

H. H. BARNARD.  
Machine for Forming Cartridge-Cases.  
No. 217,045. Patented July 1, 1879.

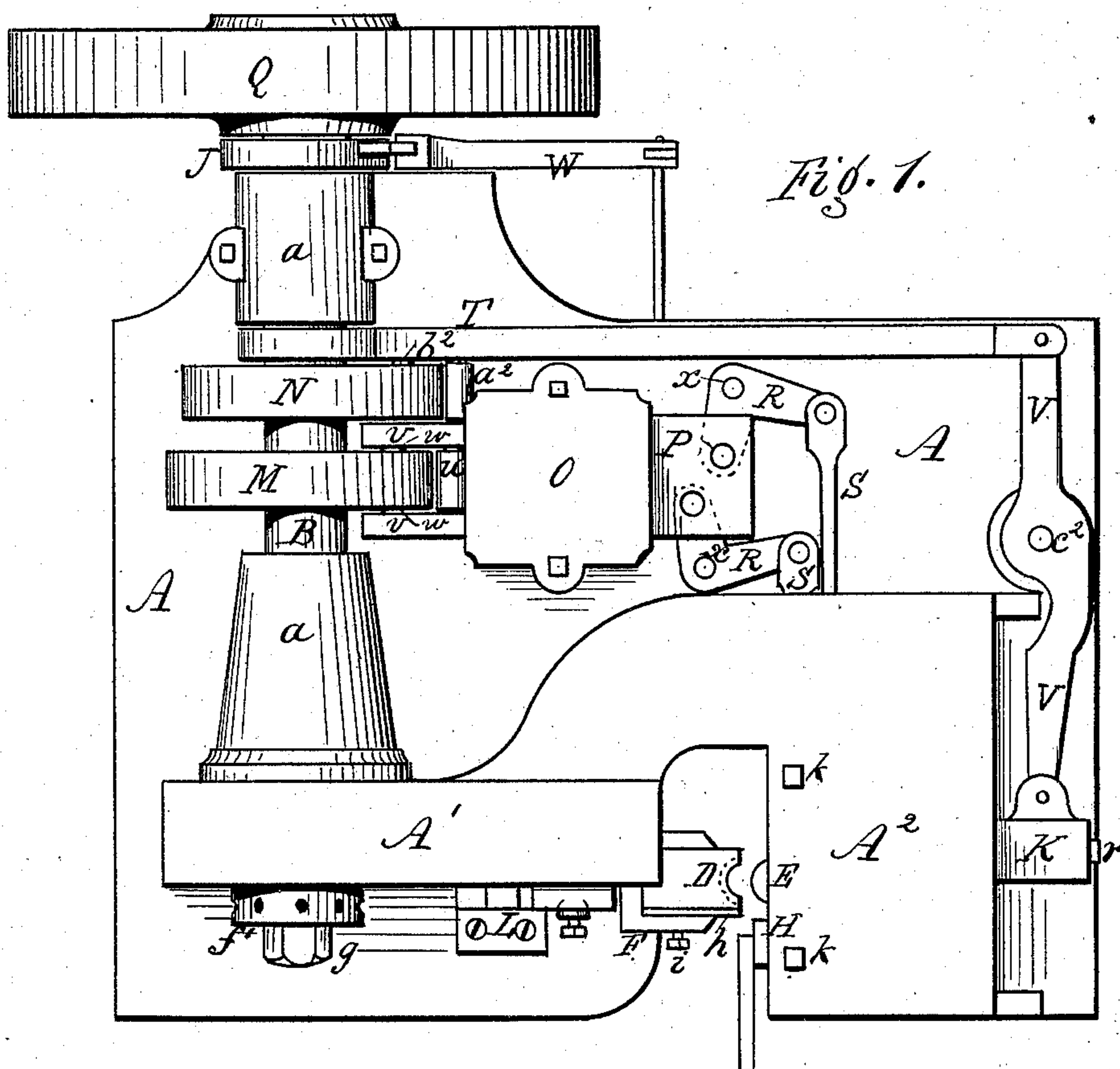
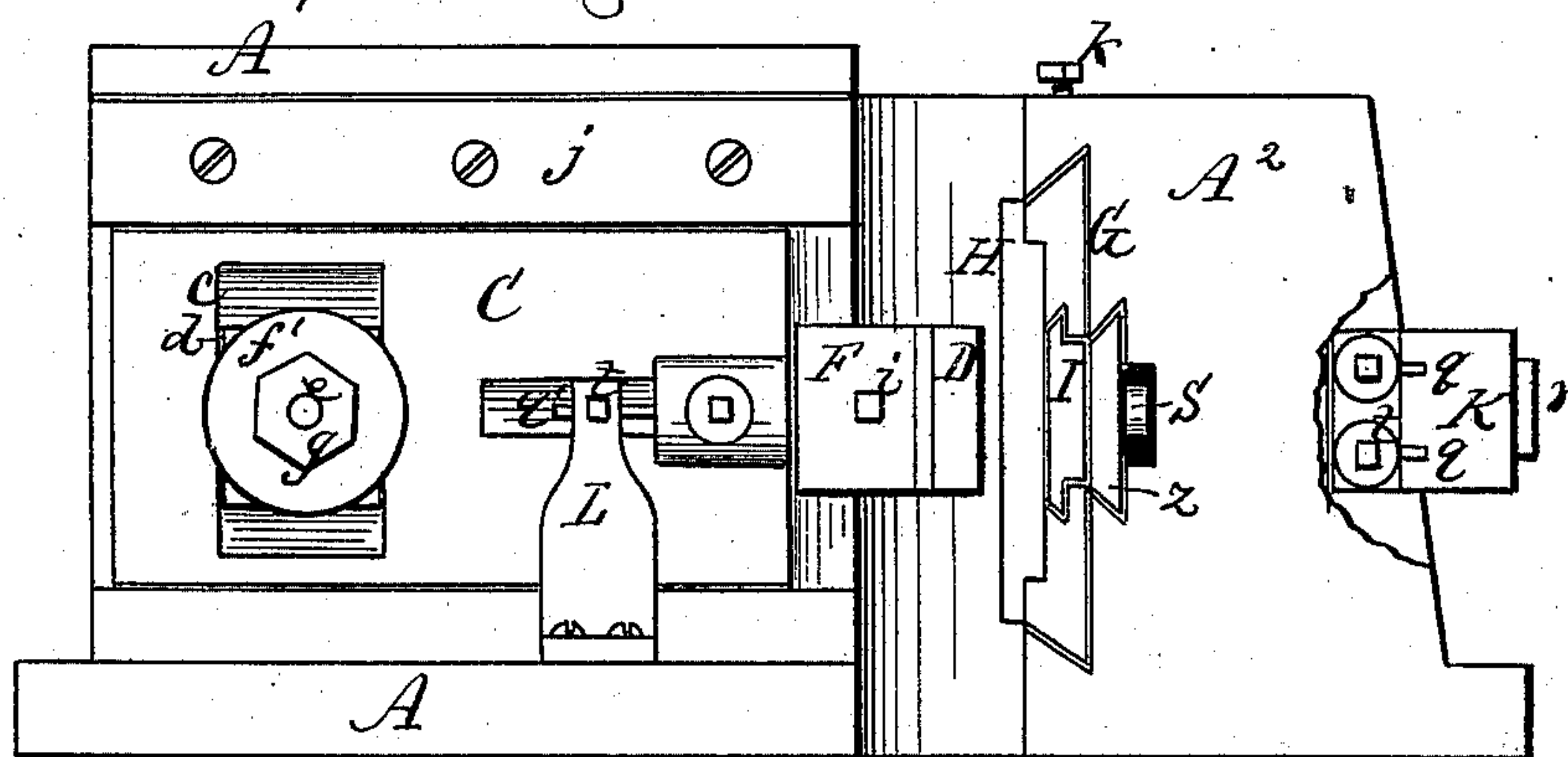


