

(No Model.)

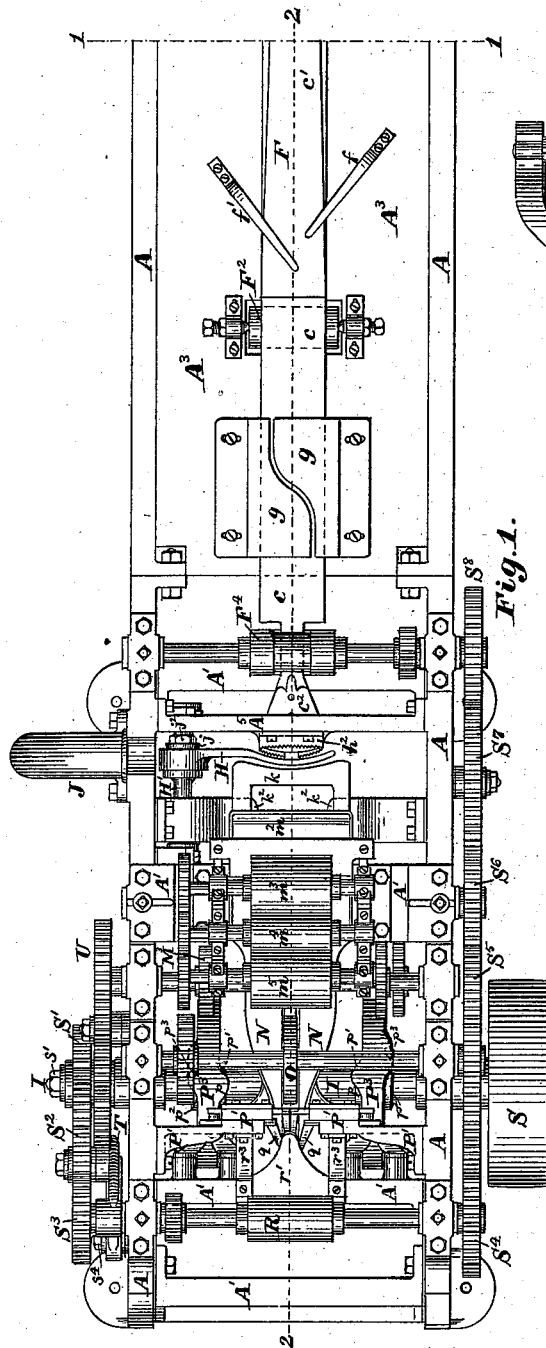
9 Sheets—Sheet 1.

L. D. BENNER.

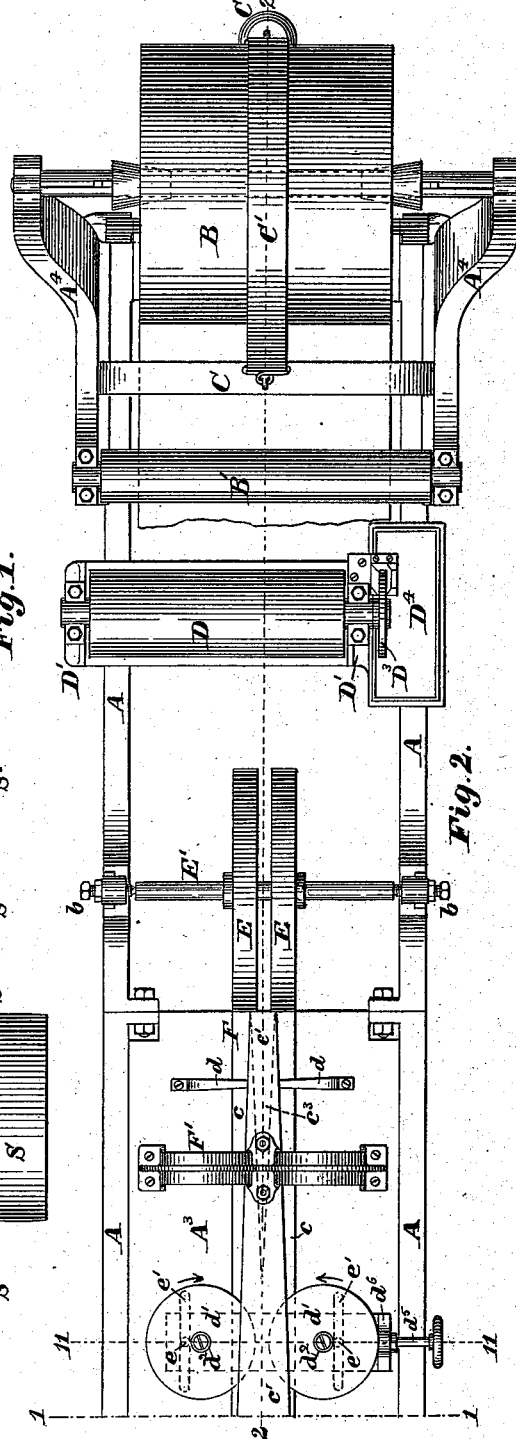
# APPARATUS FOR AND METHOD OF MAKING PAPER BAGS.

No. 382,682.

Patented May 15, 1888.



*Fig. 1.*



**Fig. 2.**

***Witnesses:***

E. A. Hemmenway.  
Walter E. Lombard.

***Inventor:***

*Inventor:*  
*Lorenzo D. Benner,*  
*by N. C. Lombard,*  
*Attorney.*

L. D. BENNER.

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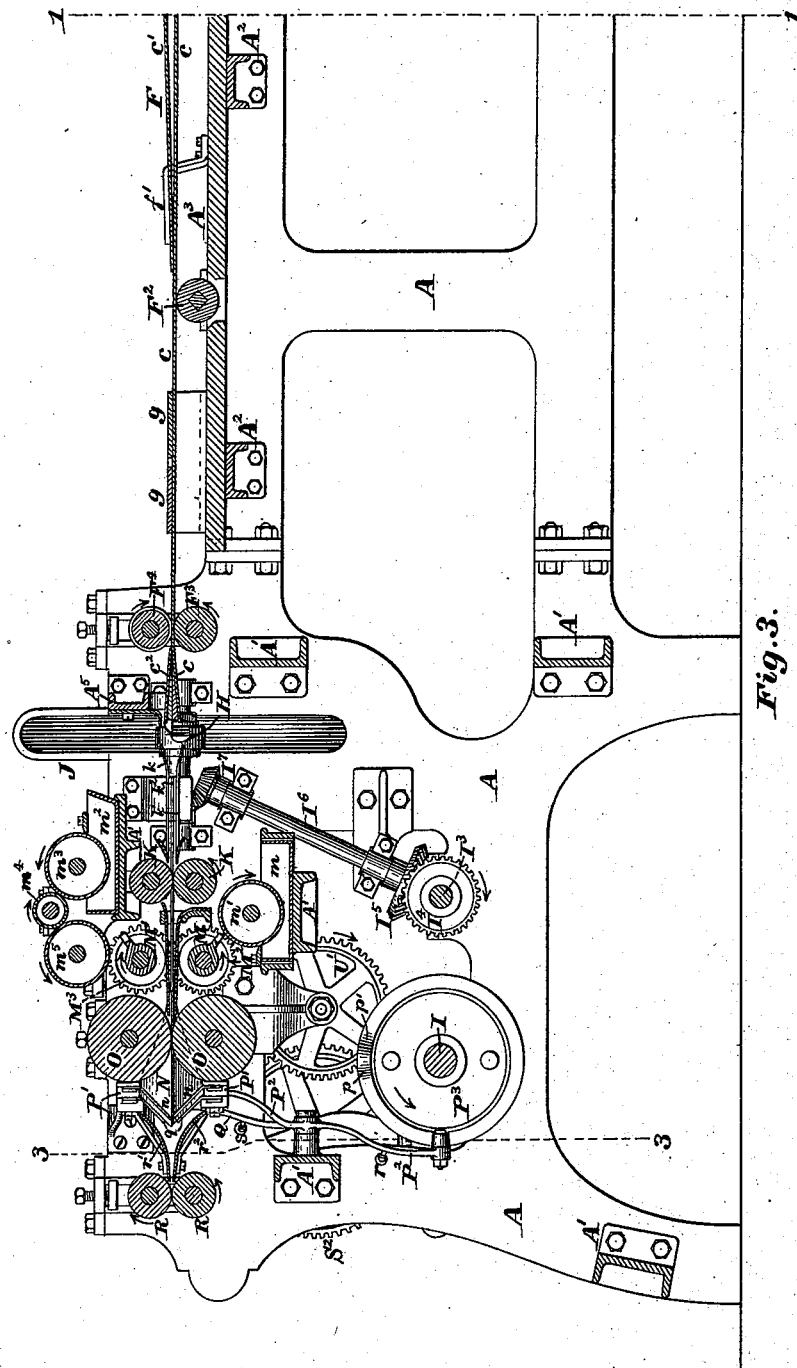


Fig. 3.

