Feb. 8, 1966 H. D. CHAPMAN 3,233,939

SEATING UNIT

Filed March 16, 1964 2 Sheets-Sheet 1

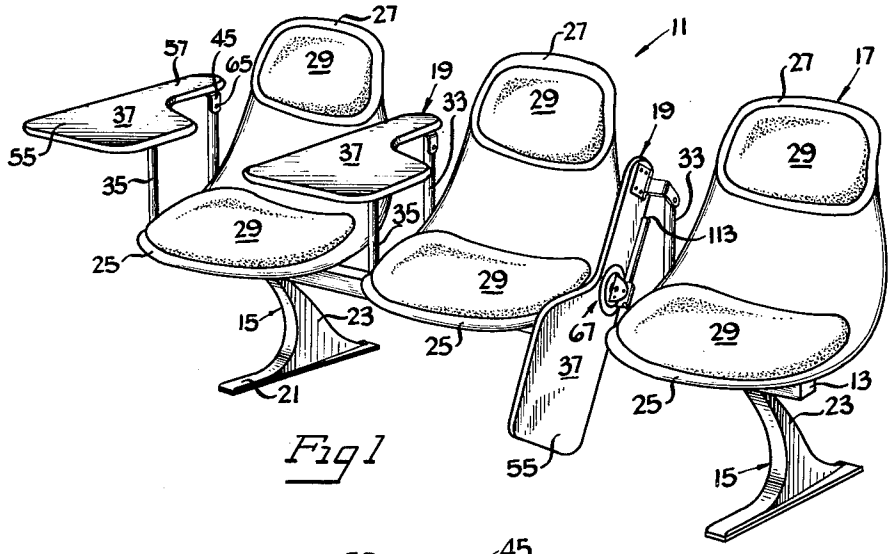


Fig 1

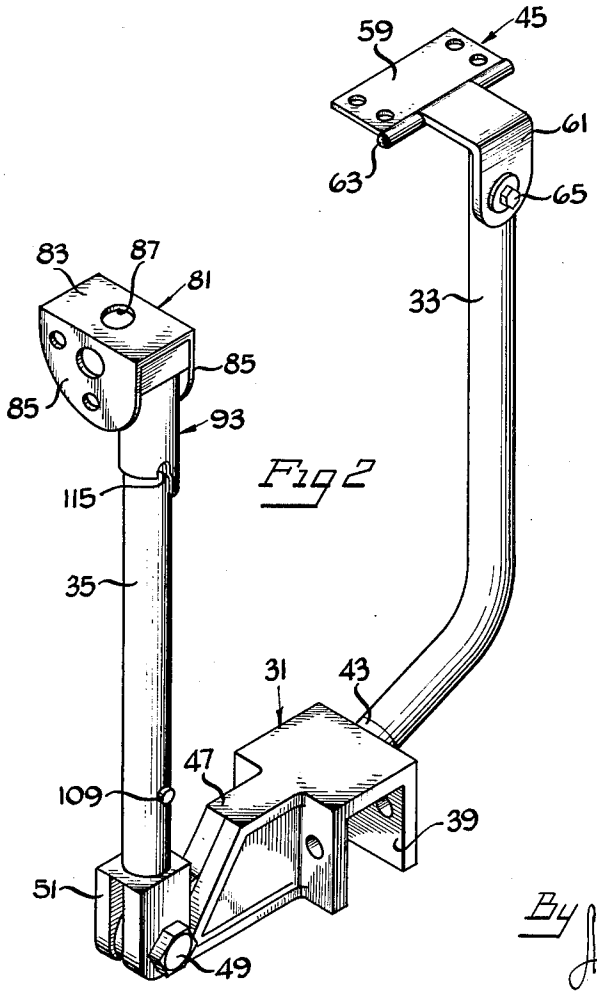


Fig 2

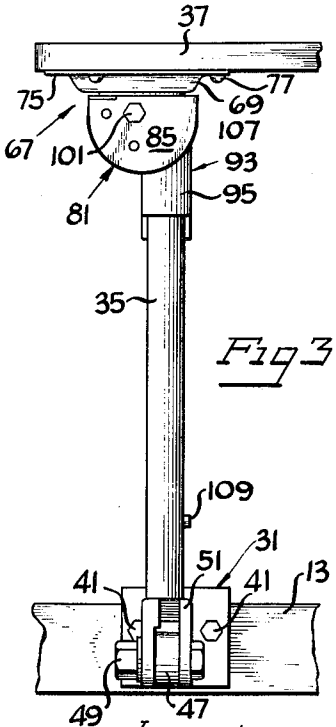


Fig 3

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Fig 4

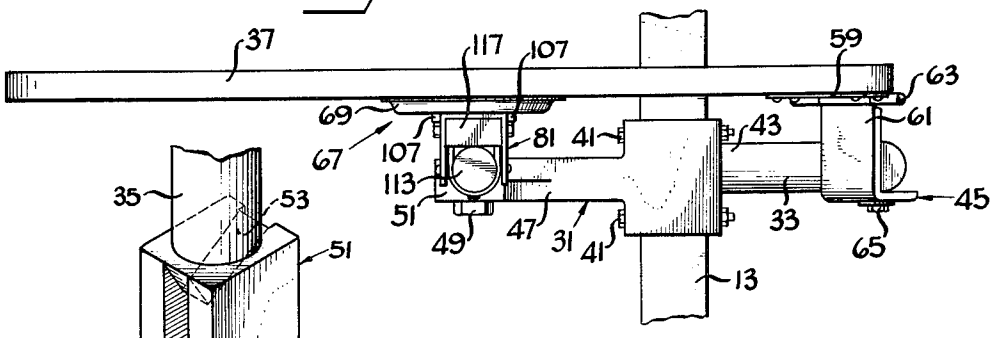


Fig 5

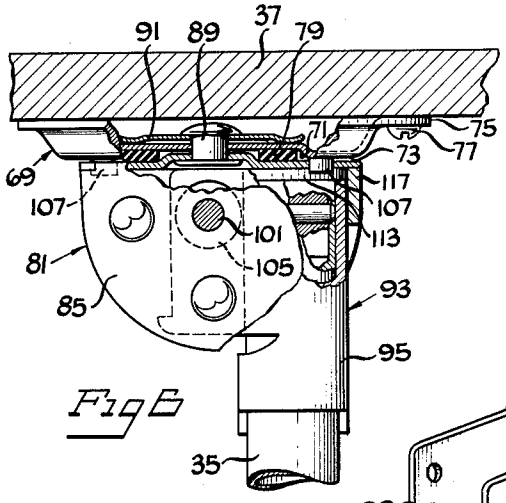


Fig 6

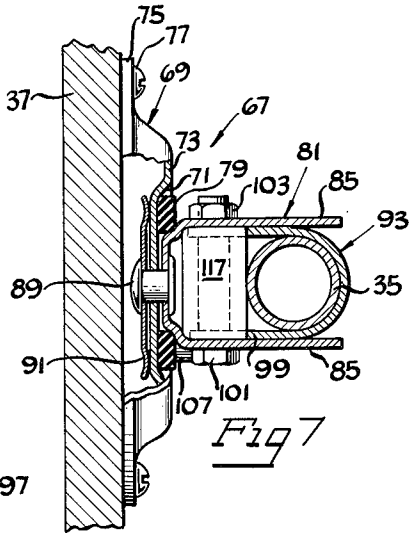


Fig 7

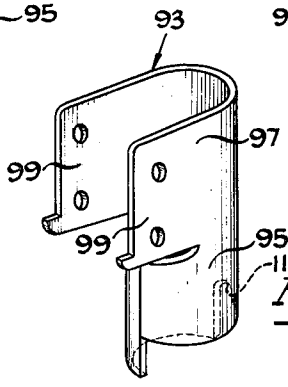


Fig 8

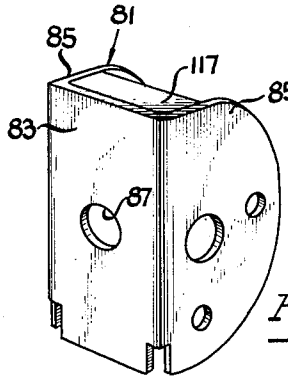


Fig 9

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United States Patent Office

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3,233,939

SEATING UNIT

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Filed Mar. 16, 1964, Ser. No. 352,185
5 Claims. (Cl. 297—162)

This invention relates to seating units and, more particularly, to seating units which include a collapsible tablet arm assembly.

