Oct. 30, 1962 D. A. HAUNOST 3,061,369

CONVERTIBLE TABLE-BENCH

Filed Sept. 21, 1959 2 Sheets-Sheet 1

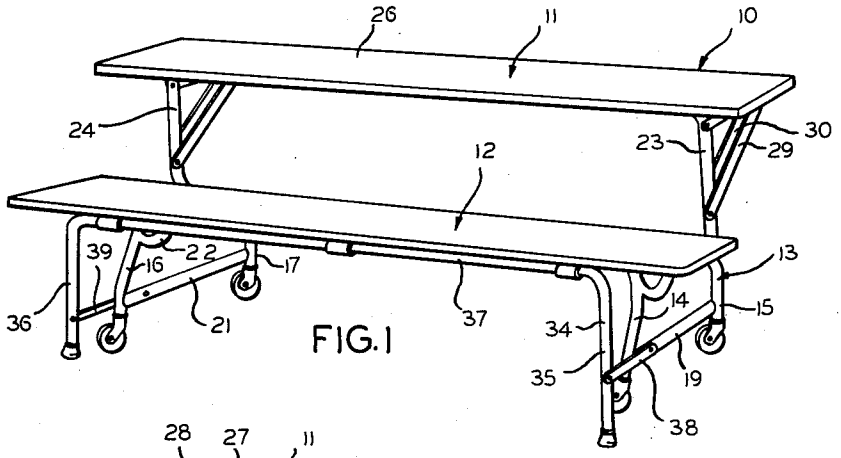


FIG. 1

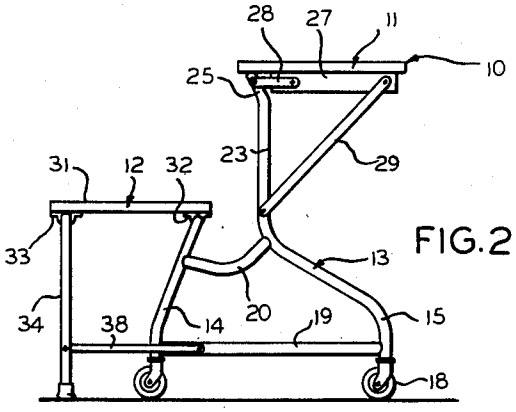


FIG. 2

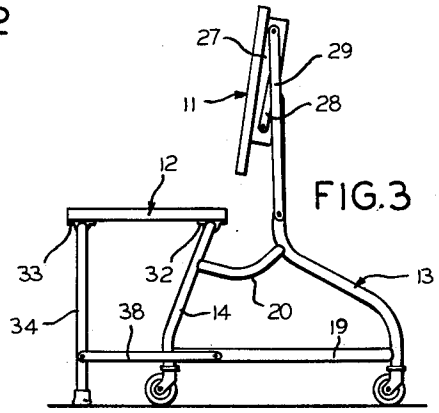


FIG. 3

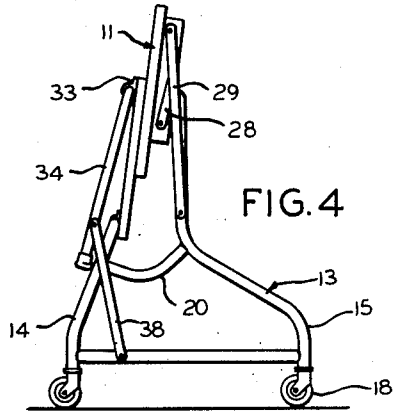


FIG. 4

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CONVERTIBLE TABLE-BENCH

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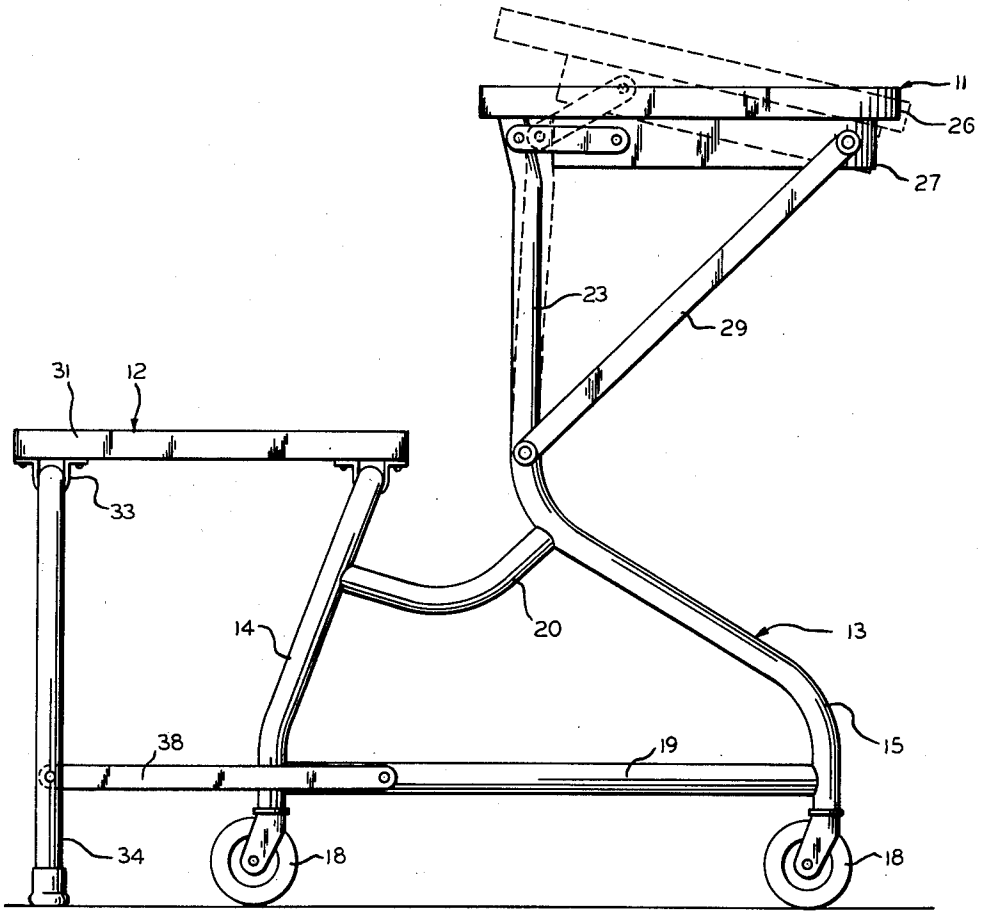


FIG. 5

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CONVERTIBLE TABLE-BENCH

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7 Claims. (Cl. 297—124)

This invention relates to a convertible table-bench structure, and more particularly to a structure having selective utility as a bench-equipped table and as a backrest-equipped bench; and which, in addition, is foldable into a portable compact unit convenient for storage and shipment.

Furniture capable of serving a plurality of uses is advantageously employed in public buildings such as schools for, in addition to reducing capital outlays, it conserves space which is always at a premium. An example of furniture of this type is a convertible table-bench structure which is selectively usable as a table having a horizontal top and a bench providing seats, and usable as a bench having a generally vertical backrest. The provision of a convertible structure of this type is one of the objects of this invention.

