Sept. 25, 1962 K. H. WILSON 3,055,705

FOLDING TABLE AND SEAT STRUCTURE

Filed Oct. 17, 1960 3 Sheets-Sheet 1

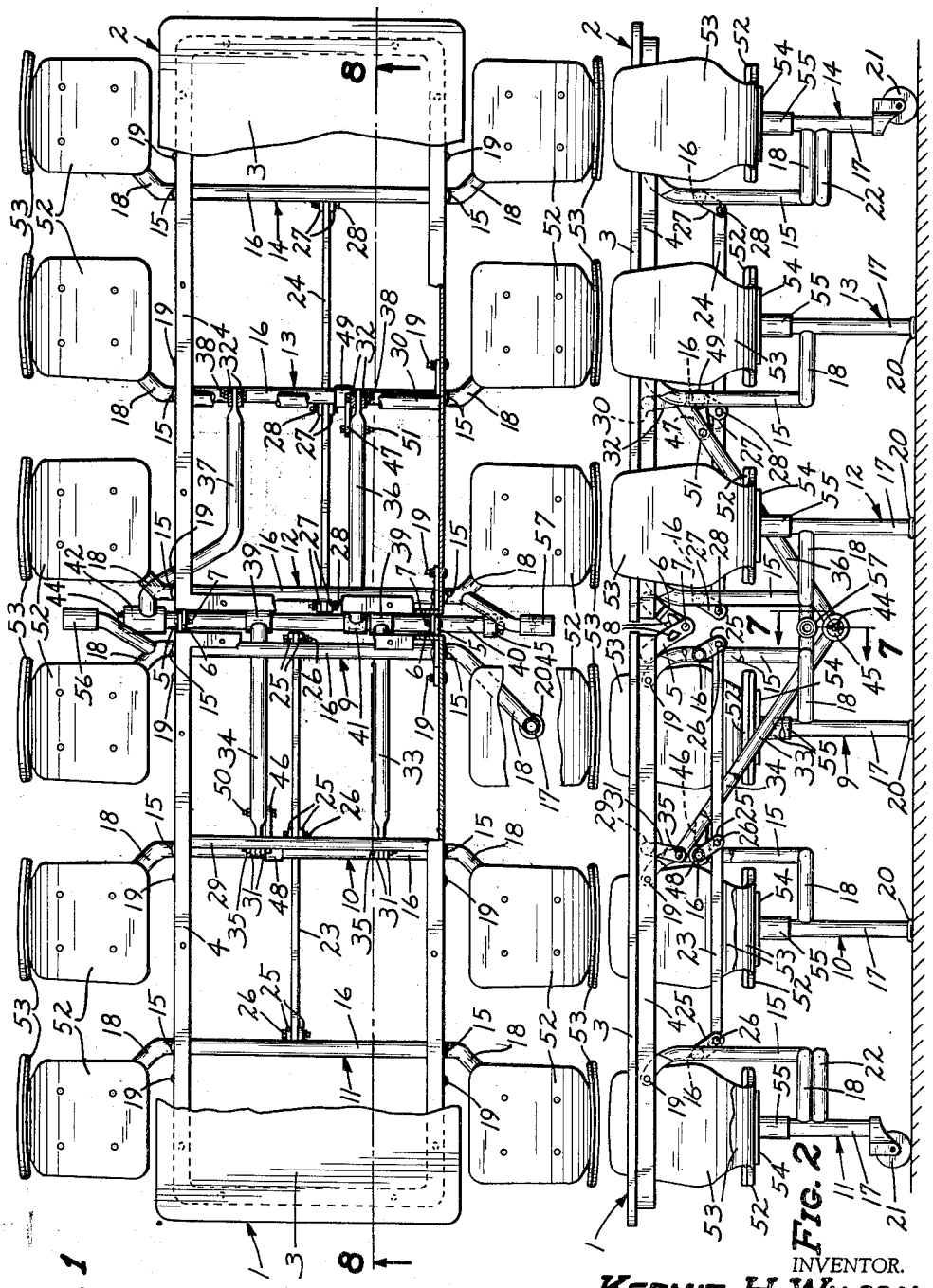


FIG. 1

FIG. 2

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FIG. 3

