



# PATENT SPECIFICATION

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## PROVISIONAL SPECIFICATION

### Improvements in or relating to Photographic Exposure Meters

5 We, GEOFFREY BOND HARRISON, a British Subject, and ILFORD LIMITED, a British Company, both of 23, Roden Street, Ilford, in the County of Essex, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to photographic exposure meters of the type which include a photo-electric cell and associated electrical equipment by means of which a measure of the brightness of the light incident upon or reflected from the subject may be obtained.

15 Exposure meters of the above type commonly consist of a casing which houses a photo-electric cell connected to a microammeter so that when light falls on the cell the needle of the microammeter is deflected. The needle is arranged to move in relation to a scale so that the reading obtained indicates the intensity of the light falling on the cell. The most common procedure is to provide in addition in the instrument several related calculating scales which may be arranged side by side or, more commonly, in annular form. The light value recorded by the microammeter is set on one of the scales, other scales are moved appropriately to take into consideration the intrinsic speed of the photographic material being employed and any other relevant factors, and finally there is read off from the ultimate scale either the exposure required for a given lens aperture or the lens aperture necessary for a given exposure time, or a series of apertures with the related exposure times may be presented from which a choice can be made.

20 Such exposure meters are sometimes embodied in the structure of the camera, but more commonly they form a separate part of the photographer's equipment, being carried loose in the pocket or on a strap passing over the shoulders.

25 According to the present invention a photographic exposure meter of the type described above is constructed in the general form of a wrist watch, the photo-electric cell and microammeter being contained within the watch casing and the casing being provided with brackets to which a normal

form of wrist watch strap may be attached.

More particularly according to this invention the photographic exposure meter comprises a casing of the general form employed for a wrist watch, a barrier layer photo-electric cell, a microammeter connected to said cell and provided with a needle co-operating with a scale which is visible through the transparent front of the casing, the barrier layer cell having its surface also visible through the said front of the casing, and co-operating scales located on the circumference of the wrist watch and movable relative to one another.

30 Conveniently, the barrier layer cell may extend across substantially the whole area below the "glass" of the wrist watch, being provided with a hole through which the spindle supporting the microammeter needle can pass. The scale for the needle may conveniently be engraved or otherwise recorded on a transparent base material applied to or laid over the surface of the whole or a part of the barrier layer cell or, alternatively, may be recorded directly on the cell surface.

35 The calculating scales may be arranged to be moved relative to one another by providing knurled rims so that the operator may move them readily with his fingers, or there may be provided in the position normally occupied by the watch winding knob, a knob which is geared to cause rotation of the scales. If desired, more than one such knob may be provided, each knob being associated with one of the scales.

40 One or more of the calculating scales can be located inside the casing and can be moved by means of a "winding knob."

45 In an alternative form of the invention there may be provided within the watch case a continuously variable density wedge, the position of which may be adjusted from outside the casing, for example, by a knurled ring or by a winding knob. In this form of the invention it may be arranged that the deflection of the microammeter needle, caused when light falls on the cell, may be counter-balanced by the introduction of a more or less dense area of the wedge between

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the effective area of the photo-cell and the outside of the casing, so that the reading of the microammeter is brought back to a fixed reference mark. The amount of density required to effect this in any given case, i.e. the position of the continuously varying density wedge, will afford a measure of the intensity of the light falling on the cell. It will be appreciated that in this modification of the invention part only of the area of the watch is occupied by the barrier layer cell, thus affording room for the parts of the density wedge which at any particular time are not in use.

In using the photo-electric type of exposure meter, the optimum exposure may be determined by various methods, and one method which is finding considerable favour is that known as the high-light method. In this method the meter is directed towards the source of light so as to measure the amount of light falling upon the subject and the required exposure is determined from the microammeter reading so obtained. The present invention is of particular value in connection with this method of determining exposure since by this means a

relatively large current is generated by the barrier layer cell, and accordingly the microammeter may be constructed with a somewhat lower degree of sensitivity than would otherwise be the case. This permits the whole construction to be made both small and robust.

If it is desired to construct an exposure meter of the kind described which can be used for measuring the amount of light reflected from the whole or part of the subject to be photographed, well known devices such as baffles or lenses can be incorporated over the whole or part of the cell surface providing only that the said devices do not interfere with the ability to read the deflection of the microammeter needle.

It will be appreciated that is is an especial advantage of this invention that the photographer does not need to carry a special piece of equipment loose in his pocket or hung round his neck, but has his exposure meter always ready on his wrist.

Dated this 17th day of December, 1947.

V. GALLAFENT,  
Chartered Patent Agent.

#### COMPLETE SPECIFICATION

### Improvements in or relating to Photographic Exposure Meters

We, GEOFFRED BOND HARRISON, a British Subject, and ILFORD LIMITED, a British Company, both of 23, Roden Street, Ilford, Essex, England, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to photographic exposure meters of the type which include a photo-electric cell and associated electrical equipment by means of which a measure of the brightness of the light incident upon or reflected from the subject may be obtained.

Exposure meters of the above type commonly consist of a casing which houses a photo-electric cell connected to a microammeter so that when light falls on the cell the needle of the microammeter is deflected. The needle is arranged to move in relation to a scale so that the reading obtained indicates the intensity of the light falling on the cell. The most common procedure is to provide in addition in the instrument several related calculating scales which may be arranged side by side or, more commonly, in annular form. The light value recorded by the microammeter is set on one of the scales, other scales are moved appropriately to take into consideration the intrinsic speed of the photographic material being employed and any other relevant factors, and finally there is read off from the ultimate scale either the

exposure required for a given lens aperture or the lens aperture necessary for a given exposure time, or a series of apertures with the related exposure times may be presented from which a choice can be made.

