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SUPPORTING LINKAGE FOR IRONS

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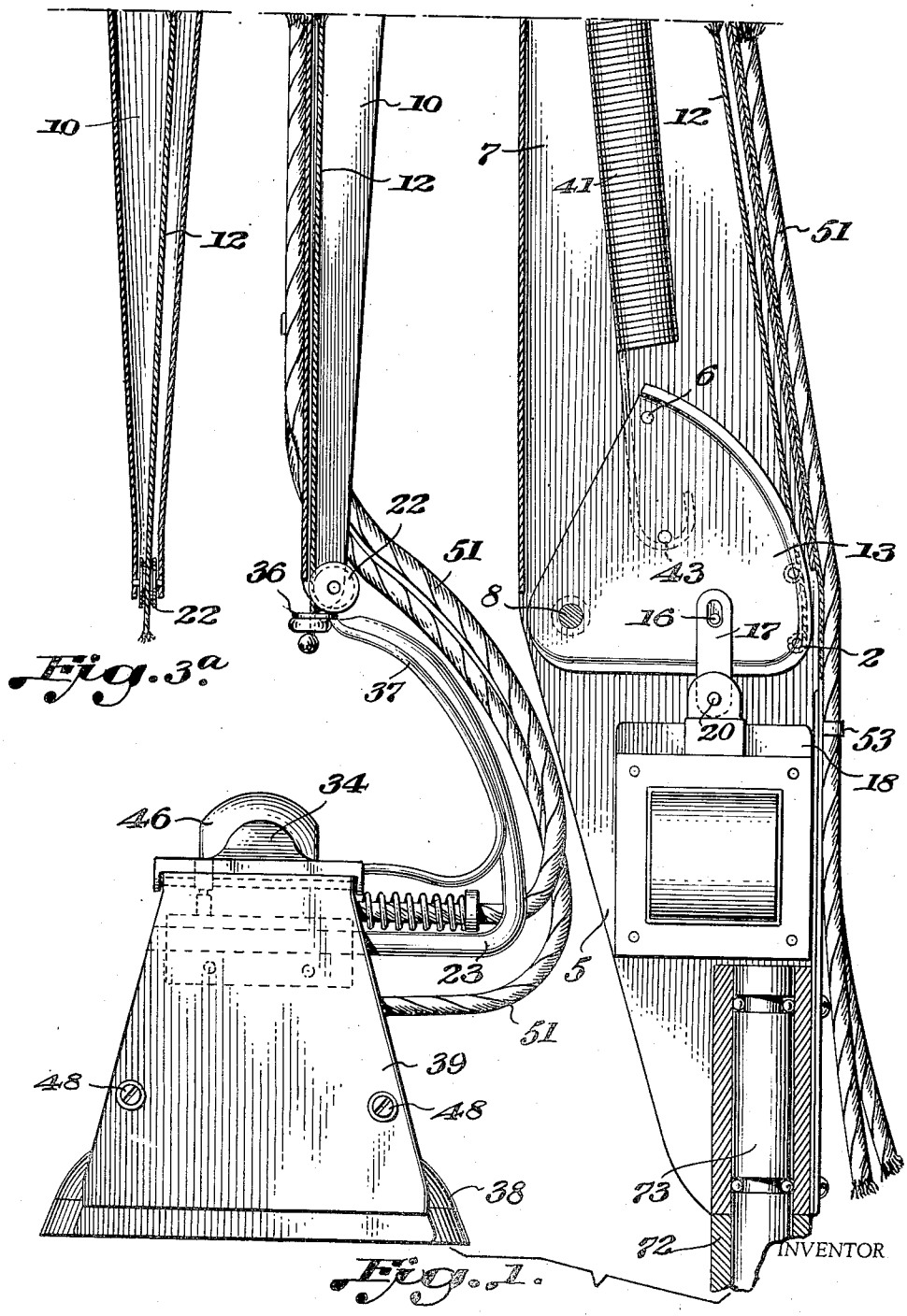


Fig. 3a.

Fig. 1.

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Fig. 2.

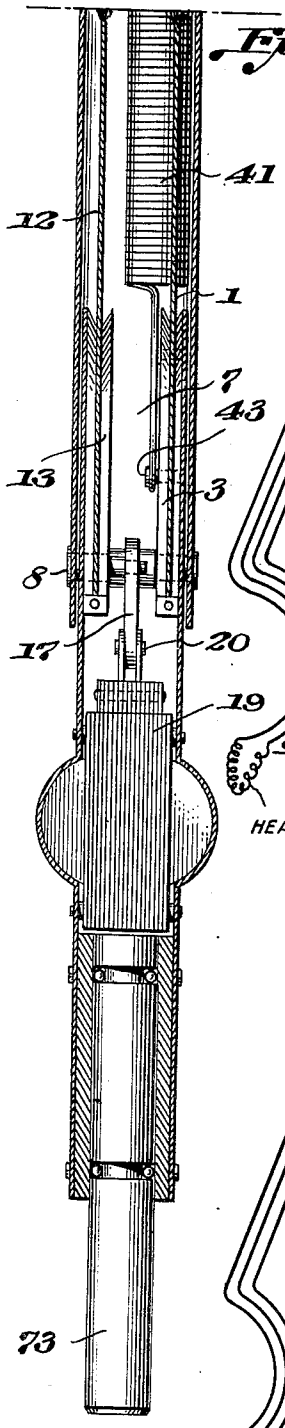


Fig. 5.

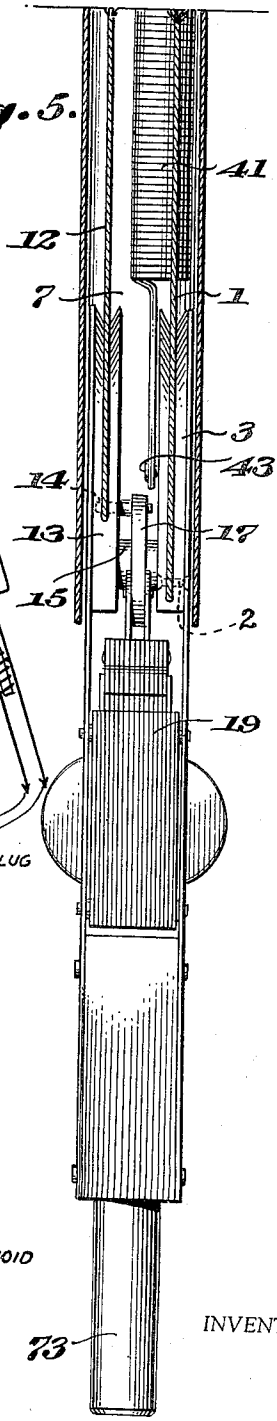


Fig. 8.

