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E. HARROLD

EXPOSURE METER

Filed Dec. 11, 1922

FIG. 1

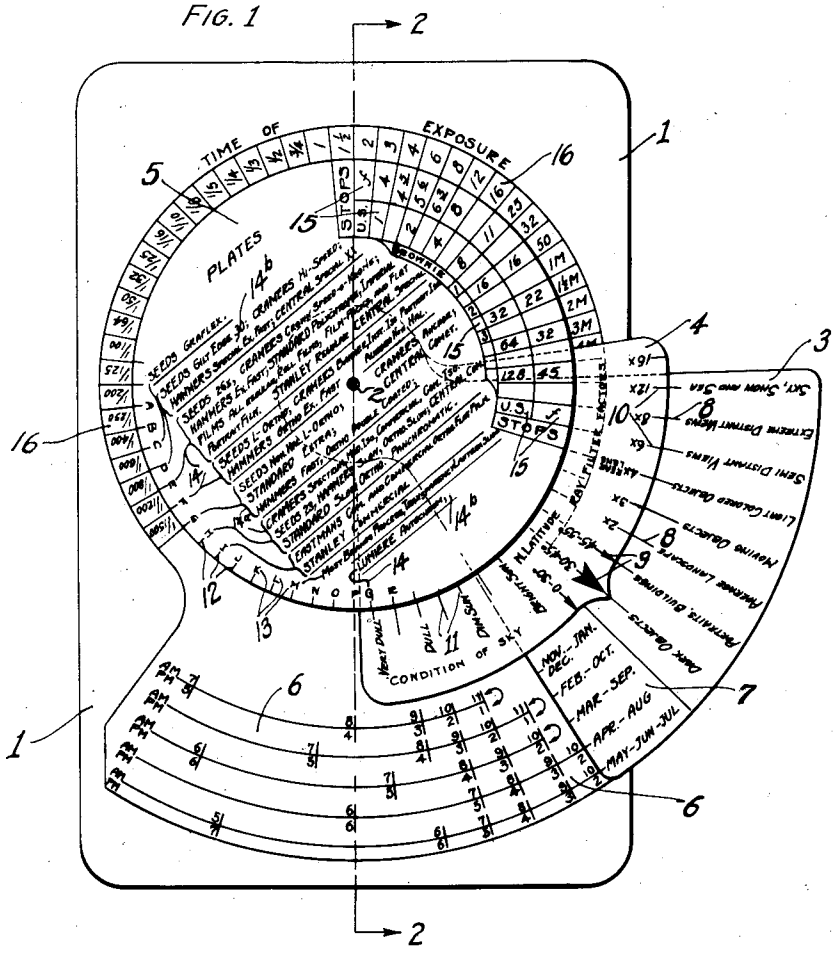
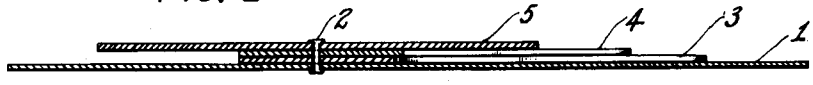


FIG. 2



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UNITED STATES PATENT OFFICE.

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EXPOSURE METER.

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To all whom it may concern:

Be it known that I, ELMER HARROLD, a citizen of the United States, and a resident of Leetonia, in the county of Columbiana and State of Ohio, have invented a new and Improved Exposure Meter, of which the following is a full, clear, and exact description.

This invention relates to a photographic meter, and more particularly to a device for furnishing from certain known conditions an exact indication of the proper duration of photographic exposures, an object of the invention being to provide a device of the character stated, which is more convenient and certain in operation than those heretofore known, it being especially more flexible with respect to its geographic use, its adaption for use with ray filters, and other general conditions which the several parts of the meter indicate, than similar devices known in the art.

A further object is to improve upon the construction set forth in Patent No. 715,061 granted to me December 2, 1902.

With these and other objects in view, the invention consists in certain novel features of construction and combination, and arrangement of parts, as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings—

Figure 1 is a plan view of my improved exposure meter.

Figure 2 is a view in section on the line 2—2, of Figure 1.

The device comprises a base 1 preferably in the form of a rectangular plat, of any suitable material, such as cardboard, parchment, celluloid, hard rubber, aluminum, etc.

Mounted to swing on the base 1, around a point constituting a center 2, are a major sector 3, a minor sector 4 and a disk or top member 5.

