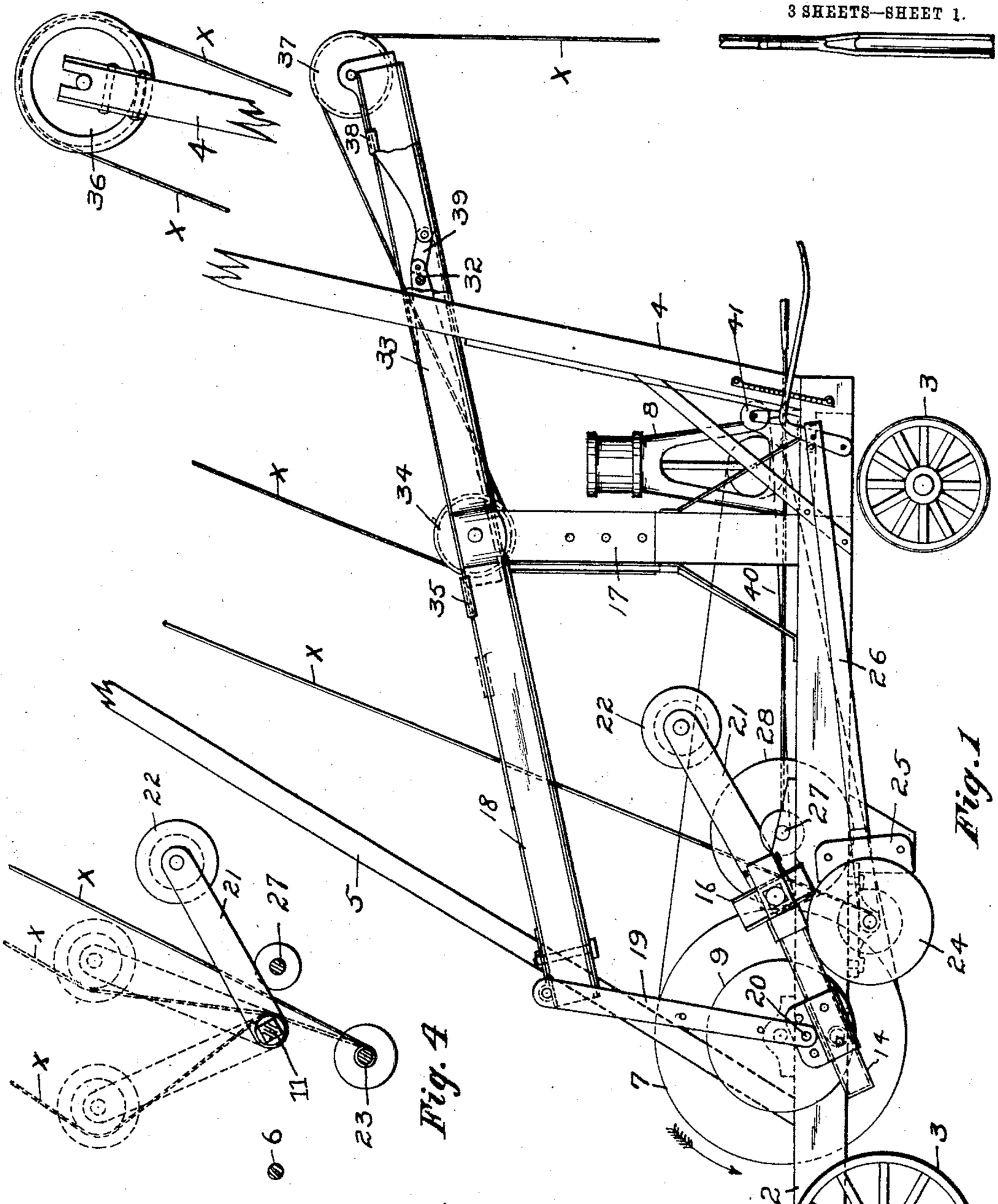
No. 779,671. PATENTED JAN. 10, 1905.

F. E. SIMPKINS.

WELL DRILLING MACHINE.

APPLICATION FILED MAR. 25, 1904.

3 SHEETS—SHEET 1.



Witnesses
Lindsay & B Little
Minnie M. Myers

Inventor
Frank E. Simpkins
By Fennebert
atty.

