

Sept. 10, 1935.

T. M. ROYAL

2,013,672

IMPROVED METHOD OF MAKING BAGS

Filed June 13, 1931

2 Sheets-Sheet 1

Fig. 1

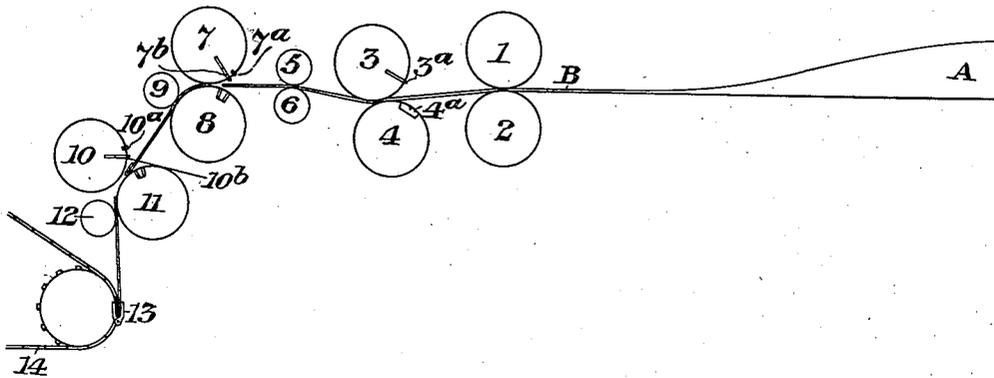


Fig. 2

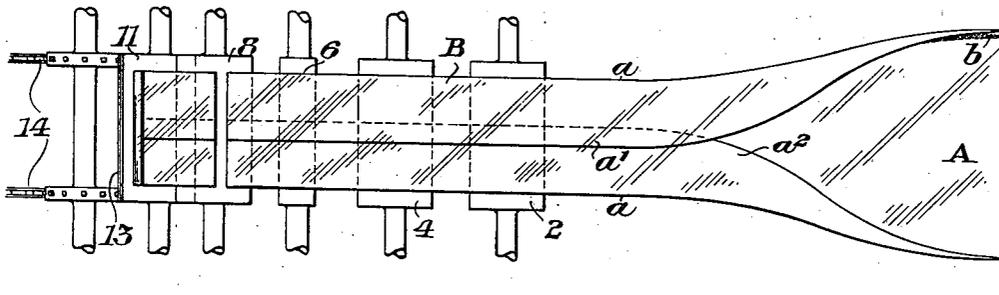


Fig. 3

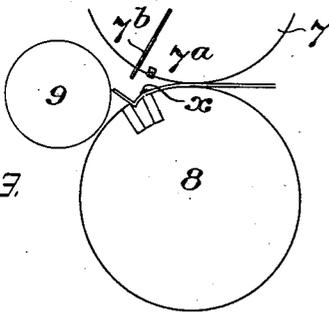


Fig. 5

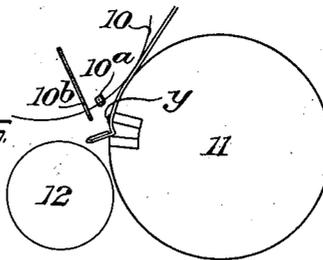


Fig. 4

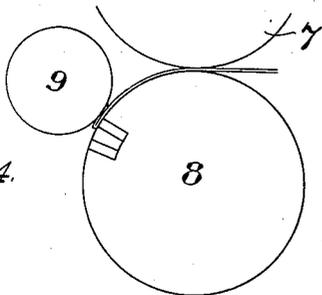
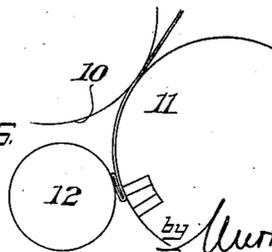


