(No Model.) 2 Sheets—Sheet 1.

J. L. FUELLING.

PHOTOMETER.

No. 589,649. Patented Sept. 7, 1897.

Fig. 1.

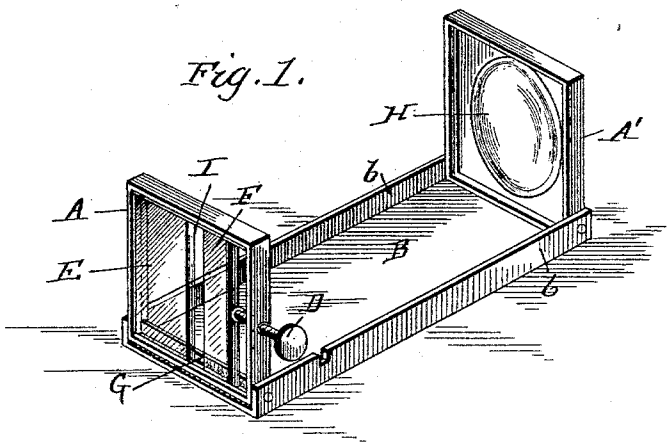


Fig. 2.

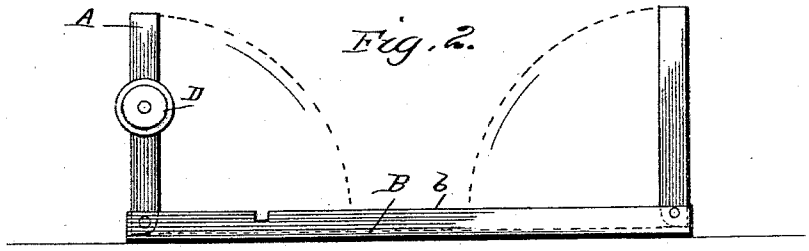


Fig. 3.

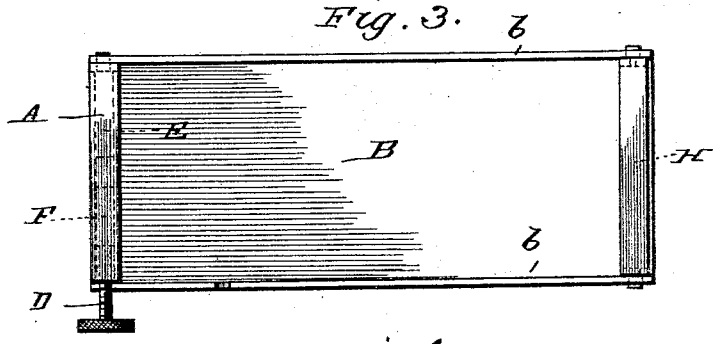
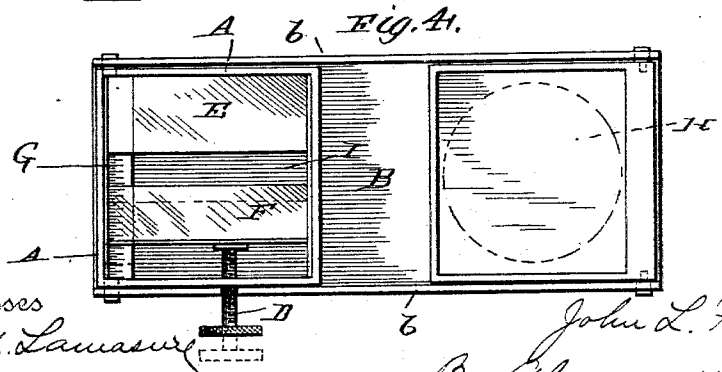


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 5.

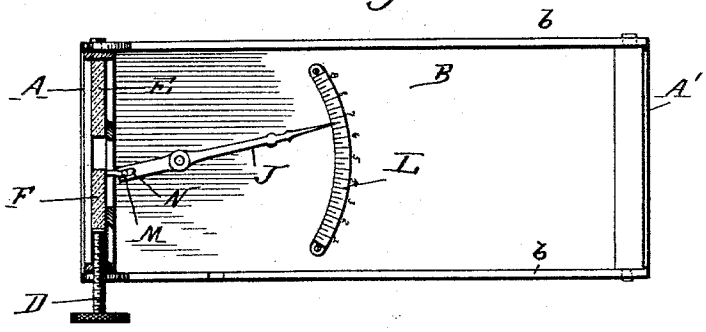
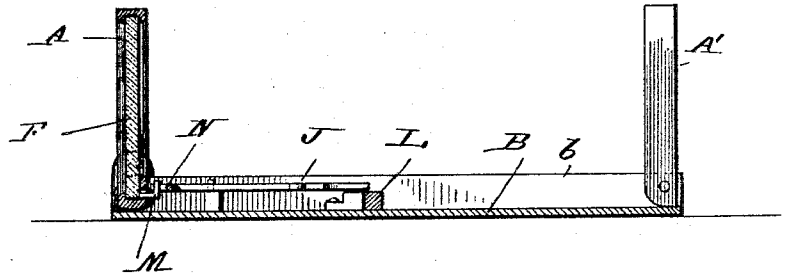


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN L. FUELLING, OF PEORIA, ILLINOIS.

PHOTOMETER.

SPECIFICATION forming part of Letters Patent No. 589,649, dated September 7, 1897.

Application filed October 26, 1896. Serial No. 610,138. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. FUELLING, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Photometers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My idea is to utilize the well-known susceptibility of the pupil of the eye to the action of light-rays, the pupil contracting or expanding according as the rays become stronger or less intense.

