Oct. 20, 1959 A. P. LANTZ 2,908,984

BALL BEARING IRONING BOARD AND A PAIR OF AUTOMATICALLY UNFOLDING SUPPORTING LEGS THEREFOR

Filed Aug. 25, 1954 3 Sheets-Sheet 1

FIG. 1.

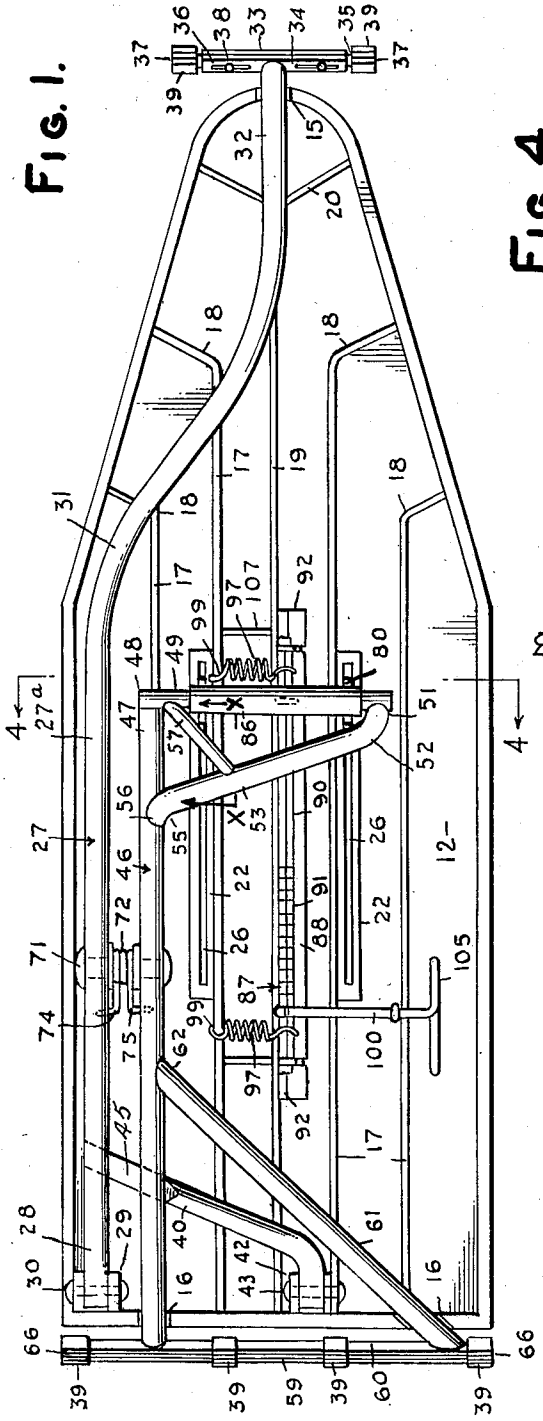
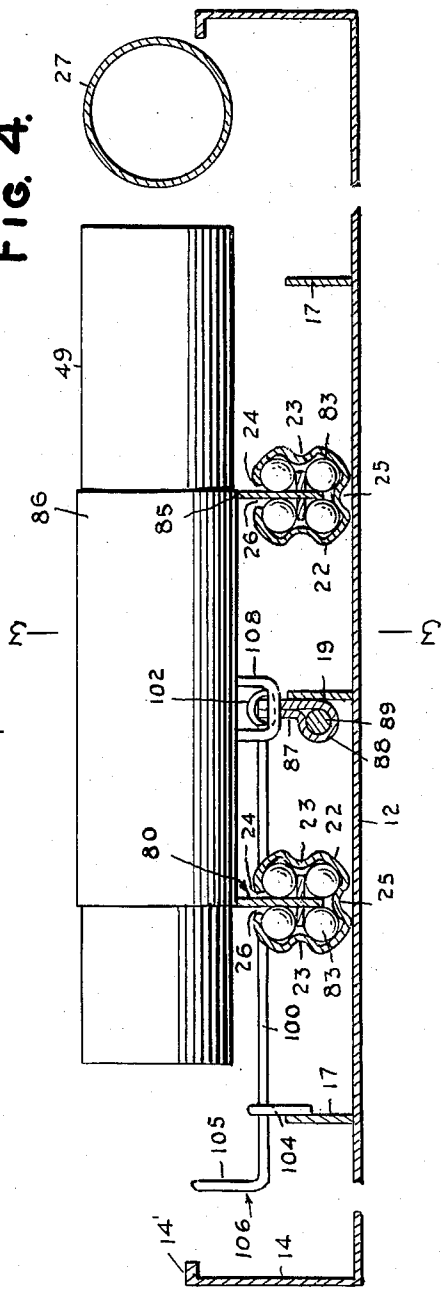


FIG. 4.



