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(54) **CONVERTIBLE IRON/STEAMER**

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(57) **ABSTRACT**

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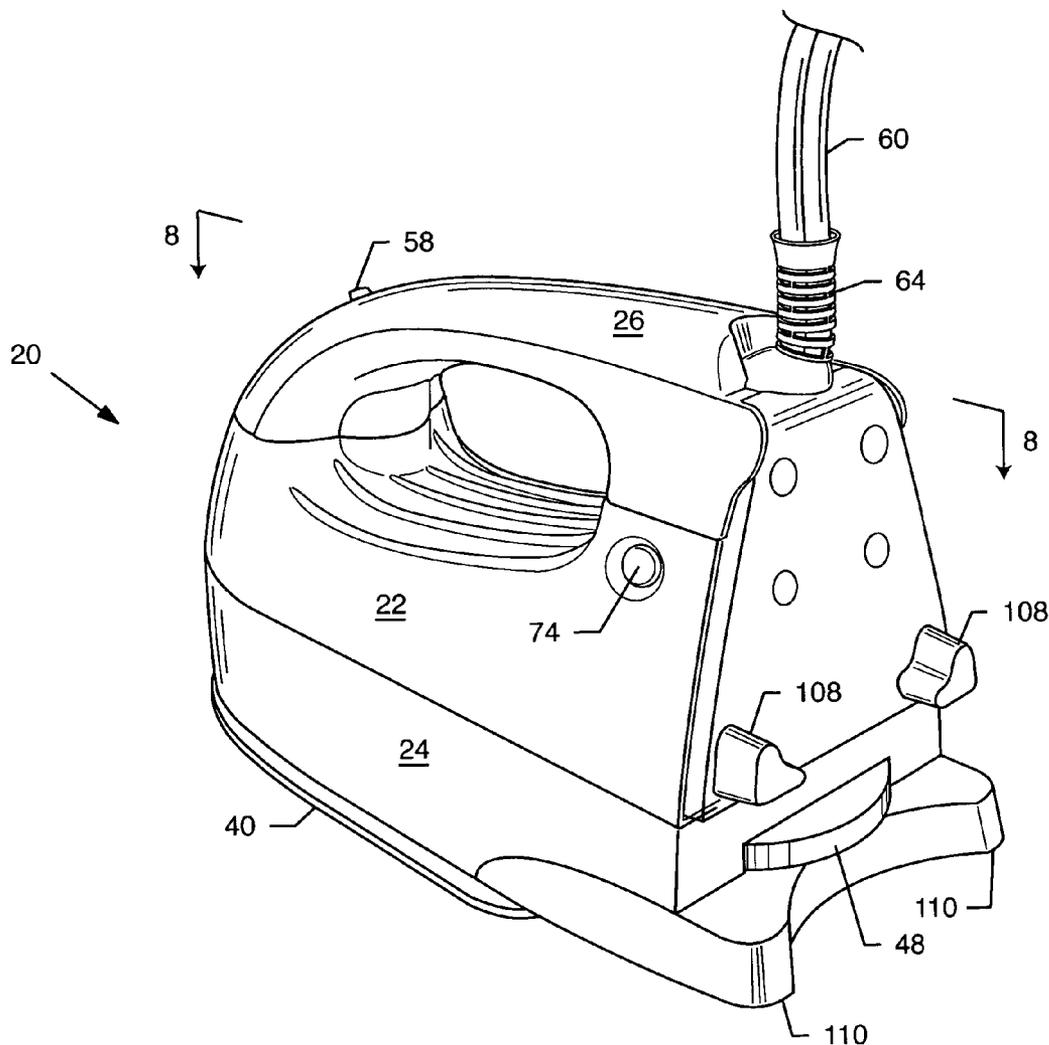
A hand-held, convertible pressing iron/steamer device includes a steaming module including a compartment for holding water, and a heater for producing steam from the water. The device further includes an ironing module including a heatable flat pressing bottom surface, the ironing module being selectively attachable to the steaming module so as to direct steam through the flat pressing bottom surface. There is also a handle attachable to the steaming module and the ironing module. In a first configuration, the handle is operably and detachably mounted to the steaming module alone. In a second configuration, the handle is operably and detachably mounted to the steaming module and the ironing module.

