June 18, 1940. H. SCHWARTZMANN 2,205,312

EXPOSURE METER

Filed July 25, 1939

Fig. 1.

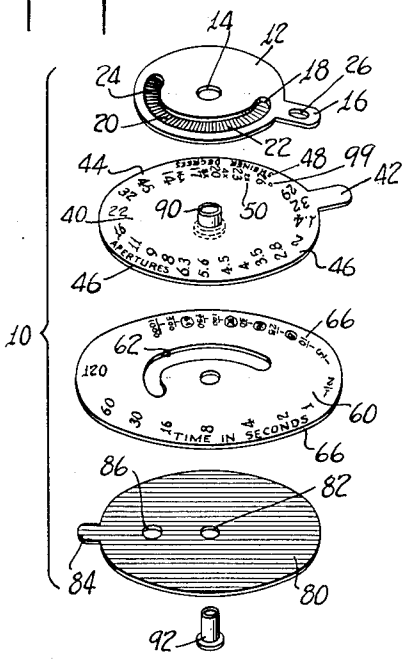


Fig. 2.

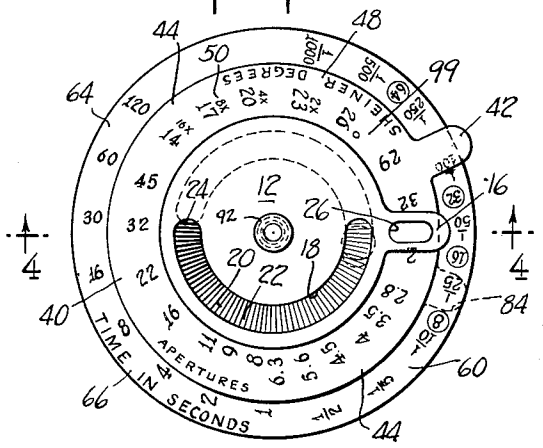
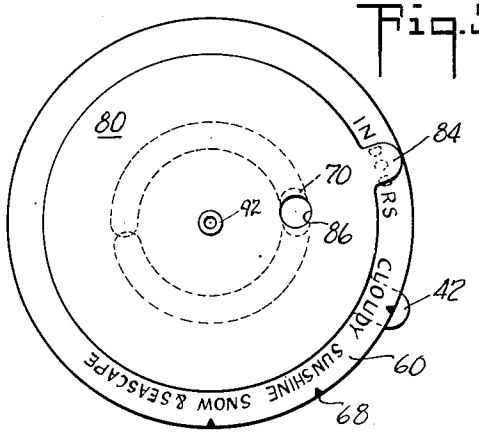


Fig. 3.



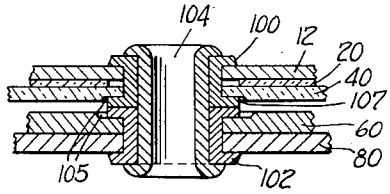


Fig. 5.

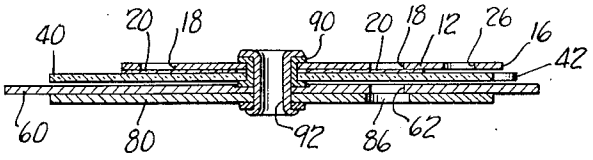


Fig. 4.

INVENTOR
HARRY SCHWARTZMANN
BY
Dyke and Schaines
ATTORNEYS.

Patented June 18, 1940 2,205,312

UNITED STATES PATENT OFFICE

2,205,312

EXPOSURE METER

Harry Schwartzmann, New York, N. Y., assignor to Fink-Roselieve Co., Inc., New York, N. Y., a corporation of New York

Application July 25, 1939, Serial No. 286,333

6 Claims. (Cl. 88—23)

My invention relates generally to photographic exposure meters, and specifically to photographic exposure meters of the "extinction" type. The main object of my invention is the provision of a device of the character described whereby the different variables—shutter speed, lens apertures, or combinations thereof—can be determined in relation to the known existing constants—film emulsion sensitivity, light conditions, or any thereof.

The object of my invention is to provide a simple device whereby, for all kinds of photography as well as cinematography, the shutter speed and lens openings for a particular film and under certain light and action conditions can be determined easily and quickly.

A further object of my invention is the provision of an exposure meter which comprises a plurality of concentrically mounted circular discs.

A further object of my invention is the provision of an exposure meter which comprises a plurality of concentrically-mounted, circular discs of different sizes, certain of which discs bear indicia related to indicia on others thereof.

A further object of my invention is the provision of an exposure meter which comprises a plurality of concentrically mounted, circular discs, adapted to rotate independently of one another, certain discs being also adapted to rotate simultaneously with others thereof.