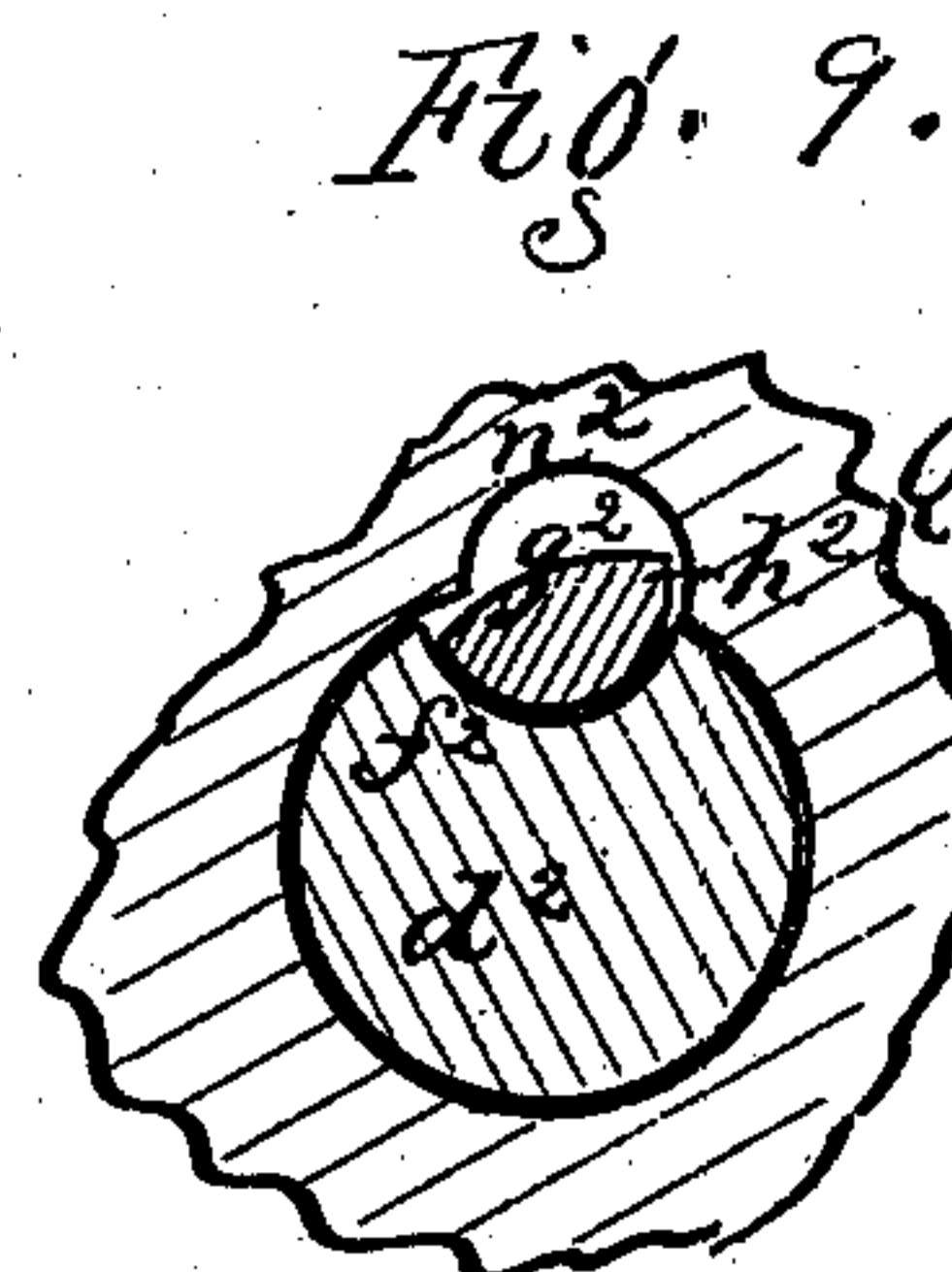
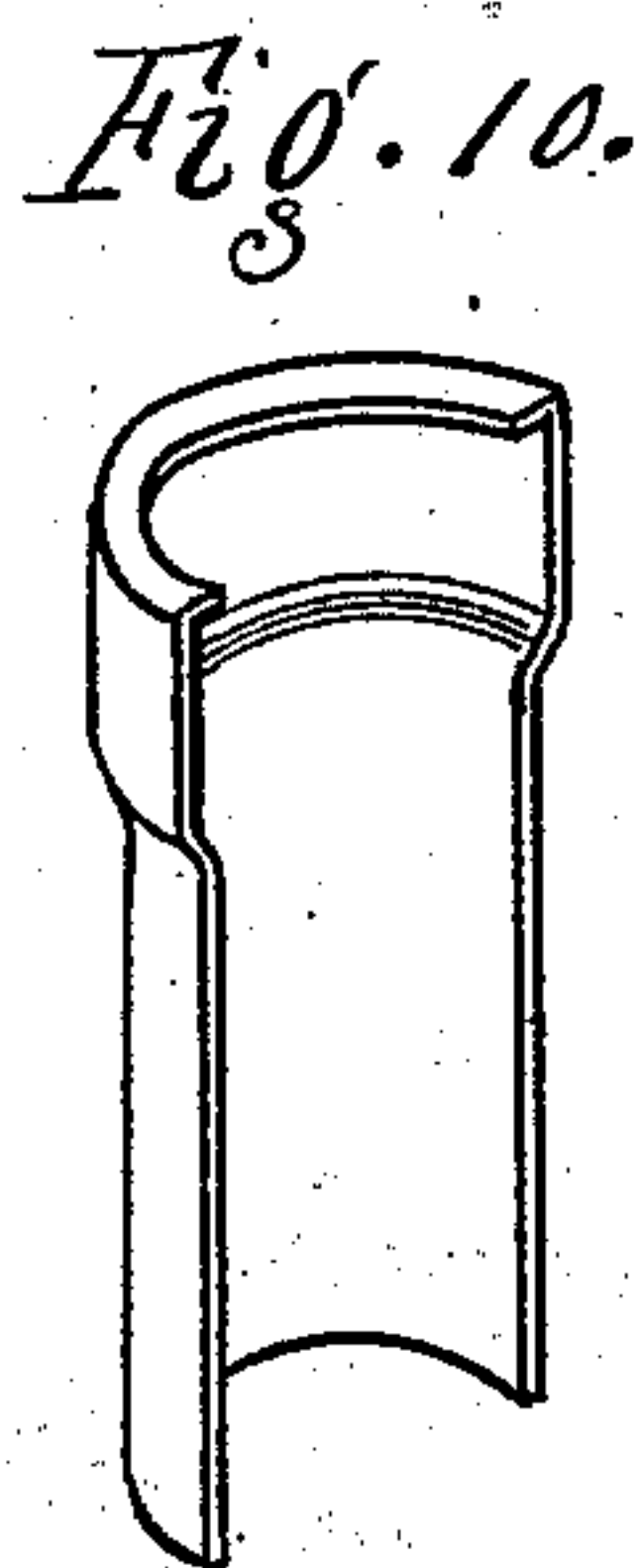
