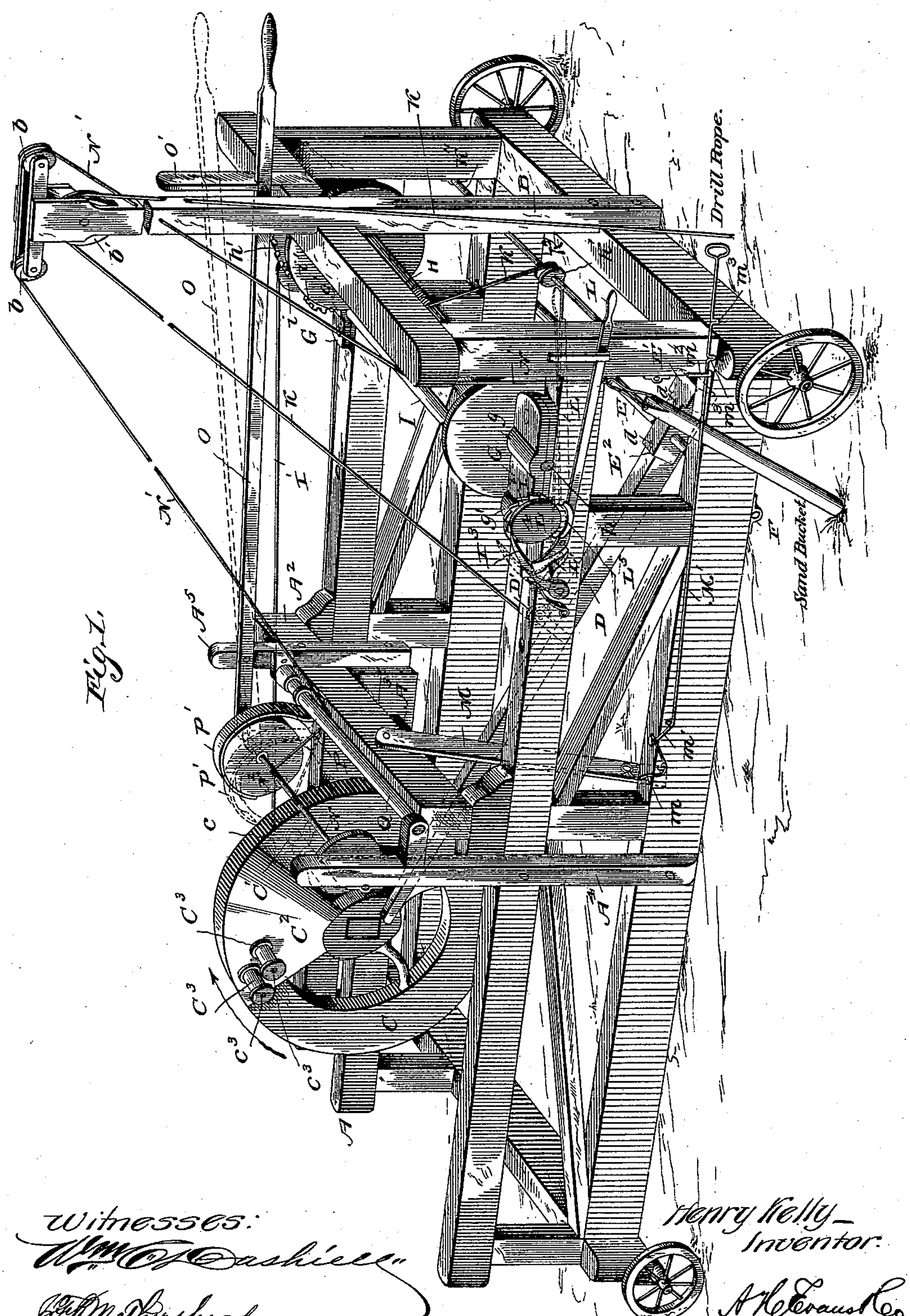
(No Model.) 4 Sheets—Sheet 1.

H. KELLY.

WELL DRILLING MACHINE.

No. 570,130. Patented Oct. 27, 1896.



Witnesses:

Wm. C. Dashiell

J. H. Mothershead

Henry Kelly
Inventor.

