March 7, 1944. D. K. FERRIS 2,343,543

DOMESTIC APPLIANCE

Filed July 28, 1939 2 Sheets-Sheet 1

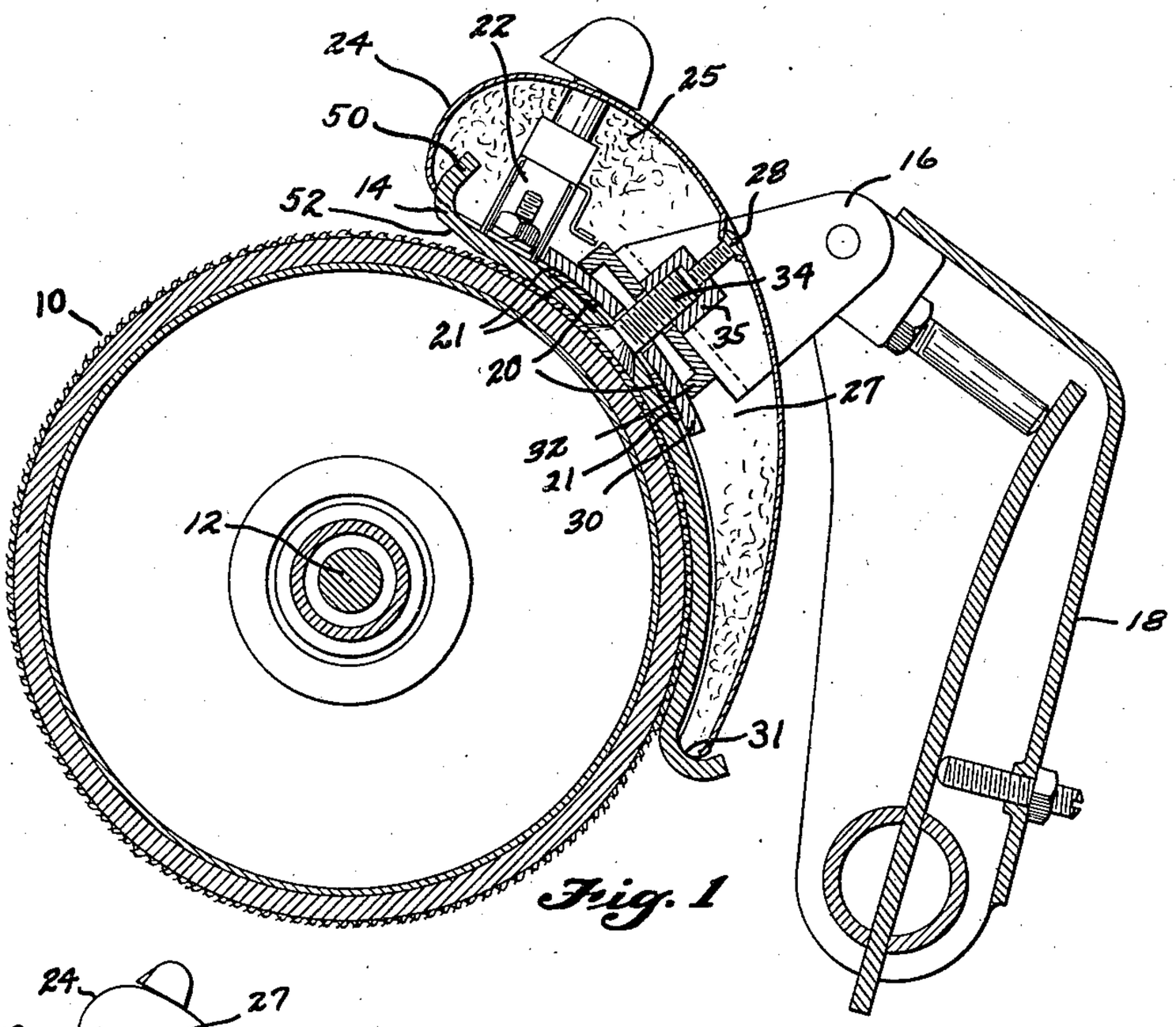

Fig. 1

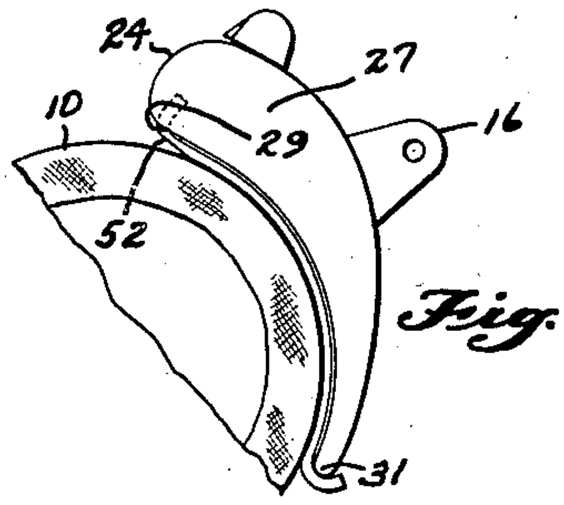

