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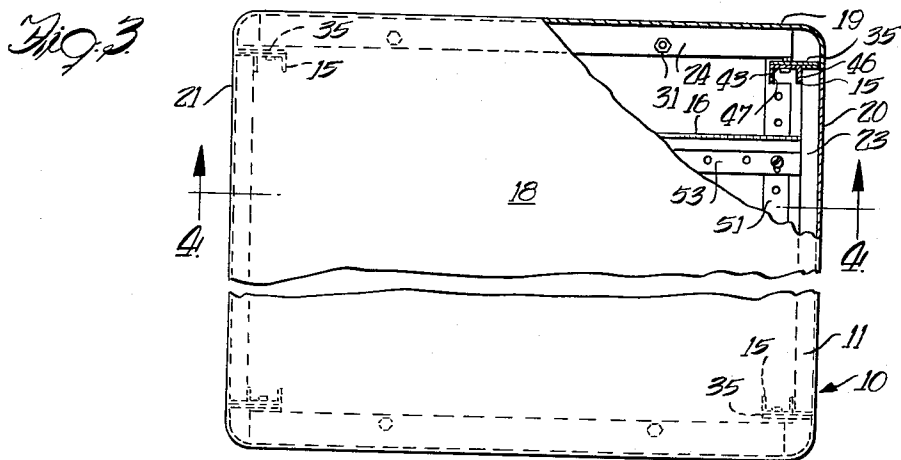
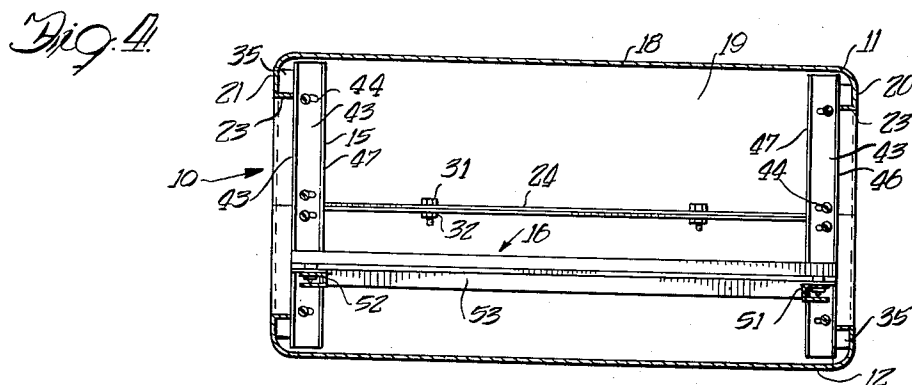
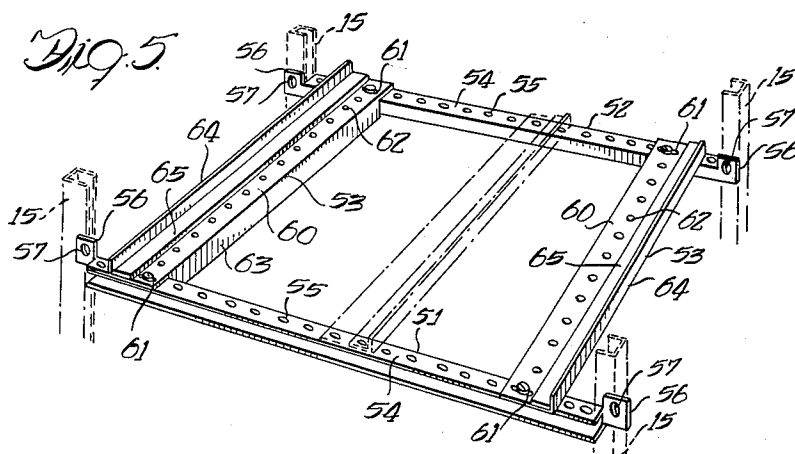
E. V. ANDERSON ET AL

