(No Model.)

4 Sheets—Sheet 1.

E. P. BAVILLE.

SCREW CUTTING MACHINE.

No. 361,572. Patented Apr. 19, 1887.

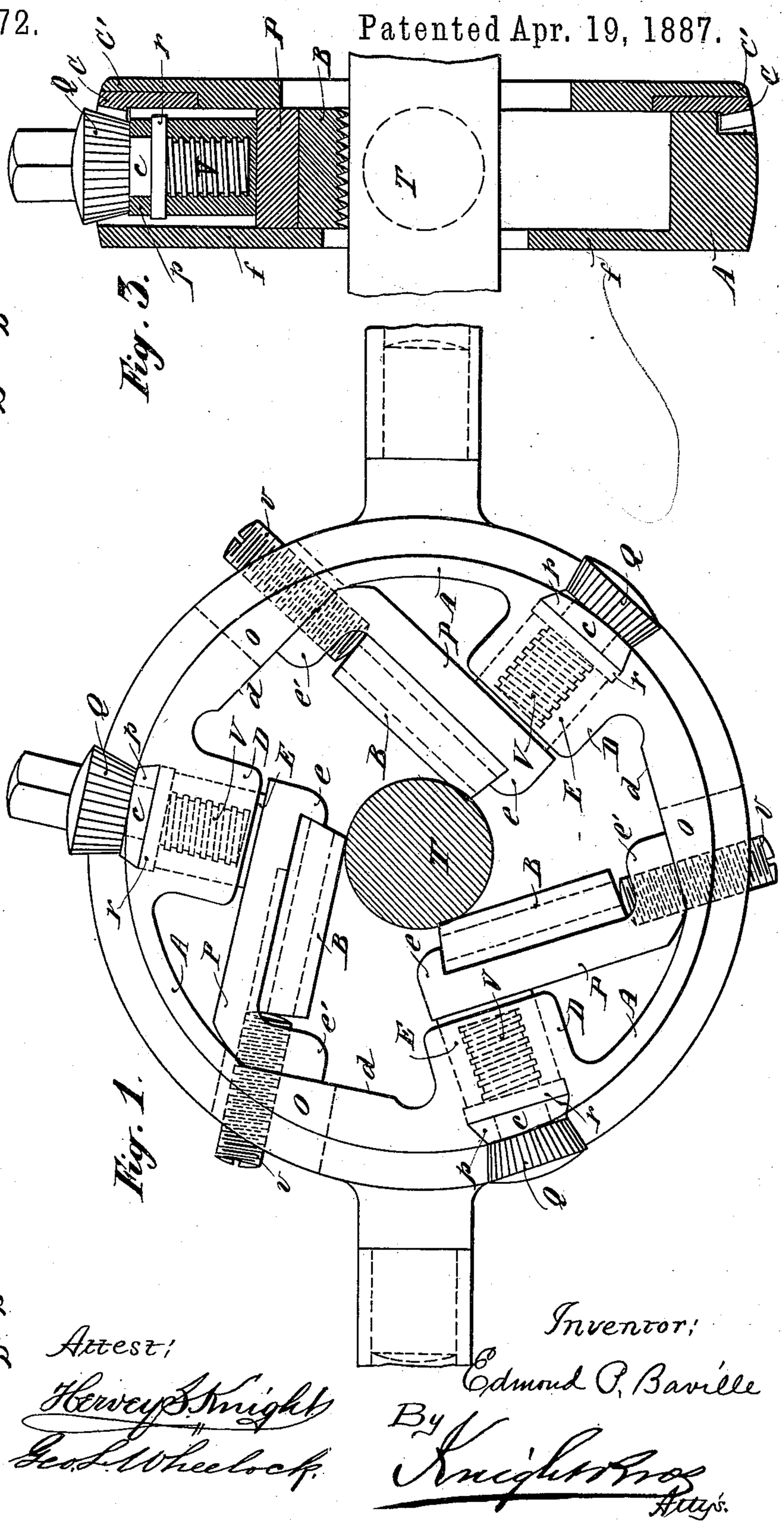

Fig. 1.

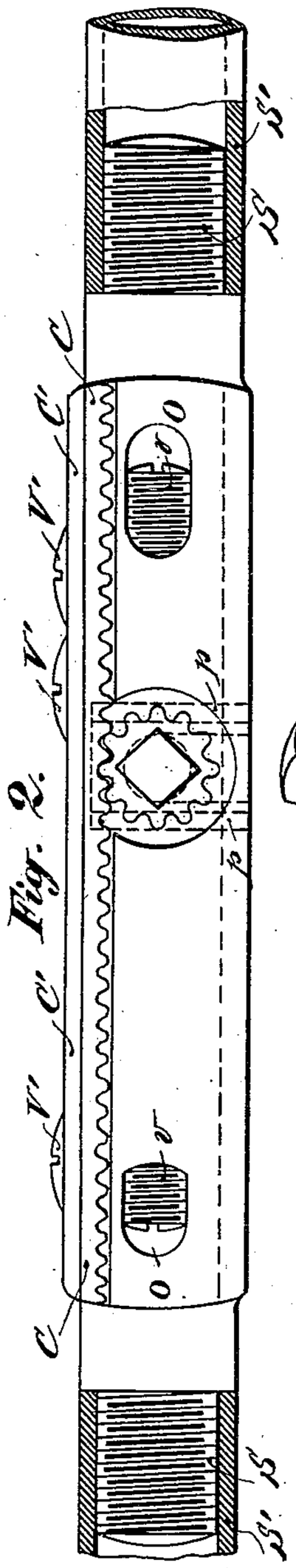

Fig. 2.

