Oct. 17, 1939. C. M. BEAM 2,176,620

DENTAL ILLUMINATION UNIT

Filed Feb. 25, 1937 2 Sheets-Sheet 1

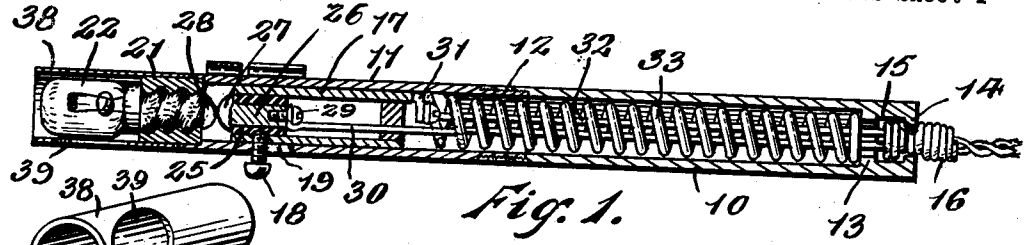


Fig. 1.



Fig. 7.

Fig. 2.



Fig. 9.

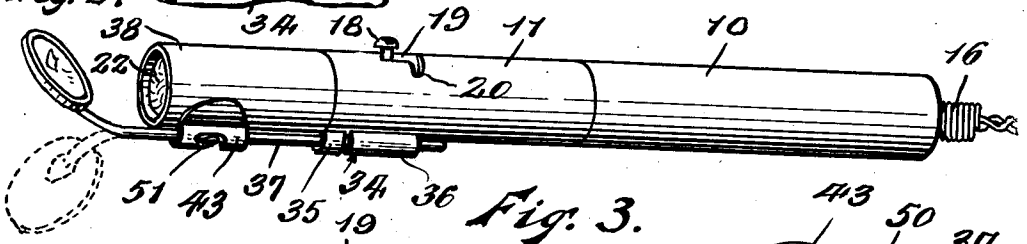


Fig. 3.

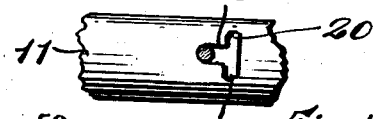


Fig. 10.

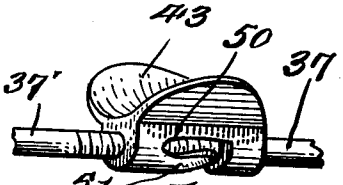


Fig. 18.

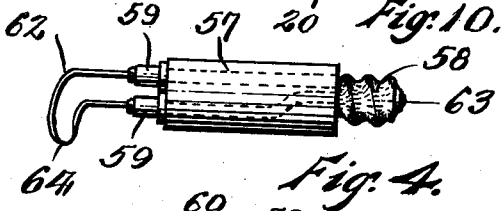


Fig. 4.

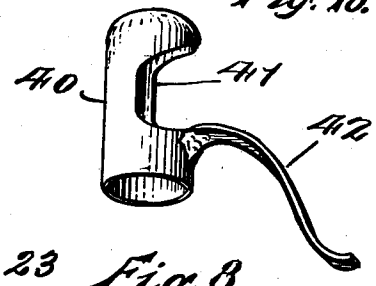


Fig. 8.



Fig. 5.

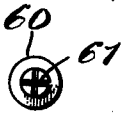


Fig. 6.

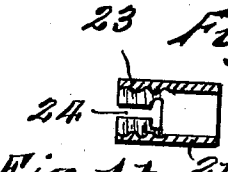


Fig. 1b.

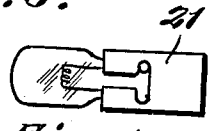


Fig. 1a.

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DENTAL ILLUMINATION UNIT

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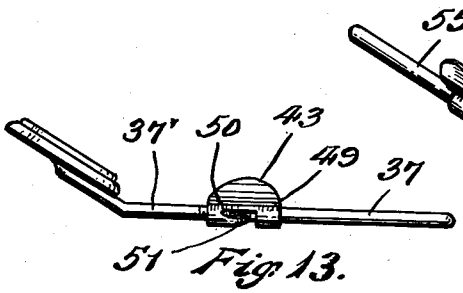


Fig. 13.

