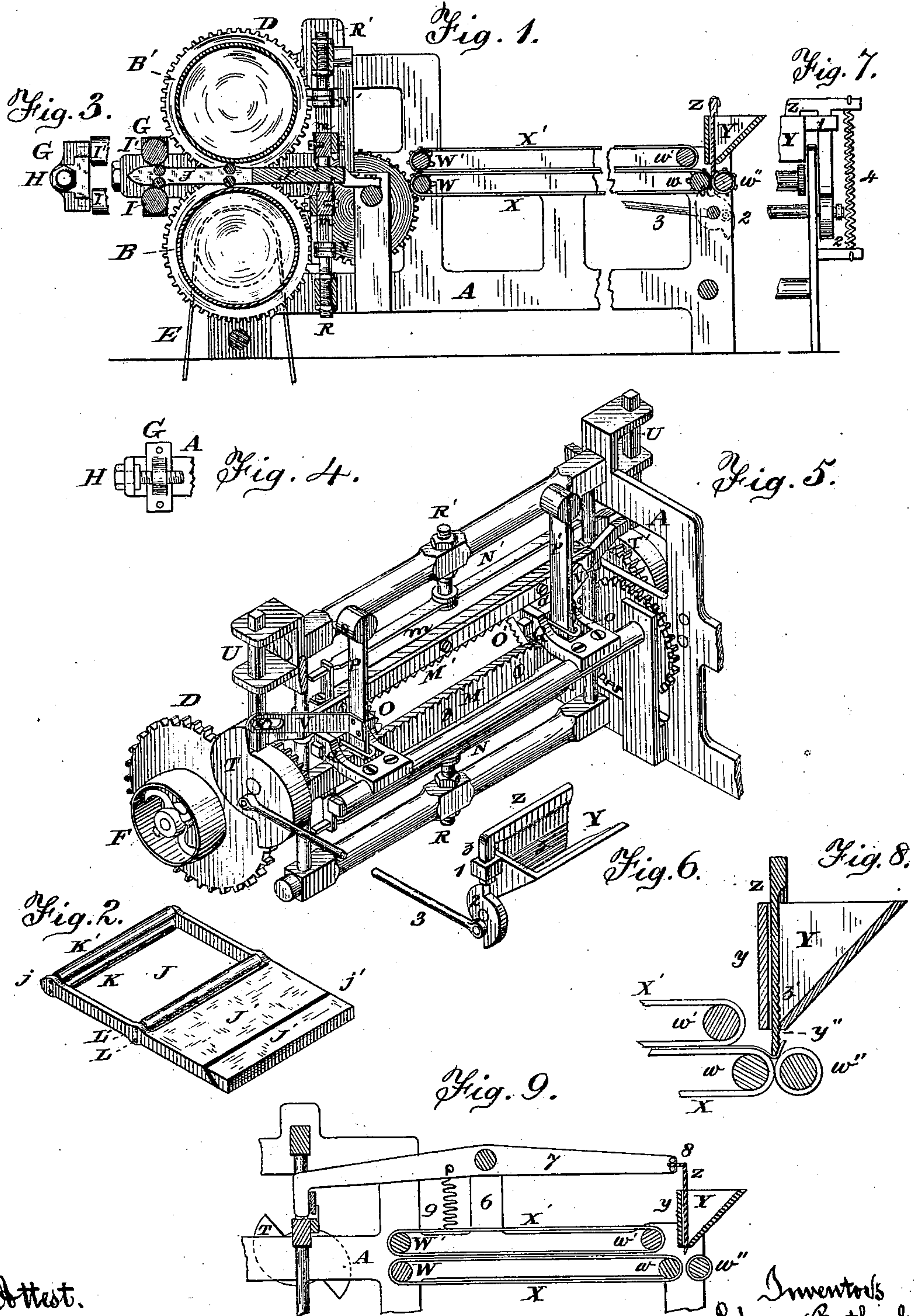


S. & M. RUTHENBURG.
Paper-Bag Machine.

No. 226,423.

Patented April 13, 1880.



Attest.
Walter Knight
Harry Knight.

Inventor's
Solomon Ruthenburg
Marcus Ruthenburg.
Roy Knight & Sons Attys.

