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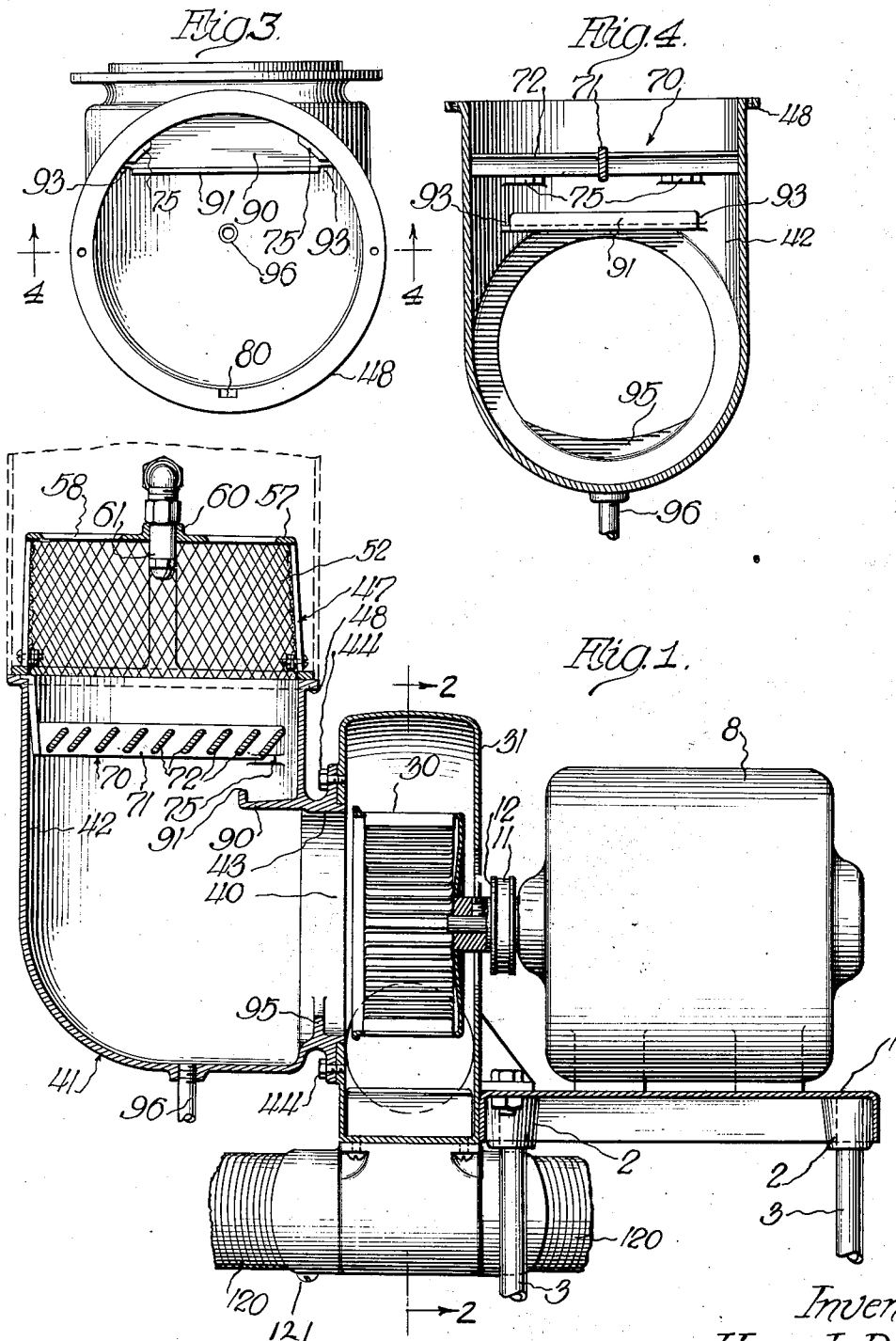
H. L. DOOLEY