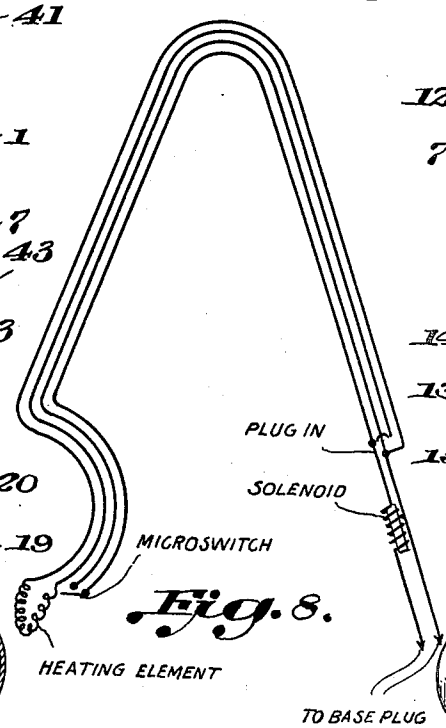
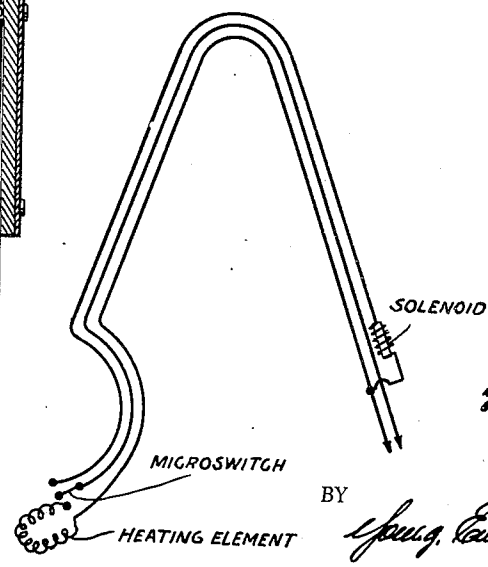


Fig. 9.



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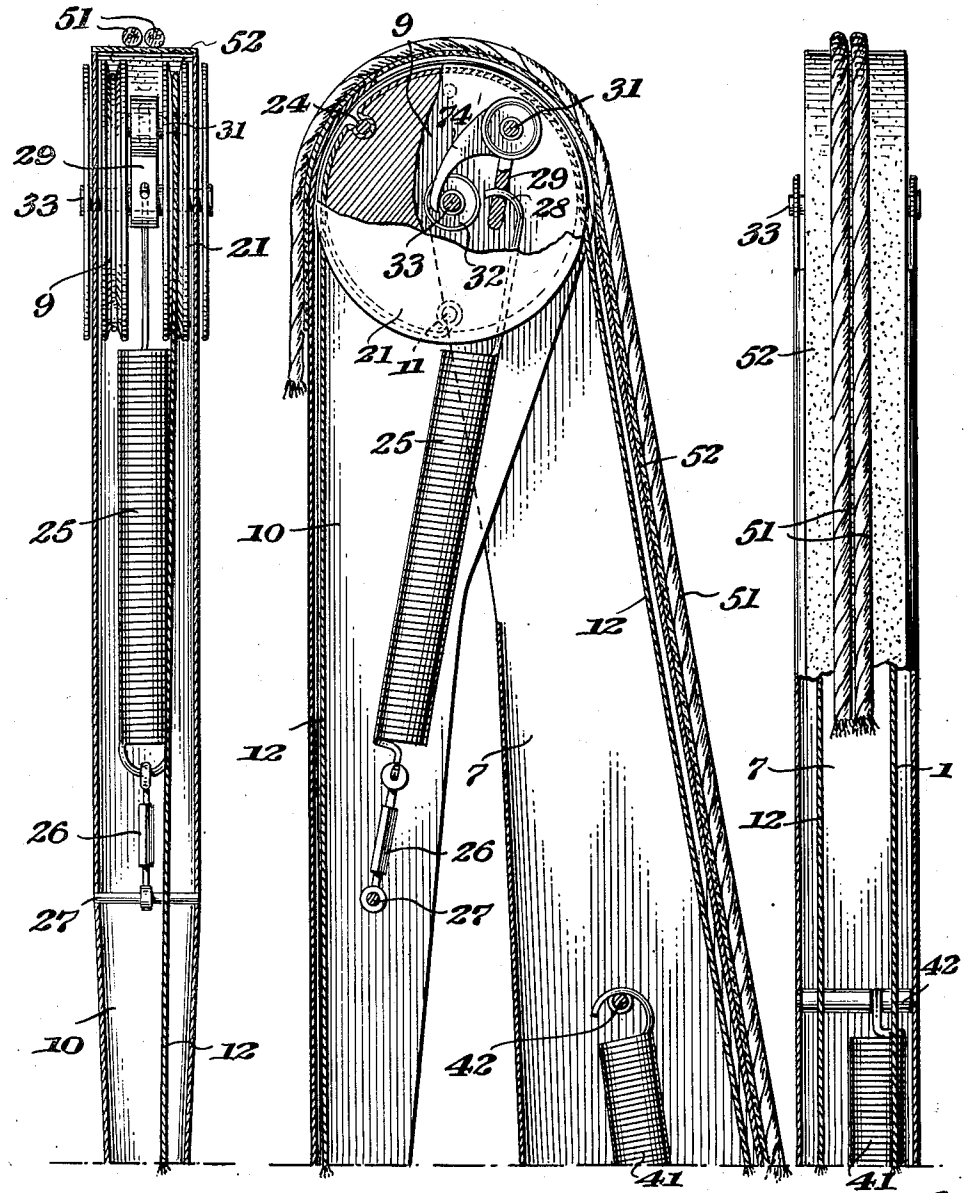


