Feb. 14, 1967 E. E. FOSTER 3,303,591

IRONING APPARATUS

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FIG. 1

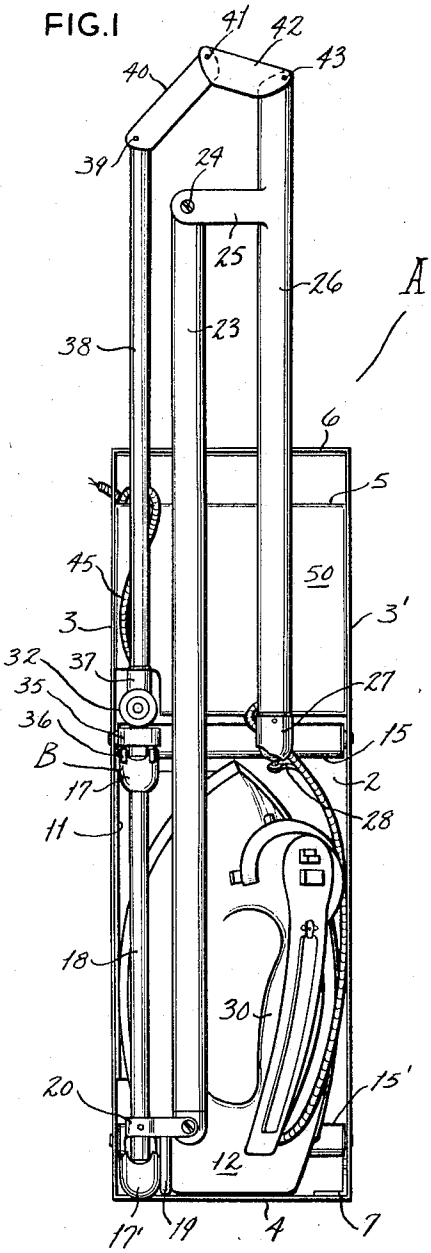
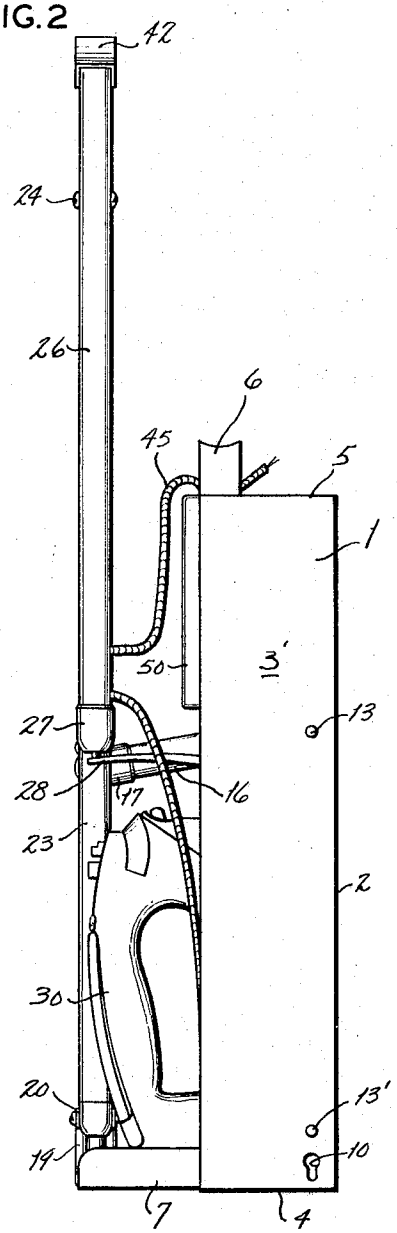


