(No Model.)

J. BAILEY.

DIE FOR FORMING AUGER BITS.

No. 419,622. Patented Jan. 21. 1890.

Fig. 1.

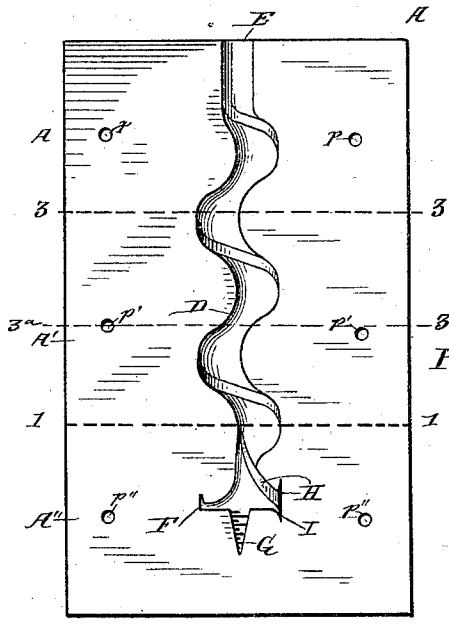


Fig. 2.

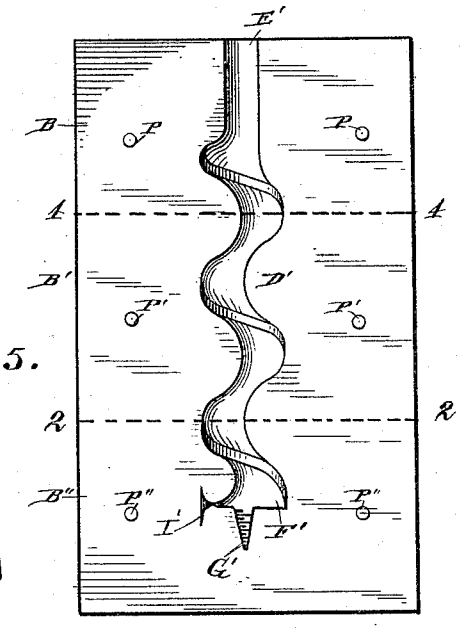


Fig. 5.

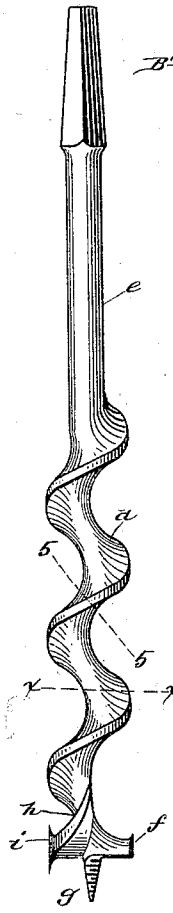


Fig. 3.

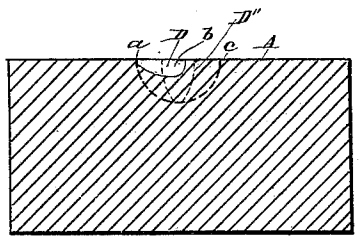
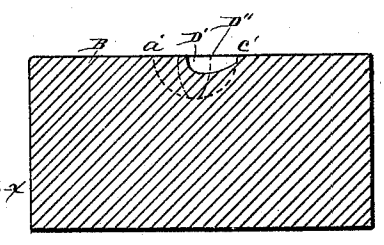


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOSIAH BAILEY, OF WILMINGTON, OHIO.

DIE FOR FORMING AUGER-BITS.

SPECIFICATION forming part of Letters Patent No. 419,622, dated January 21, 1890.

Application filed July 22, 1889. Serial No. 318,336. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH BAILEY, a citizen of the United States, residing at Wilmington, in the county of Clinton and State of Ohio, have invented certain new and useful Improvements in Dies for Forming Single Spiral Augers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to produce a set of two half-dies in one or more transverse sections, each of which dies shall have a recess of such shape that when the faces of said dies are pressed together the outlines of said recesses shall exactly correspond, and any mass of metal placed between said dies shall be pressed into the shape of a spiral auger of a certain peculiar form herein to be described.

In the drawings, Figures 1 and 2 represent the faces of the two corresponding half-dies. Figs. 3 and 4 represent cross-sections of Figs. 1 and 2 upon the lines 3 3 and 4 4, respectively. Fig. 5 represents an auger of the peculiar shape formed by my dies.

