Jan. 23, 1940. F. A. MILLER 2,188,010

STEAM-DISCHARGING PRESSING IRON

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Fig. 1.

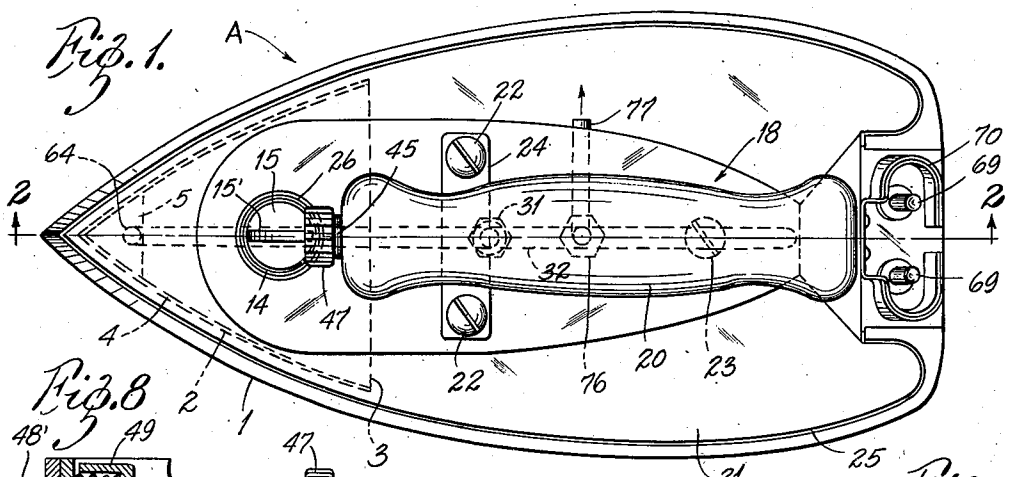


Fig. 8.

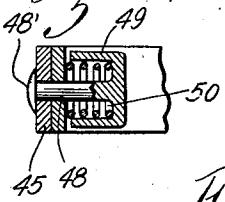


Fig. 2.

Fig. 9.

Fig. 10.

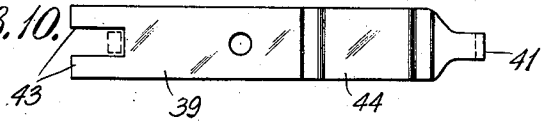
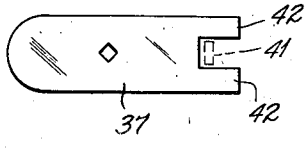


Fig. 11.



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Fig. 3.

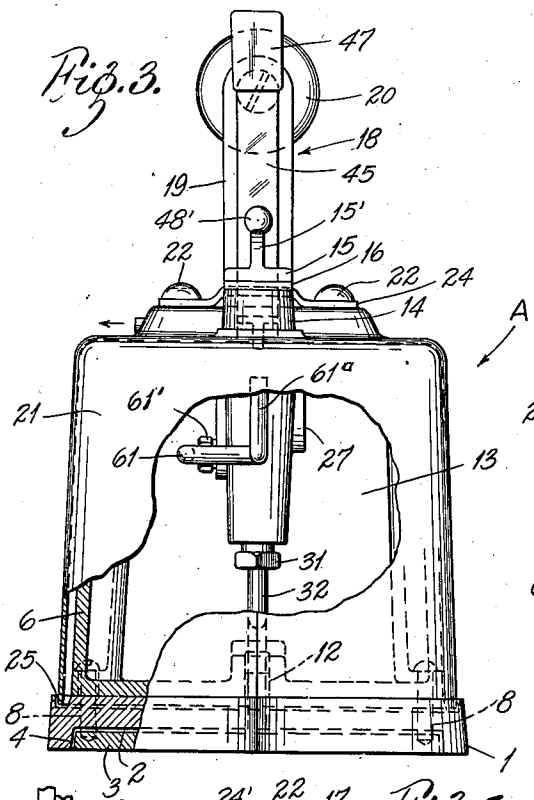


Fig. 4.

