United States Patent

[11] 3,625,610

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[45] Patented Dec. 7, 1971

[54] **PRINTING FRAME**
16 Claims, 10 Drawing Figs.

[52] U.S. Cl. 355/76
[51] Int. Cl. G03b 27/62
[50] Field of Search 355/76

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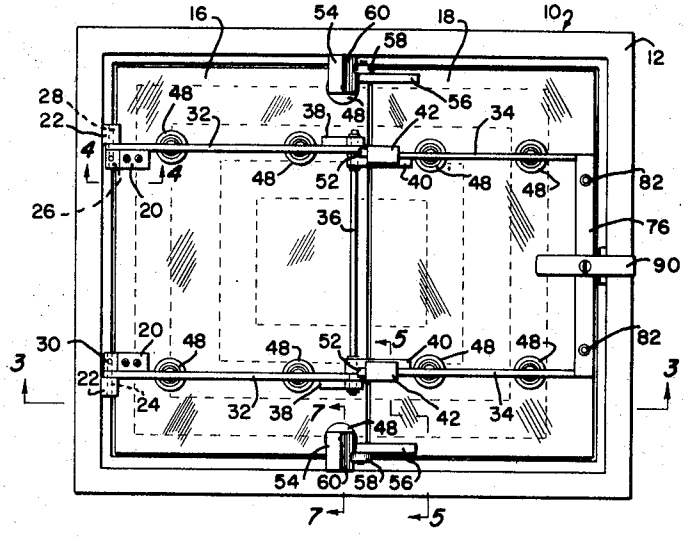
ABSTRACT: A printing frame for use in association with a camera for holding copy or photographic materials for camera viewing, has a frame with a transparent glass panel fixed therewithin, and articulated light-transmissive panels pivotally mounted to the frame for disposition upon the transparent panel to secure the copy or photographic material therebetween. The frame has arms pivotally coupled to only one side thereof for carrying the light-transmissive panels. A plurality of springs are secured at spaced-apart locations to, and along, the arms, to constrain the panels together. Components are provided for selectively adjusting the constraint of the springs to facilitate the use of the printing frame with copy or photographic materials of greater or lesser thicknesses.

The frame carries fulcrum pieces, at either sides thereof, for engagement with rollers carried by the light-transmissive panels, which pieces and rollers facilitate a removal of the light-transmissive panels from tensioned engagement with the transparent panel, so that copy or photographic materials can be inserted therebetween, and the fulcrum pieces are readily disengageable from the frame, by sliding the same out of engagement with frame-captive hardware, to allow the light-transmissive panels to be fully raised from the transparent panel, so that all said panels can be cleaned.