Fig. 3. Fig. 1a Fig. 2a

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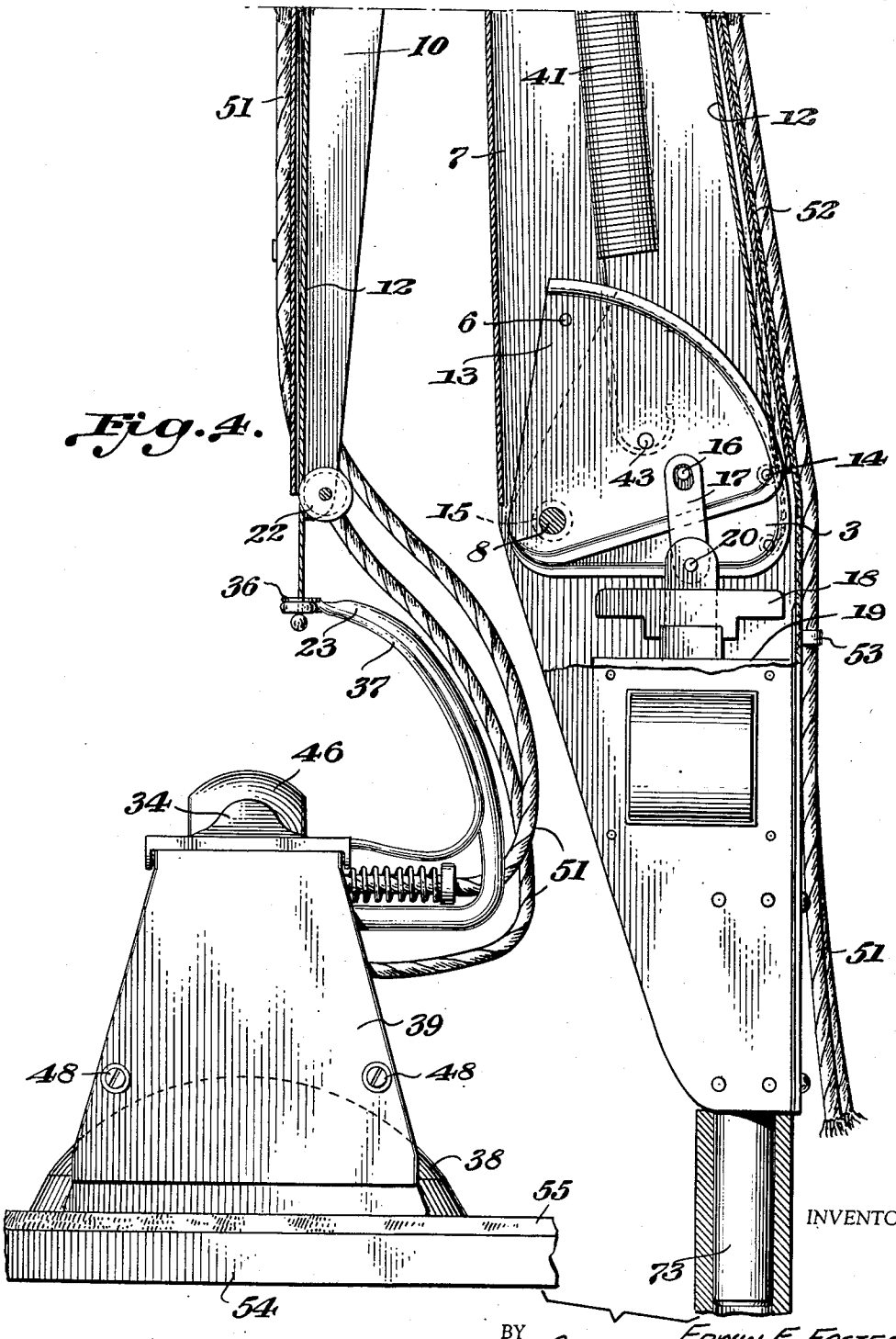
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Fig. 4.



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Fig. 4.a

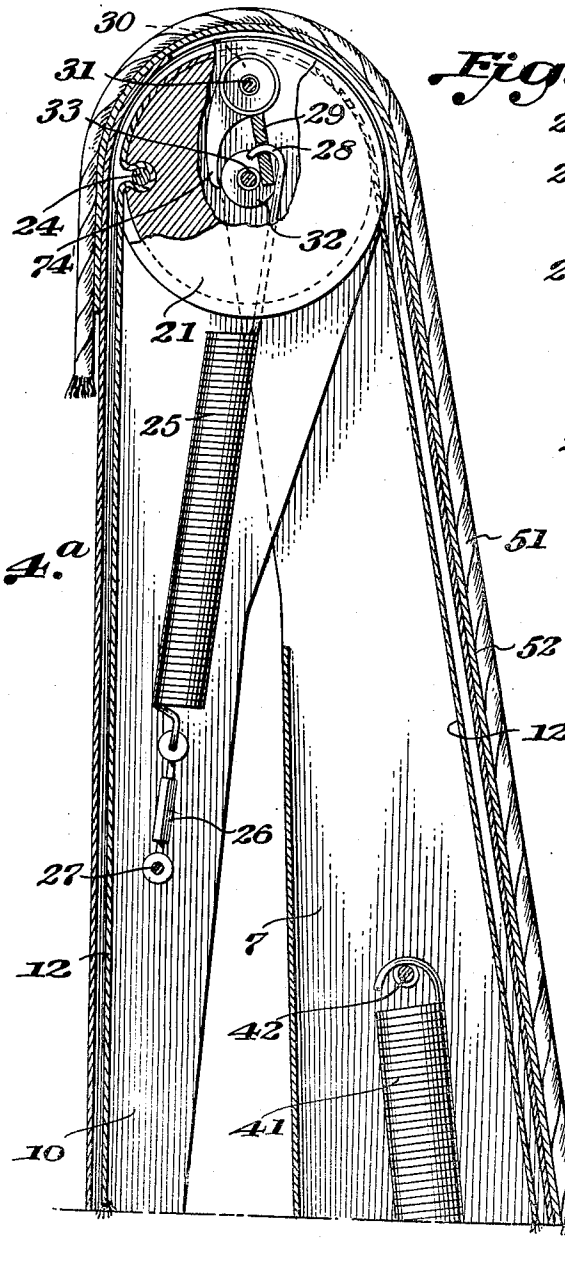
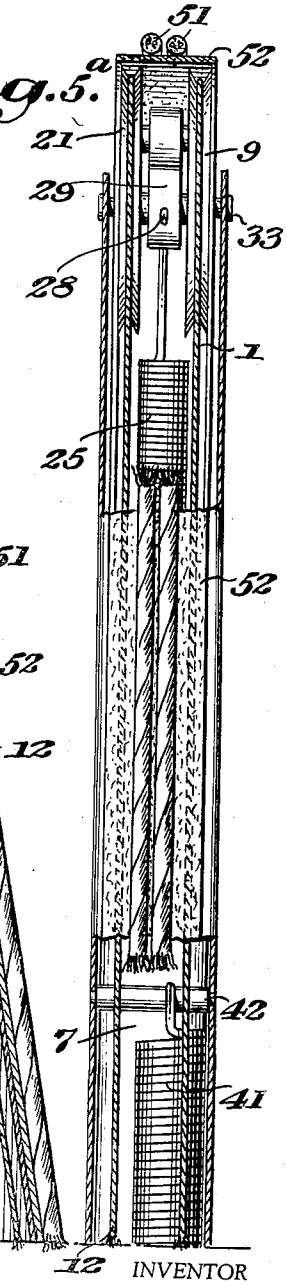


Fig. 5.a



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Fig. 6.

