March 8, 1932. I. GURWICK 1,848,709

BAG AND MANUFACTURE OF THE SAME

Filed June 19, 1930 2 Sheets-Sheet 1

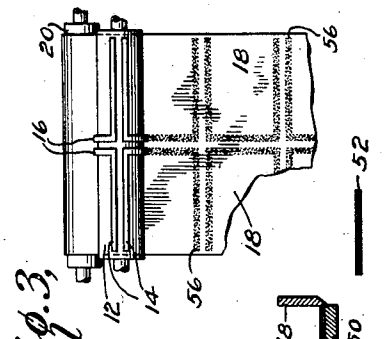

Fig. 3.

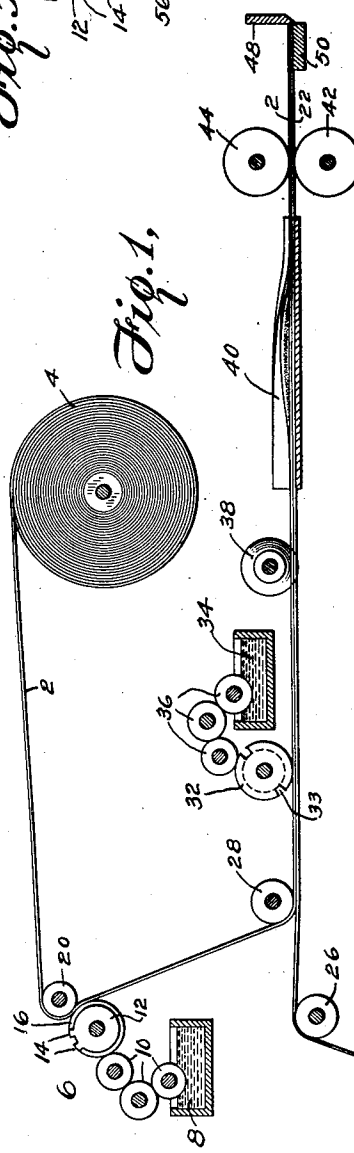

Fig. 1.

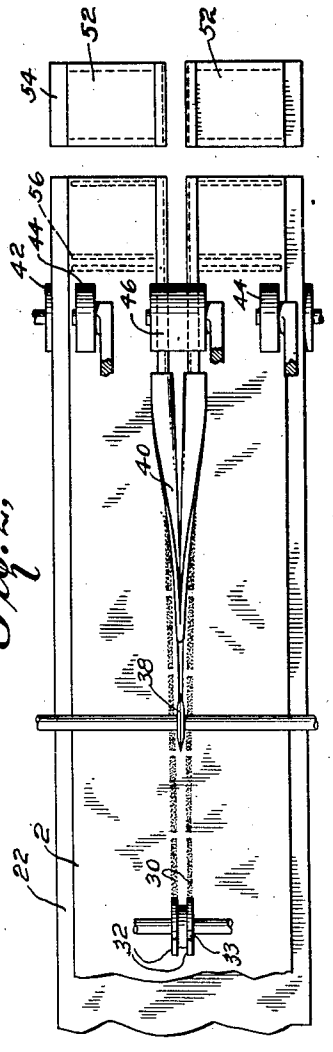

Fig. 2.

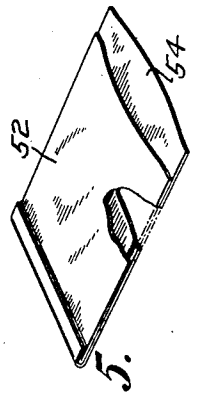

Fig. 5.

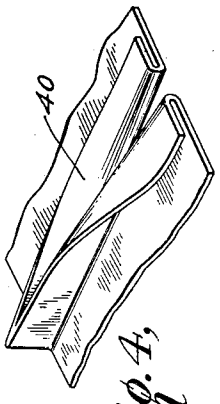

Fig. 4.

