July 30, 1963 H. C. BANKE 3,099,479

CHAIR STRUCTURE

Filed Feb. 27, 1961 3 Sheets-Sheet 1

Fig. 12

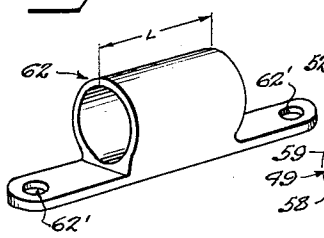


Fig. 2

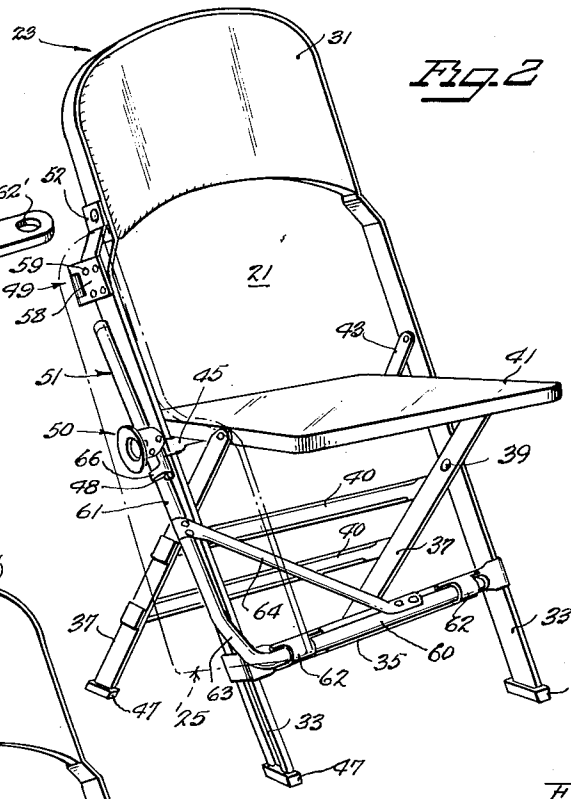


Fig. 1

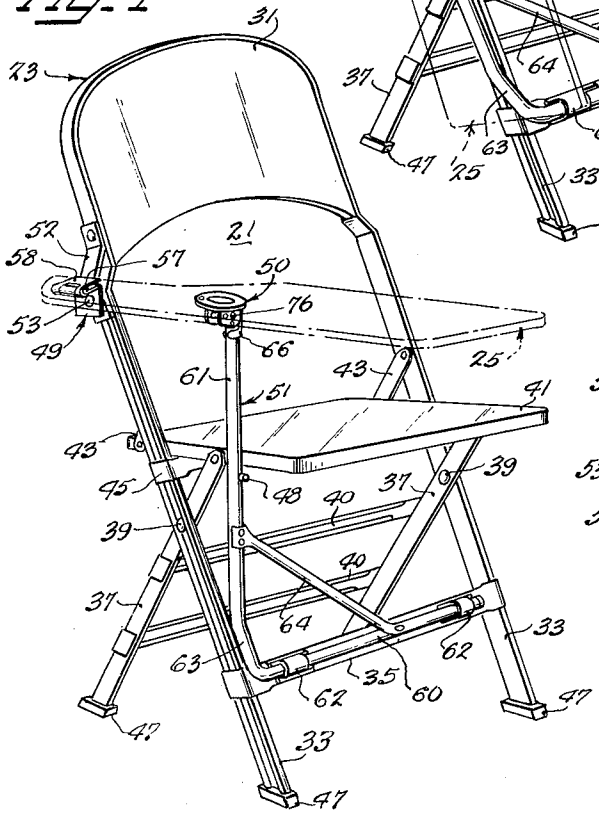
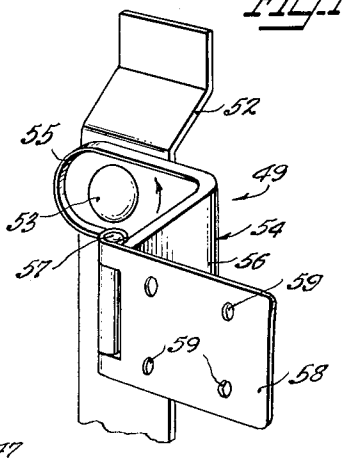


