

PATENT SPECIFICATION

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(54) SLIDE TRAY

(71) We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America, of 343 State Street, Rochester, New York 14650, United States of America, 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:—

The present invention relates generally to slide trays for slide projectors.

Slide projectors for receiving rotary slide trays and having slide tray indexing means on the projector and tray for indexing a received tray is forward and reverse directions for successively projecting the slides contained therein are generally well known in the art. One of the many well known slide projectors of this general type that is presently commercially available on the market is the 'Carousel' (registered trade mark) Slide Projector. One model of this slide projector is disclosed in British Patent Specification No. 1040701. A circular slide tray for use with a slide projector of this type is disclosed in British Patent Specification No. 1040702, and an indexing means for indexing the slide tray is disclosed in British Patent Specification No. 1118583. The slide tray disclosed in British Patent Specification No. 1040702 includes a circular, compartmented body member for receiving slides and a slide retaining disc carried by and rotatable relative to the body member. The retaining disc has a slide slot which is in register with the slide projection gate of the projector when the slide tray is mounted on the projector in its storage mode. When the tray is not on a projector, a distant mechanism releasably holds the body member and disc together in the slide storing mode, in which one slide compartment having a bridge across one end thereof for preventing the entry of a slide into the slide compartment is in register with the slide exit slot. When the exit slot of the disc is not aligned with the bridged slide compartment of the

body member, the detent mechanism is ineffective to prevent relative rotation between the two portions. When such a slide tray is mounted on a projector, a cam surface on the projector engages and disables the detent mechanism so that the projector's indexing mechanism may move the body member to align other slide compartments with the exit slot and the projection gate.

While trays of the type described in British Patent Specification No. 1040702 are usually highly reliable and have proven to be very successful in operation, it has been found that in some instances when such a slide tray is placed on a projector, the detent mechanism is not entirely disengaged, and the projector will not function properly. Such occurrences happen because the detent mechanism is disengaged by the downward movement of the slide tray over a cam surface. Since the weight of the slide tray, particularly when only partially loaded with slides, is sometimes insufficient to move the tray on to the cam surface, it has been found that in some instances it is necessary to manually push the tray on to the projector before the detent mechanism will release.

British Patent Specification No. 1259299 discloses a slide tray for such projectors wherein a detent mechanism which holds the body member and retaining disc from relative movement is released by a mechanism in the projector during each indexing operation of the projector rather than when the tray is loaded on to the projector. As such, that tray is not susceptible to malfunction as described above with respect to the tray disclosed in British Patent Specification No. 1040702. However, the detent mechanism is operative to prevent rotation between the body member and retaining disc regardless of their relative positions. As such, the exit slot in the retaining disc cannot be aligned with the bridged body member compartment when the tray is removed from the projector except by manually disabling the detent mechanism while rotating the members relative to each other

until the exit slot is visually aligned with the bridged compartment. This, of course, requires more manual dexterity and care than the same operation with the first described tray, and further increases the risk of misalignment of the body member and retaining disc, which would result in the dumping of a slide.

In accordance with the present invention there is provided a slide tray for use with a slide projector having a slide projection gate and a locking member movable between first and second positions, the slide tray comprising a body member having a plurality of spaced walls defining therebetween compartments for receiving slides, a retaining member movably connected to the body member and cooperating therewith to releasably hold slides in said compartments, the retaining member having an opening alignable with one of said compartments at a time and, when the slide tray is positioned on said slide projector, with the projection gate of the slide projector for passage of a slide to and from said one compartment, means on the body member which, when the slide tray is positioned on said slide projector, is engageable by the locking member in its first position so as to lock selective ones of the compartments in alignment with the gate, and detent means having a notch on one of said body and retaining members the sides of which are generally perpendicular to the direction of relative movement between the body and retaining members and a latch member mounted on the other of said body and retaining members for movement in a direction generally parallel to the sides of the notch, the notch and the latch member being positioned such that the latch member is movable into the notch only when the body member is in a single predetermined position relative to the retaining member to prevent relative movement between the body member and the retaining member and is engageable, when the slide tray is positioned on said slide projector, by the locking member for withdrawal from the notch during movement of the locking member from its first to its second position.

The present invention will now be described by way of example with reference to the accompanying drawings, in which:—

Fig. 1 is an exploded perspective view of a slide tray having a portion thereof broken away and of a slide projector for the slide tray;

Fig. 2 is a section through a portion of the slide tray and projector of Fig. 1;

Fig. 3 is a fragmentary top view of a portion of the slide tray and projector of Fig. 1; and

Fig. 4 is a bottom view of a portion of the slide tray and projector of Fig. 1.

