May 22, 1956 M. M. KISTNER 2,746,183

VALVE FOR STEAM IRON

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FIG. 1

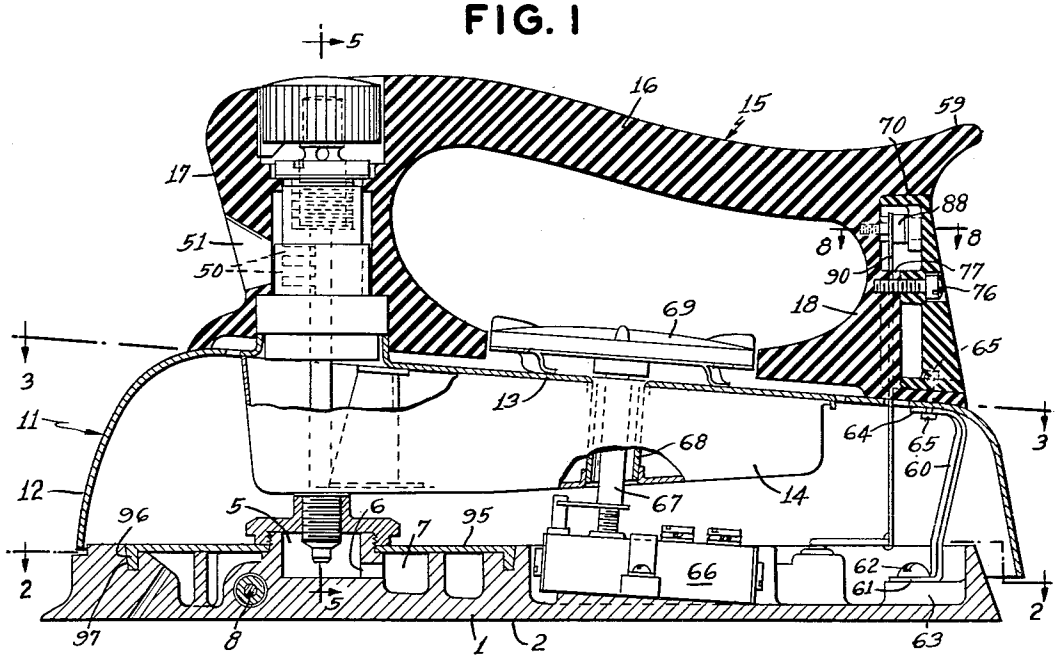


FIG. 2

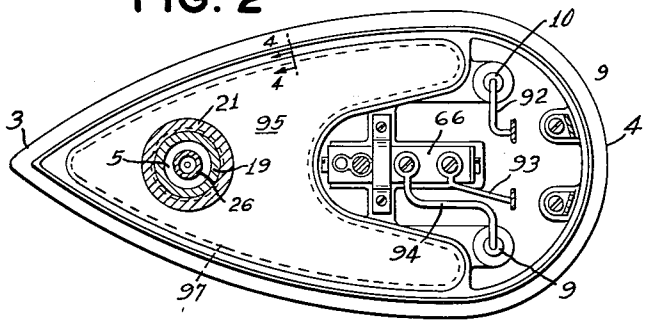


FIG. 10

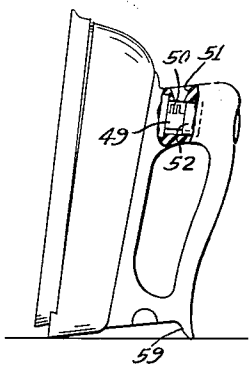


FIG. 3

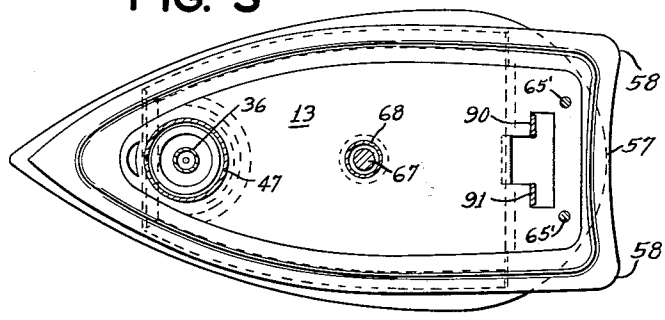
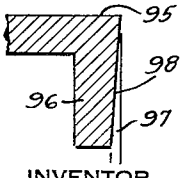


