Nov. 2, 1937. R. M. BERGSTEIN 2,097,427

ART OF SEALING CONTAINERS

Filed Aug. 23, 1935

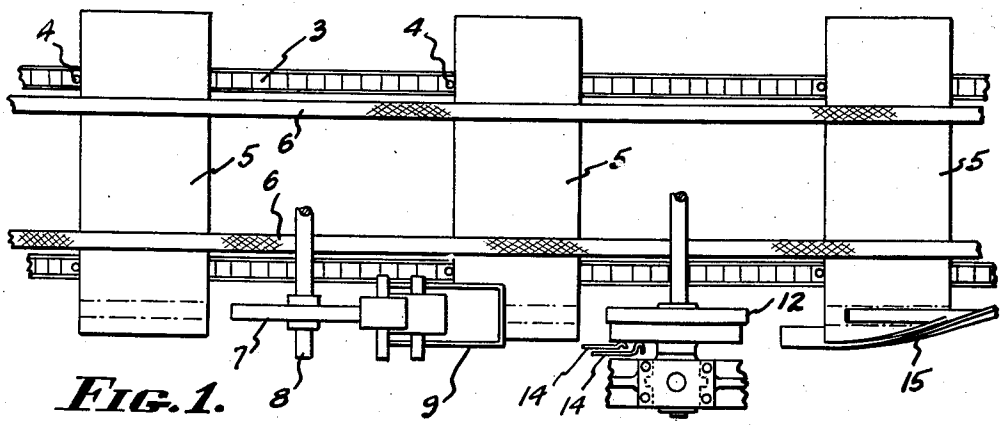


FIG. 1.

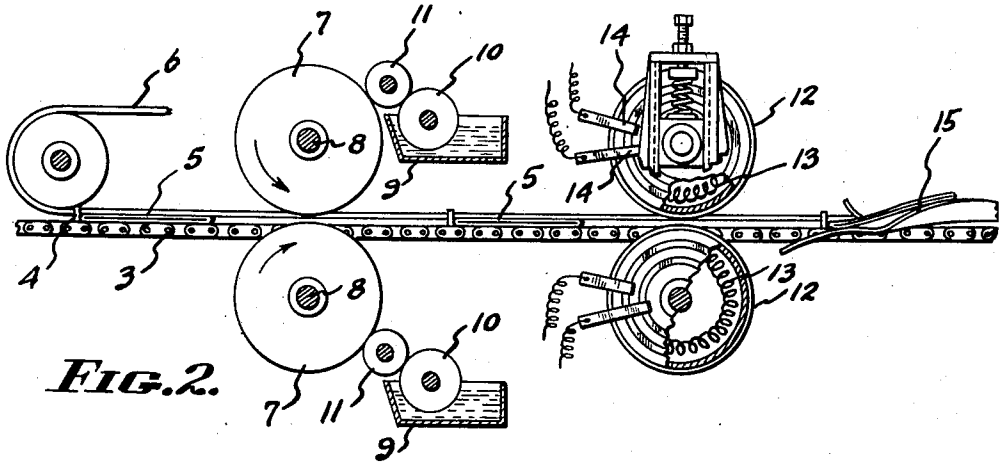


FIG. 2.

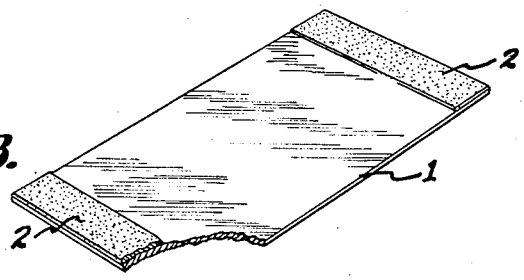


FIG. 3.

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ART OF SEALING CONTAINERS

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14 Claims. (Cl. 93—35)

My invention relates to a method of preparing and sealing containers such as bags, envelopes and the like, to make the sealed joints leak-proof and air-tight.

I contemplate as one of the objects of my invention, a method of treating sheet material which is permeable by water and other liquids, and then treating and processing portions of the material either before, during or after the products to be contained in the packages have been filled therein, so that the enclosures will be leak-proof and air-tight.

Other objects of my invention will be referred to in the ensuing description. Referring to the drawing:—

Figure 1 is a plan view, shown more or less diagrammatically, of a suitable apparatus for sealing the ends of the containers and bags.

Figure 2 is a side elevation of the apparatus diagrammatically shown in Figure 1.

Figure 3 is a perspective view of a small piece of my preferred type of sheet material after the initial treatment.

