

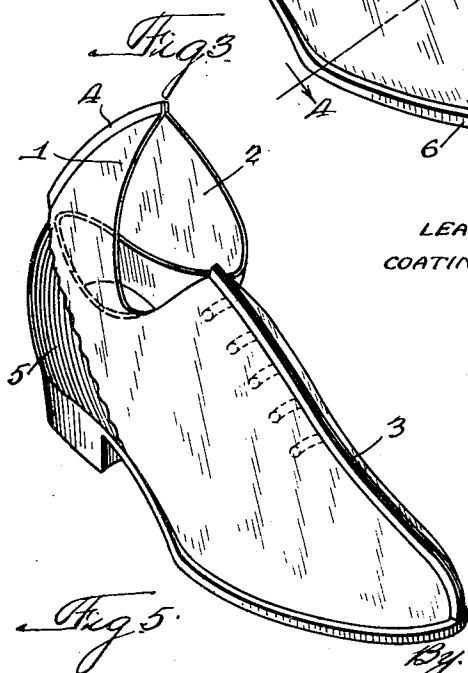
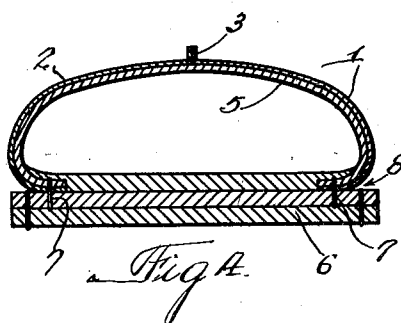
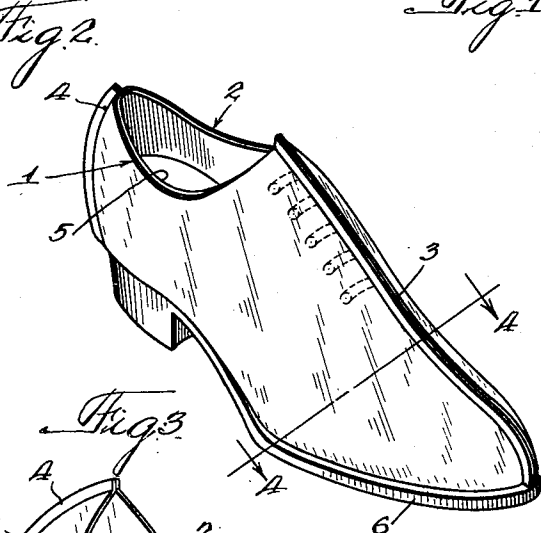
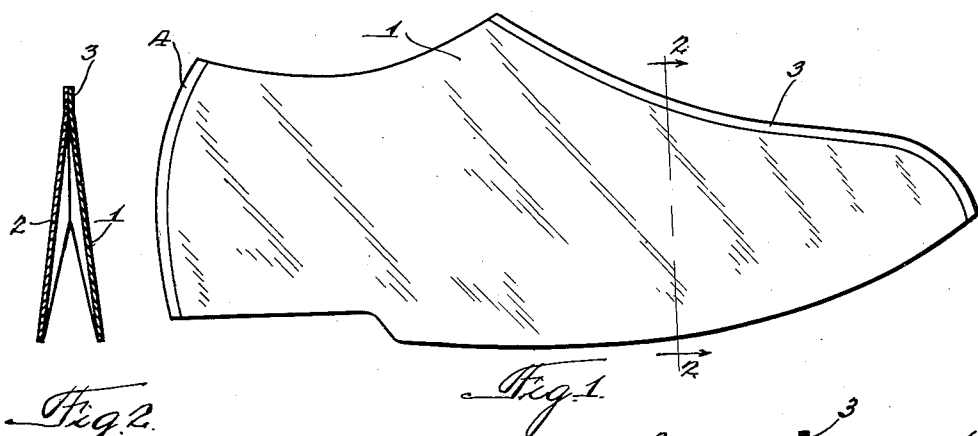
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K. VASEN

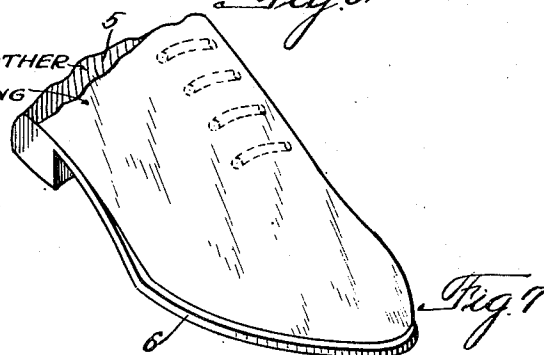
2,215,340

PROTECTIVE COVERING

Filed April 22, 1939



LEATHER
COATING



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PROTECTIVE COVERING

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3 Claims. (Cl. 12—142)

This invention relates to protective coverings and more especially to removable means adapted to cover and protect the display surfaces of leather and the like, particularly shoe parts such as the uppers, during the various processes and operations necessary in the manufacture of shoes.

