

(No Model.)

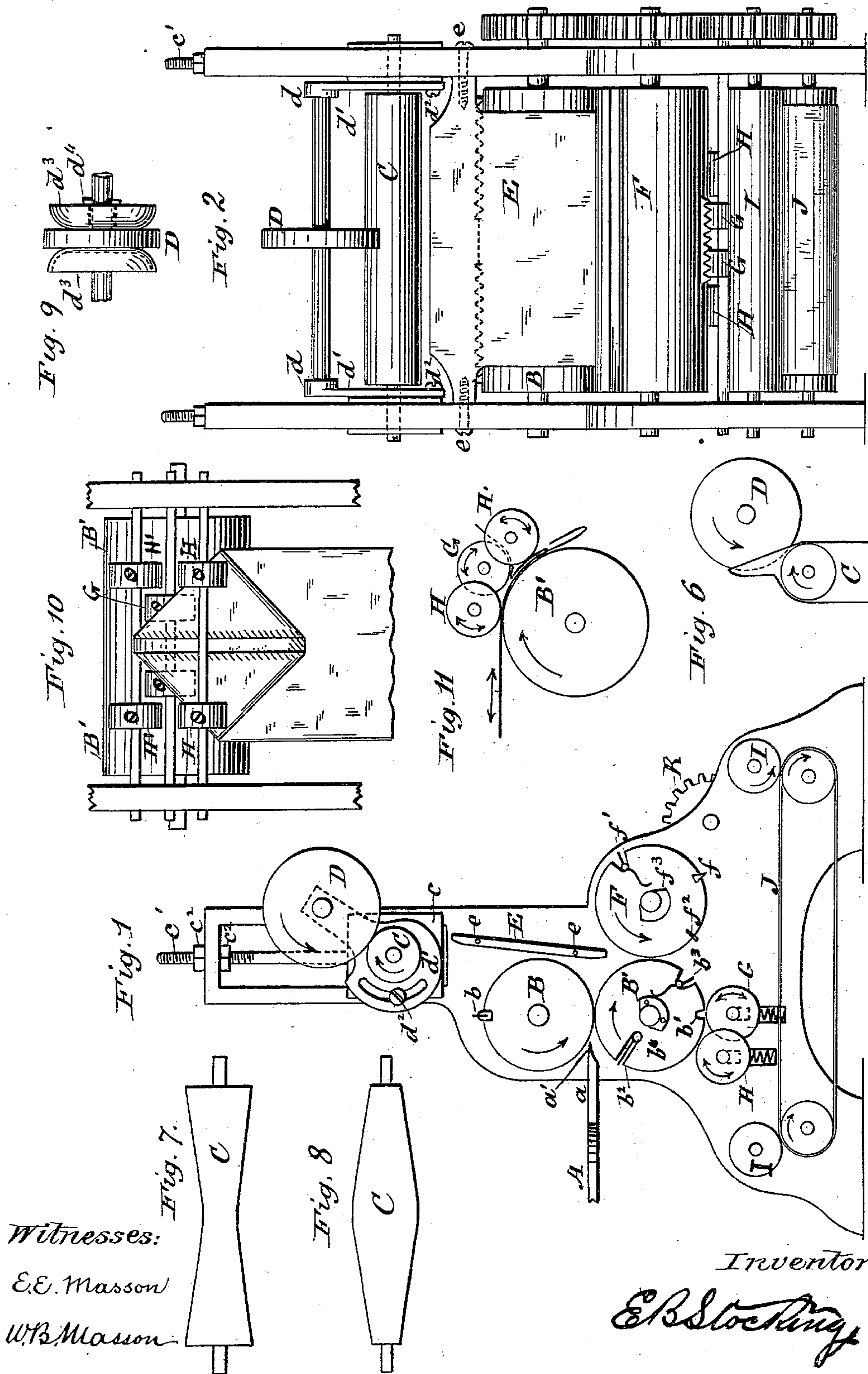
3 Sheets—Sheet 1.

E. B. STOCKING.

MANUFACTURE OF SATCHEL BOTTOMED PAPER BAGS.

No. 259,280.

Patented June 6, 1882.



(No Model.)

3 Sheets—Sheet 2.

E. B. STOCKING.

MANUFACTURE OF SACHEL BOTTOMED PAPER BAGS.

No. 259,280.

Patented June 6, 1882.

Fig. 4.