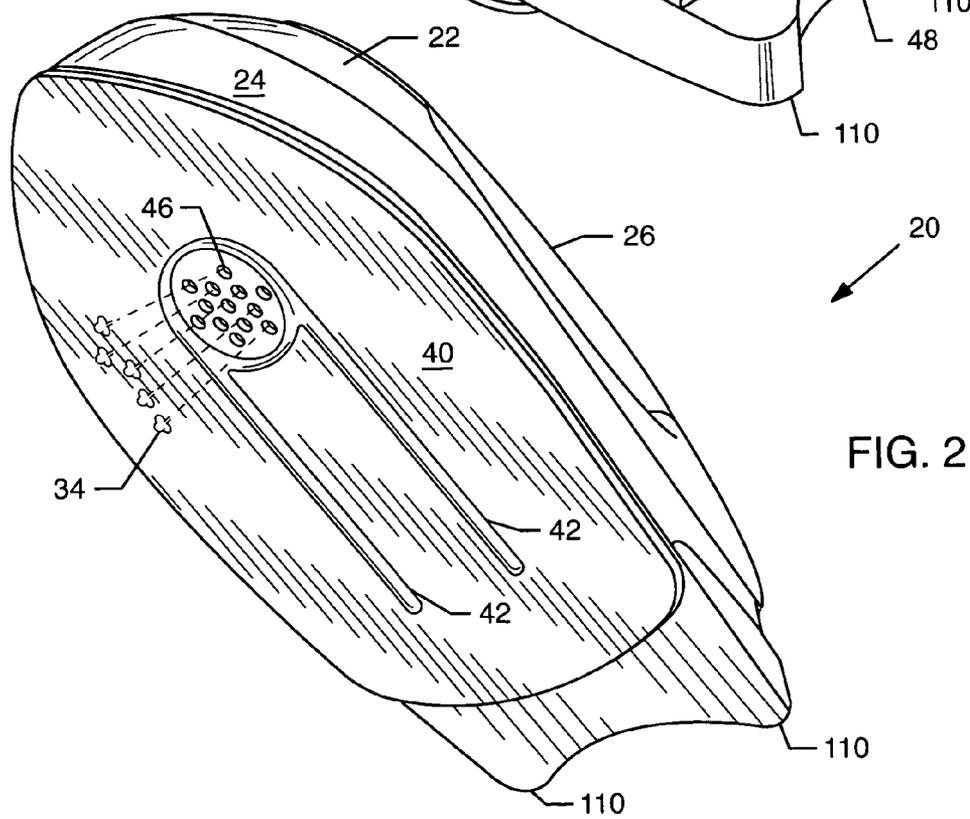
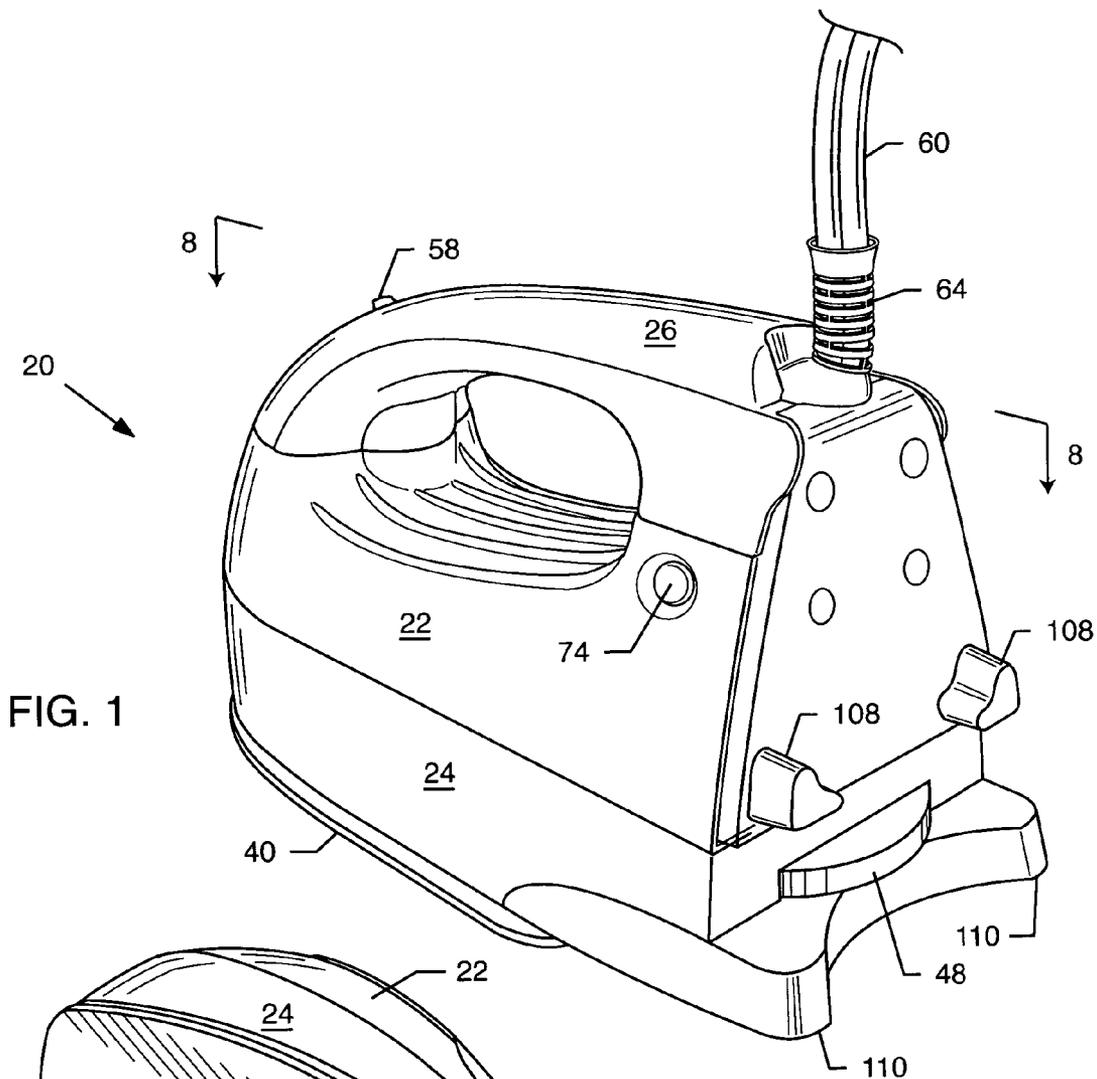
(21) Appl. No.: **10/636,490**

