

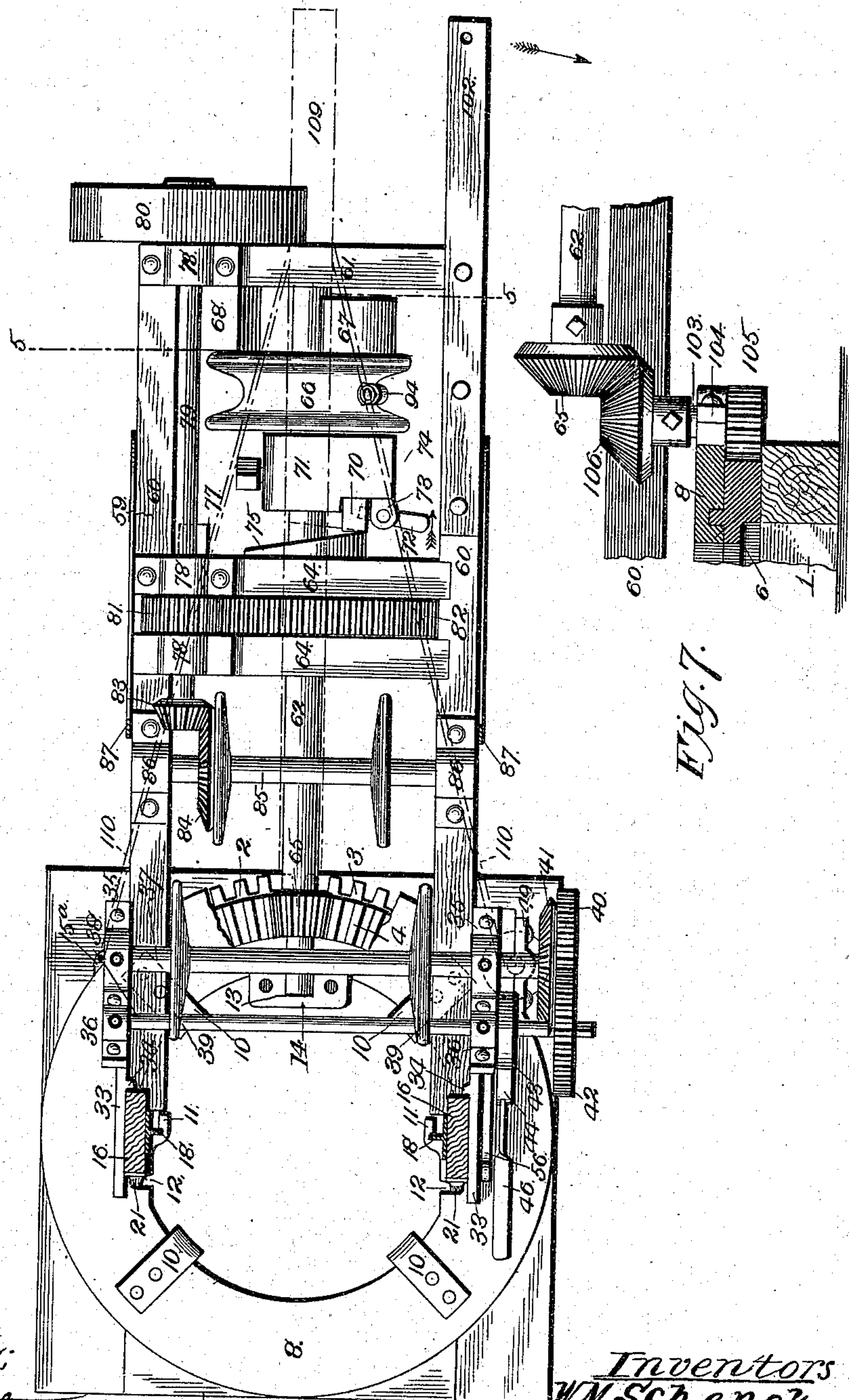
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3 Sheets—Sheet 1

W. M. SCHENCK & J. F. HELTON:  
WELL BORING AND DRILLING APPARATUS.

No. 554,315.

Patented Feb. 11, 1896.