Another object of the invention is in the provision of a convertible structure of the character described, in which a single component comprises both the tabletop and the backrest, and is selectively converted from one use to the other. Still another object is in the provision of a convertible table-bench of the type described, wherein the entire structure is foldable into a compact unit which is conveniently stored and transported.

A further object of the invention is to provide a table-bench structure having a component selectively positionable for use as a generally horizontal tabletop and as a generally vertical backrest, and in which such component is automatically maintained in either position so as to prevent collapse or inadvertent shifting from one position to the other. Still a further object is that of providing a convertible structure of the character described, which is stable in either of its useful positions, which is conveniently and easily shifted between the selective positions of use, and which is also readily folded into a compact unit.

Additional objects and advantages of the invention will become apparent as the specification develops.

An embodiment of the invention is illustrated in the accompanying drawings, in which—

FIGURE 1 is a perspective view of the structure illustrating the same as a table-bench; FIGURE 2 is an end view in elevation of the structure illustrated in FIGURE 1; FIGURE 3 is an end view of the structure converted into a backrest-equipped bench; FIGURE 4 is an end view in elevation of the structure showing the same folded into a compact storage unit; and FIGURE 5 is an enlarged, end view in elevation similar to that of FIGURE 2 but showing an intermediate position of the tabletop and associated elements in broken lines prior to being moved into the full tabletop position thereof.