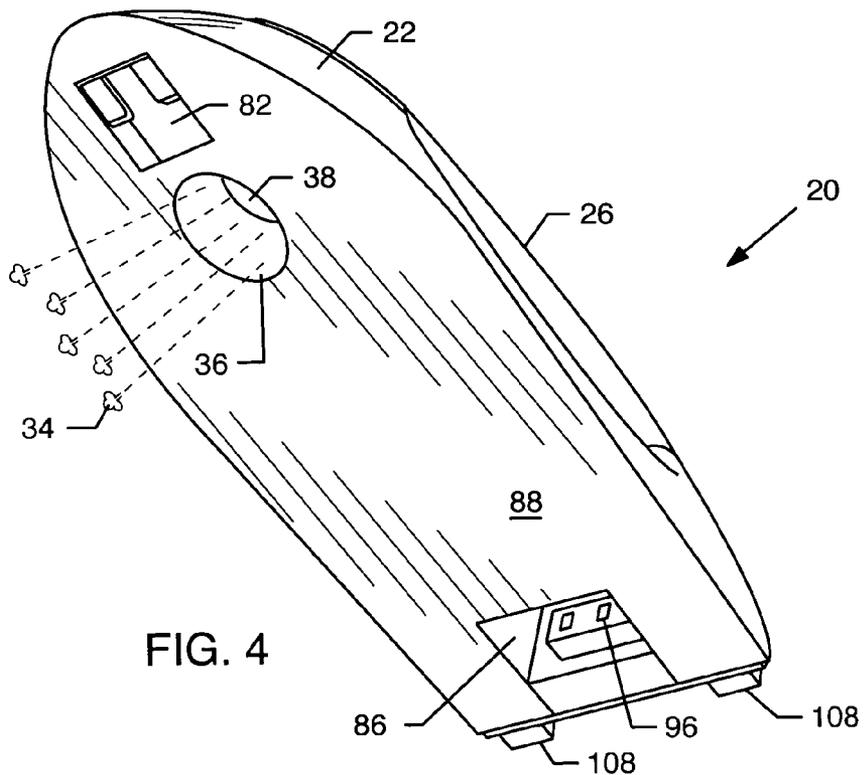
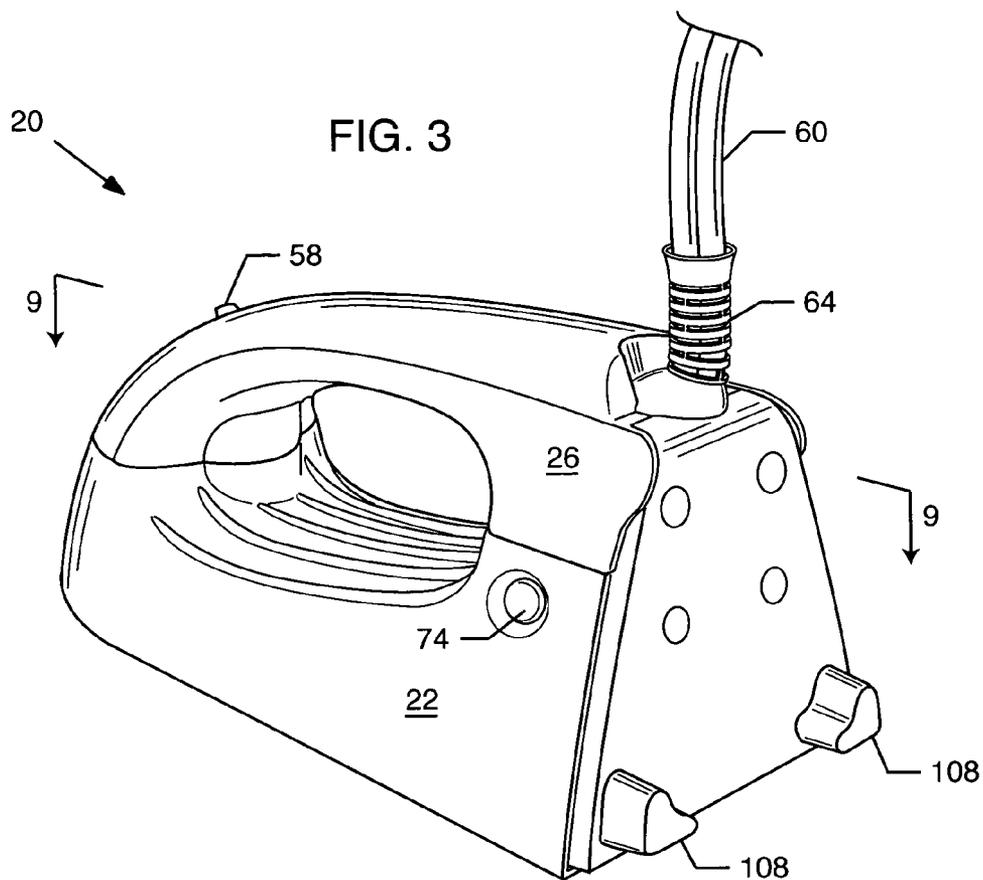
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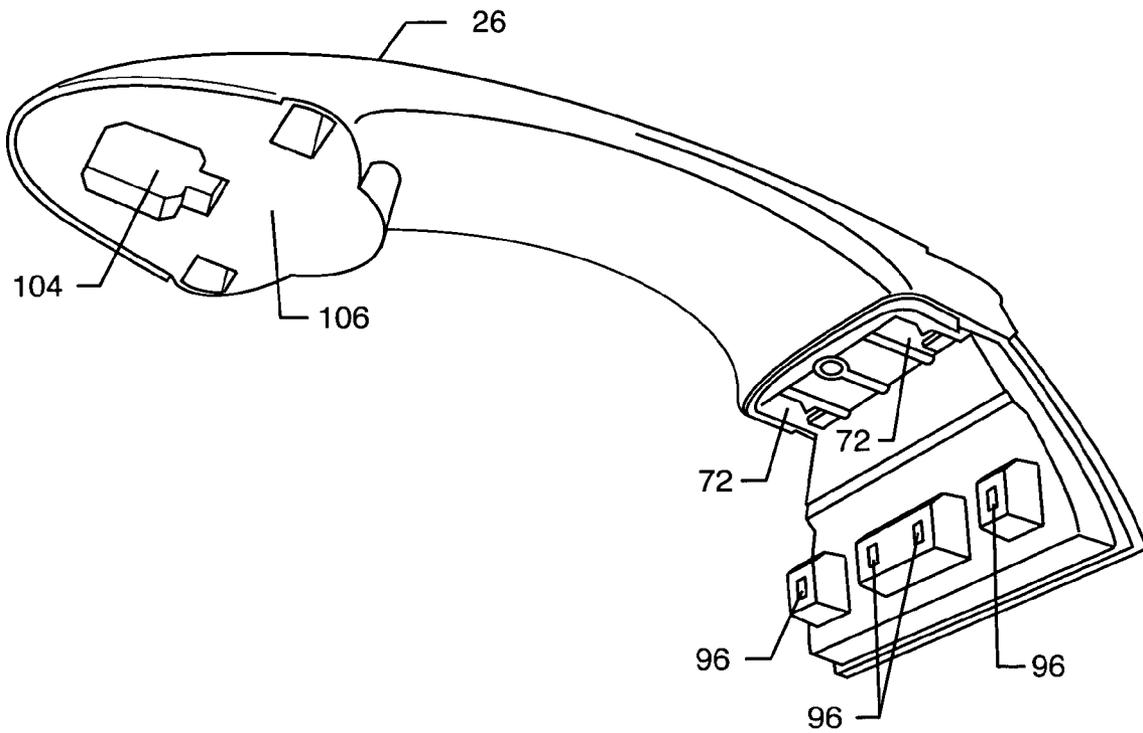