It is an object of the present invention to provide a covering of substantially indestructible material which possesses good tensile strength and is flexible, moisture proof, oil and grease proof, and which will effectively prevent the display surfaces of shoes from being soiled and stained during the great number of operations required in the manufacture thereof.

An important feature of the invention is the provision of a removable protective covering which may not only be applied to shoe parts, but may also be applied to the display surfaces of leather before the leather is shipped from the tanneries to the manufacturer of shoes, belts, hand bags, and the like. The coverings do not interfere with cutting, forming, or any manufacturing processes and, therefore, the display surfaces may be fully protected against discoloration or other injury from the time these surfaces are finished until all manufacturing processes are completed and the article is ready for the market.

A further object is the provision of a covering of the character described in which the covering material is capable of being regenerated for repeated use and has the desirable characteristics of transparency or translucency, surface dryness, good tensile strength and resistance to tearing or rupture, and a high degree of flexibility and elasticity.

A further important object of the present invention is to provide a cheap and inexpensive shoe covering which may easily be manufactured and applied to shoes for the protection thereof, particularly during the processes of manufacture, and in which the coverings may easily be removed after the shoes have been completed and wherein the covering material, after removal, may be salvaged and the material repeatedly used in the production of new coverings.

A number of attempts have been made to use various products for leather and shoe coverings. However, all such coverings have been unsatisfactory in certain respects and for various reasons. For instance, a paper covering has been suggested, and, although paper is inexpensive, it is inadequate and unsatisfactory as it tears easily and is permeable to oil and moisture. Also, paper coverings cannot be used in quantity production of shoes as they will not stand the operations necessary in connection with the high speed machines used in quantity production oper-

ations. The paper will tear or fracture usually at the base of the shoe sole.

Rubber covered textiles have also been suggested for shoe coverings. However, such material is not oil and grease resistant, and the oil from the machines frequently causes the rubber coating to swell and separate from the textile base, producing a sticky mass which stains the shoes in one way or another. Furthermore, such coverings do not possess great tensile strength and are frequently torn in the covering or machining operations; also, the porosity of the rubber coating is a serious objection.

A further disadvantage is the comparatively high cost of the rubber textile base, and this is an important item as it is, of course, obvious that such covering material, after being removed from the shoe in the final stages of manufacture, must be discarded. Such coverings are also expensive to manufacture, as it is usually necessary to cut out a base piece and an additional piece to cover the instep of the lasted shoe. This instep piece is then sewed onto the base covering member and an additional sewing operation is performed on the heel part of the cover. The finished rubber covered textile covering is then placed over the shoe and considerable tension must be applied to get a smooth coating. The cover is subsequently tacked onto the last and, following this, is lasted into the upper. After all manufacturing operations are performed, the covering is removed from the shoe by carefully cutting the covering between the sole and the upper. This cutting is a very slow procedure, since fast cutting may cause the separation of the stitched sole from the upper or otherwise injure the shoe.

Fiber shoe coverings also have been proposed which are adapted to be sewed in the front and at the back and are subsequently held down to the last by means of masking tape. Although fiber coverings may be made substantially grease proof, they have a number of other disadvantages, including high cost and the fact that it is necessary to discard the material after once used.

Vulcanized molded coverings made by the latex dipping method have also been proposed. However, the high cost of such coverings, the permeability to oil and grease, and the fact that many different sizes must be molded and that the sole portion will have to be cut out in each covering make this type of covering highly impractical. Also, such coverings cannot be salvaged for future use.

