3 Sheets

James W. Bryant, Joseph P. Bryant & Saml H. Bryant. Sheet 1.

[120.]

Paper Bag Machine.

No. 119,307. Patented Sep. 26, 1871.

Fig. 1.

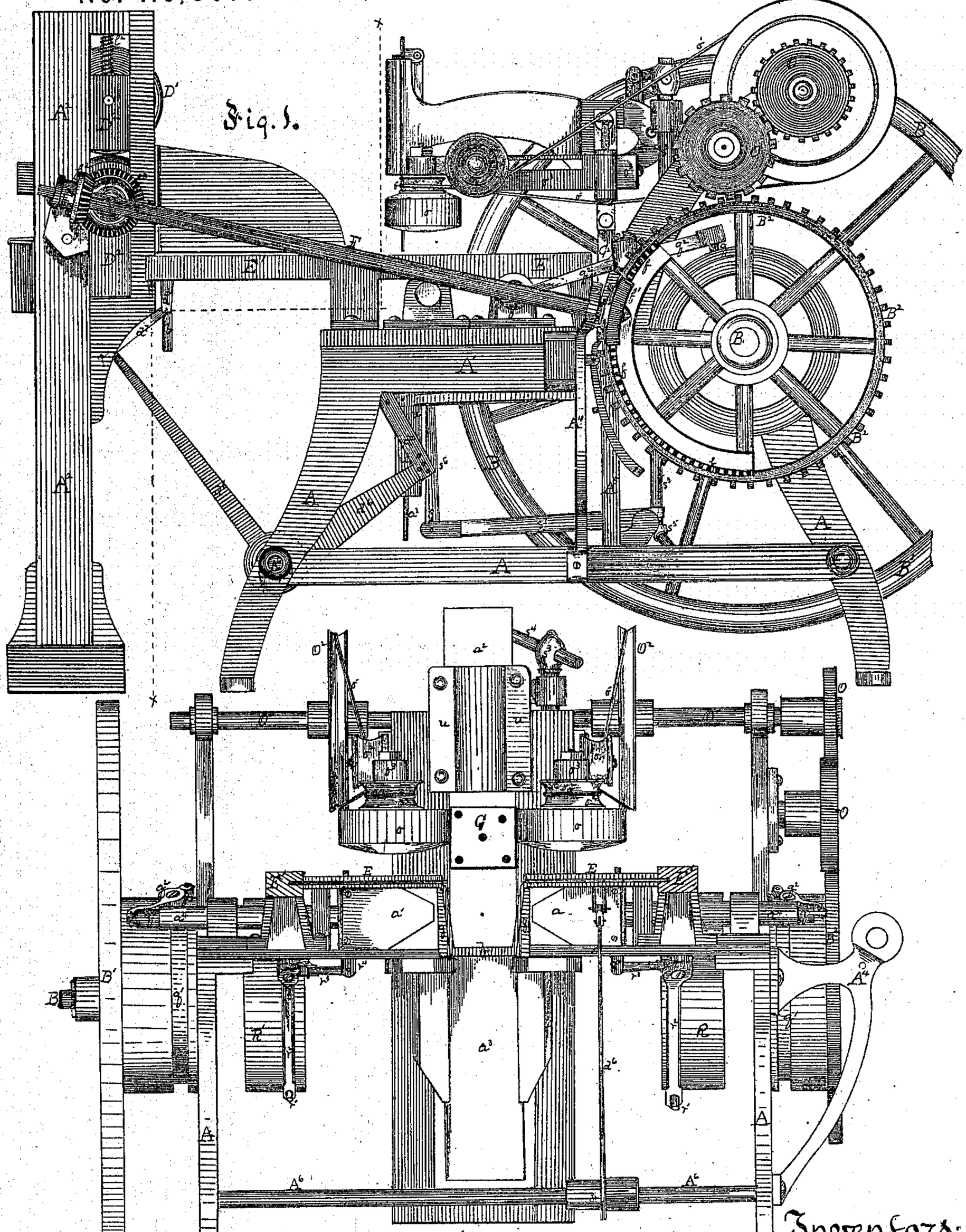

Fig. 2

Witnesses:
R. Wrenshall
James I. Kay.

Inventors:
James W. Bryant,
Joseph P. Bryant,
Samuel H. Bryant,
by their Attys, Baldwin, Christy & Hun

3 Sheets

James M. Bryant, Jos. P. Bryant & Saml H. Bryant: Sheet 2.

[120.]

Paper Bag Machine.