Witnesses;

Inventors  
M. Schenck.

and J.F. Helton

By Nelson & Nelson  
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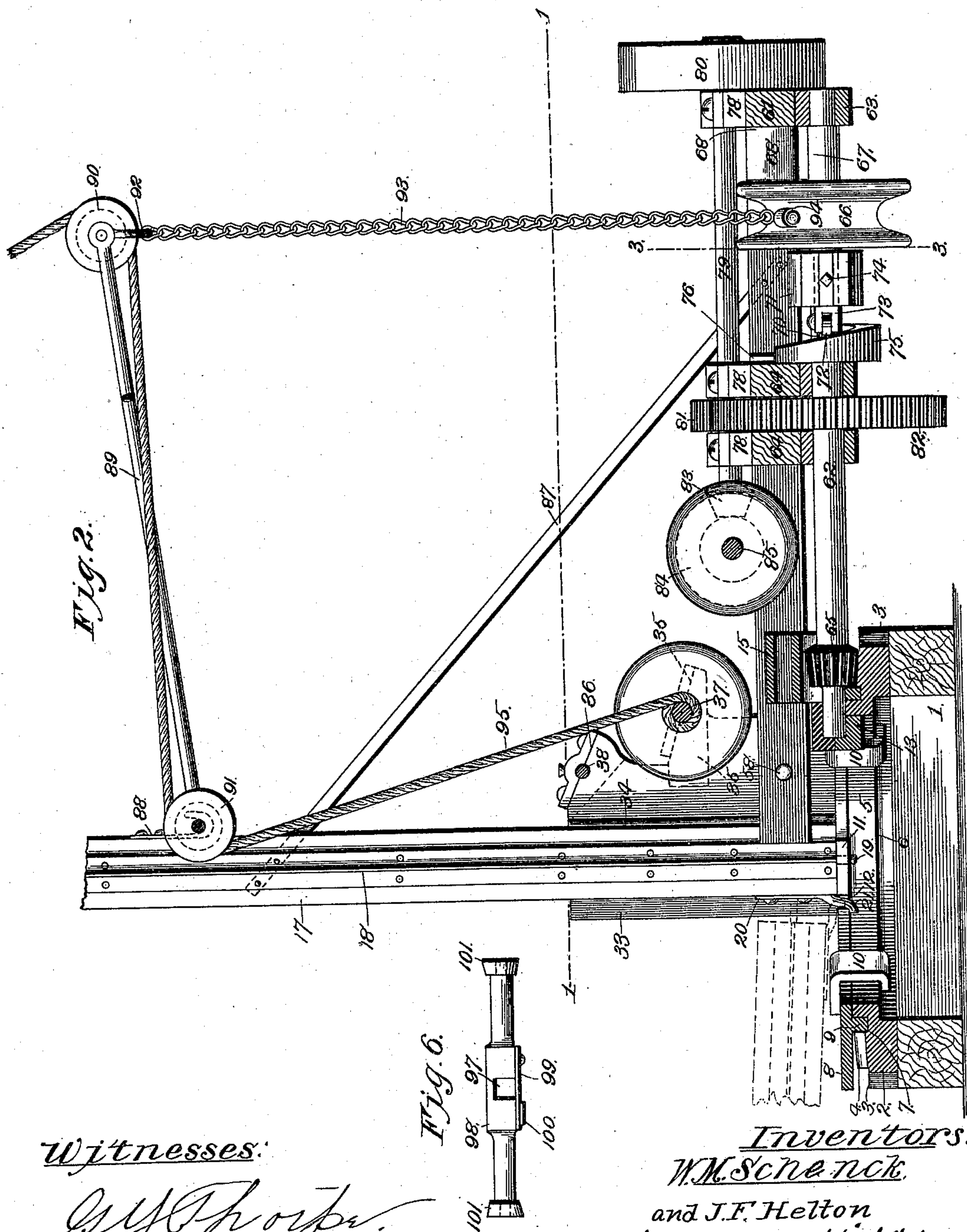
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Witnesses:

W. H. Thorpe.  
M. R. Remley.

Inventors:

W. M. Schenck.

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(No Model.)

