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(54) FURNACE DISTRIBUTION BLOWER WITHOUT A BLOWER HOUSING

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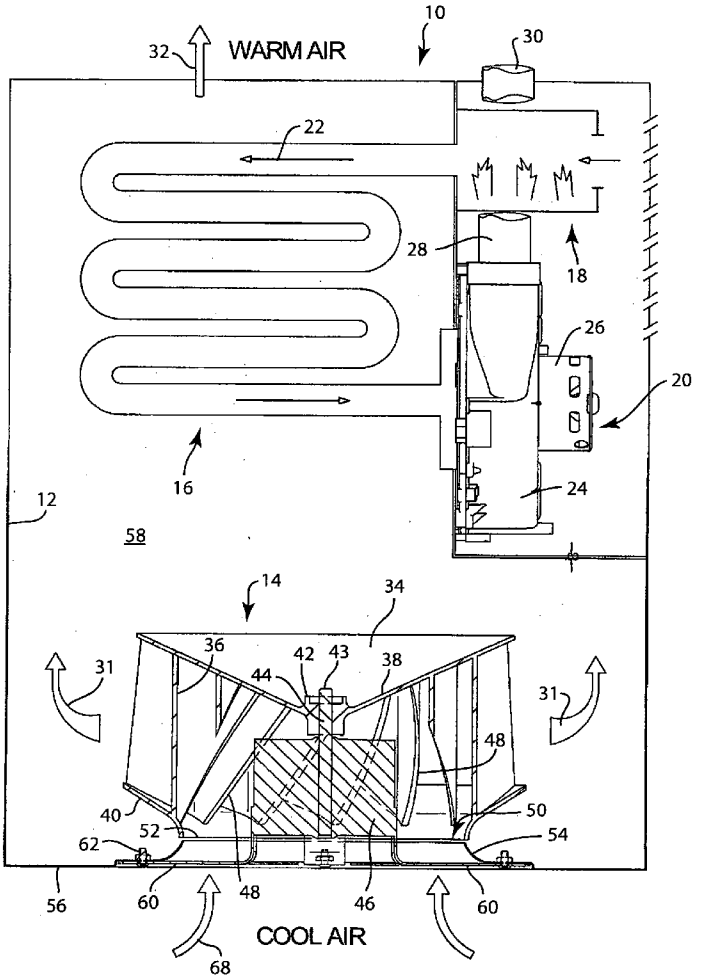
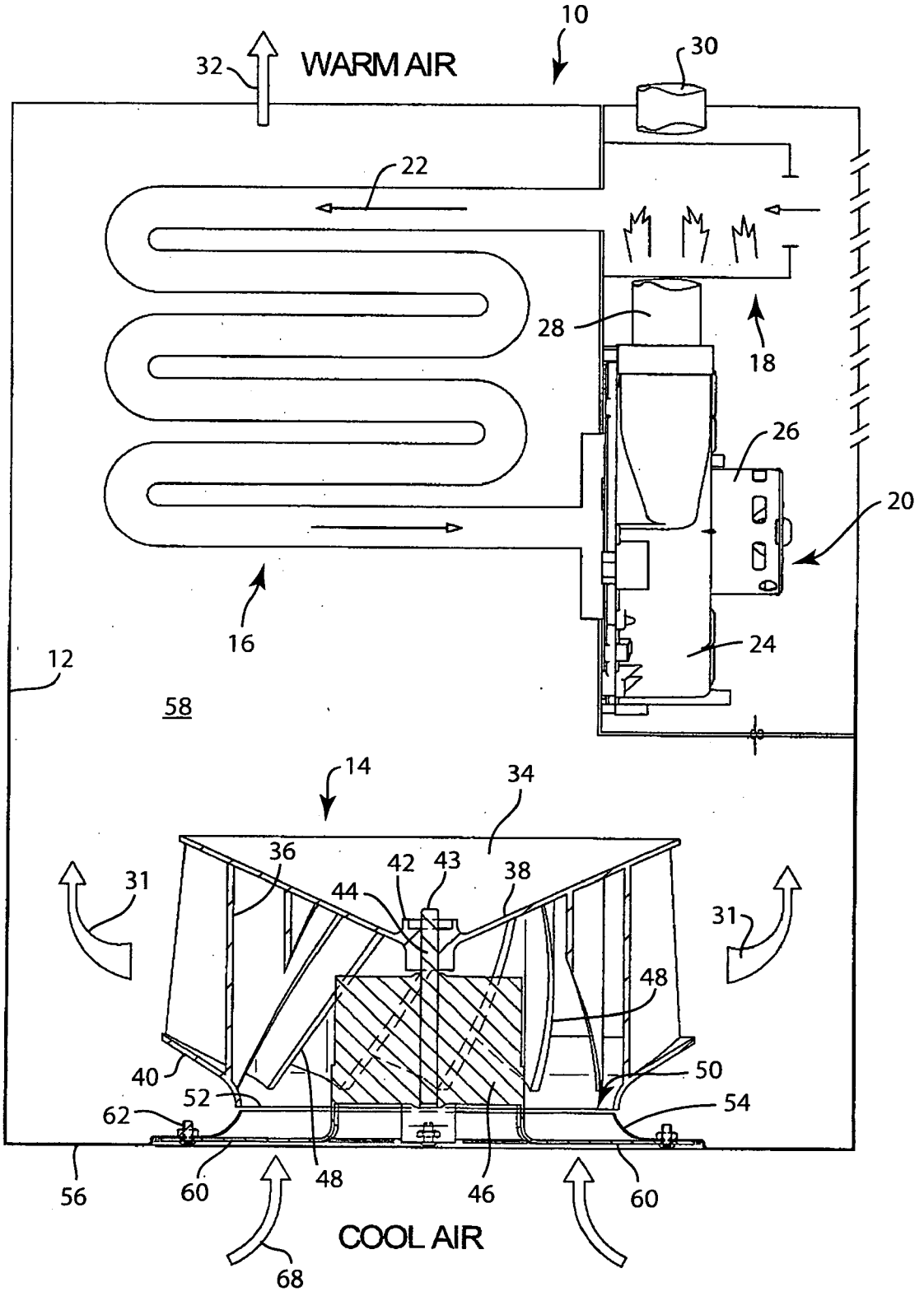
(52) **U.S. Cl.** ..... **126/110 R**

(57) **ABSTRACT**

A furnace distribution blower for use in a conventional furnace that is configured without a blower housing. The furnace distribution blower includes a backward curved impeller mounted around a drive motor having a central drive shaft. The drive motor rotates the backward curved impeller to draw air into the inlet of the impeller. Preferably, the inlet of the impeller is closely mounted to an inlet bell of the furnace. The furnace distribution blower can be mounted to a support tray such that the furnace distribution blower can be moved from an operating position in which the impeller is positioned beneath the heat exchanger and a service position in which the impeller is removed from within the furnace housing. The elimination of the blower housing decreases the cost of the furnace distribution blower as compared to a blower having a housing.

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WARM AIR
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COOL AIR
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FIG. 1

