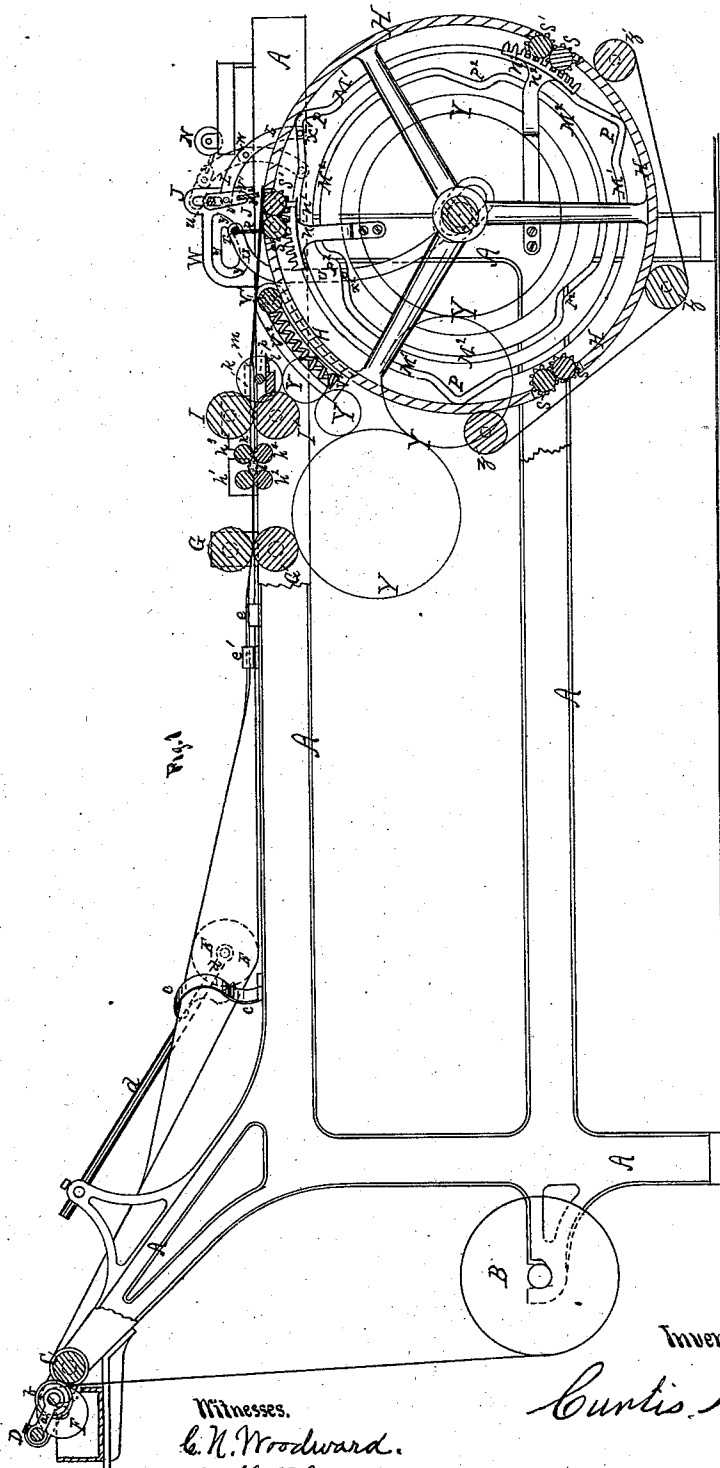


C. WOODHULL.
Paper Bag-Machines.

No. 155,563.

