No. 847,297. PATENTED MAR. 12, 1907.

F. M. STAMBAUGH.

DRILLING MACHINE.

APPLICATION FILED AUG. 1, 1906.

3 SHEETS—SHEET 1.

Fig. 1.

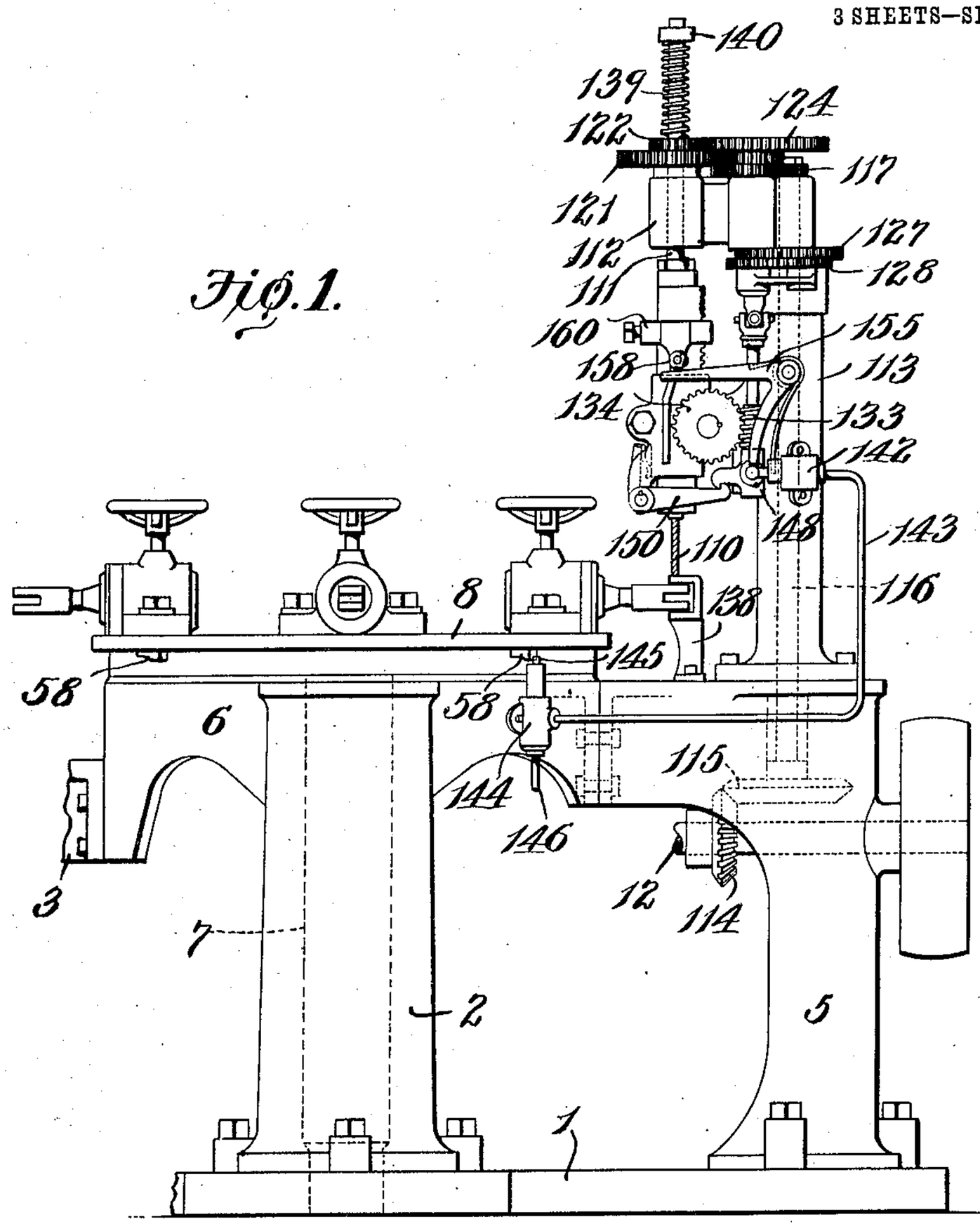
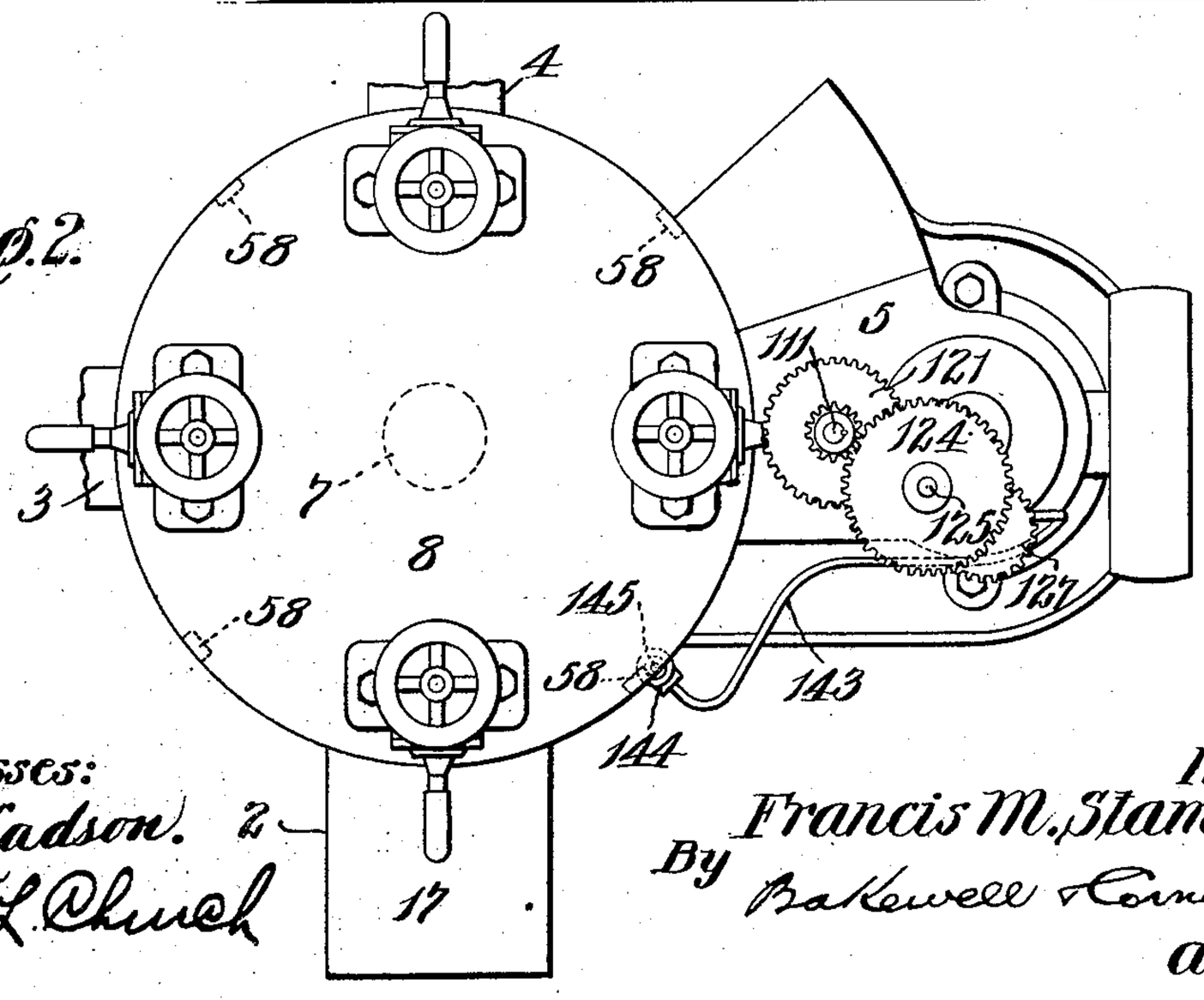