3,012,835

INSTRUMENT CABINET

Filed June 13, 1958

4 Sheets-Sheet 2



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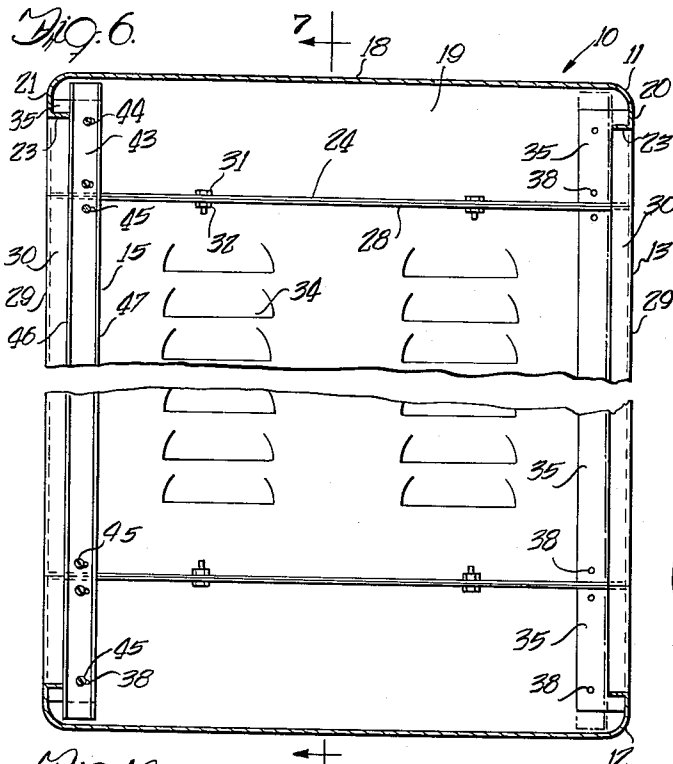
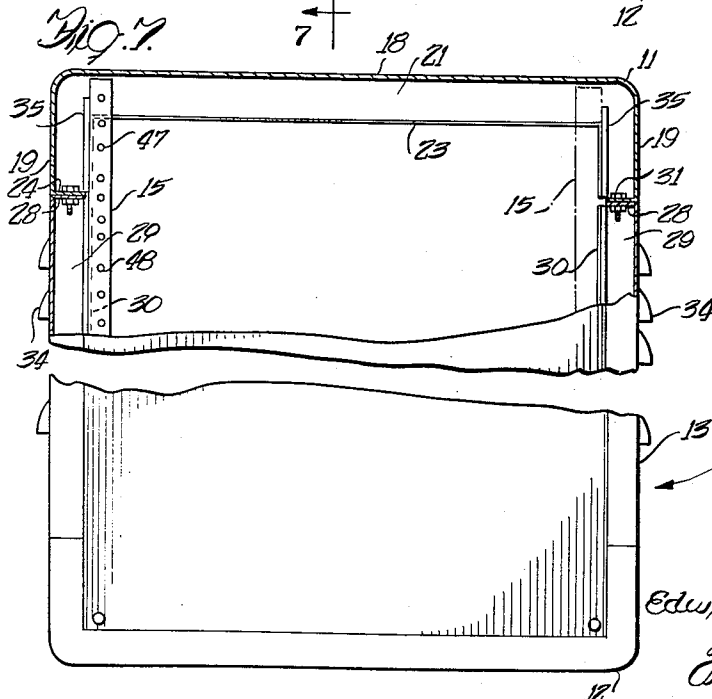
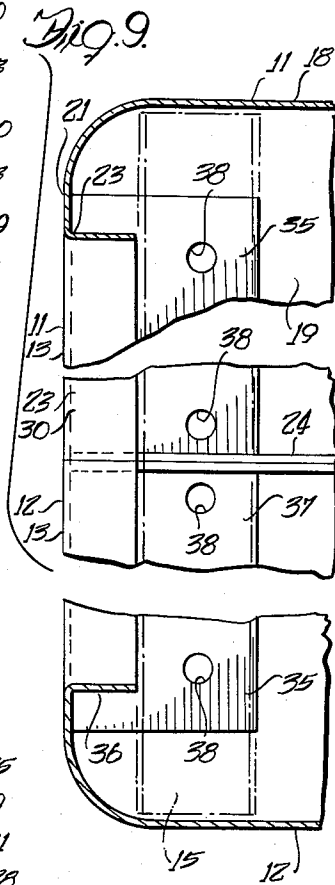
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Fig. 8.

