

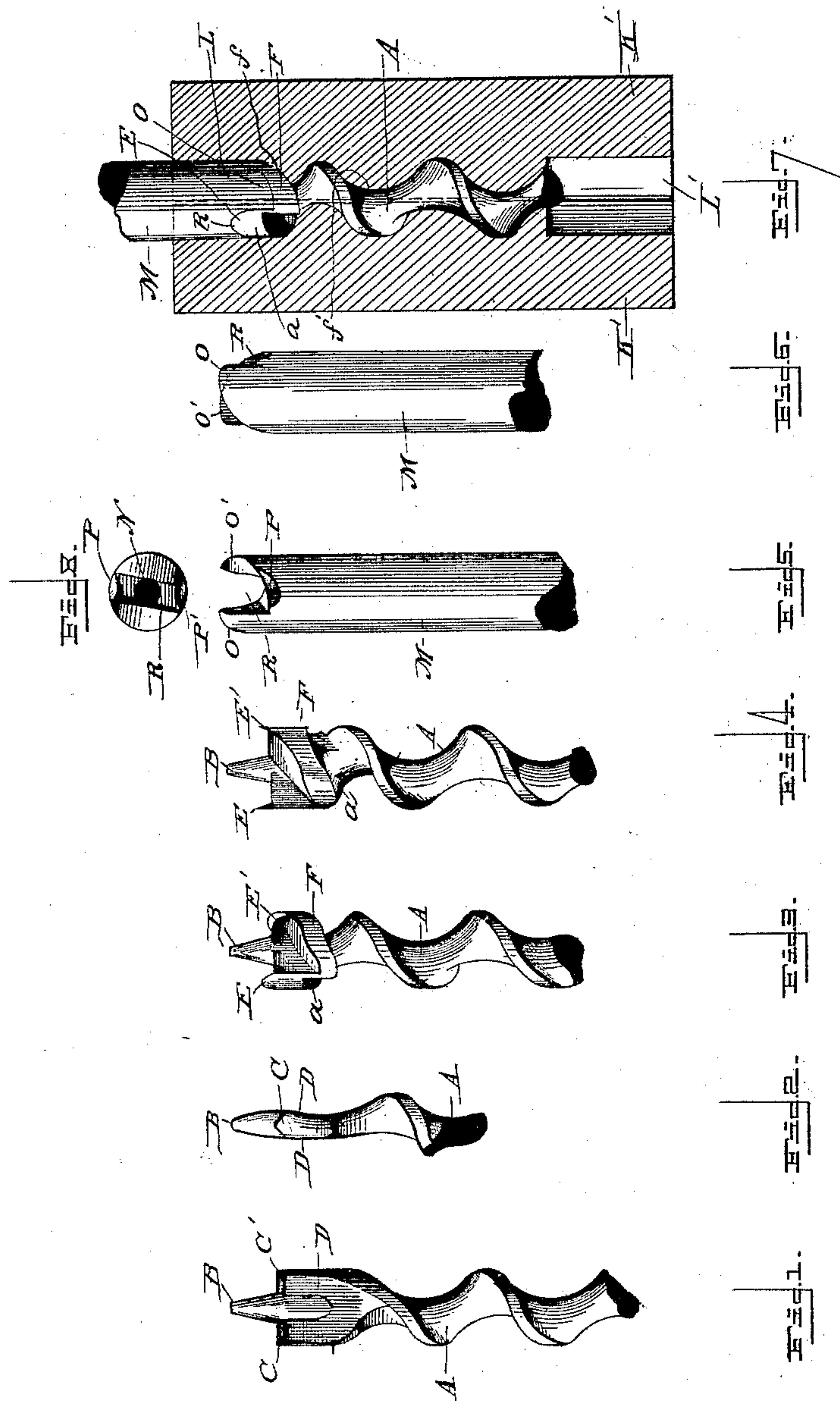
(No Model.)

2 Sheets—Sheet 1.

A. O. SPRING.  
MANUFACTURE OF SINGLE SPIRAL AUGERS.

No. 453,052.

