

Ivens & Brooke.

Punching and Shearing Mach.

N^o 94,117.

Patented Aug. 24, 1869.

Fig. 1.

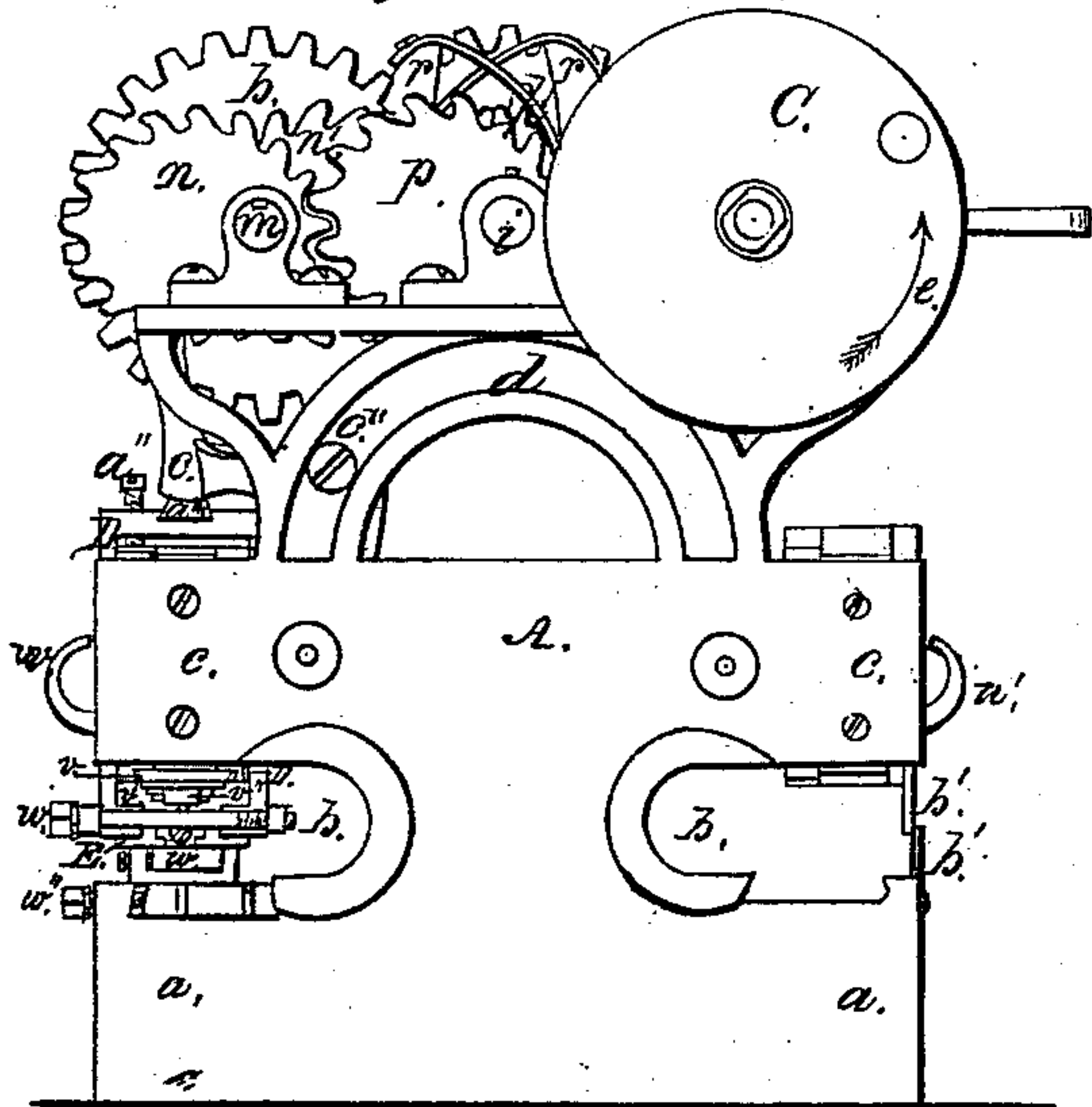


Fig. 4.

