Jan. 7, 1936. E. E. FOSTER 2,027,274

IRONING DEVICE

Filed Aug. 1, 1933 3 Sheets-Sheet 1

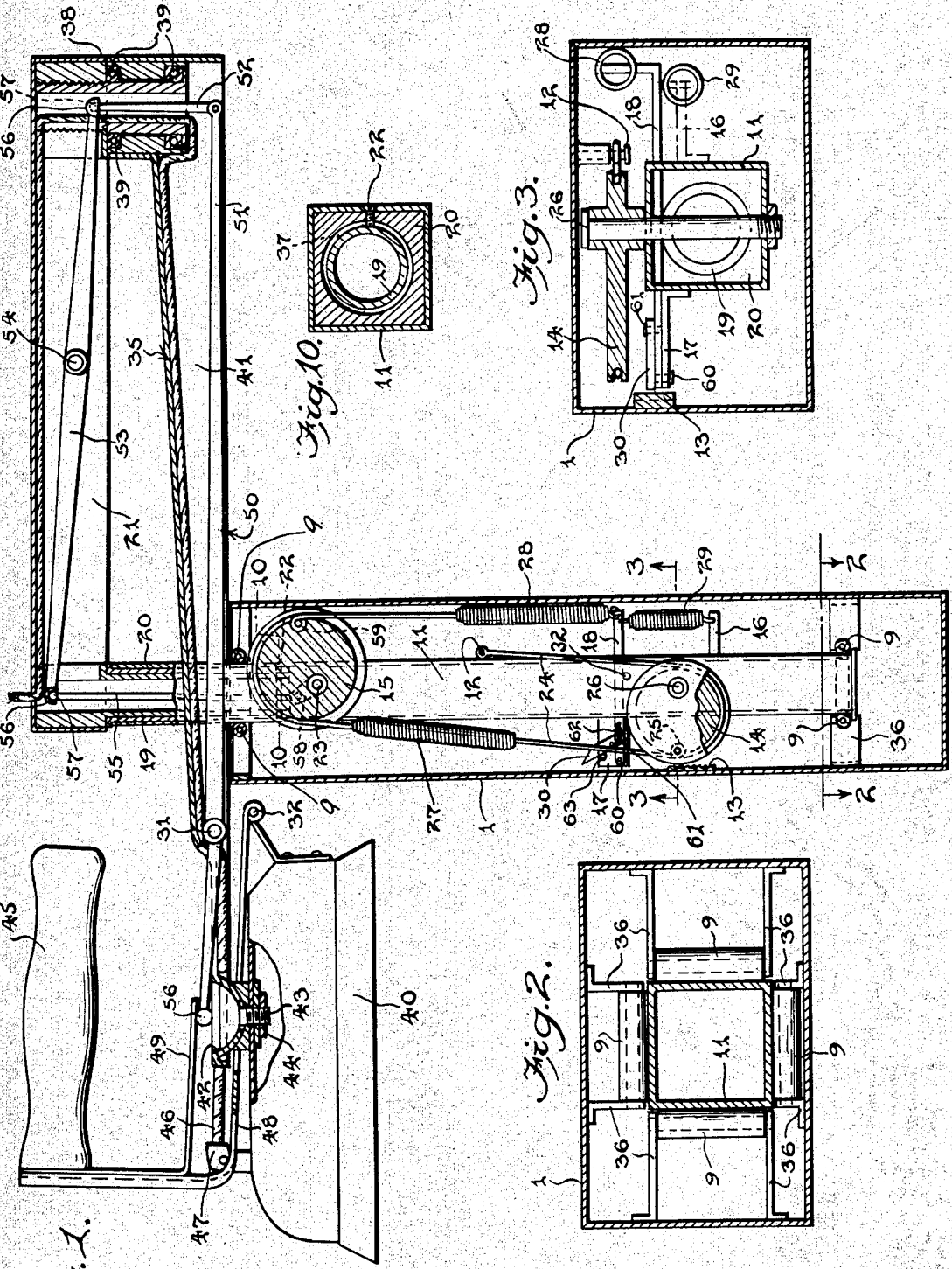


Fig. 1.

Fig. 10.