Various spray applications have been proposed, but, in so far as known, have never been utilized beyond small scale production. Concentrated vulcanized or unvulcanized compounds have been sprayed on shoes with or without the aid of a coagulant. In the use of such sprays, it is neces-

sary to build up a sufficiently heavy latex coating to withstand the usual great amount of friction and abuse during its use. Latex coverings, by reason of a substantially 40% water content, dry very slowly and, by reason of the ammonia content, have a tendency to discolor the pigment of the leather and tend to partially disintegrate the albumen-shellac or casein binder in the leather finish. Such products also have the inherent tackiness of dried out latex films. This tackiness causes continuous difficulty unless a coat of powder is applied before each machine operation. The powder application consumes a large amount of time and is impractical in modern quantity production methods. If the powder is omitted, the tacky coating will cause machines to drag over the surface, with the result that the latex coating will be fractured sooner or later. At the same time the speed of operation is reduced very materially. Also, rubber in any form is not oil and grease proof and, therefore, any oil that may be deposited on the covering will cause the covering material to swell and lose its strength entirely, making it ineffective as a medium of protection.

The material of the above-noted prior art coverings cannot be re-used and they are usually discarded as waste. All of these prior art coverings are, therefore, very expensive in addition to many other undesirable features inherently connected therewith. Natural products cannot be controlled with respect to quality and price. The applicant's covering is of synthetic origin and combines the features of complete oil and grease resistance, great tensile strength, tear and rupture resistance, transparency or translucency, and great economy. The material is a vinyl resinoid plastic with high resistance to deformation or elongation by stretching when in the film form, as contemplated in this invention. Materials incorporating these qualities were finally discovered and belong in the class of polyvinyl plastics. This class of materials, capable of providing flexible re-usable shoe coverings having the desirable characteristics described herein, may be classified in at least four sub-groups as follows:

1. Polymerized vinyl chloride.
2. Copolymerized vinyl chloride and vinyl acetate.
3. Polymerized vinyl aldehyde reaction products.
4. Polymerized vinyl alcohol.

These base products are compounded to form tough pliable films which are thermoplastic and capable of being remilled or redissolved a number of times without loss of their basic physical qualities. They do not possess a true melting point, but merely soften as heat is applied. They will not support combustion and possess extreme chemical inertness, being unaffected by alkalis, oxidizing agents, and most acids. Also, water, alcohol, and petroleum fractions have no action on them. They are neutral in the sense that they have no acid number. They possess high internal plasticity, which permits the use of a large number of different types of fillers and pigments. A small amount, which may be substantially 1% to 4%, of stabilizers, such as lead stearate, lead oleate, hydrated lime, or somewhat larger portions of lead pigments, may be used to prevent darkening on prolonged exposure to heat or direct sunlight. These stabilizers may be added to the powdered resin together with all the other compounding ingredients before fluxing in the mill, internal mixer, or in a dissolution churn.

It is preferable to add small amounts of wax of a high melting point to facilitate the removal of the calendered sheet.

Flexibility of the finished product is an important factor in the applicant's invention, and, therefore, plasticizers such as dibutyl phthalate, tricresyl phosphate, ethyl-methyl- or butyl ortho benzoyl benzoate, chlorinated naphthalene, methyl phthalyl ethyl glycolate, dibutyl sebacate, dibutoxy ethyl phthalate, diethoxy ethyl phthalate, dimethoxy ethyl phthalate, butoxy ethyl stearate, methoxy ethyl oleate, or phenol-indene-coumarone plasticizing oil may be used. The amount of plasticizer is dependent upon the degree of flexibility and toughness desired and may be varied in accordance with requirements. Fillers may be added to the base plastics for the purpose of extending and cheapening the same. Fillers such as the following may be used: asbestos, mica, talc, clay, magnesium carbonate, whiting, barium sulfate, cotton or rayon linters, wood-flour, mineral fibers, alpha cellulose fibers, etc. Other fillers of light or medium specific gravity may be used and are considered to fall within the scope of this invention.

The resins of the first and second groups of synthetic products previously mentioned are particularly suitable for the shoe coverings of the present invention. Copolymers of the second group having a vinyl chloride content of between 65% and 87% and a vinyl acetate content of between 35% and 13% provide satisfactory compounding bases. The molecular weight of these bases may vary from 10,000 to 18,000.