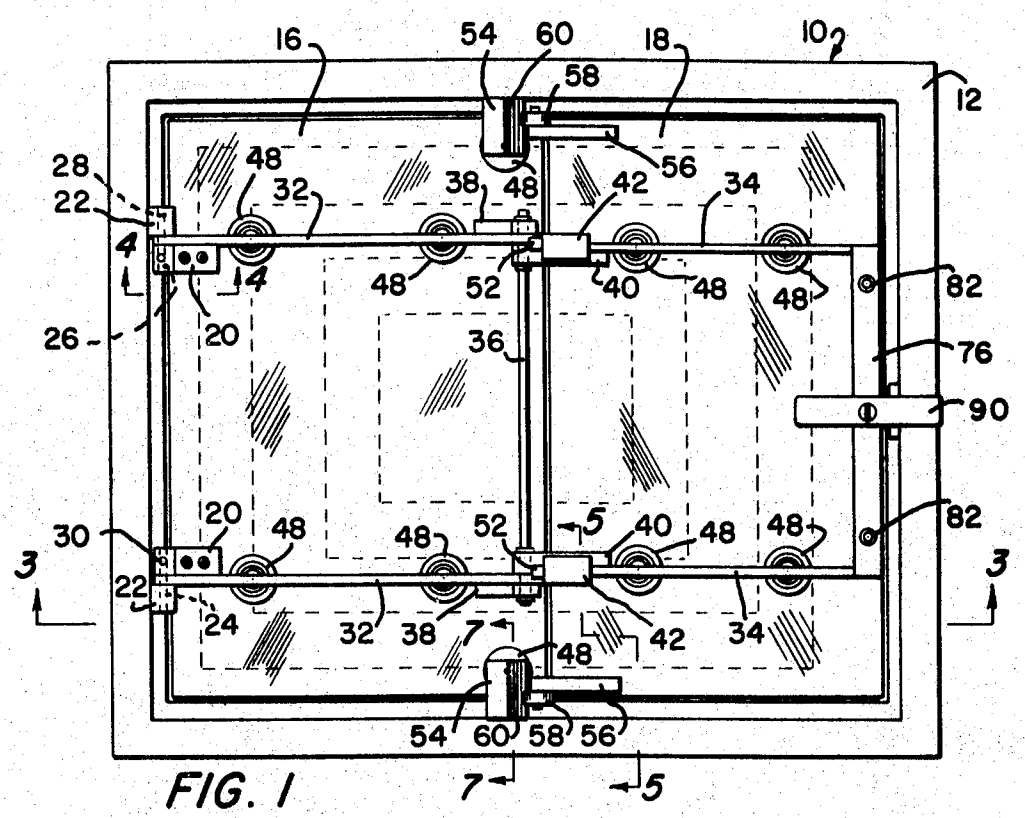


FIG. 1

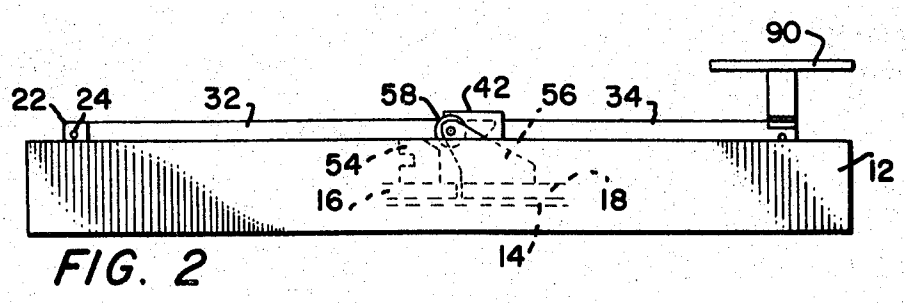


FIG. 2

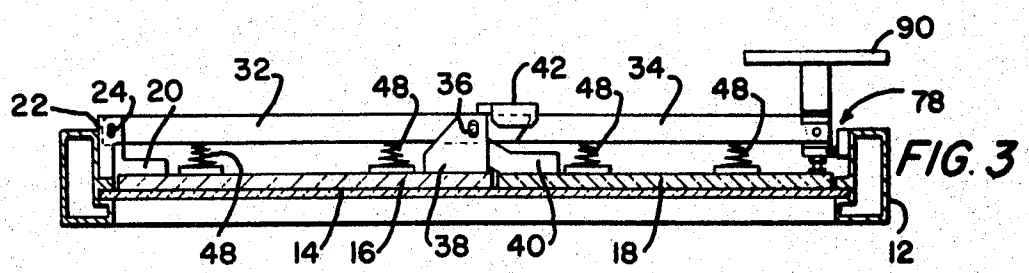


FIG. 3

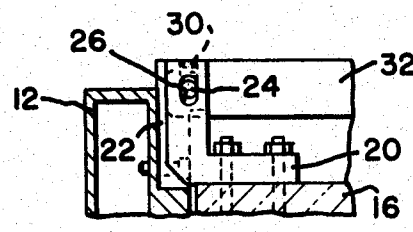


FIG. 4

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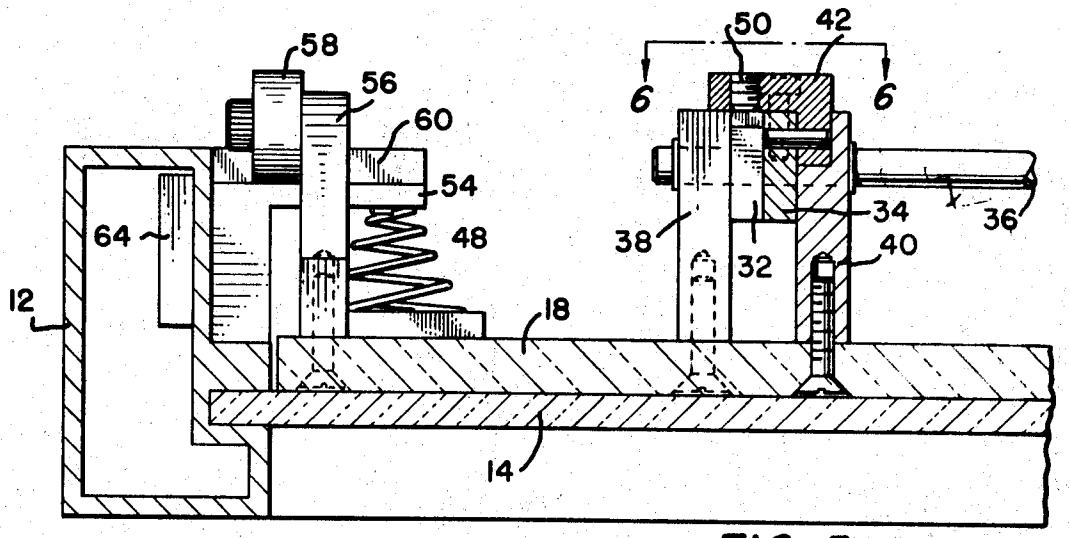

