

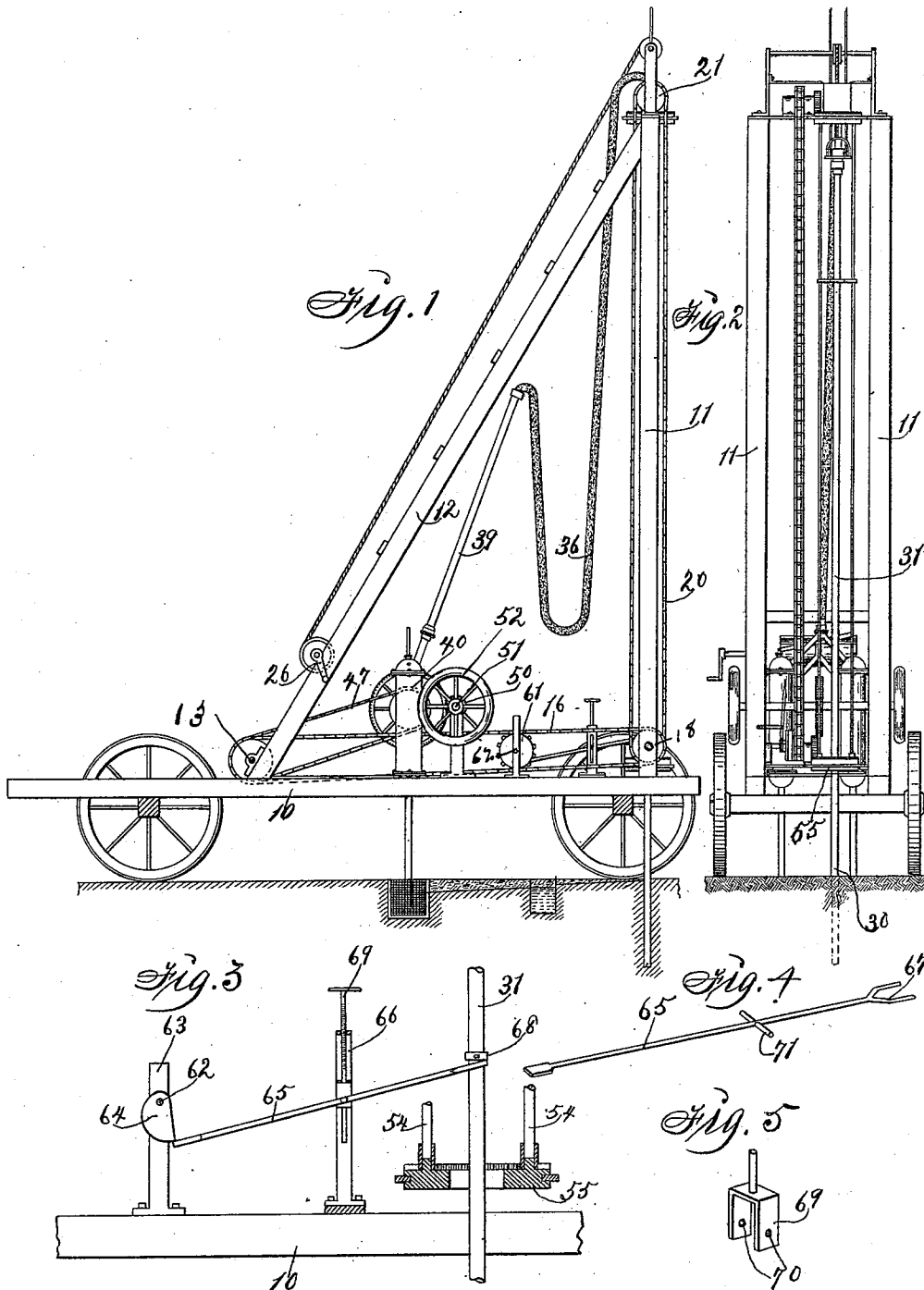
(No Model.)

