

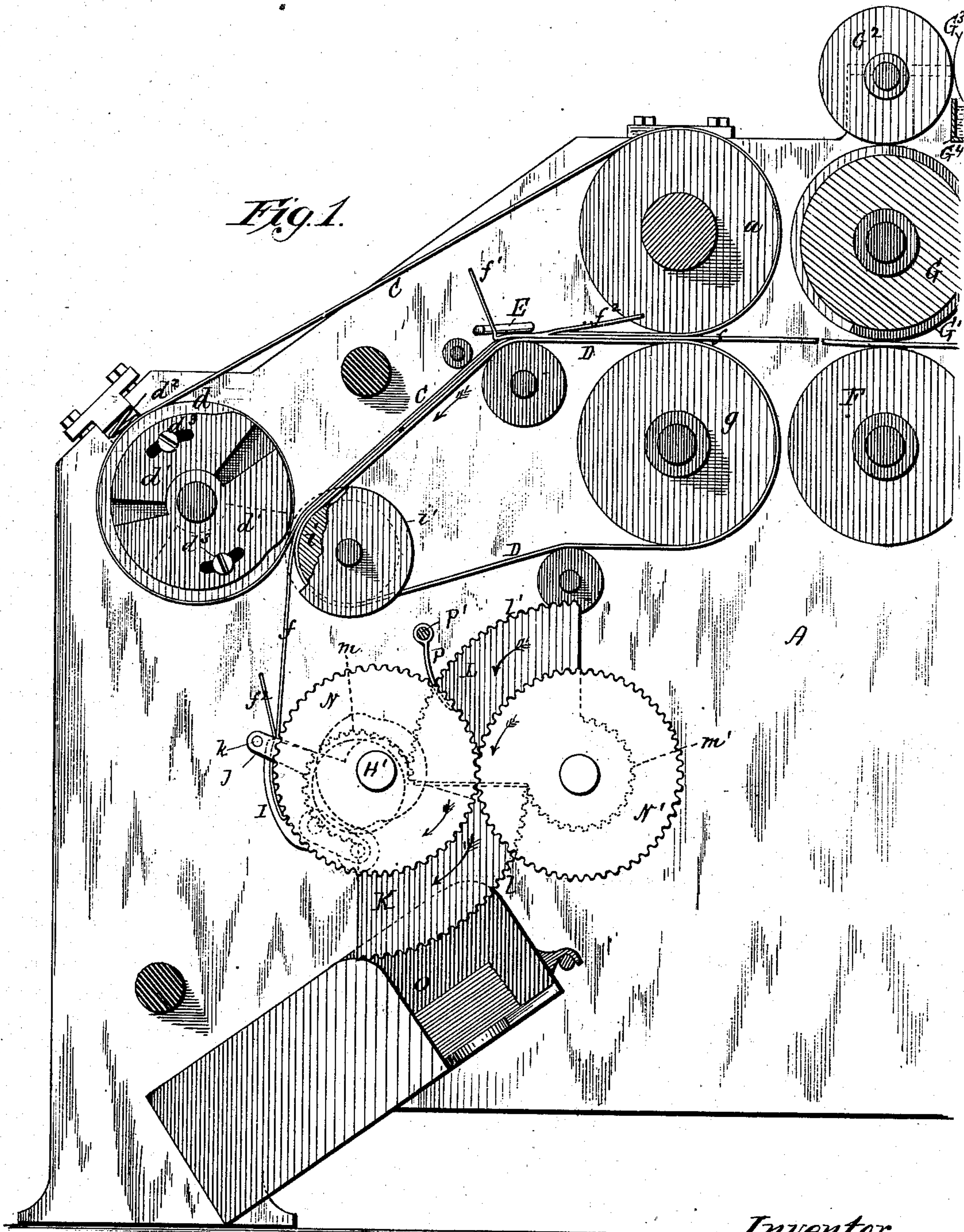
(No Model.)

4 Sheets—Sheet 1.

W. C. CROSS.
Paper Bag Machine

No. 239,455

Patented March 29, 1881.



Witnesses.
Robert Everett
E. J. Dick

Inventor:
Wm. C. Cross
by M. Bailey
Attorney.

(No Model.)

4 Sheets—Sheet 2.

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Fig. 2.

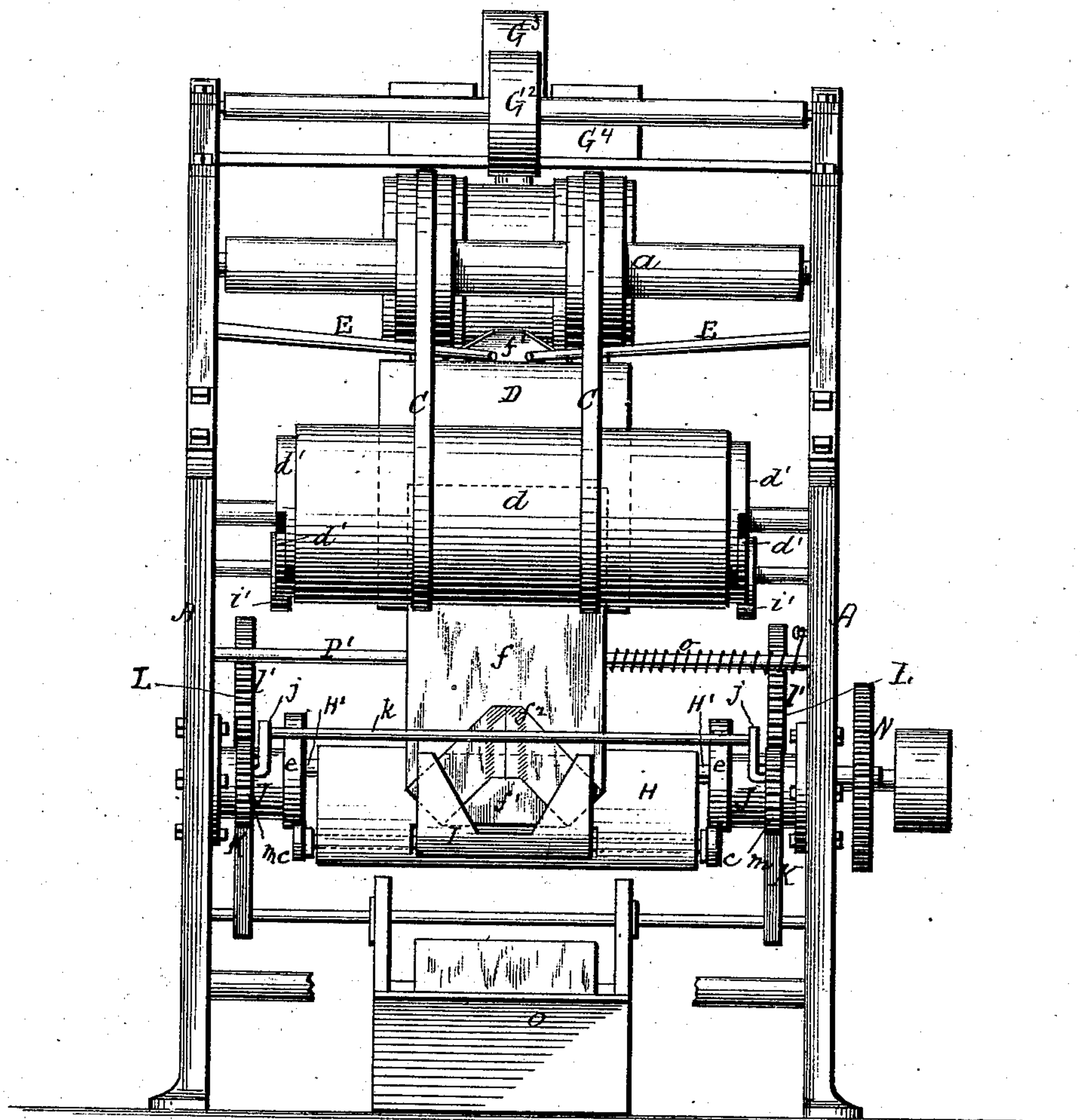


Fig. 3.

