Aug. 27, 1940. L. ILLMER 2,213,042

HEATED IRONING BOARD

Filed Oct. 10, 1939 2 Sheets-Sheet 1

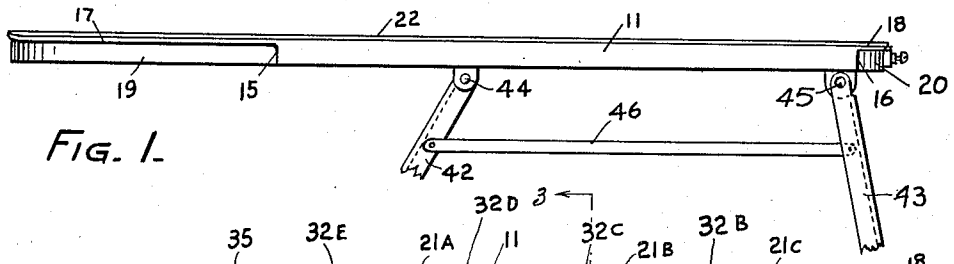


FIG. 1.

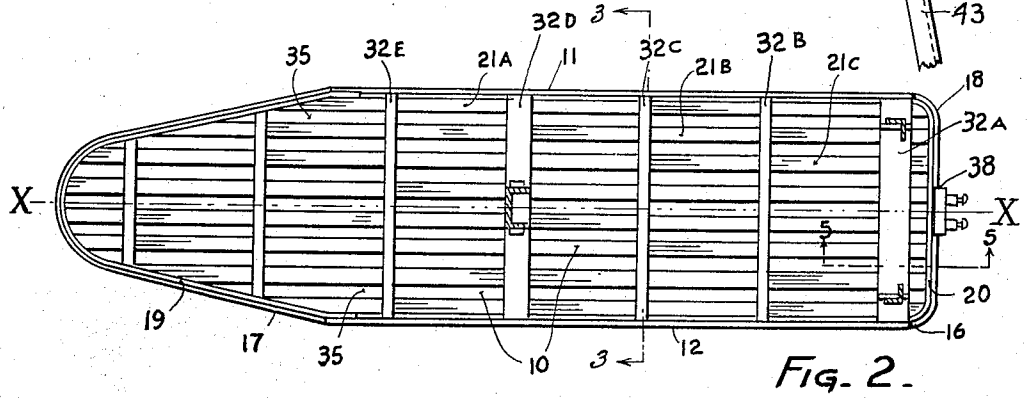


FIG. 2.

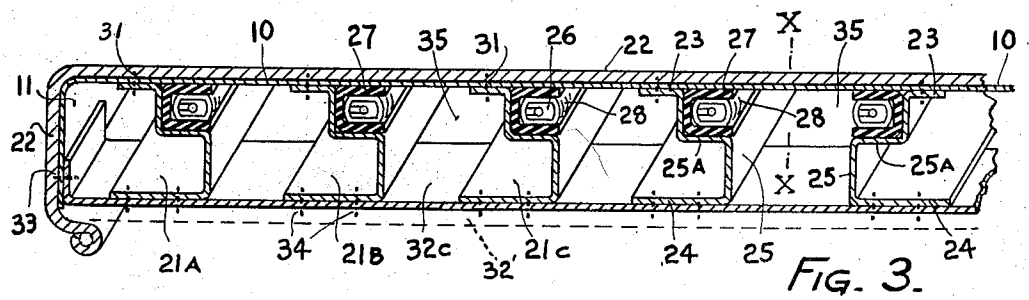


FIG. 3.

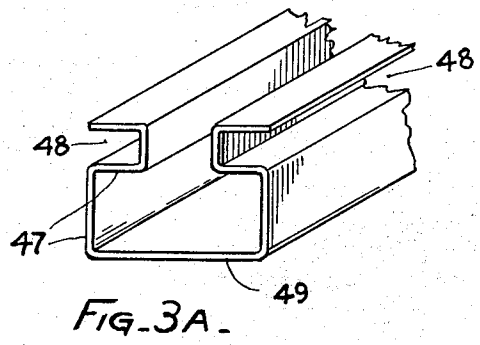


FIG. 3A.

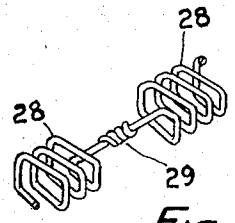


FIG. 4.

