

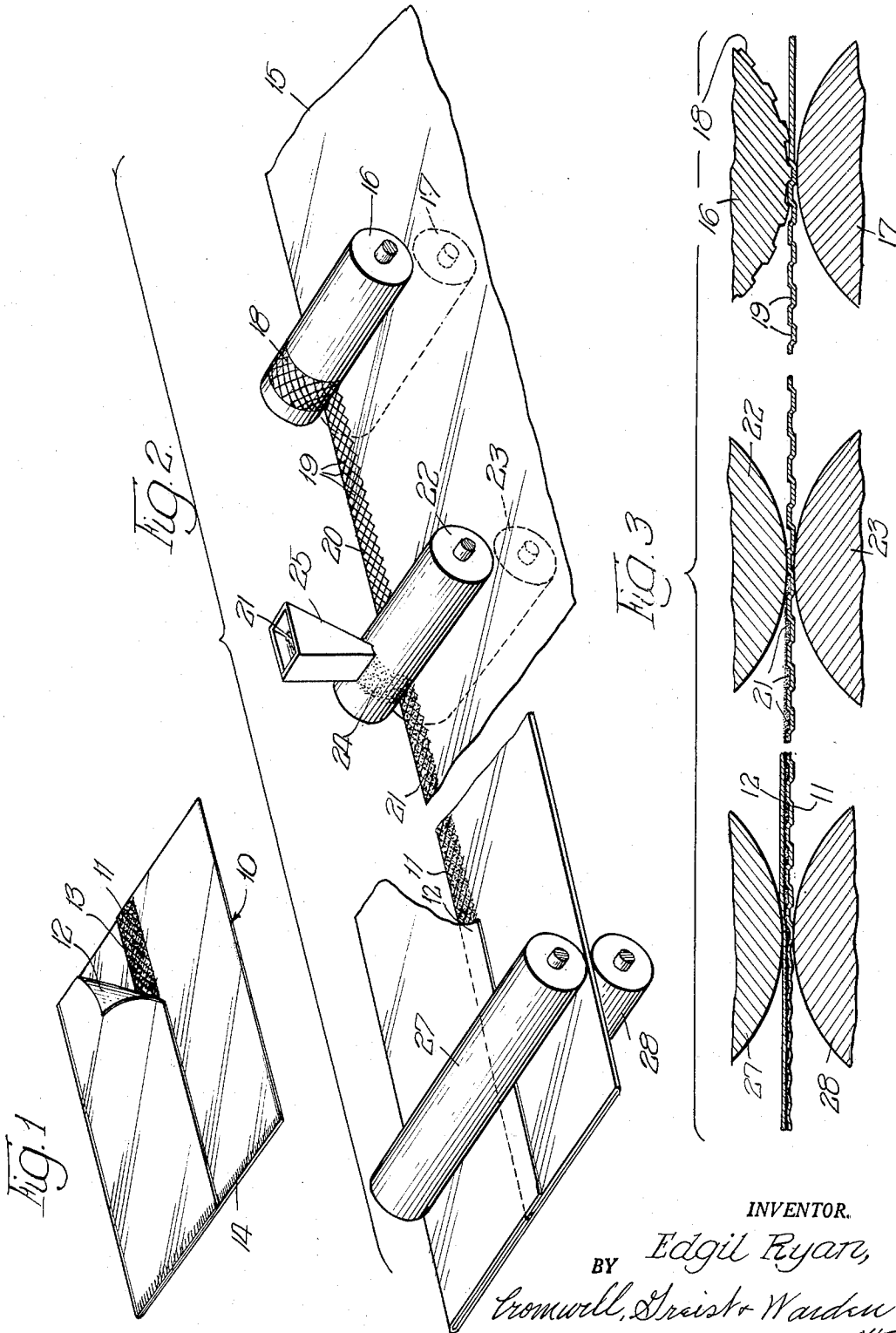
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KNURLED SEAM AND METHOD OF FORMING THE SAME

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KNURLED SEAM AND METHOD OF FORMING THE SAME

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3 Claims. (Cl. 154—106)

This invention relates to the manufacture of merchandise bags or wrappers from sheets or webs of film material and is more particularly concerned with the formation of an improved seam structure for securing together overlapping longitudinal portions of the sheet or web.