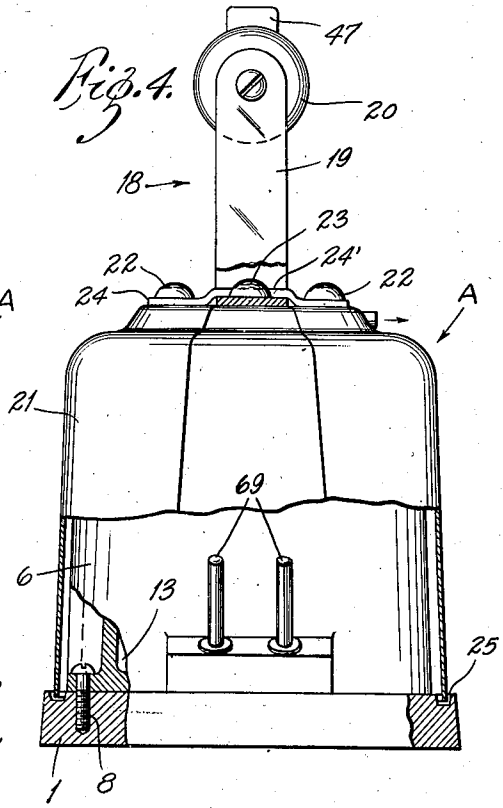


Fig. 5.

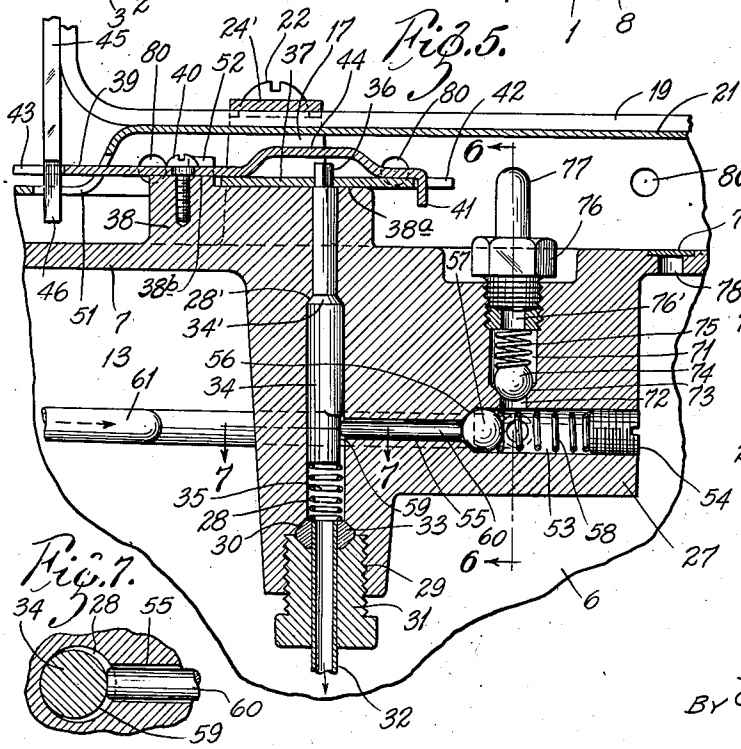


Fig. 6.

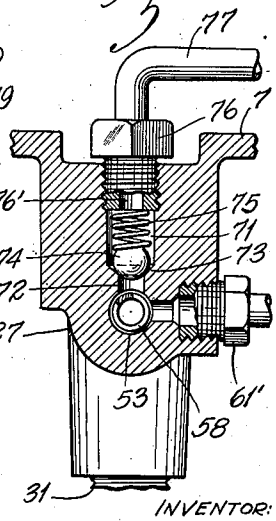


Fig. 7.

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UNITED STATES PATENT OFFICE

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STEAM-DISCHARGING PRESSING IRON

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Application May 14, 1937, Serial No. 142,532

5 Claims. (Cl. 38—77)

This invention relates generally to pressing irons, and more specifically to an improved pressing iron of the type adapted to discharge steam at or adjacent to the pressing face of the iron for the purpose of dampening articles being pressed, the predominant object of the invention being to provide an improved pressing iron of the type referred to which is of simple and economical construction, and which is provided with valve means for controlling the discharge of steam from the pressing face of the iron.

