(No Model.)

6 Sheets—Sheet 1.

H. SALMON.

PAPER BAG MACHINE.

No. 588,782. Patented Aug. 24, 1897.

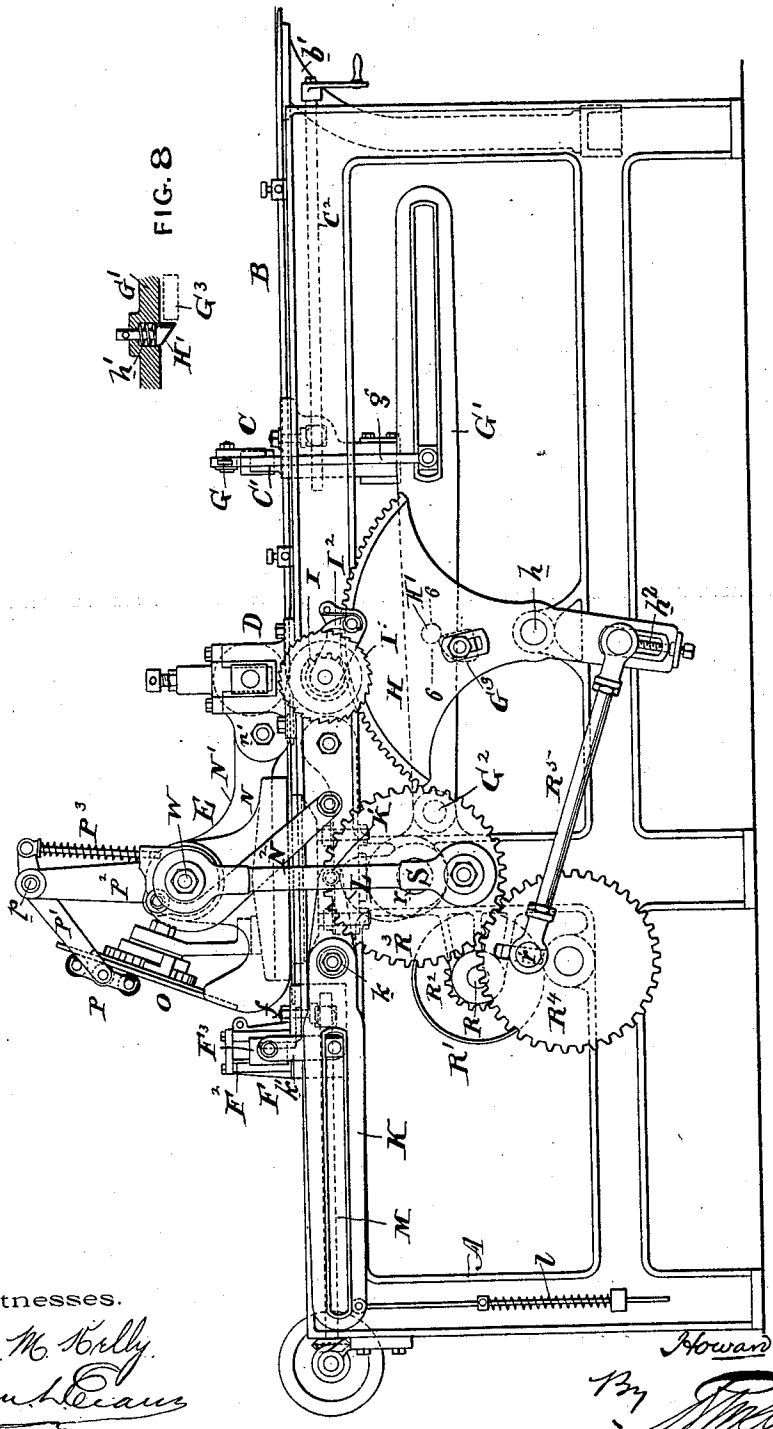


FIG. 1

FIG. 8

Witnesses.

R. M. Kelly

Wm. L. Evans

Inventor.

Howard Salmon

By Howard & Howard

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

6 Sheets—Sheet 2.

H. SALMON.

PAPER BAG MACHINE.

No. 588,782. Patented Aug. 24, 1897.

