

2 Sheets—Sheet 1.

No. 239,456.

Patented March 29, 1881.



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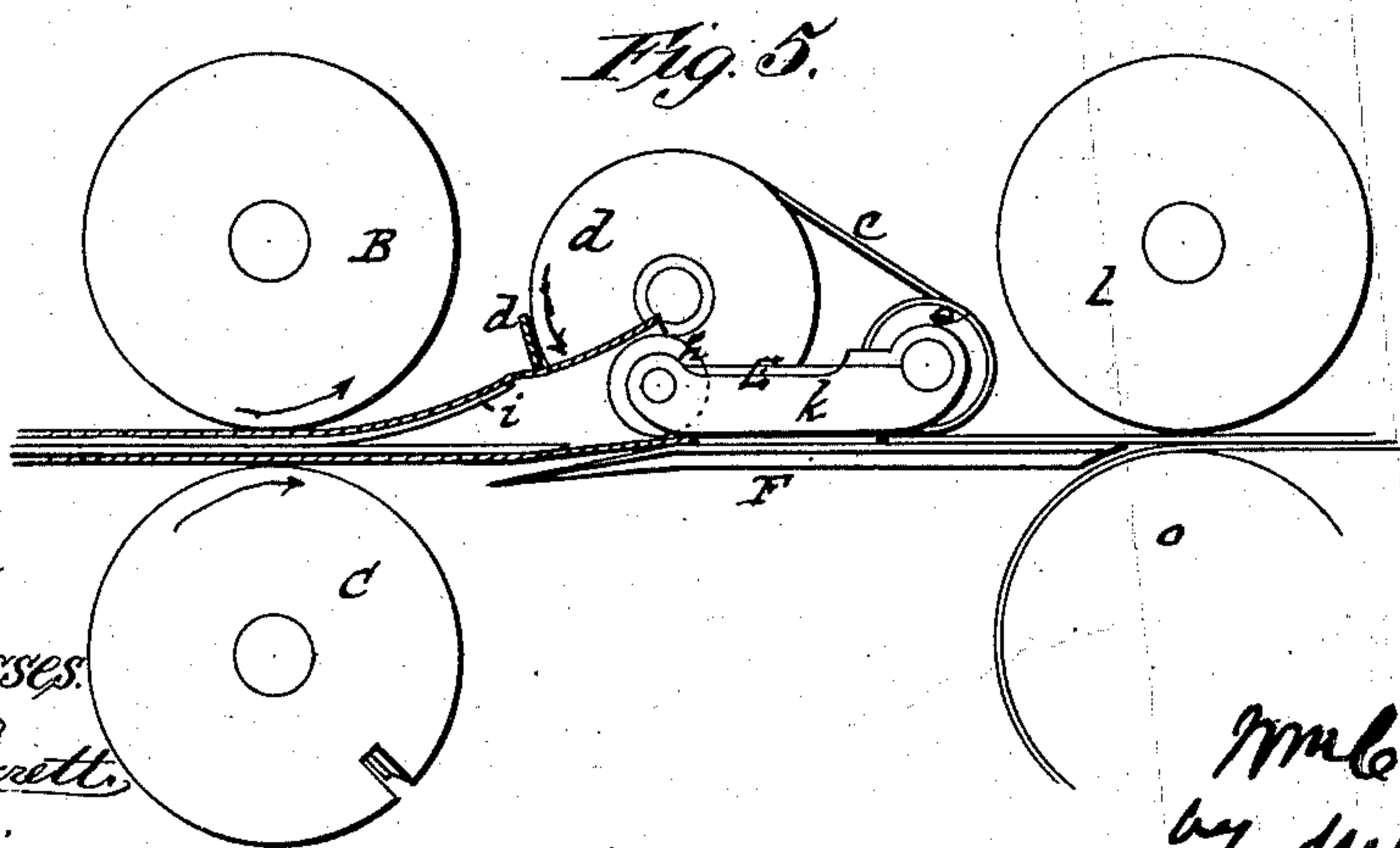
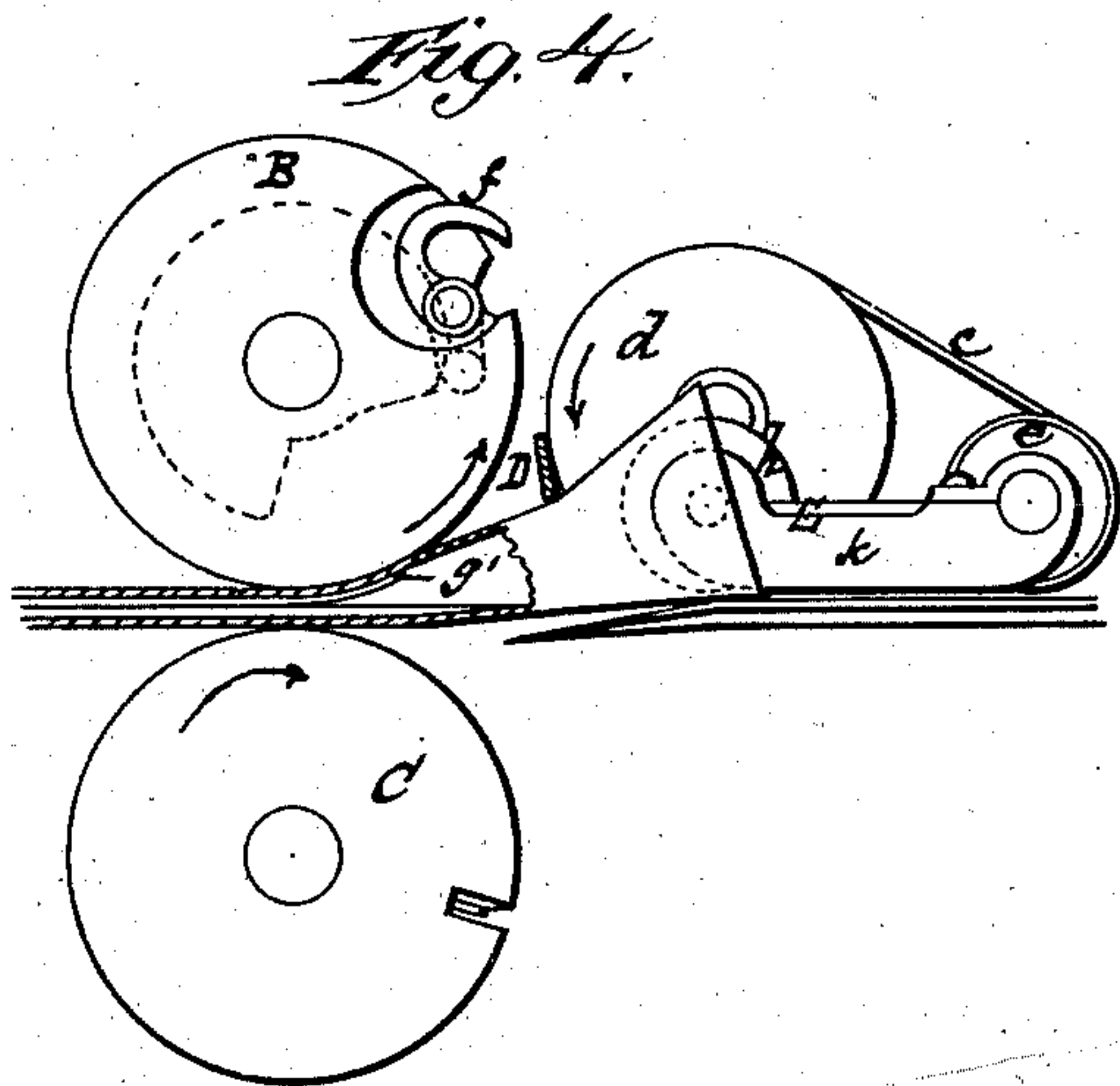
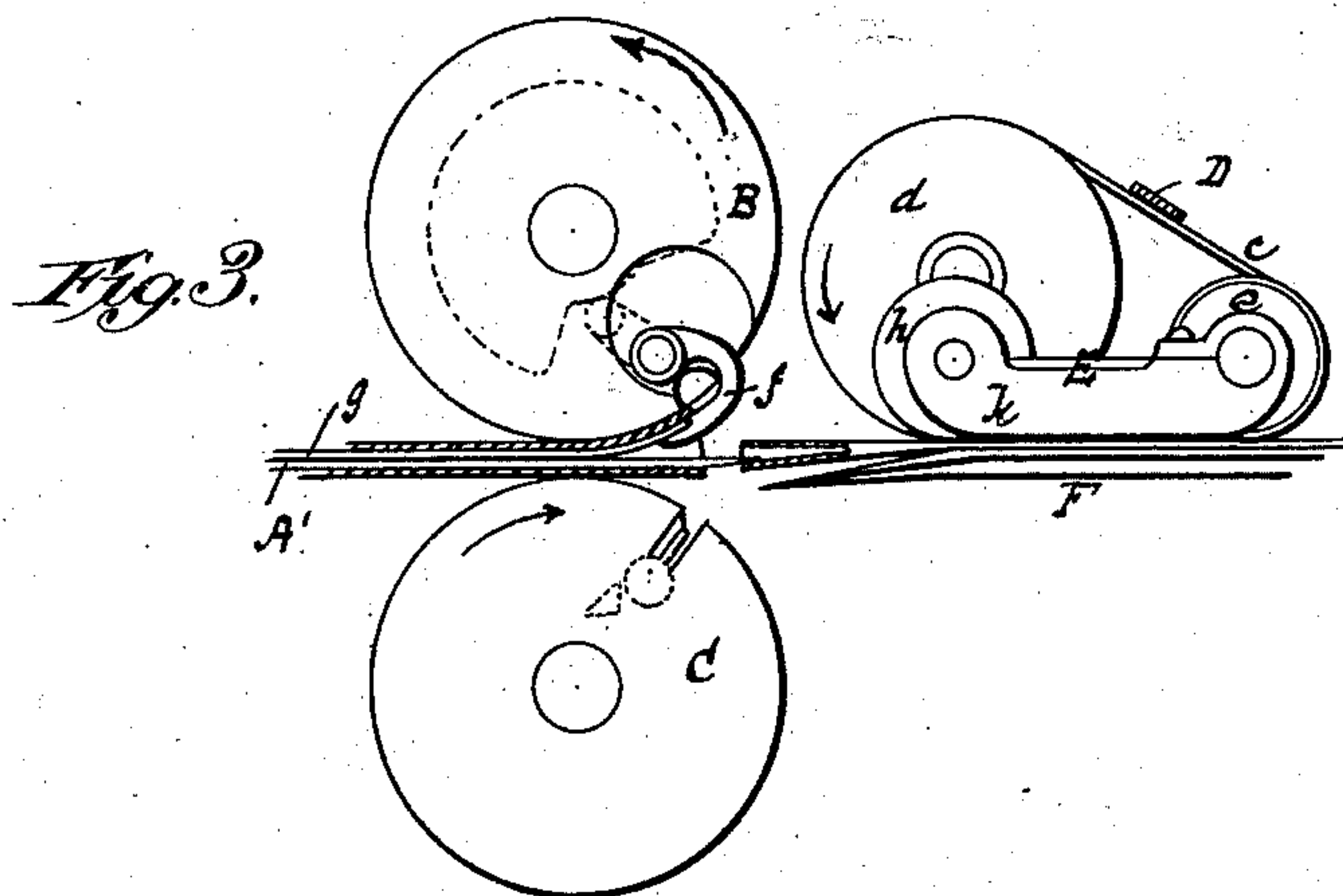
(No Model.)