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Aug. 27, 1940. L. ILLMER 2,213,042

HEATED IRONING BOARD

Filed Oct. 10, 1939 2 Sheets-Sheet 2

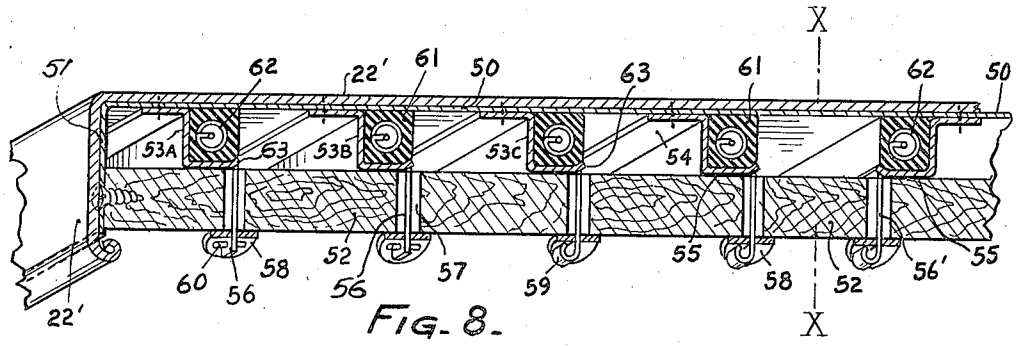


FIG. 8.

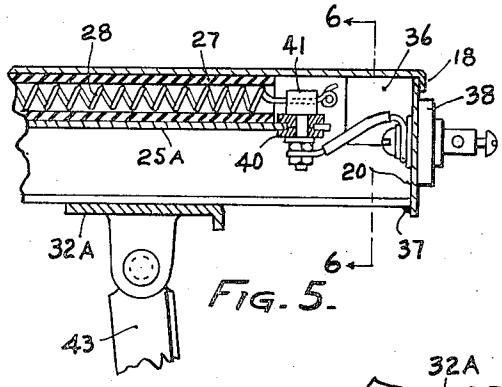


FIG. 5.

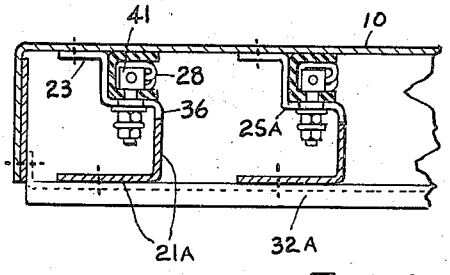


FIG. 6.

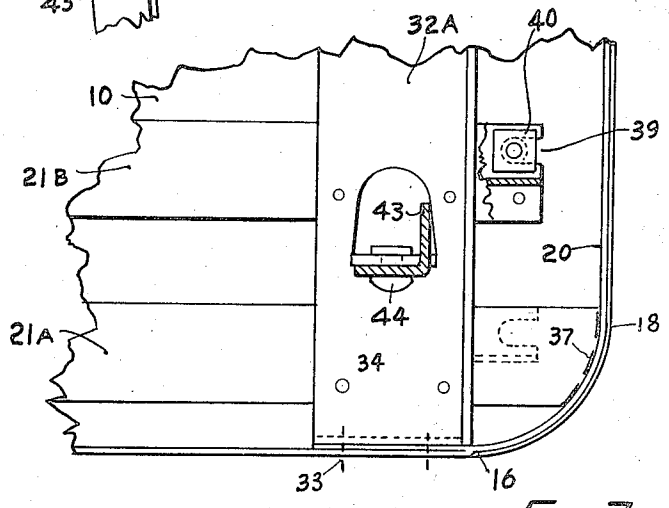


FIG. 7.

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UNITED STATES PATENT OFFICE

2,213,042

HEATED IRONING BOARD

Louis Illmer, Cortland, N. Y.

Application October 10, 1939, Serial No. 298,818

10 Claims. (Cl. 219—19)

My invention broadly relates to certain simplified accessories for fabric covered portable household or stationary factory ironing boards, and more particularly pertains to an unperforated metal plate top of the web reenforced type that is electrically heated from beneath to promote efficient ironing thereon. The present instrumentalities supplement the heater coil of an electric sadiron and otherwise expedite operations by obviating the need for drying out the cover by heat emitted from such iron.

