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WELL DRILLING MACHINE.

APPLICATION FILED MAR. 4, 1912.

1,049,068.

Patented Dec. 31, 1912.

3 SHEETS—SHEET 1.

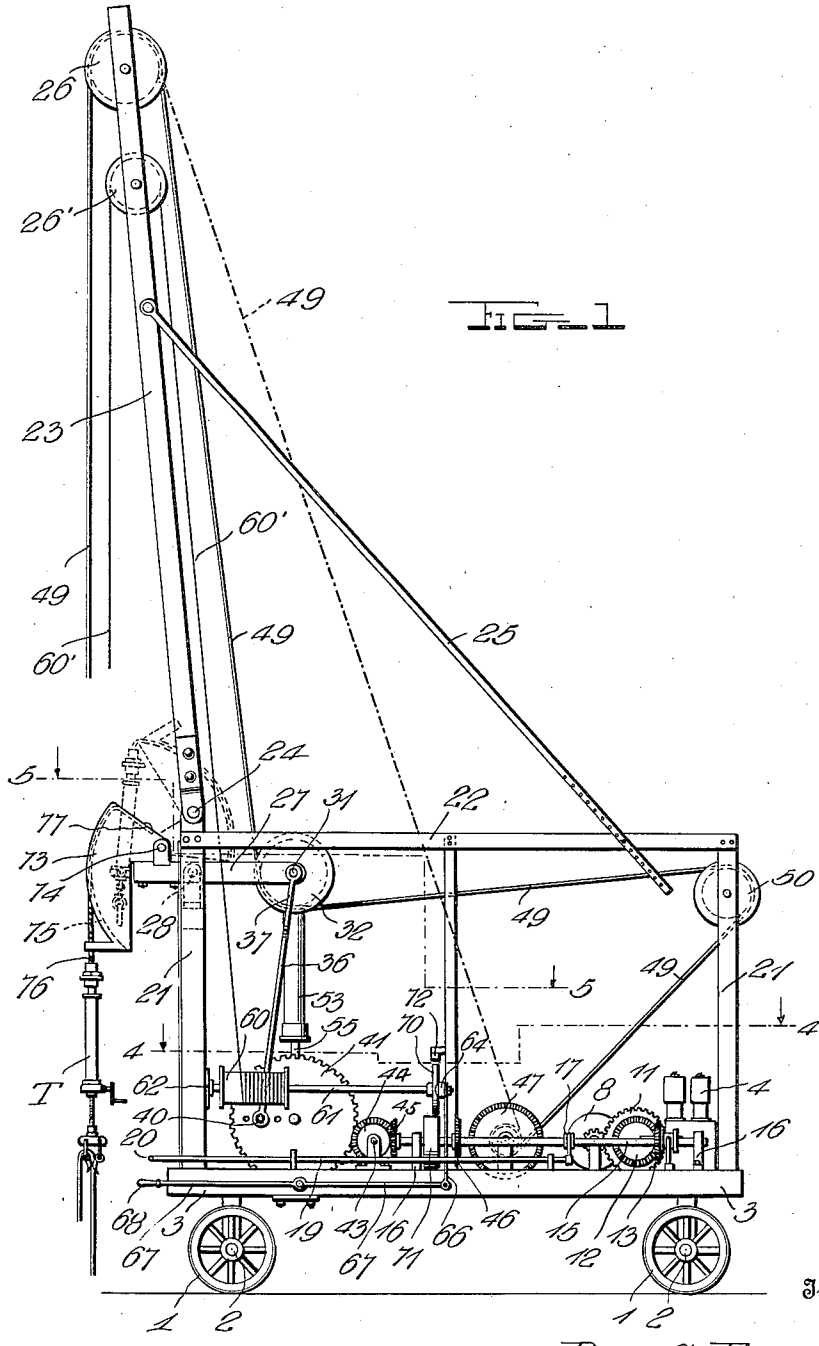

FIG. 1

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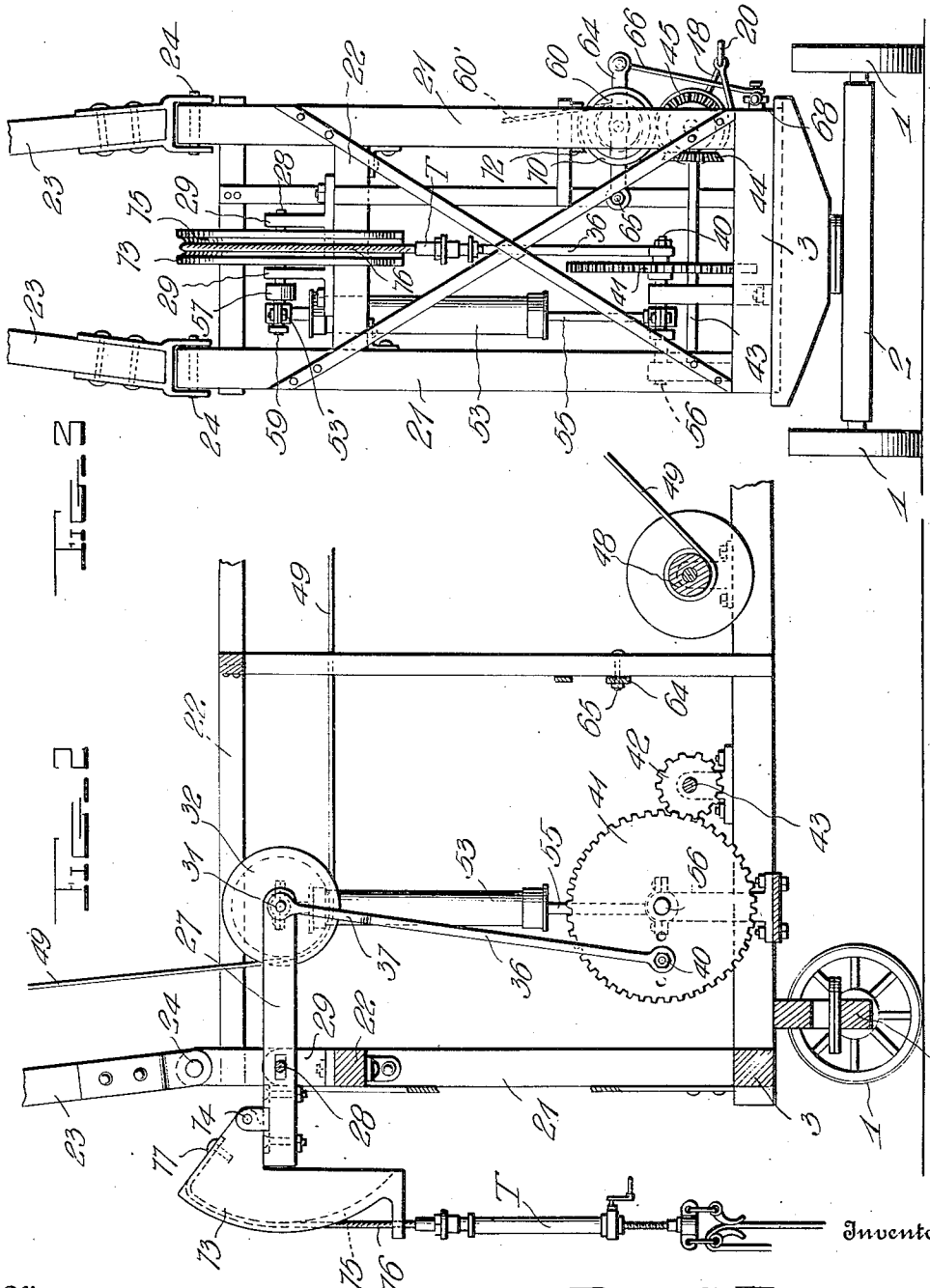

