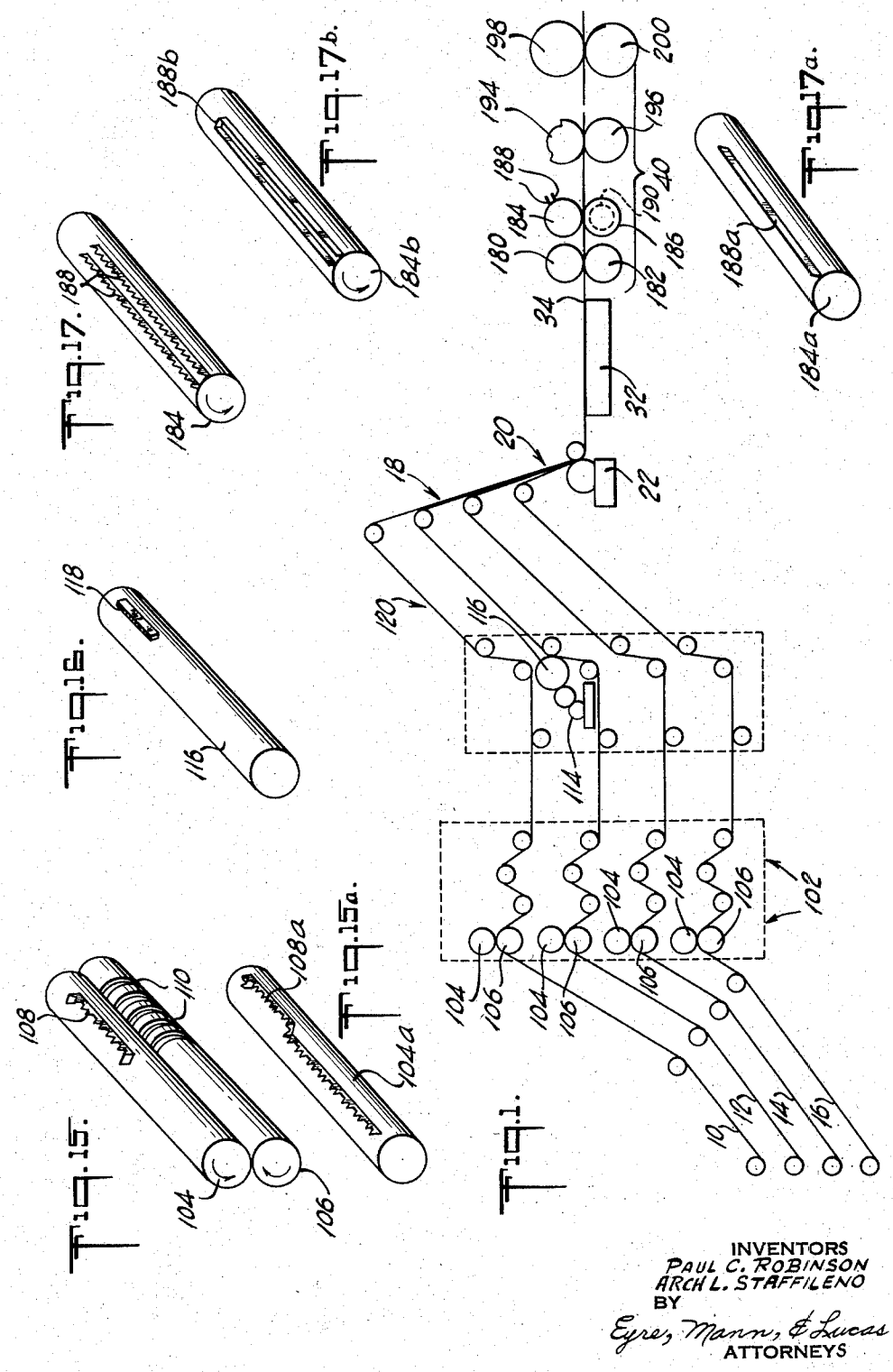
July 21, 1959 P. C. ROBINSON ET AL 2,895,387

MULTIPLY BAG WITH SUPPLEMENTAL SLEEVE

Filed Dec. 7, 1956 4 Sheets-Sheet 1



INVENTORS
PAUL C. ROBINSON
ARCH L. STAFFILENO
BY
Eyre, Mann, & Lucas
ATTORNEYS

July 21, 1959 P. C. ROBINSON ET AL 2,895,387

MULTIPLY BAG WITH SUPPLEMENTAL SLEEVE

Filed Dec. 7, 1956 4 Sheets-Sheet 2

Fig. 2.

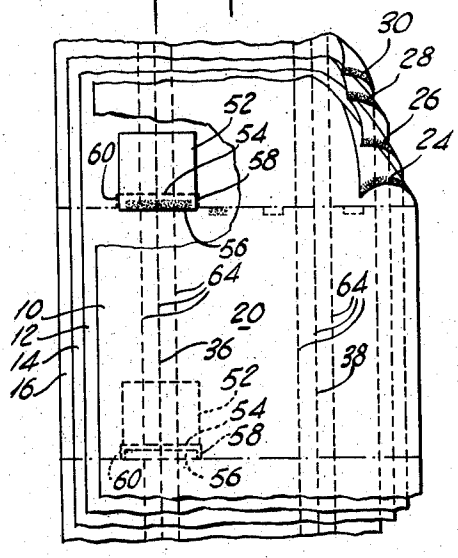


Fig. 3.

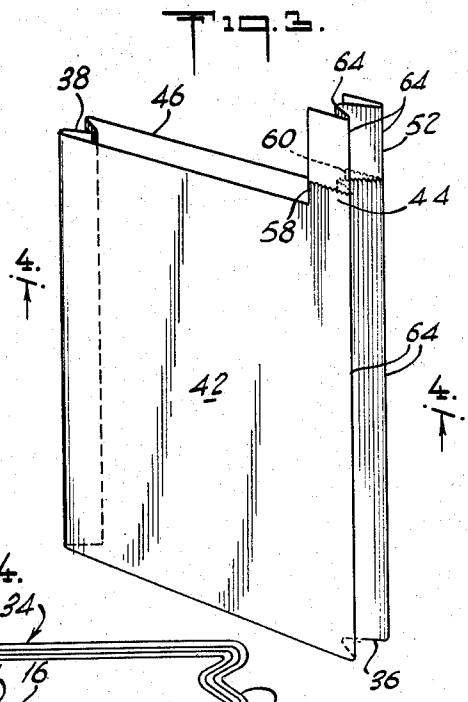


Fig. 4.