2 Sheets—Sheet 2.

W. C. CROSS.
Paper Bag Machine

No. 239,456.

Patented March 29, 1881.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM C. CROSS, OF BOSTON, MASSACHUSETTS.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 239,456, dated March 29, 1881.

Application filed January 4, 1881. (No model.)

To all whom it may concern:

Be it known that I, W. 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 invention, in so far as it relates to making the first or diamond fold, may be considered an improvement on that type of machine in which there is combined with a finger, which enters the mouth of the bag-blank as the latter moves forward, a power-driven blade, which travels at the same speed with the blank and acts to crease the upper ply along the central line of fold of the diamond fold and to tuck and carry along said ply under the finger. This blade has been hitherto termed the "plate-knife folder," and the finger has been termed the "guide-finger." Heretofore the plate-knife folder has had a reciprocatory movement to and from the guide-finger, as shown, for instance, in the Knight patent, No. 116,842, and my Letters Patent No. 215,578. This reciprocatory movement is necessarily objectionable in machinery of this class, which to be of practical value must work rapidly.

The use of the reciprocating device renders the machine slower of operation and more liable to get out of adjustment and working order. With a view to removing this objection I make use of a plate-knife folder which, instead of oscillating or reciprocating, moves continuously in one direction, being carried preferably by power-driven endless belts or tapes whose movement is so timed as to bring the plate-knife folder carried by them to, under, and out from beneath the guide-finger, and thence around to again go through the same path of movement. In other words, I impart to the plate-knife folder what is virtually a movement of continuous rotation in lieu of the usual reciprocatory or oscillatory movement.