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FIG. 2.

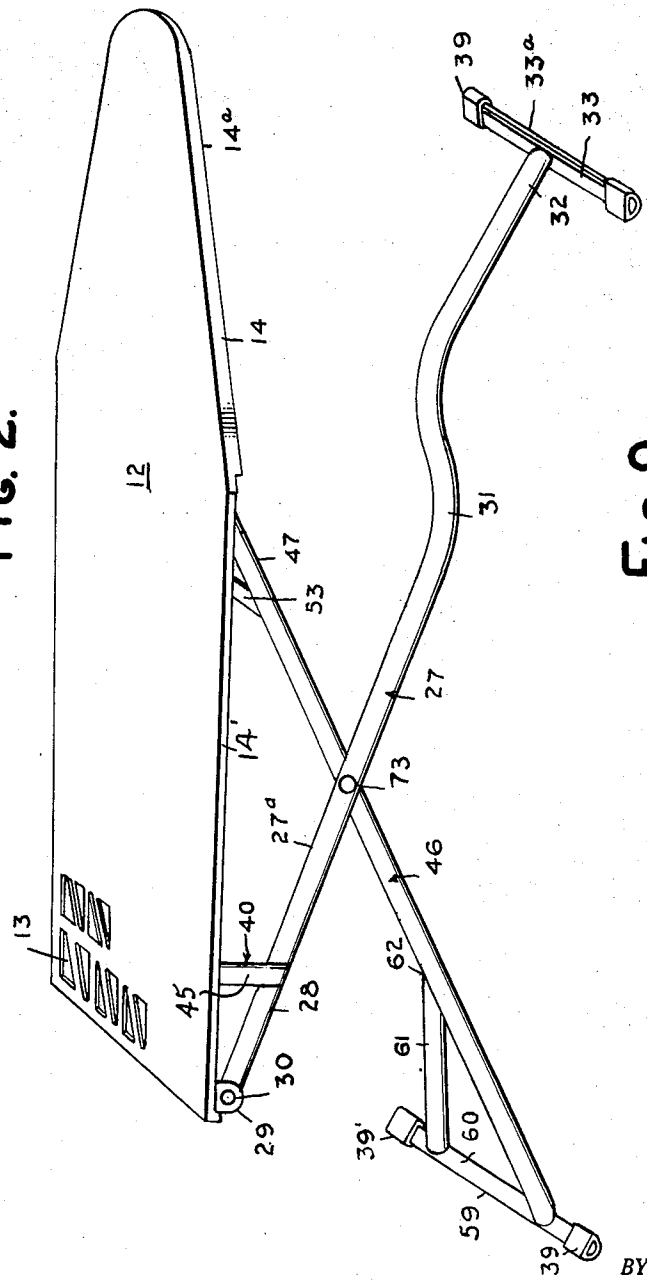
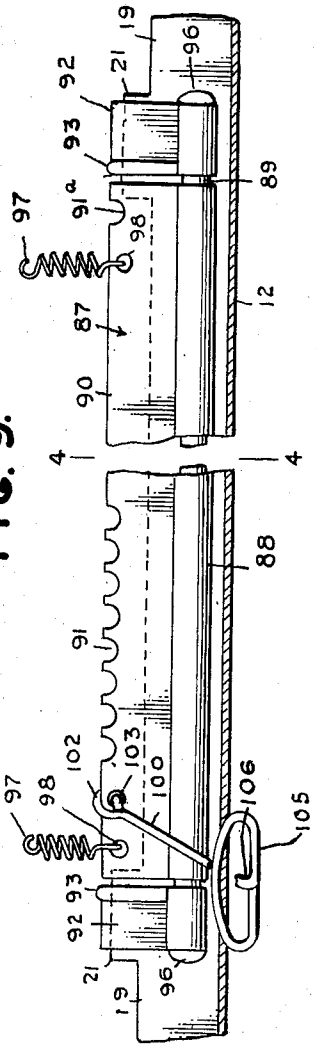


FIG. 9.



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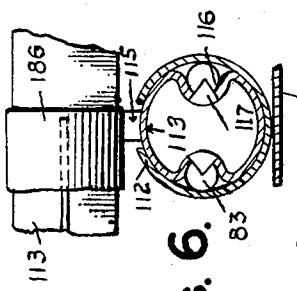


FIG. 6.

