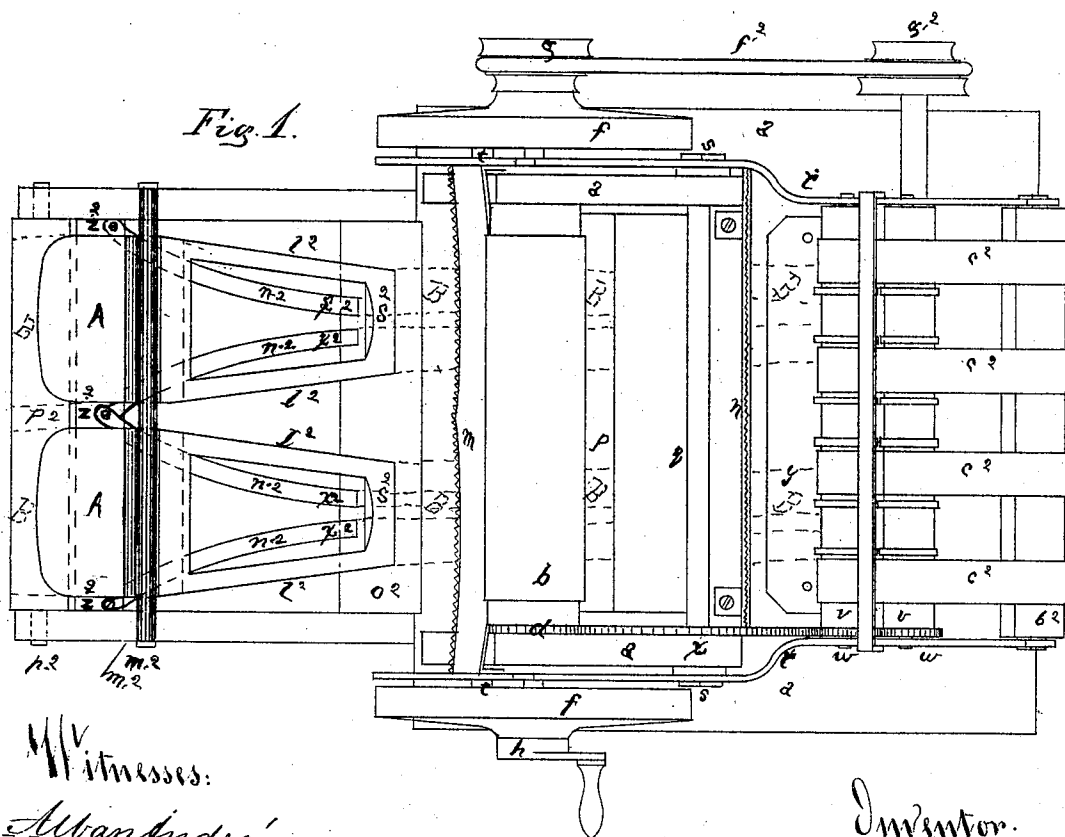
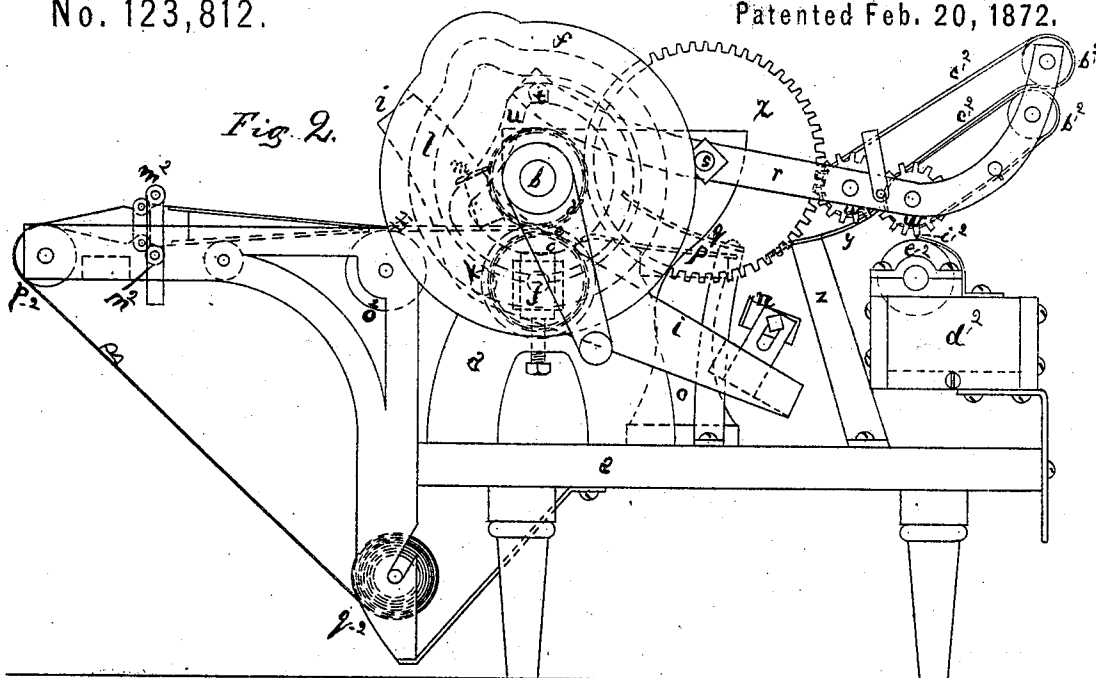