Fig. 13



Inventor
HENRY C. BANKE

By Soans, Anderson, Juedeka & Fitch
Attys

July 30, 1963 H. C. BANKE 3,099,479

CHAIR STRUCTURE

Filed Feb. 27, 1961 3 Sheets-Sheet 2

Fig 3

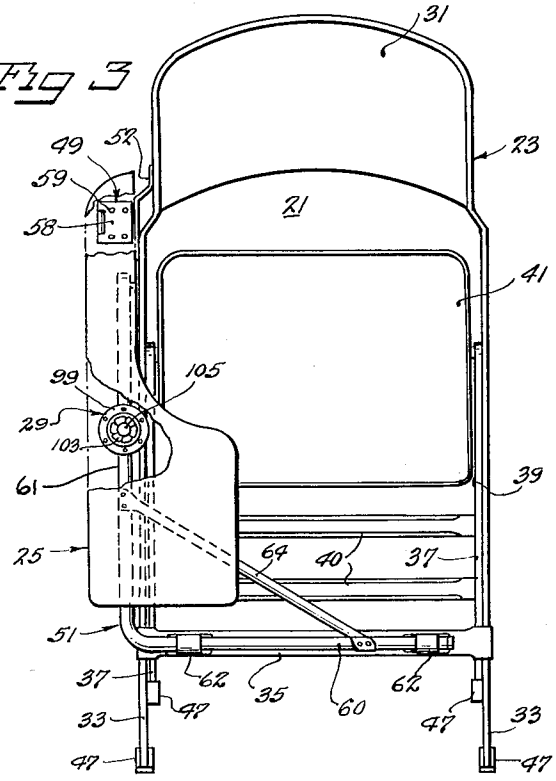


Fig. 4

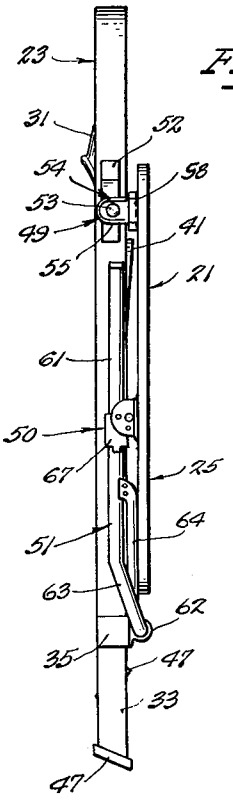


Fig. 10

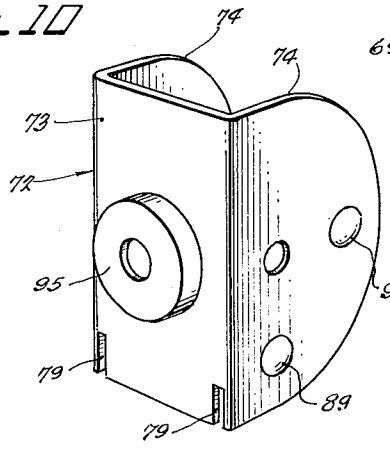
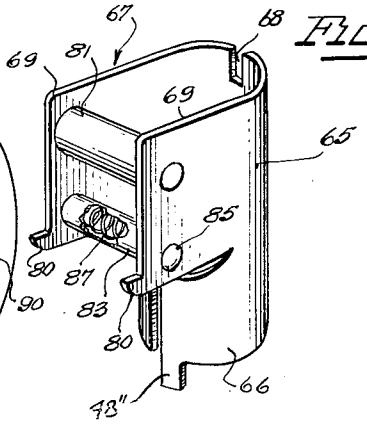


