Feb. 17, 1959 E. A. BRODEUR, JR 2,873,450

WORK GLOVE

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Fig. 1

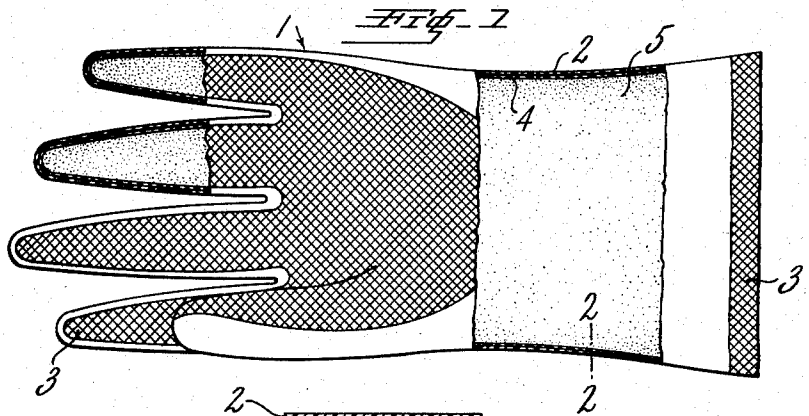


Fig. 2

DIP FORM HAVING A NON-SKID DESIGN IN NEGATIVE ON ITS SURFACE INTO VINYL PLASTISOL

↓

REMOVE FORM AND FUSE PLASTISOL BY HEATING

↓

DIP HOT FORM INTO WATER BASED LATEX OF POLYVINYL CHLORIDE, DIOCTYL PHTHALATE, BUNA N LATEX AND GROUND COTTON FLOCK

↓

REMOVE FORM IMMEDIATELY

↓

IMMEDIATELY SPRAY FORM WITH RAYON FLOCK

↓

DRY TO REMOVE RESIDUAL WATER

↓

HEAT FORM AND GLOVE THEREON TO FUSE VINYL RESIN, DIOCTYL PHTHALATE, AND BUNA N RUBBER IN TRANSITION LAYER

↓

STRIP OFF GLOVE FROM FORM

Fig. 3

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WORK GLOVE

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4 Claims. (Cl. 2—167)

This invention relates to the manufacture of gloves, and more particularly to the manufacture of gloves having an inner lining of flock and an outer surface which has a non-slip design to provide positive gripping qualities.

Prior to my invention lined work gloves or household gloves were produced by dipping or spraying a coating over a sewn textile fabric shell. This combination resulted in a reinforced film with a fabric interior. The fabric interior provided ease of donning and doffing and good interior feel. Further, such fabric interior tended to reduce perspiration by permitting the skin of the hand to breathe and absorbing any perspiration that developed. In addition, the fabric insert provided a feeling of bulk without too much sacrifice in flexibility. Finally, the fabric reinforced the film against tearing and snagging. The outside elastomeric or plastic film provided waterproofing and added wear to the fabric insert.

The fabric insert is costly, however. Also, the presence of the insert necessarily includes bulky and troublesome seams. Finally, the surface, as compared to the surface of unsupported films, is rather unattractive.

It is an object of the present invention to provide a glove to do all that a lined glove will do, and, in addition, to provide certain features not possible in lined gloves.

It is a further object of this invention to provide a glove that has positive gripping qualities, added wear, similar to a tire tread, and excellent tear and snag resistance.

Another object of this invention is to obtain the advantages of reversed dipped type products or slush molded type products for the glove, i. e.:

(1) A high gloss mirror type finish or any simulated fabric or leather type finish.

(2) Complete absence of troublesome seams.

(3) Gripping surface in a variety of attractive designs.

(4) Superimposed added gauge for added wear in areas where it is needed, and not in areas where it is not needed.

Additional advantages of this invention will be hereinafter disclosed.

The above objects are obtained by producing a glove composed of a film, such as vinyl, lined with a combination foam and flock and provided on the outside with a design serving as a combination reinforcement and gripping surface.

The inside flock provides ease of donning and doffing and also lifts the film off the skin to permit it to breathe. When perspiration does develop, the flock absorbs the initial wetness. After a certain level has been reached, subsequent moisture is absorbed by the cotton dispersed in the foam layer. The foam acts as a binder for the inside flock, contributes softness and bulk, and adds flexibility to the product.

