

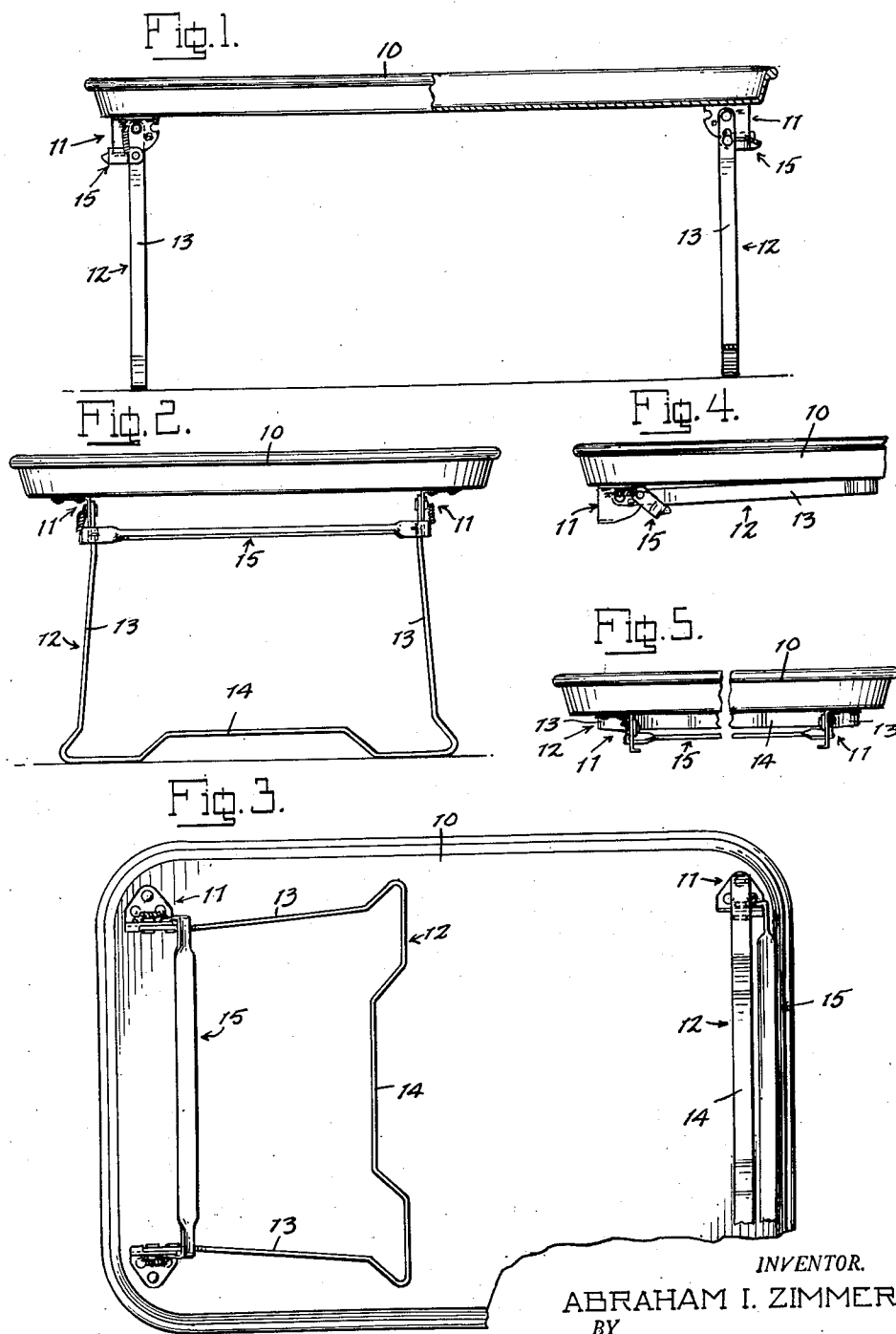
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A. I. ZIMMER
FOLDING LEG MECHANISM

