

Nov. 4, 1947.

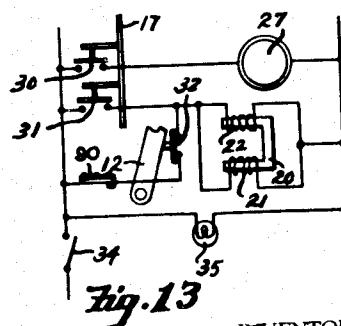
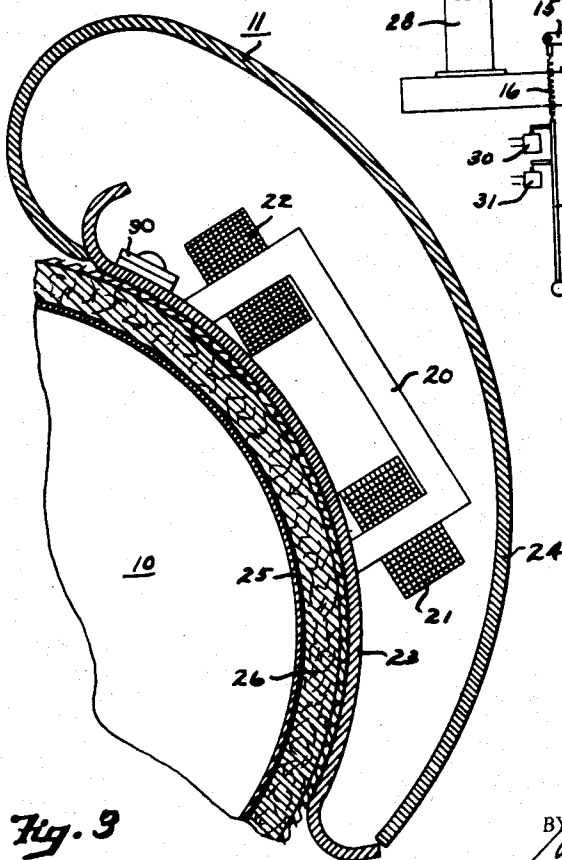
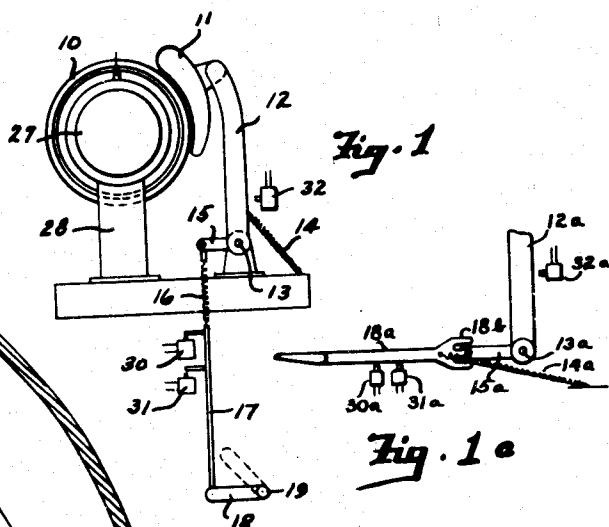
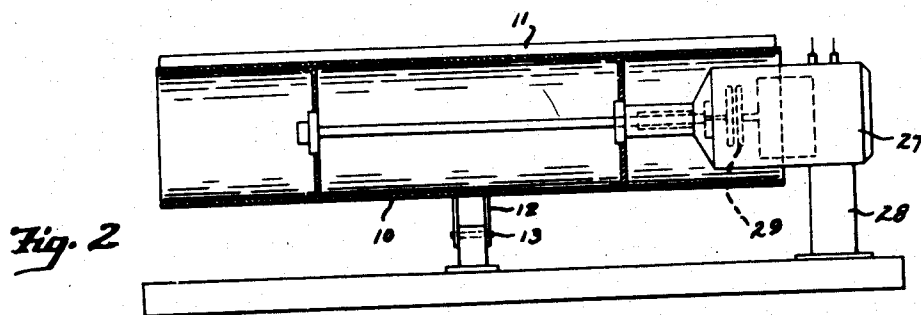
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2,430,285