Pressing irons of the type to which this invention relates should, if such irons are to be capable of efficient use, be provided with means for controlling and preventing the discharge of steam from the iron. This is true because of the fact that in pressing certain fabrics varying amounts of steam are required, and also at times it is necessary to entirely cut off the discharge of steam from the iron so that it may be used as a dry iron. One object of the present invention, therefore, is to provide a steaming pressing iron which includes as an integral part of its structure a steam-controlling valve of such improved construction and arrangement that any amount of steam discharge, from the minimum to the maximum steam discharge of which the iron is capable, may be obtained by merely manipulating, before or during an ironing operation, a valve-operating element arranged in convenient relation with respect to the handle of the iron. Also, when desired the valve-operating element referred to may be actuated to close entirely the steam-controlling valve, and thereby completely cut off the discharge of steam from the iron when it is desired to use the iron as a dry iron.

Another important object of the invention is to provide a steaming pressing iron with improved safety means which serves to prevent steam pressure within the iron from building up to a dangerous point.

Fig. 1 is a plan view of the improved pressing iron.

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1.

Fig. 3 is a front elevation of the improved iron with a part thereof broken away to illustrate parts of the construction of the iron which would otherwise be concealed.

Fig. 4 is a rear elevation of the iron with parts shown in section.

Fig. 5 is an enlarged, fragmentary, vertical section illustrating the steam-controlling valve and the safety means of the iron.

Fig. 6 is a section taken on line 6—6 of Fig. 5.

Fig. 7 is a fragmentary, horizontal section taken on line 7—7 of Fig. 5.

Fig. 8 is an enlarged, horizontal section taken on line 8—8 of Fig. 2.

Fig. 9 is a fragmentary elevation of the operating element of the steam-controlling valve of the iron.

Fig. 10 is a plan view of a member which forms a part of the operating mechanism of the steam-controlling valve of the iron.

Fig. 11 is a plan view of another member which forms a part of the operating mechanism of the steam-controlling valve of the iron.

In the drawings, wherein is shown for the purpose of illustration, merely, one embodiment of the invention, A designates the improved iron generally. The iron A includes a base portion which is in the form of a plate 1, said base plate being of the conventional shape, as shown in plan in Fig. 1, and being of substantial thickness, as shown in Figs. 2, 3, and 4. The base plate 1, adjacent to the forward end thereof, is provided with a substantially triangular-shaped recess 2, the divergent sides of said recess being slightly curved in conformity with the shape of the base plate, and the walls of said recess at the divergent sides and at the rear end thereof being preferably inclined slightly from the true vertical, as shown in Figs. 1, 2, and 3.

Disposed in the recess 2 of the base plate is a plate 3 which is of less width and length than the recess, so that a substantially V-shaped space 4 is provided between the corresponding divergent walls of the recess 2 and plate 3, the divergent walls of the plate 3 being disposed in transverse parallelism with respect to the corresponding divergent walls of the recess. The rear wall of the plate 3 contacts with the rear wall of the recess, as shown to the best advantage in Fig. 2, and said plate 3 is secured to the base plate and in position in the recess 2 by rivets 3^a or other suitable fastening devices. The plate 3 is cut away at the forward portion of its upper face so as to provide a triangular-shaped space 5 between the top of the forward portion of said plate and the forward portion of the top wall of the recess, which triangular-shaped space communicates with the V-shaped space 4.

Mounted on the base plate 1 of the iron A is the body portion of the iron, which is made up of a hollow intermediate member 6 and a top member 7 (Fig. 2). The intermediate member 6 is secured to the base plate 1 by suitable fastening devices 8 (Figs. 3 and 4), and the top member 7

is secured to the upper portion of the intermediate member by fastening device 9. Also, to provide a fluid-tight joint between the lower face of the top member 7 and the upper face of the intermediate member 6 a suitable gasket 11 is interposed between these faces. Formed centrally and longitudinally in the lower wall of the intermediate member 6 is a narrow channel 12 which is open at the bottom face of said lower wall of the intermediate member, said channel at the forward end of the intermediate portion being of increased height, as indicated at 12^a in Fig. 2, and at the rear end of said intermediate member being of still greater height, as indicated at 12^b in said view. The top wall of the rear portion 12^b of the channel 12 is in the form of a relatively thick, inwardly and downwardly inclined extension 12^c, into which the top wall of the forward portion of the channel merges, as shown in Fig. 2. The hollow interior of the intermediate member 6 provides the water reservoir 13 of the improved iron, the top member 7 serving as a closure element for the water reservoir at the top thereof, as shown to the best advantage in Fig. 2.

