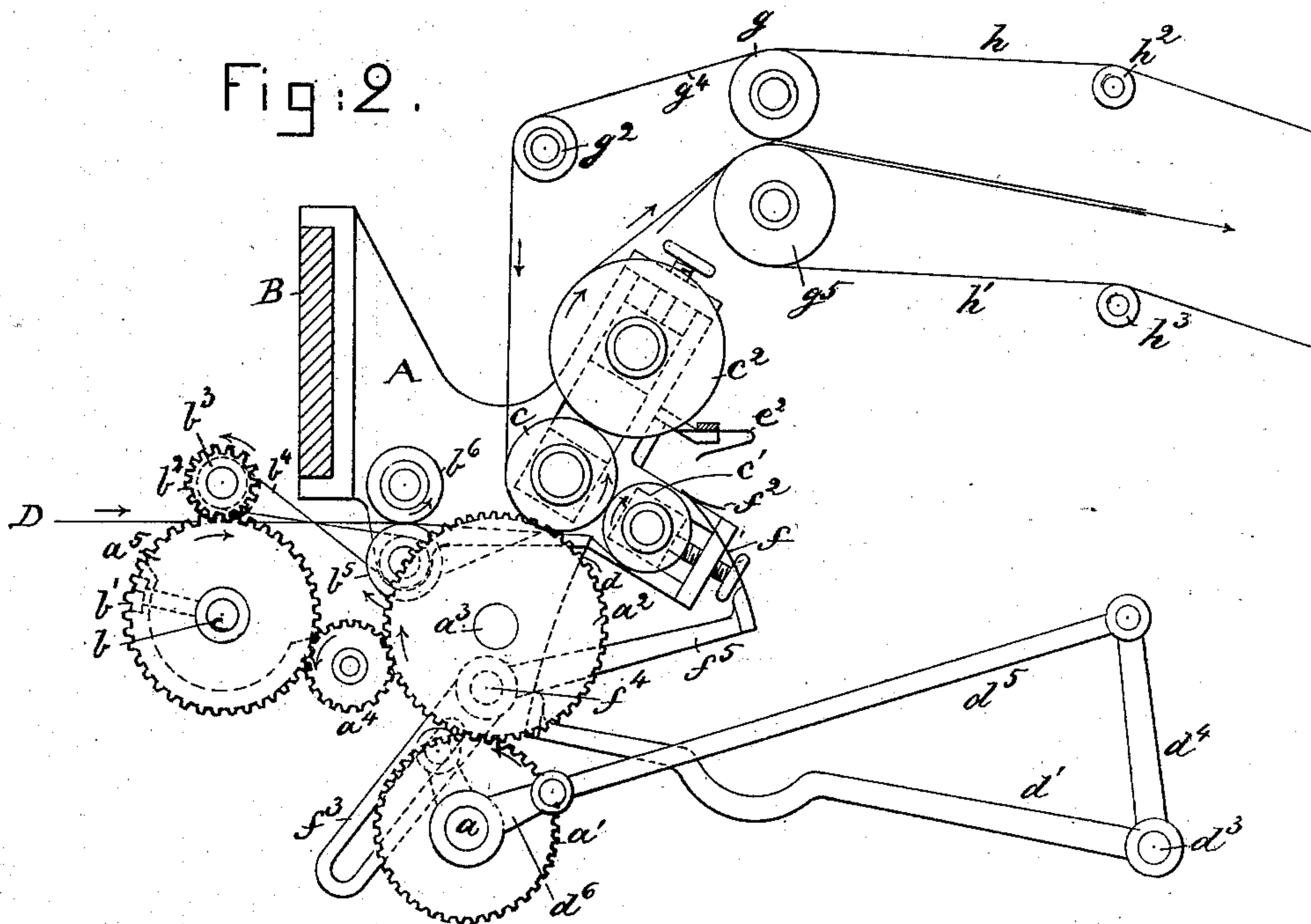
