

No. 687,804.

Patented Dec. 3, 1901.

H. WHARTON.
DIE OR TOOL HOLDER.

(Application filed Mar. 26, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

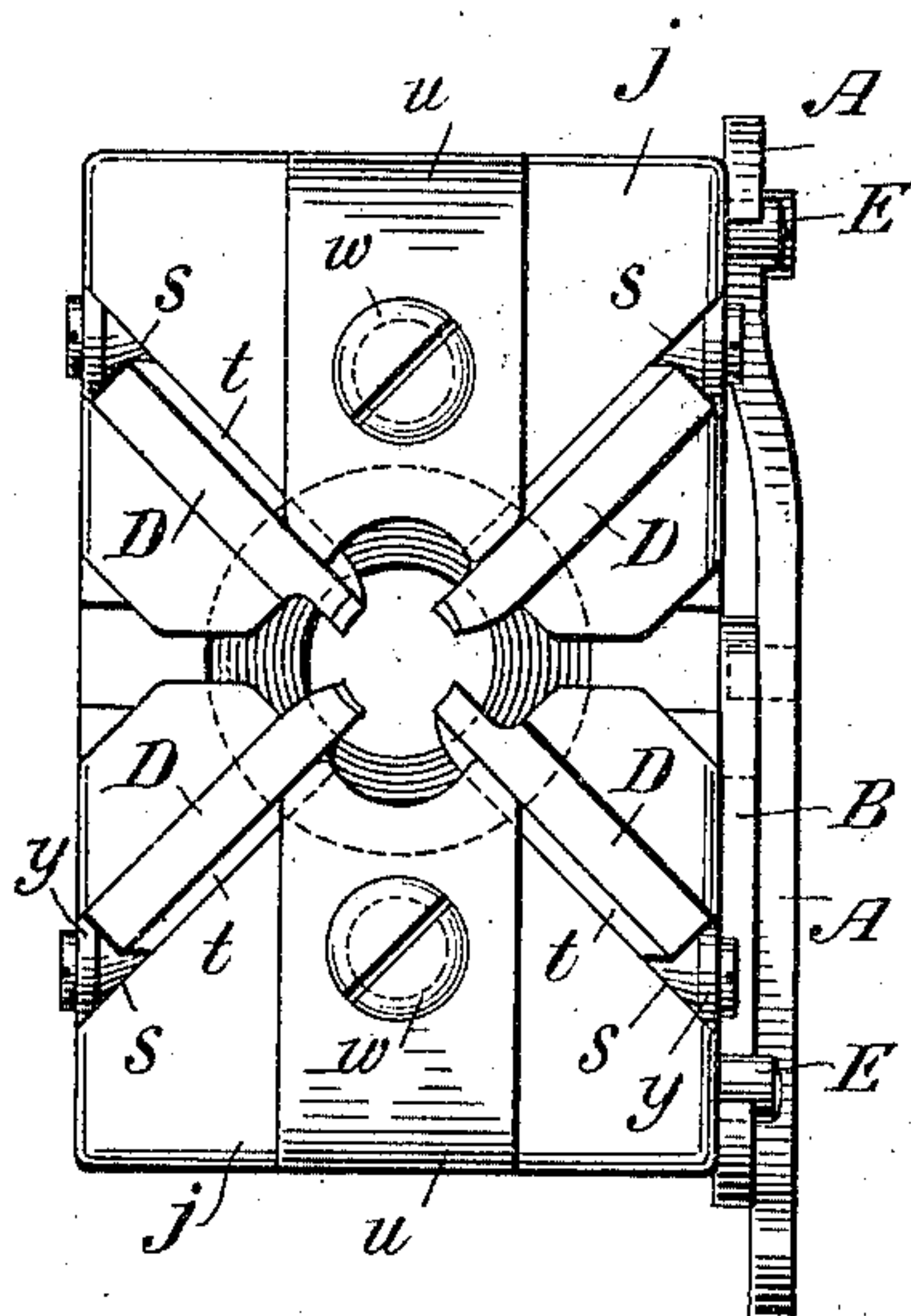


Fig. 2.