Fig. 3.

Fig. 2.

INVENTOR.
Edwin E. Foster,
BY
Emil Bönnelycke
ATTORNEY

Jan. 7, 1936. E. E. FOSTER 2,027,274

IRONING DEVICE

Filed Aug. 1, 1933 3 Sheets-Sheet 2

Fig. 4.

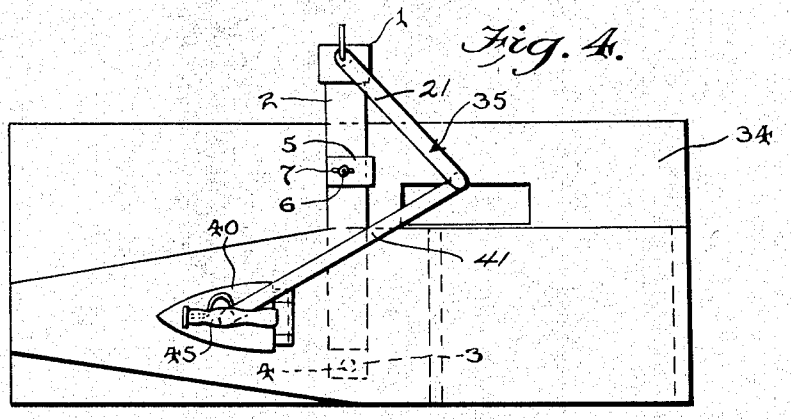


Fig. 5.

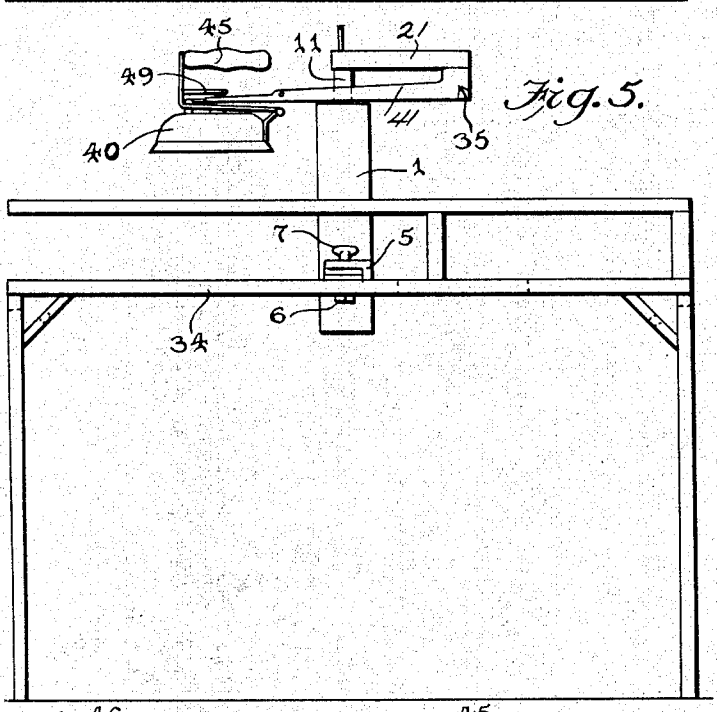


Fig. 6.

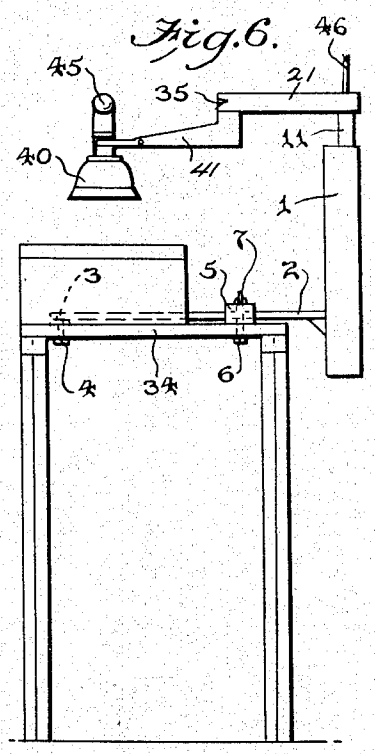


Fig. 7.

