

P i c t u r e v i e w e r

The present invention relates to a picture viewer, in particular for photo prints, including an exchange mechanism in order to cyclically exchange that one of a stack of pictures which is presented at a viewing window.

A picture viewer of this type is disclosed in US patent specification 4.259.802 and described in detail with reference to Fig. 1 - 20 thereof, and the disclosure of this patent specification is included herein by reference.

Briefly, the known picture viewer comprises a housing with a viewing window and a slider or drawer which may be reciprocated parallel to said window and relative to said housing. The housing has a spring bias system arranged to urge a stack of pictures against the window as long as the slider is received in the housing, and a retentive coating on the spring bias system retains the lowermost picture of the stack in the housing upon withdrawal of the slider, the latter in turn being provided with a separator bar arranged to force the remainder of the stack to be conveyed by the slider out of the housing. Upon the slider's being pushed home, the retained picture will "climb" up the separator bar and will assume a position on top of the stack, i.e. beneath the housing window.

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The combination of bias spring system and retentive element, as provided in the known design, certainly may have advantages primarily with respect to the ease of manufacture. However, it also has certain drawbacks. In particular, upon each stroke of the slider, the separator bar will engage the bias spring system and must suppress it, and the forces necessary to do so vary considerably over the length of the stroke so that proportionally the friction encountered by the user will vary. In result, the user has the feeling of "jamming" at certain positions of the stroke while from the standpoint of the handling, a smooth and soft touch would be highly desirable.

It is therefore an object of the present invention to improve the viewer design with an eye towards smooth movement of the slider relative to the housing.

The present invention provides a picture viewer, comprising:

5 a first frame member provided with a viewing window,
a second frame member slidably movable relative to
said first frame member in a direction parallel to
said viewing window,

a picture exchange mechanism including:

10 a retentive element mounted at one of said
frame members arranged to engage one picture
of a stack of pictures, a separator element
mounted at the other of said frame members
arranged to engage the remainder of said stack,
retentive element and separator element being arranged
and disposed such that upon relative withdrawal of said
15 frame members said one picture is removed at one end of
said stack and upon pushing-together of said withdrawn
frame members said one picture is added to the stack at
the other end thereof, and

20 bias means arranged to urge at least that picture of
the stack adjacent said viewing window against the latter
when said frame members are pushed together,
wherein said retentive element is disposed in said first
frame member, and
wherein said separator element and said bias means are
25 disposed in said second frame member.

The above-mentioned object is achieved according to the invention, by the fact that the slider is provided with both the spring bias system and the separator bar with the result
5 that these two components cannot interfere. Necessarily, the retentive element will then be a component separate from the bias system and mounted in the housing. The slider may be provided with stop members to prevent expulsion
10 of the stack of pictures by the bias system once the slider has been withdrawn from the housing, and these stop members are preferably removeable to to permit loading and unloading of a picture stack into and out of the viewer, respectively.

Embodiments of the picture viewer of the present invention will be described hereunder in detail with reference to the accompanying drawings.

- 5 Fig. 1 is a plan view of a first embodiment with the slider fully withdrawn,
Fig. 2 is a section along line 2-2 of Fig. 1 but with stop flaps displaced to assume their "loading" position,
10 Fig. 3 illustrates in section along line 3-3 the outer slider end, however with the slider fully pushed home into the housing,
Fig. 4 is a partial plan view analog to Fig. 1 to illustrate a modified
15 embodiment, with the viewer closed,
Fig. 5 is a section view along line 5-5 of Fig. 4, however, with the slider being withdrawn, i.e. with the viewer opened,
20 Fig. 6 is a section view along line 6-6 of Fig. 5 with the slider being at about halfway of its stroke, and
Fig. 7 is an illustration analog to Fig. 5 of a further modified embodiment.

25 It is to be understood that the drawings are intended to illustrate primarily the novel features which bring about the improvement, other details of the design being disclosed in the publication mentioned above so that they may be
30 readily adopted.

A first embodiment of the picture viewer according to the invention is described with reference to Fig. 1, 2 and 3.

The first frame member is a housing 1 provided with a viewing window 2 formed e.g. by a pane of transparent plastic material, the remainder of housing 1 being injection molded of opaque plastic material. Slidable relative to housing 1, a second frame member is constituted in the form of a slider 3 of substantially frame-like structure with a grip portion 5 at its outer end, longitudinal struts 6 and 7 extending in direction of the slide stroke, and a separator element in the form of a separator bar 4 joining the struts 6 and 7 adjacent the inner slider end.

