

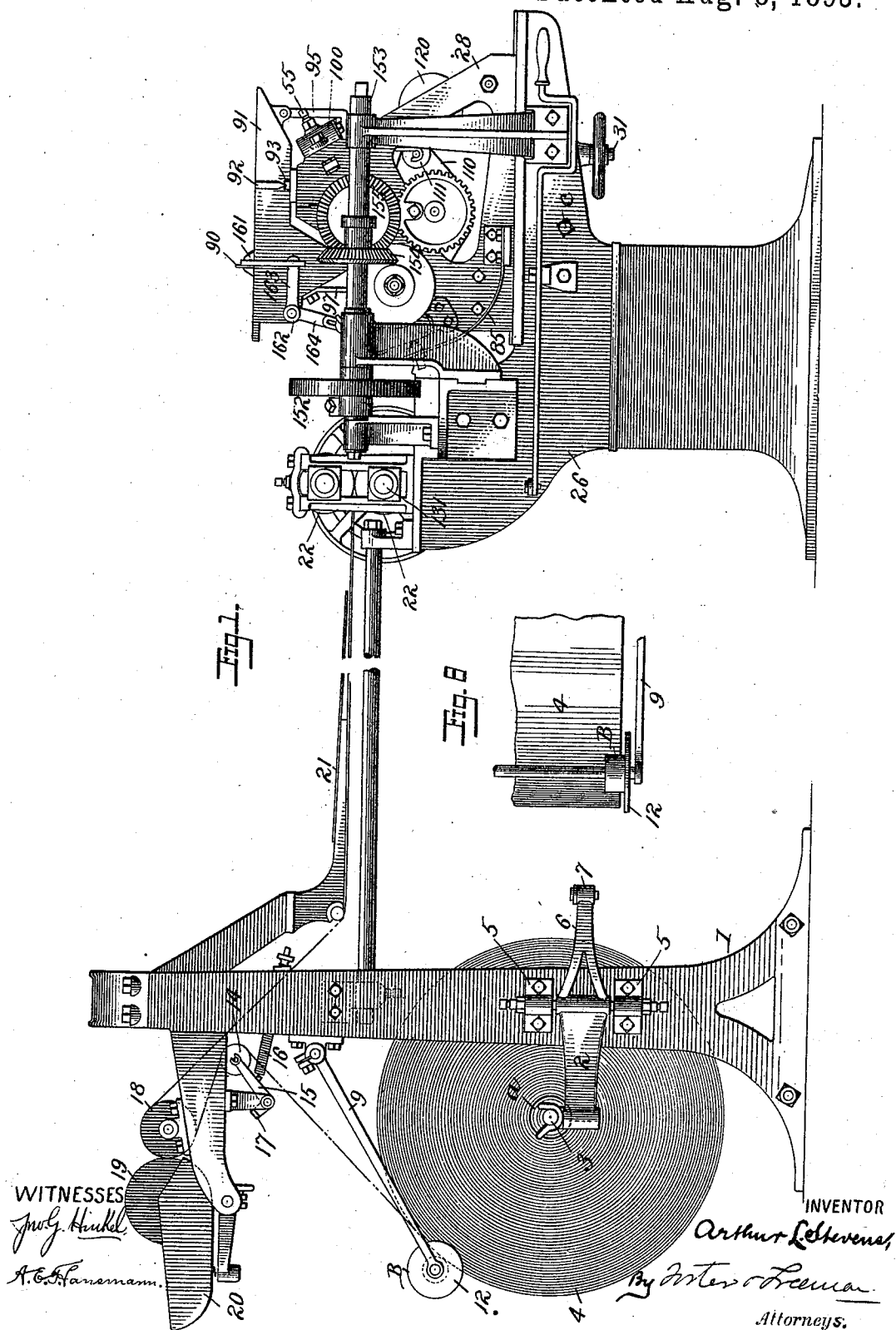
(No Model.)

3 Sheets—Sheet 1.

A. L. STEVENS.
PAPER BAG MACHINE.

No. 502,784.

Patented Aug. 8, 1893.



(No Model.)

A. L. STEVENS.
PAPER BAG MACHINE.

3 Sheets—Sheet 2.

No. 502,784

Patented Aug. 8, 1893.

