

Sept. 28, 1943.

E. E. OESTRIKE

2,330,732

METHOD OF FORMING HELMETS

Filed Feb. 6, 1940

3 Sheets-Sheet 1

Fig. 1

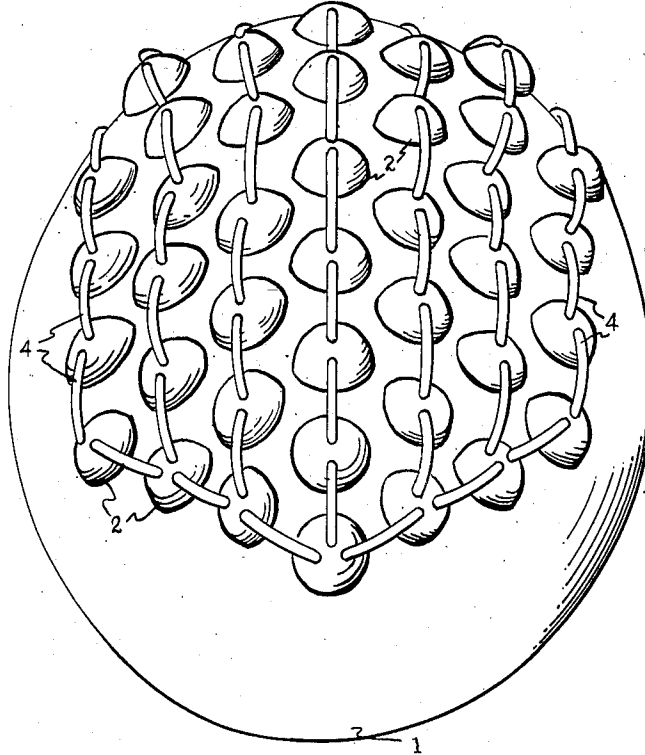
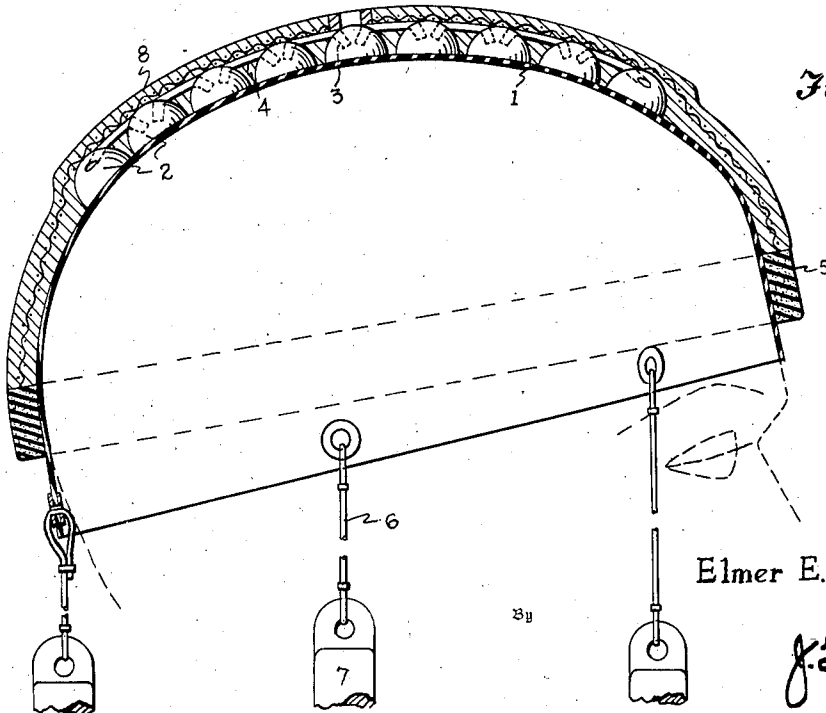