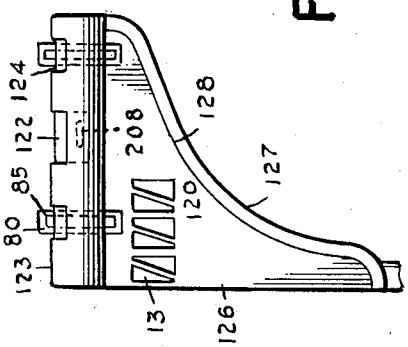
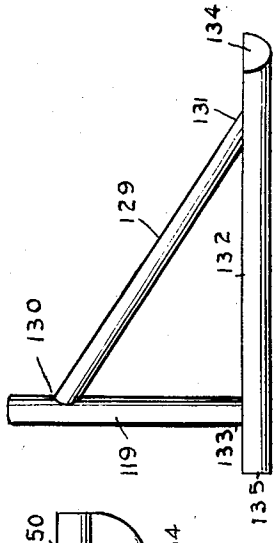


FIG. 11.



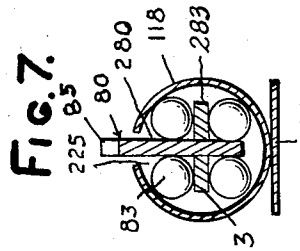


FIG. 7.

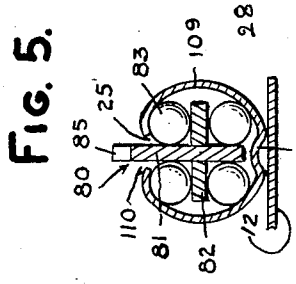


FIG. 5.

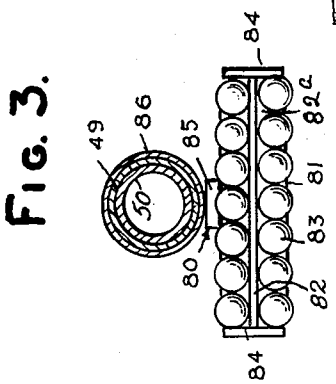


FIG. 3.

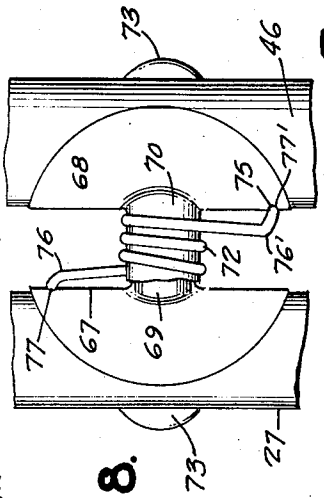


FIG. 8.

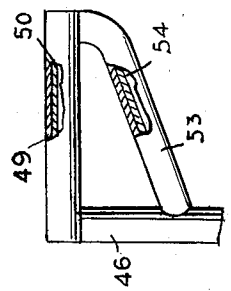


FIG. 12.

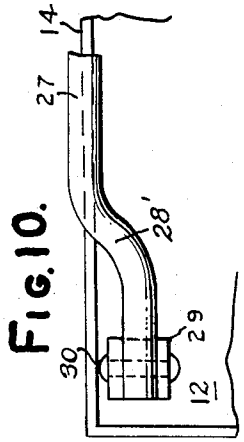


FIG. 10.

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BALL BEARING IRONING BOARD AND A PAIR OF AUTOMATICALLY UNFOLDING SUPPORTING LEGS THEREFOR

Alpha Perry Lantz, Washington, D.C.

Application August 25, 1954, Serial No. 452,068

19 Claims. (Cl. 38—121)

This invention relates to an improvement in light weight ironing boards or tables of the type having folding leg elements including a sliding pivot for one of the leg elements, and wherein said sliding pivot is mounted on bearing balls. To avoid the necessity of having to shake or jar the board to unfold the leg elements. I provide means for automatically unfolding the leg elements upon release thereof.

The primary object of this invention is the provision of guide members on the under side of the board for the sliding pivot and to interpose bearing balls between said sliding pivot and the guide members, to facilitate adjustment of the height of the board in operative position. The provision of bearing balls permits smooth operation of the leg elements in assuming adjusted position, and prevents sticking or hesitation in the movement of the pivot of the leg element.

Another object of this invention is the provision of supporting leg elements arranged to provide rigidity of support and said leg elements being in crossed relation intermediate their ends and adjacent the plane of one edge of the board, thus providing ample knee room for a person seated in a chair at the board.

Another object of this invention is the provision of trunnions and pin means pivotally connecting the leg elements at their crossing point, and spring means for automatically unfolding said leg elements.

A further object of this invention is the provision for automatically projecting the leg elements whereby an operator may set the board up without strain; obviating the necessity of holding the board for adjustment of the leg elements or pulling up on the board to adjust the height thereof.