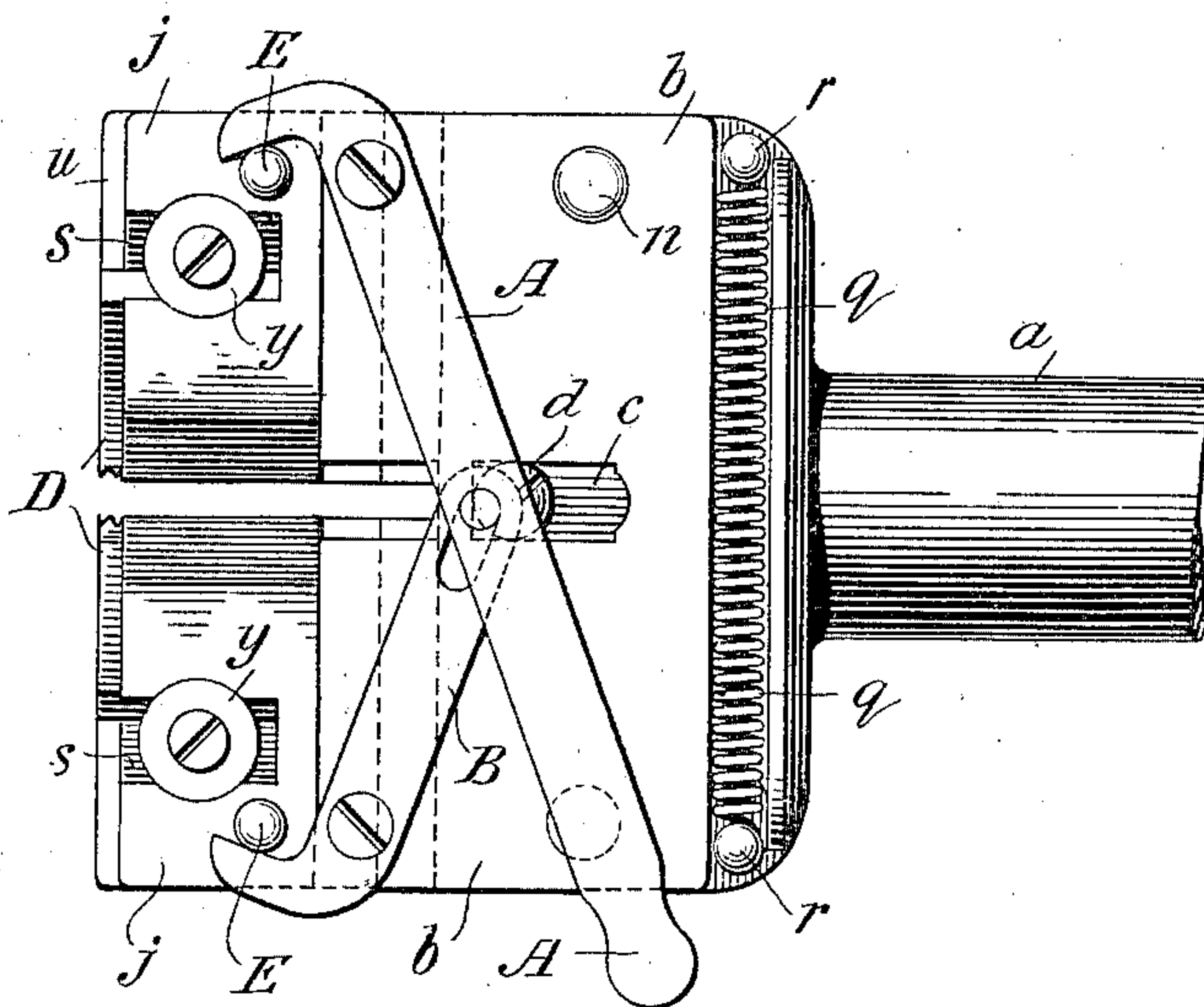


Fig. 4.

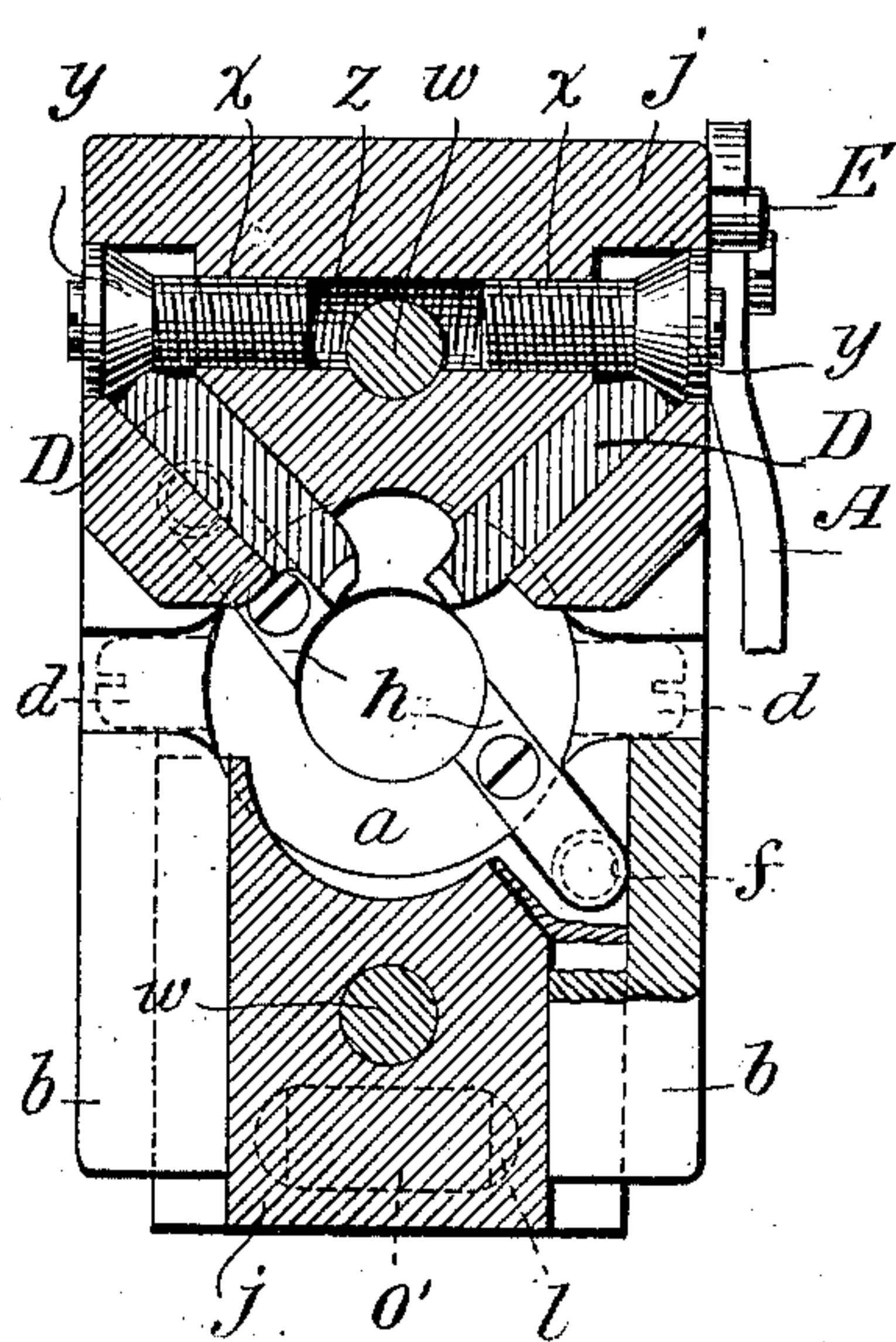
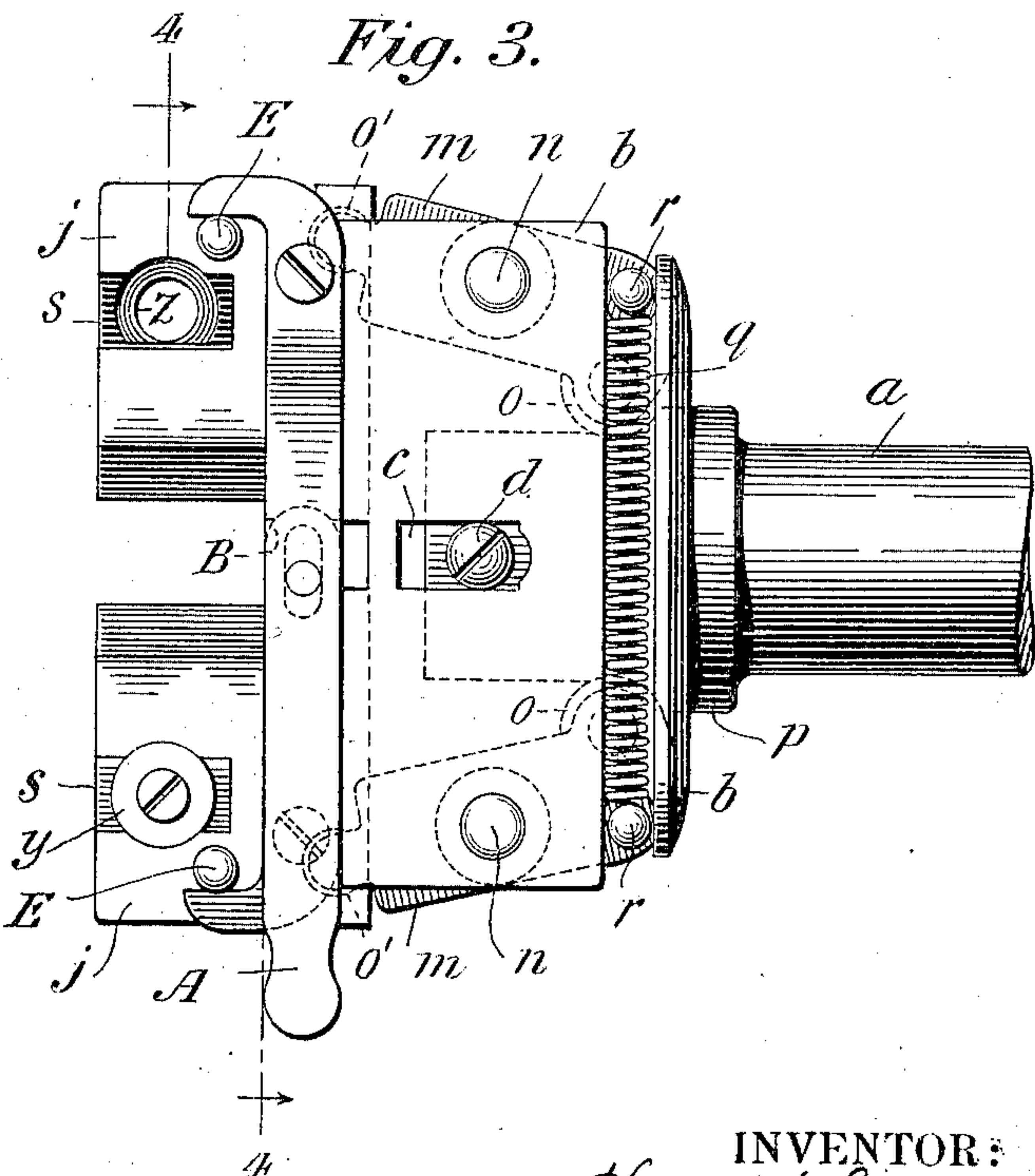


