Dec. 14, 1948. A. R. CONSTANTINE 2,456,385

IRONING MACHINE

Filed April 24, 1944 8 Sheets-Sheet 1

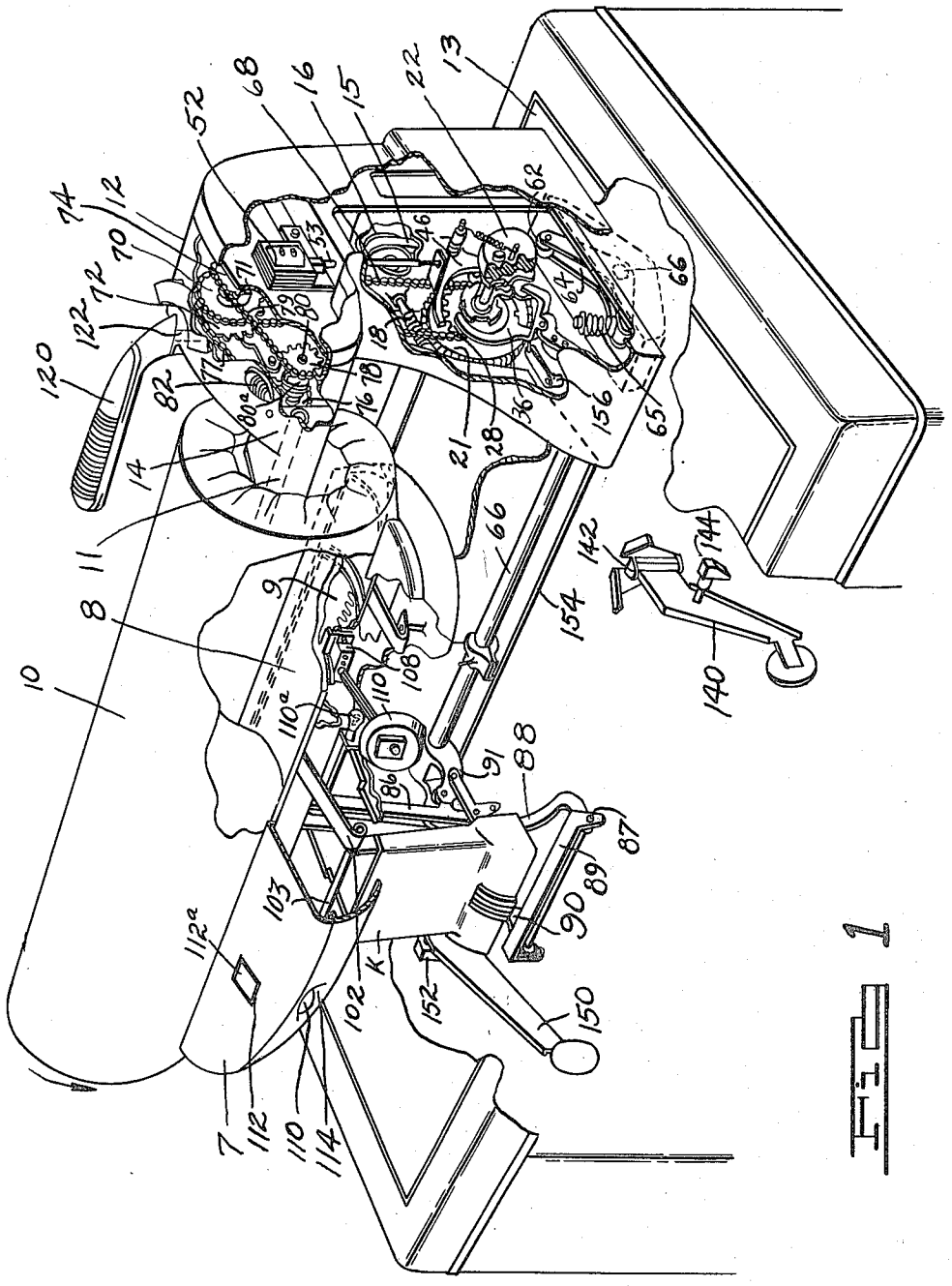


Fig. 1

INVENTOR.
ARTHUR R. CONSTANTINE
BY
M. W. Green.
ATTORNEY.

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IRONING MACHINE

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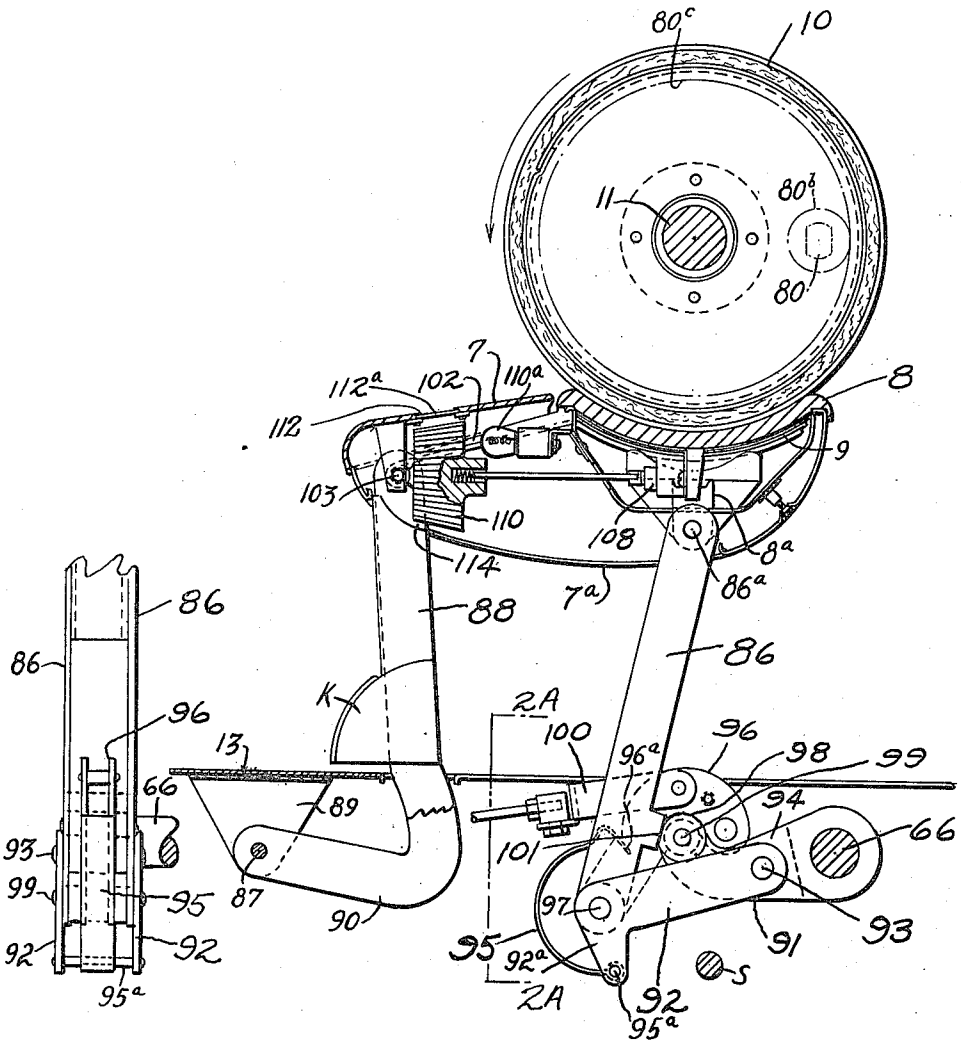


FIG 2A FIG 2

INVENTOR.
ARTHUR R. CONSTANTINE
BY
M. W. Green
ATTORNEY.

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IRONING MACHINE

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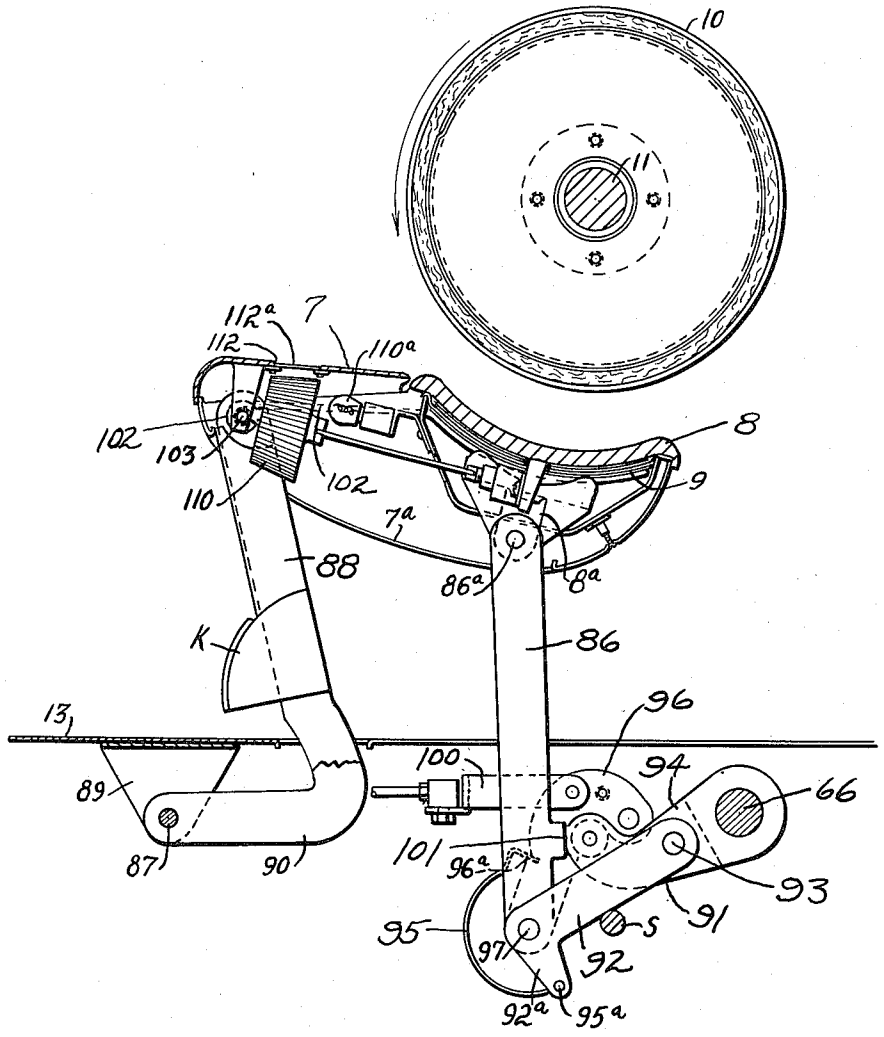