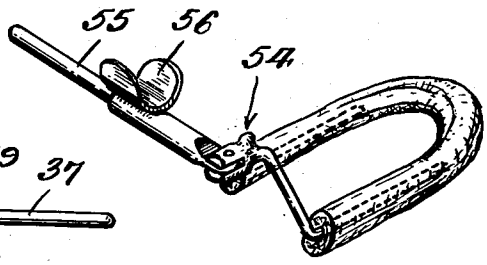


Fig. 17.

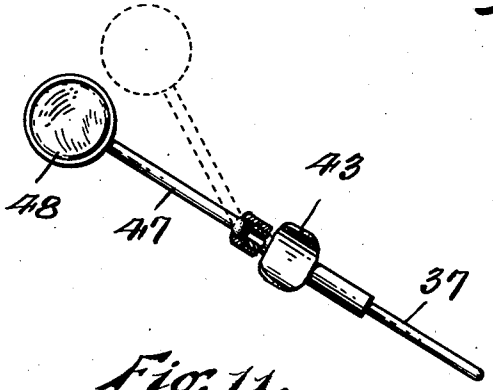


Fig. 11.

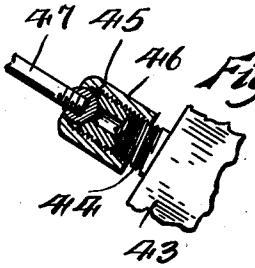


Fig. 12.

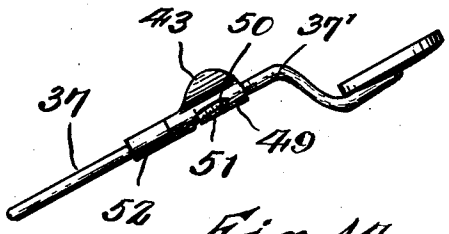


Fig. 14.

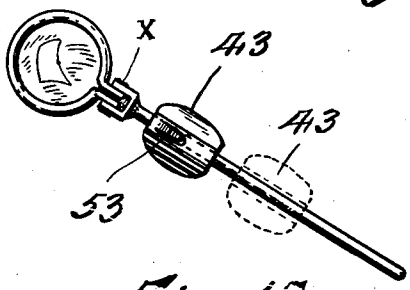


Fig. 15.

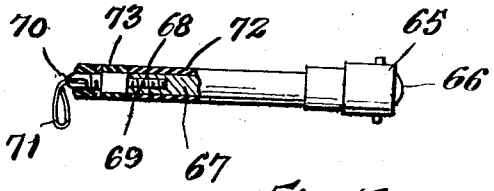


Fig. 16.

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Patented Oct. 17, 1939 2,176,620

UNITED STATES PATENT OFFICE

2,176,620

DENTAL ILLUMINATION UNIT

Calvin Michaux Beam, Asheville, N. C.

Application February 25, 1937, Serial No. 127,757

7 Claims. (Cl. 32—69)

This invention relates to a dental illumination unit and it consists in the constructions, arrangements, and combinations herein described and claimed.

It is an object of the invention to provide a transillumination unit in the form of a handle and including novel means for attaching various accessories, such as mirrors, for the purpose of reflecting light as occasion may arise.

It is also an object of the invention to provide a unit of extreme simplicity and compactness and including a novel switch means which may be readily actuated to energize or de-energize the illumination bulb or other accessory associated with the socket thereof.

It is a further object of the invention to provide a reflector hood in which an end and side light emitting openings are inherent.

It is a still further object of the invention to provide a mirror or other accessory, the stem of which includes a saddle portion movable to a position to cover the side opening of the hood, thereby directing all rays of light through the end opening of the hood to the mirror or other accessory.

It is a still further object of the invention to provide a unit which may be readily cleaned and stearilzed and entirely shockproof.

Additional objects, advantages and features of invention will be apparent from the following description considered in conjunction with the accompanying drawings, wherein:

Figure 1 is a longitudinal sectional view of the unit.

Figure 1*a* is a elvational view of a modified form of lamp socket.

