

UNITED STATES PATENT OFFICE

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HAIR TREATING METHOD AND COMPOSITION

No Drawing.

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This invention relates to methods and compositions for the treatment of hair, and particularly for imparting a permanent wave thereto.

5 An object of the invention is to provide an improved method and means for softening hair while imparting a permanent wave thereto, which will be free from objectionable odors both during the steps of applica-
10 tion and heating.

A more particular object is to provide an improved material for treating hair during permanent waving containing an ingredient which will soften the hair by the release
15 of ammonia gas during the heating, said material also containing an ingredient which will act to combine with any excess of ammonia gas and prevent the escape thereof into the atmosphere.

20 The invention accordingly comprises a method and composition both as exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

25 The invention is in certain aspects an improvement on the method and composition described and claimed in United States Letters Patent No. 1,637,469, issued January 11, 1927, to James C. Brown and in United States
30 Letters Patent No. 1,681,170, issued August 21, 1928, to James C. Brown; and with the use of the compositions included in the present invention permanent waving of human hair may be carried out in any convenient
35 manner, such as, for example, by any of the methods suggested in the first-mentioned patent.

The present invention contemplates subjecting the hair, either prior to or during
40 the heating step of the waving operation, to the action of a material adapted to release ammonia gas which softens the hair; there also being present a material adapted to release carbon dioxide in amounts sufficient to
45 unite with the excess of the ammonia gas to prevent the escape thereof into the atmosphere.

Any of the ammonia releasing materials discussed in said patents may be used, and
50 a convenient source of the carbon dioxide

has been found to be either ammonium carbonate or ammonium acetate. A specific example of a combination of materials which has been found to be particularly advantageous is a solution of ammonium carbonate and ammonium borate in water in approximately the following proportions: Ammonium carbonate, $(\text{NH}_4)_2\text{CO}_3$, 40 grams; ammonium borate $(\text{NH}_4)_3\text{BO}_3$, 3 grams; water, 300 grams. If there is used another source
55 (e. g., ammonium acetate) of carbon dioxide or other material which will act combined with any excess of ammonium gas, the said other source may be used in substantially the same proportions as the ammonium carbonate specified in the examples. Changes in
60 the concentration and substitution of other sources of ammonia are desirable, particularly in treating certain kinds of hair, and it is intended to include such variations in the
65 scope of the present invention.

It is to be observed that ammonium carbonate (and likewise ammonium acetate) decomposes at a lower temperature than does ammonium borate, and it is to be borne in
75 mind that hair waving treatments are conducted in a substantially closed space ordinarily provided by a wrapper of absorbent material about a coil of hair, and that a considerable quantity of ammonia is used up in
80 the hair treating process itself. It will be apparent that as the temperature is raised during the heating, the ammonium carbonate or analogous material begins to undergo decomposition, the ammonia gas released is
85 wholly or in part utilized in the hair treatment, and there remains a considerable excess of carbon dioxide which is held in the space adjacent the hair by the encircling pad which contains the composition. As the
90 temperature is increased to the point where the ammonium borate begins to decompose, there will be a large excess of carbon dioxide, i. e., all the carbon dioxide which is the equivalent of the ammonia already utilized
95 in the treatment and stabilized by the saponifiable matter carried by the hair. As the ammonium borate begins to decompose, therefore, such of the ammonia released by its decomposition as is not utilized in the hair
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treatment is free to combine with the carbon dioxide, with which the surrounding atmosphere within the enclosure is already laden to prevent the escape of ammonia from the enclosure, as would be the case if there were only excess ammonia found within the enclosure. This combination will form in those places adjacent the cool outer atmosphere where there would otherwise be an undesired outward seepage.

To facilitate a better understanding of the method and of the use of the composition, there is submitted the following detailed example of a treatment conducted in accordance with the teachings of the invention:

A group of tresses of a woman's hair is suitably wound upon a curler, and a pad of any suitable type which has been saturated with, or which contains, a composition such as contemplated by the invention is rolled upon the coil, and the roll is then enclosed in a heater. The heater is adapted to raise the temperature of the entire aforesaid group of tresses as follows:

	Degrees C.
Three minutes-----	65
Four minutes-----	77
Five minutes-----	90
Six minutes-----	94
Seven minutes-----	98
Eight minutes-----	102

Ammonium carbonate starts to decompose at about 60° C., whereas the ammonium borate does not begin to decompose until a temperature of about 95° is reached. It will accordingly be seen that the ammonium borate serves not only to liberate boric acid for use in the hair treatment, but also serves to assure the presence of ammonia adjacent the hair during the later stages of the treatment, at which time there will be a large excess of carbon dioxide in the space adjacent the hair.