Referring first to my treatment of the sheet material from which I propose to make my various kinds of packages, a web of material which is non-water or non-solvent proof is coated on one surface (i. e. which, after the container is formed will be the inner surface) with a coating of adhesive such as gelatine, glue or cellulose lacquers. The coating treatment may extend over the entire inner surface of the sheet material or, as indicated in Figure 3, it may be applied to one or both ends of the web, as indicated at 2, a short section of the web material being indicated at 1.

The apparatus for coating web material throughout the entire extent of a surface with a preferred adhesive material can be of any desired type. Rollers may feed the adhesive onto the surface of the sheet material or it may be applied by spraying or dipping. I have not shown any particular type of apparatus for accomplishing the surface coating, as no particular apparatus is necessary. The coating may even be applied by application with a brush.

After the sheet material is coated it is ordinarily formed again in a roll with the adhesive thoroughly dried so that the individual plies of the roll will not stick together. In forming the bags they will ordinarily be first prepared as open ended tubes which are then to be sealed at the ends according to my invention.

It is not new to apply an adhesive to a sheet of material and to then moisten the material, bring desired adhesive coated surfaces of the material into contact and to press them together. Such a plan is used, for example, in the ordinary envelope which has the sealing flap coated with dry adhesive which becomes softened by the application of moisture either from the tongue or from a wad of absorbent material.

My invention contemplates instead of applying moisture or a solvent directly to the adhesive coating, to apply moisture or solvent to the outer surface of the sheet material. The moisture or solvent penetrates through the sheet material, and softens or liquefies the adhesive. Then by the application of pressure the coated surfaces can be securely adhered together, sometimes with and sometimes without heat in addition to pressure, the particular characteristics of the adhesive and of the sheet material determining, to a certain extent, the particular sealing operation which is required.

I have illustrated suitable apparatus for continuously sealing an end or the ends of bags formed of some such flexible material as glassine. In Figure 1, I have shown a conveyor for carrying bags in the direction of their width through suitable rollers for applying moisture to the outer surfaces of end portions of the bags. The bags are subsequently conveyed to heating and pressure rollers which form leak-proof, air-tight seals at the ends of the bags. In Figure 1, I have shown a conveyor 3 having lugs 4, which feed the bags in succession along the conveyor so that the sealing operation may be accomplished. The bags are indicated at 5, and it will be noted that their end portions extend out beyond the conveying surfaces of the conveyor so as to expose said ends for the moistening and sealing treatment.

Conveyor belt 6 is arranged in spaced position from the conveyor 3 so as to hold the bags down in flat condition on the conveyor.

I have shown moistening rollers 7 mounted on rotating shafts 8. The outer surfaces of the moistening rollers may be formed of felt or other suitable liquid absorbent material. Moisture or solvent reservoirs 9 are indicated within which feed rollers 10 rotate to carry the moisture or solvent onto the surface of transfer rollers 11. The transfer rollers feed the liquid or solvent onto the exterior periphery of the rollers 7 which, as the tubular bags move along, carry the moisture or solvent into contact with the exterior surface above and below the extending ends of the tube.

After the moistening treatment the bags are conveyed to the pressure rollers 12. The pres-

sure rollers have resistance units 13 therein which are in electrical contact with contact strips 14, which are supplied with current from a suitable source.

The rollers 12 are preferably pressure rollers so that considerable pressure is exerted against the portion of the ends of the bags to be sealed together. The amount of heat employed will be dependent on the particular type of adhesive and the particular kind of stock used.

After the bags pass under the pressure and heating rollers turn plates 15 may be employed to cause the sealed ends of the bags to be folded over to form a neat appearing closure.

While I have illustrated apparatus for performing the various operations described on bag material, the moisture may be applied by hand with brushes and the heating and pressure can be applied by placing the ends of the bags in ovens and manually pressing the sealed portions together.

In the preparation and sealing of glassine bags, such as I have illustrated, gelatine and animal glue, which dries very quickly, may be employed, and water will be the solvent, applied to the outer surface of the glassine to penetrate the same and cause softening of the adhesive. If a cellulose lacquer is employed, alcohol may be the desired solvent.

While my explanation of the process is that the moisture penetrates the sheet material and softens the adhesive, I do not wish to be bound by any theory in this connection. It may be that the presence of the moisture in the sheet material causes a steaming action when the heat and pressure is applied, which softens the adhesive and causes the rapid adhering together of the contacting portions of the ends of the blanks.

