

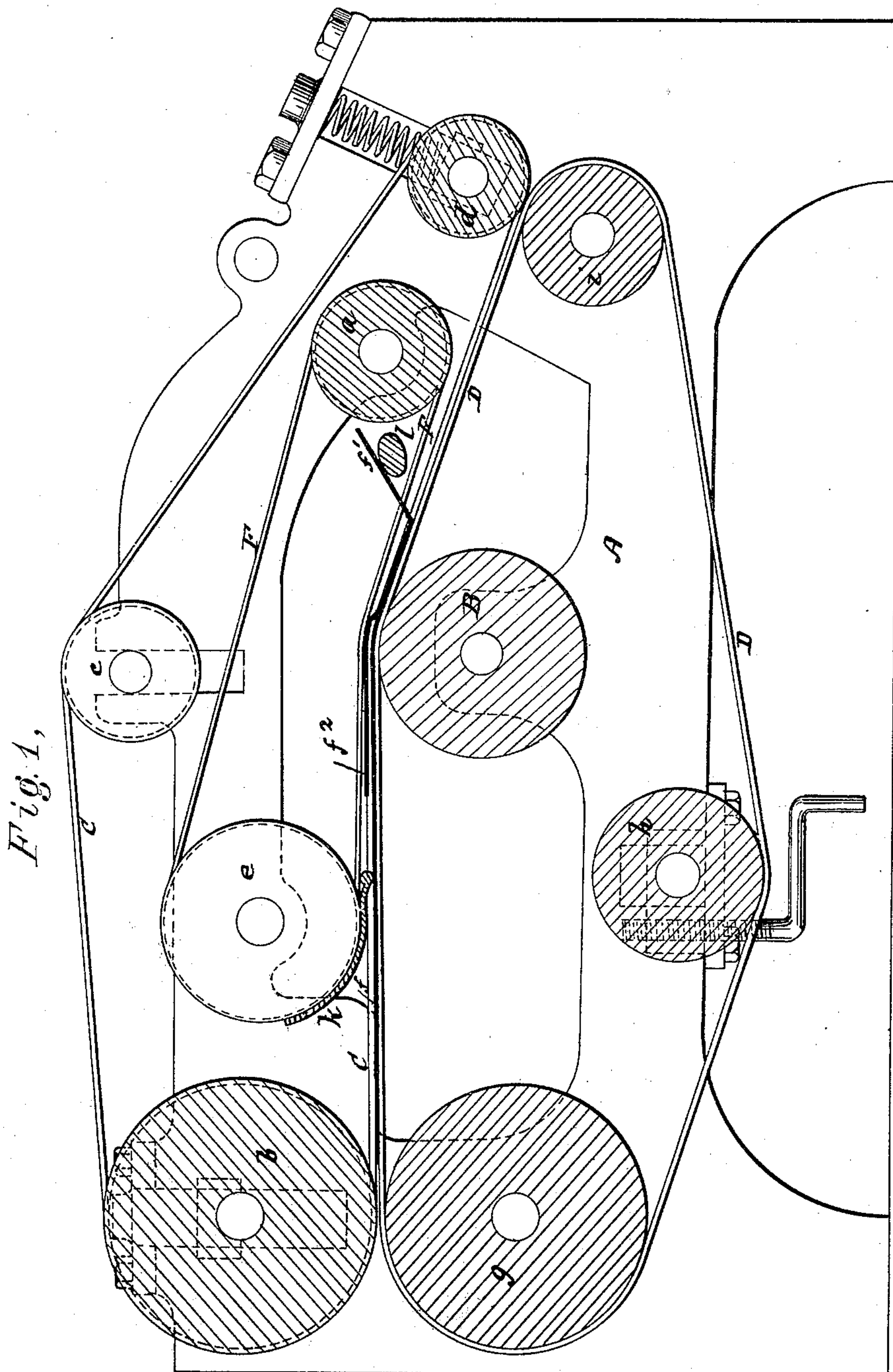
(No Model.)

4 Sheets--Sheet I.

W. C. CROSS.  
Paper Bag Machine.

No. 232,945.

Patented Oct. 5, 1880.



Witnesses:

C. F. Erick  
A. P. Love

Inventor:

W<sup>m</sup>. C. Cross,  
by W. Bailey  
his Atty.

