

(No Model.)

4 Sheets—Sheet 1.

L. S. GROSSMAN.
BOLT CUTTER.

No. 500,887.

Patented July 4, 1893.

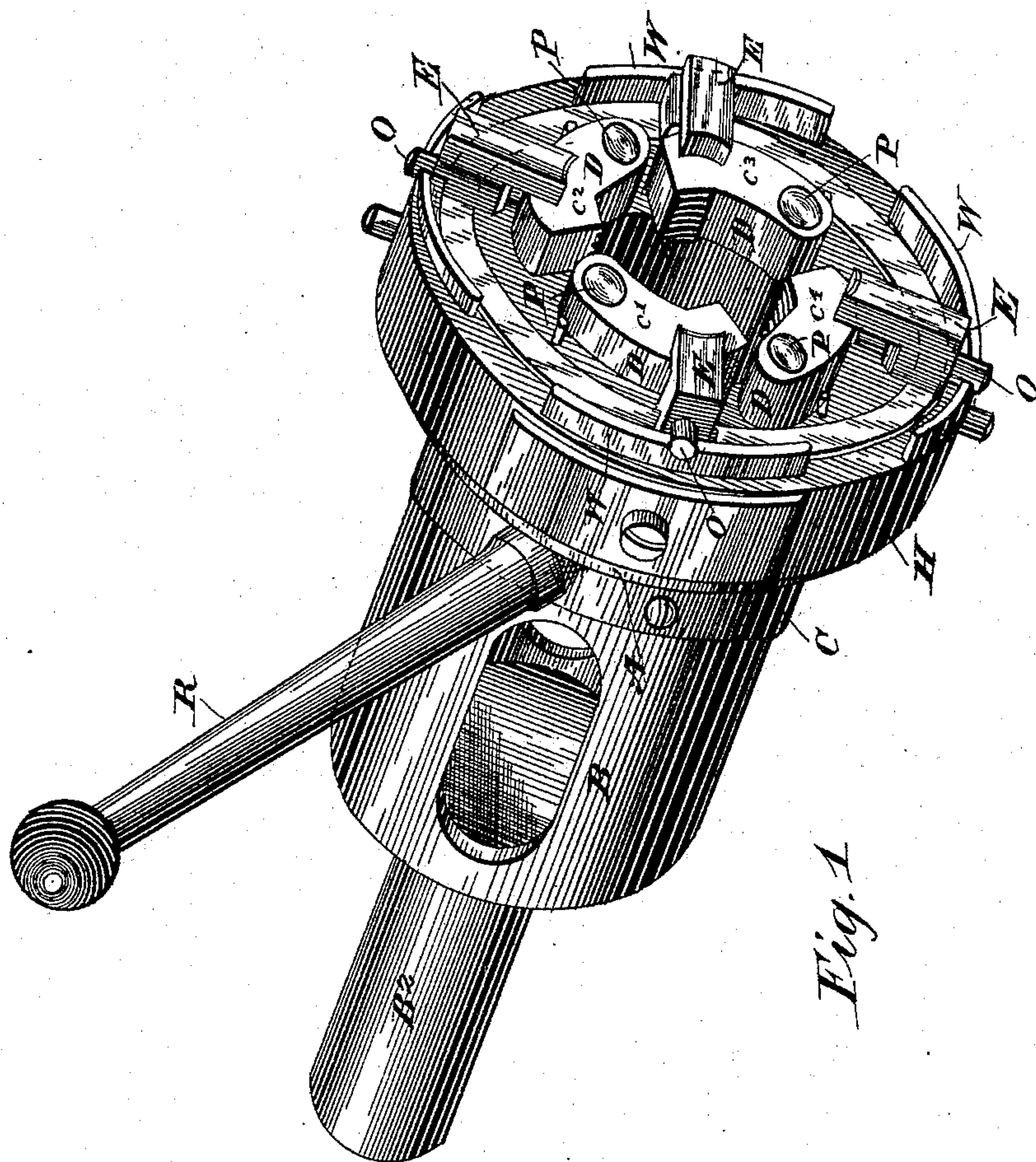


Fig. 1

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