

J. SWAN.

Making Auger Bits.

No. 100,816.

Patented March 15, 1870.

Fig. 1

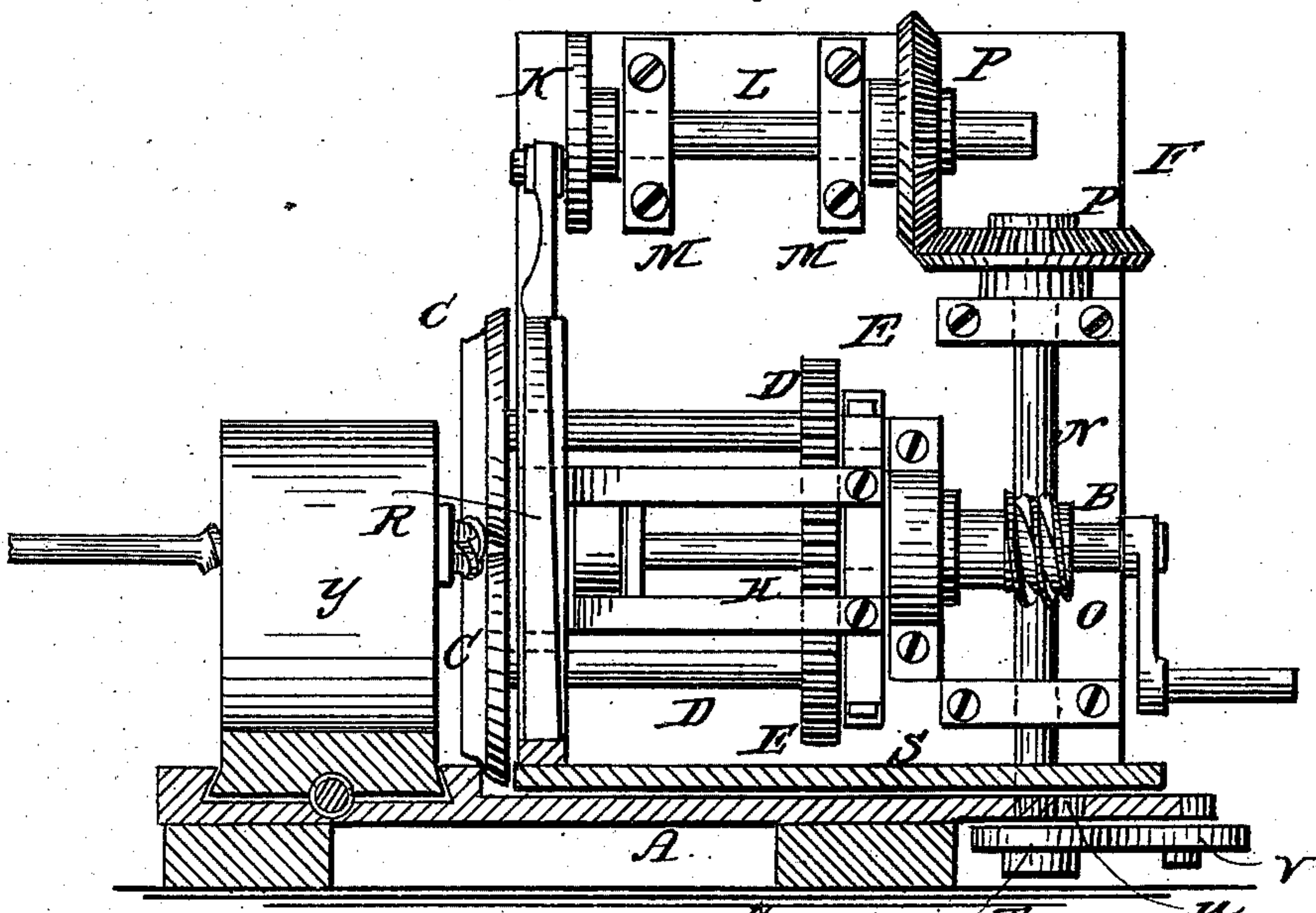
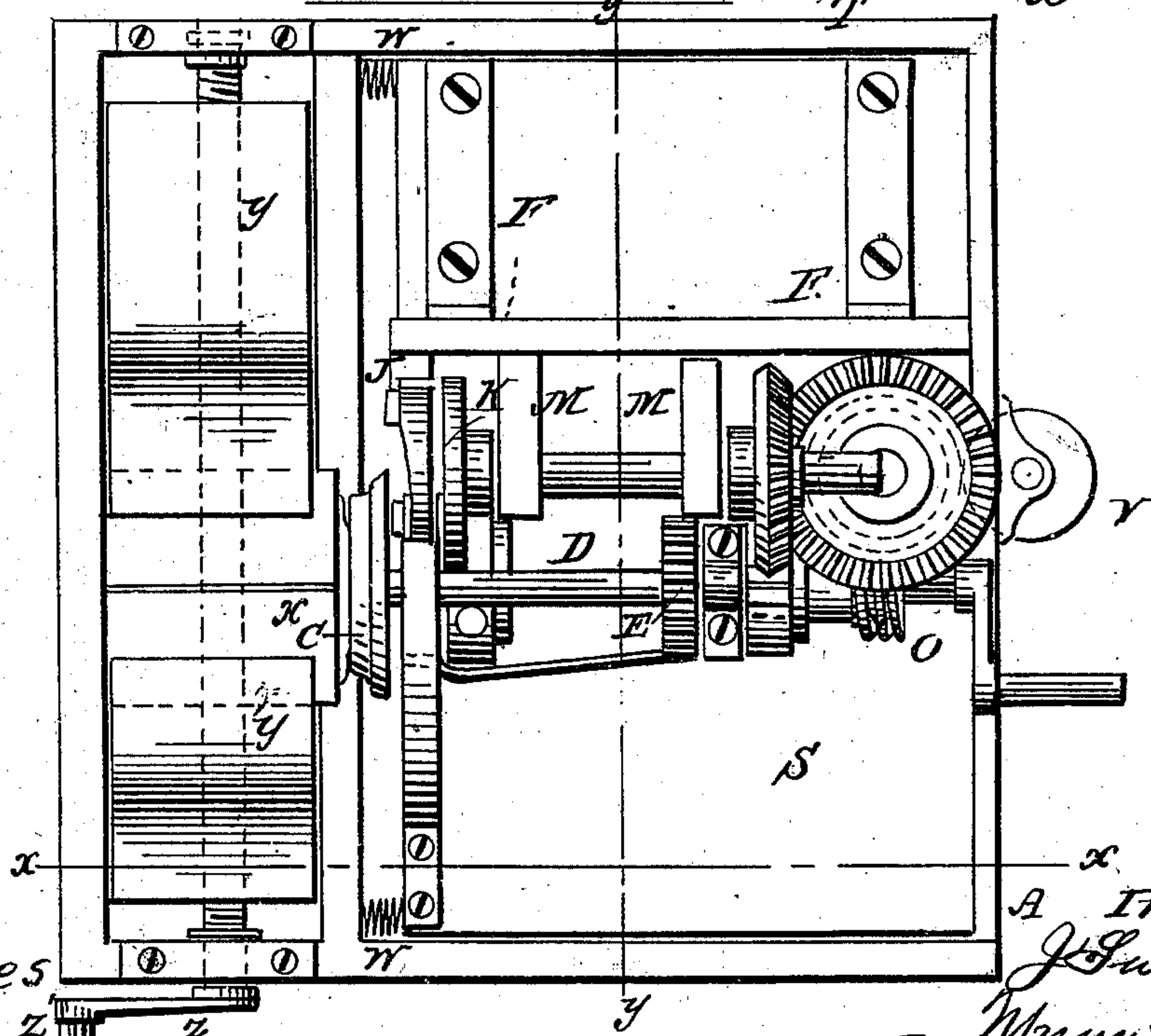


