

UNITED STATES PATENT OFFICE

2,115,156

METHOD OF AND COMPOSITION FOR WAV-
ING HAIR

James C. Brown, Mount Vernon, N. Y., assignor
to E. Frederics, Inc., New York, N. Y., a cor-
poration of New York

No Drawing. Application February 10, 1933, Se-
rial No. 656,147. Renewed April 2, 1937

12 Claims. (Cl. 167—87.1)

The present specification is a continuation in part of my copending application, Serial Number 574,923, filed November 13, 1931.

This invention relates to methods of and compositions for treating hair particularly in connection with imparting to it a permanent wave.

In permanent waving processes, as is known, the hair is generally coiled, more or less tightly, about a rod, and heated in the presence of substances adapted to aid in conditioning it for receiving and retaining the wave. For applying such substances to the hair, strips of absorbent material are preferably saturated with a water solution of the substance, or substances, and wound around the hair. The whole is then enclosed in a suitable casing or similar contrivance and heat is applied to raise the temperature of the substances adjacent the hair to, say, 100° C. in customary practice and to maintain such temperature for the desired time.

The requirements of substances for this purpose are varied and conflicting. For one thing, the substance must not injure the hair to any appreciable extent, as by altering its color, digesting its outer coating or otherwise weakening it. Damage to the hair is particularly likely to occur under the stringent conditions employed to effect a permanent wave. Moreover, among other things the substance employed should preferably be soluble in water to the desired extent, so as to be employable in a water solution. It should be moderately volatile under the conditions of the process and at the same time be capable of being handled without loss of strength at ordinary temperatures; it should be non-inflammable under conditions of the process, free from disagreeable odor, and comparatively inexpensive. In addition to these qualities the substance is to have the ability to produce the desired effect, commonly thought of as a softening action, for adapting the hair readily to receive a wave which becomes permanent after the treatment is completed and the hair allowed to cool.

I have found that superior results may be achieved when the concentration, degree of ionization, and basicity of the substance in solution are properly correlated, and I have discovered that certain carbon compounds of ammonia which, when dissolved in water in a 1.5 to 5% solution by weight at about 20° C. are not highly dissociated and have a pH value of between about 11.6 and 12.2, yield excellent results when employed for my purposes.

According to the present invention the various requirements of such substances are well satis-

fied by employing substances of the class particularly represented by aliphatic amines containing two to six carbon atoms and producing the stated conditions in water solution. More specifically, I have found that excellent results may be achieved by employing ethyl amine, although analogous organic compounds such as propyl and butyl amines and piperazine may also be employed. However, I prefer compounds of the primary or normal type to those in which more than one carbon atom is linked directly to nitrogen, such as secondary or tertiary compounds.

I have found that ethyl amine has especially advantageous properties for waving fine hair, which is more difficult to provide with a lasting wave than heavy hair. Also, when a small quantity of ethyl amine is employed by itself or is added to the ordinary compounds a rather remarkable result is obtainable even though the concentration, ionization, and pH value are maintained where it is assured that no harmful effect will be produced upon the most delicate types of hair, which may thus be given an exceptionally pleasing, tight wave effect.

By way of example, a highly satisfactory composition for present purposes may be prepared by adding, say 7 to 10 c. c. of a 33% solution of ethyl amine to 300 c. c. of water or to a similar quantity of a solution prepared in accordance with Letters Patent 1,637,469 or 1,681,170 issued to E. Frederics, Inc., as assignee of James C. Brown, such as a solution of 15 grams of ammonium acid tetraborate in 25 c. c. of aqua-ammonia, 26 degrees Bé., and 250 c. c. of water, or a semi-solution of 2.5 grams of keratin in similar quantities of ammonia in water. The ammonium salt and keratin may also be used together and supplemented by the small quantity of ethyl amine or similar substance.

When a 3% solution of ethyl amine is employed, the pH value is about 11.8. However, up to 5% of this substance may be employed, if desired, where a more difficult hair to treat is involved, though the pH value will in such case be somewhat higher. On the other hand, somewhat smaller percentages may be used where the hair is easier to treat. For instance, as little as 1.5% may be permissible in some cases. When piperazine is employed, a 3% solution gives a pH value of 11.6. Good results may be attained by using a combination of this substance, or others of the class indicated, with a solution of ammonia. The relative proportions of ammonia and such amine may vary within the ranges which give the desired concentration and ionization. In general

the amounts of substance of the character indicated may range from 1.5 to 4 or even 5 parts by weight of the solution, depending on the ammonia present.

