

CLEOPHAS BARNARD. Rock Drill.

No. 119,215.

Patented Sep. 26, 1871.

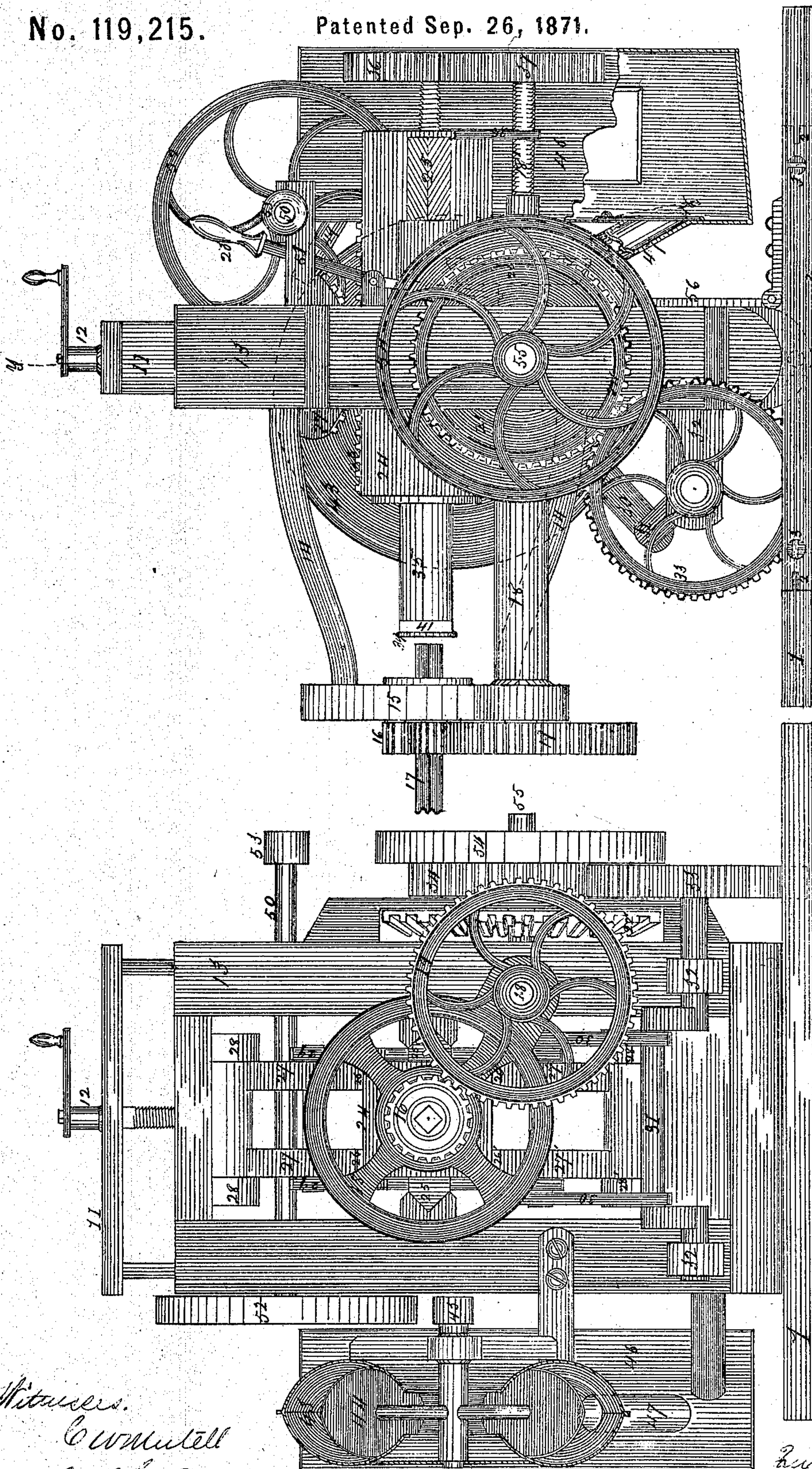


Fig. 2.

Fig. 1.

Witnesses.  
 C. W. Nuttall  
 Geo. H. Blake.

Cleophas Barnard  
 By S. Sanders, Attor.

Inventor.



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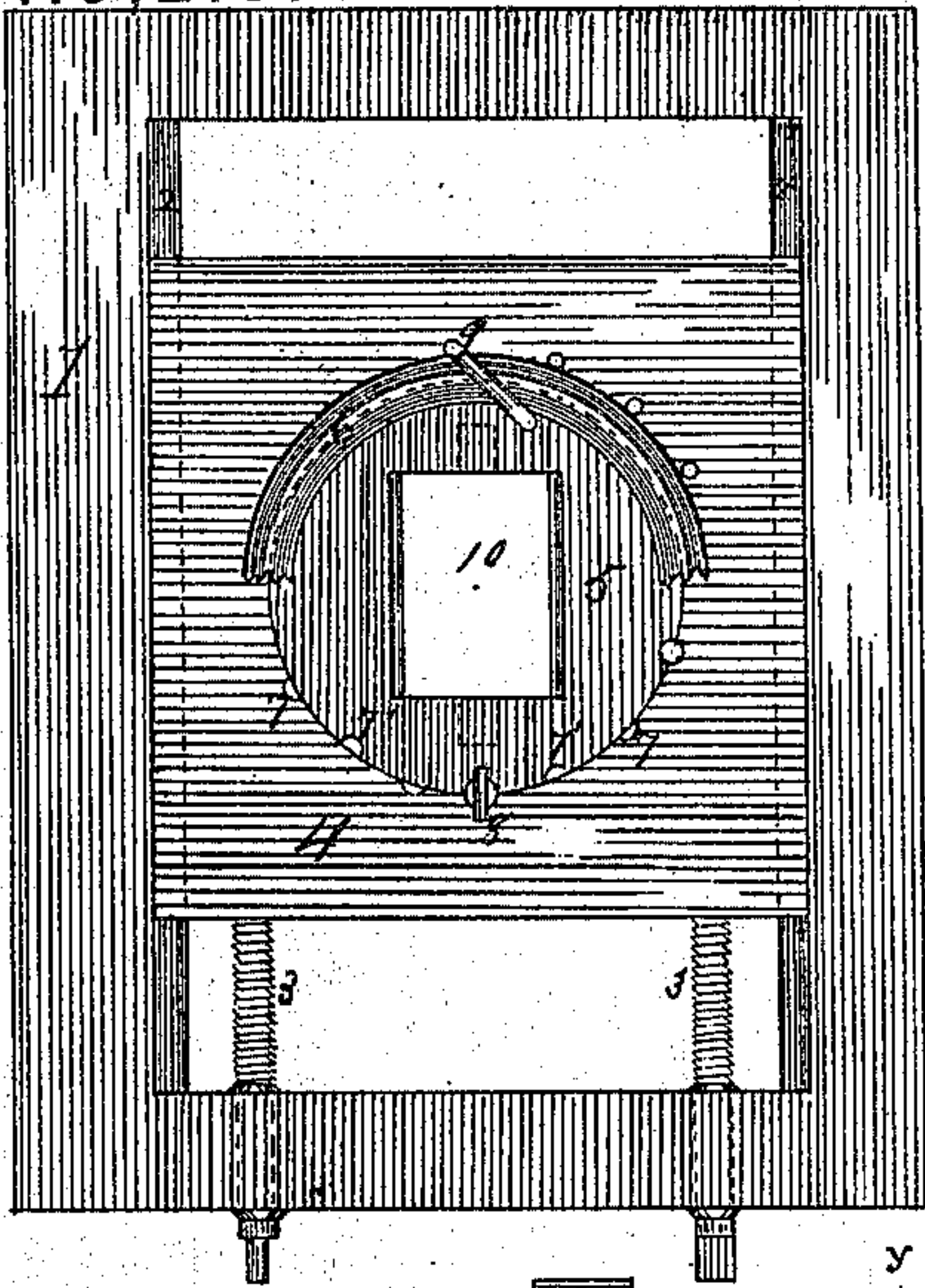


