

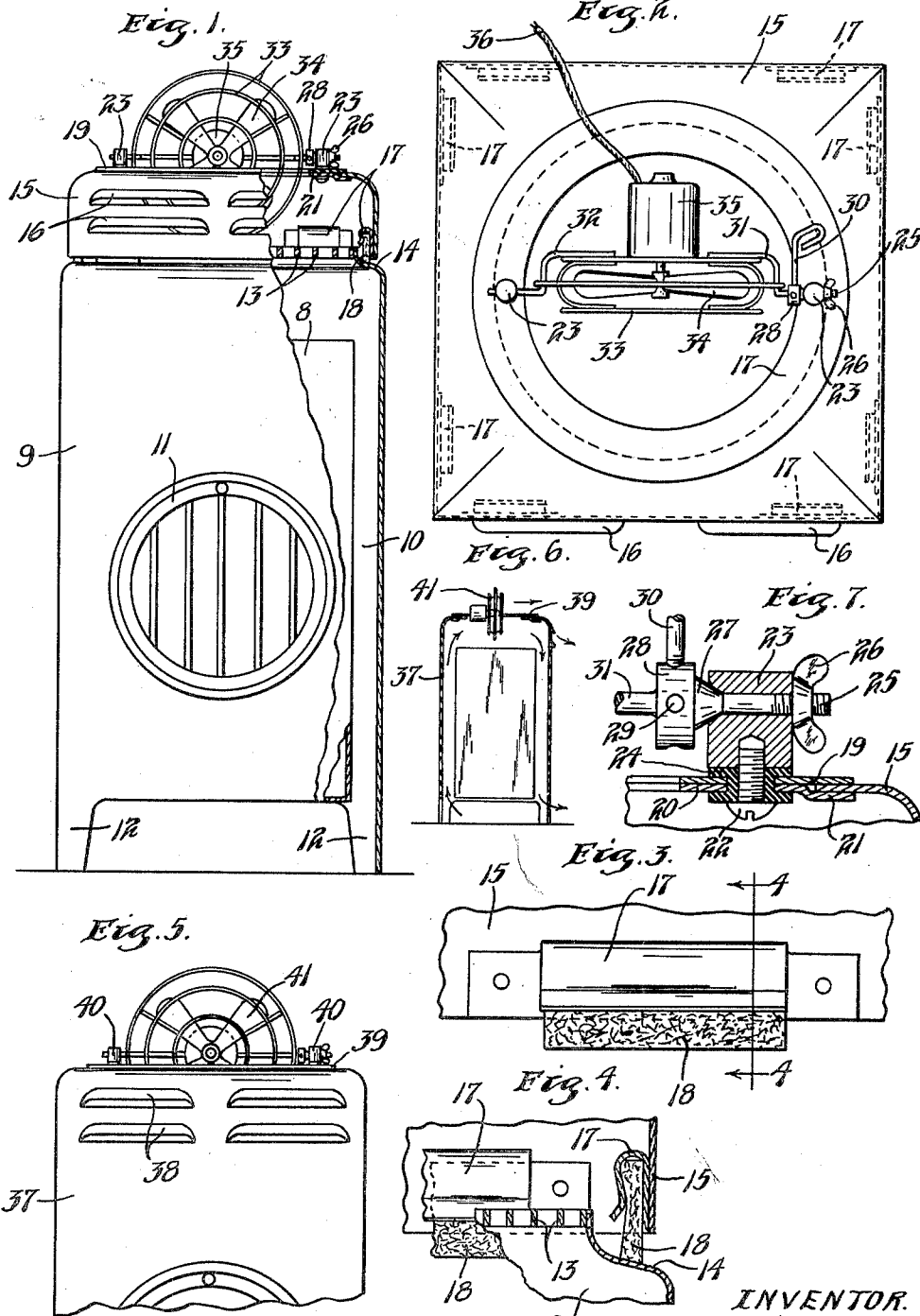
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AIR DISTRIBUTOR FOR SPACE HEATER

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AIR DISTRIBUTOR FOR SPACE HEATER

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This invention relates to space heaters and more particularly to space heaters having means for variably controlling the flow of heated air from such heaters.