2,019,525

COMBINED OIL BURNER AND AIR CONDITIONING DEVICE

Filed Aug. 25, 1932

2 Sheets-Sheet 1



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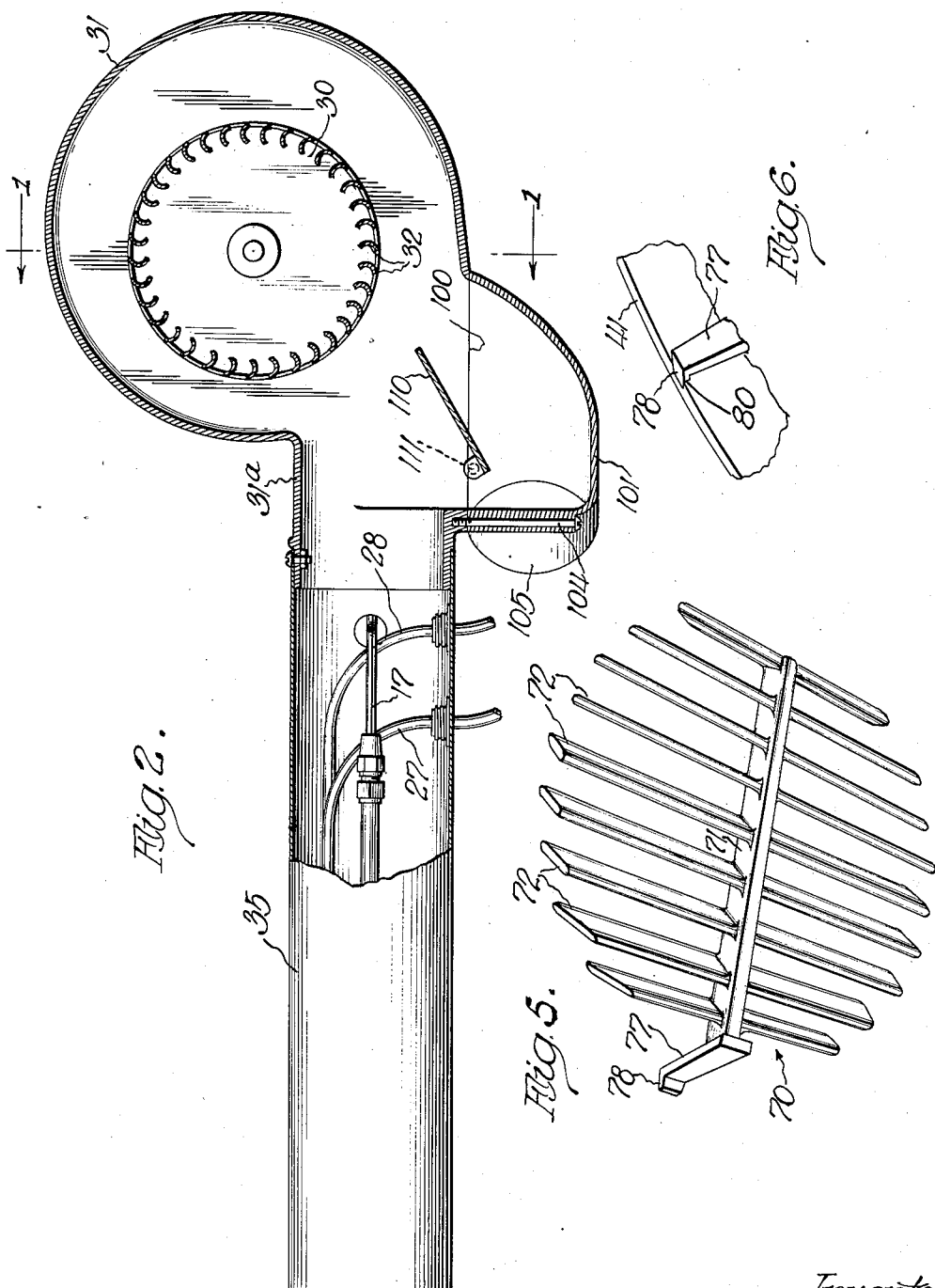
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UNITED STATES PATENT OFFICE

2,019,525

COMBINED OIL BURNER AND AIR
CONDITIONING DEVICEHarry L. Dooley, Rock Island, Ill., assignor to
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Application August 25, 1932, Serial No. 630,396

7 Claims. (Cl. 183—24)

The present invention relates generally to oil burners and the like, more particularly to oil burners operating upon a forced draft principle, and the chief object of the present invention is, briefly stated, the production of new and improved means for conditioning the air entering the draft forming means and new and improved means associated therewith for diverting a portion of the blast so conditioned and conducting the same to a separate point of utilization.

In connection with oil burners of this type, the present invention is principally concerned with the utilization of the draft or blast forming means of the oil burner air pump as a source of supply for a quantity of air under pressure which is conducted to a separate point of employment, and in this connection the present invention also has for its purpose the provision of means for washing or otherwise conditioning the air, and particularly the portion of the air blast which is diverted to the separate point of utilization. In this way, an oil burner structure is provided which is not materially increased in number of parts, cost, or complexity, but which, at the same time, secures the additional features mentioned.