By A. H. Evans & Co.
Att'ys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 2.

H. KELLY.

WELL DRILLING MACHINE.

No. 570,130. Patented Oct. 27, 1896.

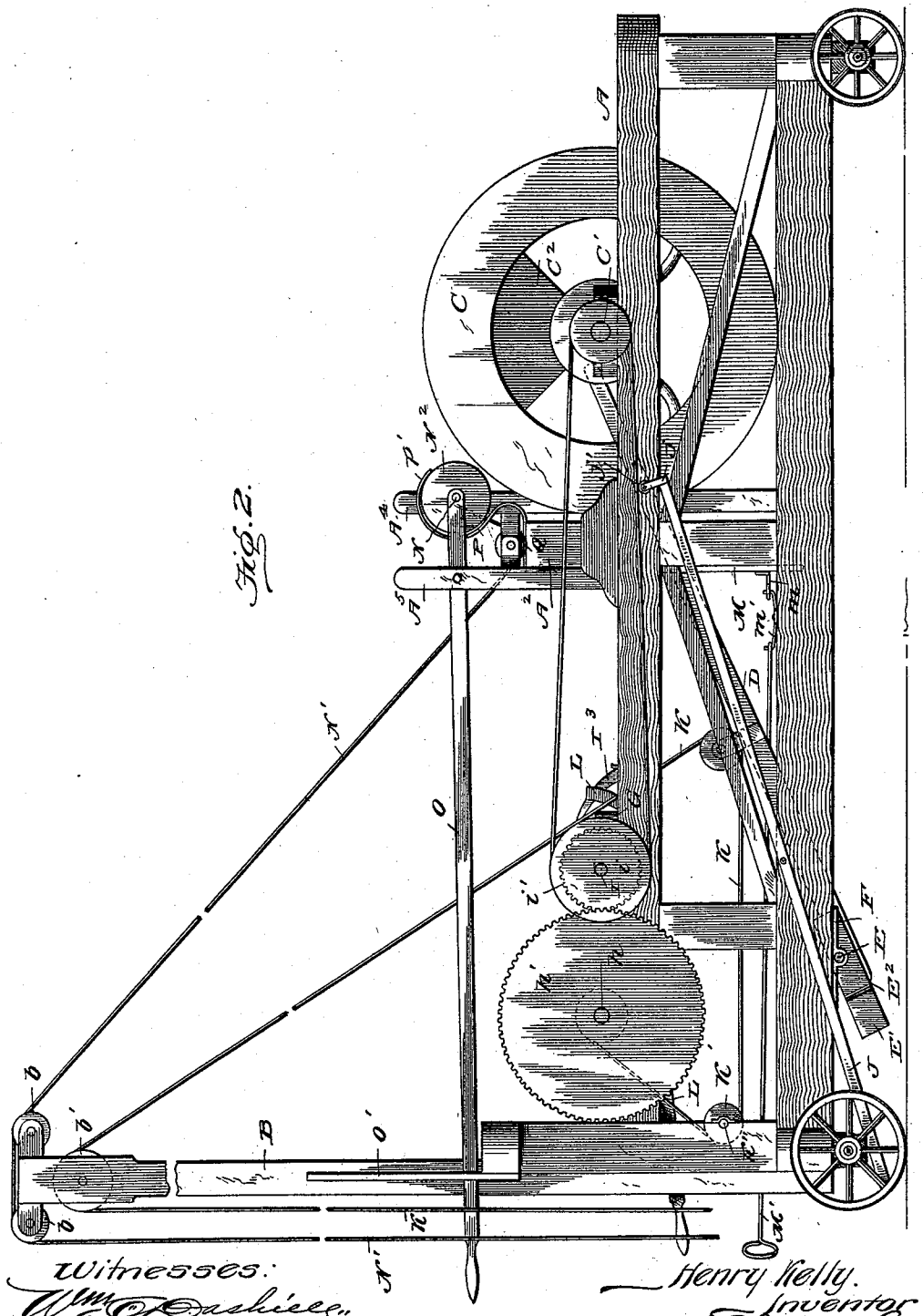


Fig. 2.

Witnesses:
Wm. C. Dashiell,
J. R. Mothershead, Jr.

