No. 801,128. PATENTED OCT. 3, 1905.

A. T. ANDERSON.

DRILLING MACHINE.

APPLICATION FILED JUNE 23, 1904.

4 SHEETS—SHEET 1.

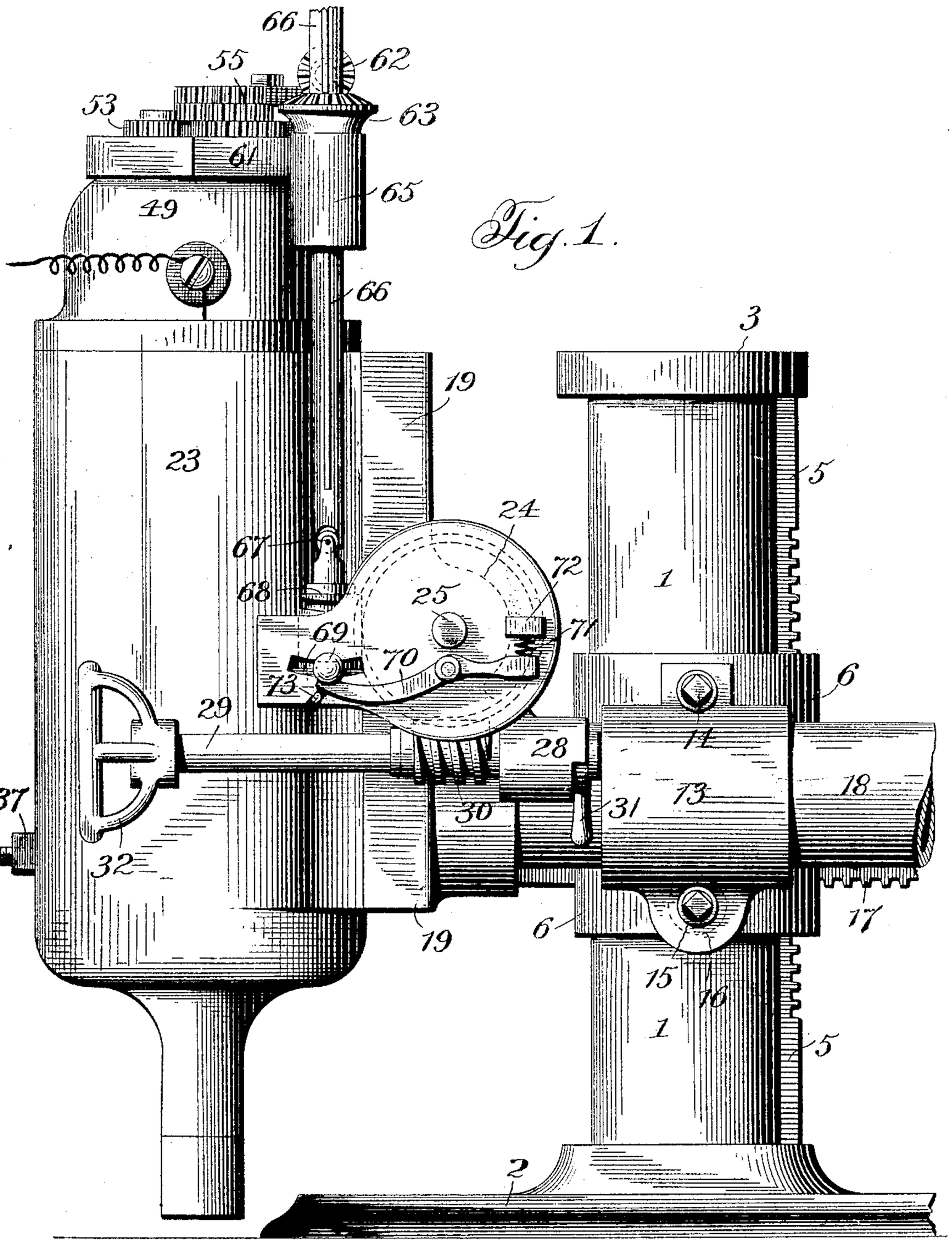

Fig. 1.

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4 SHEETS—SHEET 2.

Fig. 2.