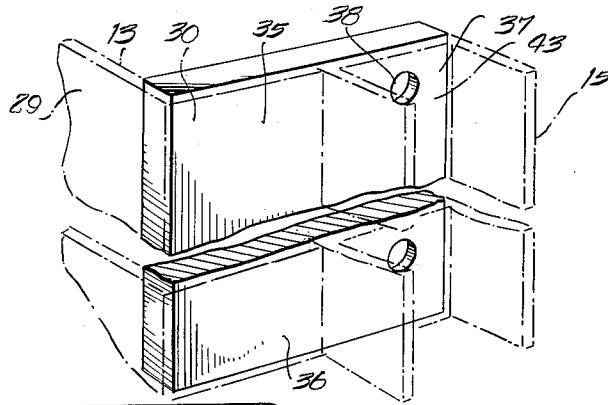
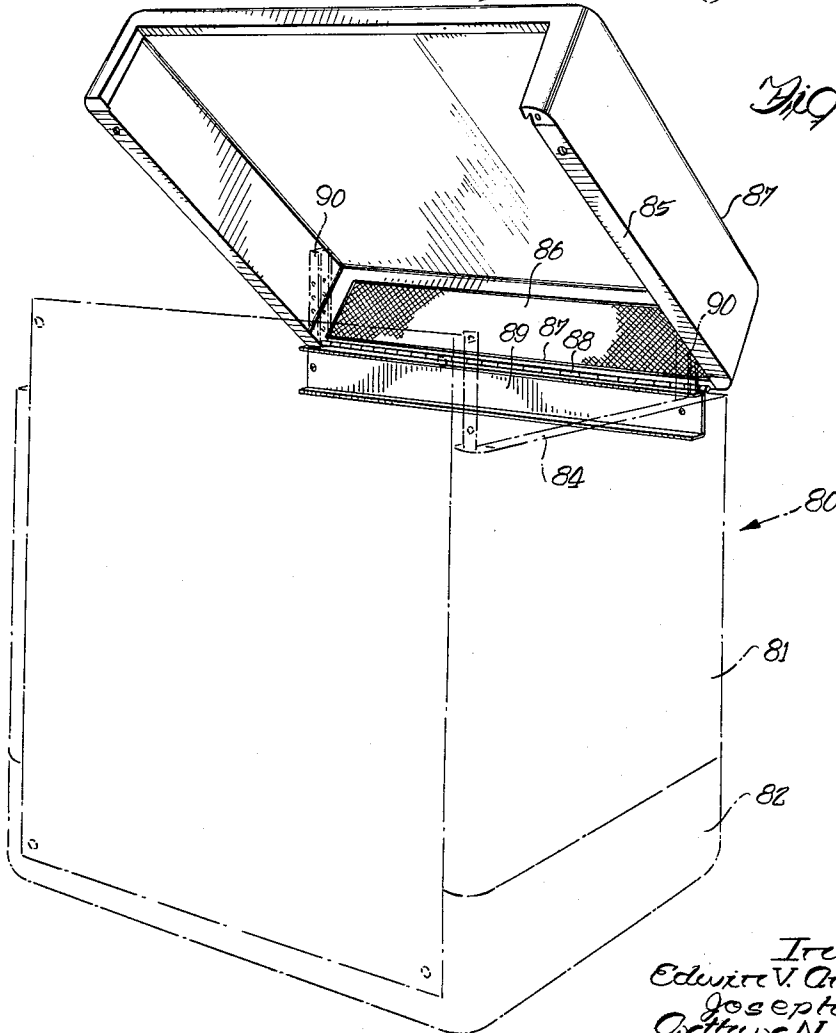


Fig. 10.



