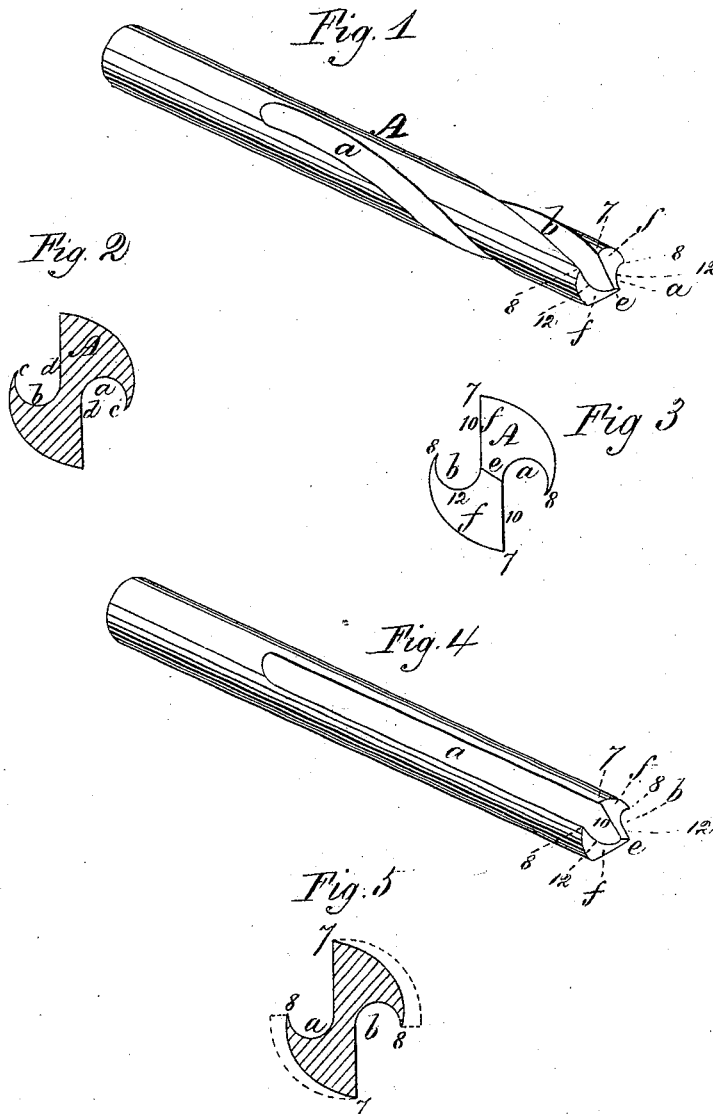


(Model.)

T. P. FARMER.
Art of Manufacturing Twist Drills.

No. 240,984.

Patented May 3, 1881.



Witnesses,
Chas. E. Griffin
W. J. Cambridge

Inventor,
Theodore P. Farmer
per R. E. Sechemacher
Atty

UNITED STATES PATENT OFFICE.

THEODORE P. FARMER, OF WORCESTER, ASSIGNOR TO THE FARMER LATHE-
DRILL AND TOOL COMPANY, OF LEOMINSTER, MASSACHUSETTS.

ART OF MANUFACTURING TWIST-DRILLS.

SPECIFICATION forming part of Letters Patent No. 240,984, dated May 3, 1881.

Application filed September 9, 1880. (Model.)

To all whom it may concern:

Be it known that I, THEODORE P. FARMER, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Twist-Drills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of a twist-drill made in accordance with my invention. Fig. 2 is a transverse section through the same, (enlarged.) Fig. 3 is a plan of the point of the drill, (enlarged.) Fig. 4 is a view of the drill before being twisted. Fig. 5 is a transverse section (enlarged) through the drill represented in Fig. 4.

In an ordinary drill for boring metals the sharp angular-edged chips, as they ascend in the grooves, are rotated in contact with the sides or walls of the hole being drilled, this grinding of the chips against the sides of the hole tending to roughen and unduly enlarge it, while it also produces much unnecessary friction, causing a loss or waste of power.

