

W. M. FULTON.
TEMPERATURE REGULATOR.
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1,358,073.

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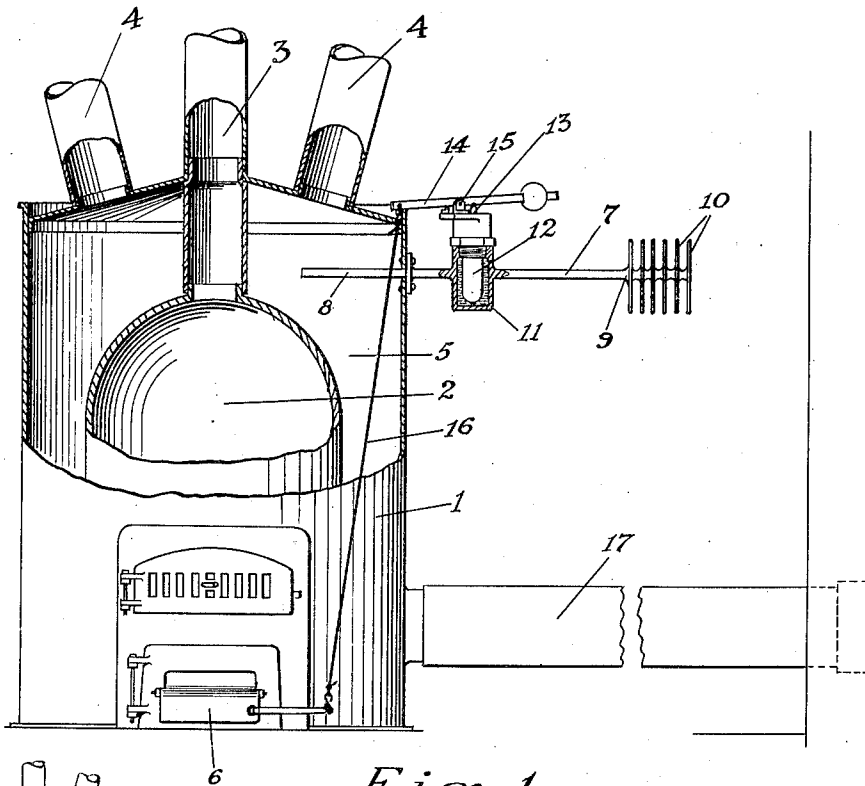


Fig. 1.

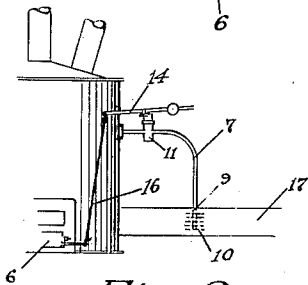


Fig. 2.

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TEMPERATURE-REGULATOR.

1,358,073.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WESTON M. FULTON, a citizen of the United States of America, and a resident of Knoxville, Tennessee, have invented a new and useful Improvement in Temperature-Regulators, which invention is fully set forth in the following specification.

This invention relates to regulating devices which are responsive to temperature variations, and while capable of a wide variety of uses, is of particular utility in regulating temperatures not differing greatly from atmospheric temperatures.

An object of this invention is to provide a regulator comprising a conductor of heat having one portion subjected to the source of heat and another portion, preferably exposed to the air, acting as a radiator or heat-dissipating means, and a thermosensitive device which is not subjected directly to the source of heat but to a portion of said conductor. A further object of this invention is to provide a simplified regulator which takes advantage of the known law of physics that a conductor of heat subjected at one portion to a source of heat and cooled by radiation at another portion has a determinate and calculable gradation in temperature between the aforesaid portions, whereby proportionate variations of temperature at an intermediate portion may be utilized for the regulation of means to be controlled.

Yet another object of this invention is to provide a furnace with a draft regulator that shall prevent overheating, and that shall be simple in construction, inexpensive to manufacture, easy to install, and efficient in operation.

Stated briefly, the invention comprises, in combination with a source of heat and means to be controlled, a conductor of heat having one portion subjected to the source of heat and another portion thereof, shown as exposed to the air, so constructed as to provide radiating or heat-transmitting projections, and thermosensitive means subjected to an intermediate portion thereof and operatively related to the means to be controlled, such, for example, as a draft regulator of a furnace.

The invention is capable of receiving a variety of mechanical expressions, two of which, for the purpose of illustration, have been shown on the accompanying drawing.

