No. 725,807. PATENTED APR. 21, 1903.

A. WATKINS.

PHOTOGRAPHIC EXPOSURE METER.

APPLICATION FILED JUNE 5, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

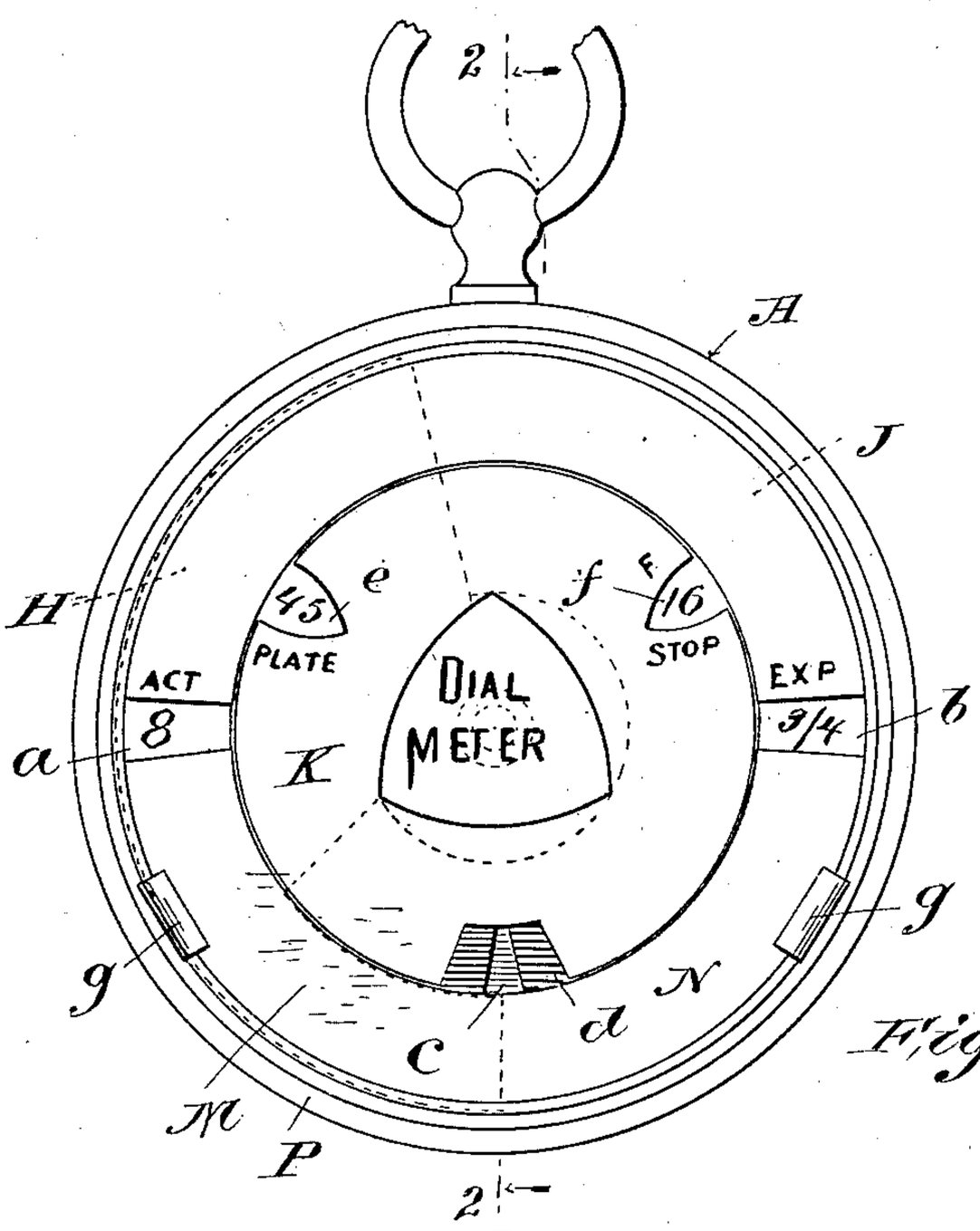

Fig. 1.

