E. E. GOLD.

AUTOMATIC REGULATOR FOR GAS HEATERS.

APPLICATION FILED NOV. 27, 1915.

1,179,519. Patented Apr. 18, 1916.

Fig. 1.

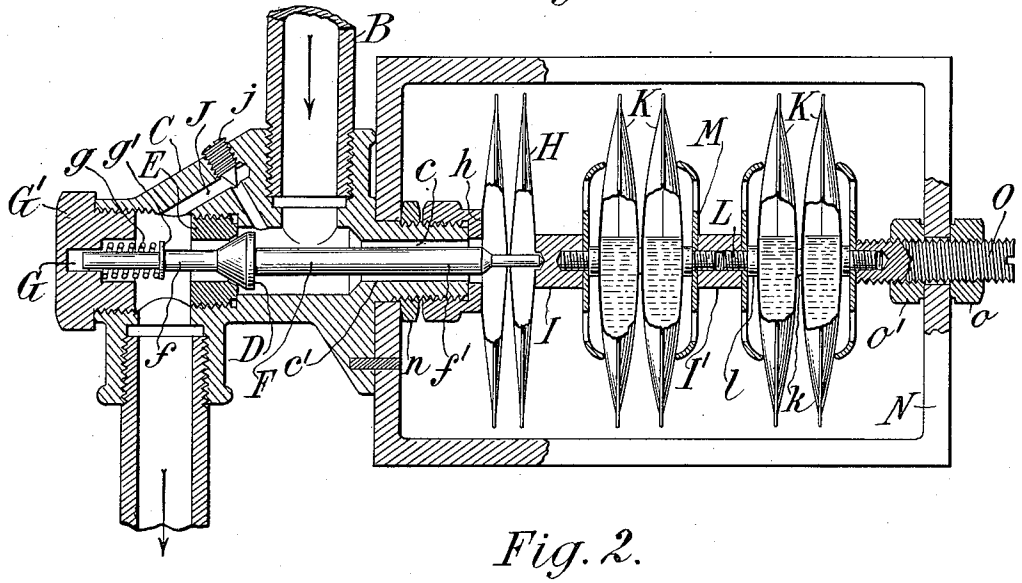


Fig. 2.

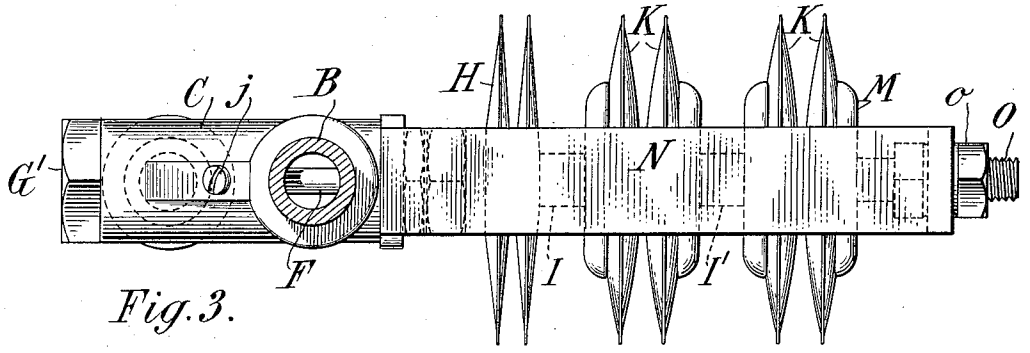


Fig. 3.

