Aug. 18, 1964 J. S. DAVIS 3,144,815

BURST RESISTANT PAPER SHOPPING BAG

Original Filed July 31, 1959 2 Sheets-Sheet 1

Fig. 2.

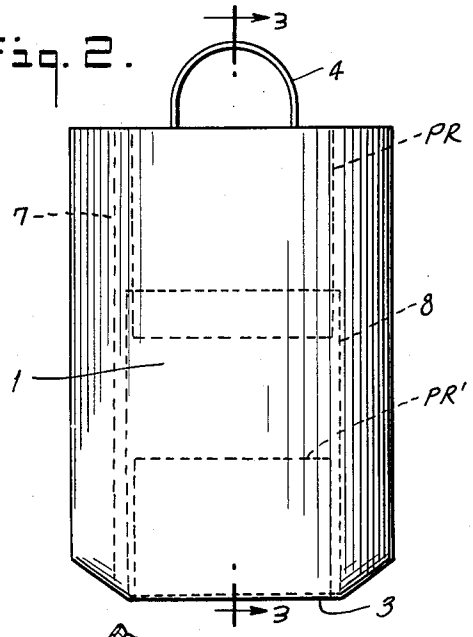
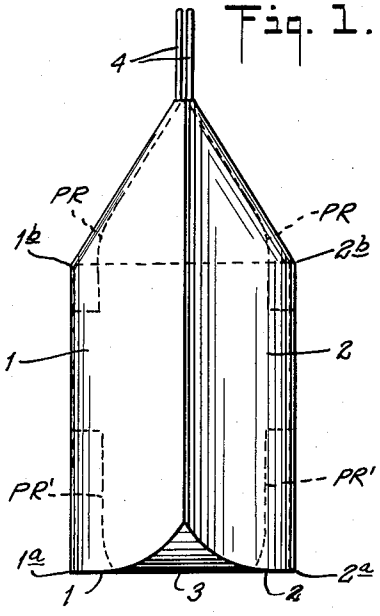


Fig. 1.



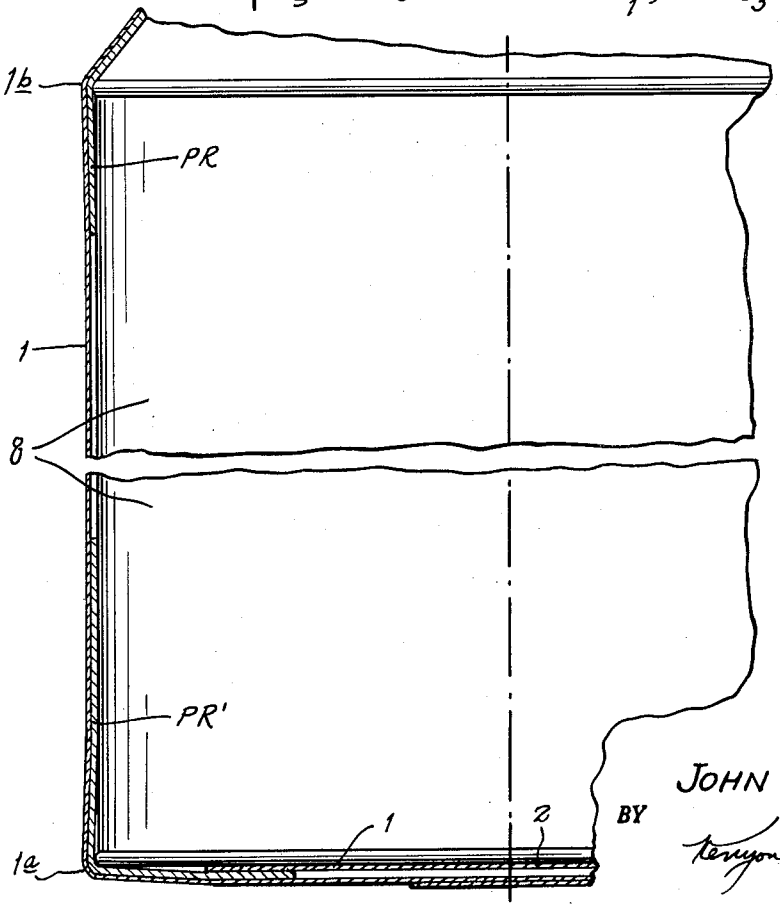


Fig. 3.