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INSTRUMENT CABINET

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4 Claims. (Cl. 312-257)

This invention relates to an instrument cabinet and more particularly to an instrument cabinet in which the height of the cabinet may be varied by the use of various size side spacers.

Instrument cabinets are important articles in the modern-day world of instrumentation. Instruments such as electrical equipment, radio equipment, gauges, and the like are used extensively in industry, research, and various other fields. These instruments must be protected against damage from contact, foreign matter and other causes. To protect against damage, instruments are commonly mounted in cabinets, but very often the instruments are modified, such as by enlarging the number or size of components, and the instrument is no longer adaptable to the cabinet so that the cabinet must be discarded and replaced by a different size cabinet.

The present invention provides an instrument cabinet which can be varied in size by the addition of side spacers of various sizes. The same top and bottom portions are useable with the various side spacers so that the major portions of the cabinet may be reusable. This also permits the stock-piling of a minimum number of pieces which can be combined in various ways to form any desired size cabinet. Further, the construction of the present invention does not require an interior framework except for vertical corner channels which also serve to mount the instrument-bearing panels or the instruments themselves, and thus the present invention minimizes the parts and material necessary.

One embodiment of the present invention provides a top which is hinged to the cabinet so that it can be raised to permit access to the instruments within the cabinet. This facilitates any repair or modification of the instruments and permits work to be done without having to remove the instruments from the cabinet.

It is the object of the present invention to provide a new and improved instrument cabinet.

Another object of the present invention is to provide a new and improved instrument cabinet which can be varied in size by the use of various size side spacers.

A further object of the present invention is to provide a new and improved instrument cabinet of variable size which may be inexpensively constructed with a minimum of parts and material.

Other and further objects and features of the present invention will be apparent from the following description and drawings in which:

FIG. 1 is a perspective view of an instrument cabinet illustrating the hinged top embodiment of the present invention;

FIG. 2 is a perspective view of an instrument cabinet illustrating another embodiment of the present invention;

FIG. 3 is a top plan view partially broken away of the instrument cabinet of FIG. 2;

FIG. 4 is a vertical sectional view taken along line 4-4 of FIG. 3;

FIG. 5 is a perspective view of the assembled chassis guides and chassis supports mountable in the instrument cabinets of the preceding figures;

FIG. 6 is a vertical sectional view similar to FIG. 4 and including spacer members;

FIG. 7 is a vertical sectional view taken along line 7-7 of FIG. 6;

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FIG. 8 is a perspective view of an attaching plate which is an element of the cabinet of the present invention;

FIG. 9 is an enlarged broken-away view of a portion of the cabinet of FIG. 6; and

FIG. 10 is a perspective view of the hinged top embodiment of the present invention with the top, top panel, hinge, and bottom strip in solid, and the remainder in dot-dash.

Referring now to the drawings, the cabinet of the present invention will be described in detail. In FIG. 2 the cabinet is generally indicated as 10 and is seen to include a top member 11 and a bottom member 12 spaced from the top member by the spacer members 13 at each side of the cabinet. The front and rear of the cabinet 10 may be enclosed by panel members such as the rear panel 14 shown in FIG. 2.

Mounted within the cabinet 10 are vertical channel bars 15 which are secured to the top member 11, spacer members 13, and bottom member 12 to increase the rigidity and strength of the cabinet. These channel bars 15 support the panel members 14 and also serve as a mounting for the chassis support structure 16.

