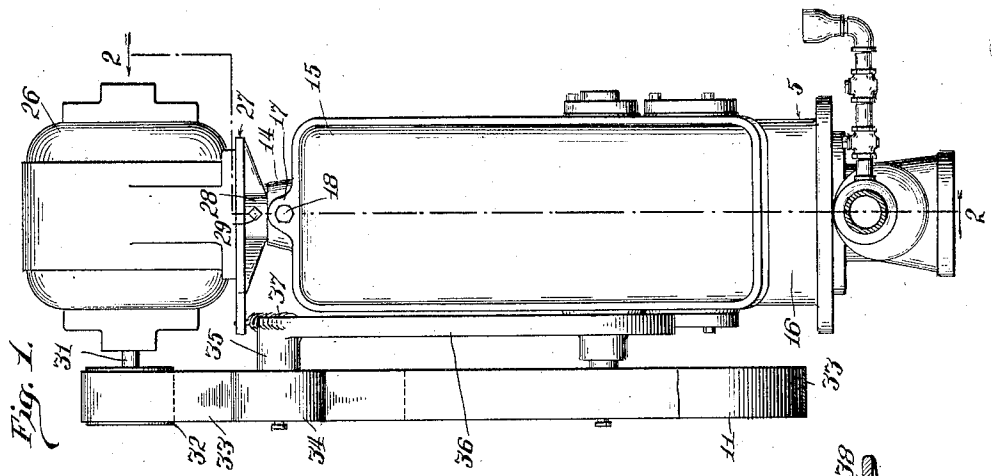


Fig. 1.

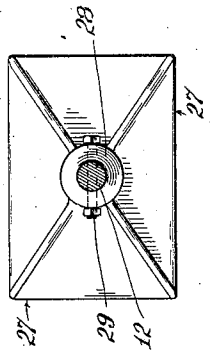


Fig. 3.

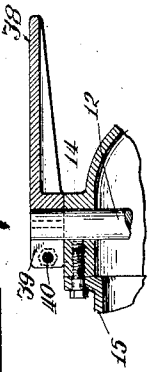


Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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DEEP-WELL PUMPING MECHANISM.

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My invention relates to the operation of deep-well pumping mechanism. Heretofore it has been common practice to operate the pistons of deep well pumps by means of a gear mounted in an oil tank or reservoir in the lower portion of a power head or casing, such gear being connected by a pitman with a vertically reciprocating cross-head connected with the upper end of a pump rod to which the pistons are attached, the gear itself being driven by means of a pulley mounted on a shaft extending through one side of the power head casing and operatively connected with the gear by a pinion carried by the shaft. The pulley has been driven by a belt from a steam engine or other source of power separate from the power head. To guide the cross-head during its reciprocation a guide rod has been provided disposed vertically in the power head. A power head of this description is shown and described in my pending application, Serial No. 655,475, filed August 3, 1923. The object of my present invention is to provide an improved construction and arrangement for operating the piston of pumping mechanism of the type referred to by which the motive power will be incorporated as a part of the power head unit, and by which also apparatus of this kind will be improved in other respects, as hereinafter pointed out. I accomplish this object as illustrated in the accompanying drawings and as hereinafter described. What I regard as new is set forth in the claims.

In the accompanying drawings,—

Fig. 1 is an end elevation of my improved apparatus;

Fig. 2 is a central vertical section substantially on line 2—2 of Fig. 1, the motor being shown in end elevation;

Fig. 3 is a bottom plan view of the motor support, the guide rod being shown in section; and

Fig. 4 is a sectional view showing a modified form of motor support.

Referring to the drawings,—5 indicates the frame or casing of the power head, the lower portion of which forms an oil reservoir, as indicated in Fig. 2, the inner wall of such reservoir being formed by a vertical partition 6. Mounted in said casing on a shaft 7 is a driving gear 8 which is rotated by means of a pinion 9 mounted on a shaft 10 journaled in suitable bearings in the side portions of the casing 5, preferably in the manner shown and described in my pending application hereinbefore referred to. The shaft 10 also carries a pulley 11, as best shown in Fig. 2.

Within the casing 5 is a vertically disposed guide rod 12, the lower end of which is stepped in a suitable socket formed in a boss 13, while its upper end extends through a boss 14 at the upper portion of the casing 5 and terminates a short distance above said boss, as shown in Figs. 2 and 4. At its side opposite that at which the gear wheel 8 is mounted the casing 5 is provided with a removable cover plate 15, the lower end of which is engaged by a flange 16 formed on the base of the casing, while its upper end is provided with a flange 17 which abuts against the boss 14 and is secured thereto by a set screw 18. Said set screw also engages the upper end of the guide rod 12 and holds it in place.

Mounted to reciprocate vertically on the guide rod 12 is a pump-actuating member in the form of a cross-head 19 which is provided at one side with an arm 20 connected by a pitman 21 with a wrist pin 22 carried by the gear wheel 8, so that rotation of said gear wheel reciprocates said cross-head. At its opposite side said cross-head is provided with an arm 23 to which is connected the upper end of a piston rod 24 which carries the usual pistons 25 by which the water is elevated.