2 Sheets--Sheet 1.

Patented Feb. 20, 1872.



Witnesses:

Alvan Andersen

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Inventor.

Luther C. Cornwall

L. C. CROWELL.
Paper Bag Machine.

2 Sheets--Sheet 2.

No. 123,812.

Patented Feb. 20, 1872.

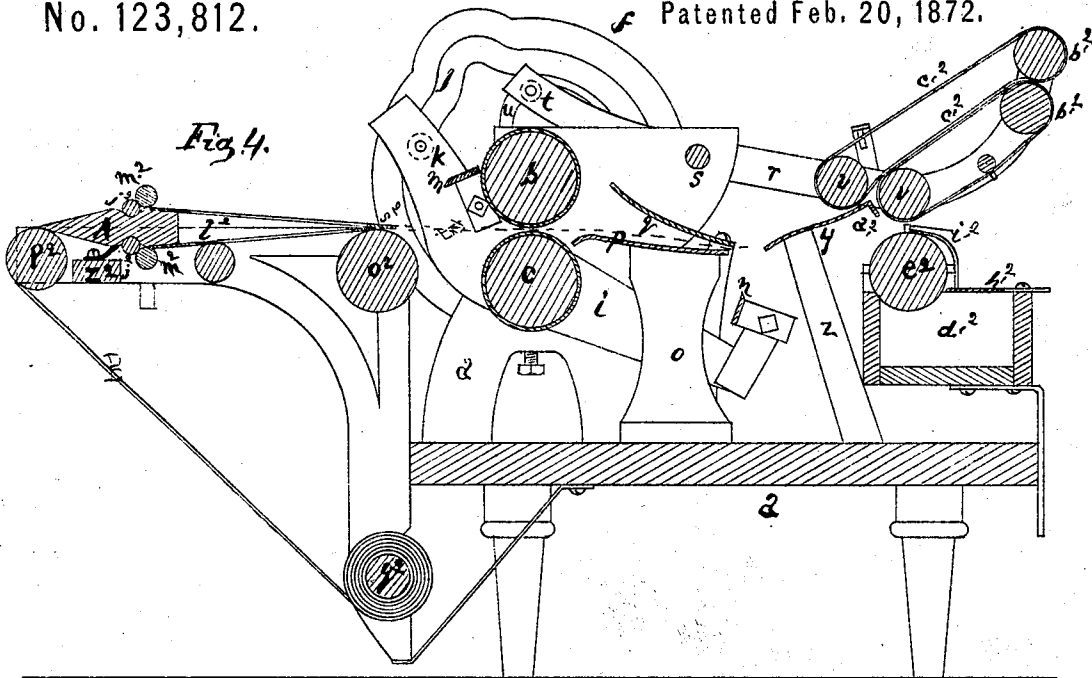


Fig. 3.

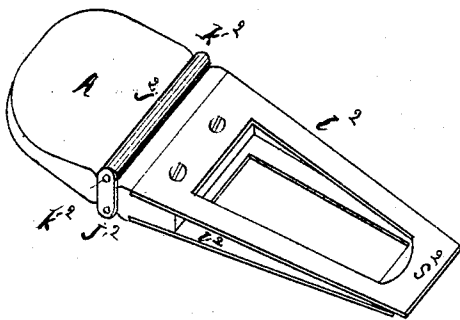


Fig. 5

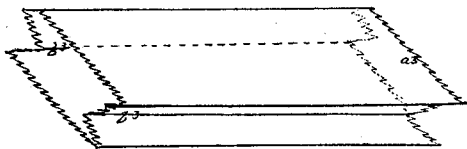
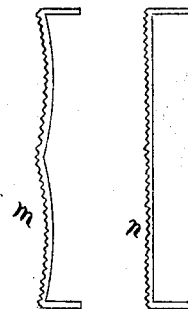


