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PHOTOGRAPHIC SHUTTER WITH ADJUSTABLE
FLASH SYNCHRONIZING MECHANISM
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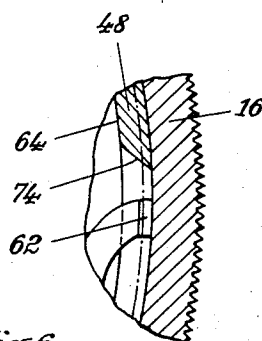
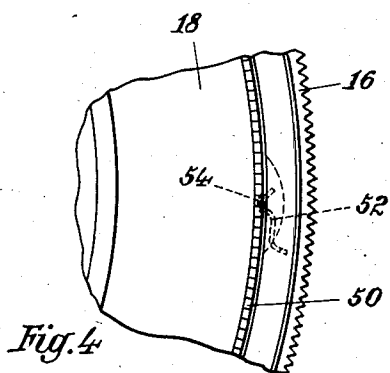
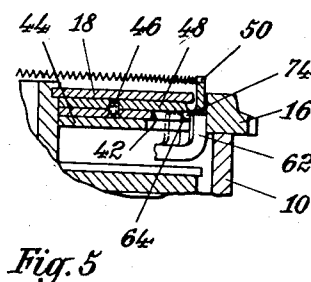
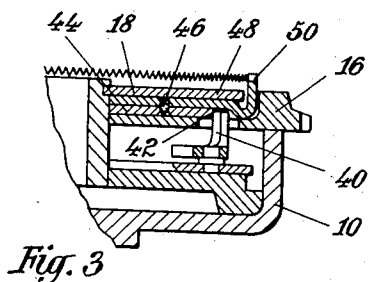
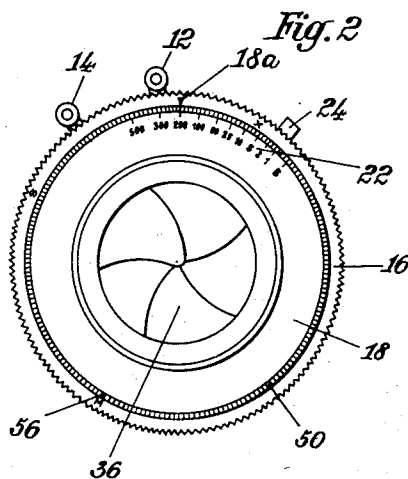
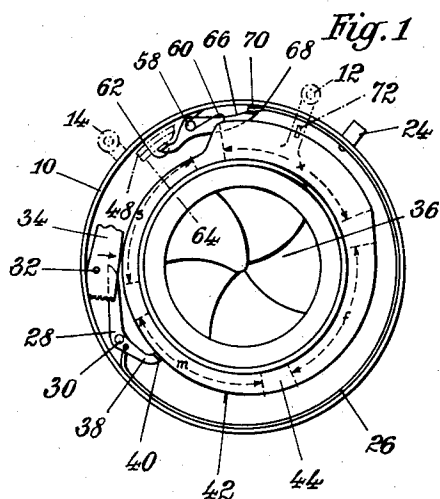


Fig. 6
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PHOTOGRAPHIC SHUTTER WITH ADJUSTABLE FLASH SYNCHRONIZING MECHANISM

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3 Claims. (Cl. 95—11.5)

1

The present invention relates to a photographic objective closure having one or more contact arrangements for the flashlight circuit, at least one of which can be set at various preignition times for taking into account the respective flashlight illumination retardation.

In conventional objective closures it is customary to set the preignition time of the contact arrangement according to the selected illumination time with the help of a special, manually-operated setting-member. However, this manual setting which is necessary each time, for example, in changing the lighting time, delays considerably the insert readiness of the camera, because it requires of the operative great care and a precise knowledge of the respective operating conditions, and, specifically, both for each of the closing times and for various lamp types. At a rapid succession of exposures, or with an insufficiently trained operative, incorrect lighting due to incorrect setting is scarcely avoidable.

It has, therefore, been sought in photographic objective closures to eliminate these disadvantages by providing, instead of an arbitrary setting of the preignition time, only a limited number of settings thereof, for example a setting "M" with a particular, constant illumination retardation (for example, 20 ms.) and a setting "X" for flashlights without illumination retardation. While this arrangement facilitates the manipulation of the setting, it does not allow any intermediate values for flashlights with illumination retardation.

Furthermore proposals have been made for a rigid association of the time setting member with a control cam for the purpose of the additional control of the manually adjusted contact setting member by said control cam during the time setting, so that a superposition of the preignition time setting is done automatically with the time setting. Since, however, the range of superposition merely for a single lamp type has to correspond with the full range of the time setting, in order to obtain an exact point of ignition setting, there follows the disadvantage at this construction that it being applicable only for a single control range, that means for a single lamp type.