FIG. 5

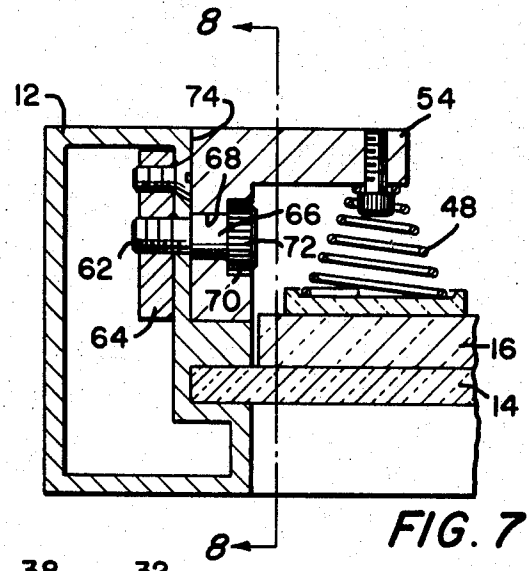

FIG. 7

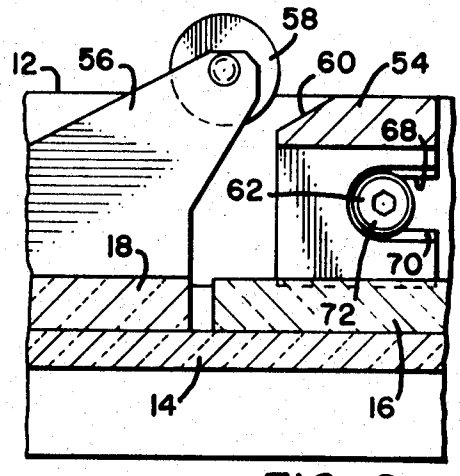

FIG. 8

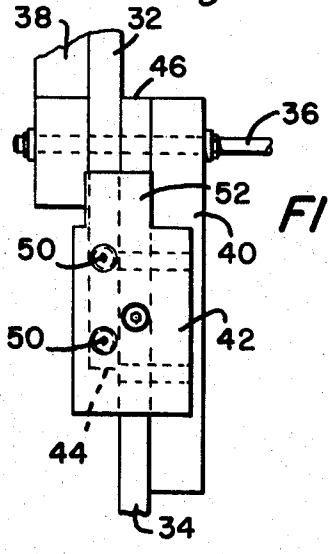

FIG. 6

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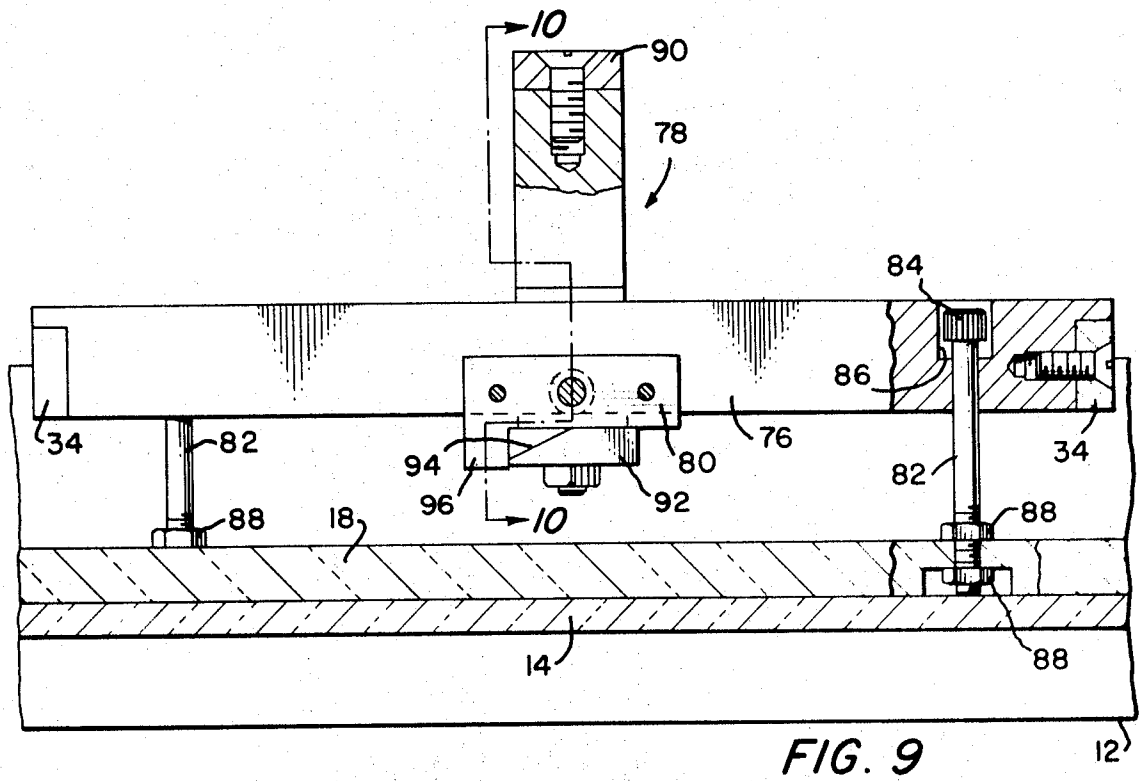