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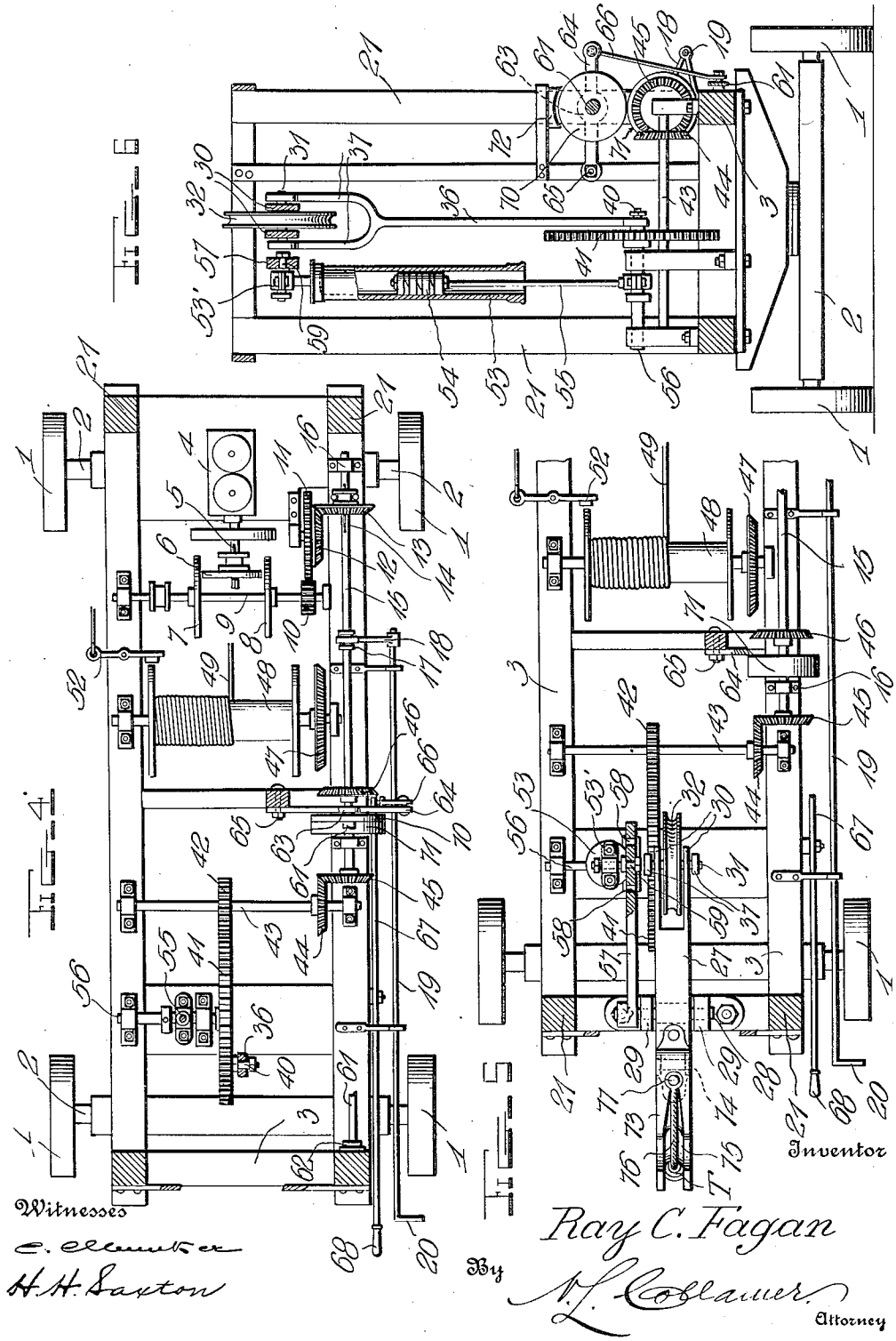

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WELL-DRILLING MACHINE.

1,049,068. Specification of Letters Patent. Patented Dec. 31, 1912.

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To all whom it may concern:

Be it known that I, RAY C. FAGAN, a citizen of the United States, and resident of Spangler, Cambria county, State of Pennsylvania, have invented certain new and useful Improvements in Well-Drilling Machines, and my preferred manner of carrying out the invention is set forth in the following full, clear, and exact description, terminating with claims particularly specifying the novelty.

This invention is a portable well drilling machine, and the objects of the same are to improve the general construction of machines of this character, to mount the whole on a small truck so it will be light and easily moved by team or by its own or other traction power, to dispose the parts within small compass and place the controls within easy reach of a single operator, and have the mast foldable for purposes of transportation. Especially the novel features of this invention are the construction of the beam and the means for rocking it, the vacuum cushion for its strokes and the manner of mounting and adjusting said cushion, the devices for handling the several drilling tools, and other details which will appear in the following specification and claims and which are shown in the accompanying drawings, wherein—

Figure 1 is a general side elevation of this machine complete. Fig. 2 is a central vertical longitudinal section of the lower portion, and Fig. 3 a front end elevation thereof. Fig. 4 is a horizontal section taken on the line 4—4 of Fig. 1, and Fig. 5 is a horizontal section substantially on line 5—5 of Fig. 1. Fig. 6 is a vertical transverse section taken about through the front axle, with the cushion in vertical section.

