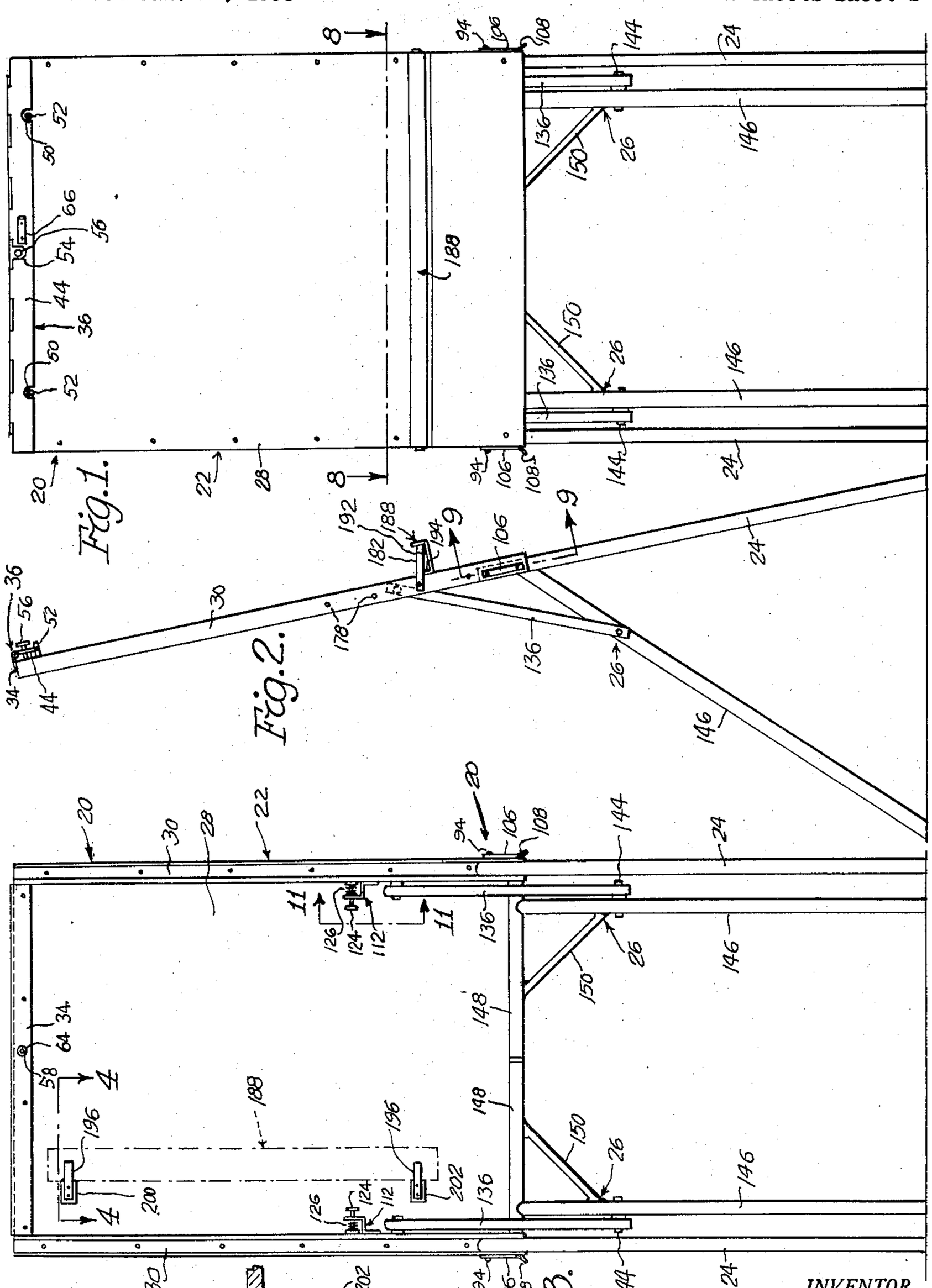
Sept. 20, 1960 D. HOWELL 2,953,341

FOLDING EASEL

Filed Jan. 22, 1958 2 Sheets-Sheet 1



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