In the manufacture of bags and wrappers adapted for use in packaging merchandise of various kinds, in which longitudinal edge portions of a sheet or web from which the bag or wrapper is being formed are overlapped in seam forming relation and secured by a liquid or paste adhesive, difficulty is experienced in obtaining a properly bonded seam particularly where the material employed is a thin cellophane sheet or similar plastic film and where the adhesive is an emulsion type which tends to form into droplets when applied to the smooth surface of the sheet.

It is the general object of the present invention to provide in a bag making process wherein edge margins of a sheet or web are overlapped and secured by a paste adhesive an improved method of forming a seam structure which will insure adequate bonding between the overlapped margins of the material.

It is a more specific object of the invention to provide an improved method of forming a bonded seam between two superimposed portions of flexible packaging material, which method comprises applying to one of the sheet portions a continuous strip or area of indentations, applying an adhesive over said area of indentations sufficient to fill the pockets formed by said indentations and superimposing the other of said portions of material over the indented area.

It is another object of the invention to provide in a bag forming method wherein the body of the bag is made in tubular form from a sheet or film of paper or other material and a seam is formed by overlapping the longitudinal portions of the sheet and securing the same together by a narrow strip of paste or other adhesive, the improvements in the seam formation which comprise subjecting one or both of the overlapping edge portions to a knurled roller to impress therein a series or plurality of indentations providing pockets for receiving the bonding paste whereby when the edge of the portions of the sheet are overlapped and pressed together the adhesive will not be forced out of the seam area but will be retained in a thicker film therein by reason of the indentations or pockets.

These and other objects of the invention will be apparent from a consideration of the seam structure and the method of forming the same which are illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view of a plain bottom bag formed with a longitudinal seam which incorporates therein the principal features of the invention, the end portions of the seam at the open end of the bag being shown torn apart in the view;

Fig. 2 is a schematic perspective view illustrating the steps involved in the formation of the seam and

Fig. 3 is a longitudinal sectional view with the thickness

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of the material exaggerated to illustrate the steps involved in the formation of the seam structure.

In the manufacture of bags or wrappers from plastic materials or films, such as cellophane, where the bag or wrapper is particularly adapted for use with fine powdered materials it is desirable to form the seams in such a manner that they will be as nearly sift-proof as possible. Where a lapped seam is formed with a paste or liquid adhesive it is difficult to apply an adhesive film on the face of the material which is of sufficient thickness to insure adequate bonding of the material. Ordinarily when the strip of adhesive is applied in the seam area and the overlapping material is passed between pressure rollers the adhesive is spread out in a very thin film which is not of uniform character. This is particularly noticeable where the adhesive employed is of the emulsion type which tends to form in droplets on the surface of the cellophane.

Referring to the drawings there is illustrated in Fig. 1 a bag 10 which is formed by folding a web or sheet into tube shape, overlapping the marginal edge portions 11 and 12 and securing the same together by an adhesive 13 which is adapted to form a bonded longitudinal or back seam. The tubed material is then cut into the necessary lengths for the size bag desired and a cross seam 14 is applied at one end to complete the formation of the bag 10.

