phase, and vaporizing the solvent from said solvent-fatty acid phase for re-use in said process.

PROCESS OF REFINING ANIMAL AND VEGETABLE OILS. Benj. H. Thurman (Refining, Inc.). *U. S. 2,260,731.* The method of producing refined vegetable oils comprises, extracting the oils by means of a solvent, therefore, continuously mixing a refining reagent with said oil in the presence of said solvent, continuously centrifugally separating foots produced by said refining reagent from said oil, and thereafter separating the solvent from the oil for re-use in the extraction step, said process being carried out in a closed system for preventing loss of solvent and admixture of air with the materials in said process.

DEHYDRATING CASTOR OIL. Alfred E. Rheineck and Samuel B. Crecelius. (Devoe & Reynolds). *U. S. 2,261,663.* The process of dehydrating castor oil comprises adding to the castor oil catalytic quantities of yellow tungstic acid corresponding to the formula H_2WO_4, prepared by precipitation with a strong acid from an alkaline solution of tungstic oxide, WO_3, and heating the mixture to a temperature of from about 225° C. to 305° C., until the tungstic acid turns blue and the oil is largely dehydrated.

PROCESS OF PREPARING HIGH MOLECULAR WEIGHT FATTY ACID CHLORIDES. Anderson W. Ralston, Miles R. McCorkle, Robert J. Vander Wal. (Armour & Company, Chicago). *U. S. 2,262,431.* In the preparation of fatty acid chlorides having at least six carbon atoms by reacting the corresponding fatty acid with a phosphorus halide used in excess, the method of removing unreacted phosphorus halide from the fatty acid chloride thus prepared comprises hydrolyzing the unreacted phosphorus halide to its corresponding acid and then separating the acid from the thus purified fatty acid chloride. The products are used as intermediates for prepn. of other products.

METHOD OF PREPARING HIGHER FATTY ACID ESTERS OF CELLULOSE. G. D. Hiatt and C. L. Crane (Eastman Kodak Co.). *U. S. 2,254,652.* A method of preparing cellulose acetate stearate which comprises reacting upon an acetyl cellulose contg. esterifiable hydroxyl groups with a reaction mixture free of sulfuric acid, comprising an impelling anhydride, a solvent, stearic acid, and phosphoric acid as the catalyst until a substantial amt., but not all of the esterification, has occurred, then adding sulfuric acid catalyst to the mass and completing the esterification, is described.

PROTEIN PLASTIC MOLDING COMPOUND AND METHOD OF PREPARING THE SAME. George H. Brother and Leonard L. McKinney. (Henry W. Wallace, as Secy. of Agriculture.) *U. S. 2,262,422.* An article of manufacture, a thermosetting water-resistant protein molding powder, comprises 20 parts thermoplastic formaldehyde-hardened at a pH of 4.1 0.1 soybean alpha protein that has been mixed with substantially 5 parts ethylene glycol and substantially 75 parts of a phenolic molding powder consisting of a mixture of a B-stage phenol-formaldehyde resin, wood flour, and a suitable accelerator.

Abstracts

Soaps

Edited by
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GLYCERINE. SOME OBSERVATIONS ON ITS RECOVERY AND REFINING IN MODERN SOAP PLANT PRACTICE. J. W. McCutcheon. *Soap 17*, No. 11, 24-8, 69 (1941). It is predicted that the future development of glycerine uses will lie in the field of polymerization, condensation, and esterification. There has been a gradual lowering of the nitroglycerine content in industrial dynamites, and an increased use of nitroglycols for the purpose of improving stability at low temperatures. As a military explosive large quantities of nitroglycerine are being used in double base propelants and as an agent for controlling the ballistics of straight nitrocellulose powders, but the single base or nitrocellulose powders are providing keen competition.

Yields are discussed. Generally speaking, the amount of glycerine left in the soap ranges from 0.2-1.2% and represents approximately 2-11% of the total glycerine available. Washing normally gives approximately 1.20 lbs. of lye to every pound of 63% soap, or approximately two pounds of lye per pound of fat consumed. This should give a normal figure for glycerine left in soap of 0.5-0.7%, representing a loss of 7% to 10%. Increasing the washes to say 1.4 pounds of lye per pound of 63% soap made under normal operation conditions would probably reduce the glycerine left in soap to 0.2-0.4%, representing a total glycerol loss of only 3%-6%. The effect of such changes will result in weakening the glycerine content of the lye from say 6% to 5% with a resulting increase in evaporation costs. Counter-flowing lyes from high grade to low grade soaps greatly reduce the wash water used and increase the glycerine content up to 15-17%, leaving 0.5-0.7% glycerine in soap or down to 11-12%, where the glycerine content left in soap is only 0.2-0.4%.

