

No. 719,988.

PATENTED FEB. 10, 1903.

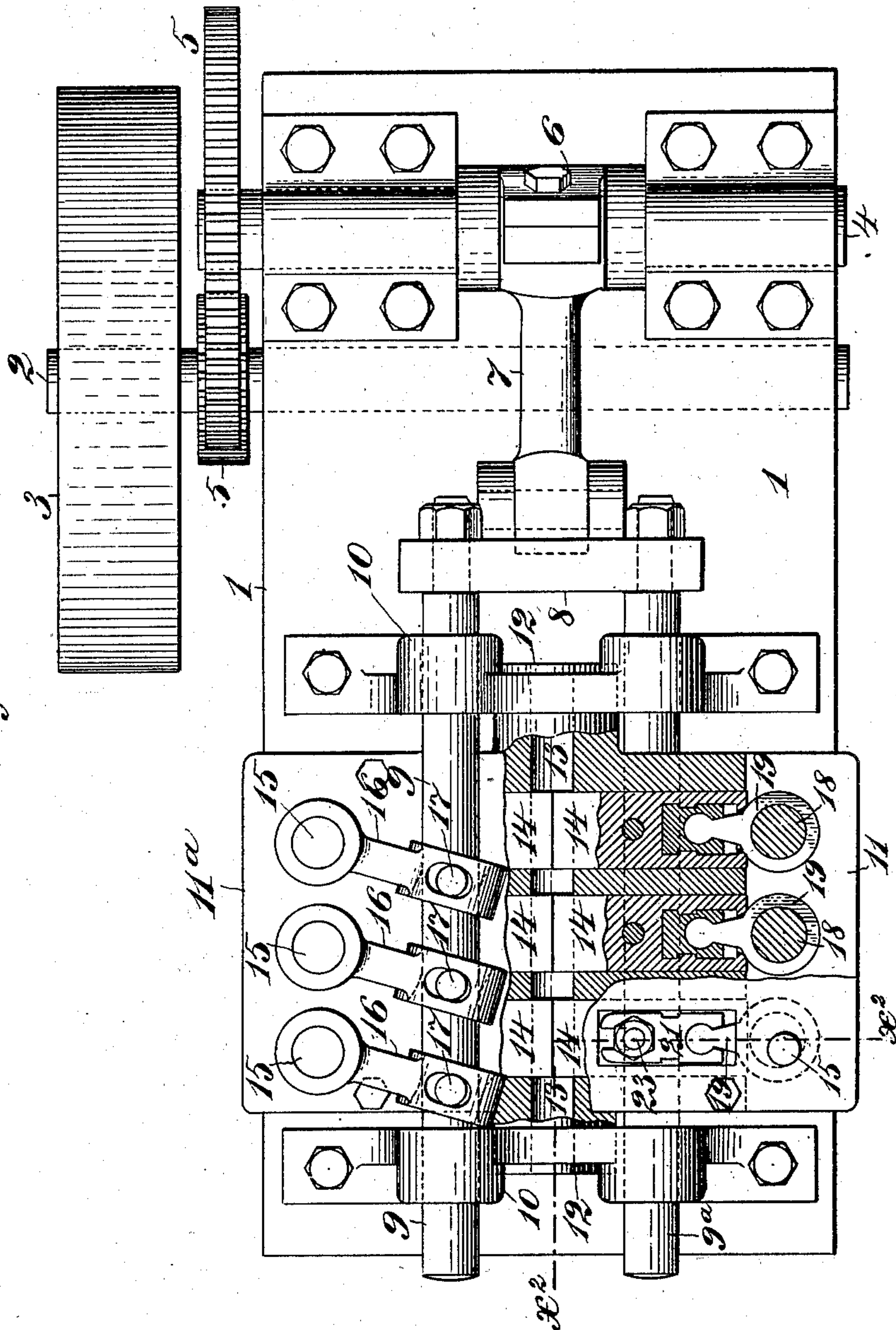
R. L. BARCLAY.
MACHINE FOR TWISTING DRILL BLANKS.

APPLICATION FILED JUNE 19, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.