Fig. 2



witnesses

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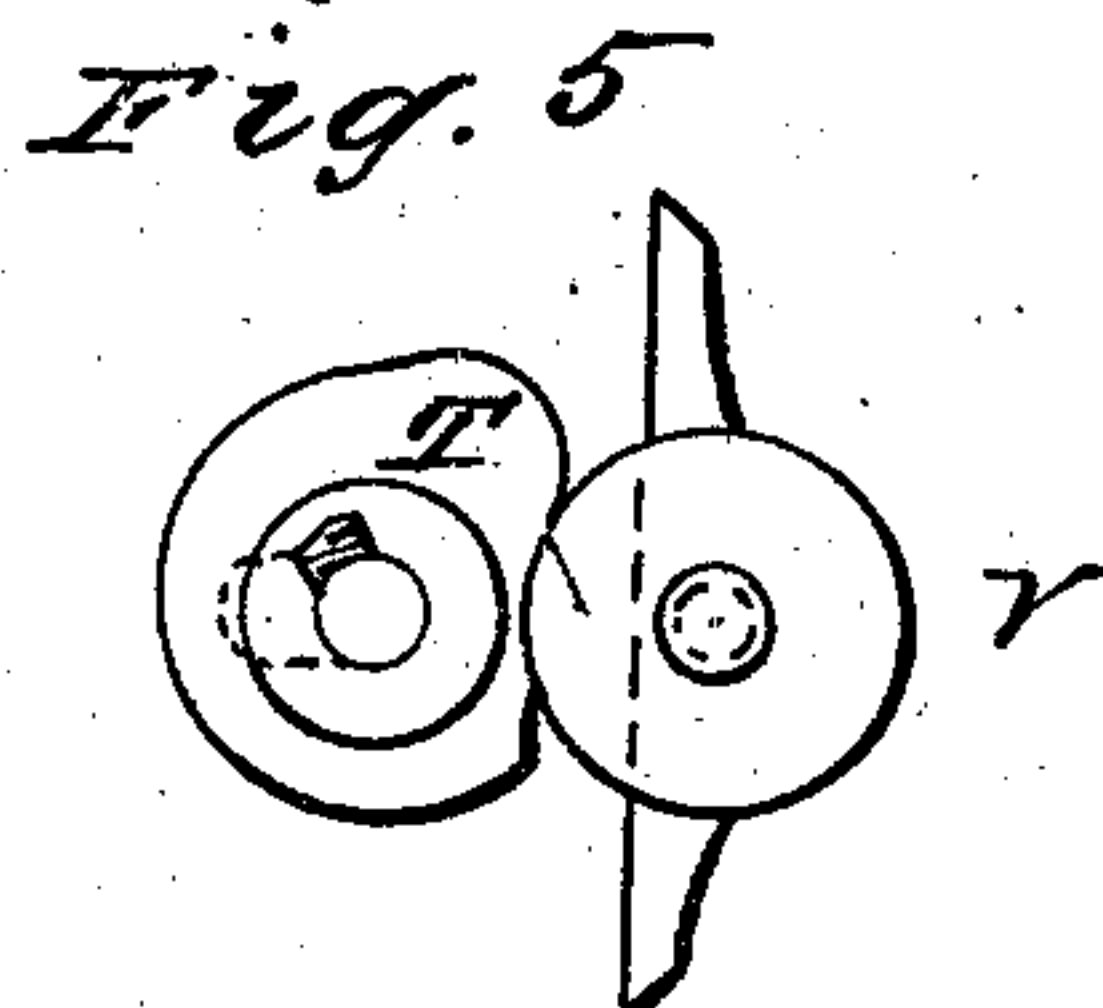
