Oct. 12, 1943. F. C. WAPPLER 2,331,526

ILLUMINATING DEVICE FOR SURGICAL INSTRUMENTS

Filed March 13, 1940 2 Sheets-Sheet 1

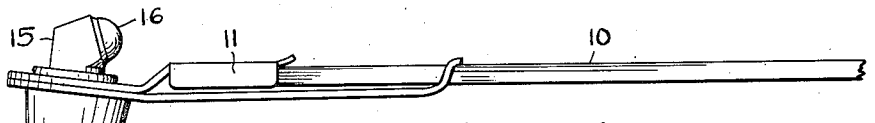
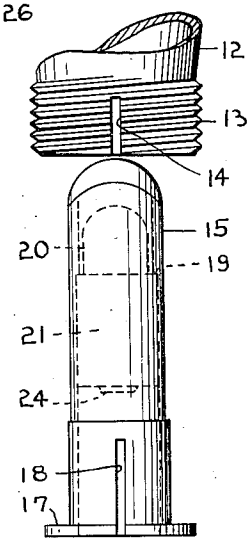


Fig. 1.



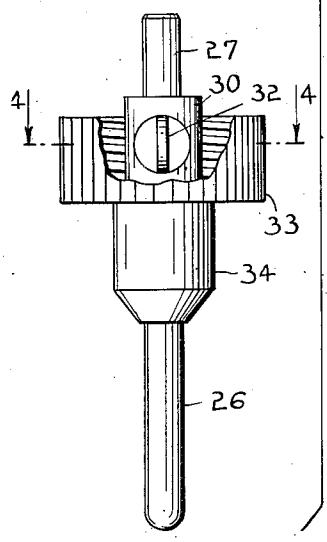


Fig. 3.

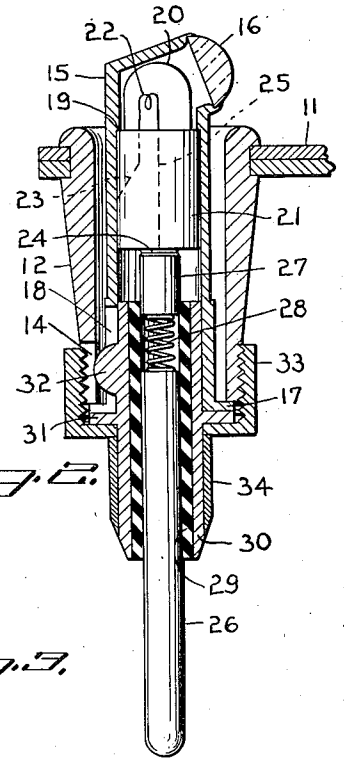
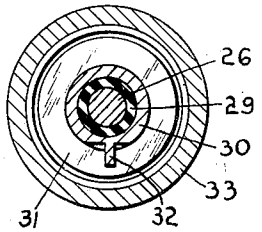


Fig. 2.

Fig. 4.



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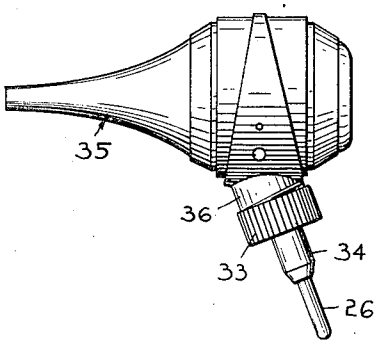
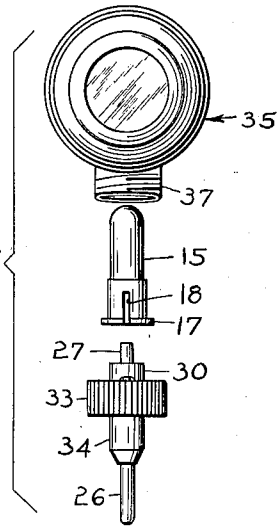


Fig. 5.

Fig. 6.



