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RAZOR BLADE

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The invention relates to improvements in razor blades, and particularly to razor blades provided with a tightly-adherent improved coating which serves as a shaving preparation and eliminates the necessity of using for shaving any separate shaving soaps, creams, or pastes. The manufacture of the improved razor blades does not cost materially more than the present blades, such as those of the Gillette type.

Claims to an improved safety razor having a shaving composition incorporated with the shaving head thereof, and to an improved guard for safety razors having a shaving composition adherently mounted thereon or incorporated therewith, are presented in my co-pending application Serial No. 268,768, filed April 19, 1939.

Claims to improved shaving preparations and forms thereof are presented in another co-pending application Serial No. 315,001, filed January 22, 1940.

The use of the invention has marked advantages over the customary methods of using a shaving soap and brush to work up a lather on the face preliminary to shaving, or the use of brushless shaving creams, or the use of electric razors. The disadvantages of these most widely used present methods of shaving are, in general, the necessary consumption of time for working up a lather by the use of the shaving soap and brush method, and, for many shavers, the tendency of the razor's pulling upon the hair, due to the razor slicing the hair instead of cutting it off squarely at the surface of the skin; the use of brushless shaving creams often leaves a minute film of material on the surface of the skin, which makes the face feel greasy; insofar as electric razors are concerned, their comparatively great cost is a disadvantage, and, furthermore, oftentimes where it is desirable to shave, current is not available, such as on Pullman cars, and in many hotels, where proper outlets are not provided.

As before stated, the instant invention is a razor blade provided with a tightly-adherent coating. This coating possesses certain necessary characteristics. It is water-resistant, has the quality of attaching itself to the razor blade in a uniform consistent layer and becoming tightly adherent, and is tough, so that the coated blade can be used repeatedly. It is non-flaking, and non-brittle, so as to be incapable of being knocked or jarred off the blade in separate pieces; in other words, the razor blade is maintained entirely covered with a uniform consistent coating. The coating has a uniform and active spreading action upon a liquid surface, forming a thin film thereon; particularly, it is notably surface active on human skin which is wet with water. The coating has some constituents slightly soluble in water. The effect on a water surface is to lower the tension thereof.

The foundation of the improved coating is a solid having some constituents slightly soluble in water. Preferably this coating is of a waxy nature. Some of the solids utilized for the coating possess the above-mentioned characteristics, including satisfactory surface activity; and some of them are compounded with or impregnated with other materials promoting the surface activity.

One of the preferred coatings consists of ordinary beeswax and oleic acid. Alternatives for the beeswax are paraffin wax, carnauba wax, Chinese insect wax, palmitic acid, and stearic acid. Each of these materials, including the beeswax, may be used alone, but, preferably, to increase the surface activity, an ingredient such as oleic acid is compounded with them.

Alternatives for oleic acid, to promote the surface activity, are camphor, menthol, and thymol.

One very satisfactory composition includes both beeswax and paraffin wax compounded with oleic acid.

Assuming that ordinary beeswax alone is utilized, it is first melted, which, for the varied compositions thereof, requires a temperature of approximately 60° C. to 63° C., at which temperature the beeswax is a thin liquid, so that it can be easily applied to the razor blade with a brush or by simply dipping the blade into the melted beeswax. These methods of applying the coating are preferable to that of first dissolving the beeswax in a suitable solvent, from the standpoint of the time necessary for having the coating become suitably hard, since it takes considerable time for a solvent to evaporate. For instance, the best solvent for beeswax is carbon tetrachloride, and a solution of beeswax therein for the purpose of coating the razor blades is an effective method, but a material length of time is required for the carbon tetrachloride to evaporate.

The solidified coating of beeswax covers the entire surface of the blade, including the cutting edge thereof, but the coating is so thin at the cutting edge as not to interfere with the use of the coated blade for shaving.

As stated, ordinary beeswax is variable in composition, and it contains small amounts of material that are soluble in water to a slight extent,

and these materials clearly fall into the class of materials which are surface active and which form a minute film on the surface of water. The amount of surface active material is small, and still it is quite effective for the purpose, since it quickly forms a microscopic film on the water which is on the face. This film, in combination with the piling up of the water in advance of the razor blade, serves to fill up the exceedingly minute spaces between adjacent hairs, so that each hair is sustained and more or less held erect, so that the hair is cut off cleanly by the razor edge instead of being sliced or pulled off.

Preferably, is is desirable to reenforce the surface activity of the beeswax by compounding therewith certain amounts of other materials having this activity to a marked degree. For this purpose, oleic acid can be used. This acid, which is a liquid at ordinary temperatures, is very slightly soluble in water, and has a chemical formula of $C_{17}H_{33}CO.OH$, is added in about 10 parts by weight to 100 parts of beeswax heated to melting temperature over a water bath. The oleic acid dissolves in the molten beeswax, and then the molten solution can be applied to the blade in the manner heretofore described with reference to beeswax alone.