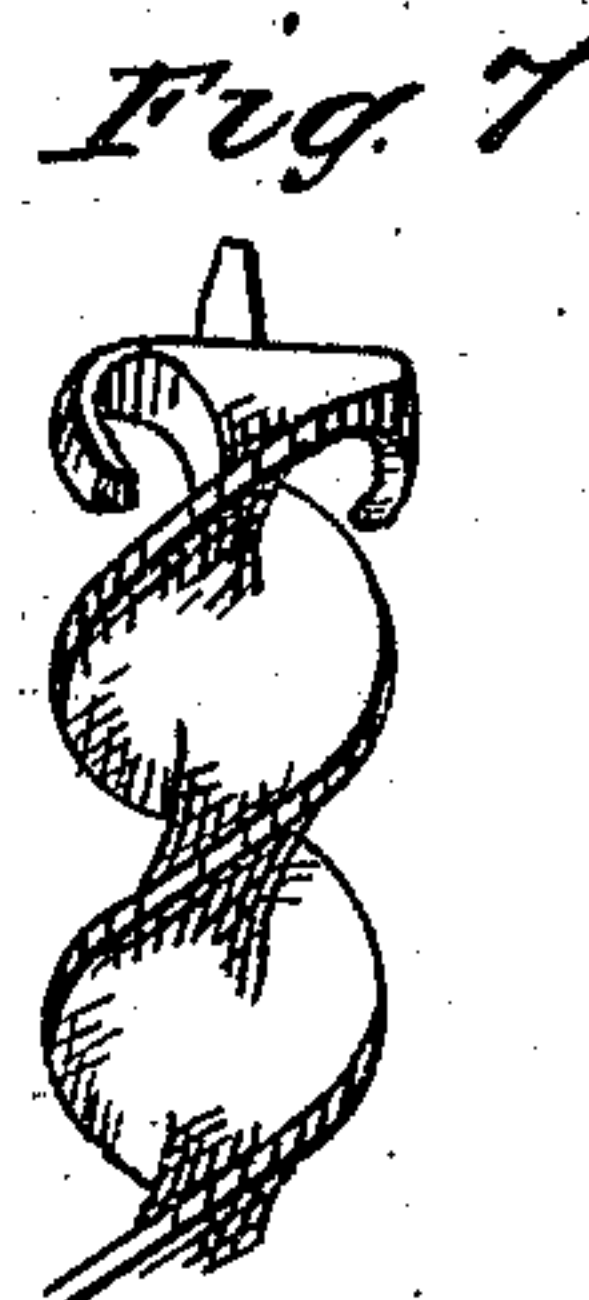
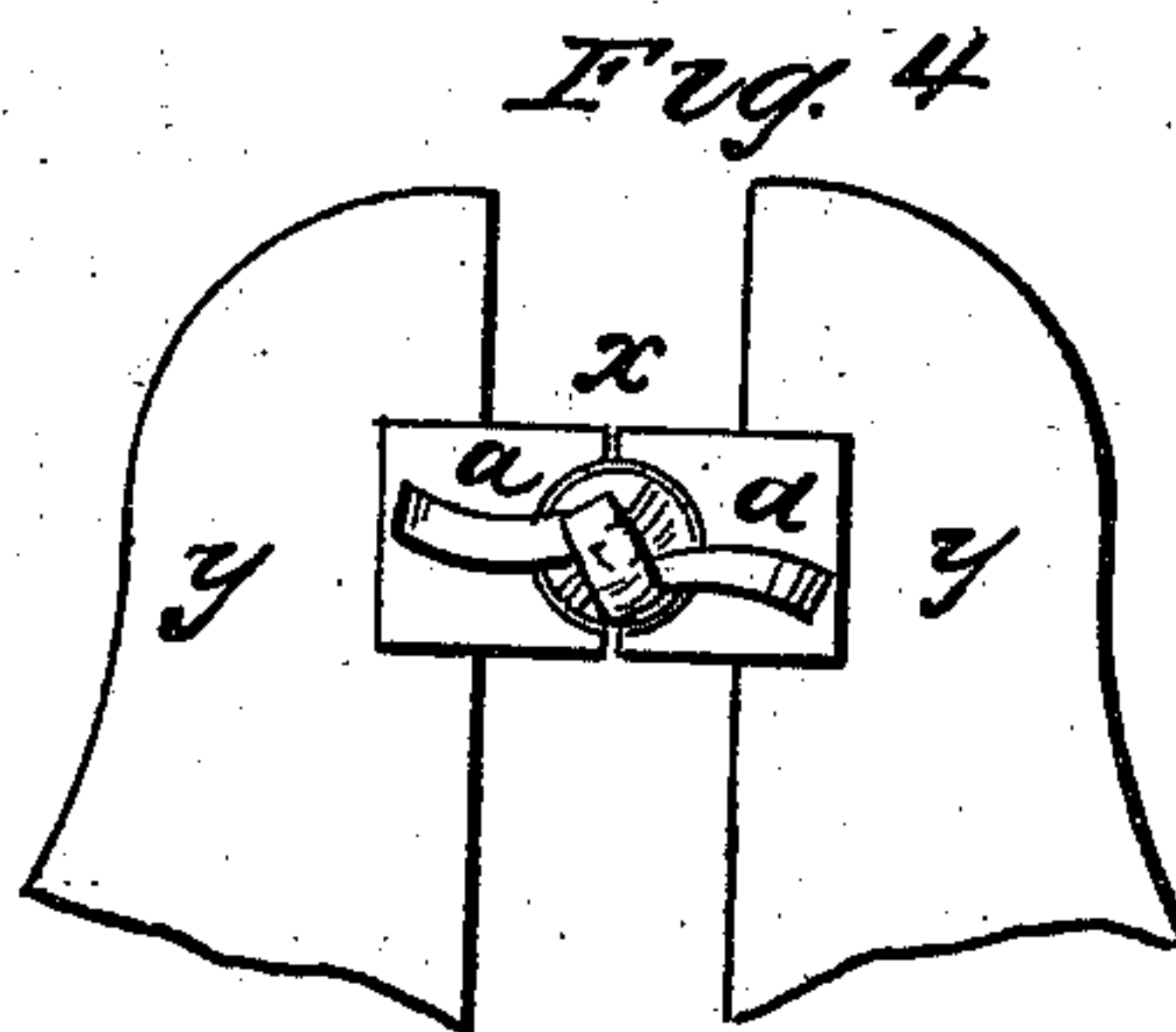