Another object of this invention is to provide a board with a flange or border having depressed portions to accommodate the leg elements in closed position to the under side of the board, and to effect a maximum reduction in the bulk of the board for shipment or storage.

Many novel details in construction and arrangement of parts and various features of practical embodiments of the invention will appear in the following detailed description taken with the accompanying drawings which illustrate the preferred form of the invention as well as several modified arrangements of parts thereof. It is to be understood that in matter of detail and arrangement, equivalent elements may be resorted to without departing from the spirit of the invention.

In the drawings:

Fig. 1 is a bottom plan view of the ironing board with the legs in folded position;

Fig. 2 is a perspective view of the ironing board in operative position;

Fig. 3 is a fragmentary end view of the cross bearing with parts omitted, on the line 3—3 of Fig. 4, and a side view of the bearing carrier;

Fig. 4 is a fragmentary section through the board showing the guide members and the cooperating bearing balls

carrying the sliding pivot taken substantially on the line 3—3 of Fig. 4.

Fig. 5 is a fragmentary cross section of a modified form of the guide member and the bearing balls therefor;

Fig. 6 is a further modification showing a modified form of a cross head secured to a modified bearing carrier;

Fig. 7 is a fragmentary cross section of a further modification having the bearing carrier of Fig. 4 and the guide member of Fig. 6;

Fig. 8 is an enlarged fragmentary detail of the leg elements pivot structure and the spring for unfolding the legs;

Fig. 9 is an enlarged fragmentary view showing details of the locking means;

Fig. 10 is a fragmentary view of a modified form of the long leg element;

Fig. 12 is an enlarged fragmentary cross section taken on the line X—X of Fig. 1;

Fig. 11 is a modified form of a short leg element.

Referring now to the drawing wherein like characters of reference indicate like parts throughout the several views, with particular reference to Figs. 1 to 4, numeral **12** indicates the flat top of my ironing board table. The table top **12** is provided with a plurality of triangular-shaped openings **13**, for ventilation and reduction of weight. A depending flange **14** surrounds the periphery of the table top **12** and bent inwardly at **14'**, as shown in Fig. 4.

At the smaller end of the board there is a depressed portion **15** in the flange **14** to accommodate the long leg element in folded position. At the larger end of the board there are a pair of spaced depressed portions **16** in the flange **14**, to accommodate the short leg element in folded position. The depressed portions **15** and **16** are of a depth only part of the height of the flange **14**, the remaining portion being equal in height to the height of the reenforcing strips **17** secured to the under side of the board top **12**.

The reenforcing strips **17** are arranged in pairs, spaced from a central reenforcing strip **19** secured along the longitudinal center line of the board. The reenforcing strips **17** are bent outwardly at **18** and extend to the flange **14**. The reenforcing strip **19** has a V-shaped outer end **20**, extending to the flange **14**. The reenforcing strip **19** is provided intermediate its ends with spaced portions **21** to which hinge leaves are secured, later to be described, for hingedly mounting the locking mechanism to the center reenforcing strip **19**.

A pair of longitudinal parallel tubular guide members **22** are secured to the under side of the board and extending longitudinally thereof. Each guide **22** having a longitudinal inwardly pressed groove **23** in each opposite side, a top longitudinal inwardly pressed groove **25**, and a bottom longitudinal inwardly pressed groove **24**. Each guide **22** is provided with a longitudinal slot **26** in its bottom inwardly pressed groove **24**, as seen in Figs. 1, 4, 5, 6, and 7.

A pair of supporting leg elements pivotally connected intermediate their ends, and located adjacent one edge of the board, will now be described. These leg elements are preferably tubular, but may be formed from metal other than tubular. This ironing board table is made of light weight metals, or other suitable materials.

The long supporting leg element **27** has a straight upper portion pivotally mounted at its upper end **28**, by means of a pin **30**, in a U-shaped stirrup **29** secured on the under side of the board adjacent the larger end thereof. The straight portion **27'** of the leg element **27**, extends obliquely downwardly adjacent the rear edge of the board, as seen in Fig. 2, and is bent inwardly as at **31**

and curves forwardly and downwardly below the board to a point below the longitudinal center of the smaller end of the board, its lower end 32 bottom end is rigidly attached to a semi-tubular foot element 33, flat upper surface 34. Semi-tubular extensions 35 slidable mounted in the semi-tubular foot element 33 opposite ends and each extension has its outer end closed at 37. A button 38 is attached to each semi-tubular extension, and each button extends through a longitudinal slot 36 adjacent the opposite ends of the semi-tubular foot element flat surface, and each button 38 wider portion fits snugly over each slot 36 to retain the extensions in a fixed position or extended position. The outer ends of the extensions have thick rubber rims 39 to prevent sliding of the foot element 33 on the floor.

