# EXHIBIT 6

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(54) **THERMOSTAT WITH OFFSET DRIVE**

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(51) **Int. Cl.**
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***G05D 23/00*** (2006.01)
***G05D 23/12*** (2006.01)

(52) **U.S. Cl.** ...................... **236/1 C**; 236/47; 236/78 D; 236/94; 388/824

(58) **Field of Classification Search** ................ 236/1 C, 236/47, 78 D, 94; 388/824
See application file for complete search history.

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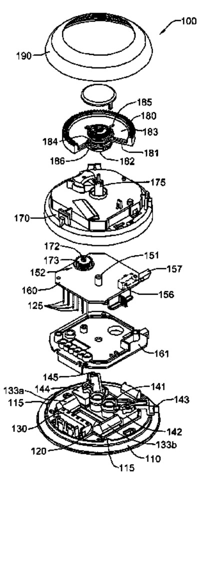
(57) **ABSTRACT**

A thermostat having a thermostat housing and a rotatable selector rotatably coupled to the thermostat housing via a support member. The rotatable selector is adapted to have a range of rotatable positions, wherein a desired parameter value is identified by the position of the rotatable selector along the range of rotatable positions. The thermostat further includes a mechanical to electrical translator that is laterally offset relative to the support member for translating the mechanical position of the rotatable selector to an electrical signal that is related to the desired parameter value.

**39 Claims, 10 Drawing Sheets**



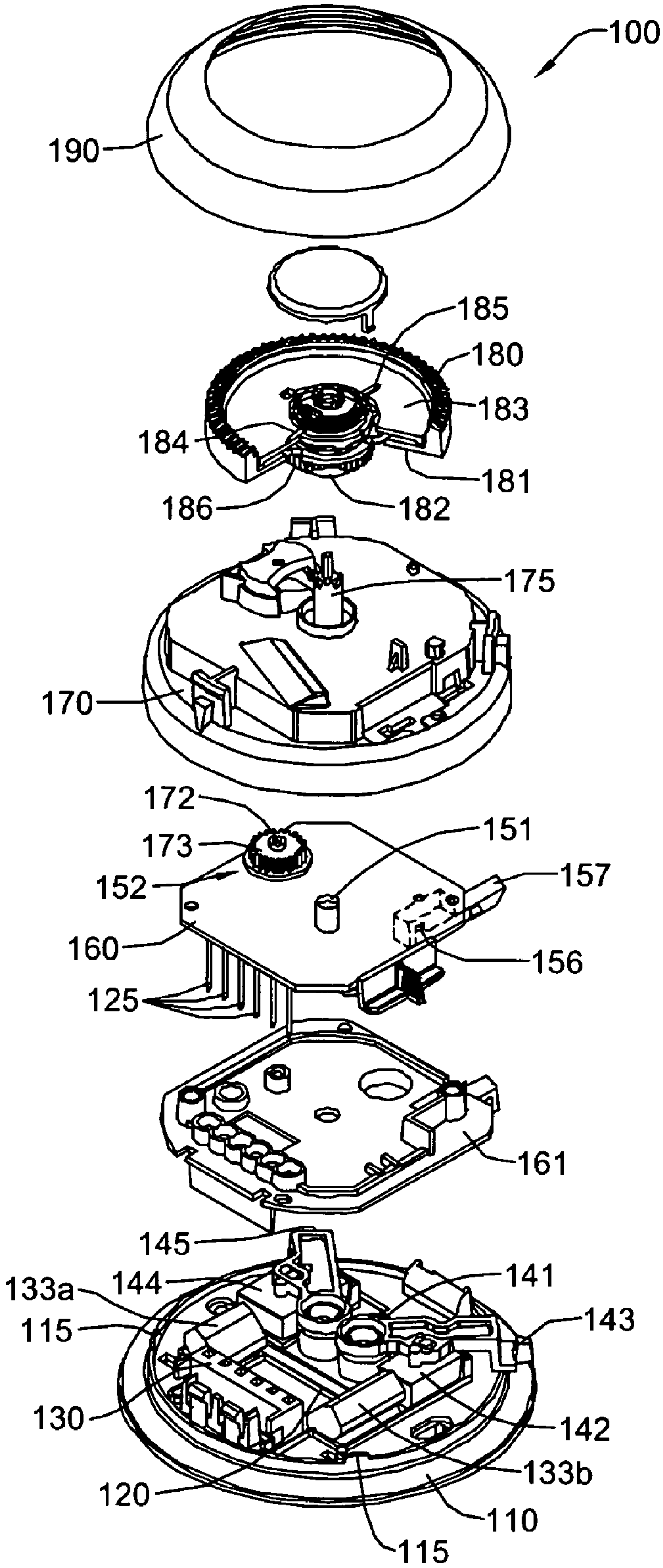

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Figure 1

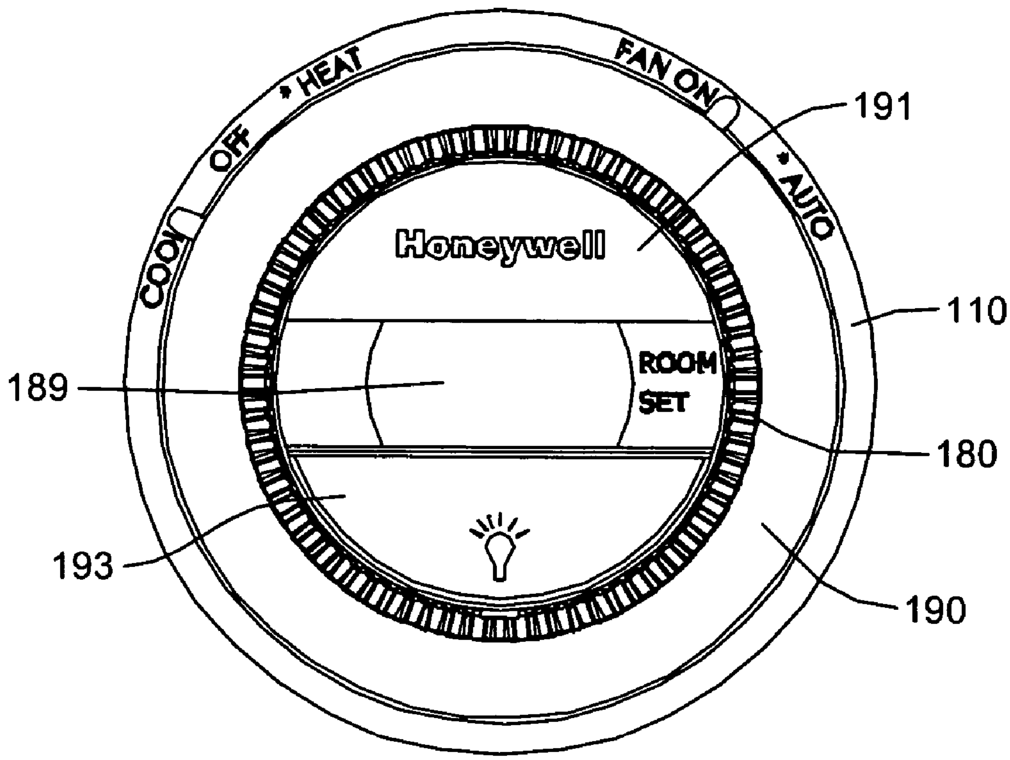
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Figure 2