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3 SHEETS—SHEET 2.

Witnesses
Lindsay & Lisle
Vinnie M. Myers

Inventor
Frank E. Simpkins
By J. Merriam
Atty

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3 SHEETS—SHEET 3.

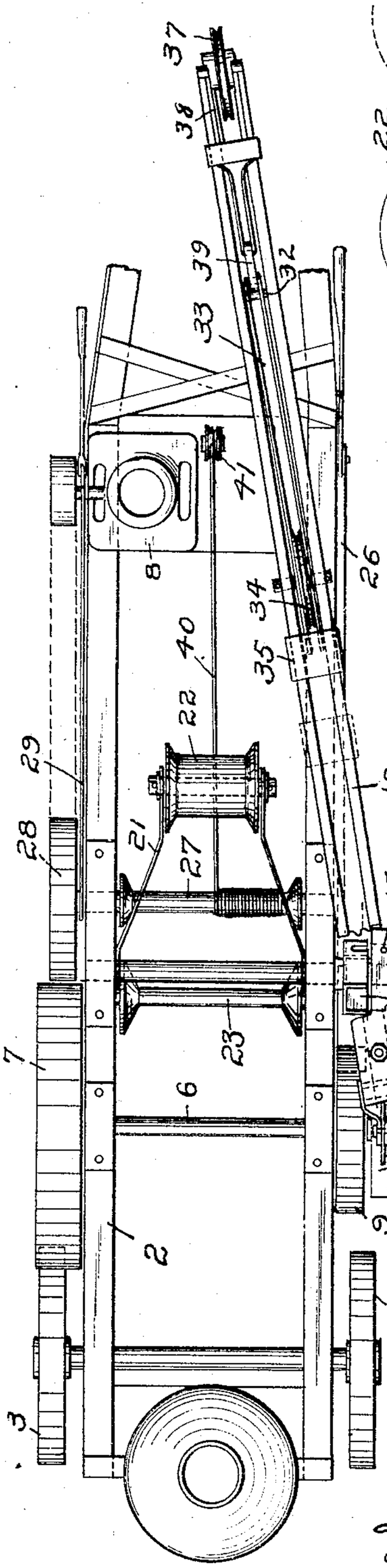

Fig. 3

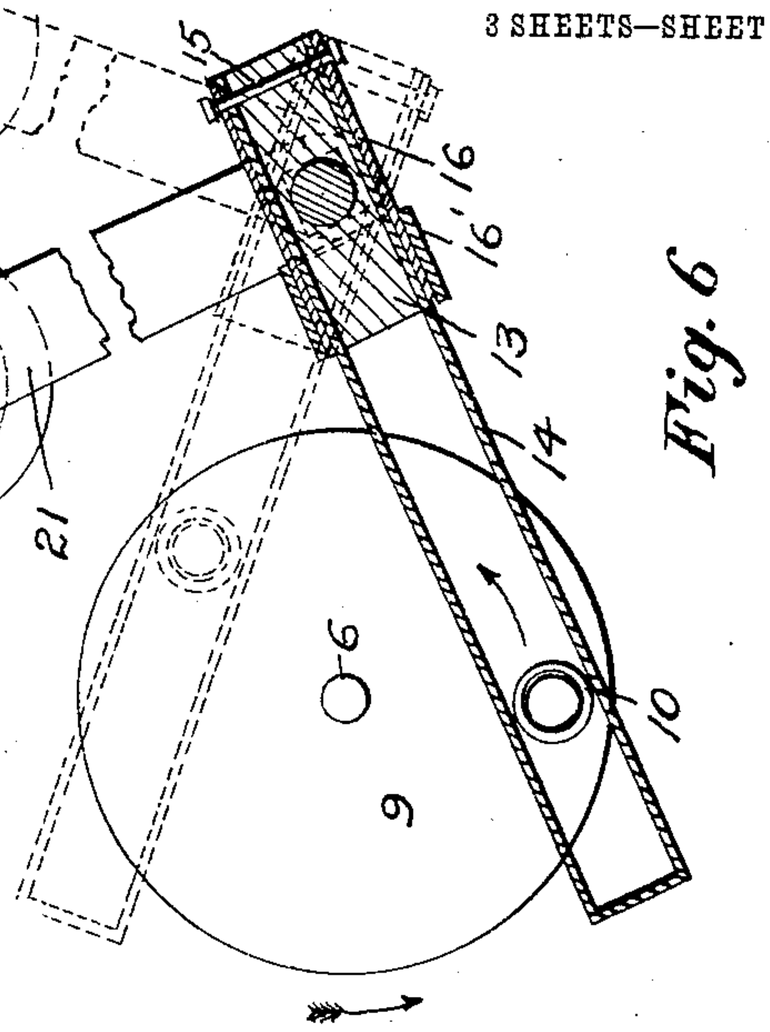

Fig. 6

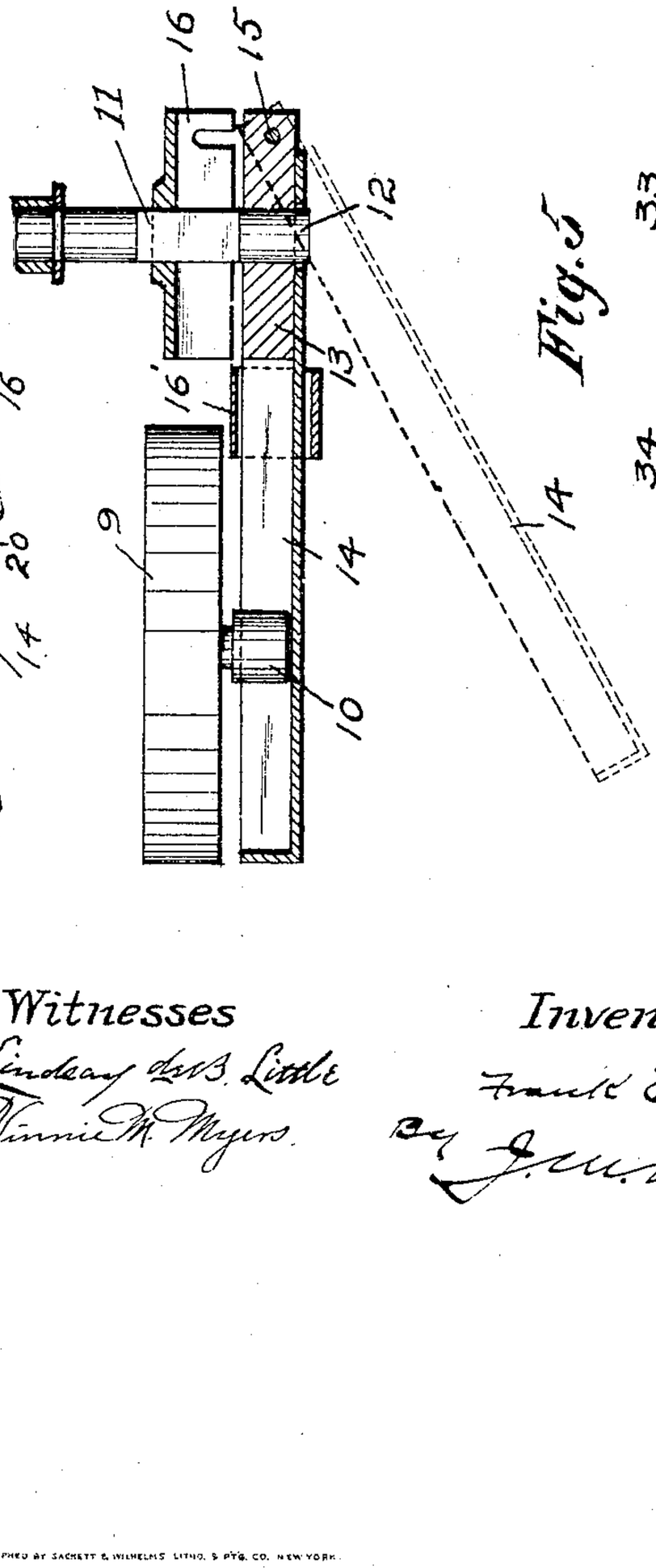

Fig. 5

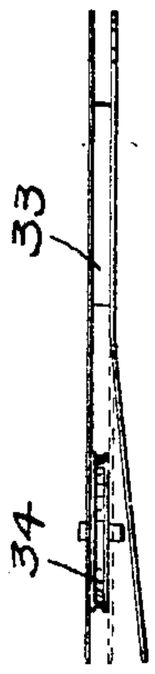

Fig. 7

Witnesses

Lindsay & B. Little

Vinnie R. Myers.