Henry Kelly.
Inventor
By A. H. Evans & Co.
Att'ys.

(No Model.) 4 Sheets—Sheet 3.

H. KELLY.

WELL DRILLING MACHINE.

No. 570,130. Patented Oct. 27, 1896.

Fig. 4.

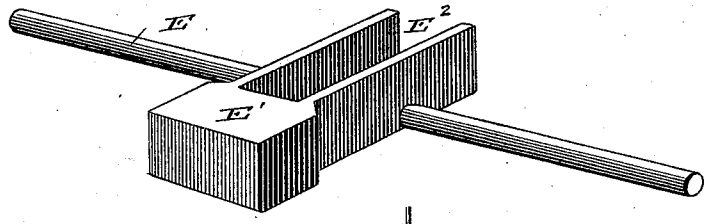
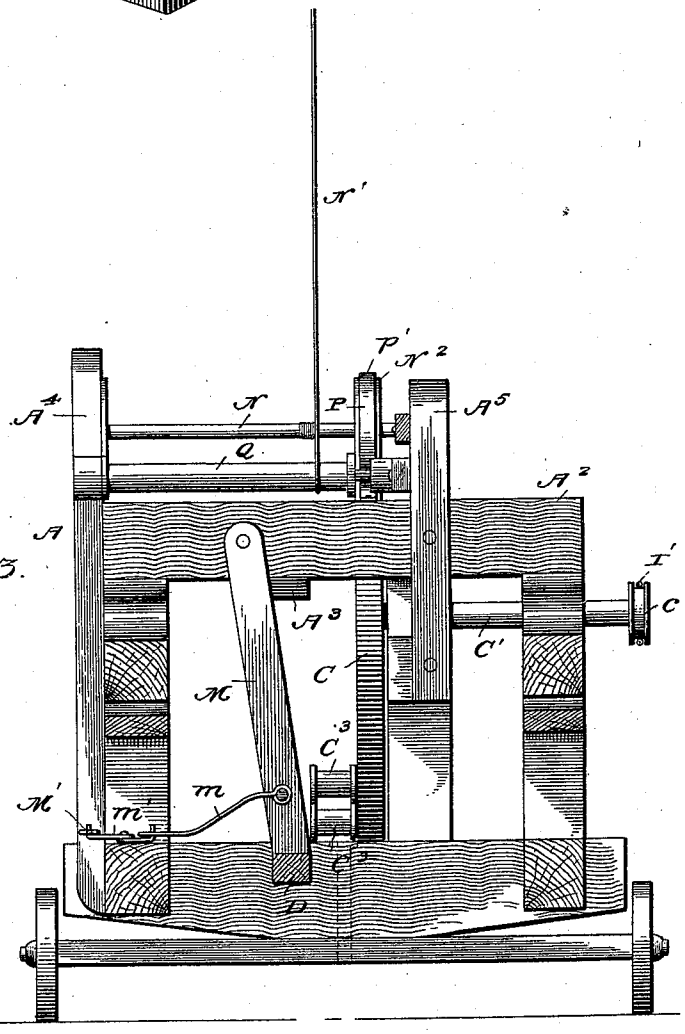


Fig. 3.



Witnesses:
Wm. O. Dashiell.
J. T. Mothershead.

Henry Kelly
Inventor.
By A. H. Evans & Co.
Att'ys.

(No Model.) 4 Sheets—Sheet 4.

H. KELLY.

WELL DRILLING MACHINE.

No. 570,130. Patented Oct. 27, 1896.

