Sept. 12, 1944. F. E. WOLCOTT ET AL 2,357,862

PRESSURE RELEASING MEANS FOR STEAM IRONS

Filed April 3, 1941

Fig. 1.

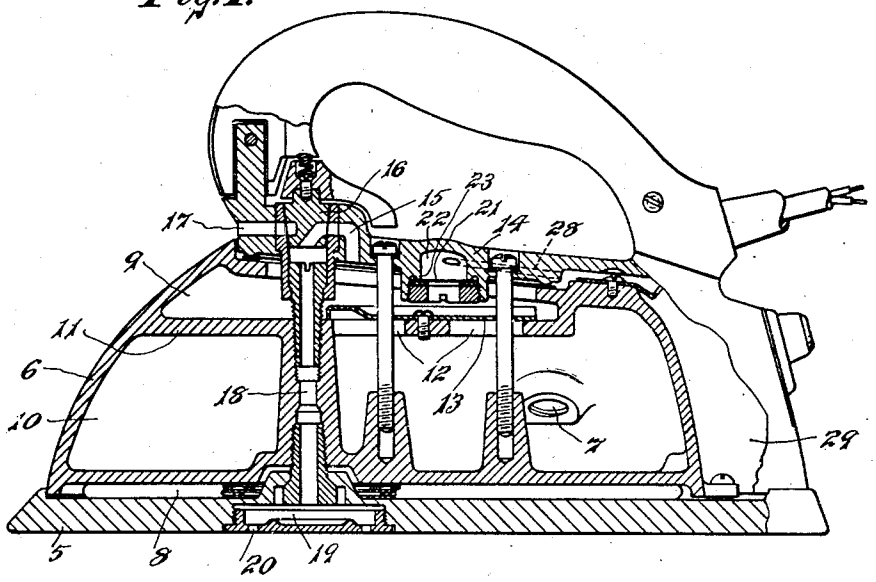


Fig. 2.

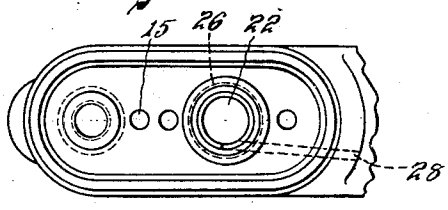


Fig. 3.

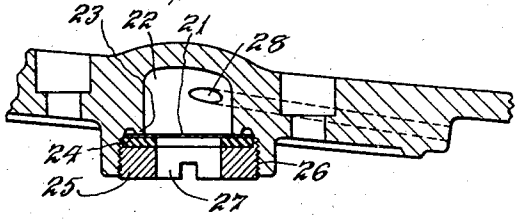


Fig. 4.

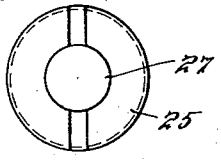
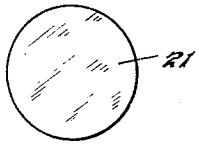


Fig. 5.



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PRESSURE RELEASING MEANS FOR STEAM IRONS

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Application April 3, 1941, Serial No. 386,694

8 Claims. (Cl. 38—77)

This invention relates to combination steaming and pressing irons and more particularly to the type of steam irons in which steam is generated directly within a container in the body of said iron and as shown and described in the co-pending application, Serial No. 337,279, filed May 25, 1940, now Patent No. 2,309,427, issued Jan. 26, 1943.

It has been found, by long experience, that it is possible for the steam passages in such irons to become clogged or sufficiently obstructed, particularly by sediment such as is left therein by water containing alkali which is deposited within the said passages as the water is evaporated, so as to cause the said irons to explode with the possibility of injuring persons in the vicinity of the iron.

Various types of safety valves have heretofore been provided in such steaming irons, but they have not been found satisfactory for the reason that they cannot be relied upon since the passages in said valves could easily also become clogged with sediment.

It is an object of this invention, therefore, to provide safety means for steam irons which can be entirely relied upon to operate under a predetermined pressure, and which will not be impaired by the use of the iron over a long period of time.

A further object of this invention is to provide such a safety device in the form of a thin diaphragm, or section in the wall of the steam container, which will rupture when steam pressure within said container has reached a certain point.

A further object is to provide such a safety device which is inaccessible, so that it cannot be easily rendered inoperable by tampering or otherwise, and which is so disposed within the structure of the iron that it may be readily rendered accessible for re-conditioning after it has operated.

Further objects of this invention will be more clearly understood from the following description and from the accompanying drawing in which—

Fig. 1 is a side view, in central vertical section, illustrating a steaming iron embodying the present invention.

Fig. 2 is a bottom view of the cover of said iron showing our improved safety means.

