O. E. DAVIDSON.
Paper Bag Machine.

No. 201,754. Patented March 26, 1878.

Fig. 1.

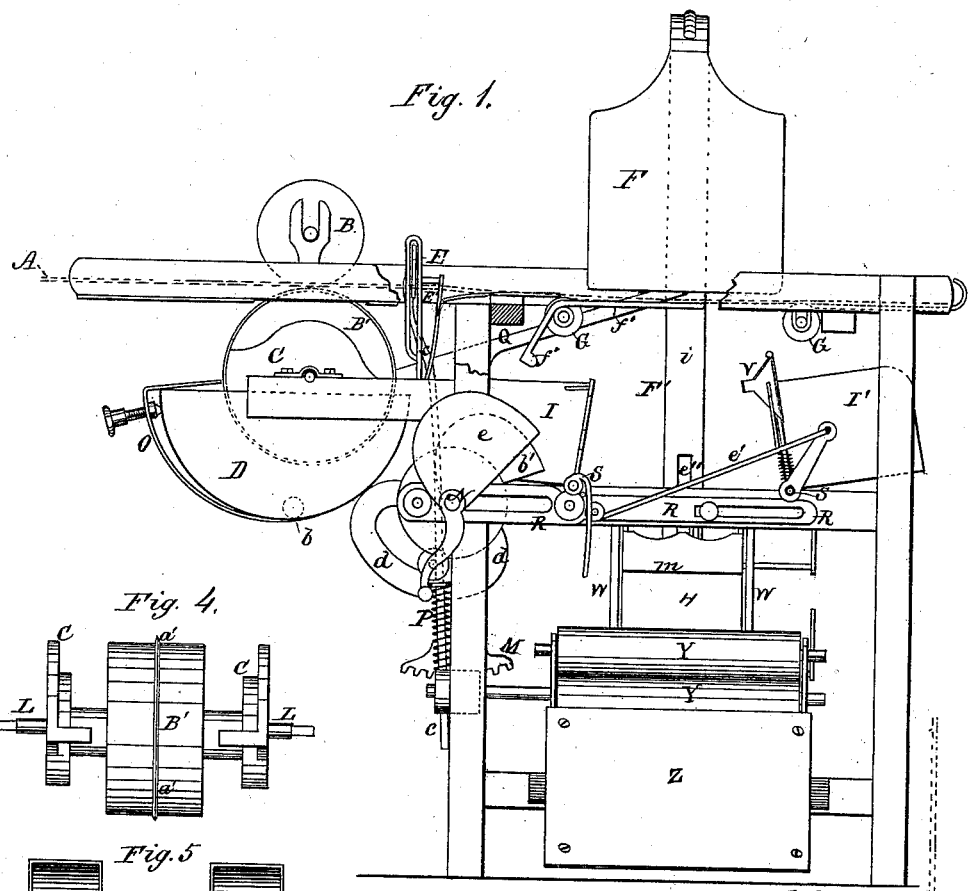


Fig. 4.

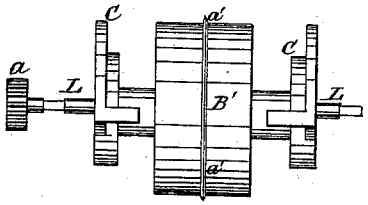


Fig. 5

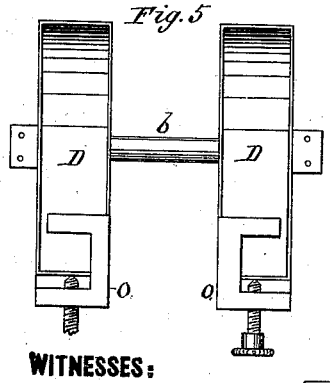


Fig. 6.

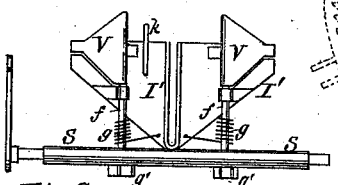


Fig. 8.

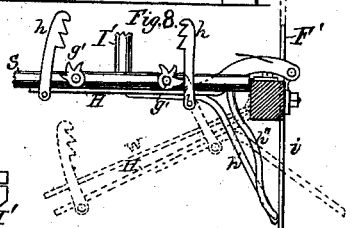
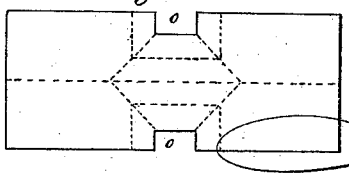


Fig. 9.



