

Miniature binocular indirect ophthalmoscope

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The optical principles of indirect ophthalmoscopy were mastered by Gullstrand (1911) although his ophthalmoscope did not achieve wide popularity because of its complexity and limited field of view.

Schepens (1947) demonstrated his binocular indirect ophthalmoscope 21 years ago in the United States of America.

The instrument described here is a further stage in simplification (Figs 1 and 2). Our intentions in developing it were to reduce the overall weight and to miniaturize the light source without impairing the optical capabilities.

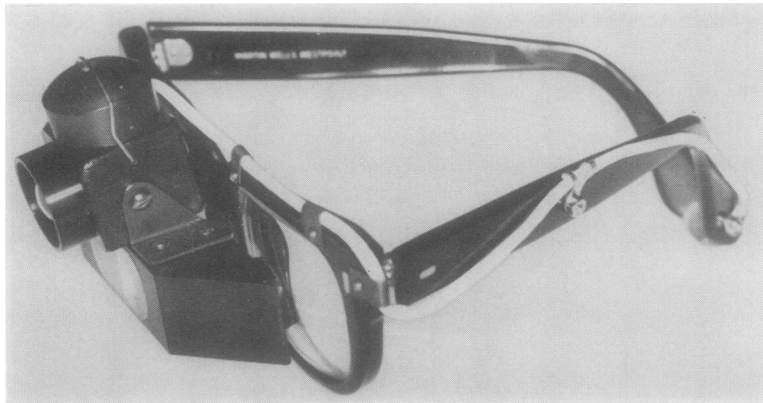


FIG. 1 *Miniature binocular indirect ophthalmoscope*

The ophthalmoscope is mounted on spectacle lenses in a shell frame. Each instrument is lighter than conventional ophthalmoscopes; it has no moving parts, and it may be powered from either the mains supply or a battery pack.

The normal range of interpupillary distances is effectively served by two sizes of instrument.

Description

The optical system (Fig. 3, opposite) is mounted on the front surfaces of a pair of spectacle lenses by short connecting tubes cemented into partial trephines.



FIG. 2 *Instrument in use*

The key problem in development proved to be the illuminating system. One of us (J.M.P.) proposed a solution utilizing a commercially available electric bulb and a single aspherical condensing lens.

This lens replaces the multiple component condensers of other modern ophthalmoscopes.

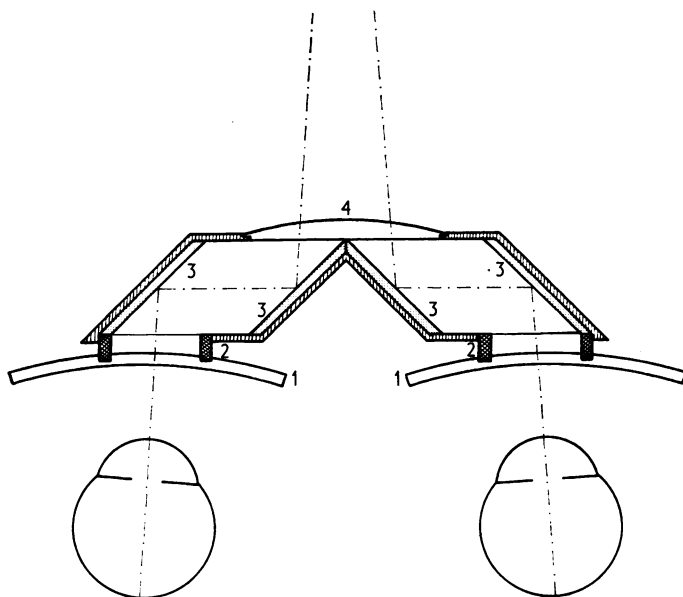


FIG. 3 *Optical system*

- (1) Spectacle lens
- (2) Connecting tubes
- (3) Surface coated mirrors
- (4) Low-power field lens

Light output is substantially improved by a high reflectance spherical mirror behind the globe. A pre-focused metal attachment to the globe permits rapid replacement of the lamp (Fig. 4).

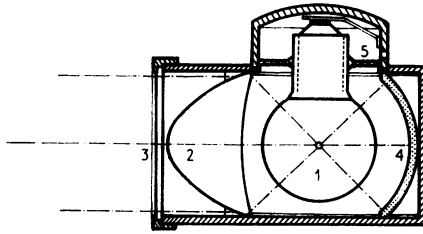


FIG. 4 *Illuminating system*

- (1) 6V/1A Miniature lamp
- (2) Compensated aspherical condenser
- (3) Infrared filter
- (4) Surface coated spherical mirror
- (5) Pre-focusing holder

A power unit and battery pack have been developed by J.M.P. for use in conjunction with the miniature indirect ophthalmoscope (Figs 5, 6, 7).

