No. 835,368. PATENTED NOV. 6, 1906.

F. E. SIMPKINS.

WELL DRILLING MACHINE.

APPLICATION FILED FEB. 14, 1906.

4 SHEETS—SHEET 1.

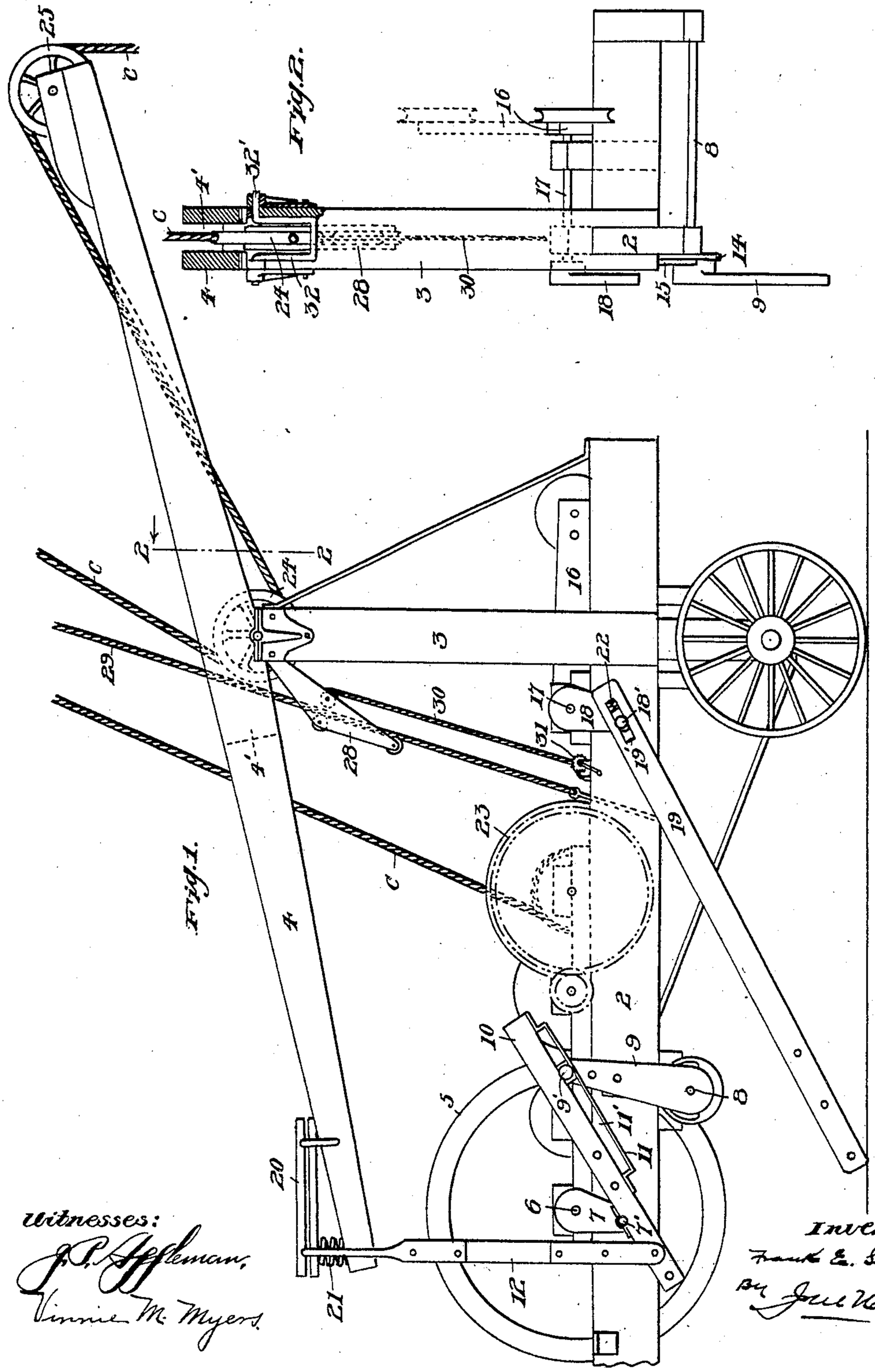

Fig. 2.

