Aug. 20, 1963 C. G. KANZELBERGER ETAL 3,101,064

FOLDING TABLE CONSTRUCTION

Filed July 31, 1961 4 Sheets-Sheet 1

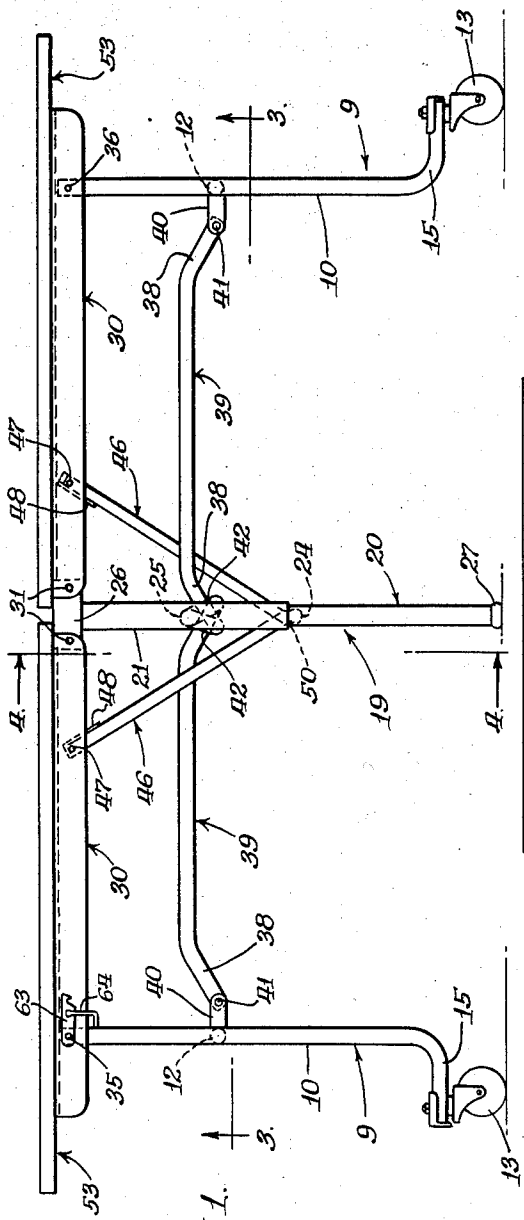


Fig. 1.

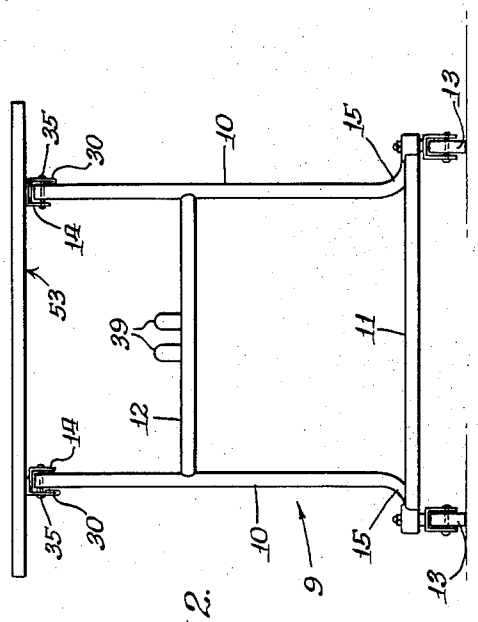


Fig. 2.