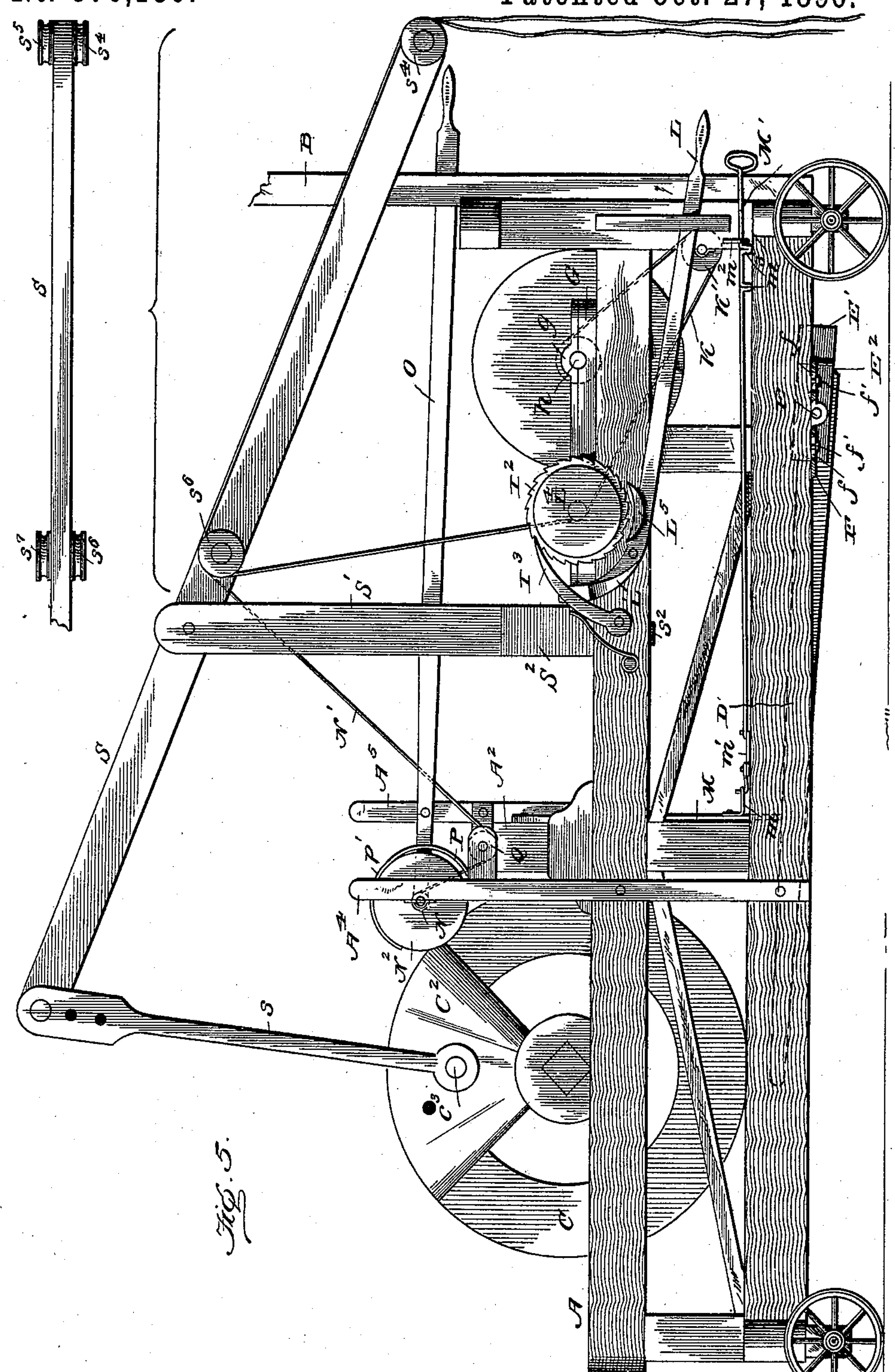


Fig. 5.

Witnesses:
Wm. O. Dashiell
J. H. Mothershead

Henry Kelly Inventor.
By A. H. Evans & Co. Att'ys.

UNITED STATES PATENT OFFICE.

HENRY KELLY, OF WATERLOO, IOWA, ASSIGNOR TO HIMSELF AND OLIN B. TANEYHILL, OF SAME PLACE.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 570,130, dated October 27, 1896.

Application filed April 4, 1896. Serial No. 586,233. (No model.)

To all whom it may concern:

Be it known that I, HENRY KELLY, a citizen of the United States, residing at Waterloo, in the county of Black Hawk and State of Iowa, have invented certain new and useful Improvements in Well-Drilling Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part thereof, in which—

Figure 1 is a side elevation in perspective of the improved machine arranged for operation of the drill by means of the counterbalanced treadle beam or lever. Fig. 2 is a side elevation of the opposite side of the machine. Fig. 3 is a vertical cross-section on line 3 3, Fig. 1. Fig. 4 is a detail showing the weighted treadle-beam shaft. Fig. 5 is a side elevation of the machine as arranged when the drill and sand-bucket are to be operated by a walking-beam.