FIG 3

INVENTOR.
ARTHUR R. CONSTANTINE

BY M. W. Green
ATTORNEY

Dec. 14, 1948. A. R. CONSTANTINE 2,456,385

IRONING MACHINE

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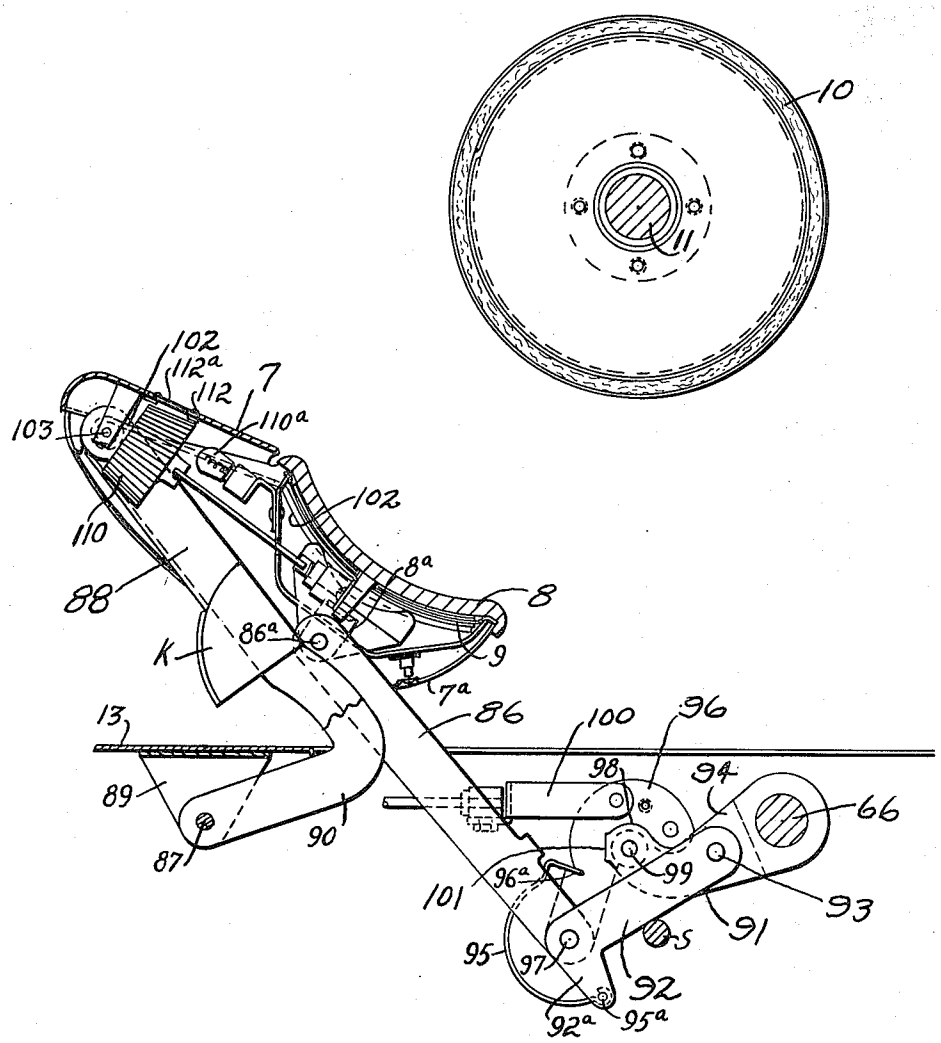


FIG 4

INVENTOR.
ARTHUR R. CONSTANTINE
BY
M. W. Green
ATTORNEY.

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IRONING MACHINE

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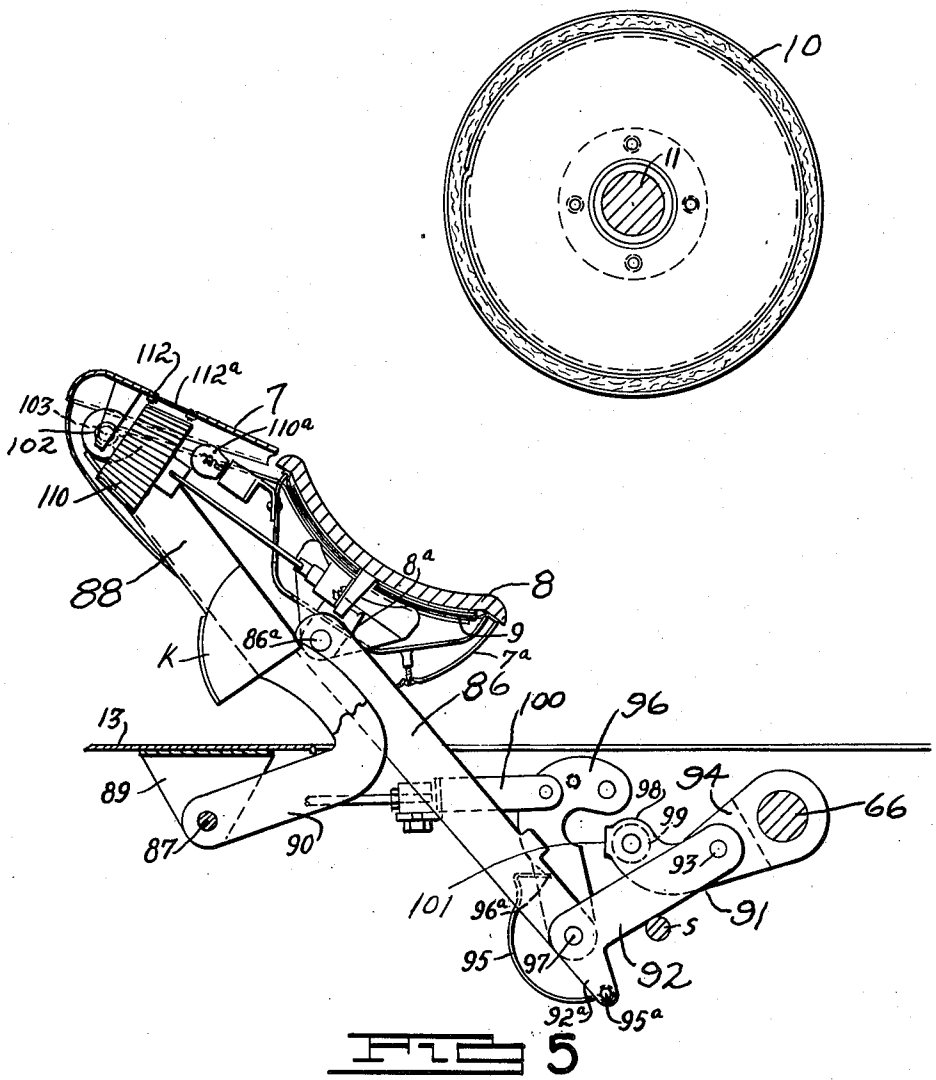


FIG 5

INVENTOR.
ARTHUR R. CONSTANTINE

BY

M. W. Green
ATTORNEY.

Dec. 14, 1948. A. R. CONSTANTINE 2,456,385

IRONING MACHINE

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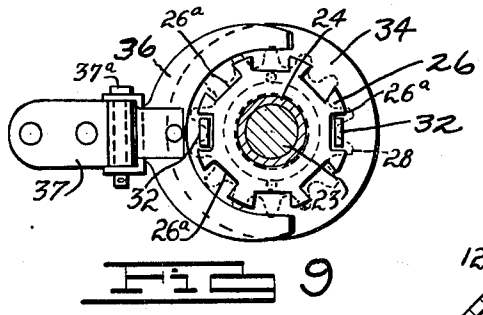


