Jan. 19, 1943. S. A. BROWN ET AL 2,308,742

PUMP

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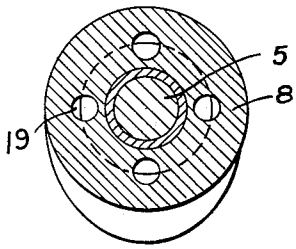



Fig. 3.

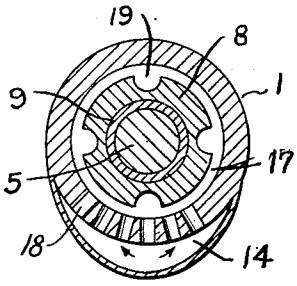



Fig. 4.

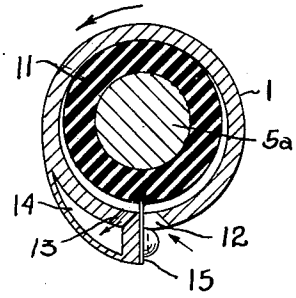



Fig. 5.

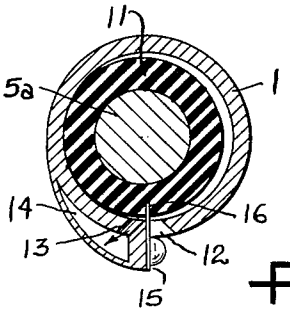



Fig. 6.

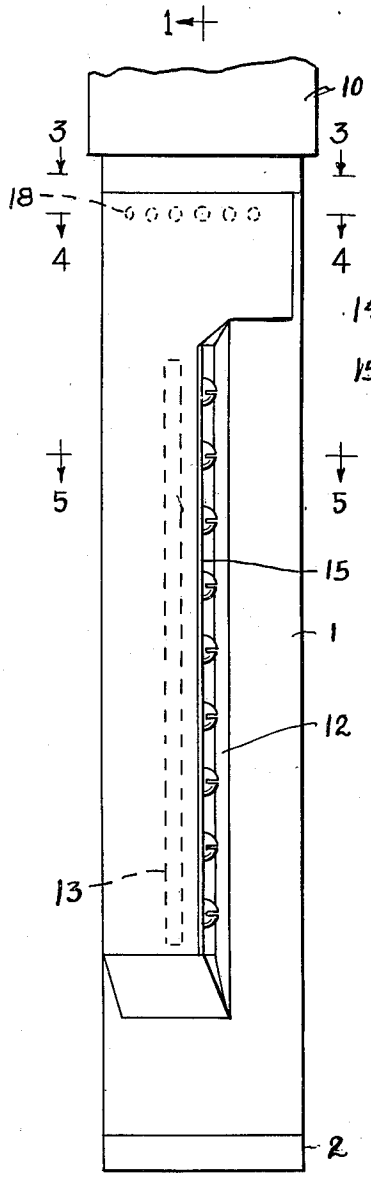



Fig. 2.

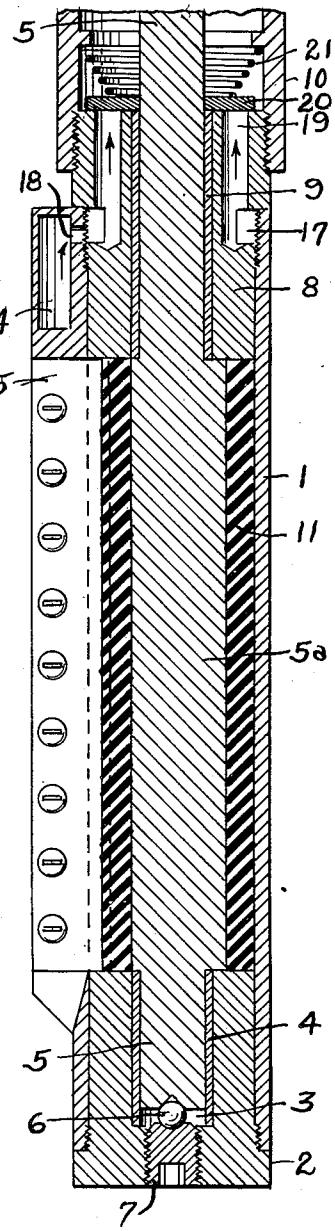



Fig. 1.