Fig. 2



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Fig. 5

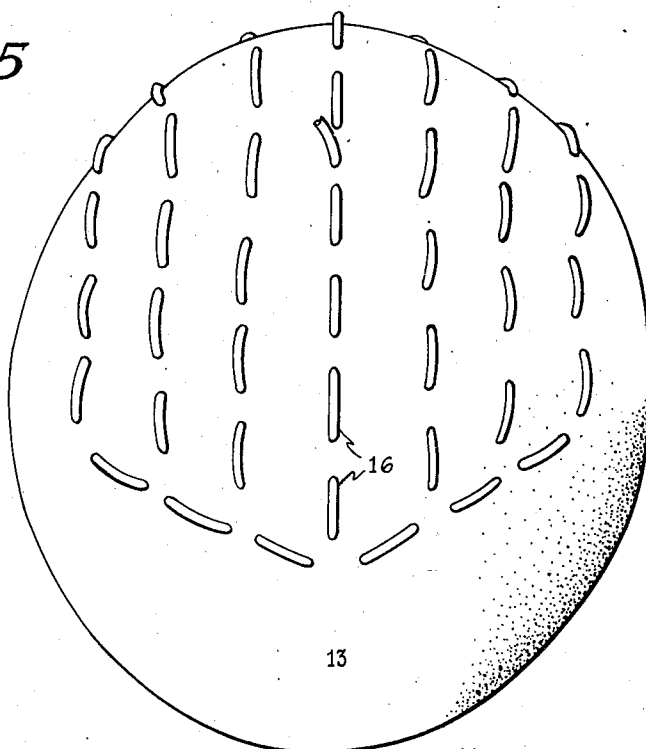


Fig. 6

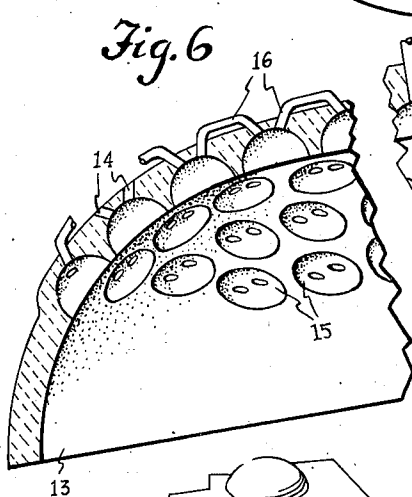


Fig. 7

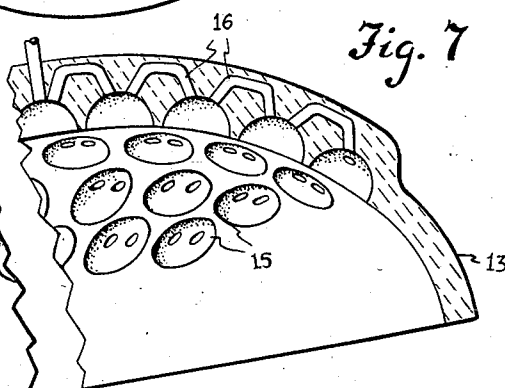
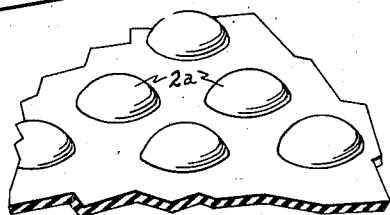


Fig. 8



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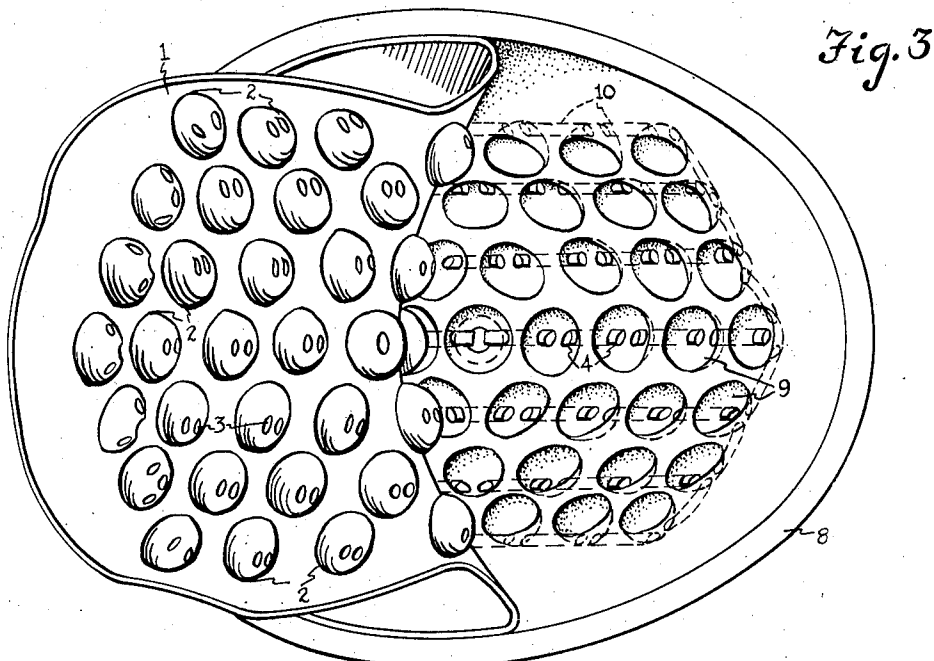


