

**No. 632,906.**

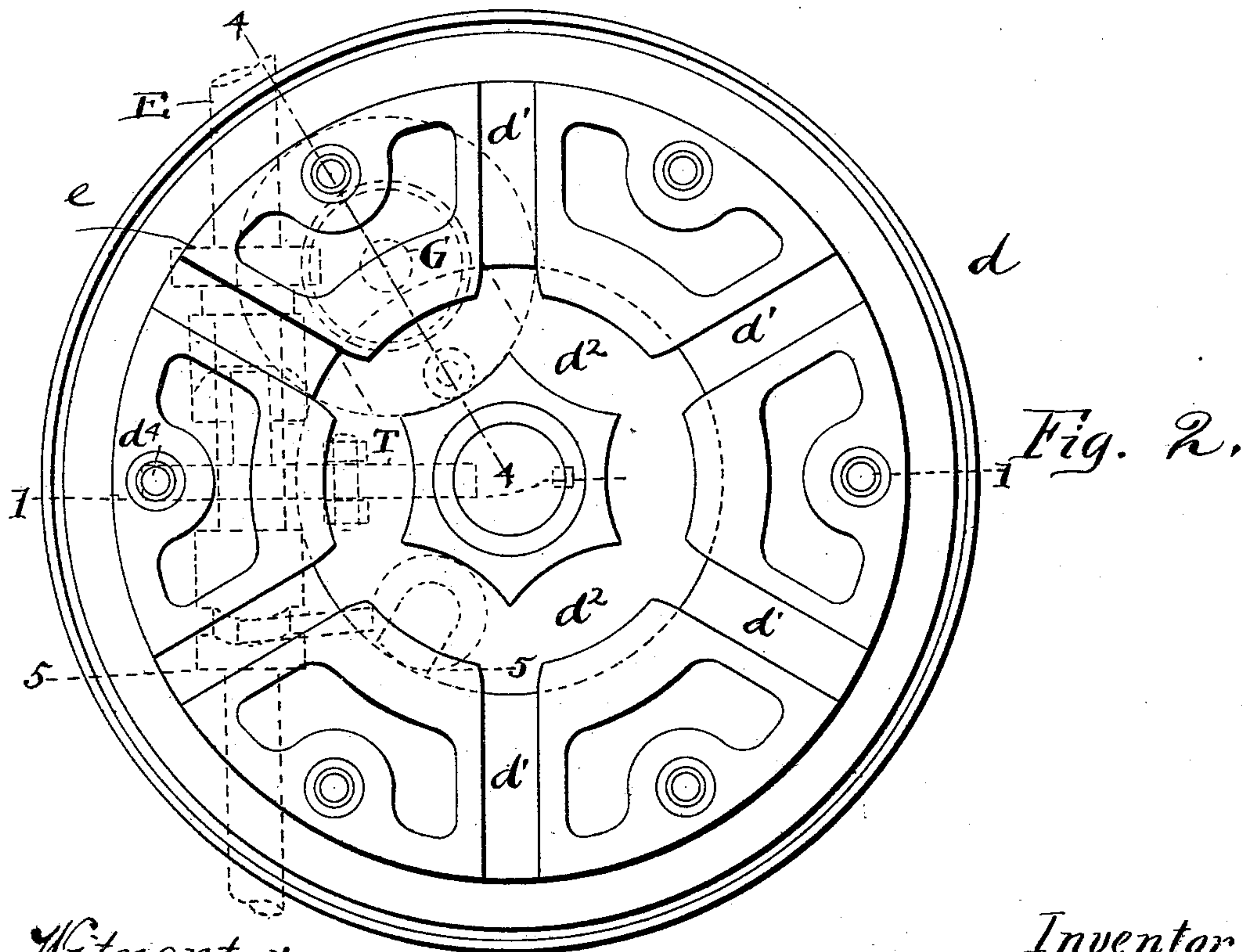