FIG. 2



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FIG. 3

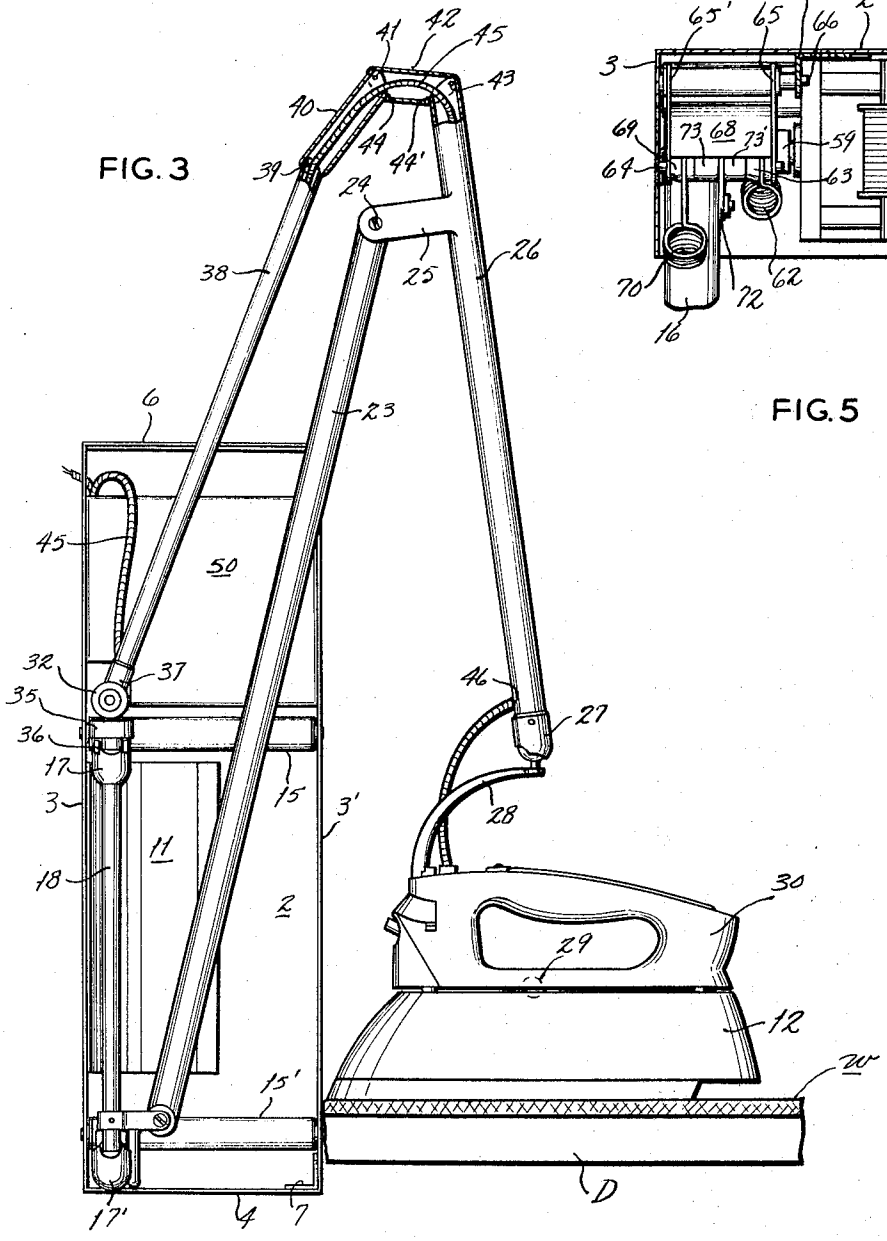


FIG. 5

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IRONING APPARATUS

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FIG. 4