But it is to be expressly understood that these embodiments have been selected for purposes of illustration only, and are not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

Referring to the drawing, wherein the same reference characters designate corresponding parts in the several figures,

Figure 1 is an elevation, partly in section, of a hot-air furnace provided with a draft regulator embodying the present invention;

Fig. 2 is an elevation of a modified arrangement.

Referring in detail to the drawing, 1 represents a source of heat, shown as any suitable form of furnace for a hot-air heating system, wherein 2 is the fire chamber, 3 the smoke flue, 4, 4 air pipes, 5 the hot-air chamber, and 6 a draft damper. While a draft regulator controlling the intake of air has been illustrated, it will be apparent that a draft regulator in any pipe or chimney might be used with the invention with equal facility. It is also to be understood that, while this invention has particular utility when applied to the control of a draft damper or regulator, such damper or regulator is to be taken as typical of any suitable means to be controlled.

In accordance with the present invention a conductor of heat has one portion thereof subjected to the source of heat. In the embodiment illustrated a conductor of heat of any suitable material has one portion, as the end 8, extending into the hot-air chamber of the furnace 1. Another portion of the conductor is so constructed as to constitute a radiator or heat-dissipating means, as by the provision of radiating projections. In the embodiment illustrated the opposite end 9 of the conductor 7 is provided with a plurality of radiating plates 10, said end constituting the radiator being shown as exposed to the air whereby convectional currents will facilitate heat dissipation and maintain the end of the conductor at approximately the temperature of the air in which it is located. Intermediate the aforesaid portions respectively exposed to the source of heat and constituting the radiator, a thermosensitive means is operatively related to the conductor of heat and operatively related to the means to be controlled, in this case the draft regulator 6. To the

end of providing means for positioning the thermosensitive means in operative relation to the intermediate portion of the conductor 7, this conductor is shown as enlarged at 11 to provide a container for a fluid such, for example, as oil. Received within this container 11 is a thermosensitive device 12. Any suitable form of thermosensitive means may be employed, that illustrated comprising a thermostat of the general type disclosed in my Patent No. 1,153,214, dated September 14, 1915. In the form shown, the operating stem 13 of this thermostat has engagement with a weighted lever 14 pivoted in the bracket 15 supported on the housing of the thermosensitive device, and one end of the lever 14 is operatively connected to the draft regulator 6 as by an operating cord 16.

In place of locating the end 9 of the heat conducting member 7 in the air of the furnace room, the heat conducting member may be so shaped as to locate the end 9, with its projections 10, in the air-intake 17 of the hot-air heating system, as illustrated in Fig. 2. In this embodiment of the invention the temperature of the outside air, as it flows to the furnace; rather than the temperature in the furnace room, will be a factor in determining the thermostatic control of the draft regulator.

In operation, portion 8 of the conductor of heat, which is subjected to the source of heat, has a relatively high temperature. On the other hand, portion 9 of this conductor, which is exposed to the air, will have a relatively lower temperature, determined by the temperature of the air to which this portion constituting the radiator or heat dissipator is subjected. Between these portions of the conductor there will be a determinate gradation in temperature, depending upon the physical characteristics of the conductor. The temperature at the point at which the thermosensitive means is positioned will vary with and in proportion to the difference in temperature between the aforesaid portions 8 and 9. Thereby the thermosensitive means may operate the draft regulator, or other means to be controlled, accurately and efficiently, but without subjection to the source of heat itself, and under the control of variations of temperature less than those occurring at the source.

While the invention has been described as employed for the purpose of draft regulation in a furnace, it is to be expressly understood that the invention is not restricted to this particular use, for it is applicable to the regulation of temperature in other relations where it is desired that the thermosensitive means itself shall not be subjected directly to the source of heat. Also, as a condition of cold is representative of an absence of heat, it will be apparent that this

invention is of equal application in regulating temperatures below the temperature of the atmosphere. In the latter event there will be a gradual rise in temperature between the cooling source and the heat transmitting portion 9 of the conductor of heat. Therefore, wherever the term "source of heat" is employed in the claims hereto appended, such expression is to be construed as inclusive of sources of temperature control either above or below atmospheric temperatures.

What is claimed is:

1. The combination with a source of heat and means to be controlled, a relatively stationary conductor of heat having one portion thereof subjected to said source of heat and another portion thereof exposed to the air and so constructed as to constitute a radiator, and thermosensitive means subjected to an intermediate portion of said conductor and operatively related to said means to be controlled.