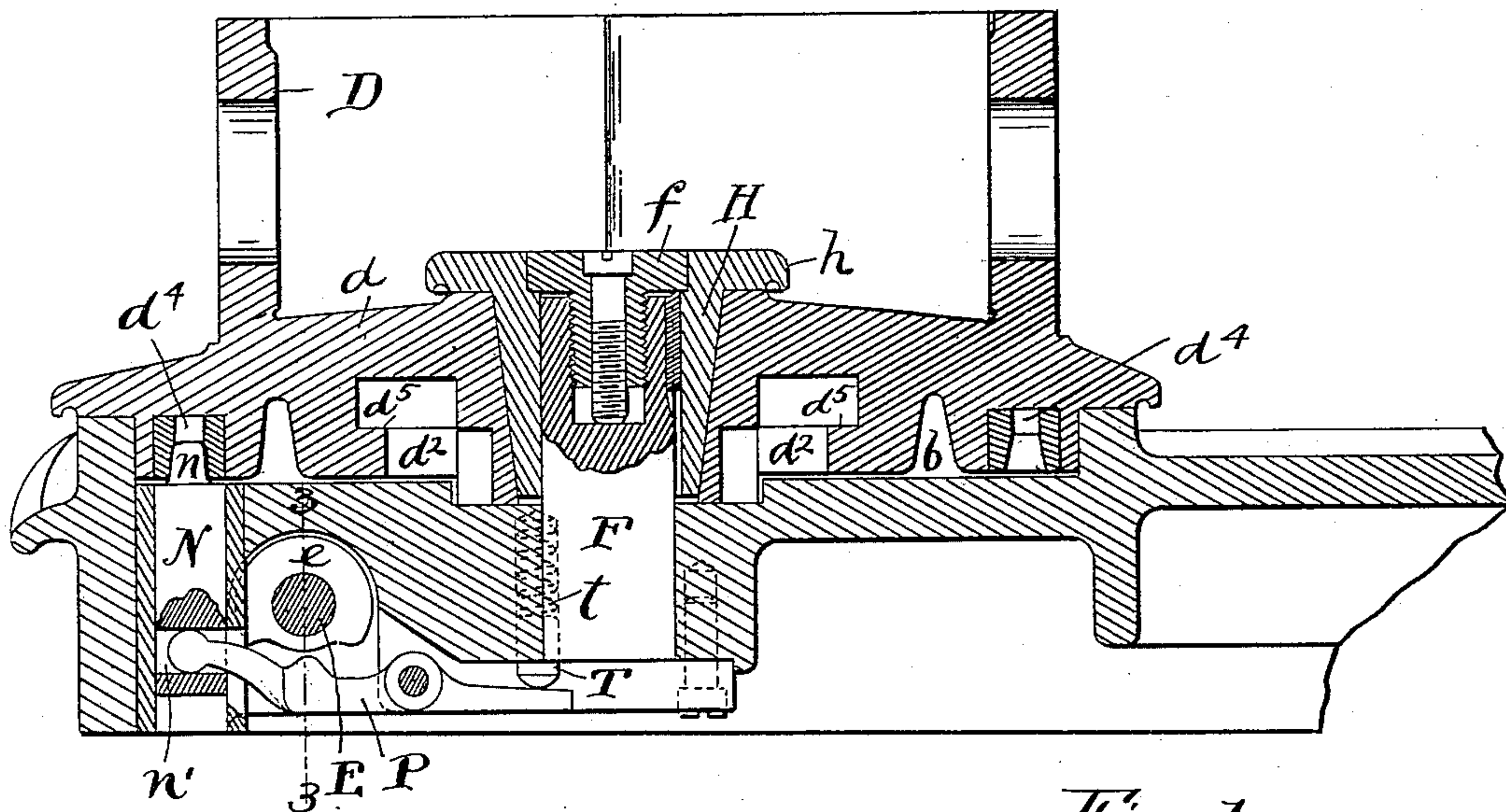
**Patented Sept. 12, 1899.**

