April 1, 1924. 1,489,012

J. SCHADEK

WELL DRILLING APPARATUS

Filed July 3, 1920

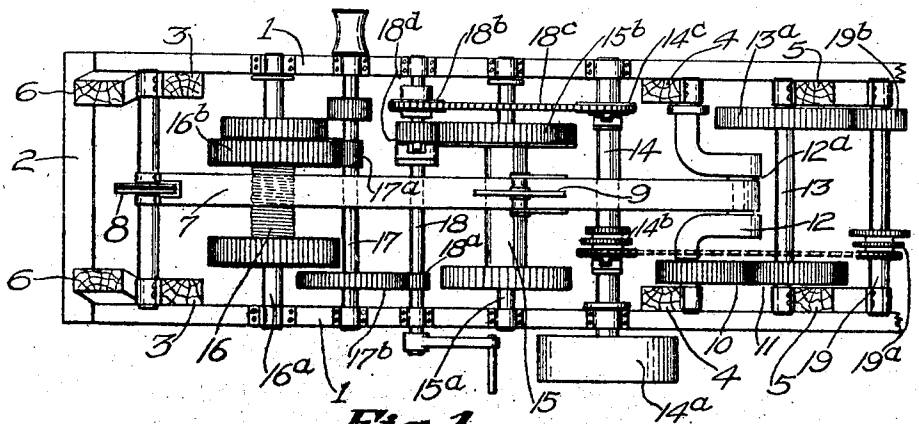


Fig. 1.

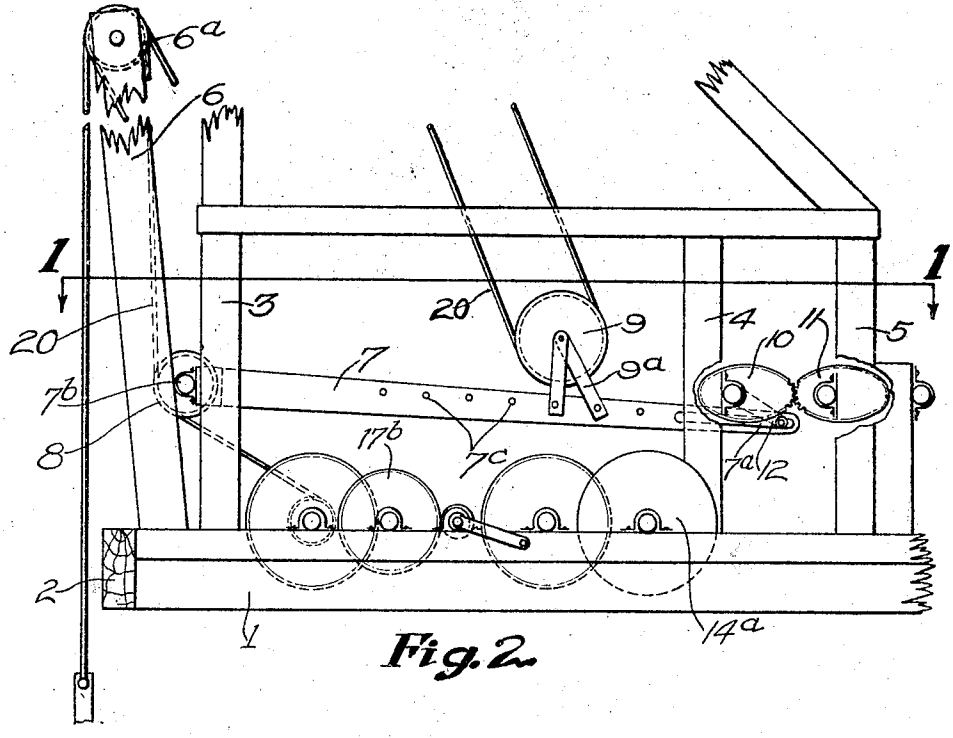


Fig. 2.

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Patented Apr. 1, 1924. 1,489,012

UNITED STATES PATENT OFFICE.

JOSEPH SCHADEK, OF SAN DIEGO, CALIFORNIA.

WELL-DRILLING APPARATUS.

Application filed July 3, 1920. Serial No. 393,941.

