June 13, 1950 H. W. STEVENS ET AL 2,511,303

WINDOW BAG AND METHOD AND APPARATUS FOR MAKING SAME

Filed Sept. 9, 1946

2 Sheets-Sheet 1

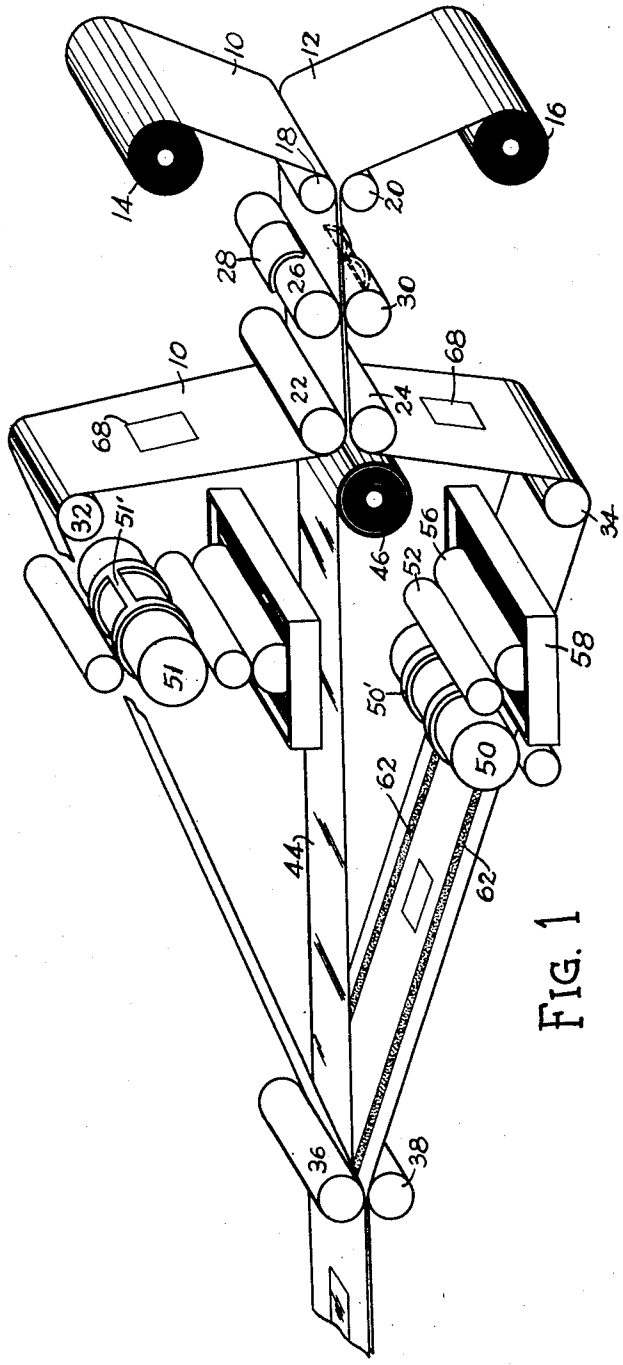


FIG. 1

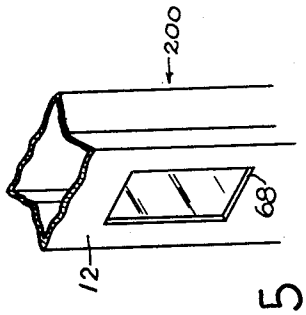


FIG. 5

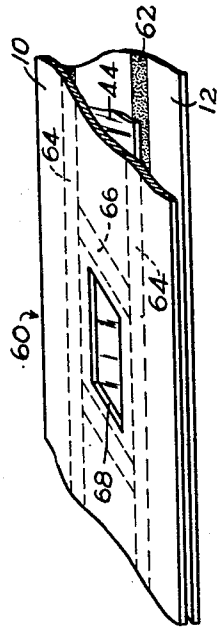


FIG. 2

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WINDOW BAG AND METHOD AND APPARATUS FOR MAKING SAME

Filed Sept. 9, 1946 2 Sheets-Sheet 2

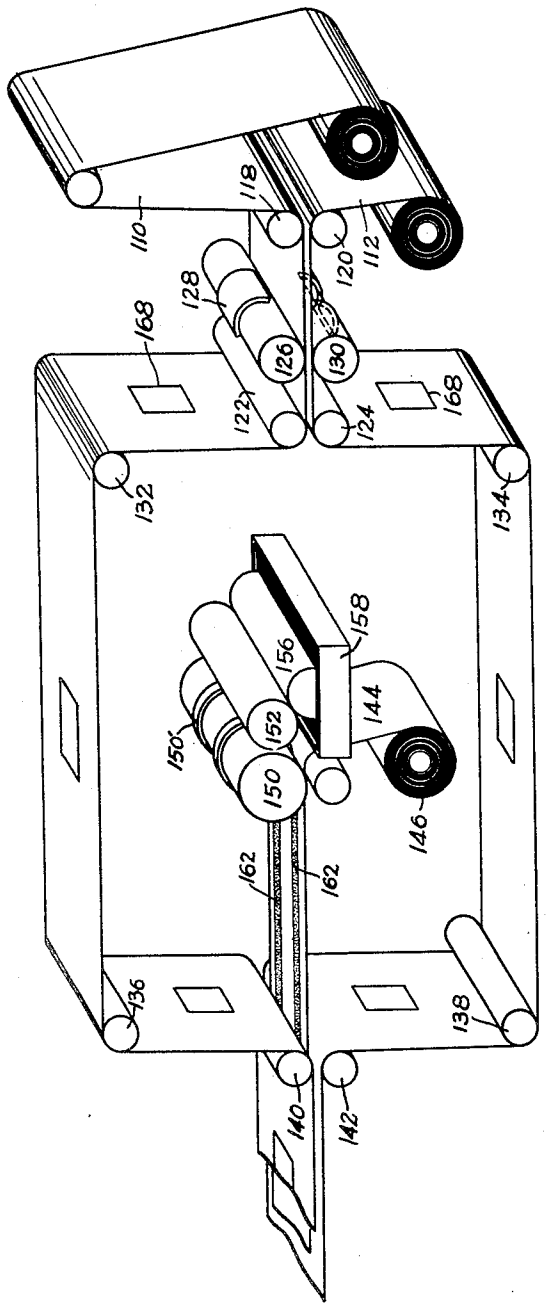


FIG. 3

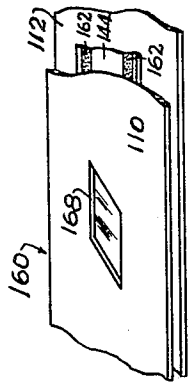


FIG. 4

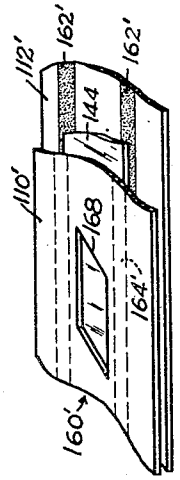


FIG. 4a

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UNITED STATES PATENT OFFICE

2,511,303

WINDOW BAG AND METHOD AND APPARATUS FOR MAKING SAME

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3 Claims. (Cl. 154—37)

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This invention relates to the art of making bags, such as those of paper or similar materials. More particularly, it contemplates improvements in machines and processes for forming a multi-ply material particularly adapted for the manufacture of so-called window bags, that is, bags formed of opaque material but provided with a side opening or window of transparent material, through which the contents of the filled bag may be viewed.

One of the difficulties with window bags made by known methods is that it is very difficult to positively secure the panel of transparent material in place relative to the opening in the bag wall, so that leakage of the contents from the bag or leakage of foreign matter into the bag, has been prevalent. Also, the known methods of manufacturing such bags are relatively slow and hence expensive, due in part to the necessity for accurate registration of the transparent panel and the opening in the bag wall.

Our invention provides a process and a machine which are capable of forming a multi-ply material which, when operated upon by a bag machine of ordinary type, will enable the manufacture of window bags free from the objections noted above. Further, the manufacture of such bags can be carried on at greatly reduced cost, due to the high speed at which the multi-ply material can be made.

We contemplate that the product of our improved machine and process may be led directly to any ordinary type of bag machine for immediate fabrication into window bags as a continuous process, but we are aware that the multi-ply material could be stored as such for use in making bags at a later time or at a different location.