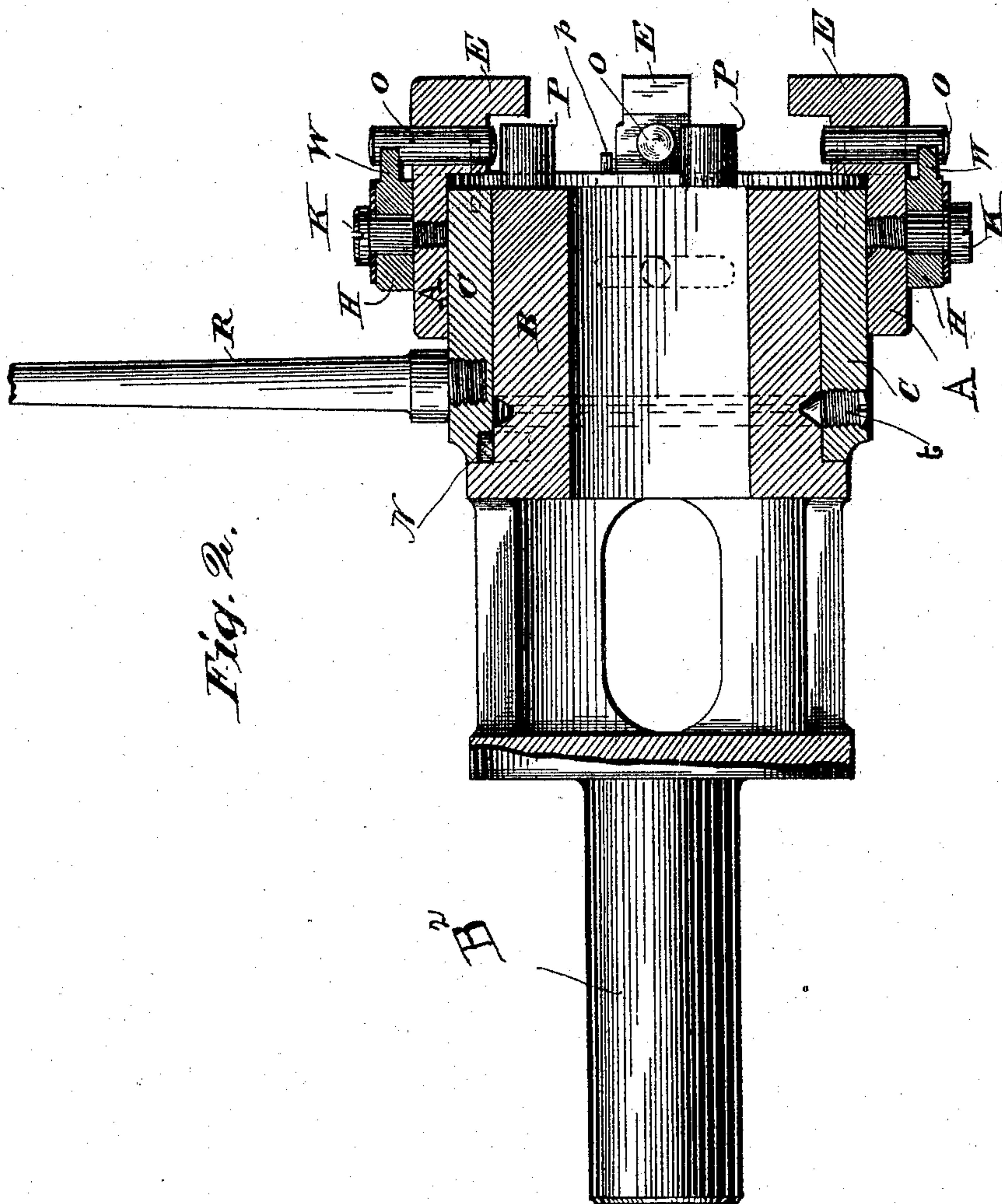
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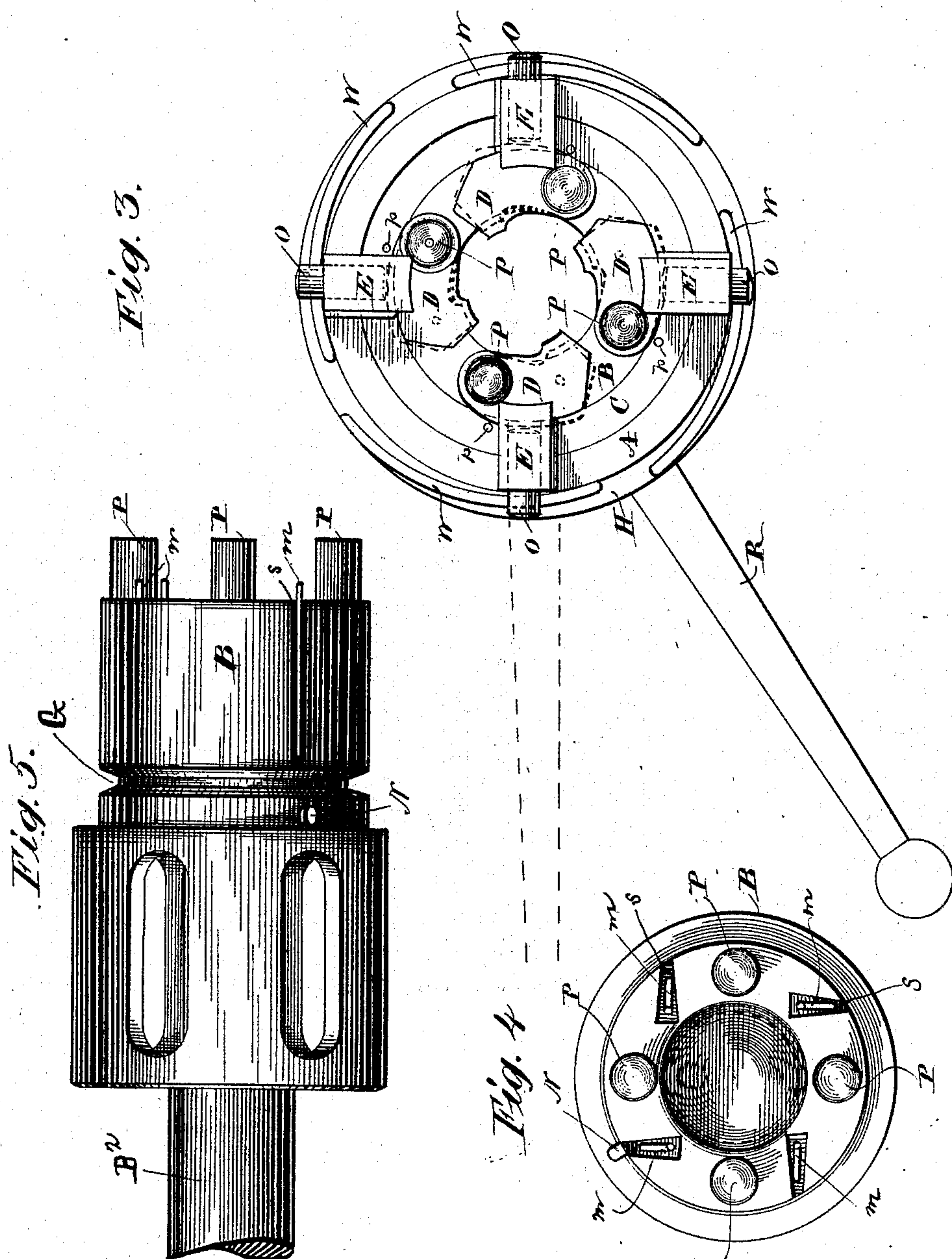
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Fig. 7.

