J. BROMBACHER.

AUTOMATIC GAS CUT-OFF.

APPLICATION FILED APR. 13, 1917.

1,273,574. Patented July 23, 1918.

FIG. 1.

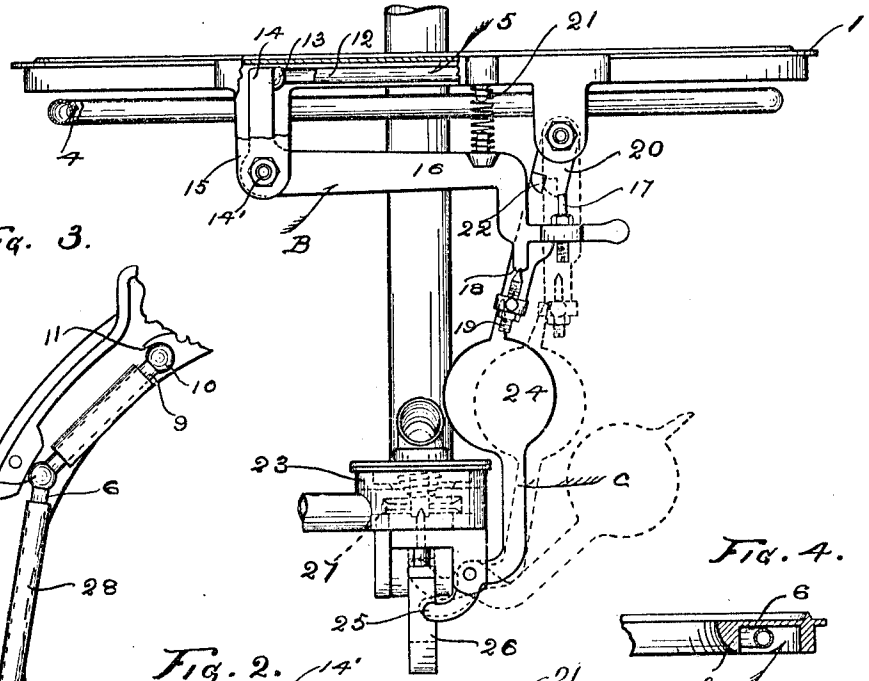


FIG. 3.

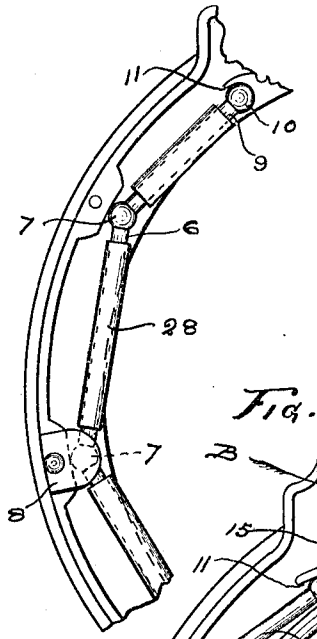
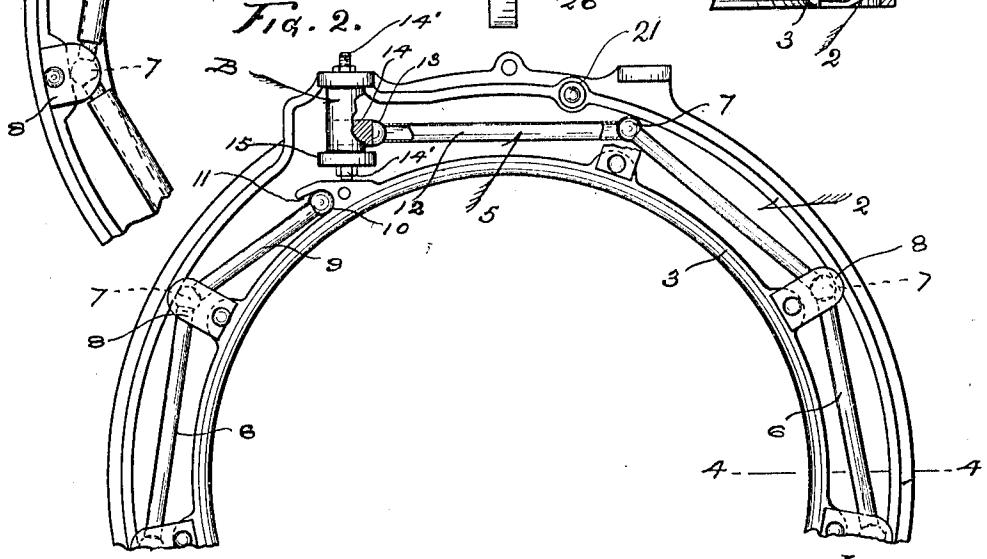


FIG. 4.