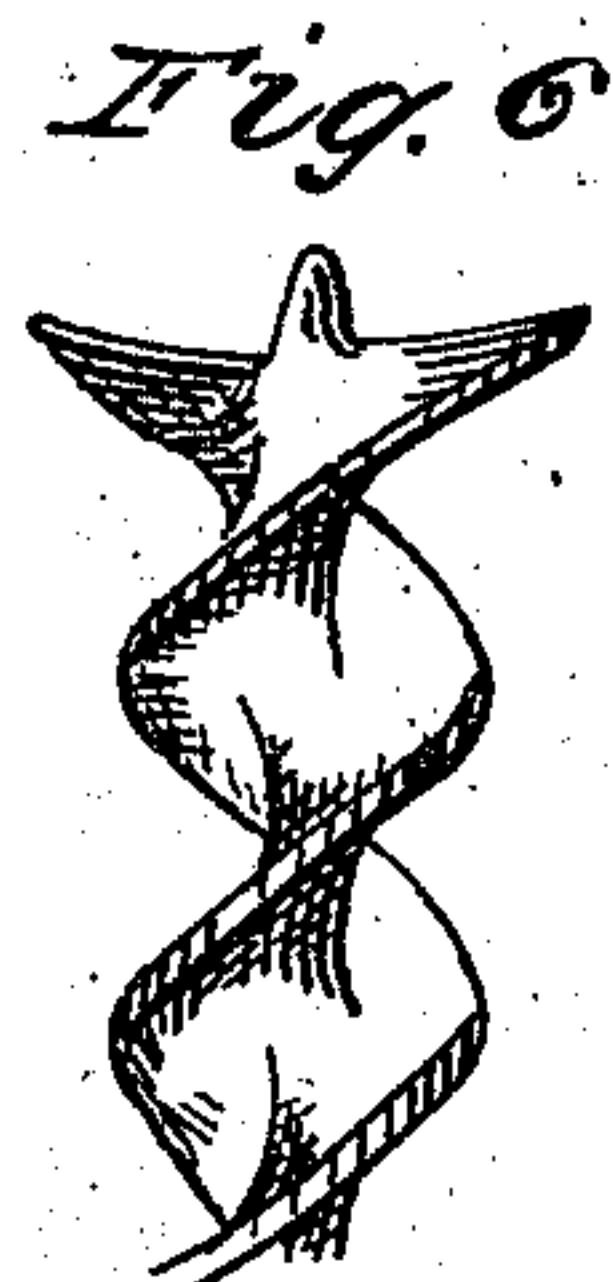
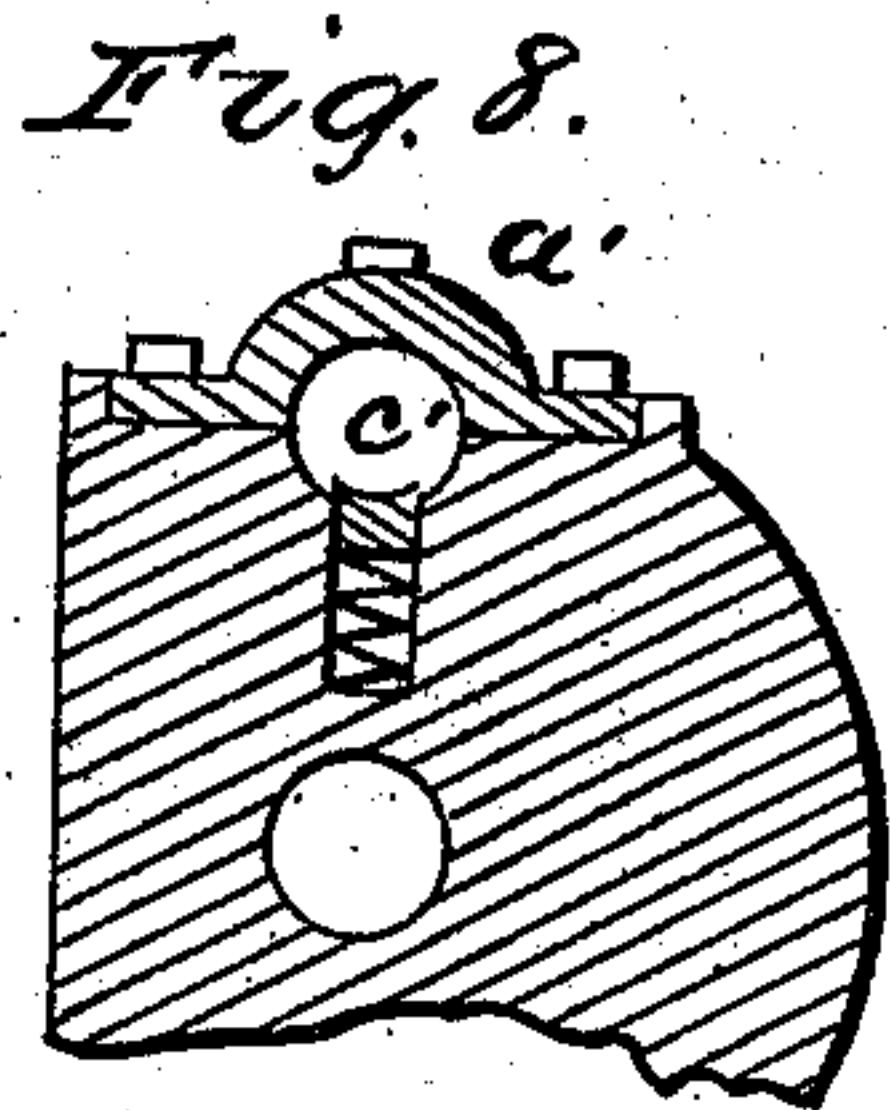
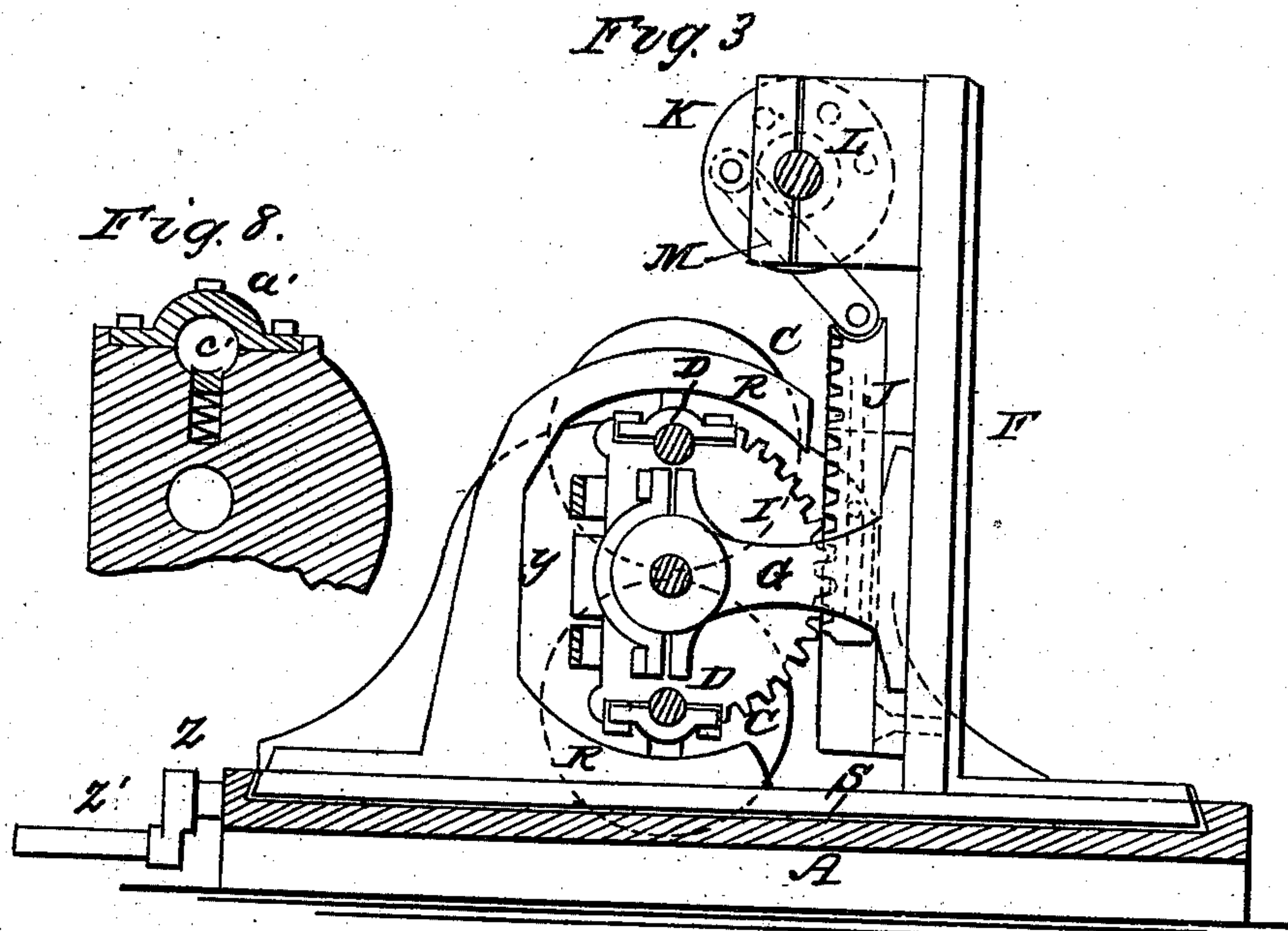
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# United States Patent Office.