ELECTROMAGNETIC IRONING MACHINE

Filed Dec. 23, 1940

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

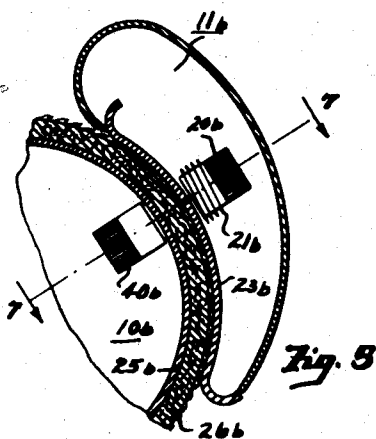


Fig. 5

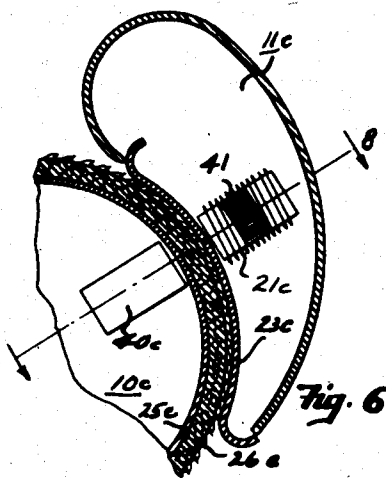


Fig. 6

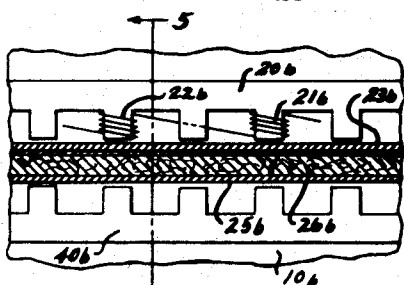


Fig. 7

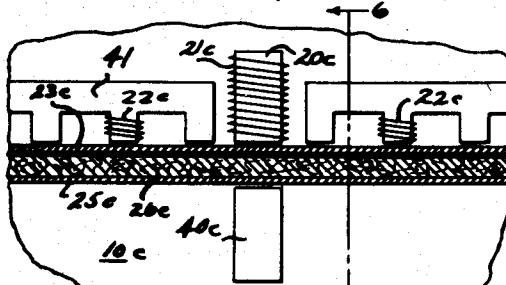


Fig. 8

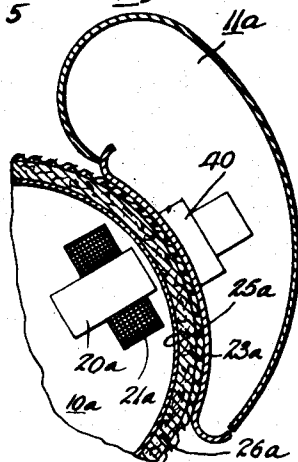


Fig. 4

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3 Sheets-Sheet 3

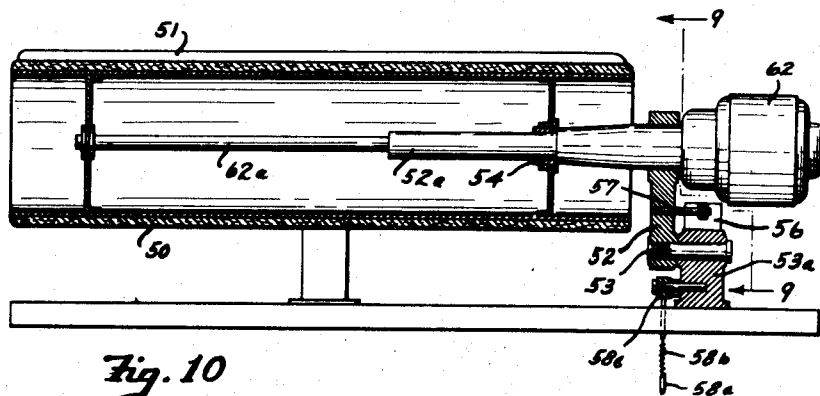


Fig. 10

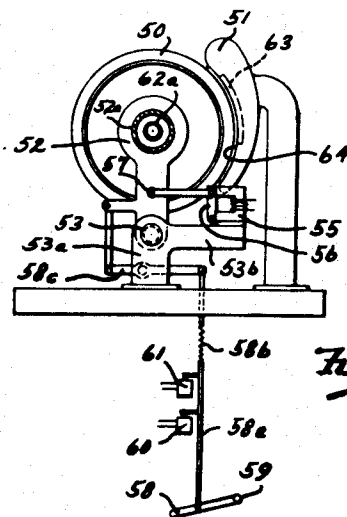
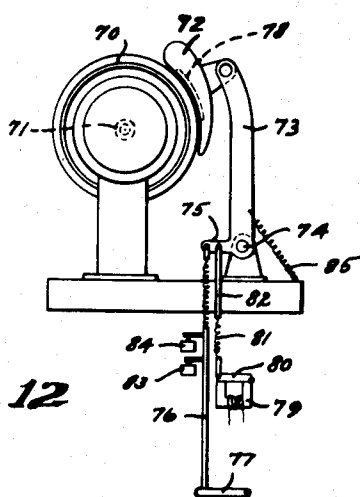


Fig. 9



UNITED STATES PATENT OFFICE

2,430,285

ELECTROMAGNETIC IRONING MACHINE

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18 Claims. (Cl. 219-19)

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This invention relates to domestic appliances and more particularly to ironing machines.

An object of this invention is to provide an ironing machine in which heating for ironing purposes is produced by heating currents induced within the machine.

Another object of this invention is to provide an ironing machine in which a pressure between the ironing members is produced by electromagnetic means.