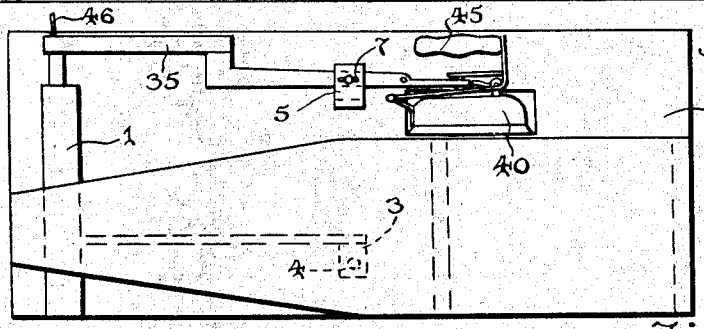


Fig. 9.

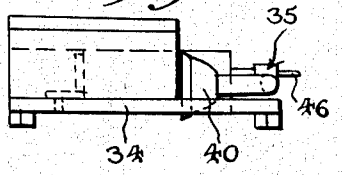
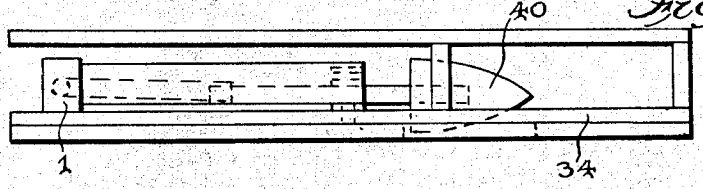


Fig. 8.



