(No Model.) 3 Sheets—Sheet 1.

W. LORENZ.

MACHINE FOR TREATING CARTRIDGE SHELLS.

No. 294,055. Patented Feb. 26, 1884.

Fig. 1.

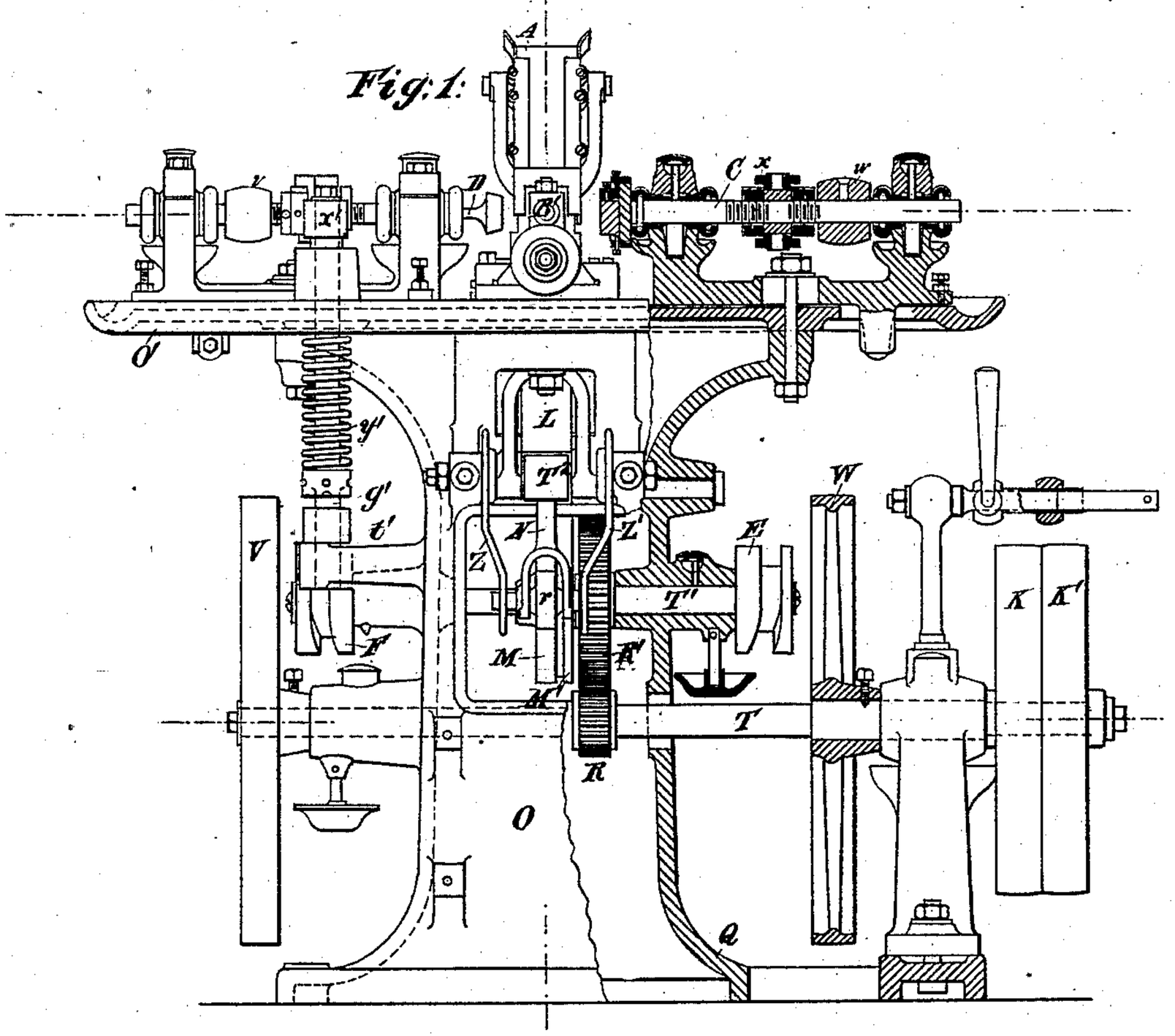
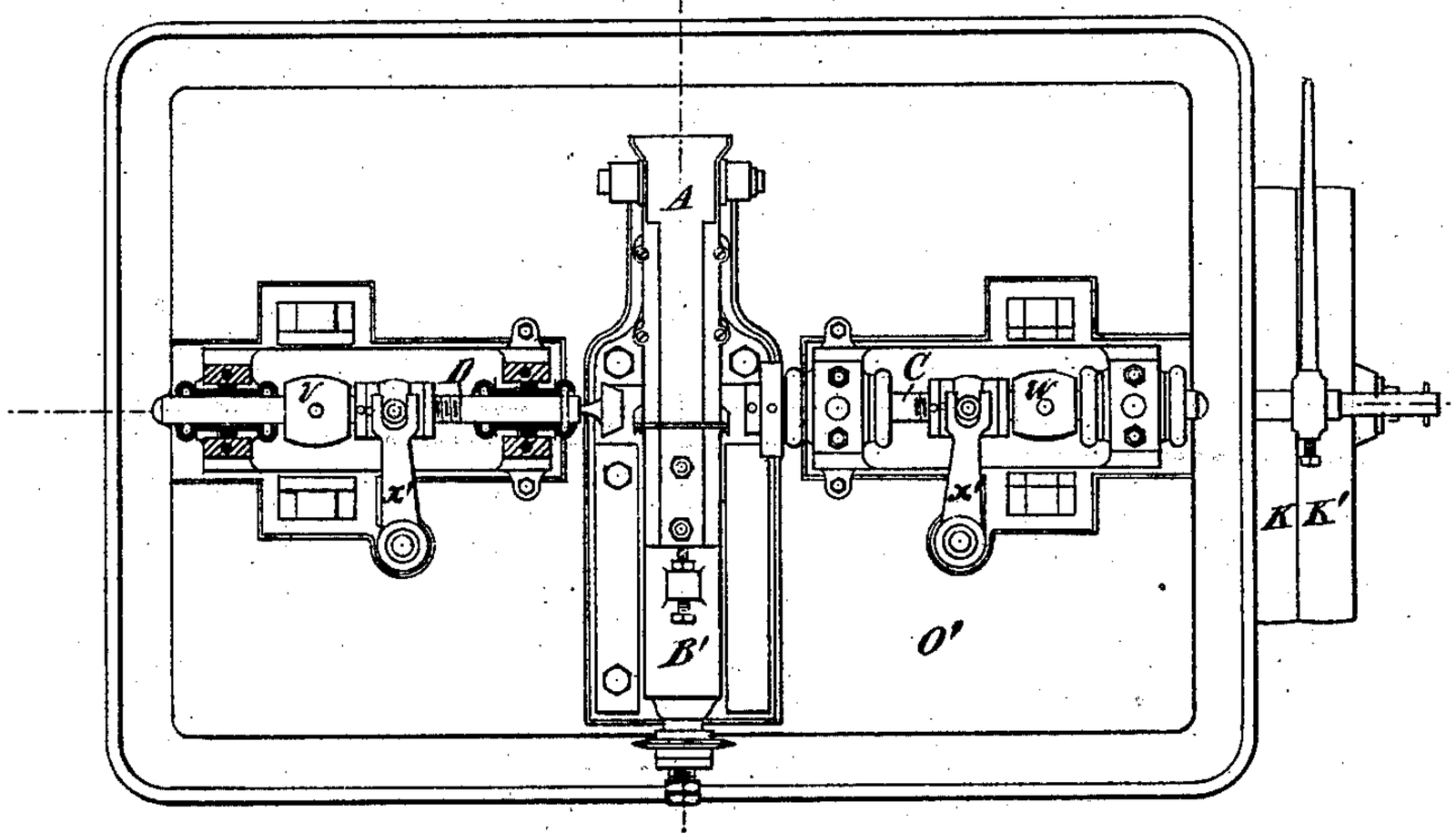


