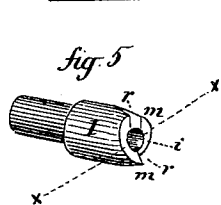
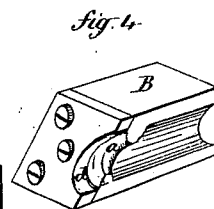
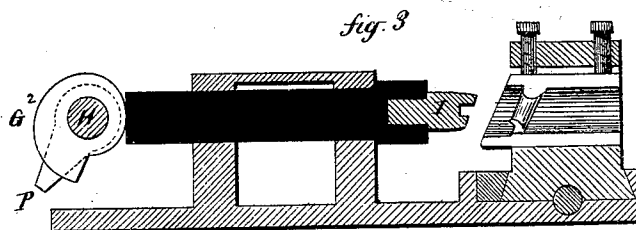
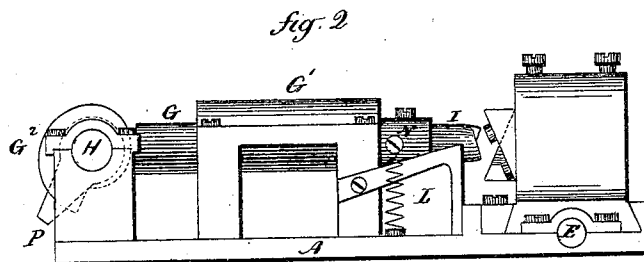
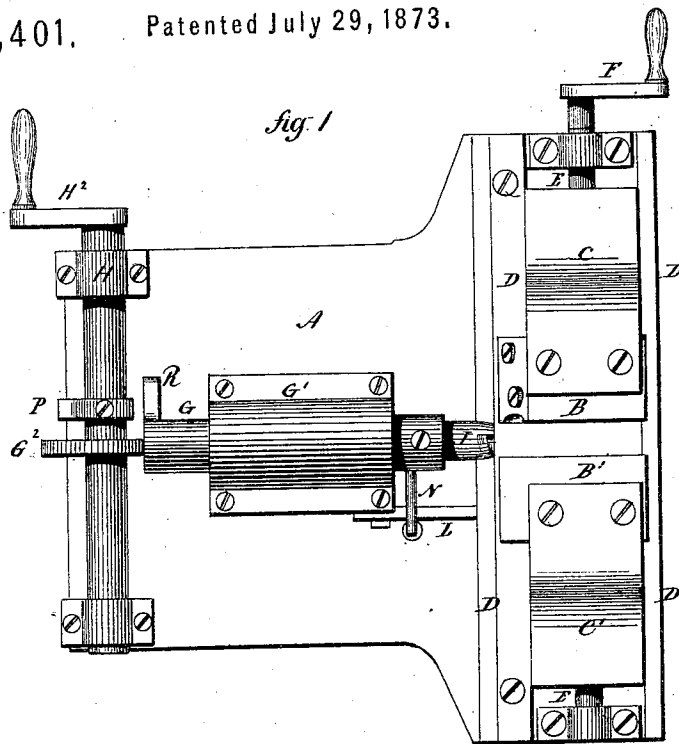


J. SWAN.
Machines for Forming Auger-Bits.
 No. 141,401. Patented July 29, 1873.



Witnesses
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JAMES SWAN, OF SEYMOUR, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR FORMING AUGER-BITS.

Specification forming part of Letters Patent No. **141,401**, dated July 29, 1873; application filed April 10, 1873.

To all whom it may concern:

Be it known that I, JAMES SWAN, of Seymour, in the county of New Haven and State of Connecticut, have invented a new Improvement in Machine for Forming Auger-Bits; and I do hereby declare the following, when taken in connection with the 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; Fig. 2, a side view; Fig. 3, a longitudinal central section; Fig. 4, a perspective view of one part of the stationary die upon which the lips are formed; Fig. 5, a perspective view of the die which forms the under side of the lips; Fig. 6, the blank prepared for the machine; and in Fig. 7, the bit as it comes from the machine.

This invention relates to an improvement in forming the head or cutting-end of auger-bits, the object being to shape the lips and at the same time to draw up the spurs and shape the point. The blank is prepared the same as for the usual upsetting process, as seen in Fig. 6. My improved machine consists in a pair of dies having a rib which clamps the blank immediately below that point where the lips are to be formed, leaving sufficient metal projecting beyond these ribs to form the lip and point—these dies extending forward of the ribs, and enlarged in diameter according to the clearance to be given, and the forward surface of these ribs being of the form required for the inner surface of the floor-lips; and combined with these dies a follower or die which has a cavity in its center to give the required shape to the point, and also shaped so that by the movement of it toward the holding-dies to compress or upset the metal of the blank within said die, it shall expand the head for the clearance and draw up the spurs at the same time within the space outside these ribs.

