G. L. HARVEY.

EXPOSURE METER.

APPLICATION FILED MAR. 29, 1916.

1,186,093.

Patented June 6, 1916.

2 SHEETS—SHEET 1.

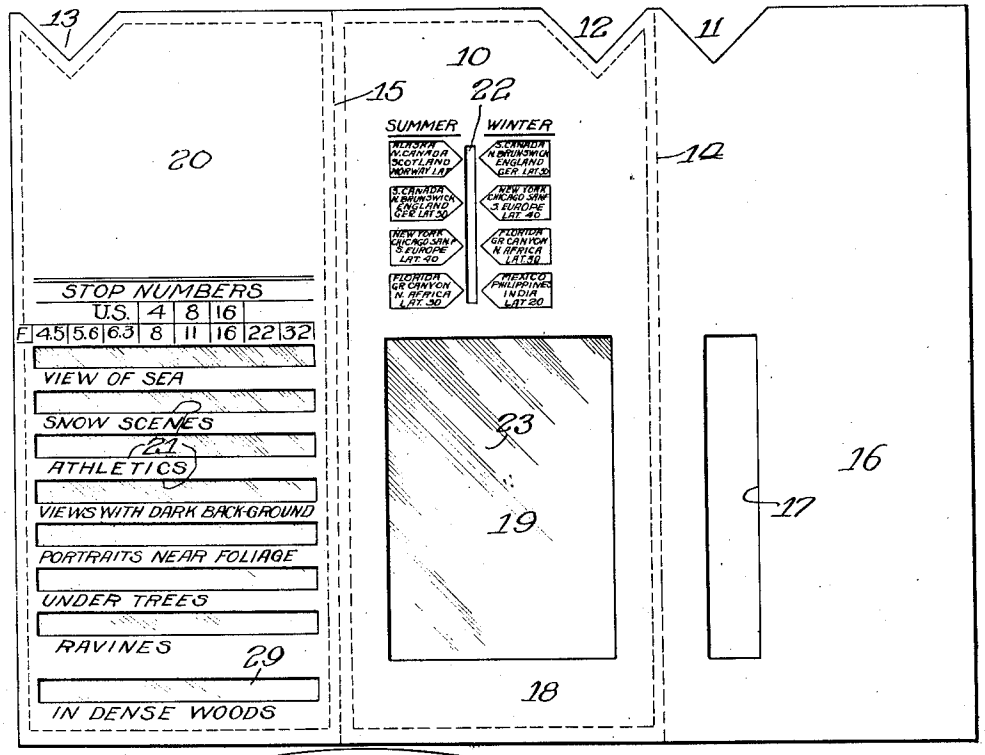


Fig. 1.

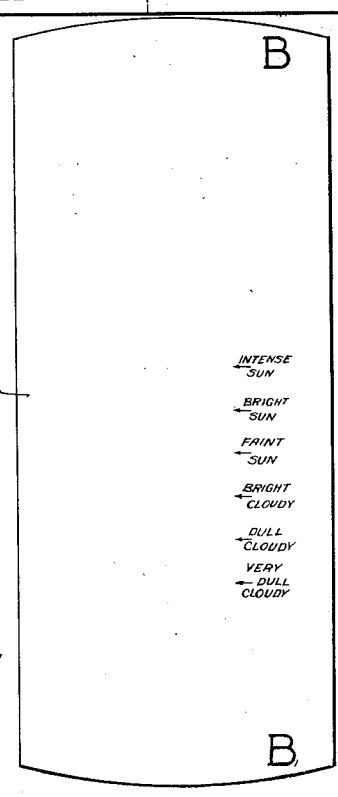


Fig. 2.

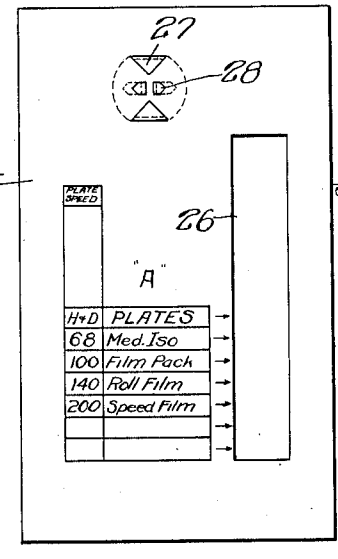


Fig. 3.