Fig. 2.



Witnesses
C. Groners
A. Strathmann

Inventor
Wilhelm Lorenz

(No Model.) 3 Sheets—Sheet 2.

W. LORENZ.

MACHINE FOR TREATING CARTRIDGE SHELLS.

No. 294,055. Patented Feb. 26, 1884.

Fig: 3:

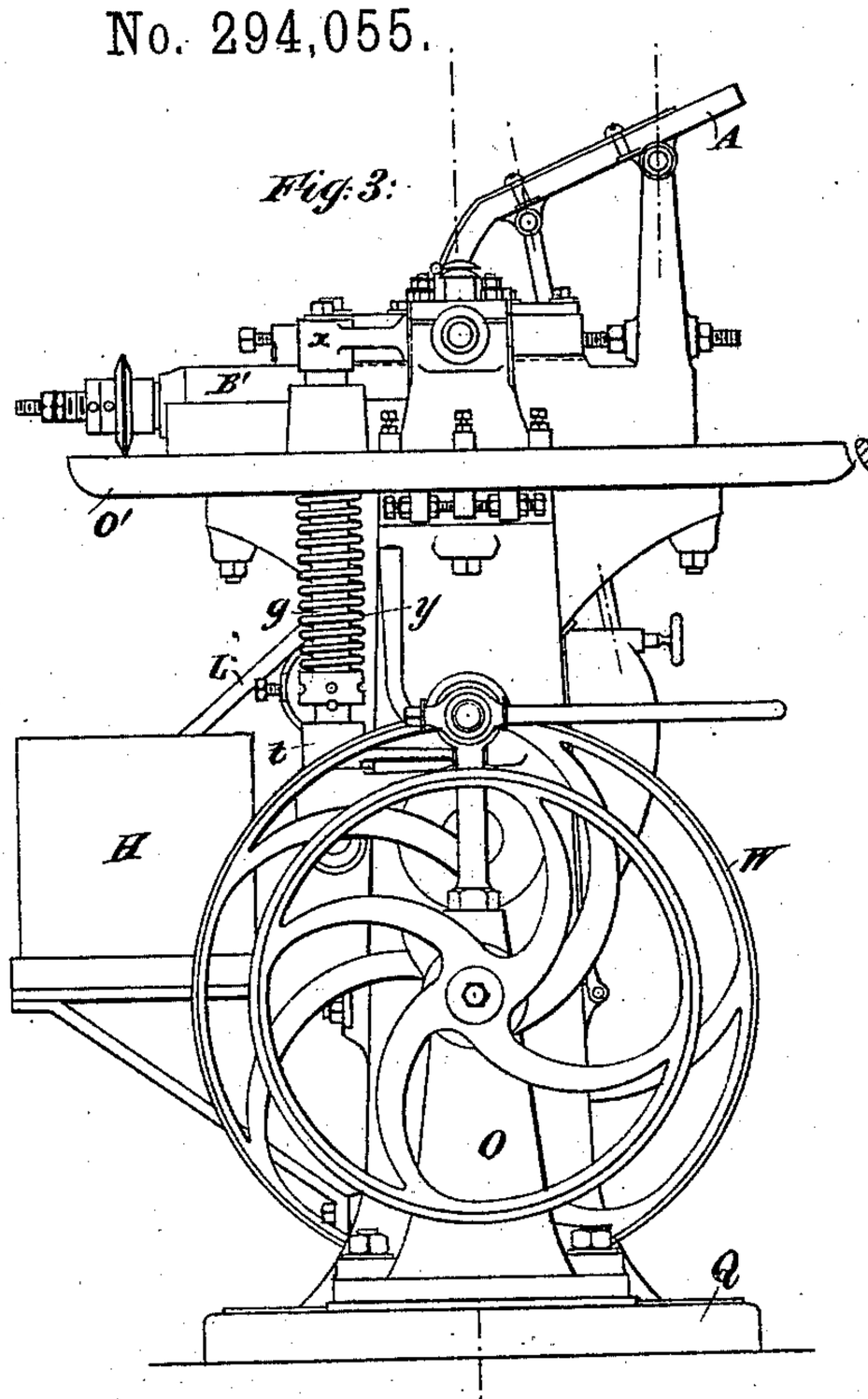


Fig: 4:

