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(54) **COUNTERTOP THERMOELECTRIC ASSEMBLY**

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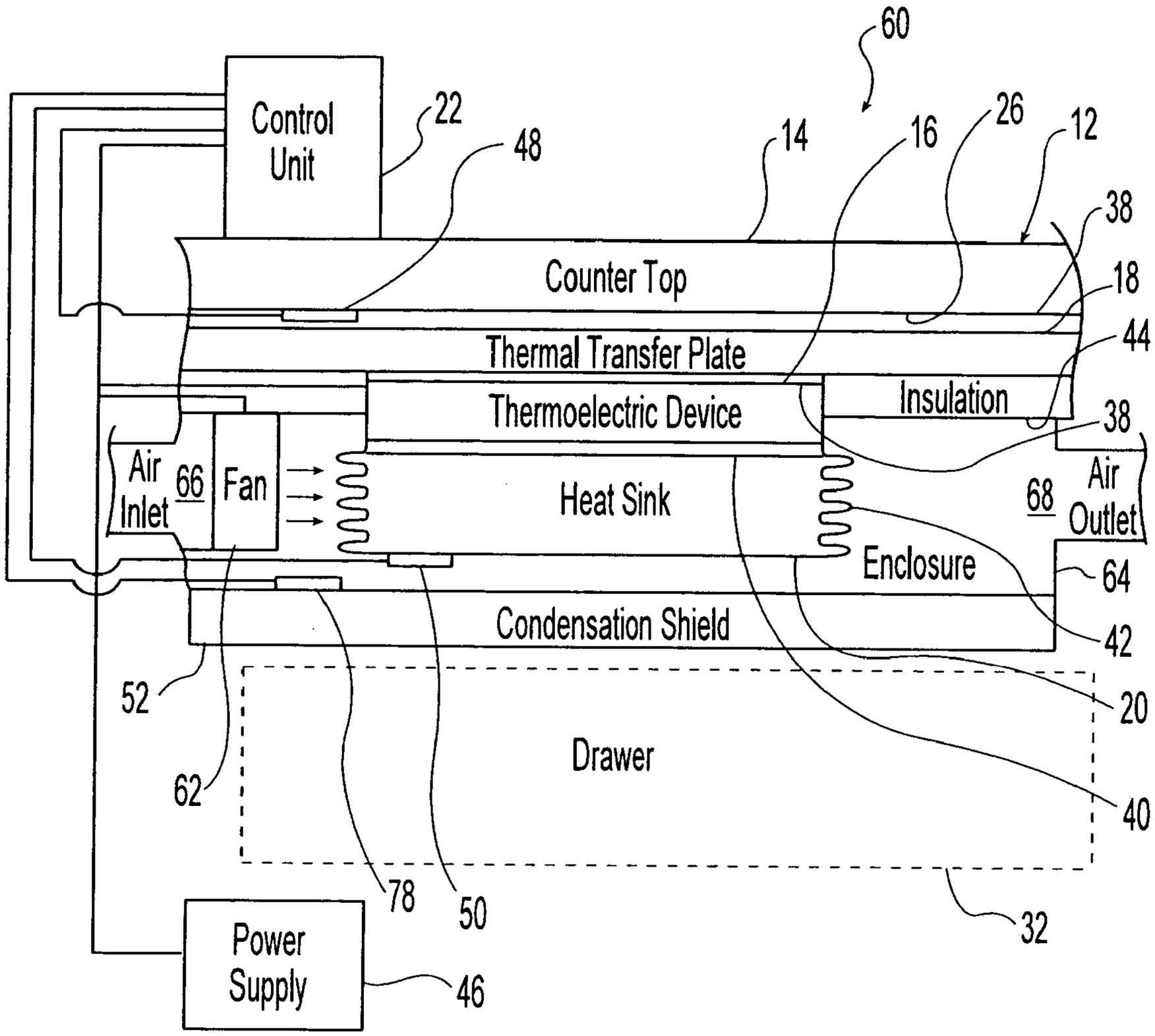
(57) **ABSTRACT**

A countertop thermoelectric assembly includes a countertop forming a food preparation surface at an upper side thereof, at least one Peltier effect device located below the countertop, a thermal transfer plate located between the countertop and the thermoelectric device, a heat sink in thermal communication with the thermoelectric unit, and a controller to selectively operate the thermoelectric unit to cool and/or warm the food preparation surface formed by the countertop. A first temperature sensor located to provide signals representative of a temperature of the countertop. A second temperature sensor located to provide signals representative of a temperature of the heat sink. A condensation shield is located below the heat sink. A moisture sensor is located to provide signals representative of moisture at the condensation shield. At least one fan is located below the countertop to direct air over the heat sink and/or the condensation shield.