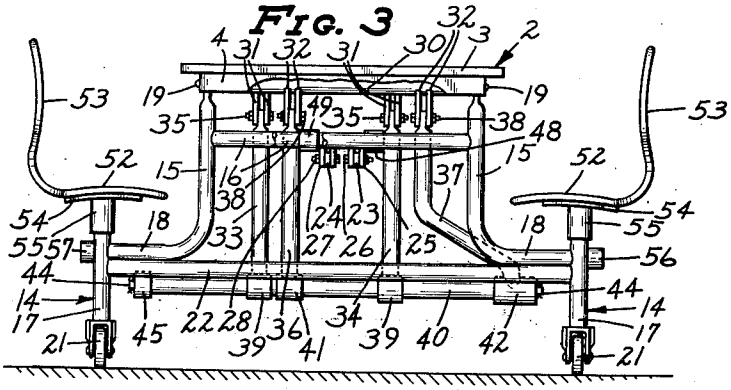


FIG. 5

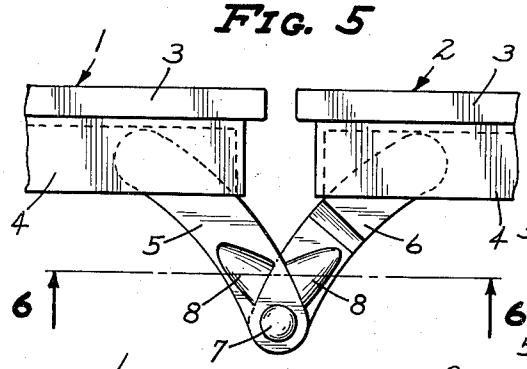


FIG. 4

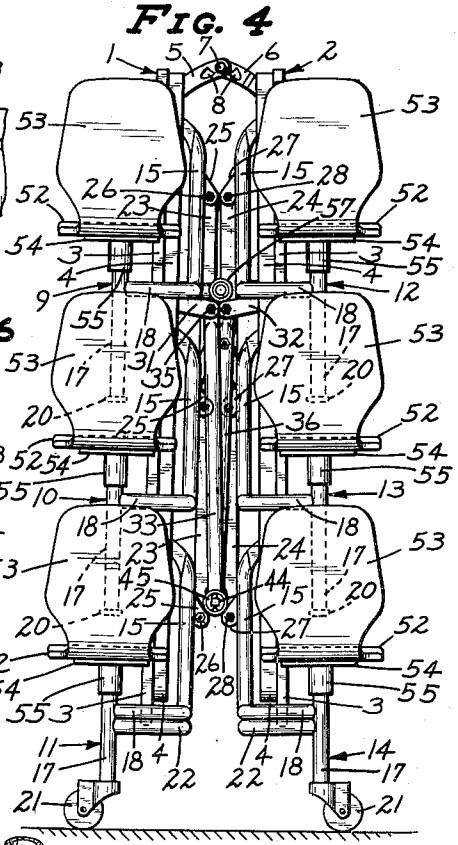


FIG. 6

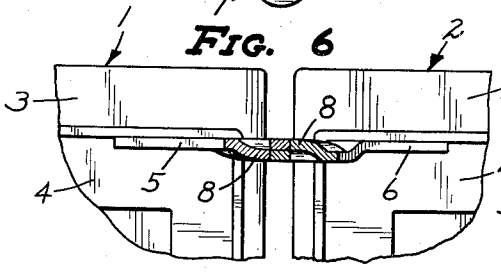
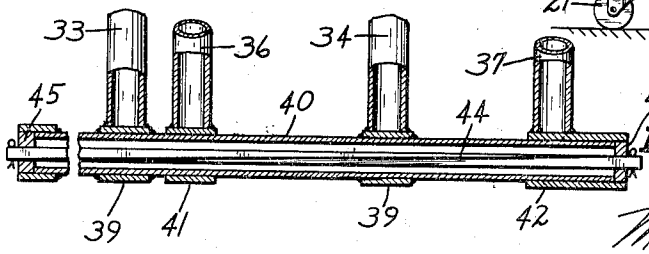