Fig. 11



Inventor

HENRY C. BANKE

By Soans, Anderson, Luedeka & Fitch

Attys

July 30, 1963 H. C. BANKE 3,099,479

CHAIR STRUCTURE

Filed Feb. 27, 1961 3 Sheets-Sheet 3

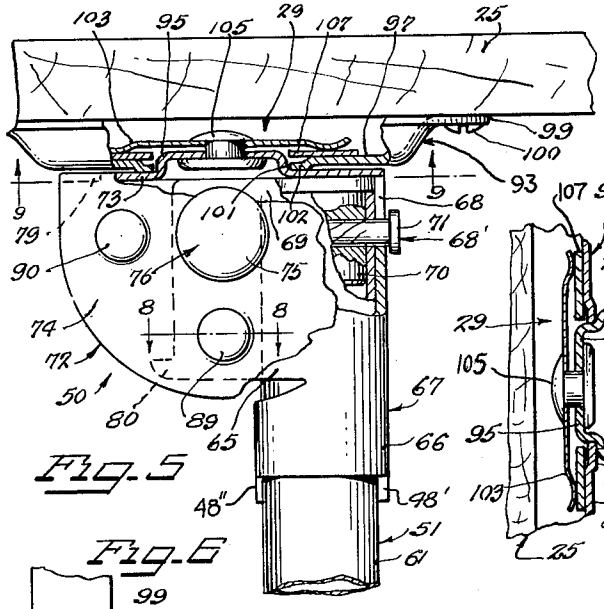


Fig. 5

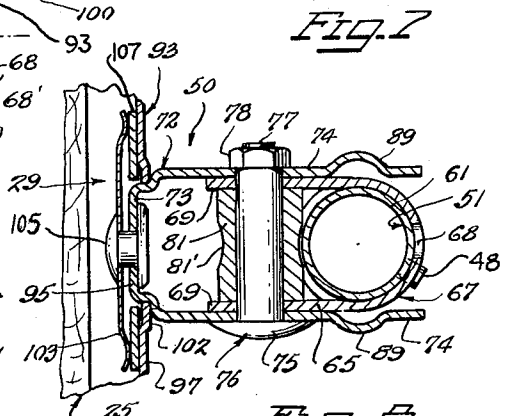


Fig. 7

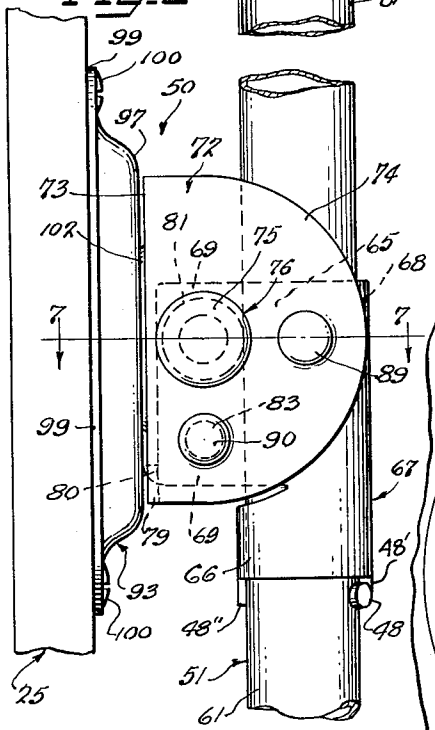


Fig. 6

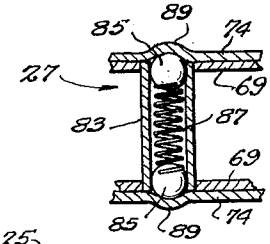


Fig. 8

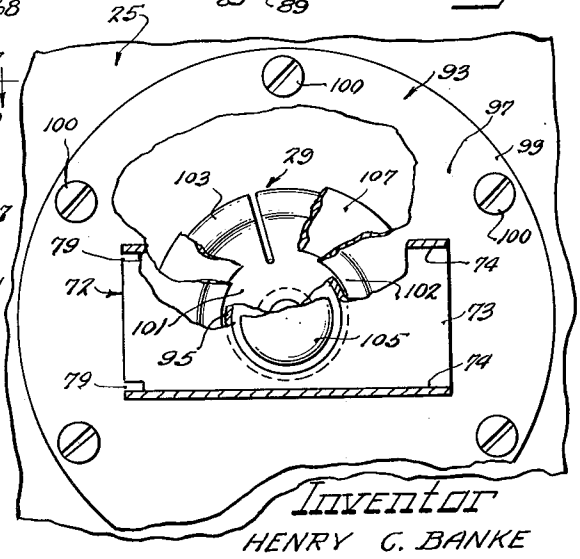


Fig. 9

Inventor

HENRY C. BANKE

By Soans, Anderson, Luedeka & Fitch

Attys

United States Patent Office 3,099,479 Patented July 30, 1963

3,099,479

CHAIR STRUCTURE

Henry C. Banke, Chicago, Ill., assignor to Clarin Mfg. Co., Chicago, Ill., a corporation of Illinois

Filed Feb. 27, 1961, Ser. No. 91,695
2 Claims. (Cl. 297—36)

The present invention relates to a chair with a tablet arm, and more particularly to structure for more effectively mounting such a tablet arm on a chair.