Our invention will best be understood by reference to the attached drawings, wherein

Fig. 1 is a perspective, diagrammatic view of one form of machine for carrying out our invention;

Fig. 2 is a view, also in perspective, of a portion of a multi-ply web made by the machine of Fig. 1;

Fig. 3 is a view similar to Fig. 1 of a modified arrangement of a machine for making this type of material;

Fig. 4 is a perspective view of a portion of a web made by the machine of Fig. 3;

Fig. 4*a* is a view similar to Fig. 4 but showing an alternative form of multi-ply web; and

Fig. 5 is a diagrammatic perspective view of one type of window bag which can be fabricated from the web materials shown.

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In general, our improved process for forming window bag material comprises the steps of feeding two webs of suitable bag material, such as paper, glassine or the like, in face to face contact, die cutting the desired window aperture in both webs as a unit, separating the webs for travel along spaced paths, and then directing the webs so as to return once again to closely spaced paths. The separation of the paths of the webs after they have been pierced provides space therebetween for a supply of the transparent window material in strip form, and for means to feed such material in sandwiched relation to the other webs at the point at which they reconvene. Means are provided for applying a suitable adhesive to one or more of the webs to maintain them in contact, it being understood that the lengths of the paths over which the respective outer webs travel while they are separated are either equal, or differ by a multiple of the web length required for one bag. This is necessary to ensure that the window openings in the two outer layers are substantially in register when the plies are secured together.

Referring now to the drawings, in Fig. 1 there is diagrammatically shown a machine in accordance with our invention, two webs of paper **10**, **12** being drawn from supply reels **14**, **16** and caused to travel in juxtaposed relation by pairs of guide rollers **18**, **20** and **22**, **24**. The span of the two webs between these sets of rollers is periodically cut, as by a die cutting roll **26** having a suitably shaped punch portion **28** operating against a backing roller **30**, as is well known in the art.

The two webs **10**, **12** leaving the set of rollers **22**, **24** are caused to separate by being led over guide rolls **32**, **34**, and thence to drive rolls **36**, **38**, the latter being driven by any desired source of power, such as a motor, not shown.

The path lengths of the respective webs from rolls **22**, **24** to rolls **36**, **38**, are shown in Fig. 1 as being equal, to provide registry between the apertures in such webs, but as noted above, the path lengths may differ by any distance which will not interfere with such registry.

A sheet of transparent material **44**, which may be regenerated cellulose or any other suitable material, is fed between webs **10** and **12** at the rolls **36**, **38**, such sheet being drawn from a supply roll **46**. A suitable pattern of adhesive is applied to web **12** by a coating roll **50** having spaced adhesive-printing bands **50'** fed from a transfer roll **52** which in turn receives adhesive from a supply roll **56** arranged to dip into a tank **58** containing the adhesive liquid. This arrange-

ment causes a pair of spaced bands 62 of adhesive to be printed on web 12, one band on either side of the apertures 68 in such web.

A similar adhesive printing arrangement is provided to print adhesive upon the under side of web 10, such arrangement comprising a coating roll 51 having bands similar to bands 58' of roll 58. The bands of roll 51, however, are shown as additionally provided with a cross bar 51' which operates to print upon web 10 a series of cross bands of adhesive 66 (Fig. 2), so spaced as to lie close to the leading and trailing edges respectively of the apertures 68 in web 10.

As best seen in Fig. 2, the resulting laminated product of the machine shown in Fig. 1 comprises upper and lower outer layers 10 and 12, both being apertured by windows 68, with a layer 44 of transparent material therebetween, such material being secured to web 12 by the bands 62 of adhesive on that web, and to web 10 by the bands of adhesive 64 on the under side of the latter. The cross bands 66 of adhesive on web 10 serve to seal layer 44 to web 10 around all four sides of apertures 68, and hence create a very positive and leakproof seal. We have shown the bands 62 in Fig. 2 so located as to overlap the edges of web 44, whence such bands not only secure web 44 to web 12, but also operate to secure web 12 to web 10. However, bands 62 may be located so as to be entirely covered by web 44, in which case other and conventional means may be utilized to secure layers 10 and 12 to one another at points not separated by web 44.