The second part of my invention is an improvement on the vibratory folders shown and described in my Letters Patent No. 222,465, of December 9, 1879. These folders I make each of two parts, hinged or jointed together in such manner that they may follow during their vibratory movements the folding apron or belt, and lie as nearly as practicable parallel

therewith, the object being to maintain these folders in such position that they will be sure to enter between the body of the blank and that flap of the diamond fold which is tilted up by the passage of the blank over what I have termed in said Letters Patent the "folding-line."

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 sectional elevation of so much of a machine for making satchel-bottom paper bags as is needed for the purposes of explanation. Fig. 2 is a plan of the same. Figs. 3 and 4 are diagrams, hereinafter referred to. Fig. 5 is a longitudinal sectional elevation of a modification to be hereinafter described.

I have omitted from the drawings the frame of the machine and also the driving-gearing of the several parts. These may be of any suitable known construction and arrangement, as will be understood without further explanation. I have also shown the diamond and the second and third fold forming mechanisms in operative connection. It will be understood, however, that my improved diamond-fold-forming mechanism may be used in conjunction with any other second and third fold forming mechanism, and that my improved second and third fold forming mechanism may be used with any other proper diamond-fold-forming mechanism.

A is the front end of the former, around which passes the paper tube from which the bags are to be made. A' is the guide rod or bar fast to and forming a continuation of the former B.

C are the feed-rolls, which are used also to sever the successive blanks from the body of the paper tube. The lower roll, C, carries the reciprocating cutter-blade *a*, and in the other roll, B, is formed a recess, *b*, into which the blade *a* enters when severing the blank. This cutting mechanism is of known construction, and requires no further explanation. That portion of the cross-cut opposite the central guide-rod, A', is made by a cutter in the former A, (not shown,) as has hitherto been customary.

In advance of the feed-rolls is the blade D,

hereinbefore termed the "plate-knife folder." This blade is attached to endless belts or tapes *c*, which are mounted on wheels or rolls *d e*, and are power-driven, being speeded to have the same rate of movement as the feed-rolls.

E is what I have termed the "guide-finger," supported in a horizontal position just over the table F, with its front end just a little back of the front wheels, *d*, of the plate-knife-folder-carrying mechanism. The mouth of the blank to be folded is to be opened to such an extent that while the under ply will pass along beneath the guide-finger, between it and the table below, the upper ply will ride up against or over the front end of the finger, and will there be maintained until operated on by the plate-knife folder. To thus open the mouth of the blank various devices may obviously be employed. One convenient means for the purpose I will describe by reference to Figs. 1, 2, and 3. In the feed-roll B is located about opposite the longitudinal center of the blank a nipper, *f*, fixed on a rock-shaft, *f'*, which projects beyond the roll at one end, and has a radial arm, *f²*, provided at its outer end with a friction-roller, *f³*, which bears against the periphery of a cam, *f⁴*, fixed to the frame of the machine. The stud or friction-roller *f³* is held against this cam by a spring.

Upon the upper face of the guide-bar A' is attached a light spring strip or finger, *g*, which at its outer end has an upward set, and projects beyond the feed-roll, this spring-strip serving to open the mouth of the blank just as it emerges from between the feed-rolls, bringing the upper ply, as indicated in Fig. 3, into a position to be grasped by the nipper *f*, which takes hold of said ply between the forks *g'* of the divided outer end of the spring-opener.

Supposing the parts thus far described to be moving in a direction indicated by the arrows, their operation is as follows: The feed-rolls carry the paper tube along, and at the proper time sever the blank therefrom. The

mouth of the tube, as it emerges from between the feed-rolls, is opened by the light spring-opener, which, as soon as the cut has been made, is free to rise to the position shown in Fig. 3, thus opening the mouth of the blank and bringing the upper ply in position to be taken by the nipper, which descends upon it, as indicated in Fig. 3, the lower ply of the blank passing under the guide-finger. The nipper, which moves with the revolving feed-roll B, draws up the upper ply high enough to bring it above the friction-roll *h* on the outer end of the guide-finger E, and then releases it. The parts at this time occupy the position indicated in diagram, Fig. 4, the upper ply being over the guide-finger. At this instant the plate-knife folder, whose movement is properly timed for the purpose, comes around and strikes the upper ply at the point indicated in Fig. 1, creasing the ply along the central line of fold of the diamond, and, moving in unison with the feed-rolls, tucking the upper ply under the

guide-finger and carrying it and also the body of the blank along beneath the same until, after emerging from beneath the guide-finger, it rises and quits the diamond-folded blank, which by this time has, at its front point, been taken hold of by the mechanism for completing the satchel-bottom. In this way I obtain a plate-knife folder, which moves continuously in the same direction instead of reciprocating.

