

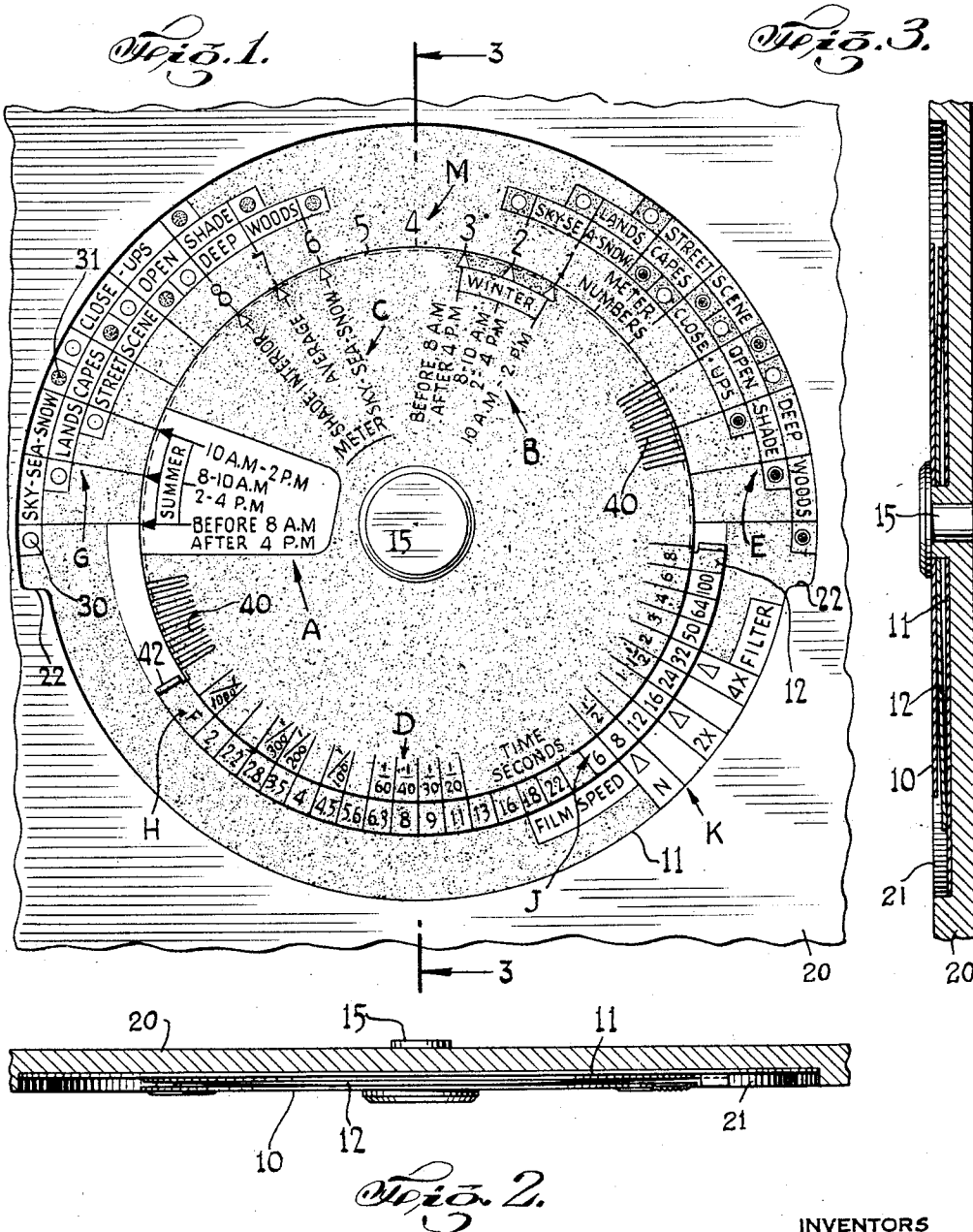
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CALCULATOR

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CALCULATOR

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This invention relates generally to camera devices. More particularly our invention relates to an improved calculator adapted for use with cameras.

One of the objects of our invention is to provide a calculator of the character described designed to readily determine the proper time of exposure—"F" lens opening combination suitable for a given light condition-film speed-filter factor combination.

Another object of our invention is to provide an improved calculator of the character described, adapted for use with or without a light meter.

A further object of our invention is to provide an improved calculator of the character described having a novel arrangement of markings and backgrounds whereby to facilitate the speed of operation thereof.

A still further object of my invention is to provide an improved calculator of the character described adapted to be permanently attached to a camera which shall comprise relatively few and simple parts, which shall be relatively inexpensive to manufacture, which shall be easy to assemble and to operate, and which at the same time possesses a high degree of efficiency.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the claims.

