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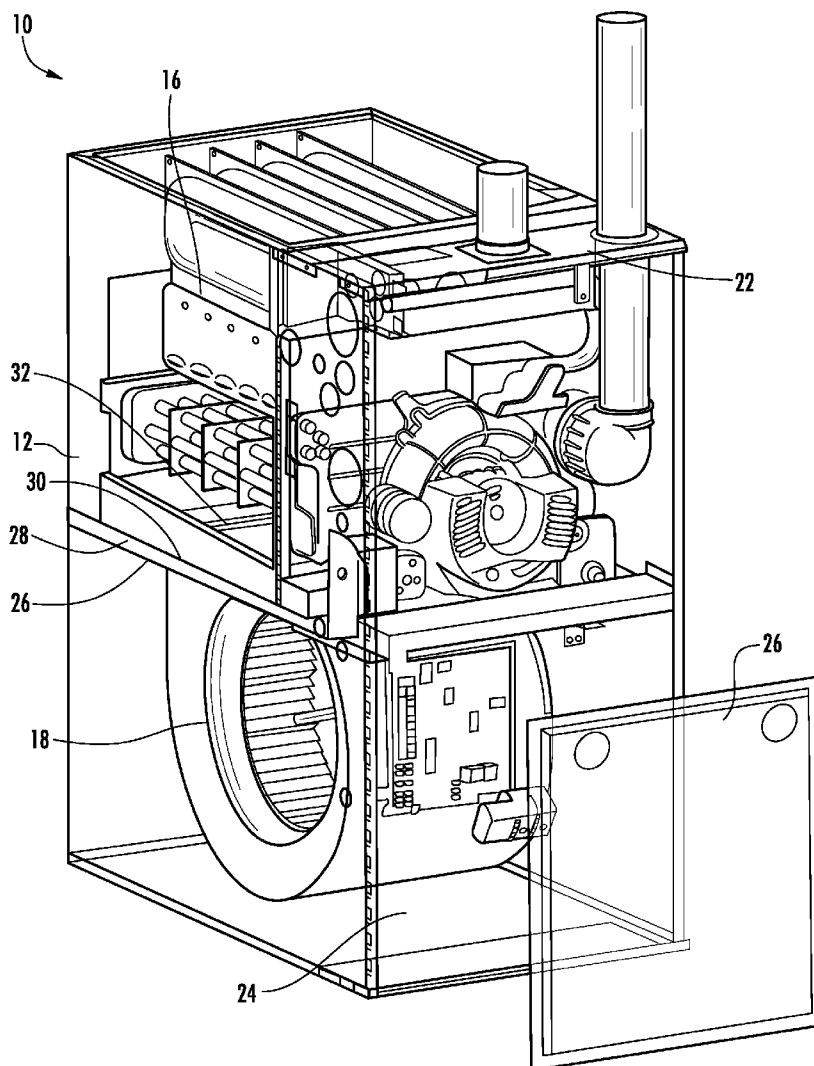
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(57) **ABSTRACT**

A furnace includes a cabinet having a top plate and a blower located in the cabinet. A blower shelf is located in the cabinet and has a first side supportive of the blower and a second side including one or more canted slide rails. A heat exchanger is located in the cabinet between the blower and the top plate and is securable to the one or more canted slide rails. The one or more canted slide rails are configured to allow removal of the heat exchanger from the cabinet along the canted slide rails without removal of the top plate from the cabinet.