Another object of this invention is to provide an ironing machine with electromagnetic means for inducing electromagnetic pull for pressing the ironing members against each other and for inducing heating currents within the machine.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form is clearly shown.

In the drawings:

Fig. 1 is a diagrammatic representation of an ironing machine embodying features of my invention;

Fig. 1a is a view similar to Fig. 1 showing a hand lever control instead of a pedal control;

Fig. 2 is an elevation taken transversely to Fig. 1, with the pedal means omitted;

Fig. 3 is a vertical cross-section of portions of the ironing members showing one form of electromagnetic means;

Fig. 4 is a view somewhat similar to Fig. 3 showing another form of electromagnetic means;

Figs. 5 and 6 are views somewhat similar to Fig. 3, but showing further modifications of the electromagnetic means, said figures being taken along the line 5-5 and 6-6 respectively of Figs. 7 and 8;

Figs. 7 and 8 are views taken along lines 7-7 and 8-8 respectively of Figs. 5 and 6;

Fig. 9 is a view somewhat similar to Fig. 1 but showing a modified form and taken along the line 9-9 of Fig. 10;

Fig. 10 is a view transverse to Fig. 9;

Fig. 11 shows the mechanism of Fig. 9 in open position;

Fig. 12 is a view similar to Fig. 1 but showing a further modification; and

Fig. 13 shows a wiring diagram to indicate the energization of the various electrical parts of the ironer.