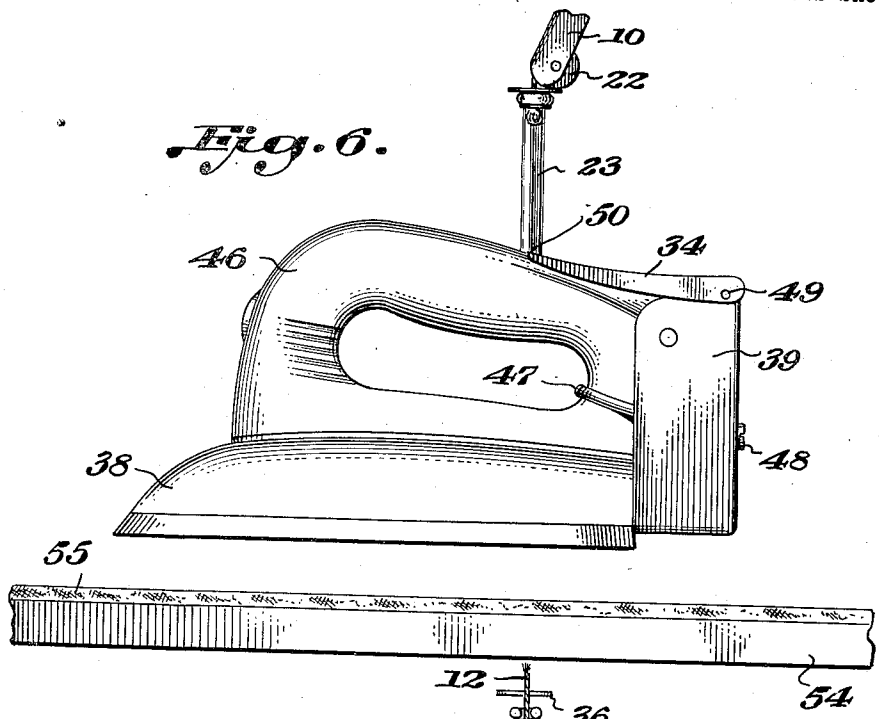
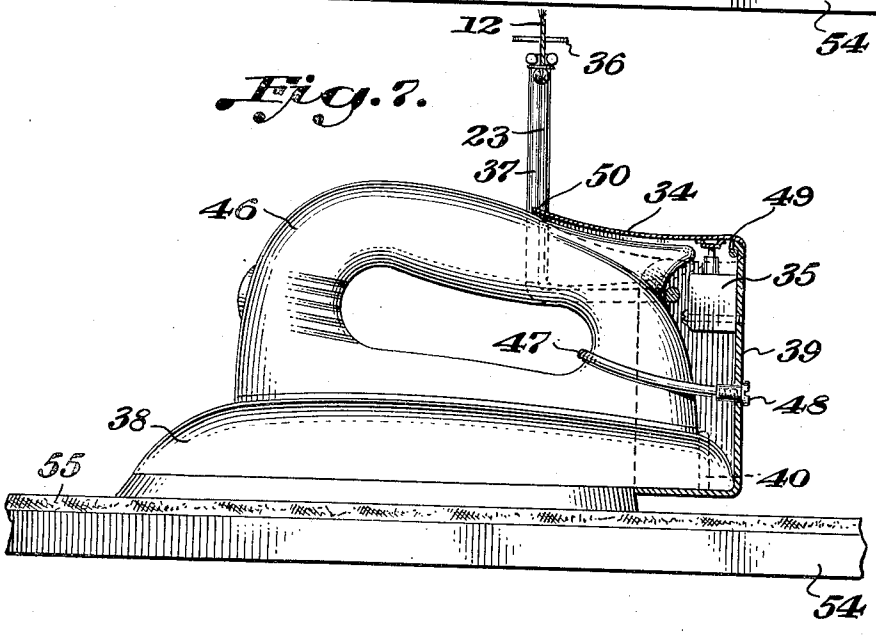


Fig. 7.



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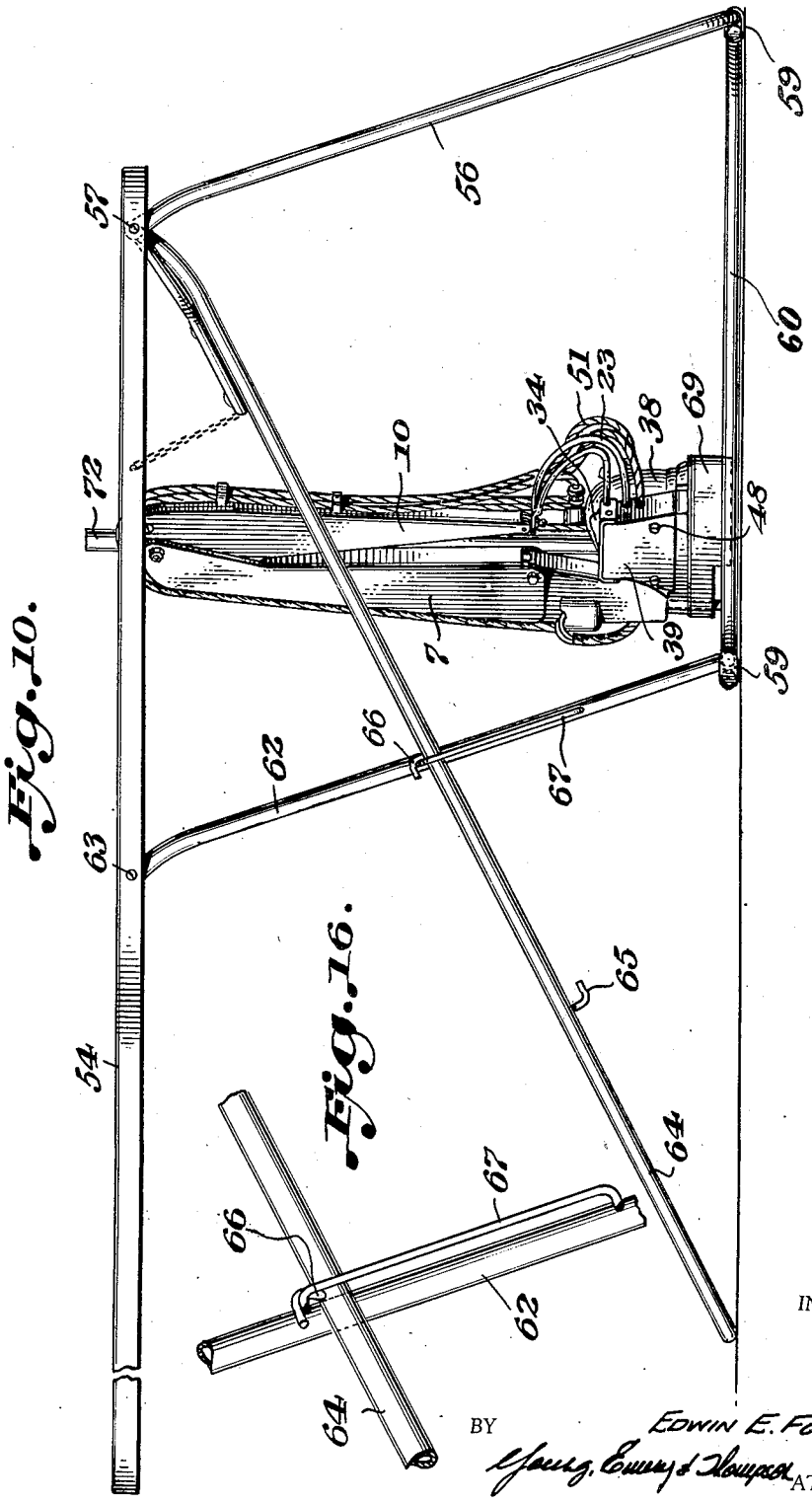