The pulley 11 is driven by means of an electric motor 26 which is mounted on a support in the form of a base plate 27 shown in Figs. 1, 2 and 3. Said base plate is provided with a central opening surrounded by a depending annular flange 28, the opening being of such size that said base plate may be fitted on the projecting upper end of the guide rod 12, where it is secured by a bolt 29, as best shown in Fig. 2. The motor is secured to the base plate 27 by bolts 30.

The armature shaft 31 of the motor 26 carries a pulley 32 which is connected by a belt 33 with the pulley 11, so that the latter pulley is driven by the motor. The belt 33 is held taut by a belt tightener in the form of a roller 34 mounted on a crank 35 carried by an arm 36 which is pivoted upon the shaft 10, so that the roller 34 may swing in the vertical plane of the belt 33. A spring 37 having one end connected with the arm 36

and the other end with the motor support 27 serves to pull the roller 34 against the belt 33 and keep it under proper tension, as best shown in Fig. 2.

In Fig. 4 I have shown a modification of the motor support in which instead of using the base plate 27 having a hole at the center to receive the upper end of the guide rod 12, I employ a base plate 38 having a split socket 39 at one margin in which the upper end of the guide rod 12 is adapted to fit. By means of a bolt 40 extending through the separated lips of said socket the socket may be contracted and clamped on the guide rod 12 so that the base plate is firmly secured thereon.

From the foregoing description it will be seen that the motor is mounted on top of the power head either in alinement with the guide rod, or substantially so, so that the operating mechanism makes a very compact unit. The motor is easy to install, and the construction described provides a support for the motor without any additional machine work on the power head casing. Moreover, it makes practicable the carrying in stock of frames of one design that can be used either as a motor-driven unit, such as that shown and described, or can be used in connection with a source of power separate from the power head, as described in my said pending application. In the latter case the spring 37 would be omitted, and the belt tightener arm 36 would be swung down into operative relation to the belt connecting the pulley 11 with the engine or other source of power. By securing the guide rod 12 to the top and bottom of the casing, the casing is strengthened and made better capable of supporting the burden imposed upon it by mounting the motor as described.

What I claim as my invention and desire to secure by Letters Patent, is—

1. A pumping apparatus comprising a power head casing, a guide vertically disposed therein and secured to the top and bottom of the casing, a pump actuating member adapted to reciprocate on said guide, and a motor support mounted on the power head casing over the upper end of said guide.

2. A pumping apparatus comprising a power head casing, a vertically reciprocating cross-head in said casing, a vertically disposed guide for said cross-head extending above said casing, and a motor support mounted on the upper end portion of said guide.

3. A pumping apparatus comprising a power head casing, a guide disposed vertically therein and extending above said casing, a pump actuating member adapted to reciprocate on said guide, and a motor support secured to the upper portion of said guide.

4. A pumping apparatus comprising a power head casing, a guide disposed vertically therein and extending above said casing, a pump actuating member adapted to reciprocate on said guide, and a motor support having a hole adapted to receive the upper end of said guide and detachably secured thereto.

5. A pumping apparatus comprising a power head casing, a vertical guide disposed therein and extending above the upper end thereof, a cross-head adapted to reciprocate on said guide, a drive shaft mounted in said casing, means operated by said shaft for reciprocating said cross-head, a pulley on said shaft, a motor support mounted on said casing over said guide, and a motor on said motor support and operatively connected with said pulley.

6. A pumping apparatus comprising a power head casing, a vertical guide disposed therein and extending above the upper end thereof, a cross-head adapted to reciprocate on said guide, a drive shaft mounted in said casing, means operated by said shaft for reciprocating said cross-head, a pulley on said shaft, a motor support secured upon the upper end portion of said guide, and a motor on said motor support and operatively connected with said pulley.

7. A pumping apparatus comprising a power head casing, a guide disposed vertically therein and extending through the upper portion thereof, a motor support mounted on the upper end of said guide, a cross-head mounted to reciprocate on said guide, a shaft mounted in said casing, means driven by said shaft for reciprocating said cross-head, a pulley on said shaft, and a belt tightener comprising an arm pivoted on said shaft, a roller carried by said arm, and a spring connected with said arm and with said motor support.

8. A pumping apparatus comprising a power head casing, a vertical guide disposed therein and extending above the upper end thereof, a cross-head adapted to reciprocate on said guide, a drive shaft mounted in said casing, means operated by said shaft for reciprocating said cross-head, a pulley on said shaft, a motor support secured upon the upper end portion of said guide, a motor mounted on said motor support, a belt connecting said motor with said pulley, and a belt tightener comprising an arm pivoted on said shaft, a roller carried by said arm and adapted to bear on said belt, and a spring connected with said arm and with said motor support.

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