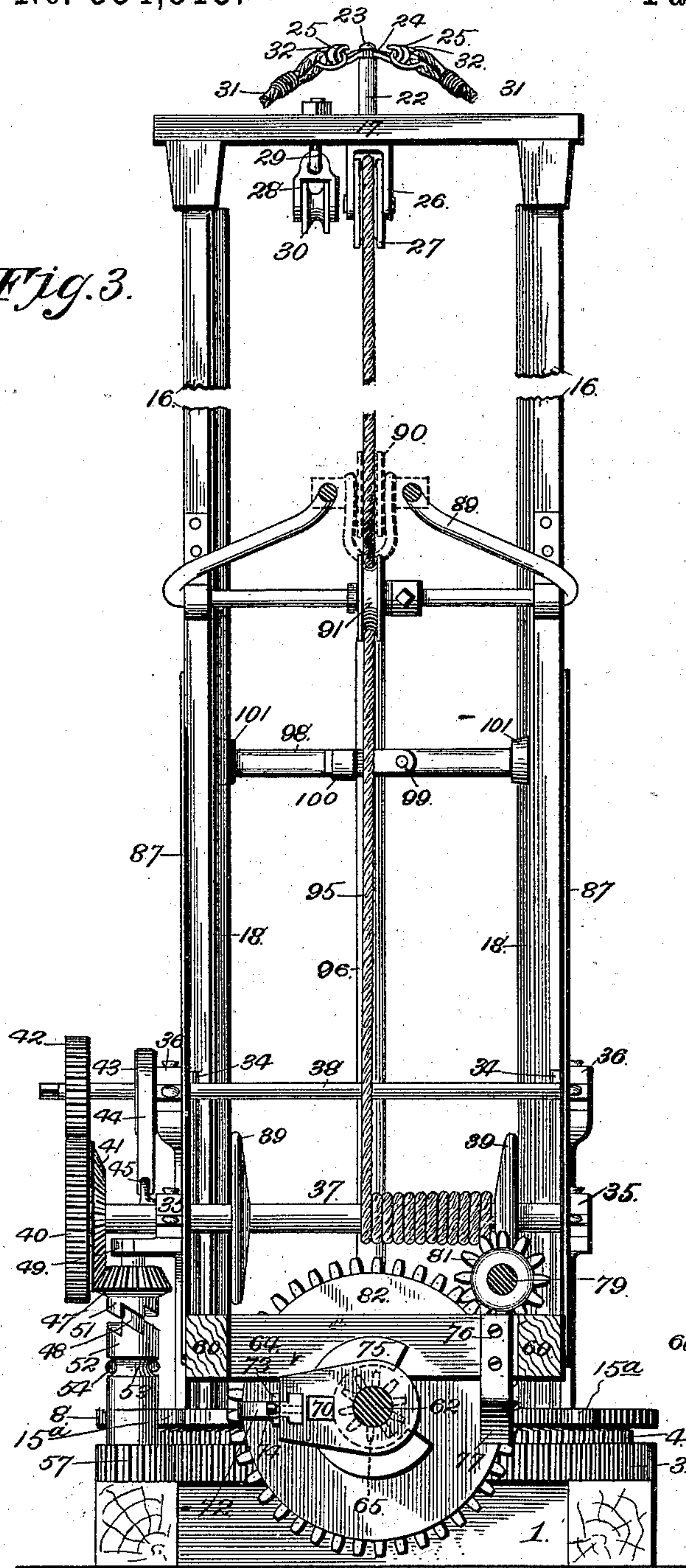
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Fig. 3.



Witnesses:

*G. P. Thorpe*  
*W. R. Remley*

Fig. 4.