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FOLDING TABLE CONSTRUCTION

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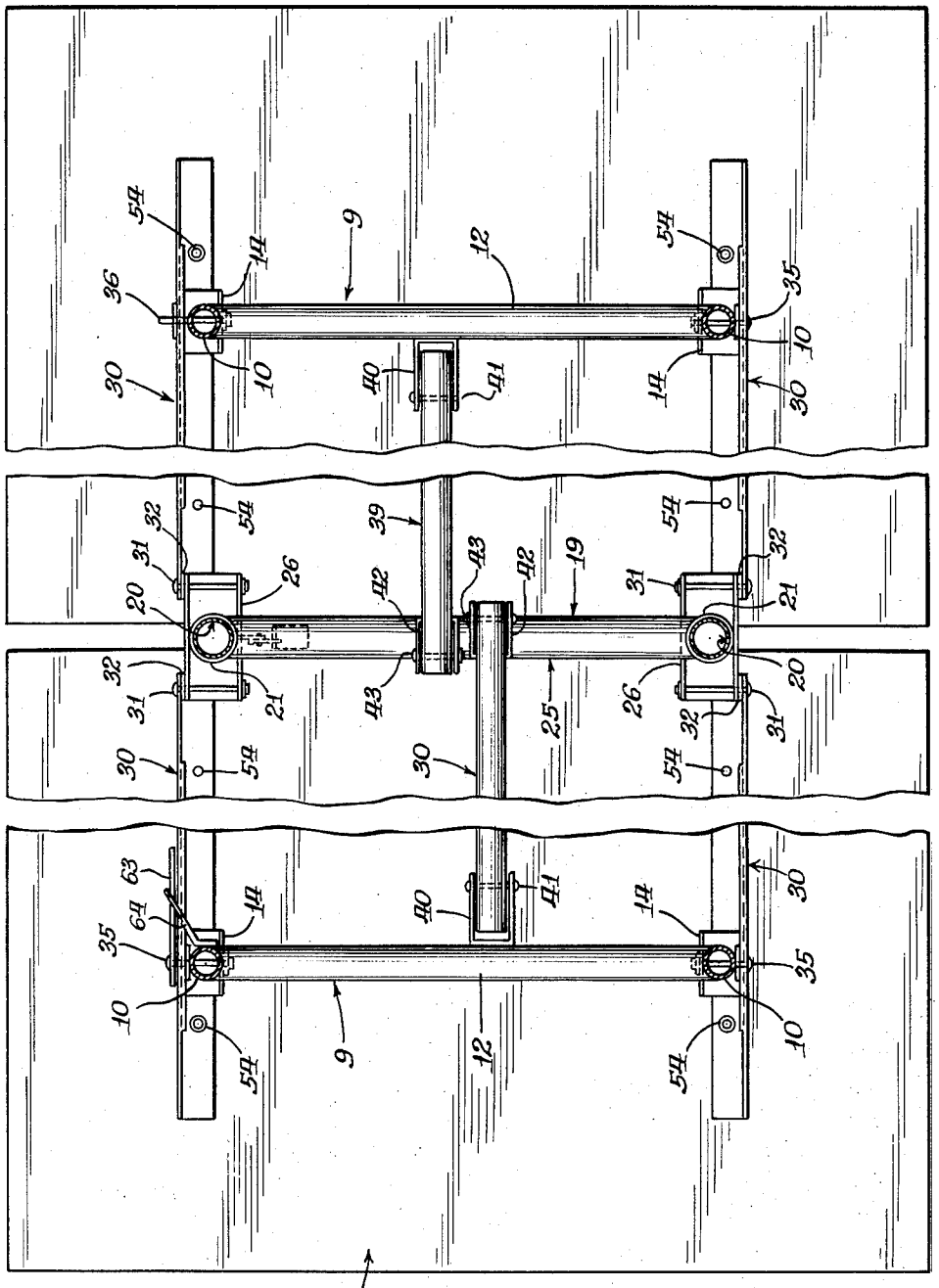


Fig. 3.

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FOLDING TABLE CONSTRUCTION

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Fig. 7.

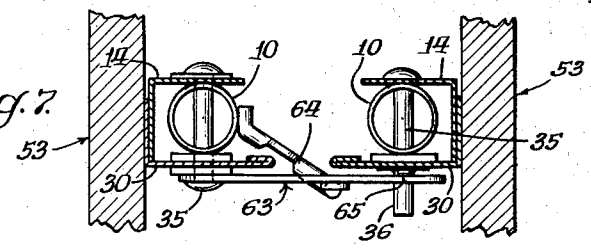


Fig. 6.

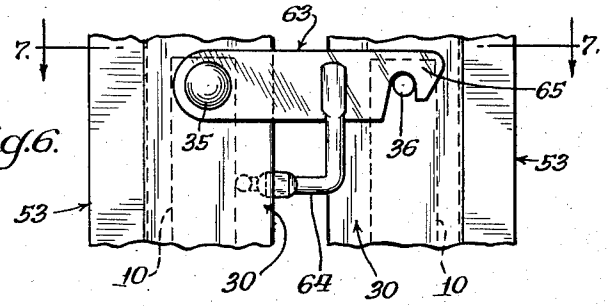


Fig. 4.