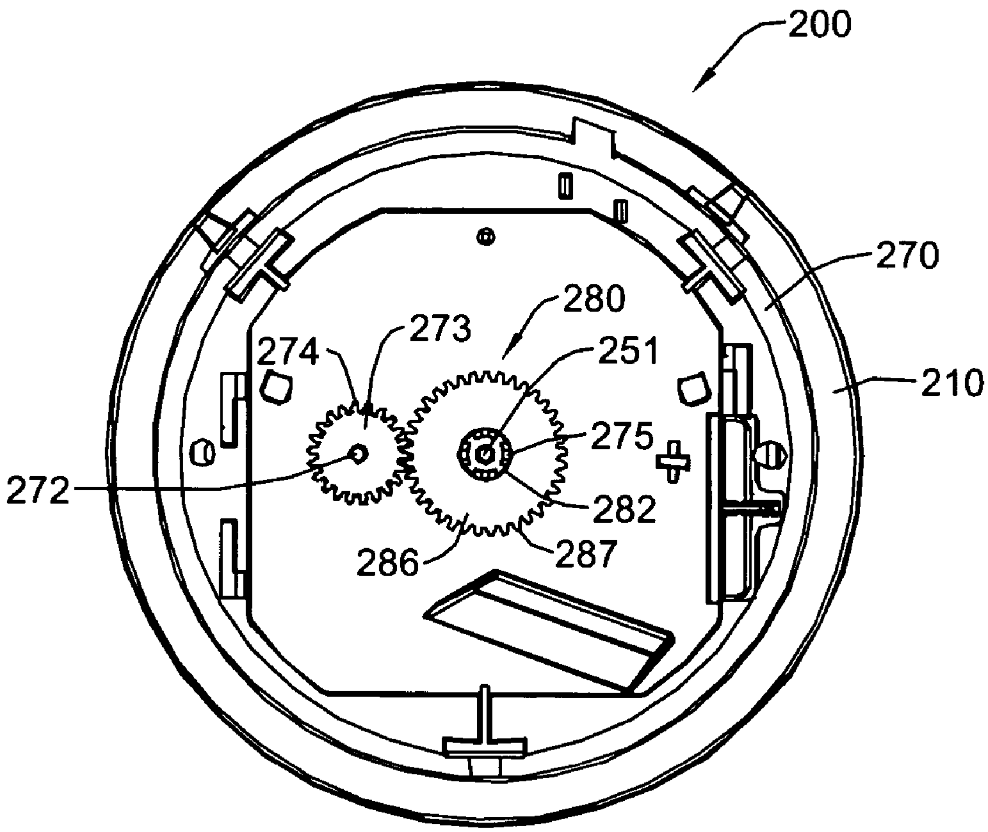


Figure 3

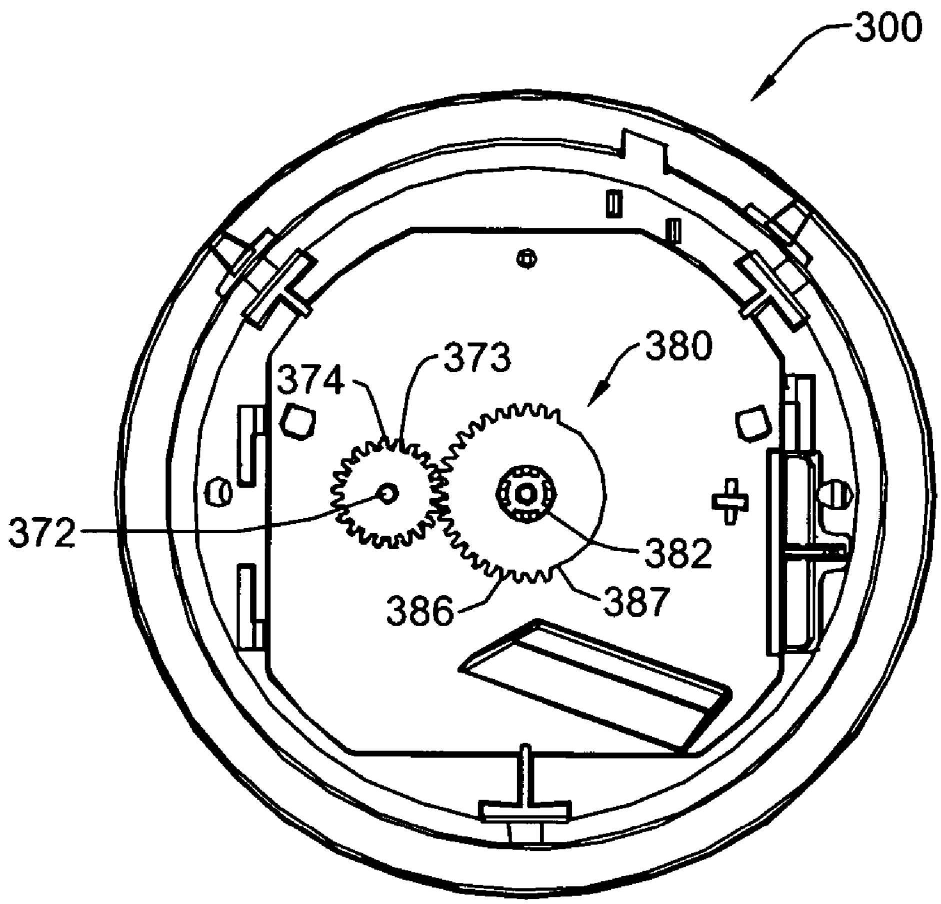


Figure 4

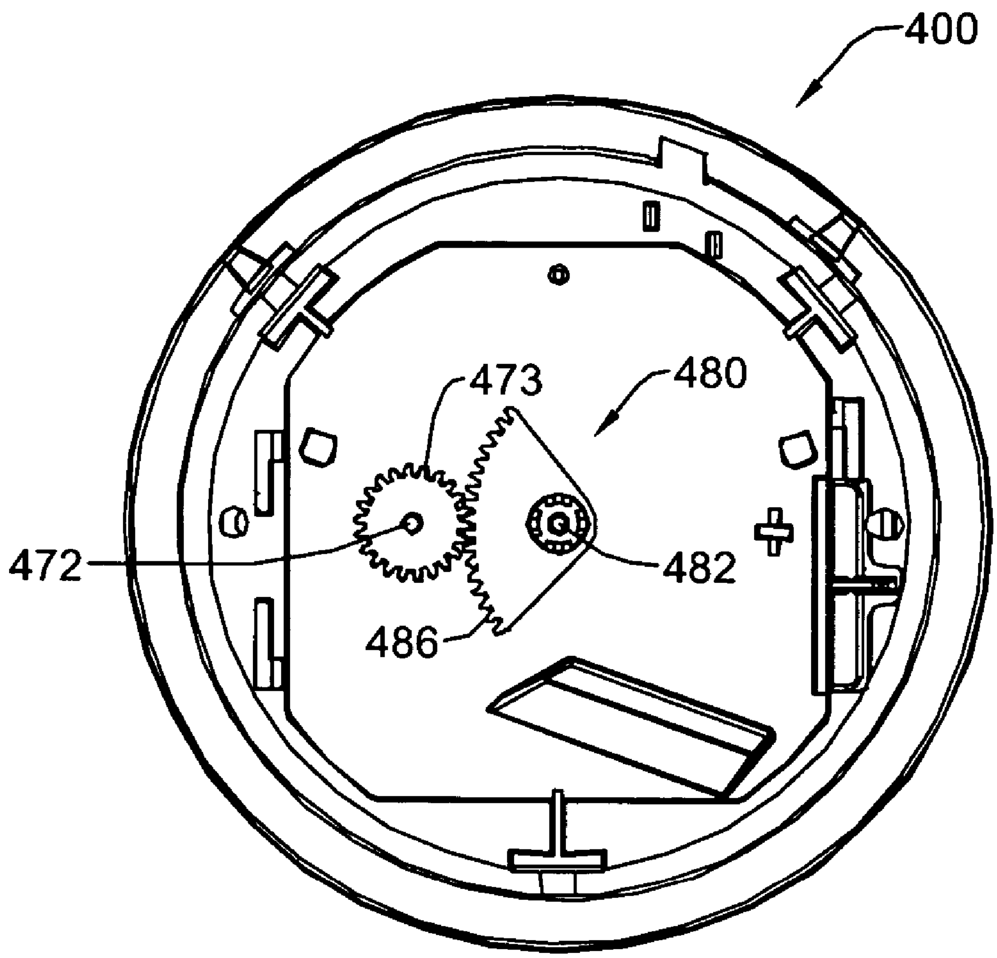


Figure 5

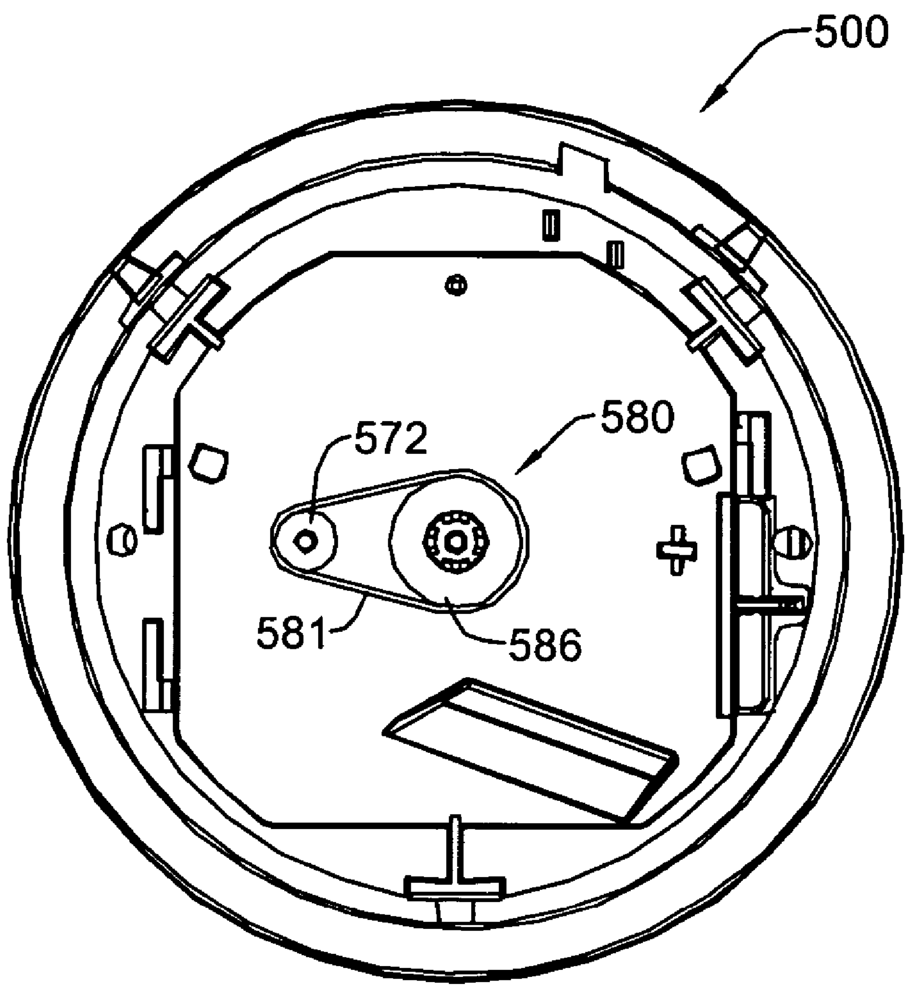


Figure 6

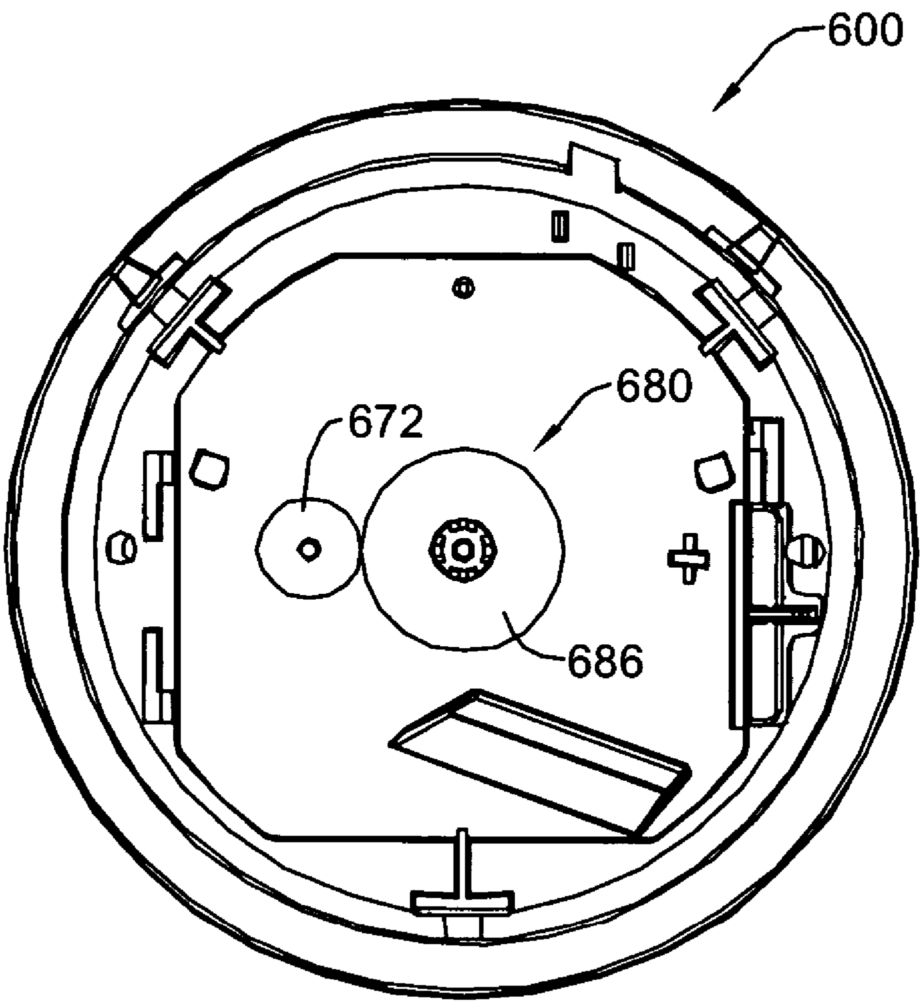


Figure 7

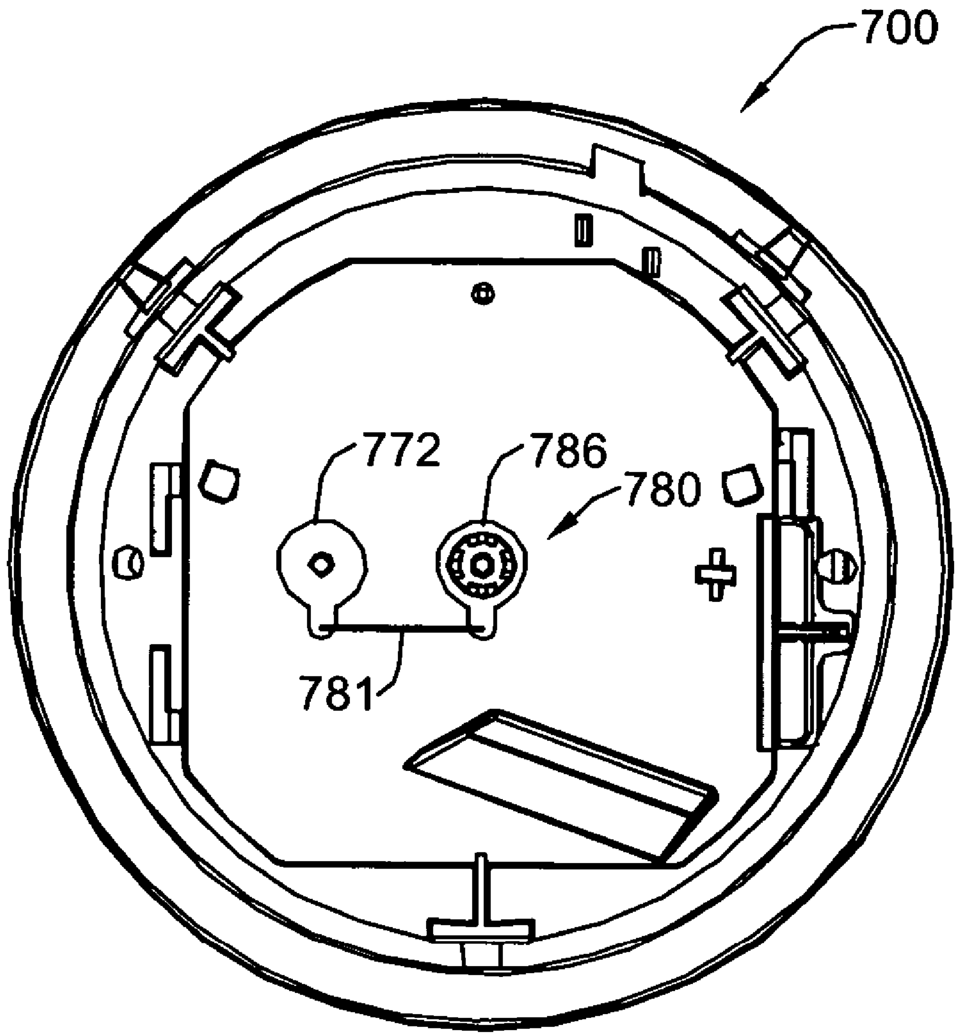


Figure 8

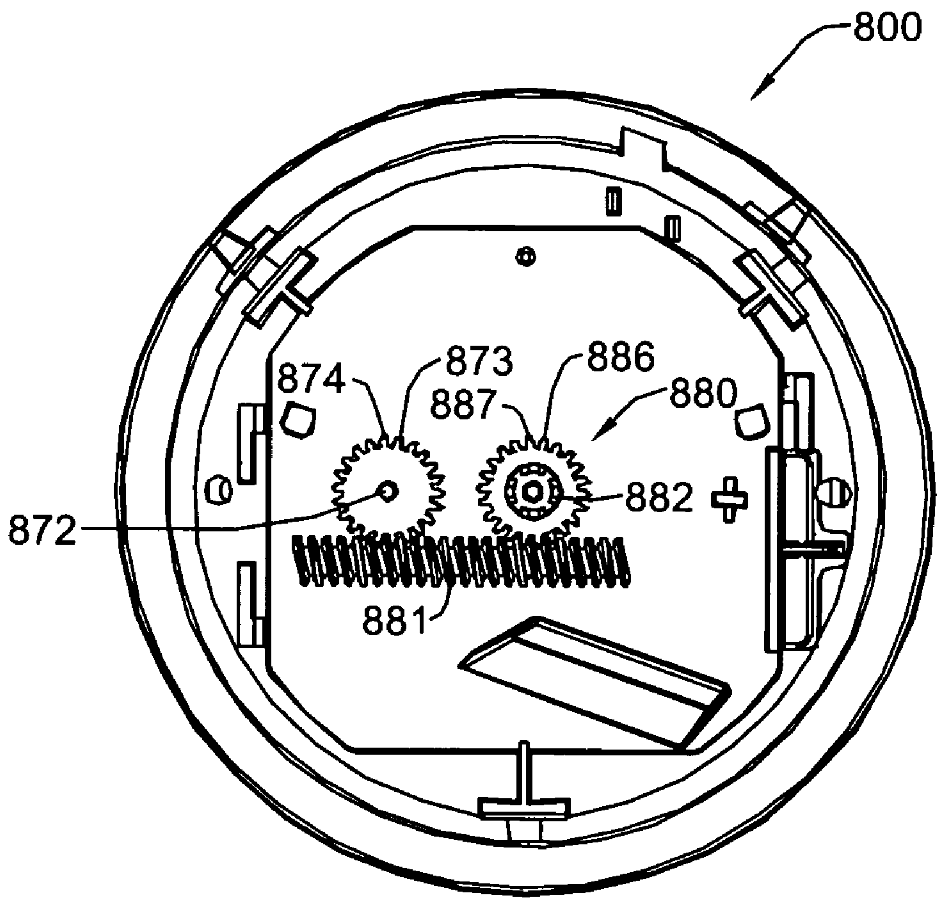


Figure 9

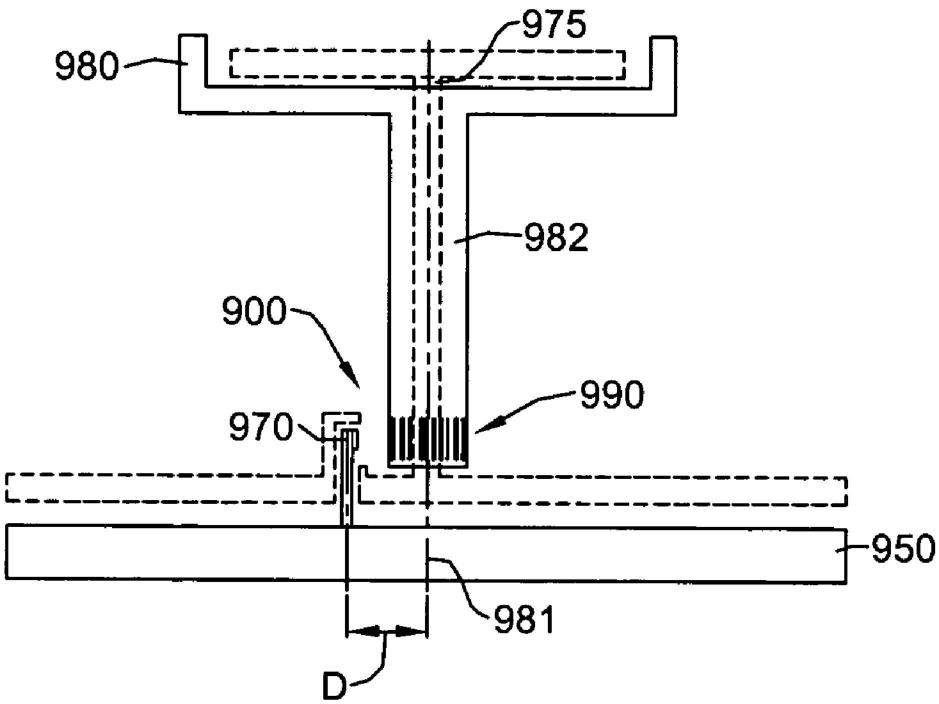


Figure 10

# THERMOSTAT WITH OFFSET DRIVE

## BACKGROUND

Thermostats are used widely in dwellings, buildings, and other temperature-controlled spaces. In many cases, the thermostats are mounted on a wall or the like to allow for the measurement and control of the temperature, humidity and/or other environmental parameter within the space. Thermostats come in a variety of shapes and with a variety of functions. Some thermostats are electromechanical in nature, and often use a bimetal coil to sense and control the temperature setting, typically by shifting the angle of a mercury bulb switch. These thermostats typically have a mechanical user interface, such as a rotating knob or the like, to enable the user to set a temperature set point. More advanced electronic thermostats have built in electronics, often with solid state sensors, to sense and control various environmental parameters within a space. The user interface of many electronic thermostats includes software controlled buttons and a display.

It has been found that while electronic thermostats often provide better control, thermostats with a mechanical user interface can often be more intuitive to use for some users. Many users, for example, would be comfortable with a rotating knob that is disposed on a thermostat for setting a desired set point or other parameter. However, to provide increased functionality and/or user feedback, it has been found that locating non-rotating parts such as displays, buttons, indicator lights, noise making devices, logos, and/or other devices or components near and/or inside the rotating knob or member can be desirable. The present invention provides methods and apparatus for locating such non-rotating parts near or inside of a rotating knob or member, while still allowing the rotating knob or member to set and/or control one or more parameters of the thermostat.

