

D. APPEL.
PAPER BAG MACHINE.
APPLICATION FILED OCT. 21, 1908.

945,485.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.

Fig. 3

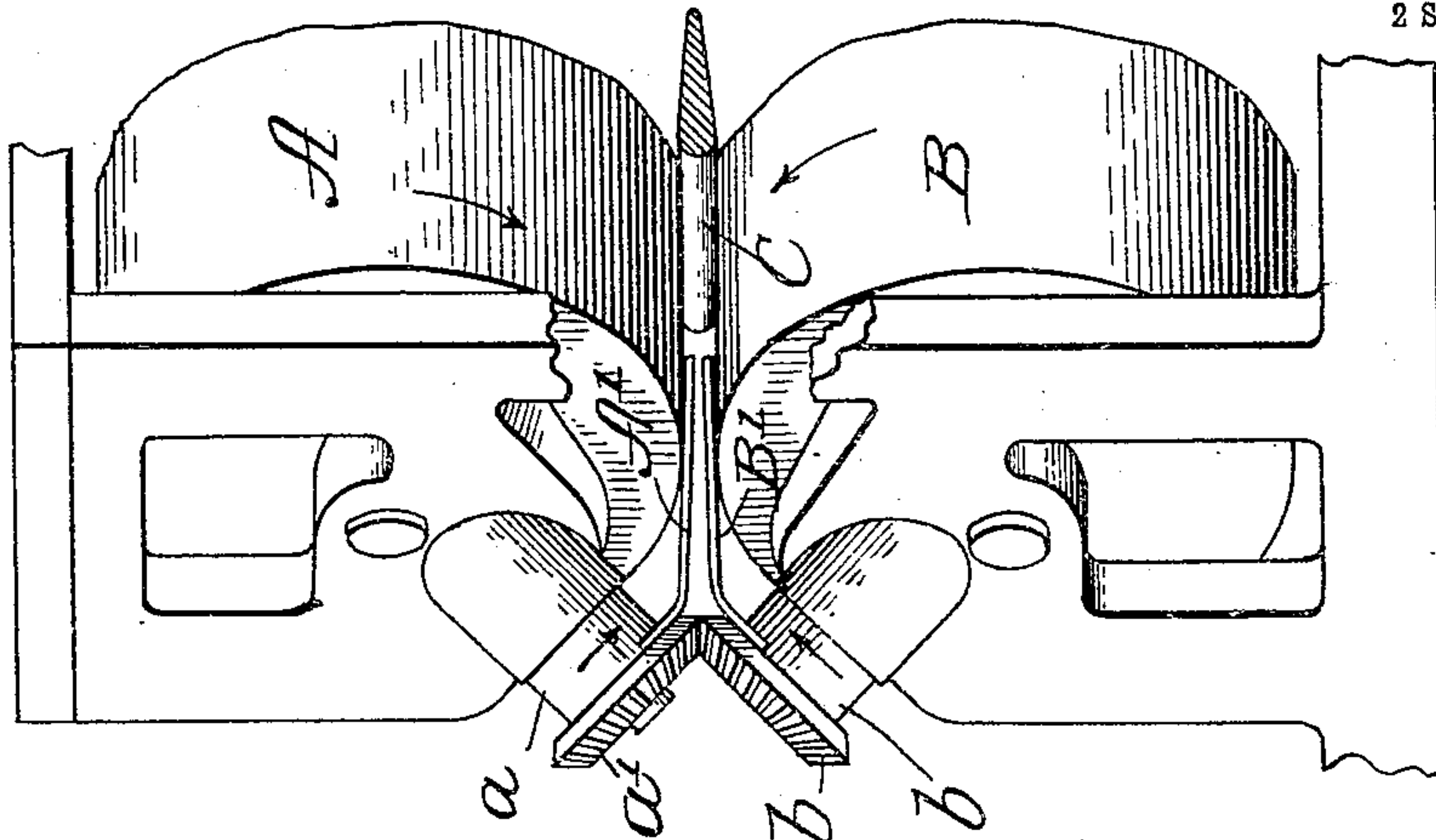


