

SPECIFICATION

Picture Storage Box and Viewer Device

The invention relates to a picture storage box and viewer device, and particularly to such a device with a picture change mechanism by means of which the picture displayed is changed for another stored in the box.

Such devices are intended to present to an observer (or to a camera) the viewing side or the exposure side of a pile of pictures or plates. After the viewing or illumination, the picture is pushed laterally away from the top of the pile and pushed under the pile again on the other side. For this purpose previously proposed devices have, basically, the following co-operating elements:

The pile—in the following description reference is made only to a pile of pictures, although the principle applies equally to plates—is located in a housing having a viewing aperture which may be closed by a transparent plate. One narrow side of the housing is open, and through the aperture a slider member may be moved, between limit stops, such that when it is pulled out it takes with it by means of a transporter the picture facing the viewing window. In this operation the picture concerned is guided over a member referred to here and hereinafter as a separator, which serving as a "pile-holder" may be, for example, a transverse bar, which, near to the aperture provided in the housing for the slider member, leaves only a slot open at the top and the bottom for a picture to pass through. The transporter of the slider member, which is constructed like a hook, therefore takes with it only this one picture, whilst the remainder of the pile is held adjacent to the separator. During the return stroke of the slider member, or as it is re-inserted, the picture pulled away through the upper slot is pushed back again through the lower slot and in so doing goes to the bottom of the pile. A pressure arrangement using a spring holds the pile and, in particular, the uppermost picture, against the viewing aperture.

In the known devices the entire housing is therefore closed on all sides with the exception of the viewing aperture—which is designed to be smaller than the pictures—and the separator slots and passages for the slider member already mentioned, so that to insert or remove a pile of pictures additional measures are necessary.

In the two constructions which have been proposed, the housing base may be detachable or may be hinged back, and in a further proposed construction the housing has a closable aperture on the narrow side opposite the slider member. It has also been proposed that an entire magazine of pictures can be exchanged.

These means for inserting or removing a pile of pictures are not only expensive but also complicated to handle.

It is an object of the invention to provide a device in which the removal and the insertion of a pile is effected in such a manner that an additional aperture in the housing and

corresponding lid or magazine parts is not necessary.

According to the present invention there is provided a picture storage box and viewer device comprising a housing for accommodating a pile of pictures, the uppermost one of which lies beneath a window in the housing, a slider member that can be pulled out of the housing parallel to the viewing window and re-inserted again, and a picture change mechanism including a transporter, by means of which, in use, a picture is removed from one end of the pile as the slider member is pulled out and as the slider member is pushed in is guided to the other end of the pile, and a holding device for preventing the remainder of the pile being affected by the transporter, wherein an externally operable device is provided for disabling the picture change mechanism so that the entire pile can be removed from the housing by means of the slider member.

By the invention, the mounting of an additional component is avoided and the user has no difficulty handling the device because the changing of pictures and the exchange of the pile is effected by means of the same operating element and at the same place.

When the separator is mounted in the housing and the transporter is mounted on the slider member, a disabling arrangement, which may be externally operated, ensures that, on its operation or in its operative position, the separator is pivoted away, pulled away, folded up or rendered ineffective in some other manner, whilst the slider member takes with it not only one (the uppermost or the bottom-most) picture but all the pictures of the pile, the transporter or an additional element in that case acting on the whole pile.

With such a construction the change of the pictures is to some extent simulated as if carried out manually; one picture is removed and placed beneath the pile. However, the invention is easier to realise by a different principle in which the change of pictures is effected in such a way that the slider member takes with it and re-inserts the entire pile with the exception of one picture which is held in the housing. The change-over mechanism can then be disabled in a much simpler manner to allow the removal of the entire pile than is the case with the conventional principle, because the disabling affects only the transporter (which in this case, in fact, is more of a "retaining element"), and the separator takes with it the entire pile without further steps needed to engage the extra picture.

The uppermost or the bottom-most picture of the pile remains in the housing to effect a change in the displayed picture. When, as customary, a spring pressure arrangement is provided which presses the pile against the viewing window and holds the picture in engagement with the transporter, then the disabling can be carried out by rendering the spring pressure ineffective and thus also the operative connection between the transporter and the picture; of course, the

transporter can also be disengaged in other ways. In this operation the transporter may be constructed as a hook, which is, however, not suitable when the pictures are thin and not planar, but possibly curved. If, on the other hand, a high friction or retentive covering enabling surface engagement with the pictures is used as the transporter, for instance using a commercially available plastics material having surface molecular structure to which fairly smooth-surfaced articles adhere firmly without sticking, then such a retentive or adhesive covering may be provided on the pressure arrangement so the transporter can be disabled in a single operation. In this case it is sufficient to withdraw the retentive covering to a position below the surface of the bottom-most picture, and in a further development of the invention the means provided for this purpose may be allowed to act additionally also, in principle, during every return stroke of the slider member, that is to say, during the picture change operation, so that the retentive covering does not hinder the re-insertion of the pile.

If, however, the retentive covering lies on the side of the pile remote from the pressure arrangement, then on the withdrawal of the pressure arrangement a picture still clinging to the retentive covering for instance can be pushed off by means of a weak counter-spring or the like.

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 division of the housing wall including the window into a multiplicity of windows each 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 spaces 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, e.g. the negative belonging to the photographic print disposed in the slider. Finally, the device may be provided with a window both at its front and at its rear face, in which case, of course, two different sliders would be mounted in parallel.

