Sept. 20, 1938. H. GLUCK 2,130,388

EXPLORING MIRROR CONSTRUCTION

Filed Feb. 28, 1936

Fig. 1.

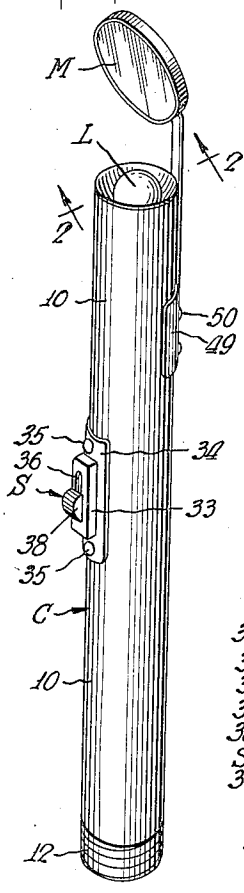


Fig. 2.

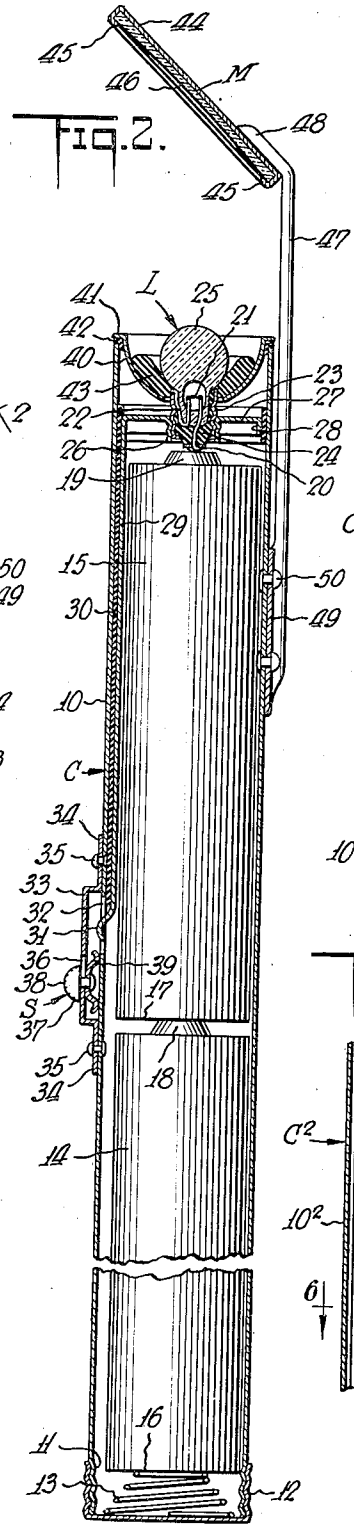


Fig. 3.

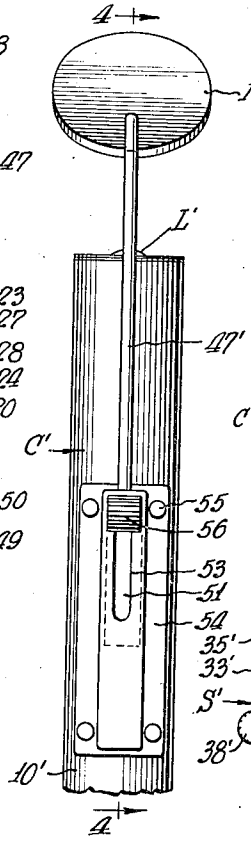


Fig. 4.

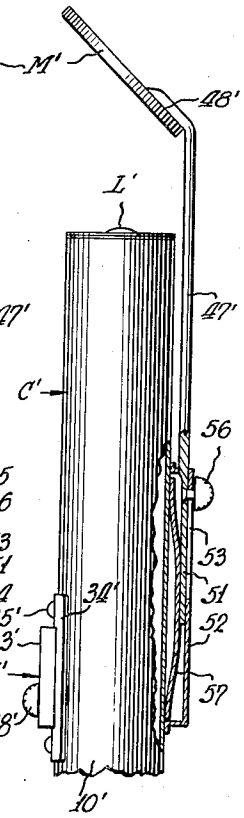


Fig. 5.