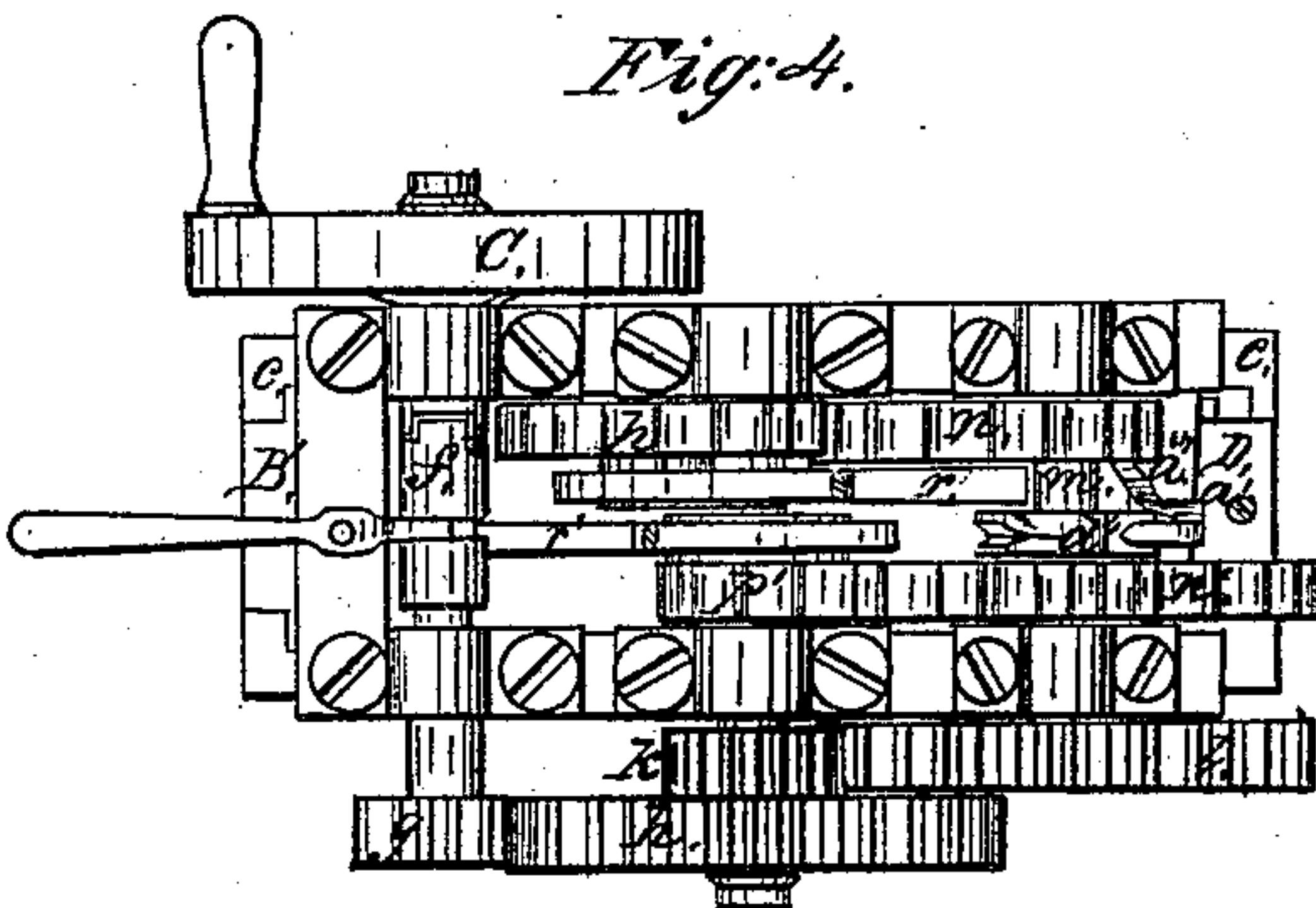


Fig. 5.

