July 13, 1943. E. E. OESTRIKE 2,324,420

METHOD OF FORMING HELMETS

Original Filed Feb. 6, 1940 3 Sheets-Sheet 1

Fig. 1

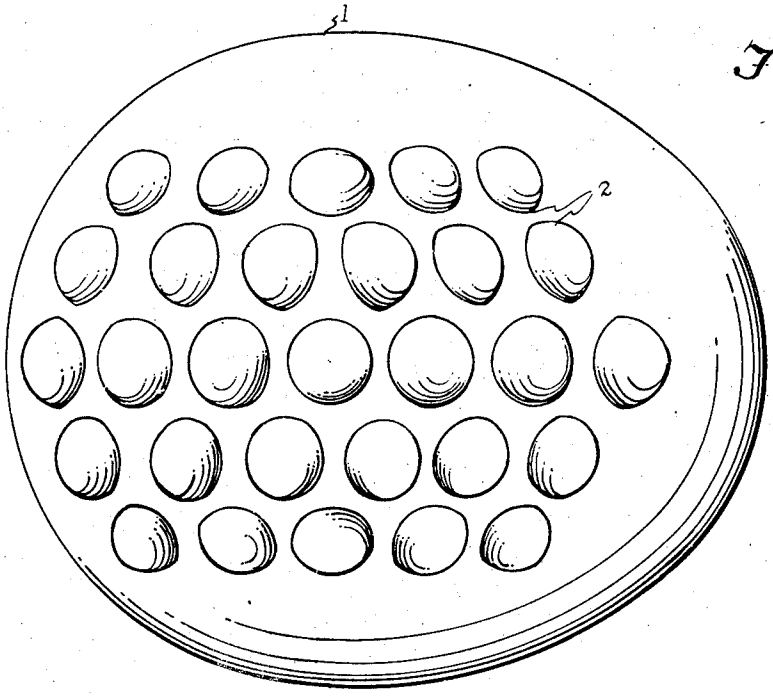

Fig. 2

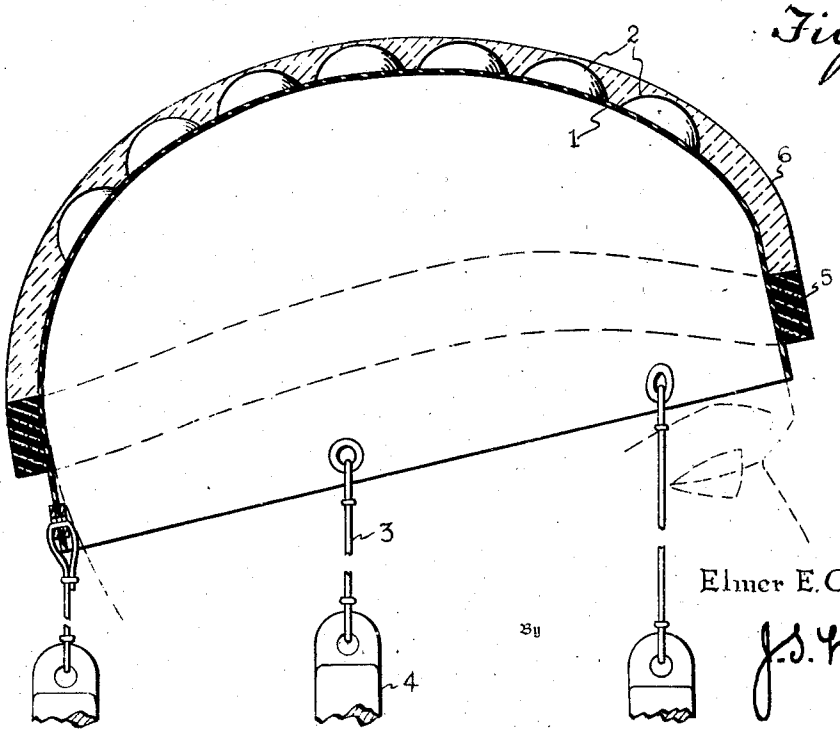

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Fig. 3

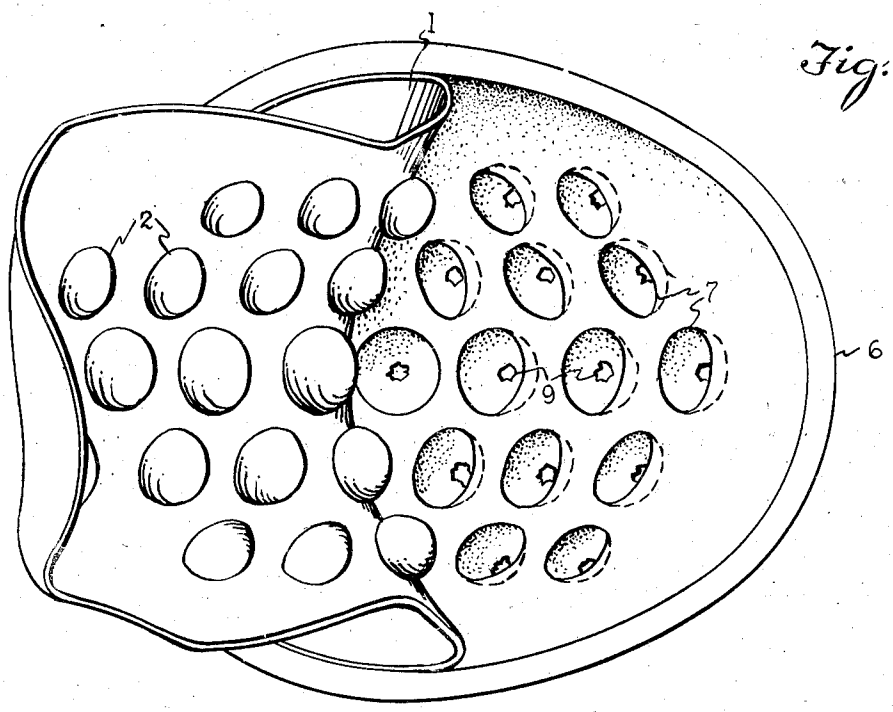

Fig. 4

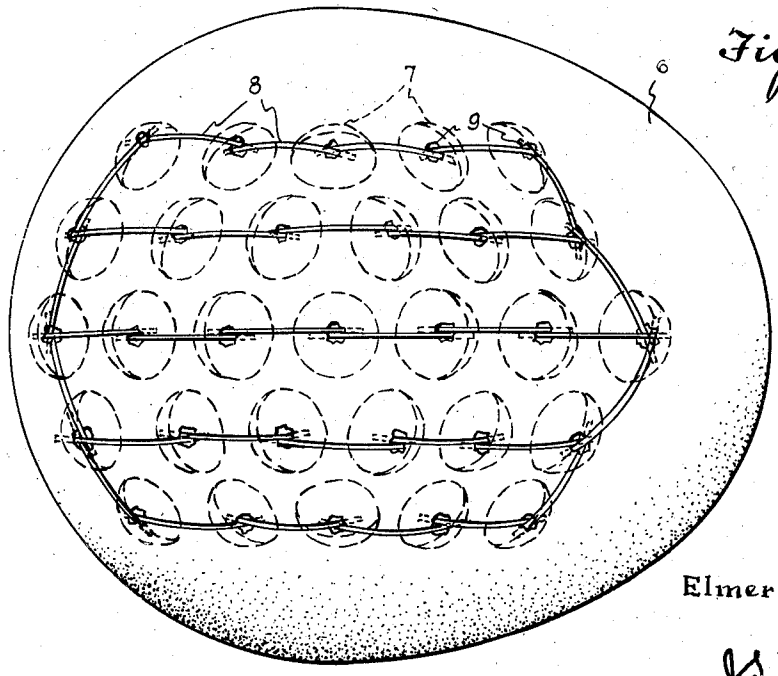

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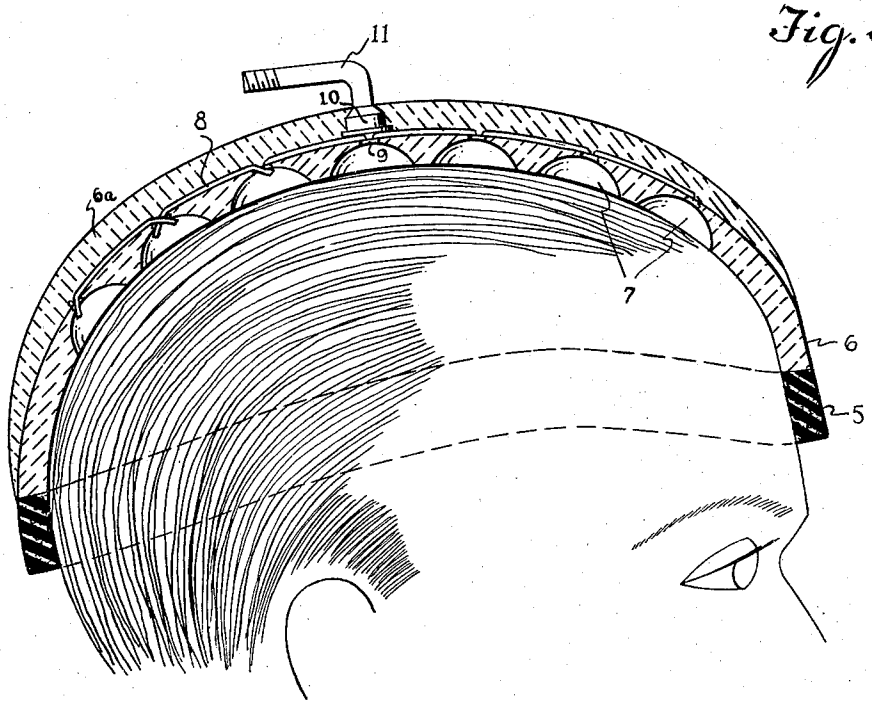
Fig. 5



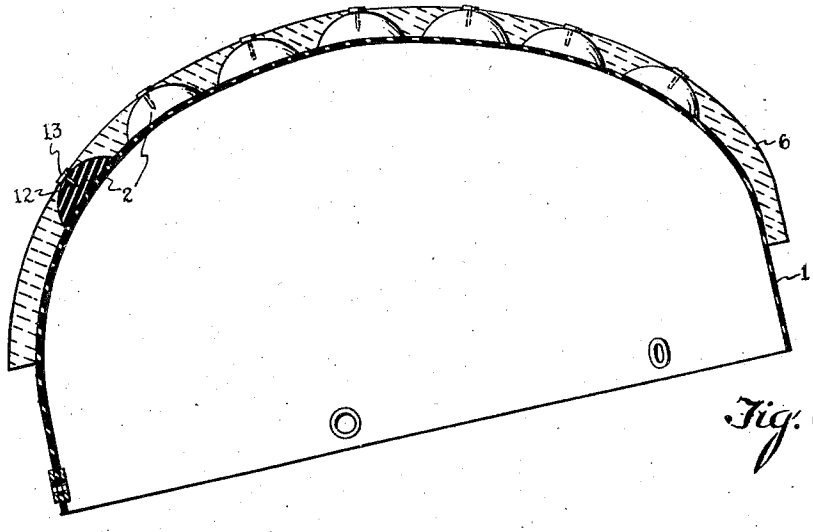


Fig. 6

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2,324,420

UNITED STATES PATENT OFFICE

2,324,420

METHOD OF FORMING HELMETS

Elmer E. Oestrike, Detroit, Mich.

Original application February 6, 1940, Serial No. 317,483. Divided and this application January 6, 1942, Serial No. 425,741

6 Claims. (Cl. 18—55)

This invention relates to methods of forming scalp-treating helmets and is a further improvement on methods disclosed by my pending application filed February 6, 1940, under Serial Number 317,483.

In common with a method to which said pending application is directed, the present method involves applying to the head of a patient requiring scalp treatments a tight-fitting cap preferably of rubber, exteriorly carrying a plurality of spaced core-forming projections, holding such cap under downward tension to assure a tight fit, applying to the cap a coating of quick-setting plastic material at least substantially embedding the projections, removing the cap and the shell formed by said material, when sufficiently set, stripping the cap from the helmet, making provision for communication between the cavities produced interiorly of said shell by the core-forming projections, and applying a final coating of plastic material exteriorly to the shell.

Prior provision for communication between the shell cavities involved drilling at least two holes leading from each cavity to outer face of the shell and fitting therein short lengths of metal tubing suitably bent to connect adjacent cavities, such tubing being embedded subsequently in the final plastic coating. Drilling the holes, bending the tubing and properly positioning it on the shell consumed considerable time, and the bending tended to unduly restrict the tubing unless skillfully effected.

An object of the present invention is to provide passage-forming connecting members between the shell cavities adapted to be very quickly applied without risk of unduly restricting communication and which may be used repeatedly in forming helmets.

