

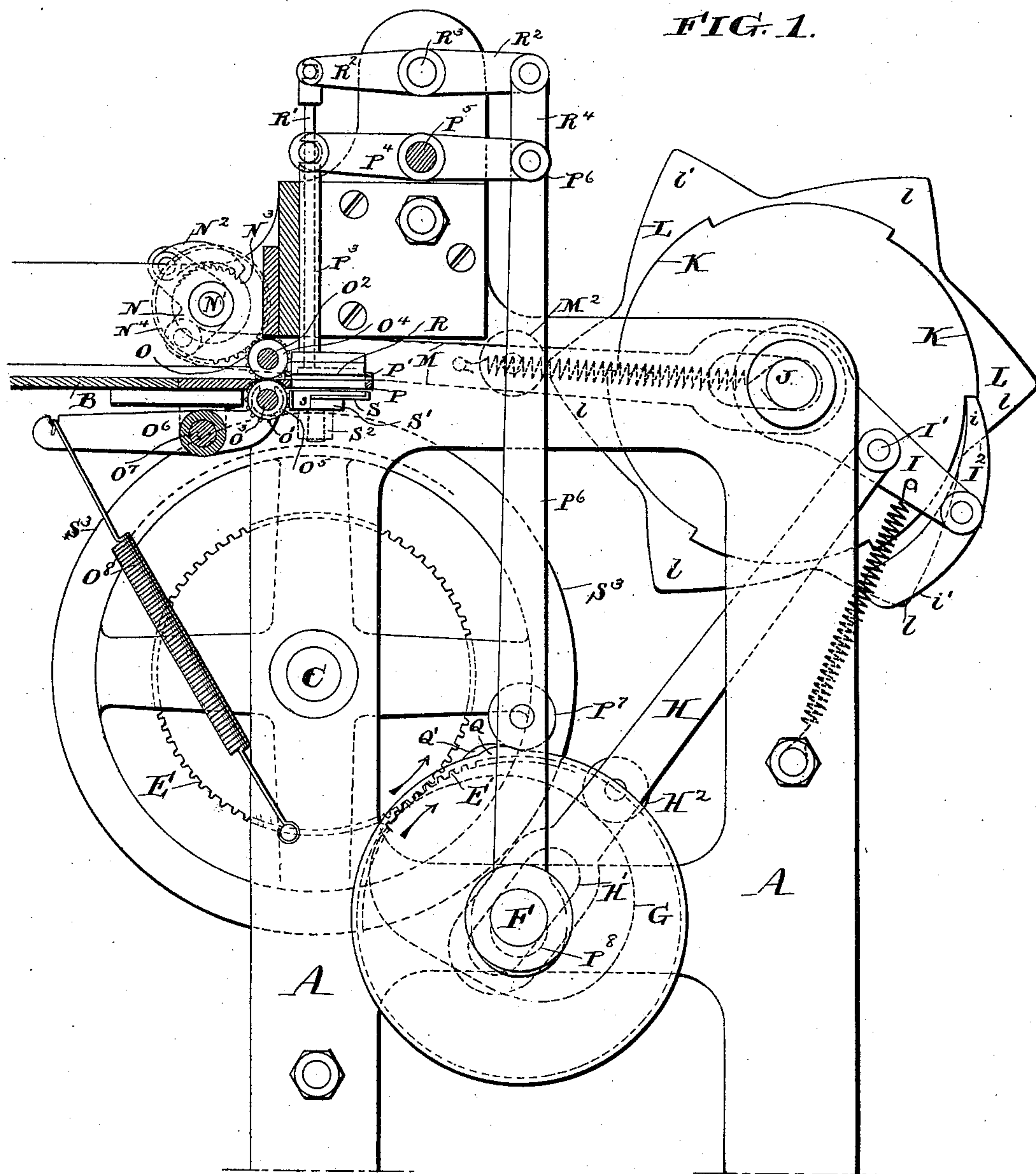
(No Model.)

4 Sheets—Sheet 1.

J. A. BONSAK.
CIGARETTE TUBE MACHINE.

No. 577,347.

Patented Feb. 16, 1897.



Witnesses:

Being Truly
J. Russell

Inventor:

James A. Bonsack
by his atty.
Francis T. Chambers

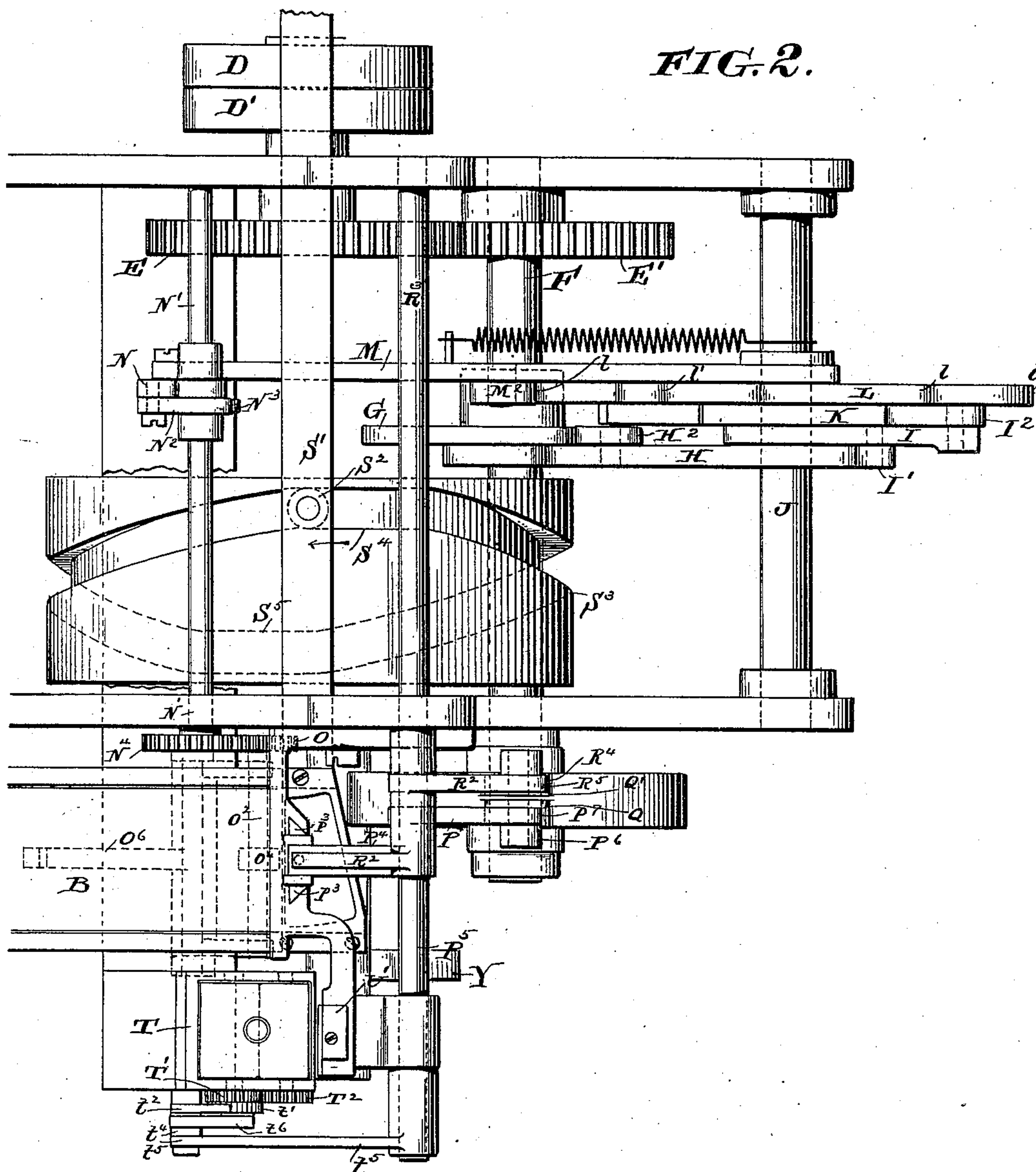
(No Model.)

