

- [54] **CAMERA WITH REMOVEABLE HANDLE**
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 June 30, 1970 Austria 5892/70

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 95/11 V, 95/42, 88/1.5 R
 [51] Int. Cl. G03b 17/56, G03b 17/20
 [58] Field of Search 352/243, 242, 34, 171;
 95/11 R, 11 V, 86, 42; 88/1.5 R, 1.5 NR

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[57] **ABSTRACT**

A camera housing has a top and a bottom defining vertical limits a lens end and a rear end opposite to said lens end. A viewfinder structure is carried by said camera housing. A handle is connected to said viewfinder structure. Guide means connect said handle to said rear end of said camera housing and permit of a movement of said handle relative to said camera housing between an inoperative position and an operative position. The handle is arranged to be within said vertical limits in both said positions.

27 Claims, 15 Drawing Figures

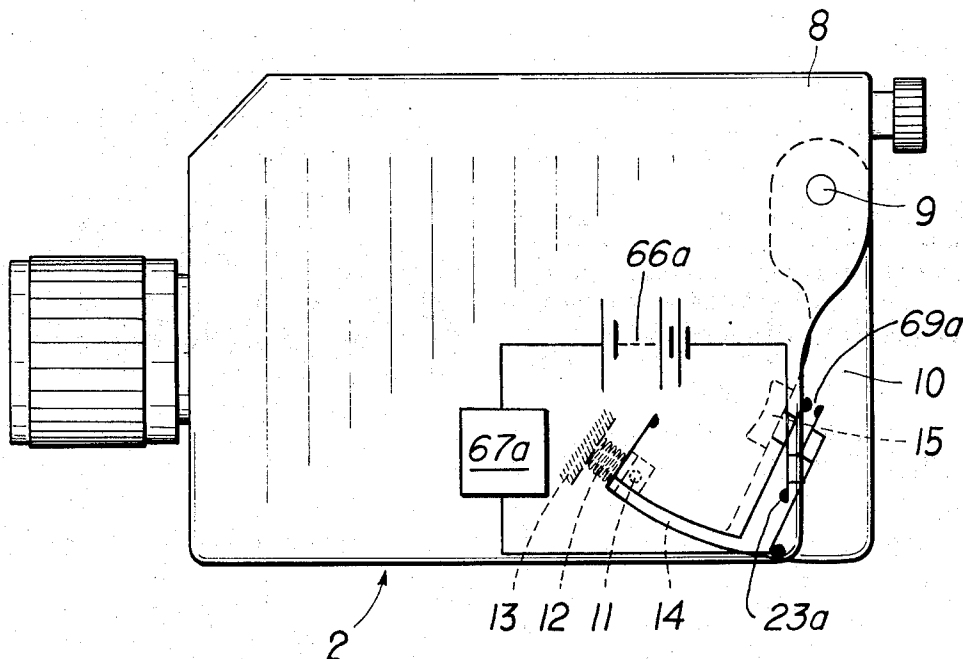


FIG. 1a

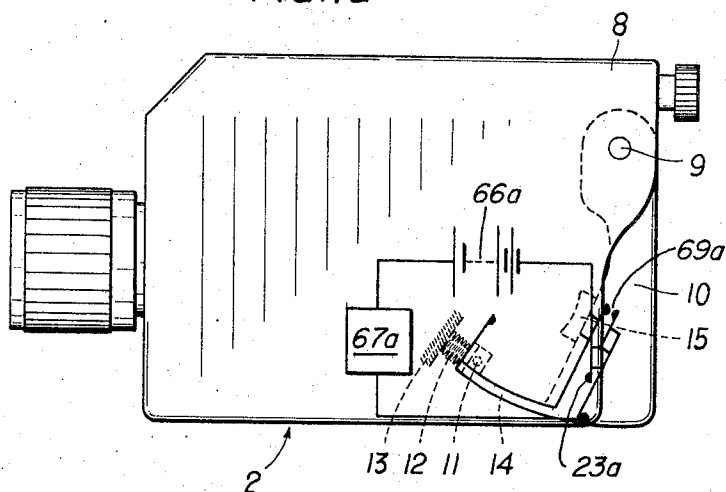
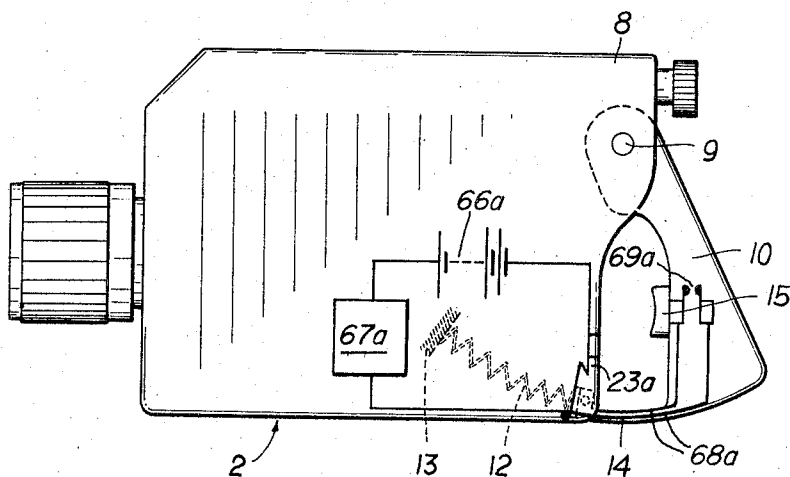


FIG. 1b



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FIG. 2a

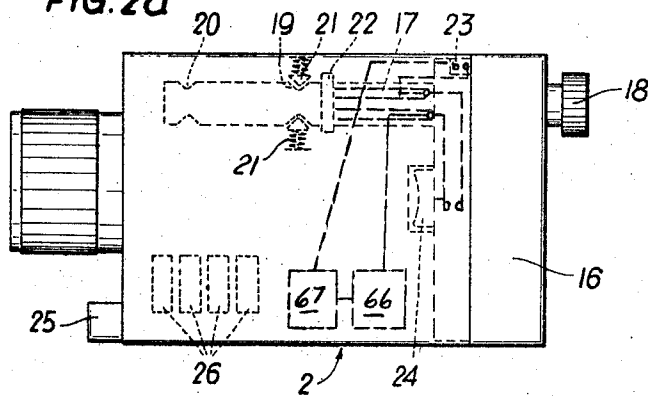


FIG. 2b

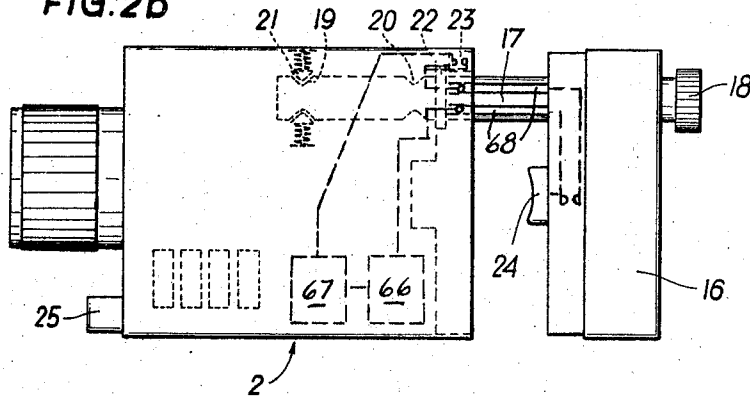
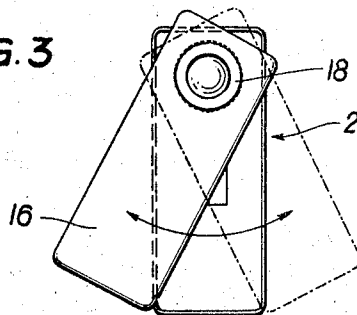


