

No. 685,805.

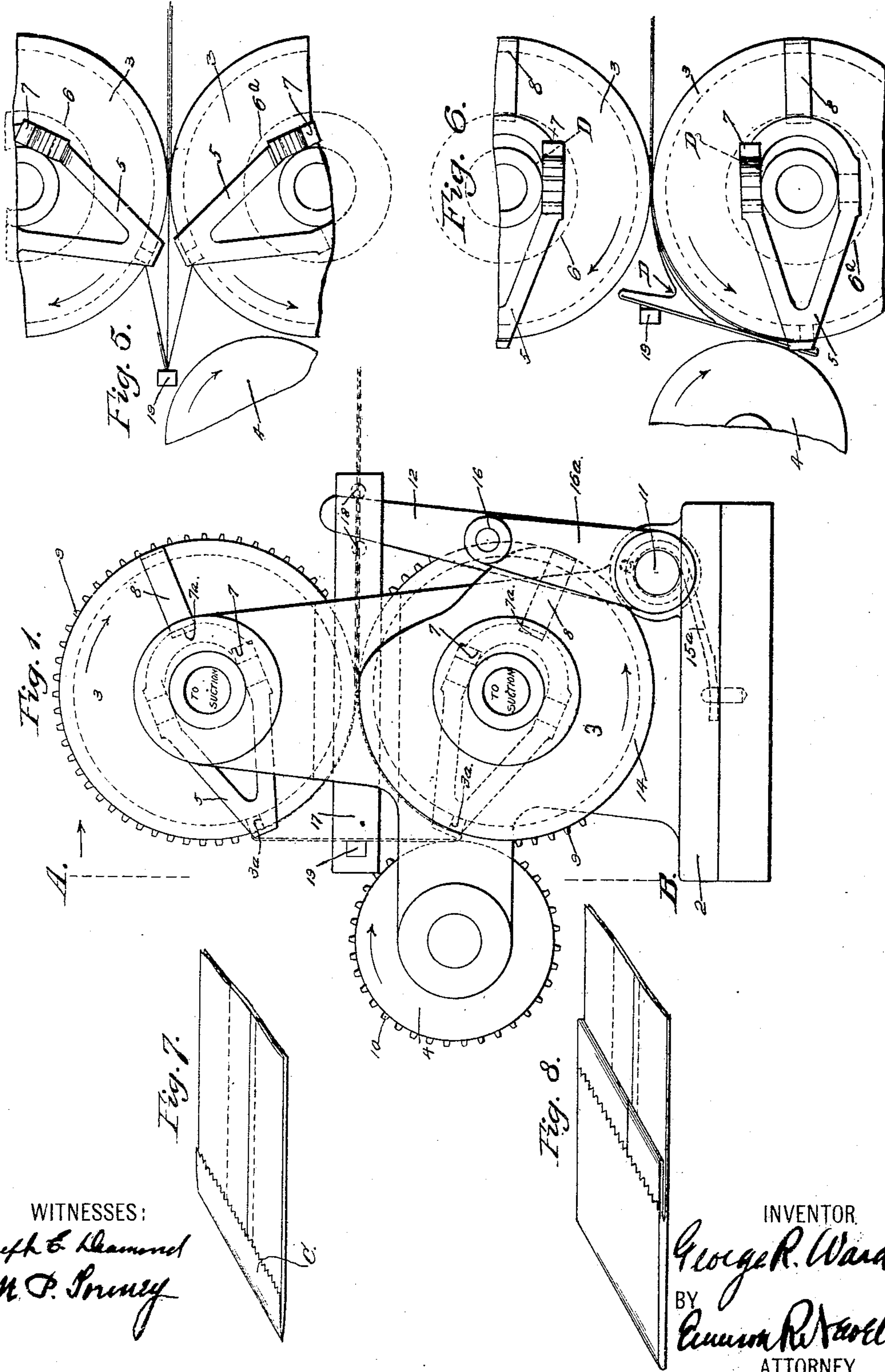
Patented Nov. 5, 1901.

