No. 690,965.

Patented Jan. 14, 1902.

A. S. JONES.

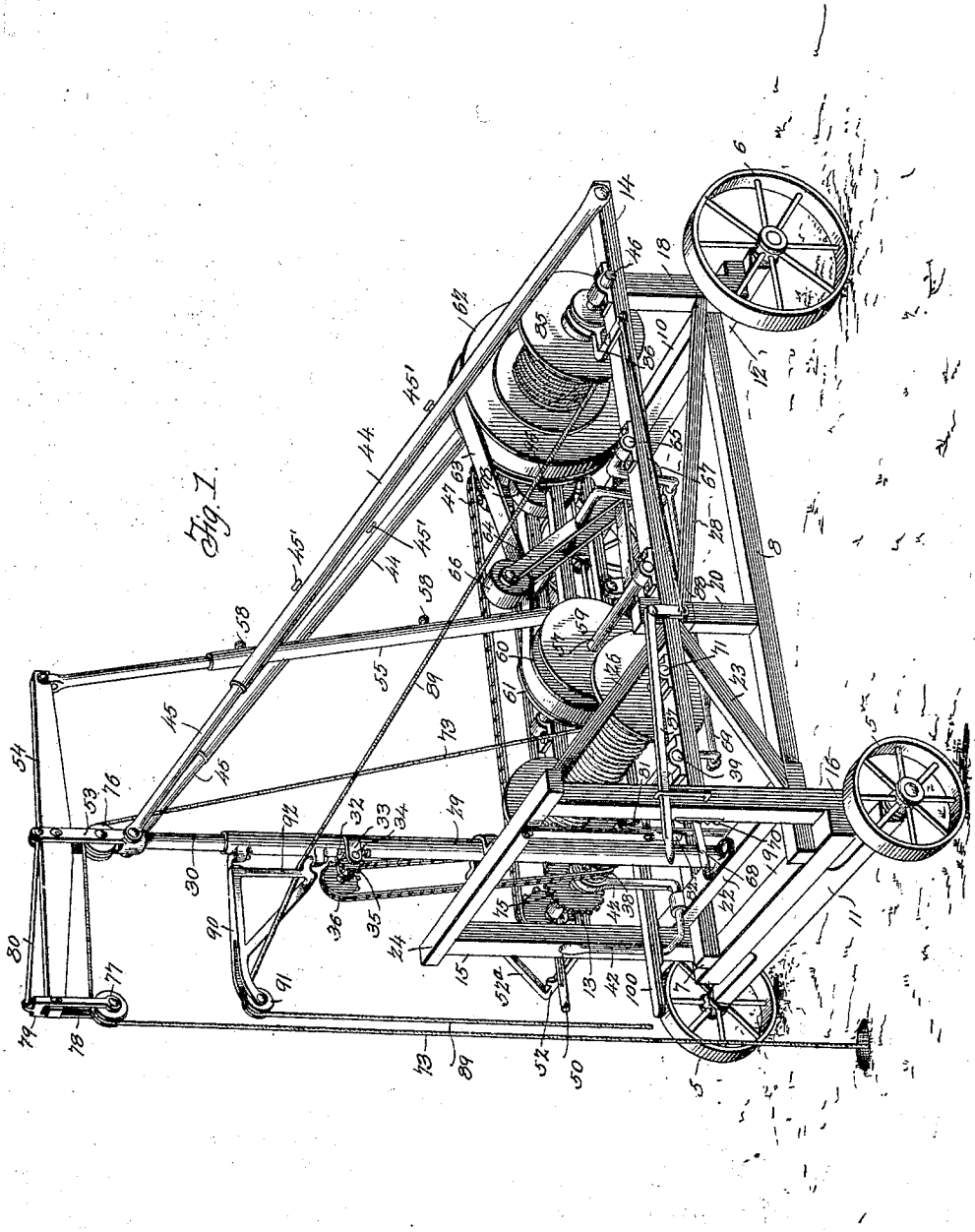
DRILLING MACHINE.