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Filed June 19, 1930 2 Sheets-Sheet 2

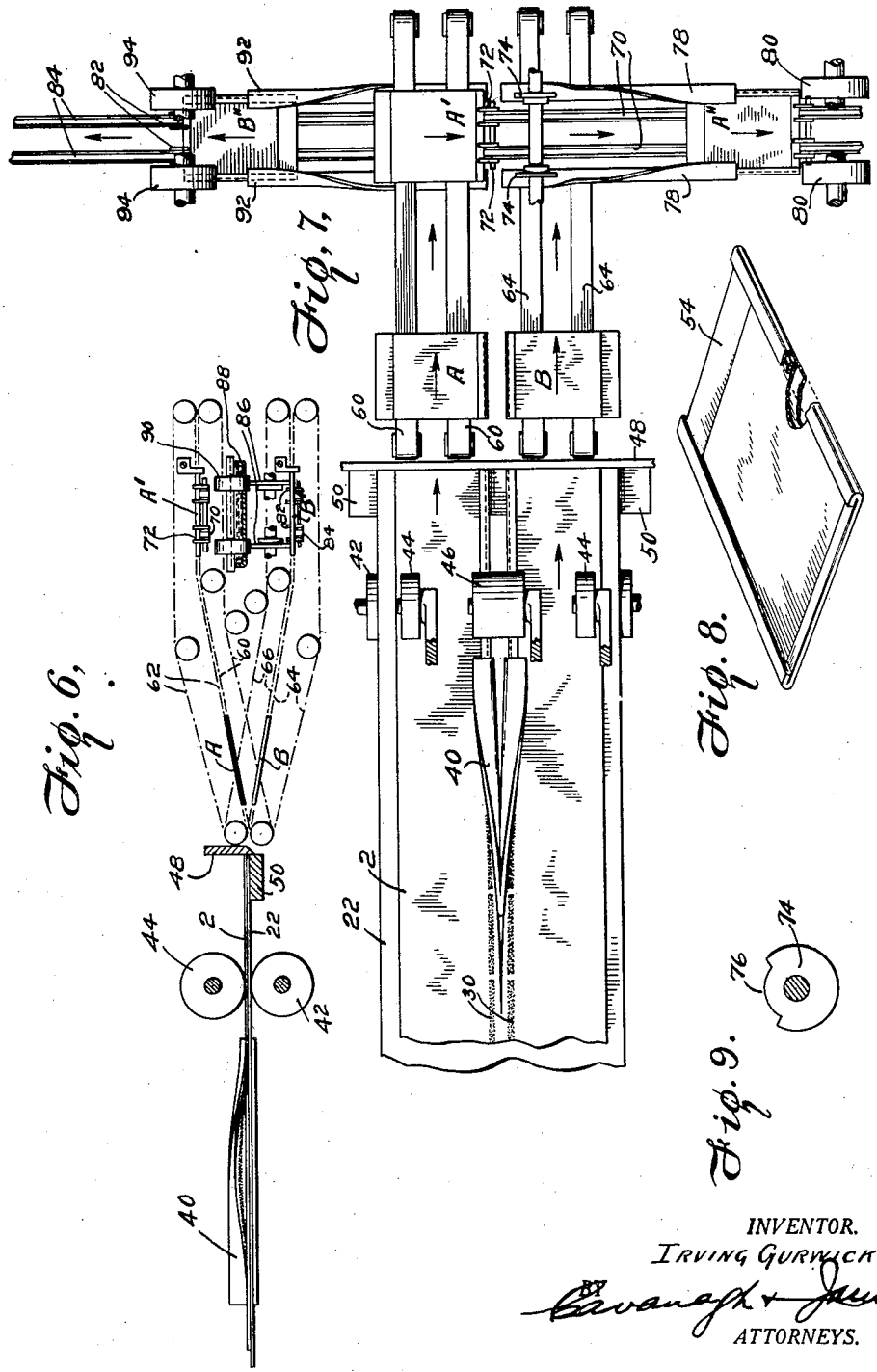

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE

IRVING GURWICK, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO TRANSPARENT PACKAGING & PRINTING CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

BAG AND MANUFACTURE OF THE SAME

Application filed June 19, 1930. Serial No. 462,189.