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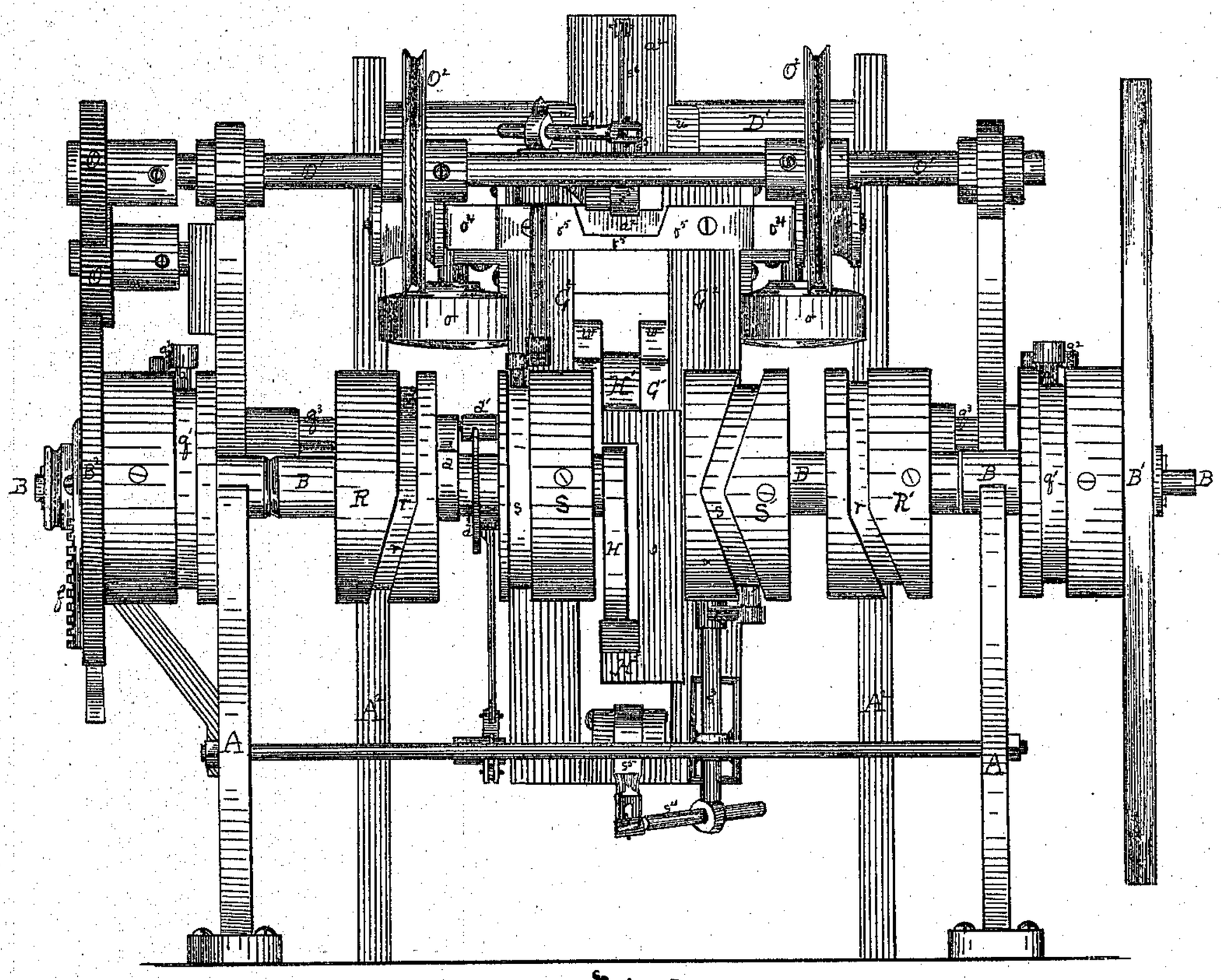

Fig. 3.

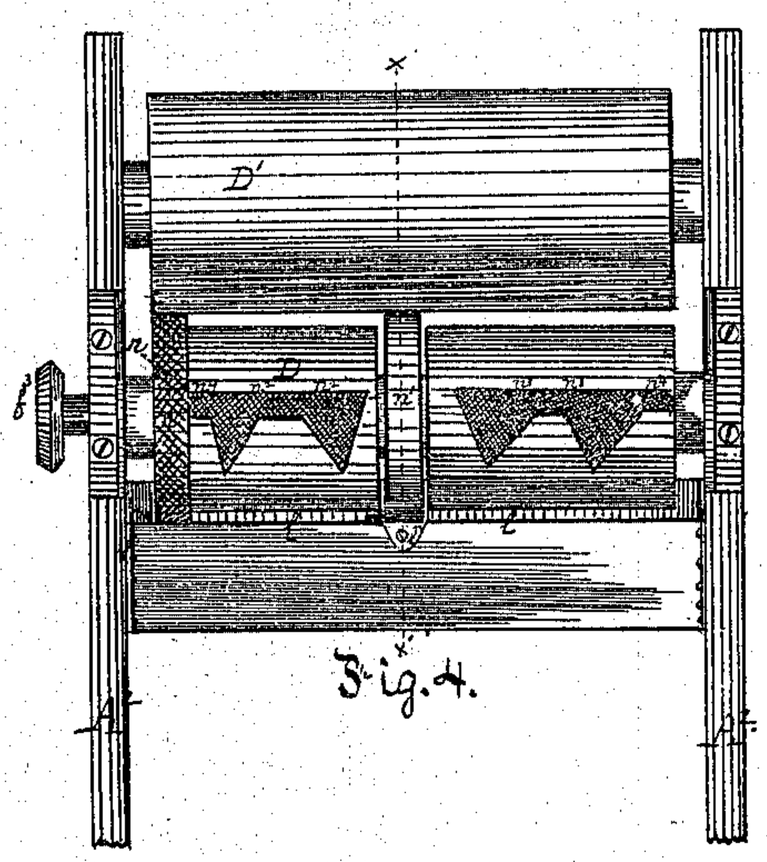

Fig. 4.