**Witnesses:**

*C. A. Kemmenway*  
*Halter & Lombard.*

**Inventor:**

*Lorenzo D. Benner,*  
*by N. C. Lombard.*  
**Attorney.**

(No Model.)

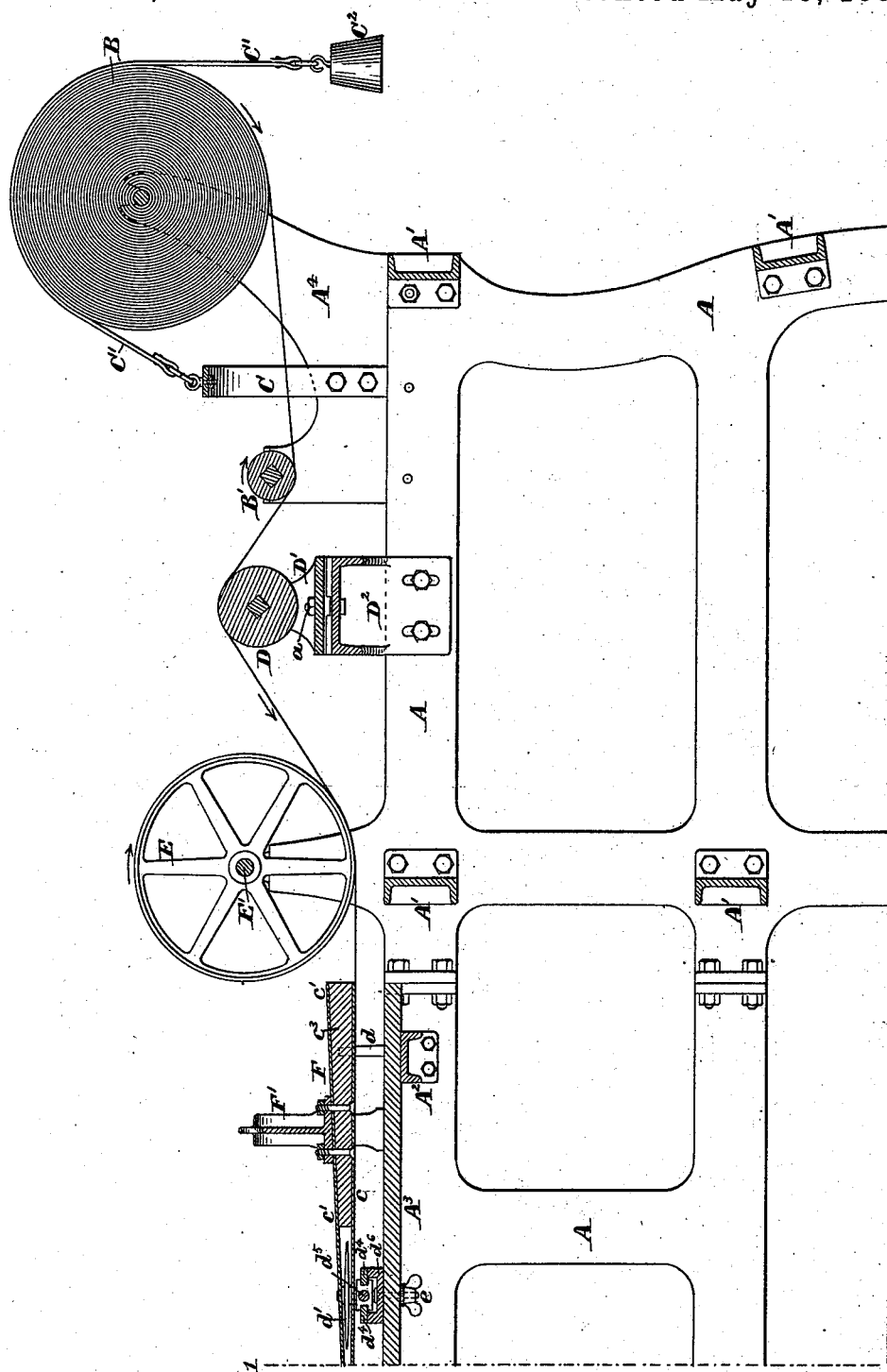
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L. D. BENNER.

# APPARATUS FOR AND METHOD OF MAKING PAPER BAGS.

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Patented May 15, 1888.



**Fig. 4.**

**Witnesses:**

O. A. Kemmenway.  
Walter E. Lombard.

***Inventor:***

**Inventor:**  
Lorenzo D. Bemmer,  
by N. C. Lombard,  
**Attorney.**

(No Model.)

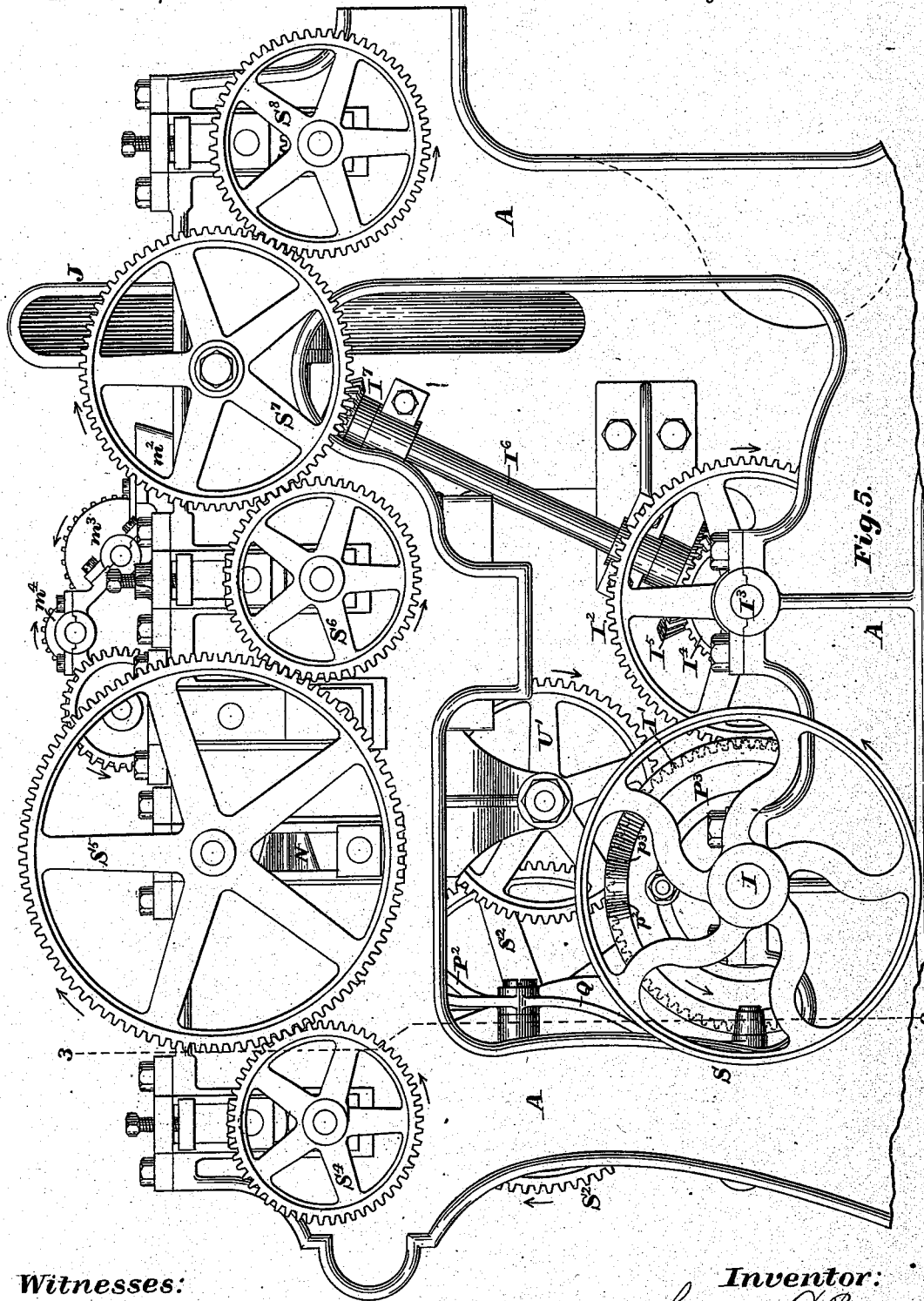
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L. D. BENNER.