Fig. 10.

Fig. 16.

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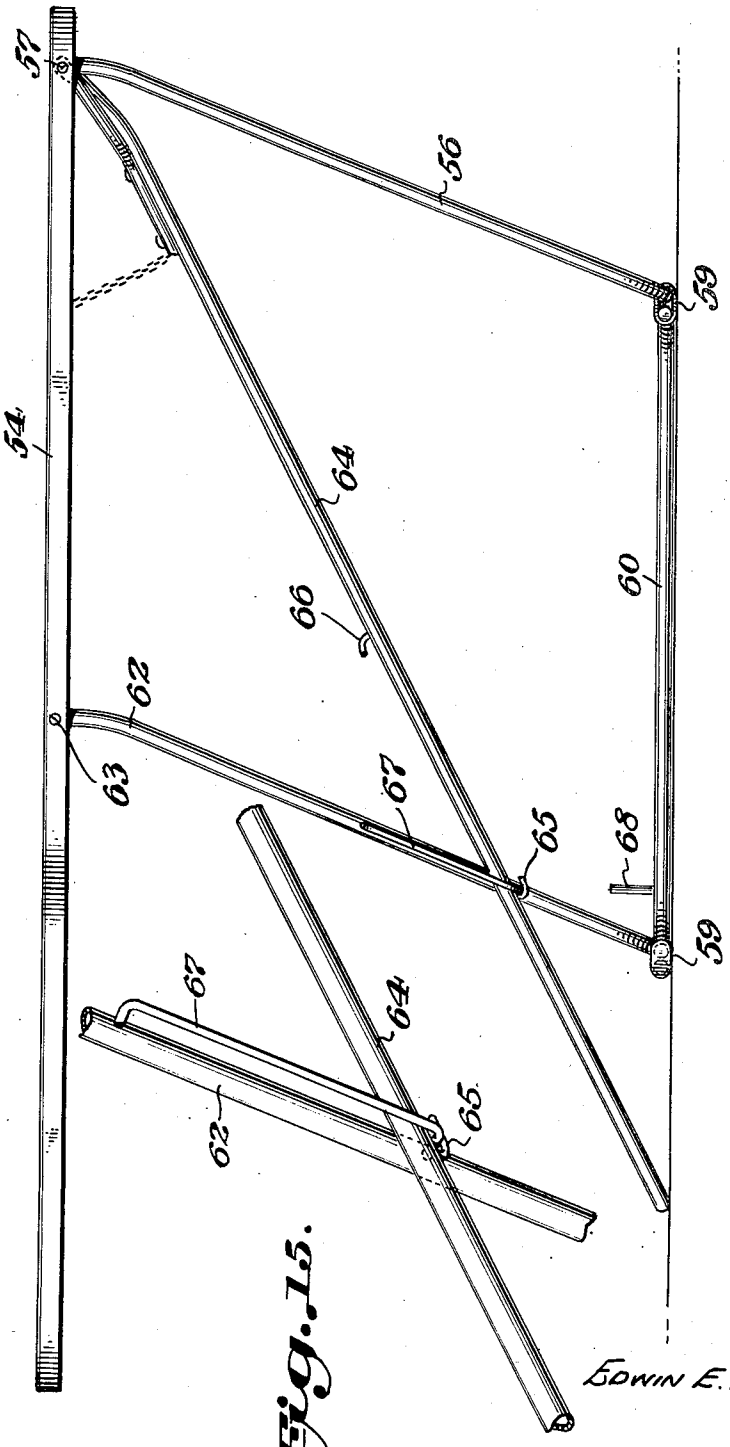


Fig. 11.

Fig. 15.

