

L. D. BENNER.
BAG MACHINE.

No. 391,936.

Patented Oct. 30, 1888.

Fig. 1.

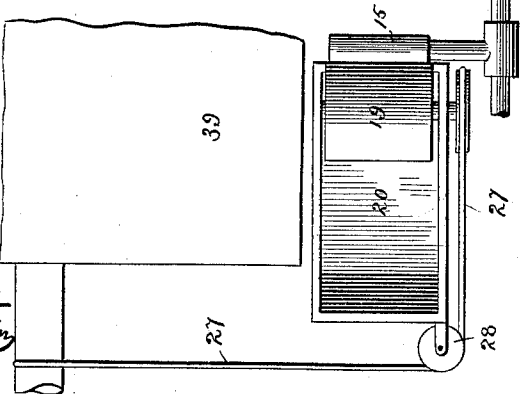
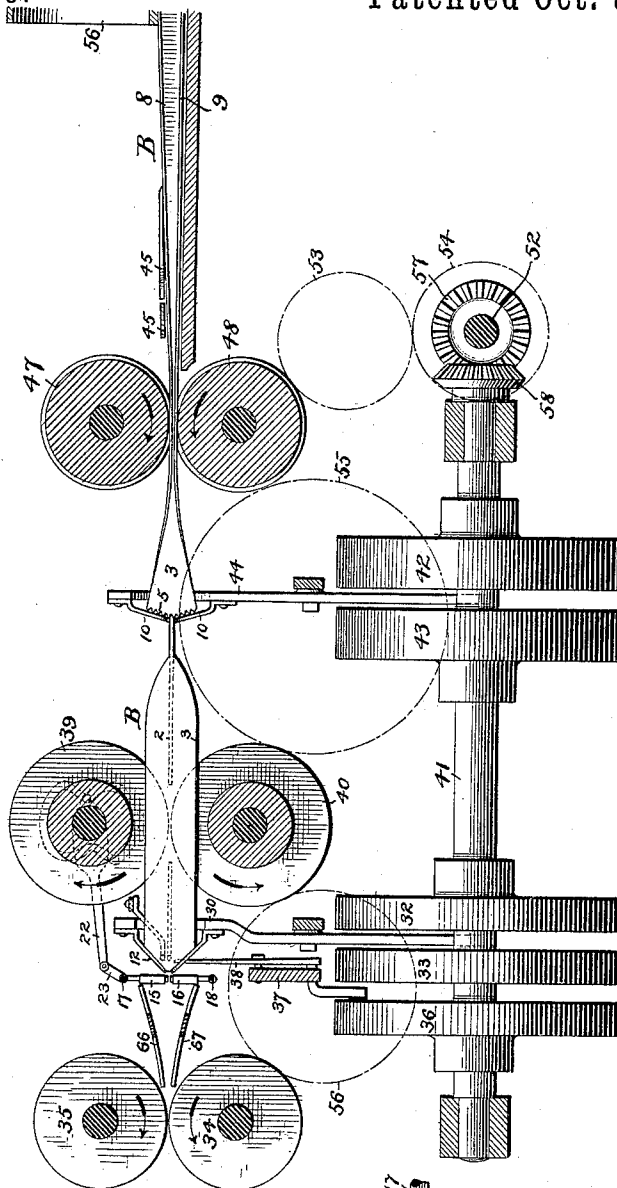


Fig. 2.

Test:
Geo. H. Graham
Chas. S. Matthews

Loungs D. Benner,
Inventor:
Foster & Freeman
attys.

(No Model.)