FIG. 7



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FIG. 8

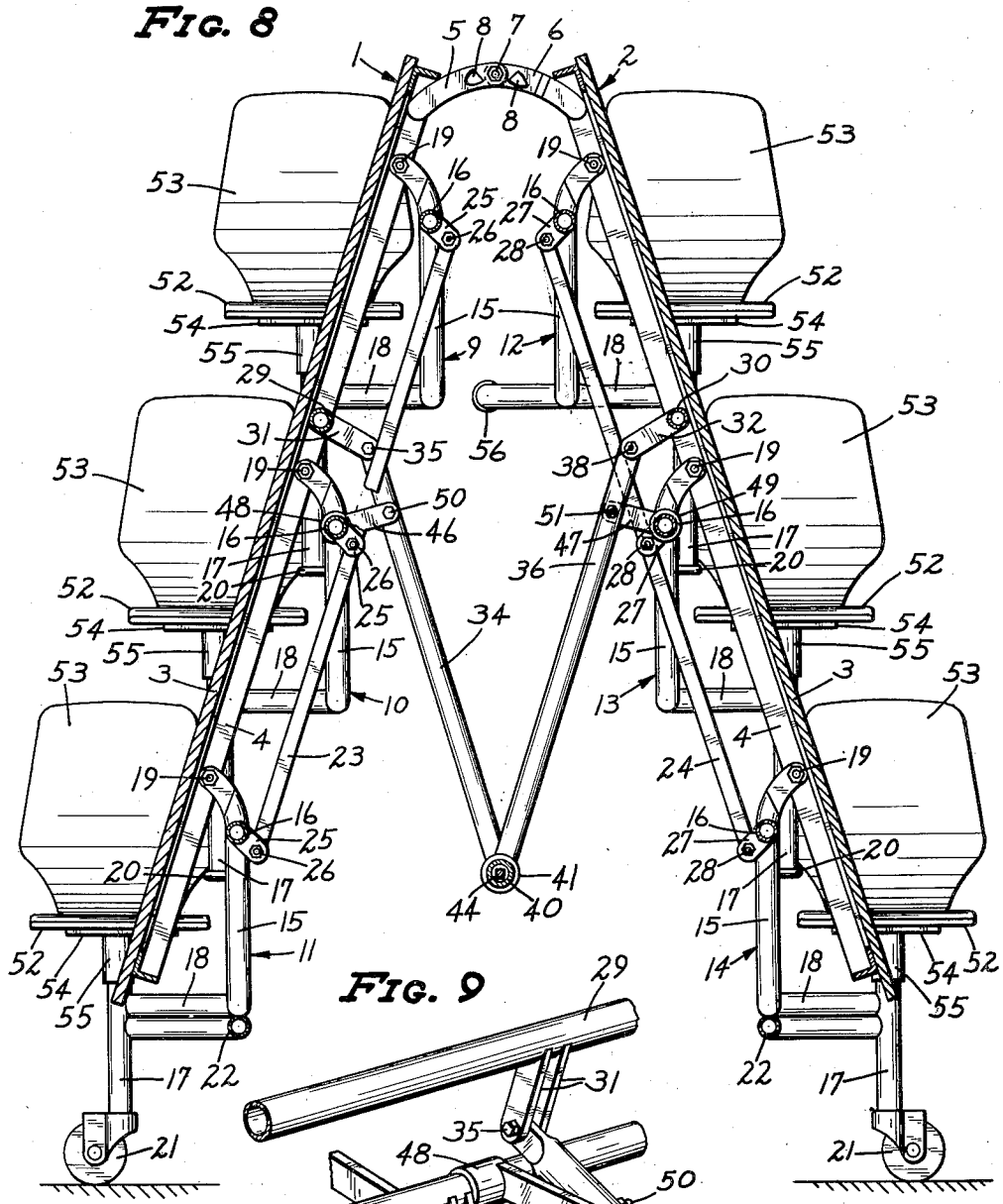


FIG. 9

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FOLDING TABLE AND SEAT STRUCTURE

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9 Claims. (Cl. 297—159)

My invention relates generally to table structures, and more particularly to combination table and seat structures which may be folded, when not in use, for storage.