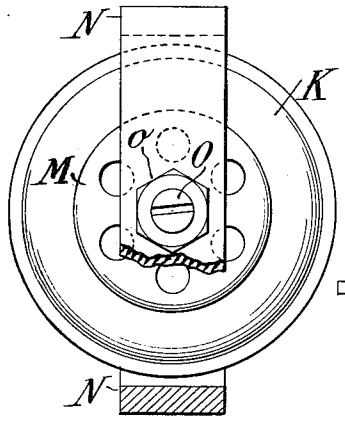
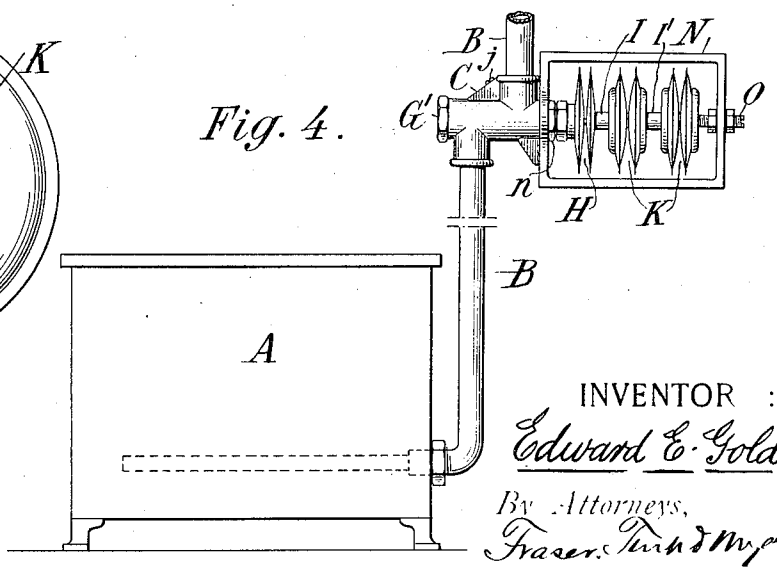


Fig. 4.



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AUTOMATIC REGULATOR FOR GAS-HEATERS.

1,179,519. Specification of Letters Patent. Patented Apr. 18, 1916.

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To all whom it may concern:

Be it known that I, EDWARD E. GOLD, a citizen of the United States of America, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Automatic Regulators for Gas-Heaters, of which the following is a specification.

My invention relates to automatic means for controlling the supply of gas to a gas heater, and has for its object to regulate the supply of gas to said heater in accordance with the thermostatic conditions prevailing in the apartment to be heated, whereby the waste of gas will be prevented.

The invention will be found particularly advantageous for use in heating garages where it is desired to maintain sufficient heat at all times to prevent the water freezing in the automobiles. It also may be advantageously used in many other places.

My invention consists in the combination of parts hereinafter mentioned and described.

A desirable form in which my invention may be embodied is illustrated in the accompanying drawing, wherein—

Figure 1 is a view, partly in section, illustrating my improved regulating apparatus; Fig. 2 is a top view thereof; Fig. 3 is an end view looking from the left, Fig. 1, partly broken and parts being shown in section, and Fig. 4 is an elevation of my invention illustrating it in use with a gas heater.

I have illustrated my invention as applied to a gas heating system for the purpose of regulating the feed of gas to the gas heater A. The supply pipe B is connected to a valve casing C within which is a valve D for controlling the flow of gas through the supply pipe B. This valve is illustrated as a cone-shaped valve, and the valve seat E has a correspondingly cone-shaped seating surface. The valve is borne by a valve stem F, one end of which has an extension f which projects into a recess G in the valve casing. A spring g bears against the casing at one side, and at the other side against a collar g^1 fixed on the valve stem, and tends to hold the valve D normally open. On the other side of the valve D the stem F has an extension f^1 which passes through an opening c in the casing C into an expansible vessel H. This expansible vessel has its outer end closed by a spacer block I which is secured thereto, and at its inner end has an opening through which the valve stem F passes, and it is secured gas-tight to the valve casing C around said opening.

It will be perceived from the foregoing that the expansible vessel H is at all times filled with gas, and that it provides an elastic connection between the valve-operating means and the valve whereby the valve may be freely operated toward and from its seat and no leakage of gas will occur, and at the same time the usual gland or other packing is dispensed with. By this means, therefore, the operation of the valve D is very much simplified, as the same may be easily moved, and the employment of the expansible vessel H enables me to dispense with the friction upon the valve stem F usually met with where a packing is employed to prevent the leaking of gas. This also enables me to employ a very light spring g, and consequently very slight power in the operating means is sufficient.

The operating means employed by me to operate the gas valve D are thermostatic operating means, and are so located and disposed that they are affected by the temperature in the surrounding atmosphere, which is the temperature of the apartment to be heated, whereby as the said temperature grows warmer the thermostat will operate to expand and close the valve D and thereby shut off the supply of gas until the temperature in the apartment is lowered, whereupon the contraction of the thermostat will permit the spring g to open the valve D and permit a further supply of gas to pass to the gas heater A.

For the purpose of at all times maintaining a slight flame in the gas heater A, a by-pass J is provided through which the passage of gas is controlled by an adjustable needle valve j.