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Inventor;
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By Knight Bros
Attys.

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E. P. BAVILLE.

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Fig. 5.

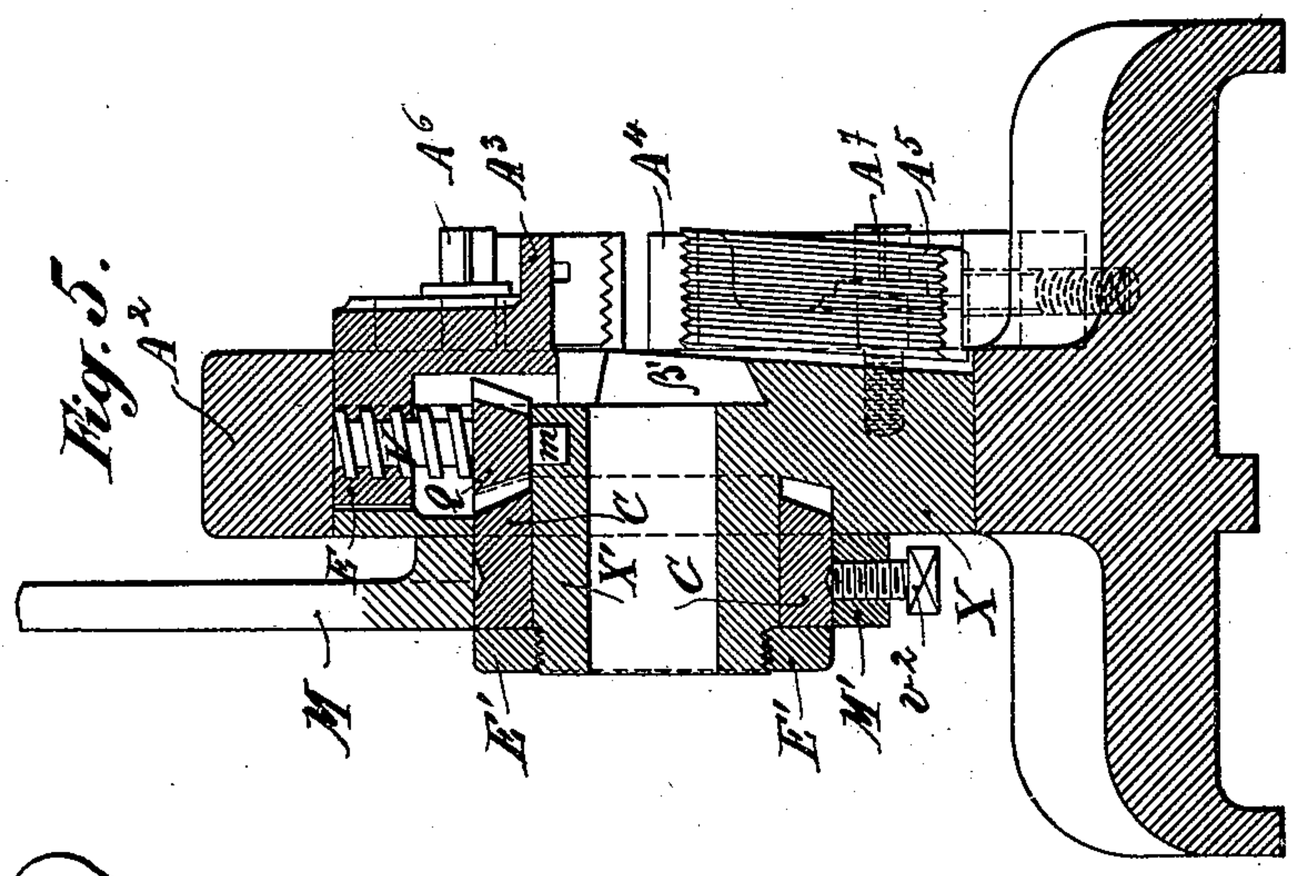


Fig. 7.

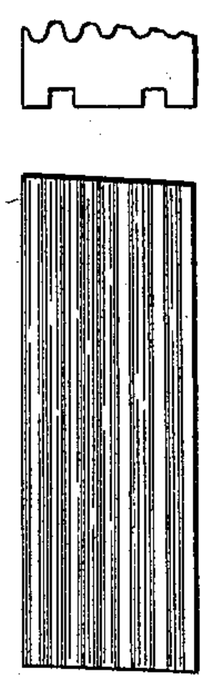


Fig. 4.