An object of my invention is the provision of a table comprising a pair of cooperating table top sections, supporting leg structures for each of the top sections, and novel linkage for maintaining the leg structures in generally vertical positions when said top sections are in normal horizontal or generally vertical folded positions.

Another object of my invention is the provision of a table structure as set forth, in which one of the leg structures associated with each of the top sections is provided with wheel means whereby, when the table is in its folded condition, the same may be easily moved to a place of storage.

Still another object of my invention is the provision of a foldable table structure having seat elements at opposite sides thereof, and of a novel arrangement whereby, when the table top sections are moved from normally horizontal operative positions to generally upright folded positions, the seat elements associated with each table top section automatically move into generally vertically spaced relationship, so that the entire structure occupies a minimum of floor space.

Another object of my invention is the provision of a folding table and seat structure as set forth, having novel means for supporting the seat elements thereof, whereby easy access is had to each of the seat elements.

Another object of my invention is the provision of a novel folding table and seat structure which is relatively simple and inexpensive to produce, which is highly efficient in operation, and which is rugged in construction and durable in use.

The above, and still further highly important objects and advantages of my invention will become apparent from the following detailed specification, appended claims, and attached drawings.

Referring to the drawings, which illustrate the invention, and in which like reference characters indicate like parts throughout the several views:

FIG. 1 is a view in top plan of a table and seat structure of my invention, some parts being broken away and some parts being shown in section;

FIG. 2 is a view in side elevation, some parts being broken away;

FIG. 3 is a view in end elevation as seen from the right with respect to FIG. 2, some parts being broken away;

FIG. 4 is a view corresponding to FIG. 2 but showing the table and chair structure in a fully folded position;

FIG. 5 is an enlarged fragmentary view in side elevation of the adjacent inner end portions of the top sections of my table structure and hinge means therefor;

FIG. 6 is a fragmentary view partly in bottom plan and partly in section, taken on the line 6—6 of FIG. 5;

FIG. 7 is an enlarged fragmentary section taken substantially on the line 7—7 of FIG. 2, some parts being broken away;

FIG. 8 is an enlarged longitudinal section taken substantially on the line 8—8 of FIG. 1, but showing the table and chair structure in a partially folded condition; and

FIG. 9 is a fragmentary view in perspective of some of the control mechanism of my invention.

In the preferred embodiment of my invention illustrated, a normally horizontal table top is shown as comprising a pair of elongated generally rectangular top sections 1 and 2, each of said sections including a flat top element 3 and an underlying rectangular frame 4. The top elements 3 may be made from any suitable material, such as wood, metal, or the like, the frames 4 being rigidly secured to the under surfaces of their respective top elements 3 by any suitable means, and being preferably made from rigid structural materials such as commercially available angle iron or other metallic stock. The top sections 1 and 2 are normally disposed in end to end relationship, and are pivotally connected at their inner end portions for swinging movements about a horizontal axis extending transversely of the top sections 1 and 2, said hinge means comprising cooperating hinge leaves 5 and 6, and pintle elements in the nature of nut-equipped bolts or the like 7. The hinge leaves 5 and 6 are welded or otherwise rigidly secured to the frames 4 at the inner end portions of their respective top sections 1 and 2, and are each provided with stop lugs or ears 8 that are engageable with edge portions of opposite hinge leaves 5 and 6 to positively limit relative swinging movements between the top sections 1 and 2 in one direction away from their normally horizontal position.

