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GB 0667223
GB 0432002
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GB 0292061
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(54) Ironing apparatus

(57) Compact, collapsible ironing apparatus is disclosed having a base (23, 222) providing supportive disposition upon a supporting surface for carrying an ironing board (32, 202) and for supporting a hand iron (1, 201) above the ironing surface of the ironing board. A first upright member (21, 223) extends upwardly from the base for carrying at its upper end the

ironing board. A second upright member (20, 221) extends upwardly from the base and an iron support linkage (15, 17, 211) is swingably interconnected at one end to the upper end of this second upright member. The linkage comprises articulated arms (15, 17, 215, 216) which are extendable to positions over the ironing surface. An iron securement unit (9, 209) pivotally interconnects the distal end of the support linkage with the iron for permitting movement of the iron between first and second orientations respectively in and out of contact with the ironing surface. In one embodiment, the ironing board (202) is swingably mounted and the base includes folding leg members (229, 229'), movable between storage and use positions conjointly with swinging movement of the ironing board between its respective storage and use positions.

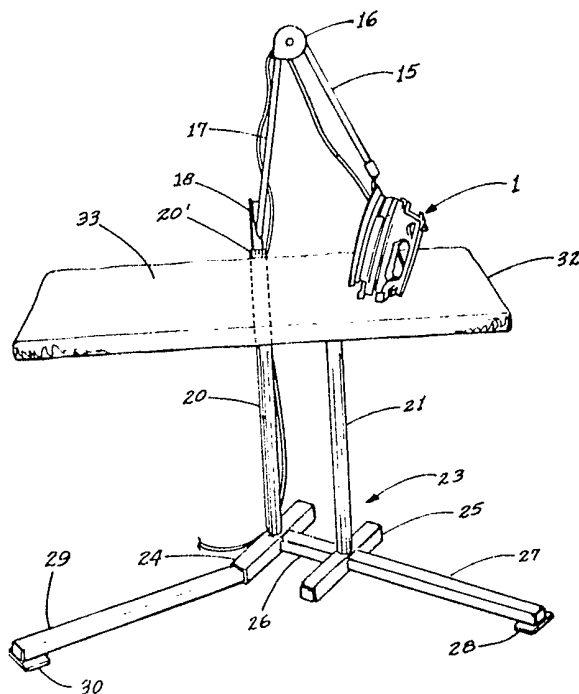


FIG. 4

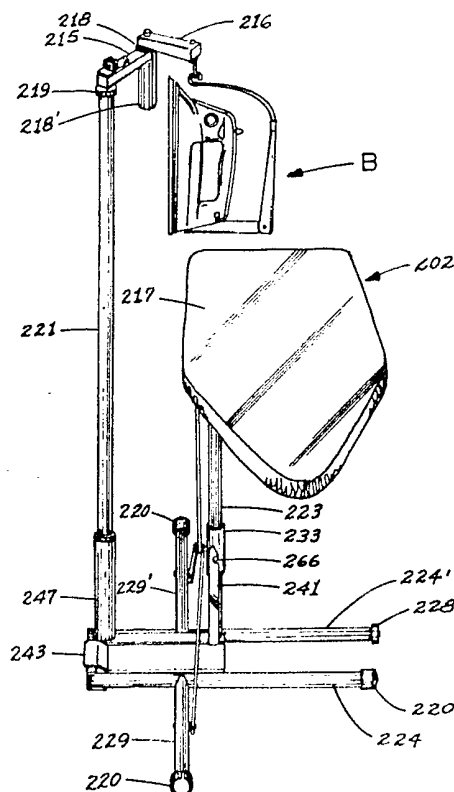
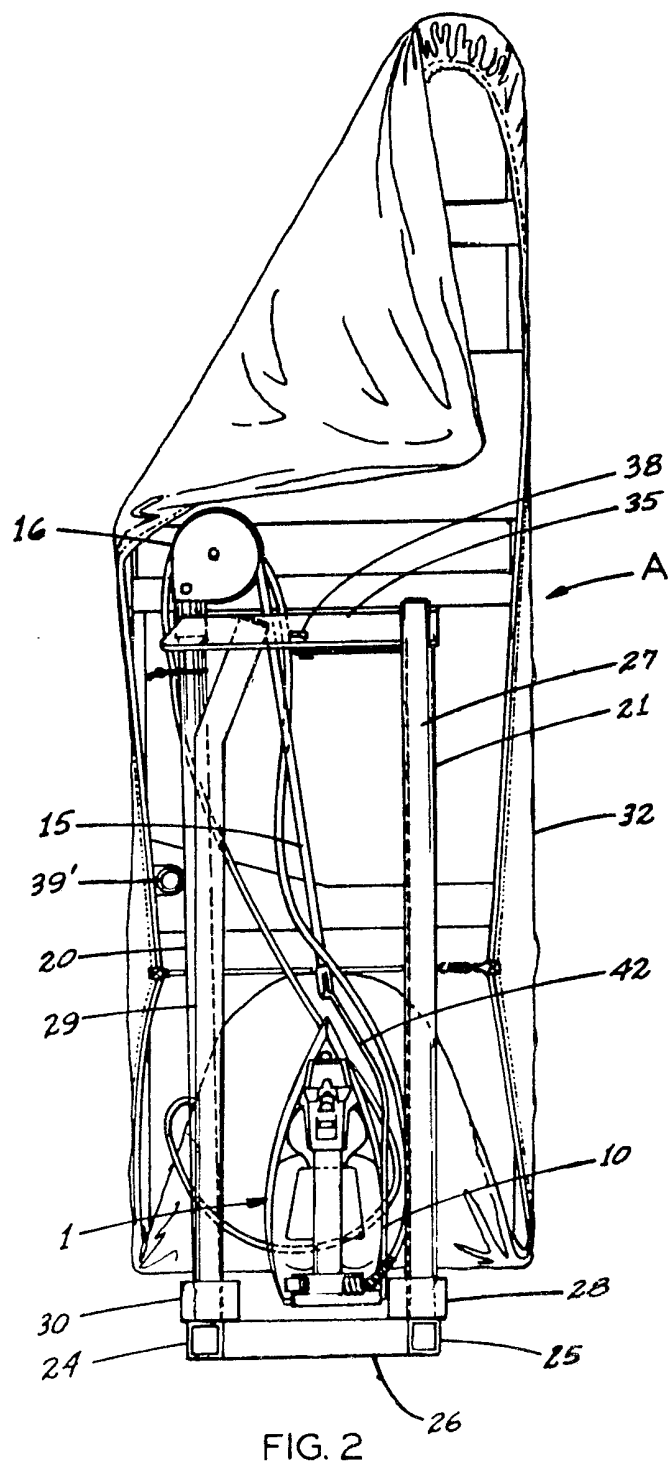
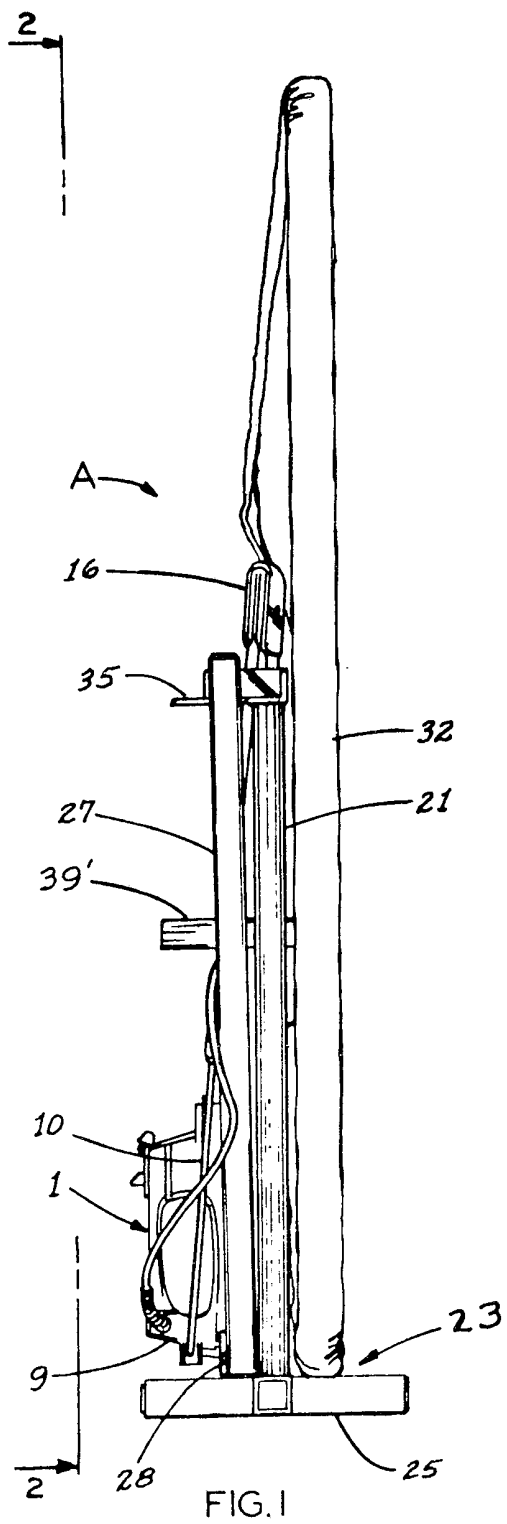
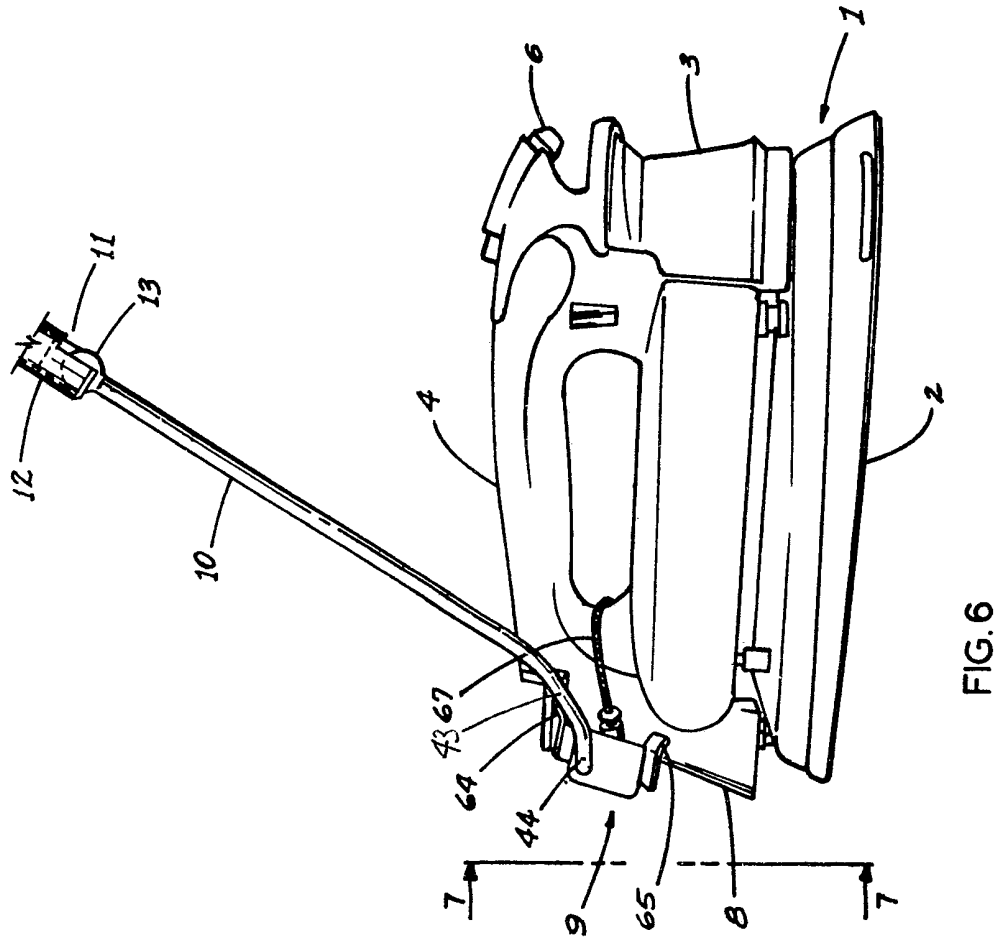
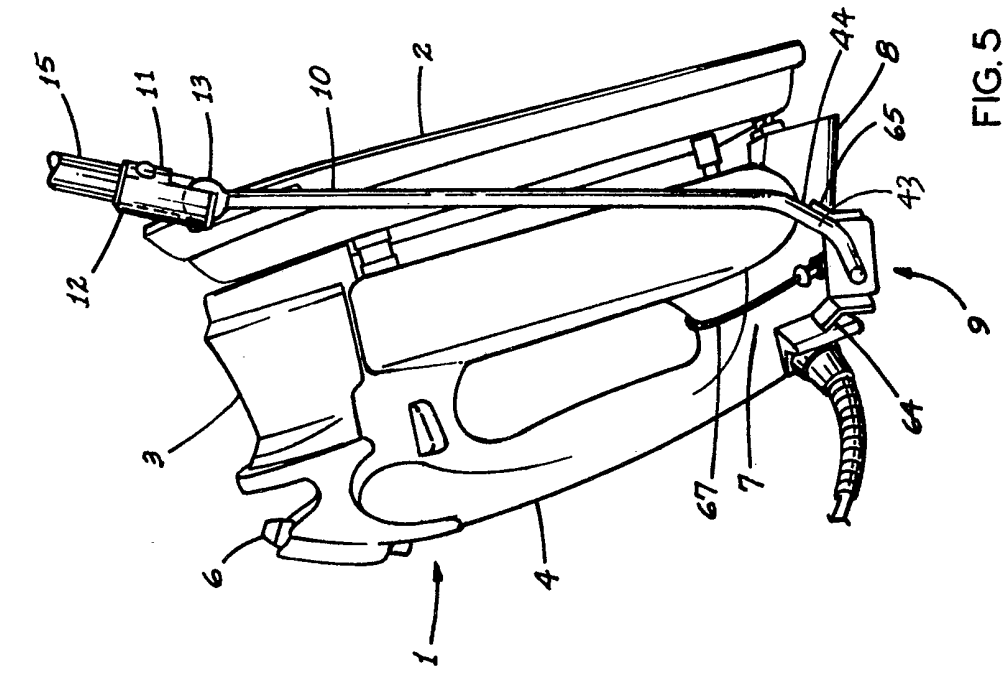