Figure 1*b* is a sectional view thereof.

Figure 2 is a perspective view of the unit shown in Figure 1, with the hood removed.

Figure 3 is a perspective view of the unit having a reflecting mirror associated therewith.

Figure 4 is a side elevation of a cautery which may be used with the unit.

Figure 5 is an enlarged detail illustrating the means for mounting of the cautery element.

Figure 6 is an end view of the socket element shown in Figure 5.

Figure 7 is a perspective view of the hood element.

Figure 8 is a perspective view of a modified form of hood element.

Figure 9 is a fragmentary perspective view of the socket for mounting of mirror or the like upon the unit.

Figure 10 is a plan view of the switch detent.

Figure 11 is a plan view of mirror employed with the device.

Figure 12 is an enlarged detail illustrating the ball and socket connection thereof.

Figures 13 and 14 illustrate further forms of mirror-holders.

Figure 15 illustrates a magnifying lens, which is permanently attached to its holder.

Figure 16 is a side elevation of a pulp tester.

Figure 17 is a perspective view of a fork member which may be employed with the unit.

Figure 18 is an enlarged perspective view of a saddle mounting for holding dental, short-stem stock mirrors.

There is illustrated in Figures 1 to 3 a tubular member comprising sections 10 and 11 connected in end to end relation by screw threads or otherwise as at 12 (see Fig. 1). The section 10 has adjacent its outer end an inwardly turned annular shoulder 13 and a similar shoulder 14 spaced from the first named shoulder defines a chamber 15 within which one end of a coil spring 16 is seated, this spring functioning to prevent undue flexing of electrical conductor, as will be explained more fully hereinafter.

The section 11 houses a metallic sleeve 17, which is partially revoluble and reciprocable therein and includes an operating head 18 extended through a slot 19 formed in the section 11. The slot 19 includes right angularly disposed slotted portions 20, the purpose of which will be more fully explained. A socket 21 is fixed in the end of the section 11 which may be of screw-threaded type and receives therein a bulb 22 or an accessory as will be apparent. As shown in Figures 1*a* and 1*b*, the socket may comprise a combination of screw thread 23 and bayonet slot 24, in which event the socket would accommodate bulbs employing either screw threads or the projecting pins which cooperate with the slot 24, better shown in pulp tester 65, Figure 16.

The sleeve 17 has an insulator plug 25 in the forward end thereof and secured therein is a contact 26 having a projecting portion 27 for engaging the base 28 of the lamp 22, or an accessory. The rear end of the contact is provided with a threaded bore receiving a binding screw 29 to which a wire 30 is engaged. The sleeve 17 has a lug 31 to which a wire 32 is connected, the wires 30—32 extending rearwardly through the sections 11 and 10 and through the spring 16. The current for energizing the bulb or accessory will be obtained from the usual house circuit and use made of a suitable variable voltage transformer so that the required amount of cur-

rent may be available, which will vary according to the accessory or bulb employed. Ordinarily, the bulb will be a 6.3 volt radio pilot bulb. The wires 30—32 will be suitably insulated to insure against short-circuits.

A helical spring 33 is enclosed in the sections 10—11, encircling the wires 30—32, one end of the spring being seated against the shoulder 13 while the other end engages the rear end of the sleeve 17. The spring 33 urges the sleeve 17 forwardly so as to engage the contacts 27—28, but may be compressed sufficiently to break the circuit between the contacts 27—28. This would be effected by exerting a rearward movement upon the head 18, which would cause a rearward movement of the sleeve 17 against the spring 33. The contact 27 may be held free of the contact 28 by partially rotating the sleeve 17, by the head 18 so as to dispose the stem thereof in one or the other of the slots 20. The arrangement of the slots 20 permits ready manipulation of the switch either by a right or left-handed operator.

Upon the periphery of the section 11, at a point approximately diametrically opposite the operating head 19, a socket member 34 is mounted. The socket member 34 is composed of two sleeve-like members 35—36 arranged in tandem relation, the bore of the member 35 being of such diameter as to freely admit the shank 37 of a mirror or like accessory, while the member 36 is provided with a split extending longitudinally thereof and having a diameter such as to firmly grip the shank 37. The metal defining the member 36 is of a resilient character permitting expansion and contraction thereof with respect to the shank.