FIG 9

FIG 6

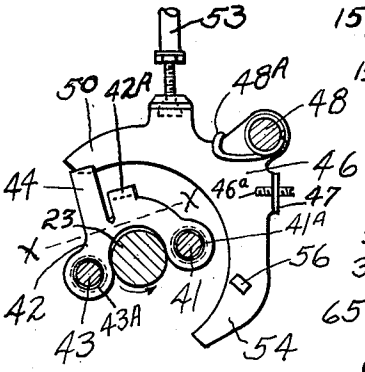


FIG 8

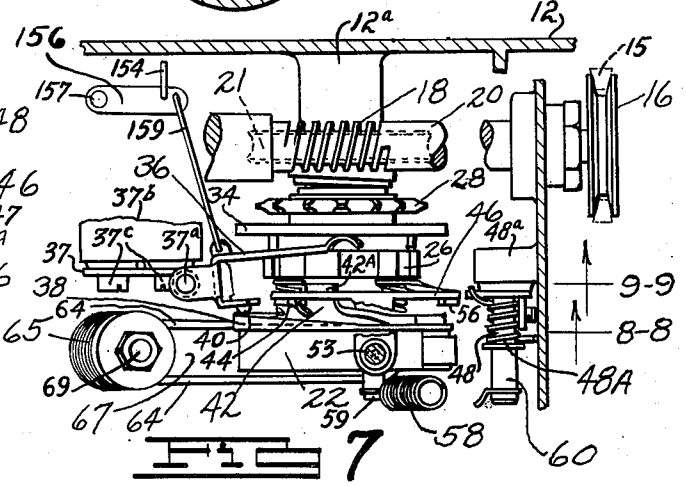


FIG 7

INVENTOR.
ARTHUR R CONSTANTINE
BY
M. W. Green.
ATTORNEY.

Dec. 14, 1948. A. R. CONSTANTINE 2,456,385

IRONING MACHINE

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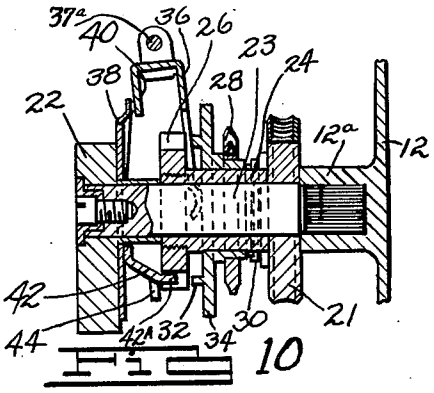
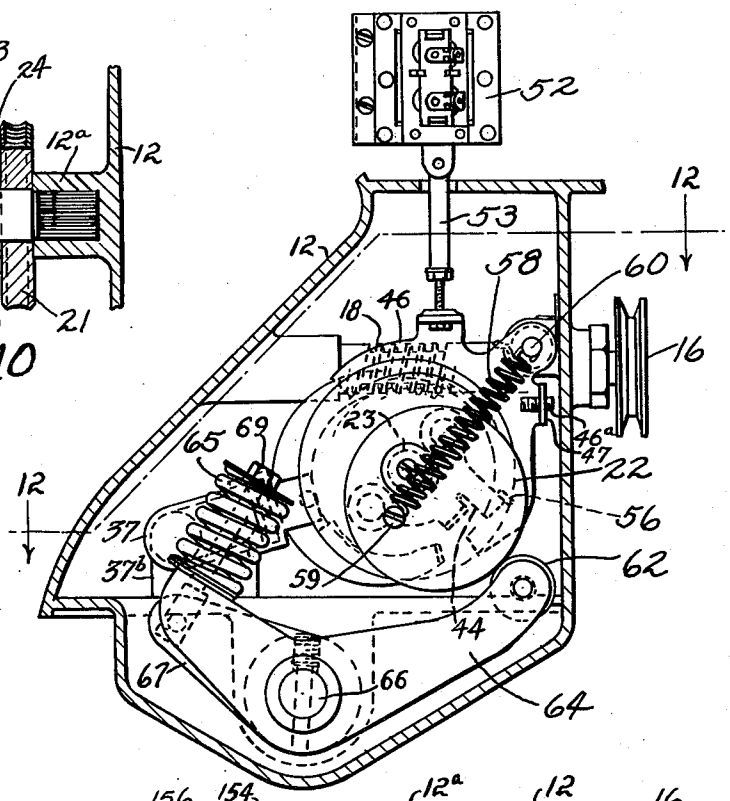


Fig. 10



Fig. 11



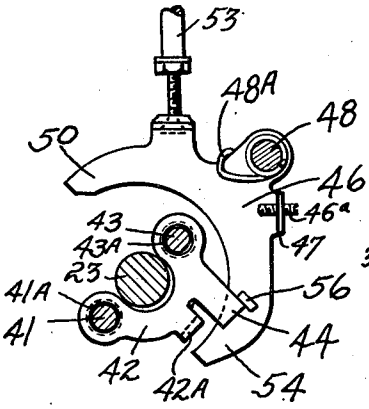


Fig. 13

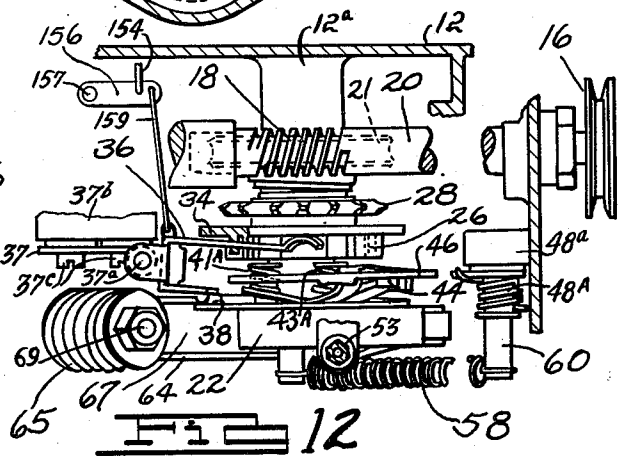


Fig. 12

INVENTOR.
ARTHUR R. CONSTANTINE
BY
M. W. Green.
ATTORNEY.

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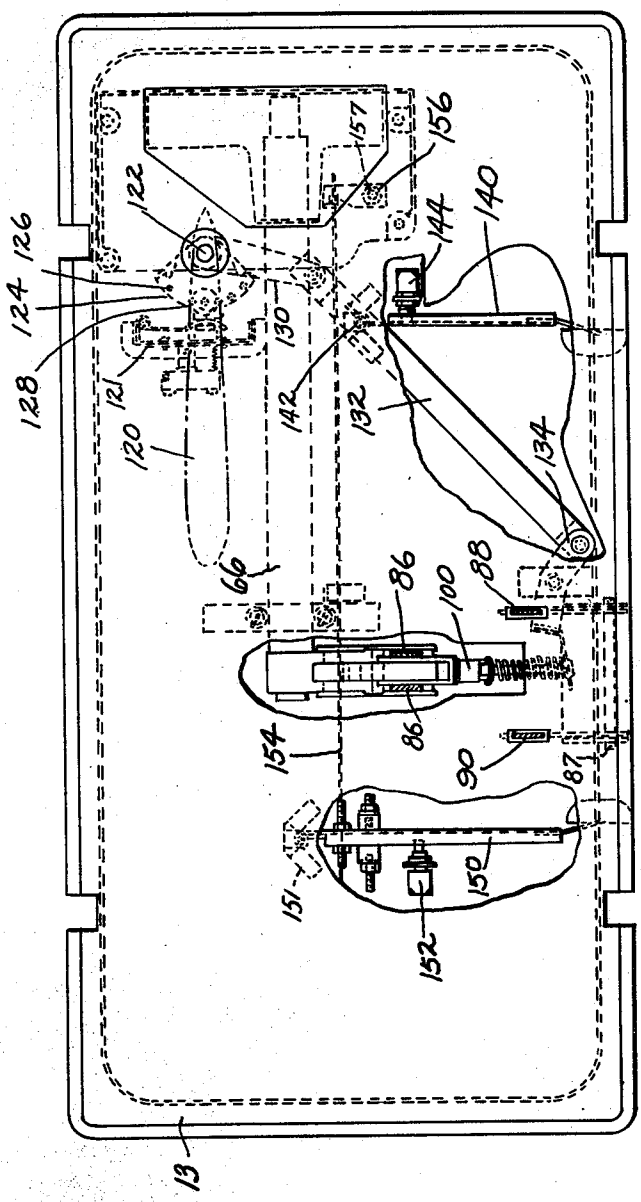


FIG. 14

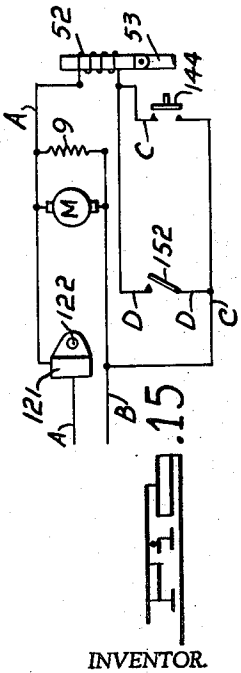


FIG. 15

INVENTOR.
ARTHUR R. CONSTANTINE
BY M. W. Green.
ATTORNEY.

Patented Dec. 14, 1948 2,456,385

UNITED STATES PATENT OFFICE

2,456,385

IRONING MACHINE

Arthur R. Constantine, South Bend, Ind., assignor to Bendix Home Appliances, Inc., South Bend, Ind., a corporation of Delaware

Application April 24, 1944, Serial No. 532,511

32 Claims. (Cl. 38—61)

1

This invention relates to ironing machines of the type employing a padded roll operated to iron or to press articles between such roll and a heated shoe.