Inventor

Frank E. Simpkins

By J. W. Neebe & Co

Atty.

No. 779,671. Patented January 10, 1905.

UNITED STATES PATENT OFFICE.

FRANK E. SIMPKINS, OF ALLEGHENY, PENNSYLVANIA.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 779,671, dated January 10, 1905.

Application filed March 25, 1904. Serial No. 199,912.

To all whom it may concern:

Be it known that I, FRANK E. SIMPKINS, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Well-Drilling Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to portable machines for drilling oil, gas, and other deep wells. One object is to so construct the apparatus that the drilling-cable is paid out from its reel and passed to and over the beam when drilling with the latter and directly to the tools without the interposition of clamps, temper-screw, or other devices now generally employed for connecting the tools with the beam, thereby reducing the cost of the drilling outfit and saving the cable from the great wear to which it is subject by the clamps. As considerable difficulty has been encountered in providing clamps that will securely hold wire cable, this obstacle is entirely overcome by my apparatus, wherein the clamps are eliminated.

A further object of this invention is to provide improved mechanism for actuating the drilling-cable in the operation of spudding and to provide improved actuating means adapted for beam-drilling and spudding interchangeably.

Still a further object is to provide improved means for so actuating the drilling-cable as to accelerate its down or working stroke and make gradual or relatively slow its up or lifting stroke.

In the accompanying drawings, Figure 1 is a side elevation of a machine constructed in accordance with my invention, the same being arranged for beam-drilling. Fig. 2 is a similar view showing the arrangement of the mechanism for spudding. Fig. 3 is a top plan view of Fig. 1. Fig. 4 is a diagrammatic view illustrating the several positions of the spudding mechanism. Fig. 5 is a sectional plan view of the arm for transmitting power from the band-wheel shaft, and Fig. 6 is a side elevation of the same and the spudding-sheave. Fig. 7 is a detail view of one of the drilling-cable sheaves carried by the beam.

Referring to the drawings, 2 designates the horizontal frame of the machine, mounted on the usual ground-wheels 3, and rising from the front of the frame is the mast or derrick 4, braced from the rear of the machine by bars 5. At one end of transverse shaft 6, journaled in frame 2, is band-wheel 7, to which passes a belt from engine 8 on the front of frame 2, as usual. On the other end of the shaft is friction-wheel 9, carrying on its outer side the roller wrist-pin 10. Also journaled in frame 2 is shaft 11, which is preferably of angular section excepting at one end, 12, said end being round and embraced by block 13, which is adapted to turn thereon. A longitudinally-recessed or trough-shaped arm 14 is pivoted at 15 to this block and is adapted to swing laterally on the pivot for engaging and disengaging the wrist-pin, as shown in Fig. 5. Shaft 11 is utilized for oscillating the spudding-sheave, and for this operation the angular channel piece or clip 16 is moved outward on angular shaft 11, with which it rotates, and caused to embrace block 13, in which position it is held by keeper 16′. For beam-drilling, clip 16 is disengaged from block 13, as shown in Fig. 1 and in full lines in Fig. 5, thus permitting block 13 to freely turn on the round shaft end 12.

17 is the samson-post mounted on frame 2 and supporting walking-beam 18, having at its rear end pitman 19, which is adjustably connected at 20 to arm 14. The arrangement of this arm is such that a quick upward stroke or movement is imparted thereto by wrist 10, this movement being simultaneous with the downward or working stroke of the tools in both the spudding and beam-drilling operations, while during the upstroke of the tools and the simultaneous downward movement of arm 14 the travel of wrist 10 in channel-arm 14 is such that the movement is relatively slow. The position of the parts at the beginning of the working stroke of the tools is shown in full lines in Fig. 6, and their position at the conclusion of that stroke is shown in dotted lines.