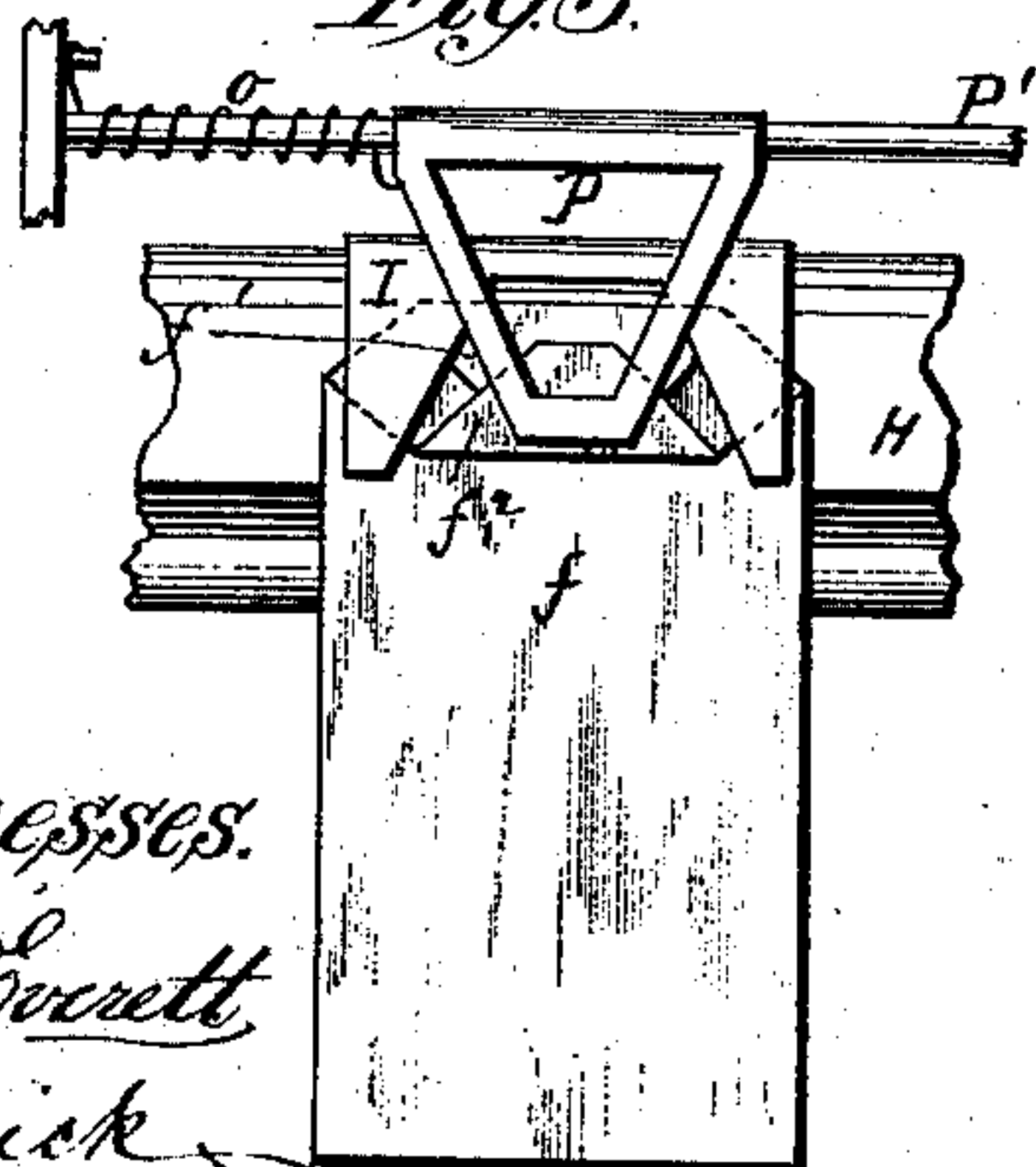


Fig. 4.

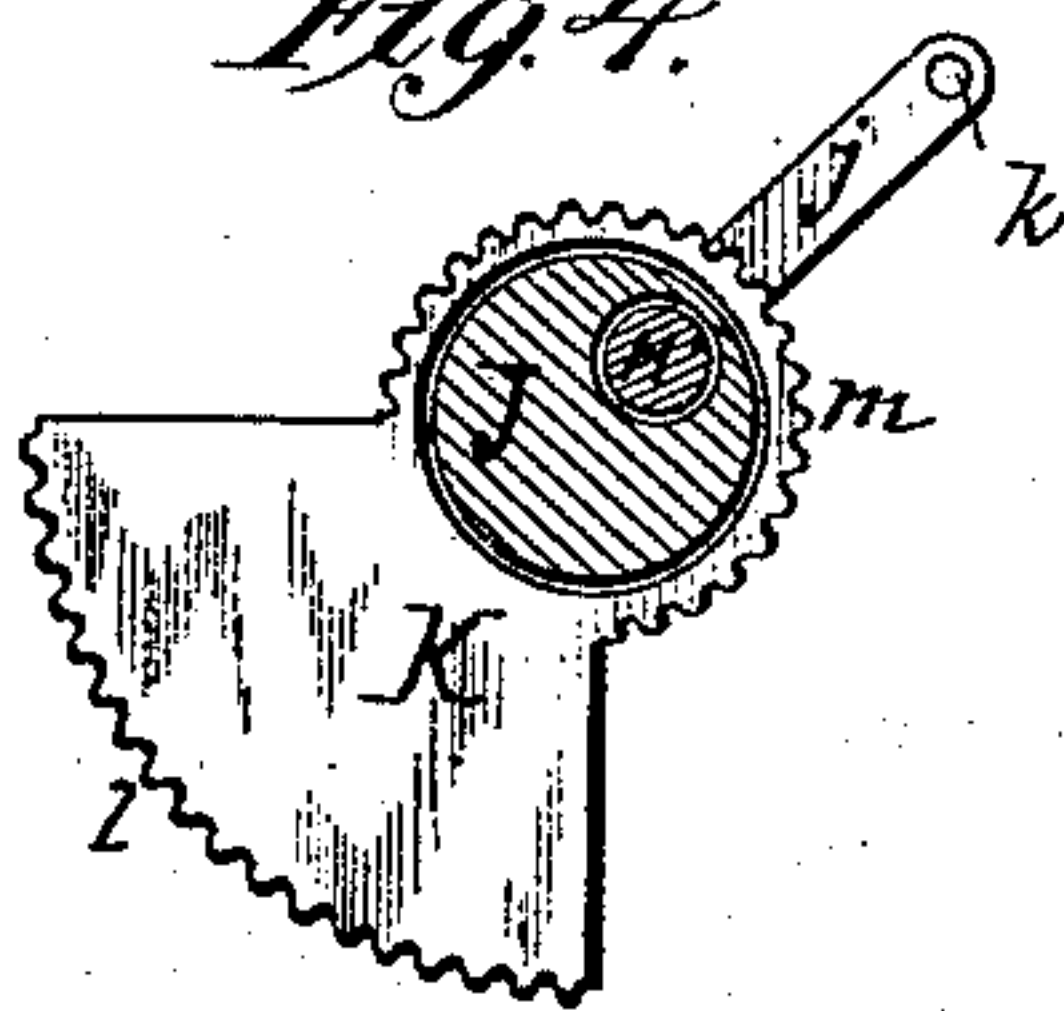
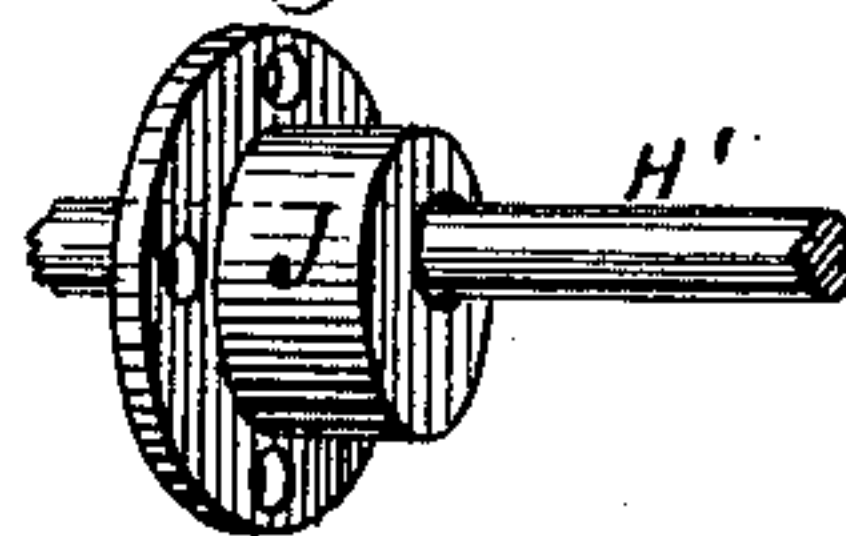


Fig. 5.



Witnesses.

Robert Everett
Ed. Dick

Inventor.
Wm. C. Cross
by M. S. Saily
Attorney.

