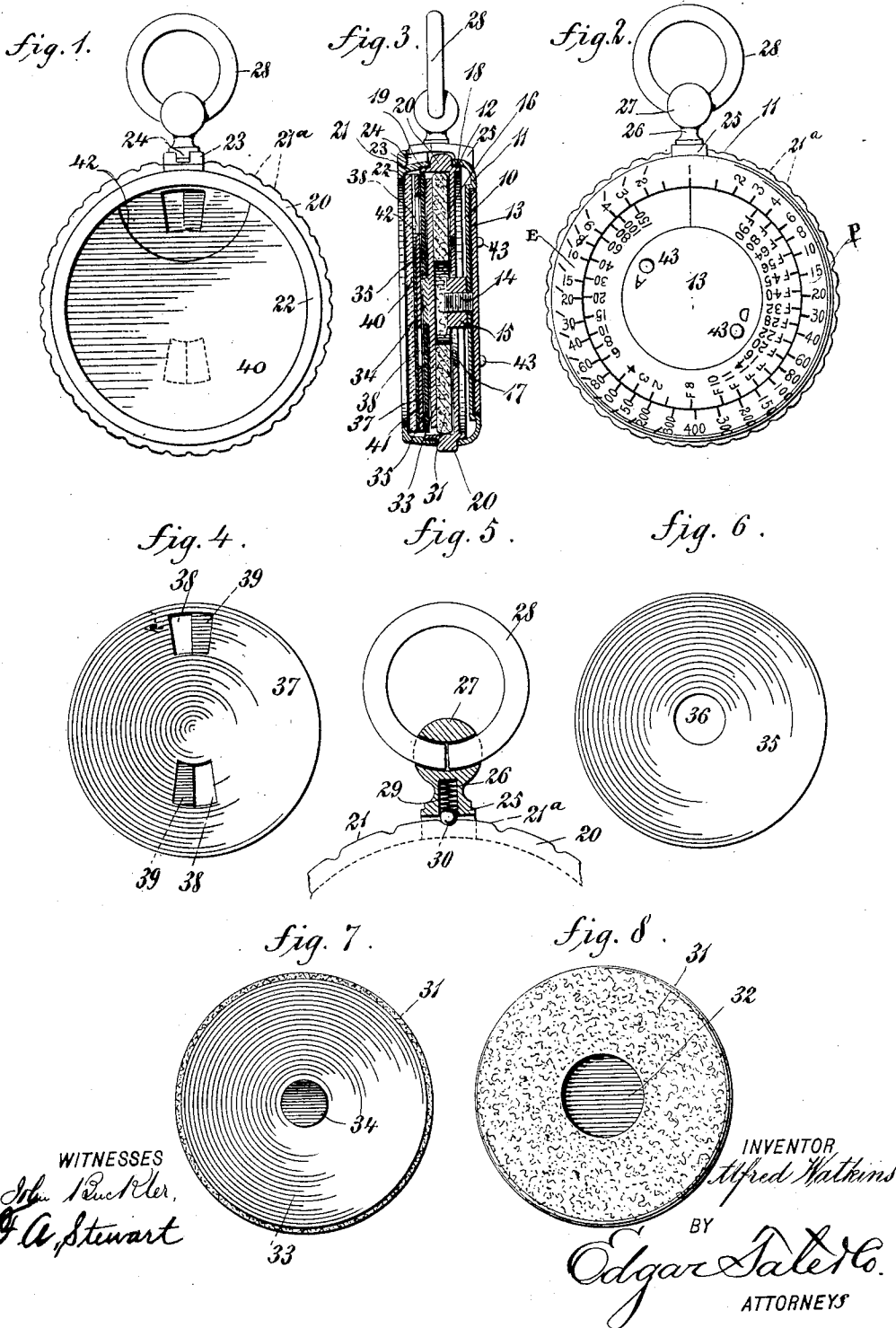


A. WATKINS.
PHOTOGRAPHIC EXPOSURE METER.

(Application filed July 5, 1899.)

(No Model.)



UNITED STATES PATENT OFFICE.

ALFRED WATKINS, OF HEREFORD, ENGLAND.

PHOTOGRAPHIC-EXPOSURE METER.

SPECIFICATION forming part of Letters Patent No. 657,685, dated September 11, 1900.