G. R. WARD.  
BAG MACHINE.

(Application filed Dec. 7, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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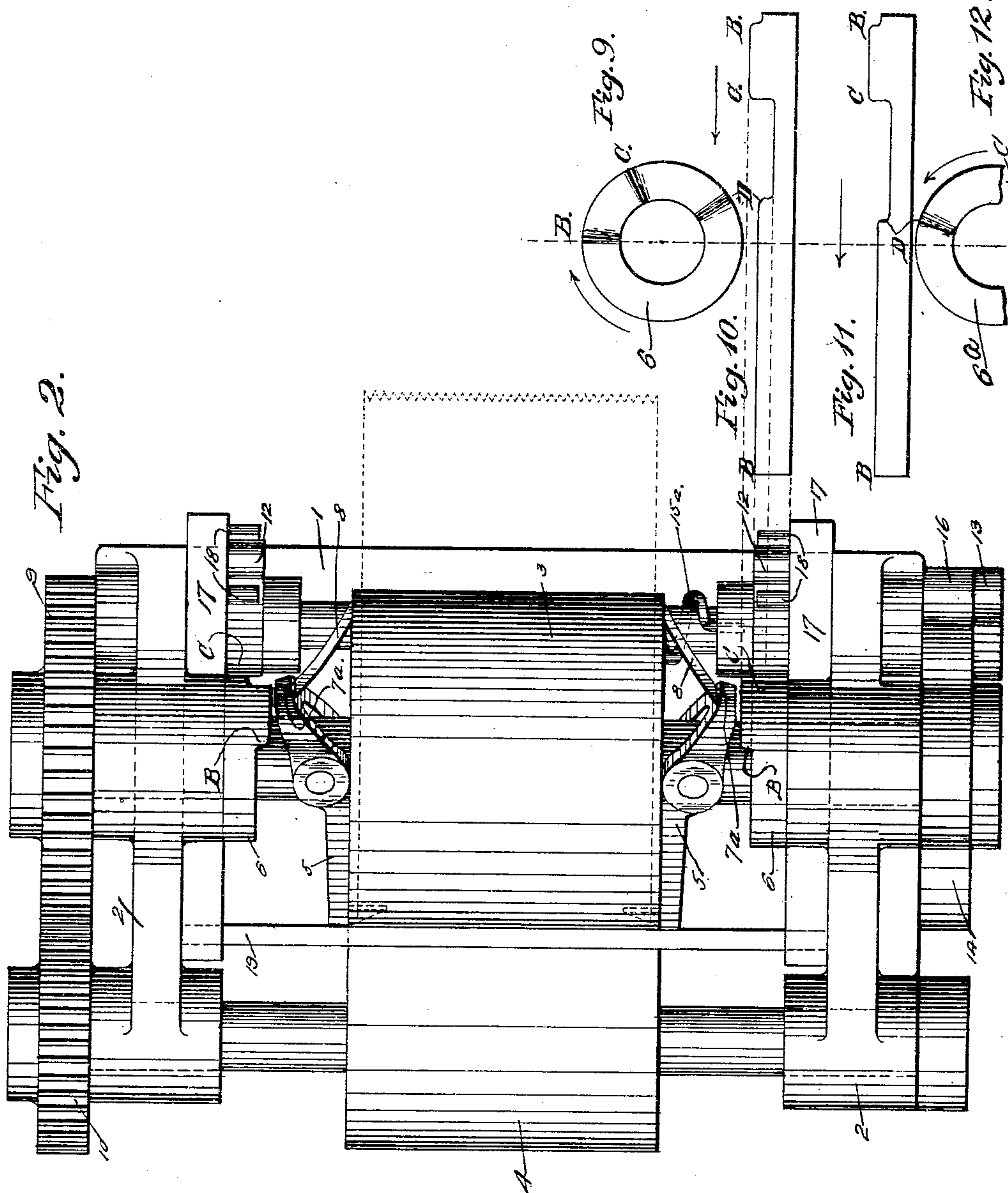
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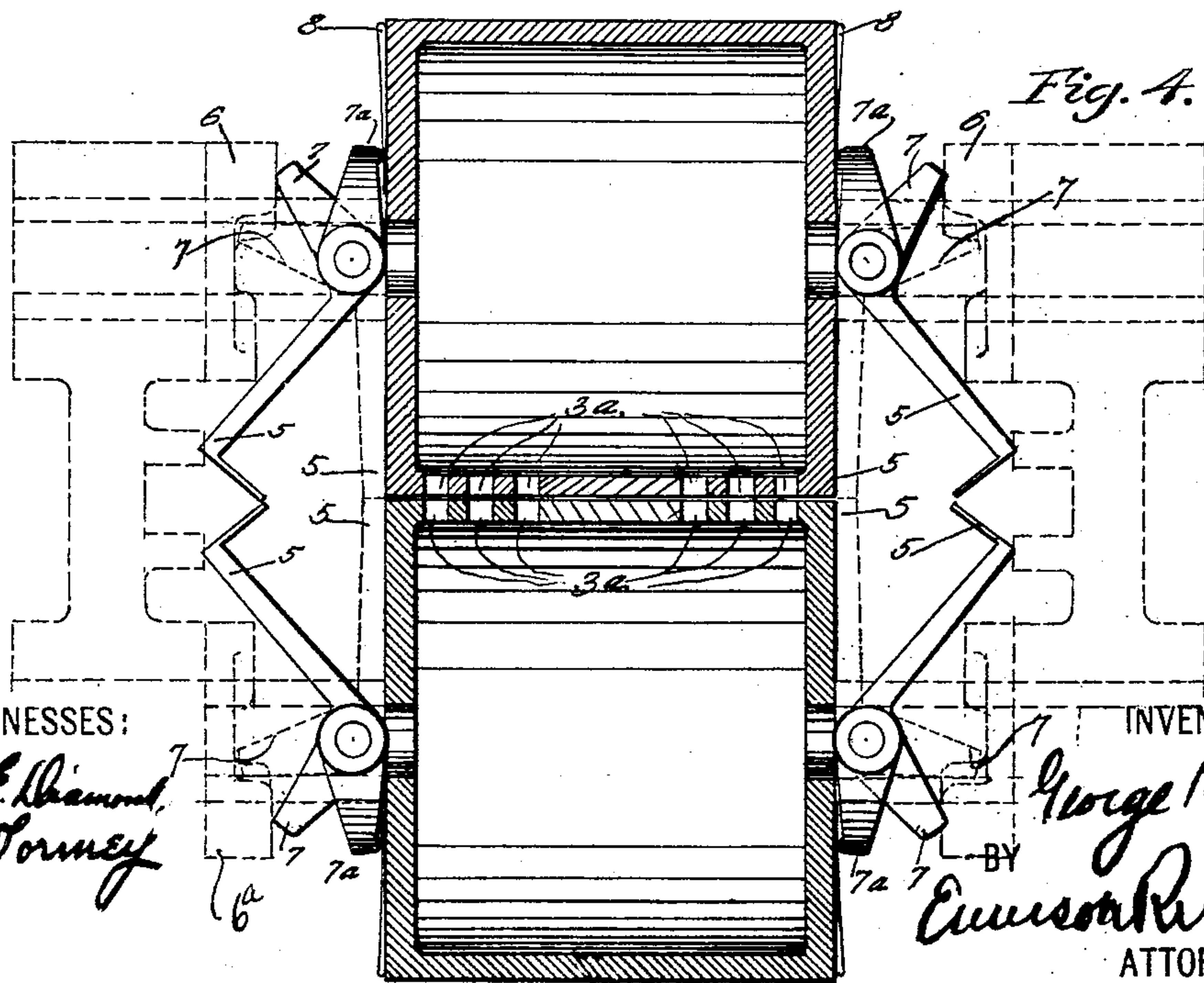
