March 2, 1965 F. A. GLOECKLER 3,171,935

HEAT RESPONSIVE DEVICE

Filed Dec. 29, 1961

FIG. 1

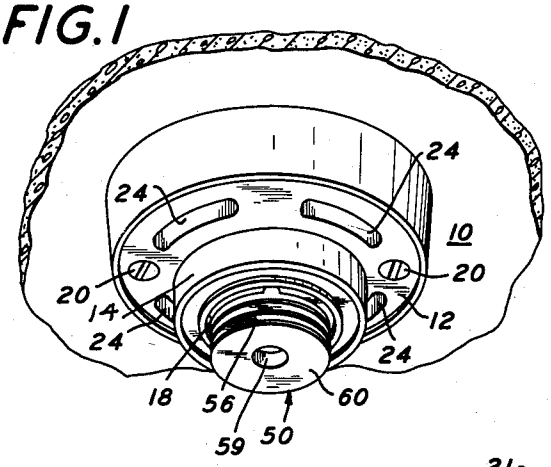


FIG. 4

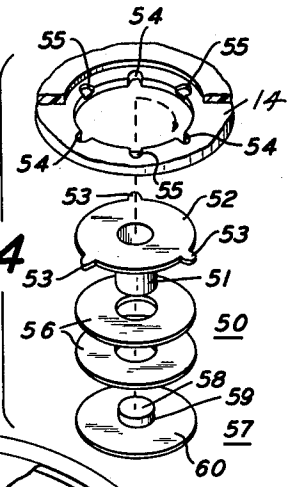


FIG. 2

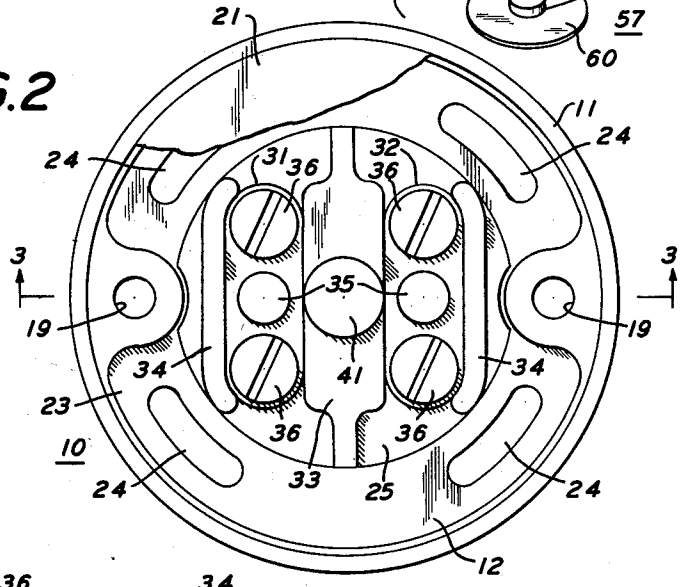
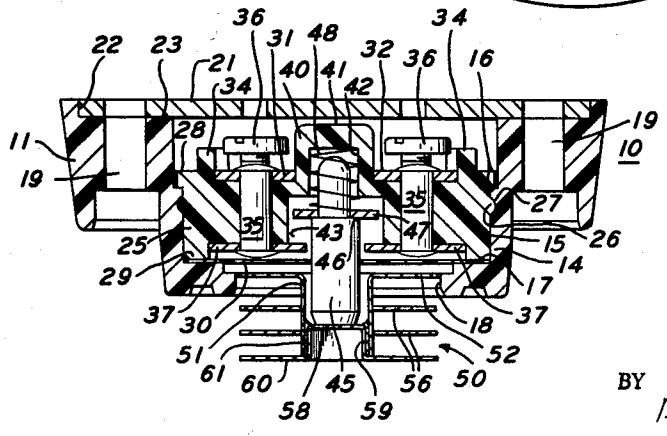


FIG. 3



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HEAT RESPONSIVE DEVICE

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9 Claims. (Cl. 200—142)

This invention relates to fixed temperature thermostats.

Various fixed temperature responsive thermostats have heretofore been proposed but these have been slow and sluggish, have been lacking in compact character, have been difficult to inspect, or have had other defects in construction or operation.