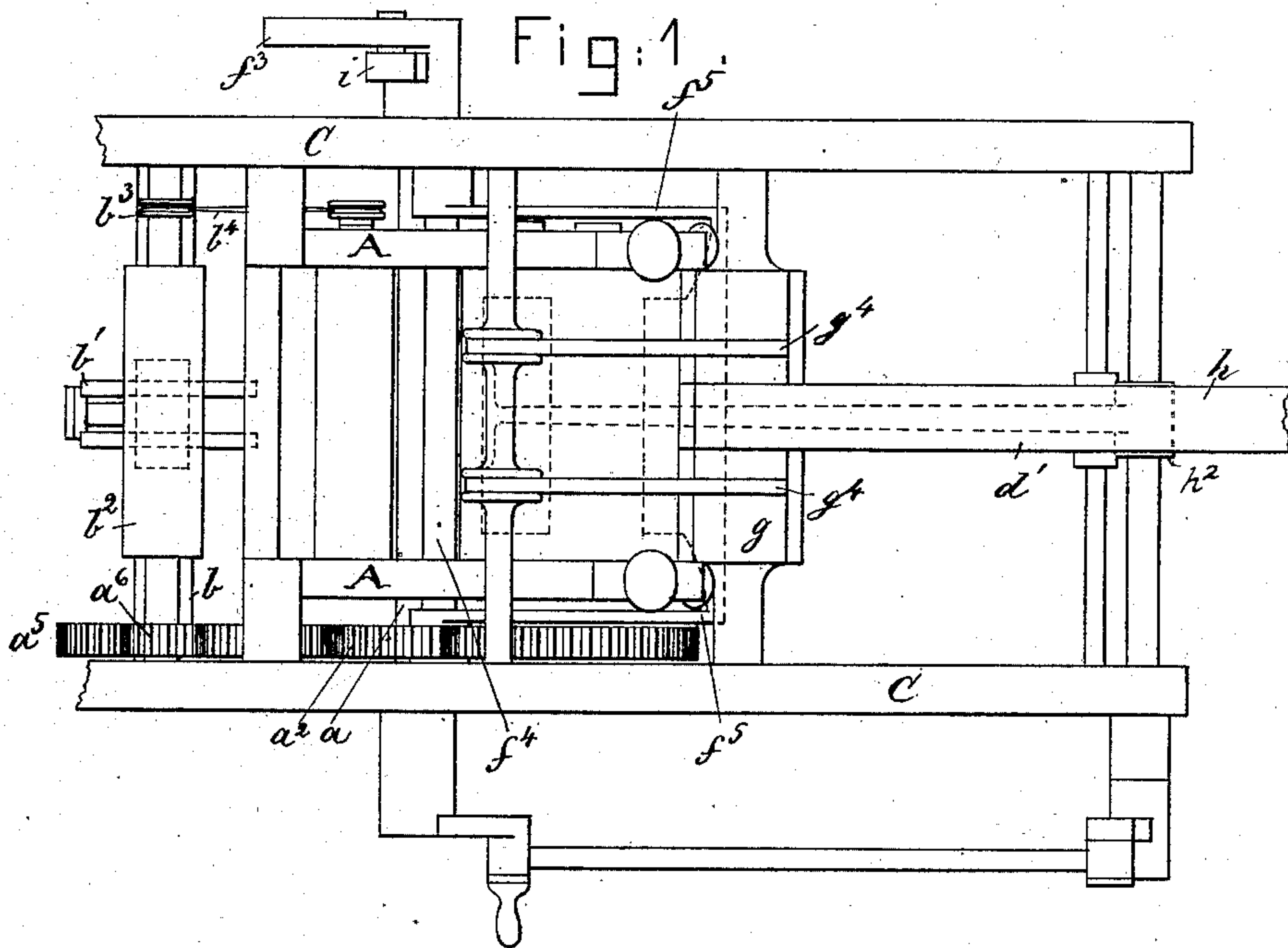