3 Sheets—Sheet 1.

L. GIST.  
WELL BORING APPARATUS.

No. 530,989.

Patented Dec. 18, 1894.



Witnesses:  
W. J. Sankey.  
R. G. Orwig

Inventor: Lane Gist,  
By Thomas G. Orwig, Attorney.

(No Model.)

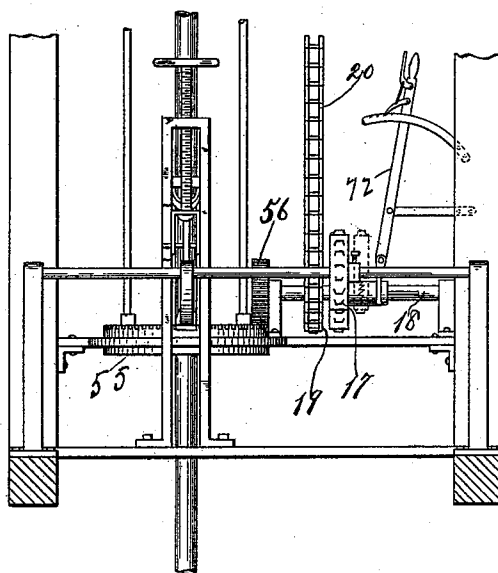
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L. GIST.  
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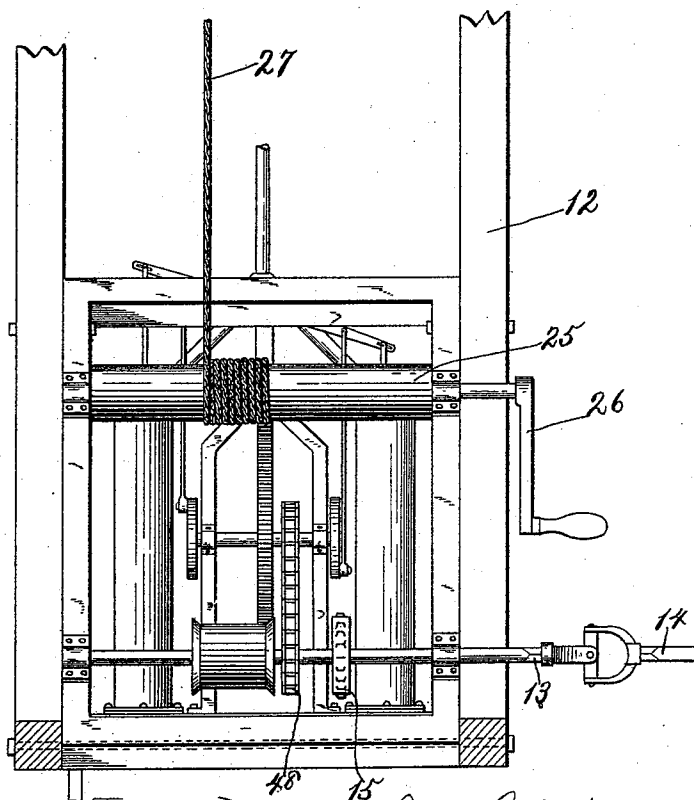
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*Fig. 6*



*Fig. 7*



Witnesses:  
W. J. Barker.  
R. H. Orwig.

Inventor: Lane Gist,  
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(No Model.)