The top member 11 and bottom member 12 may be formed of sheet metal and may be of identical construction, each being U-shaped so as to have a base 18 and sides 19. The front edges 20 and rear edges 21 are rounded to give a smooth and streamlined appearance to the cabinet and an inturned flange 23 is formed at the edge of the front and rear of the top and bottom members to strengthen the members and to frame a recess in which the panels 14 or other equipment may be mounted. A similar inturned flange 24 is formed at the outer end of the sides 19 of the top or bottom member. These flanges 24 are provided to facilitate attaching to adjacent members.

The top member 11 may be secured to the bottom member 12 to form a low cabinet, or the spacer members 13 may be attached to space the top and bottom members as in FIG. 2. These spacer members 13 may also be formed of sheet metal and have top and bottom inturned flanges 28 which mate with the inturned flanges 24 at the end of the bottom members. The front and rear edges 29 of the spacer members 13 are rounded in the same manner as the front and rear edges 20 and 21 of the top and bottom members so as to form a continuation thereof, and similarly the front and rear edges 29 are provided with inturned flanges 30 to form a continuation of the flanges 23 at the front and rear of the top and bottom members. The spacer members 13 may be attached to the top and bottom members 11 and 12 in any convenient manner such as by bolts 31 extending through the mating flanges 24 and 28 of the adjacent spacer members 13 and top and bottom members 11 and 12. When nuts 32 are tightened on these bolts 31, a complete cabinet 10 is formed. In the embodiment illustrated in FIG. 2, two bolts are utilized at each mating edge so that only 8 bolts are required to attach the spacers 13 in position, and therefore it is relatively easy to replace the side spacers with a different size or remove the side spacers altogether so that the top member 11 is mounted directly to the bottom member 12. Thus, it is obvious that the cabinet may be expanded to any desirable height depending on the height of the spacer members 13 available.

In the embodiment illustrated in FIG. 2, the spacer members 13 are seen to be formed with louvers 34. These louvers are provided to permit circulation of air through the cabinet 10 so that when equipment which generates heat is mounted within the cabinet, the warm air may pass out through the louvers and cooler air may enter through the louvers. If desired, perforations may be used in place of the louvers depending upon the desires of the user, and, of course, a plain panel may be

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utilized without either louvers or perforations if there is no need to ventilate the cabinet 10.

In order to mount the vertical channel bars 15 in the cabinet 10, attaching plates 35 are secured to the inturned flanges 23 and 24 of the top member 11 and bottom member 12 and also to the inturned flanges 28 and 30 of the spacer members 13. FIG. 8 is a perspective view of an attaching plate 35 shown mounted to the backside of an inturned flange 30 of the spacer member 13. The plate extends from the top to the bottom of the flange 30 and has an attaching portion 36 extending to the corner of the flange 30 and secured to the flange as by welding or other suitable means. A projecting portion 37 extends from the attaching portion 36 away from the flange 30 to provide a mounting for the channel bars 15. This extending portion 37 is provided with holes 38 spaced from the flanges 30 a distance at least as great as the distance from the flange 30 to the slots 44 in the channel bars 15. The channel bar can be mounted on the plate 35 by aligning the slots 44 with the holes 38 in the plate and attaching bolts 45 through the holes and slots. The projecting portion 37 extends beyond the holes 38 a distance sufficient to provide the desired strength in the plate. In the embodiment illustrated in FIG. 8, the plate extends to the inner end of the channel bar 15.

Similar attaching plates 35 are secured in the top member 11 and bottom member 12 and, as illustrated in FIG. 9, the plates extend from the ends of the top and bottom panels along the flanges 23 and 24 and slightly beyond the bottom of the flange of the bottom member 12 and beyond the top of the flange of the top member 11. These extensions at the top and bottom provide added support for the channel bars 15 but may be eliminated if desired.

