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NAIL POLISH

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This invention relates to improvements in nail polish, and more particularly to a nail polish designed to overcome certain objections to nail polishes heretofore used.

desired characteristics of nail polish of easy flow and smoothness of coating, good adhesion of the polish to the nail, good wear resistance of the polish and other recognized desirable characteristics of nail polish.

5 The use of nail polish has become very extensive and most users apply polish once a week or oftener, leaving the film of solids as a coating on the nails in the interim. Considerable attention has been directed to the fact that this use of nail
10 polish is responsible, at least in part, for inducing brittleness in the nails. The use of hydrocarbon solvents in a polish has been believed to have such a tendency and, consequently, such solvents have been largely eliminated wherever
15 possible. While the solvents used in a liquid nail polish may have some effect in producing brittle nails, the solvents must be adjusted to evaporate within a matter of seconds after application; therefore, if any of the natural oils are removed
20 by such solvents, it would be a relatively small amount for the average person who applies nail polish only once a week.

The invention will be described in connection with specific compositions of nail polish within the scope of my invention. It is to be understood that the invention may be readily practiced with other compositions of polish.

Various solvents may be employed in the nail polish, the more important feature in connection with this invention being the proper formulation of the solids content thereof. The base of the solids is preferably nitro-cellulose, and for this
15 purpose, I prefer to employ low viscosity nitro-cellulose, such as $\frac{1}{4}$ to $\frac{1}{2}$ second viscosity nitro-cellulose. Instead of using a base for the polish consisting entirely of nitro-cellulose, I prefer to substitute for a portion thereof a quantity of
20 ethyl cellulose. The quantity of ethyl cellulose used may be equal to the quantity of nitro-cellulose for which it is substituted. This use of a mixture of a smaller proportion of ethyl cellulose with a major proportion of nitro-cellulose
25 produces a more pervious film than would be obtained by the use of nitro-cellulose alone, the film is rendered much more flexible, is more stable because it is more nearly neutral, and has a greater resistance to caustic alkali such as en-
30 countered in the use of detergents.

Attempts have also been made to overcome brittleness by supplying oils to nails which have
25 become brittle, by a treatment supplementary to the use of nail polish. Such supplementary treatments can only be temporary at best, and, furthermore, any oils left by these treatments would be as readily taken up by the polish solvents as the natural oils would be.

Nails are human tissue and the growth and quality thereof are stimulated by contact with air and water vapor. In this case, nails might be said to "breathe" somewhat after the fashion of
35 skin itself. Medical opinion agrees that the nails are fed by glands underneath the nails, the natural oils coming out through the nails. Continuous retardation of this secretion from the glands by the use of a tight coating over the nail may
40 gradually eliminate the glands or at least reduce their activity, and for this reason nail brittleness is probably due more to the use of tight coatings covering them for a period of time, than to the absorption of natural oils by solvents used
45 in the nail polish.

The use of a mixture of nitro-cellulose and ethyl cellulose also requires less use of a plasticizer. Use of a plasticizer, such as dibutylphthalate or other plasticizers, is desirable be-
35 cause it affords a good measure of control of the flexibility of the film of polish. This control is quite important because the film must be sufficiently flexible to withstand the flexing of the nails, and at the same time hard enough to with-
40 stand the abrasion to which it is subjected in ordinary wear. Gum camphor has some value as a plasticizer, and it also has some bearing on improvement of the adhesion and gloss of the film. Resins including synthetic and natural res-
45 ins are useful primarily to improve the adhesion and increase the gloss of the film. Liquid synthetic resins are particularly desirable because they act somewhat as a plasticizer as well as increase the gloss of the film of polish. Many
50 such resins and combinations of resins can be used to produce the desired results in the finished product.

It is an object of my invention to provide nail polish capable of providing an air and moisture pervious coating over the nail.

Another object of this invention is to provide
50 a nail polish containing a water soluble ingredient which will be removed from the solidified film of nail polish when the nails are first placed in water.

It is also an object of my invention to accom-
55 plish the foregoing objects and still retain the

The foregoing ingredients may be easily combined to provide a basic solids mixture for use
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in connection with my invention. This invention is concerned with the formation on a nail of an air and moisture pervious film of polish. This may be accomplished by the formulation of a solids content which leaves a film of this character upon drying. For example, some degree of porosity may be obtained in a nail polish film directly, by using a substantial quantity of ethyl cellulose as in the following composition.

