

PATENT SPECIFICATION (11)

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DRAWINGS ATTACHED

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- (21) Application No. 1929/71 (22) Filed 14 Jan. 1971 (19)
 (31) Convention Application No. A313 (32) Filed 14 Jan. 1970 in
 (33) Austria (OE)
 (44) Complete Specification published 21 March 1973
 (51) International Classification G03B 21/10 21/28
 (52) Index at acceptance
 G2A 41C1 41D



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(54) APPARATUS FOR USE IN PROJECTION

(71) We, KARL VOCKENHUBER, of 118, Potzleinsdorferstrasse, Vienna 18, and RAIMUND HAUSER, of 2, Goldegg-Gasse, Vienna 4, both Austria, both Austrian
 5 Nationality, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to an apparatus for use in projection.

Numerous apparatuses for use in projection, particularly projectors, are known which are in a carrying case and comprise
 15 a cover, which is hinged to the case body and to which a mirror is secured, which is moved to an operative position as the cover is opened. These apparatuses in which the mirror is fixed directly to the cover have
 20 the disadvantage that the cover which carries the mirror has an oblique position for use and for this reason has to be relatively larger for a relatively small picture. Whereas a projector is known which is accommodated in a carrying case and has a cover
 25 that is substantially vertical in position for use, a mirror which is adjustably connected to the cover, and a back-lighted screen which is connected to the cover, and this mirror and screen can be about the same size as
 30 the cover, that projector comprises a large number of parts which support and carry the adjustable mirror and the back-lighted screen. German Patent Specification No.
 35 718,642 shows an apparatus which is of the kind described first hereinbefore, but has the disadvantage that the connecting member consists of a stand, which is composed of
 40 a plurality of sections fitted one into the other. That stand had to be assembled when the arrangement had to be changed from its transport condition to its condition for use in a complicated manipulation.

45 An object of this invention is to alleviate at least one of the described disadvantages.

According to this invention there is provided a portable picture projection apparatus comprising a carrying case containing a projector, said carrying case having an open
 50 body portion arranged to be closed by a

cover connected to the body portion by a guide mechanism for guiding movement of the cover from a case-closed position in which said cover closes the body portion and the interface between them lies substantially
 55 in a plane to at least one operating position at which the cover is displaced bodily from the body portion and only connected therewith by the guide mechanism, a mirror being fixed rigidly to the inside surface of the cover
 60 so as to be parallel thereto and a device being provided to hold the cover in its operating position with respect to the body portion from which it is displaced.

65 Preferably the mechanism comprises a link pivoted to the cover and to the body portion, the cover rotating during its movement from a closed position to its operating position about an imaginary axis which extends
 70 parallel to the plane of the interface extending between the body portion and the cover when the cover is closed.

75 Suitably the mechanism comprises a link hinged at one end to the cover and at the other end to the body portion and which guides movement of the cover parallel to
 80 itself when moving from the closed position.

Preferably a back-lighted screen is secured to said cover.

85 In this apparatus the cover of the case does not have to be very much larger than the size of the mirror and of any back-lighted screen. In a preferred embodiment of the invention, the height of the screen is substantially as large as the width of the
 90 interior of the cover. It is not essential to provide a back-lighted screen because the arrangement according to the invention may also be used for overhead projection.

95 An embodiment of the invention will now be described in more detail by way of example only with reference to the accompanying drawings in which:—

100 Figures 1 to 3 are diagrammatic views showing an apparatus according to the invention in different conditions,

Figure 1 showing the apparatus in closed condition,

Figure 2 showing the apparatus in an intermediate condition, and

Figure 3 showing the apparatus in an open condition.

Figure 4 is an elevation showing the arrangement viewed in the direction of the arrow IV in Figure 3.

Figure 5 corresponds substantially to Figure 1 and shows the apparatus in side elevation.

Figure 6 shows the opened apparatus in side elevation in the position of Figure 3.

Figure 7 shows the apparatus in side elevation in another position in which the cover of the case is entirely open.