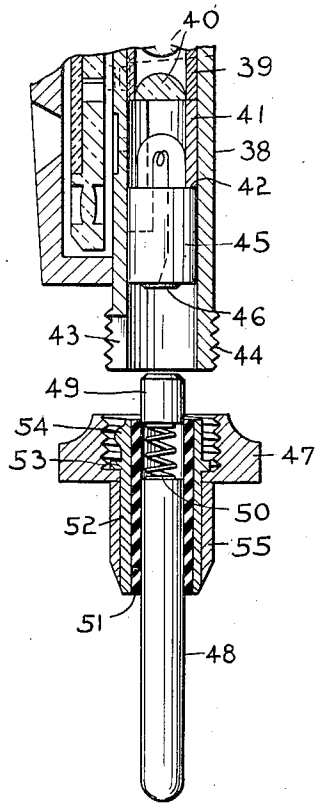


Fig. 7.

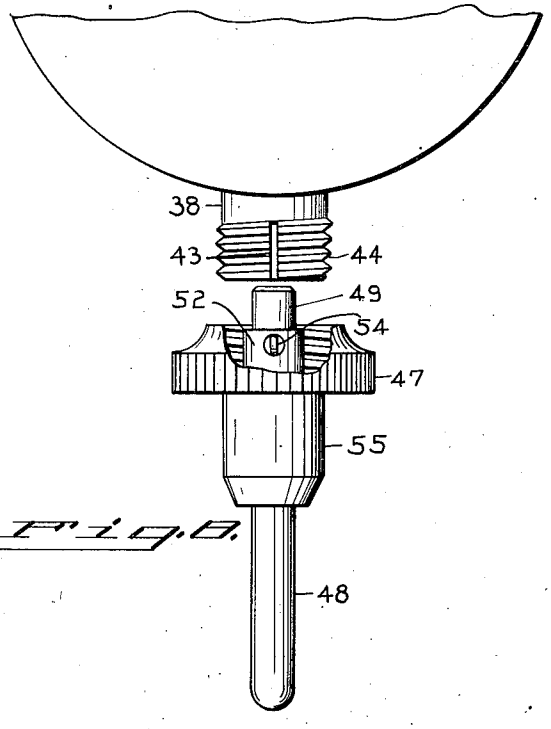


Fig. 8.

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UNITED STATES PATENT OFFICE

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ILLUMINATING DEVICE FOR SURGICAL INSTRUMENTS

Frederick Charles Wappler, New York, N. Y.

Application March 13, 1940, Serial No. 323,658

8 Claims. (Cl. 176—32)

My present invention relates generally to illuminating devices, and has particular reference to an illuminating device intended primarily for use with surgical instruments.

By the term "surgical instruments" I intend to refer generally to various devices used by doctors, such as tongue depressors, otoscopes, ophthalmoscopes, and the like, where a beam of illumination is necessary or desirable.

A general object of my invention is to provide an illuminating device of simplified character, designed to employ a small electric lamp that is to be energized, usually, by means of a battery.

A more particular object of the invention is to provide a construction which permits the employment of an unthreaded lamp unit, i. e., a lamp which is devoid of a threaded portion which would require screwing and unscrewing the lamp into association with a corresponding socket. In accordance with my invention, a lamp unit is employed which is in the form of a sort of cartridge, whereby the association of the lamp with the device, and its replacement, may be accomplished by merely sliding the lamp cartridge into or out of an operative position.

Another general object of the invention is to provide a device whose structural nature is of such a character that it may be readily adapted for use with a large variety of different surgical instruments, the same type of lamp being usable in each case, thus contributing toward standardization and uniformity.

Briefly, my invention comprises a tube of electrically-conductive material, a lamp consisting of a bulb mounted in a cylindrical sleeve, the sleeve fitting slidably into the tube, and a means removably applicable to the rear end of the tube for holding the lamp in place and at the same time establishing proper electrical connections to the lamp. More particularly, I employ a lamp having one terminal electrically connected to the sleeve, and I employ an electrical connector having one terminal adapted to engage the conductive tube within which the lamp is accommodated, whereby electrical connection is established with one lamp terminal through the conductive tube and through the lamp sleeve. Both the lamp and the electrical connector are provided with insulated terminals which engage electrically with each other when the device is assembled.

