

"SHUTTER BASEPLATE STRUCTURE FOR A
CAMERA AND METHOD OF ASSEMBLY THEREOF"

This invention relates to shutter baseplate structures for cameras, and particularly focal plane shutter-type cameras, and to methods of assembly of such baseplate structures.

5 Japanese Utility Model Application No. 138990/1986 (Laid-Open Publication No. 63-45540) discloses a focal plane shutter-type camera with a shutter baseplate structure whose assembly involves the following procedural steps.

10 After a shutter driving lever and shutter controlling members, such as a shutter speed controlling electromagnet, are assembled on a shutter baseplate from the front surface thereof, a plate for covering them is secured by tightening screws. Subsequently, the shutter baseplate is reversed and a shutter blade unit,
15 including an opening sector and a closing sector, is assembled on the shutter baseplate from the other or rear surface thereof. Then a blade retaining plate for covering them is secured by tightening screws.

20 With such a shutter baseplate structure it is necessary, when the shutter is assembled, to perform assembly operations from both the front and rear surfaces of the shutter baseplate, so that there is a problem in that it is difficult to automate the assembling operation.

25 In addition, there has also been a problem in that as various members are fixed by tightening screws, quality is uncertain.

30 According to the invention, a shutter baseplate structure for a camera, comprises a baseplate with a shutter opening therethrough, on one side of

which baseplate a first chamber is formed to accommodate shutter blades and on the other side of which baseplate a second chamber is formed to accommodate shutter controlling members, the second chamber being open to the one side for the entry of shutter controlling members, and a closure plate member for the open entry of the second chamber to partition the first chamber from the second chamber.

According to another aspect of the invention, in a method of assembly of such a baseplate structure, the shutter controlling members are first inserted into the second chamber from the one side of the baseplate, then the closure plate member is inserted into the open entry of the second chamber from the one side of the baseplate and then the shutter blades are inserted into the first chamber from the one side of the baseplate.

Other aspects of the invention are defined in the appended claims.

In a camera thus constructed, when the closure plate member is assembled to the baseplate, the shutter controlling members are accommodated in the second chamber of the baseplate from the first chamber side, and then the closure plate ^{member} is assembled from the first chamber side, followed by the accommodation of the shutter blades in the first chamber. Thus, as the shutter controlling members and the shutter blades can be assembled to the baseplate from the same first chamber side, automation of the shutter assembling operation is facilitated.

In addition, as the shutter controlling members and the closure plate member can be resiliently assembled to and coupled with the baseplate ~~structure member~~, it is possible to stabilize quality without requiring torque control as experienced in tightening screws.

An embodiment of the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of a baseplate structure according to the invention, after assembly, as viewed from the other side thereof;

Figure 2 is a perspective view of the assembled baseplate structure member, as viewed from the one side thereof;

Figure 3 is an exploded perspective view of parts of the baseplate structure, illustrating the initial assembling shutter controlling members and a closure plate member; and

Figure 4 is an exploded perspective view illustrating the final assembling of the shutter blades.

In an embodiment of a focal plane shutter-type camera according to the present invention, a baseplate structure member 1 (Figure 1) includes a baseplate 1a, and a shutter opening 1b formed therein. A box-shaped member 1c forming a second chamber 1h (Figure 3) is formed on the side of a first surface of the baseplate structure member 1 (the upper surface in Figure 1) and various members constituting shutter controlling members, such as electromagnets, levers and the like, which will be described later, are accommodated in the second chamber formed by the box-shaped member 1c.

A flange 1d (Figure 2) is formed to rise from the sides of a second surface of the member 1 (the under surface in Figure 1) along peripheral portions (Figures 3 and 4) of the baseplate 1a of the baseplate structure member 1 to form a first chamber to accommodate various members, such as sector units (which will be described later) including shutter blades. The baseplate structure member 1 (Figures 1 and 2) thus assembled is mounted in a camera structure (not shown) by bolts or screws passing through mounting bores 1e.

The box-shaped member 1c (Figure 3) has, in the position shown, solid ends, apertured sides, a generally closed bottom and an open top. Standing upright from the bottom are two posts 1f and 1g of stepped and upwardly diminishing radius, which are intended respectively to pivotally support a shutter opening lever 2 and a shutter closing lever 3. Also upstanding from the bottom are several latches 1i and 1j, which are intended to retain electromagnets 11 and 12 within the second chamber 1h. Towards the top of the member 1c are two pegs 1k and 1l intended to receive rubber dampers

(not shown) to act as stops for the levers 2 and 3.