FIG. 4



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FIG. 5

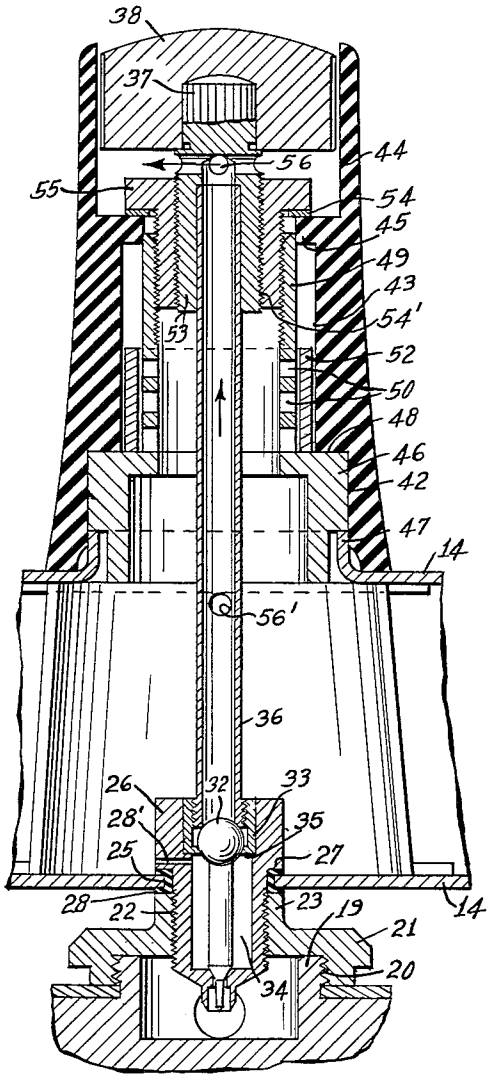


FIG. 6

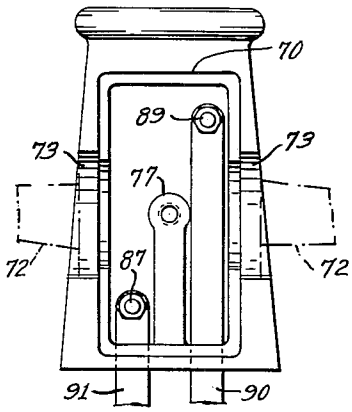


FIG. 7

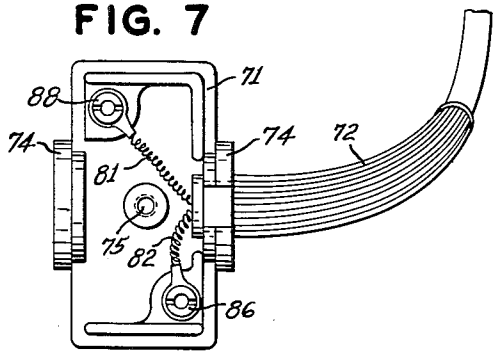


FIG. 8

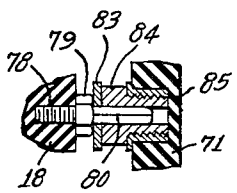
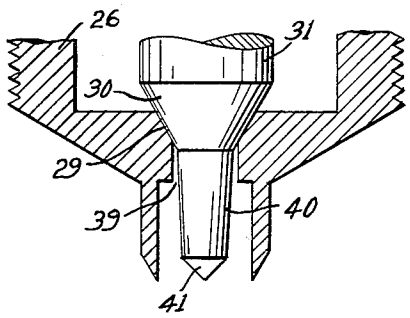


FIG. 9



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United States Patent Office 2,746,183 Patented May 22, 1956

2,746,183

VALVE FOR STEAM IRON

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Application February 21, 1951, Serial No. 211,998

3 Claims. (Cl. 38—77)

This invention relates to steam irons and is an improvement over the iron disclosed and claimed in my prior Patent No. 2,384,839, granted September 18, 1945.

An iron of the type disclosed in said patent consists of a sole plate having a heating element and channels through which steam passes to superheat the steam, a reservoir to deliver water to the sole plate, with valve control means, and a handle.

In an iron constructed specifically as disclosed in my prior patent with the reservoir and sole plate connected at the nose end by means which forms a part of the valve assembly, the parts cannot be readily disassembled. Therefore, if the iron fails to properly function, it is necessary to return it to the factory for repair and the owner is without the services of the iron for an indefinite period.

In the present invention I provide an improved and simplified means for securing the reservoir to the sole plate at the nose end of the iron. The construction herein disclosed permits disassembly of an iron by a dealer and replacement of one of the parts, such as the sole plate assembly, the valve assembly or the like. This permits the dealer to repair an iron or replace a worn or defective part with a minimum of inconvenience to the user.