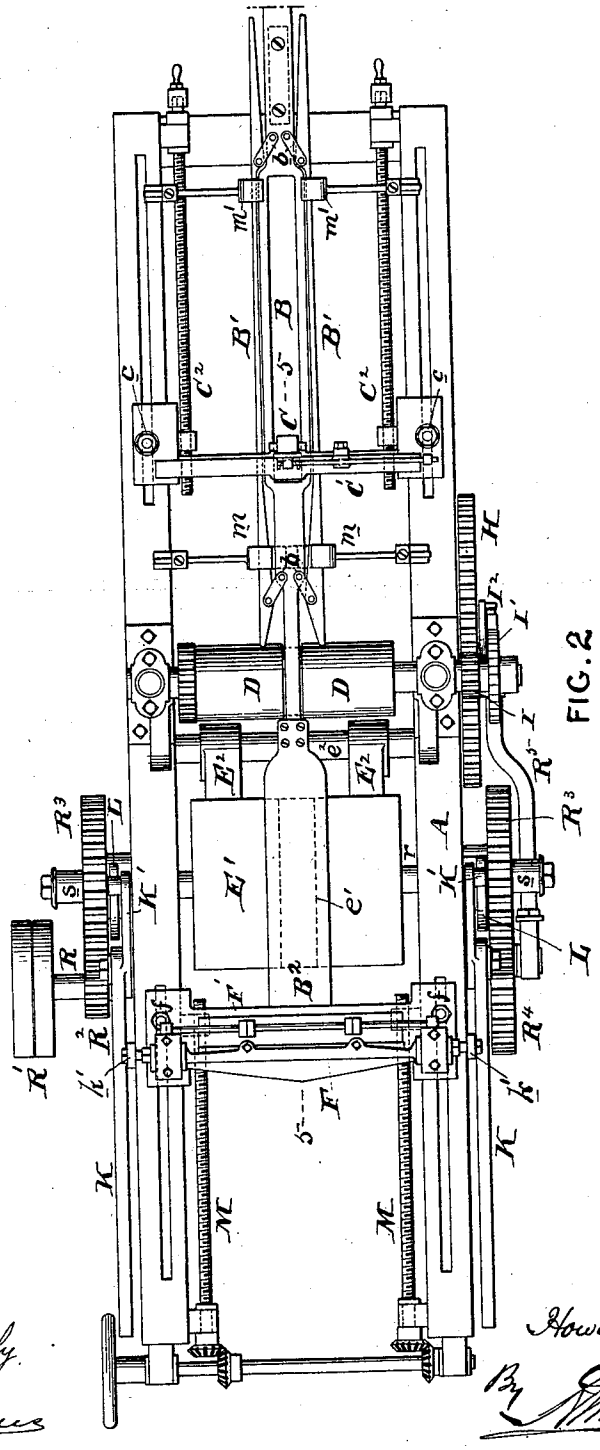


FIG. 2

Witnesses.

R. M. Kelly.

Wm. L. Evans

Inventor.

Howard Salmon

By Wm. Wallace Wood

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

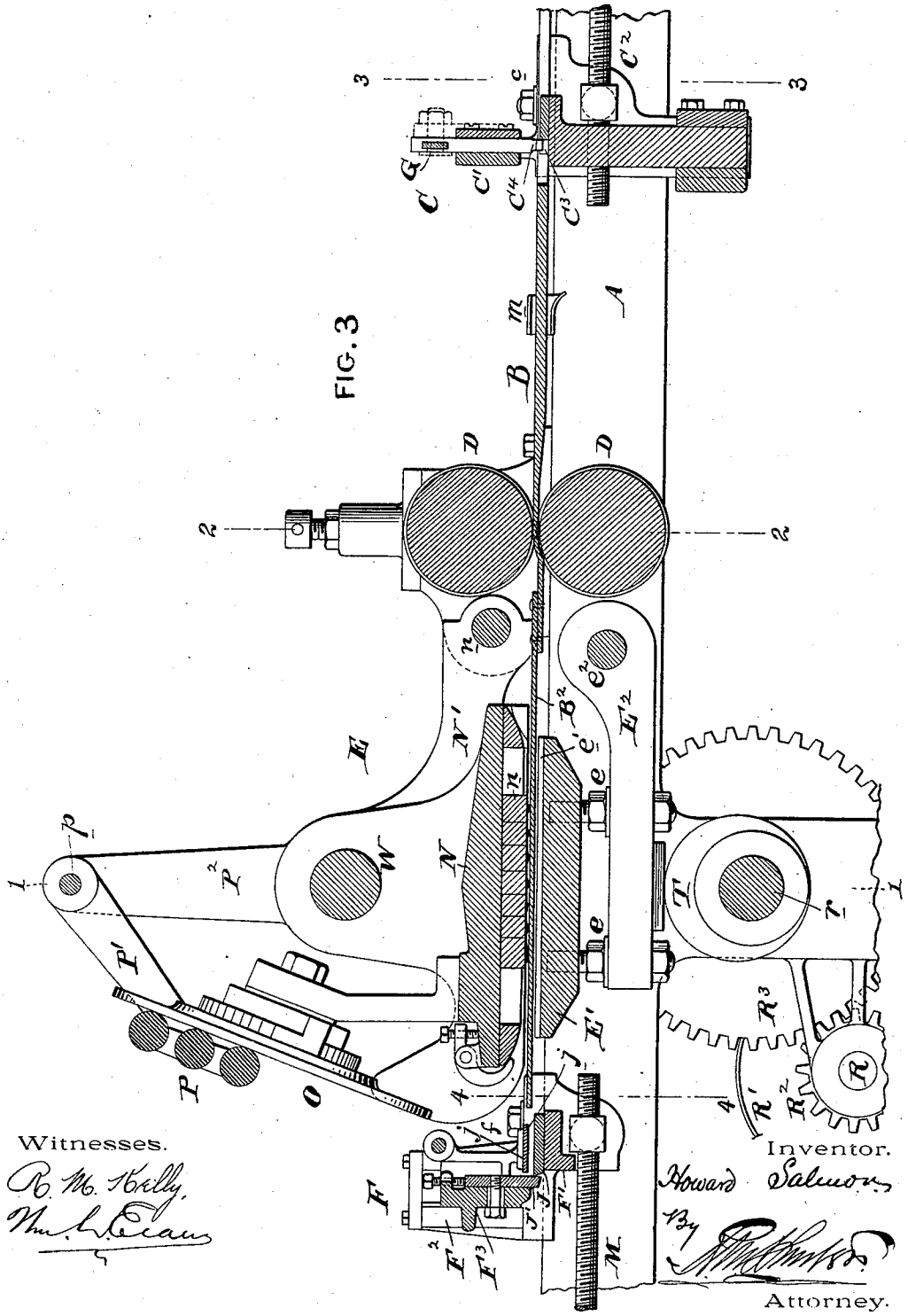
6 Sheets—Sheet 3.