It is the principal object of the present invention to provide a fixed temperature thermostat which is rapid in operation, is simple in construction, is easy to mount at the desired location for use, can be made to operate at a desired temperature level, and can be easily reset.

It is a further object of the present invention to provide a fixed temperature thermostat which is compact, attractive in appearance, and at the same time the operating condition thereof can be readily ascertained by inspection.

It is a further object of the present invention to provide a fixed temperature thermostat having a removable element so that the alarm or other circuit with which it is used can be readily tested upon removal of the element.

It is a further object of the present invention to provide a fixed temperature thermostat which is constructed and arranged to indicate that it has been operated, and in which a new or different temperature responsive element can be quickly and easily inserted as desired.

It is a further object of the present invention to provide a fixed temperature thermostat which is free from difficulties from condensation or moisture collection therein.

Other objects and advantageous features of the invention will be apparent from the description and claims.

The nature and characteristic features of the invention will be more readily understood from the following description, taken in connection with the accompanying drawings forming part thereof, in which

FIGURE 1 is a view in perspective of the apparatus in accordance with the invention;

FIG. 2 is a top plan view, enlarged, of the apparatus in accordance with the present invention;

FIG. 3 is a vertical sectional view taken approximately on the line 3—3 of FIG. 2; and

FIG. 4 is an exploded view of the temperature responsive element and the mounting therefor.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes may be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

Referring now more particularly to the drawings, a base **10** is provided which can be made of any desired material but is preferably of a molded phenolic resin having electrical insulating properties. The base **10** is preferably of generally circular shape, has an outer rim section **11** with a vertically extending intermediate plate section **12** from which a central socket **14** of generally cup shape extends, in concentric relation to the rim section **11**. The central socket **14** has a central circular space with an interior wall **15**, a shoulder **16**, an interior horizontal face **17** and a central opening **18**.

The intermediate plate section **12** preferably has a plurality of openings **19** therethrough for the reception of mounting screws **20** for securing the base **10** to a connection box (not shown) and may have disposed in parallel

relation thereto a cover disk **21** of electrical insulating material seated in an annular recess **22** on the upper face **23** of the base **10**. The plate section **12** is also preferably provided with one or more openings **24** extending from the upper face **23** of the plate section **12** and through the plate section **12** for ventilation and drainage to obviate the collection or retention of moisture in the interior of the base **10**. Within the interior of the base **10** and preferably received within the cup shaped socket **14**, a contact mounting plate **25** of electric insulating material is provided and may have an outwardly extending rim **26** which is received and retained in a complemental recess **27** in the wall **15**. The plate **25** has a shoulder **28** engageable with the shoulder **16** for limiting the downward movement of the plate **25**. The plate **25** is preferably also provided with an annular rim **29** for retaining a flexible diaphragm **30** of any desired material, such as Mylar, in position in engagement with the interior face **17** in the cup shaped socket **14**.

The contact mounting plate **25** preferably has a pair of metallic contact bars **31** and **32** positioned by inner and outer positioning ribs **33** and **34** on the plate **25**. The bars **31** and **32** are secured in position by metallic rivets **35** and have threaded conductor retaining screws **36** mounted therein for the engagement with conductors (not shown) for connection into the circuit in which the device is used.

Each of the rivets **35** preferably is provided on the lower end thereof with a metallic contact disk **37**.

The contact mounting plate **25** preferably has an upper hollow head **40** with an end wall **41** formed on the plate **25**. The head **40** has a central bore **42** therein and an enlarged opening **43** extending therefrom for the reception of a contact actuating pin **45** of any desired material, but preferably of insulating material.

The pin **45** has a shoulder **46** for the reception of a contact disk **47** and a spring **48** in engagement with the disk **47** and with the end wall **41** at the end of the bore **42** normally urges the pin **45** toward a position to bring the contact disk **47** into engagement with the contact disks **37**.

A removable temperature responsive element **50** is provided insertable at the opening **18** which preferably includes a central hollow tubular sleeve portion **51** with an integral end flange **52** having a plurality of projections **53** on its periphery. The projections **53** are insertable in complemental openings **54** at spaced locations around the opening **18** (see FIG. 4) and the flange **52** is turned to seat the projections **53** in sockets **55** to retain the element **50** in place as hereinafter explained.

