No. 679,244. Patented July 23, 1901.

F. SIMPKINS.

WELL DRILLING APPARATUS.

(No Model.) (Application filed Mar. 18, 1901.)

Fig. 1.

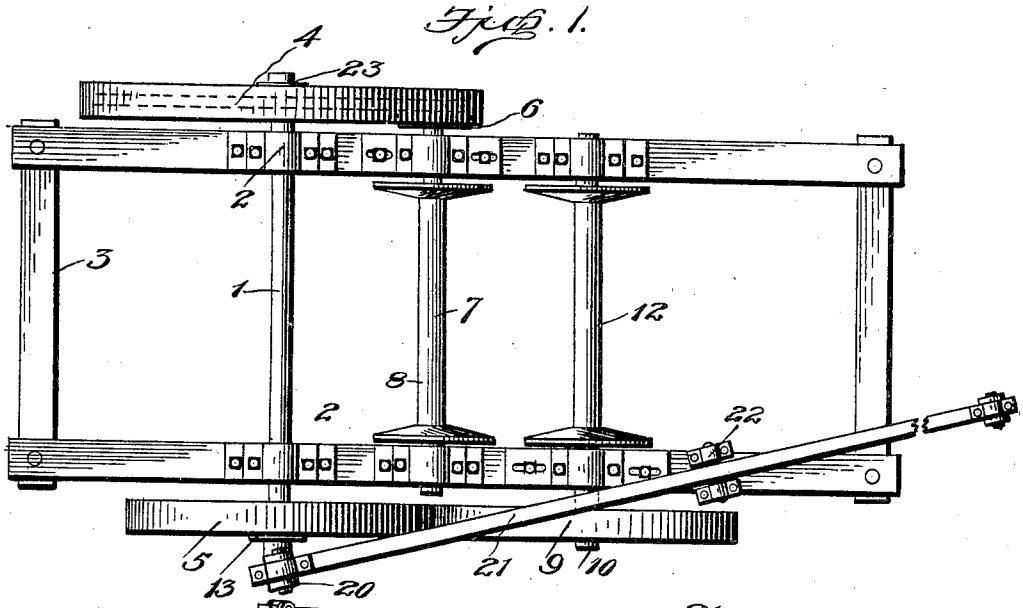


Fig. 2.

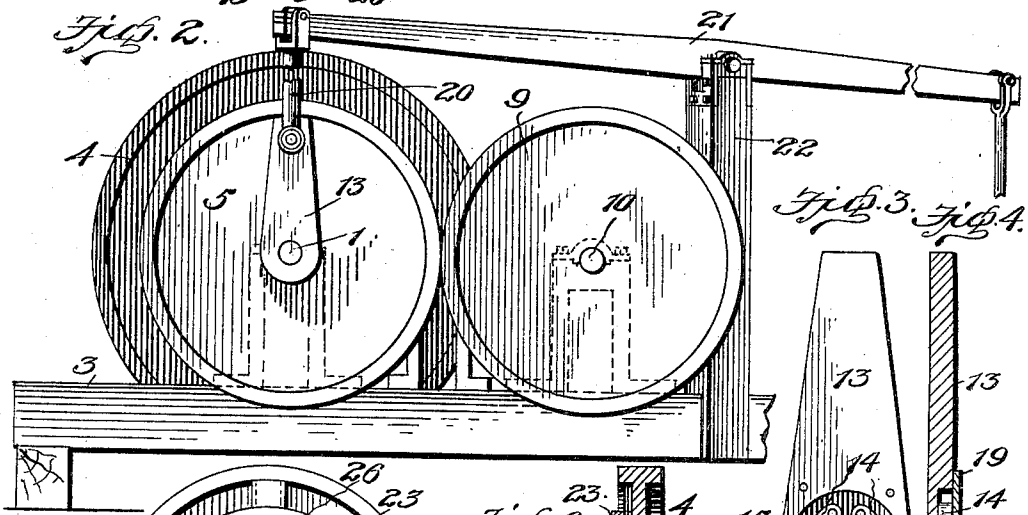


Fig. 3.