Fig. 3.



WITNESSES:

C. E. Ashley
Geo. L. Henning

INVENTOR:

Harry Wharton,
By his Attorney
Richard W. Barkey.

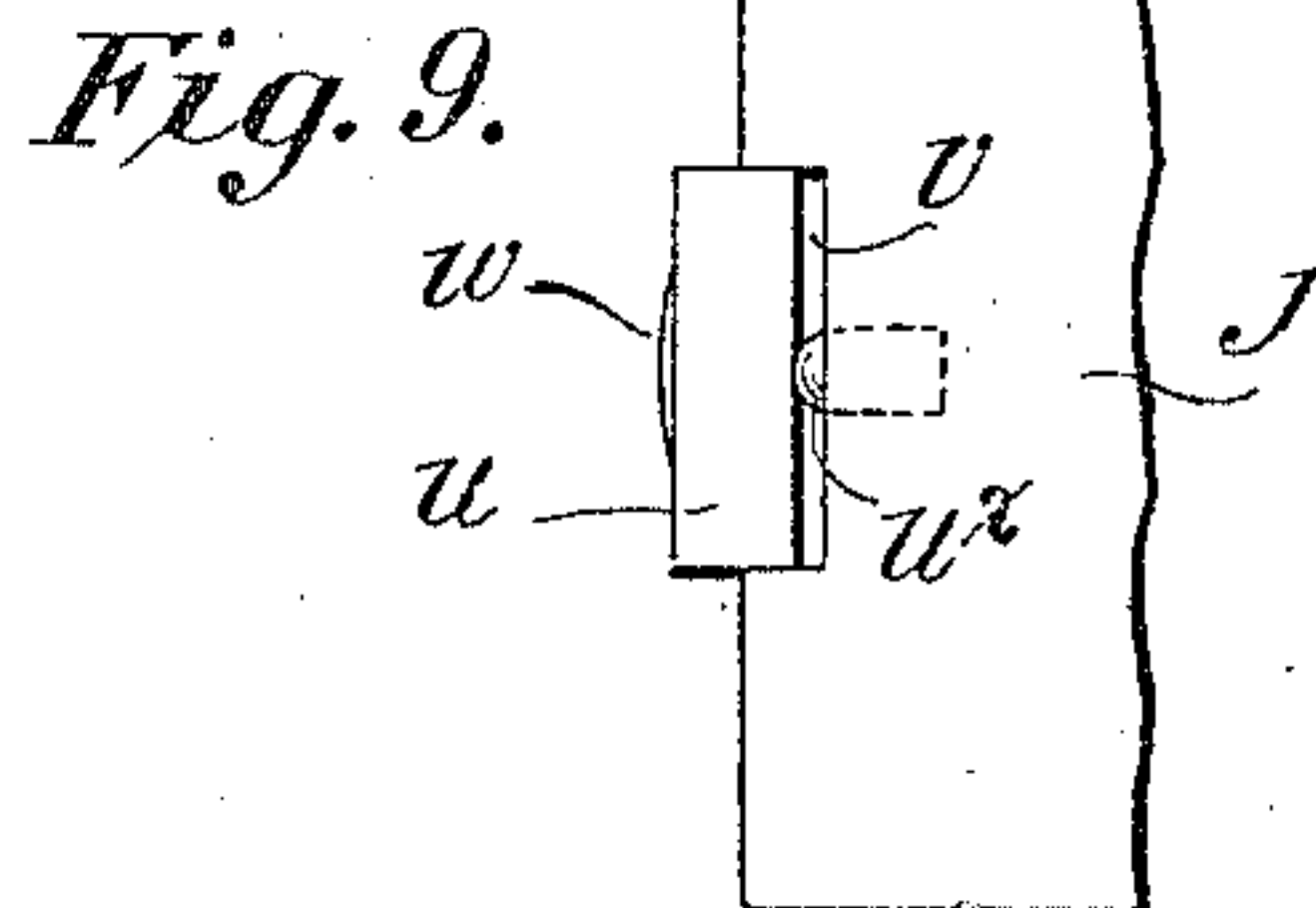