I have shown and described a method for sealing one end of a bag or container, but my method is suitable for what is called top sealing, which occurs after the contents has been placed within the bags by arranging the application of moisture or solvent and heat and pressure by rollers at right angles to those illustrated. The bag may have a liquid-tight bottom. The problem then is to bring about a similar closure at the top. In such a circumstance it would be substantially impossible to moisten the inside adhesive coating of the inner surfaces of the top ends of the bag. My process, however, of applying the solvent so that it penetrates the material of which the bags are made, resulting in a softening action of the adhesive, followed by heat and pressure can be carried out without difficulty.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A method of sealing containers formed from flexible sheet material permeable to the solvent to be used which consists as an initial step, coating the inner surfaces at least of the portions to be sealed with a drying adhesive, then forming the material into containers, then bringing together the portions to be sealed together with the adhesive coated inner surfaces into overlying relation, and moistening the outer surfaces of the portions with a solvent which permeates the sheet material and softens the dry adhesive coated surfaces, and finally pressing the portions to be sealed together.

2. A method of sealing containers formed from flexible sheet material permeable to the solvent to be used which consists as an initial step, coating the inner surfaces at least of the portions to be sealed, with a drying adhesive, then forming the material into containers, then bringing together the portions to be sealed together with the adhesive coated inner surfaces into overlying relation, and moistening the outer surfaces of the portions with a solvent which permeates the sheet material and softens the dry adhesive coated surfaces, and finally heating and pressing the portions to be sealed together.

3. A method of sealing ends of bags formed from tubular flexible sheet material permeable to the solvent to be used which consists as an initial step in coating the inner surface of the sheet material at least of the end portions to be sealed together with a drying adhesive, then forming the material into tubular form, then moistening the outer surfaces of the ends with a solvent which permeates the sheet material and softens the dry adhesive coated ends, and finally pressing the end portions together.

4. A method of sealing ends of bags formed from tubular flexible sheet material permeable to the solvent to be used which consists as an initial step in coating the inner surface of the sheet material at least of the end portions to be sealed together with a drying adhesive, then forming the material into tubular form, then moistening the outer surfaces of the ends with a solvent which permeates the sheet material and softens the dry adhesive coated ends, and finally heating and pressing the end portions together.

5. A method of making bags which consists in coating inner surface portions of a web of bag material with a drying adhesive, forming tubes of said web, applying an adhesive solvent to the outer surfaces of the tubes in portions thereof which it is desired to seal together, and then bringing said portions together to form a seal, the material of the bag being permeable to said solvent.

6. A method of making bags which consists in coating inner surface portions of a web of bag material with a drying adhesive, forming tubes of said web, applying an adhesive solvent to the outer surfaces of the tubes in portions thereof which it is desired to seal together, and then bringing said portions together to form a seal, with the application of pressure, the material of the bag being permeable to said solvent.

7. A method of making bags which consists in coating inner surface portions of a web of bag material with a drying adhesive, forming tubes of said web, applying an adhesive solvent to the outer surfaces of the tubes in portions thereof which it is desired to seal together, and then bringing said portions together to form a seal, with the application of heat, the material of the bag being permeable to said solvent.

8. A method of making sift-proof and grease-proof bags from material having a coating of drying adhesive on the inner surface thereof, which consists in moistening the outer surfaces of the material and softening the adhesive, and then joining adhesive coated surfaces together to form the bottom or top of the bag, the material being permeable to moisture.

9. A method of making bags having the interior surface coated, which consists in applying a solvent on the outside surface to soften portions of the inside coating, at least at one end thereof, and thereafter joining together the softened portions of the coating to form a seal, the material of the bag being permeable to said solvent.

10. A method of making bags having the in-

terior surface coated, which consists in applying a solvent on portions of the outside surface and softening the underlying portions of the interior coating at least at one end thereof, using a heating medium to cause rapid impregnation of the solvent, and bringing about adhesion of said portions, the material of the bag being permeable to said solvent.

11. A method of making bags having the interior surface coated, which consists in applying a solvent on portions of the outside surface and softening the underlying portions of the interior coating at least at one end thereof, using heat and pressure to cause rapid impregnation of the solvent and a firm adhesion of said portions, the material of the bag being permeable to said solvent.

12. A method of making bags having portions of the interior surface coated, which consists in applying a solvent on the outer surface and softening the interior coating at least at one end thereof, and thereafter bringing about adhesion of said portions, the material of the bag being permeable to said solvent.

13. A method of making bags having portions of the interior surface coated, which consists in applying a solvent on the outer surface and softening the interior coating at least at one end thereof, and thereafter bringing about adhesion of said portions, by using a heating medium to cause rapid impregnation of the solvent, the material of the bag being permeable to said solvent.

14. A method of making bags having portions of the interior surface coated, which consists in applying a solvent on the outer surface and softening the interior coating at least at one end thereof, and thereafter bringing about adhesion of said portions, by using a heating medium to cause rapid impregnation of the solvent, and pressing said portions firmly together, the material of the bag being permeable to said solvent.

ROBERT MORRIS BERGSTEIN.