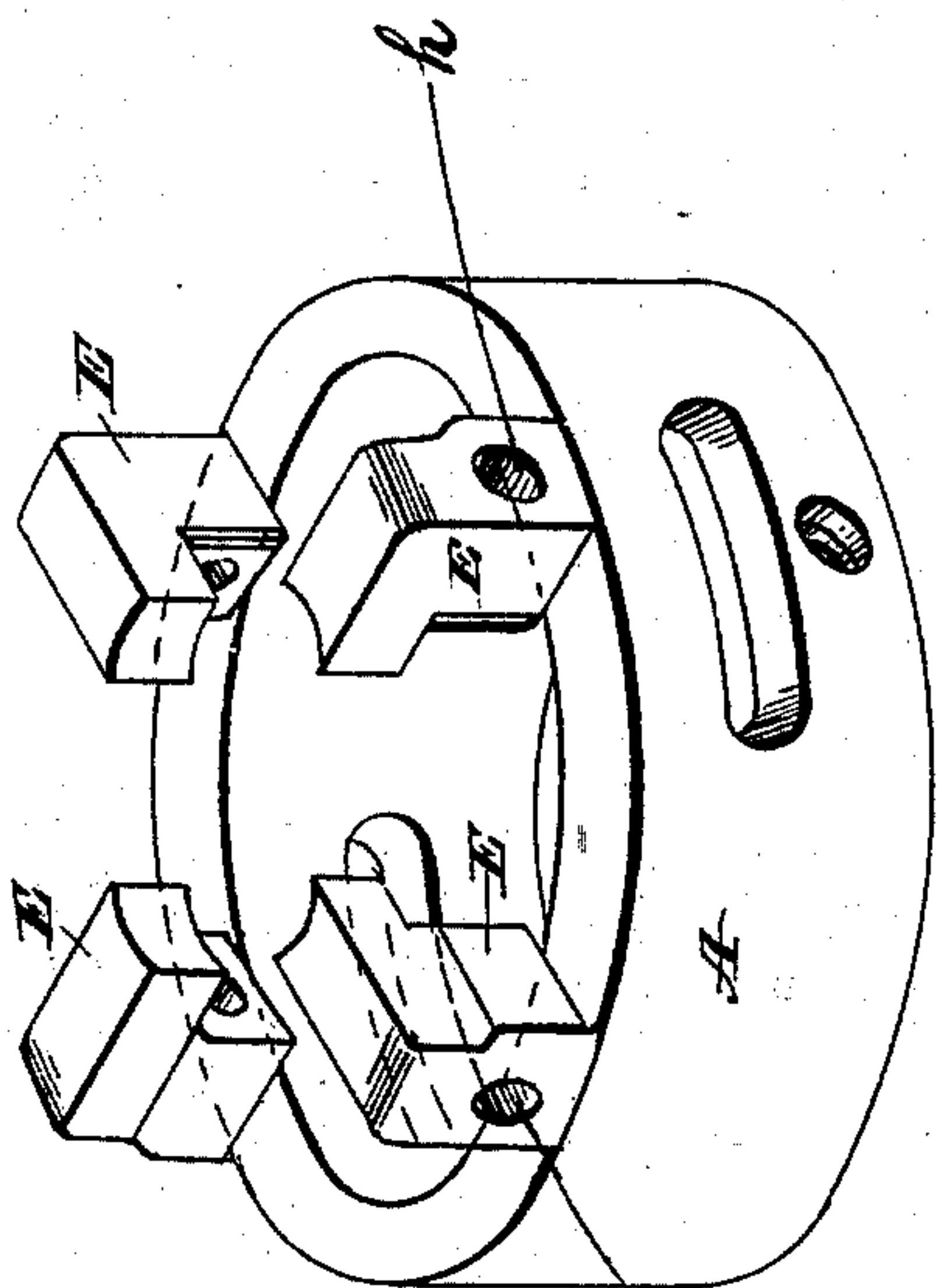


Fig. 6.