4 Sheets—Sheet 2.

J. A. BONSAK.
CIGARETTE TUBE MACHINE.

No. 577,347.

Patented Feb. 16, 1897.



Witnesses:

Henry Denny
J. H. Russell.

Inventor:

James A. Bonack
by his atty
Francis T. Chamberlain

(No Model.)

4 Sheets—Sheet 3.

J. A. BONSAACK.
CIGARETTE TUBE MACHINE.

No. 577,347.

Patented Feb. 16, 1897.

FIG. 4.

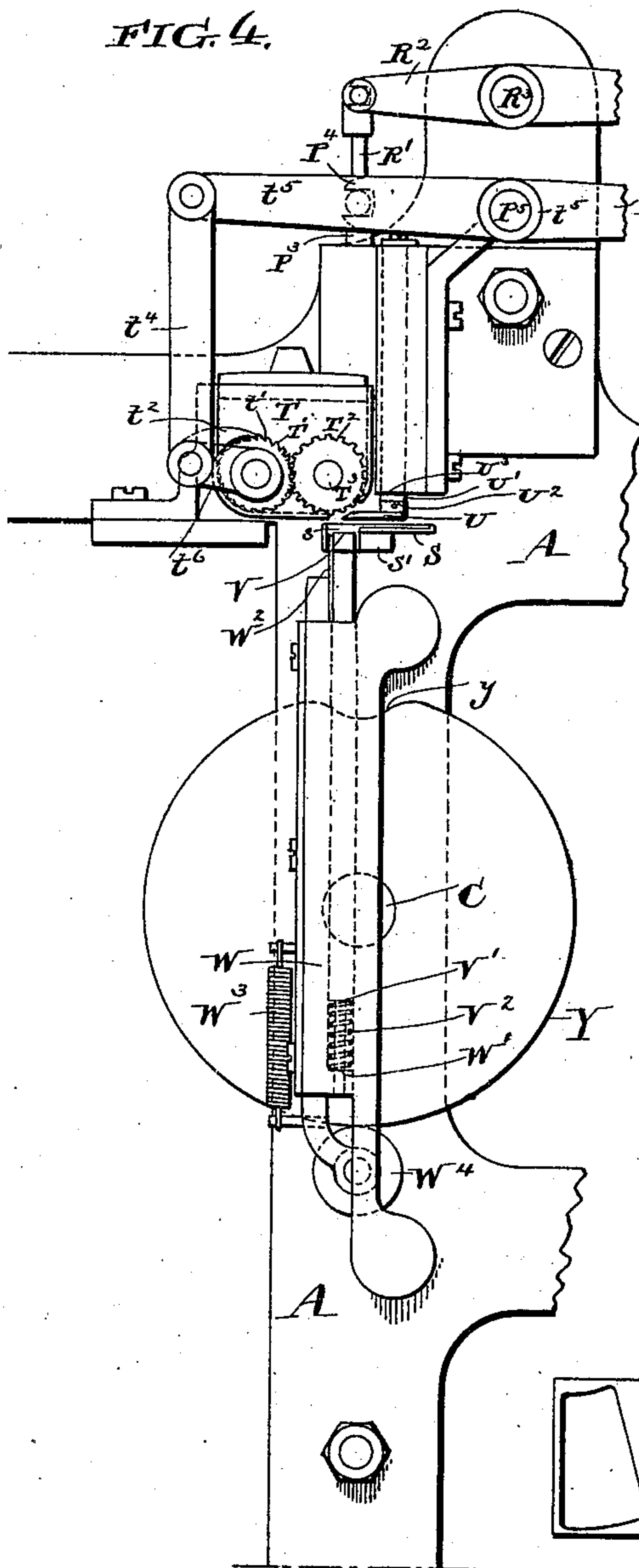


FIG. 3.

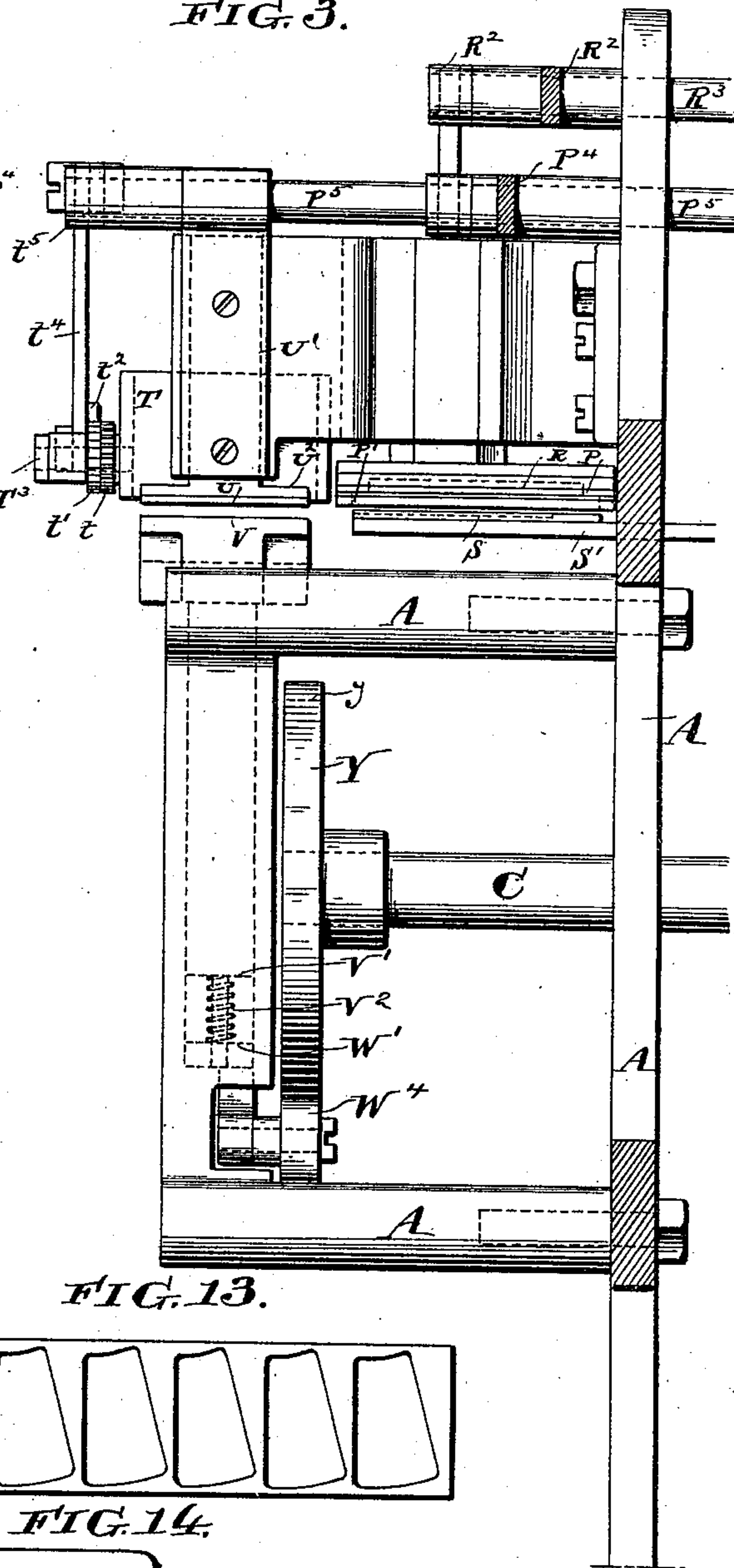


FIG. 13.