Seating units which include a collapsible tablet arm conventionally consist of a base having four leg members, a seat and a backrest mounted on the base, and a collapsible tablet arm assembly supported by each the base, the seat, and the backrest. Such seating units, while quite effective and useful, have certain disadvantages. In the first place, the mounting of the tablet arm assembly to the seat and backrest frequently demands that these latter elements themselves be supported more sturdily than their primary function would normally require.

Also, because of the minimal size of the portions of the base, seat and backrest to which the tablet arm assembly can be attached, somewhat elaborate mounting structures have had to be devised which, because of the additional materials and labor involved in their manufacture, have made the units somewhat costly.

Furthermore, a certain amount of clearance is required between such units to permit the tablet arms to be raised and collapsed. When this clearance is lacking, as through normal shifting of the units toward and away from one another incident to their use, the units become scratched and dented when the tablet arm of one unit engages a portion of an adjacent unit. Also, such shifting of the units tends to give the room in which they are located a disorganized and untidy appearance.

Also, since the tablet arms of such units are directly attached to the seat and backrest, they are always positioned at a fixed distance therefrom and no adjustments such as would enable the units to accommodate persons of various size are possible.

It is a principal object of the present invention to provide an improved seating unit including a collapsible tablet arm assembly.

An additional object of the present invention is to provide an improved structural arrangement whereby a collapsible tablet arm assembly is supported adjacent a seat and backrest.

A further object of the invention is to provide an improved seating unit whereby a plurality of seats and backrests may be supported by a common structural element, which structural element also supports a collapsible tablet arm assembly adjacent each of the seats and backrests.

A still further object of the invention is to provide a seating unit having a collapsible tablet arm assembly which does not depend upon the seat or backrest for its support.

Another object of the invention is to provide a seating unit including a collapsible tablet arm assembly, which seating units lends itself particularly well to permanent or semi-permanent installations.

An additional object of this invention is to provide an improved slidable pivotal connection between a tablet arm and a support therefor.

Other objects and advantages of the invention will become apparent with reference to the following description and accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view of a seating unit showing various of the features of the invention;

FIGURE 2 is a perspective view of a tablet arm support forming a portion of a tablet arm assembly of the seating unit of FIGURE 1;

FIGURE 3 is an enlarged fragmentary front elevational view of a tablet arm assembly of the seating unit of FIGURE 1;

FIGURE 4 is an enlarged plan view of a tablet arm assembly forming a porton of the seating unit of FIGURE 1;

FIGURE 5 is a perspective view of a portion of a tablet arm assembly such as is variously illustrated in FIGURES 1–4;

FIGURE 6 is an enlarged fragmentary broken-away elevational view, partially in section, of a portion of the tablet arm assembly as seen in FIGURE 3;

FIGURE 7 is an enlarged broken-away plan view, partially in section, of a portion of the tablet arm assembly as seen in FIGURE 4; and

FIGURES 8 and 9 are perspective views of portions of the structure shown in FIGURES 6 and 7.

Very generally, a seating unit 11 illustrated in the drawings and constituting one embodiment of the present invention comprises a beam 13 supported in generally horizontal and elevated disposition by legs 15. The beam has mounted thereon one or more body-supporting components 17 and a collapsible tablet arm assembly 19 adjacent each of the components 17.

More specifically, the beam 13, shown in the form of an elongated hollow tube of rectangular cross sectional configuration, is supported in an elevated horizontal disposition by the legs 15, each of which includes a base portion 21 which may be secured to the floor or supporting surface in any suitable manner, and a pedestal 23 extending upwardly from the base in slightly curved forwardly inclined disposition. The pedestal 23 has a plate (not shown) secured to its upper end to facilitate attachment to the beam, as by bolts or similar fasteners (not shown). Although in the preferred embodiment, the beam is supported by the legs 15, it should be apparent that it might also be supported at its ends by the wall of the room in which the seating unit is situated, or might be supported along its length by a ledge or step forming a portion of the floor of a room or stadium.