These plates 35 not only provide means for attaching the channel bars to the top member 11, spacer members 13 and bottom member 12, but also rigidify the flanges 23 and the channel bars 15 to provide a strong structure capable of supporting heavy instrumentation or other articles without failure. The thickness of the plates 35 may be varied as desired depending on the structural strength required. Further, although the drawings illustrate the use of two attaching bolts 45 to attach the channel bars 15 to each plate 35, a stronger attachment may be obtained by providing more holes 38 and slots 44 so that more bolts 45 may be used. The preferred embodiment utilizes the illustrated combination of two bolt attachments which satisfactorily prevents movement of the channel bar with respect to the top, bottom or spacer members.

The vertical channel bars 15 are U-shaped in horizontal cross section with the base 43 adjacent the attaching plates 35 and having slots 44 mating with the holes 38 of the plates 35 so that the channels 15 may be secured to the plates by locking screws 45 passing through both the slots 44 and the holes 38. The sides 46 and 47 of each channel extend into the panel opening of the cabinet 10 and are provided with a plurality of vertical aligned holes 48. The outer side 46 is suitable for mounting panels 14 as by sheet metal screws extending through the panels and through one of the holes 48 and locked in place by a speed nut. These outer sides 46 also serve to mount equipment in the cabinet when the equipment is mounted directly thereto rather than in a panel. The inner side 47 of the channel 15 also may be used to mount equipment directly thereon and may further be used to mount the chassis supporting structure 16 which will be described.

The chassis supporting structure 16 consists of a front chassis support member 51 extending across the cabinet between the front channels 15, a rear chassis support member 52 extending across the cabinet between the rear channels 15, and a pair of chassis guide members 53 extending between the chassis support members. The support members 51 and 52 are shown in FIG. 5 to be U-

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shaped in vertical cross section so as to increase the strength of the member. The top side 54 of each chassis support member is provided with a plurality of holes 55 for the adjustable attachment of the guide members 53 and each end of each support member is provided with a vertical flange 56 having a hole 57 which may be aligned with the holes 48 of the inner side 47 of the vertical mounting channel 15 as by means of a nut and bolt or a locking screw.

Each chassis guide member 53 has a horizontal base portion 60 extending between the support members 51 and 52 and having a slot 61 at each end aligned with the holes 55 on the top side 54 of the support members for the attaching of the guide members to the support members. This horizontal base portion 60 is also provided with a plurality of holes to facilitate mounting of equipment thereon. A vertical flange 63 depends from the inner side of the horizontal base 60 and abuts opposite chassis support members to add rigidity to the chassis supporting structure 16. Another vertical flange 64 extends upwardly along the outer edge of the horizontal base portion 60 extending between the chassis support members. This vertical flange 64 serves to guide a chassis or drawer which may be mounted on the chassis supporting structure 16. The chassis guide members 53 are further provided with riser bars 65 secured to the top of the horizontal base portion 60 and extending the length thereof between the vertical flange 64 and the holes 62. These riser bars 65 support a drawer or chassis above bolts or other attachments in the holes 62 so that movement of the drawer or chassis will not be obstructed by the bolts or other attachments.

The particular chassis supporting structure 16 described in detail above provides an especially flexible mounting structure for equipment or the like. The structure itself may be mounted in any of a multitude of positions corresponding to the number of holes 48 in the channels 15. Thus, equipment may be vertically positioned in almost any desired location. Further, the chassis guide members 53 may be positioned as desired along the support members 51 and 52 provided the slots 61 overlay the holes 55. Thus, equipment may be mounted in almost any horizontal position.

In FIG. 1 a cabinet 70 is illustrated having a top 71 and a bottom 72 which are similar in construction to the top member 11 and bottom member 12 of the cabinet 10 illustrated in FIG. 2. However, the top 71 is not bolted or screwed to the bottom 72 but rather is hinged thereto along its rear edge. This is accomplished by securing, as by welding, a rear top panel 73 in the panel recess of the top 71 with the bottom edge of the panel 73 flush with the bottom of the top 71. A similar panel or strip 74 is mounted in the panel recess at the rear of the bottom 72 with its top edge flush with the top of the bottom 72. With this construction, a hinge 75, such as a piano hinge, is mounted along the rear edge and secured to both the top 71 and bottom 72. The front of the cabinet 70 of FIG. 1 is enclosed by a panel 76 secured to vertical channel bars 77 in a construction similar to the panel and end channel bar construction of the cabinet of FIGS. 3 and 4.