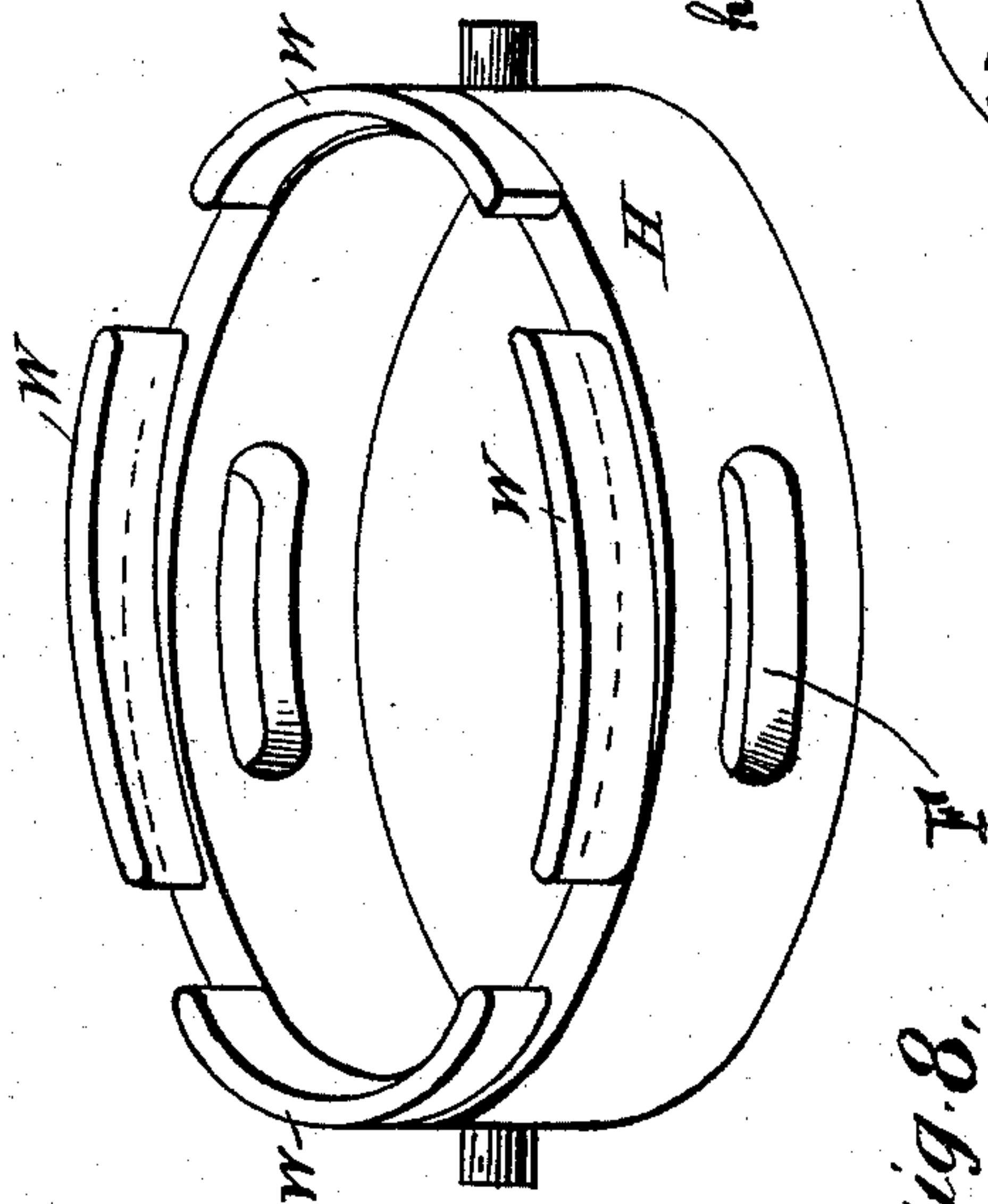


Fig. 10.