The instant improvements are primarily directed to the economical manufacture of an inherently light weight yet rigid, all-metal board or of a composite wooden base board in which the fabric covered top plate is effectively stiffened against downward deflection by a row of non-cast longitudinal girders fixedly attached beneath the top plate in laterally spaced relation to withstand the downward loading normally imposed by the sadiron thrust.

For household needs, my board is adapted to have linked tripod front and rear legs pivotally applied to fold in unison. The plate stiffening girders are disposed to supportingly reenforce an overhanging forward board end without abnormal deflection when loaded and to similarly uphold the board span extending between the front and rear legs, all without involving inordinate self-weight over a wooden ironing board provided with equivalent heating equipment.

Essentially, a thin rustless top plate is resorted to whose edges may be provided with depending flanges. Inbuilt therein are a series of longitudinal girders of thin sheet metal having a generally trough shaped profile adapted to be cheaply rolled in long lengths without the need of massive forming dies. Such initially separable girders may be kept bodily spaced apart in row formation and each provided with opposed head and foot flanges that may be integrally interconnected by a web component shaped to provide for a heater receiving pocket. The web of each such girder may be permanently attached beneath the top plate, the row of mated foot flanges preferably falling into a common plane and respectively providing for separate elongated access gaps therebetween. Each such open pocket may extend along the entire girder length and mount tubular insulation therealong in which an efficient low temperature electric resistance coil or the like heating element is operatively sustained and supplied from a suitable current source without inordinate heat losses.

The several foot flanges may be fixedly cross connected by a plurality of tie straps in latticed fashion whereby the whole skeletonized ironing board is made to act in the unitary manner of a comparatively deep I-beam truss provided with plural access gaps. The several resistance elements are well distributed over the entire upturned face of the top plate to attain a substantially uniform temperature somewhat higher than 212° F. The overlying fabric cover is thereby kept dry throughout to permit efficient non-soggy ironing thereon. Where the upturned top face is polished to render it heat reflective, this serves to further conserve the power expenditure of a superimposed electric sadiron.

An important feature of the present structure resides in the cited open access gaps through which the electrical heater element or their insulation may be initially installed or serviced for repair subsequent to permanently building up the coil embracing sheet metal girders and top plate into a unitary skeletonized board structure. The respective heater elements are compactly mounted directly beneath the top plate in close thermal relationship without superfluous air spacing. The interposed insulation lining is purposely kept relatively thin in order that a safe low temperature heater well below red heat, may suffice to impart the desired temperature to the top plate without serious inflammable hazard.

To this end, I preferably resort to a resistance element of partially flattened spiral shaped wire by which the intervening spacing between the wire perimeter and such heated top plate is reduced to a minimum dimension. My rectangular pocket profile is such that its sheet metal walls intimately contact the major portion of the embraced lining circumference to establish a highly conductive thermal circuit with respect to such heater coil while still providing adequately for fire-proofed electric insulation needs.

The object of the present invention is to afford a sturdy and thermally efficient sheet metal board structure of relatively light weight provided with access gaps of the indicated character, said board being adapted for economical fabrication on a rapid productive scale without requiring expensive stamping dies of a size commensurate with the ironing board outline and in which any one electric heating element may be initially installed or replaced through such gaps.

Embodied herein are also other structural features including a composite wood and metal board similarly equipped with an electrically heated top plate, improved coil mounting and the like. Reference is had to the accompanying two

sheets of drawings which are illustrative of certain alternative embodiments, and in which drawings:

Fig. 1 represents an elevational side edge view of an erected ironing board assembly of the household type equipped with my heating devices, and Fig. 2 is a bottom view thereof.

Fig. 3 shows a cross-sectional view taken along 3—3 of Fig. 2, and Fig. 4 details in perspective a fragment of a resistance coil used therein.

Fig. 3A cross-sectionally indicates an alternative style of twin girder disposition.

Fig. 5 is a cross-sectional detail taken along 5—5 of Fig. 2 to disclose a preferred coil end connection, and Fig. 6 depicts a fragmental view taken along 6—6 of Fig. 5.

Fig. 7 schematically illustrates a bottom view of Fig. 5, while Fig. 8 is similar to Fig. 3 but discloses a modified composite board assembly.