**A. SWASEY.**  
**TURRET OPERATING MECHANISM.**

(Application filed Mar. 31, 1899.)

(No Model.)

**2 Sheets—Sheet 1.**



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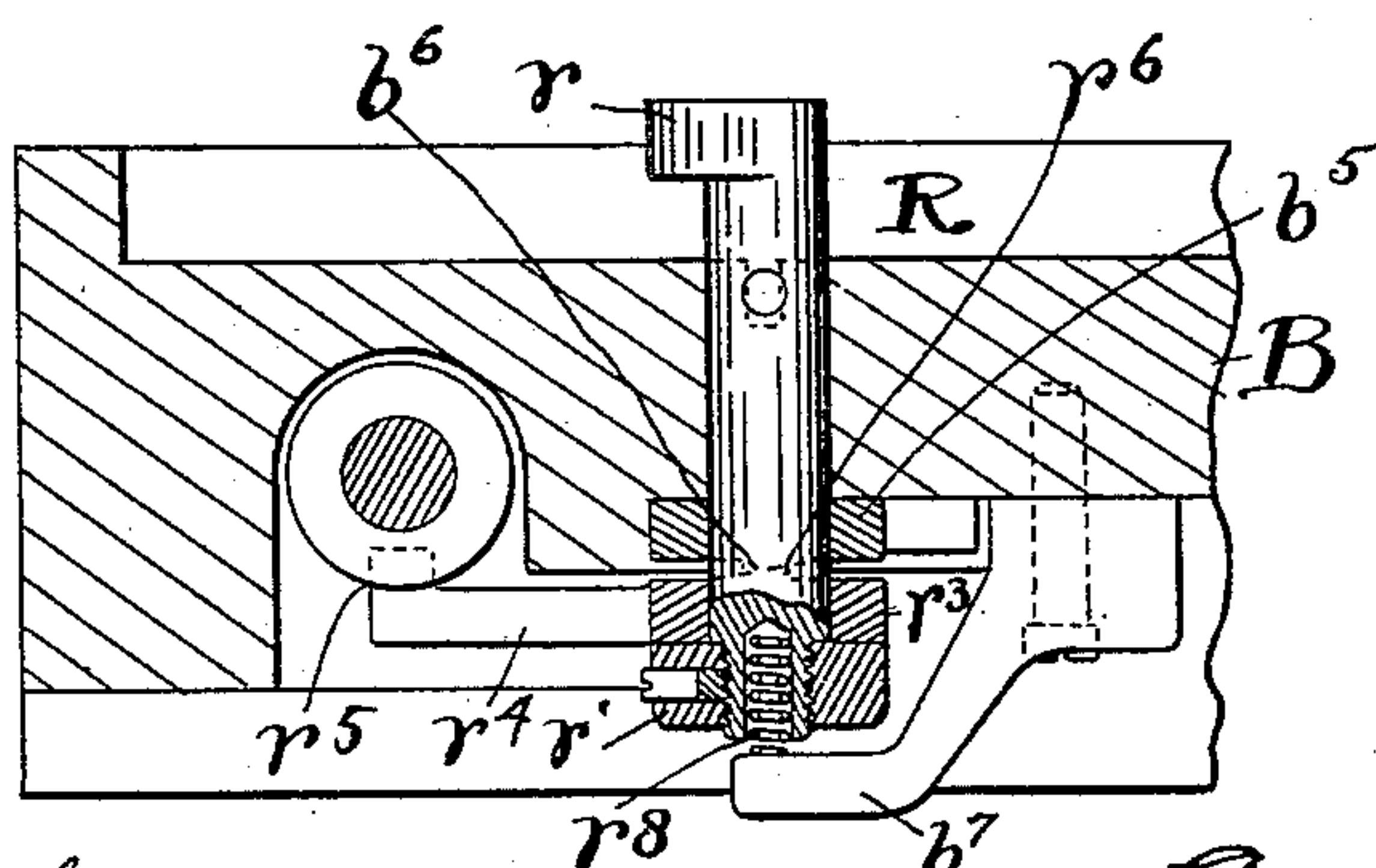