The convertible structure in its entirety is designated with the numeral **10**, and comprises a selectively positionable element **11**, a seat or bench **12** and a frame composition **13**. The element **11** is selectively movable between a generally horizontal position illustrated in FIGURES 1 and 2 wherein it serves as a tabletop, and a generally vertical or upwardly extending position as shown in FIGURE 3 wherein it serves as a backrest for the bench **12**. The bench **12** is also selectively movable between the horizontal seat position shown in FIGURES 1 through 3 and a generally vertical position as shown in FIGURE 4, wherein it is adjacent and substantially parallel to the element **11** in the backrest position thereof. This latter

configuration defines the collapsed or folded condition of the structure suitable for storage and shipment.

The frame **13** is equipped with transversely spaced front and rear legs **14** and **15** at one end thereof, and similarly spaced front and rear legs **16** and **17** adjacent the other end of the structure. Preferably, each of the legs is equipped with a roller or caster **18** that enables the structure to be rolled from one location to another when the bench **12** is folded, as shown in FIGURE 4. The legs **14** and **15** are connected together adjacent the lower ends thereof with a reinforcing member **19**, and are also rigidly related adjacent the other end portion of the leg **14** by a brace **20**. Similarly, the legs **16** and **17** are rigidly related with a reinforcing element **21** and brace **22**. In the structure shown, the frame **13** is formed of metal tubing, and the rigidly related components thereof are welded together. Such an arrangement affords strength without undue weight and is advantageous in this respect. The legs **15** and **17** are respectively provided with integral extensions **23** and **24** that project upwardly therefrom and define supports adapted to seat the element **11** in its tabletop position.

The supports **23** and **24** are parallel and are oriented so that they define a substantially vertical or upwardly extending plane, and are turned laterally slightly at the upper ends thereof (as shown at **25**) and extend forwardly slightly in the direction of the front legs **14** and **16**. The supports **23** and **24** are somewhat flexible, and although the intrinsic resilience thereof tends to bias the same toward the vertical position shown by broken lines in FIGURE 5, the supports can be deflected forwardly against such resilience and into the position shown by full lines in that figure. The purpose of such arrangement will be described in detail hereinafter.

The selectively positionable element **11** comprises a generally planar wall **26** that per se serves as the tabletop and backrest of the convertible structure. The wall **26** is equipped with a frame having longitudinally spaced, transversely extending end members **27** respectively connected with the supports **23** and **24** by links **28**. The links are pivotally connected at one end thereof to the associated supports at the inclined end portion **25** thereof, and are pivotally connected at their other ends with the respective frame members **27**. Preferably, two links **28** are provided for each frame member **27** and support, and the paired links are disposed on opposite sides of the frame member. With such a configuration, the supports **23** and **24** are oriented in respective transverse alignment with the frame members **27**. Also, each of the frame members **27** is pivotally connected with the associated support by a pair of elongated links **29** and **30**, and the links of each pair are disposed on opposite sides of the associated frame member **27**, and are pivotally secured at one end to the support and at the other end to the frame member.

The bench **12** comprises a generally planar wall **31** that per se forms the seat for the structure. The wall **31** is pivotally secured by U-shaped brackets **32** to the longitudinally extending cross bar that interconnects the front legs **14** and **16** at the upper ends thereof and is preferably formed integrally therewith. Along its forward, longitudinally extending edge, the wall **31** is pivotally connected by brackets **33** by a leg assembly **34** of inverted, generally U-shaped configuration having depending legs **35** and **36** formed integrally with a horizontally disposed, longitudinally extending cross bar **37**. The legs **35** and **36** are respectively connected with the reinforcing members **19** and **21** by links **38** and **39**. The link **38** is pivotally connected at one end to the leg **35** and at its other end to the member **19**; and correspondingly, the link **39** is pivotally connected at the opposite ends thereof to the leg **36** and member **21**.