To all whom it may concern:

Be it known that I, JOSEPH SCHADEK, a citizen of the United States, residing at San Diego, in the county of San Diego and State of California, have invented certain new and useful Improvements in Well-Drilling Apparatus, of which the following is a specification.

My invention relates to well drilling apparatus more particularly to an apparatus for providing a drop motion for drilling deep wells or prospecting and the objects of my invention are: first, to provide a drop apparatus of this class in which the upward movement of the drill is of relatively slow speed while its downward movement is greatly accelerated; second, to provide an apparatus of this class in which the difference between the upward and downward movement may be easily adjusted and regulated; third, to provide an apparatus of this class in which the length of the stroke of the drill may be readily adjusted; fourth, to provide an apparatus of this class wherein the drop motion is produced partially by means of elliptical drive gears, one of which is secured on a crank shaft which is set on an advance to the elliptical gear position; fifth, to provide an apparatus of this class in which the drop motion is compounded by means of the combination of elliptical drive gear and slotted rocker arm; sixth, to provide an apparatus of this class in which the drop motion is produced by means of a slotted rocker arm with a crank in connection therewith and seventh, to provide an apparatus of this class which is simple and economical of construction, durable, easy to operate, easy to install, very efficient in its action, easy to adjust and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this application in which:

Figure 1 is a sectional view of my well drilling apparatus through 1—1 of Fig. 2 and Fig. 2 is a fragmentary side elevational view showing the principal operating parts.

Similar characters of reference refer to similar parts and portions throughout the views of the drawings.

The sills 1, transverse supports 2, uprights 3, 4 and 5, sheave support 6, rocker arm 7, sheave 8, sheave 9, elliptical gears 10 and 11, crank shaft 12, shaft 13, drive shaft 14, drum 15, drum 16, shaft 17, shaft 18, shaft 19 and cable 20 constitute the principal parts and portions of my well drilling apparatus.

The sills 1 are placed in position and supported by the transverse supports 2 and secured thereto are the uprights 3, 4, and 5 in spaced relation in pairs shown best in Fig. 1 of the drawings. Journaled on the upper edges of the sills 1 are the shafts 16^a, 17, 18, 15^a and 14. The shaft 14 is the main drive shaft and is provided on one end with the drive sheave 14^a, which is adapted to be driven by any driving mechanism. Mounted on this shaft 14 are sprockets 14^b upon one of which is mounted a chain which connects said sprocket with one of a series of sprockets 19^a on the shaft 19. It will be noted that there are different sized sprockets on these two shafts 14 and 19 to change the relative speed of the shafts 14 and 19 as desired. Secured on this shaft 19 is also a pinion 19^b which engages a gear 13^a on the shaft 13 for revolving the shaft 13. Also secured on this shaft 13 is an elliptical gear 11 positioned eccentrically thereon and meshing with this elliptical gear 11 is another elliptical gear 10 which is eccentrically mounted on the crank shaft 12. These shafts 12 and 13 it will be noted are journaled on the uprights 4 and 5 some distance above the sills 1. The crank portion of the crank shaft 12 is positioned in advance of the long and short intermeshing portion of the elliptical gears at approximately 30 degrees, however, this advance may be varied to suit. The crank portion 12^a of the crank shaft 12 is shiftably mounted in a slot 7^a in the extended end of the rocker arm 7 so that this bearing 12^a shifts longitudinally in said slot with the revolution of the crank shaft 12. The other end of said rocker arm 7 is pivoted upon an axle 7^b journaled on the uprights 3 and mounted in the middle of this rocker arm 7 on the shaft 7^b is the sheave 8 which is a cable sheave. Adjustably mounted on the free end of this rocker arm is another sheave 9 which is a cable sheave by means of strap members 9^a secured by means of bolts in the holes 7^c.

Mounted on the sills 1 positioned on an angle are the sheave supports 6 which extend upwardly and outwardly some distance as shown best in Fig. 2 of the drawings. Mounted on the shaft 16^a is a drum 16 which is operated through the gear 16^b and pinion 17^a on the shaft 17 and this shaft 17 is operated through the gear 17^b and pinion 18^a on the shaft 18 and this shaft 18 is operated by means of a sprocket 18^b on the shaft 18 and chain 18^c connecting with a sprocket 14^c on the main drive shaft 14. Mounted on this shaft 18 is also a pinion 18^d which meshes with a gear 15^b in connection with the drum 15 on the shaft 15^a. The cable 20 is wound on the drum 16 and extends over the sheave 8 on the shaft 7^b, then upwardly over a sheave 6^a on the sheave support 6, then down around the sheave 9 on the rocker arm 7, then back to another sheave beside the sheave 6^a on the support 6, then down to the drill.