This machine is by preference rendered portable as by being mounted on a support comprising wheels 1 on axles 2 beneath a truck 3, and the whole may be transported from place to place by horse power or by driving its wheels from the engine described below. Such engine 4 is of the gasolene type, mainly because one man can attend it, no water is needed and no fuel but the gasolene, it is serviceable where water is scarce or in temperatures when water would freeze, and the power developed is large in proportion to the space occupied by the engine. On the driving or fly-wheel shaft 5 is slidably mounted a friction wheel 6 adapted to make contact alternately with friction disks 7 and 8 which are fast on a cross shaft 9 slidable in its bearings and carrying a wide gear pinion 10; and the speed is increased or decreased by moving the wheel 6 toward or from the shaft 9, while its direction is reversed by sliding said shaft 9 or the rotation of the latter ceases when neither disk contacts with the friction wheel—all as clearly shown and well understood. The means for shifting the friction wheel and cross shaft are not shown, but the control of the engine is all at one end of the machine and extremely simple.

Power from the pinion 10 is communicated to a gear 11 whose shaft carries a bevel gear 12 meshing with another bevel gear 13 splined as at 14 on the main shaft 15 which extends along above one side bar of the frame of the truck 3 and rotates and slides in its bearings 16. This shaft preferably carries a grooved collar 17 engaged by a fork 18 at one end of a slide 19 whose handle 20 is within convenient reach of the operator when he stands near the well, and from it are driven the several instrumentalities described below. Or, one operator could control the engine and another could control the work to be performed thereby.

The superstructure comprises a number of uprights 21 supporting a top frame 22, a derrick 23 pivoted at 24 thereon and suitably braced as at 25, and a crown wheel 26 and a second wheel 26′ journaled in the top of the derrick. The numeral 27 designates a walking beam having a shaft 28 fast through it between its ends, the shaft being mounted in journals 29 on a cross bar of the frame 22, and the rear end of the beam is forked as at 30 and carries a cross pin 31 on which is journaled a sheave 32. The beam is rocked by a connecting rod 36 whose upper end is forked as at 37 and the arms thereof pivoted on the extremities of said pin 31 astride the fork 30; while the lower end of the rod 36 is pivoted on a crank pin 40 projecting from a gear 41 journaled in bearings on the truck 3. This gear is revolved by a pinion 42 which is fast on a cross shaft 43 having a bevel gear 44, and one end of the main shaft 15 carries a bevel gear 45 which may be thrown into mesh with the bevel gear 44 at will, as seen in Fig. 4.

For hauling up the tools the main shaft has another bevel gear 46 adapted to be

thrown into mesh with a bevel gear 47 on the shaft of a windlass 48 journaled in the truck, and the rope 49 from the windlass leads over a sheave 50 on the main frame, thence forward and under the sheave 32 on the beam, thence upward over the crown wheel 26, and thence downward to the tool in a manner well known. For drilling with the taper screw, the rope 49 will be led direct from the windlass over the crown wheel as shown in dotted lines in Fig. 1. The direction of rotation of the windlass, and therefore whether it pays out or winds up the rope is controlled by reversing the direction of rotation of the main shaft 15 in the manner described above, the speed is similarly controlled, and a brake shoe 52 may be applied and used if needed. But the power shaft cannot rotate the drum and rock the beam simultaneously, as will be clear from Fig. 4.

The cushion for the beam comprises a cylinder 53 open at its lower end, a piston 54 therein, and a piston rod 55 whose lower extremity is mounted on a fixed pivot, such as the shaft 56 of the gear 41. Projecting rigidly from the walking beam shaft 28 and standing alongside the rear portion of said beam is an arm 57 provided with a series of holes 58, into any one of which may be inserted a pin 59 whereby an eye 53′ at the upper end of the cylinder 53 is connected with the arm and the cylinder caused to rise and fall therewith as the arm moves during the rocking of the beam. The vacuum created as the rear end of the walking beam rises tends to oppose the weight of the tool, and therefore assists the engine. This detail of construction I consider important, not only because of its usefulness as described, but also because it adds but litle weight to the machine with practically no complication of parts, means are present for adjusting the throw of the piston, and it is impossible for a vacuum cushion to freeze.

