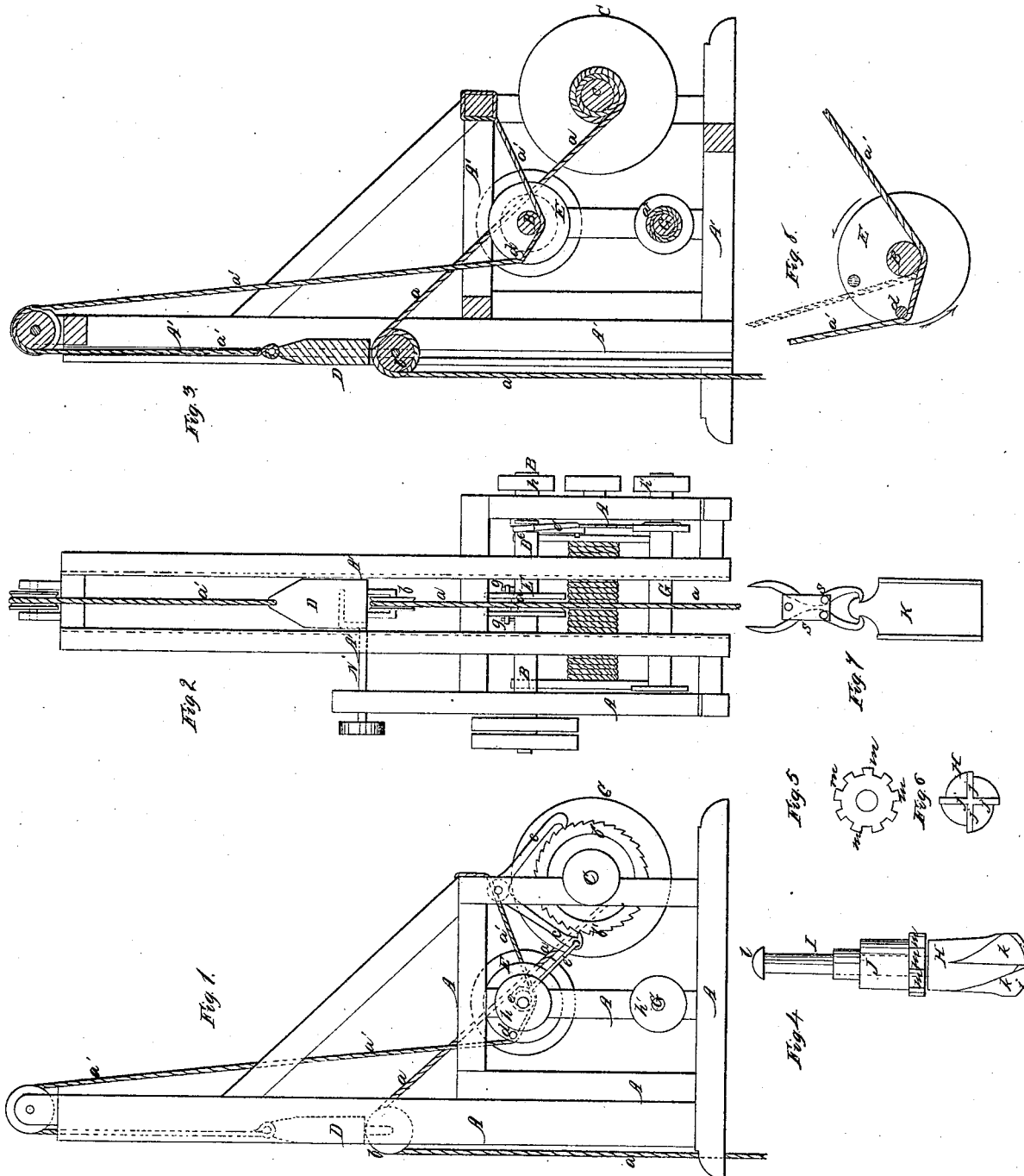


I. M. Rose, Drilling Artesian Wells.

N^o 53,189.