Fig. 1.

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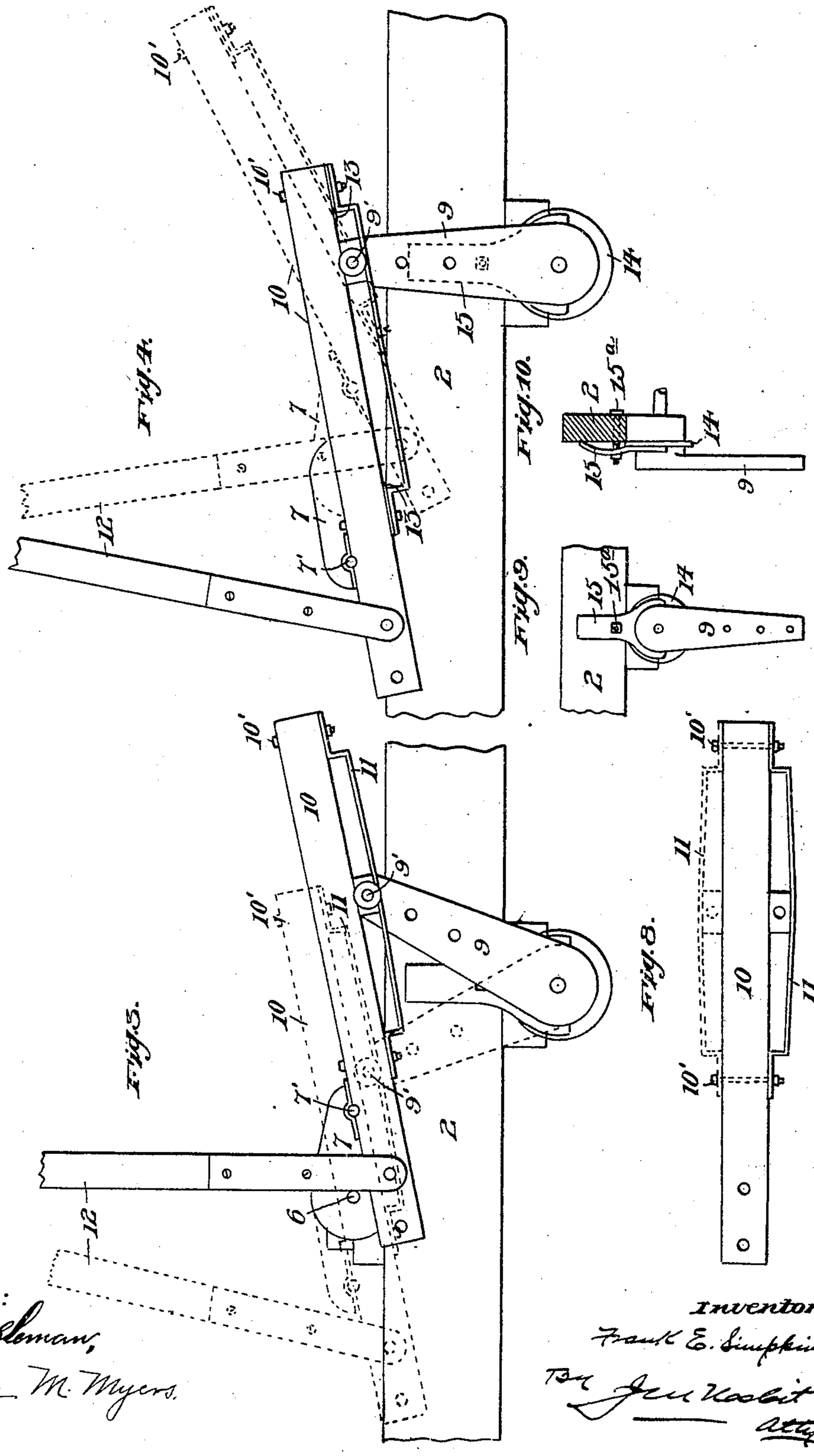
4 SHEETS—SHEET 2.