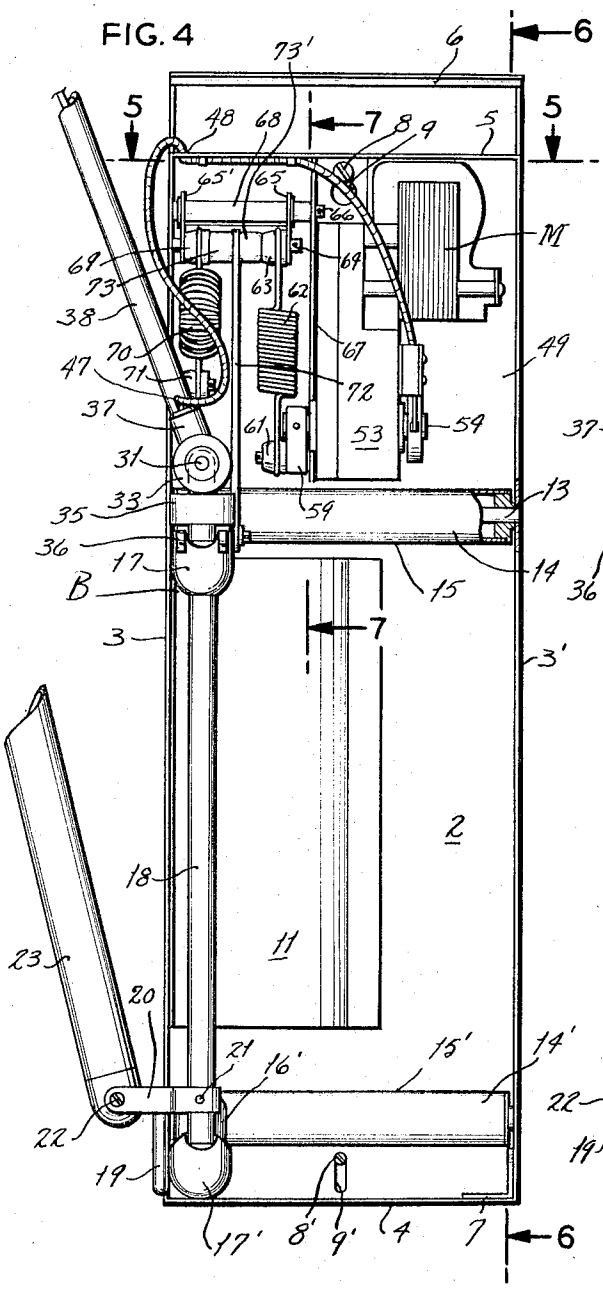
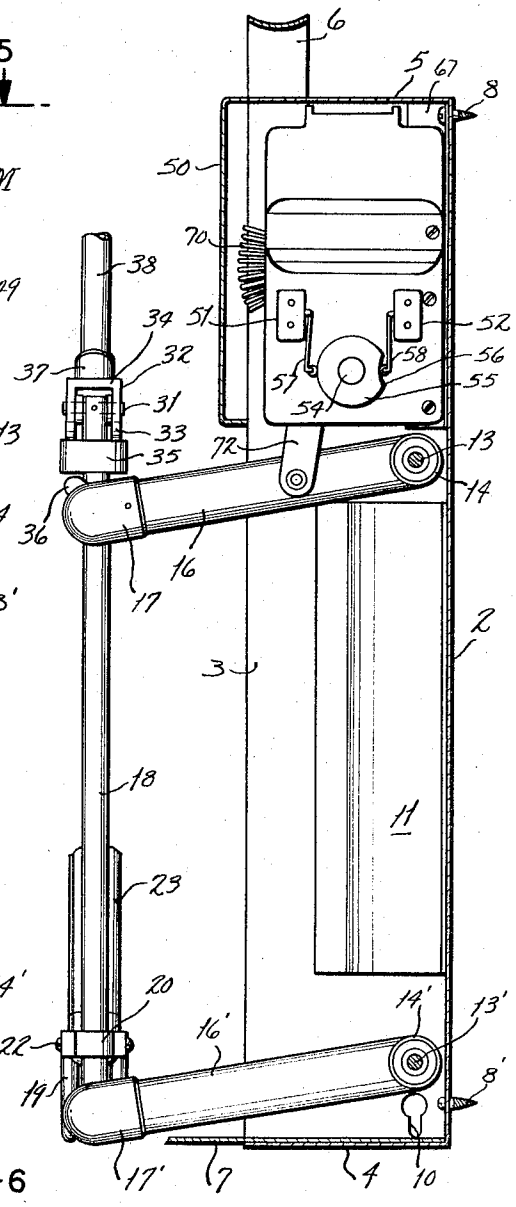


FIG. 6



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FIG. 7

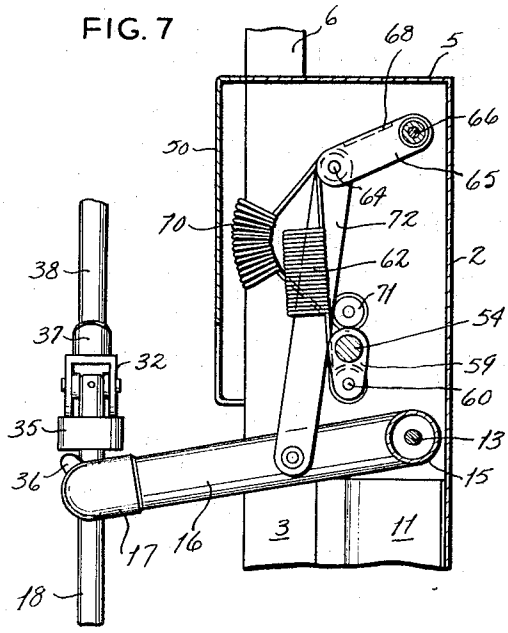
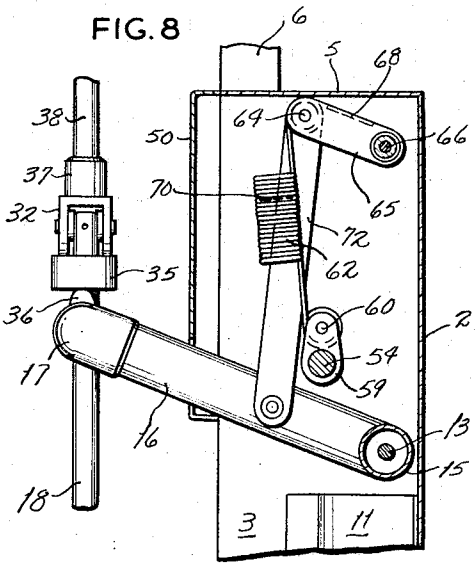