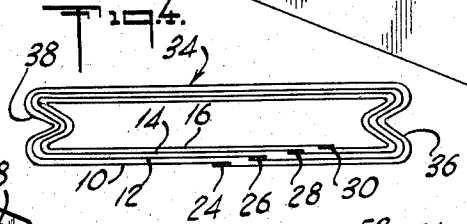


Fig. 5.

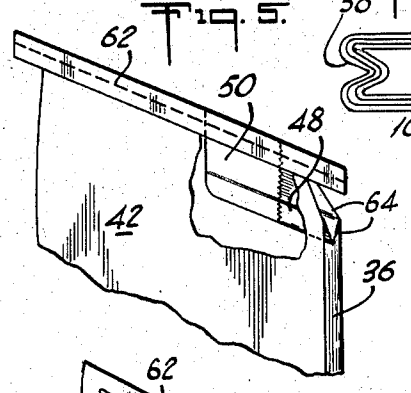


Fig. 3a.

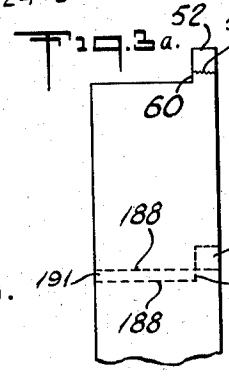


Fig. 3b.

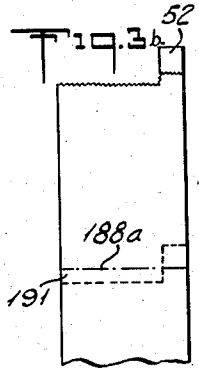


Fig. 6.

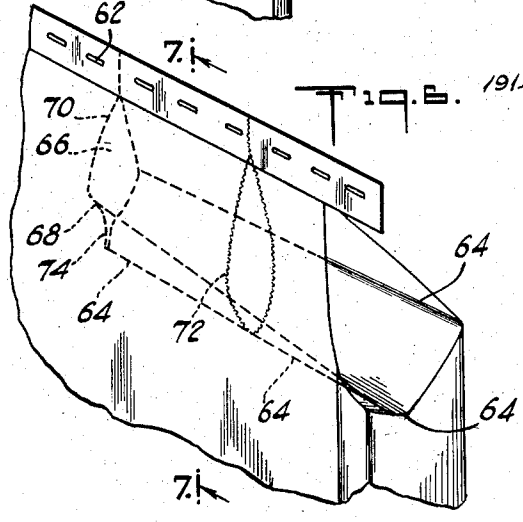


Fig. 7.

INVENTORS
PAUL C. ROBINSON
ARCH L. STAFFILENO
BY
Eyre, Mann, & Lucas
ATTORNEYS

July 21, 1959 P. C. ROBINSON ET AL 2,895,387

MULTIPLY BAG WITH SUPPLEMENTAL SLEEVE

Filed Dec. 7, 1956 4 Sheets-Sheet 3

Fig. 8.

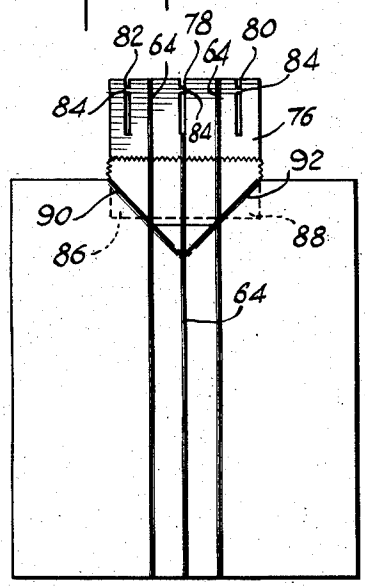


Fig. 9.

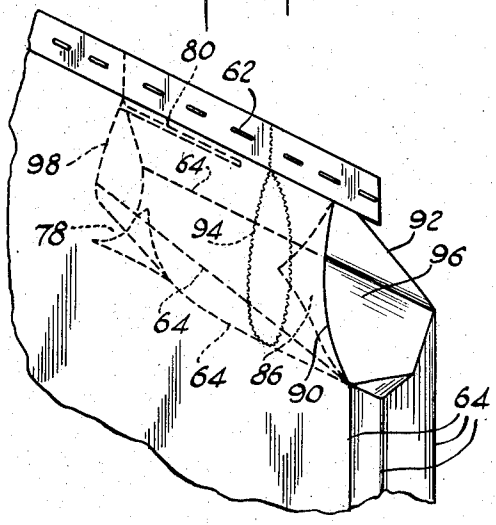


Fig. 13.

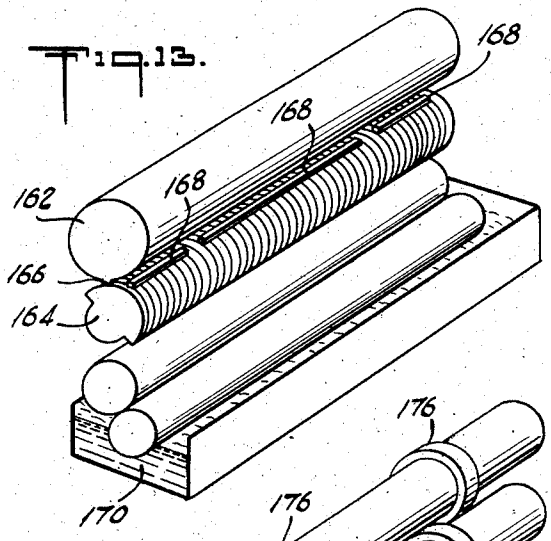


Fig. 10.