The center 2 may be formed by a rivet as shown best in Figure 2. The elements 3, 4 and 5 may be constructed of the same material as the base 1, or otherwise as desired.

On the base 1 are provided a series of lines concentric to the center 2 and a series of short cross lines drawn radial of said center, these lines forming a belt-like sector 6 on which are marked the daylight hours of the day. A division 7 on which is marked the months of the year grouped in accordance to the altitude of the sun with respect to the place of use, is located on the major sector 3. The names of the month respectively coinciding with the concentric lines of the belt-like sector 6 so that the major sector 3 may swing on its center 2 to place its left hand radial edge directly adjacent to any hour of the day opposite to any one of the five groups of months of the entire group 7. For example, if the exposure is to be made in August and the hour is 10:00 a. m. or 2:00 p. m., the major sector 3 should be moved to the position as shown in Figure 1.

A number of radial lines 8 arranged along the circumference of the major sector 3 extending from the division 7 to the right hand edge of said sector. These radial lines are arranged in accordance to the various subjects which might be photographed. It is to be understood that different subjects to be photographed require varying duration of exposure. For example, dark objects require more time of exposure than bright objects. The descriptive matter adjacent to the lines 8 refers to said varying objects, or subjects.

Two or more indicating points 9 are projected radially on the minor sector 4, said points 9 being used in accordance with the latitude of the particular place where the photograph is being taken. These points are adapted to read with respect to the radial lines 8 representing the various subjects on the major sector 3.

A number of radial lines 10 extend along the circumference of the sector 4 from the points 9 to the right hand edge of the sector 4. Adjacent to these radial lines 10 are captions indicating ray filter factors.

When the lens of the camera is used in the ordinary way, without a ray filter, then one of the indicating points 9 on minor sector 4 is used to read with respect to the various subjects which might be photographed. But when used with a ray filter, then neither of the indicating points 9 on minor sector 4 are used, but instead, the ray filter factor which represents the density of the particular filter employed, is brought into position adjacent to the line 8 and the kind of subject to be photographed. This will indicate the increase, the duration or time of exposure in exact ratio required, for the density of the filter being used.

A number of radial lines 11 are also produced on this minor sector 4, and the descriptive matter adjacent to these lines refers to the varying degrees of light due to the condition of the sun and atmosphere. For example the words on the radial lines 11, "Bright sun", "Dim sun", "Dull", and "Very dull" all of which are conditions which must be taken into account during a photographic exposure.

Radial lines 12 located about the periphery of the disk 5 are terminated by letters of the alphabet, symbolizing the speed of the various plates and films used in photography. These symbol letters could be entirely dispensed with in the construction of my invention, but are very useful in assisting the photographer in easily memorizing the symbol letter for the particular plate or film he is accustomed to use, and for indicating the proper speed position of other plates and films not included on the disk 5 but which may be published on a separate list or sheet. Lead lines 14 are directed away from the letters 13 and connect the respective letters 13 with brackets 14^a of the paragraphs 14^b, the latter setting forth the various kinds and grades of photographic plates and films, and located in their respective positions.

While I have placed the letters 13 of the alphabet between the respective lines 12 and 14, it is my intention that the respective directions of these lines 12 and 14 shall be as one continuous lead from the periphery of the disk 5 to the brackets 14^b, and thus facilitate the act of placing the disk 5 in any of its desired positions.

The purpose of the lines 14 is to guide the eye from the radial line 12 or letter 13 to the grade or kind of plate or film used, and thereby hastening this immediate operation. Different grades of photographic films and plates require different periods of exposure, and account must of course, be taken of the grade of plates or film used.

Three concentric columns or belts 15 which bear figures are located about the circumference of the disk 5. These columns or belts 15 are located diametrically opposite the radial lines 12. The figures of the belts 15 represent the size of the diaphragm "stops" or exposure openings which admit light thru the lenses of the camera upon the sensitized plate or film.

Opposite two of the columns or belts 15, the letters "f" and "U. S." are marked, these letters referring respectively to two different system commonly employed in marking photographic lenses and shutters, to indicate the relative exposure openings of the camera used. A third columns or belt is located adjacent and concentric to the last mentioned belts of the entire belt 15. This third line or belt is arranged in accordance to the exposure openings of the "Brownie" type of camera.

