March 1, 1927. 1,618,970

H. L. DE ZENG

DIAGNOSTIC INSTRUMENT

Filed Feb. 17, 1923

Fig. 1.

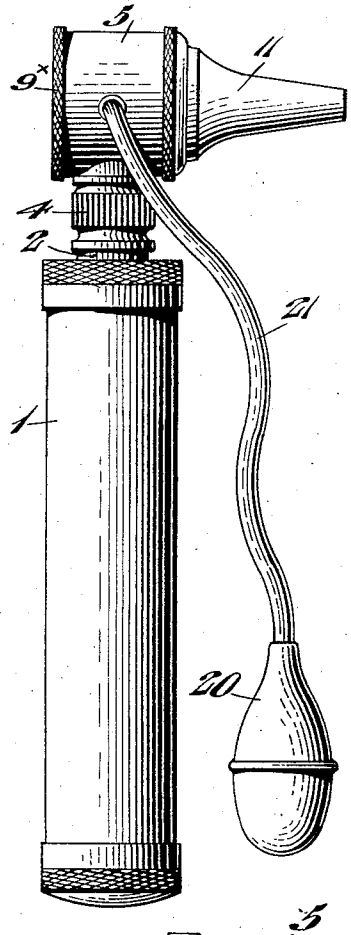


Fig. 3.

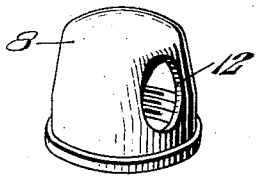


Fig. 4.

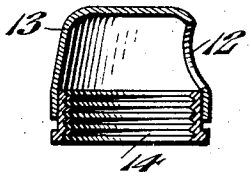


Fig. 5.

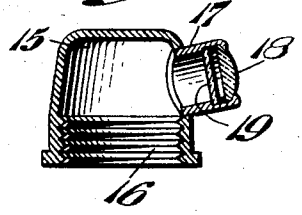
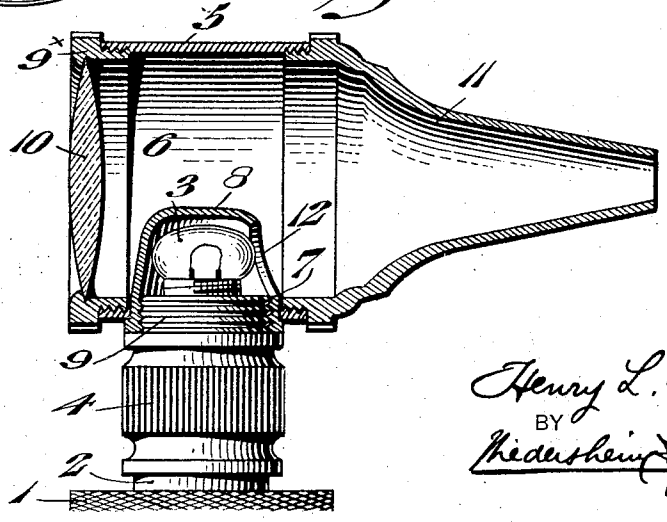


Fig. 2.



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UNITED STATES PATENT OFFICE.

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DIAGNOSTIC INSTRUMENT.

Application filed February 17, 1923. Serial No. 619,552.

The chief object of my invention is to produce a diagnostic instrument which will be simple in both construction and design and which will give a direct illumination of the object from the lamp.

Another object of my invention is to produce a diagnostic instrument having a handle and a lamp carried by the handle and so placed in the diagnostic instrument that the light will fall upon the object without interfering with the line of observation.

Another object of my invention is to so construct a diagnostic instrument that the handle may be detached therefrom and the lamp remain with the handle, the contact being made through an opening in the side of the body portion of the diagnostic instrument by means of a threaded connection or other suitable holding means.

Another object of my invention is to produce a diagnostic instrument and more particularly an otoscope having a handle and an electric lamp and a speculum, the electric lamp while being in the body of the instrument proper has its electrical connections outside thereof.