The body-supporting components 17 of the seating units may, of course, take a variety of forms but, in the illustrated embodiment, are in the shape of a shell such as might be molded of fiberglass or the like and contoured to comfortably accommodate the body of a user. The shell includes a dished seat portion 25 and an artistically embossed backrest portion 27, each of which is provided with a padding 29 to render the chair more comfortable as well as to enhance its appearance.

The seat portion 25 of the shell 17 may be attached to the beam 13 in various ways, but it is preferable that a means of attachment be used which will permit convenient attachment and removal of the shell to and from the beam but yet will assure the rigid support of the shell by the beam. Such means of attachment will therefore make it possible to quickly assemble and disassemble the unit if desired.

The collapsible tablet arm assembly 19 is detachably mounted on the beam 13 in relatively close proximity to an associated shell 17 and provides a support for reading and/or writing materials as well as for the arm of a user. When the beam supports several shells and collapsible tablet arm assemblies, the tablet arm assemblies are spaced a sufficient distance from a neighboring shell (as opposed to an associated shell) to insure convenient ingress and egress of the user to and from the seats, as well as to permit freedom of movement of the tablet arms between the operative and collapsed positions. Since the assemblies 19 are detachably mounted on the beam 13 and since, as will became apparent shortly, they

do not depend upon the seat or backrest for their support, they can be positioned in any desired location along the beam to satisfy the comfort of a user.

Each tablet arm assembly includes a mounting **31** having a stationary support **33** extending upwardly from its rearward end and a brace **35** pivotally mounted adjacent its forward end. A tablet arm **37** is mounted on the support **33** and brace **35** for pivotal movement between a generally horizontal operative position and a generally vertical lowered out-of-the-way position.

More specifically, and with reference to the preferred embodiment as seen best in FIGURES 2–5, the mounting **31** comprises an integral casting defining an inverted channel portion **39** dimensioned so as to enable it to straddle the beam **13**. Each of the side walls of the channel portion **39** are provided with a pair of spaced apart openings (not shown) which align with openings in the opposite side wall and receive bolts **41** which, in the illustrated embodiment, extend through holes (not shown) in the beam **13** and fix the mounting in place thereon. The openings in the channel may, however, receive set screws engageable with the forward and rearward faces of the beam and thereby permit a greater range of adjustability of the assembly along the beam.

A boss **43** projects from the rearward face of the channel portion **39** of the mounting **31** and receives the lower end of the support **33** which is suitably secured thereto. The support **33** is in the form of an elongated tube which extends rearwardly and slightly upwardly and then vertically upwardly from the boss **43**. A hole is provided near the upper end of the support to facilitate attachment thereto of a hinged bracket **45** which interconnects the support and the tablet arm **37** in a manner hereinafter described.

The brace **35** is attached to the mounting **31** by means of a narrow horizontally disposed arm **47** which extends forwardly from the mounting and is provided with an opening (not shown) adjacent its forward end to receive a pin **49** by means of which a clevis **51** attached to the lower end of the brace **35** is pivotally secured to the mounting. The brace **35** is in the form of a straight length of tubing having the clevis **51** secured to its lower end and connected to the arm **47** of the mounting by the pin **49** for pivotal movement in a generally vertical plane. An inclined shoulder **53** within the clevis (FIG. 5) is adapted to engage the upper end of the mounting arm **47** when the brace is in the collapsed position to limit the rearward pivotal movement of the brace to a position in which it is inclined approximately 45° to the vertical, as shown in FIGURE 1.

The tablet arm **37**, carried by the stationary support **33** and pivotally mounted brace **35**, may be of any conventional design but, as illustrated, comprises an elongated flat member having an enlarged forward portion **55** providing a surface for receiving books, writing materials, etc., and having a rearwardly extending narrow neck portion **57** located along the side of the tablet arm which is disposed farthest from the body-supporting shell **17** when the tablet arm is in the operative position. The tablet arm may be formed of any rigid material, but is most conveniently formed of wood.