I also provide improved valve means in which the construction is simplified, a better functioning valve is provided, and filling of the reservoir is made easier. The iron is provided with a filling opening on the front of the handle and is filled when it is in an up-ended position. A tubular member extends through the front leg of the handle and communicates with the top of the reservoir. This member houses the valve stem which has an operating knob flush with the top of the handle. The valve stem is a tubular member having suitable openings therein for venting air from the reservoir. Surrounding the tubular member I provide a sleeve which, when the iron is up-ended, exposes openings in the tubular member in alignment with the opening in the handle for admission of water. When the iron is in normal operating position, this sleeve falls by gravity to a position covering these openings.

A further feature of the invention is the provision of a reversible cord attaching device. Some users of irons prefer to have the cord extending from the right side and others prefer to have it extending from the left side. Heretofore it was necessary to replace the attaching member on the end of the cord to reverse it from one side to the other. I provide a member which may be mounted in either of two positions and which has its terminal connections so arranged that they will engage the terminals on the back of the iron in either position.

In the accompanying drawings I have shown one embodiment of the invention. In this showing:

Fig. 1 is a vertical, sectional view of the iron;

Fig. 2 is a horizontal, sectional view on line 2—2 of Fig. 1;

Fig. 3 is a similar view on line 3—3 of Fig. 1;

Fig. 4 is a detailed, sectional view on line 4—4 of Fig. 2;

Fig. 5 is an enlarged vertical, sectional view on line 5—5 of Fig. 1;

Fig. 6 is a view of the rear leg of the handle of the iron with the cord connector removed, but indicated in dotted lines;

Fig. 7 is a front elevation of the inner face of the connecting member on the end of the cord;

Fig. 8 is a detailed, sectional view on line 8—8 of Fig. 1;

Fig. 9 is an enlarged view of the valve seat and cooperating valve member; and

Fig. 10 is a side view of the iron in up-ended position.

Referring to the drawings, the reference numeral 1 designates the sole plate of the iron. The sole plate may be of similar construction to that shown in my prior patent. It is provided with a polished ironing face 2 and may be of the general shape shown in Figs. 2 and 3 of the drawings providing a nose 3 and a heel 4.

The explosion chamber 5 is arranged in the sole plate, the explosion chamber receiving water from a reservoir arranged over it in a manner to be hereinafter described. The explosion chamber is provided with an outlet 6 communicating with a series of passages 7 through which the steam passes, for super-heating, to outlets (not shown) for discharge of steam on to the fabric being ironed. In the sole plate there is arranged a heating element 8 which is of rod-like form and structure and which extends from two points 9 and 10 adjacent the heel of the iron substantially parallel to the sides, forming a loop around the explosion chamber as disclosed in my prior patent.

A shell 11, suitably shaped to form substantially vertical walls 12 and a flat top 13, is mounted over the sole plate. A reservoir 14 for water is arranged within the shell. A handle 15, consisting of a horizontal or gripping portion 16, a front leg 17 and a rear leg 18, is mounted over the shell 11.

As shown in Fig. 1 of the drawings, the front leg 17 of the handle is in alignment with the explosion chamber 5 and the valve mechanism to control the flow of water from the reservoir to the explosion chamber is mounted in the handle and also serves to secure the handle, shell and reservoir to the sole plate at the nose end of the iron. These parts are shown in greater detail in Figs. 5 and 9 of the drawings. As shown, a boss 19 extends above the surface of the sole plate surrounding the explosion chamber and this boss is provided with external threads 20. These threads are adapted to be engaged by the threads of a connecting nut 21. The connecting nut is provided with a central threaded opening 22 extending through a tubular portion 23 of the nut. The bottom 24 of the reservoir 14 is provided with an opening 25 and a sleeve nut 26 is arranged within the reservoir and received in the nut 21. As shown, the sleeve nut is provided with threads to engage the threads 22 and is enlarged at its upper portion to form a shoulder 27. A suitable packing or gasket 28 is arranged around the opening 25, between the upper face of the connecting nut 21 and the shoulder 27. Above the bottom of reservoir 24, the nut is provided with ports 28' to permit water to flow from the reservoir into the bore 34 of tubular nut 26.

Bore 34 is provided with a valve seat 29 to receive a valve member 30. Valve member 30 is formed on a stem 31 and the upper end of this stem carries a ball 32. Ball 32 is received in a housing 33 and this housing is movable in an enlargement in the upper end of the bore 34 of tubular nut 26. Its downward movement is limited by the shoulder 35 at the bottom of the enlargement of the bore. Housing 33 is in turn threaded to a tubular or hollow valve stem 36 which extends upwardly through the reservoir and handle.