This invention relates to bags and their manufacture, and more particularly to bags made of a thin, transparent, cellulose paper such as cellophane.

A conveniently manufactured and economical form of bag made of a thin, transparent, cellulose paper consists of two layers of paper cemented together along three of the four edges of the bag. Such a bag and a method for manufacturing the same is disclosed in my Patent No. 1,714,265, granted May 21, 1929. This bag is satisfactory and economical but suffers from the disadvantages, first, that it does not open to its full depth and second, that it is apt to open along the lower edge if excessively or suddenly loaded. It has also been attempted to fold one layer of the bag up over the other to strengthen the bottom edge thereof, but this has not proven very successful because thin, transparent, cellulose paper such as cellophane, when sharply creased, is made brittle and weakened, and consequently is apt to crack, particularly in dry or cold weather.

The primary object of the present invention is to overcome the foregoing difficulties, and this I have found may readily be accomplished by altering a bag such as is disclosed in my aforesaid patent by folding the cemented double thickness bottom edge of the bag and cementing the same to one face of the bag. The resulting construction is strong and yet cannot be given so sharp a knife-edge crease as will injuriously affect the material of the bag.

Another object of my invention resides in the provision of a method for manufacturing such an improved bag which will retain the various advantages of the manufacturing method set forth in my aforesaid patent, and which will permit the manufacture of the improved bag with but slight, if any, additional expense. To this end, the bags are made from a pair of continuously moving webs of paper. Strips of cement in the form of the peripheries of bags, extending transversely of the web, are applied to one of the webs, and the two webs are then brought into contact and cemented together. A longitudinal strip of cement is applied to an outer face of the pair of webs, and a double thickness edge of the web is folded over against one face of the webs, after which the webs are cut transversely to form the side edges of individual bags.

Webs of transparent paper such as are here dealt with frequently weave due to non-uniform stretching, and this is apt to cause irregularities in the matching together of the two webs. When the bags are to be provided with flaps it is merely necessary to make one of the webs wider than the other, and any such irregularity merely results in a slight difference in the size of the flap, which is of little consequence. At the other side of the web, however, an irregularity may lead to the exposure or escape of some of the cement, which gets upon the rollers and gums up the operation of the machine. For this reason, and with the further object of speeding up the manufacture of the bags, the preferred method set forth in my aforesaid patent included the application of strips of cement in the form of the peripheries of pairs of bags arranged bottom to bottom and extending transversely of the web. After the two webs are cemented together, they are longitudinally slit at their center, thus forming two webs which may subsequently be tranversely cut to obtain the individual bags. In accordance with further features and objects of the present invention, this duplex manufacturing method is applied to the manufacture of my improved bag, and to this end it is merely necessary to modify the method set forth in my patent by applying longitudinal strips of cement near the middle of the webs, preferably before slitting the same, and folding the double thickness inner edges of each of the resulting webs before transversely cutting the same to obtain the individual bags.

The improved bag so far described is superior to my prior bag in being strengthened along the bottom edge thereof. However, for extremely rough usage even the improved bag may prove unsatisfactory because it may be opened up along the side edges thereof, particularly near the top of the bag if the bag is suddenly opened. Also the bag cannot be opened to its full width. A still further ob-

ject of the present invention resides in the provision of a still further improved and particularly strong bag which will not be subject to opening or ripping at the upper corners and side edges thereof, and which may be opened to its full width. I provide such a bag by folding over and cementing each of the double thickness side edges of the bag to a face of the bag. If the bag is provided with a flap, the flap is preferably folded over with the double thickness edge in order to avoid having the ends of the flap die-cut, which I have found greatly weakens the corner of the bag and permits a downward rip to begin when the bag is opened. On the other hand, the folded over edge is preferably not cemented at the flap in order to make it possible to open the bag to its full width.