In order that the invention may be fully understood and readily carried into effect, embodiments will now be described with reference to the accompanying drawings, of which:

Figure 1 shows a highly schematic plan view of one embodiment of the invention from above on to the housing with the lid removed and with the slider member pushed in;

Figures 2 to 5 show in schematicised

longitudinal section through the device of Figure 1 the sequence of the change-over operation, to clarify the co-operation of the slider member and the spring plate;

Figures 6 to 9 illustrate the same stages as Figures 2 to 5 during a picture change, but with a pile of pictures inserted;

Figures 10 to 13 show the sequence of withdrawing the whole pile, similar to the sequence in Figures 2 to 5;

Figures 14 to 17 show the withdrawal of the pile, with the pile of pictures illustrated, similar to Figures 6 to 9;

Figure 18 is a schematic cross-section through the device of Figure 1;

Figure 19 is an illustration in cross-section, partially broken away, on a larger scale than Figure 18;

Figure 20 shows details, discussed with reference to Figure 19, of the housing in a perspective view;

Figures 21 to 26 illustrate an embodiment in which the transporter is arranged on the slider member, the separator is arranged on the housing and may be moved away for the withdrawal of the pile, wherein Figure 21 shows the device in its closed state, Figure 22 shows the device with the slider member pulled fully out and the spring arrangement relaxed, Figure 23 shows the device with the slider member pushed half-way in, Figure 24 shows, on a larger scale than the previous figures, the pivotable separator in two end positions, Figure 25 illustrates the pivoting separator from the front in the change-over position (left half of the picture) and in the withdrawal position (right half of the picture), and Figure 26 shows only schematically an arrangement in which the uppermost picture is removed from the housing and for this reason the separator is constructed to act reciprocally;

Figures 27 and 28 show in plan view and schematic side view, respectively, an embodiment of the pressure arrangement alternative to the pressure arrangement of Figures 1 to 20;

Figures 29—29c illustrate shelving elements to accommodate picture viewers particularly designed for photo prints;

Figures 30a, 30b and 31 show schematically designs for the housing;

Figures 32 to 41 relate to the design of the portion that is gripped;

Figure 42 shows a means facilitating operation of the slider member;

Figures 43 to 48 show variations of an element holding down a pile of pictures;

Figure 49 shows one possibility of constructing the separator from a material other than the material of the rest of the slider member and the housing;

Figure 50 relates to an advantageous variation in the manufacture of the device; and

Figures 51 to 52c show possibilities for the initial assembly of the slider member in the housing.

Figures 1 to 20 relate to a first picture storage

box and viewer device embodying the invention. The device has a housing 100 for accommodating a pile of pictures. The housing 100 comprises a base plate 102, side walls 104, a back wall 106 and a lid 108 having a viewing window 110. A slider member 112 that can be pulled out of the housing parallel to the viewing window and re-inserted again is movably guided between stops which are constructed in the side walls 104, consists of base bars 114, side bars 116, one front bar 118 and a separator bar 120. A pull 122 for pulling and pushing is formed on the front bar and a holding-down lug 124 is also formed on the front bar.

In the housing there is a pair of springs 126 biased to arch upwards, one end of each of the springs being anchored in the housing base plate 102 whilst the other end of each spring is able to execute a restricted sliding movement along the base plate. The springs 126 press against the main limbs 130 of a pressure plate 128 and urge this upwards; as indicated in Figure 1, the springs 126 are integral with the pressure plate and the arms of the springs 126 facing the back wall 106 are spaced further apart than the arms facing the front bar 118 of the slider member. The pressure plate forms part of a picture change mechanism.

The two main limbs 130 of the pressure plate 128 are joined together by a cross member 132 on which a central limb 134 is shaped. Finally, auxiliary limbs 136 extend additionally from the cross member 132. The functions of these elements will be explained in detail later.

In the base plate 102 there is formed a guide 138 parallel to the direction of movement of the slider member, in which guide a button 140 may be slidably moved. The button 140 is urged towards the back wall 106 as far as a stop (not shown) by means of a restoring spring 142 and has a central hole in which the central tongue 134 of the pressure plate slides. The button 140 is an externally operable device for disabling the picture change mechanism so that the entire pile can be removed from the housing by means of the slider member.

Control abutments 144 and 146 are shaped on the lateral bars of the slider member and their function will also be explained later.

On the main limbs 130 of the pressure plate there are mounted, e.g. glued, strips 148 of a commercially available plastics material which with only a slight contact pressure exerts an unusually high retentive force.

As will be realised, the pressure plate is intended to hold fast the bottom-most picture of the pile as the slider member is pulled out, while the separator bar takes with it the other pictures. The pressure plate acts as a transporter in that it causes a picture to be removed from one end of the pile and enables that picture to be guided to the other end of the pile. The separator bar acts a holding device for preventing the remainder of the pile being affected by the pressure plate or transporter. When the slider member is returned, however, the effect of the upward application of

pressure by the plate must be considerably reduced. The sequence of operation will be explained first of all with reference to Figures 2 to 5, without the pile inserted.

Figure 2 shows the initial state. The pressure plate lies under the influence of the springs 126 against the window 110 and the lid 108; the separator bar 120 is located between the pressure plate and the back wall 106. If the slider member 112 is now pulled, then the inclined face of the separator bar presses on the edges of the main limbs 130 that are facing it and these move downwards, as the springs 126 yield. The other end edges of the main limbs are, however, as before, pressed upwards. The control abutment 144 thus does not strike a control edge 150 of the main limb 130, which takes the form of a lateral extension thereof, because it slides away beneath the abutment 144. In the final position of the slider member (Fig. 4) the separator bar 120 is pressing the front edges of the main limbs 130 downwards, and because of a "rocking movement" the rearmost edges of the same are correspondingly raised. If the slider member is now pushed in again, then the separator bar presses the pressure plate further down again, but the lowest position of the plate is now near to the front edges, that is to say, nearest the slider member. Therefore, the control abutments 144 now engage over the control edges 150 of the pressure plate and hold this down until the slider member has returned almost to its initial position again where the control elements disengage again and the pressure plate moves rapidly upwards again (cf. Figs. 1 and 5).