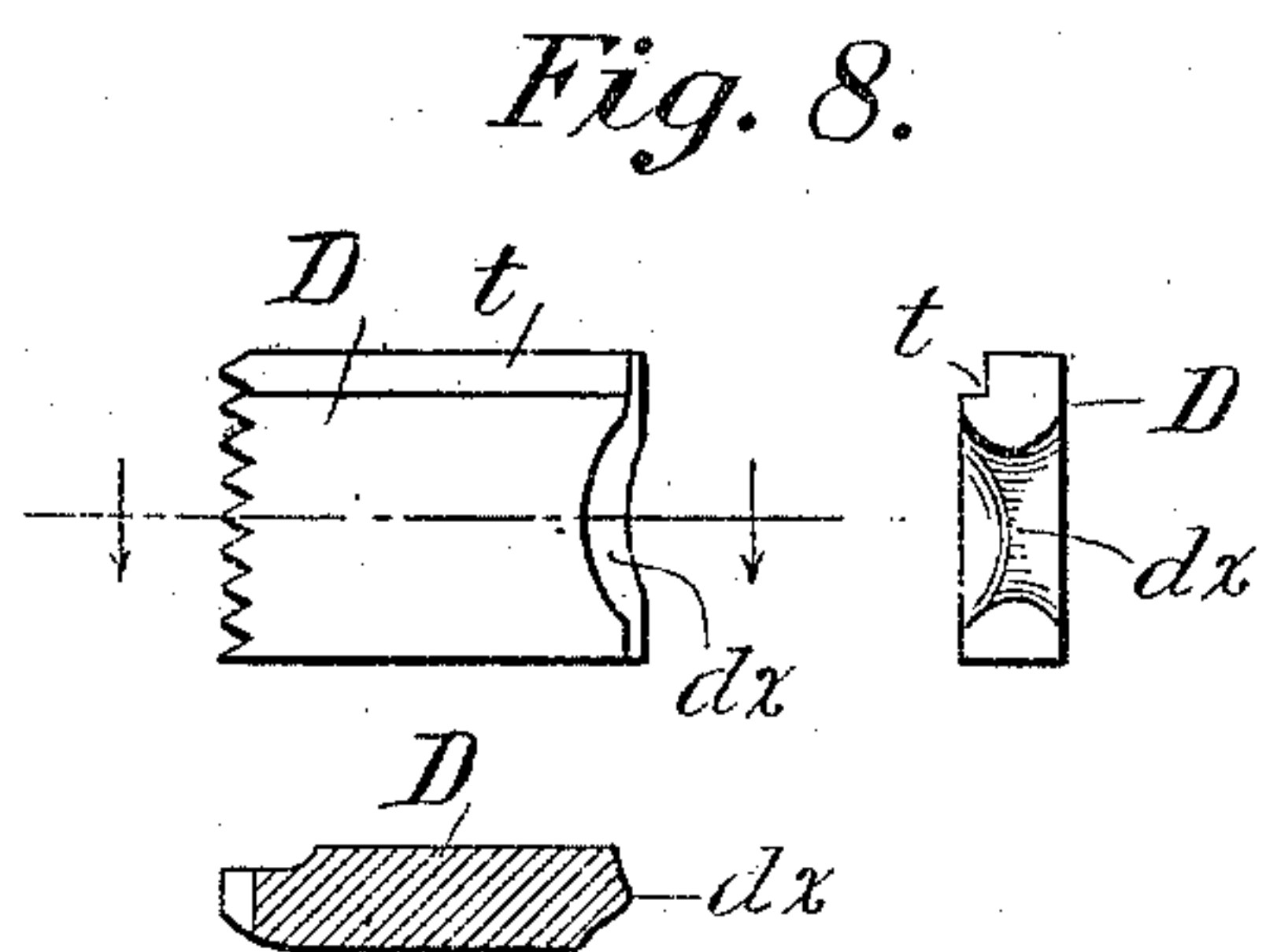
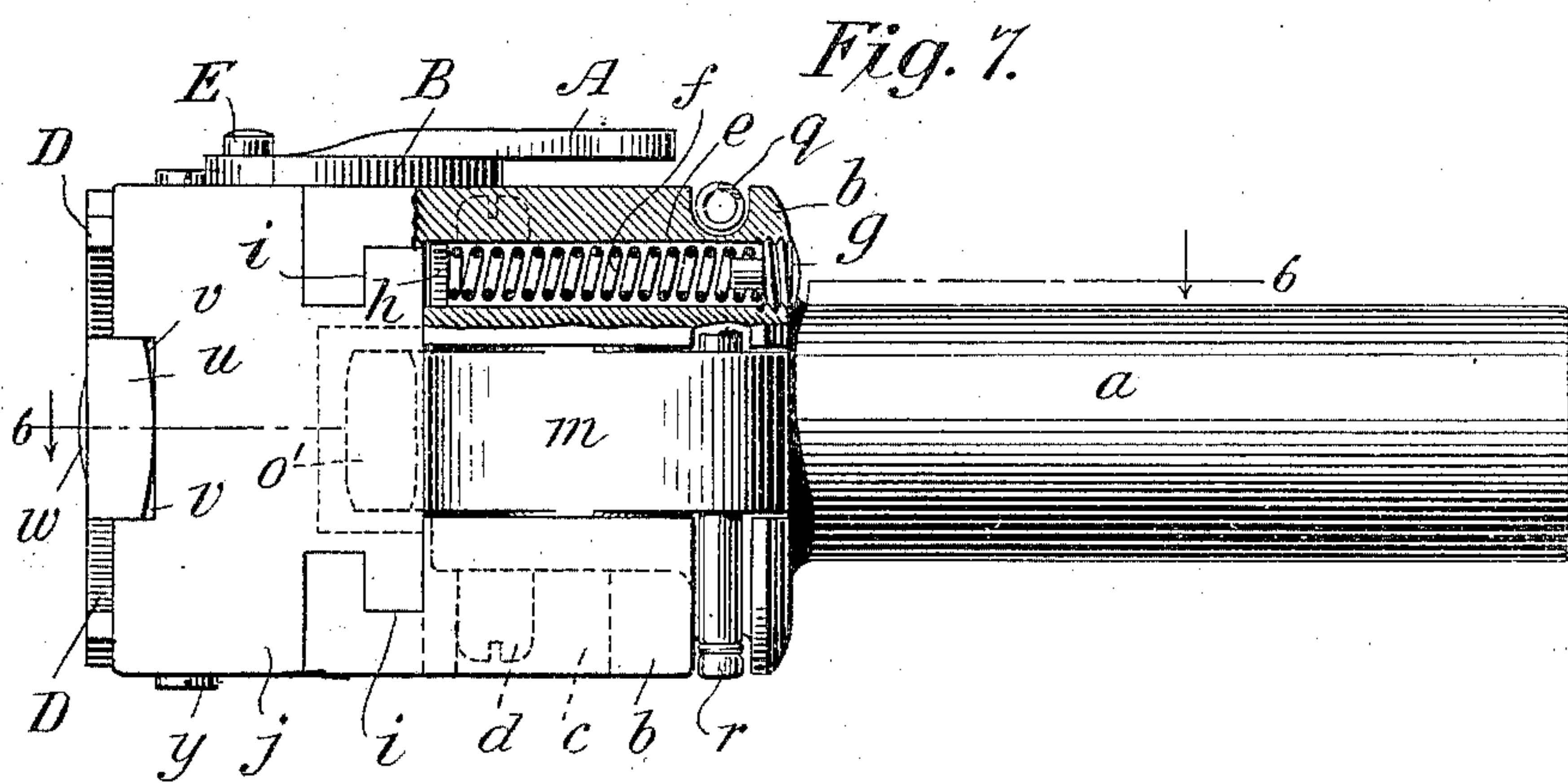
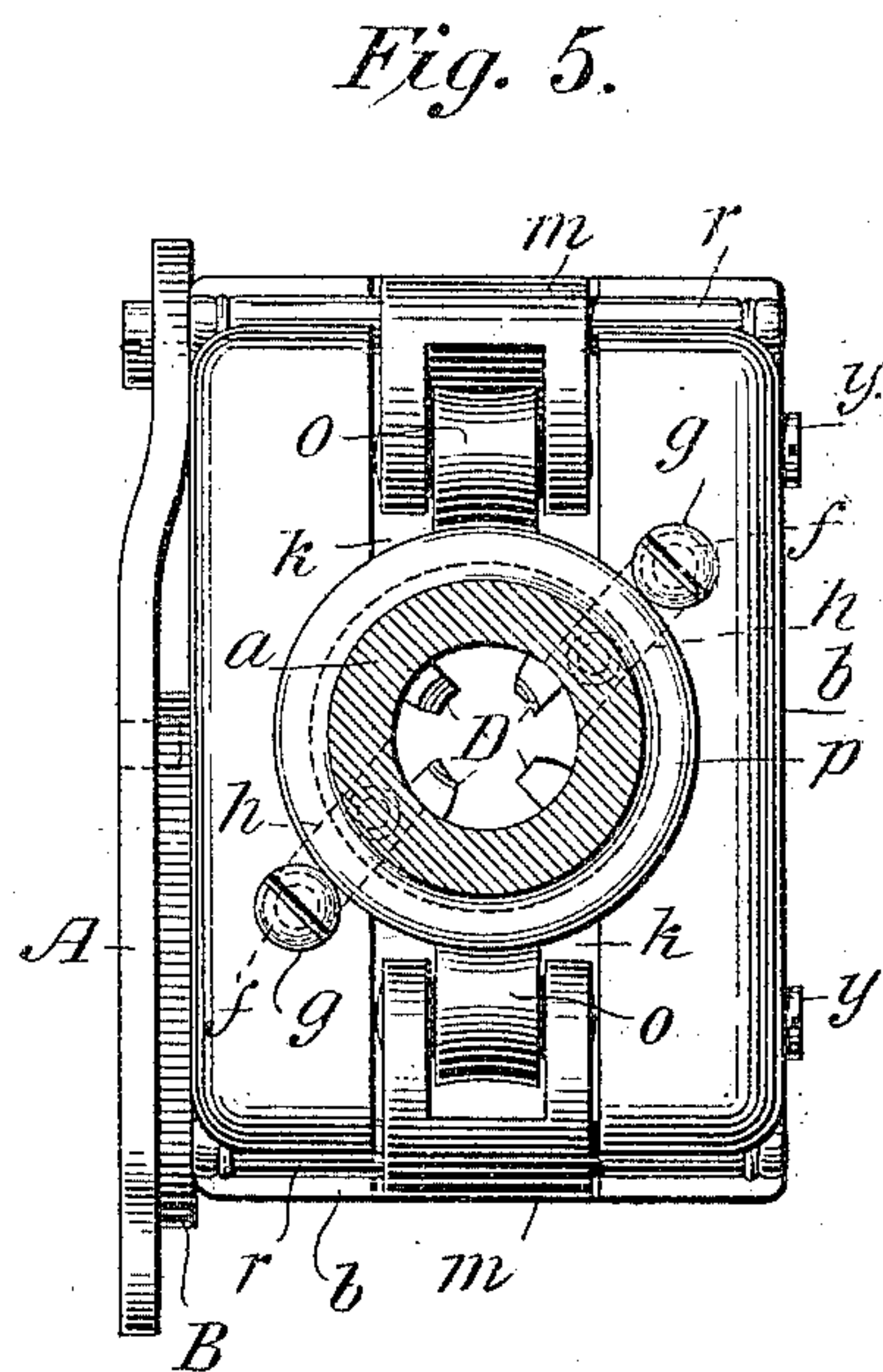