Fig. A

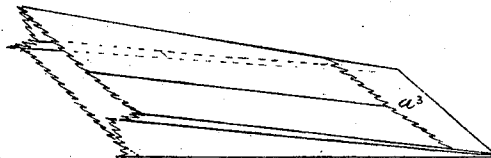


Fig. B

Witnesses:

Attest Andrein

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Inventor:

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UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BOSTON, ASSIGNOR OF ONE-FOURTH HIS RIGHT TO LUTHER CRANE, OF CAMBRIDGE, AND ONE-FOURTH HIS RIGHT TO GALEN COFFIN, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. 123,812, dated February 20, 1872.

To all whom it may concern:

Be it known that I, LUTHER C. CROWELL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in the Manufacture of Paper Bags; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My invention relates to the manufacture of paper bags from flat continuous tubes of paper, which tubes are made from continuous bands of paper by folding, lapping, and cementing the edges together, the tubes thus formed being wound upon suitable rolls or mandrels when the cemented edge or joint is sufficiently dry. These tube-wound rolls are used in this invention.

In the machine herein described, a roll of flat paper tube is placed in one end of a suitable frame. An isolated expander is inserted into the tube, being held in position by means of outside rolls. The end of the paper tube is laid over a supporting-roll to the feeding-rolls. Wires or suitable guides are now brought to bear upon the sides of the paper tube, pressing them into slots or channels on each side of the expander, so that as the paper tube is drawn along by and over the isolated expander and the creasing-bars or guides a continuous inward fold is made upon each side of the paper tube. In this folded condition it is led through the machine, a knife being made to descend upon the paper tube between the feed and supporting rolls and near the end of the isolated expander, perforating and cutting the upper plane of said tube laterally, leaving all that portion of the tube below the upper surface of the expander intact. By this portion the paper tube is drawn continuously over the expander until in the proper position, when the operation of another knife severs the tube, and the blank thus made is cemented, bottom folded, and delivered from the machine, forming a bag or case, which, when filled, will assume a quadrangular shape.

I will now proceed to describe my invention with reference to the drawing, which represents a machine embodying the same.

Figure 1 shows the machine in plan; Fig. 2, a side elevation of the same. Fig. 3 is a perspective view of the expander or separator. Fig. 4 is a longitudinal vertical section of the machine. Fig. 5 shows the two cutting-knives *m n*.

A represents a perspective view of the cut blank, *a*³ representing the projecting lip, *b*³ *b*³ the inward longitudinal folds. B represents a perspective view of the bag as it leaves the machine, *a*³ representing the bottom lap closing the end of the cut blank. *a* denotes the frame; *b c*, the feed-rolls, which are geared together by toothed wheels *d e*. To the shaft of the upper feed-roll *b* are attached the path or grooved cam-wheels *f f* and the pulley *g*, which drives the paste-roll, and also a crank or pulley, *h*, by which the machine is operated from steam or other suitable power. *i i* are levers, which are pivoted at *j*, and actuated by pins *k* attached to said levers and projecting into grooves *l* of the cam-wheels *f*. To said levers two knives or serrated bars, *m n*, are attached, one at each end, and said levers are so shaped that the cutting-bar *m* is held above a horizontal line and the cutting-bar *n* below a horizontal line. *o* is a stand supporting a guide-plate, *p*. *q* is a guide-plate, located at a sufficient height from guide-plate *p* to allow the paper tube B to pass freely between them. *r r* are levers pivoted at *s*. At one end of said levers are attached pins *t t*, projecting into grooves *i* in cam-wheel *f*. At the opposite ends of said levers are located the folding, pressing, and delivery rolls *v v*, which are geared together by toothed wheels *w w*, and are driven by being kept in gear with toothed wheel *x*, said wheel *x* engaging with toothed wheel *d* on the driving-shaft *b*. *y* is a table, supported by a stand, *z*, the end *a*² being bent at an angle, the apex being immediately below and between the two rolls *v v*. *b*² *b*² are rolls, which, being driven by tapes *c*² *c*² passing over rolls *v v*, assist in delivering the bags from the machine. *d*² is a box containing the cement; *e*², a cement-roll, driven by belt *f*² passing over pulley *g*². *h*² is a doctor, regulating the quantity of cement taken up on the surface of said roll. *i*² is a bar, located above said cement-roll, against which the paste is lodged, forming a narrow