## SUMMARY

The present invention relates generally to an improved thermostat that has a rotatable user interface member. In some cases, one or more non-rotatable component or device, such as a display, a button, an indicator light, a noise making device, a logo, and/or other suitable device or component, may be received by an opening or recess provided in the rotatable user interface member.

In one illustrative embodiment, a thermostat has a selectable temperature set point and a temperature sensor. The temperature sensor provides a temperature indicator and the thermostat provides a control signal that is dependent at least in part on the selected temperature set point and the temperature indicator. While temperature is used in this example, it is contemplated that any environmental condition or control parameter may be sensed, set and/or controlled, as desired.

The illustrative thermostat can include a thermostat housing and a rotatable selector fixed to the thermostat housing via a support member, such as a support post or the like. The rotatable selector may have a defined or undefined range of rotatable positions. In one illustrative embodiment, a set point or other desired parameter is identified by the position of the rotatable selector along the range of rotatable positions. A mechanical to electrical translator is then laterally offset relative to the support post for translating the mechanical position of the rotatable selector to an electrical signal that is related to the selected set point or parameter value. In some cases, the support post is disposed at a centroid of the rotatable selector surface area, but this is not required in all embodiments.

The mechanical to electrical translator may include a pot or any other suitable mechanical to electrical translator. In some cases, the mechanical to electrical translator includes a rotatable shaft which is mechanically rotated in response to rotation of the rotatable selector. Gears, belts, wheels, rods, or any other mechanical mechanism may be used to mechanically rotate the rotatable shaft of the mechanical to electrical translator in response to rotation of the rotatable selector. Alternatively, or in addition, optical, magnetic or any other suitable detection mechanism may be used to help translate the mechanical position of the rotatable selector to a corresponding electrical signal.



## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective exploded view of an illustrative thermostat;

FIG. **2** shows a front perspective view of an illustrative thermostat that includes a display;

FIG. **3** is a top view of a partial thermostat showing an exemplary offset drive; and

FIG. **4** through FIG. **10** illustrate further illustrative embodiments of offset drives.

## DETAILED DESCRIPTION

The following description should be read with reference to the drawings, in which like elements in different drawings are numbered in like fashion. The drawings, which are not necessarily to scale, depict selected embodiments and are not intended to limit the scope of the invention. Although examples of construction, dimensions, and materials are illustrated for the various elements, those skilled in the art will recognize that many of the examples provided have suitable alternatives that may be utilized.

FIG. **1** is a perspective exploded view of an illustrative thermostat **100**. The illustrative thermostat includes a base plate **110** which is configured to be mounted on a wall by any number of fastening means such as, for example, screws or adhesive. The illustrative base plate **110** has a circular shape, but it is contemplated that the base plate **110** can have any shape as desired. In an illustrative embodiment, the base plate has a diameter in the range of 8 cm to 12 cm.

