

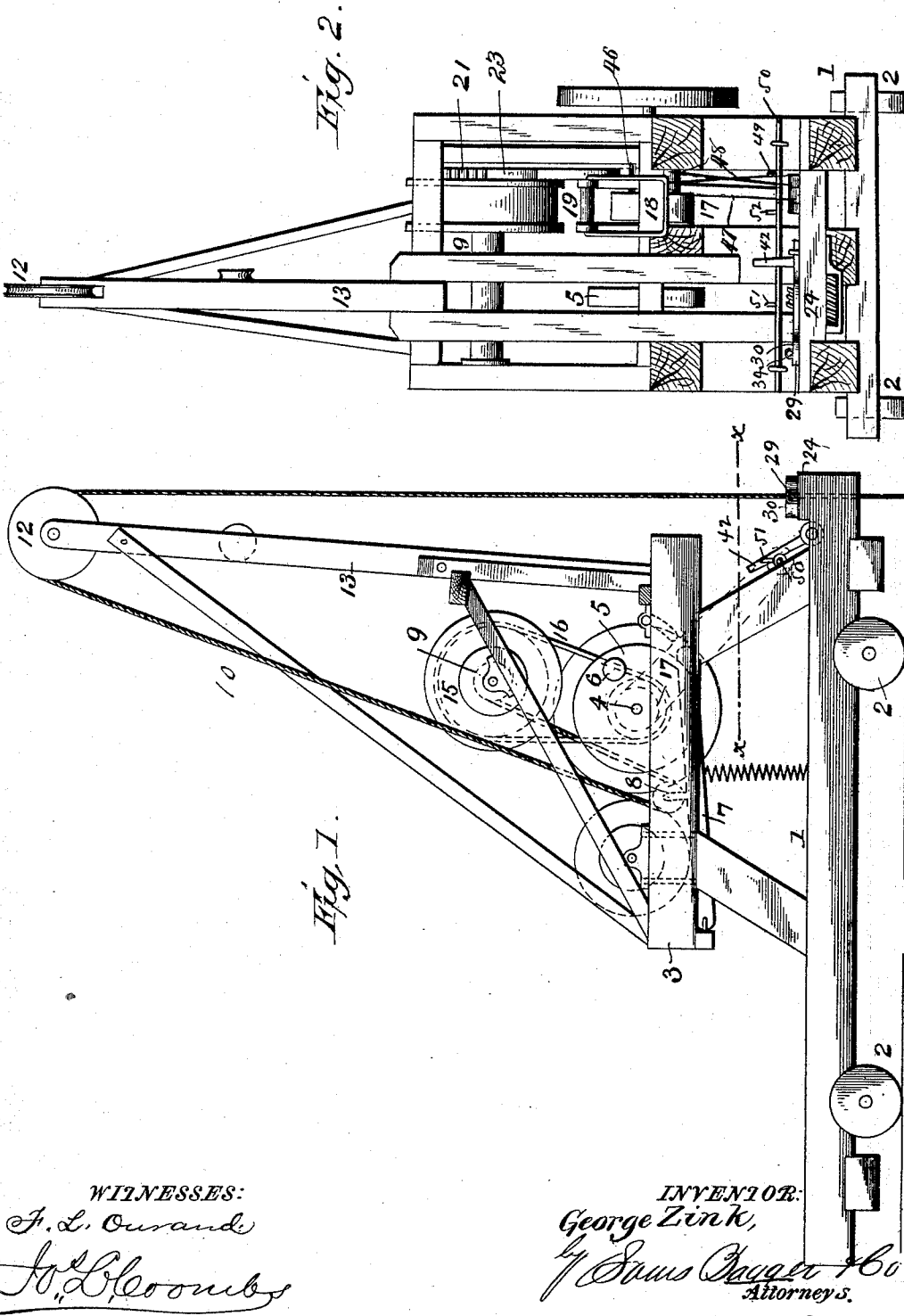
(No Model.)

2 Sheets—Sheet 1.

G. ZINK.
WELL DRILLING MACHINE.

No. 483,756.

Patented Oct. 4, 1892.