The bench **12** is selectively movable between the horizontal position thereof shown in FIGURES 1 through 3 and the generally vertical or folded position thereof illustrated in FIGURE 4. Movement between these positions is effected by a pivotal or swinging movement of the wall **31** about the cross bar of the legs **14** and **16** which defines a pivot axis. During such movement, the leg assembly **34**, and in particular the depending legs **35** and **36** thereof, are maintained in a generally vertical disposition by the links **38** and **39**. Thus, in the folded position of the bench **12**, the legs **35** and **36** are drawn inwardly by the links **38** and **39** and into substantial adjacency with the front legs **14** and **16** of the frame structure **13**. On the other hand, when the bench is horizontally disposed, the links **38** and **39** prevent pivotal movement of the legs **35** and **36** with respect to the axis defined by the cross bar **37** thereof, and thereby constrain the legs **35** and **36** in a vertical position wherein they support the bench structure and particularly the planar wall **31** thereof. Also at such time, since the legs **35** and **36** are in a floor-engaging position as shown in FIGURES 2 and 3, they tend to prevent rolling movement of the entire structure **10** upon the casters **18**.

The element **11**, as stated before, is movable between the horizontal tabletop position of FIGURES 1 and 2 and the backrest position of FIGURE 3. In contrast to the simple pivotal movement described by the structure **12** about the cross bar of the legs **14** and **16**, the element **11** has a more complex movement and both swings about the pivotal axis formed by the connection of the links **28** with the supports **23** and **24** and rotates about the pivotal axis defined by the connection of the links **28** with the frame ends **27**. This complex movement of the element **11** is best illustrated in FIGURE 5, which shows the element **11** in broken lines just prior to the movement thereof completely into its tabletop position. At such time, the wall **26** of the element **11** is generally horizontally disposed but inclines slightly in a forward and upward direction. From this disposition, if the element **11** is moved toward the backrest position thereof, the links **28** will move in a counter-clockwise direction about their pivotal connections with the supports **23** and **24**; and similarly, the links **29** and **30** will also move in a counter-clockwise direction relative to their pivotal connections with the supports **23** and **24**. However, at the same time, the frame ends **27** will move relative to the links **28** in a clockwise direction about the pivotal axes defined by the connection of the links with the frame ends. Such relative movement of the various components will continue until the element **11** is in the backrest position thereof.

Assuming that the element **11** is moved from the angular position shown by broken lines in FIGURE 5 and completely into the tabletop position thereof, the forward end portion of the planar wall **26** simply moves downwardly until the upper ends of the supports **23** and **24** are in abutment with the undersurface thereof. At such time, further downward movement of the element **11** is prevented because of the abutment of the supports with the planar wall **26** along the forward edge portion thereof and because of the constraint exerted on the rear edge portion of the wall **26** by the elongated links **29** and **30**. It will be noted, however, that in moving the forward end portion of the wall **26** downwardly, the supports **23** and **24** are necessarily deflected forwardly because of the force applied to the upper ends thereof by the links **28**. That is to say, the horizontal component of the force applied to the upper ends of the supports by the links **28** is normal to the longitudinal or vertical axes of the respective legs, and is of sufficient magnitude to overcome the intrinsic resilience thereof. It will be apparent that deflection of the supports **23** and **24** occurs because the element **11** cannot move bodily toward the right with respect to the upper end portions of the supports since such movement is prevented at that time by the rigid links **29** and **30**.

The resilience of the supports **23** and **24** tending to restore the same to the prestressed condition thereof applies a force to the element **11** tending to lock the same in the tabletop position thereof, and preferably the dimensional configuration is such that the links **28** are slightly over-center when the upper ends of the supports **23** and **24** abut the undersurface of the planar wall **26**. Thus, the biasing force of the supports tends to urge the forward edge portion of the element **11** downwardly, but such downward movement is prevented by the engagement of the supports **23** and **24** with the wall **26**. This positive locking of the element **11** in the tabletop position thereof is overcome by grasping the forward edge portion of the wall **26** and lifting the same upwardly, which swings the links **28** over-center in the opposite direction and into the position shown by full lines in FIGURE 5. Thereafter, the element **11** is freely swingable into the backrest position thereof.

While in the foregoing specification an embodiment of the invention has been described in considerable detail for purposes of making a complete disclosure thereof, it will be apparent to those skilled in the art that numerous changes may be made in those details without departing from the spirit and principles of the invention.

