

Feb. 5, 1957

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2,780,506

FOLDING SECTIONAL TABLE WITH LATCH MECHANISM

Filed Sept. 24, 1953

3 Sheets-Sheet 1

Fig. 1

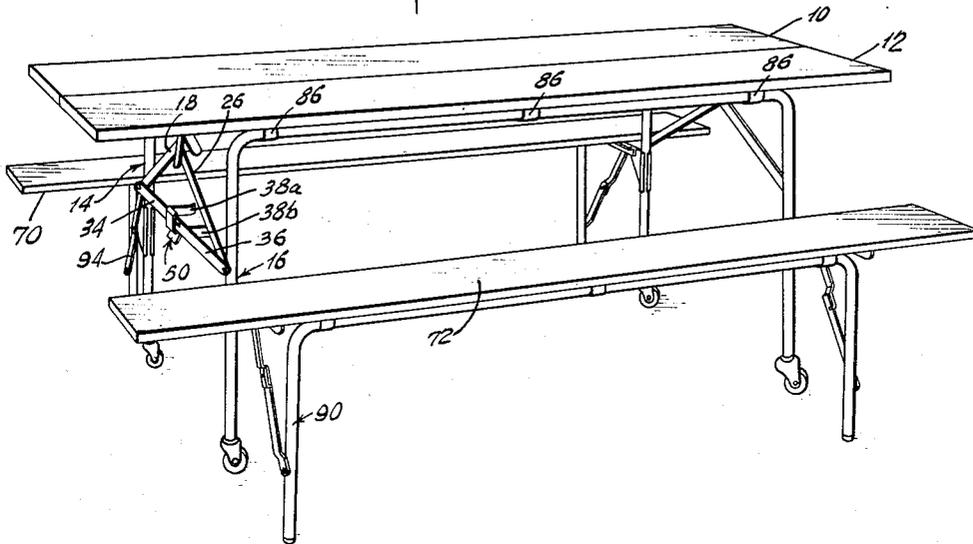
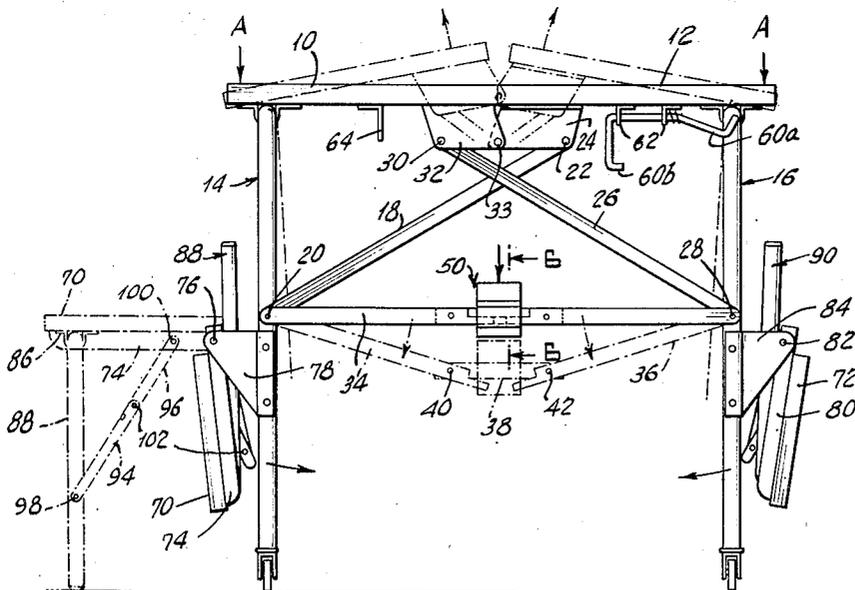