A particular feature of my invention lies in providing the tube with an internal rearwardly-directed shoulder against which the lamp sleeve abuts, thereby retaining the lamp in proper predetermined position within the tube.

In one form of the invention, the electrical connector is provided with a threaded rotatable attachment collar and the tube within which the lamp is accommodated is provided with a threaded portion with which this collar may engage.

In another form of the invention, the tube is adapted to be removably associated with a housing having a threaded neck, and the electrical connector is provided with a threaded rotatable attachment collar which is adapted to engage with this neck when the device is completely assembled.

I achieve the foregoing objects and such other objects as may hereinafter be pointed out, in the manner illustratively exemplified in the accompanying drawings in which:

Figure 1 is a side view of an illuminating device constructed in accordance with the present invention and shown in association with a tongue depressor;

Figure 2 is an enlarged longitudinal cross-section through the illuminating device;

Figure 3 is an exploded view of the parts shown in Figure 2;

Figure 4 is a cross-sectional view taken substantially along the line 4—4 of Figure 3;

Figure 5 is a view similar to Figure 1 showing the illuminating device in association with an otoscope;

Figure 6 is an exploded view of the elements entering into the device of Figure 5;

Figure 7 is a cross-sectional view of a slightly modified type of illuminating device shown in association with an ophthalmoscope; and

Figure 8 is a view, partly broken away, taken at right angles to Figure 7.

For illustrative purposes I have chosen to illustrate in Figure 1 a tongue depressor in which a wooden blade 10 is replaceably associated with a holding device 11, the latter being provided with a tubular housing 12 with which the illuminating device is separably associated. The housing 12 has its lower end shaped in the form of a threaded neck 13. For a purpose presently to be described, this neck is provided with a longitudinal slot 14.

In the embodiment illustrated in Figures 1–6, the illuminating device comprises a tube 15 of electrically-conductive material, provided at its upper end with a lens 16 by means of which a beam of light is thrown in the desired direction. At its rear end the tube 15 is preferably provided

with the flange 17, and with the longitudinal slot 18.

On the interior of the tube 15, there is formed a rearwardly-directed shoulder 19. The lamp which I prefer to employ consists of the glass bulb 20 securely and permanently mounted within a cylindrical sleeve 21 of conductive material. This unit is so constructed that one terminal of the lamp filament 22 is electrically connected with the sleeve 21 (shown diagrammatically at 23), while the other side of the filament is connected to an insulated terminal 24 (shown diagrammatically at 25). The terminal 24 is positioned at the rear end of the lamp unit, preferably at the center. It will be understood that the bulb 20 is associated with the sleeve 21 in any suitable conventional manner, and that the terminal 24 is insulated from the sleeve 21 in a well-known fashion which is known per se.

The sleeve 21 fits slidably into the tube 15, so that the lamp may be introduced into the tube by simply slipping it into the rear end of the tube. It may be removed from the tube in the same manner. When it is introduced into the tube, its forward movement is impeded by the shoulder 19, against which the forward edge of the sleeve 21 abuts. In this way, the lamp is automatically positioned in a predetermined fixed relation to the lens 16.

The assembly is completed by means of an electrical connector having two mutually insulated terminals. One terminal is constituted of the rod 26 whose upper end is in the form of a separate piece or post 27 yieldably mounted on resilient means such as the spring 28. Surrounding the rod 26, and extending for a sufficient distance to enclose the lower portion of the piece 27, is a sleeve of insulation 29. Mounted on this insulation is the second terminal of the connector which is in the form of a sleeve element 30. This element is provided with the flange 31 and with the projection or fin 32. Rotatably mounted on the element 30 directly behind the flange 31 is the threaded collar or union 33. This collar is freely rotatably, and is held against longitudinal movement by the flange 31 and by the tubular retaining member 34, the latter being securely mounted on the lower portion of the element 30.

When the connector is introduced into the rear end of the tube 15, the fin 32 engages within the two longitudinal positioning slots 14 and 18, in this way assuring the proper positional relationship of the tube 15 with respect to the housing 12. At the same time, the collar 33 is screwed into engagement with the threaded neck 13. This presses the flange 17 against the end of the neck 13, and presses the flange 31 firmly against the flange 17. Also, the terminal 27 is pressed firmly against the contact 24, yielding axially as it does so.

