

May 26, 1925.

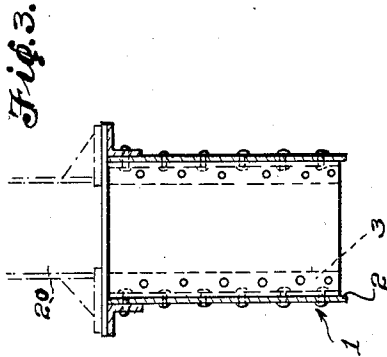
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W. H. BLAKELY

PUMPING UNIT FOR OIL WELLS

Filed June 24, 1924

2 Sheets-Sheet 1



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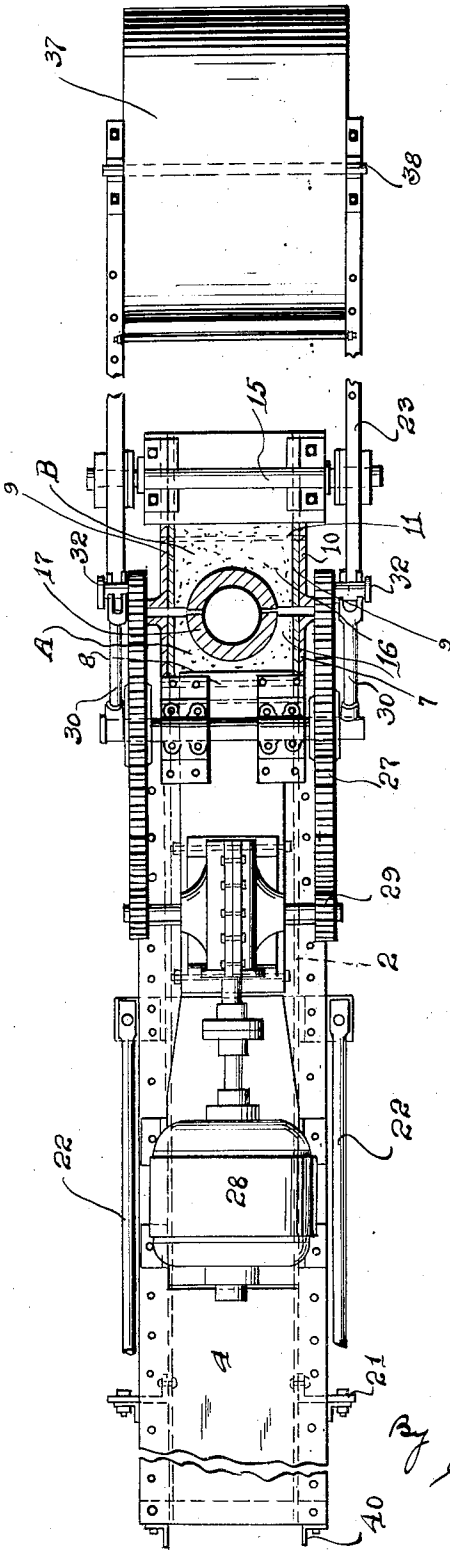
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Fig. 2.



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PUMPING UNIT FOR OIL WELLS.

Application filed June 24, 1924. Serial No. 722,117.

To all whom it may concern:

Be it known that I, WILLIAM H. BLAKELY, a citizen of the United States, residing at Tulsa, in the county of Tulsa and State of Oklahoma, have invented certain new and useful Improvements in Pumping Units for Oil Wells; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to new and useful improvements in pumping units for oil wells, and has for its object to provide an electrically operated device which can be made at a reduced cost, easily erected and dismantled and easily transported.

Now that electricity is the coming power, and most of the oil fields are electrified and lines are being run into the new fields, there has been an increasing demand for electric equipment for pumping and drilling. To this end, I have provided a pumping unit which is adapted to be supported entirely upon the well casing, having means for counterbalancing the weight of the whole apparatus including the polish rods.

The power employed in operating these units can be controlled from a central station, making it possible to start or stop the operation at any well by means of push buttons.

Provision may be made that in case a polish rod breaks the motor will increase in speed, and a centrifugal governor on the motor shaft will automatically open the electric circuit, stop the motor and sound an alarm at the control station.

Another feature of my invention is that no foundation is necessary upon which to install the apparatus, the weight being supported by the casing.

A still further object of my invention is that when the unit is dismantled, it can be easily handled and transported to the lease, as the motor, motor base, casing clamp, counterbalance beam supports, counterbalance weight, walking beam, connecting rods and spur gears are all held together with bolts. They are all of such small size and weight, that they can be easily loaded on a small truck, the weight of any single part

being such that it can be handled by one man.

This pump unit is obviously an improvement over the old central power station and pull rods arrangement, the latter encountering considerable difficulties in taking up and letting out slack in the rods, breaking of rods, and in connecting to some wells which are so located that it is necessary to run the rods under roads, under streams and on hill sides. Also with pull rods it is practically impossible to secure the maximum stroke at the wells, as with long rods there is considerable slack, and the temperature of the air causes the rods to contract and elongate.

With the above and other objects in view which will appear as the description proceeds, my invention consists in the novel features herein set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a side view of my improved pumping unit showing clearly all of the working parts.

Fig. 2 is a view looking down on Fig. 1, showing portions in section, and

Fig. 3 is a view taken on line 3—3, Fig. 1.

Referring to the drawings, 1 designates the base portion which consists of two longitudinally extending vertically disposed plates 2, preferably composed of steel and secured together by bolts. Along the upper edges of these plates 2, I secure by means of bolts, angle irons 3, adapted to serve as supports and fastening means for the floor or base plate 4, which is bolted thereto. As a further support for said structure I provide a brace 5, interposed between and bolted to said plates, as shown in Fig. 3.