Fig. 2.

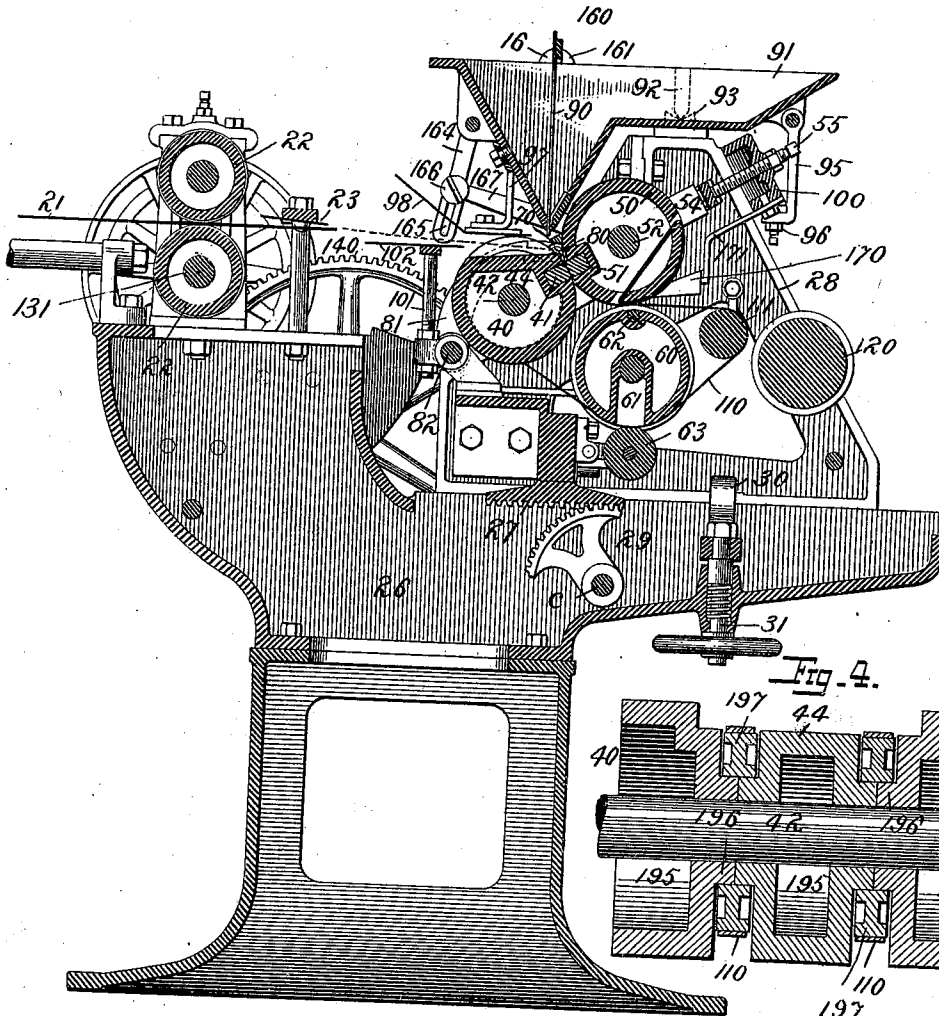


Fig. 4.

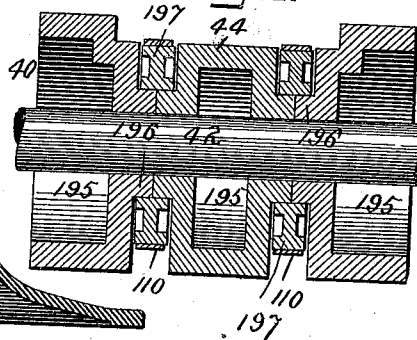
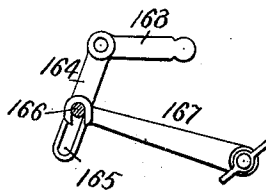


Fig. 7.



