

PATENT SPECIFICATION

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(54) FOLDING WALL TABLE

(71) We, SICO INCORPORATED, 7525 Cahill Road, Minneapolis, Minnesota, U.S.A., a corporation organised and existing under the laws of the State of Minnesota, U.S.A., do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention pertains to the field of folding wall tables of the type designed to fold between a storage position in which the table is vertically positioned adjacent the wall, and a usable position in which the table extends horizontally from the wall.

One such prior art type of folding table is shown in U.S. Patent No. 3,866,547, issued to Guyton. In this patent, the end of the table nearest the wall is connected thereto and supported by hinge arms, while the outer end is supported by auxiliary fold-up legs. During folding to the storage position, the outer end of the table rolls along the floor on rollers which are provided in the table end. A disadvantage of this type of structure is the requirement of the roller wheels along the table end. Roller wheels eventually become covered with grease leaking from around the axle, and dirt or dust picked up from the floor. It is of course not desirable to have grease or dirt near the table work surface, and particularly directly in front of a person who might sit at the end of the table. Another disadvantage of this type of structure is the requirement of a separate latch to hold the table in its vertical storage position. The separate latch adds another part to the cost of the table and adds another step which must be performed in the operation of the table.

Another type of prior art folding table is shown in U.S. Patent No. 3,730,107 issued to Bergkamp et al. In this patent, the table or ironing board folds to the vertical storage position by means of upper and lower hinge arms and pivots on the table and on the wall or other supporting structure, thus eliminating the need for roller wheels at the

end of the table. In the Bergkamp et al. structure, the table is held in its storage position by gravity due to a bend in the lower arm which places the center of gravity of the table in storage position between the back wall and the lower pivot point of the bent arm. Unfortunately, this type of structure results in a total mechanism depth or thickness which is so great as to either require a recess in the wall to which the table is attached, or a separate box or closet-like structure into which the table can be folded. This is often undesirable because of space limitations in the room or structural limitations that prevent a recess being formed in the wall.

To overcome these problems, the present invention provides a folding wall table that does not require rollers on the table, does not require a separate latch to hold the table in its storage position, and which folds compactly against the wall without requiring either a storage box protruding into the room or a recess being formed into the wall.

In the Bergkamp et al, type of structure, the table is held in its usable position by means of latches between the table top and the upper hinge arms. This type of structure has the advantage of not requiring separate support legs for the outer end of the table, but it is subject to other disadvantages. These disadvantages are overcome in a preferred embodiment of the present invention by latching the inner edge of the table, in its usable position, directly to the wall, or wall mounting plate or bracket, rather than to the upper hinge arm, and by extending or positioning the inner edge of the table directly adjacent the wall. This provides a much more convenient and less cluttered working surface. Also, by providing latch release means near the opposite or outer end of the table, ease of operation is improved, especially for larger tables. Release of the latches and application of the folding force can then all be provided from the same location with respect to the table.

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Accordingly, the invention provides a folding wall table adapted for attachment to a wall for movement between a storage position vertically disposed adjacent the wall and a usable position horizontally extending from the wall, comprising:

a table surface member;

upper and lower hinge arm means;

upper and lower wall pivot means for pivotally connecting said upper and lower hinge arm means respectively to said wall with the pivot axis of said upper hinge arm means higher than the pivot axis of said lower hinge arm means;

upper and lower table pivot means for pivotally connecting said upper and lower hinge arm means respectively to the under side or side edges of said table surface member with the pivot axis of said upper table pivot means positioned closer to the wall, when the table is in its usable position, than the pivot axis of said lower table pivot means; and

said hinge arm means and said pivot means allowing movement of said table surface member between its usable and its storage positions with the underside of the table folding against the wall in the storage position; and

the pivot axis of said lower table pivot means being spaced below a plane passing through the pivot axis of said upper table pivot means and parallel with the table surface when in its usable position, so that when the pivot axis of said lower table pivot means passes through a plane containing the upper hinge arm means and its pivot axis there is provided an overcenter resistance force to hold the table in the storage position.