H. SALMON.

PAPER BAG MACHINE.

No. 588,782. Patented Aug. 24, 1897.

FIG. 3



Witnesses.

R. M. Kelly.

Wm. L. Evans

Inventor.

Howard Salmon

By

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 6 Sheets—Sheet 4.

H. SALMON.

PAPER BAG MACHINE.

No. 588,782. Patented Aug. 24, 1897.

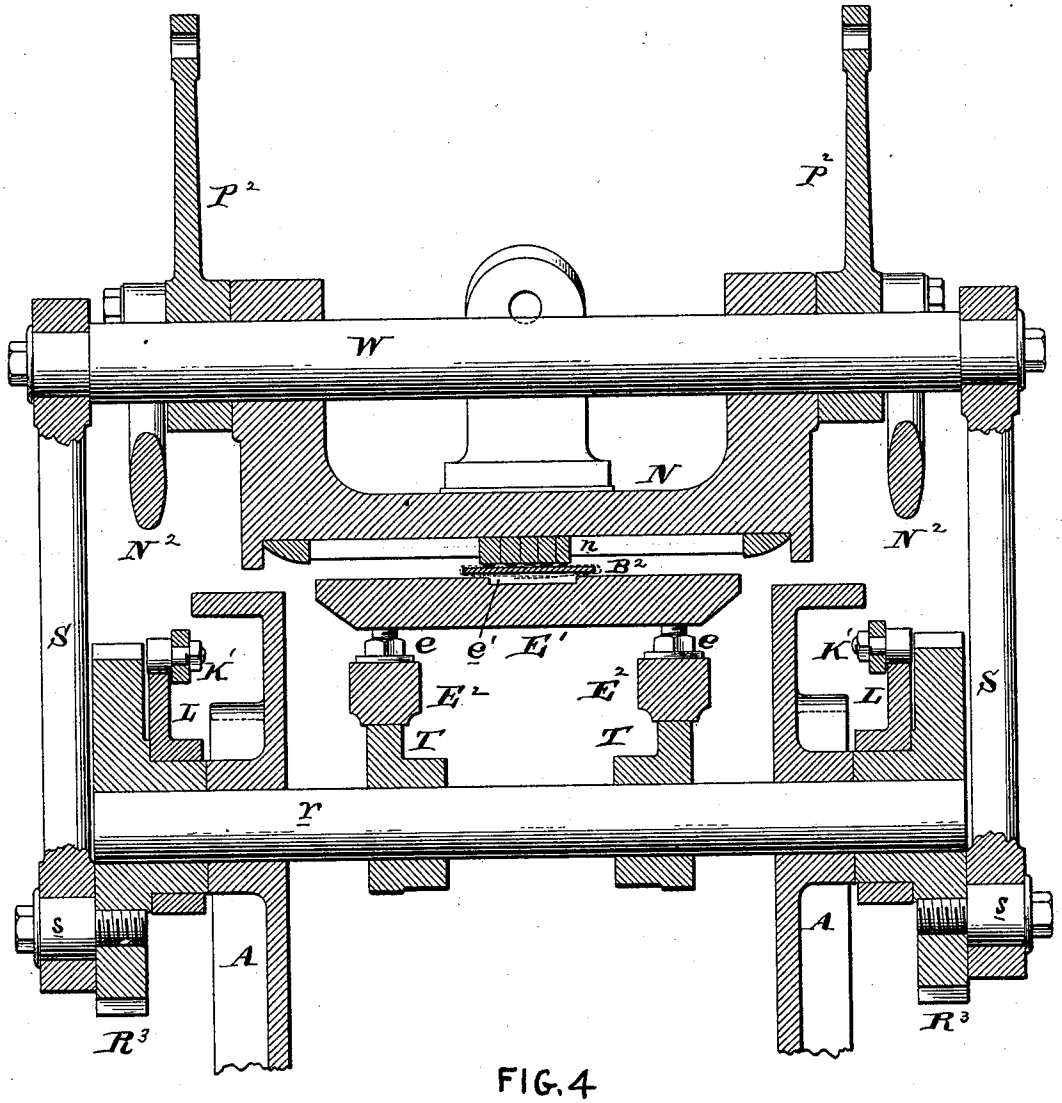


FIG. 4

Witnesses.
R. M. Kelly.
Mark Evans

Inventor.
Howard Salmon
By J. Purdy Bonner
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 6 Sheets—Sheet 5.