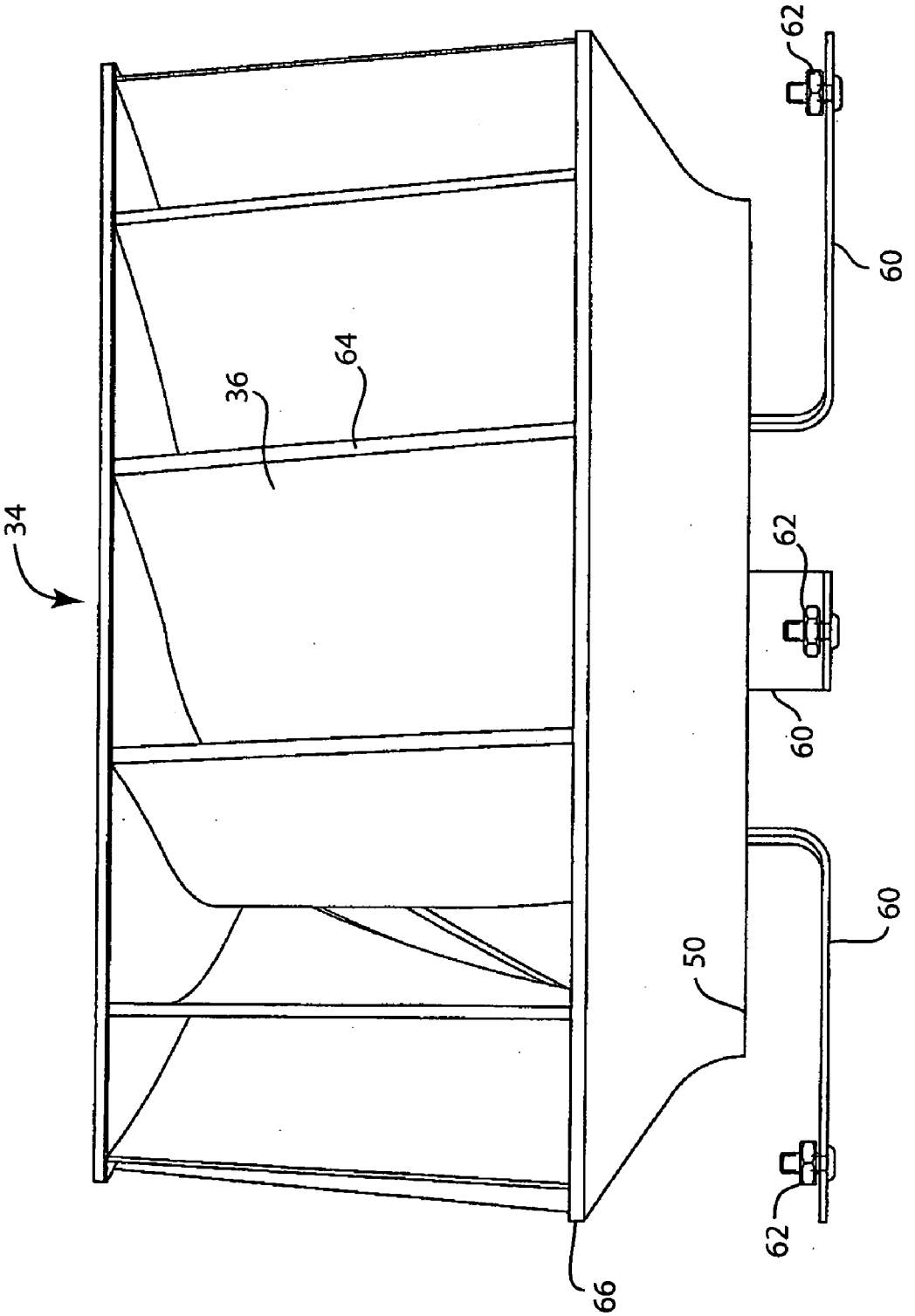
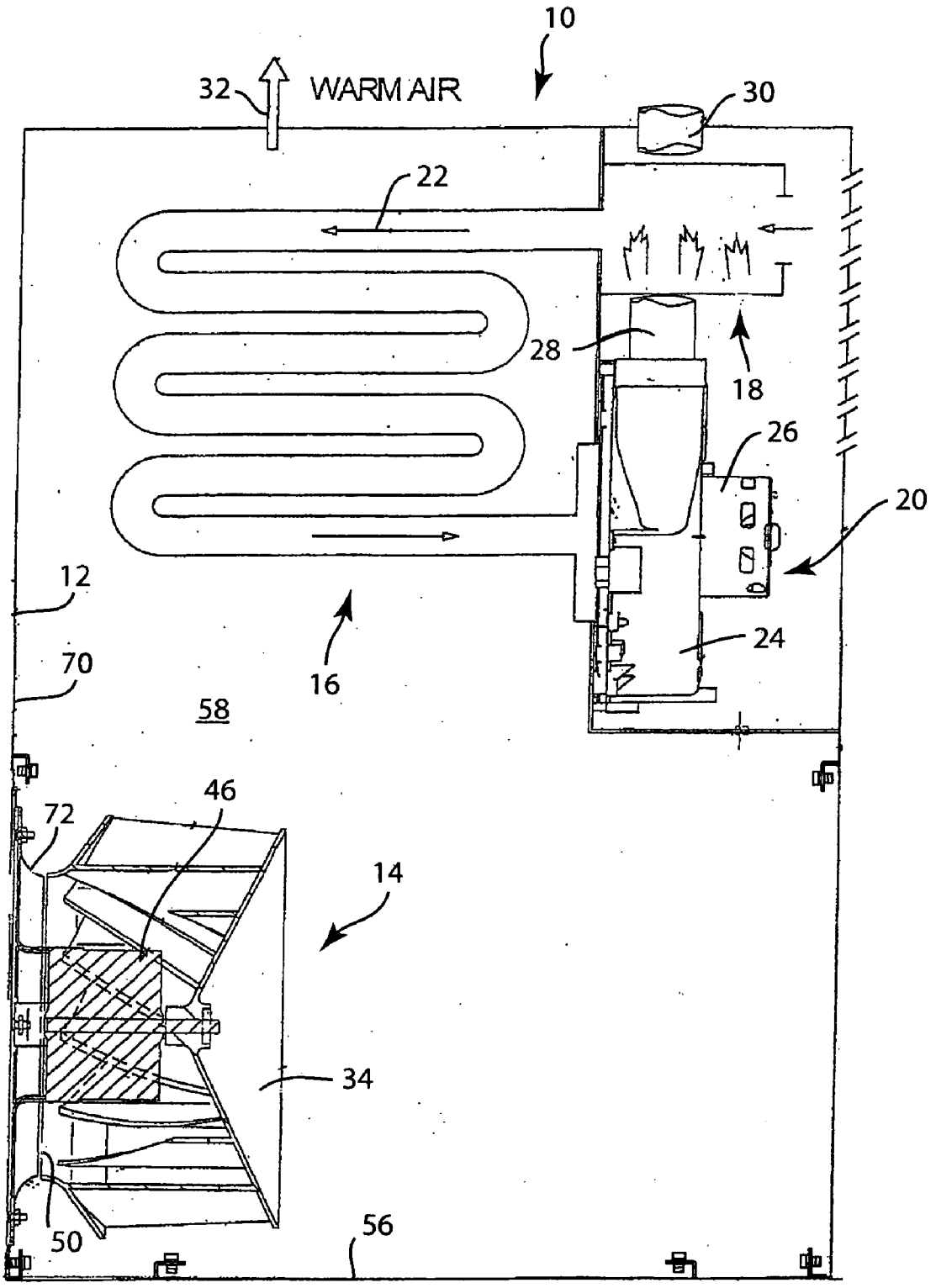


FIG. 2



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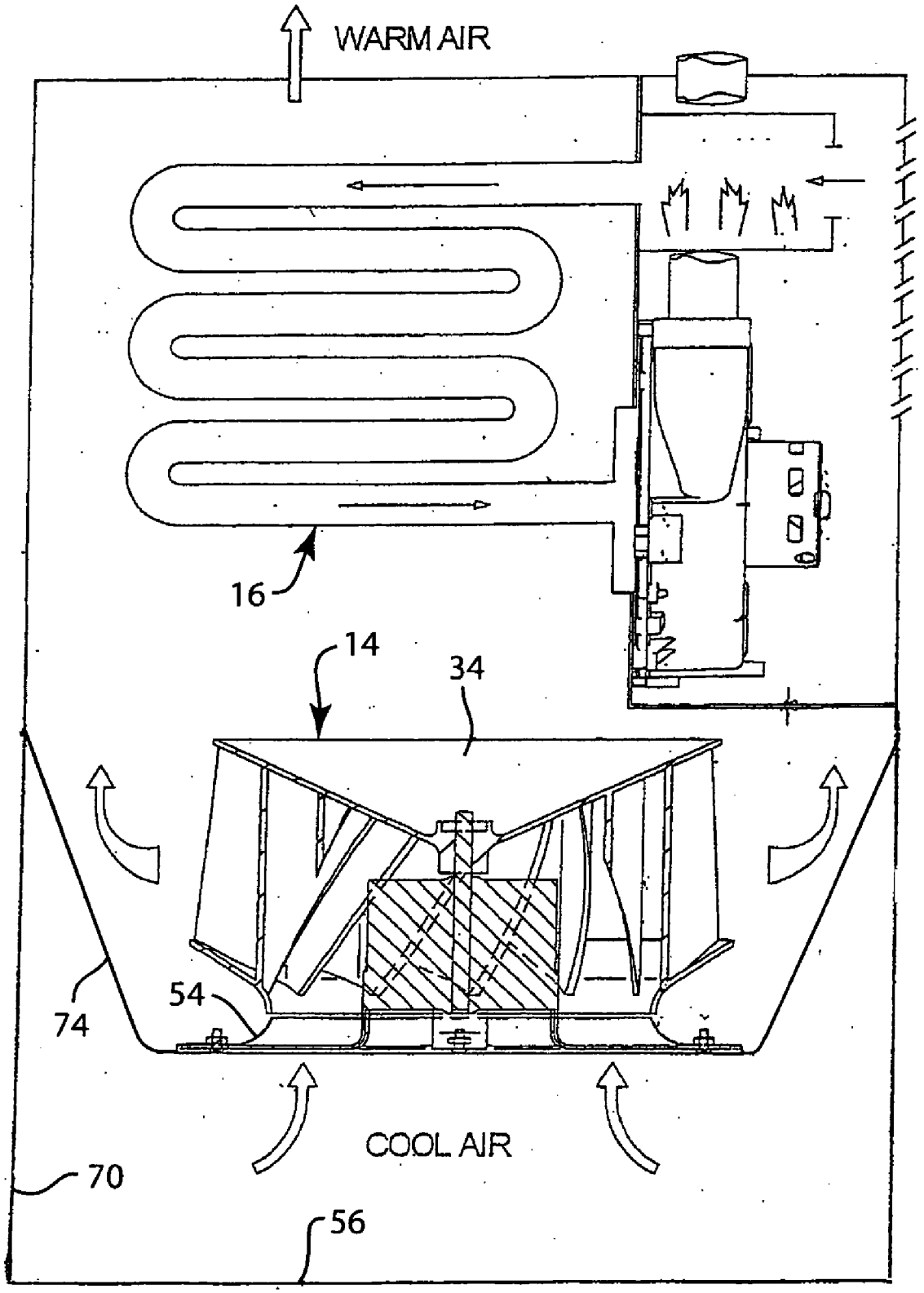

