(No Model.)

W. F. BARNES.

DRILLING MACHINE.

No. 549,559. Patented Nov. 12, 1895.

Fig. 1.

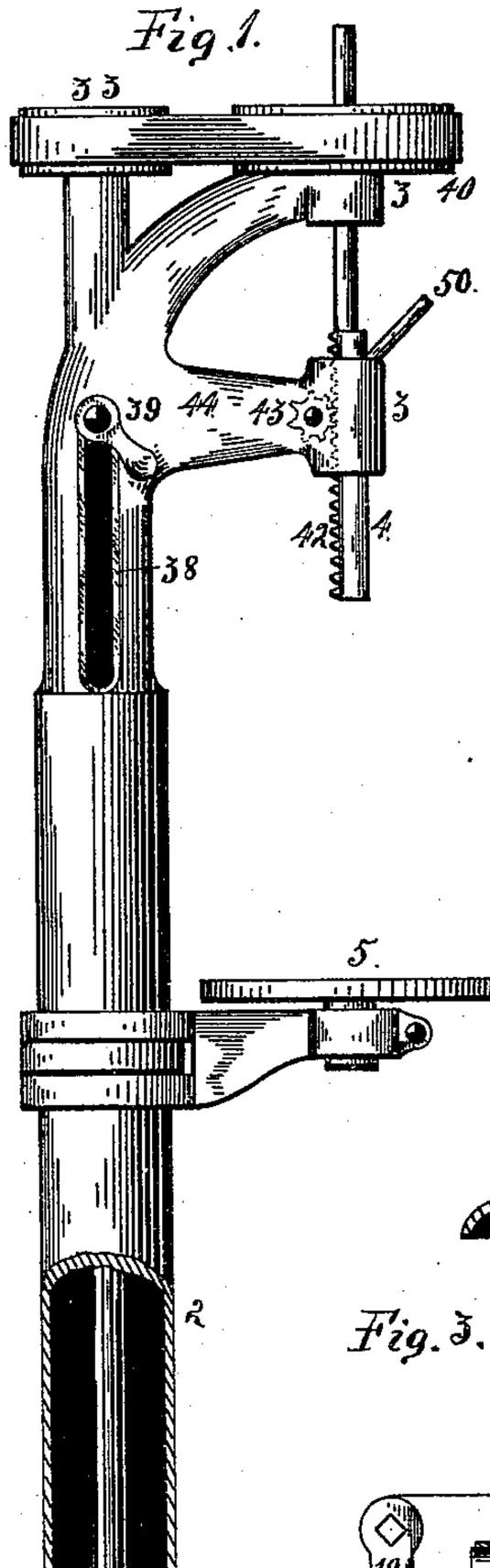


Fig. 2.

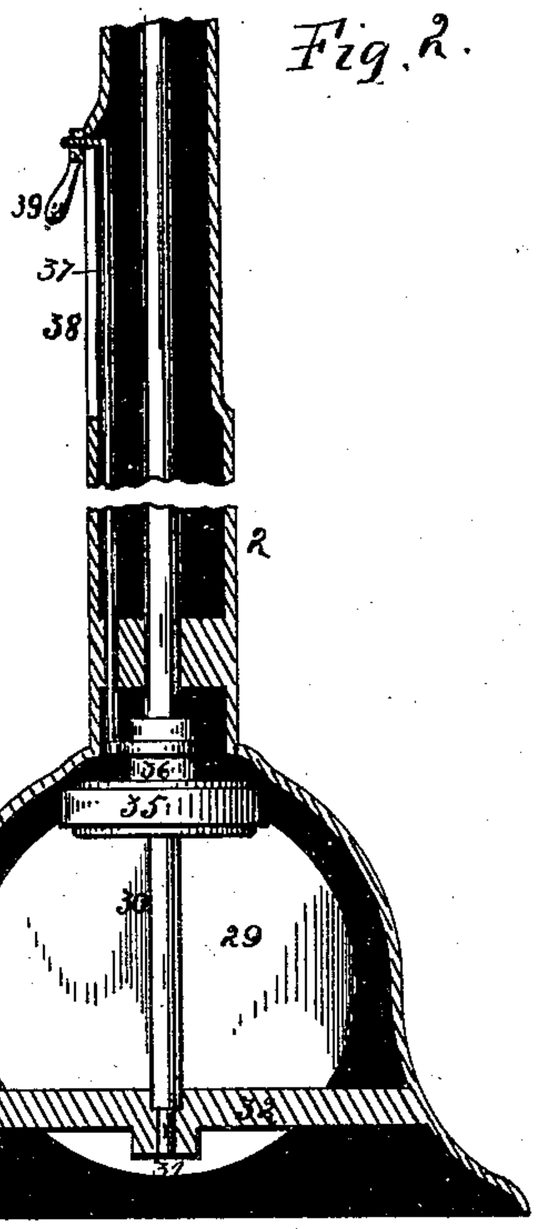


Fig. 4.