A further object of my invention is the probision of an exposure meter which comprises a plurality of circular discs, concentrically and rotatably mounted, certain of which discs are transparent and certain of which discs are opaque.

Other and still further objects of my invention will be apparent and will be pointed out hereinbelow in the specification of illustrative embodiments.

In the drawing annexed hereto, forming a part hereof:

Figure 1 is an exploded perspective view of the component parts of one form of device constructed according to and embodying my invention;

Fig. 2 is a top plan view of the assembled device;

Fig. 3 is a bottom plan view thereof;

Fig. 4 is a section on the line 4—4 of Figure 2; and

Fig. 5 is a view similar to Figure 4 of a modification.

Reference numeral 10 indicates my new and improved exposure meter generally, which comprises four circular discs, concentrically mounted one above the other.

Topmost disc 12 is centrally apertured, as at 14, and is provided with a projecting tab 16 whereby the disc can be rotated about its axis. Disc 12 is stamped or otherwise formed of relatively thin opaque material, such as laminated acetate, or any suitable metallic material, etc., and has stamped or cut out therefrom an arcuate, semi-circular window 18, near the periphery thereof. The window 18 begins opposite tab 16 and extends clockwise around the disc to the diametrically opposite side thereof. On the underside of this topmost disc 12, a strip of film 20 is secured, which is visible through window 18. That portion 22 of strip 20 which can be viewed through window 18, is of graduated density. Portion 22 is perfectly transparent at the beginning thereof near tab 16, and progressively less so until it is substantially opaque or nearly so at the opposite end 24. If desired, tab 16 may be provided with a suitable aperture 26, for purposes to be explained below.

The second disc 40 is also circular, and centrally apertured, and is provided similarly with a projecting tab 42 so that the disc can be rotated about its axis. Disc 40 is of greater diameter than disc 12 and a peripheral platform portion 44 thereof projects beyond disc 12 when the two are superimposed. Disc 40 is formed of a transparent material. On platform 44, I place the information anent film emulsion sensitivity, lens apertures, and the filter factors. The lens aperture indicia 46 are inserted ranging from "1.4" to "45" in a clockwise direction starting adjacent tab 42. The film emulsion sensitivity ratings 48 (American Sheiner degrees are used for illustration only, and not for limitation) are inserted, also in clockwise direction, starting from "14" after the last lens indicia "45" and increasing to "32" near the first lens indicia "1.4". The filter factors 50 are inserted among the sensitivity ratings 48, in a counter-clockwise direction. For convenience in use, the film ratings 48 and lens openings 46 may be in different color, and the filter factors 50 are in a different and distinctive type.

The third disc 60 is also circular, and centrally apertured. Disc 60 is preferably opaque, and has formed therein, as by stamping or otherwise, a semi-circular, arcuate window 62. Disc 60 is of greater diameter than discs 12 and 40, and has an annular platform portion 64 which projects out beyond the disc 40 when in superposed relation. Window 62 is so located that when the

discs are all assembled, window 18 on disc 12 coincides with window 62 in disc 60. Shutter speed indicia 66 are placed on platform 64, ranging from one one-thousandth (1/1000 sec.) of a second up to one hundred and twenty (secs.) seconds in a blockwise direction. On the underside of disc 60, as in Fig. 3, I insert indicia 68 to indicate general light conditions, ranging in a clockwise direction, from "indoors" through "cloudy," "sunshine" and "snow and seascape." The first of these indicia 68 are placed opposite one end 70 of window 62.

A fourth disc 80 is also provided, centrally apertured at 82, and having a projecting tab 84 formed thereon. Disc 80 may be formed, as by stamping or otherwise, of an opaque material. A circular opening 86 is formed in the body of disc 80, in line with tab 84 (See Figs. 1 and 3). Aperture 86 is of diameter substantially equal to or just a bit greater than the width of windows 18 and 62, in discs 12 and 60 respectively, and is so located with respect to the center of the disc, that when the discs are concentrically mounted, one on top of the other, aperture 86 will line up with said windows 18 and 62 (see Fig. 4).

I preferably assemble the discs in the following manner: Disc 12 is superposed on disc 40 and the two secured by a centrally inserted eyelet 90. By means of this connection, disc 12 may be rotated independently on disc 40, but when disc 40 is rotated, it carries with it the smaller disc 12. The pre-secured discs are then placed on top of discs 60 and 80 and the four concentrically secured by a second and larger eyelet 92. The lower discs 60 and 80 may thus be independently rotated with respect to each other and with respect to the upper discs 12 and 40.