2,823,087

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2 Sheets-Sheet 1



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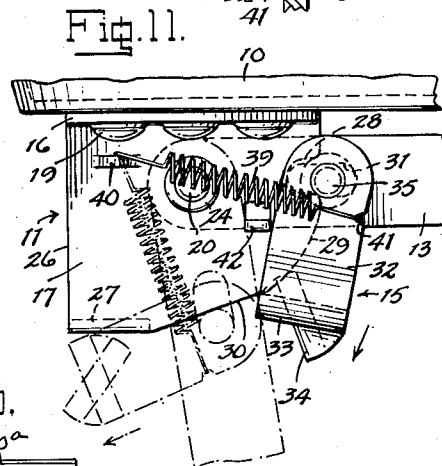
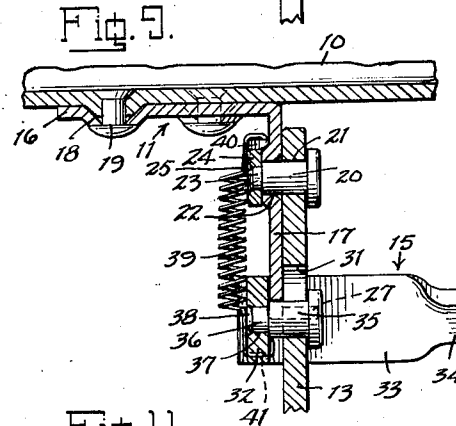
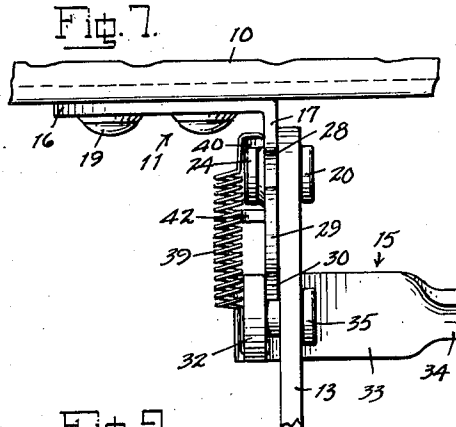
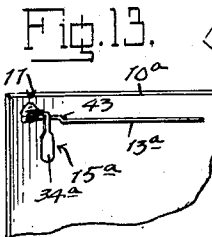
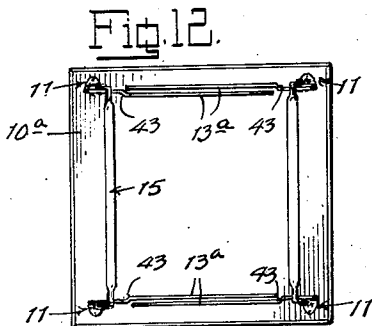
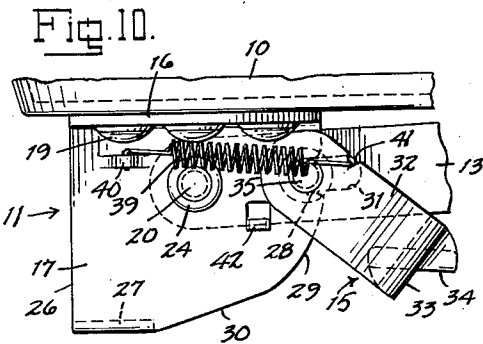
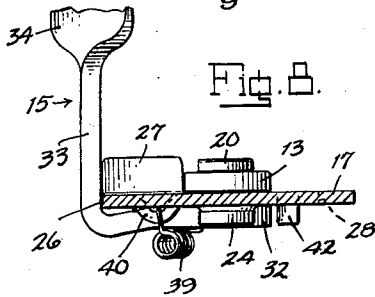
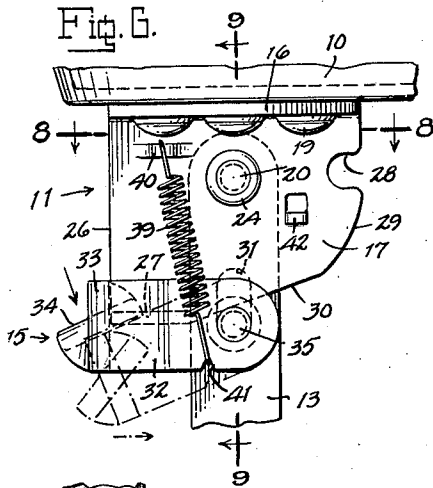
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2 Sheets-Sheet 2



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FOLDING LEG MECHANISM

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10 Claims. (Cl. 311-99)

The present invention relates to a folding leg mechanism, particularly for use with trays, tables and the like, whereby the legs of such structures are adapted to be positively locked in either an operative upright supporting position of the legs or in an inoperative folded position in substantially parallel relation to the underside of the structure.

