

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) IMPROVEMENTS IN OR RELATING TO MAGAZINE TYPE SLIDE PROJECTORS

- (71) We, FRANKE & HEIDECHE, G.M.B.H., a German Body Corporate, trading as ROLLEI-WERKE FRANKE & HEIDECHE, of 196 Salzdahlumerstrasse, Braunschweig, Germany, 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 The present invention relates to magazine-type slide projectors for horizontally situated annular magazines, with a lifting ramp for the slides at the film gate of the projector.
- 15 These lifting ramps make it possible to use magazines with which the slides are guided by both side edges, so that they cannot drop out of the magazine when it is in use unless the latter is stood on its head.
- 20 With annular magazines a slit has hitherto been provided at the slide changing point to enable the slide to drop through it, after which the slide is taken up by the gripper and introduced into the film gate from the side. After being projected the slide had to be pushed back under the magazine and then up into the magazine, after which, when the magazine was further operated, the slide of the next compartment moved
- 25 into position underneath the slit. This system calls for a projector constructed to a considerable over-all height.
- The system could be simplified to some extent by positioning the magazine above the film gate so that the slide could fall directly into this latter and then be pushed out of it again.
- By the lifting ramp in the film gate guide the slides in the gate position are pushed up out of the magazine far enough to enable them to be inserted into the film gate from the side without difficulty. When this principle is applied to magazine-type slide projectors with horizontally situated annular magazines, a number of difficulties
- or drawbacks occur, the elimination of which is the purpose of the invention. While with rod-type magazines it is sufficient, when the magazine is in the transport or in the changing position, for the gripper to be brought to a stop in such a way that it gives passage to the slides and the magazine in the axial direction, annular-type magazine projectors prove difficult to handle in this operation. The slide guide at the film gate must be moved up direct to that edge of the slide which is nearest to the projector, if a reliable slide changing operation is required. This film gate slide guide will unavoidably extend over the inner edge of the magazine. In bar-type magazines this is actually an advantage, as it enables the magazine to be accurately guided, thus preventing it from tilting, particularly in the case of long bar-type magazines. A slide guide system of this kind at the film gate is necessary, and the magazine guide system, which prevents the magazine from being tilted, is likewise desirable, even if not to the same extent as in the case of long bar-type magazines.
- With annular magazines, however, the changing operation is rendered more difficult. First of all, care must be taken to ensure that the gripper can be moved in to a position in which the operation of extracting the magazine axially, i.e. with an upward movement, from its guide will not be impeded, in addition to which the slide guides at the film gate, on the periphery of the magazine, must not impede the operation of changing the latter. The same applies to a slide gripper jaw situated on the side corresponding to the film gate and belonging to the slide change gripper which in the position of rest, although it releases the slide, does not remove it from the lifting range of the annular-type magazine. A magazine changing operation in the case of a projector of this type was only rendered

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possible by mounting the gripper in a special manner so that it could be pivoted out of the way; furthermore, the magazine had to be tilted out, under the lateral slide guides and the inner jaw of the slide change gripper.

According to the present invention there is provided a magazine type slide projector for horizontally situated annular magazines, including a circular magazine track and a central magazine guide for receiving and guiding a magazine loaded into the projector; a ramp in the path of the track for lifting slides in the magazine at a point adjacent to the projector film gate; and a slide change gripper having a first part which extends transversely of the track from the region of the film gate towards the centre of the magazine guide and a second part which extends through the central magazine guide; wherein the second part of the slide change gripper is movable radially in respect of the magazine track to assist movement of a slide from the magazine to the film gate.

Furthermore, the slide guide bears or forms an entrainment device for engagement with a jaw of the slide change gripper, so as to move the jaw, in the magazine changing operation, out of the axial path of the magazine. The central magazine guide is preferably a closed cylinder, provided with a diametral slot through which the second part of the slide change gripper projects.

A constructional embodiment of the invention will now be described by way of example with reference to the accompanying drawing, in which:

Figure 1 shows a complete projector, with a magazine inserted;

Figure 2 is a vertical radial section through the magazine, in the plane of a slide gripper device;

Figure 3 shows the slide gripper device and slide change gripper drive, and

Figure 4 is a partial plan view of the slide guide or magazine guide at the projector film gate opening.