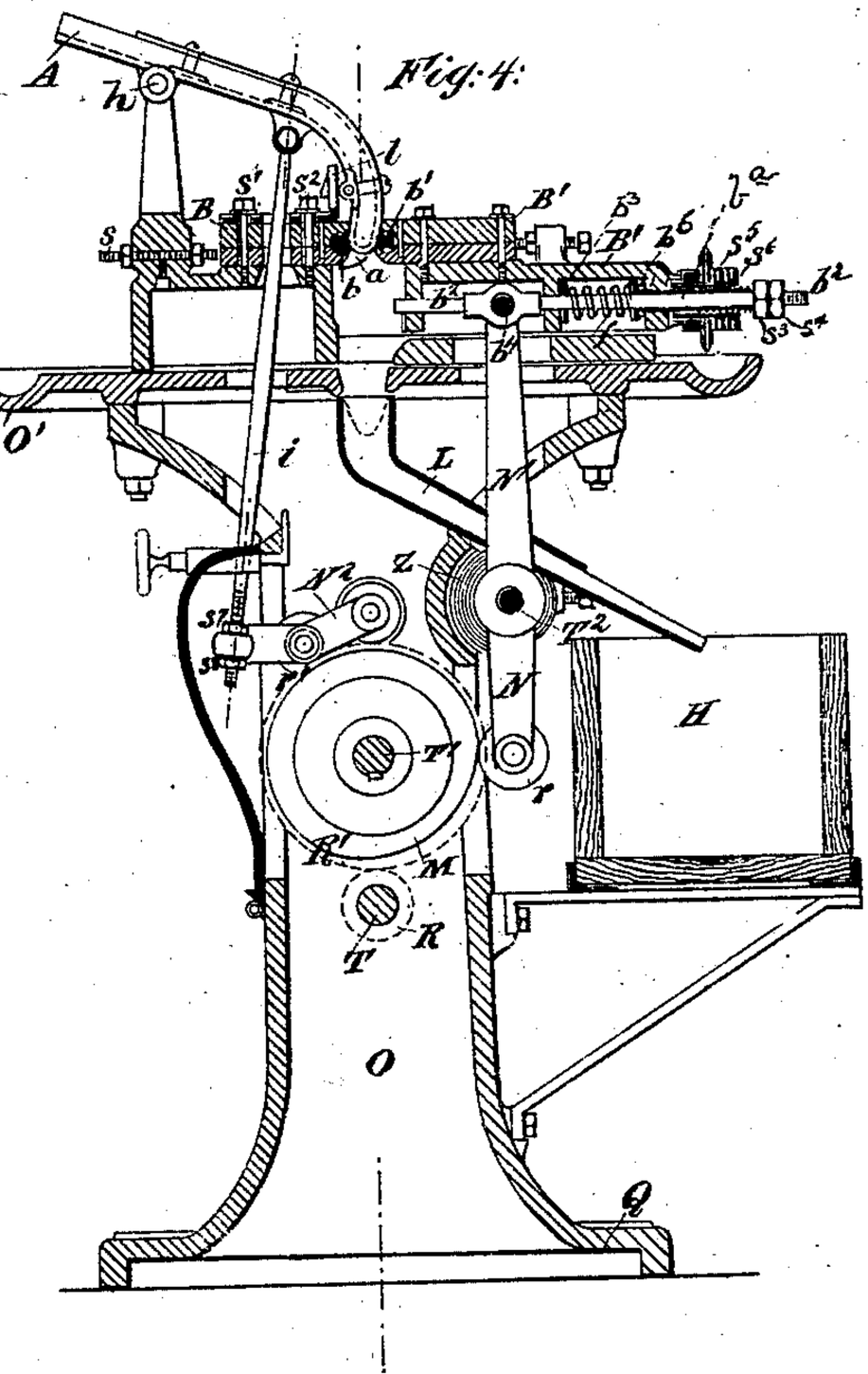


Fig: 5:

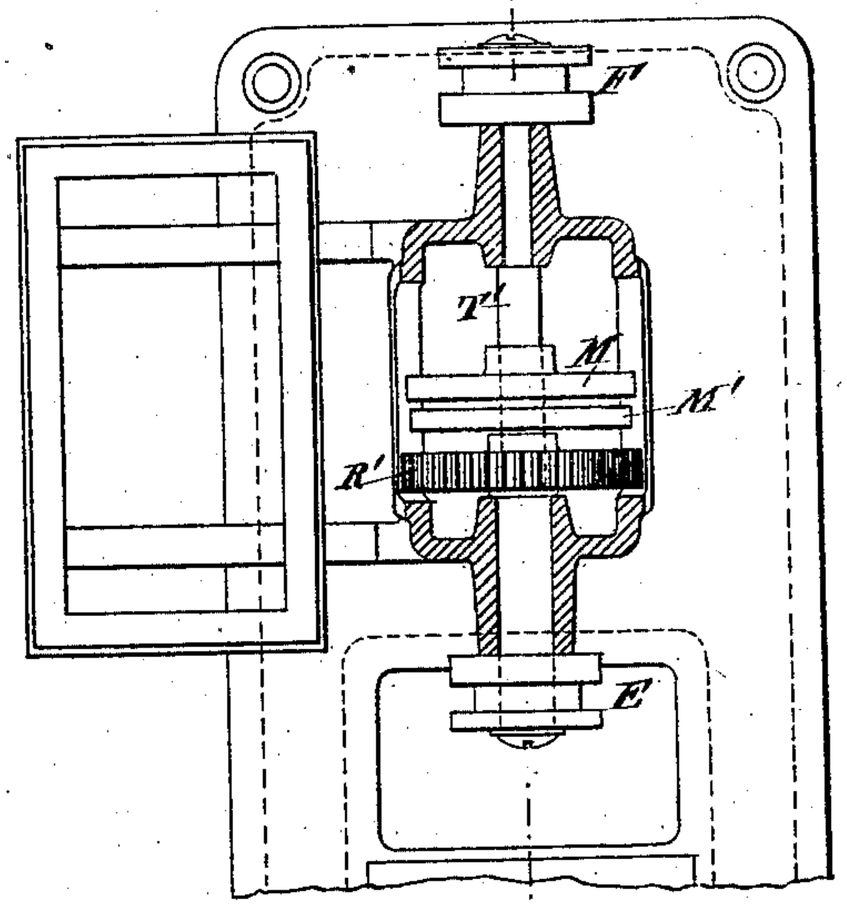
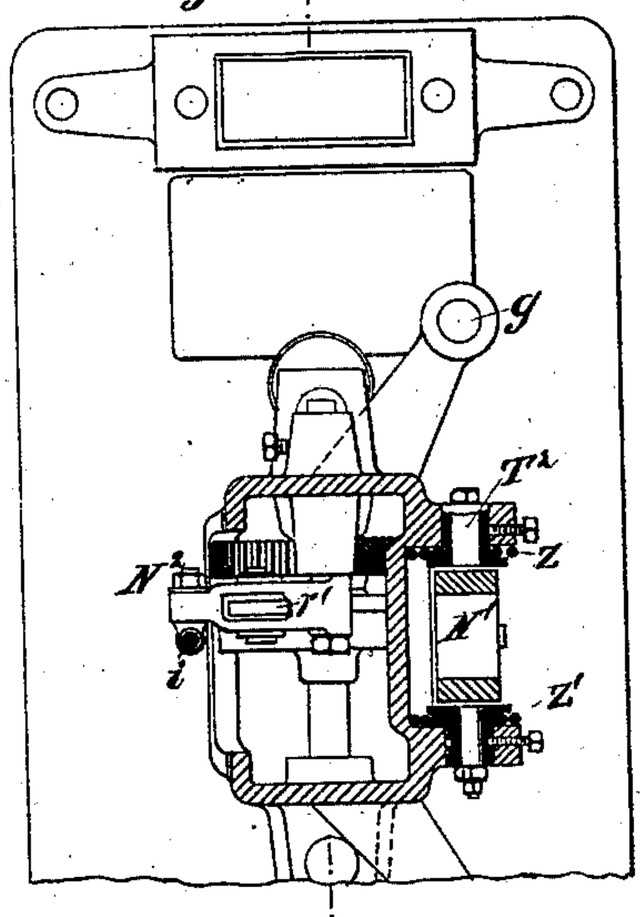


Fig: 6:



Witnesses
C. Gronert
A. Strathmann

Inventor
Wilhelm Lorenz

(No Model.) 3 Sheets—Sheet 3.

W. LORENZ.

MACHINE FOR TREATING CARTRIDGE SHELLS.

No. 294,055. Patented Feb. 26, 1884.

Fig: 7.