An object of the invention is to provide a folding leg mechanism wherein the locking action is an automatic function of the operation of folding or unfolding the legs.

A further object is to provide a mechanism including leg actuating means for folding and unfolding the legs, and which means is so arranged as to be operated by the fingers of a hand grasping the end of the tray or the like, so that the folding and unfolding operation may be carried out while supporting the tray by one hand at each end, by pushing downwardly and inwardly with the fingers in the case of folding the legs, and pulling downwardly and outwardly with the fingers in the case of unfolding the legs.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein satisfactory embodiments of the invention are shown. However, it will be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a view of the longitudinal side of a tray embodying the invention with the legs in operative upright supporting position, the left hand portion being shown in side elevation and the right hand portion being shown in vertical section;

Fig. 2 is an end view of the tray as seen in Fig. 1;

Fig. 3 is a bottom plan view, partially broken away, the left hand leg mechanism being shown in the folded position of the leg and the right hand leg mechanism being shown in the unfolded upright position;

Fig. 4 is a side elevation of the left hand end of a tray as seen in Fig. 1, and showing the leg mechanism in the folded position of the leg;

Fig. 5 is an end view, partially broken away, of the tray with the leg mechanism folded as seen in Fig. 4;

Fig. 6 is a side elevation, on an enlarged scale, of the leg mechanism at one corner of the tray, i. e., the forward left hand corner as seen in Fig. 1, with the leg in its operative upright position, the dot-and-dash lines indicating the position of the actuating bar at the point where it is unlocked in the operation of folding the leg;

Fig. 7 is an end view of the mechanism as seen in Fig. 6;

Fig. 8 is a horizontal sectional view taken along the line 8-8 of Fig. 6;

Fig. 9 is a vertical sectional view taken along the line 9-9 of Fig. 6;

Fig. 10 is a side elevation showing the leg in folded and locked position;

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Fig. 11 is a side elevation showing the actuating bar moved to unlocking position with the leg in folded position, the dot-and-dash lines indicating an intermediate position of the leg and actuating bar as they are moved from the folded to the unfolded operative position of the leg as seen in Fig. 6;

Fig. 12 is a bottom plan view of a modified form of the invention adapted for use with a bridge table or the like; and

Fig. 13 is a bottom plan view of one corner of a tray or table showing a further modified form of the invention, in which each corner leg is adapted for independent operation.

Referring to the drawings, the tray 10 is provided at each end with a pair of operatively connected folding leg mechanisms according to the invention, the mechanisms at each end being of identical but reversed construction and each comprising a pair of mounting brackets 11-11 of identical but reverse construction, upon which there is pivotally mounted a leg member 12 of generally yoke-shape including a pair of side legs 13-13 and a transverse connecting portion 14 constituting a foot for engagement with a suitable supporting surface. An actuating bar member 15 is connected to the respective side legs 13-13 of the leg member 12 to move the latter between its folded and unfolded positions, as will presently more fully appear.

For convenience of description, only one folding leg mechanism will be described in detail.

Referring particularly to Figs. 7-11, the mounting bracket 11 is of right-angular form and includes a horizontal mounting flange 16 and a vertical downwardly depending plate 17, the mounting flange 16 preferably extending toward the outer edge of the tray and having a plurality of offset countersunk holes 18 engaged by rivets 19 which secure the bracket to the tray 10, the upset rivet heads being flush with the tray surface, as shown in Fig. 9. The bracket can, if desired, be welded or secured by other suitable methods to the tray.

