

UNITED STATES PATENT OFFICE

2,204,520

LEATHER FINISHING

Henry B. Walker, Elkins Park, and Paul W. McWherter, Philadelphia, Pa., assignors to Röhm & Haas Company, Philadelphia, Pa.

No Drawing. Application January 6, 1937,
Serial No. 119,262

11 Claims. (Cl. 91-68)

This invention relates to coating compositions for leather and more specifically to a coating composition for leather comprising a pigmented emulsion of a polymerized acrylic acid ester or derivative or homologue thereof characterized by imparting to the finished leather properties and combinations of properties which have been hitherto impossible of attainment.

The coating compositions used on leather prior to this invention fall into two general classifications, the water soluble finishes, known in the industry as water finishes, pigment finishes, water dopes or seasons and the water insoluble finishes which are commonly applied in the form of solutions of cellulose esters plus plasticizing and softening agents in an organic solvent or mixture of solvents, and which are known as lacquer finishes or simply as dopes. While this description applies particularly to finishes for shoe upper leather it also applies to a greater or less degree to practically all other types of leather.

The principal differences between the two types of finish described in the preceding paragraph are that the water finishes produce a very desirable break, feel and appearance on the leather finished with them, and are relatively cheap, whereas the lacquer finishes tend to produce leather with a less desirable break, feel and appearance and are more costly. The water finishes, however, in the present state of the art, cannot be made entirely water insoluble after application, with the result that when the leather finished with them becomes wet, the finish dissolves in the water, at least partly, and is removed from the leather easily. As the finish in the great majority of cases contains coloring matter, this is, of course, removed also, with the result that in addition to the removal or marring of the finish itself, clothing and other articles are frequently damaged by contact with the moist leather.

In order to make such a finish resistant to water a top coat of lacquer is very often applied over it. However, the adhesion of the lacquer coat to the pigment finish is seldom good and consequently it soon comes off when the leather is subjected to any flexing, again exposing the water soluble pigment finish. Furthermore, even in occasional cases where adequate adhesion of the lacquer coat is obtained, the lacquer coat must be relatively quite thin if the desirable characteristics of the finished leather are to be retained. Consequently the lacquer coat soon wears through when the leather is put into use

in shoes, handbags or the like, and the water soluble undercoats are exposed.

It is possible in some cases to make a pigment finish relatively resistant to water by treating it with or adding to it formaldehyde which insolubilizes the protein binding materials. However, the finish is at the same time made so hard and brittle that the flexibility, break, adhesion, etc. are no longer satisfactory.

Lacquer finishes, on the other hand, produce leather which is very fast to water, and are, therefore, free from the drawback of the liability to damage to clothing, etc. when moist.

The lacquer finishes, however, have certain drawbacks also. For example, in finishing full grain leather (that is, leather from which the outer surface layer or grain has not been removed by some operation such as buffing, splitting, or the like) in order to obtain satisfactory adhesion of the lacquer coat it is necessary to obtain a considerable penetration of the first or base lacquer coat into the grain of the leather. This has the undesirable effect of producing a hardening and stiffening of the surface or grain layer. This hardening produces the bad "break" which is one of the most undesirable characteristics of lacquer finished leather. Another drawback attendant on this is that it is very difficult to obtain a smooth flat grain surface on those types of leather where such a surface is desirable. For example, on shoe upper leather it is desirable for the sake of producing a smooth, lustrous surface, to flatten out the natural pattern of the grain. With the customary type of water finish, this is easily accomplished by a variety of methods such as glazing and plating, which are well known to those versed in the art of leather finishing, but with lacquer finishes, on account of the hardening action mentioned above, it becomes a matter of extreme difficulty, once the lacquer coat has been applied to the surface of the leather, to smooth out the grain pattern in a satisfactory manner.

Conversely in finishing highly absorbent and porous leather such as that which has had the outer grain surface or layer removed by snuffing, buffing, splitting or the like, lacquer finishes penetrate very readily and tend to impregnate the leather giving a heavy, stiff feel.

Another drawback of lacquers is that frequently a very high proportion of plasticizing and softening agents such as raw and bodied castor oil or rapeseed oil, synthetic resinous plasticizers, tricresyl phosphate, dibutyl phthalate and the like must be incorporated in the lacquer

finish in order to give it the necessary flexibility and/or adhesion, and/or film forming power required for these open, porous leathers. Since almost all leathers have a very high attractive or absorbent power for oils or compounds of an oily nature, there is a very strong tendency for the oils and plasticizing materials to be absorbed by the leather from the lacquer coat which consequently loses flexibility and extensibility and fails to give the wear or service that it should.