FIG. 9

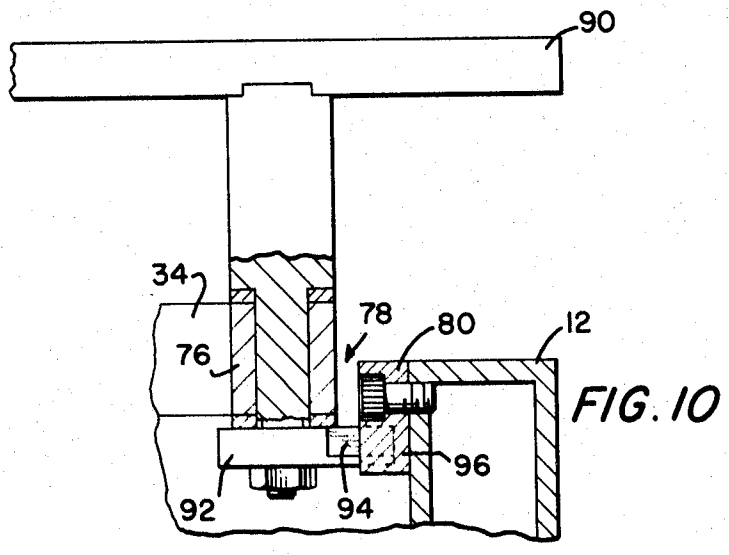

FIG. 10

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PRINTING FRAME

This invention pertains to printing frames, sometimes identified as copyholders or platens, used in association with cameras, and especially to such printing frames for holding copy or photographic materials in positions for camera viewing.

Printing frames known in the prior art comprise surmounting glass panels, one of which is light-transmissive (being translucent or transparent), and the other of which is transparent, for disposing copy or photographic materials therebetween for viewing by a camera, with the light-transmissive panel being articulatable about a pivot rod, the rod having a spring disposed thereabout with spring ends in engagement with the light-transmissive panel to constrain the latter into tensioned engagement with the transparent panel.

In these prior art devices, it is necessary to demount the pivot rod, in order that the light-transmissive panel may be elevated sufficiently to facilitate a cleaning of both panels, because the rod is bolted to the periphery of the framework. Also, these prior art devices have no means for adjusting the biasing of the single, rod-mounted spring means to accommodate the printing frame for efficient holding of copy or photographic materials of differing thicknesses. Additionally, the single-spring means has proven inadequate biasing for the copy or photographic materials, it having become clear that biasing is required at a plurality of spaced-apart locations, efficiently to constrain the panels together.

It is an object of this invention, therefore, to teach an improved printing frame which avoids the disadvantages, just noted, which obtain with prior art printing frames.

It is an object of this invention, in particular, to provide an improved printing frame having articulated arm means for coupling light-transmissive panel means to a quadrilateral frame which frame mounts a fixed transparent panel therewithin, said arm means having resilient means interposed between said arm means and said panel means at a plurality of spaced-apart locations for constraining said light-transmissive panel means into tensioned engagement with said transparent panel.

It is another object of this invention to provide a printing frame having a light-transmissive panel means which is articulatable above a fixed transparent panel, to accommodate the insertion of copy or photographic materials therebetween, said panel means being pivotally coupled to a peripheral frame at only one side thereof, and including resilient means for constraining said light-transmissive panels means into engagement with said transparent panel, and means for selectively adjusting the constraint with which said resilient means cause said panel means to engage said transparent panel.

It is another object of this invention to provide a printing frame having a pivot rod for articulation of light-transmissive panel means relative to an underlying transparent panel which rod requires no demounting to facilitate a sufficient elevation of the light-transmissive panel means from the transparent panel to accommodate cleaning of all panels.

A feature of this invention comprises the provision of a quadrilateral frame with a transparent glass panel fixedly disposed therewithin, and articulated light-transmissive panels pivotally mounted to one side only of the frame for disposition upon the transparent panel, to secure copy or photographic material therebetween. The frame has arms pivotally coupled to said one side which carry the light-transmissive panels, and a plurality of springs are secured at spaced-apart locations to, and along, said arms, to constrain said panels together. Means are provided for selectively adjusting the constraint of the springs, to facilitate the use of the printing frame with copy or photographic materials of greater and lesser thicknesses. The frame carries fulcrum pieces, at sides thereof, for engagement with rollers carried by the light-transmissive panels, which fulcrum pieces and rollers facilitate a removal of the light-transmissive panels from tensioned engagement with the transparent panel, so that copy or photographic materials can be inserted therebetween, and the fulcrum pieces are readily disengageable from the frame by sliding the same out of engagement with frame-captive hardware, to allow the light-transmissive panels to be fully raised from the transparent panel, so that both said panels can be cleaned.