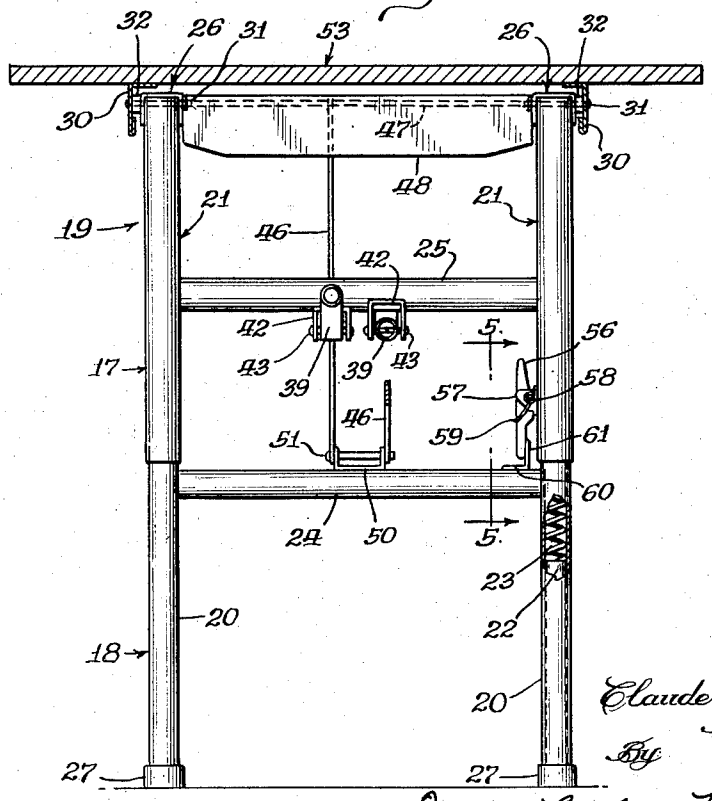
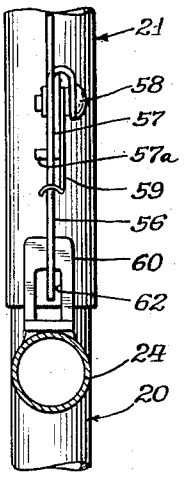


Fig. 5.



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FOLDING TABLE CONSTRUCTION

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Fig. 9.

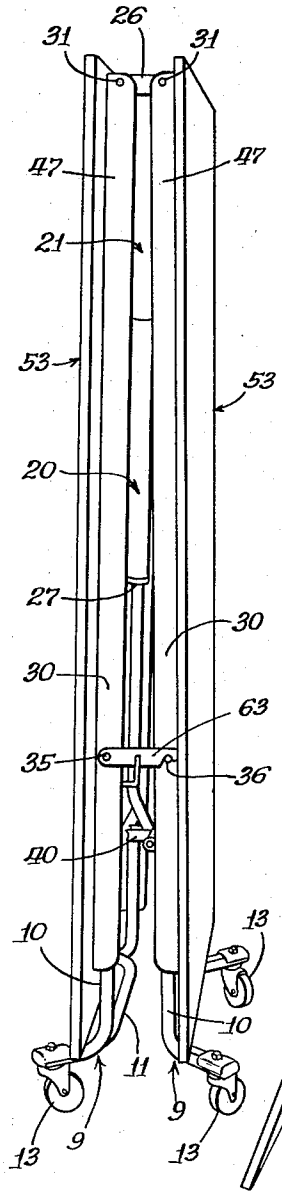
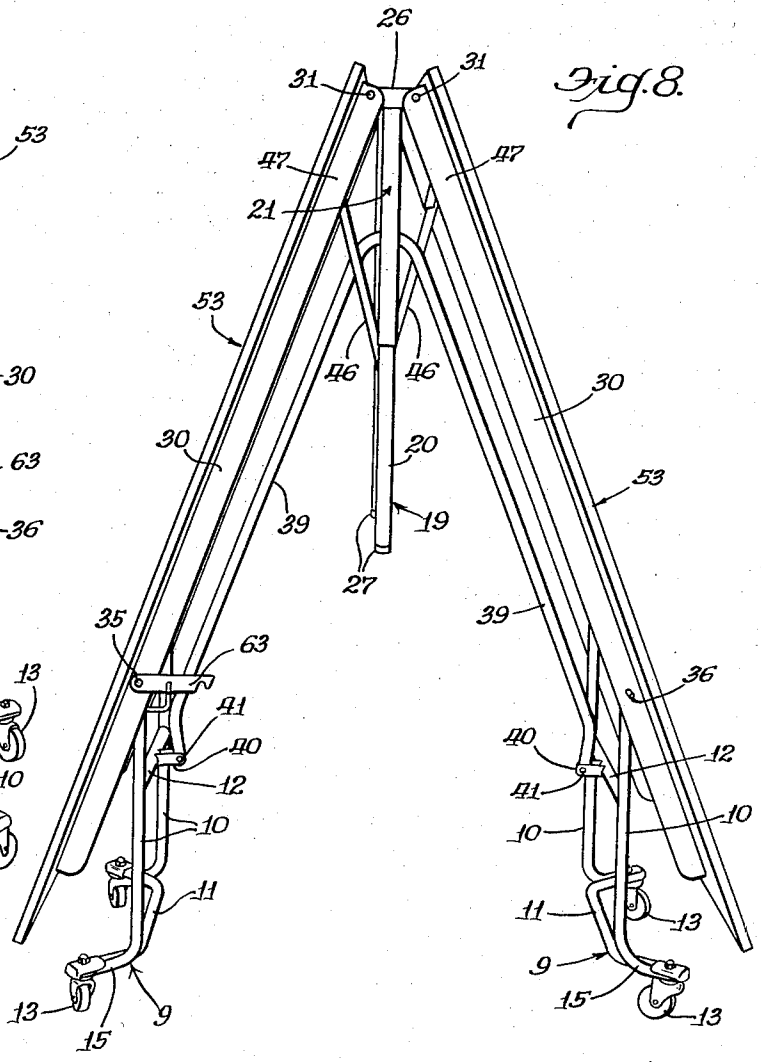