APPARATUS FOR AND METHOD OF MAKING PAPER BAGS.

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Patented May 15, 1888.



Witnesses:

*E. A. Hemmenway.*  
*Walter E. Lombard.*

Inventor:

*Lorenzo D. Benner.*  
by *N. C. Lombard.*  
Attorney.

(No Model.)

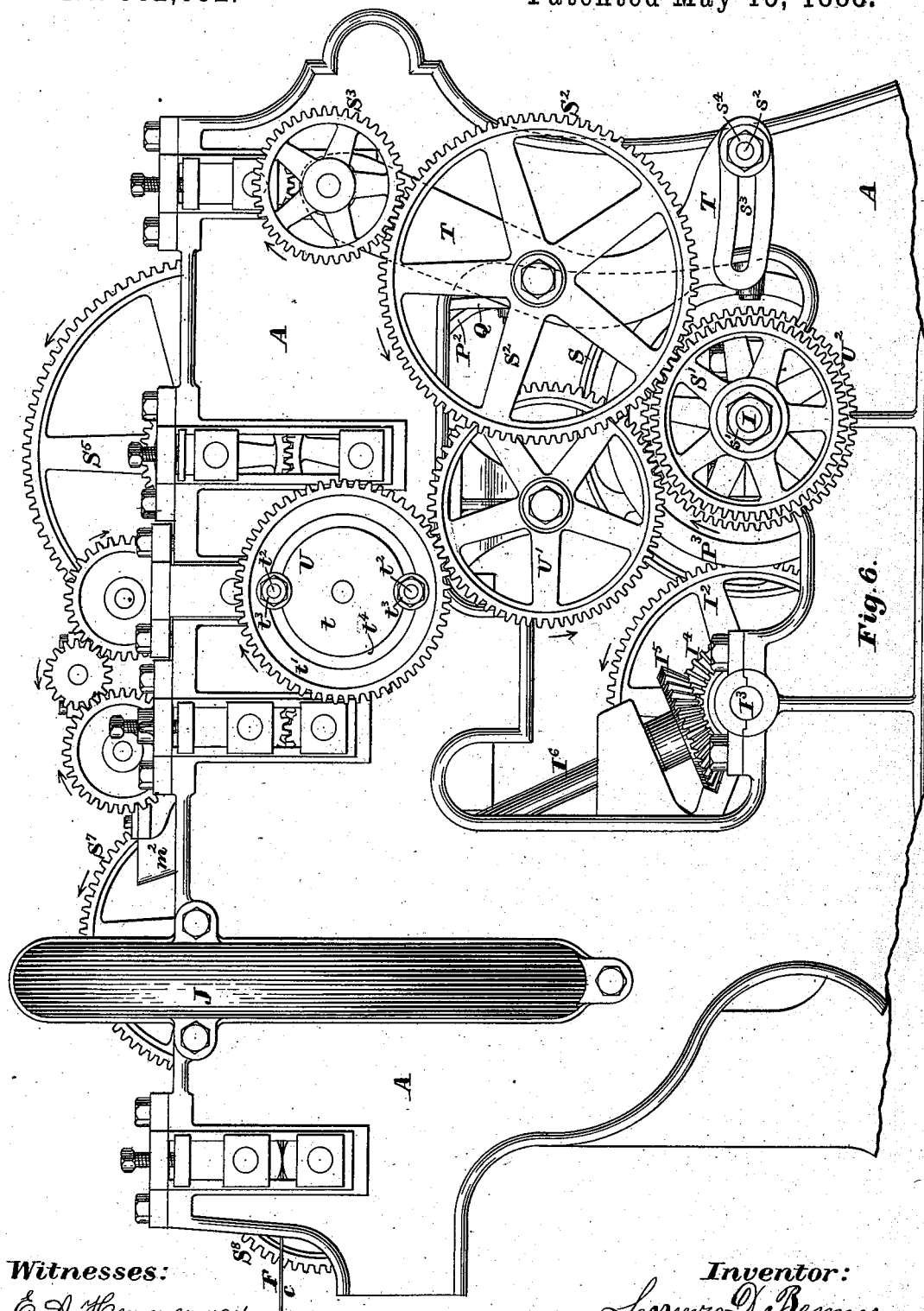
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L. D. BENNER.

APPARATUS FOR AND METHOD OF MAKING PAPER BAGS.

No. 382,682.

Patented May 15, 1888.



Witnesses:

E. A. Hemmenway,  
Walter E. Lombard.

Inventor:

Lorenzo D. Benner,  
by N. C. Lombard,  
Attorney.

(No Model.)

9 Sheets—Sheet 6.

L. D. BENNER.

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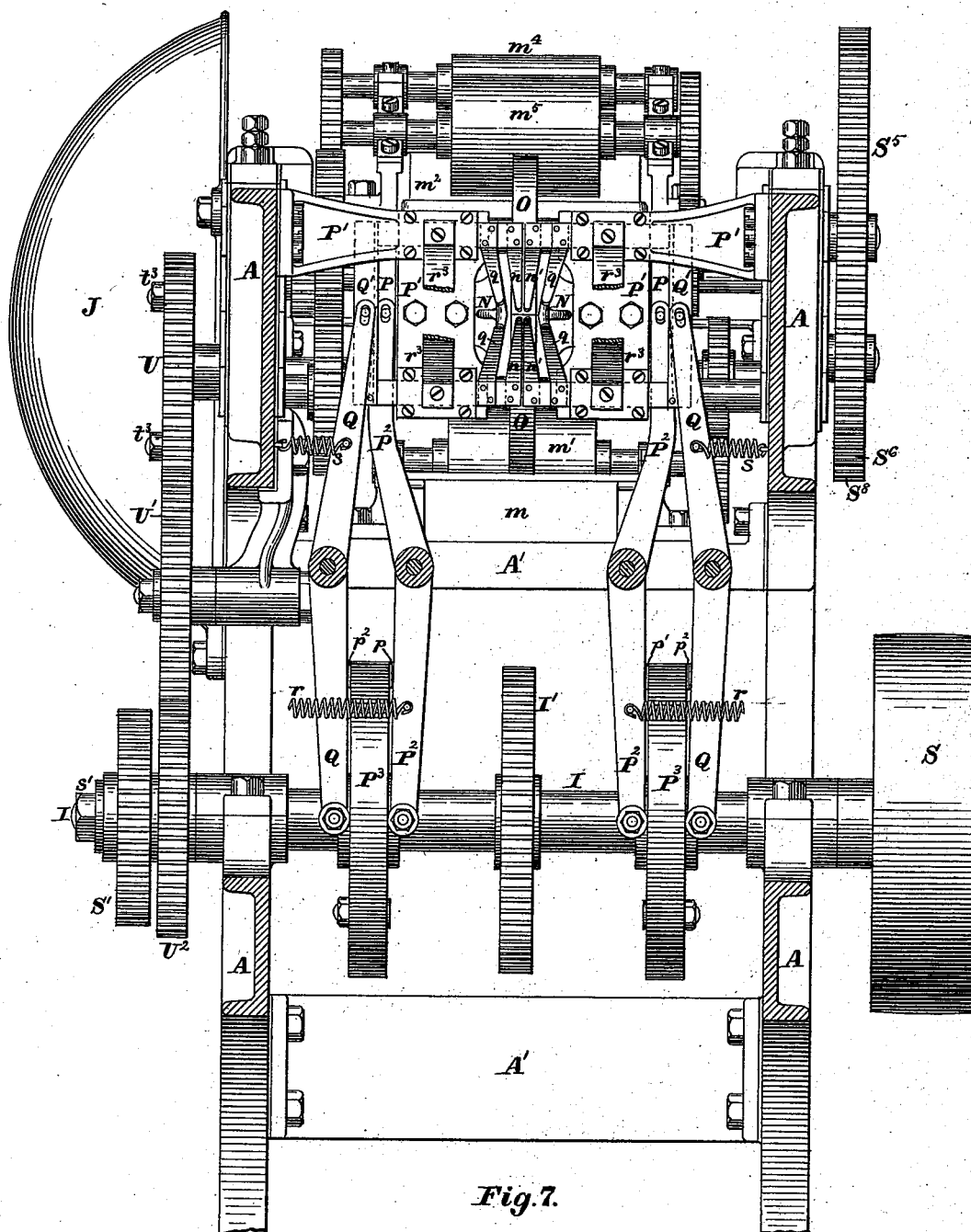


Fig. 7.