The overcenter resistance force is provided, for example, by offset table pivot geometry, aided if desired, by for example a compressional resilience of the lower hinge arm means or lower table pivot means while passing through the overcenter position.

The lower hinge arm means may be intentionally made slightly longer than strictly required by geometrical considerations so as to preload the lower hinge arm means in the storage position so as to enhance the overcenter resistance force.

Latch means may be provided for latching the inner edge of the table directly to the wall, or wall mounting plate or bracket, to stabilize the table in its usable position. Alternatively, folding outer legs can be provided.

Release means for the latch means may be provided adjacent the outer edge of the table, so that the latches may be released from an operator position at the end of the table.

There is now described, by way of

example and with reference to the accompanying drawings, a folding wall table according to a preferred embodiment of the invention.

In the drawings:

Figure 1 is a view in perspective of a preferred embodiment of a wall table according to the present invention, the top being removed for clarity of illustration and the table being depicted in an intermediate position between usable and storage positions;

Figure 2 is a rear elevational view of the table of Figure 1 showing the table parts in a storage position;

Figure 3 is an enlarged sectional view of the table of Figure 1 as seen from the line 3-3 of Figure 2, but showing the table mounted on a wall in its usable position;

Figure 4 is a view similar to Figure 3, but showing the table in its storage position;

Figure 5 is an enlarged detailed sectional view as seen from line 5-5 of Figure 3;

Figure 6 is an enlarged detailed sectional view as seen from the line 6-6 of Figure 3;

Figure 7 is an enlarged detailed sectional view of a portion of the latching mechanism seen in Figure 3;

Figure 8 is a side elevational view as seen from the right to left of Figure 2 showing the table in its storage position mounted on a wall;

Figures 9 and 10 are diagrammatic views illustrating the geometry of the hinge assembly according to the present invention; and

Figure 11 is a fragmentary side elevation view showing the geometry of the hinge arms according to the present invention.

In Figure 1, the table surface member has been removed in order to show the other components more clearly. The table frame is composed of a pair of side frame members 113 and 114, and a pair of end frame members 115 and 116. These frame members are made of metal channel stock, with the top channel leg being longer than the lower channel legs, as also seen in Figure 6, so as to provide bolt clearance. The frame members may be welded or otherwise secured together to form a generally rectangular frame, and a plurality of bolt or screw holes 117 are provided in the top channel legs of the frame members for securing the table surface member. The table surface member can be made of plywood, hardboard or particle board with a suitable decorative surface mounted thereto.

A subframe comprises a pair of channel members 118 and 119, which are positioned parallel to side frame members 113 and 114, and which are welded or otherwise secured at one end to frame member 116. Subframe channel members 118 and 119 also have bolt

or screw holes 117 for securing a table surface member. It will be understood that the table surface member also serves to positionally secure the outer ends of subframe channel members 118 and 119 with respect to the main frame.

Wall mounting assembly 140 may comprise a large rectangular plate 141 which is adapted to be bolted to a wall by means of a plurality of bolts 142. A wall mounted member 143, which may be a rectangular sectioned tube is positioned below and parallel to plate 141, and is connected therewith by means of a pair of vertical members 144 and 145. These vertical members can also be made of rectangular tubes, and they may be welded or otherwise secured to both member 143 and plate 141. Plate 141, and members 143-145 comprises the wall mounting assembly, and additional bolts 142 can be provided in member 143, and also in members 144 and 145 if necessary, for holding the assembly to the wall.

The folding table is connected to the wall mounting assembly by means of an upper hinge arm means 130 and a lower hinge arm means 120. Upper hinge arm means 130 comprises a pair of individual arms 130a and 130b. In the preferred embodiment, these arms are made of rectangular sectioned metal tubes. Hinge arm 130a is pivotally connected to the wall mounting assembly by means of an upper wall pivot 131a. In the preferred embodiment, pivot 131a is formed by a pair of tabs which are die-cut from plate 141, then bent perpendicularly thereto. A pivot bolt 136 passes through holes in tabs 133 and through the end of arm 130a to form the pivot. An identical pivot is provided for the upper wall pivot of upper hinge arm 130b.