Fig. 2



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Feb. 5, 1957

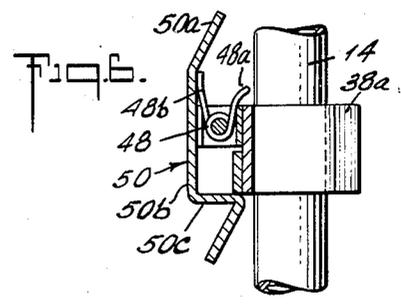
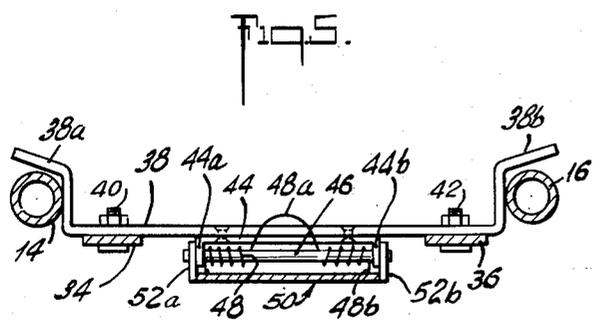
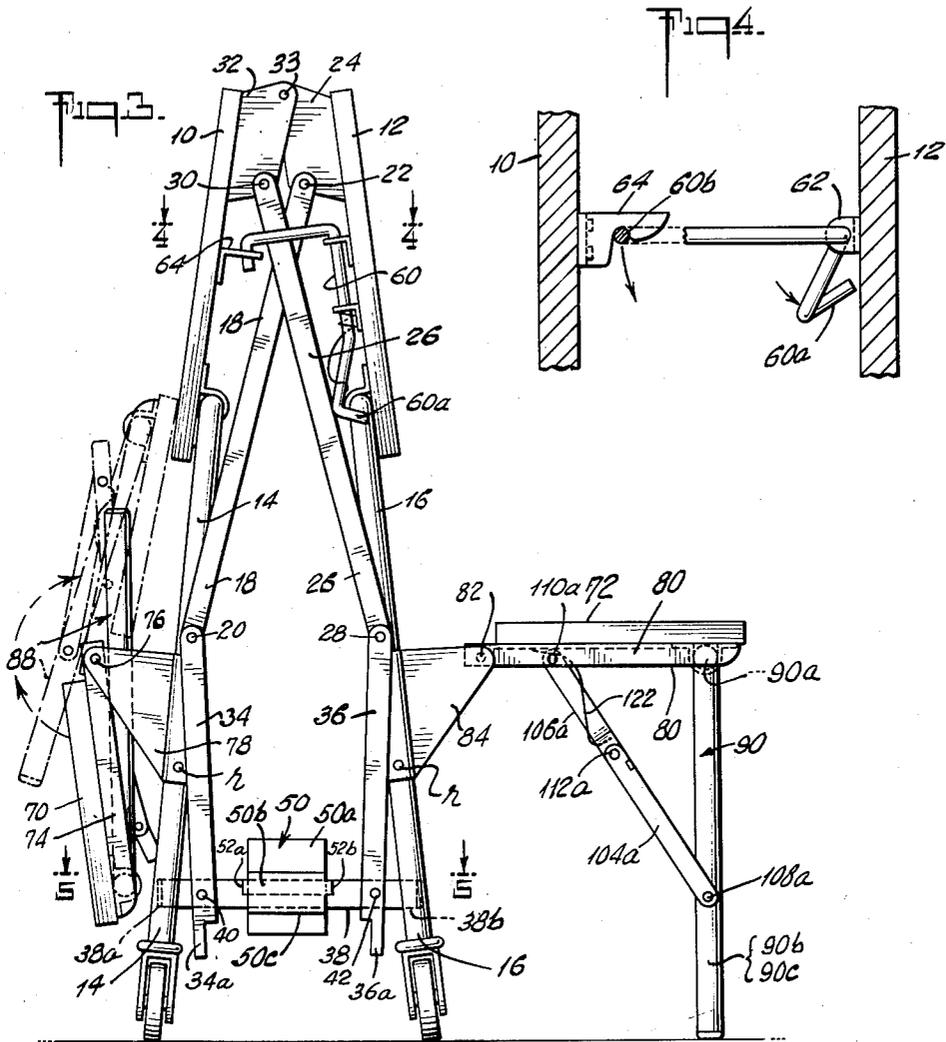
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2,780,506

