March 22, 1927. 1,621,636

G. L. LANE ET AL

WELL DRILLING MACHINE

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Fig. 1.

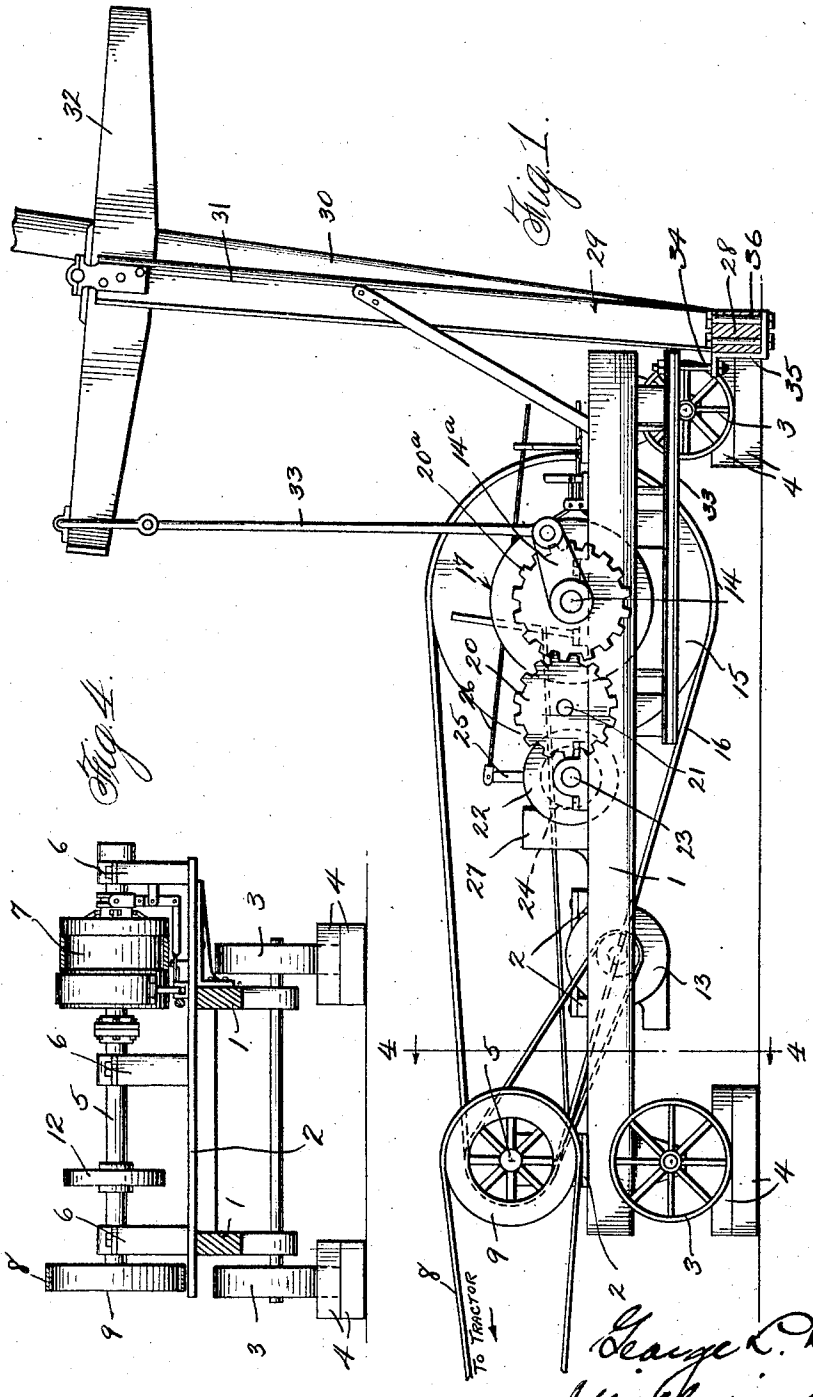


Fig. 4.