Witnesses:

E. H. Hemmenway,  
Walter E. Lombard.

Inventor:

Lorenzo D. Benner  
by N. C. Lombard  
Attorney.

L. D. BENNER.

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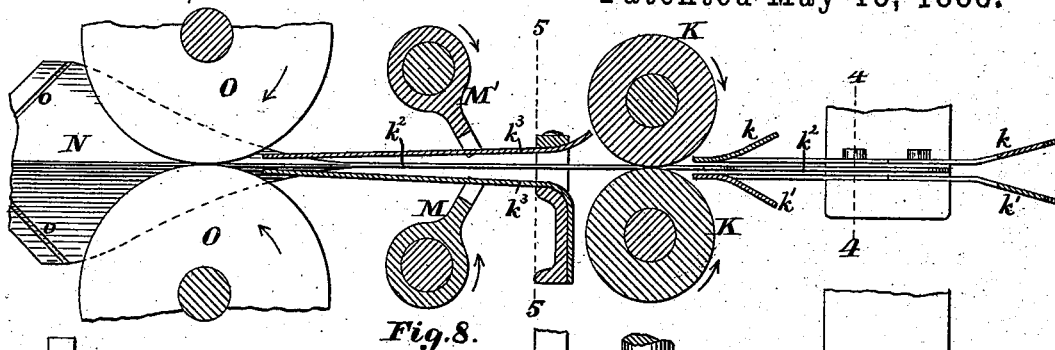


Fig. 8.

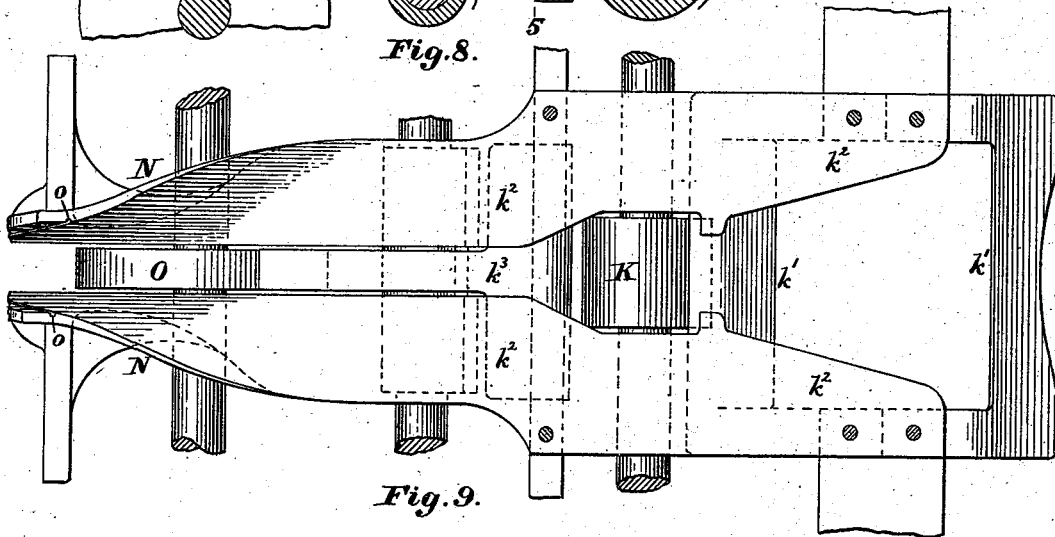


Fig. 9.

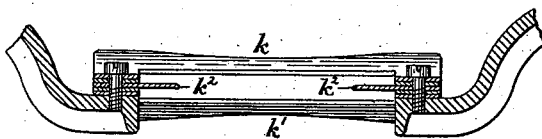


Fig. 10.

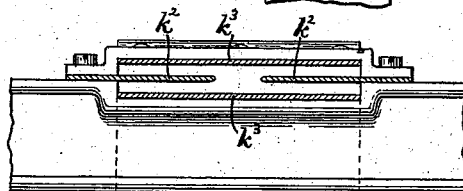


Fig. 11.

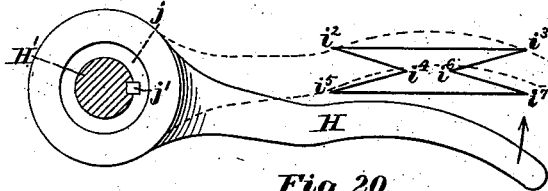


Fig. 20.

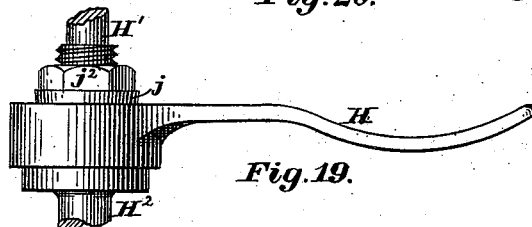


Fig. 19.

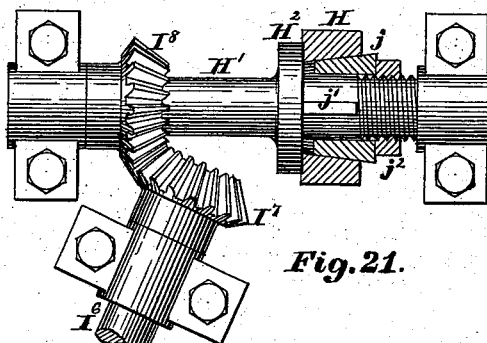


Fig. 21.

Witnesses:

C. A. Hemmenway.  
Walter E. Lombard.

Inventor:

Lorenzo D. Benner  
by N. C. Lombard  
Attorney.

L. D. BENNER.

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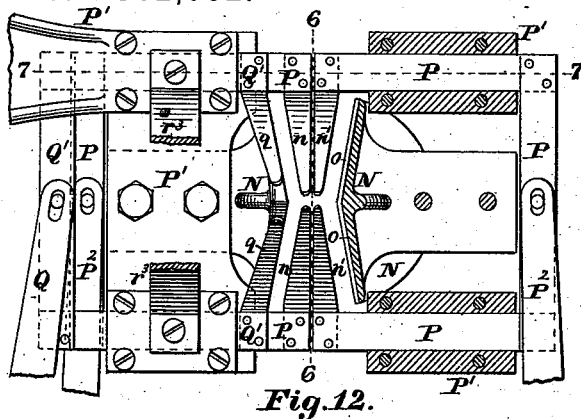


Fig. 12.

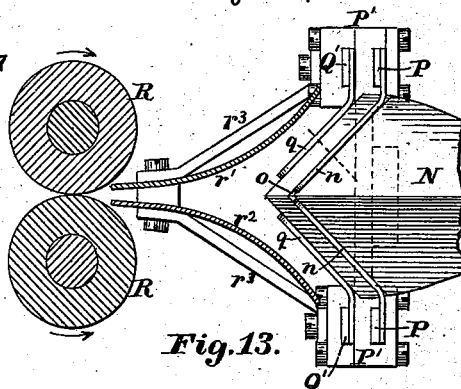


Fig. 13.

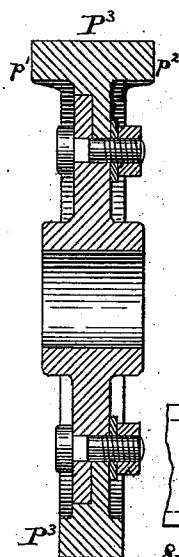


Fig. 32.

