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DE FOREST B. CATLIN

EYE TREATING APPARATUS

Original Filed March 12, 1927

Fig. 1.

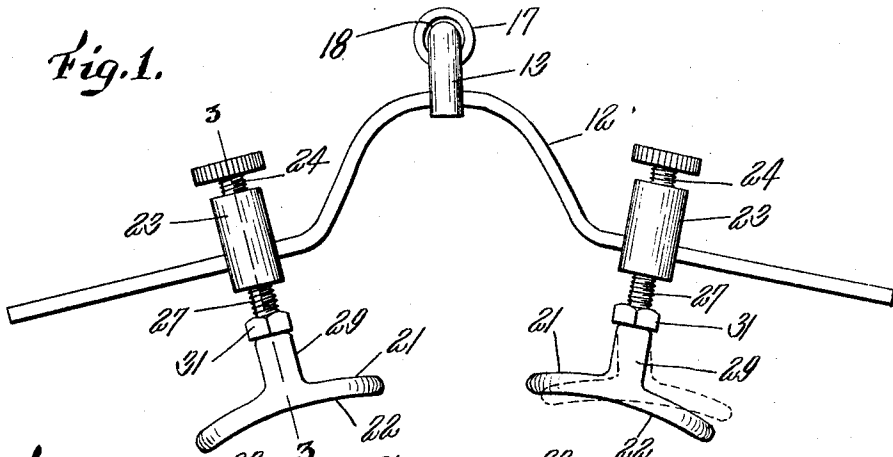


Fig. 2.

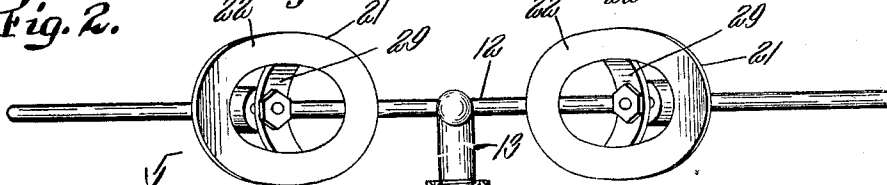


Fig. 3.

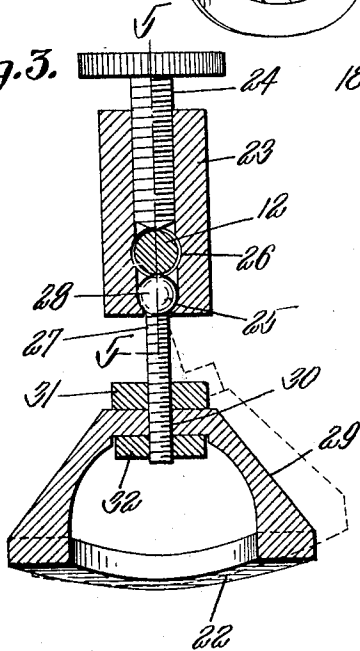


Fig. 4.

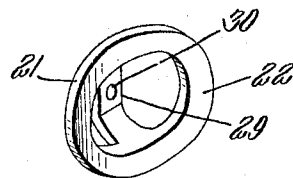
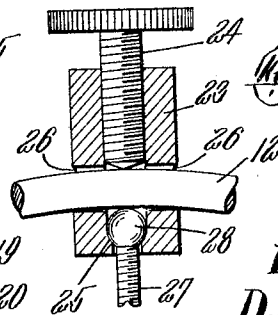


Fig. 5.



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EYE-TREATING APPARATUS.

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This invention relates to apparatus for treating human eyes by applying thereto a remedial current, such as a heating current used in diathermy, a sine wave current, or a galvanic current, the treatment being useful in cases of poor circulation, lessened nerve supply and lowered resistance accompanied by loss of muscle tone.

The apparatus of my invention includes a double electrode whose members are adapted to be applied to the closed lids of a pair of eyes, and to be connected with a suitable source of remedial current, such as a diathermy machine, a sine wave machine, or a galvanic battery, the current being delivered by the electrode members to the tissues requiring treatment. The double electrode may be called an active electrode, from which the remedial current may pass to a so-called indifferent electrode located on a suitable surface, such as the back of the patient's neck. In galvanic treatment the remedial current passes from the double electrode to the tissues through an agent such as absorbent cotton, saturated in salt water and held in openings or recesses formed for its reception in the members of the double electrode.

Of the accompanying drawings forming a part of this specification,—

Figure 1 is an end view of an apparatus embodying the invention.

Figure 2 is a side view of the same, portions of the current-conducting means being shown in section, and other portions broken away.

Figure 3 is an enlarged section on line 3—3 of Figure 1.

Figure 4 is a perspective view of one of the members of the double electrode.

Figure 5 is a fragmentary section on line 5—5 of Figure 3.

The same reference characters indicate the same parts in all of the figures.

In the drawings, 12 designates an electrode-supporting conductor, which may be a practically inflexible elongated rod of conducting metal, and is provided with means for connection with a source of remedial current, such as a diathermy machine, or a galvanic battery. In this instance, I have embodied said means in a bent conducting shank 13, fixed to the midlength portion of the conductor 12, an elongated flexible conductor 14, connected at one end with the shank 13, and provided with a flexible in-

ulating sheath 15, and an angular conducting plug 16, connected with the free end of the flexible conductor and adapted to engage the source of current. One end portion of the insulating sheath 15 is enclosed in a rigid tube 17 of "Bakelite", or other insulating material, to which is fixed a coupling member 18 having a screw-thread connection with the shank 13, as shown by Figure 2. The tube 17 may be about twelve inches long, and the flexible conductor and its sheath may be several feet long. To the free end of the sheath 15 is fixed a short rigid sleeve 19, of insulating material, to which is fixed a coupling member 20, having a screw-thread connection with the plug 16. The tube 17 constitutes an element of means for maintaining the apparatus in its operative position when in use, the tube, in this instance, constituting a handle adapted to be held by a patient whose eyes are being treated.