A short arm 40 has its flattened lower end fixed to the long leg element 27 adjacent the upper end 28, then the short arm 40 extends obliquely across the board and pivotally connected at its upper end by means of a pin 43, in a U-shaped stirrup 42 fixed on the under side of the board 12. The stirrups 29 and 42 extend below the reenforcing strips 17, 19 to allow the leg elements to lie over the reenforcing strips. The short arm 40 is preferably tubular, though it may be otherwise formed.

The short leg element 46 upper end has a triangular configuration. The short leg element 46 is straight and has its upper end 47 secured to the rear end 48 of a tubular cross head 49 extending transversely of the board, and the forward end of the tubular cross head 49 is secured to the upper end 51 of a tubular short arm 53 which curves rearwardly at 52 below the tubular cross head 49 and secured at 55 in a depression 56 in the short leg element 46 adjacent its upper end. A tubular brace 57 extends between the short arm 53 and the tubular cross head 49 to reenforce the cross head 49 at 48 if needed.

The tubular cross head 49 may be reenforced by means of a coextensive insert 50 as shown in Fig. 12. The short arm 53 may be reenforced by means of a coextensive insert 54 or these coextensive inserts 50 and 54 may be omitted if preferred.

A leg member 61 is secured at 62 to the leg element 46 below the pivot point, and extends obliquely downwardly under the board and secured to the flat upper surface 60 of the semi-tubular foot element 59 at a point near one end thereof. The semi-tubular foot element 59 other end has its flat upper surface 60 secured to the bottom end of the short leg element 49. The foot element 59 having closed ends 66, and thick rubber rims 39 as seen in Fig. 1. The foot elements 33 and 59 each extends transversely on the floor foundation.

I provide a novel pivot interconnection for pivoting the leg elements 27, 46 together intermediate their ends. Semi-circular plates 67, 68 are secured to the leg elements 27, 46 respectively at opposite points, these semi-circular plates 67, 68 having laterally extending trunnions 69, 70 as seen in Fig. 8. The trunnion 69 being of a size to fit within and rotate in the trunnion 70. A pin 73 passes through the leg elements 27, 46 including the trunnions 69, 70 and is headed at 71. A helical spring 72 having a number of coils surrounding the trunnion 70 and has its one end 74 bent at 76 and secured in the opening 77 in the semi-circular plate 67 and the leg element 27, and the spring 72 other end 75 is bent at 76' and secured in the opening 77' in the semi-circular plate 68 and the leg element 46, for projecting the leg elements 27, 46 from an inactive form to a workable form.

The short leg element 46 has its upper end tubular cross head 49 rotatably mounted in the tubular sliding bearing hinge 86. This tubular sliding bearing hinge 86 is secured on a pair of downwardly extending portions 85 of the bearing carriers 80 as seen in Figs. 1, 3, 4. Each bearing carrier comprising crossed members 82, 81, 81' forming V-shaped raceways or longitudinally extending pockets 82*a* to accommodate a plurality of bearing balls 83 in each longitudinal pockets 83*a* intermediate the opposite end stops 84 of each bearing carrier 80, and each bearing carrier 80 mounted movable in each guide member 22 already described, and seen in Fig. 4. The portions 85 extend downwardly through the slots 26 in the guide members 22 and there below in order that the tubular sliding bearing hinge 86 may clear the guide members 22.

The above described arrangement provides easy, smooth and fast operation for the short leg element in longitudinal movement of the board, for all required operations. The arrangement of the bearing balls 83 in the novel V-shaped pockets 82*a* of the bearing carriers 80 and the longitudinal inwardly pressed grooves 24, 23 and 25, which prevents any transverse turning of the bearing carriers 80.

The locking means comprising a longitudinal hinge leaf 87 formed of a flat strip of rigid metal folded through its longitudinal center portion upon itself to form a bearing 88 about a longitudinal rod 89. At each opposite end of the hinge leaf 87, there is a narrow hinge member 92 folded about the rod 89 and attached to the portions 21 of the reenforcing strip 19 for pivotally connecting the hinge leaf 87 extending longitudinally thereof. The lower edge 90 of the hinge leaf 87 is provided with a plurality of spaced notches 91 for locking contact with the staple 108 or suitable abutment fixed on the tubular sliding bearing hinge 86. A distant spaced notch 91*a* n the lower edge 90 of the hinge leaf 87 for a purpose later to appear.