The top member 7 includes an upwardly extended element 14 which provides a water inlet through which water is introduced into the water reservoir 13, said element 14 having a water passageway 14' formed therethrough which is enlarged and screw-threaded throughout its upper portion so as to receive the screw-threaded portion of a cap 15. The cap 15 is provided with an upwardly extended fin 15' to facilitate rotating the cap, and a gasket 16 is interposed between a portion of the cap and the top of the element 14 to provide a fluid-tight joint at that point.

The top member is provided also with a plurality of upwardly projected extensions 17, which aid in securing a handle 18 to the body portion of the iron. The handle 18 includes a substantially U-shaped supporting portion 19 which supports a grip 20 formed of wood or other material possessing low heat conductivity. Interposed between the lower, horizontal portion of the U-shaped supporting portion of the handle 18 and the top faces of the extensions 17 are portions of the top wall of a shell 21. The top wall portions referred to are provided with openings therein which register with screw-threaded openings formed in the extensions 17, and screws 22 and 23 which secure the handle 18 to the body portion of the iron extend through the openings of the top wall of the shell 21 and into the screw-threaded openings of the extensions 17. The screw 23 passes directly through an opening formed in the horizontal portion of the supporting portion 19 of the handle of the iron, so that a portion of the top wall of the shell 21 and a portion of the horizontal portion of the supporting portion 19 of the handle are secured between the top face of the associated extension 17 and the lower face of the head of the screw 23. However, the screws 22, which are spaced transversely of the iron, as shown in Fig. 1, and are associated with corresponding transversely spaced extensions 17, do not extend through the lower, horizontal portion of the supporting portion of the handle, but instead said screws 22 pass through openings formed through opposite end portions of a transversely extended metal strap 24 and through openings formed in the top wall of the shell 21 and into the screw-threaded openings of the associated extensions. The metal strap 24 is provided with a raised portion 24', as shown in Figs. 3 and 4, which embraces the horizontal portion of the supporting portion of the handle and thereby holds said supporting portion in its proper position.

The body portion of the shell 21 corresponds in shape with the body portion of the iron, and said shell embraces said body portion of the iron. Also, the lower edge portion of the shell is extended loosely in a channel 25 formed in the top face of the base plate of the iron. Due to this floating arrangement of the lower portion of the shell, no difficulties arise because of contraction and expansion of the base plate and shell in response to varying temperatures, as would be the case if the lower portion of the shell were securely anchored to the base plate. Additionally, the upper portion of the shell 21 is provided with an opening 26 through which the water inlet element 14 extends.

Formed on the top member 7 is a downwardly projected extension 27 in which a vertically disposed opening 28 is formed (Fig. 5), the upper portion of said opening being of less diameter than the lower portion thereof, and an inclined shoulder 28' being present where the portions of the opening of larger and smaller diameter meet. The opening 28 at its lower end communicates with a larger, screw-threaded opening 29, and an annular, inclined shoulder 30 is present at the junction of the opening 28 and the screw-threaded opening 29. The screw-threaded opening 29 receives a coupling element 31, which is preferably provided with a polygonal tool-receiving head and serves to secure a tube 32 to the extension 27 and in communication with the opening 28, said tube having associated therewith a collar 33 which is provided with annular, inclined faces that contact with the annular, inclined shoulder 30 and with an annular, inclined face within the upper portion of the coupling element 31.

Disposed within the opening 28 is an elongated valve 34, which corresponds in shape with the shape of said opening; that is to say, the lower portion of the valve is of greater diameter than the upper portion thereof, and an annular, inclined face 34' is present at the point where the larger and smaller portions of the valve meet. The annular, inclined face 34' of the valve is forced into fluid-tight contact with the annular, inclined shoulder 28' of the opening 28 by an expansible coil spring 35, which is interposed between the lower face of the valve and the top face of the collar 33 associated with the tube 32. Because of this arrangement the need for packing the valve to render it fluid-tight is eliminated.