Fig. 7

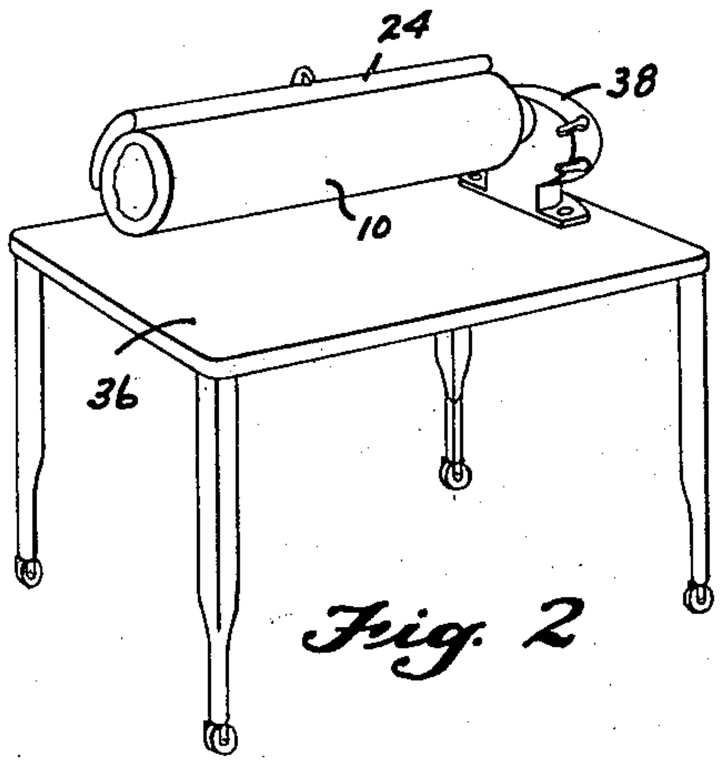

Fig. 2

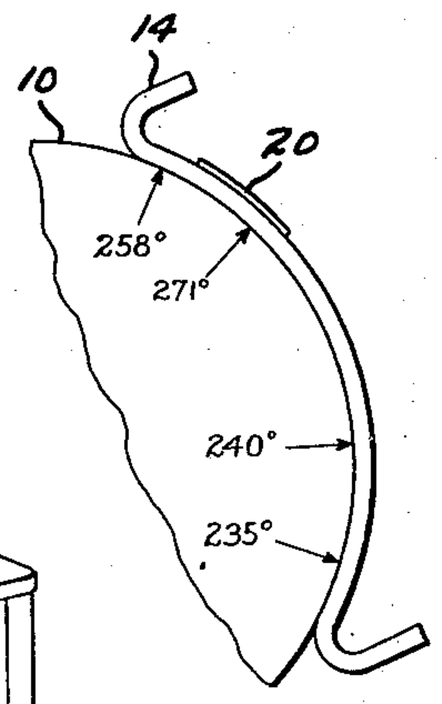

Fig. 5

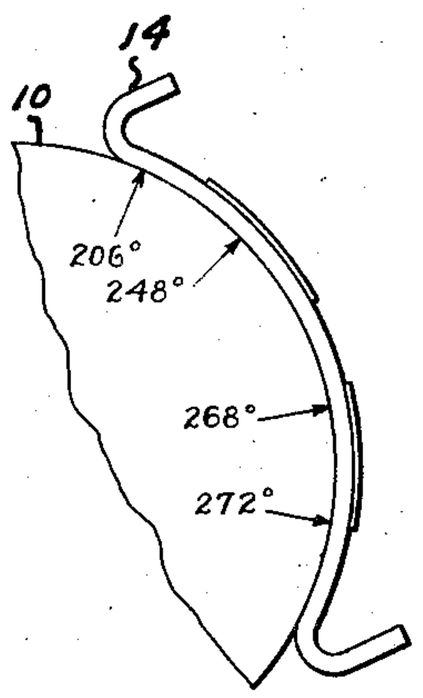

Fig. 6