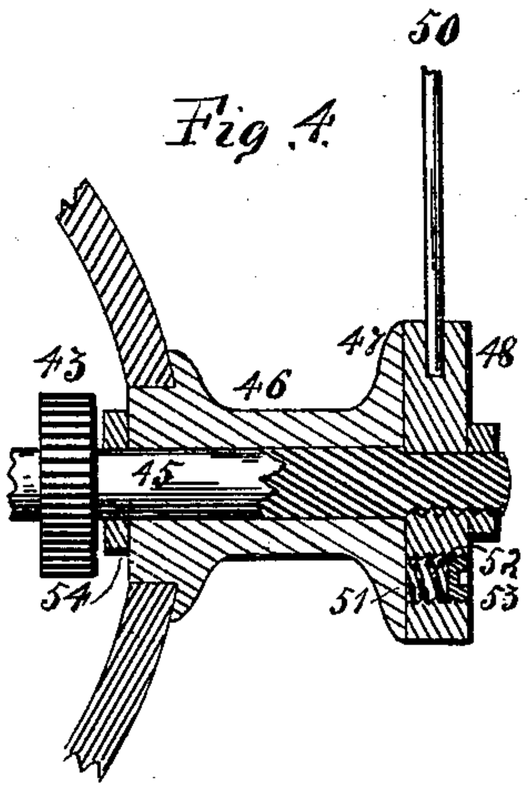


Fig. 5.