FIG. 3



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FIG. 4

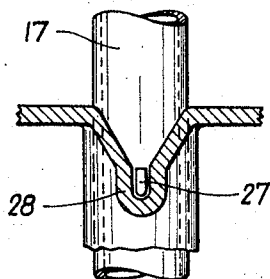


FIG. 6

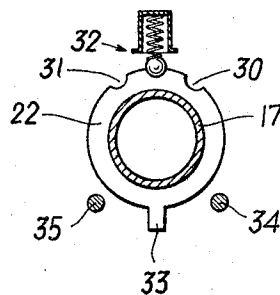
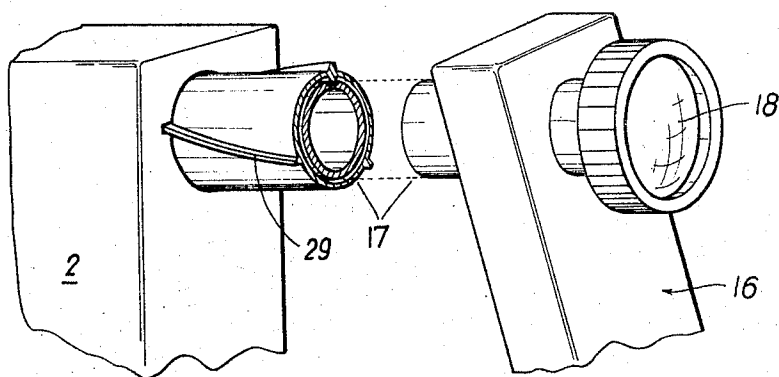