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DOMESTIC APPLIANCE

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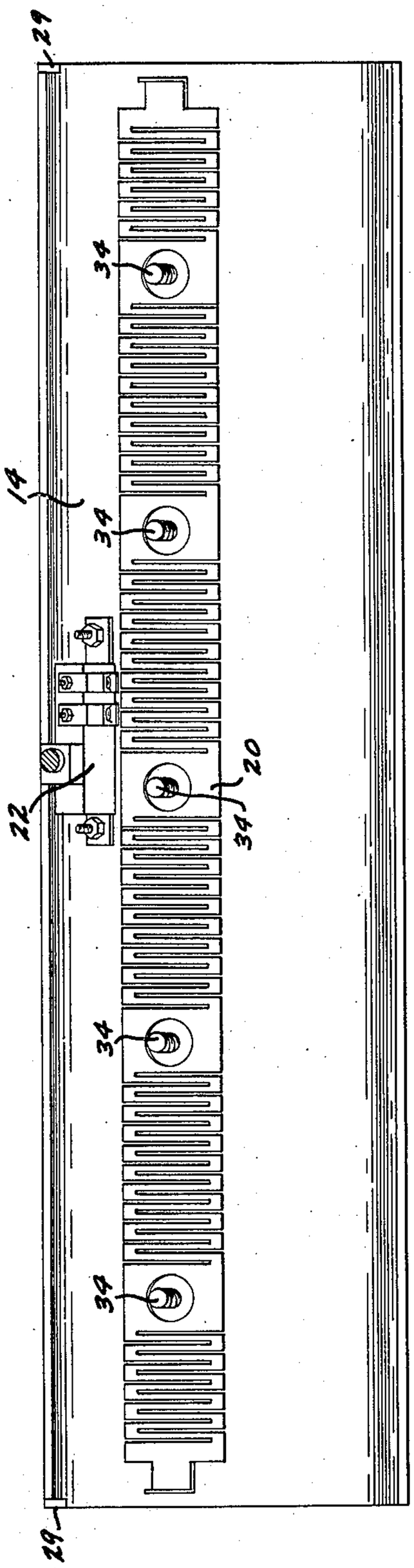