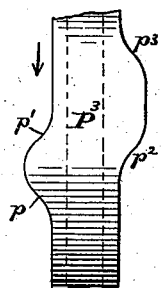


Fig. 33.

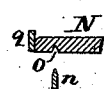


Fig. 35.

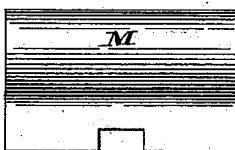


Fig. 34.

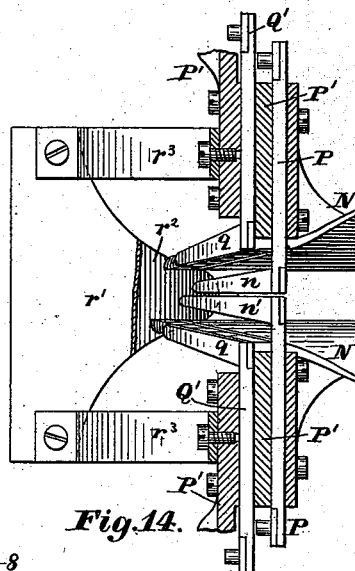


Fig. 14.

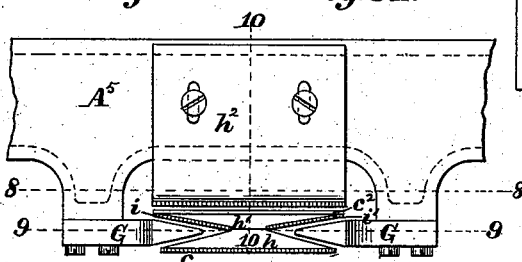


Fig. 15.

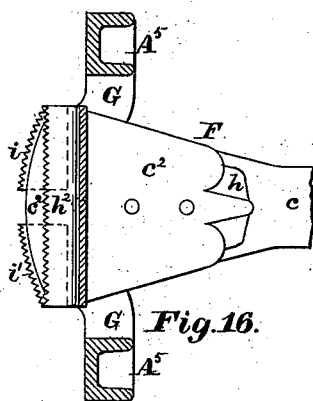


Fig. 16.

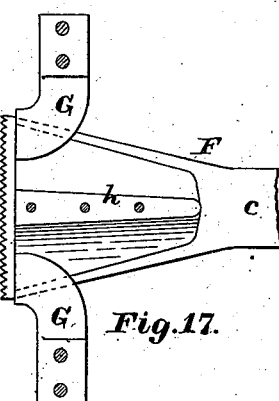


Fig. 17.

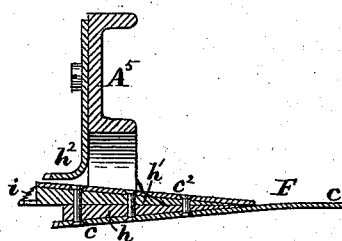


Fig. 18.

Witnesses:

E. H. Kemmenway,  
Walter E. Lombard.

Inventor:

Lorenzo D. Benner  
by N. C. Lombard  
Attorney.



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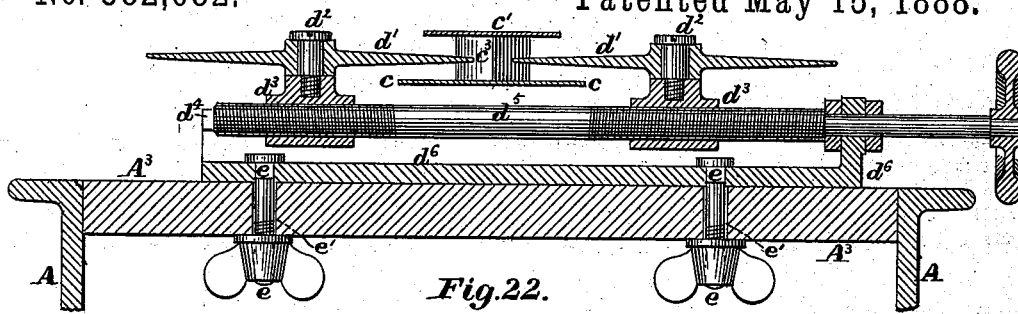


Fig. 22.

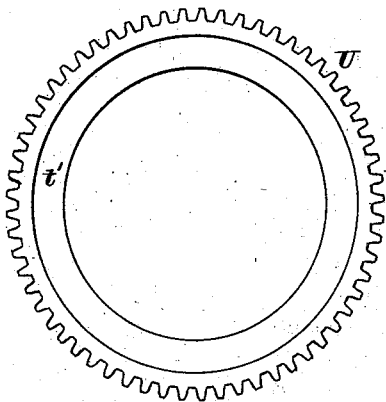


Fig. 25.

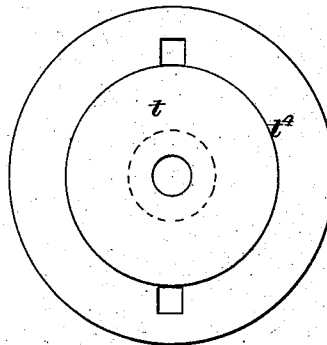


Fig. 24.

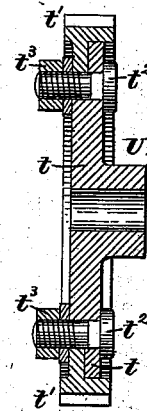


Fig. 23.

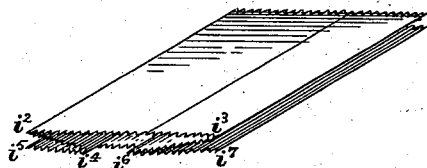


Fig. 27.

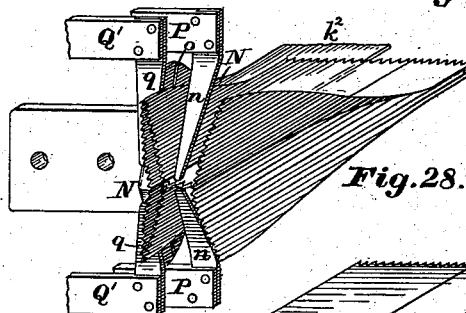


Fig. 28.

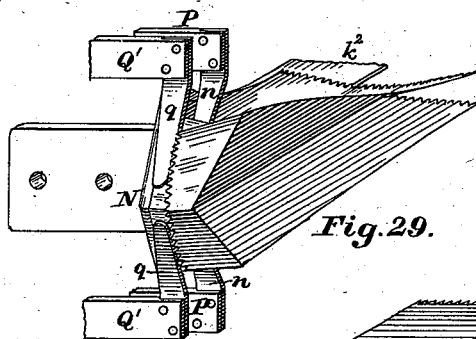


Fig. 29.

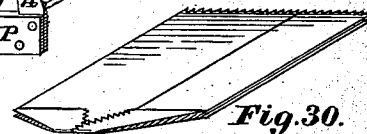


Fig. 30.

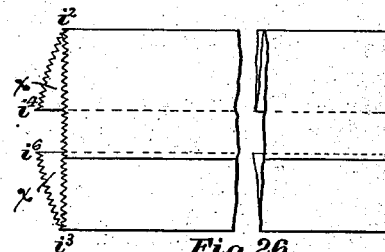


Fig. 26.

Witnesses:

C. A. Hemmenway  
Walter E. Lombard.

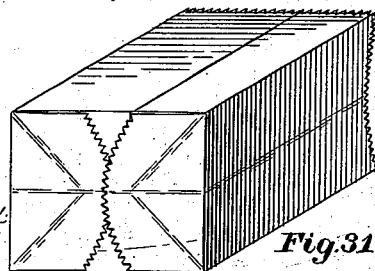


Fig. 31.

Inventor:

Lorenzo D. Benner,  
by N. C. Lombard,  
Attorney.

# UNITED STATES PATENT OFFICE.

LORENZO D. BENNER, OF GALESBURG, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

## APPARATUS FOR AND METHOD OF MAKING PAPER BAGS.

SPECIFICATION forming part of Letters Patent No. 382,682, dated May 15, 1888.

Application filed May 13, 1882. Serial No. 61,304. (No model.)