Referring to Figs. 1 and 2, my ironing machine may include a rotatable ironing member 10 and a shoe member 11, which may be mounted for relative movement towards and away from each

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other. In the form shown in Fig. 1, the shoe member 11 is a movable member, carried by a lever 12 pivoted at 13. The lever 12 normally is urged away from the roll 10 by a tension spring 14, so that the members 10 and 11 normally tend to be spaced away from each other. A lever 15 is fixed to the lever 12, and is connected by means of a spring 16 to a vertically reciprocable rod 17, which is reciprocated by the pedal 18 fulcrumed at 19. The arrangement is such that, when the pedal 18 is forced downwardly by the user's foot, the spring 16 is stretched with sufficient force to overcome the tension of spring 14, and the shoe 11 is moved in proximity of the roll 10. After the shoe 11 has thus been moved near the roll 10 by the pedal 18, electromagnetic means are energized to produce a pressure between the members 10 and 11 sufficient for ironing purposes. In addition, the electromagnetic means induces heating currents within the ironing machine of a heating value sufficient for ironing purposes.

In the modification shown in Fig. 3, the electromagnetic means comprises the iron core 20 having the coils 21 and 22 near its poles. The coils 21 and 22 preferably are wound with glass insulation. The shoe member 11 has an ironing face 23 made of non-magnetic metal, and is provided with a heat insulating shield 24. The roll 10 is provided with an iron cylinder 25 covered with a pad 26. The arrangement is such that when the coils 21 and 22 are electrically energized with alternating current, eddy currents are produced within the ironing face 23 having a heating value sufficient to heat the shoe for ironing purposes. At the same time a magnetic pull is exerted between the electromagnet and the iron cylinder 25 of sufficient intensity to produce an ironing pressure between the shoe and the roll.

The roll 10 may be supported and rotated by a motor 27 rigidly held by the pedestal 28. Suitable speed reduction gearing 29 may be interposed between the motor rotor and the drive shaft of the roll.

Energization of the electromagnetic means may be made dependent on the relative movement of the members 10 and 11 towards and away from each other. Also, if the roll 10 is made rotatable by the motor 27 continuously connected to the roll 10, energization of the motor 27 also may be made dependent on the relative movement of the members 10 and 11 towards and away from each other. Pedal 18, if desired, may also control the above energizations. To this end, as shown in Fig. 1, switches 30 and 31 are placed

in a position to be closed when the pedal 18 is depressed, and the switch 32 is placed in a position to be closed when the shoe 11 is retracted to its fully retracted position. The switch 30, when closed, energizes the motor 27. The switch 31, when closed, energizes the coils 21 and 22. The switch 32, when closed, also energizes the coils 21 and 22 and thus is in parallel with switch 31.

If desired, in lieu of the above arrangement, an electromagnetic clutch may be interposed between the motor 27 and the roll, in which case the motor may be allowed to run continuously and the electromagnetic clutch may be engaged to drive the roll 10 by the closing of switch 30.

When it is desired to operate the ironing machine illustrated in Figs. 1, 2 and 3 a master hand switch 34 (Fig. 13) is closed. If desired, a pilot light 35 indicates the closing of switch 34. An article to be ironed is placed on the roll 10, and then the pedal 18 is depressed, thus bringing the shoe 11 near the roll 10 and closing the switches 30 and 31. This causes rotation of the roll 10 and creates a magnetic pull between the members 10 and 11 sufficient for ironing purposes. The energization of the coils 21 and 22, upon the closing of switch 31, also creates currents in the non-magnetic face 23 having a heat value sufficient for ironing purposes. When desired, the members 10 and 11 may be separated by allowing the pedal 18 to swing upwardly, at which time the switches 30 and 31 are opened, and the switch 32 is closed by the backward movement of the lever 12. This temporarily deenergizes the electromagnetic coils 21 and 22 and stops the roll 10. When the shoe 11 reaches its fully retracted position, switch 32 is closed and this reenergizes the coils 21 and 22 after the shoe 11 has been separated from the roll 10 a sufficient distance to render the magnetic pull ineffective to bring the members 10 and 11 together. It also allows the electromagnetic means to keep the ironing face 23 in a heated condition, in readiness for future use.

