

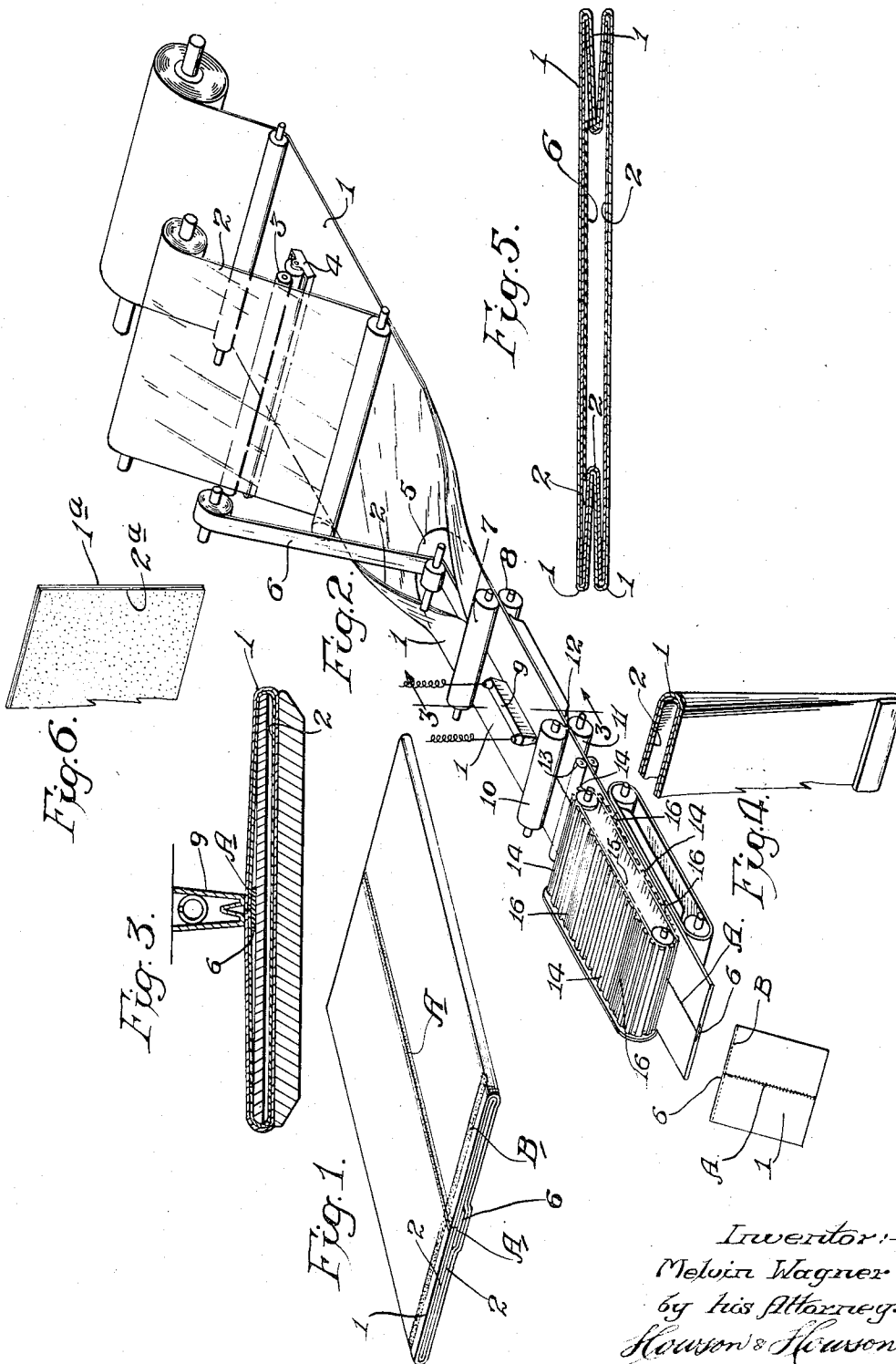
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M. WAGNER

2,169,936

BAG

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Inventor:—
Melvin Wagner
by his attorneys
Howson & Howson

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BAG

Melvin Wagner, Philadelphia, Pa., assignor to
Thomas M. Royal & Company, Philadelphia,
Pa., a corporation of Pennsylvania

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This invention relates to new and useful improvements in bags and method of making same, and more particularly to bags formed from composite multi-ply, laminated or coated webs of flexible material wherein all seams are sealed or secured together by the fusion of adjacent surfaces of thermoplastic material.