FIG. 5



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FIG. 7a

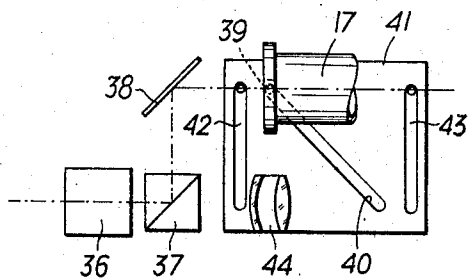


FIG. 7b

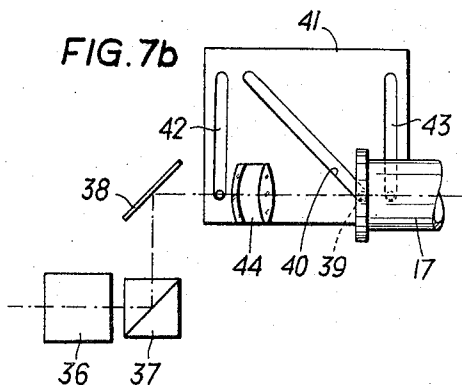


FIG. 8a

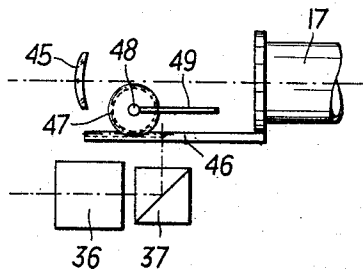


FIG. 8b

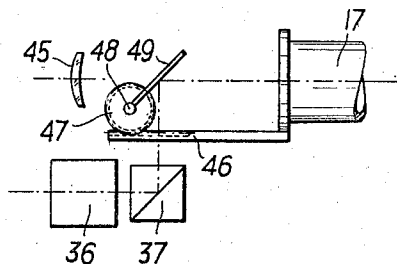


FIG. 9a

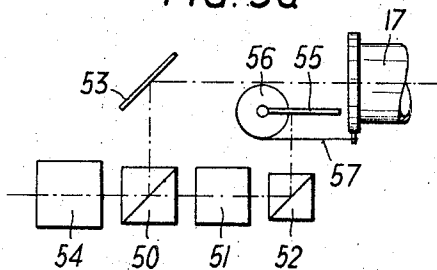


FIG. 9b

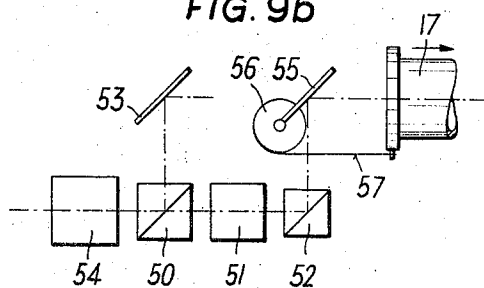
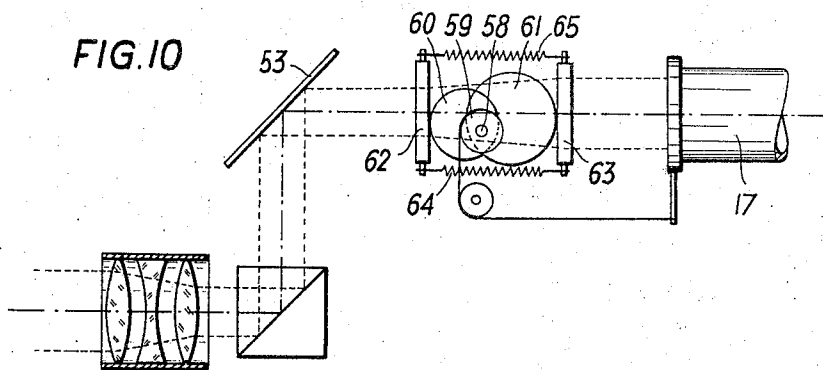


FIG. 10



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CAMERA WITH REMOVEABLE HANDLE

This invention relates to a camera which comprises a camera housing provided with a viewfinder. The camera also comprises a handle, which is connected to the housing and movable from an inoperative position to an operative position and carries a release member, if desired. That handle is conventionally secured to the underside of the camera to form a handle which is like that of a pistol and provides a relatively good support for the camera, particularly if the handle supports the camera under its center of gravity. In general, it is not sufficient for a steady holding of the camera to grip the latter only at the handle. Carrying means have been disclosed which must be secured to the camera and do not form a handy unit together with the camera. In most cases, a camera is held with both hands when shooting. Both hands must be used to operate the camera in any case when controls other than the release, such as the zooming knob, must be operated.

The invention is based on the recognition that under these circumstances it is much more favorable for the holding of the camera if the points where the camera is supported by the two hands of the user are spaced apart as far as possible. This is not possible with conventional cameras because, as has been mentioned, the handle which is like that of a pistol supports the camera in most cases under its center of gravity. The invention affords an improvement in that the handle is connected to the rear end of the camera, i.e., the end thereof which is opposite to the lens, and is connected to said rear end by guide means, preferably so as to be displaceable, and the handle extends within the boundaries which are defined by the top and bottom of the camera, and the rear end and handle are suitably arranged so that one of these parts is received by the other when the handle is in its inoperative position. Because the handle is connected to the rear end of the camera, the latter can be supported at two points which are widely spaced apart.

Within the scope of the invention the handle may be pivotally movable like a pistol grip-like handle about an axis which is approximately parallel to the optical axis of the camera. It is known to provide handles which are like those of pistols and connected to the forward end of the camera housing and pivotally movable about an axis which is parallel to the optical axis so that the handle in inoperative position covers the optical system of the camera. In other known cameras, the handle is pivoted on a pivot which is mounted at the bottom of the camera so that it is difficult to secure the camera to a stand. In these known cameras, virtually all controls which must be operated frequently, such as the zooming control, are also arranged adjacent to the front end of the camera housing so that the user cannot support the camera adjacent to its forward and rear ends.

Further details of the invention will become apparent from the following description of embodiments which are shown diagrammatically and by way of example in the drawing, in which

FIGS. 1a, 1b, and 2a, 2b are side elevations showing illustrative embodiments of the invention. The handle is shown in its inoperative position in FIGS. 1a and 2a and in its operative position in FIGS. 1b and 2b.

FIG. 3 shows the rear end of a camera provided with a handle which is pivoted on the viewfinder axis.

FIGS. 4, 5, and 6 show illustrative embodiments of pivotal mountings.

FIGS. 7a to 10 show various embodiments of viewfinders for a camera according to the invention. The handle is not shown and is assumed to be in its inoperative position in FIGS. 7a, 8a, and 9a and in its operative position in FIGS. 7b, 8b, and 9b.