For bailing out the well, the sand line 60′ is led upward from the well, over the wheel 26′ in the derrick, and down to a small windlass or drum 60 fast on a shaft 61 mounted at one end in a fixed journal 62 and at the other end in a box 63 standing above the main shaft 15 and carried by a lever 64 pivoted at one end at 65 in the frame. Its other end is connected by a link 66 with a lever 67 which leads forward and has a handle 68 convenient to the operator standing near the well, who may thereby raise and lower the box at will. Near the latter the shaft 61 carries a friction wheel 70 adapted when depressed to make contact with a wide friction wheel 71 on the main shaft or when raised to make contact with a brake shoe 72 carried by the frame. Thus the operator, by properly moving the handle 68, may cause the rotation of the drum 60 to wind up the sand line, or may check its rotation and hold the drum against rotation, or may free the drum entirely to permit the bailer to descend into the well.

The temper screw support is perhaps best illustrated in Fig. 2. This consists of an L-shaped member 73 whose shank lies on the front end of the beam 27 and is hinged at its extremity thereon as at 74, while its foot hangs vertically over the front end of the beam and has its outer edge grooved as at 75 on the arc of a circle struck around the pivot 28. In this groove lies a wire rope 76 whose lower end is connected with the temper screw T, while its upper end is carried over onto the shank of the member 73 and fastened thereto as at 77; therefore when the beam is rocked on its pivot, the temper screw is caused to move through a strictly vertical path as will be seen from Fig. 2, but when the temper screw is not in use the entire member can be turned over its hinge out of the way of the main line leading downward from the crown wheel as shown in dotted lines in Fig. 1. By the employment of this detail in a well rig, a heavy tool may be instantly and conveniently shifted without moving the machine or interrupting the position of its various parts. While I prefer to use a gasolene engine for the reasons above given, I might employ steam, electricity, or water power, or belt the power from any suitable source to the shaft 5.

What is claimed as new is:

1. The combination with a motor-driven main shaft slidable in its bearings, means for adjusting it longitudinally, and two bevel gears fast upon it; of a main line windlass having a bevel gear adapted to be engaged by one of those on said shaft, a walking beam, a sheave on the beam under which said main line is adapted to be passed, and mechanism for rocking said beam including a bevel gear with which is adapted to be engaged the other of those on said shaft when the latter is adjusted to disengage the gears above mentioned.

2. The combination with a main shaft slidable in its bearings, means for adjusting it longitudinally, and two gears and a friction wheel fast upon it; of a main line windlass adapted to be driven by one of said gears, a walking beam adapted to be rocked by the other of said gears, a sand line reel mounted on a swinging shaft, a friction wheel on said shaft adapted to be thrown into contact with the friction wheel on the main shaft, and a brake block against which the wheel on said swinging shaft may be pressed when moved away from the other friction wheel.

3. In a well rig, the combination with the truck, a power plant and its controlling mechanism mounted upon one end of the

truck, a main shaft rotating and sliding in bearings along one side bar of the truck, and a gear splined thereon and driven from said source of power; of independent mechanisms disposed upon said truck, a wheel on each adapted to be engaged independently with one of several driving wheels on said shaft, a collar fast on the latter, and a slide having a fork at one end loosely engaging said collar and a handle at the other end standing near the well.

4. In a well drilling machine, the combination with a frame, a walking beam pivoted therein and connected with the well tool, means for rocking it, an arm fast on the shaft of said beam and having a series of holes through it, and a pin adjustable in said holes; of a cushion consisting of a cylinder closed at one end, an eye on this end mounted on said pin, a piston in the cylinder, a rod extending from the piston to the open end of the cylinder, and a fixed pivot to which the remote end of the rod is attached.

5. In a well drilling machine, the combination with a frame mounted on a wheeled truck, a walking beam pivoted within the frame and forked, a sheave pivoted in the fork of the beam, a derrick in the frame carrying a crown pulley, a drum, and a main line leading from the drum under said sheave and over the crown pulley to the well; of an arm fast on the shaft of the beam, a vacuum cushion pivoted at one end to the arm and at the other end to a fixed support, a connecting rod having a fork standing astride that in the beam and pivoted on the shaft of said sheave, and a crank wheel on whose pin the remote end of said rod is pivoted.

6. In a well rig, the combination with the pivoted beam, means for rocking it on its pivot, a derrick having a crown wheel, and a main line led over the wheel and down to the well; of an L-shaped member whose shank lies on said beam and is hinged at its extremity thereto while its foot hangs over the end of the beam and is provided in its outer edge with a groove struck on an arc around the pivot of the beam, and a rope secured to said shank and extending along the groove and down into the well, the member being adapted to be turned around its hinge, as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my signature this the 24th day of February, A. D. 1912.

RAY C. FAGAN.

Witnesses:
GEO. W. LANTRY,
A. J. FASABAUGH.