FIG. 5

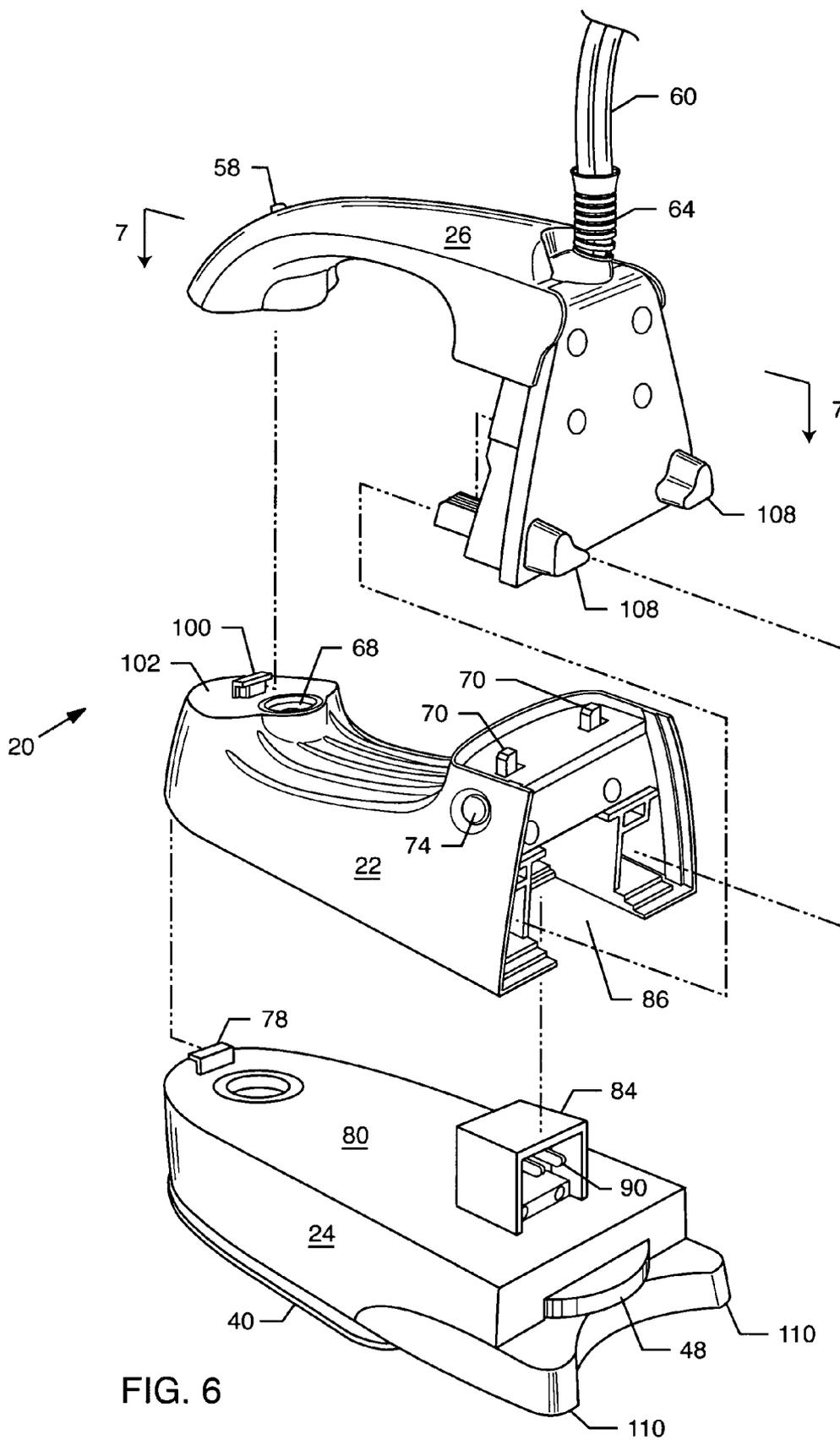


FIG. 6

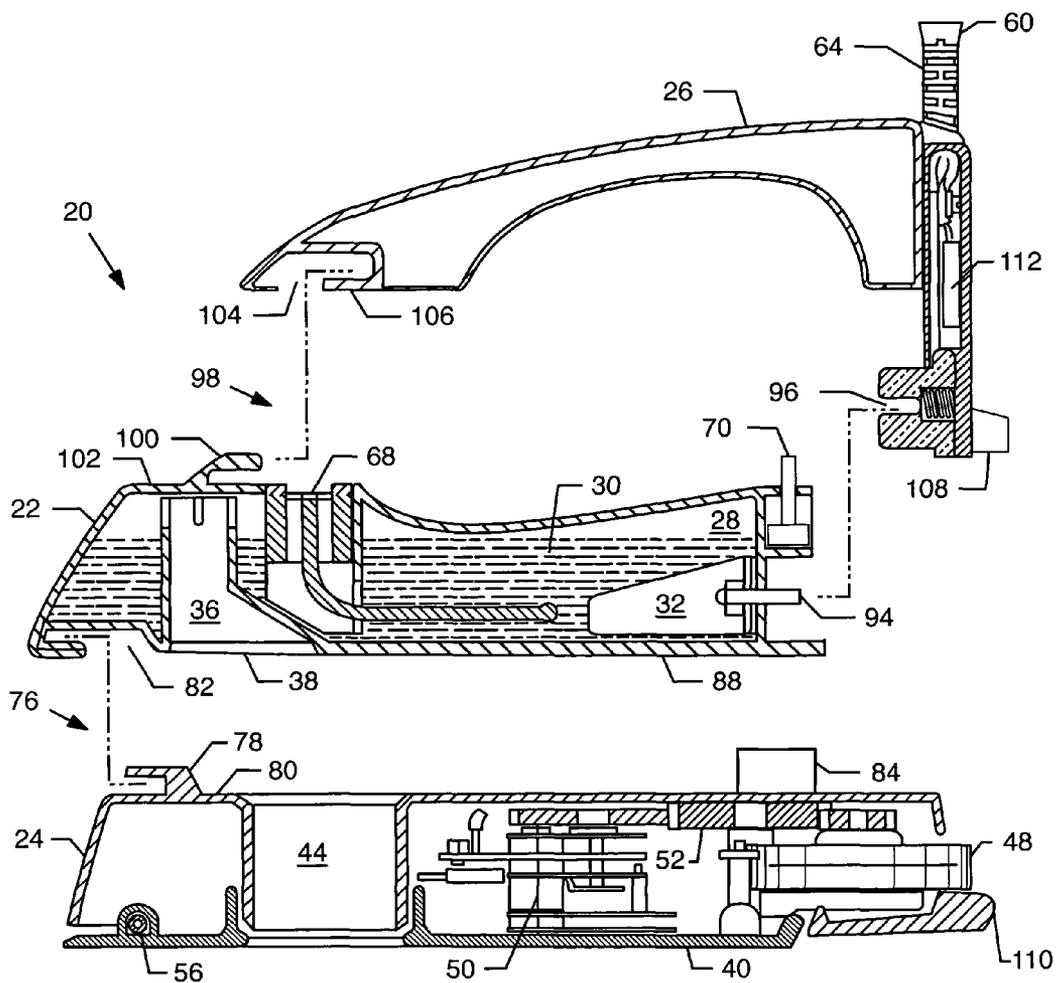


FIG. 7

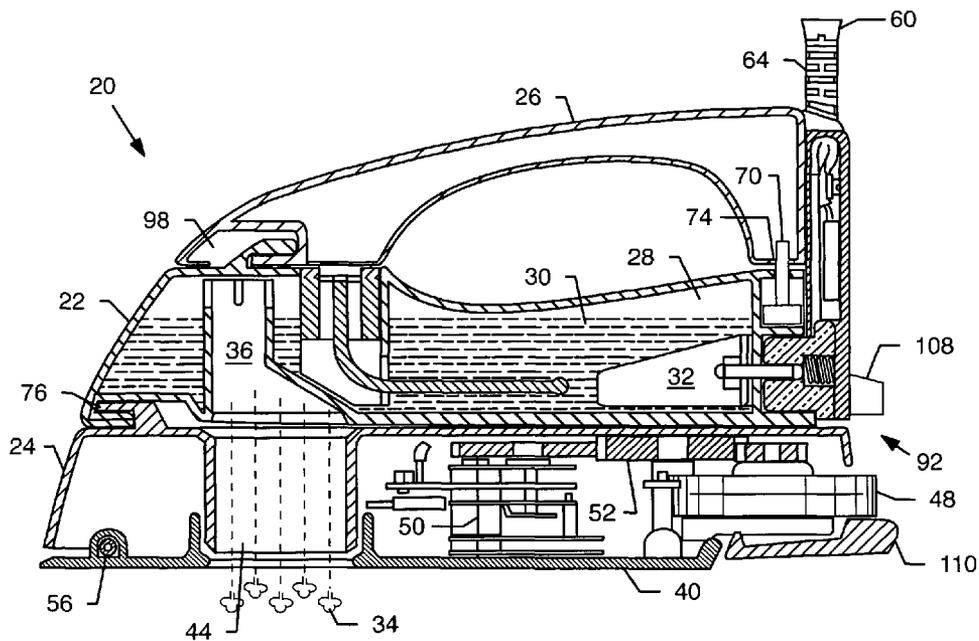


FIG. 8

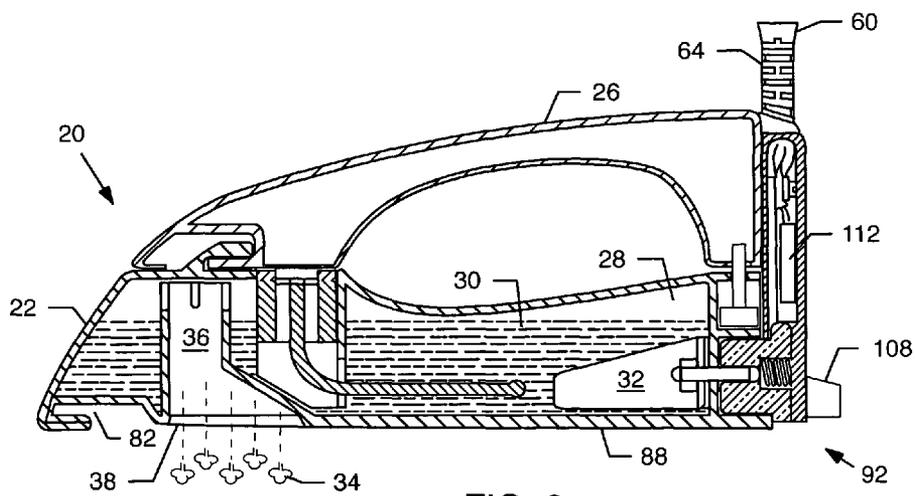
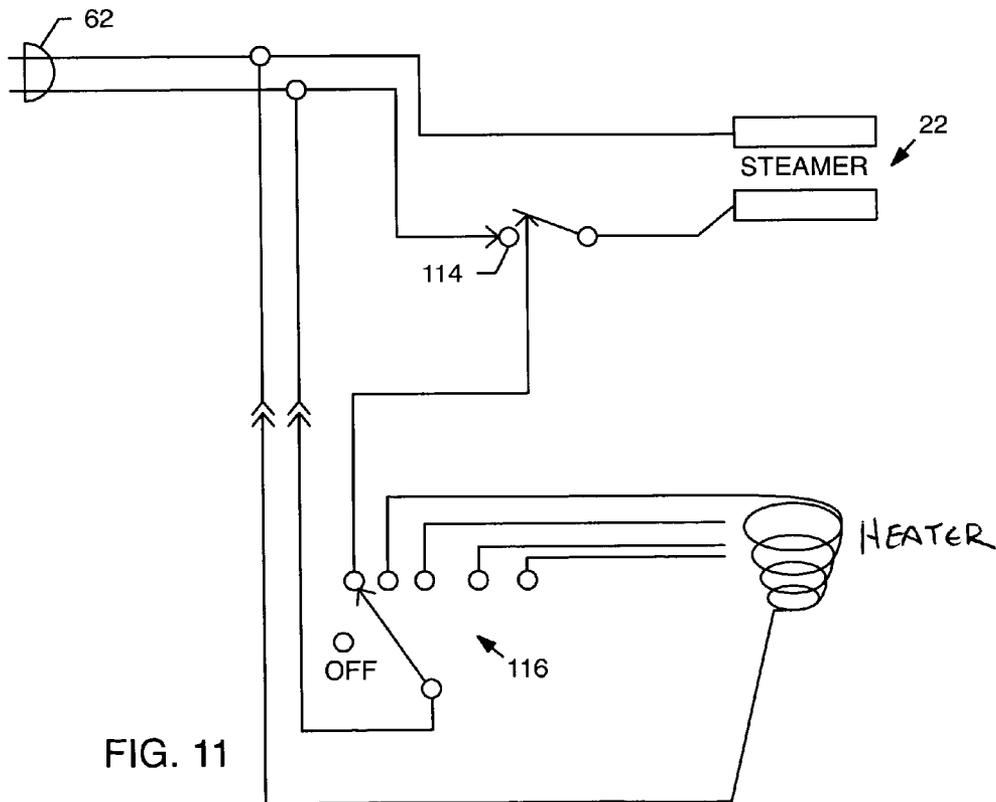
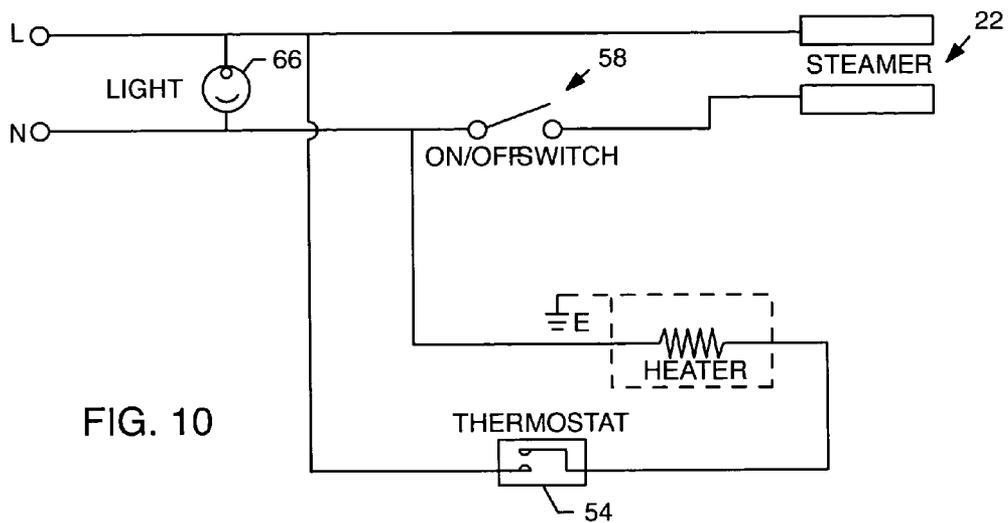


FIG. 9



CONVERTIBLE IRON/STEAMER

BACKGROUND OF THE INVENTION

[0001] The invention relates generally to a device for treating fabric articles, including garments. More particularly, the present invention relates to a convertible iron/steamer.

[0002] There is a great need for portable, efficient devices to steam and iron garments. It is well-known to use a steaming iron when ironing clothes and other garments. Non-iron devices called "steamers" have also been used to remove wrinkles and creases from clothes on a hanger or hanging from a rack by jetting steam to the clothes. These steamers do not have an ironing function because they lack the hot pressing plate found on irons. Both steam irons and steamers have been used for apply steam to remove creases and crinkles from hanging garments and other cloth materials. Steam has also been used in the cleaning of a variety of objects such as curtains, couches, furniture covers (e.g., couch covers), etc.

[0003] While steamers and steaming irons have been useful steam devices, neither device by itself is versatile enough for various applications which require the use of both devices. For example, a steaming iron can be heavy and bulky to use when steaming curtains and other hanging objects such as a wrinkled men's suit jacket. The steamer is generally lighter and easier to manipulate for steaming, hanging clothing, and other cloth objects. However, while a steamer may be useful to steam a hanging men's suit jacket, the steamer can not be used to iron out a persistent wrinkle in the suit since the steamer lacks the hot pressing plate found on irons.

[0004] Many different types of irons and steam devices have been employed to iron and steam objects such as clothing. However, these steamers and steaming irons have their limitations, as described above and as follows. For example, U.S. Pat. No. 6,061,935 discloses an appliance for treating a garment with steamer and iron. However, this appliance is a relatively large, bulky, multi-part device that requires separate steamer and iron attachments that share a common water supply at a base to which the steamer and iron are attached. This system is not practical for situations that require compactness and portability, and this system, due to its relatively large size, would not be able to fit into a small suitcase without taking up a good deal of room, if it could fit in the suitcase at all. In another example, U.S. Pat. No. 4,532,411 discloses an electric fabric steaming appliance having a detachable metallic sole-plate. However, the modularity of the appliance limited and does not appear to provide swift and simple transitions between a steamer configuration and an ironing configuration.

[0005] While devices such as those described above may provide means of steaming and ironing garments and the like, such methods can always be improved to provide better portability and flexibility.