FIG. 8



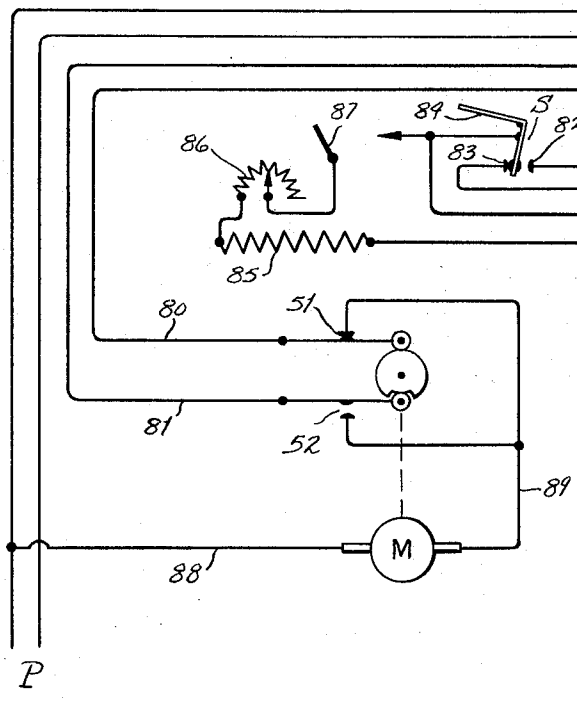


FIG. 9

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United States Patent Office 3,303,591
Patented Feb. 14, 1967

3,303,591

IRONING APPARATUS

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Filed Nov. 5, 1965, Ser. No. 506,539
5 Claims. (Cl. 38—31)

This invention relates in general to ironing equipment, and, more particularly, to a self-contained ironing apparatus embodying means for automatic iron lifting.

It is an object of the present invention to provide an ironing apparatus which compactly and unitarily comprises an iron, support linkage therefor, linkage control means and an ironing cord presented within a casing of relatively small volume, whereby the entire apparatus is amenable for extremely facile handling during the ironing operation, being readily presentable in any convenient location, such as upon a wall or horizontal surface; with minimum space being required for storage during disuse.

It is another object of the present invention to provide a relatively extremely compact comprehensive ironing apparatus which is of such limited weight as to be easily handled by the average housewife and which incorporates unique means for retaining the ironing cord so that by use of the present invention, there is completely eliminated all of the heretofore accepted troublesome experiences encountered through the use of the customary elongated ironing cord, whether connected with use or storage thereof.

It is another object of the present invention to provide an ironing apparatus which incorporates automatic iron lifting means so that upon termination of any ironing movement for whatever purpose, such as for changing the work, shifting same on the board, etc., the iron will be lifted above the board, thereby sparing the user the heretofore tedious and laborious procedure of carrying the iron to a resting place as upon a metal plate, and then returning same therefrom to the work, so that the manual effort required therefor is eliminated.

It is a further object of the present invention to provide ironing apparatus of the type stated which embodies novel detent means so that when the iron is lifted for momentary disuse the same will be restrained against floating and, thus, remain poised with relation to the work as presented by the user.

It is a still further object of the present invention to provide an ironing apparatus of the character stated which incorporates novel control means for effecting the automatic raising of the iron upon interruption of use, and which means are conveniently presented to the user so that a separate action is not required.

It is a still further object of the present invention to provide an ironing apparatus of the character stated which, upon termination of the ironing operation, will allow the iron to be stored while still hot without danger and which incorporates novel means for assuring of circuit opening upon disposition of the iron in storage attitude.

It is another object of the present invention to provide an ironing apparatus which is simple in construction, having a simplicity of parts which are constructed from durable materials so as to render the apparatus resistant to breakdown; which is reliable in usage; which may readily incorporate any type of iron without requiring structural modification; which is economical in production; and the use of which obviates numerous of the hazards inherent in the operation of currently available irons.

