Nov. 28, 1967 E. M. KUGLER 3,354,795

METHOD AND APPARATUS FOR MAKING BAGS

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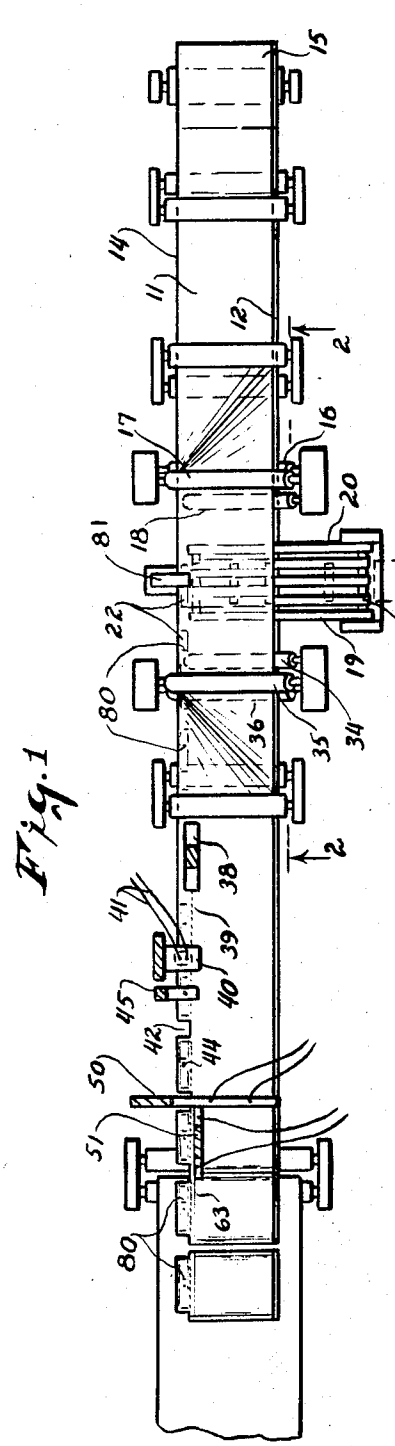