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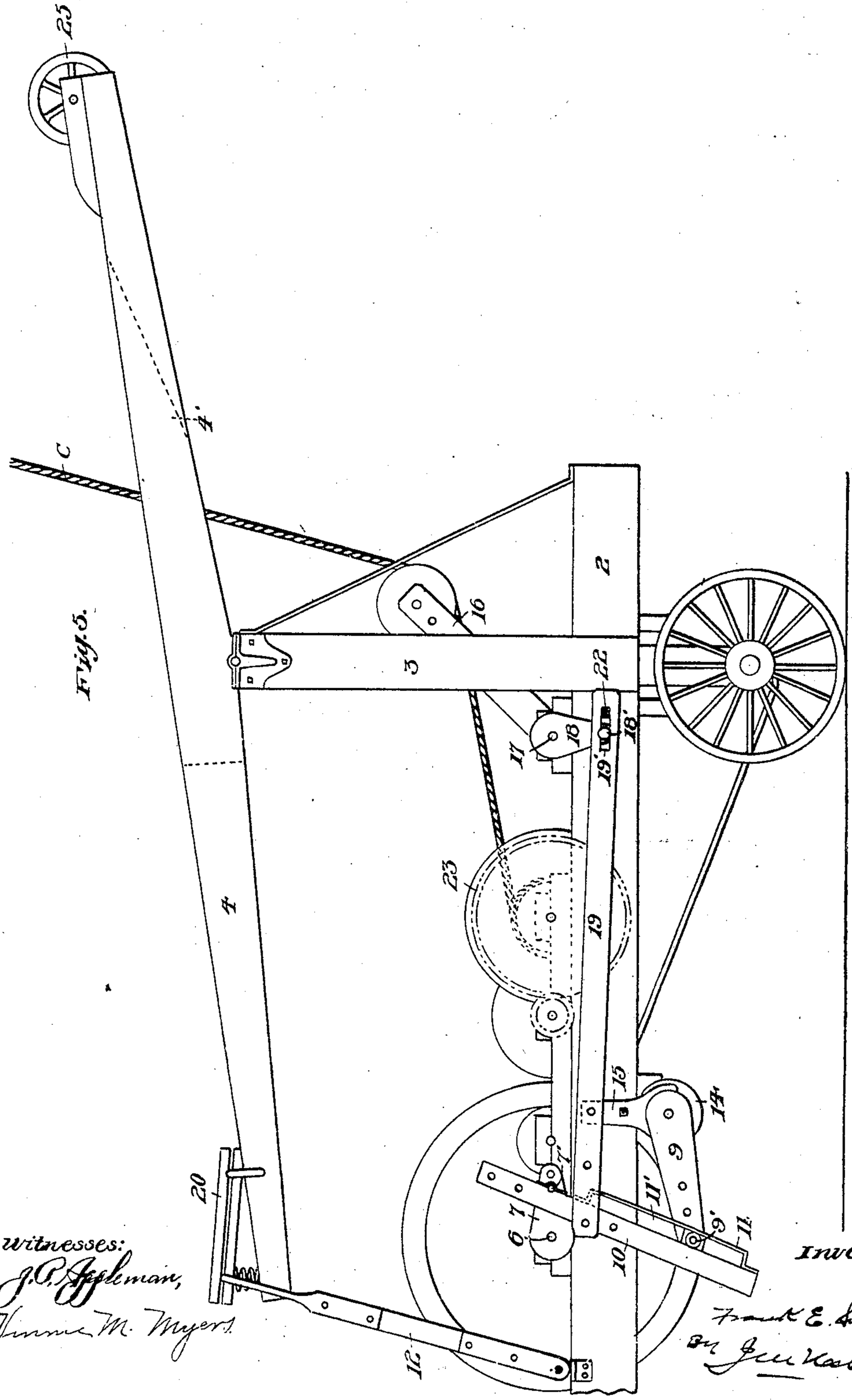
4 SHEETS—SHEET 3.