Patented May 26, 1891.



WITNESSES  
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(No Model.)

2 Sheets—Sheet 2.

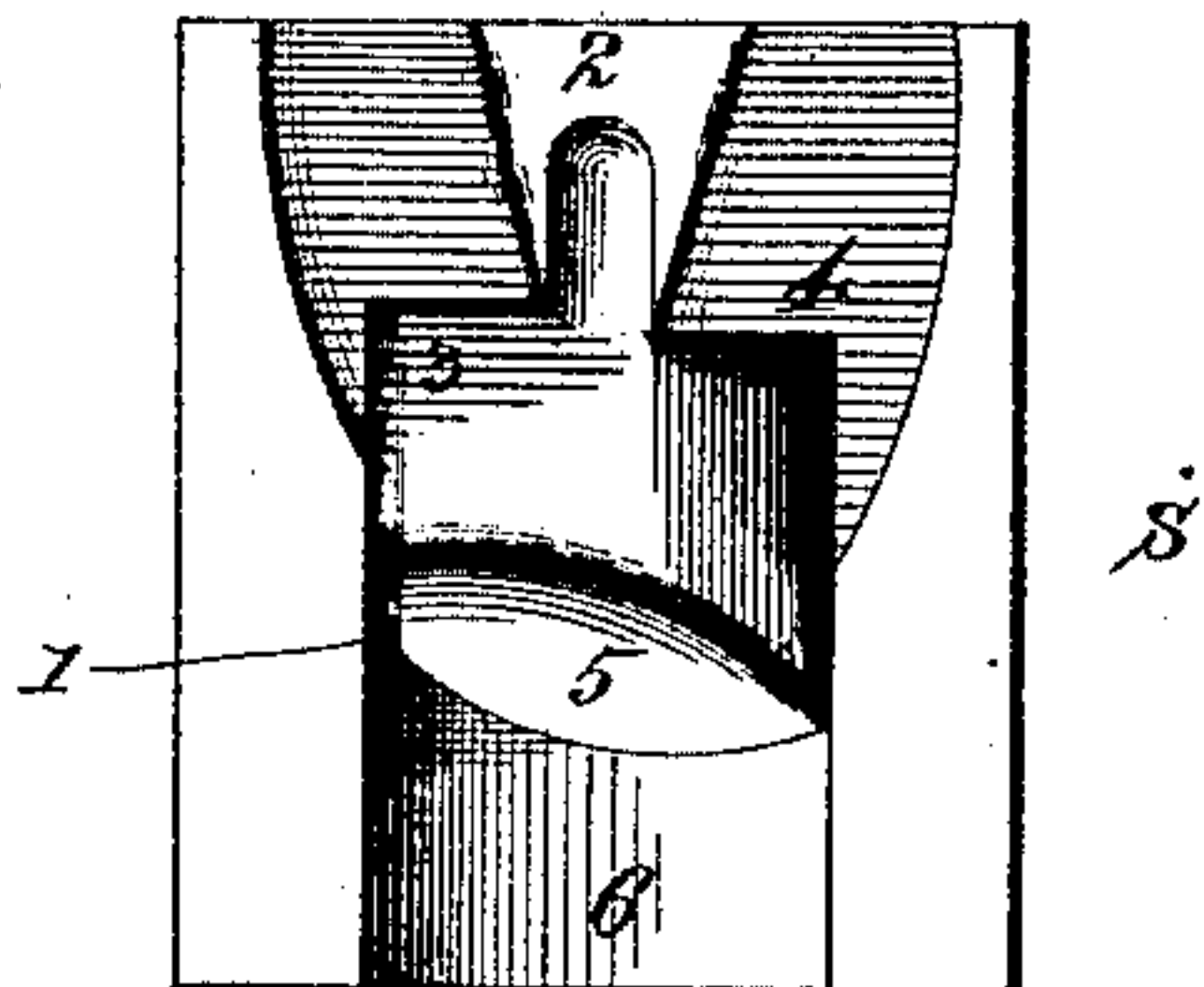
A. O. SPRING.