The electrical connector is preferably of the well-known type, as illustrated, which may be removably associated with a so-called battery-handle, whereby one terminal of the battery is brought into electrical connection with the rod 26, while the other terminal of the battery is brought into electrical connection with the sleeve 34, hence with the terminal 30.

As a result, the illuminating device is securely assembled and held in proper position with respect to the housing 12, and the proper electrical connections to the lamp filament are automatically established. More particularly, one side of the filament 22 is connected through the sleeve 21, the tube 15, and the terminal 30, with one side of the battery or other source of current, while the other side of the filament 22 is connected, through the contact 24 and the terminal 26—27, with the other side of the source of current.

The assembly of the device and its association with the instrument with which it is to be used (illustratively shown as a tongue depressor in Figure 1), is thus an extremely simple procedure. In the event that the lamp requires replacement, it is equally simple to unscrew the collar 33, to remove and replace the lamp through the rear end of the tube, and to reapply the collar 33.

In Figures 5 and 6 I have shown for illustrative purposes an otoscope 35 with which the same illuminating device may be associated. The otoscope is provided with a housing 36 having a threaded and slotted neck 37 similar to the neck 13 of Figures 1–3. The manner of association with this neck of the tube 15, and the electrical connector, is exactly the same as hereinbefore described. For these reasons, the same reference numerals are applied to the parts in Figures 5 and 6, wherever these parts are identical with the structure shown in Figures 1–4.

It will be understood that the tongue depressor of Figure 1 and the otoscope of Figure 5 are shown merely by way of example and that a large number of different instruments, requiring or benefiting from a beam of illumination, may be similarly fitted with an illuminating device of the present kind, it being understood that a suitable housing and a threaded neck is associated with the instrument in each case. Obviously, also, the broader phases of my invention are not restricted to instruments of surgical variety.

In Figures 7 and 8 I have illustrated a slight modification of the invention showing its applicability to an ophthalmoscope.

The details of the ophthalmoscope have not been fully illustrated, nor need they be fully described since such an instrument is well-known per se. In the usual form it includes a tubular housing 38 within which the lamp is to be accommodated.

I have illustratively shown a sleeve 39 mounted in the housing 38 and carrying the lenses 40 corresponding in function to the lens 16 of Figure 2. Behind the sleeve 39 is a split sleeve 41, the rear end of which, designated by the reference numeral 42, constitutes the internal rearwardly-directed shoulder hereinbefore referred to. The sleeve 41 and the tube 38 are both conductive material and the shoulder 42 of Figure 7 thus corresponds in function to the integral shoulder 19 shown in Figure 2.

The rear end of the tube 38 is provided with a longitudinal slot 43, and differs from the tube 15 of Figure 2 in the fact that it is exteriorly threaded as at 44.

The lamp that is introduced into the tube 38 is identical with the lamp shown in the other figures of the present drawings, and comprises the sleeve 45 and the insulated terminal 46. The forward end of the sleeve 45 abuts against the shoulder 42 when the lamp is inserted, thus assuring a proper predetermined positioning of the lamp with respect to the lenses 40.

The electrical connector shown in Figures 7 and 8 is substantially the same as the electrical connector described in connection with the other figures, with the exception that the rotatable

threaded attachment collar 47 is of such a size that it may engage with the threads 44 on the tube 38. The rod terminal 48, the separate upper piece 49 yieldably mounted on the spring 50, the insulation 51, the terminal 52 with its flange 53 and fin 54, and the retaining sleeve 55 are all counterparts of the corresponding elements shown and described in connection with the other figures.

The insertion and removal of the lamp into the ophthalmoscope is thus accomplished with the same ease as hereinbefore described. The fact that this lamp may be identical with the lamp used in other illuminating devices is of great advantage to the doctor, and is conducive to economy and standardization in so far as the manufacture and servicing of a large variety of different instruments are concerned.