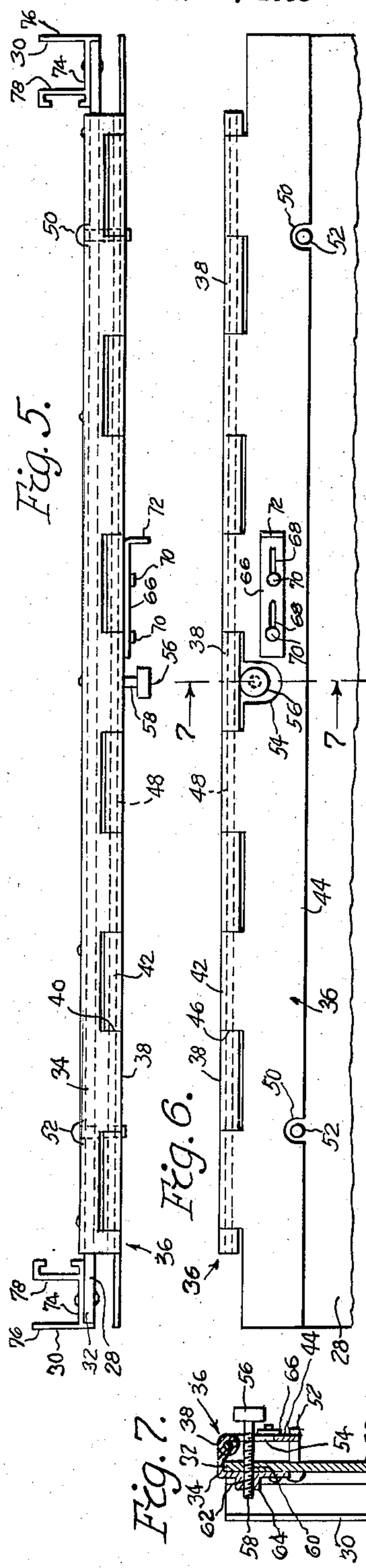

Fig. 5.

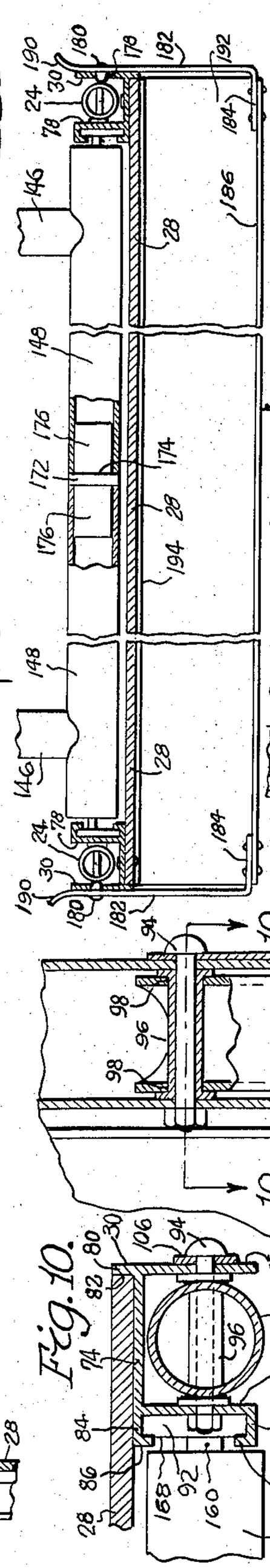

Fig. 6.

Fig. 7.

Fig. 8.

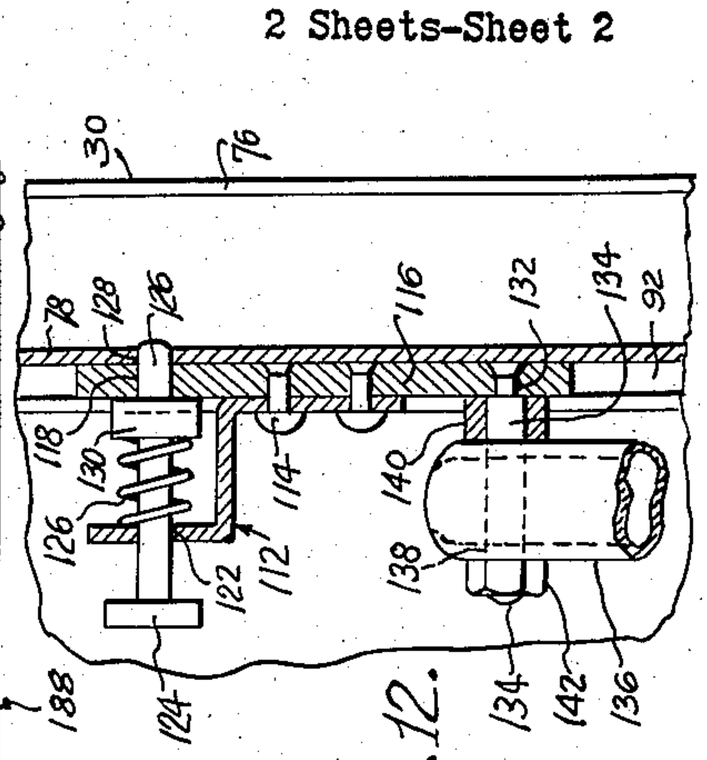

Fig. 12.