The actual picture change sequence proceeds as follows (Figs. 6 to 9): To begin with the pressure plate is loaded with a pile 152 of, for example, twenty pictures and therefore lies lower down than illustrated in Figure 2. As the slider member is pulled out, the separator bar takes with it all but one of the pictures of the pile, since the separator bar "sweeps" over the pressure plate. The bottom-most picture 152' however, against which the retentive covering 148 on the main limbs 130 directly presses from below, is held fast by the retentive covering and remains lying on the pressure plate 128. For the rest of the pile, the procedure takes place as described above with reference to Figure 3. Finally, the slider member reaches its end position shown in Figure 8, in which the pictures 152 fall at the front on to the base bars 114 of the slider member whilst still lying with their rear edges on the pressure plate. As soon as the separator bar 120 has slid over the ends of the auxiliary limbs 136 that are slightly biased in an upward direction, the picture 152' that has remained behind is pressed upwards a little by these ends at this (front) edge, so that when the slider member is re-inserted the rear face of the separator bar 120 pushes between the pressure plate and this picture 152' and raises the picture sufficiently far for it to be brought upwards over the upper edge of the separator bar. On further movement of the slider

member its separator bar therefore slides below the picture 152' that positions itself in the final position as the uppermost picture on the pile 152. The insertion of the pile is thereby not hindered by the retentive covering 148 since, as mentioned above, the pressure plate is held down by the control elements 144, 150.

If the entire pile is to be removed, then the button 140 is displaced towards the front. As is apparent from Figures 10 to 13, the central tongue 134 of the pressure plate is downwardly curved so that an S-shape, which is straight in plan, is produced, the lower end of which projects into the button. If the button is displaced out of the position shown in Figure 10 into the position shown in Figure 11, then it presses on the upper inclined face 154 of the central tongue 134 and pulls the complete pressure plate 128 down against the force of the springs 126, and in fact pulls down until the upper side of the retentive covering 148 is lower than the surface of the base bars 114 of the slider member 112. Thus, when the slider member is pulled out, the entire pile 150 is taken with it, as the pile now lies on the slider member itself. As a result of the biasing of the springs 126 and the friction contact of the central tongue 134 in the button 140, the button is not pulled back by the spring 142 which is weak in comparison. However, when the control abutment 146 strikes with its sloping control face 156 on the control edge 150, the pressure plate is pressed down even further and in this manner terminates the clamping between the button 140 and the central tongue 134 so that the button is pulled by the spring 142 into its rest position (Figure 12). Nevertheless, the control abutment 146 holds the pressure plate below the level of the base bars of the slider member so that the pile can be pulled out unimpeded to its full extent. Near to the end of the path movement the control abutment 146 releases the control edge 150 again; the springs 126 are able to press the pressure plate upwards again at its rear edge whilst at the front it is still held down by the separator 120.

From the above explanations the sequence can be followed again with reference to Figures 14 to 17 when a complete pile is to be removed; the positions of the slider member according to Figures 14 to 17 are analogous to those of Figures 10 to 13.

Figure 18 shows once again the relative positions of the base bars 114 on the one hand, and the pressure plate 128 on the other hand when the button is in the removal position.

In principle, it would also be possible to return the button into the rest position by means of a control member (not shown) simply during the return of the slider member.

However, it may be seen that in the embodiment illustrated there is the advantage that by holding the button firmly in the removal position, the device can be held permanently ready for the removal operation, which is important in conjunction with the stacking frame

which is still to be described, or during despatch of delicate pictures.

The operations that are effected by the pressure plate will now be summarised once again.

During *picture change-over*, the pressure plate is always held straight with the line of contact of the separator (transversely to the movement of the slider member) on the bottom-most picture. The picture to be retained is consequently clamped reliably in the position required. During the return of the slider member on the other hand the control elements 144 to 150 hold the pressure plate below the level of the base bars of the slider member (or other support means, e.g. on the base plate of the housing) so that the retentive covering 148 does not touch the underside of the pictures.

During the *change-over of the pile* the pressure plate is brought into the same position as during the change-over return stroke but by means of a button that can be actuated separately. This can be held in the position in which the pile can be changed as the slider is withdrawn, but springs back automatically without further manipulation into picture change-over position at the end of the withdrawal movement. It will be seen that in this manner the device is fool-proof.

The pressure plate is so constructed that it also reliably holds fast badly curved pictures and permits the change-over and removal procedure to take place. In order to deal with such "bent" pictures, however, a series of further features is provided in order to prevent incorrect operation.

Pictures that are curved downwards about the transverse axis—at right angles to the direction of movement of the slider member—could lead during the picture change to the topmost or a few of the upper pictures not being pushed back by the end wall 118 of the slider member but being jammed between the end wall of the slider member and the lid of the housing. For this reason the holding-down lug 124 is provided, beneath which the picture can be manipulated as they are inserted; further possibilities are discussed below.

Pictures that are curved in a reverse direction would not be able to allow the passage of the separator during the change-over process, but would push against this. In this case an especially low-friction material may be used for the separator, and instead of manufacturing the complete slider member in one piece in an injection moulding process, the separator may be attached as a separator part.

Pictures that arch downwards about the longitudinal axis could admittedly lie laterally on the base bars of the slider member during the return stroke of the slider member and in this way remain clear of the retentive covering of the pressure plate, but would push centrally on to the facing edge of the central limbs 132 of the pressure plate. For this reason the relevant edge of the pressure plate which is interrupted by the springs 126 and the auxiliary members 136, is designed to converge to a point, as is apparent

from Figure 1. A reverse arching of the pictures would not lead to any difficulties.

