

PATENT SPECIFICATION

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(54) DOUBLE OPTICAL SLIDE PROJECTOR

(71) We, FRANKE & HEIDECHE GMBH, a German Body Corporate, trading as Rollei-Werke Franke & Heidecke, of 196 Salzdhahmer Strasse, 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 a double projector for projecting photographic slides, comprising two objective lenses, two slide carriers each associated with a respective one of the objective lenses and disposed for movement in a direction substantially transverse to the direction of movement of a slide into or out of a common slide magazine locatable adjacent the side of one slide carrier remote from the other
- 20 slide carrier, at least one illumination system associated with the slide carriers, so that its optical axis is parallel to the direction of movement of the slide carriers and a slide exchange unit including a slide gripper for removing the slides from the slide magazine in a fixed order and feeding them alternately to one slide carrier or to the other slide carrier and which arranges them in the magazine in the same order, consecutive pairs of slides being presentable simultaneously in the slide carriers for a portion of a slide changeover operation, wherein the slide carriers are movable in said direction of movement thereof so as
- 35 to move alternately to a slide exchange location and to the focal plane of the respective objective lens associated with each slide carrier, the slide exchange location and the focal plane being remote from one another by at least the structural length in the longitudinal direction of the at least one illumination system. Such a projector is described in British Patent Specification No. 1,437,468.

45 In such double optical slide projectors

with projectors movable to and fro out of the change plane into the projection plane, one essential problem consists in reliably mastering, with one single changer system, the feed and return of slides from a slide magazine into two picture frames situated at different distances.

The invention is therefore based upon the problem of further improving a double optical slide projector according to British Patent Specification No. 1,437,468 and designing a drive for the changer so that in forward and reverse projection an exact controlling of the changer for its different strokes is achieved with the simplest means. Here at the same time a trouble-proof actuation of the changer with low noise level is to be achieved.

According to the present invention there is provided a double optical slide projector, comprising two projectors united into one appliance and a guide for a common magazine from which the slides are taken in progressive sequence and in which they are replaced after projection in the same sequence, successive slides being temporarily situated at the same time in the two projectors, having a common changer which for slide transport from the magazine into the projectors lying parallel one behind the other in the change direction and *vice versa* alternately carries out a full stroke to the projector most remote from the magazine and a partial stroke to the other projector, a drive for the changer and two slide frames allocated one to each projector and displaceable axially out of the projection position into the change plane lying outside the light beam path of the projector ready for projection, and conversely, wherein there is provided a gearing interposed between changer drive and changer to compel a changer full stroke at every drive engagement, a slipping clutch forming a part of the gearing and a stop which can

be pivoted into the changer path in dependence upon the position of the slide frames to limit the changer movement to the partial stroke. In this way the starting gearing at the beginning of each slide change cycle, with the setting of a slide out of one of the two picture frames into the magazine and feed of a fresh slide, causes an exactly dimensioned full stroke of the slide changer over the two picture frames. The full gearing travel is also maintained when a slide change takes place out of the picture frame close to the magazine, and then the changer in feeding the new slide must be stopped by the stop and merely sweep over the half changer distance, while the gearing parts still in motion equalise their travel through the interposed slipping clutch until the renewed halting of the gearing at the end of a complete executed change cycle. This measure, that a control distance always travelled completely on the gearing side is interrupted halfway as regards the changer functions if necessary, has the further advantage that the actual changer functions can start and run down at the end almost completely without jerks and with extraordinarily low noise level, since they do not have to perform work immediately, for example with the switch-on current surge of a drive motor.

The functionally exact execution of a full or a half stroke distance of the changer depends upon the position in each case of the stop which temporarily blocks the changer. In a corresponding development of the invention the position of the changer is determined due to the fact that the stop is held constantly in the changer path and is pivoted out of the changer path against a return force on setting of the slide frame most remote from the magazine in the change plane. Thus a precisely fixed end stop of the changer is obtained, allocated to the picture frame close to or remote from the magazine, to be operated in each case.

Since the picture frames are combined each with a lighting system into projection units and mounted movably in the projection direction on axially displaceable carriages, in especially advantageous development of the invention the stop is arranged on a rotatably mounted lever which is pivotable against the force of a return spring by the carriage of the projection unit most remote from the magazine. Thus the projection unit remote from the magazine with its axial movement also controls the stroke movement of the changer necessary in each case.

