Grier & Boyd,

Making Augers,

No. 54,893. Patented May 22, 1866.

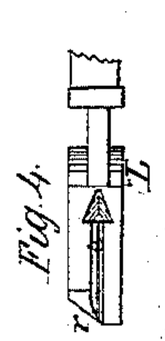
Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 1.

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

W. W. GRIER AND R. H. BOYD, OF HULTON, PENNSYLVANIA.

IMPROVED MACHINE FOR MAKING AUGER-BITS.

Specification forming part of Letters Patent No. **54,893,** dated May 22, 1866.

To all whom it may concern:

Be it known that we, W. W. GRIER and R. H. BOYD, of Hulton, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Making Augers; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use the invention, we will proceed to describe it.

Our invention relates to machines for twisting augers and all similar boring or drilling instruments; and it consists, primarily, of a revolving shaft having a recess in its end for receiving the blank and twisting it, in connection with a series of dies arranged to clasp and hold the auger as fast as twisted, and thereby complete the process of twisting and truing it at a single operation.

Figure 1 is a top-plan view. Fig. 2 is a transverse vertical section taken on the line *x x* of Fig. 1; Fig. 3, a similar sectional view taken on the line *y y* of Fig. 1. Figs. 5, 6, 7, and 8 are views of portions detached.

A represents a strong frame, made of any suitable size and material, in which are mounted two shafts, E, as shown in Fig. 1, each of these shafts being provided with a gear-wheel, F, as shown.

B represents a shaft located between the shafts E, and parallel therewith, and having a pinion, G, mounted thereon, gearing on one side into one of the wheels F, while on the under side it gears into a similar-sized pinion, H, which latter gears into the other wheel F, as shown clearly in Fig. 2, the motion of said wheels being indicated by the arrows marked thereon.

The pinion G is secured to the shaft B by a feather, *e*, as shown in Fig. 2, for the purpose of causing the shaft to turn with the pinion and still permit the shaft to move longitudinally independent of the pinion.

C represents a screw secured to the shaft B, by which, as it is rotated, the shaft is caused to move forward or back, according as it is turned in one or the other direction.

The shaft B has a hole or recess formed in its front end of proper size to receive the blank or bar of which the auger is to be made when forged of the required form and size, the form of the blank being shown by Fig. 5.

On opposite sides of the shaft B, at the front portion of the frame, is located a series of dies, *h*, as shown in Fig. 1, the number being in proportion to the length and twist of the tool to be made. These dies are arranged to meet on the line of the axis of shaft B, and have their adjoining ends or faces so formed as to correspond with the shape of the auger or tool when twisted. These dies *h* are arranged to move longitudinally, and are operated by a corresponding series of cams, *n*, on the shafts E, these cams being so arranged on the shafts E as to strike their respective dies *h* in regular succession, the relative position of the cams being shown in Fig. 3.

Connected with each die *h* is a spring, *o*, for forcing the die back as soon as the cam has passed it, the dotted lines in Fig. 3 indicating their position when moved back.

By this arrangement it will be seen that as the shaft B is rotated in the direction indicated by the arrow in Fig. 1 it begins to move gradually backward, and that as soon as it has receded a distance equal to the thickness of the first die the cam *n* will strike the die and force it forward, this operation occurring simultaneously with both of the first pair of dies and continuing until the shaft B shall have traversed the entire distance occupied by the series of dies.

The thread of screw C for a half-turn at its front end is not inclined, but is formed so that its plane is at a right angle to that of shaft B, whereby the shaft is permitted to make a half-revolution before it begins to move backward. The last portion of the thread of screw C for a quarter-turn is made in a similar manner, thereby permitting the shaft B to make one-quarter of a revolution after it has ceased to move back, the objects of which will be hereinafter explained.

