Improvements in or relating to ophthalmoscopes / [Henry Lawrence De Zeng].

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COMPLETE SPECIFICATION.

Communicated from abroad by HENRY LAWRENCE DE ZENG, of the City and County of Philadelphia State of Pennsylvania United States of America.

"Improvements in or relating to Ophthalmoscopes".

I, GEORGE HARRISON, Chartered Patent Agent, of the Firm of D. Young & Co., of 11 & 12 Southampton Buildings, London, W.C., do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention consists of a novel construction of ophthalmoscope which is adapted for viewing, magnifying, and if desired photographing, the interior of the eye and measuring its refraction by means of telescopic or microscopic, or other similar optical devices applied to an ordinary ophthalmoscope.

To the above end my invention consists in the combination with an ordinary ophthalmoscope such as a reflector with an opening therethrough, of a telescope or microscope (depending upon the relative distance apart of the lenses) co-operating with said reflector.

The invention also contemplates other features of construction hereinafter more particularly set forth.

In the drawings, Figure 1 is a longitudinal section through my ophthalmoscope; Figure 2 a sectional view of a variation; Figure 3 a sectional view of a portion of another variation, the construction illustrated in Figures 1, 2 and 3 being provided with a source of light carried by the instrument; Figures 4, 5 and 6 illustrate variations where extraneous light is used; and Figure 7 illustrates a portion of the tube showing the graduations whereby the refraction may be measured.

In carrying out the invention, A (Figure 1) represents a suitable casing forming the tube of what may be termed a telescope; B the eye piece preferably mounted in a separate tube A^1, which is adjustable with relation to the tube A; C the objective; D the reflector of the ophthalmoscope, and *d* the opening therethrough in line with the optical axis of the telescope.

The reflector, it will be observed, is placed at an angle of 45 degrees with said axis.

Extending from the casing A of the telescope and either made integral therewith or attached thereto is a casing E adapted to contain a suitable electric lamp F, or other suitable source of light.

G is a lens located in the casing E, and between the light F and the reflector D, and acting as a condenser. This lens may or may not be used as desired.

Behind the light F is a reflector H, which may or may not be used as desired.

On the tube A^1, may, if desired, be placed graduations A^2 (Figure 7) to indicate the relative adjustment of the telescopic lenses.

In Figures 4, 5 and 6, I have shown a variation in the form of the apparatus without departing from the spirit of my invention. In the figures, K represents a suitable plate provided with a handle K^1. Mounted in this plate K is the ophthalmoscope consisting of a casing M with a reflector N mounted therein, the two provided with an opening *m*; mounted in the plate K is the tube O of the telescope having the objective P (which corresponds with the objective C of

the form shown in Figure I) and the eye piece Q (which corresponds with the eye piece B in Figure 1).

The ophthalmoscope casing M is mounted on pivots m^1 so that the ophthalmoscope can be adjusted with respect to the external light.

If desired the ophthalmoscope reflector may be mounted with respect to the tube O, as shown in Figure 6, on a ball joint R, so that it can be thrown in a suitable position to reflect the light.

In Figure 2 the reflector D is placed between the objective C and the eye piece B with the casing E arranged accordingly, while in Figure 3 the casing E and the main casing A are made parallel with each other and an additional reflector J is provided. The casing E may of course be arranged at any angle with respect to the casing A, and the necessary reflector be provided to direct the light as desired.

In order that the refraction of the eye may be properly measured, I provide on the tube A^1 suitable graduations A^2 previously referred to, whereby the relative separation of the lenses B and C may be accurately indicated by adjusting the lenses so that when observing an emmetropic eye the zero mark of the scale A^2 registers with the end of the casing A, when the observed eye is ametropic the graduations on either side of the zero mark will indicate the amount and nature of the ametropie.

It is obvious that the ophthalmoscope reflector may be mounted in any suitable way without departing from the spirit of my invention and that the desired adjustments of the relation of the eye piece B with the objective C can be effected by other means than that described.

The objective C can be either a simple or an achromatic system, according to the requirements, and the eye lens B can also be a simple or an achromatic system as desired.

When it is desired to use my invention in connection with a photographic apparatus, the eye piece may be removed and a camera substituted, as is evident.

Although I have shown perforated concave reflectors, I do not desire to be limited thereto in every instance, as it will be evident that I may employ a plane or concave reflector, having no perforation therein, and no coating of quicksilver or other material on the back thereof.

When a coated reflector is used, I may employ either an opening therein, or the coating may be removed at a point in adjustment with the optical axis, of the telescope.

It will be evident that my invention can be adapted and applied to the various forms of ophthalmoscopes now in use.

It will be evident that the principle of my invention is applicable to any instrument, for viewing the interior of the eye, such as a retinoscope or other instrument, and I do not limit its application to an ophthalmoscope alone.