WITNESSES:
F. L. Ourand
J. L. Cloombs

INVENTOR:
George Zink,
By James H. Rogers & Co.
Attorneys.

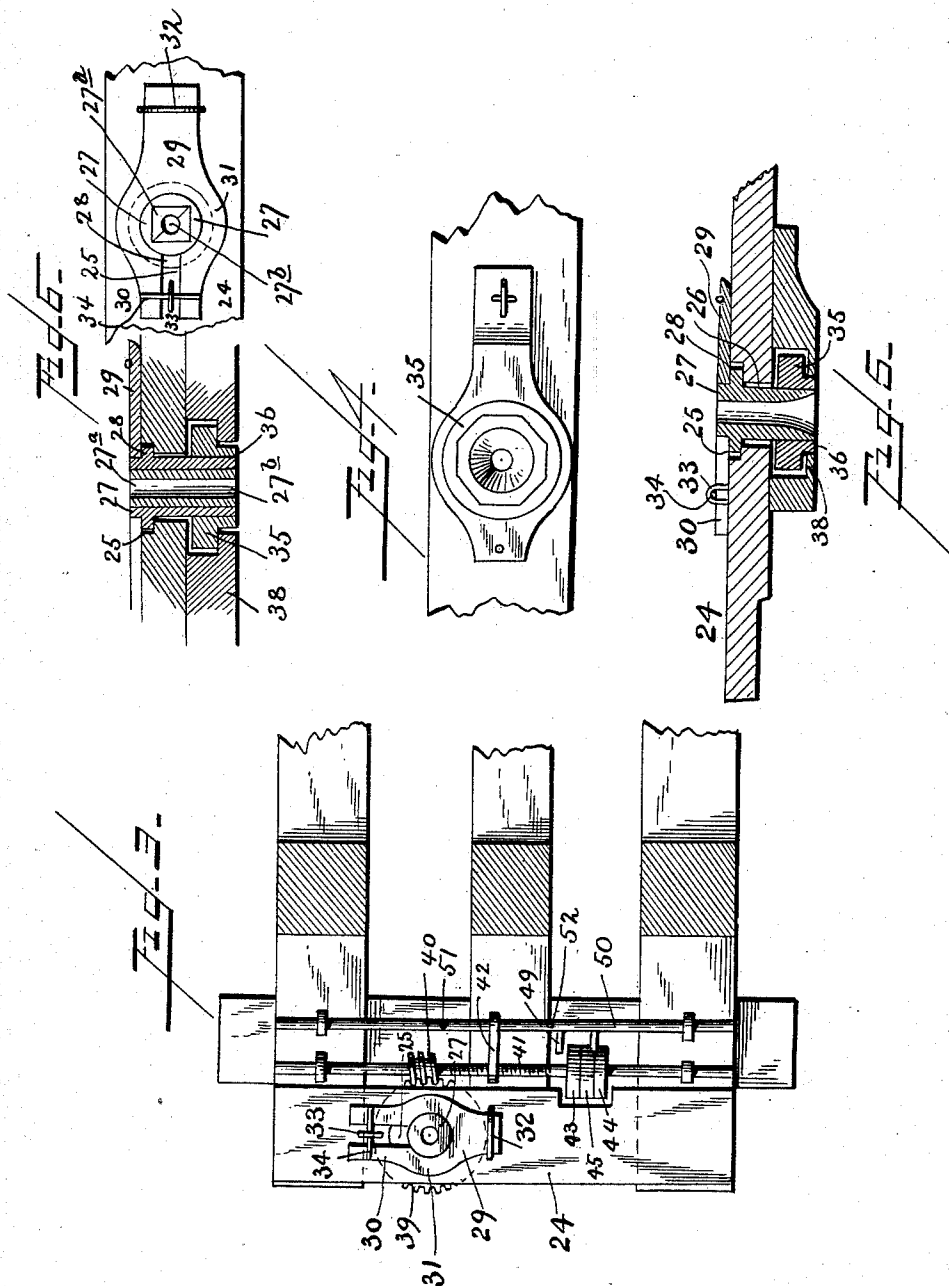
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UNITED STATES PATENT OFFICE.

