June 22, 1965 E. H. PYLE ETAL 3,190,539

TAPE SEALED STITCHED END BAG

Filed Feb. 6, 1964

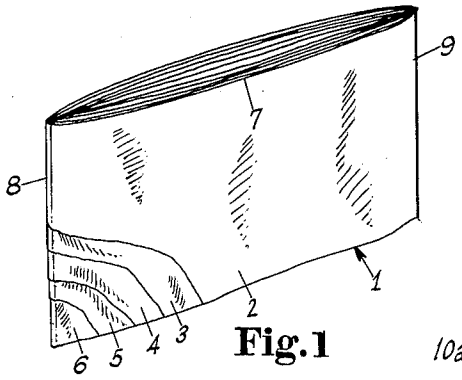


Fig.1

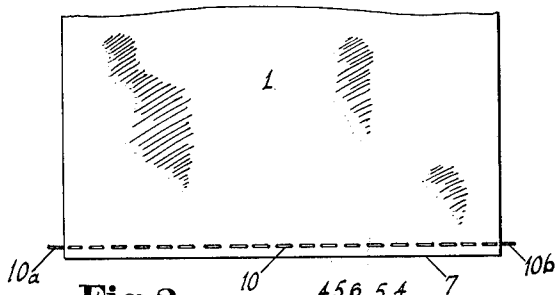


Fig.2

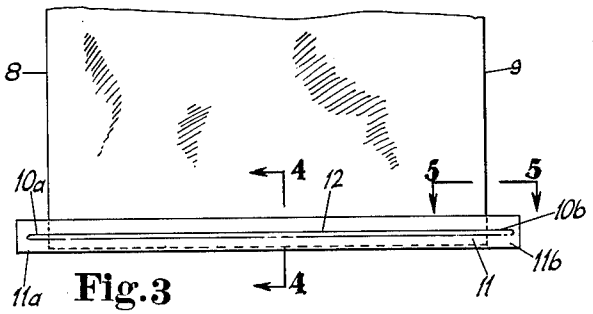


Fig.3

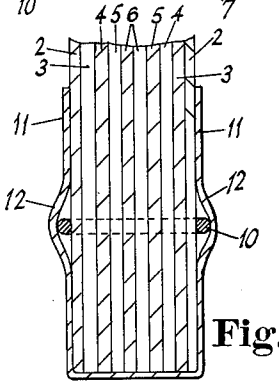


Fig.4

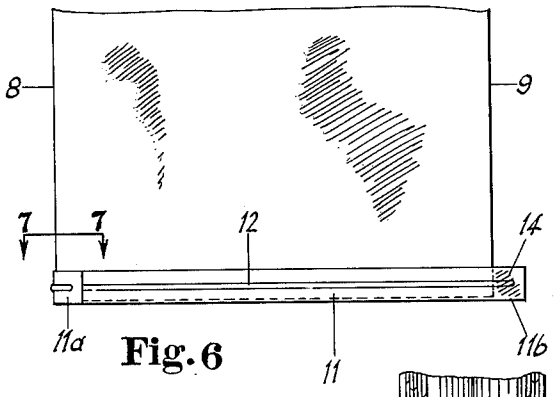


Fig.6

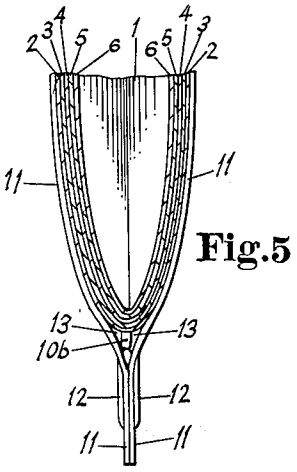


Fig.5

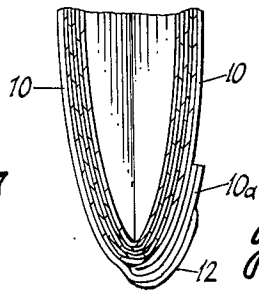


Fig.7

INVENTORS
EDWIN H. PYLE AND
CHARLES L. SWALLOW.
BY Yungblut, Melville, Strasser & Foster
ATTORNEYS.

