

SPECIFICATION

Picture Storage Box and Viewer Device

The invention relates to a picture storage box and viewer device having a picture change mechanism for changing the picture displayed.

Such devices as have been proposed hitherto are constructed as follows. In a shallow housing having a viewing window that is covered, if desired, by a transparent plate, there is a pile of pictures, the uppermost one of which is exposed to view through the viewing window and is supported at its edges. A spring biased pressure arrangement urges the pile upwards against the window or the frame thereof. At one side the housing has an aperture through which a slider member may be pulled out; the withdrawal movement of the slider member being limited by stops. Near to the housing aperture there is arranged a member referred to here and hereinafter as a separator which covers this aperture transversely and at the top and the bottom leaves clear a narrow slot for a picture to pass through. As the slider member is pulled out, the uppermost picture is pulled by a hook-like transporter through the top slot, the remainder of the pile being supported against the separator; and during the return stroke of the slider member the picture is pushed through the bottom slot and under the pile again, or more accurately, between the pressure arrangement and the bottom-most picture of the pile. The second uppermost picture now lies in front of the viewing window and the procedure can be repeated as often as desired to change the displayed picture.

This principle is extremely useful for perfectly flat thick plates because the transporter hook then engages sufficiently deeply on the edge of the plate and does not slip off. But with paper pictures, for instance photographic prints, having a thickness, for example of $\frac{1}{4}$ mm or even less, there is a high probability that the hook, which itself must have a depth of penetration that is less than the smallest picture thickness, will slip off the edge of the picture or will not grip it at all, especially when the pictures have edges trimmed at an angle or if they are curved or distorted. The hook slipping off may lead to the hook scratching over the viewing side of the picture and damaging it. Furthermore, even when the carrier material of the picture is pliant, the hook will in the course of time wear down its clear-cut edge and will then be even less able to grip; in addition, the pliant picture carriers become deformed, twisted and possibly even torn at the side at which the hook engages, with the result that the device then no longer functions at all with these pictures.

In another proposal, a picture is removed from a pile by means of a roller turned by hand and is conveyed beneath the pile again by means of a second roller. Admittedly, damage to the edge of the picture is here avoided, but the overall depth of the viewer is inevitably very much greater than the pile of pictures alone.

It is an object of the invention to produce a

picture viewer device of the above type which has an overall depth that is only slightly more than the thickness of the pile of pictures and is operationally reliable as regards its transporting function, even in the case of relatively thin paper pictures, for example photographic prints, avoiding damage to the edges of the pictures and also to the faces of the pictures by the transporter.

According to the present invention there is provided a picture storage box and viewer device comprising a housing suitable to contain a pile of pictures, the uppermost of the pictures being disposed beneath a viewing window, and a picture exchange mechanism, including a slider member reciprocable relative to said housing and parallel to said viewing window, a single picture conveyor and a conveyor for the remainder of the stack, one of said conveyors being mounted on said housing, the other of said conveyors being mounted on said slider member, the device being such that, during a withdrawal stroke of slider member reciprocation, a single picture is drawn from one end of the pile and during a return stroke of slider member reciprocation, the single picture is added to the pile at the other end thereof, wherein the picture exchange mechanism includes an element capable of surface retentive connection with the side of the single picture facing away from the pile to move the single picture relative to the pile in response to slider member movement.

A picture exchange operation consists of two individual steps: The separating of the picture to be exchanged from the pile and the transport of the separated picture parallel to itself. In the prior devices these two steps follow immediately on each other, it being understood that since the static friction always exceeds the sliding friction, the immediate beginning of the picture motion requires more force than the further transport and thus may be identified as said first step. It will be understood that the further transport of the picture once separated from the pile does not pose any considerable problems.

In a device according to the invention thus a surface-adhesive member in each case serves the purpose of separating or loosening the picture from the pile, the motion of the one picture relative to the pile being obtained by shifting, turning, bulging and lifting of the entire picture or lifting of but one edge or corner thereof. Moreover, the surface-adhesive member may be used as the transport of the picture thus the member is the transporter or at least a part thereof.

As far as the member is expected to lift the picture perpendicularly to its main surface from the pile, the adhesion of the member must be rather great. In this case glue-bonding compounds may be used which, of course, must not leave residuals on the pictures; alternatives are elements operating with sub atmospheric pressure as suction cups or even elements

operating with magnetic or electrostatic attraction.

If the picture is to be moved parallel to its own plane, usually members exhibiting a friction between the material of the member and that of the picture of a sufficient magnitude will suffice; that means that the adhesion has to exceed that which exists between the respective picture and the remainder of the pile.

Accordingly, materials may be used which exhibit inherently high friction coefficient as rubber and equivalent substances, bonding plastics (available on the market) but also of course all types of elements mentioned above for extremely high adhesive power.

In certain designs it may be desired that the adhesion will be selective, that is to say that in the desired direction of movement the adhesion is "sufficient"; in counter direction, however, it is smaller than the friction between a picture and the rest of the pile; this may be termed a "one way clutch". Such types of elements involve pike bars, inclined brush bundles ("skins") or the like but moreover this problem may be solved by desired features in that for example the adhesive member is in engagement with the picture only during the separating phase, and held spaced from the picture during the reverse motion.

Finally, it is to be noted that in all or almost all mentioned types of surface-adhesive members it is possible to make the adhesion sufficient in the case of pictures which have been previously treated accordingly. In other words, the surface-adhesive member forms only one component of an adhesive system whose other component is present on the picture. Typical for this type of surface-adhesion are magnetically operative systems wherein say the surface adhesive member is a permanent magnet and the pictures incorporate a magnetizable component. A further example are pictures which are roughened over their entire face or at individual portions thereof and at which a surface of a surface-adhesive member which is arranged to be complementary thereto will engage, such member otherwise sliding across a smooth surface.

If in the following description in a simplified manner a "retentive element" or "adhesive element" is referred to, this means a member which develops a surface adhesion but may be loosened again. In the following text embodiments will be explained, in which the surface-adhesive member is also the transporter no difference will be made between these two designations, however, this difference will be observed in the description of embodiments wherein these two functions are distinctly separate.

Preferably the retentive or adhesive element is a covering disposed on a supporting surface, and any customary application method may be employed therefor.

The retentive covering may be disposed to be effective on the uppermost or bottom-most

picture of the pile, both on the housing and on the change-over slider member, or on a pressure arrangement if this is provided. The greater the static friction, the less is the pressing force required, which is normally exerted by a spring. When the pressing force is exerted by the pressure arrangement pressing the uppermost picture against the viewing aperture through the pile from below, and the uppermost picture is to be held by the retentive covering, the force must be greater than when the bottommost picture is to be held.

If a retentive element that has a high coefficient of friction in both directions of movement is used then it is absolutely necessary for the retentive element to be disengaged from that particular picture of the pile that is facing it when the slider member is reinserted. This can be brought about by tilting away, pressing away, pushing away or covering up the retentive element so that, for example, its active face is lower than a supporting surface over which the picture is then able to slide. Conversely, the pile may be moved away from the retentive element and the picture brought closer to the retentive element only for the withdrawal of the slider member; finally the retentive element may be turned away from the pile during the return movement.

The disabling is effected automatically as the slider member moves back in and this or the housing or another pressure arrangement will have control elements intended for this purpose.

By using an additional member which may be actuated, for example, by hand, the retentive element can be disabled during the withdrawal of the slider member as well. This facilitates or permits only the exchange of the entire pile of pictures. However, it is preferred that the retentive element that has been disabled during the withdrawal of the slider member may be rendered operative again during the return stroke, thus switching the device over to its picture-change function again.

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 comprising the window into a multiplicity of windows, one for a pile of pictures, and another one for 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 photo negative disposed in the slider. Finally,

the device may be provided on both its front and its rear face with a window, in which case, of course, two different sliders would be mounted in parallel.