Although the pictures must, of course, lie freely in the slider member, disruptions might occur if the pictures were to lie crookedly. For this reason stop projections 160 and 162 which project from below and from above, respectively, are shaped on the back wall 106 and project to such an extent that they extend through recesses 164 and 166 of the separator 120 when this is in its inner end position (Figure 19). In this position one projection 160 in each case near to the lateral walls of the housing projects downwards from the lid thereof towards the interior and further inside a projection 162 projects upwards from the base plate towards the interior. The projection is aligned in the direction in which the slider member is pulled out with one of the retentive coverings 148, with the result that the corresponding recess 166 of the separator itself ensures that the separator cannot touch the retentive coverings. A further recess 168, which is formed in the slider member from above leaves room for the passage of holding-down cams 170 which project downwards from the lid and may be clearly seen in Figure 20: they have been omitted from the other figures in order to keep these clear. Their function is to press down the uppermost picture so far below the upper edge of the separator when the slider member has been inserted as to make certain that the slider member takes with it the uppermost picture. Similar holding-down cams that extend further down and are likewise indicated best in Figure 20 are located near to the front edge of the lid; they have the function of pressing the pile pulled out during the change-over so far below the level of the lower side of the picture 152' lying on the pressure plate that the sliding movement of the picture 152' over the separator is effected as far as possible without any hindrance. In Figure 19, the upper sides of the pictures are indicated below the cams 170 and 172 by broken lines 170' and 172'.

Finally, it is also apparent from Figure 19, in which however, this effect has been considerably exaggerated, how the picture held fast on the retentive coverings 148 is stressed by the separator 120 and thereby held so that it clings reliably.

The exact profile of the separator in the transverse direction depends on the type of pictures to be formed into a pile, on the choice of material and other components. A compromise must be made here between the space requirement occasioned by the necessarily inclined attitude of the separator, the fact that the separator must slide over the length of the firmly held picture but not pass the front edge of the pressure plate, and an optimum inclination for the faces of the separator. For fairly smooth plastics material an angle of about 45° to 60° has proved successful, although this angle need not be constant, as indicated only schematically in Figures 2 to 17, but may also vary along the

inclined faces or may be different on the two faces.

Figures 21 to 26 show an embodiment in which the separator is mounted in the housing and thus remains in the housing during the picture change of the pile.

A housing 301 accommodates a slider member 305. A spring arrangement 302 which may be disabled externally by means of a button 303 holds the pile against a viewing window 311. As the slider 305 is pulled, the uppermost picture is moved by the transporter on the slider member. The transporter is in this case constructed as a retentive or adhesive covering 306 which is arranged on an upper long bar 307 of the slider member.

A separator 304 may be pivoted about an axle 313 which is mounted on ribs 310 (see Fig. 25). A pin 308 is located on each side of the separator. These pins are guided in grooves 309 formed in the sides of the slider member and which can be seen to best advantage in Figure 22.

Only when the uppermost picture is lying completely in the slider member do the guide grooves 309 pivot the separator as the pins 308 follow the angle of the guide grooves. On the return stroke of the slider member, the action of the guide grooves is such that the separator is held in the pivoted state shown in Figure 22 and only after the slider member has been fully inserted is the separator restored to its original position by a part of the groove that is first inclined and then extends vertically upwards. On the return stroke of the slider member, however, an individual picture 312 that was previously uppermost has passed downwards and is pushed through the gap between the lower front edge 313 of the lowermost picture and a portion of 314 of the separator.

It will be seen that in this embodiment it is always the underside of the picture, that is to say, the side facing away from the viewing window 311, that slides over the separator edge, only during the return stroke is there sliding contact between the upper side of the picture and the underside of the last picture to the pile. This advantage is not, of course, present in the embodiment according to Figure 26 in which the bottom-most picture is removed and brought onto the pile again at the top; it should be noted that in this embodiment the separator 304 is inverted.

So that the entire pile may be removed, the button 303 is displaced to the right (Fig. 23) and in so doing presses on the top of an operating spring 315 connected to the spring arrangement 302. For this reason, in the position of the button 303 close to the housing aperture the pressure arrangement is disabled. The pictures now lie loosely in the housing and when, as the slider member is pulled out, the device is held somewhat downwardly inclined towards the slider member, the slider member takes the entire pile with it to the outside. So that the pictures can then be more easily removed, the bars 307 may be made so that they do not quite reach to the

front end of the slider member or they may alternatively be flexible or be arranged to open up when the slider member is removed.

Figures 27 and 28 show in schematic plan and longitudinal section, respectively, an example of a construction of the "pressure arrangement" assembly which may co-operate with the housing and slider member components shown in Figures 1 to 20 instead of the pressure arrangement construction shown in those figures.

The pressure plate is divided into two pressure plates 220 of the same construction. Each of them carries two retentive coverings 224 which are indicated by crossed hatching. Auxiliary springs 222 arch out of the pressure plates. On its under side, each pressure plate has a guide means in the form of an elongate slot 223 (see Fig. 28) in which the free outer arms of a doubly cranked wire 226 engage. The U-portion 228 of the wire can be pressed down by a sliding button 230 and thus renders the pressure plate and its retentive covering ineffective as explained above the force of pressure springs 232, cut out of the pressure plate and bent downwards, holding the slider member fast until a release cam (not shown) presses the pressure plates still further downwards so that the button 230 again snaps back into its initial position.

It is obvious that a wide variety of other constructions are possible, for example with wire of leaf springs, pawl- or cam-controlled constructions, constructions that may be pivoted longitudinally or transversely, expansible or rotatable constructions etc.

Furthermore, the rear face of the housing—which, in addition to the button, may also be provided with a label for writing on and/or a mounting bracket and/or an eyelet by which the device may be suspended—may carry the instructions for use and operation of the device, with the result that the top face having the window and the four adjoining lateral faces do not need to show any "technical features" but, on the contrary, may be made in their external appearance as a conventional picture frame.