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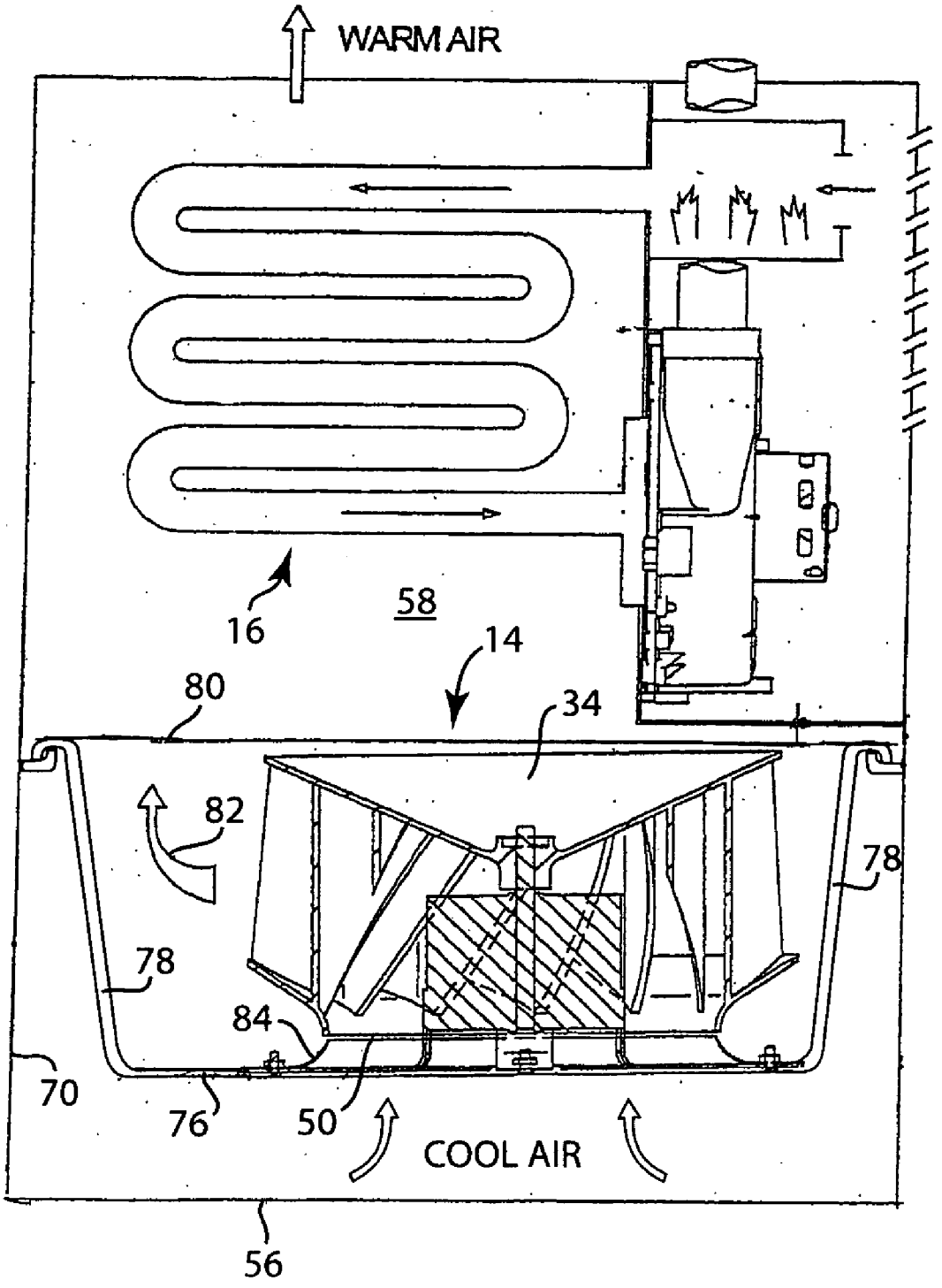

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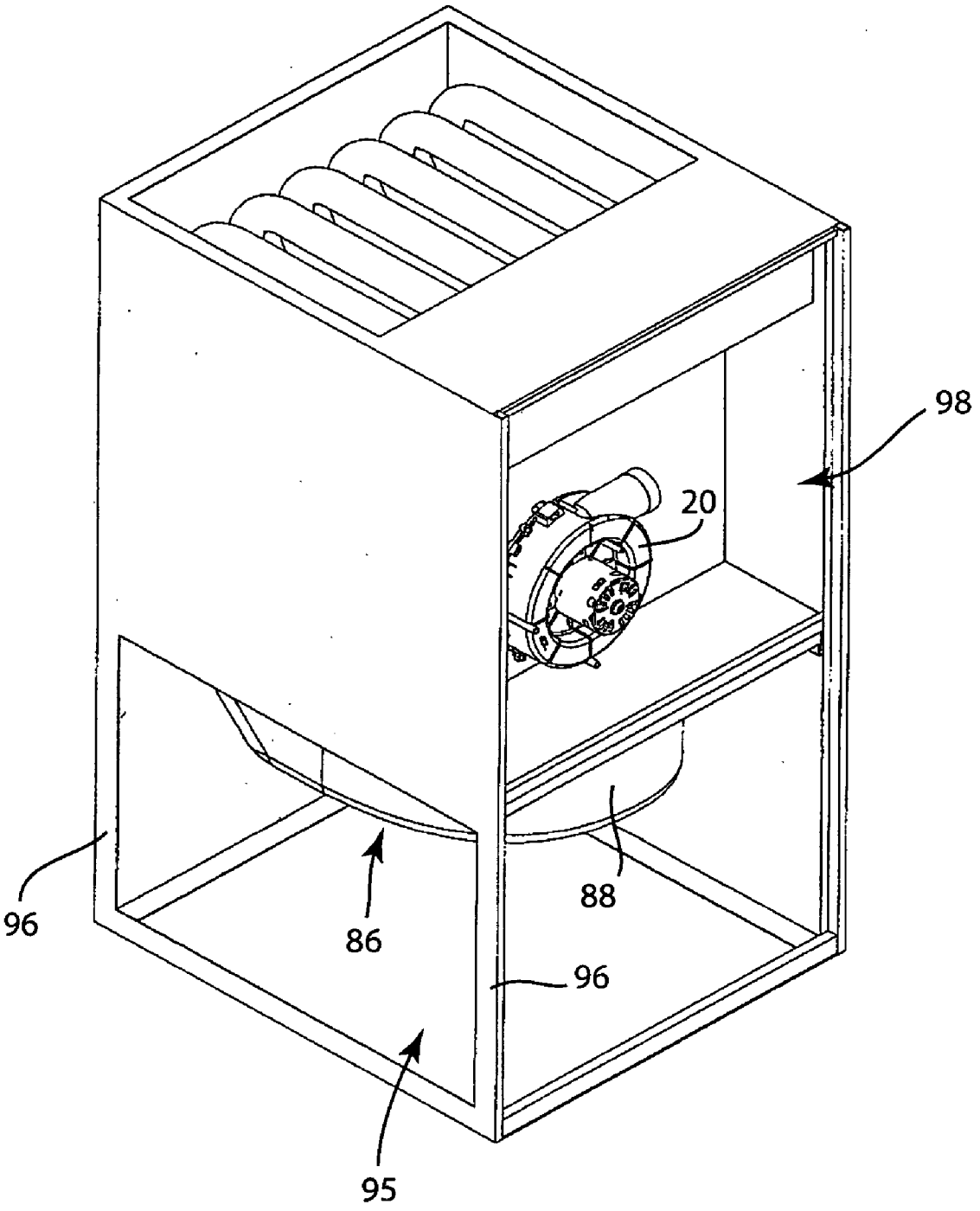


