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PATENTED AUG. 18, 1903.

G. A. GILBORNE.
WELL DRILLING MACHINERY.

APPLICATION FILED FEB. 24, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

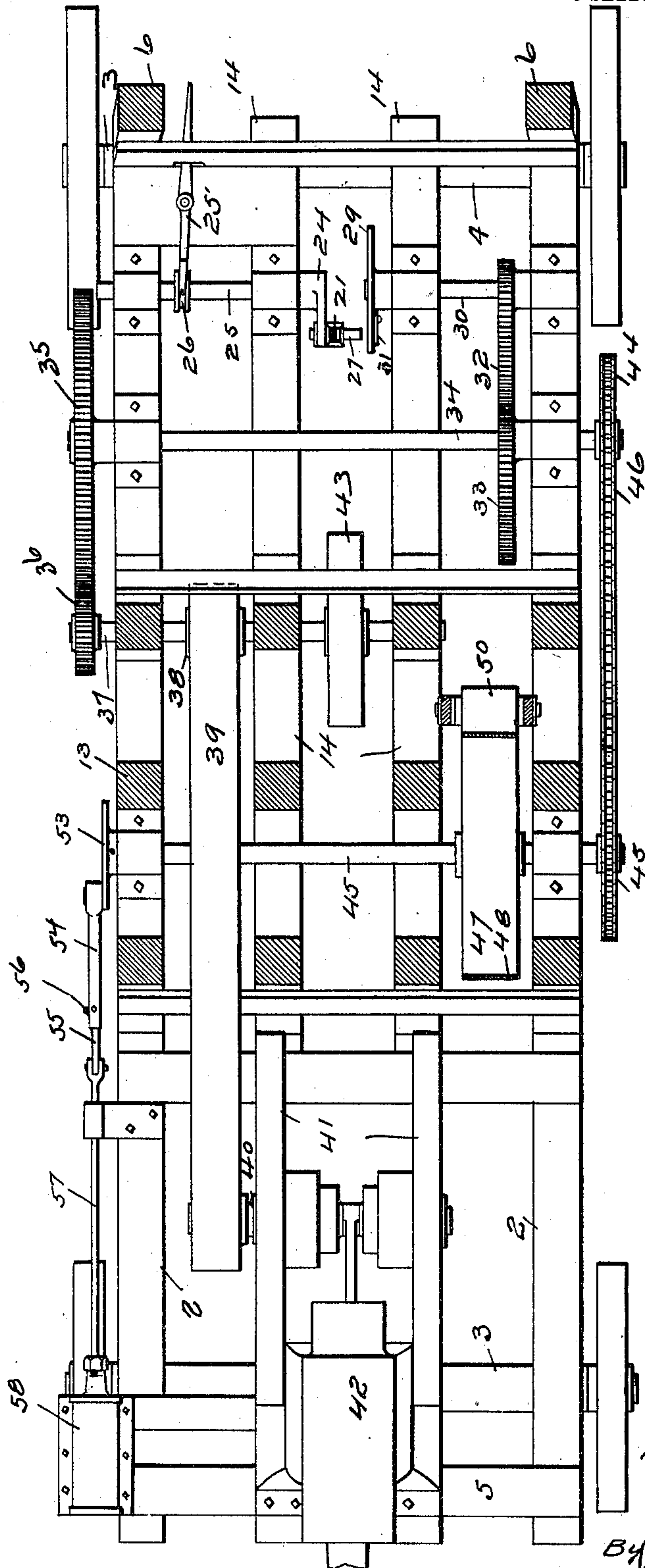


FIG. 1.