It is a primary object of the present invention to provide an ironing machine having an improved arrangement of shoe and roll whereby the shoe may be moved toward and from the roll from the under side of the roll.

It is a further object to provide a support and actuating mechanism for an ironing shoe and table with movement and location relative to the roll providing improved access thereto for ironing.

It is another object to provide an improved ironing machine clutch and drive mechanism actuated on closing of an electrical circuit and released on opening of such circuit.

It is a further object to provide an improved shoe actuating mechanism employing spring pressure and gravity to pull the shoe away from the roll and power actuation of the shoe toward the roll.

It is another object to provide a shoe and table combination capable of movement to a safety or clothes arranging position in addition to its regular movement toward and from the roll.

The above and other objects of the invention will appear more fully from the following more detailed description and by reference to the accompanying drawings forming a part hereof and wherein:

Figure 1 is a perspective view of the ironing machine partly broken away to show connections to the shoe, drive mechanism, and controls.

Figure 2 is a cross-section through the roll and shoe showing the lever arrangement and support for the shoe and table assembly, with the shoe in ironing position.

Figure 2A is a front view taken substantially on the line 2A—2A of Figure 2 and showing the safety release mechanism.

Figure 3 is a cross-section similar to Figure 2 but with the shoe out of contact with the roll in the normal out-of-contact position.

Figure 4 is a section through the roll and shoe showing the shoe and lever mechanism in the safety position, such position being attained by movement from the postion of Figure 3.

Figure 5 also shows the safety position of the shoe but with such position attained by movement of the shoe from the position shown in Figure 2 by actuation of the safety release.

Figure 6 is an end view of the clutch and drive mechanism in which the parts are shown in the

2

position they occupy when the shoe is away from the roll.

Figure 7 is a sectional plan view of the mechanism shown in Figure 6 taken on the line 7—7 of Figure 6.

Figure 8 is a view of the clutch mechanism for actuating the roll cam as viewed from line 8—8 of Figure 7 with the clutch mechanism shown in the position it occupies when the shoe is out of contact with the roll and conforms to the position of the parts shown in Figures 6 and 7.

Figure 9 is a section through the clutch mechanism as viewed from the line 9—9 of Figure 7 showing the mechanism for actuating the rotating drive for the roll.

Figure 10 is a longitudinal section through the clutch mechanism, the section being taken substantially on the axis of the shaft carrying the clutch parts.

Figure 11 is an end view of the clutch and drive mechanism with the cam actuating member for the shoe being held in position for maintaining ironing contact of the shoe with the roll.

Figure 12 is a sectional plan view of the mechanism shown in Figure 11 taken on the line 12—12 of Figure 11.

Figure 13 is a view of the clutch mechanism for actuating the roll cam similar to Figure 8, but with the parts shown in position for holding the shoe in contact with the roll and conforms to the position of the mechanism shown in Figures 11 and 12.

Figure 14 is a top view of the parts just under the cabinet top and therefore under the roll and shoe, the important features of the control mechanism being shown in this view.

Figure 15 is a schematic wiring diagram showing a control circuit for the ironing machine.

Referring to the drawings and particularly to the general view of Figure 1 an ironer roll 10 is mounted for rotation, supported and driven from one end only, the end support being effected by means of a casting 12 and a shaft 11 supported at one end of the roll, the main body portion of the casting 12 is supported upon a table 13. A top portion 14 of the casting 12 extends forward to support the shaft 11. An electrically-heated metallic shoe 8 having heating elements 9 is positioned to contact the roll 10 at the bottom thereof, as shown in Figure 2, and adjacent the shoe there is provided a table 7; the heating elements 9, and the underside of the shoe 8 and table 7 being enclosed by a cover member 7a. The shoe 8 is supported on a lever support mechanism embodying the principles of a parallel linkage sys-

tem. This mechanism moves the shoe 8 toward and from the roll 10 from the ironing position shown in Figure 2 to the inoperative or normal down position shown in Figure 3 and also allows the shoe 8 to be retracted to a secondary, or safety position, shown in Figures 4 and 5, all as will be explained later.

The oscillating motion of a shaft 66 is for the purpose of actuating the heated metallic shoe 8 of the ironing machine into and out of contact with the under side of the roll 10 (see Figures 2 and 3) through a system of links and levers which will now be described. It is assumed for the purpose of this description that the shaft 66 is oscillated at the will of the operator by mechanism and controls later to be described and also that the roll 10 is rotated in a counter-clockwise direction as viewed in Figure 1.

In the ironing position with the shoe 8 in contact with the roll 10, as shown in Figure 2, the heated metallic shoe 8 is positioned directly under the roll 10. The shoe 8 is moved into and out of ironing position by a lever 86 in combination with two support links or levers 88 and 90, the lower end of the lever 88 being broken away in Figure 2 so that the lower end of the lever 90 is visible, while all three levers can be seen in Figures 1 and 14. The links 88 and 90 are enclosed at the front thereof and above the table 13 in an ornamental shield K, which may be secured to said links in any suitable manner. The shoe 8 has a bracket 8^a connected thereto at a point substantially medially of the length thereof and the upper end of the lever 86 is pivotally connected to said bracket by a pin 86^a. Extension brackets 102 extend forwardly from the shoe 8 and carry a rod 103 which provides a floating pivot connection for the shoe 8 with the upper ends of the links 88 and 90. Each of the links 88 and 90 includes a forwardly extending offset portion which is pivotally mounted on a rod 87 carried by a bracket 89 fixed to the underside of the table 13. The actuating connection from the oscillating shaft 66 to the end of the lever 88 is a lever device generally identical as 91 and being shown in Figures 1 and 2, the lower end of the lever 86 being connected with said lever device by a pivot pin 97.

When the shoe 8 is in the inoperative normal down position of Figure 3, the entire assembly of the shoe 8 and table 7 "floats" and may be manually swung forward or toward the left, as viewed in Figure 3, by the hand of the operator to a safety position such as shown in Figure 4, the position and form of levers 86, links 88 and 90 and their pivots 86^a—97 and 87—103 allowing such movement. This position places the shoe 8 approximately four inches away from the outer periphery of the ironing roll 10 and is intended primarily as a safety position complying with all requirements for such safety movement of a shoe away from an ironing roll. However, this position of the shoe 8 may alse be used to arrange articles for pressing or ironing as will be discussed more fully hereinafter.

In the normal down position of Figure 3 as well as in the raised position of Figure 2 the center of weight of the shoe and table 7 is so positioned that gravity will normally hold the shoe 8 in the normal down position of Figure 3 with lever 86 against stop 101 on the end of a rigid arm 94, and it requires only a manual movement by the operator to move the shoe 8 and table 7 from the safety position of Figure 3 to the position of Figure 4. In carrying out this idea it is noted that

the top floating pivot 103 of links 88 and 90 is rearward of the bottom fixed pivot 87 thereof when the parts are in the normal down or ironing position of Figures 3 and 2, respectively, thus requiring a definite forward pull of the table 7 and shoe 8 to swing the assembly to the safety position of Figure 4.

The main support for the shoe 8 is from the spaced links 88 and 90 the top pivot 103 of which is secured to the ends of the bracket extensions 102, which extend toward the operator from the medial region of the shoe 8 under the table 7. The lever 86 connects directly under the shoe 8 at the pivot pin 86^a and its upper end cooperates with the upper ends of links 88 and 90 to complete a triangular support for the shoe 8, the lever 86 being actuatable (as explained later) for imparting movement, while the relatively fixed support for normal operation is afforded by the links 88 and 90 through the bracket extensions 102.

In order that the shoe 8 may be moved directly to the safety position shown in Figure 4 from the position in contact with the roll 10 shown in Figure 2, the lever device 91 previously mentioned, is made up of two parts, a pair of spaced links 92 connected at one end thereof to the lever 88 by the pin 97, and the rigid arm 94, the links 92 being connected by a pivot pin 93 to the arm 94, the links 92 having freedom of tilt at pivot 93 near shaft 66 and the arm 94 being rigidly connected to the shaft 66. The links 92 have a latch member 96 disposed therebetween and pivoted at its end on the pin 97, the member 96 being so positioned and formed as to provide a curved camming surface 98 which, when in the position shown in Figure 2, will effectively lock the members 92 and 94 together by contact of the camming surface 98 with a pin 99 in the free end of the rigid arm 94. Inasmuch as the members 92 are directly connected to the end of lever 86 the connected position of the latch member 96 will cause the oscillation of the shaft 66 to move the ironing shoe 8 upward and downward into and out of operative position with the roll 10. However, when the latch member 96 is pulled out of its interlocked position inter-connecting the members 92 and 94, as by the pulling of a member 100 by a hook-up later described which is connected to latch member 96, then even though the lever 86 be in a position to hold the shoe 8 in ironing position, such action of releasing the latch 96 will allow the shoe 8 to drop down into the inoperative normal down position equivalent to Figure 3 with the links 92 resting upon a limiting stop S, from which position said shoe can be manually swung to the position of Figure 5.