Furthermore, it has not been found generally practical to incorporate more than a small percentage of pigment in the bottom or base lacquer coats. This is entirely inadequate to give the required covering and coloring to the leather because more than a small percentage of pigment detracts too much from the flexibility and extensibility of the base lacquer coat. Consequently relatively heavily pigmented lacquer coats must be applied on top of the base coat and this further contributes to the heavy, artificial feel and appearance of the finished leather.

This invention has as an object the production of a coating composition for leather comprising a water dispersion of binding and coloring materials which when applied to the leather dries down to a film or coating which is no longer water soluble.

A further object of this invention is the production of a coating composition comprising a water dispersion of binding and coloring materials which when applied to the leather dries down to a coating which will adhere to so-called fullgrain leathers without requiring excessive penetration of the leather with consequent hardening which prevents or makes difficult the production of a smooth, lustrous surface by mechanical operations such as smooth plating as well as giving an undesirable "break" and feel to the leather.

A still further object of this invention is the production of a coating composition comprising a water dispersion of binding and coloring materials which when applied to leather gives a coating to which subsequent lacquer coats will adhere satisfactorily.

A still further object of this invention is the production of a coating composition comprising a water dispersion of binding and coloring materials which when applied to leather gives a coating of which the flexibility and extensibility are inherent characteristics of the binding medium and not imparted by mobile, readily absorbed plasticizers or softeners and which therefore, retains its flexibility and extensibility on aging.

A still further object of this invention is the production of a coating composition comprising a water dispersion of binding and coloring materials in which the proportion of pigment is sufficiently high that the first coat applied to the leather covers and colors the leather and at the same time has a high degree of flexibility and adhesion.

A still further object of this invention is the production of a coating composition comprising a water dispersion of binding and coloring materials which will have an unexpectedly great hiding and leveling effect on the irregularities and damaged spots present on snuffed and buffed leathers.

These objects are accomplished by the use of a coating composition comprising a water dispersion of a polymerized ester of acrylic acid or of a mixture of polymerized esters of acrylic acid or alpha homologues or functional derivatives

thereof as the binding or film forming medium and having dispersed therein a substantial amount of pigment or opaque coloring material together with such wetting and dispersing agents and protective colloids as are required to produce and maintain the dispersions and facilitate their application to the leather so as to produce the desired properties in the finished leather.

This coating is applied as the base or first coat to the leather and may or may not be followed by a lacquer coat or some other type of coating depending on the requirements for the particular type of leather being finished.

It has been discovered that on account of the high degree of flexibility and extensibility inherent in the polymerized acrylic acid esters together with their great cohesiveness and adhesiveness that an unexpectedly large amount of pigment may be incorporated in the composition so that an essentially permanently flexible and extensible coating with high covering and coloring power is obtained which is, when dry, no longer water soluble and to which subsequent lacquer coats will adhere satisfactorily.

The aforesaid coating compositions may be produced by dispersing a pigment in water by the aid of appropriate wetting and dispersing agents by grinding in a suitable mill such as a ball mill or colloid mill and then mixing this pigment dispersion with a water dispersion of a polymerized acrylic acid ester such as the methyl or ethyl ester or a mixture or interpolymers of two or more esters or an ester of α -methacrylic acid or a mixture or interpolymers of one or more esters of acrylic acid and one or more esters of α -methacrylic acid. Preferably, at least one of the esters used should be a lower alkyl ester of either acrylic or methacrylic acid; i. e. it should have less than five carbon atoms in the alcohol group.

The following specific examples of coating compositions comprising aqueous dispersions of polymerized esters of acrylic acid or α -methacrylic acid having dispersed therein a substantial amount of pigment which may be used in the present invention are given by way of illustration only and are not intended as limitations of the invention, the scope of which is defined by the appended claims.

	Parts
1. 20% aqueous dispersion of polymerized methyl acrylate	40
Titanium oxide	20
Sulfonated castor oil	10
Methyl cellulose—2% aqueous solution	30
2. Polymerized ethyl acrylate—30% aqueous dispersion	20
Lithol red toner	10
Sulfonated castor oil	5
Sodium oleate	1
Methyl cellulose—1% aqueous solution	64
3. Polymerized ethyl acrylate—20% aqueous dispersion	15
Polymerized methyl acrylate—20% aqueous dispersion	10
Red iron oxide	15
Sulfonated castor oil	10
Methyl cellulose—2% aqueous solution	50
4. Polymerized ethyl acrylate—20% aqueous dispersion	20
Polymerized ethyl α -methacrylate—20% aqueous dispersion	10
Ultramarine blue	20
Sulfonated castor oil	10
Methyl cellulose—1% aqueous solution	40

Other polymerized esters of acrylic and α -methacrylic acid may be substituted in part or for all of those shown in the foregoing examples such as the polymers of n-propyl acrylate, isopropyl acrylate, butyl acrylates and the corresponding esters of α -methacrylic acid including methyl α -methacrylate. Any two or more of these polymers may be mixed or any two or more of the monomers may be mixed and a joint polymer formed.

