2 Sheets--Sheet 1.

G. DUNHAM.

Paper-Bag Machines.

No. 151,862. Patented June 9, 1874.

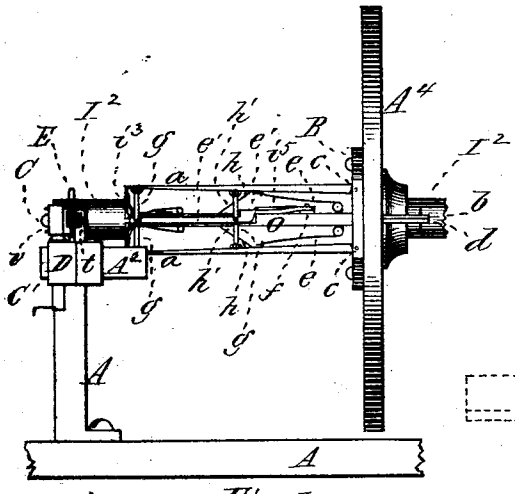

Fig. 1

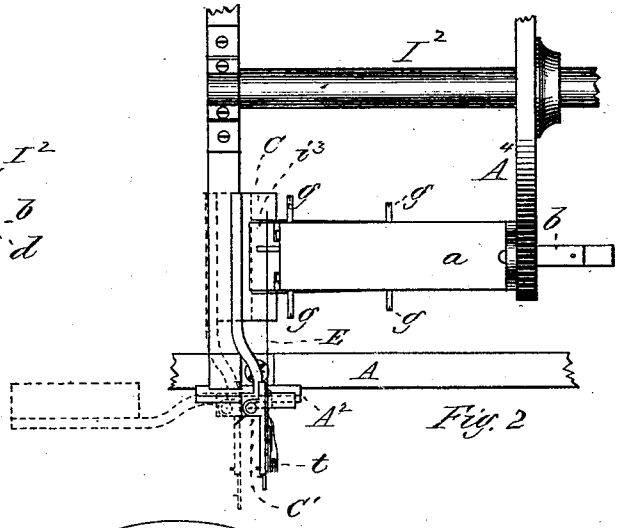

Fig. 2

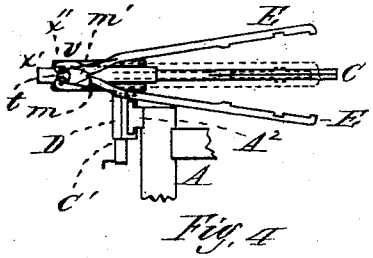

Fig. 4

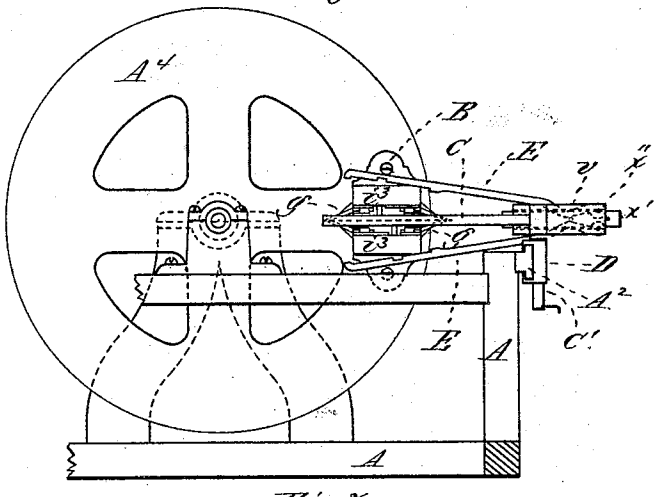

Fig. 3

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A.M. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

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G. DUNHAM.

Paper-Bag Machines.