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# UNITED STATES PATENT OFFICE

2,308,742

## PUMP

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Houston, Tex.

Application April 25, 1941, Serial No. 390,328

2 Claims. (Cl. 103—131)

This invention relates to a pump.

An object of the invention is to provide a rotary lift pump specially designed for use in pumping liquid from wells although it is capable of general use for pumping liquids.

Another object of the invention is to provide a pump comprising a cylindrical casing having an inlet and a discharge and having an eccentric rotor therein arranged to be driven by a rotary shaft around the casing to effect the intake of liquid through the pump intake and the expulsion thereof through the pump discharge into the pump tubing through which the pumped liquid is conducted to the ground surface.

Another object of the invention is to provide in a pump of the character described a novel type of rotor or impeller therein comprising a rigid driving eccentric with a resilient jacket thereon, said eccentric being rotatable within the jacket whereby, upon rotation of the eccentric, the rotor will move around the wall of the pump casing to constantly effect the intake of the liquid to be pumped through the pump intake and to simultaneously effect discharge of the liquid ahead of the rotor from the pump, said pump having a transverse partition which cooperates with the rotor to separate the intake from the discharge.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawing, wherein:

Figure 1 shows a vertical, sectional view of the pump taken on the line 1—1 of Figure 2.

Figure 2 shows an elevational view of the pump.

Figure 3 shows a cross-sectional view taken on the line 3—3 of Figure 2.

Figure 4 shows a cross-sectional view taken on the line 4—4 of Figure 2.

Figure 5 shows a cross-sectional view taken on the line 5—5 of Figure 2 showing the rotor in an intermediate position to simultaneously effect intake and discharge of the pumped liquid, and

Figure 6 shows a cross-sectional view taken on the line 6—6 of Figure 2 showing the rotor at the end of its intake stroke.

Referring now more particularly to the drawing wherein like numerals of reference designate the same parts in each of the figures, the numeral 1 designates a tubular pump casing preferably cylindrical in shape and screwed into the lower end of which there is the lower head 2 having a deep socket 3 provided with a bushing 4 to receive the lower end of the driving shaft 5. The lower end of this shaft is preferably supported on an anti-friction bearing 6 which in turn is mounted on a plug 7 screwed into the head 2.

Screwed into the upper end of the pump casing there is a gland 8 forming the upper head of the pump. This gland has a central bearing provided with a bushing 9 through which the shaft 5 works. The upper head 8 of the pump is connected to the pump tubing 10 which leads to the ground surface.

The driving shaft 5, between the upper and lower heads, is enlarged and formed with an elongated eccentric 5a whose upper and lower ends abut the opposing ends of the upper and lower heads as shown in Figure 1.

Fitted around the eccentric 5a there is a sleeve-like rubber jacket 11 which is of somewhat less transverse diameter than the transverse inside diameter of the pump casing. The ends of this jacket abut the opposing ends of the upper and lower heads as shown in Figure 1.

The pump casing has a vertically elongated intake opening 12 which is enlarged or flared outwardly as shown in Figures 5 and 6. This opening 12 extends approximately from end to end of the rotor, said rotor being formed of the eccentric 5a and its surrounding jacket 11. The pump casing also has an elongated discharge outlet 13 as shown more accurately in Figures 5 and 6 and is formed with an elongated discharge chamber 14 to receive the liquid from the outlet 13. Anchored to the pump casing there is a lengthwise inwardly extended blade 15 whose inner margin projects inwardly beyond the inside wall of the pump casing and extends into a longitudinal slit 16 in the jacket 11. This blade is located between the intake opening 12 and the discharge opening 13 and extends from the lower head 2 to the upper head 8 as shown in Figure 1. The jacket 11 is therefore held against rotation but oscillates around the inside wall of the casing as the eccentric 5a rotates. Accordingly upon rotation of the eccentric 5a in the direction indicated by the arrow in Figure 5, liquid in which the pump is submerged will be drawn in through the intake opening 12 and will be forced around in front of the rotor, as indicated in Figure 6 and will be finally discharged out through the discharge opening 13 into the chamber 14.

