March 1, 1938. C. F. ALBAN ET AL 2,109,628

THERMOSTATIC VALVE

Filed May 1, 1935

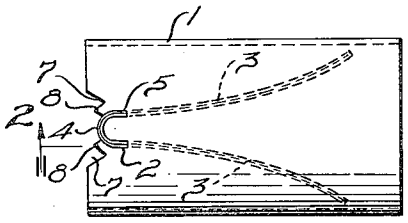


FIG. 1.

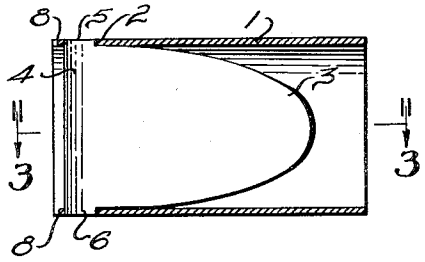


FIG. 2.

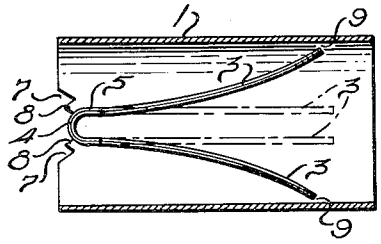


FIG. 3.

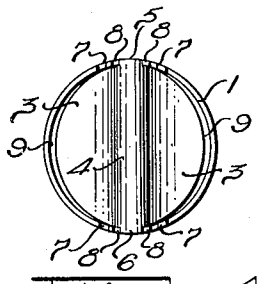


FIG. 4.

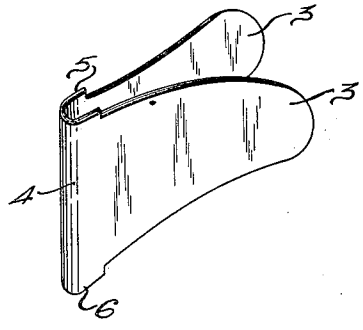


FIG. 5.

INVENTORS.
Clarence F. Alban,
Stanley R. Hood.
BY
Charles E. Nixon
ATTORNEY

Patented Mar. 1, 1938 2,109,628

UNITED STATES PATENT OFFICE

2,109,628

THERMOSTATIC VALVE

Clarence F. Alban and Stanley R. Hood, Detroit, Mich., assignors to W. M. Chace Valve Company, Detroit, Mich., a corporation of Michigan

Application May 1, 1935, Serial No. 19,260

5 Claims. (Cl. 236—93)

This invention relates to thermostatic valves and the object of the invention is to provide a thermostatic valve formed from a single sheet of bimetal bent upon itself to form valve blades for controlling flow through a conduit.

Another object of the invention is to provide a thermostatic valve including a tube and a bimetallic valve member return bent to provide valve blades and the return bent portion having extending U-shaped ends mounted in slots provided therefor in the tube, the arrangement being such that in one position the valve blades will close the tube and in the other position the valve blades will allow flow through the tube, the position of the blades being regulated by temperature variation.

A further object of the invention is to provide a valve of thermostatic metal having a return bent portion and the opposite ends of the return bent portion being extended beyond the body thereof and the said extending ends being secured in the tube to firmly anchor the thermostatic valve in the tube.

Another object of the invention is to provide a one piece valve member movable under temperature variation to position to close or open the tube and designed so that the valve portions may come to parallel relation to allow maximum flow through the tube.

These objects and the several novel features of the invention are hereinafter more fully described and claimed and the preferred form of construction by which these objects are attained is shown in the accompanying drawing in which—

Fig. 1 is a plan view of a tube and thermostatic valve in assembled relation.

Fig. 2 is a section taken on line 2—2 of Fig. 1.

Fig. 3 is a section taken on line 3—3 of Fig. 2 and showing the bimetallic valve member in elevation.

Fig. 4 is a view taken from the left end of Fig. 1.

Fig. 5 is a perspective view of the one piece bimetal valve member.

The tube or conduit 1, as shown in Fig. 1, is provided with a U-shaped slot 2 at the top and bottom. The bimetallic valve member comprises a pair of normally outwardly curved blades 3 formed from the same piece of metal return bent upon itself at 4 providing a U-shaped portion. This U-shaped portion is extended at the top and bottom at the points 5 and 6 to fit into the U-shaped slots 2 in the tube 1. The bimetallic valve member shown in Fig. 5 is fitted into the slots 2 in the tube by engaging the portions 5 and 6 therein and the metal at the forward end of the tube is provided with notches 7 forming lugs 8 which may be bent inwardly as shown to lock and anchor the portions 5 and 6 in place in the tube, as will be understood more particularly in Figs. 1, 2 and 4. When so locked in place, the blades 3 curve outwardly to fairly close contact with the edge of the tube as will be understood from Fig. 4, though a slight space 9 is provided between the edge of each blade 3 and the wall of the tube 1, so that a small portion of the fluid may pass around the valve in order that the temperature of the bimetallic valve member may be varied to cause the valve to act.