My device is adapted to measure the size of the pupil in any given light, such measurement being utilized for determining the time for exposing a sensitized plate in photography.

One form of the device is shown in the accompanying drawings, in which—

Figure 1 is a perspective view, Fig. 2 a side view, and Fig. 3 a plan view. Fig. 4 is a similar view, the mirror-frame and the gage-frame being folded down upon the main frame. Fig. 5 is a plan showing a modification of the indicator, and Fig. 6 is a vertical longitudinal sectional view thereof.

Referring to the various parts by letter, B designates a metal plate, which is preferably oblong in shape and is provided along its longitudinal edges with upturned flanges *b*.

A is an upright metal frame which is pivoted at its lower end between the flanges of the plate B at the forward end thereof. This frame is adapted to fold down between the flanges *b*, and carries the pupil-gage, which consists of two upright plates, one of which, E, is rigid, and the other, F, being movable to and from the rigid one to vary the size of the space I between them. The plate F may be adjusted by any suitable means, an ordinary set-screw D being shown, said screw being threaded through the vertical side of the frame A and connected to the plate F.

The two plates E and F may be formed of any suitable material. As shown in the drawings, they are formed of transparent material, such as glass; but it may be desirable for some purposes to form them of opaque material.

At the rear end of the frame or plate B is provided a frame A′, similar in form to plate A, and this frame is also adapted to fold down between the flange *b*. On the inner side of this frame—that is, on the side facing the frame A—is mounted a small magnifying-mirror H.

The size of the opening I between the plates E and F may be indicated by any suitable scale, and this scale may be carried by the frame A, as shown at G in Figs. 1 and 4, or it may be secured to the plate B, as shown in Figs. 5 and 6. In this latter case an amplifier J may be pivoted on the plate B and connected at its rear end to the movable plate F, its free end extending over an enlarged scale L. In this manner the very delicate movement of the plate F will be readily noted and very fine and accurate calculations may be made. The rear end of the amplifier is connected to the plate F by a pin M, which when the frame A is in an upright position fits in a slot N in the rear end of the amplifier, as shown.

The manner of gaging the size of the pupil to determine the length of the exposure of the plate is as follows: The frames A and A′ are placed in an upright position and the gage is held close to the eye, the inner edge of the stationary plate E being on a line with one edge of the pupil. The movable plate is then adjusted until its inner edge comes in line with the opposite edge of the pupil, the size of the pupil being shown by the size of the opening between the plates, and this may be indicated by the scales G or L, as desired. The number of graduation-lines between the plates or between the end of the indicator J and zero on the scale L will indicate the length of the exposure.

It will be observed that the operator sees the magnified image of his eye in the mirror, which enables him to readily and with great accuracy adjust the gage-opening to the size of the pupil.

In using the device the photographer stands near his camera and looks at the object he wishes to photograph, and the light reflected from that object affects the pupils of his eyes. If the object be white, the pupils will contract, but if it be dark they will expand, and this variation in the size of the pupil de-

termines the length of exposure. While looking at the object to be photographed, the pupil-gage is raised to one eye and the size of the pupil measured. In this manner the light which is to directly affect the sensitized plate is dealt with in operating the gage, and the light reflected from objects immediately around the camera which will not be included in the picture do not directly affect the gage, as is the case with other photometers. All objects to be included in the picture will be within the range of the eye and the pupil will be affected by the light reflected from them and an accurate determination of the length of the proper exposure will be obtained.

It will also be noted that there is no expense attached to the use of my device except, of course, the original cost, and is so small that it may be carried about the person, or it may be attached to the camera.

It will also be noted that by giving a decimal scale or a scale which is so divided that every line is equal to a decimal part of a second or minute, one has only to determine the value of the same as compared to his eye and lens to be able to make use of the scale readily with varying intensities of light.

It will of course be readily understood that the device may be used for measuring the intensities of lights by indicating their effect upon the eye, for measuring the effect of colors upon the eye—in fact, in all cases where it may be desirable to determine accurately the dilations of the pupil of the eye.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a photometer, the combination, of a mirror, a pupil-gage, and means for supporting the mirror and the gage opposite each other, substantially as described.

2. The combination, in a photometer, of a magnifying-mirror, and a pupil-gage, supported opposite the same, substantially as described.

3. In a photometer, the combination of a supporting-plate, a mirror carried thereby, and a transparent pupil-gage, opposite said mirror, substantially as described.

4. In a photometer, the combination, of a magnifying-mirror and a transparent pupil-gage, and means for supporting them opposite each other, substantially as described.

5. In a photometer, the combination, of a mirror and a pupil-gage opposite the mirror, said gage consisting of two plates having a variable opening between them, substantially as described.

6. The combination, in a photometer, of a supporting-plate, a magnifying-mirror, and a pupil-gage, said pupil-gage consisting essentially of two plates and a graduated scale-plate, and means for adjusting one of the plates to and from the other plate substantially as described.

7. The combination, of a main plate, a mirror-carrying frame pivoted at one end thereof, and adapted to fold down thereon, and a pupil-gage pivoted at the other end of the main plate and also adapted to fold down thereon, substantially as described.

8. The combination, in a photometer, of a supporting-plate, a mirror carried thereby, a pupil-gage consisting of two plates, means for adjusting one of said plates to and from the other plate, an amplifier connected to said movable plate, and a scale-plate, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JNO. L. FUELLING.

Witnesses:
JOHN B. SAMUEL,
LILLIAN E. BALZER.