*To all whom it may concern:*

Be it known that I, LORENZO D. BENNER, of Galesburg, in the county of Knox and State of Illinois, have invented certain new and useful Improvements in Apparatus for and Methods of Making Paper Bags, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to the manufacture of paper bags, and more especially to the bag shown and described in Letters Patent No. 242,499, granted to me June 7, A. D. 1881; and it consists in certain modes of construction and of the devices for forming the longitudinal folds in the tube, cutting off said tube, pasting and folding the bottom of the bag, and of means employed to guide the severed section of the tube to the bottom-folding devices, and of other features which will be best understood by reference to the description and drawings to be hereinafter given.

Figures 1 and 2 together constitute a plan of a machine embodying my invention, the line 1 1 on each of said figures representing the line of separation. Figs. 3 and 4 together constitute a longitudinal section of the same on line 2 2 on Figs. 1 and 2. Figs. 5 and 6 are elevations of the opposite sides of the forward section of the machine, drawn to a scale twice as large as Figs. 1, 2, 3, and 4. Fig. 7 is a vertical section on line 3 3 on Figs. 3 and 5, drawn to the same scale as Figs. 5 and 6. Fig. 8 is a partial central vertical section illustrating the arrangement of the pasters, feed-rolls, and guide-plates. Fig. 9 is a plan of same with the upper paster, feed-roll, and guide-plates removed. Fig. 10 is a transverse section on line 4 4 on Fig. 8, looking toward the rear of the machine. Fig. 11 is a transverse section on line 5 5, looking in the same direction. Fig. 12 is a sectional elevation illustrating the arrangement of the devices for creasing and folding the bottoms of the bags. Fig. 13 is a vertical section on line 6 6 on Fig. 12. Fig. 14 is a horizontal section on line 7 7 on Fig. 12. Fig. 15 is an elevation of the forward end of the former and stationary cut-off blades. Fig. 16 is a horizontal section on line 8 8 on Fig. 15. Fig. 17 is a similar section on line 9 9 on Fig. 15. Fig. 18 is a vertical section on

line 10 10 on Fig. 15. Figs. 19 and 20 are respectively a plan and elevation of the revolving cutting-off blade. Fig. 21 is a view illustrating the manner of mounting and operating the revolving cutting-off blade. Fig. 22 is a vertical transverse section on line 11 11 on Fig. 2. Figs. 23, 24, and 25 are detail views illustrating the adjustable gear-wheel for operating the pasters. Fig. 26 is a plan of a section of the paper tube as cut preparatory to pasting and folding the bottom. Fig. 27 is a perspective view of the same. Fig. 28 is a perspective view of the same section after it has advanced to a position where it is to be creased, and showing one set of the creasing and folding fingers in position. Fig. 29 is a perspective view of the same parts in position with the bottom folds turned inward at right angles to the side folds, which have been opened up so that the tube has assumed an H section. Fig. 30 is a perspective view of the bag after the folding of its bottom has been completed and it has been passed between pressure-rolls to turn down the side folds again, and Fig. 31 is a perspective view of the same bag after it has been opened out to receive the material with which it is to be filled. Figs. 32, 33, 34, and 35 are details to be hereinafter referred to.

The side frames, A A, of the machine are each made, for convenience, in three parts bolted together, and are maintained at the proper distance apart by the tie-girts A' and A<sup>2</sup>, to the latter of which is secured the table A<sup>3</sup>, as shown in Figs. 3 and 4.

A<sup>4</sup> A<sup>4</sup> are two standards bolted to and projecting upward from the rear ends of the frames A, and provided with bearings to receive the paper-roll B and guide-roll B'.

C is a bail or arched tie, to which one end of the brake-strap C' is secured, said strap, after passing over the roll of paper B, having attached to its other end the weight C<sup>2</sup>.

D is a second guide-roll, the shaft of which is mounted in bearings in a stand, D', which is adjustable transversely of the machine upon the vertically-adjustable girt D<sup>2</sup> by means of the bolts a, which pass through slotted holes. (Not shown.) The shaft of the guide-roll D also carries the paste wheel D<sup>3</sup>, which revolves in the paste-tank D<sup>4</sup>, which, with the paste-

wheel, is also adjustable vertically and transversely of the machine with the roll D for the purpose of adapting the paste-wheel to the width of paper being used—that is, so that the line of paste will be placed along the edge of the web of paper whatever its width may be.

EE are two wheels adjustably mounted upon the shaft E', which in turn is mounted upon centers *b b*, said wheels serving as guides to direct the paper beneath the former F, and at the same time define two longitudinal lines of fold.

The former F is composed of the plates *c, c'*, and *c''*, connected together by the filling-pieces *c<sup>3</sup>, h, and h'*, Figs. 4, 16, and 17, and supported by the arched tie-girt F', the roll F<sup>2</sup>, Fig. 3, and the lower feed-roll, F<sup>3</sup>. The plate *c'* is made narrower at its rear end than at its forward end, as shown in Figs. 1 and 2, to facilitate the formation of the inward side folds, which is done by the fingers *d d* and the rotary disks *d' d'*. The disks *d' d'*, Fig. 22, are mounted loosely upon studs *d<sup>2</sup>*, set in cross-heads *d<sup>3</sup>*, which are fitted to slide upon guideways *d<sup>4</sup>*, and are moved simultaneously toward and from each other by means of the right and left screw *d<sup>5</sup>*, mounted in bearings in the stand *d<sup>6</sup>*, which carries the guideways *d<sup>4</sup>*, and is adjustably secured upon the table A<sup>3</sup> by means of the bolts *e e*, which pass through slots *e'*, extending longitudinally of said table, as shown in dotted lines in Fig. 2.

The two edges of the web of paper are turned over upon the plate *c'* of the former F, and pressed together by the fingers *f* and *f'*, which are so arranged that the edge of the paper upon which the paste has been placed is turned over upon said plate a little in advance of the opposite edge, which is then pressed down upon said pasted surface by the finger *f'*, and smoothed out and further pressed by the plates *g g*.

F<sup>3</sup> and F<sup>4</sup> are a pair of feed rolls for feeding the paper tube to the cutting-off tools, said rolls being arranged to seize and grip the paper tube at or near its two edges without pressing upon its middle, the upper roll, F<sup>4</sup>, being reduced in diameter at the middle of its length, to allow space for the narrowed part of the plate *c* of the former F and the free passage of the paper tube over the same.

The front end of the plate *c* of the former F is shaped as shown in Fig. 17, with its extreme end serrated, and has secured to its upper side the two beveled plates *h* and *h'*, arranged with their beveled sides toward each other, as shown in Figs. 15 and 18. To the beveled under surfaces of the plate *h'* are secured the plates *i* and *i'*, having their forward ends curved and serrated, as shown in Fig. 16, and upon the upper side of said plate *h'* is secured the plate *c''*, as shown in Fig. 16. Adjustably secured to the front side of the girt A<sup>3</sup> is the angular plate *h<sup>2</sup>*, the front edge of the horizontal portion of which is straight and serrated and located a little in advance of the

front serrated edge of the plate *c*, as shown in Fig. 18.

G G are two wedge-shaped guides, Fig. 15, secured to the girt A<sup>3</sup>, and projecting between the beveled surfaces of the plates *h, i*, and *i'*, as shown in Figs. 15 and 17, which serve to partially open the inward edge fold of the tube preparatory to cutting off a section therefrom, from which to form a bag.

The serrated front edges of the plates *c, i, i'*, and *h<sup>2</sup>* form the stationary cutters, which determine the lines of separation of the several folds of the tube, as represented in Figs. 20, Sheet 7, 26, and 27, the cut from *i<sup>2</sup>* to *i<sup>3</sup>* being determined by the plate *h<sup>2</sup>*, the lines from *i<sup>2</sup>* to *i<sup>4</sup>* and from *i<sup>4</sup>* to *i<sup>5</sup>*, Fig. 27, being determined by the plate *i*, the lines from *i<sup>3</sup>* to *i<sup>6</sup>* and from *i<sup>6</sup>* to *i<sup>7</sup>* by the plate *i'*, and the line from *i<sup>5</sup>* to *i<sup>7</sup>* by the plate *c*.