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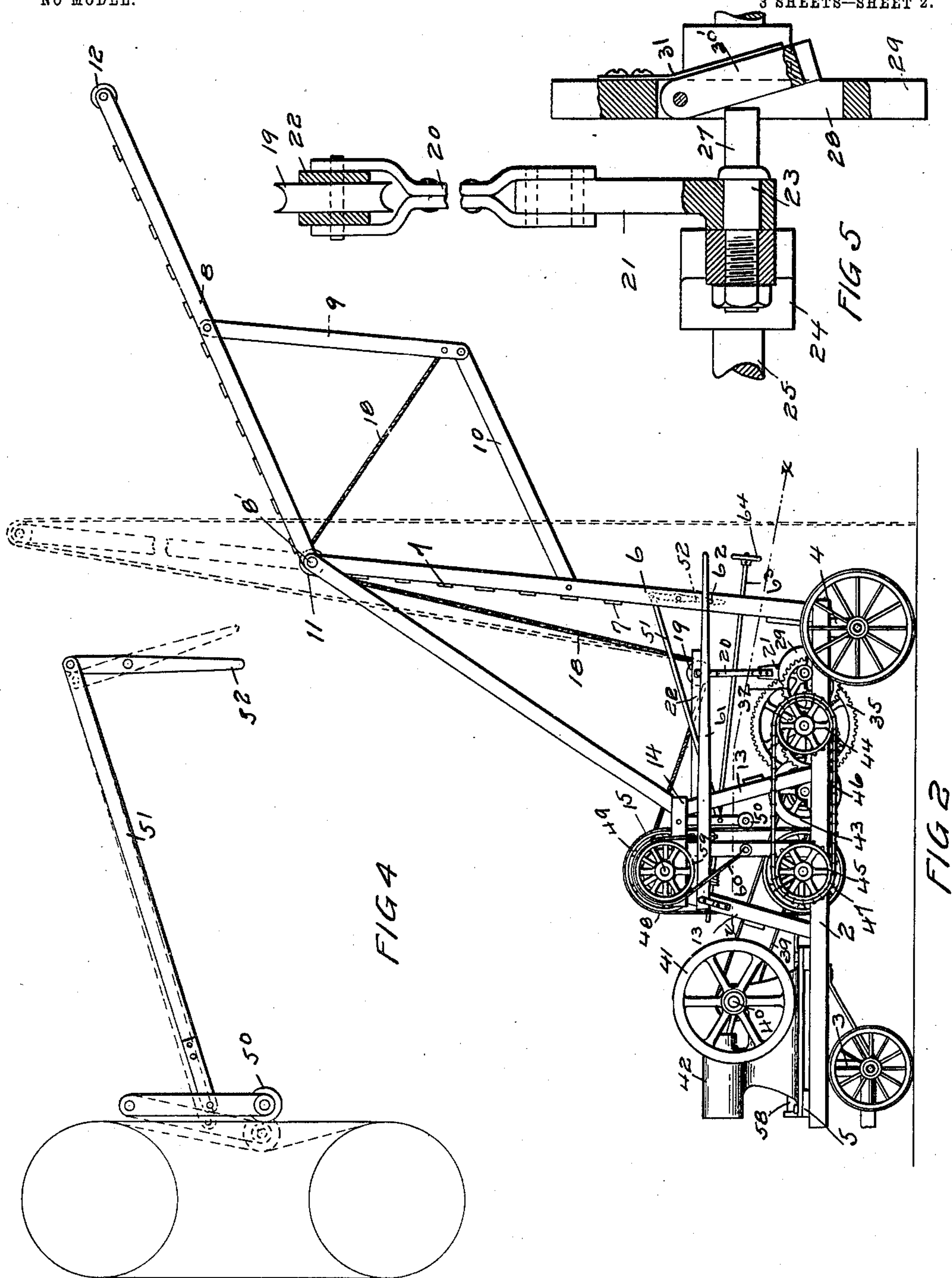
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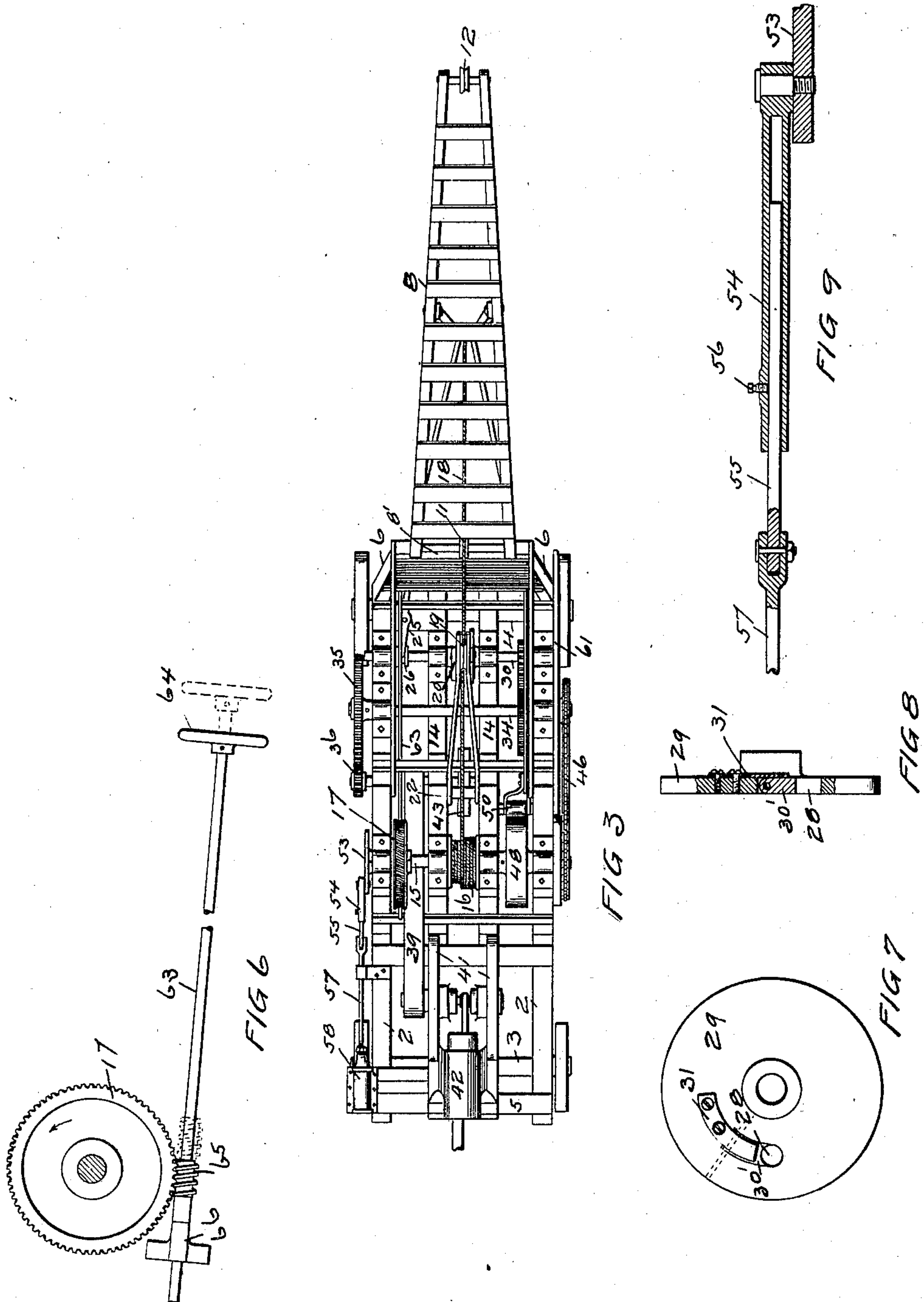
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