I can, if desired, dispense entirely with the nipper hereinbefore described, using as an opener a light spring-finger, *i*, (shown in Fig. 5,) which at its free end stands normally up away from the guide-bar A', to which it is attached, and is in such proximity to the front end of the guide-finger that the upper ply of the distended mouth of the blank will pass from the opener up against or over the guide-finger, so as to be held back thereby. This spring-finger and also the one *g* previously described are made light and yielding, so that they may be depressed and lie flat against the guide-bar when tension comes on the upper ply, as indicated, for instance, in Fig. 1. The spring-opener *g* is united to the guide-bar by a slot-and-set-screw connection, *j*, or its equivalent, to permit of the longitudinal adjustment of the same, and the spring-opener *i* may be made similarly adjustable.

I remark that, in lieu of employing a guide-finger such as shown in the drawings, I can make use of a series of small friction-rolls, which will take the place of the shoe *k*, of which the body of the guide-finger is usually composed. The guide-finger shown in Figs. 1 and 2 is hung on the stationary axle, on which the revolving rolls *e* run; but it may be supported in any other suitable manner. The friction-roll *h*, which constitutes the outer or acting end of the guide-finger, need not necessarily be of the small size shown. It may have a largely-increased diameter without impairing its effectiveness.

Before proceeding to a description of the remaining feature of my invention, I remark that provision can readily be made for permitting the plate-knife folder, as it rises, to readily disengage itself from the blank, either by cutting away the rolls *e* in such a manner as to permit the rear flap of the diamond fold to lift, or by driving at an increased rate of speed the rolls *l o*, which take hold of the front point of the diamond-folded blank and carry it along to the second and third fold forming devices. This latter arrangement is shown in the drawings, Fig. 1, the blank *x* in front having been carried along at such an increased rate of speed as to leave quite an interval between it and the blank *y* that follows.

The second and third fold forming mechanism (shown in the drawings) consists of the carrying-tapes G, mounted on the wheels or rolls *l m*, and the endless apron H, mounted on rolls *o p r*, in conjunction with the vibratory folders I. On the shafts of the wheels *l*

and *o* are mounted the paste and counter wheels, which deposit the paste along the center lines of the diamond fold in the usual manner. The apron is inclined at its front, and it
 5 and the tapes and the vibratory folders are power-driven, and are combined and arranged for joint operation in the manner shown and described fully in my Letters Patent No. 222,465, hereinbefore referred to. The improve-
 10 ment which I have made on this mechanism consists in the novel construction of the vibratory folders *I*. These folders, instead of being stiff fingers throughout their length, as heretofore, are each composed of two parts, hinged
 15 or jointed together, as indicated at *t*, so that as the said fingers sweep over the folding-line and along the paper in front and to the rear of said folding-line they will conform to the varying inclination of the apron, and will
 20 lie flat against said apron at all times. Springs *v* serve to press down the outer hinged section of the fingers in such manner as will cause them to bear flat against the apron. The general operation of this mechanism is
 25 fully set forth in my aforesaid Letters Patent, and requires no description here. The effect of thus constructing and arranging the vibratory folders is to cause them to enter unerringly between the body of the blank and the
 30 flap to be folded.

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

1. The combination, with the guide-finger, of

a plate-knife folder which rotates or moves 35 continuously in one direction, substantially as hereinbefore set forth.

2. The combination, substantially as hereinbefore set forth, of the guide-finger, blank-feeding mechanisms, and a plate-knife folder 40 which rotates or moves continuously in one direction.

3. The combination, substantially as hereinbefore set forth, of the guide-finger, the plate-knife folder arranged to rotate or move contin- 45 uously in one direction, the feed mechanism, and means, substantially as described, for opening the mouth of the blank and directing the upper ply above or upon the guide-finger.

4. The combination, substantially as hereinbefore set forth, of the feed-rolls, the spring-opener, and the nipper. 50

5. The plate-knife-folder blade and endless power-driven carrier tapes or belts upon which the same is mounted, in combination with the 55 guide-finger intermediate between said tapes, substantially as hereinbefore set forth.

6. In combination with the blank holding and feeding mechanism, the vibratory folders, jointed, substantially as and for the purposes 60 hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 4th day of January, 1881.

WILLIAM C. CROSS.

Witnesses:

E. A. DICK,
N. C. LANE.