Fig. 3.

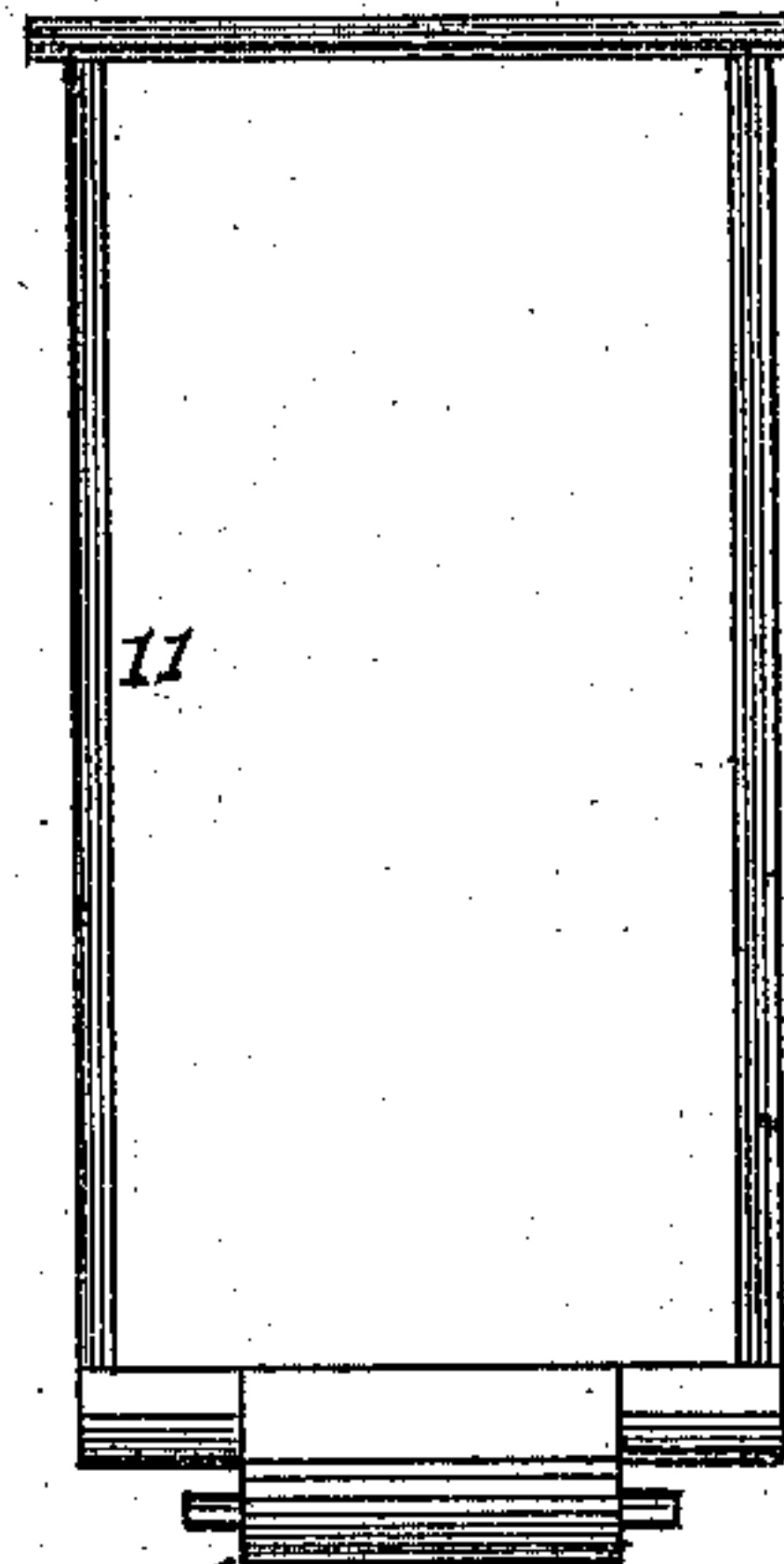


Fig. 4.