The apparatus for use in projection comprises a carrying case 1, to which a cover 2 is secured and a projector (not shown) arranged within the carrying case body. The projector may be a "substandard" motion picture projector. The cover 2 carries on its inside a mirror 3. A back-lighted screen 4 is hinged to that side of the cover 2 which is on top when the cover is open. Hinged side elements 5, 6 define together with the back-lighted screen 4, the mirror 3 and the cover 2 an enclosed light path when the cover 2 is open. It will be understood that the side elements 5, 6 may be replaced by bellows. Instead of being hinged on the axes 5a, 6a, the side parts 5, 6 might be pivoted like fan blades.

In addition to the deflecting mirror 3, there is a hinged mirror 7, which swings against a stop 7a, (Figure 6) e.g., under spring force, in response to the opening of the cover 2. The light from the projector inside the case body is thrown by this hinged mirror 7 onto the deflecting mirror 3 and by the latter onto the back-lighted screen 4. The apparatus might also be used for overhead projection; in this case the deflecting mirror 3 would throw the light from the projector in the case onto a front-lighted screen.

The cover 2 is provided at its lower end with a hinge 8, which is secured to a connecting member 9, which is connected to the case body 1 by a hinge 10. The connecting member 9 has an aperture 11. A locking member 13 snaps into the aperture 11 under the action of a spring 12 when the cover 2 is closed. The locking member is operable from the outside by a handle 17. When the locking member 13 has been retracted against the force of the spring 12, a spring 18 engaging an extension 14 of the connecting member 9 lifts the latter in the sense of the arrow *a* so that the cover 2 of the case is moved to the position shown in Figure 2. A link 15 is pivoted to the cover of the case and provided with a pin 16, which extends through an opening 19 in the connecting member 9. The opening 19 is formed with two detent indentations 20, 21.

When the cover 2 of the case has reached the position shown in Figure 2, it can be

raised as indicated by the arrow *b* (Figure 6) so that the pin 16 falls into the detent indentation 20. The resulting position of the cover 2 corresponds to an imaginary pivotal axis P (Figures 3, 6), which results from the hinges 8 and 10 and is spaced outwardly from the case body. When the cover is in the position shown in Figures 3 and 6, the back-lighted screen 4 and the side elements 5, 6 may be swung out, particularly under the action of springs 22, 23 and, if desired, after locking members, not shown, have been opened. In this position, the arrangement is ready for operation.

In a further mode of operation, the cover 2 of the case may be entirely opened from the position shown in Figure 6 so that the cover reaches the position shown in Figure 7. In this case the pin 16 enters the detent indentation 21 to lock the cover of the case, whereas the back-lighted screen 4 and the side elements 5, 6 remain in their inner position. One of the side walls 24 of the case body 1 may now be placed on a support and light from the projector in the case falls directly on the hinged mirror 7, which reflects the light onto a front-lighted screen.

Numerous embodiments of the invention are possible. For instance, the hinged mirror 7 might be operated by the connecting member 9 or its extension 14 and could be connected to means for actuating a safety switch or the like means for effecting a disconnection from the power source when the cover is closed so that a projector accommodated in the described apparatus embodying the invention cannot remain inadvertently energized when the cover of the apparatus is closed.

WHAT WE CLAIM IS:—

1. Portable picture projection apparatus comprising a carrying case containing a projector, said carrying case having an open body portion arranged to be closed by a cover connected to the body portion by a guide mechanism for guiding movement of the cover from a case-closed position in which said cover closes the body portion and the interface between them lies substantially in a plane, to at least one operating position at which the cover is displaced bodily from the body portion and only connected therewith by the guide mechanism, a mirror being fixed rigidly to the inside surface of the cover so as to be parallel thereto and a device being provided to hold the cover in its operating position with respect to the body portion from which it is displaced.

2. Apparatus as claimed in claim 1, in which the mechanism comprises a link pivoted to the cover and to the body portion, the cover rotating during its movement

Figure 3 showing the apparatus in an open condition.

Figure 4 is an elevation showing the arrangement viewed in the direction of the arrow IV in Figure 3.