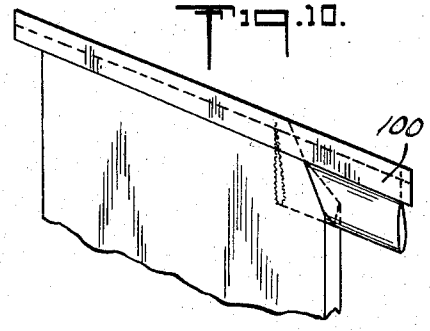
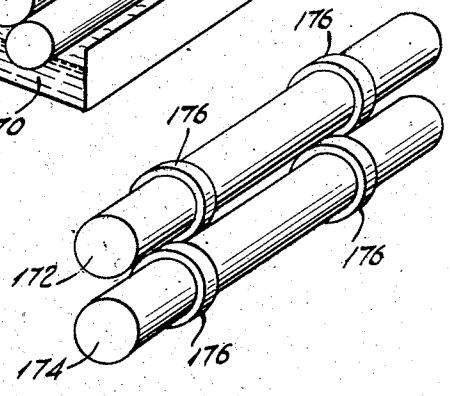


Fig. 14.



INVENTORS
PAUL C. ROBINSON
ARCH L. STAFFILENO
BY
Eyre, Mann, & Lucas
ATTORNEYS

July 21, 1959 P. C. ROBINSON ET AL 2,895,387

MULTIPLY BAG WITH SUPPLEMENTAL SLEEVE

Filed Dec. 7, 1956 4 Sheets-Sheet 4

Fig. 11.

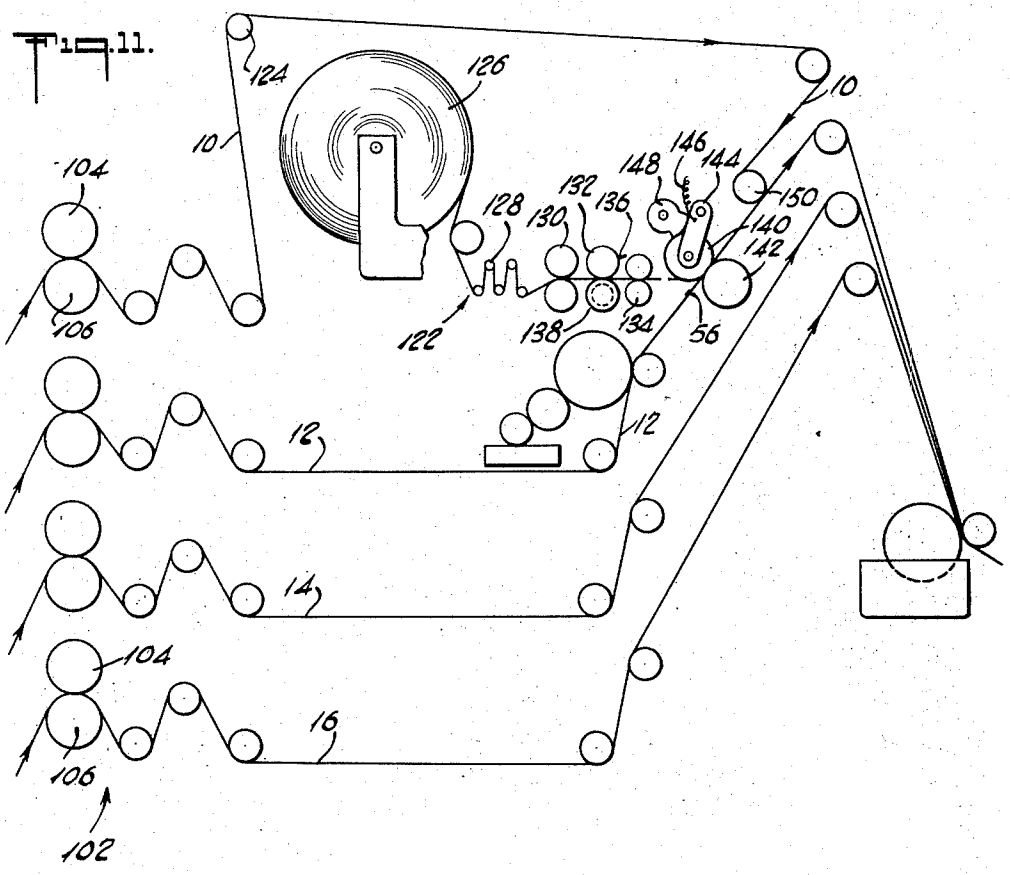
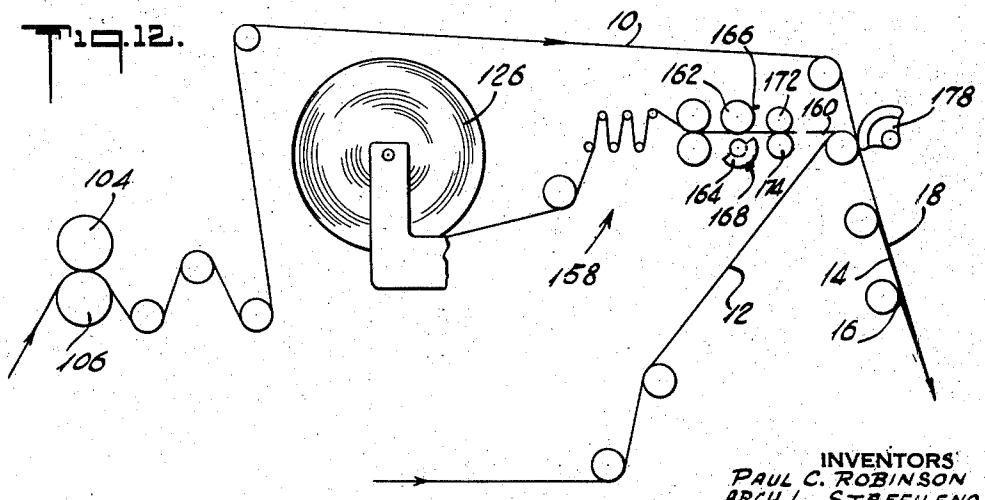


Fig. 12.