My invention relates to machines for drilling wells.

The objects are as follows: to simplify and cheapen existing constructions; to render the machine less liable to breakage from shocks by operating the treadle-beam or the walking-beam from a large wheel which is weighted at the point where it acts upon either of said levers, whereby said weight will overcome the shock and also assist in overcoming the weight of the drill-rope and drill; also to provide the drill-rope drum with an improved let-out and brake mechanism; also to provide for operating the drill-rope from a treadle-beam or a walking-beam, as may be desired, certain localities favoring the one and certain the other; also to provide an improved means for letting out and winding the sand-bucket rope; also to provide means for holding the treadle-beam down and out of the operative position when it is desired to stop the drill without stopping the engine or when the walking-beam is to operate instead of the treadle-beam.

The invention consists of the various combinations and constructions hereinafter described, and pointed out in the claims.

A represents the framework of the machine, which may be of any suitable construction and which is supported by the front and rear wheeled axles, as usual in this class of machines.

B is a vertical mast secured at its lower end to the rear end of the frame A and provided at its upper end with two small sand-bucket-rope sheaves *b b*, while directly thereunder is the larger sheave *b'* for the drill-rope.

C is the combined fly and power or drive wheel, mounted on the transverse shaft C' adjacent to the front end of the frame and formed or provided at one point with a counterbalancing-weight C^2, at or adjacent to which are removably bolted by bolts or pins c^3 c^3 two antifriction-wheels C^3 C^3, which form a cam to strike the free end of the treadle beam or lever D, to be presently described. The shaft C' is adapted to be driven from any suitable source of power, and the outer end of the shaft has a small transmitting-pulley *c*.

E is a transverse rock-shaft mounted in bearings F, bolted adjustably to the under side of the rear ends of the lower longitudinal sills of the frame A. The ends of these bearings are provided with longitudinal slots *f*, through which pass the bolts or screws *f'*. The rock-shaft E has cast thereon at its middle an offset weight E' and a socket E^2, in which the rear end of the treadle-beam D is rigidly secured by bolts *d* or otherwise. The weight E' causes the shaft E to rock in one direction and raise the front or free end of the treadle-beam D into the path of the cam on the wheel C, the raising of the treadle-lever being further assisted by the weight of the drill. The adjustable bearings F permit the treadle-beam to be adjusted longitudinally, so as to adjust its free end properly for action by the rollers C^3 C^3.

Above the shaft E on the upper sides of the upper side bars of the frame A are mounted the double bearings G G, and in the rear boxes *g* thereof is mounted the shaft *h* of the drill-rope drum H, while in the forward boxes *g'* is mounted the drum-operating shaft I, which is provided at one end with a pulley *i*, loosely connected with the pulley *c* by a slack belt I'. Said shaft I is also provided at that end with a small gear-wheel *i'*, meshing into the large gear-wheel *h'* on the shaft *h*.

J is a belt-tightening lever pivoted between

its ends to the side of the frame, extending at the handle end to the rear end of the frame within reach of the operator and provided at its opposite end with an upwardly-projecting bracket *j*, carrying an antifriction-roller *j'*, to engage the lower run of the belt I' and tighten it when it is desired to rotate the drum-operating shaft I and thereby rotate the drum and wind the drill-rope K thereon, the shaft I being virtually disconnected from the pulley *c* when the operator depresses the inner end of lever J. The shaft I at its opposite ends is provided with a ratchet-wheel I^2, engaged by a spring-pressed pawl I^3.

L is a lever pivoted to the frame A and having at its inner end a cam-like extension L', which engages the under side of the pawl I^3 to raise it out of engagement with ratchet-wheel I^2 when the outer end of the lever is raised in its guide *l*.

The ratchet-wheel I^2 is formed on its outer face with a brake-wheel L^4, and the lever L is provided directly thereunder with a brake L^5, which engages the brake-wheel when the cam L' raises the pawl I^3 out of engagement with the ratchet-wheel I^2.