wall of cement, which is readily taken up by the end of the paper tube during the operation of the machine. A is the separator or expander. $j^2 j^2$ are surface-rolls pivoted at $k^2 k^2$. $l^2 l^2$ are channels or spaces on each side of said expander. $m^2 m^2$ are rolls, secured in such position as will prevent the expander A from passing between them. $n^2 n^2$ are adjustable guides or creasers secured at z^2 , allowing the ends x^2 to project into the channels $l^2 l^2$. o^2 is a supporting-roll. p^2 is a leading-roll. q^2 is the roll of paper tube.

In operating this machine, the end of the paper tube is led over the roll p^2 over and enclosing the expander A (which is now isolated) between rolls $m^2 m^2$ by the guides or creasing-bars $n^2 n^2$, such operation forming longitudinal folds inwardly on each side of the paper tube. The rolls $m^2 m^2$ are now secured sufficiently near to each other to allow the paper to pass between them and the rolls $j^2 j^2$ of the expander A. Said rolls $j^2 j^2$, being in the rear of the rolls $m^2 m^2$, prevent the isolated expander from being drawn into the machine by the friction of the paper tube in passing. The longitudinally-folded paper tube is led to the feed-rolls $b c$. The machine is now ready for operating. The circumference of the feed-rolls being equal to the length of the bag to be made, at each revolution of the same the levers $i i$ throw the rear knife m down upon the paper tube, cutting such portion of the same as is above the end s^2 of separator A. The tube, as thus partially severed by the complete revolution of the feed-rolls, is carried on between the guide-plates $p q$, when the levers $i i$ are again operated, throwing the knife n up, completely severing the tube, and the knife m down, making the partial cut, as above described, the knives being located so that the cut made by m is in advance of the cut made by n . The end of the paper tube, as thus cut, is carried on to table y and projected over the angle a^2 , when the rolls $v v$ are thrown down, striking the paper tube and bending the end down against the cement-charged bar i^2 ; at the same time, by their continuous motion, biting the paper by the fold made at angle a^2 , lapping the cemented end over upon the body of the bag, and, passing between tapes $c^2 c^2$, the bag is delivered from the machine. By the operation of the grooved cams u upon the pins $t t$, the rolls $v v$ are raised at the proper time to allow the end of the succeeding blank to pass freely between them and the table y . The grooved cams $l u$ are so dis-

posed that at each revolution of the feed-rolls $b c$ the knives $m n$ and rolls $v v$ are made to operate upon the paper successively, producing the result as herein described.

By this machine, or an equivalent method of operation, bags or cases that will assume a quadrangular shape when filled are rapidly and reliably made.

I am aware that mechanism could be arranged to paste the edge of a strip of paper, making the same into a tube, and simultaneously making the longitudinal folds, but should prefer the method herein described, as the dryness of the stock in the long tube of paper enables bags to be formed rapidly without the liability of opening the joint, and also guarantees every bag delivered from the machine to be free from paste or cement inside of the bag, (which is often the case with bags made on other machines, cementing the walls of the bag together, rendering it useless.) A machine as herein described could be made wide enough to take two or more tubes of paper and simultaneously act upon them all to convert them into bags, and yet be compact and reliable. By removing the creasers or edges $n^2 n^2$, and enlarging the end s^2 of separator A to correspond with the width of the paper tube, common bags could be made.

I claim—

1. The folding-bars n^2 , in combination with the expander A, when used for the purpose herein shown and described.

2. The combination of the knife n with the knife m , the knife n operating upon the paper between the feed-rolls $b c$ and the folding-rolls $v v$, and the knife m operating upon the opposite side of the feed-rolls $b c$, in the manner and for the purpose herein shown and described.

3. The rolls $v v$, cement-roll c^2 , and guiding plate or table y , having the folding-plate a^2 , the rolls bending the projecting end of the bag down and pressing it against the cement-roll of the cement-bar, and then folding said cement-applied end back upon the body of the tube and feeding the bag thus formed to the take-off tapes.

4. The combination of cam-wheels $f f$, knife-levers $i i$, and folding-roll levers $r r$ with feed-rolls $b c$ and paste-roll c^2 , for the purpose herein described.

LUTHER C. CROWELL.

Witnesses:

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BURTON COGGSWELL.