Oct. 26, 1937. T. E. COTY 2,096,788

METHOD AND APPARATUS FOR MAKING BAGS

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Fig. 1.

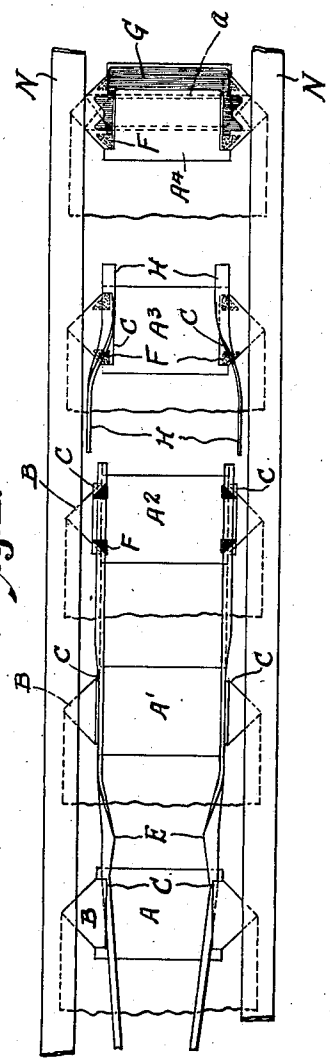


Fig. 1A.

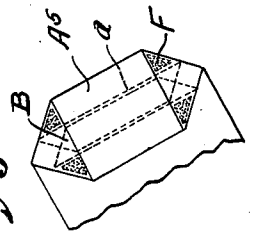
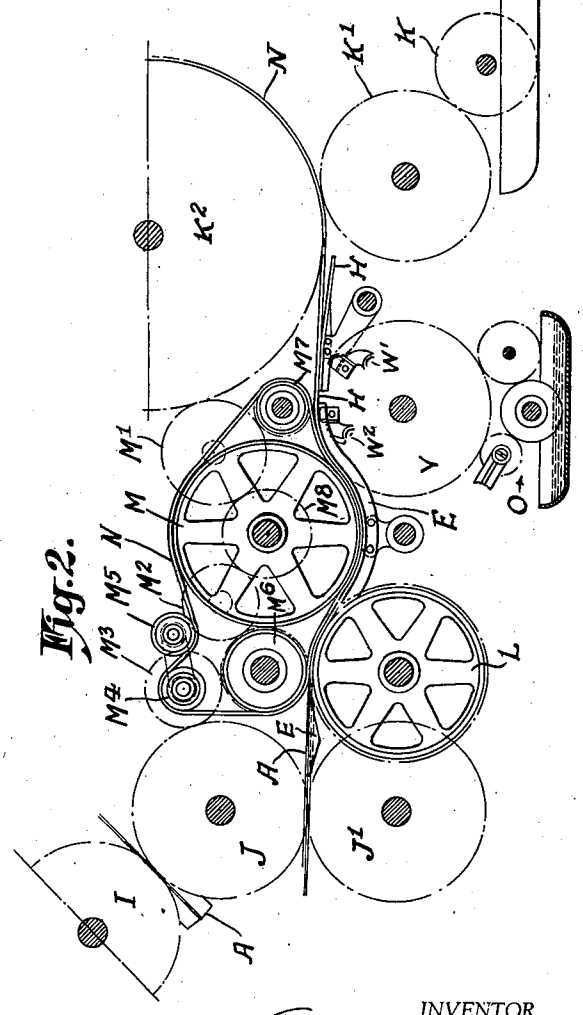


Fig. 2.



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Fig. 4.