Since certain changes in carrying out the above process, and certain modifications in the composition which embody the invention, may be made without departing from its scope, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A method of treating hair, which includes bringing into proximity with the hair a mixture of ammonium borate which decomposes at an elevated temperature and a material which will evolve carbon dioxide at a lower temperature, and applying heat

thereto so as to gradually raise the temperature thereof to said elevated temperature, while confining the evolved gases in a space surrounding the hair.

2. A method of treating hair, which includes bringing into proximity with the hair a mixture of ammonium carbonate and ammonium borate in the presence of water, and applying heat thereto so as to gradually raise the temperature thereof sufficiently high to cause a decomposition of the ammonium borate, while confining the evolved gases in a space surrounding the hair.

3. A method of treating hair, which includes bringing into proximity with the hair a mixture of ammonium borate and an ammonium compound adapted to release carbon dioxide at an elevated temperature lower than the temperature at which ammonium borate releases ammonia and applying heat thereto gradually until said last-mentioned temperature is reached while confining the evolved gases in a space surrounding the hair.

4. A hair-treating composition, including an aqueous solution of an ammonium carbonate and ammonium borate in a ratio of 40 to 3.

5. A method for treating hair, which includes bringing into proximity with the hair a material which upon the application of heat will liberate carbon dioxide, and a material which upon the the application of a higher degree of heat will liberate ammonia and a boron containing ion and applying heat thereto so as to gradually raise the temperature thereof to said higher degree of heat, while confining the evolved gases in a space surrounding the hair.

6. A method of treating hair, which includes providing adjacent the hair an atmosphere containing an excess of a gas capable of combining with ammonia to form an inoffensive compound, and thereafter evolving ammonia and a boron containing ion adjacent the hair, while maintaining the atmosphere in proximity with the hair.

7. A method of treating hair, which includes providing adjacent the hair an atmosphere containing an excess of carbon dioxide, and thereafter evolving ammonia and a boron containing ion adjacent the hair, while maintaining the atmosphere in proximity with the hair.

8. A method of treating hair, which includes bringing into proximity with the hair a relatively small amount of ammonium borate and a relatively large amount of an ammonium compound which upon decomposition will liberate a gas capable of combining with ammonia to produce an inoffensive compound and which decomposes at a lower temperature than ammonium borate, and applying heat thereto so as to gradually raise the temperature thereof to a temperature at which a decomposition of ammonium borate

will take place, while confining the evolved gases in a space surrounding the hair.

rate and a relatively large amount of ammonium carborate.

In testimony whereof I affix my signature.

DOUGLAS R. PINNOCK. 70

5 A method of treating hair, which includes bringing into proximity with the hair a relatively large amount of ammonium carbonate and a relatively small amount of ammonium borate, and applying heat thereto so as to gradually raise the temperature thereof to a temperature at which a decomposition of ammonium borate will take place, while
10 confining the evolved gases in a space surrounding the hair.

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10 A method of treating hair, which includes evolving in proximity to the hair a substance capable of combining with ammonia to produce an inoffensive compound, and thereafter evolving ammonia and a boron containing ion in proximity with the hair while maintaining the evolved substance in
20 proximity with the hair.

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11. A method of treating hair, which includes applying to a suitable carrier a material which upon the application of heat will liberate a substance which will combine with ammonia to produce an inoffensive compound, and a material which upon the application of a higher degree of heat will liberate ammonia and a boron containing ion, winding the carrier about a coil of hair upon a
30 curler and providing a covering for the carrier, and applying heat adjacent the carrier and the hair so as to gradually raise the temperature thereof to said higher degree of heat.

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35 12. A method of treating hair, which includes applying to a suitable carrier a material which upon the application of heat will liberate carbon dioxide, and a material which upon the application of a higher degree of heat will liberate ammonia and a boron containing ion, winding the carrier about a coil of hair upon a curler and providing a covering for the carrier, and applying heat adjacent the carrier and the hair so as to gradually raise the temperature thereof to said
45 higher degree of heat to provide in the space within the covering an excess of carbon dioxide and thereafter to decompose the material which releases ammonia.

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50 13. A hair treating composition, including a material which upon the application of heat will liberate a substance capable of combining with ammonia and a material which upon the application of a higher degree of heat will liberate ammonia and a boron containing ion.

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14. A hair treating composition, including an aqueous solution of a material which will
60 give off carbon dioxide upon the application of heat and an ammonium borate which will be decomposed upon the application of a higher degree of heat.

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15. A hair treating composition, including
65 a relatively small amount of ammonium bo-

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