The tablet arm for a chair is generally a flat member attached to the chair and positioned so that the person seated in the chair may use it to support materials, and in particular, as a writing surface. This is a useful and convenient way of providing these facilities with obvious saving in expense and space, and chairs with tablet arms are used a great deal in schools, lecture halls and the like. Of course, it is highly desirable that the tablet arm be firmly supported during use, even after a period of service which involves repeated raisings and lowerings, so that it will provide a solid stable surface on which to write. At the same time, it is desirable that the structure operate in cramped quarters, i.e., move so as to avoid interference with adjacent chairs. It is further desirable that the person who will be using the chair can easily and quickly tilt the arm to get in and out of the chair and can lower it when the tablet arm is not needed. Further, in addition to simplicity of operation, the operation should be as smooth and quiet as possible, and while a minimum of effort should be required, jammed fingers and bruised shin bones can result from a completely free swinging arm.

Accordingly, the principal object of the present invention is to provide an improved chair with tablet arm. More specific objects include providing such a chair which more effectively combines easy and simple operation with firm and stable support. In this connection, an object is to provide operation which is directly pressure responsive and does not require preliminary unlocking or other preparatory steps. A further specific object is to provide such an improved chair having a tablet arm which, while easy to move, is provided with restraining means which prevents the arm from "falling" and thereby create noise and possible injury. It is another object to provide such a structure which is durable and sturdy, yet economical.

Further objects and advantages will become obvious from the following description and accompanying drawings (3 sheets).

In the drawings:

FIGURE 1 is a perspective view of a folding chair having a tablet arm and embodying various features of the invention, the chair being extended and the arm being shown in phantom in its raised or operative position;

FIGURE 2 is similar to FIG. 1, with the arm in a lowered position;

FIGURE 3 is a front view (with parts broken away) of the chair structure shown in FIG. 1, with the chair folded and the arm in the storage position;

FIGURE 4 is a side view of the chair structure shown in FIG. 3;

FIGURE 5 is an enlarged fragmentary front view (with parts broken away and in section), showing the front connection means between the tablet arm and the support member of the chair shown in FIG. 1, the arm being in the raised position;

FIGURE 6 is generally similar to FIG. 5, the arm being in a lowered position;

FIGURE 7 is a sectional view taken generally along line 7—7 of FIG. 6;

FIGURE 8 is a sectional view taken generally along line 8—8 of FIG. 5, showing the pressure responsive locking means;

FIGURE 9 is a view (with parts broken away and in section) taken generally along line 9—9 of FIG. 5.

FIGURE 10 is an enlarged perspective view of the double-pivot bracket of the tablet arm front connection means;

FIGURE 11 is an enlarged perspective view of the sleeve bracket of the front connection means, together with the associated roller sleeve and the spring and ball bearings of the pressure responsive means;

FIGURE 12 is an enlarged perspective view of a mounting bearing for the tablet arm support member; and

FIGURE 13 is an enlarged perspective view of the rear support bracket for the tablet arm, as viewed when the tablet arm is lowered alongside the chair.

Briefly, the illustrated chair **21** includes a frame on which a tablet arm **25** is mounted for ready movement between a firmly supported raised or use position (FIG. 1) and a lowered or non-use position (FIG. 2), the movement being accomplished by first tilting the arm and then swinging it downwardly. Pressure responsive locking or holding means **27** releasably maintain the arm **25** in the raised position until sufficiently and properly directed pressure is applied to the arm to move it to a lowered position. No preliminary unlatching, unbolting, or the like is required to lower the arm.

Retarding means **29** are also provided to prevent the arm from "falling" from the tilted position to a lowered position (FIG. 2). The illustrated chair **21** may itself be folded, and the tablet arm **25** then moved relative to the chair into a storage position (FIGS. 3 and 4).

The present invention has application to various types of chairs, including rigid structures, but since it is especially advantageous for use in a folding chair, it will be described in connection with a folding chair **21**.