I claim:

1. In a table-bench structure having an element selectively positionable for use as a table top and backrest, a frame equipped with a pair of upwardly extending supports oriented in spaced apart, substantially parallel relation, each of said supports being resiliently deflectible in respective vertically extending planes oriented in substantially parallel relation when a force of sufficient magnitude is applied to the supports adjacent the upper ends thereof along lines substantially normal to the respective longitudinal axes thereof, said selectively positionable element comprising an elongated, generally planar surface member of greater length than the distance between said supports so as to be brought into abutment with the upper ends thereof and comprising also a pair of transversely extending frame portions respectively located adjacent the transverse edges thereof, a pair of first links each pivotally connected adjacent one end thereof to the respective frame portions and being pivotally connected adjacent the other end thereof with the respective supports at locations remote from the upper ends thereof, and a second pair of links each pivotally connected adjacent one end thereof to the upper ends of the respective supports and also being pivotally connected adjacent the other end thereof with the respective frame portions, said links affording selective movement of said element between a table position wherein the element is generally horizontally disposed and a backrest position in which said element is generally vertically disposed, said links being dimensionally proportioned so that movement of said element completely into the table position thereof deflects said supports so that the resultant force tending to restore said supports to the prior position thereof locks said element in the table position.

2. In a table-bench structure having an element selectively positionable for use as a table top and backrest, a frame equipped with a pair of upwardly extending supports oriented in spaced apart, substantially parallel relation, each of said supports being resiliently deflectible in respective vertically extending planes oriented in substantially parallel relation when a force of sufficient magnitude is applied to the supports adjacent the upper ends thereof along lines substantially normal to the respective longitudinal axes thereof, said selectively positionable element comprising an elongated, generally planar surface member of greater length than the distance between said supports so as to be brought into abutment with the upper ends thereof and comprising also a pair of transversely extending frame portions respectively located adjacent the

transverse edges thereof, a pair of first links each pivotally connected adjacent one end thereof to the respective frame portions and being pivotally connected adjacent the other end thereof with the respective supports at locations remote from the upper ends thereof, and a second pair of links each pivotally connected adjacent one end thereof to the upper ends of the respective supports and also being pivotally connected adjacent the other end thereof with the respective frame portions, said links affording selective movement of said element between a table position wherein the element is generally horizontally disposed with said second pair of links in an over-center relation and a backrest position in which said element is generally vertically disposed, said links being dimensionally proportioned so that movement of said element completely into the table position thereof deflects said supports so that the resultant force tending to restore said supports to the prior position thereof urges said element toward further movement in the path traversed thereby in moving to said table position which further movement is prevented by abutment of said surface member with the upper ends of said supports whereby said element is locked in such table position.

3. The table-bench structure of claim 2, in which said supports are tubular components having the upper end portions thereof angled laterally in the direction of the deflection enforced thereon by movement of said element into the table position thereof.

4. In a table-bench structure having an element selectively positionable as a tabletop and a backrest, a frame equipped with a pair of upwardly extending supports resiliently deflectible along the longitudinal axes thereof when a force of sufficient magnitude is applied to the upper end portions thereof, said selectively positionable element comprising an elongated, generally planar surface member engageable with the upper ends of said supports when said element is in the tabletop position thereof, a pair of first links each pivotally connected adjacent one end thereof with said surface member and being pivotally connected adjacent the other end thereof with the respective supports at locations remote from the upper ends thereof, and a second pair of links each pivotally connected adjacent one end thereof with said surface member and being pivotally connected adjacent the other end thereof with the respective supports adjacent their upper ends, all of said links affording selective movement of said element between a tabletop position wherein the element

is generally horizontally disposed and a backrest position in which said element is vertically disposed, said links being dimensionally proportioned so that movement of said element completely into the tabletop position thereof deflects said supports whereby the resiliency thereof tends to maintain said element in its tabletop position.

5. The structure of claim 4 in which said links are also dimensionally proportioned so that movement of said element completely into the tabletop position thereof disposes said second pair of links in an over-center position.

6. The structure of claim 4, and further comprising a bench carried by said frame and being adapted to provide a seat both when said element is in its tabletop position and backrest position.

7. The structure of claim 6 in which said bench is pivotally carried by said frame for selective movement between a generally horizontal seating position and a generally vertical position in adjacency with said element when the latter is in the backrest position thereof.

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