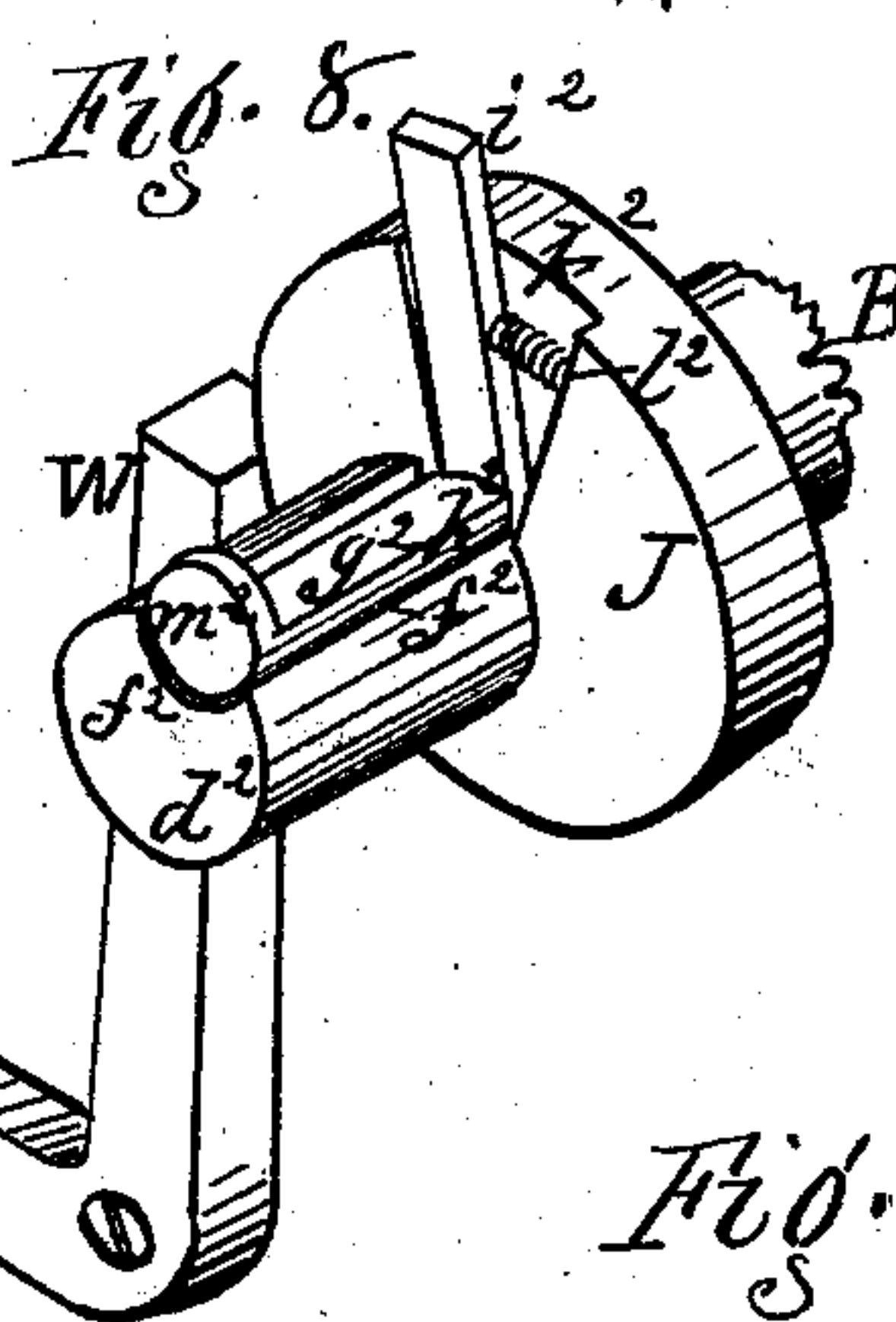