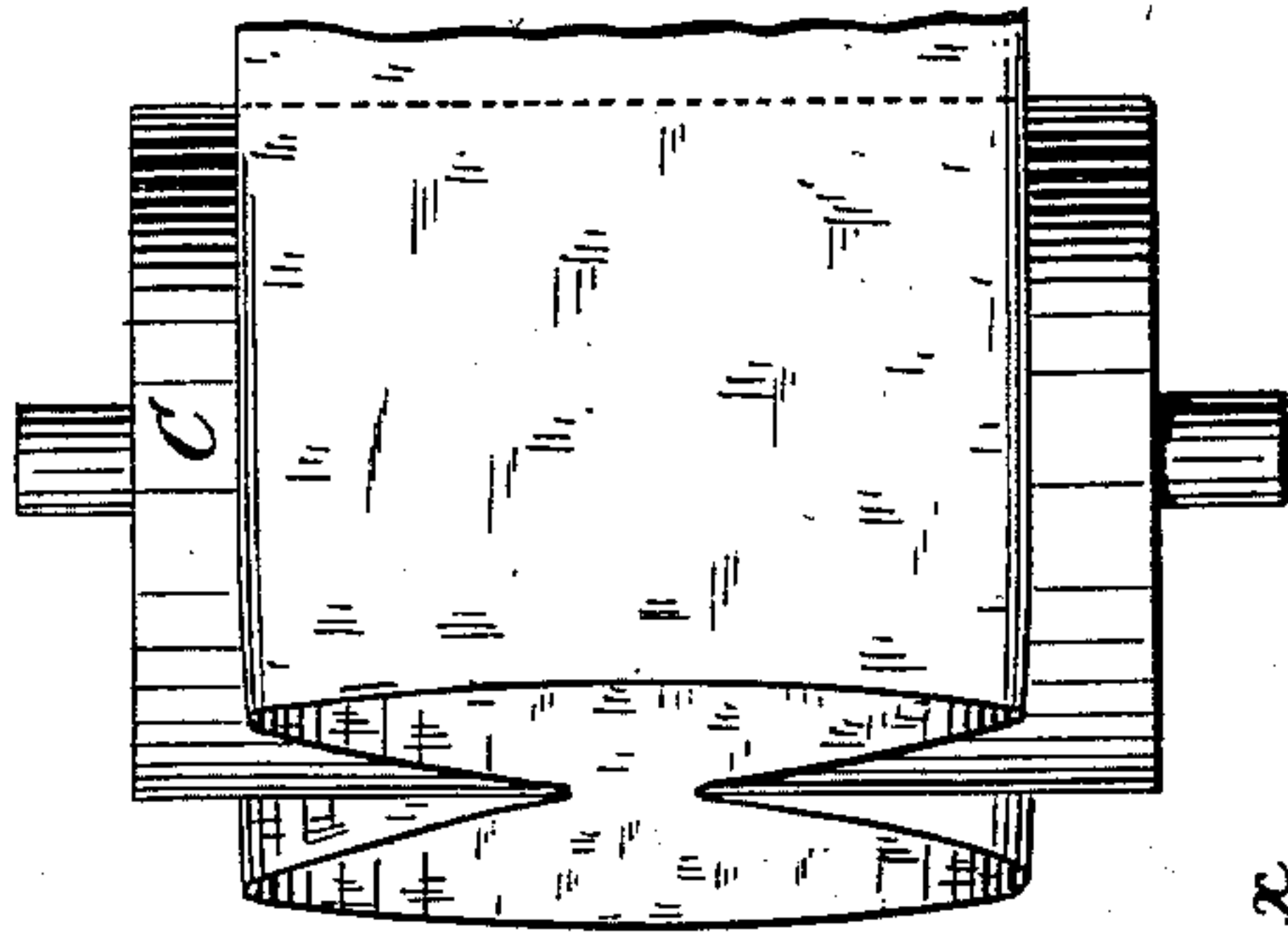


Fig. 12.

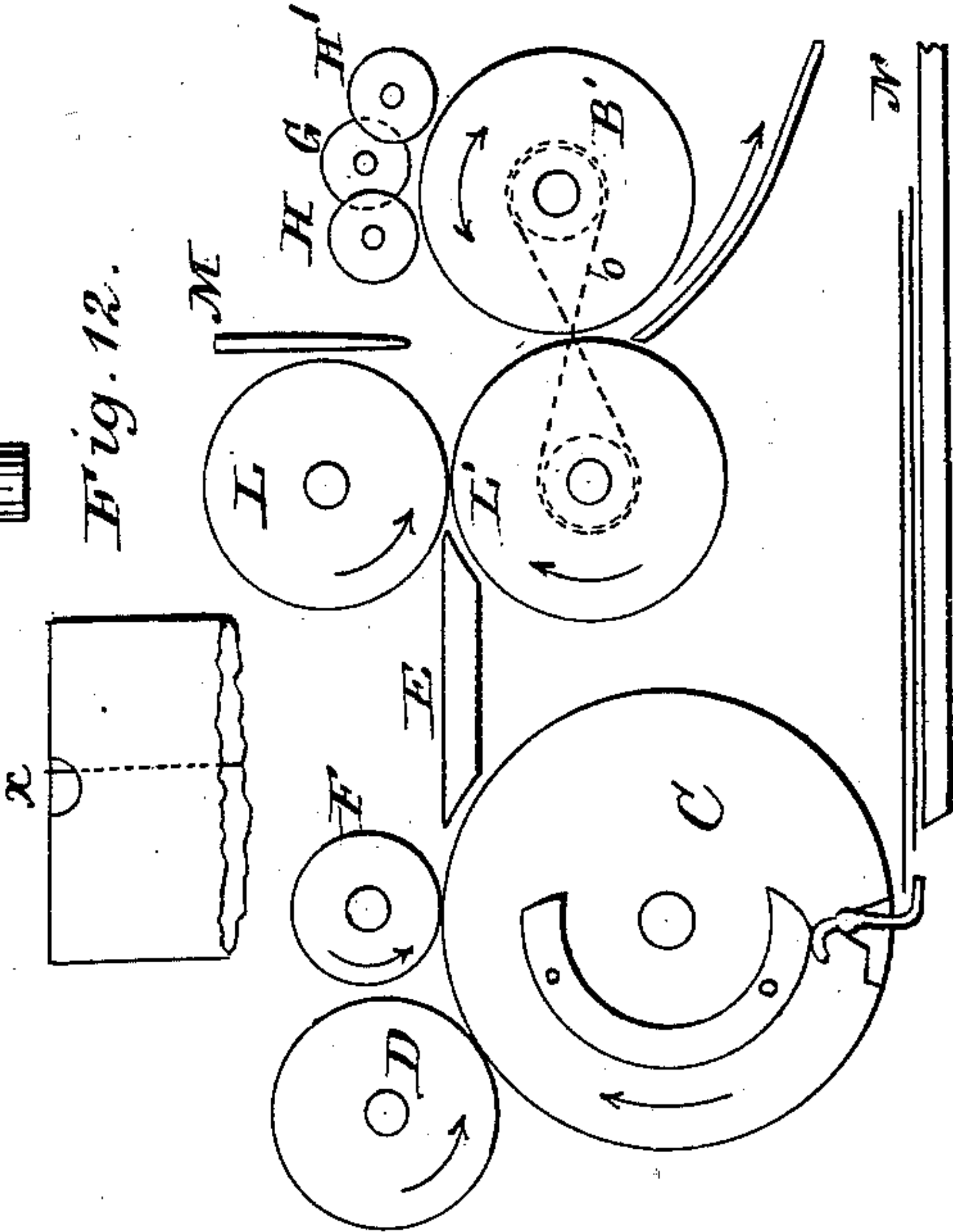


Fig. 3.