Provision may furthermore be made for a spring to be tensioned (or compressed) as the slider is pulled out or pushed in, the spring then causing the reverse movement to be performed automatically.

Furthermore, especially with the last-mentioned embodiment, a damping member to reduce noise during the changeover process may be provided, for instance a tongue or the like formed from the plastics material of which the housing and/or slider member are made.

The device may be manufactured to match different picture formats, or, alternatively, a single large format could be manufactured and the surplus residual area can be left empty for annotation or other purposes, only the size of the viewing window being varied.

Finally, it should be noted that the picture change could also be effected by a motor, for instance for advertising-display devices or

episcope picture viewers.

As only one of many conceivable examples, the text below explains how a stable photograph library arrangement can be built up from devices according to the invention.

Figure 29 illustrates one tier of a single or multitiered arrangement in longitudinal section into which the devices shown in Figures 1 to 20 may be inserted. The housings 100 have formed in their back walls 106 in each case one or more holes 190 which are not shown in those figures. The tier of the shelf is designed as a case for the housing 100, with a base plate 192, lid 194, back wall 196 and lateral walls that are not visible in Figure 28. Fixing pegs 198 project from the back wall into the interior in alignment with the holes 190, and the fixing pegs may, as shown in the drawing, be arranged to lock positively in the holes. Since a picture change would then be pointless because the uppermost picture would not, of course, be visible, a stub 200 arranged on the base plate of the shelf presses the button 140 into the withdrawal position as the housing 100 is inserted, the button being held in this position so that when the slider member is pulled out, the entire pile is always brought out with it.

The illustration of Figure 29 is to be understood as schematic. In practice, there will be a tendency to combine the individual tier elements or shelving elements to blocks, keys and key grooves respectively being provided for this purpose on the outer faces thereof. Alternatively, shelving elements may be provided wherein, in addition to the device-receiving compartments, drawers are provided to receive photo negative strips and/or poor photoprints while the devices themselves house the usable photo prints. Such alternative shelving elements are illustrated in Figures 29a to 29c.

The shelving element shown in Figure 29a consists of a framework having a top 22, side walls 24 and—not visible in the drawing—a back and a base. The top 22 and the one side wall 24 are provided with projecting ribs 26 of dovetail cross-section, whereas the other side wall 24 and the base have grooves shaped in a complementary manner to the ribs; this enables similar shelving elements to be joined together to form blocks.

In the embodiment shown in Figure 29a, each shelving element has five compartments for the insertion of devices 28. The compartments are separated from one another by lateral ledges 30 that project into the interior of the shelving elements and are somewhat wider than would actually be necessary for accommodating the devices 28, that is to say, they are wider by the width of the front edge sections 32. These edge sections are provided with numbers, in this case from 1 to 5, allocated to the compartments. Their chief function is to ensure that, in the case of shelving blocks formed from several shelving elements joined side by side individual device 28 can still be gripped laterally and pulled out of the shelving element.

There are two drawers 34 and 36 below the five compartments. The uppermost drawer is intended to accommodate duplicates of prints, reject pictures and the like, whilst the lower drawer is intended and designed to accommodate negatives. The drawers are each provided with a release button 38, on the actuation of which the drawer is ejected by a spring into a position allowing the contents to be easily removed. Stops (not shown) limit the extent of the ejection movement; the construction of such drawers is known per se and is applied to tape cassette containers that are commercially available. In the region of these drawers the edge sections 32, the base and the ledges 30 are each lengthened by projecting portions 32', 21' and the two ledges are supplemented to form complete dividing shelves 30'; the external contours of the framework surrounding the drawers and which is formed in this manner is thus flush with the device 28 slotted in above it into the compartments.

The design of the individual devices may be similar to that described above with reference to Figures 1 to 20. Each device comprises a housing part 60 and a sliding part 62 which may be moved backwards and forwards relative to the housing by means of a pull 64. As explained above, the change-over mechanism of the change-over viewer consists of a spring arrangement which can be rendered ineffective by means of a control button 66 in the housing base which can be displaced in the direction of the movement of the slider member. If the control button is in the position further away from the slider pull 64, when the slider member is pulled out and pushed in the pictures change, but if the control button is displaced into the position closer to the slider pull, then the spring arrangement no longer pushes the pile of pictures towards a viewing aperture in the housing, and as the slider member is pulled out the pictures do not change, on the contrary, the entire pile of pictures in the slider member is ejected. In the case of photo prints, it may be desired that these do not lie under spring pressure whilst being stored, and moreover after the insertion of the device 28 into the shelving element, that the housing 60 remains in the compartment when the pull 64 is pulled but the slider member conveys the prints outwards. This corresponds to the abovementioned position of the control button closer to the slider pull and provision is therefore made for a control cam provided in the shelving element to urge the control button positively into this position as the device 28 is being inserted into the shelving element compartment; furthermore, it may be necessary, or desirable, for the housing 60 to be locked in the compartment in the fully home position. Devices for photo prints, i.e. photo print change-over viewers may be manufactured only in sizes for a few selected formats of photographic prints, of which formats "A" (9 cm x 13 cm), "B" (9 cm x 11.5 cm) and "C" (9 cm x 9 cm) have become accepted as the

standard formats. The shelving elements and devices of the embodiments illustrated are matched to these dimensions. All devices thus have the same width, corresponding to the measurement of 9 cm, but the change-over viewers at least will be made in the three different lengths, corresponding to the formats "A", "B" and "C".

It is furthermore preferred that the shelving elements shall be constructed to accommodate change-over viewers of all three formats. There are then, in principle, two possibilities:

(1) The depth of the compartments corresponds to the overall length of the change-over viewer for the smallest format "C"; the longer change-over viewers then project forward out of the compartments.