The base plate **110** can include a printed circuit board **120**. In the embodiment shown, the printed circuit board **120** is affixed to base plate **110** on the opposite side shown. Depending on the requirement of the space controlling system, anywhere from two to six wires are typically used to interconnect the remotely located HVAC components (e.g. furnace, boiler, air conditioner, humidifier, etc.) to the base plate **110** at terminal blocks **133***a* and **133***b*. In this illustrative embodiment, a variety of switches are disposed on the base plate **110** and in electrical connection with the printed circuit board **120**. A fuel switch **141** is shown located near the center of the base plate **110**. The fuel switch **141** can switch between E (electrical) and F (fuel). A FAN ON/AUTOMATIC switch **142** and corresponding lever **143** is shown disposed on the base plate **110**. The FAN ON/AUTOMATIC switch **142** can be electrically coupled to the printed circuit board **120**. A COOL/OFF/HEAT switch **144** and corresponding lever **145** is shown disposed on the base plate **110**. The COOL/OFF/HEAT switch **145** can also be electrically coupled to the printed circuit board **120**. The printed circuit board **120** can be electrically coupled to a second printed circuit board **160** by a plurality of leads **125** that are fixed relative to the second printed circuit board **160**. The leads **125** extend through a PCB Shield **161** and mate with a connector **130** that is connected to the first printed circuit board **120**.

In the illustrative embodiment shown, a potentiometer assembly **152** is shown having a rotatable potentiometer shaft **172** and a gear **173**. In some embodiments, the rotatable potentiometer shaft **172** and the gear **173** may be separate pieces and subsequently secured together, or may be formed as a single piece, as desired. While a circular gear **173** is shown, it is contemplated that the any suitable gear may be used including, for example, a sector gear, a screw type gear or any other suitable type of gear, as desired.