An arcuate spring 95 is mounted at its lower end upon a pin 95^a carried by lugs 92^a depending from the links 92. The upper end of the spring 95 is received in a recess 96^a formed in the latch member 96. The spring 95 normally urges the latch 96 toward an unlocked position after movement has begun and assists re-engagement of the parts 96 and 99 when brought toward engagement.

The interior of the casting 12 carries mechanism for controlling the drive to the roll 10 and shoe 8. Power for the drive is brought in from a belt 15 (Figure 1) from a motor M which is located below the casting 12 but not shown in the drawings, except diagrammatically in Figure 15. The belt 15 drives pulley 16 and a worm 18 which is mounted to rotate with a shaft 20 (Figure 7). The worm 18 drives a worm wheel 21 which rotates on a shaft 23 having one end thereof fixed

in a boss 12ª formed on the inner surface of the casting 12. Also mounted on the shaft 23 and normally free to rotate relative thereto, is a circular, shoe actuating cam 22. The cam 22 is shown in Figure 1 as well as in Figures 6, 7, 10, 11, and 12 and as shown is eccentrically positioned on the end of the shaft 23. The previously mentioned worm wheel 21 has a hub portion 24 (Figure 10) which extends a distance along the shaft 23 toward the cam 22 and has secured thereto a notched clutch member 26 provided in its outer periphery with a plurality of notches 26ª. A sprocket wheel 28 for driving the roll 10 is secured upon the hub portion 24 of the worm wheel 21 in such manner as to be free to slide axially and to rotate relatively to the hub portion 24 of the worm gear 21. A spring 30 normally urges the sprocket member 28 toward the left as viewed in Figure 10 and projecting lug members 32 attached to a flange 34 on the hub of sprocket 28 are pushed into engagement with the notches 26ª in member 26 thus normally causing the sprocket 28 to rotate with the worm wheel 21. However, the flange 34 provided on the hub of the sprocket 28 is engageable by a shifter fork 36, which is pivotally mounted on a bracket 37 by a pin 37ª. The bracket 37 is fastened to a stationary part 37ᵇ of the casting 12 by screws 37ᶜ. When the shifter fork 36 is actuated it will push in opposition to the flange 34 against the action of the spring 30 and disengage and/or hold the lugs 32 out of engagement with the clutch member 26 so that the rotation of the sprocket wheel 28 will be interrupted. This action of the shifter fork 36 is rendered in proper sequence relative to the rotation of the shoe actuating cam 22 by means of a cam 38 positioned on the side of the cam 22 which contacts a projection 40 on the shifter fork 36 and is so designed as to shape that it will actuate said shifter fork at the desired time in relation to the rotation of the cam 22. The shoe actuating cam 22 is connected to be rotated by a bowed clutch member 42 mounted on the inner side of the cam 22 and secured to said cam by a spring mounting (described later) allowing tilting movement of said member 42 but normally urging it to a position shown in Figure 10 with its projecting end 42A extending into one of the slots 26ª of the clutch member 26, thereby connecting the cam 22 for rotation with the worm gear 21. The clutch member 42 is mounted upon two projecting pins 41 and 43 (Figures 6 and 8) on the inner face of the cam 22 upon which pins the clutch member 42 is loosely mounted for tilting movement on its bent central portion the axis of tilt being indicated by dotted line X—X of Figure 8. The portion below dotted line X—X is normally urged against the face of cam 22 by springs 41A and 43A, respectively, mounted on the pins 41 and 43, tilting being allowed by a loose fit provided by oversize holes in the clutch member 42 through which the pins 41 and 43 extend. Such position normally holds clutch member 42 and its projecting end 42A in the connected position with clutch member 26, as shown in Figure 10, for rotating cam 22 as previously mentioned.

A projecting portion 44 of the member 42 is used to actuate said member to pull it out from rotating engagement with member 26 against its normal spring action. This movement is effected by contact with a cam lever 46 of substantially half-moon shape (Figures 7, 8, 12 and 13). Cam lever 46 is mounted upon a pivot 48 secured to a boss 48ª in the casting 12 and one of its ends 50 is adapted to be moved clockwise by a solenoid 52 through a link 53, and to be moved counter-clockwise by a torsion spring 48A. Counter-clockwise movement of the cam lever 46 is limited by an adjustable stop screw 46ª mounted in a lug 47 carried by the cam lever 46 and engageable with a wall of the casting 12. As the parts are shown in Figure 7, the projecting portion 44 is engaged with the cam lever 46 and the projection 42A of the clutch member 42 is held up and away from operative contact with the clutch member 26 and, therefore, will not be in a position to cause any rotation of the cam 22. However, upon energization of the solenoid 52 the end 50 of the cam lever 46 will be pulled away from the projection 44 (Figure 8) and the lever 42 will be allowed by its natural curvature and the action of springs 41A and 43A to swing into the position shown in Figure 10, that is, into a position with the projection 42A engaged in one of the notches 26ª in the member 26. A rotation of the member 42 in a counter-clockwise direction will result (compare position of Figure 8 to position of Figure 13) until the projection 44 contacts a stop 56 on the opposite end 54 of the member 46 (see Figure 13) which member is so shaped and inclined as to form a cam surface to catch the member 44 and by cam action tilt the clutch member 42 and pull the projection 42A out of engagement with the clutch member 26. The member 42 and cam 22 then come to rest with projection 56 engaged by the member 44 (Figure 13). It is apparent from the foregoing description that a half revolution of the cam 22 has thus been effected by the actuation of the solenoid 52 and as long as the solenoid 52 is energized the position of the parts will be that shown in Figures 11 and 13. Referring to Figures 6 and 11 a return spring 58 is connected at one end by a pin 59 to the cam 22 and its opposite end is connected to a pin extension 60 of the pivot 48. The spring 58 is so located as to exert a counterclockwise pull on cam 22 when the pin 59 assumes a position below a line passing through the center of the pin 60 and the axis of the shaft 23, as in Figure 11, and tending to rotate said cam to the position shown in Figure 13, it being apparent that such counter-clockwise rotation is prevented by the aforesaid contact of member 44 with the stop or projection 56 which forms a latch. However, if the solenoid 52 is de-energized, the result will be that the lever 46 will tilt on the pivot 48 in a counter-clockwise direction as urged by spring 48A, thereby effecting movement of the stop 56 out of the path of the member 44 and allowing the cam 22 and the member 42 to continue their rotation, although such rotation is not effected by contact of the clutch parts but solely by the action of the return spring 58 (Figures 6, 7, 11, and 12). Thus, whenever the cam 22 is in the arrested position determined by the stop member 56 as shown in Figures 11 and 13 the return spring 58 will exert a pull in a direction to return the cam 22 and associated parts to their original position shown in Figures 6 and 8.

Referring to Figure 6 the cam 22 acts against a cam follower 62 and actuates a lever comprising two spaced members 64, and it will be evident on inspection of Figure 6 that the rotation of the cam 22 will oscillate the lever 64 and therefore oscillate the shaft 66 for shoe actuation as previously mentioned, the position of the parts in Figure 11 corresponding to the ironing position of the shoe 8 shown in Figure 2. The lever 64 and the shaft 66 can also be seen in the general view of Figure 1. A compression spring 65 is interposed between the oppositely extending end of

lever 64 (mounted to swing on the shaft 66) and the free end of an arm 67 which extends out from shaft 66 and is secured thereto, the spring 65 being secured to the arm 67 by a pivotally mounted bolt 69. (See Figures 6, 7, 11, and 12). The spring 65 thus arranged provides a yieldable operating connection between the cam 22 and the shaft 66, and allows the shoe 8 to move away from the roll 10 slightly to accommodate different thicknesses of the clothes to be ironed or pressed.

Referring to Figure 1 the sprocket 28 drives a chain 68 and a sprocket 70 which sprocket is on a common shaft 71 with a pair of sprockets 72 and 74 near the top of the head casting 12, the sprocket 72 being of larger diameter than the sprocket 74 to provide two speeds for driving the roll 10, as is set forth hereinafter. The two sprockets 72 and 74 respectively drive two sprockets 76 and 78 freely mounted on a shaft 80 through chains 77 and 79, respectively, and said sprockets 76 or 78 may be selectively coupled to said shaft 80 through a conventional clutch member 80^a free to slide axially but rotatably coupled to said shaft. The actuating lever 82 of such clutch member 80^a is shown at the top of the head casting 12 in Figure 1. The shaft 80 has a suitable gear 80^b connected to the end thereof and meshing with an internal gear 80^c carried by the roll 10, said gears being shown schematically in dot-and-dash lines in Figure 2. The several sprockets 72—76 and 74—78 of the chain drive from the sprocket 28 to the shaft 80 are so selected as to provide two different speeds of rotation for the roll 10, depending upon the manual selection afforded by the lever 82.