Fig. 3

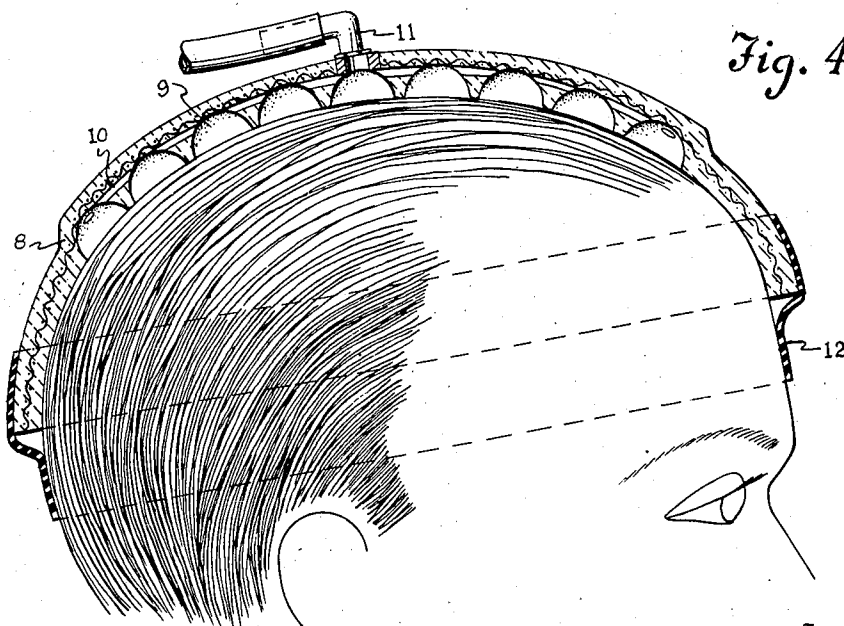


Fig. 4

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UNITED STATES PATENT OFFICE

2,330,732

METHOD OF FORMING HELMETS

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Application February 6, 1940, Serial No. 317,483

17 Claims. (Cl. 18—55)

This invention relates to methods of forming helmets and particularly helmets for administering scalp treatments.

It has been found beneficial, in cases of excessive loss of hair and other subnormal scalp conditions, to subject the scalp to alternating conditions of depressed air pressure and substantially atmospheric pressure, and various types of helmets have been designed to apply such treatments. Such helmets have been adopted quite commonly to apply varying air pressures within chambers continuously overlying considerable scalp areas, and it has been found that the scalp reactions are almost entirely limited to the air-sealed peripheries of such areas. The intermediate regions of such areas cannot materially respond to such treatments unless an impractically high pressure differential is employed under alternating conditions of the treatment. Prior helmets furthermore have been designed of a size to accommodate all patients, with resultant necessity for imposing an excessive sealing pressure on the head of a patient at the helmet base.

An object of the invention is to form a scalp-treating helmet by a method securing a close individual fit such as lends itself to a highly effective air-sealed relation to the scalp, and also to the employment of numerous helmet cavities wherein small scalp areas may be subjected to varying air pressures.

Another object is to provide a simple and effective method for forming the desired cavities and passages interconnecting them.

Another object is to so construct a helmet for scalp treatments that its deterioration by sterilizing alcohol and by oils and salves will be minimized.

In attaining the foregoing and various other objects, there is employed the apparatus and successive steps illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a cap adapted to be snugly fitted on a patient's head to receive a plastic helmet-forming material.

Fig. 2 is a vertical sectional view of a helmet as formed on said cap.

Fig. 3 is a bottom view of the helmet, as removed from the patient, showing said cap partially stripped from the helmet.

Fig. 4 is a vertical sectional view of the helmet, as used to administer treatment.

Fig. 5 is a perspective view of the helmet as partially completed by a modified method.

Fig. 6 is a fragmentary vertical sectional view of the same.

Fig. 7 shows in fragmentary vertical section a helmet, as completed by the modified method.

Fig. 8 is a fragmentary view of the cap used in the modified method.