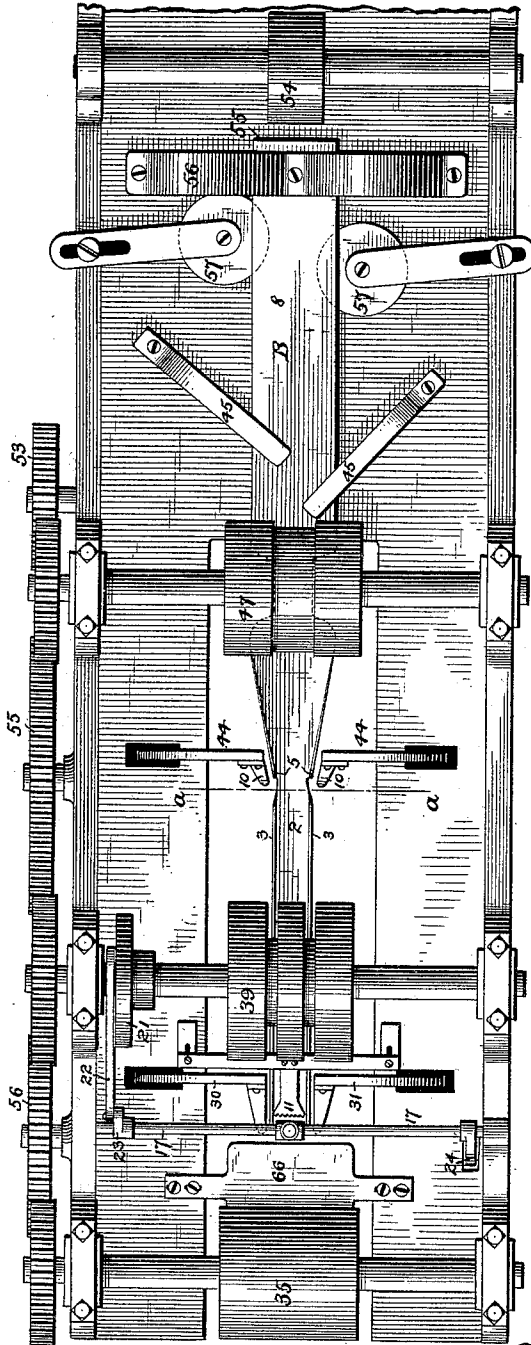
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Fig. 3.