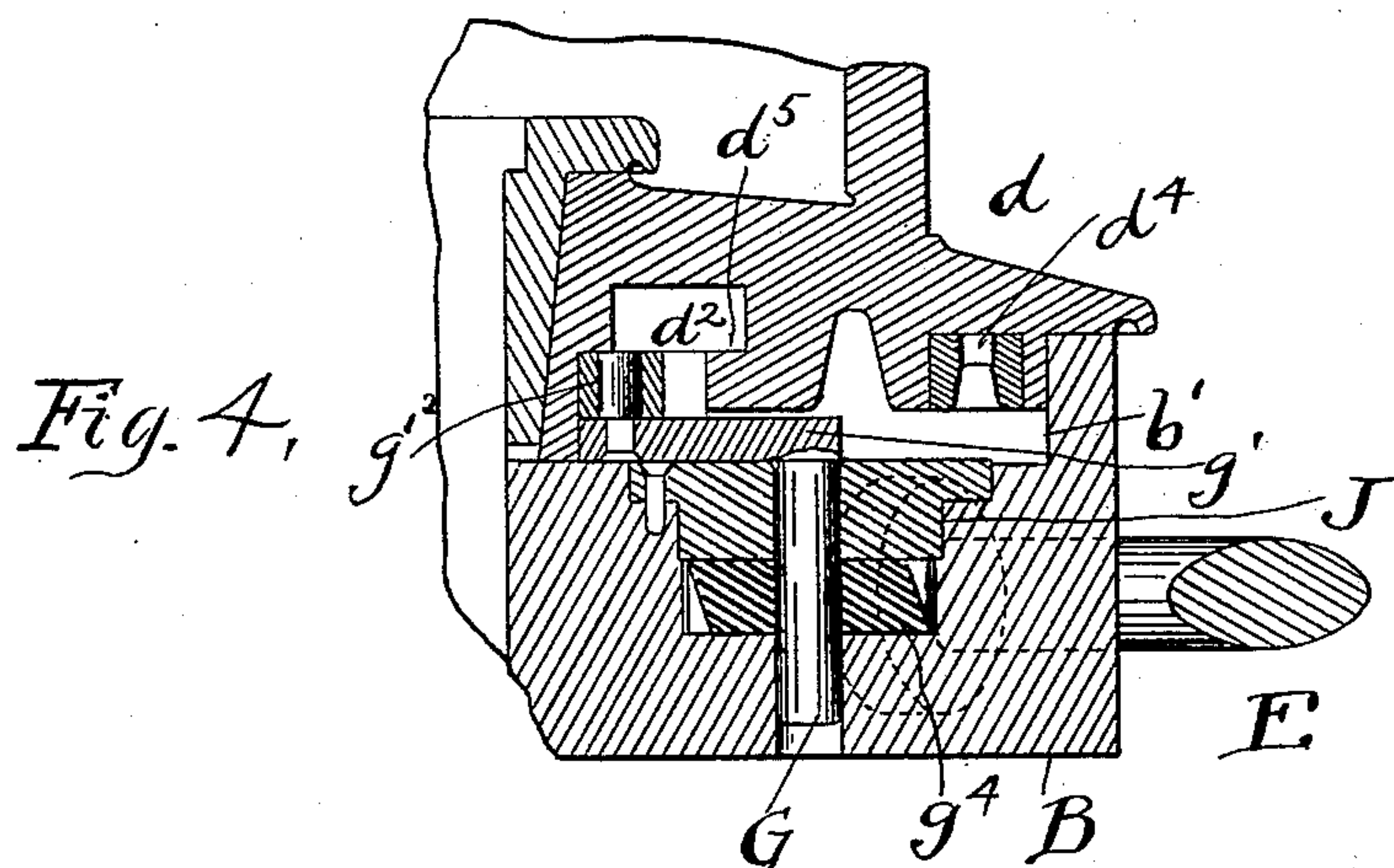
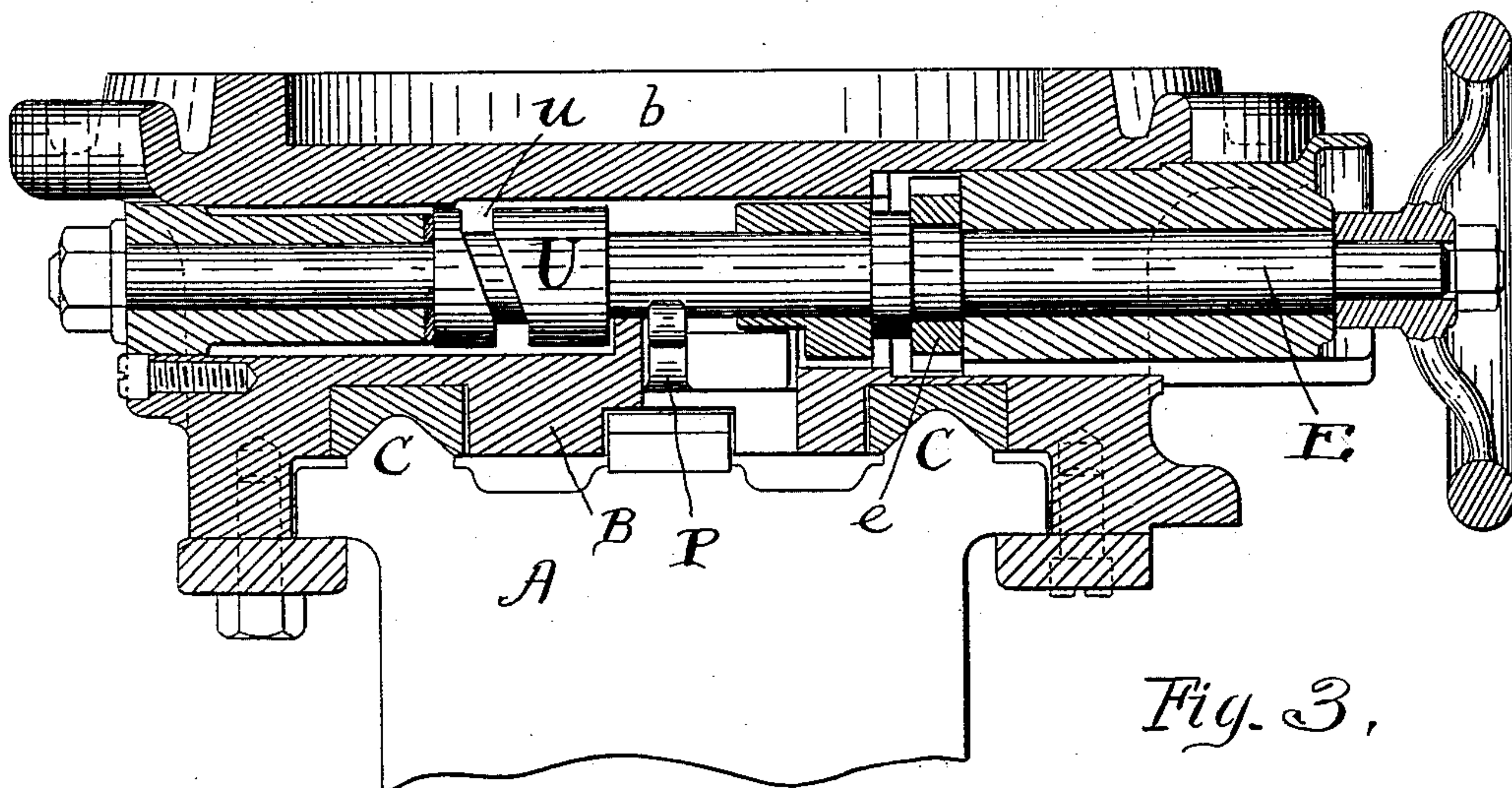
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2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