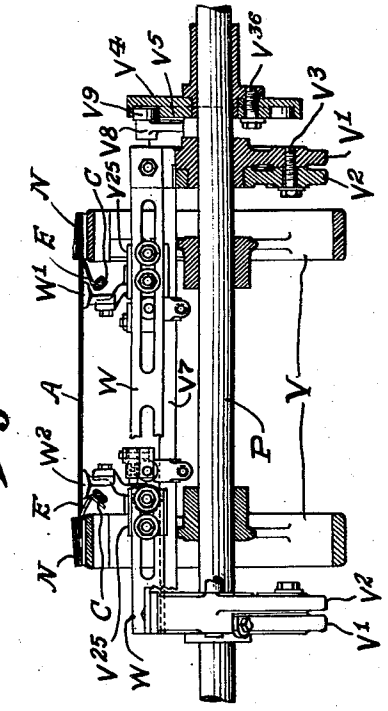


Fig. 5.

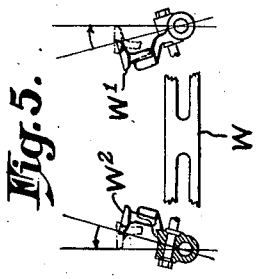
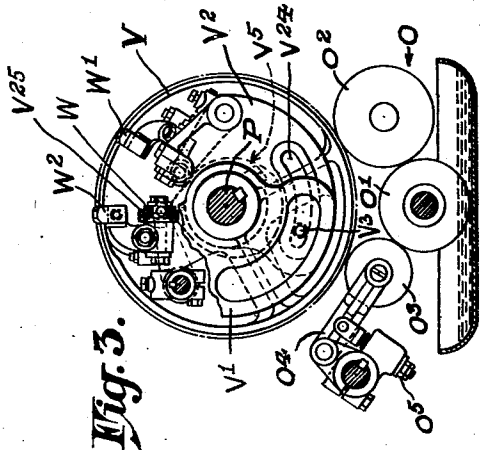


Fig. 3.



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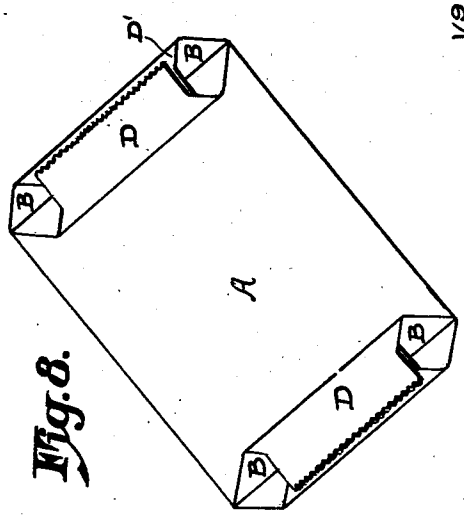


Fig. 8.

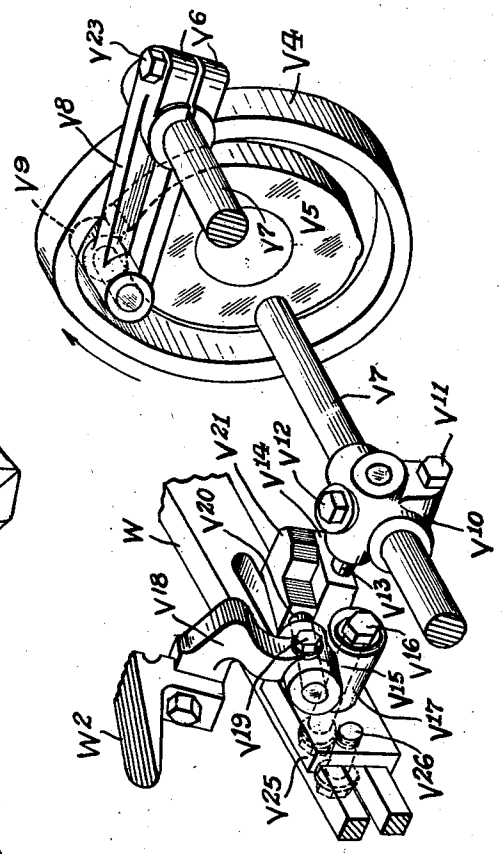


Fig. 7.