In the embodiment shown in FIGS. 1a, 1b, a handle 10 is pivoted to the camera 2 below the viewfinder hood 8 on a pivot 9 which is transverse to the viewfinder axis. In its inoperative position, shown in FIG. 1a, the handle 10 is locked against the action of a spring 12 by a detent member 11, which is diagrammatically indicated and can be released from the outside by means of a pushbutton. The spring 12 bears at one end on a surface 13 inside the camera housing and at its other end on a stirrup 14, which is connected to the handle 10. The stirrup 14 is preferably arcuate and the radius of the arc equals the distance of the stirrup 14 from the pivot 9. The stirrup 14 assists the holding of the handle 10 in its operative position. In its inoperative position, the handle 10 is partly received by the housing of the camera 2. Alternatively, the handle 10 could be adapted to surround the camera housing. As is apparent from FIG. 1b, the handle 10 carries a release button 15 for operating, e.g., an electric switch 69a. The electric connection between the switching parts of the handle 10 and the camera 2 may be provided by means of wiping contacts 68a adjacent to the pivot 9 or stirrup 14 and, if desired, through a hollow stirrup 14. Similar to FIGS. 2a, 2b, when the handle 10 is pulled out to its operative position, a main switch 23a is closed. The main switch 23a is automatically opened when the handle 10 is pivoted to its inoperative position so that the consumption of a power source, e.g., a battery 66a for camera operating means 67a is reduced.

FIGS. 2a, 2b show a preferred embodiment of the invention provided with a displaceable handle. The guide means between the camera 2 and a handle 16 consist of a slidable viewfinder hood 17, which is connected to the handle 16. The eyepiece 18 of the viewfinder of the camera is secured to the displaceable handle 16. The extensible viewfinder hood is provided at two points of its length with respective pairs of opposite detent notches 19, 20, which cooperate with mating detent members 21, which are mounted in the camera. These detent means enable a locking of the handle 16 in its operative and inoperative positions. The viewfinder hood 17 is provided with a collar 22, which closes a diagrammatically indicated main switch 23 for the camera when the handle is moved to its operative position. The main switch 23 is automatically opened when the handle 16 is displaced to its inoperative position so that the consumption of a power source, e.g., a battery 66 for camera operating means 67 is reduced. These batteries 66 may be accommodated in the camera housing or in the handle 16. The main switch 23 may also be adapted to be closed from the outside by a pushbutton, not shown, so that the user of the camera while looking through the viewfinder eyepiece 18 can operate the exposure control when the handle 16 is in its inoperative position. The user may then find out whether or not the scene is sufficiently illuminated for a shot. Upon release of said pushbutton, the main switch will be opened immediately so that the main switch 23 cannot be left closed unintendedly. The handle 16 is provided with a release button 24, which in the inoperative posi-

tion of the handle is covered by those housing parts of the camera 2 which overlie the handle 16.

Additional controls 25 are provided in the lower portion of the forward end of the camera. Pushbutton controls 26 may also be provided on that side of the camera which is remote from the viewer in FIGS. 2a, 2b, and these pushbuttons 26 are operable by the four fingers of a left hand which has grasped the camera. The electrical connection between the release button 24 and the camera 2 may comprise conducting slideways 68 provided on the extensible part 17 of the viewfinder hood or a stirrup which is similar to the stirrup 14 of FIG. 1 and provided on the underside of the handle 16.

Particularly in an embodiment such as that shown in FIG. 2 in which the handle 16 is connected to the camera by the viewfinder hood, it has proved desirable to arrange the handle in such a manner that it is pivotally movable in its operative position to a position in which it extends at an angle to the position in which the handle is aligned with the camera body. FIG. 3 shows such pivoted handle 16. Solid lines indicate a pivotal movement of the handle which is suitable for left-handed users and dash-dot lines indicate the pivotal movement of the handle 16 for right-handed users. Such pivotal movement may be effected in that the extensible part 17 of the viewfinder hood has a circular cross-section in that portion which is still contained in the camera housing when the handle 16 is in its operative position, whereas the remainder of the part 17 differs from a circle in cross-section. For instance, the part 17 of the viewfinder hood may have a polygonal cross-section in its exposable portion whereas that portion which is contained in the camera housing when the handle is in its operative position has in cross-section the shape of a circle inscribed into the polygon. This polygonal cross-section holds the handle against rotation whereas the circular cross-section permits of such rotation. When the handle is pushed back to its inoperative position, it should be moved to its aligned position. To enable this movement and to facilitate the pushing-in of the handle, the different cross-sectional shapes of the extensible part of the viewfinder and/or the housing part which receives said extensible part preferably merge smoothly one into the other.