Purification of soap lyes with iron salts and aluminum sulfate is discussed; the latter is unsatisfactory for single treat systems because of the necessity of a close pH control, and its high content of water of crystallization from a cost standpoint. In a double lye treat it is advisable to operate on a low pH first and work up to a higher one. A pH of 3.7 may give effective operation, but 5.0-5.5 is much to be preferred. The second treat should be held between a pH 7.0-7.7. The two-treat system is discussed in detail, including percentage of chemicals involved and equipment.

GLYCERINE. J. W. McCutcheon. *Soap 17*, No. 12, 34-7, 77 (1941). Double effect evaporators are not justified on a production of less than 3,000 lbs. of crude glycerine per day. It is desirable to have a steady vacuum system to minimize bumping in the evaporator, to prevent entrainment losses and serious vibrations which may lead to leaks in the callandria. The Foster verticle tube evaporator is discussed. Corrosion on the lower plate is due to the electrolytic action between the copper on the tubes and alloy steel on the bottom plates, or to the aerated lye which flows through these areas. The No. 1 effect lye should be adjusted to a pH 8.9 for evaporation, and the lye itself should be fed in small amounts to avoid rapid temperature changes. Faulty vacuum, presence of a high content of sulfides, and Na silicate may lead to difficulty. In large scale production centrifugals are economically used to remove glycerine from the salt.

Wurster and Sanger tubes are adaptable for small plant operations since the effects can be run independently of the other. Swenson tubes are very efficient on high glycerine lyes. Good crudes usually analyze 80-82% glyc., 8-10% salt, and 1-1.5% organic residue, 0.05% or less of Na_2SO_3; rosin in the fat charge may give abnormal results.

THE ACTION OF ROSIN SOAPS ON HUMAN SKIN. Leroy Edwards. *Soap 17,* No. 12, 65 (1941). The test method consisted of the application to skin of soap solutions contained in a rubber diaphragm and held in place by a collar equipped with adjustable elastic bands. The solution was removed after it had been in contact with the skin for three hours, the area washed with warm tap water, dried, and examined at intervals for signs of irritation. The soap solutions were prepared as follows: Dissolve 6.8 gms. rosin or rosin acid in 25-40 ml. of 95% ethyl alcohol, add 4-5 drops of phenolphthalein, titrate to phenolphthalein end point with aqueous NaOH, and dilute to one liter with 0.1% tetrasodium pyrophosphate.

Skin tests made with these alcohol free rosin and rosin acid soap solutions on ten males gave in each case negative results as far as irritation was concerned. Using the results obtained from the tests of these two series of rosin soap solutions on adult human skin as a basis, it seems fair to conclude that rosin soaps and rosin acid soaps under the several conditions as outlined are relatively non-irritant to human skin.

ANHYDROUS SODIUM SOAPS. HEATS OF TRANSITION AND CLASSIFICATION OF THE PHASES. Robert Vold. *J. Am. Chem. Soc. 63,* 2915-25 (1941). A differential calorimeter has been devised suitable for determination of heats of transition and transition temperatures up to 340°. These were determined for the series of phases occurring between true crystal and true liquid for sodium laurate, myristate, palmitate, stearate, and oleate.

Since the heat effects are similar at the successive transitions of sodium myristate, palmitate, and stearate, it is inferred that similar changes in structure are involved. These structural changes may not occur in the same order at the numerically corresponding transitions of sodium laurate, and may also be different for sodium oleate.

At the transitions from curd fiber phase to subwaxy soap and from subwaxy to waxy soap the heat effect is large and varies with the chain length. At the higher temperature transitions the heat effect is small and relatively independent of the chain length. The conclusions are that the low temperature transitions are probably due to changes in the arrangement of the hydrocarbon chains while the high temperature transitions are due to rearrangement of the polar heads of the molecules.

