

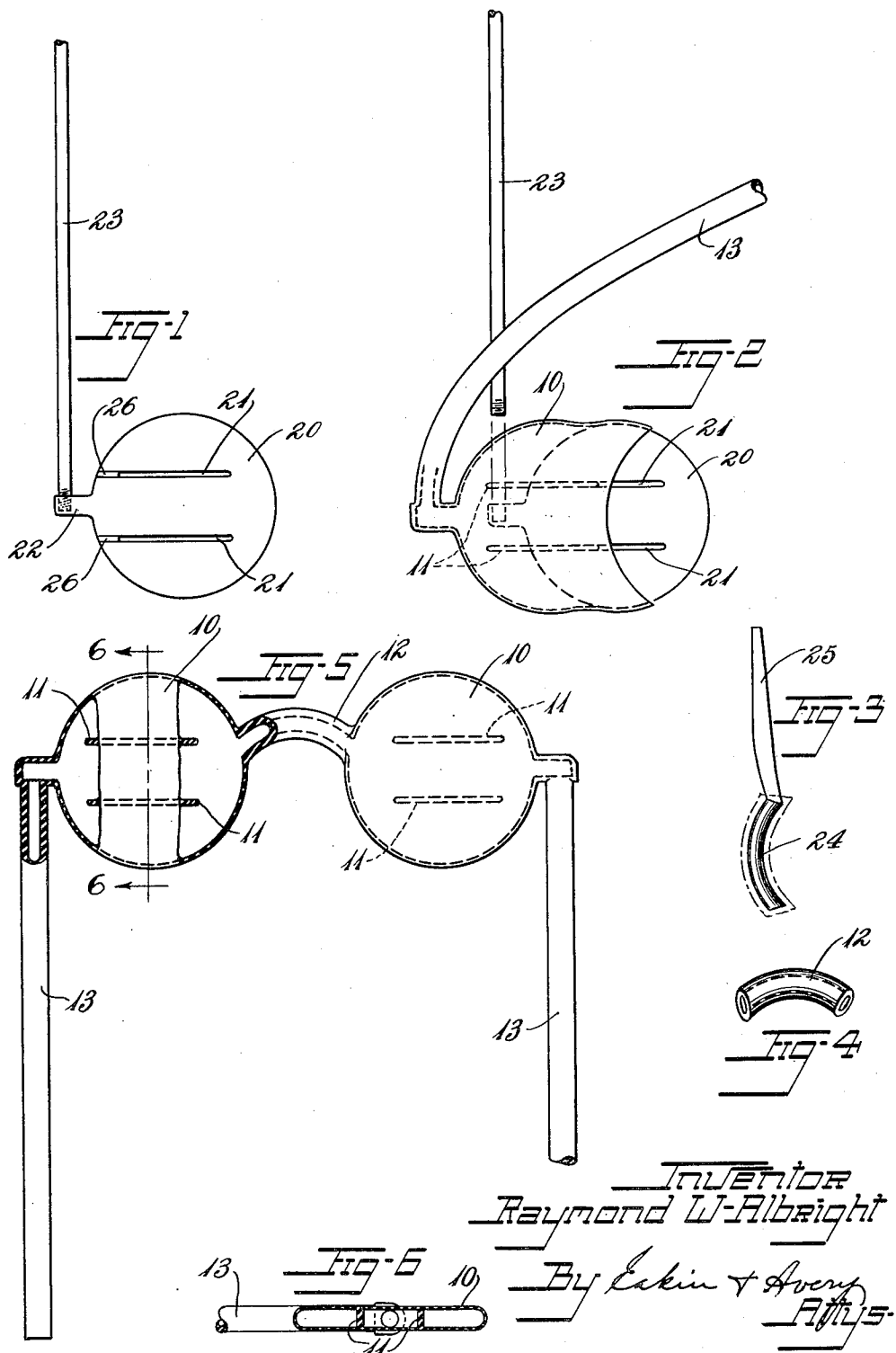
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THERAPEUTICAL APPLIANCE AND METHOD OF MAKING THE SAME

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## UNITED STATES PATENT OFFICE

2,108,934

THERAPEUTICAL APPLIANCE AND METHOD  
OF MAKING THE SAMERaymond W. Albright, Akron, Ohio, assignor to  
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13 Claims. (Cl. 128—399)

This invention relates to a therapeutical appliance especially adapted for application of heat or cold to the eyes and adjacent facial areas of a patient, and to a method of making such an appliance.