Spaced apart on the conductor 12 are the members 21, 21, of a double electrode. Said members are preferably of aluminium for lightness, and each is provided with a contact face 22, formed to bear on external surfaces of closed eyelids. To limit the area of contact of each electrode member with the eyelids, and localize said area so that the remedial current does not pass through the major and central portion of the eyeball containing the crystalline lens, and acts mainly on the muscles connected with the periphery of the ball, I impart to the face 22 an elliptical annular form, as shown by Figures 2 and 4, and curve said face, as shown by Figure 1, so that it conforms to the convexity of the eyeball and the closed eyelids. The electrode members are, therefore, formed to bear on elliptical annular areas of closed eyelids, and to surround openings coinciding with eyelid and eyeball portions surrounded by said areas, so that the current conducted by the electrode members does not act on the major central portions of the eyeballs.

In other words, the area and arrangement of the openings in the electrode members is such that the remedial current passes around, and not through, the crystalline lenses when the apparatus is in operation. I have discovered that the passage of the current through the crystalline lenses is liable, on account of its high temperature, to coagulate the vitreous fluid and cause opacity.

To permit accurate adjustment of the electrode members to the eyes, I provide a pair of conducting holders, adjustably mounted on the conductor 12, and provide with clamping means engaging the conductor to maintain the holders and electrode members variably spaced apart, the construction of each holder being preferably as next described.

23 designates a metal sleeve having a threaded bore, with which is engaged a clamping screw 24. The sleeve is provided at one end with an internal socket 25, and with a transverse orifice 26, intersecting the threaded bore and of larger diameter than the conductor 12, said orifice loosely receiving a portion of the conductor.

27 designates a screw-threaded shank projecting from the sleeve and having a ball-shaped head 28, adapted to turn in the socket 25, and thus vary the angularity of the projecting shank. The electrode member 21 is provided with a cross-bar 29, having an orifice 30, receiving the shank 27. Nuts 31 and 32 engaged with the shank, are set up against opposite sides of the cross-bar.

The socket 25 and head 28 constitute a ball-and-socket joint, permitting the angular position of the shank 27 to be varied. When the clamping screw 24 is tightened on the conductor 12, the sleeve 23 is rigidly secured to the conductor, and the ball-shaped head 28 is rigidly clamped between the socket 25 and the conductor, in any angular position to which it may have been moved. The described construction, therefore, permits the clamping screws 24 to confine the holders and the electrode members variably spaced apart, and to confine the shanks 27 and the electrode members in different angular positions relative to the sleeves 23, so that provision is made for effecting adjustments of the electrode members, such as those indicated by broken lines in Figures 1, 2 and 3.

The walls of the openings surrounded by the contact faces 22 of the electrode members, and the cross-bars 29 which are offset from said faces, form recesses in which the absorbent cotton used in galvanic treatment, may be confined.

If it be desirable to treat one eye only, one of the electrode members may be insulated by a sheet of rubber interposed between it and the other eye.

I am not limited to the means described and shown for maintaining the apparatus in position for use. If desired, the apparatus may be supported, like a pair of spectacles, wholly by the patient's head.

I claim:

1. Eye-treating apparatus comprising an electrode-supporting conductor having

means for connection with a source of remedial current, and a double electrode whose members are spaced apart on the conductor, each member having an annular contact face formed to bear on an annular area of closed eyelids, and surrounding an opening formed to coincide with eyeball portions containing the crystalline lenses of the eyes, the area and arrangement of the openings being such that the remedial current passes around, and not through, the crystalline lenses when the apparatus is in use.

2. Eye-treating apparatus comprising an inflexible conductor, an elongated flexible conductor connected at one end with the inflexible conductor, and provided at its opposite end with means for connection with a source of remedial current, a rigid tubular insulating sheath enclosing a portion of the flexible conductor and constituting an element of means for supporting the apparatus in an operative position, and a double electrode, whose members are spaced apart on the inflexible conductor, each member having a contact face formed to bear on external surfaces of closed eyelids.

3. Eye-treating apparatus comprising an electrode-supporting conductor having means for connection with a source of remedial current, a pair of conducting holders adjustably mounted on the conductor and provided with clamping means engaging the conductor, to maintain the holders variably spaced apart, and a double electrode whose members are engaged with said holders and variably spaced apart thereby, each member having a contact face formed to bear on external surfaces of closed eyelids.

4. Eye-treating apparatus comprising an electrode-supporting conductor having means for connection with a source of remedial current, a pair of holders, each including a sleeve having a threaded bore, a clamping screw engaged therewith, an internal socket at one end of the sleeve, and a shank having a ball-shaped head adapted to turn in the socket, the sleeve being provided with a transverse orifice between the threaded bore and the socket, loosely receiving a portion of the conductor, and a double electrode whose members are engaged with the shanks of the holders, and are formed to bear on external surfaces of closed eyelids, the specified construction of the holders permitting the clamping screws to confine the holders variably spaced apart on the conductor, and to confine the shanks and the electrode members in different angular positions relative to the sleeves.

In testimony whereof I have affixed my signature.

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