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Fig. 4.

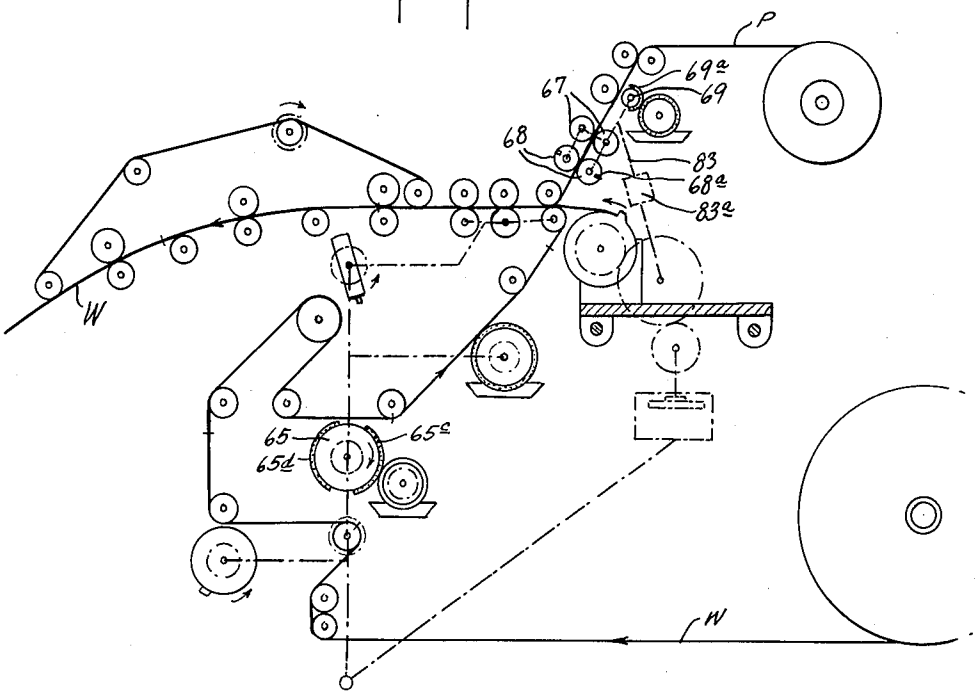
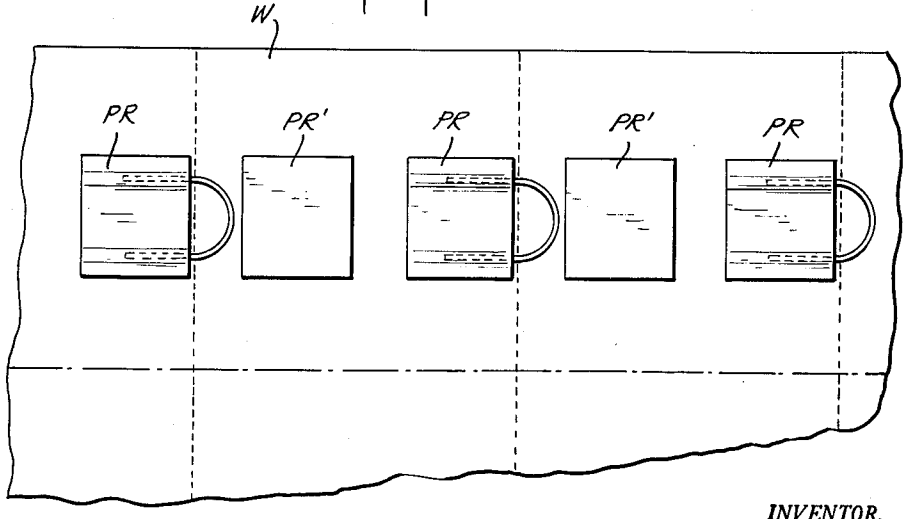


Fig. 5.



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BURST RESISTANT PAPER SHOPPING BAG

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Original application July 31, 1959, Ser. No. 830,928. Divided and this application Dec. 13, 1961, Ser. No. 159,185

1 Claim. (Cl. 93—35)

This invention relates to a burst-resistant paper shopping bag invented particularly for the purpose of permitting a customer to carry a large can of paint from a store. Therefore, throughout the following a can of paint is referred to exclusively, but the bag has the same advantages when used to carry any relatively heavy article of merchandise having sharp corners and of greater extent than that of the bottom of the bag.