(2) The depth of the compartments corresponds to the overall length of the changeover viewer for the largest format "A", and behind the shorter change-over viewers there is an empty space in the compartment.

Since, on the other hand, each viewer must fit into each compartment, is to be locked there to its housing, and its control button is to be operated by means of the control cam, there is an interaction between the construction of the shelving elements and the construction of the change-over viewer, as will be explained with reference to Figures 29b and 29c, respectively.

Figure 29b is a substantially schematic longitudinal section through a shelving element similar to that shown in Figure 29a, but here with only one drawer 36 and five compartments. In the second compartment from the top there is inserted a viewer 28a for format "C", and in the fourth compartment from the top a viewer 28b for format "A". It will be seen that from the back 23 of the shelving element control cams 68 project forwards which cams were struck by the control buttons 66 of the viewers as these were inserted into the compartment, and pushed forwards. The final position of the viewers is thereby determined by small stubs 70 projecting inwards laterally from the sides 24, to which projections there are allocated complementary recesses 72 in the sides of the change-over viewer housing. With this construction, the distance of the control button and the recesses from the front edge of the change-over viewer housing must therefore be the same for all formats.

The alternative design is illustrated in Figure 29c in a schematicised sectional view, an embodiment of a shelving element for accommodating change-over viewers of different lengths, in which the depth of the compartment is matched to the shortest size of change-over viewer. The compartments 1 to 5 are, as in the case of the embodiment shown in Figures 29a and 29b, intended to accommodate change-over viewers, whilst below them the shelving element has one compartment having projecting portions of framework and a drawer for negatives.

In the second compartment from the top there is inserted a change-over viewer 80 C, and in the

fourth compartment from the top a change-over viewer 80 A. The first projects sufficiently far out of the compartment for its housing to be gripped at the lateral knurled tabs 52, whilst the latter, in accordance with its longer length, projects further out of the compartment.

As Figure 29c shows, in this case the change-over viewer housing can be locked by means of fixing pegs 84 projecting towards the inside from the back wall 82 of the shelving element, and the control buttons 66' are, for all change-over viewers, the same distance from the back wall 86 of the housing which is provided with a retaining bore 88 complementary to the head of the fixing peg 84.

It is to be noted that the control cams 68 shown in Figures 29b and 29c have the shape of rails with a central groove accommodating the spring 142 for control button 140; this detail has not been illustrated in Figures 29 to 29c to simplify the explanation of the shelving elements. It will, alternatively, be also possible to design the devices or the picture viewers without such bias spring 142 for button 140 in which case, consequently, the control cams would be simple bars acting on button 66.

An injection-moulding process for plastics is suitable for manufacturing the devices, wherein the housing is, for example, in three parts in order to obtain individual elements that may be easily removed from their moulds; the transparent plate covering the viewing window is advantageously manufactured separately so that rectangular, oval or other shapes can be used as desired.

Alternatively, instead of a thick, transparent plate, a transparent foil covering the parts of the frame around the viewing aperture can also be glued on from the inside.

The slider member can be injection-moulded in one piece and removed from its mould without difficulty.

So that when the device is empty the less aesthetic pressure arrangement is covered over, it may be provided with a glued-on paper or other covering which exposes only the retentive covering.

The pull on the slider member will not as a general rule be allowed to project forwards; on the contrary a construction will be chosen in which it lies flush with a section cut into the end face of the housing. It must be remembered that the housing, measured in draw-out direction of the slider member, is to be dimensioned such that its length is at least equal to the respective length of the pictures in the pile plus twice the dimension of the separator in the same direction; this may readily be derived from Figures 1 to 20. Hence necessarily, the housing must be longer than the pictures, but it is desired that at least space required for the slider handle (which in turn is indispensable) be provided within the confines of the housing. Moreover, it would be inconvenient to have such or other projections extending beyond the housing dimensions.

Designs under consideration of the above

mentioned requirements and of problems in connection with manufacture and assembling will be now discussed. The following figures relate to such design details.

Figures 30a and 30b show the housing 100 by itself in longitudinal section.

Figure 30a shows the simplest design whilst in Figure 30b the inner edges 110' near to the viewing aperture are bent inwards so that around the viewing aperture the picture is held lower down and thus an engagement on all sides is achieved.

Figure 31 shows the construction of the housing from three component parts, one bottom part, one top part and an inserted transparent plate 400, 401 and 402, respectively, being provided. In this manner the parts can be removed without difficulty from single-impression moulds.

In the preceding schematic illustrations, the pull on the slider member was an element projecting forwards. This is aesthetically unsatisfactory and increases the space requirement.

Figures 32 to 41 show more satisfactory solutions. In all these cases the front end of the slider member is flush with the front end of the housing and the pull is let into the housing itself. The construction may be seen from the plan views of Figures 32, 33, 34, 35, 36 and 37 and from the accompanying cross-sections in 32a, 33a, 34a, 35a, 36a and 37a.

In Figure 35b the embodiment shown in Figures 35, 35a is shown again, this time in perspective, in order to make clear that the pull 240 itself is hollow to ensure thus a uniform wall thickness in all regions of the slider member, as this is more advantageous in injection-moulding engineering. This recess 242, which then appears at the front of the slider member can be used to accommodate labels 244 for inscription in accordance with Figures 39 to 41.

In the embodiment shown in Figures 37 and 37a, at the top of the pull there is a short depression 246 for the thumb tip and underneath the grip there is a longer depression 248 for the remaining finger tips. Instead of pushing the label carriers into the recess centrally at the front of the slider pull, the areas to the right and left of the slider member may also be designed so that they can be written on.