Further objects and features of this invention will become more apparent, by reference to the following description, taken in conjunction with the accompanying figures, in which:

FIG. 1 is a plan or top view of a preferred embodiment of the invention;

FIG. 2 is a side view of the embodiment of FIG. 1;

FIG. 3 is an elevational, cross-sectional view, taken along section 3—3 of FIG. 1, showing the arm means which constrains the panel means into tensioned engagement with the transparent panel in cooperation with a plurality of springs disposed between said panel means and said arm means;

FIG. 4 is an enlarged, fragmentary view, partly in cross section, taken along section 4—4 of FIG. 1, showing the adjustable pivot brackets;

FIG. 5 is an elevational, cross-sectional view, taken along section 5—5 of FIG. 1, showing the frame-mounted fulcrum piece, at one side of the frame, and the roller mounted to the light-transmissive panel which engages the fulcrum piece, together with the means provisioning the articulation of the panel means;

FIG. 6 is a top view of a portion of FIG. 5 showing the pressure plate and arm sections' pivot arrangement;

FIG. 7 is an elevational, cross-sectional view, taken along section 7—7 of FIG. 1, of the fulcrum piece mounted to one side of the frame, together with a portion of the frame;

FIG. 8 is an inner-frame side view of the fulcrum piece and roller arrangement, taken along section 8—8 of FIG. 7;

FIG. 9 is a side, partially cross-sectional view, of the latching arrangement of the parallel, articulated arms and striker plate (the frame not being shown); and

FIG. 10 is a further partial cross-sectional view of the latching arrangement of FIG. 9, rotated 90° of arc from FIG. 9, and taken along section 10—10 of FIG. 9.

As shown in FIGS. 1 through 4, the novel printing frame 10 of my invention comprises a quadrilateral frame 12 having a transparent panel 14 of glass fixed therewithin. A plurality of light-transmissive panels 16 and 18 are disposed in overlying attitude upon the transparent panel 14, for confining copy or photographic material therebetween for exposure thereof to a camera.

First brackets 20 are secured to the panel 16 and are pivotally coupled to frame-mounted brackets 22 by means of pivot pins 24. Brackets 20 and 22 have bore holes 26 and 28, respectively, therethrough, for accommodating pivot pins 24, and bore holes 26 in brackets 20 are elongated to facilitate movement of brackets 20 relative to pivot pins 24, to provide for adjustable spacing between panel 14 and 16. Brackets 20 further mount adjustable set screws 30, which are threadedly disposed for penetration of the elongated boreholes 26 in brackets 20 for engagement thereof with pins 24 to restrict the amount of movement of brackets 20 relative to pins 24, to provision more or less spacing between panels 16 and 14 to insure an optimumly provided nip of copy or photographic material disposed therebetween.

First arm sections 32 are pivotally coupled to the brackets 20 and 22 by means of the same pivot pins 24 and extend longitudinally and perpendicularly from the pivot axis of pins 24 over panel 16. First arm sections 32 are further pivotally coupled, at the other terminal ends thereof, to second arm sections 34. These joined terminal ends of the first and second arm sections 32 and 34 are penetrated by a pivot rod 36 and are fixed to panels 16 and 18, respectively, by joint coupling thereof, via rod 36, to panel brackets 38 and 40. Bracket 38 is fixed to panel 16 by hardware (not shown here), and bracket 40 is fixed to panel 18 by hardware (not shown here), the two brackets extending perpendicularly from surfaces of the panels 16 and 18 to receive the rod 36 and terminal ends of the arm sections 32 and 34.

Second arm sections 34 have surmounting pressure plates 42 fixed thereto which overlie the juxtapositioned terminal ends, 44 and 46, respectively, of the first and second arm sections, this novel arrangement being more clearly shown in FIGS. 5 and 6. Pressure plates 42 are provisioned to insure that when the second arm sections 34 are constrained toward panel 18, they will cause these pressure plates borne thereupon to apply force upon first arm sections 32 and cause the latter sections also to be constrained toward panel 16.

The pressure plate 42 arrangement of my invention provides for a full tensioning of the expanse of panels 16 and 18 toward panel 14, in cooperation with the plurality of springs 48 disposed between sections 32 and 34 and panels 16 and 18, without having to rely upon a leverage point presented by the frame 12—which reliance is normally resorted to in prior art devices of this kind.

The tensioning of panels 16 and 18 toward panel 14, through the teaching of my invention, is adjustable through the use of set screws 30, as priorly noted, and also in the adjustability of the pressure plate arrangement. Pressure plates 42 are tapped and have set screws 50 disposed therein for adjustable penetration of the plates so that they might bear upon the terminal ends 44 of the first arm sections 32. By threadedly withdrawing the set screws 50, the pressure plates will bring a given force to bear upon first arm sections 32. By threadedly extending the set screws through the pressure plates 42 and toward the first arm sections 32, the first arm sections will be earlier constrained toward panel 16, with pivotal movement of second arm sections 34 toward panel 18, and will be tensioned toward panel 16, with more cumulative force, with the latching of second arm sections 34, in constrained position over panel 18.