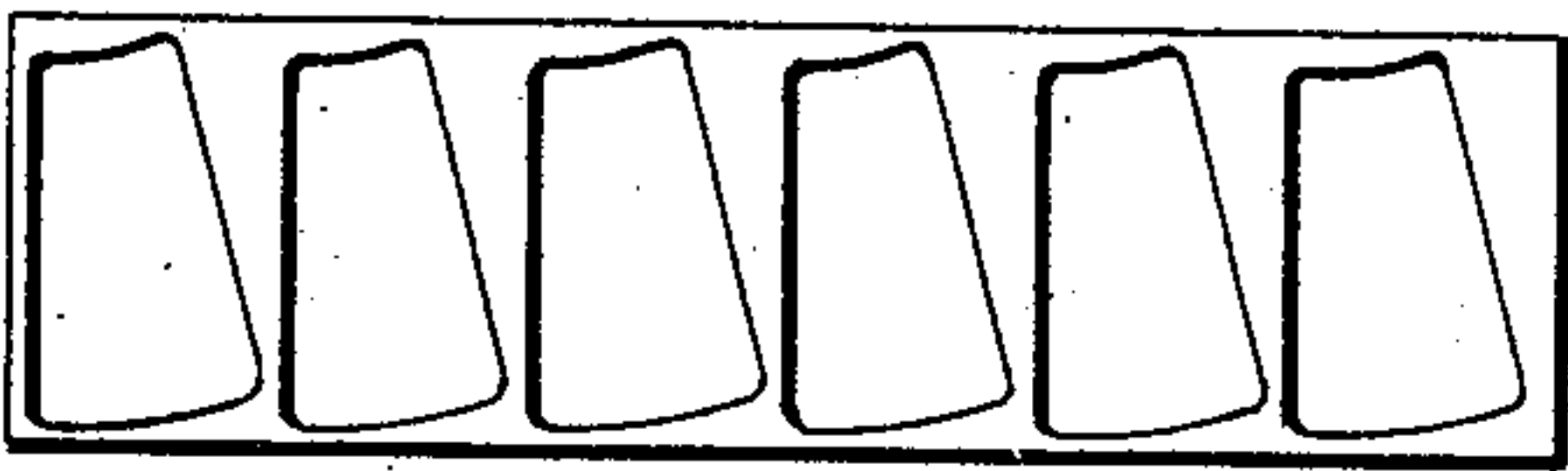


FIG. 14.

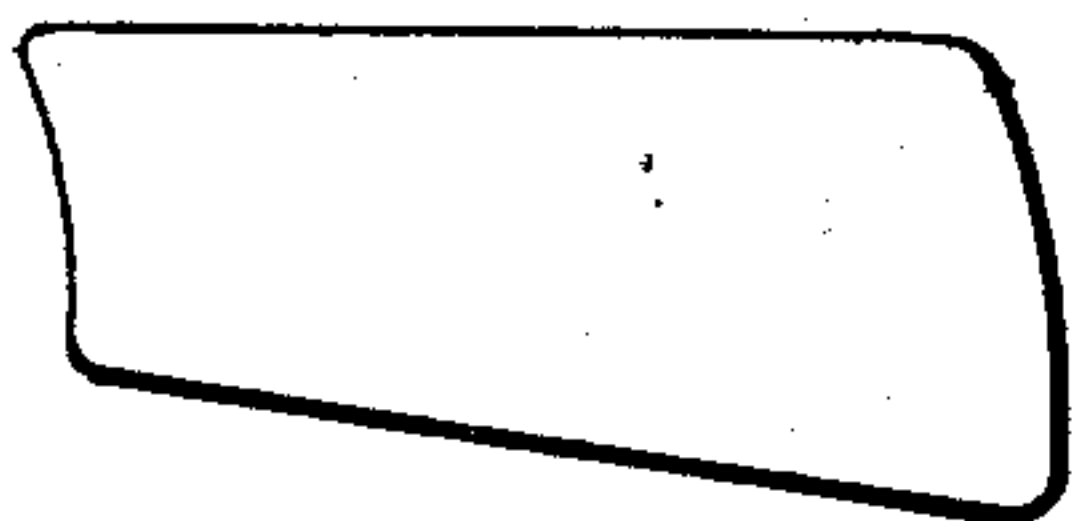


FIG. 15.

Witnesses:

Henry Damp
J. H. Russell

Inventor:

James A. Bonsack
by his atty.

Frederic T. Chambers

J. A. BONSACK.
CIGARETTE TUBE MACHINE.

No. 577,347.

Patented Feb. 16, 1897.

FIG. 5.

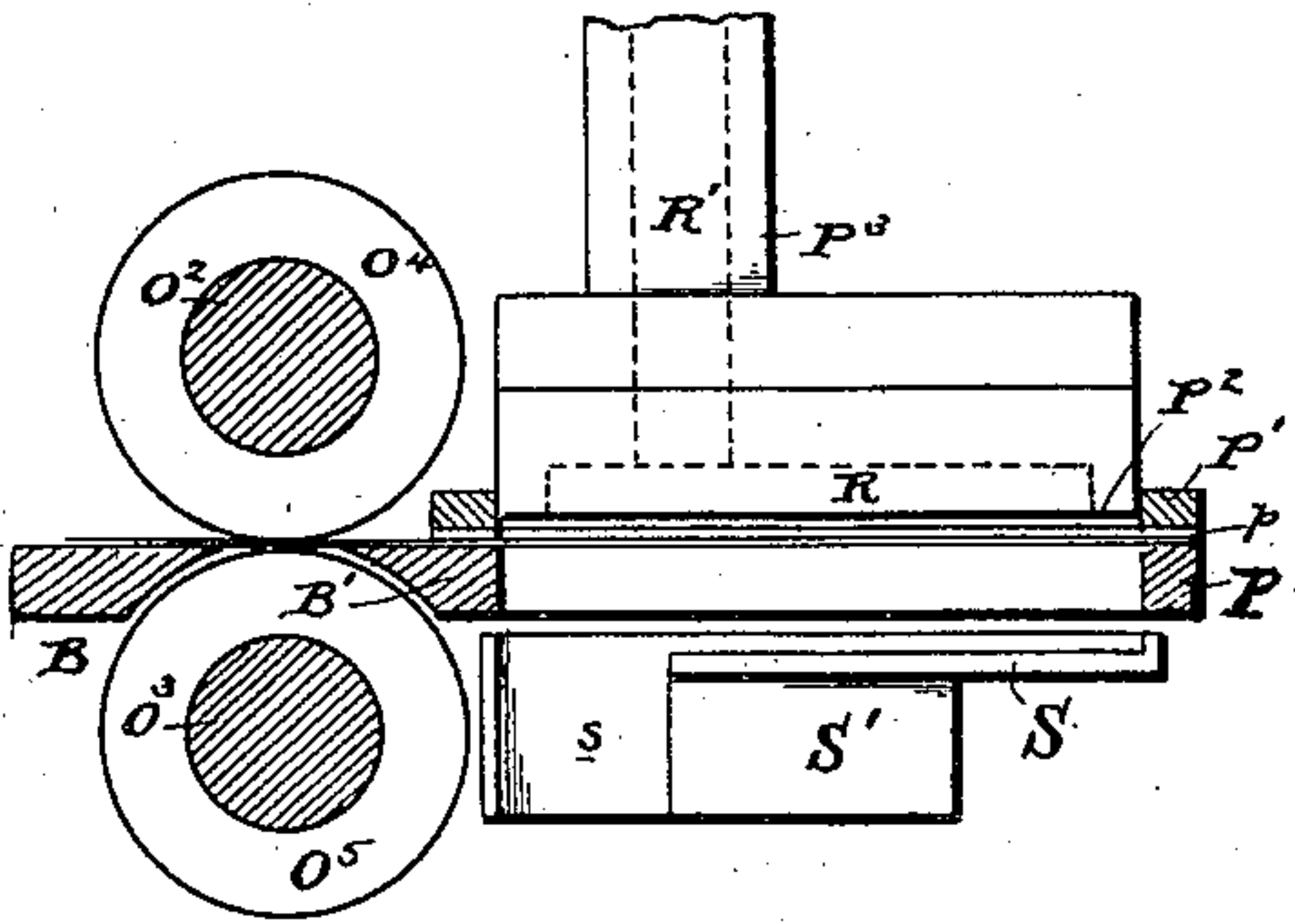


FIG. 6.