(Application filed Jan. 14, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



Witnesses
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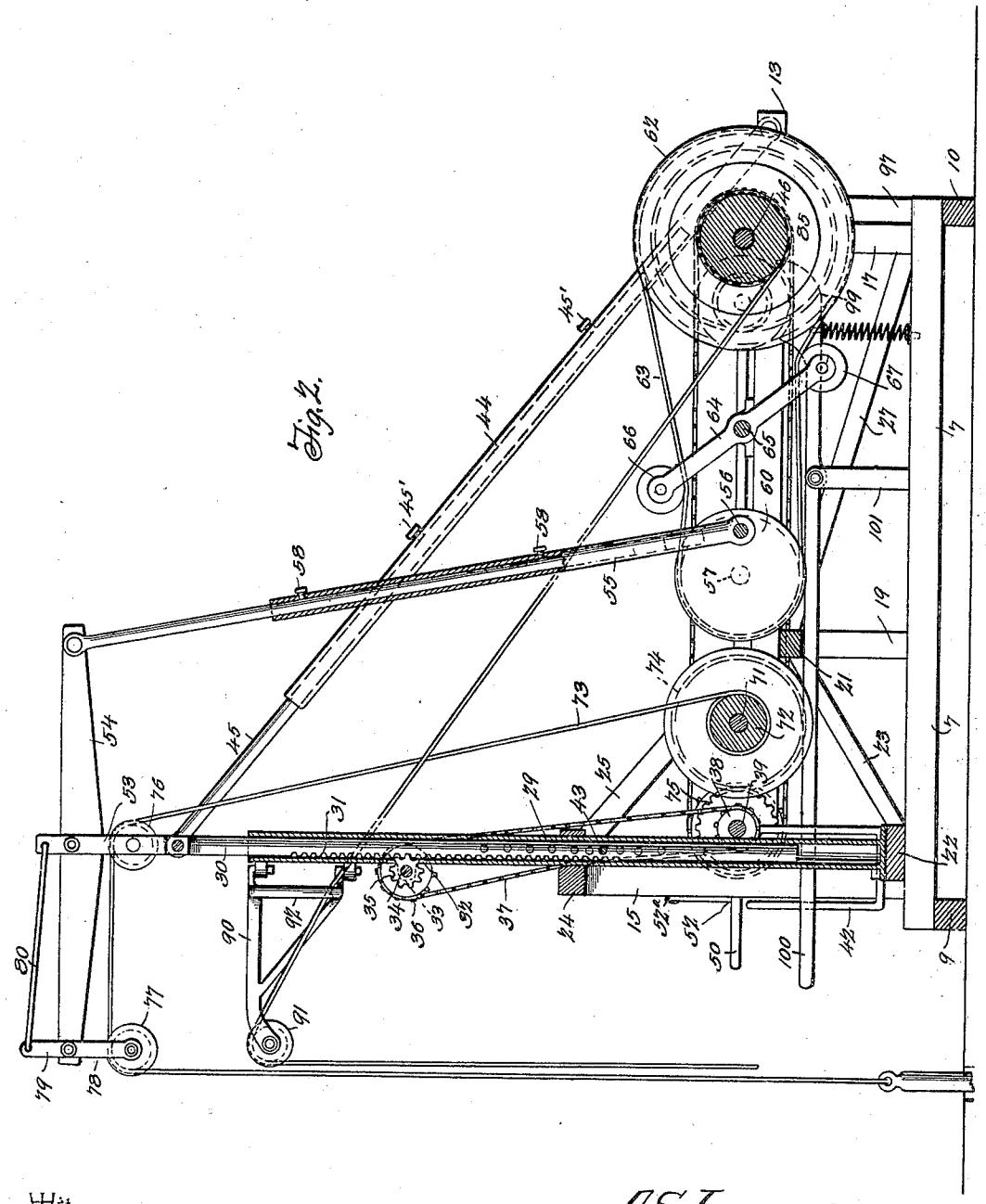
DRILLING MACHINE.

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3 Sheets—Sheet 2.

Fig. 2.