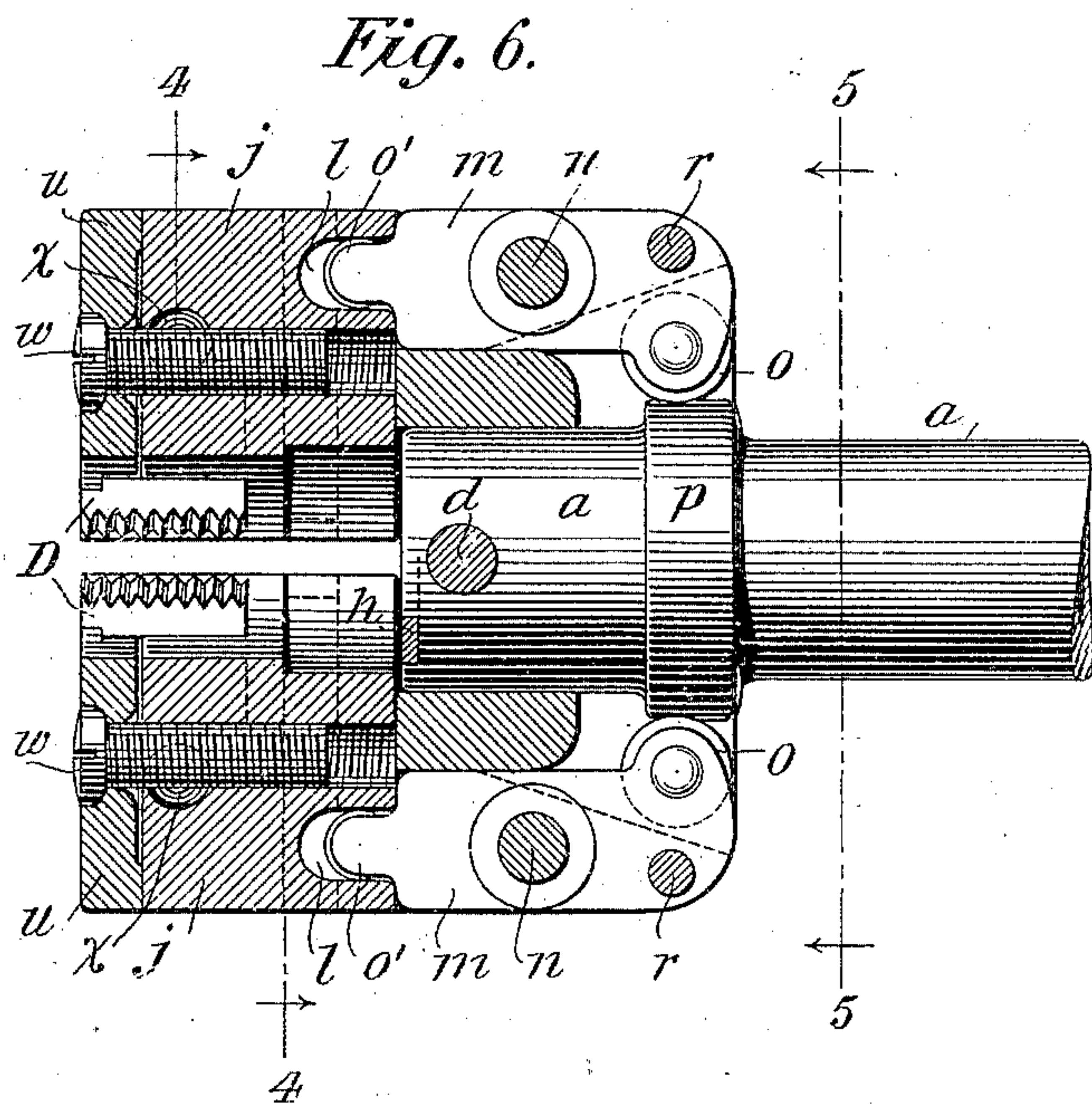
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WITNESSES:
C. E. Ashley.
Eus. C. Henning.

