

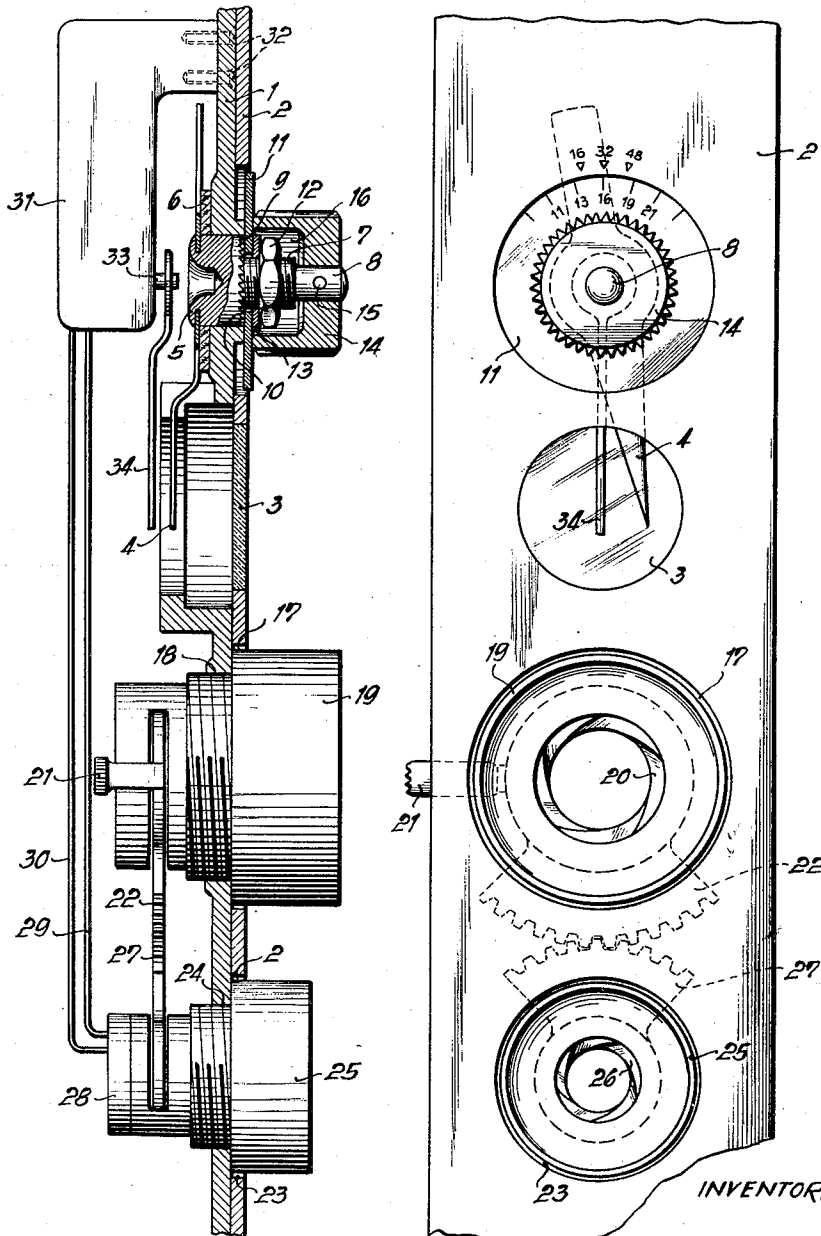
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ADJUSTING DEVICE FOR LIGHT MEASURING AND
CONTROLLING APPARATUS AND THE LIKE
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FIG. 1

FIG. 2



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ADJUSTING DEVICE FOR LIGHT MEASURING AND CONTROLLING APPARATUS AND THE LIKE

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6 Claims. (Cl. 116—114)

The present invention relates to adjusting devices.

More particularly, the present invention relates to adjusting devices used in light measuring and regulating devices of the type which are built into cameras such as motion picture cameras or used in separate exposure meters, copying devices, and the like.

With adjusting devices of the above type it is desired to be able to adjust a pair of members with respect to each other, and then to fix the relative position of these members so that the latter move together and are prevented from being adjusted with respect to each other. The known devices for accomplishing this result have several disadvantages in that the parts must be made quite thick and include set screws and the like which are freely accessible so that undesired adjustment of the parts with respect to each other by unauthorized people cannot be prevented.

One of the objects of the present invention is to provide an adjusting device having a pair of elements which may be present in a predetermined relation with respect to each other and which thereafter may be maintained in this predetermined relationship for movement together without the risk of unauthorized disturbance of the presetting.