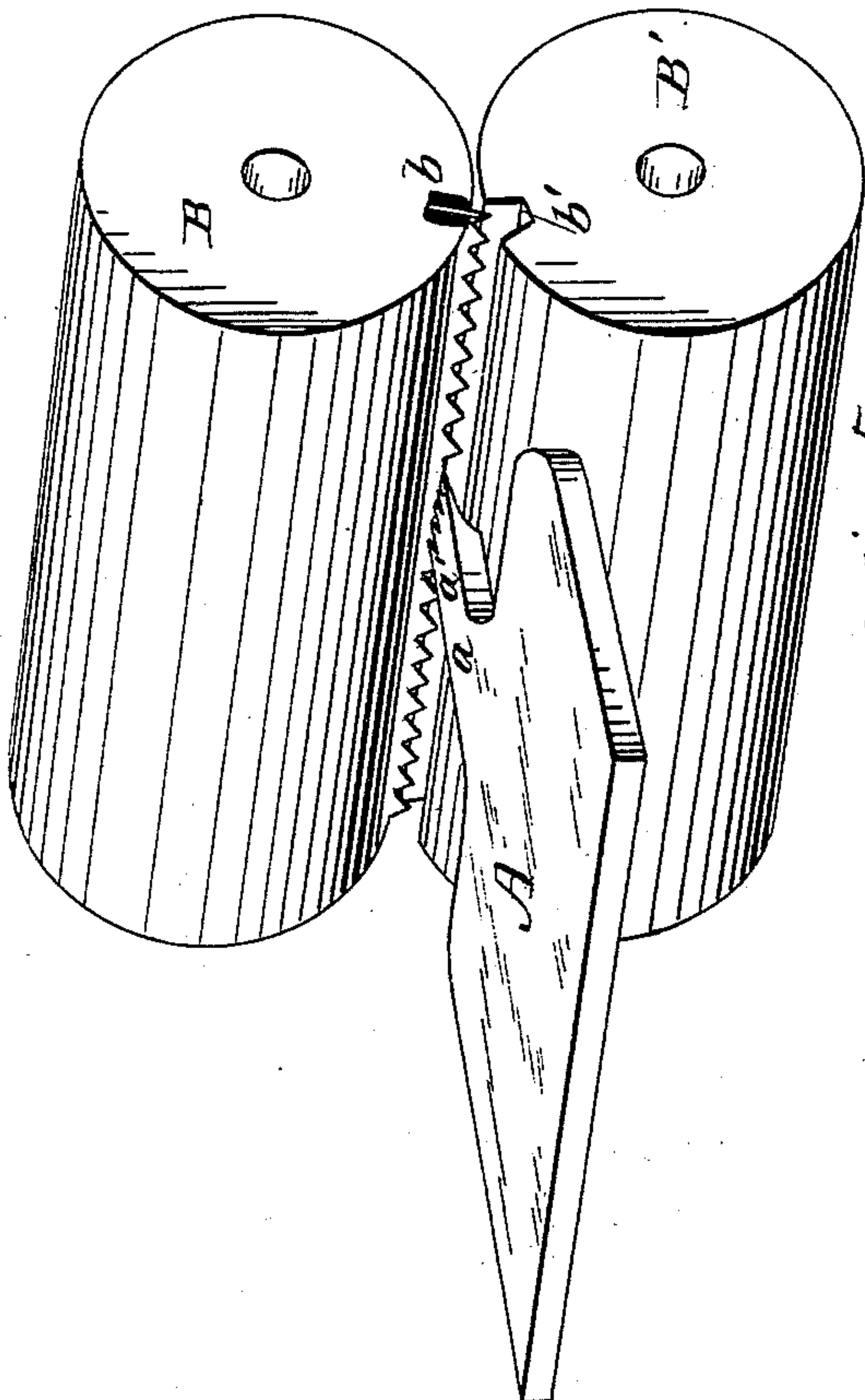
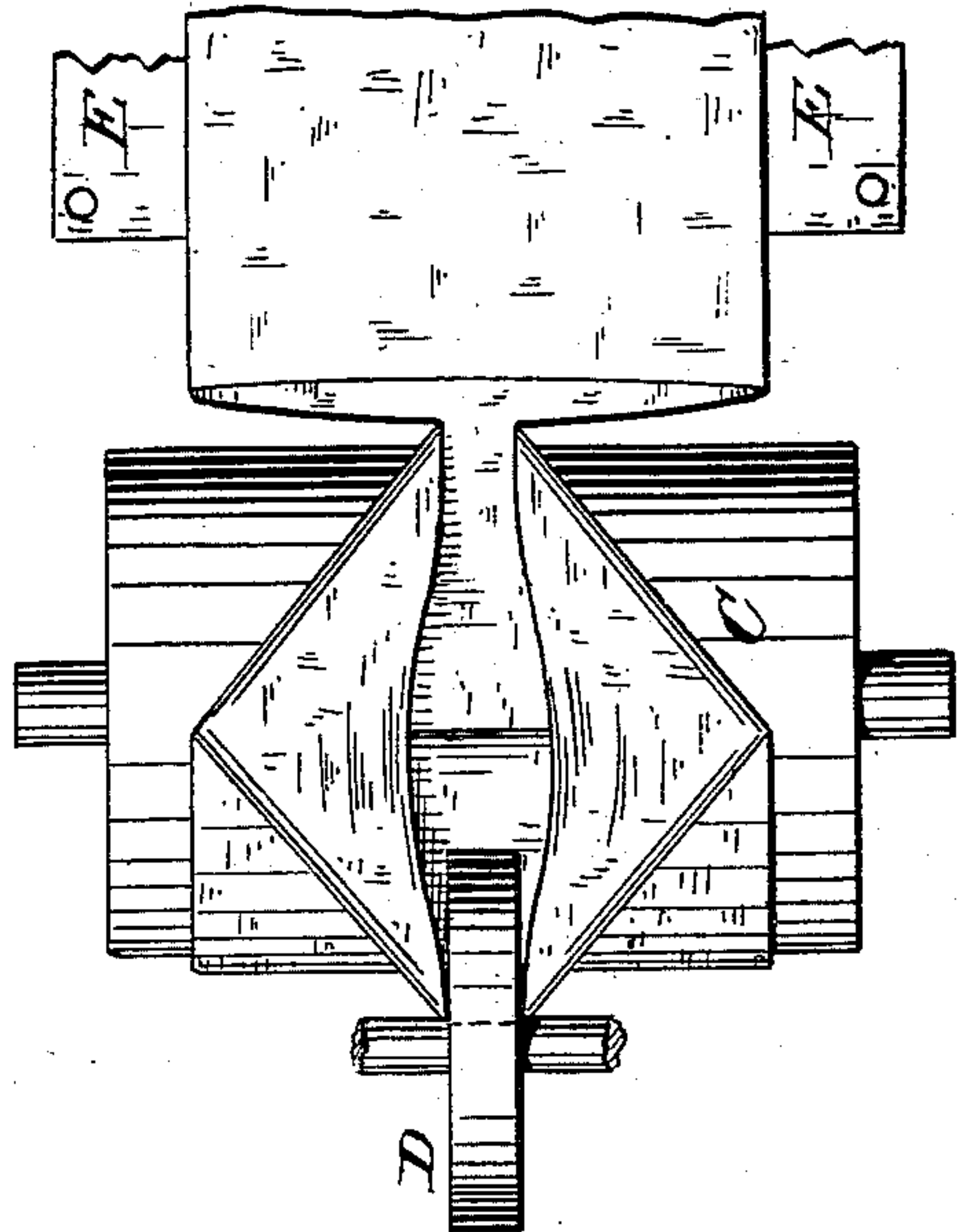


Fig. 5.