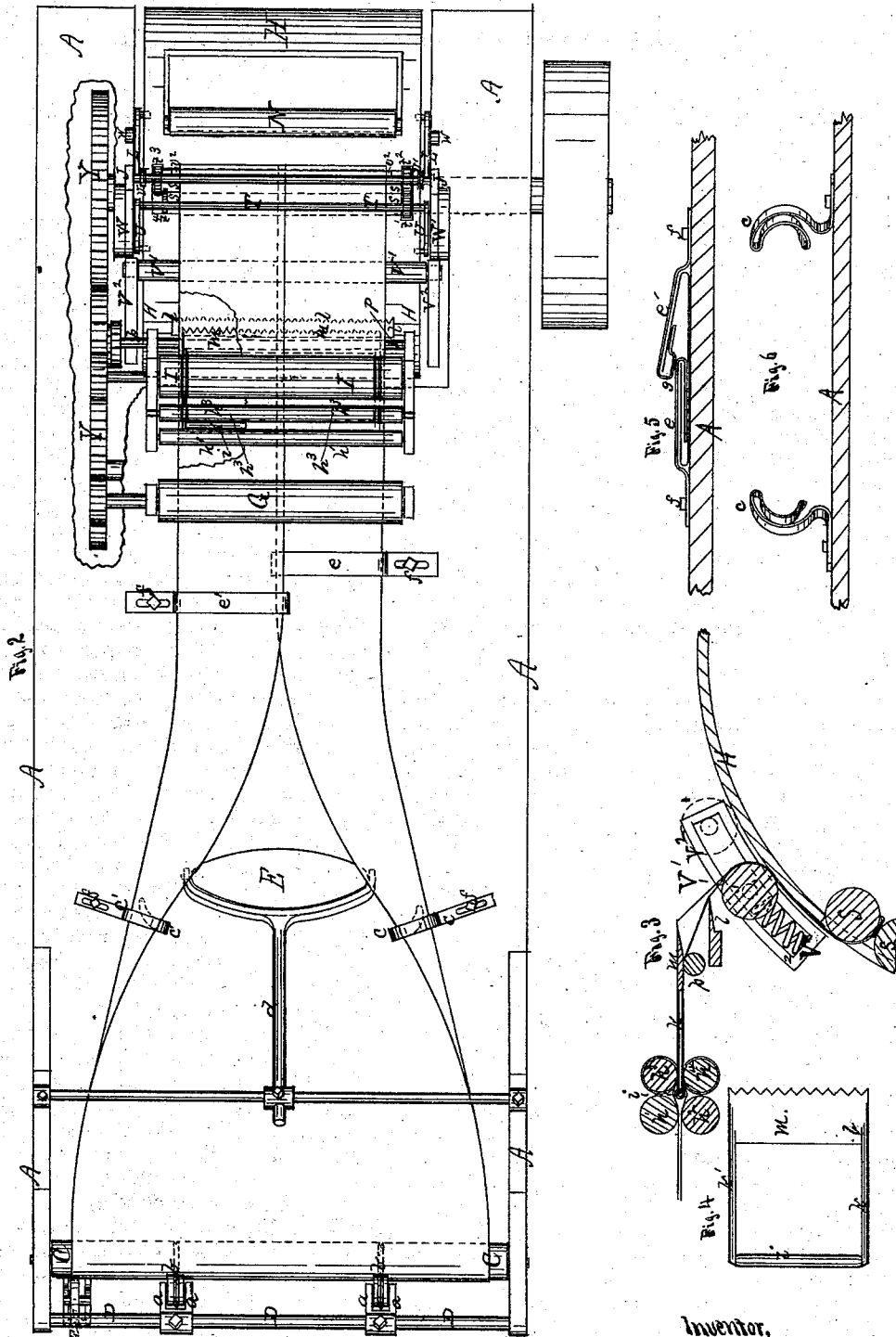
Patented Sept. 29, 1874.



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Witnesses,
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UNITED STATES PATENT OFFICE.

CURTIS WOODHULL, OF BUFFALO, NEW YORK.

IMPROVEMENT IN PAPER-BAG MACHINES.

Specification forming part of Letters Patent No. **155,563**, dated September 29, 1874; application filed December 4, 1873.

To all whom it may concern:

Be it known that I, CURTIS WOODHULL, of Buffalo, in the county of Erie and State of New York, have invented an Improved Machine for Paper Bags, of which the following is a specification:

This invention relates to machines for making paper bags; and consists in an improved arrangement for folding and creasing the paper and forming it into a tube before it passes through the rollers by which the edges are pasted together, as hereinafter set forth. The invention further consists in a series of two or more rollers, pivoted in a suitable frame or hanger, and which inclose another smaller roller, having its ends pivoted in two small wires or rods, which run out through grooves in the larger rollers, and are connected to a blade or knife, having serrated edges, by which means the upper side of the tube of paper is cut off, as hereinafter described. The invention furthermore consists in a revolving cylinder or drum, having a series of gripping rollers let into its surface at equal distances, working in connection with a pasting and tucking knife, to paste and seize the end of the bag, draw it down, and break or cut it off, as hereinafter fully explained.

In the drawings, Figure 1 is a sectional elevation. Fig. 2 is a plan view; Figs. 3, 4, 5, and 6, detail views.