FIG. 25







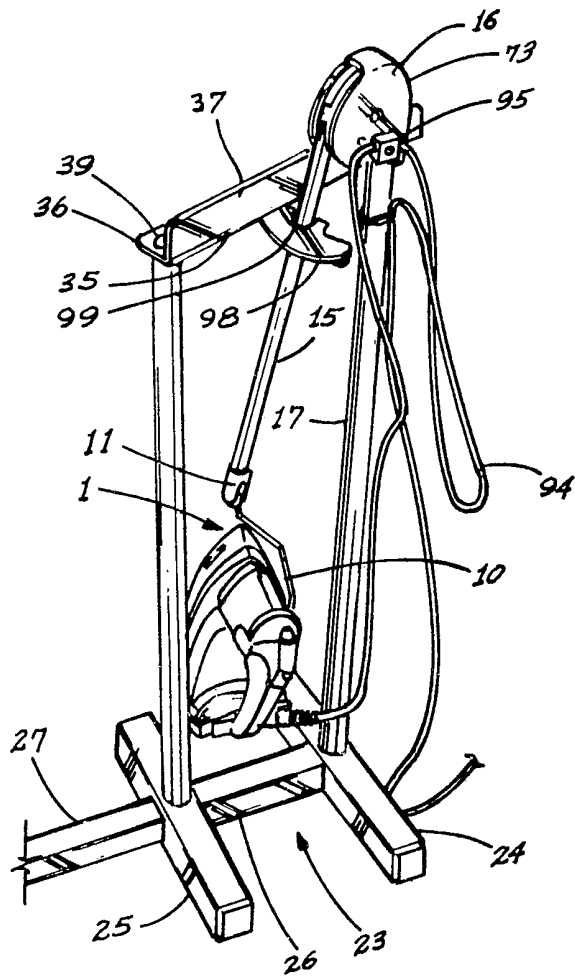


FIG. 12

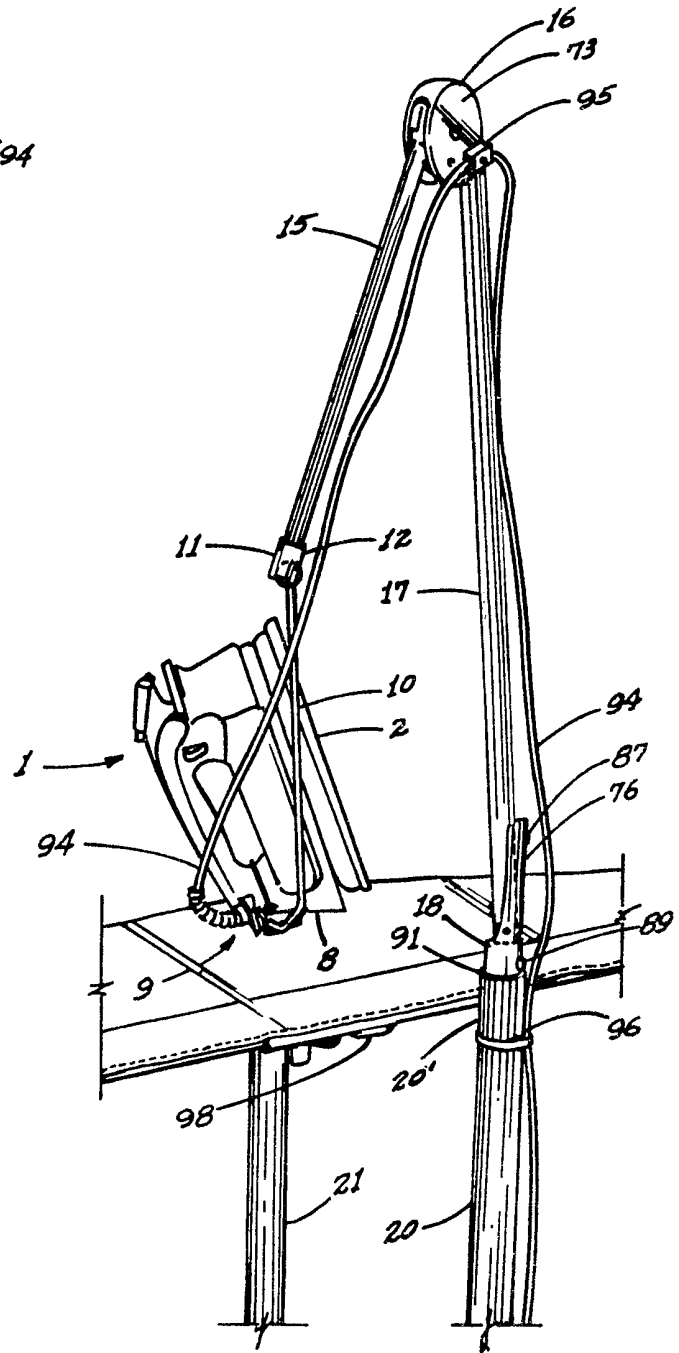


FIG. 13

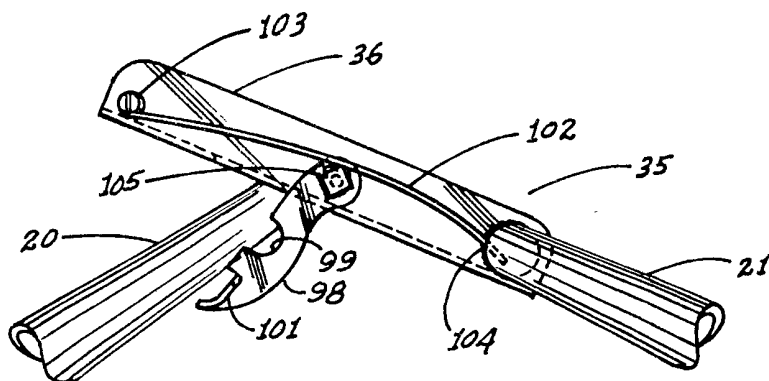


FIG. 15

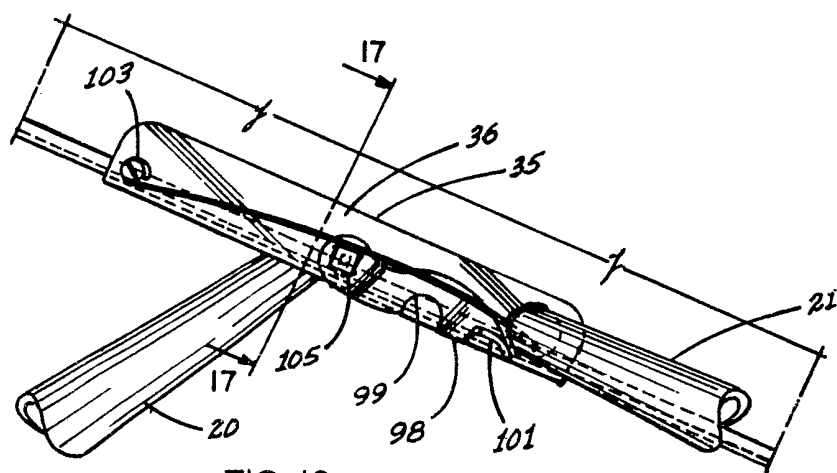


FIG. 16

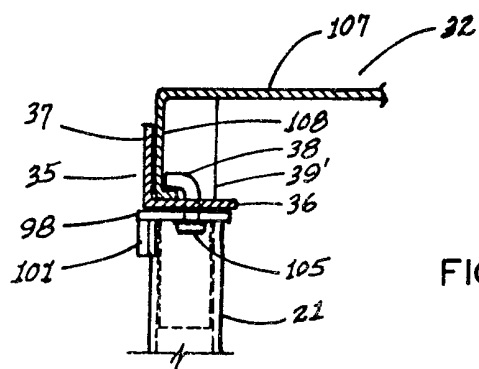
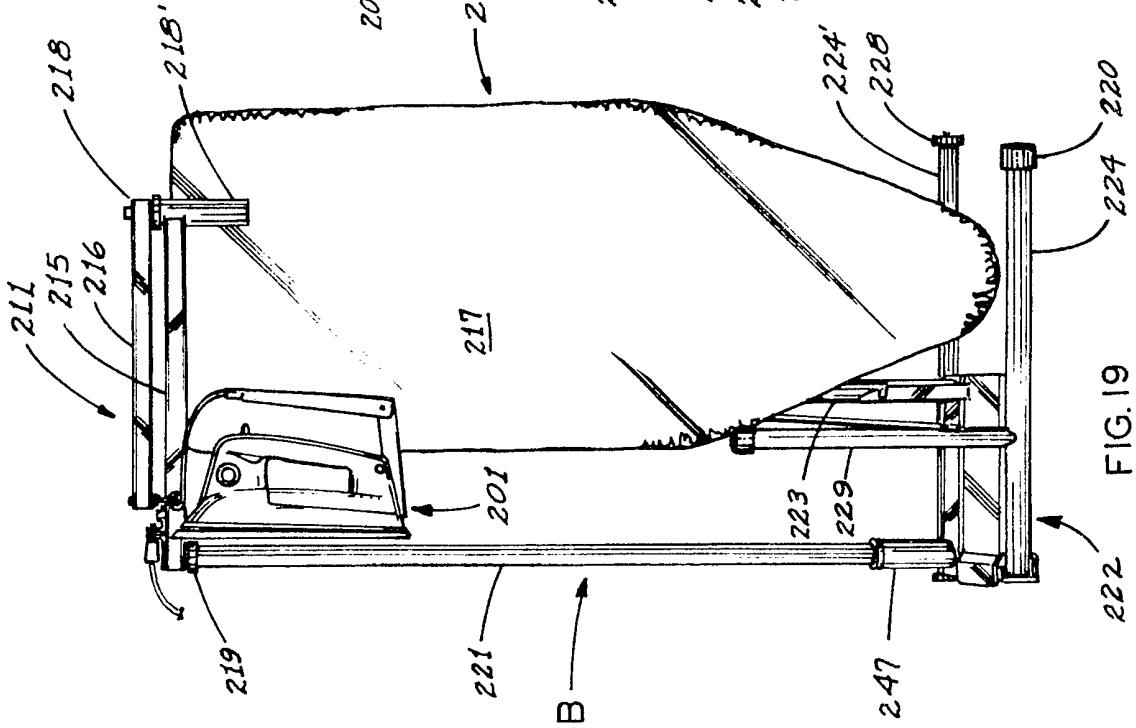
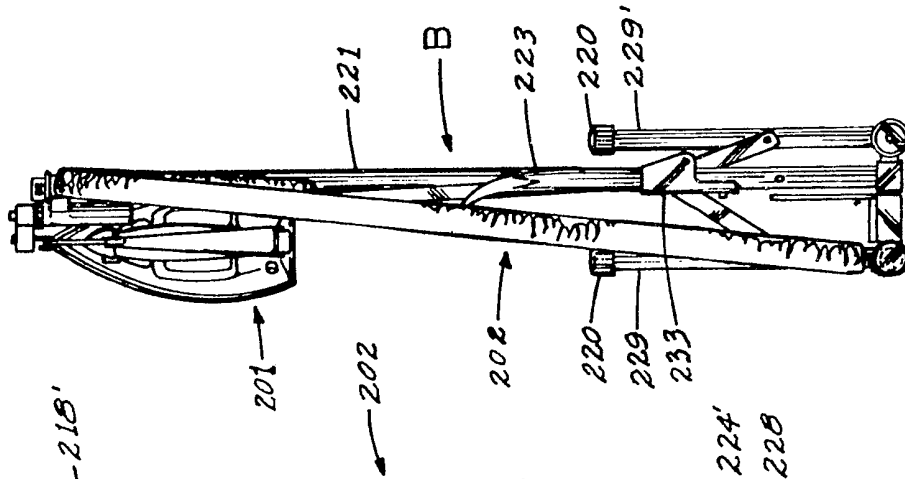
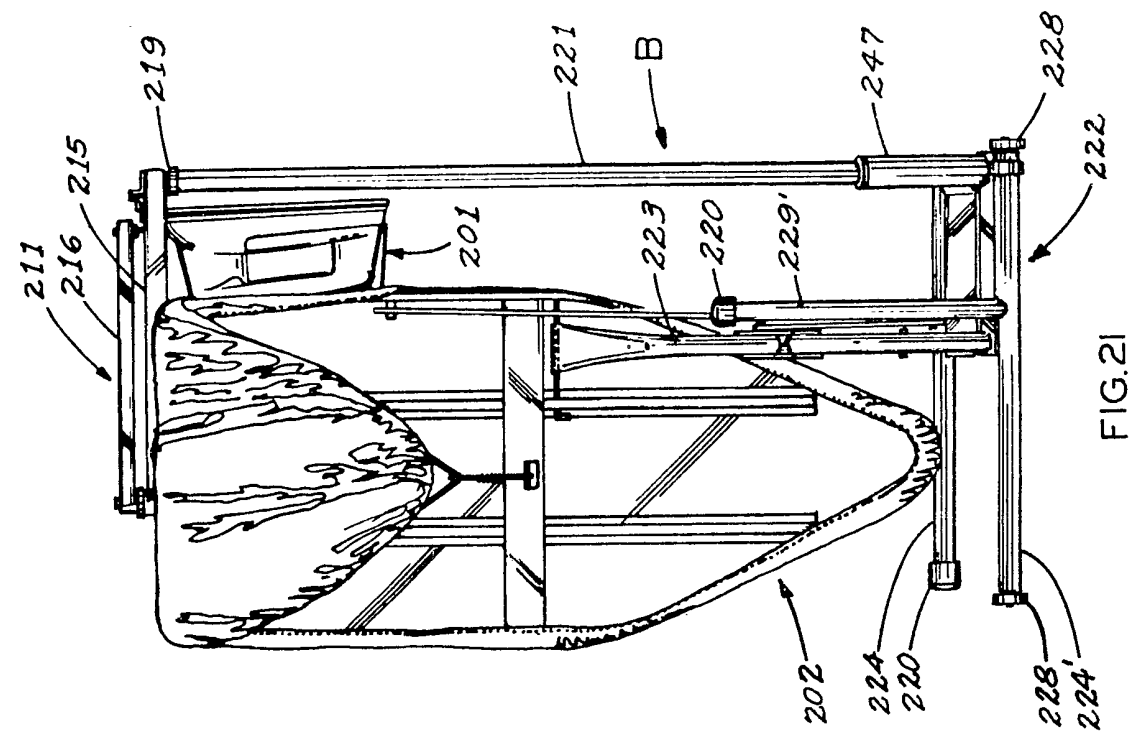