The drill-rope K is wound on the drum H and extends thence downwardly around a pulley K', sliding and turning on a spindle K^2, thence under a guide-pulley D' on the upper side of the treadle-beam D, and upwardly to and over the sheave or pulley *b'*. It will be seen, therefore, that as the power-wheel C is rotated in the direction of the arrow in Fig. 1 the treadle-beam will be depressed at every revolution of the wheel, which will cause a downpull on the drill-rope at the pulley D', and as soon as the wheel C and the beam are disengaged the weight E' will throw the free end of the treadle-beam upwardly, so that the drill will descend suddenly and not have to lift the beam in doing so. Thus the drill loses none of its force in descending. Whenever it is desired to lower the drill a little, the lever L is raised, so that its cam will raise the pawl I^3 from the ratchet I^2 and permit the shaft I to rotate the distance of one or more ratchet-teeth, and shaft I being geared to the drum H will permit it to be rotated by the weight of the drill and thus pay out the drill-rope. In lowering a drill down into a boring the brake L^5 will regulate the rotation of the shaft I and drum H. When it is desired to raise the drill out of the boring, the operator will depress lever J and thus tighten the belt I', so that the shaft I will be rotated and in turn rotate the drum H in a direction which will cause the rope K to be wound thereon, and whenever the lever J is released the pawl and ratchet I^3 I^2 will hold the shaft I against rotating in a direction that would permit rope K to unwind from the drum H.

A^2 is the transverse buffer-beam, which has a rubber cushion or buffer A^3 on its under side to receive the blow from the treadle-beam D, as shown in Fig. 3, and from this beam hangs a laterally-swinging locking-bar M, connected by a link *m* to a bell-crank lever *m'*, pivoted to the frame A and having an operating-rod M' extending to the rear end of the frame within reach of the operator. The handle end of the rod M' passes through a guide-bracket m^2 and is there provided with two lateral projections m^3 to engage the bracket and lock the rod so as to hold the bar M away from the treadle-beam D or directly thereabove. The drill may be stopped at any time by shifting this bar M over the treadle-beam to hold it depressed.

The sand-bucket mechanism will now be described.

A^4 A^5 are parallel uprights secured to the frame at opposite sides of the buffer-beam A^2, the upright A^4 being against the front side of the beam A^2 and the upright A^5 against the rear side thereof.

N is the drum, around which is wound the sand-bucket rope N', said drum being mounted at its outer end in a bearing on the upright A^4 and at its inner end journaled in the inner end of a longitudinally-extending lever O, pivoted to the standard A^5. By raising the handle end of the lever O, which extends within reach of the operator at the rear end of the frame, its inner end will be depressed and throw a friction-wheel N^2 at the inner end of said drum into engagement with the periphery of the wheel C, so that the drum will be rotated in a direction to wind the rope N' and elevate the sand-bucket. The outer or handle end of the lever O may be locked by means of the ratchet-bar O' on the rear end of the frame, so that the friction-wheel N^2 may be held in or out of contact with wheel C. Normally the friction-wheel N^2 is held out of engagement with wheel C and in contact with a brake P, formed of a flat steel plate in the form of a vertically-extending hook which is secured at its lower end to the transverse beam A^2 and having a curved upper end P' encircling the upper portion of the friction-wheel and forming a curved spring brake-band. Thus in lowering the sand-bucket in the well the rotation of the drum N may be governed by bearing down on the free end of lever O to throw the friction-wheel N^2 through the open side of the hook-like brake-band with greater or less force against said brake.

The rope N' passes downwardly and rearwardly from drum N, under a guide-roller Q, and thence upwardly and over the sheaves or pulleys *b b* at the top of the mast B. In winding and unwinding the rope travels along this roller Q, but the roller serves the further purpose of so changing the angle of strain of the rope N' on the drum N that when the sand-bucket is filled its weight will cause the rope N' to pull the inner end of the drum down, so that its friction-wheel N^2 will contact with the wheel C and cause the rotation of the drum in a direction to wind its rope and elevate the bucket. The bucket may be,

however, raised and lowered at any time by manipulating the lever O in addition to the automatic action just described.