The valve and valve seat are constructed to increase the flow of water as the valve is opened. As shown (see Fig. 9) the valve seat **29** and the valve portion **30** of the stem are at substantially the same angle. Beneath the valve seat the nut **26** has a bore **39** which is cylindrical, whereas the portion **40** of the valve stem beneath the valve member **30**, which extends through this bore, tapers toward the lower end **41**. Thus, as the valve is moved upwardly, the space between the lower end **40** of the stem and the bore **39** becomes progressively greater.

The front leg **17** of the handle is recessed to receive the parts of the valve mechanism and water supply. As shown, at the bottom of the leg the recess is cylindrical as at **42** and in the center portion of the leg it is also cylindrical, but of slightly smaller diameter as at **43**. The upper portion of the leg is also provided with a cylindrical recess **44** and a flange **45** is formed between the portions **43** and **44** of the recess.

A water intake housing **46** is mounted on the top of the reservoir and is preferably secured to a flange **47** of the reservoir by brazing. This housing engages shoulder **48** formed at the junction of the sections **42** and **43** of the bore when the parts are assembled. It carries a tubular member **49** extending upwardly therefrom and this tubular member is provided with a plurality of openings **50** for filling the reservoir. As shown (see Fig. 1) the front surface of the leg **17** is provided with an opening **51** in alignment with the openings **50** by means of which water can be poured into the reservoir when the iron is in the up-ended position shown in Fig. 10 of the drawings. A sleeve **52** surrounds the tubular member **49**. When the iron is in the normal position, this sleeve falls by gravity to the position shown in Figs. 1 and 5 to cover the openings **50**. When the iron is up-ended (as shown in Fig. 10) the tubular member **49** is at a slight incline and sleeve **52** moves to what is normally the upper end of this tubular member, thus uncovering the openings **50** to permit filling.

An externally threaded control member **53** is secured to the upper end of valve stem **36**. A hold-down nut **55** engages the threads of the control member. A washer or gasket **54** is arranged between the hold-down nut and the annulus or flange **45**. When the nut **55** is in engagement with its seat, the parts, that is the sole plate, reservoir and handle, are secured together at the nose end of the iron. Hold-down nut **55** is provided with a centrally threaded bore **54'**, the threads of which are engaged by threads of the control member **53**. The upper end of control member **53** is provided with a knurled portion **37** which receives the operating button or disc **38**. When the disc is turned, the valve **30** is moved toward or away from the seat **29** by engagement of the threads of control member **53** with the threads of the hold-down nut **55**. The top of disc **38** is substantially flush with the top of the handle, and the handle is provided with recesses at each side to permit access to the disc to turn it.

As shown, tubular valve stem **36** is provided with an opening **56'** near its lower end and control member **53** is provided with a series of openings **56** communicating with the space beneath the disc **38**. The handle is also loosely received in the recess **44**, thus providing means for venting of air or steam from the reservoir when the iron is filled. By venting the steam from this point, where no metal parts are, condensation on the exterior of the iron is avoided.

As shown in Figs. 2 and 3, the shell extends rearwardly beyond the sole plate and is provided with a rear portion **57** which, while slightly curved transversely of the iron, provides two end portions **58** serving as supports when the iron is up-ended as shown in Fig. 10. The handle at the top of the rear leg **18** is provided with a projection **59** which cooperates with the sides **58** of the rear of the shell to form a third support for the

iron when it is in up-ended position. The parts are secured together at the heel end of the iron by supports **60**. The lower end **61** of each support receives a screw **62** which is threaded into an opening in a boss **63** of the sole plate. The upper end **64** is provided with an opening aligned with a nut **65** carried by the support. Bolts **65'** are passed through openings in the bottom of recess **70** of the handle, openings in the shell, and threaded into nuts **65**.

A thermostat **66** is arranged in the sole plate and has an operating stem **67** which projects upwardly through a sleeve **68** pressed into the reservoir. Above the shell the thermostat is provided with an operating member **69**.

The rear leg of the handle is recessed as at **70** to receive the connector **71** (see Fig. 7) mounted on the end of cord **72**. As stated, connector **71** is capable of being reversed to arrange the cord on either side. At each side of the recess **70**, substantially semi-circular recesses **73** are provided (see Fig. 6). Likewise, the connector **71** is provided with semi-circular shaped portions **74** adapted to be received in the recesses **73**. The connector **71** is also provided with a central opening **75** which receives a screw **76**. The screw **76** engages threads in an opening formed in a boss **77** at the center of recess **70** in the handle to secure the parts together. Thus, it will be seen that the connector **71** may be arranged in one position with the cord extending from one side of the iron and secured in place by the screw **76**, or it may be reversed with the cord at the other side of the iron and secured in position by the screw.

