H. A. WILLIAMS.

Device for Manufacturing Twist Drills.

No. 234,362. Patented Nov. 9, 1880.

Fig. 1.

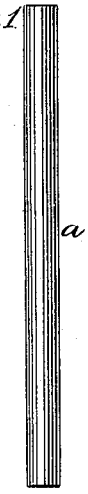


Fig. 2.

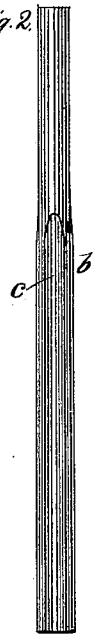


Fig. 3.



Fig. 4.



Fig. 6.

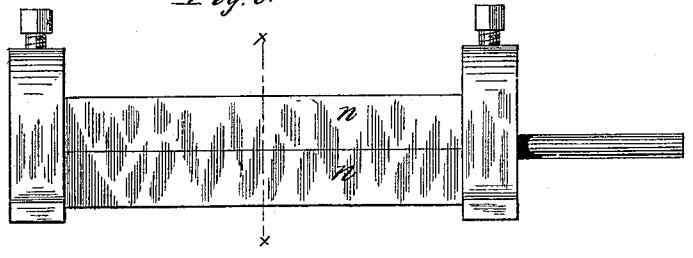


Fig. 7.

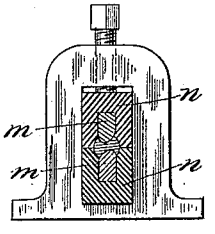
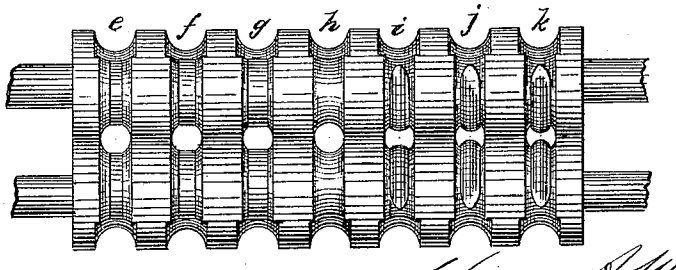


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY A. WILLIAMS, OF TAUNTON, MASSACHUSETTS.

DEVICE FOR MANUFACTURING TWIST-DRILLS.

SPECIFICATION forming part of Letters Patent No. 234,362, dated November 9, 1880.

Application filed September 30, 1879.

To all whom it may concern:

Be it known that I, HENRY A. WILLIAMS, a resident of Taunton, Bristol county, Massachusetts, have invented new and useful Improvements in Devices for the Manufacture of Twist-Drills, of which the following is a specification.

My invention relates to the manufacture of twist-drills by forming the grooves with roller-dies and producing the spiral form by the twisting process.

Such drills have been produced by these methods, and although not as satisfactory as is desirable, yet possessing qualities so superior to those made by the ordinary milling process that it is highly desirable to attain the greatest possible perfection in the devices for so making them.

To this end my invention consists of improvements in the roller-dies for producing the grooves in the drills, and also in the clamping-dies employed to produce the twist of the same.

In the accompanying drawings, Figure 1 represents the blank *a*, from which a drill is to be made. In Fig. 2, *b* represents the same after the grooves *c* have been rolled in it. Fig. 3 is the same after being twisted and ground to the size required and trued. Fig. 4 represents the same thing when completed. Fig. 5 is a side elevation of a pair of rolls for forming the grooves in the blanks, showing the shape of the die-grooves which I make for producing the said grooves of the blank. Fig. 6 is a side elevation of dies to be used for holding the blank after it has been grooved to be drawn by the twisting devices. Fig. 7 is a transverse section of Fig. 6 on line *x x*.

e f g represent three flattening-grooves or roller-dies, such as I make for the first operation. They are essentially round, except the bottom of each half, which is flat. The diameter of the round portions is the same in each, but the flat is increased in each a little successively. These grooves flatten the blanks on opposite sides preparatory to grooving them, and in doing so widen it the other way, in which direction the metal is preferably allowed to be displaced in these operations rather than lengthwise.

h is a round die-groove next in succession, in which the flattened blank is turned up edgewise and compressed a little on its round sides.

i, *j*, and *k* are die-grooves which are circular on the sides the same as the others, but ribbed or tongue-shaped on the bottoms, suitably for grooving the flat sides of the blank. The ribs or tongues of these grooves are progressively increased in development of the form and dimensions for progressively producing the complete grooves in the blank, and after passing the blank through the groove *h*, as above stated, it is passed through *i*, then back through *h*, next through *j*, back again through *h*, then through *k*, and finally through *h*—that is, after passing through each of the tongue-grooves it is passed through *h* before going through the next tongue-groove.

By this combination of roller-dies it is believed that drills of much better quality in respect of the density, toughness, and homogeneity of the metal may be produced than by any other contrivance yet made. The operation is so perfect that I roll small sizes up to a quarter-inch in diameter cold, and the drills so made are found in practice to be much tougher and more durable than when rolled hot.

I believe also that up to half-inch and even larger they may be cold-rolled with equal advantage by these dies. If desired a greater number of tongued die-grooves may, of course, be employed to develop the grooves in the blanks more gradually, and I do not limit myself to the number shown.

After thus grooving the blanks I use the clamping-dies *m* and clamps *n* for holding them for twisting by drawing therefrom with a rotating twister, which clamps and dies differ from those used in auger-twisting in that the dies are ribbed or tongued to correspond with and fit in the grooves of the blanks, and are of equal or greater length than the grooved portion of the blanks, and thereby prevent the crooking and bending of the blanks, that would occur on the side opposite to or back of the side out of which they are drawn if said dies were of less, or materially less, length than the portion of the blank to be twisted. The tendency of a twist-drill blank to crook in this manner is much greater than the flat auger-blank, be-

cause the body of metal is so much greater in proportion to the breadth. Hence the short dies, such as serve for the augers, will not answer for these drills.

I claim as my improvement in devices for manufacturing twist-drills—

1. The series of roller-die grooves *e f g*, rounding or gaging die-groove *h*, and the series of grooves *i j k*, jointly, as herein shown.

2. The combination of the clamps *n* and straight die-bars *m*, fitting into the straight grooves of the drill-blanks and extending the whole length thereof, as set forth.

HENRY A. WILLIAMS.

Witnesses:
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