Another object is to form the holes opening from the shell cavities much more rapidly and easily than heretofore.

A further object is to predeterminedly vary the size of cavities formed in a helmet in a manner to increase its effectiveness in administering scalp treatments.

A further object is to combine steps of casting the shell and forming holes leading from the cavities, thus simplifying the method.

A further object is to destroy adhesion between the core-forming projections and the shell before stripping the cap from the shell, thus materially reducing the force requisite for such stripping.

These and various other objects are attained by the construction hereinafter described and illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a cap adapted to be snugly fitted to a patient's head to provide a surface on which a shell or partial helment may be cast.

Fig. 2 is a vertical sectional view showing said cap in use with a shell cast thereon.

Fig. 3 is a view interiorly showing said shell with the cap partially stripped therefrom.

Fig. 4 is a top plan view of said shell with passage-forming core members in place.

Fig. 5 is a vertical sectional view of a completed helmet with most of the passage-forming core members removed.

Fig. 6 is a vertical sectional view similar to Fig. 2 but showing modified core-forming projections on the cap.

The cap 1, best shown in Fig. 1 is formed preferably of strong sheet rubber shaped to snugly fit the heads of patients and to thoroughly cover the hair and flatten it against the scalp. Cemented or otherwise firmly exteriorly secured to the hair-engaging area of said cap is a plurality of hemispherical core elements 2 preferably of rubber and disposed in parallel rows, their plane faces seating on the cap. For reasons which hereinafter appear, it is preferred to differentiate these core elements in size, those in the central row being largest, those adjacent to and at each side of the central row being somewhat smaller, and the elements forming the outermost rows being still smaller. A number of suitably spaced cords 3 are attached to the cap at its margin and weights 4 suspended by such cords apply a downward tension to the cap, assuring its firm engagement with the hair and scalp and eliminating wrinkles. Around the lower portion of the cap there is applied a thick band 5 of sponge rubber or the like, suitably tensioned to hold it in place. There is now applied to the area of the cap above said band a coating of quick-setting plastic material of spreading consistency, the preferred material being dental stone. Main requisites of said material are considerable strength, an absence of porosity, when set, and adaptability to be applied cold or at a quite moderate temperature. The shell 6 thus formed rests on the band 5 as a base and preferably has a thickness adequate to substantially embed and to thinly cover the elements 2. (See Fig. 2.)

Having sufficiently hardened, the shell 6 is removed from patient's head, together with cap 1 and some fairly sharp instrument (not shown), as for example an ice-pick, is employed to pierce

the thin wall portions overlying the core elements 2, the thrust thus applied to said elements serving to destroy adhesion thereof to the shell. The cap and its elements 2 are now progressively stripped from the shell, as Fig. 3 illustrates, flexibility of the cap affording withdrawal of said elements from cavities 7 formed by said elements.

The next step consists in exteriorly applying to the shell short lengths 8 of smooth, freely flexible cord, preferably rubber, the end portions thereof being so inserted in the cavities 7 through the openings 9 previously pierced that all of the cavities are interconnected by the cords.

There is now exteriorly applied to the shell one or more additional coats 6a of dental stone or the like, of a depth fully embedding the connections 8 and also embedding the base 10 of a tubular fitting 11 disposed in a communicating relation with the centermost cavity 7, as best appears in Fig. 5. The helmet is completed, after hardening of the added material by withdrawal of the connections 8. Such withdrawal is readily effected by a pull applied to the end portions exposed within the cavities 7. Said connections, if formed of rubber will stretch somewhat before their adhesion is broken, this aiding in breaking adhesion.

In the modified step of forming the shell 6 as illustrated in Fig. 6, there is centrally driven into each core element 2 the stem 12 of a tack having a fairly large and thick head 13 suited to seat firmly at its periphery on said element. An ordinary upholstering tack having its sheet metal head formed with a marginal depending flange or skirt is well suited to the purpose, since the skirt may have a tight sealing engagement with the rubber forming the element 2. The plastic material forming the shell is applied to a depth such as to fully embed the elements 2 and to partially embed the heads 13. After removal of the hardened shell and cap from head of a patient a light hammer tap on each of the heads 13 will destroy adhesion of the elements 2 and the cap may then be stripped off as in the first-described method. Due to the heads 13, the cavities in the inner face of the shell will be similarly provided with circular openings leading to the outer face of the shell and eliminating the piercing operation necessary to method first described.