Also towards the top of the member 1c is a pivot pin 1m intended for a setting lever 10. A pair of latches 1n and 1o project up from the bottom of the member 1c at the side thereof remote from the shutter opening 1b and are intended to secure a closure plate 13 to the member 1c. The top of the member 1c at its ends has guide surfaces 1r intended for the corresponding ends of the plate 13. It is convenient for these parts to be made integral and, for example of plastics material.

In order to assemble the shutter controlling members, the shutter blades and the baseplate structure member 1, the baseplate 1a (Figures 3 and 4) is disposed with the second surface uppermost and the flange 1d rising upward. Then, knurled ratchets 6 and 7 for adjusting an opening lever spring 4 and a closing lever spring 5 (described below) are assembled by engagement on posts 1f and 1g, respectively and descend to the bottom of the member 1c. Subsequently, an electromagnet 11 having a coil and frame 11a, an iron core 11b, and an iron core spring 11c and adapted to co-operate with the opening lever 2 is assembled by lowering into the second chamber 1h in the member 1c from the upper side, and is resiliently retained in position by hooks of the latches 1i so as to prevent it from being displaced. In a similar manner, an electromagnet 12 having a coil and frame 12a, an iron core 12b, and an iron core spring 12c and adapted to co-operate with the closing lever 3 is assembled by lowering into the second chamber 1h in the member 1c, where it is resiliently retained by hooks of the latches 1j.

To serve as stops for the opening lever 2 and the closing lever 3, rubber dampers (not shown) are assembled onto pegs 1k and 1l.

The shutter opening lever 2 has a main plate with an upstanding sector driving pin 2a, a depending sleeve 2b, and a depending core 2c intended to be attracted by the electromagnet 11. The shutter closing lever 3 has a main plate with an upstanding sector driving pin 3a, a depending sleeve 3b and a depending core 3c intended to be attracted by the electromagnet 12.

After the opening spring 4 is assembled up on the sleeve 2b of the opening lever 2, the sleeve 2b is fitted on the post 1f and the lever 2 is lowered into position within the chamber 1h and the end of the spring 4 is engaged by the ratchet 6. In a similar manner, the closing spring 5 is assembled onto the sleeve 3b of the closing lever 3, the sleeve 3b is fitted on the post 1g, and the lever is lowered into the chamber 1h where the end of the spring 5 is engaged by the ratchet 7.

Next, the set lever 10 which is for setting the opening lever 2 and the closing lever 3 in their initial positions is assembled on the pivot pin 1m. The closure plate 13 has a main plate 13a shaped to form the top of the chamber 1h of the member 1c, leaving arcuate sectors for the pins 2a and 3a of the levers 2 and 3 and for a pin on the setting lever 10 (Figure 4). The main plate 13a has a flange 13d which depends on one side and upstands to correspond with the flange 1d. Pivot pins 13b for the shutter sectors project up from the main plate 13a. Then the closure plate 13 is assembled from above by being guided by the tops of the opening lever post 1f, the closing lever post 1g and the pivot pin 1m which engage in complementary recesses in the lower surface of the plate 13a, and by sliding contact between the guide surfaces 1r of the baseplate structure member 1 and guide surfaces 13c at either end of the plate 13a. The thus assembled closure plate 13 is coupled to the

member 1c by being resiliently retained by hooks of the latches 1n and 10, so as to prevent the same from coming off. The main plate 13a of the closure plate 13 is disposed so as to partition the first chamber 1p within the flange 1d of the baseplate structure member 1 and the second chamber 1h within the box-shaped member 1c, the upstanding portion of the flange 13d continuing the flange 1d around the chamber 1p (Figure 4).

After the various shutter controlling members and the closure plate 13 are assembled in the baseplate structure member 1 from the upper or first chamber 1p side, an opening sector unit 14 (Figure 4) comprising a plurality of shutter blades is accommodated in the first chamber 1p with a bore 14a in each blade engaged upon one of the pivot pins 13b of the main plate 13a and a bore 14b in one of the blades of the opening sector unit 14 fitted on the sector driving pin 2a of the opening lever 2. A spacer plate 16 with a central opening is then fitted to the baseplate structure member 1 to separate the shutter blades of the opening sector unit 14 and those of a closing sector unit 15 so that the shutter blades thereof will not collide against each other. Then, the closing sector unit 15 comprising a plurality of shutter blades is accommodated so as to clamp the spacer plate 16, and a bore 15a in each blade of the closing sector unit 15 is fitted on one of the pivot pins 13b of the closure plate 13 and a bore 15b in one blade of the closing sector unit 15 is fitted on the sector driving pin 3a of the closing lever 3.