According to a further development of the double optical slide projector in accordance with the invention the gearing which pivots the changer consists of a driven cam

disc, a first lever actuated by the cam disc and a second lever articulated to the changer and in engagement with the first lever through the slipping clutch. The cam disc, in turn driven by a conventional electric motor with toothed wheel reduction gearing, forms the nucleus of the entire changer gearing. Its cam paths extending in smooth transitions advantageously effect the smoothly executed pivoting movements of the slide changer by means of the levers articulated to the cam disc and the slipping clutch.

The spatial separation of the slide changer into a gripper transporting the slides into the picture frames and a pusher returning the slides into the magazine renders possible a further development of the projector according to the invention in which the slipping clutch is arranged in the gripper gearing and the stop is pivotable into the gripper path. Since an aimed slide feed from the common magazine into the respective slide frame is necessary, but conversely an aimed feed from the respective slide frame into the common magazine is not necessary, it is sufficient if only the gripper path is temporarily interrupted, so that a slipping clutch for the compensation of the lever paths is also to be provided only in the gripper gearing.

A further preferred development of the invention is characterised by a driven cam disc having two separate cam paths, two dogs each sliding in a cam path and each secured on a pivotable lever, which levers are in operative connection through at least one further lever with the gripper and pusher respectively. The cam disc provided on both sides of cam paths here permits a compact space-saving assembly of the gearing.

According to a further development of the invention the slipping clutch consists of a first clutch disc connected through the first lever with the gripper and a second clutch disc connected through the second lever with a cam disc upon which a first friction moment generated by a compression spring acts, a spring-loaded pawl being provided which is rotatably mounted on the first clutch disc, engages with a protruding nose in a depression of the second clutch disc and generates an additional friction moment. These friction moments acting commonly upon the clutch discs also have the task, in the return of the gripper into its initial position, of effecting reliable entraining of all mutually connected levers into their initial positions.

Finally a further development of the slipping clutch in accordance with the invention is to be seen in that the clutch discs of the slipping clutch are movable in shape-locking manner with one another during

the free pivoting movement of the gripper, and in that the clutch discs, after interruption of the gripper stroke and disengagement of the pawl, for the remainder of the control travel of the cam disc carry out a force-engaging movement in relation to one another resulting only from the friction moment of the compression spring. This division of the two friction moments and extensive elimination of the friction moment acting on the pawl after interruption of the gripper stroke has the special advantage that the drive forces necessary for the remaining equalisation travel of the levers remain low. In the return of the gripper levers then firstly the pawl re-engages in the depression of the second clutch disc and thus with re-united friction moment ensures a vigorous and reliable return of the gripper into its initial position.

An example of embodiment of the invention is described further below with reference to drawings, wherein:—

Figure 1 shows a diagrammatic plan view of the changer drive arranged in several planes in the initial position (both picture frames occupied by slides).

Figure 2 shows a plan view according to Figure 1 with the changer position "filling of the picture frame close to the magazine".

Figure 3 shows a plan view according to Figure 1 with the changer position "return of a slide from the picture frame remote from the magazine".

Figure 4 shows a perspective diagrammatic representation of the gripper drive.

As shown in partial view in Figure 1, on a flat bottom plate 1 of a double optical slide projector the changer system is represented with its drives, omitting all projector parts which are unessential to the invention and detrimental to clarity. Beside the magazine 2 there are arranged two projection units 3, 4 lying side by side in one plane, with their picture frames 5, 6. The projection units, provided with a trough-shaped housing as a self-contained unit, slide in the projection direction by means of slide bushes 39 as carriages on guides 7, 7', 8, 8', provided in pairs side by side. These guides are made as simple smooth round rods and inserted into upwardly bent lugs 9, 9' of the bottom plate 1.

For the loading and unloading of the picture frames with slides from the magazine a changer system is provided. This consists essentially of the gripper 10 and pusher 11 and the gripper and pusher levers 12, 13, also of a cam disc 14 provided with two cam paths 15, 16 for the gripper and pusher drives, which disc is set in rotation in each case for a slide change cycle by an electric motor drive through a re-

duction gearing (not shown). The changer system is completed by two links 19, 20 guided in the gripper and pusher cams 15, 16 of the cam disc 14 by means of dogs 17, 18 and pivotable about their bearings 21, 22 let into the bottom plate 1, also two gripper and pusher shafts 23, 24 likewise rotatably mounted in the bottom plate and bringing the links 19, 20 into operative connection with the gripper and pusher levers 12, 13.