Figure 5 corresponds substantially to Figure 1 and shows the apparatus in side elevation.

Figure 6 shows the opened apparatus in side elevation in the position of Figure 3.

Figure 7 shows the apparatus in side elevation in another position in which the cover of the case is entirely open.

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In addition to the deflecting mirror 3, there is a hinged mirror 7, which swings against a stop 7a, (Figure 6) e.g., under spring force, in response to the opening of the cover 2. The light from the projector inside the case body is thrown by this hinged mirror 7 onto the deflecting mirror 3 and by the latter onto the back-lighted screen 4. The apparatus might also be used for overhead projection; in this case the deflecting mirror 3 would throw the light from the projector in the case onto a front-lighted screen.

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Numerous embodiments of the invention are possible. For instance, the hinged mirror 7 might be operated by the connecting member 9 or its extension 14 and could be connected to means for actuating a safety switch or the like means for effecting a disconnection from the power source when the cover is closed so that a projector accommodated in the described apparatus embodying the invention cannot remain inadvertently energized when the cover of the apparatus is closed.

WHAT WE CLAIM IS:—

1. Portable picture projection apparatus comprising a carrying case containing a projector, said carrying case having an open body portion arranged to be closed by a cover connected to the body portion by a guide mechanism for guiding movement of the cover from a case-closed position in which said cover closes the body portion and the interface between them lies substantially in a plane, to at least one operating position at which the cover is displaced bodily from the body portion and only connected therewith by the guide mechanism, a mirror being fixed rigidly to the inside surface of the cover so as to be parallel thereto and a device being provided to hold the cover in its operating position with respect to the body portion from which it is displaced.

2. Apparatus as claimed in claim 1, in which the mechanism comprises a link pivoted to the cover and to the body portion, the cover rotating during its movement



from a closed position to its operating position about an imaginary axis which extends parallel to the plane of the interface extending between the body portion and the cover when the cover is closed.

3. Apparatus as claimed in claim 1, in which the mechanism comprises a link hinged at one end to the cover and at the other end to the body portion and which guides movement of the cover parallel to itself when moving from the closed position.

4. An apparatus as claimed in any preceding claim, in which a back-lighted screen is secured to said cover and the mechanism is mounted inside the carrying case when closed by the cover.

5. An apparatus as claimed in claim 4, in which said screen has substantially the same height as said cover.

6. Apparatus as claimed in any one of the preceding claims in which the device is arranged to behave as a strut between the cover and the mechanism when the cover is in its operating position.

7. Apparatus as claimed in any one of the preceding claims in which the mechanism is constructed with a lever biased by a spring towards a position in which the cover is displaced from the body portion.

8. Apparatus as claimed in any one of the preceding claims, including means for locking the mechanism in a position corresponding to the cover-closed position.

9. Apparatus as claimed in any one of the preceding claims, including a second mirror fixed to the mechanism and which turns from an inoperative position to an operative position in response to movement of the mechanism from the position corresponding to the case-closed position to a

position corresponding to the cover-operating position.

10. Apparatus as claimed in any one of claims 1 to 8, including a second mirror resiliently biased from an inoperative position to an operative position at which it reflects light from the projector towards the mirror fixed to the cover, the action of closing the cover moving the second mirror towards its inoperative position against the bias of a spring.

11. Apparatus as claimed in any one of the preceding claims, in which the projector is a sub-standard motion picture projector having a switch in its electrical supply circuit which responds to the action of opening and closing the cover by energising the circuit when the cover is in the operating position and de-energising the circuit when the cover is in the closed position.

13. Apparatus as claimed in claim 12, in which the switch is controlled by the mechanism.

14. Apparatus as claimed in any one of the preceding claims, in which the cover has two operating positions at one of which the mirror carried by it reflects in a horizontal direction light projected onto the mirror from the body portion, and at the other of which the cover lies outside of an optical path along which light is projected from the projector in the base portion.

15. Projection apparatus arranged and adapted to operate substantially as described with reference to the accompanying drawings.

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