The plates 2 extend on each side of the well casing 6, to about the center thereof and are secured to clamping angles 7 by means of a row of long bolts 8, which also serve as separators and supports for the two plates 2, as shown in Fig. 2.

On the other side of the well casing 6, and in line with the plates 2, I provide two plates 9 of the same material as plates 2, which are bolted to clamping angles 10 by bolts 11 similar to the arrangement of the

angles 7. The lower portions of these plates project beyond the casing 6 as shown in Fig. 1, and are secured together by bolts 12. Angles 13 are bolted to the horizontal portions of the plates 9 forming a base to which the supports 14 of the transverse bearing rod 15, are secured.

The two portions A and B forming the casing clamp, are each filled with a suitable casting 16 as shown in Fig. 2, and after the split cast steel bushing 17 is placed around the casing 6, are clamped together by bolts 18, passing through the angles 7 and 10, thus supporting the entire base portion 1 on the well casing.

20 represents the removable base plate supporting the motor and gears, preferably composed of cast iron, and bolted to the floor 4 of the base portion 1.

Near the end of the base portion 1, opposite the casing clamp, I secure by bolting, two upright angles 21, being supported by braces 22. To the upper portions of these uprights 21, I bolt a bearing 23 for the walking beam 24, said walking beam having its free end connected to the polish rod 25 in any suitable manner, that shown in the drawing being in the form of a hanger 26.

At 27 I have shown a gear mounted on either side of the base plate 20 at the end near the casing 6. These gears are driven by the motor 28 through the worm gear 29, and are connected to the walking beam 24 by means of the pivoted connecting rod 30. The gears 27 are provided with a plurality of bosses 31 arranged at different distances from the center of said gear, thus enabling the length of the pumping stroke to be varied by merely shifting the connecting rod pins 32.

The connecting rod 30 is provided on its gear engaging end with an automatically disconnecting member 39, which fits over one side of the connecting pin 32, and which if the polish rod breaks will at once be disconnected from the gear 27 as will be later described.

Pivotaly mounted on the bearing rod 15 is a counter balance beam 33, pivoted at one end 36 to connecting rod 34, which in turn is pivoted to the walking beam 24 at 35. At the other end of the beam 33, is a counter weight 37, preferably composed of concrete in a cylindrical form, rotatably mounted in the bearings 38. This counter weight is arranged so as to allow a clearance of three or four inches below its maximum travel, thus if the polish rod 25 breaks, the weight 37 will drop, forcing the rod 34 upwardly and with it the walking beam 24, which pulls the connecting rod 30 off of the pin 32 and allows the gear and motor to run free. This prevents considerable damage which otherwise would occur before the power could be turned off.

In the operations of cleaning and pulling or making any repairs, the base plate 20 may be unbolted, and moved back on the platform 4, and to support the device when this is being done, I have provided legs 40 which may be adjustable to any length.

The operation of my device is obvious. The gears 27 are rotated by the motor 28, thus reciprocating the walking beam 24, and with it the polish rod, through the medium of the rod 30. The counter weight 37 is swung on its pivot 15, by the connecting rod 34 from the walking beam 24, thus insuring a steady even stroke, perfect balancing, and materially reducing the power required to pump the well.

From the foregoing, it is believed that my invention may be clearly understood without further description, it being understood that numerous changes may be made in the details of construction without departing from the spirit of the invention as disclosed in the following claims.

What I claim and desire to secure by Letters Patent is:—

1. A pumping unit including means for supporting said unit upon a well casing, means for counter balancing said unit, pumping mechanism and means for automatically disconnecting said pumping mechanism in case of rod breakage.

2. A pumping unit including means for supporting said unit upon a well casing, means for counter balancing said unit, a pumping mechanism adjustable with respect to said casing and means for automatically disconnecting said pumping mechanism in case of rod breakage.

3. A pumping unit including a base portion, means on said base portion for clamping said unit to a well casing, a counter balance pivoted to said base portion, pumping mechanism operatively connected to said counter balance and means actuated by said counter balance whereby said pumping mechanism will be automatically disconnected in case of rod breakage.

4. A pumping unit including a base portion, a casing clamp secured to said base portion, uprights also secured to said base portion and supports therefor, a walking beam pivoted to said uprights, means for connecting said walking beam to a polish rod in the well casing, a pivoted counter balance supported on said base portion, pumping mechanism, means connecting said pumping mechanism and said walking beam, means connecting said walking beam and said counter balance, and means whereby said pumping mechanism will be automatically disconnected from the walking beam in case of rod breakage.

5. A pumping unit as claimed in claim 4 wherein said pumping mechanism consists of a motor, a plurality of gears operated by

said motor, and an automatically disconnecting rod for connecting said gears with said walking beam. •

5 6. A pumping unit as claimed in claim 4, wherein said apparatus is portable.

10 7. A portable pumping unit, including a casing clamp, longitudinally extending, vertically disposed plates bolted together and secured to said casing clamp, forming a base portion, a platform secured to said base portion, a motor and pumping mechanism mounted on said platform and adapted to be shifted thereon, uprights secured to said base portion and a walking beam pivoted to
15 said uprights, a connecting rod between said

pumping mechanism and said walking beam, a counterbalance adapted to rock on said base portion, a connecting rod between said walking beam and said counterbalance, means actuated by said counterbalance 20 whereby said connecting rod between the pumping mechanism and the walking beam will be automatically disconnected in case of rod breakage, and means for supporting said apparatus when said counterbalance is 25 out of engagement.

In testimony whereof I affix my signature.

WILLIAM H. BLAKELY.