INVENTOR.
Edwin E. Foster,
BY Emil Bönnighe
ATTORNEY

Jan. 7, 1936. E. E. FOSTER 2,027,274

IRONING DEVICE

Filed Aug. 1, 1933 3 Sheets-Sheet 3

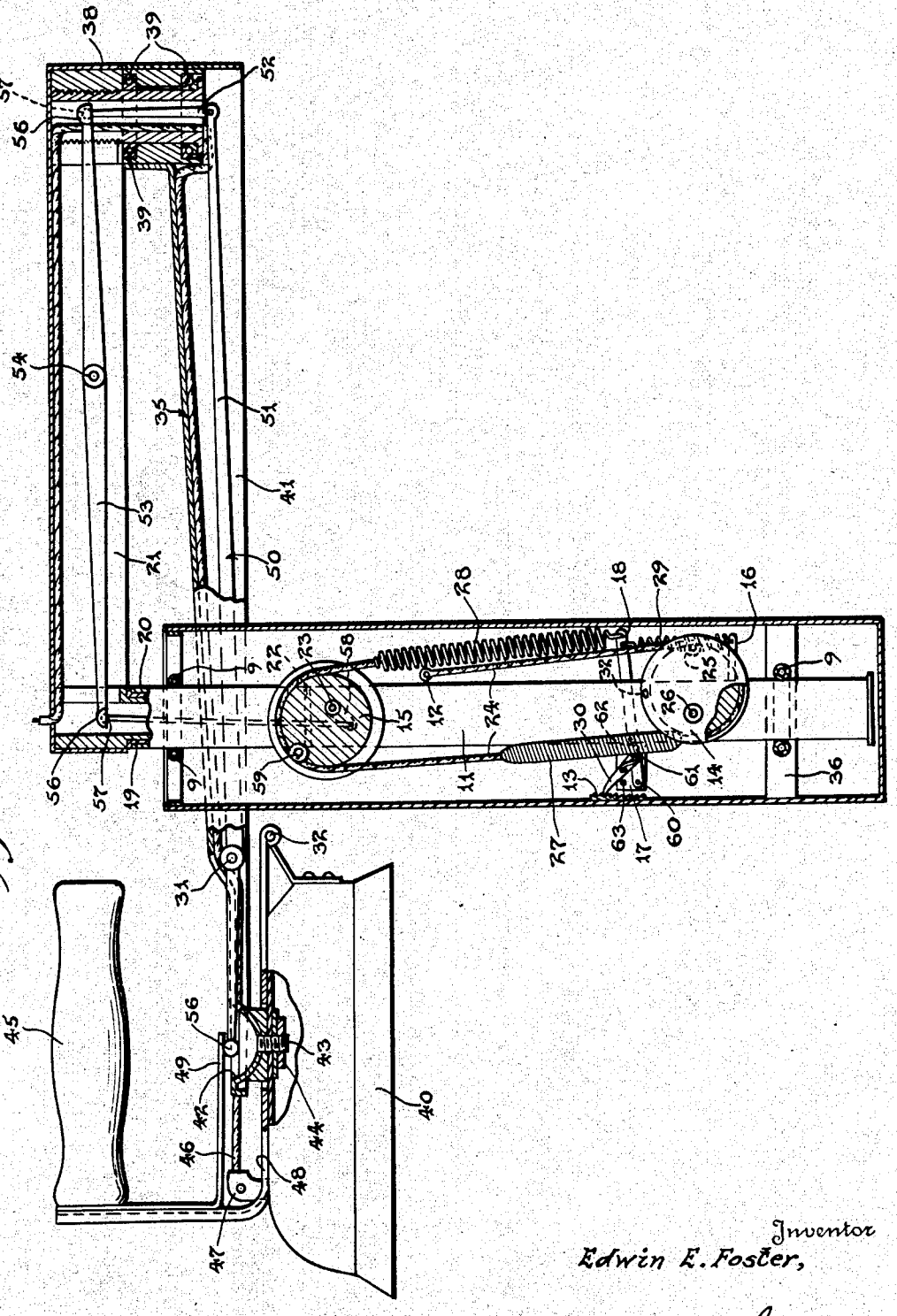


Fig. 11.

Inventor
Edwin E. Foster,

By Emil Bömelyke

Attorney

Patented Jan. 7, 1936 2,027,274

UNITED STATES PATENT OFFICE

2,027,274

IRONING DEVICE

Edwin E. Foster, Austin, Tex.

Application August 1, 1933, Serial No. 683,218

18 Claims. (Cl. 68—9)

The present invention relates to a mechanical iron, preferably of the electric type, in which the weight of the iron is counterbalanced by a mechanical arm.

The object of the invention is to provide an iron with a mechanical arm which will assist in the work of operating the iron. A still further object is to make the iron as light as possible, that is lighter than irons used heretofore for the same work, and to compensate for the weight necessary for ironing by utilizing the weight of the mechanical arm on the iron to bring the weight of the iron to the amount required or necessary.

Another object of the present invention is to provide an iron in which most of the weight encountered in lifting and lowering the iron to and from the ironing board is compensated for by mechanical means to lighten this work incident to manipulation of the iron between actual ironing.

Other objects will be apparent from the following description taken in connection with the accompanying drawings.

In the drawings in which the same reference characters indicate corresponding parts:

Figure 1 is a longitudinal sectional view showing the iron and the working mechanism therefor,

Fig. 2 is a lateral sectional view taken on line 2—2 of Fig. 1,

Fig. 3 is a lateral sectional view taken on line 3—3 of Fig. 1,

Fig. 4 is a plan view of the device mounted on a table with an ironing board,

Fig. 5 is a side view thereof,

Fig. 6 is an end view of Fig. 4,

Fig. 7 is a plan view of Fig. 4 with parts in folded position,

Fig. 8 is a side view thereof,

Fig. 9 is an end view of Figs. 7 and 8,

Fig. 10 is a sectional view taken on line 10—10 of Fig. 1, and

Fig. 11 is a sectional view similar to Fig. 1 showing the various parts when pressure is applied on the iron.

The main feature of this invention is the mechanical arm. This arm uses no outside power. This is made possible by the fact that the arm, in addition to lifting the weight of the iron and keeping it suspended in mid-air while the garment or other object is being changed, also presses downward on the iron at the proper time. Therefore, the iron, which may be as light as two or three pounds, will be supplied with enough extra pressure from this arm to give it the effective working pressure of a ten or fifteen pound iron. The fact that this iron will have sufficient pressure will make it unnecessary to supply the extra current now common in "feather weight" irons. The iron may use 600 watts instead of 1000 watts, making it more economical and also cooler to operate.