Referring now to Figures 1 and 2, a magazine is situated in a flat housing 1, of which the dimensions need be only slightly in excess of the diameter and height of the magazine. The height of the magazine is less than that of the slide, so that the surface of the magazine, when placed in position in a projector, is approximately on a level with the optical axis of the projector. The magazine guide track contains a lifting ramp 3, by which the slides are lifted out of their normal position in the magazine at the film gate to such a distance that they can be inserted, past a lateral guide edge 4 of the magazine, into the film gate. Projector housing part 5 which con-

tains the lens system and film gate is correspondingly higher than the flat housing part 1. This results in an exceptionally compact construction. As already mentioned, the dimensions of the flat housing 1 containing the magazine guides are practically governed by those of the latter itself. The height of that part of the housing 5 which contains the film gate guide need practically only be higher to an extent corresponding to the height of the lifting ramp 3, while the width of the housing part 5 is determined by the remaining necessary drive parts and apparatus components in the projector, insofar as these are not situated around the magazine in the flat housing part 1. As may be seen from Fig. 4, representing a horizontal projection, guide jaws 6 and 7, of which insertion edges 8 and 9 are bevelled to enable the slide to be reliably thrust from the magazine into the film gate guide, are situated as close as possible to the outer edge of the slide (Fig. 2) and therefore extend across the lateral guide edge 4 of the magazine. To ensure that they do not impede the action of extracting the magazine in an axial direction from its guide, the slide guide jaws are pivotable about pins 10 and mounted so that they can be resiliently pressed towards the edge of the magazine and provided with lower chamfers 11. Similar chamfers 12 are provided on the upper side thereof, to enable the magazine to be inserted. In the withdrawal of the magazine, therefore, the slide guide jaws 6 are pushed outwards, the same applying in the insertion of the magazine, and in the operation position they extend over the lateral guide edge 4 of the magazine and prevent the latter from accidentally falling out when the apparatus is tilted.

Figure 3 shows a drive device for a slide change gripper. The latter mainly consists of a U-shaped gripper 13 for the outer edge of the slide and of a jaw 14 resting thereon, a spring 15 between the two tending to draw the gripper 13 and the jaw 14 together, as a result of which the slide is clamped between these two parts.

In the slide change operation the gripper 13 moves initially in the direction shown by the arrow "A". Immediately before the outer edge of a slide 19 encounters the magazine, so that the slide cannot be moved any farther, the jaw 14 is prevented by a stop device from moving any further so that it comes to a stop outside the lateral edge 4 of the magazine and disengages from the inner edge of the slide 19, while the gripper 13 continues to move towards the left, until it moves to a position disengaged from the slide with the slide reseated in the magazine. This movement or stroke is also utilized for the "stepping-on" of the maga-

zine. On the return movement of the gripper 13 the next slide is pushed through to the jaw 14 and then clamped between the gripper 13 on the one hand and the jaw 14 on the other during the transport of the slide into the film gate and during projection. This particular type of two-jaw holder and particular system for their drive form the subject of an older application and is described in German Patent Specification No. 1,802,568. The stop device for the jaw 14, preventing it from moving into the axial path of the magazine, is in the present case formed or controlled by the guide jaws 6 and 7. This ensures that when the magazine is withdrawn in an axial direction and the pivotable jaws 6 and 7 are displaced in the direction of the film gate the slide guide jaw 14 is likewise caused to perform an additional movement towards the film gate, so that it not only gives passage to the edge of the slide but is also unable to impede the action of withdrawing the magazine, by the projecting jaws 14. A central guide stub 16 is provided with a diametral slit through which the gripper 13 can pass. The gripper 13 is arranged in such a manner that it is situated immediately above one side of the magazine and practically slides thereon (Fig. 2). As shown in Fig. 1, this gripper 13 can also be provided with a handle 18, so that it can also be gripped and operated manually.

The remaining details of the driving device for the image changing and gripper system itself may be seen from German Patent Application OS 1,802,546.

WHAT WE CLAIM IS:—

1. A magazine type slide projector for horizontally situated annular magazines, including a circular magazine track and a central magazine guide for receiving and guiding a magazine loaded into the projector; a ramp in the path of the track for lifting slides in the magazine at a point adjacent to the projector film gate; and a slide change gripper having a first part

which extends transversely of the track from the region of the film gate towards the centre of the magazine guide and a second part which extends through the central magazine guide; wherein the second part of the slide change gripper is movable radially in respect of the magazine track to assist movement of a slide from the magazine to the film gate.

2. A projector as claimed in claim 1, including a slide guide mounted at a point adjacent to the film gate and projecting into the circular path of a magazine, the slide guide being movable to allow axial movement of the magazine.

3. A projector as claimed in claim 2, wherein the slide guide bears or forms an entrainment device for engagement with a jaw of the slide change gripper so as to move the jaw out of the axial path of the magazine when the magazine is to be removed from the projector.

4. A projector as claimed in claim 2 or 3, wherein the slide guide is provided with chamfered displacement surfaces which are engageable by the magazine to effect movement of the slide guide out of the circular path of the magazine upon axial extraction of the magazine from the projector.

5. A projector as claimed in any one of claims 2 to 4, wherein the slide guide is pivotally mounted.

6. A projector as claimed in any one of claims 1 to 5, wherein the central magazine guide slide is formed by a closed cylindrical construction having a diametral guide slit therein through which the second part of the slide change gripper projects.

7. A magazine-type slide projector substantially as hereinbefore described with reference to, and as illustrated in Figures 1, 2 and 4 of the accompanying drawings.

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