- 5 Embodiments of the invention are illustrated in the attached drawings. Figures 1—70 all relate to embodiments wherein no distinction is made between the separation of the one picture from the pile and the transport function. The figures
10 following in sequence thereafter permit a clearer recognition and distinction of the two steps of the exchange operation and in some of these embodiments separate elements are provided for the separation of the picture (by means of the
15 surface-adhesive member) and the transport of the picture (by means of another member). In the drawings:

Figure 1 shows a highly schematic plan view from above of an embodiment of the invention
20 showing the housing with the lid broken away and with the slider member inserted,

Figures 2 to 5 show in schematic longitudinal section through the device of Figure 1 the sequence of the change-over operation in order to
25 render clear the co-operation of the slider member and the spring plate,

Figures 6 to 9 illustrate these same stages during a picture change, but with a pile of pictures inserted,

30 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
35 Figures 6 to 9,

Figure 18 is a schematic cross-section through the device,

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

Figure 20 is a perspective illustration to show details of the housing discussed with reference to Figure 19,

Figure 21 shows a substantially schematic
45 longitudinal section of another embodiment of a device,

Figure 22 is an illustration analogous to Figure 21 with the slider member pulled out,

Figure 23 represents a plan view of the base
50 plate of the housing with the slider member pulled out in the case of the device shown in Figures 21 and 22,

Figure 24 shows a section along the line 24—24 of Figure 21,

55 Figures 25 and 26 illustrate details of this embodiment,

Figures 27 to 30 show a further embodiment,

Figures 31 to 36 relate to a further
60 embodiment,

Figures 37 to 38 show a further embodiment,

Figures 39 to 44 relate to a further
embodiment,

Figures 45 to 51 refer to a further
embodiment,

65 Figures 52 and 53 illustrate a further

embodiment,

Figure 54 shows in partial section a different design of the separator,

70 Figures 55 to 58 show an embodiment in which the operative and inoperative positions of the retentive element are controlled by a slider member part which may be displaced relative to the main part of the slider member in the withdrawal direction of the slider member;

75 Figures 59 and 60 show a modified design of the retentive element of the embodiment shown in Figures 55 to 58;

Figures 61 and 62 show an embodiment in which the retentive element is constructed as two
80 free-running rollers;

Figures 63 to 66 shown an embodiment in which the retentive element constructed as a free-running roller can be rendered inoperative for the purpose of completely removing the pile;

85 Figures 67 to 70 show a modified embodiment of the device shown in Figure 45, in which the pile can be completely removed by means of a drawer,

Figures 71 to 76 illustrate a further
90 embodiment wherein Figure 71 to 73 are vertical sections of the device in different phases of the exchange operation and Figure 74 to 76 show sections along the correspondingly numbered arrows in Figures 71 to 73,

95 Figures 77 to 81 illustrate a further embodiment wherein Figures 79 to 81 show in vertical section views three phases of the picture exchange while Figures 77, 78 show section views as indicated by like numbered arrows in
100 Figures 79 and 80, respectively,

Figures 82 to 85 show four phases of picture exchange in a further example,

Figure 86 illustrates a detail of Figure 83 in enlarged scale,

105 Figures 87 to 89 show three exchange phases of a further embodiment,

Figures 90 to 95 relate to a further
embodiment, Figures 90, 93, 95 showing three exchange phases, Figure 91 is a plan view of
110 Figure 90 and Figure 92 and 94 illustrate in enlarged scale the control and operation of the single picture conveyor,

Figures 96 to 101 are elevation sections of a further embodiment in different picture exchange
115 phases, while Figure 97 is a partially cut-away plan view of Figure 96 and Figure 98 is a schematized isometric detail illustration,

Figures 102, 104 and 105 illustrate in elevational section three phases of picture
120 exchange in a last embodiment, while Figure 103 is a schematized plan view of Figure 102 with the slider fully driven home.

Figures 1 to 20 relate to a first embodiment.

The housing 100 comprises a base plate 102,
125 side walls 104, a back wall 106 and a lid 108 having a window 110. The slider member 112, 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
130

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 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 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.

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. 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 raised 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 top-most 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 pictures 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

- 5 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.
- 10 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
- 15 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
- 20 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

- 25 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

- 30 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
- 35 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
- 40 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.

- 45 The retentive covering is especially advantageous as a transporter when for some reason or other, for example for particularly careful treatment of extremely thin pictures, the planar pressure exerted on the pictures is to be
- 50 only small, since despite this the retentive element holds the pictures fast in a reliable manner, as experience has shown. Such a device is shown in Figures 21 to 26.

Fig. 21 shows a housing 201 having a base plate 220, a viewing window 222, side walls 224 (Fig. 23) and a detachable lid 202 which is shown detached from the housing in Fig. 22. A slider member 203 having a base plate 226, lateral bars 228 and a front bar 230, is slidably mounted in the housing. A separator 204 is fixed in the housing by arranging it between two lugs 212 which project downwards from the top of the housing. The cross-sectional shape of the separator is best illustrated in Figs. 21 and 22.

- 65 There extends centrally along the slider

member a transporter arrangement consisting of a leaf spring 210 on which a retentive covering 232 is arranged at least at the end close to the lid 202. The lateral bars 228 of the slider member

- 70 are guided between the lugs 212 and the side walls 224 of the housing.
- In two vertical members 211 close to the side walls 224 and the lid 202 of the housing in each case a downwardly projecting end portion of a
- 75 wire spring 206 is accommodated, which spring is curved in the shape of a bow towards the middle of the housing, and its other, likewise downwardly curved, end 207 is loosely accommodated in a slot 234 which is provided
- 80 between the lateral bar 228 of the slider member and the side wall 224 of the housing. A projection 209, projecting outwards up to the side wall 224, is formed on the rear end, that is to say, the end facing the lid 202, of the slider member lateral
- 85 bars.

The lid 202 can be fixed to the housing 201, for example, by studs 205.

It is assumed that a single picture 208 lies between the viewing window 222 and the spring bows 206. A pile of pictures (not shown) is arranged in the housing between the transporter 210 with its retentive covering 232 and the underside of the spring bows 206. If the slider member 203 is now pulled, the pile is held back in the housing by the separator 204, but not the

- 95 bottommost picture to which the retentive covering 232 is adjacent. This picture is moved outwards by the slider member and during this movement slides beneath the separator 204. As shown in Fig. 24, the separator is in two parts so that the transporter arrangement can pass between the two parts of the separator. When the projections 209 strike the freely movable arms 207 of the springs 206 these are drawn
- 100 outwards, the spring bows being straightened. The single picture 208 which was hitherto disposed on the spring bows is therefore no longer supported and can fall downwards. It thus falls, as the uppermost picture, onto the pile held back by the separator.

The transporter 210 has as a support for the retentive covering 232 a spring 236 that is slightly biased in an upward direction, the contact pressure of which is just adequate to take along a single picture. In the fully withdrawn position of the slider member (Fig. 22), small auxiliary springs (not shown) beside the retentive covering only in the middle of the spring 236 press the edge of the transported picture that is nearer the separator slightly upwards so that

- 115 when the slider member is pushed back in, this edge slides upwards along the outwardly facing inclined face of the separator and is thus placed on the spring bows 206 which when the slider member is returned are bowed inwards again on account of the inherent resilience of the spring 206.

During the return movement of the slider member, the transporter must slide away beneath the pile disposed in the housing. Although the

- 130

bias of the spring 236 is very weak, this return movement could nevertheless be difficult if the retentive covering 232 slid along on the bottom-most picture. For this reason provision is made for the spring to be pressed down during the return movement. In Fig. 26 the rearmost end 238 of the leaf spring 236 which, in the region of this end, is made slightly more pliable than the rest of the spring by reducing the cross-section or the like, is shown. This portion of weakened cross-section has only in the region of its front edge laterally projecting guide members 240 (see also Fig. 25) and from the base 220 of the housing two cam bars 213 having inwardly facing guide edges 242 project upwards. The base 226 of the slider member is cut away in the region of these cam bars 213.

When the slider member is drawn out, the end portion 238 passes under the separator 204 and is pressed downwards by the latter so that the guide member 240, on pushing the slider member back in, pass under the guide edges 242 and thus press the retentive covering 232 below the upper side 244 of the cam bars 213. The cam bars 213 may be of such a length that the spring 236 is not released again until close to the inner end position of the slider member where it places the retentive covering 232 from below against the now bottom-most picture of the pile.

To remove the pile, the lid 202 is opened and the pile is shaken out, the picture 208 lying at the top also falling out. So that the bottom-most picture of the pile is not held fast by the retentive covering 232 or does not have to be drawn out of the device with great effort, the retentive covering can be disabled by opening the lid 202 by, for example, the spring 236 being drawn below the level of the cam bars. For this purpose, a system or rods, for example, may be coupled up to the lid 202.

Figs. 27 to 30 show only the elements of the embodiment that are important for the operation thereof.

In a housing 300 a control guide groove 302 is formed in each of two side walls 301, in which guide groove laterally projecting free ends 304 of a doubly cranked wire bow 303 engage slidably. On the underside of these ends 304 there are arranged retentive elements 305. If an extreme portion 306 of the bow which projects forwards out of the housing 300 is pulled, then the ends 304 of the bow slide first of all parallel to a pile of pictures 308, are then guided downwards by the guide groove 302 and finally, when the retentive element 305 meets the uppermost picture, press the pile downwards against the force of a spring arrangement 309. The ends 304 of the bow with the retentive elements 305 then draw the uppermost picture of the pile through a housing aperture 310 to the outside, but the rear edge of the picture remains clamped between the retentive elements 305 and the pile or a separator 311 and cannot, therefore, drop out. After the separator the picture runs on to an auxiliary spring 312 and if the bow 303 is now pushed in again, it

is guided along the following downwardly sloping portion of the guide groove beneath the separator 311 on top of the pressure arrangement 309, but below the pile 308. On the upper side of the ends 304 of the bow there is no retentive element so that this is able to slide with a very low friction beneath the pile. (Fig. 30). A button 315 permits, as in Fig. 1—20, inactivation of pressure assembly 309 when the pile 308 is to be extracted via, say, a lid-closed aperture opposite separator 311.

