No. 647,348. Patented Apr. 10, 1900.

F. R. WIEDNER.

WELL DRILLING MACHINE.

(Application filed July 31, 1899.)

(No Model.)

Fig. 3.

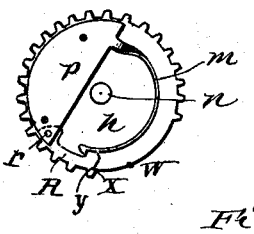
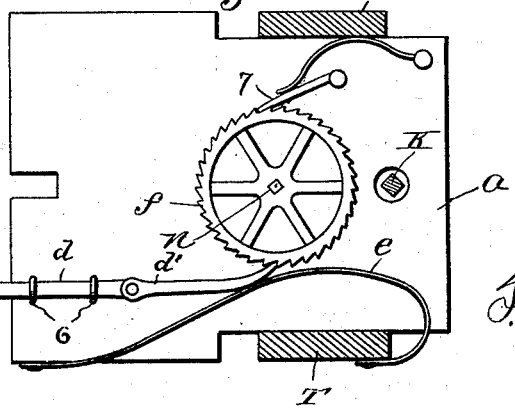


Fig. 1.

Fig. 2.



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UNITED STATES PATENT OFFICE.

FRIEDRICH R. WIEDNER, OF CIBOLO, TEXAS.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 647,348, dated April 10, 1900.

Application filed July 31, 1899. Serial No. 725,727. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH R. WIEDNER, a citizen of the United States, residing at Cibolo, in the county of Guadalupe and State of Texas, have invented a new and useful Improvement in Well-Drilling Machines, of which the following is a specification.

My invention relates to improvements in well-drilling machines, and has for its object to provide means for turning or rotating the drill-rope, so as to cause the drill to change the position of its cutting-face relative to the material being operated upon at each successive stroke, and, further, to provide means for automatically reversing the direction of rotation of the rope at regular intervals to untwist the said rope and prevent it from kinking or knotting.

In the accompanying drawings, Figure 1 is a vertical section of a machine embodying my invention. Fig. 2 is a plan view, partly in section, of a portion of the said machine, showing the preferred arrangement of the driving-ratchet and pawls. Fig. 3 is a detail showing the construction of one of the gear-wheels.

The machine, as regards the drill-operating mechanism proper, may be of any approved or preferred construction, and in the drawings I have shown for purposes of illustration a very simple form of such drill apparatus, comprising a frame formed of posts T T and connecting cross pieces or beams V V, having journaled therein near its rear end a main driving-shaft 1, connected by suitable links with a pivoted beam 2, so as to cause the beam to reciprocate vertically when the shaft is rotated, and a rope 4, passing over a pulley 5 and connecting the beam 2 and drill-rod K, so that the motion of the beam is communicated to the latter and to the drill. The front end of the framework is preferably extended vertically, as shown, to form a bearing for the pulley 5, and between the uprights T, forming such extension, I provide a box or casing A. Said casing is preferably formed of top and bottom pieces a and a', constituting bearings for the horizontally-disposed gearing to be hereinafter described, and side walls or pieces a^2.

Rigidly secured to the driving-shaft 1 is an eccentric c, engaging and actuating a lever b, having a sliding fulcrum on a cross-rod b', secured to the frame, and attached to the free end of said lever b is a jointed rod d, extending to and resting upon the top of casing A, where it is secured against lateral movement by suitable guides 6.

d' is a pawl pivoted to the extremity of said rod d and held by means of a spring e in operative engagement with a driving-ratchet f, said ratchet being also dogged by a spring-held pawl 7, which prevents its backward rotation. Ratchet f is mounted upon a vertical shaft n, journaled in the casing A, which shaft also carries the gear-wheel h, located within the casing. The gear-wheel h is of peculiar construction, preferably that illustrated in Fig. 3 of the drawings, a portion of its periphery being stripped or mutilated, as indicated at W, and a toothed segment R, adjacent to said stripped portion, being inwardly yielding and preferably detachable. Said segment R is pivoted to the wheel at a, being preferably secured thereon by a removable plate p, removably attached to the wheel-face, and is normally held so as to form a true segment of the pitch-circle of the gear and to constitute an extension of the rigid or immovable portion thereof by means of a spring. The form of spring which I prefer to employ is represented by m, and consists of a flat leaf secured to or formed integral with the plate p and having its free end bowed, as shown, so as to be approximately concentric with the periphery of the gear and bearing at its extremity against the free end of segment R. In this way the spring is made long enough to be able to withstand the sudden jars which it is required to meet without breaking.