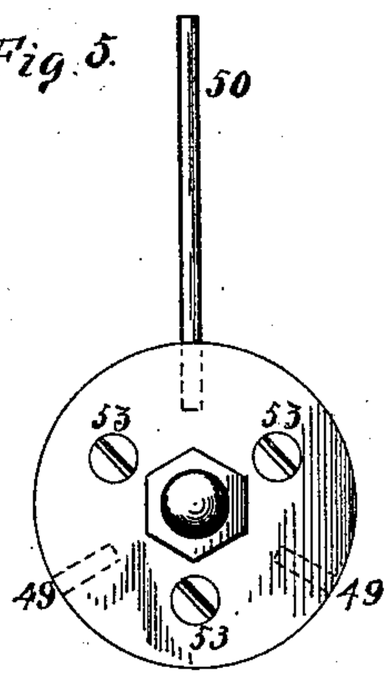
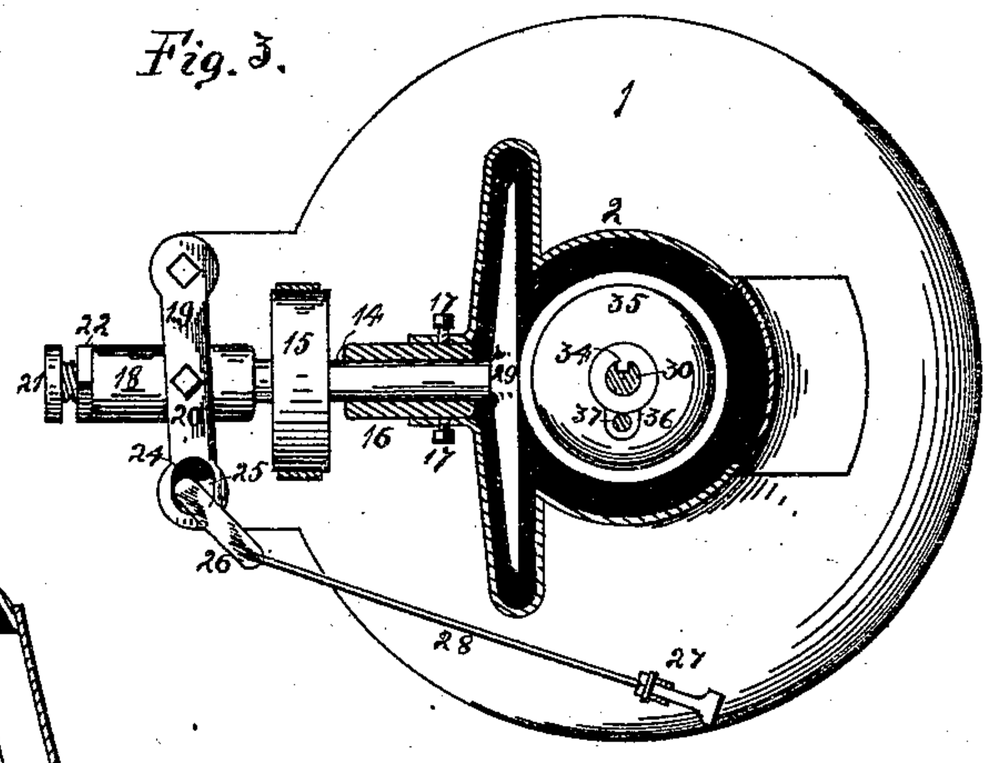
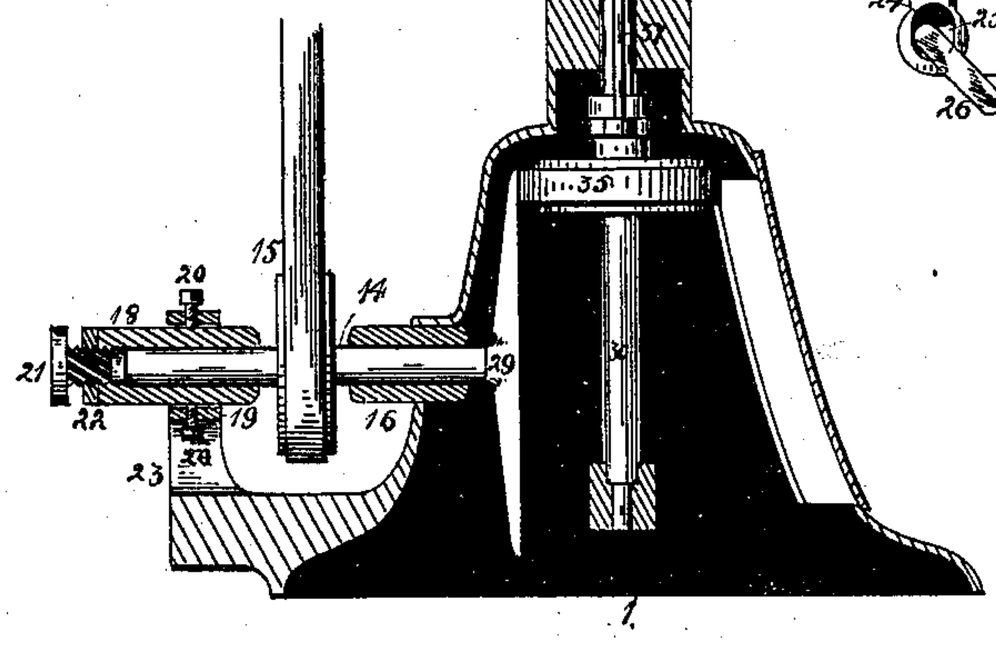


Fig. 3.





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UNITED STATES PATENT OFFICE.

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DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,559, dated November 12, 1895.

Application filed March 17, 1891. Serial No. 386,883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. BARNES, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Drilling-Machines, of which the following is a specification.

The object of this invention is to furnish means for counterbalancing the weight of the drill-spindle, which consists of a friction-contact between the main supporting-frame and drill-spindle.

In the accompanying drawings, Figure 1 is a side elevation, with the lower portion in section, of a drilling-machine embodying my invention. Fig. 2 is a sectional view showing a face view of the friction-disk and the means employed for moving the friction-wheel across the face. Fig. 3 is a partial plan and transverse section showing the upper face of the friction-wheel. Fig. 4 is a vertical section of the friction device for counterbalancing the weight of the drill-spindle. Fig. 5 is a face view of the outer disk of the drill-spindle friction device.

The drill represented in the drawings consists of a hollow base 1, composing a hollow column 2, provided with drill-spindle guides 3, in which moves a drill-spindle 4 of the usual construction.

The platen 5 herein represented may be of any of the known constructions capable of a vertical sliding engagement with the column.