Fig. 27a is a schematic cross-section and reveals the arrangement of the bow in the guide groove in the housing.

The slider member is in this case only an operating bow and could, if desired, even be replaced by a knob projecting laterally out of the housing.

Figs. 31 to 36 relate to a further embodiment. Here, a slider member 400 may be pulled out relative to a housing 402 but a slider member pull 404 can also be moved relative to the slider member itself. The pull 404 as a pulling member is hinged at 406 on a lever 412 pivoted on a base 408 of the slider member at 410. At its other end, a lever 412 is hinged to a pressure and transporter plate 414. In the rest state (Fig. 31) the plate 414 lies beneath base bars 416 of the slider member. When the pull is moved the lever 412 moves upright, in so doing lifts the plate 414 above these base bars and finally pushes the pile upwards as far as it will go. As a result, further relative movement between the pull and the slider member is prevented and if the slider pull is pulled further the entire slider member comes out. When re-inserted the pile is lowered by pivoting the lever so that the retentive element lies disabled beneath the base bars.

Fig. 36 shows a variation with two levers 412' instead of the one lever 412.

Figs. 37 and 38 show in cross-section the initial position and the transporting position for a further embodiment. As usual, a slider member 500 is guided in a sliding manner in a housing 502. On the underside of a frame portion 506 of the housing surrounding a viewing aperture 504 there is arranged a retentive element 510 recessed relative to one edge 508 of the frame pressing the pile of pictures downwards, so that it does not, therefore, engage with the uppermost picture in the rest state. When the withdrawal of the slider member commences, uppermost picture 512 is lifted by an auxiliary device (not shown) at its edges until it comes into contact with the retentive element 510, after which a separator 514 which is constructed to be complementary with the frame section 506, clamps this picture against the separator so that it remains behind in the housing whilst the pile is removed to the outside by the slider member 500 (Fig. 38).

Figure 39 shows in longitudinal section in a schematic manner an embodiment wherein the pulling of a slider 601 is separate from the transport function.

The slider 601 may be pulled out of a housing 602 and only a short portion of the slider will remain in the housing. The slider has guide members 603 which extend partially or

- 5 completely along the entire slider in the direction of its movement. These guide members have guide surfaces at their outer face by which they are guided along the inner face of the housing bottom and/or along the housing side wall. These
- 10 guide members have preferably the angular profile shape indicated in Figure 39, having at their inner side first transport surfaces 607 by which a picture is removed from pile 604 via removal slot 605. Moreover, the guide members
- 15 603 have second guide surfaces 606 at their inner side extending perpendicularly with respect to said first transport surfaces 607 and forming lateral abutments for the removed picture by which it is retained against lateral falling off from
- 20 slider 601. These second guide surfaces 606 need not extend over the entire height of the slider but may be supplemented by lateral stop faces (not shown) extending up to a housing lid 608 or are integrally formed therewith. These
- 25 supplementary lateral guide surfaces need not extend as noted above for the other guide surfaces over the entire length of the slider; it will be sufficient if they are provided at several places, the position thereof being selected such that a
- 30 removed picture will be safely held in slider 601 and is prevented from falling off prior to its being returned again via inlet slit 609 above separator 610 onto the pile of pictures.

- 35 Housing lid 608 is formed by a transparent plate and rigidly connected to the remainder of slider 601.

- The removal slot 605 is limited at the bottom by the first guide surface 607 while it is defined at the top by the outer side of the apex of separator
- 40 610 whose section is V-shaped. In a similar manner the return slot 607 is defined on the one hand by a movable element, namely the inner face of the housing lid 608 and on the other hand by a stationary surface, namely the upper end of
- 45 the left portion of separator 610.

- One or several separating stops 612 are disposed on a guide 613 by which housing lid 608 is guided. With the housing lid removed, the picture pile is retained by surfaces 614, engaging
- 50 over the upper pile edge facing away from the separator. These surfaces 614 serve as retention members because they hold down the picture pile against the pressure of spring 615. They are formed integrally with a flap 616 against the inner
- 55 side of which the picture edges abut, and which may be pivoted about an axis 617 in the direction of arrow 618 from the operative position as shown, releasing thereby a locking system not shown in detail, so that the pile may be easily
- 60 removed when the slider 601 is pulled out. Axis 617 extends parallel to removal slot 605. The flap 616 acts as a pivotable wedge engaging under the facing edge of the picture pile when pivoted.

- At the bottom of the slider 601 a lever 619 is
- 65 pivotally mounted on a pin 620. The latter is

disposed in the leading portion of the slider and adjacent this pin the lever 619 is formed as an elbow lever 621. Preferably the lever and the elbow lever 621 are integral. A lever arm 622

- 70 opposite lever 619 serves as a pressure lever because when finger pressure acts thereon the lever 619 is pivoted from its rest position in which its free end 623 disengages from the picture pile against the pressure of a spring 624 into a
- 75 transport position. In this transport position an adhesive transporter 625 disposed at the free end 623 of lever 619 will engage with the trailing edge of the bottom-most picture of the pile and will transport it upon pulling of slider 601 so that
- 80 the picture will leave the housing via removal slot 605, spring 615 serving as a separating stop with its leading end 626. The innermost end of spring 615 is fastened adjacent the free end of lever 619. Upon pivoting of the lever into its
- 85 engagement position, therefore, this fastened end of spring 619 is moved upwards while its free end adjacent the lower bearing goes downwards. This position is indicated in the drawings. In the rest position or inactive position or disengagement
- 90 position of the lever the picture pile may rest upon bar 627 laterally disposed in the housing. The slider 601 may be pushed under the pile again without bulging of the lower-most pictures, provided of course, that no pressure is applied on
- 95 lever arm 622. Alternatively or additionally the lever including the transporter 625 may be lower than the bottom of slider 601 which even in the fully extracted position will engage with its inner end beneath the picture pile and thus prevent the
- 100 transporter touching the lower-most picture during the return stroke of the slider.

- The adhesive transporter 625 may be a rubber strip, small suction cup, a roller with a one-way free wheel or any equivalent device. It is guided
- 105 by the outwardly pointing surface 628 of the right hand portion of the separator which defines an acute angle E with the first guide faces 607 upon the return stroke of the slider 601 into the housing 600 beneath the removal slot 605, for
- 110 example, into an indentation in the bottom portion of the slider or into the free space between the guide members 603. Since the pressure upon pressure lever 622 is removed prior to the return stroke of the slider 601, the
- 115 leading end 623 of the lever will come into said indentation or the said free space under the action of the bias spring 624.

- It may be mentioned that the spring 615 generally has the function of a pressure assembly to urge the picture pile against the housing lid.

- 120 The spring 615 may in the embodiment of Figure 39 be a leaf spring of plastics or metallic material. In order to ensure a uniform urging of the pile to the inner side of the transparent lid
- 125 608, instead of the spring 615 four lever arms may be disposed along the centre of the lever 619 so that they urge the pile upwards against lid 608 and support the pile uniformly. The embodiment may have in the housing 600, located beside the
- 130 slider 601 and parallel to its motion direction,

springs which urge the pile upwardly and at which a removal stop means is provided, or which even from this removal stop, so to complement or replace the elbow 626 of spring 615 which likewise serves as a stop. In such a design spring 615 may be dispensed with.

Further it may be mentioned that embodiment of Figure 39 may be arranged so that it will provide the exchange operation of the pile in a reverse manner in that the pictures are pulled from the pile by means of a lever disposed in the lid 608 and afterwards they are added to the pile at the lower end thereof.

A modification of Figure 39 is illustrated in Figure 40. In this modification the spring 624 is disposed and/or designed such that it usually will urge and bias lever 619 with its distal end upwardly so that it is activated permanently. This will result in fully automatic operation for the transporter 625, normally engaging the bottom-most picture in the pile so that it will take with it upon pulling of the slider 601 the bottom-most picture without any further actuation of the lever manually or otherwise. When the removed picture has been transferred completely to the slider 601, the transporter 625 still urges the picture upwards under the action of spring 624 so that upon pushing the slider 601 back into housing 600 the picture will enter return slit 609 while the transporter 625 enters the housing via an indentation provided in or under the return slit 609, it being at first pushed downwardly by surface 628 from its upper position thereby overcoming the bias of spring 624. The force to return the removed picture is applied to the latter by means of one or several stops once the transporter 625 is disengaged from its lower face, said stops being disposed at the trailing end of slider 601 (in the return direction) engaged by the edge of the individual picture—Figure 40 shows isometrically from the inside how the transporter passes under separator 610.