In the modification shown in Fig. 1a the hand lever 18a is pivoted to the lever 15a at 18b to allow a slight play between 18a and 15a, thus allowing the end of the lever 18a to be moved about an inch without imparting movement to 15a, but thereafter causing lever 15a to swing with lever 18a about the fulcrum 13a. The spring 14a is attached to lever 18a to pass the fulcrum 13a and thus produce the equivalent of a snap action in lever 18a. When lever 18a is moved to its lowest position, switches 30a and 31a are closed, causing the motor to turn and the shoe to be electromagnetically heated and pressed against the roll. When the lever 18a is raised the switches 30a and 31a are first opened to stop the motor and stop the magnetic pull. Thereafter the shoe is moved away from the roll and the switch 32a is closed to heat the shoe. With this construction the lever 18a stays either up or down and the hand need not hold it in either position. The wiring diagram is the same as for Fig. 1.

In the modification shown in Fig. 4, the roll 10a and shoe 11a are supported in an ironing machine substantially the same as that shown in Figs. 1 and 2. The electromagnetic means in this case may comprise one or more coils 21a stationarily mounted within the roll 10a. A suitable stationary iron core 20a is provided. The coils 21a and core 20a may be supported from the pedestal 28. The shoe 10a is provided with a non-magnetic metallic face 23a and carries a magnetic armature 40. The roll 10a includes a cylin-

der 25a made of non-magnetic metal and is provided with suitable padding 26a. The operation of the construction shown in Fig. 4 is substantially the same as that shown in Fig. 3, with the exception that the coils 21a are placed within the roll 10a and exert a pull on armature 40 within the shoe. When the coils 21a are energized upon depression of the pedal 18, or hand lever 18a, a magnetic pull is created between the core 20a and the magnetic armature 40 to create sufficient pressure between the ironing members for ironing purposes and at the same time eddy currents are induced in the face 23a of sufficient heating value for ironing purposes. The roll 10a may be rotated by a motor 27, and the wiring diagram shown in Fig. 13 is equally applicable to the construction shown in Fig. 4, it being understood that where more than one coil is used, to correspond to 21 and 22, such coil or coils may be placed in parallel or series, as preferred. It is to be noted that the same numerals have been used in Fig. 4 that have been used in Fig. 3 wherever possible, with the suffix "a" added. Whenever the numbers are so used, it is intended to indicate that similar construction and function are used. The roll 25a is not heated much faster than its radiating ability, because of its rotation.

In the modification shown in Figs. 5 and 7, numerals similar to those shown in Fig. 3 are used, with the suffix "b" added, it being intended by this numbering to indicate that parts similarly numbered have a somewhat similar construction and function. The shoe 11b is provided with a plurality of coils 21b, 22b, etc., and with an iron core structure 20b. A non-magnetic metal ironing face 23b is provided. The roll 10b is provided with a stationary iron core structure 40b. The roll 10b includes a non-magnetic metal cylinder 25b and cotton padding 26b. It will be readily understood, from the descriptions heretofore given, that when the pedal 18 (or lever 18a) is depressed, the coils 21b and 22b are energized to produce the magnetic pull and the heating currents heretofore described; and that when the pedal 18 (or lever 18a) swings upwardly, the coils 21b and 22b are temporarily deenergized until the shoe 11b has been fully retracted, at which time the coils are re-energized to maintain the face 23b in a heated condition.