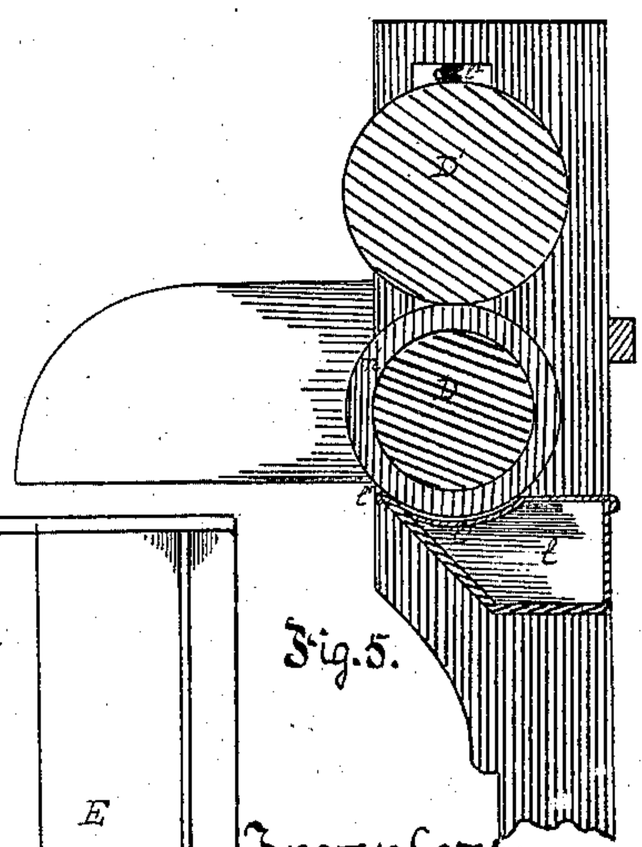

Fig. 5.

Fig. 6.

Witnesses:
R. C. Wrenshall
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3 Sheets

James M. Bryant, Jos. P. Bryant & Saml H. Bryant: Sheet 3.

[120.]

Paper Bag Machine.

No. 119,307.

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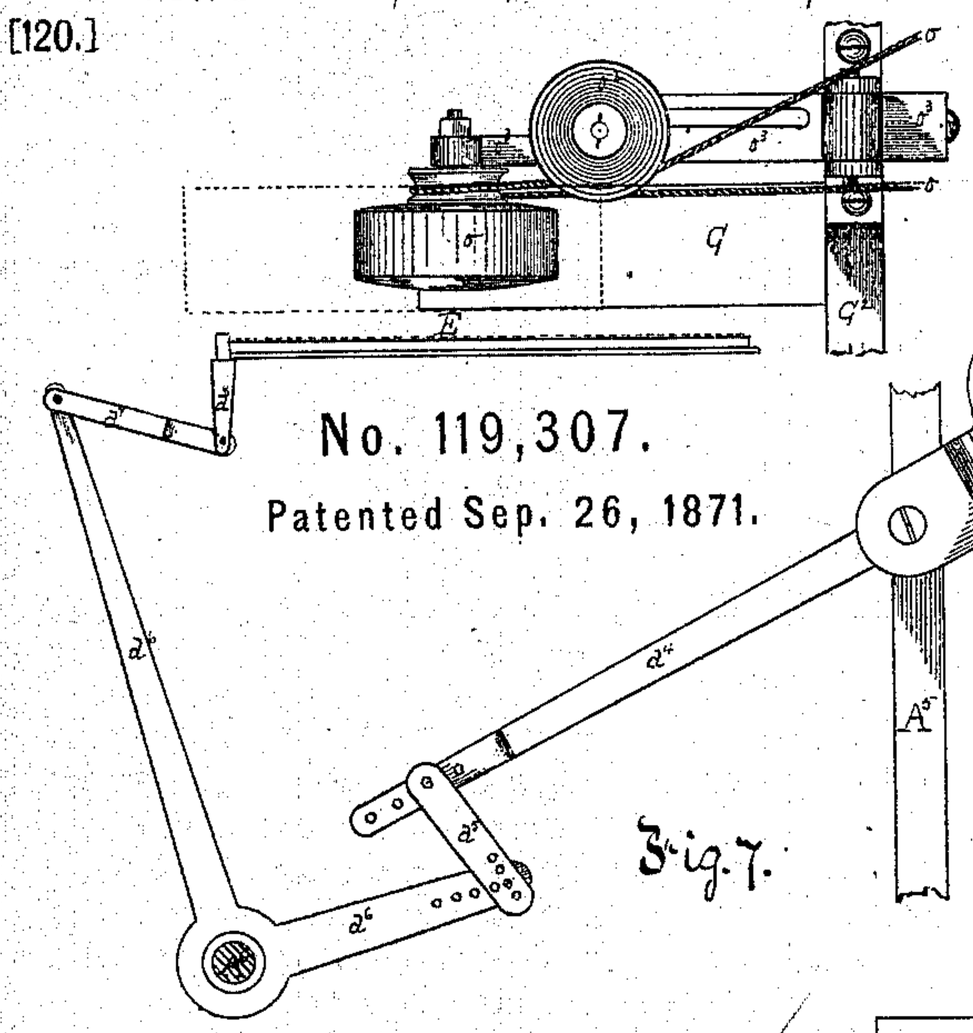

Fig. 7.