The illustrated folding chair **21** comprises a conventional construction, generally similar to that shown in United States Patent No. 2,548,098 issued April 10, 1951. As shown in FIGS. 1 through 4, the chair **21** comprises a frame including an inverted, generally U-shaped section **23** which is formed from a strip of metal that has had its lateral edges rolled inwardly to form parallel beads with a flat portion in between. The bight portion of the section **23** supports a chair back rest **31**, and the downwardly extending portions provide a pair of front legs **33** for the chair. The front legs **33** are interconnected a short distance from their lower ends by a cross brace **35** of a similar construction to that of the section **23**. The cross brace **35** is preferably rigidly and firmly secured to the legs **33** by welding, bolting, or the like, as it provides support for the tablet arm **25** in a manner to be described. A pair of rear legs **37** of similar construction to the front legs **33** are pivotally connected to them, as indicated at **39**, to form an X construction on either side of the chair **21**. The rear legs **37** may be reinforced by having a pair of cross braces **40** connected between them. The upper ends of the rear legs **37** are pivotally connected to either side of a chair seat **41**. The seat **41** is further pivotally supported by a pair of links **43** which are in turn pivotally connected to the section **23**. Further support is provided for the seat **41**, when the chair **21** is in the extended position shown in FIGS. 1 and 2, by a cross brace **45** connected between the front legs **33** above the pivots **39**. The construction just described permits the chair **21** to be folded so that the upper surface of the seat **41** faces forwardly when the chair is folded into the position shown in FIGS. 3 and 4. The ends of the legs **33** and **37** are each provided with a pad **47** of a suitable material, such as rubber or plastic.

The illustrated tablet arm **25** is a generally elongated platform or plate made of wood or other suitable mate-

rial. It is formed so that, when it is in the raised or use position shown in FIG. 1, with its upper surface lying in a generally horizontal plane, its forward end, which is enlarged relative to its rearward portion, provides a writing surface, while the rearward portion provides an arm rest while affording ample room for the occupant of the chair.

In the illustrated device, the tablet arm **25** is pivotally connected at its rearward end to the upper portion of the section **23** by a rear support means in the form of a bracket **49** (shown particularly in FIG. 13), and it is also pivotally connected by front connection means **50** to a generally L-shaped, rigid support member **51** which has one leg thereof rotatably mounted on the cross brace **35** between the front legs **33**.

The illustrated structure will now be described with some particularity, after which the operation of the device will be considered.

The rear bracket **49**, which connects the rear end of the tablet arm **25** to the section **23** in the illustrated device, is shown best in FIG. 13, and includes a fixed plate **52** which is riveted, welded or similarly secured to the left side of the frame **23** (as viewed in the drawings). Pivotally connected to the fixed plate **52**, as by a rivet **53**, for rotation about a generally horizontal axis, is first section **55** of a generally L-shaped plate or angle **54**, having a second section designated **56**. Hinged along its edge to the outer edge of section **56** by means of a hinge pin **57** is a plate **58** which is suitably securely fixed to the underside of the tablet arm **25**, as by means of screws (not shown) passing through the holes **59** provided in plate **58**.

This construction of the rear support bracket **49** provides firm, solid support for the rear end of the tablet arm **25** when the arm is being used, contributing to the overall stability and effective performance of the writing surface. In particular, when the arm **25** is in the raised position, as shown in FIG. 1, the plate **58** is folded back upon section **56** of plate **54** to provide a relatively broad support surface for the arm. This broad support surface tends to eliminate wobble or tilting and provides a firmer support for the rearward end of the arm **25**.

The illustrated support member **51** (FIGS. 1–4) is an elongated, generally tubular, L-shaped part having legs or sections **60** and **61**. Member **51** is mounted with section **60** disposed with its axis generally horizontal and parallel with the cross brace **35**, and with section **61** extending upwardly in a generally vertical direction from the end of section **60**, on the left side of the chair **21** as viewed in FIGS. 1–3. Horizontal section **60** is rotatably received within a pair of spaced apart mountings bearings **62** (one of which is shown in detail in FIG. 12) which are fixed upon the forward face of the cross brace **35**. Each bearing **62** is solidly fixed to the cross brace **35** by a pair of rivets, bolts or the like (not shown) which pass through spaced holes **62'** provided in the bearings. Also, the cylindrical bearing surface, which each bearing **62** provides, extends for a substantial length (indicated by L in FIG. 12) along the horizontal section **60**. Thus, the two spaced apart bearings **62** provide firm, steady and rigid support for the support member **51**.

Vertical section **61** has an angularly bent portion **63** provided at its lower end to allow section **61** to assume a position adjacent the chair legs (as shown in FIGS. 2 through 4), and the latter is connected at its upper end to the tablet arm **25**. A brace or strap **64** in the form of a tube of metal or the like is fixedly connected between intermediate points on the two sections **60** and **61** of the support member. The strap **64** provides reinforcement, and also provides a stop to the rearward pivoting of the support member **51** in the bearings **62**, as shown in FIG. 2. The section **61** is also provided with a stop pin **48** whose function will be explained below.