As shown in Figure 1, there is a main control lever including a handle 120 having an end thereof projecting substantially over the top of the roll 10 and a vertical portion or shaft 122 extending vertically downward through the casting 12 to a position under the table top 13. The shaft 122 is suitably supported in bearings (not shown) and is adapted to be rotated by the projecting handle 120, and as viewed in Figure 14, a cam plate 124 is secured to the bottom of the shaft 122 and has a series of notches 126 marked as follows:

Release
Off
Heat
Heat and Motor
Motor
Off
Release

A spring clip 128 is stationarily mounted to engage the notches 126 so that upon rotation of the shaft 122 the lever will successively locate itself in the seven positions above listed when such positions are effected by manual movement of the handle 120 above the top of the roll 10. By electrical switch connections in a conventional switch 121, not shown in detail, the positions Off, Heat and Motor are so connected by cam action of plate 124 as to effect actuation of the heating elements in the shoe 8 and to complete the circuit to the motor. However, with the lever 120 in either of its maximum positions marked Release, levers 130 and 132 are brought into play to tilt the lever 134 which movement will pull the previously mentioned release member 100 to release the shoe-actuating mechanism. Such release, however, will only be necessary when the shoe 8 is in the upper or ironing position as in the other positions of said shoe, it can be pulled to its safety release position without such actuation. It is to be noted that the release of the shoe can be effected

by movement of the lever 120 to its maximum position in either direction.

As shown on the drawings, Figures 1 and 14, the normal actuation of the ironing shoe 8 and table assembly 7 upward and downward toward and from the roll 10 is effected by a right knee-control device which comprises a lever 140 pivoted at 142 and positioned to actuate a conventional switch 144. Switch 144 is so constructed that one push of the lever 140 against it will close the electrical circuit to the solenoid 52 thereby actuating the solenoid to cause the shoe 8 to move into contact with the roll 10. The circuit will remain closed until a subsequent movement of the knee lever 140 in the same direction again actuates the switch 144 to open the circuit and cause solenoid 52 to be de-energized and the shoe 8 will be moved away from the roll 10 by spring 58 and gravity as previously mentioned.

For controlling the pressing of clothes, a left knee lever control 150 is used, which is pivoted at 151 and operates a switch 152 connected in parallel with switch 144 but of a conventional type which closes the circuit only when held in closed position so that left knee actuation of lever 150 will energize solenoid 52, and release of lever 150 will de-energize solenoid 52. The manner in which the switches 144 and 152 may be arranged in an electrical circuit with a motor M, the switch 21 and the solenoid 52, is shown diagrammatically in Figure 15, in which a main conductor A is connected to one terminal of the solenoid 52 and has the switch 121 connected therein. The motor M is connected with the conductor A and a main conductor B. The other terminal of the solenoid 52 is connected with one end of a wire C having the switch 144 connected therein, the other end of the wire C being connected with the conductor B. A wire D is arranged in parallel with the wire C and has the switch 152 connected therein. The heating elements 9 may be connected with the conductors A and B. Thus, it will be apparent that whenever the switch 121 is actuated through the handle 120 and shaft 122 to interrupt a supply of current to the motor M, the circuit to the heating means 9 will be interrupted and also that the circuit to the solenoid 52 will be interrupted so that said solenoid will be de-energized. It will be further noted that the switch 152 is arranged in the circuit in parallel with the switch 144. The lever 150, in addition to actuating the switch 152, is also adapted to interrupt the driving of the roll 10. Thus, the lever 150 is connected to one end of a wire 154 and the other end of said wire is connected to a lever 156 pivotally mounted on a pin 157. A rod 159 (Figures 7 and 12) connects the lever 156 with the shifter fork 36. Accordingly, when the lever 150 is actuated to exert a pull on the wire 154, the shifter fork 36 will hold the roll sprocket clutch part 32 out of engagement with the clutch part 26, thus preventing a drive from being transmitted to the roll 10.

Starting with the shoe 8 in normal down position of Figure 3 the actuation of left knee pressing control 150 will result in energizing solenoid 52 by closing of switch 152 and bring the shoe into contact with the roll 10 which is then stationary. However, if right knee control 140 has first been actuated to bring the shoe 8 up to the roll 10 while said roll is rotating, then the actuation of left knee control 150 will simply serve to disengage the clutch 26—32 and stop the rotation of the roll 10, since the closing of switch 152 in the parallel circuit already closed will have no effect upon the completed circuit. However, when knee

pressure is released on lever 150 the clutch parts 26—32 will re-energize and the rotation of the roll 10 will continue. Such momentary stopping of the roll rotation gives added ironing and evaporating time when desired and provides means to stop the roll 10 with the shoe 8 up when desired for any reason.

The thermostats for regulating the shoe heating element 9 are positioned underneath the shoe 8, one of the thermostats at the right hand end being shown at 108 in Figure 1. The control members for the thermostat 108 extend into and under the table portion 7 and terminate in an indicator dial 110. Two of these indicator dials and thermostats are provided as shown in Figure 1, one to control the heat for each end of the shoe 8. An opening 112 in the top of the table 7 with suitable transparent covering 112a allows for inspection of the dial 110 while the opposite side of the dial extends downwardly into a lower opening 114 in the cover 7a. This projection of the dial 110 allows the dial 110 to be rotated for adjustment from the exterior of the cover 7a and the result of such adjustment may be viewed at the top through the opening 112. If desired, suitable illumination may be provided by a lamp bulb 110a inside the table 7 for indicating the condition of the thermostat, varying colors and lettering being provided in the material of the dial 110 which is preferably constructed of transparent plastic through which the illumination will be visible.

In the normal operation of the machine, the lever 120 will first be moved to the Heat position and then to the motor position and the ironing shoe 8 will be in its normal down position shown in Figure 3 in which the shoe 8 is away from the roll 10. As a result the worm wheel 21 and clutch member 26 will be continuously rotated by the motor and the shoe 8 will be heated. The material ready to be ironed is fed from the table 7 and when actual ironing operation is desired the right knee-control 140 is actuated, which will actuate switch 144 and energize the solenoid 52 shown in Figures 1, 6, and 11. Such actuation will move the end 50 of the lever 46 on its pivot 48 in an upward direction to allow release of the clutch member 42 because of removing support at 50 from under the projection 44 (Figure 8) and the projection 42A will then swing into engagement with one of the slots 26a in the clutch member 26 (Figure 10) and thus the cam 22 will be caused to rotate with the worm wheel 21 which has been continuously in rotation since the motor drive was started. The rotation of the cam 22 continues for a half revolution only, however, for the reason that the projection 44 on the member 42 contacts the cam shaped end 54 of the lever 46 and tilts the member 42 so that the projection 42A is pulled out of engagement with clutch member 26 (Figures 12 and 13). Projection 44 also contacts stop 56 (Figure 13) and cam 22 is thus held in position by spring 58 (Figure 11) and stop 56 (Figure 13). The 180° rotation of the cam 22, that is, movement of said cam from the position indicated in Figures 1 and 6 to that of Figure 11, will, through its engagement with the roller 62, cause movement of the lever 64 and consequent movement of the shaft 66 in a direction to push the lever 86 in an upward direction thus swinging the shoe 8 from its retracted position (Figure 3) into ironing position under the roll as shown in Figure 2. As the cam 22 rotates, the cam 38 (Figures 7 and 12) attached to the inner side of cam 22 contacts a projection 40 on the shifter fork member 36 the camming action being so designed as to allow the lugs 32 to be urged into contact with the clutch member 26 by the spring 30 at the desired time and thus rotate the roll-driving sprocket 28 (Figure 10). The roll 10 is started in rotation, as controlled by the shape and position of cam 38, in time to have rotation begin prior to the time that the shoe 8 makes contact with the roll 10. The necessary resilience for proper contact of the shoe 8 is assured by the yieldable or spring mounting 65 of the lever 64 relative to the shaft 66, as shown in Figure 6. When the ironing operation is completed, or if for any reason it is decided to stop the operation and contacting of the shoe 8 with the roll 10, the knee-control lever 140 is again actuated and such actuation will effect opening of the switch 144 and de-energize the solenoid 52, the parts during operation just described having been in the position shown in Figure 13 with the member 44 in contact with the projection 56 with the parts held in position by the spring 58 of Figure 11. By the aforementioned second actuation of the knee lever 140 the solenoid 52 is de-energized and the lever 46 (Figure 13) therefore swings in a counter-clockwise direction, as viewed in Figure 13, under the pressure of spring 48A and takes the holding support away from the projecting end of the member 44 which was effected by contact with the projection 56. The spring 58 when such release occurs then causes the assembly carried with the cam 22 to be rotated counter-clockwise for return to the position shown in Figure 6. The shoe 8 then drops away from the roll 10 by gravity to the position of Figure 3 with the links 82 resting upon the stop S, and the position of all parts correspond to the position of the shoe 8 away from the roll 10 from which position the mechanism originally started and the same cycle can be repeated at the will of the operator.

Variations in the above normal operation are possible including; the momentary stopping of the roll 10 after initial starting by actuation and holding of the left knee control 150; the pressing operation by actuation of the left knee control 150 from the normal down position of the shoe 8; and also the manual moving of the shoe 8 and table 7 to the safety position of Figure 4, from the normal down position of Figure 3, to arrange the articles to be ironed thereon, and again swinging the shoe 8 and table 7 into position for starting of either the pressing or normal ironing operations.