An embodiment which is similar to the one just described is shown in FIG. 4. In this embodiment, the part 17 of the viewfinder hood is provided with a projection 27 at its upper and/or lower portion. This projection 27 cooperates with a housing wall 28 of the camera, which housing wall flares outwardly like a funnel. When the handle has been pushed to its inoperative position, the projection 27 is disposed within the constriction formed by the wall 28. When the handle 16 is pulled to its operative position, the projection 27 enters the enlarged space enclosed by the wall 28 so that the handle 16 is pivotally movable within the limits defined by the wall 28.

A different mounting for a handle as shown in FIG. 3 is illustrated in FIG. 5. The extensible part 17 of the viewfinder comprises a coarse screw thread 29, which positively imparts a pivotal movement to the handle 16 so as it is pulled out. This arrangement has the advantage that the handle 16 is locked in its inclined position without need for separate means. The arrangement has the disadvantage that each camera 2 is suitable only for right-handed or left-handed users, depending on the use of a right-handed or left-handed screw thread. For this

reason, the screw thread 29 is suitably detachably secured to the part 17 of the viewfinder hood so that it can be replaced.

It has already been mentioned that it is desirable to lock the handle 16 in its inclined position. In embodiments such as shown in FIG. 4 or the like, this locking may be effected by the means shown in FIG. 6. The collar 22 (see FIG. 2) is provided with detent notches 30, 31, which correspond to the two angularly spaced positions of the handle 16 and which in the illustrative embodiment shown cooperate with a ball detent 32. The collar 22 may be provided with an extension 33, which bears on stops 34 or 35 fixed to the camera when the handle 16 is in its inclined position.

Two arrangements may be used if the viewfinder eyepiece is carried by the adjustable handle itself. The arrangement may be such that the view through the viewfinder is blocked when the handle is in its inoperative position. Alternatively, means may be provided which adjust the image seen in the viewfinder in dependence on the position of the handle. The first arrangement may be particularly easily adopted in an embodiment like that of FIG. 1. In that case, the eyepiece of the viewfinder 8 would be inclined when the handle 16 is in its inoperative position so that the viewfinder image is dimmed. In an embodiment like that of FIG. 2, shutter blades for shutting out the viewfinder image may be provided. Alternatively, it may be desirable to view an object even when the handle is in its inoperative position. In this case the optical system of the viewfinder suitably comprises an optical element which is connected to the handle and adjusted by the movement thereof. Such an arrangement is shown by way of example in FIGS. 7a and 7b, in which only a portion of the extensible viewfinder hood 17 is shown in two different positions in addition to the optical system of the viewfinder and the associated mechanism. The optical system of the viewfinder is a reflex viewfinder. The light coming from a diagrammatically indicated camera lens 36 is directed by a beam-splitting prism 37 to a stationary mirror 38, which deflects the beam into the viewfinder hood 17. To compensate the displacement imparted to the viewfinder hood 17 by a movement of the handle from its inoperative position to its operative position, the viewfinder hood 17 carries a guide pin 39, which extends into an inclined slot 40 formed in a plate, which is guided by pin-slot guides 42, 43 along a straight line. A compensating optical system 44 is secured to the plate 41 and in the embodiment shown by way of example consists of two lenses. In the position shown in FIG. 7a, which corresponds to the inoperative position of the handle, this compensating optical system 44 is disposed outside the light paths of the camera and of the viewfinder. During a displacement of the viewfinder hood 17, the inclined slot 40 causes the plate 41 to be raised so that the compensating optical system 44 enters the path of light of the viewfinder to compensate the increase of the length of said light path.