## MANUFACTURE OF SINGLE SPIRAL AUGERS.

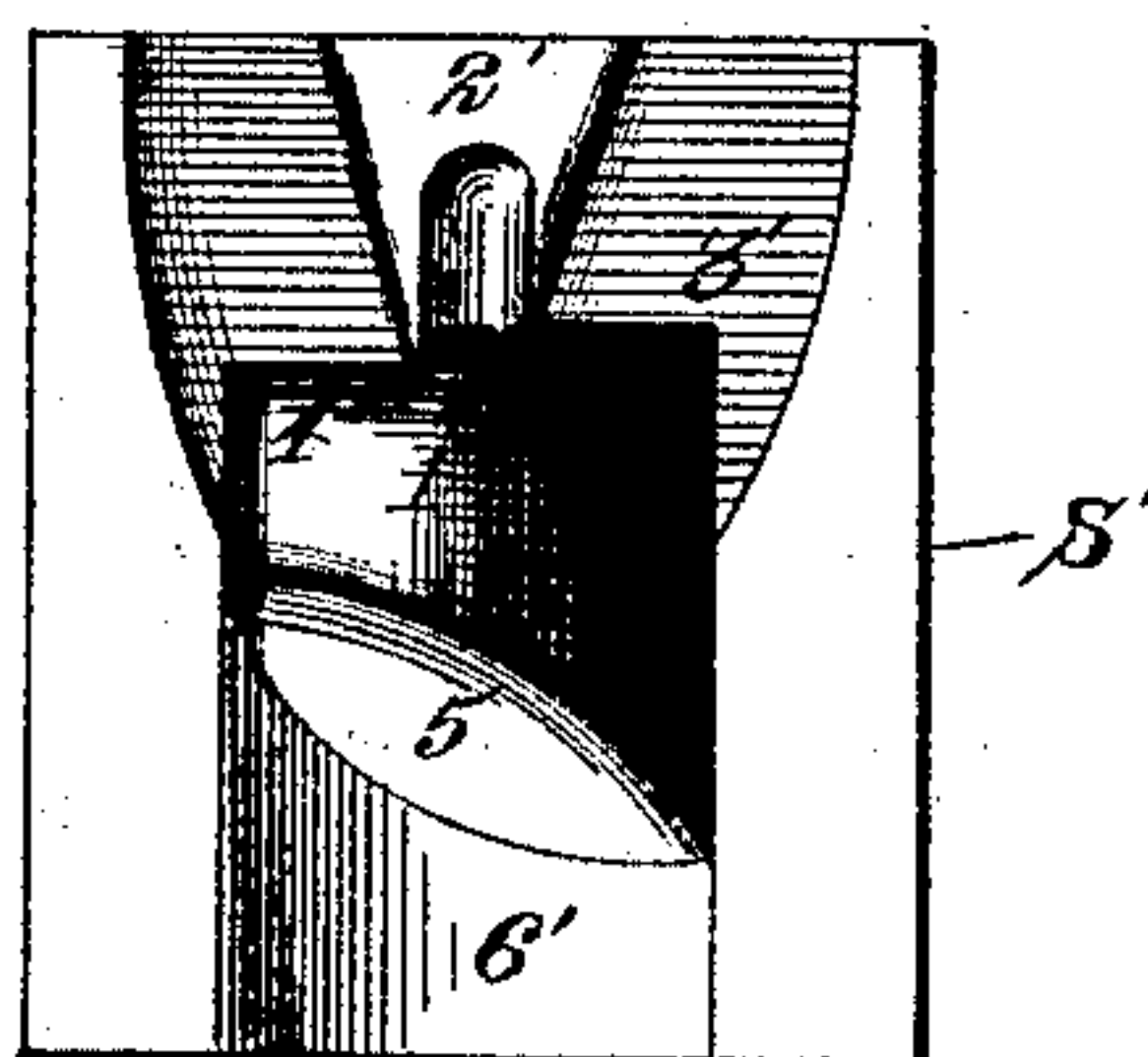
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