FIG. 6

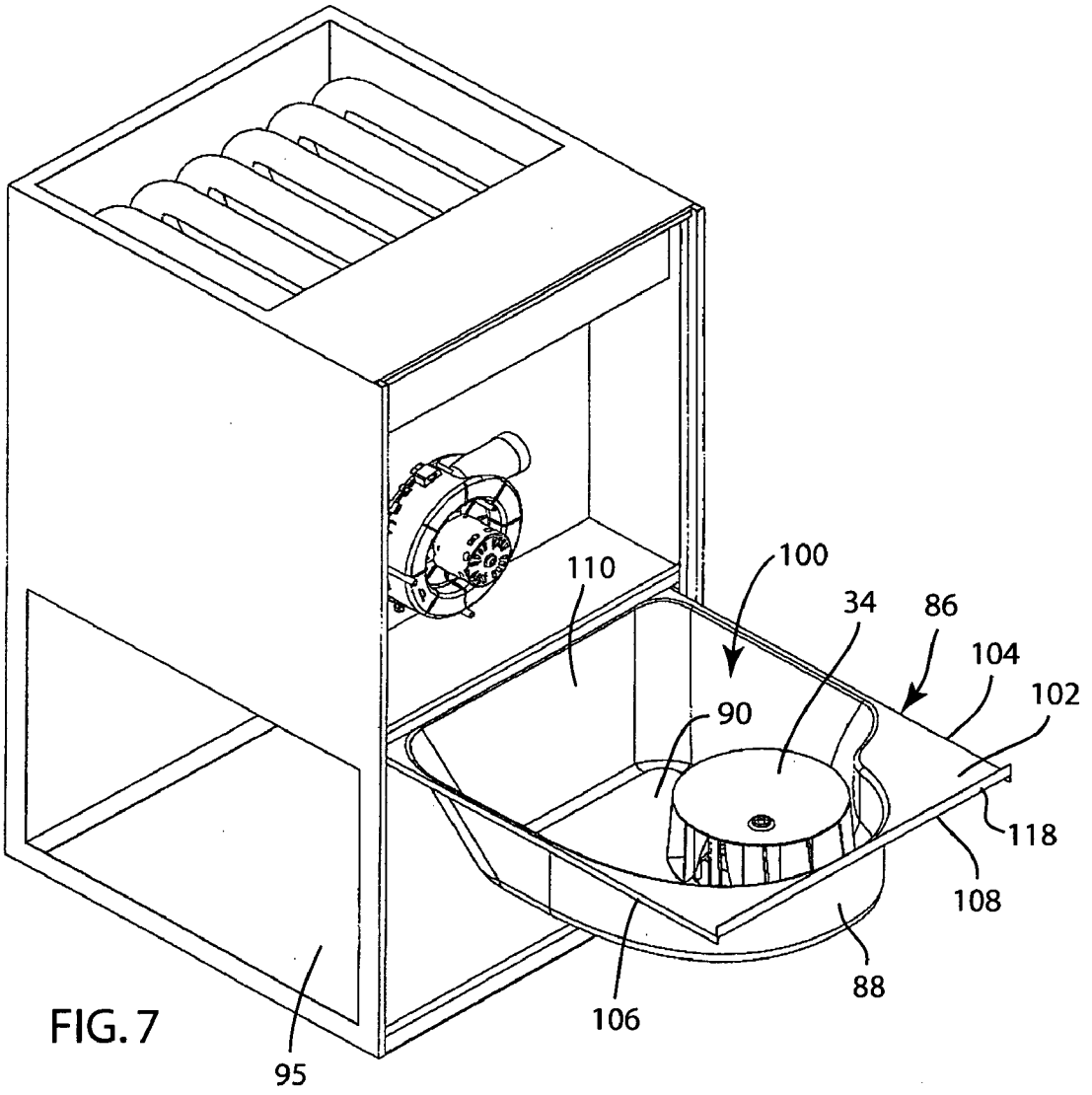


FIG. 7

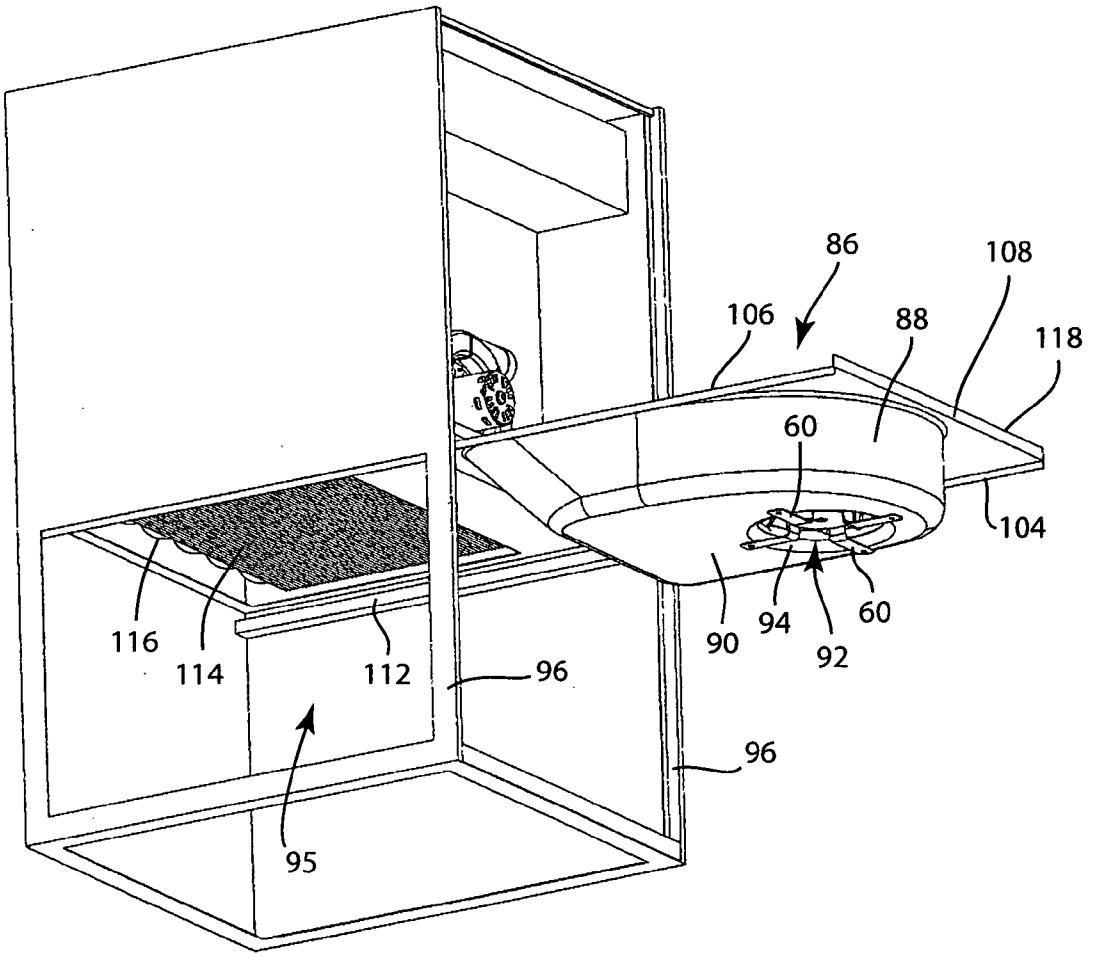


FIG. 8

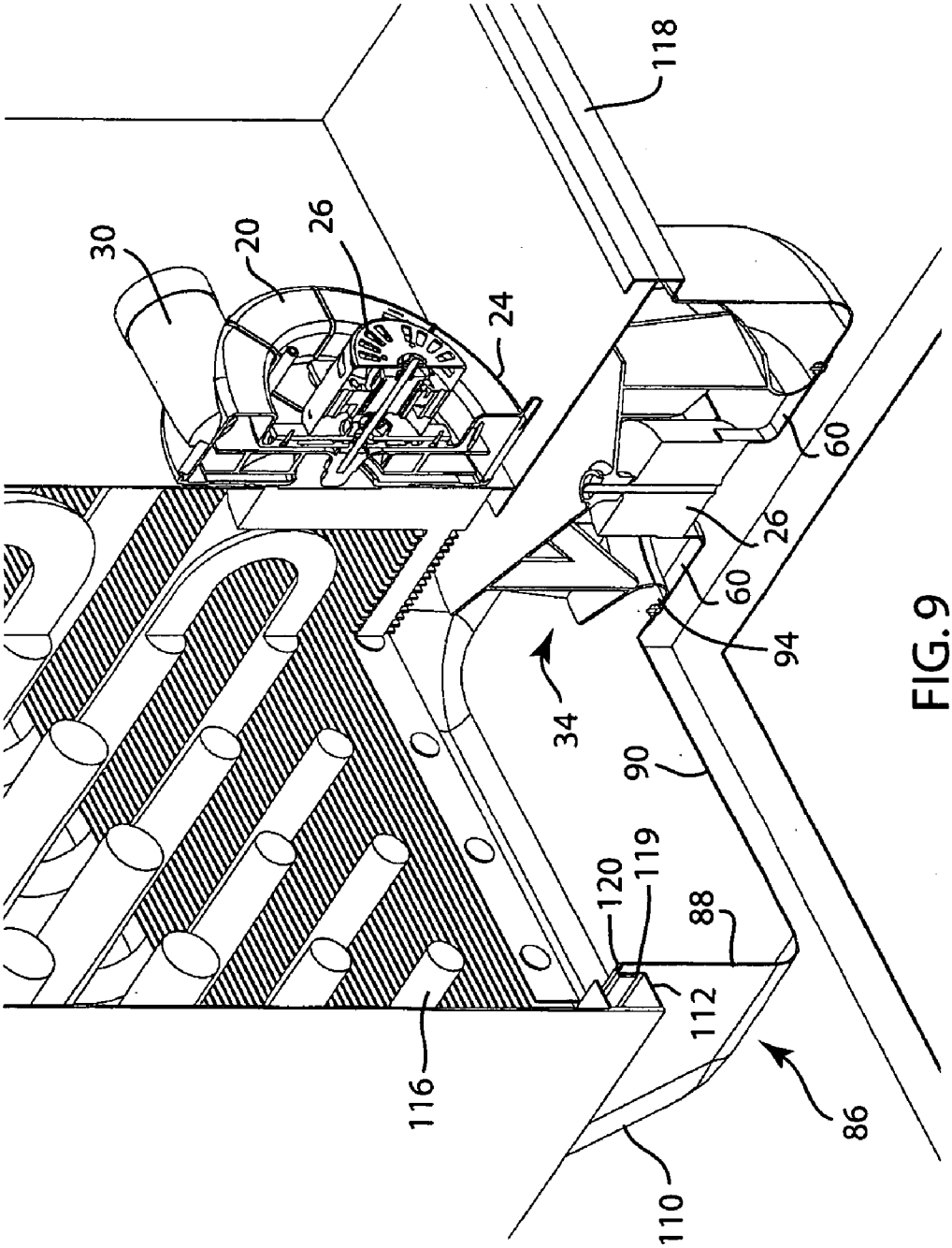


FIG. 9

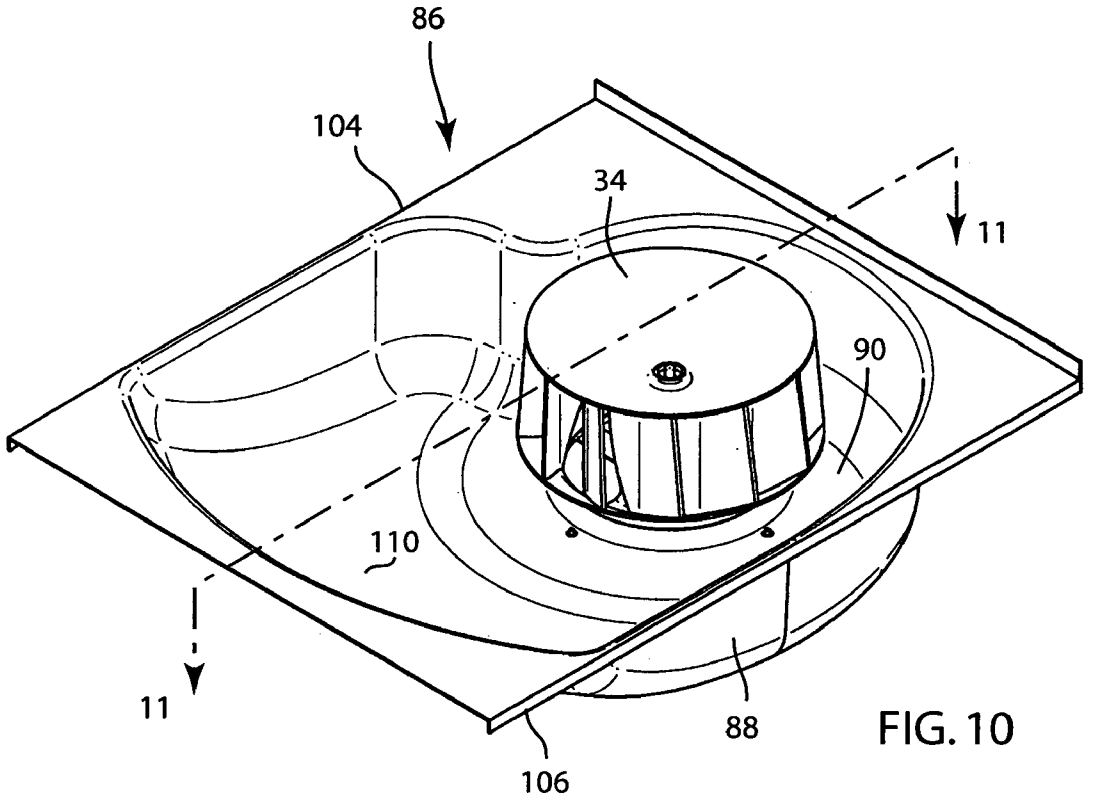


FIG. 10