Another object of the present invention is to provide an adjusting device where the means for fixing a pair of preset parts with respect to each other are completely covered and inaccessible in the completed device.

A further object of the present invention is to provide an adjusting device of the above type where a certain frictional resistance to movement of the adjusting device is provided, the means for providing this frictional resistance also serving to hold the adjusting device in a given position with respect to the apparatus of which it forms a part.

An additional object of the present invention is to provide a structure capable of accomplishing the above objects and at the same time being composed of simple and ruggedly constructed elements which are very reliable in operation.

With the above objects in view, the present invention mainly consists of an adjusting device for light measuring and regulating apparatus, this adjusting device including a shaft having a portion of relatively large diameter to which a pointer is fixed. The shaft also has a portion of relatively small diameter separated from the portion of large diameter by a shoulder, and a disc adapted to have a scale thereon is freely turnable on the shaft portion of smaller diameter and located against the shoulder thereof. A nut means threadedly engages the shaft portion of smaller diameter and presses this disc against the shoulder, and a manually engageable member is fixed to the shaft portion of smaller diameter and covers the nut means so that the latter is inaccessible.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however,

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both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing, wherein:

Fig. 1 is a fragmentary sectional elevational view of a camera which includes the structure of the present invention; and

Fig. 2 is a front view of the structure of Fig. 1 as seen from the right of Fig. 1.

In the drawing there is shown at the upper portions of Figs. 1 and 2 a wall portion 1 of a housing of a camera such as a motion picture camera, for example. This wall portion 1 is provided with an outer face covered by a suitable plate 2. The wall portion 1 is formed with a viewing aperture with which the window 3 of the cover plate 2 is in register, and this window 3 forms the window of the view finder of the camera. A pointer 4 extends into the viewing aperture and is visible through the window 3.

Referring to Fig. 1 it will be seen that the pointer 4 is fixed to and extends radially from a shaft portion 5 of relatively large diameter which is turnably carried by the housing wall 1 in a suitable opening thereof, the shaft portion 5 extending inwardly beyond the inner face of the housing wall 1. A cork disc 6 is compressed between the inner face of the housing wall 1 and the pointer 4 and is carried by the shaft portion 5 of relatively large diameter. A shaft portion 7 of relatively small diameter extends outwardly from the shaft portion 5 of relatively large diameter beyond the outer face of the wall 1, and the outer surface of this shaft portion 7 is threaded, the shaft which is composed of the portions 5 and 7 also having a portion 8 extending outwardly beyond the portion 7, being of a slightly smaller diameter than the latter, and having a smooth outer surface. Thus, there is formed between the shaft portions 5 and 7 a shoulder 9, and this shoulder 9 is formed with radially extending teeth 10 which have a saw-tooth configuration, as is evident from the drawing.

A disc 11 having a suitable scale thereon is freely turnable on the shaft portion 7, is made of a relatively soft metal such as aluminum, and is pressed against the shoulder 9 by a nut means which includes the nut 12 and the washer 13 compressed between the disc 11 and the nut 12, the latter threadedly engaging the outer threaded surface of the shaft portion 7 of relatively small diameter. This disc 11 thus has its left face, as viewed in the drawing, located against the outer face of the wall 1 as well as the shoulder 9 which is flush with the outer face of the wall 1, the tightening of the nut 12 to press the disc 11 against the shoulder 9 serving to compress the cork disc 6 to a predetermined extent. The disc 11 is provided at its outer face directed toward the right, as viewed in the drawing, with a scale having adjustment values which cooperate with a scale carried by the outer face of the plate 2, the latter being formed with a cut-out in which the disc 11 is located at least partly, in the manner shown in the drawing.

On the outermost portion 8 of the shaft 5, 7, 8 there is fixedly a manually engageable member in the form of a knob 14, a cross pin 15 extending through aligned openings of the knob and shaft 8 to fix the knob 14 to the shaft portion 8. The knob 14 is provided with an outer knurled surface so as to be easily manipulated by the operator, and furthermore the knob 14 is formed with a cutout 16 in which the nut means 12, 13 is completely located, as is evident from the drawing, the left end face of the knob 14, as viewed in the drawing, engaging the right outer face of the disc 11.