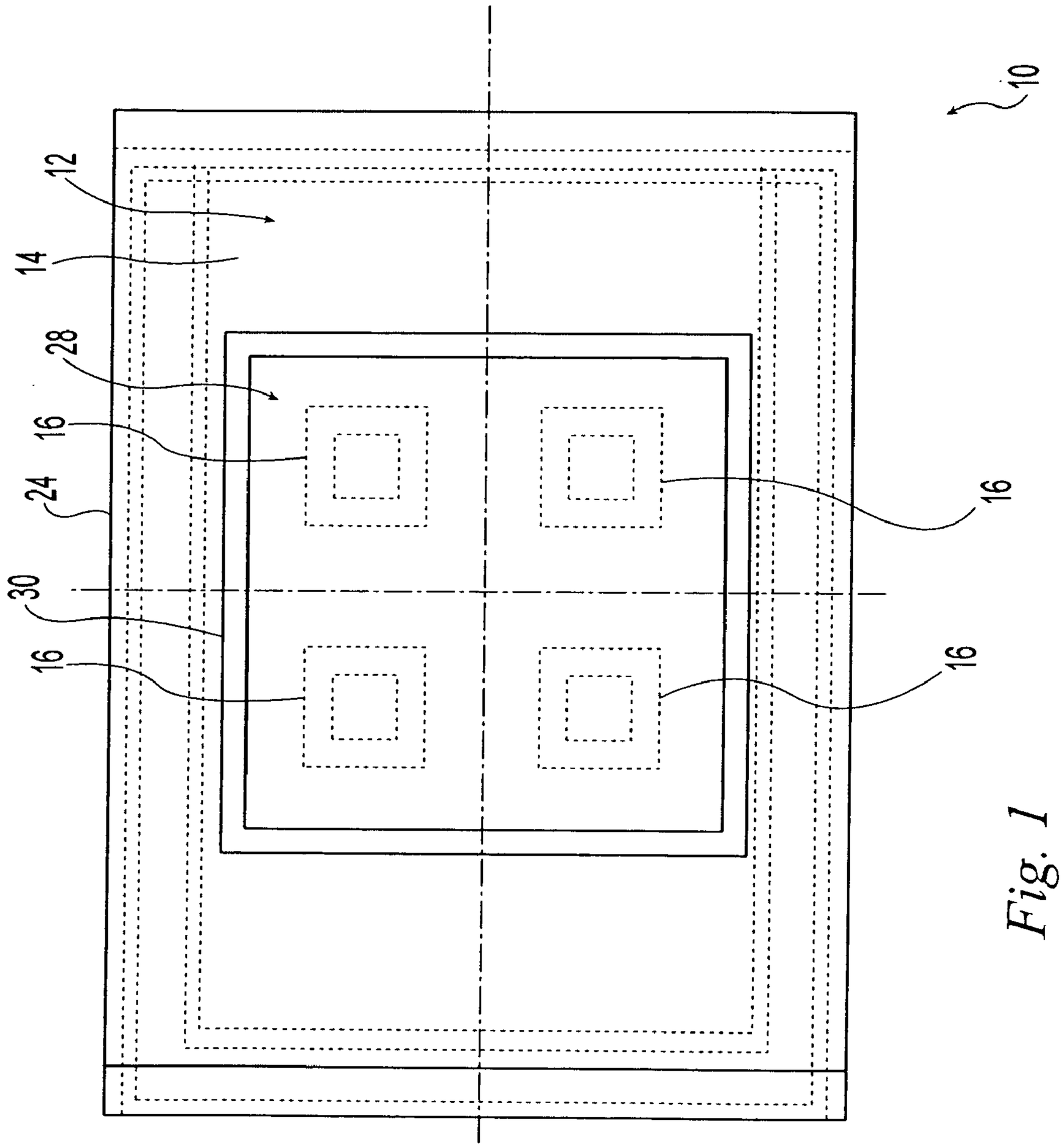


Fig. 1

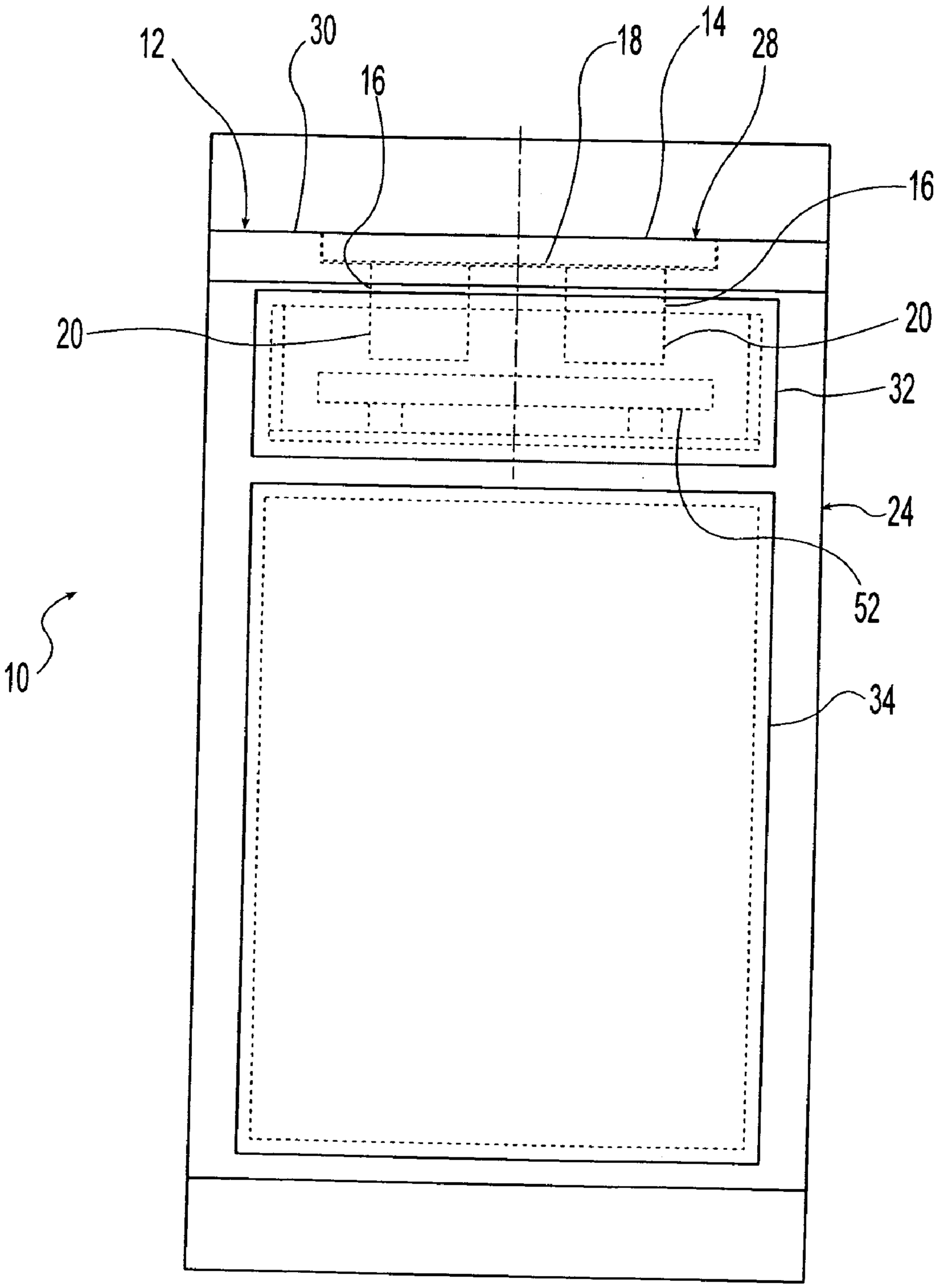


Fig. 2

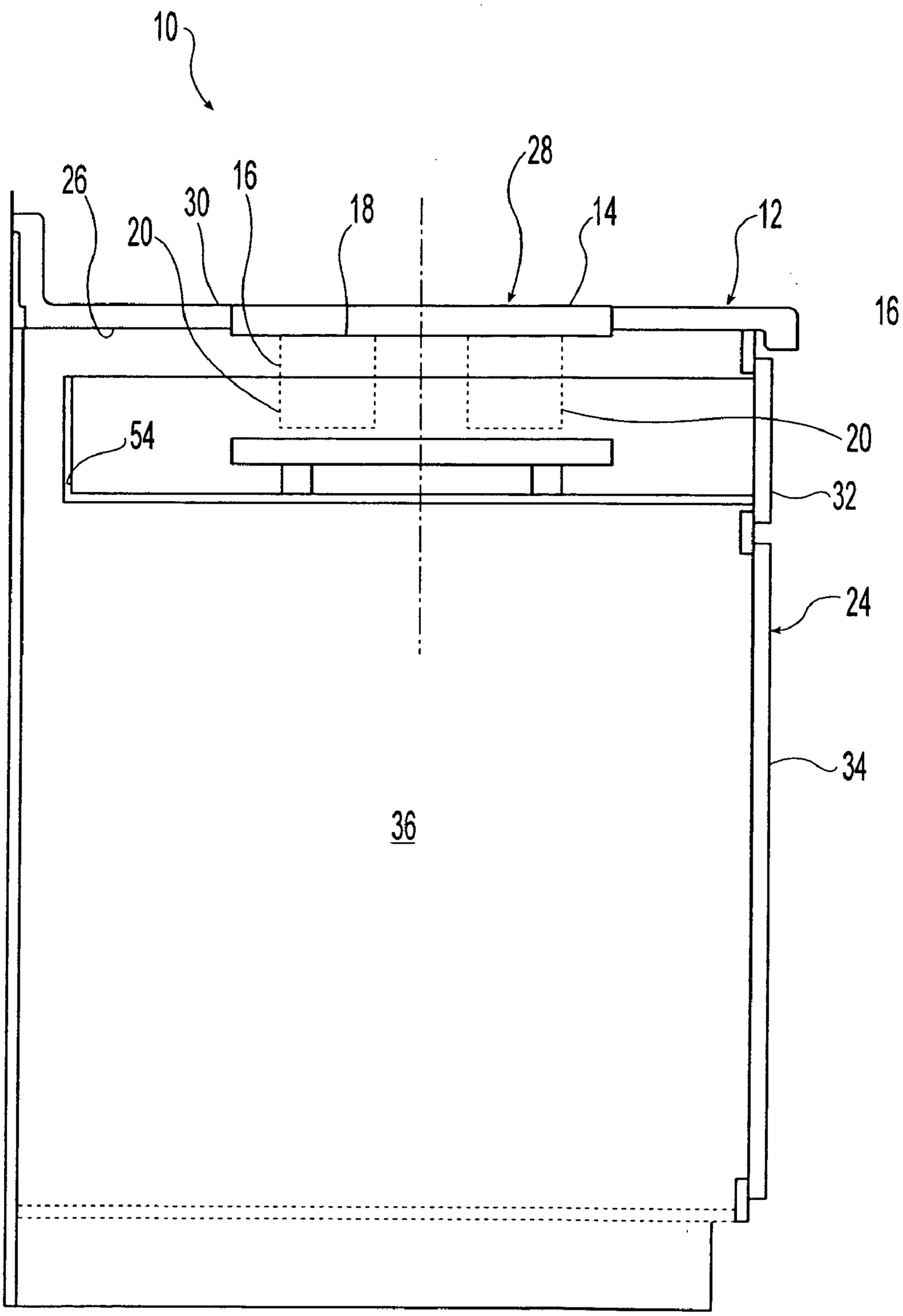


Fig. 3

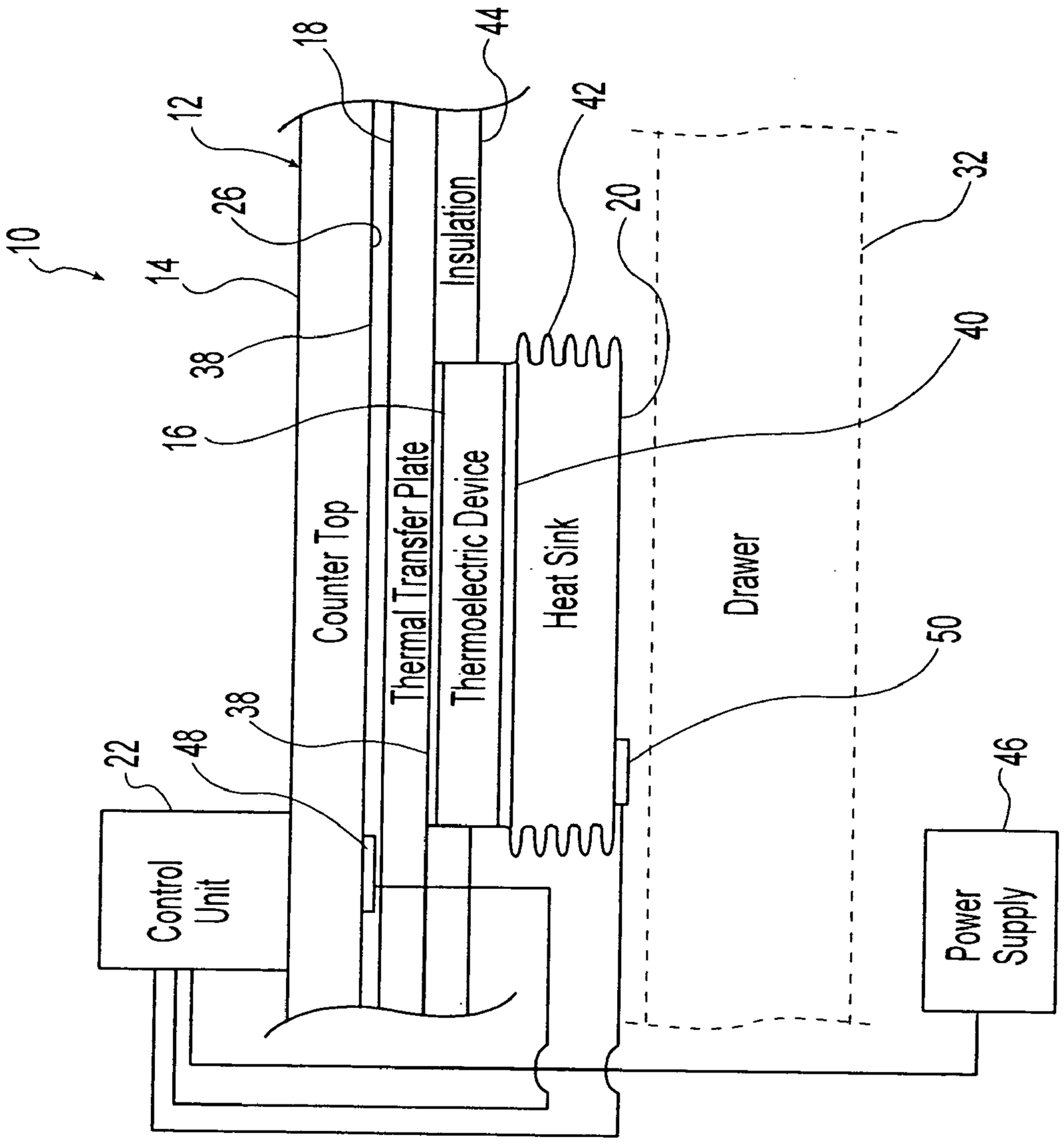

10
12
14
16
18
20
22
26
32
38
40
42
44
46
48
50
Insulation
Counter Top
Thermal Transfer Plate
Thermoelectric Device
Heat Sink
Drawer
Control Unit
Power Supply

