Patented Dec. 17, 1940

2,224,994

UNITED STATES PATENT OFFICE

2,224,994

PROCESS OF PRODUCING LAUNDRY ARTICLES

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No Drawing. Application January 11, 1937, Serial No. 120,137. In Germany January 23, 1936

4 Claims. (Cl. 154—2)

This invention relates to the manufacture of laundry articles.

One of its objects is a process of producing improved laundry articles by impregnating them with mixed vinyl polymerizates. Another object is the laundry articles obtained according to this process. Further objects will be seen from the detailed specification following hereafter.

For producing lastingly washable articles from fabrics it is important that the fabrics should be as little as possible different in its appearance from that of fabric which is normally washed. A number of processes have been suggested for retaining in the impregnated laundry articles their linen-like appearance. Thus, for example, the impregnating agent has been applied in a very thin layer. However, this is disadvantageous in that the laundered articles have a short period of use. The application of the impregnating agents, which are insoluble in water, in the form of solutions by means of sprays or rollers produce laundry articles which can, indeed, be washed but have the disadvantage that when slightly damaged by water the film-forming constituent is removed after a short time from its support and so makes the laundry article unusable. Moreover, laundry articles which have been produced with the aid of pastes or adhesives containing solvents exhibit a gradually noticeable change of their dimensions and forms in consequence of the gradual evaporation of the still retained residue of solvent which occurs during long storage.

It is further known that lastingly washable articles in which the external parts are provided only with a thin impregnation may be strengthened with stiffening insertions. These stiffening insertions have found admission also into the manufacture of pure linen laundry articles, in particular semi-stiff collars. In both cases stiffening insertions of various kinds have been proposed which, however, can be comparatively easily removed from the material and, moreover, do not give a smooth surface free from objection.

The present invention avoids or minimizes these disadvantages by use for the production of laundry articles and lastingly washable goods, particularly collars, cuffs, false fronts or the like of fabrics from any natural or artificial threads capable of being spun which are impregnated with a mixed polymerizate of the vinyl group.

Suitable mixed polymerizates which are fast to ironing in consequence of their high softening point, are the mixed polymerizates from acrylic acid derivatives, as for instance the esters and the nitriles with the vinylmethylether or vinylethylether, vinylisobutylether. The esters and the nitrile of the acrylic acid may be replaced by the corresponding derivatives of the methacrylic acid and maleic acid, especially the mixed polymerizates from maleic esters with vinylethylether. Moreover, all those mixed polymerizates from the above identified monomerides with such monomerides are suited which polymerize only in mixture, also the threefold or manifold mixed polymerizates of the unsaturated monomerides come into question. As it is possible to adjust the mixing proportions of the components of a mixed polymerizate to any desired degree, any suitable stiffness of the impregnated fabric may be easily attained. It has been proposed to use for the production of collars vinyl acetate, the mixed polymerizate from vinyl chloride and vinyl acetate (which is known by the trade name Vinylite), or the polystyrene; however, the physical and chemical properties of these products make it necessary that they should be used only in admixture with each other in order to obtain the necessary fastness to alkali and ironing and stability to light. It has also been shown that in this respect particularly narrow limits must be observed in order to produce the optimum effect. In contrast with this use of the physical mixtures of polymerizates the new chemical individual mixed polymerizates of this invention have the advantage that they exhibit the properties, hitherto only obtainable by mixing, united in an individual substance. A further limitation in the use of the known mixtures of polymerizates is caused by the fact that the fabric must be impregnated with them in the form of solutions. The different solubilities of the vinyl chloride, vinylites, polystyrenes, obviously makes the selection of suitable solvents difficult. If one turns to the production of laundry articles or permanently washable goods from colored fabrics, precautions must be taken to avoid bleeding of the dyestuff when using the solvent for a mixture of polymerizates. There exists the danger that a series of fabrics or solvents on account of their incompatibility cannot be used, whereby, again, the range of use of this known process is limited. In contrast herewith the mixed polymerizates have the advantage that they are applicable wholly without a solvent, for example in the form of an aqueous emulsion or suspension or by taking advantage of their thermoplastic properties. In the latter case the union with the fabric becomes a process of melting the

mixed polymerizate so that removal from the fabric as a consequence of impenetrating moisture cannot occur. The possibility to apply the mixed polymerizates in form of their aqueous emulsions is of particular advantage, because today the mixed polymerizates are mostly prepared in the form of emulsions, so that this intermediate form of the polymerizate may immediately find a utilization in the technique. The properties of these mixed polymerizates may be adapted for particular purposes by addition of softening agents, fulling agents, waxes or the like.

