(No Model.)

E. HORTON.

TOOL FOR TURNING METAL.

No. 316,787. Patented Apr. 28, 1885.

Fig. 1

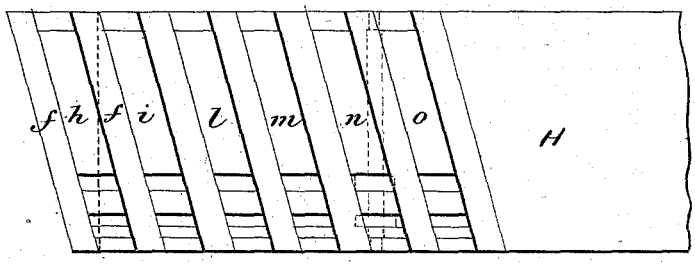


Fig. 2.

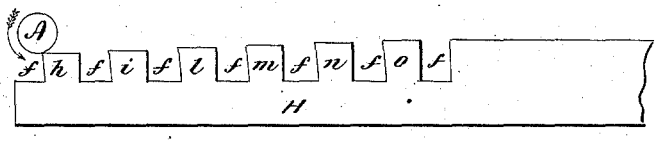


Fig. 3

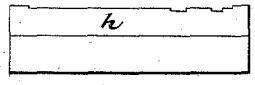


Fig. 4

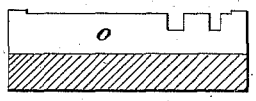
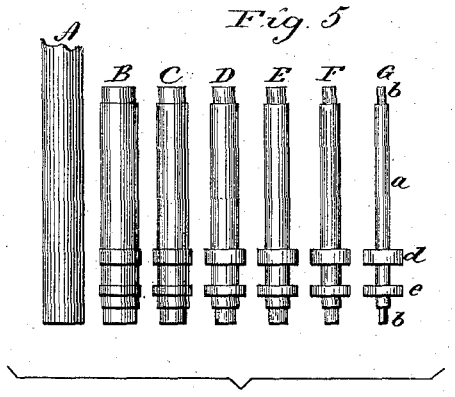


Fig. 5



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UNITED STATES PATENT OFFICE.

EVERETT HORTON, OF NEW HAVEN, CONNECTICUT.

TOOL FOR TURNING METAL.

SPECIFICATION forming part of Letters Patent No. 316,787, dated April 28, 1885.

Application filed February 4, 1885. (No model.)

To all whom it may concern:

Be it known that I, EVERETT HORTON, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Tools for Turning Metal; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a top view of the cutter-bar, showing the cutting-ribs and recesses; Fig. 2, a side view of the same; Fig. 3, an end view looking toward the first rib, H; Fig. 4, a transverse section between the last two ribs, showing face view of the last cutting-rib; Fig. 5, a side view of the blank and of the finished pinion, showing the blank as acted upon by the successive cutters to produce the final complete pinion.

This invention relates to the construction of a tool for turning small articles of metal, specially designed for what are called "clock-pinions," and in which the pinion and arbor are turned at the same time or in one piece, such for illustration as that seen at G, Fig. 5. These articles are necessarily of small diameter, and the turning, as heretofore practiced, has been by hand, and has required the most expert and expensive workmen.

The object of my invention is the construction of a tool whereby the work may be performed automatically, or by unskilled labor; and it consists in a tool composed of a series of cutting-edges parallel with each other, but inclined across the path of movement, and each successive cutting-edge rising above the preceding cutting-edge, with a recess between successive cutting-edges, and the surface back of all the cutters in a plane parallel with each other and to the path of movement of the cutter, whereby the several cutting-edges will successively operate upon the work, and the flat surface back of the cutting-edge serve as a support for the work, as more fully hereinafter described.

In representing the cutter I show it adapted to turn a pinion, such as seen at G, Fig. 5. This consists of an arbor, *a*, terminating at both ends in a gudgeon, *b*, with collars *d e* applied to or formed on the arbor concentric with it, and so that a series of holes drilled in the collars parallel with the axis, and in a circle concentric with the axis, will permit the introduction of wire pins through the holes bored in the collars, the said pins to form the teeth of the pinion. I illustrate this only as a matter of convenience, as it shows the adaptation of the cutter to make the arbor and collars complete from a single piece of wire.