The tubular sleeve portion **51** has a plurality of heat transfer fins or disks **56** carried thereon and preferably in frictional or forced fit engagement with the exterior thereof. Within the interior of the tubular sleeve portion **51**, a control portion **57** is provided which includes a control wall **58**. The wall **58** has a cylindrical section **59** integral therewith and extending therefrom with an outwardly flared heat transfer fin or disk **60** also integral therewith. The cylindrical section **59** is of smaller diameter than the interior of the tubular sleeve portion **51** and is retained in position by a cylindrical connector **61**, of material such as a ring or band of solder which is fusible at a predetermined temperature. The quantity and temperature responsive characteristics of the solder of the connector **61** determine the release point of the control portion **57**.

The wall **58** is normally in engagement with terminal end of the pin **45** and holds the contact disk **47**, against the force of the spring **48**, in spaced relation from the contact disks **37**. The fins **56** and **60** serve for making the action of the prevailing temperature condition effective at the fusible connector **61** so that in the event that a predetermined temperature is attained in the vicinity the heat is made effective for fusing the solder of the

fusible connector **61**, permitting the pin **45** urged by the spring **48**, to move the control portion **57** outwardly. The contact disk **47** is thus brought to engage the contact disks **37** and completes a circuit (not shown) for purposes of operating an alarm, a sprinkler system or other desired temperature responsive device.

It will be noted that when the control portion **57** has been released by fusing of the connector **61** the condition of the apparatus, both by the absence of the outer fin **60** and position of the pin **45**, indicates that the fusing has occurred thus providing a tell-tale after operation.

It will also be noted that at any time, if desired, by turning the temperature responsive element **50** and removing the same the alarm or control circuit can be tested. A different temperature responsive element **50** can be inserted, if desired, or the apparatus can be reset, after a fusing operation, by removing the remaining parts of the old temperature responsive element **50** and inserting a new element **50**.

I claim:

1. A fixed temperature responsive device for controlling an electric circuit comprising a base having fixed electric contact members and a movable electric contact member, a resiliently urged pin on which said movable contact member is mounted, said base having a central opening, a temperature responsive element removably carried by said base in said opening, said element having exteriorly of said base a control portion with a transverse wall in engagement with said pin, and a temperature responsive fusible connector exteriorly of said base for normally retaining said wall at a predetermined contact positioning location.

2. A fixed temperature responsive device as defined in claim 1 in which said temperature responsive element has a plurality of fins for conducting heat to said fusible connector.

3. A fixed temperature responsive device as defined in claim 1 in which said temperature responsive element has a flange portion with projections for releasable engagement with said base.

4. A fixed temperature responsive device as defined in claim 1 in which said temperature responsive element has a flange portion detachably connected to said base, said flange portion has a tubular portion extending therefrom, said control portion has a cylindrical portion connected to said wall, and said fusible connector is interposed between said tubular and said cylindrical portions.

5. A fixed temperature responsive device as defined in claim 1 in which said temperature responsive element has a flange portion detachably connected to said base, said flange portion has a tubular portion extending therefrom, said control portion has a cylindrical portion connected to said wall, and said fusible connector is interposed between said tubular and said cylindrical portions, one of said last portions having a plurality of heat conducting fins for conducting heat to said fusible connector.

6. A fixed temperature responsive device as defined in claim 1 in which said base has a plurality of vent openings therein.

7. A temperature responsive element comprising a mounting flange having a tubular portion extending therefrom, a heat transfer pin mounted on said tubular portion and a separable control portion having a cylindrical portion with a transverse end wall, said cylindrical and tubular portions being concentrically disposed with a fusible connector therebetween normally preventing separation of said control portion.

8. A temperature responsive element comprising a mounting flange having a tubular portion extending therefrom, and a separable control member having a cylindrical portion extending into said tubular portion, said control member having an interiorly disposed transverse end wall and an exteriorly disposed flange parallel to and spaced from said mounting flange, and a fusible connector interposed between said tubular portion and said cylindrical portion and normally preventing separtion of said control member, said transverse end wall normally closing said tubular portion in the holding condition of said connector.

9. A temperature responsive element as defined in claim 8 in which a plurality of heat transfer fins are mounted on said cylindrical portion between said flanges.

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