Referring more specifically to Figs. 1 to 7, the numeral 10 designates the top plate of my all-metal board, this being preferably fabricated from planished rustless sheet metal stock of about 1/64 inch thick disposed symmetrically about the longitudinal center line X—X. Such plate may be rolled in continuous lengths into a cross-sectionally channel shape to include a pair of parallel depending flanges such as 11 and 12. The contour of the severed forward end of a potential ironing board top may be given its usual tapered nose outline, while its rear end may be kept substantially square as shown. If desired, each such marginal flange may be cut away to terminate at 15 and 16, the respective marginal plate ends being downturned to provide for slightly undercut lips such as 17 and 18. Respectively inset therebehind, are separate brim strips 19 and 20 which may be welded in place to complete a metal top plate having a built up marginal flange, all without requiring expensive die matrices sunk to integrally stamp up an endless flanged top plate by the use of an abnormally large press involving high distributed die charges for the finished product.

A conventional protective fabric cover 22 (see Fig. 1) may be stretched over the top plate 10 to cushion the ironed work piece. Such cover may be skirted to extend beneath the board in the customary manner.

In the all-metal board shown in Fig. 3, a series of laterally spaced sheet metal girders 21A, 21B, 21C, etc. extend longitudinally beneath said top plate for stiffening purposes. Such girder forming sections of skeletonized zig-zag profile are preferably designed to be rolled in relatively long lengths to comprise a head flange 23 and a parallel foot flange 24 whose corresponding longitudinal edges may be interconnected by an offset web plate 25 shaped to include a ledge component 25A that lies parallel to a mated head flange. The web stock is preferably kept somewhat heavier in thickness than the top plate and its profile may be given a trough shape having multiple flat sides to form constituents of an inset heater receiving pocket such as 26 of which the side opening mouth extends lengthwise of its girder.

A comparatively thin strip of electrical insulating material 27 of woven sheet asbestos, moulded micanite or the like, having a cross-sectional U shape, may serve as a pocket lining as shown. The inset depth of the pocket ledge is preferably kept larger in size than the mouth opening of such lining whereby to snugly receive therein a coil 28 of iron, nickeline or the like low cost resistance wire. The coil components may be wound in short lengths on a cylindrical mandrel and then oppositely flattened as schematically indicated in Fig. 4, adjacent coil ends being preferably spliced together in series as at 29 to make up a continuous length extending from end to end of the ironing board alongside each girder. For present purposes, such wire coil of small diametral size is considerably cheaper to install than a mica covered flat heater element of the conventional type.

The respective head flanges 23 may be permanently spot welded or otherwise positively affixed to said plate as at 31 to constitute a unitary I-beam structure having the optimum of strength for a given weight, it being pointed out however that the web and its adjoined foot flange are primarily relied upon as the stiffening agency and that a contiguous web edge may be directly affixed to the top plate 10 and still accomplish a like result. The several spaced foot flanges 24 preferably lie in a common plane at a considerable lateral distance from the top plate to set up a deep web I-beam truss possessing a high degree of rigidity and providing for a suitable overall board thickness of from one to one and one-quarter inches when made of rustless sheet steel. In order to reenforce the spaced foot flanges against twist or other warpage under downward girder loading, a series of cross brace straps such as 32A, 32B, 32C, etc. (see Figs. 2 and 3), may be spot welded in place at 33 and 34 in latticework fashion. The span spacing between next adjacent foot flange edges and the straps thereacross is such as to leave successive access gaps as at 35 through which to service the initial intallation or replacement of the respective insulation strips 27 and their snugly embraced coils 28 which extend in parallelism with their respective servicing gaps. The lateral spacing of the longitudinal girders is such as to obviate undue deflection of the spanning top plate when subjected to localized loading by a sadiron.

A preferred attachment for the respective coil ends is detailed in Figs. 5 to 7. Each end of the respective girders such as 21A, 21B, etc. may have its head flange cut away at 36 to leave room for wiring clearance, the overhanging foot flange end then being welded at 37 to a contiguous brim strip 20 to augment board stability. Said strip may carry a switch block 38 arranged to plug in an electrically heated sadiron. Each end of the respective web ledges 25A may be slotted at 39 in keyhole fashion to receive a twin flanged bushing 40 of moulded insulator material whose interposed neck is shaped to snugly enter into anti-tilt engagement with the ledge end slot 39 as shown. A metallic coil post 41 may have its threaded shank mounted through such bushing and be electrically connected to the block 38. It is preferred to so proportion the resistance wires that each pair of next adjacent coils may be connected in series, thus bringing all coil terminals to the switch block end of my ironing board.