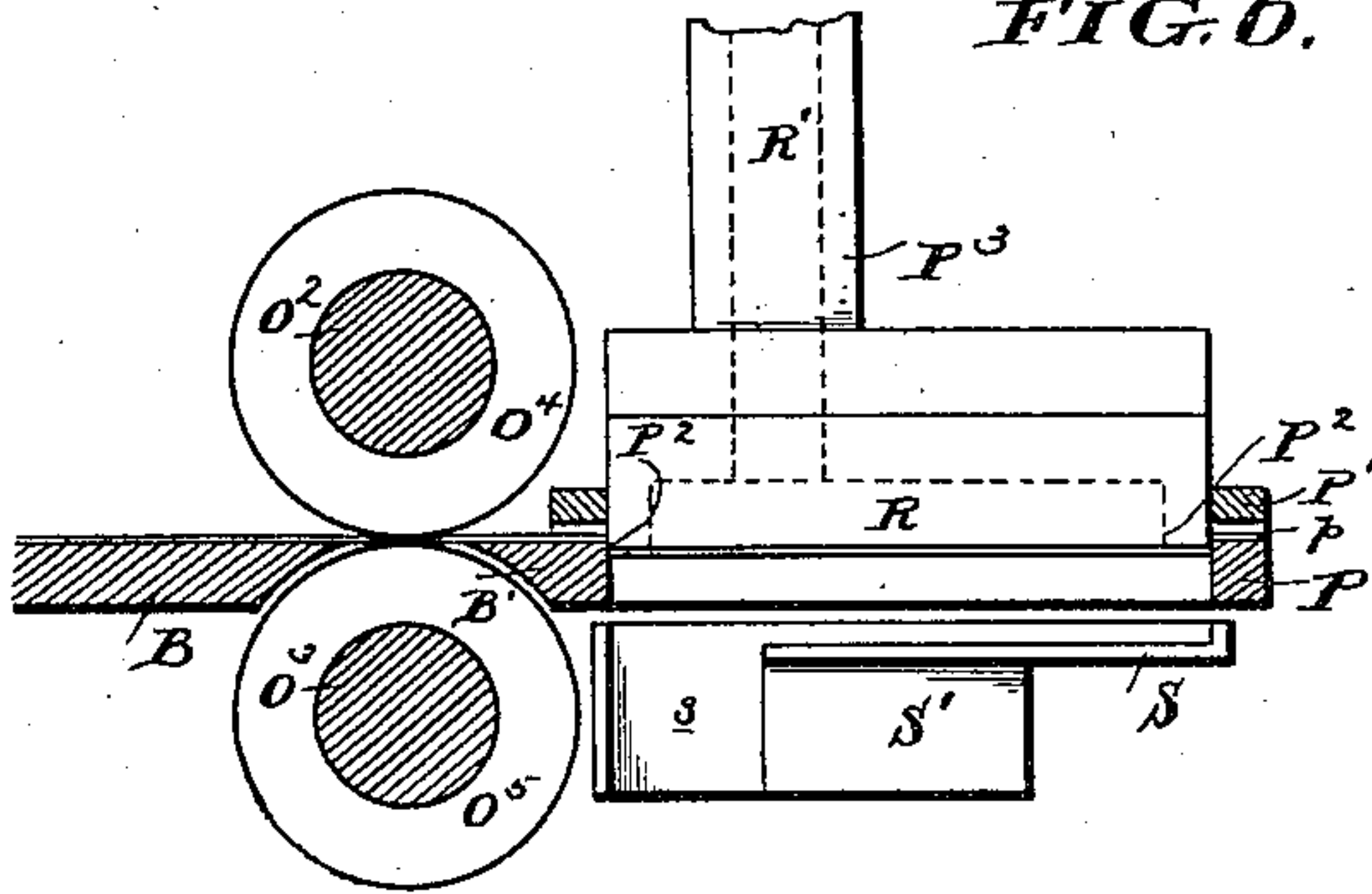


FIG. 7.

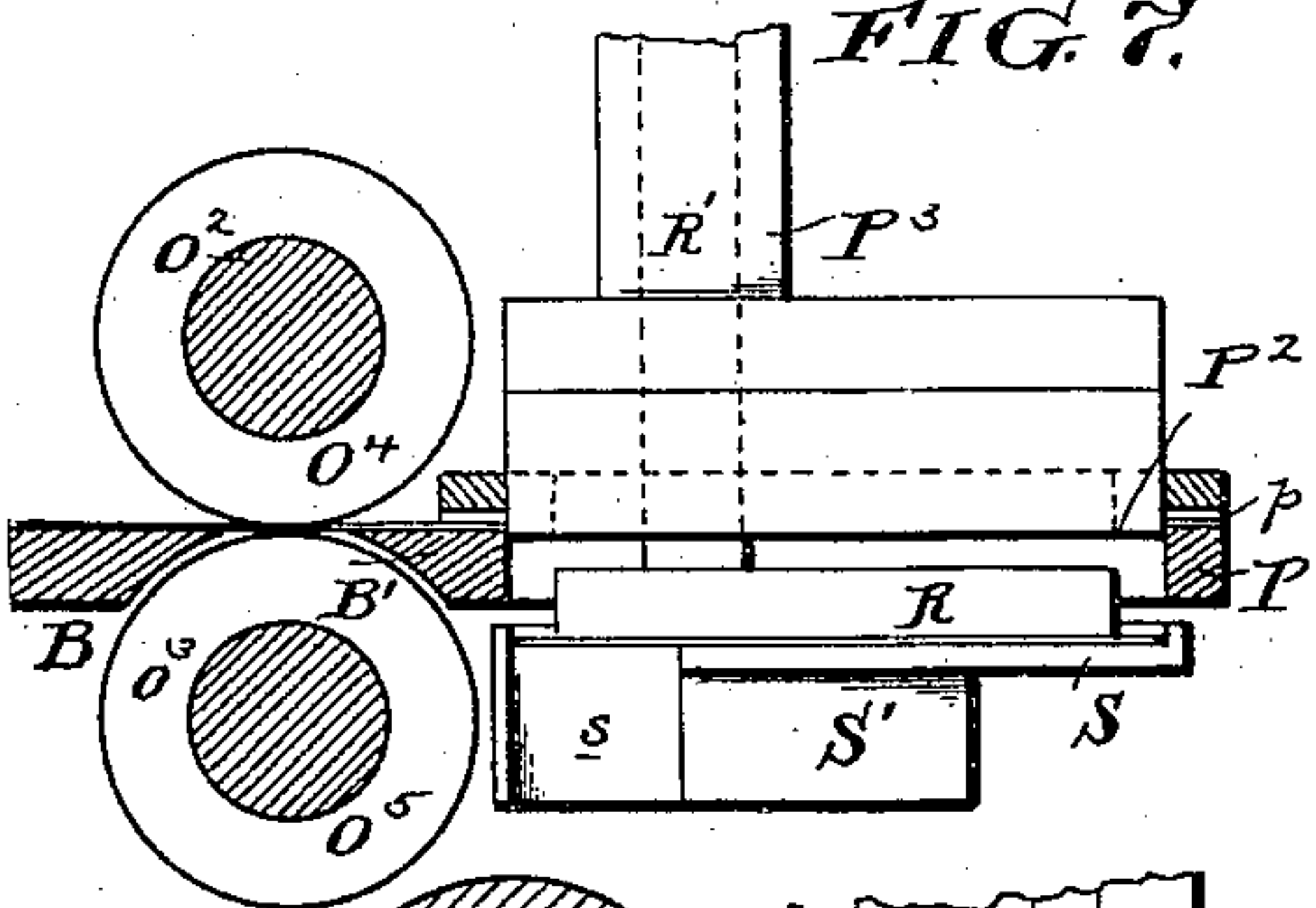


FIG. 8.