Fig. 1

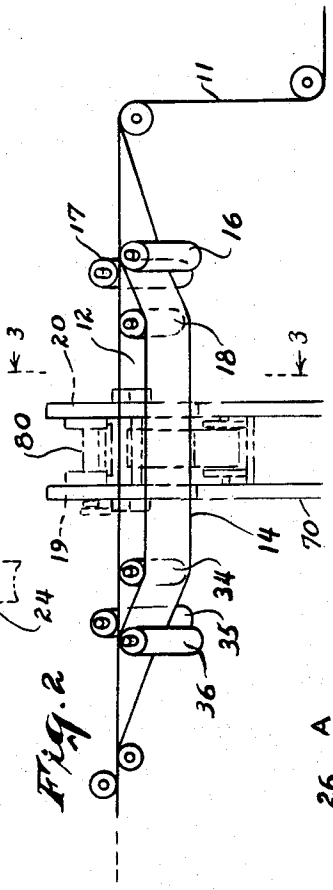


Fig. 2

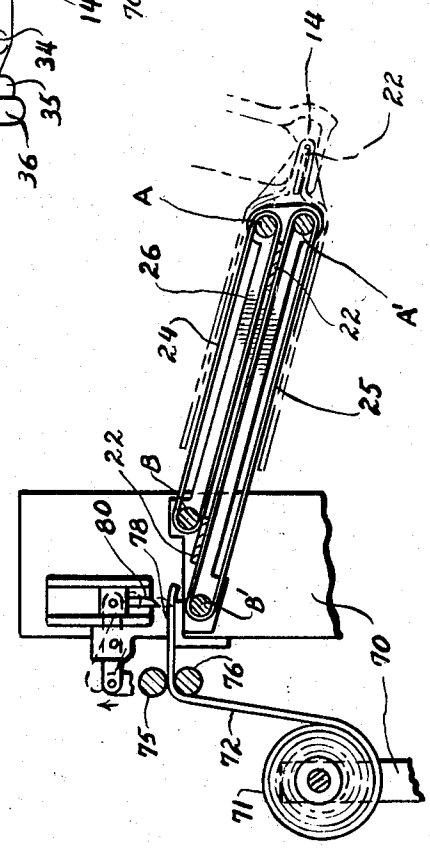


Fig. 3

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Fig. 4

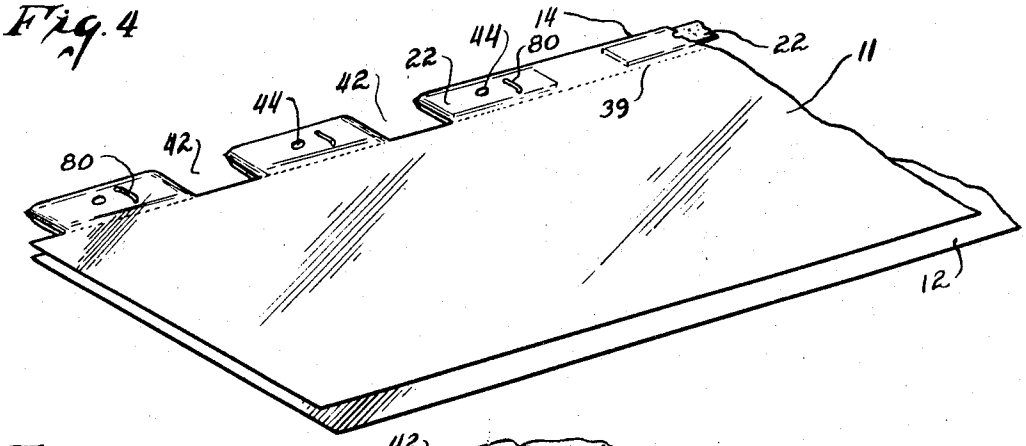


Fig. 5

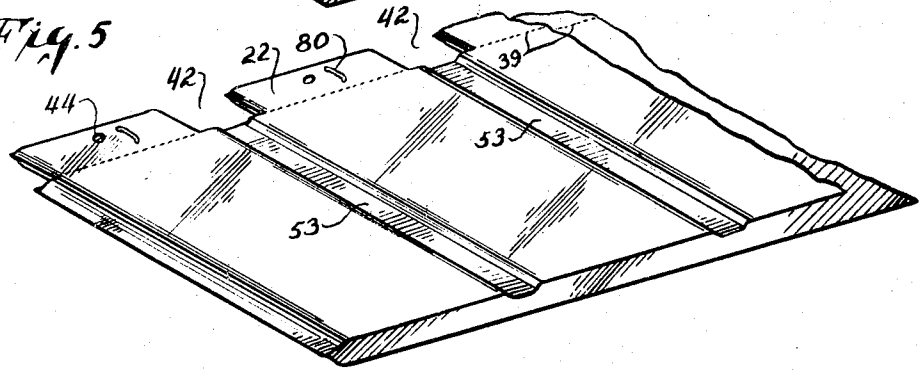


Fig. 6

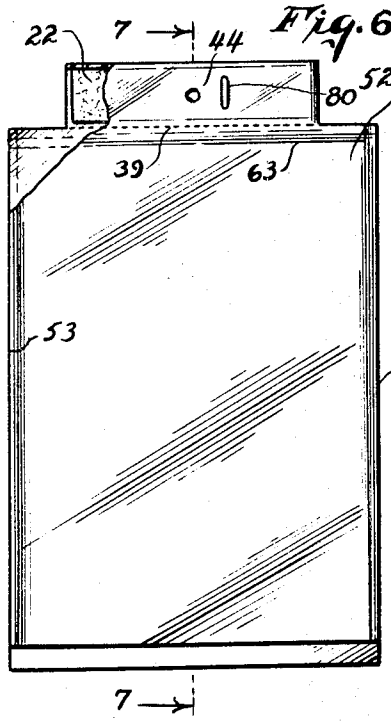
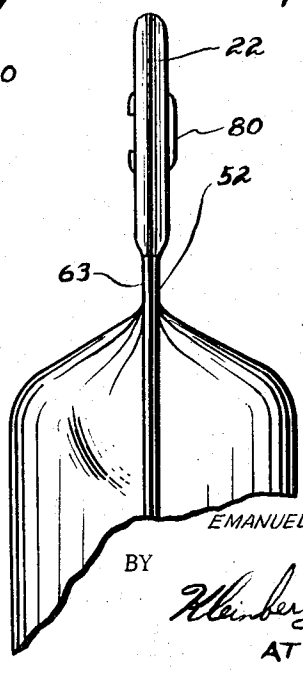


Fig. 7



Fig. 8



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METHOD AND APPARATUS FOR MAKING BAGS

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6 Claims. (Cl. 93—8)

The invention here presented is broadly in the field of the flexible packaging art; more particularly it presents a process and method for the manufacture of a bag for the storage and display of articles of merchandise; and in detail, it is concerned with a continuous method of manufacture of a bag with a reinforcing strip contained within the header end thereof.