As will be understood, the outermost coil ends are intended to be stretched within the insulation lining between corresponding posts and may have the opposed coil ends looped around or through their posts 41. After loosening the shank nuts thereof with a special wrench, such posts together with their threaded coils and insulators may be individually dismantled or replaced through an adjacent access slot. No separate permanently secured bottom plate is herein equipped; instead the series of aligned gir-

der foot flanges serve as a substitute. The girder head flanges may readily be fixedly spot welded to the top plate through a contiguous gap to complete a unitary all-metal board that may subsequently be wired with heating coils. If desired, the respective foot flanges may be demountably covered by a sheet of heat insulating material or by a thin base board 32' shown in dotted outline in Fig. 3 whereby to reduce downward radiation losses.

Certain of the cross brace straps such as 32A and 32D may be enlarged in width to provide for leg brackets respectively having ears to which the foldable front and rear legs 42 and 43 may be pivotally attached at 44 and 45. As applied to household ironing boards, appropriate interconnecting link means such as 46 may actuate the legs in unison in any suitable manner.

Fig. 3A cross-sectionally depicts an equivalent type of twin girder 47 that may be rolled into a trough shaped formation to comprise opposed coil pockets such as 48 of which the common foot flange 49 is combined into a unitary structure. The laterally spaced mounting between next adjacent twin girders affords an access gap through which to service the installed resistance coils.

In Fig. 8 there is schematically disclosed an alternative heated board of the composite sheet metal top and wooden base type. The thin top plate 50 thereof may have its continuous brim flange 51 formed integrally by die means to conform in shape with the desired board outline. A demountable wooden base plate 52 may span and close the flange mouth as shown. A series of low height sheet metal girders such as 53A, 53B, etc., having a cross-sectional Z shaped profile may each comprise a spot welded head flange 54 and a combined ledge and foot flange component 55 resting upon the wooden base to provide for a cross-sectionally rectangular pocket located directly beneath the top plate, as shown. The outwardly overhanging head flange 54 is disposed to facilitate spot welding but this may be reversed to constitute a trough shaped profile.

The free outer edge of such ledge 55 may be shaped to provide for a plurality of depending integral prongs such as 56 or 56' that are spaced apart lengthwise of said edge, preferably in staggered relation to the prongs of an adjacent girder. The base member 52 may be provided with registering board slots 57 through which a corresponding prong is entered. Such depending prongs may each be provided with a metal washer 58 and have the prong tip curled thereover at 59. As an alternative, said prong may be otherwise interlocked, for instance by the cotter wedges 60.

A tubular rectangular block insulator 61 of porcelain, baked lava composition, Bakelite or the like phenol plastic may be provided with accurately moulded flat outer surfaces adapted to snugly contact the surrounding adjacent metallic walls and thereby establish close thermal relationship therewith devoid of a superfluous air spacing. Any excessive air gap interposed between the coil perimeter and the top plate, tends to raise the required temperature head therebetween. The inherent thermal conductivity of the preferred insulation material is kept relatively high and far superior to an air gap of equal thickness. The inserted spirally circular heater coil 62 may be threaded through the tubular insulators and held to a non-flattened diametral size that will closely fit into the insulator bore with the minimum of air gap so as to become substantially embedded therein. These means together with the fact that the heater coil is itself located directly beneath the top plate, facilitate thermal conduction into the upper top side face and adapted to maintain the fabric cover 22' in a proper preheated condition by the use of a safe low coil temperature of less than 500° F., i. e., well below visible red heat. The end connections for these heater coils may be arranged in a fashion similar to Figs. 5 to 7 by cutting out any interfering board portions and attaching metal leg brackets in a conventional manner.

In the Fig. 8 alternative, each coil is further wholly enclosed within its block insulator 61 to guard against fire hazard with respect to the underlying base board 52. It is preferred to mould such accurately sized insulators in comparatively short sectional lengths placed end to end and to grippingly set the same into their respective side opening girder pockets in anti-rattle fashion. To reduce weight for a portable top, such insulator sections may also be kept spaced apart endwise, particularly in the coil splice regions. One or more longitudinal corners of each insulator may be slightly beveled or have its side faces indented. As supplementary insulator retaining means, the ledge region lying between prongs may be sprung upwardly into a resilient clip 63 which cooperatively snaps behind or otherwise engages such face and thereby compensates for any irregularity on part of the insulator side fit. The base board 52 lowers heat dissipation by radiation downwardly and thereby correspondingly reduces electric current requirements. By removing such base member, access may be gained to the coils for repair or other needs.