The paraffin waxes which may be used alone for the coatings, or combined with beeswax, or combined with beeswax and oleic acid, or combined with surface active materials other than oleic acid, are solids at ordinary temperatures, and belt at different temperatures, approximately from 50° C. to 60° C. These paraffin waxes are a class of materials represented, generally, by the formula C_nH_{2n+2}, in which n is 20 to 30. They possess some residual oil which is surface active. For the purpose of obtaining a desirable coating on razor blades for shaving purposes, the paraffin waxes are preferably not used alone, since they are fairly easily softened by hot water. It is advisable to compound them with some higher melting waxy material such as beeswax. It should be noted, however, that paraffin wax is unusually effective in creating a satisfactorily thick coating by dipping the blade into the melted mixture, since the paraffin wax solidifies somewhat more slowly than beeswax and, hence, spreads sufficiently to produce a coating of uniform consistency upon the blade before the coating becomes hard and solid.

It is also advisable to compound the paraffin waxes, or the mixture thereof with beeswax, with some additional surface active material, such as oleic acid or camphor gum.

Special reference is made to a desirable coating compounded of beeswax, paraffin wax, and oleic acid. For this coating, I utilize about 11 parts by weight of paraffin wax, 1 part of oleic acid, and 11 parts of beeswax. These materials are heated over a water bath until they are melted, which produces a homogeneous solution into which the razor blade is dipped to form the desired coating thereon.

Another desirable coating is compounded of beeswax, paraffin wax, and camphor. For this coating, I utilize about 11 parts by weight of paraffin wax, 1 part of camphor, and 11 parts of beeswax. The camphor and paraffin wax are heated over a water bath to approximately 70° C., which disperses the camphor in the paraffin wax. Then the mixture is cooled. The beeswax is then melted in this mixture over a water bath at approximately 100° C. A thin film of the compound can then be put upon the razor blade by dipping the latter into the melted mixture.

Inasmuch as beeswax is more tightly adherent and has a higher fusion point, and is tougher than the paraffin wax, it is often found advisable to increase the above-mentioned proportion of beeswax, and accordingly decrease the amount of paraffin wax, in the two compositions just mentioned, in which oleic acid and camphor are respectively used as the ingredients for promoting the surface action. The production of oleic acid or camphor can also be increased or reduced.

Palmitic acid is a solid at ordinary temperatures with a melting point of approximately 62.5° C., and stearic acid is also a solid at ordinary temperatures and has a melting point of 69° C. Both of these materials are surface active in that they tend to form films on water, and either of them can be used alone to form the razor blade coating, or used in combination with other materials to promote the surface activity.

Other surface active materials which may be utilized are menthol ($C_{10}H_{19}OH$), which is a solid at ordinary temperatures, melts at 42° C., is only slightly soluble in water, and is miscible with melted beeswax. Also, thymol ($C_{10}H_{14}O$) may be utilized, which is a solid at ordinary temperatures, melts at 49° C., is miscible with melted beeswax, and is only slightly soluble in water.

When using a razor blade coated as before described, the face is washed in the usual manner and left wet. The coated razor is dipped into the water and the shaving started in the usual manner, the face being kept wet, if, for any reason, it dries before the shaving is finished. The razor is occasionaly dipped into the water during the shaving operation. The effect of the beeswax or other coatings on the razor blade, or these coatings modified with greater surface active materials, is to produce a minute film on the wetted skin, which is formed with great rapidity, so that it is always in advance of the cutting edge of the razor blade. The spaces between adjacent hairs are so exceedingly minute that a very small amount of the coating material fills up these spaces and maintains the hair more or less erect, so that it is cut off cleanly instead of being sliced or pulled off. Furthermore, there is a greater frictional resistance offered by a wax surface of a razor blade to being passed over the face so that the hair is caught up in such a position as to be cut off cleanly. Also, the moving blade piles up a substantial amount of water before it, which enhances the spreading action of the coating material. The net result is to afford a quick clean shave which leaves the face non-irritated, smooth, and soft.

What I claim is:

1. An article of manufacture consisting of a razor blade having a shaving preparation tightly-adherently mounted thereon which is solid at ordinary temperatures, said preparation comprising material selected from a group consisting of beeswax, paraffin wax, carnauba wax, Chinese insect wax, stearic acid, and palmitic acid, and including surface-active material which is slightly soluble in water and promotes rapid self-spreading of the preparation in a film upon the surface of water when the latter is contacted thereby.

2. An article of manufacture characterized as set forth in claim 1 in which the shaving preparation comprises beeswax and includes the said surface-active material.

3. An article of manufacture consisting of a

razor blade having a shaving preparation tightly-adherently mounted thereon, said preparation being solid at ordinary temperatures and including beeswax and oleic acid.

4. An article of manufacture characterized as set forth in claim 3 in which paraffin wax is included in addition in the shaving preparation.

5. An article of manufacture characterized as set forth in claim 1 in which the shaving preparation comprises palmitic acid and includes the said surface-active material.

6. An article of manufacture consisting of a razor blade having a shaving preparation tightly-adherently mounted thereon, said preparation being solid at ordinary temperatures and including palmitic acid and thymol.

7. An article of manufacture characterized as set forth in claim 1 in which the shaving preparation comprises paraffin wax and includes the said surface-active material.

8. An article of manufacture consisting of a razor blade having a shaving preparation tightly-adherently mounted thereon, said preparation being solid at ordinary temperatures and including paraffin wax and camphor.

9. An article of manufacture characterized as set forth in claim 1 in which the shaving preparation comprises paraffin wax and beeswax and includes the said surface-active material.

10. An article of manufacture consisting of a razor blade having a shaving preparation tightly-adherently mounted thereon, said preparation being solid at ordinary temperatures and including paraffin wax, beeswax, and camphor.

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