Fig. 3 is a side view, in central vertical section, showing a portion of said safety means on an enlarged scale.

Fig. 4 is a bottom view in elevation of the clamping nut illustrated in Fig. 3.

Fig. 5 is an elevational plan view of a diaphragm which is used in the embodiment illustrated.

As shown in the drawing, a steaming iron embodying our invention may comprise a sole plate 5 on which is mounted a water container, 6, within which water may be placed through a fill opening 7, and which is heated by means of a heating element 8 that causes said water to be generated into steam.

The said container also includes a steam chamber 9 that is separated from the water chamber 10 by means of a partition 11 having openings 12 therein for the passage of steam into said chamber 9 and the said openings 12 are partly baffled by means of an overlying baffle plate 13. The said baffle plate is provided with raised portions, extending along the front and sides thereof, to provide passages under said baffle plate which communicate with the openings 12 and permit the steam to pass into the chamber 9 along the sides and rear of the baffle plate.

The steam chamber 9 is sealed by means of a cover 14 and the said cover may be provided with a steam passage 15.

In the operation of the steaming iron illustrated, the heating element 7 will cause the sole plate 5 to become heated and, at the same time, will heat the water in the compartment 10 and generate steam therefrom. The said steam will pass into the steam chamber 9 from which it will enter the steam passage 15.

From the said steam passage, the movement of the steam may be selectively controlled by means of a valve having a valve plug 16 which permits the steam to pass out of the iron either through an exhaust opening 17, or pass downwardly through a steam passage 18, into a steam distributing chamber 19 in the sole plate of the iron wherefrom it may be ejected through jet openings 20.

While said iron may be constructed so as to always provide an outlet for the steam either through the opening 17 or the jets 20, such as by suitably arranging the passages through the plug 15, there is still the danger that sediment or other matter may be accumulated, in the interior surfaces of the steam chamber and passages therefrom, to such an extent as to entirely close all of the said passages and thereby present the danger of the container 6 exploding by excessive pressure which can then be easily generated within the steam chamber.

To avoid such danger, we have provided safety pressure releasing means in the form of a dia-

phragm 21 which is mounted within a recess 22, preferably on the under surface of the said cover 14 and exposed to the pressure within the steam chamber.

The said diaphragm may be supported in position by resting upon an annular shoulder 23, in said recess, and being forced into sealing position against said shoulder by means of a gasket 24 which is positioned against the diaphragm by a nut 25 that is threaded to the inner wall of said recess, as at 26. It will be noted that the recess 22 is formed so as to expose a substantial amount of the area of the diaphragm 21 to the steam pressure within the steam chamber 9, which pressure is applied upon the under surfaces of the diaphragm through the opening 27 in the nut 25.

The said diaphragm therefore is positioned across the recess in the cover in such a manner that one side thereof will be exposed to the steam pressure while the opposite side is exposed only to atmospheric pressure.

In order to release steam from said recess 22, upon the said diaphragm becoming ruptured by excessive steam pressure within the iron, we provide a steam exhaust passage 28, in the cover 14, which extends from the said recess 22 to the atmosphere. As shown in the drawing, however, the said passage 28 is preferably made to direct the released steam into a separate compartment 29, underneath a portion of the cover 14, from which it will be released to the atmosphere through suitable openings in said cover, or through clearances between the said cover and the body of the iron. Further, the said passage is restricted to a capacity which will retard the passage of steam therethrough and, upon the rupturing of the diaphragm 21, cause the steam to be released slowly so that it will pass out of the iron in the manner of a slow leak, rather than with a sudden burst which would be apt to scald the hand of a person using the iron.

The ejection of the steam under cover, in the manner just described, is of particular advantage since it eliminates the possibility of a jet of hot steam striking a person in the vicinity of the iron, and renders it very difficult for any person, ignorant of the danger in so doing, to tamper with or plug the steam passage 28 so as to prevent escape of steam after the diaphragm 21 has been ruptured, and thereby operate the iron without the protection of the said diaphragm. Therefore, since escape of steam cannot be otherwise stopped, when a diaphragm has ruptured, the iron will be rendered useless until the cover 14 has been removed and the ruptured diaphragm replaced.

It is to be understood that the said diaphragm is adapted to rupture at a pressure which is far below the pressure required to burst the container 6 and still withstand a sufficiently high pressure to insure that it will not rupture under the pressure which is maintained during the normal use of the iron.

Due to the construction of the valve plug 16, in the particular steam iron shown in the drawing, the steam chamber 9 is always open to the atmosphere, either through the openings 17 or the jets 20, for the reason that the valve will not entirely close the said chamber to one passage before opening it to the other. Therefore, there is no danger of the pressure within the steam chamber reaching a dangerous point unless something serious, such as the plugging of those steam passages by sediment, has taken place. For this reason, when the diaphragm 21 becomes ruptured by excessive pressure, it is important that the iron be thoroughly inspected, for any possible stoppage of the steam passages, before a new diaphragm is installed.