WITNESSES

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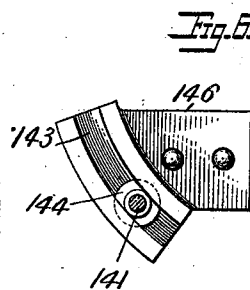
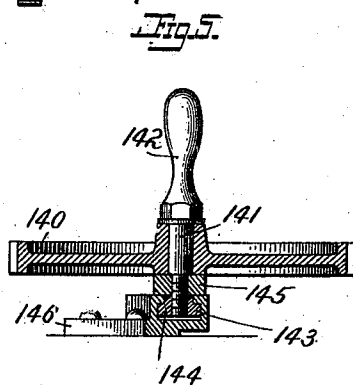
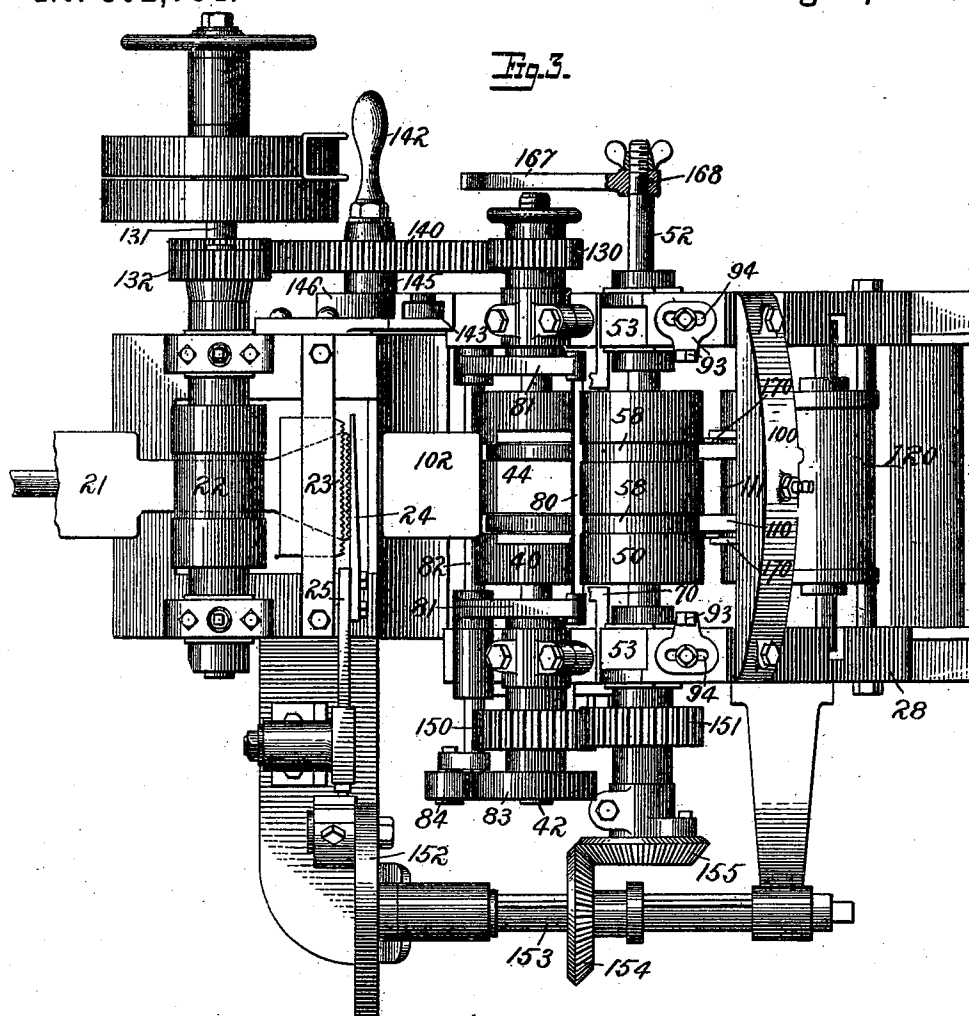
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3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

ARTHUR L. STEVENS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
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PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 502,784, dated August 8, 1893.

Application filed October 28, 1890. Serial No. 369,636. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR L. STEVENS, a citizen of the United States, residing in Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a specification.