In the recess **70** I provide a pair of contact members, one disposed above the opening in boss **75** and the other below, the openings being also arranged radially from the opening **75** as a center and at the same angle. Each of these contact posts (see Fig. 8) comprises a threaded portion **78** which is screwed into an opening at the bottom of the recess **70**, a nut portion **79** which limits its movement into the opening, and a split post **80**. The ends of the leads **81** and **82** are provided with ring terminals **83** which are received on contact screws **84**. Contact screws **84** are received in threaded openings **85** in the connector member **71**. Thus, with the connector member in one position, the lower contact **86** of the connector will engage the lower contact **87** in the recess and the upper contact **88** of the connector will engage the upper contact **89** in the recess with the cord arranged on one side. By turning the connector over to place the cord on the other side, the connectors are reversed but are properly arranged to engage the contacts in the recess when the screw **76** is inserted.

A pair of leads **90** and **91** extend downwardly from the contacts **87** and **89** and one of these leads is connected by a wire **92** (see Fig. 2) to the end **10** of the heating element. The other lead is connected by a wire **93** to the thermostat **66** and the thermostat is connected from its other terminal by wire **94** to the end **9** of the heating element.

The sole plate is provided with a seal or cover **95** which forms the top of the channels or passages **7** through which the steam passes. This cover is provided with a flange **96** (see Fig. 4) and is shaped to correspond to the shape of a groove **97** (see Fig. 2) in which the flange is received. The flange extends from the seal at an angle slightly less than a right angle disposing its outer side **98** at an angle to the wall of the groove. When the flange is forced into the groove, a steam-tight seal is produced.

In disassembling the iron, connector **71** is removed, permitting access to bolts **65'**. Removal of these bolts disconnects the shell and handle from the sole plate at the heel of the iron. To disassemble the nose end, knob **38** is first removed. The top of hold-down nut **55** is provided with slots (not shown) to receive a special tool by which it can be removed. The top of sleeve nut **26** is likewise provided with slots (not shown) to receive a

special tool which straddles the tubular member **36** and rotates the sleeve nut to remove it from connecting nut **21**. Removal of thermostat handle **69** stem **67** permits the sole plate to be separated from the other parts. The handle can also be lifted from the shell and reservoir.

The reversible cord connector disclosed herein forms the subject matter of my copending application, Serial No. 346,590 filed April 3, 1953, which is a continuation in part of this application.

I claim:

1. In a steam iron comprising a sole plate, a reservoir, and a handle, the front leg of the handle being provided with a bore, a tubular member in the bore communicating with the top of the reservoir, the tubular member being provided with openings, the front leg of the handle being provided with an opening communicating with said openings for filling the reservoir, and a sleeve surrounding the tubular member, the sleeve, when the iron is in ironing position, being positioned at the bottom of the tubular member covering the openings therein.

2. A steam iron having a recess and channels in its upper surface, the recess forming an explosion chamber, a cover arranged over the sole-plate and covering the channels to form steam passages, an externally threaded boss extending upwardly from the surface of the sole-plate in the area surrounding the explosion chamber, the boss having an internal bore communicating with the explosion chamber, a reservoir over the sole-plate, a handle over the reservoir, means for securing the parts together at the heel of the iron, the bottom of the reservoir and the cover being provided with openings positioned over the explosion chamber when the iron is assembled, the handle including a front leg, the front leg having a bore in alignment with the explosion chamber and the opening in the bottom of the reservoir, a nut secured to the threads of the boss of the explosion chamber, a member in the reservoir extending through the opening in the nut and secured to the nut, said member having an enlarged head forming a shoulder engaging the bottom of the reservoir around the opening to clamp it to said nut and having a valve seat, a valve co-operating therewith, a valve stem connected to the valve and extending through the bore of the handle, and an operating knob operatively connected to the valve stem.

3. In a steam iron comprising a sole-plate, a reservoir and a handle, the sole-plate being recessed to form an explosion chamber, an externally threaded boss surrounding the area of the explosion chamber and extending upwardly above the surface of the sole-plate, the boss having an internal bore communicating with the explosion chamber, the bottom of the reservoir having an opening in alignment with said bore, a nut having a threaded bore secured to the boss, a valve seat member in the reservoir received in the bore of the nut, said member having an enlarged head forming a shoulder engaging the bottom of the reservoir around the opening to clamp it to said nut, a valve member co-operating therewith, and a valve stem extending through the reservoir and the handle to the top of the iron.

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