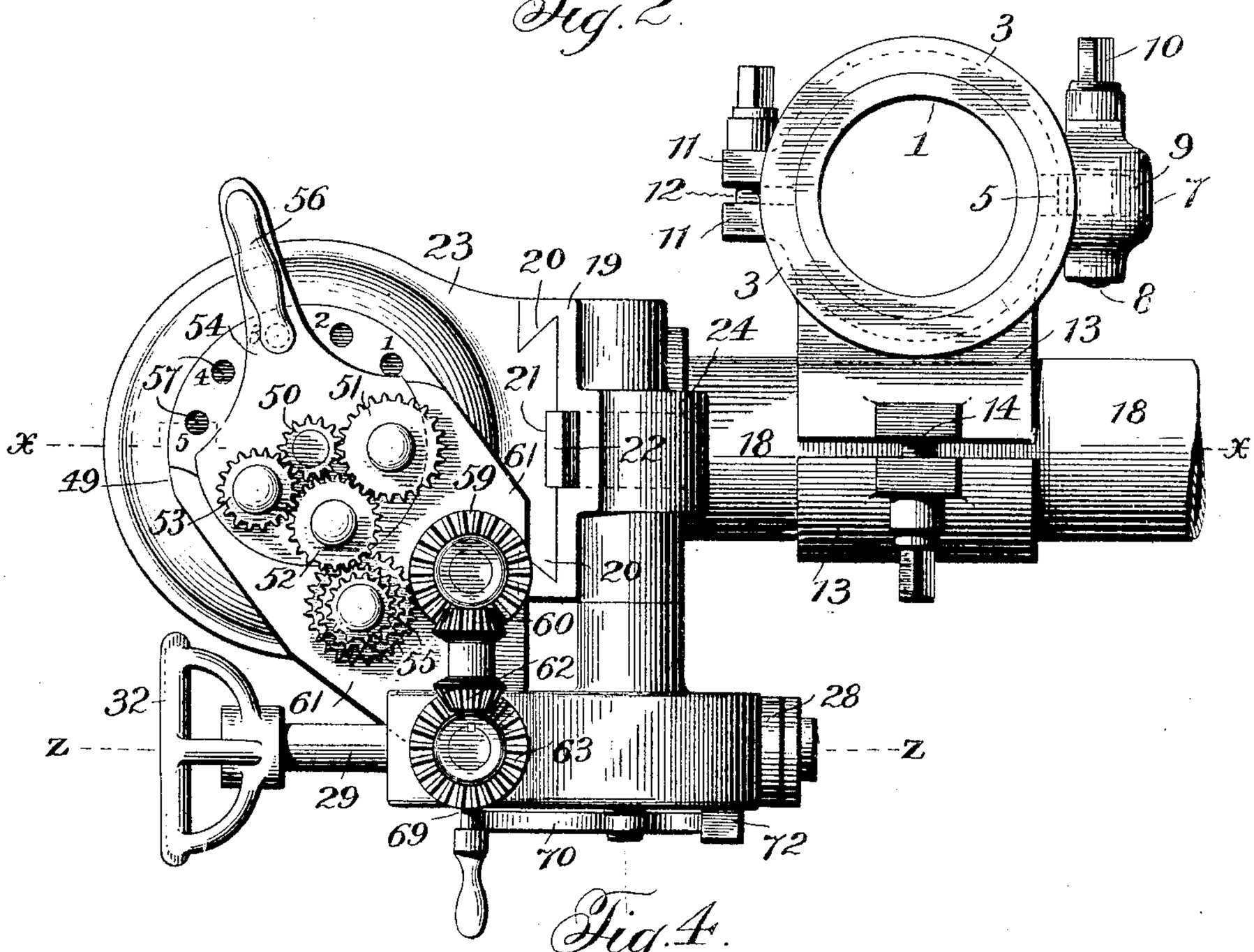
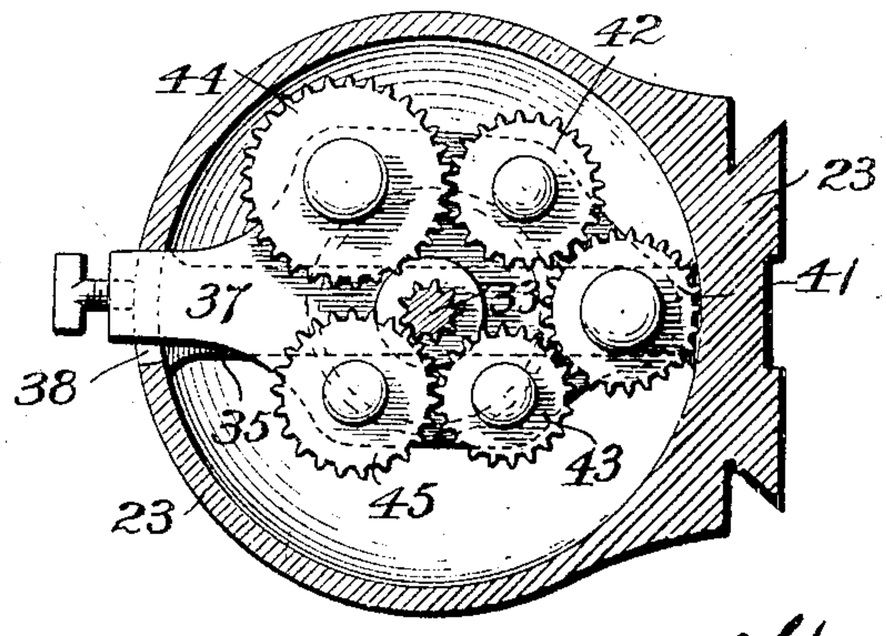


