

Dec. 17, 1940.

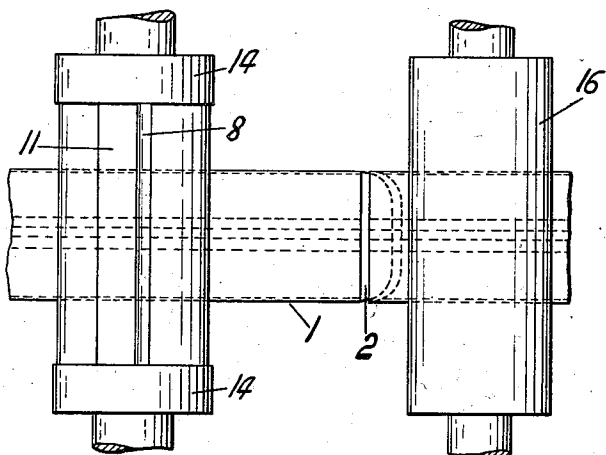
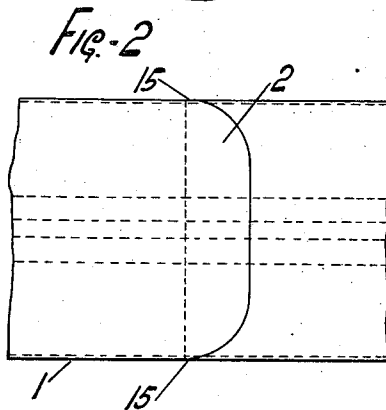
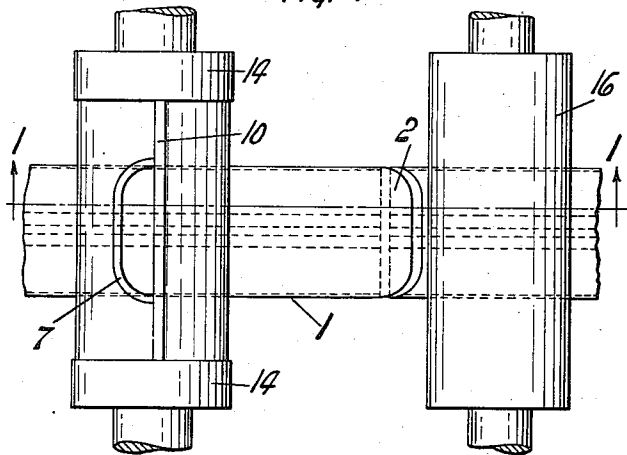
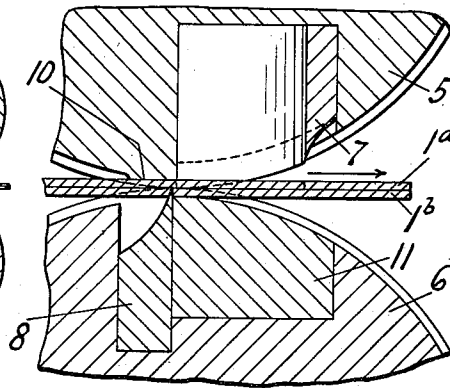
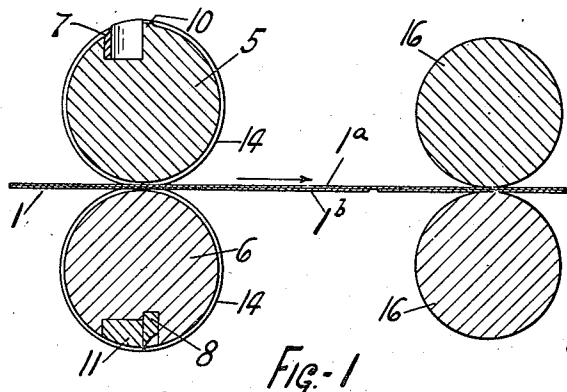
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2,225,288