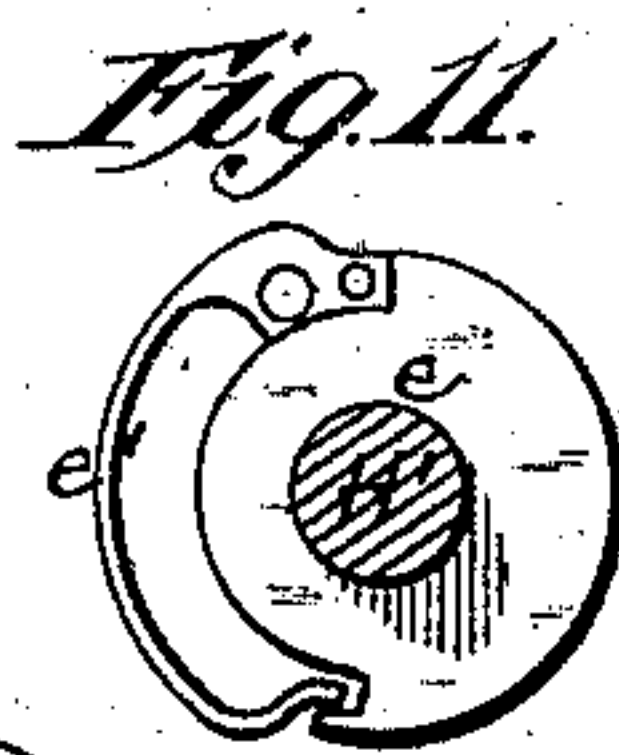
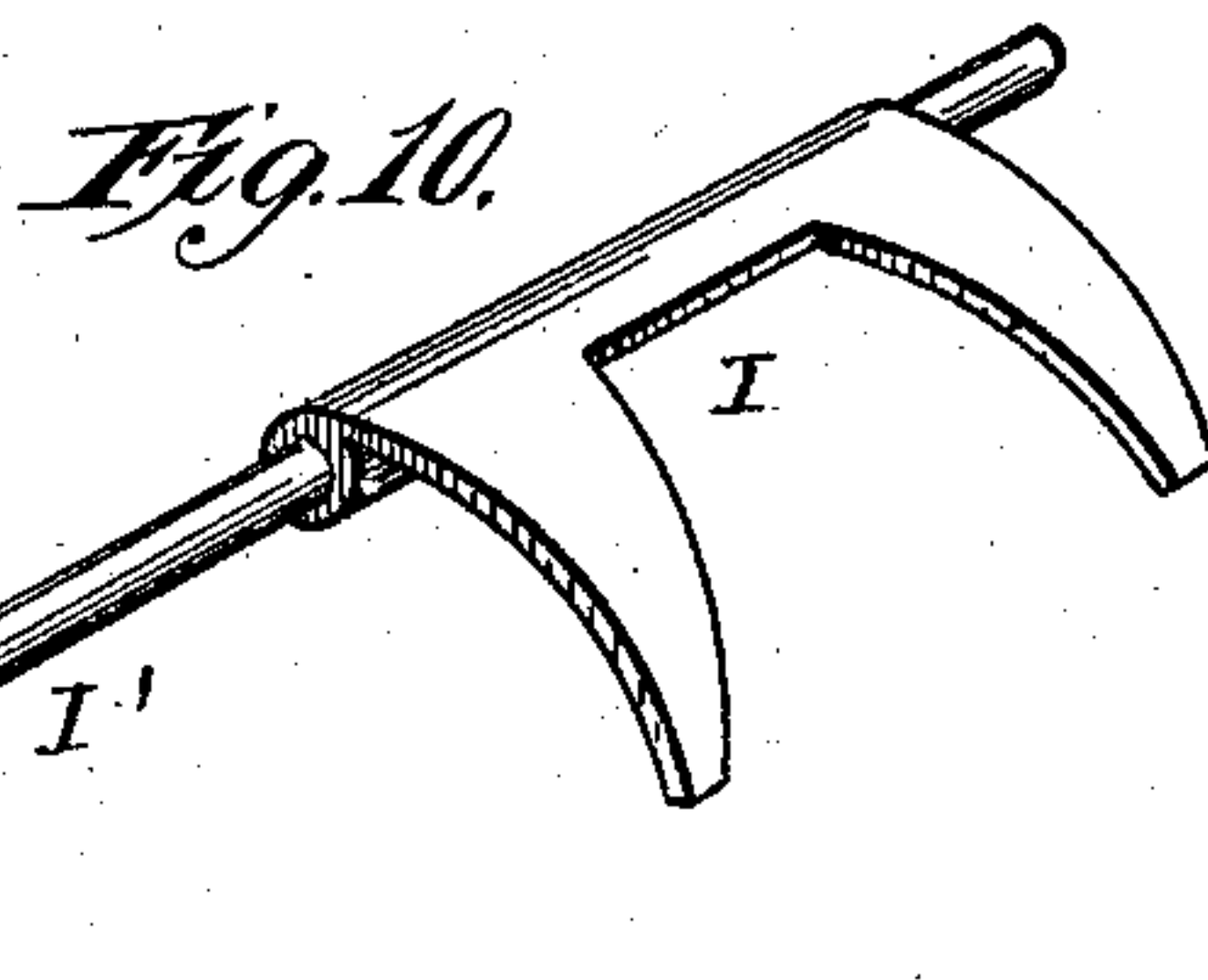
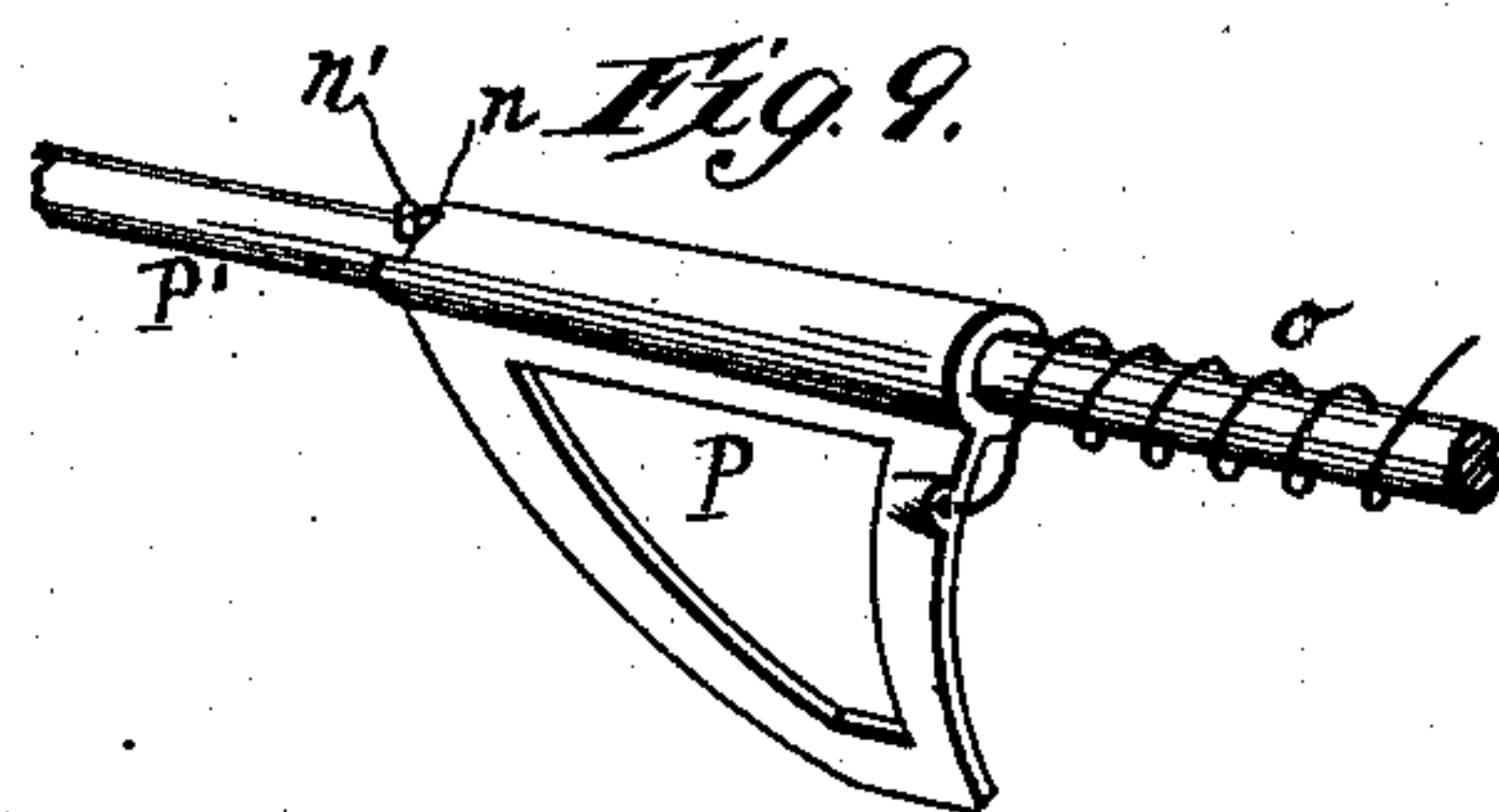
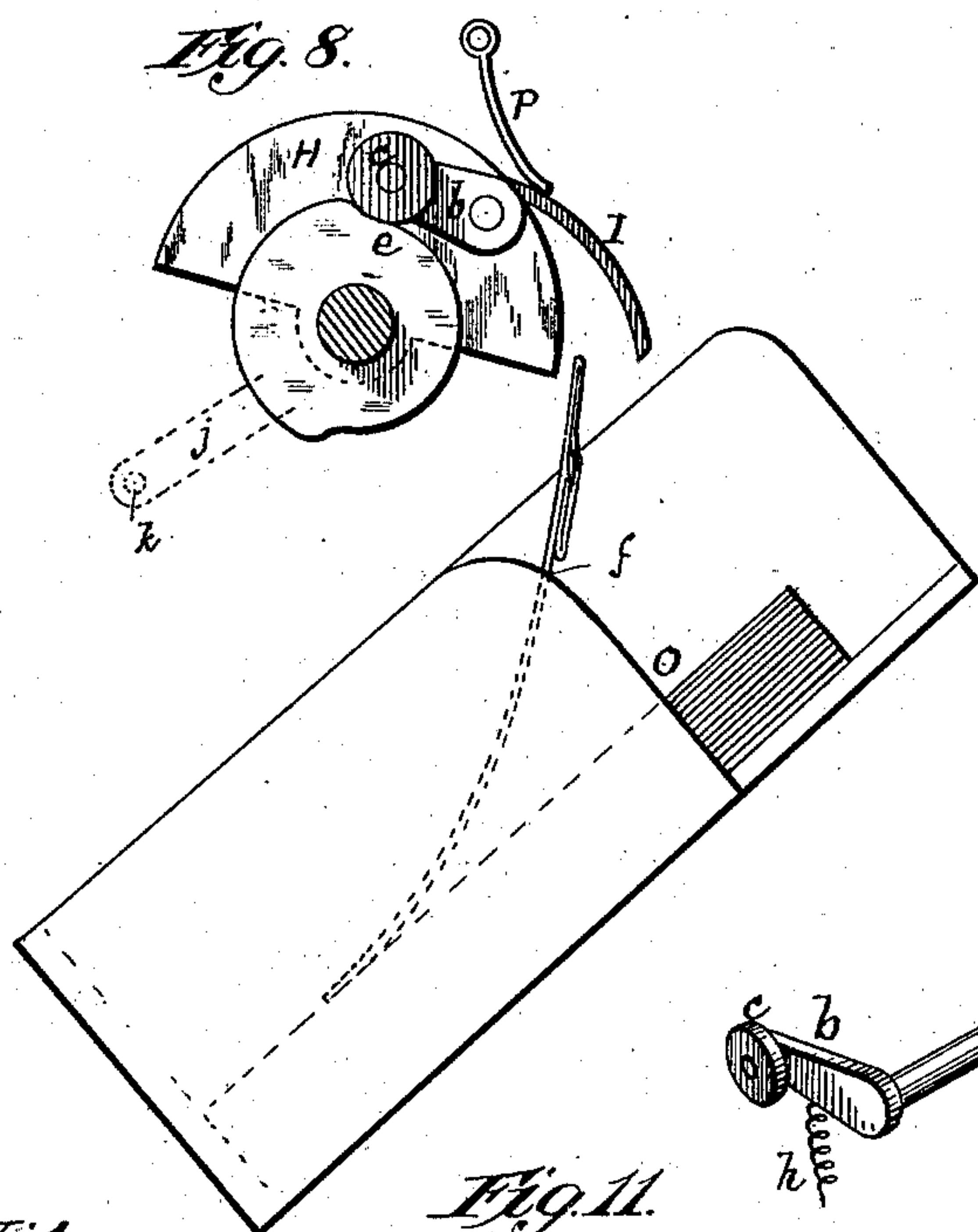
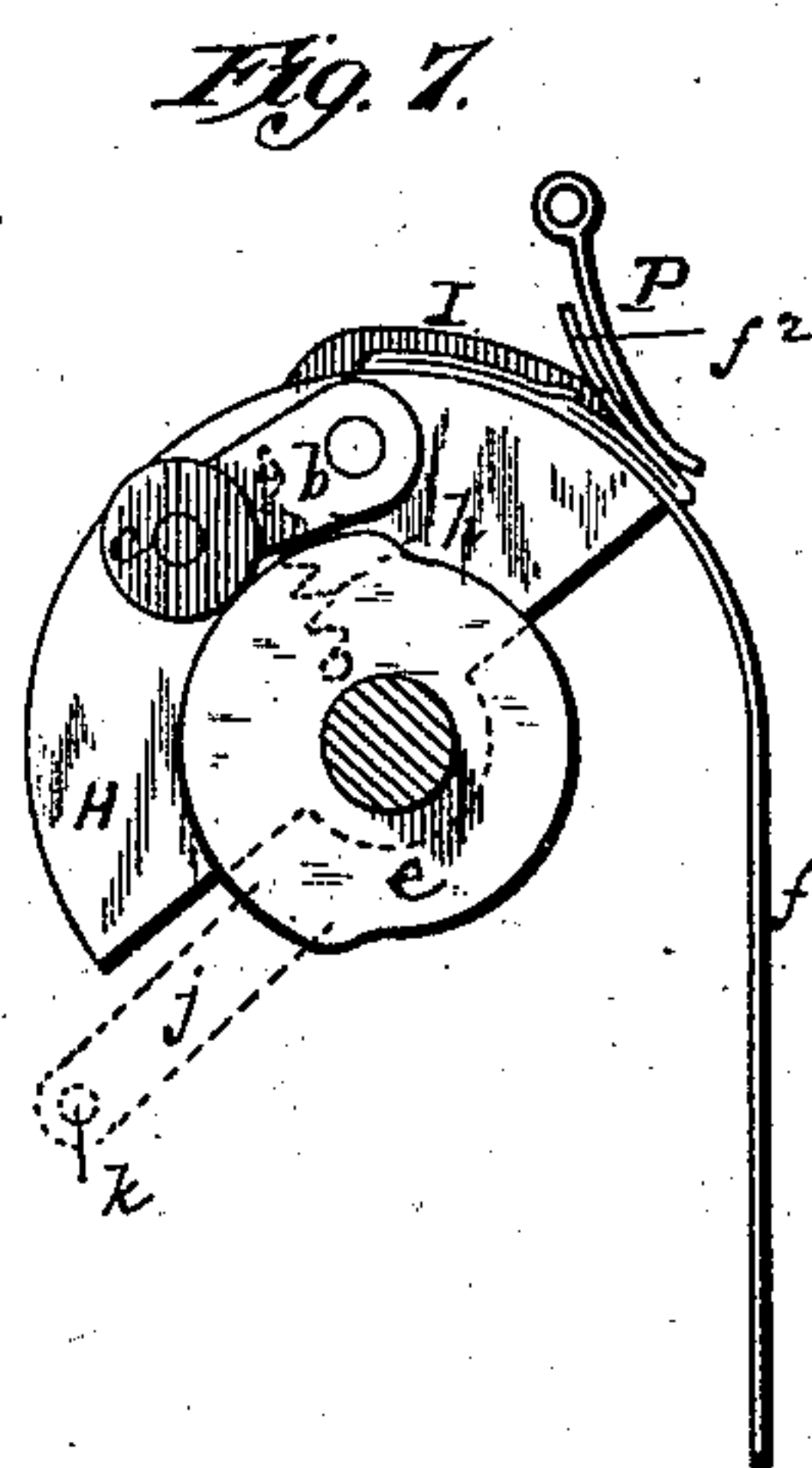