My invention relates to paper bag machines, and more especially to that class of machines in which the paper is formed into a tube from which the bag blanks are cut to form the bags, the bottom being tucked or folded and pasted before the bag blank is severed from the tube, and this is accomplished while the tube is being formed and passed through the machine with a continuous non-varying speed.

My present invention relates more particularly to a machine such as is described and claimed in my Patent No. 415,950, dated November 26, 1889, and it consists in certain improvements in the construction, arrangement and mode of operation of the various parts which will be more particularly set forth hereinafter.

Referring to the accompanying drawings:—Figure 1 is a side view of the machine embodying my improvements. Fig. 2 is a longitudinal vertical section of the bottom forming portion of the machine. Fig. 3 is a plan view of the same, the pasting device being removed. Figs. 4, 5, 6, 7 and 8 are detail views.

My present improvements relate to the manner of mounting the roll of paper and feeding the same to the former in such a way that the tube will be accurately and evenly presented to the former however irregular the roll may be. To accomplish this purpose, I support the roll shaft 3, upon arms 2, swinging freely in a horizontal plane. Thus I mount upon the standards 1, the arms 2, having sockets at their free ends for the reception of the shaft 3, provided with cones *a*, and supporting the roll of paper 4. These arms 2, are pivotally mounted in ears 5, 5, secured to the standards 1, and the rear or inner ends of the arms are connected together by a rod 7, so that while the arms can move slightly on their pivots to allow the paper roll to vibrate longitudinally, the arms will retain the same relation to each other and support the paper

shaft 3, parallel to the standards 1, in all positions.

To hold the roll in its proper relation to the pasting devices, I make use of a flanged roll B, properly supported to maintain its contact with the roll of paper whatever its size. Thus the roll B, is supported in swinging arms 9, pivotally attached to the standards 1. The body of the roll bears upon the face of the paper roll while the flanges 12, extend down the sides thereof to guide the strip laterally as it is drawn off tangentially from the roll of paper. As the paper passes from its roll under the guide roll it goes over a tension or dandy roll 14, mounted in pivoted arms 15, each provided with a tension spring 16, and toe 17, the toes acting as stops to prevent the dandy roll being drawn too far rearward, but permitting it to yield under the strain upon the web of paper, so that if the paper strip is slack at either edge, the roll 14, will bear upon it and maintain it taut and properly guide it to the pasting devices. From the tension or dandy roll, the paper passes over a guide roll 18, where it receives its line of paste on one edge from the paste roll 19, rotating in the paste box 20, in the usual way, and from thence the paper passes to the former 21, where it is folded and formed into a tube in the usual manner.

In the present case I have not illustrated, nor do I deem it necessary to describe any particular tube-forming devices, as they form no part of my present invention, and while any well known devices may be used for this purpose, I will assume that the paper fed into the machine in the manner before described, is formed into a tube and passes through the feed rolls 22, 22, driven continuously at a uniform speed, and is delivered to the bottom forming devices passing over the serrated cutting or tearing edge of the former 21, and under the fixed serrated tearing blade 23, where at the proper time the tube is severed by the blade 24, attached to the vibrating slide bar 25, which is connected to be operated in a manner set forth in my previous patent or otherwise.

As in my prior patent above referred to, the bottom forming mechanism is mounted upon a base or bed 26, forming part of the main

frame, and is adjustable longitudinally thereon. To effect this a rack bar 27, attached to the frame 28, of the bottom forming mechanism, meshes with the sector 29, which serves as a ready means of moving the frame on the base, the shaft *c*, of the sector having a handle or square end to receive a handle for turning it. A clamp 30, operated by a hand screw 31, secures the frame carrying the bottoming mechanism to the base in the desired position after adjustment, to enable the machine to make bags of the desired length.

It may be remarked here that bag tubes of various sizes may be made on this machine, in a manner well understood and fully set forth in my prior patent and it will be evident that the parts heretofore described should be made adjustable or interchangeable for this purpose.

The bottom forming mechanism embraces what I term a bottoming roll 40, an impression roll 50, and when the bags are to be printed, a fountain roll 60, arranged in juxtaposition and co-operating together with their devices hereinafter described to fold one end of each tube to make the bottom, to print the bag, and deliver it from the machine. The bottoming roll and the impression roll are each provided with blocks 41, 51, respectively, preferably made of hard steel which co-operate to form gripping surfaces that press and hold the folded end of the tube while the same is being severed into bag lengths.