FOLDING SECTIONAL TABLE WITH LATCH MECHANISM

Filed Sept. 24, 1953

3 Sheets-Sheet 2



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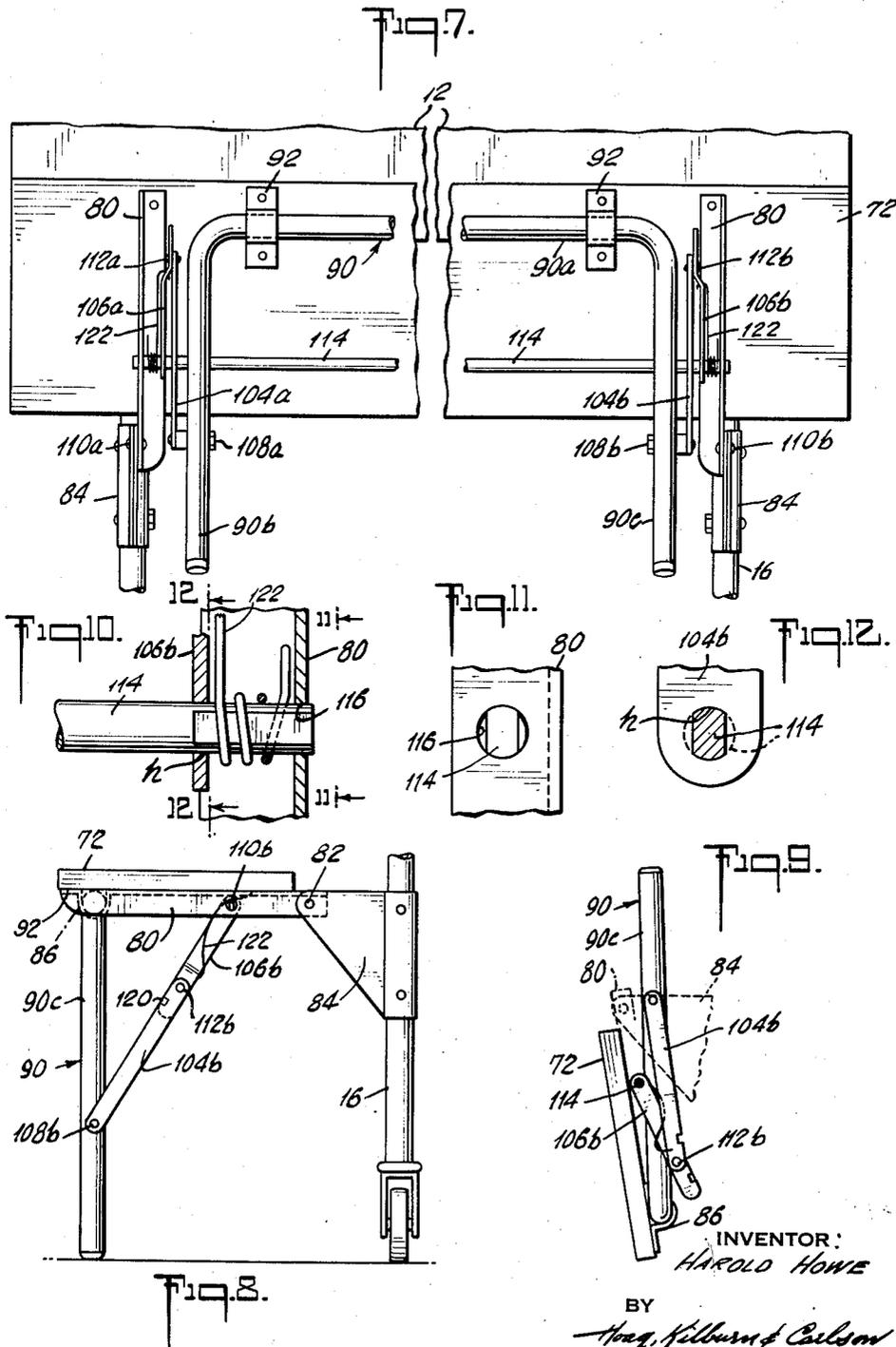
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FOLDING SECTIONAL TABLE WITH LATCH MECHANISM

Filed Sept. 24, 1953

3 Sheets-Sheet 3



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2,780,506

## FOLDING SECTIONAL TABLE WITH LATCH MECHANISM

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Application September 24, 1953, Serial No. 382,060

11 Claims. (Cl. 311—89)

This invention relates to table and bench construction. More particularly it relates to a structure comprising a two part folding table top with a bench means connected preferably to each side of the table for coaction with the top parts respectively.

An object of the invention is to provide a novel unit in which table and bench means coact to provide a structure useable for a plurality of purposes.