Another object of the present invention resides in the provision of a method for manufacturing the type of bag last set forth. For this purpose, the method previously outlined is retained, and the individual bags, after being cut from the traveling webs, are moved in a direction preferably transverse to the direction of movement of the webs, and strips of cement are applied to the side edges of the bags, after which the double thickness side edges of each bag are folded over onto a face of the bag. The folding is preferably accomplished by moving the bags continuously through appropriately shaped formers, and the bags are therefore preferably moved bottom edge foremost. This necessitates that the bags of each pair be moved in opposite directions, and this is accomplished in a manner subsequently described.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention consists in the method steps for making the same and their relation one to the other as hereinafter are more particularly described in the specification and sought to be defined in the claims. The bag is not claimed herein, being claimed in my divisional application, Ser. No. 541,975, filed June 4, 1931. The present specification is accompanied by drawings in which:

Figs. 1 and 2 are, respectively, elevational and plan views showing schematically the method of my invention;

Fig. 3 is a detail of the cement applying apparatus;

Fig. 4 is a detail of the folder or former;

Fig. 5 is a perspective view of the resulting bag;

Figs. 6 and 7 are, respectively, elevational and plan views showing schematically the subsequent method steps employed in the manufacture of bags having folded side edges;

Fig. 8 is a perspective view of the resulting bag; and

Fig. 9 is a detail of the glue wheels employed in Figs. 6 and 7.

Referring to Fig. 1, a web of paper 2, which may be a thin, transparent, cellulose paper such as the product commercially known as cellophane, is taken from a roll 4 and passed through cementing mechanism 6. This mechanism comprises a glue fountain 8 from which glue is transferred by a series of distributing rollers 10 to a glue cylinder 12.

The glue cylinder 12 is best shown in Fig. 3 in which it will be observed that the cylinder is provided with longitudinal elements 14 and circumferential elements 16 for applying the glue or cement to the web. This construction results in the application of strips of cement in the manner shown in Fig. 3, these strips of cement being in the form of the peripheries of pairs of bags 18 arranged bottom to bottom and extending transversely of the web, as shown. The pressure of the glue cylinder 12 against the web may be determined by a pressure roller 20, shown in Figs. 1 and 3.

Another web 22 of paper is unreeled from a roll 24 and brought by means of guide and feed rollers 26 and 28 into contact with the web 2, and is cemented thereto along the peripheries of the bags originally outlined by the glue cylinder 12.

Referring now to Figs. 1 and 2, the upper face of the webs of paper has applied thereto longitudinal strips of cement 30 by a glue wheel 32. This is fed with cement from a glue fountain or reservoir 34 by means of distributing rollers 36.

The webs of material are next slit or parted at the center line thereof by a slitter 38 which may be a fixed blade, or, more preferably, a rotatable knife, as illustrated. The inner edges of the resulting two webs of material are then parted and folded over against the upper face of the webs by the folder or former 40. The construction and operation of the folder 40 is self-evident from the drawings, particularly Fig. 4 thereof showing the former in perspective. The webs next pass between a lower feed roller 42 and upper pressure rollers 44 and 46. The central pressure roller 46 serves to press the folded inner edges of the webs against the face thereof in order to securely cement the same together. It will be understood that the folded edges were previously cemented, and are of double thickness, thereby preventing a sharp knife-edge crease which might weaken the transparent cellulose material employed.

The webs are then fed past cutting means, preferably in the form of a rotary shear 48, 50, for severing the same into individual bags by cutting the webs transversely to form side edges of the bags. The rotary shear is characterized by the fact that the upper and lower knives 48 and 50 are doweled to move together, and move with the webs at the time of cutting of the same, so that the

webs may be kept in continuous motion without necessitating a dwell period during the cutting operation. At this stage, bags 52 are obtained, such a bag being illustrated in perspective in Fig. 5.