Fig. 6



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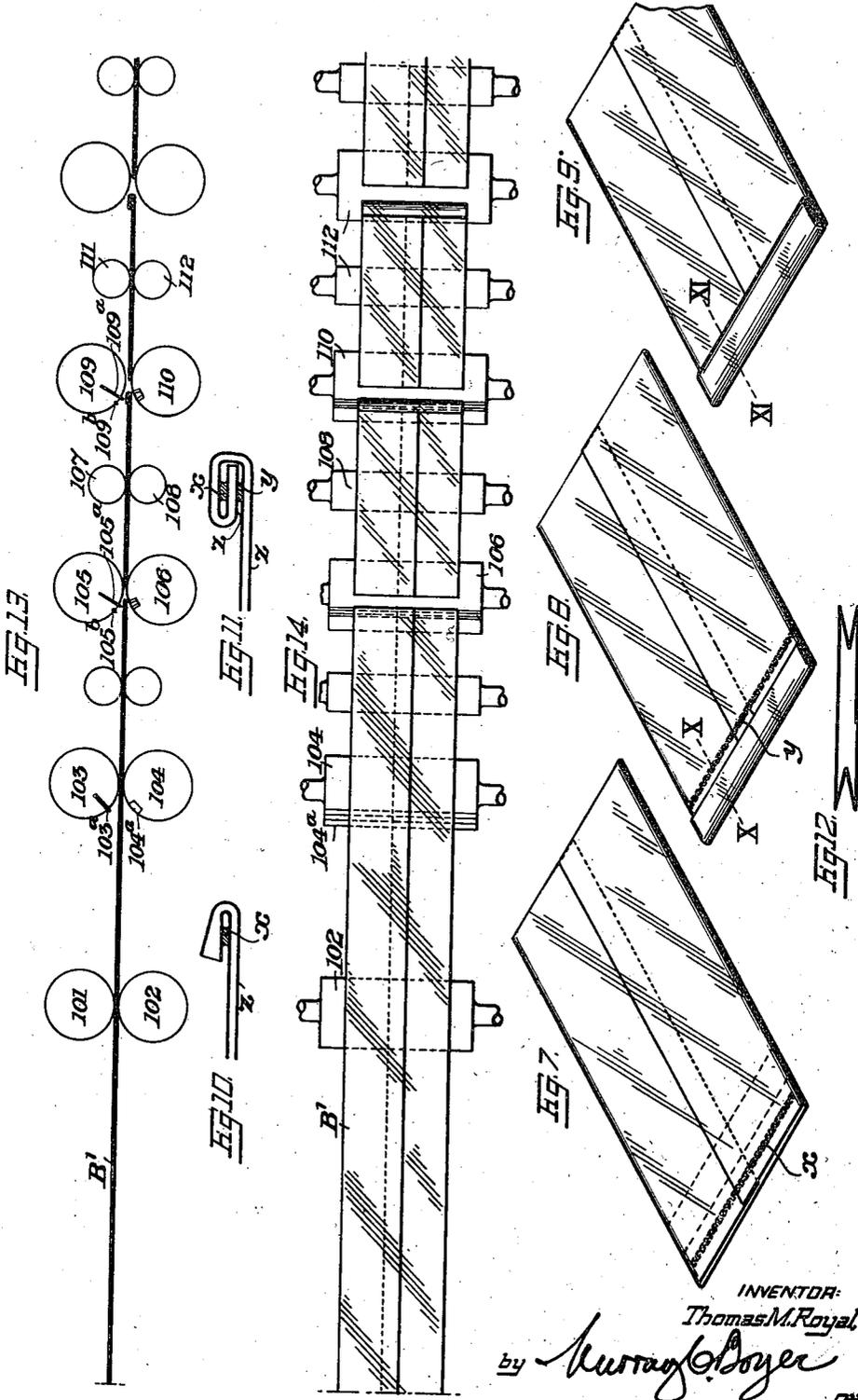
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IMPROVED METHOD OF MAKING BAGS