United States Patent Office 3,190,539 Patented June 22, 1965

3,190,539

TAPE SEALED STITCHED END BAG

Edwin H. Pyle and Charles L. Swallow, Middletown, Ohio, assignors to Albemarle Paper Manufacturing Company, Richmond, Va., a corporation of Virginia

Filed Feb. 6, 1964, Ser. No. 342,998
1 Claim. (Cl. 229—62)

This invention relates to paper bags and has to do more particularly with multiwall bags formed from a plurality of superposed tubes of bag forming material, such tubes being severed transversely into bag lengths which are then closed across their ends by means of tape and stitching. For many years it was the standard practice to close the ends of such bags by means of a length of tape folded about the end edges of the bag. Such tape was either adhered to the opposite walls of the bag by means of adhesive or, more commonly, immediately subsequent to the application of the tape—with or without adhesive—the tape covered end of the bag was passed through a sewing head which acted to apply a line of stitching extending through both the tape and the underlying marginal end portions of the bag, thereby forming a strong end closure for the bag structure.

While bags of the type just characterized have been in wide spread use for many years, they have presented a number of problems insofar as their proofness against the ingress of small insects and similar pests which work their way into the bags through the puncture holes made by the line of stitching. While it has been proposed to remedy this difficulty by sealing the line of stitching, either by placing a tape over the stitching or otherwise sealing the perforations, as by dipping the bag ends in wax or a similar sealing medium, such expedients have not proven to be wholly satisfactory in that mere placement of the tape over the stitching does not effectively seal the opposite ends of the bag against the ingress of such pests. In particular, in the conventional bag forming operation the ends of the tape and the ends of the line of stitching are coterminous, with the result that the insects work their way into the bags along the lines of stitching from the outermost ends thereof. Somewhat similar problems arise with respect to bags which have been dipped, together with the fact that the wax coating or the like tends to break away in spots, thereby leaving the end of the bag vulnerable to attack.

In order to overcome the aforementioned difficulties, a principal object of the instant invention is the provision of a tape sealed stitched end bag wherein the tape which overlies the line of stitching extends beyond the ends of the stitching and is sealed to itself so as to completely seal the ends of the line of stitching.

In addition to the foregoing, it has been observed that a tape which has been tightly sealed about the end of the bag nonetheless is vulnerable to the ingress of pests along lines substantially coinciding with the opposite side edges of the bag where the opposing surfaces of the tape come together in face-to-face contact. Due to the thickness of the bag itself, complete adhesion of the opposite sides of the folded tape to each other is prevented in the area immediately beyond the side edges of the bag, with the result that minute passageways develop through which the pests may work their way to the line of stitching, and thence inwardly into the bag. Consequently, a further object of the instant invention is the provision of a construction wherein such interstices are effectively eliminated by folding inwardly the extending ends of the tape and securing them to the underlying portions of the bag structure, the bunching of the tape occasioned by the folding of the ends serving to effectively close and seal the passageways or interstices which are otherwise formed.

The foregoing, together with other objects of the invention which will appear hereinafter or which will be apparent to the skilled worker in the art upon reading this specification, are accomplished by that construction and arrangement of parts of which an exemplary embodiment shall now be described.

Reference is now made to the accompanying drawings wherein:

FIGURE 1 is a fragmentary perspective view with parts broken away of a tubular bag body formed in accordance with the instant invention.

FIGURE 2 is a fragmentary plan view of a bag body the end of which has been closed by a line of stitching.

FIGURE 3 is a fragmentary plan view similar to FIGURE 2 but showing the line of stitching covered by a tape with the free ends of the line of stitching enclosed within the tape.

FIGURE 4 is an enlarged sectional view taken along the line 4—4 of FIGURE 3.

FIGURE 5 is an enlarged sectional view taken along the line 5—5 of FIGURE 3.

FIGURE 6 is a fragmentary view similar to FIGURE 3 but showing the application of adhesive to the tape and the infolding of the extending ends of the tape.

FIGURE 7 is an enlarged sectional view taken along the lines 7—7 of FIGURE 6.