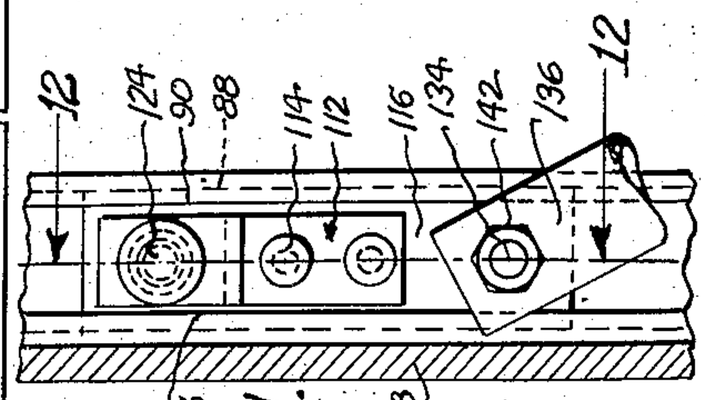

Fig. 11.

Fig. 10.

Fig. 9.

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FOLDING EASEL

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This invention relates to easels or display stands and, in particular, to folding easels.

One object of this invention is to provide a folding easel having an improved construction whereby the easel legs may be folded alongside the easel pad-holding panel so as to render it unusually compact for storage or transportation.

Another object is to provide a folding easel wherein the pad holder panel has channel members extending vertically along its opposite side edges and serving not only to impart rigidity to the pad holder but also to receive the folded main legs.

Another object is to provide a folding easel of the foregoing character wherein the auxiliary legs which extend rearwardly at an angle of inclination to the main legs to maintain the easel upright are likewise swingable upwardly against the back of the easel holder panel parallel to the main legs when the latter are swung upwardly into the channels of their respective channel members.

Another object is to provide a folding easel of the foregoing character as set forth in the object immediately preceding, wherein each of the auxiliary legs is foldable individually relatively to the other auxiliary leg for convenience and ease of folding, yet which when unfolded, forms with its companion auxiliary leg an apparently integral auxiliary leg unit of great strength and rigidity.

Another object is to provide a folding easel of the foregoing character having an improved adjustable pad holder which enables the quick replacement of one pad for another without substantial interruption.

Another object is to provide a folding easel of the foregoing character wherein the pad holder is provided with a removable shelf which is capable either of being mounted at different horizontal levels on the pad holder panel or removed and stored in receiving clips on the back of the panel.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawings, wherein:

Figure 1 is a front elevation of a folding easel in its upright or unfolded position, ready for use, according to one form of the invention;

Figure 2 is a left-hand side elevation of the unfolded easel shown in Figure 1;

Figure 3 is a rear elevation of the unfolded easel shown in Figure 1;

Figure 4 is an enlarged horizontal section taken along the line 4—4 in Figure 3, showing one of the easel shelf-holding clips for storage of the shelf;

Figure 5 is an enlarged top plan view of the pad holder clamp of the easel shown in Figures 1 to 3 inclusive;

Figure 6 is an enlarged fragmentary front elevation of the upper end of the easel of Figures 1 to 3 inclusive and 5, showing the pad holder clamp of Figure 5 in front elevation;

Figure 7 is a fragmentary vertical section taken along the line 7—7 in Figure 6;

Figure 8 is an enlarged fragmentary horizontal section taken along the line 8—8 in Figure 1, showing the detachable shelf and swinging leg construction;

Figure 9 is an enlarged fragmentary approximately vertical section taken along the line 9—9 in Figure 2, showing the main and auxiliary leg pivot constructions;

Figure 10 is a horizontal section taken along the line 10—10 in Figure 9;

Figure 11 is an enlarged fragmentary vertical section taken along the line 11—11 in Figure 3, showing details of the auxiliary leg brace links; and

Figure 12 is a vertical section taken along the line 12—12 in Figure 11.