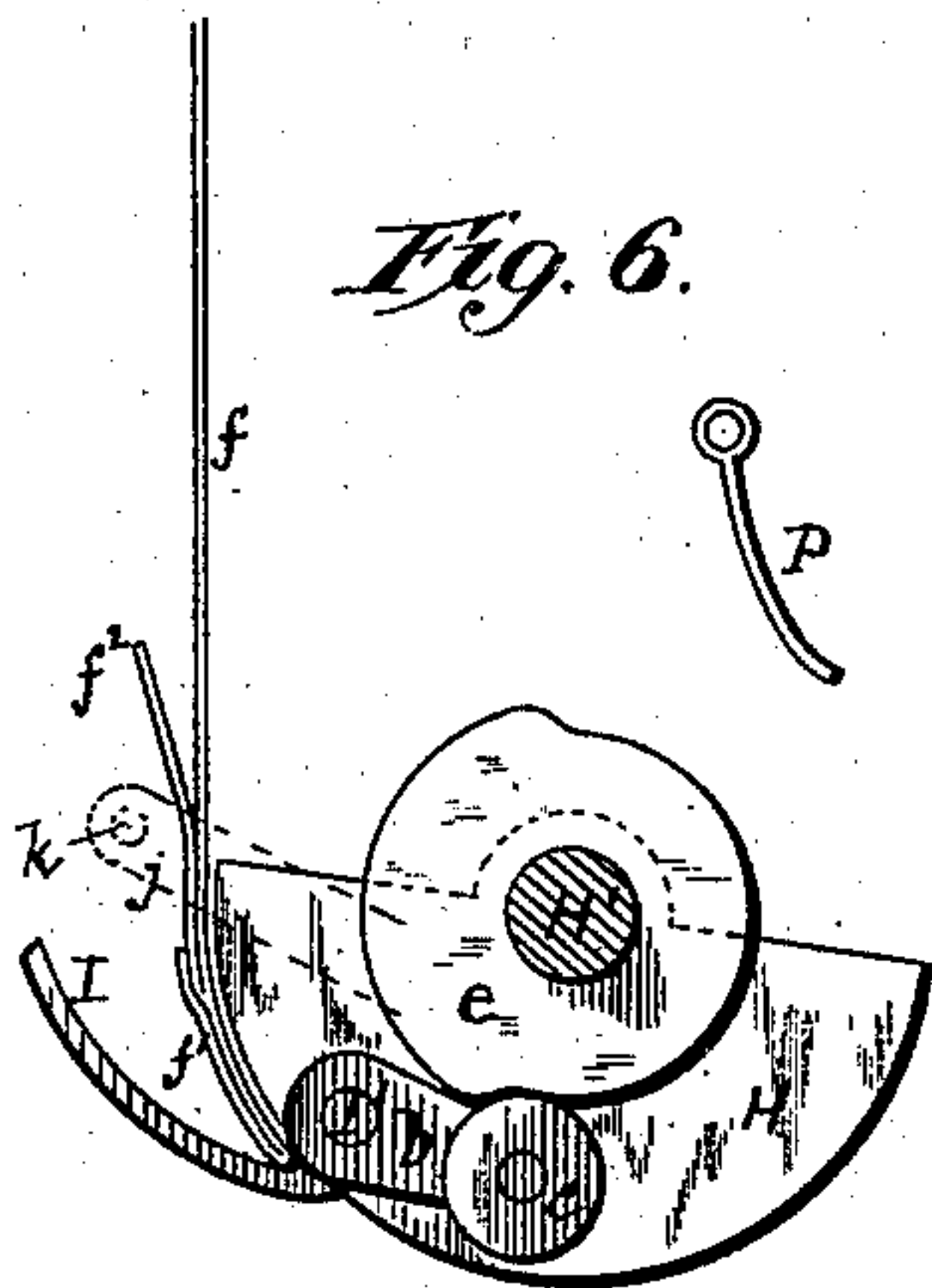
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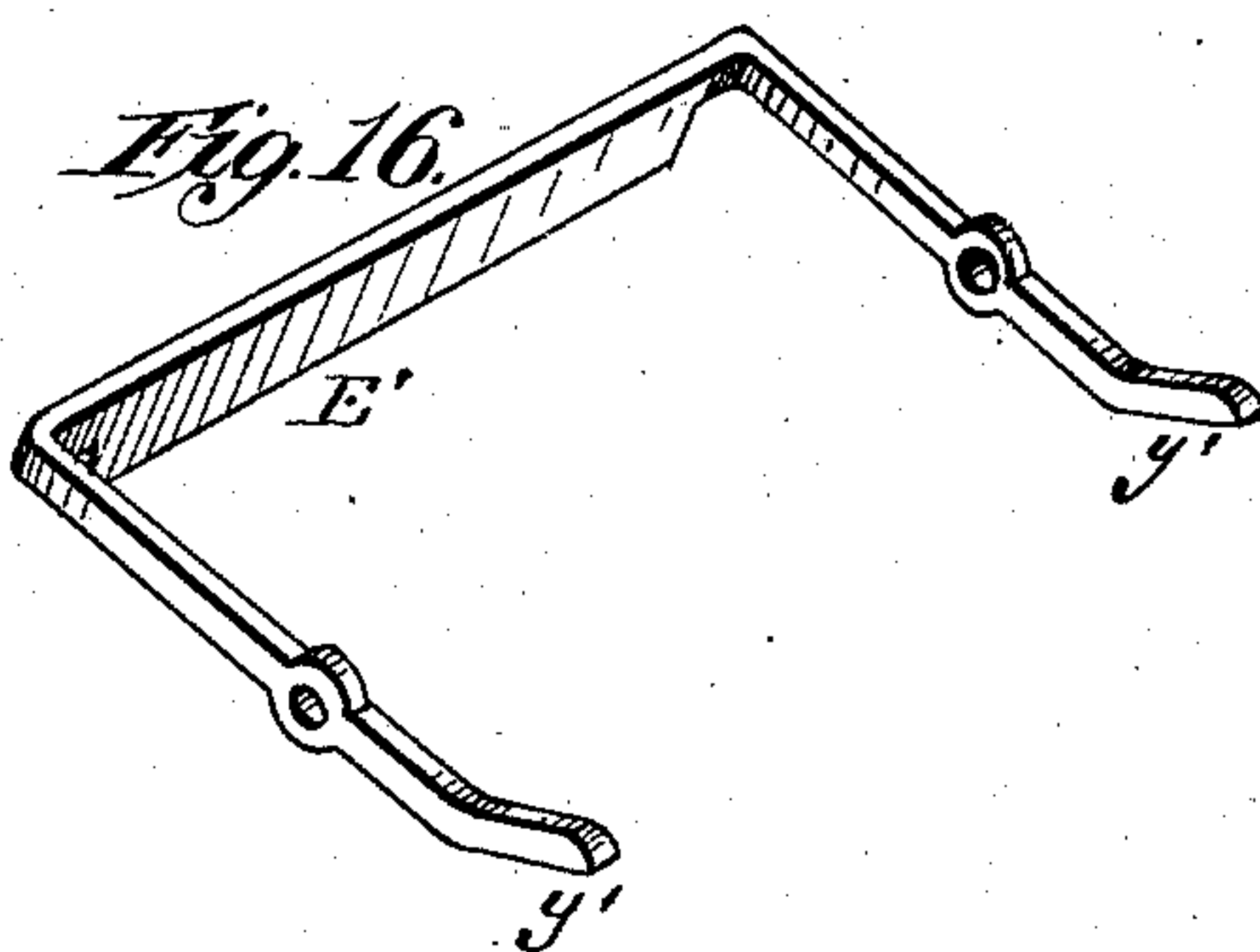
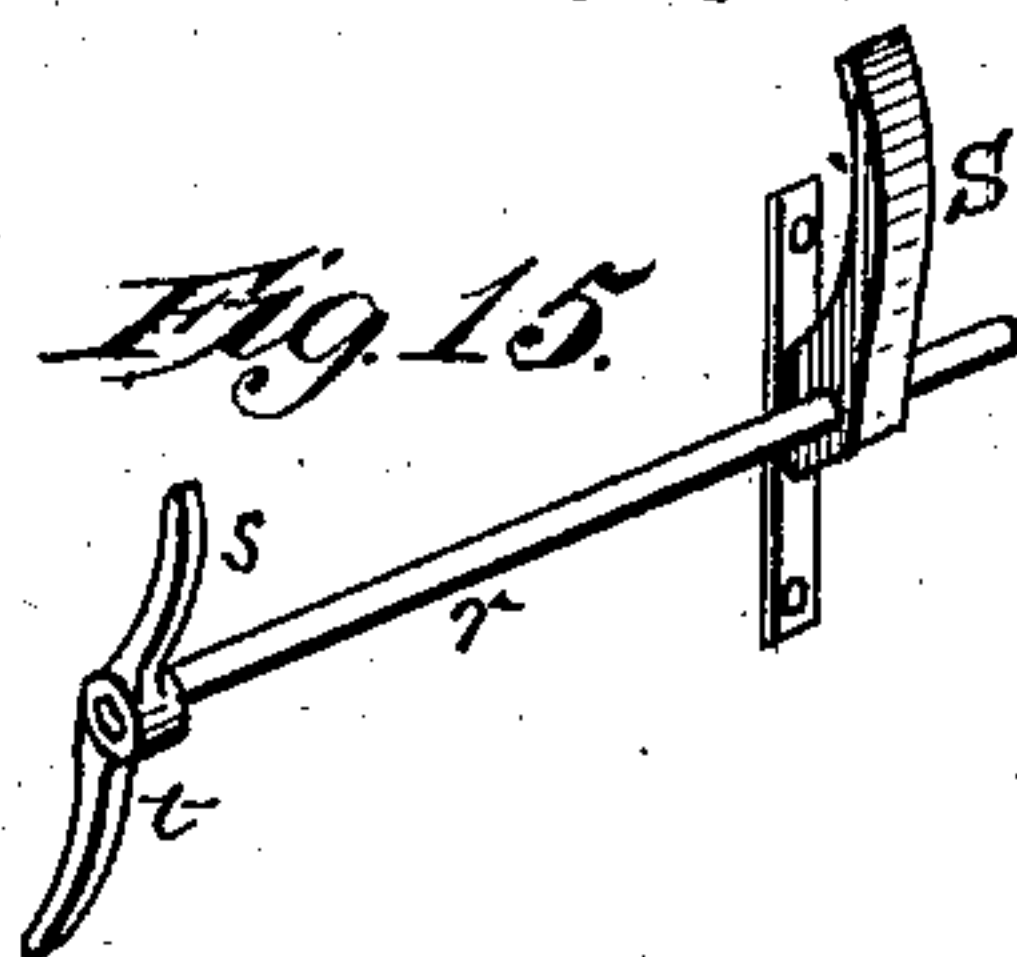
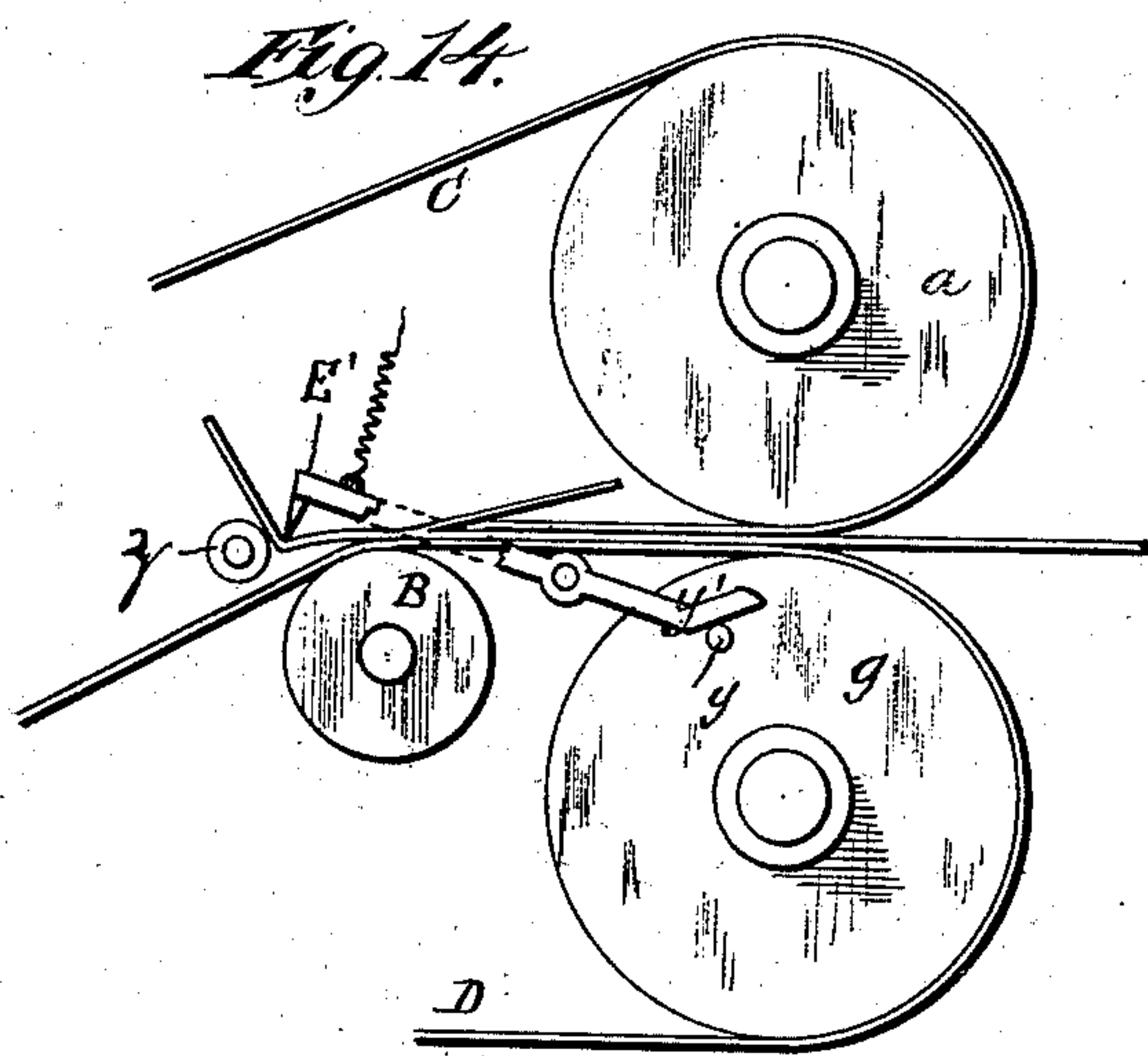