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2 SHEETS—SHEET 2.

Fig. 4.

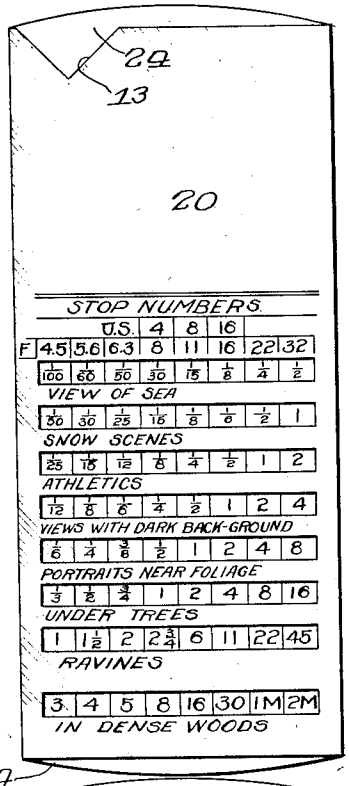


Fig. 5.

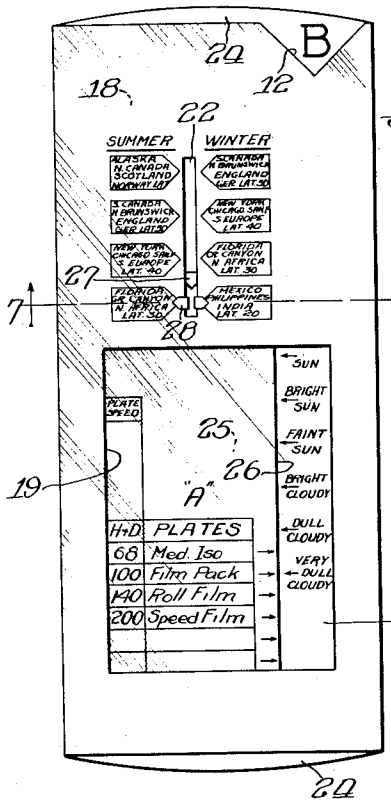


Fig. 6.

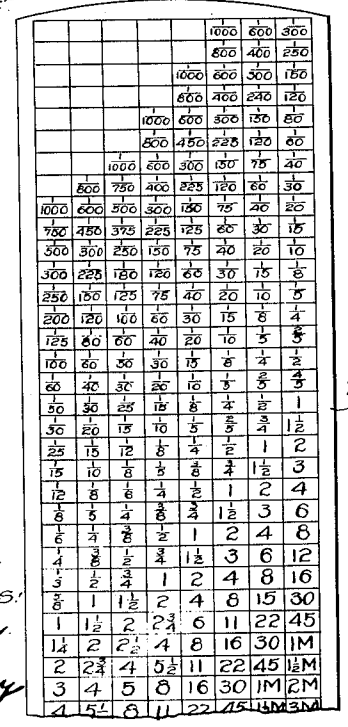
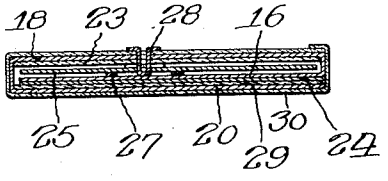


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE L. HARVEY, OF CHICAGO, ILLINOIS.

EXPOSURE-METER.

1,186,093. Specification of Letters Patent. Patented June 6, 1916.

Substitute for application Serial No. 55,504, filed October 12, 1915. This application filed March 29, 1916. Serial No. 87,451.

To all whom it may concern:

Be it known that I, GEORGE L. HARVEY, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Exposure-Meters, of which the following is a specification.

My invention relates to the art of photography and has particular reference to a novel exposure meter.

This application is a substitute for my application Serial No. 55,504, filed October 12, 1915.

The development of the art of photography has been so great that the use of cameras and photographing devices by amateurs has become practically general throughout the world. The greatest proportion or volume of photography is practised by amateurs, and particularly by amateurs who have little conception of the scope or capacity of the cameras with which they are operating, with relation to the speed of plates, light condition, etc.

I am aware that exposure meters, or devices intended as guides for use by amateurs, have been suggested and many forms thereof are available. All of such devices, however, require considerable manipulation as to the mechanical features, and, in some instances, computations are required in order to arrive at the desired result. The consequence is that many amateurs, rather than attempt these adjustments or computations, rely upon their judgment, to the detriment of the final result.