Another advantage in making the iron as light as possible and supplying the pressure with the mechanical arm is the elimination of the effort of starting and stopping the heavy reciprocating weight. A two pound iron supplied with additional pressure of thirteen pounds by the arm is more easily moved back and forth than an iron which actually weighs fifteen pounds, due to not having to overcome the inertia of the heavy weight.

Since the arm permits the iron to be lifted and released in mid-air as though it were without weight, and since the arm supplies adequate pressure to the iron when in operation, it is possible for the operator to iron comfortably while sitting down in front of the ironing table. A practical arrangement, therefore, is one as shown in Figs. 4 to 9 of the drawings. The low table with four folding legs has the ironing board mounted permanently on the top, while the mechanism folds into a compact unit as shown.

The ironing device is so constructed that the electric cord is kept out of the operator's way and will last longer due to this protection. The iron is not apt to fall off the board onto the floor, and fire hazard is lessened due to the fact that the iron is always off the board when not in use. This will eliminate scorched ironing board covers.

Practically all of the working mechanism is inside the stationary casing 1, which is mounted or secured to the ironing table 34 by means of the bracket or bar 2 secured to the casing. One end of this bar is fixed to a hinge 3, which is bolted to the table with one bolt 4 so that the bar may rotate around this bolt as a pivot point. A U-shaped clamp 5 is also secured to the table by one bolt 6, and provided with a thumb screw or winged nut 7. This clamp holds the bar 2 as shown in Figs. 4 to 6 in the ironing position, and holds the two-part arm 35 when the device is in the folded position, as in Figs. 7 to 9. The casing 1 is provided with two sets of rollers 9 mounted in arms 36 secured to the inner wall of the casing. As shown in Fig. 2, each set is composed of four rollers arranged so that the vertical square tube 11 may move up and down but cannot revolve.

A pin 12 and the ratchet track 13 are secured on the inner walls of the casing 1, as shown in Figs. 1 and 3. Such working parts as the cam

drums or wheels 14 and 15, the brackets 16 and 17, and the lever 18 on bracket 17, move with and are mounted on the vertical tube 11. The upper end of the tube 11 is provided with a bearing 20 into which fits the sleeve member 19 on which the rear arm 21 of the two-part supporting arm 35 is fixed. A set screw 22 extends into a circular groove 37 in the sleeve member 19 to prevent the member 19 from slipping out of the tube 11, as shown in Fig. 10. The elbow 38 of the mechanical supporting arm 35 is provided with ball bearings 39, as shown in Fig. 1.

The iron 40 is mounted on the forward arm 41 of the two-part arm 35 by means of a cup-shaped socket 42. A part-spherical bolt 43 seats in the socket and by means of a suitable nut 44 the arm 41 is secured so that the iron may have a pivotal motion to accommodate uneven surfaces and different thicknesses of garments to be ironed, this latter being made possible by an enlarged opening in the bottom of the socket 42 through which the bolt 43 is passed with clearance. The handle 45 is pivotally mounted on the iron at the upper rear end 32 by means of a suitably bent arm 48, and the electric cord 46 may be carried to the iron on the inside of the arms 21 and 41 to enter the iron at 47 so that it will be conveniently out of the way as well as protected. The handle 45 and the arm 48 are provided with a contact arm 49 which projects to and above the center of the socket 42.

A leverage system 50 is provided from the handle of the iron to the counterbalancing mechanism in the casing 1 on the tube 11. This system consists of a forward operating lever 51 in and pivoted near the forward or iron end of the arm 41 by means of a bearing 31 having an off-center and pivoted connection (not shown), a short connecting rod 52 in the elbow 38, a rear operating lever 53 pivoted in the rear arm 21 at 54, and a connecting rod 55 in the tube 11 connecting one end of the lever 53 to the drum 15. The lever 53 has a suitable socket 56 at each end to accommodate a ball 57 on the ends of rods 52 and 55 in order to take care of the rotation of the two-part arm 35 around the end of the tube 11 as an axis and the rotation of the two parts of the arm relative to one another. As clearly seen in Fig. 1, the end of the arm 49 contacts a ball member 56 on the end of lever 51 so that when downward pressure is applied on the handle 45, as when the iron reaches the garment to be ironed, the arm 49 will slightly rotate the lever 51 around 31, causing an upward movement of the rod 52, a slight rotation of the lever 53 around 54, and a downward movement of the rod 55.