8 As further examples of solutions which are in accordance with the invention, but without any intention of limiting the invention to any specific formula or proportions, the following may be given:

	Parts by weight
I. Ethyl amine.....	5
Ammonia.....	5.6
Water.....	93.9
	Parts by weight
15 II. Ethyl amine.....	3.0
Ammonia.....	5.6
Water.....	91.4
	Parts by weight
20 III. Ethyl amine used alone	
(i. e. without ammonia)	
Ethyl amine.....	5
Water.....	95

A rather remarkable result is achieved when 25 other substances of the class indicated are employed with another compound of ammonia, or preferably ammonia itself. Such a combination apparently produces results superior to equivalent amounts of ammonia alone, especially in 30 avoiding deleterious reactions upon the hair. Although a water solution is preferred, it will be understood that the carbon compounds may be incorporated in the pads directly, or may even be absorbed by powder and distributed in this 35 manner. In short, the invention is not limited to any particular vehicle for the amines.

In the treatment of the hair, various tufts will be coiled about rods, in the manner explained and then wrapped in a pad which has been 40 soaked with a solution of the character indicated. The whole is then inserted in a tube or casing and subjected to heat, by any suitable means such as electrical heating coils.

Where an ethyl amine solution of stated pH 45 value is employed, it has been found that the temperature used in the process need not be raised to the boiling point of water for good results, but that it is advantageously maintained at around 70° C. to 80° C.

50 In this way maximum desired coagulation of the albuminoids in the hair appears to be achieved with, at the same time, a minimum of hydrolysis. In short, through the employment of this substance not only are the conditions of the waving 55 process less stringent but also there is produced a none the less superior wave. Where it is desired, however, to use a solution having a somewhat lower pH value, the temperature may be higher.

60 It appears that ethyl amine has somewhat unique properties for present purposes, for it is instrumental in producing a wave effect which, at least, in fine hair, is superior to what has previously been considered possible without damage 65 to the hair. With all types of hair an excellent wave may be produced through the use of this

substance, with a minimum of damage to the hair, and other advantages mentioned. Moreover, the substance has a suitable boiling point, 19° C. which may in part explain its superiority, and in water solution it does not vaporize too 5 rapidly under the conditions of the process in which a high temperature and some pressure are ordinarily employed. However, the other substances mentioned are also useful particularly in combination with ammonia.

The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and 15 described, or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed.

I claim:

1. A composition for waving hair, comprising 20 an aliphatic amine containing two to six carbon atoms which in 1.5 to 5% solution in water has a pH value of about 11.6 to 12.2 and which boils at a temperature below 100° C.

2. A composition for waving hair, comprising 25 a water solution of a primary aliphatic amine having a boiling point below 100° C., containing two to six carbon atoms and having a pH value of about 11.6 to 12.2 in a 1.5 to 5% solution.

3. A composition for waving hair, comprising 30 a water solution of ammonia and a primary aliphatic amine boiling below 100° C. containing two to six carbon atoms and having a pH value of about 11.6 to 12.2 in a 1.5 to 5% solution.

4. A composition for waving hair, comprising 35 ethyl amine.

5. A composition for waving hair, comprising ethyl amine in about a 3 to 4% solution, said solution having a pH value of about 11.6 to 12.2.

6. The method of waving human hair which 40 comprises heating it in the presence of a primary aliphatic amine containing two to six carbon atoms having a boiling point below 100° C. and having a pH value of about 11.6 to 12.2 in a 1.5 to 5% solution to a temperature above the 45 boiling point of said amine.

7. The method of waving human hair which 50 comprises heating it in the presence of ethyl amine to a temperature above the boiling point of ethyl amine.

8. A composition for waving hair, comprising 55 ethyl amine in about a 1.5 to 5% solution, said solution having a pH value of about 11.6 to 12.2.

9. The method of treating hair which comprises heating the same in the presence of an aliphatic amine containing two to six carbon atoms to a temperature above the boiling point of said amine and below 100° C.

10. A hair treating composition comprising a 60 dilute water solution of ethyl amine.

11. A method of treating hair which comprises surrounding it with a vapor containing ethyl amine.

12. A method of treating hair which comprises 65 surrounding it with a vapor containing ethyl amine at a temperature of about 70°-80° C.

JAMES C. BROWN.