

(No Model.)

3 Sheets—Sheet 1.

A. U. SMITH.
MACHINE FOR SHAPING AUGER HEADS.

No. 486,239.

Patented Nov. 15, 1892.

Fig. 1

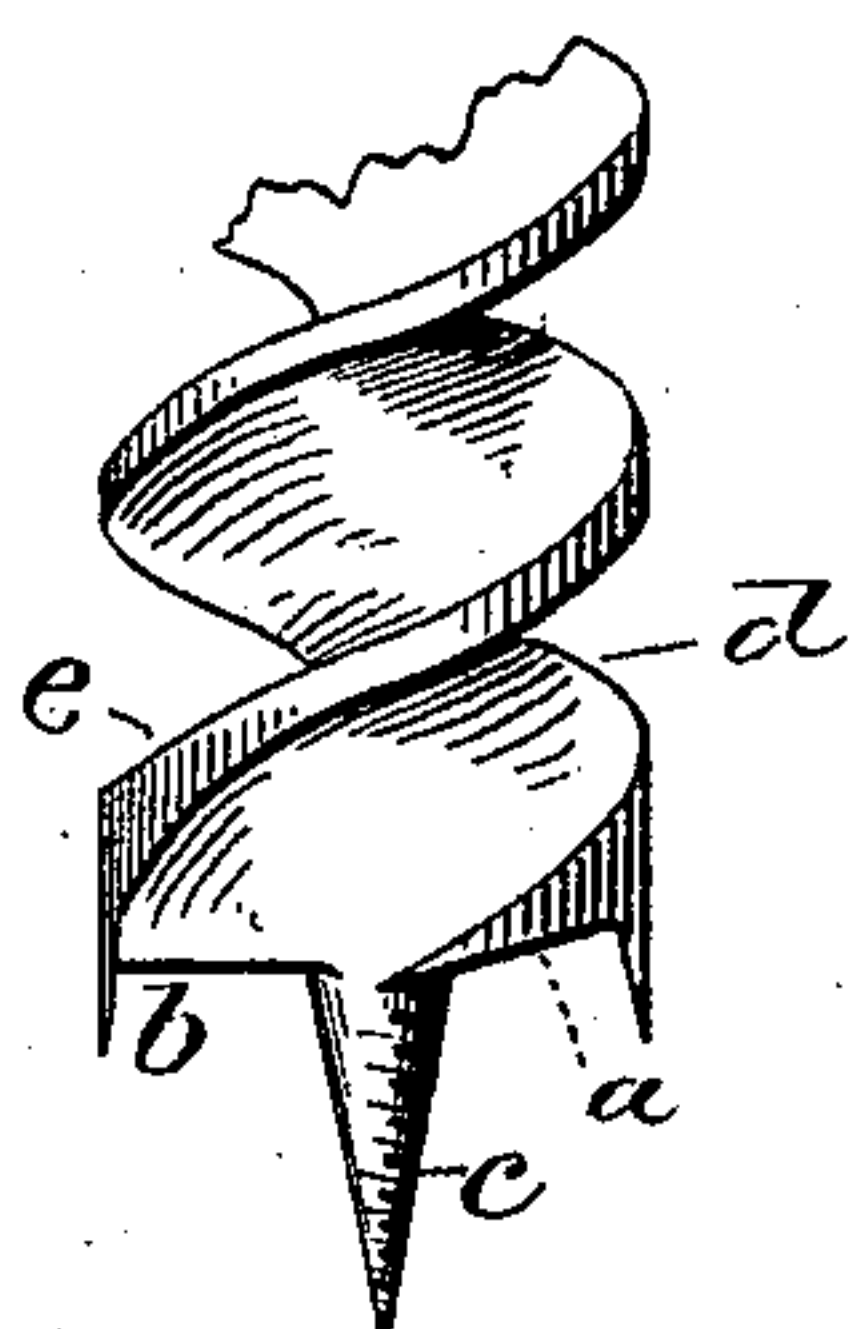
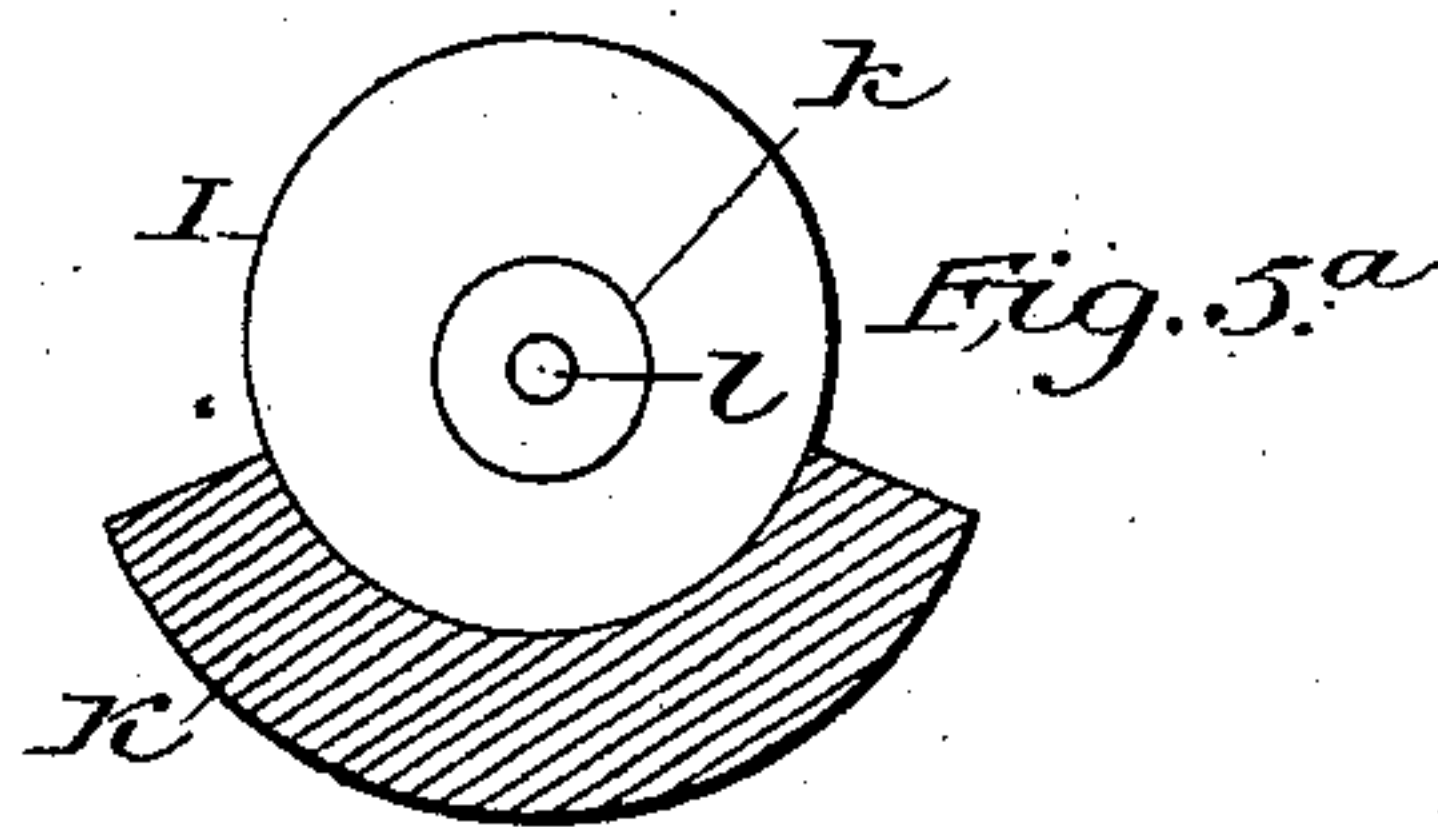
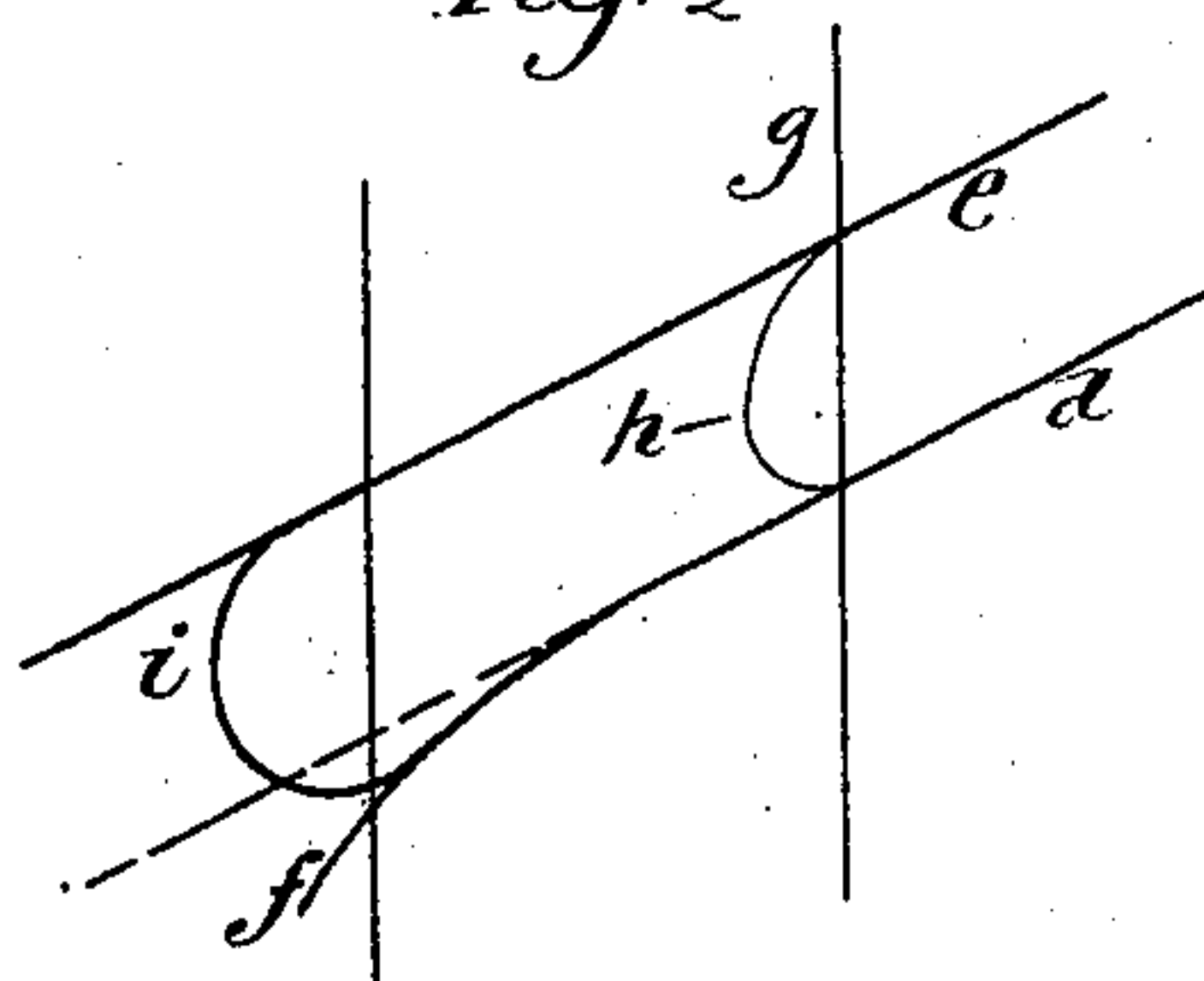