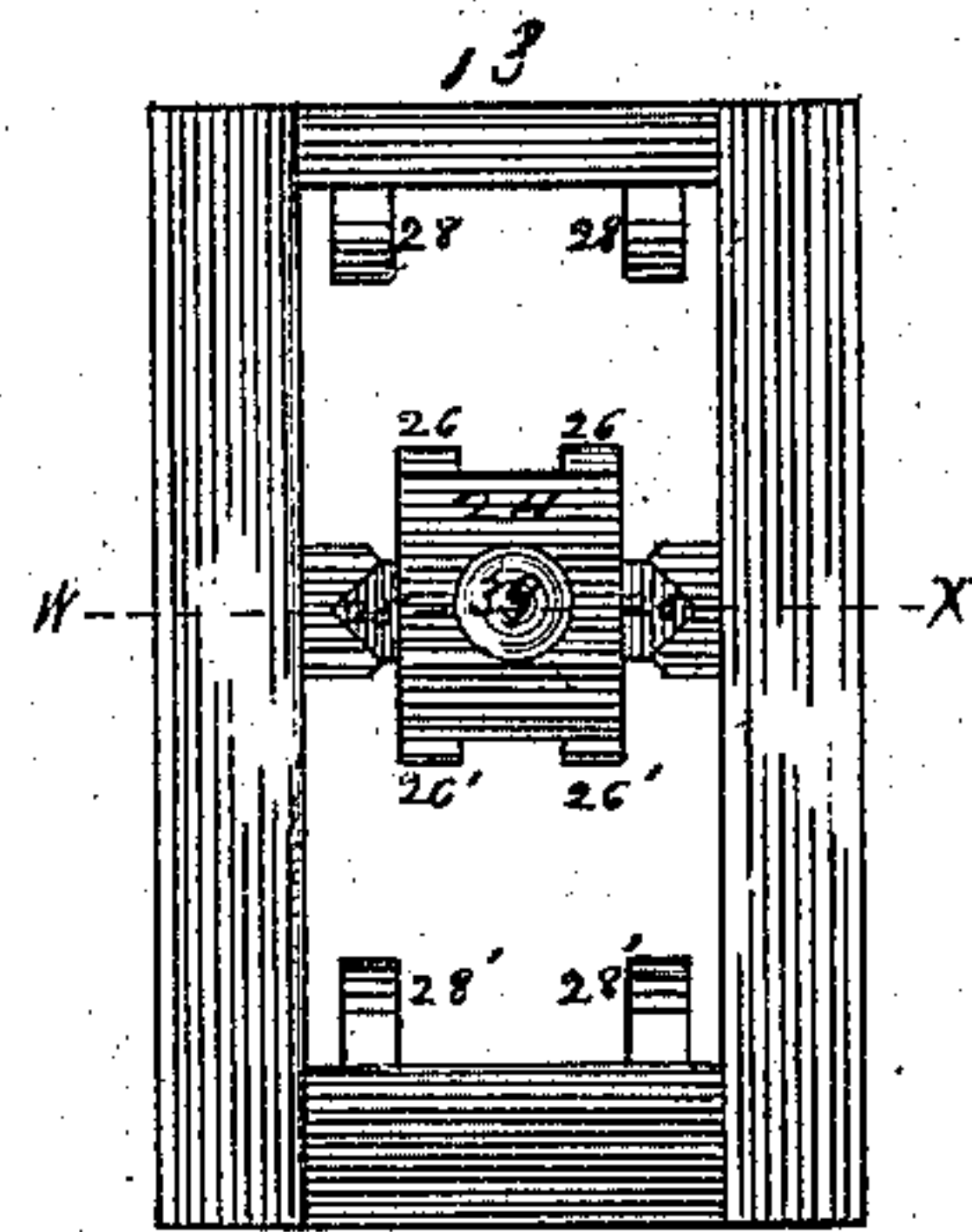


Fig. 5.

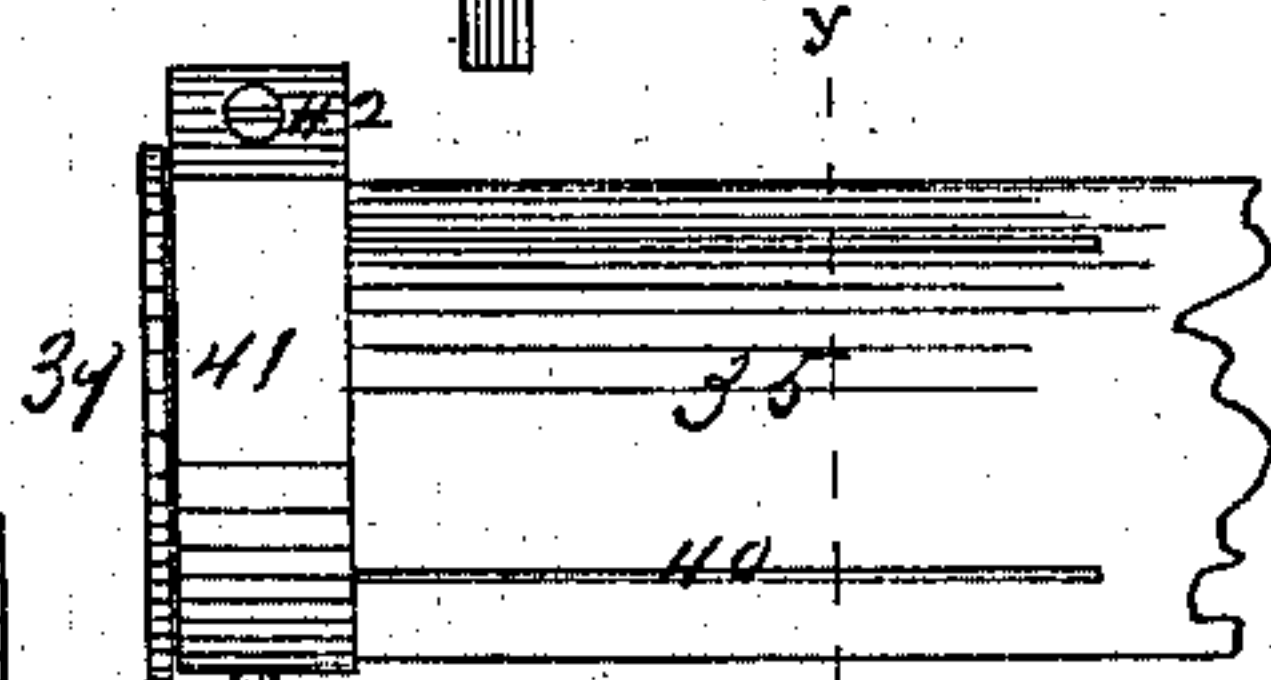


Fig. 9.

