May 8, 1951 C. L. LUND 2,551,956

AUTOMATIC CONTROL FOR AIR TO BE HEATED IN AIR HEATING FURNACES

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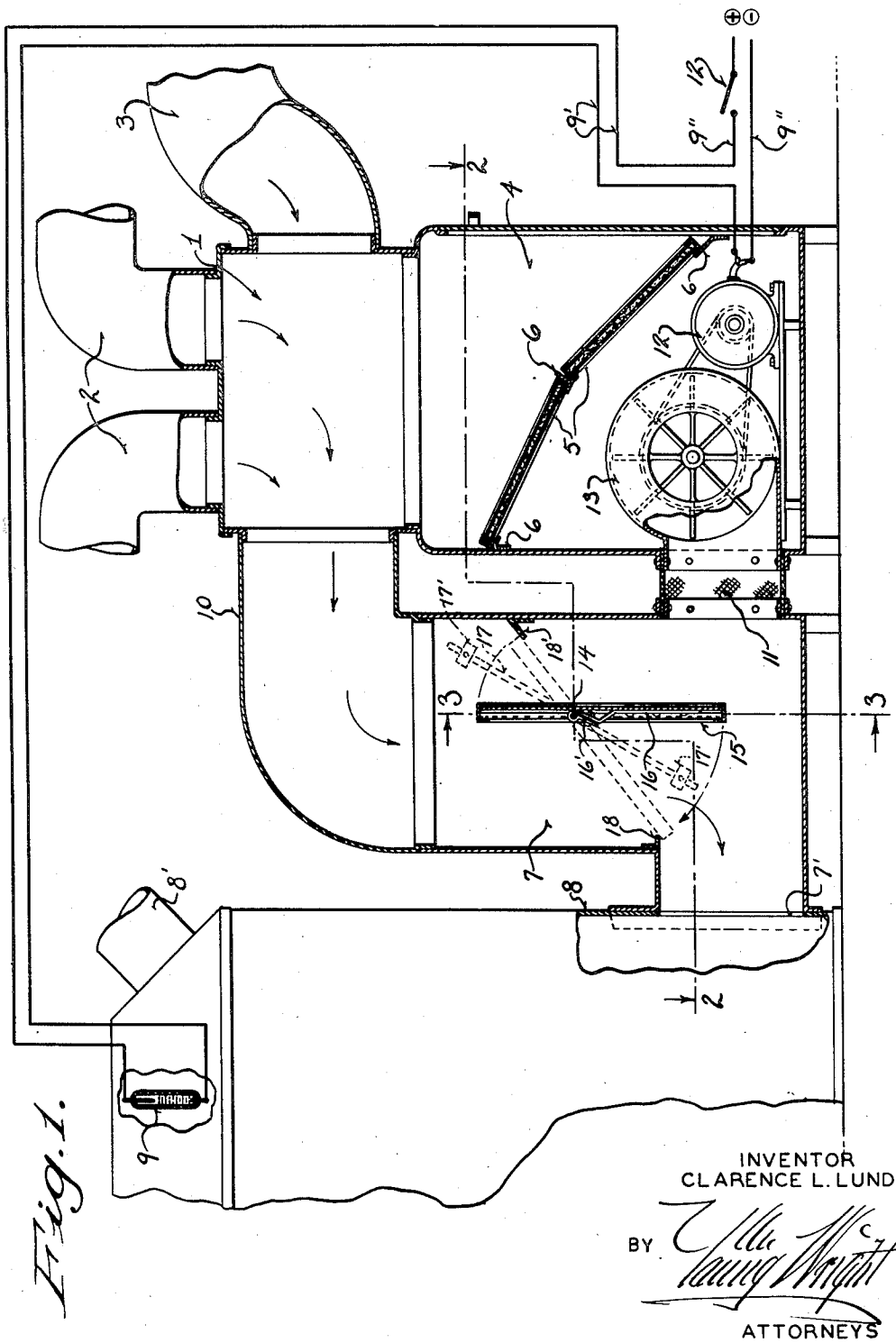


Fig. 1.

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Fig. 2.