INVENTOR:
Harry Wharton,
By his Attorney
Richard W. Barkley.

UNITED STATES PATENT OFFICE.

HARRY WHARTON, OF BIRMINGHAM, ENGLAND.

DIE OR TOOL HOLDER.

SPECIFICATION forming part of Letters Patent No. 687,804, dated December 3, 1901.

Application filed March 26, 1901. Serial No. 52,893. (No model)

To all whom it may concern:

Be it known that I, HARRY WHARTON, a subject of the King of England, and a resident of Birmingham, in the county of Warwick, England, have invented a certain new and useful Improvement in Die or Tool Holders, of which the following is a specification.

This invention relates to die-holders for screw-cutting machines and the like, the primary object of the invention being to provide for the ready and instant disengagement at any time of the cutters or chasers and the work or stock.

Another object is to secure that in cutting screws of different diameters by one and the same die or set of dies, the work of cutting shall not be done in some cases by one part or corner of the die and in other cases by some other part or corner of the die or dies, but shall be done substantially by one and the same part in all cases.

Other objects will appear hereinafter.

To these ends the invention consists of features of construction, arrangements, and combinations of devices hereinafter described, and more particularly pointed out in the appended claims.

One form of the invention is illustrated in the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front end view with the parts in normal or working position. Fig. 2 is a plan view of the same. Fig. 3 is a plan with some parts omitted and with the parts opened in the position in which the work and tool are wholly disengaged. Fig. 4 is a sectional transverse view on the planes indicated in Figs. 3 and 6 by the line 4 4. Fig. 5 is a rear end view, the shank being in section on the plane indicated in Fig. 6 by the line 5 5. Fig. 6 is a sectional longitudinal view on the horizontal planes indicated in Fig. 7 by the line 6 6. Fig. 7 is a side elevation, partly in section; and Fig. 8 shows end, side, and sectional views of a die. Fig. 9 shows a modified arrangement of a bearing.

Like reference-letters will be used to indicate the same part in the various views of the drawings.

a designates a metal shank by means of

which the holder is connected with the tool-carriage of the machine. (Not shown.)

b designates a head or block, preferably made from a solid piece of metal, which is mounted upon the shank *a* in such wise that it may have a limited motion axially of the shank and also a slight play relatively to the shank in order that the head may accommodate itself to and compensate for any slight inaccuracies which may occur in feeding the dies to the work, &c. Such axial motion is conveniently provided for by slots *c* in the head and pins *d*, fast to the shank and engaging with the slots *c*. There are two such slots, one at each side, or, as the holder lies in the machine, at the top and bottom of the holder. The head *b* is provided with symmetrically-placed bores *e*, parallel with the shank *a*, for the reception of helical springs *f*, which bear against screw-plugs *g*, closing one end of said bores, and against arms *h*, which are secured by screws to the shank *a* and which extend over the other end of said bores. The springs *g* tend to move the head *b* along the shank toward the tool-carriage of the machine. (Not shown.) By preference the shank is hollow and the arms *h* are flush with the end thereof.