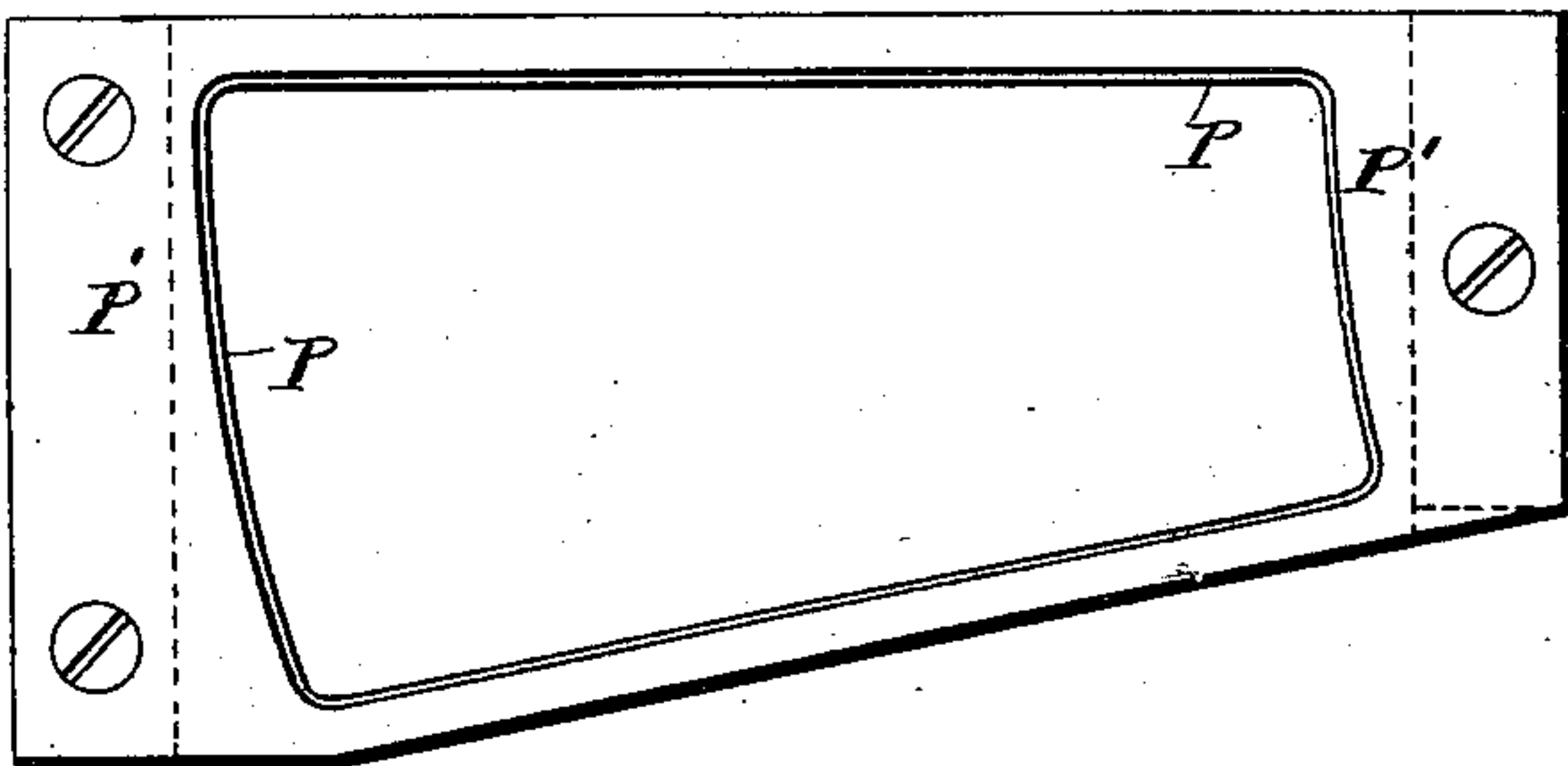


FIG. 9.

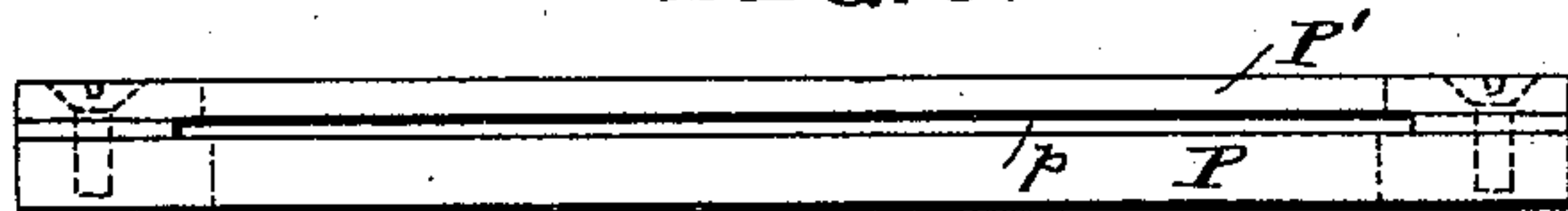


FIG. 10.