Now to describe the front connection means **50** between the tablet arm **25** and the support member **51** in the illustrated device. As shown in FIGS. 5 through 7, the tubular vertical section **61** is provided with a sleeve bracket **67** (shown in detail in FIG. 11), having a lower sleeve section **66** which slidably engages the vertical section **61**, and an upper, U-shaped section **65**, which extends around and beyond section **61**, so as to provide a pair of spaced apart vertical plates **69**.

There is a slot **68** provided in the bight of U-shaped section **65**, which slot extends downwardly from the upper edge of the section **65**. The upper end of the tubular vertical section **61** is provided with an end plug **70** (FIG. 5) which is secured in place by a pin or rivet **68'** having an enlarged head **71**. The pin **68'** is positioned so as to enter slot **68** when sleeve bracket **67** moves upwardly relative to vertical section **61** into the relative positions shown in FIG. 5, the arm **25** thereby being positioned in its raised position as seen best in FIG. 1. In that position, the shank of the pin **68'** engages the bottom of the slot **68** to prevent the bracket **67** from becoming disengaged from the vertical section **61**, while the head **71** of the pin **68'** overlaps the edges of the slot **68**. The seating of the pin **68'** within the slot **68** and the overlapping of the head **71** aid in providing firm and sturdy support between the bracket **67** and the section **61**, and so contribute to the overall stability of the structure when it is in the raised position (FIG. 1).

The rearward portion of the lower edge of the bracket **67** is provided with a pair of downward extensions **48'** and **48''**. Extension **48'** is positioned to engage the stop pin **48** on the vertical section **61**, when the device is in the lowered position shown in FIG. 6, to prevent arm **25** from swinging outwardly from the position generally parallel to the side of the chair shown in FIG. 2. Extension **48''** is circumferentially spaced from extension **48'**, allowing rotation of the arm inwardly of the chair to the position shown in FIGS. 3 and 4, at which place extension **48''** acts as a stop against further rotation in that direction.

A generally U-shaped double pivot bracket **72** (shown in detail in FIG. 10), having an intermediate portion **73** and a pair of spaced apart vertical plates **74**, is disposed, as best seen in FIG. 7, with its vertical plates **74** positioned immediately outwardly of and pivotally connected to the vertical plates **69** of the sleeve bracket **67**. As seen in FIG. 7, a suitable pivot pin, shaft or rod **76**, having an enlarged head **75** on one end and a threaded portion **77** at the other end to receive a nut **78**, passes through aligning apertures in the vertical plates **69** and **74** to connect the brackets **67** and **72** for rotational movement relative to one another about the axis of that pin **76**. The axis of the pivot pin **76** is in substantial alignment with the axis of the pivot hinge **57** of the rear connection bracket **49** to provide a common axis for arm **25** to tilt or rotate about as will be further explained. The axis of the pivot pin **76** is also disposed generally perpendicular to and spaced-apart from the longitudinal axis of the elongated vertical section **61**. The bracket **72** has a pair of vertical slots **79** extending into its center portion **73**. These slots **79** are positioned to receive a pair of ears or extensions **80** on the lower ends of the vertical plates **69** when the arm is moved to the vertical position shown in FIG. 6.

A hollow cylindrical roller spacer or sleeve **81** is rotatably disposed about the pivot pin **76** and extends between the vertical plates **69** of the sleeve bracket **67**. The outer surface of the sleeve **81** serves as a positioning roller, having a groove **81'** which extends around its circumference and is positioned to engage the vertical section **61**, as seen best in FIG. 7, to guide the bracket **67** at its upper end for movement relative to the section **61**. The sleeve **81** also aids in maintaining the proper spacing and disposition of the spaced-apart vertical plates **69** and **74**.