H is the movable cutting-off blade or striker mounted upon the short horizontal shaft H' in such a manner that it may be adjusted around the same for the purpose of causing it to strike the paper tube at the proper time to sever therefrom the desired length of tube to form a bag. This striker is secured to the shaft H' by means of the conical sleeve *j*, Fig. 19, fitted to a conical hole through the hub of the striker, and to slide upon the key *j'*, said conical sleeve being backed up by the nut *j<sup>2</sup>*, and the striker H being prevented from being moved along the shaft H' by the collar H<sup>2</sup>. The upper edge of the striker, or that portion of it which acts upon the paper tube, is made of such a shape that it will first strike the under side of the tube at a point between its edges, and then pass through the two edges of the upper side of said tube at the same instant, as illustrated by the dotted lines in Fig. 20, in which a section of the paper tube is represented by full lines *i<sup>2</sup>, i<sup>3</sup>, i<sup>4</sup>, i<sup>5</sup>, i<sup>6</sup>, and i<sup>7</sup>*, and in which, also, the arrow indicates the direction in which the striker revolves.

Motion is imparted to the shaft H' and the striker H from the main driving-shaft, I, Fig. 6, through the medium of the spur gear-wheels I' and I<sup>2</sup>, the shaft I<sup>3</sup>, bevel gear-wheels I<sup>4</sup> and I<sup>5</sup>, inclined shaft I<sup>6</sup>, and bevel gear-wheels I<sup>7</sup> and I<sup>8</sup>, Fig. 21.

J is a hollow shield or guard within which the striker H passes at each revolution.

Before the striker acts upon the paper tube the end of the tube passes between the plates *k* and *k'*, with the inward folds of the tube embracing the inner portions of the plates *k<sup>2</sup> k<sup>3</sup>*, Fig. 11, and is seized by the feed-rolls K K, which are arranged to revolve at a speed slightly greater than the speed of the rolls F<sup>3</sup> and F<sup>4</sup>, and as soon as a section is severed by the striker it is moved forward between the plates *k<sup>3</sup> k<sup>3</sup>*, still guided by the plates *k<sup>2</sup> k<sup>2</sup>*, until the extreme forward end of the blank, or those portions *x*, Fig. 26, of the inward fold of the tube which project beyond the upper and lower portions of the tube, is between the revolving pasters M M', formed as shown in Figs. 8 and 34, when they come in contact

with the opposite sides of said projecting portions  $x$  of the inward folds and deposit thereon a coating of paste. The pasters  $M$  and  $M'$  revolve at about the same speed as the feed-rolls  $K$  and  $K'$ , and as a consequence move with the tube, until, by virtue of their rotary motion, they separate from each other and the blank. The paster  $M$  is supplied with paste from the paste-tank  $m$  by the paste-roll  $m'$ , and the paster  $M'$  is supplied with paste from the paste-tank  $m^2$  by means of the rolls  $m^3$ ,  $m^4$ , and  $m^5$ , as shown in Fig. 3. As the forward movement of the blank or tube section continues, the inward edge folds are opened out, so that the tube assumes a shape somewhat resembling the letter  $H$ , Fig. 28, by coming in contact with and moving past the spirally-surfaced guides  $N$  and  $N'$ , which form continuations of the plates  $k^2$  and  $k^2$ , as shown in Figs. 8 and 9, and at the same time said tube-section is passed between the feed-disks  $O$  and  $O'$ , which seize the blank in the center of its width in such a manner as to feed it forward without interfering with the opening out of the edge folds, as shown in Fig. 28. When the forward end of the tube section has reached the extreme forward ends of the spirally-surfaced guides  $N$  and  $N'$ , two pairs of creasing-fingers,  $n$  and  $n'$ , arranged at angles of forty-five degrees to the line of movement of said blank, and between the two spiral guides, are suddenly moved outward or away from each other and into contact with the upwardly and downwardly turned portions of the blank, so as to force the paper into the grooves  $o$  and  $o'$ , formed in the inner faces of the spiral guides  $N$  and  $N'$  to define the lines of fold for the bottom, said creasing-fingers being as suddenly moved back to their normal position again after the creases are formed. These creasing-fingers are attached to the  $U$ -shaped frames  $P$  and  $P'$ , mounted in suitable bearings on the brackets  $P''$  and  $P'''$ , in which they are reciprocated horizontally by means of the levers  $P^2$  and  $P^2'$  and the cam-surfaces  $p$  and  $p'$  on the cam-wheels  $P^3$ , firmly secured upon the shaft  $I$ , Fig. 7. The cam-wheels  $P^3$  have formed upon the outer edges of their rims cam-throws  $p^2$  and  $p^2'$ , which serve to move the levers  $Q$  and  $Q'$ , and through them the  $U$ -shaped frames  $Q'$  and  $Q'$ , which carry each a pair of fingers,  $q$  and  $q'$ , arranged in a similar manner to the fingers  $n$  and  $n'$ , but a short distance in advance of the same, as shown in Fig. 13. The fingers  $q$  and  $q'$  are moved inward by the cams  $P^3$  and  $P^3'$  at the same time that the fingers  $n$  and  $n'$  are being moved in the same direction by the action of the springs  $r$  and  $r'$ , and serve to turn inward at right angles to the side portions of the  $H$ -shaped blank those portions  $x$  forward of the creased lines formed by the fingers  $n$  and  $n'$ , and that have previously had paste applied thereto. When the inward motions of the fingers  $q$  and  $q'$  are completed, they remain stationary for a short interval, while the blank continues to be moved forward by the feed-disks  $O$  and  $O'$ , when the forward ends of the upright portions of the  $H$ -shaped blank are

turned outward and downward by coming in contact with the curved surfaces and edges of the plates  $r'$  and  $r''$ , Figs. 1 and 14, supported by the braces  $r^3$ , and the flattened blank or tube section with its bottom folded, as shown in Fig. 30, is passed between the pressure feed-rolls  $R$  and  $R'$ , which press the bottom folds of the bag and cause the pasted-folded over portions to adhere to the body of the bag when the bag is completed. The backward movements of the fingers  $q$  and  $q'$  are caused by the springs  $s$  and  $s'$ , Fig. 7, acting upon the levers  $Q$  and  $Q'$ , as the cam-throws  $p^3$  pass the trucks on the lower ends of said levers when said fingers are in the proper positions to fold over portions of the next blank or tube section at the proper time.

The machine illustrated in the drawings is designed to make three different sizes of bags, in order to do which different widths of paper must be used, and the speed of the feed-rolls relative to the movements of the cut off striker and the creasing and bottom-folding mechanisms must be varied, and certain other adjustments must be made, in order that the several movements shall be made in proper time relative to each other.

The feed-rolls are driven and their speeds adjusted in the following manner: Upon the end of the shaft  $I$ , opposite to the driving-pulley  $S$ , Figs. 1, 6, and 7, is secured—by the nut  $s'$  and a suitable spline, so as to be easily removed therefrom—the spur gear-wheel  $S'$ , which meshes into and imparts motion to the intermediate gear-wheel,  $S^2$ , mounted upon a stud set in the lever  $T$ , pivoted upon the shaft of the lower of the two feed-rolls  $R$ , and clamped to the frame of the machine by means of the stud  $s^2$ , set in said frame and passing through the curved slot  $s^3$ , formed in the lower end of said lever and the nut  $s^4$ , as clearly shown in Fig. 6. The wheel  $S^2$  imparts motion to the gear-wheel  $S^3$ , secured upon one end of the lower feed-roll  $R$ , upon the opposite end of which is secured the gear-wheel  $S^4$ , which in turn engages with and imparts motion to the gear-wheel  $S^5$ , secured upon the shaft of the upper of the feed-wheels  $O$ . This wheel  $S^5$  meshes into and imparts motion to the gear-wheel  $S^6$ , mounted upon the shaft of the lower of the two feed-rolls  $K$ , and the wheel  $S^6$  engages with and imparts motion to the intermediate gear,  $S^7$ , which engages with the gear  $S^8$ , secured upon the end of the shaft of the feed-roll  $R'$ . The two feed-rolls of each pair are geared together by suitable gear-wheels located inside of the frames, as shown in Fig. 1.

If it is desired to change the speed of the feed-rolls so as to feed a longer section of the tube to each revolution of the striker, it is only necessary to slacken the nut  $s^4$ , swing the lever  $T$  toward the right, remove the nut  $s^4$  and the gear-wheel  $S^4$ , put a larger wheel in the place of  $S^4$ , and secure it by the nut  $s^4$ , and swing the lever to the left till the gear-wheel  $S^2$  is properly engaged with the new gear-wheel.