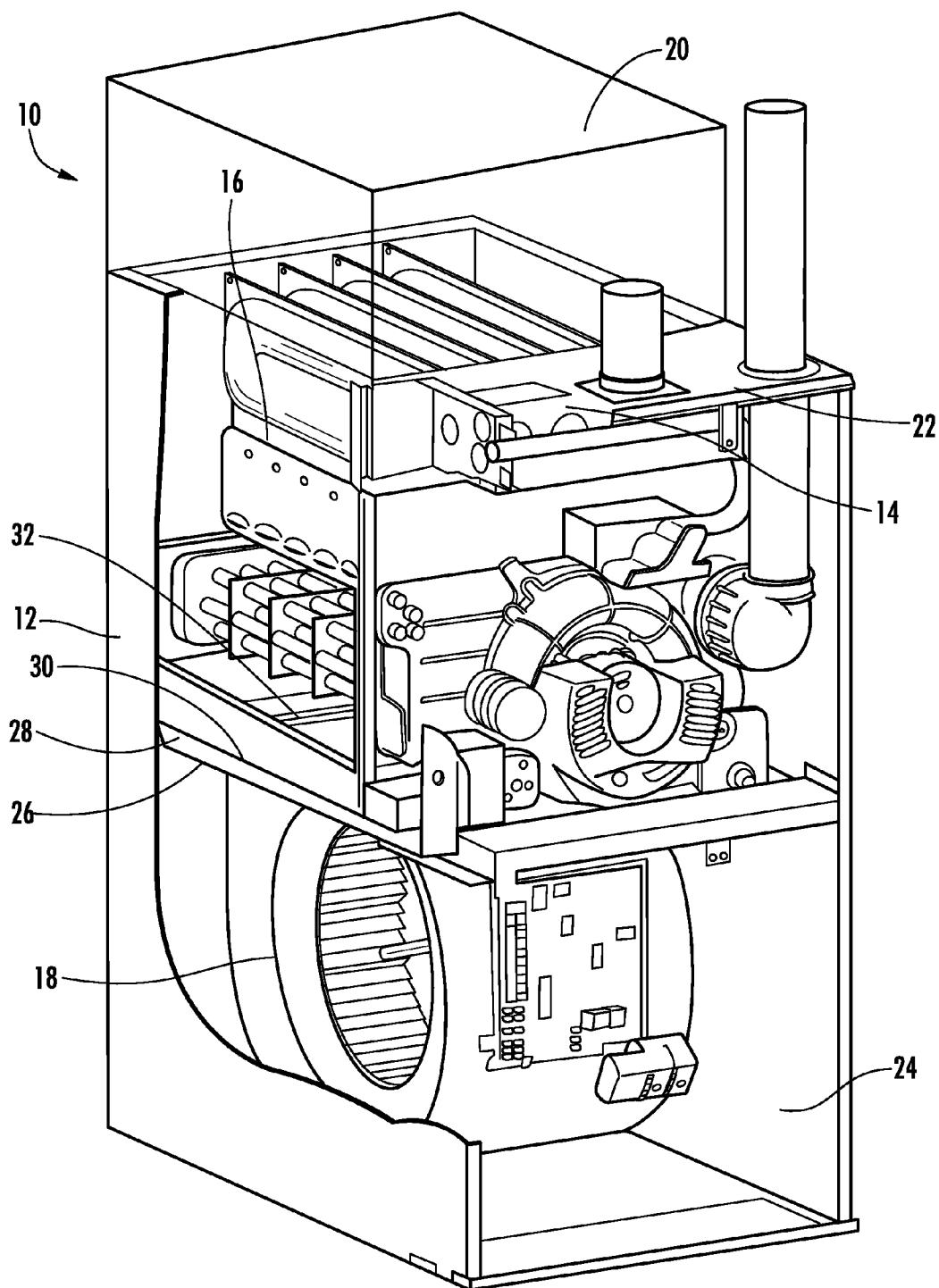


FIG. 1

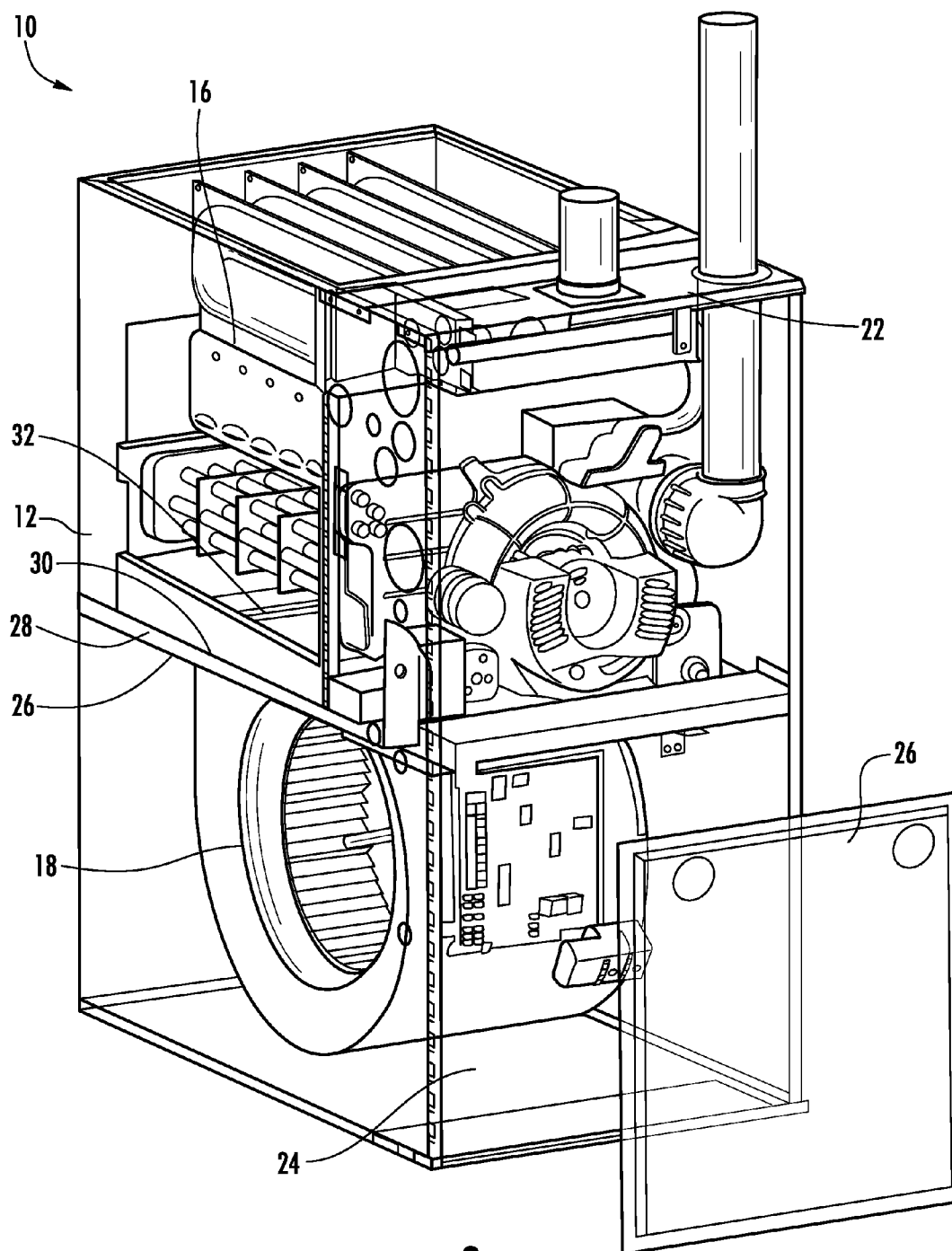