Inventors
George L. Lane
William E. Byles
By Vernon E. Hodges
their Attorney

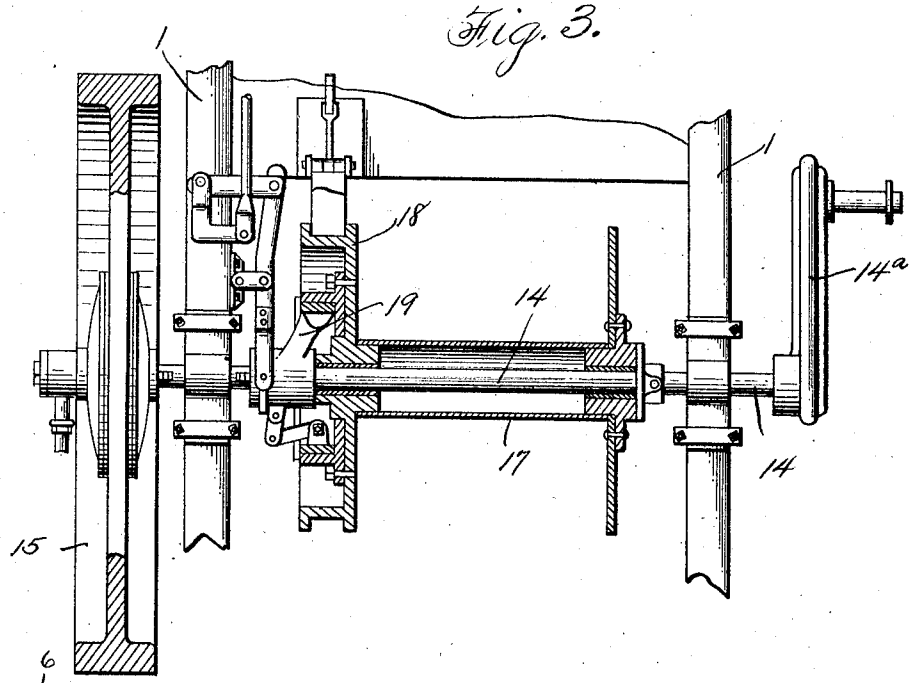
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Fig. 3.



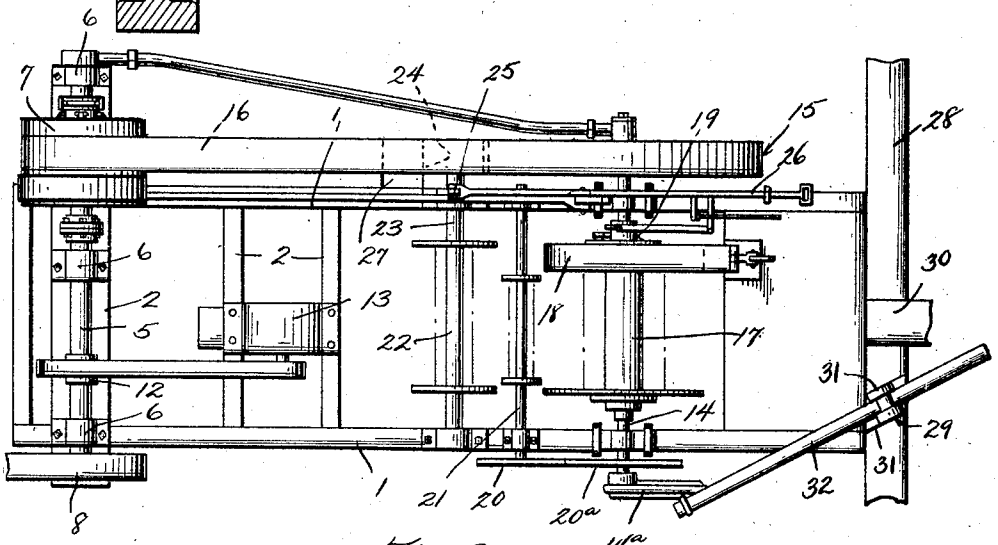


Fig. 2.

Inventors
George L. Lane
and
William E. Sykes
By Vernon E. Lloyd
their Attorney

Patented Mar. 22, 1927. 1,621,636

UNITED STATES PATENT OFFICE.

GEORGE L. LANE AND WILLIAM E. SYKES, OF MARIETTA, OHIO.

WELL-DRILLING MACHINE.

Application filed September 14, 1921. Serial No. 500,486.

Our invention relates to an improvement in drilling machines, pertaining particularly to machines for drilling wells, such as oil, gas and water wells.