In the modification shown in Figs. 6 and 8, the electromagnetic means has been made in two parts, one of which creates the magnetic pull, and the other of which creates the induced heating currents. Thus the shoe 11c is provided with a coil 21c and a plurality of coils 22c. The coil 21c is provided with an iron core 20c which cooperates with a magnetic armature 40c stationarily mounted within the roll 10 to produce the magnetic pull. An iron core structure 41 is provided for the coils 22c, so that when the coils 22c are energized, heating currents are produced within the non-magnetic metal face 23c. The roll 10c is constructed with a non-magnetic metallic cylinder 25c and padding 26c. However, if desired, the armature 40c may be omitted, and the cylinder 25c may be made of iron or other magnetic material to serve as the magnetic armature for magnet 20c, 21c. The operation of the construction shown in Figs. 6 and 8 is substantially the same in result as that heretofore described with respect to preceding figures. When the pedal 18 (or lever 18a) is depressed, the coils 21c and 22c are energized and the motor 27 rotates, at which time a magnetic pull is produced by the coil 21c, and heating cur-

rents are induced in the face 23c by the coils 22c. When the pedal 18 (or lever 18a) swings upwardly, the coils are deenergized, and when the shoe 11 is fully retracted, the coils 22c are reenergized by the switch 32. However, if desired, the coils 22c may be placed under the control of a separate switch, or under the control of master switch 34 only, in which case they are energized at all times that the switch 34 is closed to maintain the face 23 in a heated condition. The coil 21c is energized only when the pedal 18 (or lever 18a) is depressed, and need not be reenergized when the shoe 11 is completely retracted.

In Figs. 9, 10 and 11 an ironing machine is shown in which the roll 50 is movable towards and away from the shoe 51, the same being mounted on a suitable support or lever 52 which moves the roll towards the shoe 51 upon upward movement of the lever 52. Preferably this is accomplished by supporting the lever structure 52 at a fixed fulcrum 53, carried by the pedestal 53a and by mounting the roll on a bearing 54 formed on a cantilever extension 52a secured to the lever structure 52. An electromagnetic coil 55 may be carried by a fixed extension 53b of the pedestal 53a and may be provided with a movable magnetic armature 56, which is connected to the lever 52 at 57. When the coil 55 is energized, a magnetic pressure is induced between the roll 50 and the shoe 51. A pedal 58 is pivoted about the fulcrum 53, and, if desired, is provided with suitable connection 58a, including a yielding spring 58b and a fulcrumed lever 58c connected to the lever 52 to move the lever 52 when the pedal 58 is depressed. In addition, switches 60 and 61 are provided which close upon depression of the pedal, and energize respectively the coil 55, and a motor 62 carried by the lever 52 and drivingly connected with the roll 50 through shaft 62a for rotating the same. The shoe 51 may be provided with an electrical resistance 63 for heating the face 64 of the shoe.

In the operation of the structure shown in Figs. 9, 10 and 11, an article to be ironed may be placed on the roll 50 and the pedal 58 may be depressed. This moves the roll 50 near the shoe 51, energizes the coil 55 and the motor 62. Energization of the coil 55 creates a magnetic pull sufficient to provide the necessary pressure between the roll and the shoe 51 for ironing purposes. The motor 62 rotates the roll at this time.

In the modification shown in Fig. 12, a roll 70 is mounted on fixed bearings 71. The shoe 72 is mounted on a lever 73 fulcrumed at 74. The lever 73 is provided with a fixed extension 75 which is connected by a lever 76 to a pedal 77. The shoe 72 is provided with electrical resistance 78 for heating purposes. A coil 79 is part of an electromagnet including electromagnetic armature 80, which is connected by a spring 81 and lever 82 to the extension 75. Switches 83 and 84 are connected to the lever 76 and are closed whenever the pedal 77 is depressed.

In the operation of the structure shown in Fig. 12, when the pedal 77 is depressed, against the force of the tension spring 85, the switches 83 and 84 are closed thus energizing the coil 79 and an electric motor drivingly connected to the roll 70. The depression of the pedal 77 also brings the shoe 72 near the roll 70. The energization of coil 79 produces a magnetic pull on the armature 80, and through the spring structure 81, on the shoe 72 sufficient to provide the necessary pressure between the shoe 72 and roll 70 for ironing purposes.

If desired, suitable thermostatic control may be provided. In the modifications shown in Figs.