While my invention is applicable to different types of space heaters it is of particular importance in connection with heaters which are placed in the rooms of homes as distinguished from furnaces in the basements of buildings, and such heaters utilize solid or liquid fuel which is burned in a combustion chamber surrounded by a spaced casing. The casing is open at the bottom and circulation by convection is induced by the radiated heat of the combustion chamber in the air space between said chamber and the outer casing which generally has a relatively flat top with an outlet utilizing a substantial portion of said top. In these heaters the warm air rises and the cool air is forced down to the floor whence it is again taken up by the draft in the air space for reheating.

One of the principal disadvantages of space heaters of this general type is that the temperature in the upper portion of a room is much higher than it is adjacent the floor due to the inability of the natural draft to properly mix the cool and warm air in the room. Thus considerable heat is wasted. Furthermore, it is difficult to properly distribute heat over the area of a room or group of rooms.

One of the objects of my invention is to provide a space heater wherein the flow of warm air from the heater can be directionally controlled to more effectively distribute such warm air throughout the cubic content of a room or series of rooms.

Another object of the invention is to provide a construction wherein a conventional space heater with no flow control can be converted into a unit with such flow control without in any manner altering the construction of the original heater.

Another object of the invention is to provide a flow control wherein a flow of heated air can be directed upwardly or horizontally outwardly from the top of the heater and also wherein air can be directed downwardly through a portion of the heater air space so that warm air will issue from the base of the heater while at the same time cool air is drawn upwardly past the combustion chamber through another portion of the air space and furthermore, wherein additional heated air can be directed outwardly from the upper portion of the heater.

A still further object of the invention is to provide a heater in combination with air flow control

means wherein air can be directed either upwardly from the top of the heater or downwardly past the combustion chamber and out of the bottom of the heater.

Another object of the invention is to provide flow control means which can be incorporated with a conventional type of heater and wherein a cushioned air impeller is provided in such a manner that vibration from the air impeller is not transmitted to the heater casing, and furthermore, wherein the impeller and directional control means are arranged to fit heaters having casings of different shapes.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawing, wherein like reference characters refer to the same parts throughout the views, and, in which:

Fig. 1 is a front elevation of one form of my invention with portions thereof broken away to show interior construction;

Fig. 2 is a top plan of the structure shown in Fig. 1;

Fig. 3 is an enlarged fragmentary detail of one of the vibration absorbing devices;

Fig. 4 is a section taken approximately on the line 4—4 of Fig. 3;

Fig. 5 is a front elevation of another form of my invention with the lower portion broken away;

Fig. 6 is a reduced vertical section through a structure as exemplified in Fig. 5; and

Fig. 7 is an enlarged fragmentary section of a vibration damper and mounting which is applicable to both forms shown.

In Fig. 1 there is shown a space heater having a substantially closed combustion chamber 8 surrounded by a casing 9 which is spaced from said combustion chamber to provide vertical air space 10. The combustion chamber 8, of course, is adapted to contain a suitable burner or fire pot structure which is accessible through an opening in the outer casing which is closed by a door 11. The combustion chamber should also be connected to a flue not shown. The lower part of the casing 9 is open and the spaces between the legs 12 provide what is normally used as a plurality of inlets communicating with the air space 10. The upper portion of the casing 9 is open and customarily is provided with a grill-work 13 to provide a decorative finish for the top of the heater and also to support articles for heating if desired. Customarily the upper portion of the casing is provided with an inwardly extending shoulder or flange 14.