The ordinary drilling machine used at the present time is a heavy, expensive implement which is not readily portable, is subject to a great deal of vibration, owing to the location of an engine, Samson-post and mast on the main frame of the machine, which vibration has the effect of wearing out the parts.

It is an object of our invention to provide a drilling machine of light weight, of relatively few parts, mounted on a frame which is readily portable, and is adapted to be driven by a farm tractor which can also be used to transport the machine.

In carrying out our invention, we provide a frame mounted on rolls or wheels so that it can be readily moved, a removable jack-shaft having a reversing pulley for receiving rotary motion from a tractor and mounted on the frame, a band-wheel, a main shaft driven by the reversing pulley of the jack-shaft, a cable spool mounted on the main shaft with means for controlling its motion relative to the main shaft, and means actuated by the band-wheel for driving supplemental shafts and reels.

We further provide, as a detached element of the drilling-machine, a main mud sill upon which a Samson post and mast are mounted, whereby the weight of both is carried by the sill and not by the frame.

The invention further comprises certain details and construction of parts which will become more apparent as the description proceeds, and will be pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation of the drilling-machine;

Fig. 2 is a top plan of the same;

Fig. 3 is a top plan partially in section of the main shaft, and Fig. 4 is a vertical section through the machine on line 4—4 of Fig. 1.

The frame comprised of two longitudinally extending beams 1 and suitable cross-pieces 2 is mounted on wheels or rollers 3, upon which the frame may be moved to a desired position, where it is held by means such as blocks 4.

At the end remote from the drilling operation, a jack-shaft 5 is mounted in bearings 6 removably mounted on the frame, and carries reversing gear-pulley 7. The jack-shaft is operated by a belt 8 passing over a pulley 9 on the shaft and driven by a pulley on a tractor (not shown) located at any desirable position.

This is one of the important features of our invention, that is driving the machine by means of a source of power not mounted on the frame, which source of power operates normally in one direction only, and as it is essential in drilling that the direction of rotation of parts be changed or reversed, we provide for that by using the reversing gear pulley 7, which is of ordinary construction.

We preferably mount a pulley 12 on the jack-shaft for driving a blower 13 of a forge (not shown) or for driving a pump or other auxiliary implement.

At the other end of the frame, we provide the main shaft 14 driven by band-wheel 15 mounted thereon, and which is driven by belt 16 passing over the reversing pulley 7.

The cable spool 17 carrying brake-drum 18 and clutch 19 is mounted on the main shaft and carries a reel of cable for raising and lowering the tools in the well. The construction is such that, when desired, the clutch is engaged, a reel or spool is rotated by the main shaft, and the tools are drawn up. When they are to be lowered again, after cleaning out, the brake on the brake drum and the clutch are both released, and the cable runs into the well regardless of the speed or direction of rotation of the main shaft. The main shaft terminates in a crank-arm 14^a, and between the arm and longitudinally extending beams of the frame a spur-gear 20^a is mounted on the shaft. This meshes with a gear 20 of a shaft 21, which can be used for raising and lowering the well-casing by means of a cable (not shown).

At a point between the jack-shaft and the main shaft, a sand reel spool 22 is rotatably mounted. This spool is carried by a shaft 23, upon one end of which a friction roller 24 is provided. By means of lever 25 and link 26 the roller may be forced against band-wheel 15 for rotating the sand reel, and may also be moved away from the band-wheel and against a friction-block 27 for stopping this movement. As is well-known, the sand reel is used to operate a sand bailer

or pump after the tools have been run out of the well for the purpose of cleaning out the sand pumpings or drillings.

As an essential part of the machine, but separate from the main frame thereof, we provide a main mud sill 28, upon which the Samson post 29 and mast 30 are both mounted, as clearly shown in Fig. 1. The Samson-post 29 is of peculiar construction, inasmuch as it comprises two side supports 31 having a bearing between which the walking-beam 32 is suspended with an underslung effect. The walking-beam 32 performs the function of raising and lowering the tools in the drilling operation, and is actuated by pitman 33 mounted on the crank-arm 14ª. The Samson-post in the ordinary type of drilling-machine is mounted directly on the main frame which not only increases the wear and tear owing to vibration, but also is of great weight and interferes materially with the movability of the machine.