The pasters  $M$  and  $M'$  are geared together

so as to revolve in unison by the spur gear-wheels  $M^2$  and  $M^3$ , and the paster  $M$  has secured upon its shaft the gear-wheel  $U$ , to which motion is imparted by the intermediate gear-wheel,  $U'$ , acted upon by the gear-wheel  $U^2$ , secured upon the shaft  $I$ .

As it is necessary to adjust the time of contact of the pasters with the blank whenever the speed of the feed-rolls is changed, I make the gear-wheel  $U$  in two parts, consisting of the hub or center  $t$  and the toothed rim,  $t'$ , secured together by the bolts  $t^2$   $t^3$  and nuts  $t^2$   $t^3$ , said bolts being fitted to square holes in the center  $t$ , and passing freely through an annular space between the inner edge of the ring  $t'$  and the annular shoulder  $t'$  of the center  $t$ , while the nuts  $t^2$   $t^3$ , or suitable washers placed beneath them, extend across or bridge the annular space mentioned and bear upon both the center and the outer or toothed rim. The construction of said gear is clearly shown in Figs. 6, 23, 24, and 25. In order to adjust the pasters so that they shall time properly with the other movements of the machine, the nuts  $t^2$   $t^3$  are slackened and the center  $t$  is moved with the paster about its axis till the paster is in the desired position, when the nuts  $t^2$   $t^3$  are again tightened and the adjustment is complete. A similar adjustment of the movements of the creasing and bottom-folding fingers is necessary to insure the creasing and folding of the blank at the proper point, and to this end I construct the two cams  $P^3$  in two parts and unite them together in the same manner as the gear  $U$ , so that the cam-throws  $p$ ,  $p'$ ,  $p^2$ , and  $p^3$  may be adjusted around the shaft  $I$  in a convenient and easy manner.

The construction of one of the cams  $P^3$  is illustrated in Figs. 5, 32, and 33.

In Fig. 35 is illustrated the relative positions of a portion of one of the spiral guides, one of the creasing-fingers, and one of the bottom-folding fingers when in their normal positions.

It will be apparent that some of the appliances above described may be used in machines for making other forms of bags than those set forth, and with machines of different general structures for making the same bags.

The paper bag herein shown and described is not claimed, as the same, together with certain improvements, forms the subject-matter of applications filed by me in the United States Patent Office, February 3, 1888, Serial No. 262,890, and March 10, 1888, Serial No. 266,793.

I claim—

1. The within-described improvement in the art of making square or satchel bottom bags, the same consisting in folding and pasting a strip of paper longitudinally to form a tube, bending in the sides of said tube on central lines to form bellows-folds, severing the tube transversely to leave ends of the infolded portions projecting beyond the edges of the flat portions, and bending down each folded corner and pasting the same upon the body, substantially as set forth.

2. In the manufacture of square-bottom bags, the mode described of making the blanks with sides extending beyond the edges of the body, top, and bottom portions, the same consisting in forming a tube, folding in the side portions, and then severing the tube across the body portions upon nearly straight lines and across the folded portions upon lines in advance of the severed edges of the body portions, substantially as specified.

3. The mode described of folding a tube with projecting side portions,  $x$ , to form a square bottom, the same consisting in folding part of the body portion on each side against the side portions having the projecting ends, turning the side portions at right angles to the body, thereby bringing the tube to an **H** shape in cross-section, and then bending down each corner on an oblique line and pasting it to the part upon which it is folded, substantially as set forth.

4. The mode described of forming the bottoms of square bags, the same consisting in folding a tube to an **H** shape in cross-section, and then turning down the corners and pasting them to the parts beneath, as specified.

5. The combination, in a paper-bag machine, of devices, substantially as described, for folding in the sides of a tube, severing-plates  $c$   $h^2$ , crossing the body portions of the tube, severing-plates  $i$   $i'$ , crossing the folded portions of the tube with their edges in advance of the plates  $c$   $h^2$ , and a striker,  $H$ , substantially as set forth.

6. The combination of plates having edges of different lengths arranged at angles to each other to sever a tube transversely on different lines, with a bent striker formed to carry different portions of said tubes successively against different portions of said edges, substantially as set forth.

7. The combination, with devices, substantially as described, for folding in the sides of the tube and for feeding the blanks cut therefrom longitudinally, of curved guides  $N$   $N$  and rollers  $O$   $O$  for bringing the blank to an **H** shape, and appliances, substantially as described, for turning down the corners, substantially as specified.

8. The combination, with the devices, substantially as described, for bringing the blank to an **H** shape in cross-section, of guides  $N$ , having recesses  $o$  and blades  $n$ , and appliances, whereby said blades are brought against the sides of the blanks to force them into said recesses, substantially as specified.

9. The combination, with devices, substantially as described, for bringing the blanks to an **H** shape in cross-section, of blades  $q$ , devices, substantially as described, for carrying them across the sides of the blanks to turn in the corners, and feeding appliances, whereby the blanks are fed forward after the turning in of the corners, substantially as set forth.

10. The combination, with devices, substan-

tially as described, for folding the blanks to an H shape and for turning and pasting down the corners, of plates  $r'$   $r''$ , adapted to fold down the sides of the bag as the same is fed forward, substantially as set forth.

11. The former F, having its forward end composed of the serrated plates  $c$ ,  $i$ , and  $i'$ , the beveled filling-plates  $h$  and  $h'$ , and the smooth-edged plate  $c^2$ , all constructed and arranged substantially as described.

12. The combination of the serrated plates  $c$ ,  $i$ , and  $i'$ , the beveled filling-pieces  $h$  and  $h'$ , the smooth-edged plate  $c^2$ , and the wedge-shaped guides G G, all constructed and arranged to operate substantially as described.

13. The combination of the former F, having its front end composed of the serrated plates  $c$ ,  $i$ , and  $i'$ , the beveled filling-pieces  $h$  and  $h'$ , and the smooth-edged plate  $c^2$ , with the independent stationary serrated plate  $h^2$ , the wedge-shaped guides G G, and a revolving striker adapted to strike off a section of the paper tube from which to form a bag, substantially as described.

14. The combination of the striker, feed-rolls, plates  $k$  and  $k'$ , plates  $k^2$   $k^3$ , arranged between the striker-arm and feed-rolls K K to guide the paper tube from the point of cut-off to said feed-rolls K K, substantially as described.

15. The guide-plates  $k^2$   $k^3$ , in combination with the plates  $k^2$   $k^3$ , and the revolving pasters M and M', constructed, arranged, and adapted to operate substantially as described.

16. The guide-plates  $k^2$   $k^3$ , terminating at their front ends in the spirally-surfaced guides N N, in combination with feed-rolls for feeding the paper tube, substantially as described.

17. The combination of the pasting devices, spirally-surfaced guides N N, and feed-disks O O, arranged intermediate of said guides and adapted to operate substantially as described.

18. In a paper-bag machine, the combination, with forming, feeding, and guiding devices, substantially as described, of two sets of pasting apparatus arranged to apply paste to opposite sides of the bag-blank at the same time, substantially as and for the purposes described.

19. The combination, of the two spirally-surfaced guides N N, each provided upon its inner face with two grooves,  $o$   $o$ , arranged obliquely in opposite directions, the four creasing-fingers  $n$   $n$  and  $n'$   $n'$ , the levers P<sup>2</sup> P<sup>2</sup>, and the cam-wheels P<sup>3</sup>, provided with the cam-throws  $p$   $p'$ , all constructed, arranged, and adapted to operate substantially as described.

20. The combination of the two spiral guides N N, provided with the oblique grooves  $o$   $o$ , the creasing-fingers  $n$   $n$  and  $n'$   $n'$ , mechanism for reciprocating said fingers  $n$  and  $n'$ , the fingers  $q$   $q$ , levers Q Q, and the cams P<sup>3</sup>, provided with the cam-throws  $p^2$  and  $p^3$ , all constructed, arranged, and adapted to operate substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 6th day of May, A. D. 1882.

LORENZO D. BENNER.

Witnesses:

E. A. HEMMENWAY,  
WALTER E. LOMBARD.