Mounted in front of the impression roll is a fixed bar 70, having its upper face beveled or inclined, and arranged substantially in the line of the travel of the tube, and a folding blade 80, is supported to vibrate past the bar 70, to fold over the end of the tube against the edge thereof. For instance the folding blade is mounted on curved arms 81, fixed on a shaft 82, which shaft is vibrated by a cam 83, on the shaft 42, of the bottoming roll, and bearing against the friction roller 84, the shaft 82, being under tension of a spring 85, which causes the folding blade to operate to make the bottom fold by passing below the bar 70, in a manner which will be understood. As the folding movement is effected by a spring, the blade will yield in a manner to prevent breakage in case the paper should bunch or wad.

Mounted on the frame 28, is the paste box 91, having a blade 90, passing through a slot in the lower extremity of the box, and operating in a manner hereinafter set forth to apply paste to the bottom fold. This paste box is adjustably mounted on the frame, and I have shown at the sides of the box, knife edged lugs 92, resting on bearing pieces 93, adjustably secured to the frame. The paste box is thus pivotally mounted between its ends so that it may be rocked or tilted to more readily feed the paste to the discharge opening; and in order to adjust the inclination of the box, as desired I attach to its rear side a link 95, provided with an adjusting screw

96, adapted to engage the under side of a cross piece 100. Secured to the forward side of the paste box is a bracket 97, supporting a guide plate 98 preferably inclined as shown, and also mounted on the frame 28, upon a standard 101, is the guide plate 102, and these plates 98, and 102, serve to direct the free end of the tube on to and over the bottoming roll 40, and insure the proper delivery of the tube end to the rolls and to the bottom forming apparatus. The impression roll 50, is supported on a shaft 52, mounted in boxes 53, which are forced forward by a spring 54, the tension of which is adjustable by a screw 55, passing through the cross piece 100, and in this way a firm contact between the bottoming and impression rolls is obtained. At the same time the impression roll can yield sufficiently to allow for the varying thicknesses of paper forming the bag bottom to pass through, and to prevent accident in case the paper wads.

The bottom forming operations may be briefly described as follows: The end of the tube passes beyond the cutting device between the guides 98, and 102, on the surface of the bottoming roll 40, and its end rides up the incline of the bar 70, and just at this moment the folding blade 80, is operated to force the tube into the bite of the rolls 40, and 50, the bar 70, causing its free end to overlap, and be folded down on to the body of the bag. In doing so the end of the tube comes in contact with the paste blade 90, and wipes off sufficient paste to secure the fold in position, and as soon as this is done the folded end is grasped between the gripping jaws 41, 51, and carried forward, and having received the desired impression it is passed over to the delivery roll 120, and out of the machine. The bag blank is severed just after the bottoming fold is made and seized by the gripping devices, the apparatus being so timed as to do this. It is desirable that at the moment of severing, the tube should travel at a speed less than its normal so that there shall be slack paper at the point of severance. Heretofore this slack has been obtained by varying the speed of rotation of the bottom forming rolls, but as this involves a comparatively complex mechanism and results in objectionable jerks of the paper and the mechanism, I have overcome this difficulty by revolving the rolls continuously at a uniform speed, but with a varying draft on the paper in the following manner: A portion of the periphery of the bottoming roll 40, is flattened or cut away as at 44, of a width equal to or greater than the width of the paper tube, and of a sufficient depth to allow the desired amount of slack paper to accomplish cutting. This cut-away portion commences at a point just to the rear of the gripping surface or block 41, so that after the bottom fold is made and the bag securely gripped, the tube will pass into this cut-away portion and while the feed of the tube and the speed of the rolls are uniform there is allowed a desired amount of slack for