Fig. 8.



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3,101,064

FOLDING TABLE CONSTRUCTION

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Filed July 31, 1961, Ser. No. 128,034
14 Claims. (Cl. 108—113)

This invention relates generally to folding table constructions, and more particularly to a transversely folding table assembly.

The primary object of the present invention is to provide a novel transversely folding table assembly which will fold into a relatively compact assembly for easy transport and storage.

It is a further object to provide a novel folding table assembly which is foldable and self-supporting independently of the table top to permit easy replacement thereof.

Still another object is to provide a novel transversely folding table assembly wherein when the assembly is in a folded or closed condition, the legs and the table top halves are disposed substantially perpendicular to the floor.

Still another object is to provide novel locking means for locking a table such as above described both when in its open position and in its closed position.

Further objects and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the drawings, in which:

FIG. 1 is a side elevational view of a table assembly constructed according to the invention and showing the table assembly in its open position;

FIG. 2 is an end elevational view of the structure of FIG. 1;

FIG. 3 is an enlarged view of the structure shown in FIG. 1 and taken substantially along the line 3—3 of FIG. 1;

FIG. 4 is an enlarged cross sectional view taken along the line 4—4 of FIG. 1;

FIG. 5 is an enlarged sectional view of a portion of the structure shown in FIG. 4 and taken along the line 5—5 of FIG. 4;

FIG. 6 is an enlarged view of the locking means for locking the table in its closed position, as shown in FIG. 9;

FIG. 7 is a cross sectional view of the structure shown in FIG. 6 and taken along the line 7—7 of FIG. 6;

FIG. 8 is a perspective view of the table in a partially closed position; and

FIG. 9 is a perspective view similar to FIG. 8 but with the table in the completely closed position.

Generally, an embodiment of the present invention comprises a transversely folding table having a pair of table top sections which are in end-to-end horizontal alignment when the table is open and the adjacent ends of the sections are movable upwardly to place the table top sections in substantially vertical and parallel positions when the table is closed. In addition to the pair of table top sections, the table includes a unitary supporting structure which is completely operative between open and closed positions in and of itself and does not depend on the table top sections to render it operative nor to hold the parts of the unitary supporting structure together. The table top sections are removably secured to the unitary supporting structure so that they may be readily replaced in case of damage through wear or misuse.