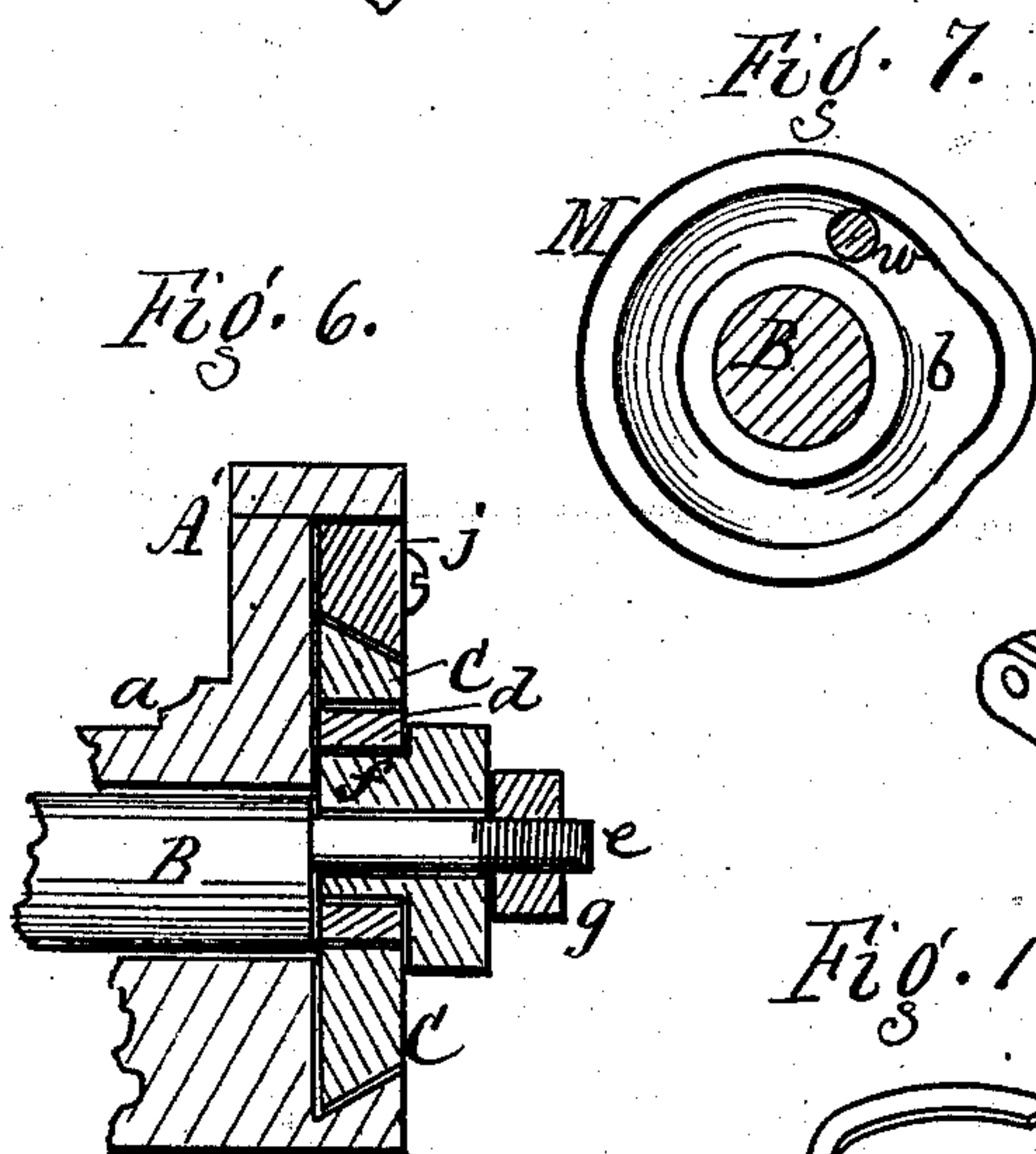
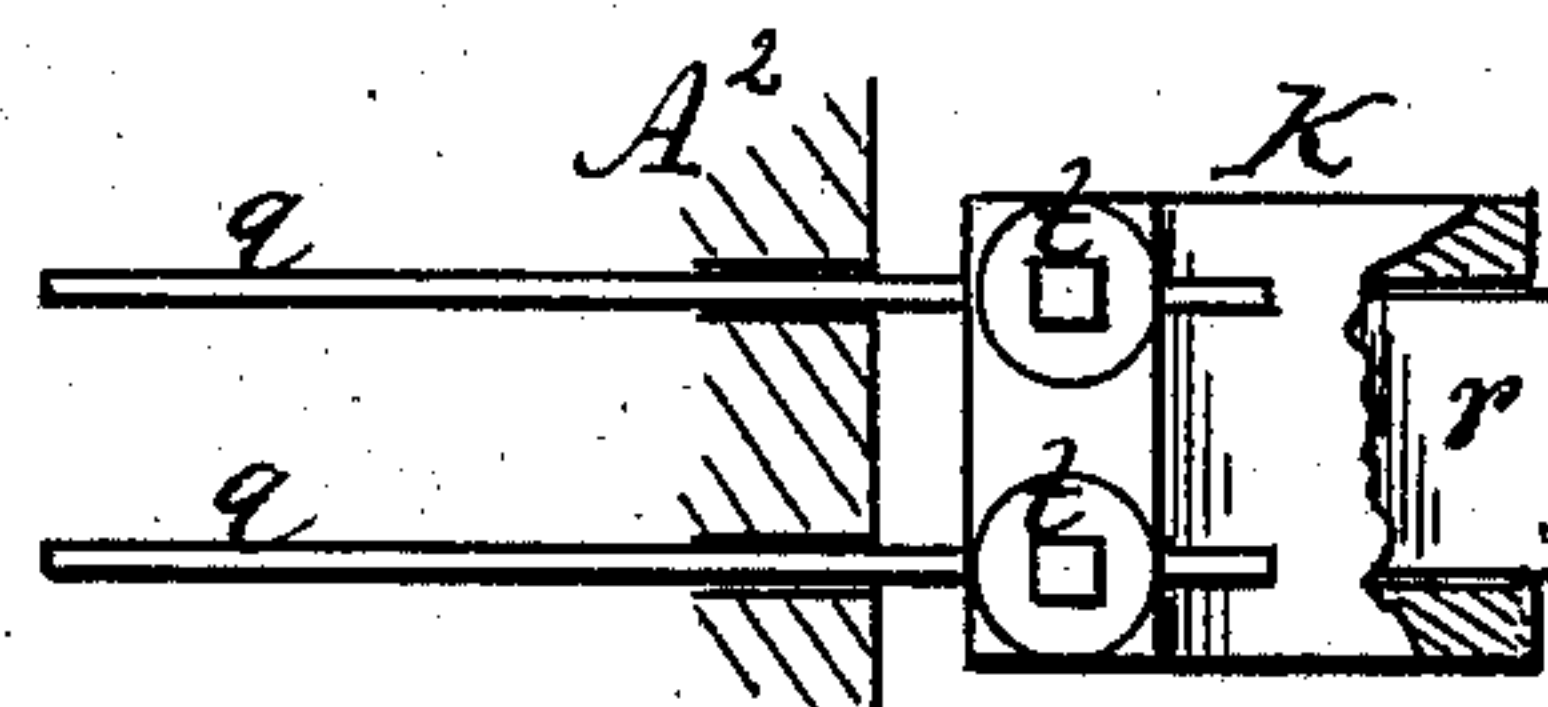