Fig. 4.



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4 SHEETS—SHEET 3.

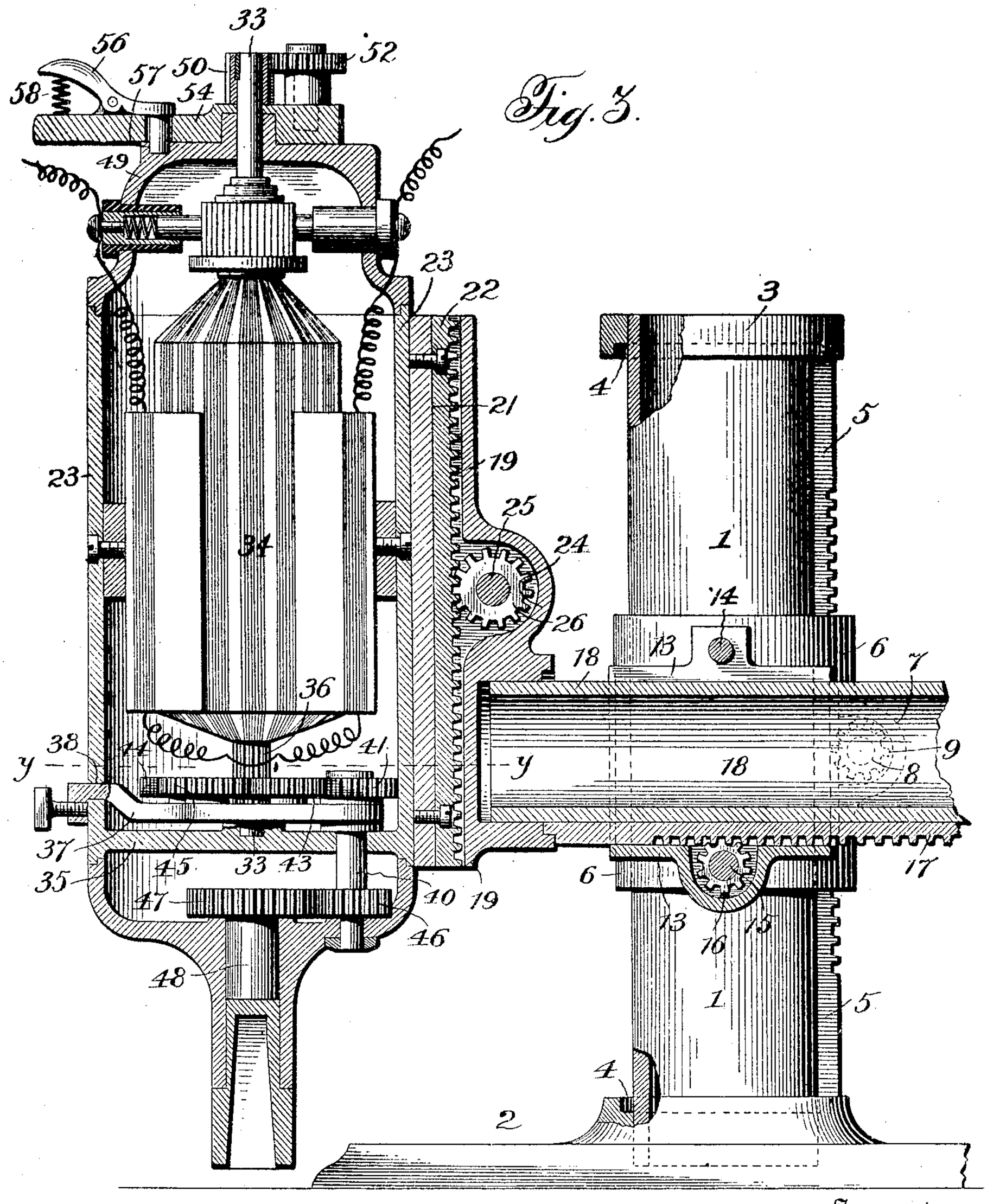

Fig. 3.