One particular and important use of the present invention is the employment thereof in connection with heating plants such as warm air furnaces. In such furnaces relatively large pipes are provided in order that there shall be sufficient circulation of heated air, the circulation being usually obtained by virtue of the fact that a column of warm air is lighter than the corresponding column of cold air.

It is in furnaces of this type that the present invention finds an important field of usefulness. The auxiliary or additional source of air pressure developed by the fan of the oil burner may be utilized for accelerating the circulation of heated air without the expense and additional complexity of auxiliary or booster fans and the like. Moreover, by the practice of the present invention, such accelerating blasts of air are cleansed and humidified before being directed into the head or bonnet of the furnace for forcing the heated air away from the furnace and into the room or rooms to be heated. Not only by washing the air blast diverted from the oil burner are room conditions improved, but also the feature of humidifying the air is an extremely important one. Warm air furnaces are known to produce dry air conditions in the rooms heated, and such conditions are generally considered to be unhealthful. It is, of course, well known to supply

some form of auxiliary humidifying means to the furnace but generally such means are either inadequate or ignored by the user altogether. By the use of the principles of the present invention, the blast of air, which is washed and humidified, is used not only to produce an accelerated flow of air throughout the room or rooms to be heated but such blast also causes the heated air directed to the rooms to be humidified so that more comfortable conditions exist in the rooms heated.

It is to be understood, however, that the utilization of the principles of the present invention in connection with warm air furnaces and the like is only one of many possibilities of my invention. For the purpose of best illustrating my invention, however, I have described the preferred embodiment thereof and have illustrated the same in the accompanying drawings as used with a warm air furnace of conventional construction.

In the drawings:

Figure 1 is a transverse sectional view taken through the inlet and fan housings, corresponding to a section taken along the line 1—1 of Figure 2;

Figure 2 is a longitudinal section taken along the line 2—2 of Figure 1 through the fan housing of the blower and showing, in particular, the detachable blast diverting means;

Figure 3 is a view looking downwardly into the inlet housing;

Figure 4 is a section taken along the line 4—4 of Figure 3;

Figure 5 is a detail perspective illustrating the grid which is adapted to be positioned just below the nozzle spray; and

Figure 6 is a fragmentary perspective illustrating the manner of supporting one end of the grid on the wall of the inlet housing.

The motor of the air burner is indicated by the reference numeral 8 and is mounted upon the upper surface of the base plate 1. The motor 8 drives an oil pump by means of a belt trained over a pulley 12 mounted on the shaft of the motor. A tube 17 leads from the discharge side of a pressure regulator to the nozzle of the burner (see Figure 2). Suitable conductors 27 and 28 connect with the coil of an ignition transformer (not shown).

The motor 8 drives a fan 30 disposed within a fan housing 31, the fan and housing constituting a blower of the centrifugal type. The fan 30 is provided with vanes or runners 32, as is usual in this type of construction. The exhaust

from the fan is directed through an air duct or flue 35.

The intake air passageway for the blower is indicated by the reference numeral 40, best shown in Figure 1, and secured to the fan housing 31 adjacent the air passageway 40 is an inlet housing 41 having a vertically disposed portion 42 and a horizontally extending portion 43, the latter being secured directly to the housing 41 by cap screws 44 or any other suitable means. A screen cage 47 is mounted on a flange 48 at the upper end of the inlet housing 41 by means of screws 50 or the equivalent. The screen cage 47 is provided with reticulated material 52 which serves to prevent the entrance of objects into the inlet housing. Preferably, the openings in the screen material 52 are large enough so that the entrance of air is not impeded. The screen cage 47 may be of any construction, but preferably the cage is provided with a rim 55 which seats on the flange 48 and has ribs 56 extending upwardly from the rim 55 to an upper ring or flange 57 which is suitably connected by radiating ribs 58 with a central boss 60 suitably apertured to receive a spray nozzle 61 disposed therein.

A grid 70 is disposed in the upper part of the inlet housing 41 beneath the nozzle 61. The grid 70 includes a supporting strut 71 and a plurality of inclined ribs or vanes 72. The grid 70 is preferably loosely mounted within the upper part of the inlet housing, and for this purpose the housing is provided near the end 43 thereof with a pair of integrally formed lugs 75. These lugs support one end of the grid 70. The other end of the grid is provided with an arm 77 having a small laterally extended lug 78 thereon which is adapted to hook over one edge of the upper end of the inlet housing, as best shown in Figures 1 and 6. For this purpose the inlet housing 41 is provided with a small notch 80.