GEORGE ZINK, OF CLEAR SPRING, MARYLAND.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 483,756, dated October 4, 1892.

Application filed November 23, 1891. Serial No. 412,789. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ZINK, a citizen of the United States, and a resident of Clear Spring, in the county of Washington and State of Maryland, have invented certain new and useful Improvements in Well-Drilling Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in well-drilling machines.

The object of the invention is to provide means for automatically rotating the drill, whereby it is presented in a different position with respect to the material being operated upon at each stroke thereof, and also to provide means whereby the operation of rotating the drill in one direction is automatically reversed after a certain interval of time and the drill rotated in the opposite direction, whereby the drill-rope is prevented from kinking or twisting.

The invention consists in the novel construction and combination of parts hereinafter fully described, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of a well-drilling apparatus to which my improvements are applied. Fig. 2 is an end view of the same. Fig. 3 is a horizontal section on the line *x x*, Fig. 1. Fig. 4 is a detail view looking from the under side of the rotating hub through which the drill passes and the plate to which it is secured. Fig. 5 is a detail sectional view of the plate carrying the rotating hub and worm-wheel by which it is actuated. Fig. 6 shows, in section and in plan, a modification of the rotating link and rope-clamping mechanism.

The mechanism for raising and lowering the drill and feeding it to its work may be of any ordinary or suitable construction, although I prefer and have illustrated in the drawings the construction set forth in a separate application filed by me of even date herewith, Serial No. 412,788. As said construction forms no part of the present invention and is not claimed herein, it will therefore only be necessary to describe it generally.

In the said drawings the reference-numeral 1 designates the base of the machine mounted upon supporting-wheels 2. This base has a superimposed frame 3, in which is journaled a driving-shaft 4, having at its inner end a disk 5, provided with a crank-pin 6, which engages with a pivoted lever 7, carrying a sheave 8. Located above the driving-shaft is a shaft 9, upon which the drill-rope 10 is wound. This rope passes over the sheave 8 on the lever, and also over a sheave 12 on the upright 13, and its free end is connected with a drill. (Not shown.) The shaft 9 carries a pulley 15, which is connected by means of a loose belt 16 with a pulley 17 on the driving-shaft. A bifurcated yoke 18, having a roller 19 and handle, is pivoted to the frame in such manner that the roller can be brought into contact with the belt, so as to tighten the same and cause the shaft 9 to be rotated, whereby the drill-rope is wound upon the shaft and the drill removed from the well. I make no claim herein, however, to these parts. The shaft is also provided with an escapement-wheel 21 and a pivoted escapement-lever provided with an operating-lever 23, by which a step-by-step rotary movement may be imparted to the shaft for the purpose of feeding or paying out the drill-rope.

At the front of the machine or that end adjacent to the well being drilled is a transverse plate 24, which is secured to the base of the machine. At a point in line with the drill this plate is provided with a recess 25 and an aperture 26. In this aperture there is fitted a rotatable hub 27, having a central angular aperture or hole and provided at its upper end with an annular flange 28, which rests upon the recessed portion of the plate and is thereby held in position. In this aperture or hole fits a two-part clamp 27^a, provided with vertical semicircular grooves 27^b. When the two halves of this clamp are placed together, there will be formed a circular aperture, through which the rope passes and is clamped, and the clamp rotating with the hub rotates the rope. To prevent any upward movement of this hub, a yoke 29, having bifurcated arms 30 and a central bulge 31, is provided. The end of this yoke fits under a staple 32, secured to the plate, while the bifurcated arms embrace a loop 33, a pin 34 being passed through said loop, whereby the hub is held