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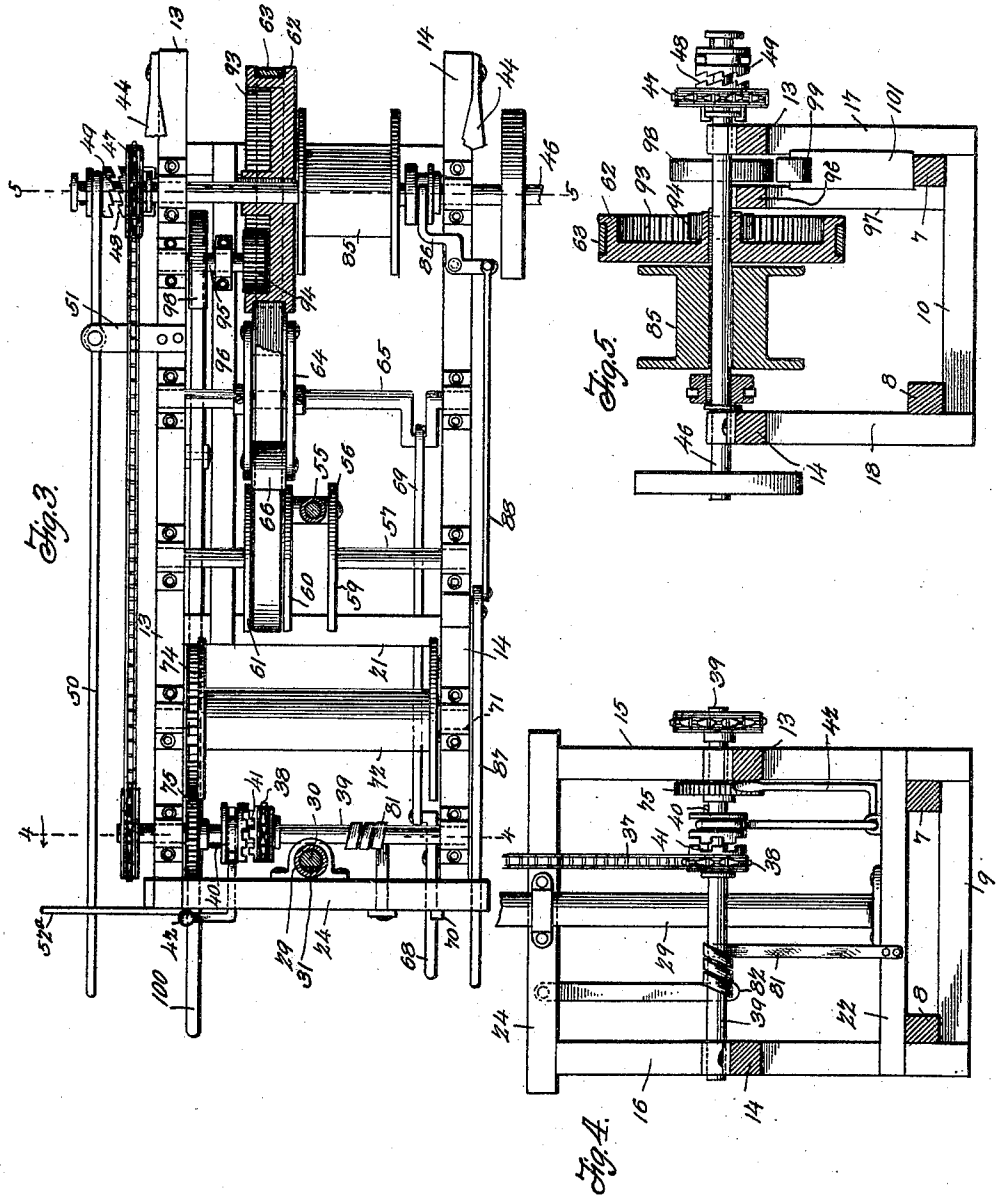


Fig. 3.



Fig. 5.



Fig. 4.

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# UNITED STATES PATENT OFFICE.