Fig. 2



Witnesses
J. H. Thompson
Lillian D. Kelsey
Albert U. Smith, Inventor
J. H. Thompson
Earle Seymour

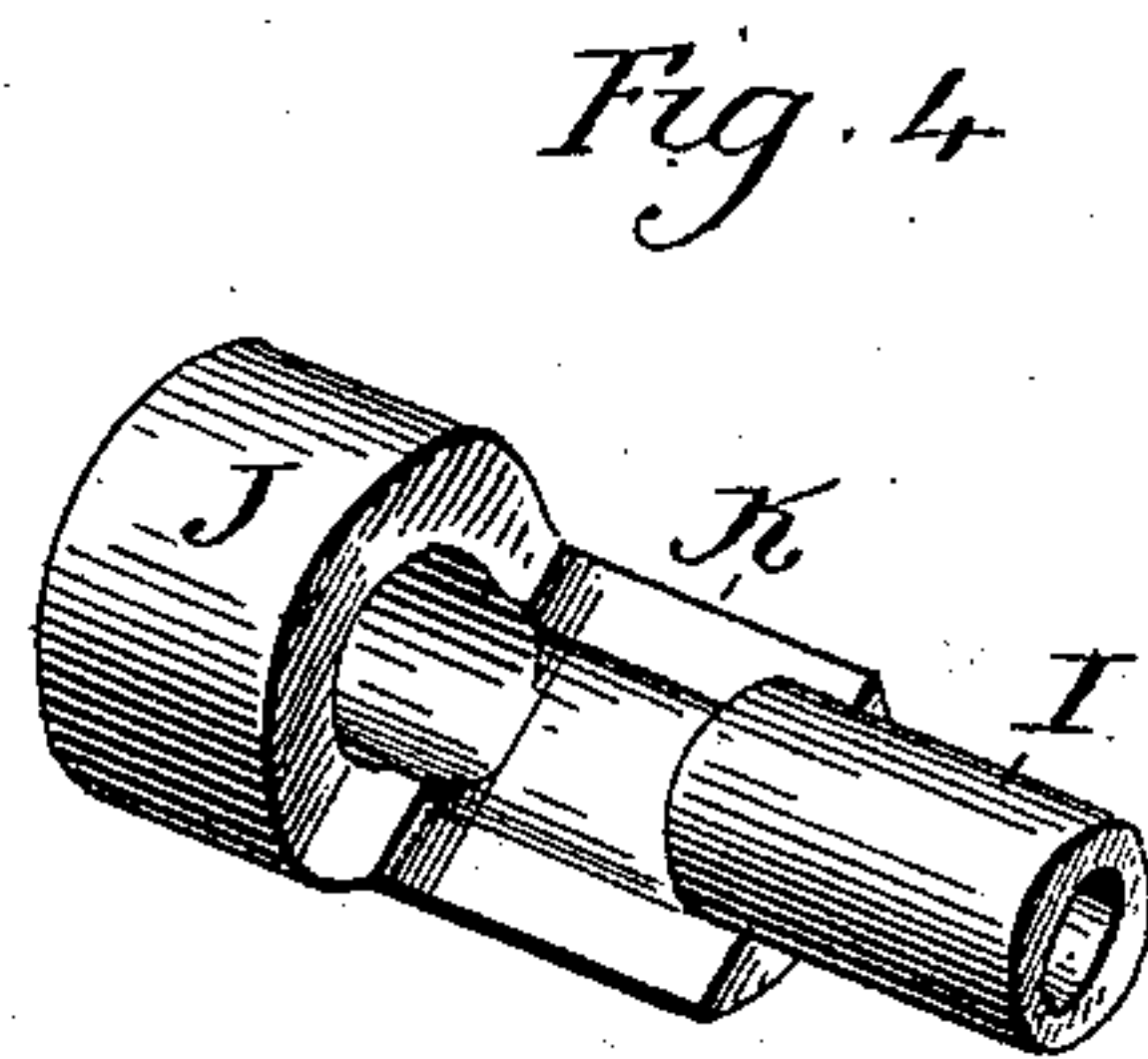
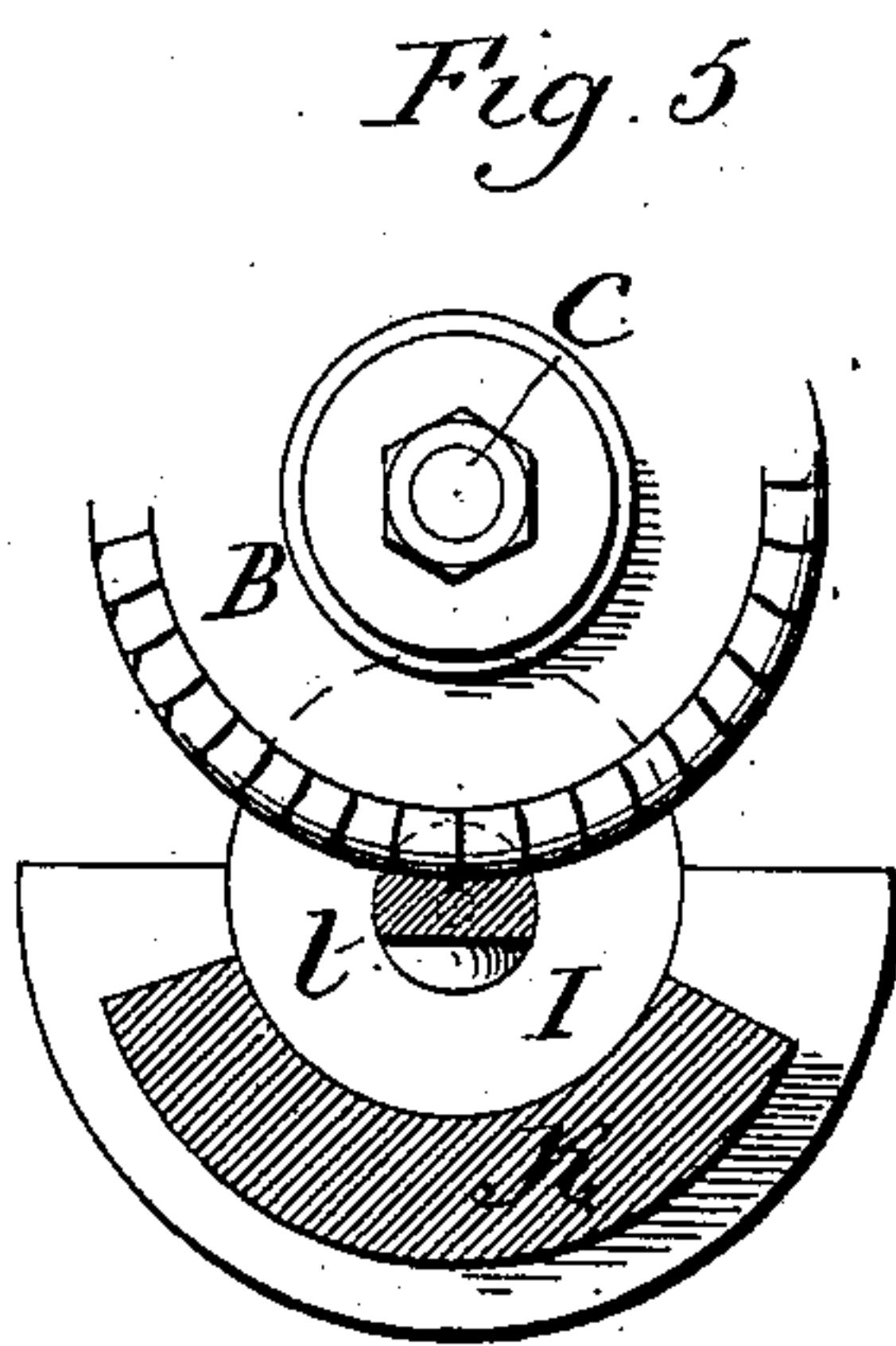