Fig. 4

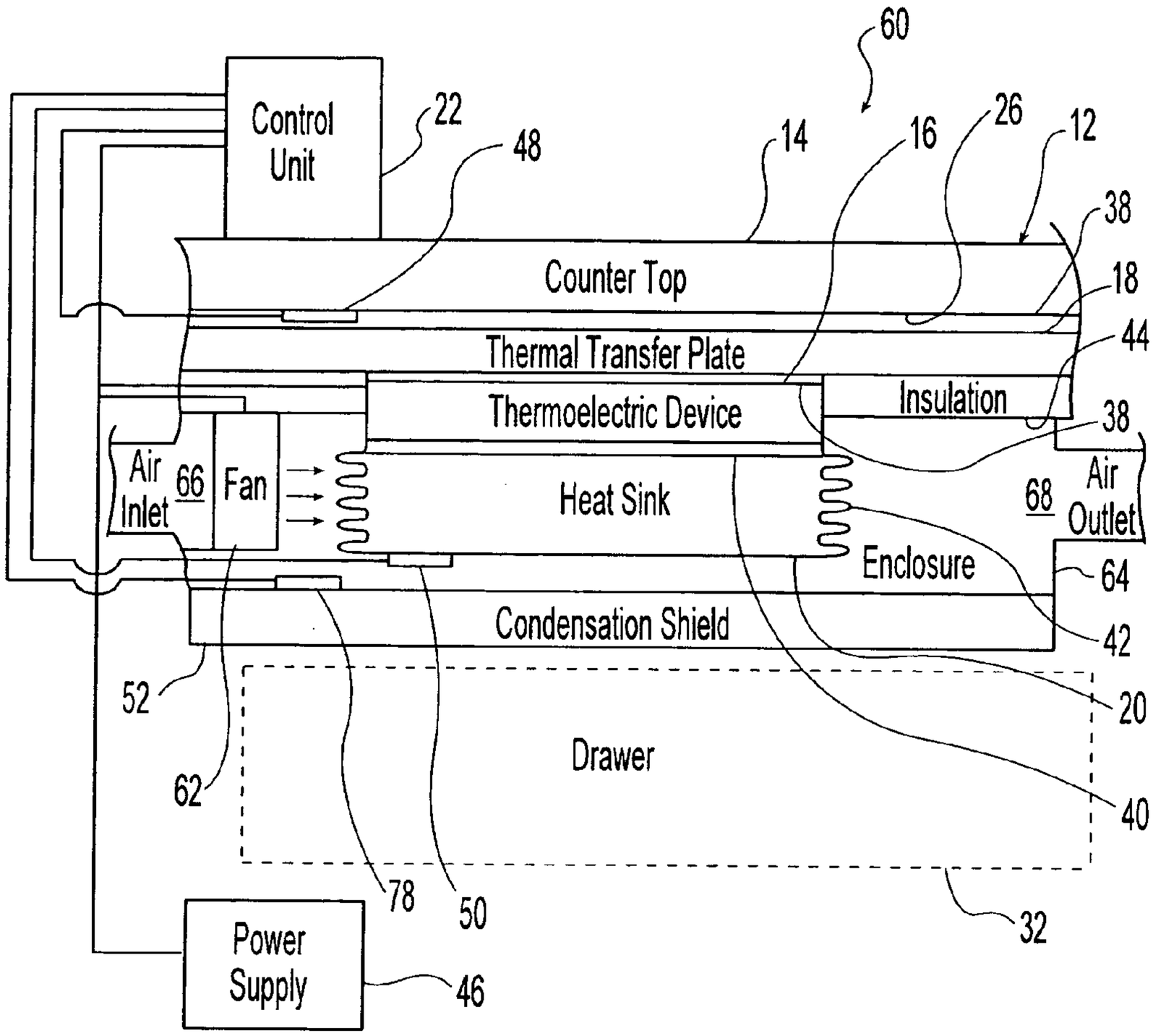

60
Control Unit
22
48
14
16
26
12
38
Counter Top
18
Thermal Transfer Plate
44
Thermoelectric Device
Insulation
38
Air Inlet
66
Fan
Heat Sink
68
Air Outlet
Enclosure
64
Condensation Shield
42
52
20
Drawer
62
40
78
50
32
Power Supply
46

Fig. 5

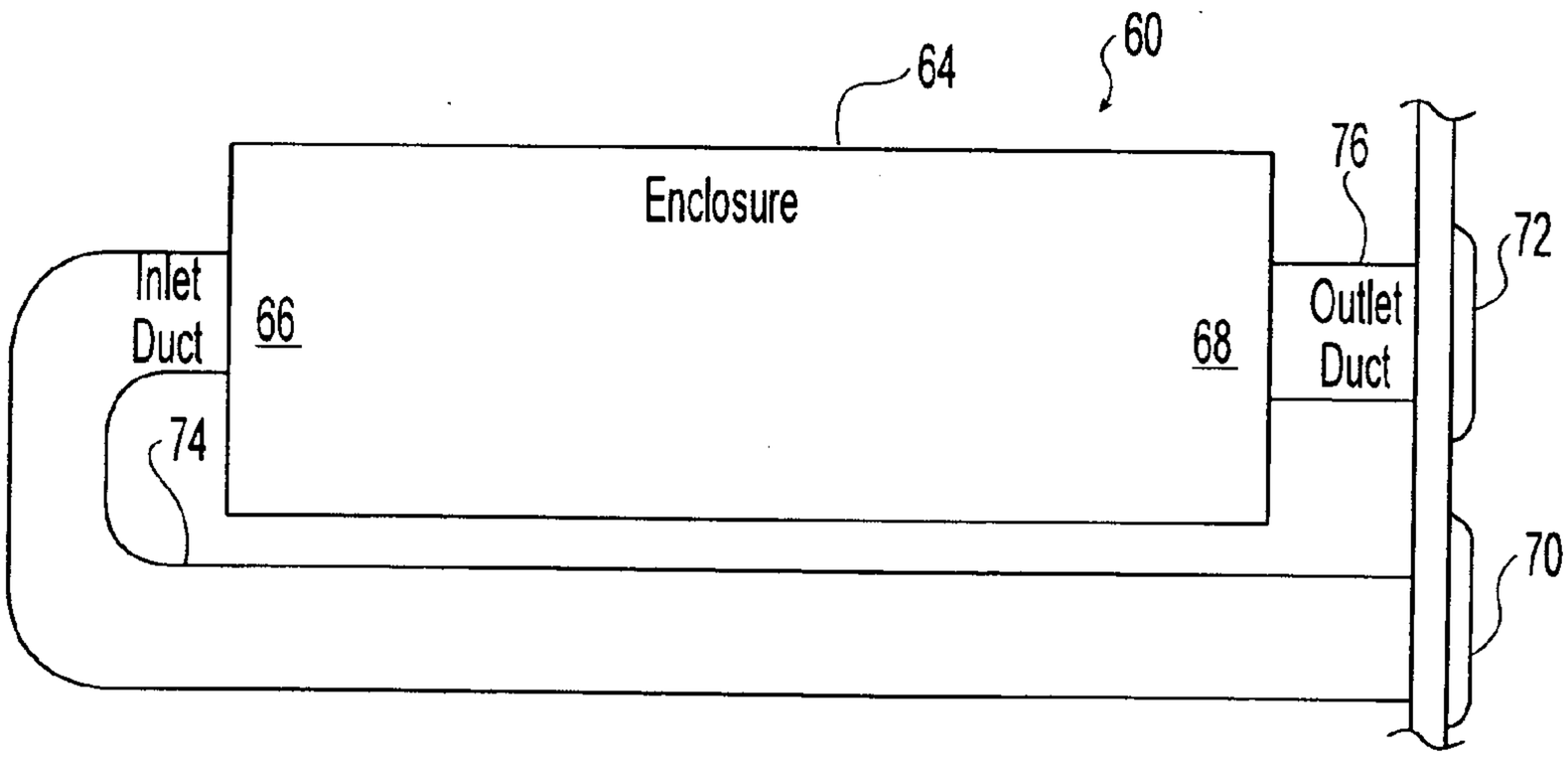

64
60
Enclosure
76
72
Inlet Duct
66
68
Outlet Duct
74
70

Fig. 6

COUNTERTOP THERMOELECTRIC ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH

[0002] Not Applicable

REFERENCE TO MICROFICHE APPENDIX

[0003] Not Applicable

FIELD OF THE INVENTION

[0004] The present invention generally relates to a device for cooling and/or heating a food preparation surface such as a kitchen countertop and, more particularly, to an assembly having a thermoelectric or "Peltier effect" unit for cooling and/or heating a food preparation surface such as a kitchen countertop.