Therefore, it is considered of great importance to locate our improved pressure releasing means on the under surface of the cover 14 so that, in order to render said means accessible for replacement of a ruptured diaphragm, it is necessary to first remove the said cover from the iron and, by so doing, expose the interior of the iron for the examination of the various passages which can then be readily cleaned out of any sediment.

From the above description and drawing, it will be clearly understood that we have provided novel pressure releasing means which are particularly advantageous in a steaming iron of the character described and whereby the steam iron is rendered safe from dangerous explosions. It will also be understood that our invention further provides a safety pressure release which cannot be tampered with nor rendered inoperable through ignorance or inexperience and further, which will not expel steam under high pressure in any particular direction and thereby eliminate the possibility of said steam striking and possibly injuring a person in the vicinity of the iron.

While we have illustrated our improved pressure releasing means in connection with a steaming iron of the particular construction shown, the said means may also be used in other types of such irons, or similar devices, without departing from the scope of our invention as set forth in the appended claims.

We claim:

1. A steaming and pressing iron of the character described comprising a container having a steam chamber with an opening at the top of said chamber, a detachable cover having a relatively thick portion for sealing said opening, said portion having an inverted recess in the bottom thereof, a pressure releasing diaphragm extended across said recess, a restricted exhaust passage within said cover communicating said recess with an external opening in the edge of said portion and a relatively thin portion on said cover shielding said opening.

2. A steaming iron of the character described comprising a casing having a steam chamber with an opening in the top of said chamber; a detachable cover sealing said opening and forming with an exterior portion of said casing a separate compartment in said steam iron having communication with the atmosphere, pressure releasing means including an inverted recess in the bottom of said cover, a diaphragm extending across said recess and exposed to pressure within said chamber, and a restricted passage in said cover communicating said recess with said separate compartment.

3. A steaming and pressing iron of the character described comprising a container having a steam chamber therein and an opening, a detachable cover sealing said opening and having an inverted recess in the bottom thereof, a frangible diaphragm extended across said recess, and a restricted exhaust passage within said cover extending laterally from and communicating said recess with an exhaust opening in said cover exteriorly of said steam chamber.

4. A combination steaming and pressing iron of the character described comprising a casing having a steam chamber therein and an opening in the top thereof, a detachable cover sealing said opening, a handle for said iron carried by

said cover, and means for releasing pressure in said chamber upon the same having attained a certain pre-determined degree; the said means including an inverted recess in the bottom of said cover, a diaphragm extending across said recess and exposed to the pressure in said steam chamber, means detachable from said cover only from the bottom thereof for detachably securing said diaphragm within said recess, a restricted lateral passage within said cover communicating said recess with an opening exteriorly of said casing, and an extension on said cover protecting said opening to prevent tampering therewith from the exterior of said iron.

5. A steaming and pressing iron of the character described comprising a casing having a steam chamber therein and opening into said chamber, a cover having a portion closing said opening and an extension overlying said casing, the said portion having an inverted recess in the bottom thereof, a diaphragm extending across said recess and exposed to pressure in said chamber, and a restricted passage in said portion extending from said recess to an opening between said extension and casing.

6. A steaming iron of the character described comprising a casing having a steam chamber therein and an opening into said chamber, a cover member including a portion for closing said opening and an extension from said portion overlying said casing, a boss integral with and depending from said portion into said opening and having an inverted recess therein, a diaphragm extending across said recess, means threaded to said boss for detachably securing said diaphragm in said recess, and a restricted lateral passage in said cover member extending from a point between the diaphragm and the top of said recess to an exterior opening in the side of said closing portion of the cover member exteriorly of said chamber and between said extension and casing.

7. In a steaming iron of the character described comprising a casing having a steam chamber therein and an opening from the top of said casing into said steam chamber, a cover having a portion fitting over said opening for closing the same and an extension on said portion providing with an exterior portion of said casing a separate chamber in said iron having communication with the atmosphere, pressure releasing means including a diaphragm secured within a recess in the bottom of said portion and exposed to pressure within said chamber, and a restricted passage in said portion communicating said recess with said separate chamber.

8. A steaming and pressing iron of the character described comprising a container having a steam chamber with an opening at the top of said chamber, a detachable cover, said cover having a relatively thick portion for sealing said opening and a relatively thin portion extending from the thick portion over an exterior portion of said container, a recess in the bottom of said thick portion, a frangible diaphragm closing said recess, and a restricted exhaust passage within said cover communicating said recess with an external opening in the side edge of said thick portion and under said thin portion.

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