An object in the construction of the present device is to provide an exposure meter which shall have the following points of advantage: first, extreme simplicity, to the end that the operator is required to move but a single part in order to arrive at the desired result, it being assumed that the meter has been set for the location as to latitude and the time of the year, as to summer or winter; second, flexibility as to all conditions of light, speed of plates, etc.; third, unlimited capacity as to the latitude or general geographic location, and fourth, cheapness in cost of construction and compactness in its final form.

The invention involves the use of a thin paper or card-board envelop or receptacle, within which are mounted two slides, one of which need be adjusted but once in a season, when in the same geographic location, the other of which is adapted for movement to arrive at the proper time for exposure of different plates and under different conditions of light.

The invention will be more readily understood by reference to the accompanying drawings, wherein—

Figure 1 is a view of the blank from which the incasing folder is formed; Fig. 2 is a similar view of the slide by means of which the different computations are arrived at; Fig. 3 is a view of the slide which provides the adjustment for different geographical locations; Fig. 4 is an assembled view of the device showing the side from which the computations are secured; Fig. 5 is a view of the device from its reverse side; Fig. 6 is a view of the reverse side of the slide shown in Fig. 2, and Fig. 7 is a section through the assembled device taken on the line 7—7 of Fig. 5.

Referring more particularly to the drawings, it will be seen that I provide a blank 10, which is notched at 11, 12, 13, and scored at 14, 15. The scoring permits of the blank being doubled on itself in such manner that the notches 11, 12, 13 are in register to provide for engagement of the computation slide when the same is inserted between the folded portions of the blank. In the leaf 16, I provide a narrow slit or window 17; in the leaf 18, I provide a rectangular window 19, and in the leaf 20 I provide a plurality of narrow transverse windows or slits 21, all for a purpose to be hereinafter described. In the section 18 I likewise provide in addition a longitudinal slit 22, which serves as a guide, as will be later described.

The section 16 has no function as relates to the means for arriving at computations, but acts as a spacer between the two computing slides. In all of the devices known to me which involve the use of two or more moving parts, a difficulty in the operation thereof has been in that one of said movable parts might be set as desired, but a movement of the second movable part would have a tendency to change the adjustment of the first part. This I have corrected by the employment of a sheet or filler occupying the space between the two movable parts.

The window openings 19 and 21 are closed by sheets of transparent material 23, 29, such as celluloid or isinglass. At the upper end

of the section 18 I indicate, by printing, the latitude or geographical location in which photography is commonly practised in the northern hemisphere, together with the corresponding locations of different localities, or cities, both for summer and winter exposures, this printed matter occupying spaces on opposite sides of the guiding slot 22. On the section 20 I print, at a point above the narrow window opening 21, the standard stop numbers, both U. S. and F. stops being indicated. On the material bebetween the slit or opening 21 I print certain descriptive matter as to the character of the object to be photographed, such as portraits, fast moving objects as in athletics, etc.

The slide, the opposite sides of which are indicated in Figs. 2 and 6, may consist of a sheet of stiff material, preferably of celluloid. This slide is lettered "B," and on the face thereof, at a point near the middle, I print descriptive matter as to the character of the light on the day or at the time when the exposure is to be made. This slide, as indicated by the numeral 24, is adapted to occupy the space within the folded sections 16, 18, 20, the printed matter as to the character of the light, whether sunlight, cloudy, etc., appearing in the window opening 19 at the right edge thereof, as viewed in Figs. 1 and 5.

On the opposite side of the slide B, as indicated in Fig. 6, is printed, in suitable squares, certain lengths of time, divided into seconds, these numerals, when the meter is properly adjusted, indicating to the user the correct exposure under the conditions for which the meter has been set. The figures are seen through the slit 21 in the section 20 of the folder, as indicated in Fig. 4. One transverse row of figures occupies a single slit 21, and the vertical rows of figures are in alinement with the stop graduations appearing on section 20.