1, 2, 3, 4, 5, 7 and 13, a thermostat 90 may be placed on or near the face plate 23 and may break the circuit to the electromagnetic means when the plate 23 becomes heated to a predetermined temperature. I prefer to place the thermostat 90 in series with the switch 32, as indicated in Fig. 13, so that it controls the circuit only when the shoe is retracted, as this is the only time when the shoe is likely to be overheated; but the thermostat 90 may be placed in series with both switches 31 and 32 if desired. In the modifications shown in Figs. 6 and 8, the thermostat is placed in series with the heating electromagnetic means 22c; but not with the pulling coils 21c.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. An ironing device comprising two ironing members, each of said members having a magnetic element for drawing said members into ironing relationship, means carried by one of said members and including one of said magnetic elements for electromagnetically inducing currents having a heating value sufficient for ironing purposes in said device, means for deenergizing one of said magnetic elements to separate said ironing members, and means for heating one of said ironing members rendered automatically effective after they are separated beyond the effective heating magnetic field.

2. An ironing device comprising an ironing member having a face movable in a direction of the surface to be ironed, another ironing member, said ironing members being relatively movable toward and away from each other, electromagnetic means inducing currents in one of said members having a heating value sufficient for ironing purposes and creating a magnetic pull between said ironing members, means for deenergizing said electromagnetic means to separate said ironing elements, and provisions for heating one of said members rendered automatically effective after they are separated beyond effective heating magnetic field.

3. An ironing device comprising a rotatable ironing member, and a shoe ironing member, said ironing members being relatively movable toward and away from each other, electromagnetic means inducing currents in one of said ironing members having a heating value sufficient for ironing purposes, and creating a magnetic pull between said ironing members, means for deenergizing said electromagnetic means to separate said ironing elements, and means for heating one of said members rendered automatically effective after they are separated beyond effective heating and magnetic pull distance of said ironing members.

4. An ironing device comprising a rotatable ironing member and a shoe member having a non-magnetic metal ironing element, said ironing members being relatively movable toward and away from each other, electromagnetic means in proximity to said ironing element inducing heating currents in said element and creating a magnetic pull between said ironing members, means for deenergizing said electromagnetic means to separate said ironing elements, and means for heating one of said members rendered automatically effective after they are separated beyond

effective heating and magnetic pull distance of said ironing members.

5. An ironing device comprising a rotatable ironing member and a shoe member having a non-magnetic metal ironing element, said ironing members being relatively movable toward and away from each other, electromagnetic means in proximity to said ironing element inducing heating currents in said element and creating a magnetic pull between said ironing members, means for deenergizing said electromagnetic means to separate said ironing elements, means for interrupting the flow of current to said electromagnetic means to separate said ironing members and shoe member, and means for automatically causing the flow of current again after said members have been separated.

6. An ironing device comprising a rotatable ironing member, a shoe member, one of said members being mounted for relative movement toward and away from the other of said members, control means controlling said movement, electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and exerting an electromagnetic pull between said members, said control means automatically causing energization of said electromagnetic means when said members are brought together and providing for automatic deenergization of said electromagnetic means to separate said members.

7. An ironing device comprising a rotatable ironing member, a shoe member, one of said members being mounted for relative movement toward and away from the other of said members, control means controlling said movement, electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and exerting an electromagnetic pull between said members, and switch means operable upon said movement controlling the energization of said electromagnetic means.

8. An ironing device comprising a rotatable ironing member, a shoe member, one of said members being mounted for relative movement toward and away from the other of said members, movable means adapted to receive power from the operator and transmitting said power to cause said movement between said members, electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and exerting an electromagnetic pull between said members, and switch means for energizing said electromagnetic means upon movement of said members toward each other.

9. An ironing device comprising a rotatable ironing member, a shoe member, said shoe member being mounted for relative movement toward and away from the other of said members, movable means adapted to receive power from the operator and transmitting said power to cause said movement between said members, electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and exerting an electromagnetic pull between said members, and switch means for energizing said electromagnetic means upon movement of said members toward each other and for deenergizing said electromagnetic means for movement of said members away from each other.