The top section 1 is supported in its normally horizontal position by a longitudinally inner leg structure 9, an intermediate leg structure 10, and a longitudinally outer leg structure 11. The opposite top section 2 is similarly supported by longitudinally inner, intermediate, and longitudinally outer leg structures 12, 13, and 14, respectively. Each of the leg structures 9–14 comprises a pair of laterally spaced generally vertical upper leg portions 15 that are rigidly connected intermediate their ends by a cross bar 16, a pair of laterally spaced lower leg portions 17 parallel to the upper leg portions 15, and horizontally disposed connecting portions 18. The upper ends of the upper leg portions 15 of each pair thereof are pivotally connected to opposite sides of the frame 4 of their respective top sections 1 and 2, as indicated at 19, for swinging movements on aligned axes parallel to the axis of the hinge pintle elements 7. As shown in FIGS. 1–4 and 8, the lower leg portions 17 are offset from the upper leg portions 15 in directions laterally outwardly and longitudinally with respect to the table top sections 1 and 2, the lower leg portions 17 of each pair thereof being laterally outwardly spaced from the opposite sides of the top sections 1 and 2, and the horizontal connecting portions 18 extending at oblique angles to the longitudinal dimensions of the top sections 1 and 2 for a purpose which will hereinafter be described. The lower leg portions 17 of the inner leg structures 9 and 12 and the intermediate leg structures 10 and 13, are provided at their lower ends with floor or ground engaging feet 20, whereas the pairs of lower leg portions 17 of the outer leg structures 11 are provided with floor or ground engaging caster wheels 21, also for a purpose which will hereinafter become apparent. As shown in FIGS. 2–4 and 8, the lower leg portions 17 of the outer leg structures 11 and 14 are braced by lower cross members 22, said cross members 22 being welded at their opposite ends to their associated lower leg portions 17 and to adjacent horizontal portions 18 of the outer leg structures 11 and 14. Preferably, the various components of the leg structures 9–14 are made from rigid metal tubing such as steel or the like.

For the purpose of maintaining the leg structures associated with each top section 1 and 2 in parallel relationship, I provide a pair of rigid links 23 and 24 that extend longitudinally of their respective top sections 1 and 2, and which are disposed in underlying spaced parallel relationship to their respective top sections. The cross bars 16 of the leg structures 9, 10 and 11 are each provided with

radially outwardly projecting pairs of rigid fingers 25, the opposite ends of the link 23 being pivotally secured to the outer ends of the fingers 25 associated with the leg structures 9 and 11, the central portion of the link 23 being pivotally secured to the outer end of the finger 25 associated with the intermediate leg structure 10, the pivotal connections being indicated at 26, and the axes thereof being parallel to the axes of the pivotal connections 19 of their respective leg structure 9, 10 and 11 to their respective top section 1. In like manner, the cross bars 16 of the leg structures 12, 13 and 14 are provided with pairs of rigid radial fingers 27 that are pivotally connected at their outer ends to the opposite ends and central portion of the link 24, as indicated at 28, the axes of the pivotal connections 28 being parallel to the axes of the pivotal connections 19 of the leg structures 12–14 to the top section 2.

As shown in FIGS. 2, 4 and 8, my novel table and seat structure is movable between an operative position wherein the top sections 1 and 2 are horizontally disposed in end to end relationship, and a folded position wherein the adjacent inner ends of the top sections 1 and 2 are moved upwardly until the top sections are disposed in closely spaced generally upright positions, with the entire structure being supported by the caster wheels 21. For the purpose of maintaining the several leg structures 9–14 in substantially vertical positions when the top sections 1 and 2 are in their normally horizontal positions and during movement thereof to their generally upright folded positions, I provide novel control means now to be described. A pair of tubular cross members 29 and 30 extend transversely of, and have their opposite ends welded or otherwise rigidly secured to opposite sides of the frames 4 of respective top sections 1 and 2. Rigidly secured to the cross members 29 and 30 are respective mounting brackets 31 and 32. A pair of laterally spaced parallel control arms 33 and 34 are pivotally connected at their upper ends to the mounting brackets 31 on aligned axes parallel to the axes of the pivotal connections 7, 19 and 26, as indicated at 35. A second pair of control arms 36 and 37 are pivotally connected at their upper ends to the outer ends of the mounting brackets 32, as indicated at 38, for swinging movements on aligned axes parallel to the aligned axes of the pivotal connections 35. The control arms 33 and 34 are disposed in downwardly converging relationship with the control arms 36 and 37, the lower ends of the control arms 33 and 34 terminating in collars 39 which encompass a horizontally disposed tubular member 40, and which are welded or otherwise rigidly secured thereto. The axis of the tubular member 40 is disposed in parallel relationship to the above described axes including that of the hinge pintle elements 7. The lower end of the control arm 36 terminates in a sleeve or collar 41 which encompasses the tubular member 40 and which is journalled thereon for rotation relative to the tubular member 40. The lower end of the control arm 37 is disposed near one end of the tubular member 40 and is welded or otherwise rigidly secured to a sleeve-like skirt 42 which encompasses the adjacent end portion of the tubular member 40 and journalled thereon for rotation relative thereto. The skirt 42 forms a part of an end cap 43, the end wall of which is formed to provide an axial opening for the reception of one end of a torsion bar 44 that extends axially through the tubular member 40. It will be noted with reference to FIG. 7 that the torsion bar is cross sectionally rectangular in shape, the axial opening in the end cap 43 preferably being of similar shape to prevent relative rotation between the end cap 43 and the adjacent end of the torsion bar 44. A second end cap 45 is welded or otherwise rigidly secured to the opposite end of the tubular member 40, and is provided with a suitable opening for the adjacent end of the torsion bar 44, whereby to anchor said adjacent end of the torsion bar against rotation relative to the tubular member 40. The arrangement is such that, when the top sections 1 and 2 are disposed in their normal horizontal positions, the bar 44 is twisted in a direction to yieldingly urge the several control arms in directions to move the top sections 1 and 2 toward their generally upright folded positions. It will be noted, that the control arms 33 and 34 associated with the top section 1 are rigidly connected to one end of the torsion bar 44 through the medium of the tubular member 40 and end cap 45; whereas the control arm 37 associated with the top section 2 is rigidly connected to the opposite end of the torsion bar 44 through the medium of the end cap 43.

