

SPECIFICATION **Picture Storage Box and Viewer Device**

The invention relates to a picture storage box and viewer device. Devices of the kind with which the present invention is concerned have been proposed. The principle of operation of these devices is as follows:

A picture facing a viewing window in the housing is taken from a pile of pictures disposed in the housing by the transporter member in the form of a hook which engages on an edge of the picture, and passed through an upper slot between the housing and a separator, the hook being joined to a slider member which is withdrawn and then returned to effect a picture change. The separator holds back the rest of the pile of pictures. The separated picture then falls in the slider member to the bottom or is pressed to the bottom by auxiliary springs, and is forced by the slider member, during its return stroke or insertion stroke, through a lower slot under the separator, it being pushed between a pressure arrangement and the pile to insert it at the bottom of the pile. The picture previously second from the top now lies against the viewing window for observation, and the operation can, if desired, be repeated to enable all of the pictures in the pile to be displayed in turn.

These designs can be used when the picture thickness is adequate and when the pictures are precisely planar, but their operation is not reliable with thin or deformed pictures from which the hook can slide. Not only does this interfere with the operation but also damage to the picture surface and also that edge of the picture on which the hook must repeatedly engage can occur.

It is an object of the invention to create a picture storage box and viewer device which has a functionally reliable transporter member that does not damage the pictures.

According to the present invention there is provided a picture storage box and viewer device comprising a housing, having a viewing window, for accommodating a pile of pictures lying with the picture side facing the viewing window, which device has at one side an aperture through which a slider member may be withdrawn and returned, and a picture change mechanism, consisting of a pile support means and a transporter element, arranged to co-operate with the slider member in order that when the slider member is withdrawn a picture, held in engagement with the transporter element by a spring arrangement, is removed from one end of the pile, and when the slider member is returned the slider member returns that picture to the pile of pictures at the other end thereof, wherein the transporter element includes a high friction element which is rotatable and can be brought into frictional engagement with a picture to remove the picture from the pile, which element is rotated by the withdrawal movement of the slider member from the housing.

Although its operation during removal of a picture presents no problems, driving the

rotatable retentive element by means of the slider member produces the difficulty that during the return stroke the retentive elements, which are then being driven in the reverse direction, might catch on the picture then being viewed. Whereas this may possibly be tolerable in the case of framed pictures or very rigid pictures, in a further development of the invention which can be used for all types of pictures, the operating chain comprising slider member, transporter member and pile of pictures, is interrupted during the return stroke of the slider member. This can be effected in a variety of ways: either the drive for the slider member/transporter member may be uncoupled for the return stroke or the distance between the pile of pictures and the transporter member may be increased, either by moving the pile away from the stationary retentive element or lifting the retentive element off the stationary pile.

Embodiments of the invention will now be described with reference to the accompanying drawings, of which:

Figures 1 to 5b relate to a first embodiment in which Figures 1 to 4 each show a highly schematic longitudinal section through the device in various operating positions of the slider member during picture change and Figure 5a is a partial plan view of the pressure arrangement while Figure 5b is a sectional view along the line 5b—5b in Figure 1;

Figures 6 to 12 are associated with a second embodiment, wherein Figures 6 to 9 show the phases of the picture change analogously to Figures 1 to 4 and Figures 10 to 12 show details; and

Figures 13 to 16 show a further embodiment in partially broken away sections, of which Figures 13, 15 and 16 are longitudinal sections and Figure 14 is a cross-section.

The following features are common to all three embodiments:

The separator is mounted in the housing; in modified embodiments it could alternatively be mounted on the slider member. When the picture is changed the picture facing the viewing window is removed from the pile and pushed back beneath the pile; the reverse sequence is possible without departing from the invention. Changing the complete pile is effected by a separate lid which is arranged opposite the aperture of the housing; constructions in which the housing is hinged at the top or at the bottom or in which, for example, by pivoting away the separator the slider member can remove the entire pile, are also possible.

The illustration of the devices in the drawings is limited to the elements required for operation and the drawings are extensively schematicised; they serve merely to explain the basic principles of the invention.