Bags or flexible packages manufactured from a plastic material such as polyethylene or the like, are well known. Conventionally, such bags may have a reinforcing strip as of cardboard, or the like, within one end of the bag. The reinforcing strip will supply shape and strength to the finished bag and allow the same to be displayed on a rack or the like.

The fabrication of a flexible bag of this type presents several obvious difficulties. The conventional process of fabricating such a bag is to simultaneously advance a flat film of the material to be utilized to form the bag, together with a continuous strip of the reinforcing material. The film may then be folded about the reinforcing strip, sealed, and severed in order to form the finished bag.

This is, of necessity, an expensive and inefficient technique. For example, it is difficult to space the reinforcing strip at the fold of the film. If the reinforcing strip is not properly located, the finished bag will be defective.

Additionally, in that the film must be folded about the reinforcing strip, it will be necessary to commence production from a flat film of bag material rather than a flattened tube thereof, or a preformed doubled over strip. These latter configurations are often more readily available and sometimes more economical to obtain. Additionally, it is, at times, impossible to commerce production from a web of flat sheet material as when such a flat sheet is wider than the available rollers for the machine or for the necessary printing press.

Still further, the known processes and methods of manufacture of the described type of package, require necessarily expensive and complicated special equipment such as for severing and sealing. For example, after the reinforcing strip is inserted within the folds of the film of material, it will be necessary to sever the reinforcing strip into individual lengths; one of each lengths for each finished bag. This severing of the reinforcing strip must be accomplished by a separate die which must be able to cut through not only the reinforcing strip, but the film of doubled over bag material. Such a separate die for cutting plastic film together with the reinforcing strip, is difficult to design and utilize. Additionally, the use of a die to cut through the web of plastic material and the cardboard reinforcing strip does not permit the sealing of the front and back walls of the bag together in the area of the reinforcing strip. This is in that the reinforcing strip of necessity, must support the front and back walls in this area. This non-sealing of an area of the bag leads to many undesirable results. For example, dirt or other contamination may collect in the reinforcing strip portion of the bag. In addition to being unsightly, this will prohibit the use of certain types of reinforcing strips and

will make necessary the provision of a seal line below the reinforcing strip to prevent the dirt from entering the main portion of the bag.

Furthermore, it will sometimes be desired to insert special reinforcing strips within the folded over bag material. For example, a premium item such as a pencil or a ruler, may function as a reinforcing strip within the bag, while being packaged in the header end thereof. It will not be possible to utilize such an item as a reinforcing member if the bag is fabricated according to the above-described present techniques.

It is a cardinal object of this invention, therefore, to provide an improved production technique for the fabrication of a flexible package with a reinforcing strip inserted at the header or upper end thereof.

It is another primary object hereof to describe a more versatile method of fabricating flexible packages and inserting reinforcing strips, or the like, therein.

With these objects in view, the invention consists of the novel features of construction and arrangement of parts which will appear in the following specification and recited in the appended claims, reference being had to the accompanying drawings in which the same reference numerals indicate the same parts throughout the various figures and in which:

FIG. 1 is a plan view of a machine to carry out the method disclosed herein with the component parts illustrated primarily diagrammatically.

FIG. 2 is an enlarged side elevational view primarily of the reinforcing strip feeding mechanism taken substantially along line **2**—**2** of FIG. 1.

FIG. 3 is a sectional elevational view taken substantially along line **3**—**3** of FIG. 2 and illustrating the reinforcing strip feeding mechanism in particular.

FIG. 4 is a view in perspective of a folded over web of bag material with reinforcing strips therewithin illustrating the first steps of the method of manufacture of the product of this invention.

FIG. 5 is a view corresponding to FIG. 4 but illustrating a further step in the manufacture of a finished bag.

FIG. 6 is a front elevational view of a typical bag manufactured according to this invention.

FIG. 7 is an elevational sectional view of a finished bag constructed according to this invention taken substantially along line **7**—**7** of FIG. 6.

FIG. 8 is an enlarged side fractional view of the bag illustrated in FIGS. 6 and 7 as it would appear with a bulky item stored therewithin.

Referring now to FIGS. 1, 2 and 3 of the drawings, there is illustrated a machine having embodied therein the principal features of the invention, and which is particularly adapted to fabricate a flexible package with a reinforcing strip at the header end thereof, as illustrated in FIGS. 6, 7 and 8.