BACKGROUND OF THE INVENTION

[0005] It is sometimes desirable to have a cool working or preparation surface when preparing certain foodstuffs such as, for example, confectioneries like fudge. Such food preparation surfaces are often made from natural stone such as, for example, granite. The natural stone has thermal properties such that it tends to remain relatively cool in most kitchen environments, particularly when the stone has a relatively large thickness. Granite also has other properties such as hardness, scratch resistance, ease of cleaning which make it a desirable material for food preparation surfaces. In commercial kitchens, granite food preparation surfaces and other thermally conductive food preparation surfaces such as, for example, stainless steel are sometimes provided with refrigeration systems to insure a desirable temperature of the preparation surface. An additional benefit of using a granite or other cold preparation surface is that it somewhat cools the ambient temperature of an otherwise warm kitchen environment.

[0006] Granite, stainless steel, and the like are also popular materials for countertops in residential kitchens because of their natural beauty as well as the above-identified properties suitable for food preparation surfaces. However, because of the relatively thin material thickness of residential countertops, the food preparation surface is typically not as naturally cool as desired for preparing some foodstuffs such as, for example, confectionaries like fudge. Additionally, the refrigeration systems used in commercial kitchens are cost and space prohibitive for most residential kitchens.

[0007] It is also sometimes desirable to have a warm working or preparation surface when preparing certain foodstuffs such as, for example, baked goods like bread. In commercial kitchens, food preparation surfaces are sometimes provided with heater systems to insure a desirable temperature at the preparation surface. Residential cooking stoves or ranges sometimes have smooth top cooking surfaces but these cooking surfaces provide temperatures which are too high to operate as a food preparation surface for some operations where cooking is not desired such as, for example, a warm surface for rising bread. Additionally, the heater systems used in commercial kitchens are cost and space prohibitive for most residential kitchens.

[0008] Therefore, most "home chefs" must make do with less than ideal conditions and commercial chefs must purchase multiple systems which are relatively expensive and space consuming. Accordingly, there is a need in the art for an improved device for cooling and/or heating food preparation surfaces such as a countertop or the like.

SUMMARY OF THE INVENTION

[0009] The present invention provides a countertop thermoelectric assembly which overcomes at least some of the above-noted problems of the related art. According to the present invention, a thermoelectric assembly comprises, in combination, a panel forming a preparation surface at an upper side thereof, at least one thermoelectric unit located below the panel and in thermal communication with the panel, a heat sink in thermal communication with the thermoelectric unit, and a controller in electrical communication with the thermoelectric unit to selectively operate the thermoelectric unit to change a temperature of the preparation surface.

[0010] According to another aspect of the present invention, a countertop thermoelectric assembly comprises, in combination, a portion of a countertop forming a food preparation surface at an upper side thereof and at least one thermoelectric unit located below the countertop and in thermal communication with the countertop. The thermoelectric unit is a Peltier effect device. A thermal transfer plate is located between the countertop and the thermoelectric device. A heat sink is in thermal communication with the thermoelectric unit. A controller is in electrical communication with the thermoelectric unit to selectively operate the thermoelectric unit to change a temperature of the food preparation surface formed by the countertop. A first temperature sensor is in electrical communication with the controller and located to provide signals representative of a temperature of the countertop. A second temperature sensor is in electrical communication with the controller and located to provide signals representative of a temperature of the heat sink.

[0011] According to yet another aspect of the present invention, a countertop thermoelectric assembly comprises, in combination, a portion of a countertop forming a food preparation surface at an upper side thereof and at least one thermoelectric unit located below the countertop and in thermal communication with the countertop. The thermoelectric unit is a Peltier effect device. A thermal transfer plate is located between the countertop and the thermoelectric device. A heat sink is in thermal communication with the thermoelectric unit. A controller is in electrical communication with the thermoelectric unit to operate the thermoelectric unit to selectively cool and warm the food preparation surface formed by the countertop. A first temperature sensor is in electrical communication with the controller and located to provide signals representative of a temperature of the countertop. A second temperature sensor is in electrical communication with the controller and located to provide signals representative of a temperature of the heat sink. A condensation shield is located below the heat sink and a moisture sensor in electrical communication with the controller and located to provide signals representative of moisture at the condensation shield.

[0012] From the foregoing disclosure and the following more detailed description of various preferred embodiments it will be apparent to those skilled in the art that the present invention provides a significant advance in the technology and art of thermal control units for food preparation surfaces. Particularly significant in this regard is the potential the invention affords for providing a high quality, reliable, low cost assembly. Additional features and advantages of various preferred embodiments will be better understood in view of the detailed description provided below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] These and further features of the present invention will be apparent with reference to the following description and drawing, wherein:

[0014] **FIG. 1** is a top plan view of a countertop thermoelectric assembly according to the present invention;

[0015] **FIG. 2** is a front elevational view of the countertop thermoelectric assembly of **FIG. 1**;

[0016] **FIG. 3** is a side elevational view of the thermoelectric assembly of **FIGS. 1 and 2**;

[0017] **FIG. 4** is a diagrammatic view of the thermoelectric assembly of FIGS. **1** to **3**;

[0018] **FIG. 5** is a diagrammatic view of an alternative thermoelectric assembly according to the present invention; and

[0019] **FIG. 6** is a diagrammatic view of the thermoelectric assembly of **FIG. 5** showing inlet and outlet vents.

[0020] It should be understood that the appended drawings are not necessarily to scale, presenting a somewhat simplified representation of various preferred features illustrative of the basic principles of the invention. The specific design features of a countertop thermoelectric assembly as disclosed herein, including, for example, specific components, shapes and dimensions will be determined in part by the particular intended application and use environment. Certain features of the illustrated embodiments have been enlarged or distorted relative to others to facilitate visualization and clear understanding. In particular, thin features may be thickened, for example, for clarity or illustration. All references to direction and position, unless otherwise indicated, refer to the orientation of the countertop thermoelectric assembly illustrated in the drawings. In general, up or upward refers to an upward direction within the plane of the paper in **FIGS. 2 and 3** and down or downward refers to a downward direction within the plane of the paper in **FIGS. 2 and 3**. Also in general, fore or forward refers to a direction toward the front of the countertop and/or kitchen cabinet, that is, a rightward direction within the plane of the paper in **FIG. 3** and aft or rearward refers to a direction toward the rear of the countertop and/or kitchen cabinet, that is, a leftward direction within the plane of the paper in **FIG. 3**.

DETAILED DESCRIPTION OF CERTAIN PREFERRED EMBODIMENTS

[0021] It will be apparent to those skilled in the art, that is, to those who have knowledge or experience in this area of technology, that many uses and design variations are possible for the improved countertop thermoelectric assemblies disclosed herein. The following detailed discussion of various alternative and preferred embodiments will illustrate the general principles of the invention with reference to countertop thermoelectric assemblies for use in cooling and/or heating residential or home food preparation surfaces such as kitchen countertops. Other embodiments suitable for other applications such as, for example, commercial food preparation surfaces or the like will be apparent to those skilled in the art given the benefit of this disclosure.