In order to cause the gripper to carry out in the one case a full gripper stroke and in the other a half gripper stroke in periodic dependence upon the projection unit which respectively is projecting or changing slide, a stop 25 on a stop lever 26 is situated in the gripper path. The stop lever is pivotable on a pivot point 27 out of the stroke path of the gripper 10 against the force of a tension spring 28, so that the gripper, as will be explained in greater detail hereinafter, can travel on the one occasion into the end position as shown in Figure 1 or into the position blocked on the stop 26 at half stroke distance as illustrated in Figure 2. Gripper 10 and pusher 11 in turn slide perpendicularly of the projection axis by means of three guide bushes each likewise on two guide rods 29, 29' into upright lugs 9", 9'" of the bottom plate 1.

The gripper and pusher levers 12, 13 pivoting radially about the gripper and pusher shafts 23, 24, on the way between their two end positions entrain the gripper 10 and slider 11 which are rectilinearly guided on the guide rods 29, 29'. The length compensation resulting from the radial pivoting movement of the levers and the rectilinear travelling movement of the gripper and pusher is compensated by the elongated holes 30, 31 provided in gripper and pusher. Engaging pins 32, 33 inserted at the outer ends of the gripper and pusher levers 12, 13 engage in these elongated holes of the gripper 10 and pusher 11.

In order to achieve the relatively long gripping and pushing strokes by the gripper and pusher levers 12, 13, likewise of long formation, by means of the minimum possible cam deflections, and at the same time to be able to keep the diameter of the cam disc 14 sufficiently small, additional lever transmissions are provided in the gearing path from the cam paths to the gripper and pusher. Thus the link 20 guided in the pusher cam 16 by its peg 35 inserted at the angled end entrains an intermediate lever 36 rigidly secured on the slider shaft 24, by the open slot 37 of the lever 36, in a ratio increased into a longer pivoting path. The same occurs in the gripper drive path. Here admittedly between link 19 and gripper 10 a slipping clutch 38 is interposed the signi-

ficance of which will be explained in the following description of operation.

At the beginning of the showing of a series of slides the two picture frames I and II are charged directly after one another each with a slide 40, 41 which slides were pushed by the gripper 10 to their stop 42, 43. In Figure 1 the projection units are shown already advanced into the projection position. The projection lamp and illumination optical system, indicated in dot-and-dash lines and shown in the picture frame I, are to indicate the unit which is just projecting. Accordingly the picture frame II, after termination of the projection time and uniformly slow darkening of the lamp I, stands with a slide ready for the likewise slow lighting up of the lamp II. The actual changeover operation from one picture to the other proceeds. During the projection and subsequent changeover operation (showing cycle) all movement drive on projection units and changer system is switched off. All parts remain in the position as illustrated, (Figure 1).

If now the frame II is completely illuminated and frame I is dark, the drive is switched on for the time duration of a change cycle. Firstly the gripper 10 travels along behind the picture frames out of the picture frame region into the opposite forward end position (as shown in Figure 3). Then the projection unit I travels out of the projection plane and into the change plane. This takes place with similar means, not illustrated for the sake of simplicity, a further cam disc and two links engaging on the carriages of the projection units. As soon as this has happened (position of the picture frames I and II in Figure 2), the slide pusher 11 travels the same path as the slide gripper 10 behind the projection unit II but through the picture frame I and pushes the already projected slide 40 standing there before it into the same magazine compartment from which it was previously taken. In order to achieve the latter the magazine has been moved back in known manner by one step by its drive (not shown) so that the numerically correct magazine compartment again stands before the change plane 44. Cam path 16, link 20 and pusher lever 13 pivot the pusher 11 back again into its rear end position (Figure 1) immediately after termination of its ejection activity.

Now Figure 2 shows the following operational step:— In fact as soon as the slide 40 from the frame I has been deposited as described in the correct magazine compartment, the magazine carries out a renewed "pilgrim step" two compartments further forward in order to make the second next slide 45 ready. The gripper 10 initially standing with its gripper head 46 fully out

(as illustrated in Figure 3) travels inward afresh and the gripper head 46 takes the slide 45 with it. Since during all these operations the picture frame II was advanced and in the projection cycle, the stop 25 of the stop lever 26 is also pivoted into the gripper path. In the pivoting of the gripper 10 its nose 48 strikes against the stop 25 and abruptly halts the pivoting movement of the gripper. Figure 2 illustrates this moment. The slide 45 is now situated directly on the stop 42 in the picture frame I. With the interruption of the gripper stroke on the stop 25 for the charging of the picture frame I however the course of movement of the cam disc 14, which as described travels a complete control path for each change cycle, is not yet terminated. Now the slipping clutch 38, the function of which is to be described later, takes up the control forces of the remaining control path.