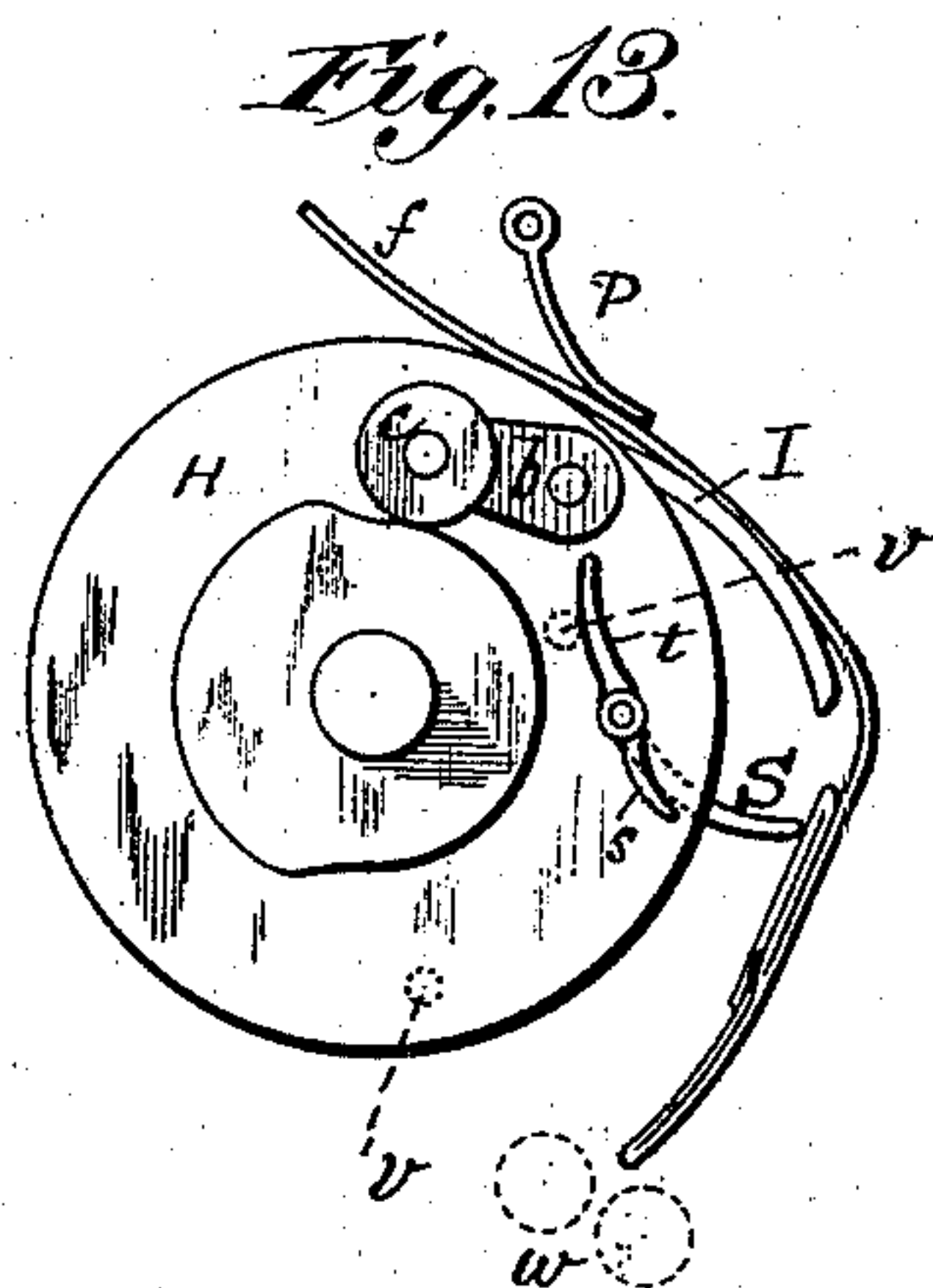
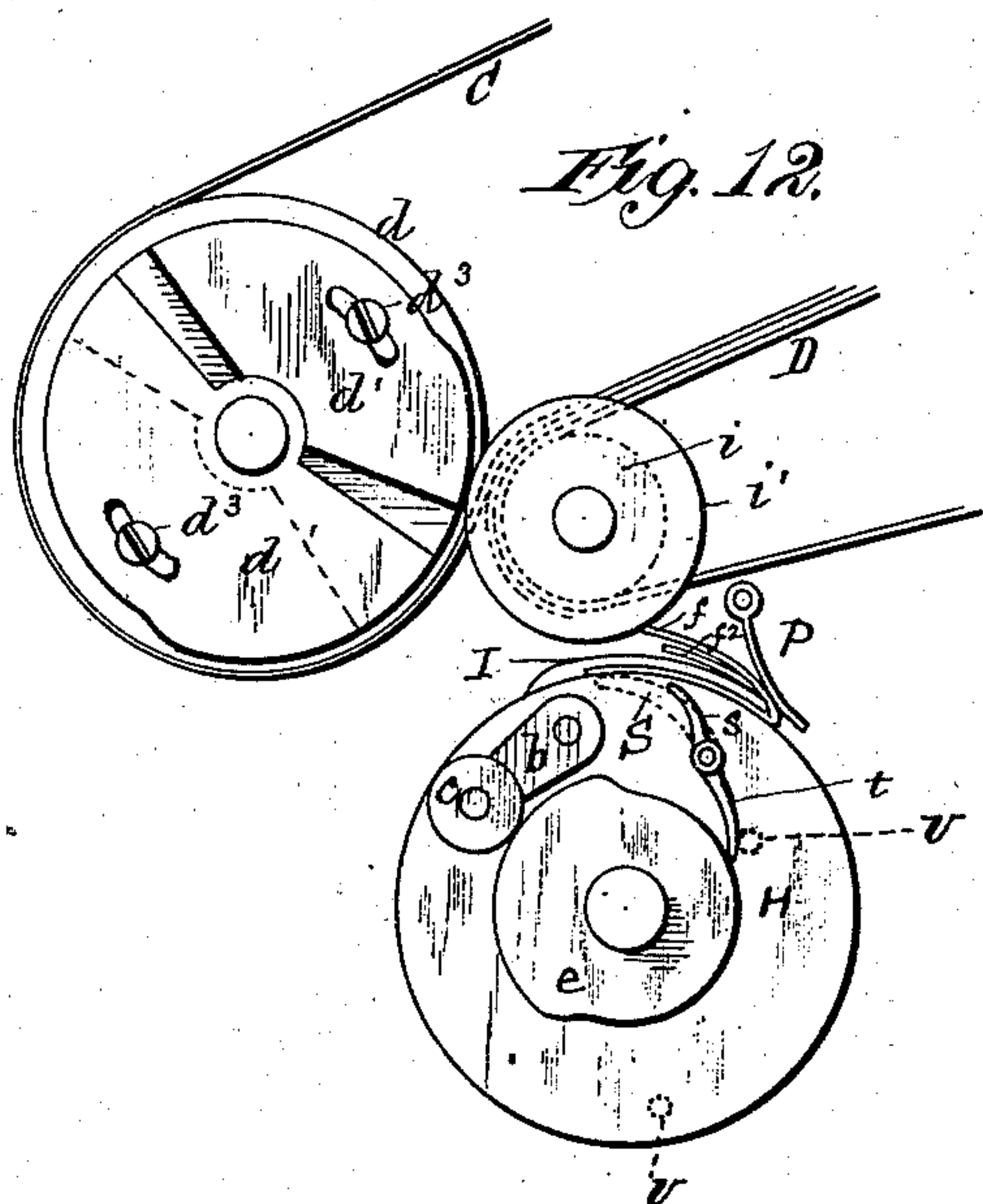
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Robert Everett
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Attorney.