The first embodiment (Figs. 1 to 5b) comprises a housing 1 with a viewing aperture or window 13, which can be closed by a transparent plate. A slider member 7 can be pulled parallel to the window 13 out of the housing through an

aperture 14 in the housing, the movement being limited by stops (not shown). A pile 15 of, for example, twenty pictures, is arranged beneath the window 13 with the picture side facing this window, and is pressed against the frame parts of the housing 1 that surround the window by a pressure arrangement 3 (Fig. 1). The narrow side of the housing 1, on the left in Figures 1 to 4, is closed by a lid 2, which can be clipped in or hinged and which, when removed, allows the pile 15 to be changed.

The pressure arrangement 3 comprises a pressure plate 16, supported by leaf springs 17 which are secured to the base 18 of the housing. The pressure plate has a bulge 8 or is arched to the same effect, so that there is always a gap between the lower edge 19 of the pile facing the slider member and the underlying front edge 20 of the plate 16, into which gap a picture can be inserted (Figs. 3 and 4).

A separator 6 is fixed in the housing. Above the separator the framework of the housing has an approximately rectangular chamber 21, in which is located the transporter comprising a "bearing pin" 25 having an elliptical cross-section mounted in fixed position, a retentive element 23 being mounted on this bearing pin. The retentive element is a short length of tubing of layered construction, of which the inner face facing the pin 25 has a very low coefficient of friction against the material of the pin but of which the outer face, for example, as a result of rubber-coating, exhibits a very high static friction both to the picture support material (i.e. the paper on which it is formed) and to the material of which the slider member consists.

The arrangement is so designed that the underside (or the "lower side") of the retentive element 23 is slightly lower than the lower edge 12 of the frame surrounding the window 13, with which frame the upper edge of the side bars 24 of the slider member 7 is flush.

The long axis of the ellipse forming the cross-section of the pin 25 is furthermore so long that as the retentive element rotates on the pin 25 the uppermost picture 11 is held on a part of its surface close to the slider member, and the long axis extends beyond the separator 6 so as also to convey the rear edge of the picture over the separator.

The slider member has a U-shaped outline with lateral arms 26 (Fig. 5a), and a transverse arm 27 at the end face as well as side bars 24, projecting upwards from the lateral arms 26, and a front bar 28 which closes off the housing aperture at the front when the slider member is pushed in. The slider member can be pulled out by a pull 29.

Arranged in the central region of the base of the housing left clear by the U-shaped outline of the slider member are the springs 17, already mentioned, as well as a disabling mechanism, the function of which is explained hereinafter. It comprises a rigid control plate 30, guided in guides 31 formed on the base 18 of the housing, of which plate a transverse part 32 lies above and

further from the housing aperture than the leaf spring 17, when the control plate 30 is in its rest position (Figs. 1 and 2). Lateral projections 33 from the control plate 30 are disposed in the path of movement of inwardly projecting abutments 34 formed on the lateral arms of the slider member.

The operation of the device is as follows:

In the closed position (Fig. 1), the uppermost picture 11 lies against the lower edge 12 of the window frame. It also lies against the underside of the retentive element 23, against which the lateral bars 24 also lie at the side of the pile of pictures 15. When the pull 29 is pulled to the right the slider member rotates the retentive element as a result of its frictional contact with the side bars 24, which element is pliant enough to follow the elliptical shape of the pin 25 as it rotates so that the picture 11 is conveyed out at the speed of the slider member. The frictional contact between picture and transporter is assisted by the pressure arrangement 3. The separator 6 acts as a stop for the remainder of the pile since the gap between separator and retentive element 23 allows only one picture to pass through (Fig. 2). In the outermost position of the slider member (Fig. 3) the transporter has moved the picture 11 right over the separator 6 and it has dropped down onto the slider member. Shortly before this the abutments 34 have met the projections 33 of the control plate 30 and have pushed this towards the housing aperture 14, the transverse part 32 of the control plate 30 sliding onto the leaf spring 17 and in so doing urges the spring downwards. As a result of the resiliency of the leaf spring 17 the control plate 30 remains held in this position by friction. In the course of this the plate 16 is pulled down so far towards the base 18 of the housing that it is lower than the upper side of the lateral arms 26 of the slider member, on which arms 26 the picture 11 rests, so that this picture can safely be pushed between edge 20 and pile edge 19 when the slider member is moved back. In the course of this the plate 16 remains clamped down with the result that the retentive element 23 although now driven by the slider member in the opposite direction of rotation, turns freely, because it does not bear against the now uppermost picture 11'. The return movement of the slider member is consequently unimpeded until the control plate 30 is pushed back into its initial position as a result of the inner side of the end arm 27 of the slider member 7 pushing against it. A further guide member 35 is provided in the base 18 of the housing for a button 36 with which, even when the slider member is pushed in, the control plate can be shifted from the outside into the position disabling the pressure arrangement 3, the slider member being, of course, pushed out slightly; this button is operated before the lid 2 is opened so as to enable the pile of the pictures to be changed or, even when the pictures are not to be changed but are to be stored or dispatched; the effect of the