At the upper end of the valve 34 a non-circular extension 36 is projected upwardly therefrom, and associated with said non-circular extension is an arm 37. The arm referred to is provided with an opening which corresponds in shape with the shape of the extension 36, and said extension extends through said opening of the arm so that movement of the rearmost end of the arm about the axis of the valve will result in rotation of said valve. The arm 37 rests on a shoulder 38^a formed on an extension 38 projected upwardly from the top member 7.

Associated with the arm 37 is a longer arm 39 which rests on a shoulder 38^b forming a part of the extension 38. The longer arm 39 is pivotally attached to the extension 38 through the instrumentality of a screw 40 seated in a screw-threaded opening formed in said extension, and at the rear end of said longer arm 39 a downturned finger 41 is provided which is located be-

tween spaced legs 42 formed on the arm 37. At its opposite, or forward, end the longer arm is provided with spaced, forwardly extended legs 43 similar to the legs 42 of the arm 37, and said longer arm is provided also with a bridge portion 44 which extends over the upper end of the non-circular portion 36 of the valve 34.

Pivotally attached to the forward upright leg of the U-shaped support 19 of the handle of the iron is a valve-actuating element 45. The valve-actuating element 45 is provided at its lower end with a downwardly extended finger 46 which is disposed between the spaced legs 43 of the longer arm 39, and at its upper end said valve-actuating element is provided with a finger piece 47 formed of Bakelite or other suitable material of low heat conductivity. The pivotal connection of the valve-actuating element 45 is provided by a pin 48 (Fig. 8) which is riveted over at its forward end to provide a head 48', and at its rear end is provided with a cup 49 that embraces an expansible coil spring 50. The coil spring 50 contacts at its opposite ends with the forward face of the rear wall of the cup 49 and with the rear face of the forward upright of the U-shaped handle support. Because of such arrangement the coil spring tends to move the cup and the pin rearwardly, with the result that the valve-actuating element 45 is drawn into close frictional contact with the forward face of the forward upright portion of the U-shaped handle support 19, whereby said valve-actuating element will be maintained by such frictional contact in various positions to which it is adjusted. The top wall of the shell 21 is provided with an opening 51 through which portions of the arm 39 and the valve-actuating element 45 extend.

From the foregoing it is obvious that movement of the upper end of the valve-actuating element in either direction about its pivot will, because of the presence of the finger 46 between the spaced legs of the longer arm 39, swing said longer arm about its pivot 40 to move the rear end of the longer arm transversely of the iron. It is likewise plain that such movement of the rear end of the longer arm 39 will, because of the presence of the finger 41 of said longer arm between the spaced legs of the arm 37, move the rear end of said arm 37 about the axis of the valve 34, with the result that the valve will be rotated within the opening 28. In order to limit the movement of the valve-actuating element 45 and the arms 39 and 37 associated therewith, the extension 38 of the top member 7 is provided with upstanding stop lugs 52 with which the arm 39 contacts when its opposite limits of movement are reached.

Formed in the extension 27 of the top member 7 is a port 53 which is closed at its rear end by a plug 54, and communicating with this passageway at its forward end and with the valve opening 28 is a passageway 55 of smaller diameter. At the point where the port 53 and the passageway 55 meet, an annular, inclined shoulder 56 is provided which constitutes a valve seat for a ball valve 57. The ball valve 57 is forced toward the shoulder 56 by a coil spring 58 which is arranged within the port 53 and is interposed between the ball valve and the forward face of the plug 57. The valve 34 adjacent to its lower end is provided with a cam face 59 with which an end face of a rod 60 contacts, said rod being disposed in the passageway 55 and its opposite end being arranged in contact with the ball valve 57. Arranged in association with the extension 27 of the top member 7 is a tube 61, which is connected to said extension by a coupling element 61' and communicates with the port 53. The forward end portion of the tube 61 is curved upwardly, as shown at 61a in Figs. 2 and 3, and the open, upper end of this curved tube portion is disposed a slight distance below a solid portion of the top member 7.