Other objects and details of the invention will be apparent from the following description, when read in connection with the accompanying drawings (four sheets) wherein—

FIGURE 1 is a front elevational view of an ironing apparatus constructed in accordance with and embodying

the present invention, illustrating same in inoperative or stored condition.

FIGURE 2 is a side elevational view of the ironing apparatus in the condition illustrated in FIGURE 1.

FIGURE 3 is a front view of the ironing apparatus in operative position, with the iron presented upon work supported by an ironing board.

FIGURE 4 is a front view of the ironing apparatus with the inspection plate removed from the casing, with the linkage being fragmentarily presented, and in a position 180° from that shown in FIGURE 3.

FIGURE 5 is a horizontal sectional view taken on the line 5—5 of FIGURE 4.

FIGURE 6 is a side view taken on the line 6—6 of FIGURE 4.

FIGURE 7 is a vertical transverse sectional view taken on the line 7—7 of FIGURE 4.

FIGURE 8 is a vertical transverse sectional view taken substantially on the line 7—7 of FIGURE 4, but with the apparatus being in raised position.

FIGURE 9 is a wiring diagram of the control circuit.

Referring now by reference characters to the drawings which illustrate the preferred embodiment of the present invention, A generally designates an ironing apparatus comprising a generally rectangular housing or casing 1, having a back wall 2, a pair of parallel side walls 3, 3', a bottom wall 4, and a top wall 5; said housing 1 being open to the front throughout its extent. For facile portability, a carrying handle 6 is provided on top wall 5. Housing 1 is relatively shallow from front to back and may be provided with a foot member 7 projecting forwardly from one side of the lower end portion of said housing 1 for conducing to stability when said housing 1 is disposed upon a support surface, such as a floor, for storage.

Housing 1 may be supported from any convenient wall surface, by means of screws of both the shoulder and the headless type as indicated respectively at 8, 8', for reception within cooperating slots 9, 9' formed in the upper and lower portions of back wall 2, for purposes which will become more apparent hereinbelow; casing 1 is also provided in the lower portions of its side walls 3, 3' with button hole-type slots 10 for receiving screws of C-clamps (not shown) which may be used for securely mounting housing 1 together with its components to be described hereinbelow as upon any horizontal surface, such as that of a table or other convenient member for ironing purposes. For purposes of rigidifying housing 1, which may be formed from relatively thin gauge sheet material, is an angle shaped brace member 11, suitably affixed to the inner face of back wall 2 in its lower portion.

Housing 1 supports, and forms an integral part of, a linkage system broadly indicated B for supporting an electrically operated iron 12. Iron 12 may be of any conventional type, being either of the steam or high resistance coil type, since the precise character of the iron does not form a part of the present invention, which is thus usable with any conventional, currently available iron.

Said linkage system B incorporates a pair of vertically spaced apart upper end lower axially parallel shafts 13, 13', extending transversely between side walls 3, 3' and being fixed at their ends therein.

Provided for rotative movement about each shaft 13, 13' is the transverse section 14, 14' respectively of an L-shaped link 15, 15', which, at one end, is integral with a forwardly projecting arm 16, 16'; the latter extending forwardly of the proximate side wall 3. It will thus be seen, transverse sections 14, 14' are substantially coextensive with the width of housing 1, so as to serve primarily as spacers for assuring of reliable presenta-

tion of the respective arms 16, 16', in vertical aligned relationship, for reliable movement within the same vertical plane during operation. Each of said arms 16, 16' at their outer ends are connected through ball and socket joints indicated 17, 17', respectively, to a vertically presented shaft 18 which, by reason of said ball and socket joints 17, 17', is adapted for rotative movement through an arc of 180°, with the limits of such movement being determined by the abutment against the diametrally opposed lateral portions of joint 17' of a detent member 19 (see FIGURES 1 and 4); said detent member 19 depending from a bracket 20, projecting laterally from shaft 18, and being secured thereto by a pin 21, immediately upwardly of socket 17'.

At its outer end bracket 20 is pivotally engaged, as at 22, to the lower end of a preferably hollow compression link 23, which progresses upwardly to a point beyond handle 6 for rockable securement at its upper end by means of a pin 24 to the outer end of a short extension 25, progressing laterally from the upper end zone of a tubular forearm 26. The lower end of forearm 26, which terminates spacedly upwardly of the lower end of compression link 23, is engaged to a ball and socket 27 which connects the said forearm 26 to iron 12 by means of a pivot link 28, the lower end of which link is connected by a pin 29 centrally of the lower portion of the handle 30 of iron 12, so that by reason of said pin 29, link 28, and joint 27, iron 12 may be easily, freely and substantially unrestrainedly manipulated to an extent comparable to an unattached iron.