FIG. 17



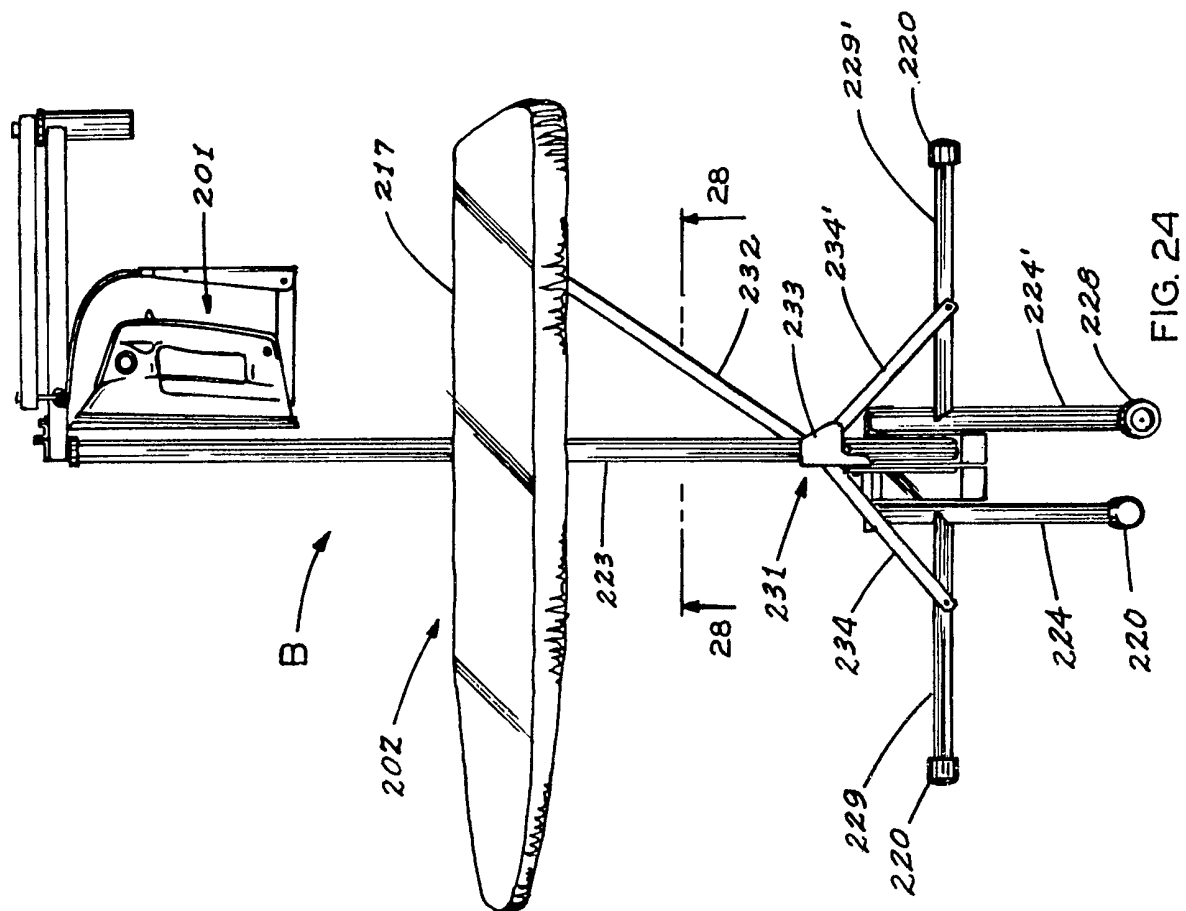


FIG. 24

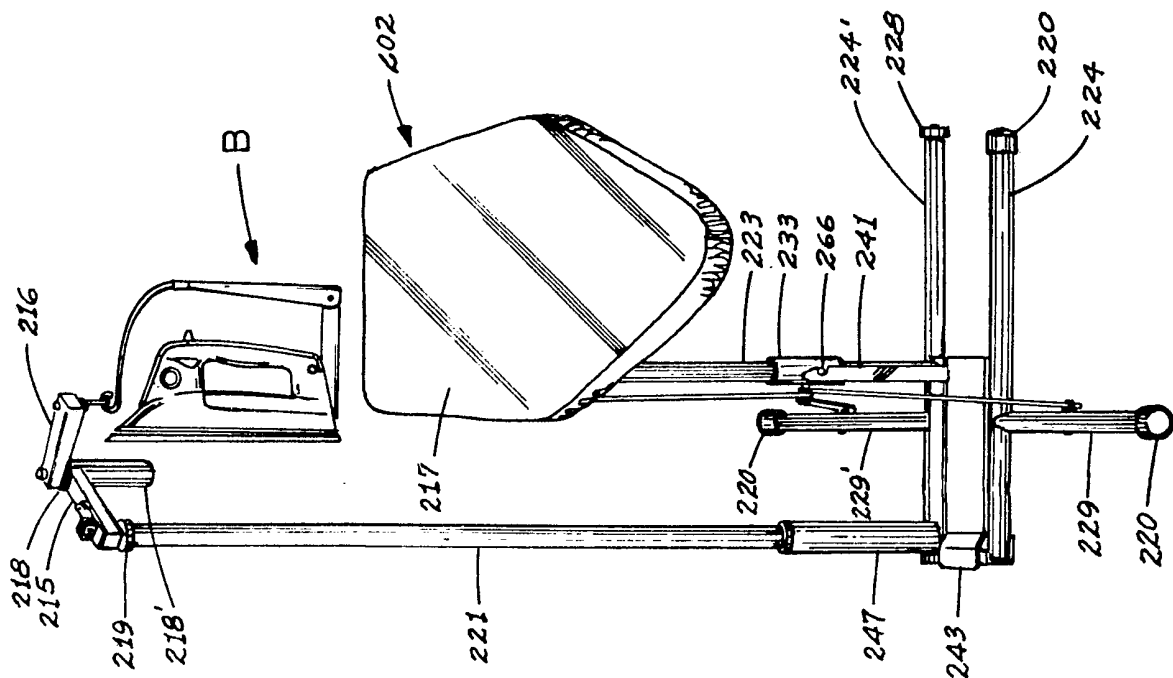


FIG. 25

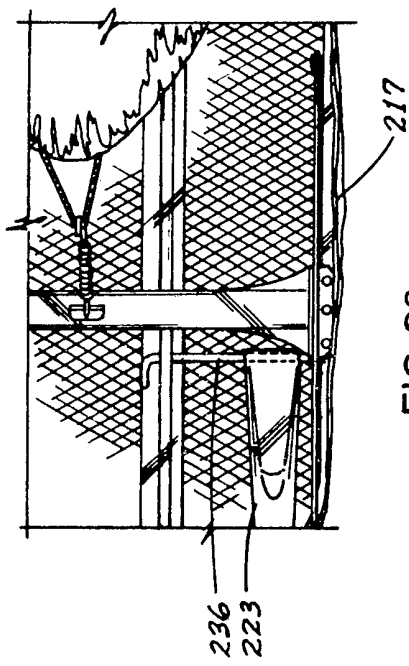


FIG. 28

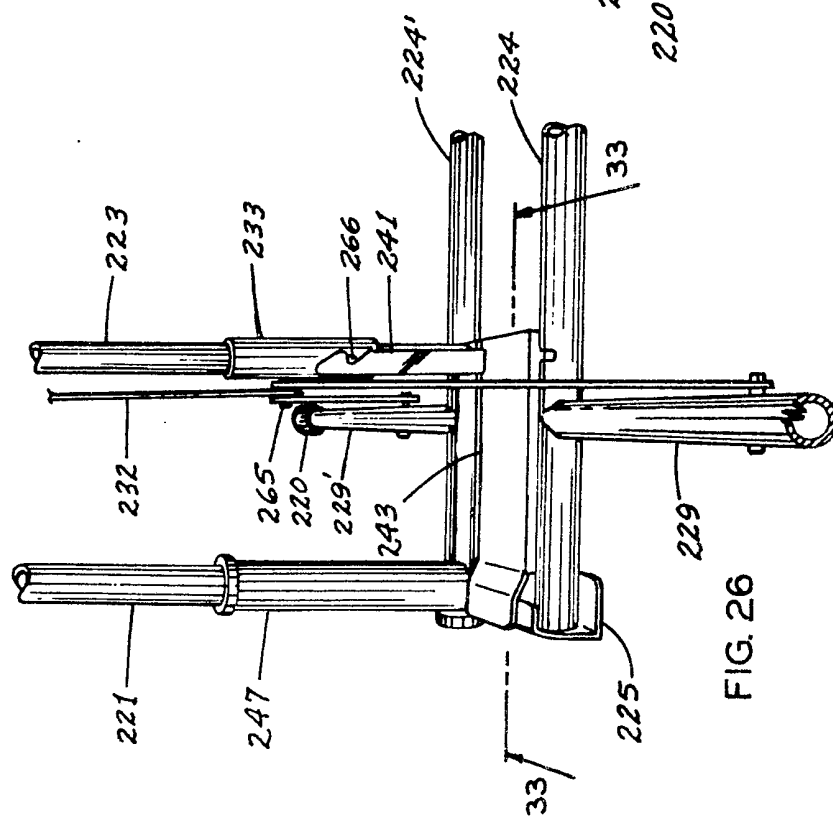


FIG. 26