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Fig. 5

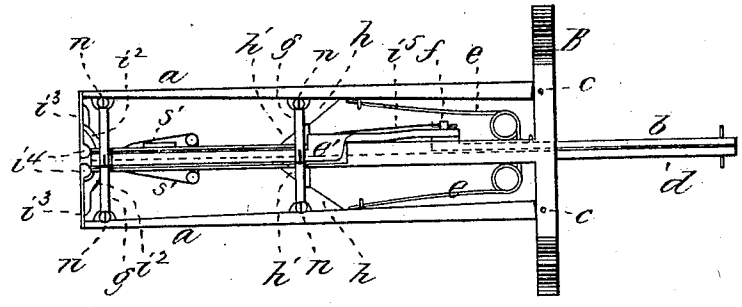


Fig. 6

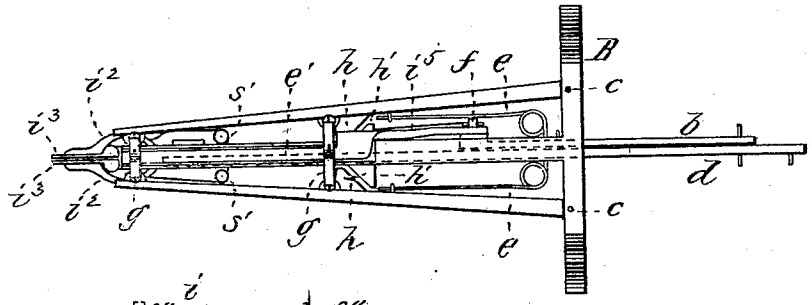
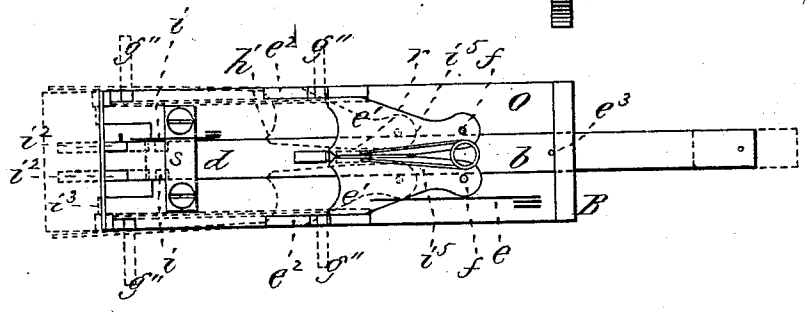


Fig. 7



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UNITED STATES PATENT OFFICE.

GEORGE DUNHAM, OF UNIONVILLE, CONNECTICUT.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. **151,862**, dated June 9, 1874; application filed October 22, 1873.

To all whom it may concern:

Be it known that I, GEORGE DUNHAM, of Unionville, in the State of Connecticut, have invented an Improvement in Paper-Bag Machines, of which the following is a specification:

The object of my invention is to provide a former upon or around which sheets of paper are folded to form paper bags by machinery, said former being secured to a revolving disk upon a shaft, and having plates on two opposite sides, which are pivoted at one end, so that they may be opened or closed together at the other end.

The plates are opened and held in a position parallel with each other by means of a wedge attached to a rod, which is forced between two inclined pieces attached to the plates, and the rod is provided with recesses near the end; and two folding plates are pivoted to the end of the middle part or frame of the former, similar in construction and operation to that shown in Letters Patent No. 141,862, granted me August 19, 1873.

Another rod moving within the former has two arms pivoted thereto, which, when the ends of the plates of the former are brought together, are slightly moved apart, and are moved forward to assist in removing the bag from the former. A knife, with two vibrating clamp-bars, is pivoted to a sliding block, which operates, in connection with the plates and pivoted arms, to fold the bottom of the bag and remove it from the former sufficiently for the revolving aprons to carry it away; and these movements are accomplished by suitable mechanism connected with a cam-shaft and cams thereon, the general arrangement of which is described in the before-mentioned Letters Patent granted to me August 19, 1873.