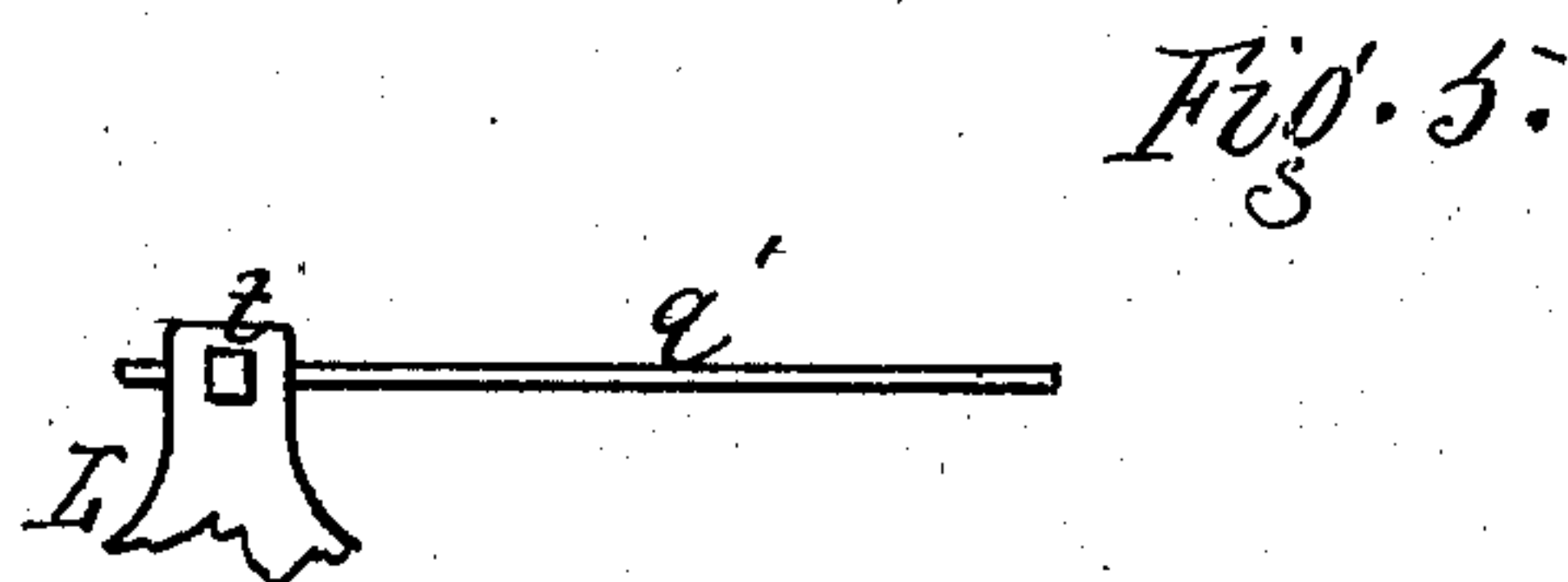
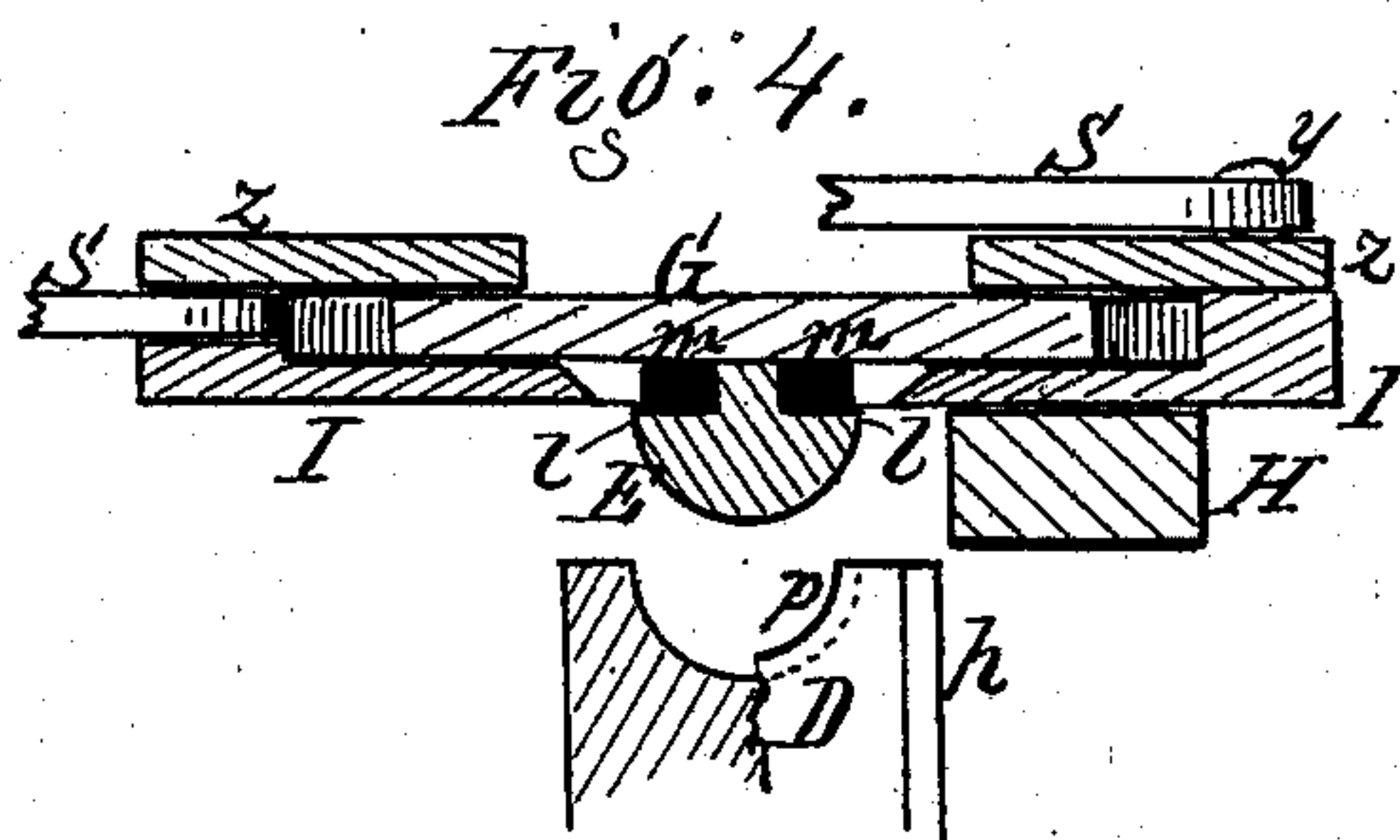