D. APPEL.

FOLDING MECHANISM FOR PAPER BAG MACHINES.

No. 252,412.

Patented Jan. 17, 1882.



Witnesses,

L. H. Connor.
B. J. Noyes.

Inventor.

Daniel Appel
by Crosby & Gregory Attys

(No Model.)

3 Sheets—Sheet 2.

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Fig:3.

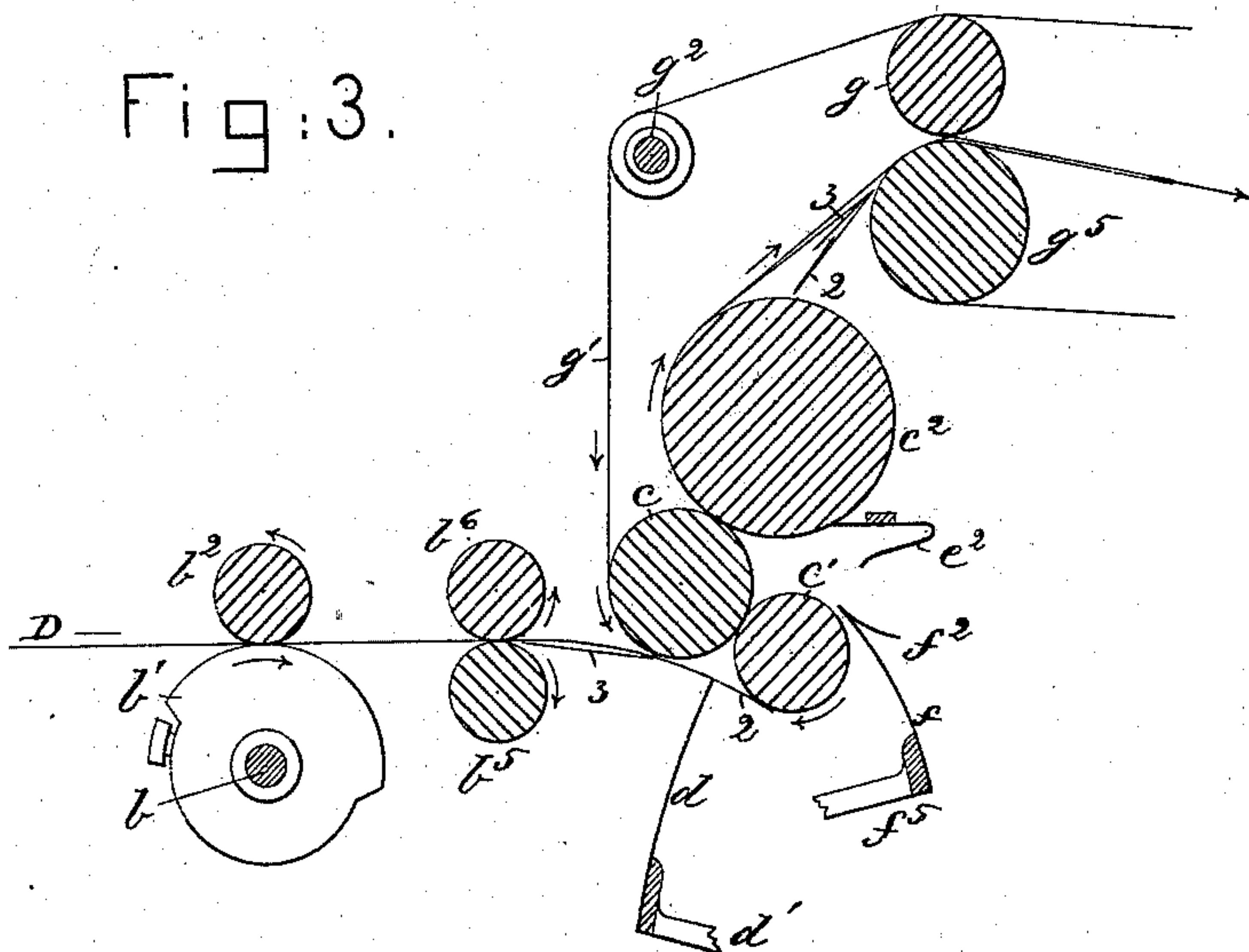
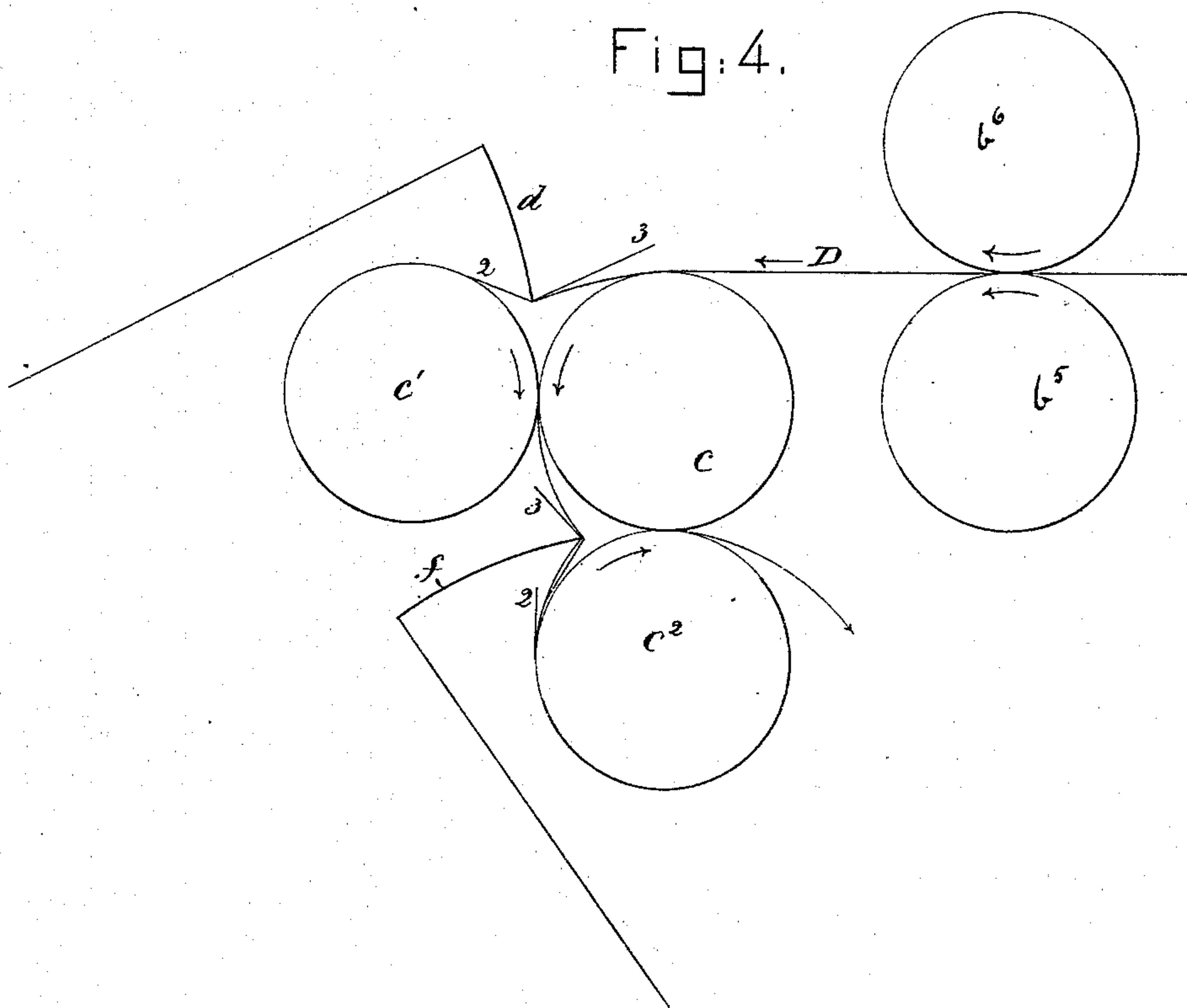