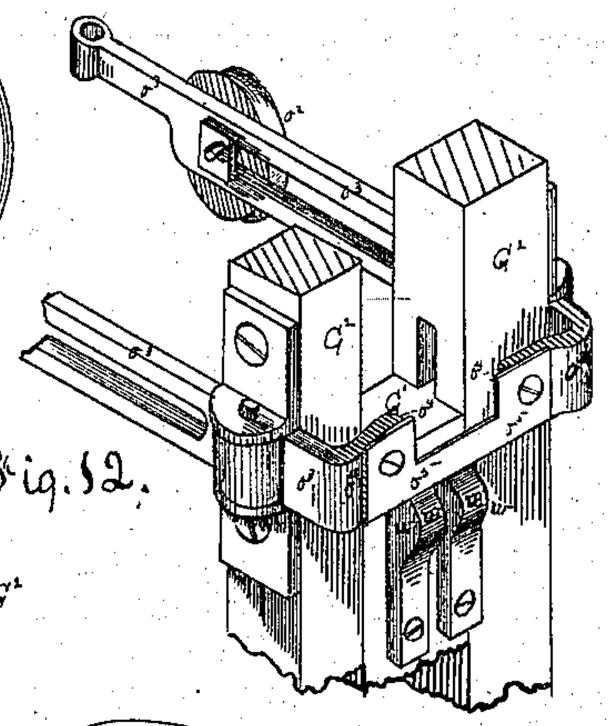

Fig. 12.

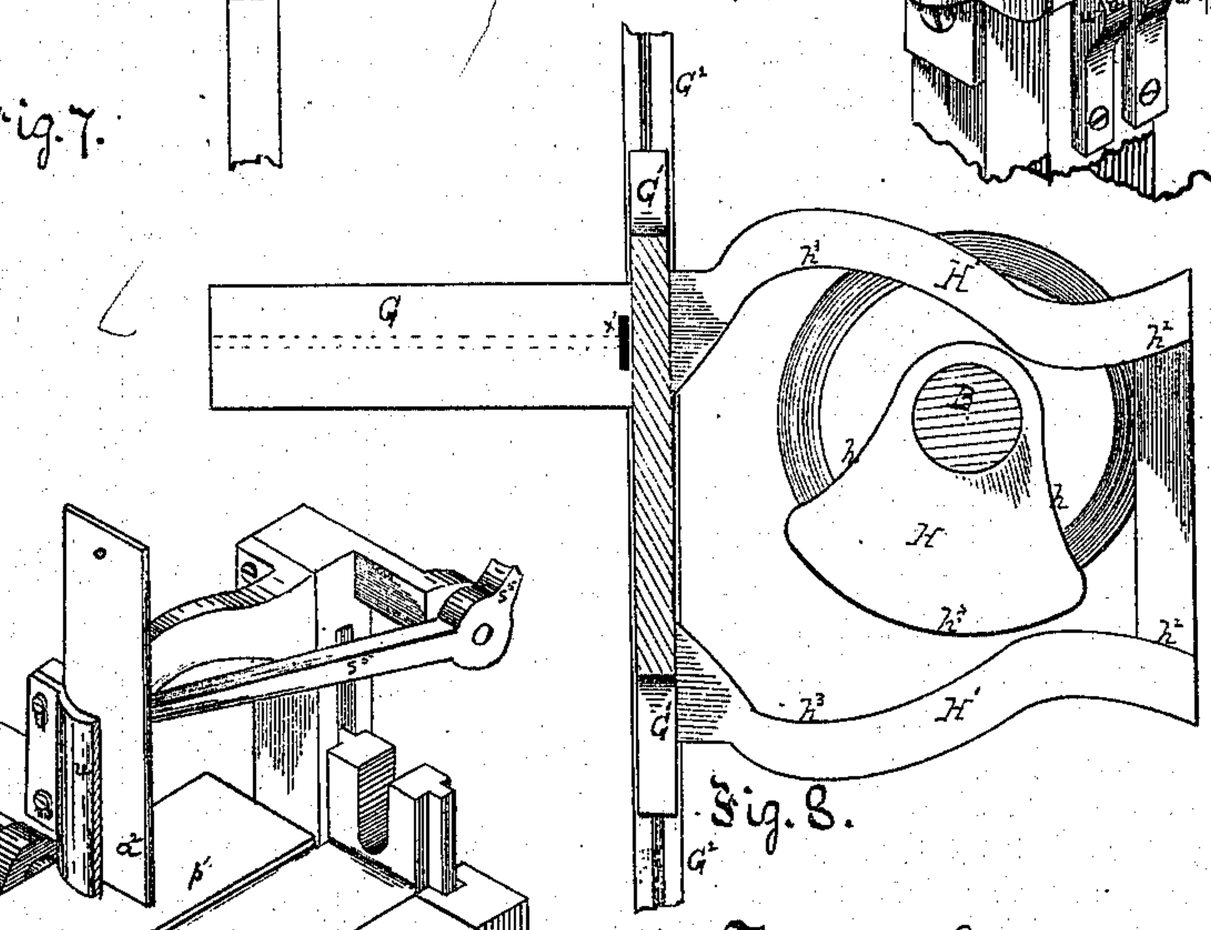

Fig. 8.