In the casing 1 two drums or pulleys 14 and 15 are eccentrically mounted on pins or axles 26 and 23, respectively, which are secured on, and preferably extend through, the tube 11, as shown, for instance, in connection with drum 14 and pin 26 in Fig. 3. The pin or axle 23 is provided with a suitable crank 58 on the inside of the tube 11 to which the end of the rod 55 is connected. A cable and spring system is placed in the casing, and, as shown in Fig. 1, one end at pin 12 of the cable 24 is fixed to the casing 1. The cable runs around the drum 14 and is secured thereto at the point 25. This cable then runs upwardly to the spring 27 and around the drum 15. The cable is secured to the drum 15 at the point 59 and then runs downwardly to one end of the spring 28 which is secured at the other end to a ratchet lever 18. The springs 27 and 28 are of practically the same strength. Another spring 29, which, however, is much lighter, is secured at one end to the same end of the lever 18 and at the other end to a lug 16 secured to the tube 11.

As clearly indicated in Fig. 3, the lever 18 is pivoted at 60 on a plate 17 which is secured to the tube 11. The ratchet member 30 is pivotally mounted at 61 on the lever 18 and is spring pressed outwardly by means of spring 62. A stop 63 is provided on the plate 17 to limit the movement of the ratchet member 30. The ratchet track 13 is secured on the inside of the casing 1, as shown in Figs. 1 and 3. The system of levers and connecting rods 50 connects the handle 45 of the iron 40 to the drum 15 in such a way that when the iron is adjacent the ironing board and the handle of the iron is moved downward, the drum 15 will revolve counter-clockwise about one-third of a revolution.

When the iron 40 is in the upper or "at rest" position, as shown in Figs. 1 and 5, all three of the springs 27, 28 and 29 are normal or have very little tension. When the iron is moved downward approaching the ironing board, the cable 24, being held at 12 to the casing 1, will cause the drum 14 to revolve counter-clockwise about one-half of a revolution and thereby stretch the spring 27 about two inches to increase the tension, the drum 15, springs 28 and 29, and lever 18 moving down with the tube 11. The upper end of the spring 27 remains practically stationary with relation to the tube 11 during this movement of the drum 14.

The reason the upper end of the spring 27 remains stationary with relation to member 11 is because it is now on the short end of the lever formed by the drum 15, considering the distance between the pin 23 laterally to the right and left. The springs 28 and 29 are connected end to end to the long end of the lever formed by the cam-shaped drum 15. Therefore, even though the spring 27 is stretched two inches as the iron is moved downward two inches, it is balanced by the springs 28 and 29 on the long end of the lever without the springs being stretched at all, considering, of course, an initial slight tension tending to keep the coils together already existing in the springs. In other words, during the actual up and down stroke or movement of the iron, the drum 15 remains stationary in relation to the vertical tube 11, that is non-rotary, while the drum 14 revolves back and forth in such a way that the lever arms change with the different positions of the stroke to compensate for the difference in tension of the spring 27. Due to the compensating cam-shaped drum 14, the spring 27 gives the iron the effect of being counterbalanced or weightless during its entire vertical stroke.

Now, when the iron is on the garment and the spring 27 is stretched about two inches and is under quite a tension, as explained in the foregoing, the tendency of the spring 27 to revolve the drum 15 counter-clockwise is slightly more than balanced by springs 28 and 29. Therefore, the weight of the operator's hand upon the handle 45 of the iron at this time is necessary to cause the drum 15 to revolve counter-clockwise about one-third of a revolution, due to the leverage system 50 and the crank 58. The spring 27 will now change from a stretched to an unstretched condition by its upper end being lowered about two inches (Fig. 11). The potential energy that was stored up in the spring 27 will have been transferred over into the spring 28 by stretching the latter about two inches. The lower

end of spring 28, which is fastened to the lever 18, will now move upward a short distance, pulling with it the lever 18 rotating around pivot 60, until the pawl 30 has engaged with one of the teeth of the ratchet track 13. The tension in the spring 28 will now cause the iron to press downward upon the garment with ten to fifteen pounds pressure through the tube 11 and the mechanical arm 35, as shown in Fig. 11. This pressure is made adjustable by means of the off-center connection of the bearing 31 in the leverage system in order to place the desired pressure on the iron. When the connection is set so that the bearing is lower, then the downward movement of the handle of the iron will not cause a full one-third turn of the drum 15 and there will be less tension on the spring 28. This adjustment may be made by any suitable means, not shown, at the point 31.