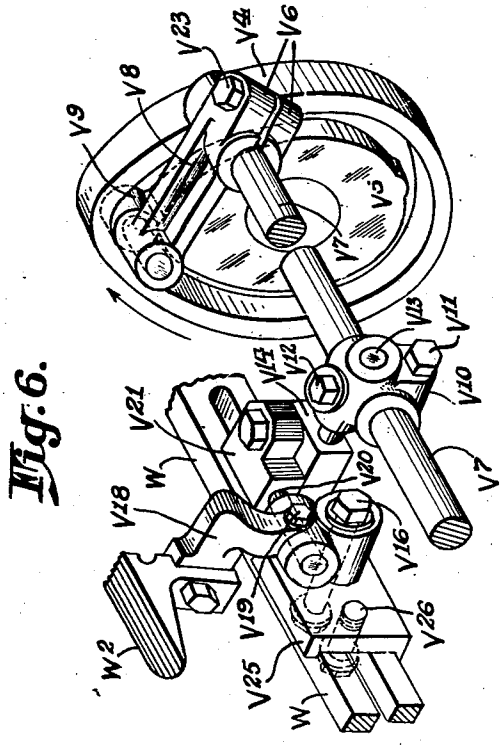


Fig. 6.

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Patented Oct. 26, 1937 2,096,788

UNITED STATES PATENT OFFICE

2,096,788

METHOD AND APPARATUS FOR MAKING BAGS

Thomas Earl Coty, Watertown, N. Y.

Application September 15, 1934, Serial No. 744,229

5 Claims. (Cl. 93—22)

My present invention relates to bag manufacture, particularly paper bags, though its use with other tissues is not to be excluded. The present invention concerns the method or art of manufacture, and the machine the operation of which exemplifies that method.

In making bags in which the bottom is folded and pasted in place, it is a common practice to cut short slits parallel to the sides of the bag-blank in order to facilitate the folding. Side folds or flaps and longitudinal folds are then formed by opening the bottom and turning back one of the longitudinal folds, giving the bag when completed the well-known "diamond fold". There have been difficulties attendant upon this construction, particularly in making the bottom tight at the roots of the slits, or when the slits are not used, as is possible with some forms of bag, in securing the corners of the folds in place at that location.

Heretofore no machine has been devised for applying paste between the side folds and the part of the web forming the bottom of the finished bag. In consequence pockets are formed (by turning over the side folds) which may become filled with cement or other materials, usually pulverulent, contained in the bags. When the bag has been filled and is then dropped or tossed around, the contents acts by its weight as a wedge and gradually forces the flaps apart until a leak is formed, or even a rent which ruins the bag. This defect has heretofore been thought unavoidable, and so far as I know, no way has been found to cure it.

I have found it possible to correct this difficulty substantially completely, by applying paste to the surface of the side flaps referred to, so that they are firmly attached to the adjacent parts of the web forming the bottom of the bag. This may be done by hand, but of course such an expedient is inadmissible and inefficient. While a device for that purpose would apparently necessarily be complex and costly, by the simple mechanism described and illustrated in this case it is possible to effect the result without slowing up the manufacture, and without increasing operating or labor costs, or overhead except by the small amount of interest and depreciation on the mechanism; while, on the other hand, the invention makes it possible to make a three-ply bag which is stronger than a four-ply bag made in former ways, as careful tests have shown, and thus to make a large saving in paper, paste and labor.

My improved method of manufacture, therefore, consists in opening the end of the bag-blank so as to form side folds and longitudinal folds for forming a closure, applying paste between the side folds and the other parts of the web forming the closure, and then turning and pasting the folds to complete the operation. Other more specific details of the method will be found in the claims. Mechanically the means for practicing the improvement in the art consists of means for forming side-folds and longitudinal-folds in a bag-closure; means for applying paste between the side folds and the other parts of the web forming the closure, and means for completing the closure. More detailed explication will be found in my claims. I have shown only a bottom closure, as that is sufficient to make the matter clear. The multiwall valve-bag in common use has both ends closed, and the invention is available for the valve-end also.