INVENTORS
PAUL C. ROBINSON
ARCH L. STAFFILENO
BY
Eyre, Mann, & Lucas
ATTORNEYS

United States Patent Office 2,895,387 Patented July 21, 1959

2,895,387

MULTIPLY BAG WITH SUPPLEMENTAL SLEEVE

Paul C. Robinson, Canajoharie, N.Y., and Arch L. Staffileno, Brooke, W. Va., assignors to Arkell and Smiths, a corporation of New York

Application December 7, 1956, Serial No. 627,004

5 Claims. (Cl. 93—8)

This invention relates to a new and improved method for inserting a supplemental sleeve in the valve of a multiply gusseted bag and to apparatus for carrying out the method as well as to the product produced thereby.

The advantage of supplemental sleeves in multiwall bags for increasing the sealing action of the valve is well known but up until now it has been customary to insert the sleeve in the folded valve after the bag tube is completely formed. Since the bag tube is completely formed, a great number of steps are involved, it first being necessary to open the tube by spreading the bag walls apart in order to expose the folded valve. After this is done the valve must be flattened out and the sleeve may then be inserted in the valve.

Thereafter the valve is folded shut and the walls of the tube closed against each other. The sleeve is frequently inserted by hand and although apparatus has been developed for this purpose the apparatus is very complicated and expensive because of the number of steps involved in inserting the sleeve and because of the difficulty in manipulating the many plies of material found in the walls of the bag tube.

In accordance with the present invention a new and improved method has been devised for inserting a sleeve in the valve of a multiply bag tube. In carrying out the present method a supplemental sleeve patch is pasted to one of the plies of bag forming material that go into a multiply bag tube while the ply of material is still in the flat before it is folded to form the bag tube. Care is taken in locating the sleeve patch on the ply so that it will be pasted down against that portion of the ply which later forms the valve and the sleeve patch is so arranged that one end portion projects out beyond the lip of the valve in the finished bag tube.

Locating the sleeve patch on the flat ply is achieved in accordance with the present invention by marking the line of the lip of the valve in the flat plies of bag forming material. Marking may be carried out by any convenient means as long as the plies of the bag tube are so weakened that they may be readily torn to separate the tube into bag lengths without using a knife to cut through the tube along the lip of the valve. Marking of the plies is preferably achieved by perforating the plies and the preforations may be in the form of slits, small holes, slots and the like. With the lip of the valve marked in this way there is no problem in locating the sleeve patch in the proper position on the flat ply and since the plies are separated into bag lengths without using a knife along the line of the lip of the valve the sleeve patch which extends out beyond the lip of the valve remains intact when the tube is separated into bag lengths. The sleeve patch may be pasted on the flat ply by hand or by means of a mechanical sleeve applicator. A mechanical sleeve applicator is preferred since it can be run at the high speed of modern bag tube forming mechanisms and operation of the applicator may be synchronized with that of the bag tube forming mechanism by conventional means so that the sleeve patch

will be properly located on the ply of bag forming material. In such case the marking along the lip of the valve provides convenient means for checking synchronization of the apparatus.

One advantage of the present method of pasting the sleeve patch in the valve of a multiply bag is that pasting is carried out on the flat surface of the ply of bag forming material and as a result the pasting is quickly and accurately performed in a single step as compared to the great number of steps involved in prior art processes. Another advantage is that the sleeve may be located between adjacent plies of the bag tube wall and when this is done the plies hold the sleeve patch in place and prevent it from shifting before the paste is dry. The sleeve patch may also be so located on the ply that portions of the sleeve will be caught in the folds at each side of the valve of the bag and this greatly assists in anchoring the sleeve in position in the bag. Still another advantage of pasting the sleeve patch on the flat ply of the bag forming material is that the sleeve patch is folded and sharply creased when the gussets are formed in the bag tube and the sharp crease lines of the gusset folds assist the supplemental sealing action of the sleeve to provide a better seal for the bag. These and other advantages of the present invention can be readily understood by reference to the accompanying drawings in which:

Fig. 1 is a schematic plan view of a bag tubing mechanism.

Fig. 2 is a plan view of a section of bag tube wall flattened out to illustrate its construction.

Fig. 3 is an isometric view of a bag length of tubing.

Figs. 3*a* and 3*b* illustrate how the bottom of the bag length of tubing is trimmed off.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3.

Fig. 5 illustrates the top portion of a finished bag.

Figs. 6 and 7 illustrate the way the supplemental sleeve in the valve of a finished bag increases sealing action of the valve of the bag.

Figs. 8, 9 and 10 illustrate a modified form of sleeve.

Figs. 11 and 12 are schematic plan views of two different forms of mechanical sleeve applicators.

Figs. 13 and 14 are enlarged isometric views of different parts of the sleeve applicator of Fig. 12.

Figs. 15, 16 and 17 are enlarged isometric views of different parts of the bag tubing mechanism of Fig. 1.

Figs. 15*a*, 17*a*, and 17*b* illustrate modifications of the structure shown in Figs. 15 and 17 respectively.