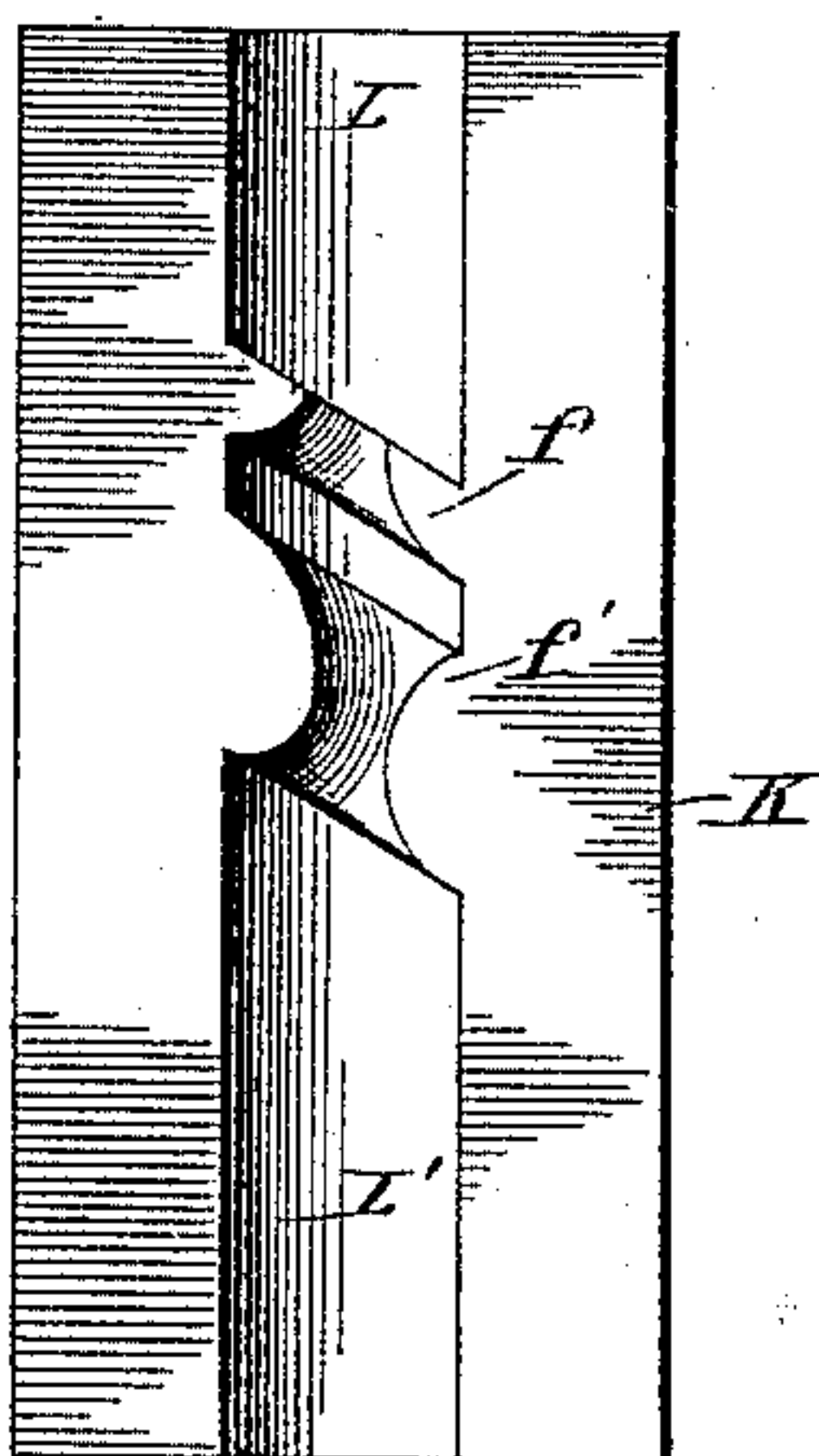
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