The leg 13 is pivotally mounted at its upper end upon the inner side of the bracket plate 17 for swinging movement about a horizontal axis normal to the plane of the plate by means of a headed pivot pin 20 extending through a hole 21 in the leg 13 and an outwardly offset countersunk hole 22 in the bracket plate 17, the forward end of the pivot pin having a reduced shouldered end 23 upon which a retaining washer 24 is secured by upsetting the end of the extension 23 as at 25. The pivot axis of the pin 20 is preferably along the vertical center line of the bracket plate 17 and relatively close to the upper end of the bracket, so that the upper end of the leg 13, which is preferably rounded concentrically to the axis, is spaced downwardly a short distance from the underside of the tray, for a purpose to presently more fully appear.

The outer edge 26 of the bracket plate 17 is vertical and adjacent its lower end the lower edge is provided with a horizontal inwardly projecting stop lug 27 having an outer edge flush with the vertical edge 26 and an inner edge which is in line with the outer vertical edge of the leg 13 in the vertical unfolded position of the latter, as seen in Fig. 6, and thus constitutes a stop abutment against which the leg is engaged in its upright position.

In the vertical edge of the bracket plate, opposite the vertical edge 26, there is provided a recess 28 having its center slightly above a horizontal line extending through the pivot axis of the pin 20, for a purpose to be presently more fully described, and below the recess the edge of the plate is downwardly curved, as at 29, in concentric relation to the pivot axis of the pin 20 to an inclined lower edge portion 30 extending to the stop lug 27. The radius of the curved edge portion 29 substantially corresponds to the length of a vertical line extending between

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the pivot axis of the pin 20 and the inclined lower edge 30, for a purpose presently to more fully appear.

Along its center line the leg 13 is provided with a longitudinal slot 31 which, in the unfolded vertical position of the leg, extends above and below the inclined lower edge portion 30 and which, in the folded position of the leg, as seen in Fig. 10, is substantially in register at its upper end with the recess 28.

The actuating bar member 15 includes a pair of forwardly projecting arm portions 32 and a transverse connecting bar portion 33, the latter being angularly twisted, as at 34, along its intermediate portion to provide convenient finger engaging surfaces for actuating the bar member, as will presently more fully appear. The arm portions 32 are respectively connected to the pair of folding leg mechanisms at the same end of the tray, each such arm portion being provided at its forward end with a headed pivot pin 35 having a reduced shouldered extension 36 secured in a hole 37 in the arm portion by upsetting the end of the extension 36, as at 38. The pin is pivotally and slidably engaged in the slot 31 of the leg 13 with its head engaged upon the inner side of the leg.

The diameter of the pivot pin 35 is such that in the vertical position of the leg, as seen in Fig. 6, it is positioned in the lower end of the slot 31 and engages the inclined lower edge portion 30 of the bracket plate 17. The distance between the pivot pin 35 and the transverse bar 33 is such that in the horizontal position of the arm portion 32, as seen in Fig. 6, the inner surface of the transverse bar portion 33 engages the vertical edge 26 of the bracket plate 17, and the outer edge of the stop lug 27, in which position it is yieldably retained by a helical spring 39 connected at its upper end to an anchor lug 40 lanced and pressed out from the bracket plate 17 and connected at its lower end to the underside of the arm portion 32, being hooked into a notch 41 provided therein.

The anchor lug 40 is at a point in the bracket plate substantially above the pivot axis of the pivot pin 20 and outwardly offset therefrom, while the notch 41 is outwardly offset from the pivot pin 35 so that in the upright unfolded position of the leg 13 the pulling force of the spring is along a line which pulls the arm portion 32 of the actuating bar into its horizontal position bringing the transverse bar portion 33 into abutting relation with the vertical edge 26 and the outer edge of the stop lug 27, and at the same time through the pivot pin connection with the leg 13 pulling the latter into its vertical position against the inner edge of the stop lug. Thus the leg is positively held in locked position, inward swinging movement being prevented by the locking engagement of the actuating bar with the edge 26 of the stop lug 27. Inward pressure against the leg 13 is directly opposed by the locking action of the bar as long as the latter is held in its horizontal position through the tension of the spring 39. A fulcrum lug 42 is lanced and bent outwardly from the bracket plate at a point intermediate the pivot pin 20 and the curved edge portion 29, for a purpose presently to more fully appear.