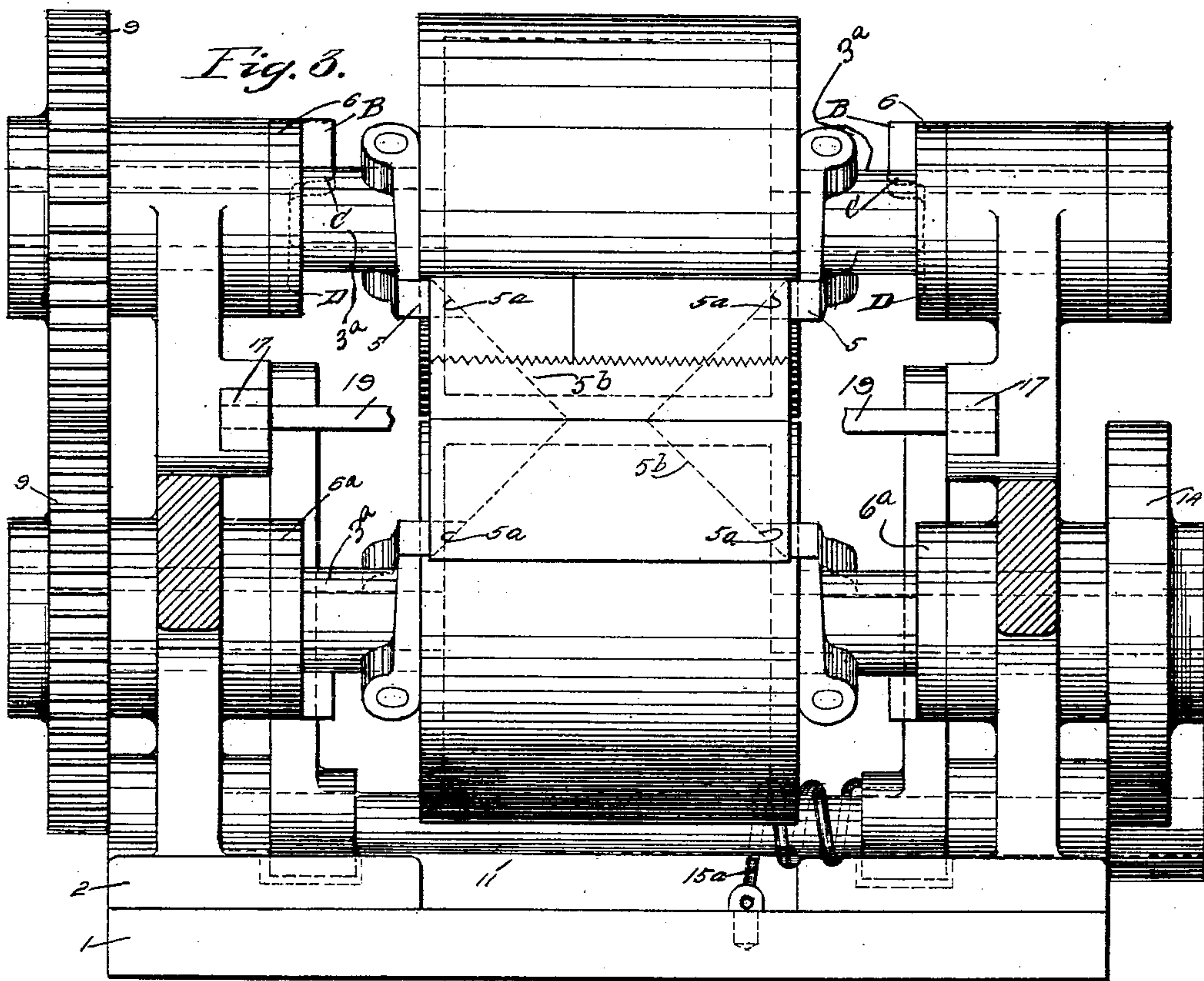
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# UNITED STATES PATENT OFFICE.