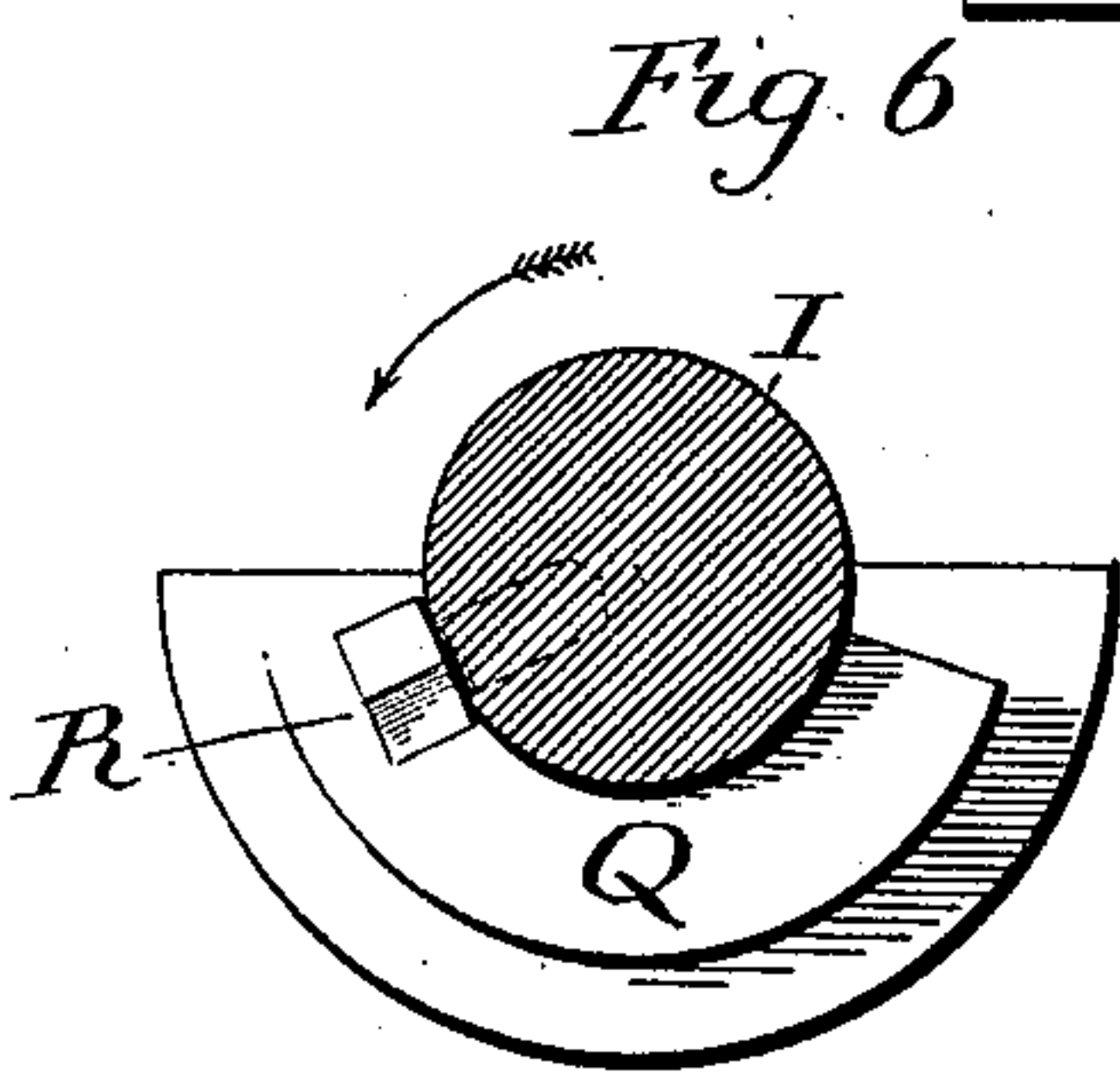
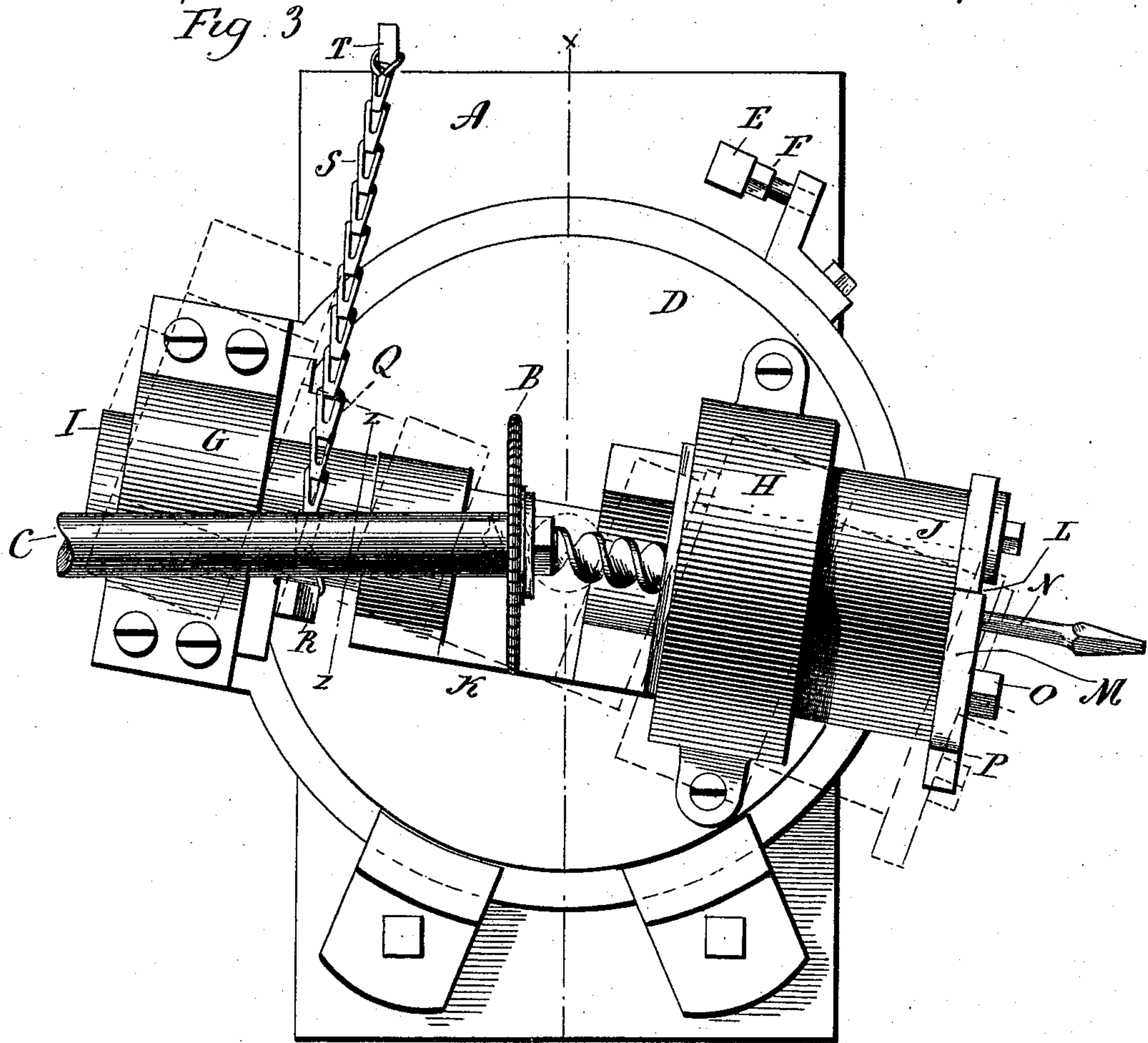
(No Model.)