A paper shopping bag is made usually of relatively heavy weight paper, is of the rectangular bottom type and it has carrying handles attached to the upper edges of its front and back walls. It may be a flat bag wherein the front and back walls join directly together, or it may have bellows side walls. Such a bag is normally given away free with the sale of merchandise and its construction must be such as to permit it to be made by high speed paper bag machines which automatically apply the handles to a bag web, tube the latter and cut it successively into bag lengths or blanks which are then bottomed by an automatic bottoming machine. This kind of bag is made, sold and used in very large quantities.

Many articles of merchandise are carried satisfactorily in such bag. The weight of the merchandise is supported by the bottom of the bag which then transmits the stress of the load in tension through the front and back walls to the handles held by the person carrying the bag. The paper is relatively strong in simple tension or when stressed in approximately this manner.

Even a relatively small shopping bag will hold a gallon can of paint. However, such a can has a diameter that is greater than the extent of the bottom of the bag in a direction extending between the front and back walls of the bag. This forms corners in these walls where they must wrap or bend around the bottom of the can and to some extent the same condition prevails upwardly where the bag walls must wrap or bend at least somewhat around the top of the can, it being understood that the bag is carried by one hand by bringing the bag handles, attached to the tops of the front and back walls, closely together. In such an instance the paper bag walls are no longer stressed in simple tension. The bag walls must extend horizontally from the bag bottom and wrap around the can bottom so as to closely coincide with the latter's right angular shape. The same condition is approximated at the top of the can although the angularity is not so great because the bag walls can extend upwardly a substantial distance before they reach the handles where they are held together by the user. A gallon of paint is, of course, rather heavy.

Now under the above conditions a strong bursting force is applied to the front and back walls of the bag. To withstand this bursting force reliably a shopping bag must be made of such very heavy weight paper that the cost of the bag is increased to a degree making its free provision uneconomical. Furthermore, shippping and handling of such very heavy weight bags are relatively impractical.

Plainly this same bursting problem is experienced whenever the merchandise is heavy, has a greater extent than that of the bag bottom between the bag's front and back walls and particularly when the merchandise has

sharp corners exerting thrust against the bag walls while the latter are tensioned due to carrying the weight of the merchandise. Because the bag bottom is normally rectangular the same conditions normally do not prevail at the edges or side walls of the bag because in that direction the bag bottom has an extent greater than that of the merchandise.

One object of the present invention is to provide a method for making a paper shopping bag of paper of normal weight and which resists satisfactorily the bursting action when carrying a can of paint or other merchandise of the character described above, and to provide a method for making such a bag on an automatic bag machine.

Another object is to provide a method for operating a fully automatic paper shopping bag machine so as to permit the production of a bag satisfying the above described objects without requiring extensive reconstruction of the machine.

Still other objects may be inferred from the following description which is aided by the accompanying drawings in which:

FIG. 1 is a side view of a bag embodying the present invention as it is used in the case of a can of paint;

FIG. 2 is a front view of FIG. 1;

FIG. 3 is a fragmentary cross section taken on the line 3—3 in FIG. 2 and illustrating the manner in which the present invention overcomes the bursting problem as it is presented both at the bottom and top of the can of paint;

FIG. 4 is a schematic view to some extent duplicating FIG. 10 of Patent 2,844,075, as the construction of that patent is modified to make the bag illustrated by the above figures; and

FIG. 5 is a fragment taken from FIG. 1 of the above patent to show the action resulting from the mentioned modifications.

Referring first to FIGS. 1 and 2 these show what externally appears to be the usual shopping bag with its front wall **1**, back wall **2**, square bottom **3** and carrying handle **4**. The latter are rectangular in contour, their legs **5** in each instance are adhesively secured to the inside of the wall to which that handle is attached, and a reinforcing paper patch is adhesively secured over these legs and to that wall. In this case the bag does not have bellows side walls but is a flat bag formed on an automatic bag machine and secured together by one wall having a lap **7** which is adhesively secured to the other wall, the bottom **3** being the type formed by an automatic bottoming machine.

As shown by FIG. 3 this bag contains a can of paint **8** and ordinarily this would be a gallon can of paint since this warrants the free provision of a shopping bag for carrying this article of merchandise. FIG. 3 is a fragmentary but the manner in which the contour of the can is generally followed by the paper bag walls is shown by FIGS. 1 and 2. Looking at the front of the bag, as in FIG. 2, it can be seen that the side edges, or the bellows side walls in the case of a square bag, are not unduly affected in contour by the article within the bag.