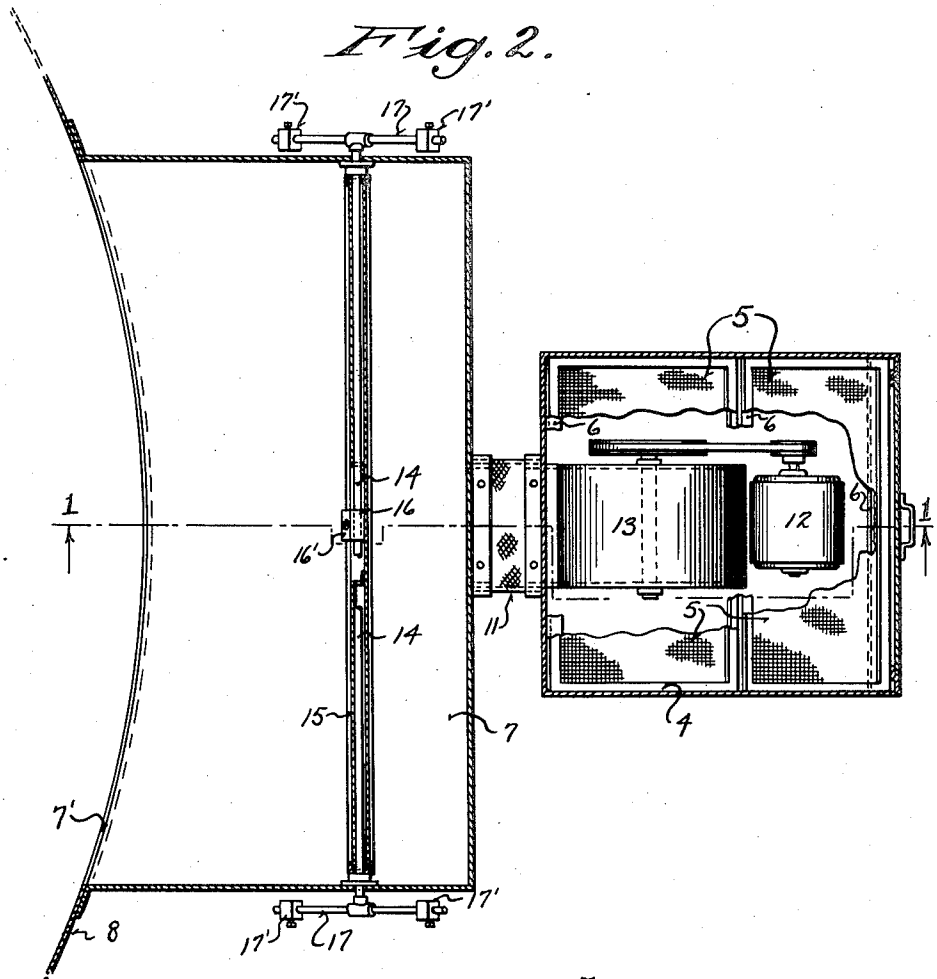
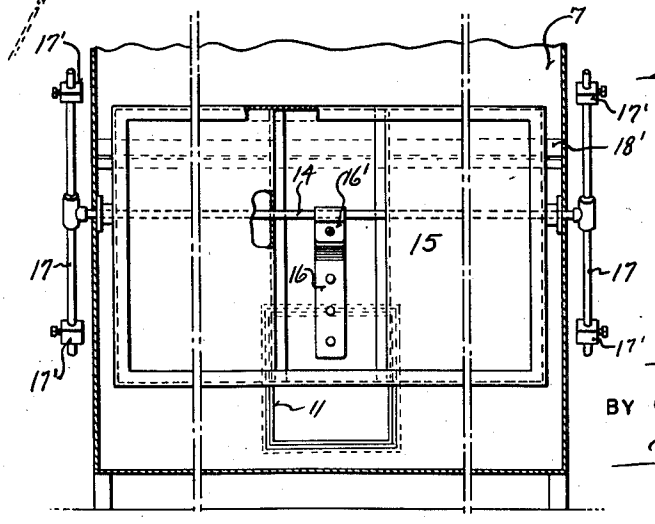


Fig. 3.



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AUTOMATIC CONTROL FOR AIR TO BE HEATED IN AIR-HEATING FURNACES

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1 Claim. (Cl. 126—110)

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My invention refers to automatic air control for furnaces and it has for its primary object to provide an overbalanced butterfly valve in alignment with the air passage to a furnace, whereby a blast of air is discharged against the long vane of a butterfly valve, under control, of a blower, when the temperature of the furnace air reaches a predetermined high degree. Thus the volume of air is increased by starting the motor drive of the pump or fan, when an electric circuit is closed through a thermostatic switch.

When the temperature of the furnace air drops the thermostat switch will break the circuit, whereby the pump or fan comes to rest and the air from the room pipes, or other source, will be drawn into the furnace, under normal conditions, for circulation to the rooms.

A further object of my invention is to provide air control to the furnace, whereby under forced draft conditions the air is thoroughly filtered.

A further object of my invention is to provide a butterfly valve with fine adjustments, whereby the normal air draft is cut off when the forced draft is in use.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination and arrangement of parts, substantially as hereinafter described, and more particularly defined by the appended claim, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claim.

In the accompanying drawings is illustrated one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawings:

Figure 1 is a side elevation of a furnace and air equipment embodying the features of my invention, the same being partly in section as indicated by line 1—1 of Figure 2.

Figure 2 is a plan sectional elevation the same being indicated by line 2—2 of Figure 1, and

Figure 3 is a fragmentary cross section through the valve mechanism, the section being indicated by line 3—3 of Figure 1.

Referring by character to the drawings 1 indicates a dome, having an air pipe 2 communicating therewith, leading from rooms in a building. 3 is a fresh air funnel, also leading into the dome, it being understood that these feeder pipes may be valve controlled.