Fig:4.



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(No Model.)

3 Sheets—Sheet 3.

D. APPEL.

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Fig: 5.

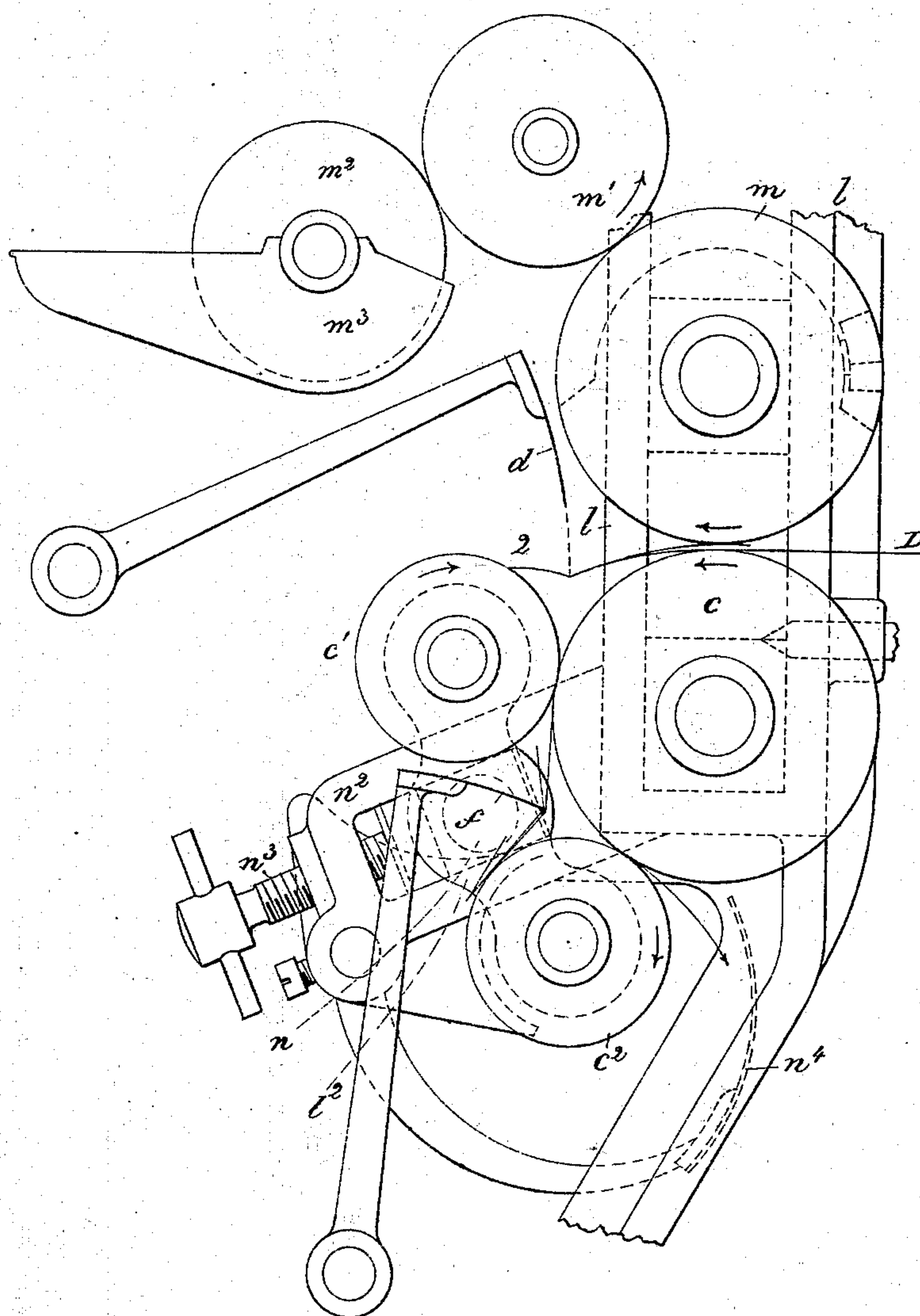


Fig: 6.

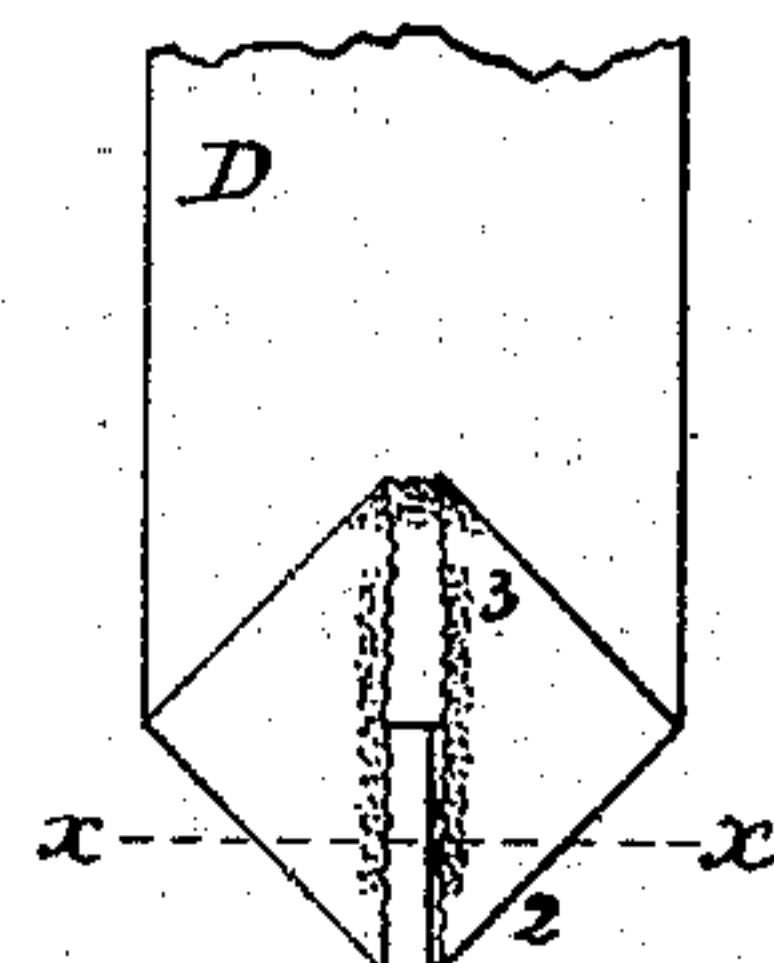


Fig: 7.