In Figs. 1 and 2 there is shown a substantially

rectangular cap 15 which has vertical side walls and a top portion with a large circular aperture thereon. Furthermore, one or more of the side walls of the cap 15 are provided with louvers 16. A plurality of metal clips 17 are secured on the inner faces of the vertical side walls of the cap 15 and as shown in Fig. 2 these clips are arranged in pairs on each side wall and are spaced a considerable distance apart. The clips are somewhat in the form of an inverted U and are adapted to grip strips of felt 18 or other suitable cushioning material. The felt strips or cushions extend downwardly slightly below the edges of the side walls of the cap 15 and are the only elements associated with the cap assembly which come into contact with the main heater casing 9, these cushions resting upon the flanges or shoulders 14 at the top of the heater casing. Fig. 1 shows the heater casing with a relatively flat upper portion and inwardly turned flange or shoulder, but should the upper edge of each of the faces of the casing 9 curve or bulge upwardly between the corners of the casing, the cap 15 can still be properly positioned. This is due to the spaced points of contact afforded by the cushioning strips 18.

The large circular aperture in the top of the cap 15 is provided with a rotatable ring composed of a pair of annular elements 19 and 20. The ring element 20 has an offset 21 which provides a space between it and the upper ring 19 in which the edge defining the aperture in the cap is relatively loosely received. Extending through the rings 19 and 20 at opposite points thereon are studs 22 which extend into blocks 23 located on the upper side of the top ring 19. The stud 22 is passed through a rubber or other suitable resilient grommet 24 which is utilized also to contact the under face of each of the blocks 23 so that said blocks and studs cannot come into metal-to-metal contact with the ring elements 19 and 20. Extending horizontally through the one of the blocks 23 is a bolt 25 which, as shown in Fig. 7, is threaded at one end to receive a thumb nut 26. The opposite end of the bolt is provided with a tapered portion 27 which fits in a frusto-conical countersink in said block 23. An annular hub 28 is secured to or forms an integral part with the tapered head 27 and said hub preferably is provided with radial threaded sockets 29 at spaced points around said hub. These sockets are adapted to selectively receive a combined handle and impeller positioning element 30 whose function will be explained below.

An angular bracket 31 extends axially from the hub 28 inwardly above the opening in the cap 15 as shown best in Fig. 2. A complementary bracket 32 which is rotatably mounted at one end in the left-hand block 23 in Fig. 2 extends inwardly over the opening in the cap 15 in a manner similar to bracket 31. These two brackets are secured as by welding to a cage 33 which is mounted around an impeller blade 34, the latter being driven by an electric motor 35 which is supplied with energy by conductor 36.

In Figs. 5 and 6 there is shown a heater casing 37 which is provided with an apertured top. The structure of the casing 37 is generally similar to the casing 9 above described except that no grill-work similar to the grill 13 is used. Louvers 38 are formed in one or more upper side panels of the casing 37 and these are generally similar to the louvers 16 in the cap 15 shown in Fig. 1. Fig. 6 shows a ring structure 39 which is constructed the same as the ring comprising the elements 19 and 20 described above, and said

ring structure carries a pair of blocks 40 in the same manner as the mounting of the blocks 23 above. The fan or impeller indicated generally at 41 is the same as the impeller previously described, and it is also run by an electric motor.

With the impeller in the position shown in the drawing the combined stop and handle 30 extends from the hub in the general direction of the motor 35. The weight of the motor will maintain the impeller unit in this position. As is clearly shown the impeller blade unit extends partially above the top of the cap or of the heater casing as in Figs. 5 and 6, and another portion of the impeller unit is down below the top and in the air space provided by the casing and the cap. 15 The arrows in Fig. 6 illustrate the flow of cool and heated air with the impeller in that position. The path of the air from the floor is shown to lie in the air space between the combustion chamber and the casing at at least one side of the combustion chamber, the air being drawn upwardly in the air space due to convection and also the action of the impeller. Heated air is directed substantially horizontally outwardly from a point immediately above the top of the heater and also downwardly through a portion of the heater air space to be directed out of the heater casing adjacent the floor and a certain portion of the heated air will also flow out of the louvers to be directed outwardly and downwardly in a diagonal direction.

The impeller may be changed in its position so that it will direct air upwardly through the aperture in the cap or the casing top or it may be directed downwardly so that air will be drawn in the top and forced downwardly through the heater air space to be ejected from the bottom adjacent the floor.