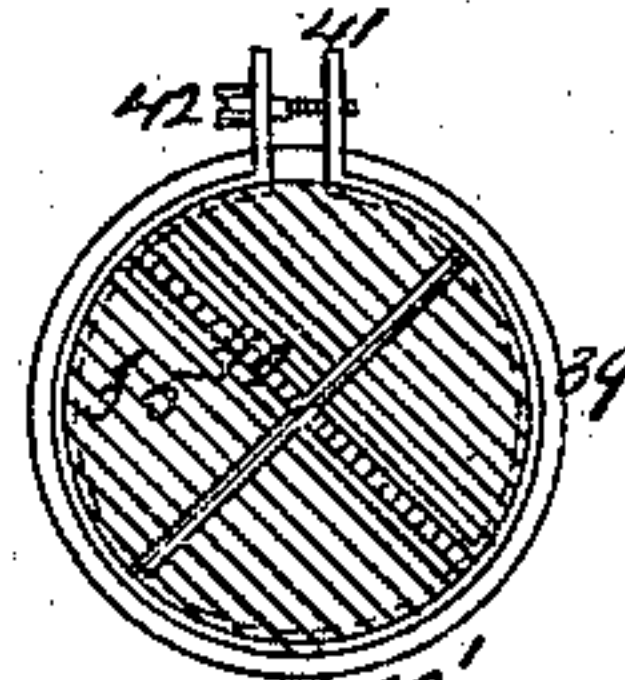


Fig. 10.

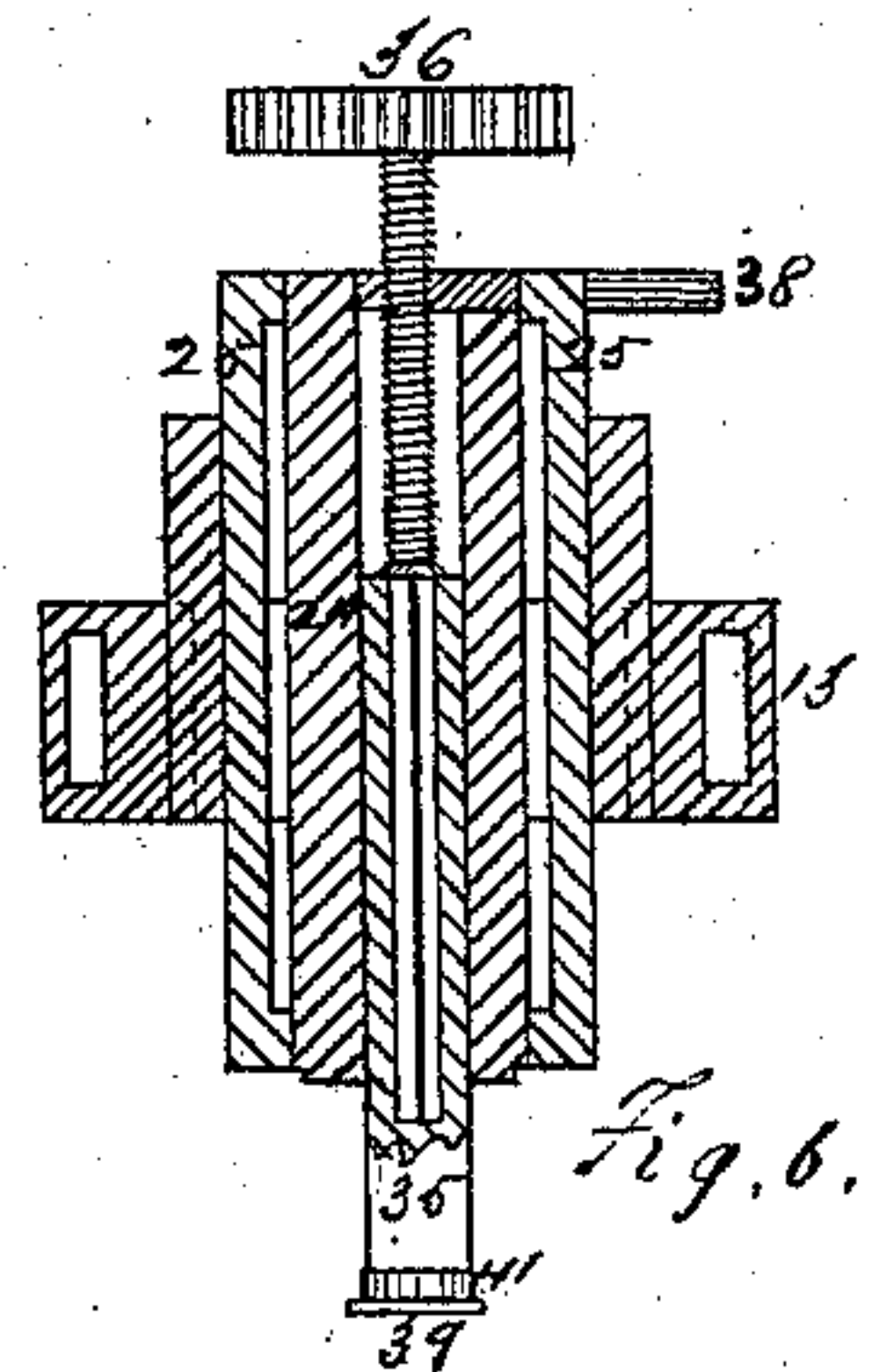


Fig. 6.