Solids		Parts by weight
1/2 second viscosity nitro-cellulose	-----	132
Ethyl cellulose	-----	16
Tricresylphosphate	-----	24
Liquid resin "Hercolyn" (dihydro methyl abietate)	-----	34
Solid synthetic alkyd resin ("Glyptal")	-----	50

Solvents		Parts by weight
Denatured ethyl alcohol	-----	83.5
Xylol	-----	21
Ethyl acetate	-----	260
Butyl acetate	-----	113
Amyl acetate	-----	112

Larger amounts of ethyl cellulose than indicated above could be readily employed, with suitable adjustment in the proportions of the other ingredients, to provide a further increase in porosity of the dried film of polish.

A particularly satisfactory way of carrying out my invention is by adding to the nail polish a water soluble substance. The dried film on a nail is then rendered air and moisture pervious when the film is first placed in water by the dissolving of the water soluble constituent.

In this manner, the polish while being worn, allows access of air and water to the nail surface and will not induce brittleness in the nail to the extent that tight films of polish do. Acidic or basic ingredients are not helpful and may be harmful to the nails. For this reason, I prefer to employ a substantially neutral porosity producing ingredient. Crystalline substances may seriously impair the desired appearance, gloss and/or adhesion of the polish film and consequently non-crystalline substances are preferred. Synthetic soaps such as sodium lauryl sulfate or diglycol stearate are admirably suited for purposes of my invention. Such synthetic soaps are water soluble, substantially neutral, non-crystalline, and blend readily with the other ingredients used in nail polish.

A suitable composition of nail polish embodying my invention follows, the proportions being by weight.

Solids		Parts
1/2 second viscosity nitro-cellulose	-----	121
20 to 30 second viscosity nitro-cellulose	-----	10
Ethyl cellulose	-----	15
Gum camphor	-----	20
Solid resin—"Santolite" (toluene sulfonamide formaldehyde)	-----	39
Liquid resin—"Hercolyn" (dihydro methyl abietate)	-----	10
Dibutylphthalate (plasticizer)	-----	15
Sodium lauryl sulfate	-----	7

Solvents

Butyl acetate	-----	190
Ethyl acetate	-----	140
Ethyl alcohol	-----	140
Monethyl ether of ethylene glycol	-----	80
Toluol	-----	57

In the foregoing example, the water soluble sodium lauryl sulfate is employed in an amount which is about 3% of the total weight of solids, 10 or about 0.8% of the total weight of liquid polish. This percentage may be varied rather widely but is preferably maintained within the limits of 0.1 to 5% of the total weight of polish, or 0.3 to 18% of the weight of total solids in the polish. Smaller amounts of a water soluble substance could be used but would have only a very slight effect on the perviousness of the film on the nail. Larger amounts of a water soluble substance than indicated would seriously impair the desired 20 qualities of gloss, wear resistance, and adhesion of the polish. The composition given may, of course, be varied both as to proportions and ingredients to suit various needs. No coloring agent is included in the formulae given, it being 25 understood that dyes or pigments of the desired shade and character may be added in a manner known to those skilled in this art.

I have found that a small proportion of a water soluble constituent of the order of about 1% of 30 the total weight of the polish actually improves the wearing qualities of the film on a nail. Where an absolutely tight film of polish is applied, foreign matter may accumulate under the film near the tip of the nail and work back under the film. 35 A pervious film in accordance with my invention releases any such material which might otherwise gather under the film causing it to chip and peel off.

It will be apparent that water soluble substances other than soaps may be useful in accordance with this invention. 40

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use 45 of such terms and expressions, of excluding any equivalent of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed. 50

I claim:

1. Liquid nail polish having a nitro-cellulose base and containing an amount not greater than 5% by weight of a substantially neutral water soluble organic solid material. 55

2. Liquid nail polish comprising a solvent and a cellulose derivative base, said polish containing an amount not greater than about 5% of sodium lauryl sulfate. 60

3. Liquid nail polish comprising a solvent and a cellulose derivative base, said polish containing an amount not greater than about 5% of diglycol stearate. 65

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