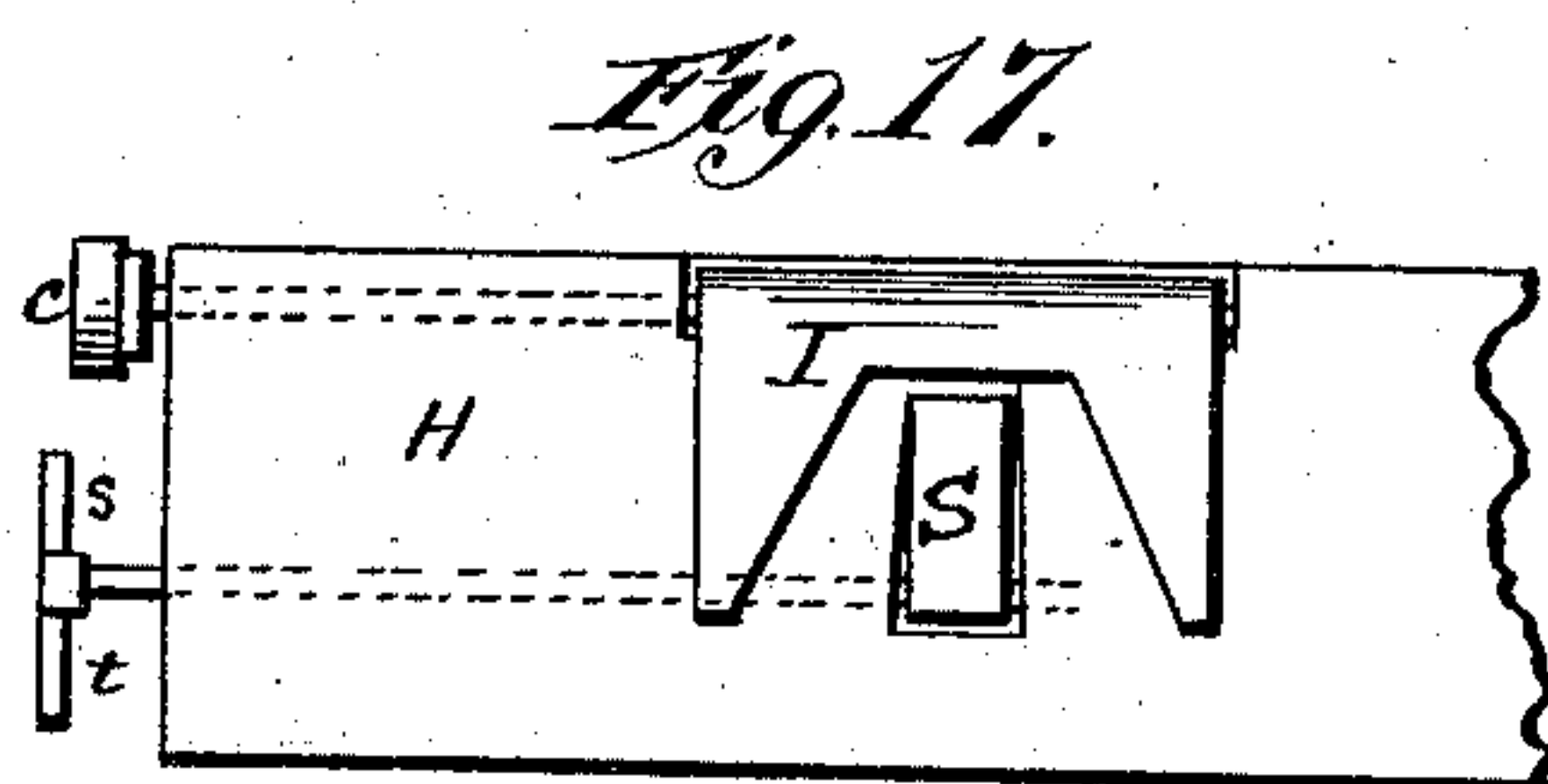
(No Model.)