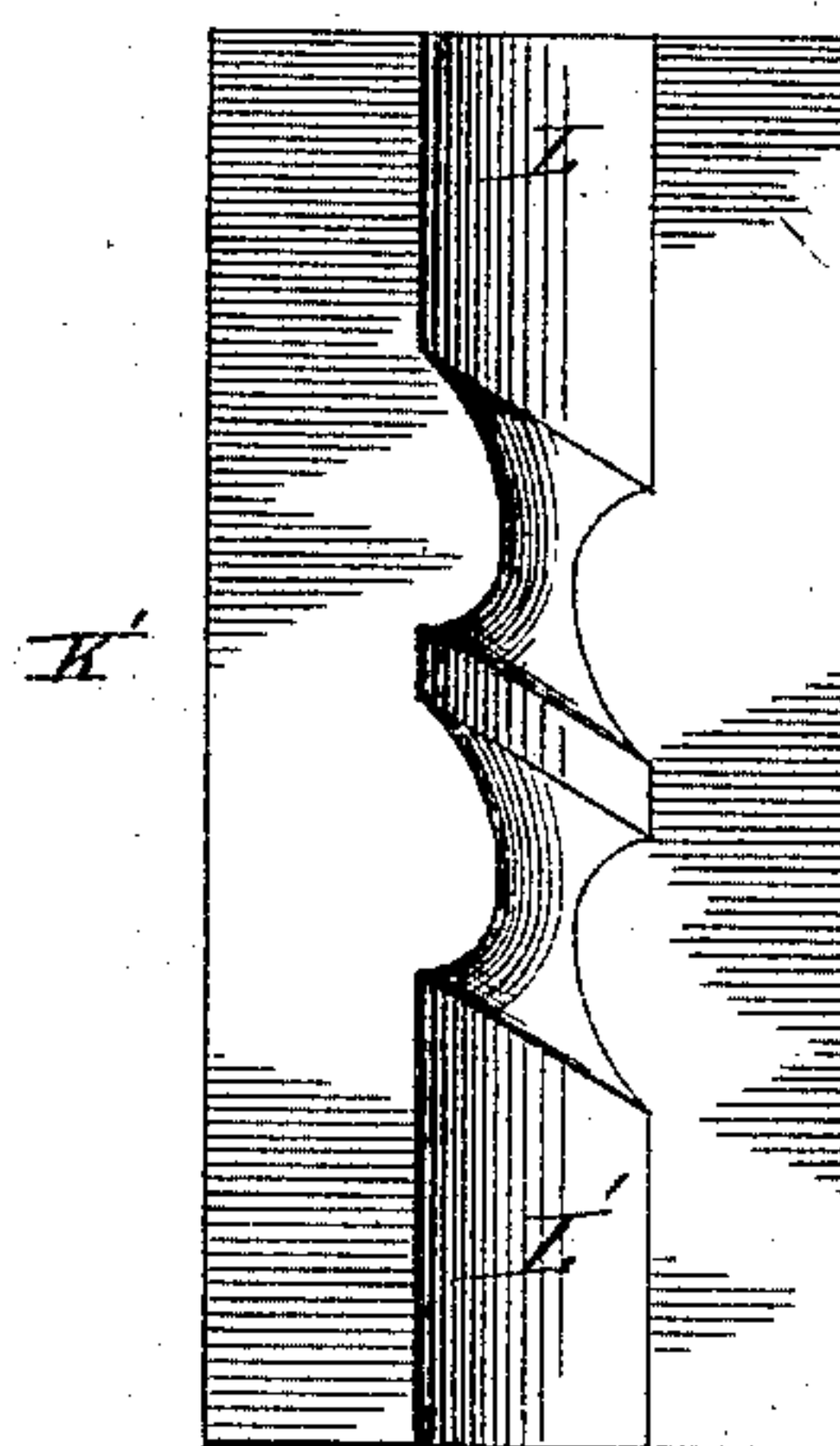
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# UNITED STATES PATENT OFFICE.