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

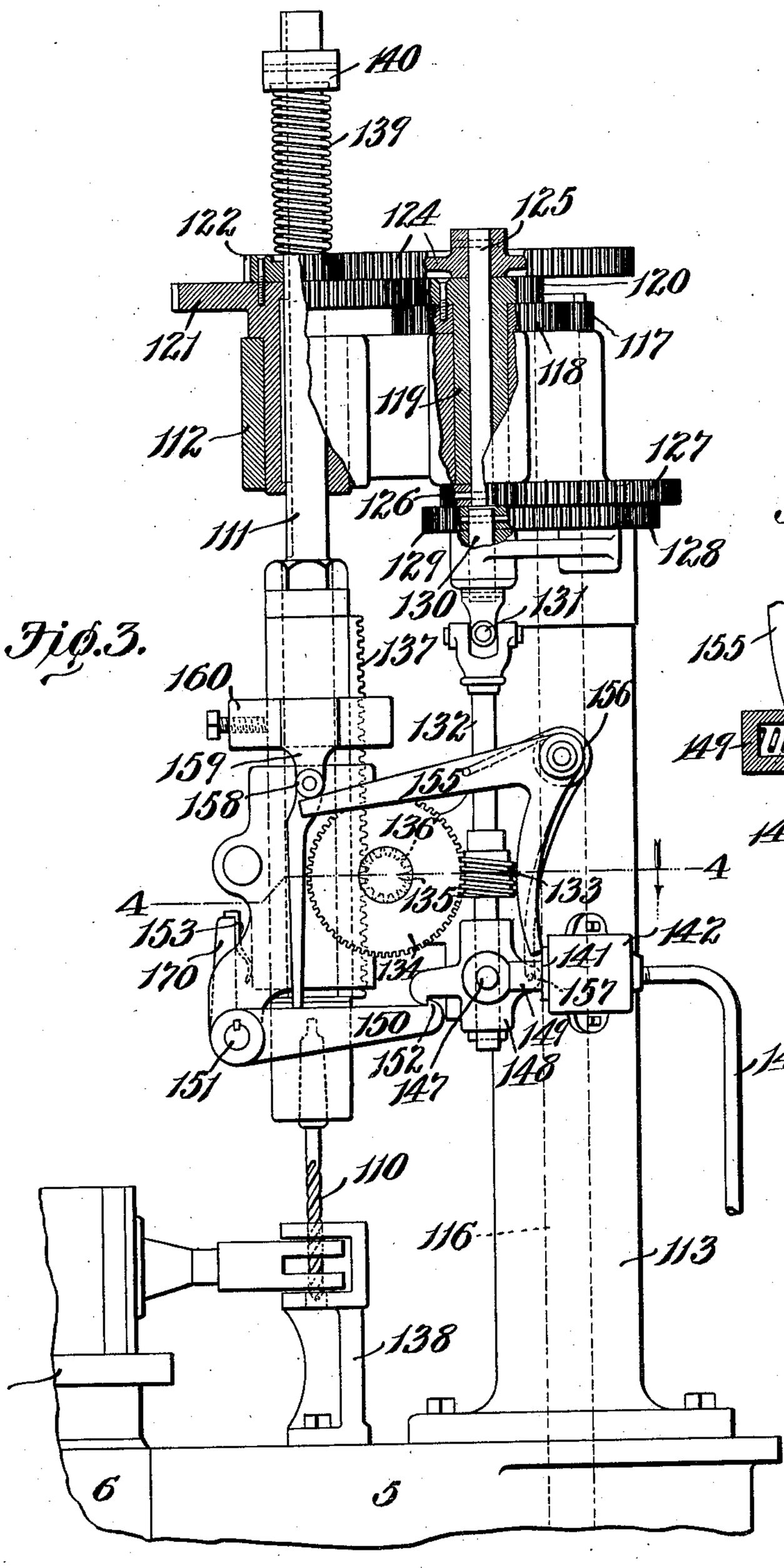
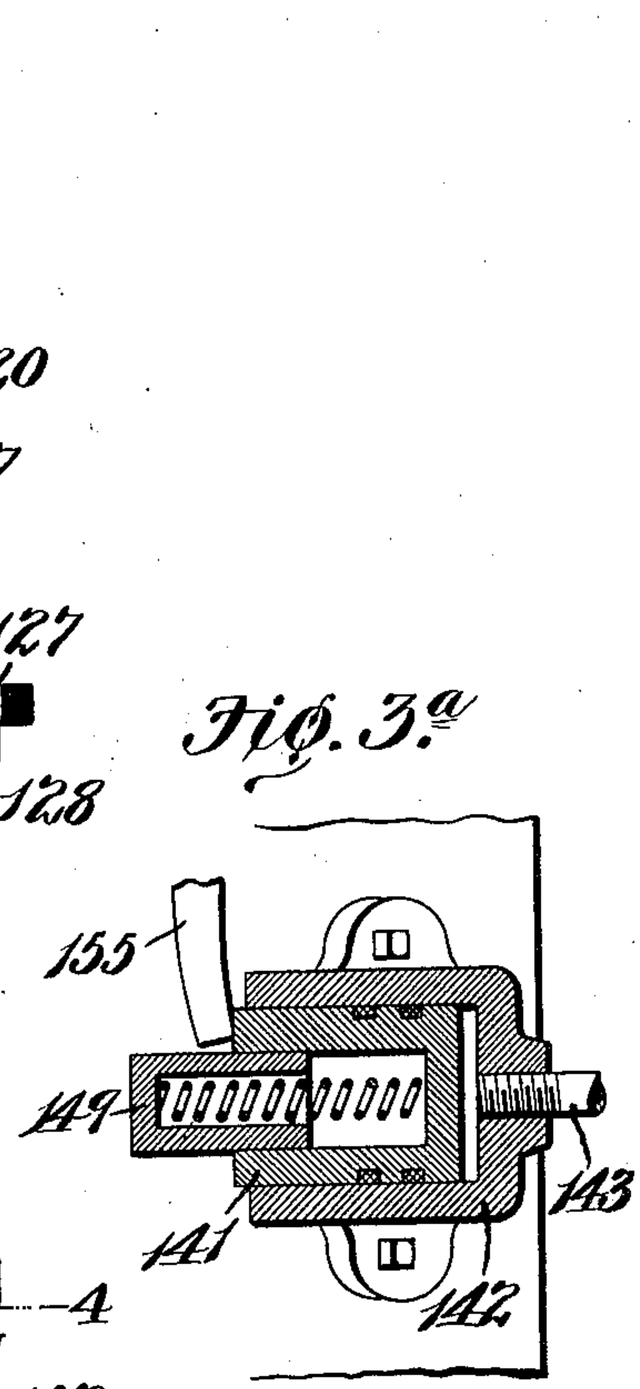


