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3 Sheets-Sheet 1



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AIR CONDITIONING APPARATUS

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2 Claims. (Cl. 126-110)

This invention relates to air conditioning apparatus and particularly to apparatus in which a blower delivering air is combined in a unitary relation with means for filtering and humidifying the air and means for heating or cooling the air.

An object of the invention is to deliver the air to be conditioned through an improved and highly efficient heat exchanger.

Another object is to associate means for hu-10 midifying, filtering and cooling air in a novel relation with a means for inducing air flow.

These and various other objects are attained by the construction hereinafter described and illustrated in the accompanying drawings, where-15 in:

Fig. 1 is a view in longitudinal vertical section of the improved air conditioning apparatus.

Fig. 2 is a horizontal sectional view of the apparatus, taken upon the line 2-2 of Fig. 1.

20 Fig. 3 is another horizontal sectional view of the apparatus, taken upon the line 3-3 of Fig. 1. Fig. 4 is a perspective view of the heat ex-

changer employed in the apparatus. Fig. 5 is a vertical cross section, taken upon the 25 line **5—5** of Fig. 1.

In these views, the reference character 1 designates a rectangular sheet metal casing which is divided by a vertical partition 2 into two compartments 3 and 4, the casing top having an inlet 5 30 to the compartment 3 for unconditioned air and

an outlet 6 from the compartment 4 for conditioned air.

In the lower portion of the compartment 3 is installed a blower 7 and a motor 8 driving such 35 blower through any suitable connection. The

blower discharges air, as indicated in Fig. 1, through the partition 2 into the compartment 4. The air delivered to the blower from the inlet 5 is preferably modified by a combined humidifier

40 and filter occupying the upper portion of the compartment 3. While said humidifier and filter may have any suitable construction, that illustrated comprises an open-topped rectangular box extended between the side walls of the casing 1,

45 and having an imperforate bottom 10 and foraminous side walls 10a. Said walls are spaced from the partition 2 and opposite end wall of the casing to form air passages 10b. In the top portion of said box is mounted a spray head 11 to

50 which water may be continuously supplied by a pipe 12, the spray discharging both downwardly and laterally from said head so as to engage two tiers of vanes 12a arranged in vertically spaced relation upon foraminous walls 12b, spaced in-

55 wardly from the walls 10a. Between the walls

10a and 12b it is preferred to dispose bodies of shredded glass 13 on which the water may trickle downwardly in extensive contact with the air, as well as dripping from vane to vane. The air escapes from the humidifier and filter box into 5the passages 10b whence it is drawn into the lower portion of the chamber 3 by the blower. The foraminous walls 10a and 12b and the shredded glass bodies 13 act to filter the air. Surplus water is drawn off from the bottom of the 10 box through a drain pipe 14. A door 15 mounted in one side wall of the casing I gives ready access to the humidifier for cleaning or inspection, and further provides for placing in the box 10, 10a a cake of ice 16, in case it is desired to cool and de- 15 humidify the air. A support 17, raising the ice cake above the box bottom, may be interiorly secured to said bottom.

Within the compartment 4 and spaced from the walls thereof is a rectangular sheet metal heat 20 exchanger, the lower portion whereof forms a combustion chamber 18. Between said chamber and an end wall of the casing I there is installed a gas or oil burner 19 discharging into said chamber and of any suitable construction, and a door 25 20 in said end wall gives access to such burner. From said combustion chamber there rises a flue 21, inclined away from the partition wall 2 and leading to one of two horizontally spaced headers 22 and 23 arranged in the top portion of the com- 30 partment 4. Said headers are connected by a considerable number of flues 24 spaced above the combustion chamber, and spaced from each other to form passages 25 for the up-flow of air. From the header 23 a pair of horizontally spaced flues 35 26 extend downwardly engaging but not communicating with the combustion chamber, and from the lower portion of each such flue, an outlet 27 for gases of combustion opens through the adjacent side walls of the casing 1. The outlet 27 40 of either flue may be capped as indicated at 28, and a plurality of vertically spaced flues 29 connecting the two down-flues provides for a flow of the gases from the flue so closed to the other outlet 27.

In use of the described apparatus the air discharged from the blower 7 passes largely between the cross flues 29 and to the conditioned air outlet 6 by way of the vertical passages 25. A portion of the air however, circulates around the 50 heat exchanger through the space 30 surrounding the heat exchanger, and rises from such space to the outlet 6.

The arrangement is such that a very extensive surface area is provided for transferring heat from the combustion gases to the air stream flowing to the outlet S.

It will, of course, be understood that the burner is used only when warm air is required, and that ice is employed in the box is, is only when it is required to cool or dehumidify the air delivered by the apparatus.

The described location of the humidifier and filter permits its installation as a readily acces-10 sible unit distinct from the heat exchanger, and the use of the space within the humidifier for air cooling purposes permits a convenient use of ice to cool or dehumidify the air and adds to the compactness of the apparatus. 15

What I claim is:

1. An air conditioning apparatus comprising a combustion chamber, a plurality of flues spaced above the combustion chamber, and spaced from each other to form substantially vertical air pas-20 sages, a pair of headers connected by said flues, a flue delivering gases from the combustion chamber to one of said headers, a pair of spaced flues

downwardly extending from the other header, one of said downwardly extending flues having an outlet for gases, a plurality of vertically spaced flues connecting the two downwardly extending flues, and means for impelling air between the downwardly extending flues and above the combustion chamber to said air passages.

2. An air conditioning apparatus comprising a pair of headers spaced apart in a substantially horizontal direction, a plurality of flues connect- 10 ing such headers and spaced apart to form passages for the upflow of air, a combustion chamber disposed substantially beneath and spaced from one of said headers, a pair of flues down-wardly extending from the last-mentioned head- 15 er and supported upon the combustion chamber, said flues being spaced apart to form an air passage and having oppositely directed openings, serving as alternative outlets, and a flue extending laterally and upwardly from the furnace 20 chamber to the other of said headers.

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