[0022] Referring now to the drawings, FIGS. **1** to **4** show a countertop thermoelectric assembly **10** installed on a residential kitchen countertop according to the present invention. The thermoelectric assembly **10** includes a panel such as a countertop **12** forming a food preparation surface **14**, at least one thermoelectric device or unit **16** located below the countertop **12** and in thermal communication with the countertop **12**, a thermal transfer plate or cold sink **18** located between the countertop **12** and the thermoelectric unit **16**, a thermal transfer body or heat sink **20** in thermal communication with the thermoelectric unit **16**, and a controller or control unit **22** in electrical communication with the thermoelectric unit **16** to selectively operate the thermoelectric unit **16** to cool and/or warm the preparation surface **14**.

[0023] The illustrated thermoelectric assembly **10** is installed on a standard kitchen cabinet **24** supporting the countertop or panel **12**. The panel **12** covers the open top of the cabinet **24** and has a planar top surface which forms the food preparation surface **14** and a planar bottom surface **26** facing the interior space of the cabinet **24**. The panel **12** preferably comprises a solid surface counter material such as, for example, natural stone like granite or marble, stainless steel, poured concrete or man-made solid surface counter materials but any other suitable material can alternatively be utilized. The illustrated countertop **12** includes an insert panel **28** held in an opening in the panel **12** by a support bracket **30**. The illustrated support bracket **30** is generally Z-shaped in cross-section but another other suitable bracket or support means can alternatively be utilized. The illustrated insert panel **28** has a planar top surface **2** which forms the food preparation surface and a planar bottom surface facing the interior space of the cabinet **24**. The insert panel **28** is positioned so that the upper surfaces of the panel **12** and the insert panel **28** form the substantially continuous food preparation surface **14**. The insert panel **28** preferably comprises solid surface counter material such as, for example, a natural stone material like granite or marble, or man-made solid surface counter materials but any other material suitable for cooling and/or warming by the thermoelectric unit **16** can alternatively be utilized. It noted that the insert panel **28** can alternatively be eliminated so that the thermoelectric unit **16** directly cools and/or warms the panel **12** without the opening or the insert panel **28**. It is further noted that the insert panel **28** is preferably eliminated when the panel **12** comprises a suitable material for cooling and/or warming by the thermoelectric unit **16** such as, for example, a natural stone material (best shown in **FIG. 4**) but the insert panel **28** is preferably utilized when the panel **12** comprises a material not suitable for cooling and/or warming by the thermoelectric unit **16** such as, for example, a laminate material (best shown in FIGS. **1** to **3**).

[0024] The illustrated cabinet **24** has a drawer **32** located near the top of the cabinet **24** which opens in a forward. Mounted in this manner, the open top of the drawer **32** faces

the bottom surface **26** of the countertop **12** when the drawer **32** is closed. Below the drawer **32** is a hinged door **34** which selectively provides access to a storage space **36** located below the drawer **32**. It is noted that the cabinet **24** can alternatively have any suitable, size, shape, and form such as, for example, the drawer **32** and/or hinged door **34** could be altered and/or eliminated.

[**0025**] As best shown in **FIG. 4**, the illustrated thermoelectric unit **16** is located below the panel **12** and in thermal communication with the panel **12** so that operation of the thermoelectric unit **16** cools and/or heats the panel **12** so that the food preparation surface **14** is at a desired temperature. The thermoelectric unit **16** is preferably a Peltier effect device, that is a device sometimes referred to as a "semiconductor refrigerator" that works according to the Peltier effect and either cools or warms an object depending on the direction of current flow therethrough. Such a thermoelectric device **16** typically includes an array of semiconductor couples electrically connected in series and thermally connected in parallel. The semiconductor couples are typically sandwiched between metalized ceramic substrates. When DC electric current is applied in series to the thermoelectric device **16**, it acts as a heat pump with heat being absorbed on the cold side, thereby cooling it, while heat is dissipated at the other side. Reversing the current causes the direction of heat flow to be reversed. Attaching a heat sink **20** and a cold sink **18** to the respective hot and cold sides enhances the efficiency of the thermoelectric device **16**.

[**0026**] It is noted that more than one thermal electric unit **16** can be stacked together to produce a sharper thermal gradient and decrease the cooling or warming time for the area of the food preparation surface **14** to be cooled or warmed. It is also noted that more than one thermal electric unit **16** or more than one stack of thermoelectric units **16** can be utilized to increase the overall area of the food preparation surface **14** to be cooled or warmed or, if adequately spaced, to provide more than one distinctly different area of the food preparation surface **14** to be independently cooled or warmed. The thermoelectric assembly **10** of FIGS. **1** to **3**, utilizes four of the thermoelectric units **16** to create a relatively large area of the food preparation surface **14** which is cooled and warmed.

[**0027**] As best shown in **FIG. 4**, the thermal transfer plate **18** is a substantially planar member located between the thermoelectric unit **16** and the bottom surface **26** of the panel **12**. The thermal transfer plate **18** preferably is sized substantially equal to area of the food preparation surface **14** which is desired to be cooled and/or warmed. The thermal transfer plate **18** provides a larger footprint than the thermoelectric unit **16** to aid in the transfer of heat over a larger area. The thermal transfer plate **18** preferably comprises a material having a relatively high coefficient of thermal conductivity such as, for example, copper, aluminum, and/or the like. The thermal transfer plate **18** is preferably provided with a suitable thermal transfer medium **38** such as, for example, thermal transfer grease or tape at its interfaces with the panel **12** and the thermoelectric unit **16** to improve heat transfer therebetween.

[**0028**] The heat sink **20** is located below the thermoelectric unit **16** and in thermal communication therewith. The heat sink **20** can be unitary with the thermoelectric unit **16** or suitably connected thereto. The heat sink **20** is preferably provided with a suitable thermal transfer medium **40** such as, for example, thermal transfer grease or tape at its interface with the thermoelectric unit **16** to improve heat transfer therebetween. The heat sink **20** is sized and shaped to provide a suitable surface area for the transfer of heat. The heat sink **20** is preferably provided with fins **42** to increase its exterior surface area. The heat sink **20** preferably comprises a material having a relatively high coefficient of thermal conductivity such as, for example, copper, aluminum, and/or the like.

[**0029**] A layer of thermally insulating material **44** is preferably provided at the lower side of the thermal transfer plate **18** to ensure that the thermal gradient does not "self cancel." The layer **44** preferably cover substantially all of the lower surface of the thermal transfer plate **18** which is not covered by the thermoelectric unit or units **16**. The layer **44** can comprise any suitable thermally insulating material.

[**0030**] The controller or control unit **22** is adapted to control operation of the thermoelectric assembly **10** so that the thermoelectric unit **16** selectively cools and/or warms the panel **12**. The control unit **22** is in electrical communication with the thermoelectric unit **16** and a suitable power supply **46**. The electric communication can be provided by hard wiring, wireless technology, or a combination. The wireless technology utilized can be, for example, X-10, Bluetooth, or other communication protocols. The illustrated control unit **22** is located above the countertop **12** but can alternatively be located at any other desired location. The control unit **22** preferably includes user input means for initiating cooling and/or warming of the panel **12** by the thermoelectric unit **16**, selecting one of multiple temperature settings such as, for example high and low settings (the control unit **22** can alternatively permit the input of a desired temperature), selecting a duration of time for operation of the thermoelectric unit **16** until operation of the unit automatically shuts off such as, for example, duration of between thirty minutes and two hours (the control unit **22** can alternatively operate the thermoelectric unit **16** for a predetermined non-user adjusted period of time),and selecting between more than one temperature controlled zone when applicable. It is noted that the thermoelectric assembly **10** operates within a temperature range which warms the panel **12** to aid in food preparation but does not heat the panel **12** to a temperature which cooks food.