The upper head 8 has an external annular groove 17 and the upper end of the chamber 14

is extended laterally as indicated in Figure 2 and has the openings 18 leading therefrom into said groove. Communicating with said groove and leading upwardly therefrom are the channels 19 which enter the pump tubing. The liquid discharged into the chamber 14 will accordingly pass upwardly therethrough and thence through the openings 18 and channels 19 into the pump tubing 10 and thence to the ground surface in a substantially uninterrupted stream.

If it is so desired, an annular plate valve 20 may be positioned on top of the gland 8 or upper head of the pump which is effective to prevent reverse flow of liquid through the channels 19. A spring 21 is used to resiliently maintain the valve 20 on the upper head or gland 8 as shown in Figure 1.

The drawing and description are illustrative merely while the broad principle of the invention will be defined by the appended claims.

What we claim is:

1. A pump comprising a tubular pump casing, a lower head screwed into the lower end of the casing having a deep socket, a driving shaft whose lower end is fitted into said socket, a plug screwed into said lower head, an anti-friction bearing between the plug and the lower end of the shaft, a gland screwed into the upper end of the casing and forming an upper head having an axial bearing through which the shaft works, a pump tubing for said casing, said upper head forming means for the attachment of the pump tubing thereto and having an external annular groove therearound and a channel leading upwardly from said groove through the upper head through which liquid may enter the tubing, an elongated eccentric on the shaft extending from the upper head to the lower head, a sleeve-like rubber jacket fitted around said eccentric of less transverse diameter than the transverse inside diameter of the casing and whose ends abut the opposing upper and lower heads, said casing being provided with an elongated intake opening and an elongated discharge outlet opening, said casing having a longitudinally elongated discharge chamber having an opening into said groove and arranged to receive liquid from the outlet opening, a lengthwise inwardly extended plate anchored to the pump casing and forming a partition co-extensive in length with said jacket, said jacket having a longitudinal slit extending from end to end thereof which receives the inner margin of the partition, said partition being located between the intake opening and the discharge opening whereby upon rotation of the eccentric the jacket will be held against rotation but caused to oscillate around the inside wall of the casing to effect the intake of liquid through the intake opening and the discharge of said liquid through the outlet opening into the chamber and thence upwardly into the pump tubing.

2. A pump comprising a tubular pump casing, a lower head attached to the lower end of the casing, a driving shaft whose lower end is supported by said head, a gland attached to the upper end of the casing and forming an upper head having an axial bearing through which the shaft works, a pump tubing for said casing, said upper head forming means for the attachment of the pump tubing thereto and having an external annular groove therearound and a channel leading upwardly from said groove through the upper head through which liquid may enter the tubing, an elongated eccentric on the shaft extending from the upper head to the lower head, a sleeve-like resilient jacket fitted around said eccentric of less transverse diameter than the transverse inside diameter of the casing and whose ends abut the opposing upper and lower heads, said casing being provided with an elongated intake opening and an elongated discharge outlet opening, said casing having a longitudinally elongated discharge chamber having an opening into said groove and arranged to receive liquid from the outlet opening, a lengthwise inwardly extended plate anchored to the pump casing and forming a partition co-extensive in length with said jacket, said jacket having a longitudinal slit extending from end to end thereof which receives the inner margin of the partition, said partition being located between the intake opening and the discharge opening whereby upon rotation of the eccentric the jacket will be held against rotation but caused to oscillate around the inside wall of the casing to effect the intake of liquid through the intake opening and the discharge of said liquid through the outlet opening into the chamber and thence upwardly into the pump tubing.

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