Leaf springs 8 are mounted on each strut 6, 7 at their centers 9 by means of rivets or the like. The length of leaf springs 8 is selected such their distal ends pointing to the housing cannot leave the latter even with the slider fully withdrawn while their other distal ends pointing away from housing 1 extend beneath stop flaps 10. - Fig. 1 and 3 show the operative position of these flaps, i.e. the position in which they act as stop means for the corners of a stack of pictures 11 urged away from struts 6, 7 by springs 8; in this position, the user may perform the exchange operation by reciprocating the slider 3 relative to housing 1. If, however, a stack of pictures is to be removed or inserted (see Fig. 2), flaps 10 may be pivoted about a shaft 15 to assume the "loading" position indicated in Fig. 2. To load the viewer, stack 11 is aligned with the housing opening as shown in Fig. 2 and pushed inwards as indicated by arrow 12, thereby depressing the inwards pointing spring ends 13. The outer stack edges are then depressed

(arrow 14) so that they become positioned in front of the inner face of grip portion 5. Flaps 10 are then returned into the operative position.

Shaft 15 is received in slots 21 of grip portion 5 and biased by coil spring 16 to the outermost ends of the slots. In the operative position, edges 19 of flaps 10 engage the inner face of slider front wall 17, flap extension 18 engaging over the top edge of front wall 17.

10 In order to pivot flaps 10 into their load position, a key 20 slidably received in slider front wall 17 is depressed and forces flap edge 19 inwards. These forces acting at a point offset with respect to shaft 15, a torque
15 tends to pivot flaps 10 about shaft 15, and the flaps will indeed pivot into the load position once extension 18 has come free of front wall 17. Spring 16 will stabilize the load position in that it makes the top face²⁸ of flaps 10 engage
20 the inner face of slider front wall 17.

Means to implement the cyclic picture exchange are provided, and for a detailed explanation, the publication referred to above may be consulted. Briefly, a retentive element
25 is mounted on the bottom 30 of housing 1 and comprises a high friction coating 22 on the surface of a lever arm 23 facing window 2. With slider 3 fully pushed home into housing 1, lever arm 23 will assume the position indicated
30 in dashed lines in Fig. 2. Upon withdrawal of the slider, coating 22 retains the lowermost

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picture of stack 11 while the remaining pictures are carried outwards on slider struts 6, 7 pushed by separator bar 4. As soon as the letter engages lever system 23, the latter is depressed against the bias of spring 24 and it will remain in this disabled position until bar 4 will return into the housing 1. With slider 3 fully withdrawn, an auxiliary spring 25 urges hte rear edge of the retained picture, i.e. the edge remote from the housing opening, upwards to window 2 and thus in front of stop extensions 26 integrally formed with housing 1. The front end of the retained picture will then be presented in front of the inwardly facing bevel of separator bar 4, and when now slider 3 is pushed back into housing 1, this picture front end will "climb" up this bevel because its opposite edge is engaged by stop extensions 26 and cannot yield. Consequently, the retained picture will pass, during the return stroke of slider 3, over separator bar 4 through a clearance provided between bar 4 and the top wall of housing 1 while the remainder of the stack 11 is conveyed into housing 1 beneath said one picture. Thus, upon each reciprocation of slider 3 relative to housing 1, the lowermost picture is conveyed to become the uppermost then presented at window 2, and because springs 8 urge against the picture corners at points indicated at 27, the picture beneath the window will be presented in flat shape; it is to be noted that this design is particularly useful for pictures in the form of photographic prints because, whenever such prints are bulged, the coating side will be on the outside of the bulge.

It will be understood that springs 24 and 25 are very weak as compared with springs 8 so that the frictional conditions during slider reciprocation vary only slightly in spite of the

deflection of springs 24, 25 occurring thereby. It may be desired to design spring 24 such that the bias produced by it remains substantially constant irrespective of the degree of deflection; a type of spring exhibiting such feature may consist of a coil spring disposed along the pivot axis of lever system 23 and having extended wire ends, one supporting lever 23 and the other abutting the housing bottom.

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It will be noted that in the embodiment of Fig. 1, 2 and 3 upon initiation of the slider return stroke, when the retained picture passes over separator bar 4, the inwards pointing distal ends 13 of leaf springs 8 will continue to urge stack 11 upwards and in engagement with the housing top wall. This is the more true as it cannot be predicted how many pictures will be loaded by the user into one viewer which, nevertheless, is supposed to function properly even with only a few prints therein so that the bias of springs 8 must be dimensioned accordingly. The retained picture, however, must penetrate between the housing top wall and the -- then -- uppermost picture of the remaining stack in slider 3 with the risk that under adverse conditions, the retained picture being insufficiently stiff, it may become bulged.

Fig. 4, 5 and 6 illustrate a slight modification permitting to overcome this risk.

As may be seen in Fig. 4, the configuration of springs 8' has been slightly modified in that distal ends 13' are offset inwards with respect to the outwards pointing ends 13". Intergrally injection molded with housing bottom 30, there are hooks 32 having an upstanding base 34 and a laterally outwardly extending arm 36 in superposition relationship with the respective adjacent slider strut 6 and 7, clearance between them being provided to permit passage of the leaf spring ends 13' upon withdrawal of slider 3. However, the lateral extension of arms 36 is dimensioned such that there will be no interference with the other leaf spring end 13".