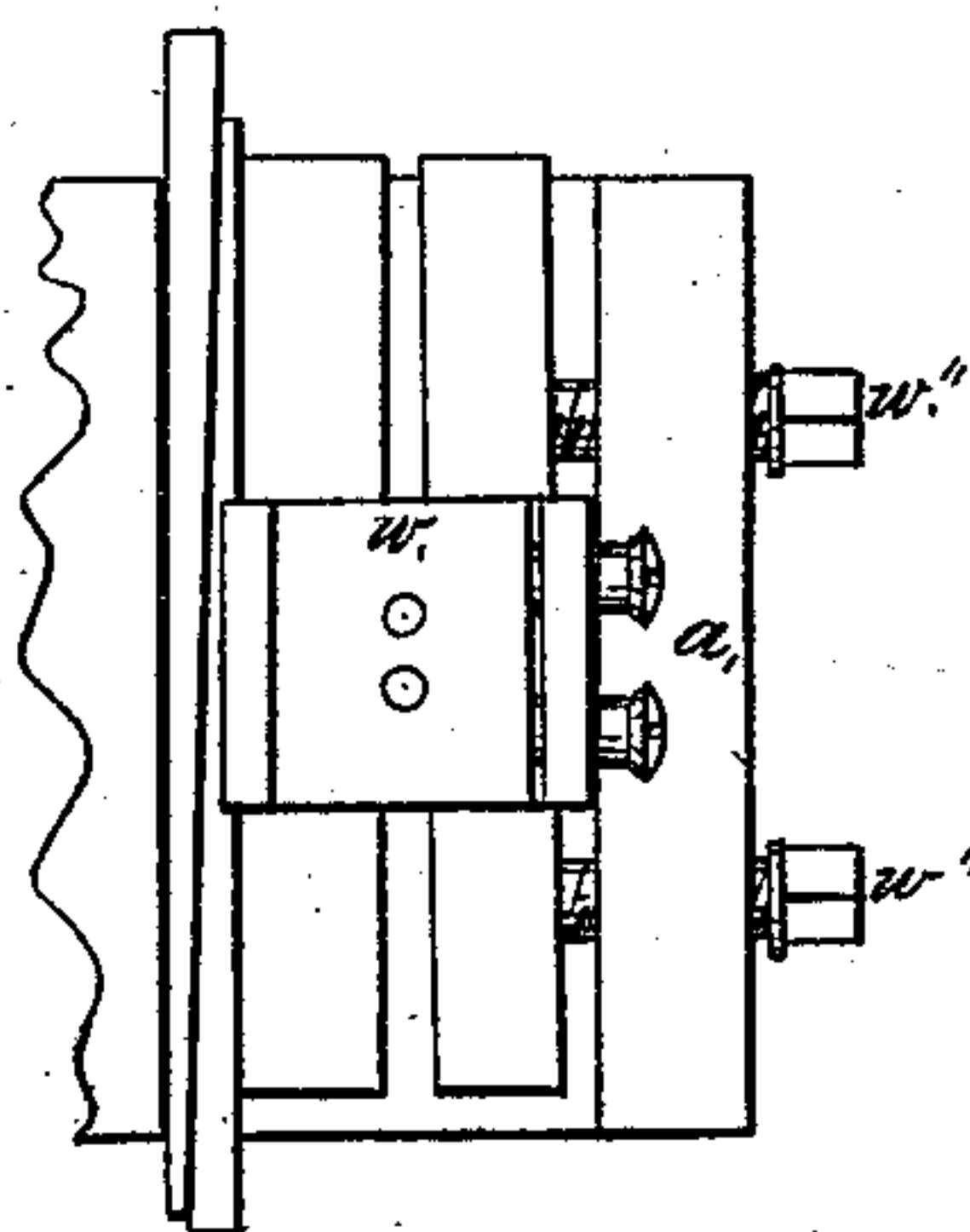


Fig. 6.