The tube 32 heretofore referred to as communicating with the valve opening 28 is connected in communication with a tube 62 by means of suitable coupling means 63 which anchors the connected ends of the tubes 32 and 62 to the portion 12c of the intermediate member 6 of the body portion of the iron. The tube 62 extends longitudinally of the channel 12 formed in the intermediate member of the body portion of the iron, and the forward end portion of said tube is curved upwardly slightly, as indicated at 62', and extends downwardly from said curved portion into an opening 64 formed in the base plate 1 of the iron, so that said tube 62 communicates with the triangular space 5 and the V-shaped space 4 of said base plate.

Arranged in a recess 65 formed in the base plate of the iron at the upper face thereof is a heating element assembly which includes a resistance wire 66 located between layers of mica 67. Also, if desired, a sheet of asbestos 68 may be arranged at the top of the heating element assembly. The resistance wire 66 of the heating element assembly is electrically connected to suitable terminals 69, which are suitably secured to the intermediate member 6 of the body portion of the iron, as shown in Fig. 2, and these terminals have associated therewith a suitable guard 70 that is attached to the shell 21.

Formed vertically in the extension 27 of the top member 7 of the body portion of the iron is an opening 71, said opening being screw-threaded throughout an upper portion thereof. At its lower end the opening is of substantially reduced diameter, as indicated at 72 in Figs. 5 and 6, and an annular, inclined valve seat 73 is provided at the point where the larger and smaller portions of said opening meet. Arranged for movement toward and from the valve seat 73 is a ball valve 74, said ball valve being urged toward the valve seat by a coil spring 75 which is interposed between the ball valve 74 and the lower face of a coupler 76 that is screwed in the screw-threaded upper end of the opening 71. The coupler 76 has a passageway 76' formed therethrough which communicates with the opening through a tube 77, said tube being bent so that it extends transversely of the iron through an opening formed in the shell 21. Also, the top member 7 of the body portion of the iron has an opening 78 formed therethrough (Figs. 2 and 5) which is sealed by a frangible disk 79.

In the use of the improved iron disclosed herein a body of water W is introduced into the water reservoir 13 of the iron through the water inlet element 14, and the heating element assembly is connected to a source of electrical energy by a suitable extension cord (not shown). With the iron so connected to a source of electrical energy, the heating element assembly will heat the water in the water reservoir 13 to produce steam, and said steam will pass downwardly into the open, upper end of the forward end of the tube 61 and move through said tube. As already stated herein, the tube leads to the port 53 in the extension 27 of the top member of the body portion of the iron, and by moving the

upper end portion of the valve-actuating element 45 with the thumb of the hand that grasps the grip 20 of the handle of the iron the valve 34 is rotated. Such rotation of the valve causes the cam face 59 of the valve 34 to move the rod 60 longitudinally of the passageway 55, and this results in the ball valve 57 being moved away from its seat 56. This permits steam to pass from the port 53 through the passageway 55 to the valve opening 28, and from said valve opening through the tubes 32 and 62 to the triangular space 5, from which space 5 the steam is discharged at the pressing face of the iron from the V-shaped space 4. It is to be noted that as the steam passes through the tube 62, which is in very close proximity to the heating element assembly and hence is maintained quite hot, said steam is superheated so as to convert into steam any particles of water carried along by the steam. If, however, any such particles of water should not be converted into steam as explained, they will be trapped by the curved portion 62' of the tube 62 and hence will be prevented from being discharged from the pressing face of the iron. It is obvious, of course, that eventually any particles of water trapped by the curved portion 62' of the tube 62 will be converted into steam by the heat applied to said tube 62.

It is plain, in view of the foregoing, that any amount of steam desired by the operator may be discharged at the pressing face of the iron by merely manipulating the valve-actuating element 45, and it is equally plain that discharge of steam at the pressing face of the iron may be completely shut off by moving the valve-actuating element 45 to the vertical position, when the ball valve 57 will be seated against its seat 56, as shown in Fig. 5.