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## BAG-MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,805, dated November 5, 1901.

Application filed December 7, 1900. Serial No. 39,039. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE R. WARD, a citizen of the United States, residing at New York, N. Y., have invented certain new and useful Improvements in Bag-Machines, of which the following is a clear, full, and exact description.

My invention relates to bag-folding machines, and one of my objects is to provide a machine which will receive a bag and fold it into the form desired.

It is desirable in a completed bag that when it is distended by air or by the material with which it is filled its bottom should automatically assume an angular, preferably a rectangular, shape. One object of my present invention is to provide a machine which will so fold a bag that it will when distended assume the rectangular-bottomed form desired.

In the preferred embodiment of my invention shown in the drawings I have provided a machine which will receive a bellows-folded bag in a flattened condition and distend the bottom-forming end of the same into the rectangular shape and then fold back a part of said bottom, preferably upon the outside of the bag, thus defining the edges of the rectangular bottom.

Other advantages of my invention will be apparent, and the invention will be defined in the claims.

In the drawings, showing the preferred embodiment of my invention, Figure 1 shows a side elevation of my machine, the bag being shown in dotted lines and with its bottom distended into the rectangular form. Fig. 2 shows a plan view of the same. Fig. 3 is a front elevation of the device shown in Fig. 1, the parts in front of the line A B in Fig. 1 having been removed. Fig. 4 shows a central vertical section through the hollowed rolls looking in the opposite direction in Fig. 3 at the time when the suction devices commence to act on the bag, adjacent parts being shown in dotted lines. Figs. 5 and 6 are detail views of the folding devices at different points in the operation. Fig. 7 shows a common bellows-folded bag, such as is preferably operated upon by the machine; and

Fig. 8 shows the bag as it is delivered from the preferred embodiment of the machine. Fig. 9 shows a detached side elevation of one of the upper stationary cams; Fig. 10, an edge elevation of the cam shown in Fig. 9, if it were split and opened out into a straight bar. Figs. 11 and 12 are similar views of one of the lower stationary cams.

In the above preferred embodiment, 1 is the base, and 2 2 the sides of the frame of the machine, in which are mounted the shafts 3<sup>a</sup> 3<sup>a</sup>. In the present form of the machine the bottom-forming end of the flattened bag is received between a set of rollers 3 3, mounted on said shafts and rotated preferably continuously—that is, not forward and then backward—by the meshing gears 9 9 on said shafts and in the directions shown by the arrows in Fig. 1. The bag is caught between the rolls and fed forward, and in order to distend the bottom-forming end of the same I have provided a rotatable suction device, which is adapted to contact with the bag and distend or assist in distending the bottom-forming end of the same into a rectangular shape. Where the rollers are used, I prefer to have a suction device for each roll and make them rotatable therewith. In the embodiment shown I have hollowed out the rolls and provided them with preferably a plurality of apertures 3<sup>a</sup>, as seen in Fig. 4 and in dotted lines in Fig. 1. The bag is gripped by the rolls a short distance before the apertures come to the position shown in Fig. 4. When the rolls are rotated, the bag is fed forward and the suction-apertures 3<sup>a</sup> are covered by the plies of the bag. As the rolls are further rotated to the positions shown in Figs. 5 and 6 the air may be exhausted from the same. I may use any suitable device, such as is well known at present, for exhausting the air from the suction devices. As the rolls are rotated the suction-apertures move apart and carry with them the plies of the bag, thus distending the bottom of the same preferably into the rectangular form shown in Figs. 1 and 3. In order to assist in so distending the bag, I have provided means rotatable with the suction devices, in this embodiment a pair of distending-fingers 5 5 for each roll, which may



be pivoted to the shafts 3<sup>a</sup> 3<sup>a</sup> and which enter between the plies of the bag as the suction devices commence to distend the same and hold the plies against the face of the rolls, as shown. These fingers are thrown inward, preferably by springs 8 on the rolls, and are moved outward at the proper times by projections 7 7 from the fingers coming in contact with stationary cams 6 6<sup>a</sup> on the frame.