[**0031**] The illustrated thermoelectric assembly **10** also includes first and second temperature sensors **48**, **50** which are in electrical communication with the control unit **22**. The first temperature sensor **48** is located at the bottom surface **26** of the countertop **12** to provide a signal representative of the temperature at the countertop **12**. The control unit **22** can use this signal to stop operation of the thermoelectric unit **16** or activate a fan (as described in more detail hereinafter) when the countertop temperature reaches a predetermined cutoff temperature or when a predetermined temperature gradient is present across the thermoelectric unit **16**. The second temperature sensor **50** is located at the heat sink **20** to provide a signal representative of the temperature of the heat sink **20**. The control unit **22** preferably uses this signal to stop operation of the thermoelectric unit **16** or activate a fan (as described in more detail hereinafter) when the heat sink **20** temperature reaches a predetermined cutoff temperature or when a predetermined temperature gradient is present across the thermoelectric unit **16**. The temperature

sensors **48**, **50** can be any suitable type of device which provides a signal representative the temperature of a desired location.

[**0032**] The illustrated thermoelectric assembly **10** of FIGS. **1** to **3**, includes a condensation guard **52** in the form of a tray or container for catching and holding condensation which drips from the heat sink **20**. The illustrated condensation guard **52** sits in the drawer **32** of the cabinet **24** below the heat sink **20** when the drawer **32** is closed. It is noted that the condensation guard **52** can take other shapes, sizes and locations.

[**0033**] As best shown in **FIG. 4**, the various components of the thermoelectric assembly **10** are preferably sized and shaped so that the thermoelectric assembly **10** has a height small enough that the thermoelectric assembly **10** is located entirely above the top of the drawer **32**. The components of the thermoelectric assembly **10** preferably extend below bottom surface **26** of the panel **12** no more than about 1.5 to about 2 inches. Sized in this manner, the drawer **32** can be opening and closed in a normal manner without damage to the thermoelectric assembly **10** and/or drawer **32** or alteration to the cabinet **24** or the drawer **32**. If the thermoelectric assembly **10** extends below the top of the drawer **32**, the drawer **32** is preferably provided with a notch or openings **54**, so that the drawer **32** can be opened and closed without contacting the thermoelectric assembly **10**.

[**0034**] It is noted that solid surface countertops do not allow any direct means of attachment thereto. Therefore, when a solid surface countertop is present, a mounting bracket assembly is used to secure the thermoelectric assembly **10** to the cabinet **24** and support the thermoelectric assembly **10** in the desired position in contact with the bottom surface **26** of the panel **12**. It is believed that a mounting bracket similar to a cabinet drawer runner can be affixed horizontally in the cabinet **24** with a spring member and/or adjusting member which provides upward pressure to keep the assembly pressed against the bottom surface **26** of the panel **12**. When an insert panel **28** is used in conjunction with a non-solid surface countertop, a mounting bracket can secure the thermoelectric assembly **10** as described above, directly to the countertop **12**, or to the support bracket **30** of the insert pane **28**.

[**0035**] **FIGS. 5 and 6** show a countertop thermoelectric assembly **60** according to a second embodiment of the invention which is substantially the same as the thermoelectric assembly **10** of FIGS. **1** to **4** and common reference numbers are utilized throughout. The thermoelectric assembly **60** additionally includes at least one electric fan **62** which is located to direct air over the heat sink **20** to aid in the dissipation of heat therefrom. Additional fans **62** can be provided for this and/or other purposes such as for example, ventilation, backup in case of failure of the first fan **62**, to dry the condensation guard **52**. The illustrated embodiment positions a single fan **62** for directing air over both the heat sink **20** and the condensation guard **52**.

[**0036**] The illustrated thermoelectric assembly **60** also is provided with a housing or enclosure **64** which encloses the thermoelectric unit **16** and the heat sink **20**. The enclosure **64** is provided with an air inlet **66** and an air outlet **68**. The illustrated air inlet **66** and air outlet **68** are connected to inlet and outlet vents **70**, **72** in the front of the cabinet **24** by inlet and outlet ducts or conduits **74**, **76**. The ducts **74**, **76** are preferably flexible tubes but can alternatively can any suitable form. Fresh air from the room enters the first vent **70** and travels through the first duct **74** to the air inlet **66**, through the air inlet **66** into the enclosure **64**, through the enclosure **64** over the heat sink **20** and condensation guard **52**, out of the enclosure **64** through the air outlet **68**, through the second duct **76** to the second vent **72** and back into the room. Circulation continues as long as the fan **62** operates. It is noted that alternatively, the inlet vent **70** and inlet duct **74** can be eliminated so that are is drawn from the interior space **36** of the cabinet **24** when there is adequate air mass available within the cabinet. The fan **62** can operate whenever the thermoelectric unit **16** is operating and/or can be activated when certain predetermined conditions are present. The illustrated condensation guard **52** is in the form of a tray at the bottom of the enclosure **64**. The illustrated condensation guard **52** forms the lower portion of the enclosure **64** and provides protection against condensation dripping into the drawer **32** from the heat sink **20**.

[**0037**] The illustrated thermoelectric assembly **60** also is provided with a water or moisture sensor **78** in electrical communication with the with the control unit **22**. The moisture sensor **78** is located to provide a signal representative of the moisture at the condensation guard **52** and/or within the enclosure **64**. The control unit **22** preferably uses this signal to continue operation of the fan **62** or activate the fan **62** until all water in the condensation guard **52** and/or enclosure **64** is evaporated. The moisture sensor **78** can be any suitable type of device which provides a signal representing the presence of moisture or water at a desired location.

[**0038**] From the above description, it should be appreciated that the present invention provides a countertop thermoelectric assembly **10** and method for warming and cooling a countertop which is relatively simple and inexpensive to produce and operate.

[**0039**] From the foregoing disclosure and detailed description of certain preferred embodiments, it will be apparent that various modifications, additions and other alternative embodiments are possible without departing from the true scope and spirit of the present invention. The embodiments discussed were chosen and described to provide the best illustration of the principles of the present invention and its practical application to thereby enable one of ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the present invention as determined by the appended claims when interpreted in accordance with the benefit to which they are fairly, legally, and equitably entitled.

1. A thermoelectric assembly comprising, in combination:

a built-in kitchen cabinet having a hinged door to selectively provide access to an interior storage space of the kitchen cabinet;

wherein the kitchen cabinet has an open top;

a kitchen countertop supported on a top of the kitchen cabinet and closing the open top of the kitchen cabinet;

wherein at least a portion of the countertop forms a food preparation surface at an upper side thereof;

at least one thermoelectric unit located below the countertop within the kitchen cabinet and in thermal communication with the countertop;

a heat sink in thermal communication with the thermoelectric unit; and

a controller in electrical communication with the thermoelectric unit to selectively operate the thermoelectric unit to change a temperature of the food preparation surface without substantially changing a temperature of the interior storage space.