In the preferred embodiment a single lower hinge arm 120 is used, although it will be appreciated that a pair of side-by-side arms could be provided. Lower hinge arm 120 is made of rectangular sectioned metal tubing, and it is pivoted at its lower end by means of a lower wall pivot 121. This pivot may be formed by a pivot bolt 123 passing through vertical members 144 and 145, and the lower end of hinge arm 120 which is positioned therebetween.

The upper ends of upper hinge arms 130a and 130b are welded to a circular crossbar 134. Crossbar 134 extends through holes provided in subframe channel members 118 and 119, so as to form the upper arm pivot generally designated by reference number 132. Crossbar 134 is free to rotate but is otherwise constrained by subframe members 118 and 119. The ends of crossbar 134 which extend beyond the points of connection of upper hinge arms 130a and 130b are designated by reference number 135.

Ends 135 extend inside the channels of side frame members 113 and 114 in close proximity to the web portions thereof, thus preventing unwanted lateral movement of the table.

Lower hinge arm 120 connects to the table at a lower arm table pivot generally indicated by reference number 122. The details of construction of this pivot are shown more clearly in the sectional view of Figure 6. In Figure 6, subframe channel members 118 and 119 are shown in sections, as is table surface member which is secured thereto by means of screws. A pivot bolt 124 passes through pivot holes provided in both subframe channel members 118 and 119, and is secured in place by caps 125 provided at each end.

Lower hinge arm 120 is welded to a circular tubular pivot tube 127. Pivot tube 127 is positioned coaxially with respect to pivot bolt 124, and is spaced in relationship thereto by means of nylon or steel bushings 126 at each end thereof. Bushings 126 are designed to fit telescopically into the ends of pivot tube 127, as the bushings also have a central bore sized to accommodate pivot bolt 124. Pivotal movement of lower hinge arm 120 with respect to the table is accommodated by relative angular motion between bushings 126 and pivot bolt 124.

The table is shown in its vertical storage position in Figures 4 and 8, in an intermediate position in Figure 1, and in its horizontal or usable position in Figure 3. The table does not require outer legs to support its outer end but instead is maintained in its horizontal position by latches. In the preferred embodiment, a pair of latch assemblies 150a and 150b are attached to subframe channel members 118 and 119, respectively. The latch assemblies are identical, and one of them (150b) is shown in greater detail in Figure 5. Latch assembly 150b includes a latch bolt or pin 151. A pair of tabs 152 are die cut from the web portion of the subframe channel member and are bent outwardly at a right angle. Tabs 152 have clearance holes to received latch bolt 151. A coil spring 153 is placed coaxially around bolt 151 between tabs 152, and is in abutment with a retaining pin 154 which is placed through a small drill hole in bolt 151, extending outwardly on both sides. The other end of spring 153 is in abutment with the tab 152 farthest from end frame member 116. In this manner, spring 153 normally urges latch bolt 151 inwardly towards end frame member 116, nearest the wall.

A control cable 155b is connected to the outer end of latch bolt 151 by any suitable means, for example by means of a ring 156 provided through a drill hole near the end of bolt 151. As seen in Figure 1, control cables

155a and 155b from the two latch assemblies extend beneath the table surface outwardly to a pair of release brackets 160a, 160b positioned just inside of outer end frame member 115. Control cables 155a and 155b are routed above crossbar 134 and pivot tube 127.

Release brackets 160a and 160b have generally flat central portions which have a pair of slots 161 formed therein. The release brackets are slidably secured to the underside of the table surface members by screws 162 and inserts 163 which fit in slots 161 and through which the screws pass. The ends of the release brackets nearest the outer end of the table have downturned tab portions 164 which form release handles.