Fig. 2

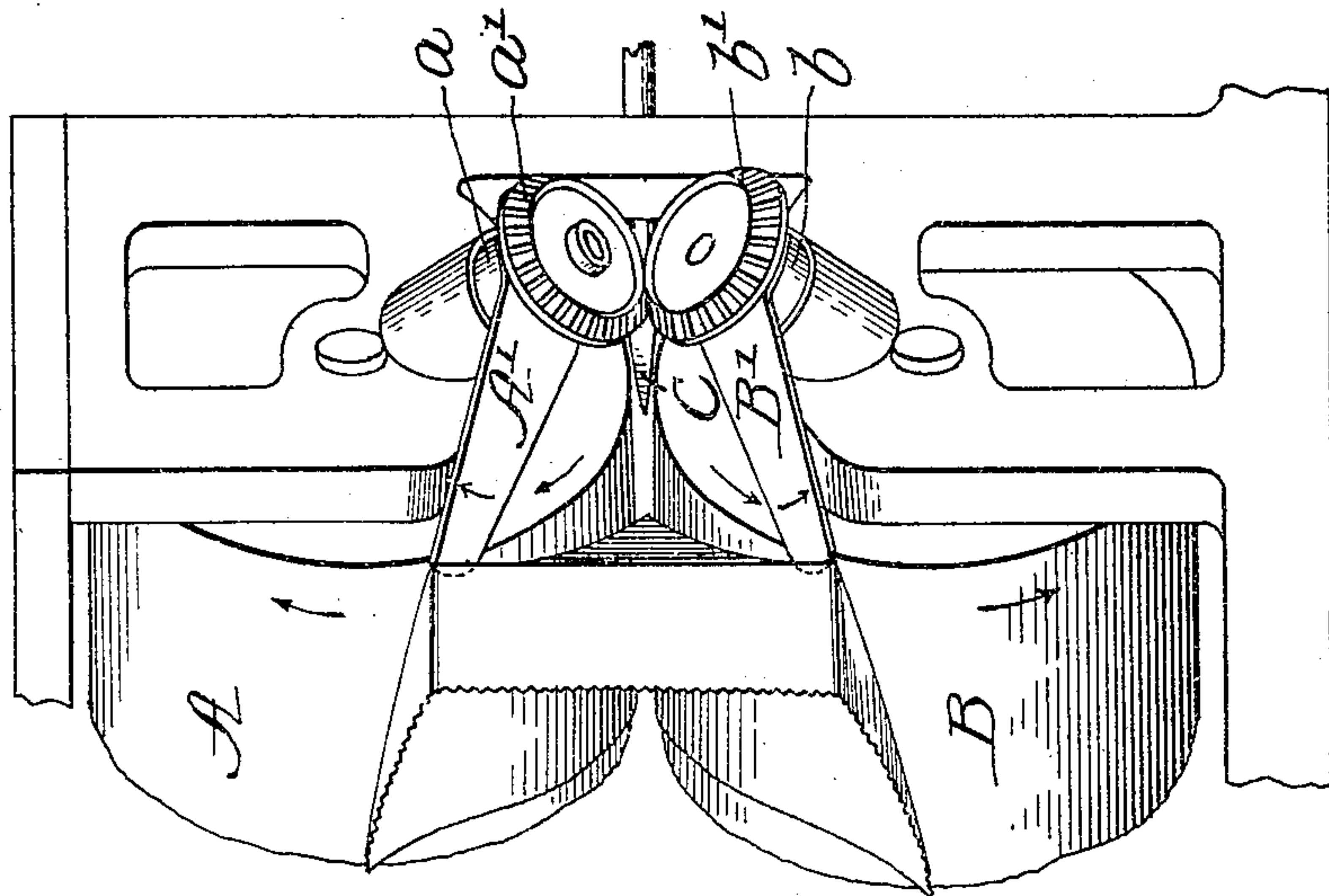
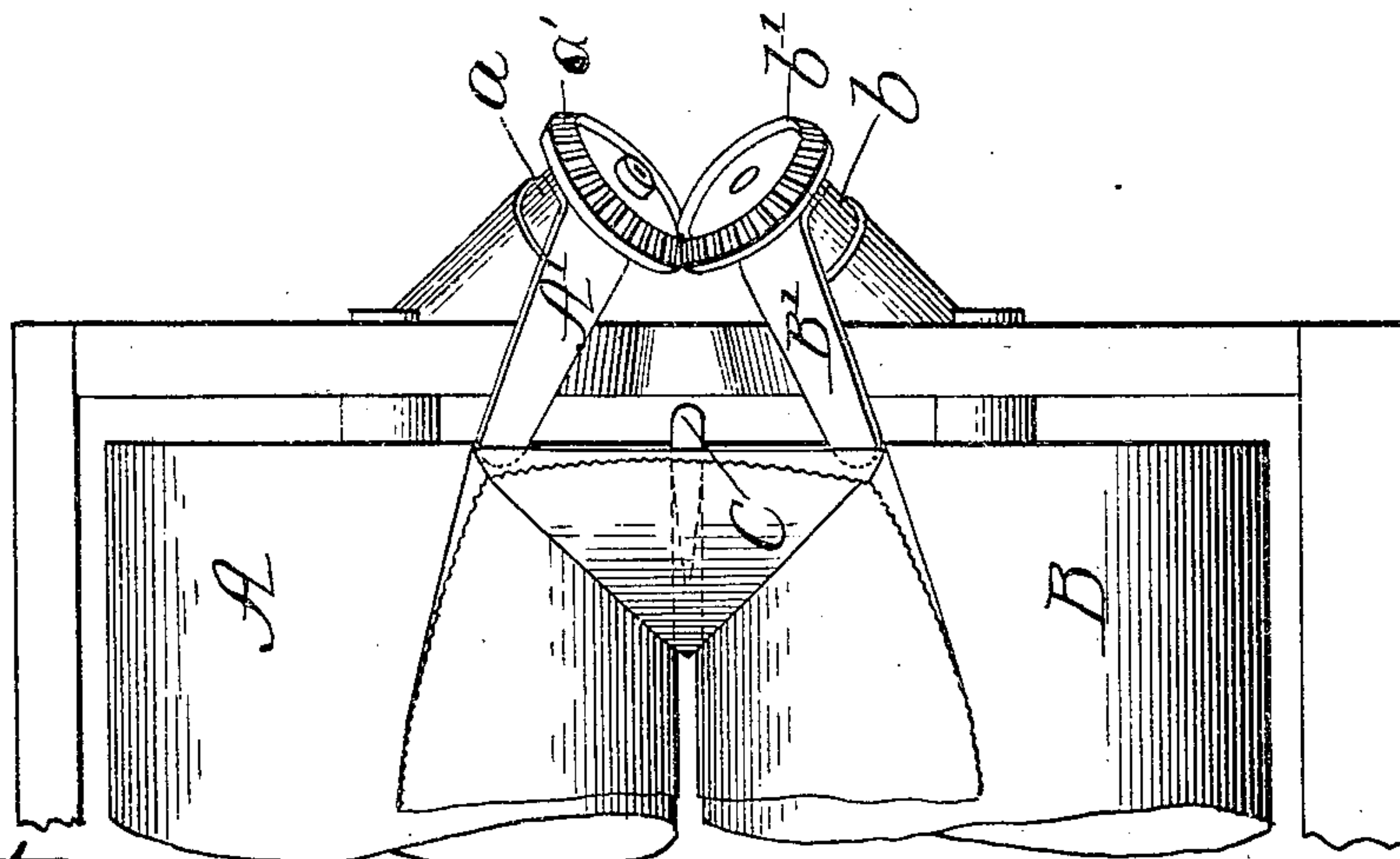