Witnesses:

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(No Model.)

3 Sheets—Sheet 3.

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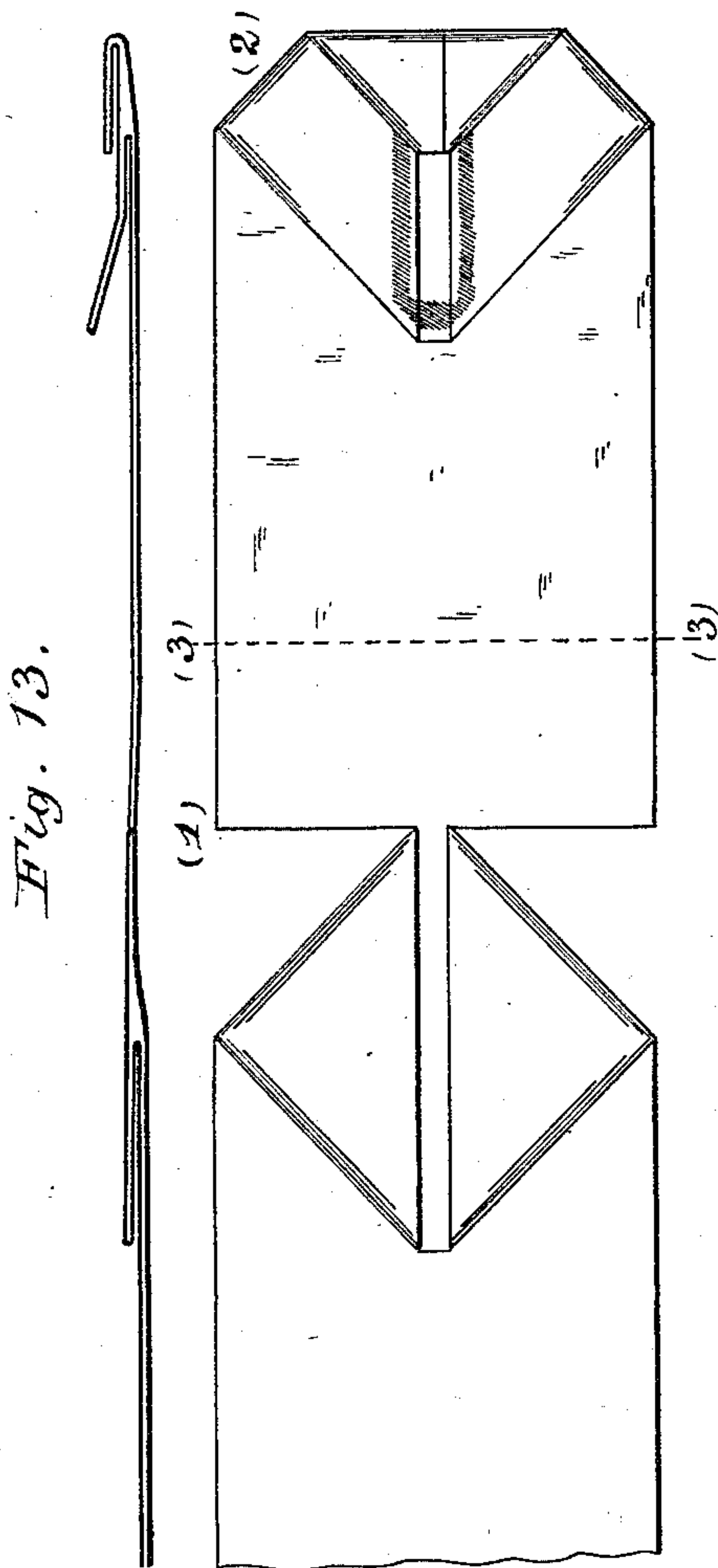
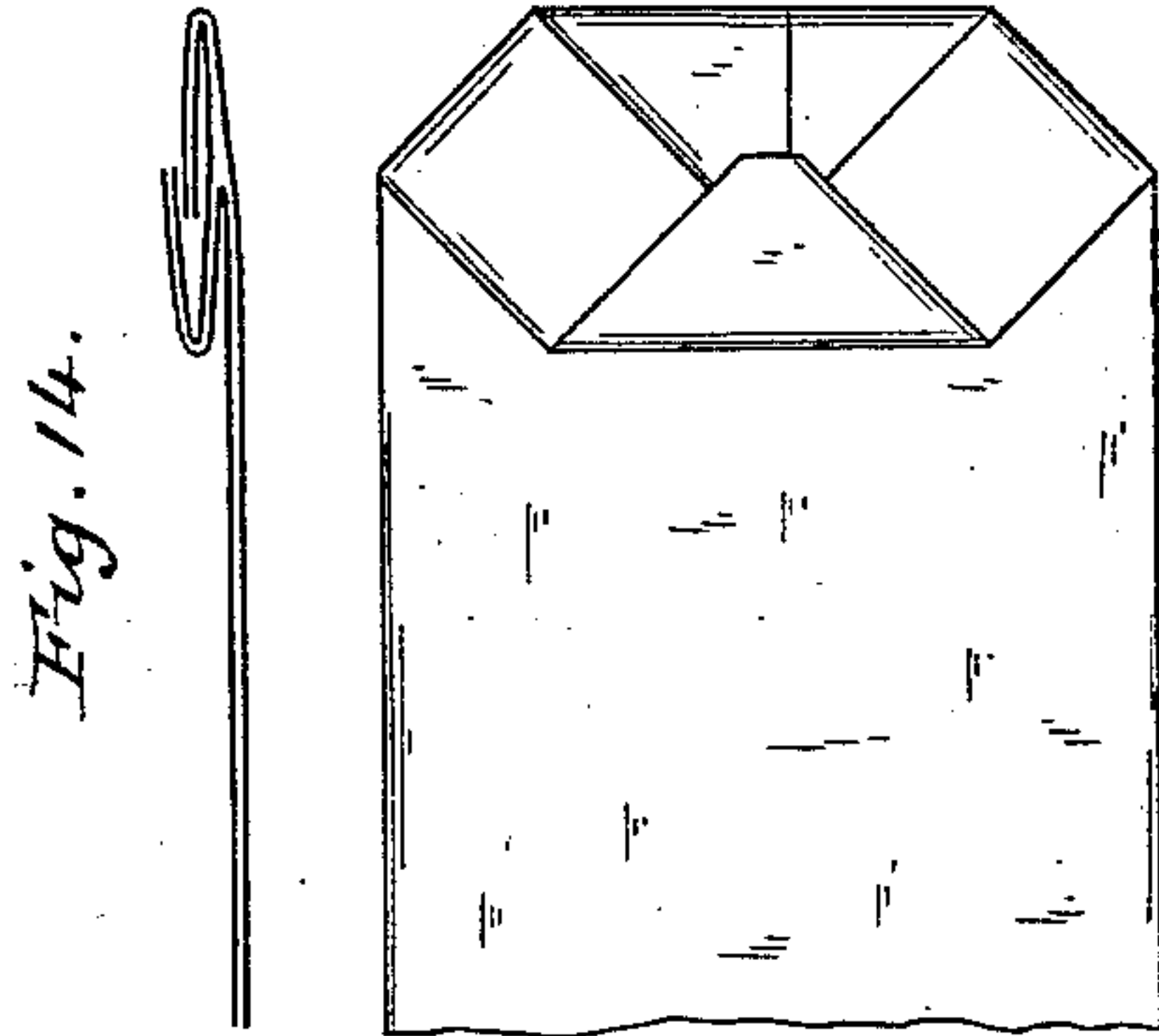