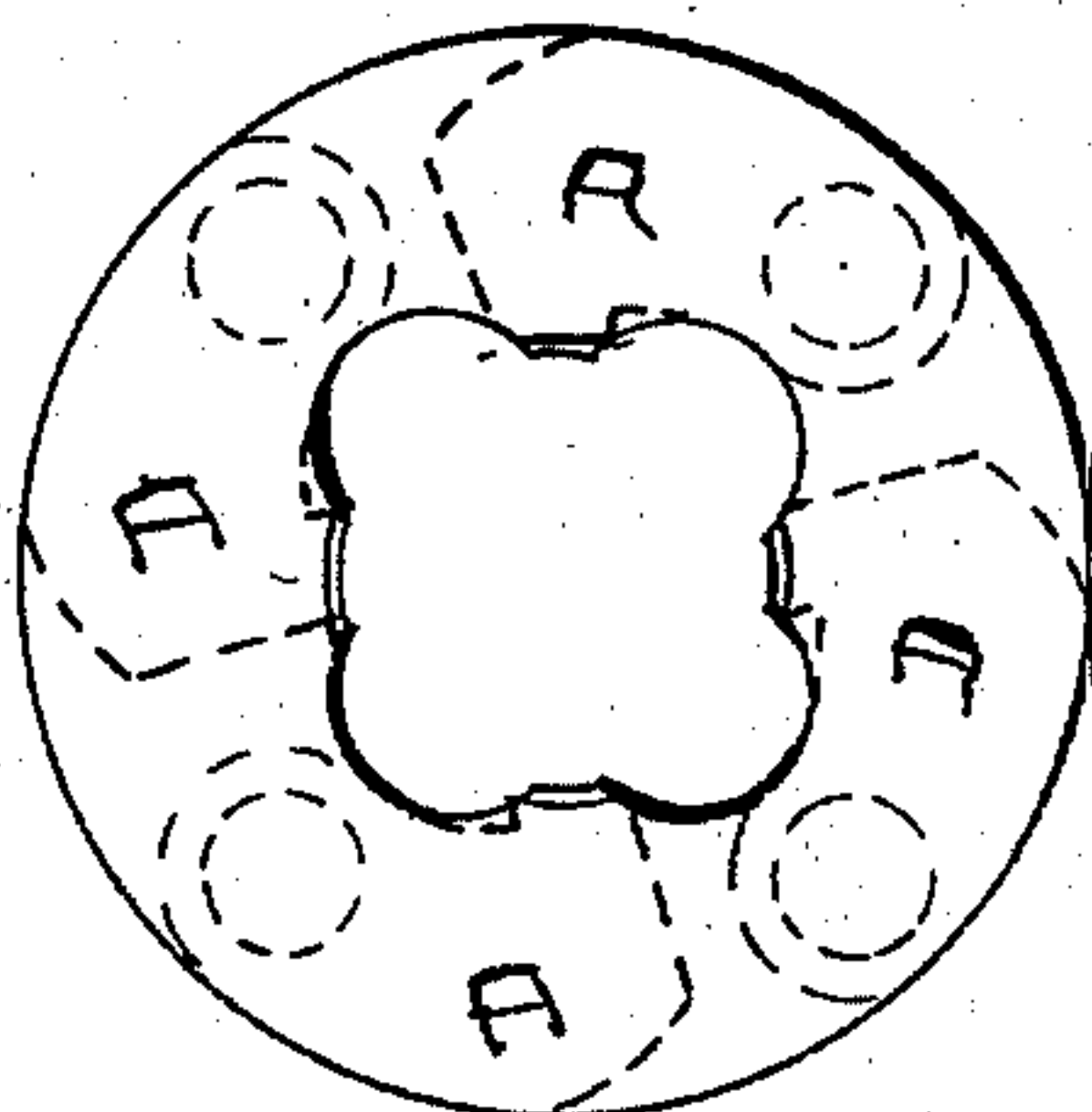


Fig. 9.

