Sept. 6, 1938. G. L. HECK 2,129,468

FAN AND BLOWER

Filed Jan. 10, 1938

Fig. 1

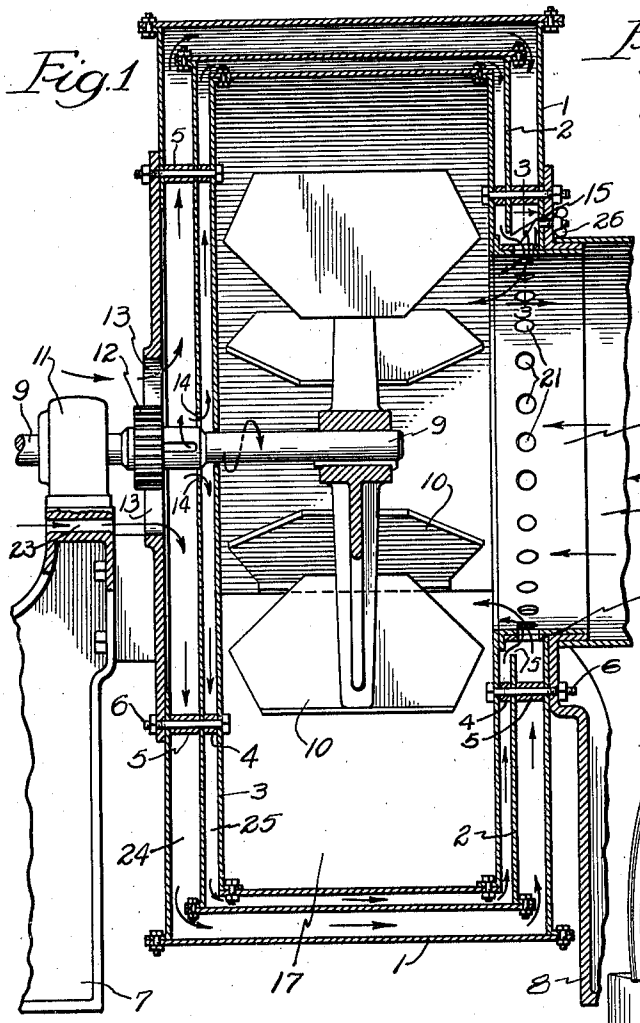


Fig. 3

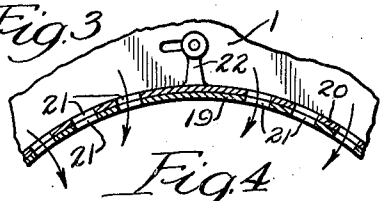


Fig. 4

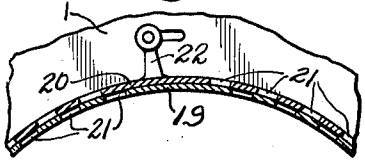
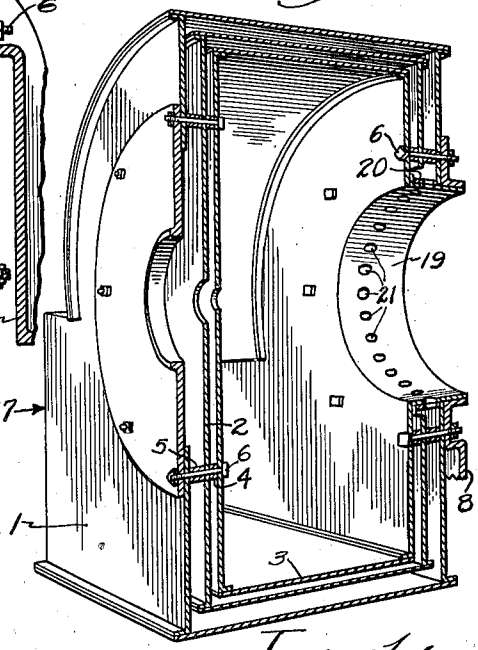


Fig. 2



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FAN AND BLOWER

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6 Claims. (Cl. 230—209)

This invention relates to fans and blowers, and more particularly to those types of fans for handling air or gases at high temperatures.

Due to the intense heat within the casing of the fan, often as high as 1600° F., the casing generally absorbs the heat from the hot air or gases and passes it on to the surrounding atmosphere causing a heavy heat loss. The fan casing or housing ordinarily is insulated with rock-wool or the like, but even with that arrangement the loss of heat is tremendous. Also the impeller shaft absorbs the heat and transmits it to the bearing lying adjacent the housing causing the bearing to "burn up" as the heat evaporates the oil and expands the metal of the bearing.

It was working with this type of fan or blower and observing the need to overcome these inherent defects that inspired the present invention.