Fig. 1



Witnesses:
D. D. Perry
H. H. Bannett

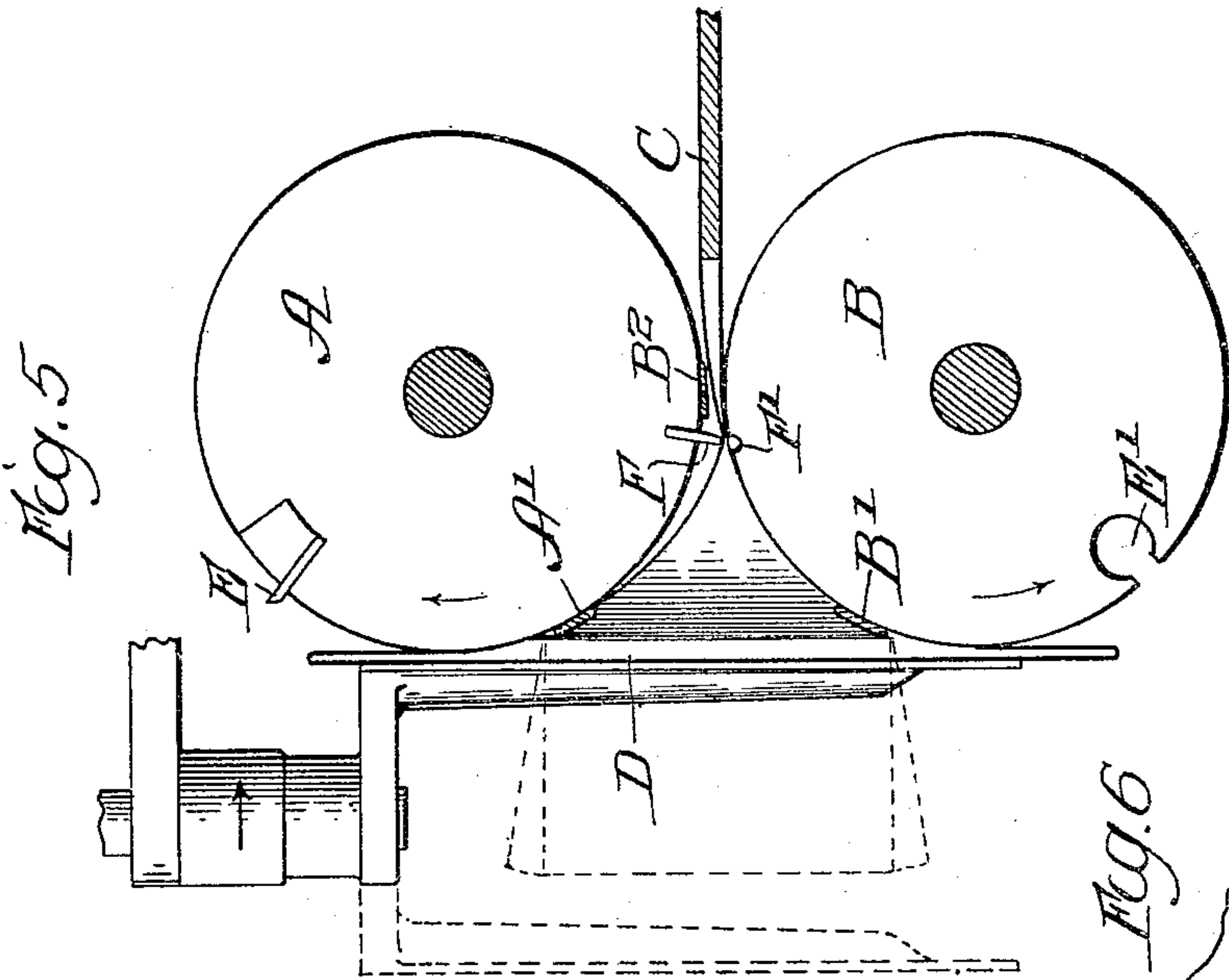
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

DANIEL APPEL, OF CLEVELAND, OHIO, ASSIGNOR TO THE ADVANCE BAG COMPANY,
OF MIDDLETOWN, OHIO, A CORPORATION OF OHIO.

PAPER-BAG MACHINE.

945,485.

Specification of Letters Patent.

Patented Jan. 4, 1910.

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To all whom it may concern:

Be it known that I, DANIEL APPEL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Paper-Bag Machines, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to machines for forming what are known as square satchel-bottomed paper bags, commonly called self-opening square or S. O. S. bags, and consists in novel devices for forming the diamond-fold upon the ends of the bag blanks, whereby the simplicity and efficiency of machines of this character may be increased.

In the accompanying drawings, in order to illustrate the principle and mode of operation of my invention in its simplest form, I have shown it independently of the details of a commercial machine, illustrating only the parts constituting and immediately associated with the invention.