The slide lettered "A," and which we have indicated by the numeral 25, is shorter than the slide B and is provided with a window opening 26 at one edge thereof, which opening registers with the opening 17 in the intermediate filler and permits the exposure of the light condition, as printed on slide B, and as indicated in Fig. 5. Printed adjacent to the window opening 26 is certain descriptive matter as to the character of the plates or films employed with their relative speed, the common terms for such speeds being indicated, as well as the technical description thereof. A reinforced clip or fastener 27 is mounted in the upper end of the slide, this fastener coöperating with and being guided in the slit 22 in the section 18. The end 28 of the clip acts as a pointer to indicate the section of the country or latitude at which the slide A is set, as best shown in Fig. 5, and is moved comparatively seldom. For instance, the slide A may be set for Chicago in the summertime, and if the user does not leave that vicinity during the summertime, the slide A need not be moved during that time.

The parts which have been described are assembled, as best shown in Fig. 7. In that figure no attempt has been made to restrict the drawing to the actual size of the device, the showing being many times thicker than the meter will be in its finished condition.

It will be noted that slide A does not project outside of the container or envelop at any time, the adjustment being made by grasping the pointers 28, which project outside of the envelop, while the slide B is exposed at one end or the other at all times. By means of this construction the adjustment of the shorter slide is not readily changed by jarring or handling, it being intended that the adjustment of that slide shall remain more or less permanent. The slide B is intended to be adjusted for each computation.

After the parts described have been properly located and the different sections of the blank folded to the proper form, the entire envelop is inclosed in a wrapping of transparent material, the wrapping being indicated in Fig. 7 by the numeral 30.

The material which I employ for closing the window openings has a double function, the function about to be described being of even greater importance than that of a mere closure. It will be noted that at some points the lower ends of the slides in their vertical movement are opposite the lower edge of one or more of the openings, and that the tendency is, in the absence of suitable means, for the slide to catch on the edge of the opening. This difficulty is obviated in the present construction by the simple expedient of closing the window opening by the transparent sheet of material.

The operation of the device is as follows, with reference to the setting as shown in Figs. 4 and 5: Assuming that the desired location is Florida, or a geographical location corresponding substantially to latitude 30, and that the time at which the exposure is to be made is in the summertime, the slide A is moved until the pointers 28 indicate the lower lefthand arrangement of figures or letters, as indicated in Fig. 5. The slide B is then moved until the arrow, corresponding to the light condition of the day on which the exposure is to be made is opposite the plate or film which is to be used. In this case the device is set as indicating a dull, cloudy day and a plate is used substantially the same as the film pack having a plate speed of 100 "H and D." The meter is then turned over, and, on its back, as indicated by Fig. 4, will be found the proper speed

of exposure for all stops. For instance, if a view of the sea is to be taken and a stop corresponding to F^8 is employed, the exposure will be one-thirtieth of a second. If a portrait is to be taken with a sixteen stop, the meter indicates that an exposure of two seconds should be given. Having once set the slide A for a geographical location and time of the year, it is unnecessary to change this slide until those conditions are changed. This slide having been adjusted, it then becomes necessary only to adjust the slide B to the light condition of the day on which the exposure is to be made, when on the reverse side of the meter will be found all conditions possible to be met, with the proper time for exposure in plain view.

It is obvious that the construction shown is capable of modification, and such modifications as are within the scope of my claims, I consider within the spirit of my invention.

I claim:

1. An exposure meter comprising a member provided with openings in opposite sides thereof and with symbols in coöperative relation to the respective openings, and a slide movable with relation to said member having upon opposite sides thereof symbols which are visible through the respective openings, the symbols on one side of said member and said slide being adapted to be correlated, whereby to set up correlative values between the symbols appearing on the opposite side of said member and slide.

2. An exposure meter comprising an envelop provided with window openings in opposite sides thereof and with symbols in coöperative relation to the respective openings, a pair of slides mounted within the envelop, one of the slides being provided with symbols on opposite sides thereof, the symbols on one side of the slide being exposed to view through the windows in one side of the envelop, the other slide being provided with symbols exposed to view through the window openings in the other side of the envelop, and said other slide having a window opening exposing to view the symbols on the adjacent side of said first mentioned slide and in correlation with the symbols on the second mentioned slide.