One object of the present invention is to avoid the recited disadvantages of prior arrangements and to provide an objective closure with a contact arrangement of simple and exact operation.

Another object of the invention is to provide on the objective closure a contact arrangement, which enables control of the pre-ignition time in a plurality of different ranges.

2

The enumerated features of the invention will be more fully understood from the following specification by reference to the accompanying drawings, in which:

Figure 1 shows a closure of my invention with the cover plate removed and unimportant parts omitted; Fig. 2 shows a front view of the closure; Fig. 3 is a fragmentary sectional view showing the details of the closure on an enlarged scale; Fig. 4 is a fragmentary plan view of the closure of Figs. 1-3 on an enlarged scale; Fig. 5 is a detail sectional view of the setting mechanism; and Fig. 6 shows on an enlarged scale the coaction of the operating parts of the mechanism of my invention.

Referring to the drawings in detail, reference character 10 designates a closure housing in which there is rotatably mounted a trigger 12, displaceable out of the resting position in Fig. 2 into the position shown in dotted lines in Fig. 1 as the closure drive mechanism is cocked. A releaser 14 is provided for releasing the closure and for setting the various lighting times, a rotatable time-setting ring 16, whose setting mark 18a collaborates with the time scale 22 provided on the cover plate 20 is provided.

For exposures with the flashlight there is disposed in the closure housing a contact arrangement for the flashlight circuit. For conductive connection of this contact arrangement with the rest of the electrical equipment there is provided a two-pole contact connector 24, over which there can be applied a suitable contact plug having coacting contacts thereon. One pole of the connector 24 is connected with the mass of the metal closure parts. The pole is connected through an insulated lead 26 in the closure housing. This lead is in turn connected with the mass of a double-armed contact lever 28, which is rotatably mounted on an insulated peg 30. A contact pin 32 serves as a pivot for angularly movable countercontact member of the contact lever 28 or harmonizing organ 34, which is, together with others of the closure parts, connected with the closure housing.

The angularly movable member 34 is a lighting harmonizing arrangement. The member 34 is mounted to oscillate in the closure housing 10 and is tensioned and biased by a power source of its own, for example, by a spring, which when the closure trigger 12 is actuated, is tensioned at the same time. The tensioned position of the movable member or harmonizing organ 34 is represented in Fig. 1. When the releaser 14 is actuated there is first released the movable member

3

or harmonizing organ 34, so that, through the intermediary of a retarding mechanism, not shown, but suitably retarded, it moves in the direction of the arrow, in doing which, after the contact pin 32 has moved into abutment with the contact lever 28, the lighting circuit is closed. A short time thereafter, through a further movement of the movable member or harmonizing organ 34, there is brought about the release of the actual closure course, in such a way that the closure sectors of the iris shutter 36 are opened and again closed in the familiar manner.

The preignition time of the contact arrangement due to the illumination retardation of the flashlamp corresponds to the distance from each other of the contact parts 28, 32. The preignition time must always be selected according to the set lighting time. For this purpose the contact lever 28 can be set in various positions relatively to the contact pin 32, in that its arm 38 is swung over an isolated projection 40, with the help of a guide cam 42 of a guide ring 44 mounted in the closure housing.

The guide ring 44 is, according to Fig. 3, connected through the intermediary of a plurality of screws 46, with a setting ring 48, which is mounted in the closure housing 10 above the time setting ring 16. Its rim extends beyond the front side of the closure, and possesses for manipulation a milling 50. The set ring 48, 50 and hence also the guide ring 42, 44, are positioned over a plurality of snap springs 52, which sit in the time setting ring 16, and engage in correspondingly distributed rests 54 in the set ring 48, 50 (Fig. 4), coupled with the time setting ring 16. In this way, in setting the desired lighting time, through rotation of the time setting ring 16, the set ring 42, 44 is also moved, and the contact lever 28 is automatically set at the preignition time of a flashlight corresponding to the set lighting time.

As already stated in the beginning, the control of the preignition time can also, for the purpose of taking into account the illumination retardation of different flashlights, be undertaken in a plurality of different ranges. For this purpose the guide cam 42 is given such a form that it exhibits three different control ranges, *f*, *m* and *s*. Each of these control ranges assures an automatic setting of the preignition time within a particular flashlight class. I provide a calibration or stroke mark 56 on setting ring 50 for enabling a simple setting of the particular control range desired relatively to the setting ring 50 and the time setting ring 16 which collaborates with a system of marks F, M, S on the time setting ring 16 corresponding to one of the most widely employed flashlight classes.