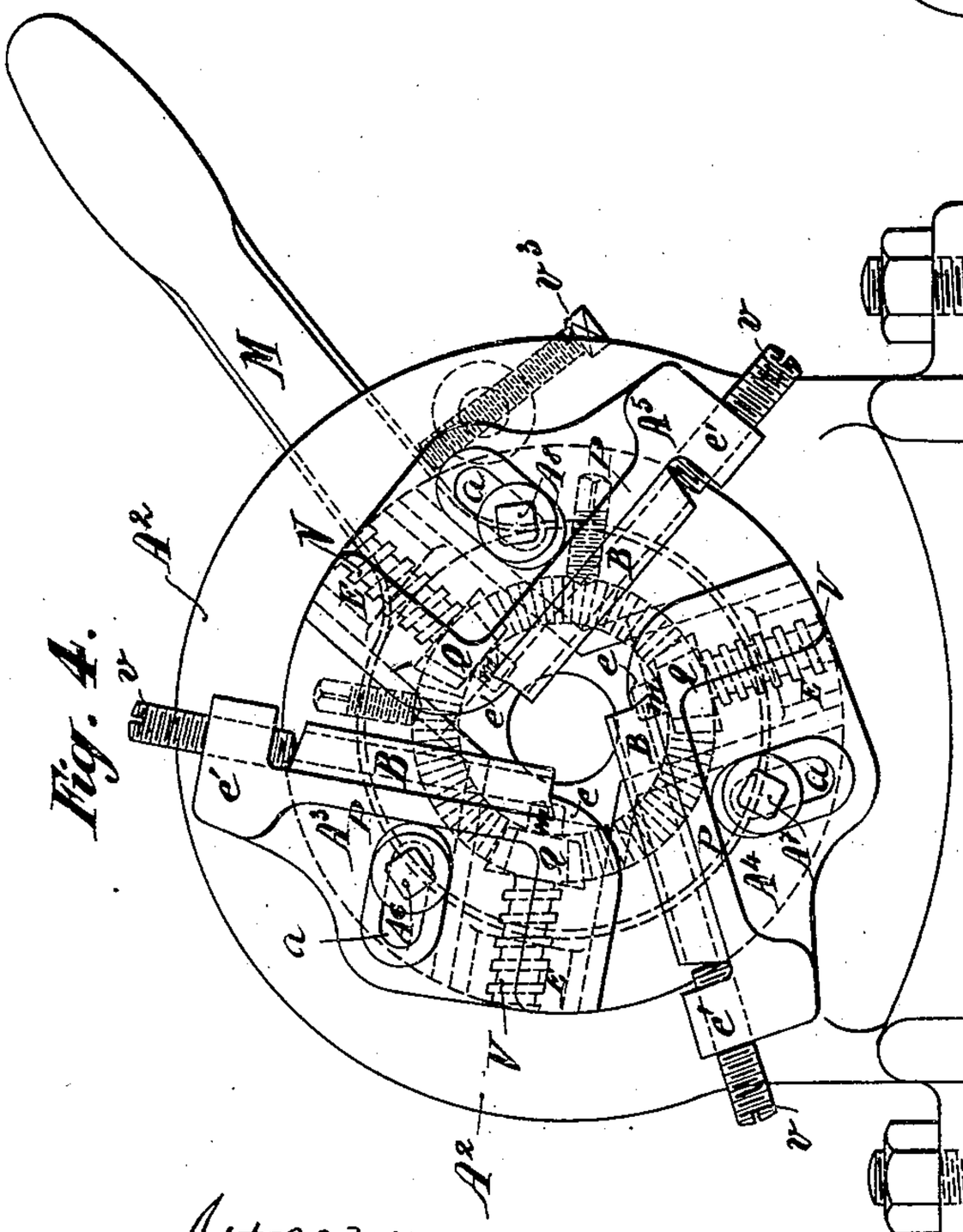
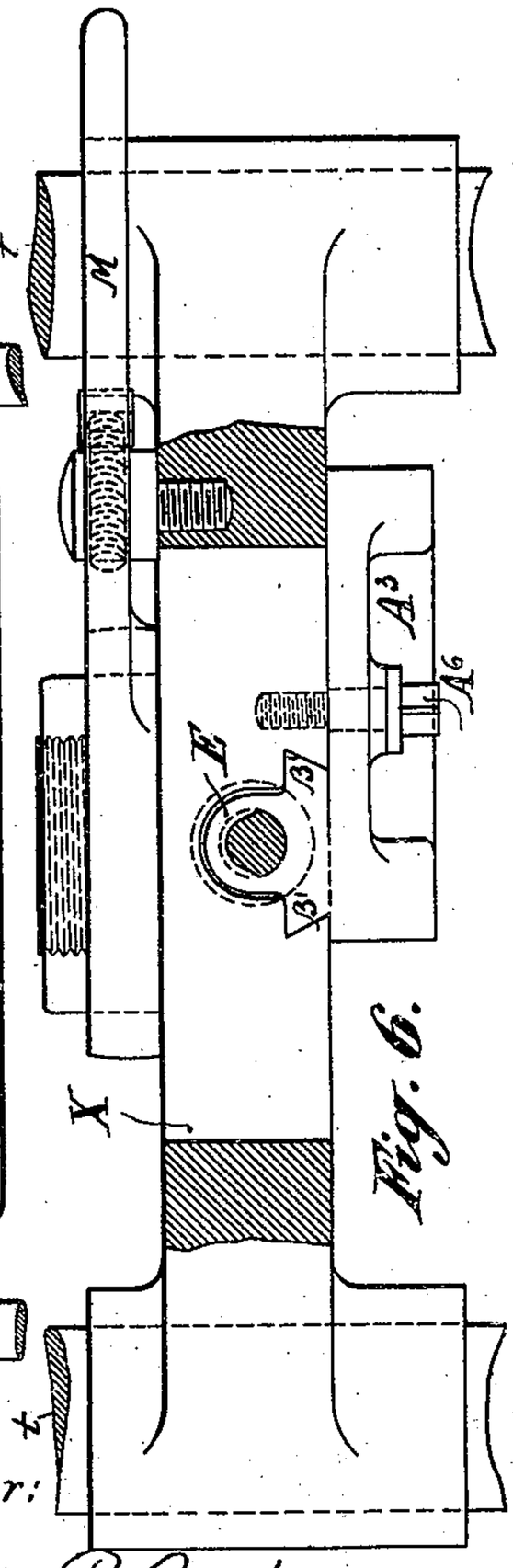