The cutter consists of a bar, H, which in width is equal to or somewhat greater than the length of the arbor to be wrought, and the bar is adapted to be secured in the tool-stock of a lathe or similar machine, so as to be moved by the tool-stock in like manner as is the tool for common turning purposes. On the upper or working surface of the bar, and diagonally across it, several grooves, *f*, are made, leaving diagonal ribs *h i l m n o*, and so on, as many as may be desired, the forward or advancing edge of the ribs being undercut, so as to produce a cutting-edge at the upper forward angle of the ribs. The height of these ribs from the plane of the bar gradually increases from the forward rib, *h*, rearward, and as seen in Fig. 2; but the upper surface of the ribs is parallel with the plane of the bar, and the surface of each bar parallel with all the others. Across the upper surface of each rib recesses are made at right angles to the path of movement of the cutter, the recess in each successive rib corresponding to the work to be performed. The face of the first rib, *h*, is as seen in Fig. 3, and is adapted to make the first cut upon the blank. The last rib, *o*, is adapted to make the last cut, as seen in Fig. 4, the shape of the last rib corresponding to the surface of the complete arbor. (See G, Fig. 5.)

The cutter is arranged in the lathe, as before described, and the wire or rod introduced in the usual manner of applying such rods for turning. The cutter, however, is arranged to pass below the rod, as seen in Fig. 2, A representing the rod, and the rod therefore revolves backward, as indicated by the arrow in Fig. 2—that is to say, the revolution of the article is in the opposite direction to what it is in the usual method of turning. Thus ar-

ranged, the cutter passes beneath the bar. The ribs being inclined, the forward point first strikes the rod and makes a cut at that point, the advancing cutter gradually working the whole length of the rod; but as the cut advances from the extreme forward end, the flat surface immediately back of the cutter forms a support upon which the blank will rest, that surface being flat and corresponding to the cut which has been made. The first cut, as here represented, is indicated at B, Fig. 5. As the cutter advances the forward end of the second cutter strikes the blank before the other end of the first cutter shall have left its cut. The work will then be resting on the first cutter as the second cutter commences its work, so that the work will be supported by the first cutter during the portion of the work of the second cutter, the second cutter in its turn becoming the support for the work, and so on each successive cutter. The successive cuts are represented as at C D E F, Fig. 5, G representing the final or complete cut.

In Fig. 1 the position of the work is indicated in broken lines as being completed by the next to the last cutter, and the last or finishing cutter just beginning its work. Under this arrangement it will be observed that the work is resting throughout a very large portion of its length of the cutter forward of the one which is just commencing its work, and thus affords a firm support for the work.

The tendency of the blank being worked upon in revolving is to draw it down onto the cutter; but because the surface back of the cutter is flat, and in the plane of movement of the cutter, that surface follows the cut and prevents the tendency of the arbor to spring down under the action of the cutter, the back surface of the cutter forming a support against its own action upon the work.

The number of cutters may be increased or diminished according to the work, and the shape of the upper surface of the cutters will be adapted to the work to be done, it only being necessary that the cutters shall stand inclined across the path of movement, and their surfaces back of their cutting-edges flat and parallel with the path in which the cutter moves.

The recesses *f* between the cutters are for the escape of chips, into which chips enter as the work progresses, and from which they may be readily brushed.

In the use of this cutter a simple common lathe may be employed as the machine, and one attendant, having no other mechanical skill than that sufficient to enable him to put in a blank and take out a finished piece, may tend several machines, as the time required for turning one pinion will enable him to remove finished work and introduce new blanks into other machines, so that a very great saving is produced by this machine over the method heretofore practiced, and it is adapted to turning of the smallest arbors and pinions used in clock-work, owing to the fact that the back of the cutter forms a support or rest for the work close up to the point where the cutter is at work, and follows the cut throughout the work, the succeeding cutter commencing its work before the blank shall have escaped from the support given it by the back of the preceding cutter.

I claim—

1. The herein-described tool for metal turning, consisting of the cutter-bar constructed with a series of ribs diagonally across it, each rib presenting a cutting-edge, and each successive cutting-edge slightly above the previous cutting-edge, and all the ribs back of the cutting-edge flat upon their upper surface, the said surfaces parallel with each other and with the path in which the cutter is to be moved, substantially as described.

2. The cutter-bar H, constructed with a series of ribs diagonally across it, leaving corresponding diagonal recesses between the ribs, each rib presenting a cutting-edge, the forward edge of each rib formed as a cutter, each successive cutting-edge slightly above the preceding cutting-edge, the upper surface of all the ribs back of the cutting-edge flat, parallel with each other, and also parallel with the path in which the cutter is to be moved, substantially as described.

EVERETT HORTON.

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