Striker plates for cooperating with latch assemblies 150a and 150b are provided in plate 141 of wall mounting assembly 140. Striker plates 166a and 166b are shown in Figures 3, 4 and 5, although they are not clearly visible in Figure 1 because they are obscured by other structure. The striker plates can be separate elements welded to the wall mounting assembly, but in the preferred embodiment the striker plates are die cut in plate 141, then bent outward at an angle. An enlarged detail is shown in Figure 7. Striker plate 166b, after being die cut from plate 141, is bent out at an angle to form a ramp and a catch for latch bolt 151. When the table is being moved to its horizontal usable position, latch bolts 151 are brought into contact with the ramp portions of striker plates 166a and 166b, causing retraction of the latch bolts against their springs 153. When the table reaches its full horizontal position, the latch bolt clears the ramp portions of the striker plates and snaps back into the position shown in Figure 7. In this position, the latch bolts prevent further movement or folding of the table.

To fold the table, the latches are released by grasping the handles 164 of release brackets 160 beneath the table and pulling them towards the outer end of the table. This causes retraction of the latch bolts, permitting upward and inward movement of the table to the storage position against the wall.

Bumpers 170 made of hard rubber or other suitable material are secured to the underside of the table frame members to cushion the movement of the table into the wall during the folding operation and to bear against the wall while the table is in that position. Bumpers 170 may be positioned in holes provided in end frame member 115 and subframe channel members 118 and 119 as seen in Figure 2, but it will be understood that they may be placed in any of the frame members or elsewhere on the table.

Similarly, bumpers 171 may be provided

as stops for the table in its usable position. As seen in Figures 1 and 2, bumpers 171 may be secured to the tops of vertical members 144 and 145 where they engage the underside of end frame member 116. Alternatively, the bumpers could be placed on member 116 to engage members 144 and 145, or the upper hinge arms 130a and 130b.

A nylon glide 172 may be positioned on the wall as seen best in Figure 4, for engagement by the outer or lower side of end frame member 116 during the initial stage of movement of the table from its storage position, thereby protecting the wall from abrasion.

As previously discussed, it is generally known in the prior art to provide a linkage or hinge assembly connected between a wall or support and a table or other generally planar member, for controlling movement of the table between a horizontal position and a vertical position against the wall. The lengths of the upper and lower hinge arms, and the positioning of the pivots along the wall and along the center line of the table or other planar member can be selected to provide the desired motion. Generally there is an infinite set of different possible geometries which will give the desired motion.

However, when the "correct" geometry is achieved according to the prior art, the table will tend to swing freely away from the wall under the influence of gravity, to come to rest at some intermediate position. Thus, it has been necessary in prior art devices to either provide counterbalance or biasing springs, high pivot friction, or latch means to hold the table in its vertical position.

The present invention intentionally modifies the linkage geometry away from the "correct" geometry of the prior art in a particular manner, so as to provide a linkage which will automatically maintain the table in its stored position, without the need for any latch, counterbalancing springs, or the like. The manner in which this feature is obtained is explained as follows.

Figure 11 shows the basic geometry of the hinge linkage. Reference number 130 indicates the upper hinge arm means, and reference number 120 designates the lower hinge arm means. The upper arm wall pivot means, which is the point about which upper hinge arm means 130 may pivot, is indicated by reference number 131. Reference number 121 indicates the lower arm wall pivot means. The point, or more properly axis, about which table 110 and upper hinge arm 130 are pivotable with respect to each other is indicated by reference number 132. The corresponding pivotal connection between table 110 and lower hinge arm 120 is indicated by reference number 122. The resulting

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geometry can be thought of as a four bar linkage, with arm 120, arm 130, the wall or wall plate between pivots 131 and 121, and the table surface member between pivots 132 and 122 making up the four elements.

When the table is in its folded position, arms 120 and 130 and table 110 are approximately aligned in the same plane but instead of mounting table pivot points 122 and 132 in the same plane parallel to table 110, these pivot points are intentionally offset by an amount indicated by reference number 190 in Figures 3 and 11. Upper arm table pivot 132 is intentionally placed higher (closer to the table surface) than lower arm table pivot 122.