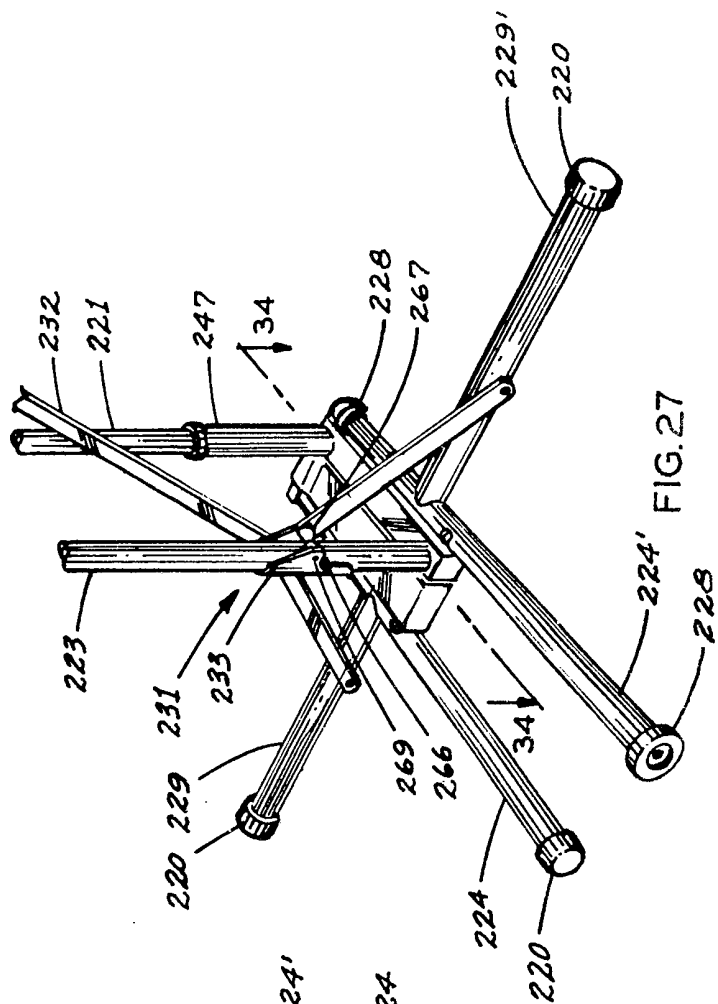
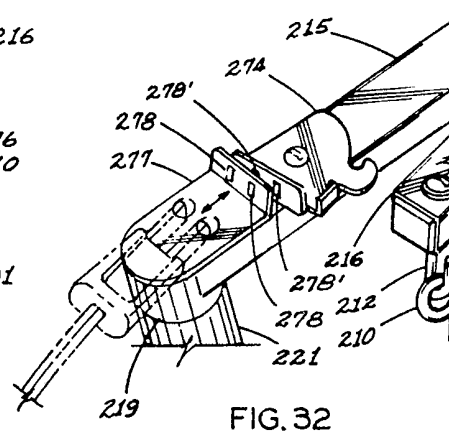
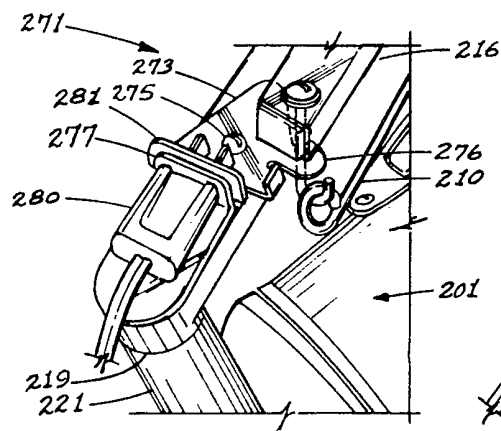
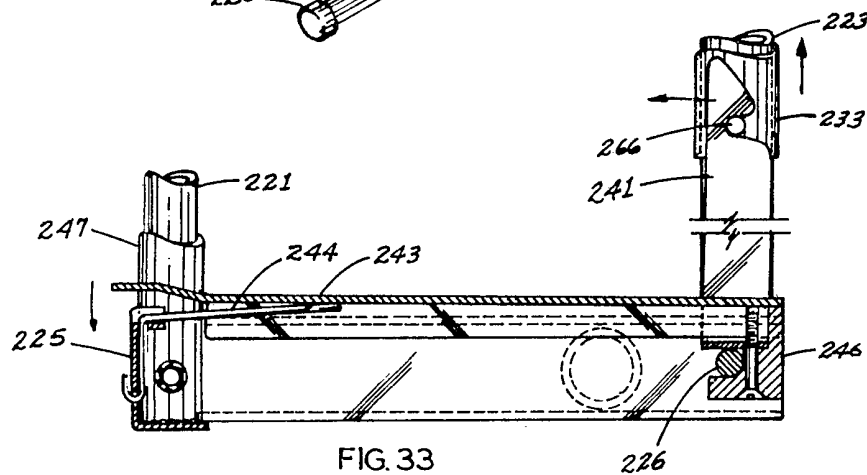
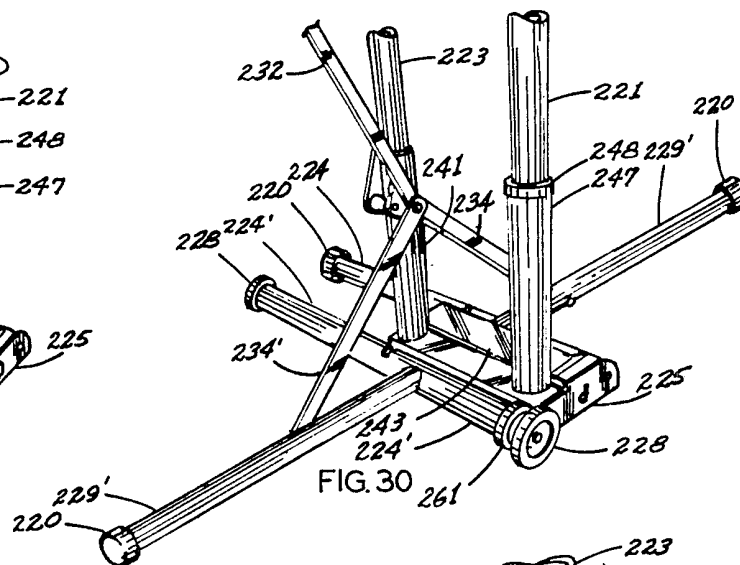
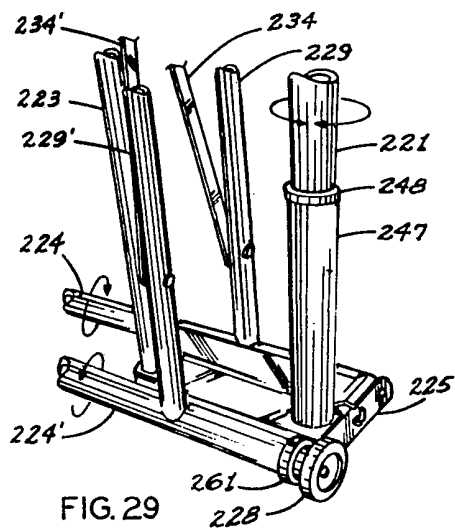