ALBERT O. SPRING, OF LANCASTER, OHIO, ASSIGNOR TO THE BAILEY AUGER BIT COMPANY, OF SAME PLACE.

## MANUFACTURE OF SINGLE-SPIRAL AUGERS.

SPECIFICATION forming part of Letters Patent No. 453,052, dated May 26, 1891.

Application filed September 11, 1890. Serial No. 364,670. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT O. SPRING, a citizen of the United States, residing at Lancaster, in the county of Fairfield and State of Ohio, have invented certain new and useful Improvements in the Manufacture of 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 provide novel and improved means for forming a double cutting-head on a single-spiral auger; and to this end I provide two sets or a series of dies for forming the head with a short auxiliary twist or spiral for a second cutter at the head of any single-spiral auger. The two-part dies for trimming and shaping the head and finally forming the same with the double spirals or twists thereon having cutters are each composed of two parts or half dies, which are recessed in such manner that when the faces of two corresponding parts are pressed together the outlines of said recesses shall exactly correspond, whereby with one set of dies the head of the previously-prepared auger-blank is trimmed and shaped preparatory to forming the double cutting-head while the other set of dies serves to hold the trimmed auger-blank and at the same time aid in forming the head with a cutter at the end of the main spiral and a second cutter at the end of the short auxiliary twist or spiral, the last-mentioned dies being adapted to be used in connection with any suitable punch or header-die for finishing the double cutting-head.

My invention consists of an improvement in manufacturing single-spiral augers with double cutting-heads and of improved dies for trimming and shaping the blank for the double head, all as herein described, and particularly pointed out in the claims at the end of this specification.

Figures 1 and 2 represent a single-spiral auger-blank trimmed and shaped preparatory to forming the double cutting-head. Figs. 3 and 4 are views of the same after it has been headed by the dies. Figs. 5, 6, and 8 are

views of a convenient form of header die or punch, which may be used to press against the auger-blank in forming the double cutting-head. Fig. 7 represents the auger-blank clamped between the finishing-dies used in forming the double head, showing also the header die or punch in position. Figs. 9 and 10 represent the faces of two-part die used for trimming and shaping the auger-head, and Figs. 11 and 12 are similar views of the two-part dies used for holding and forming the double cutting-head.

In the drawings, A represents the stock or main portion of a single-spiral auger, the end of said stock being trimmed or stamped into the form illustrated in Figs. 1 and 2 by means of the dies shown in Figs. 9 and 10, (to be hereinafter described,) so as to form the flat portion D, having shoulders C C' and central point B projecting therefrom, as shown. In this shape the stock or blank is ready for heading, and being held against endwise movement by the dies K K' in the manner indicated in Fig. 7, may be treated by pressing or hammering upon the header die or punch shown in said figure, either by continuous pressure or by hammering upon the stock of the die or upon the end of the auger-stock. A convenient form of punch for this purpose is shown in Figs. 5, 6, and 8; but I propose to use any kind of punch for hammering and shaping the head, so as to form the auxiliary spiral while the auger-blank is held in the two-part die, Fig. 7, and do not limit myself to the peculiar form shown in said figure.

The header-die shown in the last-mentioned figure consists of a main portion or stock M, having in one end thereof a diametrical groove R, of proper depth to accommodate the style and size of auger to be formed thereby. At the bottom of said groove is formed the central circular recess N, into which the projection B of the auger stock or blank is inserted. This recess may be of any proper size, and is preferably conical in shape, and has its opening of such size that the diameter thereof shall be equal to the width of the groove R. Shallow curved cut-away portions P P' are formed in the extremity of the punch at the ends of the groove R. The projections left on either



side of the groove R have diagonal oppositely-inclined faces O O', as shown in Figs. 5 and 6, which faces form the end of the main spiral *a* and the short auxiliary twist or spiral F, as shown in Figs. 3 and 4.