3 Sheets—Sheet 2.

A. U. SMITH.
MACHINE FOR SHAPING AUGER HEADS.

No. 486,239.

Patented Nov. 15, 1892.



Witnesses.

Wm. H. Shumway
William D. Kellogg

D

A

Albert U. Smith
Inventor
By attys
Carle Seymour

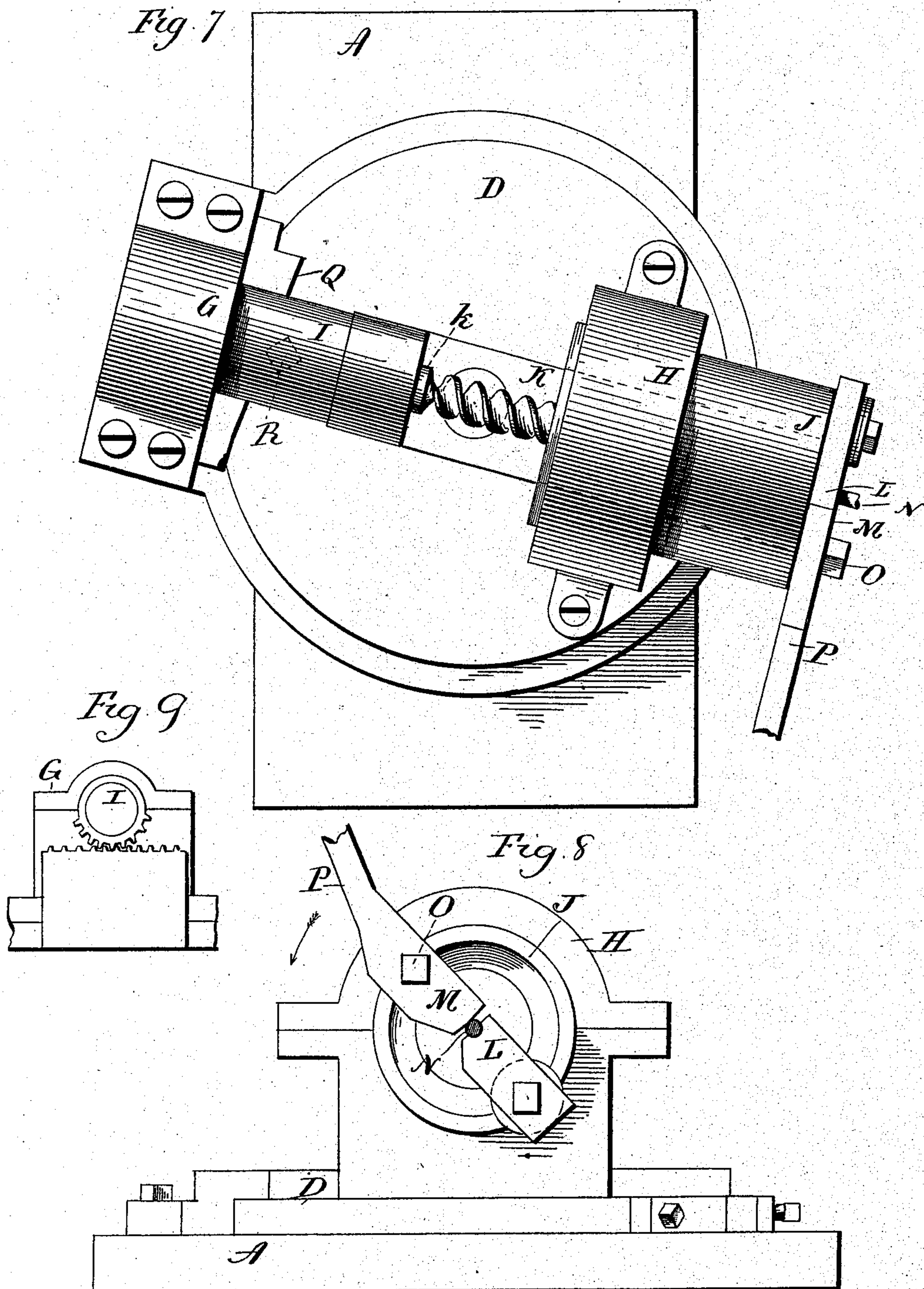
(No Model.)

3 Sheets—Sheet 3.

A. U. SMITH.
MACHINE FOR SHAPING AUGER HEADS.

No. 486,239.

Patented Nov. 15, 1892.



Witnesses.
J. H. Shumway.
William D. Kelby.

Albert U. Smith
Inventor.
By atty Earle Seymour

UNITED STATES PATENT OFFICE.

ALBERT U. SMITH, OF SEYMOUR, CONNECTICUT.

MACHINE FOR SHAPING AUGER-HEADS.