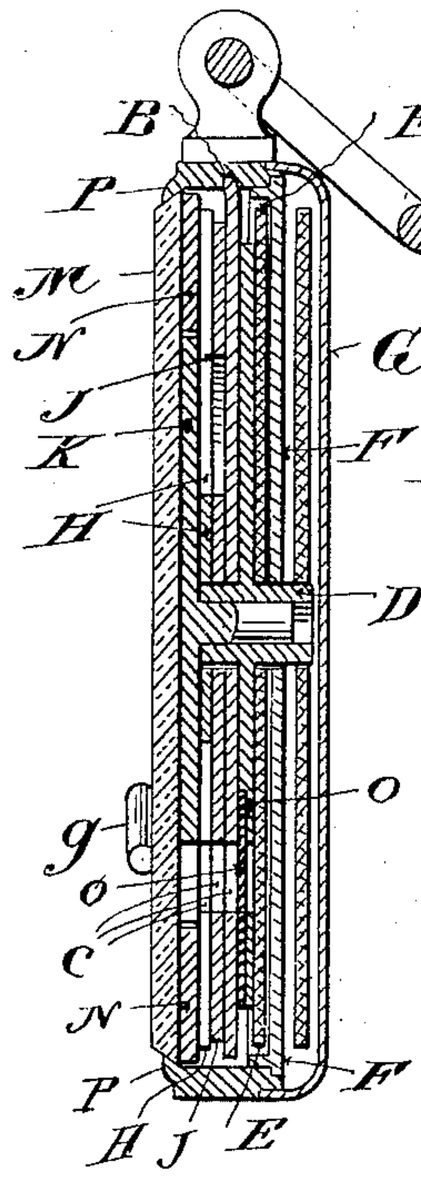

Fig. 2.

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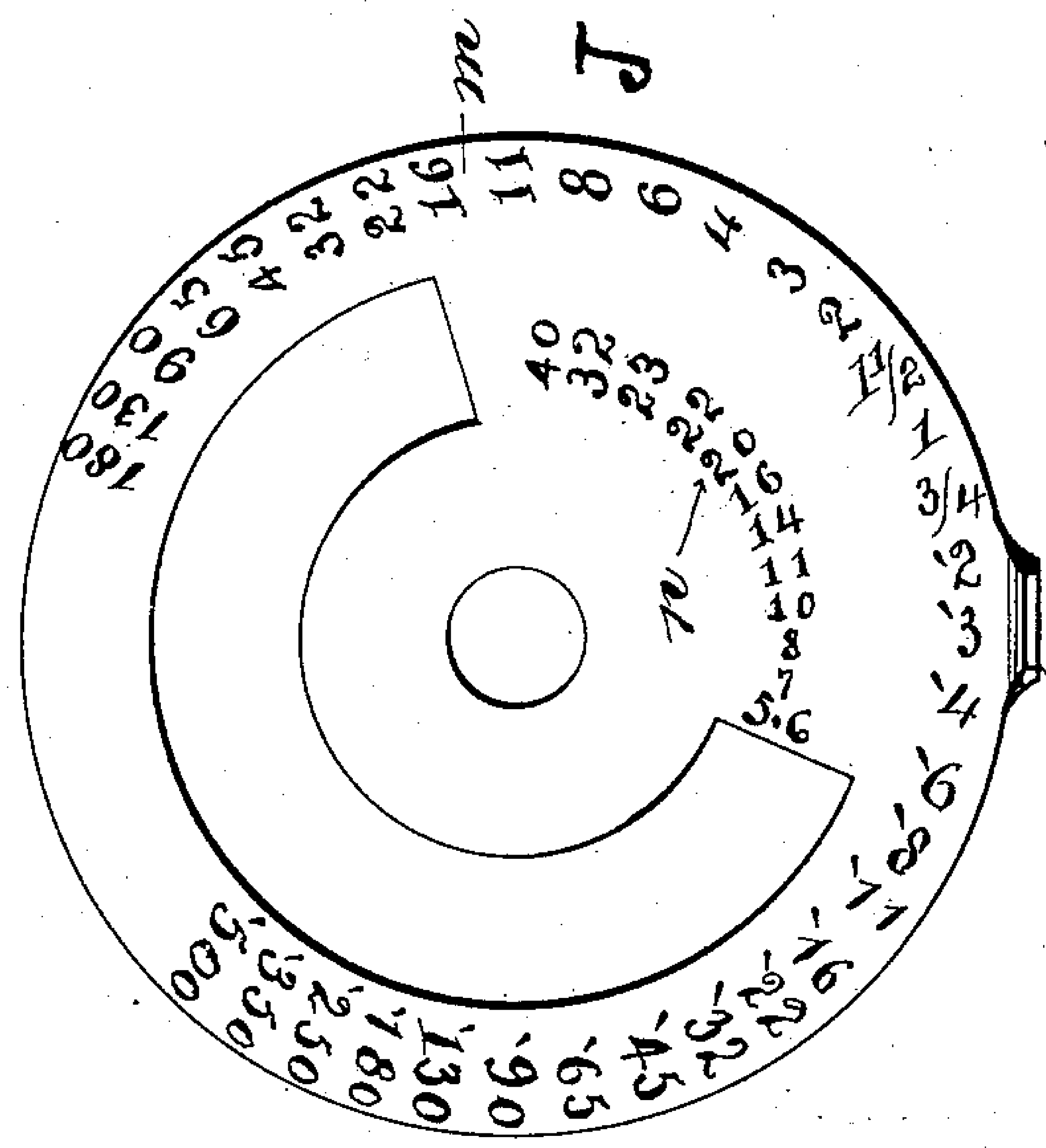