During the past year or so the bag industry has given particular attention to the sealing or securing of the seams of bags by the application of heat to effect a fusion of the surfaces of the bag material in desired regions or areas, and such methods have proven highly satisfactory in the case of bags of the type of the so-called flat type of bag in instances where the bags are formed from a composite multi-ply web arranged so that the ply of thermoplastic material is offset with respect to the paper or backing plies. However, in bags formed from multi-ply or laminated webs, wherein the thermoplastic ply or coating is co-extensive in width with the paper or backing web, sealing of the longitudinal seam therein by fusion has been impossible due to the lack of overlapping portions of the thermoplastic material at such longitudinal seam.

The same situation also exists with respect to fusion of the longitudinal seam in bags having bellows or reentrant folded side walls. However, and in addition to this, in bellows-type bags attempts to effect the heat-sealing of the bottom end have been wholly unsuccessful due to the fact that the bellows side walls, being reentrant folds, introduce the outer plies of paper or backing material between opposite surfaces of the innermost fusible ply or coating, thus creating different thicknesses in the bag transversely thereof which preclude the application of sufficient and uniform pressure and thereby cause gaps or holes to occur in the opposite interior wall surfaces at the termination of these reentrant or bellows-folded portions, making it impossible to obtain a tight end seal.

With the foregoing in mind, the principal object of the present invention is to provide a satisfactory and efficient flat or bellows-folded type bag wherein all of the seams are secured by fusing together adjacent surfaces of a thermoplastic material or coating.

Another object of the present invention is to provide a bag of the type described wherein the difficulties heretofore presented by the introduction of the outer paper or backing plies between surfaces of the thermoplastic material or coating at the end joint of a bellows-folded bag are substantially entirely eliminated.

A further object of the invention is to provide a novel method of making bags of the character described.

These and other objects of the invention and the features and details of the construction and manufacture thereof are hereinafter fully set forth and shown in the accompanying drawing, in which:

Figure 1 is a view in perspective of a flat bag made in accordance with the present invention.

Figure 2 is a diagrammatic view in perspective illustrating the method by which the bag shown in Figure 1 may be manufactured.

Figure 3 is an enlarged view in section taken on line 3—3, Figure 2.

Figure 4 is a fragmentary view in perspective illustrating a manner in which the heat-sealed bottom or top end of the bag may be foldably manipulated.

Figure 5 is a transverse view in section showing the application of the present invention to a bag having reentrant or bellows-folded side walls; and

Figure 6 is a fragmentary view in perspective of a laminated or coated web which may be employed in lieu of the composite multi-ply web shown in Figure 2 of the drawing.

Referring now more particularly to Figure 2 of the drawing, in practicing the present invention, a web of paper or other flexible material 1 of any desired width is drawn from a supply roll, and a web 2 of thermoplastic material, such as "Plio-film", or the like, of a width corresponding to that of the web 1 is drawn from a supply roll and, adhesive having been applied or introduced therebetween as by roll 3 from a paste box 4, the two webs 1 and 2 are united with their respective opposite or side edges in register.

The composite web is now brought over or around a forming plate 5 of conventional form arranged to position the opposite edges of the composite web in abutting, rather than lapping relation, on the upper side or face of the tube and longitudinally thereof. Simultaneous with the bringing of the composite web about or around the forming plate 5, a relatively narrow continuous strip of flexible thermoplastic material 6, comparable to that of the web 2, is drawn from a supply roll and fed with the composite web with respect to said forming plate so that said strip 6 is enveloped or enclosed within the tube and extends longitudinally thereof underlying the abutting edges and lapping the adjacent portions of the inner thermoplastic ply or web 2 in the manner shown in Figure 3 of the drawing.