In some communities walking-beam machines are preferred, while in others the treadle-beam is preferred. The above-described machine is provided for the latter and that shown in Fig. 5 for the former. S is the walking-beam, pivoted between its ends to the upper end of a standard S′, having a cross-bar S^2 at its lower end, through the ends of which pass the bolts s^2, which extend down through apertures in the upper side bars of the frame A and are provided at their lower ends with securing-nuts. This walking-beam may thus be readily applied and removed and when applied does not interfere at all with the mast B. The inner end of the walking-beam is provided with a depending pitman *s*, which is connected to one of the bolts or pins c^3 after the removal of its roller C^3 and the other roller and pin C^3 c^3. The outer end of this walking-beam is provided with two pulleys or sheaves s^4 s^5, and two other pulleys s^6 s^7 are mounted on the walking-beam between its pivotal point and outer end. The drill-rope K passes over the sheaves or pulleys s^4 s^6, and the bucket N′ passes over the sheaves or pulleys s^5 s^7. The rocking of the walking-beam causes the operation of the drill and bucket ropes, as will be readily understood. The said ropes are let out and wound just the same as where the treadle-beam D is used. If desired, the walking-beam S may be removed by simply removing the pin or bolt which forms its axis and the standard S′ allowed to remain on the frame, as it will not interfere in the slightest with the other parts. When the walking-beam S is used, the drill-rope will not be passed through the guide-pulley D′ on the treadle-beam D, but will pass from traveling pulley K′ past the shaft I up to pulley or sheave s^6.

In practice all of the above-described elements of my machine are kept in stock or made to order and sold separately for use in replacing parts that are broken or worn out.

Having described my invention, what I claim is—

1. A well-drilling machine comprising the frame having a mast at the front end, sheaves at the upper end of the mast, a drive-shaft at the rear end of the frame, a combined fly and power wheel on said shaft having a lateral cam or projection, a drill-rope drum on the upper portion of the frame near the mast, a let-out shaft geared to the shaft of the drill-rope drum and operatively connected with the drive-shaft, a counterbalanced rock-shaft journaled below the drill-rope drum and provided with a treadle-beam extending rearwardly with its free end in the downward path of the cam or projection on said power-wheel to be depressed thereby and returned to its normal position by said counterbalance, a guide on the beam under which the drill-rope extends between its drum and the mast-sheave, a sand-rope drum above and in front of the drive-shaft and having a friction-wheel on its inner end adapted to be depressed into engagement with the periphery of the power-wheel, and a brake to engage said friction-wheel in its opposite movement, substantially as set forth.

2. In a well-drilling machine, a rocking weight socketed to receive the inner end of a treadle-beam, and means for journaling the weight to the frame of the machine; said weight serving to counterbalance the beam, substantially as set forth.

3. In a well-drilling machine, a treadle-beam rock-shaft provided on one side with a weight and on its opposite side with a socket for the rear end of the treadle-beam, substantially as described.

4. The combination with the rock-shaft provided on one side with a weight, and on its opposite side with a socket, of a treadle-beam rigidly secured at its rear end in said socket, substantially as described.

5. In a well-drilling machine, a treadle-beam rock-shaft having a weight integral with one side and an integral socket opposite thereto, substantially as described.

6. In a well-drilling machine, the combination with the frame, the drive-shaft and the wheel thereon, of a sand-rope drum movably mounted at one end and having a friction-wheel at that end to engage the periphery of the wheel on the drive-shaft, means for moving that end of the drum, and a spring brake-band secured at one end to the frame with its free end in the form of a vertically-extending hook encircling the friction-wheel at its side opposite the drive-shaft wheel, substantially as set forth.

7. In a well-drilling machine, the combination with a frame, the mast at the front end thereof, having sheaves at its upper end for the drill-rope and the sand-bucket rope, respectively, the drill-rope drum at the front end of the frame, the drill-rope beam engaging the drill-rope, and the drive-shaft having a combined fly and power wheel operating the said beam, of a sand-rope drum above and in advance of the drive-shaft and having one end movable toward and from the fly-wheel and there provided with a friction-wheel to engage the periphery of the said fly-wheel, a spring brake-band in the form of a vertically-extending hook secured at its lower end to the frame with its open side next to the fly-wheel and embracing with its hooked free end the said friction-wheel, and a guide below and in front of the sand-rope drum, and under which the sand-bucket rope passes to the mast-sheave, substantially as described.