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4 SHEETS—SHEET 4

Fig. 5.

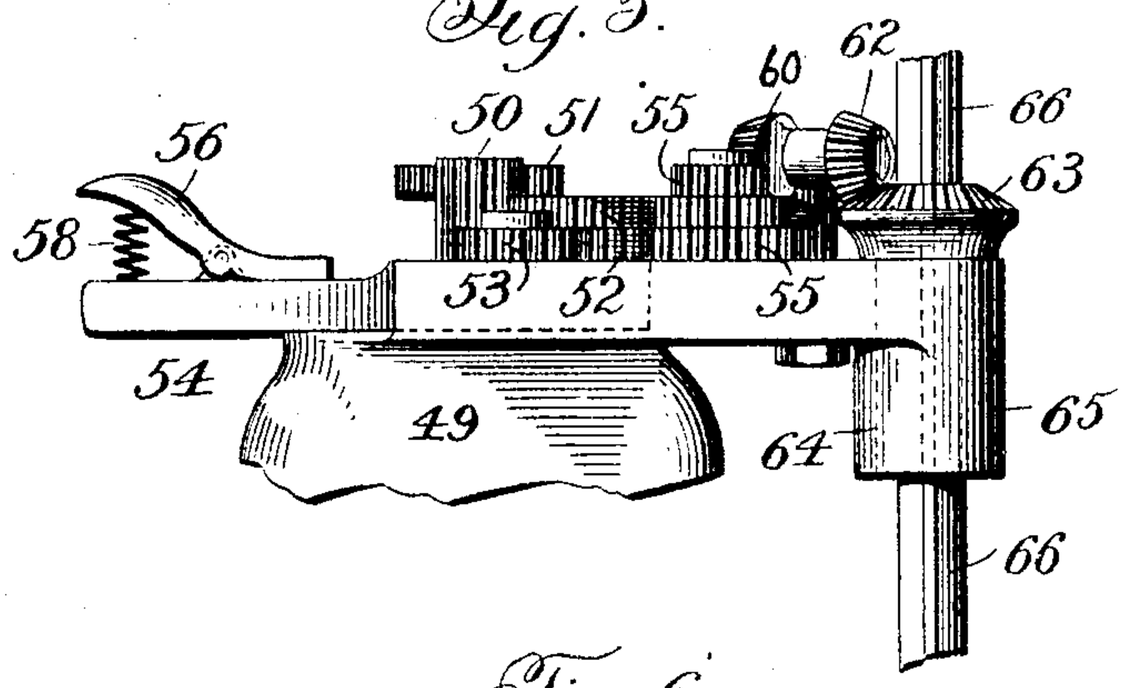


Fig. 6.