In the accompanying drawing, in which is shown one of the various possible embodiments of this invention:

Fig. 1 is a top plan view of a portion of a camera casing with a calculator constructed in accordance with our invention mounted thereon;

Fig. 2 is an end elevational view thereof with the camera casing in section; and

Fig. 3 is a cross-sectional view taken substantially on the line 3—3 of Fig. 1.

Referring now in detail to the drawing, there is disclosed a calculator constructed in accordance with our invention, and comprising a top disc 10, a bottom disc 11 and a middle disc 12. It is noted that the discs 10 and 12 are substantially the same size with the exception of a portion of the middle disc 12 which extends beyond the periphery of the top disc 10. The discs 10, 11 and 12 are arranged in superimposed relationship and are relatively rotatable about a common

pivot member 15 which also serves to hold the discs in assembled relationship. The discs 10, 11 and 12 may be made of any suitable material capable of holding its shape and satisfactory for having suitable indicia markings imprinted thereon, such material as for example cardboard, sheet metal or the like.

In accordance with our invention, the calculator is designed to be used independently of a camera, or it may be directly attached to a camera casing 20 as shown in the drawing. In the latter instance a portion of the pivot member 15 may pass through the wall of the casing 20 and may be riveted over, as shown, to retain the same in position. If desired, a portion 21 of the wall of the camera casing 20 may be recessed to receive the calculator therein. The recessed area 21 may then be of such size and contour as to snugly receive the bottom disc 11 therein, the said disc 11 being provided with an indented portion forming shoulders 22 to prevent rotational movement of the disc 11 for reasons which will soon become apparent.

It is thus seen that the middle and top discs 12 and 10 respectively may be rotated with respect to the bottom disc and relatively to each other. The discs 12 and 10 are so designed that after they are rotated to proper position in conformity with the cooperative markings on the three discs they will remain in such position. To this end the middle disc 12 is upwardly dished in a direction towards the top disc 10, as clearly shown in Figs. 2 and 3, so that the said disc 12 will act as a spring and thus create friction between itself and the top disc, as well as friction between itself and the bottom disc 11. It is thus seen that in order to relatively rotate the discs 10, 11 and 12 it is necessary to overcome the frictional force exerted by the middle disc 12. Therefore, once the discs are properly set they will not rotate of their own accord to disturb the readings.

The middle disc 12 is further designed so that the radius of friction contact between the middle disc 12 and the bottom disc 11 is greater than the radius of friction contact between the middle disc 12 and the top disc 10. Therefore, when the middle disc 12 is rotated, the top disc 10 will rotate with it. When the top disc 10 is rotated, however, the middle disc 12 will not rotate with it, but will be frictionally held in contact with the bottom plate 12.

The top disc 10 is adapted to serve as a calculator disc, and the middle disc 12, and bottom disc 11 as calculator dials. The three discs 10,

11 and 12 are each provided with suitable markings designed to be cooperatively read in the manner soon to be described. Thus, the top disc 10 is provided with a group A of summer light conditions, a similar group B of winter light conditions, a group C of conditions to be used in conjunction with a light meter, a group D of "time in seconds" values, arranged in 5 degree divisions.

The middle disc 12 is provided with a group H of fifteen "F" opening numbers in equal 5 degree divisions, and a group J of "Weston" film speed ratings in equal 5 degree divisions.

The bottom disc 11 is provided with a group E of winter types of scenes, a similar group G of summer types of scenes, a group K of filter factors "N," 2x and 4x, and a group M of meter numbers 1 to 8 inclusive, corresponding to light meter readings.

It is noted that certain groupings of numbers and markings are arranged in a light color against a dark background, while certain other groups of numbers and markings are made dark on a light background.

The calculator is so designed that the light background portions of one disc are to be matched with the light background portions of the other discs, in order to simplify the operation of the calculator.

In accordance with our invention, the calculator described herein is designed to be used in conjunction with a standard type light meter, such as the "Weston" light meter, or it may be satisfactorily used without the aid of a light meter.

The operation of our calculator for use in conjunction with a light meter will now be described.

The "Weston" film speed numbers in group J of the middle disc 12 are to be matched with one of the filter factors in group K of the bottom disc 11. Therefore, the "Weston" film speed of the specific film to be used is first determined (this is usually printed on the film package) and the middle disc is turned so that the "Weston" film speed number is aligned with the filter factor of the filter being used. Assuming that no filter is being used and that the "Weston" film speed is given as 16, the disc 12 is turned to a position where the indicating pointer, corresponding to the "N" position of the group K of the bottom disc 11, points to 16 of the group J.

Further assuming that the picture is being taken on a bright day at sea and that the light meter shows a reading of 6, the top disc 10 is turned so that the white pointer of the group C, identified as Sky-Sea-Snow points directly to the meter number 6 of the group M on the bottom disc 11.