SELECTING SOAPS FOR LAUNDRY USES. David I. Day. *Am. Perfumer and Essential Oil Rev. 43,* No. 5, 51 (1941). Tallow soap chips may be regarded as the most practical type for the large laundry. It costs less per pound of real soap. It is convenient to handle in building a soap to suit the laundry water and it is a very soluble type. Most manufacturers provide tallow chips containing at least 88% pure dry soap, commercially neutral, containing not more than 3% soda ash and sodium silicate to stabilize the product while in storage. Solutions of this soap at ordinary laundry concentration will show a pH of 9.5 to 10.0, the desired range of alkalinity from the solution of pure soap. Occasionally it is found that tallow soap chips are not satisfactory for a small plant; improved results are obtained with a powdered neutral tallow soap. A third class of soap is the cold-water or low titer commodity. An olive oil soap is, an example. It is extremely soluble even in very low temperatures and has good detergent action. The net result is that colored clothing, inclined to fade somewhat, can be washed clean with this soap and there will be no great amount of color loss. In small plants where it is desirable to add soap and builder directly to the wheel, a neutral built olive oil soap in powdered form is very suitable.

BACTERICIDAL AND BACTERIOSTATIC PROPERTIES OF SURFACE-TENSION DEPRESSANTS. Louis Gershenfeld and Vera Elaine Milanick. *Am. J. Pharm. 113,* 306-26 (1941). Reduced surface tension alone does not explain the bactericidal action of a surface-tension depressant possessing the latter property. The bactericidal action is due to a combination of 3 factors or agents: (1) the surface-active material—anionic or cationic compds.; (2) the H-ion concn. of the environment—acid or alk.; (3) the specific organism or group of organisms—as Gram-pos. or Gram-neg. The bactericidal action of both the anionic compounds (Aerosol OT, Tergitol 4 and 4T) and the cationic compd. (Triton K-12) is markedly influenced by the H-ion concn. The cationic depressant, Triton K-12, exhibited its greatest efficiency in the alk. range, and the higher the pH the greater the efficiency. The anionic depressants, Aerosol OT and Tergitol 4 and 4T, exhibited their greatest efficiency in the acid range, the lower the pH the greater the efficiency. The cationic depressant, Triton K-12, generally speaking was slightly more effective against Eberthella typi, a Gram-neg. organism, than against Staphylococcus aureus, a Gram-pos. organism. The anionic depressants, Aerosol OT and Tergitol 4 and 4T, were more effective against Staphylococcus aureus than Eberthella typhi. Forty-five references. *(Chem Abs.)*

STUDIES ON THE ACTION OF WETTING AGENTS IN MICROORGANISMS. I. THE EFFECT OF PH AND WETTING AGENTS ON THE GERMICIDAL ACTION OF PHENOLIC COMPOUNDS. E. Ordall, J. Wilson, and A. Borg. *J. Bact. 42,* 117-26 (1941). Undissocd. phenol is more toxic to Staphylococcus aureus than phenolate. The addn. of wetting agents to buffered solns. of phenolic compds. in general increases the germicidal activity. The specific effect is a function of the character as well as the concn. of the wetting agent employed. The germicidal action of solns. contg. buffer, phenol, and wetting agent is greater than that of solns, contg. buffer and phenol or buffer and wetting agent at a given pH. The fact that the germicidal action of solns. contg. buffer, phenol, and wetting agent decreases with increase in alky. from pH 9 to pH 11 although the germicidal action of solns. of buffer and wetting agent increases in the same range suggests that the presence of the wetting agent enhances the action of the undissocd. phenol more than that of the phenolate. The wetting agents used were Na laurate, Na oleate, and Na lauryl sulfonate. *(Chem. Abs.)*

STABILIZATION OF WHITE MILLED SOAPS. A. T. Fiore. *Soap 17*, No. 12, 30-33, 75 (1941). The bibliography of soap antioxidants originally published in the house organ *Givaudanian*, March, 1941, is included in this issue of *Soap*.

PATENTS

PURIFICATION OF ESTERS. John Tindall (Commercial Solvents Corporation). *U. S. 2,251,215.* In a process for the separation of carboxylic esters from a substantially anhydrous mixture comprising essentially alcohols and esters, said alcohols containing from 1 to 4 carbon atoms, the steps which comprise extracting said ester-alcohol mixture with glycerol, subsequently separating the two layers formed thereby and recovering the ester in a substantially alcohol-free state by distillation.

LIME COMPOSITIONS. Foster Dee Snell (Foster Dee Snell, Inc.). *U. S. 2,259,782.* A dry mixture to be slaked, consisting largely of quicklime and a fixed alkali metal soap, the proportion of the soap being of the order of 0.1 to 1 part to 100 parts of lime, the quicklime being adapted to combine with moisture condensed in the mixture during storage, and the quicklime and soap being adapted to remain in unreacted condition until liquid water is added, the slaking of the lime and reaction of the lime with the soap then occurring at the same time.