2. The thermoelectric assembly according to claim 1, wherein the thermoelectric unit is a Peltier effect device.

3. The thermoelectric assembly according to claim 1, wherein the countertop comprises at least one material selected from the group of natural stone, stainless steel and concrete.

4. The thermoelectric assembly according to claim 1, wherein the kitchen cabinet includes a storage drawer located between the open top and the interior storage space and the thermoelectric device is located above the drawer and does not substantially change an interior temperature of the storage drawer.

5. The thermoelectric assembly according to claim 1, further comprising a thermal transfer plate located between the countertop and the thermoelectric device.

6. The thermoelectric assembly according to claim 5, wherein the thermal transfer plate comprises a material having a relatively high thermal conductivity.

7. The thermoelectric assembly according to claim 5, wherein the thermal transfer plate extends beyond the thermoelectric unit and at least a portion of a lower side of the thermal transfer plate is provided with insulation.

8. The thermoelectric assembly according to claim 1, further comprising a temperature sensor in electrical communication with the controller and located to provide signals representative of a temperature of the preparation surface.

9. The thermoelectric assembly according to claim 8, further comprising at least one fan located below the countertop and within the kitchen cabinet to direct air over the heat sink, and wherein the controller operates the fan after the controller stops operation of the thermoelectric until signals from the temperature sensor indicate that a thermal load of the thermoelectric unit is above or below a predetermined level.

10. The thermoelectric assembly according to claim 1, further comprising a temperature sensor in electrical communication with the controller and located to provide signals representative of a temperature of the heat sink.

11. The thermoelectric assembly according to claim 10, further comprising at least one fan located below the countertop and within the kitchen cabinet to direct air over the heat sink, and wherein the controller operates the fan after the controller stops operation of the thermoelectric until signals from the temperature sensor indicate that a thermal load of the thermoelectric unit is above or below a predetermined level.

12. The thermoelectric assembly according to claim 1, further comprising at least one fan located below the countertop and within the kitchen cabinet to direct air over the heat sink.

13. The thermoelectric assembly according to claim 12, further comprising an enclosure about the heat sink and the fan and having an air outlet.

14. The thermoelectric assembly according to claim 13, wherein the air inlet and the air outlet are each in communication with an external environment about the kitchen cabinet through vents in a front wall of the kitchen cabinet.

15. The thermoelectric assembly according to claim 1, further comprising a condensation shield located below the heat sink.

16. A thermoelectric assembly comprising, in combination:

a panel forming a preparation surface at an upper side thereof;

at least one thermoelectric unit located below the panel and in thermal communication with the panel;

a heat sink in thermal communication with the thermoelectric unit;

a controller in electrical communication with the thermoelectric unit to selectively operate the thermoelectric unit to change a temperature of the preparation surface;

a condensation shield located below the heat sink; and

a moisture sensor in electrical communication with the controller and located to provide signals representative of moisture at the condensation shield.

17. The thermoelectric assembly according to claim 16, further comprising at least one fan located below the panel to direct air over the condensation shield, and wherein the controller operates the fan after the controller has stopped operation of the thermoelectric unit when signals from the moisture sensor indicate moisture is not present at the condensation shield.

18. The thermoelectric assembly according to claim 16, further comprising at least one fan located below the panel to direct air over the condensation shield, and wherein the controller operates the fan when signals from the moisture sensor indicate moisture is present at the condensation shield.

19. The thermoelectric assembly according to claim 1, wherein the controller is in electrical communication with the thermoelectric unit to operate the thermoelectric unit to selectively cool and warm the preparation surface.

20. A countertop thermoelectric assembly comprising, in combination:

a built-in kitchen cabinet having a hinged door to selectively Provide access to an interior storage space of the kitchen cabinet;

wherein the kitchen cabinet has an open top;

a kitchen countertop supporting the kitchen cabinet and closing the open top of the kitchen cabinet;

wherein at least a portion of a the countertop forms a food preparation surface at an upper side thereof;

at least one thermoelectric unit located below the countertop within the kitchen cabinet and in thermal communication with the countertop through the open top of the kitchen cabinet;

wherein the thermoelectric unit is a Peltier effect device;

a thermal transfer plate located between the countertop and the thermoelectric device;

a heat sink in thermal communication with the thermoelectric unit;

a controller in electrical communication with the thermoelectric unit to selectively operate the thermoelectric unit to change a temperature of the food preparation surface formed by the countertop without substantially changing a temperature of the interior storage space;

a first temperature sensor in electrical communication with the controller and located to provide signals representative of a temperature of the countertop; and

a second temperature sensor in electrical communication with the controller and located to provide signals representative of a temperature of the heat sink.

21. The countertop thermoelectric assembly according to claim 20, further comprising at least one fan located below the countertop to direct air over the heat sink.

22. The countertop thermoelectric assembly according to claim 21, further comprising an enclosure about the heat sink and the fan and having an air outlet.

23. The thermoelectric assembly according to claim 20, wherein the controller is in electrical communication with the thermoelectric unit to operate the thermoelectric unit to selectively cool and warm the preparation surface.

24. A countertop thermoelectric assembly comprising, in combination:

a portion of a countertop forming a food preparation surface at an upper side thereof;

at least one thermoelectric unit located below the countertop and in thermal communication with the countertop;

wherein the thermoelectric unit is a Peltier effect device;

a thermal transfer plate located between the countertop and the thermoelectric device;

a heat sink in thermal communication with the thermoelectric unit;

a controller in electrical communication with the thermoelectric unit to operate the thermoelectric unit to selectively cool and warm the food preparation surface formed by the countertop;

a first temperature sensor in electrical communication with the controller and located to provide signals representative of a temperature of the countertop;

a second temperature sensor in electrical communication with the controller and located to provide signals representative of a temperature of the heat sink;

a condensation shield located below the heat sink; and

a moisture sensor in electrical communication with the controller and located to provide signals representative of moisture at the condensation shield.

25. The countertop thermoelectric assembly according to claim 24, further comprising at least one fan located below the countertop to direct air over the heat sink.

26. The countertop thermoelectric assembly according to claim 25, further comprising an enclosure about the heat sink and the fan and having an air outlet.

27. The countertop thermoelectric assembly according to claim 24, further comprising at least one fan located below the countertop to direct air over the condensation shield.

28. The countertop thermoelectric assembly according to claim 1, wherein the countertop includes an insert panel having a planar top surface forming the food preparation surface and flush with a planar top surface of a portion of the countertop surrounding the insert panel.

29. The thermoelectric assembly according to claim 4, wherein the thermoelectric unit has a low profile so that the thermoelectric unit is located entirely above the effective storage space of the drawer.

30. The countertop thermoelectric assembly according to claim 20, wherein the kitchen cabinet includes a storage drawer located between the open top and the interior storage space and the thermoelectric device is located above the drawer and does not substantially change an interior temperature of the storage drawer.

31. The countertop thermoelectric assembly according to claim 30, wherein the thermoelectric unit has a low profile so that the thermoelectric unit is located entirely above the effective storage space of the drawer.

32. The countertop thermoelectric assembly according to claim 20, wherein the countertop includes an insert panel having a planar top surface forming the food preparation surface and flush with a planar top surface of a portion of the countertop surrounding the insert panel.

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