Referring first to FIGURE 1, there is illustrated a conventional multiwall bag 1 formed from a plurality of tubular plies of bag forming material, such as the plies 2, 3, 4, 5, and 6 formed one over the other in conventional multiwall fashion. The ends of the bag plies are substantially coterminous, defining an end edge 7. In the type of bag under consideration, the tubular plies are flat folded and creased along their opposite side edges at 8 and 9. It is in this condition that the bags are acted upon to close one of their ends, whereupon the bags are ready to be filled. Subsequent to filling, the remaining end of the bag is closed, thereby completing the package.

The first step in the closing of the bag is the formation of a line of stitching 10 (FIGURE 2) which passes through the bag walls along a line extending transversely throughout the entire width of the bag and spaced inwardly a short distance from the end edge 7 thereof. Such line of stitching is normally formed by means of a stitching head or sewing machine beneath which the end edge of the bag is passed. In commercial production, a continuous supply of bags is advanced to the stitching head in closely spaced apart relation with the line of stitching extending continuously from bag to bag. Upon passage of the bags beyond the stitching head, a cutting mechanism acts to sever the line of stitching intermediate adjacent bags with the result that short lengths of stitching, indicated at 10*a* and 10*b*, project outwardly beyond the opposite side edges of each bag. It has been found impractical to attempt to sever the lines of stitching immediately at the side edges of the bag due to the difficulty in maintaining the cutting instrumentality in precise synchronism with the advancing bags. As already mentioned, if a tape is applied to the bag end as an incident of the stitching operation—whether such tape be applied to lie under or over the stitching—the tape is also applied in a continuous length and both the tape and stitching concurrently severed by the cutting instrumentality.

In accordance with the instant invention, and as illustrated in FIGURE 3, the tape 11 is applied over the line of stitching at a time subsequent to the severance of the line of stitching intermediate adjacent bags, and the length of the tape is made sufficiently greater than the allover length of the line of stitching so that its extending end

portions 11*a* and 11*b* are of a length greater than the extending end portions 10*a* and 10*b* of the line of stitching.

The tape will have adhesive preapplied to its inner surface so that upon contact with the underlying bag it will be firmly adhered to the bag and, as to the extending end portions 11*a* and 11*b*, they will be brought together in face-to-face contact and hence will be sealed to each other with the short lengths of stitching 10*a* and 10*b* completely enclosed therein in the manner illustrated in FIGURE 3. While moisture sensitive adhesives may be employed for this purpose, it is preferred to employ a tape precoated with a heat sealable adhesive material, such as an adhesive of the polyethylene type, with the tape pressed into contact with the bag and with itself by means of a set of heated sealing bars arranged to act upon the tape subsequent to its application to the bag. Due to the added thickness of the line of stitching, such heat sealing bars are provided with longitudinal channels adapted to overlie the line of stitching, thereby defining a pocket 12, as possibly best seen in FIGURE 4, extending along each side of the tape. It will be apparent, however, that the dimensions of the tape are such that the line of stitching is completely covered and enclosed by the tape. The extending ends of the tape are flattened into face-to-face contact in the areas beyond the ends of the line of stitching by means of rubber pressure rolls which contact the tape immediately following contact by the heated sealing bars.

However, as already pointed out, a problem was encountered at the side edges of the bag at their juncture with the tape 10. Thus, as seen in FIGURE 5, it was found that even though the extending end portions 11*a* and 11*b* of the tape were tightly pressed together, passageways or interstices would develop at 13 due to the added thickness of the bag body as opposed to the thickness of the extending ends of the tape. Consequently, even though the free ends of the line of stitching were wholly enclosed within the tape, insects and similar pests could nonetheless work their way downwardly along the passageway 13 until contact was made with the line of stitching, whereupon such pests would work inwardly along the line of stitching and into the bag.

In accordance with the instant invention, it has been found that such passageways or interstices can be effectively closed and sealed by folding the extending ends of the tape inwardly and adhering them in the folded condition. In a preferred procedure, adhesive indicated at 14 in FIGURE 6 is applied to the extending end portions of the tape, as illustrated in conjunction with the extending tape portion 11*b*, whereupon the ends of the tape are folded inwardly along lines which substantially coincide with the opposite side edges 8 and 9 of the bag body. The extending portion of the tape in the infolded condition is illustrated at 11*a* in FIGURE 6.