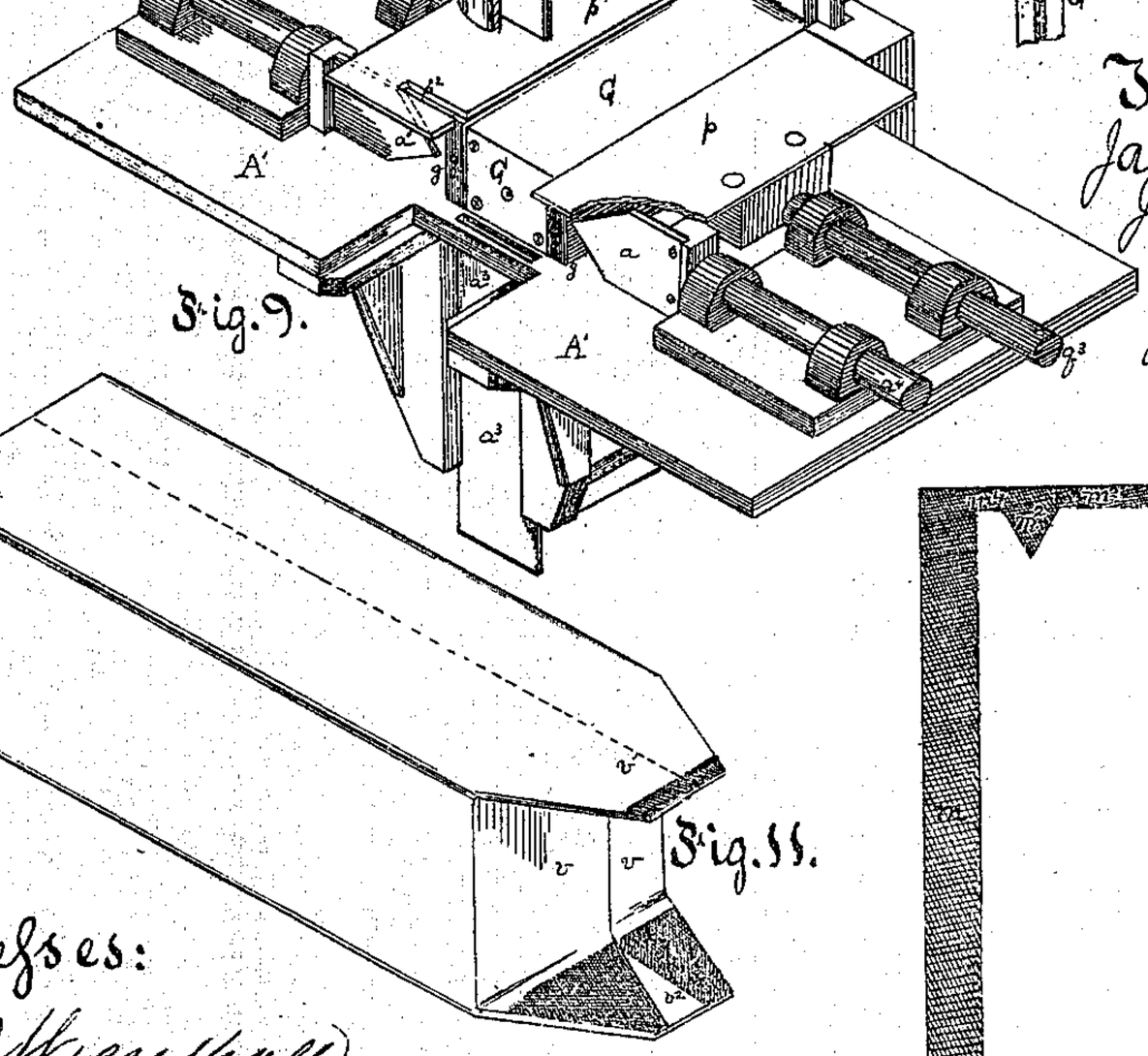

Fig. 9.

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James M. Bryant,
Joseph P. Bryant,
Samuel H. Bryant,
by Bakewell, Christy & Kerr,
their Att'ys.

Fig. 11.

Witnesses:
R. C. Wrenshall
James A. Kay

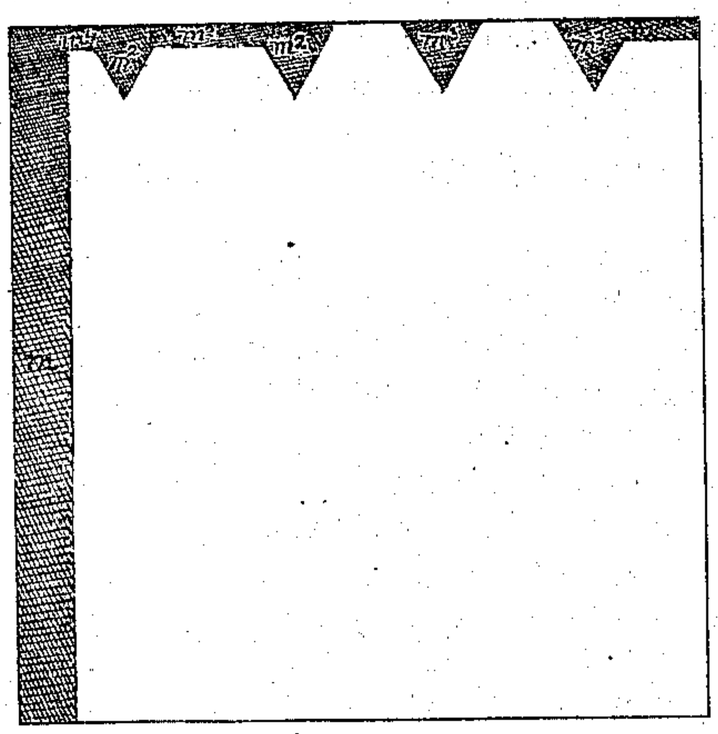

Fig. 10.