H. SALMON.

PAPER BAG MACHINE.

No. 588,782. Patented Aug. 24, 1897.

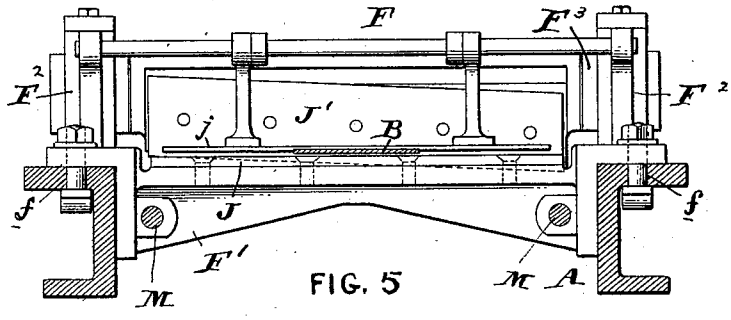


FIG. 5

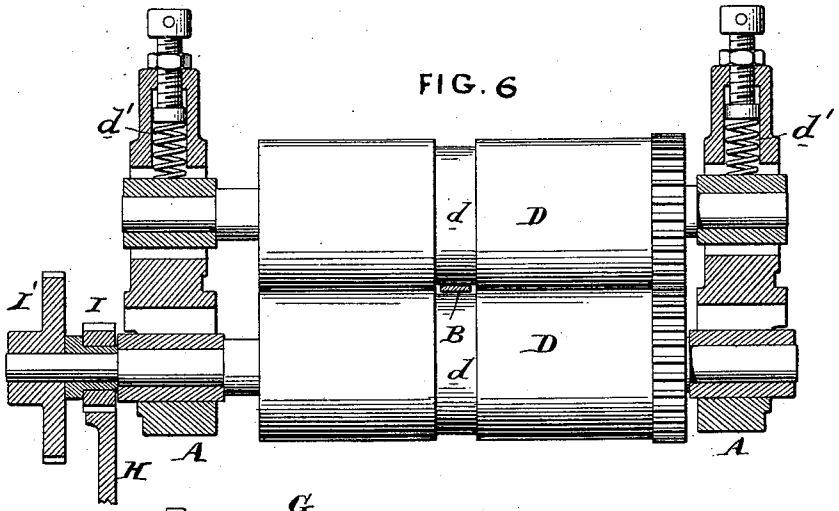


FIG. 6

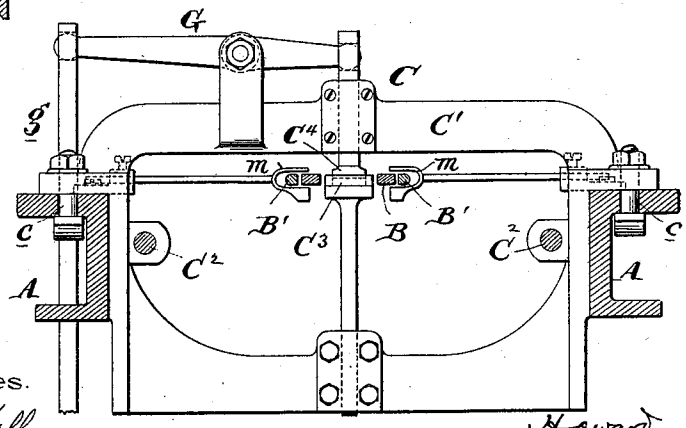


FIG. 7

Witnesses.
R. M. Kelly,

Inventor.
Howard Salmon
By
Attorney.