The front face of the head *b* has a horizontal transverse T-slot *i* therein (or this may be a dovetail slot) for the reception, guidance, and retention of two die-carriers *j*, which are shaped to fit said slot *i* and the face of the head *b*. At the sides of the head as it lies in the machine are longitudinally-extending slots *k*, and the rear faces of the holders *j* are provided with slots *l* opposite said slots *k* for the reception of one end of levers *m*, which lie in slots *k* and are fulcrumed upon the pins *n*, connecting them to the head *b*. The levers *m* may be provided with antifriction-rollers *o*, by means of which the levers engage the slots *k* and a cylindrical collar *p* on the shank, or the collar *p* may be replaced by other means for holding the levers *m* in position. One set of rollers *o'* is continuously in engagement with the slots *l*, while the other set rests sometimes on the collar *p* and sometimes on the shank *a*, according to the relative positions of the head and shank. The levers *m* are

connected together by springs q , which hook over pins r , fast to the levers, and draw the levers toward the shank. The head b is slotted transversely for the reception and protection of said springs q .

The die-carriers j are shown as having each two die guiding and holding slots s , in each of which is a die D . The slots s are rectangular in cross-section and are open at their fronts and ends. The guides s are at right angles to each other and at an angle of forty-five degrees to the line of reciprocation of the die-carriers. Each die shown is flat-sided and is provided with a plurality of cutters, and the slots s are parallel with the axis of the shank, wherefore the cutters act simultaneously on the stock or work. (Not shown.) Each die has a rabbet t along one longer edge or corner, the rabbet of the dies carried by each carrier being opposite each other, as shown in Fig. 1, whereby one clamp u on each carrier j may coact with the rabbeted portions of the dies to clamp and retain them in place in the slots s . The clamps u are arranged to bear only at their outer ends against the carriers and upon the rabbeted parts of the dies. As will be seen from Fig. 7, the clamps bear centrally of the slots s , in which they are placed and by the walls of which they are prevented from turning—that is to say, said clamps bear each at three points only against the carrier and dies. Clamps u are held in place by screws w , which pass freely through the clamps and engage with threaded holes in the carriers j , the engagement between the screws and clamps being what is commonly called a "ball-and-socket" connection.

The dies D are held against being forced endwise by the work by means of screws x , which are provided with heads y of cylindro-conical form. The carriers j are provided with screw-threaded holes z , with which screws x engage, and said holes z have cylindrical countersinks at their outer ends in which the cylindrical parts of the heads y fit accurately. The dies D are provided with conical faces d^x , which are adapted to bear against the coned portions of the heads y , and thereby to transmit the pressures through heads y to the carriers j without danger of breaking or even bending the screws x . By operating the screws x to move the heads y in or out the distance of the cutters of the dies D from the axis of the shank may be decreased or increased. The dies are thus independently adjustable with relation to the work or stock. Also the carriers j are separated somewhat when in working position, and the head b is centrally recessed and is also slotted vertically, as indicated in Figs. 1 and 2, the latter being a top or plan view. This separation and these slots provide passages for oiling the work and for allowing the cuttings to fall away freely from the same. It will be noted that the dies D and clamps u extend beyond the face of the carriers, whence it follows that threads may be cut on a screw

or bolt close up to the head thereof, the ends of the dies and faces of the clamps being flush with each other, as shown in Fig. 2.

The operation of the above-described devices is as follows: With the parts in the positions shown in Figs. 1, 2, 5, 6, and 7 the dies D are in working or cutting position and the rollers o on the adjacent ends of levers m bear upon the collar p , thus retaining levers m and carriers j inward of the head b and transmitting the pressures upon the dies D through the heads y , carriers j , and levers m to the collar p and shank a , which, with the slight play of the head on the shank above referred to, balances the forces. It is understood, of course, that the shank is firmly connected with the tool-carriage of the machine and is thereby moved forward or toward the stock or work while the latter is rotated, as is usual in this class of machines, during which feed of the tool the cutting takes place. By stopping the advance of the tool-carriage at any point the cutters of the dies will by their engagement with the work draw the head b along the shank a until the rollers o pass the edge of the collar p , whereupon the springs q , which are heavier or stronger than the springs g , will cause the levers m to move quickly toward the shank until their rollers strike the same and arrest the levers and carriers as the latter move away from the work, but such arrest of the carriers does not take place until the dies D are moved wholly out of contact with the work, so that the tool-carriage may be run back to its starting-point without the dies touching the work during such running back. A new stock may be inserted and the operation be begun over again after the dies have been returned to working position. The carriers j may be returned toward the axis of the shank by suitable means—as, for example, the means shown in the drawings and now to be described. Levers $A B$ are fulcrumed on pins at the upper side of the head and are provided with bent ends for engagement with pins E on the carriers j . The levers $A B$ are connected together by a slot and pin, as shown, so that they move simultaneously and equally. By moving lever A from the position thereof shown in Fig. 3 to the position thereof shown in Fig. 2 the carriers j are forced inward or toward the axis of the shank, thereby moving the levers m away from the shank until the rollers o are clear of the collar p , whereupon the springs g move the head b along the shank and carry the rollers o over the collar p , as will be understood. The shank being hollow and the dies movable, as described, it is obvious that threads may be cut at any point upon a stock which may be passed through the shank for that purpose, being held, of course, as usual.

It is observed that each die D is movable along the slot s therefor in a direction that is radial to the working part or cutter thereof, which adapts each die for use in cutting

screws of different diameters without greatly varying the position of the working or cutting part of the die. In a known form of cutter there are two working parts situated at about ninety degrees apart, said working parts being integral with each other and being adjustable in a direction making equal angles with the central radii of said cutters or working parts, whence it follows that in using this old cutter or chaser to form screws of different diameters the work is sometimes done by one corner of the cutters and sometimes by the other corner. The last-mentioned difficulty, for difficulty it is, does not occur in anything approaching the same degree with my cutters, for these are moved radially or in directions parallel with their central radii and not at an angle thereto.

It will be noted that there are very few parts that project beyond the outline of the head *b* in my tool-holder, most of the working parts being protected or housed against catching clothing or other objects.

Instead of the arrangement of the clamp *u* shown in Fig. 7 the arrangement shown in Fig. 9 may be employed. In this arrangement the face of the clamp is flat and not rounding and bears upon a pin *u'* of hardened steel, which sets or screws into a hole in the die-carrier, the end of the pin being rounded off, as shown.