Before it is possible to work with the light meter, the

pointer 4 must be preset angularly with respect to the disc 11 in accordance with the particular properties of the photoelectric cell which is built into the camera or which forms part of an independent light meter. Thus, in order to accomplish this presetting the knob 14 is removed and the nut 12 is loosened to a small extent. Now the pointer 4 together with the shaft 5, 7, 8 can be easily turned through a relatively small angle with respect to the disc 11. When the parts 4 and 11 have the desired angular relationship with respect to each other, the nut 12 is tightened. Thus, the washer 13 and the saw-tooth configuration of the teeth 10 of the shoulder 9 prevent accidental turning of the scale disc 11 with respect to the shaft. Once the nut 12 is tightened then the disc 11 is fixedly pressed against the shoulder 9 since the teeth 10 of the shoulder 9 dig into the disc 11 to prevent undesired angular turning thereof with respect to the shaft and pointer 4.

Now the knob is replaced on the shaft portion 8 and the cross pin 15 is replaced so that the knob 14 is thus fixed to the assembly, and it will be noted that the parts which serve to fix the disc 11 to the shaft are completely covered by the knob 14. In this way the setting of disc 11 with respect to the pointer 4 cannot be disturbed in an unauthorized manner, and the completed assembly provides an outer appearance which does not disclose the presence of the nut means constituted by nut 12 and washer 13. Moreover, these parts are protected against dampness and dust and the outer surface which is accessible may be easily cleaned. With the completed assembly shown in the drawing the disc 11 engages the outer surface and the cork disc 6 engages the inner surface of the housing wall 1. The thickness of the cork disc 6 as well as its outer diameter is so chosen that in the completed assembly the disc 6 is compressed between the pointer 4 and the wall 1 to resiliently urge the disc 11 against the outer face of the wall 1. Moreover, the disc 6 provides a predetermined frictional resistance to the turning of the shaft. Thus, the force necessary to turn the pointer 4 with the knob 14 may be regulated so as to be limited to a predetermined amount and on the other hand the pointer 4 is maintained in its adjusted position in a fully reliable manner.

When used in a camera such as a motion picture camera having a built in exposure meter, the disc 11 is turned to provide between its scale and that on the outer face of the plate 2 a certain relationship according to the type of film used and the speed of the camera, for example. Thus, the pointer 4 will be located in a predetermined angular position. A pointer movable in response to the amount of light received by the photocell of the light meter is also visible in the window 3, and the light meter is provided with a diaphragm which is coupled with the diaphragm of the camera itself so that both of these diaphragms are operated simultaneously, the camera being provided with a manually operable member for adjusting both of these diaphragms simultaneously. These diaphragms are adjusted until the pointer 34 coincides with the pointer 4, and then the operator knows that the diaphragm is in the objective of the camera is set for the proper aperture.

As may be seen from Fig. 1, the front plate 2 is formed beneath the window 3 with an opening 17 which is aligned with a threaded opening 18 formed in the front wall 1 of the camera housing. The objective 19 is threadedly connected to the wall 1 in the opening 18 thereof, and the objective assembly 19 includes the diaphragm 20 which can be adjusted manually by actuation of lever 21 which is fixed with a toothed sector 22.

Beneath the objective 19 the plate 2 is formed with an additional opening 23 which is aligned with another threaded opening 24 of the front wall of the camera housing, and a sleeve 25 is threadedly connected to the wall 1 in the opening 24 thereof and houses a second dia-

phragm 26. The adjusting structure for the diaphragm 26 is connected with a toothed sector 27 so that when the latter turns the diaphragm 26 is adjusted, and the sector 27 meshes with the sector 22, so that when lever 21 is actuated both of the diaphragms are simultaneously adjusted.

The sleeve 25 carries at its inner end in the interior of the camera housing a photocell 28 which receives its light through the diaphragm 26. The photocell 28 is connected by the electrical conductors 29 and 30, in the form of wires, to the indicator 31 which is fixed to the inner face of the housing wall 1 by the screws 32, and this indicator 31 includes a shaft 33 turnable about its axis and fixedly carrying a pointer 34 which indicates by its angular position the amount of light received by the photocell 28. The shaft 33 is coaxial with the shaft 5, 7 so that the pointers 4 and 34 turn about a common axis, and the free end of the pointer 34 extends into the view finder, as is apparent from Fig. 2.

The disc 11 is provided at its outer surface with the scale indicated in Fig. 2, this scale indicating, for example, different values of film sensitivity. The front plate 2 carries next to the scale on disc 11 a scale of different camera speeds.

When the above structure is used the two scales are positioned with respect to the other so as to provide a predetermined relationship according to the type of film used and the speed of the camera. This setting is brought about simply by turning the knob 14 so as to give the pointer 4 a predetermined angular position. The operator then turns the lever 21 until the pointer 34 coincides with the pointer 4. The turning of lever 21 simultaneously adjusts both of the diaphragms, and the pointer 34 turns because of the changing amount of light received by the photocell 28 during adjustment of the diaphragm 26. When the pointer 34 coincides with the pointer 4, the operator knows that the camera is set with the proper aperture.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of adjusting devices differing from the types described above.