Fig. 16

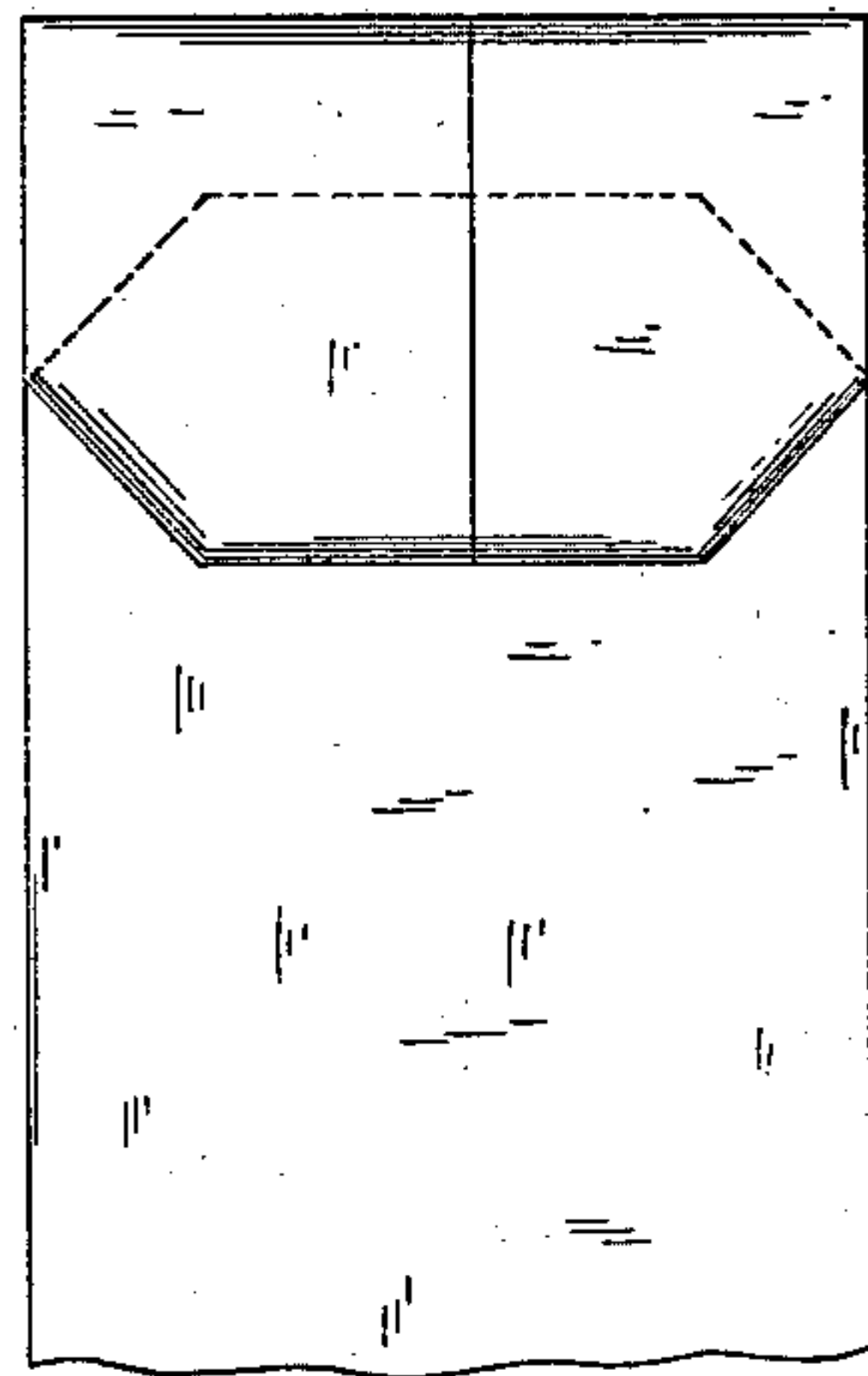
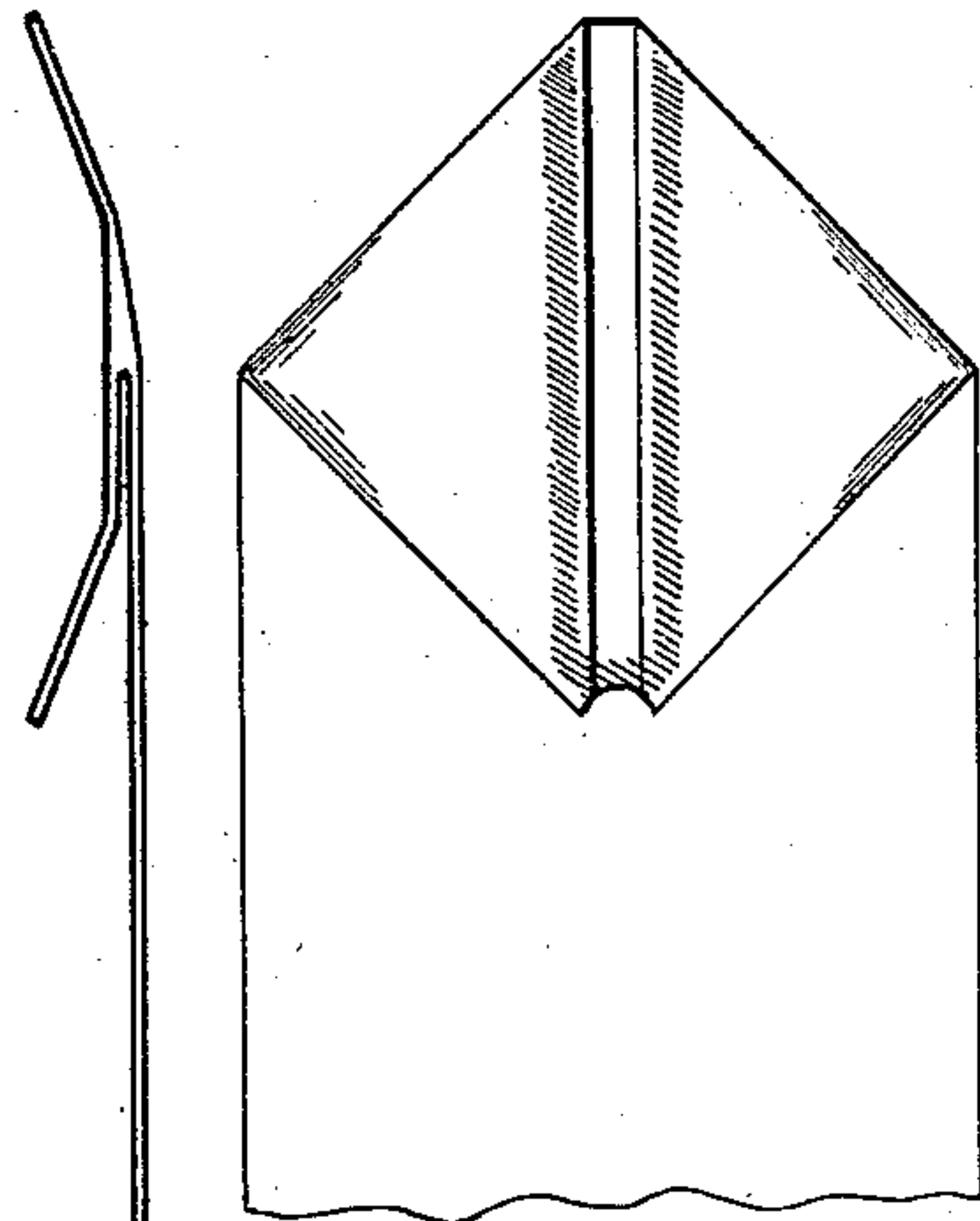