The pressure responsive locking or holding means **27** of the illustrated device, shown in FIG. 8, includes a hollow, cylindrical tube or housing **83** extending between the

plates 69 of bracket 67 at a location below the pivot pin 76. The tube 83 extends through opposed apertures in the plates 69 and is secured in that position to provide an open passageway between the plates 69. A pair of ball-bearings 85 are received in the passageway of the tube 83, and are urged outwardly in opposite directions by a small coil spring 87 positioned between them within the tube 83. The ball-bearings 85 are retained within the tube 83 by the inner surfaces of the plates 74 of the bracket 72, which surfaces overlay the openings to the passageway. These plates 74 are each provided with an outwardly curved, generally circular depression 89. The two depressions 89 are positioned generally opposite from one another and are located relative to the pivot pin 76 so as to align with the tube 83 and receive the ball-bearings 85 (FIG. 8) when the parts are in the respective positions shown in FIG. 5, wherein the arm 25 is in its raised position. The spring 87 urges the ball-bearings 85 outwardly and into the depressions 89, thus maintaining the parts releasably fixed in that position until sufficient pressure tending to rotate the bracket 72 in a counter-clockwise direction (as seen in FIG. 5) moves the ball-bearings 85 inwardly against the spring 87 to allow the rotation.

A second pair of similarly constructed, opposed depressions 90 in the plates 74 serve to releasably lock the tablet arm 25 in the tilted position. As the arm moves from the position shown in FIG. 5 to that tilted position, the ball-bearings 85 are in rolling contact with the inner surface of the plates 74 so as to retain them within the tube 83. The two positions are extreme positions, further rotation in either direction about pin 76 being restricted as will be described.

As shown in FIGS. 5, 6 and 9, the illustrated bracket 72 is pivotally connected to a flanged housing 93, which is fixed to the underside of the tablet arm 25, for relative rotation therebetween about an axis which is generally perpendicular to the upper surface of the arm 25 and intersects the axis provided by pivot pin 76. More particularly, the mid or intermediate portion 73 of the bracket 72 includes a generally circular, centrally disposed hub 95 (FIG. 10). The housing 93 has a main wall 97 disposed generally parallelly spaced from the undersurface of the arm 25, and having a peripheral skirt or flange 99 which engages the undersurface and is fixed thereto as by means of screws 100. The main wall 97 has a central, circular opening 101 which receives the hub 95 of the bracket 72 for rotation therein. The main wall 97 adjacent the opening 101 is offset to provide a circular shoulder 102 which maintains the part of the intermediate wall 73 of the bracket 72 which is outwardly of the shoulder 102, spaced slightly from the main wall 97. The hub 95 is held in the opening 101 by a formed, generally disc-shaped spring 103 which is disposed centrally over the hub 95 and connected to it by means of a centered rivet 105, having its shank passing through aligned apertures in the hub 95 and the spring 103 and its enlarged ends disposed on either side thereof. A disc-shaped washer 107 is disposed inside the housing 93 around the opening 101. The disc spring 103 has a larger diameter than the opening 101 so that its marginal portion abuts the washer 107. The spring 103 is formed so as to tend to position its center portion away from the washer 107. The rivet 105 restricts this center portion of the spring 103, the result being that the spring 103 urges the bracket 72 into abutting engagement with the raised shoulder 102 of the housing 93. The spring 103 thus cooperates with the other parts to act as a retarding means, i.e., create abutting, high friction contact to retard the relative rotation between the bracket 72 and the housing 93 to prevent "falling" of the arm. In addition to its retarding function, this spring structure will compensate for wear to the parts caused by the relative movement therebetween, and serves to reduce wobble in the device.

Now to consider the operation of the device. FIG. 1 shows the chair 21 extended, and the tablet arm 25 is in the raised position in a generally horizontal plane and the tablet arm support section 61 is in a generally vertical extending position. The rear support bracket 49, together with the front connection means 50 and the support member 51, provide firm, solid, stable support for the tablet arm 25 to provide the desired writing surface. Since the pivot pin 76 is positioned well toward the outside of the chair 21, downward pressure on the writing surface of the arm incident to its normal use will urge the arm downwardly against its supports to provide a solid, steady surface. The pressure responsive means 27 maintains the arm 25 in the desired position, and further tends to remove wobble.

To lower the arm 25, the user may simply grasp it by its inner edge and tilt or rotate it about the generally horizontal axis defined by pivot pin 76 of the front connection means 50 and the hinge pin 57 of the rear support bracket 49, by merely applying sufficient pressure against the releasable, pressure responsive, locking or holding means 27 to release it, i.e., disengage the ball bearings 85 from the depressions 89. The arm 25 is thus tilted or rotated to a position wherein its upper surface lies in a generally vertical plane. The engagement of the ears 80 in the bottoms of the slots 79 of the bracket 72 serves to prevent over tilting of the arm. The arm is maintained in the vertical position by the engagement of the ball bearings 85 with the depressions 90 which additionally serve to reduce wobble.