[0006] Accordingly, there is a need for a pressing iron/steamer device that reduces the number of individual devices that are needed to iron and steam an object. What is also needed is a pressing iron/steamer device that is portable and useful in a variety of applications. There is a further need for a pressing iron/steamer device that is modular.

There is an additional need for a modular pressing iron/steamer device that is relatively compact in size and inexpensive. The present invention satisfies these needs and provides other related advantages.

SUMMARY OF THE INVENTION

[0007] A pressing iron/steamer device is illustrated and described that provides flexibility, portability and modularity. This device is usable in any situation where an object needs to be ironed and/or steamed. These situations can occur anywhere there is a need to iron and/or steam an object, such as in the home, in a hotel, at the office, or the like.

[0008] A hand-held, convertible pressing iron/steamer device includes a steaming module having a compartment for holding water, and a heater for producing steam from the water. The device further includes an ironing module including a heatable flat pressing bottom surface, the ironing module being selectively attachable to the steaming module so as to direct steam through the flat pressing bottom surface. There is also a handle attachable to the steaming module and the ironing module. In a first configuration, the handle is operably and detachably mounted to the steaming module alone. In a second configuration, the handle is operably and detachably mounted to the steaming module and the ironing module.

[0009] The device includes a power cord operatively connected to the handle to provide power to the steaming module and/or the ironing module. The device also includes a switch for activating/deactivating emission of steam from the steaming module.

[0010] The handle seals the compartment for holding water in the steaming module. At least one of the handle and steaming module includes a docking clamp for engaging a docking recess on the other of the handle and steaming module when the handle and steaming module are engaged, and a switch for releasing the docking clamp when disengaging the handle and the steaming module.

[0011] The steaming module includes a steam passage aperture in alignment with a steam tube in the ironing module when the device is in the second configuration.

[0012] The ironing module includes a switch for activating/deactivating the heatable flat pressing bottom surface. The ironing module further includes a switch for adjusting the temperature of the heatable flat pressing bottom surface. The ironing module is operably and detachably mounted to the steaming module.

[0013] The steaming module and the ironing module are each operably and detachably mounted to the handle at a particular interface. The handle includes a power cord for providing power to the steaming module in both the first and second configurations, and to the ironing module in the second configuration.

[0014] The ironing module and the steaming module are slidably engaged from a first direction at an interface. A post on at least one of the ironing module and steaming module engages a recess on the other of the ironing module and steaming module.

[0015] The handle and the steaming module are slidably engaged from a second direction. A post on at least one of

the handle and steaming module engages a recess on the other of the handle and steaming module.

[0016] When the handle and both modules are engaged, a first post on at least one of the ironing module and steaming module engages a first recess on the other of the ironing module and steaming module, and a second post on at least one of the handle and steaming module engages a second recess on the other of the handle and steaming module.

[0017] A portion of one of the handle and steaming module includes male electrical connections, and a portion of the other of the handle and steaming module includes female electrical connections, wherein the male and female electrical connections engage when the handle and steaming module slidably engage from the second direction. Additionally, a portion of one of the handle and ironing module includes male electrical connections, and a portion of the other of the handle and ironing module includes female electrical connections, wherein the male and female electrical connections engage when the handle and steaming module slidably engage from the second direction.

[0018] At least one of the handle and steaming module includes a docking clamp for engaging a docking recess on the other of the handle and steaming module when the handle and steaming module are engaged, and a switch for releasing the docking clamp when disengaging the handle and the steaming module.

[0019] The steaming module includes an aperture for emitting steam operably connected to the heater for producing steam; and the ironing module includes a steam tube for passing steam through the ironing module and emitting steam from the flat pressing bottom surface of the ironing module. The steam tube is directly aligned with the aperture for emitting steam when the device is in the second configuration.

[0020] The pressing iron/steamer device reduces the number of individual devices that are needed to iron and steam an object. The device is also portable and useful in a variety of applications. The device is modular and relatively compact in size and inexpensive.

[0021] Other features and advantages of the invention will become more apparent from the following detailed description, taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The accompanying drawings illustrate the invention. In such drawings:

[0023] FIG. 1 is a top orthogonal view of a device embodying the present invention in one configuration;

[0024] FIG. 2 is a bottom orthogonal view of the device of FIG. 1;

[0025] FIG. 3 is a top orthogonal view of the device of FIG. 1 embodying the present invention in another configuration;

[0026] FIG. 4 is a bottom orthogonal view of the device of FIG. 3;

[0027] FIG. 5 is a bottom orthogonal view of a handle of the device of FIG. 1.

[0028] FIG. 6 is an exploded orthogonal view of the device of FIG. 1;

[0029] FIG. 7 is a cross-sectional view of the device of FIG. 5;

[0030] FIG. 8 is a cross-sectional view of the device of FIG. 1;

[0031] FIG. 9 is a cross-sectional view of the device of FIG. 3; and

[0032] FIGS. 10 and 11 are electrical schematics of the device of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0033] The present invention is useful in a variety of applications that require flexibility, portability and modularity. This device is usable in any situation where an object needs to be ironed and/or steamed. These situations can occur anywhere there is a need to iron and/or steam an object, such as in the home, in a hotel, at the office, or the like. The present invention reduces the number of individual devices that are needed to iron and steam an object and is relatively compact in size and inexpensive.

[0034] As shown in the drawings for purposes of illustration, the present invention resides in a convertible iron/steamer. With reference to FIGS. 1-10, an iron/steamer device 20 includes a steaming module 22, an ironing module 24, and a handle 26. The handle 26 is attachable to and removable from the steaming module 22 and the ironing module 24. In a first configuration, the handle 26 is operably and detachably mounted only to the steaming module 22 (FIGS. 3 and 4), and in a second configuration the handle 26 is operably and detachably mounted to both the steaming module 22 and the ironing module 24 (FIGS. 1 and 2).

[0035] The steaming module 22 includes a compartment 28 for holding a certain amount of water 30, and a heater 32 which heats the water 30 in the compartment 28 in order to produce steam 34 from the water 30. The heater 32 may be in the form of at least one metallic element which heats the water 30 in the compartment 28 when electric current is applied to the metallic element. The metallic element may be made from any highly conductive metal, such as copper. The steam 34 produced by the heater 32 is passed into a steam passage 36 within the steaming module 22 and out of the module 22 through a steam passage aperture 38.

[0036] The ironing module 24 includes a heatable flat pressing bottom surface 40, also referred to as a sole-plate. The pressing bottom surface 36 includes grooves 42 for the distribution of the steam 34. The ironing module 24 is selectively attachable to the steaming module 22 so as to direct steam 34 through the flat pressing bottom surface 36. A steam tube 44 in the ironing module 24 is aligned with the steam passage aperture 38 when the device 20 is in the second configuration. The portion of the pressing bottom surface 40 adjacent to the steam tube 44 includes a plurality of apertures 46 that allow the steam 34 to be emitted from the ironing module 24. The ironing module 24 also includes a dial knob 48 which is connected to a switch 50 for activating/deactivating the heatable flat pressing bottom

surface 40 by a gear drive 52. This knob/switch 48, 50 acts as a thermostat 54 that also allows a user to adjust the temperature of the flat pressing bottom surface 40 to several different temperature settings. The switch 50 is connected to at least one heating coil 56 which heats the pressing bottom surface 40. Alternatively, separate switches may be used to actuate/dedicate the heating function and adjust the temperature.