3 Sheets—Sheet 3.

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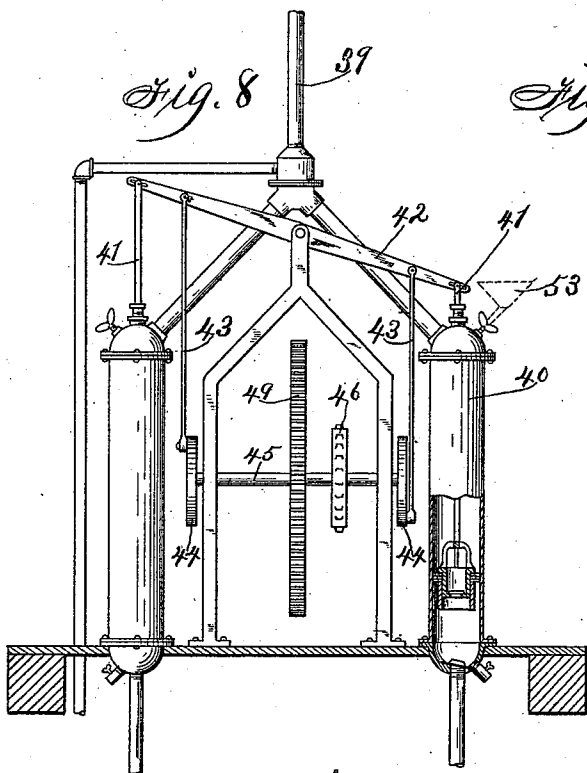


Fig. 10

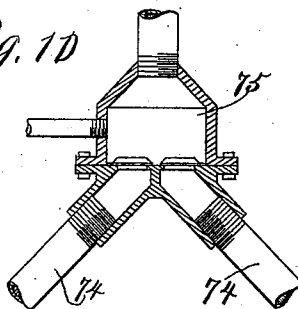


Fig. 11

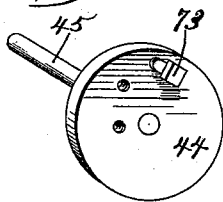


Fig. 12

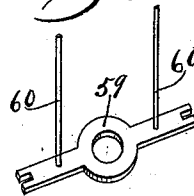


Fig. 13

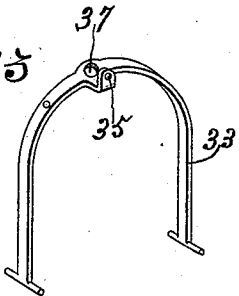
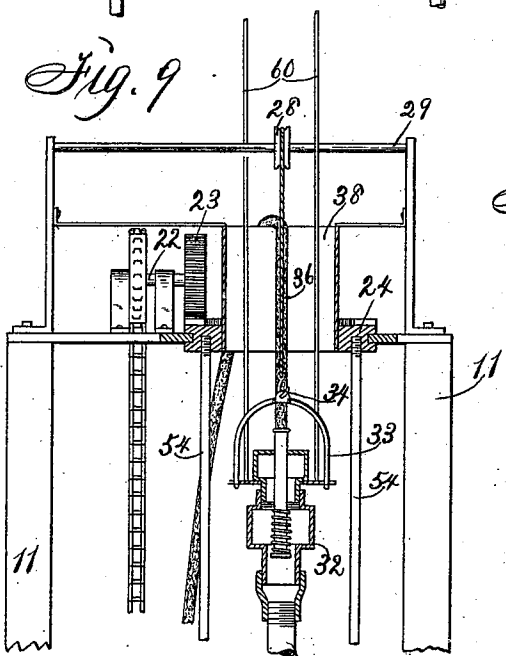
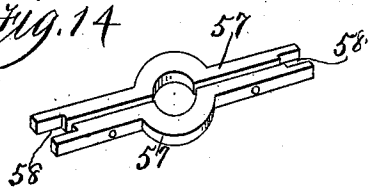


Fig. 14



Witnesses:  
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# UNITED STATES PATENT OFFICE.

LANE GIST, OF SCRANTON, ASSIGNOR OF ONE-HALF TO GEORGE L. BROWER,  
OF DES MOINES, IOWA.

## WELL-BORING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 530,989, dated December 18, 1894.

Application filed July 8, 1893. Renewed July 27, 1894. Serial No. 518,715. (No model.)

*To all whom it may concern:*

Be it known that I, LANE GIST, a citizen of the United States of America, and a resident of Scranton, in the county of Greene and State of Iowa, have invented a new and useful Well-Boring Apparatus, of which the following is a specification.

