

## UNITED STATES PATENT OFFICE

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## STABLE DEPILATORY

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This invention relates to stable transparent depilatory jellies which are substantially free from sulphide odor.

One object of my invention is the provision of a depilatory which is transparent and in the form of a stable jelly.

Another object of my invention is the provision of a method of preparing a stable transparent depilatory.

Other objects will be in part obvious and in part pointed out in the following description.

Heretofore depilatories have been made in various forms as, for instance, creams and pastes, powders, liquids and lotions, which have generally proven unsatisfactory.

The Donner Patent No. 1,379,855 refers to the preparation of cream or paste depilatories, which are made by incorporating sulphides, polysulphides and sulphhydrates in air-restraining bases such as magnesium oxide or other metal oxides, not interfering with the action of the depilatory agent, or such oxide and starch or other vegetable colloids, but does not disclose a substantially permanent transparent depilatory.

To obtain a depilatory solution I pass hydrogen sulphide gas into a solution of lithium hydroxide in the presence of an inert gas. For preparing the jelly or mucilaginous base of my depilatory I dissolve or disperse a single gum or a mixture of gums, such as tragacanth, karaya or locust bean gum under continuous energetic agitation in the presence of an inert gas, or a gas which does not react in any deteriorating way with either the depilatory base or the depilating agent. During this action the gums swell and become gelatinated and a voluminous transparent jelly filled with bubbles is provided. If the depilatory solution were added to a transparent jelly base containing air bubbles, the gums and the depilatory solution would deteriorate and be destroyed by mold or oxidation. To overcome any such oxidation or deterioration I conduct a stream of nitrogen gas or other inert gas into the liquid mixture while the gum or gums are being dissolved or dispersed in the water. In this way air (which contains oxygen and carbon dioxide) is excluded and an air-free jelly base is provided.

To make the transparent depilatory, the depilatory solution prepared as above described is added to the transparent jelly base as above described. The mixture is stirred in the presence of an inert gas. Some of the inert gas goes into solution and some is mechanically held. Due to the fact that a viscous mixture is produced, the inert gas is entrapped in the mass and when the

mass is allowed to rest or is placed in containers, some of the bubbles of inert gas come to the surface and surround the exposed surface of the mass with a layer of inert gas which prevents air or other objectionable gases from penetrating into the depilatory mixture and thus destroying the stability of the product. The inert gas or gases form a protecting sheath or covering for my depilatory and thereby prevent deterioration. Some of the bubbles of inert gas or gases remain in the body of the depilatory and prevent the access of air or other objectionable gases. It is essential to prevent the entry of carbon dioxide gas which forms an insoluble carbonate with the lithium compound or compounds and this is also effected by the admixture of inert gas as above pointed out.

When the transparent depilatory is to be placed in tubes, jars, or other containers, the tube, jar, or container is filled with an inert gas and the depilatory mixture is then placed in the tube, jar, or container. By this procedure all air or other objectionable gases are excluded and stability of the product is insured.

My finished depilatory jelly applied to the surface where hair is to be removed acts in about two to six minutes without any perceptible irritation to the skin. One advantage of having a transparent jelly is that the action of the depilatory may be watched and when the hair is curled, the depilatory jelly may be removed by simply wiping it off and washing the cleaned surface with luke warm water. As all the ingredients are soluble in water, and there are no gritty materials, complete removal of the depilatory may easily be effected.

It is desirable to provide a depilatory which is effective in removing hair but which will not irritate the skin and will not have a disagreeable sulphide odor. Only a certain amount of the depilatory agent can be employed to produce a non-irritating and satisfactory depilatory.

From my experiments I have deduced the following theory but it is to be expressly understood that my invention is not to be restricted thereto. I believe that the kerolytic effect of the alkali sulphides and sulphhydrates depends on the existence of a very certain proportion of hydroxyl and sulphhydrate ions. Sodium hydrosulphide, even in fairly concentrated solutions, fails to remove hairs, and sodium hydroxide fails to remove hairs, when applied in a concentration which does not destroy the skin.

When sodium sulphide ( $\text{Na}_2\text{S}$ ) is dissolved in

water, it is ionized according to the following formula:—



5 The depilating action is believed to depend on the concentration of the SH and OH ions and it is believed that the OH ions tend to force or "push" the chemical action of the SH ions on keratine to a maximum. However, it is necessary to reduce the irritating effect of the OH ions to a minimum without destroying their effect on the SH ions as above described. Depilatories prepared, according to the examples hereinafter given, contain concentrations of the above described ions which remove hair without irritating the skin.

10 In the preferred embodiment or form of my depilatory and the method of making the same, I use a 15% solution of lithium hydroxide in water and pass washed or purified hydrogen sulphide gas into the water solution until the percentage of the hydrogen sulphide is about 8.25%. The percentages given are by weight. During this procedure a continuous stream of an inert gas, such as nitrogen, is passed through the liquid and some of this gas goes into solution. It is also advisable to replace the air in the apparatus and containers where the hydrogen sulphide gas is generated. The water solution should be kept cool during the saturation process. After the reaction is completed, an odorless almost colorless liquid is obtained.