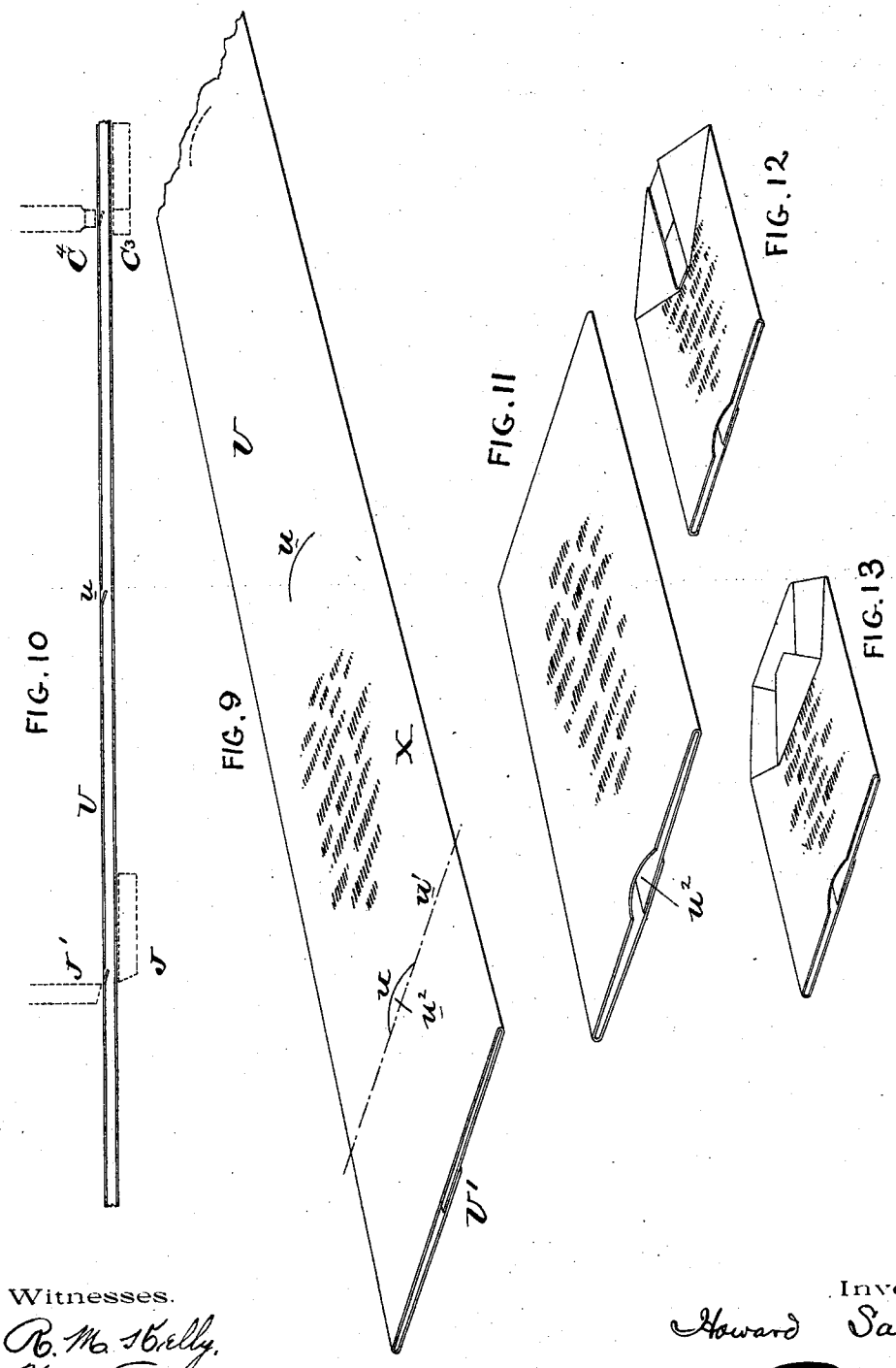
THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 6 Sheets—Sheet 6.

H. SALMON.

PAPER BAG MACHINE.

No. 588,782. Patented Aug. 24, 1897.



Witnesses.
R. M. Kelly.
Wm. L. Evans

Inventor.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HOWARD SALMON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE HENRY L. WILSON'S SONS COMPANY, OF NEW JERSEY.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 588,782, dated August 24, 1897.

Application filed March 25, 1897. Serial No. 629,202. (No model.)

To all whom it may concern:

Be it known that I, HOWARD SALMON, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improvement in Paper-Bag Machines, of which the following is a specification.

My invention has reference to combined tube forming and printing machines for paper-bag manufacture; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide a suitable apparatus for automatically forming and printing tubes from a roll of paper which shall be in complete form for finishing by hand, the said finishing operation consisting in the folding and pasting of the satchel-bottom in completing the bag. In hand-made bags it has heretofore been customary to first cut the sheet in the proper form with the recess at one end to correspond to the thumb-notch, and while in the flattened condition to print the name or advertisement upon the middle or surface corresponding with one side of the bag, and subsequently to fold and paste the said paper sheet in the form of a tube, and, finally, to fold one end thereof in the form of a diamond fold and finish the sealing to produce a satchel-bottom. Bags of this character command a greatly-increased price over what are known in the trade as "machine-made" bags, first, because the satchel-bottom is usually more perfect, and, secondly and more particularly, because the printing may be performed in a most perfect manner, since it can be accomplished by means of flat beds and type on improved printing-presses. Furthermore, the open end of the bag is cut across and formed with a notch on sharp clean-cut lines, which are characteristically different from the serrated or rough cuts invariably found upon machine-made bags.

In carrying out my invention I am enabled to retain all of the advantageous features of the hand-made bags, while at the same time the formation of the tube and printing operations are carried on automatically and at a greatly-reduced expense. To secure this result, I employ a tube-forming machine provided with punching-dies and cutting-off cutters arranged at considerable intervals apart in the machine, the former being adapted to cut the thumb-notch, while the latter completely severs the tube into lengths across the terminals of the curved line previously punched and corresponding to the thumb-notch, and with said mechanism is combined at an intermediate position a printing-press formed with a flat platen and type-form, and further provided with a flexible impression-tongue, over which the tube passes and which directly presents a flat surface under the smooth side of the bag-tube to receive the impression from the type.