Considering the roll 10 and the shoe 8 in the position shown in Figure 2, that is, in ironing position, let it be assumed that for some reason it becomes necessary to effect emergency release of the shoe 8 away from the roll 10 either because something has caught between the shoe 8 and the roll 10 or for other reasons. The operator in such event could actuate the knee-control 140 which would immediately open the switch 144 to de-energize the solenoid 52 and thereby drop the shoe 8 to the normal down position from which a manual pull backward toward the operator would swing the shoe 8 approximately four inches away from the roll 10 to the secondary or safety position shown in Figure 4. However, in case it is desired to do so, the emergency release lever 120 may be used. Whatever the position of this lever may be, a movement toward its maximum position in either direction will cause the vertical shaft 122 to be rotated to pull levers 130, 132, 134 and by such pull to also pull the member 100, thus releasing the latching mechanism shown in Figures 2 and

2A at the end of the lever 86 previously described. Such release will cause the lever 86 to drop to the position shown in Figure 3, carrying with it the shoe 8 and a pull on the table 7 or the shoe 8 backward toward the operator will also cause the shoe 8 to move to its safety position, as shown in Figure 5, which will be approximately four inches away from the outer periphery of roll 10.

It is also important to note that lever 120, which actuates shaft 122 associated with switch 121, affords a single lever control for heating elements 9, motor M and release of shoe 8. The use of the main heat and motor control lever 120 as a release lever also makes use of natural instinct to seek the lever habitually used in case of an emergency. The lever 120 is so arranged that movement of it in either direction will produce emergency release of the shoe 8. Since the movement of lever 120 to the release positions, or to any of the off positions also cuts off the electrical circuit it will release the shoe 8 from its contact with the roll 10 and thus not only prevent leaving a hot shoe 8 in contact with the roll 10 but will also normally release both mechanically and electrically since it effects both de-energization of the solenoid 52 and the release of the latch connection 96; both of which drop the shoe 8 away from the roll 10.

Although reference has been made in the foregoing specification to a specific structure, it is intended that variations and modifications may be made without departing from the fundamental principles herein disclosed and within the scope of the following claims.

I claim:

1. In an ironing machine, a roll, a shoe positioned directly under said roll, an extension support extending forwardly from said shoe, a member pivotally connected with said extension and extending downwardly therefrom, a supporting table also extending forwardly from said shoe and over said extension, means pivotally supporting the lower end of said pivoted member, a lever pivotally connected with said shoe under said shoe and extending downwardly therefrom, and means attached to the lower end of said lever for moving said shoe into and out of ironing contact with said roll.

2. A support for an ironing machine shoe to position and move said shoe upwardly and downwardly from an operative to an inoperative position under an ironing machine roll comprising a lever adapted to be pivotally connected with and positioned under said shoe, means for moving said lever vertically, an extension support adapted to extend forwardly from said shoe, a member pivotally connected with and extending downward from said extension, and means pivotally supporting the lower end of said member.

3. In an ironing machine, a pair of ironing elements, means normally urging said ironing elements apart from each other, electromagnetic means, control mechanism actuatable upon energization of said electromagnetic means for causing movement of one ironing element into contact with the other and for holding said one ironing element in contact with the other and restraining the action of said means, the arrangement being such that de-energization of said electromagnetic means will remove the restraint on said mechanism and allow said mechanism to cause movement of said ironing elements from each other.

4. In an ironing machine, a shoe, a plurality of levers supporting said shoe, pivotal connections at opposite ends of said levers, means to move at least one of said levers in a vertical direction to move said shoe from a normal down position toward an operative ironing position and to return said shoe to its normal down position, other of said levers being positioned to support said shoe and allow movement of said shoe to a safety position farther from said operative position than its normal down position.

5. In an ironing machine drive mechanism, a clutch member continuously rotated, roll drive mechanism on one side of said clutch member mounted for free rotatable and sliding movement relative thereto, a clutch member on said roll drive mechanism adapted to contact said continuously rotating clutch member on axial movement of said roll drive mechanism thereby to impart drive to said roll mechanism from said continuously rotating clutch member, shoe actuating mechanism on the opposite side of said continuously rotating clutch member mounted free to rotate relative thereto, a clutch connector operable to connect said shoe drive mechanism with said continuously rotating clutch member, an electromagnetically operated member which when energized allows 180° clutching connection of said connector and subsequently holds said connector from clutching connection.

6. In an ironing machine drive mechanism, a continuously rotating clutch part, roll drive mechanism positioned to contact said clutch part from one side thereof, shoe actuating mechanism positioned on the opposite side of said continuously rotating clutch member, a clutch connecting means between said shoe actuating mechanism and said continuously rotating clutch part comprising, a lever shaped to hold said roll clutch connection away from connection with said rotating clutch part from 180° of rotation and allowing clutch connection for the opposite 180° of rotation.

7. In an ironing machine: a roll, a shoe adapted for ironing contact with said roll, a cam for reciprocating said shoe toward and from ironing contact with said roll, a continuously rotating clutch member, a cooperating tiltable clutch member between said cam and said continuously rotating clutch member for connecting said cam with said rotating clutch member, lever mechanism arranged to hold said tiltable clutch member in a position away from clutch connection for substantially 180° of cam rotation and to allow said tiltable member to assume a position for clutch connection for the opposite 180° of rotation, and electromagnetic means for actuating said lever mechanism.

8. In an ironing machine: a rotatable ironing roll, a shoe, a table operatively arranged in front of said shoe, support means for positioning said shoe into and out of operative engagement with said ironing roll, a cover disposed under said table and shoe forming an enclosure for the underside of said shoe and table, means in said enclosure for heating said shoe, thermostat means in said inclosure under said shoe for controlling the temperature of said shoe, and a control for said thermostat extending under said table, said cover having an opening and a portion of said control extending through said opening for manual actuation, said table having a transparent portion above said control for visual observation of said control.

9. An ironing machine comprising: a roll, a shoe, extensions spaced longitudinally and extending from said shoe near the central portion of said

shoe, spaced support members pivotally connected with said extensions and extending downwardly from said extensions, means pivotally supporting said members, a pivoted lever pivotally connected with the underside of said shoe, a stop for limiting movement of said lever in one direction, said pivoted members said stop and said lever being so positioned relative to said shoe that the weight of said shoe will hold said lever against said stop with said shoe in a normal down position under said roll ready for movement to and from said roll by vertical reciprocation of said lever and also allow swinging of said shoe from said normal down position on said pivoted support members and said pivoted lever to a safety position farther from said shoe than said normal down position.

10. An ironing machine comprising, a roll, a shoe, an extension from said shoe near the central portion of said shoe, a support member pivotally connected with said extension and extending downwardly from said extension, means pivotally supporting said support member, a pivoted lever pivotally connected with the underside of said shoe, means to reciprocate said lever vertically, a stop for limiting movement of said lever in one direction, said pivoted support member said stop and said lever being so positioned relative to said shoe that the weight of said shoe will hold said shoe in a normal down position under said roll for movement to and from said roll on reciprocation of said lever and also allow swinging of said shoe from said normal down position on said pivoted support member and said pivoted lever to a safety position farther from said shoe than said normal down position.

11. An ironing machine comprising: a roll, a shoe, a plurality of levers pivoted at both ends thereof, and being pivotally connected at one of their ends with said shoe and extending downwardly from said shoe for allowing swinging movement of said shoe from a normal down position away from said roll to a safety position farther from said roll than said normal down position, and one of said levers pivoted at a point under said shoe and being movable vertically to move said shoe to and from said roll.

12. In an ironing machine a roll, a shoe cooperable with said roll, a shoe actuating mechanism including a member having opposite positions for causing movement of said shoe toward ironing position and away from ironing position, spring means positioned for normally urging said mechanism toward a position to cause movement of said shoe away from ironing position to an inactive position, latch means for holding said mechanism in said ironing position against said spring means, electro-magnetic means for moving said mechanism to a position for causing movement of said shoe from said inactive position to an ironing position and for also holding said latch means in operative position, whereby breaking of the circuit to said electro-magnetic means will cause automatic release of said mechanism to a position causing movement of said shoe to said inactive position and thereby restore said shoe from ironing position to said inactive position.

13. In an ironing machine a roll, a shoe actuating mechanism including a member having opposite positions causing movement of said shoe toward ironing position and away from ironing position, spring means connected to said shoe actuating member acting in a direction to move said member in a direction to cause release of said shoe from ironing position, latch mechanism for holding said member from release against said spring, and electro-magnetic means for holding said latch in operative position, whereby when said mechanism is actuated automatic release of said latch causing movement of said shoe away from ironing position is effected by breaking of the circuit to said electro-magnetic means.

14. In an ironing machine: a roll, a shoe beneath said roll, means connected with said shoe on the feed side of said roll and providing a floating pivotal support for said shoe, means pivotally connected with and supporting said shoe at a point disposed rearwardly of said floating pivotal support, and actuating means connected with said last-mentioned shoe supporting means for effecting movement of said shoe from a normal down position toward and into engagement with said roll and for moving said shoe from engagement with said roll back to said normal down position.

15. An ironing machine as defined in claim 14, in which the actuating means includes a spring effective to yieldingly urge said shoe into engagement with said roll.

16. In an ironing machine: a roll, a shoe beneath said roll, link means pivotally connected at one end thereof with said shoe for supporting said shoe, means providing a fixed pivotal support for the opposite end of said link means located forwardly of the pivotal connection between said link means and said shoe when said shoe is in a normal down position, means pivotally connected with and supporting said shoe at a point disposed rearwardly of said link means arranged so that the weight of said shoe naturally tends to swing said shoe rearwardly, means cooperable with said shoe supporting means opposing such rearward swinging of said shoe beyond a given position, and actuating means connected with said last-mentioned shoe supporting means for effecting upward movement of said shoe from said normal down position into engagement with said roll.