20 A depilatory jelly base adapted to be mixed with the depilatory liquid above described is prepared by dispersing or dissolving a mixture of three gums such as tragacanth, karaya and locust bean gum or tragagel in luke warm water so that the finished jelly contains about 6.6% of these gums. The tragagel gum is a gum made from the locust bean. In this specific example, the gums are used in the proportion of one part of tragagel, to one part of karaya, to 1.46 parts of tragacanth. It is to be expressly understood, however, that I am not limited to these proportions as it is within the contemplation of my invention to vary these proportions and also to use different mixtures and, in some instances, only one of the gums may be used. The gums swell or gelatinate in the water to form a jelly-like mixture. While the gums are being dissolved or dispersed in the water it is necessary to exclude air or other objectionable gases and to accomplish this result a continuous stream of an inert gas, such as nitrogen, is passed through the liquid. I connect a pipe with a nitrogen gas container or generator and have the outlet of the pipe under the surface of the liquid so that an inert gas will pass through the gum solution or dispersion during the process of gelatination. The gum mixture is stirred or agitated when the gums are added and this stirring is kept up for approximately three-quarters of an hour. If the liquid mixture is not actively stirred during the addition of the gums the resulting jelly contains lumps which spoil the smoothness of the jelly and also are undesirable since the hair removing property of the finished depilatory jelly is diminished. The above procedure results in a highly viscous almost colorless jelly. During the preparation of this jelly too much stirring is to be avoided as this results in a jelly having a lower viscosity than desired.

75 My finished depilatory jelly is then prepared by adding the depilatory solution prepared as above

described to the jelly base prepared as above described under continuous stirring and exclusion of air by the inert gas. About 14 grams of the depilatory solution prepared as above described are added to about 100 grams of the gum mixture prepared as above described. It is to be expressly understood, however, that these proportions may be varied without affecting the effectiveness of the depilatory. If the concentration of the depilatory solution is high, a thinner gum mixture is used, and if the concentration of the solution is low, a thicker gum mixture is used.

As soon as the depilatory jelly is prepared it is placed into collapsible metal tubes or jars or other containers which are filled with an inert gas so as to exclude air or other objectionable gases.

20 Instead of lithium hydroxide, I may use sodium hydroxide to prepare my depilatory solution. This solution may be used with the gum mixture above given, or with other similar gum or jelly mixtures. Another example of my depilatory is as follows. About 26.1 grams of sodium hydroxide are dissolved in about 73.9 grams of water. This solution is then saturated with about 5 grams of hydrogen sulphide gas and a substantially odorless and colorless solution is obtained. The gum mixture to be used with the above may be prepared as follows. About 30 grams of gum acacia and about 40 grams of gum tragacanth are dissolved or dispersed in about 600 grams of water. The gums are stirred and gelatinate to form a gum or jelly base. To make a transparent jelly depilatory, I take about 100 grams of the gum solution or dispersion, and about 17 grams of the solution containing the depilatory. While the water solution of the depilatory is being prepared, and while the gums are being dissolved or dispersed, I admit an inert gas or gases to the mixture so as to dissolve or entrap bubbles of the inert gas or gases in the mixtures as described in connection with my first example. It is to be expressly understood, however, that the depilatory agent prepared from sodium hydroxide may also be used with the gum mixture prepared as above described in connection with my first example.

45 As it is necessary to protect the depilatory agents from oxidation, I use inert or non-oxidizing gases to replace air in my depilatory jelly. Instead of nitrogen, other inert or non-oxidizing gases, or a mixture of gases, such as helium, neon, argon, krypton or the like, may be used. In some instances, it may be preferable to use reducing or non-oxidizing gases, such as hydrogen. It is also within the contemplation of my invention to use inert saturated or unsaturated organic gases.

60 As another method of producing my jelly depilatory, I prepare the depilatory solution as above described in the presence of inert gas or gases. The gum solution or dispersion is then prepared under a vacuum. The depilatory solution and the gum solution or dispersion are then mixed under a vacuum. The finished jelly depilatory is then put in tubes or containers filled with an inert gas or gases so that air and other objectionable gases are excluded. The proportions of the ingredients are the same as those given in previous examples.

70 In the preferred form of my invention I use a lithium compound for the reason that it gives the best results. The jelly depilatory containing a lithium compound is less irritating than stronger alkalis. In use, my lithium depilatory is more effective and may be used in smaller 75

quantities. Due to the fact that lithium carbonate is insoluble, I obtain a clear solution which indicates that the carbonate is absent and a purer product is ensured.

5 While I have given several examples, it is to be expressly understood that I am not limited thereto, as variations will suggest themselves to those skilled in the art.

What I claim is:

10 1. A transparent depilatory jelly containing a lithium depilatory compound containing sulphur and an inert gas.

2. A transparent stable depilatory, comprising a transparent gum base, a depilatory agent containing lithium and an inert gas dispersed  
15 throughout the depilatory, all the ingredients being substantially water soluble so as to be easily and completely removable from the skin after use.

3. A stable, depilatory composition of the character described, which includes, the reaction prod-

uct of hydrogen sulfide and lithium hydroxide, a gelatinous base containing locust bean gum, and nitrogen dispersed throughout the base to prevent deterioration thereof.

4. A transparent depilatory composition of the character described in which the ingredients are  
5 all substantially water soluble so that the depilatory composition may be easily and entirely removed with water after the depilatory composition has removed the objectionable hairs,  
10 which comprises, the reaction products of hydrogen sulfide and lithium hydroxide, a gelatinous base containing gum tragacanth, karaya and tragagel, and nitrogen gas dispersed throughout  
15 the composition to prevent deterioration thereof, the composition having substantially no objectionable sulphide odors and being stabilized so that it retains its effectiveness over a long period of time.

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