My improvements furthermore contemplate adjustability in the tube-former to correspond to different widths of tube to be formed, and also a relative adjustment between the thumb-notch dies and the cutting-off cutters to compensate for different lengths of bag-tube. These various improvements contemplate details of construction, all of which will be more fully understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a tube forming and printing machine embodying my invention. Fig. 2 is a plan view of same with a portion of the feed-rollers and upper part of the printing-press removed. Fig. 3 is a longitudinal section of my improved machine on line 5 5 of Fig. 2. Fig. 4 is a transverse section of same on line 1 1 of Fig. 3. Fig. 5 is a transverse section of same on line 4 4 of Fig. 3. Fig. 6 is a transverse section of same on line 2 2 of Fig. 3. Fig. 7 is a transverse section of same on line 3 3 of Fig. 3. Fig. 8 is a sectional view of a detail of Fig. 1 on line 6 6. Fig. 9 is a perspective view of the tube in the process of being formed, cut, and printed. Fig. 10 is a longitudinal section through same. Fig. 11 is a perspective view of the finished tube with printed advertisements upon it; and Figs. 12 and 13 are similar views showing the forming of the bottom

upon the tube, which are subsequently produced by hand operations.

A is the main frame.

B is the tube-former, which is connected at one end of the said frame at b' and provided with lateral sides B', hinged to the former-body by links b. These links may have sufficient friction to hold them in any adjusted position. Guides m and m' may be employed with the said lateral guides B' to insure the paper being folded about the former. The adjustment of the width of the parts B', m, and m' controls the width of the bag.

C represents the thumb-notch punching devices and are arranged so as to operate through an aperture in the former.

C^3 is the punch-plate and is curved to correspond to the curve u, Fig. 9, and C^4 is the punch, the descent of which severs the paper tube on a curved line, as indicated in said Fig. 9. The punch-plate is held in a suitable frame C', so as to have a fixed position, while the punch C^4 is vertically movable in said frame under the action of a pivoted lever G, which is operated by a link g and reciprocating arm G', pivoted to the main frame at G^2. The frame C' is adjustably supported upon the main frame A and guided longitudinally thereon parallel to the former B. It is adjusted by means of screws C^2 and may be firmly held in position by means of clamping-bolts c. To compensate for this adjustment of the frame C', the arm G' is made slotted at its free end, so that the connection with the rod g is likewise adjustable. By adjusting the frame C' upon the main frame A the connection of the rod g with the arm G' is automatically moved in the same direction while maintaining its operative position.

D D are a pair of feed-rollers carried on the main frame and geared together, so as to have the same surface speed, and are provided at their middle portions with recessed parts d to permit the passage of an extension of the former, and which is adapted to sustain the impression-tongue of the printing-press, to be described later. Furthermore, the recessed portions d prevent excessive pressure upon the pasted fold of the tube. It is preferable that these rollers shall be pressed together under the action of springs d, the tension of which may be adjusted. These rollers are driven by means of a ratchet-wheel I' and reciprocating pawl I^2, the latter being carried by a pinion I, which is rotated alternately in opposite directions by means of a reciprocating rack-segment H, pivoted to the main frame at h. This rack-segment is rocked by means of a link R^5, operated by a crank r' upon a gear R^4. This gear R^4 meshes with a similar gear R^3 upon a cam-shaft r, carried in the main frame, and to the other end of which is secured a similar gear R^3, the latter gear in turn meshing with a pinion R^2 on the power-shaft R, which is driven by the band-wheel R'. By adjusting the connection of the rod R^5 with the rack-segment H at h^2 to increase or decrease its leverage the extent of rotation and feeding action of the rolls D D may be varied to suit different lengths of bags. This may also be secured by adjusting the crank-pin r' upon the gear R^4 in any well-known manner, the radial slot for such adjustment being clearly shown.

During the reciprocation of the rack H a spring-pawl H', carried by the arm G', is operated upon by a cam G^3 on the said rack H and causes the arm to be lifted gradually and thereby operate the punch-die C^4 and then to fall, suddenly withdrawing the said punch-die, so as to permit the tube to be fed. The pawl H' is held outward into operative position by a spring h', and has a beveled face, which upon the return stroke is struck by the cam G^3 on the rack H and pressed inward, so that it does not raise the arm G'. In this manner a full reciprocation of the rack H produces a single and quick operation of the arm G'. This is essential, since the punching operation must take place rapidly and leave the tube B to be fed upon the reciprocation of the segment H. At the other end of the machine is arranged the cutting-off cutter devices F.

J is a stationary cutter, and J' is a vertical reciprocating cutter. The cutter J is secured to an adjustable frame F', which is adjustable over the main frame A under the action of adjusting-screws M, so that the cutting-off cutters may be adjusted to or from the punching-dies. The frame F' is provided with upright guides F^2, in which a vertically-reciprocating transverse frame F^3 is guided, and which carries the vertically-reciprocating cutter J'. This frame F^3 is connected at each end with a link k'. The free ends of the links are adjustably connected to pivoted arms K, pivoted at k and having arms K', which are operated by cams L upon the power-shaft r. Suitable springs l are employed to raise the arms K and also the frame F^3 when permitted by the cams L.