Fig. 9 shows a side elevation of one of the upper cams, and in Fig. 10 an edge view of the same cam is shown as it would look if it were split at B and bent back into a straight bar, the part B C being the highest, the portion C D the lowest, and D B of intermediate height. The arrows in Figs. 9 to 12 show the direction in which the projections 7 7 move over the face of the same. As the rolls move from the position shown in Fig. 4 to that shown in Fig. 5 the projections 7 ride off the cam-faces B C into recesses C D and the fingers 5 are thrown inwardly by springs 8, whose free ends rest in notches 7<sup>a</sup> and grip the plies as specified. The fingers are preferably provided with inclined faces 5<sup>a</sup> 5<sup>a</sup>, so that they will not tear the triangular fold 5<sup>b</sup> 5<sup>b</sup>, Fig. 3, which result from the distention of the bottom of the bellows-folded bag into the rectangular form, the part held between the rolls 3 3 being still held flat. The fingers define the corners and edges of the bottom, and when they have been moved to the position shown in Fig. 1 the bottom of the bag will be substantially flat and rectangular. The projections 7 7 on the upper pair of fingers then strike the faces D, Figs. 9 and 10, on the upper cams and are thrown out, moving the upper fingers 5 out of engagement with the bag. As will be seen from Fig. 11, the recesses C D are a little longer in the lower cams than in the upper cams. Consequently the lower pair of fingers will not be thrown out till the lower roll reaches the position shown in Fig. 6. As the rolls are further rotated from the position shown in Fig. 1 the lower edge of the bottom of the bag is grasped between the lower roll and roll 4, as shown in Fig. 6. The projections 7 on the lower fingers then strike cam-faces D on lower cams 6<sup>a</sup> and throw out the lower fingers, and the bag is drawn down between lower roll 3 and roll 4. This will fold over a part—in this case one-half—of the bottom of the bag upon the outside of the bag, and in order to assist in this folding and at the same time press upon the bottom of the bag to prevent the transverse seam C, Fig. 7, being pulled apart in case the paste has not dried I have provided a backwardly-moving folder. In this embodiment this consists of a transverse bar 19, carried by slides 17, traveling in guideways in the frame, Fig. 3. These slides 17 are reciprocated by cam-wheel 14 on shaft 3<sup>a</sup> engaging a roller-stud 16 on a lever-arm 16<sup>a</sup>, attached to rock-shaft 11, which carries levers 12 12, whose upper ends are located between pins 18 18 on slides 17. A

spring 15<sup>a</sup> normally keeps the parts in the position shown in Fig. 5. This folder 19 is thus independent of the rolls 3 3—that is, it is not actuated by them, but in this case by cam 14. The bag will thus be folded into the form shown in Fig. 8 and be delivered between lower rolls 3 and roll 4 at the bottom of the machine. All the rolls in this embodiment rotate continuously—that is, in one direction.

When I speak herein of a "bag," I do not mean that it must necessarily in all cases have had the bottom already pasted, and by "flattened" I do not limit myself to an absolutely flat condition, although this is preferable. The bag might be slightly distended and still be flat in the sense I use the word.

It will be obvious that many changes may be made in the constructions herein described and illustrated without departing from the spirit of my invention, and I therefore do not desire to be limited to the particular embodiments herein disclosed.

What I claim is—

1. In a bag-machine in combination, a rotatable suction device adapted to contact with a bag, an exhausting device to exhaust air therefrom, means to rotate said suction device to distend said bag, and means to fold back one side of said distended bottom upon the outside of said bag.

2. In a bag-machine in combination, a rotatable suction device adapted to contact with a bag, an exhausting device to exhaust air therefrom and means to rotate said suction device to distend the bottom of said bag into a substantially rectangular form, means to hold one part of said rectangular bag-bottom, and a folder to fold back substantially one-half of said bottom upon the outside of said bag.

3. In a bag-machine in combination, a rotatable suction device adapted to contact with a bag, an exhausting device to exhaust air therefrom, means to rotate said suction device and means to hold and thereby define the edges of said bottom whereby said bottom is distended into a substantially rectangular form, and folding means to fold back part of said rectangular bottom.

4. In a bag-machine in combination a rotatable suction device adapted to contact with a bag, means to exhaust the air therefrom and means to rotate the same to distend said bag, means rotatable with said suction device and adapted to engage said bag and assist in distending the bottom of the same into a substantially rectangular form, and folding means to fold back a part of said rectangular bottom.

5. In a bag-machine in combination a rotatable suction device adapted to contact with a bag, means to exhaust the air therefrom and means to rotate the same to distend said bag, means rotatable with said suction device and adapted to engage said bag and assist in distending the bottom of the same into a sub-



stantially rectangular form, means to prevent one side of said bottom from being folded backward, and folding means to fold back the other side of said bottom upon the outside of said bag.

6. In a bag-machine in combination a rotatable suction device adapted to contact with a bag, means to exhaust the air therefrom and means to rotate the same to distend said bag, means rotatable with said suction device and adapted to engage said bag and assist in distending the bottom of the same into a substantially rectangular form, and a rearwardly-moving folder to fold back a part of said bottom.