The control arms 34 and 36 are operatively connected to the cross bars 16 of respective intermediate leg structures 10 and 13 by rigid link elements 46 and 47 respectively, said link elements 46 and 47 having collars 48 and 49 respectively at their outer ends, the collars 48 and 49 being journalled on the cross bars 16 of their respective intermediate leg structures 10 and 13. At their inner ends, the link elements 46 and 47 are pivotally connected to respective control arms 34 and 36, as indicated at 50 and 51 respectively, in inwardly spaced relation to respective pivotal connections 35 and 38, longitudinally of the control arms 34 and 36. As the top sections 1 and 2 swing upwardly or downwardly, the link elements 46 and 47 are moved in directions to impart pivotal movement to their respective leg structures 10 and 13 relative to the top sections 1 and 2, to maintain the leg structures 10 and 13 in their generally vertical positions. The rigid links 23 and 24, together with their respective crank acting fingers 25 and 27 transfer this relative swinging movement of the leg structures 10 and 13 to the other leg structures of their respective top sections 1 and 2, to maintain all of the leg structures 9–14 in their vertical positions.

A plurality of seat elements 52, preferably provided with backrests 53, are disposed at opposite sides of the top sections 1 and 2, there being a pair of said seat elements 52 for each one of the leg structures 9–14. The seat elements 52 are provided with mounting plates 54 that are formed to provide downwardly opening socket elements 55. Each of the lower leg portions 17 of the several leg structures 9–14 extends upwardly beyond the level of its respective horizontally disposed portion 18, the upper ends of the lower leg portions 17 being rotatably received each in the socket 55 of a different one of the seat elements 52. With reference particularly to FIG. 1, it will be seen that the angular disposition of the horizontal leg portions 18 and the offset relationship of the lower leg portions 17 to their respective upper leg portions 15 provides for unobstructed access to the several seat elements 52; and when seated, the feet of the occupants may be comfortably disposed under the table without the necessity for straddling any of the leg structures. The seat elements 52 are spaced sufficiently outwardly from the top sections 1 and 2 so that there is no interference between the seat elements 52 and their respective top sections 1 and 2 when the top sections are moved btween their normally horizontal operative positions and their folded storage positions.