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Geo. H. Graham,
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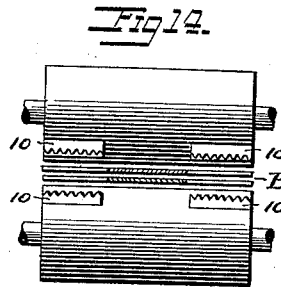
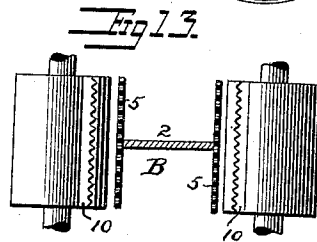
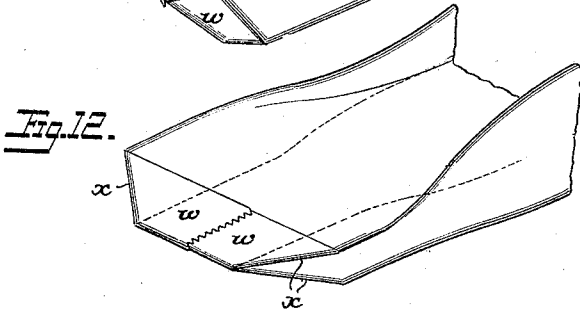
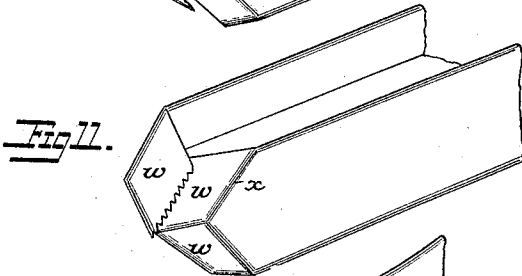
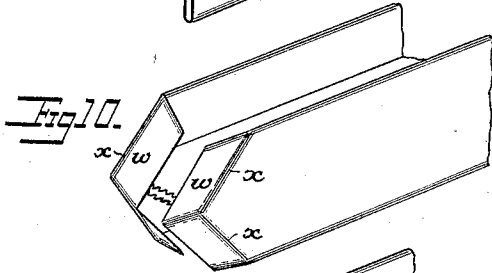
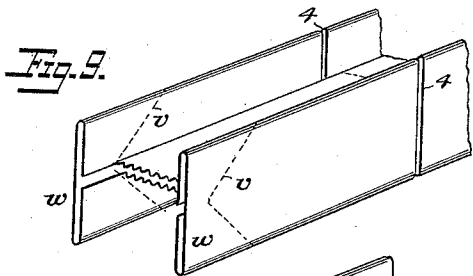
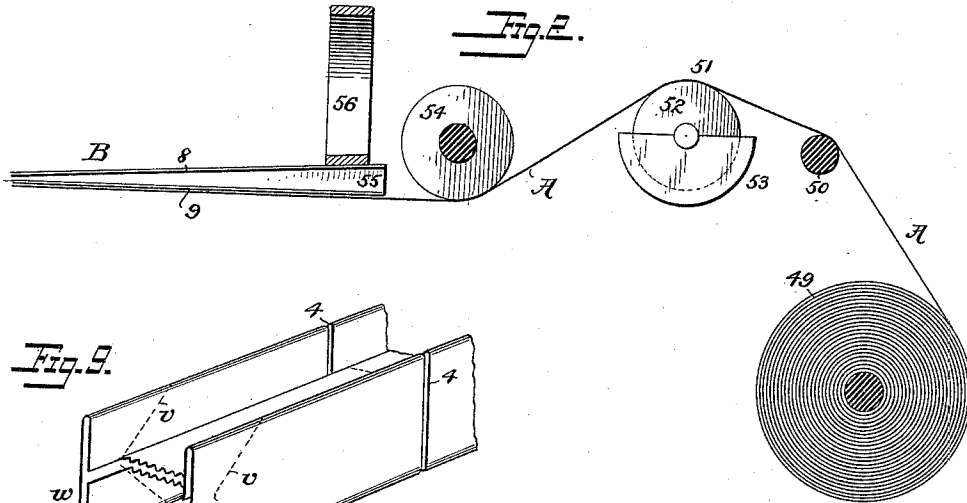
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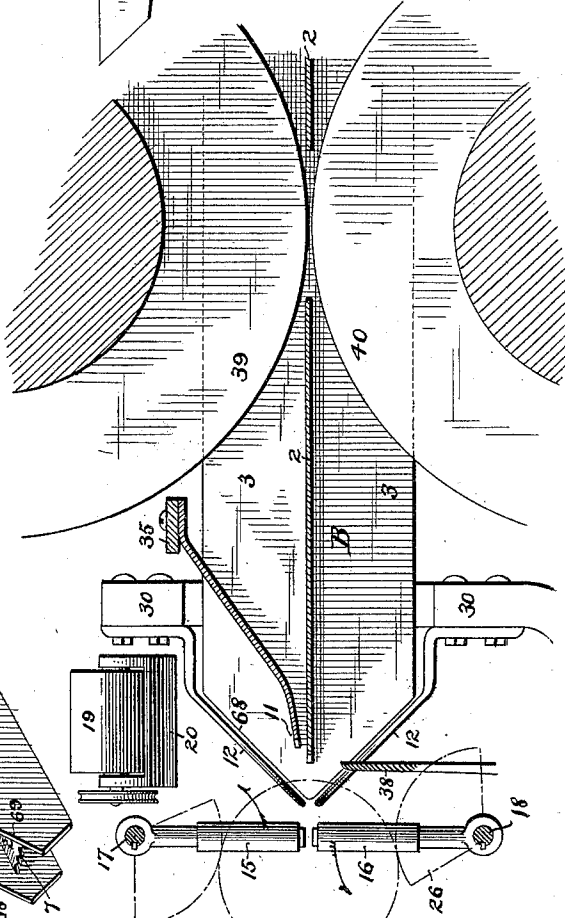
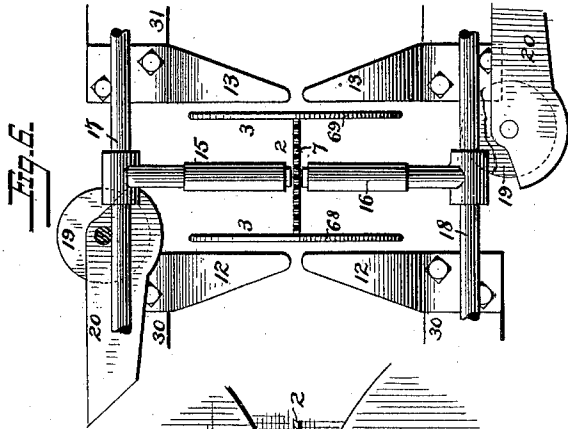
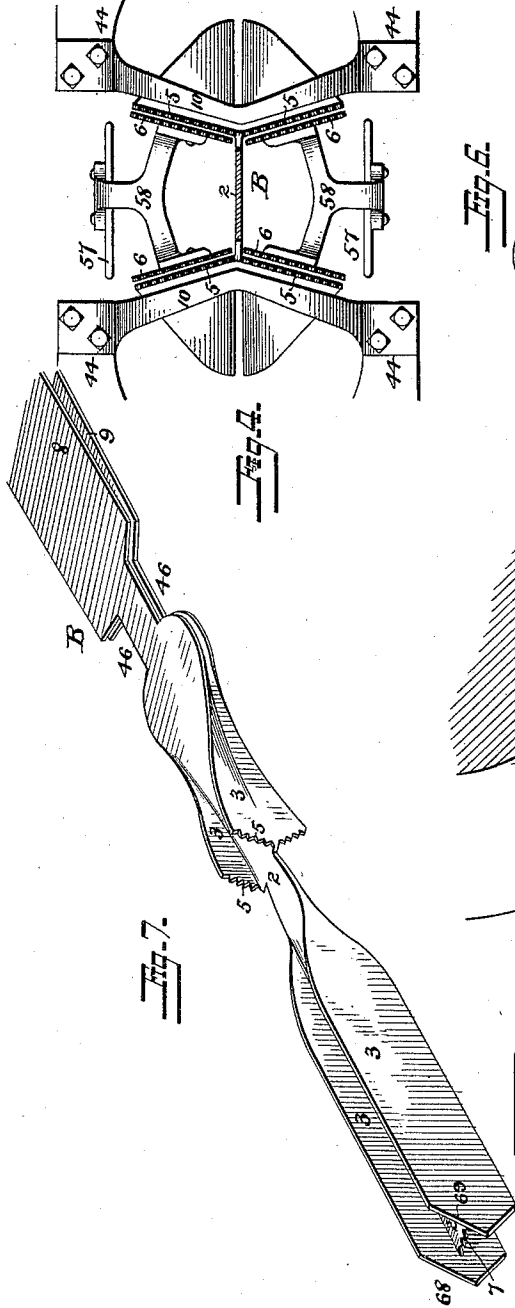
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Fig. 5.
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UNITED STATES PATENT OFFICE.