In the drawings, Figure 1 is a side view of the former as attached to the revolving disk, and of the pivoted knife. Fig. 2 is a plan view of the same. Fig. 3 is a front view of the same, showing also the movable clamp-bars, which assist in removing the bag from the former. Fig. 4 is a rear view of the knife and clamp-bars. Fig. 5 is an enlarged side view of the former. Fig. 6 is an enlarged side view of the same, showing the sides of the former brought partially together near the end, and the folding-plates closed, to remove the bag from the former and partially fold the bottom; and Fig. 7 is a plan view of the former, showing in dotted lines the folding plates and the arms thrown apart and forward.

A represents the frame, and I^2 the shaft, with the revolving disk A^4 thereon, all arranged precisely as shown in Letters Patent granted to me August 19, 1873, upon which this invention is an improvement, so far as relates to the former upon which the paper bag is made and the mechanism for removing the manufactured bag therefrom. The former consists of two plates, *a a*, pivoted at one end to the piece B, which is properly secured to the disk A^4, and to said plates *a* are hinged the bars *g* at *n*, said bars being jointed midway their length; and, for the manufacture of a square bag, the jointed bars *g* are of such length that when the plates *a* are parallel, as shown in Fig. 5, the distance from the outside of one plate to the outside of the other is equal to the width of one plate. The former is provided with a middle plate or frame, O, in which moves longitudinally a rod, *d*, which extends back through an aperture made in the disk A^4, and in the forward end of which are made recesses *i*, through which operate the curved pieces i^2 attached to the folding plates, which are pivoted to the end of the frame O, all of which mechanism is shown in said Letters Patent before mentioned.

Above the rod *d*, and close to it, is another shorter rod, *b*, to the end of which, at *f*, and within the former, are pivoted the arms *e'*, which are brought quite close together, a little forward of their pivots *f*, but which then extend outward and along a groove made in the edge of the plate or frame O, to a point near the pivots i^4 of the folding plates i^3 at the end of the former. Two pieces, *h'*, are attached to the rod *d*, one on the upper, and one on the lower, side, the forward part of each being inclined, so that taken together they form a wedge; and a piece, *h*, is attached to the top of the lower plate, *a*, and a similar piece is attached to the lower side of the upper plate, *a*. The springs *e* cause the plates *a* to close together, near their ends, when the rod *d* is drawn back, and when so closed the

jointed bars *g* are thrown outward, as shown in Fig. 3, and in dotted lines in Fig. 7. When the rod *d* is moved in again the inclined pieces *h'* ride against the inclines *h*, and force the plates *a* out to their places, where they are held by the outer ends of the pieces *h'* bearing against the inner ends of the pieces *h*. When the rod *d* is drawn back the upper piece, *h'*, passes in between the arms *e'* at the point *r*, and forces them apart, and recesses e^2 being made in each edge of the plate or frame O, the rod *b* is then forced in, moving said arms farther in past the piece *h'*, and spreading them still more, and moving their extreme ends forward into the position shown in dotted lines in Fig. 7. A bar, A^2, is secured to the frame A, and upon this bar is a sliding block, D, in which is a knife, C, swinging upon a pivot, C', and in the stem *v* of the knife is a longitudinally-sliding bar, *x'*, in which is fixed a pin, *m*, (shown in Fig. 4,) and two clamp-bars, E, are pivoted to the stem at *x''*, one of which projects out over the knife C, and the other beneath it, and said bars are bent near their pivoted ends at *m'*, so that if the bar *x'* be pushed in, the pin *m* impinges against the bent parts of the clamp-bars, and forces them open, and if the sliding bar *x'* be pulled out, the spring *t* closes the clamp-bars against the knife.