WITNESSES:

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2 Sheets—Sheet 2.

O. E. DAVIDSON.

Paper Bag Machine.

No. 201,754. Patented March 26, 1878.

Fig. 2.

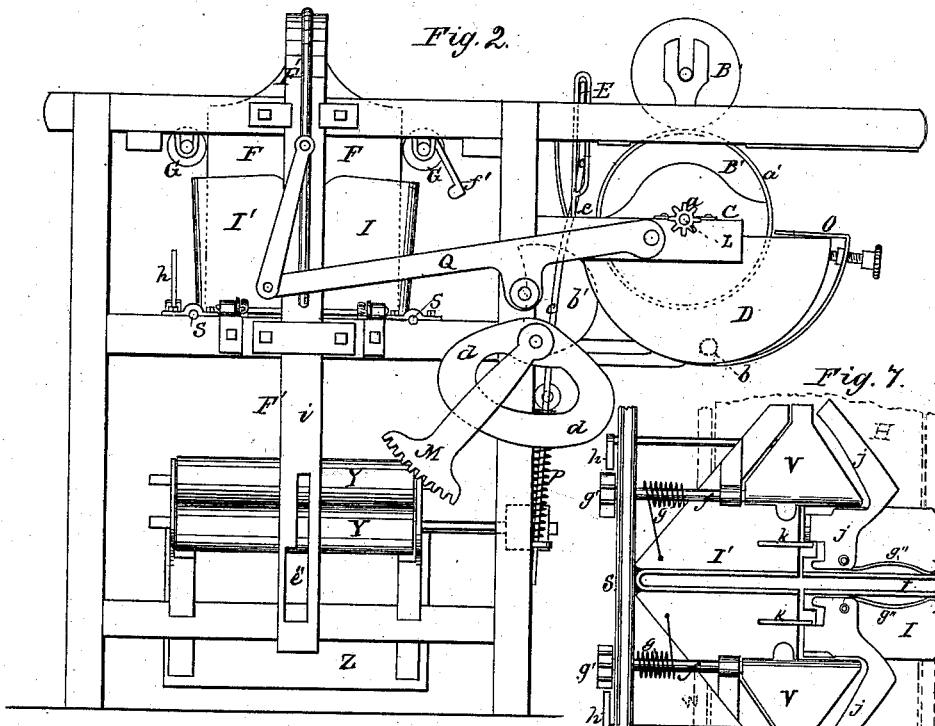


Fig. 7.

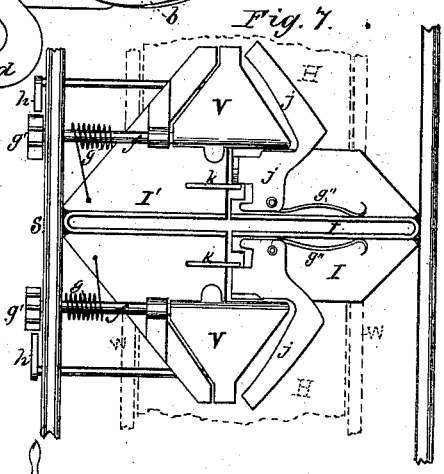
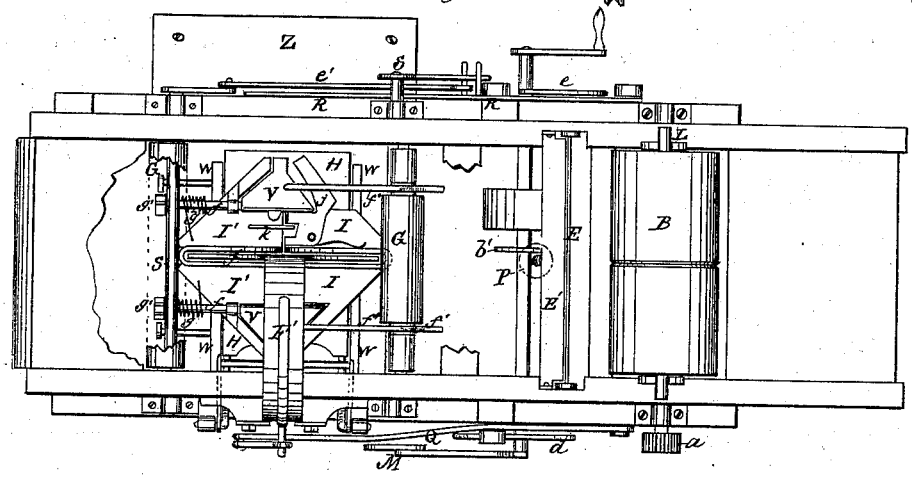


Fig. 3.