For the purpose of trimming and shaping the auger blank or head, as shown in Figs. 1 and 2, I preferably use dies of the construction shown in Figs. 9 and 10, which dies consist of two half portions S S', which have in their faces the recesses 1 1', the outlines of which exactly correspond when the dies are placed one upon the other face to face. In practice the half portion shown in Fig. 10 is preferably used on the lower side, and its recess 1' is made so as to gradually increase in depth from the left side to the right, so that in trimming and shaping the auger-head a thick or heavy portion will be left at that point where it is needed for shaping the part which forms the short auxiliary spiral or twist, together with the cutting-edge thereon. The half-die S' has also a central recess 2', which is a continuation of the recess 1', and is adapted to form the central projection or point B of the auger-blank. The deepened portion of the recess 1' at the right of the recess 2' is extended, as at 3', beyond the shallow portion 4' of the recess at the left side of the die, and the transverse rib or portion 5' is made to conform to the shape of the main spiral, which is received by the recess 6', and fits against the rib when the blank to form the double head is placed in position for trimming, that part of the blank which forms the short auxiliary spiral and cutter being received by the deepened portion of the recess 1', while the continuation of the main spiral on which the main cutter is to be formed is received by the shallow portion of said recess at the left side of the half-die. The other half of the die shown in Fig. 9 is shaped and recessed, as at 1, 2, 3, 4, 5, and 6, so as to conform, respectively, to the corresponding parts of the other half of the die, except that the recess 4, which coincides with the recess 4' of the part S' when the two parts are placed face to face, is deeper and shorter than the recess 3, and increases in depth from the center to the outer wall of the recess, as shown, and the corresponding recesses of the part S receive the corresponding parts of the auger-blank in shaping the end portion D, which forms the double head, as described with reference to Fig. 10.

In practicing this part of my invention the incomplete blank is first heated and then placed in position between the two-part die, and thereupon by the application of suitable pressure, as by hammering or otherwise, the auger-blank is reduced to the form shown in Figs. 1 and 2. After the spiral and blank for the head have been trimmed and shaped by the last-mentioned dies, as described, I preferably use dies of the construction shown in Figs. 7, 11, and 12 in forming the double cutting-head. This set of dies consists of

two parts K K', having the faces of their end portions, as at L L', cut away so as to form straight semi-cylindrical portions, which, when the two parts of the die are placed together, form cylindrical openings, and having also diagonal depressions or recesses formed in their faces of such shape that they conform to the shape of the auger-spiral, except that in the part K the diagonal rib *f*, which forms the bottom of the opening L upon that side on which the short spiral F is formed, is just half the length of the other ribs, as *f*, corresponding to the main spiral, and this short rib being at the end where the short twist or spiral is to be formed, provides a solid shoulder against which the auger-blank prepared for said twist may be pressed or hammered and shaped by any suitable hammer, punch, or pressure, and while held in this position pressure or hammering in any suitable way may be applied to the main part of the spiral prepared by the trimming-die and the cutter formed on said main spiral at the same time that the short twist with its cutter is formed. Thus augers are formed with a double head and two cutters on a single spiral, whatever the nature of the spiral.

In practicing my invention the forged bit or auger-blank, having been trimmed and shaped as shown in Fig. 1, is placed between the dies K K', as shown in Fig. 7, and being held between them with the pointed end of the blank facing the end of the opening L and the projecting sides of the flat part D in position to be pressed against the transverse ribs which form the bottoms of the respective semi-cylindrical openings L of the two half-dies, a suitable punch or die is inserted in the opening L, and thereupon the projecting parts of the blank are pressed against the transverse ribs, so as to give the proper twist and shape to the end of the main spiral for the main cutter, and at the same time form the short auxiliary twist or spiral for a second cutter.

In using the punch shown in Figs. 5, 6, and 8 in the manner hereinbefore described said punch is hammered or pressed down upon the heated blank until it reaches the position shown in Fig. 7, and its diagonal inclined faces O O' form the main and short auxiliary spirals by upsetting the end of the blank, as above described. The exterior curved depressions or recesses P P' form the cutting-edges E E' of the auger-head, while the recess N forms the point of proper size and shape, on which a suitable thread is afterward to be cut. The auger being thus reduced to the form shown in Figs. 3 and 4 can then be finished by filing, polishing, and hardening in the usual way, and is ready for use.