From the foregoing disclosure, it will be seen that I have devised a built up light weight metal ironing board in which the heating elements are protectively and uniformly distributed over an extensive top surface and which elements may be held at comparatively low temperature free from substantial fire hazard. The unperforated top plate 50 also protectively shields the underlying wooden base member 52 against cupping by moisture absorption from a sprinkled work piece while being ironed upon my board. In certain instances, it is customary to work without applying the cover fabric 21 to the top plate, as shown; instead a pair of trousers or the like heavy goods may be laid directly upon such uncovered top plate and a suitable felt sheet superimposed thereon, this sheet being in turn pressed by a sad iron of the steam ejecting type without wrinkling of the underlying metal plate.

Other advantages inherent in my electrically heated ironing board assembly are believed apparent to those skilled in this art, it being obvious that the same underlying structural principle may be utilized in other associations and that various modifications in design may be resorted to in likewise carrying out my illustrative embodiments, all without departing from the spirit and scope of my invention heretofore described and more particularly pointed out in the appended claims.

I claim:

1. An electrically heated ironing board or the like comprising a comparatively thin sheet metal top plate of which one side face serves as an ironing surface and its opposed face is laterally reenforced in skeletonized formation by girder members of sheet metal disposed lengthwise of

said board and mounted in laterally spaced relationship, each said unitary girder comprising an elongated web component cross-sectionally shaped to provide for a side opening pocket and having one longitudinal edge positively affixed to said opposed face with its mated web edge adjoined to a foot flange component in substantial parallelism with the last named face, a plurality of insulated heater elements respectively mounted in certain of such pockets, the next adjacent longitudinal edges of successive foot flanges of said girders being respectively spaced apart to constitute a separate pocket access gap between each pair of such adjacent edges.

2. An electrically heated ironing board or the like comprising an upturned fabric covered sheet metal plate of which the uncovered bottom side face is laterally reenforced in skeletonized formation by a row of girder members of sheet metal that are mounted in laterally spaced relationship, each such girder being given a cross-sectional profile that includes a head flange component positively affixed to said bottom face together with a substantially parallel foot flange component and certain longitudinal edges of which flanges are integrally interconnected by a web component, said profile being shaped to provide for a heater element receiving pocket interposed between the respective flange planes, the next adjacent longitudinal edges of successive foot flanges in said row of girders being respectively spaced apart to constitute a separate pocket access gap between each pair of such adjacent edges, and demountable base plate means spanningly closing the several access gaps against downward radiation.

3. An electrically heated ironing board assembly or the like comprising a comparatively thin sheet metal top plate of which one side face serves as an ironing surface and its opposed face is laterally reenforced by a row of initially separable girder members of sheet metal, each such girder having a trough shaped cross-sectional profile that includes a head flange positively affixed to said oposed side face together with a substantially parallel foot flange and certain longitudinal edges of which flanges are integrally interconnected by a web to provide for an open heater receiving pocket located closely beneath the aforesaid top face, next adjacent longitudinal edges of the successive foot flanges in said row of girders being respectively spaced apart to constitute a separate pocket access gap between each pair of such adjacent edges, and a plurality of insulated heater elements respectively mounted in certain of such girder pockets, each such element being enterable through a contiguous access gap subsequent to affixing the respective head flanges to the top plate.

4. An electrically heated ironing board assembly or the like comprising a comparatively thin sheet metal top plate of which one side face serves as an ironing surface and its opposed face is laterally reenforced in skeletonized I-beam formation by a row of girder components of sheet metal, each such girder component having a cross-sectional profile that includes a head flange affixed flatwise to said opposed face together with a substantially parallel foot flange and certain longitudinal edges of which flanges are interconnected by a web providing for an open heater receiving pocket extending lengthwise of the girder thereof, next adjacent longitudinal edges of successive foot flanges in said row of girders being respectively spaced apart to constitute a separate pocket access gap between each pair of such adjacent edges, a series of brace straps spacedly attached crosswise of the respective foot flanges in latticework fashion, electrical insulator means for certain of the respective pockets, and a demountable heater element operatively sustained in each of such certain pockets and which elements are enterable into their respective pockets through said latticework.