In order to move the leg to its folded position it is only necessary to press downwardly upon the intermediate portion 34 of the actuating bar with the fingers of the hand grasping the end of the tray, and thereupon continue the pressure in an inward direction. The dot-and-dash lines in Fig. 6 indicate the initial released position of the actuating bar in which the transverse portion 33 is disengaged from the vertical edge 26 and the stop lug 27, so that the leg and actuating bar are free to be swung toward the folded position. As this takes place through the continued inward pressure of the fingers upon the latching bar, the pivot pin 35 and the upper edge of the transverse bar portion 33 of the actuating bar ride upon the lower surface 30 and the curved surface 29 to the point where the pivot pin reaches the recess 28, where-

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upon the pivot pin is drawn into the recess by the spring 39.

At the same time the line of pull of the spring has moved above the axis of the pivot pin 35, which axis is substantially in line with the slot 31 in the folded position of the leg 13, so that the spring not only retains the pivot pin in the recess 28 but draws the transverse bar portion of the actuating bar against the lower edge of the folded leg, thus holding the parts in locked position. By virtue of the position of the recess 28 slightly above a horizontal line passing through the axis of the pivot pin 20, the leg in its folded position is at a slightly upwardly inclined angle so that its foot end is brought against the under surface of the tray which, in combination with the upward pushing action of the spring biased actuating bar thereon, retains the locked parts against looseness and rattling.

In order to unfold the leg, the actuating bar is gripped at the upper side of the intermediate portion 34 by the fingers grasping the end of the tray, and the bar is pulled downwardly by the fingers causing the lower edge of the arm portion 32 to move into engagement with the fulcrum lug 42, whereupon continued downward pressure upon the actuating bar causes the arm portion to fulcrum about the lug and withdraw the pivot pin 35 from the recess 28, as shown by the full lines in Fig. 11. Thus the leg is free to swing downwardly and continued downward and outward pull upon the actuating bar moves the leg to the unfolded position, the actuating bar being automatically drawn into its locked position by the spring 39 as soon as its transverse bar portion 33 passes over the lower end of the vertical edge 26 of the bracket plate 17.

In Fig. 12 there is illustrated a modified form of the invention incorporated in a table 10a, as for instance a bridge table, wherein the pairs of legs 13a at each end of the table are not connected together by transverse foot portions similar to the portions 14 in the first embodiment. Also, the legs are slightly offset adjacent their pivoted ends, as at 43, so that in the folded position they will lie in side-by-side relation. Each pair of legs is adapted to be operated by a common actuating bar 15 as in the first embodiment.

In Fig. 13 there is illustrated a further embodiment illustrated as incorporated in a table 10a, and wherein each leg 13a is adapted to be independently operated by an actuating member 15a which is similar to the actuating member 15, except that it is terminated a short distance inwardly of the leg and is provided with a finger engaging portion 34a, similar to the portion 34 of the actuating member 15 of the first embodiment, but relatively short in length.

What is claimed is:

1. A folding leg mechanism for trays, tables and the like, comprising a bracket for mounting on the underside of the tray, table or the like and including a vertically disposed depending plate portion having a lower edge, an outer edge and an inner edge, a leg pivotally connected at its upper end to said plate portion at one side thereof between said inner and outer edges for swinging movement between a substantially vertical unfolded position and a substantially horizontal folded position, said leg having a slot spaced below its pivot axis and extending substantially vertically above and below the lower edge of said plate portion in the unfolded position of said leg, an actuating member including an arm portion disposed at the other side of said plate portion from said leg, and a transverse portion extending substantially at a right angle from the outer end of said arm portion, a pin carried by the inner end portion of said arm portion engaged in said slot for pivotal and sliding movement therein, said arm being substantially horizontal in the unfolded position of said leg with said pin engaged with said lower edge of said plate portion and with said transverse portion disposed outwardly of its said outer edge, a spring connected at one end to said bracket and at its