Fig. 3

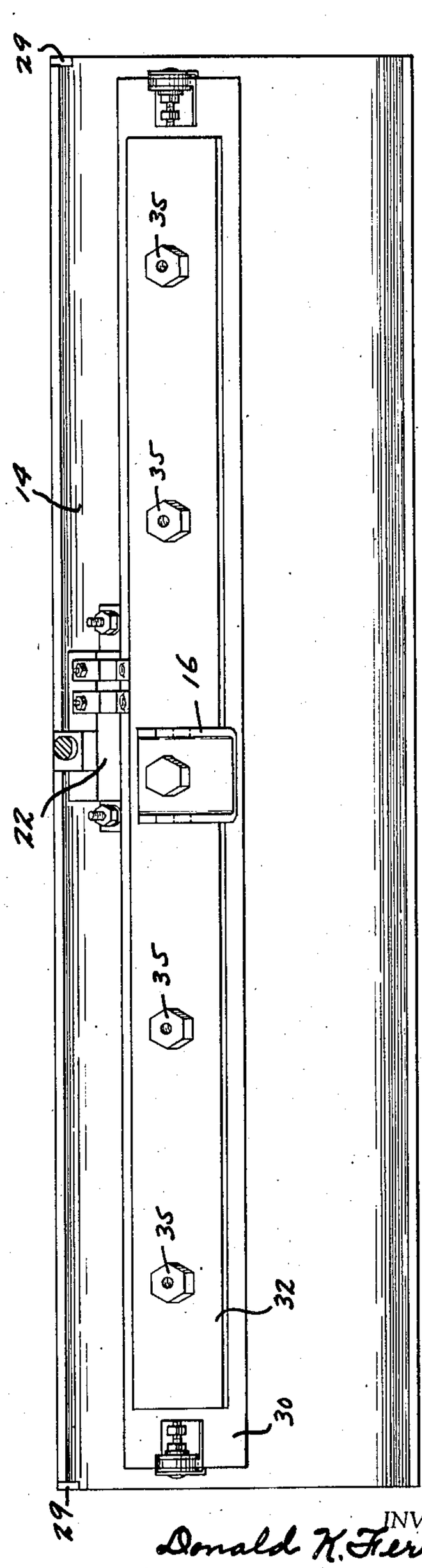

Fig. 4

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Patented Mar. 7, 1944

UNITED STATES PATENT OFFICE

2,343,543

DOMESTIC APPLIANCE

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Application July 28, 1939, Serial No. 287,119

3 Claims. (Cl. 38—66)

This invention relates to domestic appliances and more particularly to an improved ironing machine.

One object of this invention is to provide an improved shoe for use in an ironing machine.

Another object of this invention is to provide an ironing machine which may be heated to an ironing temperature in a minimum amount of time.

Still another object of this invention is to provide an ironer which may be operated continuously without any needless delay between the ironing of different articles.

Still another object of this invention is to provide an ironer in which the material to be ironed is subjected to a high initial temperature before the moisture is driven from the material.

A still further object of this invention is to provide a shoe in which the heating element is arranged in such a manner that the temperature under the trailing end of the shoe is lower than the temperature at the leading edge of the shoe during the normal ironing operation.

Still another object of this invention is to provide an improved guard for the leading edge of the shoe which also serves to enclose the heating element and the main body of the ironing shoe.

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 of the present invention is clearly shown.

In the drawings:

Fig. 1 is a vertical sectional view of a device embodying features of my invention;

Fig. 2 is a perspective view of an ironer equipped with an ironing shoe constructed in accordance with my invention;

Fig. 3 is a plan view showing the arrangement of the heating element with respect to the shoe;

Fig. 4 is a view similar to Fig. 3 showing the heating element secured in place;

Fig. 5 is a view showing the temperature distribution over a shoe constructed in accordance with my invention;

Fig. 6 is a view corresponding to Fig. 5 showing the temperature distribution in a conventional shoe not embodying my invention; and

Fig. 7 is an end view of the heating shoe with the guard in place.

Because of the limitations on the amount of current which may be passed through the wiring circuits ordinarily provided in private homes and the like, the wattage available for heating the ironer shoe and driving the motor of an ironer is definitely limited to a value which is very little more than that used in hand irons. Inasmuch as the ironer shoe is approximately five times as large as the ordinary hand-operated flat iron, the maximum available wattage per square inch in an ironing shoe, when the heat is applied over the entire shoe as taught by the prior art, is approximately one-fourth of the wattage normally used per square inch in a hand-operated flat iron.