8. The combination with the drill-rope drum, of a shaft geared thereto to rotate the drum in either direction, and pawl-and-ratchet mechanism for locking the shaft to prevent unwinding of the drum, and a lever separate and independent from the said pawl having a pawl-releaser and brake to succes-

sively release the pawl and brake the said shaft substantially as described.

9. The combination with the drill-rope drum, of a shaft geared thereto to rotate the drum in either direction, a ratchet and brake-wheel on said shaft, a pawl pivoted on the frame and engaging the ratchet, and a lever having a cam at its inner end to engage and release the pawl and a brake-block to engage said brake-wheel when the pawl is so released, substantially as described.

10. The combination with the frame, the power-wheel and the drill-rope beam, operated by said wheel and having a pulley or sheave for the drill-rope, of the drill-rope drum, having a large gear, the drum-operating shaft having a small gear in mesh with said large gear; said shaft being adapted to be driven from the power-wheel shaft when the drum is to wind the drill-rope, a ratchet and brake-wheel, on the drum-operating shaft, a pawl pivoted on the frame and engaging said ratchet, a lever separated from and engaging said pawl to throw it out of engagement with the ratchet, and a brake on the said lever and engaging the brake-wheel when the pawl is so disengaged, substantially as described.

11. A well-drilling machine comprising the frame, the mast, the power cam-wheel journaled thereon, the treadle-beam extending at its free end into the path of said cam-wheel and having a guide-pulley, for the drill-rope between its ends, the drill-rope drum at the mast end of the frame, the spindle therebelow having a traveling pulley for the drill-rope, the drum-operating shaft geared to the drum and having a ratchet and a brake-wheel, a pawl engaging said ratchet, a lever separate from and engaging the pawl to release it, a brake on said lever and engaging the brake-wheel when the pawl is released, and mechanism for throwing the drum-operating shaft into and out of gear with the cam-wheel shaft, substantially as described.

12. A well-drilling machine comprising the frame, the mast, the cam-wheel, the weighted rock-shaft mounted in adjustable bearings, the treadle-beam extending from said rock-shaft into the path of the cam, and having a drill-rope guide-pulley on its upper side, the drill-rope drum, the operating-shaft thereof geared thereto, and having a combined brake and pawl-and-ratchet let-out mechanism, and mechanism for throwing the drum-operating shaft into and out of operative connection with the cam-wheel shaft, substantially as described.

13. A well-drilling machine, comprising a frame, a power-wheel provided with a wrist-pin having a removable roller, a treadle-beam in the lower portion of the frame in the path of the roller, a removable longitudinally-extending walking-beam on the top of the frame and having a connecting rod or pitman at its inner end adapted for connection with said wrist-pin upon the removal of the roller; whereby either beam may be operated upon directly by the same power-wheel, substantially as set forth.

14. A well-drilling machine comprising the frame having a mast provided with upper and lower pulleys or sheaves, a cam-wheel, a treadle-beam operated thereby and having a drill-rope guide-pulley, a drill-rope drum, a drum-operating shaft geared thereto and adapted to be thrown into and out of connection with the cam-wheel shaft, a combined pawl-and-ratchet and brake mechanism for the drum-shaft and having an operating-lever extending to the mast end of the machine, the drill-rope extending from the drum under the treadle-beam pulley thence up and over the lower mast-sheave, the sand-rope drum having a friction-wheel at one end over and adapted to engage the periphery of the cam-wheel, a pivoted, longitudinally-extending lever in which that end of said drum is journaled; the opposite end of the lever extending to the mast end of the frame and there provided with a locking or ratchet bar, a curved brake-band partially encircling the said friction-wheel at its upper portion, a guide roll or bar and the bucket-rope extending from the drum under said roll or bar and thence upwardly and over the top sheaves in the mast, substantially as described.

HENRY KELLY.

Witnesses:
BERT BARNES,
A. J. BRECKENRIDGE.