GEORGE A. GILBORNE, OF ABERDEEN, SOUTH DAKOTA.

WELL-DRILLING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 736,716, dated August 18, 1903.

Application filed February 24, 1903. Serial No. 144,636. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. GILBORNE, of Aberdeen, county of Brown, State of South Dakota, have invented certain new and useful Improvements in Well-Drilling Machinery, of which the following is a specification.

My invention relates to machinery designed for use in drilling wells; and the object of the invention is to provide a compact portable apparatus that can be readily transported from place to place and conveniently set up and put in operation within a short space of time after being located where the work is to be done.

A further object is to provide an apparatus that is simple in construction and easily operated even by an inexperienced person.

A further object is to provide a machine that is self-contained, all operating parts and power-generating means being included within the single structure, and hence more conveniently handled than other machines usually used for the same purpose.

The invention consists generally in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of a well-drilling machine embodying my invention, the upper portion of the apparatus being cut away, the supporting-timbers therefor being shown in section. Fig. 2 is a side elevation. Fig. 3 is a plan view. Fig. 4 is a detail of a belt-tightening mechanism. Fig. 5 is a detail, partially in section, of the device for imparting reciprocating movement to the drill and the reciprocating device over which the rope passes to the drill. Fig. 6 is a detail of the worm-wheel and rod in mesh therewith. Figs. 7 and 8 are side and sectional views, respectively, of the disk shown in Fig. 5; and Fig. 9 is a detail showing an adjustable pump-rod connection by means of which the pump may be rendered operative or inoperative, as desired.