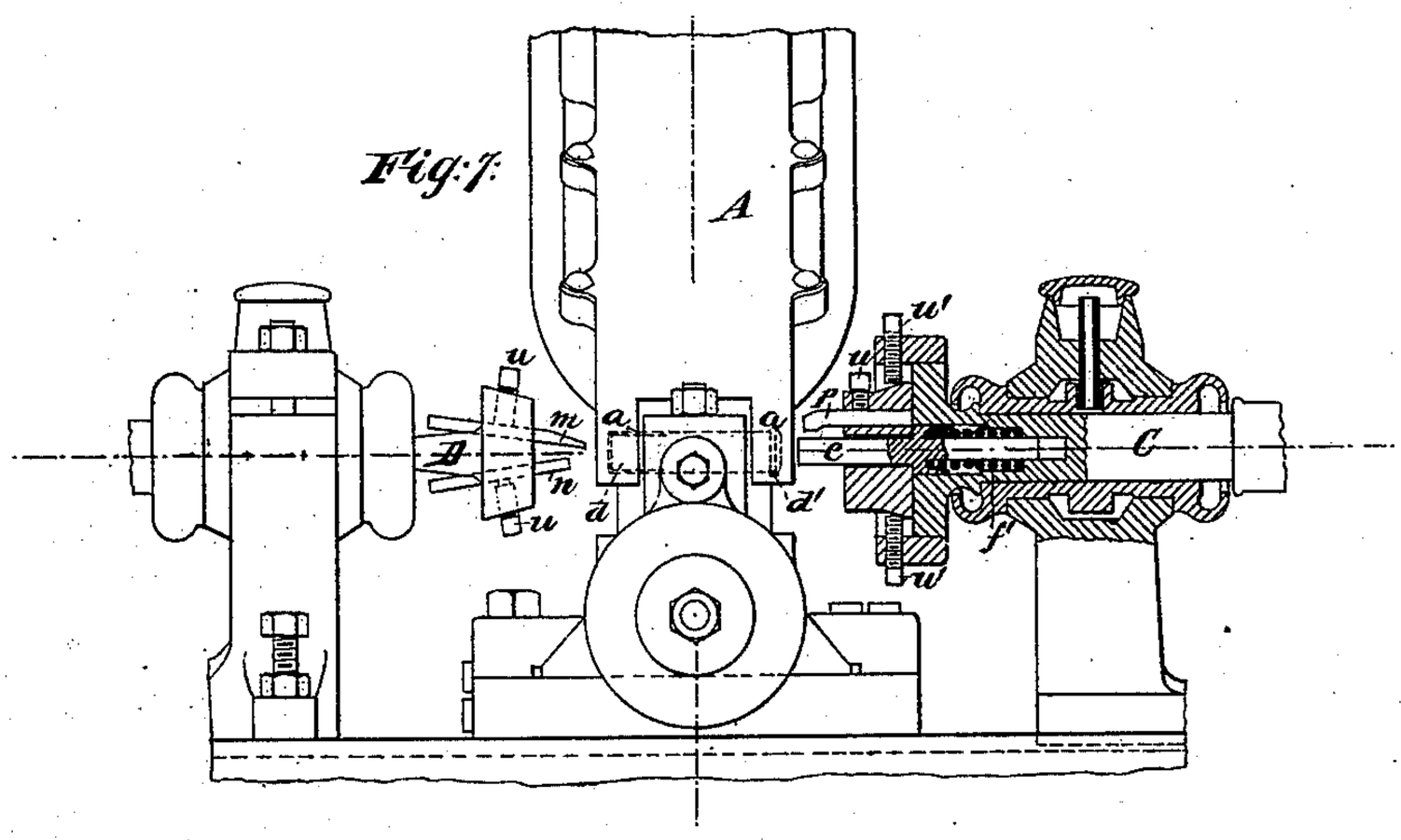


Fig: 4a.

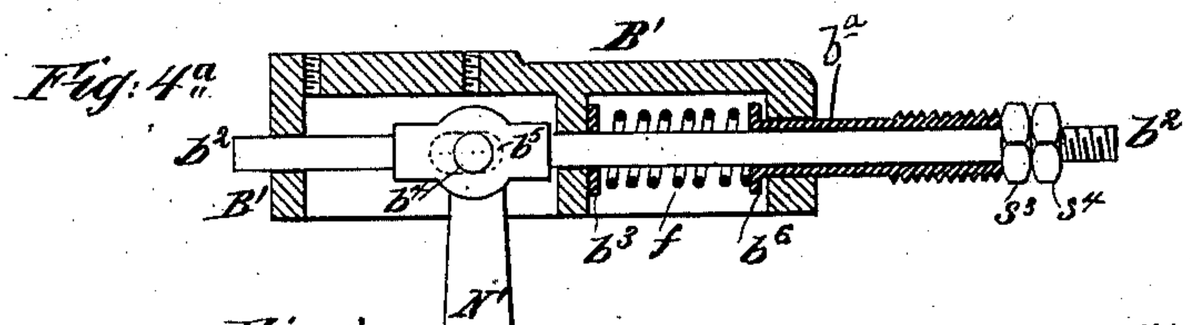


Fig: 8.