Fig. 5.



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WELL DRILLING MACHINE.

APPLICATION FILED FEB. 14, 1906.

4 SHEETS—SHEET 4.

Fig. 6.

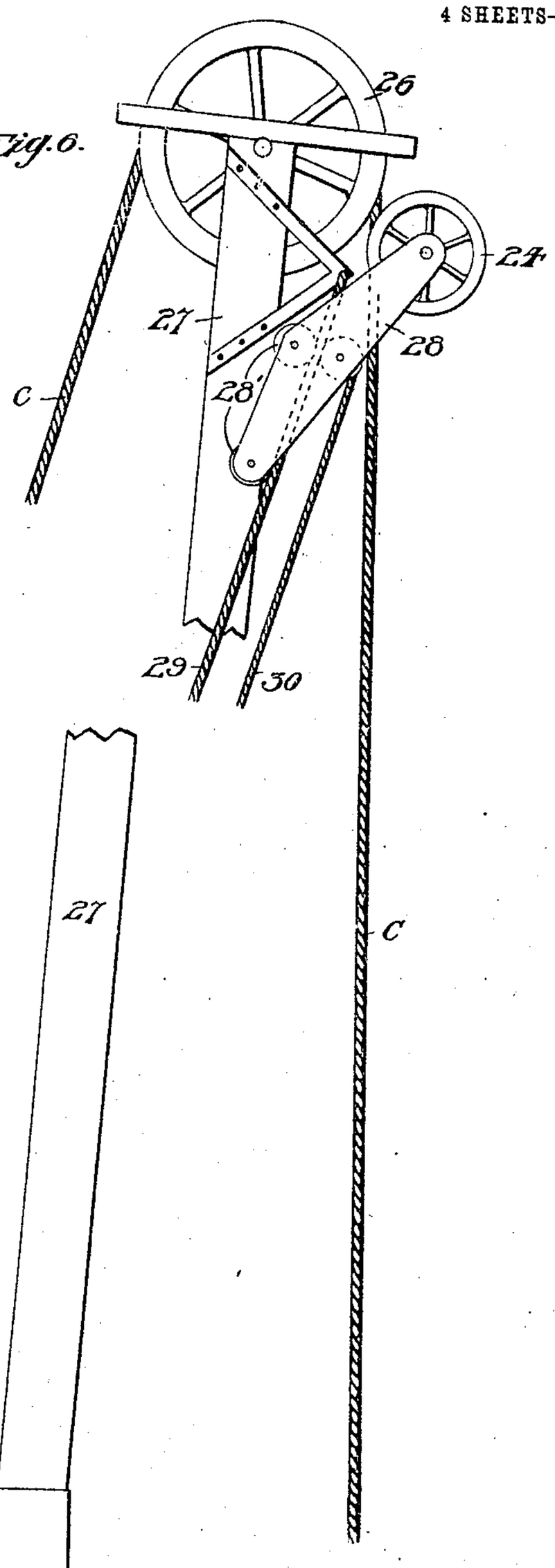
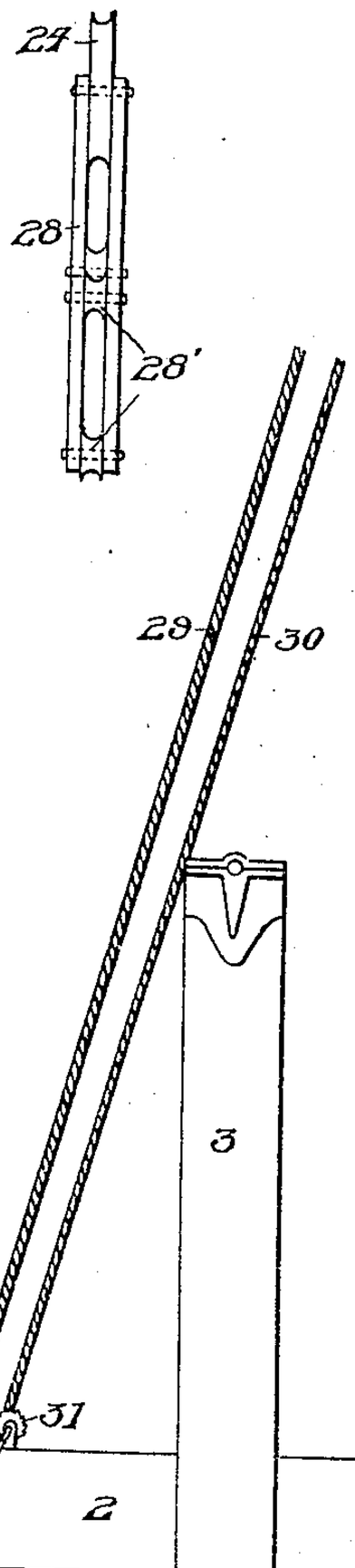