It will be noticed that the bag 52 is provided with a flap 54. This is accomplished in an exceedingly simple manner by making the lower web 22 wider than the upper web 2 by an amount equal to twice the desired width of flap. The webs are then brought into contact in symmetrical relation, thereby providing a marginal projection at each side, as is clearly evident in Fig. 2, which subsequently acts as the flaps of the individual bags.

Paper webs tend to weave. This is particularly true when dealing with a transparent, cellulose paper such as cellophane which is capable of considerable stretch and which, when the stretch is not uniform, weaves badly. Changes in temperature and humidity conditions may aggravate this condition. A number of precautions must therefore be taken which are next to be outlined.

In the first place it should be noted that the cement strips forming the outlines of the individual bags are applied entirely to one of the webs of paper. Superficially considered, it might seem desirable to apply the transverse strips to one of the webs, and the longitudinal strips to the other of the webs, but such an arrangement should be avoided because weaving of one web relatively to the other will cause a distortion in the cemented outline of the bags.

In the operation of apparatus of the type here shown, it is essential that no cement escape from between layers of the paper, and reach the various feed and pressure rolls and the like, for otherwise the machine will be gummed up and will tear the webs of paper, and the entire operation must be stopped until the machine can be cleaned and brought into running condition. For this reason, the transverse strips of cement are stopped about an eighth of an inch in from the edge of the web, as is indicated by the space 56 in Figs. 2 and 3. If the bags are to be provided with flaps so that one web is wider than the other, the strips of cement are preferably applied to the narrow, rather than the wide web. This is so because should the narrow web weave sufficiently to bring the strips of cement up to the edge of the web, this fact is readily observed by the attendant, and precautionary measures may be taken. If, on the other hand, the cement is applied to the wider web, the transverse strips terminate considerable distance from the edges thereof, and the web may weave sufficiently to bring the end of the strips of cement beyond the edge of the upper web when the webs are finally brought together, without this change being observable to the attendant until after the damage has been done.

It is to prevent gumming up of the machine that it is preferable to employ double strips of cement in the manner illustrated in Figs. 2 and 3. While it is possible to employ a single wide strip of cement in place of the double strip shown, and to cut the web at the center of the strip of cement, it is somewhat preferable to leave an uncemented space in which the cutting mechanism operates. In this connection, it may incidentally be noticed that the glue wheel 32 has its periphery notched or interrupted, as at 33, in order to interrupt the longitudinal strips of cement 30 at the point of operation of the rotary shear 48, 50.

The bag shown in Fig. 5 possesses the advantage of having its bottom edge, which is subjected to the greatest stress when the bag is suddenly or excessively filled or loaded, greatly strengthened to prevent the same from opening. While it is strengthened by folding the material of the bag, this is not accompanied by weakening or cracking of the material at the fold, because a double thickness of material is folded, and this prevents the crease from being made excessively sharp. At the same time, all of the advantages of the bag making method disclosed in my earlier Patent No. 1,714,265, such as simplicity of apparatus, continuity and rapidity of operation, and the duplex nature of the operation, together with the advantage that upon weaving of the webs, resulting inaccuracies occur almost entirely in the flaps of the bags where they are of no consequence, are all retained. The apparatus set forth in said patent has been complicated only by the addition of the glue wheel 32 and the folder 40.