Enlarged abutment 93 are placed on the narrow hinge members 92 adjacent the ends of the hinge leaf 87 to reenforce the opposite ends of the hinge leaf 87 longitudinally. The ends of the rod 89 are headed as at 96. A pair of tension springs 97 having their one ends attached in openings 98 in the lower edge of the hinge leaf 87 adjacent each end thereof, and their opposite ends are connected at 99 to one of the reenforcing strips 17 seen in Fig. 1. An adjusting arm 100 has its rearward end forming a loop 102 pivotally rolled around the lower edge 90 of the hinge leaf 87 and connected through an opening 103 near its one end thereof, the arm 100 is slidable supported at 104 to the reenforcing strip 17 and extends toward the forward edge of the board and terminating in an elongated hand engaging handle 105 bent downwardly at 106 for easy engagement.

A pair of U-shaped braces 107 are spaced and secured to the reenforcing strips 19, 17 to rigid the strip 19 in the vicinity of the hinge leaf 87. The staple 108 or abutment cooperates in a fixed position with one of the notches 91 to lock the leg elements in one of the height adjusted positions, and the notch 91*a* retains the leg elements in closed position.

To unfold this table for use the board is held by the hand, with the short leg element foot element resting on the floor then the handle 105 is moved forwardly to release the hinge leaf 87 notch 91*a* from the staple 108. The spring 72 will project the leg elements, in this instance, to assume full height then the long leg element foot element is lowered to the floor and the handle 105 is released causing the staple 108 to engage one of the notches 91 to hold the table rigid for work. The operator may be seated at the table to move the handle 105 forwardly for pressing downwardly on the top 12 to adjust the height of the table if preferred, as the spring 72 holds the leg elements 27, 46 in erected position during adjustment. When the table is folded the handle 105 is moved again forwardly and by pressing downwardly on the top 12 will cause the leg elements to fold against the under side thereof, and the leg elements are locked thereunder when the handle 105 is released.

In Fig. 5 I show a modification of a bearing carrier 80 for the sliding bearing hinge 86. Here the tubular guide member 109 fixed on the under side of the board 12, corresponds to the tubular guide member 22, of the pre-

ferred form, and has a top and a bottom inwardly pressed groove **110** and **111** and each extending longitudinally thereof, and a slot **25** extending longitudinally in the bottom inwardly pressed groove. The bearing carrier **80** comprising cross members **80, 82', 82''** and bearing balls **83**, and is like the carriers of Figs. 3 and 4.

In Fig. 6 I show a further modification, wherein the cross head **113** comprising cross members **113', 113''** intermediate its ends. This cross head **113** has the same cross configuration as the bearing carriers seen in Figs. 3, 4 and rotatably mounted in the tubular sliding hearing hinge **186**. The cross head **113** has its opposite ends embedded in the upper end of the short leg element **46** and the upper end of the short arm **53** secured to the short leg element **46**. The tubular sliding bearing hinge **186** which is secured to a portion **115** extending downwardly from a tubular bearing carrier **113** slidably mounted in a tubular guide member **112** fixed on the under side of the board **12**. Here I show one guide member and one short bearing carrier, but two may be used. A slot **25** extending longitudinally in the under side of the tubular guide member **112**. Here the tubular bearing carrier **113** has an inwardly pressed groove **116** in each opposite side and extending longitudinally therein, and each inwardly pressed groove **116** provides a pocket for a plurality of bearing balls **83**. End stops **117** are provided at the opposite ends of each pocket **116** or groove to retain the bearing balls in place. A simplified construction may be used by omitting the grooves **116** and the bearing balls.

In Fig. 7 I show a tubular guide member **118** having a slot **225**. The bearing carrier **80** in this modification is identical with the carrier in Fig. 4, and has the cross members **283, 283, 283'** and bearing balls **83**.

In Fig. 10 I show a slightly modified form of the long leg element **27**, wherein its upper portion is bent forwardly and upwardly and its upper end is pivotally connected in a U-shaped stirrup **42** at the larger end of the board. Whereby the long leg element **27** extends obliquely downwardly beyond the rear edge of the board for the convenience of a comfortable chair thereunder.