Fig. 7.



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UNITED STATES PATENT OFFICE.

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WELL-DRILLING MACHINE.

No. 835,368. Specification of Letters Patent. Patented Nov. 6, 1906.

Application filed February 14, 1906. Serial No. 300,952.

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 well-drilling apparatus; and the primary object is to provide mechanism of improved construction for so transmitting the power that the cable is moved more rapidly during the downstroke of the drilling-tools than during the upstroke.

A further object is to provide for varying the speed or throw of the actuating mechanism without changing the speed of the actuating crank-shaft.

A further object is to provide variable-speed mechanism adapted for beam drilling and spudding interchangeably.

The invention further relates to improved means for holding the cable drawn backward coincident with the beam-axis and for drawing the same backward from its normal position when hanging suspended from the crown-pulley.

In the accompanying drawings, Figure 1 is a side elevation of a portion of well-drilling apparatus embodying the invention, the same being arranged for beam-drilling. Fig. 2 is a front end view of a portion of the same, showing the beam in section on line 2 2 of Fig. 1. Fig. 3 is a detail view illustrating the movement of the power-transmitting mechanism, and Fig. 4 is a similar view of the same mechanism arranged to operate in a slightly different manner. Fig. 5 is a view similar to to Fig. 1, illustrating the mechanism connected for spudding. Fig. 6 is a broken side elevation of the front portion of the apparatus. Fig. 7 is a detail view of the sheave-carrier. Fig. 8 is a detail view of the power-transmitting arm, and Figs. 9 and 10 are similar views of the locking device for the adjustable arm-support.

Referring to the drawings, 2 designates the machine-frame, 3 the samson-post, and 4 the walking-beam.

5 indicates the band-wheel, carried by one end of shaft 6, the opposite end of the shaft having the usual crank 7. Mounted in the under portion of the frame is shaft 8, carrying crank 9. This crank comprises a support for power-transmitting arm 10, the latter being secured to wrist 7′ of crank 7 and movable positively with the said crank. Arm 10 is here shown provided on one side with the elongated offset plate or keeper 11, which forms longitudinal slot or passage-way 11′ for confining wrist 9′ of crank 9.

In the adaptation shown in Figs. 1, 3, and 5 the rear end of arm 10 is pivotally connected to the lower end of beam-pitman 12, wrist 7′ being connected to the arm at a point inward from the pitman connection.

With the power-transmitting arm 10 arranged as shown it is given a combined reciprocating and oscillating movement when crank 7 is rotated, the arrangement being such that pitman 12 is moved more rapidly through its upstroke than when moving downward, thereby securing the advantage of a quick drop of the tools and a relatively slower upward movement, which prevents too sudden strains upon the mechanism and avoids injury to the drilling-cable.