The object of my invention is to provide improved means and mechanism for boring wells and drilling through stone, and to this end my invention consists in the construction, arrangement and combination of parts, hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a side elevation of the complete machine. Fig. 2 is a front end elevation of the same. Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 are enlarged detail views of structural elements of the machine.

In the construction of the machine as shown, the numeral 10 designates a truck frame, and 11 a vertical frame mounted upon one end of the said truck frame and supported in a vertical position by means of the oblique ladder 12.

Mounted transversely in the lower end portion of the ladder 12 is a shaft 13, geared to the prime mover by means of the tumbling rod 14. Rigidly mounted upon the shaft 13 is a sprocket wheel 15, connected by means of a sprocket chain 16 with a sprocket wheel 17 rigidly mounted on the shaft 18, which latter is transversely mounted in the lower end portion of the frame 11. Rigidly mounted upon the shaft 18 adjacent to the sprocket wheel 17 is a sprocket wheel 19, connected by means of a sprocket chain 20 with a sprocket wheel 21, mounted upon a transverse shaft 22 in the upper portion of the frame 11. Rigidly mounted upon the shaft 22 is a spur wheel 23, meshing with a crown wheel 24, horizontally seated within the upper portion of the frame 11.

Transversely mounted in the lower portion of the ladder 12 is a windlass 25, provided with a winch, 26, and having secured to and wound upon its periphery the lower portion of a cable 27, the upper portion of which cable is run over a pulley 28, mounted upon a transverse shaft 29 at the upper end of the

frame 11, and extends downward from said pulley to a point of attachment with the drilling mechanism, hereinafter to be more particularly described.

The drill, designated as 30, is secured to the drill rod 31, and detachably secured to the upper end of said drill rod is a water tight swivel 32, having mounted upon its upper end a yoke 33, shown in detail in Fig. 13, to which yoke the cable 27 is secured by means of a hook 34, which is passed through the eye 35 in said yoke.

The drill rod 31 is tubular, and secured by one end to the upper portion of the swivel 32 is a water hose 36, which hose is passed through the aperture 37 in the yoke 33, and extends therefrom over the cross bar 38 in the upper portion of the frame 11 and downward therefrom as shown in Fig. 1, to a point of attachment with the delivery pipe 39 of the force pump 40.

The piston rods 41, of the pump 40, as shown in detail in Fig. 8, are driven by a rocking lever 42, operated by driving rods 43 driven by crank wheels 44 mounted upon the shaft 45, on which shaft is mounted a sprocket wheel 46 connected by means of a sprocket chain 47 with a sprocket wheel 48 on the shaft 13. Rigidly mounted upon the shaft 45 is a spur wheel 49 meshing with a pinion 50 on the shaft 51, on the outer end of which shaft are mounted balance wheels 52, 52. A funnel 53 is removably and replaceably secured upon the upper end portion of one of the pump cylinders, by means of which funnel water is introduced into said cylinder for the purpose of priming the same when necessary.

Rigidly secured to the lower side of the crown wheel 24 on opposite sides of the drill rod 31 are vertical rods 54, 54, which rods extend downward therefrom to points of rigid attachment to the upper surface of a crown wheel 55 rigidly located in the lower portion of the frame 11, which latter crown wheel is driven by means of a pinion 56 on the shaft 18.

A clamp, shown in detail in Fig. 14, is rigidly secured to the drill rod 31 and designated at 57, which clamp has slide bearings 58 formed in its outer ends, in which slide bearings engage the vertical rods 54, 54.

When the machine is used for boring pur-

poses the drill rod is rotated by means of the clamp 57, which clamp is rotated by the rods 54, 54, a longitudinal movement being imparted to the drill rod in a downward direction by reason of the screw of the angler, the said clamp 57 moving downward along the rods 54, 54. A plate 59 is mounted about the swivel 32 at a point above the swivel joint, to which plate the yoke 53 is secured, as are also rods 60, 60, which rods extend upward from said plate on opposite sides of the shaft 29 and bearing against the opposite sides of said shaft prevent a rotary movement of the upper portion of the swivel, thus obviating a tendency of the hose to become twisted.