When the operator wishes to lift the iron, he has to lift only the weight of his own hand, as the handle of the iron will then move slightly upward, allowing the drum 15 to revolve clockwise to its original position due to the leverage system, and the spring 27 will then lift the iron. The purpose of the relatively weak spring 29 is to hold the lever 18 downward against the stop 32 on the tube 11, except when the drum 15 is revolved counter-clockwise. There are a number of teeth in the ratchet track 13 in order to take care of the different thicknesses of the material to be ironed.

I claim as my invention:

1. An ironing device comprising an iron having a movable handle; a supporting arm connected to the iron and movable so that the iron may be moved laterally and lengthwise on an ironing board; a casing by which the supporting arm is carried; means in the casing to counterbalance the weight of the iron and arm when raising and lowering the iron and arm; and means operable by the actuation of the handle relative to the iron and passing through the supporting arm to remove the influence of the counterbalance when the iron is adjacent the material to be ironed.

2. An ironing device comprising an iron having a movable handle; a jointed arm for supporting the iron and movable so that the iron may be moved laterally and lengthwise on an ironing board; means by which the arm is movably mounted; means in the arm mounting for compensating for the weight of the arm and iron when raising and lowering the iron and arm; and means operable by the actuation of the handle relative to the iron to remove the influence of the means for compensating for the weight of the arm and iron when the iron is adjacent the material to be ironed and to add ironing pressure on the iron.

3. An ironing device comprising an iron having a movable handle; a jointed arm for supporting the iron and movable so that the iron may be moved laterally and lengthwise on an ironing board; means by which the arm is movably mounted; means in the arm mounting for compensating for the weight of the iron when raising and lowering the iron and arm; and means operable by the actuation of the handle relative to the iron to remove the influence of the means for compensating for the weight of the iron when the iron is adjacent the material to be ironed and to add ironing pressure on the iron.

4. An ironing device comprising an iron having a movable handle; a rotatable arm for supporting the iron; a vertically movable member in which the arm is rotatably mounted, the axis of rotation of the arm being in the longitudinal axis of the member; a casing for supporting the member and having means therein for the vertical movement of the member; means in the casing and mounted on the member to counterbalance the weight of the iron and arm when raising and lowering the iron; and means operable by the handle through the arm to remove the influence of the counterbalance when the iron is adjacent the material to be ironed and to add ironing pressure on the iron.

5. An ironing device according to claim 4, in which the counterbalance means includes a plurality of springs and means for operatively connecting the springs to the member and to the casing.

6. An ironing device according to claim 4, in which the counterbalance means includes a plurality of springs operatively connected to the member and the casing and a pair of eccentrically mounted pulleys which are rotatably secured on the member and a cable is provided connecting the ends of the springs with the pulleys and the member.

7. An ironing device comprising an iron having a movable handle; a movable arm for supporting the iron; a vertically movable member on which the arm is rotatably mounted; a casing for supporting the member and having means therein for the vertical movement of the member; a pair of pulleys rotatably and eccentrically mounted on the member; a cable having one end secured to the casing and the other end to the member and having a plurality of tension springs connected to the cable and the pulleys, said cable passing around the pulleys and being secured thereto; and means in the arm operable by the handle to rotate one of the pulleys to tension the springs due to the eccentric mounting of the pulleys to counterbalance the weight of the iron and arm when raising and lowering the iron and to transfer the tension of the springs to another to apply a force on the iron by the arm when the iron is on the garment and the handle is pressed.

8. An ironing device according to claim 7, in which the means includes a plurality of levers and rods extending from the iron to one of the eccentric pulleys to transfer the handle movement to the last-named pulley.