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UNITED STATES PATENT OFFICE

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IMPROVED METHOD OF MAKING BAGS

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Application June 13, 1931, Serial No. 544,080

5 Claims. (Cl. 93—35)

My invention relates to the manufacture of bags and analogous containers of paper and similar material of the type usually produced upon bag machines. Paper bags and the like, ordinarily produced by the operation of automatic machines, are made from blanks comprising sections of a continuous or continuously formed tube of paper or other material developed in the usual or well-known manner. The ordinary manner of forming these blanks is to separate the same successively from such tube by transverse cuts or breaks effected by a striker blade whose timed operation regulates or determines the length of the blanks. These striker blades are usually so arranged and operated that their action produces blanks in which one wall at each end thereof is longer than the other, and these ends may be substantially straight or the end of one wall portion may be relatively straight while the ends of the other wall portion may be curved. In both instances one end of each wall portion of the blank projects beyond the end of the other wall portion, and one of these projecting ends is subsequently folded and pasted down to form a bottom or end closure and thus produce a bag. When one of these ends is curved the convexly curved portion projects at one end while the straight edge portion projects at the opposite end and it is this latter end that is subsequently folded and pasted down to form the bottom. As the striker blade is usually, and in most instances necessarily, provided with serrations, the end edges of the wall portions of the blank; those at the open end of the finished bag, as well as those at the end turned over to form the closure or bottom of the bag, are serrated.

In the formation of the bottoms of bags thus made, a portion of suitable adhesive is usually applied to a face or wall of the bag adjacent to the part to be turned over or upon the latter, and this folded portion is then flattened down and fastened against one wall of the bag by the interposed adhesive. But this mode of fastening the turned portion of the blank to form the bottom closure has never been entirely satisfactory. By reason of the fact that the adhesive can only be applied to one face of the wall of the blank and usually within the side margins thereof, unconfined portions are left at the sides of the bag bottom adjacent to the corners thereof, which constitute air gaps.

In the manufacture of bags from "cellophane" or similar pellicles or films, it is undesirable to separate the pre-formed tube into blanks by means of a serrated striker blade. In the first

place, while "cellophane" is relatively strong when subjected to strain in either direction it is, nevertheless, more or less fragile and if the fibres are broken or ruptured at any edge of the same it can be readily torn or separated at right angles to said edge, usually longitudinally of the blank or the finished bag. If therefore blanks are formed from a tube by severing the latter transversely of its length by a striker blade having a serrated edge, the fibres of the "cellophane" are so broken or ruptured by such blade at such serrated edge as to make it possible easily to tear the same at right angles to said edge; a tear being liable to start at any serration and when once started continuing throughout the body of the blank or the finished bag. Additionally, as the points of the serration are relatively stiff, they interfere with the insertion of many goods. These "cellophane" bags or containers of "cellophane" with serrated edges can not be used for the packaging of sheer silk stockings, as the points stick in the stockings, pick up stitches and cause runners. "Cellophane" bags with serrated edges are also objectionable for many other reasons; one being their unsightliness. If, however, the tube of "cellophane" is severed into blanks by straight, shear cuts transversely of its longitudinal axis, it is almost impossible to start a tear from such straight cut edges. For practical reasons, in the formation of blanks by straight cuts transversely of their length, each wall of the blank is of the same length.

These straight cut blanks with each wall of the same length can not be bottomed or closed to form bags in the usual manner, since the adhesive applied to retain the folded end employed in forming such bottom closure would only engage adjacent portions of the same face or wall of the bag blank, and as the other wall of the blank would be wholly unconfined, an open end would result. To overcome this objection, I propose to give one end of the bag blank, which may be a straight, smooth cut end, a double fold, and to permanently secure the second folded portion to one side wall of the same; the inner face of such second portion which adheres to one face or wall of the bag blank being part of the face of the opposite side or wall of the bag. Preferably, both folded portions will be secured by lines of adhesive, suitably applied.