For the purpose of conveniently and easily raising the adjacent inner ends of the table top sections 1 and 2 to move the structure to its folded position of FIG. 4, and from either side thereof selectively, I provide handle members 56 and 57 that project laterally outwardly from the horizontal leg portions 18 of respective inner leg structures 9 and 12, each at an opposite side of the table structure. When it is desired to move the table and chair structure to its folded position of FIG. 4, the operator merely grasps one of the handle members 56 or 57 and raises the same upwardly. The adjacent inner ends of the top sections 1 and 2 swing upwardly carrying with them the inner and intermediate leg structures 9, 10, 12 and 13, the axes of upward swinging movements of the

top sections 1 and 2 being those of the pivotal connections 19 of the outer leg structures 11 and 14. During this upward swinging movement, the outer leg structures 11 and 14 move toward each other on their respective caster wheels 21, all of the leg structures 9–14 remaining in their generally vertical positions by virtue of their connections to the control arms 34 and 36, movement of the structure toward its folded position being aided by the counter-balancing torsion bar 44. The torsion bar 44 is under sufficient torsional strain, when the table and seat structure is moved to its folded position of FIG. 4 to maintain the table structure in its folded position, and when thus folded, the structure may be easily moved to a place of storage on the caster wheels 21. When it is desired to unfold the structure, the operator merely grasps adjacent edge portions of the top sections 1 and 2 and pushes the same apart, thus spreading the outer leg sections 11 and 14 apart, and permitting the inner and intermediate leg sections to descend into engagement with the ground or floor.

While I have shown and specifically described a commercial embodiment of my folding table and seat structure, it will be understood that the same is capable of various modifications, and that modification may be made within the spirit and scope of the invention, as defined in the claims.

What I claim is:

1. In a folding table and chair structure, a table top comprising a pair of normally horizontal top sections disposed in substantially end to end relationship, hinge means pivotally connecting the adjacent inner end portions of said top sections for swinging movement between their normally horizontal positions and substantially upright closely spaced folded positions, longitudinally inner and outer generally vertically disposed leg structures pivotally connected to the inner and outer end portions respectively of said top sections on axes parallel to the axis of said hinge means, individual horizontally disposed seat elements each mounted individually on a different one of said leg structures laterally outwardly of an adjacent side of said top sections, a pair of rigid links extending generally longitudinally of said top sections and each pivotally connected at its opposite ends to the inner and outer leg structures of a different one of said top sections on axes in spaced parallel relation to the axes of the pivotal connections of the leg structures to their respective top sections, a pair of control arms underlying the inner end portions of said top sections, and means operatively pivotally connecting said control arms at their inner ends for swinging movements in a vertical plane normal to the axis of said hinge means, the outer end portions of said arms being each operatively pivotally connected to a different one of said top sections and an associated leg structure, said control arms and links cooperating to maintain said leg structures in their generally vertical positions and said seat elements in their horizontal positions when said top sections are disposed in their normally horizontal or generally upright folded positions.

2. In a folding table and chair structure, a table top comprising a pair of normally horizontal top sections disposed in substantially end-to-end relationship, hinge means pivotally connecting the inner end portions of said top sections for swinging movements on a horizontal axis parallel to the adjacent inner ends of said top sections, longitudinally inner and outer generally vertically disposed leg structures pivotally connected to the inner and outer end portions respectively of said top sections on axes parallel to the axis of said hinge means, horizontally disposed pairs of individual seat elements, said seat elements of each pair thereof being mounted on an individual one only of said leg structures at opposite sides of said top sections, a pair of rigid links extending generally longitudinally of said top sections and each pivotally connected at its opposite ends to the inner and outer leg structures of a different one of said top sections on axes in spaced parallel relation to the axes of the pivotal connections of the leg structures to their respective top sections, a pair of control arms underlying the inner end portions of said top sections and pivotally connected together at their inner ends on an axis parallel to the axis of said hinge means, the outer ends of said arms each being operatively pivotally connected to a different one of said top sections, and means pivotally connecting each of said arms longitudinally inwardly of the outer end thereof to an associated leg structure, said inner ends of the top sections being movable upwardly and said top sections swinging about the axes of the pivotal connections to their respective outer leg sections to dispose said top sections in substantially upright closely spaced folded relationship, said outer leg structures moving inwardly toward each other during said upward swinging movement of the top sections, said control arms and links cooperating to maintain said leg structures in their generally vertical positions and said seat elements in their horizontal positions when said top sections are disposed in their normal horizontal or generally upright folded positions.

3. The structure defined in claim 2 in which said leg structures comprise upper leg portions underlying their respective top sections and pivotally secured thereto, and lower leg portions laterally outwardly offset from the upper leg portions and underlying their respective seat elements.