As next step now the projection unit I advances again into its projection position (Figure 1) and is ready to project. The time duration of the operational courses of a slide change as just described also determines the minimum time duration of the actual slide projection in the picture frame which is projecting in each case. According now to how long the projection time has been set beyond the irreducible minimum time, now the changeover operation from picture frame II to I follows. At the same time the gripper 10 is again driven into its forward end position outside the picture frame range (Figure 3).

With the moving back of the projection unit II into the change plane a further change cycle commences. The magazine first travels one compartment back. The pusher 11 pivots into the forward end position and entrains the slide 41 from the picture frame II. In order now to bring the slide into the magazine, a slide bridge 49 is to be crossed. The slide bridge represents a guideway provided behind the projection unit I and connecting the magazine 2 with the picture frame II. After the depositing of the slide 41 in the correct magazine compartment there follow two forward magazine steps. At the same time the pusher 11 has returned into its rear end position. The slide 50 now standing before the change plane is entrained by the gripper head 46 as soon as the pivoting operation of the gripper 10 begins. Since in the travel of the projection unit II back into the change plane an engaging member 51 protruding laterally from the carriage has pivoted the stop lever 26 with its stop 25 out of the gripper path against the spring force of the spring 28, the gripper 10 can travel through as far as its rear end position, (Figure 1). This signifies that the slide 50 stands exactly between gripper head 46

and pusher head 47 in the picture frame II. With the advance of the projection unit II into its projection plane the change cycle is terminated. In this case the gripper 10 has also travelled its complete stroke distance so that the slipping clutch 38 did not need to come into action for an equalisation of distance.

For every change cycle the cam disc 14 travels exactly one half revolution. The gripper and pusher cams 15, 16 are made symmetrical in their shaping and according to their successively proceeding control functions for gripper and pusher are let into a surface each of the cam disc 14, somewhat offset in relation to one another. Thus the circuit of the cam paths is travelled half way for each cycle. Nevertheless for each renewed start until the commencement of a control action an adequate cam path distance remains as run-up time, so that the control functions, that is each transition of the cam paths from the interior outwards and *vice versa*, commence absolutely smoothly and without noise only after the starting up of the cam disc 14.

In order even for the half stroke distance of the gripper in the charging of the picture frame I to maintain fully the uniformly proceeding revolution of the changer drive and not to have to complicate the control system by expensive additional control means, the slipping clutch 38 is provided in the gripper drive. As shown in perspective diagrammatic representation in Figure 4, the slipping clutch is provided on the lower end of the gripper shaft 23 and formed as two-disc clutch. The gripper shaft 23 is rotatably mounted in the bottom plate 1 (indicated broken away) between two securing discs of which only the lower 52 is represented. Beneath the bottom plate a first clutch disc is loosely rotatably mounted as forked disc 53 with an open incision 54 on the gripper shaft. The pin 34 of the link 19 engages in the incision 54. Beneath the forked disc 53 at the outermost end of the gripper shaft 23 a second clutch disc, formed as pawl disc 56, is rigidly and non-releasably connected with the gripper shaft 23. On a projection of the pawl disc there is a pawl 57 rotatably mounted on the pivot point 58. This pawl is in operative connection with the forked disc by means of an upwardly angled nose 60 protruding into a cut-out 59 of the forked disc 53.

In order now to generate friction forces by which the control forces transmitted by the control cam 15 of the cam disc 14 (merely indicated in Figure 4) are conducted practically without slip to the gripper shaft 23 and further to the gripper 10, firstly there is provided a compression spring 55 bearing on the lower securing disc 52 and pressing upon the forked disc 53. The grip-

per can already be pivoted satisfactorily with the friction moment thus produced and operative in force-engaging manner between the two clutch discs. In order however to obtain an additional security especially in the transporting of the slides for charging the picture frames, with the pawl and its co-operation with the forked disc a further friction moment is provided. The protruding nose 60 of the pawl 57 is pressed in nearly shape-locking manner in the cut-out 56 of the forked disc 53 as a result of adaptation of the contours, by means of a tension spring 61. Thus the two friction moments of the clutch are added for the actuation of all stroke movements of the gripper 10.