Fig. 6.



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(No Model.)

4 Sheets—Sheet 3.

E. P. BAVILLE.

SCREW CUTTING MACHINE.

No. 361,572. Patented Apr. 19, 1887.

Fig. 8.

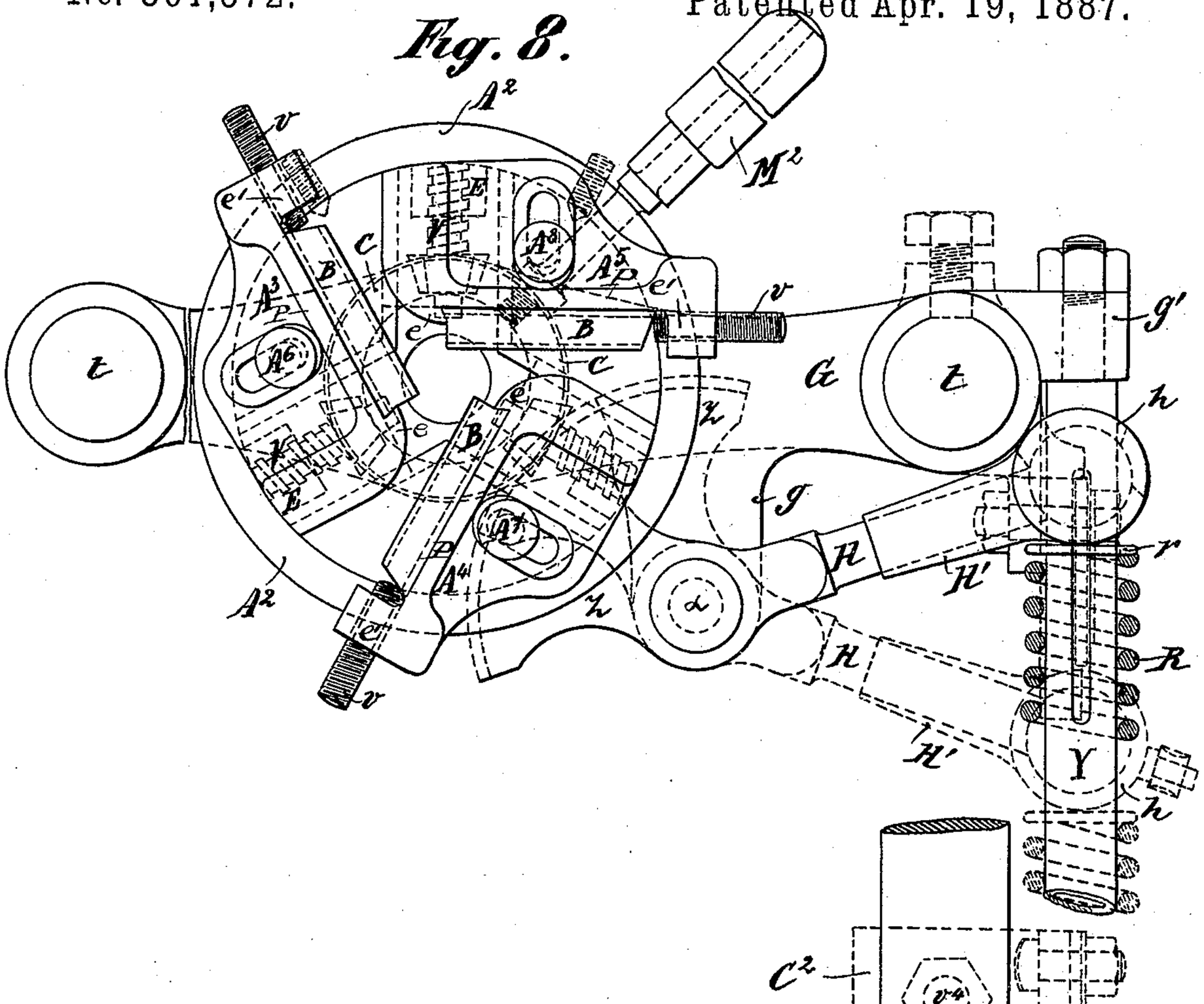
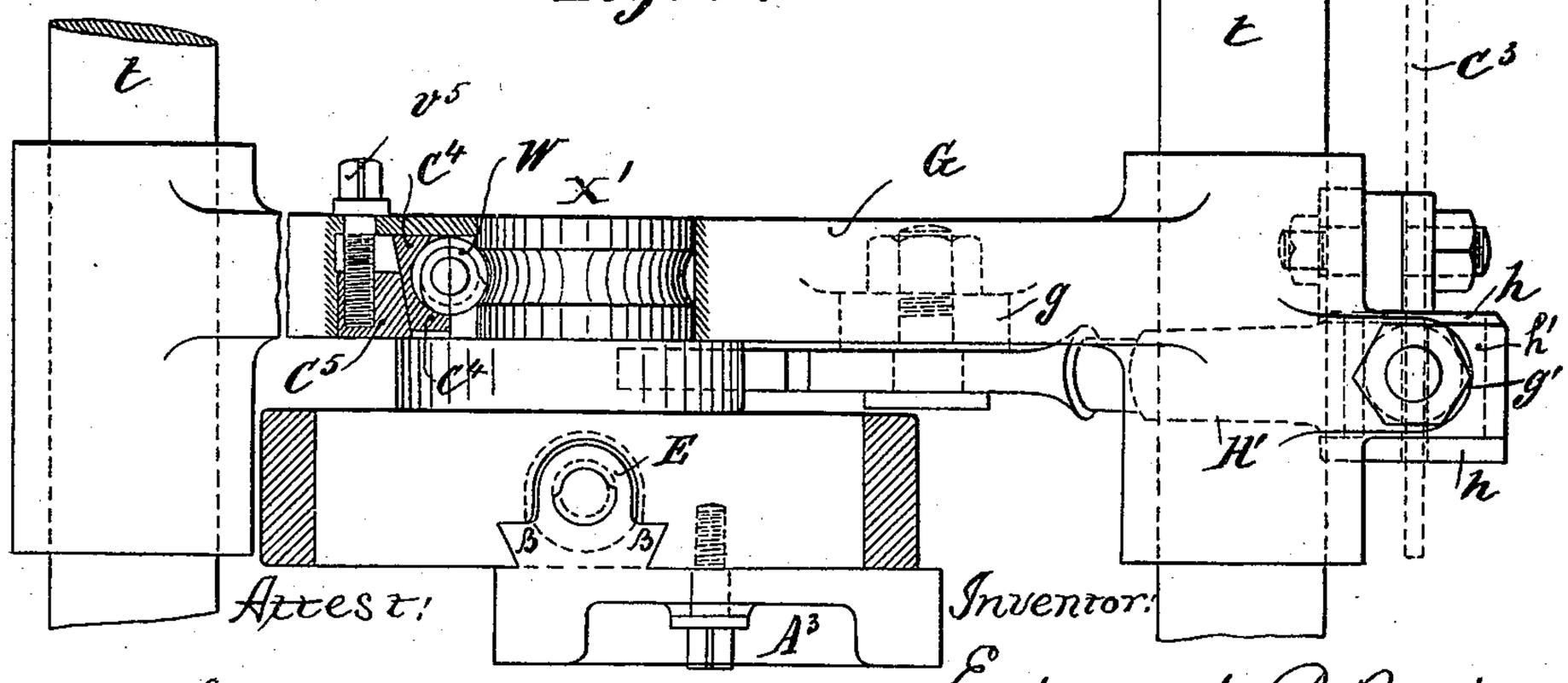