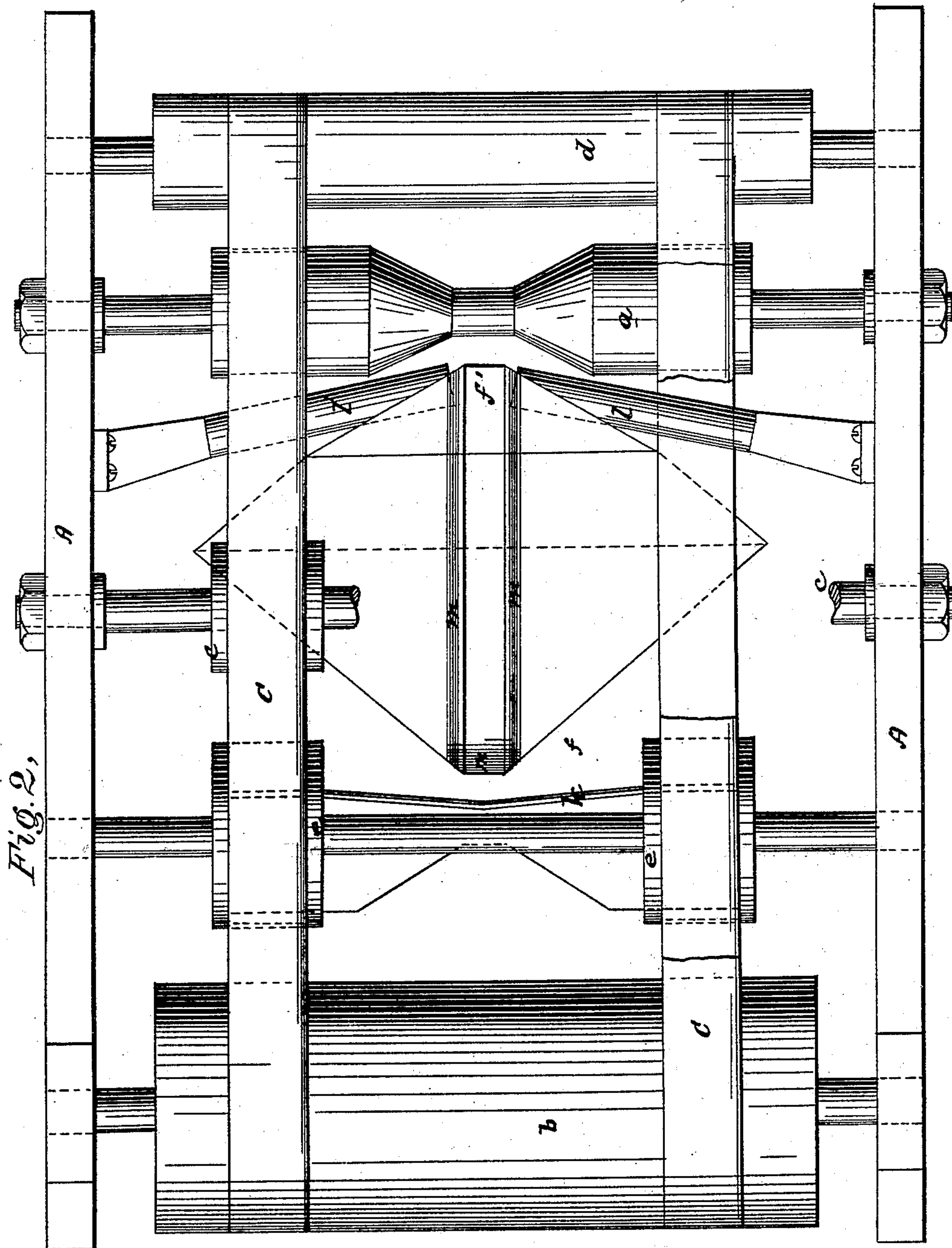
(No Model.)

4 Sheets--Sheet 2.

W. C. CROSS.  
Paper Bag Machine.

**No. 232,945.**

**Patented Oct. 5, 1880.**



Witnesses:

McGeorgie  
Oct. 1. 1871

Inventor:

Wm C. Cross,  
by W. Bailey  
his Atty.