My present invention has for its object to reduce this friction to a minimum and otherwise improve the construction of drills of this description, so as to cause them to perform their work to better advantage than heretofore; and it consists in a twist-drill formed by first providing the stock with two symmetrical longitudinal grooves lying in parallel but not coinciding longitudinal planes, and cut from opposite sides of the stock, each groove passing by the center on opposite sides thereof, and with a "relief" formed by cutting away each of the opposite sides of the stock, and then twisting said stock in such a manner and to such an extent as to render the grooves spiral with a uniform twist, and also cause the opposite edges of each groove to approach each other, so that while sufficient space or "clearance" is left for containing the chips the distance between the edges of the groove is diminished, thus lessening or contracting the surface area of the body of rough-edged chips, which are brought into contact with and ground against the sides of the hole being bored, where-

by the friction is proportionately reduced, and the undue enlargement of the hole avoided.

In the said drawings, A represents my improved drill, which is first made, in accordance with Letters Patent No. 171,786, issued to me January 4, 1876, with two symmetrical longitudinal grooves, *a b*, as seen in Figs. 4 and 5, lying in parallel but not coinciding longitudinal planes, and cut from opposite sides of the stock, each groove passing by the center on opposite sides thereof.

After the formation of the grooves *a b*, each side of the drill is cut away throughout its entire length, from the cutting-edge 7 of one groove to the nearest edge 8 of the other groove, thus forming a relief, the removal of the intermediate metal between these two points represented by the space included within the dotted lines, Fig. 5, causing the cutting-edges only to come into contact with the sides of the hole being bored, so as to reduce the friction to a minimum, as described in the aforesaid Letters Patent of 1876. The drill is now twisted by means of dies or other suitable mechanism to such an extent as not only to cause the grooves *a b* to extend spirally around the drill with a uniform twist, but to close up or contract the distance between the opposite edges of each groove, and by thus reducing the width of this space *c d*, Fig. 2, it will be seen that the surface area of the body of sharp and angular edged chips necessarily brought into contact with and ground against the sides of the hole being bored as the drill is rotated is diminished to the greatest possible extent compatible with other requirements, and consequently the friction and loss of power from this cause are reduced to a minimum, and the liability of the hole being roughened and unduly enlarged in a great measure obviated, while the sectional area of the groove is left of such size as to leave the necessary clearance or space for the accommodation of the chips as they ascend from the cutting-point. Another advantage is also gained by contracting the sectional area of the groove, which is that it causes the chips to ascend faster than where a groove of larger sectional area is employed.

The point *e* of the drill is formed in the same manner as described in my aforesaid patent

of 1876, the end being ground off on each side at an angle, so as to form the rounded faces *f*, the straight or cutting edges 10 of which project beyond the curved edges 12, so as to come into contact with and cut the metal to be bored.

5 My improved drill is especially adapted for vertical drilling in deep holes, for the reason that the incline of the spiral grooves prevents the chips at the point from being crowded or pressed down by the direct weight of the mass of chips in the grooves above, and thus forced under the cutting lips or edges at the point of the drill, as is liable to occur under like circumstances in a drill provided with straight longitudinal grooves; and I am thus enabled to preserve all of the advantages resulting from the peculiar formation of the grooves and lips or cutting edges at the point, as described in my aforesaid patent of 1876, and at the same time combine therewith the additional advantages resulting from the employment of a spiral groove in vertical drilling.

20 What I claim as my invention, and desire to secure by Letters Patent, is—

As an improvement in the art of making twist-drills, providing the stock with two symmetrical longitudinal grooves lying in parallel but not coinciding longitudinal planes cut from opposite sides of the stock, and passing by the center on opposite sides thereof, and then cutting away each of the opposite sides of the stock, from 7 to 8, to give proper relief, and then twisting said stock in such a manner and to such an extent as to render the grooves spiral, with a uniform twist, and also cause the opposite edges of each groove to approach each other to diminish the surface area of chips brought into contact with the sides of the hole being bored, substantially as and for the purpose set forth.

40 Witness my hand this 25th day of August, A. D. 1880.

THEODORE P. FARMER.

In presence of—

P. E. TESCHEMACHER,
L. B. RUSSELL.