In operation, the correct film sensitivity being used is first determined, and disc 12 rotated with respect to disc 40 by means of tab 16 so that the correspondingly correct Sheiner number appearing on platform 44 of disc 40 may be viewed through window 26. The rearmost disc 80 is then rotated by tab 84, so that the tab points to or overlies the corresponding general light condition of indicia 68 on the underside of the third disc 60, and at the periphery thereof. The device 10 is then brought to the eye of the user and presented face outwardly toward the object being photographed. The subject is then viewed through the aperture 86, and disc 40 rotated by means of tab 42 projecting beyond the periphery of disc 60 (and carrying with it disc 12) until the details of the subject can barely be distinguished. Referring to Fig. 2, it will be readily appreciated that any rotation of disc 40 with respect to disc 60 causes a relative movement of lens aperture indicia 46 with respect to shutter speed indicia 66. Thus, as shown in Fig. 2, the lens aperture "3.5" will be suitable for an exposure at a shutter speed of one-tenth of a second.

When filters are used, the exposures must be increased to compensate for the loss of light through the various filters. To adjust my device for any filter, the normal reading is first taken and the position of the small "o" 99 on platform 44 of disc 40 is noted in relation to the time shutter speed scale 66. Disc 40 is then rotated until the proper filter factor 50 is brought to the same position where the "o" 99 was originally, providing an automatic compensation by time increase for the filter being used.

My device may also be used for cinematography since I provide on the projecting platform portion of disc 60 the "frames per second" indicia used for motion picture cameras.

In the modified form of my device illustrated in Fig. 5, the discs and their relative disposition are identical with my preferred embodiment, except that discs 12 and 40, and discs 60 and 80 are first secured in pairs by means of individual eyelets 100 and 102 respectively and then secured together by means of a large eyelet 104. If desired, and in order to bring the discs closer together, eyelets 100 and 102 may be countersunk to some extent, as seen at 105, 107. This method of securement will prevent any slippage once the appropriate settings of discs 12 and 80 have been made with respect to discs 40 and 60 respectively.

I claim:

1. A device of the character described comprising a plurality of discs superposed one above the other, and means to rotatably secure the discs together in such relation, the topmost of said discs having thereon a strip of graduated density, another of said discs constructed to permit the passage of light therethrough disposed below the first disc having a plurality of scales thereon, one of said scales defining film sensitivity ratings, the first referred-to disc having an index thereon adapted to cooperate with the film sensitivity rating scale on the second referred-to disc, a third disc below the first two having a plurality of scales thereon defining shutter speeds and general light conditions, and a fourth disc, below the first three, having an index thereon cooperating with one of the scales on the third disc and having a relatively small circular viewing opening therein corresponding in size to the width of the density strip, said third disc having an opening therein through which the graduated density strip of the first disc can be viewed through the opening in the fourth disc.

2. A device as in claim 1 in which the first disc is of opaque material except for the graduated strip, the second disc is of transparent material, and the third and fourth discs are of opaque material except for the openings therein.

3. A device as in claim 1 in which the first disc is of apaque material and has an arcuate window therein in which the graduated density strip is mounted, the second disc is of transparent material, the third is of opaque material and has an arcuate window therein which coincides in size and shape and position to the arcuate window in the first disc, and the various discs are so mounted that upon relative rotation thereof, the various discs openings may be placed in registry.

4. A device of the character described comprising a plurality of circular discs superposed one above the other, and means to rotatably secure the discs together in such relation, the topmost of said discs having thereon a strip of graduated density, another of said discs constructed to permit the passage of light therethrough disposed below the first disc and of greater diameter than said first disc having a plurality of scales thereon on the portion thereof which projects out beyond the margins of the topmost disc, one of said scales defining film sensitivity ratings, the first referred-to disc having an index thereon adapted to cooperate with the film sensitivity rating scale on the second referred-to disc, a third disc below the first two and of greater diameter than the second disc having a plurality of scales thereon defining shutter speeds and general light conditions, and a fourth disc, below the first three,

having an index thereon cooperating with one of the scales on the third disc and having a relatively small generally circular viewing opening therein corresponding in size to the width of the density strip, said third disc having an opening therein through which the graduated density strip of the first disc can be viewed through the opening in the fourth disc.

5. A device as in claim 4 in which the shutter speed scale on the third disc is on one side thereof and the general light condition scale is on the reverse side thereof.

6. A device as in claim 4 having means to rotatably secure all four discs together in superposed relation and having the top two discs and the bottom discs secured in pairs by means of individual eyelets whereby the bottom two discs may be rotated as a unit relative to the top two discs as a unit.

HARRY SCHWARTZMANN.