These and other features of my invention are more fully described hereinafter; reference being had to the accompanying drawings, more or less diagrammatic in character, in which:

Figure 1 is a side elevation of sufficient of the

mechanism of an automatic bag-making machine to illustrate means which may be employed and successive steps in the manufacture of my improved double-folded-bottom bags.

5 Fig. 2 is a plan view of a portion of the mechanism illustrated in Fig. 1; the upper rolls being omitted.

Fig. 3 is an enlarged diagrammatic view of the means employed for making the first fold and 10 applying adhesive to the blank in the formation of the bottom closure.

Fig. 4 is an enlarged diagrammatic view showing the first folded end portion of the blank passing between pressing rolls.

15 Fig. 5 is an enlarged diagrammatic view of the means employed for applying the second fold to the end of the blank and applying adhesive whereby the latter may be secured in place.

Fig. 6 is an enlarged diagrammatic view showing 20 the rolls for pressing down the double-folded bottom.

Fig. 7 is a perspective view of a bag blank prepared in accordance with my invention before the same has been formed into a bag; the 25 position of the folds being indicated by dotted lines, and a line of adhesive being indicated.

Fig. 8 is a similar view, illustrating the bag blank after the first bottom fold has been applied thereto.

30 Fig. 9 is a perspective view of the finished bag.

Fig. 10 is an exaggerated cross-sectional view taken on the line X—X, Fig. 8, showing the single fold secured by a line of adhesive.

35 Fig. 11 is a similar cross-sectional view taken on the line XI—XI, showing the double fold secured in place by a second line of adhesive.

Fig. 12 is a cross-sectional view illustrating another type of tube which may be formed into 40 bag blanks, in accordance with my invention.

40 Fig. 13 is a view in elevation illustrating other means which may be employed to produce bags with double-folded bottoms, and

45 Fig. 14 is a plan view of the elements illustrated in Fig. 13; the upper rolls shown therein being omitted.

The common practice in the manufacture of flat bags made of the usual tubing formed by longitudinally folding a continuous web or sheet of material and fastening overlapping edges of the same together by a longitudinal seam, or square bags made from tubing with bellows-folded or plicated sides, is to sever blanks from such tube by means of a striker blade which is moved at regularly timed intervals in a plane transversely of the tube as the latter is carried forward by draft rolls or other means commonly employed in bag machines of the automatic type. The effect of this operation of the striker blade with the cooperating parts is to produce blanks having projecting portions at each end of the same; one wall extending beyond the other wall of the blank in alternate relation, with each end edge of said walls serrated. Following this action of the striker blade the forward end of the blank with the projecting end portion of one wall or side of the same is creased and folded or turned over and fastened down by a transverse line of adhesive which is preferably applied to one face or wall of the blank just in advance of the creasing and folding operation; the projecting portion of one wall of such blank engaging such adhesive.

75 Bags so made usually present an open end with one wall or side projecting beyond the other, with both edges serrated. While such bags are entire-

ly efficient for many purposes, the serrated edges at the open end of the same are highly objectionable, and in the manufacture of bags from the transparent material familiarly known as "cellophane", the presence of these serrated edges is particularly objectionable. While "cellophane" possesses considerable tensile strength and may be subjected to more or less strain in any direction without danger of tearing the same it is, nevertheless, more or less fragile and if the fibres are broken or ruptured at any edge of the same it can be readily torn or separated at right angles to said edge, usually longitudinally of the blank or finished bag; such tearing being likely to occur when goods or commodities are being inserted in such bags. If therefore blanks are formed from a tube of "cellophane" by severing the latter transversely of its length by a striker blade having a serrated edge, the fibres of the "cellophane" are so broken or ruptured by such 10 blade at such serrated edge as to make it possible to easily tear the same at right angles to said edge; a tear being liable to start at any serration and when once started continuing throughout the body of the blank or the finished 25 bag. Additionally, as the points of the serrated edges are relatively stiff, it is more or less difficult to insert some types of merchandise, sheer silk stockings, for instance, in these bags or containers; the points of the serrations being sufficiently sharp to catch the threads and cause runs in such stockings, in the operation of packaging the same in "cellophane" bags or 30 containers.