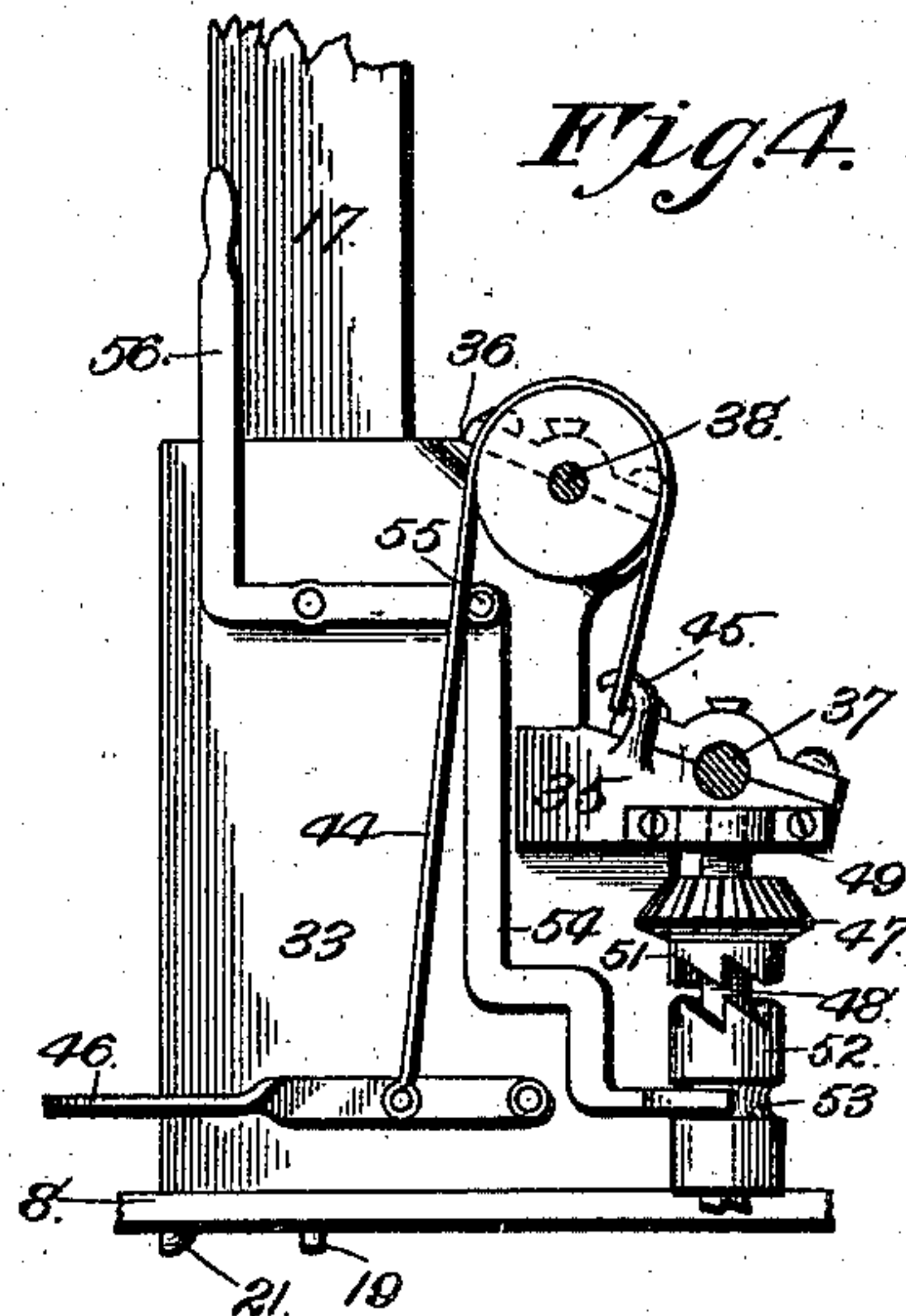
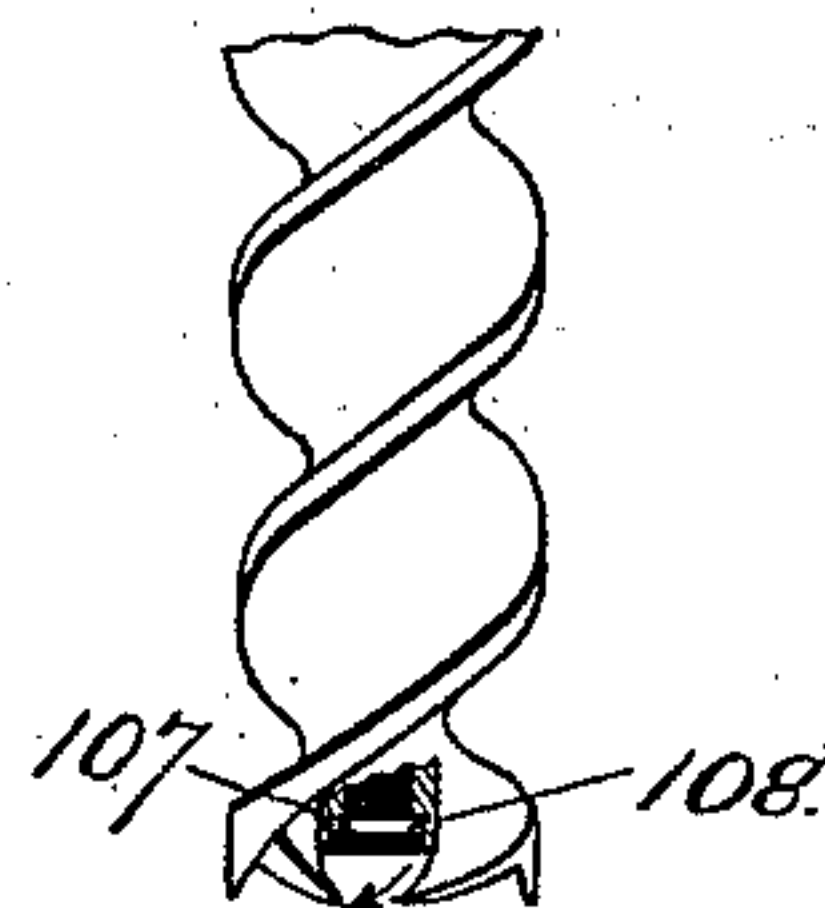