Referring to the drawings in detail, Figures 1 to 3 inclusive show a foldable easel, generally designated 20, according to one form of the invention as having a pad holder, generally designated 22, a pair of individually swinging main or front legs 24, and a pair of individually swinging auxiliary or rear legs 26 inclined at an acute angle to the main or front legs 24. The pad holder 22 is provided with a sheet metal panel 28 of aluminum or other suitable material having a pair of compound channel members, generally designated 30, riveted or otherwise secured to its back along its vertical side edges (Figure 3).

The panel 28 along its upper edge 32 has a forwardly-facing angle member 34 riveted or otherwise secured thereto and forming a hinge bracket for the pad holder clamp, generally designated 36. For this purpose, the angle member 34 at its forward edge is provided with laterally-spaced tubular portions 38 integral therewith and formed by bending operations upon the forward edge portion of the angle member 34, the intervening portions thereof having been notched out as at 40 (Figure 5) to receive the corresponding laterally-spaced tubular portions 42 of the swinging pad clamping member or plate 44 (Figures 6 and 7). The latter is similarly notched out as at 46 to receive the tubular portions 38.

The tubular portions 38 and 42 interlace in alignment with one another, with the tubular portions 38 and 42 thereof interfitting and a hinge rod 48 is inserted through the aligned tubular portions 38 and 42 in order to hingedly support the clamping member 44. The pad clamping plate 44 along its lower edge is provided with a pair of laterally-spaced notches 50 adapted to provide clearance for a pair of forwardly-projecting laterally-spaced headed pins 52 mounted in suitable laterally-spaced holes in the panel 28 and adapted to enter correspondingly located aligned perforations in the stack of sheets of paper or other material constituting the pad (not shown) to be mounted upon the easel 22.

The central portion of the pad clamping plate 44 has an aperture 54 to provide clearance for the knurled head 56 of a clamping screw 58, the shank of which is threaded through aligned holes 60 and 62 respectively (Figure 7) in the panel 28 and boss 64 in the center of the rearward vertical part of the angle member 34. It is of course only necessary that the hole 62 be threaded, the hole 60 being optionally left smooth. A latch bar 66 provided with a pair of elongated slots 68 (Figure 6) is slidably mounted upon headed pins 70 likewise seated in the panel 28. The latch bar 66 is slid to and fro horizontally by means of a handle portion 72 projecting at right angles therefrom in order to insert the latch bar 66 between the screw head 56 and the clamping bar 44 or to withdraw it from that location, as desired, in order to lock or unlock the clamping bar 44 from engagement with the upper end portion of the pad of stacked sheets.

Each of the compound channel members 30 (Figures 5, 9 and 10) has a back wall 74 and parallel outer and inner side walls 76 and 78, the former having a forwardly-projecting flange 80 which fits against the corresponding

side edge 82 of the panel 28 (Figure 10), while the back wall 74 rests against the back surface of the panel 28. The back wall 74 has an inner extension 84 with a perpendicular flange 86, whereas the inner side wall 76 has a flange 88 perpendicular to the side wall 76 and the flange 88 has a smaller flange 90 perpendicular thereto. This construction provides an elongated space or guideway 92.

The side walls 76 and 78 (Figures 9 and 10) are drilled in alignment to receive aligned pivot holes 94 surrounded by flanged bearing bushings 96 passing through the aligned holes 98 in the opposite sides of each tubular main leg 24. The legs 24 are preferably formed of metal tubing, such as aluminum tubing, and each has a hole 102 therein spaced away from its respective pivot bolt 94 and adapted to receive a locking pin 104 mounted on a spring locking lever 106, one end of which is drilled for the passage of the bolt 94 (Figure 9) and the other end of which is upturned as at 108 to serve as a handle. The pin 104 is mounted in a hole 110 in the spring locking lever 106 and projects through a hole 112 in the channel side wall 76 into locking engagement with the hole 102 when the main leg 24 is in its extended position shown in Figures 1 to 3 and 9.