WITNESSES:

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Solon C. Kemon

INVENTOR:

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UNITED STATES PATENT OFFICE.

OTIS E. DAVIDSON, OF CLARKSVILLE, TENNESSEE.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. **201,754**, dated March 26, 1878; application filed September 28, 1877.

To all whom it may concern:

Be it known that I, OTIS E. DAVIDSON, of Clarksville, in the county of Montgomery and State of Tennessee, have invented a new and useful Improvement in Paper-Bag Machines and Paper Bags; and I do hereby declare that the following is a full, clear, and exact description of the same.

The machine comprises pasting, cutting, folding, and bag-delivering apparatus, which operate in the order here named.

The elements of the pasting apparatus are the paste-holders D, the feed-rolls B B, and the plain segments C C, the last two being operated by a toothed segment on the driving-shaft.

The elements of the cutting apparatus are the knife E, spring P, and cam on shaft N.

The elements of the folding apparatus are weighted skids for temporarily supporting the paper strip A, the former F, the side folders I I′, corner-folders V, table H, and the means for operating these—to wit, the cam on shaft N, the sliding bar R, and rock-shafts S, connected with said bar.

The bag pressing and delivery apparatus consists of the hinged table H, pressing-rolls Y, and inclined delivery-table Z.

In the accompanying drawing, forming part of this specification, Figure 1 is a side elevation of the machine, with part of the frame in section. Fig. 2 is an elevation of the opposite side of the machine. Fig. 3 is a plan view. Figs. 4, 5, 6, 7, and 8 are detail views of detached parts. Fig. 9 is a plan view of a blank for a paper bag, the same having notches to facilitate folding along the dotted lines.

I will now proceed to more particularly describe the construction and arrangement of parts. The upper roll B is idle; but the lower feed-roll B′ is fast on the same shaft, L, with paste-appliers or segments C, and is hence operated by the same means—to wit, the toothed segment M, which is a radial arm of the driving-shaft N, and meshes with a pinion, *a*, on said shaft L. The roll B′ has a central circumferential rib, *a′*, and the upper roll B a corresponding groove to receive the same. The function of these is to crease the paper along the middle, in order to make it fold true around the former, hereinafter described. The segments C C are so located that they pass through the paste-boxes at each rotation.

The paste-boxes are connected by a tube, *b*, Fig. 5, for the purpose of allowing the paste to be equally distributed and remain at the same height in the two boxes. The scrapers O, which are attached to the paste-box D and adjusted by set-screws acting against their spring-shanks, serve to remove any excess of paste from the segments C.

The driving-shaft N has three cams—one cam, *b′*, (centrally located,) for depressing the knife or cutter E against the stress of a spring, P, which is coiled around the shank or rod *c*, carrying said cutter; another oval-shaped cam, *d*, which acts upon a lever, Q, and thereby raises the former F at suitable intervals of time; and a cam, *e*, for reciprocating the slotted bar R, by which the hinged side-folders I I′ are operated. The rotation of said shaft N and its attached segment and cams therefore causes the feeding, pasting, cutting, and folding devices, and also a part of the delivery devices, to operate in the desired manner and succession.

The side-folders I I′ are T-shaped, their vertical portions being formed of parallel plates placed near each other. The folders are pivoted to rock-shafts S, which are suitably connected, by a rod, *e′*, with the sliding bar R, operated, as aforesaid, by the cam *e*.

The folder I′ on the rear rock-shaft S has hinged triangular corner-folders V, attached by means of shafts *f*, which are encircled by spiral retracting-springs *g*, and provided with pinions *g′*, with which the rack-bars *h* of table H engage, to operate said corner-folders V, when the table falls away from the folders I I′.

The front-folders I, Figs. 3 and 7, have each an arm or flat angular plate, *j*, pivoted to their horizontal base portions, and provided with a spring, *g″*. The arms *j* are pressed back, when the folders I I′ close together, by a stud, *k*, projecting from the rear folders I′, the stud in such case acting upon a beveled projection of the arm *j*.