Though I have shown and described a particular construction, combination and arrangement of parts and portions I do not wish to be limited to this particular construction, combination and arrangement but desire to include in the purview of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

It is obvious that with this construction there is provided a well drilling apparatus in the form of a drop in which slow speed and less power is utilized in raising the drill and that said drill is greatly accelerated in its downward movement caused by the varying pitch lines of the elliptical gears combined with the shiftable bearing on the rocker arm, the shaft being positioned in advance of the rapid variation in the pitch of the elliptical gears; that the length of the stroke is adjustable by means of the crank shaft and the sheave on the rocker arm; that the crank journaled in the slot in the rocker arm provides for slow upward movement of the drill and greatly accelerated movement downwardly and that by combining the two, a greatly accelerated motion is produced in the downward movement of the drill.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. An apparatus of the class described, including a rocker arm pivotally mounted at one end and provided with a longitudinal slot in its free end, a crank shaft with a crank portion journaled in said slot, an elliptical gear secured to said crank shaft, another elliptical gear meshing therewith and means for driving said last mentioned elliptical gear and a cable supporting pulley secured near the free end of said rocker arm whereby the movement in one direction of said rocker arm is greatly accelerated by the combined action of the elliptical gears and slotted rocker arm.

2. A well drilling apparatus, including a supporting frame, a rocker arm with one end pivotally mounted on said frame and provided with a longitudinal slot in its free end, a crank shaft adjacent the free end, an elliptical gear secured to said crank shaft in an eccentric position, another elliptical gear eccentrically mounted intermeshing therewith, the crank arm on said crank shaft being positioned slightly in advance of the long pitch of said elliptical gear and the crank portion reciprocably mounted in the slot of said rocker arm and a cable supporting pulley secured near the free end of said rocker arm whereby the movement in one direction of said rocker arm is greatly accelerated by the combined action of the elliptical gears and slotted rocker arm.

3. A well drilling apparatus, including a supporting frame, a rocker arm with its one end pivotally mounted on said frame at the drilling end of said frame provided with a longitudinal slot in its free end, a crank shaft with the crank portion reciprocably mounted in said slot, an elliptical gear eccentrically secured to said crank shaft with its maximum pitch following the crank arms of said crank shaft and another elliptical gear eccentrically mounted intermeshing with said first mentioned elliptical gear so that its minimum pitch is in alinement with the maximum pitch of said first mentioned elliptical gear and a cable supporting pulley secured near the free end of said rocker arm whereby the movement in one direction of said rocker arm is greatly accelerated by the combined action of the elliptical gears and said slotted rocker arm.

4. An apparatus of the class described, including a supporting frame, a rocker arm with its one end pivotally mounted on said frame at the drilling end thereof and provided with a slot in its free end, a crank shaft with the crank portion reciprocably mounted in said slot, an elliptical gear eccentrically secured to said crank shaft following the crank arms of said crank shaft, another elliptical gear eccentrically mounted and positioned so that its minimum pitch line alines with the maximum pitch line on the first mentioned elliptical gear, means for revolving said last mentioned elliptical gear in connection with the revolution of said crank shaft, a sheave adjustably mounted on said rocker arm near the free end thereof, another sheave positioned in alinement with the axis of said rocker arm, a pair of sheaves positioned upwardly and outwardly therefrom, a cable drum positioned on the frame below said rocker arm, a cable wound on said drum over the sheave in alinement with the axis of the rocker arm, then over one of the sheaves above and

outwardly therefrom, then over the sheave on the free end of said rocker arm, then back over one of the pair of sheaves and down to the drill.

5. A well drilling apparatus, including a rocker arm provided with a longitudinal slot in its free end, a crank shaft with the crank portion reciprocably mounted in said slot, and elliptical gear means for revolving said crank shaft.

In testimony whereof, I have hereunto set my hand at San Diego, California, this 25th day of June, 1920.

JOSEPH SCHADEK.