In general, it will be understood that those skilled in the art may make changes in the details herein described and illustrated, without departing from the spirit and scope of the invention as expressed in the appended claims. It is, therefore, intended that these details be interpreted as illustrative and not in a limiting sense.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

1. In an illuminating device of the character described, an electrically-conductive tube having an open rear end and an internal rearwardly-directed shoulder, a lamp comprising a bulb mounted in a sleeve, said sleeve fitting slidably within said tube and said bulb being narrower than said sleeve so that the lamp may be inserted into the tube through the open rear end thereof and may be advanced forwardly until the front edge of said sleeve abuts against said shoulder to hold the lamp in predetermined position within said tube, said lamp having one terminal adapted to establish electric contact with the tube and having also an insulated rear terminal, and an electrical connector removably applicable to the rear end of the tube and provided with mutually insulated terminals adapted to engage the tube and the rear lamp terminal respectively.

2. In an illuminating device of the character described, the combination of elements set forth in claim 1, one of the connector terminals being a post adapted to press against said rear lamp terminal, the other being a member insulated from the post and adapted to press against the rear end of said tube.

3. In an illuminating device of the character described, the combination of elements set forth in claim 1, one of the connector terminals being a post adapted to press against said rear lamp terminal, and resilient means allowing said post to yield axially when it is pressed against said terminal.

4. In an illuminating device of the character described, the combination with the elements set forth in claim 1, of a threaded rotatable attachment collar carried by said connector.

5. The combination with the elements set forth in claim 1, of a housing adapted to receive said tube, a rearwardly-extending threaded neck on said housing through which said tube may be inserted forwardly into said housing, and a threaded rotatable attachment collar carried by said connector and removably engageable with said neck.

6. In an illuminating device of the character described, a housing having a threaded neck provided with a longitudinal positioning slot, an electrically-conductive tube having an internal rearwardly-directed shoulder, said tube being insertable into said housing through said neck, a lamp comprising a conductive sleeve in electrical connection with one lamp terminal, said sleeve fitting slidably into said tube and adapted to abut against said shoulder to hold the lamp in predetermined position within said tube, an electrical connector removably applicable to the rear end of the tube and having one terminal that is thereby brought into electrical connection with said tube and hence with said lamp sleeve, both the lamp and the connector having insulated terminals which connect electrically with each other when the connector is in position, a longitudinal positioning slot in said tube, a fin on said connector adapted to engage within both positioning slots to hold the tube in predetermined relation to the housing, and a threaded rotatable attachment collar carried by said connector and removably engageable with said neck.

7. In an illuminating device of the character described, an electrically-conductive tube having an open rear end and an internal rearwardly-directed shoulder, a lamp comprising a bulb mounted in a sleeve, said sleeve fitting slidably within said tube and said bulb being narrower than said sleeve so that the lamp may be inserted into the tube through the open rear end thereof and may be advanced forwardly until the front edge of said sleeve abuts against said shoulder to hold the lamp in predetermined position within said tube, said lamp having one terminal adapted to establish electric contact with the tube and having also an insulated rear terminal, an electrical connector removably applicable to the rear end of the tube and provided with mutually insulated terminals adapted to engage the tube and the rear lamp terminal respectively, a housing adapted to receive said tube, a rearwardly-extending threaded neck on said housing through which said tube may be inserted forwardly into said housing, said neck being provided with a rearwardly-open longitudinal positioning slot, said tube being also provided with a rearwardly-open longitudinal positioning slot, a fin on said connector adapted to enter into both of said slots, and a threaded rotatable attachment collar carried by said connector and removably engageable with said neck.

8. In an illuminating device of the character described, an electrically-conductive tube having an open rear end and an internal rearwardly-directed shoulder, a lamp comprising a bulb mounted in a conductive sleeve which is in electrical connection with one lamp terminal, said sleeve fitting slidably within said tube and said bulb being narrower than said sleeve so that the lamp may be inserted into the tube through the open rear end thereof and may be advanced forwardly until the front edge of said sleeve abuts against said shoulder, and means removably engaging said tube at the rear and adapted to press forwardly against said lamp to hold said lamp in said advanced position, said means comprising a connector having one terminal in electrical connection with said tube and hence with said lamp sleeve, both the lamp and the connector having insulated terminals which connect electrically with each other when the connector is in position.

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