The arc travel by pivot point 132 is a circle centered at 131, and is indicated by reference number 91. The arc normally traveled by lower arm table pivot 122 is an arc indicated by reference number 92, centered at pivot point 121.

By providing offset 190, and by making corresponding adjustments in the lengths of the hinge arms, it is possible to provide a built-in resistance force to hold the table in its vertical position. The resistive force is supplied by resilient forces in one or more of the hinge arms caused by an overcenter condition when the table is near the storage position.

This is better explained with the help of the diagram of Figure 9. In Figure 9, the arms and pivots are numbered as before, with the arms indicated only by a single straight line. Offset 190 is exaggerated for purposes of illustration. In Figure 9, the table is in its storage position adjacent and parallel to the wall. For the given pivot point placement, it is apparent that something in the linkage will have to undergo deformation in order to unfold the table. In the vertical position shown, pivot 122 is closer to the wall than pivot 132. However, as the table is unfolded to its horizontal position (rotating counter-clockwise in Figures 9, 10 and 11) pivot 122 must pass outwardly to a position beneath pivot 132, and then further outwardly on arc 92 before pivot 132 has moved very far outwardly and downwardly on arc 91. (Of course the wall prevents pivot 132 from moving outwardly and downwardly ahead of pivot 122, which would otherwise result in bringing the table down "upside down").

However, the initial movement of pivots 122 outwardly to a position approximately beneath pivot 132 will cause binding or deformation of the linkage. Specifically, hinge arm 130 might be stretched, hinge arm 122 might be compressed, or table pivots 122 and 132 might be moved towards each other. In the preferred embodiment, lower table pivot 122 is designed to bow by allowing resilient bending of pivot tube 127.

As seen in Figure 6, pivoting of lower hinge arm 120 with respect to the table is accommodated by pivot tube 127, bushings 126, and pivot bolt 124 which completes the pivotal connection to the subframe channel members. Pivot bolt 124 is secured by the subframe channel members with respect to any translational movement. However, pivot tube 127 is secured only at its ends, and its middle is spaced apart from pivot bolt 124. Accordingly, pivot tube 127 is free to flex or bow to accommodate the intentional mismatch in the length of lower hinge arm 120, during movement through the overcenter position. Resilient bending of pivot tube 127 holds the table securely against the wall in its vertical position as explained below.

The overcenter resistance effect is seen further in Figure 10. From an observation of arcs 91 and 92 it is seen that these arcs are farthest apart close to the wall, and they become increasingly close together as the pivots move away from the wall. In Figure 10, a point indicated by reference number 132c indicates the position of upper arm table pivot 132 when the table is in the full vertical storage position. The point indicated by reference number 122c is the position of lower arm table pivot 122 with the table in the full vertical storage position. The offset between these points 190 is again exaggerated for purposes of illustration. The distance on table surface member 110 between table pivots 132 and 122 is indicated in Figures 10 and 11 by dimension A.

It will be appreciated that the shortest distance between point 132c and arc 92 falls at a position approximately vertically beneath point 132c, indicated by reference number 95. It will also be appreciated that dimension A is greater than the distance from point 132c to pivot 95. Since the initial motion upon unfolding the table requires pivot point 122 to move outwardly beyond pivot point 132, it is clear that binding will result. Dimension A is allowed to be momentarily resiliently shortened, allowing pivot point 122 to move from point 122c along arc 92. This shortening is accommodated by flexing or bowing of pivot tube 127 as previously explained.

The above described situation would exist if a portion of wall near the top of the table in its stored position were cut away. In normal situations, the top of table 110 immediately butts into the wall when the table is first moved away from its stored position, thus preventing stationary rotation about point 132c while pivot point 122 is moved past the point of maximum resistance. Instead, pivot point 132 is caused to move a short distance to a point indicated

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by reference number 132d while pivot 122 is moving from pivot 122c to point 122d. Since the distance between arcs 91 and 92 decreases as pivot 132 is moved to the right, this has the effect of increasing the mismatch in distance between dimension A and the shortest distance to arc 92. In this case, the point 95 would be shifted somewhat to the right. Thus, the effect of the top end of the table butting against the wall is to increase the overcenter resistance effect somewhat.