FIG. 27



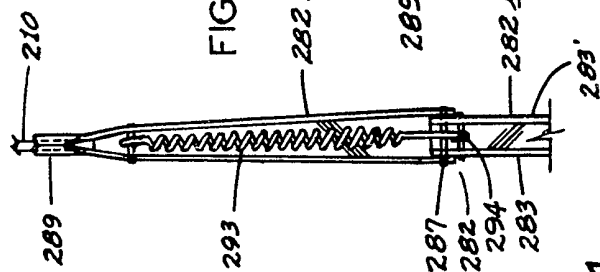


FIG. 39

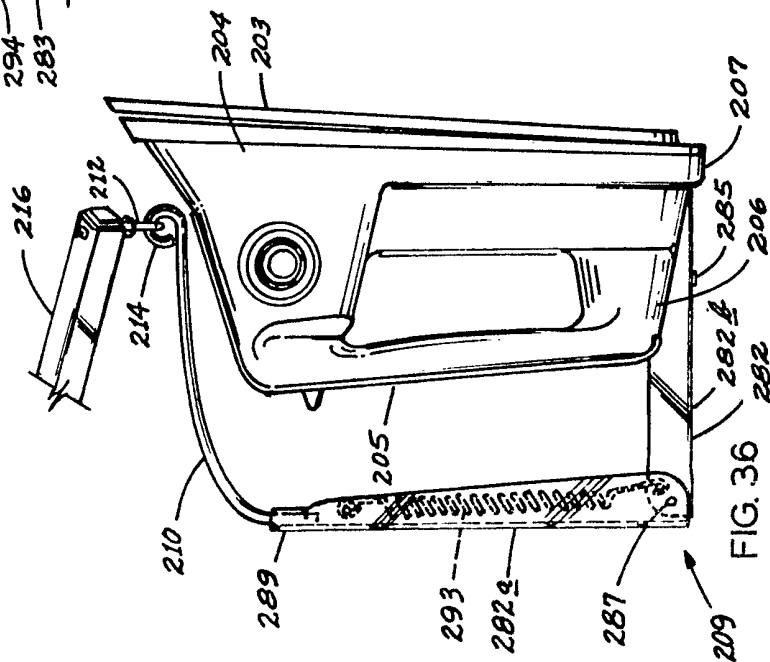


FIG. 36

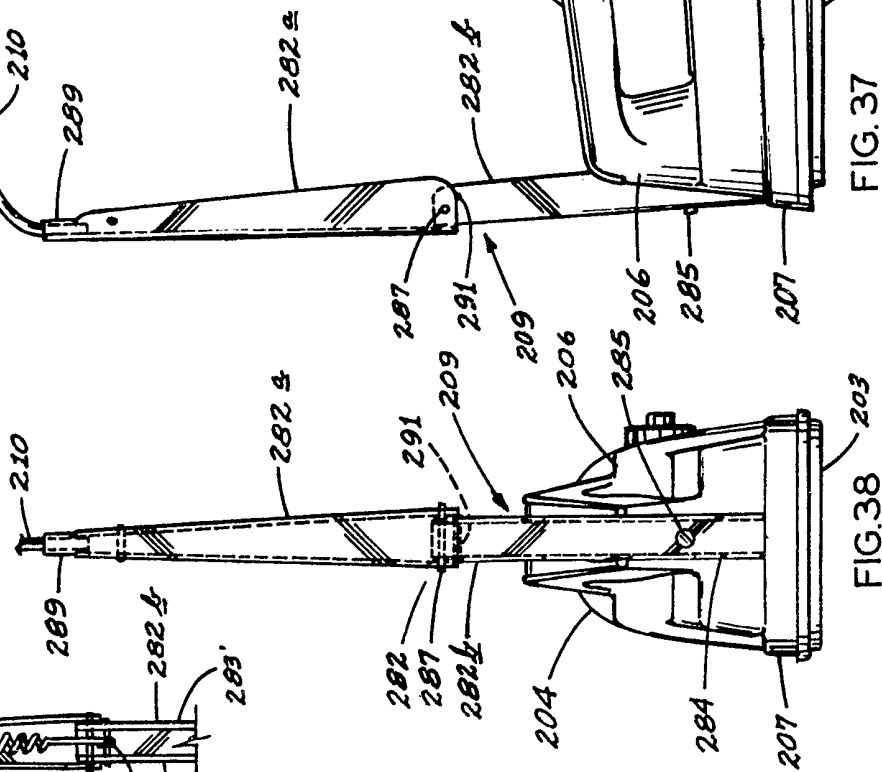


FIG. 38

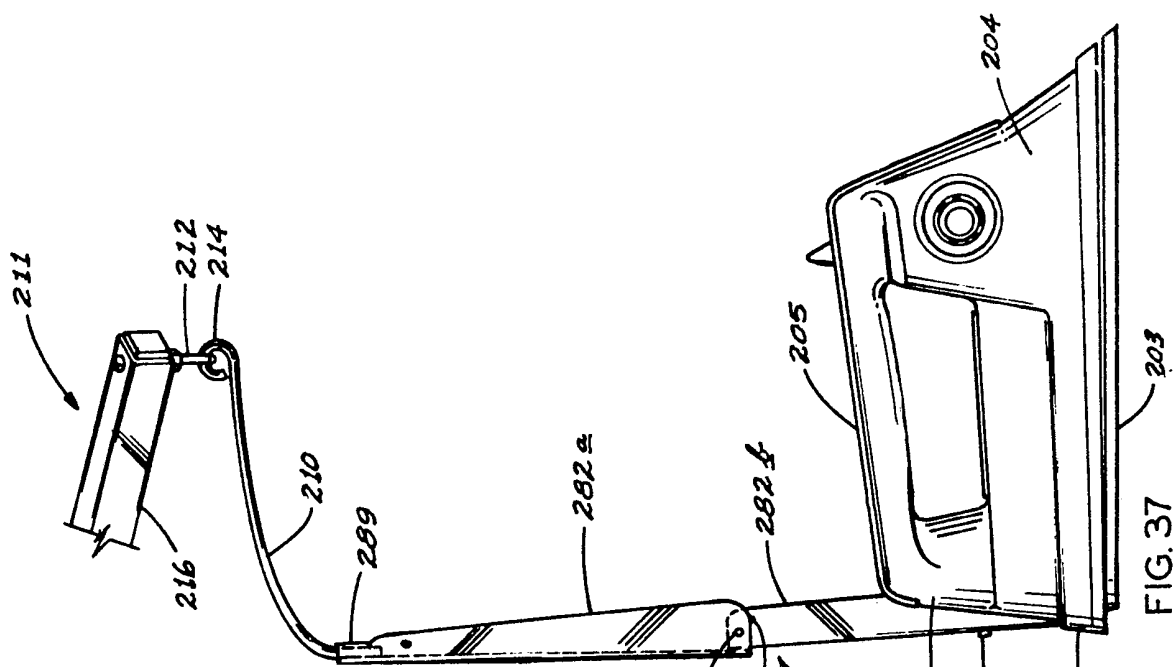


FIG. 37

SPECIFICATION

Ironing apparatus

The invention relates to an ironing apparatus and, more particularly, to a compact, collapsible ironing apparatus including means for automatic iron lifting.

The invention provides an ironing apparatus comprising a base a post extending upwardly from the base, means for securing proximate the post an ironing board in a use position with its ironing surface horizontally disposed for ironing thereon, an articulated linkage one end of which is interengaged with the post and the other end of which is attached by pivotal securement means to a hand iron, the articulated linkage permitting movement of the iron between first and second orientations respectively in and out of contact with the ironing surface, the linkage being swingable about the post and providing articulation when the iron is in the first orientation for freely permitting relocation of the iron to desired positions over the ironing surface.

The invention is illustrated by the drawings, of which:

FIGURE 1 is a front elevation of an ironing apparatus according to the invention in its collapsed state;

FIGURE 2 is a side elevation of the ironing apparatus of FIGURE 1, taken about the line 2—2 therein;

FIGURE 3 is a perspective view of the ironing apparatus of FIGURE 1 in a condition between its collapsed and ready for use states;

FIGURE 4 is a perspective view of the apparatus of FIGURE 1 in its ready for use state;

FIGURE 5 is a side elevation of the iron and certain portions of the iron lifting mechanism included in the apparatus of FIGURE 1, the iron being shown in a lifted position;

FIGURE 6 is a side elevation to that of FIGURE 5, but showing the iron in a lowered position;

FIGURE 7 is a rear elevation of the iron showing the connection of the iron lifting mechanism to it;

FIGURE 8 is a cross-sectional view taken along line 8—8 of FIGURE 7;

FIGURE 9 is a fragmentary rear elevation, partly in cross-section, taken along line 9—9 of FIGURE 8;

FIGURE 10 is a side elevation taken along line 10—10 of FIGURE 9;

FIGURE 11 is an end elevation, partly in cross-section, taken along line 11—11 of FIGURE 9;

FIGURE 12 is a perspective view of apparatus of FIGURE 1, as observed from the rear, with the ironing board removed;

FIGURE 13 is a fragmentary perspective view of portions of the apparatus of FIGURE 1 and particularly of the iron supporting or lifting elements as extended for use with the iron being shown in a lifted position;

FIGURE 14 is a vertical cross-sectional view of certain supporting elements of the apparatus of FIGURE 1;

FIGURE 15 is a bottom view of certain ironing

board securement features of apparatus of FIGURE 1;

FIGURE 16 is a bottom view similar to FIGURE 15 illustrating the securement features in a position for interengagement of the apparatus with the ironing board;

FIGURE 17 is a transverse cross-sectional view taken along line 17—17 of FIGURE 16;

FIGURE 18 is a perspective view of apparatus of FIGURE 1 interengaged with a conventional ironing board;

FIGURE 19 is a side elevation of another ironing apparatus according to the invention including an ironing board, in its collapsed position;

FIGURE 20 is a front elevation of the apparatus of FIGURE 19;

FIGURE 21 is a side elevation, from the opposite side, of the apparatus of FIGURE 19;

FIGURE 22 is a front perspective view of the ironing apparatus of FIGURE 19 illustrating movement of elements when first being oriented for use;

FIGURE 23 is a similar perspective view of the apparatus of FIGURE 19 when the elements are nearly in the use position;

FIGURE 24 is a front perspective view of the ironing apparatus of FIGURE 19 as oriented for use, certain iron support elements of the apparatus being shown prior to disposition of the iron for use.

Figure 25 is a perspective view, from the side, of the apparatus of FIGURE 19 with the elements in the same positions as depicted in FIGURE 24;

FIGURE 26 is an enlarged fragmentary perspective view of base and support elements of the apparatus of FIGURE 19;

FIGURE 27 is an enlarged perspective view, again of a fragmentary nature but from another location, showing certain features of base and support elements of the apparatus of FIGURE 19;

FIGURE 28 is a fragmentary bottom view of certain ironing board mounting features being part of the apparatus of FIGURE 19, as taken along line 28—28 of FIGURE 24;

FIGURE 29 is an enlarged fragmentary perspective view of portions of base and support elements of the apparatus of FIGURE 19, with leg members retracted;

FIGURE 30 is a perspective view similar to that of FIGURE 29 but illustrating the leg members extended;

FIGURE 31 is an enlarged perspective view of the attachment of an iron support arm and associated structure being parts of the apparatus of FIGURE 19;

FIGURE 32 is a perspective view illustrating further aspects of the elements shown in FIGURE 31;

FIGURE 33 is a vertical cross-sectional view of portions of the base, as taken generally along line 33—33 of FIGURE 26;

FIGURE 34 is a horizontal cross-sectional view of certain base and support members with elements partly broken away for illustration, as taken generally along line 34—34 of FIGURE 27;

FIGURE 35 is a vertical cross-sectional view, partly broken away, of portions of certain base structure, as taken generally along line 35—35 of FIGURE 34;

5 FIGURE 36 is a side elevation of certain portions of the iron and an iron lifting mechanism of the invention, being parts of the apparatus of FIGURE 19, the iron being shown in a lifted position;

10 FIGURE 37 is a side elevation of the iron and the iron lifting mechanism with the iron in a use position;

FIGURE 38 is a rear view of the components illustrated in FIGURES 36 and 37; and

15 FIGURE 39 is a view of a portion of the iron lifting mechanism as seen from the direction opposite from that of FIGURE 38.

With reference to FIGURES 1 and 2 of the drawings, an ironing apparatus A is shown in a compact, folded state for storage, with an iron 1 in a stored position. The iron 1 is a conventional hand steam iron, and is typical of numerous types of domestic or commercial hand irons which are presently available. It is possible to substitute a dry iron for the steam iron, if desired.

25 Referring particularly to FIGURES 5 and 6, the iron 1 has the usual sole plate 2, body 3 and a hand grip 4. At the forward end there is a steam or spray nozzle 6 and at the rear end a support portion 7 of increased thickness. The portion 7 defines a base or heel 8 of the iron on which it is intended to be seated if used conventionally, that is apart from the apparatus of the invention.

30 Connected to the iron 1 is a securement unit, designated generally 9, secured by a rod 10 to a ball swivel joint 11 including a sleeve 12 clampingly engaging a ball 13 at the upper end of the rod 10. The sleeve 12 is carried at the distal end of a tubular forearm member 15.

40 Referring now to FIGURE 4, which illustrates the ironing apparatus A in a configuration for use in ironing of articles of fabric, the forearm 15 is seen to be pivotally secured by an elbow unit 16 in articulating relationship to a main support arm 17, also of tubular configuration, in turn pivotally secured to a tubular extension 18 telescopically received within a tubular main post 20. There is thus provided an articulating linkage pivotally connected at one end to the post 20, and

50 swingable relative thereto and pivotally connected by the securement unit 9 at the other end to the iron 1. The post 20 is one of a pair, the other being designated 21. The posts 20 and 21, which are parallel, extend upwardly from a base, generally 23, having a pair of traverse tubular base members 24 and 25, each of rectangular cross-section and bridged by a third tubular base member 26, also of rectangular cross-section.

60 The base member 26 is provided with an opening for receiving a foot 27 of rectangular tubular form. The foot 27 is received in rectilinear alignment with the member 26 and has at its base-remote end a pad or enlarged surface support member 28. Similarly, there is provided a

65 second foot 29 which extends outwardly from the

base 23 at an angle with respect to the base member 24 to provide an obtuse angular relationship with the foot 27. The foot 29 similarly includes at its base-remote end a pad 30. The feet 27 and 28, with the base 23, provide a broad, stable support for the apparatus A.

