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ENVELOPE AND CONTAINER SEALING

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This invention relates to containers and means for sealing the same, it being particularly applicable to flexible containers, such as envelopes, paper bags, and other articles made of flexible sheet material, and including compositions having certain peculiar adhesive characteristics.

It is applicable not only to paper, but to fabrics and other flexible sheet material, such as are used for envelopes, mailing wrappers, labels, and the like.

Heretofore it has been customary in adhesives used in conjunction with articles such as those above mentioned to provide a gum or glue-like preparation which will absorb water and thereby become viscous or sticky.

While such adhesives are in general use, they possess certain inherent disadvantages, both in storage and application.

Many of these adhesive compositions are affected by humidity and become sticky when not in use.

It also is difficult in applying them to estimate correctly the amount of water necessary to properly take care of the material. If insufficient water is applied, the bond which is obtained may be unsatisfactory, while if an excess of water is applied, the adhesive material becomes too thin and both adversely effects the bond and tends to spread or smear, impairing the appearance of the article. Also, if an excess of water is supplied, it may distort the paper or other material carrying the adhesive, causing the same to warp or wrinkle and further impairing the appearance of the article.

It is an object of the present invention to eliminate the disadvantages attending the use of prior types of adhesives.

Another object is to provide an improved envelope or like container of flexible material which may be sealed without the application of moisture.

Another object is to provide an improved envelope or like container, which may be caused to seal in a plurality of manners.

Another object is to provide an improved envelope or like container which will be relatively unaffected by variations in atmospheric conditions.

Another object is to provide an improved envelope which may be neatly and securely sealed.

Another object is to provide an improved envelope which will be sanitary to use.

Another object is to provide an improved

envelope which will remain flat where adhesive is applied.

Another object is to provide an improved envelope which will be capable of use in any desired form.

Another object is to provide an improved envelope which may be economically produced.

Another object is to provide an improved envelope which may be rapidly sealed.

Another object is to provide an improved envelope which may be sealed in a plurality of manners.

Other objects will hereinafter appear.

The invention will be better understood from the description of several practical embodiments thereof in which will be given two examples of compositions which may be rendered adhesive only upon the application of heat, and two examples of compositions which may be rendered adhesive in this manner, or, alternatively if desired, may be used in the manner of the older types of adhesive by the application of water.

The invention is hereinafter described as applied to an article referred to as an envelope, and by this term, as used in the specification and claims, is meant any receptacle or container of flexible sheet material, comprehending the ordinary type of envelope used in mailing letters and the like, and also similar containers whether these be intended when in use to be flat or which are provided with gussets or pleats to permit expansion, such as found in the larger size envelopes, paper bags, and the like.

A very simple composition of matter which has been found extremely satisfactory as an adhesive consists of substantially 35% (by weight) of gum shellac in 65% alcohol. This material is insoluble in water and can be rendered viscous only by the application of heat and can be sealed by simultaneously heating the article to which it is applied and pressing the parts which are to be sealed together.

As above mentioned, various types of heaters for this purpose are illustrated and described in my copending application above referred to, and as the inventions relating to the use of such heaters are included in that application, they will be included in the present specification only by reference thereto, for the sake of brevity.

With the composition above described, very effective adhesion may be obtained. However, in some instances it is desired to enhance the stickiness or tackiness of the material and to reduce its brittleness, and in such instances there may be added up to substantially 5% of a non-drying

permanently sticky material such as balsam of fir.

Another composition which has been found very satisfactory for heat sealing, and which is unaffected by moisture consists of 50% calcium resinate (the calcium salt of rosin) and 50% boiled linseed oil. These are heated together and then dissolved in any desired quick drying solvent such, for instance, as carbon tetrachloride.

To the mixture last above described may be added, for the purpose of somewhat plasticizing the material, up to 5% of a mixture made by melting together two parts of rosin to one part of non-drying oil such as castor oil.

It will be understood that in the above mentioned examples the solvent serves as a vehicle for the solid materials, rendering the mixture fluid and readily applied to the papers or the like on which it is to be used, and after application is permitted to evaporate.

The proportion of solvent will, of course, be varied to suit the nature of the paper, the mode of application of the adhesive and the like.

The following is a composition which may be very conveniently caused to adhere by application of heat, and which furthermore may, if desired, be rendered adhesive by the application of water in the same manner as the older types of adhesive. It comprises:

	Per cent
30 Gum arabic.....	36
Glycerine.....	11
Water.....	50

Still another composition which may be used with heat alone or with water alone is as follows:

	Per cent
Dextrine.....	50
Maltose.....	10
Dextrose.....	3
40 Sucrose.....	5
Water.....	32

The proportions of water given in the last two examples are, of course, those which are used to render the mixtures fluid for application of the paper and are decreased by evaporation after such application.

From the examples above given, it will be evident that a wide variety of gums, resins, sugars, etc., may be used as constituents of the adhesive materials which will secure the results desired, namely;—the ability to seal, in the absence of water, upon the application of heat.