Fig. 4.

Fig. 5.

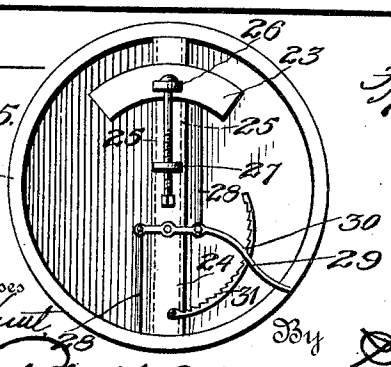
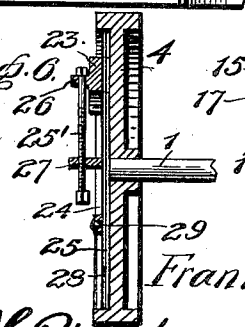


Fig. 6.



Witnesses

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WELL-DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 679,244, dated July 23, 1901.

Application filed March 18, 1901. Serial No. 51,712. (No model.)

To all whom it may concern:

Be it known that I, FRANK SIMPKINS, a citizen of the United States, residing at Greenville, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Well-Drilling Apparatus; and I do 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.

The invention described herein relates to certain improvements in apparatus for drilling wells, and has for its object a construction of lifting mechanism whereby a free unimpeded descent of the drill-tools is permitted and whereby an approximately uniform load is maintained on the driving power.

The invention is hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a top plan view of my improved well-drilling mechanism. Fig. 2 is a side elevation of the same. Fig. 3 is a back or inner side view of the crank-arm. Fig. 4 is a sectional view of the same. Fig. 5 is a front elevation of the drive-wheel, showing the counterbalancing means; and Fig. 6 is a sectional view of the same.

In the practice of my invention the power-shaft 1 is mounted in suitable bearings 2 on a suitable frame 3. On this shaft is keyed the driven pulley 4, which may be driven through a belt from any suitable form or construction of motor, and on said shaft is also keyed an operating-wheel 5. The opposite sides or faces of the drive wheel or pulley 4 are recessed, and arranged within the recess on the inner side of the wheel is a friction wheel or disk 6, which is driven by contact or frictional engagement with the periphery of the drive-wheel 4 and communicates motion to a shaft 7, on which may be mounted a sand reel or drum 8.

The operating-wheel 5 is used as a friction-wheel and comes in contact with a friction-wheel 9, keyed to a shaft 10, mounted in bearings on the frame 3, which bearings are made removable or adjustable to adjust said wheel 9 toward and from the wheel 5 to compensate for wear and increase or diminish the frictional bearing between them to vary the driving power at will. This shaft 10 carries a drum or reel 12 and is employed for raising and lowering the drill-tools.

Upon the outer face of the operating-wheel 5 is arranged a crank-arm 13, which is loosely mounted on the contiguous end of the shaft 1 and is provided with pawls 14 to engage a recess 15, formed in the periphery of a ratchet wheel or hub 16, rigidly keyed to said shaft 1. As a convenient mode of retaining the crank-arm in place said arm is provided on its inner face with a recess 17, in which is fitted a flange 18, formed integrally with the said ratchet wheel or hub 16, and against the outer face of this flange bears a ring 19, which is bolted or otherwise secured to the crank-arm. By this construction the crank-arm is held against endwise play in either direction on the shaft 1 or maintained in proper position to always bring the pawls 14 into alinement with the recess 15 in the ratchet-wheel. The pawls 14 are mounted in an extension of the recess 17 and are so arranged as to drop into the recess 15 as the crank-arm is at its highest vertical position, so as to connect said arm to turn with the shaft 1 and communicate motion to the drill mechanism. The crank-arm is connected by a pitman 20 to a walking-beam 21, pivotally mounted at or near its center on a post 22, secured to the frame 3. The opposite end of said walking-beam is adapted to be connected by any of the mechanisms known in the art to the drill rods or rope.