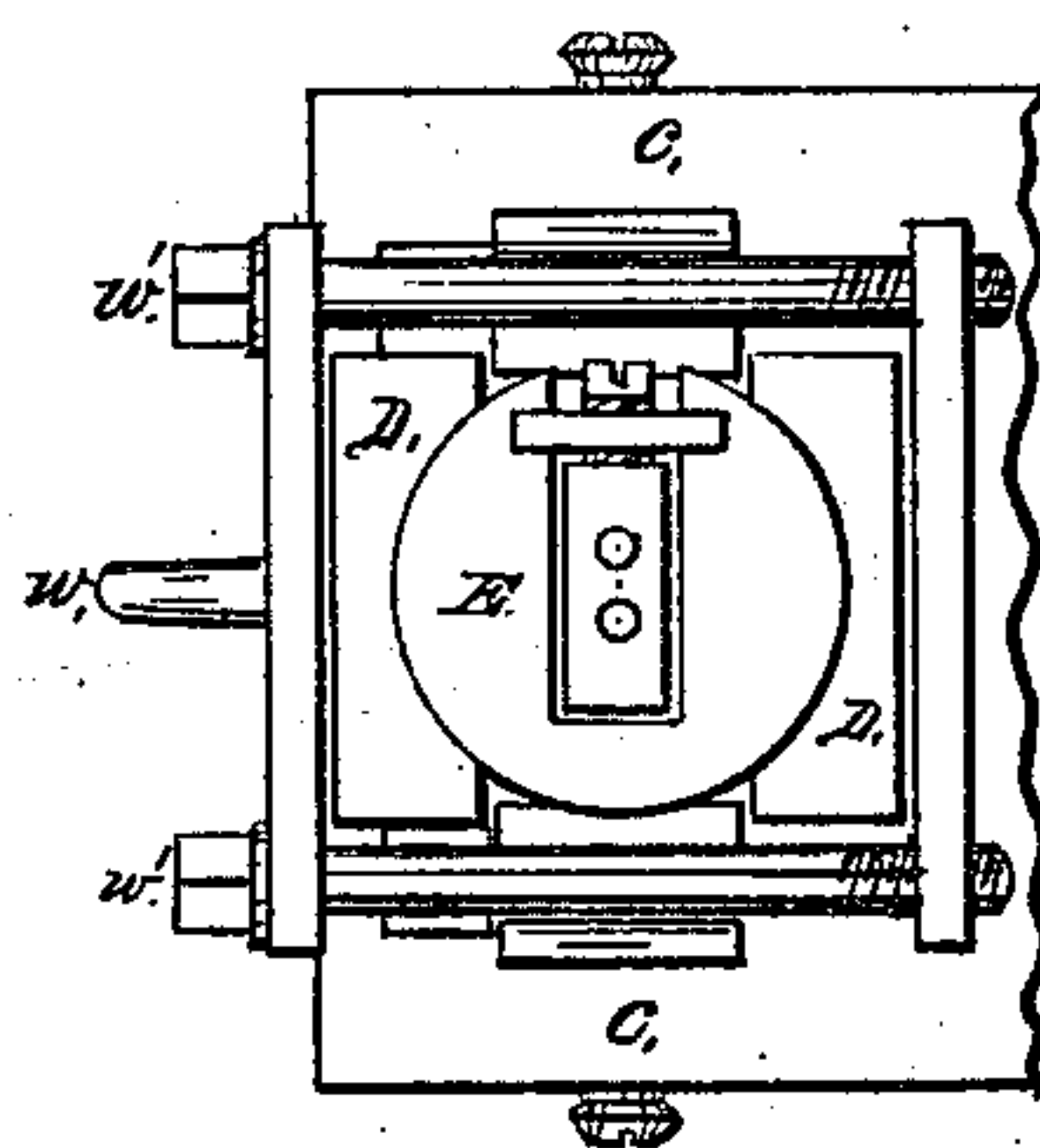


Fig. 2.