The bag shown in Fig. 5 may be still further improved and strengthened to withstand extremely rough usage by folding the side edges thereof over upon a face of the bag, as is illustrated in Fig. 8 of the drawings. One manner in which this may be accomplished is illustrated in Figs. 6 and 7 which are a continuation of Figs. 1 and 2, the webs 2 and 22 passing through the folder 40, the feed and pressure rollers 42 and 44, and the rotary shear 48, 50, just as was described in connection with Figs. 1 and 2. The individual bags are then moved in a direction transverse to the direction of movement of the webs, that is, they are moved in a direction parallel to the side edges thereof in order to permit the same to be folded over against the face of the bags. However, it is preferable that the bags be moved bottom edge foremost, because if moved in the other direction the paper is apt to wrinkle in passing through the formers. It is evident from an inspection of Fig. 7 that to move the bags A and B each

bottom edge foremost necessitates that they be moved in opposite directions.

To permit this, the series of bags A are brought to a different elevation than the series of bags B, so that each will be clear of the other during the desired transverse movement thereof. The bags, upon leaving the rotary shear 48, 50, are received by sets of lower and upper carrier tapes, indicated by broken lines in Fig. 6. Only the lower carrier tapes are indicated in Fig. 7.

The A bags are transferred by lower carrier tapes 60 and upper carrier tapes 62 which are themselves supported upon and motivated by appropriate idler and feed wheels indicated in the drawings. This causes the A bags to be elevated to the point A'. The B bags are transferred by lower and upper carrier tapes 64 and 66, which are guided and motivated by appropriate feed and idler wheels, as is indicated on the drawings. The B bags are thereby transferred to the depressed position B'.

The A bags being elevated, the apparatus therefor is most clearly evident in the plan view given in Fig. 7. Transversely moving carrier chains or tapes 70 are provided, and these carry at frequent and appropriately spaced intervals the gripper fingers 72. When the A bags reach the point A', the folded bottom edge thereof is seized by the gripper fingers 72, and the bag is thereby pulled in a transverse direction bottom edge foremost. Cement is applied to the side edges thereof by cement wheels 74. The associated glue fountain and distributor rollers have been omitted from the drawings for the sake of simplicity, but it will be obvious that these may be constructed like those indicated in Fig. 1 of the drawings. The glue wheels 74 are preferably notched or interrupted at 76, as is illustrated in detail in Fig. 9, in order to avoid placing cement on the flap of the bag. The bag is next drawn through the folder 78 which folds the cemented double thickness side edges over against a face of the bag. The folded edge may be creased by pressure rollers 80, but cannot be given a knife-edge crease because of the double thickness of the material.

The mechanism for folding the side edges of the B bags is similar to that just described for the A bags, but is operated in the opposite direction. The B bags, on reaching the station B', are seized by gripper fingers such as the fingers 82 on carrier tapes or chains 84. The bags are thereby moved transversely, bottom edge foremost, and have strips of cement applied to the side edges thereof by glue wheels 86 receiving cement from a glue fountain 88 through appropriate distributor wheels 90. This cement applying mechanism is visible in Fig. 6, but not in Fig. 7. The bags are next drawn through folders 92 and finally past pressure rollers 94, as shown by the bag B''. The glue wheels 86, like the glue wheels 74, are preferably arranged to avoid cementing the edge of the flap of the bag.

The finished bags are illustrated in Fig. 8, and this bag is evidently exceedingly strong because it has been cemented along the side and bottom edges and thereafter folded and again cemented along these edges. The folds in each case are of double thickness material and therefore not sufficiently sharp to injure or weaken the paper. The bag may be opened to its full width and to its full depth. The flap 54 is itself provided with a folded edge, but this is not cemented and therefore does not interfere with full opening of the bag. While it is possible to die-cut the corners of the flaps when the bags are first being cut from the webs, so as to avoid the folded edge of the flap, I prefer to employ the present construction because I have found that a die-cut corner on the flap weakens the paper at the corner of the bag and permits a rip to readily start which, because of the nature of the transparent, cellulose material employed, may then readily run down the length of the bag. With the present construction, the corner of the flap, instead of being weakened is actually strengthened, and it is exceedingly difficult to tear the bag either by opening the same in a sudden or careless manner, or by excessively loading the same.