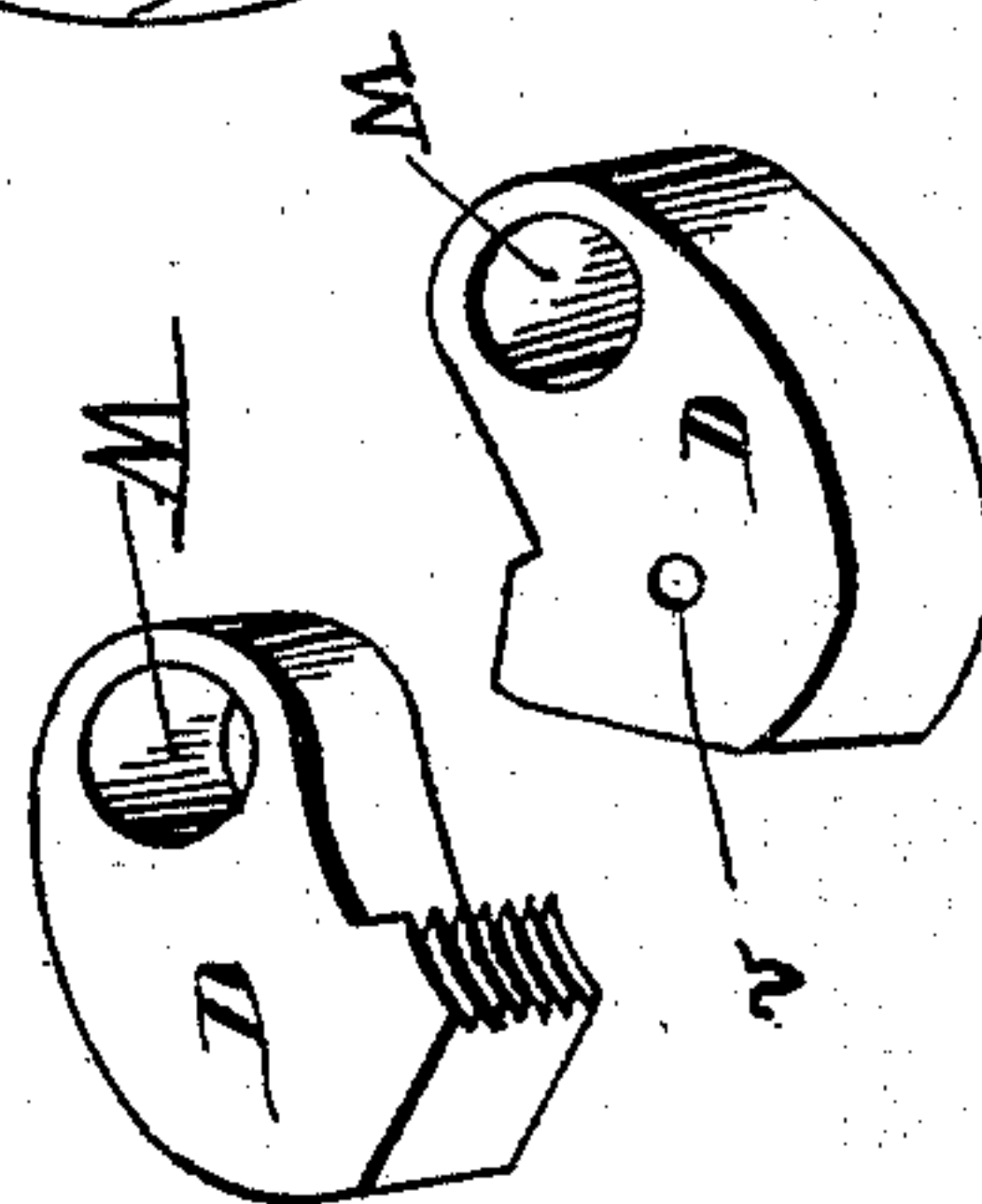
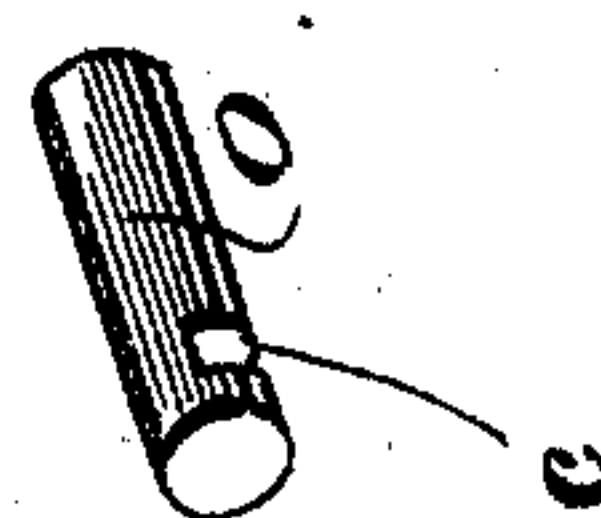


Fig. 8.



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UNITED STATES PATENT OFFICE.

LAWRENCE S. GROSSMAN, OF CLEVELAND, OHIO, ASSIGNOR TO THE
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BOLT-CUTTER.

SPECIFICATION forming part of Letters Patent No. 500,887, dated July 4, 1893.

Application filed March 7, 1893. Serial No. 465,054. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE S. GROSSMAN, a resident of the city of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Bolt-Cutters, of which the following is a specification.

My invention relates to that class of mechanical appliances for use in cutting the threads upon bolt-blanks, piping and similar work, by means of a head containing a series of threading dies; and the general purpose and object thereof are to provide a device of the above class, wherein—at the will of the operator—the dies may be readily opened or closed upon the work at any time, or at any point within the line of their travel. The form of opening dies of the above class heretofore employed is the familiar cutter-edges (usually in combination with cases) adapted to slide in slots, within the barrel, in a direction radial to its center. The exterior ends of such dies are provided with caps, or lateral projections, which are adjusted to engage with inclined slots, or ways, in the die-ring and to thereby force the dies forward toward the center of the barrel as the said die-ring is propelled outwardly, and, to withdraw the dies from said center as the said ring is moved inwardly along the head. In bolt-cutters of the said prevailing type, however, the comparative extent of interior groove bearing is, necessarily, so considerable and precise, that not only is the original cost of constructing these devices unduly enhanced, but by reason of the liability of said interior bearings to become choked with chips, or grit, the uniformity of their wear and operation is largely affected.

My invention is especially intended to avoid, or much reduce, the undesirable features in bolt cutting devices above referred to, and, at the same time, to provide a combination or series of dies, of the order named, which have positive advantages of structure, and a mode of operation not possessed by other forms in use. I attain this object by the device hereinafter more particularly described and illustrated by the several drawings accompanying and forming a part of this specification.