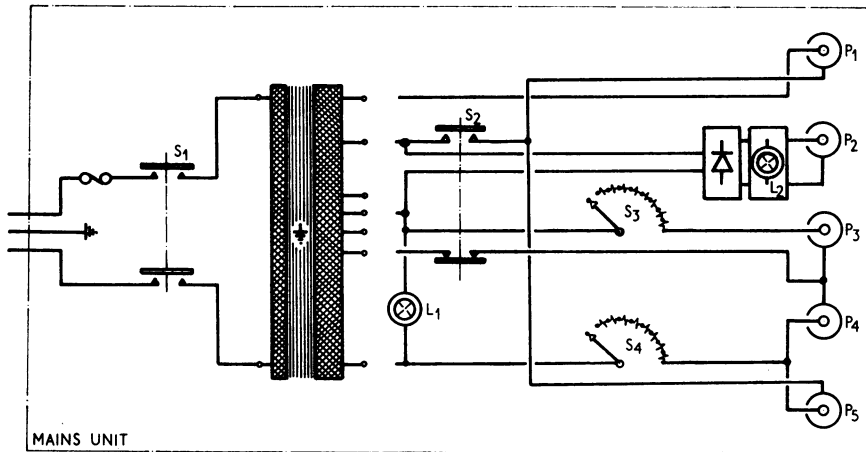


FIG. 5 *Power supply - mains unit*

- S1 - Power switch
- S2 - Voltage selector switch
- S3 - Intensity selector : cautery
- S4 - Intensity selector : any 6V or 12V instrument
- L1 - Power and cautery continuity indicator
- L2 - Charging indicator
- P1 - 2.8V/1A suitable for retinoscope, etc.
- P2 - 8V/400 mA battery charger
- P3 - 3.5V/3A cautery (intermittent only), etc.
- P4 - 6.3V/1A indirect ophthalmoscope, etc.
- P5 - 12.6V/1A pantoscope, etc.

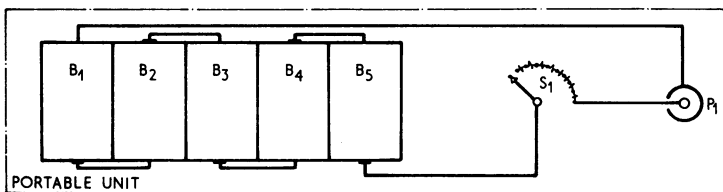


FIG. 6 *Portable unit*

- B (1-5) 1.25V/4Ah, NiCd battery
- S1 - Intensity selector
- P1 - 6.5V/1A indirect operating magnifying glasses

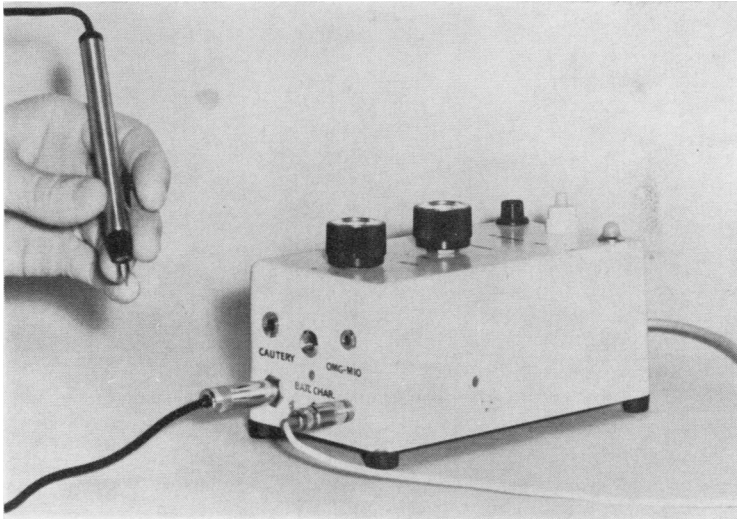


FIG. 7 Power supply. Cautery and miniature indirect ophthalmoscope leads connected

Developmental work was done by D. Schultz of Scientific Optical Laboratories of Australia with the assistance of the computer unit at the Weapons Research Establishment, South Australia. The miniature binocular indirect ophthalmoscope is manufactured by Scientific Optical Laboratories of Australia Pty. Ltd., 649 South Road, Black Forest, South Australia.

References

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SCHEPENS, C. L. (1947) *Trans. Amer. Acad. Ophthal. Otolaryng.*, **51**, 298