After moving past the point of maximum deflection, table pivot 122 comes to position 122d while table pivot 132 comes to position 132d. In this position, table pivot 122 is back on arc 92, and from this point on while lowering the table both pivots 122 and 132 can proceed outwardly and downwardly on arcs 92 and 91 respectively, with the angular positioning of the table moving as controlled by the geometry.

If a greater degree of overcenter resistance force is needed, the lower hinge arm 120 can be lengthened slightly. This has the effect of preloading the resilient pivot tube 127, so as to provide a greater resistance force. Also, lower arm wall pivot 121 can be moved slightly outwardly from the wall to increase the resistance force. In the preferred embodiment, the overcenter compression forces are not fully relaxed when the table is in the storage position against the wall. A residual force is therefore maintained for holding the table firmly against the wall, and preventing it from sagging.

One successful embodiment of the table of Figures 11—18 uses the following set of critical dimensions: The length of upper hinge arm 130 from pivot center to pivot center was 12-1/2 inches. The corresponding length of lower hinge arm 120 was 23-11/16 inches. Table pivots 122 and 132 were 4-1/4 inches apart in a direction parallel to the table surface, and 1/4 inch offset (dimension 190) in a direction perpendicular to the table top. With the table in its usable position, pivot 132 is approximately 15/16 of an inch higher than upper wall pivot 131. In this embodiment upper wall pivot 131 may extend outwardly from the wall approximately 3/16 of an inch further than lower wall pivot 121, although this dimension is not believed to be as critical so long as wall pivots 121 and 131 remain generally equally spaced outwardly from the wall.

From the preceding description it will be apparent that the present invention provides a folding wall table that is easy to fold and unfold, and provides a large and uncluttered work space. The table folds flat against a wall when not in use, and is held there by an overcenter resistance force. It is held

securely in its usable position by latches connected to the wall or wall mounting plate.

WHAT WE CLAIM IS:—

1. A folding wall table adapted for attachment to a wall for movement between a storage position vertically disposed adjacent the wall and a usable position horizontally extending from the wall, comprising:

a table surface member;

upper and lower hinge arm means;

upper and lower wall pivot means for pivotally connecting said upper and lower hinge arm means respectively to said wall with the pivot axis of said upper hinge arm means higher than the pivot axis of said lower hinge arm means;

upper and lower table pivot means for pivotally connecting said upper and lower hinge arm means respectively to the underside or side edges of said table surface member with the pivot axis of said upper table pivot means positioned closer to the wall, when the table is in its usable position, than the pivot axis of said lower table pivot means;

said hinge arm means and said pivot means allowing movement of said table surface member between its usable and its storage positions with the underside of the table folding against the wall in the storage position; and

the pivot axis of said lower table pivot means being spaced below a plane passing through the pivot axis of said upper table pivot means and parallel with the table surface when in its usable position, so that when the pivot axis of said lower table pivot means passes through a plane containing the upper hinge arm means and its pivot axis there is provided an overcenter resistance force to hold the table in the storage position.

2. A folding wall table according to claim 1, wherein said lower hinge arm means has a compression resilience or stiffness such that it can resiliently deform under compression forces being overcenter movement of the table.

3. A folding wall table according to claim 2, wherein said lower hinge arm means comprises a single relatively rigid arm, and wherein said lower table pivot includes a resilient tubular member pivoted to the table at its ends and connected to the upper end of the lower hinge arm at the center thereof, whereby the resilient tubular member deflects to absorb the overcenter resistance force.