To limit the outward movement of the pivoted segment, I provide a small stop or projection x on the face of the gear-wheel, which is arranged to engage a recess y in the segment and prevent it from moving beyond its proper position in the pitch-circle.

i is a pinion meshing with the gear h and mounted upon the square drill-rod K, so as to rotate therewith, but loosely enough to permit the latter to slide freely therethrough. Said pinion has secured thereto or formed integral therewith a drum j, flanged at s and extending into close proximity to the top a of the casing A, so that said pinion and drum are held against vertical movement by contact with the top and bottom of the casing. Attached to and wound upon the drum j is a

cord or rope *l*, whose free end passes over a pulley L, mounted between the sides a^2 of the casing, and carries a depending weight *o*. The drill-rod K passes through guiding-apertures in the casing A and is connected at its upper and lower ends, respectively, with the rope 4 and the drill-rope Q.

The operation of the device is as follows: When the shaft 1 is rotated to operate the drill, the cam *c* imparts to the lever *b* an oscillating movement, which in turn communicates to the rod *d* and pawl *d'* a reciprocating movement in a longitudinal direction, and the pawl operating in the usual manner rotates the ratchet *f*. The step-by-step rotation of the ratchet is communicated through the shaft *n* to the gear *h*, which, meshing with the pinion *i*, rotates the latter and causes the turning or rotation of the drill-rod K and rope 4, so as to change the position of the drill-point, as described. At the same time the rope *l* is wound upon the drum *j* and the attached weight *o* lifted. Now when the stripped portion of gear *h* begins to pass the pinion *i* the latter is suddenly released and under the impulse of the depending weight communicated through the rope to the drum reverses its direction of movement, lowering the weight and untwisting the drill-rope. The gear *h* continuing its rotation, the mutilated portion passes beyond the point of contact with the pinion, and the toothed segment of the gear again comes into engagement with the teeth of the pinion. It will be seen, however, that after the pinion has been independently rotated in the manner described it will often happen that it will stop in such position that its teeth and those of the gear *h* will meet crown to crown, and if no means were provided to overcome this difficulty the machine would necessarily be stopped or the contacting gear-teeth broken. By the use of the yielding segment R in the gear *h*, however, this difficulty is obviated, as when such a condition occurs the yielding segment will be pressed inward, so that the teeth of the pinion can slip easily into mesh, and then the segment will be forced outward into its normal position.

What I claim is—

1. In a machine of the class described, the combination with the drill-rod, of a pinion mounted thereon, a gear intermittently meshing with said pinion to rotate it in one direction, means for rotating said gear, and means for rotating said pinion in the opposite direction when not in mesh with said gear, substantially as set forth.

2. In a machine of the class described, the combination with the drill-rod of a pinion mounted thereon, a mutilated gear arranged to mesh with said pinion and intermittently rotate the same in one direction, and weight-operated devices for rotating said pinion in the opposite direction when not in mesh with said gear, substantially as set forth.

3. In a machine of the class described, the combination with a drill-rod, of gearing for intermittently rotating said drill-rod in one direction, and weighted devices attached to said drill-rod for rotating it in the opposite direction during the intervals when the gearing is inoperative, substantially as set forth.

4. In a machine of the class described, the combination with the drill rope and rod, of a pinion carried by the drill-rod, a mutilated gear adapted to normally engage said pinion to rotate it, and to release the same at intervals, and yielding devices arranged to cause the said gear and pinion to mesh properly at the expiration of such intervals, substantially as set forth.

5. In a well-drilling machine, the combination with a drill mechanism for actuating the same, and a drill-rod, of a pinion mounted on said drill-rod, and gearing connecting said pinion and the drill-actuating mechanism including a gear-wheel meshing with said pinion, said gear-wheel having a segment of its periphery stripped or mutilated and a segment adjacent to said mutilated segment yieldingly held, whereby said gear-wheel releases said pinion at intervals, and after such intervals yieldingly engages the same again, substantially as set forth.

6. In a well-drilling machine, the combination with a drill-rod, of a pinion mounted thereon, gearing for driving said pinion in one direction including a mutilated gear having a stripped portion W, a yielding segment R adjacent thereto, and a spring for normally holding said segment in alinement with the rigid toothed segment, and means for rotating the pinion in the other direction while the stripped portion is passing said pinion, substantially as set forth.

7. In a well-drilling machine, the combination with the frame, a casing mounted thereon, a drill-rod extending through said casing, and gearing for rotating said drill-rod, mounted in said casing, of a driving-shaft, an eccentric carried thereby, an oscillating lever mounted on said eccentric and actuated thereby, and devices operatively connecting said oscillating lever and the gearing, substantially as set forth.

8. In a well-drilling machine, the combination with the frame, of a main drive-shaft mounted therein, a casing carried by the frame, rod *k* extending through said casing and connected with the drill-rope, pinion *i* mounted on said rod, having a drum *j* secured thereto, weight *o* attached to said drum, mutilated gear *h*, meshing with said pinion, ratchet *f* actuating said gear, an oscillating lever actuated by the main drive-shaft, and rod *d* and pawl *d'*, operatively connecting the lever and the ratchet *f*, substantially as and for the purposes set forth.

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