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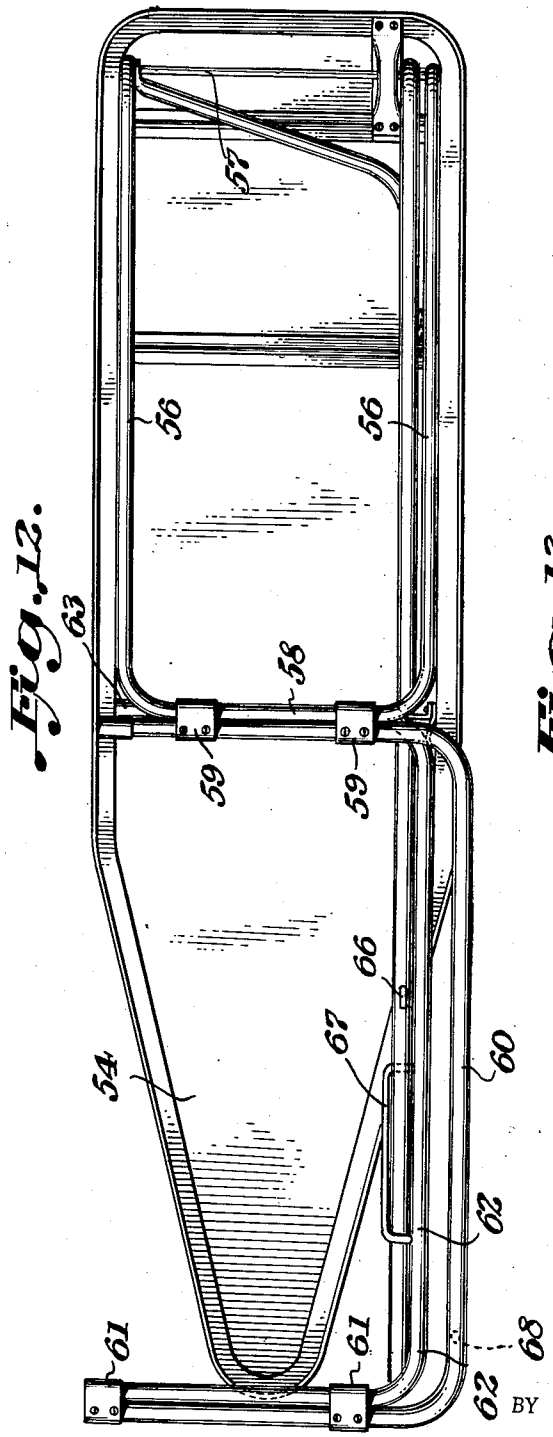


Fig. 12.

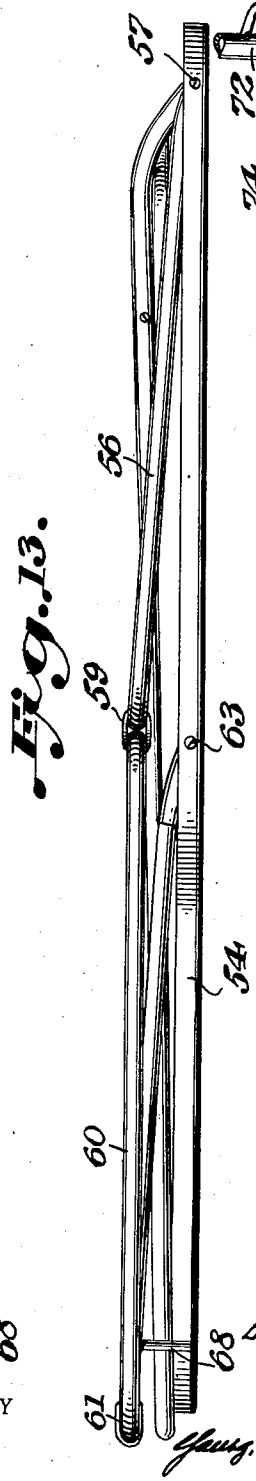


Fig. 13.

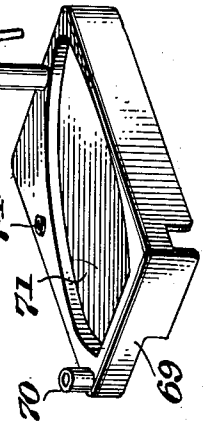


Fig. 14.

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Patented June 8, 1954

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UNITED STATES PATENT OFFICE

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SUPPORTING LINKAGE FOR IRONS

Edwin E. Foster, Austin, Tex.

Application September 20, 1949, Serial No. 116,644

8 Claims. (Cl. 38—30)

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This invention relates to a supporting linkage for an iron and particularly to a linkage to support an iron for movement in a horizontal plane over an ironing surface.

Another object resides in the provision of a detachable stand for the iron and arm not only to support the iron and arm when in the ironing position, but also to support the arm and iron in the non-assembled position of the parts.

A feature of the invention resides in the provision of a mechanical arm attached to a supporting post adjacent to the ironing board and one end of the arm attached to a standard electric iron by means of a flexible cable.

Another object resides in the provision of an easy working trigger attached to the handle of the iron and connected to an electric solenoid in the arm so that at the time the operator starts to lift the iron, the electric solenoid will do the work of lifting the iron through the first half of the lifting stroke, at which point a counter-weighting spring will take over and support the iron in the upper half of the lifting stroke, the current through the solenoid cutting off at the end of the upward stroke.

A further object resides in the provision of an adapter which will connect the mechanical arm to any standard electric or steam electric iron and cause the iron to have its full pressure while on the material to be ironed, and to become weightless and always lift itself when the weight of the operator's hand is removed from a feather touch trigger, the trigger in the handle operating a micro-switch which energizes the electric solenoid.

Further objects will be apparent from the following description when considered in connection with the accompanying drawings in which:

Figures 1 and 1*a* taken together show a side elevation partly in section of the arm and the iron in rear elevation in its lifted position;

Figures 2 and 2*a* taken together show a rear elevation of the arm partly in section;

Figures 3 and 3*a* taken together show a front elevation of a forearm of the arm partly in section;

Figures 4 and 4*a* taken together show a side elevation of the arm and rear elevation of the iron showing parts of the arm in section and the iron in its ironing position;

Figures 5 and 5*a* taken together show a rear elevation of the upper arm section of the arm with parts in section;

Figure 6 is a side elevation of the iron in the raised position;

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Figure 7 is a side elevation of the iron in the ironing position;

Figures 8 and 9 are wiring diagrams;

Figure 10 is a side elevation of the ironing board with the iron and support in folded position;

Figure 11 is a side elevation of the board in a different position from that of Fig. 10;

Figure 12 is a bottom plan view of the board in the folded position;

Figure 13 is a side elevation of the board in the folded position;

Figure 14 is a perspective view of the support base;

Figure 15 is a perspective view of a detail of the legs of the board; and

Figure 16 is a perspective view of a detail of the legs of the board.