7. In a bag-machine in combination a plurality of suction devices adapted to contact with the opposite sides of a bag, means to exhaust the air therefrom and rotate the same to distend said bag, and means rotatable with said suction devices and adapted to engage said bag and assist in distending the bottom of the same into a substantially rectangular form, and folding means adapted to fold one side of said distended bottom over upon the outside of said bag.

8. In a bag-machine in combination, a plurality of hollowed rolls having apertures constituting suction devices adapted to contact with the plies of a flattened bellows-folded bag, means to exhaust the air therefrom and rotate the same to distend said bag, and means rotatable with said rolls and adapted to engage said bag and assist in distending the bottom thereof into a substantially rectangular form, and folding means adapted to fold one side of said distended bottom over upon the outside of said bag.

9. In a bag-machine in combination, a set of rolls provided with suction devices and adapted to receive a bag between them and feed the same forward, means to exhaust air from said suction devices and means to rotate the rolls and distend the bottom of said bag into a substantially rectangular form, and folding means adapted to fold one-half of said distended bottom over upon the outside of said bag.

10. In a bag-machine in combination, a set of hollowed rolls provided with suction-apertures and adapted to receive between them and feed forward a bellows-folded bag, and means to exhaust air from said rolls and rotate the same and distend said bag into a substantially rectangular form, and folding means adapted to fold one side of said distended bottom over upon the outside of said bag.

11. In a bag-machine in combination, a rotatable suction device adapted to contact with a flattened bellows-folded bag, means to exhaust the air from said suction device and rotate the same whereby the plies are distended, distending-fingers rotatable with said suction device and means to insert the same between said plies and move the same apart

and distend the bottom of said bag into a substantially rectangular form, and folding means adapted to fold one side of said distended bottom over upon the outside of said bag.

12. In a bag-folding machine in combination, a roll to hold a portion from side to side of a bellows-folded bag in a flattened condition, distending-fingers, means to insert said fingers between the plies of said bag near the bottom of said bag and move said fingers apart to distend said plies at the bottom of said bag, and a rearwardly-moving folder independent of said roll and adapted to press upon the bottom of said bag and turn back a part of said bottom while said fingers are distending said plies.

13. In a bag-folding machine in combination, means to hold a bellows-folded closed-bottomed bag, means to distend the bottom thereof into a substantially rectangular form, and a folding device adapted to simultaneously press upon said bottom of said bag and fold back a portion of said bottom.

14. In a bag-machine in combination, a plurality of rolls adapted to receive between them and feed forward a flattened bag, distending-fingers for each roll rotatable with the same, and stationary cams adapted to actuate said fingers and throw the same inward to engage said bag and distend the bottom of the same into a substantially rectangular form, and folding means adapted to fold one-half of said distended bottom over upon the outside of said bag.

15. In a bag-machine in combination a plurality of rolls adapted to receive between them and feed forward a flattened bag, distending-fingers for each roll rotatable with the same, and stationary cams adapted to actuate said fingers and throw the same inward to engage said bag and distend the bottom thereof into a substantially rectangular form, and folding means adapted to fold one side of said distended bottom over upon the outside of said bag.

16. In a bag-folding machine in combination, a pair of continuously-rotating rolls adapted to receive a flattened bellows-folded bag between them and feed the same forward, means rotatable with said rolls and adapted to grasp said bag forward of said rolls and distend the same, and a folding device to fold back a part of the bottom of said bag upon the outside of the same.

17. In a bag-folding machine in combination, a pair of continuously-rotating rolls adapted to receive a flattened bellows-folded bag between them and feed the same forward, distending-fingers rotatable with said rolls and adapted to enter between said plies and grasp the same forward of said rolls and distend the bottom of the bag into a substantially rectangular form, and folding means adapted to fold back a part of said bottom upon the outside of said bag.



18. In a bag-folding machine in combination, a roll to hold a portion from side to side of a bellows-folded bag in a flattened condition, distending-fingers, means to insert said  
5 fingers between the plies of said bag near the bottom of said bag and move said fingers apart to distend said plies at the bottom of said bag, and a rearwardly-moving folder adapted to press upon the bottom of said bag

and turn back a part of said bottom while said fingers are distending said plies.

Signed at New York, N. Y., this 5th day of December, 1900.

GEORGE R. WARD.

Witnesses:

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JOSEPH E. DIAMOND.