The tube with the strip 6 extending longitudinally therein then passes between one or more pairs of press rolls 7 and 8 and then beneath a longitudinally extending heating iron or element 9 which is arranged transversely of the tube so as to overlie the portions thereof immediately adjacent opposite sides of the seam. The iron or element 9 may be heated in any suitable manner such as by electricity and the heat generated therein penetrates through the backing web 1 to cause a permanent fusion of the overlapping portions of the thermoplastic strip 6 and the abutting edge portions of the inner thermoplastic web 2 as indicated at A in Figure 1 of the drawing. The thus longitudinally sealed tube next passes between a pair of rolls 10 and 11, the roll 10 of which carries a cutting knife or blade 12 arranged and operable to sever sections of desired length from the tube.

The longitudinally sealed tube sections then pass beneath one or more rolls 13 and into a bottom end sealing mechanism which is arranged so as to grip or clamp the leading edge portion of each tube section at or prior to the instant it is severed from the tube. A number of grips or clamps 14 are provided and several of these move through the end sealing mechanism in engagement with each tube section which are supported upon a moving endless belt 15. In addition to the grips or clamps 14 several transverse heating irons or elements 16 are associated therewith, and these are arranged with respect to said grips or clamps 14 so as to engage the rear edge portion of each tube section during travel thereof through this mechanism, the heat from said iron or element 16 penetrating the several layers of material of the composite web to effect a permanent fusion of the adjacent surfaces of the underlying portions of the inner ply of thermoplastic material as indicated at B in Figure 1 of the drawing.

After fusion of the bottom end of the bag according to the foregoing description it is discharged from the bottom sealing mechanism at which time the bottom end portion may, if desired, be foldably manipulated and secured by means of adhesive in the relation shown in Figure 4 of the drawing. This same thing may, of course, be done with the top end of the bag after it is filled and heat-sealed in the manner previously described.

The invention also may be employed to advantage in bags of the so-called bellows type having reentrant folds or side walls. As previously stated herein, considerable difficulty has been encountered in producing a tight end seal in bags of this type by fusion of adjacent surfaces of the thermoplastic material due to the occurrence of gaps or holes at the inner termination or edge of the reentrant or bellows folds caused by introduction of the web of paper or backing material 1 into the folds between the thermoplastic material 2 which creates different thicknesses in the bag transversely thereof and precludes the application of sufficient and uniform pressure necessary to effect a tight seal.

I have found, however, that by feeding the sealing strips of thermoplastic material 6 into the tube in widths at least as great as the minimum distance between the inner edges of the reentrant or bellows-folded side wall portions, these objections and difficulties in this type of bag may be overcome, since in addition to providing the necessary lapping portions beneath the longitudinal seam to insure tight sealing thereof, the said strip 6 is of such width that it extends laterally at least

to the inner edges of the reentrant bellows folds and renders the back of more uniform thickness throughout its transverse width with the result that when heat is applied through a transverse zone adjacent the end of the tube to form the bottom end seal, sufficient and uniform pressure may be applied to cause the thermoplastic material of the strip 6 to flow and intimately combine with the thermoplastic material of the inner web 6 at and adjacent the portions of the inner edges of reentrant folds in said zone, thus filling and effectively sealing any gaps or holes which occur at those points.

It will be obvious, of course, that in lieu of a composite multi-ply web formed by uniting together the webs 1 and 2 as previously described, a web of preformed laminated structure, or a sheet, coated with a thermoplastic material may be employed. One such preformed laminated web is shown in Figure 6 of the drawing and comprises, for example, a backing sheet of paper or the like 1a to one side or surface of which has been applied a coating of flexible thermoplastic material 2a, and in practicing the invention the composite multi-ply or preformed laminated webs may be interchangeably employed. Furthermore, in each type of bag, instead of cutting sections from the tube prior to fusing the bottom end seam B, said seams B may be fused prior to severing sections of the tube if desired, in which event all that is required to be done is the positioning of the cut-off rolls 10 and 11 after, instead of ahead of the bottom end sealing mechanism. Other details of the manufacture of bags may be varied as required by shop practice and the construction of the particular bags being made, and while particular details of the construction and practice of the invention have been herein illustrated and set forth, it is not intended that said invention shall be limited thereto, but that changes and modifications may be incorporated and embodied therein within the scope of the annexed claims.

