Dec. 31, 1929. F. MARION 1,741,529

HEATING SYSTEM AND APPARATUS

Filed Jan. 7, 1928

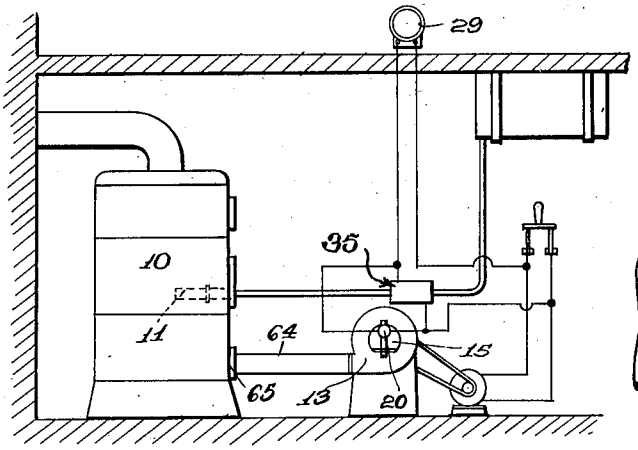


Fig. 1.

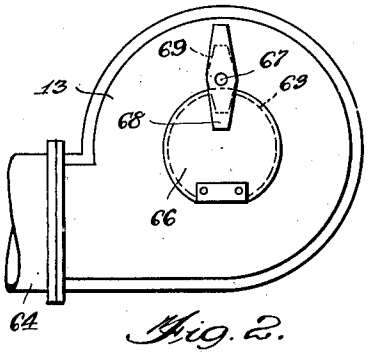


Fig. 2.

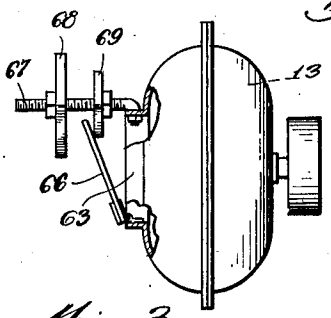


Fig. 3.

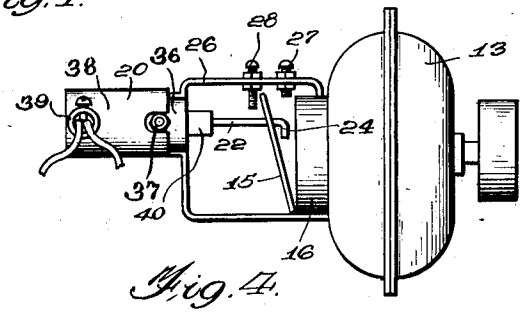


Fig. 4.

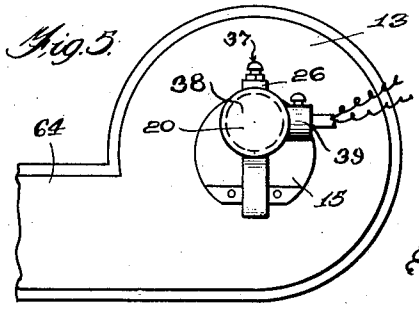


Fig. 5.

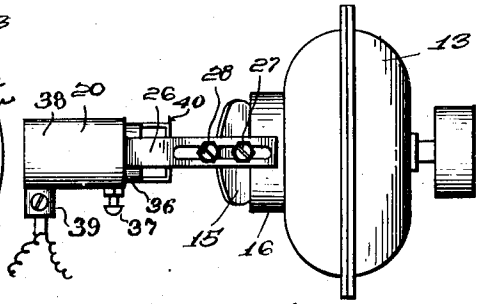


Fig. 6.

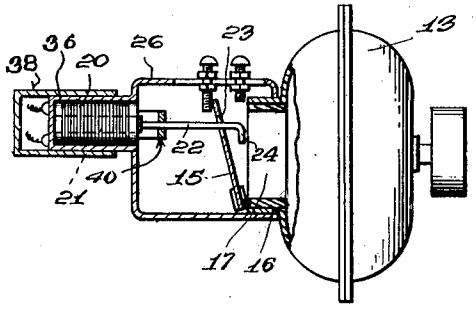


Fig. 7.

INVENTOR.
Frank Marion,
BY
H. S. Woodward
ATTORNEY.

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UNITED STATES PATENT OFFICE

FRANK MARION, OF BRATTLEBORO, VERMONT, ASSIGNOR OF ONE-THIRD TO ELWIN L. SCOTT, OF BARRE, VERMONT, AND ONE-THIRD TO HERBERT G. BARBER, OF BRATTLEBORO, VERMONT

HEATING SYSTEM AND APPARATUS

Application filed January 7, 1928. Serial No. 245,229.

This application is a continuation in part of my application Serial No. 133,261 with respect to claims 9 and 10, and Figures 16 and 17 of the said prior application.

The invention seeks to provide a novel control for fuel burners for heating systems, and particularly a desirable new construction in the draft control, or air supply valve or damper.

It is an important aim to effect improvements in such a system and also to simplify the construction and installation of a system having a wide range of functional activity.

Thus, it is a purpose to utilize automatically as required, both natural and forced draft, without complicated construction. At the same time the device is adapted to operate with forced draft at all times if desired as long as power therefor is available, yet having the advantage that it will automatically accommodate itself to the emergency when the power fails, so as to operate with natural draft to the maximum possible therewith.