PROCESS FOR THE EMULSIFICATION OF TARS. William Chadder, Henry Spiers, and Edwin Arnold (Thermal Ind. and Chem. (T.I.C.) Res. Co., Ltd.). *U. S. 2,247,-722.* Process for the preparation of stable aqueous emulsions of a bituminous material such as road tars, pitch, and bitumen suitable for use on roads, characterised in this, that an inverted emulsion is first prepared by mixing the whole of the bituminous material to be emulsified, and an aqueous alkaline solution containing a quantity of water amounting to about 16% by weight of the said bituminous material, together with an alkali soap of liquid rosin and casein, and said inverted emulsion is then gradually added to and dispersed in an aqueous alkaline solution containing a total of about 15% by weight, dry basis, of an alkali soap of liquid rosin and casein, whereby said inverted emulsion is reverted into an emulsion of the "oil-in-water" type.

METHOD OF INHIBITING THE CLOUDING OF LIQUID SOAP DURING STORAGE IN GLASS CONTAINERS. Harry L. Roschen (Ind. Pat. Corp.). *U. S. 2,255,629.* The method of inhibiting the clouding during storage in glass containers of liquid soaps of the class consisting of liquid potassium soaps and liquid sodium soaps of liquid higher fatty acids, which comprises separating any insoluble calcium and magnesium compounds from the soap solution, and thereafter adding to the clear solution about 1-2% of a water soluble alkali metal hexametaphosphate based on the total soap content of the solution.

METHOD OF PRESERVING SOAP AND RESULTING PRODUCT. Bernard Maxwell (Lever Brothers Co.). *U. S. 2,258,619.* The method of stabilizing a soap composition having as a constituent a material proportion of a potassium soap, which comprises incorporating in the soap composition a small amount of alpha-stannic acid.

TREATMENT OF TEXTILE MATERIALS — WATERPROOFING. Edwin Holroyd Sharples (Courtaulds, Ltd.). *U. S. 2,234,091.* A process of waterproofing textile material which comprises subjecting the material free from moisture but containing a small percentage of a soluble soap of a higher fatty acid to the action of dry chlorine and therefore insolubilizing said soap in situ by treating the material with an insolubilizing agent.

WATER-CONTG. LUBRICANT FOR COMPOSITION BEARINGS—PHENOL RESINS. Robert Williams (The Ironsides Co.). *U. S. 2,257,359.* The method of lubricating composition bearings of the phenol-formaldehyde resin type, comprising applying to the journal surfaces of such a bearing during active use of the latter a liquid composed principally of water and having uniformly dispersed therein minor percentages of a wetting agent or soap.

IMPARTING GLOSS TO SOAP FLAKES. Thomas Penny (Lever Brothers and Unilever, Ltd.). *Brit. 538,934.* The invention consists in a continuous method of enhancing the gloss and transparency of soap flakes which comprises passing the flakes through a steaming zone in which they are freely exposed to the action of steam for not more than a few seconds and then passing them through a drying zone in such manner that they are kept substantially separate from each other until their surfaces have become sufficiently dry to prevent them from sticking together when they are collected. Preferably the flakes are allowed to fall through the steaming and drying zones.

The invention also comprises apparatus for imparting an enhanced gloss and transparency to soap flakes comprising a steaming unit adapted and arranged to receive and project steam onto both sides of a stream of soap flakes and a drying unit adjacent to the steaming unit and adapted to receive and to project currents of drying air onto both sides of said stream of soap flakes after it has passed through said steaming unit. In order to ensure as far as possible that both sides of the flakes are polished it is preferable to pass the flakes between two oppositely arranged steam jets. The degree of gloss and transparency is partly determined by the temperature of the steam and it is an advantage to maintain a high temperature in the steaming zone. Very good results have been obtained at temperatures therein of 90-100° C.

The velocity of the air current controls the time of fall of the soap flakes and in conjunction with its temperature controls the extent of the drying action. The soap flakes on discharge must be sufficiently dry to avoid their sticking to one another to any substantial extent and should not be hotter than about 35 to 40° C. The tower structure is constructed as far as possible from wood and fibre boards, to prevent troubles due to moisture condensation and discoloration of the flakes owing to metallic contamination.

The enhanced gloss and transparency appear to be imparted to the flakes through the steam treatment causing a partial solution and partial melting of their surface layers, whereby minor surface irregularities are evened out. The subsequent drying operation enables the flakes to be collected and packaged without them sticking together and without impairing the gloss to any substantial extent.

The soap flakes treated in accordance with this invention in many cases acquire a pronounced curl, which is an advantage, as it prevents clogging of the flakes when they are thrown into water.