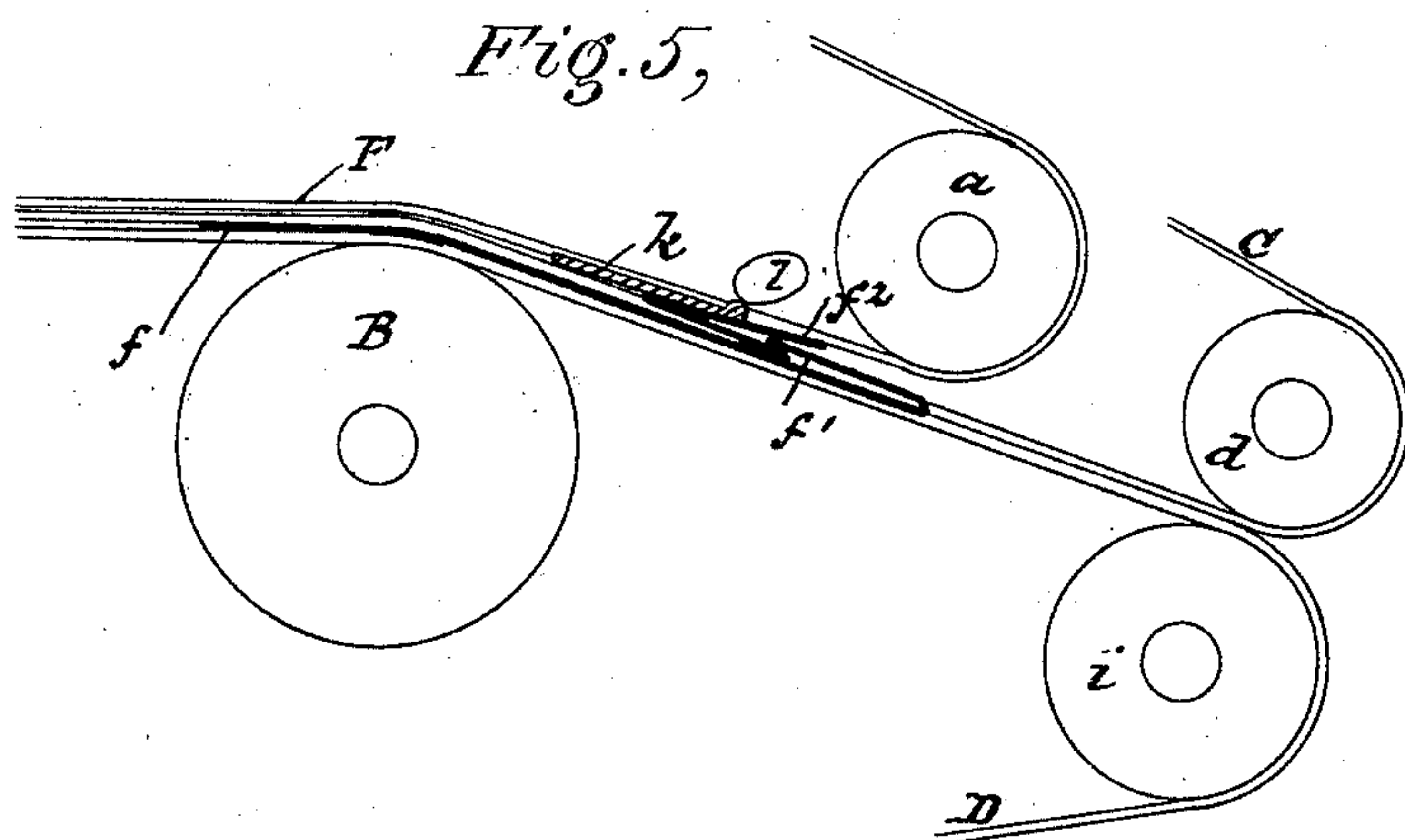
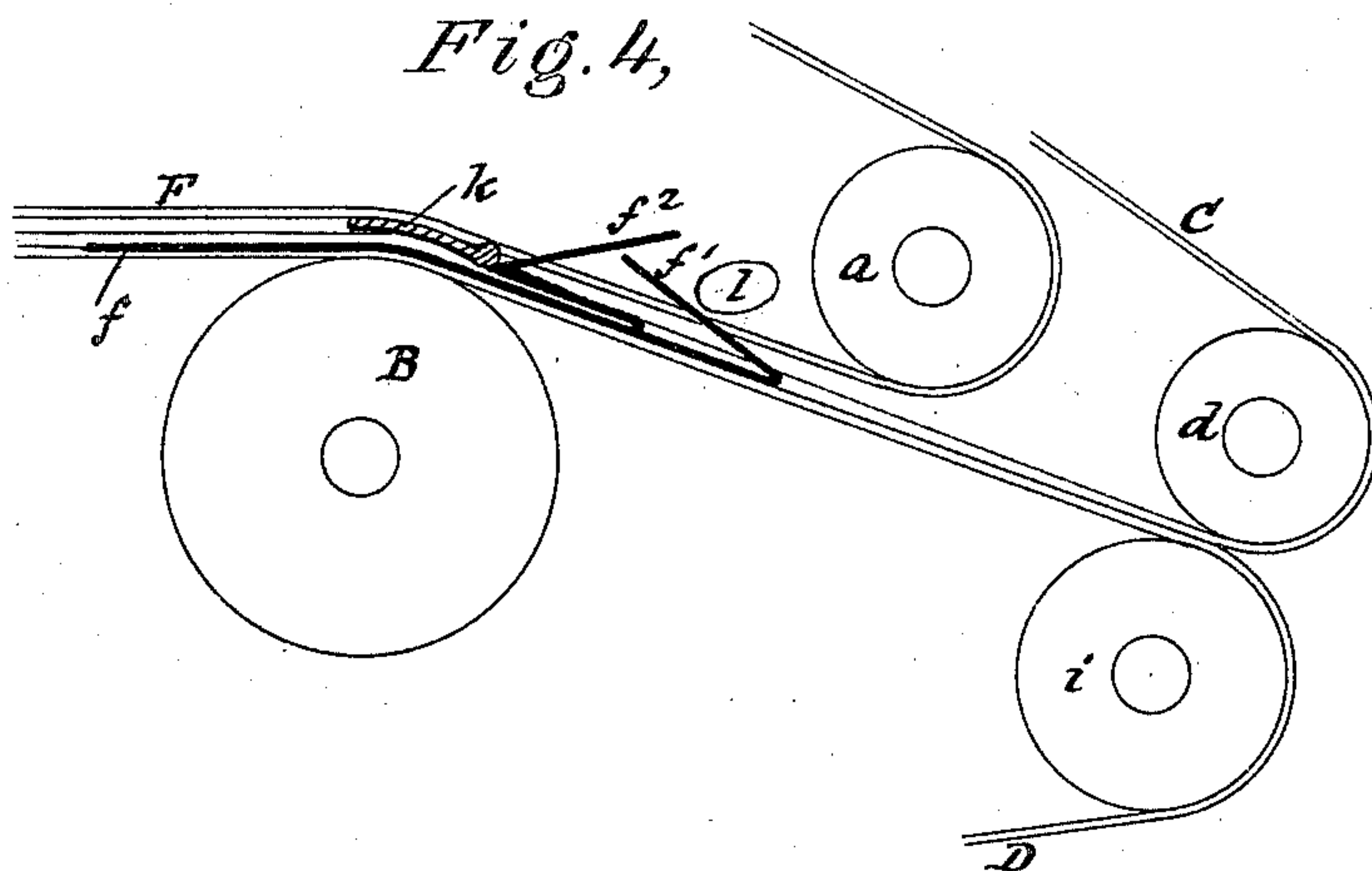
