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AUTOMATIC AIR CONTROL

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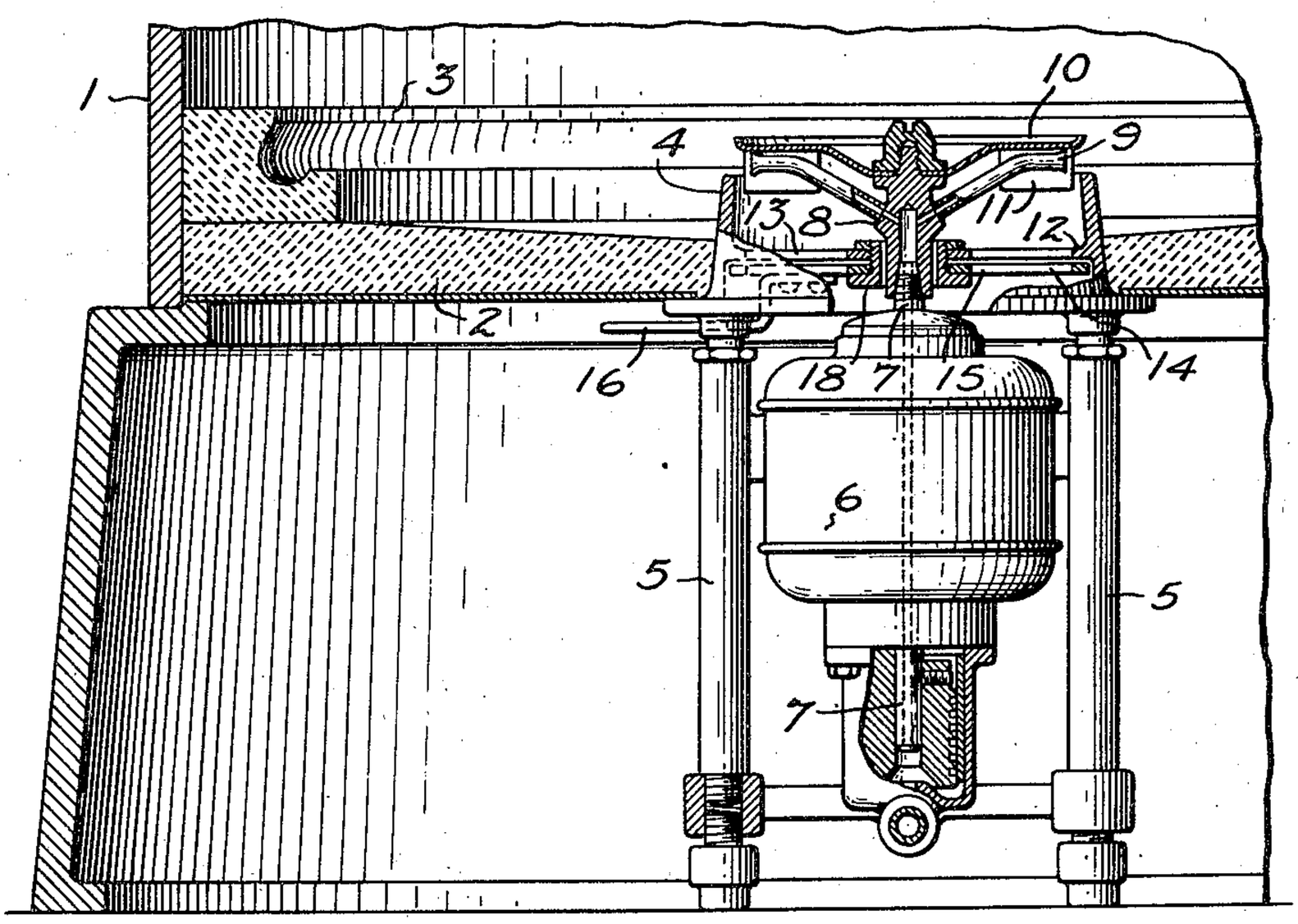