SPECIFICATION forming part of Letters Patent No. 486,239, dated November 15, 1892.

Application filed March 22, 1892. Serial No. 425,887. (No model.)

To all whom it may concern:

Be it known that I, ALBERT U. SMITH, of Seymour, in the county of New Haven and State of Connecticut, have invented a new Improvement in Machines for Shaping Auger-Heads; 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 side view of the head portion of an auger; Fig. 2, a diagram of that portion of the auger to illustrate the work desired to be accomplished by the machine; Fig. 3, a top or plan view of the machine, showing the cutter as in operation; Fig. 4, a perspective view of the mandrel detached, on a reduced scale; Fig. 5, a transverse section cutting on line x of Fig. 3 and looking toward the left; Fig. 5^a, an end view of the part I of the mandrel, showing a face view of the center k and its eccentricity with relation to the part I; Fig. 6, a transverse section cutting on line z of Fig. 3; Fig. 7, a top view of the machine, the cutter removed and the mandrel represented as having received part of its longitudinal movement; Fig. 8, a view of the machine from the right, showing the device for clamping the auger; Fig. 9, a modification.

This invention relates to a machine for cutting, milling, or shaping the heads of augers, with special reference to double-twist augers, it having for its object to mechanically cut and shape the parts of the head immediately back of the floor-lips, and which has usually been done by hand, requiring therefor specially-skilled labor, this owing to the fact that from the floor-lip backward for about one-third the circumference there is a constant variation both in the width and depth of the groove formed by the twist.

To illustrate: In Fig. 1, a represents one floor-lip and b the other floor-lip, c representing the point between. One twist d terminates in the floor-lip a and the other twist e terminates in the floor-lip b . The depth and pitch of the twist is regular from the shank to a point a little back of the floor-lips, but from that point to the floor-lips there is a change

in the shape of the groove formed by the twist both in width and depth, and this is illustrated in Fig. 2. The line d represents the line of the twist d of Fig. 1. The line e represents the line of the twist e of Fig. 1, f representing the termination of the twist d at the floor-lip. The twists, as before stated, are regular to a point indicated by the line g , and the depth of the groove formed by the twist is also regular and indicated by the curved line h . In order to give a greater clearance at the floor-lip than will be given by a continued width of groove, the upper surface of the twist gradually turns downward from the point g to the floor-lip, as indicated at f in Fig. 2, the broken line indicating what would be the regular continuation of the twist, and also to further facilitate the clearance the groove formed by the twist gradually deepens from, say, the point g to the floor-lip, and as indicated by the curved line i .

Heretofore the finishing of the twist of the auger by machinery has been required to terminate substantially at the point g , and from that point on, owing to the irregular curve, it has been necessary to finish that portion of the auger by hand, employing files of the proper shape for the purpose.

The machine of this invention, as before stated, is designed to cut or shape this particular portion of the auger, and whereby the work will be automatically performed and with a perfect uniformity; and the invention consists in the construction and combination of mechanism, as hereinafter described, and particularly recited in the claims.

A represents the bed of the machine, and which is arranged upon a common shaping or milling machine, not necessary to be illustrated.

B represents the milling-tool, carried by an arbor C, as usual in milling or shaping machines, the mill itself being shaped according to the size of the auger and the work to be performed.

On the bed A and in suitable guides a turntable D is arranged so that it may receive a partial rotation upon a fixed center.

E represents a stationary stop on the bed, and F a corresponding stop on the turn-table, by which the starting-point in the rotation of

the turn-table is fixed, the screw F permitting adjustment to vary the point of starting to the required extent.

On the bed D two bearings G H are arranged in diametrical line, and in these bearings a mandrel composed of two parts I J is arranged, the one part being supported in bearings G and the other part J in the bearing H, but the two parts connected, as at K. (The mandrel is shown detached in Fig. 4 on a reduced scale.) The connection K serves to unite the two parts, so that they may revolve together; but otherwise they are separate between their two inner ends, and so as to leave a space between those two ends. In the inner end of the part i a center k is arranged to receive the point of the auger, and in this center is a recess l, corresponding to the point c of the auger, so that the point of the auger may enter the recess in the center and the face or lips of the auger set upon the face of the center; but this center k and its recess l are eccentric to the axis of the part I of the mandrel to the extent of the increase required in the depth of the groove in the twist of the auger hereinbefore mentioned. The part J of the mandrel is tubular and of a diameter somewhat greater than the largest auger which the machine is adapted to operate upon, as seen in Fig. 8.

Upon the outer end of the part J of the mandrel a pair of jaws LM are arranged, the one L being stationary and having a notch N in its inner end corresponding to the shank of the auger, and so that resting therein the shank will be substantially concentric with the mandrel or in proper relation thereto. The jaw M is hung to the part J of the mandrel upon a pivot O, with an arm P extending therefrom, by which the jaw may be turned upon its pivot to permit the introduction of an auger, and then after the auger has been introduced the jaw M may be turned so as to clamp the shank of the auger firm upon its seat in the jaw L, and as seen in Fig. 8. The arm P extends to a convenient distance and so that it may be operated by hand, or a weight may be hung thereon, having a tendency to turn the mandrel in the direction indicated by the arrow.