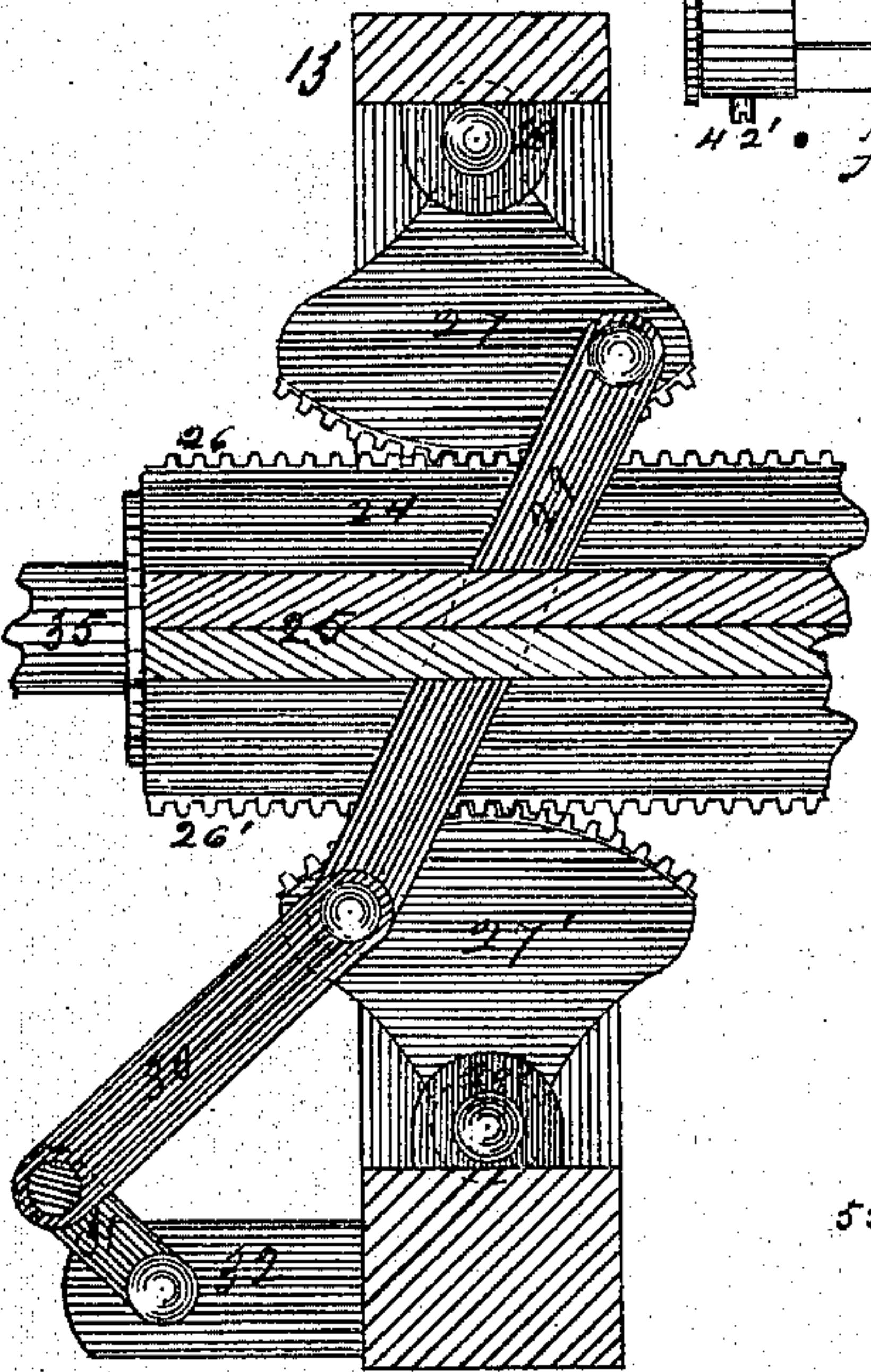


Fig. 7.