METHOD OF MANUFACTURING BAGS

Filed July 21, 1937

2 Sheets-Sheet 1



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Fig.-6

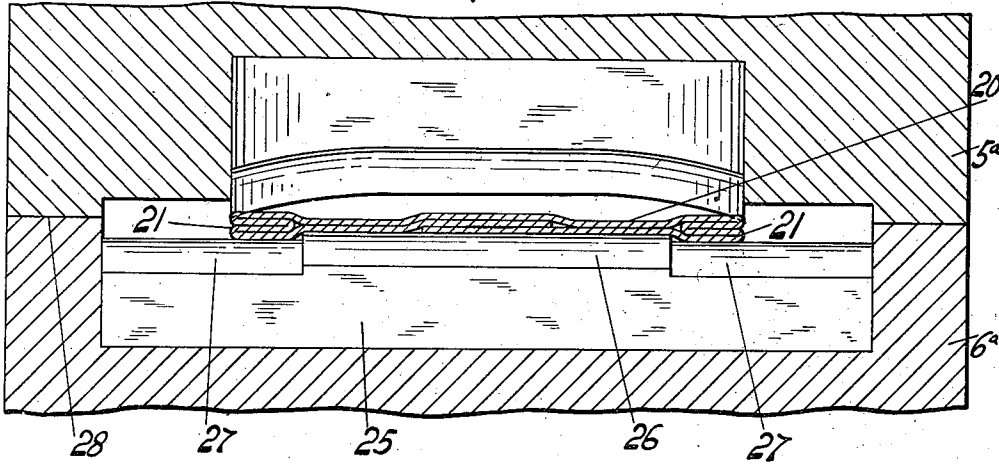


Fig.-7

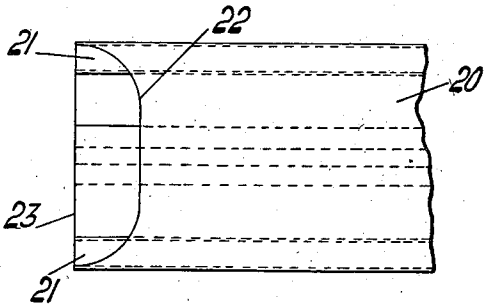
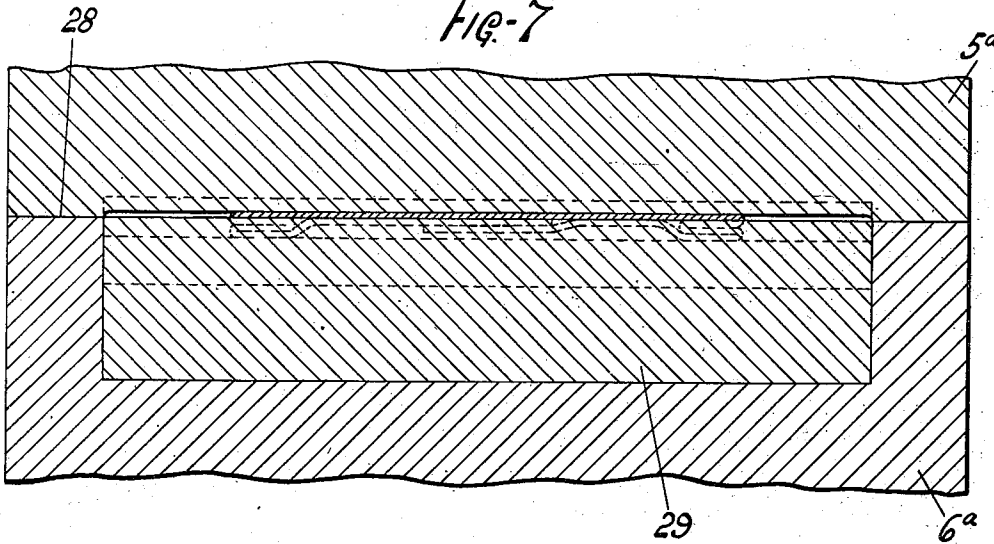


Fig.-8

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METHOD OF MANUFACTURING BAGS

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13 Claims. (Cl. 93—35)

The present invention relates to a new and improved method for the manufacture of bags or bag blanks from tubular stock, and while the invention may have a broader or more extended application, it is particularly adapted and intended to be used in the manufacture of bags from "Cellophane" or similar transparent sheeting.