While difficult to illustrate, the result of such folding is shown in FIGURE 7 wherein it will be seen that the passageways or interstices 13 have been effectively closed. This is believed due to the fact that the innermost side of the tape, that is, the underlying side of the tape in the direction of folding tends to buckle or bunch along the line of fold which is at the edge of the bag body. At the same time, the opposite side of the tape is caused to stretch around the edge of the bag and hence is drawn taut and consequently exerts pressure on the innermost side of the tape tending to force the buckled or bunched inner side of the tape into the passageway and hence effectively close and seal it.

Again, while water base adhesives may be employed to secure the folded ends of the tape in the folded condition, a hot melt adhesive is preferred in that once such adhesive is activated it may be rapidly set by cooling, thereby greatly speeding up the time required to secure a tight bond between the folded ends of the tape and the bag body.

As should now be evident, the instant invention provides a tape sealed stitched end bag in which the line of stitching is completely covered and sealed against infestation. In addition to tightly sealing the bag ends, the folded ends of the tapes enhance the durability of the seal in the area immediately beyond the side edges of the bag. It has been found that even though the tape was perfectly sealed at the side edges of the bag, unless its ends are infolded, the shock load of material being packed in the bag and/or the weight of additional bags stacked thereon was sufficient to spread the tape seal and open a passageway for infestation. Needless to say, the absence of extending tape ends which could be readily torn off in handling of the filled bags further insures against exposure of the stitching to infestation.

Modifications may be made in the invention without departing from its spirit and purpose. For example, while a preference has been expressed for heat sealable adhesives, other types of adhesives may be employed. Thus, the tape itself may be treated with a pressure sensitive type of adhesive which will seal to the bag end by pressure alone. Similarly, a cohesive material, i.e., one which will stick only unto itself, may be employed to secure the folded ends of the tape. In such event, areas of cohesive material will be applied both to the extending ends of the tape and to the underlying portions of the bag body—actually the tape itself—which will be contacted thereby. Alternatively, the infolded ends of the tape may be secured to the bag body by short lengths of gummed tape or the like applied as the tape ends are folded.

Having thus described the invention in an exemplary embodiment, what it is desired to secure and protect by Letters Patent is:

In a bag having a body formed from a plurality of superposed tubular plies of bag forming material, with the opposite ends of the plies terminating substantially coterminous to define essentially straight end edges, the tubular bag body having creases along its opposite side edges defining a pair of opposing bag walls, a line of stitching passing through said opposing bag walls and extending transversely throughout the entire width of the bag end along a line spaced inwardly from the straight end edge thereof, said line of stitching closing the bag end with opposite end portions of the line of stitching extending freely beyond the opposite side edges of the bag body, a length of tape folded about the straight end edge of the bag body with its inner surface adhesively secured to the opposing walls of the bag body, said tape being of a width sufficient to cover and seal the line of stitching on both sides of the bag body, said tape being of a length sufficiently greater than the length of the line of stitching, including the extending end portions thereof, to provide opposing tab portions at each end of the tape which tab portions have areas thereof of a size capable of being sealed together in face-to-face contacting relation lying outwardly beyond the extending end portions of the line of stitching, the opposing tab portions of the folded tape being sealed together in face-to-face contact with the extending end portions of the line of stitching completely enclosed and sealed therebetween, the said sealed together tab portions of the tape and the enclosed end portions of the stitching being folded inwardly along lines coinciding with the opposite side edges of the bag body, with the infolded tab portions adhesively secured to the underlying areas of the bag body.

References Cited by the Examiner

UNITED STATES PATENTS

2,093,979	9/37	Farmer	229—62
2,868,435	1/59	Fischer	229—66
2,978,852	4/61	Hopkins et al.	

FOREIGN PATENTS

414,175	8/34	Great Britain.

FRANKLIN T. GARRETT, *Primary Examiner.*