A is the frame of the machine, which supports on the back end the usual roll of paper B, which is carried upward over a roller, C, provided with grooves or creases to conform with the widths of the different-sized bags. Back of this roller C is a rod or shaft, D, carrying two hangers or frames, *a a'*, which are provided with small wheels *b b'*, having V-shaped tongues upon their rims to conform to the shape of the grooves in the roller C, which serves to crease the paper as it passes over the roller, and thus aid in the after operation of forming the tube. The paper, after passing over the roller C, is folded over upon itself from either side, and passes through two peculiar-shaped fingers or formers, *c c'*, (see Fig. 6,) which are made to conform to the natural shape of the paper as it is turned over to guide it evenly forward, but of such a shape that it will not cramp or crowd the paper. After

leaving the fingers *c c'* it passes under and around an oval-shaped ball, E, which is suspended by a yoke and rod, *d*, to the frame A, as shown. This is so arranged by set-screws as to be made adjustable to any point, and which revolves by the action of the paper as it is drawn forward, and, by its peculiar form, allows the paper to be folded over in a natural and easy curve, without wrinkling and "buckling." F is the usual paste-wheel, placed at the end of the roller C, as shown, by which means the edge of the paper is pasted as it passes over. *c c'* are two fingers or formers, (see Fig. 5,) secured to the table of the machine by set-screws and slots *f*, to enable them to be adjusted to fit any sized bag desired. These fingers consist of thin strips of metal, which run over the top and are bent around the two edges of the paper, and back underneath to the fold, as shown in Fig. 5. The back finger *c'*, or the one upon the pasted side of the paper, is made with its inner end slightly raised, to prevent the pasted edge of the paper from coming in contact with the finger *c* as it passes over it. The outer point of the finger is made with its under side bent down, as at *g*, to prevent the pasted edge of the paper from coming in contact with the metal. By this means the paper is formed into a flat tube, and in this shape passes between two rollers, G G', which are revolved by suitable gears, and press the tube of paper together, and thus cause the two edges to adhere to each other. Immediately in front of the rollers G G' are a series of four rollers, *h¹ h² h³ h⁴*, which inclose another smaller roller, *i*, (see Figs. 3 and 4,) made just the length of the width of the interior of the bag. The ends of this small roller are pivoted in two rods or wires, *k k'*, which run out between the two forward rollers in grooves formed in them for that purpose, and are connected to a blade or knife, *m*, having its edge serrated, as shown. The tube of paper is passed through the two back rollers, *h¹ h²*, and thence around the smaller roller *i* and blade *m*, and continues on until it reaches a point a short distance beyond the center of a large drum or cylinder, H, its object to be hereinafter explained. I I' are two rollers, operated by suitable gears, which are grooved, as shown, where the wires

k k' of the blade m pass through, which serve to draw the paper out from the rollers h^1 h^2 h^3 h^4 , and pass it forward. Beneath the front of the blade m is another smaller roller, p , also revolved by gears, &c., which serves to remove and prevent the forming of any wrinklings or "gatherings" about the edges of the knife m . l is a stationary serrated-edged blade or knife, placed beneath and slightly in advance of the blade m , as shown, this difference forming the usual disparity between the lengths of the sides of the bags. H is a large cylinder or drum, made of greater width than the tube of paper, and which is made to revolve toward the blades m and l by suitable belting or gears. At equal distances around this cylinder are set pairs of small rollers s s' , nearly as long as the cylinder is wide, and provided at either end with small pinions t^1 t^2 t^3 t^4 , the first two of which mesh into each other, while the other two, upon the opposite ends of the rollers, are made to run by each other, as shown, so that by acting upon one, the rollers will be rolled in toward each other, while by operating the other, the opposite result will be obtained. Inside of the drum H are two curved racks, n^1 n^2 , set at the points shown, the former, by acting upon the pinion t^3 , causing the rollers s s' to be turned inward, while the latter rack, by acting upon the pinion t^4 , turns them out again, as hereinafter explained. J J' are two perpendicular pieces, having slots in their upper parts in which pins u u' work up and down. Attached to these pins are two cranks or plates, v^1 , to which a blade or knife, v^2 , is secured, thus connecting the two plates together. L L' are two curved rods or connections, which are pivoted at w to upright standards secured to the frame A , and run down either side of the drum H , and end in pins or rollers x x' , which work in slots or channels M^1 formed in the sides of the drum H , as shown. These channels run parallel with the periphery of the drum, except at as many equal points as there are pairs of gripping-rollers s s' , when they diverge slightly outward, as shown at P . The upper ends of the arms L L' are pivoted to the plates v^1 . It will thus be seen that when the drum is revolved the straight portions of the channels M^1 will hold the curved arms L in the position shown in the dotted lines in Fig. 1, and by this means keep the edge of the blade v^2 pressed against the usual revolving paste-roller N (which works in a paste-trough, as shown) until the tube of paper is in the position shown, when the cams P will cause the knife v^2 to descend, and the edge, with its supply of paste pressing upon the end of the tube, will paste it, and the drum, continuing to revolve, will carry it back to its former position against the paste-wheel.