Such exposure meters are sometimes embodied in the structure of the camera, but more commonly they form a separate part of the photographer's equipment, being carried loose in the pocket or on a strap passing over the shoulders.

According to the present invention a photographic exposure meter of the type described above is constructed in the general form of a wrist watch, the photo-electric cell and microammeter being contained within the watch casing and the casing being provided with brackets to which a normal form of wrist watch strap may be attached.

More particularly according to this invention the photographic exposure meter comprises a casing of the general form employed for a wrist watch, a barrier layer photo-electric cell, a microammeter connected to said cell and provided with a needle co-operating with a scale which is visible through the transparent front of the casing, the barrier layer cell having its surface also visible through the said front of the casing, and co-operating scales located on the circumference of the wrist watch and movable relative to one another.

Conveniently, the barrier layer cell may

- extend across substantially the whole area below the "glass" of the wrist watch, being provided with a hole through which the spindle supporting the microammeter needle can pass. The scale for the needle may conveniently be engraved or otherwise recorded on a transparent base material applied to or laid over the surface of the whole or a part of the barrier layer cell or, alternatively, may be recorded directly on the cell surface.
- The calculating scales may be arranged to be moved relative to one another by providing knurled rims so that the operator may move them readily with his fingers, or there may be provided in the position normally occupied by the watch winding knob, a knob which is geared to cause rotation of the scales. If desired, more than one such knob may be provided, each knob being associated with one of the scales.
- One or more of the calculating scales can be located inside the casing and can be moved by means of a "winding knob."
- In an alternative form of the invention there may be provided within the watch case a continuously variable density wedge, the position of which may be adjusted from outside the casing, for example, by a knurled ring or by a winding knob. In this form of the invention it may be arranged that the deflection of the microammeter needle, caused when light falls on the cell, may be counter-balanced by the introduction of a more or less dense area of the wedge between the effective area of the photo-cell and the outside of the casing, so that the reading of the microammeter is brought back to a fixed reference mark. The amount of density required to effect this in any given case, i.e. the position of the continuously varying density wedge, will afford a measure of the intensity of the light falling on the cell.
- It will be appreciated that in this modification of the invention part only of the area of the watch is occupied by the barrier layer cell, thus affording room for the parts of the density wedge which at any particular time are not in use.
- In using the photo-electric type of exposure meter, the optimum exposure may be determined by various methods, and one method which is finding considerable favour is that known as the high-light method. In this method the meter is directed towards the source of light so as to measure the amount of light falling upon the subject and the required exposure is determined from the microammeter reading so obtained. The present invention is of particular value in connection with this method of determining exposure since by this means a relatively large current is generated by the barrier layer cell, and accordingly the microammeter may be constructed with a somewhat lower degree of sensitivity than would otherwise be the case. This permits the whole construction to be made both small and robust.
- If it is desired to construct an exposure meter of the kind described which can be used for measuring the amount of light reflected from the whole or part of the subject to be photographed, well known devices such as baffles or lenses can be incorporated over the whole or part of the cell surface providing only that the said devices do not interfere with the ability to read the deflection of the microammeter needle.
- It will be appreciated that it is an especial advantage of this invention that the photographer does not need to carry a special piece of equipment loose in his pocket or hung round his neck, but has his exposure meter always ready on his wrist.
- Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—
1. A photographic exposure meter comprising a photo-electric cell and associated electrical equipment including a microammeter by means of which a measure of the brightness of light falling on the cell may be obtained, constructed in the general form of a wrist watch, the photo-electric cell and microammeter being contained within the watch casing and the casing being provided with brackets to which a normal form of wrist watch strap may be attached.
  2. A photographic exposure meter comprising a casing of the general form employed for a wrist watch, a barrier layer photo-electric cell, a microammeter connected to said cell and provided with a needle co-operating with a scale which is visible through the transparent front of the casing, the barrier layer cell having its surface also visible through the said front of the casing, and co-operating scales located on the circumference of the wrist watch and movable relative to one another.
  3. A photographic exposure meter according to claim 2 wherein the barrier layer cell extends across substantially the whole area below the "glass" of the watch casing and is provided with a hole through which passes the spindle supporting the microammeter needle.
  4. A photographic exposure meter according to claim 2 or 3 wherein a scale for the microammeter needle is engraved or otherwise recorded on a transparent cover applied to or laid over the surface of the whole or part of the barrier layer cell.
  5. A photographic exposure meter

- according to any of claims 2 to 4 wherein the said co-operating scales are arranged to move relative to one another by the provision of knurled rims operable by the fingers. 20
- 5 6. A photographic exposure meter according to any of claims 2 to 4 wherein the said co-operating scales, or some of them, are geared together and operable by a knob located in the position normally occupied by the winding knob of a wrist watch. 25
- 10 7. A photographic exposure meter according to any of claims 2 to 6 wherein there is provided a continuously variable density wedge movable in the position
- 15 between the photo-electric cell and the "glass" of the watch casing whereby the deflection of the microammeter needle, caused when light falls on the cell, may be counter-balanced by the introduction of a more or less dense area of the wedge between the effective area of the photo-cell and the outside of the casing, so that the reading of the microammeter is brought back to a fixed reference mark.
8. A photographic exposure meter substantially as hereinbefore described.

Dated this 16th day of December, 1948.

V. GALLAFENT,  
Chartered Patent Agent.

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