From the foregoing explanation of a modification it will be understood that a manually operated pressure lever such as lever 622 in Figure 39 is not necessary, because the reciprocation of the slider is sufficient for the operation. The bias spring for the lever may be provided in this case as a compression spring under the lever for example. Similar to the embodiment of Figure 39, the modification of Figure 40 may be modified so that the transporter acts upon the upper face of the pile, the pictures being taken off at the top side and returned at the bottom side of the pile.

To facilitate the reintroduction of lever 619 of the embodiment of Figure 39 its leading end 630 may be rounded and may protrude with respect to the transporter 625 in return direction of slider 601 so that the transporter does not engage the inclined front face 628 of separator 610 (Fig. 41). Further the lever 619 may have at its distal end lateral edges and protuberances 631 beside the transporter 625, said protuberances 631 sliding

over the downward facing edge of the separator which is provided with an indentation 632 dimensioned such that the transporter 625 does not even touch the separator.

Alternatively, as shown in Figure 42, the transporter may be designed as a roller 633 with one-way rotation, i.e. the roller 633 does not revolve during pulling of the slider but is rotatable during the return stroke and engages with very little friction the facing surface 634 of an indentation in the central area of separator 610.

Further possibilities to facilitate the introduction of lever 619 are illustrated in Figures 43 and 44. Therein the lower portion of separator 610 is designed as a freely rotatable roller of different diameter, rotated by transporter 625 during its return stroke into housing 600.

Figures 45 to 51 illustrate a further embodiment similar to Figure 39 and only the modifications will be explained. Lever 619 and spring 615 are replaced by leaf springs 711 at the bottom of slider 712, and at the distal ends of each spring, a transporter is disposed having the form of a lip 714 consisting of an adhesive or retentive material, as for example rubber. The lips have a thin end 715 which bends during pulling of the slider about an upper edge 716 of the spring 711 thus assisting the action of each spring 711 by forming an adhesive end thereof during pulling of the slider which will provide a better bonding with a minimum of slipping (Figure 49). By contrast during the return stroke the leading end of lip 715 (Figure 50) is bent to the right and slips, because of its small bias, substantially without friction across the picture which is supported by the front edge 716 of leaf spring 711.

In Figures 49 and 50 arrow 717 indicates the direction of pulling of slider 712, while arrow 718 indicates the return direction. In one case the bending of lip 714 about the upper edge 716 of spring 711 is shown, while Figure 50 indicates that, upon return of the slider 712, the front end 716 of spring 711 engages respective pictures 719 and the lip 714 slips across the bottom face of picture 719.

This lip acts automatically to activate and inactivate itself. In comparison to a transport roller as described later, it has the advantage of being very flat so that the housing may have a height only slightly exceeding that of the pile, in addition to the advantage that the cost of manufacture of such lips is very small. The two springs 711 urge a picture removed from the pile to the level of the insert slit as indicated in Figure 45.

Figure 48 is a plan view of the springs 711 and it will be recognized that the springs 711 may be stamped as tongues of a leaf spring 720 which is mounted on the slider bottom or generally at the bottom portion of the slider.

Figures 46 and 47 show respectively isometrically and in longitudinal section one of the springs 711.

The lip 714 must in its initial state extend in front of the edge of spring 711 but must also be

very resilient so that it yields during the return stroke of the slider into the housing to permit the main bias of spring 711 to act upon the pile. A tongue 711a stamped from the free end of spring 711 serves to clamp the bottom end of the lip and is shorter than the upper portion 711b of spring 711, this difference in length being dependent upon the material of which the lip 714 is made. In other words, the bias of the adhesive material of which the lip 714 is made, must be small relative to that of the supporting spring 711. During the slider return stroke into the housing, the greater force of the supporting spring 711 will overcome the bias so that the friction of the leading end 715 of the lip is greatly reduced, and the supporting action of spring 711 exists substantially between the metal of the spring and the picture material. The spring end is rounded as indicated at 716 so that the leading end 715 of the lip 714 will not be cut due to the reciprocating movement.

Figures 46a, 47a, 49a and 50a correspond to Figures 46, 47, 49 and 50 respectively and show a design of spring 711 wherein beside the lip 715 skids 700 are provided. The thin lip end 715 will be bent beneath the skids and the engaged picture will during the return stroke run on the skids.

A return stop 728 is provided in the embodiment of Figure 45 at the trailing end (in the pulling direction of the slider) of the housing lid 713 which is fixed to the slider. Since this stop will be at the left end of the housing in Figure 45 prior to the pulling of the slider, additional stops 721 are provided at edge 722 of the housing and adjacent to the return slit as shown in Figure 51, the additional stops keeping down the pictures of the pile, whose edges lie beneath the edge 722 of slider 712 no picture will be pulled out via the return slit.

Figure 52 illustrates isometrically a further embodiment empty; Figure 53 illustrates a longitudinal section of the same embodiment with slider inserted.

Again the pile is urged resiliently upwards, for this purpose, however, spring arms 873 are mounted on slider 872. The arms carry rollers 869, 870. These rollers 869, 870 urge the picture pile elastically towards a transparent housing lid 860. They are arranged as free wheel rollers, braked against rotation during the removal of a picture from the pile so that the picture to be removed will be pushed through the removal slot due to the friction between the rollers and the picture. During the return of the removal picture to the pile, the rollers 869, 870 may freely rotate so that they may freely roll under a separator 787 at which there is the picture edge stop surface 811 and in an indentation 872a in the bottom part of the slider.

The braking of the free wheel rollers 869, 870 against rotation during the pulling of the slider 872 is due to the fact that their shafts are journaled in slots 875, and this applies at least to the shaft of the left free running wheel 870 in Figures 52, 53. These slots 875 extend

substantially in the direction of the movement of the slider 872. Moreover a stop edge 874 is provided at the side of each of the rollers 869, 870 on the rearwardly side relative to the pulling direction of the slider 872 and prevents rotation thereof once the roller has engaged the edge.

These rollers 869, 870 also serve the purpose of urging upwards the picture which has been removed via the removal slot 810 so that it is lifted to the level of the return slit 816.

The leading roller 870 is supplemented by a roller 871 behind it to form a twin roller system. This has the effect that the free wheel roller 870, once it has passed the separator 788 during the return stroke, will not be urged upwardly too early thereby closing the return slit 816 by lifting the pile. The difficulty cannot overcome by repositioning of the roller 870 to the right in Figure 53 because in this case the pictures would not be removed completely from the pile.

In this design the picture is simply held by preferably transparent tongues 876 extending at the upper right hand edge and perhaps lateral stop surfaces 877 prevent falling off to the side. Only at these points are portions of the pictures covered.

Figure 54 shows substantially schematically another design of separator. A smooth cylinder W is rotatable in housing G. The cylinder is provided at the side with a toothed gear Z engaging a toothed rack Z' moving with the slider S. The uppermost picture B of the pile is to be exchanged in the design. Upon pulling the slider the cylinder W will be driven in the direction of arrow P so that the cylinder surface urges the adjacent edges of the remaining pictures of the pile downwardly while the upper-most picture B is pulled over it. During the return stroke a free wheel system (not shown) between gear Z and cylinder W serves the purpose of preventing premature ejection of the picture which is now the upper-most.

Alternatively cylinder W may be designed without free wheel system which would assist the pushing in of the removed picture under the pile but in this case the upper-most picture would have to be kept back by means not shown.

An expert skilled in the art will be able to modify this type of separator readily for embodiments wherein the lower-most instead the upper-most picture is to be removed or to embodiments where the separator is mounted on the slider.

Figures 55 to 60 show two embodiments in which the retentive element can be rendered operative or inoperative as a result of a relative movement between two parts of the slider member. In detail, Figures 55 and 58 show longitudinal sections through this embodiment, with the slider member in different positions, whilst Figure 56 shows a plan view of the embodiment and Figure 57 shows a cross-section through this embodiment; Figure 59 and 60 show a retentive element that has been modified compared with that shown in Figures 55 to 58.

The retentive element 901 is accommodated

in a recess 902 in a lid 903 of the slider member which is denoted generally by reference 904. This retentive element 901 is a rubber strip arched in a slightly convex manner towards pile of sheets 905. At its end 906 which is at the front when viewed in the direction in which the slider member is pulled out, the rubber strip is fixed to the slider member lid 903, whilst its rear end 907 is movable relative to the housing lid 903 and is connected to a rod 908.

In the inoperative position of the retentive element 901 its convex portion still lies within the recess 902, so that it cannot engage with the uppermost sheet of the pile 905, as seen in Figure 55. If, as a result of pulling the rod 908, the rear end 907 is pulled towards the front end 906, the convex portion of the retentive element 901 arches outwards, emerges from the recess 902 and positions itself against the uppermost sheet of the pile 905, as seen in Figure 58.