Link 18 at its upper end, upwardly of joint 17, pivotally mounts, as by means of a transversely extending pin 31, a clevis-type member 32 having annular lateral components 33 and connecting top web 34. Also provided on said shaft 18 between the lateral components 33 of clevis 32 and joint 17 is a slideably disposed brake sleeve 35 presented for abutment on its undersurface by a cam member 36 projecting from the upper portion of joint 17—so that upon such abutment by upward swinging of arm 16, brake sleeve 35 will be brought into snug, friction-producing relationship with the lower edge surfaces of components 33 of clevis 32 so as to inhibit rockable movement thereof about the pivot axis created by pin 31. Thus, with arm 16 in lowered position (as shown in FIGURE 6) clevis 32 may rock about pin 31 for purposes presently appearing. Integral with web 34 and opening upwardly thereabove is a socket 37 for fixedly receiving the lower end of a hollow tension link 38 which extends upwardly to a point above the upper end of compression link 23 and at its upper end is hinged as by a pin 39 to the lower end of a short hollow arm 40 which in turn, at its upper end is pivotally secured, as at 41, to one end of a short hollow connecting link 42; which latter at its opposite end is pivotally engaged, as at 43, to the upper end of forearm 26 above extension 25 (FIGURES 1 and 3). Connecting link 42 is provided in the lower portions of each of its ends with integrally formed stops or detents 44, 44'; or, if desired, the said link 42 may be so formed at its ends as to restrict relative movement with respect to arm 40 and forearm 26, so as to assure of the proper interrelationship of forearm 26, tension link 38, and compression link 23 for effective operation of the apparatus, as well as to prevent any untoward, damaging flexing of an articulated cord housing 45, extending therethrough and containing the four conductor wires of the control circuit. Said cord 45, at one of its ends, passes outwardly through an opening 46 in the lower end of forearm 26, just upwardly of joint 27, for extension to iron 12, and said cord passes downwardly through tension link 38 for projection outwardly through an opening 47 at the lower end thereof just above socket 37 for insertion through an opening 48 in top wall 5, of housing 1, for projection into a compartment 49 therein defined by the walls of said housing 1 and a removable front or inspection plate 50, for suitable connection of the contained conductors to a motor or prime mover M as preferably of the gearhead type, and to micro-switches indicated generally at 51, 52.

Motor M is operatively connected to a gear box 53 within which is journaled a shaft 54 for rotation at a pre-determined angular velocity upon energization of motor M, said shaft being presented for extension transversely of compartment 49 and projecting at its end beyond box 53. Upon its end, proximate side wall 3', shaft 54 mounts an annular plate cam 55 for rotation therewith, said cam having a single edge depression or recess 56. Cam 55 is so presented as to edgewise engage, at substantially diametrally opposed points, the trigger arms 57, 58 of microswitches 51, 52, respectively, which are normally urged into open position, so that the arm of the switch engaging the edge of depression 56 will be open while the arm of the switch engaging the normal circumferential edge of cam 55 will be closed. Thus, for purposes of illustration the arrangement shown in FIGURE 6 presents the micro-switch 52 as being open and the micro-switch 51 as being closed. It will be seen that upon rotation of shaft 54, cam 55 will be rotated for effecting opening and closing action of the said switches 51, 52 for purposes to be described hereinbelow.

At its opposite end, or that proximate side wall 3 of housing 1, shaft 54 mounts a crank 59 having a crank pin 60, which latter carries a mounting 61 for securing the lower end of a spring link 62, which is in the form of a constant compression spring, as more particularly described in Re-Issue Patent No. 23,974. The upper end of spring link 62 is secured about a mounting 63 suitably fixed upon a pin 64 which, at its ends is secured within the lower end portions of a pair of transversely aligned links 65, 65' which latter are pivotally mounted at their upper ends upon a transverse shaft 66, fixed at its outer end within housing wall 3, and at its inner end within a mounting flange 67 projecting forwardly from the inner face of housing rear wall 2. Disposed upon shaft 66 between links 65, 65' is a spacer 68. Carried also upon pin 64 adjacent its engagement to arm 65' is a mounting 69 for engagement to the upper end of a second constant compression link 70 of the same type and character as link 62, and with the lower end of said link 70 being engaged about a fixed mounting 71 suitably anchored to housing wall 3. It will, thus, be seen that spring links 62, 70 are intransversely aligned relationship and compactly presented within the volume between gear box 53 and housing wall 3. Centrally carried upon pin 64, intermediate spring link mountings 63, 69 is the upper end of a connecting link 72 being presented between said spring links 62, 70 and with its lower end being engaged to arm 16 (FIGURES 6, 7, and 8); there being spacer members 73, 73' provided upon pin 64 so as to prevent inadvertent lateral displacement of link 72.