Another desirable embodiment is shown in FIGS. 8a, 8b. Because a small parallax is hardly significant when an object is merely roughly viewed through the viewfinder, a view through a diagrammatically indicated direct-vision finder lens 45 may be opened when the viewfinder hood 17 is in its inoperative position shown in FIG. 8a. The viewfinder hood 17 is connected to a rack 46, which is in mesh with a pinion 47. A mirror 49 is pivotally movable with the pinion 47 and connected

to the shaft 48 thereof. When the handle and viewfinder hood 17 are in their inoperative position, the mirror 49 opens the view through the direct-vision finder lens 45. When the handle is moved to its operative position, shown in FIG. 7b, the displacement of the viewfinder hood 17 and of the rack 46 imparts to the mirror 49 a pivotal movement so that the view through the viewfinder lens 45 is blocked whereas the beam from the lens 36 is deflected into the viewfinder hood 17.

Alternatively, the displacement of the viewfinder hood 17 may be compensated by two beam splitters. A first beam splitter 50 is disposed behind a supplementary lens 54, and a second beam splitter 52 is disposed behind a main lens 51. When the handle is in its inoperative position, shown in FIG. 9a, the beam coming from the first beam splitter 50 is deflected into the viewfinder hood 17 by a mirror 53, which is fixed to the camera, whereas the beam coming from the second beam splitter 52 is blocked by a pivoted mirror 55, which is similar to the mirror 49. The mirror 55 is connected to a string drum 56, to which one end of a tension string 57 is secured. The other end of the string is secured to the extensible part 17 of the viewfinder hood. A spring, not shown, tends to rotate the drum 56 in the clockwise sense. During a displacement of the part 17 of the viewfinder, the mirror 55 is moved to its inclined position shown in FIG. 9b. In this position, the mirror 55 blocks the beam coming from the first beam splitter 50 and deflects the beam coming from the second beam splitter 52 into the viewfinder hood 17.

According to FIG. 10, differences between the lengths of the light path in the optical system of the viewfinder may be compensated by the provision of an afocal means in the optical system of the viewfinder. Because the light rays entering the viewfinder hood 17 are substantially parallel, they will not be affected by a displacement of the viewfinder hood 17 and of the eyepiece, which is not shown. Care must only be taken to compensate any changes in focal length. This may be accomplished by the provision of a common shaft, to which a string drum 59 and two camwheels 60, 61 are secured. The string drum is similar to the string drum 56 shown in FIG. 9. and connected to the viewfinder hood 17. Each of the camwheels 60, 61 controls a displaceable optical element 62, 63. The two optical elements 62, 63 are held in engagement with the camwheels 60, 61 by at least two tension springs 64, 65.

Numerous embodiments are possible within the scope of the invention. For instance, the above-mentioned shutter for blocking the path of light of the viewfinder when the handle is in its inoperative position could be operable like the mirror 49 or 55. Besides, the eyepiece of the viewfinder may be operatively connected to the handle so that it is retracted when the handle is in its inoperative position and is moved to an operative position together with the handle. such a camera may have a particularly simple shape, e.g., a prismatic shape, in its inoperative position or when carried in a carrying case.

What is claimed is:

1. A camera, which comprises

a camera housing having a top and a bottom defining vertical limits, a lens end, and a rear end opposite to said lens end,
a viewfinder structure carried by said camera housing,

a handle connected to said viewfinder structure, said handle being displaceable relative to said camera housing,

guide means connecting said handle to said rear end of said camera housing and permitting of a movement of said handle relative to said camera housing between an inoperative position and an operative position, and

a viewfinder eyepiece carried by said handle, said viewfinder structure comprising a viewfinder hood forming at least part of said guide means and having an extensible part, and said handle being arranged to be within said vertical limits in both said positions.

2. A camera as set forth in claim 1, in which said rear end and said handle are arranged to be received one in the other when said handle is in said inoperative position.

3. A camera as set forth in claim 1, in which said handle in its inoperative position is pivotally movable about a pivotal axis at least through a limited angular range, and said viewfinder structure comprises a viewfinder hood defining an axis which coincides with said pivotal axis.

4. A camera as set forth in claim 1, in which said extensible part has a non-circular cross-section at least in part of its length.

5. A camera as set forth in claim 1, in which said extensible part is provided with a coarse screw thread.

6. A camera as set forth in claim 1, in which said screw thread is detachably connected to said extensible part to permit of a selective use of right-handed and left-handed screw threads.