UNITED STATES PATENT OFFICE.

JAMES M. BRYANT, JOSEPH P. BRYANT, AND SAMUEL H. BRYANT, OF TEMPERANCEVILLE, PENNSYLVANIA.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. 119,307, dated September 26, 1871.

To all whom it may concern:

Be it known that we, JAMES M. BRYANT, JOSEPH P. BRYANT, and SAMUEL H. BRYANT, of Temperanceville, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Paper-Bag Machines; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, in three sheets, making a part of this specification, in which—

Figure 1, Sheet 1, is a side elevation of our improved machine. Fig. 2, Sheet 1, is a front sectional elevation along the line *x x*, Fig. 1, the table being back under the former. Fig. 3, Sheet 2, is a rear elevation of the machine. Fig. 4, Sheet 2, is a detached rear elevation of the feeding and pasting-rolls. Fig. 5, Sheet 2, is a sectional view of the rolls through *x' x'*, Fig. 4, and showing one of the guides by which the paper is conducted into the feed-table. Fig. 6 is a plan view of the feed-table. Fig. 7, Sheet 3, is a detached side view of the devices by which a reciprocating motion is communicated to the table. Fig. 8, Sheet 3, is a like view of the former and its operative devices. Fig. 9, Sheet 3, shows in perspective the former and the folders. Fig. 10, Sheet 3, illustrates the distribution of the paste on the bag-blank as effected by the pasters on the feeding-rolls. Fig. 11 shows in perspective a partly-formed bag; and Fig. 12, Sheet 3, is a detached perspective view of the arms which carry the discharging-rollers, and of co-operating devices.

Like letters of reference indicate like parts in each.

Our invention relates to the construction of a machine for making paper-bags and sacks; and consists in the construction, combination, and arrangement of the operative devices by which the several successive steps in the manufacture are secured, as hereinafter set forth and claimed.

To enable others skilled in the art to make and use our improvement, we will proceed to describe its construction and mode of operation.

The frame-work A, A^1, A^2, &c., is of any desired construction suitable for carrying the devices and for the operation of the machine. Power is applied through a main driving-shaft. B B^1 is a fly-wheel. For convenience the shaft B is arranged at the rear of the machine, just back of the horizontal bed A^1, though this position may be varied at pleasure. In front of the machine are a couple of posts, A^2, with suitable boxes, in which are the bearings D^2 of the feed-rolls D D^1. A spring, l^2, is arranged above the bearing of the upper roll D^1 to cause it to press downward with any desired force. On one end of the lower roll D is a pasting-ring, *n*, of India rubber or other suitable material, the face of which is a little above or outside of the face of the roll, and a like ring, n^1, is arranged at about the middle of the same roll. This latter ring is designed merely for feeding purposes. Under the lower or pasting-roll D is arranged a vat or box, *l*, for holding paste. On the face of the pasting-roll D are the **W**-shaped pasters n^2 n^3, the outer end of the base edge of each being extended out to the end of the roll, as shown at n^4. The outer faces of these pasters n^2 n^3 n^4 are even with the outer face of the pasting-ring *n*, so that all will dip into and take up paste from the vat *l*. The paste is prevented from coming in contact with the feeding-ring n^1 by means of a trough, l^1, directly under it. The paper is cut into sheets or blanks of the proper size, and the sheets are fed in successively, or the paper may be fed in from a roll, and the usual appliances arranged for cutting it off in proper lengths. Such a sheet is shown in outline in Fig. 10, and the parts which are pasted or gummed by the pasters *n* n^2 n^3 n^4 are shown by the shaded lines. The ring *n* gums the edge at *m*, and the pasters n^2 n^3 n^4 gum the parts marked m^2, m^3, and m^4, respectively. The object of this distribution of the paste or gum will presently be explained. The roll D D^1 may operate by a continuous or intermittent motion at pleasure, but we prefer the latter; and to secure such motion we place a gear-wheel, B^2, on the end of the shaft B, and on the side of the latter make a segmental gear, *f*, of the proper relative length, so as to get so much motion in the rolls D D^1, and at the proper time, as is needed for feeding purposes. The segmental gear *f* meshes into a bevel gear-wheel, f^1, on the end of the shaft F, and a similar wheel, f^2, meshes into