The particular type of thermostat employed by me, according to my invention, for the purpose of operating the valve D, is well adapted for this purpose. The said thermostat, as illustrated, comprises a plurality of expansible and contractible vessels K. These are preferably made of some spring metal, such as phosphor bronze, and contain a small quantity of volatile fluid,

such as ethel chlorid, alcohol, or other fluid the precise nature of which depends upon the range of temperatures desired to be maintained in the apartment, as different fluids are known and available which are capable of condensing and volatilizing at various extreme temperatures, and are therefore available for maintaining a different range of temperatures in the apartment. The thermostatic diaphragms K are preferably arranged in pairs, as illustrated, connected at their centers by a button or spacer *k* secured to each of them. Spacers I, I^1 space the diaphragms. These spacers are illustrated as being held in position by threaded studs L which are secured to the outside of each diaphragm in a pair and screw into the said spacers. Spiders M may be employed to assist in holding the diaphragms in position. These spiders are perforated to receive the studs L, and rest on one side against the spacers I, I^1, and on the other side against the heads *l* of the threaded studs L. A frame N is employed to aid in supporting the diaphragms, and this frame is mounted upon an extension c^1 of the valve casing C and is held thereon by a nut *n*. At its outer end the frame is perforated to permit the passage of a supporting adjustment bolt O which is perforated at its end to receive a threaded stud L and is adjusted and held in position by nuts *o*, o^1 on each side of the frame N. The said adjusting screw O serves both to support the diaphragms K and to adjust them in position toward and from the valve stem F. The spacer I which is interposed between the expansible vessel H and the end diaphragm K is secured, as stated, directly to the expansible vessel, and serves to close the opening in the end thereof. One side of the spacer receives the thrust of the valve stem, and at the other side it receives the end of the diaphragm K of the series of connected diaphragms, so that as the diaphragms expand the motion thereof is communicated through the spacer I to the valve stem, and as the diaphragms contract the spring *g* will keep the valve stem at all times in contact with the outer end of the spacer I.

I have illustrated as part of my invention a desirable construction of parts permitting the easy removal of the parts for repair and replacement. The recess G in the valve casing C is formed in a plug G^1, and this plug is screwed in the valve casing so as to be removable therefrom as desired. The valve seat E is likewise removable from the casing by unscrewing, and its size is such that it will readily pass out through the opening in which the plug G^1 is screwed. This permits the removal of the valve D and its connected stem, which are then free. The frame N within which the thermostats are supported is preferably constructed as illustrated so that the same shall be open whereby the thermostats are freely exposed to the temperature in the apartment, and are rendered sensitive to changes therein and energetic in their action.

The adjusting bolt O permits of the position of the thermostats relative to the valve being altered. Upon a retraction of the said bolt O the spring *g* will tend to further expand the expansible vessel H which is preferably formed of metal similar to that in the diaphragms K, and will keep the valve stem F in proper position relative to the spacer I. It will be apparent, however, that in such case the thermostat will be capable of a greater expansion before closing the valve. Therefore, the said adjusting means provide for a variation in the temperature to be maintained in the apartment by varying the degree of expansion at which the thermostat will operate the valve, and therefore permitting the thermostat to operate the said valve at varying temperatures.

I have illustrated in the accompanying drawings the most desirable manner of constructing my invention now known to me, but desire it to be understood that my invention is not in all respects limited to the precise construction shown, as modifications may be made thereto within the limits of the appended claims.

What I claim is:—

1. An automatic regulator for gas heaters, comprising a gas supply pipe, a valve casing, a valve therein, a removable valve seat, a valve stem freely mounted in said casing and having one end projecting through an opening therein, an elastic vessel secured gas-tight to the casing around said opening, the end of said valve stem extending into said elastic vessel and into operative relation with the closed rear wall thereof but separable therefrom, a thermostat adapted to be affected by the temperature of the surrrounding atmosphere and a connection between said thermostat and said elastic vessel, whereby the expansion of said thermostat is operatively exerted upon said valve stem and a spring adapted to hold said valve normally open and said valve stem in operative relation to said thermostat, said valve and its stem adapted to be removed upon the removal of said valve seat.

2. An automatic regulator for gas heaters comprising a gas supply pipe, a valve casing, a valve therein, a removable valve seat, a valve stem freely mounted in said casing and having one end projecting through an opening therein, an elastic vessel secured gas-tight to the casing around said opening, the end of said valve stem extending into said elastic vessel and into operative relation with the closed rear wall thereof, but separable therefrom, a plurality

EDWARD DE HOGDE.