Another object of the invention is to provide a table and bench structure convertible into a seat with coactive slanting back rest adapted to be placed against the wall of a gymnasium or other room, and thus conserve space.

Another object of the invention is to provide table and bench structures easily convertible into a two tier bleacher when one bench is folded and the other bench and the table are in open position, and placed against a wall.

Another object of the invention is to provide a structure of the above described kind which can be readily folded into a plurality of closely spaced substantially parallel planes for storage, or to temporarily provide greater floor space as for example in a school, college or military dining room or gymnasium where the space is used at different times for classes, lecture halls, athletic events etc.

Other objects of the invention will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be pointed out in the following description, and the scope of the application of which will be indicated in the following claims.

The invention will best be understood if the following description is read in connection with the drawings, in which,

Figure 1 is a perspective view of table and bench structure in unfolded position;

Figure 2 is an end view of the structure shown in Figure 1 showing the relation of the parts just after the beginning of folding action, and showing particularly the locking and operational means by which the folding action of even large relatively heavy tables and the moving toward one another of a plurality of associated bench means may be easily accomplished, the bench members being shown in full lines in folded position, and the unfolded position of one being shown in dotted lines;

Figure 3 is an end elevation showing the table structure in folded position with the top parts locked together preventing unintentional unfolding and with one bench member in folded position and the other bench in open position coacting with one of the top parts to provide a combination seat and backrest;

Figure 4 is a plan view taken on the line 4—4 of Figure 3;

Figure 5 is a plan view taken on the line 5—5 of Figure 3;

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Figure 6 is an end elevational view taken on the line 6—6 of Figure 2;

Figure 7 is a side elevational view showing the under surface of a bench member and the support and interconnecting means by which a plurality of pairs of braces are controlled for opening and closing movement simultaneously;

Figure 8 is an end view of the structure shown in Figure 7;

Figure 9 is a side elevational detail view showing a bench and its support means and brace and linkage means;

Figure 10 is a detail view partly in cross section of part of the structure shown in Figure 7 by which remote control of one of a plurality of pairs of braces is obtained for actuating it simultaneously with another pair of braces;

Figure 11 is a detail view taken on the line 11—11 of Figure 10; and

Figure 12 is a detail view taken on the lines 12—12 of Figure 10.

The table top shown in Figure 1 comprises the two parts 10 and 12 each pivotally supported on individual support means, indicated generally by the numerals 14 and 16 respectively. Each support means is connected to the other top part i. e., the part other than the one to which it is directly pivoted, by one or more link members, link members 18 being shown pivotally connected at one end to support means 14 by pivot 20 and at the other end by pivot 22 to hinge plate 24 extending downwardly from top part 12; and link members 26 being shown connected at one end to support means 16 by pivot 28 and at the other end connected by pivot 30 to hinge plate 32 depending from the under surface of top part 10, the hinge plates 24 and 32 being overlapped and pivotally connected by pivot means 33. Extending between the support means 14 and 16 and desirably pivoted at one end to said members 14 and 16 on said pivots 20 and 28 respectively are the links 34 and 36 which adjacent their other ends respectively are interconnected with a third link 38 by the pivots 40 and 42 respectively.

The inner ends 34a and 36a of links 34 and 36 respectively are extended beyond said pivots 40 and 42 respectively, said extended ends being reduced in height providing space for bracket 44 which is to be described. When the table is fully unfolded the reduced end portions 34a and 36a of said links 34 and 36 respectively are horizontally aligned with one another and they are vertically aligned with bracket 44.

The ends 38a and 38b of link 38 are bent first rearwardly and then outwardly providing stops limiting the movement of the support means 14 and 16 toward one another as is illustrated in Figure 5. When the legs 14 and 16 are moved in against the bent over ends respectively of cross link 38 the table top is folded, as shown in Figure 3; but the whole table structure including the benches comprising the seat members 70 and 72 and their support means, can still be supported on said support means or legs 14 and 16.