LORENZO D. BENNER, OF PEORIA, ILLINOIS, ASSIGNOR TO THE UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

BAG-MACHINE.

SPECIFICATION forming part of Letters Patent No. 391,936, dated October 30, 1888.

Application filed March 21, 1888. Serial No. 267,944. (No model.)

To all whom it may concern:

Be it known that I, LORENZO D. BENNER, a citizen of the United States, residing at Peoria, Peoria county, Illinois, have invented certain new and useful Improvements in Bag-Machines, of which the following is a specification.

The machine constituting the present improvements is adapted to the manufacture of that class of bags made from tubes having infolded or bellows-folded sides, short sections of which tubes having one end closed by certain peculiar folds, constitute bags that will open or distend into square form when filled. The present machine, it may be stated, however, is adapted to the manufacture of that class of bags wherein the bottom-closing folds are formed by turning a portion of the material lying within the bellows sides over or around the end of the bag, as set forth in United States Letters Patent No. 382,682, and claimed in an application for Letters Patent filed by me in the United States Patent Office on the 10th day of March, 1888, certain features being applicable to other bag-machines and to the manufacture of other classes of bags.

That the present improvements may be more readily comprehended, their practical embodiment, as represented in the accompanying drawings, will be fully set forth.

In said drawings, Figure 1 is a central longitudinal sectional elevation of the greater portion of a bag-machine embodying the present improvements. Fig. 2 is a similar view of the paper-roll end of the machine. Fig. 3 is a plan view of the machine. Fig. 4 is an enlarged transverse vertical section of the former and partial-severing devices, taken on the line *aa* of Fig. 3. Fig. 5 is an enlarged central longitudinal section of the forward end of the former and adjacent devices. Fig. 6 is an end elevation of the same. Fig. 7 is a perspective view of the former removed from the machine. Fig. 8 is a plan view of a portion of the machine, showing particularly a mode of driving the paste-roller. Figs. 9 to 12, inclusive, are perspective views of a portion of the tube, bag-blank, and bag, showing the position of the side incisions and the manner of

forming the bottom folds. Figs. 13 and 14 are modifications hereinafter referred to.