2. In combination with a source of heat and means to be controlled, a relatively stationary conductor of heat having one portion thereof subjected to said source of heat and another portion provided with a plurality of projections to facilitate the transmission of heat thereby, and thermosensitive means subjected to an intermediate portion of said conductor and operatively related to said means to be controlled.

3. In combination with a source of heat and means to be controlled, a relatively stationary conductor of heat having one portion thereof subjected to said source of heat and another portion provided with a plurality of radiating plates, and thermosensitive means subjected to an intermediate portion of said conductor and operatively related to said means to be controlled.

4. In combination with a source of heat and means to be controlled, a relatively stationary conductor of heat having one portion thereof subjected to said source of heat and another portion thereof exposed to the air and so constructed as to constitute a radiator, a container in heat-conducting relation to and intermediate of the aforesaid portions, and thermosensitive means in said container and operatively related to said means to be controlled.

5. In combination with a source of heat and means to be controlled, a relatively stationary conductor of heat having one portion thereof subjected to said source of heat and another portion thereof provided with heat-dissipating projections, a container in heat-conducting relation to and intermediate of the aforesaid portions, and thermosensitive means in said container and operatively related to said means to be controlled.

6. In combination with a source of heat 11

and means to be controlled, a rod of heat-conducting material having one portion subjected to said source of heat, another portion provided with projections to facilitate
5 air-cooling and an intermediate portion formed to receive thermosensitive means, and thermosensitive means in operative relation to said intermediate portion and operatively, related to said means to be controlled.
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7. In combination with a furnace and a draft-regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and another portion thereof exposed to the air and so constructed as to constitute a radiator, and thermosensitive means subjected to an intermediate portion of said conductor and operatively connected to said draft-regulator.
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8. In combination with a furnace and a draft-regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and another portion thereof provided with heat-dissipating projections, and thermosensitive means subjected to an intermediate portion of said conductor and operatively connected to said draft-regulator.
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9. In combination with a furnace and a draft-regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and another portion thereof exposed to the air and so constructed as to constitute a radiator, a container in heat-conducting relation to and intermediate of the
30 aforesaid portions, and thermosensitive means in said container and operatively connected to said draft-regulator.
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10. In combination with a hot-air furnace and a draft-regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and another portion subjected to the air-intake of said furnace, and thermosensitive means subjected to an intermediate portion of said conductor and operatively connected to said draft-regulator.

11. In combination with a hot-air furnace and a draft-regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and another portion subjected to the air-intake of said furnace and so constructed as to constitute a radiator, and thermosensitive means subjected to an intermediate portion of said conductor and operatively connected to said draft-regulator.

12. In combination with a hot-air furnace and a draft-regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and another portion subjected to the air-intake of said furnace and provided with heat-dissipating projections, and thermosensitive means sub-

jected to an intermediate portion of said conductor and operatively connected to said draft-regulator. 65

13. In combination with a hot-air furnace and a draft-regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and another portion subjected to the air-intake of said furnace, a container in heat-conducting relation to and intermediate of the aforesaid portions, and thermosensitive means in said container and operatively connected to said draft-regulator. 70 75

14. In combination with a hot-air furnace and a draft-regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and another portion subjected to the air-intake of said furnace and so constructed as to constitute a radiator, a container in heat-conducting relation to and intermediate of the aforesaid portions, and thermosensitive means in said container and operatively connected to said draft-regulator. 80 85

15. In combination with a furnace and a draft regulator therefor, a conductor of heat having one portion subjected to the heat of said furnace and a heat-dissipating portion exposed to the air, and thermosensitive means subjected to an intermediate portion of said conductor and operatively connected to said draft-regulator. 90 95

16. In combination with a source of heat and means to be controlled, a relatively stationary conductor of heat having one portion thereof subjected to said source of heat and another portion thereof exposed to the air and provided with means to transmit heat readily therebetween, and thermosensitive means subjected to an intermediate portion of said conductor and operatively related to said means to be controlled. 100 105

17. In combination with a source of heat and means to be controlled, a rod of heat-conducting material having one portion subjected to said source of heat and another portion constructed to facilitate dissipation of heat to the air, and thermosensitive means subjected to an intermediate portion of said rod and operatively related to said means to be controlled. 110 115

18. In combination with a source of heat and means to be controlled, a rod of heat conducting material subjected at one portion to said source of heat and having a heat-dissipating portion subjected to the air, and thermosensitive means subjected to an intermediate portion of said rod and operatively related to said means to be controlled. 120

In testimony whereof I have signed this specification. 125

WESTON M. FULTON.