Figs. 1 to 5*a* show an iron **38** operatively attached to a forearm section **10**, which latter is pivotally hinged to a main or rear arm section **7**. As shown in Figs. 4 and 5, a cable **1** is attached to a pin **2** on the periphery of a cam **3**, which is riveted to a housing **5** by means of pins **2** and **6**. The main arm section **7** pivots on the housing **5** on the pin **8** and the cable **1** extends up the arm section **7** and over a curved guide member **9**, which is riveted to the forearm **10** by means of two or more rivets, not shown. The cable **1** is attached to the curved guide member **9** at the pin **11** in Fig. 1*a*. With this construction, the free end of the arm **10** is constrained to move in the same horizontal plane parallel to the ironing board as the arm **7** pivots about the pin **8**. A second cable **12** is attached to the pulley section **13** at the pin **14** and the pulley section **13** is provided with a hub **15** and is pivotally connected on the pin **8**. The pulley section **13** is also provided with a pin **16**, to which a slotted connecting link **17** is attached at its upper end, the lower end of the link **17** being pivotally connected to a movable head **18** of a solenoid **19** at the point **20**. The cable **12** extends up the arm **7** and over a movable pulley **21** and down the forearm **10** over a small pulley **22** and out of the lower end of the forearm to where it is attached to an adapter bracket **23**. The cable **12** is attached to the movable pulley **21** at the point **24**. A counter-weight spring **25** is pivotally mounted through a turnbuckle **26** to a pin **27** in the forearm **10** and the upper end of the tension spring **25** is pivotally connected at the point **28** to a link **29** which is pivoted through ball bearing **30** to a pin **31**, which is attached to the movable pulley **21**. Movable pulley **21** pivots on a suitable bearing **32** and around a pin **33**

which connects the forearm section 10 to the upper arm section 7. The object of the tension spring 25 is to counter-weight the iron through the cable 12 through its upper half of the vertical stroke of the iron. As the iron is moved downward from the position shown in Fig. 1, due to a slight downward pressure on the handle by the operator, the spring 25 will cross the center of the pulley 21 when the iron is about halfway down. The lifting effect of the spring 25 is therefore removed and the iron will drop freely the rest of the way to the ironing board so that by the time it reaches the material to be ironed it will have its full weight on the material to be ironed. There is no effort required to hold the iron down, since the operator is not overcoming a counter-weight spring. When the operator starts to lift the iron, however, a trigger 34 changes from the position shown in Fig. 6 to the position shown in Fig. 7, due to a spring in a micro-switch 35. When the micro-switch 35 is closed, as shown in Fig. 7, the solenoid 19 is energized and the solenoid plunger, or head 18, is pulled downward to its closed position shown in Fig. 1. This stroke of the solenoid is sufficient to lift the iron just past the over-center position of the spring 25 to where the iron will be carried the rest of the way up by means of the counter-weight spring 25. A slot, Fig. 4, is provided in the link 17 so that the pulley 13 can move through the rest of the stroke as the head 18 of the solenoid has completely closed. As the iron reaches the limit of its upward stroke, a plate 36 hits the pulley 22 and causes a push link 37 to push the trigger 34 downward to cut off the current to the solenoid. This trigger 34 remains downward, as shown in Fig. 6, at the time the operator catches hold of the handle again. In other words, the trigger 34 is already in a closed position and cannot pinch the hand as the iron is guided downward and through its ironing stroke.

The iron 38 is attached to an adapter bracket plate 39 by means of the screw 40, Fig. 7.

A tension spring 41 is attached to the upper arm 7 at the point 42 and to a pin 43 on the housing 5. This spring 41 is used to counterweight the weight of the elbow as the arm is extended.

As shown in Figs. 1, 4, 6 and 7, the iron 38 is provided with a handle 46 to which the adapter bracket 39 is secured by means of a suitable U-shaped stirrup 47 fastened by means of screws 48. The trigger 34 which operates the micro-switch 35 is pivoted at 49 to the bracket 39 at one end thereof with the other end 50 projecting well up on the handle 46 as shown in Figs. 6 and 7.

In order to protect the two wires 51 a strip of material, preferably leather, in the form of a band 52 is secured around a portion of the outer face of the arm section 10 and completely on the arm section 7 and to which the wire is clamped by means of clips 53.

The ironing board 54 may be of any suitable construction, but for strength and the utmost utility metal construction of stainless steel, aluminum and other metals and alloys may be employed. The board 54 as shown in Figs. 6 and 7 is covered with a suitable fabric 55 and a folding leg structure supports the board. As shown in Figs. 10 to 13, a pair of legs 56 is connected at the upper end to the board by a pivotal connection 57 and at the bottom end the legs are integral with a bottom section 58. This bottom section 58 is connected by means of link members 59 to a U-shaped foot or support section 60 which latter forms the base for the ironing board with the link members 59 and a further pair of link members 61 actually forming the elements which contact the floor. The link members 61 are also connected to a second leg member 62 which is pivotally secured to the board 54 at 63. A diagonal strut 64 is also pivoted on the connection or rod 57 and is provided with two hook members 65 and 66 spaced relative to each other and cooperating with a guard rail 67 secured on the second leg member 62. Thus in one position the board 54 is held in the right adjusted position as shown in Fig. 11 in which the hook 65 contacts the bottom end of the guard rail 67 and in the left adjusted position as shown in Fig. 10 the upper hook 66 contacts the rail 67. By releasing the hook 66 from the rail 67, the board may be folded as shown in Figs. 12 and 13.

All of the elements which comprise the frame to support the ironing board are preferably made of tubular metal sections which are not only light, but they are strong.

As seen in Fig. 11, the bottom or support section 60 is provided with a pin 68 which is for the purpose of receiving and holding a base member 69, Figs. 10 and 14, by means of a sleeve element 70 secured to the base. This base member 69 has a depressed portion 71 in the approximate shape to receive the iron 38 and a post member 72 is also secured on the base member. Fig. 10 shows the board set up ready for use, but the iron 38 is shown as supported in the depressed portion 71 and the two sections 7 and 10 of the arm are folded with the stem 73 of the arm mounted and supported in a hole 74 in the base 69.

Figs. 8 and 9 are wiring diagrams showing two different ways in which the heating element, the micro-switch and the solenoid can be electrically connected to a base plug.

As shown in Figs. 1*a* and 4*a*, a brake member 74' is secured on the pin 31 to contact the pin 33 to act as a brake member to keep the arm from swinging outwardly.

It is believed to be obvious regarding the use of the board during ironing in that the board 54 may be shifted or adjusted to two different positions as shown in Figs. 10 and 11. Also in Fig. 10, the arms 7 and 10 and the iron 38 are raised so that the stem 73 fits into the post 72 and the iron is then ready for use. In using the device as so far described, the stem 73 is inserted in the hollow post 72 on the ironing board so that the arm 7 projects vertically above the ironing board and the arm 10 holds the iron suspended above the board. The spring 25 will at this time exert tension on the cable 12 to lift the iron to a position as shown in Figures 1 and 6 above the level of the ironing board. By grasping the handle of the iron, the operator can move the iron to any desired position above the board and the linkage will function to support the iron in a horizontal plane above and parallel to the board.