It will be understood that for special purposes it may be desirable in some cases to employ a bag in which only the bottom is folded, as is indicated in Fig. 5, or in other cases to employ a bag in which the bottom is not folded and only the side edges are folded, by the method illustrated in Figs. 6 and 7, but that the best and strongest bag is that illustrated in Fig. 8 employing both bottom and side folds.

The construction of my improved bag, and the method of making the same, as well as the many advantages of both the bag and the method will, it is believed, be apparent from the foregoing description. The bags may be made continuously, rapidly, and economically. Difficulties due to weaving of the material are effectively avoided. The resulting bag is reinforced by being doubly cemented and folded, and weakening of the bag by sharp creasing is prevented. Instead of the duplex method illustrated, producing the A and B series of bags, a simplex method may be employed in which only one series of bags is produced, and in such case the necessity for the carrier tape mechanism, which brings the A and B series of bags to different altitudes, is dispensed with. However, I prefer the duplex method here disclosed, not only because of the increased output of the machine, but also because a more accurate series of bags may be produced inasmuch as

with the duplex method here disclosed all irregularities due to changes in the width of the webs and due to weaving of the same are brought to the open edge and flap of the bag where they are of little consequence and furthermore cannot expose strips of cement which might gum up the apparatus.

It will be apparent that while I have shown and described my invention in the preferred form, many changes and modifications may be made in the bag and bag making method disclosed without departing from the spirit of the invention, defined in the following claims.

I claim:

1. In the manufacture of paper bags, the method which includes applying to a web of paper, strips of cement in the form of the peripheries of bags extending transversely of the web, bringing the said web into contact with and cementing it to another web of paper, applying a longitudinal strip of cement to an outer face of the cemented webs, folding a cemented double thickness edge of the webs over against one face of the webs, and thereafter cutting the resulting webs transversely to form individual bags.

2. In the manufacture of thin, transparent, cellulose paper bags, the method which includes continuously applying to a single web of the paper, strips of cement in the form of the peripheries of bags extending transversely of the web, bringing the said web into contact with and cementing it to another web of paper which is wider than the first web to provide flaps for the bags, applying a longitudinal strip of cement to an outer face of the cemented webs, folding a cemented double thickness edge of the webs over against one face of the webs, and thereafter cutting the resulting webs transversely to form the side edges of individual bags.

3. In the manufacture of paper bags, the method which includes applying to a web of paper, strips of cement in the form of the peripheries of pairs of bags arranged bottom to bottom and extending transversely of the web, bringing the web into contact with and cementing it to another web of paper, longitudinally cementing and slitting the webs at the middle thereof, folding the cemented double thickness inner edges of each of the resulting webs over against a face of the webs, and thereafter cutting the resulting webs transversely to form individual bags.

4. In the manufacture of paper bags, the method which includes continuously applying to a single web of the paper, strips of cement in the form of the peripheries of pairs of bags arranged bottom to bottom and extending transversely of the web, bringing the said web into contact with and cementing it to another web of paper, applying longitudinal strips of cement to an outer face of the cemented webs near the middle thereof, slitting the webs at the middle thereof, folding the cemented double thickness inner edges of each of the resulting webs over against a face of the webs, and thereafter cutting the resulting webs transversely to form the side edges of individual bags.

5. In the manufacture of cellophane bags, the method which includes continuously applying to a single web of cellophane, strips of cement in the form of the peripheries of pairs of bags arranged bottom to bottom and extending transversely of the web, bringing the said web into contact with and cementing it to another web of cellophane which is wider than the first web to provide flaps for the bags, applying longitudinal strips of cement to an outer face of the cemented webs near the middle thereof, slitting the webs at the middle thereof, folding the cemented double thickness inner edges of each of the resulting webs over against a face of the webs, and thereafter cutting the resulting webs transversely to form the side edges of individual bags.

