(No Model.)

W. A. CARDWELL.

OPERA, FIELD, OR MARINE GLASS.

No. 384,122. Patented June 5, 1888.

FIG. 1.

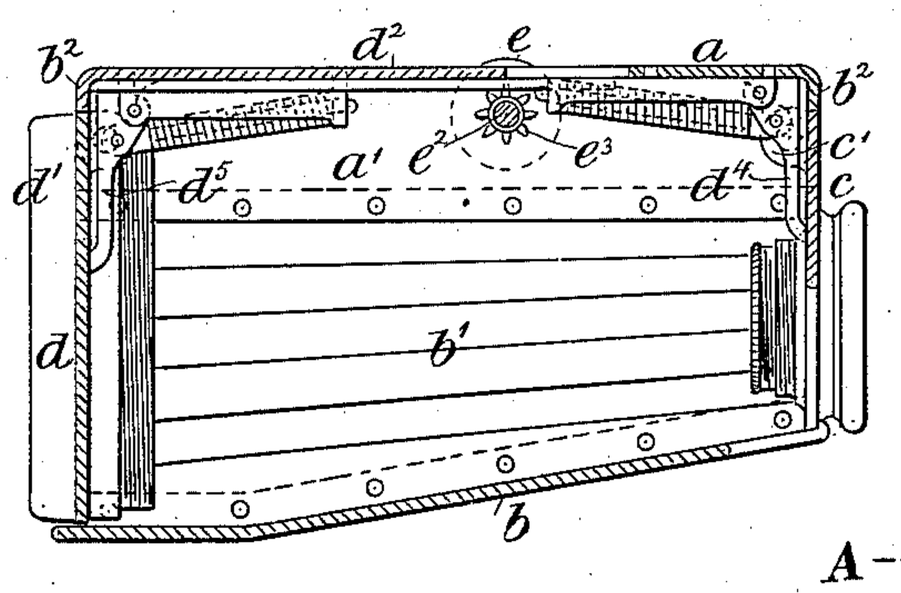


FIG. 3.