A horizontal shaft 14 has a pulley 15 keyed or set-screwed thereto and revolves in bearings supported by the base of the drill. This pulley has a belt connection with the line-shafting. The bearing 16 is held by set-screws 17, passing through the frame in such a manner as to permit a slight vertical oscillation. The bearing 18 is held centrally within a pivoted arm 19, having a central depending socket, through which the bearing passes and in which it is held by set-screw 20, which permits a slight horizontal oscillation. One end of this bearing is open, while its other end is screw-threaded, and into which is turned a thumb-screw 21. A jam-nut 22 serves to hold the screw when adjusted. This arm 19 has a pivotal connection with an arm 23, rising from the base portion of the drill. The other end has an elongated slot 24, in which is placed an eccentric 25, having an arm 26 projecting horizontally from its upper face. The free end of this arm 26 is connected by a rod 28 to a kick-lever 27, pivoted to the base of the drill, as shown at Fig. 3. Upon the inner end of the shaft 14 is secured a friction-disk 29, which is located within the hollow base of the drill.

A vertical shaft 30 has its lower end resting in a socket 31, held in place by a cross-arm 32, cast integral with the base portion of the drill. This shaft extends vertically through the central opening of the drill-column and projects sufficiently from the top to receive a pulley 33. The lower portion of this shaft is grooved and receives a feather 34, which connects the friction-wheel 35 with the shaft. The friction-wheel has its face of elastic material and revolves in contact with the face of the friction-disk 29. The hub portion of the wheel has a central collar 36, so fitted that the wheel can revolve independent of the collar. A vertical rod 37 has its lower end connected with this collar and extends upward within the column of the drill. Its upper end is bent and extends laterally through an elongated opening 38 in the side of the upper portion of the drill, and a clamping-lever 39 has a screw-threaded connection therewith. By means of this lever the friction-wheel can be raised or lowered, and the rapidity of its revolutions will depend upon how far it is from the center of the friction-disk. When the wheel is in contact with the disk on its upper half, the wheel will be revolved, and when below the center will revolve in the opposite direction, and by means of this lever 39 the wheel can be held in any adjustment within the length of the slot 38 by turning it up until the friction is sufficient to hold it.

The pulley 33 on the upper end of the shaft 30 has a belt connection with a pulley 40, which has a feather connection with the drill-spindle 4, thereby permitting the raising and lowering of the spindle. This spindle is of the usual form, and has a rack 42, which is raised and lowered by a toothed wheel 43 within the hollow overhanging arms 44 of the upper portion of the drill.

I have devised a friction device for holding the drill-spindle at any desired elevation within its range, and which consists of a shaft 45, connected with the toothed wheel 43 to revolve therewith. This shaft extends through an arm 46 on the side of the overhanging arm and has its projecting end screw-threaded. This arm has its outer end 47 in disk form. A disk 48 has a feather connection with the shaft 45. This disk in this instance has three radial holes 49 in its periphery, and into which a hand-lever 50 may be inserted for the purpose of turning it. At suitable intervals transverse openings 51 are formed through the disk 48, a spring 52 is inserted therein, and an adjusting-screw 53 is screw-threaded therein. These springs press against the face of the arm 46, and by means of the screws 53 their tension may be varied to press with more or less force. A collar 54 on the shaft 45 holds the shaft from moving endwise and keeps the toothed wheel 43 in place with respect to the toothed rack. By means of this friction connection I am able to do away with all counterbalancing-weights heretofore employed, and as the spindle is taised or lowered it will stand in any posirion, and by the adjustable springs it can be made to move with more or less force, as required.

By means of the kick-lever and its connection with the eccentric the operator can move the eccentric so as to move the bearing 18 rearward, thereby allowing the shaft with the friction-disk attached to also move rearward, which movement will disengage the disk from its contact with the friction-wheel, thereby stopping the rotation of the wheel, and consequently the rotation of the drill-spindle, and when it is desired to start the spindle the operator can move the disk until it is in frictional contact with the wheel. By means of the adjusting-screw 21 the friction between the disk and wheel may be regulated. By locating the frictional driving mechanism in the hollow base portion of the drill-frame it is protected from all outside influences, but can be got at when required through an opening which is closed by a door.

It is evident that the shaft 30 may extend exterior of the column, and instead of its belt connection with the drill-spindle other means may be employed without departing from the gist of my invention.

I claim as my invention—

1. In a drilling machine, the combination of a drill spindle, and friction mechanism for counterbalancing the weight of the spindle, consisting of a stationary disk, a disk connected to the operating shaft of the spindle, and a spring or other yielding material having a connection with one of said disks and exerting its influence upon the other disk.

2. In a drilling machine, the combination of a drill spindle provided with a toothed rack, a toothed pinion engaging the teeth of the rack, an operating handle for the pinion and friction mechanism between the handle and pinion for counterbalancing the weight of the spindle.

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