AMBROSE SWASEY, OF CLEVELAND, OHIO, ASSIGNOR TO WARNER & SWASEY, OF SAME PLACE.

## TURRET-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 632,906, dated September 12, 1899.

Application filed March 31, 1899. Serial No. 711,252. (No model.)

*To all whom it may concern:*

Be it known that I, AMBROSE SWASEY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Turret-Operating Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention relates to mechanism for moving and indexing a lathe-turret and for holding it firmly after it has been indexed and while each of the tools it is designed to carry is acting upon the stock.

One object of the invention is to provide as the means for turning the turret to bring the various tools into working position simple mechanism which will impart to the turret a motion which is analogous to a pendulous motion in this, that the turret is slowly started and its speed is gradually increased until half its movement is completed, and then its speed gradually decreases until it comes to rest.

Another object is to provide simple mechanisms for indexing the turret and for holding it firmly after it has been indexed, all of which will be hereinafter described, and pointed out definitely in the claims.

In the drawings, Figure 1 is a vertical sectional view in the plane indicated by line 1 1 of Fig. 2. Fig. 2 is a bottom view of the turret. Fig. 3 is a vertical sectional view of the turret-slide in the plane indicated by line 3 3 of Fig. 1. Fig. 4 is a vertical sectional view of the turret-slide in the plane indicated by line 4 4 of Fig. 2, and Fig. 5 is a vertical sectional view of the turret-slide in the plane indicated by line 5 5 of Fig. 2.

Referring to the parts by letters, A represents the bed of the lathe, and B represents the turret-slide, which is mounted upon the V-shaped ways C. The drawings do not show any mechanism for moving the slide backward and forward, because such mechanism is no part of the present invention. Any suitable mechanism, of which several kinds are well known, may be employed for this purpose.