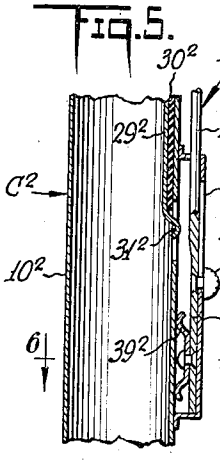
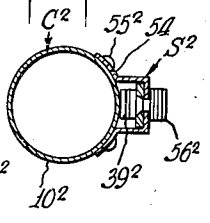


Fig. 6.



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EXPLORING MIRROR CONSTRUCTION

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2 Claims. (Cl. 240—2.18)

The present invention relates to an illuminated exploring mirror construction and it particularly relates to a device of the portable type useful for examining patients' teeth.

The usual type of dentists' exploring mirror consists of a single unit including holder and a small electric bulb and is connected by a flexible cord or wire to a stand which contains the other instrumentalities to be utilized by the dentist during the course of his treatments.

The electric bulbs are usually very small and the distribution of light upon the mirror from the bulb is frequently insufficient to assure sufficient illumination to enable the dentist thoroughly to inspect the teeth.

In addition, the filaments of the bulbs, being very delicate, tend to break during normal usage and when such filaments break or burn out, or when other parts of the unit become deranged, it is necessary to have the entire unit replaced or repaired at substantial cost and expense.

Furthermore, the cord being connected to the power lines which supply the building, even though the voltage has been stepped down, may give a shock in case the cord or the enclosing mechanism becomes moist due to repeated insertion in patients' mouths.

Due to these many difficulties, the electrically illuminated dentists' mirrors are not most widely used, although every modern dentist set is equipped therewith. Dentists usually rely on their hand mirrors and illumination from the window or from a source of light directed to shine into the patient's mouth. However, these portable hand mirrors are not altogether satisfactory at the rear of the patients' mouths or when the outside illumination is not substantial, as on cloudy days, or toward dusk.

Furthermore, unless the external lighting source is properly directed onto the mirror, as it is being moved through the mouth, there is insufficient illumination to enable the dentist to perform a thorough inspection.

It is among the objects of the present invention to provide an improved portable exploring mirror, particularly useful for dental offices but also useful by laymen, which may be readily and inexpensively constructed and repaired, and which is of such small size and weight as to enable it to be readily utilized by the dentist or layman and inserted in the mouth.

A further object is to provide a portable dentists' mirror which may be readily employed by a dentist regardless of external lighting conditions and without the necessity of adjusting lamps in or about the room to make a thorough inspection of the patient's mouth whether the patient be in position on a dentist chair or in some other place in and about the dentist's office, or even at his home.

A further object is to provide a dentists' mirror which, although provided with a source of electrical illumination, may be moistened and even sterilized by liquid solution without injury to the electrical circuit or danger of short circuits and without liability of shocking the patient whose teeth are being examined.

Other objects will be obvious or will appear in the following specification:

In accomplishing the above objects, according to one embodiment of the present invention, a small compact cylindrical or polygonal holder is provided receiving one or two relatively small batteries, to which holder is attached an angular mirror including a dish-shape holder and small concave mirror element therein.

At one end of the tube is provided electric bulb or lamp holder, said bulb or lamp holder being preferably positioned so as to recess the bulb within a cavity at the end of the casing.

In one embodiment, the electric lamp or bulb is of a special construction with a screw cap thereof entirely enclosing the filament, said cap being lined with a white reflecting material and the end of the bulb being formed by a spherical globule or lens of glass, which is positioned axially of the tube holder and toward the lower end of the mirror, so as to concentrate the light energy of the filament upon such mirror.

Preferably the base of the lamp is sealed by a gasket as is also the lamp holder, to enable the end of the device to be inserted in an antiseptic or sterilizing solution, the gaskets being arranged so as to prevent the solution from coming in contact with the electrical connections and causing any short circuits.

To illuminate the lamp, a manually operated slide button may be provided to close the circuit through the electric bulb, or the mirror itself may have a sliding connection combined with a switch so that it may be extended for usage or withdrawn for compactness in carrying and transportation.

When so constructed, the mirror, when extended, will cause the lamp to light, and when withdrawn, will extinguish the lamp.