The mode of operation with the arrangement according to the invention is as follows:

Assume that the operative uses flashlights of class M with his apparatus. He will, therefore, set the stroke mark 56 in such a way that it coincides with the mark M on the time setting ring 16 (Fig. 2). This is done in such a way that the time setting ring 16 is held fast and the setting ring 48, 50, is, under pressure of the snap springs 52 maintained out of the rests 54, and rotated until the desired setting occurs. In doing so the snap springs 52 fall into other rests 54.

If now, it is desired to set a lighting time, for example, $\frac{1}{200}$ second, as can be seen in the setting shown in Fig. 2, then, with the setting movement of the time setting ring 16 of the guide ring 44, as well as the range *m* of its guide cam

4

42, the rings are brought into a position, and the contact lever 28, 38, 40 is swung into a position relatively to the countercontact pin 32 which assures the necessary preignition time for this lighting time.

According to this setting there follow in sequence the tensioning and release of the closure, and hence the execution of a flashlight exposure, in the manner already explained above.

If, now, the operative, for special reasons desires to employ another flashlight class for another exposure, then all he has to do is to change the setting of the setting ring 48, 50, relatively to the system of marks on the time setting ring 16, while the actual setting of the preignition, as described, occurs automatically through the time setting ring 16 in setting the new light time.

Besides the described contact arrangement for flashlights with illumination retardation there is also often built into the closure a second contact arrangement for flashlamps without illumination retardation (X lamp class). The latter functions in such a way that, having inactivated the first contact arrangement, the second contact arrangement does not close the flashlight circuit until the closure sectors are present in the open position. For this purpose this contact arrangement is usually closed by a running down closure mechanism. Such a contact arrangement is described hereinafter.

In the closure housing 10 there is mounted a double armed lever 58. It is subject to the action of a spring 60, which strives to swing an arm 62 of the lever 58 clockwise, and press it on the lower edge 64 of the setting ring 48. The other arm 66 of the lever 58 lies in the neighborhood of the annular wall of the closure. This arm 66 is insulated, and collaborates with an exposed contact end 68 of the lead 26 in such a way that it holds it against an insulated piece 70 of the annular wall of the closure. As soon, however, as the lever 58 is able to move farther clockwise out of the position shown in Fig. 1, the contact end 68 comes into the range of a projection 72 of the closure trigger 12, which is, together with the rest of the closure parts, connected with the mass pole. Thus, when the tension ring 12 runs down, the circuit is closed. The above-mentioned farther swinging of the lever 58 is enabled by a recess 74 in the lower edge 64 of the setting ring 48, into which the end 62 of the lever is able to enter at a particular position of the setting ring 48, 50.

In the event that under employment of the X lamp class, the contact arrangement 28, 32 does not close the circuit prematurely, there is provided a suitable safety provision. The latter consists in that, in setting the stroke mark 56 at a mark X of the time setting ring 16, the control range *x* of the guide cam 42 collaborates with and swings the contact lever 28, 38, 40 in such a way that it is unable to reach the contact pin 32 until after the circuit has been closed by the other contact arrangement 68, 72.

Of course, the control system could also be arranged in such a way as to enable the employment of flashlights both with and without illumination retardation with a single contact arrangement. Finally, it should also be noted that the division of the control range could occur not only according to the lamp classes but also according to other viewpoints, for example, according to the peak time of the flashlights.

While I have described my invention in cer-

tain preferred embodiments, I realize that modifications may be made and I desire that it be understood that no limitations are intended other than may be imposed by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. In a photographic objective closure, in combination, a photographic shutter, time setting means on said shutter permitting the setting thereof at different exposure times, a flashlight-contact arrangement and a flashlight-synchronizer mechanism built in said shutter, said contact arrangement being closed by a part of said flashlight-synchronizer mechanism in set pre-ignition time with respect to the opening of said shutter for taking into account respective flashlight delays of different flashlamps, a cam member adjustably mounted in said shutter and cooperating with said contact arrangement for setting the latter in various pre-ignition times, said cam member having a plurality of control ranges thereon deviating from each other for the purpose of taking into account different flashlight delays of different flashlamps, and disengageable coupling means arranged between said time setting means and said cam member for positioning a selected one of said control ranges on said cam member in selective relationship to

said contact arrangement and to said time setting means and for moving said member in proportion to the movement of said time setting means, whereby the setting of said contact arrangement in various pre-ignition times occurs at each flashlamp in the selected relationship automatically with the time setting of said shutter.

2. A photographic objective closure as set forth in claim 1, in which said coupling means is provided with snap springs arranged in said time setting ring and engageable in distributed rests in said cam member.

3. A photographic objective closure as set forth in claim 1, which includes a second contact arrangement for flashlamps without flashlight delay, said cam member being provided with an additional control range for setting said first contact arrangement proportionally to the setting of said second contact arrangement.

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