A slide tray 10 of the present invention is particularly adaptable for use in slide pro-

jectors 12 of the general type disclosed in British Patent Specification No. 1040701, in which indexing and locating means for the slide tray are of the general type disclosed in British Patent Specification No. 1118583. In general, slide projectors of the type referred to herein have a slide changing cycle including returning a slide, if any, from a slide projection gate to its tray compartment, indexing the slide tray one compartment by a movable rib 14, and permitting the next succeeding slide to be lowered into the projection gate. During the viewing of a slide, the tray 10 is prevented from rotating by a locking projection 16. A more detailed description of an indexing and tray locking mechanism of this type appears in aforementioned British Patent Specification No. 1118583. The top of the projector 12 has a circular rim 18 having a lip 20 carrying an index mark 21. The top of the projector 12 further has a central spindle 22 projecting from a surface 23. The spindle 22 has an opening through which a spring biased spindle key 24 extends. An opening 26 in the surface 23 is in register with the slide projection gate (not shown) and a pin 28 is provided for locating a slide tray 10. A lens assembly 30 is aligned with the projection gate and is focused by a knob 32. A pair of buttons 34 and 36 control forward and reverse operation of the slide indexing mechanism and a select button 38 is provided for withdrawing tray locking projection 16 so that the slide carrying portion of the tray 10 may be rotated on the projector.

Insofar as previously described, the slide projector shown is of a conventional type. The tray locking projection 16 forms a portion of a locking member which further includes a lever 40, the locking projection 16 forming one end of the lever 40. The lever 40 is pivotally mounted on the projector housing by a stud 42 and includes an arm 44 having a cam follower 46. The cam follower 46 is urged by a spring 50 into engagement with the cam surface of a single revolution cam 48. The cam 48 is mounted on a shaft 49. During the indexing cycle of the projector 12, the cam 48 is rotated a single revolution to rotate the lever 40 from its full line position in Fig. 2 to its phantom line position before the rib 14 begins to move the tray 10 and to return the lever 40 to its full line position upon completion of the index cycle. When the select button 38 is depressed, the cam 48 rotates one-half revolution to rotate the lever 40 to its phantom line position and to hold it there until the select button 38 is released, whereupon the cam 48 completes a full revolution. A detailed description of this operation and a mechanism for rotating cam 48 is found in British Patent Specification No. 1118583.

The locking member further includes an arm 52 pivotally mounted to the lever 40 at

54 and constrained to substantially linear movement by a pin-in-slot arrangement 56. A tab 58 on the lever 52 extends upwardly past the surface 23.

5 Slide tray 10 includes a body portion 60 having concentric inner and outer walls 62 and 64, respectively. The walls 62 and 64 are joined together by radially extending spacers or separator walls 66 to form a plurality of
10 spaced compartments for receiving slide mounts 68. The slide compartment which is at register with the projection gate when the tray 10 is mounted on the projector 12 in a storage mode is not normally a slide holding
15 compartment and has a bridge 70 extending thereacross to prevent the insertion of a slide therein from the top of body portion 60. All of the remaining compartments are slide storing compartments, and are open at each axial
20 end of the body portion 60.

An annular lip 72 extends radially outwardly from the bottom of the outer wall 64 and carries a plurality of depending pins 74 for cooperation with the rib 14 for indexing
25 the body member 60 and with the tray locking projection 16 to prevent rotation of the body member 60 between indexing operations unless the select button 38 is depressed. A notch 76 in the lip 72 fits over the lip 20
30 the tray 10 is lowered on to the projector 12. An annular lock ring 78 fits within the upper end of the inner wall 62 and has a peripheral flange 80 which overlaps the slide compartments to prevent the slides from falling out
35 if the tray 10 is inverted. The lock ring 78 is removable from the body member 60 to permit slide editing or loading.

A slide retaining member 90 in the form of an annular disc is mounted for rotation on
40 the bottom of the body portion 60 by three rivets 92 (Fig. 4) with the inner periphery of the disc abutting a circular wall 98 on the body member 60. Slide mounts 68 inserted in the slide tray compartments are supported on
45 the retaining member 90.

The slide retaining member 90 has an opening 94 through which heated air expelled from the projector 12 is directed. The heated
50 air passes over those slides that are supported by the retaining member 90 above the opening 94 for preheating them when the tray 10 is properly mounted on the projector 12. The retaining member 90 further has a radially extending notch 96 merging with and crossing
55 opening 94 to form a slide passageway for uncovering slide compartments one at a time during relative movement of retaining disc 90 and the body member 60, and through which slides 68 are transported from the tray
60 10 to the slide projection gate. When the slide tray 10 is in a normal slide storing position, the slide compartment covered by the bridge 70 is aligned with the passageway 96.

65 The body member 60 has a circular wall 98 with a central opening 100 having a notch

102 for receiving the corresponding spindle 22 and key 24 respectively, of the projector 12. When the slide tray 10 is initially placed on the projector 12, the spindle 24 extends
70 through the opening 100 and the tray 10 is rotated until the notches 76 and 102 align with the lip 20 and the key 24, respectively, and are received thereby, allowing the tray 10 to drop into a loaded position. The retaining
75 member 90 has an opening 104 adapted to receive the pin 28 of the projector 12 for locating the retaining member 90 with the slide passageway 96 in register with the slide projection gate of the projector 12. The
80 retaining member 90 remains fixed by virtue of the pin 28 and the opening 104, and the body member 60 is indexed as a unit relative to the retaining member 90 by the rib 14 and the projector's slide indexing mechanism. Such indexing of the body member 60 during
85 operation of the projector 12 successively brings the slide compartments and slides contained therein into register with the slide passageway 96 and the gate of the projector 12.