button 36 is to remove the pressure from the pile of pictures.

The embodiments according to Figures 6 to 12 again have the main elements that were provided in the first embodiment: a housing 101 with a lid 102, a pressure arrangement 103 arranged in the housing for a pile 109 of pictures, a slider member 108, and a separator 107 mounted in the housing. The pressure arrangement 103 has an arm 104 projecting down centrally from the housing outlet, the free end of which arm engages in a guide aperture of a button 105. On displacing the button 105 to the right this presses on the upper side of the arm 104, which in turn pulls the entire pressure arrangement 103 downwards.

As can best be seen in the cross-section in Figure 10, longitudinally extended friction belts 106 parallel to the direction of withdrawal of the slider member are disposed at both sides on side walls 120 of the housing 101, which belts are supported by means of several pins 117. The pins 117 are formed on the side wall 120 of the housing.

The lower sides of the friction belts bear against the uppermost picture 115 of the pile 109 of pictures, pressing on its outer lateral edges 114. Outside the pile 115 of pictures, the friction belts have saw teeth 111 which engage a ratchet tooth 113, shaped in or attached to the lateral bar 110 of the slider member 108. The saw teeth 111 are so designed that when the slider member is drawn out, the friction belts 106 are taken along by the ratchet tooth 113 and the division of the teeth is so dimensioned that the withdrawal distance of the slider member is an integral multiple of the division spacing, so that the slider member, when pushed in, again accurately engages with a tooth of the saw teeth 111. When the slider is pushed in, as in the case of the first embodiment, the rotating transporter element must not contact the topmost picture since this would be damaged or at least placed under severe stress. It is for this reason that saw teeth are used so that the ratchet tooth 113 rides past under the saw teeth.

The uppermost picture 115 is transported over the separator 107 as a result of the fact that the total extension of the friction belts, which here play the part of the transporter elements, extend beyond the separator and the withdrawal path of the slider member is correspondingly longer than the relevant measurement of the pictures.

So that the withdrawn picture 115 is on the return of the slider member introduced under the pile again, the spring of the pressure arrangement has a downwardly extending tongue 116, which is shown in Figure 9; obviously it is possible in this case to provide slider member-controlled release of the spring pressure as in the first embodiment, but this is not shown here. It is possible in this case to make use of the button 105 to relieve the spring pressure, the purpose of which has already been described above, and which is normally operated only when the lid 102

is to be removed for the purpose of changing the pile.

Instead of providing the support or bearing of the transporter element 106 on fixed pins 117 as shown in Figure 10, it is alternatively possible to provide rotatable pins 18, as indicated schematically in Figure 12. Obviously such continuous pins can be provided in only that part of the housing covered by the frame of the viewing aperture 122.

Instead of providing teeth on the transporter element it is also possible for it to be driven by simple friction by the slider member, using a resiliently mounted lever to press the transporter against the slider member, the angle of the lever being so chosen as to provide the preferential drive in the withdrawal direction.

In the embodiment according to Figures 13 to 16, it is possible to identify again the elements known from the second embodiment, a housing 201 with lid 202, a slider member 209, a pressure arrangement 203, a button 205, arranged in the base, engaging with a middle bar 204 of the pressure arrangement, and a separator 208. The operation of these parts will therefore not be explained again.

There is arranged in a chamber 220 in the housing a first transporter element 206 in the form of a roller provided with a retentive covering, which by its bearing pins 222 is mounted in inclined grooves 216 in the lateral walls of the housing. In the starting position or closed position as shown in Figure 13 the bearing pins 222 of the roller 206 are disposed at the lowest point of the inclined grooves 216 and are held in this position by small U-shaped springs 217. In this position the circumference of the roller bears against the uppermost picture 226.