In the drawing, which shows several of the various possible embodiments, according to the present invention

Fig. 1 is a perspective view of one form of the

device according to the present invention looking down into the bulb socket;

Fig. 2 is a side section of the view upon the line 2—2 of Fig. 1 upon an enlarged scale;

Fig. 3 is a rear view of an alternative embodiment in which the mirror is extensible, the lower part of the tube being broken away;

Fig. 4 is a side view in partial section upon the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary side section of an alternate type arrangement without the batteries in position, illustrating how the extensible arm may also be arranged to close the lighting circuit;

Fig. 6 is a transverse sectional view upon the line 6—6 of Fig. 6.

Referring to Figs. 1 and 2, the casing C is provided with a cylindrical shell 10, which may be polygonal as desired.

The lower side of the shell is threaded as indicated at 11 and is provided with a threaded cap 12, said cap holding a conical biasing spring 13 which presses the two batteries 14 and 15 together.

The batteries 14 and 15 are enclosed by insulating paper sheets. The negative zinc bottom 16 of the battery 14 is electrically connected to the casing 10 by the coil spring 13 and the zinc bottom 17 of the battery 15 is directly connected to the positive pole 18 of the lower battery 14.

The positive pole 19 of the upper battery 15 connects with the lower lead 20 of the lamp L which lead 20 is in turn connected to the filament 21.

The other lead 22 of the filament is connected to the shell 23 of the lamp which encloses the insulating seal 24 separating the leads 20 and 22. The interior of the shell 23 is preferably lined with a white material and this may be conveniently accomplished by making the seal 24 of such a white reflecting material which will assure that substantially all of the light of the filament will be reflected upwardly.

The top of the bulb is formed by the globe or lens of glass 25 which assures the most effective distribution of the illumination of the filament 21 upon the mirror M.

The shell 23 of the lamp L is adapted to screw into the down-turned nipple 26 of the plate 27, which plate is flanged as indicated at 28 and provided with an extension 29, said plate 27, flange 28 and extension 29 being insulated from the casing 10 by the insulating sleeve 30.

The lower end of extension 29 is provided with the out-turned spring finger 31, which projects through the opening 32 in the casing 10, into the box 33 of the switch mechanism S. As shown, the box 33 is provided with flanges 34 held in position in the shell 10 by the rivets 35.

The box 33 is slotted as indicated at 36 and through the slot projects the neck 37 carrying the finger button 38 (see Fig. 2). The inner portion of the neck 37 carries the spring leaf 39 which, when the circuit is open, presses against the portion of the side of the casing 10 enclosed by the box 33.

To close the circuit however, the button 38 is pressed upwardly until the spring fingers 39 and 31 slide over one another, whereupon the circuit will be closed. To open the circuit, button 38 is again pressed down, the resiliency of the fingers 31 and 39 being sufficient to assure a connection which will not be broken by a movement or a shaking of the casing C.

Held in position by the lamp L is the reflective bowl 40 which is provided with side flanges 41 separated by the gaskets 42 from the upper edge of the casing 10. The bulb, when screwed in position in the nipple 26, will clamp down the gaskets 42 and 43, assuring substantial liquid tightness at the upper end of the casing C.

It will be noted that the gasket 43 is shaped to fit the bottom of the bowl 40 and that the gasket 42 is angled to fit under the flange 41 and around the upper edge of the casing 10.

The mirror structure M is provided with the sheet metal cup or holder 44, the sides of which are turned over as indicated at 45 to hold the edges of the slightly concave mirror element 46. It is desired that the axis of the lamp L either intersect the axis of the mirror M at the center of the mirror element 46, or that the point of intersection of said axes will be above the mirror M.

The arm 47 is welded or otherwise connected at 48 to the casing 44 and at its lower end is provided with the flange 49, which is riveted at 50 to the casing 10, preferably in a liquid-tight fashion.

In operation, by moving the button 38, the circuit may be closed through the lamp L to illuminate the mirror M and enable the dentist to explore thoroughly the interior of the patient's mouth.

The casing may conveniently be of such length and size as could be conveniently grasped in the hand. The lining of the casing shell 23 of the lamp L with a white reflective material, and lens 25, assure that substantially all of the light generated by the filament 21 will be transmitted directly on to the mirror face 46 with the result that a very small power bulb 25 may be employed to give a very high intensity of illumination. Because of the high light efficiency, relatively small batteries 14 and 15 may be employed and the casing C made very small. In addition the batteries will last for a long while and need only be replaced relatively infrequently.