The coil spring 75 associated with the ball valve 74, which constitutes a safety valve, will successfully resist a steam pressure of one and one-half pounds per square inch or less. If, however, the steam pressure within the iron rises above one and one-half pounds per square inch, the ball valve 74 will be raised off of its seat by such pressure to permit the excess pressure to escape through the tube 77. Also, as an additional safety measure, the frangible disk 79 is provided, this disk being adapted to be ruptured by a steam pressure of fifteen pounds per square inch to permit the excessive pressure to escape from the interior of the iron. The steam which escapes when the frangible disk 79 is ruptured is discharged into the upper portion of the shell 21, and to permit said steam to pass from the shell the upper portion thereof is provided with apertures 80 formed in a wall portion of the shell. It is to be noted that steam that escapes from the tube 77 and through the apertures 80 is discharged from the far side of the iron away from the body of an operator of the iron.

It is obvious, of course, that the electrical heating assembly illustrated in the drawings and referred to above, in addition to serving as the means for producing steam from the water in the water reservoir of the improved iron, acts also to heat the base of the iron in the manner common to electrically heated pressing irons. Also it is plain that the space between the top of the shell 21 and the upper portion of the body portion of the iron serves to insulate the handle of the iron from heat given off by said body portion of the iron, the heat which moves into this space being discharged through the openings 80 whereby said heat is deflected from the handle.

I claim:

1. A steaming pressing iron including a base having a pressing face, a water reservoir within said iron adapted to receive a body of water, electrical heating means for producing steam from the body of water within said reservoir, and means for conducting steam produced within said reservoir to said base, said base being provided with a recess formed therein, and a plate disposed in said recess, certain of the faces of said plate being spaced from corresponding faces of said recess to provide a substantially V-shaped steam discharge opening at the pressing face of said base with which said steam-conducting means communicates.

2. A steaming pressing iron including a base having a pressing face, a water reservoir within said iron adapted to receive a body of water, electrical heating means for producing steam from the body of water within said reservoir, and means for conducting steam produced within said reservoir to said base, said base being provided with a recess formed therein, and a plate disposed in said recess, certain of the faces of said plate being spaced from corresponding faces of said recess to provide a substantially V-shaped steam discharge opening at the pressing face of said base and a space that communicates with said V-shaped steam discharge opening, and said steam-conducting means being in communication with said space and said V-shaped steam discharge opening.

3. A steaming pressing iron including a base having a pressing face, a water reservoir within said iron adapted to receive a body of water, electrical heating means for producing steam from the body of water within said reservoir, and means for conducting steam produced within said reservoir to said base, said base being provided with a triangular recess formed therein, and a triangular plate disposed in said recess, certain of the faces of said plate being spaced from corresponding faces of said recess to provide a substantially V-shaped steam discharge opening at the pressing face of said base and a triangular-shaped space that communicates with said V-shaped steam discharge opening, and said steam-conducting means being in communication with said space and said V-shaped steam discharge opening.

4. A steaming iron including a base portion having a pressing face, a main body portion providing a boiler within said iron adapted to receive a body of water, said boiler being disposed directly above said base portion, heating means for producing steam from the body of water within said boiler, a conductor for conducting steam produced within said boiler to a steam discharge opening in said base portion, an imperforate portion of said conductor being disposed in a channel extending between the lower portion of said boiler and a portion of said base, and said imperforate portion of said conductor being directly exposed to said heating means whereby steam passing through said imperforate conductor portion is superheated and is discharged directly from said imperforate conductor portion through the steam discharge opening in the base portion of the iron.

5. A steaming iron including a base portion having a pressing face, a main body portion providing a boiler within said iron adapted to receive a body of water, said boiler being disposed directly above said base portion, heating means for producing

steam from the body of water within said boiler, a conductor for conducting steam produced within said boiler to a steam discharge opening in said base portion, an imperforate and substantially straight portion of said conductor being disposed in a channel formed in the lower portion of said body portion and open at the bottom thereof and said imperforate portion of said conductor being directly exposed to said heating means whereby steam passing through said imperforate conductor portion is superheated and is discharged directly from said imperforate conductor portion through the steam discharge opening in the base portion of the iron.

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