Secured on the outer side of link 38 is a U-shaped bracket 44 between the arms 44a and 44b of which a cross rod 46 is provided having thereon the spring member 48. Also pivoted on rod 46 as by ears 52a and 52b, disposed on the outside of the arms 44a and 44b of bracket 44, is a foot pedal-locking member 50, which is best shown in Figures 3 and 6, comprising the backwardly inclined upper portion 50a, the intermediate portion 50b from which the ears 52a and 52b project, and the portion 50c extending inwardly substantially at right angles to the intermediate portion 50b, which, when in position under the aligned ends 34a and 36a of said links 34 and 36, provides a lock preventing the down-

ward movement of said links and thus preventing inadvertent initiation of folding of the table structure. Member 50 is yieldingly retained in the locking position shown in Figure 6 by means of said spring 48 the middle portion 48a of which presses against said link member 5 33, and the ends of which are wound around cross rod 46 with the extremities 48b and 48c extending into engagement with the inner surface of pedal member 50. Spring 48 thus tends to pivot said member 50 into the locking position shown in Figure 6.

When sufficient pressure is exerted downwardly upon the portion 50a of pedal member 50 to overcome the force of spring 48 member 50 pivots in a clockwise direction unlocking the inner ends of said links 34 and 36 and initiating folding movement of the table as illustrated in Figure 2. So long as the folding pressure is maintained said links 34 and 36 continue to rotate until they extend downwardly in substantially parallel relation into the position illustrated in Figure 3. The folding force exerted through foot pedal 50 to link 38, and through link 38 to said links 34 and 36 and to the table top parts 12 and 10 through links 18 and 26 respectively, may be aided and accelerated by pressing down and in on the outer edges of the respective table top parts as indicated by the arrows A—A, Figure 2.

Means are shown for locking the table in folded position, the means illustrated comprising the latch bar 60 pivotally mounted in brackets 62 attached to the inner surface of top part 12. The right hand portion 60a of bar 60 is bent into a handle by which the main body of the bar may be rotated toward or away from a bracket 64 projecting from the under surface of table top part 10, and which has an open end slot into which the bent over end 60b of rod 60 may be inserted and frictionally engaged thereby locking the table in folded position. For unlocking it is only necessary to press on the latch bar 60a indicated by the arrow in Figure 4, and the structure may be easily unfolded by exerting a lifting force along the outer margin of either of the top parts 10 and 12, the force being transmitted to the other top part by link 40 18 or link 26. When the unfolding movement is complete the portion 50c of the rotatable pedal member 50 will seat under the adjacent ends of links 34 and 36 thereby locking the table in folded position.

Figure 3 illustrates how the top parts 10 and 12 coact with bench means movable toward and away from one another as the table is folded and unfolded, to provide back rest means for the benches. As illustrated the bench means comprise the seat members 70 and 72, the seat member 70 having on its under surface one or more angle members 74 pivotally connected by pivot means 76 to bracket means 78 secured on the support means 14 for table top part 10. Similarly seat means 72 has on its under surface one or more angle members 80 pivotally connected by pivot means 82 to bracket means 84 secured on the support means 16 for table top part 12.

Rotatably supported on the under surface of seat member 70 in brackets 86 is the leg or support means 88 movable from the unfolded position shown in Figure 2 to the folded position shown on the left hand side of Figure 3, and seat member 72 is similarly provided with support means 90 rotatably mounted in brackets 92 on the under surface of seat member 72.

Interconnecting the angle means 74 on the bottom of seat 70 with the support means 88 are the brace members 94 and 96 which at their outer ends are respectively pivotally connected to support means 88 and to angle means 74 by pivots 98 and 100 respectively, their inner ends being interconnected by pivot 102. Similarly the angle means 80 on the bottom of seat 72 is interconnected with the support means 90 by the brace members 104 and 106, the outer ends of which are connected respectively to the support means 90 by pivot means 108 and to the angle means 80 by pivot means 110, and which are interconnected at their inner ends by the pivot 112.

The support means shown herein for the seats 70 and 72 respectively each comprise a plurality of legs each having a pair of folding braces, and means are provided whereby folding and unfolding action of one pair of brace members is communicated to another set of brace members for facilitating folding and unfolding of the support means. Since the means is the same for both seat members 70 and 72 it will suffice to describe the means employed in connection with seat member 72, which, on the right hand side of Figure 3, is shown in unfolded position coacting with folded table top part 12 which in this position constitutes a back rest for the seat 72. The remote control means for controlling one pair of braces with another is best seen in Figure 7 which shows the under side of seat 72 in its folded position.