About halfway of the slider stroke, arms 36 engage over spring ends 13' and with continued withdrawal of the slider, spring ends 13' are progressively depressed with the result that the ends of the pictures in the stack adjacent the housing become loosened. Upon pushing home of slider 3, the leading edge of the retained picture can freely enter the space 38 on top of the stack until the arms 36 will have released spring ends 13'. Thus, the risk of the separated picture to become damaged is greatly reduced.

The retentive element is not illustrated in Fig. 4 through 6 nor is the auxiliary spring, reference being made to Fig. 1-3.

Fig. 7 illustrates a further modification in which, contrary to the preceding embodiments, the picture immediately beneath the window 2 is retained in the housing 1 upon withdrawal of slider 3 (the retentive element may be implemented by a high friction coating around the window adapted to engage a narrow picture edge portion, complemented by a soft spring analog to the auxiliary spring 25 of the first embodiment and adapted to suppress the picture edge adjacent the housing opening after withdrawal of the slider so that it may be engaged by bevel 40 of separator bar 42). Fig. 7 shows that with the slider fully pulled out, the separated picture⁴² rests upon rails 44 upstanding from the housing bottom so that spring ends 13' may engage thereunder upon the slider's being returned into the housing.

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Attention is drawn to the claims of our patent application No. 85.30146 (Serial No. 2,167,207) which is an application divided out of the present application.



Claims

1. A picture viewer, comprising:

a first frame member provided with a viewing window,

a second frame member slidably movable relative to

said first frame member in a direction parallel to said

5 viewing window,

a picture exchange mechanism including:

a retentive element located in said first frame member and arranged to engage one picture of a stack of pictures,

10 a separator element located in the said second frame member and arranged to engage the remainder of said stack,

the retentive element and separator element being arranged and disposed such that upon withdrawal of the said second
15 frame member said one picture is removed from one end of said stack, and upon pushing-together of said frame members said one picture is added to the stack at the other end thereof, and

bias means located in the said second frame member and
20 arranged to urge at least that picture of the stack adjacent said viewing window against the latter when said frame members are pushed together, (4)



2. A picture viewer as set forth in claim 1 wherein stop means, to prevent expulsion of the stack of pictures by the bias system once the said second frame member has been withdrawn, are provided at at least one of said frame members at positions opposite to said bias means where the latter act upon said at least one picture urged against said window.
3. A picture viewer as set forth in claim 2 wherein said stop means are provided at least at said first frame member.
4. A picture viewer as set forth in claim 2 wherein said stop means are provided at least as said second frame member.
5. A picture viewer as set forth in claim 4 wherein stop means remote from said viewing window with said frame members drawn apart is removable.
6. A picture viewer as set forth in claim 5 wherein said stop means comprise a pivotable stop element.
7. A picture viewer as set forth in claim 6 wherein said stop element is arranged to assume two stable positions and is spring biased into either of them.
8. A picture viewer as set forth in claim 1 wherein said bias means comprises leaf springs mounted in said second frame member at about the center of



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their length and arranged to urge said at least one picture against said window with their two distal ends adjacent respective corners of said one picture.



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9. A picture viewer as set forth in claim 8 in which said second frame member is of substantially frame-like configuration with struts extending in said direction adjacent lateral side edges of said viewing window, wherein each strut carries one of said leaf springs.

10. A picture viewer as set forth in claim 8 or claim 9 wherein said leaf springs extend substantially parallel to said direction and their distal ends projecting to said first frame member when the frame members are fully withdrawn extend into said first frame member.

11. A picture viewer as set forth in claim 1 in which said retentive element is biased by means of a spring system wherein said spring system exerts a substantially equal bias irrespective of its deflection.

12. A picture viewer as set forth in claim 11 wherein said retentive element is deflectable by said separator element when moving thereacross.

13. A picture viewer as set forth in claim 1 wherein said first frame member is provided with resilient means arranged to present said one engaged picture in front of a stop projection engaging that edge of said one picture which is remote from the remainder of the stack.



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14. A picture viewer as set forth in claim 1 wherein disabling means are provided to suppress said bias means at least with respect to picture stack edges adjacent said separator element during
5 a first portion of a pushing-together stroke of said frame members.

15. A picture viewer as set forth in claims 8 and 14 wherein said disabling means comprises extensions of said first frame member disposed
10 and arranged to engage over a portion of said leaf springs during said stroke portion so to deflect said spring portion away from said window.

16. A picture viewer as set forth in claim 8 and 15 wherein said leaf springs extend along longitudinal struts of said second frame member and each
15 have a first distal end and a second distal end, and wherein said disabling means are arranged to deflect only those distal ends which, with the frame members being pulled apart, point in
20 direction to said first frame member.

17. A picture viewer substantially as herein described with reference to, and as illustrated by, Figures 1, 2 and 3 of the accompanying drawings.

18. A picture viewer as set forth in claim 17
25 but modified substantially as herein described with reference to, and as illustrated by, Figures 4, 5 and 6 of the accompanying drawings.

19. A picture viewer as set forth in claim 17 but modified substantially as herein described with
30 reference to, and as illustrated by, Figure 7 of the accompanying drawings.