AMOS S. JONES, OF CLIFTON, KANSAS.

## DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 690,965, dated January 14, 1902.

Application filed January 14, 1901. Serial No. 43,226. (No model.)

*To all whom it may concern:*

Be it known that I, AMOS S. JONES, a citizen of the United States, residing at Clifton, in the county of Washington and State of Kansas, have invented a new and useful Drilling-Machine, of which the following is a specification.

This invention relates to well-drilling machines; and it has for its object to provide a construction which will be compact and which may be caused to occupy a small space to facilitate shipment, while the weights of the apparatus will be advantageously placed.

A further object of the invention is to provide a construction wherein the drill-mast may be adjusted to the proper height for use under different specific conditions and means for readily adjusting the height of the mast from the same source of energy as is derived the drilling power.

Other objects of the invention are to provide an arrangement of the main winding-drum wherewith breaking of the drill-rope will be prevented and from which the rope will be paid out automatically as the drilling operation proceeds, to provide a simple and efficient system of gearing with which the mechanism may be gradually started and which will not be damaged should the drill become lodged in the well during the drilling operation, and to provide a most efficient construction of bit which will permit the casing to readily follow the drill.

Further objects and advantages of the invention will be evident from the following description.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a perspective view showing the complete mechanism with the parts in their operative positions as when drilling. Fig. 2 is a vertical longitudinal section of the complete machine. Fig. 3 is a top plan view of the machine, the mast having its upper portion cut away and the bull-wheel being shown in section. Fig. 4 is a detail elevation showing the clutch mechanism for throwing into an operative relation the mast-adjusting mechanism, said elevation being shown by a section on line 4 4 of Fig. 3. Fig. 5 is a section on line 5 5 of Fig. 3.

This mechanism comprises a frame mounted upon supporting-wheels 5 and 6 and including lower sills 7 and 8, the ends of which are disposed upon cross-beams 9 and 10, with which are connected the axletrees 11 and 12 for the supporting-wheels. Spaced outwardly from the sills and lying in a plane above and parallel therewith are the longitudinal beams 13 and 14, the forward ends of which are engaged with the uprights 15 and 16 substantially midway of the ends of the latter, while the rear ends of the beams are mounted upon rear uprights 17 and 18. At points between the front and rear uprights and mounted upon the sills are intermediate uprights 19 and 20, upon the upper ends of which is disposed a cross-beam 21, which projects beyond said uprights to support the longitudinal beams. A mast-supporting cross-beam 22 is disposed upon the sills and against the rear sides of the forward uprights, and braces 23 are disposed upon this forward cross-beam 22 against the forward uprights and extend rearwardly and upwardly, with their upper ends in the angles between the intermediate uprights and the longitudinal beams. A cross-brace 24 is disposed upon the upper ends of the uprights 15 and 16, and braces 25 and 26 extend from the upper ends of the uprights 15 and 16 downwardly and rearwardly and are fixed at their lower ends upon the beams 13 and 14 in advance of the uprights 19 and 20. Other braces 27 and 28 extend from the upper ends of the intermediate uprights to the lower ends of the rear uprights.

The mast of the machine comprises a lower tubular section 29, which is stepped upon the beam 22, and an upper section 30, which is disposed telescopically therein and is provided with a rack-face 31. A slot 32 is formed in the lower section, and at opposite sides thereof are ears 33, in which is journaled a shaft 34, carrying a pinion 35, which engages the rack 31 through the slot 32. A sprocket 36 is fixed upon the shaft, and engaged therewith is a chain 37, engaged also with a sprocket 38, mounted loosely upon a shaft 39, which is mounted in bearings upon the beams 13 and 14, directly in the rear of the forward uprights 15 and 16. A clutch 40 is splined to the shaft 39, and the sprocket 38

has a clutch-face 41 for engagement by the clutch 40 when the latter is moved laterally under the influence of its rock-lever 42. Thus if the shaft 39 be rotated and the clutch be operated the movable section of the mast will be raised, and when raised to the proper height it is held from dropping by means of a bolt 43, passed through both sections of the mast. To prevent rearward displacement of the mast at all times, telescopic braces, each including a section 44, attached pivotally to the rear portion of a beam 13 or 14, and a second section 45, pivoted to the upper portion of the slidable section of the mast, are provided. Set-screws 45′ are engaged with the sections 44 and are adapted to impinge the sections 45 to hold them in their adjusted positions.