The table H has raised ribs *m*, Fig. 1, which crease the corners of the bag-bottom when the folders I I′ press it down upon the table, and thus adapt the bag-corners to fold readily.

The springs or spring-arms W are hinged

like the table, and lie parallel to its side edges, as shown.

When the former D is pressing the paper down, the arms *h' h''*, Fig. 8, of table H and spring-arms W are in contact with the imperforate portion *i* of its long slotted shank F'; but when the former F rises, the said arms *h' h''* enter the slot *e''* in the shank F', (dotted lines, Fig. 8,) and thus the table H and spring-arms W are allowed to drop by their own gravity; but, owing to the location of the arms *h' h''* and the form of the slot *e''*, (the same having a notch or shoulder,) the table falls somewhat below the spring-arms W, so that the bag is supported and held off the table while sliding down to the finishing and delivery rolls Y, and thereby prevented from being smeared by the paste adhering to the table.

The main features of the operation are as follows: The bag is formed from pieces which are cut off from a continuous paper strip A, (dotted lines, Fig. 1.) The strip passes between the rolls B B', being fed by friction with roll B', and is pasted along the edges by the plain segments C C, which, like the feed-rolls B B', have an intermittent rotary motion. The segments have a lateral projection, so that paste is applied to the blank in the form of the letter L. The portion of the strip A which has been thus pasted is forced or carried along over the space under former F, being supported in such position by the pivoted weighted skids *f'*, and is then pressed up against a stationary bar, E', and cut off by the vertically-acting knife E. It is next pressed downward by the flat vertically-acting former F between the transverse rollers G, the descent of the former being caused by the oval-shaped cam *d* acting on lever Q. When the lower end of the former F has pressed the paper upon the table H, the grooved side-folders I I' are thrown into vertical position, Fig. 2, and fold and press the sides of the pasted paper around the former F, and also press the side flaps down upon the table H. The pivoted arms *j* supplement the action of the side-folders I I' in folding the corners of the bag true and pressing them down on the table. The former F then recedes, the table H falls along with spring-arms W, the corner-folders V next act upon the side flaps of the bag to fold them under and then release it, so that it slides on the spring-arms W down to and between the rollers Y, which give it the finishing pressure and deliver it upon the inclined table Z, whence it slides off into any suitable receptacle.

It is obvious that friction-rollers might be substituted for the pinions on which the rack-bars act, and, generally, the details of the apparatus may be changed or improved without affecting the operation of the main or essential parts of the machine.

I show in Fig. 9 a blank for a bag, which is cut out or notched on the sides at *o*, to facilitate the operation of the folders V in folding under the bottom flaps of the bag, for it is obvious that the less the width or the fewer the thicknesses of paper to fold, the easier will the function of the folders be performed.

What I claim is—

1. In a paper-bag machine, the cylindrical feed-roll, the segments C C, for pasting the edges of the paper strip, the segment M, for intermittently engaging the pinion *a*, and the rotating shaft N, all combined to operate as shown and described.

2. In a paper-bag machine, the vertically-reciprocating former F, consisting of a flat metal plate, the hinged vibrating folders I I', so constructed as to receive or embrace the former, as described, and the hinged table H, adapted to maintain a horizontal position when the former descends and the said folders act on the blank, all combined as specified.

3. In a paper-bag machine, the hinged side-folders I I', the flaps V V, the hinged table H, and toothed arms *h*, for acting on the pinions fixed on the rock-shafts *f f* of the flaps, all combined as shown and described, to operate as specified.

4. In a paper-bag machine, the vertically-acting former, having a slotted shank, F', and the hinged table, having an arm, *h'*, combined and operating substantially as shown and described.

5. In a paper-bag machine, the spring-arms *j*, pivoted to the base of the folders I, and the fingers or studs *k*, projecting from the folders I', all combined and operating as shown and described.

6. In a paper-bag machine, the combination of the vertically-acting former, having the slotted shank F', the hinged table, having arm *h'*, racks *h*, and the corner-folders V, all combined to operate as shown and described.

7. In a paper-bag machine, the combination of the hinged spring-arms W and table H, having arms *h' h''*, with the former F and the slotted shank F', constructed as shown and described, to operate as specified.

OTIS E. DAVIDSON.

Witnesses:
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A. A. JOHNSON.