In Fig. 11 I show still a further modification of a short leg element structure. Of which the leg element **119** upper portion comprising a triangular plate **120** with its upper end rolled into a tubular cross bearing, or a sliding bearing hinge **123**. A cross head **122** is rotatably mounted in said sliding bearing hinge **123**. The plate **120** is rigidly secured at its one straight edge **126** to the upper end portion of the leg element **119**, and has its other edge **127** or hypotenuse of the triangle curved and tapered toward the straight edge **126**. This curved edge **127** is rolled as at **128** to reenforce the edge thereof. The bearing carriers **80** (not seen in Fig. 10,) extending portions **85** are secured to the tubular cross head **122** through spaced openings **124** provided in the sliding tubular bearing hinge **123** and said openings **124** extend downwardly in the plate **120** to accommodate the rotating movement of the sliding tubular bearing hinge **123** for height adjustment, or when the leg is folded. An abutment or staple **208** is fixed to the cross head **122** and extends through an opening in the sliding tubular bearing hinge **123** and seen in dotted lines, thereunder, to cooperate with the locking hinge leaf **87**. The lower portion of the leg element **119** has a slanting short leg **129** secured at **130**, the bottom end of the leg **129** is secured at **131** adjacent the forward end of a foot element **132**. The bottom end of the leg element **119** is secured to the other end of the foot element **132** adjacent its end thereof. The foot element **132** has closed ends **135, 134**.

I claim:

1. In an ironing table including an elongated flat board having forward and rear edges and large and small ends; the novel structure comprising foldable leg elements including a long leg element and a short leg element pivotally interconnected in crossed relation intermediate their central portions for supporting the board; means near the large end of the board for hingedly mounting the upper end of the long leg element in a position adjacent the rear edge of the board, and in its extended position, the long leg element projecting downwardly below the board in a plane adjacent to and longitudinally of the rear edge thereof, the lower portion of said long leg element curving forwardly and downwardly below the small end of the board, a semi-tubular foot element fixed to the lower end of the long leg element and extending transversely of the board, a short arm mounted near the upper end of the long leg element and extending obliquely forwardly and upwardly under the board in the extending position of the long leg element, and hingedly mounted at the larger end of the board, the short leg element in its extended position projecting downwardly adjacent the rear edge of the board in the direction of the larger end thereof, means for hingedly mounting the upper end of said short leg element slidably relative to the board for height adjustment, said means comprising a pair of tubular bearing guides mounted on the under surface of the board intermediate the ends thereof and extending longitudinally thereof, a bearing carrier slidable in each said tubular bearing guide, each bearing carrier having a plurality of pockets therein and a plurality of bearing balls in each pocket, said tubular bearing guides each having a longitudinal slot therein, protruding means on each bearing carrier extending through said slots, a sliding tubular bearing hinge fixed adjacent its ends on said protruding means, a tubular cross head fixed on the upper end of the sliding short leg element and extending transversely under said tubular guide members and rotatably mounted within said sliding tubular bearing hinge, the cross head has its forward end fixed on the upper end of a short arm which curves rearwardly obliquely and secured adjacent the upper end of the short leg element, an additional leg member fixed to the short leg element below its pivot connection and extending obliquely downwardly below the board in its extending position, a semi-tubular foot element extending transversely of the board and attached adjacent its opposite ends to the bottom ends of the short leg element and the additional leg member.

2. The structure according to claim 1 wherein the means connecting the long and short leg elements together intermediate their central portions comprising semi-circular plates secured to the leg elements at opposite points and each semi-circular plate having a laterally extending trunnion, one trunnion fitting within the other trunnion, a pin passing through the leg elements including the plates and their trunnions, and a helical spring surrounding said other trunnion, the spring has its one end secured to the long leg element and its opposite end secured to the short leg element for automatically projecting the leg elements from a layaway condition to a workable position.

3. The structure according to claim 1 wherein each bearing carrier is a tubular member having a plurality of inwardly pressed grooves forming pockets for the bearing balls.

4. The structure according to claim 1 wherein the tubular bearing guides each having a top and a bottom inwardly pressed groove extending longitudinally thereof, a slot in each of the bottom inwardly pressed grooves and extending longitudinally thereof.

5. The structure according to claim 1 wherein the long leg element is provided with a rearwardly bent elbow adjacent the upper end thereof, whereby the long leg element extends in a plane beyond the rear edge of the board.

6. The structure according to claim 1 wherein said tubular short arm has a flattened lower end mounted

near the upper end of the long leg element, whereby the short leg element may lie thereover in folded position.

7. The structure according to claim 1 wherein each bearing carrier having a general configuration of a cross formed of longitudinal flat members providing 4 longitudinal pockets, and each said tubular bearing guide having an inwardly pressed groove in each opposite side and extending longitudinally thereof, including a top and a bottom inwardly pressed groove extending longitudinally of each tubular bearing guide, a slot in each said bottom inwardly pressed groove and the same extending longitudinally thereof, said bearing carriers are slidably carried in said tubular bearing guides by a plurality of bearing balls between said pockets and said inwardly pressed grooves, the ends of said pockets are closed to retain said bearing balls with said bearing carriers, an integral portion on each said bearing carrier protruding downwardly through said slots and below said slots and fixed to the sliding tubular bearing hinge.