Fig. 9.



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(No Model.) 4 Sheets—Sheet 4.

E. P. BAVILLE.

SCREW CUTTING MACHINE.

No. 361,572. Patented Apr. 19, 1887.

Fig. 10.

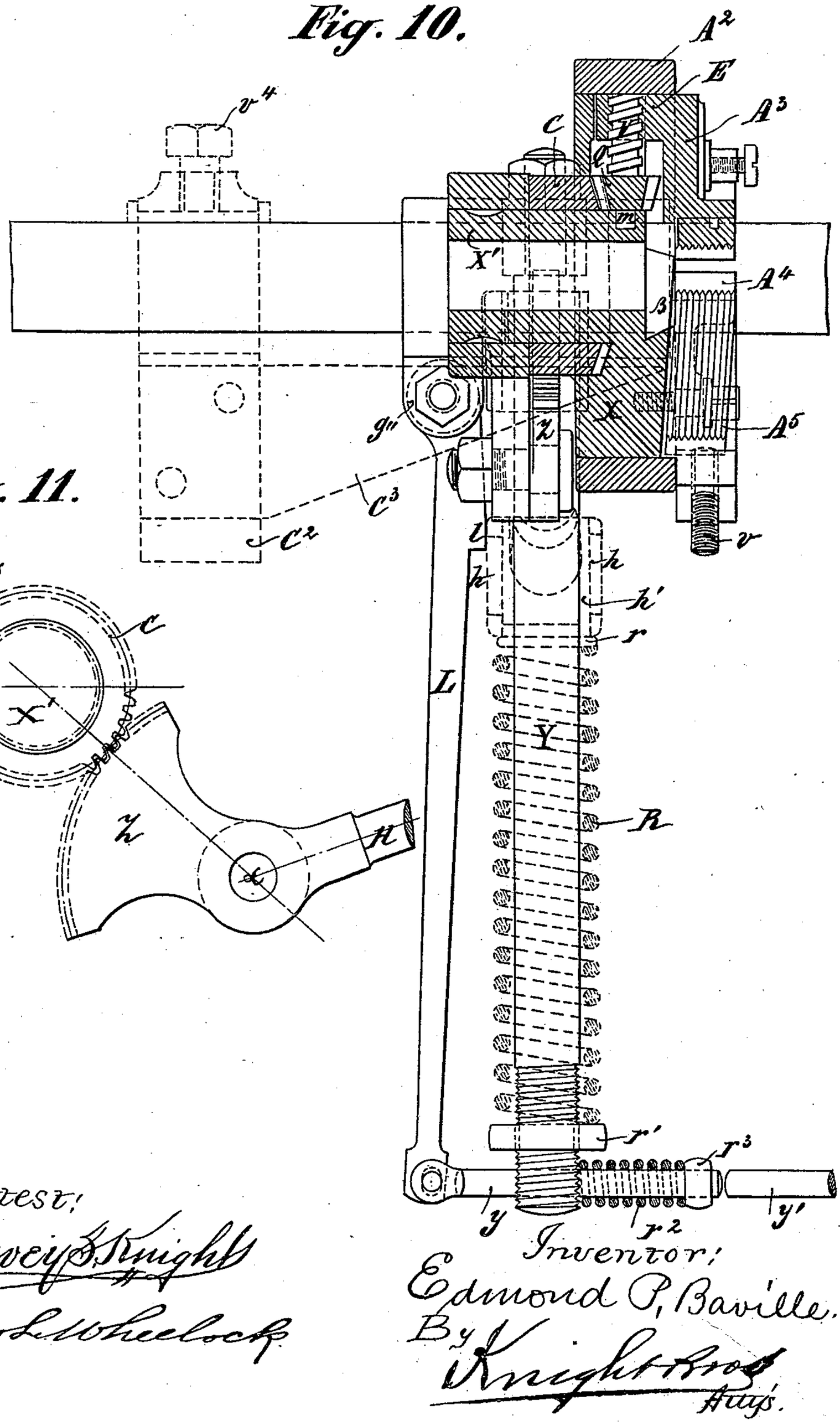

Fig. 11.

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UNITED STATES PATENT OFFICE.

EDMOND P. BAVILLE, OF BRUSSELS, BELGIUM, ASSIGNOR TO JULIEN PONTY, OF SAME PLACE, AND HENRY HOWARD, OF COVENTRY, R. I.

SCREW-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 361,572, dated April 19, 1887.

Application filed October 27, 1886. Serial No. 217,320. (No model.)

To all whom it may concern:

Be it known that I, EDMOND PIERRE BAVILLE, engineer, residing at Brussels, in the Kingdom of Belgium, have invented new and useful Improvements in Machines for Threading Screws, (for which no patent has been obtained in any country,) of which the following is a specification.

The dies and die-stocks which form the subject of this invention all belong to that kind of dies in which each cutter consists of a simple bar or piece of steel grooved on the face to suit the thread to be cut, the cutter being placed tangentially to the blank in a tool-holder adjustable in the die-stock, by means hereinafter described, and shown in the annexed drawings, of which—

Sheet I shows a die-stock to be worked by hand. Sheet II shows a die-stock suitable for ordinary threading-machines, with means of disengaging by hand. Sheets III and IV show the same die-stock with means for automatic disengagement and mechanism for cutting conical screws.

In Sheet I, Figure 1 is a front view of the die-stock with the cover C′ and circular rack removed. Fig. 2 is a side view, partly in section, and Fig. 3 is an axial section, of said die-stock. In Figs. 1 and 2 the arms are shown broken off.

In Sheet II, Fig. 4 is a front elevation; Fig. 5 is an axial section, and Fig. 6 is an edge view, partly in section, of the die-stock with hand mechanism for retracting the cutters. Fig. 7 shows a face and an end view of the cutter. In Figs. 4 and 5 the die-stock is mounted to slide as in an ordinary screw-threading machine, while in Fig. 6 it is arranged with eyes to slide along rods.

In Sheets III and IV, Fig. 8 is a front view of the die-stock with the automatic disengaging mechanism, the handle, and part of the rod appearing broken. Fig. 9 is a view of the upper side, partly in section, the guide-rods and handle appearing broken. Fig. 10 is an axial section showing in dotted lines the wedge-shaped plate for retracting the dies for forming conical screws. Fig. 11 is a view of part of the disengaging and other mechanism hereinafter referred to.

The hand-stock, Sheet I, consists, essentially, of a ring, A, which is perfectly circular outside, but from which project toward the interior radially, and at one-hundred and twenty degrees apart, three bosses, D, of suitable length. In these bosses D are the nuts E′ of the tool-holders, which are fixed directly and perpendicularly to the backs of the holders P, from the inner ends of which shoulders *e* project at acute angles, against which rest the cutters B, whose ends are ground to this angle at the outer end. The holder P is bent at right angles and slides on a straight face, *d*, of the ring A, which in this place has through it a slot, O, sufficient for the passage of the setting-screw *v*, which clamps the cutter in the holder. In the nuts E of the holders, screws V are caused to turn by their pinions Q, being prevented from moving lengthwise, because the plate *p* embraces the shank *c* between the pinions Q and the shoulder *r*, the plate *p* being itself fixed in a dovetail in the ring A.