[0037] An on/off switch 58 that regulates the flow of electrical power through the device 20 is located on the handle 26. The on/off switch 58 also activates/deactivates emission of steam from the steaming module 22. In the alternative, the power and steaming functions could be controlled by separate switches. A power cord 60 with a conventional plug 62 is operatively connected to the handle 26 to provide power to the device 20, in general, and to the steaming module 22 and the ironing module 24, in particular. One end 64 of the power cord 60 is permanently attached to the handle 26 and encased in a soft plastic that provides both protection and flexibility to the power cord 60. In the alternative, the power cord 60 may be modular so as to be attachable/detachable to the handle 26 with the end 64 including male or female electrical connections to connect to mating electrical connections in the handle 26. The handle 26 also includes a pilot light 66, in the form a neon bulb or light emitting diode, to indicate that the device 20 is active. The handle 26 provides power to the steaming module 22 in both the first and second configurations, and to the ironing module 24 in the second configuration.

[0038] The handle 26 seals the water-receiving opening 68 of the compartment 28 in the steaming module 22 when the handle 26 is mated to the steaming module 22.

[0039] The steaming module 22 includes a docking clamp 77 for engaging a docking recess 72 on the handle 26 when the handle 26 and steaming module 22 are engaged. The steaming module 22 also includes a docking release switch 74 for releasing the docking clamp 70 from the docking recess 72 when the handle 26 is disengaged from the steaming module 22. In the alternative, the docking clamp 70 and release switch 74 could be located on the handle 26 with the docking recess 46 located on the steaming module 22.

[0040] The steaming module 22, ironing module 24, and handle 26 may be made from plastic or any other suitable material. The heatable pressing bottom surface 40 may be made from any metal used in conventional irons for that purpose.

[0041] The handle 26 and modules 22, 24 of the device 20 may be operably and detachably mounted to each other. The ironing module 24 and the steaming module 22 are slidingly engaged from a first direction at an interface 76. The interface 76 includes an L-shaped or hook post 78 located on a top surface 80 of the ironing module 24 which slides into a mating recess 82 on the steaming module 22. The ironing module 24 further includes an electrical plug portion 84 protruding from the top surface 80 which slides into a recess 86 located on a bottom surface 88 of the steaming module 22 as the modules 22, 24 are mated. Alternatively, the post 78 may be located on the bottom surface 88 of the steaming module 22 and the recess 82 located on the top surface 80 of the ironing module 24.

[0042] The electrical plug portion 84 includes male electrical connections 90 which face towards a rear portion 92 of

the device 20. The steaming module 22 also includes male electrical connections 94 which face towards the rear portion 92 of the device 20. The handle 26 includes female electrical connections 96 which are oriented in the direction of the male electrical connections 90, 94. The respective male and female electrical connections 90, 94, 96 of the handle 26 and modules 22, 24 engage when the handle 26 and the modules 22, 24 slidably engage from a second direction, generally opposite the first direction, at an interface 98. Alternatively, the male and female electrical connections 90, 94, 96 may be arranged in any male/female fashion on the handle 26 and modules 22, 24. The interface 98 includes an L-shaped or hook post 100 located on a top surface 102 of the steaming module 22 which slides into a mating recess 104 on a bottom surface 106 of the handle 26. Alternatively, the post 100 may be located on the bottom surface 106 of the handle 26 and the recess 104 located on the steaming module 22. As the handle 26 and steaming module 22 engage, the docking clamp 40 engages the docking recess 72. As the handle 26 and steaming module 22 engage, the handle 26 also engages the ironing module 24 as the female electrical connections 96 of the handle 26 engage the male electrical connections 90, 94 of the modules 22, 24.

[0043] The ironing module 24 is not detachable from the steaming module 22 when the handle 26 is mounted to both modules 22, 24. The ironing module 24 is only detachable from the steaming module 22 when the handle 26 is detached from both modules 22, 24.

[0044] The handle 26 and the ironing module 24 each include, respectively, backrest pods 108, 110 that allow the device 20 to be placed in a rest position so that the pressing bottom surface 40 is not in contact with any material which could burn from prolonged contact with the bottom surface 40 when the ironing function of the device 20 is active.

[0045] In an alternative, if a user desires to only iron, and not steam, a garment or other object, the handle 26 may be connected to the ironing module 24 only.

[0046] FIGS. 10 and 11 illustrate the electrical schematics of the device 20. The handle 26 includes circuitry 112 for routing power to the modules 22, 24. As seen in FIG. 10, inserting the ironing module 24 into the steaming module 22 breaks an electrical contact point 114 which is otherwise closed. However, when the ironing module 24 breaks the electrical contact point 114, the electrical circuit providing power to the steaming module 22 is still closed by the ironing module 24. In this respect, when the handle 26 is mated to both modules 22, 24 and a plug 162 of the power cord 40 is connected to a power source, power still flows to the steaming module 22. There are also separate electrical connections 116 to prevent current in the steaming module 22 when the device 20 is on other settings. In the alternative, a timer may be included to provide an automatic power shut-off.

[0047] In use, a user may prepare a garment for wear by eliminating wrinkles and other creases from the garment by steaming the garment. The user fills the compartment 28 of the steaming module 22 with water 30. Once the compartment 28 is filled to a desired level, the user then attaches the handle 26 to the steaming module 22. The handle 26 provides power to the steaming module 22 when the power cord 60 is plugged into a power source, such as an electrical wall socket. When the handle 26 is mated to the steaming

module 22, the handle 26 seals the opening of the compartment 28 into which the water 30 was poured. After turning on the power switch 58, the user may then proceed to steam the garment.

[0048] Alternatively, a user may prepare a garment for wear by eliminating wrinkles and other creases from the garment by both ironing and steaming the garment. The user fills the compartment 28 of the steaming module 22 with water 30. Once the compartment 28 is filled to a desired level, the user then mates the steaming module 22 to an ironing module 24. The user then attaches the handle 26 to both the steaming module 22 and the ironing module 24. The handle 26 provides power to both the steaming module 22 and the ironing module 24 when the power cord 60 is plugged into a power source, such as an electrical wall socket. When the handle 26 is mated to the steaming module 22, the handle 26 seals the opening of the compartment 28 into which the water 30 was poured. After turning on the power switch 58, the user may then proceed to iron and/or steam the garment.

[0049] The user may choose not to steam the garment as it is being ironed. In that case, the user need not fill the compartment 28 with water 30 prior to mating the handle 26 to the steaming and ironing modules 22, 24. In another alternative, after a user has already begun to steam the garment, the user may decide to also iron the garment. In this situation, the user would deactivate the power switch 38, detach the handle 26 from the steaming module 22 mate the ironing module 24 to the steaming module 22, then and proceed as described above.

[0050] The above-described embodiment of the present invention is illustrative only and not limiting. It will thus be apparent to those skilled in the art that various changes and modifications may be made without departing from this invention in its broader aspects. Therefore, the appended claims encompass all such changes and modifications as falling within the true spirit and scope of this invention.