4 Sheets—Sheet 4.

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Paper Bag Machine
No. 239,455.
Patented March 29, 1881.



Witnesses:
Robert Everett
E. A. Dick



Inventor:
Wm C. Cross
by *M. S. Sully*
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM C. CROSS, OF BOSTON, MASSACHUSETTS.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 239,455, dated March 29, 1881.

Application filed December 15, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. CROSS, of Boston, Massachusetts, have invented certain new and useful Improvements in Machinery for Making Satchel-Bottom Paper Bags, of which the following is a specification.

My present improvements have reference to that portion of said machinery by which the second and the final folds of the satchel-bottom are made, the first or diamond fold having previously been made by appropriate known means; and they particularly relate to the method of and means for making the final fold.

The principal feature of my said improvements resides in a method of making the final fold, which consists in first folding back the front flap of the diamond fold to form the second fold, the bag-blank traveling satchel-bottom end foremost, then reversing the whole bag to bring its mouth end foremost and the rear flap of the diamond fold to the front relatively to the direction of feed, then folding back this flap to form the final fold of the satchel-bottom, and subsequently discharging the completed bag. The principal co-operating elements of the machinery by which the whole bag is thus reversed and the final fold made are a rotating reversing-roll, which receives and is provided with means to retain the folded front end of the satchel-bottom, and a rotating reversing-bar, which travels in the same direction with, but at stated intervals at a greater speed than, the reversing-roll, and wipes against and acts to carry forward around said reversing-roll the body of the bag, so as to bring its mouth end foremost. One of these instrumentalities—the reversing-roll—I can make use of without the reversing-bar, in order to partially reverse the bag and make the final fold, by making at the same time a blind fold in the body of the bag, as will be hereinafter described.

The nature of my improvement and the manner in which the same is or may be carried into effect can best be explained and understood by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical central section, partly in elevation, of a satchel-bottom-paper-bag machine containing my improvements, only so much of the machine being represented as needed for the purposes of

explanation. Fig. 2 is an elevation of that end of the machine from which the bag is discharged. Fig. 3 is a detail view in elevation, representing the nipper and the third folder in the position they occupy on the reversing-roll at the time the third fold is made. Fig. 4 is a side elevation, partly in section, of the sector-gear which carries the reversing-bar and the fixed eccentric-hub on which said gear is mounted. Fig. 5 is a perspective view of said hub, together with a portion of the rotary shaft, which it loosely encircles. Figs. 6, 7, and 8 are diagrammatic views representing the reversing-roll, nipper, and reversing-bar in positions which they respectively assume during a revolution of the roll. Fig. 9 is a perspective view of the third folder detached. Fig. 10 is a perspective view of the nipper detached. Fig. 11 is a side elevation of a modification of the nipper-actuating cam. Figs. 12 to 17, inclusive, represent modifications hereinafter more particularly referred to.

The parts of the machine are supported in a frame, A, of suitable construction.

The carrier, which carries forward the blank while the second fold is being made, is similar to the carrier described in several of my recent Letters Patent—*e. g.*, Letters Patent No. 222,465, dated December 9, 1879—consisting of carrying-tapes C, passing around rolls *a d*, and apron D, passing around rolls *g i*, and folding-roll B. This carrier is arranged and operates substantially as described in my aforesaid Letters Patent.

E are folders, which may be movable, as described in my Letters Patent No. 222,465, but are here shown as stationary, and act to fold back the front point or flap, *f'*, of diamond fold of the blank *f*, as indicated in Fig. 1, thus forming the second fold, which is pressed down by the final rolls *d i* as it passes between them. Before the diamond-folded blank reaches the carrier it passes between rolls F G, the upper one of which is provided with paste-ridges G', which deposit the usual parallel lines of paste upon the diamond fold. The paste is supplied to the ridges from the paste-trough G⁴ through the intermediary of rolls G² G³, in the usual way.

Upon each end of the roll *d* is a cam, *d'*, the periphery of which runs in contact with an annular rim, *i'*, of roll *i*, the object of this ar-

rangement being to separate the tape-carrying
 roll d from the apron-carrying roll i at stated
 intervals, for purposes hereinafter mentioned;
 and to admit of this movement the upper roll,
 5 d , has its bearing in boxes which are movable
 and controlled by pressure-springs d^2 , as will
 be understood without further explanation. In
 order that the cam d' may be adjusted so as to
 set it to any desired position, or vary the rela-
 10 tive length of its different surfaces, I make it,
 as shown in Fig. 1, of two overlapping parts,
 movable on the shaft or axle of roll d as an
 axis, and united or clamped together and to
 the end of the roll by set-screws d^3 , which pass
 15 into the roll through curved slots in the cam's
 sections.

I remark here that while I prefer the form
 of carrier just described, yet carriers of other
 known kinds may be employed for the purpose
 20 of delivering the partly-folded blank to the
 mechanism now about to be described.

Below the discharge end of the carrier, and
 in such position that the nipper hereinafter
 described will take hold on the blank passing
 25 out and down from between the final rolls $d i$,
 is the device H, which I have termed the "re-
 versing-roll." Said roll, as indicated in Fig.
 2, is a semi-roll having its power-driven shaft
 H' supported in proper bearings in the frame
 30 A. In bearings on the roll is mounted the
 nipper I, (shown more plainly in Fig. 10,) hav-
 ing its shaft I' projecting through the ends of
 the reversing-roll. Upon each end of the
 shaft is a crank-arm, b , with a roller-stud, c ,
 35 which travels around a stationary cam, e , fixed
 to some suitable part of the machine-frame.
 The roller-stud is held against the periphery
 of the cam by a spring, h , attached at one end
 to arm b and at the other end to roll H.