4. A folding wall table according to claim 2 or 3, wherein said upper hinge arm means comprises a pair of arms made of metal tubing, and said upper table pivot comprises



by reference number 132d while pivot 122 is moving from pivot 122c to point 122d. Since the distance between arcs 91 and 92 decreases as pivot 132 is moved to the right, this has the effect of increasing the mismatch in distance between dimension A and the shortest distance to arc 92. In this case, the point 95 would be shifted somewhat to the right. Thus, the effect of the top end of the table butting against the wall is to increase the overcenter resistance effect somewhat.

After moving past the point of maximum deflection, table pivot 122 comes to position 122d while table pivot 132 comes to position 132d. In this position, table pivot 122 is back on arc 92, and from this point on while lowering the table both pivots 122 and 132 can proceed outwardly and downwardly on arcs 92 and 91 respectively, with the angular positioning of the table moving as controlled by the geometry.

If a greater degree of overcenter resistance force is needed, the lower hinge arm 120 can be lengthened slightly. This has the effect of preloading the resilient pivot tube 127, so as to provide a greater resistance force. Also, lower arm wall pivot 121 can be moved slightly outwardly from the wall to increase the resistance force. In the preferred embodiment, the overcenter compression forces are not fully relaxed when the table is in the storage position against the wall. A residual force is therefore maintained for holding the table firmly against the wall, and preventing it from sagging.

One successful embodiment of the table of Figures 11—18 uses the following set of critical dimensions: The length of upper hinge arm 130 from pivot center to pivot center was 12-1/2 inches. The corresponding length of lower hinge arm 120 was 23-11/16 inches. Table pivots 122 and 132 were 4-1/4 inches apart in a direction parallel to the table surface, and 1/4 inch offset (dimension 190) in a direction perpendicular to the table top. With the table in its usable position, pivot 132 is approximately 15/16 of an inch higher than upper wall pivot 131. In this embodiment upper wall pivot 131 may extend outwardly from the wall approximately 3/16 of an inch further than lower wall pivot 121, although this dimension is not believed to be as critical so long as wall pivots 121 and 131 remain generally equally spaced outwardly from the wall.

From the preceding description it will be apparent that the present invention provides a folding wall table that is easy to fold and unfold, and provides a large and uncluttered work space. The table folds flat against a wall when not in use, and is held there by an overcenter resistance force. It is held

securely in its usable position by latches connected to the wall or wall mounting plate.

WHAT WE CLAIM IS:—

1. A folding wall table adapted for attachment to a wall for movement between a storage position vertically disposed adjacent the wall and a usable position horizontally extending from the wall, comprising:

a table surface member;

upper and lower hinge arm means;

upper and lower wall pivot means for pivotally connecting said upper and lower hinge arm means respectively to said wall with the pivot axis of said upper hinge arm means higher than the pivot axis of said lower hinge arm means;

upper and lower table pivot means for pivotally connecting said upper and lower hinge arm means respectively to the underside or side edges of said table surface member with the pivot axis of said upper table pivot means positioned closer to the wall, when the table is in its usable position, than the pivot axis of said lower table pivot means;

said hinge arm means and said pivot means allowing movement of said table surface member between its usable and its storage positions with the underside of the table folding against the wall in the storage position; and

the pivot axis of said lower table pivot means being spaced below a plane passing through the pivot axis of said upper table pivot means and parallel with the table surface when in its usable position, so that when the pivot axis of said lower table pivot means passes through a plane containing the upper hinge arm means and its pivot axis there is provided an overcenter resistance force to hold the table in the storage position.

2. A folding wall table according to claim 1, wherein said lower hinge arm means has a compression resilience or stiffness such that it can resiliently deform under compression forces being overcenter movement of the table.

3. A folding wall table according to claim 2, wherein said lower hinge arm means comprises a single relatively rigid arm, and wherein said lower table pivot includes a resilient tubular member pivoted to the table at its ends and connected to the upper end of the lower hinge arm at the center thereof, whereby the resilient tubular member deflects to absorb the overcenter resistance force.

4. A folding wall table according to claim 2 or 3, wherein said upper hinge arm means comprises a pair of arms made of metal tubing, and said upper table pivot comprises



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a tubular member to which said arms are attached.