FIG. 2.



WITNESSES:

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AUTOMATIC GAS CUT-OFF.

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To all whom it may concern:

Be it known that I, JULIUS BROMBACHER, a citizen of the United States, residing at Los Angeles, county of Los Angeles, and State of California, have invented a certain new and useful Improvement in Automatic Gas Cut-Offs, of which the following is a specification.

My invention relates to an automatic gas control and has particular reference to a means influenced by thermostatic action for shutting off the flow of gas when for any reason the flame has been extinguished.

One of the objects of this invention is to provide a simple and effective device in which the cutting off of the flow of gas may be effected within a predetermined time after the extinguishment of the flame and wherein the setting of the cut-off mechanism is automatically accomplished by the thermostatic action.

Another object of this invention is to provide a new and novel thermostat in which the greatest extent of expansion and contraction in a circular plane may be had; in which the thermostat may be protected against any direct flame and against water of condensation and consequent corrosion.

These and other objects are accomplished by a form of structure shown in the accompanying drawing in which—

Figure 1 is an elevation showing my invention.

Fig. 2 is a bottom plan view showing a form of thermostat used in and forming part of my invention.

Fig. 3 is a fragmentary bottom view of a modified form and

Fig. 4 is a fragmentary view on line 4—4 Fig. 2.

My invention may comprise an annular member or ring 1, which may form a support for a water circulating coil, not shown, and which is formed on its under side with a channel 2, the inner web 3 of which may be inclined or curved to direct the flame from the burners 4 against the coil supported on the top of said ring; also to prevent the flame from actually contacting with a thermostat 5, disposed and held in said channel 2, as hereinafter pointed out, and to protect the thermostat from condensing waters and consequent corrosion. The flame from the burners 4 impinge against the web 3 and the heat resulting is conducted to the thermostat 5, which responds to the influence of the increasing temperature of the ring without exposure to a direct flame, thus preserving the life of the metal.

The particular form of thermostat and its specific assembly is most important and as presently set out, because of the necessity of obtaining an even contractive and expansive movement in a circular plane and because a continuous strip of metal of a circular form will respond expansively and contractively only in a diametrical plane, resulting eventually in a distortion. Hence the amount of movement attained by such continuous circular strip is limited and unreliable.

The present thermostatic device has been devised to give the greatest extent of movement obtainable by thermic influence on metals and consists of a plurality of units 6, preferably of copper or any other metal having a greater co-efficient of expansion than iron or the ring 1 in which it is housed.

These units 6 lie within the area of the annular plane of the ring 1 and with respect thereto are tangentially disposed.

They may be held in assembled relation by balls 7, of larger diameter than the units, and through the medium of these balls, which hold the units spaced, the contractive and expansive movement of one unit is transmitted to the other. The balls 7, as seen, normally bear and operate against the inner face of the outside wall and may be held in loose position by plates 8.

The unit 9, which may be termed the thrust unit of the series, is held by a ball 10, lying loose in a pocket 11, formed in the web 3, of the ring 1, and the terminal unit 12 is in engagement with a spherical surface 13, formed on one end 14, of a bell-crank lever B fulcrumed on pivots 14′, adjustable in suitable bearings 15 on the ring 1. The longer end 16 of the bell-crank lever B is provided with an adjustable stop 17, and with an indented projection 18 for engagement by preferably an adjustable member 19, in a link 20, pivotally hung from the ring 1. The engagement of said member 19,

with the projection 18, is insured by a spring 21, that also serves to hold the units of the thermostat in close engagement during the contractive movement thereof and such engagement functions to hold the stop 17 in line with a lug 22 on the link 20, for purposes hereinafter appearing.