In the ironing machines now on the market, the heating element is arranged so as to apply heat to the shoe substantially uniformly throughout the entire shoe area with the result that the wattage per square inch at any one point is necessarily low. With such an arrangement the relatively cold moist material fed to the ironer very quickly cools the leading edge of the ironing shoe to a temperature which is too low to iron out the wrinkles, but which is high enough to drive out an appreciable amount of moisture. Furthermore, with such an arrangement, the heat already absorbed by the material when it reaches the trailing edge of the shoe plus the heat applied to the trailing edge of the shoe tends to increase the temperature of the relatively dry material passing under the trailing edge to an unnecessarily high temperature. Apparently, this high temperature has very little useful effect on the material passing under the trailing edge of the shoe, as I have found that a much better ironing job is done by an ironing shoe in which all of the heat is applied to the leading edge of the shoe and no special effort is made to heat the trailing edge. By concentrating the heating element adjacent the leading edge of the shoe it is possible to maintain the leading edge of the shoe sufficiently hot during the entire ironing operation to properly set the material without any wrinkles before the moisture is completely driven out of the material. The heat conducted from the leading edge of the shoe to the trailing edge of the shoe through its substantially unbroken heat conducting face plus the heat in the material passing under the trailing edge of the shoe is sufficient to maintain the temperature under the trailing edge of the shoe sufficiently high for a good ironing job. By concentrating the applied heat to the leading edges of the shoe, thereby substantially doubling the wattage per square inch of surface under the heating element, one not only improves the ironing job but also very materially reduces the time required to bring the shoe up to ironing temperature. In many of the present ironers on the market, approximately

seven minutes is required to bring the ironing shoe up to the ironing temperature; whereas, with my improved arrangement, the leading edge of the shoe is brought up to ironing temperature in approximately three minutes' time and when the leading edge is thus heated, the ironer may be put into use. This compares favorably with the amount of time required for bringing an ordinary flat iron up to heating temperature. In view of this advantage, the entire ironing operation is speeded up since with the old arrangement it was necessary to allow extra time for the shoe to heat between each article of any size which was passed through the ironer. However, inasmuch as the time for properly heating my improved ironing shoe has been cut substantially in half, the amount of time which must be left between each ironing operation is likewise cut in half. In fact, with the new arrangement the time required between each ironing operation is no longer than the time ordinarily taken in preparing the next article for ironing.

Referring now to the drawings in which I have disclosed an ironer embodying my invention, the reference numeral 10 designates a conventional roller which is mounted on the main drive shaft 12 in the usual manner. The shoe 14 is carried by the link 16 supported on the main arm 18 which applies the pressure to the shoe. The construction of the shoe proper is much the same as the construction of any other shoe having a substantially unbroken heat conducting face throughout its ironing area, except for the fact that the entire heating element 20 (see Fig. 3) is placed in front of the center line of the shoe 14. The heating element 20 may be of any conventional construction and is insulated from the metal parts of the shoe mechanism in the usual manner by means of mica 21 or any other suitable material. For purposes of illustration, I have shown the heating element 20 in the form of a ribbon stamped from a single piece of material. The flow of current to the heating element is controlled by the thermostat 22 which also is of standard construction and needs no further explanation, since the construction and arrangement of the thermostat forms no part of the invention.

In order to prevent any one operating the ironer from coming in contact with the heated shoe 14, I have provided a sheet metal guard 24 which also serves to enclose the heated element and the thermostat.