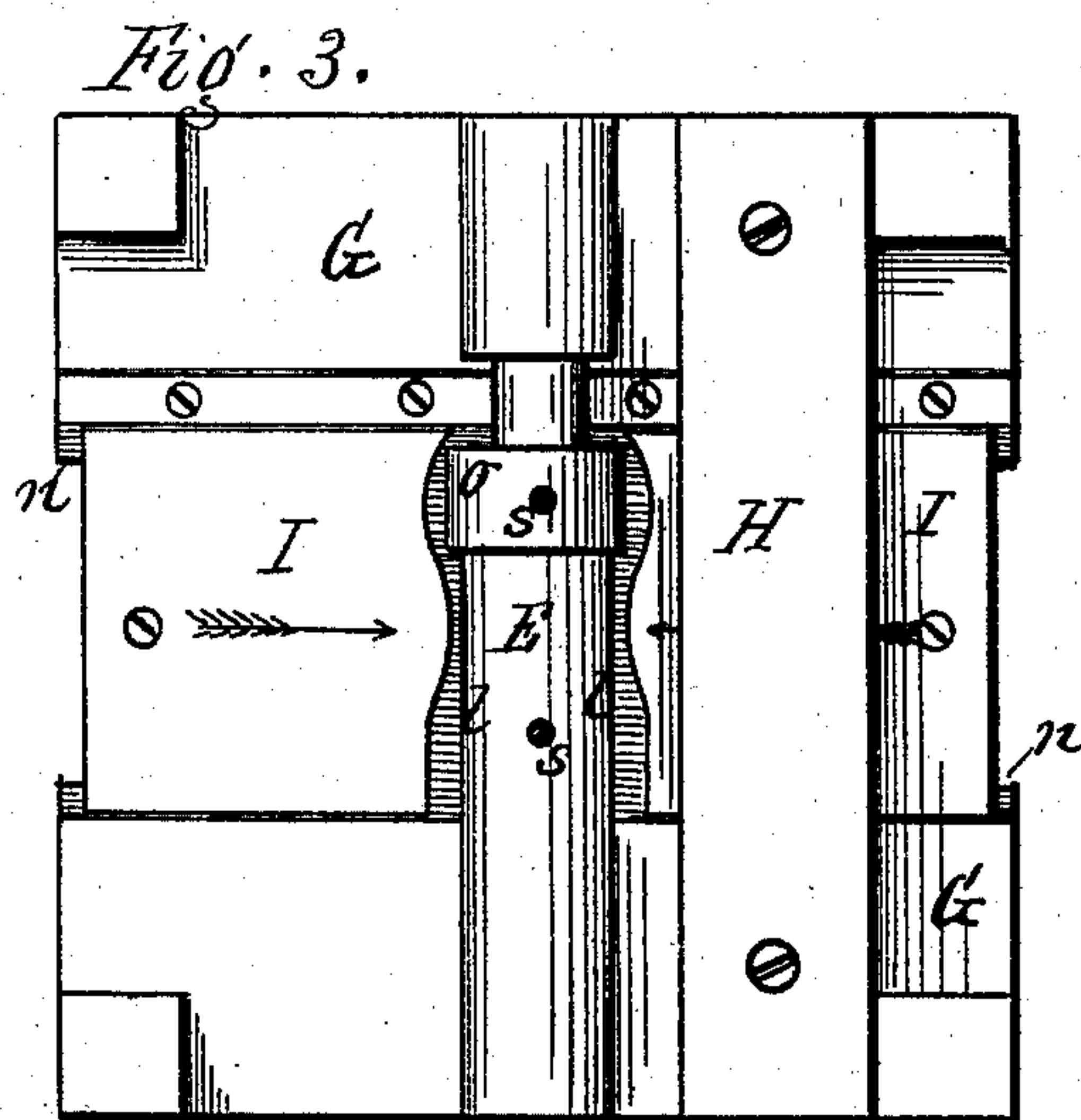
Fig. 2.