Now as soon as the gripper 10 has to carry out only a half stroke distance, while as already described the cam disc 14 travels its full control distance, it is not desirable to permit the quite powerful total clutch friction moment to continue to act even for the remaining control distance which takes place almost in idling. For this purpose on further rotation of the cam disc 14 and with the gripper 10 stationary the pawl 57 disengages from the cut-out 59. Now the narrow edge of the nose 60 slides along almost free from friction on the end face of the forked disc 53 and hardly loads the changer drive any further. In the return into the initial position in which the idling gripper 10 hardly signifies a load, at the first moment the first friction moment acts alone, until the pawl has re-engaged in the cut-out of the forked disc.

The situation of the slide pusher 11 is different from that of the slide gripper 10. Since in every case in slide return, irrespective of whether the slide comes from the picture frame I or II, the slide pusher 11 begins the return stroke movement from its rearward end position, a clutch is not necessary in its drive path. The pusher stroke is therefore always a full stroke which is determined exactly by the cam path 16 of the cam disc 14.

Figure 4 illustrates in perspective representation that changer drive, projection units, gripper 10 and pusher 11 are arranged with their pivot levers in three planes one below the other. The gripper and pusher shafts 23, 24 here produce the operative gear connection from the lowermost drive parts lying beneath the bottom plate 1 to the uppermost functional parts which complete the slide change.

WHAT WE CLAIM IS:—

1. Double optical slide projector, comprising two projectors united into one appliance and a guide for a common magazine from which the slides are taken in progressive sequence and in which they are replaced after projection in the same



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and pusher head 47 in the picture frame II. With the advance of the projection unit II into its projection plane the change cycle is terminated. In this case the gripper 10 has also travelled its complete stroke distance so that the slipping clutch 38 did not need to come into action for an equalisation of distance.

For every change cycle the cam disc 14 travels exactly one half revolution. The gripper and pusher cams 15, 16 are made symmetrical in their shaping and according to their successively proceeding control functions for gripper and pusher are let into a surface each of the cam disc 14, somewhat offset in relation to one another. Thus the circuit of the cam paths is travelled half way for each cycle. Nevertheless for each renewed start until the commencement of a control action an adequate cam path distance remains as run-up time, so that the control functions, that is each transition of the cam paths from the interior outwards and *vice versa*, commence absolutely smoothly and without noise only after the starting up of the cam disc 14.

In order even for the half stroke distance of the gripper in the charging of the picture frame I to maintain fully the uniformly proceeding revolution of the changer drive and not to have to complicate the control system by expensive additional control means, the slipping clutch 38 is provided in the gripper drive. As shown in perspective diagrammatic representation in Figure 4, the slipping clutch is provided on the lower end of the gripper shaft 23 and formed as two-disc clutch. The gripper shaft 23 is rotatably mounted in the bottom plate 1 (indicated broken away) between two securing discs of which only the lower 52 is represented. Beneath the bottom plate a first clutch disc is loosely rotatably mounted as forked disc 53 with an open incision 54 on the gripper shaft. The pin 34 of the link 19 engages in the incision 54. Beneath the forked disc 53 at the outermost end of the gripper shaft 23 a second clutch disc, formed as pawl disc 56, is rigidly and non-releasably connected with the gripper shaft 23. On a projection of the pawl disc there is a pawl 57 rotatably mounted on the pivot point 58. This pawl is in operative connection with the forked disc by means of an upwardly angled nose 60 protruding into a cut-out 59 of the forked disc 53.

In order now to generate friction forces by which the control forces transmitted by the control cam 15 of the cam disc 14 (merely indicated in Figure 4) are conducted practically without slip to the gripper shaft 23 and further to the gripper 10, firstly there is provided a compression spring 55 bearing on the lower securing disc 52 and 65 pressing upon the forked disc 53. The gripper

can already be pivoted satisfactorily with the friction moment thus produced and operative in force-engaging manner between the two clutch discs. In order however to obtain an additional security especially in the transporting of the slides for charging the picture frames, with the pawl and its co-operation with the forked disc a further friction moment is provided. The protruding nose 60 of the pawl 57 is pressed in nearly shape-locking manner in the cut-out 56 of the forked disc 53 as a result of adaptation of the contours, by means of a tension spring 61. Thus the two friction moments of the clutch are added for the actuation of all stroke movements of the gripper 10.