Pressure plates 42 have over-reaching tabs 52 projecting therefrom, in the direction of first arm sections 32, to assist in the elevation of panel 16 from panel 14. When panel 18 is pivoted to remove from panel 14, the pivotal arcing thereof is delimited by the tabs 52. The tabs engage the first arm sections 32 and "lever" the first arm sections 32 into removal from panel 16—causing panel 16 to be removed from panel 14. Panel 16 is caused to pivot, slightly, on pins 24, the limit thereof being established by the engagement of fulcrum pieces and rollers—of which components more is explained in the ensuing text.

As shown in FIGS. 1 and 3, a considerable plurality of springs 48 is disposed between the arm sections 32 and 34 and the panels 16 and 18. This teaching of my invention assures a proper tensioning of the panels 16 and 18 toward panel 14 fully throughout the dimensional areas of the panels. Novelly, then, my invention teaches improved biasing means for constraining the panels 16 and 18 and panel 14 together, and means for adjusting the constraint to accommodate for copy or photographic materials disposed therebetween of greater and lesser thicknesses.

This novel printing frame sets forth means for effecting a removal of panel 16 from panel 14, with pivotal movement of panel 18 about rod 36, to allow insertion of copy or photographic material therebetween. Such means are already known in the prior art. However, the known means require that the panels corresponding to my panels 16 and 18 be pivoted about a rod which extends fully across and is penetration of the frame, and is bolted at either ends thereof externally of the frame. Thus, the prior art devices require the full demounting of the rod to facilitate a full pivotal elevation of panels (corresponding to my panels 16 and 18) so that cleaning of the panels might be undertaken. The pivotal arrangement means of my teachings, shown in FIGS. 5, 7 and 8, sets forth fulcrum pieces 54, at either sides of the frames 12, which have no structural connection with the pivot rod 36. The panels 18 mount roller supports 56 thereon, incorporating rollers 58 for rolling engagement with the fulcrum pieces. When the panel 18 is pivotally removed from panel 14, the rollers engage and roll upon camming surfaces 60 of the fulcrum pieces 54. This has the effect of preventing panel 16 from removing from panel 14, except for a small degree—just enough to admit of the insertion of copy or photographic material between panel 16 and panel 14. However, as reference to FIGS. 7 and 8 evidence, the fulcrum pieces 54 are slidably removable from the frame 12.

Each fulcrum piece 54 is held captive to the frame 12 by means of a plural-diameter-shank bolt 62 secured to a wall of the frame. A lock nut 64 disposed within a hollow side member of frame 12 fasteningly secures the bolt 62 to the frame 12, with an unthreaded, headed end 66 thereof projecting from the frame to receive the fulcrum piece. The fulcrum piece 54 has a bolt slot 68 formed therein for sliding engagement with the bolt. A shoulder 70 formed in the slot insures that the bolt head 72 will effect engagement therewith and hold the fulcrum piece 54 firmly against the upright wall surface 74 of the frame 12. When the panels 16 and 18 are pivoted, the forces acting on the fulcrum piece urge its slot 68 up against the bolt 62, so emplacement security of the fulcrum piece is maintained. It requires manual pressure in the opposite direction to dislodge the fulcrum piece 54 from the bolt 62 for withdrawal from the frame 12.

There is sufficient clearance between the fulcrum piece 54 and roller 58 for the fulcrum piece to be slid relative to the roller 58 to allow its being dislodged from bolt 62. It is only when panel 16 is pivoted on rod 36, that the roller 58 closes upon the fulcrum piece and rolls upon the camming surface 60.

An additional spring 48 is carried by each of the fulcrum pieces 54 to provide further panel-to-panel constraint, and also to assist in holding the fulcrum piece in proper position against the wall 74 of the frame.

With reference to FIGS. 9 and 10 it will be seen that the second arm sections 34 are joined in a cross member 76, adjacent the side of the frame 12 opposite the panel-pivoted side. The cross member 76 resiliently mounts a latching assembly 78 for engagement thereof with a striker plate 80 secured to the frame 12. I note the latching assembly 78 is resiliently mounted; this is so because of the resilience afforded to the second arm sections 34 by springs 48. Further, the cross member 76 is secured to the panel 18 by through bolts 82 which accommodate for movement of the latching assembly 78 toward the panel 18. The through bolts 82 are headed at one end, and the heads 84 thereof are nested in counterbores 86 formed in the cross member 76. The threaded opposite ends of the through bolts 82 are fastened, by means of a pair of lock nuts 88, to panel 18. With the application of manual pressure on the latching assembly 78, the bolt heads 84 remove from the counterbores 86 while the cross member 76 moves along the bolt shanks toward the panel 18. This provisioning allows the latching to be accomplished, without running the risk of fracturing the panel 18; such risk would be occasioned were the cross member 76 rigidly fixed to the panel. More importantly, though, it effects a camming action which applies tension of springs 48 on panel 18.