UNITED STATES PATENT OFFICE.

SOLOMON RUTHENBURG AND MARCUS RUTHENBURG, OF CINCINNATI, OHIO.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 226,423, dated April 13, 1880.

Application filed July 16, 1879.

To all whom it may concern:

Be it known that we, SOLOMON RUTHENBURG and MARCUS RUTHENBURG, both of Cincinnati, Hamilton county, Ohio, have invented new and useful Improvements in Paper-Bag Machinery, of which the following is a specification.

Our improvements are designed especially for those machines for the manufacture of paper bags in which from a long flattened tube of paper tubular blanks (bag-lengths) of the proper longitudinal dimensions are so severed as to leave one edge protruding, and in which such bag-lengths are automatically conveyed to another part of the machine, where each bag-length in succession has one such protruding edge pasted and folded to constitute a bag.

Our invention comprises an arrangement whereby successive bag-lengths are separated by the simultaneous operation of one or more pairs of oppositely-acting blades, which work in conjunction with a tube-supporter or mandrel. These blades, striking the paper tubing and its included mandrel perpendicularly, operate to sever the desired bag-length, and are then instantly retracted by their rebound from their impact with the mandrel and by the resilient force of their actuating-springs, in order that there may be no sensible detention of the paper tubing in its continuous progress through the machine.

To enable the mandrel to receive the impact of the severing-blades without injury to the latter, there is embedded in the mandrel a foil, fillet, or cushion of some softer material than steel, such as lead or copper.

The cutting-edges of the severing-blades have, preferably, the customary serrated contour.

The desired protrusion (lap or flap) of one edge of each extremity of the bag-lengths is secured by proper location and presentation of the blades relatively to the paper tube and its supporting-mandrel.

The filleted tube-supporter and the coacting oppositely, simultaneously, and perpendicularly striking severing-blades constitute a distinguishing and important feature of our invention.

The bag-lengths are carried forward by end-

less belts or aprons to another part of the machine, where each bag-length, in turn, has its advancing edge folded and pasted by the joint action of the hereinafter-described rolls and of a blade which operates downwardly within the paste-trough and through the open-slotted bottom thereof.

The effective strokes of the severing-blades and that of the folding and pasting blade are preferably produced by the reaction of strong springs, which, at the proper juncture, have been automatically retracted for that purpose.

In the accompanying drawings, Figure 1 is a vertical section in the plane of the feed of a paper-bag machine embodying our invention. Fig. 2 is a perspective view of the mandrel or tube-supporter. Figs. 3 and 4 are, respectively, a partial side view and a partial front view of the front rolls, showing their means of adjustment. Fig. 5 is a perspective rear view of our severing-blades and their accessories. Figs. 6, 7, and 8 are, respectively, a perspective view, a partial rear elevation, and an enlarged cross-section of our folding and pasting device. Fig. 9 represents a modification of our mechanism for operating the folding and pasting blade.

Journaled horizontally in a suitable frame, A, so as to range vertically one over the other, are a pair of feed rolls or cylinders, B B', match-gear (D) to one another, and connected to the engine or other motor by belt E and pulley F, or by other customary means.

Cheeks G, so attached as to be adjustable either forward or rearward in the frame by means of screws H, afford journal-bearings for rollers I I', which coact with the feed-rolls B B' to hold our mandrel or tube-supporter in position. This mandrel is constructed as follows:

J is a rectangular frame, rounded or chamfered (j) in front to permit the easy application and passage rearward of the paper tube, and having at its rear portion the form of a slab, J', grooved to receive fillets j', of lead or other material softer than steel.

Journaled in frame J are two pairs of rolls, K K', L L'. The distance fore and aft between the two pairs of mandrel-rolls K K' and L L' is somewhat less than that between the two pairs of frame-rollers B B' and I I', in order to hold the isolated mandrel J against dis-

placement without preventing the access and passage of the paper tubing—that is to say, the rolls $L L'$, being placed slightly in front of the feed-cylinders $B B'$, and being journaled in the shiftable mandrel, operate, by the friction of the paper and the mobility of said mandrel, to crowd against the cylinders and to preserve an equal pressure on paper of varying thickness, while the rollers $I I'$, $K K'$ operate to overcome or to prevent kinks or creases in the material. The rollers $I I'$ are further useful in holding the mandrel steady against any displacement consequent on the impact of the severing-blades or other causes.