The unitary supporting structure comprises a pair of end supporting frames and a central supporting frame. The upper ends of the end supporting frames and the central supporting frame are interconnected by a plurality of table top supports or aprons and by a plurality of stretcher bars spaced below the aprons. The stretcher bars are of novel conformation to prevent binding of the

parts. The unitary supporting structure also includes means for equalizing the movement of the leg frames relative to the table top supports during movement between open and closed positions, and the leg frames are held in a substantially vertical position throughout such movement by the equalizing means and the conformation of the stretcher bars. Two novel locking assemblies are provided, one for locking the table in the open position, and the other for locking the table in the closed position.

In detail, each end supporting frame indicated generally at 9 (see FIG. 2), comprises a pair of vertically extending legs 10. The lower ends 15 of the legs 10 are bent diagonally outwardly, and are connected by a cross bar 11, the ends of which are also bent to parallel the lower ends 15 of the legs 10. Casters 13 may be secured to the lower ennds 15 of the legs 10 and the cross bar 11 to facilitate movement of the table on the floor when the table is closed. A brace 12 is secured between and intermediate the ends of the legs 10 to render the end supporting frame rigid. The upper end of each leg 10 is provided with an L-shaped cap 14.

The central supporting frame, indicated generally at 19 and shown in FIG. 4, comprises an upper portion 17 and lower leg portion 18. The latter comprises a pair of floor engaging legs 20 rigidly connected together by a cross brace 24. The lower ends of legs 20 may be provided with cups 27 preferably made of plastic. The upper portion 17 comprises vertically extending tubular leg members 21 rigidly connected by a cross brace 25 and telescopically receiving the upper ends of the legs 20. The upper end of each leg member 21 is provided with a cap 26 in the form of an inverted channel, the caps 26 being rigidly secured to the upper end of the leg members 21 and extending longitudinally of the table.

To carry the table top and to provide a unitary supporting structure completely operative in and of itself, the two end supporting frames 9 and the central supporting frame 19 are connected together by table top supports in the form of two laterally spaced pairs of aprons 30. The aprons 30 have an inverted L shape in cross section. The aprons of each pair are aligned with each other and are pivotally connected at their adjacent ends to the respective ends of one of the caps 26 of the central supporting frame 19 as by a pin 31. A spacer or washer 32 is interposed between each apron 30 and cap 26 as shown in FIGS. 3 and 4. Each apron 30 is also pivotally connected adjacent its outer end to the cap 14 on the upper end of one of the legs 10 of one of the end supporting frames 9, as by a pin 35.

The unitary supporting structure further includes a pair of stretcher bars 39 pivotally connected to the end supporting frames 9 and the central supporting frame 19. Thus, one end of each stretcher bar 39 is pivotally connected as by a pin 41 to a bracket 40 rigidly secured to the cross brace 12 of one of the end supporting frames and extending substantially horizontally toward the central supporting frame 19. The other end of each stretcher bar 39 is pivotally connected, as by a pin 43, to a bracket 42 rigidly secured to the underside of the cross brace 25 of the central supporting frame. The two brackets 42 are spaced from each oher laterally of the table and extend downwardly at an angle so that the ends of the stretcher bars cross each other. The brackets 40 and 42 are so positioned that the axes of pins 41 and 43 of each stretcher bar 39 substantially define parallelograms with the axes of the pins 35 and 31 pivotally connecting the table aprons 30 to the supporting frames.

The unitary supporting structure also includes means for equalizing the movement of the supporting frames 9 and 19 relative to the aprons 30, thereby maintaining the supporting frames substantially vertical through-

out the movement between open and closed positions. To this end, a pair of links **46** are provided. Each link **46** is pivotally connected to and between two table aprons at a point longitudinally spaced from the pivots **31** at the inner ends of the aprons by a rod **47** and a plate **48**. The ends of each rod **47** are mounted in the respective table aprons **30**, as shown in FIG. 1. Each plate **48** has a length substantially equal to the distance between the aprons **30**, and the upper edge of each plate **48** is curved about the rod **47**. The links **46** may be secured to the plate **48** as by welding, and the rod extends through the curved portion of the plate and through the upper end of the link **46**.

The other end of each link **46** is pivotally connected to the lower leg portion **18** of the center supporting frame. For this purpose, a bracket **50** is secured to the upper side of the cross brace **24** of the central supporting frame as by welding. Since the cross brace **24** is part of the lower leg portion **18**, it may be seen that, when the table is moved from the open position as shown in FIG. 1 to the closed position as shown in FIG. 9, the lower leg portion is moved downwardly of the upper portion **17**, the telescopic relation of the legs **20** of the lower leg portion **18** with the tubular leg members **21** of the upper portion **17** permitting such movement.