17. In an ironing machine, a roll, a shoe positioned directly under said roll, a pair of links pivotally connected at the upper end thereof with said shoe at points spaced longitudinally of said shoe, means pivotally supporting the lower ends of said links, a generally upright member pivotally connected at its upper end with said shoe at a point lying rearwardly and substantially medially of the points of connection of said links with said shoe to provide a three-point support for said shoe, and means for actuating said member to move said shoe into and out of ironing contact with said roll.

18. In an ironing machine, a roll, a shoe positioned directly under said roll, a generally upright member pivotally connected at its upper end with said shoe on the feed side of said roll, means pivotally supporting the lower end of said member, a second generally upright member pivotally connected with said shoe at a point lying substantially in a vertical plane passing through the axis of said roll when said shoe is engaged with said roll, and means for actuating said second member to move said shoe into and out of ironing contact with said roll.

19. In an ironing machine: a roll, a shoe beneath said roll, means connected with said shoe on the feed side of said roll and providing a floating pivotal support for said shoe, means below said shoe pivotally connected with and supporting said shoe at a point disposed rearwardly of said floating pivotal support, actuating means including a latch and an arm engageable by said

latch operatively connected with said last-mentioned shoe supporting means for effecting movement of said shoe from a normal down position toward and into engagement with said roll and for moving said shoe from engagement with said roll back to said normal down position, and means for disengaging said latch to release said shoe from engagement with said roll.

20. In an ironing machine, a roll, a shoe, and means for effecting movement of said shoe toward and away from said roll, comprising: a generally parallel linkage system floatingly supporting said shoe, a shaft, an arm fixed to said shaft, a link pivotally connected with said arm at a point intermediate the ends of said arm, means connecting the opposite end of said link with an element of said linkage system, a latch pivotally mounted relative to said link, the opposite end of said latch being connectable with the free end of said arm, means providing a connection between said latch and said element, and an operating member connected with said latch for effecting disengagement thereof, whereby to effect movement of said shoe away from said roll regardless of the position of said arm.

21. In an ironing machine, a roll, a shoe, and means for effecting movement of said shoe toward and away from said roll, comprising: a pair of links disposed forwardly of said shoe and spaced longitudinally thereof, means pivotally connecting the upper ends of said links with said shoe, means providing a fixed pivotal support for the lower ends of said links, a shaft, an arm fixed to said shaft, a floating link pivotally connected at one end thereof with said arm at a point intermediate the ends of said arm, a lever pivotally connected by a pin at its lower end with the opposite end of said floating link, means pivotally connecting the upper end of said lever with said shoe, a latch pivotally mounted at one end upon said pin, the opposite end of said latch being engageable with the free end of said arm, spring means carried by said floating link arranged to normally urge said latch toward said arm, means for actuating said shaft to effect movement of said shoe toward said roll, and an operating member connected with said latch for effecting disengagement thereof, whereby to effect movement of said shoe away from said roll regardless of the position of said arm.

22. In an ironing machine: a roll, a shoe, and means for supporting and controlling the movement of said shoe toward and away from said roll, said means including elements pivotally connected with and supporting said shoe, and means cooperable with said supporting elements arranged to selectively maintain said shoe in a position in engagement with said roll, or in a normal down position spaced from said roll with freedom for movement away from said roll toward the operator of the machine into a safety position with said shoe farther away from said roll than when in said normal down position.

23. In an ironing machine: a roll, a shoe adapted to engage the underside of said roll, a generally parallel linkage system pivotally connected with said shoe and floatingly supporting said shoe for movement toward and away from said roll, said linkage system being arranged to support said shoe in a normal down position located a given distance from said roll and to be manually swingable toward the operator of the machine and away from said roll to support said shoe in a safety position farther from said roll than said normal down position, and means for actuating said linkage to raise said shoe from said normal down position into engagement with said roll.

24. In an ironing machine: a roll, a shoe adapted to engage the underside of said roll, a generally parallel linkage system pivotally connected with said shoe and floatingly supporting said shoe for movement relatively to said roll, said linkage system being arranged to support said shoe in a normal down position located a given distance from said roll and to be manually swingable toward the operator of the machine and away from said roll to support said shoe in a safety position farther from said roll than said normal down position, said linkage system including an element actuatable to raise said shoe from said normal down position into engagement with said roll and to return said shoe from roll engaging position to said normal down position, and means for actuating said element.

25. In an ironing machine: a roll, a shoe adapted to engage the underside of said roll, a generally parallel linkage system pivotally connected with said shoe and floatingly supporting said shoe for movement toward and away from said roll, said linkage system being arranged to support said shoe in a normal down position located a given distance from said roll and to be manually swingable toward the operator of the machine and away from said roll to support said shoe in a safety position farther from said roll than said normal down position, means for actuating said linkage to raise said shoe from said normal down position into engagement with said roll including a latch and an actuating arm interlocked with said latch, and means independent of said arm operable to release said latch to allow movement of said shoe away from said roll.

26. In an ironing machine: a roll, a shoe below said roll, and means for controlling the movement of said shoe toward and away from said roll including a pair of spaced generally vertical links arranged forwardly of said shoe and pivotally connected at their upper ends with said shoe, fixed means pivotally supporting the lower ends of said links, a generally vertical lever pivotally connected at its upper end with the underside of said shoe and extending downwardly therefrom, means connected with said lever for effecting movement of said lever to move said shoe toward and away from said roll, a stop cooperable with said last-mentioned means for supporting said shoe when said shoe is in a normal down position spaced from said roll, said shoe being manually swingable on said links and lever toward the operator of the machine from said normal down position to a safety position farther away from said roll.

27. In an ironing machine: a roll, a shoe below said roll, and means for controlling the movement of said shoe toward and away from said roll including generally vertical link means arranged forwardly of said shoe and pivotally connected at the upper end thereof with said shoe, fixed means pivotally supporting the lower end of said link means, a generally vertical lever pivotally connected at its upper end with the underside of said shoe and extending downwardly therefrom, means providing for a floating pivotal connection for the lower end of said lever; said link means, lever and pivotal connections being arranged to provide a substantially parallel linkage, and means for effecting vertical movement of said lever to move said shoe toward and away from said roll, stop means arranged to support said shoe in a normal down position spaced from

said roll, said shoe being manually movable on said link means and lever in a forward direction from said normal down position to a safety position spaced farther away from said roll.

28. In an ironing machine: a roll, a shoe adapted to be moved into engagement with and away from said roll, means for moving said shoe into engagement with and away from said roll comprising a generally parallel linkage system pivotally connected with said shoe and floatingly supporting said shoe for movement relative to said roll, said linkage system being arranged to support said shoe in a normal down position a given distance from said roll, means for actuating said linkage system to effect movement of said shoe from roll-engaging position directly to a safety position located a greater distance from said shoe than said normal down position, said linkage system also being arranged so that said shoe can be manually swung from said normal down position to said safety position.

29. In an ironing machine: a roll, a shoe, mechanism for moving said shoe from a normal down position into engagement with said shoe, said mechanism including a linkage system pivotally supporting said shoe, a rotatable element for actuating said linkage, an electromagnetically controlled member for holding said rotatable element in a position to effect engagement of said shoe with said roll when the electromagnet is energized, said linkage system including a latch actuatable to release said shoe from engagement with said roll even though said rotatable element is being held stationary by said electromagnetically controlled member, and means operable to substantially simultaneously release said latch and to effect de-energization of the electromagnet.

30. In an ironing machine having a roll member and an under-the-roll shoe member, said members being engageable for ironing purposes, said shoe member normally occupying a position under and spaced from said roll member when no ironing is being done, and means for moving said shoe member from said position under said roll member to a safety position out from under said roll member farther from said roll member than said first-mentioned position, said means comprising a plurality of levers, pivoted at both ends thereof and being pivotally connected at one of their ends with said shoe member and extending downward from said shoe member and forming a generally parallel linkage system pivotally connected with said shoe member, and supporting said shoe member for manual swinging movement toward the operator of the machine to said safety position farther from said roll member than said first-mentioned position.

31. In an ironing machine having a roll member and an under-the-roll shoe member, said members being engageable for ironing purposes, said shoe member normally occupying a position under and spaced from said roll member when no ironing is being done, means for moving said shoe member from said position under said roll member to a safety position out from under said roll member farther from said roll member than said first-mentioned position, said means comprising a plurality of levers, pivoted at both ends and being pivotally connected at one of their ends with said shoe member and extending downward from said shoe member and forming a generally parallel linkage system pivotally connected with said shoe member, and supporting said shoe member for manual swinging movement toward the operator of the machine to said safety position farther from said roll member than said first-mentioned position, and means for effecting movement of at least one of said members toward the other to bring said members into ironing engagement when said shoe member is in said first-mentioned position under said roll member.

32. In an ironing machine having a roll member and an under-the-roll shoe member, said members being engageable for ironing purposes, said shoe member normally occupying a position under and spaced from said roll member when no ironing is being done, and means for moving said shoe member from said position under said roll member to a safety position out from under said roll member farther from said roll member than said first-mentioned position, said means comprising pivoted lever members extending downward from said shoe member and forming a linkage system supporting said shoe member for manual swinging movement of said shoe member to a position farther from said roll member than said first-mentioned position.

ARTHUR R. CONSTANTINE.

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