For the spudding operation pitman 19 is disengaged at 20 and moved to position shown in Fig. 2, and clip 16 is adjusted, as above de-

scribed, so as to cause shaft 11 to turn with arm 14. Fixed to this shaft are arms 21, which support sheave 22, over which passes the drilling-cable X, the extreme positions of sheave 22 while spudding being shown in dotted lines in Fig. 4, while in the same figure the solid lines represent the inoperative position of the sheave, as when drilling with the beam. The oscillating movement thus imparted to sheave 22 is transmitted directly to the drilling-cable, and the latter is shortened and lengthened and the tools raised and lowered by rapidly-succeeding strokes.

The drilling-cable reel 23 is preferably positioned in frame 2 below shaft 11, and the reel-shaft carries at one end friction-wheel 24, which is positioned between wheel 9 and the fixed brake-block 25, and as the reel-shaft rotates in a movable bearing controlled by hand-operated bar 26 wheel 24 may be moved into frictional engagement with wheel 9 for reeling the drilling-cable or into engagement with block 25 for holding the reel against rotation. The sand-line reel 27 is preferably arranged slightly in front of shaft 11, and the shaft thereof is also mounted in a movable bearing and carries friction-wheel 28, which may be moved into engagement with the periphery of band-wheel 6 for operating the reel, the adjustment being controlled by bar 29, similar to bar 26. The movable bearings of the reel-shafts have not been shown in detail, as their construction is well known in the art.

I preferably form beam 18 of two pieces of channel-iron arranged back to back and slightly separated. Hinged at 32 between the forward portions of the beam members is the two-part arm 33, and journaled in this arm is sheave 34. When drilling with the beam, arm 33 is turned downward thereinto and so held by the sliding keeper 35, and in this position the axis of sheave 34 coincides with the axis of the beam, so that the oscillations of the latter do not effect sheave 34 in the slightest degree. From reel 23 the drilling-cable X passes upward over crown-pulley 36 and then downward and around sheave 35 and forward from the latter over sheave 37 at the front end of the beam, from which the cable drops in a vertical line to the drilling-tools without the interposition of a temper-screw, clamps, or other devices now generally used for connecting the beam and cable. I prefer to mount sheave 37 on a slide 38 and to connect the inner end of this slide to the extremity of arm 33 by a link 39, so that when arm 33 is turned upward, as in the spudding operation, sheave 37 is drawn inward from the extremity of the beam, as in Fig. 2, and entirely out of the way of the cable, which in that operation depends directly from the crown-pulley. The forwardly-swinging arm 33 carries sheave 34 to position forward, even farther than is shown in Fig. 2, for embracing the drilling-cable when changing from spudding to beam-drilling, the cable being inserted by simply springing outward one member of arm 33 to admit the cable, as shown in Fig. 8, and after the cable has been thus inserted it is slackened sufficiently to enable the arm to be turned backward and downward, as in Fig. 1. With this mechanism the cable is under perfect control, is paid out from the reel as required without stopping the drilling, and is no more affected by the oscillations of the beam than though suspended therefrom by clamps and a temper-screw, as heretofore.

From reel 28 the sand-line 40 is preferably carried forward under anchor-pulley 41, from which it passes upward and around a sheave (not shown) located in the upper portion of the derrick, as is usual in this class of machines.

I do not confine myself to the structural details herein disclosed, as obviously the same may be changed or modified in many particulars without departing from the spirit and scope of the invention as defined by the appended claims.

I claim as my invention—

1. The combination of a shaft having a crank, an arm mounted to oscillate in the plane of the crank and operatively connected thereto, and a beam and spudding mechanism adapted to be actuated by said arm interchangeably.

2. The combination of a shaft, an arm mounted thereon and adapted interchangeably to turn with the shaft or independently thereof, spudding mechanism operatively connected to the shaft, a walking-beam having a detachable connection with said arm, and means for oscillating the arm.

3. The combination of a shaft, spudding mechanism operatively connected to the shaft, an arm adapted to turn on the shaft, an arm-engaging member movable on the shaft and adapted to turn therewith, a walking-beam having a detachable connection with said arm, and means for oscillating the arm.

4. The combination of a frame mounted to oscillate on a horizontal axis and carrying a spudding-sheave which is moved in a vertical arc by said frame, a cable-reel beneath the plane of the frame-axis, and a drilling-cable passing upward from the reel in position to be deflected horizontally by said sheave.