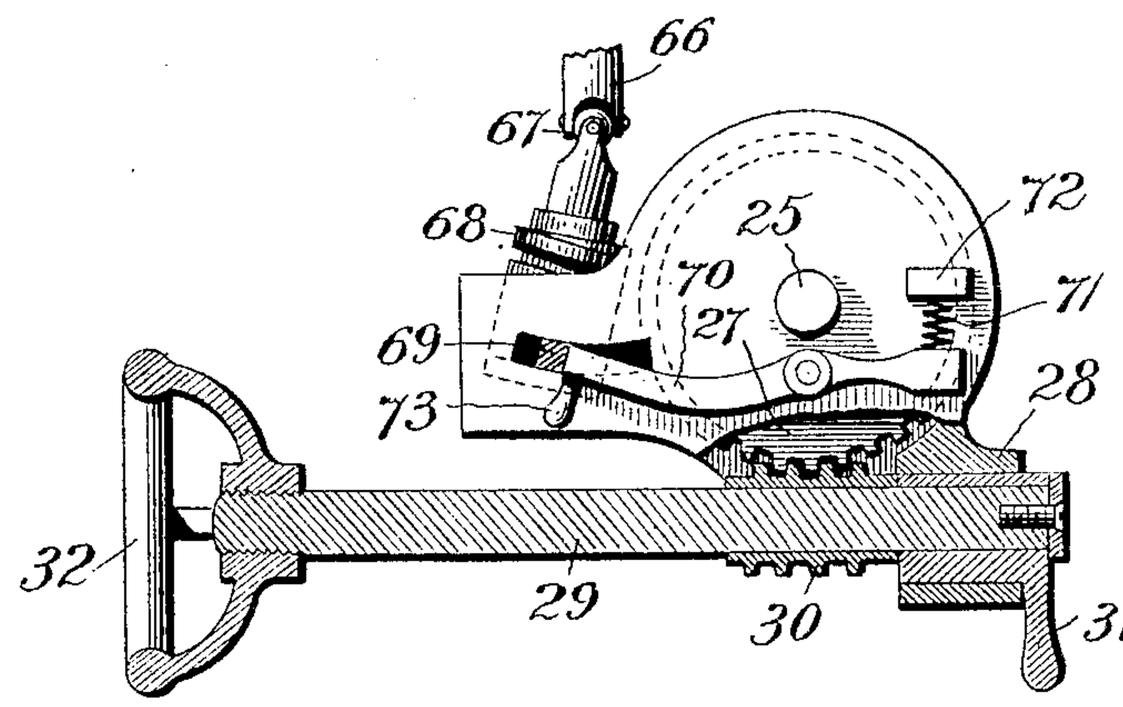
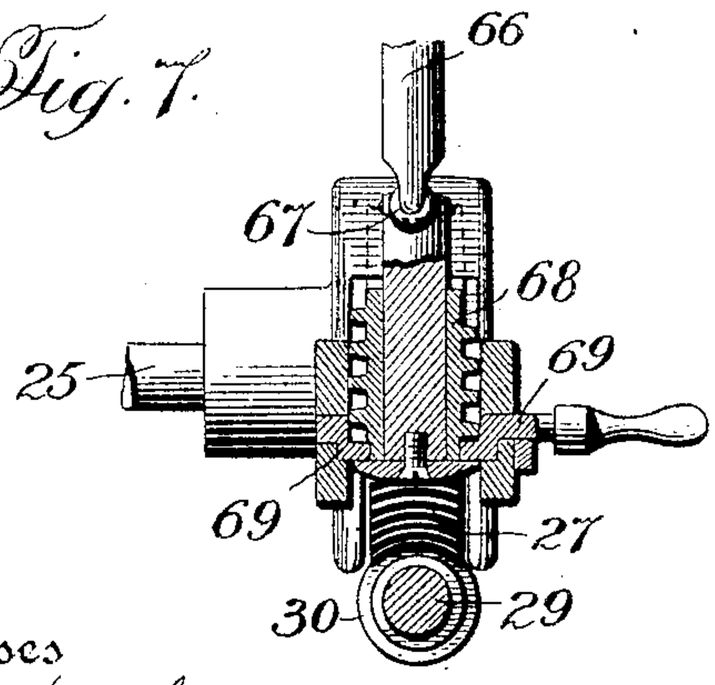
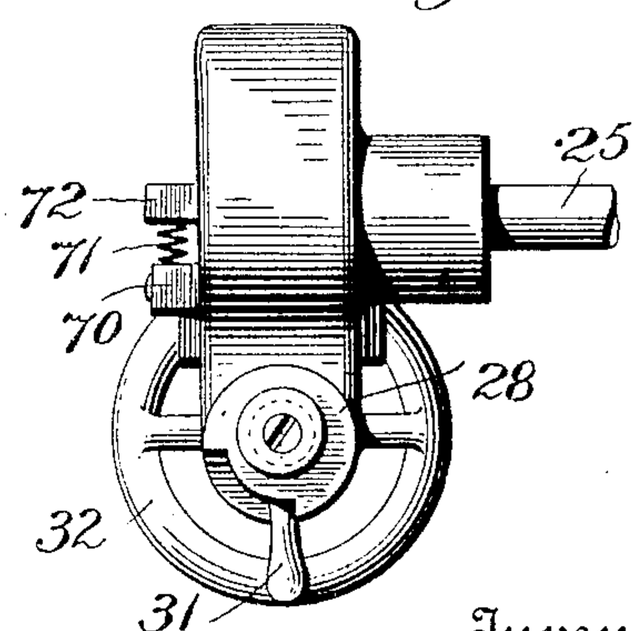


Fig. 8.

Fig. 7.





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UNITED STATES PATENT OFFICE.

ALFRED T. ANDERSON, OF AURORA, INDIANA.

DRILLING-MACHINE.

No. 801,128. Specification of Letters Patent. Patented Oct. 3, 1905.

Application filed June 23, 1904. Serial No. 213,891.