By then referring to the "F" values of the group H on the middle disc 12, which are to be read in conjunction with the markings in group D on the top disc 10, it is found that a number of time-in-seconds values might be used with a corresponding number of "F" openings.

To take another example which may be read in connection with Fig. 1 of the drawing, and assuming now that the same film speed is given and the same light meter reading and light conditions are utilized, but a 2x filter is used, the operation would be as follows: The "Weston" film speed number 16 of the group J would be aligned with the 2x filter factor. The Sky-Sea-Snow pointer of the group C would be once more set in line with the meter number 6 of the group M as shown. It is then seen that the "F" opening-time combinations of the groups H and D would

include F-2.8 at $\frac{1}{300}$ seconds, F-11 at $\frac{1}{20}$ seconds, F-4.5 at 100 seconds, etc.

The calculator may be operated in the following manner without the aid of a light meter.

Assuming that the "Weston" film speed number is still 16 and that a 2x filter is to be used: The middle disc 12 is rotated until the 16 in group J is aligned with the pointer of the 2x filter factor in group K of the bottom disc 11 as shown.

It is noted that in group G of the bottom disc 11 there is an arced section arranged in three steps. Referring to the outermost step, we read the black letters Sky-Sea-Snow, arranged on a white background. These words are preceded and immediately followed by a white and black circular area 30 and 31 respectively. The area 30 indicates that the portion of the section covered by the words Sky-Sea-Snow which is nearest to the white disc represents the brightest aspect of the Sky-Sea-Snow condition. As we progress toward the black area 31, the indication is that the poorer brightness aspect of the Sky-Sea-Snow light condition prevails. This significance of the white and black area is the same in all sections of the light condition portions of the groups G and E of the bottom disc 11.

Referring now to the top disc 10, it is noted that here is a summer group A and a winter group B. Assuming now that it is desired to take a street scene on a cloudy summer day at 12 o'clock noon. The next step is to align the black pointer marked "10 a. m.-2 p. m." in the summer group A with the street scene line nearest the black area in the group G and we get the proper "F" opening-time-in-seconds combinations read cooperatively on the discs 10 and 12 in the groups D and H.

To facilitate the manual rotational movement of the disc 10, there is provided a pair of diametrically opposed roughened areas 40, to cause a gripping action between the fingers of the operator and the top disc 10. Also to facilitate the manual rotational movement of the middle disc 12, there is provided upturned projecting portions 42 as shown.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. An exposure calculator for cameras comprising a flat bottom disc, a flat top disc and a bowed middle disc, said discs being relatively rotatable about a common axis, the apex of said bowed middle disc being in frictional contact with said top disc adjacent said common axis and the base of said bowed middle disc being in frictional contact with said bottom disc remote from said common axis so that the frictional contact force between said middle disc and said top disc is substantially smaller than the frictional contact force between said middle disc and said bottom disc for the purposes set forth.

2. An exposure calculator for cameras comprising a flat bottom disc, a flat top disc and a bowed middle disc, said discs being relatively ro-

tatable about a common axis, said middle disc being sprung between said top and bottom discs, the apex of said bowed middle disc being in frictional contact with said top disc adjacent said common axis, the base of said bowed middle disc being in frictional contact with said bottom disc remote from said common axis, so that the frictional contactive force between said middle disc and said top disc is substantially smaller than the frictional contactive force between said middle disc and said bottom disc whereby rotational movement of said middle disc will cause said top disc to rotate with it and whereby said top disc may be rotated independently of said middle disc and said bottom disc, said bottom disc being provided with a combined subject and light condition scale for winter adapted to be matched and read in conjunction with a combined time-of-the-year and time-of-the-day scale on said top disc, said bottom disc being further provided with a combined subject and light condition scale for summer adapted to be matched and read in conjunction with a combined time-of-the-year and time-of-the-day scale for summer on said top disc, said middle disc being provided with a film speed rating scale adapted to be matched and read in conjunction with a filter factor scale on said bottom disc, said top disc being provided

with a shutter speed scale adapted to be matched and read in conjunction with a diaphragm opening scale on said middle disc, indicia on said matching scales being similarly colored and disposed in similarly contrasting backgrounds, indicia on different scales on the same discs being differently colored and disposed on differently colored backgrounds.

3. An exposure calculator for cameras comprising a flat bottom disc, a flat top disc and a bowed middle disc, said discs being relatively rotatable about a common axis, said middle disc being sprung between said top and bottom discs, the apex of said bowed middle disc being in frictional contact with said top disc adjacent said common axis, the base of said bowed middle disc being in frictional contact with said bottom disc remote from said common axis, so that the frictional contactive force between said middle disc and said top disc is substantially smaller than the frictional contactive force between said middle disc and said bottom disc whereby rotational movement of said middle disc will cause said top disc to rotate with it and whereby said top disc may be rotated independently of said middle disc an said bottom disc.

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