The arms K are provided with horizontal slots M, similar to the slot in the arm G', to permit the adjustment of the connection with the links k' when the frame F' is adjusted longitudinally upon the main frame A. Clamping-bolts f, operating through slots in the bed-plate or main frame, may be employed to clamp the frame F' in its adjusted positions. A stripper-plate j is employed immediately above the cutter J to hold down the tube during the rising of the cutter J'. The operation of the cutting-off cutters J J' is to produce the transverse cut u', (indicated in dotted lines in Fig. 9,) so that it crosses the terminals of the curved or irregular punched portions u in such a manner that the small piece of paper u^3 is completely severed by the combined action of the punch and cutting-off cutters and falls away to leave the thumb-notch, as shown in Fig. 11. By this combined

action of the punch and cutters a smooth-cut open end of the tube is secured, and the end of the tube to be formed into the bottom is also made with a clean transverse cut, which is characteristic of hand-made bags and especially desired by the trade.

In machine-made bags it has been customary to produce a serrated severance of the tube in such a manner as to produce a thumb-piece and an extension, respectively, upon two adjacent tube-sections; but in this case the extension corresponding to the piece cut out from the thumb-notch of the adjacent tube-section is left upon the bottom and must be properly pasted and is otherwise objectionable. In my improved machine herein set out this is obviated, and the piece removed in the formation of the thumb-notch is completely eliminated from the tube-sections.

Interposed between the feeding-rolls D and the cutting-off devices F, I arrange a printing-press E, preferably of the flat-bed type, as shown. Referring to the construction here illustrated, E′ is the impression-bed or platen, and this is adjusted upon the arms E^2, pivoted at e^2 to the main frame by adjusting-screws *e*, the object of which is to level the platen and adjust it to or from the type-bed N. The power-shaft *r* is provided with two cams T, which operate upon the arms E^2 to raise or lower the platen. The type-form bed N is pivoted upon a transverse shaft *n*, secured to the main frame A, and is movable to and from the platen by means of links S, transverse shaft W, and cranks *s* upon the gears R^3 of the power-shaft *r*.

N represents the type, which is secured in the type-form and clamped to the bed N in any suitable manner.

O is the ink-table and is carried by the type-bed.

P are the inking-rollers and are pivoted to a transverse shaft *p*, journaled to the arms P^2, carried upon the transverse shaft W. A spring P^3 insures the inking-rollers traveling over the ink-table and type-form when the parts are operated. Links N^2 connect the arms P^2 and the main frame. It will now be observed that as the cranks *s* raise the shaft W the type-bed is lifted, and simultaneously the arm P^2 is rocked and the inking-rollers pass down over the type of the type-form. When this operation is taking place, the platen is lowered. When the reverse operation takes place, as indicated in Figs. 1, 3, and 4, the printing takes place upon the paper-tube which is intermediate of the feeding-rolls and the cutting-off devices. Furthermore, this printing operation is with a flat impression-surface.

The platen E′ is provided with a longitudinal groove *e′*, extending through it upon its upper surface, and arranged above the platen and intermediate of it and the type-form bed is an impression-tongue B^2, which is detachably connected to the extension of the former B. The impression-tongue is of a width substantially equal to the width of the bag-tube, but may be less, if desired. It is of greater width than the groove *e′* in the platen, so as to rest upon the platen at each side of the said groove. This impression-tongue may be changed with each change in the width of the tube made and printed. This impression-tongue is, furthermore, the real impression-surface upon which the printing is performed and is that upon which the make-ready may be made. The tube moves over this impression-tongue freely when the platen is lowered and the type-form bed raised, and when the printing is to take place the paper remains stationary, while the type-form bed is lowered into position immediately above the paper and the platen E′ raised, so as to operate upon the under side of the impression-tongue and press it against the type of the type-form bed, producing a most perfect impression and thereby imparting a high finish to the printing upon the tube. Furthermore, the pasted seam of the tube is received in the groove of the platen and is not subjected to excessive pressure, which might squeeze out the paste. Furthermore, the double layer of paper and paste play no part by obstructing or interfering with the printing, as this operation takes place upon the smooth side of the tube and between a perfectly-flat impression-surface and the type. The impression-tongue, furthermore, performs a function of holding and guiding the tube in proper position irrespective of the movements of the platen and type-form bed.

In the operation of the machine the web of paper is fed from a roll and paste applied to one edge in any suitable manner, and such a web is delivered to the former B of my improved machine. During the passage of the web over the former the free sides are bent downward by gravity and under the action of the guides *m′* and *m*, the guides *m′* being so formed as to permit the pasted side of the tube to clear the stationary punch-plate C^3 and its support. When the tube reaches the feed-rollers D, it has been overlapped and constitutes a completed tube. While the tube is being fed through the machine, the punch-dies C^3 C^4 operate to punch the curved or irregular cut *u* simultaneously or thereabout with the action of the cutting-off cutters J J′; but intermediate of these cutters and punches the tube will have been formed with one or more of such curved cuts *u*, as clearly shown in Figs. 9 and 10. The operation upon the tube to feed it is an intermittent one, so that the tube is fed a distance corresponding to the length of the tube-section—namely, the distance between two such curved cuts *u*—and when this is done the punching of a new cut *u* and the severing upon the transverse cut *u′* (see dotted lines, Fig. 9) takes place, and at the same time the printing, as at X, is performed. When these

three operations are accomplished, the tube is at rest, and consequently the printing, as well as the cutting, is produced in the most perfect and clean manner. With each punching for the thumb-notch upon one portion of the tube to constitute one tube-section the printing devices are printing upon a portion corresponding to another tube-section, and the cutting-off devices are severing a completed tube-section from the extreme end of the tube.