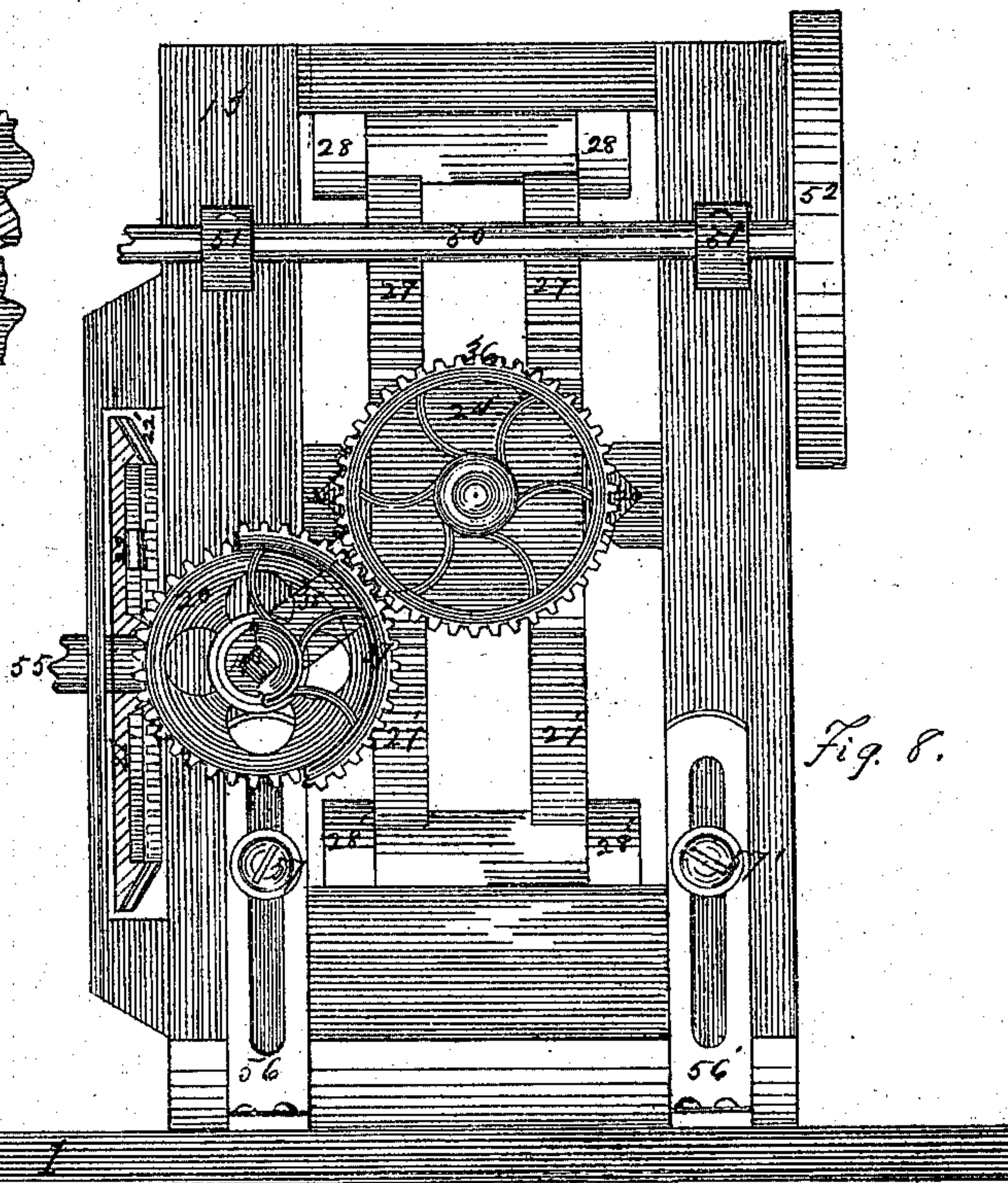


Fig. 8.

Witness.

George H. Blake.

Inventor. Cleophas Barnard  
By S. Sanders, atty.



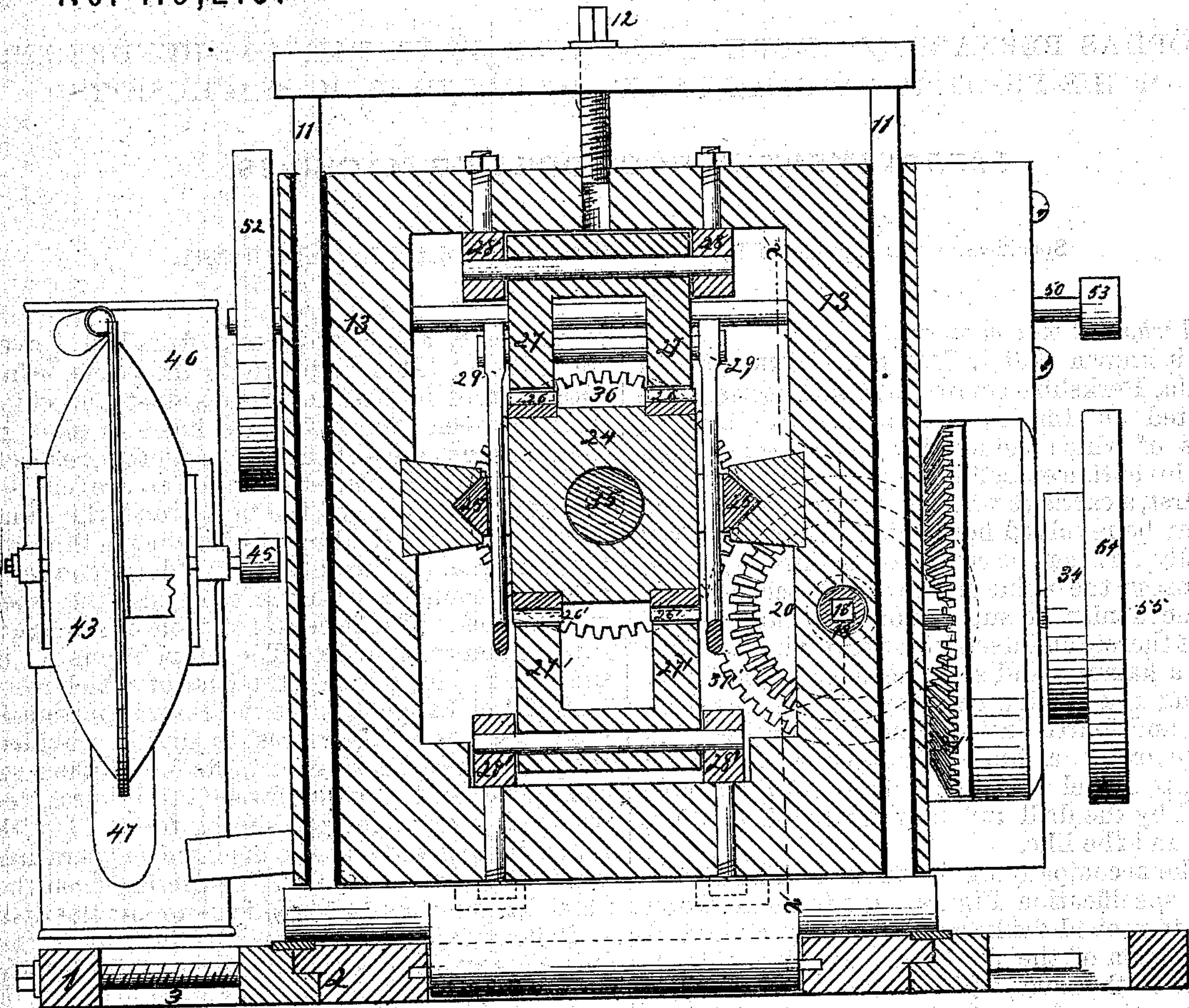
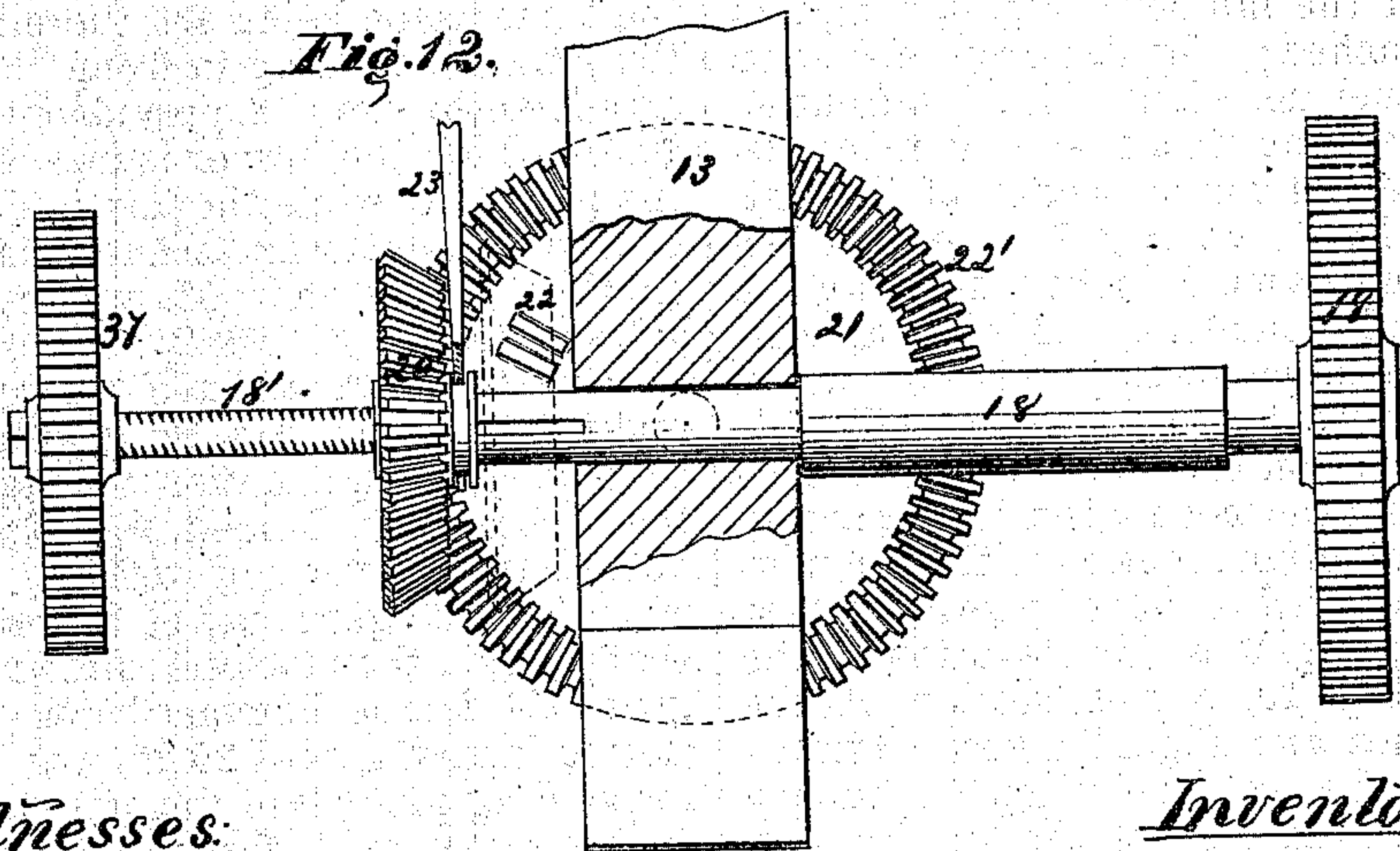
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Rock Drill.