It will be noted that the ribs or vanes 72 are inclined with respect to the horizontal away from the air intake passageway 40, as best shown in Figure 1. It will also be noted that the lugs 75 and the arm 77 afford a support for the grid which ensures that the same will always be disposed in the inlet housing in the proper position, namely, with the vanes 72 inclined away from the air intake passageway. The purpose of so disposing the vanes 72 is to prevent the air being drawn into the fan housing 31 from carrying directly with it any particle of the spray, the inclination of the vanes being such that they are positioned substantially normal to a line drawn from the outlet of the nozzle 61 to the center of the passageway 40. If, for example, the vanes were inclined in just the opposite direction they would be, more or less, disposed edgewise with respect to the flow of air toward the intake passageway, in which case the spray would be drawn directly into the fan housing, which is undesirable because the rapidly rotating fan 30 should not be caused to come into direct contact with any solid drops of liquid. Therefore, by inclining the vanes 72 as shown, the spray carried initially by the inflowing air comes into contact with and wets the inside surface of the grid structure 70, whereby no drops of water or other liquid will be drawn directly into the fan housing, but the air being drawn into the housing will be swept over a wetted surface of extensive area so that all of the spray will be taken up, not as globules or drops of liquid, but as a liquid vapor.

In order to further insure that no particles of liquid will be drawn into the fan housing, the

present invention contemplates providing baffle means for the purpose of presenting any condensed water vapor from running down the walls of the inlet housing and thereby getting into the fan housing in liquid form. Across the upper part of the inlet housing and over or above the passageway 40 a horizontally disposed baffle 90 is provided. This baffle wall 90 is formed as a trough, having for that purpose an upstanding lip 91 which terminates just short of the vertical walls of the inlet housing, as best shown in Figures 3 and 4, thereby providing discharge outlets 93 by which any condensed water flowing down the walls of the inlet housing adjacent the intake passageway 40 will be directed laterally, the baffle 90 thereby serving as a gutter. The lugs 75 for supporting the grid are disposed just above the gutter or baffle 90.

A lower baffle wall 95 also is provided, but this wall is disposed vertically and serves to prevent any liquid in the bottom of the inlet housing from being drawn directly into the fan housing 31. The baffle wall 95 is not high enough to materially restrict the flow of air through the passageway 40 but is high enough to prevent the incoming draft from bodily lifting any liquid from the lower walls of the inlet housing directly into the fan housing 31. A drain connection 96 is provided for the lower end of the inlet housing and serves to direct any excess liquid to a point of discharge, such as a sewer or the like.

The operation of the structure so far described is believed to be apparent from the description above and is substantially as follows. When the oil burner is in operation and the fan rotated to create necessary blast of air, the spray nozzle 61 directs water in a diverging solid cone and almost immediately the spray comes into contact with and thoroughly wets the grid 70. The draft of air being drawn into the inlet housing and through the passageway 40 sweeps over the wetted surface of the grid and vaporizes and picks up the liquid in the form of vapor and thereby becomes humidified. By drawing the draft of air through a spray of liquid, such as water or the like, the air is also washed and the majority of solid impurities removed thereby, the baffle means 91 and 95 operating as described above in preventing any globules of liquid from being directly drawn into the fan 30. The excess liquid flows to waste through the drain 96 and carries with it the dirt, impurities and the like removed from the air.

Mention has been made above, in connection with an oil burner employing washed and humidified air, that a portion of the air blast may be diverted and directed to a separate point of utilization. In order to carry this provision into effect, referring now more particularly to Figure 2, the lower portion of the discharge end 31a of the fan housing is provided with a suitable aperture 100 particularly adapted to receive a casting 101 or the like detachably secured thereto. The casting 101 is adapted to be held in position over the opening 100 by screws or the like 103 and a stud bolt 104. The casting 101 is provided with a pair of oppositely disposed branches 105 serving as divided outlets through which the diverted blast of air passes. Thus, where the air tube 35 constitutes one outlet for the fan or blower housing, the casting 101 constitutes a second outlet. An adjustable vane or shutter 110 is pivotally supported by the casting 101 by means of a rock shaft 111, one end of which projects outwardly of the housing and has secured to it a

handle, which may be used in moving the shift-able vane 110 to adjusted position. The vane 110 is movable between relatively wide limits, one being that wherein the draft is practically all shut off from the auxiliary outlets 105 and the other limit being that in which the draft is practically all diverted through the auxiliary outlets 105. This latter feature may be of considerable importance, particularly where it may be desired to direct washed and humidified air to the rooms to cool the latter during the hot months, this being secured by the present invention without requiring any apparatus other than that required for heating the rooms during the winter months. Flexible tubing 120 or the equivalent may be utilized for conducting the auxiliary blast from the outlets 105 to any point desired, a set screw 121 or equivalent means being employed to secure the flexible tubing 120 in position.