We have found it to be advantageous to use as the adhesive for securing together the various plies, a permanently plastic or tacky non-drying adhesive, of which the prior art affords many examples. Since, in general, the material forming the transparent windows has different physical properties from that forming the outer plies, a rigid lamination thereof would give rise to buckling of the transparent window portion whenever differential expansion or contraction occurred. The use of a non-drying adhesive permits sufficient slight movement between the plies to overcome this difficulty, whether due to thermal expansion, differential absorption of moisture or other causes.

It is clear that many other patterns of adhesive may be applied to the webs 10 and 12, and that adhesive may also or alternatively be applied to portions of web 44, in order to achieve the desired results. We, therefore, do not wish to be limited to the particular patterns shown in the drawings. The essential requirement is that whatever paste patterns are applied to the webs are adequate to insure that the window material is securely fastened to one or both of the other plies.

The composite web 60 resulting from the operation of the parts described may be reeled up by any suitable and well known mechanism for transport or storage. However, we prefer to operate our machine directly in conjunction with a conventional bag machine, not shown, the material 60 being tubed, folded and subjected to the other known operations of bag-making to produce finished window bags at high speed and with maximum economy. In the latter case, the feed rolls 36, 38 of Fig. 1 may be, in fact, the web driving rolls of a conventional bag machine. In any event, such conjoint operation imposes the usual requirements of synchronism between the die cutting rolls 26 and 30 and the cut-off elements of the bag machine, in order that the window in the finished bag will be properly positioned with reference to the top and bottom of the bag. Also, in the event that the outer ply of the bag is to bear printed matter, it is necessary that the conventional compensator of the bag machine control the feed through the apparatus disclosed herein. Such synchronizing arrangements are well known in the art and we have therefore deemed it unnecessary to show them in this application.

It will be observed that the use of a strip of window material between two plies of other material in accordance with our invention results in numerous advantages, both from the point of view of production and in the structure of the bags made therefrom. Conventional window bags which have a discrete window panel secured to the inside of a single ply of bag material are difficult to manufacture, since the handling of the window elements is complicated, and problems of obtaining correct placing of the elements over the window apertures are quite troublesome. More important, such prior art constructions are subject to leakage and sifting of the contents around the edges of the window, because of the difficulty of obtaining a perfect seal of the window material to the bag material. Our construction provides a double lap joint between the window ply and the outer and inner plies, which makes perfect sealing very easy to accomplish.

Another important advantage of our invention lies in the fact that window bags can be constructed in which the inner ply or liner can be chosen for maximum compatibility with the contents of the bag, while at the same time the outer ply may be of a different material chosen for strength, printability or other features. For example, the inner ply may be of greaseproof paper, glassine, waxed paper or similar material, while the outer ply may be of kraft or other high strength paper, or it may be any material now used in fabricating bags. In other words, the invention provides maximum flexibility of bag design, while actually simplifying the manufacturing operations in comparison with the making of prior art single ply window bags.

Additionally, where the transparent layer is composed of a material, such as thin regenerated cellulose, which has adequate bursting strength but is only slightly resistant to tearing inwardly from edge cracks, the use of a layer of other material on both sides of the transparent portion operates to prevent the starting of such edge cracks. Hence the effective over-all strength of the bag is considerably greater than would result, say, if the transparent layer were merely on the inside of a composite web of two-ply paper.

In Fig. 3 we have shown a somewhat simplified form of machine, which prints adhesive bands only upon the inner or transparent ply of material. This machine comprises supply rolls from which are drawn webs 110, 112 of paper or similar material, and a die-cutting roll 126, having punch element 128 and backing roll 130 to perforate the two webs with the window apertures 168. The outer webs are guided over rollers 132, 134, 136 and 138, and thence between drive rolls 140, 142. The transparent web 144 is fed from supply roll 146 under a coating roll 150 having two adhesive printing bands 150', the latter receiving adhesive from a tank 158 via transfer rolls 156 and 152, similar to those described above in connection with Fig. 1.

As shown in Fig. 4, the composite material 160 resulting from the operation of the arrangements shown in Fig. 3 comprises the outer layers 110

and 122, provided with windows 168, and the transparent web 144 is secured by the adhesive stripes 162 only to web 110.