Other dispersing agents may be used in place of, or in addition to those shown in the foregoing examples, such as the sodium naphthalene sulfonates, the potassium or ammonium salts of oleic or stearic acid and the like or the triethanolamine oleate or stearate or other sulfonated oils such as sulfonated neatsfoot oil.

Various other protective colloids may be used in place of or in addition to the methyl cellulose such as casein, gum arabic, gum tragacanth, karaya gum, and the like.

It is essential not to use an excess of dispersing agents or protective colloids if the water resistance and other desirable properties of the coating are to be maintained.

Various other modifying and addition agents may be added in addition to those already mentioned in order to obtain the objects of this invention such as water soluble dyes, ammonia, aqueous alkaline dispersions of shellac, or aqueous wax dispersions.

Various other polymeric compounds may be used in addition to or as substitutes in part for the acrylates such as styrene or vinyl acetate.

These coating compositions may be applied to the leather in various ways well known to those versed in the art such as by spraying or applying with a brush or swab according to the type and condition of the leather being finished and the particular properties desired in the finished leather.

The leather is dried thoroughly after the above mentioned coating is applied and then one or more lacquer coats may be applied depending again on the type of leather being finished and the particular properties desired in the finished leather. However, due to the relatively high proportion of pigment present in the base coat it will be found that only light lacquer coats containing a minimum of pigment will be required to give the desired results.

After the first lacquer coat has been applied and allowed to dry the leather may then be subjected to those mechanical operations involving the application of heat and pressure, well known to those versed in the art, such as smooth plating, embossing or ironing which are required to give the desired appearance to the leather. If a smooth lustrous effect is desired it will be found that due to the peculiar thermoplastic properties and great adhesiveness of the binding material used in the base coat that an unusually and unexpectedly smooth surface is obtained by plating or ironing.

On the other hand if it is desired to imprint some artificial grain or design on the leather by the operation known as embossing, leather finished by this method will be found to take and retain such an imprint to an unexpected degree.

The finish is completely insoluble in water and shows no tendency when wet to come off on clothing and the like.

The leather finished by this method has an unusually soft, mellow feel, good break and natural appearance.

The finish remains permanently flexible and extensible and is particularly resistant to the deteriorating effects of sunlight and heat.

The adhesion of such a coating composition for smooth, tight grained leathers is unexpectedly good and is accomplished without the necessity of obtaining excessive penetration or impregnation of the leather and consequently the leather is not made hard and the break and feel are vastly superior to the break and feel of leather finished with lacquer coats entirely.

We claim:

1. Leather having a finish coating comprising a pigment and a polymer of at least one ester of the group consisting of acrylic and α -methacrylic esters that has been applied to the leather in the form of an aqueous dispersion.

2. Leather having a finish coating comprising a pigment and a polymerized acrylic acid ester that has been applied to the leather in the form of an aqueous dispersion.

3. Leather having a finish coating comprising a pigment and a polymer of at least one ester of the group consisting of acrylic and α -methacrylic esters having less than five carbon atoms in the alcohol group, that has been applied to the leather in the form of an aqueous dispersion.

4. Leather having a finish coating comprising a pigment and a polymerized acrylic acid ester having less than five carbon atoms in the alcohol group, that has been applied to the leather in the form of an aqueous dispersion.

5. Leather having a finish coating comprising a pigment and polymerized methyl acrylate that has been applied to the leather in the form of an aqueous dispersion.

6. Leather having a base coating comprising a pigment and a polymer of at least one member of the group consisting of acrylic and α -methacrylic esters that has been applied to the leather in the form of an aqueous dispersion and a top coating of a lacquer.

7. Leather having a base coating comprising a pigment and a polymer of methyl acrylate that has been applied to the leather in the form of an aqueous dispersion and a top coating of a lacquer.

8. The process of finishing leather which comprises coating the surface of the leather with a pigmented aqueous dispersion of a polymer of at least one ester of the group consisting of acrylic and methacrylic acid esters and drying the coated leather.

9. The process of finishing leather which comprises coating the surface of the leather with a pigmented aqueous dispersion of a polymeric lower alkyl ester of acrylic acid and drying the coated leather.

10. The process of finishing leather which comprises coating the surface of the leather with a pigmented aqueous dispersion of polymeric methyl acrylate and drying the coated leather.

11. The process of finishing leather which comprises coating the surface of the leather with a pigmented aqueous dispersion of a polymeric lower alkyl ester of acrylic acid, drying the coated leather and applying to the acrylate coating thus applied a top coating of a lacquer.

HENRY B. WALKER,
PAUL W. MCWHERTER.