What is claimed is:

1. A hand-held, convertible pressing iron/steamer device, comprising:

- a steaming module including a compartment for holding water, and a heater for producing steam from the water;
- an ironing module including a heatable flat pressing bottom surface, the ironing module being selectively attachable to the steaming module so as to direct steam through the flat pressing bottom surface; and
- a handle attachable to the steaming module and the ironing module, wherein in a first configuration the handle is operably and detachably mounted to the steaming module alone, and in a second configuration the handle is operably and detachably mounted to the steaming module and the ironing module.

2. The device of claim 1, including a power cord operatively connected to the handle to provide power to the steaming module and the ironing module.

3. The device of claim 1, wherein the handle seals the compartment for holding water in the steaming module.

4. The device of claim 1, wherein at least one of the handle and steaming module includes a docking clamp for engaging a docking recess on the other of the handle and steaming module when the handle and steaming module are

engaged, and a switch for releasing the docking clamp when disengaging the handle and the steaming module.

5. The device of claim 1, wherein the steaming module includes a steam passage aperture in alignment with a steam tube in the ironing module when the device is in the second configuration.

6. The device of claim 1, wherein the ironing module includes a switch for activating/deactivating the heatable flat pressing bottom surface.

7. The device of claim 1, wherein the ironing module includes a switch for adjusting the temperature of the heatable flat pressing bottom surface.

8. The device of claim 1, including a switch for activating/deactivating emission of steam from the steaming module.

9. The device of claim 1, wherein the ironing module is operably and detachably mounted to the steaming module.

10. The device of claim 1, wherein the steaming module and the ironing module are each operably and detachably mounted to the handle at a particular interface, and wherein the handle includes a power cord for providing power to the steaming module in both the first and second configurations, and to the ironing module in the second configuration.

11. The device of claim 1, wherein the ironing module and the steaming module are slidingly engaged from a first direction at an interface.

12. The device of claim 11, wherein a post on at least one of the ironing module and steaming module engages a recess on the other of the ironing module and steaming module.

13. The device of claim 11, wherein the handle and the steaming module are slidingly engaged from a second direction.

14. The device of claim 13, wherein a post on at least one of the handle and steaming module engages a recess on the other of the handle and steaming module.

15. The device of claim 13, wherein a post on at least one of the ironing module and steaming module engages a recess on the other of the ironing module and steaming module.

16. The device of claim 13, wherein a first post on at least one of the ironing module and steaming module engages a first recess on the other of the ironing module and steaming module, and a second post on at least one of the handle and steaming module engages a second recess on the other of the handle and steaming module.

17. The device of claim 13, wherein a portion of one of the handle and steaming module includes male electrical connections, and a portion of the other of the handle and steaming module includes female electrical connections, wherein the male and female electrical connections engage when the handle and steaming module slidably engage from the second direction.

18. The device of claim 13, wherein a portion of one of the handle and ironing module includes male electrical connections, and a portion of the other of the handle and ironing module includes female electrical connections, wherein the male and female electrical connections engage when the handle and steaming module slidably engage from the second direction.

19. The device of claim 13, wherein a portion of one of the handle and ironing module includes male electrical connections, and a portion of the other of the handle and ironing module includes female electrical connections, and a portion of one of the handle and steaming module includes male electrical connections, and a portion of the other of the handle and steaming module includes female electrical

connections, wherein the male and female electrical connections of the handle and steaming module and the male and female connections of the handle and ironing module respectively engage when the handle and steaming module slidably engage from the second direction.

20. The device of claim 13, wherein at least one of the handle and steaming module includes a docking clamp for engaging a docking recess on the other of the handle and steaming module when the handle and steaming module are engaged, and a switch for releasing the docking clamp when disengaging the handle and the steaming module.

21. The device of claim 13, wherein the steaming module includes an aperture for emitting steam operably connected to the heater for producing steam; and the ironing module includes a steam tube for passing steam through the ironing module and emitting steam from the flat pressing bottom surface of the ironing module; wherein the steam tube is directly aligned with the aperture for emitting steam when the device is in the second configuration.

22. A hand-held, convertible pressing iron/steamer device, comprising:

- a steaming module including a compartment for holding water, and a heater for producing steam from the water;
- an ironing module including a heatable flat pressing bottom surface, the ironing module being selectively attachable to the steaming module so as to direct steam through the flat pressing bottom surface; and
- a handle attachable to the steaming module and the ironing module, wherein in a first configuration the handle is operably and detachably mounted to the steaming module alone, and in a second configuration the handle is operably and detachably mounted to the steaming module and the ironing module;

wherein the ironing module and the steaming module are slidingly engaged from a first direction at a first interface, and the handle and the steaming module are slidingly engaged from a second direction at a second interface.

23. The device of claim 22, wherein the first interface includes a first post on at least one of the ironing module and steaming module engages a first recess on the other of the ironing module and steaming module and the second interface includes a second post on at least one of the handle and steaming module that engages a second recess on the other of the handle and steaming module.

24. The device of claim 22, wherein a portion of one of the handle and ironing module includes male electrical connections and a portion of the other of the handle and ironing module includes female electrical connections, and a portion of one of the handle and steaming module includes male electrical connections and a portion of the other of the handle and steaming module includes female electrical connections such that the male and female electrical connections of the handle and steaming module and the male and female connections of the handle and ironing module

respectively engage when the handle and steaming module slidably engage from the second direction.

25. A hand-held, convertible clothes pressing iron/steamer device, comprising:

- a steaming module including a compartment for holding water, a heater for producing steam from the water, and an aperture for emitting steam operably connected to the heater for producing steam;
- an ironing module including a heatable flat pressing bottom surface, a steam tube for passing steam through the ironing module and emitting steam from the flat pressing bottom surface of the ironing module, the ironing module being selectively attachable to the steaming module so as to direct steam through the flat pressing bottom surface when the device is in the second configuration and the steam tube is directly aligned with the aperture for emitting steam; and
- a handle attachable to the steaming module and the ironing module, wherein in a first configuration the handle is operably and detachably mounted to the steaming module alone, and in a second configuration the handle is operably and detachably mounted to the steaming module and the ironing module, wherein the steaming module further includes at least one docking clamp for engaging a particular docking recess on the handle when the handle and steaming module are engaged and a switch for releasing the at least one docking clamp when disengaging the handle and the steaming module;

wherein the ironing module and the steaming module are slidingly engaged from a first direction at a first interface, and the handle and the steaming module are slidingly engaged from a second direction at a second interface, wherein the first interface includes a first post on at least one of the ironing module and steaming module engages a first recess on the other of the ironing module and steaming module and the second interface includes a second post on at least one of the handle and steaming module that engages a second recess on the other of the handle and steaming module; and wherein a portion of one of the handle and ironing module includes male electrical connections and a portion of the other of the handle and ironing module includes female electrical connections, a portion of one of the handle and steaming module includes male electrical connections and a portion of the other of the handle and steaming module includes female electrical connections such that the male and female electrical connections of the handle and steaming module and the male and female connections of the handle and ironing module respectively engage when the handle and steaming module slidably engage from the second direction.

* * * * *