To effect an ironing operation, a downward pressure on the iron is exerted by the operator to turn the pulley 21 through tension on the cable 12, thereby moving the iron downward relative to the arm 10 to the position shown in Figures 4 and 7. As the pulley 21 turns, the pivot point 31 will move across the center 33 so that the spring 25 will exert no upward force on the iron and the full weight of the iron is on the material. It will be noted that during this operation the operator's hand holds the trigger 34

downward so that the solenoid 19 is deenergized.

At the completion of an ironing operation the operator releases the handle so that the trigger 34 swings upward under the influence of a spring in the switch 35 allowing the switch 35 to close to energize the solenoid 19. At this time, the pulley member 13 exerts a pull on the cable 12 to turn the pulley 21 back toward the position shown in Figure 1*a* and to raise the iron from the ironing board. After a partial upward movement of the iron the pivot point 31 for the spring 25 will cross to the right of the pivot 33 as seen in Figure 1*a* so that the spring 25 will again become effective to exert a pull on the cable 12 to raise the iron. When the iron reaches its fully elevated position due to the pull of the spring 25, the plate 36 will hit the pulley 22 and cause the push link 37 to push the trigger 34 downward opening the switch 35 thereby to deenergize the solenoid. The parts will remain in this position until the iron is again forced downward by an operator as described above.

I claim as my invention:

1. An ironing device comprising a pair of arm sections pivotally connected to each other at one end, means supporting the other end of one of the arm sections, means connecting the arm sections so that as they pivot relative to each other the free end of the other arm section will be guided in a horizontal plane, means movable relative to the arm sections to support an iron having a handle from the free end of said other arm section for vertical movement toward and away from an ironing surface, electric motor means carried by the first named supporting means and connected to the movable means and adapted when energized to raise the iron toward the free end of said other arm section, a control switch to energize the electric motor means operable from the handle of the iron, and a switch control member connected to the control switch and movable with the movable supporting means to engage a part on said other arm section and open the switch when the iron is raised.

2. An ironing device comprising a pair of arm sections pivotally connected to each other at one end, means supporting the other end of one of the arm sections, means connecting the arm sections so that as they pivot relative to each other the free end of the other arm section will be guided in a horizontal plane, means movable relative to the arm sections to support an iron having a handle from the free end of said other arm section for vertical movement toward and away from an ironing surface, electric motor means carried by the first named supporting means and connected to the movable means and adapted when energized to raise the iron toward the free end of said other arm section, a control switch to energize the electric motor means operable from the handle of the iron, a switch control member connected to the control switch and movable with the movable supporting means to engage a part on said other arm section and open the switch when the iron is raised, and an overcenter spring device connected to one of the arm sections and the movable supporting means and acting therethrough to raise the iron to its fully elevated position after it has been partially raised by the motor means.

3. An ironing device comprising a pair of arm sections pivotally connected to each other, supporting means to support one end of one of the arm sections, means connecting the arm sections so that as they pivot relative to each other

the free end of the other arm will be guided in a horizontal plane, means movable relative to the arms for supporting an iron having a handle from the free end of said other arm for vertical movement toward and away from an ironing surface, an electric solenoid carried by the first named supporting means and connected to the movable supporting means to control raising and lowering of the iron, and a switch operable from the handle of the iron to control energization of the solenoid.

4. An ironing device comprising a pair of arm sections pivotally connected to each other, supporting means to support one end of one of the arm sections, means connecting the arm sections so that as they pivot relative to each other the free end of the other arm will be guided in a horizontal plane, means movable relative to the arms for supporting an iron having a handle from the free end of said other arm for vertical movement toward and away from an ironing surface, an electric solenoid carried by the first named supporting means and connected to the movable supporting means to control raising and lowering of the iron, a switch connected to the solenoid to control energization thereof, and a trigger mounted on the handle of the iron and engageable with the switch to open the switch and de-energize the solenoid when the trigger is engaged by the hand of an operator and to close the switch to energize the solenoid when the trigger is released.

5. An ironing device comprising a pair of arm sections pivotally connected to each other, supporting means to support one end of one of the arm sections, means connecting the arm sections so that as they pivot relative to each other the free end of the other arm will be guided in a horizontal plane, means movable relative to the arms for supporting an iron having a handle from the free end of said other arm for vertical movement toward and away from an ironing surface, an electric solenoid carried by the first named supporting means and connected to the movable supporting means to control raising and lowering of the iron, and a switch operable from the handle of the iron to control energization of the solenoid, said movable supporting means including a cable extending through the arm sections connected at one end to the iron and at the other end to the solenoid.

6. An ironing device comprising a pair of arm sections pivotally connected to each other, supporting means to support one end of one of the arm sections, means connecting the arm sections so that as they pivot relative to each other the free end of the other arm will be guided in a horizontal plane, means movable relative to the arms for supporting an iron having a handle from the free end of said other arm for vertical movement toward and away from an ironing surface, an electric solenoid carried by the first named supporting means and connected to the movable supporting means to control raising and lowering of the iron, a switch operable from the handle of the iron to control energization of the solenoid, a spring connected at one end to one of the arm sections, and a pulley mounted in the arm sections connecting the other end of the spring to the movable supporting means to raise the iron to its fully elevated position after it has been partially raised by the solenoid.

7. An ironing device comprising a pair of arm sections pivotally connected to each other, supporting means to support one end of one of the

arm sections, means connecting the arm sections so that as they pivot relative to each other the free end of the other arm will be guided in a horizontal plane, means movable relative to the arms for supporting an iron having a handle from the free end of said other arm for vertical movement toward and away from an ironing surface, an electric solenoid carried by the first named supporting means and connected to the movable supporting means to control raising and lowering of the iron, a switch operable from the handle of the iron to control energization of the solenoid, said movable supporting means including a cable extending through the arm sections connected at one end to the iron and at the other end to the solenoid, a rotatable pulley in one of the arm sections connected to the cable, and a spring in said one of the arm sections connected to the pulley to exert a variable lifting force on the cable as the pulley turns.

8. An ironing device comprising a pair of arm sections pivotally connected to each other, supporting means to support one end of one of the arm sections, means connecting the arm sections so that as they pivot relative to each other the free end of the other arm will be guided in a horizontal plane, means movable relative to the arms for supporting an iron having a handle from the free end of said other arm for vertical movement toward and away from an ironing surface, an electric solenoid carried by the first named supporting means and connected to the movable supporting means to control raising and lowering of the iron, a switch operable from the handle of the iron to control energization of the solenoid, and an overcenter spring device connected to the movable supporting means to exert a low lifting force thereon when the iron is lowered and a higher lifting force thereon when the movable supporting means is moved by the solenoid to raise the iron.

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