Referring now to the drawings, Fig. 1 illustrates one way of manufacturing multiply bag tubes. Four plies of bag forming material **10**, **12**, **14** and **16** are used but it will be understood that tubes may be made with two or more plies and that method is the same regardless of the number of plies employed. Ordinarily heavy craft paper is used but specially treated paper and other web materials are frequently used. Broadly speaking multiply bag tubes are formed by feeding a plurality of individual separate plies of bag forming material **10**, **12** **14** and **16** through a series of rolls which bring the plies together as at **18** to form the bag tube wall **20**. Each ply in the bag tube wall is slightly offset from its adjacent ply as illustrated in Fig. 2. After bag tube wall **20** is formed it is fed through the rolls of a paste applicator **22** which applies a continuous line of paste along one side of the wall and because of the staggered relationship of the plies the exposed portions **24**, **26**, **28** and **30** along the side of each respective ply in the margin of the tube wall receives a continuous line of paste as indicated in Fig. 2. In Fig. 2 the adhesive strip along the margin of each ply is actually under the ply but in the bag tubing mechanism the adhesive is exposed since the plies are folded over on each side to form the bag tube. Bag tube **20** next passes over the bed of a

conventional tube forming apparatus 32 where the wall is folded in conventional manner and pasted to form the usual bag tube 34. As illustrated in Fig. 4 bag tube 34 has the usual gussets 36 and 38 and because of the staggered relationship of the plies, each ply forms a separated tube and the tubes are nested inside one another. Bag tube 34 then passes through a final series of rolls 40 where it is divided up into bag lengths 42 (Figs. 1 and 3). The tube may be divided into bag lengths by cutting it with a knife and as is customary in the art the cutter rolls are so arranged that a tab of material 44 is left projecting out beyond the top edge 46 of the bag tube wall in the area of one of the gussets 36 and this tab of material along with a portion of the gusset and opposite side walls of the bag tube are folded inwardly into the tube to form a valve 48 as illustrated in Fig. 5. The method described above for forming and valving bag lengths of gusseted multiply tubing is conventional and apparatus for carrying out the method is so well known in the art that it is not considered necessary to go into the mechanical details thereof.

In accordance with the present invention a bag tube 34 is formed in conventional manner and a sleeve member 50 (Fig. 5) is pasted in the valve 48 of the bag length of tubing 42 by pasting a sleeve patch 52 (Fig. 2) on one of the plies of bag forming material while the ply is still in its flat unfolded condition. To this end, the flat plies 10, 12, 14 and 16 of bag tube forming material are first marked along the line of the lip of valve 48 by weakening the plies with perforations which may be in the form of a plurality of holes 54 (Fig. 2).

The perforating operation is synchronized in known manner with the step of dividing the tube into bag lengths and the timing is such that the outline of the lip of the valve is located in its proper position in the flat plies of bag forming material. Since the outline of the lip of the valve 48 is marked on the flat plies there is no problem in properly locating sleeve patch 52 on a ply of bag forming material. The sleeve patch is positioned on the ply by pasting one end portion of it down against the ply so that the free portion of the sleeve patch covers and projects out beyond the line of holes 54 which mark the lip of valve 48 in the flat ply of bag forming material. The sleeve patch is preferably pasted to a surface of one of the plies which will subsequently be brought into face to face contact with the surface of an adjacent ply in the bag tube wall. As a result the sleeve is positioned between two adjacent plies of bag-forming material which protect it from damage during the tubing and valving operations. Adhesive 56 holds the sleeve in place on the ply and the adhesive may be applied directly to the sleeve or it may be applied to the ply of bag forming material. After sleeve patch 52 is in position on a flat ply of bag-forming material the plies are gathered together and bag tube 34 is then formed in usual manner. During the tubing operation sleeve patch 52 is sharply creased along the fold lines of gusset 36 and as later described herein below these fold lines in the sleeve tend to materially increase the supplemental sealing action of the sleeve in the valve of the finished bag.

Referring now to the bag length of tubing 42 it will be noted that tab 44 straddles the gusset 36 at one side of the tube and that opposite side edges 58 and 60 of tab 44 are approximately aligned with each other. As a result the plies in both of the side walls of tube 42 may be cut through along the line which extends from side edges 58 and 60 of tab 44 out to gusset 38 at the side of the tube without disturbing sleeve patch 52. Bag lengths 42 of tubing are formed by tearing the tube in two along the line of the plurality of holes 54 at the lip of valve 48. Tearing the paper in this way does not disturb the sleeve patch 52 which remains in position in the bag length of tubing where it is held in place by adhesive 56. When the bag length of tubing is subsequently valved, sleeve patch 52 is folded along with the valve and the sleeve patch forms a sleeve 50 which projects inwardly into the finished bag tube. The top and bottom of the bag tube are closed in the usual manner and it will be noted that the line of stitching 62 across the top of the bag passes through opposite side portions of sleeve 50 which is thereby firmly anchored in place in the bag.

Referring to Figs. 2, 5, 6 and 7 it will be seen that sleeve 50 is sharply creased along the gusset crease lines 64. The center gusset crease line 64 appears in the center at the bottom of the sleeve and this crease line divides the sleeve into two side panel members 66 and 68. The panel members are in turn divided approximately in half by the two side crease lines of the gusset fold. These crease lines materially contribute to the supplemental sealing action of the sleeve. As shown in Fig. 6 when a filling nozzle (not shown) is inserted into the valve of the bag, the valve walls are spread apart bringing the center gusset crease line up towards the top of the bag. When the center gusset crease line of the valve moves up, the plies in the side wall of the valve naturally flex along the line of the two outside gusset crease lines and sleeve 50 also flexes and bends in an orderly manner along the line of the gusset creases. The side panels 66 and 68 of sleeve 50 are not spread as far apart at the inner edge 70 as they are at the lip 72 of valve 50 because the filling nozzle (not shown) tapers down towards its discharge end in the tube. As a result a small fold of paper 74 (Fig. 6) tends to form at the center in the bottom of the sleeve. When the filling nozzle is withdrawn, the material in the bag pushes against the valve and the sleeve member tends to flatten out in an orderly manner against the side wall of the bag as illustrated in Fig. 7.

It will be obvious to those skilled in the art that the sleeve member 50 can be made in any desired shape or form and that the position of the sleeve may be changed by shifting it in longitudinal direction along the plies of bag forming material. For example in Fig. 8 the sleeve patch 76 is provided with three slits 78, 80 and 82. The first slit 78 is positioned along the center gusset crease line 64 and the other two slits 80 and 82 are each positioned between the outside gusset crease line 64 and side edge of the sleeve patch. Slits 80 and 82 are arranged in the sleeve patch so that they will be positioned immediately below the place where the line of stitching 62 passes through the sleeve in the finished bag (see Fig. 9). In cutting slits 78, 80 and 82, a small portion of the ply may be left intact to form a tab 84 which prevents the slitted sleeve from being crumpled or torn during the bag tubing and valving operations.