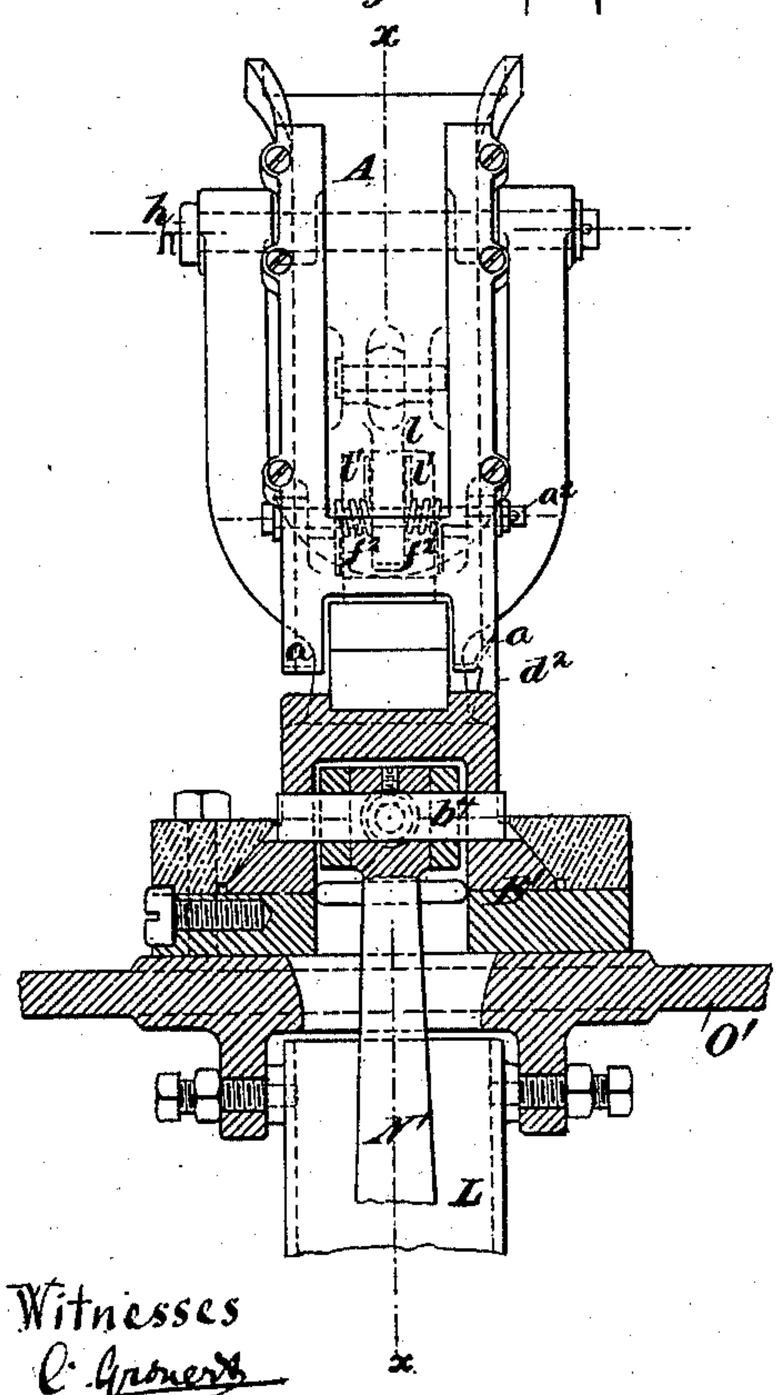


Fig: 10.

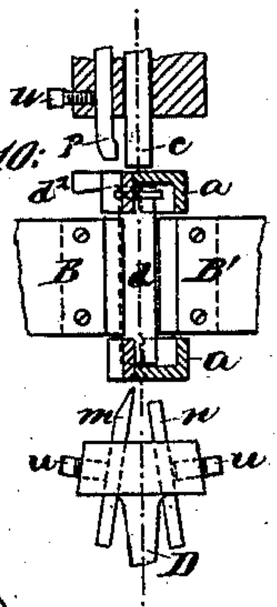
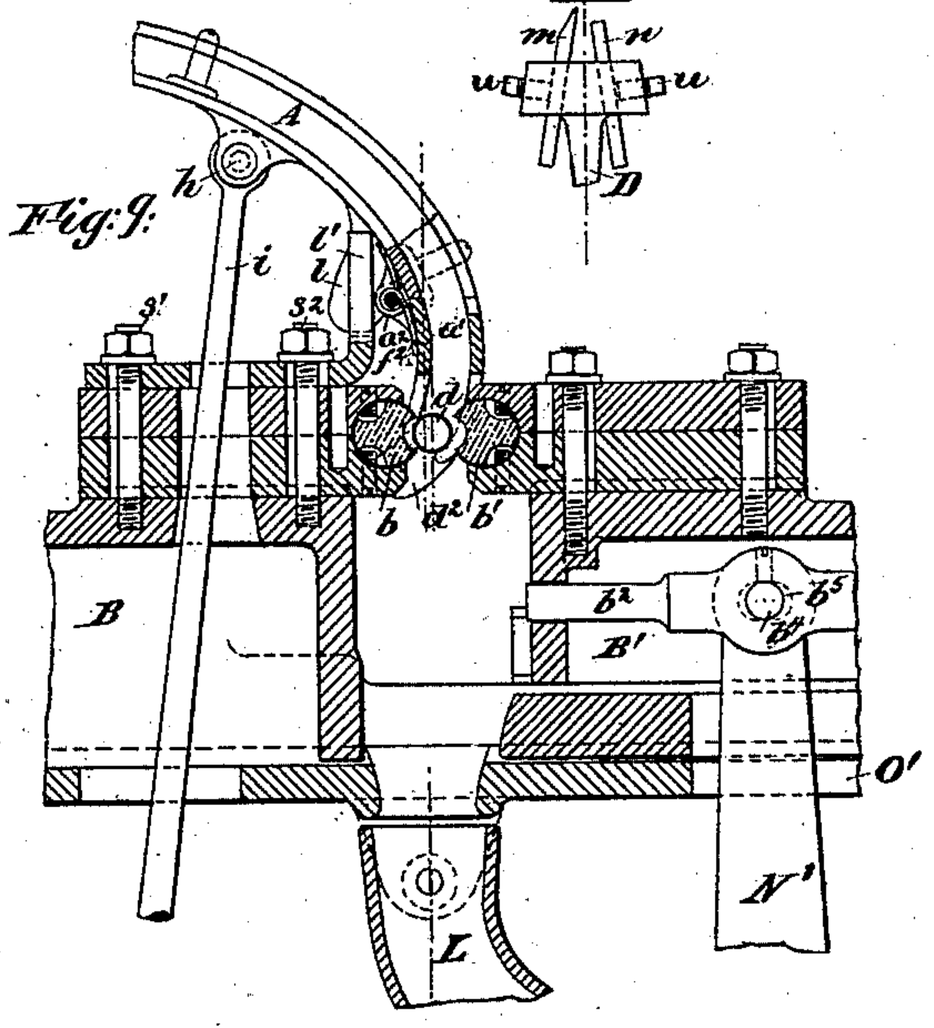


Fig: 9.



Witnesses
C. Gronert
A. Strathmann

Inventor
Wilhelm Lorenz

UNITED STATES PATENT OFFICE.

WILHELM LORENZ, OF CARLSRUHE, BADEN, GERMANY.

MACHINE FOR TREATING CARTRIDGE-SHELLS.

SPECIFICATION forming part of Letters Patent No. 294,055, dated February 26, 1884.

Application filed June 10, 1882. (No model.) Patented in Germany June 29, 1881, No. 17,333; in France August 26, 1881, No. 144,574; in Belgium October 3, 1881, No. 55,879; in England December 6, 1881, No. 5,323, and in Austria-Hungary January 5, 1882.

To all whom it may concern:

Be it known that I, WILHELM LORENZ, of Carlsruhe, in the Grand Duchy of Baden, German Empire, have invented certain new and useful Improvements relating to Machines for Treating Cartridge-Cases, of which the following is a specification.