10. An ironing device comprising a rotatable ironing member, a shoe member, said shoe member being mounted for relative movement toward and away from the other of said members,

movable means adapted to receive power from the operator and transmitting said power to cause said movement between said members, electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and exerting an electromagnetic pull between said members, and switch means for energizing said electromagnetic means upon movement of said members toward each other and for deenergizing said electromagnetic means for movement of said members away from each other and for energizing said electromagnetic means when said members are in a fully separated condition.

11. An ironing device comprising a rotatable ironing member, an electric motor drivingly connected to said ironing member, a shoe member, means for causing relative movement between said members, control means controlling the said movement, electromagnetic means inducing a magnetic pull between said members to augment the first named means, switch means energizing said electromagnetic means and said motor upon relative movement of said members toward each other, said control means closing and opening said switch means for relative movement of said members toward and away from each other.

12. An ironing device comprising a rotatable ironing member, an electric motor drivingly connected to said ironing member, a shoe member, said shoe member being relatively movable toward and away from the other, control means controlling the said movement of said relatively movable member, electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and inducing a magnetic pull between said members, and switch means energizing said electromagnetic means and said motor upon relative movement of said members toward each other.

13. An ironing device comprising a rotatable ironing member, an electric motor drivingly connected to said ironing member, a shoe member, said shoe member being relatively movable toward and away from the other, control means controlling the said movement of said relatively movable member, electromagnetic means inducing currents in said device having a heating value sufficient for heating purposes, and switch means energizing said electromagnetic means and said motor upon relative movement of said members toward each other.

14. An ironing device comprising a rotatable ironing member, a shoe member, one of said members being mounted for relative movement toward and away from the other of said members, movable means adapted to receive power from the operator and transmitting said power to cause said movement between said members, electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and exerting an electromagnetic pull between said members, and switch means for energizing said electromagnetic means upon movement of said members toward each other and for deenergizing said electromagnetic means for movement of said members away from each other.

15. An ironing device comprising a rotatable ironing member, a shoe member, one of said members being mounted for relative movement toward and away from the other of said members, movable means adapted to receive power from the operator and transmitting said power to cause said movement between said members,

electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and exerting an electromagnetic pull between said members, and switch means for energizing said electromagnetic means upon movement of said members toward each other and for deenergizing said electromagnetic means for movement of said members away from each other and for energizing said electromagnetic means when said members are in a fully separated condition.

16. An ironing device comprising a rotatable ironing member, an electric motor drivingly connected to said ironing member, a shoe member, one of said members being relatively movable toward and away from the other, control means controlling the said movement of said relatively movable member, electromagnetic means inducing a magnetic pull between said members, switch means energizing said electromagnetic means and said motor upon relative movement of said members toward each other, said control means closing and opening said switch means for relative movement of said members toward and away from each other.

17. An ironing device comprising a rotatable ironing member, an electric motor drivingly connected to said ironing member, a shoe member, one of said members being relatively movable toward and away from the other, control means controlling the said movement of said relatively movable member, electromagnetic means inducing currents in said device having a heating value sufficient for ironing purposes and inducing a magnetic pull between said members, and switch means energizing said electromagnetic means and said motor upon relative movement of said members toward each other.

18. An ironing device comprising a rotatable ironing member, an electric motor drivingly con-

nected to said ironing member, a shoe member, one of said members being relatively movable toward and away from the other, control means controlling the said movement of said relatively movable member, electromagnetic means creating a magnetic pull between said ironing members and inducing currents in said device having a heating value sufficient for heating purposes, switch means energizing said electromagnetic means and said motor upon relative movement of said members toward each other, said control means closing and opening said switch means for relative movement of said members toward and away from each other.

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