No. 119,215.

*Fig. 11.*

Patented Sep. 26, 1871.

*Fig. 12.*Witnesses:

Geo. R. Wright Jr.

Inventor

Cleophas Barnard  
By S. Sanders, atty.



# UNITED STATES PATENT OFFICE.

CLEOPHAS BERNARD, OF FLORIDA, ASSIGNOR OF FIFTEEN ONE-HUNDREDTHS OF HIS RIGHT TO TIMOTHY LAGUE, OF HOLYOKE, MASSACHUSETTS.

## IMPROVEMENT IN ROCK-DRILLING MACHINES.

Specification forming part of Letters Patent No. 119,215, dated September 26, 1871.

*To all whom it may concern:*

Be it known that I, CLEOPHAS BERNARD, of Florida, Berkshire county, Massachusetts, have invented an Improved Machine for Drilling Rocks, of which the following is a specification:

My invention embodies four principal features, viz., first, a carriage whereon the drilling apparatus may be revolved horizontally, may be moved laterally, and may be canted or inclined to elevate or depress the point of the drill; second, suitable mechanism to support or carry the drill and impart thereto an intermittent revolving motion; third, a hammer and suitable mechanism for oscillating and feeding the same against the drill-head; and fourth, in combination with the drilling apparatus, a fan, constructed as described below, to impel a current of air into the hole formed by the drill and blow away all the dust, chips, and the like.

In the accompanying drawing, making a part of this specification, Figure 1 is a front elevation of my improved drilling-machine and a vertical cross-section of the fan-drum; Fig. 2, a side elevation of the same, and a vertical section of the lower portion of the fan-box; Fig. 3, a plan of the carriage detached; Fig. 4, a front elevation of the main frame detached; Fig. 5, a front elevation of the sliding frame and hammer detached; Fig. 6, a horizontal section of the last-named through line *w x*; Fig. 7, a vertical section of the sliding frame detached, showing the arrangement and connection of the hammer-beam, racks, pinion, connecting-rods, crank, and crank-shaft, whereby the hammer is oscillated; Fig. 8, a rear elevation of the carriage and sliding frame, showing the mechanism for imparting an intermittent revolving motion to the hammer-shaft, whereby it is fed or moved forward as fast as the drill cuts; Fig. 9, a side elevation of the hammer-head; Fig. 10, a cross-section of the same through lines *x y*; Fig. 11, a vertical transverse section of the machine taken on line *y y* of Fig. 2, with a front view of the fan-drum attached; and Fig. 12, a sectional view on the line *x x* of Fig. 11, showing the mechanism for revolving the drill intermittently.