This link 20 serves to hold the weighted end 24 of a lever C, fulcrumed in a suitable bearing on a valve chamber 23, in inoperative position at one time and release same from such position at another time. The other end 25 of said weighted lever C is disposed in operative relation to a weighted lever 26, operable by thermostatic action, not shown, to govern a valve 27, in said valve chamber 23, and control the flow of gas to the burners 4. The end 25 of said weighted lever C may, however, be disposed in operative relation directly to the valve 27.

In Fig. 3 is shown a modified form of thermostat consisting chiefly in covering the thermostatic units 6, with a sleeve or other protecting medium 28, that may be directly exposed to the flame of the burners and preserve the thermostatic units against deterioration. The sleeves are preferably mounted on the units in a loose manner and conduct the heat to the units. For this purpose they extend beyond the plane of the circular ring in order that the flames may strike directly against the sleeves.

Assuming that the weighted lever C has dropped to the extreme position shown in Fig. 1 and closed the valve 27 to shut off the flow of gas when the flame has been extinguished other than by voluntary agency, the flow of gas is again started by manually placing the bell-crank end 16 in the position shown in Fig. 1 in which position the member 19 is in engagement with the indented projection 18. The adjustable stop 17 is thus held in the path of the travel of the lug 22 on the link 20.

The gas being lighted, the heat therefrom will influence the thermostat which, expanding, will tilt upward the bell-crank end 16, releasing the link 20 and allowing it to swing on its pivot until the lug 22 engages the stop 17, the swinging of the link being accentuated by the weighted lever C which travels and is held with it in the position indicated in dotted lines.

The bell-crank lever B is held in lifted position by the expanding thermostat and this insures the maintenance of the link and weighted lever in set position.

When the bell-crank B is manually placed as above described, the end 14 thereof is moved away from the terminal unit 12 of the thermostat, leaving all of the other units 6 free and under no tension. The application of heat, however, to the thermostat and the consequent expansion of the units thereof places the entire thermostat under tension and the tension is maintained as long as heat influences the thermostat. Obviously therefore, the link 20, and weighted lever C will be held inoperative so long as the thermostat is under heat influence. Should the flame be extinguished, as often happens in an accidental manner, whereby the gas escapes from the burners, the thermostat will begin to cool instantly and the resulting contraction will leave the spring 21 free to exert a downward pressure on the bell-crank end 16 which, moving in conformity with the contractive action of the thermostat, will carry the stop 17 past the lug 22 and permit the weighted lever C to fall to the extreme position indicated in dotted lines. In so falling, the end 25 of said lever C closes the valve 27 and cuts off the flow of gas automatically.

It will be noted that the circular nature of the thermostat has the advantage, in addition to those mentioned, of remaining under the influence of but one or less than the entire number of burners and that despite the reduction in the number of influencing burners, the gas will be continuously supplied.

What I claim is:—

1. A gas cut-off comprising a valve, a lever in operative relation to said valve, a link against which said lever bears, an adjustable member and a lug on said link, a bell-crank having on one end an adjustable stop and its other end in engagement with a thermostat and arranged to be placed manually on said adjustable member to hold said lever in inoperative position, said bell-crank operable by expansion of said thermostat to lift said bell-crank and allow said link to swing and the lug thereon to engage the stop on said bell-crank, said bell-crank operable by thermostatic contraction to move its stop away from said lug and allow the lever to fall and operate said valve.

2. A gas cut-off comprising a valve, an operating means for said valve, a series of circularly arranged units, a bell-crank to receive the movement of said thermostatic units, means held by said bell-crank to hold the valve operating means in inoperative position while the thermostatic units remain uninfluenced by heat, said bell-crank movable under thermostatic influence to release said means and cause same to move to and be held in position for operation of said valve when the thermostatic units contract.

3. A gas cut-off comprising a valve, an operating means for said valve, a plurality of thermostatic units circularly arranged, a lever to receive the movement of said units, and a pivotal means coöperating with said lever to hold the valve operating means in inoperative position, said pivotal means hav-

ing a lug, and said lever operable by said thermostatic in one direction to release said pivotal means and cause the lug thereon to engage said lever, said lever operable by said thermostatic units in another direction to release the pivotal means and operating means.

In testimony whereof I affix my signature in the presence of two witnesses.

JULIUS BROMBACHER.

Witnesses:
FRANK NEWNHAM,
HENRY E. STORRS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."