severing the tube as the latter descends into the cut away part of the roll. The bottoming rolls as illustrated in the drawings are of a greater diameter than the feeding rolls 22, but the speed of rotation is not the same for the feed rolls and bottoming rolls, as the time of rotation for the bottoming rolls relative to the feed rolls is dependent upon the size of the bag and is controlled by the size of the change gear, and the bottoming rolls make one revolution for each bag whether its length is long or short. The surface velocity of the bottoming rolls is always a little greater than that of the feed rolls, although the amount of this excess of velocity is more or less according to the length of the bag and the circumference of the bottoming rolls is a little more than the length of the longest bag made on the machine and of course the circumference of the change gear on the pitch line is the exact length of the bag made. It is unimportant what size the feed rolls are, provided the gear on the feed roll shaft is the same diameter as the roll. The feed rolls and bottoming rolls have a non-varying speed that is constant during every revolution, but their relative velocities and times of rotation are in practice changed for the various sizes of bags.

Inasmuch as the contact of the rolls cannot be depended upon to feed the paper when the retracted face of the roll 40, is opposite to the roll 50, I make use of tapes 110, which pass around proper supporting rolls, and which maintain the bag in frictional contact with the roll 50, and carry it between the latter and the roll 60, during the time that the roll 40, is not in contact with the roll 50.

In order that bags of varying lengths may be formed on the same machine, the bottom forming devices carried by the frame 28, are adjusted to or from the cutting and feeding devices, and to properly deliver the bags, and have the cutting knife operate in time, I provide a changeable gear 130, on the shaft of the bottoming roll, and to properly connect said gear with the driving shaft 131, and its gear 132, I provide an adjustable gear 140, which is adapted to mesh with and connect the gears 130, and 132, under all conditions. In order to do this the gear 140, is mounted upon a stud 141, preferably having a handle 142, and secured and adjusted in a segmental slot 143, by means of a block 144, into which the screw threaded end of the stud 141, is screwed, and a washer 145, which bears upon the upper surface of a segment containing the slot, and by this means the stud can be adjusted to any position to enable the teeth of the wheel to properly mesh with the other gears. This segmental piece or plate 146, may be attached to the frame or base 26, in any suitable manner, and the radius of this segmental piece has for its center the axis of the driving gear 132.

As in the prior patent, the impression roll receives motion from the bottoming roll

through the medium of the gears 150, 151, and the cutting knife which is operated from the disk 152, on the shaft 153, is driven by the bevel gears 154, 155, the former of which is adjustably mounted on the shaft 153, so that the beveled gear 155, may be changed to adjust the cutting blade or striker to act in correct time with the bottom forming device. In order to operate the paste blade at the proper time, I mount it in a frame or on a bar 160, which is arranged to slide between guides 161. Pivoted to the paste box at 162 is a bell-crank lever 163, one end of which engages with the sliding bar carrying the paster 90, and the other end 164, is provided with an elongated slot 165, in which the screw 166, is adjustably secured and this screw forms a bearing for the arm 167, mounted on the extension of the shaft 52, of the impression roller by an eccentric 168.

In order to insure the delivery of the bag, I apply a deflector or doctor in the form of a vertical plate 170, the free end of which takes into grooves 58, in the impression cylinder the whole being adjustably supported by an arm 171, secured to the cross-piece 100.

To properly support the feeding tapes which carry the bag lengths forward when the depressed or cut-away portion of the gripping roll 40 is opposite to the roll 50, said roll 40 is preferably composed of three sections 195, mounted side by side upon the shaft 42, as shown in Fig. 4, and interposed between the adjacent ends of the sections on the supporting shaft or on annular collars 196, formed on said ends, are mounted pulleys 197. These pulleys are free to revolve independently of the gripping roll, and are of such a diameter that when they are in proper position the tapes will be guided against lateral movement on the pulleys by the ends of the roll sections, while the outer carrying surface of the tapes will project slightly above the depressed or cut-away portion of the gripping roll.

It will be evident that while I have described my machine in connection with parts for forming bags from a continuous tube, parts of it may be employed in the formation of other articles of paper from a continuous strip.

It will be evident that any suitable support may be substituted for the bottoming roll to support the tube normally in an arched position, and for withdrawing the support when the tube must be slackened during the severing operation, the feed rolls on each side of the support moving uniformly in all cases.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim—

1. The combination in a machine for making paper articles from a continuous strip, of feeding rollers, severing device, and gripping rolls moving at a uniform speed, one of said gripping rolls having a flattened or depressed

portion, substantially as described to withdraw the support from the strip at the time it is cut, for the purpose set forth.