The function of the slits is illustrated in Fig. 9. As there shown when a filling nozzle (not shown) is inserted into the bag and the side walls of the sleeve are spread apart, tabs 84 will break and give the sleeve great flexibility. Slits 80 and 82 release the body of the sleeve from the line of stitching and slit 78 at the center in the bottom of the folded sleeve enables portions of the sleeve on opposite sides of the slit to overlap. It will be noted that the sleeve still flexes along the two outside gusset crease lines 64 and the overlap provides an escape for excess paper at the center of the sleeve in somewhat the same way as fold 74 takes care of excess material in sleeve 50. The overlapped portions of the sleeve also assist the sleeve in flattening out against the side wall of the bag when the bag is inverted to close the valve. Another advantage of sleeve patch 76 involves its position on the ply of bag forming material. In this case the end portion of sleeve patch 76 which is pasted on the ply is so arranged that the corners 86 and 88 extend beyond the diagonal fold lines 90 and 92 which are formed in the side walls of the bag tube when it is valved. These diagonal fold lines mark the side of the valve and a portion of the sleeve at each side extends past the fold lines into the side wall of the finished bag. This exten-

sion of the sleeve past the fold lines at each side of the valve greatly assists in anchoring the sleeve in position in the finished bag. If desired, slits **80** and **82** may extend from lip **94** of valve **96** all the way out to the free end edge **98** of the sleeve.

A modified form of sleeve **100** is illustrated in Fig. 10. In this case the sleeve patch is pulled through the valve before the sewing operation and the sleeve forms a so-called tuck in sleeve in the valve of the bag.

A suitable form of apparatus for carrying out the process of the present invention is illustrated in the drawings. The bag tubing mechanism shown is made up of standard mechanical parts and the electronic controls are conventional. Since the use of these are well known in the art, schematic drawings are employed for convenience and clarity of description. Referring to Fig. 1 the first step in carrying out the process of the present invention involves weakening the plies of bag-forming material to outline the lip of the valve of the bag. This is done in the stack of rolls **102** where each individual ply of bag forming material **10, 12, 14** and **16** passes between a pair of rolls **104** and **106** which as shown in Fig. 15 carry a serrated knife blade **108** adapted to cooperate with a plurality of grooves **110** for perforating the individual plies of bag forming material. Knife blade **108** shown in the drawings is adapted to perforate the ply with a plurality of holes **54** (Fig. 2) across the line at the lip of valve and to perforate the ply at each side of tab **44** with a pair of slits as at **58** and **60** in Fig. 3. The size and speed of rolls **104** and **106** are adjusted in known manner so that the perforations along the line of the lip of the valve will be properly located in the flat plies of bag-forming material. For example this may be done with a single drive shaft for the mechanism with appropriate gearing for synchronizing the perforating operation with the cut off rolls **40** which separate the tubing into bag lengths. The drive shaft and gearing are not shown as these are conventional mechanical expedients well known in the art.

After the plies are perforated they pass through a second stack of rolls **112** and if desired adhesive **56** may be applied to a ply for holding sleeve patch **52** in position on such ply. This may be conveniently done with a conventional paste applicator **114** which includes an applicator roll **116** with a paste pad **118** for applying the adhesive. As in the case of the perforating rolls the speed of the paste applicator roll is synchronized with the speed of the rolls which separate the tubing into bag lengths so that adhesive **56** will be properly located on the ply which later receives sleeve patch **52**.

Sleeve patch **52** is applied to one of the plies of bag-forming material as at **120**. One form of mechanical sleeve applicator **122** is shown in Fig. 11. As there shown, sleeve applicator **122** is preferably positioned in the tubing mechanism where it will apply a sleeve patch **52** between plies **10** and **12** of bag-forming material. In order to provide room for the sleeve applicator between the plies the path of travel of ply **10** is changed so that the ply passes across the top of applicator **122** as illustrated in Fig. 11. Referring to Figs. 1 and 11 it will be seen that the path of the ply may be changed by means of an idle roll **124**. When the path of travel of a ply is changed, care is taken to maintain the distance of travel the same as it is for the other plies of the bag tube or if the distance is changed, the change is equal to the length of a bag length of tubing **42** so that the marked plies will properly register with each other in the wall of the bag tube.

Turning now to the form of sleeve applicator shown in Fig. 11, **126** is a roll of sleeve stock which is fed through a plurality of rolls **128** which reverse the path of travel of the sleeve stock to eliminate curl. The web of sleeve stock then passes through a pair of draw rolls **130**, perforating rolls **132** and forwarding pinch rolls **134**. The speed of these rolls is synchronized with the speed of the rolls **40** that later separate the tubing into bag lengths, conventional drive shafts and gearing (not shown) being used for this purpose. The speed of these rolls is such that one sleeve patch **52** of desired length will be fed against ply **12** for each bag length of tubing at the proper time to paste the trailing end portion of the sleeve stock against adhesive **56** as illustrated in Fig. 2. The speed of the web of sleeve stock is of course much less than the speed of the plies of bag-forming material. Perforating rolls **132** are adapted to weaken the sleeve stock in a line across the stock and the distance between adjacent lines is equal to the length of a sleeve patch **52**. Weakening the sleeve stock is most conveniently carried out by perforating the stock with a line of holes (not shown) and for this purpose rolls **132** are provided with a serrated blade **136** which is adapted to cooperate with a plurality of grooves **138** for positioning a line of holes across the web of sleeve stock. Serrated blade **136** and grooves **138** may be of the same type of construction as those illustrated in Fig. 15 and are therefore not shown in detail. After the web of sleeve stock is perforated it is then fed by pinch rolls **134** against the surface of the bag-forming ply **12** and as the leading edge of the sleeve stock moves upwardly in the direction of travel of ply **12** it is engaged by pinch rolls **140** and **142** which suddenly accelerate the speed of the end portion of the web of sleeve stock so that it tears at the perforated line to separate a sleeve patch **52** from the web. Pinch roll **140** is driven at the high rate of speed of ply **12**. The roll is mounted on a pivotal arm **144** so that it is held away from ply **12** by spring means **146** until the leading edge of the sleeve stock **126** contacts the ply of bag-forming material **12**. At this time the raised portion of cam **148** bears against roll **140** forcing it down against the sleeve stock, ply **12**, and roll **142**. As a result a sleeve patch **52** is applied to the ply of bag-forming material **12** and pasted down against adhesive **56** as illustrated in Fig. 2. Since the adhesive **56** may still be tacky it is preferred to immediately combine the plies **10** and **12** so that ply **10** will cover sleeve patch **52** and hold it in the desired position between the plies. This is done by means of roll **150** which changes the path of travel of ply **10** and combines the two plies **10** and **12** immediately after the sleeve patch is positioned on the ply of bag-forming material **12**. If the sleeve patch is to be slit as shown in Fig. 8, the appropriate slitting knives are positioned on rolls **132** in conventional manner.