On the face of the bearing G is a segment-shaped cam Q, (see Fig. 6,) corresponding substantially to the pitch of the twist of the auger, and in the part I of the mandrel is a stud or projection R, which is adapted to bear upon this cam Q, and so that as the mandrel rotates the stud will ride upon this cam, and thereby impart a longitudinal movement to the mandrel, and as indicated in Fig. 7. If the auger be introduced into the machine as thus far described and as seen in Figs. 3 and 7 and a rotation be imparted to the mandrel by means of the arm P, there will be at the same time a longitudinal movement imparted to the mandrel through the cam Q and the stud R, which works thereon, so that if the cutter

B be arranged in its proper working position, as seen in Fig. 3, it will cut the regular equal twist in the auger; but as the point of the auger is arranged in the part I eccentric to the axis of that part I of the mandrel the cut will gradually deepen as the mandrel rotates, understanding that the cut commences on the longer radius of the eccentricity, and this cut commences at the point g of Fig. 2, and continuing to the end of the twist or to the floor-lip the cut will be deepened, as at i, to the extent of the eccentricity of the point of the auger with relation to the mandrel which carries it. To give the increase in the pitch of the twist, so as to increase the width of the groove toward the floor-lip, a partial rotation is imparted to the turn-table D and the mandrel which it carries, so that as the auger rotates for the cut, as before described, it will at the same time swing upon the vertical axis of the bed, and thereby cause the cutter to produce the gradually-widening groove of the twist, as seen in Fig. 2.

To mechanically impart the proper rotation of the bed for the result just mentioned, a chain S is made fast by one end to the mandrel. (Represented in Fig. 3 as attached to the stud R of the part I of the mandrel.) The chain then extends forward around the mandrel and its other end is secured to a stationary point T on the bed A or other part of the machine, and so that this chain or whatever the connection may be is taut when the cutting commences. The result of rotating the mandrel, as before described, is to wind the chain around the mandrel, and as one end of the chain is made fast at a stationary point such winding of the chain tends to shorten it, and consequently to draw that part of the mandrel toward the stationary point where the chain is attached, and which will turn the turn-table, as indicated in broken lines, Fig. 3, and such turning of the mandrel upon the vertical axis or axis at right angles to its own will be to cause the cutter to operate upon the auger and gradually increase the width of the cut because of the increased angle which the cutter takes with relation to the axis of the auger. One groove or twist of the auger having been thus shaped at the head, the auger is turned over and the second or other twist correspondingly cut to shape that part of the head. It will be understood that the adjustment of the parts of the machine are to be made according to the particular shape required for the auger to be operated upon.

In operation the turn-table is brought to the position determined by the stops E and F. At that position the auger is introduced and grasped, as before described. Then a weight applied to the arm P will operate to turn the mandrel and auger against the cutter and so as to regulate the rotation of the mandrel according as the cut is produced, and as the rotation of the turn-table is made automatic all that is required is that the op-

erator shall properly introduce the auger and then the operation of the machine to cut or shape the head is automatic.

While it is preferred to employ the chain 5 or other connection of similar character to impart the rotative movement to the turn-table, it will be understood that any suitable device may be employed for that purpose—as, for illustration, a toothed segment may be on 10 the mandrel, as seen in Fig. 9, and a corresponding stationary rack arranged into which the teeth on the mandrel will operate, so that a required turning of the mandrel upon an axis at right angles to its own will be pro- 15 duced.

While preferring to make the cam Q stationary and apply the stud to the mandrel, it will be apparent that this order may be reversed—the cam on the mandrel and the bearing for the cam stationary. This modifica- 20 tion is too evident to require illustration.

In cases where the increased depth of cut is not required the center which supports the head of the auger will be made concentric 25 with the mandrel. The invention is therefore not to be understood as limited to necessarily making the center eccentric to the mandrel. It will be also evident that it is imma- 30 terial how the two parts of the mandrel are connected, it only being essential that they shall be connected so as to properly hold and impart the required rotation to the auger.

I claim—

1. In a machine for shaping the heads of 35 augers, the combination of a turn-table arranged for a limited extent of rotation, a rotative mandrel arranged upon the said turn-table, the axis of the mandrel being at right angles to the axis of the turn-table, the man- 40 drel constructed in two parts with a recess between the two parts, the face of one part

of the mandrel provided with a center adapted to receive the point and head of the auger, the other part of the mandrel made tubular and provided with jaws adapted to grasp the 45 shank of the auger, and whereby rotation may be imparted to the mandrel and auger, a stationary cam around one part of the mandrel, corresponding to the twist of the auger, and a stud against which said cam may bear, 50 whereby under the rotation of the mandrel a longitudinal movement is imparted to the mandrel to operate upon the auger, substantially as described.

2. In a machine for shaping the heads of 55 augers, the combination of a turn-table, a mandrel arranged upon the said turn-table and adapted to revolve upon an axis at right angles to the axis of the turn-table, the mandrel formed in two parts, but so as to leave a 60 space between the two parts, the face of one part of the mandrel in the said space provided with a center adapted to receive the point end of the auger, but eccentric to the axis of the mandrel, the other part of the man- 65 drel tubular, means, substantially such as described, to grasp and hold the auger in the said tubular part of the mandrel, with mechanism, substantially such as described, to impart a rotative movement to said turn-table, and 70 a cam corresponding to the twist of the auger and adapted to impart a corresponding longitudinal movement to said mandrel, with a revolving cutter adapted to operate upon the auger, substantially as described. 75

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALBERT U. SMITH.

Witnesses:

ALFRED S. HOUGHTON,
S. HART CULVER.