Fig. 4.

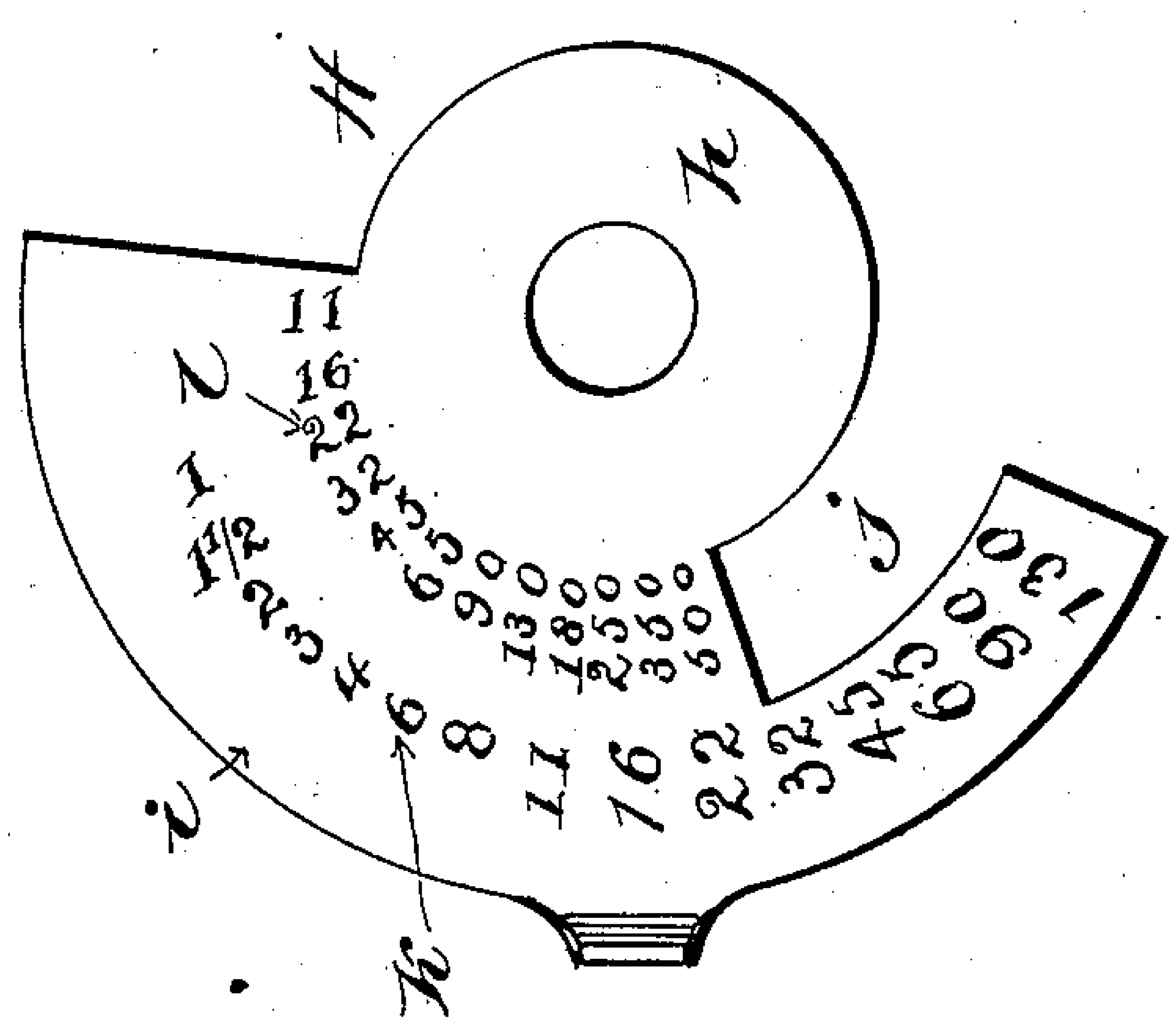

Fig. 3.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALFRED WATKINS, OF HEREFORD, ENGLAND.

PHOTOGRAPHIC-EXPOSURE METER.

SPECIFICATION forming part of Letters Patent No. 725,807, dated April 21, 1903.

Application filed June 5, 1901. Serial No. 63,192. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WATKINS, of Hereford, England, have invented certain new and useful Improvements in Photographic-Exposure Meters, of which the following is a specification.

My invention relates to improvements in photographic-exposure meters, and has for its object to provide means for ascertaining the time necessary to expose the sensitive plate or film in a camera or like instrument and in a simple and quick way.

My present invention is an improvement on the class of meters shown in my United States Patent No. 657,685, dated September 11, 1900, and comprises the novel details of construction hereinafter described, and further pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a face view of a meter embodying my improvements. Fig. 2 is a cross-section on the line 2 2, Fig. 1. Fig. 3 is a face view of one of the dials, and Fig. 4 is a similar view of the other dial.

Similar letters of reference indicate corresponding parts throughout the several views.

The meter consists, substantially, of a casing or frame A, which is circular in form and retains the various parts of the meter in a manner similar to a watchcase, within which is the plain metallic plate B, held in the casing by means of lugs and which has a rearwardly-projecting post D at its center. At the back of the plate is a circular piece of sensitized paper E, having an aperture in its center to receive the post D and rotate thereon. The use of the paper will appear later. Back of this single piece of paper is another plain plate F. The cover G is secured to the casing and is adapted to revolve therein and serves to inclose the parts at the rear. Between the plate F and cover G is stored a supply of the sensitized paper for subsequent use, the plate tending to protect it from the light. The former sheet of paper E is in contact with the plate F, the latter being fastened within the back or cover G. Thus by revolving the outer cover G the paper by its frictional contact is revolved.

Both the plate B and dial J are provided with an aperture C, Fig. 2, to permit light to enter upon a portion of the paper E.

In front of the plate B are two dials H J, pivoted at the center to the post D, adapted to rotate thereon. The dials are both substantially circular flat metallic plates, one overlapping a portion of the other. The dial H has a center disk *h* and the outer portion *i* having a cut-away portion *j* to expose a portion of the other dial J when they overlap. On the outside edge of both dials is provided a tongue or finger-piece G for turning the dials when they are in the casing. These are at right angles to the dials, are semicircular in shape, and adapted to pass around the edges of the crystal M and lie between the crystal and rim P, the ends projecting enough to allow of their being operated to revolve the dials.