70 A specially configured ironing board 32 is clampingly interengaged with the post 21 in a manner described below to provide a rectangular ironing surface having portions which extend substantially equidistantly on opposite sides of the upper portion 20' of the post 20, from which upper portion the extension 18 extends and is free to rotate therein and, thus, swing about the longitudinal axis of the post 20. The dimensions of the ironing board 32 are suitable (e.g., slightly more than 40 inches in length, and having a width of slightly more than half such length) for disposing the arm 17 for swinging and articulating motions to present the iron 1 in a supported relationship for movement over substantially all the upper surface of the ironing board 32. The latter is preferably covered by the usual heat-resistant cover and an underlying pad or resilient layer, thereby providing a smooth, continuous, substantially flat yet slightly resilient and conformal surface 33 for ironing.

85 As will be apparent from FIGURE 4, the angle between the longitudinal axis of the ironing board 32 and that of the base member 26 and the foot 27 is substantially equal to the angle between the longitudinal axis of the ironing board 32 and that of the foot 29.

100 Through a mechanism more readily apparent from the following description, the arm 17, the forearm 15, the rod 10 and the securement unit 9 provide a lifting force for maintaining the iron 1 in the raised position illustrated in FIGURE 4 when in disuse or intermediate ironing steps of the user and, thus, in an orientation providing unencumbered access to the surface 33 of the ironing board 32 for placing thereon of various articles to be ironed and yet with the iron 1 conventionally presented for immediate use by

110 lowering into contact with an article to be ironed. When the iron 1 is in an orientation contacting the ironing board surface 33, the articulating arm and forearm freely permit the iron 1 to move to selected positions upon the ironing board surface 33, as desired during ironing operations. During such movement, the arm 17 is free to swing about the longitudinal axis of the post 20.

115 To secure the ironing board 32 to the apparatus A, one end of a bracket 35 of L-shaped cross-section (FIGURE 3) is attached to the upper end of the post 21. The bracket 35 comprises a horizontal base flange 36 and a vertical flange 37. Extending upwardly through the base flange 36 is a locking finger 38 for clamping the side lip of the ironing board in a manner described shortly hereinbelow. The base flange 36 may be provided with an aperture 39 aligned with the bore of the post 21 for receiving a downwardly projecting tubular member 39' of the ironing board, as later explained.

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This arrangement permits securement not only of the rectangular ironing board 32 but of an ironing board of conventional type. Such an ironing board is generally designated 40 in

FIGURE 18, which shows it in disposition for use and secured by the clamping arrangement of bracket 35 to apparatus A, all as described hereinbelow.

Before such discussion, the features of the arrangement for securement by unit 9 of the iron 1 to the apparatus A and the iron support features of the apparatus are more clearly revealed.

Thus, referring to FIGURES 7—11, the securement unit is attached to the lower end of the rod 10. The latter includes a lateral offset portion (see FIGURE 2) but extends downwardly throughout the major portion of its length until bending rearwardly to form a rearwardly offset portion 43 which in turn is bent at a point 44 (FIGURES 5 and 6) to provide a transverse portion 45 which is substantially at a right angle to both the rearwardly offset portion 43 and the major portion of the rod 10. The unit 9 comprises a one-piece sheet metal member 47 which is bent to provide a housing of U-shaped configuration, including an upper surface 48, a bottom surface 49 and a vertical wall surface 50. The member 47 also includes at its opposite sides plates 51 and 51' which are apertures at 52 and 52' for

journalling of the member 47 about the longitudinal axis of the rod portion 45. The distal end 54 of the rod portion 45 extends well beyond the plate 51 and is provided with a sleeve 55 closed at one end and having a flange 56 at the other end. The flange diameter is greater than that of the aperture 52 so that it will bear against the inner surface of the plate 51 with the rod end 54 being retained within the sleeve 55. Further, the rod end 54 is provided with a transverse slot 58 for receiving one end 59 of a coiled torsion spring 60, having its other end 61 provided with a hook 62 for engaging a lip defined by upper surface 48 of the member 47, whereby torsional force of the spring may be exerted upon the rod relative to housing member 47.

The upper surface 48 of the member 47 has a projection 64 extending laterally beyond the rod 10 for engaging the rod 10 to establish a stop which limits pivotal movement of the iron 1 when lowered to a use position. A lateral projection 65 of the lower surface 49 similarly establishes a maximum position of rotation of the iron upward, i.e. counterclockwise as viewed in FIGURE 10, when rotated about the axis of the rod portion 45. The projection 65 engages the offset portion 43 of the rod 10, so that the overall angular extent of movement permitted by rotation of the unit 9 about the axis of the rod portion 45 is somewhat greater than 90° but much less than 180°. Accordingly, the iron 1 is permitted to rotate about the rod portion 45 between a raised position, shown in FIGURE 5, and a lowered position, shown in FIGURE 6.

To secure the unit 9 to the iron 1, there is provided a flexible band 67, such as of wire cable,

having its ends wedged or otherwise secured within threaded fittings 68 and 68'. The latter are screwed into threaded ferrules 69 and 69' having enlarged diameter heads slotted for screwdriver tightening of the band 67 about the handle portion 7 of the iron 1 to secure the unit 9 to the iron 1 without any modification of the iron or damage to it. This arrangement is amenable for use with any of the many different varieties of irons which have an enlarged handle portion 7 by which the handle per se is affixed to the iron.

The securement unit 9 may thus be attached to the iron by tightening of the ferrules 69 and 69'. Then, the spring 60 is suitable pretensioned by depressing the outer, closed end of the sleeve 55 to shift the rod 10 to the right, as viewed in FIGURES 8 and 9, relative to the housing member 47. This permits the rod to clear the projections 64 and 65, whereupon the iron is rotated a selected number of turns about the axis of the rod portion 45 until a desired state of tension of the spring 60 is achieved, preferably such as almost to counterbalance the weight of the iron 1 so that it will remain in the position shown in FIGURE 6 in the absence of any assistance by the user but, with only the slightest upward pressure by the fingertips of the user, the iron can be caused to rotate upwardly as viewed in FIGURE 5, where it remains by virtue of the relocation of the centre of gravity of the iron relative to rod 10 and by engagement of the projection 65 with the rod portion 43. The sleeve 55 thus permits pretensioning while allowing the rod portion 45 to remain rotatably journalled within the housing member 47 at all times.

Referring now to FIGURES 13 and 14, it is seen that the swivel joint 11 permits the free orientation of the rod 10 relative to the longitudinal axis of the forearm 15 and provides also a wide range of permissible movement of the iron relative to the forearm 15 when the latter is not utilized for supporting the iron, as will be the case when the iron is in its lowered position (FIGURE 6) for ironing of various articles of clothing, but permitting the rod 10 to hang substantially vertically downward from the swivel joint 11 when the iron is supported, as shown in FIGURE 13, the iron being, accordingly, positioned relative to the rod 10 as shown in FIGURE 5.

With reference specifically now to FIGURE 14, the forearm 15 is of hollow tubular character, being preferably of circular cross-section. It is secured at its proximal end to a sheave 71 journalled for rotation upon a shaft 72 within a suitable housing 73. The latter is in turn secured to the distal end of the main support arm 17 so that there is capability for the elbow 16 to permit articulating movement of forearm 15 with respect to the support arm 17, which also is of tubular character and circular cross-section.

The proximal end of the arm 17 is pivotally connected by a pin 75 extending transversely through the tubular extension 18, which is of larger diameter than arm 17 and has a substantially semi-circular portion cut away

proximate its upper end to define a half sleeve 76, against which the arm 17 may lie to provide a coaxial relationship between the extension 18 and the arm 17 for storage, but otherwise permitting the arm 17 to swing downwardly, as shown in FIGURE 14, to form a substantial angle relative to the longitudinal axis of the extension 18.

To limit the outward extending movement of the arm 17 relative to the extension 18 and also to fix the angular relationship between the arm 17 and the forearm 15, there is provided a cable 78 which extends through the hollow bore 77 of the arm 17, passes over the sheave 71 in a groove 79 defined by flanges (as at 80, on opposite sides thereof) and is secured at one end to a suitable fitting 81 carried at the proximal end of the forearm 15.

Proximate the lower end of the arm 17, there is provided within its bore 77 a plug 83 of circular cross-section having formed therein a groove 84 providing a generally large radius of curvature over which the cable 78 passes and then extends through an aperture 86 below the plug 83 and thence outwardly for securement by a screw or other fitting 87 to the cut-away portion 76.

It will, therefore, be appreciated that there is a fixed angular relationship provided at all times between the arm 17 and the tubular extension 18 and between the forearm 15 and the arm 17. If, for example, the forearm 15 should be swung downwardly towards the arm 17 to reduce the angle therebetween, the cable 78 will be moved around the sheave 71 to reduce the length of the cable between the fitting 87 and the aperture 76 and thereby to reduce the angle between the arm 17 and the longitudinal axis of the tubular extension 18.

Further, when the iron 1 is in its raised position, as depicted in FIGURES 13 and 18, the weight of the iron upon the forearm 15 causes tensioning of the cable 78 with resultant frictional force generated by the cable 78 upon the surface of the groove 84 within the plug 83 to provide a braking movement fixedly maintaining the angular relationship of the arm 17 with respect to the tubular extension 18. Further, since the cable 78 is then locked, in position within the bore 77 of arm 17, the angular orientation of the sheave 71, and consequently of the axis of the forearm 15, will remain fixed. In this way, the forearm 15 can remain orientated in position to maintain iron 1 in the position in which it was last placed in its raised orientation, the iron 1 then remaining suspended by the arm 17 and forearm 15 in readiness for recommencement of ironing.

The resultant lifting of the iron 1 to a convenient position in readiness for being lowered again to the ironing board surface when desired by the user provides extreme convenience and eliminates a very substantial fatigue factor which otherwise would be necessitated for the user, who when using a conventional iron would have to be constantly lifting, carrying and transferring the iron at frequent and repeated intervals through ironing operations. Moreover, since the tension on the

cable 78 is released as soon as the iron 1 is returned to its normal position anywhere on the board, the articulating movement of the arm 17 with respect to the tubular extension 18 and of the forearm 15 with respect to the arm 17 is once more freely permitted so that the iron may be readily transferred to any point within the reach of the articulations thus provided. The length of the cable 78 is selected to provide for the freedom of movement requisite for the iron 1 to be readily moved to any point on the ironing board surface.

The apparatus A may be folded to provide compact, convenient storage when not in use. For this purpose, the tubular extension 18 is axially slidable in telescoping relationship within the post 20. To maintain the extension 18 in its raised position shown in FIGURE 14, it is provided with a button 89 extending through a hole 90 within the extension 18. The button 89 is biased outwardly by a leaf spring 92 or the like to bear against a lip 92 of the upper portion 20' of the post 20.

Referring to FIGURE 13, the iron 1 has a power cord 94 which is held at the elbow 16 by a suitable clamp 95 affixed to the housing 73. The cord 94 is thus maintained conveniently out of the way during ironing operations. The cord 94 is also secured to the upper portion 20' of the post 20 by a further clamp 96 of suitable configuration. Accordingly, upon the arm 17 being raised from its stored position telescopically enclosed with the post 20, movement of the arm 17 upwardly is permitted until the section of the cord 94 between the clamps 95 and 96 becomes taut, limiting further upward movement and so precluding the tubular extension 18 from being pulled upwardly out of the upper portion 20' of the post 20.

For storage of the ironing apparatus A, the button 89 is pressed inwardly to clear the lip 92 of the post portion 20' and the arm 17, having been swung into axial alignment with the tubular extension 18, may now be lowered telescopically into the post 20 to a storage position depicted in FIGURE 12 wherein the post 20 receives the entire length of the arm 17 and the housing 73 rests on the lip 92 of the post. Further, the forearm 15 extends downwardly from the elbow 16 in a position presenting the iron 1 substantially intermediate the posts 20 and 21 and maintaining the iron in a suspended condition, where it is safely not in contact with any other structure. Hence, the apparatus may be folded for storage even though the iron 1 is still hot.