In the said drawings similar letters are used in each to designate similar parts.

Figure 1 is an oblique longitudinal perspective view of a bolt-cutter head embodying my invention. Fig. 2 is a similar sectional view with the dies removed. Fig. 3 is a front or face view of the device shown in Fig. 1, with the dies set for operation. Fig. 4 is an end view of the barrel or central portion, of said device showing the outer extremities of the wire springs *m*, I have preferably employed, as well as their longitudinal retaining slots *S*. Fig. 5 is a longitudinal perspective view of the said barrel. Fig. 6 is an outline representation of the die-ring *H*. Fig. 7 similarly shows the band *A*. Fig. 8 is a perspective view of one of the reciprocating pins *O*. Fig. 9 represents top and bottom views respectively of a die *D*, and, Fig. 10 shows a solid four cutter die from which the dies, in their proper leading order may be derived for use in my said device.

In the several figures, *B* is the barrel of the cutter head. It is a hollow cylinder, terminating in the usual stock, or butt *B*², and is provided with the equi-distant pivots *P*, arranged upon the outer end of the said barrel parallel with its longer axis. Said pivots correspond in number with the number of dies to be employed. As a preferable mode of retaining springs in bearing beneath the dies—for the purpose which will hereinafter more fully appear—I provide elongated slots *S*. *S* in the sides of the barrel *B*, each adapted to receive, and retain upright in a socket therein, the bent wire springs *m*. These wires are of a sufficient length to slightly protrude from the outer ends of their slots *S*. and enter the holes *v*. in the under side of the dies *D*. when the latter are in place. The arrangement of the slots and wires just described is, of course, but one of several possible methods of achieving the spring action against said dies essential in the connection. A stop *N* is located upon said barrel adapted to register with a corresponding limiting groove or slot in the part, or case *C*.

A groove *G* is provided upon the barrel *B* as one mode of enabling the case *C* to be screwed, or otherwise secured to the same, so

as to permit a rotary, without longitudinal motion of the said parts with respect to each other.

C is a hollow cylindrical sheath, or case, adapted to fit and turn axially upon the exterior surface of the barrel B. It is provided, at its inner end, with a groove, or slot, to receive, and lap over, the stop N, in order to thereby check, or limit, the said axial movement. The handle R may conveniently be employed to actuate said case C. Countersunk screws *t* (Fig. 2) may be employed to penetrate through the case C, within the groove G, and thereby hold the parts B and C in the same relative position. At predetermined intervals upon the outer end of said case C are located the pin-stops *p*, as preferable modes of limiting the outward action of the dies D, when free to be actuated by the springs *m*. About the front end of the case C is a band, or hollow cylinder A, adapted to be removed at will therefrom, but to be maintained in a fixed relative position with respect to the case C, when in position about the same, and, to turn axially therewith. The outer edge of said band A may slightly project beyond the outer edge of said case C. At equidistant points about said outer edge of the band A, are longitudinal projections E which overhang the outer edges of the parts C and B—in directions radial to the barrel's center—and, each having an interior configuration, at the said overhanging portions, resembling a square scarf joint, and proportions to admit the dies, D, thereunder, at a close operative fit, in a manner to be hereinafter further specified. Through the base of said projections E are holes, or bearings, *h*, adapted to receive the sliding pins O. The latter are of sufficient length to extend at the same time beyond both the exterior and interior faces of said projections E when mounted within their respective bearings *h*, and, are adapted to reciprocate within said bearings. The outer ends of the said pins, across the side nearest the face of the bolt-cutter head—when said pins are in position—are channeled, as shown at *c* in Fig. 8. Around the said band A is a die-ring H, provided with a number of elevated ways *w*, corresponding with the number of dies in the head; said ways are of the scroll variety—and lead—by the same curvature—from their several starting points at the inner side of the die-ring H to their respective terminals near the outer limit of the said edge. The said ways *w* are of a suitable gage and height to enable them to become engaged within the said channeled ends *c* of the pins O, when the die-ring H is in position about the cutter head.

The die-ring H is equipped with slots F and a set-screw K, to restrict the rotary motion thereof about the band A to within the limits of travel upon the ways *w*—and, enable the said ring to be firmly set to the band A at any point within the said limits desired. The said die-ring H, may be burred or otherwise fin-

ished to facilitate its said rotary movement.

D, D, are the dies, which are of the general semi circular form shown in Figs. 1, 3, 9 and 10. They are of a thickness to enable them to freely pass—at a close fit—beneath the overhanging portions of the projections E—and be retained, by said portions, in near proximity to the end of the barrel B. The cutter edges of the dies D are at one extremity thereof—while the other extremity is at an angle therefrom upon a kind of arm or shank with respect to the edge extremities. The said arm, or shank, extremity of the dies is provided with an eye M to fit the pivots P. Near the cutter end of the said dies D—upon the lower surface thereof—is a hole, or recess *v*, to receive the projecting ends of the wire-springs *m*, above described. The dies D are shown in the drawings as so proportioned and ranged about the head of the barrel B, as to bring their cutting edges in correct lead at the center. The form of the die D may be accurately derived from an ordinary solid four cutter-die—shown in Fig. 10—by dividing the same through the several dotted lines on said figure.