The hinged cabinet 70 of FIG. 1 facilitates the inspection, repair, and replacement of equipment within the cabinet. Thus, if the equipment must be examined, replaced, or repaired, it may not be necessary to remove the panel 76 as much of the equipment may be accessible simply by raising the top 71.

FIG. 10 illustrates a hinged cabinet 80 similar in construction to the cabinet 70 of FIG. 1 except for the addition of spacer members 81. The bottom member 82 is identical to the bottom member 72 of FIG. 1 and the top member 87 is identical to the top 71 of FIG. 1. The spacer members 81 are mounted between the top and bottom and have flanges 84 at their ends which mate with flanges 85 of the top and bottom members. The spacer members 81 are secured to the bottom member 82 by bolt-

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ing the flanges 84 to the flanges 85 of the bottom member.

A rear top panel 86, identical with the panel 73 of FIG. 1, is mounted at the rear of the top member with a bottom flange 87 substantially flush with the flanges 85 of the top member. A piano hinge 88 is secured to the bottom flange 87 with its axis in a horizontal plane. The hinge is also secured to a strip 89 similar to the strip 74 of FIG. 1 which may be mounted to the rear vertical channel bars 90 secured to the spacer members 81 and bottom member 82. The top member 87, top panel 86, hinge 88 and strip 89 form a subassembly which can be removed from the cabinet so that different sized spacer members and channel bars may be interchanged to vary the size of the cabinet as desired.

As in the construction of FIG. 1, the hinged cabinet 80 of FIG. 10 permits easy access to the interior of the cabinet simply by swinging the top member 87 upwardly about the hinge 88 so that equipment within the cabinet may be easily inspected, repaired, or replaced.

From the above description it is apparent that the present invention teaches a cabinet construction which can be enlarged or reduced in height by simply changing the size of spacer members 13. The construction is extremely simple, requiring only the top 11, bottom 12, and spacer members 13. These members are bolted together and further strengthened by the vertical channel bars 15 which serve the triple purpose of strengthening the cabinet, serving as a mounting for panels and as a mounting for equipment and equipment mounting structures. The unique equipment mounting structure 16 of this invention when combined with the cabinet, permits mounting of equipment at almost any position within the cabinet. When the hinged construction of FIG. 1 is utilized, the equipment is easily accessible for repair, inspection, or replacement.

Therefore, the present invention provides a simple, inexpensive yet sturdy cabinet construction which may be assembled in various sizes from a minimum number of interchangeable parts for the mounting of equipment in almost any position.

While this invention is susceptible of embodiments in many different forms, there are shown in the drawings and are herein described in detail several embodiments with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention, and is not intended to limit the invention to the embodiments illustrated. The scope of the invention will be pointed out in the appended claims.

We claim as our invention:

1. An instrument cabinet, comprising: a U-shaped bottom member formed of sheet metal and having a base portion and upstanding opposed side portions, the ends of said side portions having inturned substantially horizontal flanges; a U-shaped top member formed of sheet metal and having a base portion and depending opposed side portions spaced from and vertically aligned with the side portions of said bottom member, the ends of said side portions having inturned substantially horizontal flanges; spacer members formed of sheet metal and mounted between the side portions of said top and bottom members and having top and bottom inturned substantially horizontal flanges which mate with the flanges of the top and bottom members, said top, bottom and spacer members defining front and rear panel mounting recesses; means for removably securing the flanges of said spacer members to the flanges of said side portions to permit interchanging of various sized spacer members; and a pair of vertical support channels on each side of the cabinet, said channels being U-shaped in horizontal cross section having a base secured at a plurality of points to each the bottom, top and spacer members, and having a pair of vertical leg portions extending into said panel mounting recess substantially normal to the sides of the cabinet, the outer of said leg portions being provided for the mounting of a panel and the inner leg portion being

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provided for the mounting of instrumentation or other equipment.