The accompanying drawings show an embodiment of the mechanical features of my invention, by which the improvement in the art may be practiced:—

Figure 1 is a diagrammatic plan showing a bag passing through this part of the apparatus.

Figure 1*a* is a view of a bag having no slits, with the invention applied thereto.

Figure 2 is a side elevation partly in section and partly diagrammatic of a machine for carrying out the process indicated in Figure 1.

Figure 3 is a side elevation of some parts shown in Figure 2, also partly in section.

Figure 4 is an end view of the pasting mechanism.

Figure 5 is a separate detail view showing the pasters or pads in two positions.

Figures 6 and 7 are perspective sketches on a larger scale of one of the pasting mechanisms, with the cam operating it, and the universal joint which I have devised for this movement; Figure 6 showing the pad in pasting position, and Figure 7 when not so acting.

Figure 8 is a sketch of a completed bag.

I have indicated certain parts of a "bottomer" in order to make clear a desirable location for the mechanical part of my invention; the bottomer is of the type shown in Letters-Patent to A. C. and T. E. Coty, Serial Number 1,770,972, dated July 22nd, 1930, though other machines may be used.

In Figure 1, A is the bag in its first position as it enters the new pasting mechanism hereinafter described, and successive positions are indicated at A^1, A^2, A^3, and A^4; B is the side flap of the bag, and C is the part of a flap which cor-

responds to the slitted part of the web. At E I have shown a guide mechanism which acts to turn back the flaps C until they are in substantially a vertical position, and at the same time lifts the side fold B so that the pasting mechanism may pass thereunder, as hereafter indicated. This position is shown at A^1. At A^2 the pasting mechanism has applied paste at F, F, while the flap C is still turned up. At A^3 a guide H has been interposed, which turns down the flap C so that the side fold is secured to the other parts of the web forming a closure. The bag then passes on to A^4; the paste pad of the bottomer here applies the paste at G, so that when the two flaps are folded over the one on the right will be superposed on the one on the left to form a tight closure.

In Figure 1*a* it is obvious that the guides E and H will not be needed inasmuch as there is no flap C to be turned up; and the guide E need not be employed for the purpose of lifting the flap B. As will be obvious from the shape of the pasting mechanism (see Figures 5, 6 and 7) the paste pads themselves will lift the side flap B sufficiently, and the guide E for this form of the bag would have no function, though the mechanism would operate with it in place, on bags like 1*a*.

In Figure 2 I have shown the mechanism arranged in place between the opening mechanism for the bag-bottom and the folding devices of a bottomer such as the one already referred to, as shown for example in Figure 11 of Patent No. 1,770,972. The cylinder M is mounted on the main power-shaft of the bottomer. By means of the gear M^1 indicated diagrammatically the cylinder K^2 is operated, this being the creaser cylinder of the bottomer, which bears that reference letter in the patent referred to. M^1 also drives the pulley M^7, around which one set of the belts N passes; as shown in Figure 4, there are two sets of these belts or tapes N. The gear M^8 on the shaft of the cylinder M acts to drive these cylinders or gears. On the other side of the cylinder M the gear M^2 meshes with M^8 and drives the gear M^6 around a pulley upon which the belts pass, and that gear drives the gear M^3 which operates the cylinder J of the opening mechanism of the bottomer. The pulley M^4 is loose on the shaft of the gear M^3, and M^5 is an ordinary belt-tightener mounted on an arm and having a spring (not shown) to press it against the belt. The cylinder V carries the paste pads W^1, W^2, the construction of which will be described later, and these pads pass over the pasting mechanism O. A paste device has a roll K running in a tank K^3 and with a distributing drum K^1 is also used to apply the paste G shown in Figure 1, by well-known mechanisms not shown. It will be seen that the bag A enters at the left between the cylinders I and J. It is shown already partly opened, the opening mechanism being that described in the patent already referred to. The bag then passes down between cylinders J and J^1 over the cylinder L and beneath cylinder M^6, having passed over the guide E for opening the edges C of the side folds B; pads W^1, W^2 are then operated, as presently to be described, and the blank then passes under the guides H to turn down the flaps C and thence around the creaser cylinder K^2 to the folders of the bottomer.