A cylindrical open-ended hood 38 is provided, adapted to engage over the socket 21 and enclose the bulb 22. The hood also has formed therein an aperture 39 opening upon the side thereof. In Figure 8, a modified form of hood is shown and comprises a hood 40 having a closed outer end and intermediate its length is cut away as at 41 to permit emanation of light rays. Adjacent the lower edge of the cut-away portion there is secured a hook member 42, so shaped as to comfortably fit the jaw of a patient, and when such hood is associated with the unit, it will be apparent that the lighting unit will be readily supported and light rays directed to that portion of the mouth being worked upon.

The hood member 38 will be employed in transillumination and in use, the hood with the aperture 39 to the rear of the teeth will cause illumination of the gums so as to disclose dead roots or other defects in the gums. Where a mirrored image of a tooth is required, any one of the various mirrors shown in Figures 11 to 14 may be employed; also magnifying lens, Fig. 15 and fork, Fig. 17. In all structures of mirrors the stem 37 would be inserted in the socket 34 for support of the mirror in advance of the open end of the hood.

In order to afford further support of the mirror each stem 37 includes a saddle 43, so shaped as to fit the circumference of the hood, and of such size as to function to close the aperture 39 when the stem 37 is fully engaged in the socket 34.

Referring more particularly to the saddle 43, as shown in Figures 11 to 15, in Figures 11 and 12 the saddle 43 is shown as integral with the stem, the outer end of the stem terminating in a threaded stud 44, and having a spherical seat receiving a ball member 45. The ball member 45 is retained upon the seat by a cap 46 engaged upon the stud 44. The ball 45 has fixed thereto a shaft 47, the outer end of which carries a mirror 48. The mirror is therefore adjustable to various angles and is very useful in posterior operating.

In Figures 13 and 14 the saddle is rigid with the stem 37, but includes a threaded socket 49 receiving the threaded shank 37' of the mirror, and in order that the mirror may be held against undesired rotation from an adjusted position, the socket 49 is slit as at 50, providing a spring tongue 51 adapted to bear quite forcibly upon the threads of the shank 37'. The pressure of the spring tongue 51 is not such as to preclude adjustment of the saddle, however. In Figure 14 the stem further includes a stop 52, limiting the rearward adjustment of the mirror beyond the opening 39, and transillumination is made possible by rotating the hood 38 until the opening 39 is uncovered.

In Figure 15 the saddle 43 is slidably adjusted upon the stem and includes a spring tongue 53 for frictional binding action upon the stem. It will be apparent that in this form, the magnifying lens and its stem may be rotated within the saddle 43 and socket 34, as well as being adjustable longitudinally thereby bringing the magnifying lens to any desired relation to the light bulb, so as to get proper forms of lens. The magnifying lens is further adjustable by the hinge at X.

In Figure 17 there is shown a fork 54 hingedly connected to a stem 55 which may be inserted in the socket 34 of the light unit and also includes a saddle 56. This form of device will be found highly useful when applying cotton rolls within the mouth for excluding moisture from the lower posterior teeth, and ample light will be furnished through the end aperture as well as the side aperture 39 of the hood, since the saddle 56, in this instance, is so located as to not cover the aperture 39, and functions only for support of the fork.

In Figures 4, 5 and 6 there is shown a construction of cautery suitable for use with the appliance and comprises a body 57 of insulating material, upon one end of which there is an attaching base 58, the other end having mounted thereon a pair of spaced stud members 59. As may be seen in Fig. 5, the studs 59 are of tapering formation and are divided longitudinally of their lengths for a short distance and exteriorly screw-threaded. A sleeve 60 cooperates with the threaded portion of the stud to compress the slotted portions 61 of the stud to firmly grip an end of the cautery wire 62. One of the studs 59 is connected with the attaching base 58 while the other stud is electrically connected with the central contact 63 of the base.

It will be apparent that the cautery may be substituted for the bulb of the unit, and in use, the heat developed in the wire 62, at the point 64, may be directed at a location preliminary to lancing, stopping hemorrhages, de-sensitizing teeth and the like.