The table when moved from the closed position tends by its own weight to move to the open position, and when in the open position would require considerable force to move it to the closed position. For this reason, cushioning means is provided to cushion the movement to the open position, and the cushioning means also assists in the movement to the closed position so that excessive effort will not be required to effect such movement. To this end, the cushioning means shown herein comprises a coiled spring **23** (see FIG. 4) mounted in each leg **20** and seated on a dowel **22** secured in the lower end of the leg. The spring **23** extends upwardly into the associated tubular leg member **21** and bears at its upper end against an abutment therein. The springs **23** will thus be compressed as the table moves toward the open position to cushion such movement, and on movement of the table toward the closed position the energy stored in the springs **23** assists in raising the table to its closed position.

From the foregoing description, it will be noted that the unitary supporting structure is completely operative in and of itself. The table top sections, indicated at **53**, are removably mounted to the aprons **30** of the unitary supporting structure and are secured thereto as by screws **54** (see FIG. 3). Thus, if either of the table top sections **53** becomes damaged, it may be readily replaced, since the table top sections are not relied upon to hold the parts of the unitary supporting structure together and the latter remains completely operative even when the table top sections are removed.

As heretofore mentioned, each stretcher bar **39** forms one side of a parallelogram, the opposite side being one of the aprons **30** and the other sides being provided by portions of the end supporting frame **9** and of the central supporting frame **19**. In theory, the stretcher bars **39** could be straight but it was found in practice that a binding ocurs particularly at the closed position. Moreover, it was found that the end supporting frames **9** tended to assume a slanting position, rather than a vertical position, during movement between open and closed positions so that the casters **13** would not function properly. Such difficulties may arise from the fact that there may be a slight play at each pivot pin in the assembly and such play in some instances becomes cumulative. To avoid these difficulties, each stretcher bar **39** is bent at its ends, as indicated at **38** in FIG. 1, the bent portions **38** extending downwardly to their respective pivots **41** and **43** so that the main extent of each stretcher bar is above a line connecting the pivots **41** and **43**.

In the closed position of the table as shown in FIG. 9, the aprons **30** are substantially parallel to the end supporting frames **9**, but because the pivot pin **35** is somewhat spaced from the flange of the apron on which the table top section **53** is mounted, the end supporting frame **9** may move to a slightly over-center position relative to the apron. Thus, in the closed position, the lower portion of each leg **10** may be slightly closer to the apron than the upper portion of the leg which is positioned by the pivot pin **35**. The stretcher bar **39**, if it were connected to the end suporting frame in the plane of the latter, would thus be unable to effect relative movement of the end supporting frame **9** and the adjacent aprons **30** in shifting the table from its closed position. This difficulty is avoided by the bracket **40** which extends horizontally from the cross brace **12** of the end supporting frame. On shifting from the closed position, the pull exerted by the stretcher bar **39** is applied at the pivot **41** where it is attached to the bracket **40**, and because of the length of the bracket **40**, the stretcher bar **39** can move the end supporting frame out of its slightly over-center position. The over-center position of the end supporting frame is advantageous since, when the table is closed, the over-center tends to maintain the table in such position, and with the bracket **40**, the end supporting frame can be readily moved out of such over-center position.

The table is arranged to be locked in both its open and closed positions. To lock it in the open position, a latch **56** is provided as shown in FIGS. 4 and 5. The latch **56** is arranged to lock the upper portion **17** and the lower leg portion **18** of the central supporting frame together, when in their closed position. Thus, the latch **56** is pivotally carried on a bracket **57** by a pin **58**. The bracket **57** is secured to the inner side of one of the tubular leg members **21** of the central supporting frame as by welding. A torsion spring **59** is coiled about the pin **58** and engages the bracket **57** and the latch **56** to bias the lower part of the latch **56** against a shoulder **57***a* of the bracket **57**. The lower end of the latch **56** is formed with a hook portion **61** which is adapted to engage a strike **60**. The strike **60** is rigidly secured as by welding to the upper side of the cross brace **24** of the lower leg portion **18** adjacent to the upper portion **17** carrying the bracket **57**. The strike **60** is provided with an opening **62** in which the hook portion **61** engages. To release the latch **56**, the upper end thereof is manually drawn toward the tubular leg member **21** to withdraw the hook portion **61** at the lower end thereof from the opening **62** in the strike **60**, and the table is free to be moved toward its closed position. When the table is moved in the opposite direction from the closed to the open position, the latch **56** will operate automatically to engage the strike **60** and lock the table in the open position.