By mounting the mast and Samson post on the mud-sill 28, we achieve two important results, namely that the mast is perpendicular in a longitudinal plane, and does not incline toward one side of the machine more than another. As at present constructed, it is customary to incline the mast over which the rope from the cable spool passes so that the end of the mast will be directly over the end of the walking-beam, so as to get a direct vertical movement of the cable and tools. As ordinarily constructed, the mast must incline to achieve that result, as the walking-beam is normally mounted at one side of the drilling machine, and substantially parallel therewith. We have discovered that by mounting the Samson post and the mast both on the mud-sill, we can cause the walking-beam to extend at an angle as indicated in Fig. 2, which will bring the end of the walking-beam under the end of the mast, as indicated. This is an important feature of our invention. By mounting the Samson-post and mast on a mud-sill detached from the main frame, we are enabled to use a much lighter frame than is ordinarily necessary. The effect of the underslinging of the walking-beam on the Samson-post is to decrease the radius over the drilling well at the end of the walking-beam so that the tools are at all times directly over the drilling-well, which eliminates the whip of the drilling-cable against the wall of the well and the casing therein, which whipping not only wears out the cable but also knocks down cavings on the top of the tools.

Located at the forward end of the machine, and beneath the longitudinal side members 1, 1, are the metal I-beams 33, from the outer ends of which depend the tie-bolts 34 which engage a substantially V-shaped clamping member 35 bolted by means of bolts 36 to the mud-sill 28. In that the entire weight of the tool, mast, and walking-beam is upon the mud-sill 28, rather than on the outer end of the driving mechanism of the well-digger, it is necessary to anchor the outer end of the driving mechanism against possible upward movement due to the heavy tools that are used, and the lifting exertion imparted to the driving mechanism as the walking-beam is operated. As is obvious from Fig. 1, after the Samson-post and mast on the mud-sills are properly located, the driving mechanism is rolled up on its rollers or sills 3, and fastened to the mud-sill as described, the same being readily detachable when desirable to move to a new location.

We claim:

1. In a drilling machine, the combination with a frame carrying shafting, of an independent normally detached mud-sill, a Samson-post mounted on said mud-sill, a walking-beam mounted on said post, and means connecting the walking-beam with the shafting to transmit a reciprocating motion thereto.

2. In a well drilling machine, the combination with a frame carrying shafting, rollers on the frame for moving the frame, a normally detached mud-sill, a Samson-post and mast mounted on said mud-sill, and means for connecting the mud-sill to the main frame with a rigid connection during the drilling operation.

3. In a drilling-machine, the combination with a main frame, a main shaft mounted in said frame, a band wheel, and a crank-arm on said shaft, an independent mud-sill normally detached from said frame, a Samson-post and a mast mounted on the mud-sill, said mast perpendicular to the mud-sill in one plane, a walking-beam pivotally mounted on the Samson post and at an incline to the longitudinal extent of the main frame, whereby one end of the walking-beam is over said crank-arm, and the other end is under the end of said mast.

4. As a portable unit of a well drilling apparatus adapted for association with a normally detached mud-sill upon which a mast and Samson post are mounted, and a walking-beam on the Samson post, a wheeled frame, shafting on the frame, and means actuated by the shafting for transmitting reciprocatory motion to the walking beam.

5. In a drilling apparatus, the combination with an independent mud sill, a mast extending vertically thereupon in one plane but inclined in another plane from the perpendicular, a Samson post mounted on the mud sill, a walking-beam journaled in the Samson post with one end under the end of the mast, of a portable wheeled frame, shafting mounted in the frame, a crank-arm on the shafting, said wheeled frame adapted

to be so positioned with relation to the mud-sill that the crank-arm is substantially in line with an end of said walking-beam, means for anchoring the frame to the mud-sill, and a pitman connecting the walking-beam and the crank-arm.

6. In a drilling machine the combination with a frame, of an independent and normally detached mud sill, a Samson post mounted on the mud sill, a walking beam carried by the Samson post, means for operating the walking beam, and means for detachably connecting the independent mud sill with the frame when the machine is in operation.

In testimony whereof we hereunto affix our signatures.

GEORGE L. LANE.
WILLIAM E. SYKES.