In the illustrative embodiment, the potentiometer assembly **152** is fixed relative to and electrically coupled to the second printed circuit board **160**. The potentiometer assembly **152** is shown offset from a center **151** of the second printed circuit board **160**. The potentiometer assembly **152** can provide a mechanical translation of the position of the gear **173** to a corresponding electrical signal. The electrical signal provided by the potentiometer assembly **152** may correspond to a desired set point or other control parameter that can be read by electronics on the second printed circuit board **160** to help control one or more HVAC devices. While a potentiometer is used in the illustrative embodiment, it is contemplated that any suitable mechanical position to electrical signal translator may be used including, for example, mechanical sliders, magnetic position sensors, optical position sensors, or any other suitable mechanical to electrical translator, as desired.

A temperature sensor, or in the illustrative embodiment, a thermistor (not shown) is fixed relative to and electrically coupled to the second printed circuit board **160**. In the illustrative embodiment shown, the temperature sensor or thermistor can be located near an edge of the second printed circuit board **160** in some embodiments. However, it is contemplated that the thermistor may be located at any position on or near the second printed circuit board **160**, as desired.

A light source **156** is shown disposed on and electrically coupled to the second printed circuit board **160**. The light source can be, for example, an LED or any other suitable light source. In the illustrative embodiment, the light source **156** is positioned adjacent to a light guide **157**. The light guide **157** is shown extending away from the second printed circuit board **160**, and through an intermediate housing **170**.

The intermediate housing **170** is shown disposed over the second printed circuit board **160** and base plate **110**. The intermediate housing **170** can be fixed relative to the second printed circuit board **160**, if desired. The intermediate housing **170** includes a support post **175** that extends away from the intermediate housing **170** as shown. In the illustrative embodiment, the support post **175** is located at or near a center or centroid of the intermediate housing **170**, but this is not required.

The potentiometer shaft **172** can extend from the gear **173** through the intermediate housing **170** to a potentiometer (not explicitly shown) that is electrically coupled to the second printed circuit board **160**. In one embodiment, the potentiometer shaft **172** is rotatable, and is laterally offset from the support post **175**.

A rotatable selector **180** is shown disposed about the support post **175**. The illustrative rotatable selector **180** is shown having a circular annular shape. However, this is not required. For example, the rotatable selector **180** may have a circular semi-annular shape, a square shape, a hexagonal shape or any other suitable shape, as desired. The rotatable selector **180** can include a planar portion **181** and a sleeve **182**. The sleeve **182** is shown disposed on the planar portion **181** and extends away form the planar portion **181**. In the illustrative embodiment, the sleeve **182** is located at or near a center or centroid of the rotatable selector **180**, but this is not required.

A circular gear **186** is shown disposed about the sleeve **182**. In some embodiments, the circular gear **186** and the rotatable selector **180** may be separate pieces and subsequently secured together, or may be formed as a single piece, as desired. The circular gear **186** can be configured to engage the potentiometer circular gear **173** so that the potentiometer gear **173** moves as the rotatable selector gear **186** moves. The sleeve **182** is disposed about the support post **175** and is adapted to allow for rotational movement of the rotatable selector **180** about the support post **175**.

A scale plate **183** can be disposed adjacent the planar portion **181** and fixed in a non-rotating manner to the support post **175**. The scale plate **183** can include indicia such as, for example, temperature indicia for both a current temperature and a set point temperature. A current temperature indicator **184** can be fixed to the scale plate **183** and can be formed of a bimetal coil, if desired. A set point temperature indicator **185** can be fixed to the planar portion **181**. Thus, in this illustrative embodiment, the rotatable selector **180** and set point temperature indicator **185** rotate relative to the scale plate **183** and current temperature indicator **184**.

In some embodiments, a display (e.g. LCD display), one or more buttons, indicator lights, noise making devices, logos, and/or other devices and/or components may be fixed to the support post **175**, if desired, wherein the rotatable selector **180** may rotate relative to these other devices and/or components. For example, FIG. **2** shows an illustrative thermostat that includes a display **189**, which is fixed relative to the support post **175**, wherein rotatable selector **180** may rotate about the display **189**. In some illustrative embodiments, a desired parameter value (e.g. temperature set point) is displayed on the display **189**, and in some cases, the desired parameter value that is displayed on the display **189** changes as the rotatable selector **180** is rotated. In some embodiments, the current temperature and/or the temperature set point may be displayed on the display **189**, as well as other information as desired. The illustrative thermostat of FIG. **2** also shows a logo region **191** and a back light button **193**, both of which may also be fixed relative to the support member or post **175**, wherein rotatable selector **180** may rotate about the logo region **191** and back light button **193**.

FIG. **1** also shows an outer housing **190** disposed on the intermediate housing **170**. In the illustrative embodiment, the outer housing **190** has an annular shape, however the outer cover **190** can have any suitable shape, as desired.

FIG. **3** is a perspective view of an illustrative thermostat **200** showing an offset drive in accordance with an illustrative embodiment of the present invention. In this embodiment, the thermostat **200** has a selected temperature set point and a temperature sensor (not shown). The temperature sensor provides a temperature indicator and the thermostat provides a control signal that is dependent at least in part on the selected temperature set point and the temperature indicator. The thermostat **200** includes a thermostat housing **270**, a rotatable selector **280** fixed to the thermostat housing **270** via a support post **275**. The rotatable selector **280** has a defined or undefined range of rotatable positions.

In the illustrative embodiment of FIG. **3**, the set point is identified by the position of the rotatable selector **280** along the range of rotatable positions. FIG. **3** shows a rotatable selector sleeve **282** disposed about the fixed support post **275**. The rotatable selector sleeve **282** can be disposed at or near the centroid of the rotatable selector **180**, but this is not required. The rotatable selector sleeve **282** is adapted to be rotatable about the support post **275**. Thus, in the illustrative embodiment, the rotatable selector sleeve **282** rotates in unison with the rotatable selector **180**.

In the illustrative embodiment, the rotatable selector sleeve **282** is fixed to a rotatable selector gear **286**. In some embodiments, the rotatable selector gear **286** and the rotatable selector **280** may be separate pieces and subsequently secured together, or may be formed as a single piece, as desired.

A mechanical to electrical translator including, for example, a potentiometer, is shown laterally offset relative to the support post **275**. The mechanical to electrical translator translates the mechanical position of the rotatable selector **280** to an electrical signal that is related to the position of the rotatable selector **280**. In the illustrative embodiment, the potentiometer includes a rotatable shaft **272** that includes or is attached to one or more gears **273**. In one embodiment, the potentiometer gear **273** and a rotatable selector gear **286** translate the mechanical position of the rotatable selector **280** to a mechanical position of the rotatable potentiometer shaft **272** of the potentiometer, and the potentiometer translates the mechanical position of rotatable potentiometer shaft **272** to an electrical signal that is related to the mechanical position of the rotatable selector **280**.

In the illustrative embodiment shown, potentiometer gear **273** extends 360 degrees around the rotatable potentiometer shaft **272**. The rotatable selector gear **286** also is shown extending 360 degrees around the rotatable selector sleeve **282**. In some embodiments, the rotatable selector gear **286** can have a circumference **287** that is equal to, greater than, or less than, the circumference **274** of the one or more potentiometer gears **273**, to provide a desired gearing ratio.