The invention also includes a second locking arrangement for locking the table in the closed position as shown in FIGS. 6, 7 and 9. The pivot pin **35** at the upper end of one end supporting frame also pivotally carries a latch member **63**. The latch **63** is provided with a hook **65** at its end opposite from its pivoted end, and has a length such that in the closed position of the table, the hook **65** of the latch **63** will engage the pin **35** of the end supporting frame at the other end of the table to maintain the table locked in the closed position such as shown in FIG. 9. For this purpose the last-mentioned pin **35** is extended as at **36**. The latch **63** is held in a position for automatic engagement with the pin **36** by an arm **64**. The arm **64** is rigidly secured to the latch **63** intermediate the ends thereof and extends downwardly and inwardly to bear against the tubular leg member **10**. Since the latter is always in a substantially vertical position in both the open and closed positions of the table, the latch **63** is maintained in a substantially horizontal po-

sition throughout the movement of the table. The outer edge of the hook 65 of the latch 63 has a camming surface which will cause the end of the latch 63 to swing upwardly on contacting the pin 36, and the latch 63 then drops into the locked position as shown in FIGS. 6 and 9, when the table is completely closed. The table may be unlocked for opening movement thereof merely by manually raising the latch 63 to disengage the hook 65 thereof from the pin 36.

If the feature of having the table top sections removable and not a part of the supporting structure is found to be unnecessary for any reason, the aprons 30 could be eliminated and the table top sections 53 could be pivotally connected directly to the end leg frames 9 and the center leg frame 19 by providing means such as simple brackets on the undersides of the table top sections to receive the pivot pins 35 and 31.

We claim:

1. A transversely folding table movable between open and closed positions and comprising a unitary supporting structure comprising a pair of table top supports adapted to extend horizontally in end-to-end relation when the table is in its open position, a center leg frame pivotally connected at its top to the adjacent ends of said table top supports, a pair of end leg frames pivotally connected at their tops to the respective table top supports adjacent their remote ends, a pair of stretcher bars each pivotally connected to said center leg frame and to one of said end leg frames at points equally spaced from said table top supports, and means for equalizing the movement of said leg frames relative to said table top supports on movement between open and closed positions, and a pair of table top section removably secured to the respective table top supports.

2. A transversely folding table according to claim 1, including locking means for locking said unitary supporting structure in its closed position comprising a latch mounted on one of said table top supports and a strike engageable by said latch and mounted on the other table top support.

3. A transversely folding table according to claim 2, in which said latch is pivotally mounted on the pivot connecting one of said end leg frames with its associated table top support and said strike comprises the pivot connecting the other end leg frame with its associated table top support.

4. A transversely folding table according to claim 3, in which said latch is provided with an arm engaging said one end leg frame during movement from open to closed positions for holding said latch in position to engage said pin.

5. A transversely folding table according to claim 1, in which said center leg frame includes a main portion pivotally connected to said table top supports and a relatively movable portion, and said equalizing means comprises a pair of links connected at one of their ends to the respective table top supports and at their other ends to said movable portion.

6. A transversely folding table comprising a pair of end supporting frames, a central supporting frame, a plurality of table aprons pivotally connected at one of their ends to the upper end of said central supporting frame to extend in opposite directions therefrom, the upper ends of said end supporting frames being pivotally connected to said aprons adjacent the opposite ends thereof, a plurality of stretcher bars pivotally connected to said end supporting frames and said central supporting frame and extending therebetween, means for holding said end supporting frames and said central supporting frame substantially vertical when said central supporting frame is raised to fold said table to a closed position, and locking means for locking said table in said closed position, said locking means comprising a latch freely pivotally carried on one of said aprons adjacent one end supporting frame means mounted on said latch and engaging said one end supporting frame for supporting said latch against downward pivotal movement below the horizontal during folding movement of the table and a strike mounted on the oppositely extending apron and engageable by said latch in the closed position of said table.