The machine of FIGS. 1, 2 and 3 may be supported on any suitable frame (not illustrated).

The web of material **11** for forming the bag **52** may be supplied in the form of a continuous doubled over strip with a fold **14** from a supply roll **15**.

Although the material is not described in detail, it will be preferable to utilize a heat sealable material, such as polyethylene, or the like.

It will be noted that although the process herein described commences with a doubled over sheet of material, it could equally well commence with a flattened tube of material or even a single sheet thereof.

If a flattened tube is utilized, it will merely be necessary to open one end thereof by means of any cutting apparatus. If a single sheet is utilized, it will only be necessary to fold the same over any of the conventionally available forming boards to produce a doubled over strip.

No matter how supplied, however, the doubled over web of material **11** may be advanced to a plurality of feed rollers **16**, **17** and **18**, which may be tilted somewhat from the horizontal as seen in FIG. 2. Thus, the advancing folded web of material **11** will be advanced so that the fold **14** thereof will be substantially lower than the opposite open end **12** thereof. As will be described in detail hereinafter, this will facilitate the insertion of the reinforcing strip **22** into position.

Of course, this tilting of the web of material **11** from the horizontal is optional as are many other features of this invention.

There will be seen in FIGS. 2 and 3 one exemplary embodiment of a device for feeding the reinforcing strip **22** to the interior of the folded web **11** of bag forming material.

There is illustrated in FIG. 3 two cooperating endless conveyor belts **24** and **25** with a relatively small gap **26** therebetween. The said endless belts **24** and **25** will constitute feed and guide means for successive reinforcing strips **22**. Each of the conveyor belts **24** and **25** will be mounted over pairs of rollers A and B, and A' and B', one of which is a driven roller.

As will be seen, the entire conveyor belt system above-described will be relatively thin so that the opposite and confronting sides of the folded web **11** may pass above and below the same. The rollers may be connected by any suitable rigid connecting members **19** and **20** to insure proper positioning within the advancing folded web **11**.

As with other features of the invention, the conveyor belt system previously described and the reinforcing strip mechanism to be described immediately hereinafter, are optional as other well known equivalents can be substituted therefor. For example, air suction transport means of any of several well known types could be substituted for the conveyor belt system.

Provided in an operative position adjacent the conveyor belt system will be a standard **70** supporting a roll **71** of the reinforcing material **72** in a continuous form. Although the roll **71** herein shown is to one side and below the conveyor belt, it could equally well be positioned above or to any side thereof. In the exemplary embodiment depicted, the continuous strip is fed over a pair of drive rollers **75** and **76** to be urged over a cutting support **78**. Above the conveyor belt end of the cutting support **78** will be a periodically descending knife **80** adapted for controlled vertical movement. In the exemplary embodiment depicted therefore, when a predetermined length of the reinforcing strip **22** is extended past the knife **80**, the said knife **80** will be caused to descend against the cutting support **78** causing a predetermined width of the reinforcing strip **22** to be severed and to fall on the lower conveyor belt **25**. The said reinforcing strip **22** will then be urged between the conveyor belt system downward toward the discharge end thereof.

The above-described apparatus has been illustrated, however, merely in an exemplary manner. It is contemplated that other individual reinforcing strip feeding mechanisms may be utilized. For example, a stack of pre-cut reinforcing strips may be fed to the web **11** by the conveyor belt system. This system will be especially advantageous in conjunction with the use of special premium items as a header such as a pencil, ruler, phonograph record, die cut cardboard, or any one of a myriad of other like items.

It is only important that the reinforcing strip **22**, no matter what be its shape or form, whether pre-cut or not, be laterally fed within a folded over sheet of continuously advancing web material **11**. It is this feature which is the gist of the invention and which accounts for the many advantages flowing therefrom. It is further contemplated that special reinforcing strips may be provided, such as a folded piece of cardboard enclosing a fragile item, such as a phonograph record.

As previously described, the discharge end of the conveyor belt system, will be positioned in juxtaposition with the interior of the fold **14** of the continuously advancing web **11**. As the reinforcing strips **22** are discharged from the lower end of the conveyor belt system, they will be deposited within the interior of the folded web **11** at the fold **14**.

Successive reinforcing strips **22** now deposited within the folded web **11** will continue their advance along with the said web.

As will be seen primarily in FIG. 3, the optional downward tilt below the horizontal of the fold **14** will insure that the successive reinforcing strips **22** are impinged directly against the said fold.