Fig. 1

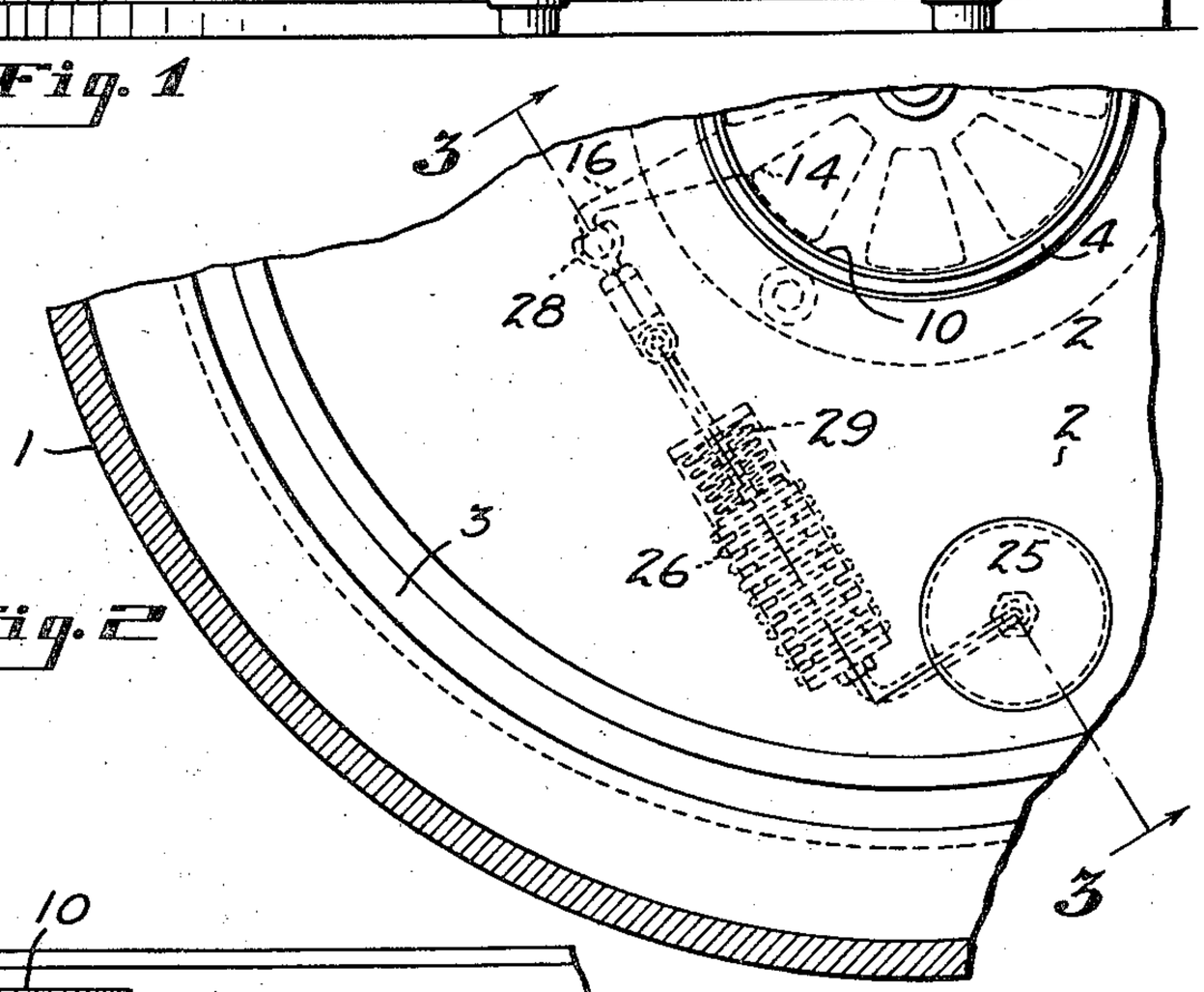

Fig. 2

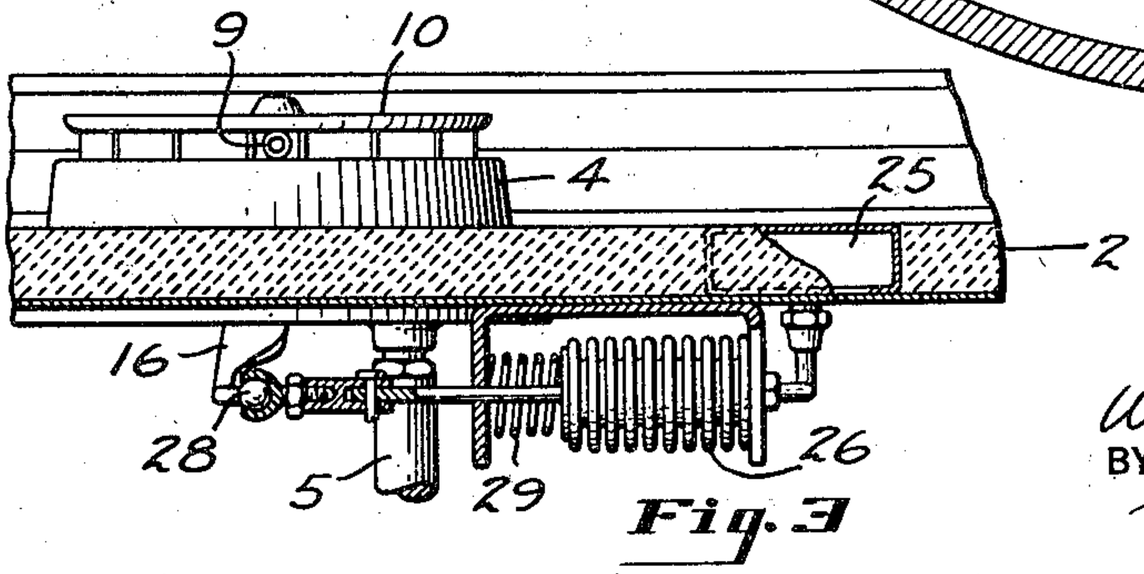

Fig. 3

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AUTOMATIC AIR CONTROL

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1 Claim. (Cl. 158—1)

This invention relates to oil burning furnaces and more particularly to the fuel distributing units therefor and the means for supplying air for mixture with the fuel.

One of the objects of the present invention is to provide a compact fuel distributing unit of new and improved construction.

Another object is to provide a fuel distributing unit having a new and improved means for regulating and adjusting the flow of air therethrough, that assists in atomizing the fuel distributed thereby.

Another object is to provide an oil burning furnace in which the supply of air thereto is automatically controlled.

Another object is to provide an oil burning furnace in which the supply of air thereto is automatically decreased after the initial ignition period.

A further object is to provide an oil burning furnace in which a large supply of air is admitted thereto during the initial ignition period and in which the supply of air is automatically decreased after adequate combustion conditions are attained.

With the above and other objects in view, which will be apparent from the following detailed description, the present invention may be said to consist in certain features of construction and combinations of parts which will be readily understood by those in the art to which the invention appertains.

In the drawing which illustrates a suitable embodiment of the invention,

Fig. 1 is a fragmentary vertical section of a furnace and oil distributing device with which the control of the present invention is incorporated;

