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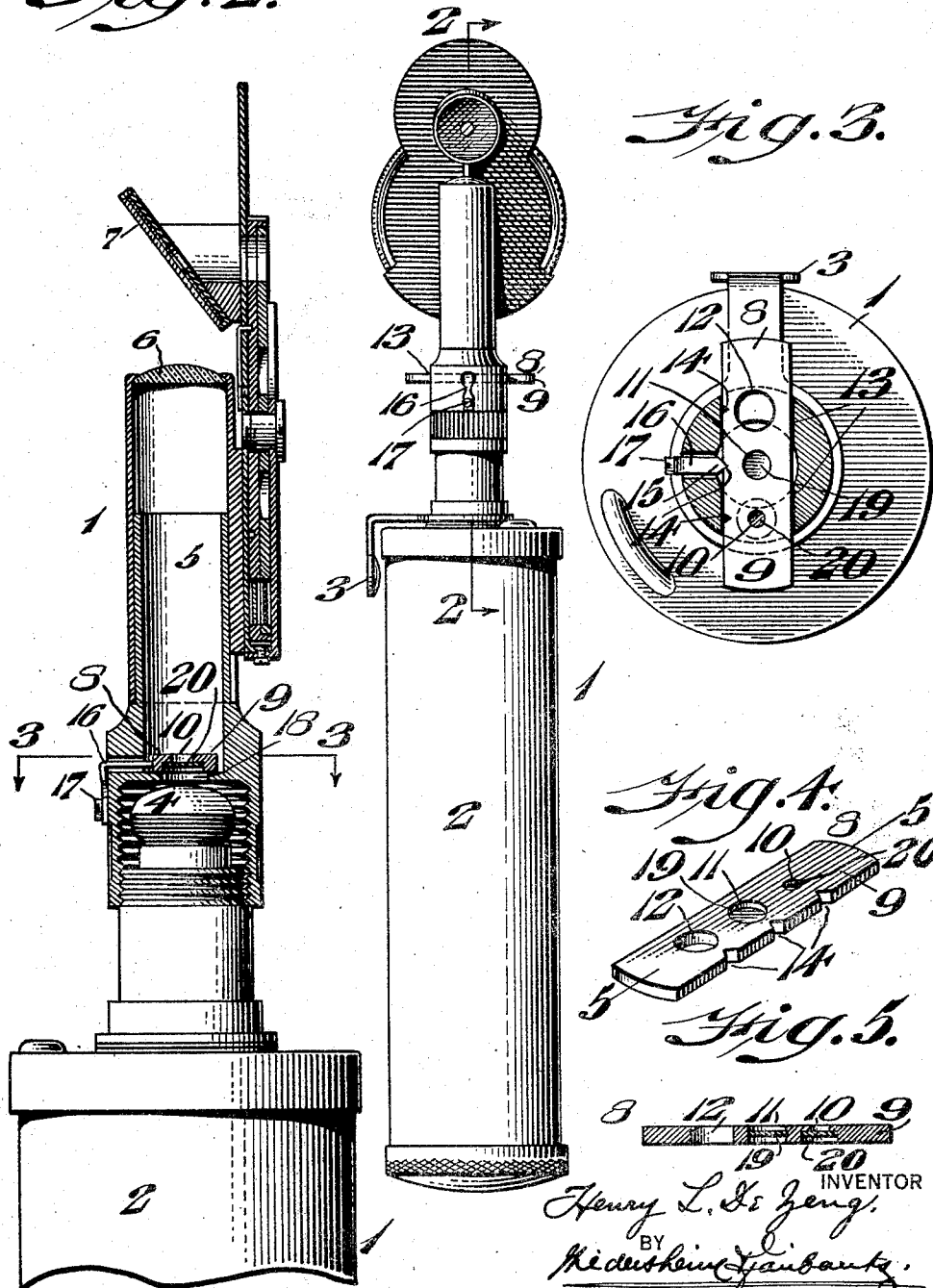
OPHTHALMOLOGIC INSTRUMENT

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*Fig. 2.*

*Fig. 1.*

*Fig. 3.*



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## UNITED STATES PATENT OFFICE.

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## OPHTHALMOLGIC INSTRUMENT.

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*To all whom it may concern:*

Be it known that I, HENRY L. DE ZENG, a citizen of the United States, residing at Moorestown, county of Burlington, State of New Jersey, have invented a new and useful Ophthalmologic Instrument, of which the following is a specification.

In some types of ophthalmoscopes, retinoscopes, etc., now on the market, the governing or controlling of the illumination is accomplished by governing the intensity of illumination of the light source through the use of a variable electrical resistance in series with the light source. Such control of the illumination is satisfactory within certain limitations, but in two important particulars it proves quite inadequate. The two particulars in which my improved control of illumination is superior are firstly in maintaining a clearly defined limit to the area illuminated and secondly in providing either diffused light or light emanating directly from the light source as may be desired.

In the ophthalmoscope a normal amount of perfectly diffused light is ordinarily the most satisfactory but there are cases in which either more or less illumination either diffused or undiffused may be highly advantageous. In making examinations of persons whose eyes are particularly sensitive to light, it may be very desirable to use a greatly reduced illumination. And again there are instances, such as the presence of small vitreous opacities which necessitate a greatly increased illumination. These variable requirements in illumination are fully met in the present invention.

