(No Model.)

M. WEISS.

HOLLOW MILL.

No. 418,903. Patented Jan. 7, 1890.

Fig: 1.

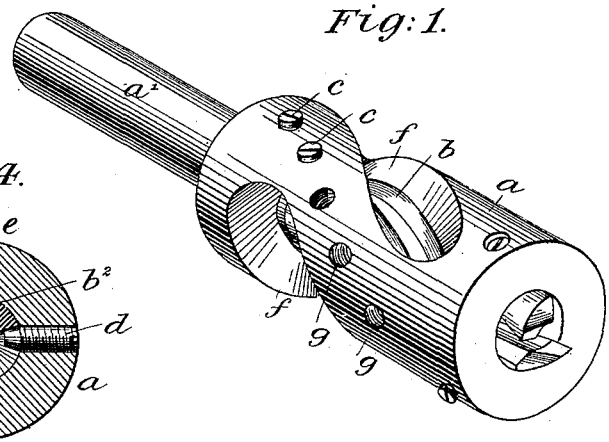


Fig: 4.

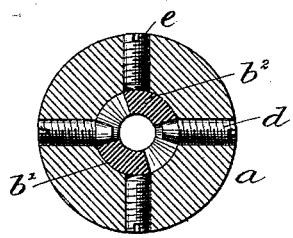


Fig: 2.

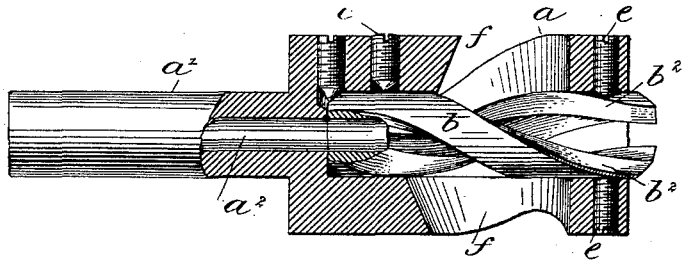


Fig: 3.

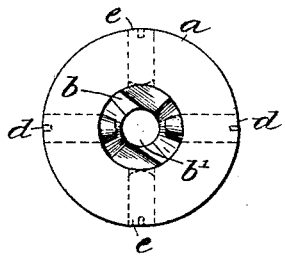


Fig: 5.

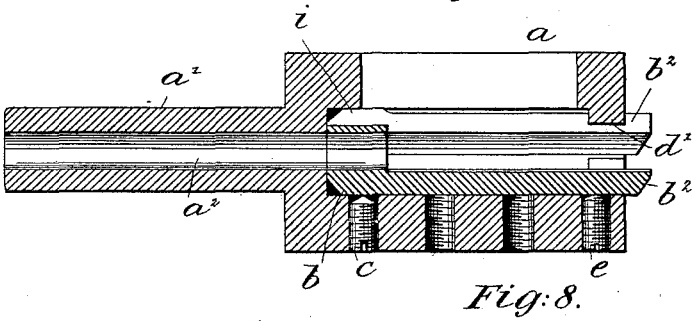


Fig: 6.

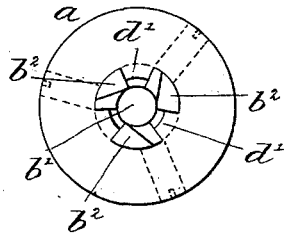


Fig: 7.

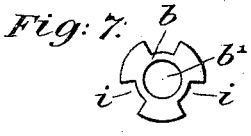
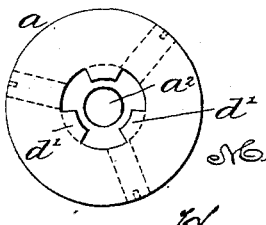


Fig: 8.



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HOLLOW MILL.

SPECIFICATION forming part of Letters Patent No. 418,903, dated January 7, 1890.

Application filed May 17, 1889. Serial No. 311,191. (No model.)

To all whom it may concern:

Be it known that I, MORRIS WEISS, a citizen of the United States, and a resident of Brooklyn, Kings county, New York, have invented certain Improvements in Hollow Mills, of which the following is a specification.

My invention relates to that class of machinists' tools known as "hollow mills," and which are employed for cutting down shoulders or screws and the like; and the object of the invention is, in part, to produce a mill with a tool having long cutters that may be used for a long time and require only to be ground occasionally, like a twist-drill, to keep them in order, and in part to provide such a mill with stops behind the cutters, whereby they are steadied and braced near the cutting-edge.

My invention will be fully described hereinafter, and its novel features carefully defined in the claims.