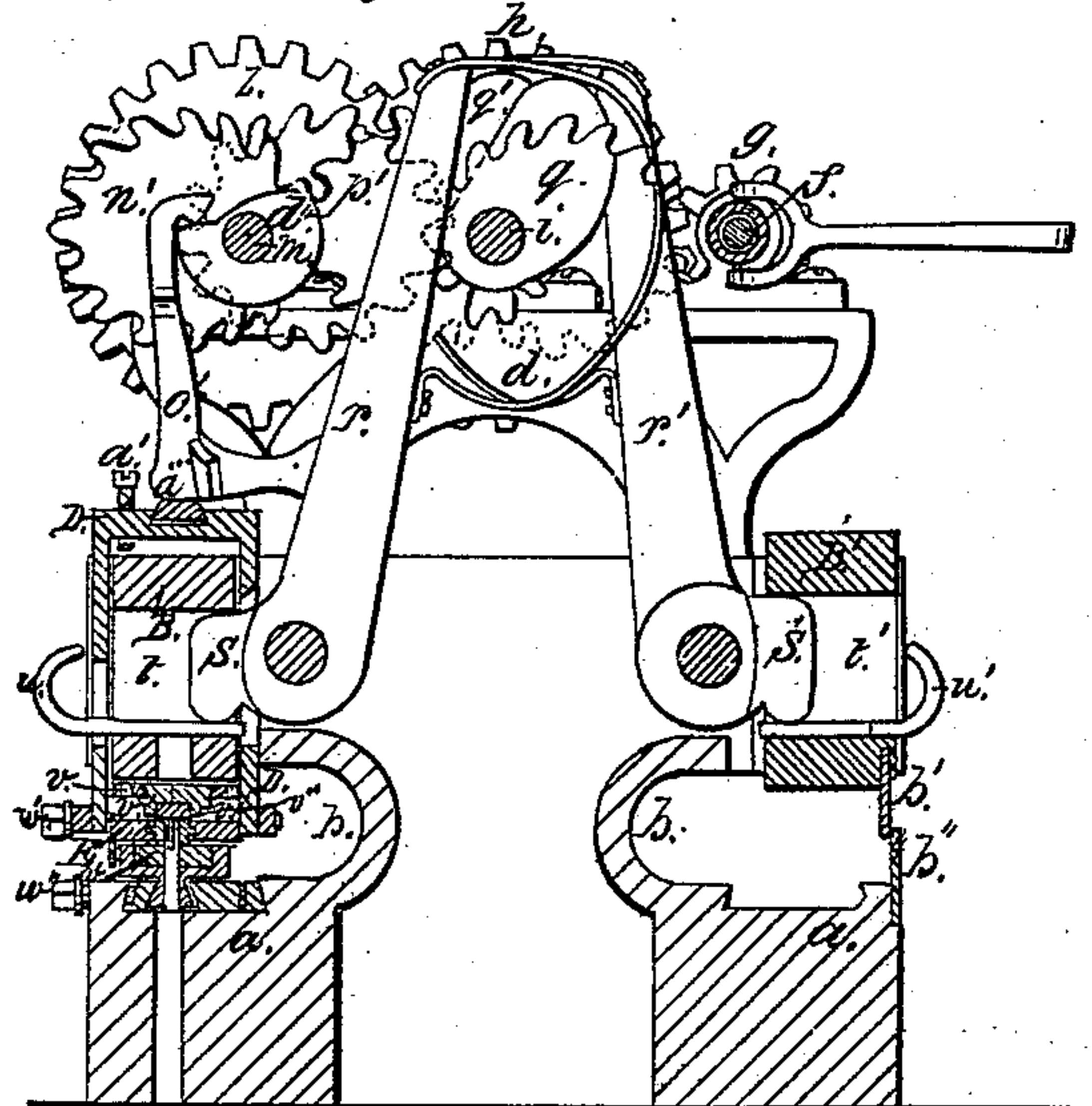
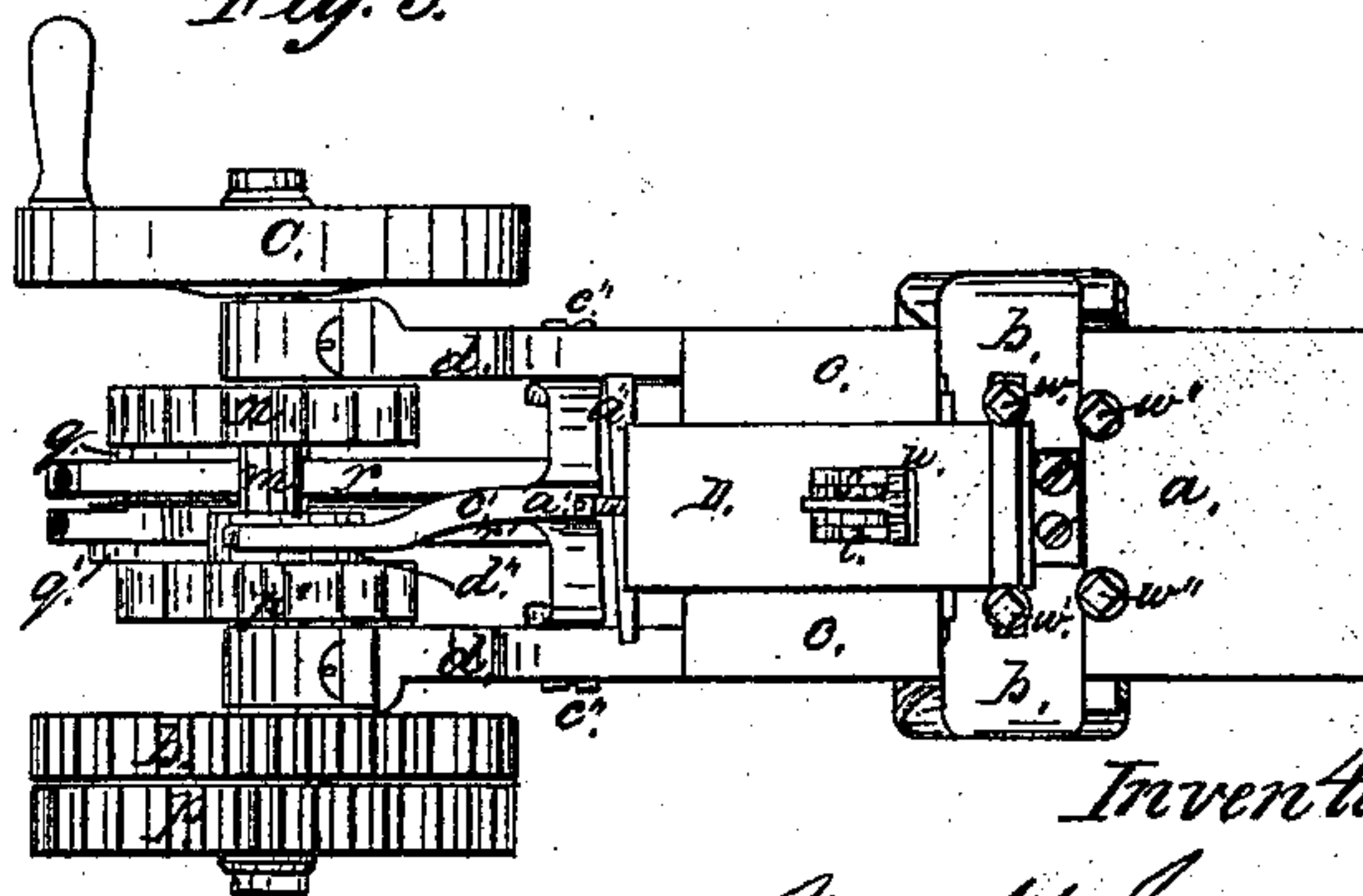