JAMES SWAN, OF SEYMOUR, CONNECTICUT.

Letters Patent No. 100,816, dated March 15, 1870.

## IMPROVED MACHINE FOR BENDING THE LIPS OF AUGER-BITS.

The Schedule referred to in these Letters Patent and making part of the same.

### 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 and useful Improvements in Machine for Forging Auger-Bits by Means of Rolls; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification.

This invention relates to the manufacture of auger-bit lips by machinery, and consists in certain improvements thereon which will be more particularly specified hereinafter.

In the accompanying sheet of drawings—

Figure 1, Sheet I, represents a sectional side elevation of the machine, the section being through the line *x x* of fig. 2.

Figure 2, Sheet I, is a top or plan view.

Figure 3, Sheet II, is a vertical cross-section of fig. 2 through the line *y y*.

Figure 4 is a face view of the bit-holder, showing the horn-like attachment on each of its sides.

Figure 5 represents the cam motion by which the forming-rolls and sliding base-plate are made to approach toward and recede from the bit-holder.

Figure 6 represents the form of the lips of the bit before the bit enters the machine.

Figure 7 represents the form of the bit after it has been operated upon by the machine.

Figure 8 is a vertical section of a portion of the head or block, in which the shafts carrying the forging-rollers have adjustable spring bearings.

Similar letters of reference indicate corresponding parts.

In order that any boring-bit may properly work in wood, it is necessary that the lips should be "sheared" or beveled backward from their cutting-edges toward the pod, both on their upper faces and on their sides. This perfection of form is technically called the "clear," and without it the implement will bind in the wood and be inoperative.

By no process of hand-forging, nor by any forging apparatus hitherto invented, can this "clear" be given with anything like sufficient accuracy of proportion to obtain a good result. Such result has hitherto been obtained only by the use of expensive tools and the services of very skilful workmen.

The mouth or under side of the lips are required to be flaring, the metal being extremely thin at the cutting-edge, and gradually increasing in thickness through the throat until it reaches the pod.

This configuration is not obtained by hand-forging, nor has it been obtained by any hitherto invented machinery, for the reason that the insides of the lips have

never been formed by projections from crimp dies. Now, such projections, issuing as they must from dies inside the throat of the bit, can never be made large enough at their extremities to give the proper amount of flare to the mouth. If they were made large enough they could not be extricated from the dies.

By my improvement both the "clear" and the proper amount of flare in the mouth of the bit are obtained in one operation. The horn-like attachments or projections to the bit-holder enter the mouth of the bit from the outside, and are therefore readily withdrawn, while they admit being made fully as large as the interior of the mouth is intended to be.

The motions necessary for performing the various operations will be understood by more particular reference to the drawings.

A is the bed-plate of the machine.

B is the driving-shaft.

C C represent the forming-rollers.

D D are the shafts, upon the ends of which these rollers are firmly keyed or fastened.

E E are gear-wheels on the shafts D. These shafts have spring bearings in the heads, which oscillate or are given a partial revolution on the driving-shaft B, back and forth.

It will be seen that by means of the cap *a'*, (fig. 8,) and the springs and bearing pieces *c'*, the shafts D may be adjusted toward or from each other. Said shafts rest on the bearing pieces *c'*, so that, on the rotation of the heads, the forging-rollers may be brought slightly nearer each other at the desired point by means of the guides R, in order to operate on the blank.

The boxes of the driving-shaft B are stationary, in brackets projecting from the vertical plate F, one of which brackets is seen in the cross-section, fig. 3, (Sheet II,) marked G.

H is a gear-wheel on the driving-shaft, which meshes into the spur-wheels on shafts and drives the rollers.

An oscillating motion or reciprocating partial revolution is given the rollers by means of cogs on the circular side I of one of the heads to which the roller-boxes are attached, and the rack J, which engages therewith, (seen in fig. 3.)