In the drawings, 2 represents parallel side timbers, supported on the wheeled axles 3 and 4 and connected at intervals by the cross timbers or bars 5. At the rear end of the frame are the upright inwardly-inclined timbers 6, that form the lower section of the

drill-machine tower. These timbers are connected by the cross-slats 7 to the upper ends of said timbers. A folding section 8 is hinged on a rod 8'. Bars 9 and 10 pivotally connect the middle portions of the timbers 7 and the folded section 8. A pulley 11 is provided on the rod 8', and a similar pulley 12 is provided at the outer end of the section 8. When not in use, the folding section is swung down against the timbers 6, where it is suspended in a compact folded position until the machine has been located near the work. It is then raised, as hereinafter described, to the position shown in dotted lines in Fig. 2, and suitable guy-ropes (not shown) are provided for staying and supporting the tower in its upright position.

Near the middle of the machine I arrange a framework consisting of the posts or standards 13, resting upon the side timbers 2 and the intermediate timbers 14, and upon this framework I arrange a shaft 15, provided with a drum 16 and a worm gear-wheel 17. A rope 18 is wound upon said drum and passes under a pulley 19, mounted in a forked bar 20, and from thence passes over the pulley 11 and is connected to the bars 9 at a point near their pivotal connection with the bars 10. The bar 20 is secured at its lower end to an arm 21, and at its upper end is connected to guide-bars 22, that are pivoted to the timbers 13 and support the said bar 20 in an upright position, while permitting its vertical movement. The arm 21 is mounted on a pin 23, carried by a crank 24 on a shaft 25, that is mounted in bearings in the timbers 2 and 14. This shaft has a longitudinal movement in its bearings, being operated by means of a pivoted lever 25', engaging a grooved collar 26, secured on said shaft. A projecting end 27 is provided on a pin 23, that is adapted to enter a slot 28, provided in a disk 29 on a shaft 30, that is also mounted in bearings in the timbers 2 and 14 on the opposite side of the machine from the shaft 25. A block 30' is pivoted within the slot 28 and is normally held therein by a spring 31. Operation of the lever 25' will move the shaft 25 lengthwise and advance the pin 27 into the slot 28 against the block 30 and the tension of its spring. The operator will thus be able, when the disk 29 is revolving, to thrust

the pin 27 into the slot and cause the operation of the bar 20 without stopping the machine. An elliptical gear 32 is provided on the shaft 30, meshing with a similar gear 33 on a shaft 34, and through the operation of these gears the disk 29 will be operated at a varying speed. A large gear 35 is provided on the shaft 34, meshing with a pinion 36 on a shaft 37. A pulley 38 is connected by a belt 39 with a similar pulley on a shaft 40, provided with fly-wheels 41, and said shaft 40 is connected with the piston of an engine 42, mounted on the frame of the machine at its forward end, and being of ordinary construction is not shown or described in detail herein. The shaft 37 is preferably provided with a fly-wheel 43. The opposite end of the shaft 34 from the gear 35 is provided with a sprocket 44, connected to a similar sprocket on a shaft 45 by belt 46. The shaft 45 is provided with a pulley 47, connected by a belt 48 with a pulley 49 on the shaft 15. This belt 48 is sufficiently loose on the pulleys to allow movement of the shaft 45 without operating the shaft 15; but said shaft 15 may be operated from said belt by movement of the belt-tightener 50, that is operated by means of the long arm 51, connected with the pivoted lever 52. The shaft 45 is provided at one end with a disk 53, whereon a hollow rod 54 is eccentrically mounted, and a stem 55 fits within said rod and is adjustably secured therein by means of a set-screw 56. The outer end of said stem is pivotally connected with the piston-rod 57 of a pump 58, which is of ordinary construction, and not being claimed herein requires no detail illustration. The pump may be rendered inoperative at any time by loosening the set-screw 56 and allowing the stem to slide therein without operating the piston. I prefer to provide a friction-brake device on the shaft 15, consisting of a pulley 59 and a strap 60, secured at one end to the standard 13 and at its other end to the pivoted lever 61, whose free end normally rests on a pin 62. Whenever desired, the operator can raise this lever off the pin and bearing down on the same cause the strap 60 to grip the surface of the pulley and stop the revolution of the shaft 15 and the rope-drum.

Beneath the worm gear-wheel 17 I provide a rod 63, having an operating-wheel 64 and a worm-gear 65, adapted to engage the teeth of the worm-wheel, and said rod is slidable in a bearing 66 to allow said gear 65 to be moved into and out of engagement with the teeth of the worm-wheel, as indicated by full and dotted lines in Fig. 6.