7. A camera as set forth in claim 1, in which said extensible part is arranged to be extended out of said camera housing in response to a movement of said handle from its inoperative position to its operative position and comprises a portion which is circular in cross-section and arranged to be disposed in said camera housing when said handle is in said operative position whereas the remaining portion of said extensible part is non-circular in cross-section.

8. A camera as set forth in claim 7, in which said two portions of said extensible part smoothly merge one into the other.

9. A camera as set forth in claim 7, in which said camera housing has portions which respectively mate with said portions of said extensible part and which smoothly merge one into the other.

10. A camera as set forth in claim 1, which comprises a viewfinder optical system having an optical element which is operatively connected to said handle to be movable in response to a movement of said handle.

11. A camera as set forth in claim 10, in which said viewfinder optical system defines a light path and said optical element comprises a deflecting mirror disposed in said light path.

12. A camera as set forth in claim 11, in which a camera lens is carried by said housing and included in said light path, said viewfinder optical system comprises a reflex section and a direct-vision section, and said mirror is arranged to expose said direct-vision section to light from said camera lens when said handle is in its inoperative position and to deflect

light from said camera lens into said reflex section when said handle is in its operative position.

13. A camera as set forth in claim 11, which comprises

a first beam splitter arranged to direct light into said optical system when said handle is in its operative position and

a second beam splitter arranged to direct light into said optical system when said handle is in its inoperative position.

14. A camera as set forth in claim 10, in which said viewfinder optical system defines a light path and is arranged to change the length of said light path in response to a movement of said handle, and said viewfinder optical system comprises an afocal element included in said light path.

15. A camera as set forth in claim 10, in which said viewfinder optical system defines a light path and

additional optical elements are provided which are arranged to be moved into and out of said light path in response to a movement of said handle.

16. A camera as set forth in claim 15, in which said additional optical elements comprise lens elements.

17. A camera as set forth in claim 15, in which said additional optical elements comprise prisms.

18. A camera as set forth in claim 1, which comprises spring means tending to move said handle to its operative position and

locking means adapted to lock said handle in its inoperative position against the action of said spring means.

19. A camera as set forth in claim 1, which comprises a power source,

electric circuitry for operating the camera, and a switch connected between said power source and said circuitry,

said handle being adapted to cooperate with said switch to close the same when said handle is in its operative position.

20. A camera as set forth in claim 1, which comprises first electric means carried by said handle, second electric means carried by said camera housing, and

contacting means connecting said first and second electric means regardless of the position of said handle and comprising wiping contacts and conducting slideways engaged by said wiping contacts.

21. A camera, which comprises a camera housing having a top and a bottom defining

vertical limits, a lens end, and a rear end opposite to said lens end,

a viewfinder structure carried by said camera housing,

a handle connected to said viewfinder structure, said handle having a first end portion pivoted to said rear end of said camera housing and a second end portion opposite to said first end portion,

a stirrup member being carried by said second end portion and movable into said camera housing, and a spring being interposed between said camera housing and said stirrup and tends to move said stirrup out of said camera housing.

22. A camera as set forth in claim 21, in which said handle is pivoted to said rear end of said housing on a pivotal axis and

said stirrup has an arcuate portion centered on said pivotal axis.

23. A camera as set forth in claim 21, in which said stirrup is hollow and encloses said spring.

24. The camera as set forth in claim 21, in which said rear end and said handle are arranged to be received one in the other when said handle is in an inoperative position.

25. The camera as set forth in claim 21, which comprises

spring means tending to move said handle to its operative position and

locking means adapted to lock said handle in its inoperative position against the action of said spring means.

26. The camera as set forth in claim 21, which comprises

a power source,

electric circuitry for operating the camera, and a switch connected between said power source and said circuitry,

said handle being adapted to cooperate with said switch to close the same when said handle is in its operative position.

27. The camera as set forth in claim 21, which comprises

first electric means carried by said handle,

second electric means carried by said camera housing, and

contacting means connecting said first and second electric means regardless of the position of said handle and comprising wiping contacts and conducting slideways engaged by said wiping contacts.

* * * * *