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# UNITED STATES PATENT OFFICE.

HENRY H. BARNARD, OF ROCHESTER, NEW YORK, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY S. MILLER, OF SAME PLACE.

## IMPROVEMENT IN MACHINES FOR FORMING CARTRIDGE-CASES.

Specification forming part of Letters Patent No. **217,045**, dated July 1, 1879; application filed July 6, 1877.

*To all whom it may concern:*

Be it known that I, HENRY H. BARNARD, of the city of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Machines for Forming Cartridge-Cases; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan of the machine. Fig. 2 is an elevation of the same. Figs. 3, 4, 5, 6, 7, 8, and 9 are detail views. Fig. 10 is a perspective view of a half cartridge-case as formed by this machine.

The cases or shells made by this machine are formed in halves, and are intended for holding shot alone. The halves are struck up from pieces of tin, and when fitted together they form a complete cylinder, and are wound with thread, which, when the cartridge is discharged from the gun, unwinds, and finally allows the cartridge to divide for the shot to scatter.

The improvement consists of a machine for cutting off the tin, punching or striking it up in the form of the half-shell, trimming the edges, and finally discharging it in the completed state, all at one operation, as hereinafter more fully described.

A is the bed or frame of the machine, and  $A^1 A^2$  are vertical portions of the same, which rise to suitable height and stand at right angles to each other, as clearly shown in Figs. 1 and 2. These parts serve, respectively, as the bearings for the punch and "form" and their connecting parts. B is the driving-shaft, mounted in suitable boxes  $a a$ , and having at one end a fly-wheel, Q, by which it is driven. C is a dovetailed slide, which rests in a way in the bearing  $A^1$ , and is arranged to slide forward and back. It carries at its front end the punch D, by which the pieces of tin are cut off from a strip and stamped up on the form E to produce the half cartridge-case.  $c$  is a rectangular opening in the slide.  $d$  is an open box, which fits in said opening, but has a free movement up and down.  $e$  is a crank-pin on the end of the driving-shaft B, which crank-

pin projects through the open box before spoken of, and forms an eccentric.  $f$  is an eccentric, also fitting in the open box, having a hole to receive the crank-pin, and also having an enlarged rim,  $f^1$ , on the outside, provided with holes in its periphery, by which it may be turned.  $g$  is a nut screwing on the end of the crank-pin outside the eccentric, and serving to secure the eccentric in place on the pin. This arrangement is shown in Fig. 6, which is a vertical section.

It will be seen that the throw of the crank-pin, as the driving-shaft is revolved, will move the slide C forward and back to force the punch against the form or die to press the half-cases. The eccentric  $f$  enables this throw to be varied more or less, for as it is turned on the crank-pin its eccentric side may be brought in line with or away from the projection of the crank-pin, as indicated in Fig. 6. This is essential to give more or less power to the concussion of the punch upon the form in working different kinds of tin.

When the eccentric  $f$  is set up to place by the nut  $g$  its inner end strikes and clamps upon the end of the driving-shaft B without binding upon the intermediate open box,  $d$ , thereby making the eccentric a fixture with the shaft in whatever position it may be adjusted, and leaving a free movement for the eccentric to turn in the box.

The punch D, and also a cutter,  $h$ , are clamped in a holder, F, connected removably with the slide C, by which said parts may be put in or taken out at pleasure.

The punch and cutter are preferably held in the holder by a set-screw,  $i$ , so that, in addition to being removable, they may be adjusted both vertically and horizontally to fit accurately to the form.

The slide C is held at the top by a gib,  $j$ , attached by screws, so that as wear occurs it may be tightened by grinding off the back side of the gib.

G is a dovetailed frame, which is inserted endwise in a way in the vertical portion  $A^2$  of the frame, and is held in position by set-screws  $k k$ . Fig. 3 is a front elevation, and Fig. 4 a cross-section, of this frame. It has attached, centrally, the form E, which comes opposite



the punch, and also a shear, H, whose inner edge comes in line with the outer edge of the cutter *h*, so that the cutter will just pass by it. This device forms the means for cutting off the piece from the length of tin to form the case. The tin is preferably fed in on a suitable guide and strikes a stop when the proper length is entered. The back of the form E is cut away, except a narrow tongue, leaving sharp edges *l l* standing out from the back of the frame, as shown in Fig. 4, and forming thereby vertical grooves or passages *m m*, leading down through the bottom of the frame, as shown.

I I are two cutters, resting in ways *n n* of the frame, and moving toward and from the form. The inner ends of these cutters are of the curved form shown, so that the center and top will first strike the edges of the form just described. These cutters, striking past the rear edges, *l l*, trim or cut off the waste tin after the shell has been made by the punch, and square the edges of the shell, so that when two halves are placed together they will fit accurately.