The main objects of the present invention are to provide a housing for a fan or blower unit which is positively air cooled; to provide a suitable housing which will cause air to circulate around the bearing adjacent the housing; to provide a hollow walled housing through which air is circulated to dissipate the heat absorbed by the housing; to provide a fan or blower of this type wherein the heat absorbed by the housing is dissipated by controlled circulating air which reclaims the heat and returns it to the interior of the housing to be utilized; and to provide a fan and blower of this general type which is simple in construction and operation, comparatively light in weight and cheaper to manufacture than fans and blowers now in use.

An illustrative embodiment of this invention is shown in the accompanying drawing, in which:

Fig. 1 is a cross sectional view of my improved fan housing.

Fig. 2 is a perspective view of the same.

Fig. 3 is a fragmentary sectional view taken on the line 3—3 of Fig. 1, illustrating the control means in open position.

Fig. 4 is a view similar to Fig. 3, illustrating the control means in closed position.

Referring in detail to the drawing, the hollow-walled housing comprises an outer shell 1, an intermediate shell 2, and an inner shell 3. The shells are usually constructed of a steel plate alloy to withstand the high temperatures present in the interior of the housing. The shells are spaced apart from each other by means of spacers 4 and 5, through which bolts 6 are inserted to position and hold the housings in spaced relationship to each other.

The complete housing is supported by frame castings 7 and 8 for positioning the same. An impeller shaft 9 is so positioned that one end thereof extends into the interior of the housing where it carries an impeller 10 secured thereto, the other end of the shaft 9 being mounted in a pair of bearings 11. Only the inner bearing is shown in the drawing, the outer bearing being placed in spaced alignment with the inner bearing, as is customary and well known in the art. A heat slinger 12 usually constructed of fluted copper, is positioned on said shaft adjacent said inner bearing 11 and between the bearing and the fan housing to assist in dissipating any radiant heat that may be transferred along the shaft 9 toward the inner bearing 11.

The outer shell 1 and the intermediate shell 2, are provided with axially concentric cool air inlet openings 13 and 14 respectively, and the intermediate shell 2 is also provided with an outlet opening 15 at the main inlet side of the fan, the purposes of which will be hereinafter explained.

The housing is also provided with the usual main air inlet opening 16 and discharge opening or outlet 17 for the principal air handled by the impeller. The main inlet 16 is connected by means of a suitable conduit 18 to the source of hot air supply, not shown, wherein the high temperatures are created and the outlet 17 is connected to the place where delivery is desired by means of the usual conduit, not shown.

As shown, the inlet 16 is provided with a pair of concentric collars 19 and 20, the collar 19 being integral with and extending outwardly of the inlet opening 16 of the inner shell 3. The collar 20 surrounds and is movable with respect to, the collar 19 and each of the collars 19 and 20 is provided with equally spaced apertures or outlet openings 21 which are arranged in such a manner that when the arm 22, secured to the collar 20, is moved to the "open" position, as shown in Fig. 3, the openings 21 of the two collars will register with each other and provide unrestricted openings through the two collars. When the arm 22 is moved to the "closed" position, such as shown in Fig. 4, the slidable collar 20 is moved to cause the openings 21 to be out of registry and thereby closed. A locking means such as a wing nut 26 is employed to hold the collars in position.

In operation the movement of the impeller 10 will cause air to be drawn into the main fan

inlet 16 and discharged from the outlet 17, thereby causing a suction at the openings 21 of the collars 19 and 20, which openings are within the suction area of the impeller 10, so that when the openings 21 are in registry with each other air will be drawn from the passageways 24 and 25 between the housing shells as indicated by the arrows in Fig. 1. It will be seen that the air drawn from the passageways 24 and 25 will enter such passageways through the shaft or cool air inlet openings 13 and 14 and will be drawn from the room in which the fan is placed in such a manner that it will first pass through the slotted opening 23 in the support 7, and around the inner bearing 11. The cool air entering at 13 and 14 is then drawn through the spaces or passageways 24 and 25 to the collar or outlet openings 21 and thence into the interior of the fan where it is mixed with the air entering the inlet 16. As shown in Fig. 1 the outlet opening 15 of the middle shell 2 provides communication between the inner space 25 and the outer space 24 at the vicinity of the collar outlet openings 21, thus cool air is drawn through both spaces 24 and 25 simultaneously.

It is a known fact that in a fan of this type wherein the temperatures within the fan housing range from 600° F. to 1600° F., the housing absorbs and radiates large quantities of heat derived from the heated air or gases drawn into the housing through the inlet 16. This heat is radiated into the surrounding atmosphere and lost. The impeller shaft 9 also absorbs considerable heat and transfers it to the inner bearing 11 which often results in bearing damage or failure.