The object of the invention is to improve upon existing methods. By the use of the invention the manufacture of bags from this type of material is simplified, the machines may be speeded up and production increased. Waste due to faulty register of various operative parts of the bag making machine is eliminated and many other advantages are secured thereby.

The purpose of the invention is to improve upon and adapt more efficiently the basic invention contained in the patent to Schmidt No. 2,074,992, dated March 23, 1937, and to apply that invention so as greatly to increase its utility and adaptability to the manufacture of both flat and square bottom or pleated bags, or any other type of bag. The Schmidt patent referred to disclosed cutting one end of a bag from a tubular web by a knife cut which enters one ply or side of the bag and cuts that ply against the other side or ply. In that invention, however, only one end of the bag was cut. By the present invention it is possible to cut both ends of the bag by the use of the basic conception of the Schmidt patent. It is thus practical to dispense altogether with the use of a mandrel within the bag against which a cut is made, and such omission greatly simplifies the operation of the bag making machine.

It will be seen by the disclosure contained herein that the old methods of bag making are replaced by a more efficient method and apparatus.

The disclosure in this case is of the best known form of the invention and is made for the purpose of enabling those skilled in the art to practise the invention, but it will be understood that the details are not essential and may be varied or modified within the scope of the invention.

There are shown herein two forms of the invention, the first being adapted for the manufacture of the so-called "flat" bags in which the stock is formed as a simple tube without reentrant folds or bellows. The second form of the invention is adapted for the manufacture of the square type of bag in which the sides are formed with the bellows folds. For any other type or style of bag the necessary modifications may be made.

In illustrating the invention, the means for forming the tubular stock in the web is not illustrated as this mechanism is well known in the art and has no bearing upon the invention, and any form of tube making device may be employed. Nor has it been necessary to illustrate the final operation of making the bag by which one end of the bag is folded over and sealed to the opposite face of the bag to make the closed end, as this mechanism is old and well known in the art.

It will be understood that the illustration and disclosure of the invention made herein is for the purpose of explaining the same so that those skilled in the art may practise it, and that changes and modifications may be made within the scope of the invention as set forth more particularly in the claims.

In the drawings Figs. 1 to 5 show the means for cutting the flat bag and Figs. 6 to 8 the modifications for the square bottom or pleated bag.

Fig. 1 is a transverse section through the cutting and separating rolls on the line I—I of Fig. 3;

Fig. 2 is an enlarged section through the cutting rolls during the cutting operation;

Fig. 3 is a top plan view of the parts shown in Fig. 1;

Fig. 4 is a view of the underside of the parts shown in Fig. 1;

Fig. 5 is a plan view of the tube as it is cut and before separation of the successive blanks;

Fig. 6 is a section through a pleated tube showing the cutting rolls adapted for that operation;

Fig. 7 is a section through the rolls showing the cutting of the lower ply and the reentrant folds;

Fig. 8 is a view showing the end of a blank of the square type.

In the various views it will be understood that the thickness of the material may be exaggerated for the purpose of making the invention clearer, and the drive mechanism for the various rolls has been omitted for clearness and simplicity.

In the form of the invention shown in Figs. 1 to 5 inclusive, the flat two-ply tubular bag stock is indicated by the numeral 1, consisting of the upper ply 1^a and the lower ply 1^b. In the formation of the flat bag, as illustrated, the upper ply is cut upon a curved or arched line to form the extending flap 2 on the open end of the bag, the corresponding recess on the opposite end of each bag blank being folded over and sealed to make the end closure.