The removal of the cap 12 enables replacement of the batteries, whereas insertion of the fingers into the cap 40 enables ready unscrewing and replacement of the globe or lamp L.

The lamp L, when in position, will clamp the gaskets 42 and 43, making the end of the casing C, liquid-tight and enabling dipping of the end of the casing into a sterilizing liquid and thorough antiseptic treatment.

The efficiency of illumination enables very low power batteries to be employed with assurance of elimination of any possible shock to the patient, regardless of how the instrument may be manhandled.

In Figs. 3 and 4 is shown an alternative construction in which the mirror M' is extensible, similarly functioning parts being indicated by the same numerals primed.

Referring to Figs. 3 and 4, the arm 47' has an extension 51 fitting into the auxiliary box 52 of similar construction to the box 33, said box having a slot 53 and side flanges 54 riveted at 55 to the sides of the casing 10'. The button 56 projects out past the slot 53 and is riveted to the extension 51 of the arm 47'. By manipulating the button 56, the mirror may be extended as indicated in Figs. 3 and 4, or withdrawn close to the lamp L', the tension of the leaf spring 57 in the box 52 maintaining the arm 47' in any adjusted position.

In Figs. 5 and 6, the extensible mirror M' also may close the electrical circuit and the structure, as shown at S^2, is substantially the same as that

shown at S in Figs. 1 and 2, similarly functioning parts being indicated by the same numerals provided with a superior 2.

In the device of Figs. 5 and 6, by pushing out the mirror M^2, the lamp L^2, not shown, will be simultaneously illuminated when the batteries are in position in the casing C^2.

By providing a mirror M' or M^2, as shown in Figs. 3 to 6, which may be withdrawn, a most compact arrangement is provided enabling the device to be readily stored or carried around in one's pocket.

To sterilize the device after usage, it is only necessary to dip the upper portion thereof adjacent the lamp L into an antiseptic solution, the gaskets 42 and 43 preventing leakage into the interior of the casing C. If desired, a ring may be placed around the exterior of the casing above the plate 49 in Figs. 1 and 2 or above the box 52 in Figs. 3 and 4 to indicate to the user of the instrument that the mirror and tube should not be dipped into the antiseptic solution beyond a predetermined depth.

It is thus apparent that the applicant has provided a compact, inexpensive, portable dental mirror which may be readily repaired and replaced and which does not need to be connected to power lines.

The special lamp construction 25, in combination with the mirror M, which is positioned so that the axes thereof will intersect at the surface of the mirror or slightly thereabove, will assure most satisfactory illumination of the field of the mirror with very little electrical energy being consumed by the lamp 25.

It is to be understood that the above specific embodiments have merely been shown by way of illustration and that many changes and alternatives might be made coming well within the scope and preview of the present invention.

It is intended that all such alternatives and variations shall be included within the accompanying claims.

What is claimed is:

1. A portable electrically illuminatable mirror device for exploring teeth for dentists' or home use comprising a handle member, a minute electrical lamp having a bulb and a threaded base and an oblique mirror provided with a holding extension connected to said handle, said handle receiving a battery means and being provided with a switch to connect or disconnect a circuit energized by said battery means, said member taking the form of a cylindrical tube, a semi-spherical reflector in the end of said tube having an opening at the bottom thereof, a partition in said tube below and inside of said reflector having a central threaded nipple to receive the threaded base of said lamp and annular gaskets between the periphery of said reflector and said tube and between the bottom of said reflector and said bulb, said reflector being clamped to the end of said tube and said gaskets being tightly clamped against said reflector by screwing said base into said nipple, thereby making the end of the device liquid-tight.

2. A portable electrically illuminatable mirror device for exploring teeth for dentists' or home use comprising a handle member, a minute electrical lamp having a bulb and a threaded base and an oblique mirror provided with a holding extension connected to said handle, said mirror being extensible and said arm being provided with a slidable connection to the handle with a finger piece to enable the mirror to be extended or withdrawn, said member taking the form of a cylindrical tube, a semi-spherical reflector in the end of said tube having an opening at the bottom thereof, a partition in said tube below and inside of said reflector having a central threaded nipple to receive the threaded base of said lamp and annular gaskets between the periphery of said reflector and said tube and between the bottom of said reflector and said bulb, said reflector being clamped to the end of said tube and said gaskets being tightly clamped against said reflector by screwing said base into said nipple, thereby making the end of the device liquid-tight.

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