Fig. 12 illustrates another form of sleeve applicator **158**. Applicator **158** is of the same construction as applicator **122** except applicator **158** is adapted to feed a sleeve patch **160** into the nip between two plies (**10** and **12**) of bag-forming material.

In the structure illustrated in Fig. 12 the web of sleeve stock is perforated by means of a pair of rolls **162** and **164** (Fig. 13) which are provided with the usual serrated knife blade **166** and cooperating grooves (not shown) of the same type illustrated in Fig. 15. Roll **164** also carries paste pads **168** which pick up adhesive from a conventional paste applicator **170** and apply adhesive **56** in spots across the trailing end portion of each sleeve patch **52**. The forwarding pinch rolls **172** which cooperate with each other and contact the web of sleeve stock between the spots of adhesive **56** so that the adhesive will remain in place and will not be spread over the sleeve patch. It will be understood that since adhesive is applied directly to the sleeve patch there is no need for applying adhesive **56** to the ply and paste applicator **114** (Fig. 1) may be eliminated when sleeve applicator **158** is used.

Sleeve applicator **158** is so positioned in the tubing mechanism that pinch rolls **172** and **174** feed the leading edge of sleeve stock **126** towards the plies of bag-forming material but in this case the leading edge of the sleeve stock **126** is fed into the nip between plies **10** and **12** as these plies are gathered together to form bag tube wall

20 (Fig. 1). As soon as the leading edge of the sleeve stock turns into the nip of plies 10 and 12 applicator roll 178 bears against the outside of ply 10 to accelerate the sleeve stock up to bag ply speed and separate a sleeve patch 160 from the web of sleeve stock 126 and paste it down against ply 12. With the exception of applying adhesive to the sleeve patch and with the exception of feeding the sleeve patch into the nip between two plies of bag-forming material, sleeve applicator 158 operates in the same manner as described for sleeve applicator 122.

As previously described hereinabove, bag lengths of tubing 42 are preferably separated from tube 34 by cutting through the plies across a major portion of the tube and by breaking the paper along the perforated line at the lip of the valve so that sleeve patch 52 will not be disturbed and will remain intact in position in the bag. This operation is carried out by a plurality of rolls at 40. Draw rolls 180 and 182 cooperate with pinch rolls 194 and 196 to put tension on tube 34 so that knife blades 188 of roll 184 in cooperation with grooves 190 of roll 186 (Fig. 17) will readily cut through all the plies of bag-forming material in the tube. Knife blades 188 are so arranged that a strip of paper 191 (Fig. 3*a*) is cut out of tube 34 from the side edge of the tube at gusset 38 all the way across the tube to the opposite side edge 58 and 60 of tab 44 and the height of the strip is approximately equal to the height of tab 44 (see Fig. 3*a*). Breaking the tube along the perforated line 54 across the lip of the valve is carried out by means of pinch rolls 194 and 196. Pinch rolls 194 and 196 travel at a higher rate of speed than the draw rolls 180 and 182 and pull the tube 34 taut so that it may be readily severed by knife blades 188 and at the same time this tension breaks the balance of the tube off along perforated line 54 at the lip of the valve. This action separates a bag length of tubing 42 from the continuous tube and rolls 198 and 200 further accelerate the bag length of tubing to deliver it from the machine.

Modifications of the preferred form of apparatus will be obvious to those skilled in the art. For example the line of perforations may extend all the way across the top of a bag length of tubing and in such case the serrated knife blade 108*a* of Fig. 15*a* is employed in place of knife blade 108. If this is done the cut off roll 184*a* carries a single knife blade 188*a* as shown in Fig. 17*a* which is used in place of the double knife blade 188 of Fig. 17. As a result the leading edge of each bag length of tubing 42 will break off along the perforated line of knife blade 108*a* and knife blade 188*a* will trim off the trailing edge of each bag length of tubing to give it a straight line across the bottom (see Fig. 3*b*). Alternatively knife blade 108 may just perforate the plies across the lip of the valve and slits 58 and 60 may be omitted. In this case the knife blades 188 of cut off roll 184 are in the form shown in Fig. 17*b*. As there shown, knife blade 188*b* is adapted to cut through the tube at lines 58 and 60 and from these out to the side edge of the tube at gusset 38. Bag lengths of tubing 42 are formed by breaking the tube at the line of holes 54 across the lip of the valve as previously described hereinabove.

It will be understood that it is intended to cover all changes and modifications of the preferred form of invention herein chosen for the purpose of illustration which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. In the manufacture of multiply gusseted bag tubes with automatic bag tube forming apparatus of the type in which a plurality of plies of bag-forming material are continuously fed into the mechanism as separate flat plies of material which are subsequently superimposed one on top of the other to form a bag wall the sides of which are overlapped and pasted together in the form of a bag tube which is in turn provided with gussets at each side of the tube and then divided into bag lengths which are valved by folding the gusset and a portion of the bag side wall inwardly into the tube at the open mouth thereof, the method of positioning a supplemental sleeve patch on a ply of bag forming material in the area of the valve while the ply is in flat unfolded conditon which comprises the steps of, weakening the plies of bag forming material at least along the line of the lip of the valve while the plies are flat before being folded into the form of a tube, feeding a web of sleeve stock at a speed below that of the plies of bag forming material, weakening the web of sleeve stock in a line across the web in order to delineate lengths of sleeve patch therein, continuing the feeding of the web of sleeve stock at a speed below that of the plies of bag forming material to feed one end of the sleeve patch at the free end of the web into the nip between two plies of bag forming material at the place where the plies are superimposed one on top of the other in order to accelerate the speed of such sleeve patch up to that of the plies of bag forming material and separate the sleeve patch from the web, controlling the feeding to position the sleeve patch between the plies in the area of the valve of the finished bag tube.