By curving the blades as shown, an increase in temperature will cause the blades to draw together in substantially parallel lines, as shown in dotted lines in Fig. 3, to prevent restriction of flow through the tube. The bimetallic valve member shown in Fig. 5 is formed from a single sheet of bimetallic metal in which the two metals have different coefficients of expansion in order to produce the desired action. By using different combinations of metals of different coefficients of expansion the action of the valve may be controlled and kept within the desired temperature ranges. Also by placing the low expansive side of the bimetal on the inside or outside of the formed blade the valve may be made to close when cold and open when hot or may be made to open when cold and close when hot and the various temperatures at which the valve may be caused to act may be varied by using different metal combinations and dimensions. Preferably the two elements forming the bimetallic blade are each formed of a nickel alloy thus adapting the device to be used under high as well as low temperatures. Such nickel alloys for instance are disclosed in the U. S. patent to W. M. Chace No. 1,642,485, but various other nickel alloys adapted for this purpose may be used.

From the foregoing description it becomes evident that the device is very simple and efficient in operation, is very cheap to manufacture due to the fact that the valve itself is formed from a single sheet of bimetal and provides a device which accomplishes the objects described.

Having thus briefly described our invention, its utility and mode of operation, what we claim and desire to secure by Letters Patent of the United States is—

1. In a thermostatic valve, a bimetallic valve member formed from a single sheet of bimetal return bent upon itself and provided with semi-

elliptical valve blades normally curved outwardly from the bend, said bend having parts extending outwardly from the respective opposite edges of the blades, a tube slotted at one end at diametrically opposite points to receive the said extending parts of the return bent portion, and lugs on the tube bent to engagement with the said extending parts to anchor the same in the slots and thereby secure the valve member in place.

2. A thermo-responsive valve for use within a tube, comprising a valve member formed of a single sheet of bimetallic material return bent upon itself in the form of a V and so shaped that when at low temperature the blades curve outwardly to engagement with the walls of the tube to practically close the same to a flow of fluid therethrough and when heated to certain higher temperature occupy a parallel relation in the tube wherein they provide a minimum obstruction to flow of fluid, the valve member having an integral portion at each of the opposite ends of the bend and the tube having diametrically opposed slots in one end to receive the same to thereby anchor the blades on a diametrical line of the tube.

3. A valve unit comprising a tube provided with diametrically opposed pairs of spaced slots in the wall thereof, a sheet of bimetal return bent upon itself to provide blades, the bend having U shaped parts to fit the respective pairs of slots to support the bimetal in the tube, the blades functioning to close or open the tube to fluid flow depending upon the temperature of the fluid.

4. A thermostatic valve for use within a tube through which fluid varying in temperature may flow, comprising a valve member formed of a single sheet of bimetal return bent upon itself and provided with valve blades extending outwardly from the bend, the shape of the blades in periphery being such as to engage the wall of the tube when flexed outwardly to engagement therewith due to certain low temperature fluid and to flex inwardly under an increasing fluid temperature to space the blades in respect to the wall of the tube to the degree determined by the temperature of the fluid above the certain low temperature, the bend at each of its opposite ends having parts extending outwardly from the respective edges of the blades and the tube having spaced slots at one end on diametrically opposite sides to permit the blade to be inserted in the tube from the said end with the extending portions engaging in the slots, the metal of the tube end, subsequent to insertion of the blade being struck inwardly to engage the said extending portions of the bend in the slots to retain the valve member in place.

5. A valve unit comprising a tube provided with diametrically opposite pairs of spaced slots in one end thereof forming a U shaped portion between the respective pairs of slots, a sheet of bimetal rebent upon itself to provide opposed blades of like form and dimension, the bend having integral U shaped parts projecting at its opposite ends and fitting in the respective slots in the tube in engagement with said U shaped portions therebetween, the said blades flexing to close or open the tube to fluid flow depending upon the temperature of the fluid passing through the tube.

CLARENCE F. ALBAN.
STANLEY R. HOOD.