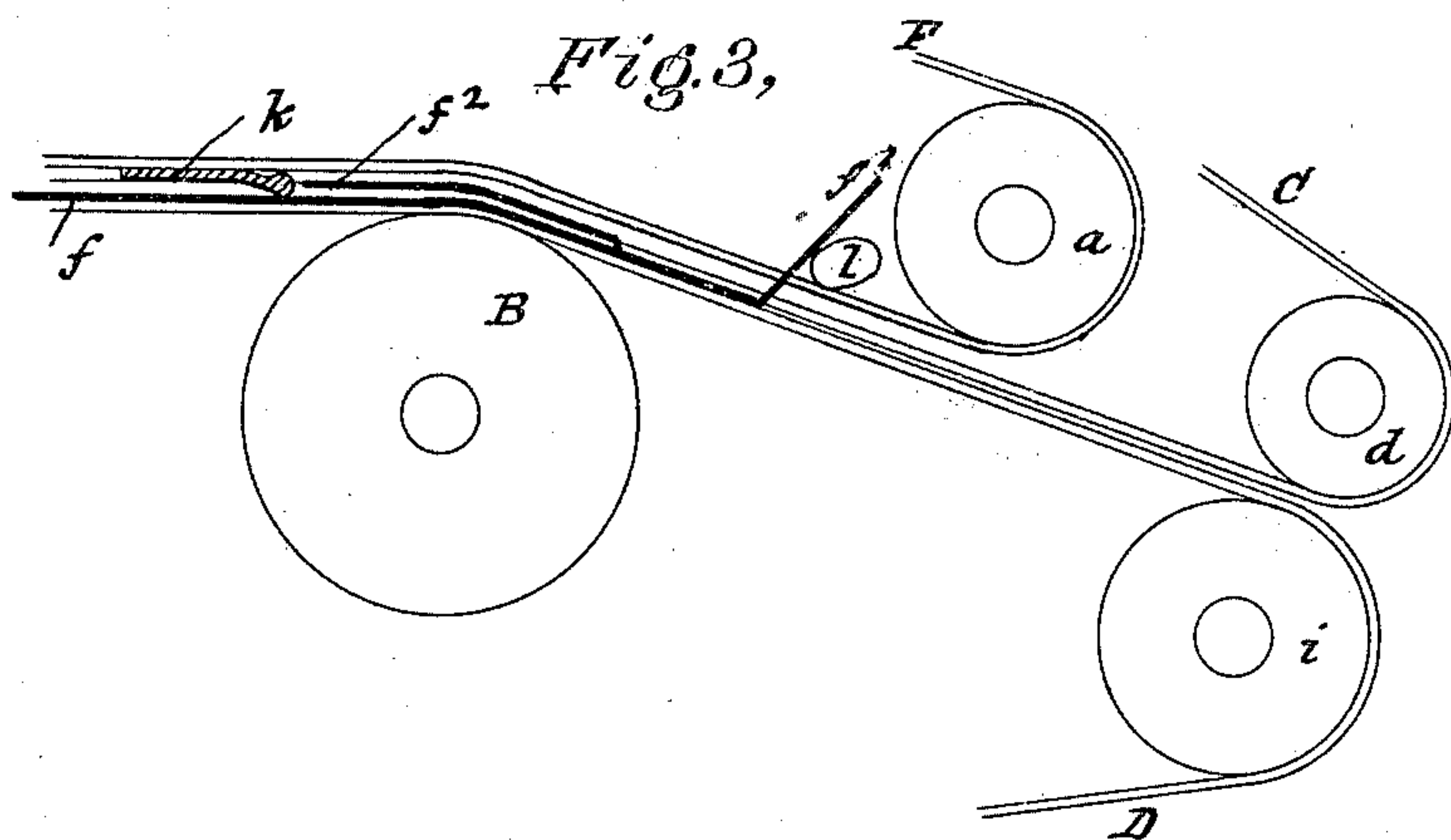
(No Model.)