Application filed July 5, 1899. Serial No. 722,786. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WATKINS, a subject of the Queen of Great Britain, residing at Hereford, in the county of Hereford, England, have invented certain new and useful Improvements in Instruments for Calculating Photographic Exposures, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to instruments for calculating photographic exposures, being an improvement on Letters Patent granted to me in Great Britain February 9, 1895, No. 25,000; and the object thereof is to provide a portable compact instrument of this class by the use of which the photographer may readily calculate the duration of exposure under the varying actinic and other conditions, which exposure is requisite to produce a proper impression upon the sensitive plate, film, or other surface.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which like reference characters denote like parts in the several views, and in which—

Figure 1 is a face or front view of an instrument constructed according to my invention; Fig. 2, a back or rear view thereof; Fig. 3, a vertical transverse section of the body portion thereof; Fig. 4, a face view of the tint-disk employed in my improved construction; Fig. 5, a partially-sectional view of a detail of construction; Fig. 6, a face view of the sensitive disk; Fig. 7, a face view of a compression-pad which I employ, and Fig. 8 a rear view thereof.

Referring more particularly to the drawings, I provide a casing constructed as follows: A circular back plate 10 is provided with a peripheral bead 11, from which projects forwardly an annular flange 12, concentric of the plate 10, and mounted within the bead 11 is a plate 13, provided with a central screw-threaded stud 14, which passes through the plate 12 and is revolvably provided with a nut 15 upon the inner or front side thereof. A disk 16, centrally apertured, as at 17, is provided with a rearwardly-projecting annular flange 18, which fits snugly within the flange 12, and the flanges 12 and

18 are so formed that the latter is locked in revoluble engagement with the former. The disk 16 is provided with a forwardly-directed annular flange 19, and an annular bead 20 is formed upon the outer surface thereof and provided with a milling 21^a. An annular rim 21, provided with an interior annular flange 22, (shown in Fig. 1,) is detachably mounted upon the flange 19 and is provided with a lug 23, which is recessed, as at 24, and upon the flange 12 is mounted a fixed catch 25, which extends outside of the bead 20 and is adapted to engage the recessed lug 23 to lock the plate 10 and rim 21 together, the disk 16 and bead 20 being revoluble between them. A stud 26, provided with a spherical head 27, projects from the catch 25, and the ordinary key-ring 28 is connected with the bead 27. The stud 26 and catch beneath it are chambered to receive a spiral spring 29, secured therein, and between the outer end of said spring and the bead 20 is mounted a spherical catch 30, which operates in connection with the milling 21^a to lock said bead 30 in a predetermined position in the revolution thereof.

A compression-pad 31 is placed within the casing above described, which, as shown in the drawings, is cup-shaped in form and similar to the ordinary watchcase. The pad 31 is circular in form and preferably composed of felt and bears at its edges against the inner surface of the flange 19. Centrally thereof is formed an opening 32, registering with the aperture 17 in the disk 16, and within this opening the nut 15 is free to rotate. The pad 31 is preferably faced with a disk of rubber 33, upon which is formed a central nipple 34. A circular strip of actinically-sensitive paper 35 fits against the rubber disk 33 and is apertured centrally, as at 36, to fit the nipple 34.

The tint-disk which I employ is shown at 37, and consists of a circular strip of opaque material provided with a plurality of openings 38, two of which are shown in the drawings, and which are arranged unequally distant from the center of the strip 37. Each of the openings 38 is partially closed by a tint-gage 39, consisting of a bit of colored paper or similar substance. The color of the darkest or whole tint-gage corresponds, preferably, to the tint which the sensitive pa-

per 35 will assume when exposed to two seconds midday sunlight in summer. The other opening is provided with a lighter tint-gage, and to color the sensitive paper to the same depth requires only one-quarter or one-eighth or other definite fraction of the time required for the whole tint. This lighter tint is used for interior photography, and it would take too long a time to test the light with the whole tint. The exposed tints of the two gages vary according to the desired use thereof, as described above.

In front of the tint-disk 37 is mounted the circular crystal or observation glass 40, and said glass bears against the rim 22 and is revoluble. The inner or rear surface thereof is provided with a sheet of opaque material 41, which is cut away segmentally at one side, as at 42, in such a way that only one tint-opening is in sight at one time.

Upon the outer surface of the bead 11 and adjacent the edge thereof I form two segmental scales P and E, the unit graduations of which coincide. The scale P is designed to register the sensitiveness of the photographic plate or film, which must be found by trial, and the scale E the time-exposure thereof which it is desired to determine.

The plate 13 is provided with a pair of projections 43, by means of which it may be rotated, and upon its edge portion with two scales D and A, respectively, which are designed to register the relation of the diaphragm of the lens to its focal length and the actinic value of the light determined by the instrument above described and in the manner described hereinafter.

The operation and use of the above-described instrument and scales forming part thereof will be evident from the foregoing description when taken in connection with the accompanying drawings and the following statement thereof.