It is clear that many of the parts of the device I show—as well as the modes of connecting the same—may be varied without departing from the essential elements of the particular device I claim. For instance, the pin-and-eye-pivot, I employ, may readily be exchanged for some equivalent method of hinging the parts D to the head—and—also, the overhanging projections E may be made separate and detachable parts from the band A—in which case (with the exception of the projecting portions E), the part A might be constructed as integral with the case C—instead of as a distinct and independent part as shown in the drawings.

In order to prepare my said device for use, the spring-wires *m*, are first introduced into the elongated slots in the barrel B—before described: the several dies D are next hooked upon their respective pivots P (and in their proper leading order) with the projecting ends of the said wires *m*, resting within the said recesses *v*, in the under surfaces of the said dies. The case C is now slipped over the barrel B in such position that said limiting groove or slot therein will register with the stop N, and, is secured by the screws *t*. The cylinder A, is now applied thereto—and firmly secured in such position by a countersunk screw—or other means. The die-ring H is next passed up around the said band A beneath the reciprocating pins O (which are first introduced within their several bearings *h*) and so as to engage the ways *w*, with said pins O, within and by means of the said channels *c* therein. In this latter position the said die-ring is securely fastened—against longitudinal disengagement with said pins—by the screw K, within a circumferential slot F for the purpose in said die-ring—and—by further turning down the screw K—the die-

ring H. may be set against rotary change. It is evident that by thus setting the die-ring H, at any given point within the limit of its possible rotary movement, the pins O by reason of their engagement with the ways *w*—will each be thereby withdrawn through the projections K—and, their inner ends firmly held at the same relative distance from the center of the barrel B. On the other hand, if it is desired at any time to alter this relative distance, it will only be necessary to loosen the set screw K—and rotate the die-ring until by such movement—the scroll-ways *w*—have caused the pins O to reciprocate to the extent and degree desired—and a new adjustment of their inner ends secured accordingly. Inasmuch as the dies D have their operating bearing against the said inner ends of the pins O—they are themselves—by the above means regulated and adjusted to the diameter of the particular work to be treated. When so adjusted—as above described—the butt B² of my said bolt cutter head is secured within the lathe chuck whereupon, said device will meet and thread the blank bolts—or other work—as in other similar devices. Should, however, it be desired to arrest the operation at any stage—either before the entire thread is cut, or thereafter—and, to back the tool off—it will only be necessary to reverse the lever, or handle, R. Thereupon, the case C is carried partially around the barrel B—and oppositely thereto, and—inasmuch as the band A—with its projections E—is in fixed contact with said case, the said projections E—by reason of the said opposite motion of the lever R—will each slide downwardly along the outer side of the dies D, toward their pivoted ends—and the dies be instantly freed from cutting contact by the expansion of the wire springs *m*, and the consequent opening of the dies from the work will ensue. The work can now, of course, be immediately backed out of the die head, without the necessity of following the threads, in the process—as is the case with fixed or solid die-cutters. When it is desired to again throw the cutting edges upon the bolt-piece, the handle R is turned in the opposite direction to that which released the work, whereupon, the projections E are forced forward, along the exterior side of the dies, and the latter, by reason of their bearing against the fixed ends of the pins O, within said projections—will at once be thrown inwardly upon the work and at the same relative distance as before.

Having thus described my said invention,

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

1. A bolt-threading head having the barrel thereof provided with dies pivoted to its front, in combination with a circumscribing band, adapted to be rotated upon said barrel, plungers connected with said band and bearing against said dies, springs in engagement with said dies which tend to throw them outwardly about their pivoted portions, means for reciprocating said plungers and for setting the same uniformly at any point desired within the range of their reciprocation, together with appliances for actuating said band, about said barrel, substantially as shown and described.

2. A bolt-threading head, having dies pivoted to the barrel thereof, in combination with a movable band, about said barrel, provided with projections behind said dies, pins entering said projections and adapted to reciprocate therethrough, a die-ring surrounding said band having scrolled ways which severally engage with the outer ends of said pins, springs tending outwardly connected with said dies, together with means for actuating said band around said barrel, substantially as shown and described.

3. A bolt-threading head having the dies pivoted to the barrel thereof, in combination with a case movable axially upon said barrel, a band adapted to be fixed, detachably, around said case, and containing projections which severally overhang said dies, reciprocating pins, provided with channels through their outer ends, which enter said projections and are, respectively, in bearing therein with said dies, a die-ring surrounding said band, and adapted to be partially rotated thereabout, and to be set at any point within the limit of its said rotation, scrolled ways upon said die-ring, severally engaging with said outer ends within said channels; springs connected with said dies under outward tension—together with means for actuating said case axially upon the surface of said barrel substantially as shown and described.

4. In a bolt threading head, the barrel B provided with the pivots P, in combination with the movable case C, and the band A, having the projections E, and the pins O, together with the dies D, the springs *m*, and the sliding die-ring H—substantially as shown and described.

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Witnesses:

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