4 Sheets—Sheet 3.

W. C. CROSS.  
Paper Bag Machine.

No. 232,945.

Patented Oct. 5, 1880.



Witnesses:

*McGeorgie*  
*Peck*

Inventor:

*W. C. Cross,*  
by *W. Bailey*  
his Atty.



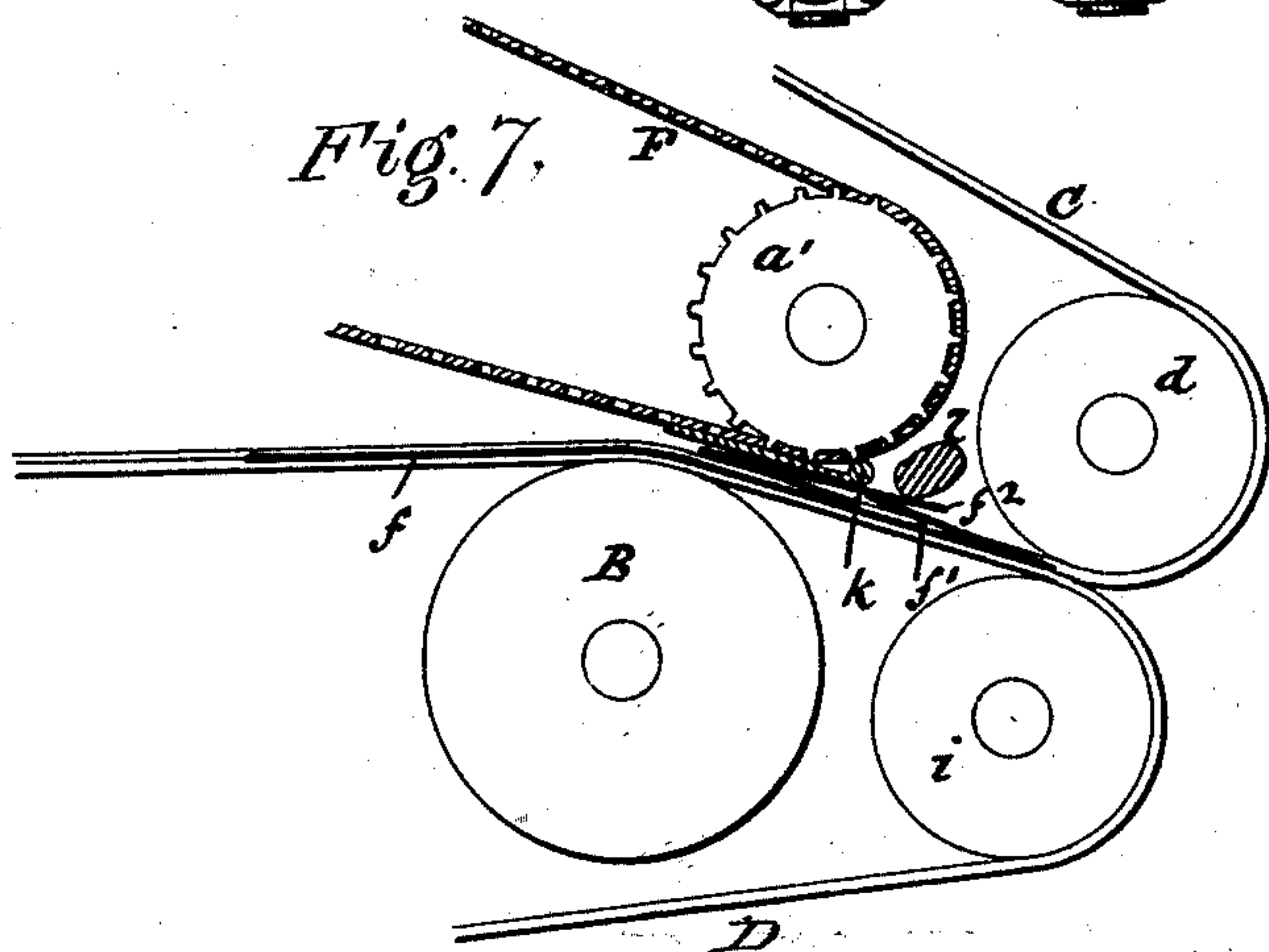
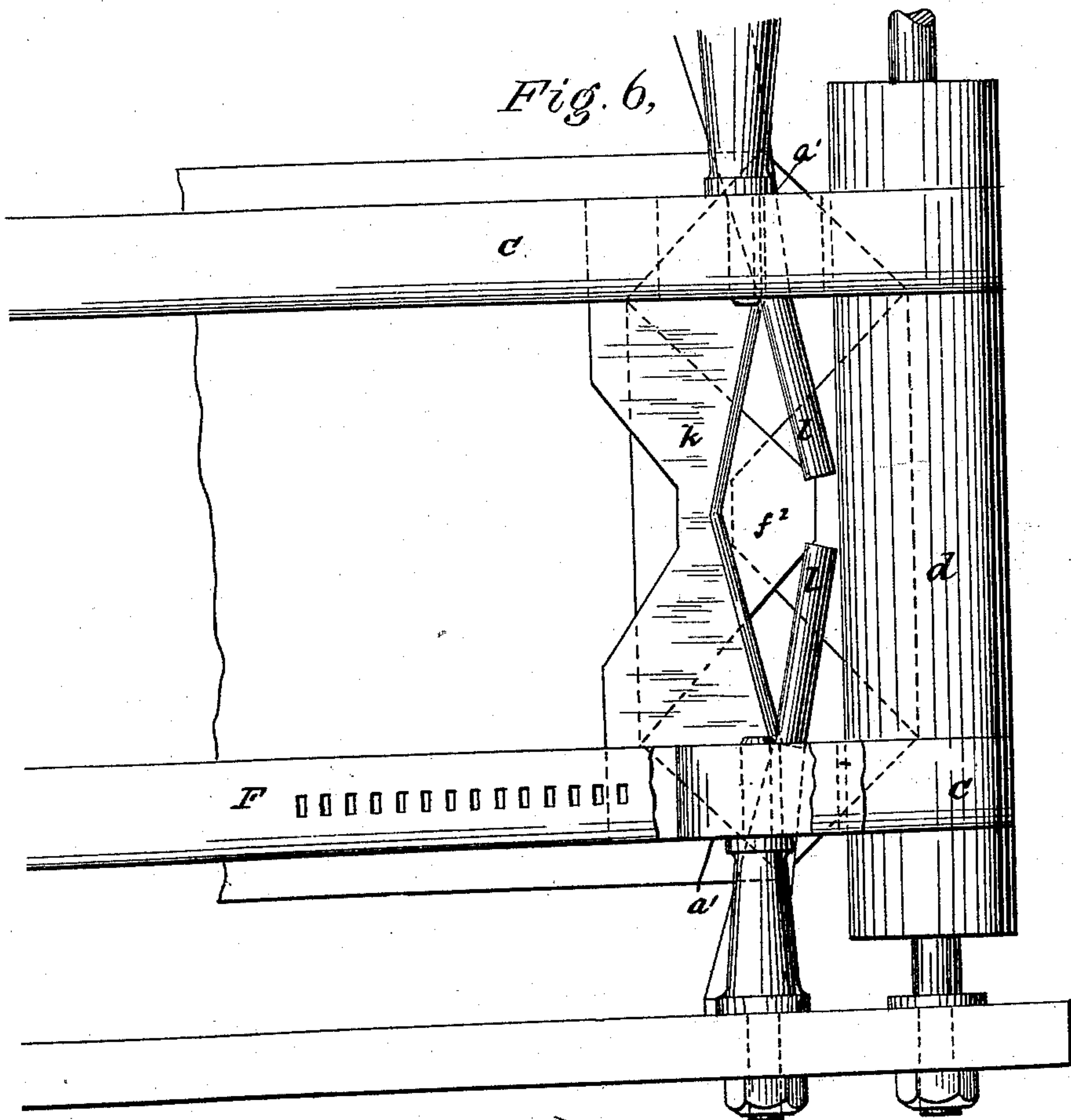
(No Model.)