However, FIG. 1 shows how the bag walls **1** and **2** are first deflected horizontally and then bent right angularly upwardly due to the contour of the bottom of the can. Sharp corners **1***a* and **2***a* are formed in this manner. To a lesser degree of seriousness the same condition prevails at the top of the can as indicated by the angular points of deflection **1***b* and **2***b* in the case of the walls **1** and **2** respectively.

As so far described the illustrated shopping bag may be produced automatically by using the machine disclosed by the J. S. Davis et al. Patent 2,844,075, issued July 22,

1958. A bag made by this machine when using paper of normal weight presents the problem of bursting at the corner points **1***a* and **2***a* and sometimes at the upper points **1***b* and **2***b*. At these points there is the tendency for the article of merchandise, the can of paint in this instance, to apply an outward thrust effect to very localized portions of the bag walls while the latter are stressed in tension, because of carrying the package, the resulting stress being far from simple tension and being in fact a combination of a strong piercing action and a tensioned wall with the paper fibers of the latter weakened by right angular bending, this having reference particularly to the conditions at the bottom portion of the bag.

Going now to FIGS. 4 and 5. the parts shown and the numerals and legends applied correspond to those appearing in the figures of the Davis et al. patent identified above.

Because of the complete description in the Davis et al. patent it is unnecessary to go into detail here concerning the parts of the machine shown by that patent, other than to explain the modifications required by the present invention. Thus, the rotary element **65** which applies the rectangular solid pattern of adhesive to the web W, has only one adhesive printing segment **65***c* in the case of the patent. To practice the present invention a second corresponding printing segment **65***d* is mounted by the rotary element diametrically opposite to the segment **65***c*. In addition, both segments are made longer. In the commercial form of the patented machine segment **65***c* was 3⅛" long whereas in the present instances both segments **65***c* and **65***d* are made 6¼" long or almost double length. It is to be understood that because the bags have front and back walls each is provided with handles so that the rotary element **65** has two sets of the mentioned segments spaced from each other axially with respect to the rotary element.

In the commercial form of the patented machine the drive, indicated schematically at **83** in the patent, included intermeshed idler gears providing a 1 to 2 speed reduction, and in the case of the present invention these idler gears are reversed in position to provide a 2 to 1 ratio or, in other words, an overall speed increase of 4. This change in the gearing is schematically illustrated at **83***a* in FIG. 4 of the present application.

With this change the feed rollers **67** drive the patch web P four times faster than before. The adhesive applying roller **69**, which formerly turned ½ revolution per bag length of the passing web W, with this gearing change now rotates two revolutions per passing bag length, and one of its adhesive printing segments is removed so as to leave only the one segment **69***a*. Finally, one of the knives is removed from the die cutting rolls **68** leaving only the single knife **68***a*.

The timing of the rotary elements **67**, **68** and **69** relative to each other is the same as before, the adhesive applying roller **69** now passing one patch length and printing adhesive on the next, and the die cutting rolls **68** now cutting two patch lengths for each passing bag length (bag blank) of the web W. Although the speed of the feed rollers **67** is increased to feed four times faster, the patches still feed to the bag web W at slightly slower speeds than the travelling speed of the latter.

FIG. 5 shows the results obtained by the above described modifications. The cord handle patches PR are now twice as long as before, or 6¼" as compared to the 3⅛" length. A second patch reinforcement PR' is fed to the bag web intermediate and in longitudinal registration with each two of the patches PR applied to the handle legs. There is about a 3" separation between the patches PR and PR'. The dimensions specified concern a shopping bag for carrying a one gallon can of paint, the bag being a flat bag, having a height of about 13", a width of about 12½" and a bottom which is about 5" in extent in the direction extending between the front and back walls of the bag. The bottom of the bag is generally rectangular either in the case of a flat bag or a square bag having bellows side walls, the bottom being typical of the kind formed by the usual bag bottoming machine.

Although FIG. 5 shows only one line of patches applied to the bag web it is to be understood that there are corresponding patches applied to the part of the bag web not illustrated by FIG. 5 of the present application and which is the one that will form the other bag wall.