I propose to overcome this difficulty by forming blanks from a tube of "cellophane" which may be produced in any suitable manner, including formation by an automatic bag machine or otherwise, by successively severing such tube into blanks by smooth, shear cuts applied transversely 40 of the same substantially at right angles to the longitudinal axis of the tube, and to provide bottom or end closures for such blanks by imparting double folds to one end of the same and securing such folds to a wall of the blank which subsequently forms the bag. Each fold may be 45 secured by a transverse line of adhesive.

In the drawings, which are largely diagrammatic, A may represent a web of "cellophane" which may be developed into a tube B, by folding the same along the lines a , whereby one side portion a' , of such web is caused to overlie the other side portion a'' thereof; the overlapping portions forming a seam and being secured together by an interposed line of adhesive b applied adjacent to one edge of one side portion of such web.

In carrying out my invention, the tube of "cellophane", indicated at B, and which may be formed from the web A in the usual manner common in the operation of automatic bag-making machines or otherwise, may be carried forward by draft rolls 1 and 2 and presented to cutting rolls 3 and 4; the former having a blade 3^a extending longitudinally of the roll and serving, in cooperation with an anvil plate 4^a carried by the roll 4, to produce a shear cut transversely of the tube B and form successive blanks therefrom. From the cutting rolls the severed blanks pass to forwarding rolls 5 and 6, and from 70 the latter they are delivered to cooperating paste-applying and bottoming rolls 7 and 8. The upper roll 7 may carry a paste-applying element 7^a extending longitudinally of such roll, with a creasing and tucking blade 7^b parallel therewith, 75

which creasing blade is adapted to engage the body of the blank adjacent to the forward end thereof and press such end in folded relation between gripping elements carried by the roll 8 which are presented thereby in open position to receive such folded portion; such gripping elements being subsequently closed and holding the folded end of the bag blank and carrying it forward for subsequent engagement by a small pressing roll 9. Just before the folded end of the blank reaches the roll 9 the gripping means carried by the roll 8 are released and the folded end of the bag blank automatically springs out of contact therewith and momentarily occupies a position with the folded end free and ready for presentation to the small press roll 9 as shown in Fig. 3; the latter roll serving to press the folded end of the blank against the transverse line of paste, indicated at x and previously applied to the face of the blank. The rear portion of the bag blank is still within the bite of the rolls 7 and 8 and is being advanced thereby before the roll 9 engages the same against the surface of the roll 8, as shown in Fig. 4, and from said rolls 8 and 9 the bag blank with the single bottom fold passes to a second set of bottoming and paste-applying rolls 10 and 11 which may be of the same character as those indicated at 7 and 8; the roll 10 having a paste-applying element 10^a, and a creasing and tucking blade 10^b; the latter being adapted to engage the single folded end of the bag blank and press such end in further folded relation between gripping elements of the same type as those carried by the roll 8; such gripping elements holding the folded end of the bag and carrying it forward for subsequent engagement by a small pressing roll 12. Just before the double-folded end of the blank reaches the roll 12 the gripping means carried by the roll 11 are released and the double-folded end of the bag automatically springs out of contact therewith and momentarily occupies a position with the double-folded end free and ready for presentation to the small press roll 12, as shown in Fig. 5; the latter roll serving to press the double-folded end of the bag against the second transverse line of paste, indicated at y and applied to the face of the bag wall, as shown in Fig. 5. From this second bottoming operation the folded ends of the bag blank may be presented to and caught successively by gripping members 13 carried at properly spaced intervals by an endless chain 14, diagrammatically indicated in Fig. 2; being held by such gripping elements until the pasted portions are sufficiently set to retain the folded portions in definite position to complete the bag.