Fig. 3.



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WILLIAM H. IVENS AND WILLIAM E. BROOKE, OF TRENTON, NEW JERSEY.

Letters Patent No. 94,117, dated August 24, 1869.

IMPROVED MACHINE FOR PUNCHING AND SHEARING METAL.

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

To all whom it may concern:

Be it known that we, WILLIAM H. IVENS and WILLIAM E. BROOKE, both of Trenton, in Mercer county, and State of New Jersey, have invented certain new and useful Improvements in "Punching and Shearing-Machines;" and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings through letters of reference marked thereon, forming part of this specification, and in which—

Figure 1 represents a side elevation of a machine embracing our improvements.

Figure 2, a vertical longitudinal section of the same, taken on the line *x x* on fig. 4.

Figure 3 is an end elevation.

Figure 4, a top view or plan of the machine.

Figure 5, a plan of the die with its means of adjustment on the bed, taken on an enlarged scale.

Figure 6 is an inverted view of the punch and its stripper on the same scale as fig. 5.

The same letters indicate corresponding parts in the several figures.

The nature of our invention consists—

First, in so applying the power, that while the motion of the driver is uniform, the motion or travel of the punch or shear shall be slow while cutting through the stuff, and quick on receding, thus increasing power when the work is being performed, and speed when no force is required.

Secondly, in a novel construction and combination of the punch-holder with its stripper, adjustable disk, and die, whereby the punch and die may be rotated, and thus easily adjusted to different points across the plate.

Thirdly, in the combination of devices for retaining the stripper in position until the punch is withdrawn, and its means of adjustment to suit different thickness of plates.

Fourthly, in the general arrangement of the operating-mechanism with relation to the punching and shearing-heads, whereby shop-room is economized, and the operation of the machine rendered less dangerous.

Referring to the drawings—

A represents the frame of the machine, which may be cast all in one piece, with solid blocks or anvils *a*, and a throat or opening on either side as at *b*, the upper portions *c* of which are so formed as to constitute guides for the vertically-sliding heads *B B'*, which carry the punch or shears, and these are further surmounted by suitable frame-work *d*, to afford journal-bearing for the operating-mechanism.

Motion is communicated to the punching and shearing-heads *B B'* from the driving-wheel *C*, which is rotated by any suitable motor in the direction of the arrow *e* on fig. 1.

The axis of the wheel *C* is provided with a sleeve, *f*, or other suitable clutch, by which it may be thrown in or out of gear with the train of wheels which give motion to said punching and shearing-heads.