R is another knife or blade, attached to a rod, T , and provided with two arms, U , similar to those used upon the pasting-blade v^2 , and whose rollers or pins x^2 x^2 work in a similar grooved channel or slot, M^2 , and having a

similar set of cams, P^2 , except that they turn inward instead of outward. By this device the blade R is brought down upon the tube of paper just as the rollers s s' come beneath it, and by this means the end of the bag is doubled down between the rollers, which, by means of the curved rack n^1 , draw it in and paste it, and thus form the bottom end of the bag. The rollers s will be provided with springs, which will keep the rollers pressed together, and thus retain the paper between them after they have passed the rack n^1 .

V^1 is a roller, whose ends rest upon springs in curved slotted pieces V^2 , as shown. These springs are made of just sufficient strength to keep the roller V^1 pressed forward against the tube of paper, and keep it taut while being doubled back by the action of the drum H . This roller V^1 will be so arranged that, as the tube assumes the position shown in Fig. 3, it will be pulled downward upon the serrated blades m and l , and thus cut or broken off, and so form a complete bag. The bag is then carried onward until it reaches a point upon the upwardly-moving side of the drum, when the pinion t^4 , being acted upon by the rack n^2 , will cause the bag to be rolled out, when it may be removed.

The blade R , as it enters between the rollers s s' , will be carried forward with them a short distance, and, to allow of this being done without injury to the knife, I rest the ends of the rod T , carrying the blade, in slots or channels y y in small perpendicular standards or posts W , (see Fig. 1,) which, by means of their peculiar form, will cause the blade to follow the movement of the rollers and drum, and thus prevent any cramping or crowding of the knife.

The upward or back portion of the cams P^1 P^2 will be made shorter than the forward or downward portion, as shown in Fig. 1, to cause the blades v^2 and R to rise up faster than they descend.

z z z are pulleys or drums, around which an endless belt passes to assist in holding the bag as it is torn off, as well as to carry it around to the point of delivery.

The circles Y , Fig. 1, represent the position of the gear-wheels for operating the rollers, &c.

The arms U of the tuck-knife R may be carried downward, and end in yokes or collars around the shaft of the drum H , to hold it more steadily in its operation.

I do not wish to confine myself to the method shown for operating the gripping-rollers s s' , as I am aware that many devices may be employed for that purpose.

The device I employ for folding the paper and forming it into a tube I believe possesses many advantages over any others with which I am acquainted. It is very simple in its working, contains but few parts, and is not liable, therefore, to get out of order or injure the paper, no matter how fast the machine may be run. The method of holding the knife m is also worthy of particular mention, as, by

the use of the two grooved rollers $h^3 h^4$, the knife is held back while the paper is drawn forward over it. This is a very simple and effective device, and does away with many of the objections to the apparatus now in use. By this machine, also, the bag is formed complete before it is cut off, which I believe is accomplished by no other machine.

The upper pulley or drum z , carrying the endless belt, will be placed as near the spring-roller V^1 as possible to seize the bag and assist the griping-rollers $s s$ in tearing it off.

I claim—

1. The knife or blade m , held within the tube by means of two pairs of rollers, $h^1 h^2 h^3 h^4$, pivoted roller i , rods $k k'$, arranged and operating as hereinbefore specified.

2. The combination, with the griping-rollers $s s'$, geared together by pinions $t^1 t^2$, of the isolated pinions $t^3 t^4$ and fixed segments $n^1 n^2$, whereby the fold is held during the severing of the tube and discharged after completion, as hereinbefore specified.

3. The tucking knife or blade R , in combination with the arms $U U$, and channels or grooves M^2 , and guides or sockets w , arranged and operated as hereinbefore specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CURTIS WOODHULL.

Witnesses:

CHAS. H. THAYER,
C. N. WOODWARD.