The arrangement may be such that crank 9 oscillates with arm 10, at which time crank-wrist 9′ is held fixed in slot or passage-way 11′, or crank 9 may be held fixed and arm 10 caused to move backward and forward over wrist 9′. Either arrangement affords the desired power-transmitting motion for arm 10.

In the adaptation shown in Figs. 1 and 3 crank 9 is free to oscillate, wrist 9′ being clamped against arm 10 by slot-forming keeper 11. The movement of the parts when thus arranged is clearly indicated by the full and dotted line positions shown in Fig. 3.

In Fig. 4 crank 9 is shown in fixed position with arm 10 free to move longitudinally on wrist 9′, spacing-strips 13 being inserted between the arm and keeper for preventing the latter from binding and holding said wrist. For locking crank 9 the base thereof is provided with annular shoulder 14, which is adapted to be engaged by friction-yoke 15, secured to frame 2 by bolt 15ª, and when this yoke is tightened up by means of said bolt shoulder 14 is clamped between it and the bearing of shaft 8, and thus the shaft and crank are prevented from turning.

In both adaptations the stroke of arm 10 may be varied for the purpose of varying the speed of pitman 12, causing the up and down strokes of the latter to be either faster or slower, as may be desired. To secure the faster strokes in the arrangement of Figs. 1

and 3, wrist 9′ is confined in the inner portion of slot or passage-way 11′, or nearer wrist 7′ than when the slower motion is desired. In the arrangement shown in Fig. 4 crank 9 is secured in such position as will afford the desired speed, wrist 9′ thereof being nearer wrist 7′ for a faster motion than for the slower motion.

In Fig. 5 the mechanism is shown connected up for actuating the spudding-arm 16, the latter being mounted on shaft 17, carrying crank 18, and the wrist of this crank is connected by pitman 19 with arm 10. In this adaptation, as in the beam-drilling operations above described, arm 10 so operates as to permit the drilling-cable to drop suddenly, its movement being faster than when rising and carrying the weight of the tools. Also in this adaptation crank 9 may be held immovable, or it may be free to oscillate with arm 10, as above described. Also the speed may be varied for affording pitman 19 either a faster or slower motion by varying the position of wrist 9′ when fixed in keeper 11 with crank 9 loose and when the wrist is loose by varying the fixed position of crank 9.

The offset plate or keeper 11 is preferably secured to arm 10 by bolts 10′ and may be positioned at either edge thereof, so that the arm will always exert its pressure directly on wrist 9′ and not through the medium of the keeper. Thus for the beam-drilling operation keeper 11 is secured to the edge opposite that to which wrist 7′ is connected, while in the spudding arrangement said wrist connection and keeper are on the same edge of the arm. To make the change, it is only necessary to remove bolts 10′ and reverse the position of the keeper.

For cushioning pitman 12 at the beginning of its downstroke, at which time the weight of the tools is thrown upon the walking-beam, pitman 12 is connected to plate 20, pivoted to play vertically on the upper edge of the beam and held normally raised by spring 21, the pitman being thus afforded slight downward movement, which is resisted by said spring at the beginning of the downstroke. For the spudding operation pitman 19 is similarly cushioned by spring 22 in the outer end of the pitman-slot 19′, in which slot wrist 18′ of crank 18 is in slight longitudinal play.