If the slider member is now operated, the roller is rotated by the friction contact between the upper edge 211 of the slider member side bar 228 and takes with it the uppermost picture 226 until pins 215 formed on the rear end of the slider member strikes the bearing pins 222 and pushes these forwards and at the same time along the grooves 216 upwards, until the bearing pins 222 fall under the action of the springs 217 into recesses 230 and stop there whilst the slider is pushed back again.

In this manner the transporter element 206, during the return stroke of the slider member, is lifted with respect to the uppermost picture and is thus inactive. Counter stops 218 close to the pull part of the slider member then push the transporter element 206 back out of the recesses 230 so that they can roll back along the inclined grooves 216 down into the starting position, assisted by the springs 217.

When the uppermost picture 226 has passed from between the remainder of the pile and the transporter element 206, it is no longer driven by the latter and would remain between the separator 208 and the upper side of the housing if further transport were not provided by a second transporter element 207. This transporter

element is a roller provided with a retentive covering, similar to the transporter element 206, which roller 207 cannot, however, be disengaged from its drive; the drive is provided by the underside of a bar 213 of the slider member lateral bars 228. The distance between the bar 213 and the base part of the bar 228 is large enough for it to be possible not only for the second transporter element 207 to be mounted here but also for a fastening means 219 of the separator 208 to extend through the slot and be fixed in the housing 201.

The second driven transporter element 207 conveys the uppermost picture 226 right over the separator 208, after which it falls down or is pressed down by auxiliary springs (not shown) and is pushed under the separator 208 and back under the pile, as in the second embodiment. The disengagement of the second transporter roller 207 is not necessary since it can rotate without difficulty in the opposite direction when there is no picture clamped between the separator 208 and the upper side of the housing.

Changing the pile by removing the lid 202 with the pressure arrangement 203 moved down is effected as in the second embodiment described above.

It is also pointed out that between the slider member and the rotating transporter on the one hand, and the transporter and the picture to be driven on the other hand, a gear transmission may be provided in such a manner that the picture is given a higher linear speed than the slider member itself, so that the slider member can be of minimum length and nevertheless the picture is completely removed from the pile and conveyed past the separator. This is clearly visible in Figure 14 but applies equally to the other embodiments. There are equivalent means to obtain such operation: supplementary acceleration of the one picture by, say, a spring biased by the slider member, or auxiliary transporter means, as a hook or the like, subjected to a high transmission ratio and acting only over the last portion of the picture path.

Furthermore it is not absolutely necessary for the separator to support the pile at the end face. A lateral friction-contact support can alternatively be provided for the pile.

The withdrawal of the slider member can be used to tension a spring arranged in the housing which then pulls the spring back again, or conversely the slider member may be under spring pressure and be triggered by a button or the like, whilst the spring is retensioned during insertion of the slider member.

Finally, it is also not essential for the transporter element to be mounted on the housing. If the slider member is so formed that it takes the entire pile out with it, the transporter element could be arranged on the slider member and be driven in counter-rotation in such a manner, for example by friction contact with the housing, that the one picture to be held back is held in the housing.

It will be understood that the transporter must be designed so that it will at first engage the adjacent picture, i.e. it must engage before the separator. On the other hand, the transporter must convey the picture beyond the separator and thus be active up to this point at least. In the embodiments described, this problem is solved by provision of each a roller in front and behind the separator or of a tape conveyor extending over the separator. An alternative design would employ groove guides extending across the separator and a roller movable along said grooves and blocked against rotation during such longitudinal movement but rotatably driven by the slider member at the end of the groove where the blocking is released. Therefore, the picture is picked up by the roller and transported a first path by frictional engagement without rolling action and further moved by rotation of the roller. The roller shaft may be rectangular adapted to the slot configuration, the slot having beyond the separator, a widened circular shape apt to serve as a bearing for the square roller shaft end.

The device may be provided with further modifications alternatively or in combination, in order to improve its usefulness.