In addition, each channel member 30 (Figure 12) is provided with a Z bracket 112 riveted or otherwise secured as at 114 to an elongated slide block or plate 116 reciprocably mounted in the guideway 92 adjacent the inner wall 78 of the channel 30. The guide block 116 near its upper end is provided with a hole 118 which registers with a hole 120 in the channel side wall 78 when the auxiliary or rear legs 26 are in their lowered positions shown in Figures 1 to 3 and 12. Reciprocably mounted in a hole 122 aligned with the hole 118 is a headed locking plunger 124 having a tip 126 adapted to enter into locking engagement with the holes 118 and 120 (Figure 12) in the above-described lowered position of each auxiliary or rear leg 26. Each locking plunger 124, of which there are two (one for each side channel 30) is urged toward its locking position by a helical compression spring 128 disposed between the Z bracket 112 and a collar 130 on the plunger 124.

Each slide block 116 near its lower end is drilled as at 132 (Figure 12) to receive the outer end of a pivot stud 134 which pivotally supports the upper end of a tubular brace link 136 in aligned holes 138 therein, the link 136 being spaced apart from the slide block 116 by a collar or washer 140. A nut 142 threaded upon each stud 134 retains its respective brace link 136 in position.

The lower end of each tubular brace link 136 is drilled to receive a pivot bolt 144 (Figures 1, 2 and 3) also passing through aligned holes in the tubular leg member 146 of each auxiliary or rear leg 26. The upper end of each leg portion 146 is welded or otherwise secured at right angles to a tubular hub 148 (Figure 9) and strengthened by a diagonal brace 150 interconnecting the leg member 146 also welded thereto. At its outer end, each tubular hub 148 is provided with outer and inner plugs 152 and 154 bored centrally as at 156 and 158 to receive a spring-urged reciprocable pivot pin 160 which is pushed outward by a helical compression spring 162, the outer end of which passes through a hole 164 in the pivot pin 160 and the inner end of which abuts the inner plug 154. Each pivot pin 160 at its outer or free end is adapted to enter a bearing hole 166 forming a pivot bearing in a bearing plate 168 (Figure 9) which is riveted or or otherwise secured as at 170 to the side wall 78 of the channel member 30 in the space or guideway 92.

The inner and adjacent ends of the tubular hubs 148 are interconnected as well as provided with bearing support by a flanged double-ended bearing shaft 172 (Figure 8) having a central annular flange 174 disposed between the opposite ends of the tubular hubs 148 and

bearing shaft portions 176 extending outwardly in opposite directions from the flange 172 into the bores of the tubular hubs 148. This construction not only supports the rear or auxiliary legs 26 for independent swinging motion between their folded and unfolded positions, but also facilitates assembly by enabling the pivot pins 160 to be pushed inward while they are being lined up with their bearing holes 166, the springs 162 forcing the pivot pins 160 into the bearing holes 166 at the instant alignment occurs.

The side channel members 30 of the pad holder 22 are provided with a series of vertically-spaced holes 178 (Figures 2 and 8) which serve as sockets for pins 180 mounted on spring angle arms 182, the angled ends 184 of which are riveted or otherwise secured to the flanged rim 186 of a detachable and adjustable shelf 188 and the opposite ends 190 are bent laterally to serve as operating handles. The shelf 188 has a bottom plate 192 upon which crayons, erasers or other equipment may be supported. The shelf may be adjusted at any one of a number of different levels corresponding to the levels of the holes 178 in the side channel members 30 by spreading the handle ends 190 apart from one another (Figure 8) in order to withdraw the pins 180 from the holes 178 in which they are at that moment located. An inner flange 194 engages the panel 28 and steadies the shelf 188, which is thus in the form of a shallow channel member with the opposite ends closed by the spring arms 182.

The shelf 188, when removed for transportation or storage, is adapted to be temporarily mounted on the back of the panel 28 (Figures 3 and 4) by means of spring clips 196 secured as at 198 to blocks 200 which in turn are secured in vertically-spaced relationship to the back of the panel 28. The outer ends 202 of the spring clips 198 are bent outward in order to facilitate the insertion and removal of the shelf 188 which is stored in the vertical position shown by the dotted lines in Figure 3.

In the operation of the invention, let it be assumed that the auxiliary legs 26 have been secured to the pad holder 22 and to each other in the manner described above by retracting the spring-urged pins 160 (Figure 9) and letting the latter snap into the bearing holes 166 when alignment is achieved. Let it be assumed that the foldable easel 20 is in its opened or unfolded position shown in Figures 1 to 3 inclusive and in the detail views of Figures 8 to 12 inclusive, and that the shelf 188 is in its position of use mounted on the front of the panel 28. To fold or collapse the foldable easel 20 into its position for transport or storage, the operator first removes the shelf 188 by grasping the handles 190 (Figure 8) and pushing them outward away from one another and from the side channel members 30, causing the pins 180 to leave their respective holes 178 and enabling the shelf 188 to be removed. The shelf 188 is then placed against the rear surface of the panel 28 (Figure 3) and pushed laterally beneath the spring clips 196 which hold it in the vertical dotted line position of Figure 3.