The objects of this invention are to provide an applicator adapted to be placed over a patient's eyes and to be maintained at a desired temperature by circulation of heated or cooled water through its hollow interior; to provide an applicator which may be bound in place over the eyes of a patient without undue discomfort or inconvenience; to provide such an applicator which shall be capable of distension under internal pressure so that the applicator may accommodate or fit itself to the curves of the facial areas at and around the eyes and thereby to insure uniform application of heat or cold to the area undergoing treatment; to provide for limiting distension of the applicator under applied pressure to avoid application of excessive pressure to any portion of the eyes or surrounding facial areas during treatment; to provide a therapeutical device comprising a pair of somewhat distensible applicators adapted to be bound in place over the eyes of a patient and having integral relatively less distensible rubber tubes providing means for directing a stream of water continuously through the applicators while they are bound in place over a patient's eyes; to provide a therapeutical appliance of the type described which shall be structurally integral and which shall be made entirely of tough latex rubber; and to provide a method of making such an appliance.

The invention in a preferred embodiment will be described with reference to the accompanying drawing in which

Fig. 1 is an elevation of a form used for making a portion of the therapeutical appliance;

Fig. 2 is an elevation showing the form of Fig. 1 in a disassembled condition with a rubber deposit constituting a portion of the appliance being removed from the form;

Fig. 3 is an elevation showing a form used for making another portion of the appliance.

Fig. 4 is an elevation of a portion of the appliance made upon the form of Fig. 3, after it has been trimmed and is ready for assembly with other constituent portions of the appliance;

Fig. 5 is an elevation partially broken away and sectioned and showing the finished appliance of my invention.

Fig. 6 is a vertical section taken on line 6—6 of Fig. 5.

The therapeutical appliance of this invention

in a preferred form illustrated in Fig. 5 comprises two hollow, thin walled rubber applicators 10, 10 which are substantially flat and generally circular in shape and are of such size that they may be fitted conveniently over a patient's eyes to cover completely the eyes and immediately adjacent facial areas. Thin integral webs of rubber 11, 11 extend from one flat side of the applicator to the other for a substantial distance, preferably in a direction parallel to a line joining the inlet and outlet fluid conduits to be described hereafter. Communicating with the interiors of the two applicators at points upon their peripheries and integrally joined to the walls thereof is provided a rubber tube 12 having walls relatively heavier and accordingly less distensible than the thinner walls of the applicators. The tube 12 preferably is curved and of such length as is necessary conveniently and comfortably to bridge a patient's nose when the applicators are in position over his eyes. Connecting fluid conduits, preferably integral rubber tubes 13, 13 communicate with the interiors of the hollow applicators at points preferably generally opposite the point of communication of the aforesaid tube 12. The tubes 13, 13 preferably are made with a right angle turn in the plane of the applicators near the point of joinder with the applicators, and should be sufficiently long to extend from under a binding holding the applicators in position, to be connected to fluid circulating apparatus. The walls of the tubes 13, 13, like those of the tube 12, preferably are heavier and less distensible than the walls of the applicators. Thus, it will be seen that the appliance, which in some respects resembles a pair of spectacles, may be placed in position over the eyes of a patient and bound in place in any convenient manner, and that water or other fluid at a desired temperature may be circulated continuously through the appliance to subject the contiguous bodily tissues to a controlled uniform temperature, without undue discomfort to the patient. The water may be forced through the appliance under pressure sufficient to distend the thin walled applicators slightly and thereby to insure even contact of the applicator with the irregular areas over and about the eyes. Distension of the applicator is limited however by the webs of rubber 11, 11 joining the two flat sides of the applicators which serve to prevent extreme distension of the applicator which might cause excessive pressure to be exerted upon the eyes, particularly when the appliance is bound tightly in place. In addition, the webs aid in directing flow of the water to

outer circumferential portions of the applicator. It is to be understood that the webs within the applicators, although highly desirable, are not essential and that an applicator without such webs may be used quite satisfactorily in the application of hot or cold treatments.