It will be also evident that these constituents may be chosen to correspond to any character of seal required, and in accordance with the dictates of economy and adaptability to application by existing apparatus.

The temperature at which the materials become viscous must, to render their use acceptable, lie between the highest temperatures which will ordinarily be encountered in atmospheric conditions, and those at which the paper to which they are applied will be adversely affected, and therefore, must for general purposes, lie within a range of from about 125° F. to 350° F.

The temperature at which the adhesive may be rendered viscous is, of course, a function of the time during which heat is applied and the maximum temperature to which the paper may be safely subjected for this period of time.

The word "solid" is used herein to denote a condition of the adhesive material in which it not only is not in liquid form, but in which it is sufficiently non-adhesive that, when applied to flaps of envelopes packed in packages or boxes as

these envelopes are customarily packaged, it will not adhere to an uncoated paper surface in contact with it, throughout the ranges of temperature, humidity, and other atmospheric variations to which such packaged envelopes may be exposed.

The word "viscous" is used herein to describe a state in which the adhesive will adhere to a contacting paper surface, such as the underlying part of the envelope, with such tenacity that it holds two plies of the paper together after it has cooled and returned to its solid state, forming an effective seal between them.

Naturally, the higher the temperature to which the adhesive may be subjected, the quicker the seal may be effected. For instance, in the composition last above described, being applied to light bond paper or sulphite paper of the weights commonly used for envelopes, if the adhesive is subjected to a gentle pressure and to heat of about 150° F., two to five seconds will be required to effect a seal. If the temperature be increased to 200° F., the time required to effect the seal is about one-half second. If, as in the case of modern mailing machines, envelopes carrying this adhesive are passed between heated rolls at a rate as high as three per second, it will be apparent that a temperature of about 350° F. and possibly a little higher may be required and will afford an effective seal. It will be understood that the envelope may be of any desired form, and need not differ in appearance from those now in use. The adhesive may be applied to the edge of the top flap, this being done in any desired manner, for example by the use of a solvent which renders the adhesive liquid and is permitted to evaporate after the solution has been applied, or the adhesive may be melted and applied while in liquid form.

While I have described the above embodiments of my invention in some particularity, obviously many variations and modifications may be made therein without departing from the spirit of the invention, and I do not therefore limit myself to the precise details disclosed herein, but claim as my invention all modifications, variations and embodiments thereof coming within the scope of the subjoined claims.

I claim:

1. An envelope comprising a sheet of flexible material folded to provide a pocket and a flap, a coating adhering to a portion of the surface of said sheet adapted to be positioned between said pocket and said flap and consisting of a normally solid material possessing the dual property of being capable of becoming viscous and producing a seal upon the application of heat and also capable of becoming viscous and producing a seal upon the absorption of moisture, the material of the envelope sheet and the coating having surfaces which normally maintain themselves separated and are capable of adhesion after said coating material has been rendered viscous.

2. An envelope comprising a sheet of paper folded to provide a pocket and a flap, a coating of gum material adhering to a portion of the surface of said sheet adapted to be positioned between said pocket and said flap, the paper being characterized by having a surface capable of becoming firmly bonded to the viscous adhesive and the coating being characterized by normally being incapable of being bonded to said surface and having the dual property of being rendered viscous and capable of bonding to said surface upon the application of heat and also capable of

bonding to said surface at ordinary atmospheric temperatures on the addition of moisture.

3. An envelope comprising a sheet of paper folded to provide a pocket and a flap, a coat of gum material adhering to a portion of the surface of said sheet adapted to be positioned between said pocket and said flap, the paper being characterized by having a surface capable of becoming firmly bonded to the viscous adhesive and the coating being characterized by normally being incapable of being bonded to said surface and of being rendered viscous and capable of bonding to said surface upon the application of heat substantially in excess of temperatures normally encountered and below temperatures capable of causing deterioration in the paper and adhesive and also capable of bonding to said surface at ordinary atmospheric temperatures on the addition of moisture.

4. An envelope comprising a sheet of flexible fibrous material and a coating adhering to a portion of the surface of said sheet consisting of a normally solid material having the dual property

of being capable of becoming adhesive upon the application of heat, and also capable of becoming adhesive upon the application of water at atmospheric temperatures.

5. An envelope comprising a sheet of paper and a coating adhering to a portion of the surface of said sheet consisting of a normally solid material having the dual property of being capable of becoming adhesive upon the application of heat, and also capable of becoming adhesive upon the application of water at atmospheric temperatures.

6. An envelope comprising a sheet of flexible material folded to provide a pocket and a flap, a coating adhering to a portion of the surface of said sheet adapted to be positioned between said pocket and said flap and consisting of a normally solid material possessing the dual property of being rendered adhesive and producing a seal upon the application of heat and also capable of becoming adhesive and producing a seal upon the absorption of moisture.

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