It should first be understood that in practice the instrumentalities now to be described are adapted to operate upon a long web of paper or other suitable material of suitable width for the purpose, so that said web has first applied to it a line of paste along one longitudinal edge, then has its two longitudinal edges brought together and united about or around a "former," with its opposite sides bent inward to form a bellows-sided tube; that this tube is drawn over or along the former, which latter, starting in a flat condition, gradually assumes an H shape. Thus the previous flat condition of the tube in its progression through the machine is changed so that its opposite sides are extended at right angles as vertically in opposite directions from the remainder of the tube, and thus open out or distend the inward folded or bellows sides, imparting an H shape to the tube in transverse section; that this tube is then first partially severed transversely on the vertical lines of the H and afterward wholly severed on the horizontal line of the H at a point generally in rear of the first-mentioned severance to constitute bag-lengths; that each bag-length, before it is wholly severed from the tube, has lines of paste applied to its end, and then has its extended side portions folded on lines defined by the end of the former back onto the body of the tube over its forward end to close said end, and the bag-length is then flattened down to complete the proper laying of the bottom folds and sealing the same to form a flat bellows-sided bag.

The paper web A, in the form of a roll, 49, is supported in the usual manner at one end of the machine, proper friction being imparted to said roll to impart sufficient tension to the web, and said web is led over a guide roller or bar, 50, and thence over a roll, 51, that is provided at one end with a paste-disk, 52, turning in a paste-vat, 53, by which a continuous line of paste is applied to one edge of the web. From said roll 51 the web is led under a breaking-roll, 54, and under the butt-end of a former, B, that is supported at or near said end over the horizontal table of the ma-

chine by a bridge, 56, in the usual manner. This former for a portion of its length is composed of two flat plates, 8 9, separated a distance apart at its butt-end to permit portions of the paper web to be directed between said plates by suitable side guides, 57, as is common in that class of formers adapted to form a bellows-sided tube. The former extends between the feed-rolls 47 48, and, as usual, is reduced in widthwise dimensions, as at 46, to pass said rolls, which are also grooved to receive it, the lower roll forming a support therefor. After passing said feed-rolls the former is gradually bent into H form, as shown in Fig. 7, the two contiguous longitudinal edges of the plates 8 9 being curved away from each other in opposite directions to form vertical portions 3 3, and having a central horizontal portion, 2. This former B, so far as its construction is concerned, may be made in any suitable manner. As illustrated, its flat and H portions are integral, but it is obvious that they may be made otherwise. At or near the point that the former assumes the H shape the two plates 8 and 9 are preferably merged in one plate, at least so far as the horizontal portion 2 is concerned, and up to said point the two plates should be separate plates to permit the free passage of the inward-folded sides of the tube, although it is apparent that the same result would be accomplished by a former formed in a single piece having upon its opposite sides the longitudinal recess necessary to the formation and passage of said inward-folded sides. It may also be stated that so far as the formation of the tube into H form is concerned and the subsequent making of bags therefrom the flat tube may be formed in an ordinary tubing-machine and transferred to a machine embodying substantially the present former. Beyond the feed-rolls the H-shaped former extends between a second set of feeding-rolls, 39 40, which may be either grooved to receive the portions 3 of the former, or be simply narrow rolls, and which former has a portion of its central portion, 2, removed to permit the rolls to act upon the center of the tube to properly feed it along the former from said feed-rolls 47 48.