The bottom *f* of the ring A has through it a central hole for the passage of the blank T that is to be threaded. On the other side of the ring A is placed a circular rack, C, which gears with the pinions Q and can be turned freely by one of those pinions, being held in position in a chase or annular groove formed in the inner face of a ring, C′, which is fixed by screws V′ to the body of the stock. The ring A is provided with screw-threaded studs S, on which are secured pipes of suitable length to secure an arm, S′. (Shown in the drawings broken off.)

Now, if all the cutters are equally distant from the center, (which can be verified by introducing a blank, T,) it may be readily seen that if one of the pinions Q be turned in the one direction or the other all the cutters will approach toward or recede from the center to an equal extent, because all the pinions receive from the circular rack C the same rotary motion, causing the screws V to turn in the same manner in the nuts E, which advance or retire in consequence. For this purpose one of the pinions Q is provided with a squared head, to which a suitable key is applied.

In the stock shown in Sheet II, Figs. 4, 5, and 6, the mechanism for moving the tool-holders, though based on the same principle, is different in construction. This kind of

stock is chiefly intended to be fixed in the middle of a slide or on a runner, so as to be moved by the rotating bolt. This stock is distinguished from all now in use by the arrangement of the tool-holders A^3 A^4 A^5, which are not wholly within the body of the stock, but on the contrary project from the front face of it. The tool-holders have at their bases dovetailed guides B′, at right angles to the cutters B, which slide in corresponding grooves formed in the face of the stock. The middle lines of these guides are radial, so that the cutters B can always be placed tangentially to the blank. The tool-holders also have slots *a*, through which pass guide-bolts A^6 A^7 A^8, screwed in the body X of the stock, so that the pressure on the guides is relieved by those bolts. The tool-holders have end shoulders, *e* and *e′*, between which the cutters are fixed by the screws *v*, as in the form of the device already described. The adjustment of the tool-holders is effected by the screws V, with beveled pinions Q, which are radially mounted in suitable cavities formed in the body X of the stock. The screws V work in screw-threaded lugs E on the dovetailed guides B′, these lugs being free to move in the cavities in which the screws V are situated. Each screw V has at one end a small pivot, *m*, entering the nave X′ of the stock, and at its other end it is held in position by a ring, A^2, which in the present case, Figs. 4 and 5, forms part of the support in which the stock is held. With the pinions Q of the screws V engages the circular rack C, which turns on the nave X′ of the stock on turning the handle M, the eye of which, M′, is fixed on the rack C by screws v^2, so that the tools are advanced or retracted according as the rack is turned in one direction or the other.

In order to keep the tools always equally distant from the center, a regulating-screw, v^3, passes through a lug and serves as a stop for the handle M. The handle remains in this position as long as the blank is being cut, and when it is cut to the desired length the handle M is turned backward, so as to retract the cutters and thus stop their action. The rack C is held in position by the ring E′, which is screwed on the end of the nave X′. The described arrangement of the tool-holders gives not only to them, but also to the whole stock, great strength and solidity, because the body of the stock is much less hollowed out than in existing stocks, and is consequently more rigid. The cuttings are also more easily cleared off, and there is no difficulty in lubricating.

The means employed in this form of the device for advancing and retracting the cutters is substantially the same as that employed by me for advancing and retracting the gripping-jaws of a chuck, for which I have filed an application of even date herewith. Whatever features the device herein described possesses in common with the said chuck are not herein claimed, but are claimed in the other application referred to.

The Sheets III and IV represent a similar stock mounted on a machine with slide-rods *t* and combined with automatic disengaging mechanism, Figs. 8, 9, 10, 11. In this case the circular rack C, instead of being provided with a lever, M, is toothed at its periphery, as shown in the part view, Fig. 11, and with it gears a toothed sector, Z, which is pivoted at *a* on an arm cast on the sliding cross-head G, Fig. 8. When the sector is in the position indicated by the full lines, the cutters are retracted, whereas when it is in the dotted position the cutters are closed on the blank. Opposite the sector, at a suitable inclination, extends an arm, H, consisting of a round rod inserted in a sleeve, H′, in which it can slide longitudinally. The sleeve H′ has at its opposite end a fork with eyes *h*, which are jointed to a slide, *h′*, through a hole, in which passes a vertical rod, Y, on which *h′* can slide up or down. In this manner the arm H of the sector can follow the movements of the slide *h′* on the rod Y—that is to say, can allow for lengthening or shortening, according to the positions of the sector. The upper end of the rod Y is bolted to a bracket, *g′*, of the sliding cross-head, and it is surrounded by a strong helical spring, R, which bears at the top against a washer, *r*, which bears on the slide *h′*, and at the bottom against a nut, *r′*, screwed on the end of the rod Y, so that by it the spring R can be more or less compressed to give it greater or less force. To a lug, *g″*, on cross-head G, Fig. 10, is jointed the lever L with shoulder *l*, which can engage the edge of the sleeve H′ when it is pushed down to the dotted position, the cutters being then closed in. It is held in this position by the spring r^2, surrounding a horizontal rod, *y*, between a collar, r^3, on that rod and the rod Y, through which it passes to join at its ends with the end of the lever L.