Figures 3, 4, 5, 6 and 7 should be read together. I have not described the paste-pad-operating mechanism in connection with Figure 2, because the parts are shown more plainly in the figures now considered.

Referring first to Figure 4, the pads W^1, W^2, are shown in the position which they will occupy when the paste is being applied beneath the folds and the guides E have turned back the parts C of the flaps B so as to be out of the way of the paste-pads. These pads (Figure 4), are mounted upon a bar W, and as will be seen, may be moved along the bar to adjust them for different positions as regards the width of the bag being made. The disks V constitute a "cylinder", as is well understood in bag-machines, and the bag A is stretched from one to the other of the disks, the closure passing through the machines in lateral position. The bar W is fixed to the disks V^1, V^1, shown on the right and left of Figure 4, and these are mounted on the shaft P, which carries the disks or cylinder V, and are secured to disk V^2 by a bolt V^3, moving in the slot V^{24} shown in Figure 3, which adjusts the position of the pads W^1, W^2, circumferentially with reference to the disks V, V, and so determine their relation to the bag-bottom. It will be seen that this gives a complete adjustability around the circumference of the disk within the necessary limits, and also a lateral adjustment to adapt them to different widths of bag blank.

The pads are operated, as will be seen in Figures 6 and 7, by means of a cam-roller V^9 running on a cam V^5 and held in place by a groove in the disk V^4, a split hub V^6 serving to adjust the position of the disk and cam so that the paste pads W^1, W^2, will be actuated at the proper time. This construction is sketched in Figure 5, which shows the two pads in solid lines in the non-pasting position, and in dotted lines in the position in which paste is being applied. The pads take the paste from the pasting device O, (see Figure 3), in which the roller O^1 driven by the roller O^2 runs in the paste in the tank, and a distributing roller O^3 is in contact with the roller O^1, and also is engaged by each of the pads W^1, W^2, as they pass it. The roller O^3 is carried on arm O^4, which is spring-pressed towards the cylinder V, the spring being adjustable by a lock-nut O^5.

Turning now to Figures 6 and 7, the construction of the pads and the means of operating them will be readily understood. I will describe Figure 7 particularly, as 6 and 7 show the same mechanism and I have omitted some of the reference characters in Figure 6 in order to clarify that drawing. Figure 7 shows the non-pasting position. Here V^4 is the outer disk as shown in section in Figure 4, V^5 is a cam, which is in general of circular outline having the raised portion or hump. The cam-roller V^9 travels in the cam-groove, the position of the high parts of the cam with reference to the roller being adjusted by means of the bolt V^{36} shown in Figure 4 on the right. This cam operates an arm V^8, which has a split hub V^6, which may be tightened upon the shaft V^7 by means of the bolt V^{23}. On the shaft V^7 is a hub V^{10} which also is split and is secured on the shaft by the bolt V^{11}. It will be seen that by easing the bolt it is possible to slide the hub V^{10} along the shaft V^7, and in this way to regulate the stroke of the paste-pad W^2, approximating hub V^{10} to the stud V^{16} about which the pad W^2 reciprocates increasing the stroke. A rod V^{13} is secured in the hub V^{10} by means of the set-screw V^{12}. This rod makes a working fit with a bore in the block V^{14}. A similar rod V^{20} passes through the hub V^{15} of an

arm V^{18}, which carries a paste-pad W^2. This rod V^{20} makes a working fit with the bore in the block V^{21} superposed on the block V^{14}, and is held in place by a set-screw V^{19}; and this part of the device beginning with the hub V^{15} oscillates by means of a hub V^{17} around the stud V^{16}, which is carried by a slide V^{25} on the bar W, as shown in Figure 4. This slide may be secured in place on the bar W by means of a bolt V^{26}.