The shaft 39 is rotated from the drive-shaft 46, which is mounted in bearings at the rear ends of the beams 13 and 14, and which drive-shaft may be rotated from any suitable source of power, as will be readily understood. The drive-shaft is provided with a sprocket-wheel 47, mounted loosely thereon at or near one end, which projects beyond the beam 13 and has a clutch-face 48 for engagement by a clutch-wheel 49, which is splined on the drive-shaft. This clutch has the usual peripheral groove, in which is engaged a strap at the end of a lever 50, pivoted upon a laterally-extending bracket 51 on the beam 13, the forward end of the lever lying upon a rack 52, carried by a frame 53, attached to and projecting laterally from the forward portion of the frame of the machine. When the lever is in one position the clutch is engaged and when in an opposite position the clutch is disengaged, and thus may the shaft 39 be thrown into and out of operative relation to the shaft 46, and when in operative relation the lever 42 may be operated, as hereinbefore described, to raise the upper section of the telescopic mast.

At the upper end of the mast is a yoke 53, and between the arms of this yoke and near to the upper ends thereof is pivoted a walking-beam 54, which projects forwardly and rearwardly from the mast, the rear end of the beam having the upper section 54 of a connecting-rod pivoted thereto, the lower section 55, with which the upper section is slidably connected, having connection with the crank 56 of a crank-shaft 57, which is mounted in bearings on the beams 13 and 14. The sections of the connecting-rod are telescopically connected, as shown, and are provided with set-screws 58 for holding them adjustably. The crank-shaft 57 is in two sections, as shown, upon the inner ends of which are fixed spaced crank-disks 59 and 60, which are connected by an eccentric-pin, which is the crank 56. These disks act as guides to prevent lateral displacement of the connecting-rod upon the crank-pin in all positions of the pin. The disk 60 forms one end of a flanged pulley-wheel 61 upon one of the shaft-sections and through the medium of which the shaft is rotated to operate the walking-beam.

To rotate the pulley-wheel 61, a main drive-pulley 62 is fixed upon the drive-shaft 46, and connecting this main drive-pulley with the pulley 61 is a normally loose belt 63. When the pulley 61 is to be rotated to operate the walking-beam, this belt is tightened by means of a belt-tightener consisting of a rocker 64, fixed upon a crank-shaft 65, which is mounted in bearings on beams 13 and 14. The rocker includes spaced plates, as shown, extending at opposite sides of the crank-shaft, and between the plates and at the ends thereof are mounted pulleys 66 and 67. The pulley 66 bears against the upper face of the upper portion of the belt, and the pulley 67 bears against the lower face of the lower portion of the belt, and when the shaft is rocked the rocker is operated to move the engaged portions of the belt toward each other, as will be understood, and thus take up the slack of the belt, when sufficient friction will be established between the belt and the pulleys 61 and 62 to transmit power from one pulley to the other. To rock the shaft 65, an angular rock-lever 68 is pivoted to the upright 16 and is connected by means of a rod 69 with the crank of the shaft 65. The lever 68 has a knife-edge for engagement with a rack 70 on upright 16 to hold the lever, and thus hold the rocker in adjusted position. Any desired tension may be thus given to the belt, and should the walking-beam be prevented from operation from any cause the belt will slip, and thus breaking of parts of the structure will be prevented.

Mounted in bearings upon the beams 13 and 14 and directly in the rear of the shaft 39 is a shaft 71, on which is fixed the winding-drum 72 for the drill-rope 73, said drum having a gear 74 at one end with which meshes a gear 75 upon shaft 39 for rotating the winding-drum from shaft 39. The winding-drum is thus thrown into operative relation with the drive-shaft and at the same time with the shaft 39.