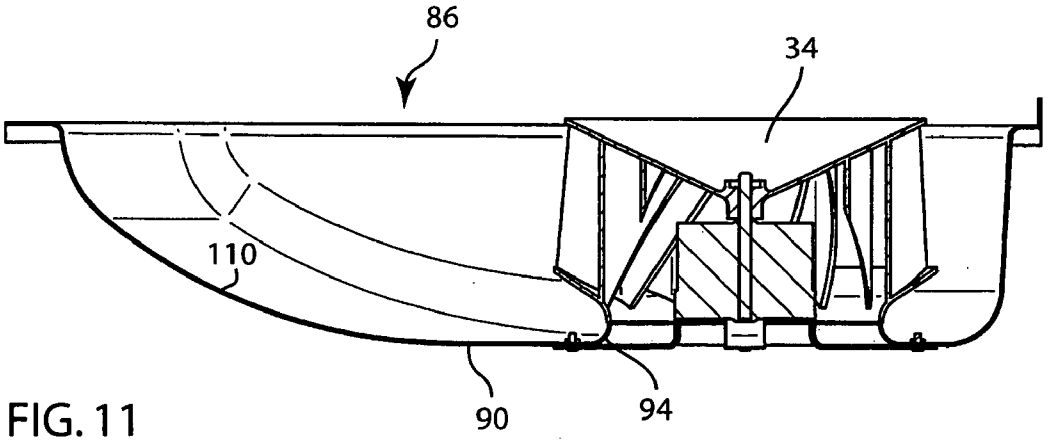


FIG. 11

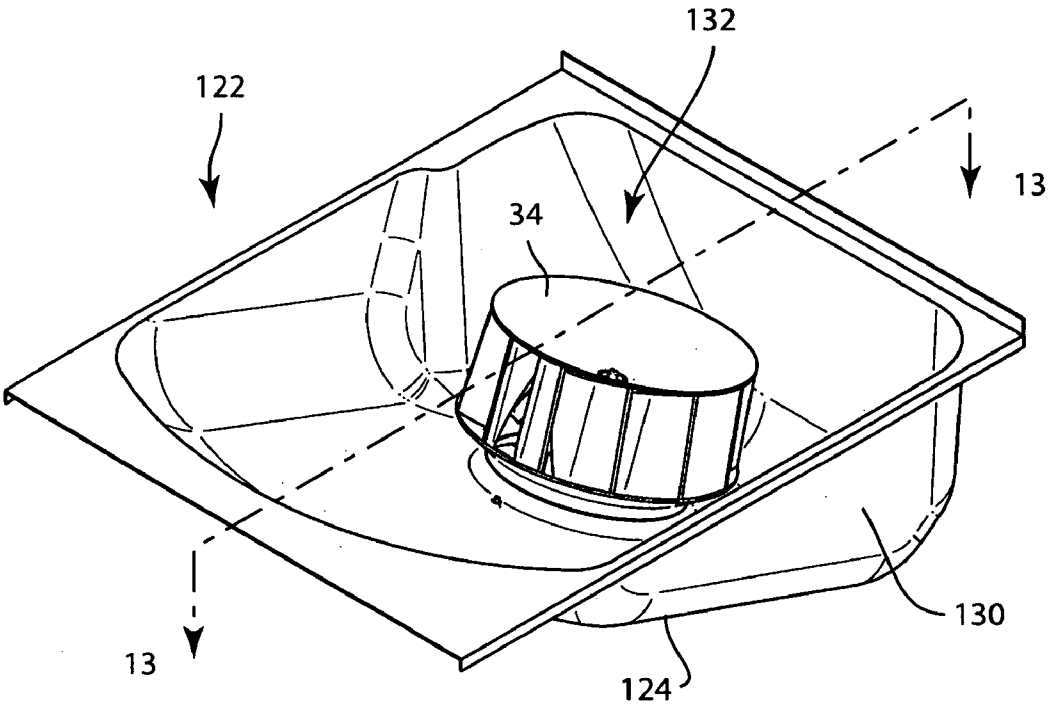
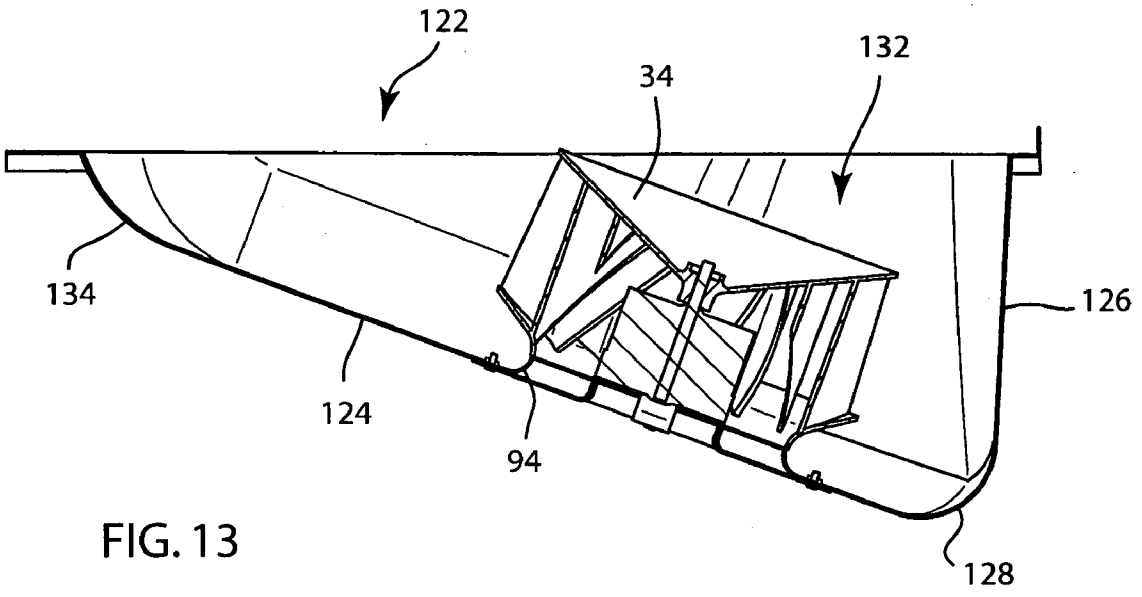


FIG. 12



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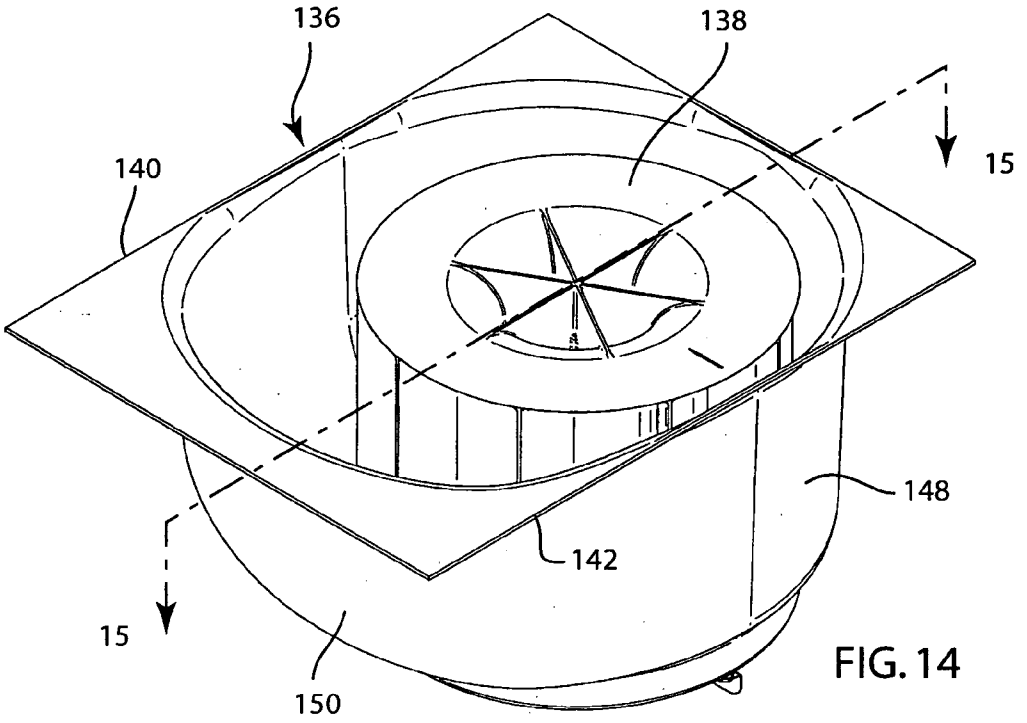