Then the front end of the arm 25 may be lowered to the position shown in FIG. 2: the arm 25 pivots or swings about rivet 53 of the rear support bracket 49, sleeve bracket 67 slides relative to the vertical section 61 of the support member 51, said section 61 moving through an arc as member 51 pivots in mounting bearings 62, and the bracket 72 pivots relative to the housing 93. As already pointed out, this last relative pivoting motion is retarded by the spring 103, thereby slowing down this movement to prevent the arm 25 from "falling" suddenly and rapidly to cause a noise or to possibly injure someone. In the illustrated chair 21, the downward swing of the arm 25 is limited by the strap 64 engaging a front leg 33 of the chair (FIG. 1), and by the engagement of stop pin 48 with the lower edge of the sleeve bracket 67, as seen best in FIG. 6. When the arm 25 is in this lowered position, it is out of the way and the chair 21 may be used as any other chair. It may be noted that the vertical section 61 moves through a relatively small angle in going from its position in FIG. 1 to its position in FIG. 2.

If it is desired to store or carry the chair 21, the legs 33 and 37 are brought together, raising the seat 41 so that the section 23 (including the front legs 33), the seat 41, and the rear legs 37 are all in general alignment with one another as shown in FIG. 4. Then, the arm 25 may be rotated to lie generally flush against the chair, as shown in FIGS. 3 and 4, the plate 58 of the rear support bracket 49 pivoting about hinge pin 57, while the sleeve bracket 67 and the parts connected to it are rotating about vertical section 61. In this latter position, the chair 21 is ready for transportation or storage.

Thus, the illustrated chair has a firmly and stably supported tablet arm which may be readily lowered in direct repsonse to pressure. It requires no preliminary step such as unlatching, etc. The structure provides firm stable support for the arm at all times, and particularly when it is in the raised or use position. The retarding means eliminate the noise of "falling" arms and guard against injury. The operation of the arm is easy and uncomplicated, and requires a minimum of time and also a minimum of space.

Obviously many modifications and changes may be made to the illustrated chair structure without departing from the spirit and scope of the invention. Various features of the invention are set forth in the following claims.

I claim:

1. In combination with a chair including a chair frame providing a pair of front legs, a pair of rear legs, and a back rest, a tablet arm assembly comprising, a tablet arm, a pivotal connection securing a rearward portion of said tablet arm to said back rest adjacent one side of the chair for relative movement about a pair of transverse axes, and means connecting a forward portion of said tablet arm to said frame comprising a support member carried at its lower end by the frame for swinging movement through a generally vertical plane along said one side of the chair from a generally vertical position and in a direction toward said back rest to a rearwardly inclined position, and a universal connection between the tablet arm and said support member including a bearing means on the underside of said tablet arm, a yoke-like element connected with said bearing means for pivotal movement about an axis disposed at right angles to the plane of said tablet arm, a sleeve element slidably engaging said support member for movement axially thereof and connected with said yoke-like element for relative pivotal movement about an axis transverse to and spaced from the axis of the sleeve and support member, whereby said tablet arm may be rotated about said transverse axis of said universal connection and one of said axes of said rearward pivotal connection to move between a generally horizontal position of use and a generally vertical position along said one side of the chair, and when in said generally vertical

position the tablet arm may be moved vertically downward about the other transverse axis of said rearward pivotal connection and said axis of said bearing means to cause said sleeve to slide along said support member and place said tablet arm in its lowered position alongside the chair with said support member disposed in its rearwardly inclined position with respect to its connection with said frame, and a biasing means in position to urge the adjoining surfaces of said bearing means and yoke-like element together to resist relative rotation therebetween, whereby said tablet arm is maintained in any selected position along said support member when the tablet arm is positioned in said generally vertical position along said one side of the chair.

2. The combination set forth in claim 1, wherein said front and rear legs are pivotally interconnected intermediate their ends to permit folding of said chair, a cross brace extends between said pair of front legs adjacent the lower end portions thereof, and said support member for the tablet arm includes a lower transverse portion swingably mounted on said cross brace.

References Cited in the file of this patent

UNITED STATES PATENTS

2,664,943	Clarin	Jan. 5, 1954
2,954,073	Junkunc	Sept. 27, 1960
3,024,065	Eves et al.	Mar. 6, 1962