This invention relates to improved machinery for simultaneously broaching or rimming and cutting and trimming both ends of cylindrical metal cases, more particularly adapted to the treatment of cartridge-cases, and also for expanding such ends at the same time where required, the case being automatically held firmly and securely at its middle during the operation. The machine effects automatically the adjustment and trimming of the cartridge or other case to the exact length required, the advance and withdrawal of the cutters, and the discharge from the machine of the finished article. For these purposes the cartridge-cases or similar articles to be treated are introduced into an inclined and curved chute, in which they descend, arriving at the bottom between two slides having steel cheeks at their inner ends, suitably formed for seizing and holding the cases. One slide is adjusted in position by a screw, and is then secured by other set-screws. The other slide is actuated by a cam and levers in such manner that the cartridge-case on passing between the cheeks is pressed by the cheek of the last-named slide against the other one, so as to hold it firmly during the broaching operation. For accurately adjusting the extent of motion of the reciprocating slide, the spindle, through which motion is imparted to it from the lever, is provided with adjustable screw-collars and spring-washers. Before the cartridge-case is secured firmly for the broaching operation, it is temporarily held by the action of a spiral spring, which causes the lever to impart its motion to the slide during the first part of the stroke, while during the latter part the lever bears directly on the slide through the before-mentioned spindle and collars. The said lever is always kept with its end bearing with an anti-friction roller against the driving-cam by means of volute springs. For feeding the cartridge-cases between the cheeks of the slides, the chute is mounted near its upper end on a pivot, and its lower end has a spring-jaw, by which it temporarily holds the lowest cartridge-case. The chute, being held in a raised position, is lowered by the action of a lever operated by a cam and connecting-rod at the same time that the reciprocating slide is made to advance, so as to bring the lowest cartridge-case in the chute in position to be grasped by the cheeks of the slides as these close upon it. As soon as this has been effected by the spring action of the slide, the chute is raised by its cam, whereby its spring-jaw slips from the lowest cartridge-case, which is held by the cheeks of the slides. At the same time two lateral gage-plates on the chute, which extend below the jaw, accurately adjust the position of the cartridge-case laterally between the cheeks of the slides before it has been firmly grasped, and as the chute rises the spring-jaw closes upon the next following cartridge-case, holding it ready for the next descent. The connecting-rod that imparts motion to the chute is connected to its lever by a screw adjustment, so as to accurately regulate the motion of the chute. The chute is guided so as to be perfectly steady in its motion by means of a fixed guide, within which a projection on the chute works up and down. The broaching and expanding operations having been completed, the movable slide again recedes, allowing the cartridge-case to fall into a second chute, which delivers it into a receiving-box. The chute then again descends, and the slide advances for repeating the above-described operation. In the axial line of the cartridge-case, as this is held by the slides, are two spindles carrying the cutters and tools to operate on the ends of the case. These spindles are carried in bearings, and are so arranged as to be capable of advancing for operating on the cartridge-case when held by the slides, and then receding to allow it to drop. The cutters are held in chucks or heads on the spindle, accurately adjustable by set-screws. One spindle carries a central sliding pin held by a spring, so that as the spindle advances the pin abuts against the end of the cartridge-case and pushes it so as to bear with

its rim against a collar on the slide, preparatory to causing the cutter of the spindle to cut or trim all the cases to a uniform length. The forward motion of the cutter-spindle for this purpose is effected just before the final nip is put upon the cartridge-case by the slides. It is preferred to employ this adjustment in combination with that effected by the gage-plates on the chute; but the one or the other adjustment may be employed alone. The adjustment and nipping of the cartridge-case being effected as above described, the cutter-spindles advance so as to bring the cutters into action on each end of the case, and rotary motion is imparted to them by pulleys and belts. The to-and-fro motion of the spindles is effected by means of cams acting on levers on the lower ends of vertical shafts whose upper ends have forked levers engaging with pins on loose collars on the spindles that are held between adjustable collars fixed thereon. The vertical shafts are acted upon by helical springs tending to turn them, so as to withdraw the spindles when the cutting operation is completed. The shaft carrying the last-named cams and cams for actuating the slide, as above described, is geared by spur-gearing to a driving-shaft having fast and loose pulleys driven from any convenient motor.

The above-described mechanism is mounted on a pedestal-stand, permitting free access to all sides of the machine.

The construction of the said machine will be readily understood on reference to the accompanying drawings, which form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a front elevation of the machine, partly in section; Fig. 2, a plan view, partly in section. Fig. 3 is a side elevation of the machine. Fig. 4 is a central vertical section at right angles to Fig. 1. Fig. 4^a is an enlarged detail section of parts shown in Fig. 4. Fig. 5 is a horizontal section of the framing. Fig. 6 is a sectional plan taken somewhat above that at Fig. 5. The remaining figures represent details on a larger scale. Fig. 7 is a front view, partly in section, of the chute and cutters; Fig. 8, a front view of the chute and section of the reciprocating slide; Fig. 9, a central vertical section on the line x x in Fig. 8; and Fig. 10 is a plan view, partly in section, showing the chute and slides and tools for treating the ends of the cartridge-case.

Similar letters of reference indicate corresponding parts in all the figures.

Q represents the base of the framing. O is an upright pillar or hollow stem, and O′ a table or extended head at the top thereof. The mechanism is mounted upon these parts.

The cartridge-cases or other articles, d, Figs. 7, 9, and 10, to be operated upon, are introduced into the chute A, from which they pass one at a time between the slides B and B′, which have at their inner ends suitably-formed cheeks, b b', for seizing and holding firmly a case, d. The slide B is adjusted to the required position by the regulating-screw s, and is there secured by the screws s' s^2. The slide B′ is reciprocated to and fro, actuated by the lever N N′ and cam M in such manner that the case d, on passing between the cheeks b b', is pressed by the cheek b' firmly against b, so as to hold it securely while it is subjected to the cutting-tools.