It will be apparent that objectives C of different power can be used in connection with the eye lens B and *vice versa*, in accordance with the requirements. It will be evident suitable eye pieces may be used for producing upright images when required, and that other changes may be made by those skilled in the art and I do not therefore desire to be limited in every instance to the exact construction I have herein shown and described.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, as communicated to be by my foreign correspondent, I declare that what I claim is:—

1. In combination, a telescope and an ophthalmoscope having a reflector for extraneous light and means permitting the transmission of light from the object through said reflector, substantially as described.

2. In combination, a telescope and an ophthalmoscope having a reflector, the latter having an opening in its reflecting surface in line with the telescope.

3. In combination, a telescope and an ophthalmoscope having an adjustable

reflector for extraneous light and means permitting the transmission of light from the object through said reflector.

4. In combination, an adjustable telescope and an ophthalmoscope having an adjustable reflector for extraneous light and means permitting the transmission of light from the object through said reflector.

5. In combination, a telescope, the lenses of which are relatively adjustable, means for measuring said adjustment, and an ophthalmoscope.

6. In combination, a telescope and an ophthalmoscope having a reflector for extraneous light, said reflector supported by an universal joint, and means permitting the transmission of light from the object through said reflector.

7. In combination, a telescope and an ophthalmoscope having a reflector for extraneous light, means permitting the transmission of light from the object through said reflector, and means carried by the case of the instrument adapted to support a source of extraneous light, substantially as described.

8. In combination, a telescope and an ophthalmoscope, the latter having a reflector for extraneous light, means permitting the transmission of light from the object through said reflector, means carried by the case of the instrument for supporting a source of artificial light, and a reflector adapted to direct the rays of said artificial light against said ophthalmoscope reflector.

9. In combination, a telescope and an ophthalmoscope, the latter being in line with the optical axis of the telescope, means carried by the case of the instrument for supporting an artificial source of light, and a reflector adapted to direct the rays from said source of light to the ophthalmoscope, substantially as described.

10. An article of manufacture combining an ophthalmoscope and a telescope, comprising a case provided with a telescopic eye piece and object lens adjustable with respect to each other, a source of artificial light carried by the case, and a reflector located in the telescopic axis of the eye piece and object lens, said reflector having means permitting the transmission of light from the object through said reflector and adapted to reflect the rays of the artificial light against the object, substantially as described.

11. An article of manufacture combining a telescope and an ophthalmoscope, consisting of a case having two portions, one at an angle with the other, one portion containing the telescopic eye piece and lens, the other portion containing a source of artificial light and a reflector having means permitting the transmission of light from the object through said reflector, said reflector located at the junction of the two portions of the case and adapted to reflect the light from the artificial source to the object.

Dated this 1st. day of July 1901.