In the illustrative embodiment, the rotatable selector sleeve **282** (and affixed rotatable selector **280**) can rotate any desired number of degrees about the support post **275**. In some embodiments, the rotatable selector sleeve **282** rotates in a range of 180 degrees or less, and causes the potentiometer rotatable shaft **272** to rotate in unity with the rotatable selector sleeve **282**. For example, the rotatable selector sleeve **282** can rotate a first number of degrees causing the potentiometer rotatable shaft **272** to rotate an equal number of degrees. In other embodiments, the rotatable selector sleeve **282** (and affixed rotatable selector **280**) can rotate a first number of degrees, causing the potentiometer rotatable shaft **272** to rotate a second number of degrees, where the second number of degrees is greater than or less than the first number of degrees.

In one illustrative embodiment, the rotatable selector sleeve **282** can rotate through a range, where the range can be anywhere from 90 to 180 degrees, causing the potentiometer rotatable shaft **272** to rotate from 180 to 360 degrees. In this illustrative embodiment, the one or more rotatable selector gears **286** and the potentiometer gears **273** rotate in opposite directions.

FIG. **4** through FIG. **7** illustrate further exemplary embodiments of offset drives in accordance with the present invention. Referring to FIG. **4**, in this illustrative embodiment of an offset drive **300**, the rotatable selector **380** includes one or more gear teeth **386**. One or more potentiometer gear teeth **373** engage the one or more rotatable selector gear teeth **386**. The one or more potentiometer gear teeth **373** extend 360 degrees around the potentiometer rotatable shaft **372**. The one or more rotatable selector gear teeth **386** extend around only a portion of the set point selector sleeve **382**. In one embodiment, the one or more rotatable selector gear teeth **386** extend 180 degrees or less around the set point selector sleeve **382**. The rotatable selector gear can have a circumference **387** equal to or greater than a circumference **374** of the potentiometer gear, as desired. In this embodiment, the rotatable selector gear and the potentiometer gear rotate in opposite directions.

Referring to FIG. **5**, in this illustrative embodiment of an offset drive **400**, the rotatable selector **480** includes a sector gear having one or more gear teeth **486**. The one or more potentiometer gear teeth **473** engage the one or more rotatable selector gear teeth **486**. The one or more potentiometer gear teeth **473** extend 360 degrees around the potentiometer rotatable shaft **472**. The one or more rotatable selector gear teeth **486** extend about an arc along the sector gear. In one embodiment, the one or more rotatable selector gear teeth **486** extend in an arc of 150 degrees or less. In this embodiment, the one or more rotatable selector gear and the potentiometer gear rotate in opposite directions.

Referring to FIG. **6**, in this illustrative embodiment of an offset drive **500**, the rotatable selector **580** includes a selector rotatable member **586**. A potentiometer rotatable member **572** is coupled to the selector rotatable member **586** with one or more belts **581**. The belt **581** may be any continuous band of flexible material for transmitting motion and power or conveying materials. The one or more belts **581** translate the mechanical position of the rotatable selector **180** to a mechanical position of the rotatable member **572** of the potentiometer, and the potentiometer translates the position of rotatable member **572** to an electrical signal that is related to the selected parameter. The selector rotatable member **586** and the potentiometer rotatable member **572** can have equal or different sizes, as desired. In one embodiment, the selector rotatable member **586** has a greater diameter than the potentiometer rotatable member **572**, but this is not required. In this embodiment, the selector rotatable member **586** and the potentiometer rotatable member **572** rotate in a same direction.

Referring to FIG. **7**, in this illustrative embodiment of an offset drive **600**, the rotatable selector **680** includes a selector rotatable member **686**. A potentiometer rotatable member **672** is in direct contact with the selector rotatable member **686**. Again, the selector rotatable member **686** and the potentiometer rotatable member **672** can have equal or different sizes, as desired. In one embodiment, the selector rotatable member **686** has a greater diameter than the potentiometer rotatable member **672**, but this is not required. In some embodiments, one or both of the selector rotatable member **686** or the potentiometer rotatable member **672** have a smooth surface, but this is not required. For example, one or both of the selector rotatable member **686** or the potentiometer rotatable member **672** may have a rough surface or any other desired texture, as desired. In this embodiment, the selector rotatable member **686** and the potentiometer rotatable member **672** rotate in opposite directions.

Referring to FIG. **8**, in this illustrative embodiment of an offset drive **700**, the rotatable selector **780** includes a selector rotatable member **786**. A potentiometer rotatable member **772** is coupled to the selector rotatable member **786** with one or more tie elements **781**. The one or more tie elements **781** translate the mechanical position of the rotatable selector **180** to a mechanical position of the rotatable member **772** of the potentiometer, and the potentiometer translates the position of rotatable member **772** to an electrical signal that is related to the selected parameter. The selector rotatable member **786** and the potentiometer rotatable member **772** can have equal or different sizes, as desired. In one embodiment, the tie element **781** is a rigid member, but this is not required. In this embodiment, the selector rotatable member **786** and the potentiometer rotatable member **772** rotate in a same direction.

Referring to FIG. **9**, in this illustrative embodiment of an offset drive **800**, the rotatable selector **880** includes one or more gear teeth **886** that engage a slider or screw gear element **881**. One or more potentiometer gear teeth **873** also engage the screw gear element **881**. The one or more potentiometer gear teeth **873** are shown extending 360 degrees around the potentiometer rotatable shaft **872**, however this not required in all embodiments. The one or more rotatable selector gear teeth **886** extend 360 degrees around the set point selector sleeve **882**, however this not required in all embodiments. The rotatable selector gear **886** can have a circumference **887** equal to or greater than a circumference **874** of the potentiometer gear, as desired. In this embodiment, the rotatable selector gear **886** and the potentiometer gear **873** rotate in a same direction.

Referring to FIG. **10**, in this illustrative embodiment of an offset drive **900**, a rotatable selector **980** includes a sleeve **982** and a pattern **990** disposed on the sleeve **982**. In one embodiment, the sleeve **982** is disposed about a fixed support post **975**. The pattern **990** can be arranged such that the position of the rotatable selector **980** can be determined by monitoring the pattern. The pattern can be disposed on the rotatable selector sleeve **982** by any suitable technique such as, for example, directly printed the pattern on the rotatable selector **980**, applying a pattern film (e.g., tape) on the rotatable selector **980**, or by another suitable process.

A sensor **970** may be provided for sensing the pattern **990**. In the illustrative embodiment, the sensor **970** is positioned adjacent the pattern **990** but laterally offset from a rotatable selector **980** rotation axis **981** by a distance D. The sensor **970** can be coupled to a circuit board **950**, and can be used to determine the relative position of the rotatable selector **980** based on the sensed pattern. The sensor **970** may be an optical sensor, a magnetic sensor, or any other suitable sensor, and the pattern **990** can be an optical pattern, a magnetic pattern, or any other suitable pattern, as desired.

Having thus described the several embodiments of the present invention, those of skill in the art will readily appreciate that other embodiments may be made and used which fall within the scope of the claims attached hereto. Numerous advantages of the invention covered by this document have been set forth in the foregoing description. It will be understood that this disclosure is, in many respects, only illustrative. Changes may be made in details, particularly in matters of shape, size and arrangement of parts without exceeding the scope of the invention.

What is claimed is:

**1**. A thermostat comprising:

a thermostat housing;

a rotatable selector rotatably coupled to the thermostat housing via a support member, the rotatable selector having a first rotation axis, the rotatable selector having a range of rotatable positions along the first rotation axis, wherein a desired parameter value is identified by the position of the rotatable selector along the range of rotatable positions; and

a mechanical to electrical translator comprising a second rotation axis that is laterally offset relative to the first rotation axis of the rotatable selector, the mechanical to electrical translator translating the mechanical position of the rotatable selector to an electrical signal that is related to the desired parameter value.