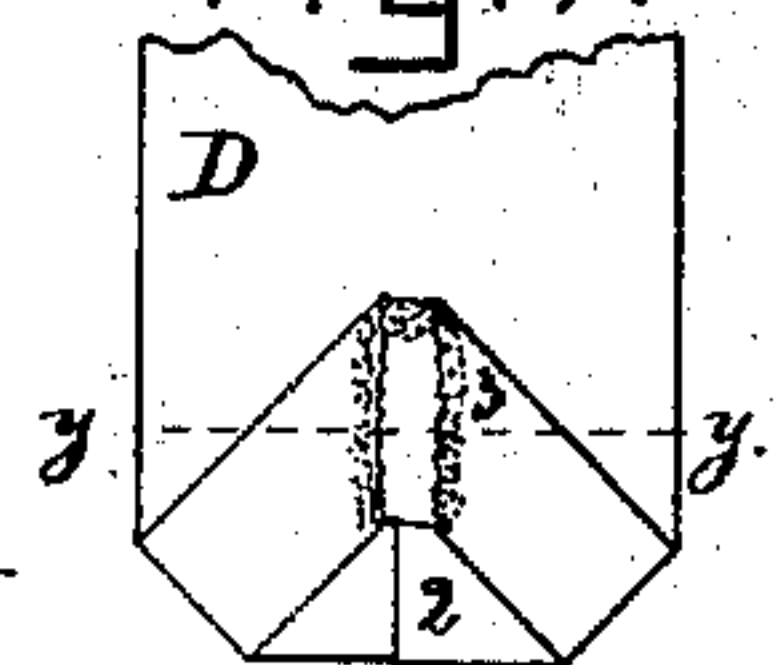


Fig: 8.

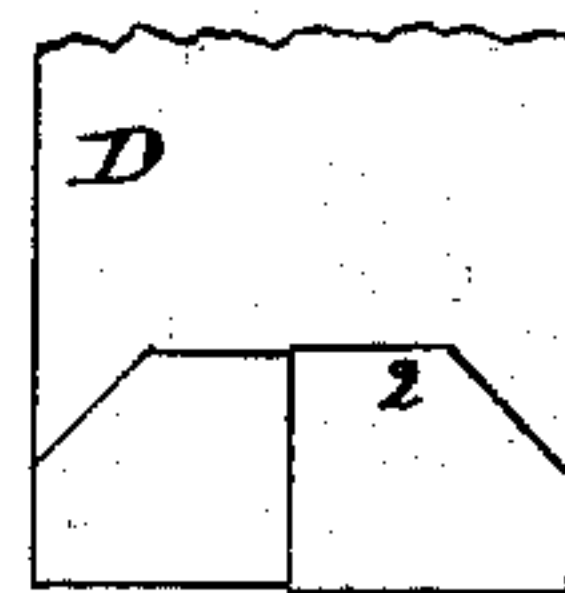
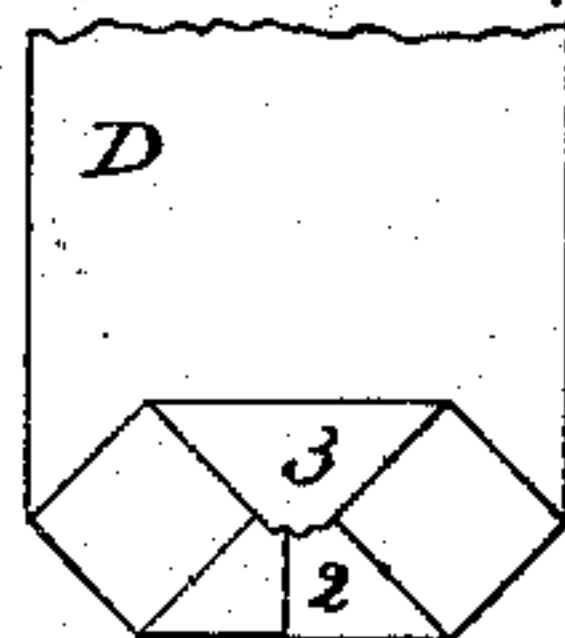


Fig: 9.



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UNITED STATES PATENT OFFICE

DANIEL APPEL, OF CLEVELAND, OHIO, ASSIGNOR TO NEWTON W. TAYLOR,
OF SAME PLACE.

FOLDING MECHANISM FOR PAPER-BAG MACHINES.