4 Sheets—Sheet 4.

W. C. CROSS.  
Paper Bag Machine.

No. 232,945.

Patented Oct. 5, 1880.



Witnesses:

*M. Gorgis*  
*E. A. Dick*

Inventor

*Wm. C. Cross,*  
*by M. Bailey*  
*his Atty.*



# UNITED STATES PATENT OFFICE.

WILLIAM C. CROSS, OF BOSTON, MASSACHUSETTS.

## PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 232,945, dated October 5, 1880.

Application filed August 30, 1880. (No model.)

*To all whom it may concern:*

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

My invention has relation to that portion of satchel-bottom paper-bag machinery which makes the second and final folds required after the diamond is formed to complete the satchel-bottom.

The invention consists in combining, substantially as hereinafter described, with the carrying-tapes which feed along the diamond-folded blank and determine the lines of the second and final folds an auxiliary endless apron or belt which travels in the same direction with, but at a greater speed than, the carrying-tapes, and is provided with a folding plate, strip, or blade, which enters between the rear flap of the diamond fold and the body of the bag-blank and acts to fold this flap over and down upon the central part of the diamond fold.

The invention further consists in combining with the foregoing instrumentalities a folding device which acts to fold the front flap of the diamond to make the other fold required for the satchel-bottom.

Either of the folders may act first—that is to say, the front flap of the diamond may be folded first and then be overlapped by the rear flap, or the operation may be reversed. I prefer, however, that the front flap should be folded first.

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

Figure 1 is a longitudinal vertical central section, and Fig. 2 a plan, of machinery embodying my invention. Figs. 3, 4, 5 are diagrams representing the position of the parts during the progress of the folding operation.

I do not here show the mechanism for forming and pasting and cutting the tubular blank and for making the diamond fold. These may be of any suitable construction. I can use, for instance, the diamond-fold-forming

mechanism shown in my Letters Patent No. 221,531, dated November 11, 1879, from which mechanism the diamond-folded blanks can be delivered to the machinery about to be described.

In the said machinery I use carrying-tapes, arranged and operating substantially as shown and described in my Letters Patent No. 222,465, December 9, 1879—that is to say, the tapes are stretched, the lower ones, D, around the rolls *g B i h*, (the latter being a tension-roll,) and the upper ones, C, around the rolls *b d c* (the latter being a tension-roll.) The two sets of tapes run in contact and the rolls *g b* are power driven.

An apron can, if desired, be substituted for the lower tapes, D. All the parts are supported in a frame, A, of suitable construction. The blank *f*, to be operated on, passes between the two sets of tapes, the diamond fold uppermost. It is held at its side edges by the tapes, and the distance from side to side, between the tapes, determines the size of fold, which can be varied by setting the tapes of each set nearer to or farther from one another. The farther end of the apron formed by the tapes has a downward inclination between the points B and *i*, so that as the blank is fed along first one point and then the other of the diamond fold may tilt or stand up sufficiently to permit the folder to pass between it and the apron.

The parts thus far described are organized and operate substantially in the manner described in my aforesaid Letters Patent No. 222,465.

The auxiliary endless apron hereinbefore referred to is shown at F. It is stretched around rolls *e a*, mounted in bearings in frame A, the roll *a* being power driven. This auxiliary apron, in this instance, consists of two tapes which run along above and in contact with the lower lengths of the upper tapes, C.

In order to insure entire accuracy of movement they are perforated, as indicated in Fig. 7, the perforations registering and meshing with studs or spurs on the power-driven roll *a*, or the bosses *a'*, which, in that figure, take the place of the said roll. This roll is driven by gearing from the main or first shaft, the gearing being such as to cause the apron F to



travel at a rate of speed sufficiently greater than that of the carrying-tapes to do the work hereinafter specified.

Inasmuch as gearing of this kind is well known it is not necessary to show or describe it here. The apron F, at the front, is inclined downward, as shown, so as to follow the downward inclination of the carrying-tapes. Attached to and extending crosswise between the tapes of the auxiliary apron F is a blade, strip, or plate, *k*, which is made of sheet metal or other suitable material.