To all whom it may concern:

Be it known that I, ALFRED T. ANDERSON, a citizen of the United States, residing at Aurora, in the county of Dearborn and State of Indiana, have invented new and useful Improvements in Drilling-Machines, of which the following is a specification.

One object of this invention is to provide a drilling-machine in which the bit may be swung around to any desired point and readily adjusted to any desired height.

A further object of the invention is to provide means whereby the drill-bit may be fed forward automatically and the speed of such feeding controlled.

A further object of the invention is to provide means for rendering inactive the automatic feeding means and feeding the bit by hand; and, finally, the object of the invention is to simplify the arrangement and construction of the parts and to increase generally the effectiveness of the machine.

These objects are attained by the use of the mechanism illustrated in the accompanying drawings; and the invention consists in certain novel features of the same, as will be hereinafter first fully described and then particularly pointed out in the appended claims.

In the drawings mentioned, which illustrate the preferred embodiment of my invention, Figure 1 is a side elevation of the machine. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section taken on the line *x x* of Fig. 2, the standard or supporting-column being partly broken away. Fig. 4 is a horizontal section on the line *y y* of Fig. 3. Fig. 5 is a detail elevation of the mechanism for automatically feeding the bit forward. Fig. 6 is a detail section on the line *z z* of Fig. 2. Figs. 7 and 8 are detail views showing the manner of throwing the automatic feeding mechanism out of gear and holding it in such position.

In carrying out my invention I employ a standard or column 1, having a base 2, which is secured to the floor of the shop or workroom and provided at its upper end with an annular cap or ring 3, as shown. In the upper side of the base and the lower side of the ring or cap and adjacent to the side of the column or standard I form the annular grooves 4, which receive the ends of a rack-bar 5 and hold the same against the column, while at the same time permitting it to slide around the column to any desired point, as will be readily understood. A sleeve 6 is fitted around the column 1 and the rack-bar 5 and is provided at an intermediate point of its length with an offset or box 7, in which is journaled a short shaft 8, carrying a pinion 9 in mesh with the rack-bar and having an angular end 10, which may be engaged by a wrench or crank-handle when it is desired to raise or lower the drill, as will be understood. At the side opposite the offset or box 7 the sleeve is constructed with two lugs 11, which are drawn together by means of a screw 12 to bind the sleeve around the column, and thereby hold the working mechanism at any height to which it may be adjusted. On one side of the sleeve 6 is formed a sleeve 13, arranged axially at a right angle to the said sleeve 6 and of a similar construction, having a clamping-screw 14 and carrying a short shaft 15, on which is a pinion 16, meshing with a rack-bar 17 on the side of a tube or beam 18, which passes through and is supported by the said sleeve 13 and supports the working mechanism at its front end. The front end of the said horizontal supporting beam or arm 18 is formed integral with or secured to the lower end of a guide-plate 19, having on its front side dovetailed ribs 20 and a central vertical groove 21. The groove 21 receives and guides a rack-bar 22 on the drill and motor casing 23, the said casing engaging and sliding upon the ribs 20, as shown most clearly in Fig. 2. On the back of the guide-plate is formed an offset or journal-box 24, in which is mounted a shaft 25, carrying a pinion 26 in mesh with the said rack-bar 22 and having a worm gear-wheel 27 on its outer end, the casing of the said worm-wheel being integral with the said guide-plate 19. On its lower rear side the worm-wheel casing is formed with a depending offset 28, in which is eccentrically mounted a shaft 29, having a worm 30 meshing with the worm-wheel 27 and provided at its opposite ends with a shifting lever or handle 31 and a hand-wheel 32, respectively. By throwing the lever 31 down the eccentric throws the shaft up, so as to maintain the worm 30 in mesh with the worm-wheel 27, so that by rotating the hand-wheel 32 the worm-wheel will be rotated and the shaft 25 transmit the motion thereof directly to the pinion 26, which will then act on the rack-bar 22, so as to cause

the casing 23 to move up or down, as will be readily understood.