SPECIFICATION forming part of Letters Patent No. 252,412, dated January 17, 1882.

Application filed May 11, 1881. (No model.)

To all whom it may concern:

Be it known that I, DANIEL APPEL, of Cleveland, county of Cuyahoga, State of Ohio, have invented an Improvement in Folding Mechanism for Paper-Bag Machines, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to improvements in mechanism for folding paper in the formation of the bottoms of bags, and has for its object the construction of a machine wherein the successive folds required for the formation of a bag-bottom may be produced by means of two blades and three rolls, as will be hereinafter described.

My folding apparatus will preferably follow and form a connected part of a machine having suitable devices for the production of a tube with a diamond fold at its leading end—such, for instance, as the machine represented in Reissued Patent No. 9,202, May 18, 1880, or in my patent of the United States No. 231,642, August 31, 1880; but instead thereof it is obvious that the diamond fold may be made by any other well-known mechanism, and so, also, it is obvious that the mechanism herein described might be employed to fold paper for bag-bottoms irrespective of the previous formation of a diamond fold in the tube—as, for instance, in a bag such as represented in United States Patent No. 236,633.

Figure 1 represents in top or plan view a sufficient portion of a paper-bag-making machine to illustrate my invention; Fig. 2, a partial elevation and section thereof; Fig. 3, a vertical sectional diagram of Fig. 1; Fig. 4, a modification showing the three rolls and two tucking-blades under a different arrangement. Fig. 5 is yet another modification illustrating my invention. Figs. 6, 7, 8 represent the diamond-folded end of the bag-blank and the same as it will appear after being operated upon by the blades which make the first and second cross-folds; and Fig. 9 represents the bag unfolded from the position Fig. 8, showing the bottom completed and the fold in the body of the bag taken out.

Referring to Figs. 1 and 2, the shaft a will be driven positively from a suitable train of

gearing or belt. A pinion, a' , thereon will engage a spur-gear, a^2 , held on a stud, a^3 . This spur-gear will drive an intermediate, a^4 , which, in engagement with a toothed wheel, a^5 , will positively drive the shaft b , having connected with it the paste-applying surface b' , of usual shape, (see full line, Fig. 1, and dotted lines, Fig. 2,) to apply paste to the diamond-folded part of the bag blank, as shown in Figs. 6 and 7. The toothed wheel a^5 engages the pinion a^6 on and drives the roller b^2 , which keeps the bag-blank down upon the pasting device and co-operates with it in feeding the blank forward to be folded for the formation of the bottom. This roller b^2 has a grooved belt-wheel, b^3 , connected by a crossed belt or cord, b^4 , with a similar grooved wheel on the feeding roller b^5 .

Above the roller b^5 is a roller, b^6 , which is moved therefrom by friction. The rolls b^5 and b^6 feed the pasted blank forward, in this instance, with the diamond fold formed upon the under side of the blank. The rolls b^5 and b^6 are of such size and so arranged with relation to the folding-rollers c c' c^2 that the leading end of the bag-blank, provided with the usual diamond fold, will be placed by the feeding-rolls b^5 and b^6 in such position with relation to the rolls c c' as to permit the first folding or tucking blade d to strike the bag-blank on the dotted line x x , Fig. 6, and tuck it between the rolls c c' , forming a fold therein, as at Fig. 7. The once-cross-folded end of the bag-blank is fed forward by the rollers c c' beyond the nip of the rollers c and c^2 , and as herein shown enters a pocket, e^2 , substantially such as in my patent, where it is referred to by same letter. The second folding or tucking blade f meets the bag-blank on the dotted line y y and tucks it between the rollers c and c^2 , which fold the blank, as shown in Fig. 8, the rollers c c' c^2 continuing to feed the blank forward.

The rollers c and g are grooved to receive the cords or tapes g^4 extended about them and the guide-roll g^2 , as shown. These tapes continue the movement of the bag after both folds are made, and carry it between the endless tapes or bands h h' , which run over rollers g g^5 , guide-rolls h^2 h^3 , and farther to the right over other rollers like g g^5 , but not shown.

These rollers last referred to will be so located with relation to the axis of the rollers g g^5 as to twist the bands h h' so that they will turn the under side of the bag uppermost and discharge it between converging belts of different speeds, as in my said patent, which latter belts will partially unfold the bag, leaving the bottom, however, fully folded and pasted, ready to pass to the drying apparatus.