4. The structure defined in claim 3 in which the lower leg portions of said outer leg structures include ground-engaging wheels to facilitate inward movement of the outer leg structures toward each other during folding movements of the table and chair structure, the inner leg structures and seat elements associated therewith overlying their respective outer leg structures and associated seat elements when said top sections are disposed in their generally upright folded relationship.

5. In a folding table and chair structure, a table top comprising a pair of normally horizontal top sections disposed in substantially end to end relationship, hinge means pivotally connecting the adjacent inner end portions of said top sections for swinging movements between their normally horizontal positions and substantially upright closely spaced folded positions, longitudinally inner and outer generally vertically disposed leg structures pivotally connected to the inner and outer end portions respectively of said top sections on axes parallel to the axis of said hinge means, each of said leg structures comprising generally vertically extending upper and lower leg portions and generally horizontally disposed connecting portions, said lower leg portions being offset from their respective upper leg portions in directions laterally and longitudinally outwardly relative to their respective top sections, individual seat elements each mounted individually on the upper end of a different one of said lower leg portions at opposite sides of said top sections, a pair of rigid links extending generally longitudinally of said top sections and each pivotally connected at its opposite ends to the inner and outer leg structures of a different one of said top sections on axes in spaced parallel relation to the axes of the pivotal connections of the leg structures to their respective top sections, a pair of control arms underlying the inner end portions of said top sections, means operatively pivotally connecting said control arms at their inner ends for swinging movements in a vertical plane normal to the axis of said hinge means, the outer ends of said arms being each operatively pivotally connected to a different one of said top sections, and means pivotally connecting each of said arms longitudinally inwardly of the outer end thereof to an associated leg structure, said control arms and links cooperating to maintain said leg structures in their generally vertical positions and said seat elements in their horizontal positions when said top sections are disposed in their normally horizontal or generally upright folded positions.

6. In a combination table and chair structure, a table

top; supporting means for said table top; said means including a plurality of longitudinally spaced pairs of laterally spaced legs; each leg of said pair of legs comprising a normally upright upper leg portion underlying said top adjacent a longitudinal edge, a generally upright lower leg portion disposed laterally outwardly of the adjacent longitudinal edge of said top, and an angular intermediate connecting portion; means pivotally connecting the legs of each pair thereof to said top for swinging movements on a common horizontal axis extending normal to the longitudinal dimensions of said top between their normal upright positions and in operative folded positions generally parallel to said top; and a plurality of individual seat elements carried one each by a different one of said legs, said seat elements overlying in part their respective ones of said intermediate connecting leg portions and being laterally outwardly spaced from the vertical planes of the adjacent longitudinal edges of said table top.

7. The structure defined in claim 1 in which the legs of each pair of legs are rigidly secured together for common movements between their operative and inoperative positions, and in which the distance between the lower ends of said lower leg portions and the top surfaces of their respective seat elements is less than the distance between the pivotal connections of adjacent pairs of said legs to said top, whereby the lower leg portions of adjacent legs are in substantial longitudinal alignment when said legs are moved to their folded inoperative positions.

8. In a folding table and chair structure, a table top comprising a pair of normally horizontal top sections disposed in substantially end to end relationship, hinge means pivotally connecting the adjacent inner end portions of said top sections for swinging movement between their normally horizontal positions and substantially upright closely spaced folded positions, generally vertically disposed rigid leg structures pivotally connected at their upper ends to said top sections on axes parallel to the axis of said hinge means, said leg structures comprising upper leg sections underlying their respective top sections and generally vertical lower leg portions laterally outwardly off-set from said upper leg portions and from an adjacent edge of their respective top sections, a plurality of horizontally disposed individual seat elements mounted one each on a different one of said lower leg sections, and a linkage operatively connected to said top sections and to said leg structures for maintaining said leg structures in their generally vertically disposed positions and said seat elements in their horizontal positions when said top sections are disposed in their normally horizontally or generally upright folded positions.

9. The structure defined in claim 6 in which said angular intermediate leg portions are horizontally disposed and at an angle to a vertical plane normal to the longitudinal dimension of said top, whereby said seat elements are each off-set from their respective upper leg sections in directions longitudinally and transversely of said table top.

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