Fig. 8.





# UNITED STATES PATENT OFFICE.

WILLIAM M. SCHENCK AND JAMES F. HELTON, OF KANSAS CITY, MISSOURI.

## WELL BORING AND DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 554,315, dated February 11, 1896.

Application filed September 3, 1895. Serial No. 561,364. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM M. SCHENCK and JAMES F. HELTON, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Well Boring and Drilling Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

Our invention relates to well boring and drilling machines, and the object of the invention is to produce a machine of this character which may be operated easily by a single draft-animal, and will be comparatively simple, strong, durable, and inexpensive of manufacture.

Other objects of the invention will appear in the following description, and will be pointed out in the appended claims.

In order that the invention may be fully understood, reference is to be had to the accompanying drawings, in which—

Figure 1 represents a horizontal section of a machine embodying our invention as taken on the line 1 1 of Fig. 2. Fig. 2 represents a vertical longitudinal section of the lower portion of the machine. Fig. 3 represents a vertical section taken on the line 3 3 of Fig. 2. Fig. 4 represents, in side elevation, a part of the machine to show clearly the mechanism for throwing the machine in and out of gear and the brake mechanism. Fig. 5 represents a vertical section taken on the line 5 5 of Fig. 1. Fig. 6 represents a traveling cross-piece which carries the drill or auger. Fig. 7 represents a slightly-modified form of mechanism for transmitting motion to the power-shaft. Fig. 8 represents a part of the auger to show clearly the valve at its lower end.

Referring now to the drawings, where similar reference-numerals designate corresponding parts, 1 designates a rectangular framework or base, preferably of heavy timbers. 2 designates an annulus bolted securely upon the same and provided peripherally with cog-teeth 3, and provided also with a circular series of crown-teeth 4. Said toothed annulus or "sun" gear is provided internally with the L-shaped flange 5, so as to form the downwardly-disposed annular shoulder 6 and the annular groove 7.

8 designates a circular crown-plate which

is provided with the depending annular flange 9, fitting rotatably within the groove 7 of the sun-gear. Said plate carries angle brackets or clips 10, which engage the shoulder 6 of the sun-gear, and thereby prevent the crown-plate rising from its proper position when in operation. Said crown-plate is provided at diametrically-opposite points with the forwardly-disposed hooks 11, and rearward of said hooks with the laterally-extending notches or slots 12. Forward of said hooks the crown-plate is provided with a bearing-box 13, having a detachable cap 14, and forward of said bearing-box and in a higher plane than the same is a socket 15.