**2**. A thermostat according to claim **1** wherein the mechanical to electrical translator includes a potentiometer having a rotatable shaft that rotates about the second rotation axis, the mechanical to electrical translator further having one or more gears, wherein the one or more gears translate the mechanical position of the rotatable selector along the first rotation axis to a position of the rotatable shaft of the potentiometer along the second rotation axis, and the potentiometer translates the position of the rotatable shaft of the potentiometer along the second rotation axis to an electrical signal that is related to the desired parameter value.

**3**. A thermostat according to claim **2** wherein the rotatable selector is attached to a first gear having teeth, and the rotatable shaft of the potentiometer is attached to a second gear having teeth, wherein the teeth of the first gear engage the teeth of the second gear.

**4**. A thermostat according to claim **3** wherein the first gear circumscribes at least part of the rotatable selector.

**5**. A thermostat according to claim **3** wherein the second gear circumscribes at least part of the rotatable shaft of the potentiometer.

**6**. A thermostat according to claim **3** wherein the first gear is larger than the second gear.

**7**. A thermostat according to claim **2** wherein the rotatable selector rotates in a range of 180 degrees or less, causing the rotatable shaft of the potentiometer to rotate in unity with the rotatable selector.

**8**. A thermostat according to claim **2** wherein the rotatable selector rotates a first number of degrees, causing the rotatable shaft of the potentiometer to rotate a second number of degrees, wherein the second number of degrees is greater than the first number of degrees.

**9**. A thermostat according to claim **1** wherein the mechanical to electrical translator includes one or more belts.

**10**. A thermostat according to claim **1** wherein the mechanical to electrical translator includes one or more engaging wheels.

**11**. A thermostat according to claim **1** further comprising a circuit board that is fixed relative to the thermostat housing, and wherein the mechanical to electrical translator includes a potentiometer mounted to the circuit board.

**12**. A thermostat according to claim **1** wherein the rotatable selector includes a face plate that is fixed relative to the support member, and a rotatable dial that is rotatable relative to the support member.

**13**. A thermostat according to claim **12** wherein the face plate includes a temperature scale, and the rotatable dial includes a pointer.

**14**. A thermostat according to claim **12** further comprising a temperature indicator fixed relative to the support member.

**15**. A thermostat according to claim **14** wherein the face plate includes a temperature scale and the temperature indicator includes a pointer.

**16**. A thermostat according to claim **15** wherein the temperature indicator includes a bi-metal thermometer.

**17**. A thermostat according to claim **12** wherein the face plate includes a logo region with a logo provided thereon.

**18**. A thermostat according to claim **12** further comprising a housing ring having an aperture therein, wherein the housing ring is fixed relative to the thermostat housing and the aperture is adapted to accept the face plate.

**19**. A thermostat according to claim **1** wherein the mechanical to electrical translator includes a magnetic position sensor.

**20**. A thermostat according to claim **1** wherein the mechanical to electrical translator includes a mechanical slider.

**21**. A thermostat according to claim **1** wherein the mechanical to electrical translator includes an optical position sensor.

**22**. A thermostat comprising:

a thermostat housing having a support post;

a rotatable selector rotatably coupled to the thermostat housing with at least part of the rotatable selector disposed about, and being rotatable with respect to, the support post of the thermostat housing, the rotatable selector having a range of rotatable positions, wherein a desired parameter value is identified by the position of the rotatable selector along the range of rotatable positions; and

a mechanical to electrical translator laterally offset relative to the support member for translating the mechanical position of the rotatable selector to an electrical signal that is related to the desired parameter value.

**23**. A thermostat comprising:

a thermostat housing defining a housing surface area, the housing surface area having a housing centroid;

a rotatable selector rotatably coupled to the thermostat housing via a support member, the rotatable selector having a range of rotatable positions, wherein a desired parameter value is identified by the position of the rotatable selector along the range of rotatable positions; and

a rotatable mechanical to electrical translator for translating the mechanical position of the rotatable selector to an electrical signal that is related to the desired parameter value; wherein the rotatable selector and the rotatable mechanical to electrical translator rotate in opposite directions when the rotatable selector is rotated.

**24**. A thermostat according to claim **23** wherein the support member is disposed at the housing centroid.

**25**. A thermostat comprising:

a thermostat housing;

a rotatable selector rotatably coupled to the thermostat housing, the rotatable selector having a range of rotatable positions, wherein a desired parameter value is identified by the position of the rotatable selector along the range of rotatable positions, the rotatable selector having a pattern disposed thereon; and

a mechanical to electrical translator for translating the mechanical position of the rotatable selector to an electrical signal that is related to the desired parameter value, the mechanical to electrical translator including means for sensing the pattern on the rotatable selector and to determine a mechanical position of the rotatable selector therefrom.

**26**. A thermostat according to claim **25** wherein the means for sensing includes an optical sensor.

**27**. A thermostat according to claim **25** wherein the means for sensing includes a magnetic sensor.

**28**. A thermostat according to claim **25** wherein the pattern is printed on the rotatable selector.

**29**. A thermostat according to claim **25** wherein the pattern is printed on a tape, and the tape is adhered to the rotatable selector.

**30**. A thermostat comprising:

a non-rotatable region;

a rotatable selector extending around at least part of the non-rotatable region, the rotatable selector having a range of rotatable positions, wherein a desired parameter value is identified by the position of the rotatable selector along the range of rotatable positions, the rotatable selector having a rotation axis; and

a mechanical to electrical translator comprising a rotation axis that is laterally offset relative to the rotation axis of the rotatable selector, the mechanical to electrical translator translating the mechanical position of the rotatable selector to an electrical signal that is related to the desired parameter value.

**31**. A thermostat according to claim **30** wherein the non-rotatable region includes a display.

**32**. A thermostat according to claim **30** wherein the non-rotatable region includes a button.

**33**. A thermostat according to claim **30** wherein the non-rotatable region includes an indicator light.

**34**. A thermostat according to claim **30** wherein the non-rotatable region includes a noise making device.

**35**. A thermostat according to claim **30** wherein the non-rotatable region includes a logo.

**36**. A thermostat comprising:

an electronic display for displaying information;

a rotatable selector having a range of rotatable positions relative to the display, wherein a desired parameter value is identified by the position of the rotatable selector along the range of rotatable positions, the rotatable selector having a rotation axis;

a mechanical to electrical translator for translating the mechanical position of the rotatable selector to an electrical signal that is related to the desired parameter value.

**37**. A thermostat according to claim **36** wherein the desired parameter value is displayed on the display.

**38**. A thermostat according to claim **37** wherein the desired parameter value that is displayed on the display changes as the rotatable selector is rotated.

**39**. A thermostat comprising:

a non-rotatable region;

a rotatable selector extending around at least part of the non-rotatable region, the rotatable selector having a range of rotatable positions, wherein a desired parameter value is identified by the position of the rotatable selector along the range of rotatable positions, the rotatable selector having a rotation axis; and

a mechanical to electrical translator laterally offset relative to the rotation axis of the rotatable selector for translating the mechanical position of the rotatable selector to an electrical signal that is related to the desired parameter value.

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