The rearward end of the tablet arm is pivotally connected to the upper end of the stationary support **33** by the hinge bracket **45** (FIGURES 1, 2 and 4) comprising a pair of metal straps **59** and **61** formed of flat metal stock and hingedly interconnected about a hinge pin **63**. One of the straps (**59**) is fastened to the underside of the tablet arm **37** in such a manner as to position the axis of the hinge pin **63** in generally parallel relation to the longitudinal axis of the tablet arm (FIGURE 1). The opposite strap **61** of the bracket is formed into a L-shape and is provided with a hole adjacent its outer end which receives a bolt **65** (FIGURE 2) passing through the strap and through the upper end of the support **33** in generally parallel relation to the axis of the beam **13**. Accordingly, the tablet arm is adapted for swinging movement about a horizontal axis defined by the bolt **65**, and is adapted for folding movement between horizontally and vertically disposed positions about an axis defined by the hinge pin **63**.

The tablet arm is guided in its movement between the operative and collapsed positions by the brace **35** to which the tablet arm is slidably joined by a connector **67** (FIGURES 6–9) which is similar to, but represents an improvement over, that shown in U.S. Patent No. 3,099,479, assigned to the assignee of the present invention. In accordance with the disclosure of the above-identified patent, the connector **67** comprises a generally circular plate **69**, the central portion of which is offset outwardly and then inwardly to provide a flat generally circular depression **71** bordered by an annular raised portion **73** which in turn is skirted by a peripheral flange **75**. The plate **69** is fixed to the underside of the tablet arm **37** generally centrally of the longitudinal axis thereof by suitable fasteners **77**.

The circular depression **71** of the plate **69** has disposed therein an annular bearing **79** engaged by a generally U-shaped bracket **81**, shown in detail in FIGURE 9, which includes a generally flat base or web portion **83** and a pair of spaced-apart generally parallel outwardly extending plates **85**. A hub **87** projects outwardly from the base or web of the bracket and, in the assembled connector, is centered within the opening of the annular bearing **79** with the portions of the web peripheral to the hub in engagement with the outer surface of the bearing. A hole extends through the hub and plate and receives a rivet **89** which pivotally secures the bracket **81** to the plate **69** while permitting rotational movement of the bracket relative to the plate.

The U-shaped bracket **81** is urged in the direction of the annular bearing **79** by a spring washer **91** disposed on the inwardly directed side of the plate and engaged by the rivet **89**. The biasing effect of the washer **91** creates a frictional contact between the bracket and bearing which retards the relative rotational movement between the bracket and the plate and prevents a rapid "falling" of the tablet arm **37**. In addition, the washer **91** compensates for wear of the parts and serves to reduce wobble and noise in the device.

The U-shaped bracket **81** is connected to the brace **35** of the tablet arm assembly by a sleeve bracket **93** (FIGURE 8) including a lower tubular sleeve section **95** which encircles the brace and an upper section **97** of U-shaped cross section providing a pair of spaced-apart vertical plates **99** extending outwardly in flanking relation to the arm of the brace.

A suitable rod **101**, having an enlarged head at one end and a threaded portion at the other end to receive a nut **103**, passes through aligned apertures in the vertical plates **85** and **99** of the brackets **81** and **93** to interconnect the brackets for rotational movement relative to one another about the axis of the rod **101**. The axis of the rod is in substantial alignment with the axis of the hinge pin **63** of the hinge bracket **45** connecting the tablet arm to the stationary support **33** and provides a common axis about which the tablet arm tilts or rotates, as will be further explained. The axis of the rod **101** is also disposed generally perpendicularly to, and spaced from, the longitudinal axis of the brace **35**.

A hollow cylindrical roller **105** is rotatably disposed about the rod **101** and extends between the vertical plates **99** of the sleeve bracket **93**. The outer surface of the roller **105** is positioned to engage the brace **35** (FIGURE 7) to guide the sleeve bracket at its upper end for movement relative to the brace. The roller also aids in maintaining the proper spacing and disposition of the spaced-apart vertical plates **99**.