Additional objects, advantages and features of invention reside in the construction, arrangement and combination of parts involved in the embodiment of the invention as may be understood from the following description and accompanying drawings, wherein

Figure 1 is a side elevation of a furnace and heating system embodying my invention.

Figure 2 is a fragmentary elevation of a blower showing the new air valve structure.

Figure 3 is a view at right angles to Figure 2 partly in section.

Figure 4 is a view similar to Figure 3 of a preferred construction.

Figure 5 is a side view thereof.

Figure 6 is a top view thereof.

Figure 7 is a vertical longitudinal section of the last named valve and operating means.

There is illustrated a furnace 10, in which there is installed a liquid fuel burner 11 of any approved construction suitable for use with forced draft. Air is supplied to this burner by means of a centrifugal air pump or fan 13 conforming to approved practice. The fan casing has an axial intake opening 63 and a tangnetial effluent conduit 64 which is continued sufficiently to enter the clinker door 65 of the furnace or any other suitable opening. Upon the lower edge of the intake 63 there is hinged a door-like valve 66, adapted to fall open by gravity, and at the upper side a stud bar 67 is mounted beside the path of the door in its opening and closing movements. The bar is threaded throughout its length and provided with two stops 68 and 69 tapped and threaded to be adjusted longitudinally upon the bar by rotation of the stops. Respective lock nuts or other means may be provided for each to retain it in adjusted positions, if desired. The stops have arms movable into the path of the valve by rotation of the stop on the bar 67 to a proper position, and to clear the valve otherwise. The outer stop 69 is adjusted to support the valve in extreme open position, and in such relation to the intake that operation of the fan will produce a vacuous condition at its inner side sufficient to cause the valve to move toward closed position. The inner stop is adjusted to check closing movement of the valve and afford entrance to sufficient air under maximum fan speed to maintain the high fire properly. By this construction, when the fan stops the valve will fall to maximum opening position, affording a much reduced obstruction to access of air and enabling the natural draft of the ordinary furnace installation to maintain the low fire, and when the fan is started for high fire operation, the valve will again move to partially closed position according to the requirement of the fire under forced draft. This device would be useful where operation of the fan is controlled by thermostat in the room to be heated.

When desired, the inner stop 68 may be manually turned so that its arms clear the valve entirely, and it may close. This may be found desirable in case the fire is out and it is necessary to start it while the fan is in operation, to prevent the fan draft from blowing out the newly started flame.

In Figures 4 to 7 a utilization of the valve of the preceding figures is indicated having more extensive use and to be used as in Figure 1 in a heating system. Here, a valve plate 15 corresponding to the valve 66 is hinged at

the lower side of the intake of the fan casing, and for ready removal and replacement is actually pivotally connected to a cylinder or ring 16 which is slidably engaged and frictionally held upon a flange 17 formed integrally on the fan casing. By suitable bracket connections a solenoid 20 is fixedly mounted parallel to the axis of and adjacent the upper side of the ring 16 but out of normal path of the valve. In the solenoid there is slidable an armature 21 having a stem 22 extended longitudinally therefrom and engaged slidably through a vertical slot 23 in the upper swinging portion of the valve 15. The stem is provided with a head 24 at its extremity, and the relation of the solenoid to the valve is such that when the solenoid is energized the armature will be drawn outward from the valve and held in a position to support the valve 15 in maximum open position. The upper bracket arm 26 is longitudinally slotted and extended beside the path of the valve a distance, and adjustable longitudinally of the slot there are two bolts, 27—28, held by suitable nuts. The arm 26 extends over the outer part of the ring 16 in spaced relation thereto so that one bolt 27 may be adjusted inwardly of the valve to check the valve against closing when very near to closed position. The bolt 28 is adjustable outwardly of the valve to check it at the desired maximum open position. The position of the stem 22 in the slot 23 when the valve is at minimum opening position is such that it clears the edges of the slot, so as to leave the valve free to fall open by gravity, but such opening of the valve will be prevented by the intake draft when the fan operates. This structure would be operated as in Figure 1, when the fan is constantly operated and the fire controlled by the thermostat 29 in the room to be heated and acting through the solenoid.

It should be noted that in all the constructions of the valve the closing movement will be effective by the draft or suction at the intake of the fan when the latter is operating. Opening will be effected either by the solenoid, or in case the power current fails for any reason, by gravity in lieu of a spring.

It is apparent that the device is adapted to be constructed in an extremely simple form, and its installation is free from complications so that persons of minimum of expertness may install the apparatus.

It will be understood that in conjunction with the air valve control a fuel valve control may be used where liquid or gaseous fuel is used, to operate so as to increase the supply of fuel when the valve is opened, such valve being formally indicated in the present instance at 35 and construction of such valve is already understood in the art.

I claim:

1. In a heating apparatus including a burner having a fuel supply and means to control the fuel from a minimum degree for low fire to a maximum for high fire, a forced draft means for the burner, and a conduit open through the forced draft means constantly: a valve at the intake of the conduit responsive to the forced draft to produce a predetermined minimum opening for low fire operation and thermostatically controlled means to open the valve to a maximum opening at high fire operation of the burner.

2. The structure of claim 1 in which the valve is constructed tending to open at all times, yieldable to air supply under pressure.

In testimony whereof I affix my signature.

FRANK MARION.