The carriage is made up of an oblong frame, 1, provided with tongues or grooves 2 2, whereon, by means of screws 3 3, is moved laterally the bed 4. Within such bed, and forming the central part thereof, is the turn-table 5. A rim

or flange, 6, Fig. 3, projecting from bed 4 over the edge of table 5, prevents the table being lifted out of its bed and keeps dust and chips from between them. 7 7' are holes or slots in the adjacent edges of the bed and table, respectively, wherein is placed the pin 8 to prevent accidental revolution of the table; and the same may be accomplished by passing the pin through the flange and table only, or by a dog, 9, one end of which connects with the table and the other with the bed. In the center of table 5 is an aperture or depression, 10. The main frame 11 is simply an oblong frame, the base of which rests on bed 4 or flange 6, while the central portion of such base lies in apertures 10, and is provided with trunnions bearing in table 5. Moving up and down on the main frame 11, by means of screw 12, is arranged the sliding frame 13, with which is connected all the mechanism operating the drill-hammer and fan. Projecting from the frame 13 are arms 14 14, which support the disk or drill-carriage 15. Having its bearing in the disk 15 is arranged a pinion, 16, pierced centrally by an aperture of such shape that a drill, 17, of the same shape being set therein revolves with the pinion. Bearing in frame 13 and disk 15 is arranged the shaft 18, provided with gears 19 and 20, of which the former is fast and meshes into the pinion 16, while the latter, a bevel-gear, may be moved lengthwise on such shaft. 21 is a disk or wheel on the shaft 18, and, revolving in the sides of frame 13, disk 21, is provided with one or more teeth, 22, which mesh into bevel-gear 20 and impart, when disk 21 is revolved, an intermittent revolving motion to the drill 17. 23 is the brake-lever, hinged to frame 13, and connected at its lower end with the hub of gear 20, whereby such gear may be moved lengthwise on shaft 18 and the machine thrown out of or into gear. 24 is the hammer-beam, provided with slotted lateral guides 25 25, which move in corresponding grooves in the sides of frame 13. 26 26' are racks, made fast to the upper and lower sides of beam 24. 27 27' are segmental pinions bearing at 28 28', and meshing into such racks. 29 29 are rods connecting the segmental pinions 27 27', and 30 30 are other rods connecting the segmental pinions 27' with the crank-shaft 31. Shaft 31 has bearings 32 32 projecting from the frame 13, and is provided with a gear, 33, which meshes into another gear, 34, of equal size, and



made fast on the same shaft with disk 21, and by this arrangement the hammer is oscillated against the drill-head whenever motion is imparted to disk 21 and the machine is in gear. 35 is the hammer-shaft, in the nature of a male screw, and extending lengthwise through beam 24, which latter is in the nature of a female screw. On the rear of shaft 35 is made fast a gear, 36, which meshes into another gear, 37; gear 37 is made fast on the rear of shaft 18'; shaft 18' forms a male screw and passes through a projection, 38, of beam 24, in which projection is a corresponding female screw. The threads on shafts 18' and 35 are the same in number per inch. Shaft 18' is square or angular and enters a similarly-shaped hole in the rear end of shaft 18, thus forming a telescopic shaft of which both parts revolve simultaneously, and one part, 18', oscillates simultaneously with beam 24, and by this device an intermittent revolving motion is communicated to the hammer-shaft 35, which is accordingly fed forward as the drill cuts into the rock. The disk 21, exterior to teeth 22, is provided with a bevel-gear, 22', so cut away at one side that gear 20, sliding back on shaft 18, may be made to mesh therein, and the hammer-shaft thus fed rapidly backward or forward through beam 24. The hammer-shaft 35 is provided with a detachable head, 39, which, if broken, may be replaced without the expense of an entire new shaft. Head 39 is provided with a radial shank, 40, extending into shaft 35, where it is secured by the band 41 and its binding and set-screws 42 42'. 43 is an ordinary fan-drum; 44 the fan proper, revolving therein, and having its shaft provided with a belt-pulley, 45. 46 is the fan-box or air-chamber. 47 is a pipe or duct connecting such box and drum, and 48 the valve or clapper to such pipe. 49 is the nozzle or outlet of air-box 46. To nozzle 49 may be attached a flexible tube and the unattached end brought to bear on the hole formed by the drill when in operation. 50 is a shaft, bearing at 51 51, and provided with large and small pulleys 52 and 53. A belt connects pulleys 52 and 45, and another belt connects pulleys 53 and 54, which latter is fast on the same shaft 55 with disk 21 and gear 34, and it is to shaft 55 that power is applied by gear, pulley, or otherwise, and motion communicated thence, as above described, to the mechanism operating the drill-hammer and fan. 56 56' are slot-

ted stays hinged to table 5. Through the slots in such stays pass set-screws 57 57' into frame 13, whereby such frame, with the mechanism attached, is, within certain limits, held at any desired angle of elevation.

It is obvious that in a machine so complicated as that above described many changes may be made in its mechanical structure without impairing or essentially changing its principle or mode of operation. The fan, for instance, may be entirely dispensed with, and no change whatever made in the mode of operating the drill; but, without attempting to point out all the possible changes, I would say that I do not confine myself to the exact form and arrangement of parts above specified, but intend to cover all such forms and changes of structure as are substantially the same in operation and mechanical effect; and

What I claim as my invention is—

1. The carriage, composed of frame 1, bed 4, and table 5, arranged and combined substantially as specified.

2. The sliding frame 13, provided with arms 14 and disk 15, substantially as specified.

3. The mechanism for revolving the drill intermittently, consisting of pinion 16, shaft 18, gears 19 and 20, and toothed disk 21, arranged and combined substantially as specified.

4. The detachable head 39, provided with radial shank 40, as specified.

5. The mechanism for oscillating the hammer, consisting of racks 26 26', pinions 27 27', connecting-rods 29 and 30, and crank-shaft 31, arranged and combined substantially as specified.

6. The mechanism for revolving or feeding the hammer against the drill, consisting of shaft 35, gears 36 and 37, and shaft 18', in combination with beam 24 and shaft 18, substantially as specified.

7. The fan, consisting of drum 43, fan proper 44, air-chamber 46, pipe 47, valve 48, and nozzle 49, in combination with drill 17, hammer-shaft 35, and mechanism for carrying and revolving the drill and for feeding and oscillating the hammer, all arranged, combined, and operating substantially as above specified.

CLEOPHAS BERNARD.

Witnesses:

C. W. MUTELL,  
SIDNEY SANDERS.