Fig. 15.



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UNITED STATES PATENT OFFICE.

EDGAR B. STOCKING, OF WASHINGTON, DISTRICT OF COLUMBIA.

MANUFACTURE OF SACHEL-BOTTOMED PAPER BAGS.

SPECIFICATION forming part of Letters Patent No. 259,280, dated June 6, 1882.

Application filed October 23, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDGAR B. STOCKING, a citizen of the United States of America, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in the Manufacture of Satchel-Bottomed Paper Bags; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to that class of machinery which is employed in the manufacture of paper bags known as "satchel-bottomed;" and the object of my invention is to provide simple and effective means by which I can, by machinery, practice a novel and equally simple method of forming and closing the diamond fold—that is, making the folds known as the "diamond" or first fold, and the second and third or final fold, which are usually made at the end of a tubular blank to form a satchel-bottom thereon; and my invention consists in a novel method and novel means for the practice of that method, both of which are more fully hereinafter described, and specifically set forth in the claims.

Referring to the drawings, Figure 1 is a side elevation of a machine (one side frame and one slotted arm being removed) embodying my novel means. Fig. 2 is an end elevation of the same, both side frames being in position. Fig. 3 is an enlarged view of the cutting-rolls and the former. Figs. 4, 5, and 6 are detail illustrations of the method of and means for making the diamond fold. Figs. 7, 8, and 9 are modified forms of said means. Figs. 10 and 11 are detail illustrations of the method of and the means, in modified form, for practicing said method of closing the diamond fold. Fig. 12 is a modified arrangement of the principal elements of the machine; and Figs. 13 to 16 are representations of blanks as they appear at different stages of the operation of the machine in the manufacture of bags.

Like letters of reference refer to like parts in all of the figures.

The web from which bags are to be made

is formed into a tube in the usual manner and by the usual means, and I have shown at A the former about which said tube is made, (in this instance seam down,) or as much of the former is herein shown as is necessary to a clear understanding of my invention. The former terminates in a central narrow extension, *a*, provided at its upper surface with a stationary serrated knife, *a'*. (See Fig. 3.)

B B' are feed and cutting rolls, the former being provided with a transverse severing-knife, *b*, the cutting-points at the central portion of which are removed, leaving a plain blade at that point in extent a trifle greater than the width of the extension *a'* of the former; and roll B' is provided with a transverse groove, *b'* in which the knife *b* operates to sever the tube through both plies, except at the central portion thereof, and this portion of the upper ply is severed by knife *a'* on the former, in a manner hereinafter described.

C and D are what I term the "diamond-rolls." I shall also speak of them as the "lower" and "upper" diamond-roll, respectively, as they are illustrated, but do not wish to be understood as indicating thereby that their relative positions are necessarily those shown, as they may be effectively used in other relative positions. The roll D is virtually a disk, its length being slight in comparison to that of roll C, with which it co-operates.

The diamond-roll C may be a plain roll, as shown in Figs. 1, 2, 4, 5, 6, and 12; or it may be the form of two truncated cones united at their bases, as in Fig. 8, or united at their smaller ends, as in Fig. 7, by a plain portion; or, if desired, there may at the central portion of the roll be a groove, said plain portions and groove agreeing in outline with the upper diamond-roll, which may, as desired, be plain, rounding, or sunken at its periphery.