Fig. 3a.



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3 SHEETS—SHEET 3.

Fig. 4.

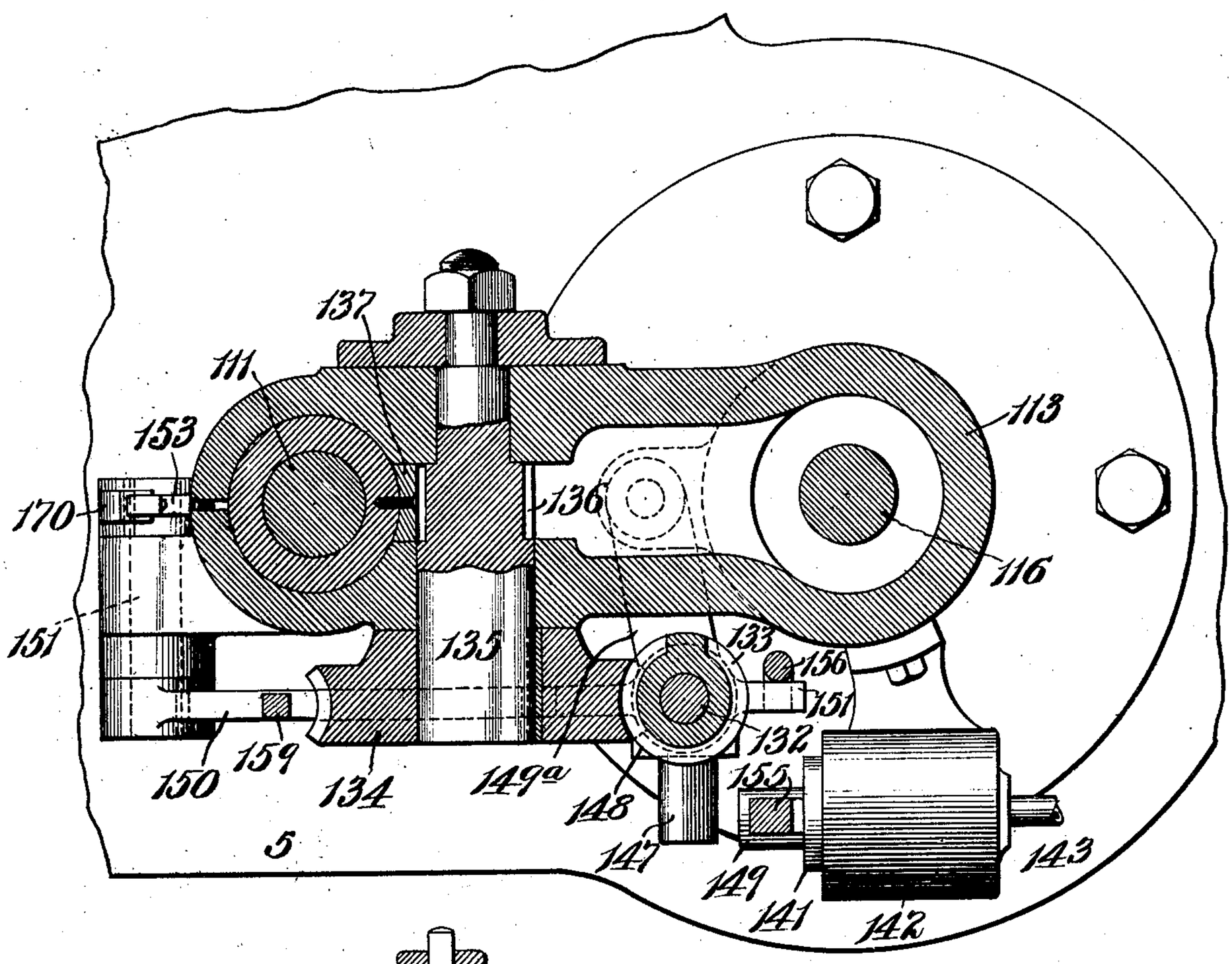
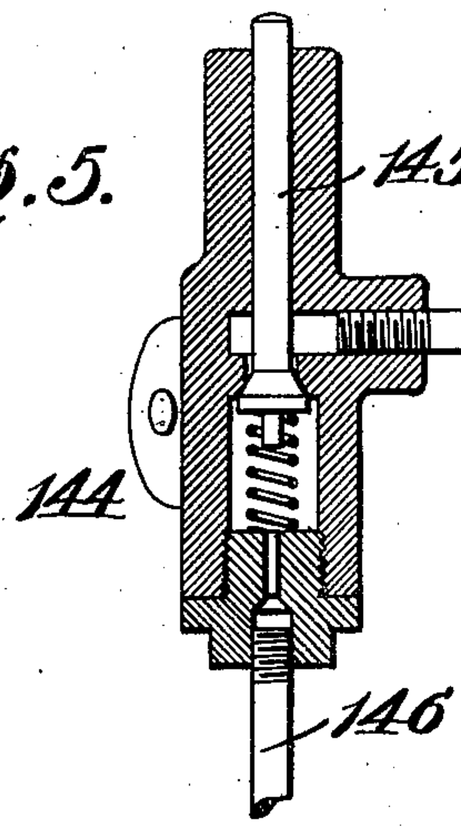


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANCIS M. STAMBAUGH, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE AMERICAN BRAKE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

DRILLING-MACHINE.

No. 847,297. Specification of Letters Patent. Patented March 12, 1907.

Original application filed November 9, 1905, Serial No. 286,563. Divided and this application filed August 1, 1906. Serial No. 328,758.

To all whom it may concern:

Be it known that I, FRANCIS M. STAMBAUGH, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Drilling-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of a machine embodying the features of my invention. Fig. 2 is a top plan view of the machine shown in Fig. 1. Fig. 3 is a front elevation, partly in section, of the drill and its operating mechanism. Fig. 3ª is a detail sectional view of the air-controlled device comprising part of the mechanism for causing a reciprocating movement to be imparted to the drill. Fig. 4 is an enlarged horizontal sectional view on the line 4 4 of Fig. 3, and Fig. 5 is a detail sectional view of the valve for admitting compressed air to the device shown in Fig. 3ª.