When motion is applied to the shaft 1 in either direction with the crank-arm 13 in an upright position, the pawls 14 drop downward and into the recess 15 of the ratchet-wheel 16, and the movement of the shaft thereby shifts the crank-arm, which communicates motion to the walking-beam, and thereby raises the drill-tools until the point of connection of the pitman with the crank-arm has been moved to a position below the shaft 1 and to one side of the vertical plane of said shaft, and as soon as the arm 12 reaches this position the pawls 14 will be retracted by gravity and drop back into the recess 17, and the weight of the drill-tools will thereupon

move the crank-arm farther in the same direction, and as said arm turns freely on the shaft the downward movement of the drill-tools will be entirely free or unimpeded.

It will be readily understood that while the crank-arm 13 is being shifted in the manner described there will be a load upon the motor equal to the weight of the rope and drill-tools. As soon as the crank-arm 13 has reached a position below the shaft 1 where the drill-tools will be free to descend the load will be entirely removed from the motor and the latter will be liable to race. In order to overcome this tendency and to maintain an approximately uniform load on the motor, a counterweight 23 is attached to the shaft 1 in such manner that such weight can be utilized to assist in raising the drill-tools, it being so adjusted in relation to the shaft as to move down through an arc of a circle while the drill-tools are being raised, and it will consequently have to be shifted by the motor upward through an arc of a circle while the ratchet-wheel 16 is being moved forward into operative position to cause its recess 15 to be engaged by the pawls 14. A convenient means of applying this counterweight 23 to the shaft is shown in Figs. 5 and 6 and consists in arranging within the outer recessed face of the drive wheel or pulley 4 a supporting arm or member 24, provided on its outer face with guide-ribs 25, which are undercut for the reception of a dovetailed projection on the weight 23. A convenient means for adjusting the weight 23 consists in providing a screw shaft or rod 25′, loosely mounted in a lug 26 on the weight 23 and projecting downward through a threaded opening in a lug 27, fixed to the said support 24. The said supporting arm or member 24 may be secured to the drive-wheel 4 in any preferred manner, that shown in the present instance consisting in providing said arm with bolts 28, adapted to engage the inner periphery of the rim of said wheel. These bolts are connected to an operating-lever 29 upon opposite sides of the pivotal connection of the lever and are adapted to be simultaneously thrown into and out of action by moving the lever. The lever is provided with a cord 30 to engage a rack 31 on the member 24. The counterweight 23 is thus mounted so as to move down simultaneously with the crank-arm 13, and it follows from such construction and arrangement that the motor will be relieved of approximately half its load by raising the drill-tools and the load while shifting the ratchet-wheel to bring it into operative relation with the pawls 14 will be the same as the weight 23, so that the motor will have at all times a load equal or approximately equal to the counterbalancing-weight, whereby racing of the gearing upon the reels of the crank-arm will be avoided.

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

1. In a well-drilling apparatus, the combination of a driven shaft, a crank-arm loosely mounted thereon and provided in one side with a recess, a hub fixed to the shaft and having a ratchet-flange fitting within the recess in the arm, pawls pivoted to the crank-arm within said recess to engage the ratchet-flange, whereby the arm is shifted, a ring encompassing the hub and secured to the recessed side of the arm to hold the arm in place and close said recess, connections from the arm to the drill rod or rope, and a slidably-adjustable counterweight mounted upon the shaft and arranged in approximate alinement with the crank-arm to move in a path corresponding with the path of movement of said arm, substantially as described.

2. In a well-drilling apparatus, the combination of a driven shaft, a crank-arm loosely mounted upon one end thereof, a clutch connection between the shaft and crank-arm whereby the latter is shifted, a band wheel or pulley upon the opposite end of the shaft, a counterweight-support carried by the shaft, a counterweight adjustably mounted on said support, and locking means for engaging and disengaging the support with and from the band-wheel, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK SIMPKINS.

Witnesses:
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QUINTON J. BURNETT.