To control this movement of the retentive element 901 from its inoperative position into its operative position and back again, the slider member 904 consists of two parts 909 and 910, which may be displaced relative to one another in the direction in which the slider member is pulled out. These two parts are the part 909 which is at the rear when viewed in the direction in which the slider member is pulled out and which forms the main part of the slider member 904, and the part 910, which is at the front when viewed in the direction in which the slider member is pulled out and which is displaceably mounted in the first part 909. The front end 911 of the rod 908 is secured to the front part 910.

When the slider member 904 is pulled out of its housing, in which operation the front part 910 of the slider member is laterally gripped and pulled, owing to the frictional resistance which the rear part 909 of the slider member encounters from the housing, initially only the front part 910 of the slider member is moved until the retentive element 901 has pressed so far onto the uppermost sheet of the pile 905 that a further movement of the slider member part 910 relative to the slider member part 909 is no longer possible; the resistance to a further deformation that the retentive element encounters from the uppermost sheet on the pile 905 acts to some extent as a stop which limits the movement of the two slider member parts relative to one another. The two slider member parts 909 and 910 now move together because the uppermost sheet on the pile 905 is carried along and pulled out of the housing in which the slider member is located. As the slider member is reinserted, again first of all only the front part 910 of the slider member moves, as a result of which the retentive element 901 is extended again so that it disappears completely into the recess 902 and cannot engage the pile 905. This movement of the front part 910 of the slider member is limited by a stop 912 that is provided on the front part and co-operates with a counter-stop 913 on the rear part 909 of the slider member.

It should be pointed out that the separation between the two slider member parts can also be made, of course, in the rear region of the slider member, for instance in such a manner that the rear end 907 of the retentive element 901 is attached to one part of the slider member and the front end 906 is attached to the other part of the slider member, and the pulling force for pulling the slider member out of the housing 914 and the pressure for reinserting the slider member into the housing is exerted by way of a joining element which acts on that part of the slider member to which the end 907 is fastened. In all cases it is essential that the retentive element is automatically controlled by the movement of the slider member, in that with pull or push to move the slider member initially only a first part of the slider member is moved, which part brings the retentive element from its inoperative into its operative position or *vice versa* and only thereafter is the second part of the slider member moved with it.

As Figures 59 and 60 show, a retentive element 915 which is attached to a small block 916 may also be used. The small block 916 can be moved by the rod 908 along an inclined face 917 that is provided in a recess 918 in the housing lid 903 and out of and into the recess 918, so that in principle the same operation as explained with reference to Figures 55 to 58 takes place.

A further modification which is not illustrated in the drawing, may consist, for example, in that an inherently resilient element is provided in a passage in the housing lid 903, this passage being so designed that on pulling the slider member a part of the element emerges from the passage to which part a retentive element is attached, and engages with the uppermost sheet of the pile, the part disappearing into the passage when the slider member is re-inserted.

Figures 61 and 62 show a schematic partial view of an embodiment in which the uppermost sheet of a pile is carried along by two roller-shaped retentive elements 919 and 920. The axles of the rollers 919 and 920 are mounted in slots 921 and 922 and on one side of each roller there is provided a brake 923 and 924 fixed to the part denoted generally by a reference 925, on which also the rollers are mounted.

When the rollers are moved by the element 925 in the direction of arrow 926, in which operation they are intended only to roll on the pile 905, their axles which are freely movable in the slots 921 and 922 are displaced to the ends of the slots furthest away from the brakes 923 and 924, so that the rollers are not impeded by the brakes. However, the axles of the rollers 919 and 920 are displaced in the slots 921 and 922 until the circumferential faces of the rollers come into contact with the brakes 923 and 924 when the part 925 is moved in the opposite direction, indicated by arrow 927. As a result the rollers are unable to turn and carry with them uppermost sheet 928 of the pile 905.

Of course, it is also possible to use only one free-wheel arrangement of this kind, that is to say, only one roller 919 with one brake 923; the use of two such free-wheeling rollers is provided here merely to increase the certainty of the uppermost sheet in each case being gripped and transported. The free-wheeling rollers acting from above on the pile of sheets 905 are, of course, pressed resiliently onto the pile of sheets.

Figures 63 to 66 shown an embodiment in which a free-wheeling roller 929 acting from above on the pile of sheets 905 is provided, this roller consisting of a retentive material, for example rubber, and of which the axle 930 may be so displaced in a slot 931 that the roller 929, when it is intended to take with it a sheet from the pile 905 runs against a brake 932, whilst in the other direction of displacement, in which it is not intended to convey a sheet, it is not impeded by the brake 932 and rolls over the pile of sheets. The slot 931 is located in a part 933 which is pivotable about an axle 934, so that the roller 929 can be moved out of its recess 935 into contact with the uppermost sheet of the pile 905, or can be moved into this recess and out of engagement with the pile. For this purpose, on the part 933 or on the rear end of the brake 932 firmly joined thereto, there is provided a projection 936 which engages in a slot 937 running at an angle to the axis of an adjusting wheel 938 in which the slot 937 is situated.

This opportunity for adjustment is provided so that the pile 905 may be completely removed, and this can be effected by pulling a drawer 939 out of housing 940. If, before the drawer 939 is pulled out, the roller 929 is not brought out of engagement with the pile of sheets, then the uppermost sheet would remain in the housing when the drawer 939 is pulled out. To remove the pile of sheets an aperture 941 is provided in the bottom of the drawer 939, through which aperture a finger may be pushed to lift up the pile of sheets. Instead of this aperture or in addition thereto, lateral recesses 942 lying opposite one another could be provided in the side walls and in the bottom of the drawer (see Figure 63), through which recesses the pile of sheets 905 can be gripped at the sides between thumb and index finger and lifted out.

Figures 67 to 70 show a modified embodiment of the device shown in Figure 45 from which the pile of sheets can be completely removed; Figures 67 and 68 show plan views of this embodiment, the slider member for changing the picture and the drawer for completely removing the pile being in their inserted state in Figure 67, whereas these two elements are shown in their pulled-out state in Figure 68.

Figures 69 and 70 show longitudinal sections. Details are given below only of the modifications with respect to the embodiment shown in Figure 45.

To remove the complete pile of sheets 905 from slider member 943, an additional retentive element 944 is provided on a lever 945 that is

pivotable about an axle 946. On an end 947 of the lever 945 that is located on the side of the axle 946 opposite the retentive element 944, there acts a wedge-shaped projection 948 of an adjusting wheel 949, so that depending on the angular position of the adjusting wheel 949 the retentive element 944 remains either in a recess in the bottom of the slider member and the drawer, this position being shown in Figure 70 in solid lines, or the retentive element 944 is pushed so strongly against the underside of the pile of sheets 905 that it exerts a stronger retentive force than that exerted by the retentive lips 715. This latter position is indicated by dot-dash lines in Figure 70, and in this position the retentive element 944 takes with it also the lowermost sheet of the pile so that this does not, as shown in Figure 69, remain behind in the housing. Alternatively, in this embodiment the drawer 950, which forms the front part of the slider member and can be pulled a little way out of the slider member in the direction in which the slider member is pulled out, as clearly seen in Figure 68, may be provided with lateral recesses which correspond to the recesses 942 in Figure 63.

It may be mentioned that the roller 929 of the embodiment shown in Figures 63 to 66 can also be made considerably smaller if, instead of the blade-shaped brake 932, a cup-shaped brake surrounding the roller 929 in cross-section like a half moon is selected, as a result of which a corresponding reduction in the overall depth of the device can be made.

Figs. 71—76 illustrate a first embodiment wherein the picture to be exchanged is lifted from the stack or pile of pictures in a direction substantially perpendicular with respect thereto.

In housing 1000 slider 1002 is slidably reciprocable. The slider carries separator 1004 and in the housing there is a spring bias assembly 1006. A control button is slidably moveable in housing bottom 1010, and button 1008 engages over a free leg 1012 of the bias spring assembly such that in the initial position (Fig. 71 and Fig. 76, upper part) the spring bias assembly urges the picture stack 1014 upwards against viewing window 1016 of the housing 1000, however, the spring bias assembly is pulled clear of the stack upon button 1008 being shifted to the right (in Fig. 71—73).

During this clearing, a surface adhesive coating 1018 disposed about centrally on the bias assembly side which faces the stack will take with it the picture 1020 immediately adjacent to it. The lateral portions of this picture, however, will abut ribs 1022 extending upwards from housing bottom 1010 so that the picture will assume a downwards bulged profile. (Fig. 75). The lowermost central portion of the one picture is now against stop blocks 1024. These stop blocks have upper faces which are beneath ribs 1022 but higher than the surface-adhesive coating.