FIG. 14

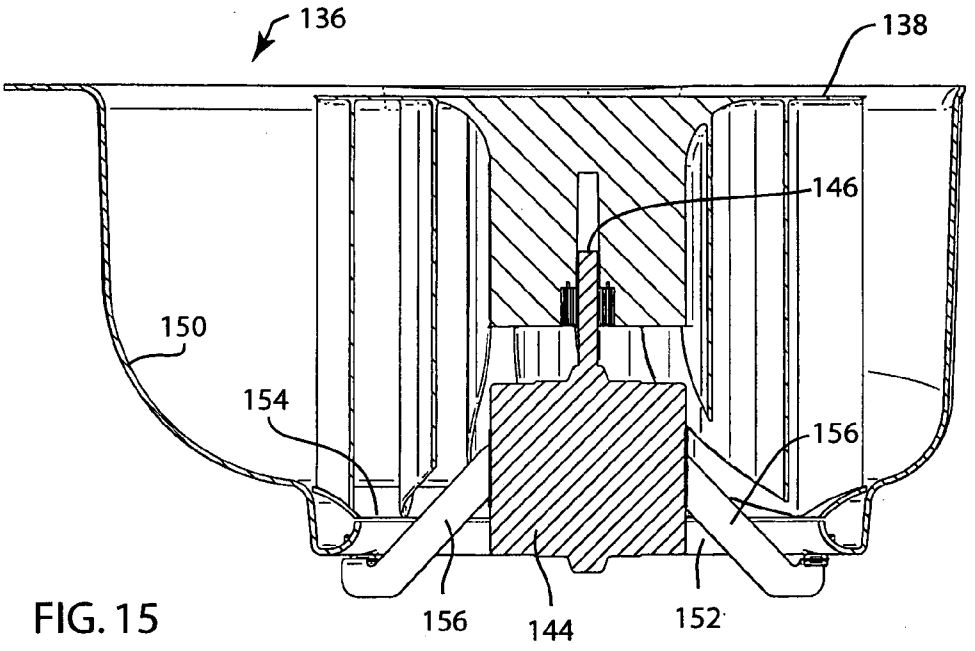

FIG. 15

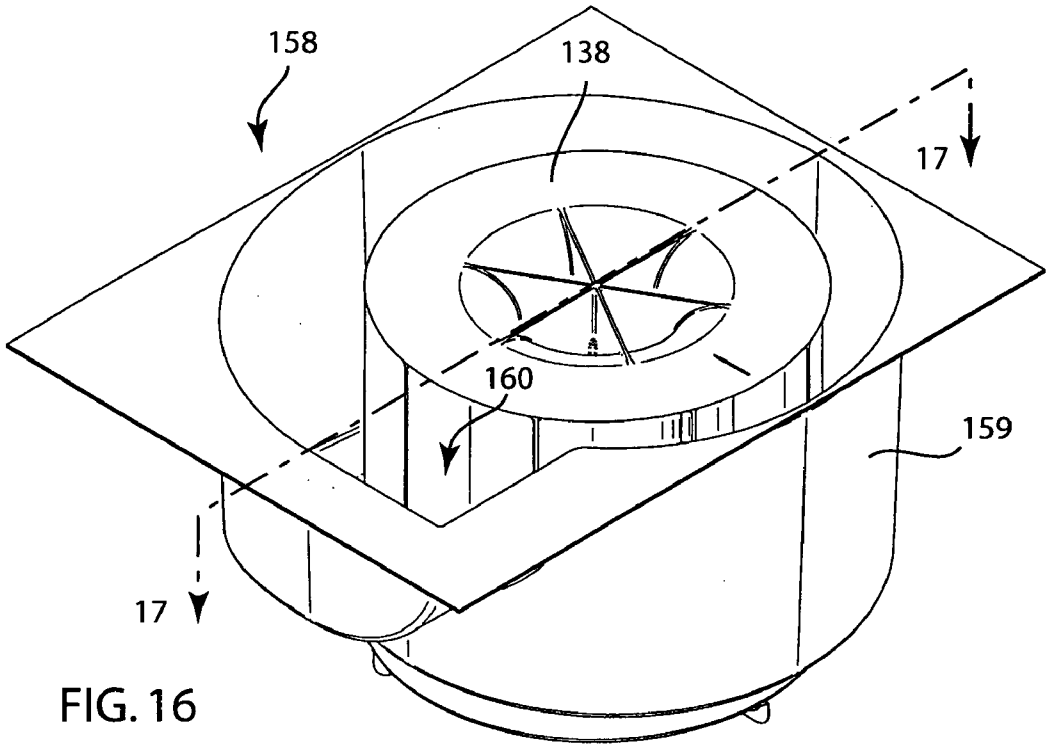
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FIG. 16

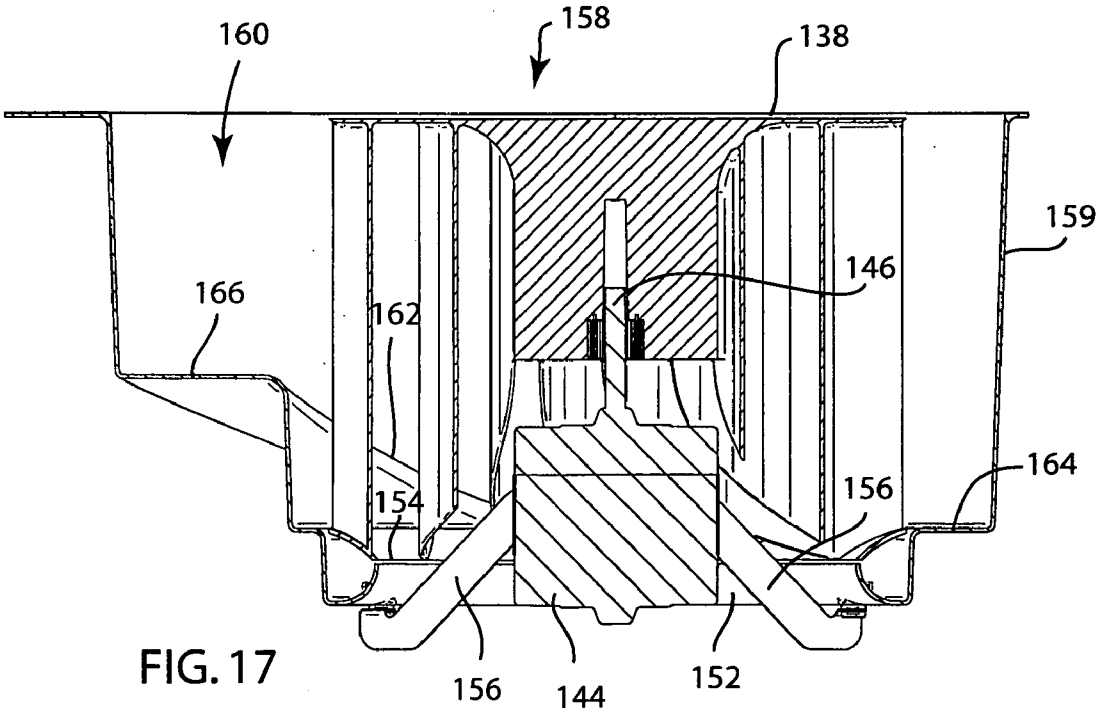
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FIG. 17

FURNACE DISTRIBUTION BLOWER WITHOUT A BLOWER HOUSING

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is based on and claims priority to U.S. Provisional Patent Application Ser. No. 60/528,124, filed on Dec. 9, 2003 and U.S. Provisional Patent Application Ser. No. 60/545,183, filed on Feb. 17, 2004.

BACKGROUND OF THE INVENTION

[0002] The present invention generally relates to a furnace, and particularly to a furnace distribution blower used within the furnace. More specifically, the present invention relates to a unique configuration and mounting for a furnace distribution blower that does not include a blower housing surrounding a rotating impeller that creates a flow of air over the furnace heat exchanger.

[0003] Typically, a household furnace includes a furnace distribution blower that draws a supply of fresh air into the furnace housing and directs the flow of fresh air over a heat exchanger. The heated air, after passing over the heat exchanger, is directed to the environment to be heated.

[0004] In typical prior art furnaces, the furnace distribution blower includes a blower housing that surrounds a forward curved impeller wheel. The blower housing includes an inlet opening that receives the flow of fresh air. The rotating forward curved impeller directs the fresh air radially outward against a scroll shaped housing, which ultimately directs the flow of air out of an outlet formed in the housing and over the heat exchanger of the furnace. In this type of system, the impeller for the furnace distribution blower is positioned in the center of the housing such that the flow of fresh air is directed by the housing.

[0005] One disadvantage of the prior art furnace distribution blower is the cost and materials required for the housing. Typically, the housing is formed from either a metallic or plastic material that must be separately formed and assembled.

[0006] Therefore, it is an object of the present invention to provide a furnace distribution blower that does not include a housing yet provides the required airflow characteristics for proper operation of the furnace.

SUMMARY OF THE INVENTION

[0007] The present invention utilizes a backward curved impeller mounted on a vertical motor shaft of a drive motor. The backward curved impeller surrounds the drive motor including the vertical motor shaft. The drive motor preferably includes a plurality of brackets that mount the motor to a bell-shaped inlet plate of the furnace housing to draw air into the impeller from the bottom portion of the furnace. The bell-shaped portion of the inlet plate is generally the same size as the inlet of the impeller and is designed to be close vertically to the inlet of the impeller so that pressurized air in the furnace will not escape back through the inlet bell.

[0008] The impeller of distribution blower draws air through the cool air inlet of the furnace, over the drive motor and moves the cool air across the heat exchanger. The inlet air flow, now warmed by the heat exchanger, is exhausted from the top of the furnace.

[0009] In one embodiment of the invention, the inlet of the backward curved impeller is mounted slightly above the bottom wall of the furnace housing such that cool air can be received from the bottom of the furnace. Alternatively, the impeller can be rotated 90° and mounted to one of the sidewalls of the furnace housing such that inlet air is received from next to the furnace housing. In yet another alternate embodiment of the invention, the impeller can be suspended above the bottom wall of the furnace housing such that the flow of cool air can be received from both the bottom and the sides of the furnace housing.

[0010] In yet another alternate embodiment of the invention, the rotating backward curved impeller can be spaced from the bottom wall of the furnace housing and surrounded by a scroll-shaped outer wall. The scroll-shaped outer wall increases the efficiency of the rotating backward curved impeller by directing the air flow upward toward the heat exchanger without the use of a housing. The outer wall allows the inlet air to be drawn from both the side and the bottom wall of the furnace housing.

[0011] In yet another alternate embodiment of the invention, the rotating backward curved impeller is spaced above the bottom wall of the furnace within a scroll-shaped support tray. The support tray is formed from stamped metal and is supported beneath the heat exchanger and is movable relative to the furnace housing. The support tray includes a scroll-shaped outer wall. The scroll-shaped outer wall directs the flow of air upward from the impeller toward the heat exchanger of the furnace and increases the efficiency of the rotating backward curved impeller without the use of a housing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The drawings illustrate the best mode presently contemplated of carrying out the invention.