The auger herein referred to is of the shape described and claimed in United States Patent No. 413,159, granted to me October 22, 1889. It has the characteristic features of form and the advantages of operation duly set out in the specification of the said patent, as follows:

The main single spiral web *d*, terminating in the chip-removing edge and lip *f*, allows the utmost space for the removal of the chips after they have been broken up by the edge and lip *f*. At the same time the necessary strength is preserved by making the inner edge of the main spiral blade, that which forms the axis of the spiral, of sufficient thickness, and then allowing said blade to taper off to a considerable degree of thinness at the outer edge. Thus is produced a shape which combines and attains the conflicting objects of strength and freedom from choking. The cutter *i* is firmly mounted on the short auxiliary spiral *h*, and performs its office without in any way interfering with the upward passage of the chips. The power for driving the auger is transmitted through the stock *e* and the auger is drawn down to its work by the screw-point *g*.

The dies for forming this auger consist of two half portions A and B, which have in their faces the main zigzag recesses D D′, the outlines of which exactly correspond when the dies are placed one upon the other face to face. These recesses are so shaped that when measured at any point along a line perpendicular to the spiral formed by them—such as line 5 5 of Fig. 5—they will be thickest at that portion nearest the axis of the spiral—that is, toward the inner edge of the blade, and grow thence constantly thinner toward the outer edge of said blade. Thus the cross-section of this recess in each die is a segment of an oval with the larger end toward the central line of the die.

In Fig. 3 the half oval D in full lines shows the section on line 3 3 of Fig. 1, while the dotted segment of an oval D″ shows a section on line 3^a 3^a of Fig. 1. The thick portion *b* of the recess is always toward the axis of the spiral, and from this portion the recess grows thinner constantly toward the edge in all the three sections D D′ D″, as shown. The semicircle *a c* indicates the limiting semi-cylindrical volume within which the recess D is confined and beyond which it at no point extends. In the same way the semicircle *a′ c′* outlines the extreme edge of the recess D′ in the die B.

It is of course evident that the sections D, D′, and D″ are taken on planes *x x* perpendicular to the axis of the auger spiral, and consequently their dimensions are not exactly the same as those which would be obtained by measuring along the line 5 5 and along lines parallel to 5 5, in the manner hereinbefore described; but the characteristics of the intersecting curves are the same, so that the sections D, D′, and D″ will do for purposes of illustration to give an idea of the general shape of the cross-section of the blade.

The recess H (shown in Fig. 1) forms the short auxiliary spiral *h* for supporting the cutter. This cutter is formed by the recesses I I′. The chip-removing edge and lip *f* on the end of the main spiral web are formed by the recesses F F′. The point *g* is similarly formed by the recesses G G′. The stock *e* is formed by the recesses E E′.

I have shown the recesses G G′ with spiral grooves for forming the screw-thread on the point *g*. In some cases it might be desirable to have these recesses plain and cut the thread afterward by the proper tools.

When the auger to be formed is of small diameter and not of great length, it is possible to form the entire tool from point to stock by two single dies A and B; but when the auger is of considerable diameter and length it is necessary to divide the dies into transverse sections A B A′ B′ A″ B″, &c., upon the lines 1 1, 2 2, 3 3, and 4 4. Then only one pair of corresponding sections will be used at a time. In this way the amount of metal being operated upon at any time is small, and consequently the pressure necessary to drive it into the recesses of the dies will not be great enough to break or crush the dies themselves.

In operation I use preferably a rod of iron which is heated to a high temperature and placed between the two dies or between two corresponding sections thereof. The dies are then forced together by the blows of a hammer or by steady pressure—such as that of a hydraulic press—and the portion of the iron rod between the dies is formed into the shape of an auger.

The dies may be guided by the pins P P′ P″, &c., entering the holes *p p′ p″*, &c., so that the opposing recesses will register exactly one with another.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. A set of dies for forming an auger with a single main spiral blade, each of which dies has a zigzag recess of constantly varying cross-section, said recess being so shaped that when at any point it is measured along a line perpendicular to the blade of the main spiral which would be formed therein the recess is thickest at that portion which forms the axis of the spiral and grows thence constantly thinner out toward that portion of the recess, or of the corresponding recess in the other die, that forms the edge of the main spiral blade, substantially as described.

2. A set of dies made in one or more transverse sections for forming an auger with a single main spiral blade, each of which dies has a zigzag recess of constantly varying cross-section, said recess being so shaped that when at any point it is measured along a line perpendicular to the blade of the main spiral which would be formed therein the recess is thickest at that portion which forms the axis of the spiral and grows thence constantly thinner out toward that portion of the recess, or of the corresponding recess in the other die, that forms the edge of the main spiral blade, said dies having also the corresponding recesses E E′, for forming the stock of the auger, the recesses G G′, for forming the point, the recesses I I′, for forming the cutter, the recesses H H′, for forming the auxiliary supporting spiral for said cutter, and the recesses F F′, for forming the chip-removing edge and lip, substantially as described.

JOSIAH BAILEY.

In presence of—
A. E. CLEVENGER,
J. M. GUSTUS.