40 Encirclingly loosely the shaft H' on each side
 of the machine is a cylindrical eccentric sleeve
 or boss, J, fixed to the machine-frame. (See
 Figs. 4, 5.) On this boss is mounted the hub
 of the revolving sector-gear K, to which is
 45 fixed the device hereinbefore termed by me
 the "reversing-bar," consisting of the two
 radial arms j (attached one to each of the ec-
 centrically-mounted sector-gear) and the cross-
 bar k . The main object of thus mounting the
 50 reversing-bar eccentrically to the reversing-
 roll is that it may revolve without striking
 against the third folder, (hereinafter referred
 to,) which latter device must run in yielding
 contact with the semi-cylindrical periphery of
 55 the reversing-roll. The cutting away of the
 reversing-roll is due to the eccentric placing
 of the reversing-bar, for were the roll not thus
 cut away the reversing-bar could not, of course,
 clear it.

60 The sector-gear K has the two sets of teeth
 $l m$, and is driven by a like sector-gear, L, with
 corresponding sets of teeth $l' m'$, the teeth l
 meshing with the teeth m' , and the teeth m
 with the teeth l' . Gear L is fast on a shaft,
 65 M, which is driven from shaft H' through the
 intermediary of pinions N N'. The result of
 this arrangement is that the reversing-bar

makes one complete revolution in the same
 time that the reversing-roll makes one revolu-
 tion; but owing to the sector-gear connection 70
 it moves for about two-thirds of a revolution
 at much greater speed than the reversing-roll,
 and during the remaining one-third of the rev-
 olution at a proportionately slower rate. The
 object of this is that the reversing-bar may 75
 whip or wipe the bag-blank around the roll, so
 as to bring the mouth end of the blank fore-
 most, as will presently be described.

P is the third folder, which is hung on a rod,
 P', and capable of a limited oscillatory move- 80
 ment thereon, determined by the length of the
 recess or slot n in its hub, Fig. 9, into which
 projects the stop-pin n' on the rod P'. A spring,
 o , presses the folder forward, so that it will
 bear with yielding pressure against cylindrical 85
 portion of the reversing-roll.

The operation of the above-described mech-
 anism, all the power-driven parts of which are
 continuously moving, is as follows: The blanks,
 diamond fold uppermost, pass along through 90
 the carrier and out from between the final
 rolls $d i$. Two blanks, f , are shown in Fig. 1.
 The rear one is just about having the front
 point or flap, f' , of its diamond fold folded
 back in order to form the second fold. The 95
 front one, with its front flap folded, has passed
 far enough out from between the rolls $d i$ to
 meet the reversing-roll. In this position its
 partly-folded end has entered between the re-
 versing-roll and the open nipper, as shown in 100
 Fig. 6, the reversing-bar having the position in-
 dicated by the dotted lines, and the upper part
 or mouth end of the blank being still held by
 the carrier. The body of the blank thus ex-
 tends between the carrier and the reversing- 105
 roll, and it is from this point that the opera-
 tion will be more particularly described. The
 nipper now closes down on the blank, the
 points at which its forked front end takes hold
 of the blank determining the line of fold of 110
 the rear flap, f^2 , of the diamond fold. Simul-
 taneously the rolls $d i$ separate enough to re-
 lease hold on the mouth end of the blank, and
 the reversing-bar (which is just about in con-
 tact with the body of the blank) takes up its 115
 rapid rate of rotation and wipes the blank-
 body forward, bringing its mouth end fore-
 most and its rear flap, f^2 , to the front of the
 satchel-bottom. This flap, as it passes beneath 120
 the third folder, is wiped back and pressed
 down by the latter, which passes between the
 forked end of the nipper, and the third fold is
 thus made, as indicated in Fig. 7. The re-
 versing-bar, in its rapid movement, has en- 125
 tirely cleared the bag and occupies the posi-
 tion indicated by dotted lines in Fig. 7. From
 that point onward until it reaches the posi-
 tion indicated in Fig. 6, it moves slowly, so as
 to allow the nipper and reversing-roll to catch 130
 up with it. When the reversing-roll has trav-
 eled from the position shown in Fig. 7 to that
 shown in Fig. 8 the nipper opens and the com-
 pleted bag drops from the reversing-roll into
 a proper receptacle, R. Further movement of

the reversing-roll brings the parts again to the proper position, as in Fig. 6, to receive the next succeeding blank.

It will thus be seen that I completely reverse the whole blank after the second and before the third or final fold is made, thus bringing each flap successively to the front relatively to the feed, so that each may in succession be wiped back and folded down by a blade or blades or their equivalent, beneath which the blank passes, and discharging the blank mouth end foremost from the machine.

I remark that the rise on the nipper-operating cam may be formed of a stiff spring, as indicated at e' , Fig. 11, which will enable the nipper to accommodate itself to inequalities in the thickness of the material grasped by it.

In the fore part of this specification I have mentioned the fact that the reversing-roll can be used without the reversing-bar to partially reverse the bag and make the final fold by making at the same time a blind fold in the body of the bag. Such an arrangement is shown in side elevation in Figs. 12 and 13.

Like letters in these figures and in the figures already described indicate corresponding parts.

The reversing-roll here is cylindrical, and is set closer to the final rolls d i of the carrier, a portion only of which is shown. The nipper takes the blank in the same way and at the same point as already described, and the reversing-roll carries the blank along, partly reversing it, as shown, so that in passing under the third folder, in order to make the final fold, a blind fold is made, as indicated in Fig. 12. When, after having passed the third folder, the nipper rises and releases the blank, an oscillatory knocker, S , which lies normally in a recess in the roll at a point where it will be under the part of the blank held between the nipper and the roll, is caused to suddenly protrude and to throw the blank out from beneath the nipper, as indicated in Fig. 13. The knocker is shown in plan view in Fig. 17 in position in the roll. It is also shown detached in Fig. 15. It consists, as there shown, of a finger attached to an oscillatory shaft, r , mounted properly in the reversing-roll, and carrying at its end which protrudes therefrom two fingers, s t , which wipe against studs v fixed to the frame, and extending into their path in such manner as to throw the knocker S out from and withdraw it into the reversing-roll at proper times. From the reversing-roll the blank may, if desired, pass down between power-driven delivery-rolls, indicated at w by dotted lines in Fig. 13.

In lieu of using the stationary fingers or blades E , Figs. 1 and 2, to make the second fold, I can employ an oscillatory blade, E' , as in Fig. 14, moved in one direction by a spring, x , and in the other direction by a pin, y , or a cam or its equivalent on each head or end of the roll g . The blade forms part of a frame shown separately in Fig. 15, which is hung on

suitable studs on the frame, with its ends y' in position to be acted on by the pin y , which operates to depress the blade just as the front flap of the diamond has come under it to the proper extent, said flap riding upon the idle roll z . The sudden downward movement of the blade creases the flap and causes it, as the blank continues to move forward, to pass under and be folded back by the roll z .

I remark, in conclusion, that while I prefer to employ a nipper such as described for the purpose of retaining for the prescribed time the blank on the reversing-roll and determining the line of the last fold, yet it is manifest that other means may be employed for the purpose—as, for instance, a pocket of proper depth and shape on the reversing-roll. I do not therefore restrict myself to the particular instrumentality herein shown in illustration of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. The improvement in the art of making satchel-bottom paper bags which consists in reversing the blank while being fed along diamond fold foremost, so as to bring its mouth end foremost before folding that flap of the diamond which overlies the body of the bag-blank, substantially as hereinbefore set forth.

2. That step in the art of making satchel-bottom paper bags which consists in reversing the whole bag while being fed along to bring its mouth end foremost after the second fold and before the final is made, substantially as hereinbefore set forth.

3. The improvement in the art of folding the flaps of the diamond fold of a bag-blank, in order to make the second and final folds of the satchel-bottom, which consists in first folding back the front flap of the diamond fold to form the second fold, the bag-blank traveling diamond-folded end foremost, then reversing the whole blank so as to bring its mouth end foremost and the rear flap of the diamond fold to the front relatively to the direction of feed, then folding back this flap to form the final fold of the satchel-bottom, and subsequently discharging the completed bag, all substantially as hereinbefore set forth.

4. The combination, substantially as hereinbefore set forth, of the rotating reversing-roll, means, substantially as described, carried by said roll, for receiving and retaining the front end of the partially-folded blank and determining the line of the final fold, and the rotating reversing-bar.

5. The combination, substantially as hereinbefore set forth, of the rotating reversing-roll, the nipper carried thereon and operated at stated intervals to grasp and release the blank, the rotating reversing-bar, and the third folder.

6. The combination, with the carrier, of the reversing-roll, provided with means, substantially as described, for receiving and retaining the blank delivered to it diamond-folded end

foremost from the carrier, and rotated in a direction to bring to the front relatively to the direction of its movement that flap of the diamond which overlies the body of the blank, substantially as hereinbefore set forth.

7. The reversing-roll and the nipper or its equivalent, as specified, in combination with the eccentrically-mounted and variably-speeded power-driven rotary reversing-bar, these parts being arranged and operated to move with relation to one another substantially in the manner and for the purposes hereinbefore set forth.

8. The carrier operated, substantially as described, to relax its hold on the blank at stated

intervals, in combination with the third folder, the reversing-roll, the nipper or its equivalent, as specified, and the rotating reversing-bar, these parts being arranged and operated to move with relation to one another substantially in the manner and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 7th day of December, 1880.

WILLIAM C. CROSS.

Witnesses:

E. A. DICK,
W. C. LANE.