As shown in Figure 7 the support means 90 for seat 72 comprises a U-shaped member the intermediate portion 90a of which extends through the brackets 92 and the outer portions 90b and 90c of which constitute legs. Brace member 104a is connected at its outer end to leg 90b by pivot 108a. Brace member 106a is connected at its outer end to angle member 80 by pivot 110a, and said members are interconnected at their inner ends by the pivot member 112a. Similarly leg member 90c is connected by pivot 108b to the outer end of brace member 104b the inner end of which is connected by pivot 112b to brace member 106b the upper end of which is connected to angle member 80 by pivot 110b.

Extending between link members 106a and 106b is a connecting rod 114 the extremities of which are rectangular in cross section. The rod ends respectively extend through brace members 106a and 106b and angle members 80. In angle members 80 circular holes 116 are provided through which the rod ends extend, said circular holes providing bearings within which the connecting rod is rotatably supported. In brace members 106a and 106b, however, rectangular holes h are provided adjacent their outer ends respectively. Rotary motion of connecting rod 114 is thus communicated to said links 40 106a and 106b respectively and when the brace means at either end of a seat member is folded or unfolded, to cause folding or unfolding of its support means, the folding or unfolding force is communicated through rod 114 to the other brace members connected to the other leg of the support means for the seat thus causing folding of both pairs of braces simultaneously and facilitating the folding of the support means for the seat.

As illustrated in Figure 8 one brace member of each pair of braces may comprise a stop member 120 to prevent folding of the brace members except in one direction. As shown in Figure 10 a spring member 122 is provided which tends to urge the brace members into folded position thereby facilitating the folding of the seat member and its support means. Spring 122 extends around the non-circular end portion of connecting rod 114, see Figure 10, between the angle member and the brace members, and its ends press on the brace members adjacent their pivoted interconnection.

The bench means when folded as has been described will take substantially the position illustrated in full lines on the left hand side of Figure 3. Also in this folded position the locking spring 122 acts as a past center pressure means to prevent the legs of the bench from unfolding during handling or transportation. In this position the leg means will be projecting upwardly. For unfolding, the upwardly extending leg means may be grasped and rotated inwardly, or the seat means may be lifted and rotated outwardly, thus raising the seat means to unfolded position, after which a pull on either leg 90b or 90c will be communicated from one pair of leg braces to another by connecting rod 114 making it possible to unfold a bench assembly with a minimum of effort.

The table and bench structure shown herein has the two part function of either providing a table and seats useable for example for dining, or for work or school 75 purposes generally, etc., or as a seat and back rest

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combination useable for example in lecture halls, for spectators watching an athletic event, or for any of a great variety of occasions. With both benches and top parts folded a plurality of seat and back rest means are provided back to back. With the top and one bench folded a seat and back rest is provided which may be moved against a wall thus using a minimum of floor space when placed against a wall, for example, a gymnasium wall, with one bench and the top unfolded a two-tier bleacher is provided.

These structures are readily convertible for different uses and may be easily moved. When folded they occupy a minimum of space and they are thus particularly well adapted for use in rooms which serve different purposes successively as for example in assembly halls and gymnasiums which may be used at different times for gatherings, lectures, exhibitions, sporting events, etc. By the pedal operated link means disclosed herein folding of a table with the attendant moving of the support and bench means may be accomplished with a minimum of effort, or the table may be locked in unfolded position. The convertibility between coactive seat and back rest means and table and bench means greatly increases the utility of the structure.

It will thus be seen that there has been provided by this invention a method and apparatus in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As various possible embodiments might be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matters hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What I claim is:

1. In a structure comprising two table top parts, support means for each part and link means interconnecting the support means for each top part to the opposite top part, a three link means interconnecting the support means for said top parts, a first of said links being pivotally connected at one end to one of said support means, a second of said links being pivotally connected at one end to the other of said support means, and the third of said links being interconnected between said first and second links by pivots spaced from the inner ends of said first and second links, and means carried by said third link and movable under the adjacent ends of said first and second links to lock the support means in unfolded position.

2. The structure claimed in claim 1 in which the pivots interconnecting said first and second links respectively to said third link are spaced apart a predetermined distance to limit the movement of said support means toward one another and provide a firm support for said structure in its folded position.