Prior to the passage of the paper web between the feed-rolls 47 48 its longitudinal edges will have been brought together over the center of the former and united by the line of paste previously applied to one of the edges, the proper envelopment of the former and the meeting of the edges of the web being aided by the guide-fingers 45, and in passing between the rolls 47 48 the completion of the tube is effected. After passing between said feed-rolls the tube will preferably be partially severed transversely on the lines 4, so as to leave the horizontal portion uncut on both the upper and lower plies of the tube, as seen in Fig. 9. This partial severance may be effected while the tube is in its flat condition; but, as shown,

it is imparted as the tube assumes or after it assumes the H form. To this end the portions 3 of the former B abruptly terminate in serrated or cutting edges 5, with which coact suitable cutters, 10, adapted at the proper time to partially sever the tube transversely on the lines 4. As shown in Fig. 4, the portions 3 of the former at the serrated edges 5 have not quite assumed their ultimate vertical position with respect to the portion 2, and hence, if the cutters 10 be arranged vertically, a more or less shearing cut will be obtained. The edges of the cutters, as shown, however, are arranged substantially parallel with the serrated edges of the former, the shearing effect being obtained by a rocking motion of the cutters, as will presently appear. The cutters are mounted at the upper ends of a pair of pivoted arms, 44 44, the opposite ends of which are acted upon by a pair of cams, 42 43, mounted upon a longitudinally-arranged shaft, 41, by which cams the arms and their cutters are vibrated simultaneously at the proper time to effect the partial severance of the tube. Thus by pivoting the arms 44 so as to get a rocking motion the lower portions of the cutters will meet the serrated edges of the former slightly in advance of their upper ends and a more or less shearing cut will be obtained.

In practice it will be found desirable to provide supplementary cutting-edges 6 just within the serrated edges 5, so as to insure the proper severance of both plies of the tube. As seen in Fig. 4, these supplementary cutting-edges are provided upon both sides of the former and are supported by suitable brackets, 58, from cross-pieces 57, extending transversely of the machine-frame. The manner of attaching the cutting-edges to the brackets and the brackets to the cross-pieces may be such as to get any adjustment that may be found necessary in practice. These cutting-edges 6, however, will be so set with respect to the edges 5 that the ply of the tube severed by said edges 6 will be severed on a line slightly in rear of the ply severed by the edges 5, so as to impart a projecting flap to insure the proper sealing of the bottom.

The H-former terminates just beyond the rolls 39 40, the vertical portions 3 thereof terminating in V-shaped ends 69 69, and the horizontal portion in a serrated edge, 7, slightly in rear of the ends of the portions 3. With the end of the portion 2 a cutting-blade, 38, coacts to sever the web transversely. This cutting-blade is mounted to reciprocate vertically in guides formed by a cross-bar, 37, and receives properly-timed motion from a cam, 36, mounted on the longitudinal shaft, 41, with which cam a stud projecting from the frame carrying the blade engages. Above and slightly in rear of the cutting-edge of the portion 2 a supplementary cutter, 11, is supported from a cross-bar, 35, by which cutter the complete severance of the two plies of the web is insured, and the movement of said blade is so timed

with respect to the position of the transverse incisions 4 imparted to the tube that the complete severance effected by it will in some forms of bags be slightly in rear of said incisions 4, as seen in Fig. 9, and at each action of said blade a bag-length will be severed from the tube free to be delivered from the machine.

With the V-shaped ends of the portions 3 of the former coact side-folding devices, by which the side plies of the tube end are creased and folded upon angular lines onto the body of the tube and over its open end to form the bottom of the completed bag. These devices may be of any construction; but as shown they consist of a pair of fingers, 12 13, coacting with the ends 68 69, respectively, of the portions 3. Each pair of fingers is secured to pivoted arms 30 31, that are rocked at proper times by suitably-shaped cams 32 33, mounted on the shaft 41. These fingers are arranged parallel with the incline of the V-shaped ends 68 69, and just in advance thereof, so that each pair of fingers may be moved across the end of the former toward and from each other. This movement of the fingers will be so timed with respect to the severing action of the blade 38 that the tube will have moved slightly beyond the end of the former, (indicated by dotted lines, Fig. 9,) to provide a sufficient length of tube, as *w*, to extend over the center of the end of the tube when said extended ends are folded back, as will be described. The pairs of fingers in moving toward each other will therefore contact with this extension *w* of the sides of the tube and bend them over the V-shaped ends 68 69 of the former, imparting similar-shaped creases *x* thereto, as in Fig. 10, and directing said ends *w* of the sides of the tube over its center and open end, so that a portion of the end *w* of one side will overlie the other over said end, as in Fig. 11, which overlying ends as the tube moves forward toward the delivering-rolls 34 35 will be contacted by flattening-guides 66 67, the vertical side of the tube will be directed from the H shape into a flat position, as in Fig. 12, whereby said ends *w* are laid flat, and then pressed down upon the body of the tube by the rolls 34 35.