The dial H is provided on its face with numbers in a semicircle near the circumference of the dial and which numbers represent the actinometer or tinting time, to be described later on. The other set of numbers *l* are also in semicircular form within the former numbers and represent the speed of a sensitive plate or film which is used in taking a photograph. The dial J is similar to the other except that the numbers run in the reverse direction. The numbers *m* on the outer circle represent the exposure time, while the inner circle *n* represents the diaphragm-opening in the lens of a camera. Partially over the dials in the center is a stationary face-plate K, secured to the plate B by means of the post D and having the aperture *e* to expose to view one of the numerals *l*, representing the plate speed, and the aperture *f* to expose one of the numbers *n*, representing the diaphragm. To cover the whole from dust, I have placed a crystal M on the outside of the dials, which is held in place by an ordinary rim P, similar to a watch, the crystal being adapted to revolve in the case or frame A. There is provided another face-plate N to cover such part of the dials as is not covered by the face-plate K. For economy and simplicity I have attached this second face-plate to the crystal and is revoluble therewith. The latter face-plate is provided with an aperture *a* to expose one of

the numbers *k*, representing the actinometer or tinting time, and the aperture *b* to expose one of the numbers *m*, representing the exposure time.

The face-plate K is provided with an aperture *c* and next to which is one or more tinting-disks *d*, secured to the back of the plate B, the tinting-disk being a surface colored to a predetermined tint. I preferably cover the aperture *c* and disks *d* with a blue transparent material O, Fig. 2.

For using the meter for ascertaining the time necessary to expose the plate or film in a camera, which will be called "exposure" time, it is first necessary to know the speed of the plate used in the camera either by test, or it is generally indicated by a number on the package when the plates are purchased. It is also necessary to know just what size diaphragm is intended to be used in the lens of the camera, also indicated by a number. With this in mind the operator proceeds to turn the paper E by revolving the back G until a new portion of the paper is exposed to the aperture C and record the time taken for the paper in the aperture C to darken to the color of the disk *d*. This is termed the "actinometer" or "tinting" time. We now have the diaphragm-stop, the plate speed, and the actinometer. Then turning the dial H until the number representing the plate speed appears through the aperture *l*—say, for instance, the plate speed be 45—turn the dial H until that numeral appears in the aperture *e*. If the diaphragm used in the lens of the camera be 16, turn the dial J until that number appears in the aperture *f*. The dials being thus set, turn the face-plate N by revolving the crystal until the aperture *a* is over the number representing the actinometer or tinting time, which we will say is eight seconds. When thus set, the numbers are in such predetermined position that the time necessary to expose the plate or film in the camera will appear through the aperture *b* in the face-plate. If the actinometer time was represented in seconds, then the exposure time will be in seconds, and if in minutes then the exposure time will be in minutes, &c. In this way the amateur photographer is not confused and delayed by a complication of numbers.

I do not limit myself to the detail of construction shown and described, as the same may be changed without affecting the spirit of my invention—as, for instance, the plate N could be made stationary and the inner face-plate K made revoluble, and by reversing the relative positions of the various sets of numbers the actinometer and exposure time may be made to appear through the apertures *e* and *f* without changing the result or operation of the meter.

Having described my invention, I claim—

1. In an exposure-meter, a plurality of dials, sets of numerals on the dials, face-plates therefor, four apertures in said face-plates, means for exposing the predetermined numbers representing the diaphragm of the lens, the speed of the plate, tinting time, and automatically exposing the numeral representing the exposure time when the above predetermined numerals have been set, substantially as described.

2. In a photographic-exposure meter, a plurality of dials, one set of numerals on one of said dials arranged in circular form, said numerals representing the plate speed, another set of numerals representing the actinometer arranged outside the said first numerals, the second dial, with two sets of numerals, similarly arranged, one representing the diaphragm-opening, the other representing exposing time, a plurality of face-plates adapted over said dials, said face-plates having apertures adapted to expose one of each of said sets of numerals.

Signed at Hereford, England, this 20th day of May, 1901.

ALFRED WATKINS.

Witnesses:
MINNIE JOYCE,
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