The drill-rope passes from its winding-drum upwardly and over a pulley 76, mounted in the yoke 53, directly below the walking-beam, and then outwardly and over a second pulley 77, which is mounted between the sides of a second yoke 78, which is pivoted upon the forward end of the walking-beam, with the sides of the yoke straddling the beam. The stem 79 of the yoke extends upwardly, and a rod 80 is pivoted thereto at one end and to the upper end of the yoke 53 at its other end, this rod lying parallel with a line connecting the pivots of the walking-beam and the yoke 78, whereby as the walking-beam is rocked the yoke 78 is held at all times in vertical position, while the drill-rope is prevented from playing backwardly and forwardly upon the pulleys excepting when the drill is undergoing adjustment.

To prevent unwinding of the drill-rope

from its drum during the drilling operation, a friction-brake is provided and consists of a strap 81, one end of which is attached to the beam 22, while the other end is attached to a spring-plate attached to and depending from the cross-brace 24. The strap intermediate of its ends is wrapped around the shaft 39, and the spring-plate acts to draw the strap with sufficient tension to frictionally engage it with the shaft. This frictional engagement is sufficient to overcome the weight of the drill, but is nevertheless so slight that should the drill become stuck the upward movement of the walking-beam will draw off from the winding-drum an amount of slack to compensate for the movement of the said beam. At the lower end of the spring-plate is a handle 82, which may be grasped to move the spring-plate in a direction to slacken the brake-strap and permit the shaft 39 to turn freely when the winding-drum is to be operated or the mast to be raised.

The sand-drum (shown at 85) is mounted loosely and slidably upon the main drive-shaft and is adapted to frictionally engage one end thereof with the side face of the drive-pulley 62 and when in this position will be rotated thereby. To thus shift the sand-drum into and out of frictional engagement with pulley 62, said drum has a peripherally-grooved hub extending from the outer end thereof, and with the groove of this hub is engaged the yoke at the end of an angular lever 86, mounted on the beam 14. A second angular lever 87 is mounted on the side face of beam 14 and is connected by means of a rod 88 with lever 86 for operating the latter to shift the sand-drum.

To accommodate the sand-line 89 from the sand-drum, a crane-arm 90 of triangular shape is provided and is pivoted to the lower section of the mast. The outer end of the crane-arm is bifurcated and provided with a guide-pulley 91, over which the sand-line is passed. A guide-arm 92 is vertically disposed at the base of the crane-arm, and the sand-line is taken between this guide and the mast, whereby when the crane-arm is swung laterally from its operative position (shown in Fig. 1) the sand-line will be retained by the guide in engagement with the pulley. This arrangement of the sand-line permits it to be swung entirely out of the way when not in use.

The face of the drive-wheel 62 opposite to the sand-drum is recessed and provided with an internal gear 93, with which is engaged a pinion 94 upon a shaft 95, mounted in bearings on beam 13 and on a supplemental beam 96, disposed parallel with beam 13 and supported upon beam 21 and a post 97 on beam 10. On said shaft between beams 13 and 96 is fixed a brake-drum 98, with which coöperates a shoe 99 at the end of a lever 100, pivoted in the bifurcated upper end of a post 101 on sill 7. This brake-lever extends forwardly of the machine to be grasped and operated. When the shoe is engaged with the brake-drum, the drive-shaft of course is stopped.

What is claimed is—

1. In a well-drilling machine, the combination with a pivoted walking-beam and means for operating it, of a hanger pivoted to the beam, a guide-pulley in the hanger, a guide-pulley pivoted below the pivot of the beam, the pivots of the pulleys lying in a line parallel with a line connecting the pivots of the beam and hanger, and a rod pivoted to the hanger at one end and pivoted at its opposite end in line with the pivots of the walking-beam and the adjacent pulley and lying parallel with a line connecting the pivots of the pulleys.