3. The structure claimed in claim 1 including means for supporting on said third link for oscillatory movement around said third link the means movable under the adjacent ends of said first and second links, said oscillatory means having a first portion movable under said first and second links in their aligned position to lock them and having a second portion extending upwardly from said first portion for receiving force tending to oscillate it in a direction to unlock said first and second links and to transmit table folding force to the top parts respectively through said first and second links.

4. The structure comprising two table top parts, support means for each part, and folding brace means extending from one top part to the support means for the other top part respectively, said top parts being movable from abutting relation in a horizontal plane when said support means are moved apart, into planes which are more vertical than horizontal when the said support means are moved together, and three-link means interconnecting the support means for said top parts,

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a first of said links being pivotally connected at one end to one of said support means, a second of said links being pivotally connected at one end to the other of said support means, and a third of said links being interconnected between said first and second links by pivot means spaced from the inner ends of said first and second links, said first and second links being disposed substantially horizontally when the said support means are moved apart and being disposed substantially vertically when the support means for the top parts respectively are moved together, said third link remaining horizontally disposed at all times and serving to limit movement of said support means toward one another and cause said support means to provide firm support for the structure at all times, including when said said support means are as close together as permitted by said third member.

5. The structure comprising two table top parts, support means for each part, and link means interconnecting each support means to the top supported by the other support means, first and second additional link means extending downwardly in relation to the said link means, and a third additional link means pivotally connected to said first and second additional link means at points spaced from the lower extremities of said first and second additional links, said third additional link means remaining substantially horizontal at all times including when the table is folded and unfolded, a bracket supported by said third link means, a rod supported by said bracket and extending substantially parallel to said third link, a foot pedal supported on said rod for rotation around said rod, the ends of said first and second additional links being partly cut away below the pivots joining them to said third additional link to provide space for said bracket when said first, second and third links are aligned with the reduced ends of said first and third links extending under said bracket, and spring means supported on said rod and tending to rotate said pedal to project a portion thereof under the aligned reduced ends of the first and second additional links to lock said three links in alignment and prevent the disalignment of said links and the folding of the table until force is exerted upon the foot pedal to rotate it from locking position thus conditioning the table for folding.

6. A folding table comprising two parts each part including a top portion and support means for the top portion, hinge means joining the two top portions together, means for communicating folding and unfolding force from one of said table parts to another, and means for effecting folding and unfolding of said table by movement of said support means toward and away from one another and movement of said top portions between an unfolded position in which said portions are aligned in a horizontal plane to a folded position in which they are disposed in substantially parallel planes, said last mentioned means comprising three links, including an intermediate link which is disposed in a horizontal plane between the two support means and two end links pivotally connected between said intermediate link and said support means respectively, said end links being movable from a position of horizontal alignment with said intermediate link when the table is unfolded to a position in which they are disposed in substantially parallel vertical planes when the table is folded.

7. The table structure claimed in claim 6 including means carried by said intermediate link tending to move under the opposed inner ends of said end links when the table is unfolded thus locking the table against inadvertent folding action.

8. The table structure claimed in claim 6 including locking means mounted for rotation on said intermediate link and including a portion movable under the adjacent ends of said two end links to lock them when the three links are aligned, and means tending to rotate said locking means to move into said locking position, said locking means including a pedal portion which when pressure is applied to it rotates said locking means out of locking

position and transmits folding force through said three links to the table support means respectively causing said support means to move together until stopped by abutting against the respective ends of said intermediate link and at the same time moving the top portions from unfolded to folded position.

9. A folding table comprising two parts, each part including a top portion and support means for the top portion, hinge means joining the two top portions together, means for communicating folding and unfolding force from one of said table parts to another, means for spacing the support means apart to enable the table to stand upright on its said support means even when the table is in folded condition, said spacing means consisting of the intermediate link of a three link combination which is movable from a position in which all three links are aligned when the table is completely unfolded to a position in which the end links of said combination are disposed in substantially parallel planes when the table is folded, said end links being pivotally interconnected between said intermediate link and the support means of said parts respectively.

10. The device claimed in claim 9 in which the ends of said intermediate link are angularly related to the main body of said link to provide stops against which said support means respectively abut when the table is in folded position.

11. The device claimed in claim 9 in which the inner

ends of the end links are extended beyond their pivotal connections with said intermediate link and means are provided supported by said intermediate link for extending under the said extended ends of said end links when the said combination of three links are aligned and the table is therefore in open position.

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