in place. The lower portion of this hub is of octagonal or other polygonal form and fits into a correspondingly-shaped annular disk or worm-wheel 35, having a downwardly-projecting annular flange 36, fitting in an opening in a plate 38, secured to the lower side of the transverse plate 24. The periphery of this disk is formed with a series of spiral or worm-gear-teeth 39, which engage with a worm-screw 40 on a transverse shaft 41, journaled in the machine-base. This shaft is also provided with screw-threads, with which engage similar threads on an arm 42, hereinafter to be described. The shaft 41 is also provided with two fast or fixed pulley-wheels 43 and 44 and an intermediate loose or idler pulley 45. These pulleys are connected with a pulley 46 on the driving-shaft by a crossed belt 47 and a straight belt 48, which belts are embraced by projecting pins or studs 49 on the transverse shifting-bar 50. This bar is capable of being shifted alternately to the right or left as the arm 42 comes in contact with one or the other of the pins 51 or 52 on said shifting-bar. It will be seen that the shifting-bar lies a short distance above and in the rear of the shaft 41, so that the arm 42 will rest by gravity against said shifting-bar.

The operation is as follows: As the apparatus is set in motion to raise and lower the drill in its work the hub 27 is rotated by means of the worm-wheel, worm, and shaft 41, the latter being rotated by the pulleys 43 and 44 and belts 47 and 48 and the pulley 46 on the driving-wheel, according to the direction in which the hub is being rotated. Suppose, for instance, the parts are in the position shown in the drawings, with the crossed belt 47 on the fixed pulley 43 and the straight belt 48 on loose pulley 45. Then as the shaft is rotated by said pulley 44 the worm-wheel and hub will be rotated, thus rotating the drill and drill-rod. As the shaft continues to revolve the arm 42, by means of the screw-threads, will be fed toward the opposite end of the shaft until it strikes the pin 51 on the bar 50, when said bar will be moved laterally and by means of the studs will shift belt 48 onto the fixed pulley 44 and belt 47 onto the loose pulley 45. The rotation of the shaft 41 will now be reversed and the worm-wheel and hub rotated in the opposite direction, so as to unwind the drill-rope, which had been twisted previously. The arm 42 will then be fed back to the other end of the shaft 41, and, striking the pin 52, will again shift the belts and reverse the movement of the parts. Thus the drill will be automatically and alternately rotated in opposite directions, so that there will be no kinking of the drill-rope, due to twisting of the same.

In some instances the drill, instead of be-

ing connected directly to the rope, is secured to wooden poles or bars which pass through and are rotated by the hub and worm-wheel. These poles are connected with the drill-rope by means of a swivel, and it is obvious that there being no kinking or twisting of the poles there is no necessity for rotating them in opposite directions. The rod 42 can therefore be removed from its shaft, and the hub and worm-wheel and the poles or bars will be rotated continuously in the same direction.

Having thus described my invention, what I claim is—

1. In a well-drilling machine, the combination, with a drill-rope and drill and means for raising and lowering the same, of a driving-shaft having a pulley thereon, a worm-shaft having screw-threads thereon, an arm engaging with said screw-shaft and engaging with pins on a shifting-bar, fast and loose pulleys on said shaft connected by means of crossed and straight belts with the pulley on the driving-shaft, and a transverse plate carrying a revoluble worm-wheel engaging with the worm-shaft, said wheel being provided with an angular aperture and a two-part clamp for the passage of the drill and drill-rod, substantially as described.

2. In a well-drilling machine, the combination, with a driving-shaft having a pulley thereon, a worm-shaft having loose and fixed pulleys connected to said pulley by crossed and straight belts and provided with screw-threads and a gravity-arm, and a shifting-bar having pins engaging with said arm and pins engaging with the said belts, of a transverse plate having a worm-wheel engaging with said worm-shaft and having an angular opening therein and a rotatable hub having an angular periphery fitting within said opening and a central aperture and a two-part clamp for the passage of the drill and drill-rod, substantially as described.

3. In a well-drilling machine, the combination, with the transverse plate having a recess on its upper side and a circular aperture, of a hub having an angular lower end and an annular flange at its upper end, a yoke for securing said hub in place, a worm-wheel having an angular recess in which said hub fits and an annular flange at its lower side fitting in an opening in a plate secured to the under side of said transverse plate, a screw-threaded worm-shaft, and means for rotating the same, substantially as described.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

GEORGE ZINK.

Witnesses:

BENNETT S. JONES,
E. A. BROWNE.