The improved machine is designed to operate without the usual temper-screw and clamp mechanism, the drilling-cable C being paid out as needed directly from spool 23. In order to impart the motion of the beam to the cable, the latter is caused to pass around a sheave 24, the axis of which is preferably coincident with the beam-axis, and then outward over a sheave 25, carried by the outer end of the beam. However, as the beam is inactive during the spudding operation the cable should depend from the crown-pulley 26, supported by mast 27, directly into the well. In order to effect the change necessary for the two operations, sheave 24 is mounted in buggy 28, provided with rollers 28′, which travel on the track-forming guy-line 29, the latter extending from the upper end of mast 27 downwardly and backwardly through the longitudinal recess 4′ of the beam, its lower end being anchored to frame 2. Line 30, secured to the buggy, operates to draw the same downwardly on track 29, the line being operated by suitable winding device 31, positioned on frame 2. When the mechanism is in the position indicated in Fig. 6, the drilling-cable depends directly into the well, sheave 24 at such time being raised and closely adjacent crown-pulley 26. For beam-drilling buggy 28 is drawn downward and through beam-recess 4′ to the position shown in Fig. 1, with the axis of sheave 24 coincident with the beam-axis, the lowering of the buggy operating to deflect cable C backwardly, as will be understood. To make the change for the spudding operation, it is only necessary to release line 30, when the pull of the drilling-cable will cause the buggy to move upward on track 29 to the position shown in Fig. 6, in which it is held by the resistance of the cable to lateral deflection.

To provide the necessary space for the sheave 24 at the beam-axis, the upper end of the samson-post is recessed, as shown in Fig. 2, and may be provided with the U-shaped bearing member 32 within said recess, having the outwardly-extending bearing-forming extremities 32′.

While the variable-power-transmitting mechanism and the mechanism just described for manipulating the drilling-cable are preferably embodied in the same machine, it will be understood that either may be used alone without departing from the invention.

I claim—

1. The combination of a shaft having a crank, an arm, a support adapted to afford the arm a combined reciprocating and oscillating movement, a pivotal connection between the arm and crank, and cable-actuating means connected to the arm.

2. The combination of a shaft having a crank, an arm, a support adapted to afford the arm a combined reciprocating and oscillating movement, a pivotal connection between the arm and crank, and cable-actuating means connected to the arm.

3. The combination of a shaft having a crank, an arm, an arm-support adjustable with relation to the shaft and adapted to afford the arm a combined reciprocating and oscillating movement, a pivotal connection between the arm and crank, and cable-actuating means connected to the arm.

4. The combination of a shaft having a crank, an arm, an arm-support adapted to af-

ford the arm a combined reciprocating and oscillating movement, means for positioning the support at different distances from the crank-shaft for the purpose of varying the oscillations of the arm, a pivotal connection between the arm and crank, and cable-actuating means connected to the arm.

5. The combination of a shaft having a crank, an arm having a longitudinal passage-way, an arm-support adjustable in the passage-way, a pivotal connection between the arm and said crank, and cable-actuating means connected to the arm.

6. The combination of a walking-beam, a beam-axis, a cable-guide at the outer end of the beam, a crown-pulley, a crown-pulley support, a drilling-cable, a cable-engaging sheave movable beneath the crown-pulley, and means for positioning said sheave at the beam-axis.

7. The combination of a walking-beam, a cable-guide at the outer end of the beam, a crown-pulley, a crown-pulley support, a trackway extending from said support downwardly past the beam, a drilling-cable, a cable-engaging sheave and a sheave-carrier movable on the trackway.

8. The combination of a walking-beam, a beam-axis, a cable-guide at its outer end, a crown-pulley, a crown-pulley support, a backwardly-inclined trackway extending downwardly from the support past the walking-beam, a cable-engaging sheave, a sheave-carrier movable on the trackway, and means for drawing downward the carrier for the purpose of causing the sheave to deflect the drilling-cable inwardly and for holding the sheave coincident with the beam-axis.

9. The combination of a walking-beam having a vertical recess, a beam-axis, a cable-guide at the outer end of the beam, a crown-pulley, a crown-pulley support, a backwardly-inclined trackway extending downwardly from said support and through the beam-recess, a drilling-cable, a cable-engaging sheave, a sheave-carrier movable on the trackway, and means for moving the carrier downward for the purpose of positioning said sheave at the beam-axis.

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

FRANK E. SIMPKINS.

Witnesses:
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