There is now available apparatus designed especially for heating water to a desired temperature and circulating it under pressure through an applicator such as the appliance hereinabove described. Obviously, however, any convenient means for providing a continuous supply of hot or cold water may be employed in conjunction with the present appliance and such auxiliary apparatus forms no part of the present invention.

The complicated structure of the present appliance has necessitated the provision of special procedure for its manufacture, which is accomplished by depositing rubber from a liquid rubber dispersion upon suitable forms. Two forms are required. The first form illustrated in Fig. 1 is designed to form one applicator and integral connecting tube, and comprises a generally flat and circular applicator-forming portion 20, preferably having two parallel narrow slots 21, 21 extending from the periphery of the form inward for a distance corresponding to the length of webs required in the finished applicator. A tubular projection 22 having a diameter corresponding to the desired inner diameter of the connecting tube, is provided upon the periphery of the form, preferably between the open ends of the two slots 21, 21 and a rod 23 designed to form the connecting tube proper is screwed into the tubular projection 22 preferably at right angles to the axis thereof and in the plane of the applicator-forming portion 20. The second required form shown in Fig. 3 is designed to form the short tube which connects the two applicators and bridges the nose of a patient, and comprises a curved tubular portion 24 shaped to form the tube, one end of the form being extended to provide a handle 25 for convenience in dipping.

In proceeding with the manufacture of the therapeutical appliance, small pieces of pearl glue 26, 26, or other water-soluble coherent solid or equivalent disintegrable material, are wedged in the open ends of the slots 21, 21 of the form 20, and the entire form is immersed in a liquid dispersion of rubber preferably a compounded latex, until a relatively thin layer of rubber about 0.01 inch thick is deposited upon the form in any usual manner. The form then is removed from the dispersion and the tube-forming portion 23 preferably is re-dipped until the rubber coating thereupon is considerably heavier than that upon the rest of the form for example about 0.04 inch thick. The entire rubber coating then is washed thoroughly, during which the glue in the slots is dissolved and completely removed. The washed coating then is dried and partially vulcanized to a degree which will permit of considerable stretching without permanently deforming the rubber, but which is not sufficiently far advanced to prevent securing the best possible adhesion between the rubber and other parts of the applicator later to be adhered thereto. To remove the form from the interior of the rubber, the rod 23 is unscrewed and pulled out, the end of the rubber tube 13 formed thereon, and the applicator portion 10 of the rubber is slit for a short distance along the periphery thereof at a point generally opposite to the point of communication of the connecting tube with the applicator portion, and the applicator-forming portion 20 of the form is

removed through the slit, the rubber being stretched to permit its removal as indicated in Fig. 2. The procedure thus far described then is repeated to make a second applicator and integral connecting tube identical in structure with the first. The second form 24 then is provided with a relatively heavy coating of rubber of approximately the same thickness as that of the connecting tubes 13, and the rubber is washed, dried, and partially vulcanized as in making the applicators. The rubber then is stripped from the form and is trimmed to provide a nose-bridging tube 12 as illustrated in Fig. 4.

To assemble the various parts of the appliance, the ends of the short nose-bridging tube 12 and the portions of the two applicators immediately surrounding the two slits hereinabove mentioned, are coated with a rubber adhesive such as a rubber cement, or latex, and the ends of the tube are inserted into the slits and are pressed into adhesive engagement with the walls of the applicators. When the adhesive has dried, the entire assembled appliance preferably is immersed in a liquid dispersion of rubber to acquire a thin overall enveloping coating of rubber, which is dried. Thereafter vulcanization of the as yet only partially vulcanized rubber of the assembled appliance, is completed in any convenient manner to provide the finished therapeutical device illustrated in Fig. 5.

The term "liquid dispersion of rubber" has been used in the specification and appended claims in a broad sense to include all flowable dispersions of rubber and like natural or synthetic gums or resins, whether the rubber be artificially dispersed in water, or in an organic solvent, as well as natural latices of rubber producing plants. The dispersions may be concentrated, diluted, thickened, thinned, vulcanized or otherwise treated as may be desired, and may contain any necessary compounding ingredients such as are commonly used in the manufacture of rubber goods.