The operator next pulls inward upon each locking plunger 124 (Figure 12) in order to detach the tip 126 thereof out of its respective locking hole 120, whereupon the operator grasps the leg member 146 of each rear or auxiliary leg 26 and swings it upward in an arc toward the panel 28 while the tubular brace 136 thereof pushes the slide block 116 along the guideway 92 in the side channel member 30. Each auxiliary leg 26 is folded into engagement with the back surface of the panel 28 in this manner, and locking holes (not shown) corresponding to the locking holes 120 may be optionally formed in the inner side wall 78 of the side channel members 30 near the upper ends thereof in order to yieldably lock the auxiliary or rear legs 26 in their folded positions.

To fold the main or forward legs 24, the operator pulls outward upon the handle portion 108 of each spring arm

106 (Figure 9), thereby withdrawing the locking pins 104 from their respective locking holes 102 in the tubular legs 204, whereupon the legs 24 are swung through semi-circular paths upward into the channels of the channel members 30 against the bottom walls 74 thereof (Figure 10). The foldable easel 20 is now in its collapsed or folded position for compactness of storage or transport.

The insertion and removal of the pads of stacked sheets (not shown) from the pad holder 22 has been described in general terms in connection with the description of the construction thereof. To do this, the operator grasps the handle portion 72 of the slide bar 66 (Figure 6) and pulls it to the right into the position thereof shown in Figures 5 and 6, thereby withdrawing its end from between the screw head 56 and the clamping bar or plate 44, thus permitting the latter to be swung upward around its hinge rod 48, freeing the pad holding pins 52 for insertion or removal of a pad. When this has been done, the clamping plate 44 is swung downward into engagement with the pad after the latter has been placed upon the pins 52, and the slide bar 66 is then slid to the left by means of the handle 72 so that its end again is interposed between the head 56 of the screw 58 and the pad clamping plate 44. The latter may then be tightened by turning the head 56 of the clamping screw 58 to thread it further into its boss 64 (Figure 7).

What I claim is:

1. A folding easel comprising an easel panel having opposite side edges and upper and lower edges, a pair of elongated stiffening members secured to the back of said panel in spaced parallel relationship, a pair of main legs pivoted near their upper ends to said stiffening members near the lower ends and lower edge of said members and panel respectively and swingable from upwardly-directed closed positions adjacent said members and panel downwardly through substantially semi-circular paths to downwardly-directed open positions extending in opposite directions from said closed positions, an auxiliary leg structure pivotally mounted at its upper end on the lower end portion of each stiffening member near the lower edge of said panel and swingable from an upwardly-directed closed position adjacent the back of said panel to an open position directed downwardly therefrom, and means for releasably holding the auxiliary leg structures in their open positions.

2. A folding easel, according to claim 1, wherein each stiffening member has an elongated guideway extending therealong and wherein the releasable holding means includes a link pivotally connected at its lower end to each of said auxiliary leg structures and at its upper end to a slide member slidable in the longitudinal guideway of its respective stiffening member.

3. A folding easel, according to claim 2, wherein the releasable holding means also includes a locking element engageable in locking relationship between each slide member and its respective stiffening member in the open positions of said auxiliary leg structures.

4. A folding easel, according to claim 1, wherein each auxiliary leg structure includes a hub member pivotally connected substantially at right angles to one of said stiffening members and also includes a leg member connected substantially at right angles to said hub member.

5. A folding easel, according to claim 4, wherein the hub members of the auxiliary leg structures are disposed substantially coaxial with one another.

6. A folding easel, according to claim 4, wherein the hub members are also pivotally connected to one another for independent pivotal motion relatively to one another.

7. A folding easel, according to claim 4, wherein the hub members contain pivot elements yieldingly urged into pivotal engagement with their respective stiffening members.

8. A folding easel, according to claim 4, wherein the hub members are disposed coaxial with one another and are pivotally connected at their outer ends to their respective stiffening members and are pivotally interconnected at their inner ends by a common pivot member.

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