The guard 24 comprises a drawn sheet metal member provided with a pair of end walls 27, the lower edges of which are spaced slightly from the upper surface of the shoe. As shown in Figs. 3, 4 and 7, notches 29 are provided in the turned-up portion of the shoe for positioning the guard. Only the end walls of the guard contact the shoe and each end wall contacts the shoe only at the notch 29 and at point 31 adjacent the trailing edge of the shoe 14 as shown in Figs. 1 and 7. By virtue of this construction, very little heat is transferred from the shoe to the guard. The space between the shoe 14 and the element 24 is filled with heat insulating material 25 such as glass wool, rock wool, or the like. The guard 24 is secured to the shoe by means of one or more screws 28. The heating element 20 is held in place by means of the strip 30 which, in turn, is held in place by the yoke 32. The yoke 32 is bolted to the shoe by means of a plurality of bolts 34 provided with nuts 35 into which the screws 28 are threaded. The ironer may be mounted on a table 36 which also supports a conventional driving mechanism 38 which supplies power for rotating the roller 10.

As best shown in Fig. 1 the main body of the shoe has a concave curvature which substantially conforms to the convex surface of the roller, and the upturned flange 50 at the leading edge has a convex curvature. Between the main concave portion of the shoe and the convex portion, I have provided a plane surface 52 which very materially facilitates ironing articles having buttons. I have found that with this improved construction the buttons pass under the ironing shoe very freely without straining or tearing the material to which the button is fastened. The plane surface 52 need not be a long surface and, in fact, I have found that the best results may be obtained by using the proportions shown in Fig. 1. Any increase in the length of this surface makes it more difficult to feed pleated materials and the like to the ironer as the point of contact between the shoe and the roll becomes too far removed from the front edge of the shoe. Whereas, with a short plane surface as shown in Fig. 1, this point of contact is very close to the front edge of the shoe.

As shown somewhat diagrammatically in Fig. 5, the heating element 20 is placed adjacent the leading edge of the shoe whereby the temperatures prevailing under the shoe during the ironing operation approximate the temperatures indicated. As shown, the highest temperature, which for purposes of illustration has been shown as 271° F., is considerably ahead of the central portion of the shoe where the material to be ironed still has much of its original moisture, and the temperatures at the trailing edge of the shoe are somewhat lower; whereas, with the old arrangement, the temperatures during similar test conditions were approximately those shown in Fig. 6. As pointed out hereinabove, I have found that the arrangement in Fig. 5, while not requiring any more wattage than the ironers now on the market, does a much superior ironing job in less time, due to the improved distribution of heat.

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. In an ironing machine, a roll, an arcuate ironing shoe having a substantially unbroken heat conducting face throughout its area and having its leading edge of substantially the same lateral extent as its trailing edge adapted to cooperate with said roll for ironing and pressing purposes, means for heating said shoe substantially throughout its leading edge only, said last named means comprising a heating element disposed adjacent the leading edge of said shoe and constituting the sole means for heating said shoe, and means to insulate the trailing edge of said shoe from loss of heat.

2. An ironing machine comprising a rotatable ironing member and an arcuate shoe having a substantially unbroken heat conducting face throughout its area and having its leading edge of substantially the same lateral extent as its trailing edge to be held relatively stationary against said rotatable ironing member to establish a leading edge and a trailing edge on either side of a center line of said face of said shoe, electric heating means for said face of said shoe

concentrated along a heating zone on one side of said center line and near said leading edge to cause articles being ironed to be carried by said rotatable ironing member past said heating zone to produce the maximum heating effect on said articles near said leading edge and to carry heat to said trailing edge, and heat retaining means for said trailing edge.

3. An ironing machine comprising a rotatable ironing member rotatable about an axis and a shoe having a substantially unbroken heat conducting face throughout its area and having its leading edge of substantially the same lateral extent as its trailing edge parallel to said axis to be held relatively stationary against said rotatable ironing member to establish a leading edge and a trailing edge on either side of a center line of said shoe, electric heating means for said shoe concentrated along a heating zone on one side of said center line near said leading edge and parallel to said axis to cause articles being ironed to be carried by said rotatable ironing member past said heating zone to produce the maximum heating effect on said articles near said leading edge and to carry heat to said trailing edge by heat conduction substantially throughout the width of said face, by said articles being ironed and by said rotatable ironing member.

DONALD K. FERRIS.