As already stated, the hub V^{10} may be moved along the shaft V^7 in order to increase its distance from the stud V^{16} on which the arm V^{18} reciprocates and the slide V^{25} will be adjusted on the bar W so as to co-operate with the other parts of this universal joint. The cam V^5 is stationary and the whole of this apparatus rotates with the cylinder V towards the observer in Figure 4 or to the right in Figure 2. As the shaft V^7 is thus carried around the cam V^5, so long as the cam-roller is on the circular part of the cam, the pad W^2 maintains the position shown in Figure 7. When, however, the roller V^9 is drawn by the rotation of the shaft around the cam as it is drawn along by the disk V constituting the cylinder, it reaches the high parts of the cam and turns the shaft V^7 towards the observer in Figure 7. This causes the rod V^{13} to press up on the block V^{14} and consequently upon the block V^{21}, thus pressing up the rod V^{20}, and presses the arm V^{18} to the left so as to bring the pad into the position shown in Figure 6. As soon as the roller V^9 passes the high point of the cam, the pad W^2 is withdrawn to the position shown in Figure 7. The shaft V^7 in Figure 4 appears just below the bar W. The cam-groove operates the roller V^9 positively at all times.

It will be seen that in these combined instrumentalities the pads W^1, W^2, are drawn over the paste-roller O^3 by the rotation of the disks V. At the same time as the pads approach the position in which paste is to be applied between the side folds and the main web of the bag, the roller V^9 comes to one of the high points of the cam V^5 in Figure 7, and moves these pads into the position shown in Figures 4 and 6 and in dotted lines in Figure 5, in which they make contact with the bag A, as already described. Upon passing further along, the pads are brought back to the full-line position shown in Figure 5. They then are operated by the other hump of the cam V^5 so that they assume the position shown in Figure 6 as they pass over the paste-roller O^3, then returning to the position shown in Figure 7.

It will be understood from Figures 3 and 4 that there are two sets of the pads, being four in all, to accommodate the four positions of the paste F shown in Figure 1. The second set of pads being exactly like the first and being operated by similar mechanism in the same way, it is unnecessary to describe them further.

The mechanism is so located with relation to the bottomer that its functions are performed between the time of opening the flaps of the bottom of the bag and the time when the bag passes to the folding mechanism of the bottomer.

Figure 8 shows the bag as finally completed, which does not differ in appearance from other well made bags, though of superior construction.

It is obvious that equivalent mechanisms could be devised which, while changing the form, would embody the invention herein described, and I aim to cover such mechanism by the claims.

I claim:—

1. The improvement in the art of making bags from blanks, which consists in opening the end of a bag-blank to form side folds and longitudinal folds; applying paste beneath the under sides of the side folds and the parts of the web employed in forming the closure, and then completing the closure with the longitudinal folds.

2. The improvement in the art of making bags from blanks, which consists in opening the end of the blanks to form side folds and longitudinal folds; separating the side folds from the adjacent parts of the web employed in forming the closure of the bag; applying paste between the side folds and the adjacent parts of the web; returning the side folds to position and completing the closure of the bag.

3. In bag-making apparatus, means for opening the end of a bag-blank to form side flaps and longitudinal flaps; means for applying paste beneath the under sides of the side flaps and parts of the web adjacent thereto which are employed in forming the closure; and means for completing the closure of the bag with the longitudinal flaps.

4. In bag-making apparatus, means for opening the end of the blank to form side-folds and longitudinal-folds; means for separating the side folds from the adjacent parts of the web which are employed in forming the closure of the bag; means for applying paste between the side folds and the adjacent parts of the web; means for returning the side folds to position; and means for completing the closure of the bag.

5. The improvement in the art of closing pasted bags, which consists in advancing a tubular bag-blank having unsecured side and end closure flaps; lifting the side flaps to a desired extent while the blank is advanced; applying adhesive under the lifted flaps; sealing the flaps by the adhesive; and then completing the closure.

THOMAS EARL COTY.