The cap 1 shown in Figs. 1, 2, and 3 is formed preferably of strong sheet rubber, shaped to snugly fit a patient's head and thoroughly cover the hair, flattening the latter against the scalp. Cemented or otherwise firmly exteriorly secured to the crown portion of the cap is a plurality of small hemispherical core elements 2, preferably rubber and disposed in parallel rows, the cap being engaged by their plane faces. Opening into the curved face of each intermediate core element are two sockets 3, approximately radial to such face, and three such sockets are formed in the end elements of the rows. Inserted and frictionally retained in the sockets 3 are short flexible connections 4 preferably of rubber, interconnecting the elements 2 of each row and further interconnecting the end elements of the several rows. It is feasible and preferable to apply the connections 4, as described, before placing the cap on a patient's head. Around the lower portion of the cap there is engaged a thick band 5 of sponge rubber or the like, suitably tensioned to hold it in place. The cap is tightly stretched to firmly engage the scalp and hair by attaching to its periphery cords 6 suspending weights 7. These weights permit of accurate predetermination of the applied tension. There is now applied to the cap a heavy coating of a quick-setting plastic material of spreading consistency, such as dental stone, plaster of Paris or plastic wood. The helmet structure 8 thus built up rests on the band 5 as a base, and has a thickness adequate to completely embed the connections 4. (See Fig. 2.) When sufficiently hardened, the helmet is removed together with the rubber cap, and the latter is stripped off, as Fig. 3 illustrates. In stripping the cap from the helmet, the connections 4 are released from the sockets 3 and retained in the helmet, their ends being exposed within cavities 9 cored in the dome portion of the helmet by the elements 2. Said exposed ends permit the connections 4 to be readily withdrawn, leaving cored passages 10 interconnecting the cavities 9. Thus, when treatments are being administered by the helmet (Fig. 4), air pressure variations imposed through a fitting 11 applied to one of the cavities 9 take equal effect in all of said cavities. It is to be noted that machines for inducing the

desired variations are in common use and well known to the medical profession. To complete the helmet, a sealing means may be applied to its lower margin to supplement the seal provided by the helmet itself in preventing air flow between such margin and patient's head. Fig. 4 discloses such a means formed by a band of sheet rubber 12 embracing the lower or rim portion of the helmet and so projecting below such portion as to further embrace the head of a patient.

In the modified method of forming the helmet, illustrated by Figs. 5, 6, 7 and 8, the cap 1 as first described is used, and has permanently attached thereto hemispherical core elements 2a, differing from those first described only in omission of the sockets 3. Plastic material is applied to a depth sufficient to fully embed said elements, and the helmet thus formed is removed, when hardened, together with the cap. After stripping off the latter, two divergent openings 14 are drilled through the dome portion of each cavity 15 to the outer face of the helmet. Short lengths of metal tubing 16 are now inserted in the openings 14 to interconnect adjoining cavities of each row and the end cavities of the several rows as appears in Fig. 6. There is then exteriorly applied to the member 13 a sufficient final coating of the plastic material to embed all of the connections 16. (Fig. 7.)

The helmet produced by either described method closely fits an individual patient and no other. In either case, the dome portion of the helmet is formed with a considerable number of spaced cavities and with intervening areas adapted to conform closely to and seat upon the scalp. In each described helmet, the several cavities are so interconnected that variations of air pressure imposed in one cavity are transmitted to all.

The described methods of production are inexpensive and the resulting helmets may be used repeatedly until the patient has received any necessary course of treatments, however extensive.

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 covering, embracing the lower portion of said covering by an elastic band tensioned to hold it in place, and applying to the area of said covering exposed above the band a thick helmet-forming coating of quick-setting plastic material, substantially impervious to air, whereby said band defines a lower edge of the helmet.

2. 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 an elastic cap, weighting the cap to stretch it tightly upon the scalp and applying to the cap a thick helmet-forming coating of quick-setting plastic material, substantially impervious to air.

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 an elastic cap, applying and maintaining a predetermined tension on the lower portion of the cap to hold it stretched in tight engagement with the scalp, and applying to the cap a helmet-forming coating of quick-setting plastic material, substantially impervious to air.

4. In a method of forming a scalp-treating helmet and fitting it individually to a patient, the

steps of applying to the patient's scalp a flexible covering carrying a plurality of spaced core-forming projections, extending in various directions from the covering, applying to said covering a helmet-forming coating of quick-setting plastic material substantially impervious to air and substantially embedding said projections, removing as a unit the helmet together with said covering and its projections, and separating the covering together with its projections from the helmet.