Button 1008 comprises diagonally pointing push rods 1026 able to yield elastically inwards. In the initial position (Fig. 76, upper part), these

push rods may be engaged by push hooks 1028 integral with the slider. Upon outward pulling of the slider consequently button 1008 is first shifted to the right. Soon however, the push rods
 5 will meet ribs 1022 and are flexed inwards so that the push hooks come clear. Only in this phase, separator 1004 will engage the stack from which the lowermost picture has been bulged downwards, and this picture cannot be moved by
 10 the separator for its front edge abuts blocks 1024. During passage of the separator, horn-like extensions 1030 of the separator will push the picture further downwards but will not convey it.

Upon the return stroke of the slider, these
 15 extensions 1030 will engage under the edge of the picture retained in housing 1000 (Fig. 72), lift it from surface-adhesive coating 1018 and make it slip over the separator unto the stack. A resetting web 1032 on the slider will finally abut
 20 button 1008 and push it back into its initial position. Protuberances 1034, 1036 adjacent rear wall 1035 of housing 1000 serve as stack alignment stops, and so do protuberances 1038 at slider front wall 1040.

25 Figs. 77—81 relate to an embodiment similar in operation to the preceding one.

In housing 1100, slider 1102 is slidably reciprocable between its inner end position (Fig. 79) and its outer end position (Fig. 80). The
 30 section shape of the device may be recognized in Fig. 77 and 78; it is slightly lens-shaped. In housing 1100, a set/reset spring (so-called "frog spring") 1104 is clamped in grooves 1106. Because its lateral webs 1108 are biased
 35 inwards, its pressure plate 1110 is biased ("reset") upwards (Fig. 77 and 79) or biased ("set") downwards (Fig. 78, 80, 81). Upon switching from the reset position into the set position pressure plate 1110 will take with it the
 40 adjacent lowermost picture 1112 due to its being held by adhesive coatings 1114. The latter are disposed bilaterally of the picture centre and therefore the picture will adapt itself to the downwards bulged pressure plate profile. As in
 45 the previous embodiment, one may provide stop blocks for the picture front edge for safety reasons such blocks, however, are not shown and as well the protuberances in the housing to align the stack and their passage slots in the separator are
 50 not illustrated either. The reader may refer to the preceding Figures 71 to 76.

A separator bar 1116 is connected via lateral rods 1118 with front wall 1120 of slider 1102, and this wall is further connected to bottom parts
 55 1122 and lateral guide parts 1124. Between the latter and the lateral rods 1118 the lateral webs 1108 of the spring 1104 extend.

It is to be noted that the plate 1110 is held stable in either of its set or reset positions but that
 60 a slight pressure upon the plate upper side wall suffice to switch it into its set status, and that inversely, slight pressure from the bottom will switch back or reset the spring. This pressure is exerted by the slider:

65 Upon pulling outwards of the slider, its

separator bar 1116 will urge upon the rear chamfered edges 1126 of the pressure plate 1110 and will then pass thereacross with a relatively wide clearance, the remaining stack
 70 1128 being conveyed outwards thereby. Just in the central portion, a horn 1130 depends from the separator bar and engages, upon the slider return stroke, under the front edge of picture 1112, lifting the latter to permit its passage over
 75 the separator. During the phase, spring 1104 still assumes its set position (Fig. 81). Only upon the control wedges 1132 integral with the slider front wall 1120 engaging under pressure plate 1110, the latter is switched back or reset. The horn
 80 1130 is unable to do this even if considerable tolerances are considered because it will engage the chamfered edge face 1134 of pressure plate 1110 so to push the latter downwards.

In the drawings, the bulging of housing, slider, spring and pictures is exaggerated in order to clarify the illustration; in practice, the pictures will be only slightly bulged but this will suffice to make the device operate as described.

Figs. 82—86 show an embodiment wherein
 90 the surface-retentive element although serving as the single-picture-conveyor will perform the function of the removal of said one picture from the stack in another phase of the slider movement.

In housing 1200, slider 1202 is slidably reciprocable. Its inner end position is shown in Fig. 83 and its outer end position in Fig. 84. At the bottom of housing 1200 at 1204 a spring bias assembly 1206 is fixed. A pressure plate of the
 100 assembly designated 1208 carries adjacent its inner end a cylinder segment 1210 rotatable between two angular positions about an axis 1212. The axis 1212 extends perpendicular to the slider movement and parallel to viewing window 1214.

Fig. 82 shows the slider during its return stroke almost driven home. The cylinder segment which extends upwards beyond the pressure plate 1208 is provided with a surface adhesive coating and
 110 assumes its end position in the clockwise sense. Upon engagement of the leading edge of the lowermost picture 1216, this edge will stick to segment 1210 and will be bent away from the stack because of the segment being rotated
 115 counterclockwise upon further slider movement; this is illustrated in enlarged scale in Fig. 86. In the inner end position, consequently, a rather wide gap 1220 will be created between the picture and the remaining stack 1218
 120 (Fig. 83) so that the separator 1222 mounted at the slider may readily convey the stack. Since the segment extends across but a portion of the entire width of the housing and of the pressure plate, the separator bar may be provided with a large indentation where it passes across the cylinder segment, but the separator slides across the picture bilaterally of the segment urging picture 1216 against
 125 pressure plate 1208. Picture 1216 is, however, retained by the adhesive cylinder segment coating
 130

(Fig. 84) which is rotated in clockwise direction upon pulling of the slider so to assume the position shown in Fig. 82.

So far and in the following the term "surface adhesive" has been used, this term is meant to define the function of the particular member because a glue (assuming that it would not be consumed and have a theoretically infinite life) would at least leave traces at the pictures. Other means able to develop a strong adhesive force are suitable. For example, the "surface-adhesive element" could be provided with microscopically small elastic hooks and the pictures with cooperative microscopic loops; such means are sometimes referred to as "burdock" connectors. The loop surface will be inert with respect to the viewing face of the pictures and thus will not interfere with the picture removal.

Another means would be to provide the pictures with a strip of magnetizable material or to glue such a strip unto them, these strips cooperating with a permanent magnet forming the adhesive element in the device. In such embodiments, the magnet can become effective prior to actual contact with the picture. Such an embodiment is illustrated in Figs. 87, 88 and 89 which show different phases of the picture exchange and thus of the slider movement.

Housing 1300, slider 1302, spring bias assembly 1304, viewing window 1306 and separator 1308 will be recognized. The functions of these elements are similar to the preceding embodiments. A cover wall 1310 of the housing comprises inwardly protruding ribs 1312 disposed laterally of the window and rounded at their ends; these ribs serve to push the stack 1314 downwards.

Beyond the ribs in slider push-in direction, a permanent magnet 1316 is mounted at the inner side of the cover wall 1310. The magnet is made of highly coercive material.

The pictures are provided with a strip of magnetizable material adjacent their innermost edge (or at both their edges in order to be independent when inserting the pictures into the device). These strips are at the picture face opposite the magnet. In the slider position driven home these edges lie in front of the magnet 1316 which is dimensioned so that it is able to attract the edge of the adjacent picture but unable to attract that of the next following one. Thus, the separator may pass between said uppermost picture and the remaining stack, and upon the return stroke of the slider, the edge remote from the magnet will engage under the separator which finally will tear away the magnetized edge from the magnet. The next following picture will now be attracted by the magnet and the exchange operation may be repeated at will.

In the embodiment of Figs. 90—95 the single picture conveyor is provided on the slider 1402 while the housing 1400 is provided with stack conveyor 1404, being again a separator bar. A spring biased pressure assembly 1406 is fixed at the housing bottom at 1408.

The single-picture-conveyor is a hook member 1410 mounted pivotally about an axle 1412 in the slider 1402. Its pivotal motion is controlled by means of a cam pin 1414 extending, with clearance, through an opening in slider lateral wall 1416 outwards into a cam groove 1418 sunk into the adjacent housing side wall 1420.

With the slider fully driven home, a tip 1422 of the hook member is somewhat spaced from the trailing edge of the uppermost picture 1424 but an adhesive element 1426 is pressed onto the picture.

In this position, engaging edge 1428 of the tip 1422 is upwardly spaced from the uppermost picture. For the first millimeters of slider outward movement, said one picture is pushed forward by the adhesive element, and this is readily possible because the leading picture edge is still in front of the separator bar 1404. Thereafter, cam pin 1414 is guided upwards in cam groove 1418 so to pivot the hook member 1410 so that its tip is urged downwards on the stack 1430 while the adhesive element takes off the uppermost picture. With further slider movement, tip 1422 engages the trailing edge of the uppermost picture (Fig. 94) and pushes it through the separator slot. It will be noted that during this phase, the tip edge 1428 is higher than the rounded face 1432 of the tip which faces the stack so that the next following picture will not be damaged, neither upon pulling of the slider nor upon its return stroke.