The lower diamond-roll is supported at each end in hanging boxes *c*, fitted to ways in the frame of the machine, which boxes are, by the threaded rods *c'* and nuts *c''*, adapted to be raised and lowered and secured in desirable positions, whereby the diamond-rolls are adjustable to different heights above the roll B.

The upper diamond-roll, D, is a narrow disk mounted upon a shaft which runs in bearings *d*, supported adjustably on the shaft of roll C,

and adjusted by means of the slotted arms d' and screws d^2 , which enter the bearings c , whereby the point of contact of the roll D upon roll C may be adjustably determined, so that it shall sooner or later, as desired, cease its opening function, as illustrated in Fig. 6, and begin its laying-back function, as illustrated in Fig. 5.

E is a table extending the entire width of the machine and from near the lower diamond-roll to near the roll F, and is secured to the frame by bolts or screws e .

The upper diamond-roll may, if desired, be furnished with side disks, d^3 , of rubber or metal, and of the form shown in Fig. 9, either solid, as shown on the right, or dish-shaped, as shown on the left, of that figure in dotted lines, and these may be fixed or attached to the shaft with the upper diamond-roll, or they may be loosely fitted on said roll or on said shaft, as shown in dotted lines at the right of Fig. 9, whereby their centers drop below the center of rotation of the shaft, and they are thus given a dragging rotation as compared with the positive frictional rotation of the upper diamond-roll, in which case a pin or washer, d^4 , should be used to keep the disks substantially, though not rigorously, upright, for a purpose hereinafter described.

The roll F co-operates with roll B' as a feeding, cutting, and folding roll, the knife f operating with a groove, such as b' in roll B', located at its center transversely and through a distance a trifle greater than the width of the removed portion of the knife b in roll B. The jaw f' operates in conjunction with the folding-blade b^2 of roll B', and the jaw b^3 with the blade f^2 of the roll F, also co-acting to fold, these elements being operated by the cams $b^4 f^3$ in a manner well-known in this class of machinery.

The rolls G G, I term "point-turning" rolls, and they are yieldingly held against roll B', as shown. They are short rolls extending over about the middle third (more or less) of the roll B'. H H are two rolls, also short, and yieldingly held against roll B' and adjustably secured to their shafts by set-screws. (Clearly shown in Fig. 10.) The point-turning rolls G may be supplanted by a single roll having a groove or grooves in its periphery for the purpose of clearing the paste-lines of the diamond. J is an endless delivery-belt, and I I are simple pressure-rolls.

I have not shown a complete system of gearing, as it is a matter within the skill of an ordinary skillful mechanic to provide the same to produce the direction of rotation indicated by arrows in the drawings. I have, however, shown the rolls B B' F I and the roll driving the endless belt J as connected directly in each case except where the intermediate gear, K, is shown. Power may be applied at any convenient point—for instance, to shaft of roll B. The diamond-rolls also may be positively driven.

The operation of the machine so far described is as follows: After being led by hand, at the start, through the machine until the

leading end of the tube is in the bight of rolls F B', the action thereafter is automatic, and said tube is first severed or cut in its upper ply by being pressed by the central portion of the knife b against and below the knife a' . The knife b now severs the remaining portions of the upper and lower plies, except the seam portion of the lower ply, which in this instance is left for feeding purposes. The tube in this condition is drawn by rolls B' F over the lower diamond-roll, and in its passage thereon and thereover in a direction of feed which is substantially U shaped the severed portion gaps or opens, as clearly shown in Fig. 4; and this effect is produced, I would remark, no matter in which direction the tube is fed, and this fact and method of opening the tube may be taken advantage of in connection with far different co-operating means or mechanism than that herein shown, and hence the importance of the method. The tube being opened, the upper diamond-roll takes footing on the inner surface of the lower ply of the tube, and as it rotates convergingly with roll C the upper ply is rolled upward and backward, as shown in Fig. 6, and finally is flattened down, as shown in Fig. 5, the abrupt changes in the directions which the tube is caused to take aiding in the operation, and it leaves the diamond-rolls in the condition shown at 1, Fig. 13. The operation of the side disks, $d^3 d^4$, at this time would be to draggily or directly flatten the side portions of the diamond the moment that the leading end of the diamond reached them, and thus serve to prevent the upper ply from rolling under the roll D. This may also be avoided by grooving the periphery of roll D and supporting therein a rod whose lower end should reach below the point where the upper ply first strikes the roll D; but these disks and the rod are mere accessories, which actual trial has demonstrated to be not vital to a practical operation, but which with light and flimsy stock can be used with advantage. While the diamond is passing over the table E paste may be applied by the usual well-known devices. As the point of the diamond is fed into the bight of rolls F B' the knife f severs the seam portion and the blade f^2 forces the blank into the jaw b^3 , which, by the coaction of rolls G rotating convergently with roll B', makes the second fold of the bottom, as shown at 2, Fig. 13. Jaw b^3 retains its hold until the rear point of the diamond has passed beyond rolls G. In the meantime blade b^2 has coacted with jaw f' and forced the blank into said jaw a sufficient distance to enable the jaw to hold the blank by a transverse partial fold on a line at a short distance from its mouth end—say at 3, Fig. 13—and as roll F continues its rotation the movement of the front point of the diamond beyond the rolls G is suddenly reversed, and said point rides up said rolls G—that is, toward and beyond its center of rotation, which, as shown in Fig. 1, would be relatively down rolls G. During this change in the direction of the movement of the rear point

the rolls H H, having been properly adjusted, determine the line of the fold to be made in the said point by holding the central portion of the diamond against the roll B' and forcing the blank between said roll and the point-turning rolls G, as clearly shown in Fig. 11, with reference to the back point of the diamond, the operation of rolls H H G G on the front point being exactly the same, and the bottom is completed, in the condition shown at Fig. 14, at the exit thereof from rolls B' G, and it falls upon the endless belt J when jaw f' drops the mouth end, and the bag is delivered through rolls I and apron or belt J; or the direction of the movement of the upper portion of belt J may, by suitable change of gearing, be reversed, when the bag would be delivered at the other end of the belt under the former.