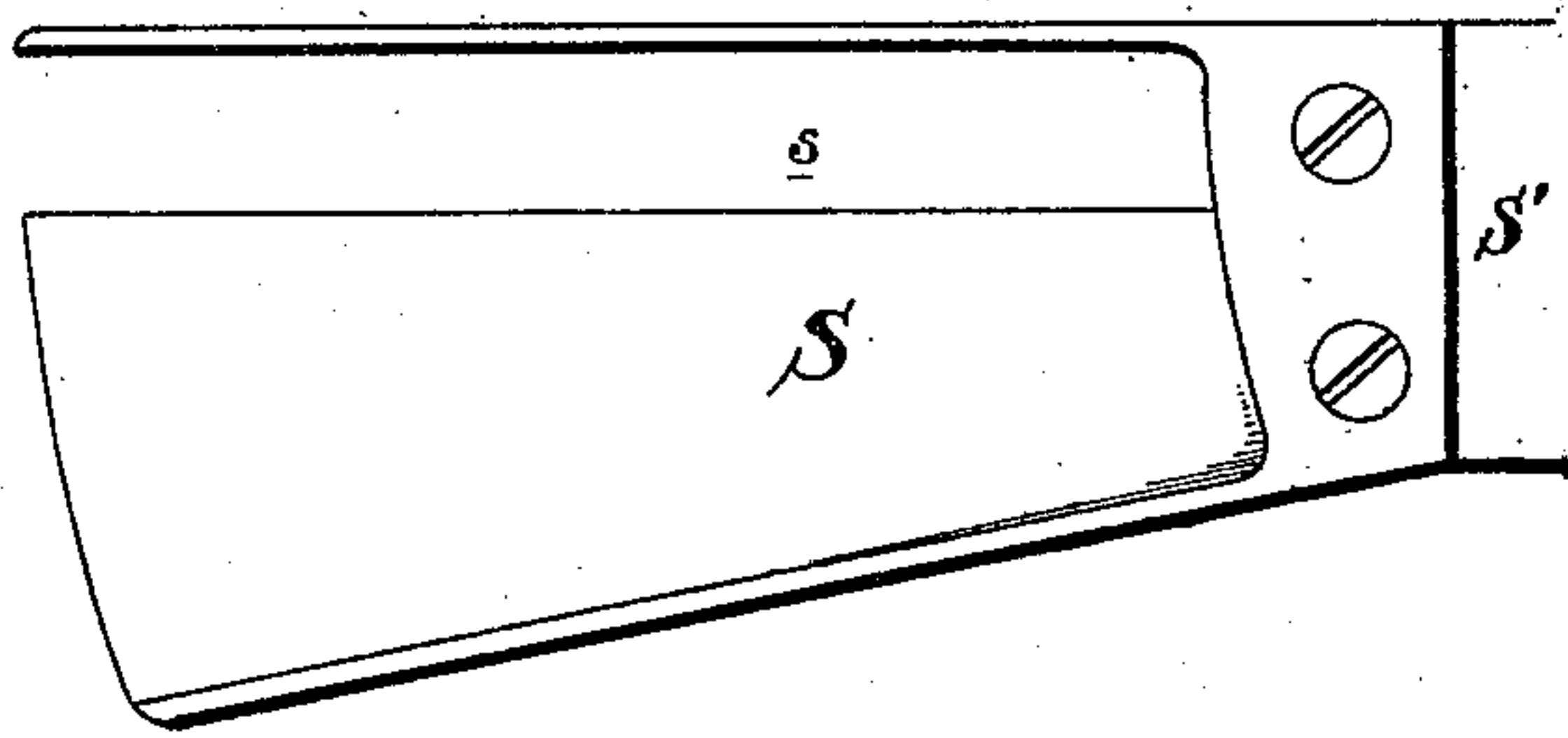


FIG. 11.

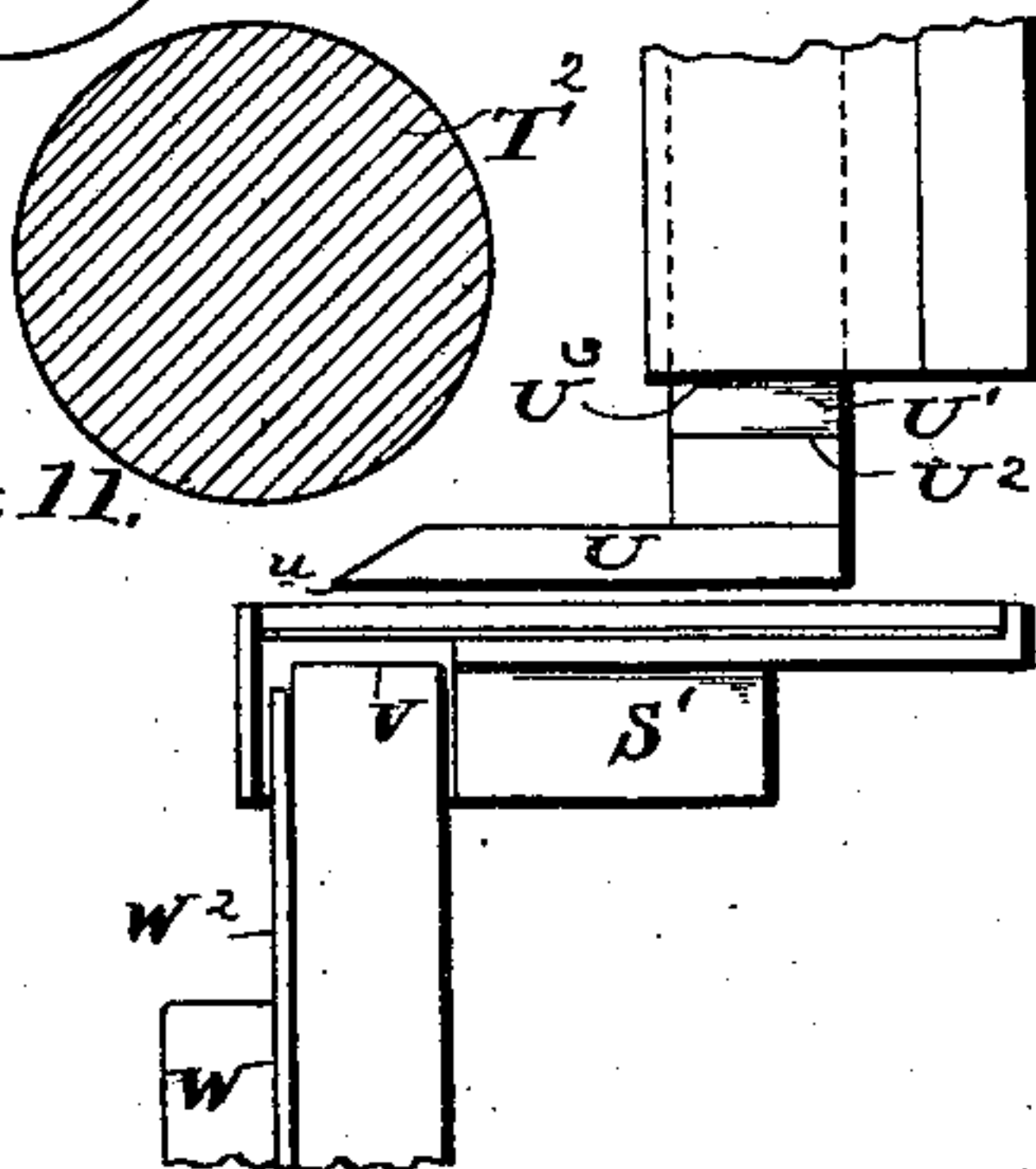
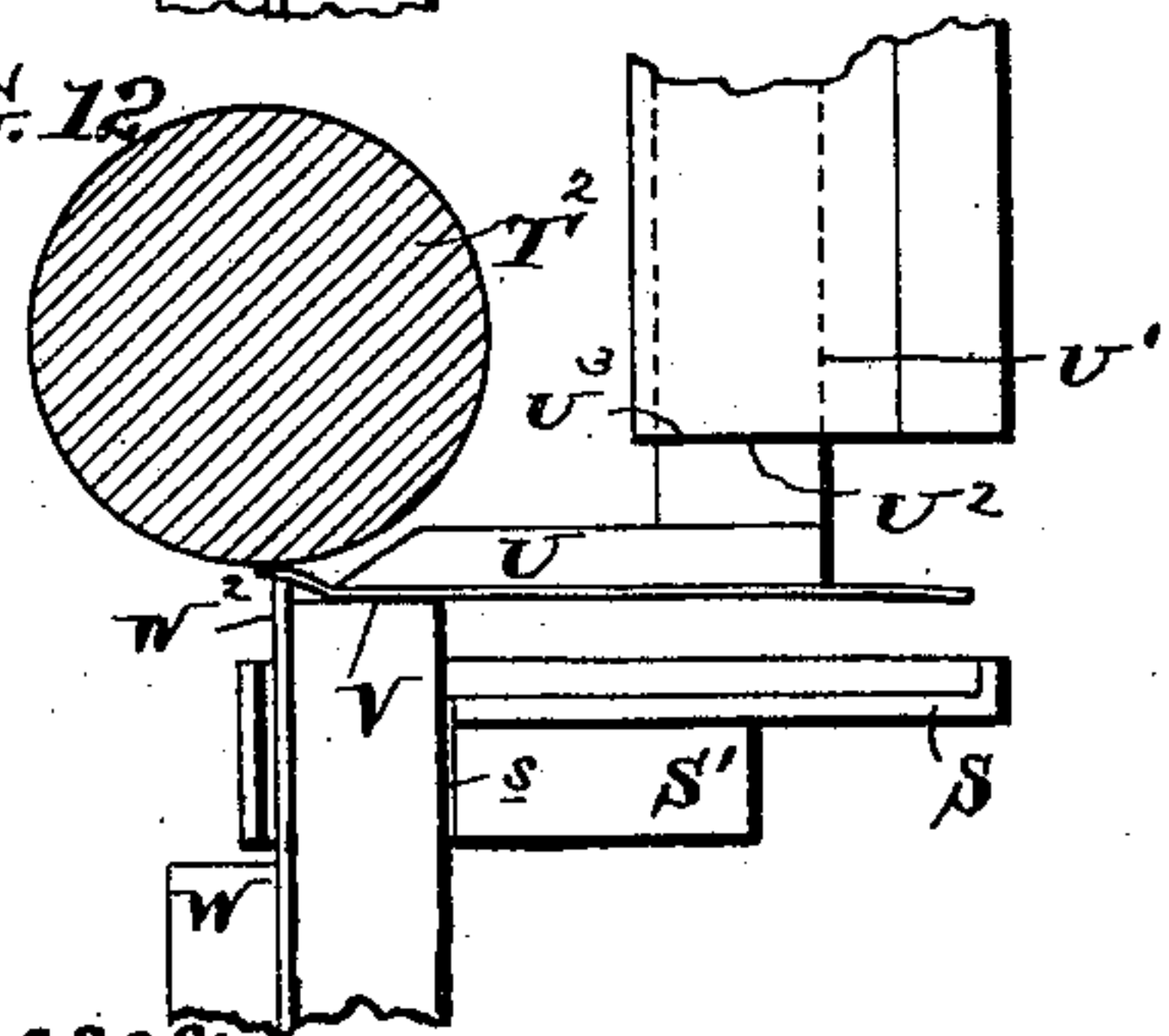