Fig. 2 is a plan view of the furnace interior, the air control device being shown in broken outline; and

Fig. 3 is a section taken approximately on line 3—3 of Fig. 2.

Referring to the accompanying drawing, in which like numerals refer to like parts throughout the several views, the furnace 1 is provided with a transverse hearth 2 of refractory material near the bottom thereof and an endless hearth ring 3 mounted on the hearth 2 adjacent the furnace wall.

The distributing unit shown in the drawing and selected for illustration comprises an annular housing 4, supported on legs 5, which extends through a central opening formed in the hearth 2. An electric motor 6 having a hollow shaft 7 is supported by the housing 4 below the lower end thereof. A distributing head 8 is mounted within the housing 4 and is secured to the upper end of the shaft 7. The head 8 is provided with a plurality of upwardly and outwardly extending radial distributing tubes 9. These tubes 9 are in communication with the hollow shaft 7 and terminate immediately above the upper edge of the housing 4 and slightly inwardly of the periphery thereof as shown in Fig. 1. A fan member 10 is secured to the head 8 and is provided with blades 11 which are positioned adjacent the distributing tubes 9 and extend within the housing 4 below the upper edge thereof. The outer edges of the blades 11 preferably extend slightly beyond the ends of the tubes 9.

During operation of the unit, fuel is fed through the hollow shaft 7 and thence outwardly through the distributing tubes. The fan member draws air from below the hearth through the housing 4, where the same mixes with the fuel discharged through the tubes 9. The atomized fuel is discharged against the hearth ring 3 and is ignited, thereby providing a continuous flame around the hearth ring.