A novel arrangement for locking the forearm 15 in the position shown in FIGURE 12 is provided by a lever 98 having a notch 99 for accommodating the forearm 15 and swingable about the axis of the locking finger 38.

Referring to FIGURES 15—17, the configuration of the lever 98 is more clearly seen. It includes a flange 101 providing a surface for convenient application of force for movement between the positions shown in FIGURES 15 and 16. To maintain the lever 98 in position against the bottom surface of the horizontal flange 36 of bracket 35, there is provided a spring wire 102

having one end connected to the bracket by a screw, rivet or other suitable fitting 103 and the other end extending through an aperture 104 in the wall of the post 21. Further, the locking finger 38 is provided with a head 105 of generally rectangular configuration against which the spring wire 102 is resiliently urged, tending to maintain the lever 98 in a position either aligned with the longitudinal axis of the bracket 35, as in FIGURE 16, or as (as shown in FIGURE 12) in a position in which the notch 99 engages the forearm 15.

The mechanism for interengagement of the ironing board 32 to the bracket 35 is now apparent. The tubular extension 39' of the ironing board is inserted in the post aperture 39, as will be seen in FIGURE 17. The ironing board 32 is shown simplistically in FIGURE 17 as having merely an upper surface 107 and a side flange 108, although as previously stated a padding layer and cover are fitted. The finger 38 is oriented relative to the lever 98 so that it will be directed toward the horizontal flange (see FIGURE 17) when lever 98 is oriented substantially in line with bracket 35. However for interengaging the bracket 35 and ironing board 32, the lever 98 is oriented first as shown in FIGURE 15 with the dinger 38 being then directed parallel to the side edge 108. The side edge 108 is now adjacent the vertical flange 37 of the bracket 35. The lever 98 is then swung from the position in FIGURE 15 to the position in FIGURE 16, thus bringing the locking finger 38 into engagement with the wall 108 to clamp it between the vertical flange 37 and the distal end of the finger 38. The ironing board 32 is then locked in place and reliably maintained in the position shown in FIGURE 4, providing a stable, convenient orientation.

Such a locking arrangement also makes possible the use of apparatus A with conventional ironing board 40, as FIGURE 18 illustrates. The lever 98 is similarly turned to bring the locking finger 38 into engagement with the usual upright flange (not shown) of the conventional ironing board, which, thus, presents a side edge 109 which is seated against the bracket 35. The conventional ironing board 40 has the usual legs 111 and 112 having elongated extensions 111' and 112' at their extremities for providing a stable base of support for the ironing board 40. Accordingly, when the ironing board 40 is clamped in position, the use of the feet 27 and 29 as previously described is obviated, as FIGURE 18 shows.

Referring now to FIGURES 19—38, B designates generally another embodiment of an ironing apparatus of the invention. The apparatus B includes a commercially available hand steam iron 201, representative of many domestic or commercial hand irons presently available.

In FIGURES 19—21, the apparatus B is shown in a folded state for storage with all elements positioned to occupy minimum volumetric space such as will permit the entire apparatus to be placed in a closet or other confined space. The apparatus B may easily be erected for use. In FIGURES 24 and 25, the apparatus B is shown

with its various mechanisms reconfigured with all elements deployed for initiating the ironing operation.

In addition to the iron 201, there is provided an ironing board generally designated 202 which is adapted to swing between a storage position shown in FIGURES 19—21 and a use position shown in FIGURES 24 and 25.

Referring particularly to FIGURES 36—38, the iron 201 has the usual sole plate 203, body 204 and a hand grip 205 having a thicker rear portion 206 merging into a base or heel 207 on which the iron may be seated.

Connected to iron 201 is a securement unit generally designated 209 connected by a rod 210 by which the iron is to be supported and interconnected with a support linkage generally designated 211. This linkage includes a downwardly depending hook 212 having a projection 213 over which is fitted a swivel eye 214 formed at the upper end of the rod 210 and permitting the rod 210 to freely swivel about two axes of rotation at right angles to each other and defined by the hook 212.

The iron support linkage 211 comprises articulated first and second arm members 215 and 216 each swingable within a horizontal plane above the ironing surface 217 of the iron board 202 when the latter is in the use position as shown in FIGURES 24 and 25. The arm 216 is interconnected with the arm 215 by a swivel joint 218 including a tubular housing 218' having, for example, sleeve-type bearings therein to provide a strong secure coupling having very low friction. The arm 215 is, however, interconnected at its proximal end by a fixed connection 219 to a rotatable upright post 221 for permitting substantial weight to be applied by the arm 215 when the linkage is extended yet with extremely low friction.

The arms 215, 216 are preferably of tubular construction, as of steel tubing having rectangular cross-section. The linkage 211 is carried at the upper end of the tubular upright post 221 which extends upwardly from the rear of a base 222. The post 221 is vertically oriented in the preferred construction. Extending upwardly from the front of the base 222 is a shorter tubular upright post 223 which is curved slightly to the left, as seen in FIGURE 20, at its upper extremity with respect to the vertical. Pivotaly secured to the upper end of the post 223 is the ironing board 202. The base 222, its components, and posts 221 and 223 are all preferably of steel tubing. Protective rubber or plastic caps 220 are fitted over the free ends of the tubular base members. An arrangement permitting rotation of the post 221 about its axis of elongation is explained later.

Referring to FIGURES 26 and 27, the base 222 is formed primarily of two tubular support members 224 and 224' interconnected at the rear by a bracket-like member 225 and forwardly by a rod 226 (FIGURE 34), the latter extending through a beam 227 upon which stand the posts 221 and 223. The support members 224 and 224' extend

forwardly from the rod 226 to provide extensions beneath the ironing board 202 for stable support. The members 224, 224' can freely rotate in the bracket 225 and relative to the rod 226. At

5 opposite ends of member 224' are rotatable caster wheels 228 by which the apparatus when folded may be rolled easily across a floor surface.

Extending radially from the members 224 and 224' are respective feet 229 and 229' each
10 swingable in a vertical plane on a horizontal transversely oriented pivot axis defined by rotation of the members 224 and 224' between respective raised positions (FIGURES 19—21) for storage and extended positions (FIGURES 24 and 25) for
15 use. In the extended positions, the feet 229 and 229' provide a greatly widened area of contact of the base 222 with the floor or other supporting surface.

This movement of the feet 229 and 229' extends them in opposite directions from the base 222 and substantially aligned with the longitudinal axis of the ironing board 217 which underlying the same. This enhances the side-to-side stability of the apparatus. The movement of
25 the feet 229 and 229' is controlled by a swing control linkage 231 interconnected with the ironing board 202 by an arm 232 pivotally attached to the underside of the board 202. This linkage causes the legs to be extended upon
30 movement of the ironing board 217 from its storage position to its use position. For this purpose, a sleeve 233 is slidable upon the post 223. The linkage 231 includes first and second links 234 and 234' interconnecting the sleeve 233 with the respective leg members 229, 229'.
35 Arm 232 interconnects link 234' with the ironing board 202 at a location radially spaced from a point of its pivotal securement to the upright member 223.

Referring to FIGURE 28, the upper end of the post 223 is connected to the ironing board 202 by a shaft 236 which extends between longitudinal ribs of the ironing board which is thereby free to rotate on an axis at right angles to the post 223
45 for movement between storage and use positions.

Referring now to FIGURES 26—30 and 33—35, the construction of the base and its various elements are more clearly revealed. The rod 226, is, in effect, a cross shaft for maintaining the members 224 and 224' in spaced relationship. It is threaded at its opposite ends into plastics plugs, as at 237 in FIGURE 34, which are secured to the shaft by set screws 238. Each plug 237 is free to rotate within the corresponding member 224 and
50 224'. Slots 240 are provided for this purpose in each of members 224 and 224'. Accordingly, the feet 229 and 229' may revolve through an angle of about 95°. Rockably affixed, relative to the rod 226, is a tension latch member 241 secured by
60 welding to a U-shaped latch release member 243 extending rearwardly from the base for permitting the user to exert foot pressure to release the latch member 241. The release lever 243 is held in its level position prior to release by a spring wire
65 244 secured to the base member 225. The release

lever 243 extends rearwardly from an L-section member 246 which conforms to the shaft 226 so that the release lever 243 may pivot around the axis of the shaft 226 to move the latch member
70 241 rearwardly as viewed in FIGURE 33.

At the rear of the base, secured to the bracket 225 is a tubular member 247 in which is rotatably mounted the post 221. FIGURES 34 and 35 show that the member 247 is welded to the lower end of the bracket 225. At its upper end, the member 247 has a sleeve bearing 248 for journalling the post 221 for rotation. A thrust bearing 250 is located within the member 247 at its lower end for receiving a seat upon the post 221. The
80 bearing 250 has seated upon it a plug 252 fitted at the lower end of the post 221.

The plug 252 is arcuately slotted at 253 to receive a screw 254 seated within an extension 255 for limiting rotation of the post 221 within the member 247. Also provided in the plug 252 is a recess 257 for receiving a ball detent 258 located on the side opposite the screw 254. The ball 258 is seated in the recess 257 during storage movement of the ironing apparatus as described below. For this purpose, a plug 260 is fitted into the member 224' and defines, together with a ring 261 affixed by a set screw 262, an inclined seat or recess 263 for camming the ball 258 into the recess 257 upon clockwise rotation of the member 224' as viewed in FIGURE 35.
95

When the ironing board is in the use position, the sleeve 233 is locked in its lower position by the latch member 241. The links 232 and 234 and 234' are all connected to the sleeve 233 by a single stub shaft 265 (FIGURE 26). This sleeve also includes a latch pin 266 which the latch member 241 engages by a suitable shoulder. To permit the sleeve 233 to rise smoothly upon the post 223, an hourglass-shaped roller provides rolling engagement with member 223 (FIGURE 21). Downward movement of the sleeve 233 is limited by a pin 269 (FIGURE 27) to orient precisely the sleeve 233 in its locked lower position for rigidly securing the feet 229 and 229' in their extended orientation.
100 105 110

When the user exerts foot pressure on the release lever 243, the latch member 241 clears the pin 226 permitting sleeve 233 to be slid upwardly on the post 223 for movement of the ironing board to its storage position with corresponding rotation of the feet 229 and 229' to their raised positions. Therefore, the operator need not bend over to reorient the ironing apparatus for storage, consistent with an overall design philosophy of facilitating the task of ironing in every possible way.
115 120

As viewed in FIGURE 24, the ironing board 202, when thus released, is rotated or swung counterclockwise. The ironing board 202 continues rotating counterclockwise until reaching a vertical position, there stopping on dead centre, the feet 229 and 229' then being vertical. Further, for compact storage, the arms 215 and 216 are oriented as shown in FIGURE 21 proximate the bottom surface of the ironing board 202, with the
125 130

iron 201 located proximate the upper end of the post 221 while remaining suspended by the rod 210 and safely out of contact not only with the ironing board surface but also with any other structure. Accordingly, there is no fire hazard or danger of harmful contact of iron 201 with adjacent materials or surfaces. This permits the apparatus to be configured for storage without waiting for the iron to cool.

As discussed previously, the rotation of the post 221 is limited by the slotted plug 252. Therefore, the arm member 215 may be reoriented to a position shown in FIGURES 19—21 and with further movement being limited by the engagement of the screw 254 in the slot 253. The slot 253 limits rotation of the arm 216 during use of the iron, stopping the arm from rotating before it comes into alignment with the arm 215 and, thus, preventing the arms from doubling back as would interfere with ironing and reorientation for storage.

When the ironing board is reoriented for storage, the rotation of the base member 224' cams the ball detent 258 into the recess 257, assuming that the arm 215 has been first moved to its storage position, as in FIGURES 19—21. The ball detent locks the post 221 against further rotation to prevent the iron support arms from swinging when the apparatus is tipped on its base and rolled on the rollers 228 to or from a storage location.