A variant of the composite webs described above is illustrated in Fig. 4a, which shows a composite web 160' comprising outer layers 110' and 112' having window apertures 168 therein. The transparent layer 144' is secured to both webs by bands 162' of adhesive on the upper side of web 112', and bands 164' of adhesive on the under side of web 110'.

In both machines described above, it will be understood that the drive rolls (36, 38 of Fig. 1 and 140, 142 of Fig. 3) not only act to pull the materials through the machines, but they exert sufficient pressure thereon to cause the laminae to be permanently secured to one another in the areas at which adhesive was applied.

Fig. 5 of the drawings shows, by way of example only, one type of window bag which may readily and rapidly be fabricated from materials produced in accordance with our invention. In this figure, the bag 200 is formed by tubing the material 60 shown in Fig. 2 so that layer 12 of the material forms the outside of the bag, with window 68 being located as desired in one of the wide panels on what may be the front side of the bag. It will be appreciated that the size of the window apertures shown in Figs. 2, 4 and 4a are somewhat exaggerated for clarity, since to form a gusseted bag of the type shown in Fig. 5, the amount of material extending from the window to each edge of the composite web would have to be greater than as shown. Also, it is to be understood that the window apertures need not be located on the longitudinal center lines of the webs, since if the bag to be formed is of the side seam type, the window apertures would be substantially nearer one edge of the composite webs than the other.

It will be seen from the above description that we have provided an improved method and apparatus, which, when used in connection with conventional bag making machinery, enables the manufacture of window bags in a continuous manner at a much higher speed than heretofore and hence at a reduced cost due to the saving of machine time. It will also be noted that this process and apparatus are extremely flexible in that changes in size or location of the window relative to the finished bag can be accomplished with a minimum of effort and in a short time, thus reducing the idle time of our apparatus as well as of the associated bag machine.

Bags fabricated from the composite material produced in accordance with our invention are superior in strength and leak-proofness to conventional bags having discrete window panels, and the number of imperfect bags which must be rejected, and which represent a total loss to the manufacturer, is greatly reduced. While suitable transparent materials are relatively expensive compared to the material, such as paper, which comprises most of the bag body, we have found that the savings resulting from the advantages pointed out above more than offset the cost of using a continuous strip of the transparent material. Hence, bags made in accordance with our invention can actually be produced at a lower cost than bags of comparable sizes and materials as made by conventional systems. Moreover, our invention makes it practicable to fabricate, at high speed, window bags having two main plies chosen to have the characteristics desired respectively in an outer layer and an inner liner, with the resulting advantages pointed out above.

Having described our invention in accordance with the patent statutes, we wish it to be understood that the specific means and steps recited herein are illustrative only, and that our invention is not restricted thereto except insofar as required by the scope of the appended claims.

We claim:

1. In a web handling apparatus, means for continuously feeding a pair of webs synchronously along juxtaposed paths, means adjacent said paths for die-cutting both of said webs to form corresponding apertures therein, means for separating said webs, after being cut, for travel along spaced paths, means for returning said webs to juxtaposed relation with their corresponding apertures in substantial register, means for continuously feeding a third web between said juxtaposed webs, and means for applying an adhesive to at least a portion of one of said three webs on a surface facing another of said webs, said third web feeding means being located between the spaced paths taken by said first named pair of webs.

2. In a web handling apparatus, means for continuously feeding a pair of webs synchronously along juxtaposed paths, means adjacent said paths for die-cutting both of said webs to form corresponding apertures therein, means for separating said webs, after being cut, for travel along spaced paths, means for returning said webs to juxtaposed relation with their corresponding apertures in substantial register, means for continuously feeding a third web between said juxtaposed webs, means for applying an adhesive to at least a portion of one of said three webs on a surface facing another of said webs, and means for pressing said three webs together to cause them to adhere to one another, said third web feeding means being located between the spaced paths taken by said first named pair of webs.

3. The process of fabricating a multi-ply web of window bag material, comprising continuously feeding a pair of relatively opaque webs along juxtaposed paths, die-cutting spaced registering apertures in both of said opaque webs, directing said webs along spaced paths, continuously feeding a strip of relatively transparent material along a path between said spaced paths, applying a non-drying adhesive in longitudinal bands along one of said webs adjacent the apertures therein, and applying pressure to said webs to secure them together and to said strip, with the material of the strip overlying the apertures in said webs.

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