In the movement of the tablet arm from the operative to the collapsed position, the tablet arm is tilted so as to pivot about the axes of the hinge pin **63** and rod **101**. As

the tablet arm is lowered for pivotal swinging movement about the rearward bolt 65 passing through the support 33, the sleeve section 95 travels downwardly along the brace 35 toward the clevis 51, and the U-shaped bracket 81 of the connector 67 rotates about the axis defined by the rivet 89. During such movement, the brace 35 rotates rearwardly about an axis defined by the pin 49 of the clevis 51. Swinging movement of the tablet arm in the downward direction is halted when the tablet arm reaches a collapsed position by the engagement of the sides of the U-shaped bracket 81 with studs 107 projecting from the outer surface of the plate 69 (FIGURES 6 and 7), by the engagement of the lower edge of the sleeve section 95 of the sleeve bracket 93 with a stud 109 extending through the brace adjacent its lower end, and by engagement of the shoulder 53 of the clevis with the upper edge of the arm 47 of the mounting 31.

In the movement of the tablet arm from the collapsed to the operative positions, the opposite actions occur and such movement is halted by the studs 107 projecting outwardly from the plate 69 and engageable with the bracket 81, and by engagement of the upper end of the sleeve section 95 with a cap 113 provided at the upper end of the brace 35. The cap 113 engages the lower surface of the plate 69 when the tablet arm 37 is in the operative position. The disposition of the tablet arm and plate in overlying relation to the upper end of the brace arm prevents the tablet arm from being inadvertently collapsed.

While the construction of the tablet arm assembly thus described has rendered the use of the assembly highly satisfactory, the connector 67 by means of which the tablet arm 37 is attached to the brace 35 does permit some undesirable rotation of the tablet arm about the axis of the hinge pin 63 as the arm is being lowered or when in the lowered position. Also, the connector is occasionally not capable of preventing the tablet arm from falling rapidly to the lowered position if suddenly released.

Accordingly, to prevent a rotational movement of the arm relative to the shell 17 when the tablet arm is in the lowered position, a slot 115 is provided in the lower edge of the sleeve section 95 of the sleeve bracket 93. This slot extends upwardly from the lower edge and is positioned so as to receive the stud 109 of the brace when the tablet arm has reached its lowermost position and lies in a plane normal to the beam 13. The interaction between the slot and pin prevents the aforementioned rotation of the tablet arm in the lowermost position.

To prevent pivotal movement of the tablet arm 37 about the axis of the hinge pin 63 as the arm is being moved from the lowered to the raised position, a small plate 117 is affixed as by welding to the U-shaped bracket 81 adjacent the inwardly facing edge thereof and spans the gap between the plates 85 adjacent the web 83. The edge of the plate furthest from the web 83 is preferably disposed so as to be maintained in engagement with the side of the brace 35 as the tablet arm is raised. The presence of the plate prevents rotation of the tablet arm about the hinge pin 63. Also, the friction between the edge of the plate and the brace serves the important function of preventing the tablet arm from falling rapidly to the lowered position should it be suddenly released.

A seating unit has thus been provided having a collapsible tablet arm assembly which does not depend upon the seat or backrest of the unit for its support, thereby obviating a serious design limitation of previously available units and making it possible to space the tablet arm assembly from the seat and backrest any desired distance. In addition, the tablet arm assembly is supported in a manner which renders it easy to assemble and, because of the use of a minimum of structural parts, manufacturable at a minimum of cost.

Furthermore, the structure of the unit is such that several of its body-supporting components can be supported by a single structural element, thus ensuring that the units will always be properly spaced from one another so as to prevent damage to the units by swinging movement of the tablet arm between operative and collapsed positions. The unit also lends itself particularly well to permanent or semi-permanent installation and is therefore well adapted for use in auditoriums or the like.

While various of the structural features of the preferred embodiment of the invention have been shown and described, it should be apparent that various modifications may be made therein without departing from the scope of the invention.