In said drawings Figure 1 is a front elevation of one end of a pair of rolls and the devices coöperating therewith to partially form the diamond fold upon the end of the bag blank, said devices being shown in the position they occupy when they have opened out the end of the blank into "box" form in the process of forming the diamond-fold thereon; Fig. 2 a perspective view of the same parts in the same position; Fig. 3 a perspective view of the same parts at approximately right angles to the view in Fig. 2; Fig. 4 a front elevation of the complete rolls and rotating fingers, and the rotating folding blades; Fig. 5 a side elevation, partly in section, of the same; and Fig. 6 a perspective view of the mouth of the bag blank opened out into box form.

The same letters of reference are employed to indicate corresponding parts in the several views.

A and B represent a pair of rolls occupying the position of the usual diamond-forming rolls in machines of this character; but in the present instance these rolls are not provided with any of the usual gripping devices for engaging and opening out the bag blank, and may be simply a pair of

plain rolls. They do not operate as feed rolls, and are separated from each other to permit the passage between them of the rotating fingers A' B' by means of which, in coöperation with the rolls, the mouth of the bag blank is opened out into box form, as shown in Figs. 1, 2 and 6. At their outer ends these fingers A' B' are secured to and carried by a pair of rotating hubs *a b* mounted upon inclined axes, and geared together by a pair of beveled gears *a' b'*, as shown. The fingers A' B' project from their supporting hubs at an angle to the axis of rotation thereof approximately the same as that of the faces of the beveled gears.

The rolls A B and the rotating fingers A' B' coöperate together to open out the mouth of the bag blank into the box form shown in the following manner: The bellows-folded bag blank is fed forward between the rolls A B, as usual, the upper and lower plies of its opposite bellows folds being held apart by a suitable spreader or separator, C, as in cases where the plies of the blank are to be engaged by the side grippers usually employed in machines of this character. As the front end of the bag blank passes forward between the rolls the rotating fingers A' B' at the proper time enter between the rolls, and between the upper and lower plies of the bellows folds of the blank, as shown in Fig. 3, and as the ends of the fingers swing on forward (and upward and downward, respectively,) the planes of their rotation cause them to press the upper and lower plies of the blank against the faces of the rolls A B. The fingers A' B' are slightly resilient, so that they may press the plies of the bag blank against the faces of the rolls with a yielding pressure, and their speed of rotation is such that their inner ends travel slightly faster than do the surfaces of the rolls. The result is that they move forward with and upon the faces of the rolls with a wiping action, holding the upper and lower plies of the blank to the surfaces of the rolls and maintaining them in taut condition. As the inner ends of the fingers A' B' move forward and upward and downward, respectively, they also move outward over the faces of the rolls, toward the ends thereof, and the adjustment of the parts is such that as the

ends of the fingers approach the ends of the rolls they spread the upper and lower plies of the blank apart to the limit permitted by the blank, thereby opening out the mouth of the blank into the box form shown in Figs. 1, 2 and 6.

When the mouth of the blank has been thus opened out into box form, the diamond fold may be completed in any suitable manner and by any suitable means; but in the present instance I have illustrated novel means for completing the diamond-fold, especially adapted for efficient coöperation with my novel means above described for opening out the mouth of the blank into box form. This novel means for completing the diamond fold consists of a pair of rotating blades D D, Figs. 4 and 5, suitably supported upon vertical axes at their upper ends, and adapted, after the fingers A' B' approach the position shown in Figs. 1 and 2 and bring the mouth of the bag blank into the box form there shown, to swing inward against the opposite sides of the box so formed, and press them inward and flatten them out into an approximately vertical plane, as shown in Figs. 4 and 5, thereby completing the formation of the diamond fold in that manner.