9. An ironing device comprising an iron having a movable handle; a movable arm for supporting the iron; a vertically movable member on which the arm is rotatably mounted; a casing for supporting the member and having means therein for the vertical movement of the member; a pair of pulleys rotatably and eccentrically mounted on the member; a cable having one end secured to the casing and the other end to the member and having a plurality of tension springs connected thereto, said cable passing around the pulleys and being secured thereto; a ratchet device mounted on the casing and the member in order to maintain one of the springs under tension while using the iron on the garment to insure downward movement of the member and to prevent upward movement of the member relative to the casing; and means in the arm operable by the handle to rotate one of the pulleys to tension the springs to counterbalance the weight of the iron and arm when raising and lowering the iron and to transfer the tension of the springs to another due to the eccentric mounting of the pulleys to add to the weight of the

iron when the iron is on the garment and the handle is pressed.

10. An ironing device comprising an iron having a movable handle; an arm for supporting the iron and movable so that the iron may be moved laterally and lengthwise on an ironing board; means for counterbalancing the weight of the iron and arm when raising and lowering the iron and arm; and means independent of the operation but in the arm operable by the handle of the iron to remove the influence of the counterbalance when the iron is adjacent the material to be ironed and to add ironing pressure on the iron.

11. An ironing device comprising an iron having a movable handle; an arm for supporting the iron and movable so that the iron may be moved laterally and lengthwise on an ironing board; means for counterbalancing the weight of the iron and arm when raising and lowering the iron and arm; and means independent of the operation but in the arm operable by the acutation of the handle relative to the iron to remove the influence of the counterbalance and to add to the weight of the iron and lever when the iron is adjacent the material to be ironed and to add ironing pressure on the iron.

12. An ironing device comprising an iron having a movable handle and mounted on an arm which supports the iron and movable so that the iron may be moved laterally and lengthwise on an ironing board; counterbalance means associated with the arm to counterbalance the weight of the iron when raising and lowering the iron; and means in the arm but operable independent thereof to remove the influence of the counterbalance or to bring the counterbalance effect into action relative to the iron, which is controlled by the handle when the iron is on the material to be ironed or the ironing has been completed and to add ironing pressure on the iron.

13. An ironing device according to claim 7, in which a ratchet device is provided mounted on a lever to maintain one of the springs under tension to add to the effective weight of the iron while ironing, and a spring for the ratchet lever to force the ratchet out of its track when the iron is raised.

14. An ironing device according to claim 12, in which the arm is in the form of a double jointed arm having an elbow.

15. An ironing device comprising an iron having a movable actuator; an arm for supporting the iron and movable so that the iron may be moved laterally and lengthwise on an ironing board; means for counterbalancing the weight of the iron and arm; means to effect ironing pressure on the iron; and means operable by the movement of the actuator of the iron to transfer the energy of the counterbalance means to the second mentioned means when the iron is on the material to be ironed.

16. An ironing device comprising an iron having a movable handle; an arm for supporting the iron and movable so that the iron may be moved laterally and lengthwise on an ironing board; means for counterbalancing the weight of the iron and arm; and means operable by the movement of the handle of the iron relative to the iron to remove the influence of the counterbalance when the iron is adjacent the material to be ironed and to apply ironing pressure to the iron by means of the arm to add to the weight of the iron for the ironing pressure.

17. An ironing device comprising a member on which an iron is provided, a pair of pulleys eccentrically and rotatably mounted on the member, a pair of springs between the pulleys and on opposite sides thereof, a cable passing around the pulleys and connected to the springs to form a continuous spring and cable system of which one end of the system is secured to the member and the other end to a fixed point, one of the springs being under tension to effect a counterbalanced position of the iron and member, and means actuated from the iron for rotating one of said pulleys to transfer the energy in the tensioned spring to the other spring to remove the counterbalancing force and to utilize the energy in the last-mentioned spring to effect an ironing pressure on the iron.

18. An ironing device according to claim 17, in which the iron is supported by a jointed arm and in which the actuating means are mechanical elements passing through the arm and the joints thereof.

EDWIN E. FOSTER.