The latching assembly 78 comprises a T-shaped handle 90 which terminates in a latching tongue 92. The tongue comprises a flat plate having a beveled, access edge 94 to facilitate its engagement with the striker plate 80. The striker plate 80 has a depending edge 96, projecting perpendicularly therefrom toward panel 18, to provide a stop for the latching tongue or latching plate 92.

Minor adjustment of the constraint with which the latching assembly 78 urges panel 18 toward panel 14 can be effected by a slight reorientation of the nuts 88, taking care to insure that the threaded shank portions of the bolts 82 do not project so far as to contact the panel 14.

While I have described my invention in connection with a specific embodiment thereof, it is to be clearly understood that this is done only by way of example and not as a limitation to the scope of my invention as set forth in the objects thereof and in the appended claims. For example, I teach the disposition of the beveled edge, a camming edge 94 on the latching

tongue 92. Of course the teaching will suggest to those skilled in this art to dispose such a beveled, camming edge on the striker plate 80 in an alternate embodiment. Also, the embodiment presented, only by way of example, teaches the use of elongated boreholes 26 in the brackets 20. In an alternate embodiment, it would be feasible to deploy cam bushing about pins 24, perhaps. Therefore, it is to be expected that others skilled in this art will find other means of practicing the objects of my invention, taking teaching from my disclosure; all such alternate means and embodiments shall be considered to be embraced by the spirit of my invention.

I claim:

1. A printing frame, comprising:
a quadrilateral frame;
a first transparent panel fixedly mounted within said frame;
a second light-transmissive panel means;
means pivotally coupling said second panel means to only one side of said frame for movement of said second panel means about at least a first given pivotal axis, away from, and into, overlying disposition upon said first transparent panel;
said frame having striker plate means on a side thereof opposite said one side for receiving latching means;
said coupling means including articulated arm means extending longitudinally and perpendicularly from said given pivotal axis, resilient means interposed between said arm means and said second panel means at a plurality of spaced-apart locations for constraining said second panel means into tensioned engagement with said first panel, and latching means disposed for movement relative to said second panel means for latching engagement thereof with said striker plate means; wherein
said arm means comprises at least one articulated arm having a plurality of pivotally coupled, longitudinal sections, each section of said plurality having means coupling said resilient means thereto; and wherein
each of said sections has a terminal end thereof disposed in juxtaposition with a terminal end of another of said sections;
further including means in penetration of said juxtapositioned terminal ends for coupling the same together and for disposing said terminal ends for pivotal movement relative to each other through a given limited arc; and wherein
at least one of said terminal ends has first means disposed for engagement with a given terminal end juxtapositionally coupled thereto for constrainingly urging said given terminal end toward said second light-transmissive panel means upon pivotal movement of said one terminal end to one limit of said given arc.

2. A printing frame, according to claim 1, wherein:
said coupling means include means for selectively adjusting the constraint with which said resilient means cause said second light-transmissive panel means to tensionally engage said first transparent panel.

3. A printing frame, according to claim 1, wherein:
said one side of said frame defines an upright wall surface; and
said coupling means includes means accommodating a given degree of movement of said arm means transverse to said first transparent panel for varying the constraint with which said resilient means cause said second light-transmissive panel means to tensionally engage said first transparent panel.

4. A printing frame, according to claim 3, wherein:
said movement accommodating means include means for selectively restricting said given degree of movement.

5. A printing frame, according to claim 1, wherein:
said terminal end engagement means includes second means disposed for engagement with said given terminal end to cause said given terminal end to move away from said first transparent panel upon pivotal movement of said one terminal end to the other limit of said given arc.

6. A printing frame, according to claim 1, wherein:
said terminal end engagement means includes means for selectively adjusting the constraint with which said terminal end engagement means causes said given terminal end to be urged toward said second light-transmissive panel means.

7. A printing frame, according to claim 1, wherein:
said second panel means comprises a plurality of light-transmissive panels;
a plurality of said resilient means are disposed between each of said sections and each of said light-transmissive panels.

8. A printing frame, according to claim 1, wherein:
said arm means comprises a pair of articulated arms, disposed in parallel, each of said arms having a plurality of pivotally coupled, longitudinal sections, each section of said plurality having means coupling said resilient means thereto; further including
a cross member, disposed parallel with said first, given, pivotal axis, coupled at either ends thereof to said arms, in adjacency to said opposite side; and
said latching means are carried by said cross member.