The upper projecting edges of the cutters I I trim and cut the extreme top of the shell, where it is turned in to form a flange to hold the wads.

The chips or shavings of tin, as they are cut from the shell, fall down the grooves *m m* and drop out through the frame, preventing any obstruction.

The form is constructed with an enlargement, *o*, near its top, and the punch is constructed with a similar enlarged socket to cover it, so that the cartridge-shell (shown in Fig. 10) will be formed with an enlarged end, the object of which is to receive a body of wads back of the shot to prevent the shot being driven out of the cartridge when discharged; also, to lighten the rear end of the cartridge and insure accuracy in direction. Furthermore, the upper end of the punch has a flange, *p*, Fig. 4, which projects horizontally over the socket of the punch, the object of which is to produce a flange on the upper or rear end of the cartridge-case to hold the wads in place, said flange being formed by the striking of the flange *p* over the top of the enlargement *o* as the punch moves up to the form.

*q*, *q*, and *q'* are rods, forming strippers, whose object is to push the formed cartridge or shell off from the form, or out from the punch, as said parts separate after having formed the shell. The shell is liable to stick to either one of them. The rods *q q* are attached to a slide, K, moving on a guide, *r*, and they pass through the bearing A<sup>2</sup>, the frame G, and form E, and pass out from the latter through the holes *s s*, Fig. 3. Every time the punch moves back, after forming a shell, these rods project out and drive the shell from the form if it sticks to it. The rod *q'* is made fast to a standard, L, and the punch and its holder slide upon the rod, the rod coming in line with the socket, and as the

punch draws back the rod forces the shell out of the socket of the punch if it should stick there. The rods *q q q'* are adjusted by means of set-screws *t t t*.

M and N are two cams fixed upon the driving-shaft, and having internal cam-grooves *b*. With these cams engage the apparatus for driving the trimming-cutters and the stripping-rods, before described. O is a bearing rising from the frame in advance of the cam M. Through this bearing plays a slide, P, bearing a roller, *u*, against which the cam bears to give the forward motion, and two forked arms, *v v*, in the rear, having pins *w w*, which engage in the internal cam-grooves to give the back motion. To the forward end of the slide P are pivoted two bell-cranks, R R, having their fulcrums at *x x*, and to the outer ends of the bell-cranks are pivoted two pitmen, S S. These pitmen run through passages in the bearing A<sup>2</sup>, and at their opposite ends are pivoted at *y y* to slides *z z*, which carry the cutters I I.

T is a connecting-rod having a roller *a*<sup>2</sup>, which engages with the periphery of the cam N, and a pin, *b*<sup>2</sup>, which enters the groove of said cam. To the outer end of the rod is pivoted a rock-lever, V, having its fulcrum at *c*<sup>2</sup>; and the opposite end of the rock-lever is pivoted to the slide K, which carries the stripping-rods *q q*. The actions of the cams are so timed as to give proper movement to the cutters and the strippers.

J, Fig. 8, is a disk, made fast on the driving-shaft near the fly-wheel Q. *d*<sup>2</sup> is the outer end of the driving-shaft, upon which the hub of the wheel rests loosely, as shown in Fig. 9.

A longitudinal groove, *f*<sup>2</sup>, forming a half-circle, is made in the end of the shaft, and in this fits a corresponding lock, *g*<sup>2</sup>, which, when turned in one position, coincides with the exterior circle of the shaft, but when turned in the other position throws one edge above the circle of the shaft, as shown at *h*<sup>2</sup>.

*i*<sup>2</sup> is an arm on the inner end of the lock, which passes up through a mortise, *k*<sup>2</sup>, of the disk J, and is pressed forward by a spring, *l*<sup>2</sup>, so as to elevate the edge *h*<sup>2</sup>. *m*<sup>2</sup> is a circular end to the lock, resting in a corresponding socket of the clamp on the outer side of the wheel to keep the lock in place. *n*<sup>2</sup> is a notch or offset made in the eye of the hub. When the wheel is turned so that this notch or offset comes into engagement with the lock, the shoulder of the hub formed by the notch will strike against the upward-projecting edge *h*<sup>2</sup> of the lock, and the fly-wheel will then give motion to the driving-shaft; but when the lock is turned down into the socket of the shaft, so as to lie flush, then the fly-wheel will turn free on the shaft without giving motion to it.

W is a crank-arm pivoted under and just outside of the disk J. With the outer end of this crank-arm connects a rod extending in any desired manner to a treadle within convenient reach of the foot of the operator. A



spring is attached to the crank-arm to produce the desired reaction. In its normal position the upper end of the crank-arm stands out of the path of the arm  $i^2$ , so that the latter runs free; but when the foot is pressed upon the treadle the end of the crank-arm comes under said arm  $i^2$ , and the latter is pressed back, forcing the lock  $g^2$  into its seat, and releasing the fly-wheel from the driving-shaft, so that the machine instantly stops, notwithstanding the fly-wheel continues its revolutions.

The value of this device is that it is much more sensitive than ordinary devices for stopping machinery, and enables the operator to have perfect control of the machine.

Having thus described my invention, what I claim herein as new is—

1. In a machine for forming cartridge-cases, the combination, with the form E, provided with the shear-edges  $l\ l$ , of the cutters I I, on opposite sides of said shear-edges, arranged to trim or cut the rough edges of the case by a

closing movement of the cutters past the shear-edges, as specified.

2. In a machine for forming cartridge-cases, the combination of a form or pattern on which the half-case is struck, a punch or die which fits said form or pattern to strike the half-case, and laterally-moving cutters in the rear of the form, which trim the edges of the half-case when formed, as specified.

3. In a machine for forming cartridge-cases, the combination, with the form E and side cutters, I I, of the holes or passages  $m\ m$  in the rear of the form for the discharge of the shavings from the cutters, as specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRY H. BARNARD.

Witnesses:

R. F. OSGOOD,  
JACOB SPAHN.