On the opposite end of the axis of the wheel *C* is a pinion, *g*, which gears with a wheel, *h*, on the shaft *i*, and on the same shaft *i* is another pinion, *k*, gearing with the wheel *l* on the shaft *m*, on which are firmly keyed two eccentric elliptical wheels *n n'*, which gear with similar wheels *p p'*, hung to revolve freely around the shaft *i*, and which have cast upon one side, or otherwise suitably attached to them, cams *q q'*, by the rotation of which the elbow-levers *r r'* are caused to vibrate, and communicate a vertical reciprocating motion to the heads *B B'* through their short arms *s s'* entering slots or mortises *t t'* in said heads.

These mortises are made of a length equivalent to the amount of motion intended to be communicated to them, greater than the vertical measurement of the arms *s s'*, by which they are operated, so that when either head *B* is desired to be at rest while the operating-gear is in motion, the levers *r* and *r'* may vibrate without moving said head, but when it is desired to operate them, or either of them, a key or wedge, *u u'*, is to be inserted in the mortise *t* or *t'*, for the arm *s* or *s'* to strike upon, by which means the heads, or either of them, are caused to reciprocate.

The head *B* is constructed for punching, and is provided at its lower end with a detachable piece, *v*, which fits in a dovetail groove laterally across it, and to this laterally-movable piece *v* is fitted another piece, *v'*, which is capable of oscillation around the vertical centre of the head.

Embracing the head *B*, on two sides and at its top, is a yoke, *D*, so formed at its lower end as to carry and clamp a disk, *E*, which is capable of adjustment around its axis, but stationary in relation to the yoke when the machine is in operation.

The piece *v'* is furthermore formed with a groove on its under side, which spans the head *v'* of the punches which pass through suitable apertures in the disk *E*, so that when said disk is turned in its bearing in the yoke *D*, to vary the angle of position of the punches, the grooved piece *v'* will be turned at the same time; this being set to suit the angle at which it is desired to punch the series of holes while the punches are depressed, and entering their corresponding holes in the female die *w*, which is also adjustably attached to the bed *a*, so as to be capable of a similar motion around the same axis.

The punches or male and female dies are rotated together, and when in proper position may be there secured by tightening their respective clamping-screws *w w''*.

This yoke *D* is further provided, at its upper end,

with vertical adjusting-screw a'' , and a transverse wedge, a''' , by which its time and distance of motion may be regulated.

The forked elbow-lever c' is pivoted to the upper part d of the frame A, on either side at c'' , and rests on the transverse wedge a''' , its upper end bearing against or being prevented from vibrating by contact with the cam d'' until the notched portion of said cam comes against its hooked upper end, at which time also the punches connected with the head B, having been stripped of the metal punched, the upper portion of the head comes in contact with the adjusting-screw a'' , and lifts the stripper-carrying yoke, so as to admit of the adjustment of the plate for a repetition of the same operation.

The eccentric elliptical wheels $n n'$ and $p p'$ are so geared with each other that the greatest amount of leverage is afforded at the time the punches or shears are cutting through the plate, and at their return motion, no power being required, the said punches are speedily withdrawn.

The head B' is operated similarly to the head B, but, as represented in the drawing, is provided with a cutter, b' , instead of with a punch or punches, which operates in combination with the stationary cutter b'' attached to the bed or anvil a as a shears.

The machine may, however, be constructed as a double-punching or double-shearing one, or for punch-

ing on one side and shearing on the other, as here represented.

Having thus described our invention,

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination and arrangement of the eccentric elliptic gears $n n'$ and $p p'$, and their cams $q q'$, with the elbow-levers $r r'$ or their equivalents, for operating the punching or shearing-heads B B', substantially as set forth.

2. The combination of the rotating punch-holder v' and adjustable disk E, of the stripper D, with the adjustable die w , substantially as specified.

3. The combination of the cam d'' and retaining-lever c' with the stripper D, provided with suitable adjustments a'' and a''' , substantially as set forth.

4. The arrangement of the driving-gears $g h k l$ and operating-gears $p p' n n'$, and their cams $q q'$, above and between the cutting and punching-heads, substantially as shown and described, for the purpose set forth.

In testimony whereof, we hereunto subscribe our names, before two subscribing witnesses.

WM. H. IVENS.
W. E. BROOKE.

Witnesses:

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Z. C. BOBBINS.