The present invention provides for the practically simultaneous cutting of both the upper and

lower plies by passing the tubular stock through upper and lower cylinders 5 and 6. The upper cylinder is provided with the curved or arch shaped blade 7 which forms the flap, and the lower cylinder with the straight blade 8 which forms the straight end of the bag. Each of the knives projects outwardly from its roll a sufficient distance to cut through its respective ply only, and thus to cut against the opposite ply. Thus the blade 7 enters and severs the upper ply only, while the blade 8 enters and severs the lower ply only. It will be understood that the knife blades may be reversed and that different configurations of cuts may be made by changing the shape of the blades.

Each roll operates as an anvil for the knife on the opposite roll, thus, the roll 6 operates as the anvil for the knife 7 and the roll 5 as the anvil for the knife 8. As the two cuts do not register, the knives do not register, and a minute space, approximately .010 of an inch, is allowed so that there is no danger of injuring the knives by interference. The roll 5 is provided with a slightly elevated, hardened surface 10 against which the blade 8 will sever the lower ply and the roll 6 is provided with an insert or anvil 11 against which the blade 7 will sever the upper ply. The anvil 11 is preferably set in the roll and is of sufficient breadth and extent to include the entire surface of the blade 7.

In order to insure the accuracy of the cuts, so that each blade will pass through its own ply and not cut through the opposite ply, the rolls 5 and 6 are provided with raised bearing surfaces 14, which are each substantially the thickness of one ply of the material and which are in rolling contact. The overlapping seam will compress sufficiently in passing through the rolls so as to be a negligible factor.

It will be observed that, as the blades do not actually register at their ends, slight uncut portions will be left on the corners or edges of the tubular stock. These uncut areas are indicated by the numeral 15 in Fig. 5. The successive bag blanks are separated or torn apart by the next rolls through which the stock passes in the direction of the arrow in Fig. 1, and as the uncut area is quite narrow, this operation may be performed without injury to the bag blanks.

The rolls which separate the blanks are indicated by the numeral 16. They are spaced sufficiently from the cutter rolls so that they will seize the forward end of each bag blank before the cutters on the rolls 5 and 6 are in position to make the next cut. The rolls 16 are overdriven slightly with respect to the rolls 5 and 6 so that each bag blank is torn from the end of the tubular stock, as shown in Figs. 1, 2 and 3. This operation completes the cutting of the bag blanks and from the rolls 16 the blanks pass through the usual gumming and folding mechanisms common to bag making machines.

In the making of square bottom bags, which are characterized by the reentrant folds or bellows sides, the problem of adapting the invention is complicated by the difference in the thickness of the stock. This is illustrated in Figs. 6 and 7 in which 5* is the upper roll and 6* the lower roll, in which the tubular stock is indicated by the numeral 20, the folded or pleated sides of the bag being indicated by the numeral 21. It will be observed that along the sides of the tubular stock the material is of four thicknesses or plies, while over the major portion of the width it is only two plies in thickness, disregarding the over-

lapping seam. In this form the upper or curved blade cuts through the top ply only as shown at 22 in Fig. 8, while the straight cut 23 passes through the lower ply and the pleated side walls.

Unless means were provided to compensate for the difference in thickness between the side and edge portions of the stock, the curved blade would sever only the pleated sides of the stock, and for this purpose a special anvil 25 is formed on the lower roll, as shown in Fig. 6. This anvil is provided with a raised central portion 26 and depressed side portions 27. The portion 26 is equal to the added thickness of the two extra plies at the sides of the blank and fits between the pleated portions of the blank so as to give the proper backing for the curved blade, while the recessed side portions relieve the edges of the blank sufficiently to compensate for the two added thicknesses of material. It may be noted that the seam will compress in this form as in the first or flat tube. The proper spacing of the rolls is maintained by the rolling contacts between the two rolls at 28.

The lower roll 6a is provided with the straight blade 29 which cuts through all of the plies except the uppermost ply. The relative spacing and location of the blades in the form shown in Figs. 6 and 7 is the same as for the flat bags, and the separating rolls are similar.