A retinoscope to be most serviceable must be capable of adjustment in illumination to meet the different requirements which present themselves. Diffused light is preferable in retinoscopy, but undiffused light may be employed. A very skillful operator who is kept in full training by almost daily use of the retinoscope requires, for his utmost satisfaction on exceedingly small spot of well-diffused light by which a very quick and accurate reflex is obtained as the projected light is made to traverse its path across the eye under examination. On the other hand, a less experienced operator or one whose daily work requires only an occasional resort to the retinoscope, will require a somewhat larger spot in the instrument in order

that he may be able to see and properly interpret the reflex action obtained. Finally, the average operator who uses a retinoscope, requires for his greatest satisfaction in its use, some provision for controlling the size of the light spot in his retinoscope so that he is enabled to arrive quickly at an approximate diagnosis by using the light spot of larger size following which the use of the smaller light spot enables him, with careful attention, to arrive at his final and more accurate results. In both ophthalmoscopy and retinoscopy the state or degree of diffusion is important and the present invention covers control of the degree of diffusion as well as the change from diffused to undiffused light or vice versa. All of these exacting requirements are provided for in a very simple and practicable manner in the present invention, which relates to certain novel features of advantage and construction in ophthalmologic instruments, such as ophthalmoscopes, retinoscopes, etc., and has particular reference to novel means for governing the illumination.

A principal object of the invention is to provide novel means for obtaining either direct or diffused light from the same instrument, as required either in ophthalmoscopy or retinoscopy, thereby providing means for practicing either art with the same instrument. A further important object is to provide means for varying the size of the opening through which the light passes on its way from the source to the object.

Other objects of my invention are to provide novel means for changing the character of the illumination and to provide an instrument by the use of which, the examination of the eye may be made more accurately under superior illuminating conditions than heretofore, also in which the type of the illumination may be varied.

Further object and advantages of my improved instrument which include simplicity of design and construction by which the foregoing results may be accomplished in a practicable manner, as will be apparent from the following specification taken in connection with the accompanying drawings, in both of which the preferred forms of the invention are described by way of illustration only, but it will be understood that I may make any modification in the details of construction shown and described

within the scope of the appended claims, without departing from or exceeding the spirit of my invention.

Figure 1 represents a side elevation of an ophthalmologic instrument embodying my invention.

Figure 2 represents a section on line 2—2 of Figure 1.

Figure 3 represents a section on line 3—3 of Figure 2.

Figure 4 represents a perspective view of a slide employed.

Figure 5 represents a section on line 5—5 of Figure 4.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings—

1 designates my novel construction of ophthalmologic instrument, the same comprising the handle 2, within which is a storage battery of any conventional type, having the manually operated thumb piece 3, whereby the electric light 4 is controlled, its rays passing upwardly through the passage 5 and the lens 6, to the reflector 7, all of the foregoing elements as well as the other elements portrayed in the drawings, being of any conventional type, with the exception of the novel feature of my invention which will now be described and which consists in the provision of the slide 8, which comprises the body portion 9 having the ports or openings therein, 10, 11 and 12, whose diameter increases in the order stated.

The slide 8 is manually moved or adjusted at a right angle to the longitudinal axis of the instrument, being guided and supported in the slots or ways 13, and one edge of said slide is provided with the notches 14, which are engaged by the nose 15 of the resilient catch or detent 16, which is secured in position by the screw 17, it being apparent that the notches 14 are so positioned with respect to the openings 10, 11 and 12 that the desired opening, when the slide is locked, is always in alignment with the longitudinal axis and with the opening 18, in proximity to the source of light 4.

In the practice of ophthalmoscopy, the operator will ordinarily move the slide 8 until the hole 12 which is the largest and contains no diffuser, is brought into operative alignment and he will then proceed with his eye examination. If, however, he finds that for any reason he wishes a reduced illumination, or wishes to employ light in a state of diffusion, he will, then, by means of pressure with one finger, move the slide 8 until the next opening 11, carrying a light diffuser 19 is brought into alignment. Usually he will not, in the practice of ophthalmoscopy, require the use of the smallest opening 10.

In practicing retinoscopy, the operator will usually move the slide 8 until the hole 11 carrying the light diffuser 19 is brought into alignment, thus providing the illumination most generally adapted to the practice of retinoscopy. The most skillful retinoscopists will, however, move the slide 8 so that the smallest hole 10 carrying the diffuser 20 is brought into alignment, the small spot of diffused light produced thereby being ideal for retinoscopic examination. The construction and arrangement of the slide 8 makes possible the adjustment of the slide by simply pressing the finger against it without removing the instrument from the position normal for the making of an eye examination.

In the accompanying drawings, the invention is shown in its application to the ophthalmoscope. It will be understood, of course, that the invention applies equally to the retinoscope, the head of the retinoscope then being used in place of the ophthalmoscope head. Moreover, the employment in the present invention, of a condensing lens 6 between the light source 4 and the reflector 7, the focal length of which lens is considerably greater than is customarily employed in ophthalmoscopes, permits the use of the ophthalmoscope in the practice of retinoscopy as well as in the practice of ophthalmoscopy. The great advantage thus obtained in enabling the operator to practice both ophthalmoscopy and retinoscopy with the same instrument will be at once evident.

It will now be apparent that I have devised a novel ophthalmologic instrument which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have in the present instance, shown and described a preferred embodiment thereof which will give in practice satisfactory and reliable results, it is to be understood that such embodiment is 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:—

An ophthalmological instrument comprising a source of light, a light passage way extending therefrom, a reflector in line with the light passage way, a slide operative in the passage way beyond the light source, having three openings, progressively increasing in size, one of said openings having clear illumination and the other two having a ground glass screen fitted respectively therein.

HENRY L. DE ZENG.