While I have described the preferred form of my invention, I do not limit myself to the precise form thereof shown in the drawings and above described, since the invention may be embodied in other forms or arrangements without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a die or tool holder, the combination of a shank, a head slidable along said shank, die-carriers movable radially in guides on said head, spring-actuated levers for moving said carriers outwardly, and an abutment fixed on said shank and coacting with said levers to hold the dies in working position until the levers are released from the control of said abutment by the movement of the head along the shank, whereby the levers quickly move the dies out of working position.

2. In a die or tool holder, the combination of a shank, a head slidable along said shank, die-carriers movable radially in guides on said head, spring-actuated levers for moving said carriers outwardly, an abutment fixed on said shank and coacting with said levers to hold the dies in working position until the levers are released from the control of the abutment by the movement of the head along the shank, whereby the levers quickly move the dies out of working position, and independent dies on said carriers and set at an angle to the direction of said radial or outward motion.

3. In a die-holder for screw-making ma-

chines, the combination of a shank, a head slidable therealong and spring-moved in one direction along said shank, die-carriers slidable radially on said head to carry the dies into and out of working position, spring-pressed levers fulcrumed on said head and operating said carriers, and locking means fixed on said shank for causing said levers to hold said carriers in normal position, said locking means releasing said levers as said head is moved along said shank in one direction, substantially as described.

4. In a die-holder for screw-making machines, the combination of a shank, a head slidable therealong and spring-moved in one direction along said shank, die-carriers slidable radially on the said head to carry the dies into and out of working position, spring-pressed levers fulcrumed on said head and operating said carriers, means fixed on said shank for locking said levers and carriers in normal position with the dies in working position, and a lever system for returning said carriers to normal position, said locking means releasing said carrier-operating levers when the head is moved along said shank in one direction, substantially as described.

5. In a die or tool holder, the combination with a carrier, of a die or tool slidable in guides thereon, a cylindroconical stop for said die or tool, the axes of stop and die or tool forming other than a right angle with each other, the end of said die or tool being adapted to bear against the coned stop and the cylindrical part of the stop always bearing against the carrier, whereby the pressure upon the die or tool is always transmitted through the stop to the carrier, and means independent of said stop for retaining the die or tool in said guides, substantially as described.

6. In a die or tool holder, the combination with a carrier, of a die or tool slidable in guides thereon, a cylindroconical stop for said die or tool, the axes of stop and die or tool forming other than a right angle with each other and the end of said die or tool being adapted to bear against the coned part of said stop and the cylindrical part of said stop always bearing against the carrier, whereby the pressure upon the die or tool is always transmitted through the stop to the carrier, and a screw for adjusting the position of said stop, the screw being relieved of transverse strain by said cylindro-stop.

7. In a die or tool holder, the combination with a carrier, of a die or tool slidable in guides thereon, an adjustable cylindroconical stop for said die or tool, the axes of die and stop forming other than a right angle with each other and the end of the die or tool being adapted to bear against the coned part of said stop, and the cylindrical part of said stop fitting in a cylindrical hole in the carrier and always bearing thereagainst, whereby the pressure on said die or tool is always trans-

mitted through the die and stop to the carrier, and means other than said stop for retaining the die or tool in said guides.

8. In a die-holder for screw-making machines, the combination of a shank, a head slidable therealong and spring-moved in one direction along said shank, die-carriers slidable in guides across the front of said head, levers of the first order working in slots in said head and operating said carriers, springs connecting said levers and tensioned to cause them to move said carriers outward from normal position, and a collar fixed on said shank for locking said levers and carriers with the latter in normal position, substantially as described.

9. In a die-holder for screw-making machines, the combination of a shank, a head slidable therealong and spring-held in normal position relatively thereto, die-carriers slidable in guides on said head to carry the dies into and out of working position, carrier-operating spring-pressed levers fulcrumed on said head, and locking means fixed on said shank for causing said levers to hold said carriers in normal position, said locking means releasing said levers when said head is moved in one direction along said shank, substantially as described.

10. In a die or tool holder, the combination of a shank, a head movable along said shank, die-carriers movable radially in guides on said head, spring-actuated levers engaging said carriers positively to move them, an abutment fixed on said shank and coacting with said levers to hold the dies in working position until the levers are released from the control of said abutment by the movement of the head along said shank, springs operating to move said head along the shank to a normal position, and levers fulcrumed on said head and adapted to close said die-carriers and move their operating-levers to permit said operating-springs to return said head to normal position simultaneously with the return of the dies to working position.

11. In a die or tool holder, the combination of a shank, a head slidable along said shank and having undercut guides across the front face thereof, die-carriers held by and movable along said guides, said carriers being recessed at their rear faces and said head having longitudinal slots therein, levers of the first order in said longitudinal slots and fulcrumed on said head, said levers engaging with said re-

cesses in said carriers, springs connected with said levers to cause them to move said carriers outwardly, and a collar or means fixed on said shank and coacting with said levers to hold the dies in working position and releasing the levers and dies as said head moves in one direction along said shank.

12. In a die or tool holder, the combination with a shank, of a head slidable therealong and having guides across the front face thereof, die-carriers slidable along said guides and held against said front face thereby, said carriers being slotted on their rear faces and said head being provided with longitudinal slots therein, levers of the first order fulcrumed on said head and lying in said longitudinal slots thereof, springs for causing said levers to move the carriers outwardly, means fixed on said shank and coacting with said levers to hold the dies in working position and releasing the levers as the head slides along the shank in one direction, a lever system fulcrumed on said head and adapted to draw said carriers inward and their operating-levers back to normal position, and springs for returning said head to normal position.

13. In a die or tool holder, the combination of a die-carrier, said carrier being provided with two converging die-receiving slots, dies in and movable along said slots, a clamping-plate bearing upon each die and at one point only upon the die-carrier or a part connected therewith, and means for securing said plate in position.

14. In a die or tool holder, the combination of a die-carrier provided with two converging slots, dies in and movable along said slots, a cylindroconical stop for each of said dies or tools, said dies or tools bearing against the coned part of said stops and the cylindrical parts of said stops always bearing against said carrier to transmit pressure thereto, a screw for adjusting the position of each of said stops, a clamping-plate bearing upon each die and at one point only upon the die-carrier or a part connected therewith, and means for securing said plate in position, substantially as described.

Signed at New York city, in the county of New York and State of New York, this 23d day of March, A. D. 1901.

HARRY WHARTON.

Witnesses:

GUS. C. HENNING,
R. W. BARKLEY.