The outside skin is composed of a formulation designed to provide the optimum tear properties possible for the film, without sacrificing flexibility and other desirable properties. To augment this tear feature, the working surface area of the dipping form used to make the glove has interconnected narrow channels. These interconnected channels are spaced so that the width between them is at least twice as great as the width of the channel. By a proper combination of spacing, depth and width of the interconnected channels, a lace work of material is superimposed over the working area of the glove. The resulting plus-gauge achieves a three fold purpose:

(1) Positive gripping qualities.

(2) Added wear similar to a tire tread.

(3) Excellent tear and snag resistance.

This invention and its objects are more clearly described by reference to the accompanying drawing, in which—

Fig. 1 is a view of a glove made in accordance with this invention; and

Fig. 2 is a cross-section of a portion of the glove.

Fig. 3 is a recitation of the steps followed in making the glove.

Parts are broken away to expose the flock lining on the inside of the glove. An outline of a typical process for the manufacture of the glove is inserted below the glove.

Referring to Figs. 1 and 2, the glove **1** comprises a continuous vinyl plastisol outer layer **2** having non-skid, non-slip gripping areas **3**. The outer vinyl layer **2** is lined with a layer of a mixture of flock and rubber-resin blend **4**, having an exposed coating of floc **5** thereover.

A specific example showing the manner in which I make my flock-lined fused plastisol gloves will now be given.

A non-porous, heat resistant form having a non-skid design in negative on its surface, this form typically being made from porcelain or other highly glazed ceramic material or from polished aluminum, is dipped into a special vinyl plastisol formulation of which the following is a typical example:

Ingredient:	Parts by weight
Polyvinyl chloride powder	100
Dioctyl phthalate (plasticizer)	35
Didecyl adipate (plasticizer)	35
Stabilizer	2
Pigment	2
Total	174

The above plastisol formulation is specially formulated for (1) high tear-resistance comparable with a snag resistance of a fabric-lined plastic glove and (2) flat curing characteristics so that over-fusion at the less protected or more exposed area of the glove does not occur before complete fusion occurs at the more protected areas, e. g. those between the fingers.

The ratio of plasticizer to polyvinyl chloride may be varied within the range 60–90 parts of plasticizer per 100 parts of resin. Up to 30 parts of this plasticizer may be composed of secondary plasticizers such as solvaloid C, a petroleum derivatives of an aromatic oil type. Viscosity depressants such as glycol oleates and laurates may be incorporated up to 5 parts per 100 parts of resin. For the stabilizer, any of the accepted stabilizer systems are permitted, such as dibasic lead phosphates, organotin systems, and barium cadmium systems. As to pigments, any coloring techniques or pastes common to the trade are operable. We are not limited in our selection of pigments.

The dipped form is removed from the plastisol and fusion of the plastisol layer on the form is effected by heating for twenty minutes at 450° F.

The above fusion cycle of 20 minutes at 450° F. may vary, depending upon the particular oven and molds

being used. Thus, there will be a variation with any changes in either the mold or oven, or minor variations of the plastisol. It is essential that the fusion be uniform and complete. Variations in the above three factors will result in the following ranges:

Time	minutes	10 to 25
Temperature	° F.	350 to 450

The form and fused plastisol layer, while still hot from the fusion step, are dipped into a water-based latex made by blending (1) a latex of polyvinyl chloride or similar thermoplastic resin, (2) an emulsion of dioctyl phthalate in water, (3) a butadiene-acrylonitrile rubbery copolymer latex, and (4) a small amount of ground cotton flock. A typical formulation for this material which forms the "transition layer" of the finished glove is as follows:

Ingredient:	Parts by weight
"Geon 552" latex (50% latex of polyvinyl chloride)	100
Aqueous emulsion of dioctyl phthalate (50% water, 50% dioctyl phthalate)	60
"Nitrex 2615" (50% butadiene-acrylonitrile rubbery copolymer latex)	100
Ground cotton flock (16 mesh)	10

The "16 mesh" designation referred to in the above example designates any size that will pass through a 16 mesh screen or finer. Larger strands of flock, while operable, are not as suitable. If used, a definite detraction from the interior feel of the product will result.

Any number of materials commonly used for plasticizing the polyvinyl chloride latex may be used, such as: dioctyl phthalate, didecyl adipate, acrylonitrile, glycerin, di-iso-octyl-phthalate, etc.

I have found that rayon flock gives the best combination of pile and softness. Nylons and dynels may be used, but are not as satisfactory. Cottons may be used only in a limited quantity and only when mixed with other fabric flocks which are non-absorbent in nature. The quantity of cotton should not exceed 30% of the total flock weight.