By the machinery thus far described but one size of bags can be made on account of the rotary knives and folding devices being congregated in so few rolls, it being necessary that the rolls should be a blank-length in circumference and relatively timed and the diamond-rolls adjusted the proper distance from said rolls to insure and regulate the arrival of successive blanks in proper time to be operated upon thereby. Therefore I have devised different arrangements of the principal elements in order that several sizes of bags may be made on one machine. This is partly accomplished by putting knife b in an independent pair of rolls, as the diamond-rolls will make any size within the diameter of roll D, as the extreme distance of the diamond from point to point should not exceed greatly one-third of the circumference of roll D when distended thereon, as shown at Fig. 6, though I by no means would limit myself to the exact proportions herein stated.

In addition to the independent cutters just mentioned, the companion folding rolls B' and F may be omitted, also knife f, leaving rolls B, B', and F ordinary feeding-rolls of any desired circumference and entirely unrelated to the length of blanks operated upon. For the elements thus discarded I substitute a duplicate set of point fold line determining rolls, H H', as shown in Figs. 10, 11, and 12, these being located beneath roll B' in Fig. 1, Fig. 10 being a bottom view and Fig. 11 an end elevation of Fig. 10 with frames removed, and Fig. 12 being a rearrangement or reversal of said rolls B' G H H and H' H'.

In Fig. 12 I have illustrated an arrangement of the principal elements which adapts them to operate upon single separate blanks of different sizes. Each blank, as shown at the upper part of the figure, is cut away at the end and just opposite the seam, so as to form a thumb-hole, x. This is done in the usual and well-known manner. The blanks are in this instance fed seam up on the table N by hand or any well-known suitable mechanism, which may be connected with tube forming and severing mechanism.

The lower diamond-roll, C, is provided with

a nipper of usual construction and operation, which seizes the blank at the seam and carries it around and under the upper diamond-roll, and leaves the blank in the bight of rolls C and F, which feed it over the table E and into the rolls L L', during which time the diamond fold has been made and paste applied, as hereinbefore described. The upper roll, L, is cut away to allow the passage of the paste-lines.

Roll B' is set a little distance from roll L', and is rotated positively but yieldingly by a slipping belt, o, (shown in dotted lines,) and the diamond is fed by rolls L L' until the point is taken by rolls H H, which (see Fig. 10) take up the feeding function and force the point up on rolls G and force it on the proper fold-line, 2, Fig. 13, under rolls G, which lay down the point, and it is secured by the paste. After the rear point of the diamond has passed rolls G, and before the mouth end of the blank has left the rolls L L', the reciprocating blade M descends and forces the blank at about the line 3, Fig. 13, into or between the rolls L' and B', when the thickness of four plies of the blank causes sufficient friction on roll B' to overcome the slight power of the belt o, and said roll is now driven by and convergently with roll L', and acts to draw the blank and deliver it between said rolls out of the machine in the doubled condition shown in Fig. 16. During this movement of the blade M the rear point is caused to ride up on rolls G, and the duplicate set of rolls H' determine the fold-line and force the point to bend thereon and pass under rolls G, as in case of the front point. (See Fig. 11.)

It will readily be seen that the blank-forming mechanism must and need only be timed to leave a blank, as shown, at each revolution of diamond-roll C, and that folding-blade M need only be timed to operate when the back point has passed rolls G, so that this arrangement may be adjusted to produce bags of more than one size.

The diamond-roll C, Fig. 12, may, if desired, be provided with side nippers to determine the central line of the diamond across the upper ply; but this I do not deem essential.

Having described my invention and its operation, what I claim as new, and wish to secure by Letters Patent, is—

1. The method herein shown and described of forming the diamond fold by machinery, which consists in abruptly changing the direction of feed and rolling back one ply of the blank by two convergently-rotating rolls, substantially as shown and described.

2. The method herein shown and described of forming the diamond fold by machinery, which consists in feeding the tubular blank, cut substantially as described, in, on, or through a U-shaped line of feed, and by two convergently-rotating rolls rolling back one ply of said blank, substantially as shown and described.

3. The method of closing a diamond fold by machinery, which consists in reversing the direction of the feed of the rear point (the front

point having been folded by suitable means) and forcing it separately from and independently of the body of the blank into the bight of convergently-rotating means, substantially as shown and described.

4. The combination of the roll C, means, substantially as described, for opening the tube, and the disk D, the latter located at about the longitudinal center of the former, and both rolls adapted by location and arrangement to be operative at their convergently-rotating peripheries, whereby a tube upon being passed between the same is opened and one of its plies is lifted and rolled back upon its body portion, all substantially as shown and described.

5. As a means for determining the fold-line of a point of the diamond fold, the rolls H H, in combination with a blank-supporting carrier or roll, B', substantially as shown and described.

6. As a means for folding a point of a diamond fold, the combination of the rolls H H and the rolls G G, substantially as shown and described.

7. In a paper-bag machine, the combination of means for folding the front point of the diamond with means for folding the rear point thereof and means for folding the body of the blank independently and separately from the rear point, and thereby reversing the direction of the movement of said rear point, and means for rolling down said point separately from the body of the blank, all substantially as shown and described.

8. The combination of a former, provided with a central narrow knife-edged projection, with rolls provided with a transverse severing-knife having a portion at its center removed, whereby said central portion co-operates with said projection to sever one ply of a tube, and

allows the other ply thereof to pass between said roll uncut thereby, substantially as shown and described.

9. The combination of the rolls B and B', the diamond-rolls C D, and the roll F, substantially as shown and described.

10. The combination of the roll B' and the roll F, the former provided with the slot b' , blade b^2 , and jaw b^3 , and the latter provided with the blade f^2 , jaw f' , and knife f , and provided with the cams b^4 and f^3 , respectively, substantially as and for the purpose set forth.

11. The combination of the roll B', provided with blade b^2 , and the rolls G H, and the roll F, provided with the jaw f' , substantially as shown and described.

12. The combination of the rolls B', F, G, and H, and the apron or belt J, and roll I, substantially as shown and described.

13. The combination of the roll B' and the adjustable rolls H H, yieldingly held against said roll B', substantially as shown and described.

14. The combination of the rolls B, B', and F with the adjustably-supported rolls C and D, substantially as shown and described.

15. The combination of the roll C, bearings c , rods c' and nuts c^2 , with the roll D, arms d' , slotted as shown, and the screws d^2 , as shown and described.

16. The combination of the roll B' and the rolls G H, adapted, substantially as shown and described, to be rotated in either direction, as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

EDGAR B. STOCKING.

Witnesses:

E. E. MASSON,
M. P. CALLAN.