A is the bed of the machine; B B', the holding-dies placed upon slides C O', which are arranged in guides D so as to slide transversely across the bed A, and in order that they may move together simultaneously toward or from each other I arrange a shaft, E, threaded with a right-and-left hand thread, the right-hand thread working in a corresponding nut

under one slide, and the left-hand thread working in a corresponding nut on the other slide, so that turning the said-shaft by means of the crank F, the two slides will move simultaneously toward or from each other, so that the blank placed between the two dies will be firmly grasped for the operation of the machine, or released therefrom after operation. These dies B B' are formed, as seen in Fig. 4. Near the forward end a spiral rib, *a*, is arranged to fit into the last twist of the blank, Fig. 6, its forward surface corresponding to the form desired to be given to the inner surface of the lip. Each part of the die is provided with a corresponding rib, so that in a double-lip auger one lip will be formed on each rib. Forward of this rib the die or cavity is enlarged and constitutes a recess, *d*, while back of the rib the diameter of the cavity corresponds to the diameter of the body of the auger; but this recess *d* is as much larger than the cavity in the rear as is desired for the clearance of the lip, it being understood that the cut of the auger must be a little larger than the diameter of the body. The faces of the dies are oblique to each other and to their axis, as seen in Fig. 2—that is to say, are parallel with the ribs. In a line central with the dies B B' a mandrel, G, is arranged in a head, G', and so as to slide longitudinally therein and be rotated. The mandrel is moved forward by a cam, G², on a driving-shaft, H, the said shaft supported in bearings H¹, and caused to revolve by the application of power thereto in any convenient manner, here represented as by means of a crank, H². At the end of the mandrel next to the holding-dies a die, I, is placed, the die shown detached in Fig. 5. Centrally in the said die a cavity, *i*, is made of the form of the point *n* of the bit, and from the points *m* upon opposite sides of the said die I the peripheral surfaces converge toward the axis of the die, so as to form shoulders *r* in line with these points; and the points *m* are salient in virtue of the oppositely-oblique faces of the die, said form corresponding in obliquity to the faces of the holding-dies.

The blank, Fig. 6, having been properly heated, is placed between the dies B B', as before described, and the dies closed thereon, so as to hold the blank firmly, then the die I

being thrown forward the point of the blank enters the cavity *i*, and the end of the die strikes the blank, upsets the metal down onto the rib *a*, and expands it into the recess *d*, and forces a portion of the metal of the blank up into the space between the periphery of the die I and the wall of the recess *d*, to form the spurs S, as seen in Fig. 7.

In order to cause the metal to take, during the upsetting action, the proper direction, I give at the time of upsetting a slight rotation to the die by means of an incline, L, upon which an arm, N, extending from the mandrel rides, the incline L turning the mandrel G to the extent of the inclination as it advances. This tends to throw the metal forward to form the floor-lips *b*, Fig. 8; and in order to the more perfect completion of the head after it is thus formed, I give to the mandrel at that time a quick partial revolution by means of a cam, P, which, after the mandrel has been moved forward, strikes an arm, R, extending at right angles from the mandrel G, and causes a quick partial revolution of the mandrel. The finishing of the head at this time is accomplished by the peculiar shape of the end of the die I, as before described. The upsetting takes place about on the line *xx* of Fig.

5, or a little back of the extreme points *m*; hence, in the last partial rotation the die works upon the metal from the line *xx* to the extreme points *m*, drawing the metal to the extent of that inclination. A spring on the mandrel, not seen, serves to draw it back after the head is formed.

I claim as my invention—

1. In a machine for forming the heads of augers, the dies B B', having the rib *a* and the enlarged recess *d* forward of the said rib, and upon which rib and within said recess the head is formed.

2. In combination with the dies B B', the die I, having a partial rotation imparted thereto as it advances toward the holding-dies, substantially as set forth.

3. In combination with the dies B B', the die I, provided with a mechanism substantially such as described, for imparting a partial rotation thereto after it has arrived at its extreme forward movement, substantially as set forth.

JAMES SWAN.

Witnesses:

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