D. YOUNG & Co.,
11 & 12 Southampton Buildings, London, W.C.,
Agents for the Applicant.

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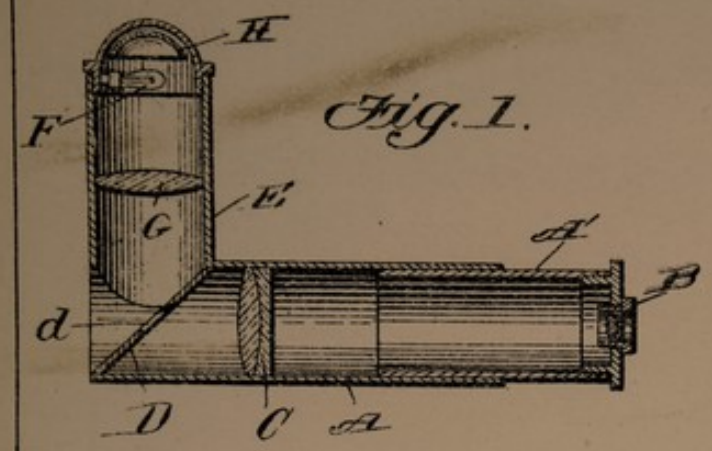
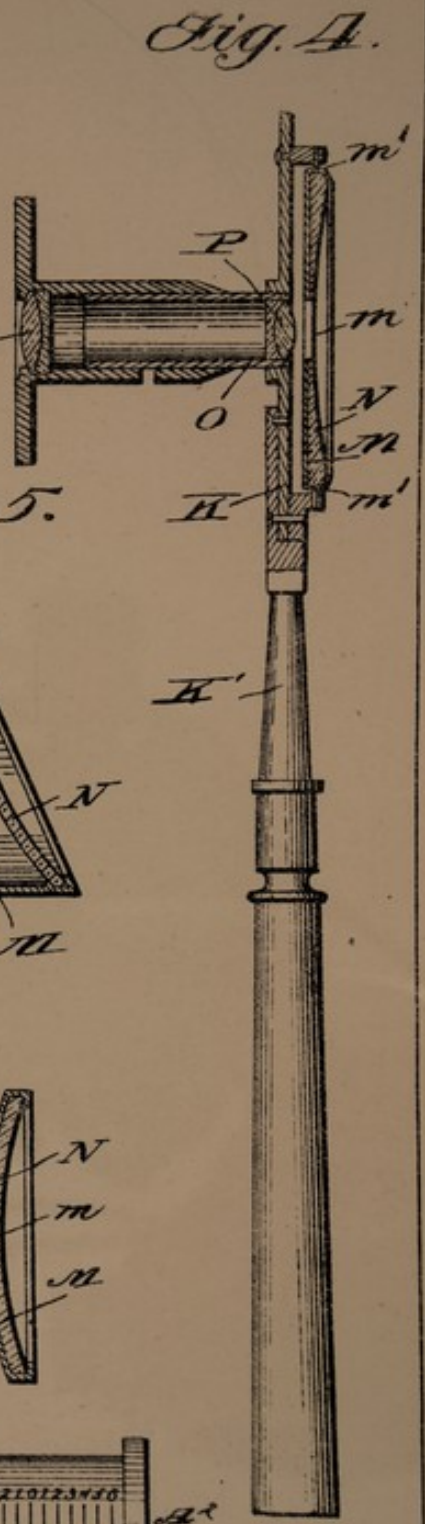
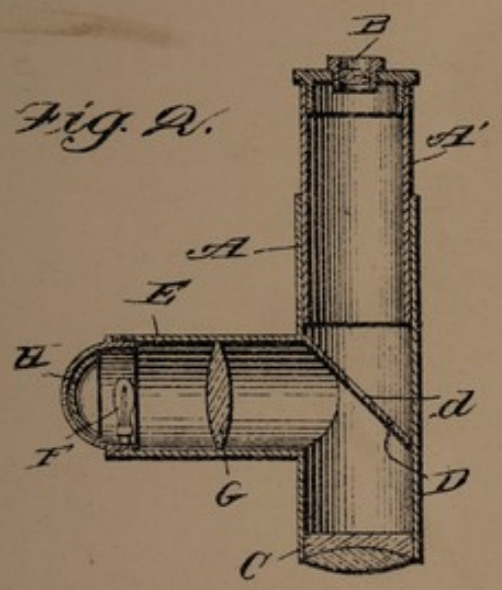
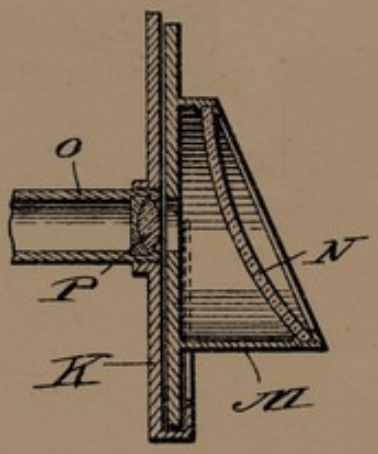
HARRISON'S COMPLETE SPECIFICATION.

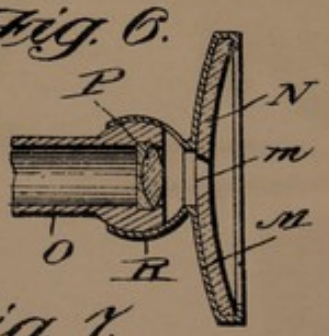
(1 SHEET)

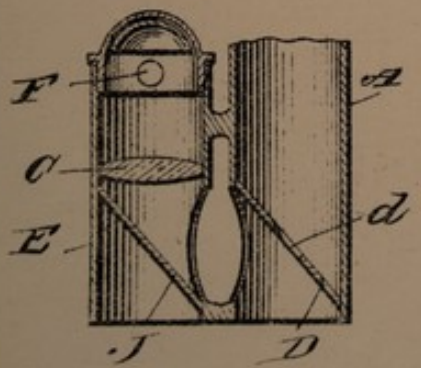


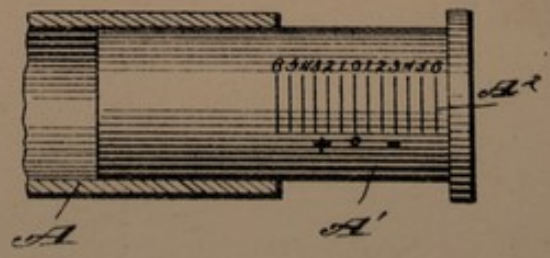












[This Drawing is a reproduction of the Original on a reduced scale.]

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