Turning now to FIGURE 9, the control circuit of ironing apparatus A will now be described. Micro-switches 51, 52 are respectively connected by conductors 80, 81 to poles 82, 83, respectively, of a double pole switch, indicated generally S, having control lever 84; said switch S being disposed upon handle 30 of iron 12 for convenient engagement by the hand of the operator when the iron is in use. Control lever 84 will normally be urged into circuit closing engagement with pole 83 (as shown in FIGURE 9) through bias of a spring (not shown) so that the circuit to pole or contact 82 is interrupted or open.

The iron heating element is shown diagrammatically at 85, with its temperature control at 86, and the iron control switch at 87, which latter may be preferably a mercury switch, so that when the iron is disposed in horizontal position, the main switch will be closed and when the iron is disposed in vertical disposition, the circuit will automatically open. By the utilization of a switch of this type, an automatic safety feature is thereby pro-

vided, assuring that when the user returns the iron to stored condition, the circuit will automatically be open.

Motor M and iron **12** are adapted to be energized from a conventional convenient source of power, such as the usual household supply through cord **45** plugged into the customary receptacle. One side of motor M is connected to the power source P by a conductor **88**, and the other side is connected in parallel relationship by conductor **89** to micro-switches **51**, **52**.

Referring now to FIGURES 1 and 2, it will be seen that when the ironing apparatus of the present invention is in storage condition, the same is exceedingly compact, with iron **12** being received within the lower portion of housing **1** in vertical or upright position, with its rearward end resting firmly upon lower wall **4**; the said linkage system B being snugly collapsed, with link **38** and shaft **18** in axially aligned relationship, and with the latter being axially parallel to link **23**, and forearm **26** (FIGURE 1). In this state, ironing apparatus A is in immediately closely united condition for ease of portability, as well as for storage in minimal space, and in any convenient manner, such as suspension from a wall surface or disposition upon a support surface.

To utilize ironing apparatus A the same is placed in immediate relationship to a conventional ironing board, as indicated at D (FIGURE 3), as by being placed upon a table and secured thereto by C-clamps or being so located upon a wall surface for proper disposition. The user will remove iron **12** from housing **1** by merely pulling same outwardly which, through linkage system B, will cause the components thereof to swing into position generally shown in FIGURE 3. With the iron being swung into horizontal position, the switch **87**, if it is of the mercury type, will automatically close so as to connect the iron with the source of electricity. Should it be a manually operated switch, the user, by appropriate manipulation, can so close said switch **87**. As stated hereinabove, lever **84** of switch S is biased into closed engagement with pole **83**, as shown in FIGURE 9, which represents the condition of the circuit when iron **12** is in raised or lifted condition. Lever **84** is of the trigger type, so that the user, upon grasping the handle **30** of iron **12**, will automatically swing same against the bias of its spring so as to open the circuit at pole **83**, and close same at pole **82**. By such action, motor M is energized through microswitch **51**, causing shaft **54** to rotate through an arc of 180°, with trigger arm **58** of micro-switch **52** being removed from depression **56** of cam **55**, so as to close micro-switch **52** and with such rotation of shaft **54** being terminated by reception of trigger arm **57** within said depression **56**, resulting in opening of micro-switch **51** and thereby de-energizing motor M. Simultaneously with such action by cam **55**, crank **59** is similarly moved through a like arc of 180° from the position shown in FIGURE 8 to that in FIGURE 7, provoking the exertion of a downward pull upon connecting link **72** by spring link **62**, so as to force arm **16** and the related components of linkage system B downwardly to cause iron **12** to be presented upon the work, as indicated at *w*. With lever **84** maintained in circuit closing contact with pole **82**, iron **12** will rest upon the work for easy maneuvering thereof by the user.