Fig. 96—101 illustrate an embodiment whose manner of operation may best be recognized in Fig. 98 (schematic):

Housing 1500 carries posts 1502 to which leaf springs 1504 are fixed. The free ends of the leaf springs carry pluge 1506 with an adhesive coating. These adhesive elements face the picture stack 1508, and the uppermost picture 1512 engages with its two inner corners a respective adhesive coating under the bias of pressure assembly 1510. Upon inwards flexing of the leaf springs, therefore, said one picture is squeezed inwards and thus bulged upwards. Said flexing of the springs is effected by control cams 1514 disposed on slider 1516. Further, the slider carries a single-picture-conveyor 1518 which is a solid horn.

With the slider fully driven home (Figure 96), the coated plugs 1506 are in their outermost rest position. Once the slider motion has been initiated (Figure 99), cams 1514 push the plugs 1506 inwards with simultaneous upwards bulging of the uppermost picture. Horn 1518 penetrates into the gap 1520 so formed and pushes the remaining stack downwards against the bias of the pressure assembly with its rounded downward pointing face. Upon further slider pulling, horn 1518 will convey the singled picture 1512 across the stack conveyor 1522 to the outside, stack conveyor 1522 being again a separator bar having centrally an indentation permitting passage of the horn 1518.

Immediately after the horn having engaged the uppermost picture, control cams 1514 will

release plugs 1506 which flex back into their initial positions unobstructed by the next following picture 1524 for horn 1518 constantly pushes away the stack. This is true for the slider return stroke, too, so that picture 1524 will be squeezed only upon recommencing of slider outward motion.

It is to be noted that horn 1518 does not have sharp edges so that the removed picture may easily fall unto the slider bottom once having passed the separator and may be pushed home under the stack. Further, in this embodiment, the housing 1500 does not have a transparent cover plate but simply a window frame, a transparent plate being disposed on the slider 1516. It must be further noted that the stack conveyor 1522 and the adhesive elements 1506 are both disposed on the housing, the single-picture-conveyor moving relative thereto.

A last embodiment is illustrated in Figure 102—105.

Housing 1600 is provided with a pressure plate assembly 1602 which may be disabled by means of a displaceable button 1604 under control of slider 1606 in the same manner as described above with reference to Figures 71—76. The slider 1606 carries the separator bar 1608 and stack alignment stops 1610 engage stack 1612 adjacent its centre. On the upper side of pressure plate 1614 an adhesive element 1620 is mounted eccentrically, i.e. between alignment stops 1610 and an outer housing side wall 1616, element 1620 frictionally and this retentively engaging the lowermost picture 1618 of the stack 1612.

Figure 102 shows the return stroke of the slider shortly before its being driven home the control mechanism of the pressure plate assembly has just released the latter, i.e. enabled it so that the adhesive element 1620 holds picture 1618 at the point of engagement.

Upon further inward pushing of the slider 1606, therefore, picture 1618 is turned with respect to the remaining stack, its lateral edge 1622 engaging thereby a soft leaf spring 1624 which yields and flexes outwards. Picture corner 1626 diametrically opposite to element 1620 is pushed under separator bar 1608 (Fig. 103). The lowermost picture is thus prepared to be exchanged.

Upon pulling of the slider 1606 (Figure 104) the separator bar 1608 may readily slip unto picture 1618 and convey the remaining stack outwards while the surface adhesive element still holds the lowermost picture. Since, however, upon pulling of the slider the pressure plate assembly will be disabled, with the slider fully pulled outwards picture 1618 lies loosely on internal ribs 1628 of the housing and is re-aligned with the stack under the action of the leaf spring 1624 to permit the picture to slip unto the stack again (Figure 105).

Reference is made to six co-opending 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 copending applications are 78.37449, 78.37451, 78.37452, 78.37453, 78.37454 and 78.37455.

Claims

1. A picture storage box and viewer device comprising a housing suitable to contain a pile of pictures, the uppermost of the pictures being disposed beneath a viewing window, and a picture exchange mechanism, including a slider member reciprocable relative to said housing and parallel to said viewing window, a single picture conveyor and a conveyor for the remainder of the pile, one of said conveyors being mounted on said housing, the other of said conveyors being mounted on said slider member, the device being such that, during a withdrawal stroke of slider member reciprocation, a single picture is drawn from one end of the pile and during a return stroke of slider member reciprocation, the single picture is added to the pile at the other end thereof, wherein the picture exchange mechanism includes an element capable of surface retentive connection with the side of the single picture facing away from the pile to move the single picture relative to the pile in response to slider member movement.
2. A picture viewer device as claimed in claim 1, wherein said surface retentive element is brought into frictional contact with said single picture side.
3. A picture viewer device as claimed in claim 1, wherein said surface retentive element is brought into separable adhesive (tacky) contact with said single picture side.
4. A picture viewer device as claimed in claim 1, wherein said surface retentive element comprises a first connection component providing adhesion in conjunction with a second complementary connection component provided on each picture.
5. A picture viewer device as claimed in claim 4, wherein one of the components is a magnet and the other is a magnetizable material.
6. A picture viewer device as claimed in claim 1, wherein said surface retentive element provides electrostatic attraction.
7. A picture viewer device as claimed in claim 1, wherein said surface retentive element engages said picture side by suction.
8. A picture viewer device as claimed in any preceding claim, wherein said surface retentive element is arranged to be controlled by the slider to move said single picture parallel to itself.
9. A picture viewer device as claimed in claim 8, wherein said surface retentive element is arranged to be controlled by the slider to shift said single picture in the picture withdrawal direction.
10. A picture viewer device as claimed in claim 8, wherein said surface retentive element is arranged to be controlled by the slider to shift said



release plugs 1506 which flex back into their initial positions unobstructed by the next following picture 1524 for horn 1518 constantly pushes away the stack. This is true for the slider return stroke, too, so that picture 1524 will be squeezed only upon recommencing of slider outward motion.

It is to be noted that horn 1518 does not have sharp edges so that the removed picture may easily fall unto the slider bottom once having passed the separator and may be pushed home under the stack. Further, in this embodiment, the housing 1500 does not have a transparent cover plate but simply a window frame, a transparent plate being disposed on the slider 1516. It must be further noted that the stack conveyor 1522 and the adhesive elements 1506 are both disposed on the housing, the single-picture-conveyor moving relative thereto.

A last embodiment is illustrated in Figure 102—105.

Housing 1600 is provided with a pressure plate assembly 1602 which may be disabled by means of a displaceable button 1604 under control of slider 1606 in the same manner as described above with reference to Figures 71—76. The slider 1606 carries the separator bar 1608 and stack alignment stops 1610 engage stack 1612 adjacent its centre. On the upper side of pressure plate 1614 an adhesive element 1620 is mounted eccentrically, i.e. between alignment stops 1610 and an outer housing side wall 1616, element 1620 frictionally and this retentively engaging the lowermost picture 1618 of the stack 1612.

Figure 102 shows the return stroke of the slider shortly before its being driven home the control mechanism of the pressure plate assembly has just released the latter, i.e. enabled it so that the adhesive element 1620 holds picture 1618 at the point of engagement.

Upon further inward pushing of the slider 1606, therefore, picture 1618 is turned with respect to the remaining stack, its lateral edge 1622 engaging thereby a soft leaf spring 1624 which yields and flexes outwards. Picture corner 1626 diametrically opposite to element 1620 is pushed under separator bar 1608 (Fig. 103). The lowermost picture is thus prepared to be exchanged.

Upon pulling of the slider 1606 (Figure 104) the separator bar 1608 may readily slip unto picture 1618 and convey the remaining stack outwards while the surface adhesive element still holds the lowermost picture. Since, however, upon pulling of the slider the pressure plate assembly will be disabled, with the slider fully pulled outwards picture 1618 lies loosely on internal ribs 1628 of the housing and is re-aligned with the stack under the action of the leaf spring 1624 to permit the picture to slip unto the stack again (Figure 105).

Reference is made to six co-opending 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 copending applications are 78.37449, 78.37451, 78.37452, 78.37453, 78.37454 and 78.37455.

Claims

1. A picture storage box and viewer device comprising a housing suitable to contain a pile of pictures, the uppermost of the pictures being disposed beneath a viewing window, and a picture exchange mechanism, including a slider member reciprocable relative to said housing and parallel to said viewing window, a single picture conveyor and a conveyor for the remainder of the pile, one of said conveyors being mounted on said housing, the other of said conveyors being mounted on said slider member, the device being such that, during a withdrawal stroke of slider member reciprocation, a single picture is drawn from one end of the pile and during a return stroke of slider member reciprocation, the single picture is added to the pile at the other end thereof, wherein the picture exchange mechanism includes an element capable of surface retentive connection with the side of the single picture facing away from the pile to move the single picture relative to the pile in response to slider member movement.
2. A picture viewer device as claimed in claim 1, wherein said surface retentive element is brought into frictional contact with said single picture side.
3. A picture viewer device as claimed in claim 1, wherein said surface retentive element is brought into separable adhesive (tacky) contact with said single picture side.
4. A picture viewer device as claimed in claim 1, wherein said surface retentive element comprises a first connection component providing adhesion in conjunction with a second complementary connection component provided on each picture.
5. A picture viewer device as claimed in claim 4, wherein one of the components is a magnet and the other is a magnetizable material.
6. A picture viewer device as claimed in claim 1, wherein said surface retentive element provides electrostatic attraction.
7. A picture viewer device as claimed in claim 1, wherein said surface retentive element engages said picture side by suction.
8. A picture viewer device as claimed in any preceding claim, wherein said surface retentive element is arranged to be controlled by the slider to move said single picture parallel to itself.
9. A picture viewer device as claimed in claim 8, wherein said surface retentive element is arranged to be controlled by the slider to shift said single picture in the picture withdrawal direction.
10. A picture viewer device as claimed in claim 8, wherein said surface retentive element is arranged to be controlled by the slider to shift said

16



single picture in a direction opposite to its withdrawal direction.