The operation of my invention is as follows: If a paper bag has been made upon the herein-described former, while the plates are held out parallel with each other, by the process described in Letters Patent No. 141,862, granted to me August 19, 1873, the disk A^4 is rotated until the former is brought in front of the stripping-aprons therein shown. The pivoted knife C, which is in its most outward position, and away from in front of the former, as shown in dotted lines in Fig. 2, is moved around to a position a little in front of the end of the former, and the sliding bar *x'* is pushed in, and the clamp-bars E are forced apart and away from the knife, and the block D is moved along upon its slide A^2 until the knife is brought up against the plate or frame O, between the folding plates i^3. The rod *d* being then drawn out, the plates *a a* of the former are closed quickly, the jointed bars *g* thrown outward against the inside of the bag, the arms *e'* slightly thrown outward by the piece *h'*, and the folding plates i^3 closed together with the knife C between them, so that the bottom of the bag, which was formed over the end of the former, is thus folded over the knife by the closing of the folding plates i^3. The sliding bar *x'* in the stem of the knife is then drawn out, and the clamp-bars E are brought in against the folded bottom of the bag upon the knife, and the sliding block D is moved back, drawing the knife C and its clamp-bars E away from the end of the former.

At the same time that the sliding block D starts to move back, the rod *b* in the former moves in, moving the extreme forward ends of the arms *e'* against the folded bottom of the bag inside. As the knife C, clamp-bars E, and arms *e'* thus move out together, the bag is moved from the former until the knife, with its clamp-bars, is in a position a little in front of the former, as shown in dotted lines in Fig. 2, and is free, or nearly free, from the folding plates i^3. The sliding bar *x'* is then moved quickly in, forcing the clamp-bars E away from the knife and from the bag folded thereon, and the knife, with its clamp-bars, is then moved quickly upon its pivot, around into the position shown at L in dotted lines in Fig. 2. The stripping-aprons, described in the beforementioned Letters Patent, then shut together, clasping the folded end of the bag between them, and drawing it entirely from the former, and carrying it away for packing. The clamp-bars E might equally well be closed upon the knife by pushing in the sliding bar *x'*, and be held away from the knife by the springs *t*.

The movements of the rods *d* and *b*, the sliding bar *x'*, the sliding block D, and the rotary movement of the knife C upon its pivot may all be accomplished by suitable rod or lever connections, with cams placed upon the cam-shaft, shown in the beforementioned Letters Patent granted to me, and which will be sufficiently well understood by reference to said Letters Patent to require no special description here.

It is designed that the same number of these formers are to be attached to the revolving disk A^4—say, four—as are shown and described in said Letters Patent, so that all the different processes of manufacturing bags and removing them from the formers may be carried on at the same time; and it will be seen that to remove the bag from the former, the latter is contracted in size, and is expanded again to be of the proper size to have the next bag made upon it.

The jointed bars *g* retain a straight position and form two sides of the former while the bag is being made upon it; but when the arms *e'* are thrown outward by drawing back the rod *b*, they press outward against the jointed bars *g* and trip them, or bend them at their joints, permitting the former to contract, as before described.

Having thus described my invention, what I claim as new is—

1. The contracting and expanding former *a*, in combination with the revolving disk A^4, substantially as herein described.

2. The jointed bars *g*, combined and operating with the former for flattening the bag, substantially as set forth.

3. The arms *e'*, in combination with the rod *b* and its piece *h'* for tripping or throwing out the jointed bars *g*, substantially as described.

4. The arms *e'*, in combination with the knife C, for removing the bag from the former, so that it may be clasped by the rolls arranged to carry it away, substantially as set forth.

5. The knife C, arranged to operate upon a

pivot in a rotary manner, for the purpose of being used in folding the bottom of the bag, and in removing the bag from the former, and then being removed out of the way of the stripping-aprons, which seize the bag and carry it away, substantially as set forth.

6. The clamping-bars E, in connection with the knife C, for griping the bag when the latter is being removed from the former, substantially as set forth.

GEORGE DUNHAM.

Witnesses:

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CARLOS L. MASON.