What is claimed is:

1. A collapsible tablet arm assembly for use with a seating unit which includes a beam supported in a generally horizontal position and a seat and backrest supported on the beam, said tablet arm assembly comprising a mounting member defining an inverted channel adapted to receive the beam with the member in straddling relation to the beam, a stationary post extending generally vertically upwardly from said mounting member adjacent one side of the beam, a tablet arm, means securing said tablet arm to the upper end of said post for swinging movement of the arm about each of a first pair of generally mutually transverse axes, a brace mounted at its lower end on said mounting member adjacent the other side of the beam so as to permit pivotal movement of said brace about an axis generally parallel to the beam toward and away from said post, and a connector slidably carried by said brace and secured to said tablet arm so as to permit swinging movement of said tablet arm about a second pair of axes each of which is generally parallel to one of said first axes.

2. A tablet arm assembly in accordance with claim 1 wherein said mounting member includes an arm projecting away from the beam, and wherein said brace is pivotally mounted adjacent the outer end of said arm.

3. A tablet arm assembly in accordance with claim 2 wherein a clevis is secured to the lower end of said brace and affords the means by which said brace is pivotally mounted on said arm, and wherein said clevis includes a surface inclined relative to the axis of said brace engageable with a surface of said arm when said brace is inclined toward said post so as to limit further pivotal movement of said brace in the direction of said post.

4. In a tablet arm assembly which includes a tablet arm movable between a generally horizontal operative position and an out of the way collapsed position in which it is suspended in an inclined disposition from one of its ends, means mounting the tablet arm adjacent a body supporting seat for movement between such positions, said mounting means comprising means supporting the one end of the tablet arm for pivotal movement about a fixed generally horizontally extending axis and for folding movement about a second axis extending generally transversely of said first axis, an elongated brace pivotally mounted at one of its ends adjacent the seat and adapted to extend generally vertically upwardly from the one end to the approximate level of said first horizontally extending fixed axis when the tablet arm is in said operative position and to extend upwardly and rearwardly from the one end when the tablet arm is in said collapsed position, said brace being provided with a stud projecting from the outer surface thereof adjacent said one end, a connector securing said tablet arm to said brace, said connector being slidably mounted on said brace for movement between a position adjacent the one end of said brace when the tablet arm is in said collapsed position and a position adjacent the other end of said brace when the tablet arm is in said operative position, said connector including a sleeve encircling said brace and adapted for sliding movement therealong, said sleeve being provided with a narrow slot extending upwardly from its lower edge to intimately receive said stud of said brace when said tablet arm is in said lowered position so as to prevent any rotation of said sleeve relative to said brace when said tablet arm is in said position.

5. In a tablet arm assembly which includes a tablet

arm movable between a generally horizontal operative position and an out of the way collapsed position in which it is suspended in an inclined disposition from one of its ends, which includes means supporting the one end of the tablet arm for pivotal movement about a fixed generally horizontally extending axis and for folding movement about a second axis extending generally transversely of the first axis, and which includes an elongated brace pivotally mounted at one of its ends adjacent the seat and adapted to extend generally vertically upwardly from the one end to the approximate level of the first horizontally extending fixed axis when the tablet arm is in the operative position and to extend upwardly and rearwardly from the one end when the tablet arm is in the collapsed position, a connector for slidably securing the tablet arm to the brace comprising a sleeve slidably carried on said brace, a bracket including a web and a pair of spaced plates extending from said web, said plates being disposed in flanking relation to said sleeve and being mounted thereon for pivotal movement of said bracket about a first axis generally normal to the longitudinal axis of said sleeve, said web of said bracket being mounted on said tablet arm for pivotal movement about a second axis generally normal to the plane of said tablet arm for folding movement of the tablet arm between the operative position and a position in which it is slidable to the collapsed position, and a plate secured to

said bracket in spanning relation to said plates adjacent said web, said plate being positioned so that when said bracket has been rotated about said first axis a sufficient degree to place said second axis in a generally horizontal position and said sleeve has undergone sliding movement along the brace an edge of said plate is positioned in close proximity to the brace and is effective to prevent rotation of the tablet arm about the first axis as said connector slides along the brace.

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