This invention relates to metal-working machines, and particularly to drilling-machines.

The object of my invention is to provide a drilling-machine of novel construction and comprising means for causing the drill to move automatically into and out of position for engaging the article or piece of work upon which it operates. Preferably the drill is goverened by air-controlled apparatus, and the work on which the drill is adapted to operate is mounted on a movable member, which carries different pieces of work progresssively into position to be acted upon by the drill, as shown and described in my pending application, Serial No. 286,563, filed November 9, 1905, of which the present application is a divisional.

Referring to the drawings, which represent the preferred form of my invention, 1 indicates a base provided with a plurality of standards, 2, 3, 4, and 5, the standard 2 at the front of the machine carrying a table 17, at which the operator stands while removing the piece of work which has been finished and placing an unfinished piece of work in position on the member which carries it into position to be operated on by the drill.

The standard 5 supports my improved drilling-machine, and, if desired, other machines or tools for performing other operations on the work may be located on the standards 3 and 4. Rotatably mounted in the base 1 and in the top plate 6, which is parallel to the base and connected to the standards, is a vertical shaft 7, having connected to its upper end a table 8, which travels on the top plate and is provided with a plurality of chucks adapted to hold the work being operated on, said work being herein shown as castings that are to be used as pistons for slack-adjusters. When my improved drilling-machine is used in connection with other machines or tools for performing other steps or operations on the castings, as described in my pending application above referred to, the operator places an unfinished casting in the chuck, which is then adjacent the standard 2, the table being then turned one-quarter of a revolution to move the unfinished casting into position to be operated on by a machine (not shown) located at the standard 3. The above operation is then repeated, thus locating the first-mentioned casting in position to be operated on by a machine (not shown) at the standard 4. When the operation above described is again repeated the casting which was first placed on the work-table will be brought into alinement with the rotating drill, and mechanism hereinafter described will then be thrown in gear to cause said drill to descend, operate on the casting, and then return to normal position. The table is then turned another quarter of a revolution, and the operator removes the finished casting and places the unfinished casting in the chuck on the work-table. The work-table may be turned either manually or mechanically by suitable mechanism connected to the shaft 12.

My improved drilling-machine comprises a drill 110, carried by a stock 111, which is reciprocatingly and rotatably mounted in the arm 112 of a bearing 113, carried by the standard 5. The drill-stock is continuously rotated by means of a beveled gear 114 on the drive-shaft 12, which meshes with a gear 115 on a vertical shaft 116, supported in the bearing 113 and having secured to its upper end a pinion 117, meshing with a gear 118 on a shaft 119, mounted in the arm 112, said

gear having connected thereto a gear 120, which meshes with a gear 121, splined to the drill-stock, as shown in Fig. 3. Fastened to the gear 121 is a pinion 122, which meshes with a gear 124, keyed to a shaft 125, that is rotatably mounted in the shaft 119, said shaft 125 carrying at its lower end a pinion 126, that meshes with a gear 127, having fastened thereto a gear 128 in engagement with a pinion 129, secured to a short shaft 130. Connected to said short shaft by means of a universal coupling 131 is a shaft 132, having a worm 133, that meshes with a gear 134 on a shaft 135, that has fastened thereto a pinion 136 in engagement with a rack-bar 137, connected to the drill-stock, said shaft 135 being journaled in a portion of the bearing 113.