A derrick comprises the vertical side bars, 16, connected at their upper ends by the top bar, 17. Said derrick is provided internally with the vertical guide-track 18, preferably of T-iron, said guide-tracks being bolted to the timbers 16. Secured rigidly to the lower end of said guide-tracks are the depending stems 19, which are engaged by the forwardly-disposed hooks 11, and secured to the rear edges of the timbers 16 are the plates 20, which are provided with curved hinge-arms 21, engaging the notches or slots 12. Said track, at its upper end, is provided centrally with the vertical post 22, and rotatably mounted upon the bolt 23 engaging the same is a plate 24, provided with a series of radially-arranged hooks 25. Depending centrally from the top bar, 17, is a bracket 26, provided with a pulley 27. Contiguous to said bracket is a second bracket 28, which is secured to a hook-bolt 29, carried by the cross-bar and is provided with a pulley 30. The derrick is braced and supported in its vertical position by means of a series of guy-ropes 31, which are anchored at their lower ends in the customary manner, and are provided with rings 32 at their upper ends, which detachably engage the hooks 25. The derrick is braced, furthermore, from lateral movement in either direction by the metallic side plates 33, rising from the crown-plate 8, and from forward movement by the ribs 34, which engage the front edges of the timbers 16. Said plates 33 are laterally widened at opposite points to form bearing-boxes 35 and 36 for the shafts 37 and 38, respectively, the caps of said boxes being detachable. The shaft 37 is provided with disks



39, so as to form practically a winding-drum, and mounted upon its outer end is a cog-wheel 40, provided at its inner side with or secured to a beveled cog-wheel 41. The cog-wheel 40 meshes continually with a cog-pinion 42 upon the shaft 38. Mounted upon said shaft 38 also is a friction-disk 43, which is engaged by the flexible strap 44, secured at one end to a hook 45, projecting from the boxing 35, and at its opposite end to a foot-lever 46, pivoted to the contiguous side plate 33. The bevel-gear 41 meshes continuously with a bevel-pinion 47 mounted loosely upon the vertical shaft 48. Said shaft is journaled at its opposite ends in the bearing-box 49, forming a part of the bearing-box 35, and in the bearing-sleeve 50, secured to the crown-plate 8 in any suitable manner. Said bevel-pinion is provided with a depending clutch-section 51, which opposes a second clutch-section 52 mounted to slide upon and rotate with the shaft 48. Said clutch-section is provided with an annular groove 53, which is engaged by the forked end of a lift-bar 54. Said lift-bar is pivotally connected, as at 55, to an angle-lever 56, mounted upon the contiguous side plate 33. The shaft 48 receives movement from the cog-pinion 57, mounted rigidly thereon, and rotating around the stationary toothed annulus or sun-gear 2.

From the foregoing it will be apparent that the winding-drum is inoperative when the clutch-sections are apart, and that it rotates when said clutch-sections are together and the planet-gear 57 is rotating around the sun or master gear, as will be hereinafter more particularly referred to. Mounted pivotally upon bolts 58, carried by the side plates 33, is a frame 59, consisting of the parallel longitudinal timbers 60, through which said bolts extend, and a transverse timber 61, connecting their front ends. At their rear ends said longitudinal timbers are preferably notched so as to fit snugly against the front edges and inner sides of the derrick-timbers 16. (See Fig. 1.) A longitudinal shaft 62 is journaled at its opposite ends in the bearing-box 13 of the crown-plate 8 and in the bearing-box 63, secured to the under side of the transverse timber 61 of said frame. It is also journaled in bearing-boxes secured to the under side of the parallel cross-timbers 64 of said frame. A bevel-pinion 65 upon said shaft meshes continually with the crown-teeth 4 of the sun-gear, and said pinion is held at all times down to its work by reason of the angle brackets or clips 10 hereinbefore described. Mounted loosely upon said shaft is a heavy wheel 66, and 67 is a lug projecting laterally therefrom and adapted to come into forcible contact at times with the stop-block 68, carried by the frame 59. Projecting from the opposite side of said wheel is a tempered-steel dog 69, which is engaged at intervals by a sliding dog 70, mounted in an arm 71 secured rigidly upon the shaft 62. Said sliding dog has a cavity in its outer face, which is engaged by the in-

ner end of a lever 72, pivoted upon a block 73 clamped removably in position by a bolt 74. The opposite end of said sliding dog travels upon the cam-plate 75, concentrically surrounding the shaft 62 for about two hundred and seventy degrees, and carried rigidly by one of the cross-timbers 64 of the frame 59. A plate 76 is also secured to said cross-timbers and is provided with an inclined shoulder or cam-surface 77, which is adapted by engagement with the lever 72 to retract the sliding dog from the position to which it has been advanced by the concentric cam 75, as will appear in the description of the operation of the machine. Journaled in bearing-boxes 78 upon said framework, near one side, is the longitudinal shaft 79, and mounted rigidly upon one end of the same is the fly-wheel 80, and near its opposite end a cog-pinion 81. Said cog-pinion meshes continually with the cog-wheel 82 upon the shaft 62. Upon the inner end of said shaft 79 is mounted rigidly the bevel-pinion 83, which meshes continuously with the bevel-pinion 84 of the winding-drum 85, journaled at its opposite ends in bearings 86 upon the framework 59.