Numerous modifications may be made in details of the invention as hereinabove described without departing from the scope of the discovery as defined in the appended claims.

#### I claim:

1. A rubber article adapted for therapeutical use in treating an area of a human body, comprising a thin walled and somewhat distensible closed hollow rubber bag of relatively large cross-sectional area designed substantially to cover the area to be treated, an integral rubber web joining two sides of the rubber bag for a substantial distance in such manner as to limit the distension of the bag, and two less distensible fluid conduits of relatively small cross-sectional area communicating with said bag at generally opposed points in such manner as to direct fluid through the interior thereof from one conduit serving as a fluid inlet to the other conduit serving as a fluid outlet.

2. A therapeutical appliance as defined in claim 1 made substantially entirely of latex rubber.

3. A therapeutical appliance of the type described, comprising a generally flat and circular thin walled hollow rubber applicator having a single fluid-containing chamber of relatively large cross-sectional area adapted to be placed over and substantially to cover a patient's eye, and two integral rubber tubes of relatively small cross-sectional area communicating with the said chamber at generally opposed points upon the periphery of the applicator so as to direct a fluid stream across the interior thereof from one tube

serving as a fluid inlet to the other tube serving as a fluid outlet.

4. A therapeutical appliance as defined in claim 3, having an integral thin rubber web joining the two sides of the flat rubber applicator for a substantial distance and serving to limit distension of the applicator.

5. A therapeutical appliance as defined in claim 3, made substantially entirely of latex rubber.

6. A therapeutical appliance as defined in claim 3 made substantially entirely of latex rubber, in which the walls of the rubber tubes are substantially thicker and less distensible than the relatively thin walls of the applicator.

7. A therapeutical appliance of the type described, comprising two similar generally flat and circular thin walled rubber applicators of relatively large cross-sectional area adapted to fit over and substantially to cover the eyes of a patient, an integral rubber tube of relatively small cross-sectional area communicating with the hollow interiors of each of two applicators at points upon the peripheries thereof, said rubber tube being of such length and configuration as to bridge the nose of the patient when the applicators are placed over his eyes, and two fluid conduits of similar relatively small cross-sectional area communicating respectively with the hollow interiors of the two applicators at points upon the peripheries thereof which are generally opposed to the points of communication of the aforesaid integral tube.

8. A therapeutical appliance as defined in claim 7 having thin rubber webs joining the two sides of each of the flat rubber applicators for a substantial distance and serving to limit distension of the applicators.

9. A therapeutical appliance as defined in claim 7 in which the two fluid conduits comprise flexible

rubber tubes integrally joined to the applicators.

10. A therapeutical appliance as defined in claim 7 made substantially entirely of latex rubber.

11. A therapeutical appliance as defined in claim 7 made substantially entirely of latex rubber, in which the two fluid conduits comprise flexible rubber tubes, the walls of which are substantially thicker and less distensible than the relatively thin walls of the applicators.

12. A therapeutical appliance of the type described, comprising a generally flat and circular thin walled and somewhat distensible hollow rubber applicator adapted substantially to cover a patient's eye when placed thereover, an integral rubber web joining the two sides of the flat rubber applicator for a substantial distance and serving to limit distension thereof, and two fluid conduits less distensible than the said applicator communicating with the interior thereof so as to direct a fluid stream through the interior from one conduit serving as a fluid inlet to the other conduit serving as a fluid outlet.

13. A therapeutical appliance of the type described comprising a generally flat and circular thin walled hollow rubber applicator of relatively large cross-sectional area adapted to be placed over and substantially to cover a patient's eye, an integral thin rubber web joining the two sides of the flat rubber applicator for a substantial distance and serving to limit distension thereof, and two integral rubber tubes of relatively small cross-sectional area communicating with the interior of the hollow applicator at generally opposed points upon the periphery thereof so as to direct a fluid stream across the interior of the hollow applicator from one tube serving as a fluid inlet to the other tube serving as a fluid outlet.

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