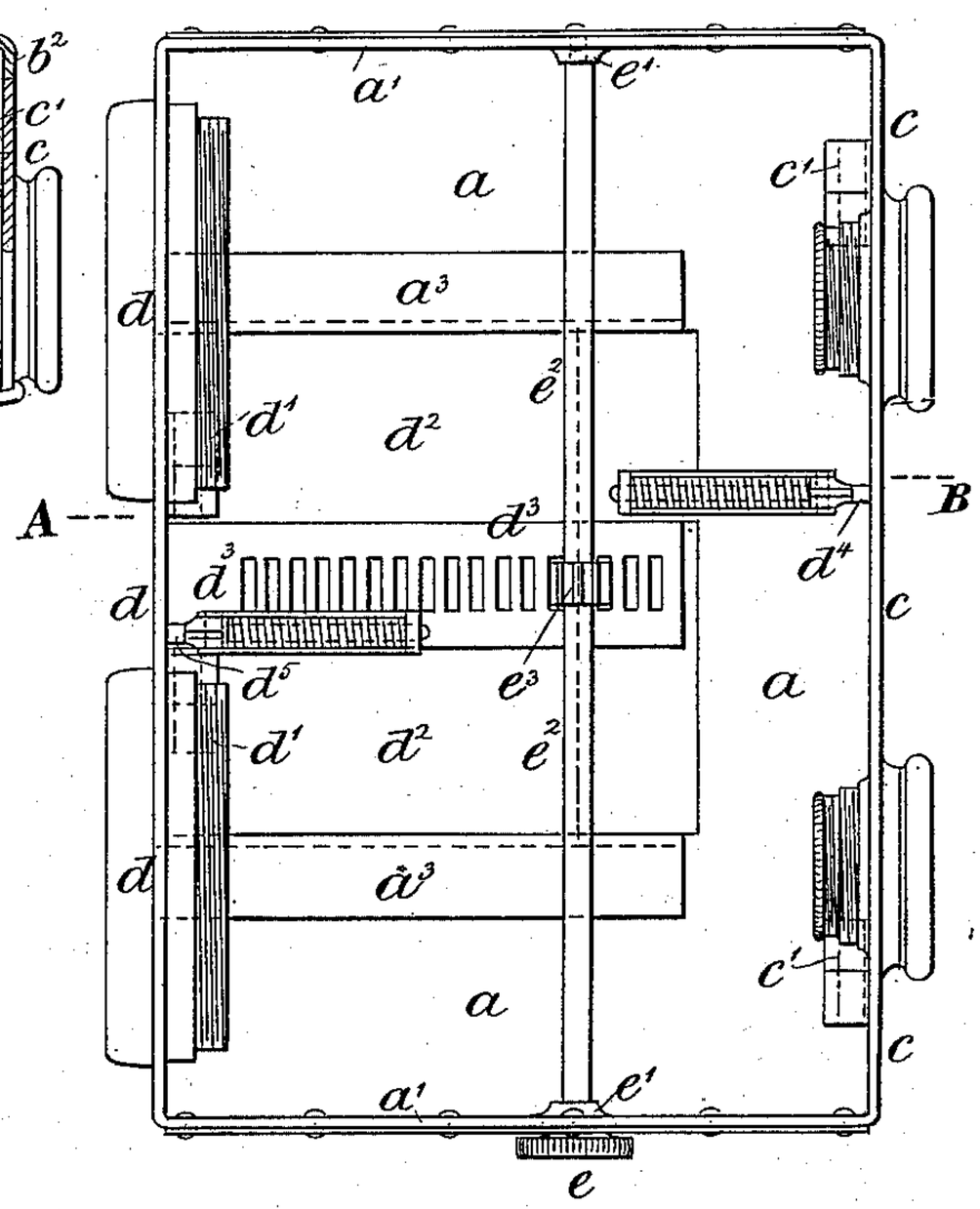


FIG. 2.

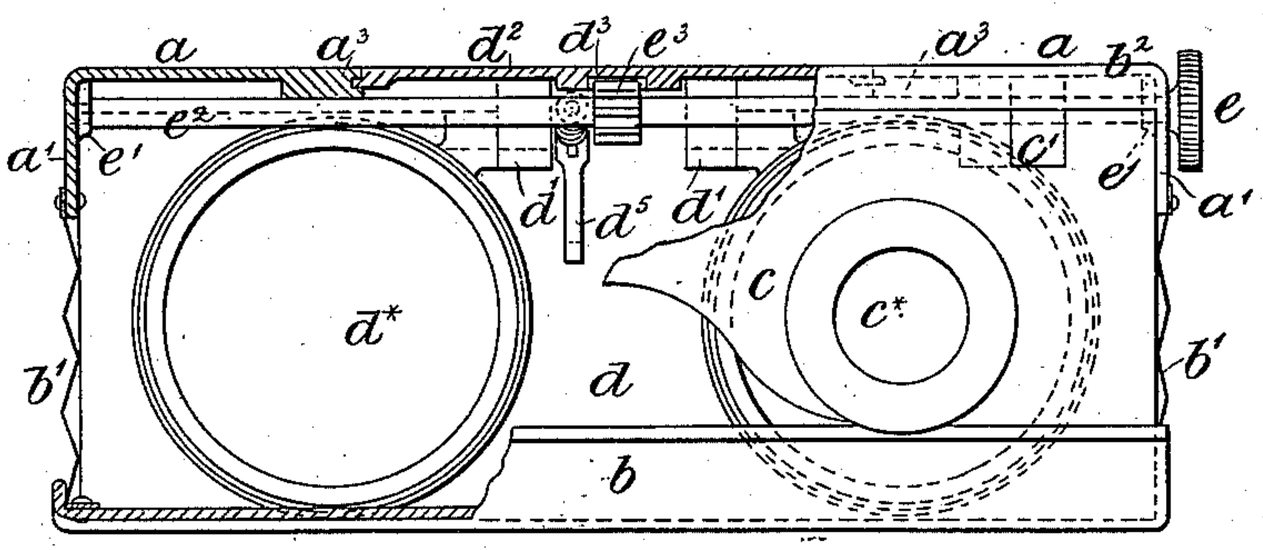
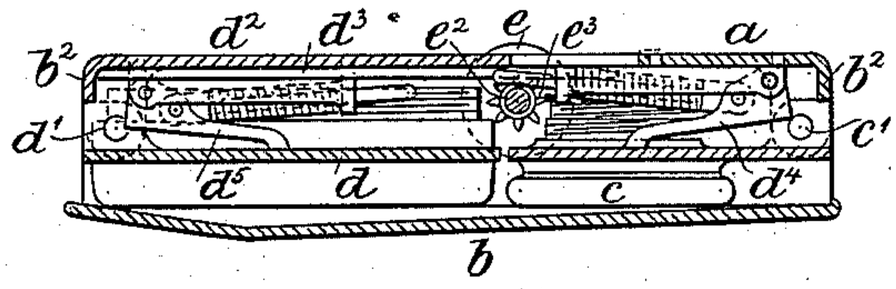


FIG. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM A. CARDWELL, OF MOAT CROFT, EASTBOURNE, COUNTY OF SUSSEX, ENGLAND.

OPERA, FIELD, OR MARINE GLASS.

SPECIFICATION forming part of Letters Patent No. 384,122, dated June 5, 1888.

Application filed February 1, 1888. Serial No. 262,640. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ALEXANDER CARDWELL, of the Moat Croft, Eastbourne, in the county of Sussex, England, lieutenant-colonel of volunteer artillery, a subject of the Queen of Great Britain, have invented certain new and useful Improvements in Opera, Field, or Marine Glasses, of which the following is a specification.