An improved method of forming the seam structure is illustrated in Fig. 2. The web or sheet 15 from which the bag or tube is to be formed is first passed between a pair of rolls 16 and 17. The upper roll 16 is provided with an embossed or knurled surface 18 forming a relatively narrow band thereon, the width of the surface 18 depending on the width desired for the seam structure. The roll 17 is smooth and forms a back-up roller for the knurled surface 18 of the roller 16. The web 15 is passed between the rolls 16 and 17 with the edge margin 11 subject to the knurled area 18 on the roll 16 so that a series of indentations or pockets 19 are formed in the seam forming area. After the knurling has been applied to the web 15 the knurled portion or area 20 is provided with a paste or liquid adhesive 21. The web 15 is passed between the rolls 22 and 23, the upper roll 22 being a gluing roll and the lower roll 23 being a back-up roller. The upper roll 22 is provided with a circumferential gluing band or area 24 of sufficient width to provide the desired seam construction. A glue box 25 may be supported above the roll 22 and arranged to apply glue to the area 24 on the roll for transfer to the web 15. The film of glue 21 as shown in Fig. 3 fills the pockets 19 in the seam area and also extends over the areas of the web which connect the pockets. Thereafter the edge margin 12 of the web 15 is overlapped with the margin 11 to bring the glue between the overlapped portions and the tube thus formed in flattened condition is passed between a pair of pressure rolls 27 and 28 which apply pressure to the seam area and tend to flatten out the depressions or pockets 19. A substantial quantity of the glue is held in the seam area by reason of the excess amount of the material in the pockets 19 and the fact that they are not completely flattened out by the pressure rollers 27 and 28. The resulting seam structure includes a film of glue of substantial thickness which is spread over substantially all the seam area and provides a bond between the surfaces of the overlapping margins of the material.

The knurling process produces, in addition to the small pockets in the seam area, an over-all concave or trough-like condition in the seam area which further tends to hold the adhesive within the seam area during the seam operation.

While the seam structure is illustrated in connection

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with the formation of a merchandise bag it will be understood that it is not intended to limit the use of the same to the bags but it may be employed wherever two sheet materials are joined in edge overlapping or superimposed relation. The embossing or knurling surface 18 on roll 16 may be any desired pattern so long as it provides pockets or recesses in the surface of the material sufficient to receive the desired quantities of glue or adhesive. The knurling may be accomplished at any time prior to the application of the adhesive.

In the form of the invention illustrated the knurling is shown applied to only one of the overlapping seam forming portions of the material. It may be applied, if desired, to both of the seam area portions of the material so that adhesive retaining pockets are provided in both face-to-face seam area portions of the material.

Suitable adhesives of known composition which may be used in carrying out the invention are:

1. Polyvinyl acetate resin emulsion having the following formulation:

82% by weight lacquer phase comprising:
 50.0% by weight polyvinyl acetate.
 5.0% by weight plasticizer.
 43.5% by weight toluene.
 1.5% by weight oleic acid.

18% by weight water phase comprising:
 92.0% by weight distilled water.
 8.0% by weight aqua ammonia.

2. Vinyl acetate base:

83 parts by weight vinyl acetate resin emulsion (55% solids).

17 parts by weight dibutyl phthalate plasticizer.

In using the adhesive given in the examples with PT cellophane 1 part glycerine should be mixed with 4 parts of either example. When using them with MST cellophane 1 part perchloroethylene should be mixed with 4 parts of either example.

I claim:

1. The method of forming a seam between overlapping portions of flexible sheet material which comprises subjecting one of the seam forming portions to a knurling tool to form therein pockets for receiving the adhe-

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sive, applying a paste adhesive over the knurled area sufficient to fill the pockets, and pressing the seam forming area of the other portion of the material into face-to-face engagement with the knurled area to permit the interposed layer of adhesive between the surfaces of the material to form a continuous film and bond the surfaces together when it is set.

2. A method of forming a seam between two superimposed portions of sheet material, which comprises providing a series of relatively shallow glue receiving pockets defining the seam area of the one portion of the sheet material, applying a layer of paste adhesive over the face of the pocketed seam area sufficient to fill the pockets with the paste adhesive, overlapping the seam area of the other portion of the sheet material and passing the overlapped seam areas and interposed adhesive between pressing devices which tend to spread the adhesive into a film of substantial thickness extending uniformly over the seam area for bonding the surfaces of the sheet material in the seam area.

3. The method of bonding superimposed seam forming portions of sheet material which comprises subjecting one of the seam forming portions to an embossing member to form in the surface thereof an embossed pattern comprising a plurality of recesses for receiving the adhesive, coating the embossed area with a paste adhesive sufficient to fill the recesses with said adhesive, and pressing the seam forming area of the other portion of the material into face-to-face engagement with the embossed area to spread the interposed coating of adhesive between the surfaces of the material and form a continuous film for bonding the surfaces together.

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