It will be understood that the hose and pump are employed to convey water to and through the drill rod for the purpose of washing out the loosened earth from the excavation being made.

When it is desired to operate the machine as a drill the sprocket chain 16 is removed and another sprocket chain, not shown, is so placed as to connect the sprocket wheel 15 and the sprocket wheel 61 mounted on the shaft 62 in a support 63 on the truck frame 10. Mounted upon the shaft 62 adjacent to the sprocket wheel 61 is a cam 64, which cam in its rotary movement imparts an oscillating movement to the lever 65, as shown in detail in Figs. 3 and 4, which lever is fulcrumed on a support 66 on the truck frame 10 and is provided with bifurcated forward ends 67. The bifurcated forward ends 67 of the lever 65 inclose the drill rod 31 and impinge against the lower side of a collar 68, adjustably mounted upon said drill rod. An adjusting screw 69 is mounted in the support 66, whereby the altitude and position of the lever 65 are adjusted and fixed. It is evident that in the rotation of the cam 64 the rear end of the lever 65 will be depressed, thus elevating the forward end of said lever together with the drill rod, and upon the further rotation of the said cam the lever will be released from engagement therewith and the drill rod will fall by reason of its own gravity and forcibly drive the drill deeper into the earth. During the drilling operation should the drill advance faster than the water could remove the loosened earth the operator may by actuating the windlass 25 cease the advance of said drill pending the entire removal of the loosened earth which would otherwise pack about the drill rod and obstruct the operation of the same. The lower end portion of the adjusting screw 69 is shown in detail in Fig. 5, and is provided with bearings 70, into which the trunnions 71 on the lever 65 are rotatably se-

cured. Lever and clutch mechanism 72 is provided, by means of which the machine may be thrown in and out of gear at will.

By reference to Fig. 10 it will be observed that the wristpin 73 on the crank wheel 44 is removable and adjustable to regulate the stroke of the pump, the said wheel being provided with a plurality of differentially located perforations interiorly screw-threaded, into which the said wristpin is secured.

By reference to Fig. 10 it will be observed that the force pump at the convergence of the delivery pipes 74, 74, is provided with a valve chamber 75, in which are fitted valves and overflow pipes whereby the supply of water to the drill rod is automatically regulated.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent of the United States therefor, is—

1. In an apparatus for boring wells, the combination with a prime mover geared thereto of a vertical drill rod, a clamp mounted upon said drill rod, connecting rods vertically positioned on opposite sides of said drill rod, crown wheels fixed to the top and bottom ends of said connecting rods and connecting the same, and rotated mechanism acting upon said crown wheels, as set forth.

2. In an apparatus for boring wells, the combination of a drill rod, a clamp mounted upon said drill rod, crown wheels mounted at the top and bottom of the supporting frame in proximity to said drill rod, connecting rods between said crown wheels, which connecting rods engage said clamp, rotated mechanism driven by a prime mover to operate said crown wheels a hose swiveled to said drill rod, a pump connected to said hose and a clamp secured to the swivel whereby said hose is retained stationary, together with a rope and windlass for elevating said drill rod.

3. In an apparatus for boring wells, the combination with the drill rod and a hose swiveled thereto, of means for rotating said drill rod, comprising a clamp rigidly mounted upon said drill rod, vertical connecting rods, crown wheels secured to the top and bottom ends of said rods and rotated by a prime mover, and sliding bearings formed on said clamp and engaging said connecting rods.

In testimony whereof I have hereunto set my name, this 13th day of August, 1892, in the presence of two witnesses.

LANE GIST.

In presence of—  
JAMES BURKE,  
JAMES TRACY.