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PROCESS OF REMOVING HEAT-SEALED ADHESIVE LABELS

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1 Claim. (Cl. 134—29)

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Our present invention is a novel and improved process of removing both the labels, or the like, and the adhesive from any solid surface, such as glass, metallic, synthetic plastic, or the like articles, wherein such labels have been adhesively attached by heat or pressure, or otherwise.

Heretofore it has long been desired to affix labels, notices, or the like printed and trade-marked matter to the exterior of containers of various kinds, particularly of glass or metal, by means of extremely secure adhesive so as to prevent loss, removal, tearing off, or other damage to the label or other printed matter so secured thereon.

This is particularly desirable where such containers carrying adhesively secured labels are subjected to rough handling in transportation, use, storage, or the like, and particularly also wherein such specific articles as beer bottles or the like trade-marked containers are employed where it is desired to return same for re-filling and use again.

In an effort to secure permanently attached labels to such articles it has been found that special types of adhesive, gums, resinous compounds, or the like, wherein the bonding action of the label to the container thru such adhesive is effected by heat or pressure or otherwise, which insures film attachment of the label or other substance to the container or other surface.

While this improvement in the art of applying labels has been developed and is of importance, it has previously been found difficult to remove any such heat-sealed label from the container without extreme difficulty, numerous operations, repeated treatment, and the time element involved. Thus, for example, prior methods, so far as we are informed, have required from ten to fifteen minutes intensive operations to effectively remove a heat-sealed adhesively-bonded label from the outside of a container, particularly a glass or metal container, to remove the label and thereafter to remove the residue of the heat-treated adhesive which had been employed without an undue amount of labor and time, which involved such an economic disadvantage as to seriously restrict the use of the heat-sealed attachment employed.

Therefore, in spite of the desirable advantages of having a permanently adhered label, the difficulties of removing it, where the container was of sufficient value to be returned for re-use and re-filling, seriously prevented the commercial use of such a permanent attaching compound and heat-sealing methods. Ordinary washing,

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hot water, scraping, or the like were insufficient to remove such heat-sealed labels and, particularly, the residue of the adhesive because of its intimate association with the container itself by reason of the heat and pressure employed when the label-applying was affected.

We have discovered that such prior heat-sealed adhesive compositions of matter, particularly those which included a resinous ingredient, could be effectively, quickly, and economically de-labelized and the heat and pressure adhesive completely removed by our present process, utilizing novel compositions of matter which we have discovered and involving only a few seconds for each of the two main successive steps.

Furthermore, our process may utilize to a certain extent the usual tanks and equipment for label-removing and bottle-cleaning, washing, and drying which is now in general use and which—briefly—involves a series of tanks thru which the containers to be de-labelized and cleaned would ordinarily travel, preferably by a continuous conveyor. Such prior equipment usually included one or more rinsing and soaking tanks, one or more cleaning, steam-applying or the like tanks, and subsequent drying treatment. These prior steps, however, would have no effect on a heat-sealed adhesive as above noted.

Our present process utilizing our novel composition of matter includes a special treatment of the bottle, or the like, in one of the preliminary soaking tanks, which, under the dissolving, disintegrating, and dispersing influence of our compound will almost instantly, within a few seconds, effect a release and floating off of the label. Our composition of matter includes as ingredients an alkali and sodium phosphate admixed in a dry powdered state in the proportions of one ounce of alkali to three ounces of sodium phosphate to a gallon of water, this solution being then heated to 180° to 212° F., as more fully explained hereafter, and applied to the heat-sealed label to be removed as two steps in substantially immediate sequence.

Thereupon, a succeeding treatment with the application of a suitable force and spray, also utilizing our composition of matter, will effect a positive removal of the residue of heat-sealed adhesive whether including a resinous ingredient or otherwise; thereby removing the same from the bottle, or the like, and giving a clean surface also within a few seconds. Each of these steps can be effected in from one-half to a minue and a half of time and during the continuous travel of the containers thru the tanks.

We find that by heating our novel composition of matter in the first tank to remove the label and partially dissolve, disperse, and soften the heat-sealed adhesive with a temperature of from 180° F. to 212° F. is amply sufficient. This temperature, with our novel composition of matter, is found to be commercially satisfactory in so dissolving any heat-sealed resinous adhesive or gum which we have found available, and in from thirty to ninety seconds to effect a complete dispersing of the label and partially dispersing the adhesive composition of matter between the label and the container.

For the second treatment under heat, force, and power, we find that a spray directly on the remaining residue of the heat-sealed adhesive, and utilizing our composition of matter at a temperature of from 170° F. to 200° F., and from thirty to sixty pounds pressure, will effect a complete removal of adhesive and cleaning of the container in from thirty to ninety seconds, and during the continuous travel of the bottles, or the like, thru the rest of the washing equipment.

Our novel compound comprises an admixture of non-injurious ingredients which includes an alkali and a detergent, together with a suitable phosphate, all of which are subsequently rinsed and removed.

A suitable composition for this purpose is made up of sodium oxide, sodium hydroxide, and sodium phosphate or trisodium phosphate including silica and phosphorus, together with a detergent comprising silica and phosphorus together with a wetting agent, as well as carbon dioxide and sodium chloride. These are mixed as a dry powder and then dissolved in the proportions of four ounces of the powder to a gallon of water and raised to the temperature above-noted when they are ready for use.

An analysis of such a mixture made in accordance with the standards of the American Society for Testing Matter results in the following:

	Per cent
Total alkalinity as sodium oxide (Na_2O)	21.6
Free sodium hydroxide (NaOH)	0.97
Water (distillation method)	46.0
Loss of weight at 105° C	44.6
Matter insoluble in alcohol	53.1
Fatty acids	None
Synthetic detergent or wetting agent	2.0
Silica (SiO_2)	5.6
Phosphorus (P_2O_5)	13.6
Carbon dioxide (CO_2)	4.9
Sodium chloride (NaCl)	0.32
Sodium sulphate	None
Chromates	None

We find it feasible as a practicable and simple method to utilize a pre-mixed dry powder, commercially known as SF–11 supplied by the Leland Chemical Company, or the Monsanto Chemical Company's MXP, which constitutes the dry powder component of the resultant composition of matter, identified by the analysis above set forth.

We find that where it is necessary in the bottle-washing operation to employ hard water, that our composition of matter is especially important in controlling the scale as well as eliminating the formation of scale and cleaning the tanks when scale has already formed.

We also use the composition of matter above noted for the force-spraying operation and in the range of temperature degrees outlined above.

Our process and compound when employed as above explained is found to be amply efficient and so quickly and completely dissolving, dispersing, or removing the resin or gum which has been sealed by heat as to leave the surface completely clean and smooth, and so quickly as not to delay the continuous travel of the bottles or the like containers thru standard washing operations.

Also our process and compositions are efficient for general cleaning of the outside of glass and metal wherein a resinous or the like adhesive substance has been applied, although we have explained our invention in connection with label-removing.

We claim:

The improved process of removing heat-sealed adhesive substances, labels, or the like from the surface of an article, glass, metal or the like which consists in two continuous steps; first, applying to the surface of the substance to be removed a heated solution containing as ingredients an alkali and a sodium phosphate in the proportions of an ounce of alkali to three ounces of sodium phosphate admixed in a gallon of water and heated within a range of 180° F. to 212° F., applying said solution from approximately 30 to 90 seconds, and thereupon applying a second treatment of said heated solution as a spray under pressure of from 30 to 60 pounds per square inch from 30 to 90 seconds and while heated within a range of temperature from 180° F. to 200° F.

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