Turning now to FIG. 3, it can be seen that the patches PR on each side of the bag wall extend into the bag bottom formed by the bottomed portions of the front and back walls **1** and **2**, in the case of the type of bottom illustrated, the patches PR' then extending horizontally beneath the bottom of the can of paint and around the bottom corner of the can so as to reinforce the bag at the points **1***a* and **2***a* which receive the previously described bursting action when the bag is carried by its handles **4**. The patches PR' extend upwardly along the bag for a substantial distance and the patches, of course, are in each instance adhesively secured throughout their extents to the bag walls themselves. Furthermore, at the top of the can the patches PR are now long enough to extend downwardly so that the bag is reinforced at the other points **1***b* and **2***b* of possible bursting. It is to be understood that the dimensions of the patches previously indicated should be varied according to the size of the article of merchandise carried and the size of the bag itself which is required to carry the particular article involved.

It can be seen that in accordance with the invention the shopping bag is provided with the carrying handles **4**, the front and back walls **1** and **2** connect to and depending from these handles and a bottom that is connected to and extends between the lower portions of these walls. As previously described these walls have the localized areas **1***a* and **2***a*, in particular, which are deformed outwardly when the bag carries any sharp cornered article of merchandise of greater extent than the bag's bottom as exemplified by the can of paint. Therefore, the bag is subjected to bursting at these areas. Without increasing the weight of the paper used for the paper shopping bag itself, this bursting tendency is overcome by the reinforcing patches PR' which are secured to the bag walls throughout the extent of the areas requiring reinforcing Thus, the bag walls are reinforced against the bursting and this is done in a manner permitting production of the shopping bag by a fully automatic paper shopping bag machine.

When bottomed in the customary manner the bag bottom has an oblong shape and the bag walls **1** and **2** are connected to the longer side edge portions of this bottom. Therefore, only the front and back walls require the reinforcing action, since transversely the bag is larger than the article it carries. The patches PR' extend into the bag bottom for substantial distances and up the front and back walls for substantial distances, thus providing an efficient resistance to the combined bursting and tension stresses previously described. Both the handle **4** and the patches PR and PR' are centrally located with respect to the front and back walls of the bag and the handles and patches are vertically aligned in each instance so that the stress extends straight from the handles around the corner of the can where the reinforcing patches are located and to the bag bottom which carries the weight of the can of paint.

As shown by FIGS. 1 through 3 the present invention provides a new paint can package assembled as described by the foregoing. The package is carried by the cord handles, is burst-resistant and the front and back walls of the bag may be used as advertising display panels by printing applied to the bag web, in the usual manner.

The described method of making the new shopping bag permits the use of the already existing bag making machine so as to eliminate the requirement for special machining.

Any bag made of paper or other bag material, which

carries any article which bulges the bag's walls so as to apply a bursting stress at the wall's bulged portions, may be provided with the reinforcement arrangements described hereinabove. Then the bag may be made of lighter weight paper, for example, than would otherwise be required only to resist the stress at the bulged portions which are normally localized so as to make the reinforcement patches effective at those portions without greatly increasing the overall weight of paper or the like required to make the bag.

In the commercial field the type of flat bag illustrated, with its oblong bottom, is called a satchel bottom bag. A bag having bellows side walls is called a self-opening, or SO, bag. The principles of this invention are applicable to both types and possibly any other paper bag construction when the previously described carrying conditions are encountered.

This application is a division of my copending patent application, Serial No. 830,928, filed July 31, 1959, now abandoned.

What is claimed is:

In the manufacture of shopping bags by feeding a flat web of indefinite length longitudinally through folding and forming apparatus, applying to the flat web, as the web travels through said apparatus, two longitudinally extending rows of equal sized handle patches at equally spaced locations along each row and with the patches of each row of a transverse width substantially less than one half the width of the web and with the patches overlying the surface of the web that is to form the inside surface of the bags, tubing the web with the patches on the inside of the tube, cutting the tube to lengths for separate bags, and folding and bonding each length in a bottoming operation that closes the bottom for each bag, the improvement which comprises applying twice as many patches along a given length of each row in a given length of the web as there are bag lengths in said given length of the web, alternate patches of each row being applied at places on the web that are near the upper ends of the bags, applying cord handles to the web in position to be held by said alternate patches and only said alternate patches, the other patches that have no handles being applied at places on the web that are spaced from the cuts that sever the web and at places which locate these other patches in each corner where the bottom of the bag meets each side wall of the bag after the bottoming operation.

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