While I prefer the construction shown, it is evident that the various details may be modified without departing from the spirit of the invention. I do not confine myself to any particular details of the printing-press mechanism, as this may be greatly modified while securing the same general advantages.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a bag-tube forming and printing machine, the combination of a former over which the paper to form the tube is folded, a set of punching-dies for punching a curved or irregular line through the middle of the tube, a set of cutting-off cutters arranged at a distance from the punching-dies and adapted to cut the tube transversely on a line connecting the terminals of the curved or irregular punched portion, feeding devices for feeding the tube of paper between the punches and cutters, and printing devices intermediate of the punching and cutting-off devices consisting of a fixed impression-tongue over which the tube passes arranged between the type-form bed and platen, a flat type-form bed movable to and from the impression-tongue upon one side, and a movable platen movable to and from the impression-tongue upon the other side.

2. In a bag-tube forming and printing machine, the combination of a former over which the paper to form the tube is folded, a set of punching-dies for punching a curved or irregular line through the middle of the tube, a set of cutting-off cutters arranged at a distance from the punching-dies and adapted to cut the tube transversely on a line connecting the terminals of the curved or irregular punched portion, feeding devices for feeding the tube of paper between the punches and cutters, printing devices intermediate of the punching and cutting-off devices consisting of a fixed impression-tongue, a flat type-form bed movable to and from the impression-tongue upon one side, and a movable platen movable to and from the impression-tongue upon the other side, and power devices for simultaneously operating the type-form bed and platen toward the impression-tongue when the feeding devices are at rest.

3. In a combined tube making and printing machine, the combination of a tube-former, feeding-rolls adjacent to the rear end of the former and inclosing an extension thereof, an impression-tongue secured to and carried by the extension of the former, a flat type-form bed movable to and from the impression-tongue on one side, and a platen arranged upon the other side of the tongue for supporting it during the printing operation of the type-form bed.

4. In a combined tube making and printing machine, the combination of a tube-former, feeding-rolls adjacent to the rear end of the former and inclosing an extension thereof, an impression-tongue secured to and carried by the extension of the former, a flat type-form bed movable to and from the impression-tongue on one side, and a platen arranged upon the other side of the tongue for supporting it during the printing operation of the type-form bed provided with a longitudinal groove centrally located upon its surface adjacent to the impression-tongue but of less width than the tongue.

5. In a combined tube making and printing machine, the combination of a tube-former, feeding-rolls adjacent to the rear end of the former and inclosing an extension thereof, an impression-tongue secured to and carried by the extension of the former, a flat type-form bed movable to and from the impression-tongue on one side, a platen arranged upon the other side of the tongue for supporting it during the printing operation of the type-form bed, cutting-off devices arranged to the rear of the impression-tongue, and power devices for operating the cutting-off devices and printing devices alternately with the feeding-rolls whereby the cutting-off and printing operations take place when the tube is stationary.

6. In a combined tube making and printing machine, the combination of a tube-former, feeding-rolls adjacent to the rear end of the former and inclosing an extension thereof, an impression-tongue secured to and carried by the extension of the former, a flat type-form bed movable to and from the impression-tongue on one side, a platen arranged upon the other side of the tongue for supporting it during the printing operation of the type-form bed, cutting-off devices arranged to the rear of the impression-tongue, power devices for operating the cutting-off devices and printing devices alternately with the feeding-rolls whereby the cutting-off and printing operations take place when the tube is stationary, and means to adjust the cutting-off devices to or from the printing devices.

7. In a combined tube forming and printing machine, the combination of means to feed the tube, means to cut off the tube in predetermined lengths, and printing devices intermediate of the feeding and cutting-off devices consisting of an impression-tongue about which the tube is fed, a flat type-form bed movable to and from the impression-tongue, and a platen or abutment adapted to receive the thrust of the type-form bed.

8. In a combined tube forming and printing machine, the combination of means to feed

the tube, means to cut off the tube in predetermined lengths, and printing devices intermediate of the feeding and cutting-off devices consisting of an impression-tongue about which the tube is fed, a flat type-form bed movable to and from the impression-tongue, an abutment adapted to receive the thrust of the type-form bed consisting of a flat platen having a longitudinal groove therein, and power devices to raise and lower the said platen to and from the impression-tongue.

In testimony of which invention I have hereunto set my hand.

HOWARD SALMON.

Witnesses:
R. M. HUNTER,
GEO. W. REED.