Should the operator discontinue the ironing operation for any purpose whatever, such as to change the work *w*, to shift same, etc., mere release of lever **84** will permit same, under bias of its spring, to rock into circuit closed relationship with pole **83**, with consequent energization of motor M through micro-switch **52** so as to bring about a rotation of cam **55** for effecting closing of micro-switch **51** and opening of micro-switch **52** upon reception of the trigger arm **58** thereof within depression **56**, as in the condition shown in FIGURE 9. Thereupon, motor M is de-energized. During such rotation of cam **55**, crank arm **59** is rotated into the condition shown in FIGURE 8, with consequent lifting of connecting link **72** by a pushing action of spring link **62**, with attendant upward pivoting of aligned links **65**, **65'**, and the associated components of linkage system B for raising iron **12** above work *w*. As may also be seen in FIGURE 8, such lifting action forces brake sleeve **35** into braking action with members **33**, so as to inhibit any swinging of tension link **38**, and thereby assuring that iron **12** will not float but be stably retained in the particular, raised position selected by the user. Iron **12** will remain reliably in such lifted state until the user is desirous of resuming the ironing operation, whereupon, the user, by grasping handle **30**, will effect the aforesaid swinging of lever **84** for circuit closing relationship with pole **82** for the sequential action above described.

As above stated, the lifting action of iron **12** to a convenient, but out-of-the-way, position is automatically accomplished requiring no exertion on the part of the user. It is apparent that the present invention substantially eliminates the very serious fatigue factor in ironing for the average housewife, sparing her the constant lifting, carrying action of the iron at innumerable intervals during the ironing action.

It will be seen that spring link **70** is a constant force compression spring which serves as a counter-weight for approximately one half the weight of forearm **26**, iron **12**, and the linkage system B, whereby motor M may be relatively small, since it will do a portion of its work on the down-stroke and the remainder on the up-stroke. Spring link **62** serves to prevent the overloading of motor M in case the operator accidentally holds iron **12** downwardly after having released lever **84**. Under such circumstances, spring link **62** would merely flex until the operator hand was removed from lever **84** and then lift its half of the load.

It should be understood that changes and modifications in the formation, construction, arrangements, and combination of the several parts of the ironing apparatus may be made and substituted for these herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. An ironing apparatus comprising:

(a) a casing,

(b) first linkage means mounted within said casing for pivotal movement therein,

(c) second linkage means connected to said first linkage means exteriorly of said casing,

(d) an iron connected to said linkage means remote from connection of the latter to the first linkage means for movement therewith between disposition within said casing when in disuse and operative position exteriorly of said casing,

(e) a prime mover mounted within said casing upwardly of said first linkage means,

(f) a drive shaft engaged to said prime mover for rotation upon energization of the latter,

(g) a crank mounted on said drive shaft for rotation therewith,

(h) a first constant compression spring link connected at one end to said crank,

(i) a second constant compression spring link connected at one end to said casing in spaced relationship to said first constant spring link,

(j) means provided within said casing for operatively connecting the other ends of said first and second compression spring links to said first linkage means, and

(k) control means for energizing said prime mover for optionally effecting raising and lowering of said first linkage means for consequent raising and lowering of said iron.

2. An ironing apparatus as defined in claim **1** and further characterized by said first and second compression spring links being vertically presented in side-by-side,

axially parallel relationship and within said casing upwardly of the pivotal mounting of said first linkage means.

3. An ironing apparatus as defined in claim 1 and further characterized by said first and second constant compression spring links being located upwardly of said first linkage means within said casing, said crank being located upwardly of said first linkage means whereby upon actuation of said prime mover for effecting upward pivotal movement of said first linkage means for bringing about raising of the iron, said first and second constant compression spring links will be transversely aligned in normal condition of repose, and upon downward swinging of said first linkage means said first constant compression spring link will remain in normal condition of repose and said second constant compression spring link will be in flexed, stressed condition.

4. An ironing apparatus as defined in claim 3 and further characterized by said second constant compression spring link being adapted to counterweigh a portion of the combined weight of said first and second linkage means and said iron when the latter is in raised position.

5. An ironing apparatus as defined in claim 1 and further characterized by means operatively connecting the first and second compression spring links to said first linkage means comprising:

(l) a shaft mounted in said casing,

(m) a pair of connecting links secured to said shaft in axial normal relationship to said shaft for rotation therewith,

(n) a bar extending transversely between said links in axially parallel relationship to said shaft, said first compression spring link being engaged at its other end to one end of said bar, said second compression spring link being connected to the other end of said bar,

(o) and an arm interengaging said bar and said first linkage means, said arm being located between said first and second constant compression spring links, whereby upon elevating said first linkage means said first compression spring link pushes upwardly on said bar for bringing about a raising of said first linkage means.

References Cited by the Examiner

UNITED STATES PATENTS

2,369,732	2/1945	Foster	38—30
2,939,229	6/1960	Foster	38—30
3,137,953	6/1964	Foster	38—30

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