In the accompanying drawings, illustrative of my invention, Figure 1 is a general perspective view of the mill, and Fig. 2 is a longitudinal sectional elevation of the same. In this latter view only the tubular holder is represented in section. Fig. 3 is an end or face view of the mill, and Fig. 4 is a transverse section of the same in the plane of the stop-screws. Figs. 5, 6, 7, and 8 illustrate a slightly-different construction of the mill. In these views, Fig. 5 is a longitudinal sectional elevation. Fig. 6 is an end or face view. Fig. 7 is a view of the inner end of the tool, and Fig. 8 is an end view of the tool-holder.

In describing my invention I will first refer to the mill as represented in the first four figures.

a is the holder, which is in the nature of a tubular socket, and is provided with a stem *a'* for securing it in the turret of the lathe.

b is the tool, (as a whole,) which is also tubular in form, its external diameter being such as to cause it to fit snugly in the socket in the holder *a*. The bore *b'* in the axis of the tube will be of the proper diameter to receive and fit the shank of the screw or other piece on which the shoulder is being formed, and in the bottom of the holder and its shank will be or may be formed a bore a^2, which forms a continuation or prolongation of the bore in the tool *b* when the latter is in place.

The tool *b*, which is at first a simple tube, is divided longitudinally, except at its butt or base, into two or more cutters b^2 by milling it out spirally, somewhat as a twist-drill is milled out from a solid cylinder. This gives to the united cutters a spiral form, as clearly shown; but each cutter will have a substantially uniform cross-section at all points in its length.

Suitable cutting-edges are formed on the ends of the respective cutters in a manner that will be well understood by any competent machinist, and the tool is inserted in the socket in the holder and secured therein by a suitable set screw or screws *c*. I prefer to use two securing-screws *c*, one pointed and the other flat or blunt at its end; but this is not absolutely essential. At the start the tool may be made to extend to the bottom of the socket with its cutting end projecting a little beyond the face of the holder, somewhat as represented in Fig. 2; but as the ends of the cutters are worn away by frequent grinding the tool will be drawn out and secured in its new position by the set-screws *c*. As the cutters are long and slender it is essential to brace and steady them near the cutting-point to prevent them from springing or "chattering." This is effected by providing each cutter b^2 of the tool with a back stop, against which it may press when the tool is cutting. Fig. 4 best illustrates these stops *d*, which are screws that pass through the wall of the holder *a* and have conical points which take behind the respective cutters near the end of the holder.

In order to further steady the cutters and to enable them to be sprung inward a little, so as to cause them to fit more closely the shank of the screw on which the shoulder is being formed, I provide the holder with other screws *e*, one for each cutter, as clearly shown in Fig. 4. These latter screws bear directly on the outer faces of the cutters and serve as clamping-screws.

In order to provide an outlet and clearance for the chips and débris, the holder has spirally-formed apertures *f* in its sides arranged opposite to the respective spaces between the

spiral cutters of the tool, and, as the stops *d* compel the tool to turn spirally as it is drawn out, I arrange the holes *g* for the reception of the screws *c* spirally, so that these screws may always bear properly on the outer face of the spiral cutter.

The object in making the cutters spiral in form is to provide the proper undercut bevel at the cutting end required in taking a rank cut. However, for some classes of work the united cutters may be straight, and there may be more than two cutters.

In Figs. 5 to 8, inclusive, is illustrated a mill embodying my improvements, in which the cutters of the tool are three in number, and straight, and, in lieu of stops in the form of screws, stops *d'* are formed on the holder *a* at its face. These stops may be integral or be secured permanently to the holder, and they may, as shown, fill the spaces between the cutters.

In order to permit the tool *b* to be introduced into the socket of the holder, grooves *i* are formed in the butt or base of the tool (see Fig. 7) to allow these stops to pass.

The manner in which the mill is to be used will be obvious to any good mechanic.

Having thus described my invention, I claim—

1. The combination, with the tubular tool having two or more cutters united at their bases, of the socketed holder adapted to receive said tool and provided with stops arranged behind each cutter of the inserted tool near the face of the holder, substantially as and for the purposes set forth.

2. The combination, with a socketed holder therefor, of a tubular tool comprising two or more cutters united at their bases, said cutters each having a substantially-uniform cross-section at all points in its length.

3. The combination, with a socketed holder therefor, of a tubular tool comprising two or more like elongated and spirally-formed cutters united at their bases, substantially as set forth.

4. The combination, with the tool comprising two or more united cutters, of the socketed holder provided with the stop-screws *d* near its end, said screws having their tips arranged behind the respective cutters of the tool, as set forth.

5. The combination, with the tool comprising two or more united spiral cutters, of the holder provided with a socket to receive said tool, a shank, stop-screws to steady the cutters, a securing-screw to hold the tool in place, a series of holes to receive said screws, and lateral apertures for the passage of the chips, substantially as set forth.

6. The combination, with the socketed holder provided with stops for the cutters and with clamp-screws *e* for the same, of the tool adapted to fit in said holder comprising two or more elongated and united cutters, as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

MORRIS WEISS.

Witnesses:
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J. D. CAPLINGER.