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Witnesses
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IMPROVED DRILLING AND DRIVING MACHINE.

Specification forming part of Letters Patent No. 53,189, dated March 13, 1866; antedated February 16, 1866.

To all whom it may concern:

Be it known that I, ISRAEL M. ROSE, of the city and county of New York, State of New York, have invented a new Pipe-Driving, Drilling, and Pumping Machine for Oil and other Wells; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of one side of my machine adapted for drilling. Fig. 2 is a front elevation of the machine. Fig. 3 is a longitudinal section taken in a vertical plane through the center of the machine. Figs. 4, 5, and 6 are views of the drill and its jar. Fig. 7 shows the hammer and its nippers for driving the pipe into the well. Fig. 8 is a view showing the contrivance for giving the reciprocating motion to the drill.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements on machinery for sinking Artesian wells, and particularly such as yield oil, wherein contrivances for drilling the wells and extracting the detritus or sand therefrom and driving down the tubing are required.

The main object of my invention is to give the required up and down movements to the drill, and at the same time feed the drill down to the work as rapidly as it progresses, by means of machinery which shall be automatic in its operation and which shall admit of a very rapid motion being given to the drill, as will be hereinafter described.

Another object of my invention is to so construct the drill that it will be caused to rotate by striking upon the bottom of the well, and thus obviate the necessity hitherto existing of turning the drill-rope at every blow for the purpose of preventing the drill from striking in the same place in succession, as will be hereinafter described.

Another object of my invention is to so construct the jar of the drill that it also serves the purpose of a reamer for chipping the sides of the well as the work of boring progresses, and leaving the surface sufficiently smooth for receiving the tubing, as will be hereinafter described.

A represents a strongly-braced frame, which

sustains two vertical guides, A' A', and also the mechanism for giving a quick reciprocating motion to the drill, driving tubing into the well and pumping up the sand as the work of drilling is carried on.

B is the main driving-shaft, having a loose and tight pulley on one end for receiving a belt that gives motion to this shaft; and C is a flanged drum, which carries a rope, *a*, that is wound upon this drum preparatory to the operation of drilling, and that passes over a pulley, *b*, which is applied to the lower end of a reciprocating block, D, working between the vertical guides A' A', as shown in Figs. 1, 2, and 3. This rope is attached in any suitable manner to the jar of the drill, as will be hereinafter described, and paid out automatically as the drill descends in the well. The said flanged drum has a ratchet-wheel, *b'*, affixed in any suitable manner to one of its flanges, as shown in Fig. 1, which is acted upon by means of two pawls, *c c*, that receive an oscillating motion, so as to allow the weight of the drill and its jar to unwind the rope from the drum C as fast as the work progresses. The motion above mentioned is imparted to the pawls *c c* from an eccentric, *e*, on the main driving-shaft B through the medium of a pitman, *e'*, as shown in Figs. 1 and 2.

The drill receives its vertical motion from a tappet-wheel, E, on the main driving-shaft B, which acts upon a rope, *a'*, one end of which is secured to the rear part of the frame of the machine, and the other end is secured to the reciprocating block D. The tappet-wheel E is constructed of two flanged disks slightly separated from each other so as to allow the rope *a'* to pass freely between them. These disks have a tappet or transverse pin, *d*, secured to them near their circumference, which, as the shaft B revolves, depresses the rope *a'* and then suddenly releases it. The wheel E is applied loosely on its shaft, but caused to turn a certain distance with it by means of clutch-pins *g g*, as shown in Fig. 2, or in any other suitable manner. The clutch-connection is such that the wheel E moves with its shaft until the pins *g g* come under the shaft, when the connection ceases and the wheel turns back and allows the drill to descend and do its work.

As the main shaft B is rotated the pin *d* strikes the rope *a'* at every revolution and

gives a quick up-and-down movement to the block D, which has suspended to it the rope *a* which carries the drill, as above described. The driving-shaft also causes the flanged drum carrying the drill-rope *a* to revolve very slowly and to pay out this rope as rapidly as may be required to feed the drill down to its work. The pawls *c c* do not cause the drum C to feed the rope any faster than the work progresses, but they should allow sufficient slack rope to enable the drill to strike fairly upon the bottom of the well at every downward stroke.