other end to said arm at a point between said pin and said transverse portion, abutment means at the outer side of said leg against which said leg engages in its unfolded position, abutment means engageable by said transverse portion of said actuating member under the pull of said spring in said horizontal portion of said arm to restrain inward horizontal movement of said arm and inward pivotal movement of said leg, said transverse portion of said actuating member being disengageable from said last mentioned abutment means through downward swinging movement of said arm about said pivot pin, said plate portion having a locking recess in its inner edge which in the folded position of said leg is in substantial register with the upper end of said slot, and engageable by said pin of said actuating member under the pull of said spring through movement of said pin in said slot toward the pivot axis of said leg.

2. The invention as defined in claim 1, wherein the vertical distance of said lower edge of said plate portion from said pivot axis of said leg is substantially equal to the distance of said inner edge of said plate portion from said pivot axis.

3. The invention as defined in claim 1, wherein the vertical distance of said lower edge of said plate portion from said pivot axis of said leg is substantially equal to the distance of said inner edge of said plate portion from said pivot axis, and said inner edge includes a convexly curved portion concentric to said pivot axis extending between said recess and said lower edge and of a radius substantially equal to said vertical distance between said pivot axis and said lower edge.

4. The invention as defined in claim 1, wherein the vertical distance of said lower edge of said plate portion from said pivot axis of said leg is substantially equal to the distance of said inner edge of said plate portion from said pivot axis, and said inner edge includes a convexly curved portion concentric to said pivot axis extending between said recess and said lower edge and of a radius substantially equal to said vertical distance between said pivot axis and said lower edge, and wherein said lower edge includes an upwardly inclined portion extending between said curved portion and its portion in vertical line with said pivot axis.

5. The invention as defined in claim 1, wherein the pull line of said spring in the folded position of said leg is between said pivot axis and the inner end of said arm portion of said actuating member, whereby said transverse portion of said actuating member is drawn against the edge of said leg.

6. The invention as defined in claim 1, wherein the center of said recess is above the horizontal plane of said pivot axis, whereby said leg in its folded position is at an upwardly inclined angle.

7. The invention as defined in claim 1, further characterized by fulcrum means carried by said plate portion disposed at a point spaced below said recess and between said recess and said pivot axis and engageable in the folded position of said leg by an edge of said arm portion of said actuating member upon downward swinging movement of said actuating member to disengage said pin from said recess.

8. A folding leg mechanism for trays, tables and the like, comprising a bracket for mounting on the underside of the tray, table or the like and including a vertically disposed depending plate portion, a leg pivotally connected at its upper end to said plate portion at one side thereof for inward folding swinging movement from a substantially vertical unfolded position to a substantially horizontal folded position, and for outward unfolding swinging movement from said substantially horizontal folded position to said substantially vertical unfolded position, said plate portion having outer and inner locking means for releasably locking said leg in its respective unfolded and folded positions, an actuating member pivotally connected to said leg for moving it between its unfolded and folded positions and including a first locking part for locking engagement with said outer locking means in the unfolded position of said leg and a second locking part for locking engagement with said inner locking means in the folded position of said leg, and spring means connected between said bracket and said actuating member exerting pressure to releasably retain said locking parts in locking engagement with said respective locking means in said respective unfolded and folded positions of said leg, said actuating member having downward-inward swinging movement to release said first locking part to effect folding movement of said leg and having downward-outward swinging movement to release said second locking part to effect unfolding movement of said leg.

9. The invention defined in claim 8, further characterized by an identical but reversely disposed folding leg mechanism mounted on the underside of the tray, table or the like, in transversely spaced relation to the first mechanism with the pivot axes of the legs of the two mechanisms coaxial, and wherein said actuating member is common to the two mechanisms and includes a transverse portion extending between the two mechanisms and having arm portions at its ends.

10. The invention as defined in claim 8, further characterized by an identical but reversely disposed folding leg mechanism mounted on the underside of the tray, table or the like, in transversely spaced relation to the first mechanism with the pivot axes of the legs of the two mechanisms coaxial, and wherein a transverse member connects said legs of said two mechanisms together as a unit.

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