A detent mechanism is provided for holding the body member 60 immovable relative to the retaining member 90 when the slide
90 passageway 96 is in register with the compartment covered by bridge 70. The detent mechanism comprises a wire spring 110 having a bent end portion 112 that is movable into and out of a notch 114 formed along the inner
95 surface of the inner wall 62. The other end of the wire spring 110 is attached to the retaining member 90 by a pair of bent tabs 116 and 117 so that the bent portion 112 is pressed against the inner surface of the wall
100 62 and the notch 114 is positioned on the body member 60 so that when the bent portion 112 of the wire 110 is within the notch 114, the compartment covered by the bridge 70 is aligned with the slide passageway 96. When the slide tray 10 is mounted on the
105 projector 12, the spring wire 110 is positioned adjacent the tab 58 on the arm 52 so that movement of the arm 52 to the left (as viewed in Fig. 2) pushes the bent portion 112 of the wire out of the notch 114 to the phantom line position shown in Fig. 2. When
110 the tray 10 is initially mounted on the projector 12 the bent portion 112 is in the notch 114. Upon the first cycling of the indexing mechanism of the projector 12, the tab 58 engages the wire 110 and withdraws the bent
115 portion 112 thereof from the notch 114, releasing the body member 60 for movement relative to the retaining member 90. The body portion 60 is then indexed one slide compartment by the rib 14 and the tray locking
120 projection 16 is returned to its normal position between tabs 74 to prevent further rotation of the body member 60. The bent portion 112 is returned to the right as viewed in Fig. 2, but is no longer aligned with the
125 130

notch 114. The bent portion 112 now rests on the smooth, inner surface of the wall 62, and should the operator wish to remove the tray 10 without returning the body member 60 and retaining member 90 to their original, storage position, he need only withdraw the key 24 into the spindle 22 in a known manner and tilt the tray 10 slightly to slide lip 72 out from under lip 20, and then lift the tray 10 from the projector. Once removed, the tray 10 can be returned to its storage mode by inverting the tray 10 to prevent slides from falling out and by rotating the retaining member 90 relative to the body member 60 until the bent end portion 112 of the wire spring 110 falls into the notch 114. Thus, the tray parts can be returned to their storage condition rapidly.

WHAT WE CLAIM IS:—

1. A slide tray for use with a slide projector having a slide projection gate and a locking member movable between first and second position, the slide tray comprising a body member having a plurality of spaced walls defining therebetween compartments for receiving slides, a retaining member movably connected to the body member and co-operating therewith to releasably hold slides in said compartments, the retaining member having an opening alignable with one of said compartments at a time and, when the slide tray is positioned on said slide projector, with the projection gate of the slide projector for passage of a slide to and from said one compartment, means on the body member which, when the slide tray is positioned on said slide projector, is engageable by the locking member in its first position so as to lock selective ones of the compartments in alignment with the gate, and detent means having a notch on one of said body and retaining members the sides of which are generally perpendicular to the direction of relative movement between the body and retaining members and a latch member mounted on the other of said body and retaining members for movement in a direction generally parallel to the sides of the notch, the notch and the latch member being positioned such that the latch member is movable into the notch only when the body member is in a single predetermined position relative to the retaining member to prevent relative movement between the body member and the retaining member and is engageable,

when the slide tray is positioned on said slide projector by the locking member for withdrawal from the notch during movement of the locking member from its first to its second position.

2. A slide tray according to Claim 1 wherein the body member is circular and has radially spaced, annular, inner and outer walls and spaced, radial separator walls connecting the annular walls, and wherein the retaining member is a circular disc which is rotatably connected to the body member, the said opening of the retaining member being radially disposed.

3. A slide tray according to Claim 2 wherein the notch is radially disposed on the body member and the latch member is mounted on the disc, and further comprising means for urging the latch member into the notch.

4. A slide tray according to Claim 3 wherein the latch member comprises a wire spring having one portion secured to the disc and a second portion spring urged for movement into the notch.

5. A slide tray according to Claim 2, 3 or 4 for use with a slide projector of the type referred to which is further provided with a locating member, the disc having means which, when the slide tray is positioned on said slide projector, is engageable by the locating member for preventing rotation of the disc relative to the projector.

6. A slide tray according to any one of Claims 1 to 5 wherein the means engageable by the locking member in its first position to lock selective ones of the compartments comprises a plurality of abutments on the body member.

7. A slide tray according to Claim 6 for use with a slide projector of the type referred to which is further provided with means for indexing a received slide tray wherein, when the slide tray is positioned on said slide projector, the abutments are engageable by the indexing means to rotate the body member to align successive compartments with the gate.

8. A slide tray according to Claim 1 substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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