It will be understood, of course, that the utilization of the conditioned auxiliary blast of air from the fan or blower of the oil burner as a means for accelerating the circulation of the heated air and as a means for conditioning the same is only one possible application of the present invention. Many other applications of the principles of the present invention may be employed within the practice of the broader aspects of my invention.

What I claim, therefore, and desire to secure by Letters Patent is:

1. Air conditioning means comprising a blower for creating a blast of air and including a housing having an air inlet and a fan chamber, a screen cage over said inlet, a spray supported on said cage and directed into the inlet, a grid carried by the housing and adapted to be wet by said spray, thereby presenting an extensive wetted surface to be swept over by the incoming air, means to drain any excess liquid from the inlet, and means to prevent liquid masses from entering the fan chamber of the blower from the housing.

2. An air conditioning device comprising a blower for creating a blast of air, an inlet chamber for the blower, a screen cage supported by said chamber, nozzle means supported by said cage and adapted to direct a spray into the inlet chamber to wash the entering air, means in said chamber serving as a baffle to prevent the entrance of liquid into the blower, and means for conducting said washed air to a point of utilization.

3. Air conditioning means comprising a fan and fan housing for creating a blast of air, an inlet chamber for the housing including a laterally directed air passage leading into the fan housing, a screen cage disposed over said inlet chamber, a spray carried by said cage for washing the incoming air, and baffle means adjacent the upper and lower portions of said air passage-way to prevent liquid from entering the fan housing.

4. An air conditioner comprising a fan and a fan housing for creating a blast of air, an inlet

housing secured to the fan housing and having an air passageway leading into the latter, a spray carried by the inlet housing and having nozzle means disposed above said housing and adapted to direct a liquid spray into the inlet housing, a grid carried by the latter and adapted to intercept the liquid spray, said grid including a plurality of flattened inclined fins disposed with their flat portions facing in the general direction of the spray and adapted when wet by the spray to present an extensive wetted surface to the incoming air.

5. Air conditioning means comprising a fan and a fan housing for creating a blast of air, a vertically disposed inlet housing secured to the fan housing and having a laterally directed air passageway leading into the fan housing, vertically extending baffle means associated within the lower part of the inlet passageway, horizontal baffle means disposed above the inlet passageway, a screen cage carried by the inlet housing adjacent the upper end thereof, a liquid spray supported by the screen cage and including a downwardly directed nozzle, a grid disposed in the inlet housing below the spray and provided with horizontally extending fins laterally inclined in a direction downwardly and away from the fan housing, said grid being adapted to intercept the liquid spray and prevent the entrance thereof directly into the fan housing, and cooperating means formed on the grid and the inlet housing for supporting the grid in position, said horizontal baffle means being adapted to prevent liquid on the vertical walls of the inlet housing from entering the air passageway and the lower vertical baffle means serving to prevent liquid on the lower walls of the inlet housing from being drawn into the fan housing.

6. A device of the class described including blower housing means having a horizontally extending inlet and a plurality of outlets, blower means disposed therein, operating means for driving said blower means, a vertically extending inlet housing leading from said blower inlet, nozzle means supported above said inlet housing and adapted to direct a spray of water thereinto, a grid disposed across said inlet housing below said spray, and a plurality of baffle means disposed between said grid and said blower and extending normal to each other.

7. A device of the class described including blower housing means having a horizontally extending inlet and a plurality of outlets, blower means therein, a motor for driving said blower means, a vertically extending inlet housing leading from said blower inlet, nozzle means supported above said inlet housing and adapted to direct a spray of water thereinto, a grid disposed across said inlet housing below said spray, a plurality of baffle means disposed between said grid and said blower inlet and extending normal to each other, and means for controlling the amount of air delivered by the blower means to each of said outlets.

HARRY L. DOOLEY.

CERTIFICATE OF CORRECTION.**Patent No. 2,019,525.****November 5, 1935.****HARRY L. DOOLEY.**

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 49, claim 6, after "blower" insert inlet; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of December, A. D. 1935.

(Seal)

Leslie Frazer
Acting Commissioner of Patents.