a miter-wheel, f^3, on the neck of the pasting-roll D. The shaft F is supported by a bearing, f^4, at its forward end, and by a post, A^4, at its rear end. The blank, being thus gummed, is dropped into a table, E, which operates in grooved sliding ways E^1, and which is made open along the middle, as shown in Fig. 6, and has an intermittent reciprocating motion, by which it carries the blank forward under the former G, where, at the proper time, it leaves it and returns to the feed-rollers for another blank. The devices for securing this motion are shown detached in Fig. 7. On the shaft B is a post, d, which carries projecting from the side of its outer end a roller, d^1, the two constituting mechanically a cam. This engages alternately the arms d^2 and d^3, (constituting practically a cam-yoke,) so arranged as to have a lever motion. These arms d^2 d^3 are at or back of their point of junction, pivoted to a post, A^5, of the frame-work, and the opposite end d^4 (which may be called a cam-lever) is united by a connecting-rod, d^5, to a bent lever, d^6, which in turn is pivoted to a rock-shaft, A^6, which latter has its bearings in the frame of the machine. The upper arm of the bent lever d^6 is, by a connecting-rod, d^7, connected with a lug, d^8, of the table E. It will now be seen that, as the cam-roller d^1 engages alternately the cam-arms d^2 d^3 through the devices described the table will move as set forth. The two halves of the table are connected together so as to have a common motion by means of a U-shaped connection, b. The bag is made on a former, G, which is of the size desired in the bag. This former is arranged horizontally and lengthwise of the machine, and so that when the blank or sheet is brought under it, as already described, by means of the table E, it (the former G) will be directly over the middle of the sheet, but with the rear end of the sheet projecting back beyond the end of the former G so that such projecting part may be folded over the end of the former G to make the bottom of the bag. This former G has only a vertical motion. The means for securing this motion are a head-block, G^1, sliding between vertical parallel ways G^2, as illustrated in Fig. 8. On the main shaft B, directly in rear of the former G, is arranged a bell-shaped cam, H, having two working sides, h, slightly concave, like the outer face of a bell, and an outer circular-working face, h^1, substantially as shown. This works in a cam-yoke, H^1, bell-mounted at its outer end h^2, and bulging within as at h^3. This cam-yoke H^1 is rigidly affixed to the head-block G^1 so that as the cam-yoke H^1 goes up and down the head-block G^1 and former G will receive a like motion. The object of the forms of cam and cam-yoke thus described is to cause the former G to start quick and move rapidly in both directions, and hold it stationary up or down, as the case may be, as long as possible, since it must be up long enough for the paper-sheet or blank to be fed in under it, as already described, and down long enough for the folding to be done, as presently to be described. From the top of the bed-plate A, at opposite sides of the path of the former G, rise two side-forming plates, g g, Fig. 9, which, with so much of the bed-plate A^1 as is included between them, constitute a forming-box, in which the paper-bag is folded and made. The blank for the bag, being carried forward by the table E under the former G, as already described, the former G makes a downward stroke on the center of the blank and carries it down into the box formed by the side-forming plates g g and bed-plate A^1. Three sides of the bag are thus brought to the shape desired. The former continues in this position (as shown in Fig. 9) till the folding is done. The table E is now free, and may at any time commence its return stroke to receive another blank from the rolls D D^1. If so desired, the side-forming plates g g may be made adjustable on the bed A^1 by any known mechanical device, such as slotted lugs and set-screws, for the purpose of, with a change of formers, making paper bags of different sizes. Playing across the upper edge of the side-forming plates g g are two horizontal sliding top-folders p p^1. These strike edgewise against the paper of the blank, which projects up from between the side plates g g and the former G, and fold the paper over onto the top of the former G, so as to make the fourth or upper side of the bag. The top-folder p, which comes against the upwardly-projecting pasted edge of the blank, and folds it down, moves a little in advance of the other, so that the pasted or gummed edge of the blank shall be folded down first, and the other or unpasted edge on top of it. As the later-moving top folder p^1 advances and folds down the unpasted edge, the first-moving top folder p, having completed its stroke, recedes, so that the later-moving folder p^1 advances over onto the fold of the paper, and presses the pasted and unpasted edges well together. It then returns to its previous position. These motions are secured by a pair of spiral grooves, q^1 q^1, or grooved cams, as they are sometimes called, arranged on the main axle B. A wrist, q, plays in each groove, and communicates motion by a lever, q^2, to a plunger, q^3, to the forward end of which the top-folders p p^1 are secured. The plungers q^3 work in suitable bearings on the bed A^1. The arrangement of these grooves q^1 is shown in Fig. 3, but not their obliquity, as in the position of the machine in the figure the oblique parts of the grooves are on the further side; but the construction and arrangement of obliquity of such grooves with reference to the motions desired is well known to skilled machinists.

The sides being folded over and pasted together, next follows the operation of folding in the paper, which, projecting back beyond the end of the former G, is to constitute the bottom of the bag. To do this we use the folders a a^1 a^2 a^3, of which the two a a^1, that work horizontally, are pointed or V-shaped, and the other two, a^2 a^3, which work vertically, are, by preference,

blunt or square-pointed. They all move parallel with the face of the end of the former G. The two, $a\ a^1$, that work horizontally, advance against the opposite sides of the unfolded end, and press down the middle parts v of the paper sides, as illustrated in Fig. 11, after which the upper vertically-moving folder a^2 makes a downward stroke, and folds down the upper fold v^1. As this folder a^2 (to insure rapid working) makes its downward stroke before the last-moving top-folder p^1 is out of its way, we make a slot, p^2, in the latter for it to work through. Next, the lower vertical folder a^3 makes an upward stroke, folds over the lower fold v^2 of the bag, advances sufficiently far (the upper folder a^2 receding) to cover the overlapping ends, and press such ends well together, when the bag is complete.