Held and restricted to a vertical motion by vertical bars $a a'$ in the frame are heads or helms m of two similar knives, blades, or choppers, $M M'$, which blades are, by means of springs $N N'$, held almost in contact with the fillets j' .

The connection of the knives or blades $M M'$ with their guiding-bars is such as to cause the under knife, M , to reciprocate in a plane as much to the rear of M' as the desired lap or flap projecting from the end of the slip or bag-length.

$O O'$ are two shorter serrated blades, which are held in the represented oblique position, so as, when in operation, to connect the top and bottom cuts made by the knives $M M'$. The blades $O O'$ are held nearly in contact with the filleted edges of slab J' by means of springs $P P'$, which engage in staples o on the shanks o' of the said blades. The shanks o' play in guides Q .

The springs $N N'$ may be adjustable toward or from the mandrel by means of screws $R R'$.

The serrated edge of each blade $M M' O O'$ is at all positions parallel with the mandrel-surface with which it coacts.

So geared (S) as to be rotated isochronously with the feed-rolls are cams $T T'$, whose rotation operates, through suitable rods U and arms V , to first simultaneously retract the four blades $M M' O O'$, and to then suddenly release the same and to permit the springs $N N' P P'$ to forcibly impel the blades upon the paper tubing and to sever a bag-section so instantaneously as to render unnecessary any cessation of the passage of the tubing rearward.

The geared connection of the cams $T T'$ with the feed mechanism is such as, at each semi-rotation of the cams, to separate a tubular blank of the proper length for the desired bag.

By a simple change of gearing a tubular blank of less or greater length may be obtained.

Our folding and pasting mechanism is constructed as follows: Geared to the feed so as to move isochronously therewith is a pair of rolls or cylinders, $W W'$, around which and other cylinders, $w w'$, near the rear end of the machine, are stretched endless bands or aprons $X X'$. Match-geared into, and on a level with and nearly touching, the roll w is another roll, w'' . The front wall, y , of the paste-trough Y is vertical, and the rear wall, y' , of said trough

is set at such obliquity to the front wall, y , as to leave at the bottom of the trough a narrow slot or opening, y'' . The paste-trough Y is so located in the machine as to place the slot y'' immediately over and in the same vertical plane with the pass between the rolls $w w''$. Located within the paste-trough, and having legs z exterior to said trough, is our folding and pasting blade Z . The legs z occupy and slide vertically within guide-eyes 1 .

2 are cams, rotated isochronously with the feed by means of rods 3 or other suitable means. These cams, pressing upwardly against the legs z , serve, at the proper juncture to first elevate the blade Z , and then to suddenly liberate it, for the action of springs 4, which coact with the gravity of the blade to cause its protrusion through the slot y'' in the bottom of the feed-trough, and its penetration between the rolls w and w'' sufficiently to insure the nipping of the bent extremity of the bag-length and the delivery of the completed bag from the machine.

A portion of the rear face of the blade Z may be grooved or indented (z') to enable it to carry the proper modicum of paste into the lap of the bag-length.

The operation of our machine is as follows: The trough Y having been supplied with paste and the machine set in motion, one end of the previously-formed paper tubing is drawn onto the mandrel J and pressed between the rolls $K K'$ and the rolls $I I'$, whence it is again drawn rearward until it becomes nipped by the feed-cylinders $B B'$, which, still carrying the tubing rearward, bring it within the range of the blades or choppers $M M' O O'$. These blades having by this time been forcibly retracted by the cams $T T'$, and having reached their greatest point of separation, are suddenly surrendered by the cams to the action of the springs $N N' P P'$, which, in turn, cause the said blades to close instantaneously and with considerable force upon the tubing, and to embed themselves in the mandrel-fillets and to trim the end of the tubing in such a manner as to secure the desired lap, the blades instantaneously thereafter receding, so as not to interrupt the continuous passage of the material. On sufficient tubing having passed rearward to constitute a bag-length the blades again close together upon the mandrel, and the severed bag-length is immediately carried rearward by the aprons $X X'$ until its projecting lap, passing between the rollers $w w'$ and under the paste-trough, is caught by the descending blade Z , which, pushing it between the rolls $w w''$, imparts the desired fold, and at the same instant deposits the necessary paste upon the lap, and the folded and pasted end being caught by the rolls $w w''$ is by them drawn down and pressed together and discharged from the machine as a completed bag.