At times it is desirable to place the impeller so that its path of air flow will be directed in intermediate directions to secure different combinations of flow and for that reason I provided a frusto-conical bolt head 27 and wing nut 26 so that the impeller can be frictionally retained in any number of different positions. This fact coupled with the fact that the impeller and its support are rotatable as a unit on the rings about the openings in the casing top afford a universal movement for any type or adjustment desired. Furthermore, the combined stop and handle 30 can be moved to different positions with respect to the hub 28 to which it is detachably secured and it should be pointed out that the element 30 will positively retain the impeller in certain positions so that the electric cord 36 will not become entangled with the impeller in the event the friction retaining means should not be tightened sufficiently and slippage should occur.

The resilient grommets 24 are extremely important since they practically eliminate vibration in the heater casing or the cap 15 which would otherwise be caused by the rotation of the motor or impeller. Heaters of this general type are usually provided with rather lightly constructed casings and any considerable degree of vibration of the impeller would otherwise be transmitted to the casing and cause objectionable noise. The cushion strips 18 in addition to providing rests for the cap 15 are, of course, also very effective in the prevention of the transmission of vibration to the heater casing.

From the foregoing it will be seen that I have provided a space heater construction wherein it is possible to accurately control the distribution of air in an enclosure to secure not only uni-

form distribution but maximum heating efficiency. The flow of heated air can be controlled in a number of different ways to suit any desired need. It is a structure which can be utilized in combination with a conventional heater having the usual air space between the casing and the combustion chamber and it can also be incorporated with a heater casing built especially to carry out the aims of my invention. It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

1. In a space heater, a combustion chamber, a casing around said chamber and spaced therefrom to provide an air passage in heat exchange relation to said combustion chamber, an impeller, an impeller support mounted on said heater, said support being movable to position said impeller with its path of air flow directed partially within and partially without said casing.

2. The structure in claim 1 and said impeller support being rotatable with respect to said casing.

3. In a space heater, a combustion chamber, a casing around said combustion chamber and spaced therefrom to provide an air passage, said casing having an apertured top, and a directional air impeller supported by said top and swingable on a horizontal axis, said impeller, in one position, having a portion of its air flow path directed out of the aperture in the top of said casing and another portion of its air flow path directed into a portion of the space between said combustion chamber and said casing.

4. The structure in claim 3 and means for releasably securing said impeller in different positions on its horizontal axis.

5. In a space heater, a combustion chamber, a casing around said combustion chamber and spaced therefrom to provide an air passage, said casing having an apertured top, and an air impeller supported at the top of said casing and adjustable to a plurality of positions to direct its flow, in one position, outwardly through the

aperture in the top of said casing, in a second position to direct its flow downwardly through the aperture in said casing top and through the air space between said combustion chamber and casing, and in a third position to direct its flow partially outwardly through the aperture in said casing top and partially downwardly through the air space between said combustion chamber and said casing.

6. The structure in claim 5 and said impeller having a support rotatable on horizontal and vertical axes.

7. In a space heater, a combustion chamber, a casing around said combustion chamber and spaced therefrom to provide an air passage, said casing having an aperture in its top, an apertured cap member having downwardly extending walls and resting upon the top of said casing, an air impeller, a support for said impeller connected to said cap and adjustably maintaining said impeller adjacent the opening in said cap, said support being movable to position said impeller with its path of flow directed partially outside of said cap and partially within said cap.

8. The structure in claim 7 and said cap having a plurality of resilient cushioning elements at its lower edge and in contact with the top of said casing.

9. In a space heater, a combustion chamber, a casing around said combustion chamber and spaced therefrom to provide an air passage, said casing having an open bottom, an inwardly extending flange at the top of said casing above said combustion chamber and defining an opening, a support carried by the flanged top of said casing, an air impeller carried by said support, said support and air impeller being adjustable relative to said casing and the aperture in its top to provide for an impelled flow of air upwardly in said casing and out of the aperture in its top, downwardly in said casing and into the aperture in said casing top or a combined flow outwardly from the top of said casing and downwardly in the space between said casing and said combustion chamber.

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