

PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in or relating to Photographic Exposure Meters

We, THE GENERAL ELECTRIC COMPANY LIMITED, of Magnet House, Kingsway, London, W.C.2, a British company, and The Hon. CHARLES WILLIAM STOPFORD, of Research Laboratories of The General Electric Company Limited, Wembley, Middlesex, a British subject, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to photographic exposure meters and more particularly to such meters employing a photo-electric cell (preferably a self generating cell to avoid the necessity for a battery) and an electrical indicating instrument operated by the output from the cell. Usually in meters of this kind the instrument indicates the output from the cell on a scale which may be suitably calibrated to indicate exposure time. For this purpose it is necessary to know the characteristics of the instrument and, if the instrument is to indicate directly against a slide rule for adjusting the exposure time for stop numbers and plate speeds, then the instrument must have a logarithmic characteristic. The present invention is directed towards providing a meter which is substantially independent of the characteristics of the instrument.

30 According to the present invention, an operating member is provided for adjusting the current applied to the instrument to a predetermined value as indicated by the

instrument so that the degree of movement of the operating member gives an indication of the amount of light falling on the cell and therefore of the exposure time. Since the instrument has only to indicate one predetermined value of current its characteristics are immaterial. It may therefore be made highly sensitive and the predetermined value may be that at which the instrument just indicates or just ceases to indicate a current flow. This high sensitivity may be obtained by concentrating the flux in the air gap by using pointed pole pieces. A meter is thus obtained which is capable of indicating exposure times for very small amounts of light, for example the light in the interior of buildings, and at the same time may be made to indicate exposure times for large amounts of light, for example the exposure times for outdoor photography.

The current applied to the instrument may be adjusted to the predetermined value either by adjusting a resistance in the circuit or by varying the amount of light falling on the cell, for example by means of an iris diaphragm or by means of a wedge filter. Furthermore the operating member may form part of a slide rule for adjusting for stop values and plate speeds.

Dated the 15th day of April, 1936.

For the Applicants,
G. S. STURROCK.

COMPLETE SPECIFICATION

Improvements in or relating to Photographic Exposure Meters

We, THE GENERAL ELECTRIC COMPANY LIMITED, of Magnet House, Kingsway, London, W.C.2, a British company, and The Hon. CHARLES WILLIAM STOPFORD, of Research Laboratories of The General Electric Company Limited, Wembley, Middlesex, a British subject, 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 comprising a

photo-electric cell (preferably a cell requiring no external E.M.F.) whose output controls an instrument (usually an ammeter) by whose indications the exposure is determined.

Most exposure meters of this type comprise an ammeter with a graduated scale, and a pointer moving over the scale whose position indicates the light falling on the cell. If, as is usual, the meter includes an instrument of the nature of a slide rule, by which account may be taken of factors other than the external illumination (i.e.

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that determining the exposure), it is known to be highly desirable that the said graduated scale should be logarithmic. Further, if for one cell is substituted another of slightly different characteristics, it will usually be necessary to modify the entire slide rule.

In an alternative method that has been proposed, the graduated scale is replaced by a single mark. The pointer is always brought to this mark by varying (e.g. by means of an iris diaphragm) the reading of the instrument, corresponding to a given external illumination. No logarithmic scale of the ammeter is then required; and if the cell is changed, the only modification necessary is the restoration (e.g. by a variable resistor in the circuit of the instrument) of the reading of the instrument corresponding to a given illumination so that the coincidence of the pointer with the mark again indicates the same external illumination. No alteration of the slide rule is required.

The object of the invention is to provide an improved meter operating according to this alternative method.

Since the ammeter has to operate only at one current (namely that which brings the pointer to the single mark) its characteristic at other currents is immaterial. It can then be designed so that its sensitivity at this point is exceptionally high, so that the exposure can be determined for small external illuminations; at the same time the meter can still be used for large illuminations. If the ammeter is a moving coil instrument this can be achieved by using pointed pole pieces and concentrating the flux of the magnet into the position that the coil will occupy when the pointer is at the mark.

According to the invention is an exposure meter of the type specified comprising means for varying the reading of the said instrument corresponding to a given external illumination and a fixed mark to which the pointer of the said instrument is brought by the said means when the exposure is to be measured, the sensitivity of the said instrument when the output of the cell is such as to bring the pointer into the immediate neighbourhood of the said mark is much greater than its sensitivity when the output is substantially different from the said output.

Preferably the said mark corresponds to substantially zero output, so that the pointer moves appreciably away from the

mark when the output exceeds some limit. The means for varying the reading corresponding to a given illumination may be an iris diaphragm before the cell or a variable resistor in series or in shunt with the instrument.

The motion of the member controlling the said means is preferably logarithmic, that is to say, such that the distance of the member from some datum is proportional (or inversely proportional) to the logarithm of the external illumination required to cause the pointer to depart appreciably from the said mark. This arrangement is known *per se*. The member is then made on part of a slide rule (in known manner) by means of which account is taken of other factors determining the exposure, such as plate speed or lens aperture.

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. An exposure meter of the type specified, comprising means for varying the reading of the said instrument corresponding to a given external illumination and a fixed mark to which the pointer of the said instrument is brought by the said means when the exposure is to be measured, wherein the sensitivity of the said instrument when the output of the cell is such as to bring the pointer into the immediate neighbourhood of the said mark is much greater than when the output is substantially different from the said output.

2. An exposure meter according to Claim 1 wherein the said instrument is a moving coil ammeter and the pole pieces of the magnet are pointed so as to concentrate the flux into the region occupied by the said coil when the pointer is at the said mark.

3. An exposure meter according to Claim 2 wherein the said mark corresponds to substantially zero output.

4. An exposure meter according to Claim 1, 2 or 3 wherein the motion of the member controlling the said means is logarithmic as hereinbefore defined

5. An exposure meter according to Claim 4 wherein the said member is part of a slide rule by means of which account is taken of factors determining the exposure other than the external illumination.

Dated the 6th day of April, 1937.

For the Applicants,
G. S. STURROCK.