Figs. 7, 8 and 9 show a blank and the successive steps of forming the same into the bag with the double-folded end or bottom closure. In Figs. 10 and 11 I have shown, in greatly exaggerated form, the respective folds at the end of the bag, with the lines of paste between the same; the second fold when pasted down serving to completely close and seal one end of the blank to form the desired bag. The double-folded end produced in the manner described, completely seals the end of the bag and avoids the air gaps at the corners of the bags common to those types of bags having their bottoms formed by a single fold of the material. As clearly shown in Fig. 10, a single fold of the end of the blank is insufficient inasmuch as it leaves one side wall of the bag unconfined; the straight shear cut producing blanks having side walls of the

same length throughout. When the second fold is applied, as indicated in Fig. 11, one wall of the bag, which may be indicated at z for convenience, is brought over and secured to the opposite wall or face of the bag which, for convenience, is indicated at z' .

While I have illustrated in the perspective views a flat bag of the type having single walls with side folds, it will be understood that my invention is not limited thereto and that square bags made from bellows-folded tubing such as indicated in Fig. 12, may be bottomed in a manner precisely similar to the flat bags illustrated, without departing from my invention.

It will be understood of course that I do not wish to be limited to the use of mechanism such as that illustrated in Figs. 1 and 2, for carrying out the method or process constituting my invention. While such means is well adapted to produce from straight cut blanks the double-bottomed bags forming part of my present invention, other means for effecting the same result may be employed, and in Figs. 13 and 14 I have shown a modified arrangement of mechanism which may be employed in the production of bags with double-folded end closures.

In Figs. 1, 2, et seq., I have illustrated the features of my invention in connection with tubing produced upon an automatic bag machine in advance of the blank severing means. It will be understood, however, that my improved bags may be made from preformed tubing, which may be presented to the severing means for formation into blanks; such blanks being carried forward for the performance of the several operations necessary to transform the same into bags with double-folded ends, and the mechanism illustrated in Figs. 13 and 14 is shown as operating upon a pre-formed tube of material.

In the operation of the mechanism arranged in the manner illustrated in Figs. 13 and 14, which views are purely diagrammatic, a tube B', previously formed from a web of "cellophane," may be carried forward by draft rollers 101 and 102 and presented to cutting means for severing the same into bag blanks, which may comprise a pair of rolls 103 and 104; the roll 103 having a straight cutting blade 103^a arranged lengthwise thereof and adapted to cooperate with an anvil 104^a carried by the roll 104. The blanks thus formed may then be presented to a pair of rolls 105 and 106; the former having a paste-applying element 105^a arranged lengthwise of the same, adjacent to a folding blade 105^b; the latter cooperating with gripping means carried by the roll 106, and these elements respectively serve to apply a line of paste transversely of the blank adjacent to one end of the same and impart a fold to said end which is subsequently turned over in the same manner as illustrated in Figs. 1, 2, et seq. The blank with the single turned end may be carried forward by draft rolls 107 and 108 and pass to rolls 109 and 110, which may be of the same character as the rolls 105 and 106; being provided with cooperative means for creasing and folding the end of the bag blank to form the second fold, and such means may include a folding blade 109^a carried by the roll 109 and cooperating with the complementary means carried by the roll 110 for securing the final fold in place. The roll 109 also carries a paste-applying element 109^b which acts after the creasing action by the blade 109^a. From these latter rolls, the bag with the double-folded end may be carried forward by a series of draft rolls 111 and 112 whereby the

final fold may be given preliminary pressure against the second line of paste and passed to gripping means which may be the same as those shown in Figs. 1 and 2, for holding the finally 5 folded end of the bag until the paste is set. Such gripping means may be carried by endless chains in the same manner as indicated in Figs. 1 and 2. The bags produced by such mechanism from the pre-formed tube of material, "cellophane" or the 10 like, may be of a type identical with those illustrated in Figs. 7, 8 and 9.