Another object of my invention is to produce an otoscope of extremely simple construction wherein a handle carrying an electric lamp may be detachably connected so that the lamp globe or filament is within the casing while its base is in the handle.

Another object of my invention is to produce a diagnostic instrument and more particularly an otoscope in which the lamp proper, while being within the body portion proper, has its electrical contact outside the body portion. This construction eliminates all unnecessary and troublesome electrical connections now existing in all other types of otoscopes having the lamp proper within the body portion proper. It furthermore removes all electrical connections of whatever type or nature from the otoscope proper, the same being confined to the handle.

Another object of my invention is to so construct a diagnostic instrument and particularly an otoscope that stock lamps of universal utility, commonly known as the flash-light lamps of commerce, may be employed to directly illuminate the object and to thereby reduce not only the cost of maintenance of the instrument but make it possible for the user to procure his supplies from any electrical supply store in the country. Furthermore, through the adaptation of these lamps in this way, both the mechanical and the electrical construction of the instrument are greatly simplified, and the cost of manufacture consequently reduced.

Another object of my invention is to produce a diagnostic instrument having an electric lamp which is properly shielded so as to prevent the light from interfering with the eye of the examiner, also to concentrate the light properly upon the object for increased illumination thereof, and to selectively retard certain wave lengths of light when that is desired or to diffuse the light when required.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results. It is, however, to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a side elevation of a diagnostic instrument, embodying my invention.

Figure 2 represents, on an enlarged scale, a vertical sectional view of the upper portion of Figure 1.

Figure 3 represents a perspective view of a shield employed, in detached position.

Figure 4 represents a sectional view of a modified form of shield and nipple assembled.

Figure 5 represents a vertical sectional view of another form of shield with a lens and a screen.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings, in carrying out my invention, I employ a handle 1 which may serve as a container for a battery, said handle having the extension 2 supporting the lamp 3. The rotatable nut 4 is positioned between the top of the handle 1 and

the lamp 3 and is rotatable, so as to open and close the lamp circuit. 5 designates a body portion having within it a chamber 6, said body portion having a hole in its lower portion, as indicated at 7, in which is soldered, brazed or otherwise secured a shield 8, having its lower portion threaded and adapted to engage the threaded extension 9 of the extension 2 of the handle 1, it being understood that said body portion 5 and shield 8 are detachable as a unit from the handle in the construction seen which construction can be modified, as shown in Figure 4, to be hereinafter referred to.

At the end of the chamber 6 is located the cap 9× having the lens 10 therein and at the other end of said chamber is the speculum 11, which is in threaded engagement with the walls of the body 5. The shield 8 has the aperture or opening 12 therein, whereby the light rays from the lamp 3 are permitted to be discharged into the speculum 11.

It will be understood that while I have shown the cap 9× and the speculum 11, as in threaded engagement with the body 5, other forms of connections may be employed, if desired.

In Figure 4, I have shown another form of shield designated as 13 having a push fit on the upper exterior portion of the nipple 14 which latter is secured to the wall of the chamber 5, said nipple being internally threaded, as will be apparent from Figure 4, for engagement with the threaded extension 9, seen in Figure 2.

In Figure 5, I have shown another form of shield, which may be employed, which I have designated as 15, said shield being internally threaded at its lower portion at 16, to engage the threaded extension 9, seen in Figure 2.

The forward portion of the shield 15 has the extension 17, in the outer end of which is secured the lens 18 in the rear of which is a screen 19.

In Figure 1, I have shown a pneumatic attachment, which may be employed, comprising the compressible bulb 20, and the tube 21, the upper end of which latter is connected with the chamber 6, seen in Figure 2.

The advantages of my novel construction are as follows:

By placing the lamp in the handle of the instrument and connecting the handle with the instrument in such a manner as to bring the lamp into operative position for directly illuminating the object, I greatly cheapen and simplify the construction. By introducing the lamp through an opening in the side of the instrument and by the use of the shield, I am enabled to get a clear and unobstructed view of the object, under direct illumination from the lamp. I also obviate the necessity of having any electrical connections of any kind within the instrument proper. I have furthermore by this novel construction obviated the necessity for any condensing lenses or reflectors common to other forms of diagnostic instruments of this general character.