6. In the manufacture of paper bags, the method which includes applying to a web of paper, strips of cement in the form of the peripheries of bags extending transversely of the web, bringing the said web into contact with and cementing it to another web of paper, cutting the resulting webs transversely to form individual bags, applying strips of cement to the side edges of the bags, and folding the cemented double thickness side edges of each bag over onto a face of the bag.

7. In the manufacture of paper bags, the method which includes applying to a web of paper, strips of cement in the form of the peripheries of bags extending transversely of the web, bringing the said web into contact with and cementing it to another web of paper, applying a longitudinal strip of cement to an outer face of the cemented webs, folding a cemented double thickness edge of the webs over against one face of the webs, cutting the resulting webs transversely to form individual bags, applying strips of cement to the side edges of the bags, and folding the cemented double thickness side edges of each bag over onto a face of the bag.

8. In the manufacture of thin, transparent, cellulose paper bags, the method which includes continuously applying to a single web of the paper, strips of cement in the form of the peripheries of bags extending transversely of the web, bringing the said web into contact with and cementing it to another web of paper which is wider than the first web to provide flaps for the bags, applying a longitudinal strip of cement to an outer face of the cemented webs, folding a cemented double thickness edge of the webs over against one face of the webs, cutting the resulting webs transversely to form individual bags, moving

the resulting bags bottom edge foremost in a direction transverse to the direction of movement of the webs, applying strips of cement to the side edges of the bags, and folding the cemented double thickness side edges of each bag over onto a face of the bag.

9. In the manufacture of paper bags, the method which includes applying to a web of paper, strips of cement in the form of the peripheries of pairs of bags arranged bottom to bottom and extending transversely of the web, bringing the web into contact with and cementing it to another web of paper, cutting the resulting webs transversely to form individual bags, applying strips of cement to the side edges of the bags, and folding the cemented double thickness side edges of each bag over onto a face of the bag.

10. In the manufacture of paper bags, the method which includes applying to a web of paper, strips of cement in the form of the peripheries of pairs of bags arranged bottom to bottom and extending transversely of the web, bringing the web into contact with and cementing it to another web of paper, longitudinally cementing and slitting the webs at the middle thereof, folding the cemented double thickness inner edges of each of the resulting webs over against a face of the webs, cutting the resulting webs transversely to form individual bags, applying strips of cement to the side edges of the bags, and folding the cemented double thickness side edges of each bag over onto a face of the bag.

11. In the manufacture of paper bags, the method which includes continuously applying to a single web of the paper, strips of cement in the form of the peripheries of pairs of bags arranged bottom to bottom and extending transversely of the web, bringing the said web into contact with and cementing it to another web of paper, applying longitudinal strips of cement to an outer face of the cemented webs near the middle thereof, slitting the webs at the middle thereof, folding the cemented double thickness inner edges of each of the resulting webs over against a face of the webs, cutting the resulting webs transversely to form individual bags, moving the resulting bags transversely of the direction of movement of the web, applying strips of cement to the side edges of the bags, and folding the cemented double thickness side edges of each bag over onto a face of the bag.

12. In the manufacture of cellophane bags, the method which includes continuously applying to a single web of cellophane, strips of cement in the form of the peripheries of pairs of bags arranged bottom to bottom and extending transversely of the web, bringing the said web into contact with and cementing it to another web of cellophane which is wider than the first web to provide flaps for the bags, applying longitudinal strips of cement to an outer face of the cemented webs near the middle thereof, slitting the webs at the middle thereof, folding the cemented double thickness inner edges of each of the resulting webs over against a face of the webs, cutting the resulting webs transversely to form individual bags, moving the resulting bags bottom edge foremost in a direction transverse to the direction of movement of the webs, applying strips of cement to the side edges of the bags, and folding the cemented double thickness side edges of each bag over onto a face of the bag.

Signed at New York, in the county of New York and State of New York, this 17th day of June, A. D. 1930.

IRVING GURWICK.