In certain embodiments of the product to be formed, it may be desirable to staple the reinforcing strip **22** in position within the folded over web of material **11**. For this purpose, an automatic stapler **81** may be provided adjacent the fold **14** in the area of the conveyor belt system. Thus, as each reinforcing strip **22** is fed into position within the web **11**, it may be secured in position as by either a lateral or longitudinal staple **80**.

After leaving the conveyor belt system station, the folded web **11** together with the reinforcing strips **22** therebetween, will be advanced between a plurality of rollers **34**, **35** and **36** as seen in FIG. 2, to be returned to a substantially horizontal position.

The order of the steps to be described hereinafter are merely preferred and not limiting. It is realized that the order of certain of these steps may be altered for specific purposes.

The continuously advancing folded web **11** with the reinforcing strips **22** therewithin may be fed to a vertically reciprocating perforating member **38** having a plurality of projections at its lowermost edge. The vertically reciprocating member will periodically be caused to descend on the advancing folded web **11** therebelow causing a line of perforations **39** to be formed therein.

The perforating member **38** may be rotary instead of reciprocating as may other members to be described hereinafter.

As will be again mentioned, this line of perforations **39** may permit the reinforcing strip area of the finished bag to be removed when not desired.

For certain purposes, as when forming a side gusseted bag as disclosed particularly in FIGS. 6, 7 and 8 of the drawings, an area of the folded web **11** adjacent the fold line **14** and longitudinally between the reinforcing strips **22** may be severed and removed. For this purpose, a vertically reciprocating die **40** with an electrically heated seal wire **41** therewithin will be positioned to periodically intersect the advancing folded web **11**. As will be seen in FIG. 4, the advancing web **11** with the reinforcing strips **22** therewithin will now have cutouts **42** adjacent the fold **14**, with the area of the cutouts **42** heat sealed together thus retaining a closed upper end of the bag. This result is an important feature of the invention as it could not be obtained utilizing the prior art processes and machinery.

For display purposes or the like, the finished bag may be hung on a display rack or the like. For this purpose, a central opening **44** may be punched through the folded web **11** and the reinforcing strip **22** by a vertically reciprocating punch die **45**.

After leaving the punch die **45** the folded web **11** and the reinforcing strip **22** will appear as illustrated to the left of FIG. 4. There now remains to only seal and sever the web **11** along portions to form the finished bag.

The web **11**, being of a heat sealable material, may be simultaneously heat sealed and severed by a hot wire knife

conventionally known in the art. Such a hot wire severing and sealing device is shown at **50** in FIG. 1. The vertically reciprocating severing and sealing device **50** will periodically descend on the advancing web **11** therebelow along a line **53** perpendicular to the direction of movement thereof, causing the lengths of the web **11** to be severed and the opposite ends of the severed portions to be sealed. This severing and sealing may be accomplished separately however, especially when using certain materials which do not permit these functions to be accomplished simultaneously.

Simultaneously, a vertically reciprocating sealing device **51** will descend along a line **63** substantially parallel to and directly below the line of perforations **39** sealing the confronting faces of the web **11**. In place of the reciprocating device **51**, a band, rotary, or even a sonic sealing device may be utilized.

It will be realized that this sealed line **63** may be eliminated for the purposes of this invention in that the reinforcing strip **22** will be entirely sealed within the bag. In the prior art, in that the reinforcing strips were contained within an open passage, this seal line **63** is necessary to isolate the reinforcing strip passage from the remainder of the bag.

The formed bags **52** will now be fed to a faster moving end conveyor belt **54**, where they will be separated for stacking or use.

There will be seen then that there is described hereinabove a method for continuously forming bags **52** of almost any shape or size. It will be realized that the method is versatile and many variations of the product formed herein are possible.

For example, it is contemplated that adhesive may be applied to the reinforcing strips **22** prior to insertion into the interior of the folded web **11**. This will insure that the reinforcing strips **22** remain in position thereafter. Alternately, the reinforcing strips **22** may be coated with a heat sealable material and may then be joined to the bag by any heating device so as to present a smooth laminated appearance.

It is further contemplated that should the adhesive mentioned immediately above be applied, it will be possible to eliminate the lateral heat seal directly below and parallel to the line of perforations **39**.

Referring now particularly to FIGS. 6, 7 and 8 it will be seen that a bag **52** constructed according to the embodiment of the invention herein disclosed, will have advantages never heretofore attainable in mass-produced bags.