If these bags are to be printed, the gripping means carried by the endless chains and engaging the finally folded ends of the bags may serve 15 to convey them to a point where they will be discharged ready for presentation to the impression platen of suitable printing mechanism.

When "cellophane" is severed by a smooth, shear cut, which may be transversely of the longitudinal grain thereof, the danger of tearing or 20 starting a tear at such edge is so greatly reduced as to be practically negligible, hence bags made in accordance with my invention with smooth, clean cut edges will stand considerable handling 25 without tearing, when goods or commodities of any nature are inserted in the same. It will be understood that while a substantially straight cut may be desirable in many instances I may employ blades capable of imparting smooth, clean 30 cuts transversely of the tube in a relatively curved direction, or at an angle which may be other than a right angle.

While I have illustrated in the drawings different forms of mechanism capable of effecting the 35 double fold and sealing the same to the end of a tubular blank for the purpose of transforming such blank into a bag or container with a closed end or bottom, it will be understood that I do not wish to be limited to any of the mechanisms illustrated, or any part thereof, since any means 40 capable of preparing blanks with smooth edges and effecting the double-folded end closure of the same is within the scope of my invention.

It will be understood of course that I may employ any form of material in the manufacture 45 of my improved bags, and that when "cellophane" is employed I may use any form thereof; including the water- or moisture-proof type. It is believed that the water- or moisture-proof coating 50 imparts to the "cellophane" additional strength or resistance to tearing.

I claim:

1. The method of making bags of "cellophane" and similar material which consists in continuously forming a web or sheet of "cellophane" or 55 similar material into tubular shape, imparting movement to said tube longitudinally of the same, severing said tube by substantially straight, transverse clean edged cuts into blanks of predetermined length, applying lines of adhesive transversely of said blanks adjacent one end of the 60 same, imparting a plurality of folds to said end

of the blanks, causing said folded portions to engage said lines of adhesive, and successively compressing said folded end portions against such adhesive.

2. The method of making bags of "cellophane" 5 and similar material which consists in forming a web or sheet of "cellophane" or similar material into tubular shape, severing said tube by straight transverse cuts into blanks of predetermined length, applying a line of adhesive transversely 10 of said blanks adjacent one end of the same, folding said end of the blanks and causing it to engage said line of adhesive, compressing said folded end, applying a second line of adhesive, imparting a second fold to said blanks which includes 15 the first fold, and confining said second fold in place in contact with the second transverse line of adhesive.

3. The method of making bags of "cellophane" and similar material which consists in forming a 20 web or sheet of "cellophane" or similar material into tubular shape, severing said tube by straight transverse cuts into blanks of predetermined length, applying a line of adhesive transversely of said blanks adjacent one end of the 25 same, simultaneously folding said end of the blanks and causing it to engage said line of adhesive, compressing said folded end, applying a second line of adhesive, simultaneously imparting a second fold to said blanks which includes 30 the first fold, and confining said second fold in place in contact with the second transverse line of adhesive.

4. The method of making a bag of "cellophane" or similar material which consists in forming a 35 web or sheet of cellophane or similar material into tubular shape, imparting movement to said tube longitudinally of the same, severing said tube by straight, transverse clean edged cuts into a blank, applying a plurality of lines of adhesive in 40 parallel relation transversely of said blank adjacent one end of the same, imparting a double fold to said end of the blank, causing said folds to engage said lines of adhesive, and finally compressing said folded end into sealing contact with 45 a wall of said blank to complete the bag.

5. The method of making a bag of "cellophane" or similar material which consists in forming a web or sheet of "cellophane" or similar 50 material into tubular shape, imparting movement to said tube longitudinally of the same, severing said tube by straight transverse, clean edged cuts into a blank of predetermined length, successively applying lines of adhesive in parallel relation transversely of said blank adjacent one 55 end of the same, successively imparting a double fold to said end of the blank, causing the respective folds to engage said lines of adhesive, and compressing said finally folded end into sealing contact with a wall of said blank to complete the 60 bag.

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