The object of my invention is to provide an opera, field, or marine glass which will be capable of being folded into a small compass when out of use and thus rendered easily portable. For this purpose I employ a frame-work of any suitable material, which is provided with a rigid top and bottom connected to the sides, which are formed of flexible material. The ends of the frame are hinged, one to the top or bottom and the other to a slide carried thereby, and they are capable of folding upon the top or bottom. These ends are formed to carry the lenses, and the slide, to which one of them is hinged, is provided with a rack, to which motion is given by means of a pinion, whereby one of the ends is capable of being moved nearer to or farther from the other in order to adjust the instrument to the required focus. When in use, the ends of the frame are placed in a vertical position and there retained by any suitable means, and thus tighten and hold the flexible material in proper form; but when out of use the ends may be folded upon the top or bottom of the frame, when the instrument will assume a compact and convenient form for carrying in the pocket.

In order that the said invention may be more clearly understood and readily carried into effect, I will proceed, aided by the accompanying drawings, more fully to describe the same.

In the drawings, Figure 1 is a longitudinal section taken on the line A B of Fig. 3, showing an opera or field glass constructed according to my invention, and showing the instrument expanded ready for use. Fig. 2 is an end view thereof, partly in section. Fig. 3 is an under side view thereof with the bottom removed, and Fig. 4 is a longitudinal section showing the instrument when folded and out of use.

Similar letters of reference indicate corresponding parts in all the figures.

The frame-work of the instrument is constructed with a rigid top, *a*, of metal or other suitable material, formed with flanges *a'* and with a rigid bottom, *b*, of similar material. The sides *b'* are formed of leather, silk, or other suitable opaque flexible material, and they are riveted, cemented, or otherwise connected to the flanges *a'* of the top *a*, and also to the bottom *b*. The rear end, *c*, of the frame is hinged to the top *a* by means of plain hinges or joints *c'*, and the front end, *d*, of the frame is similarly connected by a hinge, *d'*, with a slide, d^2, which travels between or in guides a^3, formed on or carried by the top *a*. These ends *c* and *d* are formed to carry the lenses c^* and d^*, which are securely held in fittings in the usual manner, or they might be cemented in the ends *c* and *d*; and the slide d^2, to which the end *d* is hinged, is formed or provided with a rack, d^3, to which motion is given by means of a pinion, e^3, mounted upon a cross-shaft, d^2, mounted in bearings *e'*, carried by the top *a* and furnished with a milled wheel or button, *e*, exterior of one of the side flanges, *a'*; or there might be a milled wheel *e* upon each end of the cross-shaft e^2, whereby the front end, *d*, is capable of being moved nearer to or farther from the rear end, *c*, in order to adjust the instrument to the required focus.

In connection with the ends *c* and *d*, I employ spring-levers d^4 d^5, the one d^4 being carried by the top *a* and the other, d^5, being carried by the slide d^2, so as to exert a constant pressure upon the ends *c* and *d*, in order to automatically place and retain such ends in a vertical position, but so as to allow of such ends being folded down upon the top *a*, as shown at Fig. 4. The ends will thus, when the instrument is to be used automatically, be brought into a vertical position, when they will abut against stops b^2 upon the frame. According to this arrangement, when the instrument is in use the ends *c d* of the frame are placed in a vertical position, as shown at Figs. 1, 2, and 3, and the ends are retained in that position by means of the spring-levers d^4 d^5. By these means the flexible sides *b'* are tightened and held in proper form for use; but

when out of use the sides b' and ends c d may be folded upon the top a of the frame, when the instrument will assume the form shown at Fig. 4.

If desired, instead of employing spring-levers d^4 and d^5 for opening out the ends c and d, other suitable means—such as cords attached to such ends—may be employed for that purpose, and the ends may be fitted with "sight" hinges in lieu of the plain hinges c' and d', in order to retain the ends c and d in their vertical position. By these means I obtain an opera or field glass which may be folded into a compact form for carrying in the pocket, and which may also be readily converted into a practical instrument.

A strap or clasp or other fastening means may be employed to retain the instrument in its folded or closed condition, and, if desired, the instrument when out of use may be placed in a suitable case or cover.

Although in the drawings I have represented the top of the instrument as being formed to carry the operating parts it will be evident that such arrangement may, if desired, be reversed and the bottom may be caused to carry such parts.

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

1. An opera, field, or marine glass formed with rigid top and bottom and flexible sides, substantially as described.

2. An opera, field, or marine glass formed with rigid top and bottom, flexible sides, and hinged ends, substantially as described.

3. An opera, field, or marine glass formed with rigid top and bottom a and b, flexible sides b', and hinged ends c and d, carrying lenses c^* and d^*, in manner substantially as herein shown and described, and for the purpose stated.

4. An opera, field, or marine glass formed with rigid top and bottom a and b, flexible sides b', end c, carrying lenses c^* and hinged to rigid top a or bottom b, end d, carrying lenses d^* and hinged to a slide, such as d^2, traveling in guides, such as a^3, on top or bottom a or b, and provided with a rack, d^3, receiving motion from pinion e^3, and spring-levers d^4 d^5, for opening out and retaining the ends c and d in a vertical position against stops b^2, in manner substantially as herein shown and described, and for the purpose stated.

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