2. The combination in a machine for making paper articles from a continuously moving strip, of feed rolls having uniform speed, a severing device gripping rolls also having a uniform speed but a greater surface velocity than the feed rolls, one of the gripping rolls being provided with a depressed or flattened portion whereby the curved support for the body of the tube is momentarily withdrawn during the action of the severing device, substantially as described.
3. The combination in a machine for making paper bags from a continuously moving tube, of feed rolls having a uniform speed, bottom gripping rolls of larger diameter also having a like uniform speed, but a surface velocity greater than that of the feed rolls, the lower gripping roll being provided with a cut-away portion, substantially as described.
4. The combination in a machine for making bags from a continuously moving tube, of feed rolls having a uniform speed, bottom gripping rolls also moving at a uniform speed and provided with gripping blocks, the lower gripping roll being cut-away or flattened adjacent to its block, and a severing device timed to act during the time the tube is above the flattened part of the roll, substantially as described.
5. The combination in a machine for making paper bags from a continuously moving tube, of feed rolls and bottom gripping rolls all having a uniform speed of rotation and one of the gripping rolls having a cut-away portion, fixed folding bar, vibrating tucking blade, and a severing device timed to act as the tube passes onto said cut-away portion of the gripping-roll, substantially as described.
6. The combination in a paper bag machine, of the feeding mechanism, severing device, and gripping rolls, one of said rolls having a cut-away portion, supporting pulleys adjacent to said cut-away portion of the gripping roll and in the line of the latter, and carrying tapes, substantially as described.
7. The combination in a paper bag machine, of the feeding and severing mechanism, bottom gripping rolls one of which has a cut-away portion and is composed of three sections, pulleys intermediate of the sections, and carrying tapes, substantially as described.
8. The combination in a paper bag machine, of feed rolls and bottom gripping rolls having a constant speed of rotation, one of the gripping rolls provided with a cut-away portion, and carrying tapes, substantially as described.
9. The combination in a paper bag machine of feed rolls and bottom gripping rolls having

a constant speed of rotation, and one of the gripping rolls provided with a cut-away portion adjacent to the point where it grips the pilot end of the bag, a printing cylinder, and carrying tapes extending between the gripping rolls and around the printing cylinder, substantially as described.

10. The combination in a paper bag machine, of feed rolls, bottom gripping rolls the lower one of which has a cut-away portion, printing cylinder, carrying tapes, severing device, fixed folding bar, tucking blade and a pasting device, substantially as described.

11. The combination in a paper bag machine, of feed rolls having a constant speed, bottom gripping rolls having a constant speed, the lower gripping roll provided with a cut-away portion, printing cylinder, guide roll, carrying tapes, fixed folding bar, tucking blade, vibrating paster, and a severing device timed to act as the bag length passes onto said cut-away portion of the gripping-roll, substantially as described.

12. The combination in a paper bag machine, of the bottom gripping rolls, paste receptacle, paster blade, bell-crank lever pivoted to the receptacle and connected at one end to the blade, an eccentric on the shaft of one of said rolls, and a connection between the other end of said lever and said eccentric, substantially as described.

13. The combination in a paper bag machine, of the frame, the paste receptacle, bearings on its sides having sharpened lower ends supported on the frame, and a link at the rear of the receptacle securing it adjustably to the frame, substantially as described.

14. The combination in a paper bag machine, of the frame, the adjustable bearings thereon, paste receptacle, bearings on its sides having sharpened ends resting on said adjustable bearings, a link connecting the rear of the receptacle to the frame, and an adjusting screw, substantially as described.

15. The combination of the frame, the shafts 131 and 42, gear wheels thereon, a stationary plate 146 having a segmental slot with undercut sides, a bearing piece 143 adjustable in said slot, a stud 141 supported by the piece 143 and terminating in a handle, and a gear wheel on the stud and meshing with the gear wheels on said shafts, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR L. STEVENS.

Witnesses:

MINOR HARVEY,
FRANK R. STEVENSON.