Figure 42 shows in plan view recesses 410 near to the ends of the lateral parts of the slider member nearest the pull; these lateral parts enable the pile of pictures that has been inserted to be gripped at the side with two fingers. Alternatively, the pictures may also be pressed from below through the slider member aperture towards the outside. In this process the pictures lie against the stop 420 holding down the pictures from above (Fig. 43), so that it is advisable, to facilitate operation, to be able to move this hold-down stop aside in some manner or other. This may be effected by means of hinge-back elements (Fig. 44), slideaway parts (Fig. 45), pull-out elements (Fig. 46) or lever-like parts (Fig.

47); in these figures the arrow indicates in which direction the movement away occurs. According to Figure 48, this hold-down stop may also be pulled away laterally for a distance over the longitudinal edges of the picture.

It may be advisable to manufacture the separator from a particularly low-friction material; however, it would be uneconomical to manufacture the complete slider member or the complete housing from such a material. Figure 49 shows how this may be avoided by attaching the separator 430 to the corresponding lateral limbs of the slider member or of the housing 432 by means of pins 434.

As shown in Figure 50, it is possible to manufacture by an injection moulding process the top closure lid together with the housing, the lid having a pull that is open at the top and has a U-shaped profile. After moulding the joining bars 440 may then be punched through and the pull can be placed on the inserted and subsequently centred slider member.

Figure 51 shows at 460 and 462, respectively, tongues shaped on the housing (see also Figs. 52a to 52c) which, when the slider member is inserted for the first time over their sloping faces 464, move resiliently outwards, but when the slider member is pulled out again do not move resiliently outwards because a stop 466 on the slider member runs against the co-operating vertically extending face 468.

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: 78.37451, 78.37452, 78.37453, 78.37454, 78.37455 and 78.37536.

Claims

1. A picture storage box and viewer device comprising a housing for accommodating a pile of pictures, the uppermost one of which lies beneath a window in the housing, a slider member that can be pulled out of the housing parallel to the viewing window and re-inserted again, and a picture change mechanism including a transporter, by means of which, in use, a picture is removed from one end of the pile as the slider member is pulled out and as the slider member is pushed in is guided to the other end of the pile, and a holding device for preventing the remainder of the pile being affected by the transporter, wherein an externally operable device is provided for disabling the picture change mechanism so that the entire pile can be removed from the housing by means of the slider member.

2. A device according to claim 1, in which the holding device is a separator extending across the housing opening through which the slider member moves and the transporter is mounted on the slider member, wherein the disabling device is arranged to pivot the separator out of the path

transversed by the pile.

3. A device according to claim 2, wherein the disabling device is also arranged to switch the slider member into its pile-removing mode of operation.

4. A device according to claim 1, wherein the holding device is mounted on the slider member, the transporter is mounted on the housing, and the disabling device is arranged to disengage the transporter from the adjacent picture that the transporter would otherwise grip.

5. A device according to any of claims 1 to 4, including a pressure arrangement pressing the pile against the viewing window, the pressure arrangement further effecting or facilitating the engagement between the transporter and the picture to be exchanged and the disabling device is arranged to act upon the pressure arrangement.

6. A device according to claim 5, wherein the disabling device is arranged to push or pull the pressure arrangement away from the window.

7. A device according to claim 4, wherein the transporter comprises a retentive or adhesive element on the side of the pressure arrangement facing the pile of pictures and can be pressed back beneath housing and/or slider member bars supporting the pictures by means of the disabling device.

8. A device according to claim 5, including a button that is displaceable in the housing and which is in operative connection with a control member of the pressure arrangement, wherein in one end position of the button the pressure arrangement is effective, and in the other end position of the button it is disabled.

9. A device according to claim 8, characterized in that the button is slidably movable.

10. A device according to claim 8 or 9, characterized in that the pressure arrangement comprises an assembly of pressure plates which is pressed by a leaf spring arrangement towards the window, and that the button is operatively connected with said leaf spring arrangement.

11. A device according to claim 10, wherein the leaf spring arrangement has an extension on which the button presses when displaced to move the assembly of pressure plates against the spring force towards the wall of the housing lying opposite the viewing window.

12. A device according to claim 11, wherein the button is frictionally retained by said element in its disabling position.

13. A device according to any preceding claim, wherein after actuation of the disabling device and removal of the pile from the drawn-out slider member, the disabling device is returned into its non-activated position by the return of the slider member.

14. A device according to claim 13 as dependent on claim 9, wherein the slidably movable button to operate the disabling device is arranged to be moved by the slider member return into its non-activated position.

15. A device according to claim 12, wherein the button is biased into its non-activated position



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47); in these figures the arrow indicates in which direction the movement away occurs. According to Figure 48, this hold-down stop may also be pulled away laterally for a distance over the longitudinal edges of the picture.

It may be advisable to manufacture the separator from a particularly low-friction material; however, it would be uneconomical to manufacture the complete slider member or the complete housing from such a material. Figure 49 shows how this may be avoided by attaching the separator 430 to the corresponding lateral limbs of the slider member or of the housing 432 by means of pins 434.

As shown in Figure 50, it is possible to manufacture by an injection moulding process the top closure lid together with the housing, the lid having a pull that is open at the top and has a U-shaped profile. After moulding the joining bars 440 may then be punched through and the pull can be placed on the inserted and subsequently centred slider member.

Figure 51 shows at 460 and 462, respectively, tongues shaped on the housing (see also Figs. 52a to 52c) which, when the slider member is inserted for the first time over their sloping faces 464, move resiliently outwards, but when the slider member is pulled out again do not move resiliently outwards because a stop 466 on the slider member runs against the co-operating vertically extending face 468.

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: 78.37451, 78.37452, 78.37453, 78.37454, 78.37455 and 78.37536.