The distance between the receiving-rolls $W W'$ and the folding and delivering rolls $w w' w''$ is preferably greater than the length of the

longest bag designed to be manufactured by the machine.

The blade Z, occupying the paste-trough and protruding through the slot in the bottom thereof, serves to agitate the paste and to insure its passage through the slot in proper quantity and condition, and the said blade while at rest operates as a plug or stopper to the trough-slot.

The severing-blades M M' O O' nearly touching the mandrel when at rest, it follows that the momentum they acquire when subject to the action of the springs is such as to carry them beyond their normal position entirely through the paper tubing and into the substance of the mandrel-fillets, the retractile force of the springs causing them to resume their normal position, so as to permit the uninterrupted progress of the material between the blades and the mandrel the moment that the blades have done their duty.

The above-described embodiment of our invention may be modified in non-essential particulars. For example, the operating-cams of the folding and pasting blade may be driven by bands, endless chains, or bevel-gearing, or such blade may be operated as indicated in Fig. 9, in which standards 6 afford bearings for levers 7, whose rear extremities being pivoted to the folding-blade, as at 8, and whose front extremities resting upon the upper severing-blade, M', or upon a projection therefrom, the said folding-blade is depressed at every retraction of the severing-blades and is elevated by a spring, 9.

Whatever mechanism be adopted for communicating motion to the folding-blade must be such as is positive in its operation, so as to insure isochronous action of the severing and folding devices.

The side severing-blades, O O', while desirable adjuncts of the top and bottom severing-blades, M M', are not absolutely essential, and may, with their operating springs and cams, be omitted, the speed of the forwarding-aprons being such as to complete, by tearing asunder, the nearly complete separation made by the blades M M'.

By proper change in the mandrel to a form well known in paper-bag machines (as, for example, that in which the mandrel is prolonged and made fast to the frame at its receiving end) our severing and our folding and

pasting devices may be employed in the same machine which constructs the tube.

We claim as new and of our invention—

1. In a paper-bag machine, the combination, with a filleted tube-supporter, J j', and with feed-cylinders B B', of the pair of oppositely-driven severing-blades M M', which strike the tubing and its supporter on their flat sides in planes parallel to each other, perpendicular to the supporter, and at right angles to its length, substantially as and for the purpose set forth.

2. In combination with the feed-cylinders B B', filleted supporter J j', and principal severing-blades M M', the similarly and simultaneously operated side blades, O O', whose cutting-edges are at such obliquity to the length of the supporter as to connect the incisions made by the blades M M', substantially as set forth.

3. In a paper-bag machine, the combination, with feed-cylinders B B', and with one or more pairs of oppositely and simultaneously acting severing-blades, of the mandrel or tube-supporter J, having fillets j', of softer material than said blades, substantially as set forth.

4. The combination, in a paper-bag machine, of paste-trough Y, with slotted bottom y'', said trough containing a reciprocated blade, Z, to close the slot, and which co-operate with the folding-rolls to paste and fold the lap, in the manner set forth.

5. The described combination, in a paper-bag machine, of the slotted-bottomed paste-trough Y y'', the contained reciprocated folding and pasting blade Z, and the forwarding, folding, and delivering rolls w w' w''.

6. In combination with the slotted-bottomed paste-trough Y y'', the contained reciprocated pasting and folding blade Z, grooved or indented (z') on its rear surface, substantially as and for the purpose designated.

7. The combination of the slotted-bottomed paste-trough Y y y' y'', the folding and pasting blade Z z z', guides 1, cams 2, rods 3, springs 4, and the forwarding, folding, and delivering rolls w w' w''.

In testimony of which invention we hereunto set our hands.

SOLOMON RUTHENBURG.
MARCUS RUTHENBURG.

Attest:

GEORGE H. KNIGHT,
L. H. BOND.