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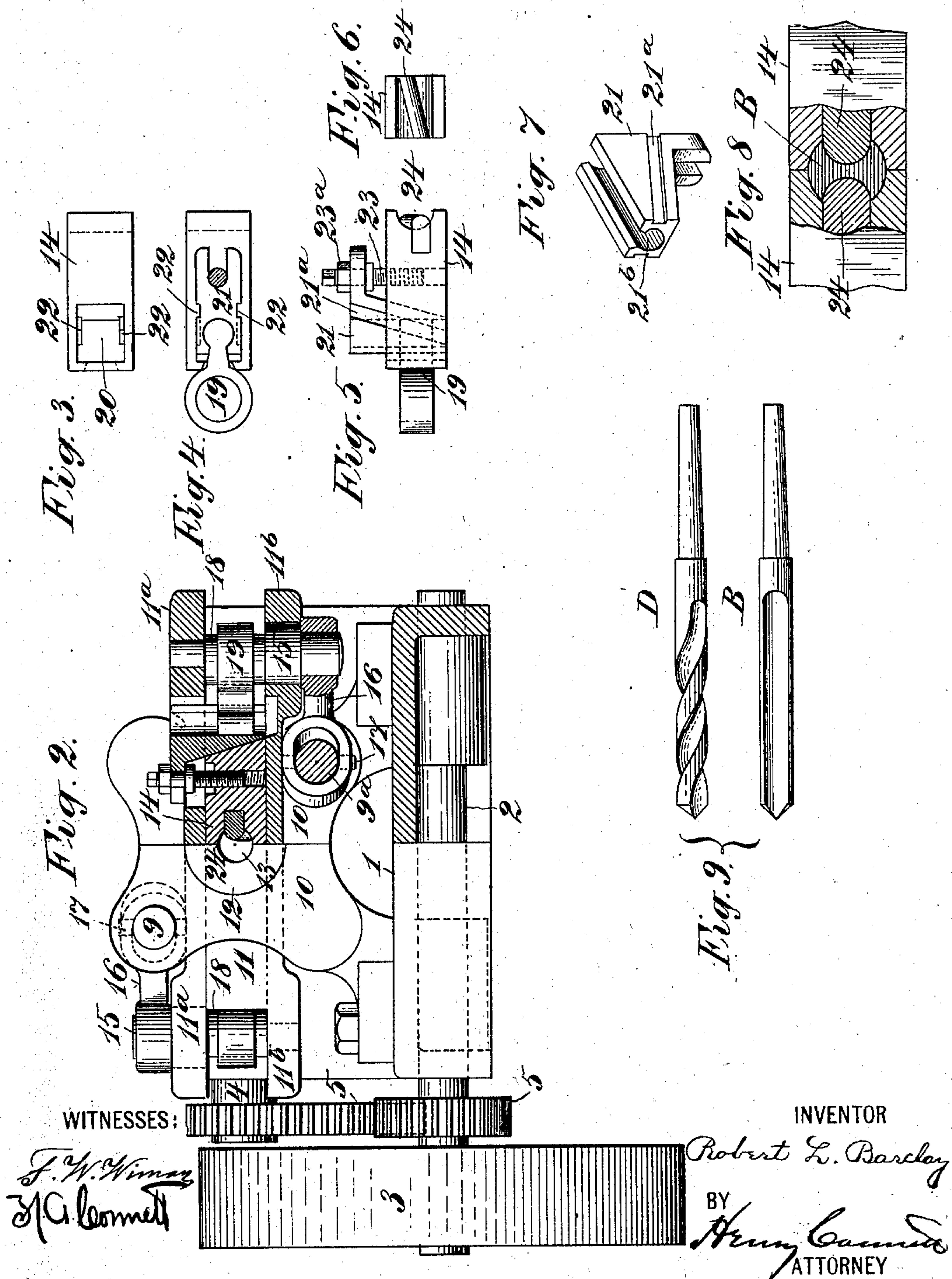
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UNITED STATES PATENT OFFICE.

ROBERT L. BARCLAY, OF BROOKLYN, NEW YORK.

MACHINE FOR TWISTING DRILL-BLANKS.

SPECIFICATION forming part of Letters Patent No. 719,988, dated February 10, 1903.

Application filed June 19, 1902. Serial No. 112,296. (No model.)

To all whom it may concern:

Be it known that I, ROBERT L. BARCLAY, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, and city and State of New York, have invented certain new and useful Improvements in Machines for Twisting Drill-Blanks, of which the following is a specification.