Referring to FIGURES 31 and 32, there is illustrated a mechanism 271 for securely retaining the linkage in its storage position with the arms 215 and 216 folded back on one another as shown in FIGURES 24 and 25. Located atop the arm 215 near its connection 219 with the post 221 is a latch 273 pivotally connected as by a screw 275 to the upper surface of the arm 215. The latch 274 includes a finger 276 located for engaging the hook 212 when the arm 216 is swung back against the arm 215. A spring (not shown) beneath the latch 275 suitably biases it for counterclockwise movement about the pivot 275 to maintain the finger 276 in contact with the shank of the hook 212. Further, a fitting providing a flange 277 having a pair of slots 278 is affixed to the arm 215 rearwardly of latch 274. The slots 278 are spaced for receiving the prongs 279 of the iron plug 280 for storage. The latch 274 is similarly provided with a flange 281 having corresponding slots 278'. The geometry of latch 274 is such that the slots 278 and 278' will come into registry only when the hook 212 is engaged by the finger 276. Thus, the plug 280 cannot be inserted for storage until the latch 274 is secured but, when so inserted, the plug 280 effectively locks the latch 274 in place. The latch 274 securely maintains the storage orientation of the arms of linkage 211 when the apparatus is being moved.

Referring now to FIGURES 36—39, there is illustrated the securement unit 209 by which the iron 201 is supported from the linkage 211 and interengaged with it. The unit 209 permits the iron

to be moved between first and second orientations respectively in and out of contact with the ironing surface 217. In this regard, the iron is supported so that it can exert its weight when touching the surface for effective ironing when moved over the clothes to be ironed. Thus, the ironing is carried out partly by pressure and partly by steam and heat. However, the user may easily effect movement of the iron to its raised position, being assisted substantially. The unit 209 comprises a piece 282 of sheet metal bent to provide a channel section configuration providing an upper portion 282a and hingedly secured to a lower portion 282b having side flanges 283 and 283' tapered to diminish in height toward the lower end for conformance with the conventionally tapered handle portion 206 of the iron. The flanges 283 and 283' extend forwardly at right angles from a flat rear wall 284 which is secured easily and simply to the handle portion 206 by a screw 285, which may take the place of one conventional part of the iron.

The lower end of the rod 210 is suitably affixed to the portion 282a which similarly includes a pair of forwardly extending flanges 286 and 286' which are spaced just outwardly of the flanges 283 and 283' and are hingedly secured thereto by a transverse pin 287 extending through all four flanges, whereby the rod 210 and the element 282 are pivoted to permit relative movement with the rod remaining always within a plane vertically bisecting the iron. It is noted that the unit 272, and thus the rod 210, extends upwardly from the iron in near alignment with the power cord 289 without interference with the same.

The upper portion 282a has its upper end crimped and appropriately brazed or welded to the lower end of the rod 210, as at 289. The pin 287 is horizontal and located above the iron handle 205 whereby the portions 282a and 282b form an angular relationship depicted in FIGURE 36 when the iron is raised, with the portions 282a lying near the top surface of the handle 205 but with sufficient space provided between it and the handle for insertion of the users' hand. The pin 287 is located such that when the iron 201 is lowered into position for ironing, the portions 282a and 282b come into substantial alignment and with slightly over-centred relationship with a lower edge 291 of the portion 282a contacting the rear surface of the upper end of the portion 282b. The portions 282a and 282b are interconnected by a coiled tension spring 293 having one end hooked across a pin 294 at the iron-remote end of the member 282a and the other end hooked to a pin 294 located just below the pivot pin 287 whereby the axis of the spring 293 lies close to the pin 287 when the iron is lowered, yet can exert increased leverage for maintaining the iron in a raised position, as shown in FIGURE 29.

As the iron is lowered into contact with ironing surface 217, the effective lever arm provided by the spring 293 becomes less and less with the iron pressing with a substantial portion of its weight

upon the articles being ironed and with additional weight being applicable by pressure of the operator's hand. Thus, the iron securement unit shown in FIGURES 36—39 provides a significant advantage with respect to movement of the iron from its raised to its horizontal position and subsequent return to its raised position. Since the axis of the spring 293 moves into alignment with the hinge axis defined by the pin 287, the weight of the iron is transferred to the articles undergoing ironing.

It is preferred that the height of the linkage and length of rod 210 be such that the iron occupies its horizontal position a short distance, such as about 0.5 inch (1.2 cm), before touching the ironing surface 217 so that the iron will drop under its own weight the remaining small incremental distance to the ironing surface, being thus no longer substantially under the influence of spring 293. To raise the iron, the user when lifting the iron handle will produce rotation about pin 287, rocking the iron upon its heel which thus serves as a fulcrum enabling the iron to be lifted easily. As the iron sole plate 203 begins to form an angle to the horizontal, the spring 293, being pretensioned, begins increasingly to exert its influence by effective increase of the lever arm relative to the pin 287, so that the iron seems to lift itself without substantial effort. This greatly minimizes the tiresome application of lifting forces and provides hitherto unachieved ease of ironing by making it possible to reposition the iron while it is fully supported by the ironing apparatus.

This arrangement also provides a reduced height permitting the overall apparatus to be lower than otherwise possible while still making the iron readily accessible for movement between its raised and lowered positions yet without blocking the operator's view of the iron as requisite for most efficient use.

It is to be noted that the ironing board 202 is pointed at only one end, being that which would be to the left of the user when the iron is in the use position, as preferred if the user is right-handed.

The iron support arrangement permits, however, the iron to be easily relocated from its position shown (wherein the iron also points to the left), to an opposite direction, as a left-handed individual would prefer. Of course, the apparatus could be manufactured with the elements reversed or with the ironing board attached so that its pointed end would be to the right of the user, e.g., as viewed in FIGURE 24.

The new apparatus not only provides the user with previously unobtainable ease of ironing but also permits the apparatus to be taken from storage and rapidly reoriented for use. Upon completion of ironing, the user may just as quickly return the apparatus to its storage orientation, even while the iron is still hot. Then, the apparatus can be easily rolled for return to a closet or other storage location, being very compact and occupying storage space scarcely more than would be required for a separate iron and conventional ironing board.

CLAIMS

1. An ironing apparatus comprising a base a post extending upwardly from the base, means for securing proximate the post an ironing board in a use position with its ironing surface horizontally disposed for ironing thereon, an articulated linkage one end of which is interengaged with the post and the other end of which is attached by pivotal securement means to a hand iron, the articulated linkage permitting movement of the iron between first and second orientations respectively in and out of contact with the ironing surface, the linkage being swingable about the post and providing articulation when the iron is in the first orientation for freely permitting relocation of the iron to desired positions over the ironing surface.

2. An ironing apparatus according to claim 1 in which the linkage comprises an arm pivotally secured to the post and extending outwardly from the post in angled relationship, a forearm pivotally connected to the arm in articulating relationship by means of an elbow, the elbow including a braking mechanism for preventing articulation of the forearm relative to the arm in response to the weight of the iron pulling down from the forearm when in the second orientation, the linkage thereby preventing articulation when the iron is in the second orientation.

3. An ironing apparatus according to claim 2 in which the braking mechanism comprises a cable interconnecting the forearm and the post and arranged to be under tension in response to the weight of the iron pulling down from the forearm, the elbow including a cable sheave rigidly secured to the forearm and pivotal with respect to the arm, the cable passing at least partly around the sheave to provide friction preventing rotation of the sheave and thereby to prevent articulation upon cable tensioning.

4. An ironing apparatus according to claim 2 or claim 3 in which the post member is of tubular configuration, the arm is also of tubular configuration and has a first lower portion telescopically received by the post member for movement between storage and use positions and a second upper portion hingedly affixed to the first portion, the second portion being alignable with the first portion for telescopic reception by the post for storage but forming an angle with the first portion and the post for use.

5. An ironing apparatus according to any preceding claim further comprising a second post extending upwardly from the base spaced from the first post, the means for securing the ironing board comprising a bracket transversely carried at the upper end of the second post, and a locking device associated with the bracket for clampingly interengaging the bracket and a side edge of the ironing board.

6. An ironing apparatus according to any preceding claim in which the pivotal securement means comprises a fitting for attachment to the iron, a transverse shaft rotatably interengaging the fitting, a forearm extension interconnecting the shaft with the post-remote end of the linkage, the

iron being rotatable about the shaft for movement between the first and second orientations, the second orientation providing an upstanding disposition of the iron, and a spring wound about the shaft for resiliently urging the iron for movement from the first to the second orientation, the spring being pretensioned substantially to compensate for the movement of the iron normally maintaining the iron in the first orientation, whereby the iron will move from the first to the second orientation upon an upward force exerted by the user on the iron which force is greatly less than the weight of the iron, the forearm extension being interconnected by a swivel with the post-remote end of the linkage.

7. An ironing apparatus according to claim 6 in which the fitting includes a bracket having a band for tightening about the handle of the iron to secure the handle in pivotal relationship to the shaft.

8. An ironing apparatus according to claim 7 in which the bracket has projections for engaging the forearm extension to define the limits of movement of the iron in the first and second orientations, the transverse shaft being shiftable relative to the bracket for permitting clearance between the projections and the forearm extension to permit free rotation of the iron about the axis of the transverse shaft for pretensioning the spring.

9. An ironing apparatus according to claim 1 further comprising a pair of support legs attached to the base and swingable between raised storage positions and extended use positions in which they project in opposite directions from the base to increase the effective area thereof.

10. An ironing apparatus according to claim 9 in which the ironing board is swingable on a horizontal, transversely oriented pivot axis between vertical and horizontal orientations respectively constituting storage and use positions, the pivot axis being above the base and positioned laterally between the support members, the support legs when in their extended use position underlying the ironing board being substantially aligned with the longitudinal axis thereof, the support legs each being swingable in a vertical plane on a horizontal, transversely oriented pivot axis, and each support leg being interconnected by a swing control linkage with the ironing board.

11. An ironing apparatus according to claim 10 in which the base comprises first and second tubular members connected by a frame on which are mounted the first and a second post, the first and second tubular members extending transversely to the longitudinal axis of the ironing board, each of the pair of support members legs constituting a radial extension of a respective tubular member.

12. An ironing apparatus according to claim 11 in which a sleeve is slidable on one of the posts, the swing control linkage comprises first and second links interconnecting the sleeve with each of the pair of support legs for movement of the latter with sliding of the sleeve, and a third link interconnecting one of said links with the ironing board for causing sliding of the sleeve with swinging of the ironing board, and further comprising latch means for latching the sleeve in a position in which said ironing board is horizontally disposed and the support legs are each extended.

13. An ironing apparatus according to claim 12 further comprising foot-operable latch control means for selectively releasing the latch means to permit swinging of the ironing board to a vertical disposition and swinging of the support legs to a raised position.

14. An ironing apparatus according to any of claims 9 to 13 in which the iron support linkage comprises articulated first and second arm members each swingable within a horizontal plane above the ironing surface, the first arm member being secured to and radially extending from the upper end of the second post, the second post being rotatably connected to the base, the second arm member being swingably pivoted to the first arm member and having a distal end supporting the iron, the first and second arm members being swingable into positions folded upon one another for storage with the iron supported proximate the second post in a stored position, and the first and second arm members being adjacent the ironing board when vertically disposed in its storage position.

15. An ironing apparatus according to claim 14 further comprising means responsive to folding of the support legs to lock rotation of the second upright post and means for retaining the first and second arm members in folded orientation.

16. An ironing apparatus according to claim 15 in which the iron securement means comprises a unit for attachment to the iron, and a support arm extension providing interconnection of the unit and a distal end of the second arm member, the iron being rotatable with respect to the support arm extension for movement between the first and second orientations, and spring means interengaging the unit and the support arm extension, the spring being pretensioned and oriented for exerting increasing leverage as the iron is moved from the first to the second orientation and for maintaining the iron in the second orientation.

17. An ironing apparatus substantially as described herein with reference to Figures 1 to 18 of the drawings.

18. An ironing apparatus substantially as described herein with reference to Figures 19 to 38 of the drawings.