The flattening-guides 66 67 bridge the space between the ends of the former B and the delivering-rolls 34 35. They are supported from the frame of the machine and so arranged as to gradually approach each other at their forward ends, and at their entrance ends are sufficiently spaced apart to permit the end folds of the tube to pass between them.

From the foregoing it will be seen that the paper web and tube are acted upon throughout their passage through the machine before they are severed into bag-length and while the tube is positively supported by the former, and hence great accuracy in the manipulations thereof and in forming the bottom folds will result.

In order to supply suitable lines of paste to the ends *w* of the tube to properly seal the bottom folds, I may use any suitable pasting appliance—as, for instance, a pair of paste-

carrying rolls which are adapted to lie in the path of the movement of said ends, so as to be drawn against the paste-rolls as the fingers 12 13 bend the sides of the tube over the inclined ends of the former, and thereby take therefrom sufficient paste to be sealed to the body of the tube upon the completion of the laying of said bottom folds. These paste-carrying rolls are mounted upon transverse shafts 17 18, (see Fig. 5,) located one above and the other below the path of the tube, and are vibrated at the proper time from their vertical positions, one upward and the other downward, in the direction of the arrows, in contact with paste-rollers 19, turning in vats 20 to be supplied with a fresh coating of paste. This movement of the paste-carrying rolls is imparted by a suitably-shaped cam, 21, mounted on the shaft of the roll 39, through a rod, 22, having a stud engaging with said cam connected to an arm, 23, fast on the shaft 17. This motion is communicated from said shaft 17 to the other shaft, 18, by a segment, 24, fast on said first-mentioned shaft, through an intermediate wheel, 25, to a like segment, 26, fast on said shaft 18, by which the movements of the rolls 17 18 will be in unison. Continuous rotary movement is imparted to each of the paste-rollers 19 by means of an endless band or cord, 27, passing from a grooved pulley on the shaft of the rolls 39 40 to a similar pulley on the end of the paste-rollers, guide-pulleys 28 being provided to properly direct the band.

Motion is imparted to the various instrumentalities of the machine from a shaft, 52, its gear-wheel 54 imparting motion to the feed-rolls 47 48 through an intermediate, 53, which are geared together to run in unison, by an intermediate, 55, to the second set of feed-rolls 39 40, also geared together, and by an intermediate, 56, to the delivery-rolls 34 35, also geared together to run in unison. Said shaft 52 is also provided with a beveled wheel, 57, meshing with a similar wheel, 58, on the end of the shaft 41, through which said latter shaft and the cams it carries are moved in time with the other parts of the machine.

It is to be remarked that instead of supporting the cutters 10 so as to vibrate across the serrated ends 5 of the former, said cutters might be mounted in rotating or rocking shafts, as shown in Fig. 13; and indeed said cutters might be carried by one or both of a pair of horizontally-arranged rolls acting upon the tube when in its flat condition, as seen in Fig. 14, when the tube is to be severed in its flat condition, as before described; and while each of the fingers of the pairs of fingers of the side-folding devices are shown as independent, it is obvious the fingers of each pair may be a single finger properly coacting with the inclined ends of the former.

I claim—

1. In a bag-machine, the herein-described former, H shape in transverse section, substantially as described.

2. In a bag-machine, the combination, with

an H-shaped former, of rolls extending between the parallel flanges of said former, substantially as described.

3. In a bag-machine, the combination, with an H-shaped former for supporting the tube in its movement through the machine, of tube feeding and severing devices for severing the tube into bag-lengths, and bottom-folders for forming the bottoms of the bags, substantially as described.

4. In a bag-machine, the combination, with an H-shaped former for supporting the tube in its movement through the machine, of feeding-rolls for feeding the tube onward, a primary severing device for severing the sides of the tube, bottom-folders for forming the bottoms of the bags, and a final severing device for completing the severance of the bag-lengths from the tube at the mouth of the bag, substantially as described.