Comparing now the distribution of the paste, as shown in Fig. 10, with the form of the folds, as shown in Fig. 11, it will be seen that the paste is so applied that all exterior overlapping parts are, when the folding is done, pasted together. The gummy parts $m^2\ m^3$, Fig. 10, constitute the inside of the parts $v^1\ v^2$, Fig. 11, and the parts marked m^4, Fig. 10, constitute the extremity of the upper fold v^1, onto which the extremity of the lower fold v^2 laps, and to which it is pasted.

The devices by which these end folders are operated commence with four spirally-grooved wheels; or, as they are sometimes called, grooved cams S S^1 R R^1, arranged on the shaft B. In the grooves $s\ r$ of each is a wrist, $s^1\ r^1$, the obliquity of the grooves being such as to give the motion desired. From the wrists r^1 of the grooved cams R R^1 the levers r^2 extend forward and upward under the bed of the machine, Fig. 2, to which they are pivoted; thence forward, and at their forward ends they are connected by rods r^3 to lugs r^4 of the folders $a\ a^1$. These folders are guided in their stroke by the stems a^4, to which they are fastened. To operate the top vertical folder a^2, a lever, s^2, Fig. 3, leads from the wrist s^1 of the grooved cam S to a vertical shaft, s^3, which is free to vibrate. From the upper end of this shaft a lever, s^4, leads to the bent lever s^5, Fig. 9, the forward end of which is fastened to a swinging lug, s^6, attached to the folder a^2, the object of the swinging lug s^6 being merely to leave the folder a^2 free to move vertically in its slides $u\ u$.

A similar arrangement of devices, except that it is inverted, leads from the grooved cam S^1 to the lower vertical folder a^3, as illustrated in Fig. 3, the lettering being the same as for the corresponding devices of the upper vertical folder.

As soon as the folders have all returned to their original positions, the former G, with the now perfectly formed bag thereon, rises clear of the box in which it was made till it comes between the discharging rollers $o\ o$, one on each side, which engage the bag, and, by frictional contact, run or slide it off the former G, when it falls to the floor through the opening E^2, Fig. 6, over the end of the table E, which, in the mean time, has brought a new blank from the feed-rolls D D′.

To furnish a supply of air between the bottom of the bag and the end of the former G, I run one or more perforations, $x\ x$, lengthwise through the former G from its forward end to any suitable air-hole, x^1, at or near its base. The same result may be secured by making a longitudinal groove or grooves in one or more faces of the former G.

The discharging-rollers $o\ o$ are operated by band o^1 and band-wheels $o^2\ o^2$ suitably arranged. The gear-wheels O O communicate power from the wheel B^2 on the shaft B to a shaft, O^1, on which the driving-band wheels $O^2\ O^2$ are arranged. The rollers $o\ o$ are carried on arms o^3, which extend back and are pivoted to the same posts G^2, which act as sliding ways to the head-block G^1, Fig. 8. This feature is more particularly shown in Fig. 12, Sheet 3. The arms o^3 are made in the form of bent levers, with an extension, o^4, projecting back of the posts. A spring, o^5, connects them together in such a way as to keep the adjacent faces of the rollers o at a greater distance apart than the breadth of the former G, except when the former G is in position for the discharge of the bag, as in Fig. 7. Then the same motion that carries the head-block G^1 and former G upwards, also brings up a pair of wedges or inclines, $w\ w$, which engage the projections o^4, force them back—which motion causes the rollers o to approach each other—and engage the bag on the former G, and, by frictional contact, discharge the bag, as already set forth. Also, for use with different-sized formers in making different-sized bags, they may be made adjustable by any known mechanical means.

If it be desired to print the bag on one side, it can be done while the bag is being formed by inserting a form or stereotype containing the type or engraving or design to be printed in the bottom of the box in which the folding is being done; or the ordinary bed-plate of a printing-press may be arranged so as to constitute the bottom of the box at the time of folding, and in such case the pressure required in printing may be applied in any known way.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. A pair of feeding and pasting-rolls, D D^1, one roll, D, being provided with raised **W**-shaped pasters $n^2\ n^3$, a pasting-ring, n, and feeding-ring n^1, substantially as described.

2. A paste-vat, l, arranged under the feeding and pasting-roll D, so that the paste-ring n and pasters $n^2\ n^3\ n^4$ shall dip therein, and with a transverse trough, l^1, under the feeding-ring n^1, substantially as set forth.

3. The arrangement of the feed-rollers D D′, reciprocating feed-table E, vertically moving former G, and top and end sliding folders, constructed and combined relatively to each other, substantially as described.

4. The vertically-moving former G, operated by and in combination with the cam-yoke H′ and cam H, the yoke H′ being bell-mouthed and enlarged back, substantially as shown, so as to receive a quick throw and be held stationary during the greater part of the time of the operation of the machine.

5. The bent arms o^3 o^4, carrying the rollers *o o* at their forward ends, in combination with inclines or wedges *w w*, for causing the rollers to engage and discharge the bag, substantially as set forth.

In testimony whereof we, the said JAMES M. BRYANT, JOSEPH P. BRYANT, and SAMUEL H. BRYANT, have hereunto set our hands.

JAMES M. BRYANT.
JOSEPH P. BRYANT.
SAMUEL H. BRYANT.

Witnesses:
A. S. NICHOLSON,
G. H. CHRISTY.