When the device is used as a sand-pump—that is, for elevating sand from the bottom of a well or other place—the cable (not shown) is secured at one end to said drum, and at its opposite end to the sand-receptacle, being guided over the pulley 30, hereinbefore described, at the upper end of the derrick. When the machine is to be employed for boring or drilling purposes the sand-pump drum is functionless. The outer end of said frame is supported by the inclined brace-bars 87, bolted at their opposite ends to said framework and to the derrick-timbers 16. A suitable distance above the upper ends of said brace-bars are secured to the front edges of the derrick-timbers the upwardly-disposed hooks 88, and mounted to rock in said bearing-hooks is the approximately-U-shaped walking-beam 89, the front end of which overhangs the wheel 66. A rod connects the front ends of the arms of said walking-beam, and rotatably mounted thereon is a pulley 90, which occupies the same vertical plane as the pulley 27 and the pulley 91 upon the bridge or pivot-arm of said walking-beam. Embracing the opposite sides of the pulley 90, and also mounted loosely thereon, is the pendent clevis 92, which is connected by a chain 93 with a lug 94 projecting peripherally from the wheel 66. Extending around the guide-pulleys 27, 90, and 91, as illustrated, is the rope 95, which is secured at one end rigidly to the drum-shaft 37, and at its opposite end is connected to the upper end of the drill or auger stem 96. Said drill or auger stem, which is rectangular, preferably in cross-section, is rigidly secured within the rectangular opening 97 of the traveling carrier 98 and is prevented from disengagement therewith by means of the pivoted plate 99 engaging the upwardly-disposed hook 100. At its opposite end said carrier is pro-



vided with the bevel antifriction-rollers 101, which engage, respectively, and travel vertically upon opposite sides of the guide-tracks 18. Said rollers are disposed at the front side of their respective guide-tracks with respect to the direction of rotation of the machine.

For sand-pump purposes or for drilling purposes the draft-animal is attached by means of a singletree (not shown) to the draft-bar 102, bolted to and projecting forwardly from the framework 59, which framework in practice will probably be built of channel-iron, as it is necessary that the parts of the frame shall not change their fixed relation under the strain imposed.

In the practical operation of drilling, as the draft-animal travels in the direction indicated by the arrow, Fig. 1, the pinion 65 travels upon and is rotated by the crown-teeth of the sun-gear 2, and therefore causes the wheel 66 and the arm 71 to rotate in the direction indicated by the arrow, Fig. 3. The wheel 66 is rotated because the sliding dog 70 is forced by the concentric cam 75 outwardly and into the path of the fixed dog 69 of said wheel, which it engages, as will be readily understood. It also causes the operation of the sand-drum and of the shaft 48, and as it is undesirable that the rope be fed from the drum-shaft 37 during said operation a pin or spike is dropped in between the teeth of the wheels 40 and 42 to prevent any accidental rotation thereof. As the wheel 66 revolves it winds the chain 93 upon the drum and depresses the outer end of the walking-beam, which, acting as a lever, draws the rope downwardly over the pulley 27 and raises the drill. The elevation of the drill is continued until the outer end of the lever 72 comes in contact with and is pivotally operated in the direction indicated by the contiguous arrow, Fig. 1, by the trip-cam 77. This operation of the lever withdraws the sliding dog 70 from the path of the fixed dog 69 to permit the drill to drop and at the same time to cause the wheel 66 to resume its original position, which is determined by the position of the stop-block or bumper 68, against which the lug 67 of the wheel strikes. Immediately after it reaches this position the sliding dog of the arm 71, rotating on the shaft, comes again into engagement with the concentric cam 75 and is forced thereby into contact with the fixed dog 69 to again operate the wheel 66 and raise the drill, as before described. The end of the walking-beam, besides the great leverage it has because of its length, also serves to prevent the rope becoming slack. The alternate raising and dropping of the drill takes place, as described, as long as the planet-gear 65 rotates upon the sun-gear.