2. An instrument cabinet, comprising: a U-shaped bottom member formed of sheet metal and having a base portion and upstanding opposed side portions, the ends of said side portions having inturned substantially horizontal flanges; a U-shaped top member formed of sheet metal and having a base portion and depending opposed side portions vertically aligned with the side portions of said bottom member, the ends of said side portions having inturned substantially horizontal flanges; said top and bottom members defining front and rear panel mounting recesses; means for removably securing the flanges of said side portions together; and a pair of vertical support channels on each side of the cabinet, said channels being U-shaped in horizontal cross section having a base secured at a plurality of points to each the bottom, and top members, and having a pair of vertical leg portions extending into said panel mounting recess substantially normal to the sides of the cabinet, the outer of said leg portions being provided for the mounting of a panel and the inner leg portion being provided for the mounting of instrumentation or other equipment.

3. An instrument cabinet, comprising: a U-shaped bottom member formed of sheet metal and having a base portion and upstanding opposed side portions, the ends of said side portions having inturned substantially horizontal flanges; a bottom rear panel secured between the rear of the side portions of the bottom member and having an inturned flange at the top substantially flush with the inturned flanges of the bottom member side portions; a U-shaped top member formed of sheet metal and having a base portion and depending opposed side portions vertically aligned with the side portions of said bottom member, the ends of said side portions having inturned substantially horizontal flanges; a top rear panel secured between the rear of the side portions of the top member and having an inturned flange at the bottom substantially flush with the inturned flanges of the top member side portions; a hinge member, having a horizontal axis, secured to both said bottom panel flange and said top panel flange to mount the top member on the cabinet for pivotal movement to expose the interior of the cabinet; said top and bottom members defining a front panel mounting recess; and a pair of vertical support channels on each side of the cabinet, said channels being U-shaped in horizontal cross section having a base secured at a plurality of points to the side portion of the bottom member and having a pair of vertical leg portions extending inwardly substantially normal to the sides of the cabinet, the outer of said leg portions being provided for the mounting of a panel and the inner leg portion being provided for the mounting of instrumentation or other equipment.

4. An instrument cabinet, comprising: a U-shaped bottom member formed of sheet metal and having a base portion and upstanding opposed side portions, the ends of said side portions having inturned substantially horizontal flanges; a U-shaped top member formed of sheet metal and having a base portion and depending opposed side portions spaced from and vertically aligned with the side portions of said bottom member, the ends of said side portions having inturned substantially horizontal flanges; spacer members mounted between the side portions of said top and bottom members and having top and bottom inturned substantially horizontal flanges which mate with the flanges of the top and bottom members; a top rear panel secured between the rear panel secured between the rear of the side portions of the top member and having an inturned flange at the bottom substantially flush with the inturned flanges of the top member side portions; a bottom rear panel extending between the rear of the spacer members and having an inturned flange at the top substantially flush with the inturned flanges of

the spacer members; a hinge member, having a horizontal axis, secured to both said bottom panel flange and said top panel flange; means for removably securing the spacer members to the bottom member and to the bottom rear panel to permit interchanging of various sized spacer members, said top member and top rear panel being pivotable about said hinge to expose the interior of said cabinet; said top, spacer, and bottom members defining a front panel mounting recess; and a pair of vertical support channels on each side of the cabinet, said channels being U-shaped in horizontal cross section having a base secured at a plurality of points to each the spacer member and the side portion of the bottom member and having a pair of vertical leg portions extending inwardly substantially normal to the sides of the cabinet, the outer of said leg portions being provided for the mounting of a panel and the inner leg portion being provided for the mounting of instrumentation or other equipment.

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