[0013] In the drawings:

[0014] **FIG. 1** is a schematic illustration of a traditional furnace employing a furnace distribution blower constructed in accordance with the present invention;

[0015] **FIG. 2** is a magnified view of the furnace distribution blower of the present invention;

[0016] **FIG. 3** is a schematic drawing of an alternate placement of the furnace distribution blower within a traditional furnace;

[0017] **FIG. 4** is a schematic drawing of another alternate placement of the furnace distribution blower in a traditional furnace;

[0018] **FIG. 5** is a schematic drawing of yet another alternate placement of the furnace distribution blower within a traditional furnace;

[0019] **FIG. 6** is a top perspective view of a traditional furnace incorporating the furnace distribution blower of the present invention;

[0020] **FIG. 7** is a view similar to **FIG. 6** illustrating the movement of the furnace distribution blower and support tray into a service position;

[0021] **FIG. 8** is a view similar to **FIG. 7** illustrating the support tray in the service position;

[0022] **FIG. 9** is a partial sectional view taken through the furnace distribution blower and support tray;

[0023] **FIG. 10** is a top perspective view of the furnace distribution blower and support tray of the first embodiment of the invention;

[0024] **FIG. 11** is a section view taken along line **11-11** of **FIG. 10**;

[0025] **FIG. 12** is a top perspective view of the furnace distribution blower and a second embodiment of the support tray;

[0026] **FIG. 13** is a section view taken along line **13-13** of **FIG. 12**;

[0027] **FIG. 14** is a top perspective view of yet another alternate embodiment of the furnace distribution blower and support tray;

[0028] **FIG. 15** is a section view taken along line **15-15** of **FIG. 14**;

[0029] **FIG. 16** is a top perspective view of yet another alternate embodiment of the furnace distribution blower and support tray; and

[0030] **FIG. 17** is a section view taken along line **17-17** of **FIG. 16**.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0031] **FIG. 1** illustrates a conventional furnace **10** utilized to warm a supply of air and distribute the warmed air through a residence. The furnace **10** generally includes an outer housing wall **12** that surrounds a distribution blower **14**, a heat exchanger **16**, combustion chamber **18** and draft inducer **20**. As is well known, a supply of fuel is provided to the combustion chamber **18** which creates a heated supply of air. The heated supply of air circulates through the heat exchanger **16**, as illustrated by arrows **22**. The flow of heated air from the combustion chamber is drawn through the tortuous path of the heat exchanger **16** by the draft inducer, including a blower housing **24** and a drive motor **26**. The outlet **28** of the draft inducer **20** is connected to an exhaust pipe **30** such that the combustion gases can be expelled from the furnace **12**.

[0032] The furnace distribution blower **14** creates a flow of air **31** that passes over the heat exchanger **16** and flows to the environment to be heated, as illustrated by arrow **32**.

[0033] In prior art furnace configurations, the furnace distribution blower is typically a blower having a blower housing with an inlet and an outlet and a drive motor for rotating a forward curved (FWC) inlet wheel. The forward curved inlet wheel draws fresh air from outside of the furnace housing **12** and directs the flow of air over the heat exchanger **16**. Typically, the distribution blower includes an external housing that is formed from either a molded plastic material or metal and encloses the rotating forward curved wheel to create the desired flow of air through the furnace.

[0034] Referring now to **FIG. 1**, thereshown is an improved furnace distribution blower **14** that is constructed without a blower housing in accordance with the present invention. As illustrated, the furnace distribution blower includes an impeller **34** having a plurality of impeller blades **36** extending between an inwardly recessed back plate **38** and a curved front wall **40**. As illustrated, the impeller is a backward curved (BWC) or a radial (RAD) wheel made from either metal or molded plastic. The impeller **34** includes a central hub **42** that receives one end **43** of a drive shaft **44** of a central drive motor **46**. As illustrated in **FIG. 1**, the drive motor **46** and the impeller **34** are concentric such that the impeller **34** rotates around the centrally mounted drive motor **46**. As illustrated in **FIG. 1**, the inner blade tips **48** of the impeller **34** pass around the drive motor **46** such that the drive motor **46** can rotate the impeller.

[0035] The impeller **34** includes an inlet **50** having a diameter defined by a top lip **52**. The top lip **52** of the impeller **34** is spaced slightly inward from an inlet bell **54** formed as a portion of the bottom wall **56** of the furnace housing **12**. As illustrated, the close spacing between the top lip **52** of the impeller **34** and the inlet bell **54** prevents pressurized air within the furnace interior **58** from escaping back through the inlet.

[0036] As illustrated in **FIGS. 1 and 2**, the impeller **54** has its inlet **50** mounted facing downward with the motor **46** mounted vertically inside the impeller inlet **50**. The motor **46** can have a wire-type bellyband mount with three or four radial mounting arms **60** resiliently mounted by connectors **62** to the bottom wall **56**. The bottom wall **56** includes the inlet bell **54** that provides tight spacing between the bottom wall of the furnace and the inlet end of the impeller **34**. This tight spacing is necessary so that the discharge side can be pressurized by the rotating impeller **34**, thus forcing air over the furnace heat exchanger **16**, and through the duct system.

[0037] Referring now to **FIG. 2**, thereshown is a more detailed view of the distribution blower, including the impeller **34**, of the present invention. As illustrated, the impeller **34** includes multiple impeller blades **36** that each terminate at a radial blade tip **64**. During rotation of the backward curved impeller **34**, the impeller **34** develops most of its pressure on its blades and thus can operate efficiently without an external housing. As shown in **FIG. 2**, the inlet **50** has a diameter slightly less than the outermost diameter **66** defined by the impeller blades **64**.

[0038] Referring back to **FIG. 1**, it can be understood that the flow of cool air, illustrated by arrows **68**, is drawn through the inlet **50** and passes over the motor **46**. Thus, the rotating impeller **34** not only provides the required airflow over the heat exchanger **16**, but also supplies a flow of cooling air over the motor **46**. The configuration of the rotating impeller **34** eliminates the need for an external housing, which dramatically decreases the cost of creating the furnace distribution blower **14** as compared to the prior art.

[0039] In the embodiment of the invention illustrated in **FIG. 1**, the motor **46** is a conventional and commercially available motor that is far less costly than a specialized "inside-out" motor utilized in a conventional motorized wheel application. This design enables maintenance to occur later in the furnace's life with just the motor being replaced instead of the entire blower and blower housing. The embodiment shown in **FIG. 1** will reduce the overall price of the furnace distribution blower **14** as compared to a traditional forward curved (FWC) unit mounted in an expensive blower housing.

[0040] Referring now to **FIG. 3**, thereshown is an alternate embodiment of the present invention in which the furnace distribution blower **14** of the present invention is mounted at an alternate location along the furnace housing **12**. Specifically, the furnace distribution blower **14**, including the backward curved impeller **34**, is mounted to a sidewall **70** of the furnace housing **12**. The sidewall **70** includes the inlet bell **72** that is closely spaced to the inlet **50** of the impeller **34**. Like the embodiment illustrated in **FIG. 1**, rotation of the impeller **34** creates a radial flow of air that passes over the heat exchanger **16** of the furnace **10**. In the embodiment illustrated in **FIG. 3**, the bottom wall **56** of the furnace housing **12** does not include an inlet opening. The embodiment illustrated in **FIG. 3** is particularly desirable where space restrictions prevent the inlet opening being formed in the bottom wall of the furnace housing.

[0041] Referring now to **FIG. 4**, thereshown is yet another embodiment of the furnace and furnace distribution blower **14** of the present invention. As illustrated, the furnace distribution blower **14**, including the impeller **34**, is suspended above the bottom wall **56** by an intermediate wall **74**. The intermediate wall **74** includes the inlet bell **54** that is closely spaced from the inlet **50** for the impeller. The use of the intermediate wall **74** allows inlet air to flow into the furnace from either or both the bottom wall **56** and the sidewall **70**. This type of mounting arrangement increases the flexibility of the furnace.

[0042] Referring now to **FIG. 5**, thereshown is yet another alternate embodiment of the furnace and furnace distribution blower of the present invention. As illustrated in **FIG. 5**, the furnace distribution blower **14**, including the impeller **34**, is mounted to a support wall **76** suspended above the bottom wall **56** of the furnace housing. The support wall **76**, in turn, is joined to upstanding sidewalls **78**. The sidewalls **78** are preferably a continuous element that is scroll-shaped and has an open top **80**. Thus, as the impeller **34** rotates, the flow of air **82** is directed radially against the sidewalls **78** and out of the open top **80** and into contact with the heat exchanger **16**. The curved sidewall **78** has the advantages of increasing the efficiency of the backward curved impeller **34**, while creating room around the sides and bottom to allow air to be drawn into the furnace from both the bottom wall **56** and the sidewall **70**. Further, the open top **80** allows for the rails that furnace companies typically desire to use to slide in the blower. Further, the open top of the internal housing can be made from a single piece of sheet metal stamped on a large press.

[0043] The open topped scroll created by the sidewall **78** can also be created to increase the airflow upward toward the heat exchanger **16** of the furnace. As illustrated in **FIG. 5**, the bottom support wall **76** includes an inlet bell **84** to provide tight spacing between the inlet **50** of the impeller **34** to maintain the pressure within the open interior **58**.

[0044] Referring now to **FIGS. 6 and 7**, thereshown is a preferred embodiment of the present invention in which the furnace distribution blower is mounted within a support tray **86**. As shown, the support tray **86** is movable between an operating position (**FIG. 6**) and a service position (**FIG. 7**) in a manner to be described below. The support tray **86** includes a scroll-shaped outer wall **88** that is joined to a bottom wall **90**. As shown in **FIG. 8**, the bottom wall **90** receives each of the mounting arms **60** such that the impeller and motor are mounted above an inlet opening **92** formed in the bottom wall **90**. The inlet opening **92** is generally defined by the inlet bell **94**, as best shown in **FIG. 9**.

[0045] As illustrated in **FIGS. 6 and 8**, the support tray **86** is mounted within an open, lower region **95** defined by a series of spaced support posts **96** that form part of the furnace frame. Inlet air can be drawn into the opening **92** from the area surrounding the support tray **86**, as is clearly illustrated.

[0046] Referring back to **FIG. 6**, the draft inducer **20** is mounted within a recessed area **98** between the support posts **96**, as is conventional.

[0047] Referring now to **FIG. 7**, the impeller **34** is positioned within a scroll-shaped well **100** defined by the outer wall **88** of the support tray **86**. The outer wall **88** depends from a planar top surface **102** that is defined by a first side edge **104** and a second side edge **106**. The first and second side edges **104**, **106** are joined by a front edge **108**. The well **100** includes an upwardly sloping front wall **110** that, in combination with the scroll shaped outer wall **88**, directs the flow of air from the impeller **34** upward toward the heat exchanger of the furnace.