In order to regulate the amount of air flowing through the housing 4 to obtain satisfactory combustion, a shutter arrangement is provided. As shown in the drawing, the housing 4 is formed with an integral flange 12 extending radially inwardly thereof and having a plurality of regularly spaced openings 13 therein. These openings are arranged to be closed by a rotatable annular disc 14 likewise having openings 15 therein, arranged at times to register with the openings 13 and permit unrestricted flow of air therethrough. By rotating the disc 14, the openings 13 can be partially or completely closed to permit the proper supply of air. A suitable lever 16 is secured to the disc 14 for rotating the same. The disc 14 is supported from the flange 12 by a sleeve 17 surrounding the distributing head and threaded into the flange 12. The sleeve 17 is formed with an outwardly extending radial flange 18 which engages the lower surface of the annular disc 14 to support the same.

In the operation of oil burning furnaces it has been found that considerable time elapses before the proper and desired heating flame is obtained. This is due to the fact that the supply of air adequate for the proper combustion of the fuel when the interior of the furnace is at the desired heating temperature is not adequate for rapid rise to this temperature. As a result, considerable time elapses, when the furnace is cold, from the time

of initial ignition until the desired heating temperature is obtained within the furnace.

The present invention has to do with means for automatically admitting a supply of air to the furnace, during the initial fuel ignition period, which is greater than the supply necessary when the furnace is operating at the proper heating temperature, and for shutting off this additional supply when the interior of the furnace reaches a predetermined temperature.

In order to positively control the air and provide for an automatic increase or decrease of the air supply in accordance with the temperature prevailing within the combustion chamber, I provide a means whereby the disc 14 is thermostatically operated by means of a heat responsive unit. Although other types of heat responsive units may be employed, the type here shown lends itself to convenient use of the rotatable air control disc 14. This unit comprises an enclosed chamber 25, and is mounted in the hearth 2 with a thin wall exposed to the heat within the furnace. The chamber 25 is in communication with an expansible-contractible bellows member 26 that is suspended by a bracket 27 from the lower side of the hearth. One end of the bellows member 26 is connected through a universal member, such as a ball and socket joint 28, with the operating lever 16 of the disc 14. The movable end of the bellows 26 is guided by the bracket 27 and a compression spring 29 may be interposed between the bracket and the movable end to assist in the contraction of the bellows 26. The bellows and chamber 25 may be filled with a volatile fluid or heat responsive fluid, so that when the temperature within the furnace increases the bellows member 26 will cause the disc 14 to gradually shut off the supply of air flowing through the inlet openings controlled thereby. This device is adjusted so that when the bellows member 26 is contracted, such as when the furnace is in inoperative condition, the air supply openings are wide open to permit a maximum supply of air during the initial ignition and starting period. By using the chamber 25, heat responsive means is provided which can be mounted in the hearth without interrupting the continuity of the hearth surface.

It is clearly obvious that other types of heat responsive means may be employed to equal advantage.

In the construction shown and described, a means of supplying additional air over and above the amount necessary for normal operation is provided, which is automatically controlled by the temperature of the furnace, and which will automatically shut off the supply of additional air when the furnace temperature reaches a predetermined value but which will automatically permit an increase in air supply when the temperature falls below the said predetermined value.

It is to be understood that the air control means shown and described in connection with Figs. 1, 2 and 3 may be used to equal advantage in furnaces using fuel distributing means other than the rotary device shown.

The advantages of the air control means described and shown in the drawing are readily apparent.

Furthermore, it is to be understood that the particular forms of apparatus shown and described, and the particular procedure set forth, are presented for purposes of explanation and illustration, and that various modifications of said apparatus and procedure can be made without departing from my invention as defined in the appended claim.

What I claim is:

In an oil burning furnace having a combustion chamber, fuel and air distributing means for distributing a fuel and air mixture into said combustion chamber, means operative at all times during operation of the furnace and independently of the supply of fuel by said first means for regulating the amount of combustion supporting air supplied to said combustion chamber, temperature responsive means responsive to temperature conditions within said combustion chamber, and connections so arranged between said temperature responsive means and air regulating means that said temperature responsive means causes said air regulating means to decrease the supply of air upon a rise in combustion chamber temperature and to increase the supply of air upon a drop in combustion chamber temperature independently of the supply of fuel.

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