The blank of which the auger is to be formed is first forged by proper dies into the required form, as shown in Fig. 5. A pair of tongs is then provided having a recess, *e*, formed in the face of each jaw, as shown in Fig. 4, (where the face of one jaw is seen,) of proper form and size to receive and firmly grasp the shank and head of the blank.

It will be observed that one corner is cut from the point of each jaw of the tongs, as shown at *r*, this portion being curved to correspond with twist to be given to the auger. When the two jaws of the tongs are placed face to face ready for use the curved portion of one jaw will be above and the other below, exactly corresponding to the twist of the auger when completed.

The blanks, being properly heated in a suitable furnace or fire, are placed properly in the tongs L, and shoved into the hole in the end of shaft B, the tongs being held firmly in the recess *t* in the front of the frame A, as shown in red in Fig. 1. Motion being imparted to the shaft B, it begins at once to twist the blank, the curved portion of the tongs serving as a die to regulate the form of the twist at the beginning, and while the point *b*, that feeds the screw C along, remains in the straight portion of the thread at the rear end of C, and which will continue until the shaft B has made a quarter of a revolution. As the motion of the shaft continues it begins to recede as the point *b* enters the inclined portion of the thread, thereby drawing the shaft off from the blank and twisting it at the same time. As soon as the shaft has receded a distance equal to the thickness of the first set of dies *h* the cams *n* come in contact therewith and force the dies forward, causing them to close upon the twisted portion of the blank, this operation being continued by each pair of dies successively, thereby serving to form the twists with perfect regularity, and at the same time holding the twisted portion firm and preventing it from being twisted any more while the remaining portion is being twisted. By the time that the last pair of dies is closed the point or guide *b* will have entered the straight portion of the thread at the front end of screw C, and which, as previously explained, extends half-way around the shaft B. By this operation the blank will be twisted as shown in Fig. 6, the lips protruding, as indicated by the red lines. The straight portion of the screw-thread permits the shaft B to still make a half-revolution, by which the lips are given the proper set or inclination, and thus finished ready for sharpening. When the operation is thus completed the motion of the shaft B is reversed, the twisted blank having been removed, by which the parts are restored to their original position, ready for twisting another.

It is obvious that any number of dies may be used, and that they may be made of any desired thickness, the number of the cams being made to correspond. It is also obvious that any style or form of auger, bit, or drill may be twisted by a machine constructed and operating on this plan, the form of the hole in the shaft B being made to conform to the form of the blank and the face of the dies conformed to the twist of the tool. For instance, in Fig. 7, I represents the end of shaft B fitted to twist that style of bits which are twisted like a corkscrew, *l* representing the dies to be used therewith.

Fig. 8 represents a cross-section of the blank necessary to form the twist-drill, and which may be readily completed by this machine, whereby a great saving will be effected over the process now in use of cutting the twisted groove in them by means of milling-tools.

It will, of course, be understood that a different machine will be used for each of the various sizes of tools to be made, the dies, cams, and screw being all arranged to operate conjointly and proportioned each to the other.

By arranging the cams so that they can be adjusted on the shafts E and changing the dies *h* and screw C a variety of tools having various twists and sizes may be formed on the same machine; but in practice it will doubtless be found preferable to have a machine adapted to make each of the different sizes separately.

Having thus fully described our invention and its operation, what we claim, and desire to secure by Letters Patent, is—

1. A machine for twisting augers, bits, drills, and similar articles, and consisting, essentially, of the shaft B and a series of dies, arranged to operate substantially as and for the purpose set forth.

2. The rotating and longitudinally-moving shaft B, having a hole made longitudinally therein of proper size and form to receive the blank and hold it while being twisted and drawn out, as shown and described.

3. In combination with said shaft B, the tongs L, having their jaws constructed as shown and described.

4. In combination with the shaft B, the screw C, with its thread constructed as described, for the purpose of imparting to the shaft an intermittent longitudinal movement, while it has a continuous rotary movement during the operation of twisting the blank, for the purpose of both twisting the blank and setting the lips at one operation.

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