Claims

1. A picture storage box and viewer device comprising a housing for accommodating a pile of pictures, the uppermost one of which lies beneath a window in the housing, a slider member that can be pulled out of the housing parallel to the viewing window and re-inserted again, and a picture change mechanism including a transporter, by means of which, in use, a picture is removed from one end of the pile as the slider member is pulled out and as the slider member is pushed in is guided to the other end of the pile, and a holding device for preventing the remainder of the pile being affected by the transporter, wherein an externally operable device is provided for disabling the picture change mechanism so that the entire pile can be removed from the housing by means of the slider member.

2. A device according to claim 1, in which the holding device is a separator extending across the housing opening through which the slider member moves and the transporter is mounted on the slider member, wherein the disabling device is arranged to pivot the separator out of the path

transversed by the pile.

3. A device according to claim 2, wherein the disabling device is also arranged to switch the slider member into its pile-removing mode of operation.

4. A device according to claim 1, wherein the holding device is mounted on the slider member, the transporter is mounted on the housing, and the disabling device is arranged to disengage the transporter from the adjacent picture that the transporter would otherwise grip.

5. A device according to any of claims 1 to 4, including a pressure arrangement pressing the pile against the viewing window, the pressure arrangement further effecting or facilitating the engagement between the transporter and the picture to be exchanged and the disabling device is arranged to act upon the pressure arrangement.

6. A device according to claim 5, wherein the disabling device is arranged to push or pull the pressure arrangement away from the window.

7. A device according to claim 4, wherein the transporter comprises a retentive or adhesive element on the side of the pressure arrangement facing the pile of pictures and can be pressed back beneath housing and/or slider member bars supporting the pictures by means of the disabling device.

8. A device according to claim 5, including a button that is displaceable in the housing and which is in operative connection with a control member of the pressure arrangement, wherein in one end position of the button the pressure arrangement is effective, and in the other end position of the button it is disabled.

9. A device according to claim 8, characterized in that the button is slidably movable.

10. A device according to claim 8 or 9, characterized in that the pressure arrangement comprises an assembly of pressure plates which is pressed by a leaf spring arrangement towards the window, and that the button is operatively connected with said leaf spring arrangement.

11. A device according to claim 10, wherein the leaf spring arrangement has an extension on which the button presses when displaced to move the assembly of pressure plates against the spring force towards the wall of the housing lying opposite the viewing window.

12. A device according to claim 11, wherein the button is frictionally retained by said element in its disabling position.

13. A device according to any preceding claim, wherein after actuation of the disabling device and removal of the pile from the drawn-out slider member, the disabling device is returned into its non-activated position by the return of the slider member.

14. A device according to claim 13 as dependent on claim 9, wherein the slidably movable button to operate the disabling device is arranged to be moved by the slider member return into its non-activated position.

15. A device according to claim 12, wherein the button is biased into its non-activated position

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by an auxiliary spring and after activation of the button the pressure arrangement may be pulled or pushed further away from the window by means of the slider member upon its return stroke than already effected by the button thereby releasing the frictional engagement between the button and the pressure arrangement element to subject the button to the action of the auxiliary spring only to return the button to the non-activated position.

16. A device according to claim 12 or 15, wherein the leaf spring arrangement including the extension is a stamped and, preferably, bent metal member.

17. A device according to claim 12 or 15, wherein the leaf spring arrangement is pivotably attached to a U-shaped crank in turn pivotable about an axis perpendicular to the slider movement which axis is in the housing, the crank forming the leaf spring arrangement element.

18. A device according to any of claims 1 to 17, wherein the transporter is disabled during each return stroke of the slider member regardless of whether the disabling device is activated or not.

19. A device according to claim 18, including separate components for disabling the transporter by the disabling device and by the slider return stroke.

20. A device according to any of claims 1 to 19, wherein the disabling device is actuatable by insertion of the entire device into a casing.

21. A device according to claims 9 and 20 in combination with a casing for the device, wherein the button is slidable parallel to the outer walls of the housing and actuatable by a stop provided in the casing to actuate the disabling device.

22. A device according to any of claims 1 to 21, wherein the slider member has a pile holding-down component for holding-down any curved pictures and assuring picture exchange when the disabling device is not actuated, which component can be pivoted, shifted away or removed when the slider member is pulled and the disabling device is actuated for pile removal purposes.

23. A device according to claim 21, wherein the pile holding-down component is provided adjacent the outer slider member wall.

24. A device according to claim 22 or 23, wherein the slider member is provided with grip apertures to enable a pile of pictures to be gripped manually for removal from the device.

25. A device according to claim 24, wherein the grip apertures are provided in a slider member bottom opposite the housing window.

26. A device according to any of the preceding claims, wherein the slider member has a handle which when the slider member is returned in the housing does not extend beyond the dimensions of the housing.

27. A device according to claim 26, wherein the window wall of the housing and/or the wall opposite thereto has an incision complementary to the contour of the slider member handle.

28. A device according to claim 26 or 27, wherein each outwardly facing portion of the handle is provided with grip facilitating indentations, projections, knurling or the like.

29. A device according to any of claims 26 to 28, characterized in that the handle is of hollow design.

30. A device according to claim 29, wherein a label or label carrier is inserted into the hollow handle.

31. A device according to any of claims 26 to 30, wherein the handle is movably connected to the slider member and may be brought in an actuatable position by tilting, pivoting, or otherwise shifting its position.

32. A picture storage box and viewer device substantially as described herein with reference to Figures 1 to 20, or as modified as described with reference to Figures 27 and 28; or as described with reference to Figures 21 to 25 or modified as described with reference to Figure 26, with or without any of the features of Figures 29, 29a, 29b, 29c, 30a, 30b, 31, 32 and 32a, 33 and 33a, 34 and 34a, 35, 35a and 35b, 36 and 36a, 37 and 37a, 38 to 51, and 52a, 52b and 52c of the accompanying drawings.