5. In a method of forming a scalp-treating helmet, individually fitted to a patient, the steps of applying to the patient's scalp a tight-fitting flexible cap having affixed thereto a plurality of spaced, core-forming projections and passage-forming core members detachably secured to and interconnecting the projections, applying to the cap a helmet-forming coating of quick-setting plastic material substantially impervious to air, and completely embedding the projections and interconnecting members, separating the helmet, when set, from the cap together with the interconnecting members, and removing the interconnecting members from the helmet.

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 covering carrying a plurality of spaced core-forming projections, applying to the covering a helmet-forming coating of quick-setting plastic material, substantially impervious to air and embedding the projections, removing as a unit the helmet together with said covering and its projections, progressively separating the covering and its projections from the helmet, and establishing communication between the helmet cavities formed by the projections.

7. 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 carrying a plurality of spaced core-forming projections, applying to the cap a helmet-forming coating of quick-setting plastic material, substantially impervious to air and embedding the projections, separating the helmet from the cap, extending at least one passage from each cavity to the outer face of the helmet, and applying tubular members to the helmet in sealed engagement with said passages, and thereby rendering all of the cavities intercommunicating.

8. In a method of forming a one-piece helmet and individually fitting it to a patient, the step of molding the helmet on the patient's head and concurrently forming the helmet with a plurality of spaced cavities interrupting the interior face of the helmet, and opening in diverse directions.

9. In a method of forming a one-piece helmet and individually fitting it to a patient, the step of molding the helmet on the patient's head and concurrently forming the helmet with a plurality of spaced cavities interrupting the interior face of the helmet and with passages interconnecting such cavities.

10. In a method of forming a helmet and individually fitting it to a patient, the steps of applying to the patient's scalp a tight-fitting flexible covering carrying a plurality of spaced core-forming projections, applying to the covering a coating of quick-setting plastic material substantially embedding the projections, separating the helmet from the covering and projections, applying to the helmet tubular members forming passages for rendering the cavities cored by the projections intercommunicating, and apply-

ing a further coating of plastic material to air-seal the joints between the tubular members and the cavities.

11. 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 covering, snugly engaging said covering by a band encircling the patient's head to define the lower edge of the helmet, and applying to area of the covering exposed above the band a helmet-forming coating of quick-setting material, substantially impervious to air.

12. 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 an expandible cap, applying a predetermined downward tension to the cap at its lower edge, and applying to the tensioned cap a helmet-forming coating of quick-setting plastic material, substantially impervious to air.

13. 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 expandible cap, applying a predetermined downward tension to the cap at its lower edge, snugly engaging said cap by a band encircling the patient's head to define the lower edge of the helmet, and applying to area of the tensioned cap exposed above the band a helmet-forming coating of quick-setting plastic material substantially impervious to air.

14. In a method of forming a scalp-treating helmet individually fitted to a patient, the steps of applying to the patient's scalp a tight-fitting flexible cap having affixed thereto a plurality of spaced, core-forming projections and having removably inserted in such projections the extremities of flexible passage-forming core members interconnecting the projections, applying to the cap a helmet-forming coating of quick-setting plastic material, substantially impervious to air and completely embedding the projections and interconnecting members, separating the helmet, when set, from the cap, and thereby withdrawing the interconnecting members from the projections, and removing said members from the hel-

met through the cavities formed by the projections.

15. 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 the cap a helmet-forming coating of quick-setting plastic material substantially impervious to air and substantially embedding the projections, separating the helmet, as partially formed by said material, from the cap and projections, the interior face of said helmet being formed with cavities by said projections, exteriorly applying to the partially formed helmet elongated members interconnecting adjacent cavities, such members being adapted to render the cavities intercommunicating, and applying a further coating of plastic material to the partially formed helmet adequate to embed the interconnecting members.

16. In a method of forming from plastic material a scalp-treating helmet having spaced cavities opening in its interior face, the steps of embedding in the helmet in the course of its formation, flexible connections having end portions extending into said cavities, and withdrawing said connections from the helmet through the cavities to form passages interconnecting the cavities.

17. In a method of forming a scalp-treating helmet of plastic material and individually fitting such helmet to a patient, the formation of a plurality of spaced cavities in the interior face of the helmet by applying at least a portion of the plastic material to a flexible cap tightly fitting the patient's head and carrying core members for the production of said cavities, and the formation of passages in said helmet interconnecting the cavities by embedding in the helmet, in the course of its formation, flexible connections between the cavities having end portions extending into the cavities, and withdrawing said connections from the helmet through the cavities.

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