The movement of the parts is so timed that the blade reaches the point of the rear flap of the diamond fold just as the blank has passed far enough down the inclined part of the carrying-tapes to tilt this point up; then, as the apron F travels faster than the blank-carrying tapes, the blade conforming to the tape-surface will advance under the flap and finally turn it over and fold it down, and return around the rolls *a* *c*, and operate upon the next succeeding blank.

The auxiliary apron can be made to exactly conform in its movements to the requirements of the work by varying its speed (which can be accomplished by changing its driving-gearing) or by lengthening or shortening it, which can be done by providing endless tapes of different lengths, and by making one of the rolls—as, for instance, the roll *c*—adjustable to and from the other roll *a* to conform to the length of tapes required.

The folding of the front flap of the diamond fold can be effected by various instrumentalities, as, for instance, by the use of vibrating or movable fingers, as shown in my Letters Patent No. 222,465.

The device which I have here shown consists of two stationary fingers, *l*, fixed to the frame, one on each side, and projecting obliquely toward the center, so as to nearly meet over the inclined portion of the carrying-tapes.

The fingers can be placed so as to be to the rear of the point where the traveling folding-blade quits the blank, as shown in Figs. 1, 2, 3, 4, 5, where the fingers are at such an elevation above the carrying-tapes as to permit the blade to pass beneath them, while still low enough to pass beneath the upwardly-tilted point of the front flap of the diamond-folded blank; or they may be so placed as to extend in advance of that point, as indicated in Figs. 6 and 7, the machinery in these figures being the same as that shown in the preceding figures, save as to the position of the fingers and as to the roll *a*, which is replaced by two short bosses or wheels, *a'*, supported upon suitable short axles projecting from the frame A.

The blank *f* is to be pasted along the dark lines *m*. This may be done by suitable and well-known instrumentalities; but I prefer to cut away the roll *b*, so as to form thereon paste-ridges of the proper shape and dimensions, to

be supplied with paste by well-known means, which will be deposited upon the diamond-fold face of the blank as the latter passes beneath it.

The operation of this machinery is as follows, it being understood that the blank moves continuously and uninterruptedly through the machine while being acted on: The parts moving in the direction indicated by the arrows, and the diamond-folded blank traveling along with the tapes and pasted along the lines *m*, as soon as the blank travels far enough to bring the points of its front flap, *f'*, beyond the roll B this point will stand up from the tapes, while the body of the blank confined between the parts C D will travel along down the inclined part of the tapes. The part *f'* will pass up over the fingers *l*, which will act to fold over this part, as indicated in Fig. 3, on a line determined by the points at which the front portion of the diamond is held by the carrying-tapes. By this time the blank has traveled far enough to bring the diamond fold to a position in which the point of the rear flap, *f''*, will also be tilted or raised, and at this time the folding-blade on the auxiliary apron has reached a position where it passes between the part *f''* and the carrying-tapes, and, traveling faster than the blank, folds said flap over upon the flap *f'*, as indicated in Fig. 4, pressing the parts down and completing the satchel-bottom, as shown in Fig. 5. The complete bag is then discharged from the machine.

The fingers *l* are inclined obliquely to the front and an interval is left between their adjoining ends, so that they may not interfere with the turning down of the flap *f''* of the traveling bag-blank; also, the folding-blade carried by the auxiliary apron is cut away at the rear to the shape indicated at *n*, in order to exercise continued pressure with the best effect upon the exterior or final-fold flap *f''*.

I do not claim, broadly, a folder or folding-apron moving in the same direction with, but at a greater speed than, the blank-carrier; but,

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

1. The combination, substantially as set forth, with the carrier, which feeds along the diamond-folded blank and holds it at points which determine the lines of the second and final folds, inclined at its front so as to cause the end flaps of the blank to successively tilt or rise, as described, of the auxiliary apron correspondingly inclined at the front, and traveling in the same direction with, but at a greater speed than, the carrying-tapes, and the folding-blade attached to said apron and acting to fold the rear flap of the diamond fold while the blank is in motion.

2. The combination of the blank-feeding carrier, inclined at the front, as described, the

correspondingly-inclined auxiliary traveling  
apron, the folding-blade carried by said apron,  
and the front flap-folder, these parts being  
combined and arranged to operate jointly,  
5 substantially as hereinbefore set forth.

3. The combination, substantially as here-  
inbefore set forth, of the carrying-tapes, in-  
clined at their front, as described, the corre-  
spondingly-inclined auxiliary traveling apron,

the folding-blade carried by said apron, and to  
the stationary fingers.

In testimony whereof I have hereunto set  
my hand this 12th day of August, 1880.

WILLIAM C. CROSS.

Witnesses:

FRANK T. BENNER,  
GEORGE S. LITTLEFIELD.