In particular, semi-stiff collars, cuffs, false fronts and other laundry articles can be produced by using the fabric impregnated with the said mixed polymerizates as an intermediate layer. The external layers of the article, for instance of a collar, may be of any white or colored fabric, for instance a natural and/or artificial spun fiber, with or without impregnation; for example, a laundry collar in conformity with the invention may be constructed as follows:

The intermediate layer consisting of a fabric woven from a small number of threads is impregnated with an emulsion of a mixed polymerizate from acrylic acid nitrile and vinyl isobutylether or from acrylic acid nitrile and acrylic acid methyl ester in known manner; on both sides of this layer there is united with the fabric a non-impregnated linen fabric by means of pressure and heat. The union is insoluble and completely firm, since it is produced by a process of melting the mixed polymerizate. The linen character of the two exposed surfaces remains unchanged. This half-stiff collar is capable of being washed. In this operation it does not require starching but only ironing to make it usable. By the application of an aqueous emulsion it is achieved in a simple manner that the natural porosity of the fabric is preserved and that without special processes a stiffening intermediate layer permeable to air and moisture is obtained. The impregnation may be carried out according to a dipping process or by means of brushes. The good union of the intermediate layer impregnated with our mixed polymerizates with the fabric layers of a collar which is lasting and fast to boiling due to the application of warmth and pressure which latter need not be greater than the pressure exerted by the pressing iron allows of carrying out the impregnation in such a manner that surfaces of the fabric of the same or different sizes and at regular or irregular distances from each other are impregnated, so that the total impregnated surface has a chequered texture. By using as the collar portion and/or neck portion an impregnated fabric there is obtained a lastingly washable collar. The fabric which is used as the neck portion and/or collar portion may be impregnated either with the same or with a different mixed polymerizate of the vinyl group as that used for impregnating the whole. So also it is possible to obtain a lastingly washable collar which is permeable to air and moisture by impregnating the external fabric as described above. A lastingly washable collar is obtained which is particularly comfortable in use by making the collar portion of impregnated fabric and using for the neck portion pure linen. These two parts are combined with the impregnated stiffening intermediate layer by use of pressure and heat to produce fusion. A similar construction is applicable in the same manner for cuffs and false fronts.

It has also been found that very durable stiffening of a laundry article (for instance collars, cuffs, false fronts or the like) may be obtained by using for the production of the intermediate layer a mixed fabric made by weaving impregnated threads with non-impregnated threads. For the impregnation the aforesaid mixed polymerizates are again advantageous; there may be produced an ordinary article having good permeability to air and moisture, since it is necessary in the new kind of union of the parts by fusion of the polymeride to use only a few of the impregnated threads per sq. cm. of mixed fabric as this suffices to produce very permanent and effective stiffening. Such stiffening insertions made from fabrics impregnated with the said mixed polymerizates are suitable also in such collars and cuffs permanently connected with the shirt. It is further possible by use of a suitable thickness of the impregnating layer of the intermediate piece to combine with union by pressure and heat of this intermediate layer with the external part of a collar or a cuff an impregnation of the external part without destroying the woven structure of the layer, and with retention of the capacity for being washed. This is of particular advantage for the stiffening of the collar and cuffs permanently connected with the shirt. Such laundry articles provided with intermediate layers need not be starched. They are fast to washing and ironing. In their resistance to alkali they differ advantageously from the hitherto usually impregnated laundry articles. A yellowing after several washings in consequence of insufficient removal of the alkali does not occur. In consequence of the intimate union of the impregnating agent with the fabric produced by the melting process removal of the impregnation or the stiffening intermediate layer need not be feared even after very long use and frequent washing; since, in the production of such laundry articles no volatile solvents are used, changes of shape and dimensions and a bleeding of dyestuffs are excluded.

What I claim is:

1. A process of producing semi-stiff laundry articles, which comprises impregnating a fabric with an aqueous emulsion of a mixed polymerizate of a vinyl ether with a compound selected from the group consisting of nitriles and esters of unsaturated aliphatic carboxylic acids, and uniting the coherent film with further layers of fabric at an elevated temperature and at a pressure equal to that exercised by a pressing iron.

2. A process as defined in claim 1 wherein the unsaturated aliphatic carboxylic acid is maleic acid.

3. A process as defined in claim 1 wherein the unsaturated aliphatic carboxylic acid is acrylic acid.

4. A process as defined in claim 1 wherein the unsaturated aliphatic carboxylic acid is methacrylic acid.

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