Tear resistance is a function of the plasticizer and other ingredients in a given compound. Therefore, a highly plasticized compound is used which provides a high degree of tear resistance. In practicing the present invention, the following formulas may be employed. However, it is within the scope of the invention to change the proportion as well as the types of plasticizers, fillers, and stabilizers in relation to the base plastic material. The following formulas are satisfactory:

Formula #1

	Parts by weight
Highly polymerized vinyl chloride.....	100
Tricresyl phosphate.....	30-45
Rayon linters.....	5-10
Calcium hydroxide.....	2-3

Formula #2

	Parts by weight
Copolymerized vinyl acetate-chloride (13% acetate, 87% chloride; mol. wght. 12-18,000).....	100
Methyl phthalyl ethyl glycolate.....	35-50
Carnauba wax refined.....	2-4
Calcium stearate.....	2-5
Hydrated lime.....	1-2

Formula #3

	Parts by weight
Polymerized vinyl aldehyde reaction products.....	100
Butoxy ethyl stearate.....	10-20
Carnauba wax.....	2-3
Lead stearate.....	2-4
Magnesium carbonate.....	5-10

Formula #4

	Parts by weight
Polymerized vinyl alcohol.....	100
Phenol-indene-coumarone oil.....	15-25
Montan wax.....	2-3
Lead oleate.....	1-2
Alpha cellulose fibers.....	5-10

The base materials are fabricated into thin sheets having all the desirable characteristics previously described and these thin sheets may be formed into suitable shoe coverings or a suitable film-forming dispersion or emulsion, preferably applied by a spray, may be used if desired.

Further objects will be apparent from the specification and the appended claims.

In the drawing:

Fig. 1 is a side elevation of one of the completed shoe coverings adapted to be snugly attached to a shoe upper.

Fig. 2 is a transverse sectional view through the embodiment shown in Fig. 1 and taken on a line substantially corresponding to line 2—2 thereof.

Fig. 3 is a perspective view of a finished shoe to which the covering has previously been applied.

Fig. 4 is a transverse sectional view through the embodiment shown in Fig. 3 and taken on a line substantially corresponding to line 4—4 of Fig. 3.

Fig. 5 illustrates a method of tearing the covering from a finished shoe.

Fig. 6 is a fragmentary detail section similar to that illustrated in Fig. 4 after the cover has been torn from the shoe.

Fig. 7 illustrates a covering applied by the spray method.

Referring to the drawing in detail, the embodiment illustrated in Figs. 1 to 6 comprises a shoe covering formed of two flexible sheets or films 1 and 2 secured together along the upper front edge as shown at 3 and similarly secured together at the heel end as shown at 4. These edge portions may be secured together merely by the application of heat and pressure thereto. The sheets may be interchangeable as the edge contours are preferably identical and, as they are merely thin films of vinyl resinoid plastic, the characteristics of all surfaces are the same. The finished structure provides a covering element or envelope which may substantially entirely enclose the shoe upper and conform thereto, as shown in Fig. 3, and may be made to fit the upper snugly. The finished shoe comprises an upper 5 and a sole 6 (Fig. 4) which are secured together with the covering in place by means of stitching 7.

The covering sheets or films 1 and 2 provide an envelope substantially coextensive with the surface of the upper. Therefore, when the upper and the sole are stitched together, the edge of the cover is stitched in between the upper and the sole as shown at 8. This construction provides a covering which entirely encloses the upper and may be transparent or translucent, is tough and flexible, and adheres snugly to the surface of the upper, and conforms with the contour thereof. The covering is moisture proof, oil and grease proof, and solvent resistant, and completely protects the upper against discoloration or injury from any cause.

After the shoe has been completely finished, the covering material may be torn therefrom substantially in the manner illustrated in Fig. 5. The material of the cover will tear along the perforations formed by the stitches 7 and a small strip 9 of the covering material will remain snugly secured between the sole and the upper, substantially as shown in Fig. 6, to thereby provide a water proof joint therebetween. The covers, after removal, are salvaged and, after suitable processing, are re-formed into new

covers, which provides a very great saving in the cost of material.

The base materials are fabricated into thin sheets in a comparatively simple manner. As all of the ingredients may be either in powdered or a liquid form, the fillers, plasticizers, and stabilizers with the base plastics are combined and a blending period of approximately twenty-four hours is allowed, during which time the plasticizers have an opportunity to partially or totally combine with the base plastics. After this period, the entire mass is transferred to a heated rubber mill and fluxed thoroughly until all resin particles have been homogenized and blended with the non-film-forming ingredients. The same effect may be obtained in an internal double arm heavy duty mixer externally heated.

After suitable mastication, the hot plastic mass, preferably kept at temperatures of about 200° F. to 225° F., is then transferred to a rubber calender which is heated at about the same temperature. The calendered sheet, preferably about .005 to .010 inch thick, is then dusted with suitable metal stearate powders, which will not interfere with the final heat sealing process of the shoe covers whereby the edges are secured together as shown at 3 and 4 in Fig. 1. The dusting facilitates the handling of the sheets and, although it is desirable, it is not essential.