In the top of the slide B is a cylindrical recess *b*, in which the base-plate *d* of the tur-

ret D is supported and may be turned. A stud F, which is fast to the slide B, is centrally placed with reference to this recess, and it extends vertically through a tapered hole in the base-plate. A tapered sleeve H embraces the stud F, to which it is keyed, and fits the tapered hole in the base-plate, whereby the turret is accurately centered. This sleeve has a head *h*, which overhangs the base-plate and holds it down on the bed of the recess *b*. A screw *f*, which screws into the stud F, engages with the top of this sleeve and holds it down. The turret turns upon the sleeve H, as well as in the recess *b*, and is guided by both instrumentalities.

In the under surface of the base-plate, cut into the integral metal thereof, or in a sub-base secured thereto are as many radial grooves *d'* as there are sides to the turret or places for attaching tools. These grooves are connected at their inner ends by the grooves *d''*. These grooves *d''* are of peculiar shape, as shown—that is to say, their outer walls are arc-shaped and are concentric with the turret, while their inner walls are reversely curved upon a radius equal to the distance from the axis of the crank-shaft G to the inner face of the crank-arm *g'*. These connecting-grooves *d''* must be wide enough to permit the passage of the crank-pin *g* from one of the radial grooves *d'* to the next one. The mechanism for turning the turret would be operative if these connecting-grooves were not shaped as specifically described, provided they were so shaped that the crank-pin *g* could pass through them from one radial groove to the next one; but the peculiar shape of these grooves, as described, gives them certain specific and practically valuable functions, as will be understood from the subsequent description.

In the top surface of the slide B there is a cylindrical recess *b'*, in which a crank-arm *g'* operates. This crank-arm is attached to the top of a crank-shaft G, whose lower end finds its bearing in a cylindrical hole in the slide B. A bearing for the upper end of this crank-shaft, just beneath the crank-arm *g'*, is furnished by a plate J, which is secured to the slide B. Below the plate J a spiral gear *g''* is secured to this crank-shaft. A crank-pin *g*



is fastened to the crank-arm  $g'$ , and on this pin is a friction-roller  $g^2$ , which projects into the described grooves in the under face of the base-plate of the turret.

5 An operating-shaft E is journaled in the slide B. A spiral gear  $e$  is secured to it, and this gear engages with the spiral gear  $g^4$  on the crank-shaft G. By turning this shaft E the crank-shaft G is caused to rotate, and the  
10 crank-pin  $g$  thereon moves in the path indicated by dotted lines in Fig. 2. It enters one of the radial grooves  $d'$  and by engaging with the walls thereof slowly starts the turret and moves it with increasing speed until the crank  
15 has made half its revolution and then with decreasing speed until the turret comes to rest as the crank-pin moves out of said radial groove and into the connecting-groove  $d^2$ . When the crank-shaft comes to rest, the  
20 outer arc-shaped end of the crank-arm is in engagement with the arc-shaped inner wall of the connecting-groove  $d^2$ , (see Fig. 2,) whereby the turret is practically locked in the proper position. Reliance, however, is  
25 not placed upon this locking device for accurately holding the turret in working position.

An indexing device is provided which consists of a vertically-movable pin N, having a tapered upper end  $n$ , and which is vertically  
30 movable in a hole in the slide B. The upper tapered end of this pin is adapted to enter one of the tapered holes  $d^4$  in the turret, of which there are as many as there are radial grooves  $d'$ . This pin is moved up and down by means  
35 of a lever P, pivoted to the slide B and having its curved front end projected into a transverse slot  $n'$  in the indexing-pin. A spring  $t$  presses a vertically-movable pin T down onto the tail of the lever, and thus the  
40 normal position of the indexing-pin is, through the action of the mechanism described, in engagement with the turret, as shown in Fig. 1. On the shaft E, however, there is a cam  $e'$ , which is adapted to engage  
45 with the lever P and does engage therewith and cause the withdrawal of the indexing-pin before the turret begins its movement.