Beneath the main driving-shaft B is a flanged reel, G, having a rope, *a'*, wound upon it, which rope is used instead of the rope *a* and drum C, and in the place of this rope when it is desired to remove the sand from the well by a sand-pump.

The reel G receives its motion from the driving-shaft B through the medium of a belt which is applied to the drums *h h'*, and when this reel is employed the pitman *e'* may be disengaged from the pawls *c c*.

The drill H (shown in Figs. 4 and 6) has four or more radial chisel-edged cutters, *j j*, formed on its lower flaring end. The beveled edges of these cutters incline all in the same direction, and the sand or chips pass upward between spaces *k k*, which are formed in the flaring or enlarged end of the chisel-stock, and which present vertical and inclined surfaces, as shown in Fig. 4. The chisel-stock has a central stem, I, formed on its upper end, which has a head, *l*, that is intended to keep the jar J in place upon the stem, but allow this jar to move freely between the stock H and said head. The jar J is a cylindrical block of metal having steel flanges *m* applied to its lower end and projecting from its circumference, as shown in Figs. 4 and 5. These flanges have spaces between them, and sharp cutting-edges, and they are intended to serve as reamers for smoothing the sides of the well as the drill progresses in its work. It is not intended that the flanges of the jar shall enlarge the diameter of the well, but merely to break off the projections which may be left by the drill, so that the tubing will readily enter the well.

In Fig. 7 I have represented a trip-hammer, K, which works between the guides A' A' when the sliding block D is removed, and is employed as a hammer for driving the pipe or tube into the well after the work of drilling is completed. This hammer K is alternately caught and released by means of a pair of nippers, *s*, and operates substantially like an ordinary pile-driver.

If desirable, a crank-shaft, N, for operating a pump may be applied to the frame A A', as indicated in red lines, Fig. 2. When this crank-shaft is employed it is driven by means

of a belt or pitman connected to the main driving-shaft B.

It will be seen from the above description that I adapt a single frame to serve as a support for all the driving mechanism which is required in the operation of drilling wells, removing the sand therefrom, driving down the tubing, and pumping up the oil. I also provide for the use of a rope in the operation of drilling and removing the sand, and so apply such rope that the contrivance which gives a vertical motion to the drill will not wear out this rope.

The pawls *c c* are not intended for rotating the flanged drum of the rope *a*, but merely for allowing the drill to descend by its own gravity. These pawls operate somewhat upon the principle of an escapement. When it is desired to allow the drill to drop down into the well the ratchet-wheel *b'* may be detached from its flanged drum so that this drum will turn freely. A brake may be applied to said flanged drum for regulating its speed when used to allow the chisel or drill to descend rapidly into the well preparatory to recommencing the drilling operation.

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

1. The arrangement of the slide D, pulley *b*, and ropes *a* and *a'*, substantially in the manner and for the purpose described.

2. The combination of a paying-out contrivance and tappet-wheel, E, with the suspension-rope *a* and drill-rope *a'*, substantially as described.

3. The tappet-wheel shaft B, eccentric *e*, pawls *c c*, and ratchet-wheel *b'*, with the flanged drum C, ropes *a* and *a'*, all operating substantially as described.

4. The tappet-wheel E, constructed, substantially as described, out of two disks and a transverse pin, *d*, and fitted to the shaft B so as to periodically become loose and fast on said shaft, for the purpose set forth.

5. The reel G, in combination with the tappet-shaft B and suspended reciprocating pulley *b*, the parts being arranged substantially as described.

6. The application of a crank-shaft, N, to the frame A' A' of a machine adapted for pipe-driving and drilling, so that said frame may be used for operating a pump, substantially as and for the purpose described.

7. Constructing the jar of a drill with flanged cutters *m m* on it adapted to serve as reamers, substantially as described.

Witnesses:

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