While the invention has been illustrated and described as embodied in adjusting devices for light measuring and regulating apparatus and the like, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In an adjusting device for a light measuring and controlling apparatus, in combination, a shaft; a pointer fixed to and extending radially from said shaft; a disc having a scale thereon, said disc being freely turnable on said shaft; fixing means cooperating with said disc and carried by said shaft for fixing said disc thereto in a predetermined angular position with respect to said shaft; and a manually engageable member carried by said shaft and being accessible to the operator for turning said shaft and the pointer, disc, and fixing means carried thereby, said manually engageable member covering said fixing means so that the latter is inaccessible.

2. In an adjusting device for light measuring and regulating apparatus, in combination, a shaft having a pair of portions of different diameters which form at their junc-

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tion a shoulder of said shaft, one of said shaft portions being of smaller diameter than the other and having an outer threaded surface; a pointer fixed to and extending radially from said shaft; a disc having a scale thereon, said disc being freely turnable on said shaft portion of smaller diameter and located against said shoulder; nut means threadedly engaging said shaft portion of smaller diameter and pressing said disc against said shoulder; and a manually engageable member fixed to said shaft and formed with a cutout in which said nut means is located so that the latter is inaccessible.

3. In an adjusting device for a light measuring and regulating apparatus, in combination, an elongated shaft formed intermediate its ends with a shoulder located between a shaft portion of relatively large diameter and a shaft portion of relatively small diameter, said shoulder having a toothed face extending radially from and surrounding said shaft portion of small diameter; a pointer fixed to and extending radially from said shaft portion of larger diameter; a disc having a scale thereon, said disc being freely turnable on said shaft portion of smaller diameter and engaging said toothed face of said shoulder; nut means threadedly engaging said shaft portion of smaller diameter and pressing said disc against said toothed face; and a knob fixed to said shaft and formed with a cutout in which said nut means is located.

4. In an adjusting device for a light measuring and regulating apparatus, in combination, a housing wall having an inner face and an outer face and formed with a bore; a shaft extending through said bore beyond said faces of said wall and being turnably carried by the latter in said bore, said shaft having an inner portion extending beyond said inner face of said wall and an outer portion extending beyond said outer face of said wall; a disc fixed to and extending radially from said shaft at said outer portion thereof, said disc having a scale thereon, and said disc engaging said outer face of said wall; a pointer fixed to and extending radially from said inner portion of said shaft and being spaced from said inner face of said wall; and means located between and engaging said pointer and said inner face of said wall for urging said disc against said outer face of said wall and for providing a predetermined frictional resistance to turning of said shaft.

5. In an adjusting device for a light measuring and regulating apparatus, in combination, a housing wall having an inner face and an outer face and formed with a bore; a shaft extending through said bore beyond said

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faces of said wall and being turnably carried by the latter in said bore, said shaft having an inner portion extending beyond said inner face of said wall and an outer portion extending beyond said outer face of said wall; a disc fixed to and extending radially from said shaft at said outer portion thereof, said disc having a scale thereon, and said disc engaging said outer face of said wall; a pointer fixed to and extending radially from said inner portion of said shaft and being spaced from said inner face of said wall; and means located between and engaging said pointer and said inner face of said wall for urging said disc against said outer face of said wall and for providing a predetermined frictional resistance to turning of said shaft, said means being in the form of a cork disc carried by said shaft and compressed between said pointer and said inner face of said wall.

6. In a camera, in combination, a housing wall having inner and outer faces and formed with a viewing aperture for the camera and with an opening adjacent said viewing aperture; a shaft having a portion of larger diameter turnably carried by said wall in said opening thereof and having a portion of smaller diameter extending outwardly beyond said outer face of said wall, said shaft having a shoulder between said portions of large and small diameter substantially flush with said outer face of said wall; a disc having a scale thereon, being freely turnable on said shaft portion of smaller diameter and engaging said shoulder and said outer face of said wall; nut means threadedly engaging said shaft portion of smaller diameter and pressing said disc against said shoulder; a knob fixedly carried by said shaft portion of smaller diameter, engaging said disc, and formed with a cutout in which said nut means is completely located; a pointer visible in said viewing aperture and fixed to said shaft portion of larger diameter in spaced relation to said inner face of said wall; and a cork disc compressed between said pointer and said inner face of said wall and carried by said shaft for urging said disc against said outer face of said wall and for providing a predetermined frictional resistance to turning of said shaft.

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