The following is a brief description of the operation of my improved well-drilling machine: The apparatus having been set in the desired position where the work is to be performed, the tower is raised by unfolding the hinged sections. The rope is then disconnected from the bars 9 and passed over the pulley 12 and connected to the drill, as indicated by

dotted lines in Fig. 2. The operating mechanism is then set in motion and the drum revolved until the desired amount of rope has been unwound therefrom. The rod 63 is then moved longitudinally, bringing the gear 65 and the worm-wheel into engagement with each other and locking the shaft 15 against further movement in one direction. The belt-tightener device is then operated to release the belt and allow the shaft 34 to reciprocate the bar 20 without operating the shaft 15. This reciprocation of said bar will raise and lower the drill in the usual manner. As the hole is drilled deeper and more rope is required the drum is unlocked and revolved a few times until the desired amount of rope is obtained, when it is again secured and the operation of drilling again continued. Whenever it is desired to discontinue entirely the operation of drilling, the drum-shaft will be revolved in the opposite direction, revolving the worm-wheel in the direction indicated by the arrow in Fig. 6 and automatically throwing the worm 65 out of engagement with the teeth of the worm-wheel. The well having been completed, the operator will disconnect the rope from the drill, lower the upper section of the tower to its folded position, when the machine is ready to be moved to another piece of work.

I claim as my invention—

1. The combination, with a wheeled frame, and the tower provided thereon, of a rope-drum and shaft mounted on said frame, means for operating said shaft, a shaft 30 connected with said operating means, a disk 29 secured on said shaft 30 and having a slot 28, a block 30' yieldingly held within said slot, a longitudinally-movable shaft 25, a crank 24 carried thereby, a pin 27 carried by said crank and arranged to enter said slot, a bar 20 carried by said crank and provided with a pulley over which the rope passes from said drum.

2. The combination, with a wheeled frame, of an upright tower mounted thereon, an engine also mounted on said frame, standards provided near the middle of said wheeled frame, a rope-drum and shaft mounted on said standards and operatively connected with said engine, a rope arranged on said drum and connected with said tower, a bar having a pulley under which said rope passes, a crank whereon said bar is mounted, a variable-speed mechanism, and a clutch interposed between said crank and said speed mechanism.

3. The combination, with a frame, of a tower comprising a fixed and a hinged section, an engine arranged on said frame, standards mounted on said frame, a drum-shaft having a rope-drum mounted on said standards, suitable driving connections provided between said engine and said drum-shaft, a rope provided on said drum and connected with the hinged section of said tower, a reciprocating bar provided between said tower and drum

and having a pulley under which said rope passes, a variable-speed mechanism, and a clutch device arranged to connect said bar and said speed mechanism.

5 4. The combination, with a frame, of a tower mounted thereon, a rope-drum and its shaft mounted in bearings on said frame, means for operating said shaft, a variable-speed mechanism, an oscillating bar having a pul-
10 ley under which the rope passes from said drum to said tower, a crank whereon said bar is mounted, a suitable clutch mechanism interposed between said crank and said speed mechanism, and means within control of the
15 operator for operating said clutch to connect said variable-speed mechanism and said crank.

5 5. The combination, with a wheeled frame, and a tower mounted thereon, of a rope-drum and its shaft mounted on said frame, means
20 for operating said shaft, a second shaft, means for operating said second shaft at a greater speed during a portion of its revolution than during the remaining portion, a
25 disk mounted on said second shaft and provided with a slot, a vertically-reciprocating arm, a crank whereon said arm is mounted, said crank being movable toward or from said disk, and a pin carried by said crank and
30 adapted to enter said slot.

6. The combination, with a wheeled frame and a tower mounted thereon, of a rope-drum and its shaft supported on said frame, means for operating said shaft, a shaft 34 driven from
said drum-shaft, a shaft 30, elliptical gears 35 provided on said shafts 30 and 34 and operating the former at a variable speed, a reciprocating bar, a crank whereon said bar is mounted, and a clutch mechanism interposed
between said crank and said shaft 30, for the 40 purpose specified.

7. The combination, with a frame, of a rope-drum and its shaft mounted thereon, means for driving said shaft, a shaft 30, suitable gearing interposed between said drum-shaft 45 and said shaft 30 and operating the latter at a reduced speed during a portion of its revolution, a sliding shaft 25, an oscillating arm carried by said shaft 25 and having a pulley
over which the rope passes from said drum, 50 and a suitable clutch device interposed between said crank and said shaft 30, substantially as described.

In witness whereof I have hereunto set my hand this 16th day of February, 1903.

GEORGE A. GILBORNE.

In presence of—

IRA O. CURTISS,

JULIUS H. KAISER.