From the foregoing description it will be understood that the drill-stock rotates continuously, and when the worm 133 is in engagement with the gear 134 the drill-stock will be moved downwardly to cause the drill to form a hole in the bifurcated end of the casting, as shown in Fig. 3, a guide 138 being fastened to the standard 5 in alinement with the end of the drill. Said worm and gear are in engagement only at certain predetermined times in the cycle of operations of the machine, however, and after they have been disengaged the coiled spring 139, which surrounds the drill-stock between the collar 140 and the gear 122, will operate to move said drill-stock upwardly to withdraw the drill from the casting. The worm 133 is moved into engagement with the gear 134 by means of air-controlled apparatus comprising a piston 141, mounted in a cylinder 142, fastened to the support 113 and supplied with air by a pipe 143, leading to a valve-casing 144, secured to the top plate 6, as shown in Fig. 1, and provided with a valve-stem 145, that normally occupies a position to be engaged by one of a plurality of blocks 58, carried by the rotating table on which the castings are mounted. As said valve-stem is depressed the compressed air which enters the valve-casing 144 from the supply-pipe 146 passes through the pipe 143 to the cylinder 142 and actuates the piston 141, the forward movement of said piston engaging a lug 147, projecting laterally from a block 148, in which the end of the shaft 132 is rotatably mounted and moving the worm 133 into engagement with the gear 134. Preferably the piston is provided with a yielding plunger 149, which permits the worm to yield as it engages the gear, and thus cause said gear and worm to mesh properly. The block 148 has an arm 149[a], which is pivotally connected to the bearing 113, as shown in dotted lines in Fig. 4, this construction controlling positively the swinging movement of the shaft 132. For holding the worm and gear in engagement for a predetermined time I provide a locking-dog in the form of a rock-arm 150, fastened to the shaft 151, mounted in the support 113, and provided with a second arm 170. The arm 150 is provided with a hook 152, which engages a coöperating hook formed on the block 148, and the arm 170 carries a leaf-spring 153, which bears against the support and holds the hooked end of the arm 150 normally elevated. Pivotally mounted on the support is a second bell-crank lever 155, and surrounding the pivot of said lever and connected to one arm thereof is a spring 156, which at its other end is connected to a lug 157 on the block 148, said spring operating to withdraw the worm 133 from engagement with the gear 134 when the locking-dog is disengaged from the block 148. One arm of the bell-crank lever bears against the piston 141, and its other arm projects into alinement with a roller 158, carried by an arm 159, depending from a collar 160, removably fastened to the drill-stock. As the drill-stock descends the end of said arm engages and rocks the locking-dog 150 to release the block 148, and the roller on said arm being in contact with the arm of the lever 155 will actuate said lever for forcing the piston back into the cylinder 142, the spring 156 operating simultaneously to disengage the worm and gear, the drill-stock being thereafter moved upwardly by the spring 139, as previously described.

The time at which the worm 133 and gear 134 are disengaged may be varied to provide for the different thicknesses of the material being operated on by changing the positions of the collar 160 on the drill-stock.

While I have herein shown and described my improved drilling-machine operating in connection with a revolving table and air-controlled apparatus to be operated for causing the drill to move into engagement with its actuating mechansim, I do not wish to have it understood that my invention is limited to this specific construction, as the work-table could be brought into alinement with the drill in any suitable manner, and, if desired, the air-controlled apparatus could be replaced by a lever or any other suitable mechanism for moving the worm 133 into engagement with the gear 134.

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

1. A machine of the class described, comprising a rotatable tool-stock, a rack-and-pinion mechanism for imparting a movement in one direction to said stock, a worm for actuating said mechanism, means for rotating it, an air-controlled piston for moving said worm into engagement with said mechanism, means for positively holding said worm in engagement with its coöperating gear, means for disengaging said holding means, and means carried by the tool-stock

for causing said piston to be returned to its normal position; substantially as described.

2. A machine of the class described, comprising a rotatable tool-stock, a rack-and-pinion mechanism for imparting movement in one direction to said stock, a worm for actuating said mechanism, means for rotating said worm, an air-controlled piston for moving said worm into engagement with said mechanism, a locking device for holding said worm in engagement with said mechanism, a lever for engaging said piston to return it to its normal position, an adjustable device carried by the tool-stock for releasing said locking device and adapted to actuate said lever, and means for moving the worm into its inoperative position; substantially as described.

3. A machine of the class described, comprising a rotatable tool-stock, a rack-and-pinion mechanism for imparting movement in one direction to said stock, a worm for actuating said mechanism, means for rotating the worm, an air-controlled piston provided with a yielding member which engages said worm and moves it into operative engagement with said mechanism, means for holding said worm in engagement with its cooperating gear, means for disengaging said holding means, and yielding means for moving the gear into inoperative position; substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 27th day of July, 1906.

FRANCIS M. STAMBAUGH.

Witnesses:
WELLS L. CHURCH,
CORA BADGER.