This invention relates to means for twisting the fluted blanks for twist-drills, and particularly to that class of such machines wherein the twisting-dies reciprocate in their operation on the blank.

The object of the invention is to provide a suitable mounting for the dies and a suitable means for adjusting and operating them.

In the accompanying drawings, which illustrate an embodiment of the invention, Figure 1 is a plan of the machine, partly broken away or in section to better illustrate the construction; and Fig. 2 is an end elevation, partly in section, at line $x-x$ in Fig. 1. Figs. 3 to 7, inclusive, are detail views of a plunger or die-holder and its adjusting mechanism. In these views Fig. 3 is a side view, of the plunger alone, and Fig. 6 is an end view of the same, showing the die set therein. Fig. 4 is a plan view, and Fig. 5 a side view, of the plunger and its adjusting devices and the connecting operating link or rod. Fig. 7 is a perspective view of the adjusting-slide. Fig. 8 is an illustrative view showing how the dies are applied to the drill, and Fig. 9 shows the drill-blank before twisting and also the finished drill.

The machine will now be described with reference to the accompanying drawings, premising in order to make the description more clear that the drill-blank B to be operated on (seen in Fig. 9) is straight and fluted on opposite sides, being usually forged in this form. This blank while hot is pushed through a guideway in the machine endwise, and preferably by hand, and reciprocating or hammering dies (preferably three pairs) act upon it to impart thereto the proper twist. The dies have a very limited movement and preferably operate quite rapidly.

1 is the base or bed plate of the machine, in which is rotatively mounted the main shaft 2, having on it a driving-pulley 3. A crank-

shaft 4, rotatively mounted on the base, is driven from the main shaft by gears 5 of the usual kind. To a crank in the shaft 4 is coupled at 6 a connecting-rod 7, which is coupled at its other end to a cross-head 8, carrying two slide-rods 9 9^a. These rods have slide-bearings in bearing-blocks 10, mounted on the bed-plate, and when the machine is in operation the slide-rods have imparted to them a longitudinal reciprocating movement. A guide-block 11 is mounted on the bed-plate, being supported, preferably, by trunnions 12, which fit tightly or snugly in apertures in the bearing-blocks 10, between which the block 11 is placed. This block 11 has bored through it a hole 13 of the proper size to receive the drill to be twisted, this bore being in the longitudinal axis of the machine, as here shown. In the upper face of the block 11 and extending transversely at right angles to the bore or hole 13 are milled or planed out three guideways to receive the pairs of plungers or die-holders 14. The ends of the aligned plungers in each pair meet end to end in the axis of the bore 13. On the block 11 is secured a cover-plate 11^a. This plate extends over the block at its opposite sides and with flanges 11^b on the block form bearings for upright rock-shafts 15, one for each plunger 11. The plungers at one side are operated through the medium of the upper slide-rod 9 and those at the other side through the medium of the lower slide-rod 9^a. As the plungers are substantially alike and the operating and adjusting devices connected with them are alike, it will suffice to minutely describe one plunger and its appurtenances.

Secured to the rock-shaft 15 is an arm 16, which has at its end a fork or eye through which extends the slide-rod 9 or 9^a, as the case may be, and a stud or pin 17 in said rod engages a slot in the arm. The object of this construction is merely to couple the arm 16 loosely to the slide-rod, so that as the rod moves to and fro the shaft 15 will be rocked. On the shaft 15 is an eccentric 18, which is embraced by a yoke on a connecting-rod 19, coupled at its other end in an indirect manner to the plunger. This construction enables the reciprocating slide-rod to impart to

the plunger a slight reciprocating movement in its guideway. In order that the plunger may be adjusted to a limited extent in or out with respect to the axis of the bore 13, it is provided with an adjusting device, which will now be described.