The rollers g^5 and c^2 are not so far separated one from the other as to need any support for the bag while passing from the nip of the belt g^4 and roller c^2 to the nip of the same belt and roller g^5 . The bag is stiff enough to support itself and insure the entrance of its folded end into the converging space between the belt g^4 and roller g^5 .

The rollers b^6 , c , c' , and c^2 will be suitably grooved annularly to obviate pressing on the bag opposite the paste, so as to unduly spread or remove the paste.

The projection f^2 on the folding-blade f , co-operating with the pocket e , prevents the leading cross-folded end of the bag from unfolding, as the said blade tucks it between the rollers c c^2 in forming the second cross-fold.

The rollers b^5 b^6 have their bearings, as have also the rollers c c' c^2 , in a housing or frame, A, supported by a cross-bar, B, the housing being extended down between the side frames, C, of the frame, so as to afford sufficient room between the housing and side frames for the reception of the gears, which, placed on the shafts of the rollers c c' c^2 , drive them in unison at the same speed.

The first folding or tucking blade d is carried by an arm, d' , shown in Figs. 2 and 3 and in dotted lines, Fig. 1, as secured to a rock-shaft, d^3 , having an arm, d^4 , attached by link d^5 with the crank d^6 on the shaft a . At its opposite end this shaft a has a second crank, i , the pin of which enters a slot in an arm, f^3 , on a rock-shaft, f^4 , having two arms, f^5 , which carry the blade f .

In Fig. 3, D represents the bag-blank, and 2, 3 the front and rear ends of its diamond-folded portion. At the upper part of Fig. 3 the bag-bottom is shown as folded twice for the bottom, the body of the bag also being folded, as it will be by the blade f and rollers c c^2 . The rollers c c' c^2 are placed nearly in contact with their surfaces, all moving in the same direction, and the paper bag, while it receives its two cross-folds for the formation of the bottom of the bag, is supported at its back upon one and the same roller, thus making a most compact and simple arrangement of parts, and the two blades tuck the bag-blank into spaces between the periphery of this same roller and the two others arranged about it.

Instead of the exact arrangement of the rollers shown in Figs. 1 to 3, it is obvious that I might make other arrangements or combination of three rolls and two blades, which would operate in substantially the same manner and be within the scope of my invention. I have

shown such plans in Figs. 4 and 5, which I will now describe. In Fig. 4 the three rolls c c' c^2 are of equal diameter. The blade d makes the first and the blade f the second fold in the blank, and the feed-rolls b^5 b^6 are of same diameter as the rolls c , &c. In Fig. 5 the central roll, c , is of greatest diameter, and the rolls c' and c^2 are arranged almost in contact with it. The paste-applying roller m in Fig. 5 is brought up close to and just above the roller c , and its bearings, as well as those of rollers c , are placed in housings l . The roller m has paste applied to it by the roller m' , it receiving paste from the roller m^2 in the paste-box m^3 . The axles of rollers c' c^2 are held in arms l^2 , (shown in dotted lines,) secured at the opposite ends of a shaft, n , sustained in boxes placed in housings n^2 , the said boxes and rolls being adjusted toward and from the roll c by the screws n^3 .

At the right of roll c^2 , and below roller c , I have placed a shield, n^4 , (shown in dotted lines,) to receive against it and divert the folded bag down to belts, such as shown in my said patent, to open the fold in the body of the bag.

The plan represented in Fig. 5 is one I highly approve for compactness and simplicity, and I could yet further modify it by making the rolls c c' c^2 of equal diameter and placing roller c^2 directly under roller c , while roller c' would have its axle in the same horizontal line as the axle of roller c .

It will be noticed in all the modifications that the roller c supports the main part of the bag-blank, while both of the cross-folds for its bottom are made by the blades d and f , and that the rolls c' and c^2 respectively support the extreme forward end of the blank as the blades d and f strike the blank one after the other to tuck or fold the blank first between the rollers c c' and then between c and c^2 .

I am aware that two blades and four rollers, one pair of rolls working with one blade and a different pair of rolls with the second blade, is old, as in my patent referred to.

Having described my invention, what I claim is—

In a paper-bag machine, three rollers arranged in contact, or nearly so, and two folding or tucking blades co-operating therewith to fold or tuck the paper-bag blank twice in succession between parts of the periphery of that one of the said rollers which forms a support for the main part of the bag, and the two rollers arranged about it, which support the free or leading end of the blank in advance of the portion engaged by the blade, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DANIEL APPEL.

Witnesses:

O. E. STOCKWELL,

H. F. KINGSLEY.