7. A transversely folding table as defined in claim 6, wherein said latch supporting means comprises an arm rigidly secured to said latch intermediate the ends thereof, said arm depending from said latch member and engaging said one end supporting frame whereby said latch is held in a substantially horizontal position during closing movement of the table for engaging said strike.

8. A transversely folding table comprising a pair of end supporting frames, a central supporting frame, said central supporting frame comprising a pair of upper portions and a pair of lower leg portions in a telescoping arrangement, a plurality of table aprons pivotally connected at one of their ends to the upper end of said upper portions of said central supporting frame to extend in opposite directions therefrom, the upper ends of said end supporting frames being pivotally connected to said aprons adjacent the opposite ends thereof, a plurality of stretcher bars pivotally connected to said end supporting frames and said upper portions of said central supporting frame, link means pivotally connected to said table aprons and to said lower leg portions of said central supporting frame for effecting telescoping movement of said portions, and locking means for locking said table in the open position, said locking means comprising a latch pivotally carried on one of said portions, spring means biasing said latch toward said one portion, and a strike carried on another of said portions and engageable by said latch in the open position of said table.

9. A transversely folding table according to claim 8, in which said latch is pivotally mounted on the inner side of one of said upper portions, a cross brace mounted between said pair of lower leg portions, and said strike is mounted on said cross brace.

10. A transversely folding table comprising a pair of end supporting frames, a central supporting frame, a plurality of table aprons pivotally connected at one of their ends to the upper end of said central supporting frame to extend in end-to-end relation when the table is in open position, the upper ends of said end supporting frames being pivotally connected to said aprons adjacent the opposite ends thereof, a plurality of stretcher bars pivotally connected to said end supporting frames and said central supporting frame at points equally spaced from said aprons, and means for equalizing the movement of said supporting frames relative to said aprons on movement of the table between open and closed positions, said stretcher bars having upwardly bent portions adjacent their pivotal connections with the respective supporting frames and extending substantially parallel to said aprons between said bent portions to prevent the parts from binding in the closed position of the table.

11. A transversely folding table according to claim 10, in which each of said end supporting frames has a bracket extending horizontally from the plane of the end supporting frame and the associated stretcher bar is pivotally connected to the outer end of said bracket whereby said stretcher bar is adapted to move the end supporting frame out of an over-center position relative to the apron to which the end supporting frame is connected.

12. A transversely folding table movable between open and closed positions and comprising a pair of table top sections adapted to extend horizontally in end-to-end relation when the table is in its open position, a center leg frame, a pair of end leg frames, said table top sections having means at their adjacent ends pivotally connected to the top of said center leg frame and having means adjacent their remote ends pivotally connected to the tops of the respective end leg frames, a pair of stretcher bars

each pivotally connected to said center leg frame and one of said end leg frames at points equally spaced from the pivotal connections at the tops of said leg frames, and means for equalizing the movement of said leg frames relative to said table top sections on movement between open and closed positions.

13. A traversely folding table movable between open and closed positions, comprising a pair of table top sections adapted to extend horizontally in end-to-end relation when the table is in open position, a horizontally extending cap member having its ends pivotally fastened to the adjacent ends of said table top sections at each side of said table, a downwardly extending tubular leg member secured to substantially the center of each of said cap members, a cross brace extending between said tubular leg members, a floor engaging leg fastened in telescoping relation to each of said tubular leg members, equalizing means pivotally secured to said table top sections and to said floor engaging legs for maintaining said floor engaging legs in a substantially vertical position, a pair of end leg supports pivotally fastened to the remote ends of said table top sections, each of said end leg supports comprising a pair of leg members and a cross brace extending therebetween, a pair of stretcher bars extending between the respective cross braces of said end leg supports and said tubular leg members and pivotally secured at their adjacent ends to the cross brace of the tubular

leg members with their ends at equal distances from the pivotal connections at the tops of said end leg supports and said tubular leg members, and a horizontally extending bracket rigidly secured to each of the cross braces of the end leg supports and pivotally connected to the adjacent end of each of said stretcher bars, the pivotal connections of said ends of each stretcher bar and the pivotal connections of each table top section with said end leg supports and said cap member forming a parallelogram.

14. A table as in claim 13, wherein each of said stretcher bars upwardly bent portions adjacent their ends and extending substantially parallel to said table top sections between said bent portions to prevent the parts from binding in the closed position of the table.

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