For accurately adjusting and determining the length of the stroke of the slide B′, the spindle b^2 thereof carries adjusting screw-nuts s^3 s^4 and s^5 s^6, as also the loose washer b^3 and collar b^6. The washer b^3 is loose upon the rod b^2. The collar b^6 has a sleeve, b^a, attached to it, which passes through the end of the slide B′, is screw-threaded, as shown, and is fitted with the set-nuts s^5 s^6, which bear against the end of the slide, and serve to set the collar b^6 in or out upon the rod b^2. The set-nuts s^3 s^4 engage with threads upon the rod b^2, and bear against the end of the sleeve b^a, and thus serve to set the rod b^2 out or in.

Before the article d is firmly grasped by the slides, it is held loosely by the action of the spring f on the advance of the slide. The pin b^4, by which the lever N′ is connected to the rod b^2, has for this purpose a certain amount of play for its projecting ends in slotted holes b^5 of the slide B′, as at Figs. 4 and 9, so that the pressure of the advancing lever is first conveyed to the slide through the medium of the spring f only, causing the cheek b' to grasp the article for a time with a yielding hold, during which time the article can be accurately adjusted in position between the cheeks. On the further advance of the lever the spring f is further compressed until the pin b^4 abuts against the end of the slot b^5, so that the slide is now acted upon directly by the lever, so as to effect the forcible holding of the article. The lever N N′ is kept with its roller r always pressed against the cam M by means of volute springs Z Z′. The lever is composed of two arms, N N′, fixed on the same shaft T^2, which form practically a single lever, the upper arm, N′, being forked, so as to allow the discharge-chute L to pass through it.

The transfer of the articles d from the chute A to the cheeks b b' is effected simultaneously with the advance of the slide B′. The chute A is for this purpose pivoted at h, and is raised by means of the rod i at the moment when the article d is held loosely by the action of the spring f, as before described. By this movement the jaw a', Fig. 9, of the chute A is caused to open, turning on the pin a^2, and allow the article d, which has been held by the cheeks to slide off, after which the jaw immediately closes again by the action of the springs f^2 f^2, thereby grasping the next lowest article in the desired position at the end of the chute and preventing it from falling out. As the chute A rises, the gage-plate d^2, projecting down from its lower end, presses against the end of the article d, and adjusts

it longitudinally between the cheeks *b b'*, as indicated in Figs. 8, 9, and 10, whereupon the cheeks *b b'* close firmly upon the article, and the cutters are brought into operation, during which time the chute A remains raised.

To allow of the closing together of the cheeks *b b'*, to seize the article held by its jaw while the chute A is lowered, the chute is cut out, as shown in Figs. 9 and 10. The rod *i*, by which the chute is raised, is actuated by the lever N^2, whose roller *r'* bears against the cam M'.

For the accurate adjustment of the chute A, the rod *i* is adjusted relatively to the lever N^2 by means of the screw-nuts S^7 S^8. At the back of the chute is a projection or stud, *l*, that slides within a fixed guide, *l'*, as the chute is moved up and down, so as to prevent any lateral motion of the chute and insure the accurate action of the gage-plate d^2. On the cutting of the article being completed, the slide B' recedes and allows the article to fall into the discharge-chute L, whence it passes into the box H; at the same time the chute A descends to its lowest position again, so as to bring the axis of the next article *d* held thereby in line with the axis of the cutter-spindles, and between the cheeks *b b'*, whereupon the latter seize the said article, and the above-described operation is repeated.

The cutting operation takes place as follows: Simultaneously with the advance of the slide B' the spindles C and D, carrying the cutting-tools, also advance toward the ends of the article *d*. The tools marked *m*, *n*, and *p* revolve with their spindles, and are accurately adjusted in the heads or chucks on the latter by means of the screws *u u'*. The spindle C has a central pin, *c*, pressed forward against a collar by the spring *f'*. On the advance of the spindle this pin butts against the end of the article *d*, and pushes it while still held loosely between the cheeks *b b'*, so as to bring the rim on the article against the face of the cheek. By this means the cutting of all the articles to a uniform length is insured. This adjustment having been completed, the cutter-spindles further advance, so as to bring the cutters *m*, *n*, and *p* into action, the spring *f'* of the pin *c* being compressed during such motion. The spindles C and D are rotated by belts on the pulleys V *v* and W *w*, and are caused to advance by the action of the cams E and F upon levers *t t'* on vertical axes *g g'*, having other levers, *x x'*, on their upper ends, that are connected with the spindles C and D. The backward motion of the latter is effected by the helical springs *y y'* on the axes *g g'*, tending to turn these against the action of the cams. The shaft T' is driven by the spur-gearing R R' from the main shaft T, the latter being provided with fast and loose pulleys K K', driven by a belt from any convenient mill-shaft or motor-engine.

I claim as my invention—

1. The feed mechanism for the cartridge-cases, consisting of the pivoted chute A, having a spring-jaw, *a*, and gage-plate d^2, in combination with the rod *i*, lever N^2, and cam M', as set forth.

2. The combination of the cheeks *b b'*, slides B B', and adjusting means therefor with the spring *f*, levers N N', and cam M, as set forth.

3. In a cartridge-finishing machine, the combination of the slide B' and rod b^2 with the washer b^3, sleeve b^a, having collar b^6, and springs Z Z' and lever N N', as herein set forth.

4. The combination of the spindle C and spring-pin *c* with the cheeks *b b'*, substantially as herein set forth.

In testimony whereof I have hereunto set my hand, at Berlin, Prussia, this 1st day of February, 1881, in the presence of two subscribing witnesses.

WILHELM LORENZ.

Witnesses:
C. GRONERT,
BERTHOLD ROI.