5. In a bag-machine, the combination, with an H-shaped former for supporting the tube in its movement through the machine, of feeding-rolls for feeding the tube onward, primary severing devices coacting with the former for severing the sides of the tube, bottom-folders for forming the bottoms of the bags, and a final severing device for completing the severance of bag-lengths from the tube, substantially as described.

6. In a bag-machine, the combination, with a former composed of flat and H-shaped portions, of tubing devices coacting with the flat portion of the former, tube feeding and severing devices, and bottom-folders for closing the bottoms of the bags, substantially as described.

7. In a bag-machine, the combination, with a former composed of flat and H-shaped portions, of tubing devices coacting with the flat portion of the former, rolls for feeding the tube onward, and tube-severing devices and bottom-folders coacting with the H-shaped portion of the former for forming the bag-bottoms and severing bag-lengths from the tube, substantially as described.

8. In a bag-machine, the combination, with a former of flat and H-shaped portions, said flat portion composed of a pair of flat plates which gradually merge into the H-shaped portion, of tubing devices coacting with said flat plates to form a bellows-sided tube, feeding-rolls for feeding the tube from the flat portion of the former to the H-shaped portion, cutters for severing the tube, and side-folders for forming the bottoms of the bags, substantially as described.

9. In a bag-machine, the combination, with an H-shaped former for supporting the tube in its movement through the machine and having cutting-edges intermediate of its length in its vertical sides, of cutters coacting with said cutting-edges for partially severing the tube, rolls for feeding the tube onward, bottom-folders for forming the bottoms of the bag, and a second cutting device for completing the severance of tube into bag-lengths, substantially as described.

10. In a bag-machine, the combination, with tube feeding and severing devices and an H-shaped former for supporting the tube in its movement through the machine, its vertical sides terminating in V-shaped ends, of side-folders coacting with said V-shaped ends to form the bottom folds, substantially as described.

11. In a bag-machine, the combination, with the tube feeding and severing devices and an H-shaped former for supporting the tube in its movement through the machine, its vertical sides terminating in V-shaped ends, of side-folders coacting with said V-shaped ends to form the bottom folds, flattening-guides for laying the sides of the bag-length together, and delivering-rolls for completing the laying of the bottom folds and delivering the completed bags, substantially as described.

12. In a bag-machine, the combination, with an H-shaped former having cutting-edges intermediate of its length and terminating in V-shaped ends, of cutters coacting with said cutting-edges for effecting a partial severance of the tube, side-folders coacting with said V-shaped ends for forming the bottom folds, and a second cutter for completing the severance of a bag-length, substantially as described.

13. In a bag-machine, the combination, with an H-shaped former, its sides terminating in V-shaped ends and its central portion in an edge, of a cutter coacting with said cutting-edge, side-folders coacting with said V-shaped ends, and pasting mechanism arranged to deposit paste upon the bag-length near its severed edges, substantially as described.

14. A bag-machine provided with an H-shaped former having vertical cutting-edges intermediate of its ends and a transverse cutting-edge at or near one end, substantially as set forth.

15. An H-shaped former provided with V-shaped side ends and with a transverse cutting-edge between said ends, substantially as set forth.

16. A bag-machine provided with a former having double flat plates at one end to receive the bellows fold of the bag between them, and an H-shaped plate in cross-section at the opposite end to support the bag length in position while the corners are folded, substantially as set forth.

17. The combination, with a bag-machine, of an H-shaped former having vertical and transverse cutting-edges at different points, and cutters co-operating with the vertical edges, and a separate cutter co-operating with the transverse edge, substantially as set forth.

18. The herein-described former for bag-machines, consisting of two H-shaped portions, each consisting of two side portions, 3, and a central portion, 2, said two H-shaped portions connected together by said central portion, 2.

19. The herein-described former for bag-machines, consisting of the two plates 8, 9, flat for a portion of their length and gradually

curving into H form, and then consisting of two side portions, 3, and a central portion, 2, substantially as described.

5 20. In a bag-machine, the combination, with a former provided with two side portions, 3, and abruptly terminating in cutting-edges 5, of vibrating cutters coacting with said cutting-edges, substantially as described.

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

LORENZO D. BENNER.

Witnesses:

GEO. M. GIBBONS,
PETER F. HARMON.