[0048] As can be understood in **FIG. 8**, the housing for the furnace includes a pair of spaced lower support rails **112** each mounted to the furnace housing and sized to support one of the side edges **104** or **106** of the support tray **86**. As can be understood in **FIGS. 7 and 8**, the entire support tray **86** can be pulled out from beneath the metallic grate **114** positioned between the heat exchanger tubes **116** for servicing or initial installation. The flange **118** on the front edge **108** limits the travel of the support tray **57**.

[0049] Referring now to **FIG. 9**, each of the support rails **112** includes an upstanding lip **119** that receives a U-shaped top edge **120** formed on the sidewall **88** of the support tray **86**. The sidewall **88** is integrally formed with the bottom wall **90** to generally surround the impeller **34**. As shown in **FIG. 9**, the mounting arms **60** support the drive motor **26** and impeller **34** across the inlet opening **92** defined by the inlet bell **94**. As the drive motor **26** rotates the impeller **34**, the cooling air is drawn into the impeller and is directed radially outward against the sloped front wall **110** of the support tray **86**.

[0050] Referring now to **FIGS. 10 and 11**, the support tray **86** of the first embodiment of the invention is shown. The support tray **86** includes the generally flat bottom wall **90** that supports the impeller **34**. The generally flat bottom wall **90** is joined to the upwardly sloping front wall **110** and the scroll shaped side wall **88**. When the impeller **34** rotates, cooling air is drawn into the impeller through the inlet bell **94** and is expelled radially outward against the outer wall **88**. The outer wall **88** is joined to the sloping front wall **100** to direct the flow of air upward toward the heat exchanger. Since the entire support tray **86** is configured to direct the flow of air upward toward the heat exchanger, the rotating impeller can be operated without the requirement of a housing. In the preferred embodiment of the invention, the support tray **86** is formed from a single sheet of stamped sheet metal in the configuration shown in **FIGS. 10 and 11**. As discussed previously, the support tray **86** includes the U-shaped side edges **104**, **106** that rest upon the side support rails **112** to allow the support tray **86** to be moved between the operating and services positions relative to the furnace.

[0051] Referring now to **FIGS. 12 and 13**, thereshown is an alternate version of the support tray **122**. In the alternate version of the support tray **122**, the impeller **34** is mounted at an angle relative to horizontal, as best seen in **FIG. 13**. The impeller **34** is mounted to the generally sloping bottom wall **124** of the support tray **122**. The sloping bottom wall **124** is joined to a generally vertical back wall **126** by a curved bottom end **128**. Likewise, the bottom wall **124** is joined to a pair of spaced sidewalls **130** to define the well **132** that contains the rotating impeller **34**. As the impeller **34** rotates, the flow of cooling air is directed radially outward against the pair of sidewalls **130**. The sidewalls **130** direct the flow of air into contact with the sloping bottom wall **124**. The bottom wall **124** includes an upwardly sloped front end **134** that directs the flow of cooling air upward into contact with the heat exchanger. It is anticipated that the sloping bottom wall **124** will aid in directly the flow of cooling air upward toward the heat exchanger for a more efficient operating system.

[0052] Referring now to **FIGS. 14 and 15**, thereshown is yet another embodiment of the support tray **136** and impeller **138** of the present invention. Like the support trays identified previously, the support tray **136** includes a pair of spaced side edges **140, 142** that allow the support tray **136** to be supported beneath the heat exchanger of a conventional furnace. As illustrated in **FIG. 15**, the furnace blower assembly includes the drive motor **144** connected to the impeller **138** by the drive shaft **146**. However, in the embodiment of the invention illustrated in **FIG. 15**, the impeller **138** has an increased operating height as compared to the previous embodiments of the invention. The increased operating height of the impeller **136** will aid in the amount of air flow created during the rotational operation of the impeller **138**.

[0053] As illustrated in **FIG. 14**, the support tray **136** includes a sidewall **148** that directs the flow of cooling air from the rotating impeller **138** toward the curved front end **150**. As best seen in **FIG. 15**, the curved front end **115** includes a relatively smooth curve that directs the flow of cooling air upward toward the heat exchanger.

[0054] As illustrated in **FIG. 15**, the support tray **136** includes the inlet bell **152** that is closely spaced with the inlet **154** for the impeller **138**. The drive motor **144** is mounted within the opening defined by the inlet bell **152** by the plurality of mounting arms **156**. Once again, the mounting arms **156** support the drive motor **144** within the inlet of the impeller **138** such that the flow of cooling air passes over the drive motor **144**.

[0055] Referring now to **FIGS. 16 and 17**, thereshown is yet another alternate embodiment of the support tray **158** and impeller **138**. In the embodiment of the invention illustrated in **FIG. 16**, the support tray includes a sidewall **158** that is created to direct a flow of cooling air out of the support tray **158** at the outlet **160**. Specifically, the sidewall **158** includes a scroll shaped bottom wall **162** that is upwardly curved to direct the flow of cooling air out of the support tray **158**. The curved bottom wall **162** starts at its lowest point defined by the bottom shoulder **164** and curves upward to its highest position **166** generally aligned with the outlet **160**. Once again, the sidewall **159** of the support tray **158** aids in directing the flow of air from the impeller **138** upward toward the heat exchanger of the furnace. As with all of the other embodiments previously discussed, the furnace blower assembly does not include a housing surrounding the impeller and the drive motor. Instead, the embodiment shown in **FIGS. 16 and 17** includes a support tray that is used to create a scroll shape that directs the flow of cooling air toward the heat exchanger.

[0056] As can be understood in the drawings, the scroll-shape of the support tray has the advantage of increasing the efficiency of the backward curved impeller **34** while creating room along the sides and bottom to allow air to be drawn into the support tray. Further, the open top of the support tray allows the support tray to be slid into and out of the furnace housing, as clearly illustrated.

[0057] In the preferred embodiment of the invention, each of the support trays is formed from a single piece of stamped sheet metal formed on a large press. However, it is contemplated that the support trays could be formed from other materials while operating within the scope of the present invention.

[0058] Although not shown in the Figures, it is contemplated that the furnace distribution blower could be configured as two backward curved impellers mounted back-to-back and having a horizontal drive motor mounted in one of the wheel inlets. The motor would be mounted to a bracket to provide an inlet area and have a shaft passing through both of the impellers such that inlet air could be drawn in from both sides of furnace housing.

[0059] Various alternatives and embodiments are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter regarded as the invention.

What is claimed is:

1. A furnace distribution blower comprising:

a drive motor having a drive shaft; and

an impeller having an inlet surrounding the drive motor, the drive motor being operable to rotate the impeller around the drive motor to draw a flow of air into the inlet of the impeller such that the impeller radially discharges the inlet air,

wherein the impeller is not surrounded by a housing.

2. The furnace distribution blower of claim 1 wherein the drive motor is mounted above an inlet opening of a furnace by a plurality of mounting arms.

3. The furnace distribution blower of claim 2 wherein the inlet of the impeller is closely spaced from an inlet bell of the furnace that defines the inlet opening of the furnace.

4. The furnace distribution blower of claim 1 wherein the impeller is a backward curved impeller having a plurality of backward curved impeller blades.

5. The furnace distribution blower of claim 4 wherein the inner blade tips of each impeller blade are spaced from the drive motor such that the impeller is rotatable about the drive motor.

6. The furnace distribution blower of claim 1 wherein the impeller is mounted to a sidewall of the furnace.

7. The furnace distribution blower of claim 1 wherein the impeller is mounted to a support wall spaced from the bottom wall of the furnace.

8. A furnace distribution blower for use in a furnace having a furnace enclosure including a pair of spaced sidewalls and a bottom wall, the distribution blower comprising:

a drive motor having a drive shaft;

an impeller having an inlet surrounding the drive motor, the drive motor being operable to rotate the impeller around the drive motor to draw a flow of air into the inlet of the impeller such that the impeller radially discharges the inlet air, wherein the impeller is not surrounded by a housing; and

a scroll-shaped outer wall surrounding the impeller, wherein the scroll-shaped outer wall has an open upper end and directs the flow of air from the impeller into the furnace enclosure

9. The furnace distribution blower of claim 8 further comprising a support wall spaced above the bottom wall of the furnace enclosure, the support wall including an inlet bell aligned with the inlet of the impeller.

10. A furnace distribution blower for use in a furnace having a heat exchanger and a support frame, the blower comprising:

a drive motor having a drive shaft;

an impeller having an inlet surrounding the drive motor, the drive motor being operable to rotate the impeller around the drive motor to draw a flow of air into the inlet of the impeller such that the impeller radially discharges the inlet air; and

a support tray positioned below the heat exchanger of the furnace and surrounding the impeller, the support tray including an inlet bell and a scroll-shaped outer wall to direct the flow of air from the impeller toward the heat exchanger.

11. The furnace distribution blower of claim 10 wherein the drive motor is mounted above the inlet bell formed in the support tray by a plurality of mounting arms.

12. The furnace distribution blower of claim 11 wherein the inlet of the impeller is closely spaced from the inlet bell of the support tray.

13. The furnace distribution blower of claim 10 wherein the impeller is a backward curved impeller having a plurality of backward curved impeller blades.

14. The furnace distribution blower of claim 13 wherein the inner blade tips of each impeller blade are spaced from the drive motor such that the impeller is rotatable about the drive motor.

15. The furnace distribution blower of claim 10 wherein the support tray is movable along the support frame of the furnace.

16. The furnace distribution blower of claim 15 wherein the support tray is movable between an operating position in which the impeller is positioned beneath the heat exchanger and a service position in which the impeller is removed from beneath the heat exchanger.

17. The furnace distribution blower of claim 15 wherein the support tray is formed from stamped metal.

18. The furnace distribution blower of claim 10 wherein the support tray includes an angled bottom wall, wherein the drive motor and impeller are mounted to the angled bottom wall such that the impeller is positioned at an angle relative to horizontal when the impeller is positioned beneath the heat exchanger.

19. The furnace distribution blower of claim 10 wherein the support tray includes a pair of spaced side edges that are slidably movable along the support frame of the furnace such that the support tray can be moved from an operating position in which the impeller is positioned beneath the heat exchanger and a service position in which the impeller is removed from the beneath the heat exchanger.

20. The furnace distribution blower of claim 10 wherein the support tray includes a scroll-shaped side wall that directs the flow of air from the impeller upward toward an outlet of the support tray.

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