In using a helmet formed as described herein, the slight annular space formed between the edge portion of helmet and patient's head is sealed by a means which is no feature of present invention and periodic vacuum impulses are applied to the cavities 7 through a hose or the like (not shown) connected to the fitting 11 and leading to a machine (not shown) suited to apply said impulses. Such machines are well known and in common use. Each cavity behaves as an individual suction cup, the scalp being drawn upwardly therein during vacuum periods and released in intervals between such periods. As a general rule, the larger the cavities, the more intense must be the vacuum effect to produce effective massaging since a large scalp area will not lift as readily as a small one. However, it has been discovered that cavities taking effect on the center portion of the scalp may and should be larger than those effective remote from said portion for reason that the scalp is tighter and has a minimum play in its center portion and hence yields less readily than elsewhere. Thus improved results are obtained by varying the sizes of the cavities as has been described.

It should be understood, as a vital principle of the described helmet, that it conforms closely to the scalp of an individual patient, this being essential to derivation of independent vacuum cup effects from the several cavities.

What I claim is:

1. In a method of forming a scalp-treating helmet and individually fitting it to a patient, the steps of applying to the patient's scalp a tight-fitting flexible cap exteriorly carrying a plurality of spaced core-forming projections, applying to such cap a shell-forming coating of quick-setting plastic material substantially embedding the projections, separating the shell from the cap and projections, the interior face of the shell being formed with cavities by said projections, exteriorly applying to the shell a plurality of flexible elongated members freely extending into and interconnecting the cavities, applying to the shell a further coating of plastic material adequate to embed the interconnecting members, and withdrawing the interconnecting members through the cavities and thus rendering the cavities intercommunicating.

2. A method of forming a scalp-treating helmet as set forth in claim 1, said elongated members being formed of elastic material.

3. In a method of forming a scalp-treating helmet and individually fitting it to a patient, the steps of applying to the patient's scalp a tight-fitting flexible cap exteriorly carrying a plurality of spaced core-forming projections, applying to such a cap a shell-forming coating of quick-setting plastic material substantially embedding and thinly covering the projections, separating the shell from the cap and projections, the interior face of the shell being formed with cavities by said projections, piercing the thin walls of the shell formed above the cavities, exteriorly applying to the shell a plurality of flexible elongated members freely extending into and interconnecting the cavities, applying to the shell a further coating of plastic material adequate to embed the interconnecting members, and withdrawing the interconnecting members through the cavities and thus rendering the cavities intercommunicating.

4. In a method of forming a scalp-treating helmet and individually fitting it to a patient, the steps of applying to the patient's scalp a tight-fitting flexible cap exteriorly carrying a plurality of core-forming projections, tensioning said cap to assure same a smooth surface, applying to such a cap a shell-forming coating of quick-setting plastic material substantially embedding the projections, removing the shell and cap as a unit from the patient's head, destroying adhesion between the projections and shell, and stripping the cap and its projections from the shell.

5. In a method of forming a scalp-treating helmet and individually fitting it to a patient, the steps of applying to the patient's scalp a tight-fitting flexible cap exteriorly carrying a plurality of core-forming projections, applying to such cap a shell-forming coating of quick-setting plastic material embedding and covering the projections, removing the shell and cap as a unit from the patient's head, piercing openings in the shell at each of the cavities formed by said projections, and in the same operation destroying adhesion between the projections and shell, and stripping the cap and its projections from the shell, and applying to the shell a further coating of plastic material while making provision in said coating

for communication between the cavities through said pierced openings.

6. In a method of forming a scalp-treating helmet and individually fitting it to a patient, the steps of applying to the patient's scalp a tight-fitting flexible cap exteriorly carrying a plurality of cone-forming projections each having a reduced extension, applying to such cap a shell-forming coating of plastic material embedding the projections and partially embedding their extensions, removing the shell and cap as a unit from the patient's head, stripping the cap and its projections from the shell, whereby cavities are formed interiorly of the shell by said projections and said extensions form openings from said cavities through the shell, interconnecting the cavities by elongated core members exteriorly applied to the shell with their ends inserted in the cavities through said openings, applying a further coating of plastic material to the shell sufficient to embed said elongated core members, and withdrawing the core members through the cavities to leave passages rendering the cavities intercommunicating.

ELMER E. OESTRIKE.