5. An electrically heated ironing board assembly or the like comprising a comparatively thin sheet metal top plate of which one side face serves as an ironing surface and its opposed face is laterally reenforced by a row of girder components of sheet metal mounted in laterally spaced relationship, each such girder component having a zig-zag cross-sectional profile that includes a head flange affixed flatwise to said opposed face together with a substantially parallel foot flange and certain longitudinal edges of which flanges are interconnected by a web having a ledge component interposed between the flange planes to provide for a mouthed side opening pocket extending lengthwise of the girder thereof, the inset pocket depth measured along the aforesaid face being greater than its mouth distance between the top plate and the ledge, electrical insulator means interiorly lining the respective pockets, and a perimetrically flattened spiral coil of resistance wire substantially embedded in one such lined pocket, said coil being independently mountable through a contiguous girder spacing.

6. An electrically heated ironing board assembly or the like comprising a comparatively thin sheet metal top plate of which one side face serves as an ironing surface and its opposed face is laterally reenforced by a row of girder components of sheet metal, each such girder component having a cross-sectional profile that includes a head flange affixed flatwise to said opposed face together with a substantially parallel foot flange and certain longitudinal edges of which flanges are interconnected by an offset web having a ledge component interposed between the flange planes to provide for a wall of a side opening pocket located closely beneath the aforesaid top face, the respective foot flange ends extending onwardly beyond their mated ledge ends for wiring clearance purposes, conductor post means carried at each such cleared girder end, and an insulated heater element mounted between each pair of corresponding girder posts.

7. An electrically heated ironing board assembly or the like comprising a comparatively thin planiform sheet metal top plate whose perimetric outline is nose shaped at one end and substantially square at the other end, the opposed longitudinal plate edges being respectively provided with a depending brim flange component cut away to terminate inwardly of said top plate ends, mated brim strips respectively affixed to the top plate in a spanning relation to corresponding flange terminals to build up an endless brim flange, a row of laterally spaced girder components affixed to said top plate within the brim flange confines, each such girder component having a cross-sectional profile to include a foot flange constituent and integral web constituent respectively shaped to provide for a heater element receiving pocket extending lengthwise of the girder thereof, next adjacent longitudinal edges of successive foot flanges being spaced apart to constitute a separate gap therebetween affording servicing access to a contiguous pocket.

8. An electrically heated composite ironing board assembly or the like comprising a fabric covered sheet metal top plate of which the uncovered side face is laterally reenforced in skeletonized I-beam formation by a row of girder components of sheet metal, each such girder component having a cross-sectional profile that includes a web constituent affixed to the uncovered face together with a foot flange constituent having plural prongs depending therefrom and which profile is shaped to provide for an open heater receiving pocket interposed between such top plate and a corresponding foot flange constituent, the next adjacent longitudinal edges of successive foot flanges being respectively spaced apart to constitute a separate pocket access gap between each pair of such adjacent edges, a plurality of insulated heater elements respectively mounted in certain of such pockets, and an apertured base board disposed to cover the several access gaps and having said prongs entered through such board.

9. An electrically heated ironing board assembly or the like comprising a fabric covered sheet metal top plate of which the uncovered side face is laterally reenforced by a row of girder members of sheet metal mounted in laterally spaced relationship, each such unitary girder having a cross-sectional profile that includes a flat head flange affixed to said face and a substantially parallel foot flange, certain longitudinal edges of said flanges being web interconnected to provide for an open pocket located closely beneath said uncovered side face between the planes of said flanges, moulded sectionalized insulator tubes set end to end as a lining for one such pocket, each such tube having a perimetrically rectangular profile defining opposed flat surfaces that snugly abut corresponding pocket wall confines, and a heater element mounted through said tubular lining.

10. An electrically heated ironing board or the like comprising a comparatively thin sheet metal plate of which one side face serves as an ironing surface and its opposed face is laterally reenforced in skeletonized I-beam formation by a row of girder components of sheet metal extending lengthwise of said board, each such girder component being given a cross-sectional profile that includes a web constituent affixed edgewise to said opposed face together with a foot flange constituent disposed in substantial parallelism with said plate and which profile is shaped to provide for an open mouthed heater receiving pocket located intermediate the foot flange and said plate, a demountable heater element operatively sustained in one such pocket, insulator sustaining means interposed between said element and its pocket confines, the longitudinal foot flange edges next adjacent to said one pocket being spaced apart to constitute a pocket access gap of sufficient size to permit of removing therethrough said one heater element and its associated insulator means.

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