As an auxiliary to the diamond-forming devices above described, I provide a supplemental finger B², Fig. 4, upon each of the hubs or rotary supports of the two fingers B' B' which coöperate with the lower roll B. These fingers project from their axes of rotation at a considerable angle from the fingers B' B', and follow after the latter in their rotation. Their inner ends are so bent or shaped as not to engage the surface of the roll B, but on the contrary as they swing between the rolls their inner ends project far enough above the surface of the lower roll to pass over both plies of the bellows side-folds of the blank. The position of these fingers B² B² is such that they swing in between the two rolls behind the main transverse crease of the bag blank, which is formed at the middle of the diamond-fold and along which the upper half of the diamond-fold is bent back upon the body of the blank, and their function is to engage the bag blank near such crease line and draw it bodily downward with the lower roll as it moves forward from between the rolls, and thereby facilitate the folding backward of the upper half of the diamond fold upon the body of the blank as the latter passes downward from the diamond-forming rolls to the pasting and folding rolls, which latter may be of the usual or any suitable construction and therefore need not be illustrated or described.

As heretofore stated, and as will be obvious from the explanation which has been given, the rolls A B may be perfectly plain

rolls, but I prefer to mount upon these two rolls the cutting devices for partially or wholly severing the bag blanks, and also the creasing devices for forming the main transverse crease of the diamond fold, heretofore referred to. To this end I secure in the roll A a transverse cutter E, Fig. 5, which coöperates with a recess or groove E' in the roll B to sever the bag blank from the bag tube at each revolution of the rolls; and I also secure in the roll A a transverse creaser plate or bar F which coöperates with the groove F' in the roll B, to form the aforesaid crease in the bag blank.

As will be appreciated by those skilled in the art, the diamond-forming devices which I have illustrated and described are of extreme simplicity, as compared with any heretofore devised and used, and owing to the fact that the movement of all of the parts comprising them is a continuous rotary one, they provide for and permit a speed of operation materially greater than is possible in machines of this character in which any of the essential parts have other than rotary movement.

It will also be understood by those skilled in the art that in my machine, as in many machines of this character, only a portion of the surfaces of the rolls A B perform any essential function, and that the remainder of the rolls might be cut away or omitted, leaving simply rotary supports for the essential portions. Where, therefore, "rolls" are referred to in my claims it is not to be understood that I intend to limit such claims to the employment of complete cylindrical rolls.

Again, while my invention can be utilized to the greatest advantage and to the fullest extent by employing both sets of fingers A' A' and B' B', coöperating with the upper and lower rolls, respectively, nevertheless either roll, with its coöperating set of fingers, may be employed independently of the other roll and its coöperating fingers. For instance, the upper roll A and its coöperating fingers A' A' may be employed in connection and coöperation with a lower roll provided with suitable gripping devices for handling the lower ply of the bag blank, or the lower roll and its coöperating fingers may be employed in connection with an upper roll provided with suitable gripping devices for handling the upper ply of the blank; and I therefore desire to secure as my invention the rotating fingers coöperating with either an upper or a lower roll, or its equivalent, in the manner and for the purpose described.

Having thus fully described my invention, I claim:

1. In a paper bag machine, the combination of the roll A and the rotating fingers A' A' mounted independently of said roll at the

opposite ends thereof and cooperating therewith to assist in opening out the mouth of the bag blank in the manner described.

2. In a paper bag machine, the combination of the roll B and the rotating fingers B' B' mounted independently of said roll at the opposite ends thereof and cooperating therewith to assist in opening out the mouth of the bag blank in the manner described.

3. In a paper bag machine, the combination of the roll B and the rotating fingers B' B' and B² B² mounted independently of said roll and cooperating therewith to assist in opening out the mouth of the bag blank, in the manner described.

4. In a paper bag machine, the combination of the rolls A B and the rotating fingers A' A' and B' B' mounted independently of said rolls and cooperating therewith to open out the mouth of the bag blank in the manner described.

5. In a paper bag machine, the combination of the rolls A B and the rotating fingers A' A', B' B' and B² B², mounted in-

dependently of said rolls, and cooperating therewith to open out the mouth of the bag blank in the manner described.

6. In a paper bag machine, the combination of the rolls A B, the rotating fingers A' A' and B' B' mounted independently of said rolls and cooperating therewith to open out the mouth of the bag blank, and the rotating blades D D for flattening down the mouth of the blank, in the manner described.

7. In a paper bag machine, the combination of the rolls A B, the rotating fingers A' A', B' B' and B² B², mounted independently of said rolls and cooperating therewith to open out the mouth of the bag blank, and the rotating blades D D for flattening down the mouth of the blank, in the manner described.

DANIEL APPEL.

Witnesses:

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