2. In a well-drilling machine, the combination with a pivoted walking-beam of a hanger pivoted thereto adjacent an end thereof, a guide-pulley mounted in the hanger, a second guide-pulley mounted vertically below the pivot of the walking-beam, the line connecting the centers of the pulleys lying parallel with a line connecting the pivots of the beam and hanger, and means operable by movement of the beam for pivotally moving the hanger to maintain it in a vertical position.

3. In a well-drilling machine, the combination with a mast and a walking-beam pivoted therein and having means for operating it, of a hanger pivoted to an end of the beam and extending thereabove and below, a pulley in the hanger below the beam, a pulley mounted upon the mast vertically below the pivot of the beam, the pulleys being equally spaced from the pivots of the beam and hanger, respectively, and a rod pivoted to the hanger above the beam and to the mast above the beam and lying parallel with a line connecting the pivots of the beam and hanger, said pulleys being adapted to receive a drill-rope.

4. The combination with a support, of a pivoted sand-line crane having a guide-pulley, and a guide carried by the frame and arranged parallel with the plane of the pivots thereof, said guide being adapted to receive a sand-line between it and the support to prevent displacement of the line from the pulley.

5. In a well-drilling machine, the combination with a supporting-frame of a telescopic mast mounted thereon, a section thereof having a rack, a pinion carried by a second section and engaged with the rack, a shaft at the base of the mast, connections between the shaft and pinion for operating the latter, means for throwing said connections into and out of operative relation to the shaft, a drill-rope-winding drum, connections between said shaft and drum for rotating the latter, a drive-shaft, and means for throwing the drive-shaft into and out of operative relation to the first shaft.

6. In a well-drilling machine, the combination with a supporting-frame having a telescopic drill-mast thereon, a section of said mast having a rack, a pinion engaged with

said rack, a shaft at the base of the mast connections between the shaft and pinion and having means for throwing them into and out of operative relation to the shaft, a drive-shaft connections between the shafts adapted for movement into and out of operative relation to the drive-shaft, a drill-rope-winding drum in the rear of the first shaft and having connections for operation thereby, a walking-beam upon the mast, a crank-shaft connected with the walking-beam for operating the latter, belt connections between the crank-shaft and the drive-shaft, and means for varying the tension of the belt to operably connect the crank-shaft and drive-shaft.

7. In a drilling-machine, the combination with a walking-beam of a drill-rope-winding drum, a shaft operably connected with the drum, a telescopic supporting-mast for the walking-beam, means adapted for connection with the shaft for raising the mast, and a brake mechanism connected with the shaft for lowering the mast and preventing unwinding of the rope from the drum.

8. In a well-drilling machine, the combination with a telescopic drill-mast one member of which carries a rack, of a pinion engaged with the rack, a shaft at the base of the mast operating connections between the shaft and pinion adapted for movement into and out of operative relation to the shaft, a drill-rope-winding drum mounted adjacent to the shaft and having operative connections, and a brake mechanism for lowering the shaft and retarding rotation of the drum, said brake mechanism comprising a strap wound about the shaft and having a spring attached thereto to hold the strap under tension, said strap being fixed at one side of the shaft.

9. In a well-drilling machine, the combination with a supporting-frame having a mast, of a walking-beam mounted in the mast, a crank-shaft mounted in the frame and connected with the walking-beam, a winding-drum mounted between the crank-shaft and the mast and adapted to receive the drill-rope, means carried by the mast and beam to receive the rope, a shaft mounted at the base of the mast and operatively connected with the drum for operating it, a drive-shaft, connections between the shaft at the base of the mast and the drive-shaft and adapted for movement into and out of operative relation to the drive-shaft, a drive-pulley on the drive-shaft, a drive-pulley on the crank-shaft, a belt connecting said pulleys, a belt-tightener for said belt, a sand-reel on the drive-shaft and adapted for movement independently thereof rotatably and slidably, means for moving the reel into frictional engagement with the pulley on the drive-shaft for rotation thereby, an internal gear within the drive-pulley, a shaft having a pinion engaged with the internal gear, a brake-wheel carried by the shaft and a brake in operative relation to the brake-wheel.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

AMOS S. JONES.

Witnesses:
STOY E. WARE,
WALTER A. JONES.