FIG. 12.



Witnesses:

Henry D. May
J. H. Russell

Inventor:

James A. Bonsack
by his atty.
Frederic T. Chambers

UNITED STATES PATENT OFFICE.

JAMES A. BONSAK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
BONSAK MACHINE COMPANY, OF SALEM, VIRGINIA.

CIGARETTE-TUBE MACHINE.

SPECIFICATION forming part of Letters Patent No. 577,347, dated February 16, 1897.

Application filed December 8, 1891. Serial No. 414,402. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. BONSAK, of the city and county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in Cigarette-Tube Machines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to machines for forming and preparing blanks, whereby they are adapted for making tubular wrappers and mouthpieces for cigarettes, which are preferably of conical or tapered shape, and although the machine, as hereinafter described, and shown in the drawings, does not form the blanks into complete tubes it will for the sake of brevity be called a "cigarette-tube" machine.

The object of my invention is to provide improved means for cutting the blanks from rolls or sheets of paper and for applying paste to them preparatory to their further treatment. The nature of my improved devices will be best understood as described in connection with the drawings, in which they are illustrated, and in which—

Figure 1 is a side elevation of a machine embodying my improved devices. Fig. 2 is a plan view of the machine; Fig. 3, a front elevation of the parts of the mechanism shown in Fig. 4; Fig. 4, a side elevation of the machine, showing those parts which are cut away in Fig. 1. Figs. 5, 6, and 7 are views of the feed-rolls and cutting-dies, illustrating the operation of the dies in severing the blank. Fig. 8 is a plan view of the female die and the guard-plate immediately above it, Fig. 9 being an edge view of the same devices. Fig. 10 is a plan view of the carrier; Figs. 11 and 12, views illustrating the action of the nippers used for carrying the blanks into contact with the paste-roll. Fig. 13 is a plan view of a piece of paper from which the blanks have been cut; Fig. 14, a view of one of the blanks, and Fig. 15 a view of the cigarette-tube rolled from the blank.

A indicates the framing of the machine, upon which the movable parts hereinafter described are supported.

B is the table, which supports the paper

before it reaches the feed-rolls, B' indicating that part of the table which extends to the delivery side of the feed-rolls and in which the female die to be hereinafter described is formed or attached.

C is the driving-shaft of the machine, D and D' being fast and loose pulleys.

E is a gear-wheel secured on shaft C, and E' a gear meshing with gear E and secured on the counter-shaft F. G is a cam secured on and turning with shaft F; H, a rod which, as shown, rests at one end on the shaft F by means of yoke H', while at its other end it is attached at I' to a lever I, journaled on shaft J.

H² is a cam-roller secured on rod H and resting on cam G, which gives to it and the rod H a reciprocating motion, which is imparted, of course, to the rock-lever I.

I² is a pawl having a weighted end i', which keeps its active end i in contact with a ratchet-wheel K, which ratchet-wheel is secured to the shaft J.

L is a star-cam having a series of points ll, &c., and preferably one point l' of greater length than the others. This cam is secured to the shaft J and receives an intermittent movement of rotation through the action of the pawl I² on ratchet-wheel K, the movement of rotation being equal in each case to the length of a cam-section l and the cam-wheel L remaining stationary, while the pawl I² is moved back to take a fresh hold on the ratchet-wheel K.

M is a rod conveniently supported, as shown at M', on shaft J on one end and at its other end attached to one arm of a bell-crank lever N, which is journaled on shaft N'. A cam-roller M² is secured to the rod or slide M and rests in contact with the cam-wheel L, the action of which is to give the rod M an intermittent reciprocating motion and through it to communicate an intermittent oscillating or rocking motion to the bell-crank lever N, which carries on one arm a pawl N², said pawl resting on and actuating a ratchet-wheel N³, secured to shaft N', which is thus given an intermittent rotary movement. To shaft N' is also secured a gear-wheel N⁴, which is in gear with the wheel O, secured to shaft O², upon which is also secured the upper feed-

roll O^4 . The wheel O is in engagement with a similar wheel O' on shaft O^3 , upon which shaft is secured the lower feed-roll O^5 . The shaft O^3 , as shown, is supported and its roller O^5 held against roll O^4 by a lever O^6 , pivoted at O^7 and attached, as shown, to a spring O^8 . It will readily be seen that by the mechanism described the feed-rolls O^4 and O^5 are given an intermittent rotative movement and that by the action of the cam l' a movement of greater length is given to them at regular intervals. The purpose of this, I will here explain, is so that when the machine is fed with strips of paper instead of by a continuous roll the action of the cam-finger l' , which should be first to come into operation, will carry the paper through a greater distance than the action of the fingers l , which necessarily come into operation afterward. In this way the front edge of the strip is fed to the required distance over the rear edge of the female die, and the subsequent shorter movements of the strip are just sufficient to feed an uncut portion of the sheet over the die, and the blanks are thus cut with the greatest possible economy.

The number of the cam-fingers and the arrangement of the parts actuated by them are such that a single rotation of the cam-wheel L will correspond with the passage of a single sheet of paper through the machine.

P is a female die formed in or secured to the part B' of the supporting-table. The form of the die is that desired for the blank, and I prefer that the corners should be rounded, as shown, and above the table B' is secured a plate P' , between which and the die P the paper is fed from the rolls $O^4 O^5$. The plate P' is cut away above the opening in the female die in corresponding shape, so as to give passage to the male die P^2 , which is secured to a slide P^3 , said slide being attached at its upper end to a lever P^4 , secured on shaft P^5 , to the other end of which is attached the connecting-rod P^6 , which, as shown, is held in position at its lower end by a yoke P^8 , passing over the shaft F , and has attached to it a cam-roller P^7 , which rests upon a cam-surface Q , said cam being attached to and moving with the shaft F and the formation of the cam being such as to lift the rod P^6 and force the male die down during the period when the feed-rolls $O^4 O^5$ are out of operation, raising it again above the plate P' or the lower surface thereof before the motion of the feed-rolls is resumed. The downward motion of the male die causes it to pass into the female die, severing the blank from the sheet or roll of paper and forcing it down into or through the female die and onto a receiver or carrier situated below the female die. I prefer, however, to limit the downward motion of the male die, so that its lower edge will pass but a short distance below the upper edge of the female die, and to carry the blank through the female die and onto the receiver I employ a

stripper R , which fits into a cavity of the male die and is attached to a slide R' , connected at its upper end with a lever R^2 , pivoted on shaft R^3 , the other end of the lever R^2 being connected with a rod R^4 , which, like the rod P^6 , is steadied by means of a yoke at its lower end passing around shaft F and is provided with a cam-roller R^5 , which rests on a cam-surface Q' , attached to shaft F and rotating with it, the shape of the cam Q' being such as to give a motion to the stripper-arm corresponding to the motion of the male die, but prolonging its downward motion, so that after the male die has operated the stripper will continue to move down, pushing the blank through the female die and onto the receiver. This action of the dies and strippers is clearly indicated in Figs. 5, 6, and 7 of the drawings.