It may be readily seen that so long as the shoulder *l* keeps the sleeve-lever H′ down, the cutters remain closed in on the blank; but as it draws the stock along the slide-rods *t t*, the end of *y* approaches a stop, *y′*, and when *y* meets *y′* the shoulder *l* of the lever L is disengaged from the slide *h′*, and the arm B, urged by the spring R, ascends, turns the sector Z, and thereby turns the circular rack C, which acts on the pinions Q, withdrawing the cutters from contact with the blank, and thereby stopping the threading operation.

When threading a cylindrical screw, the cutters must be incapable of movement toward or from the center of the blank; but it may be readily understood that in order to cut conical screws the cutters should be regularly retracted or advanced, according as they are traversing the cone from apex to base, or vice versa. This movement is obtained in a very simple manner, and the length of the screw is fixed by aid of a sleeve, C^2, secured on the slide-rod *t* by setting-screw v^4, in which sleeve is firmly fixed an angle blade or plate, C^3, which passes above the slide *h′* through a slot in the

rod Y and pushes down the slide *h'*, thereby closing in the cutters.

The blade C^3 being placed behind the stock, the stock in advancing withdraws from the blade, and this allows the slide H' gradually to ascend, retracting the cutters along the taper screw until the blade is quite clear of the slot, whereupon the cutters are completely retracted. Obviously, if the blade C^3 were located in the front of the stock, the cutters would be gradually advanced in the manner already intimated, instead of being retracted. When the blade C^3 is used, the lever L may be dismounted, or vice versa, to prevent interference.

Figs. 9 and 11 show the arrangements for changing diameter. For this purpose the nave X' of the stock is toothed as a worm-wheel, with which gears the worm W. (Shown in end elevation in Fig. 9 and in side elevation in Fig. 11.) The worm is lodged its whole length in a hollow of the angle piece or block C^4, in which it can be turned by a key applied to the squared head of its stem S. The worm W, the angle-piece C^4, and a counter-wedge, C^5, are lodged in a hollow of the sliding cross-head, in which the whole is held by the screw v^5, which screws into the counter-wedge. When this is screwed up, the whole is firmly fixed; but when the wedge is loosened the worm can be turned, causing the body X of the stock, together with the pinions Q, to turn around relatively to the circular rack C, thus advancing or retracting the cutters. When these are set to the desired position, the wedge C^5 is again tightened, and the whole remains fixed in position. This mechanism is therefore quite independent of that for withdrawing the cutters at the end of the threading operation. Fig. 7 shows a specimen of a cutter removed.

In Fig. 8 M^2 is a handle for withdrawing the die when the screw is finished.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent—

1. In a die-stock, the combination, with the tool-holders secured to the external face of the frame by dovetailed guides and grooves and screws for moving said holders, of the guide-slots cut in said holders parallel to the screws which respectively advance them and the guide-bolts extending through said slots and into the body of the stock, substantially as set forth.

2. The combination, with a die-stock having radial screws for advancing and retracting the tool-holders and a circular rack engaging said pinions and having teeth on its periphery, of a toothed sector engaging said peripheral teeth and operated by engagement with a fixed part of the frame, substantially as and for the purpose set forth.

3. The combination, with the dies, the means for advancing and retracting them, and the ring C, having teeth on its periphery, of the sector engaging said teeth, a spring for holding said sector normally at one extremity of its permitted movement, a detent for holding it at the other extremity in opposition to the force of said spring, and a fixed stop for tripping said detent, substantially as and for the purpose set forth.

4. The combination, with a die-stock having a ring, C, with teeth on its periphery, and a sector engaging said teeth and having the arm H, of the socket H', the rod Y, on which said socket slides, the spring R, for holding said socket and arm at one extremity of its permitted movement, the hinged arm L, having shoulder *l*, for holding said socket at the other extremity of its movement in opposition to the force of the spring R, and the fixed stop *y'*, for tripping said arm L, substantially as set forth.

5. In a die-stock, the combination, with the ring C, having teeth and the sector engaging said teeth and having the arm H extending therefrom, of the detent L *l*, for holding said arm at one extremity of its permitted movement, and a spring for moving it to the other, a spring for holding said trip-lever normally in engaging position, and a stop for tripping it, substantially as set forth.

6. The combination, with a die-stock having the toothed ring C, for the purpose set forth, and a sector engaging therewith and having the arm H, of the plate having inclined edge for moving said arm from one extremity of its permitted movement to the other, substantially as set forth.

7. In a die-stock, the combination, with a toothed ring, C, and a sector engaging therewith, for the purpose set forth, and having an arm extending therefrom, of a spring for holding said arm normally at one extremity of its permitted movement and an incline for moving said arm in opposition to the force exerted by said spring, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 30th day of September, 1886.

EDMOND P. BAVILLE.

Witnesses:
AUG. JOERISSEN,
LÉON DOCQUIER.