3. An exposure meter comprising an envelop formed of a blank doubled on itself to provide an intermediate sheet dividing the envelop longitudinally, the opposite sides of the envelop being provided with window openings, the intermediate sheet having a window opening registered with one of the openings of the envelop, one side of the envelop being provided with symbols adjacent the window opening therein, a slide mounted in one of the sections of the envelop and provided with symbols upon opposite sides thereof which are exposed to view through the windows in the respective opposite sides of the envelop, and a second slide mounted in the other section of the envelop and provided with symbols which are exposed to view through the opening in the adjacent side of the envelop, and also provided with a window opening exposing to view the symbols on the adjacent side of the first mentioned slide, which symbols are correlated with respect to the symbols on the second mentioned slide.

4. An exposure meter, comprising in combination a member having thereon certain symbols indicating geographical locations and size of stops, a movable member having symbols indicating speed of plates and adapted to be correlated with said geographical location symbols, and a second movable member having symbols indicating light conditions and time, said symbols indicating the light conditions to be correlated with the symbols indicating speed of plates on said first mentioned movable member and the symbols indicating time of exposure to be correlated with the symbols as to stops on said member, substantially as described.

5. An exposure meter, comprising in combination a fixed chart having on one side certain symbols indicating geographical locations and on the other side symbols indicating size of stops, a movable chart having symbols indicating speed of plates and adapted to be correlated with said geographical location symbols, and a second movable chart having symbols indicating light conditions and time, said symbols indicating the light conditions to be correlated with the symbols indicating speed of plates on said first mentioned movable chart and the symbols indicating time of exposure to be correlated with the symbols as to stops on said fixed chart, substantially as described.

6. In an exposure meter, the combination of an envelop having window openings in its sides, and having on one side adjacent to a window opening certain symbols indicating geographical location, and on the other side and arranged transversely of the envelop certain symbols indicating size of stops, a slide movable within said envelop, said slide having thereon certain symbols indicating speed of plates, a pointer on said slide, said pointer being arranged to indicate certain geographical locations as indicated on said envelop, said slide being provided with a window opening, and a second slide having on one side certain designations as to light conditions, and on the other side symbols giving exposure times, said second slide being adapted to be associated in said envelop in such manner that the symbols as to light conditions may be viewed through the window in said first slide and said symbols as to exposure times to be cor-

related with the symbols on the envelop relating to the size of stops, substantially as described.

7. In an exposure meter, the combination of an element having in one wall thereof a plurality of sight apertures and adjacent to said apertures designations of certain subjects to be photographed, stop numbers arranged transversely of the element and in proximity to said apertures, and a movable slide containing designations as to exposure times, and designations as to light conditions and speed of plates visible from the opposite side of said element, one of said sets of designations appearing on the back of said slide, said designations being arranged to be correlated by movement of said slide to the end that said slide may automatically display correct exposure times for different subjects and different sizes of stop openings, substantially as described.

8. In an exposure meter, the combination of an envelop having in one wall thereof a plurality of apertures and provided between said apertures with designations of certain subjects to be photographed, provision being made for the display of stop numbers transversely of the envelop and in proximity to said apertures, a slide movable within said envelop, said slide containing designations as to exposure times, and means on the opposite side of said envelop whereby said slide may be adjusted to correspond to light conditions and speed of plates, said means including a second slide visible and operable from the opposite side of said envelop from that on which the designations of stop numbers appear, substantially as described.

9. In an exposure indicator, the combination of a member providing a plurality of windows with a designation of the different subjects to be photographed located adjacent to each window, stop numbers displayed in a line parallel to said windows, and a chart movably mounted with relation to said member, said chart having a plurality of rows of exposure times displayed thereon and being adapted for adjustment as to light conditions, a row of said exposure times being visible through said windows, whereby at a single adjustment of said movable chart there is visible the correct exposure times for a plurality of subjects and for the different stops.

10. In an exposure meter, the combination of a member having a plurality of sight apertures therein, the space adjoining said apertures containing designations of subjects to be photographed, a series of standard stop numbers disposed adjacent to said apertures, a slide containing on one face a table of exposure times, said slide being adapted to be associated with said member and arranged so that a line of exposure times may be viewed through said apertures, each exposure time corresponding to a stop number in line therewith, and symbols as to light conditions and speed of plates, said symbols being adapted to be correlated by movement of said slide, substantially as described.

Signed at Chicago, Illinois, this 21st day of February, A. D. 1916.

GEORGE L. HARVEY.

Witnesses:
T. D. BUTLER,
H. C. JACOBS.