5. The combination of a horizontal shaft, arms projecting therefrom, a sheave carried by the arms, an actuating-arm projecting from said shaft, a cable-reel beneath the plane of the shaft, a drilling-cable extending upward from the reel and adapted to be deflected horizontally by said sheave, and means for oscillating the said shaft.

6. The combination of a shaft, oscillating spudding mechanism mounted on the shaft, an arm loosely mounted on the shaft, means for rigidly uniting the arm and said mechanism, a beam adapted to detachably connect with

the arm, and a shaft having a crank operatively connected to said arm.

7. The combination of a shaft angular in cross-section, a spudding-sheave carried and adapted to be oscillated by the shaft, an arm loosely mounted on the shaft, a clip rotatable with the shaft and movable thereon for detachably engaging the arm, and a shaft having a crank operatively connected to said arm.

8. In well-drilling apparatus, the combination of a derrick, a crown-pulley in the upper portion thereof, a cable-reel, a drilling-cable extending from the reel upwardly to and over the crown-pulley and depending from the latter to the drilling-tools, a walking-beam, the guides for the cable intermediate the crown-pulley and tools, one of said guides being carried by the outer portion of the beam and the other guide having position at the beam-fulcrum, means for engaging and disengaging the cable and said guides without disengaging the cable from either the crown-pulley or the tools, and spudding mechanism for actuating the drilling-cable when the latter is disengaged from said guides.

9. In well-drilling apparatus, the combination of a derrick, a crown-pulley in the upper portion thereof, a cable-reel, a drilling-cable extending from the reel to and over the crown-pulley and depending from the latter to the drilling-tools, a walking-beam, a sheave concentric with the beam-fulcrum, a sheave at the outer end of the beam, means for engaging and disengaging the drilling-cable and said sheaves without disengaging the cable from either the crown-pulley or the tools, and spudding mechanism adapted to actuate the cable when the latter is out of engagement with said sheaves.

10. In well-drilling apparatus, the combination of a crown-pulley, a walking-beam, a sheave having its axis coincident with the beam-axis, a cable-guide at the outer extremity of the beam, and a drilling-cable extending upward to and downward over the crown-pulley and around said sheave and over said guide.

11. In well-drilling apparatus, the combination of a crown-pulley, a sheave having its axis coincident with the beam-axis, a second sheave mounted on the outer extremity of the beam, and a drilling-cable depending from the crown-pulley and extending beneath the first-mentioned sheave and forward along the beam directly from said sheave to and over the sheave at the extremity of the beam and depending from the latter.

12. In well-drilling apparatus, the combination of a walking-beam, a sheave, a support for the sheave carried by and movable with relation to the beam and adapted to hold the sheave with its axis coincident with the beam-axis, and a cable-guide on the outer portion of the beam.

13. In a well-drilling machine, the combination of a walking-beam, a sheave, a sheave-support pivoted to the outer portion of the beam and adapted to hold the sheave with the axis thereof coincident with the beam-axis, and a cable-guide carried by the outer portion of the beam and alining with said sheave.

14. In well-drilling apparatus, the combination of a walking-beam, an arm pivoted to swing vertically on the beam, a sheave mounted on the arm, means for securing the arm with the sheave and beam-axis coincident, a cable-guide at the outer extremity of the beam, and a drilling-cable passing around the sheave and guide and downward from the latter.

15. In well-drilling apparatus, the combination of a walking-beam, an arm pivoted to swing vertically on the beam, a sheave mounted on the arm and adapted to be held thereby with its axis coincident with the beam-axis, a movable cable-guide at the outer extremity of the beam and operatively connected to the said arm and adapted to be drawn rearward when the arm is turned upward, and a drilling-cable passing around said sheave and over and downward from the said guide.

16. In well-drilling apparatus, the combination of a walking-beam, an arm pivoted to swing vertically thereon, a slide at the outer end of the beam, a sheave carried by the slide, a link connecting the slide and said arm and constructed and arranged to draw the slide inward when the arm is turned upward, and a drilling-cable extending around and guided by said sheaves.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK E. SIMPKINS.

Witnesses:
J. M. NESBIT,
ALEX. S. MABON.