I do not desire to be limited to the exact means of manufacturing augers herein described, nor to the exact shape and configuration of the trimming and finishing dies, as various modifications might be made in the form of dies and the method of manufacture



without departing from the spirit of my invention.

I claim as new and desire to secure by Letters Patent—

5 1. The herein-described trimming-dies for forming double heads on single-spiral augers, consisting of a two-part die, the lower half of which has a transverse recess which increases in depth from the left to the right wall thereof, a transverse rib which conforms to the shape of the main spiral, a central elongated recess which forms a continuation of the transverse recess, and the upper half of the die having similar recesses shaped to conform to the contour of the lower die when the two parts are placed together face to face, substantially as described.

2. A set of trimming-dies consisting of two parts, one of which has a transverse recess which increases in depth from the left to the right side of the die and has its deepened portion at one side extended beyond the shallow portion of the recess at the opposite side of the die, while the other part is similarly recessed, but has the deepened portion of its transverse recess made shorter than the shallow portion of said recess on the opposite side of the die, substantially as shown and described.

3. A header-die for forming augers, which consists of a stock which has a diametrical groove in one end of a width approximately equal to the thickness of the stock from which the auger is to be formed, a central conical depression at the bottom of said groove, the projections left on either side of said groove, having oppositely-inclined diagonal faces formed thereon, in combination with the two-part die, each of which parts has diagonal depressions which receive the auger-spiral, and semi-cylindrical depressions which guide the header-die, substantially as described.

4. A header-die for forming augers, which consists of a stock which has a diametrical groove in one end of a width approximately equal to the thickness of the stock from which the auger is to be formed, a central conical depression at the bottom of said groove, the projections left on either side of said groove having oppositely-inclined diagonal faces formed therein, and curved exterior cut-away portions in the header-stock at the ends of the groove, in combination with the two-part die, each of which parts has diagonal depressions which receive the auger-spiral, and semicircular depressions which guide the header, together with the rib *f*, of one-half thickness or length of the other ribs, as and for the purpose specified.

5. The herein-described method of forming double cutting-heads or double-twist cutting-heads on single-spiral augers, which consists, first, in laterally compressing the single-spiral blank between dies constructed to flatten the extremity of the blank and produce a point thereon in the axial line of the blank with flattened portions on either side thereof, one of which portions is thicker and heavier than the other, then holding this partly-finished blank between dies and shaping the rough head by compressing it in the longitudinal line of the shank by punches or dies, which will bend the thinner side of the head into a continuation of the main spiral and form a cutting edge or point thereon and simultaneously compress the enlarged side of the head into a short second spiral and form a second or auxiliary cutting edge or point, substantially as specified.

6. The herein-described method of producing single-spiral augers with double cutting-heads, which consists in compressing the rough single-twist blank between dies adapted to flatten its extremity and produce a central point thereon and leave flattened portions at either side of said point, then holding the blank so treated between suitable dies and compressing the flattened portions thereof by a suitable die or punch, so as to bend one side of the extremity into a continuation of the main spiral of the blank and simultaneously shape the other side of the extremity into a short second spiral, substantially as and for the purpose set forth.

7. An improvement in the art of manufacturing single spiral-augers with double-twist or spiral cutting-heads, which consists, first, in taking a single-twist auger-blank stock and compressing one of its ends between dies which will flatten the end into a chisel-pointed head, with a point projecting centrally therefrom in the axial line of the blank and leave one side of said head thicker than the other, then clamping said partly-finished blank between other dies and compressing the head by a punch or die, so as to bend the thin side of said head into a continuation of the main spiral and form a cutting edge or point thereon and shape the thickened side of said head into a short auxiliary spiral having a cutting edge or point, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT O. SPRING.

Witnesses:

JAMES M. FARRELL,  
NELSON ROLLER.