Several disks of the sensitive paper 35 may be stored between the disk 16 and the pad 31, and one of these is placed in front of the rubber facing 33 of the compression-pad 31 and behind the tint-disk 37, and the glass 40 is revolved behind the tint-disk 37, and the glass 40 is revolved to bring the desired opening 38 into view and allow the light to pass therethrough and strike the paper 35, and the time which is consumed to turn the sensitive paper the color of the adjacent tint-gage, gives the actinic value of the light measured by the scale A.

With the scales P and E arranged as described, the unit graduations coinciding, the scale P can be used as a continuation of the scale E for all values below one second, such values being expressed as the denominator of an improper fraction, of which one is the numerator. To determine the value of E or the time of exposure, the calculation of scale A having been made by means of the instrument, as above described, the plate 13 is turned until the graduation D, which is al-

ways a known quantity, is opposite the proper division of the scale P, denoting the sensitiveness of the plate, which is, as above stated, determined by experiment. The division of the scale A, representing the actinic value of the light, will be opposite the division or graduation of the scale E, indicating the proper time of exposure.

I may make various changes in the construction and adaptation of the principle embodied in the construction described without departing from the scope of my invention or sacrificing the advantages thereof.

Having fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A photographic-exposure meter, comprising a casing having a removable front rim, a glass provided with a partial covering of opaque material rotatably mounted therein, a tint-disk provided with an opening, and a tint-gage mounted behind said glass, said casing being adapted to receive a disk of sensitive material behind said tint-disk, and means for removing said sensitive disk, substantially as shown and described.

2. In a photographic-exposure meter, a casing adapted to receive a disk of light-sensitive material revoluble therein, and provided with a central opening, a compression-pad revolubly mounted in said casing in connection with said sensitive material, and provided with a nipple which projects within said central opening therein, and means mounted upon said casing for rotating said compression-pad, substantially as shown and described.

3. In a photographic-exposure meter, a circular casing provided with a revoluble peripheral bead and adapted to receive a disk of light-sensitive material which is adapted to revolve therein, and devices mounted in said casing in connection with said disk of sensitive material, and in operative connection with said revoluble bead and arranged to revolve the former, and to be revolved by the latter, substantially as shown and described.

4. The herein-described photographic-exposure meter, comprising a casing provided with a front rim, a glass rotatably mounted in said rim and provided with a rotatable opaque element, a tint-disk mounted behind said glass and within the casing, said tint-disk being provided with a plurality of openings, and with a tint-gage arranged adjacent an edge of each of said openings, devices for sustaining a disk of light-sensitive material within said casing behind said tint-disk, and means for moving said sensitive disk, substantially as shown and described.

5. The herein-described photographic-exposure meter, comprising a casing provided with a front rim, a glass rotatably mounted in said rim and provided with a rotatable opaque element, a tint-disk mounted behind said glass and within the casing, said tint-

disk being provided with a plurality of openings, and a tint-gage arranged adjacent an edge of each of said openings, means for sustaining a disk of light-sensitive material within said casing behind said tint-disk, and means for moving said sensitive disk, substantially as shown and described.

6. In a photographic-exposure meter, a casing, a rotatable disk of light-sensitive material mounted therein and provided with a central opening, and a compression-pad revolvably mounted in said casing in contact with said disk of sensitive material, and provided with a nipple which operates within the central opening therein, said casing being provided with means for rotating said compression-pad, substantially as shown and described.

7. In a photographic-exposure meter, a circular casing provided with a revoluble peripheral bead, and means mounted within said casing for supporting a revoluble disk of light-sensitive material, said revoluble bead being in operative connection with said disk when the latter is in position, substantially as shown and described.

8. In a photographic-exposure meter, a circular casing provided with a revoluble peripheral bead, means mounted within said casing for supporting a revoluble disk of light-sensitive material, said revoluble bead being in operative connection therewith, and a spring-operated sounding device arranged to operate in connection with said bead, substantially as shown and described.

9. In a photographic-exposure meter, a cir-

cular casing provided with a revoluble peripheral bead and adapted to receive a revoluble disk of light-sensitive material, said revoluble bead being in operative connection with said disk when the latter is in position, a spring-operated sounding device arranged to operate in connection with said bead, said casing being provided at its front with a plurality of tint-openings, each of which is provided with a tint-gage, and through which tint-openings the light is caused to strike said disks, said casing being further provided forwardly of said tint-openings with a revoluble glass cover or face provided throughout a predetermined portion of its surface with an opaque coating or substance, substantially as shown and described.

10. A photographic-exposure meter, comprising a circular casing provided with a revoluble peripheral bead and adapted to receive a disk of light-sensitive material which is adapted to revolve therein, and devices mounted in said casing in connection with said disk when the latter is in position, and in operative connection with said revoluble bead and arranged to revolve the former, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 13th day of June, 1899.

ALFRED WATKINS.

Witnesses:

J. S. APPLEYARD,
THOS. COLES.