An alternate method may be used which may be somewhat cheaper in its operation. In this alternate method the base plastic is dissolved in toluol which has been heated to a temperature of about 180° F. This dissolves about 80% of the vinyl chloride acetate copolymer, having a molecular weight of approximately 12,000 in 20% of toluol. Compounding ingredients may be added before solution of the plastic is accomplished preferably in a dispersed form. The homogeneous dispersion of the base plastic, plasticizer, fillers, and toluol is then applied by means of an adjustable doctor blade onto an endless chromium plated conveyor belt. This conveyor belt passes through a tunnel heated to 180° F. and finally to 320° F. to permit the escape of the 20% toluol. The solvent is subsequently reclaimed and re-used. As the solvent is leaving the deposited mass, a continuous film is being formed and, after approximately 19% of the solvent has evaporated, the film is dusted and ready for use.

When the shoe covers are returned after use in the factory, they are simply redissolved in the proper amount of solvent, again spread on the continuous conveyor, the toluol evaporated, and thereupon the sheet is formed. In this manner the scrap covers may be used as many as ten to fifteen times or more, depending upon the waste occurring in the shoe factory. The sheets or films, after being formed, are cut out with suitable dies in accordance with a desired shoe covering pattern. The open ends of the cut out sheets are then fused together at comparatively high temperature by means of the simultaneous application of heat and pressure. This method of fusing is based upon the thermoplastic qualities of the composition and affords a distinct saving in labor as compared to the sewing method now employed in connection with other shoe covering materials. The covering thus produced is shaped accurately to the lines of the last and is then ready for use.

After the shoe has been put through all manufacturing operations, the covering is easily removed by pulling over the shoe somewhat as

shown in Fig. 5. When the covering is torn loose along the stitching perforation, there is left usually approximately a $\frac{1}{8}$ inch strip of the covering in the lasted shoe, which provides a water proof gasket which prevents water from entering through this region.

The previously described methods provide shoe coverings made solely from resinoid plastic sheeting or film. The invention also contemplates a dispersion or emulsion of the base plastics and plasticizers with or without fillers. Such a dispersion or emulsion may be sprayed or otherwise applied to form a coating on any finished display surface; for instance, it may be applied to the finished leather at the tannery before shipment to the manufacturer, or it may be applied at any time when such protection is desired. The material is then dried to remove the solvents and thereby form a flexible coating or film over a surface having the characteristics of the sheet covering previously described. This reduces the labor and power costs and eliminates the cutting and forming of the sheet covers. The heat bonding and assembling cost of the covers is also eliminated. The following is a suitable formula for a plastic dispersion for spraying:

Parts by weight		
	Copolymerized vinyl chloride-acetate	
	12-18,000 mol. wght.....	25-35
30	Dibutyl phthalate	5-8
	Toluol	70-57

This dispersion may be applied hot from a spray gun, followed by a forced drying for several minutes at 225° F.

An emulsion for the same purpose may be prepared as follows: 80% of the above dispersion, which has been heated, is emulsified with 20% of water with the aid of an emulsifying agent such as triethanolamine, representing the stationary type, and morpholine, representing the volatile type. The emulsion may be applied in the same manner as the dispersion. After the coverings are removed from the finished ar-

ticles, they may again be dispersed or emulsified, as the case may be. The only loss in this method is the loss of toluol. This loss, however, is compensated for in the time and power savings as compared to the sheeting method.

Modifications may be made without departing from the spirit of the invention, and it is therefore desired that the invention be limited only by the prior art and the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A method of providing a temporary protective coating for the display surface of leather and leather articles which comprises covering the leather and leather articles with a composition containing a highly polymerized regeneratable vinyl resin having a molecular weight between 10,000 and 18,000 and a plasticizer therefor, which composition forms on the surface of the leather and leather articles a thin tough film which adheres lightly and is easily removed.

2. A method of providing a temporary protective coating for the display surface of leather and leather articles which comprises coating the leather and leather articles with an emulsion containing a highly polymerized regeneratable vinyl resin having a molecular weight between 10,000 and 18,000 and a plasticizer therefor, which emulsion forms a coating on the surface of the leather and leather articles in the form of a thin tough film which adheres lightly and is easily removed.

3. A fabricated leather article provided on a display surface thereof with a temporary protective covering of a composition containing a polymerized regeneratable vinyl resin having a molecular weight of between 10,000 and 18,000 and a plasticizer therefor, which composition provides on the surface of the article a thin tough film which adheres lightly and is easily removable.

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