When the machine is to be used as a sand-pump, the drill of course is removed, and the sliding dog 70 is also removed from position, so that the wheel 66 and the walking-beam will remain stationary. When it is desired to raise the drill for any purpose and wind

the rope upon the drum-shaft 37, the operator grasps and operates the lever 56 and throws the clutch-section 52 into engagement with the clutch-section 51, which, meshing with the bevel-gear 41, operates the said drum-shaft and winds the rope thereon, or the rope may be wound upon the drum without the assistance of the draft-animal by fitting the crank-handle (not shown) upon the squared end of the shaft 38 and rotating the same to impart motion to the drum-shaft 37. In this case the clutch-sections must be disengaged. When it is desired to lower the drill, it may be done by placing one foot upon the lever 46 to cause the frictional engagement of the brake-strap 44 with the brake-disk 43. It will descend with more or less speed, in proportion to the friction between said brake strap and disk.

When it is desired to use the machine for boring purposes, the auger is first placed in operative position with respect to the carrier 98, which, of course, travels vertically upon the guide-tracks 18, and it is lowered to the proper depth in the manner just described. The frame 59, with all of the parts connected thereto, is removed from position, and in place thereof a sweep or lever 109 is fitted into the socket 15 of the rotatable crown-plate 8. Said sweep or lever is then braced from lateral movement by means of the forwardly-converging brace-rods 110, which are connected at their opposite ends to the sweeps and to the ears 15<sup>a</sup> projecting from the crown-plate at opposite sides of the socket 15. (See dotted lines, Fig. 1.) The draft-animal is then attached to said sweep or lever and driven in a circuitous route, the derrick and the planet-gear 57 rotating upon and around the sun-gear, respectively, and thereby causing the auger to operate.

To keep the air at the bottom of the well fresh at all times, we preferably construct the auger with a hollow bore or channel through its entire length, and enlarge the bore or channel at its lower end to form the downwardly-disposed shoulder 107 to limit the upward movement of the clack-valve 108 pivoted to the lower end of the auger. As the auger is moved downwardly, air-pressure, together with the loose material, tends to hold said valve closed, and in order to convey fresh air to the bottom of the well the auger at intervals is raised some distance to permit the valve to open and fresh air to pass downwardly through the bore or channel of the auger, as will be readily understood.

Referring now to the modified form shown in Fig. 7, 103 designates a short vertical shaft which is journaled in a boxing 104, formed with or secured peripherally to the crown-plate 8. A planet-gear 105, mounted upon the lower end of said shaft, meshes with the sun-gear, which in this instance is not provided with the crown-teeth, and at its upper end with the bevel-gear 106, meshing with the bevel-gear 65 upon the shaft 62, which shaft 62 in this instance is journaled at the upper in-



stead of the lower side of the framework 59. In consequence of this we prefer to arrange the sand-pump at the outer side of the framework and the fly-wheel at the inner end.

5 This change of arrangement, however, does not change the effect in the least, and is not necessary to be illustrated.

Having thus described the invention, what we claim as new, and desire to secure by Letters Patent, is—

10 1. A well-drilling machine, comprising a stationary sun-gear, a rotatable derrick, a drum, a planet-gear rotating and revolving around the sun-gear and geared to the drum, 15 a walking-beam mounted upon the derrick, a rope suitably guided upon the derrick and walking-beam and attached at one end to the drum and at the other to a drill, a frame carried by the derrick, a shaft journaled therein and geared to the sun-gear, a wheel mounted loosely on said shaft and provided with 20 a dog and with a bumper-arm, an arm fixed upon said shaft, a sliding dog therein, a le-

ver engaging said dog, a fixed cam upon the framework arranged around said shaft, a second cam which lies in the path of said lever, 25 a bumper in the path of said bumper-arm, and a chain connecting the said wheel with the walking-beam, substantially as described.

2. In a well boring and drilling machine, 30 the combination of a stationary sun-gear, a crown-plate rotatably mounted upon the sun-gear and provided with forwardly-disposed hooks and lateral slots, and a derrick superposed relative to the crown-plate and provided with pendent stems 19 engaged by said 35 hooks, and rearwardly downwardly-curved arms 20 engaging said slots, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses. 40

WILLIAM M. SCHENCK.

JAMES F. HIELTON.

Witnesses:

M. PEARL LOWE,

G. Y. THORPE.