The open bottom of the dome communicates

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with the top portion of a trunk or casing 4, having removable filter screens 5, extending across said upper portion of the trunk or casing, the filter screens are supported by angle iron flanges 6.

Spaced from the trunk or casing 4, is an air expansion valve chamber 7, which chamber at its lower end is provided with an air delivery mouth 7', that discharges into the air jacket 8, of a furnace. The upper portion of the furnace is provided with the usual hot air pipes 8', and a thermostatic switch 9, of the mercury type.

The upper end of the valve chamber 7 is connected to the dome 1, by a housing 10, whereby air is discharged into the chamber from the room pipes 2, or funnel 3, under normal circulation.

The valve chamber 7 and trunk or casing 4, at their lower portions, are connected by a flexible duct 11, the same being in horizontal alignment, with the air delivery mouth 7', of said chamber.

The thermostatic switch 9, is electrically connected by wires 9' to line wires 9'', which line wires supply current to the driving motor 12, of a blower fan 13, as indicated in Figures 1 and 2 of the drawings.

The blower fan is encased in the trunk or casing 4, below the filter screens thereof and said fan discharges directly into the flexible duct 11.

Owing to the flexible duct connection between the trunk or casing 4 and expansion valve chamber 7, it will be noted that said flexibility is provided for the purpose of absorbing vibration from the blower fan.

The chamber 7 has journaled in its side walls a shaft 14, upon which shaft is mounted a butterfly valve 15. The valve is frictionally held to the shaft by a simple strap 16 having tension adjustable clip portion 16', which encases the shaft.

It will be noted that the lower vane of the butterfly valve is of materially greater length or area than the upper vane portion and said lower vane extends downwardly into the line of travel of air from the discharged duct 4, to the delivery air mouth 7'.

The ends of the valve shaft extend beyond the side walls of the chamber 7 and have mounted thereon, oppositely disposed rods 17, having adjustable counterbalanced weights 17' thereon.

By this adjustable weight feature, the valve is finely controlled as to balance, whereby it is sensitive to the current of air traveling through the bottom of the chamber 7, thus when the air strikes the lower vane of the valve it will cause the fan to move in an angular position, as indicated in

dotted lines of Figure 1. In this dotted position the valve ends will set upon transversely disposed angle irons 18, 18', secured to the end wall and the top edge of the delivery mouth 7' of the chamber, whereby the upper portion of said chamber and housing 10 will be cut off from the lower portion of the aforesaid chamber to discharge air from the fan directly into the furnace mouth.

From the foregoing description it is apparent, when the temperature rises to a predetermined degree in the furnace air jacket, the mercury switch will close the circuit 9' and line wire circuit 9'', whereby the motor 12 will start the fan or blower 13, it being understood that the make or break switch 12' in the line wire circuit, at this time, is closed.

The forced draft current of air from the fan, will exert pressure upon the lower vane of the valve, whereby said valve will swing to its closed position. In this closed position the normal current of air from the dome 1, to the furnace is cut off and said air from the dome and room pipes will then travel downwardly, through the trunk filter screens, to be forced in a large volume, into the furnace, to thus increase its utility, whereby the circulation of hot air into the rooms, is materially increased.

I claim:

In a hot air furnace having a bottom air inlet mouth; an air controlling apparatus for the furnace, comprising an air chamber having its lower end in communication with the furnace mouth, an air dome in communication with the top portion of the chamber, air supply pipes communicating with the dome, a casing communicating with the bottom of said dome, an air duct in the bottom of the casing communicating with the chamber and aligned with the furnace mouth, a gravity controlled butterfly valve pivoted in the chamber, the pivotal axis of said valve being disposed above the furnace mouth and casing duct,

said valve having an upper short vane and a lower long vane, said lower long vane, due to gravity, functioning to normally hold the valve biased in an open vertical position with said long vane in the path of air travel from the casing duct, said valve being movable to an inclined closed position when the long vane is swung upward for closing off communication between the chamber and the dome and the furnace mouth and duct connecting the chamber to the casing, a motor driven fan in the casing having a discharge communicating with the air duct, connecting the casing and chamber, a thermostatic switch encased within the hot air jacket of the furnace, electric supply wires connecting the thermostatic switch and motor, whereby when the furnace develops a high temperature, the switch closes the electric circuit to start the motor and cause air from the dome to be delivered to the furnace under forced draft, through the casing duct and furnace mouth and exert pressure upon the long vane of the valve, to cause the same to rock and close the chamber above the furnace mouth and cut off normal flow of air from the dome supply pipes to the furnace and establish a forced draft from said dome supply pipes, through the casing and its duct into the furnace mouth.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,508,813	Miles	Sept. 16, 1924
1,688,363	Teare	Oct. 23, 1928
1,765,537	Miller	June 24, 1930
1,830,273	Hill	Nov. 3, 1931
2,089,969	Kuenhold	Aug. 17, 1937