It will be seen that it would be highly desirable to also have means whereby pulp testing might be carried out and in Figure 16 I have illustrated a preferred form of such appliance. The tester comprises an attaching base 65 having a central contact 66, electrically connected to the shank 67. The shank 67 is internally screw-threaded as at 68 and receives a threaded stem 69 of a stud 70. The stud 70 will be of a construction similar to the ones 59, for the purpose of firmly gripping a test wire 71. The shank 67 and stud

70 will be suitably insulated by sleeve members 72 and 73.

In use, the tester will replace the bulb 22, and it will thus be apparent that the wire 71 may be readily applied to a tooth to be tested and in practice a piece of damp cotton will be secured in the loop of the wire for the purpose of intensifying the current. Inasmuch as only the positive contact is employed in the tester, the circuit must be completed through the operator and patient, which would occur when the operator touches the patient.

From the foregoing, it will be apparent that I have provided a unit highly efficient for diagnosing oral ailments as well as materially assist in dental operations generally, and while I have shown and described certain preferred embodiments of the invention, this is by way of illustration only, and I consider as my own, all such modifications in construction as fairly fall within the scope of the appended claims.

I claim:

1. An illumination unit comprises a casing member having a switch, an electrical circuit associated therewith, a socket in the casing adjacent the switch, a bulb in the socket to be energized, said bulb including a contact cooperable with a contact of the switch at times, a hood member on the socket and enclosing the bulb, said hood member having a light-emitting aperture in the end thereof and a light emitting aperture in the side thereof, a socket on the side wall of the casing member, a stem detachably carried by the socket and having a mirror adjustably related to the end aperture of the hood member, said stem having a saddle member shaped for seating engagement with the hood member and movable to close the aperture of the side wall at times.

2. An illumination unit comprising a tubular casing, a socket member in one end thereof adapted to receive a means to be energized, said means including a contact, a plug in the casing, said plug being partially revoluble and longitudinally movable in the casing and having a contact for engaging the first named contact in one position of the plug, spring means normally urging the plug into contacting position, said casing having a T-shaped slot, an operating stem on the plug extended through the slot, and electrical connections for the plug and socket.

3. An illumination unit comprising a tubular casing, a metallic socket seated in one end thereof, a bulb in the socket having a central contact, a switch member in the casing, said switch comprising a metallic sleeve in contact with the casing, an insulated plug in the sleeve, a metallic core in the plug and having a contact at one end, a binding post on the sleeve and metallic core for connection with an electromotive source, a helical spring within the casing in bearing contact with an end of the sleeve urging longitudinal movement of the sleeve for engagement of the contacts, the casing having a T-shaped slot, an operating stem on the sleeve and projecting through the slot and said sleeve being selectively rotatable to one or the other of the T-portions of the slot.

4. In an illumination unit a source of light, a tubular hood member therefor, said hood member having an end light-emitting aperture and a light-emitting aperture in the side thereof, a pair of longitudinally aligned sockets on the unit, an accessory having a stem, said stem being disposed in the aligned sockets, the rearmost socket having a resilient gripping action on the stem, a saddle on the stem, said saddle having a curvature to snugly seat upon the hood member, and said saddle member being movable to close the opening in the side of the hood.

5. The structure of claim 4 in which the saddle member is longitudinally slidable upon the stem.

6. The structure of claim 4 in which the saddle member is threadedly engaged upon the stem and wherein the stem includes a stop member cooperable with the foremost socket.

7. In an illumination unit, a source of illumination, a tubular hood member therefor, said hood having an end light-emitting aperture and a light emitting aperture in the side thereof, socket members on the unit rearwardly of the hood member, a stem insertable in the sockets, a saddle member on the stem shaped to snugly engage the periphery of the hood member and adjustable to a position to close the side aperture, said saddle having a depending longitudinally extended boss, the boss being provided with an internally threaded bore, an accessory having a screw-threaded stem, the stem being engaged in the threaded bore, and said boss having a portion thereof cut away to define a finger, said finger being resilient and disposed inwardly of the bore, and said finger further having threads cooperable with the threads of the stem.

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