Now as soon as the gripper 10 has to carry out only a half stroke distance, while as already described the cam disc 14 travels its full control distance, it is not desirable to permit the quite powerful total clutch friction moment to continue to act even for the remaining control distance which takes place almost in idling. For this purpose on further rotation of the cam disc 14 and with the gripper 10 stationary the pawl 57 disengages from the cut-out 59. Now the narrow edge of the nose 60 slides along almost free from friction on the end face of the forked disc 53 and hardly loads the changer drive any further. In the return into the initial position in which the idling gripper 10 hardly signifies a load, at the first moment the first friction moment acts alone, until the pawl has re-engaged in the cut-out of the forked disc.

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Figure 4 illustrates in perspective representation that changer drive, projection units, gripper 10 and pusher 11 are arranged with their pivot levers in three planes one below the other. The gripper and pusher shafts 23, 24 here produce the operative gear connection from the lowermost drive parts lying beneath the bottom plate 1 to the uppermost functional parts which complete the slide change.

WHAT WE CLAIM IS:—

1. Double optical slide projector, comprising two projectors united into one appliance and a guide for a common magazine from which the slides are taken in progressive sequence and in which they are replaced after projection in the same

sequence, successive slides being temporarily situated at the same time in the two projectors, having a common changer which for slide transport from the magazine into the projectors lying parallel one behind the other in the change direction and *vice versa* alternatively carries out a full stroke to the projector most remote from the magazine and a partial stroke to the other projector, a drive for the changer and two slide frames allocated one to each projector and displaceable axially out of the projection position into the change plane lying outside the light beam path of the projector ready for projection, and conversely, wherein there is provided a gearing interposed between changer drive and changer to compel a changer full stroke at every drive engagement, a slipping clutch forming a part of the gearing and a stop which can be pivoted into the changer path in dependence upon the position of the slide frames to limit the changer movement to the partial stroke.

2. Double optical slide projector according to Claim 1, characterised in that the stop is so arranged that it is held constantly in the changer path and is pivoted out of the changer path against a return force in the case of setting of the slide frame most remote from the magazine in the change plane.

3. Double optical slide projector according to Claim 2, in which the slide frames are combined each with a lighting system to form a projection unit on an axially displaceable carriage, characterised in that the stop is arranged on a rotatably mounted lever which is pivotable against the force of a return spring by the carriage of the projection unit most remote from the magazine.

4. Double optical slide projector according to one of the preceding Claims, characterised in that the gearing consists of a driven cam disc, a first lever actuated by the cam disc and a second lever articulated to the changer and in engagement with the first lever through the slipping clutch.

5. Double optical slide projector according to one of Claims 1-3, having a changer consisting of a gripper for the slide transport from the magazine into the slide frame and a pusher for the slide transport from the slide frames into the magazine, character-

ized in that the slipping clutch is arranged in the gripper gearing and the stop can be pivoted into the gripper path.

6. Double optical slide projector according to Claim 5, characterised by a driven cam disc having two separate cam paths, two dogs each sliding in a cam path and secured on a pivotable lever each which levers are in operative connection through at least one further lever with the gripper and the pusher respectively.

7. Double optical slide projector according to Claim 6, characterised in that the slipping clutch is provided between the lever articulated to the gripper and the lever guided in the cam path.

8. Double optical slide projector according to Claim 7, characterised in that the slipping clutch consists of a first clutch disc connected through the first lever with the gripper and a second clutch disc connected through the second lever with the cam disc, upon which clutch discs a friction moment generated by a compression spring acts, and in that a spring-loaded pawl is provided which is rotatably mounted on the first clutch disc, engages with a protruding nose in a depression of the second clutch disc and effects an additional friction moment.

9. Double optical slide projector according to Claim 8, characterised in that the clutch discs of the slipping clutch are shape-lockingly movable with one another during the free gripper pivoting and in that the clutch discs, after interruption of the gripper stroke and disengagement of the pawl, carry out a force-engaging movement in relation to one another resulting only from the friction moment of the compression spring for the remaining control distance of the cam disc.

10. A double optical slide projector, substantially as described herein with reference to and as illustrated by the accompanying drawings.

11. A double optical slide projector as claimed in Claim 1, substantially as herein before described.

For the Applicants:
MATTHEWS, HADDAN & CO.
Chartered Patent Agents
33 Elmfield Road
Bromley, BR1 1SU, Kent