9. A printing frame, according to claim 8, further including:
means fastening said latching means both to said cross member and to said second light-transmissive panel means;
said fastening means and said cross member being cooperative to accommodate movement of said cross member relative to said second light-transmissive panel means, about an axis parallel to said first, given, pivotal axis, in a first given pivotal direction from a normally assumed position of said cross member, and for prohibiting movement of cross member relative to said second light-transmissive panel means in a second given pivotal direction from said normally assumed position of said cross member.

10. A printing frame, according to claim 9, wherein:
said latching means includes a longitudinal handle;
said handle being disposed transverse to said first, given, pivotal axis, upon said fastening means being in latching engagement with said striker plate means.

11. A printing frame, according to claim 10, wherein:
said fastening means includes means for selectively adjusting said normally assumed position of said cross member into greater and lesser proximity to said second light-transmissive panel means.

12. A printing frame, comprising:
a quadrilateral frame;
a first transparent panel fixedly mounted within said frame;
a second light-transmissive panel means;
means pivotally coupling said second panel means to only one side of said frame for movement of said second panel means about at least a first given pivotal axis, away from, and into, overlying disposition upon said first transparent panel;
said frame having striker plate means on a side thereof opposite said one side for receiving latching means;
said coupling means including articulated arm means extending longitudinally and perpendicularly from said given pivotal axis, resilient means interposed between said arm means and said second panel means at a plurality of spaced-apart locations for constraining said second panel means into tensioned engagement with said first panel, and latching means, disposed for movement relative to said second panel means, for latching engagement thereof with said striker plate means; wherein
said arm means comprises at least one articulated arm having a plurality of pivotally coupled, longitudinal sections, each section of said plurality having means coupling said resilient means thereto; wherein
each of said sections has a terminal end thereof disposed in juxtaposition with a terminal end of another of said sections; further including
means in penetration of said juxtaposed terminal ends for coupling the same together and for disposing said terminal ends for pivotal movement relative to each other through a given limited arc; wherein

said penetration means comprise a rod; and

at least one of said terminal ends includes means facilitating limited transverse movement thereof, relative to said rod, toward and away from said first transparent panel.

13. A printing frame, according to claim 12, wherein:

said one terminal end has elongated slotting formed therein to receive said rod and to facilitate said transverse movement.

14. A printing frame, comprising:

a quadrilateral frame;

a first transparent panel fixedly mounted within said frame;

a second light-transmissive panel means;

means pivotally coupling said second panel means to only one side of said frame for movement of said second panel means about at least a first given pivotal axis, away from, and into, overlying disposition upon said first transparent panel;

said frame having striker plate means on a side thereof opposite said one side for receiving latching means;

said coupling means including articulated arm means extending longitudinally and perpendicularly from said given pivotal axis, resilient means interposed between said arm means and said second panel means at a plurality of spaced-apart locations for constraining said second panel means into tensioned engagement with said first panel, and latching means, disposed for movement relative to said second panel means, for latching engagement thereof with said striker plate means; wherein

said second panel means comprises a plurality of light-transmissive panels;

said coupling means further include means pivotally coupling said light-transmissive panels together for relative movement therebetween about at least a second given pivotal axis; and further including

means coupled to said frame for limiting movement of said second light-transmissive panel means, about said first given pivotal axis, to a prescribed arc;

said movement limiting means being slidably removable from said frame to facilitate movement of said second light-transmissive panel means, about said first given pivotal axis, in an arc greater than said prescribed arc.

15. A printing frame, comprising:

a quadrilateral frame;

a first transparent panel fixedly mounted within said frame;

a second light-transmissive panel means;

means pivotally coupling said second panel means to only one side of said frame for movement of said second panel means, about at least a first given pivotal axis, away from, and into, overlying disposition upon said first transparent panel;

said frame having striker plate means, on a side thereof opposite said one side, for receiving latching means;

said coupling means including articulated arm means extending longitudinally and perpendicularly from said given pivotal axis, resilient means interposed between said arm means and said second panel means at a plurality of spaced-apart locations for constraining said second panel means into tensioned engagement with said first panel, and latching means, disposed for movement relative to said second panel means, for latching engagement thereof with said striker plate means; wherein

said second panel means comprises a plurality of light-transmissive panels;

said coupling means further include means pivotally coupling said light-transmissive panels together for relative movement therebetween about at least a second given pivotal axis; and further including

means coupled to said frame for limiting movement of said second light-transmissive panel means, about said first given pivotal axis, to a prescribed arc;

said movement limiting means being slidably removable from said frame to facilitate movement of said second light-transmissive panel means, about said first given pivotal axis, in an arc greater than said prescribed arc; and

means mounted to said second light-transmissive panel means disposed for engagement with said movement limiting means, upon movement of said panels about said second given pivotal axis, to cause said second light-transmissive panel means to move in said prescribed arc.

16. A printing frame, according to claim 15, wherein:

said movement limiting means comprise a fulcrum piece; and

said second light-transmissive panel means mounted engagement means comprise a roller disposed for effecting rolling movement thereof relative to said fulcrum piece.

* * * * *