A clamp is provided for holding the turret fast to the slide B after it has been indexed.  
50 This clamp is a laterally-projecting finger  $r$  on the upper end of a pin R, which is vertically movable in the slide B. This finger enters an undercut groove  $d^5$  in the outer walls of the groove  $d^2$ . This pin is drawn down-  
55 ward after the turret is indexed by suitable mechanism operated by the shaft E. In the preferred form of the mechanism for so moving this pin R the lower end of this pin has a nut  $r'$  screwed upon it, and between this  
60 nut and the lower face of the slide B a loose collar  $r^3$  is placed, embracing the pin. This collar has an arm  $r^4$ , and the arm carries a finger  $r^5$ , which enters a cam-groove  $u$  in a sleeve U, secured to the shaft E. This collar  $r^3$  has  
65 upon its upper face inclined surfaces  $r^6$ , which engage with corresponding inclined surfaces  $b^6$  on a block  $b^5$ , secured to the under sur-

face of the slide B. A coiled spring  $r^8$ , which enters a hole in the bottom of this clamping-pin, is compressed between the end of that  
70 hole and a bracket  $b^7$ , which is secured to the slide B. The spring therefore exerts a continuous pressure to move the pin R upward to cause the finger  $r$  to loosen its hold upon the turret; but when the turret has reached  
75 an operating position and has been indexed the cam-groove  $u$ , acting through the described mechanism, causes the collar  $r^3$  to be turned, and the resulting engagement of the inclined surfaces  $r^6$   $b^6$  draws this clamping-pin down-  
80 ward, whereby its finger  $r$  firmly clamps the turret to the slide B.

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

85 1. In a turret-lathe, the combination of a turret-slide and a turret rotatably mounted thereon and having on its lower surface a plurality of radial grooves, and other grooves connecting the inner ends thereof, with a  
90 crank-shaft mounted in the turret-slide parallel to the axis of the turret, a crank-arm secured thereto, a crank-pin projecting from said crank-arm into the grooves in the turret, and means for turning said crank-shaft, sub-  
95 stantially as specified.

2. In a turret-lathe, the combination of a turret-slide, and a turret rotatably mounted thereon and having in its under face a plu-  
100 rality of radial grooves, and other grooves connecting the inner ends of said radial grooves, the inner walls of said connecting-grooves being arc-shaped upon a radius equal to the distance from the axis of the crank-  
105 shaft to the outer face of the crank-arm carried thereby, with a crank-shaft mounted in the slide parallel to the axis of the turret, a crank-arm secured thereto, and a crank-pin secured to said arm and projecting into the grooves in the turret, and means for rotating  
110 said crank-shaft, substantially as specified.

3. In a turret-lathe, the combination of a turret-slide and a turret rotatably mounted thereon and having on its lower surface a plu-  
115 rality of radial grooves, and other grooves connecting the inner ends thereof, with a crank-shaft mounted in the turret-slide parallel to the axis of the turret, a crank-arm secured thereto, a crank-pin projecting from said crank-arm into the grooves in the turret,  
120 a horizontal shaft mounted in the turret-slide, and meshing gears secured to said shaft and to the crank-shaft, substantially as specified.

4. In a turret-lathe, the combination of the turret-slide, a turret rotatably mounted there-  
125 on having index-holes in its under side and turret-turning mechanism with a rotatable shaft mounted in the slide and extending transversely of its path of movement, mechanism intermediate of the shaft and turret-  
130 turning mechanism whereby the latter is operated, a vertically-movable index-pin, a lever pivoted to the slide and engaging with said pin, a spring for moving the pin upward, and



a cam on said shaft for engaging with the lever whereby the pin is moved downward, substantially as specified.

5 5. In a turret-lathe, the combination of a turret-slide, and a turret rotatably mounted thereon and having in its lower face an undercut groove concentric with its axis, with a vertically-movable clamping-pin, having a finger which enters the undercut part of said groove, 10 a shaft mounted in the turret-slide, and mechanism operated by said shaft to draw the clamping-pin downward, substantially as specified.

15 6. In a turret-lathe, the combination of a turret-slide, a turret rotatably mounted thereon and having in its lower face an undercut groove concentric with its axis, with a verti-

cally-movable clamping-pin, having a finger which enters the undercut part of said groove, a spring which acts to move said pin upward, 20 a nut on the lower end of said pin, a collar loosely embracing the pin, an inclined surface to the top of said collar, and another on the turret-slide, an arm secured to said collar and having a finger, a shaft mounted in the 25 turret-slide and having a cam-groove into which said finger projects, substantially as specified.

In testimony whereof I hereunto affix my signature in the presence of two witnesses. 30  
AMBROSE SWASEY.

Witnesses:

WM. E. REID,  
JOHN WEBER.