By constructing a fan housing in the manner such as I have herein disclosed, it will readily be seen that a great deal of the heat absorbed by the housings will be reclaimed by the process of drawing cool air into the spaces or passageways between the housing shells and passing such air to the interior of the fan, thereby not only preventing or reducing heat loss, but also cooling the fan housing.

Another advantage of my construction is that the cool air in the room outside of the fan housing is drawn into the passageways in such a manner that it passes first around the inner bearing 11, thereby acting as a means for cooling this bearing. As the air passes around the bearing it also travels along the impeller shaft 9, thereby acting as a positive means to cool the shaft.

When the fan is first placed in operation, or upon initial operation of the heater from which hot air is drawn, the control bands or collars 19 and 20 are placed in the closed position shown in Fig. 4 in order that no cold air will be drawn into the interior of the fan until a desired temperature is reached. As the temperature of the incoming air is increased, the collar 20 is shifted so that the openings 21 assume the position shown in Fig. 3, thereby keeping the housing as cool as possible without reducing the delivery temperature of the air discharged at 17.

In former constructions, insulation in the form of rock-wool or the like was placed around the housing in order to prevent the dissipation of heat. But since the insulation used in present day constructions weighs about 300 pounds, applicant's construction, wherein the necessity for insulating materials is obviated, is considerably lighter. Further, the housings in use today are constructed of a heavy steel alloy due to the weight of the insulation and the tremendous absorption of heat. With applicant's construction a lighter weight housing is employed and the weight of the complete construction is thereby reduced an additional amount. Furthermore, after the oven has been shut down the insulation used in present day constructions causes the heat to be held in the interior of the fan thereby increasing the length of time to cool the fan. By eliminating the insulation as applicant discloses, it can readily be seen that the fan housing is cooled much more quickly.

It is to be understood that some of the details set forth may be altered or omitted without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. A hollow walled fan and blower housing having opposed inlet openings, one of which leads directly into the interior of the housing and the other of which leads to the interior of the hollow wall of said housing, and said housing having means providing communication between the interior of said hollow wall and the interior of said housing at the first-named inlet opening, whereby said housing may be cooled by air circulating through the hollow wall thereof from the last-named inlet opening.

2. A hollow walled fan and blower housing having a main inlet opening leading directly into the interior of said housing for air handled by the impeller and a cool air inlet opening leading to the interior of the hollow wall, and said hollow wall having an outlet opening leading into the interior of said housing on the side thereof opposite said cool air inlet opening and within the suction area whereby circulation is had through said hollow wall from said cool air inlet opening.

3. A hollow walled fan and blower housing having a main inlet opening leading directly into the interior of said housing for air handled by the impeller and a cool air inlet opening leading to the interior of the hollow wall, said hollow wall having an outlet opening leading into the interior of said housing on the side thereof opposite said cool air inlet opening and within the suction area whereby circulation is had through said hollow wall from said cool air inlet opening, and means to control the amount of cool air circulated through said hollow wall.

4. A fan and blower housing comprising inner, intermediate and outer shells, said shells being positioned one within another and spaced from each other to provide surrounding passageways between the inner and intermediate shells and the intermediate and outer shells respectively, said housing having a main inlet opening leading directly through said shells into the interior of said inner shell, and said outer and intermediate shells having respective cool air inlet openings and an outlet opening leading to the interior of said inner shell within the suction area thereof, all arranged whereby cool air may circulate from the exterior of said housing through said surrounding passageways and into the interior of said inner shell.

5. A fan and blower housing comprising inner, intermediate and outer shells, said intermediate shell being placed within said outer shell and said inner shell being placed within said intermediate shell and all of said shells being spaced apart from each other to provide passageways between said inner and intermediate shells and said intermediate and outer shells, said outer and intermediate shells each being provided with op-

posed openings, means to provide communication between said passageways and the suction area of the interior of said inner shell, an impeller shaft mounted in a bearing and an impeller disposed on one end of said shaft and positioned within said inner shell, whereby upon operation of said impeller air will be caused to circulate around said bearing and through said passageways and be withdrawn from said passageways into the interior of said inner shell.

6. A fan and blower housing comprising inner, intermediate and outer shells, said intermediate shell being placed within said outer shell and said inner shell being placed within said intermediate shell and all of said shells being spaced apart from each other to provide passageways between said inner and intermediate shells and said intermediate and outer shells, said outer and intermediate shells each being provided with opposed openings, adjustable means to provide communication between said passageways and the suction area of the interior of said inner shell, an impeller shaft mounted in a bearing, and an impeller disposed on one end of said shaft and positioned within said inner shell, whereby upon operation of said impeller air will be caused to circulate around said bearing and through said passageways and be withdrawn from said passageways into the interior of said inner shell.

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