Finally around the upper periphery of the disk 5, but on the rectangular base 1, is a concentric belt, bearing figures representing the duration of the exposure to be made under the various possible conditions. When all the different members are placed to correspond to the conditions under which the picture is taken the duration of exposure will be found directly adjacent to the figure representing the diaphragm stop being used.

The operation of my improved device is as follows; In making use of the device, the major sector 3 should be moved until the correct month, as marked thereon in the belt-like section 7, is directly adjacent to the correct hour of the day as marked on the belt-like sector 6 of the rectangular base 1. Then the minor sector 4 should be moved to place the corresponding latitude pointer 9 directly opposite the radial line 8 which stands for the particular subject to be photographed.

For example, the position shown in Figure 1 shows the pointer 9 opposite one of the lines 8 standing for "dark object." (But if a ray filter is being used, instead of bringing the latitude pointer 9 opposite the radial line which stands for the particular subject to be photographed, the sector 4 should be moved until the ray filter factor, representing the density of the filter being used, stands directly opposite the line which represents the subject to be photographed.) Then the operator, knowing the grade of plate or film which he is about to employ observes such plate or film from the groups 14^b.

Follow the direction by sight by aid of the bracket 14^a, the lead line 14, through the letter 13 to the radial line 12. Revolve the disk 5 until the radial line 12 is in coincidence with the line 11 on the minor sector 4 which correctly represents the condition of the light at the time the picture is being taken. For example, let it be assumed that the photographer is using the lumière autochrome plate, and that the condition of the sky is dull. Then the radial line 12, running through symbol letter 2, should be moved opposite the words "Very dull" on the minor sector 4. This is the last adjustment necessary, and the operator will now find the time or duration of exposure (to meet the various conditions outlined hereinbefore) on the belt of figures 16 directly opposite the particular diaphragm stop or exposure orifice which he elects to use.

Various slight changes might be made in the general form and arrangement of parts described without departing from my invention, and hence I do not limit myself to

the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

I claim:

1. A photographic exposure meter, comprising a base member, and three additional members moving in directions relative to each other, and also relative to the base member, one member on which are markings thereon representing the different photographic plates and films, said markings being so arranged in order to their sensitiveness to light, and also to be so arranged as to extend over a very small area, these markings being represented thereon by character markings arranged along the edge or periphery of said member, and to minimize time in determination of various photographic exposure markings used as lead lines are terminated between the various markings thereon representing the photographic plates and films and the markings thereon representing the character markings respectively representing said photographic plates and films.

2. A photographic exposure meter having a base member having markings thereon representing the hours of the day, and also having markings thereon representing various durations of exposure, three other additional members mounted with respect to the main member, the first additional member having markings thereon representing the months of the year, and also having markings thereon representing various subjects of photography and being so adapted as to read in accordance to the base member, the second additional member being so mounted as to read in accordance to the markings on the first additional member, said member having markings thereon representing the condition of the sky, and markings thereon representing ray filter factors, and the third additional member having markings thereon representing the different photographic plates and films so adapted as to read in accordance to the sky condition markings on the second additional member, and said member also having markings representing the various light admitting openings so arranged as to read in accordance, and relative to the time markings on the base member.

3. A photographic exposure meter, comprising a plurality of moving members, having on one of its movable members a schedule of ray filter factors so arranged that these factors can be moved adjacent to the various items of some other schedule, to compensate for the density of the filter used.

4. A photographic exposure meter, comprising a plurality of moving members, having on one of its movable members a schedule of various plates and films to be used, said plates and films arranged into groups having approximately the same speed, and each of said groups arranged with a lead line and symbol to read onto the various items of some other schedule to compensate for the various speeds of plates and films used.

5. A photographic exposure meter, comprising a base, and a plurality of movable members thereon, said base and one of said movable members having time registering indicia, two of said movable members having registering indicia determine factors of subject, and latitude, and another movable member containing captions defining different grades of film and plate with lead lines therefrom registering with the light factors on one of the last mentioned members, and also having lens opening scale thereon registering with a time exposure scale on the base.

6. A photographic exposure meter, comprising a base, and a plurality of movable members thereon, said base and one of said movable members having time registering indicia, two of said movable members having registering indicia determine factors of subject, and ray filter, and another movable member containing captions defining different grades of film and plate with lead lines therefrom registering with the light factors on one of the last mentioned members, and also having lens opening scale thereon registering with a time exposure scale on the base.

ELMER HARROLD.