The invention primarily consists in providing a method and means by which the feature of cutting a plied blank of material, and particularly a tubular stock, by a cut through one ply and against the opposite ply may be adapted for both sides of the stock. Using each knife roll as the anvil or supporting surface against which the opposite roll and blade will cut, not only simplifies the operation but it makes register of the cuts positive and accurate and avoids the rejections and waste due to faulty register where the cutting of the opposite plies has been done at spaced points as heretofore. By the system shown it is possible to secure so close a register of the opposite cuts, due to the absence of a central mandrel, that the formation of preliminary cuts in the stock are unnecessary.

Other advantages are apparent in the invention, as will be understood by those skilled in the art.

What is claimed is:

1. In the manufacture of bags from tubular stock, the process of concurrently cutting through opposite plies of the stock while the plies are in contact by oppositely directed cuts passing through each ply only and against but not entering the adjacent ply.

2. In the manufacture of bags from tubular stock, the process of cutting through the opposite plies of the stock while the plies are in contact by substantially simultaneous cuts passing through each ply only and against but not entering the adjacent ply.

3. In the manufacture of bags from tubular stock, the process of cutting through the opposite plies of the stock while the plies are in contact by concurrent cuts repeated along the stock, which cuts enter the opposite plies but do not penetrate the adjacent plies and are out of register at the edges of the stock sufficiently to leave tearable portions between the ends of the cuts, and separating the successive blanks by tearing such uncut areas.

4. In the manufacture of bags from tubular stock, the process of compressing the stock between two backing surfaces and cutting opposite plies of the stock by cuts which enter the plies

from opposite sides but do not penetrate the adjacent plies, while each cut is supported by the oppositely positioned backing surface.

5 5. In the manufacture of bags from tubular stock while the plies thereof are in contact, the process of cutting bag blanks from the stock by repeated cuts from opposite directions, each cut penetrating one ply only but not passing into the adjacent ply, the two cuts defining the bag
10 mouth and being out of exact register at the edges of the stock, and separating the successive blanks by tearing the uncut portions of the stock remaining after the completion of the cutting operation.

15 6. In the manufacture of bags from tubular stock having pleated edge portions while the plies thereof are in contact, the process of cutting bag blanks from the stock by repeated cuts from opposite directions, one cut penetrating one ply
20 only and the other cut penetrating the other ply and the pleated edge portions, each cutting operation being performed against the remainder of the stock.

25 7. In the manufacture of bags from tubular stock having pleated edge portions while the plies are in contact, the steps of supporting each side of the stock against a backing surface, one of the surfaces being of irregular depth to accommodate the added thickness of stock at the edge portions,
30 and cutting the plies from opposite directions, each cut being made directly against the stock and one of said cuts passing through one ply and the pleated side portion, while the other cut passes through the other ply only.

35 8. A process in accordance with claim 6 in which the cuts are out of register sufficiently to leave tearable uncut areas at the edges of the stock, and separating the blanks by tearing them apart.

9. A process in accordance with claim 7 in which the cuts are out of register sufficiently to leave tearable uncut areas at the edges of the stock, and separating the blanks by tearing them
5 apart.

10. In the manufacture of bags from tubular stock, the process of compressing the stock between an uncountoured backing surface and a countoured backing surface, cutting through one ply in contact with the uncountoured backing surface
10 against but not into the remaining plies and concurrently cutting through the remaining plies against but not into said first ply.

11. In the manufacture of bags, the process of bringing a plurality of plies of stock in contact
15 against a backing surface and concurrently cutting through one ply in contact with said backing surface against but not into the remaining plies and cutting through the remaining plies against but not into the first ply. 20

12. In the manufacture of bags, the process of compressing a plurality of plies of stock between substantially opposed cutting members, operating said cutting members substantially simultaneously and spacing said cutting members so that each
25 cutting member cuts through the ply in contact with said cutting member against but not into the ply in contact with said opposed cutting member.

13. In the manufacture of bags from tubular
30 stock, the process of cutting through opposite plies of stock by operating substantially opposed cutting members and spacing said cutting members so that each cutting member cuts through one ply against but not into the adjacent ply. 35

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