Mounted centrally in the casing 23 is the driving-shaft 33, which is the axle or armature-shaft of an electric motor 34. The lower end of the driving-shaft or motor-axle is stepped in a horizontal partition or plate 35 within the casing and is provided with gear-teeth 36 just above the stepped portion. A vibratory plate 37 is pivotally mounted at its rear or inner end on the upper side of the partition 35 and has its front end projecting through a horizontal slot 38 in the casing to hold the plate in its adjusted position. The pivotal point of this plate is a boss on the partition, and through this boss is journaled a shaft 40, having its lower end bearing in the lower end of the casing. On the upper end of this shaft 40 is a pinion 41, which is in mesh with pinions 42 43, mounted on stud-shafts carried by the plate 37 and arranged on the opposite edges of the plate. These pinions 42 43 mesh, respectively, with the gear-wheels 44 45, which are of different sizes and adapted to mesh with the gear-teeth on the lower end of the driving-shaft. Near the lower end of the shaft 40 is secured a pinion 46, meshing with a pinion 47 on the upper end of the drill-socket 48, the drill-socket being journaled in and supported by an extension or depending protuberance of the casing. From this arrangement it will be readily seen that the drill may be rotated at a higher or lower rate of speed, as may be desired.

The upper end of the driving-shaft or motor-axle has a bearing in a cap 49, which is fitted on and secured to the upper end of the casing, and gear-teeth 50 are formed on the upper end of the shaft in the same manner as teeth 36 are formed on the lower end of the same. These gear-teeth are in mesh with the pinions 51, 52, and 53, which are arranged in different horizontal planes, are of different diameters, and are carried by a vibratory lever-plate 54. These several pinions are adapted to mesh, respectively, with the toothed steps of a multiple gear wheel or pinion 55, and the lever-plate is pivotally mounted on a central boss of the cap, so that it may be thrown to one or the other side to bring the proper pinion into engagement with the said multiple gear accordingly as it is desired to feed the drill faster or slower. In order to hold the plate in its adjusted position, I provide the latch 56, adapted to engage one of a series of openings 57 in the cap 49 and held in engagement with the same by a spring 58, arranged between the plate and the latch, as shown. In the form illustrated five openings are shown, numbered, respectively, "1, 2, 3, 4, 5." When the latch engages an even-numbered opening, none of the pinions 51 52 53 will engage the gear 55; but should the plate be thrown to either side, so that the latch will engage one of the odd-numbered openings, the proper pinion will be brought into engagement with the gear. The gear 55 meshes with the side teeth of a gear-wheel 59, which is formed with a beveled gear upper portion meshing with a bevel-pinion 60, the shaft of which is journaled in a sleeve supported by a post rising from a rearward extension 61 of the cap. On the outer end of the said shaft is secured a bevel-pinion 62, which engages with a bevel-pinion 63, having an elongated hub 64, which is journaled in a sleeve 65, depending from the extension 61 of the cap 49. The feeding-shaft 66 is feathered in this beveled pinion 63 and its hub, so that it may readily slide through the same, but will be forced to rotate therewith. This feeding-shaft is constructed in two sections connected by a universal joint 67, and on the lower shorter section is secured a worm 68, which meshes normally with the worm-wheel 27, hereinbefore described. This lower section of the feeding-shaft and the worm thereon are inclosed by an extension of the worm-wheel casing, and on the lower end of the shaft is secured a shifting plate or lever 69, which engages curved grooves in the casing and is provided with an extension or handle projecting through a slot in the outer wall of the casing. Pivoted on the wall of the casing is a latch or trigger 70, the front end of which bears against the under side of the plate 69 and is held up to the same by a spring 71, arranged between the rear end of the trigger or latch and an offset 72 on the worm-wheel casing to which it is secured. At its front end the trigger or latch is provided with a depending handle 73, which projects downward to be conveniently reached and grasped by the operator. If it is desired to throw the automatic feed out of gear, the lever 69 is thrown forward, thereby carrying the worm 68 away from and out of mesh with the worm-wheel, and as it is thus swung forward the front end of the latch 70 presses up behind the said lever 69 and engages the same, so as to hold the worm away from the wheel.

The operation of the machine will be readily understood from the foregoing description, taken in connection with the accompanying drawings. The proper bit having been fitted in the socket 48, the sleeve 6 is moved around the column 1 and the pinions 9 and 16 rotated so that through their action on their respective rack-bars the drill will be brought directly over the work at the proper height. The screws 12 and 14 are then turned home, so as to secure the drill in this position. The vibratory plate 37 is then adjusted so as to bring the pinion 44 or the pinion 45 into mesh with the driving-shaft, so that the bit will be rotated faster or slower, according to the nature of the work or the substance to be bored.