I claim:

1. In a bag of the character described including a tubular body composed of flexible sheet material having an inner surface of thermoplastic material and arranged with its opposite edges in abutting relation longitudinally of said body, a longitudinal seam comprising the butting edges of said laminated structure, and a longitudinally extending strip of thermoplastic material interiorly lapping the adjacent edge portions of the inner thermoplastic surface of the sheet and intimately fused thereto.

2. A bag of the character described including a tubular body composed of flexible sheet material having an inner surface of thermoplastic material and arranged with its opposite edges in abutting relation longitudinally of said body, a longitudinal seam comprising the abutting edges of said sheet, and a longitudinally extending strip of thermoplastic material interiorly lapping the adjacent edge portions of the inner thermoplastic surface of the sheet and intimately fused thereto, and a seal for one end of the body comprising a zone extending transversely across the entire body wherein the inner thermoplastic surfaces of said body and the strip are intimately fused together.

3. In a bag of the character described including a tubular body comprising front and rear faces and composed of flexible sheet material having an inner surface of thermoplastic material and arranged with its opposite edges in abutting rela-

tion longitudinally of one face of said body, a longitudinal seam comprising the abutting edges of said sheet, and a relatively narrow longitudinally extending strip of thermoplastic material interiorly lapping the adjacent edge portions of the inner thermoplastic surface of the sheet and intimately fused thereto.

4. A bag of the character described including a tubular body comprising front and rear faces and composed of flexible sheet material having an inner surface of thermoplastic material and arranged with its opposite edges in abutting relation longitudinally of one face of said body, a longitudinal seam comprising the abutting edges of said sheet, and a relatively narrow longitudinally extending strip of thermoplastic material interiorly lapping the adjacent edge portions of the inner thermoplastic surface of the sheet and intimately fused thereto, and a seal for one end of the body comprising a zone extending transversely across the entire body wherein the inner thermoplastic surfaces of said body and the strip are intimately fused together.

5. In a bag of the character set forth including a tubular body comprising front and rear faces and reentrant bellows-folded side walls composed of flexible laminated sheet material having an inner surface of thermoplastic material and arranged with its opposite edges in abutting relation longitudinally of one face of said body, a longitudinal seam comprising the abutting edges of said sheet, and a longitudinally extending strip of thermoplastic material interiorly lapping the adjacent edge portions of the inner thermoplastic surface of the sheet and intimately fused thereto.

6. A bag of the character set forth including a tubular body comprising front and rear faces and reentrant bellows-folded side walls composed of flexible sheet material having an inner surface of thermoplastic material and arranged with its opposite edges in abutting relation longitudinally of one face of said body, a longitudinal seam comprising the abutting edges of said sheet, and

a longitudinally extending strip of thermoplastic material interiorly lapping the adjacent edge portions of the inner thermoplastic surface of the sheet and intimately fused thereto, and a seal for one end of the body comprising a zone extending transversely across the entire body wherein the inner thermoplastic surfaces of said body and the strip are intimately fused together.

7. In a bag of the character set forth including a tubular body comprising front and rear faces and reentrant bellows-folded side walls composed of flexible sheet material having an inner surface of thermoplastic material and arranged with its opposite edges in abutting relation longitudinally of one face of said body, a longitudinal seam comprising the abutting edges of said sheet, and a longitudinally extending strip of thermoplastic material interiorly lapping the adjacent edge portions of the inner thermoplastic surface of the sheet and intimately fused thereto, said strip at least as great as the minimum distance between the inner edges of said reentrant bellows folds.

8. A bag of the character set forth including a tubular body comprising front and rear faces and reentrant bellows-folded side walls composed of flexible sheet material having an inner surface of thermoplastic material and arranged with its opposite edges in abutting relation longitudinally of one face of said body, a longitudinal seam comprising the abutting edges of said sheet, and a longitudinally extending strip of thermoplastic material interiorly lapping the edge portions of the inner thermoplastic surface of the sheet and intimately fused thereto, said strip of thermoplastic material having a width at least as great as the minimum distance between the inner edges of said reentrant bellows folds, and a seal for one end of the body comprising a zone extending transversely across the entire body wherein the inner thermoplastic surfaces of said body and the strip are intimately fused together.

MELVIN WAGNER.