A light-sealing spacer blade 17 is fitted on pegs on the baseplate 1a on the side remote from the box-shaped member 1c. Then the blade retaining plate 18 for closing the first chamber 1p from the outside is

attached to an outermost surface layer portion of the flange 1d by means of hooks 1q so as to clamp the spacer blade 17 to prevent leakage of light and serving as a sector guide for the closing sector unit 15, thereby completing the assembly. The plate 18 has a shutter opening 18a similar to those in the plate 16 and in the base plate 1a. Because the exposure operation using these focal plane shutter-type sector units is well known, description thereof is omitted.

It will be understood that, although in the above-described embodiment various parts such as the posts, pegs, pivot pins and latches are arranged integrally with the base plate structure member, they may be fabricated from metal or the like and pressure fit to form a unitary whole or fixed by adhesive or the like.

Because the shutter controlling members and the shutter blades can be assembled upon the baseplate structure member from the same first chamber side, automation of the assembly operation of the shutter section of the camera is facilitated.

In addition, as the shutter controlling members and the lower structure member are resiliently assembled to and coupled with the baseplate structure member (with a snap action of the hooked latches), it is possible to stabilize the quality without requiring torque control as experienced with conventional thread tightening.

In addition, because the peripheral portions of the baseplate structure member are surrounded by flanges and covered by the closure plate and the blade retaining plate after assembly of the shutter controlling members, the shutter blades and the like, the possibility of oil attaching to the shutter controlling members, the shutter blades and the like from the outside is reduced or eliminated.

Furthermore, as the various upstanding posts, pins and pegs on the baseplate structure member are smoothly fitted into the recesses in the closure plate 13a while the latter is being guided through sliding contact between the guide surfaces 13c and the guide surfaces 1r of the baseplate structure member, the cases where the upstanding parts fail on assembly are fewer and their positions can be stabilized.



CLAIMS

1. A shutter baseplate structure for a camera, comprising a baseplate with a shutter opening therethrough, on one side of which baseplate a first chamber is formed to accommodate shutter blades and on the other side of which baseplate a second chamber is formed to accommodate shutter controlling members, the second chamber being open to the one side for the entry of shutter controlling members, and a closure plate member for the open entry of the second chamber to partition the first chamber from the second chamber.

2. A baseplate structure as claimed in claim 1, in which the closure plate member has recesses on the other side thereof to receive the one side ends of mounting members for shutter controlling members in the second chamber.

3. A baseplate structure as claimed in claim 1 or 2 in which the closure plate member has pins projecting on the one side thereof to act as pivots for shutter blades in the first chamber.

4. A baseplate structure as claimed in any preceding claim, in which the baseplate has a flange on three edges partially to surround and define the first chamber, and the closure plate member has a flange on one edge thereof to complete the definition of the first chamber.

5. A baseplate structure as claimed in claim 4, in which the closure plate member flange extends on the other side of the closure plate member to form part of the enclosure of the second chamber.

6. A baseplate structure as claimed in any preceding claim, in which the closure plate member has



cutaway portions through which shutter controlling members can project from the second chamber into the first chamber to engage shutter blades therein.

5 7. A baseplate structure as claimed in any preceding claim, in which the second chamber contains latches by which the closure plate member may be resiliently attached thereto.

10 8. A shutter baseplate structure for a focal plane shutter-type camera, substantially as hereinbefore particularly described with reference to the accompanying drawings.

15 9. A method of assembly of a baseplate structure as claimed in any preceding claim, in which the shutter controlling members are first inserted into the second chamber from the one side of the baseplate, then the closure plate member is inserted into the open entry of the second chamber from the one side of the baseplate and then the shutter blades are inserted into the first chamber from the one side of the baseplate.

20 10. A method as claimed in claim 9, in which the shutter controlling members and the closure plate member are resiliently latched into position.

25 11. A method of assembly of a shutter baseplate structure for a focal plane shutter-type camera, substantially as hereinbefore particularly described with reference to the accompanying drawings.

12. A focal plane shutter type camera including a shutter baseplate structure as claimed in any of claims 1 to 8.

30 13. A focal plane shutter-type camera including a shutter baseplate structure assembled by a method as claimed in any of claims 9 to 11.