11. A picture viewer device as claimed in claim 8, wherein said surface retentive element is arranged to be controlled by the slider to shift said single picture in a direction transverse to its withdrawal direction.

12. A picture viewer device as claimed in claim 8, wherein said surface retentive element is arranged to be controlled by the slider to turn said single picture relative to the remainder of the pile.

13. A picture viewer device as claimed in any of claims 1 and 3 to 7, wherein said surface retentive element is arranged to lift at least a portion of said single picture from the remainder of the pile.

14. A picture viewer device as claimed in claim 13, wherein said surface retentive element is arranged to squeeze said single picture inwards so to lift its central portion from the remainder of the pile.

15. A picture viewer device as claimed in claim 13, wherein said surface retentive element is arranged to lift an edge of said single picture from the remainder of the pile.

16. A picture viewer device as claimed in any preceding claim, wherein the single picture conveyor is mounted on the housing and the conveyor for the remainder of the pile is mounted on the slider.

17. A picture viewer device as claimed in any preceding claim, wherein the single picture conveyor is provided with said surface retentive element.

18. A picture viewer device as claimed in claim 17, wherein the pile is urged by a pressure assembly against said viewing window, said conveyor for the remainder of the pile is a separator bar extending transverse to the picture withdrawal direction defining a picture removal slot and a picture return slot, and said surface retentive element is disposed at the side of said pressure assembly facing the picture pile.

19. A picture viewer device as claimed in claim 18, wherein the surface retentive element is rotatably mounted and can free-wheel over the remainder of the pile and the separator bar.

20. A picture viewer device as claimed in claim 19, wherein the separator bar is provided with passage indentations aligned with the passage path of said surface retentive element.

21. A picture viewer device as claimed in claim 19, wherein said surface, retentive element is a roller which is braked for picture withdrawal and free-running during the slider return stroke.

22. A picture viewer device as claimed in claim 19, wherein the surface retentive element includes an adhesive coating.

23. A picture viewer device as claimed in claim 18 or 19, wherein the pressure assembly comprises a plate carrying said surface retentive element and extending, even in the slider position in which said single picture is fully withdrawn from the pile, into said picture removal slot, said plate being further provided with resilient picture

lift-off members.

24. A picture viewer device as claimed in claim 23, wherein the separator is wedge-shaped at its side remote from the pile to lift said single picture after removal from the pile during the return stroke of the slider.

25. A picture viewer device as claimed in any of claims 18, 19, 23 and 24, wherein at least during a portion of the slider return motion, said pressure assembly is retained clear of the separator and of the remainder of the pile.

26. A picture viewer device as claimed in claim 25, wherein the housing is provided with internal support ribs for the remainder of the pile and parts of said pressure assembly carry said surface retentive element, which parts are arranged to be withdrawn beneath said ribs.

27. A picture viewer device as claimed in claim 25, wherein the slider may be pulled out of the housing and is provided with internal support ribs, and parts of said pressure assembly carry the surface retentive element, which parts are arranged to be withdrawn beneath said ribs of the slider.

28. A picture viewer device as claimed in any preceding claim, wherein the conveyors can be manually enabled and disabled.

29. A picture viewer device as claimed in any of claims 1 to 27, wherein the single picture conveyor is automatically enabled and disabled by means of co-operative spring members and control surfaces.

30. A picture viewer device as claimed in claim 28, wherein the single picture conveyor is mounted on a lever movable relative to the slider in a longitudinal direction relative to the pile.

31. A picture viewer as claimed in claim 30, wherein the single picture conveyor is mounted on a spring biased lever.

32. A picture viewer device as claimed in claim 21, wherein the single picture conveyor includes a roller which is braked in the picture withdrawal direction and free-running in picture adding direction, the circumferential surface of said roller having a high frictional coefficient on the surface of the single picture.

33. A picture viewer device as claimed in claim 32, wherein the roller is journaled in slots extending substantially parallel to the slider movement direction, and that a brake is provided which is engageable by the roller when it is shifted along said slots in one direction of slider movement.

34. A picture viewer device as claimed in claim 16, 17 or 18, wherein the single picture conveyor comprises a lip member urged by a pressure device into engagement with the picture upon the slider being moved in the picture withdrawal direction and loosely pivoting into a disabled state during a return stroke of the slider.

35. A picture viewer device as claimed in claim 19, 20 or 21, wherein the single picture conveyor when crossing the separator bar in the picture adding direction is held spaced from the separator or rolls thereover with low friction.



36. A picture viewer device as claimed in claim 1, wherein the slider comprises two slider portions relatively shiftable to each other in direction of slider movement and that on that slider portion which is leading a control member is mounted to cause the surface retentive element to engage and disengage with the single picture, said element being mounted on the trailing slider portion.
37. A picture viewer device as claimed in claim 36, wherein said surface retentive element is a strip bulged upon a slider withdrawal stroke and thereby frictionally engaged with said single picture, the strip being flattened and thereby disengaged from the single picture upon a slider return stroke.
38. A picture viewer device as claimed in claim 36, wherein said surface retentive element is mounted on a wedge member movable along an inclined cam track thereby selectively frictionally engaging said single picture.
39. A picture viewer device as claimed in any of claims 21, 32 or 33, wherein a twin roller assembly is provided with associated brake means.
40. A picture viewer device as claimed in any of claims 21, 32, 33 and 39, wherein said roller may be pivoted out of engagement with said single picture and with said pile by means of an adjustable wheel.
41. A picture viewer device as claimed in claim 40, wherein said wheel is provided with a helical slot on its circumference engaged by a cam pin mounted on a member wherein said wheel is journaled.
42. A picture viewer device as claimed in claim 9 including the feature of claim 2, wherein a supplementary surface retentive member is mounted on a level pivotable about a pivot axis by means of a cam surface disposed at an adjustment wheel so to engage selectively the side of the pile opposite to the viewing window such that its retentive force exceeds that of the surface retentive element.
43. A picture viewer device as claimed in any preceding claim wherein means for removing the entire pile of pictures from the housing comprises a drawer.
44. A picture viewer device as claimed in any preceding claim, wherein the surface retentive element is adaptable to non-plane picture faces.
45. A picture viewer device as claimed in any of claims 1 to 16, wherein said single picture moved by said surface retentive element relative to the remainder of the pile is engageable at its edge opposite its direction of removal by a stop member serving as the single picture conveyor.
46. A picture viewer device as claimed in claim 45, wherein the stop member is substantially hook-shaped.
47. A picture viewer device as claimed in claim 46, wherein said stop member is arranged to urge the remainder of the pile away from the single picture.
48. A picture viewer device as claimed in claim 47, wherein the surface retentive element can be brought in frictional engagement with said single picture and is mounted on said stop member.
49. A picture viewer device as claimed in claim 48, wherein said stop member is idling over a first portion of the slider withdrawal stroke, said surface retentive element engaging said single picture during said idling of the stop member.
50. A picture viewer device as claimed in any of claims 45 to 49, wherein said conveyor for the remainder of the pile is a separator bar extending across the single picture motion path leaving a picture removal slot and a picture return slot, respectively, above and beneath itself, and said separator bar has passage indentations for said stop member.
51. A picture viewer device as claimed in claim 18 or 50, wherein the separator bar is made of a material of low friction coefficient with respect to the material of said pictures.
52. A picture viewer device as claimed in any of the preceding claims, wherein the slider is biased by spring means into one of its end positions.
53. A picture viewer device as claimed in any of the preceding claims, having more than one viewing window and including a slider allocated to each window.
54. A picture viewer device as claimed in any of the preceding claims, wherein the or each viewing window is divided into several window areas allocated to separate pictures or to a single picture.
55. A picture viewer device as claimed in any of the preceding claims, including a receptacle preferably fixed in the housing and for housing photographic negative film strips of photographic prints which form the stack of pictures.
56. A picture storage box and viewer device substantially in accordance with any embodiment of the invention described herein with reference to the accompanying drawings or an embodiment modified as described herein with reference to the accompanying drawings.