As hereinbefore pointed out, the shield for the lamp may either be permanently fixed to the body 5 of the instrument proper or it may be detachable and when detachable, both the shield and the lamp may be removed from operative position through the body 5 after removing either the end cap 9× with the lens, or the speculum 11.

In order to concentrate more light upon the object, I have devised the novel construction seen in Figure 5, wherein the extension 17 and lens 18 are employed. In order to variegate the type of illumination, I have shown a screen 19, which may be used either independently or with the lens 18.

If it is important to use diffused light for examining the object or illumination in certain colors, then the screen 19 may be varied for obtaining these variations in the illumination.

One of the greatest advantages in my novel construction lies in the detachability of the handle 1, which may or may not carry the lamp, but when the handle does carry the lamp, then the same lamp and handle may be utilized with other diagnostic instruments by connecting them in a manner similar to that shown in Figure 2.

Another advantage of my invention is in its novel construction which provides for the use of the standard or stock lamps of commerce which, while obtainable in practically every town, city and hamlet in the country, are very much cheaper in cost than the special lamps used in other similar diagnostic instruments.

As already pointed out, the elimination of the electrical connections from the instrument proper and particularly from the chamber 6 of Figure 2 removes at once the possibility of disarrangement of parts necessary to the proper performance of the lamp, which in other similar forms of diagnostic instruments has been found to be extremely unsatisfactory. While I have shown the lamp 3 as being carried by the extension 2 of the handle 1, nevertheless said lamp may be carried in a separate holder, which may be detachably connected with the handle 1 by any suitable coupling means.

It will now be apparent that I have devised a new and useful diagnostic instrument which embodies the features of advantage enumerated as desirable in the statement of invention and the above description, and while I have, in the present instance, shown and described preferred embodiments thereof which will give in practice satisfactory

and reliable results, it is to be understood that these embodiments are susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

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

1. In a diagnostic instrument, a speculum barrel having an opening in one side thereof, a lamp cap having an opening in one side thereof and having a portion of its outer surface secured to the speculum barrel around the opening therein and having a portion of its inner surface threaded, a handle having a threaded portion adapted to engage the threaded portion of the cap, and a lamp secured to the handle portion adapted to fit into the cap and transmit light through the opening therein when the threaded portion of the handle is screwed into the cap.

2. In a diagnostic instrument, a speculum barrel having an opening in one side thereof, a lamp cap having an opening in one side thereof and having a portion of its outer surface secured to the speculum barrel around the opening therein and having a portion of its inner surface made into a connecting section, a handle having a connecting section adapted to interengage with the connecting section in the cap, and a lamp secured to the handle portion adapted to fit into the cap and transmit light through the opening therein when the connecting sections of the cap and handle are engaged.

3. In a diagnostic instrument, a speculum barrel having an opening in one side thereof, a lamp cap having an opening in one side thereof secured in the opening in the speculum barrel, a tubular member in the opening of the cap, a lens in the tubular member, a handle fitting in the lens cap, and a lamp on the handle projecting into the lens cap to transmit light through the tubular member and the lens therein.

4. In a diagnostic instrument, a speculum barrel having an opening in one side thereof, a lamp cap having an opening in one side thereof secured in the opening in the speculum barrel, a tubular member in the opening of the cap, a lens in the tubular member, a diffusing member in the tubular member aligned with the lens, a handle having a portion fitting into the lamp cap, a lamp in the handle projecting into the lamp cap to transmit light through the tubular member and the lens and diffusing member therein.

5. In a device of the character described, a tubular body portion having an opening in the lower side, a speculum at one end of the body portion, a covered cap shield having an opening on the side next to the speculum secured in the opening in the body portion, a lens in the opening of the shield, a diffusing member aligned with the lens, and a lamp in the shield.

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