2. The method specified in claim 1 which includes the step of pasting one end portion of the sleeve patch in position against one of the plies with which it is in contact.

3. In the manufacture of multiply gusseted bag tubes with automatic bag tube forming apparatus of the type in which a plurality of plies of bag-forming material are continuously fed into the mechanism as separate flat plies of material which are subsequently superimposed one on top of the other to form a bag wall the sides of which are overlapped and pasted together in the form of a bag tube which is in turn provided with gussets at each side of the tube and then divided into bag lengths which are valved by folding the gusset and a portion of the bag side wall inwardly into the tube at the open mouth thereof, the method of positioning a supplemental sleeve patch on a ply of bag forming material in the area of the valve while the plies are in flat unfolded condition which comprises the steps of, weakening the plies of bag forming material at least along the line of the lip of the valve while the plies are flat before being folded into the form of a tube, feeding a web of sleeve stock at a speed below that of the plies of bag formnig material, weakening the web of sleeve stock in a line across the web in order to delineate lengths of sleeve patch therein, continuing the feeding at a speed below that of the plies of bag-forming material to bring one end of the sleeve patch at the free end of the web into contact against a surface of one of the plies which surface is thereafter positioned against the surface of an adjacent ply in the wall of the finished bag tube, controlling the feeding to position one end portion of the sleeve patch against such surface to cover the area of the gusset in a finished bag length of tubing at the open mouth thereof, thereafter accelerating the speed of such sleeve patch up to that of the ply of bag forming material with which it is in contact to separate such sleeve patch from the web and place it in position on the ply to provide a supplemental sleeve for the valve of the finished bag tube.

4. In automatic bag tube-forming apparatus of the type in which a plurality of plies of bag-forming material are continuously fed into the apparatus as separate flat plies of material which are subsequently superimposed one on top of the other to form a bag wall the sides of which are overlapped and pasted together in the form of a bag tube which is in turn divided into bag lengths which are valved by folding a portion of the bag side wall inwardly into the tube at the open mouth thereof, the improvement which comprises apparatus for inserting a supplemental sleeve in the valve of the bag tube which includes means for weakening the plies of bag-forming material at least along the line of the lip of the valve while the plies are flat before being folded into tube form, means for feeding a web of sleeve stock at a speed below

that of the plies of bag-forming material comprising a pair of cooperating draw rolls that bear against the web to move it between the rolls and means adapted to give interrupted rotation of said draw rolls adapted to synchronize the rotation with that of the feeding of the plies of bag-forming material to feed a sleeve patch length of the web into contact with each bag tube length of the plies, means for weakening the web of sleeve stock in a line across the web in order to delineate lengths of sleeve patch therein, means for continuing the feeding at a speed below that of the speed of the plies of bag-forming material which means for continuing the feeding are adapted to bring one end of the sleeve patch at the free end of the web into contact with one of the plies of bag-forming material in the area of the valve therein, means for thereafter accelerating the speed of such sleeve patch up to that of the ply of bag-forming material with which it is in contact whereby the said sleeve patch is separated from the web and positioned on the ply to provide a supplemental sleeve for the valve of the finished bag tube.

5. In automatic bag tube forming apparatus of the type in which a plurality of plies of bag-forming material are continuously fed into the apparatus as separate flat plies of material which are subsequently superimposed one on top of the other to form a bag wall the sides of which are overlapped and pasted together in the form of a bag tube which is in turn divided into bag lengths which are valved by folding a portion of the bag side wall inwardly into the tube at the open mouth thereof, the improvement which comprises apparatus for inserting a supplemental sleeve in the valve of the bag tube which includes means for weakening the plies of bag-forming material at least along the line of the lip of the valve while the plies are flat before being folded into tube form, means for feeding a web of sleeve stock at a speed below that of the plies of bag-forming material, means for weakening the web of sleeve stock in a line across the web in order to delineate lengths of sleeve patch therein, means for continuing the feeding at a speed below that of the speed of the plies of bag-forming material which means for continuing the feeding are adapted to bring one end of the sleeve patch at the free end of the web into contact with one of the plies of bag-forming material in the area of the valve therein, means for thereafter accelerating the speed of such sleeve patch up to that of the ply of bag-forming material with which it is in contact whereby the said sleeve patch is separated from the web and positioned on the ply to provide a supplemental sleeve for the valve of the finished bag tube, said means for accelerating a length of sleeve patch to separate it from the web including an idler roll positioned under the ply adjacent the place where the free end of the web of sleeve stock is fed into contact with such ply and a cooperating roll positioned above such ply and out of contact therewith, pivotal means for rotatively mounting said cooperating roll, cam means adapted to pivot the cooperating roll down into contact against the free end portion of the web of sleeve stock after it is fed into contact with the ply of bag-forming material and means for driving the cooperating roll at a speed approximately equal to that of the ply of bag-forming material whereby a length of sleeve patch may be separated from the web and applied in position on the ply of bag-forming material.

References Cited in the file of this patent

UNITED STATES PATENTS

1,649,760	Vierengel	Nov. 15, 1927
2,129,842	Holweg	Sept. 13, 1938
2,586,514	Canno	Feb. 19, 1952
2,677,319	Potdevin	May 4, 1954
2,714,983	Potdevin	Aug. 9, 1955
2,723,604	Fischer	Nov. 15, 1955
2,740,577	Bahman	Apr. 3, 1956
2,753,768	Hahn et al.	July 10, 1956
2,756,994	Wiig	July 31, 1956