This rack receives a reciprocating vertical motion from a crank-pin in the disk-wheel K, which is on the end of the shaft L. This shaft is confined to the plate F by the bracket boxes M N.

N is a vertical shaft, which is revolved by the worm-gear O, and it revolves the shaft L by means of the miter gear-wheels P P.

R R represent circular guides, so formed or constructed as to allow the rollers to spread from each other during one portion of their revolution, and to approach each other during the other portion. The resistance offered by the metal between them serves



to spread them, while the guides force them toward each other. Any required flexibility may be given, by means of spiral springs operating on the boxes in which their respective shafts revolve.

All the operating parts of the machine which we have so far described are supported on the sliding plate or platform S. This plate is dovetailed into the bed-plate A, and is allowed to slide back and forth, so as to carry the forming-rollers toward and from the bit-holder.

This motion is given (in one direction) by means of the cam T on the end of the upright shaft N, beneath the bed A, (seen in fig. 1.)

The shaft passes through the bed in a slot, *u*, as seen in the drawing, and the cam acts against the stationary roller V. The action of the cam throws the plate, and consequently the rollers C, toward the bit-holder, or forward. The back motion is produced by means of springs W, (seen in fig. 2.)

X represents the bit-holder in two parts, attached to the movable jaws *y y*. These jaws are operated by a right and left-handed screw, *z*, so that the parts of the bit-holder *x* are separated or drawn together by revolving the screw. This is done by means of the crank Z'.

The jaws *y y* slide in a dovetail recess in the bed A, as seen in fig. 1.

The heated blank, (as seen in fig. 6,) is properly secured in the bit-holder by means of the jaws *y y*, and the machine is set in motion by power applied to the driving-shaft B. For a right-hand bit the machinery turns to the left, and *vice versa*. The forming-rollers are advanced by means of the cam, and commence to roll the heated metal before them in the direction of the extremities of the lips, the interior shape of the mouth of the bit being preserved by the anvil-horn extremities of the two horn-like attachments to the parts of the bit-holder. These attachments or projections are marked *a a*.

The rolls also commence their oscillation, and, as they oscillate, the cam further advances them and causes them to impinge more and more on the face of the bit, which is thereby sheared or beveled more and more from the point of first contact. At the same time the guides R cause the rolls to approach each other, and, as a consequence, the sides of the lips are sheared or beveled more and more from the first point of contact. This shearing progresses during the half oscillation, and until a perfect "clear" is obtained. The rolls then perform their return movement, (produced by the springs, but governed by the cam,) and though, by their continued rotation on their axes, they yet continue to roll out the metal of the bit in the direction of the cutting-edges, they, by the reverse ac-

tion of the cam and of the guides, recede from each other and from the bit-holder, and do not mar or injure what they have accomplished in giving "clear" to the bit, but simply thin away the metal until all that was superfluous in the stock is rolled out beyond the point where the cutting-edges of the bit terminate.

After this the machine is stopped and the bit is removed. Nothing remains to be done but to remove the superfluous metal from the points beyond the cutting-edges. A bit is then obtained with a "clear," and with sufficiently flaring mouths, from this operation alone.

It is obvious that if the oscillating motion be given to the bit itself around its long axis, combined with the cam motion, (instead of to the pair of rollers,) the same or a similar result would be produced, provided the rolls were made to approach and recede, as above described.

The application of rollers to the forging or forming of lips of auger-bits being new, I desire it to be distinctly understood that I do not confine myself to the shape, number, or manner of using them for this purpose.

The advantages of this machine over any machine or device hitherto adopted for the purpose are, the cutting-lips are brought to the proper shape and form in the most perfect and expeditious manner.

Having thus described my invention,

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

1. The combination with the bit-holder *x* and horns *a a* of the pair of lip-swaging rolls, arranged and operating as shown and described.

2. The combination of the pair of swaging-rolls with the mechanism herein described for imparting to said pair of rolls an oscillating motion, substantially as set forth.

3. The arrangement of the rolls and their operative mechanism upon a sliding plate, S, so that their relative position will remain unchanged, and all will move together to and from the blank.

4. The combination of upright rotating shaft N, plate S, and bed-plate A, slotted at *u*, with cam T and friction-roller V, the former attached to said shaft and the latter to said bed plate, all arranged and operated in the manner and for the purpose specified.

5. The combination of the guide-yoke R and oscillating pair of rolls, arranged and operating in conjunction one with the other, substantially as described.

JAMES SWAN.

Witnesses:

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J. H. SWAIN.