8. The structure according to claim 7 wherein the bearing carriers comprises longitudinally extending cross members providing four V-shaped bearing pockets.

9. The structure according to claim 1 wherein said tubular bearing guides are provided with a plurality of circumferentially spaced longitudinally extending inwardly pressed grooves, said bearing balls being contained in said pockets of said bearing carriers and between the grooves; and wherein end stops are provided on said bearing carriers at the ends thereof to retain said bearing balls in said carriers.

10. The structure according to claim 9 wherein the bearing carriers comprise longitudinally extending crossed members providing V-shaped bearing pockets.

11. The structure according to claim 1 includes locking and height adjustment for the elements, said locking and adjusting means comprising a locking leaf rotatably mounted along the longitudinal center portion of the board on the under side thereof, said locking leaf comprising a long hinge portion and a pair of narrow hinge portions carried by a rod, one narrow hinge portion at each end of the long hinge portion, the narrow hinge portions are fixedly mounted on means on the underside of the board for pivotally mounting the long hinge portion swingable, notches in the lower edge of the long hinge portion and spaced longitudinally thereof, and detent means on the sliding tubular bearing hinge cooperating with the notches to hold the table in adjusted position.

12. The structure according to claim 11 wherein said narrow hinge members are provided with abutments at both ends of the locking leaf to reenforce said locking leaf longitudinally.

13. The structure according to claim 11 wherein the locking leaf comprises a longitudinal flat strip folded about said rod, and wherein said narrow hinge members each comprises a flat strip folded about said rod, and means for moving said locking leaf notched edge into and out of engagement with said detent.

14. The structure according to claim 13 wherein the means for moving the locking leaf into engagement with the detent comprising spring means connected to the long hinge leaf and a fixed means of the table.

15. The structure according to claim 14 wherein the locking means and height adjustment comprises spaced number of notches in the lower edge in the locking leaf including an individual notch, a detent on the sliding tubular bearing hinge, and an arm pivotally connected adjacent one end at the lower edge of the locking leaf, said arm extending toward the forward edge of the board and being provided with a hand loop, said individual notch locks the leg elements closed on the under side of the table.

16. In an ironing table, an ironing board of the character described having a large and a small end, front and rear edges and foldable leg elements pivotally interconnected intermediate their central portions, the long leg element hingedly mounted at its upper end on the under side of the board at the large end adjacent the rear edge thereof and having a short arm fixed adjacent its upper end, said short arm curving across below the board and being hingedly mounted at the large end intermediate the edges of the board, the lower portion of said long leg element curving under the board then on a line downwardly below the small end thereof, said short leg element having a triangular upper end extending transversely of the board, a bearing assembly comprising a tubular bearing guide fixed on the under side of the board and extending longitudinally thereof, said tubular bearing guide has a slot in its under side and extending longitudinally thereof, a bearing carrier slidably mounted in said tubular bearing guide and has a portion protruding downwardly through said slot and fixed on a sliding tubular bearing hinge, a plurality of bearing balls rotatable in the pockets of the carrier and the tubular bearing guide, said short leg element triangular upper end provides a tubular cross head carried by said sliding tubular bearing hinge, said slot permitting the movement of the carrier for moving said short leg element longitudinally of the bearing guide.

17. The structure according to claim 16 wherein transverse foot elements are mounted on the lower ends of the long and short leg elements and are provided with semi-tubular sliding extensions at each end.

18. The structure according to claim 15 wherein the cross head comprises longitudinally extending crossed members providing the cross head and rotatably mounted in said sliding tubular bearing hinge.

19. In a height adjustable ironing board of the character described, having a long leg element and a short leg element projecting longitudinally under the board in opposite directions and pivotally interconnected intermediate their central portions, a sliding bearing hinge means for the upper end of the short leg element, said means comprising spaced bearing guides extending longitudinally of the board intermediate the ends thereof and each having a slot extending longitudinally therein, bearing carriers slidably mounted in said bearing guides, each having a plurality of pockets therein and a plurality of antifriction bearings in said pockets, means on said carriers protruding through said slots, a tubular bearing hinge fixed on said protruding means, a tubular cross head fixed on the upper end of said short leg element and rotatably mounted within said tubular bearing hinge, a locking leaf pivotally mounted on the under side of the board and extending longitudinally along the center line thereof, cooperating locking means on said tubular bearing hinge and said locking leaf, and spring means for holding said locking leaf in operative position, whereby the ironing board may be adjusted to and held in any desired height position.

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