If the nature of the work requires the drill to be fed by hand, the worm 67 is held out of engagement with the worm-wheel 27, as before described, and the shaft 29 turned so as to bring the worm 30 into mesh with the worm-wheel. The operator may then feed the drill forward in accordance with his judgment by rotating the hand-wheel 32 on the shaft 29, as will be readily understood. I prefer to feed the drill automatically, and in most cases the automatic feeding is the more desirable, as it saves the time and labor of the operator and permits the work to be performed faster than when the feeding is by hand. The use of the shaft 29 to remove the drill from the bored opening, however, is advantageous, as it saves wear and tear on the operating mechanism. To adjust the feeding mechanism, the lever 54 is adjusted to bring one of the pinions 51 52 53 into mesh with the gear 55, so that the motion of the driving-shaft will be transmitted, through the said gear and the gears 59, 60, 62, and 63, to the feed-shaft 66 and the worm 68 thereby rotated. The rotation of the worm actuates the worm-wheel 27 and the shaft 25 of the same, so that the pinion 26 is set in motion and acts on the rack-bar 22 so as to gradually move the motor-casing downward, as will be clearly understood. The feeding mechanism having been thus properly adjusted, the motor is started in the usual manner by closing the circuit, whereupon the driving-shaft and the parts connected therewith will be set in motion.

The parts are compactly arranged and are simple in construction. The drill may be readily brought over the work at any point, and the advantages of the machine are thought to be obvious without further detailed reference thereto.

I do not restrict myself to the exact details of construction, combination, and arrangement herein set forth, it being obvious that minor variations thereof not involving the exercise of invention may be made by the skilled mechanic, and such departures from what is herein described and claimed not involving invention I consider as within the scope and terms of my claims.

Having thus described my invention, I claim—

1. In a drilling-machine, the combination of a support, a drill-casing slidably mounted thereon, a feeding-rod upon which the drill-casing has a sliding bearing, a rack-bar on the casing, a pinion mounted on the support and meshing with said rack-bar, intermediate gearing between said pinion and the feeding-rod, a motor within the drill-casing, and gearing on the casing between the motor and the feeding-rod.

2. In a drilling-machine, the combination of a support, a drill-casing mounted thereon, a feeding-rod carried by the support and having a sliding bearing on the drill-casing, a rack-bar on the casing, intermediate gearing on the support between the feeding-rod and the rack-bar, a motor in the drill-casing, a plurality of gear systems mounted on the drill-casing, and means for bringing any one of said systems into connection with the feeding-rod and the motor, substantially as set forth.

3. In a drilling-machine, the combination of a support, a drill-casing mounted thereon, a feeding-rod, gearing driven by the said feeding-rod to move the drill-casing on the support, a motor in the drill-casing, gearing on the casing connected with the feeding-rod, a vibratory plate mounted on the drill-casing, and a plurality of gears carried by said plate and adapted to separately connect the motor with the gearing connected with the feeding-rod, substantially as set forth.

4. In a drilling-machine, the combination of a support, a drill-casing mounted thereon, a feeding-rod, gearing driven by said feeding-rod to move the drill-casing on the support, gearing mounted on the casing connected with the feeding-rod, a vibratory plate mounted on the casing, a motor within the casing, a plurality of gears carried by the vibratory plate and adapted to separately connect the motor with the gearing mounted on the casing connected with the feeding-rod, and a latch carried by the said plate and adapted to lock it to the casing in any one of its adjusted positions, substantially as set forth.

5. In a drilling-machine, the combination with the drill-casing and its support, of a feeding-rod carried by the support and having a sliding bearing upon the drill-casing means for operating said feeding-rod, intermediate gearing on the support connected with the lower end of the feeding-rod to move the drill-casing on its support, and means for moving the said lower end away from the said intermediate gearing without affecting the relation of the upper part of the rod to the sliding bearing, substantially as set forth.

6. In a drilling-machine, the combination with the drill-casing and its support, of a feeding-rod carried by the support and having a sliding bearing on the drill-casing and having a lower vibratory section, intermediate gearing on the support between the said lower section and the drill-casing to move the drill-casing on its support, means for supporting and for moving the said lower section away from said intermediate gearing into an inoperative position, and means for holding the same in said inoperative position, substantially as set forth.

7. In a drilling-machine, the combination with the drill-casing and its support, of a feeding-rod carried by the support and having a sliding bearing on the drill-casing and having

a lower vibratory section, intermediate gearing on the support whereby the rotation of the feeding-rod will move the drill-casing on its support, a shifting-plate at the lower end of the said rod to move the lower section of the feeding-rod away from the intermediate gearing, and a trigger on the support adapted to automatically engage said plate and hold the said lower section in the said disconnected position, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED T. ANDERSON.

Witnesses:

J. F. ANDERSON,

C. J. ANDERSON.