5 5. A folding wall table according to claim 3 or 4, wherein the effective length of said lower hinge arm means is longer by a predetermined amount than the effective length of said upper hinge arm means plus the distance between said upper and lower wall pivot means minus the distance between said upper and lower table pivot means, so as to preload said resilient tubular member when the table is in its storage position.

15 6. A folding wall table according to any of the preceding claims, wherein the pivot axis of said lower wall pivot means is spaced further from the wall than the spacing of the pivot axis of the upper wall pivot from the wall, whereby the overcenter resistance force is increased.

20 7. A folding wall table according to any of the preceding claims, which includes a wall mounting bracket for securing to a wall, said bracket including said wall pivot means for said hinge arms.

25 8. A folding wall table according to claim 7, which includes stop means attached to said wall mounting bracket for limiting movement of said table surface member in its usable position.

30 9. A folding wall table according to any of the preceding claims, which includes latch means attached to the underside of said table surface member adjacent the edge thereof closest to the wall in the usable position, for securing said table in its usable position.

35 10. A folding table according to claim 9, wherein said latch means includes a pair of latch bolt assemblies secured to the underside of the table surface member adjacent said edge.

40 11. A folding wall table according to claim 10 as appendant to claim 7, wherein the wall mounting bracket is provided with striker plates for engagement by the latch bolts.

45 12. A folding wall table according to claim 10 or 11, which includes latch release means positioned adjacent the end of the table opposite said edge and operatively connected to said latch assemblies for actuation thereof.

50 13. A folding wall table according to claim 1, substantially as described herein with reference to the accompanying drawings.

55 14. A folding wall table substantially as described herein and substantially as shown in Figures 1 to 8 of the accompanying drawings.

60 15. A folding wall table adapted for attachment to a wall for movement between a storage position vertically disposed adjacent the wall and a usable position

horizontally extending from the wall, comprising:

a table surface member;
upper and lower hinge arm means;
upper and lower wall pivot means for pivotally connecting said upper and lower hinge arm means respectively to said wall with the pivot axis of said upper hinge arm means higher than the pivot axis of said lower hinge arm means;

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75 upper and lower table pivot means for pivotally connecting said upper and lower hinge arm means respectively to the underside of said table surface member with the pivot axis of said upper table pivot means positioned closer to the wall, when the table is in its usable position, than the pivot axis of said lower table pivot means; said hinge arm means and said pivot means allowing movement of said table surface member between its usable and its storage positions;

the pivot axis of said lower table pivot means being spaced below a plane passing through the pivot axis of said upper table pivot means and parallel with the table surface when in its usable position, so as to provide an overcenter resistance force to the movement of the table through an intermediate position near the storage position; and

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95 latch means attached to the underside of said table surface member adjacent the edge thereof closest to the wall in the usable position, for securing said table in its usable position.

100 16. A folding wall table according to claim 15, wherein said wall pivot means includes a wall plate having striker plate means for cooperating with said latch means.

105 17. A folding wall table according to claim 16, further including latch release means positioned near the opposite end of the table surface member from the latch means, and means operatively connecting the release means to the latch means for unlatching the table.

110 18. A folding wall table according to claim 15, wherein said upper hinge arm means comprises a pair of arms made of metal tubing.

115 19. A folding wall table according to claim 18, wherein said lower hinge arm means comprises a single relatively rigid arm, and wherein said lower table pivot includes a resilient tubular member pivoted to the table at its ends and connected to the end of the lower hinge arm at its center, whereby the resilient tubular member deflects to absorb the overcenter resistance force.

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130 20. A folding wall table according to claim 18, wherein the effective length of said lower hinge arm is longer by a predetermined amount than the effective

(16)



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- 5 length of said upper hinge arm means plus the distance between said upper and lower wall pivot means minus the distance between said upper and lower table pivot means, so as to preload said resilient tubular member when the table is in its vertical storage position.

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