Other thermoplastic resins may be substituted, in whole or in part, for the polyvinyl chloride in the latex, the only requirement being that such thermoplastic resins be compatible with polyvinyl chloride so that such thermoplastic resins will adhere to the outer layer of polyvinyl chloride.

The form is immediately removed from the last mentioned dipping medium. This immediate removal of the hot form avoids any danger of cracking of the porcelain or ceramic. If the form were left in the cold dipping medium for any length of time, it would crack and be ruined. The residual heat in the hot form and plastisol coating thereon dries out most of the water immediately and forms a porous structure.

The resulting surface, which is still somewhat wet from the latex dip coat, is sprayed with rayon flock of the kind commonly used for flocking rubber gloves. The temperature of the material of the glove at this point is about 275–280° F. By spraying the flock before the latex is completely dry from the residual heat left in the form, good binding of the flock to the latex and through the solids of the latex to be underlined fused plastisol is obtained.

The form and layers thereon are dried for approximately one-half hour at 160–220° F. in order to remove all of the water remaining.

The time and temperatures given above for setting the flock binders may be varied to suit the process. Variation should be kept within 20% over or below the given figures. Thus, if the temperature is increased, the time must be correspondingly decreased; similarly, a decrease in temperature will require an increase in time.

The form and the glove thereon are heated for 20 minutes at 350° F. This fuses the thermoplastic resin, dioctyl phthalate, and Buna N rubber in the transition layer. The rayon flock is readily capable of withstanding the high temperature used in this step.

The resulting glove is stripped from the form, it being turned inside out in the stripping operation.

The glove is highly advantageous in that there are no troublesome seams. The inside flock provides ease of donning and doffing and also helps absorb perspiration. The tread gauge provides excellent tear and snag resistance, as well as positive gripping qualities. No lubrication is necessary to effect the stripping, as the flock supplies all of the lubrication needed.

While a preferred method of practicing the invention has been described herein, it will be understood that changes in the details thereof may be made without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A glove, comprising an outer vinyl film comprising polyvinyl chloride, dioctyl phthalate and didecyl adipate, an inner transition layer comprising a thermoplastic resin compatible with polyvinyl chloride, rubbery butadiene-acrylonitrile copolymer, and flock, and an inner lining of flock, the outer surface of said glove having certain portions which have a non-skid design thereon.

2. A glove, comprising an outer vinyl film consisting essentially of polyvinyl chloride, dioctyl phthalate, didecyl adipate, stabilizer, and pigment, an inner transition layer comprising a thermoplastic resin compatible with polyvinyl chloride, dioctyl phthalate, rubbery butadiene-acrylonitrile copolymer, and flock, and an inner lining of flock, said glove having an outer surface, certain portions of which have a superimposed non-skid design thereon.

3. A glove comprising an outer vinyl film of polyvinyl chloride, dioctyl phthalate and didecyl adipate, an inner transition layer comprising a thermoplastic resin compatible with polyvinyl chloride, rubbery butadiene-acrylonitrile copolymer, and flock, and an inner lining of flock, the outer surface of said glove having certain portions of which have a non-skid design thereon, the combination of the outer vinyl film, moisture-absorbent transition layer, and inner lining of flock providing a seamless glove which has great resistance to tear, has good interior feel and has the ability to absorb perspiration.

4. A glove comprising an outer vinyl film of polyvinyl chloride, an inner transition layer comprising flock and a rubber-resin blend, the resin in said rubber-resin blend being selected from the group consisting of polyvinyl chloride and thermoplastic resins compatible with polyvinyl chloride, and an inner lining of flock, the outer surface of said glove having certain portions which have a non-skid design thereon, the combination of the outer vinyl film of polyvinyl chloride, non-skid design, moisture-absorbent transition layer, and inner lining of flock providing a seamless glove which has great resistance to tear, good interior feel, and the ability to absorb perspiration.

References Cited in the file of this patent

UNITED STATES PATENTS

1,346,683	Reynolds	July 13, 1920
2,115,561	Ogilby	Apr. 26, 1938
2,434,035	De Laney et al.	Jan. 6, 1948
2,446,921	Grant	Aug. 10, 1948
2,451,758	Malm	Oct. 19, 1948

FOREIGN PATENTS

270,134	Great Britain	May 5, 1937
488,809	Great Britain	July 14, 1938
522,683	Great Britain	June 25, 1940