The plunger has in it a transversely-extending aperture 20 in Fig. 3, which receives a slide-block 21, with oblique grooves 21^a in its sides adapted to be engaged by oblique lugs 22 on the plunger. In the block 21 is a groove 21^b, which is engaged by the rounded end of the rod 19 to form a coupling between the two. The rod enters the outer end of the plunger through a suitable aperture therein. When the adjusting-block is driven in, it increases the distance between the operative end of the plunger and the axis of the rock-shaft 15, which is a fixed point. To conveniently operate and adjust the block 19, a screw 23, which has a collared bearing in a slotted lug on the said block, is driven into the plunger. A nut 23^a on the screw locks it to the said lug. The operative or inner end of plunger has a half-round groove formed in its end face to embrace one-half of the drill, and this groove may be formed in practice by first forming the transverse guideways in the block 11, then placing the plungers therein, so that the plungers of the pairs abut end to end along the axis, and then boring the hole 13 through the block and plungers, so as to properly cut half-round grooves in the ends of the latter. In the inner end of the plunger is set a die 24, rounded to fit the flute or groove in the drill-blank and set obliquely to the axis of the drill. This obliquity, which usually will be about twenty-five degrees, is indicated clearly in Figs. 5 and 6. The obliquity of the dies which form a pair will be inclined in opposite different directions, so as to fit and produce the obliquity of the flutes in the opposite sides of the twisted drill D. (Seen in Fig. 9.) The pairs of dies will be so spaced with reference to the length of the twisted portion of the drill and the pitch of the twist that the plungers or holders of the dies may all lie in the same plane.

The operation is simple. The machine is set in motion, and the pairs of dies move in and out rapidly. The drill-blank B is heated to the proper degree and inserted point foremost in the bore 13 at the end of the machine. (Seen at the left in Fig. 1.) As the drill is pushed in the dies impart to it the proper twist, and by the rapid hammering of the dies on the heated metal they impart a set to the latter and compact it. When the drill-blank has been pushed in to the full extent of the flutes, the twist will have been effected, and the drill may be withdrawn by rotating it axially, as in drawing a screw.

Obviously the present invention is not limited to all of the special details of construction herein shown and described, as these

may be varied in some respects without departing materially from the invention. For example, the adjusting devices of the die-holder and die are not indispensable, and the die and its holder, herein called also the "plunger," might be integral or formed from one piece of metal. If the dies are constructed separately, they may be secured in place by any known means.

The invention is not limited to a plurality of pairs of dies. One or more pairs may be employed. It will be understood that in their movements the die-holders of a pair move in opposite directions simultaneously—that is, they move inward toward the drill-blank at the same time. The slide-rods are disposed one above and the other below for convenience of construction. When the adjusting-block 21 is set and fixed in the holder 14, it forms, in substance, a part of the latter, and the rod 19 may be considered as coupled directly to the holder.

Having thus described my invention, I claim—

1. A machine for the purpose specified, comprising a guide for the fluted drill-blank, a pair of slidably-mounted die-holders alined and adapted to meet end to end in the guideway for the drill-blank, obliquely-set dies in the meeting ends of said holders, and means for imparting a longitudinally-reciprocating movement to said die-holders, substantially as set forth.

2. A machine for the purpose specified, comprising a guide for the fluted drill-blank, a pair of slidably-mounted die-holders alined and adapted to meet end to end in the guideway for the drill-blank, obliquely-set dies in the meeting ends of the die-holders, and means for imparting a reciprocating motion to said holders and dies, said means comprising reciprocating slide-rods, upright rock-shafts, each having on it an eccentric, arms on the rock-shafts coupled loosely to the respective slide-rods, and connecting-rods coupling the respective die-holders to the eccentrics on the said rock-shafts, substantially as set forth.

3. A machine for the purpose specified, comprising a guide for the drill-blank, a plurality of properly-spaced pairs of slidably-mounted die-holders, the holders of each pair being alined and adapted to meet end to end in the axis of the guideway for the blank, the dies set obliquely in the meeting ends of said holders, and means for imparting a reciprocating movement to said holders toward and from the blank in its guide, substantially as set forth.

4. A machine for the purpose specified, comprising a guide for the drill-blank, a pair of longitudinally-alined and slidably-mounted die-holders movable transversely to said guide and meeting end to end therein, obliquely-set dies in the meeting ends of said holders,

mechanism for imparting a reciprocating movement to said holders, and means for adjusting said holder, said means comprising the coupling-block 21, mounted in an aperture in the holder and having oblique grooves 21^a engaging lugs in the holder, and a securing-screw, substantially as set forth.

In witness whereof I have hereunto signed my name, this 18th day of June, 1902, in the presence of two subscribing witnesses.

ROBERT L. BARCLAY.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.