These modifications include pliable support at the back face, means to hang the device as a frame, interchangeable additional frames to be fastened by some means at the front face and having different shapes and surface treatments, the biasing of the slider by means of a spring into its fully opened or fully closed position, the provision on the housing wall including the window of a multiplicity of windows one related to a pile of pictures, and another one to a pile of text cards, picture and text possibly being disposed on a common information carrier. Further, the window wall of the housing may be provided with space to permit a user to make notes thereon.

Further, it is possible to provide a space within the device, preferably stationary within the housing, to store, the negative belonging to the photo negative disposed in the slide. Finally, the device may be provided with a window at both its front and its rear face with, of course, two different sliders mounted in parallel.

Reference is made to six co-pending British patent applications filed concurrently with this application by the same applicant, which disclose arrangements which may be within one or more of the claims of this application and which have claims which may be infringed by the embodiments described herein. The co-pending applications are 78.37449, 78.37451, 78.37452, 78.37453, 78.37455 and 78.37536.

Claims

1. A picture storage box and viewer device comprising a housing, having a viewing window, for accommodating a pile of pictures lying with the picture side facing the viewing window, which device has at one side an aperture through which a slider member may be withdrawn and returned,



element is a roller provided with a retentive covering, similar to the transporter element 206, which roller 207 cannot, however, be disengaged from its drive; the drive is provided by the underside of a bar 213 of the slider member lateral bars 228. The distance between the bar 213 and the base part of the bar 228 is large enough for it to be possible not only for the second transporter element 207 to be mounted here but also for a fastening means 219 of the separator 208 to extend through the slot and be fixed in the housing 201.

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Claims

1. A picture storage box and viewer device comprising a housing, having a viewing window, for accommodating a pile of pictures lying with the picture side facing the viewing window, which device has at one side an aperture through which a slider member may be withdrawn and returned,



and a picture change mechanism, consisting of a pile support means and a transporter element, arranged to co-operate with the slider member in order that when the slider member is withdrawn a picture, held in engagement with the transporter element by a spring arrangement, is removed from one end of the pile, and when the slider member is returned the slider member returns that picture to the pile of pictures at the other end thereof, wherein the transporter element includes a high friction element which is rotatable and can be brought into frictional engagement with a picture to remove the picture from the pile, which element is rotated by the withdrawal movement of the slider member from the housing.

2. A device according to claim 1, wherein during the slider member return stroke, the distance between said one end of the pile and the high friction element is increased in comparison with the corresponding distance when the slider member is withdrawn.

3. A device according to claim 2, wherein for the purpose of increasing the distance the spring arrangement for holding a picture in engagement with the transporter element is disabled.

4. A device according to claim 3, wherein the spring arrangement on the one hand, and the slider member on the other hand have control elements that enter into operative engagement for the disablement of the spring arrangement as a result of return movement of the slider member.

5. A device according to claim 3 or 4, including an additional, externally operable, disabling member for disabling the spring arrangement.

6. A device according to claim 1, wherein the rotary drive of the high friction element is disabled when the slider member is returned.

7. A device according to claim 2, wherein the entire high friction element can be moved away from the pile when the slider member is returned.

8. A device according to claim 7, wherein the moving away of the high friction element is effected by means on the slider member.

9. A device according to claim 8, wherein further means is provided on the slider member for moving the high friction element back again when the slider member is fully returned.

10. A device according to any one of claims 1 to 9 in which the pile of pictures is retained in the housing and the transporter element is mounted on the housing and is driven by the slider member.

11. A device according to any one of the claims 1 to 9, in which the slider member is designed for taking along the pile of pictures and carries with it the transporter element which when the slider member is withdrawn is rotated by the housing, which element is arranged to hold one picture back in the housing.

12. A device according to any preceding claim, including a gear transmission by means of which the transporter element is rotated so that the linear speed of the slider member relative to the housing is lower than that of the picture relative to the rest of the pile of pictures.

13. A device according to any preceding claim, wherein the transporter element includes a flat belt which projects beyond the edge of the pile of pictures parallel with the direction of movement of the slider member.

14. A device according to claim 13, wherein the belt is provided with asymmetric teeth which engage with a projection for driving the belt.

15. A picture storage box and viewer device substantially as described herein with reference to Figures 1 to 5b, Figures 6 to 10 or modified as described with reference to Figure 11 and/or 12, or Figures 13 to 16 of the accompanying drawings.