The cutouts or notches **42** on either side of the bag in the area of the reinforcing strip **22** will permit the bag **52**, when filled with bulky merchandise, to expand out to provide substantial thickness so as to contain the article within the bag **52** in substantially smooth and wrinkle-free condition. In expanding out, the side edges of the bag will move inwardly with respect to the bag width, with parallel movements, and it will be found that a pleat will be formed at the top and shoulder portions of the bag.

Of course, still additional advantages may be obtained from a bag constructed according to the instant invention.

For example, the reinforcing strip can be in the form of a protective enclosure containing an item such as a phonograph record or the like. When fed to the interior of the advancing folded web, the reinforcing strip will not only serve to stiffen and shape the bag, but to enclose an item packaged therewithin.

Additionally, the bag may be provided with a central longitudinally extending heat seal zone, and the reinforcing strip can be supplied in multiple, so that the finished bag may be severed into individual portions for special merchandising techniques.

In any of the embodiments hereinbefore described, the reinforcing strips **22** may be removed from the remainder of the bag without damage to the remainder of the bag by severing the same along the line of perforations **39**.

Additionally, a suitable grommet or tag may be inserted within the central opening **44** for display or other purposes.

While it is preferred to employ a reinforcing strip **22** of a relatively stiff material, such as cardboard, or the like, it is within the scope of this invention to utilize other reinforcings, such as tapes, or cords, etc.

In the above-described exemplary embodiment of the invention, there was shown and described a device which may be either intermittent or rotary to fabricate one reinforced bag at a time. It will be realized, however, that it will be possible to fabricate two such bags at a time from a single doubled over sheet of material. This may be accomplished by a double mechanism as set forth heretofore.

While there are above disclosed but a limited number of embodiments of the structure and product of the invention herein presented, it is possible to produce still other embodiments without departing from the inventive concept herein disclosed, and it is desired, therefore, that only such limitations be imposed on the appended claims as are stated therein, or required by the prior art.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. In a machine for continuously forming a series of flexible bags of the type having a reinforcing strip at one end thereof, which machine is characterized by a mechanism for advancing a continuous folded web of material having superimposed walls and and an integral longitudinal fold, a reinforcing strip feeding mechanism for inserting individual and separated reinforcing strips within said superimposed walls of said folded web of material adjacent the fold thereof, means to seal the mating surfaces of said folded web walls together along local and separated areas commencing between successive reinforcing strips and corresponding to bag width intervals in a cross direction to the movement of said web, and means to segment said web at each of said local and separated areas to form individual bags.

2. A machine for continuously forming a series of flexible bags as set forth in claim **1**, wherein said means to segment are both comprised of a single hot knife.

3. In a machine for continuously forming a series of flexible bags of the type having a reinforcing strip at one end thereof, which machine is characterized by a mechanism for advancing a continuous folded web of material having superimposed walls and an integral longitudinal fold, a reinforcing strip feeding mechanism for inserting individual and separated reinforcing strips within said superimposed walls of said folded web of material adjacent the fold thereof, severing and sealing means to remove the portions of said walls of said web between each of said separated reinforcing strips while sealing the remaining confronting edges of said walls of said web together about the periphery of said removed portion, and means to seal the remainder of the mating surfaces of said folded web walls along separated lines commencing from each of said cutout portions in a cross direction to the movement of said web, and means to segment said web along each of said separated lines to form individual bags.

4. The method of continuously fabricating a flexible bag of the type having a reinforcing strip at one end thereof, characterized by the steps of, advancing a continuous folded web of material having superimposed walls and an integral longitudinal fold, feeding successive separate reinforcing strips laterally between said superimposed walls and depositing the same adjacent the longitudinal fold thereof, and sealing the mating walls of said folded web together along separated areas corresponding to bag width intervals in a cross direction to the movement of said web and separating said web at each of said areas to form individual bags.

5. The method of continuously forming a flexible bag as set forth in claim 4 wherein said steps of sealing and separating said web are simultaneously accomplished.

6. The method of continuously fabricating a flexible bag of the type having a reinforcing strip at one end thereof, characterized by the steps of, advancing a continuous folded web of material having superimposed walls and an integral longitudinal fold feeding successive separate reinforcing strips laterally between said superimposed walls and depositing the same adjacent the longitudinal fold thereof, removing the portion of said folded web between siad successive reinforcing strips, and sealing the mating walls of said folded web together along separated areas corresponding to bag width intervals in a cross direction to the movement of said web commencing from each of said removed portions of said web, and separating said web at each of said areas to form individual bags.

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