The blank having been carried through and freed from the female die is now to be transported to the pasting devices, which apply paste to one of its edges. The receiver, therefore, should be a movable one, and such a receiver I have indicated at S , the receiver having a cavity, as shown, (see Fig. 10,) corresponding to the outline of the blank. As shown, and for use with the nippers to be hereinafter described, the receiver or carrier has a slot s formed through its bottom along the side on which the edge to be pasted rests. It is attached to a slide S' , supported in proper bearings on the frame of the machine and having a cam-roller S^2 , which fits into a cam-groove in a cam-roll S^3 , the cam-groove being of the general outline shown in Fig. 2 and having two straight sections S^4 and S^5 at its two extreme positions, so that the carrier S will remain stationary for a time beneath the female die and for another time at the extreme point to which it is moved by the action of the cam S^3 . This cam, it will be noticed, is secured to the shaft C and is constantly rotating with it. By the action of the cam the carrier S is moved from beneath the female die to the position indicated in Figs. 11 and 12, in which position a presser-foot or nipper U extends above it with its edge u over the slot s . (This nipper U is attached to a slide U' , and is free to move up from the position shown in Fig. 11 to that shown in Fig. 12, where shoulders U^2 come in contact with the lower edge U^3 of the slide-guide, arresting further upward motion.) This position of the carrier S also brings it above a nipper V , which registers with the slot s and is supported upon a shoulder W' of a slide W through the medium of a spring V^2 , which intervenes between the lower end V' of nipper V and the shoulder W' . The slide W has attached to it a plate or finger W^2 , which lies alongside of the nipper V , as shown in Fig. 11.

To the slide W is attached a cam-roller W^4 , which rests against a cam Y , the roller being held in contact with the cam-surface by the action of a spring W^3 and the cam having a depression y , which permits the spring to

draw the slide W up when it comes into operation on the cam-roller. This cam, it will be noticed, is secured to and rotates with the shaft C. When the slide W moves up, it carries with it the nipper V, which, moving through the slot s, presses the blank against the nipper U and continuing to move upward carries the blank and the nipper U upward to the position shown in Fig. 12, where further upward motion in the nippers is arrested by the shoulders U². The slide W continues to move upward, the spring V² yielding, and the plate W² moves past the edge of nipper V, pushing the extreme edge of the blank against the paste-roller T², and thus preparing it for the further operation of making it into a tube, as indicated in Fig. 15. The action of the nippers V U is timed to take place during the rest of the carrier before it moves back to its position beneath the female die, and this backward motion may begin at any time after the nippers have seized the blank, the nippers returning, of course, to their original position before the carrier returns with a new blank.

I have not shown in the drawings any mechanism for removing the blank after its edge has been pasted or for carrying on the further operations necessary in forming or filling the tube, my present invention having no reference to such mechanism, but simply going so far as the formation of the blank and the application of paste to it.

It only remains to note the mechanism by which the paste-roll is operated.

T is a paste-box having in it paste-rolls T' and T², the roll T² having a part of its surface exposed and lying immediately above the edge of the nipper U. The paste-rolls are geared together and given an intermittent motion of rotation by means of a pawl t², acting on a ratchet t', secured to the shaft of roller T', said pawl being secured on the end of a rock-lever t⁶, actuated through a connecting-rod t⁴ by a lever-arm t⁵, secured to the shaft P⁵. This shaft is a rock-shaft receiving its motion from the lever P⁴, which is attached to it and which is actuated, as before described, by the cam Q and operates in turn the male die. By this arrangement it will be noted the motion of the feed-rolls corresponds with the motion of the male die, so that the paste-rolls are stationary during the time when the carrier lies beneath them and while the nippers are lifting the blank to its surface.

It is of course apparent that the specific arrangement of cams, connecting-rods, &c., illustrated in my drawings could be very greatly varied without departure from my invention, and except where the said specific mechanism is especially referred to in the claims I do not wish to be understood as limiting my invention upon its use.

It is also apparent that the machine herein described, and shown in the drawings, can be used for forming and preparing blanks of paper or similar material and adapting them

for tubes which may be used for other purposes than cigarette wrappers or mouth-pieces, and I do not wish to limit my invention to tubes of any special shape or for any special use.

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

1. In a cigarette-tube machine, the combination with a pair of rotating feed-rolls, of die-cutters situated on the delivery side of said rolls and arranged to operate while the rolls are stationary to cut blanks from the paper, and mechanism for imparting a series of intermittent feeds to the rolls, the initial feed of each series being greater than the others.

2. In a cigarette-tube machine, the combination with a pair of intermittently-rotating feed-rolls, of a receiving-platform situated on the delivery side of the rolls and having formed in or secured to it a female die; a male die arranged to lie above the female die while the paper is being fed over it and to descend into it to cut the blank when the feed-rolls are stationary; and an intermittently-moving carrier having an opening extending through its bottom and along one of its sides and arranged to lie beneath the female die to receive the blank, and having received it to move carrying the blank to the pasting mechanism.

3. In a cigarette-tube machine, a blank-cutter consisting of a female die P in combination with a male die P² and a stripper R, said stripper arranged as described to carry the blank through the female die after it has been severed by the male die, a reciprocating carrier located beneath the stripper, a paste-roll, nippers for clamping the blank, and a presser for forcing the edge of the blank against the paste-roll.

4. In a cigarette-tube machine, the combination of cutting-dies, a reciprocating carrier S arranged to receive and remove the blanks from the dies; nippers arranged in the path of the carrier to seize the blank, and a paster, as roll T², arranged in the path of the nippers to apply paste to one edge of the blank.

5. In a cigarette-tube machine, the combination of a pair of feed-rolls, mechanism as described for imparting a series of intermittent rotations of equal length intermitted by a rotation of greater length to said rolls, and blank-cutting dies situated on the delivery side of the rolls and arranged to operate during the intermission in the movements of the feed-rolls.

6. In a cigarette-tube machine, the combination of the blank-cutting dies, the intermittently-moving carrier S, the intermittently-moving paste-roll T² between which and the point below the dies the carrier moves; the movable nipper U arranged with its edge beneath the roll T²; the nipper V arranged to grip the blank against the nipper U and lift it toward the paste-roll T² and the plate W²

arranged to move past the edge of the nipper U and press the edge of the paper against roll T².

7. In a cigarette-tube machine, the combination of the blank-cutting dies, an intermittently-moving carrier, the paste-box T, the intermittently-moving paste-rolls T' T², the paste-roll T² having an exposed section, and the carrier moving from the dies to the paste-
10 roll, and nippers arranged as described to seize the blank from the carrier and carry one edge against the paste-roll T².

8. In a cigarette-tube machine, the combination with dies arranged to cut blanks from
15 a strip or roll of paper, a paster, as roll T², carriers arranged to take each blank from the dies after it is severed from the strip, and nip-

pers arranged to carry it to and against the paster.

9. In a cigarette-tube machine, the combination with the feed-rolls of mechanism for imparting a series of intermittent feeds thereto, said mechanism comprising a revoluble shaft, an arm and intermediate pawl-and-ratchet mechanism for actuating the shaft
25 and a cam-wheel for actuating the arm, said wheel having a series of cam projections cooperating with the arm, one of the projections being longer than the others.

JAS. A. BONSAK.

Witnesses:

LEWIS R. DICK,

FRANCIS T. CHAMBERS.