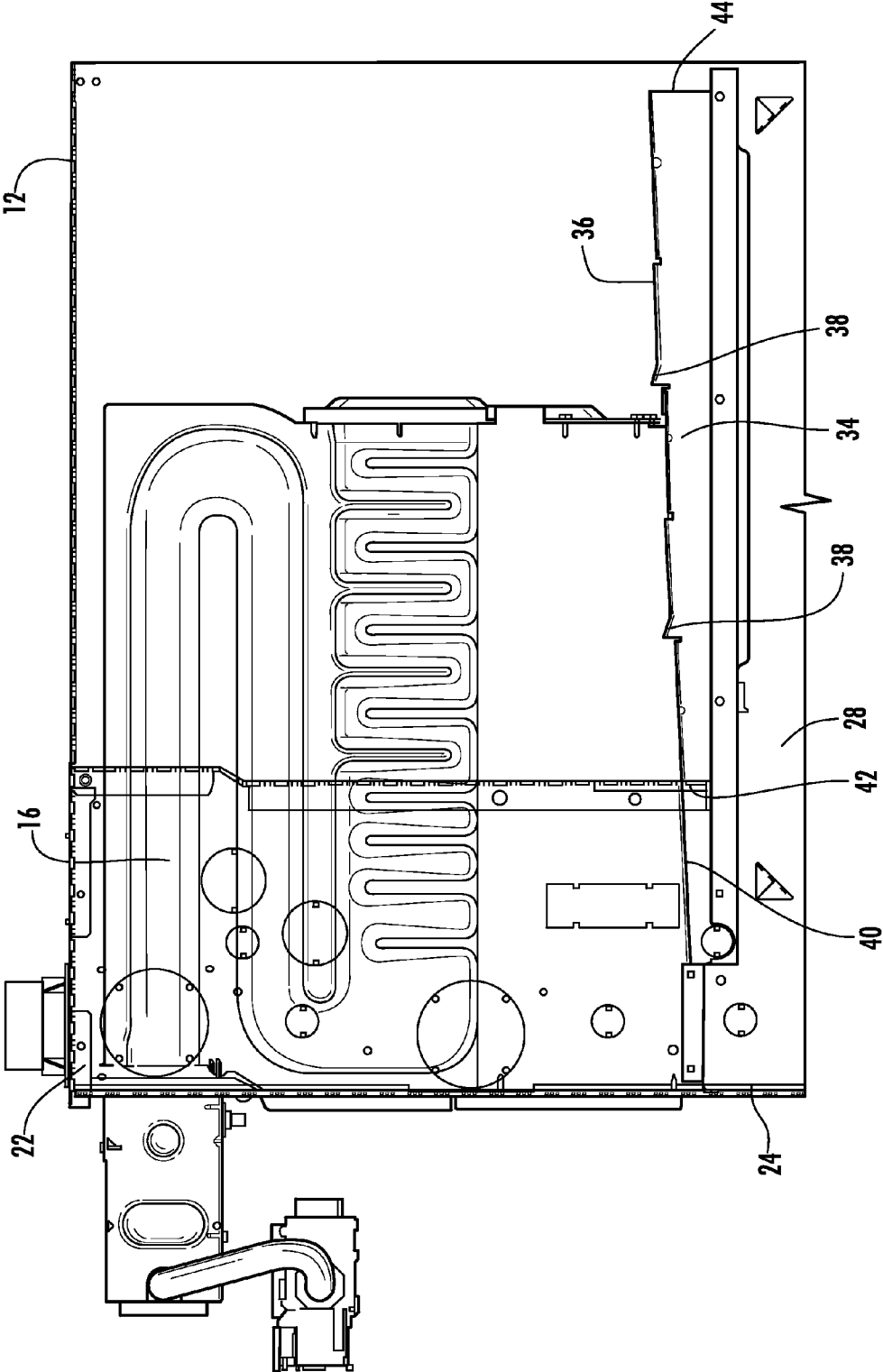


FIG. 2



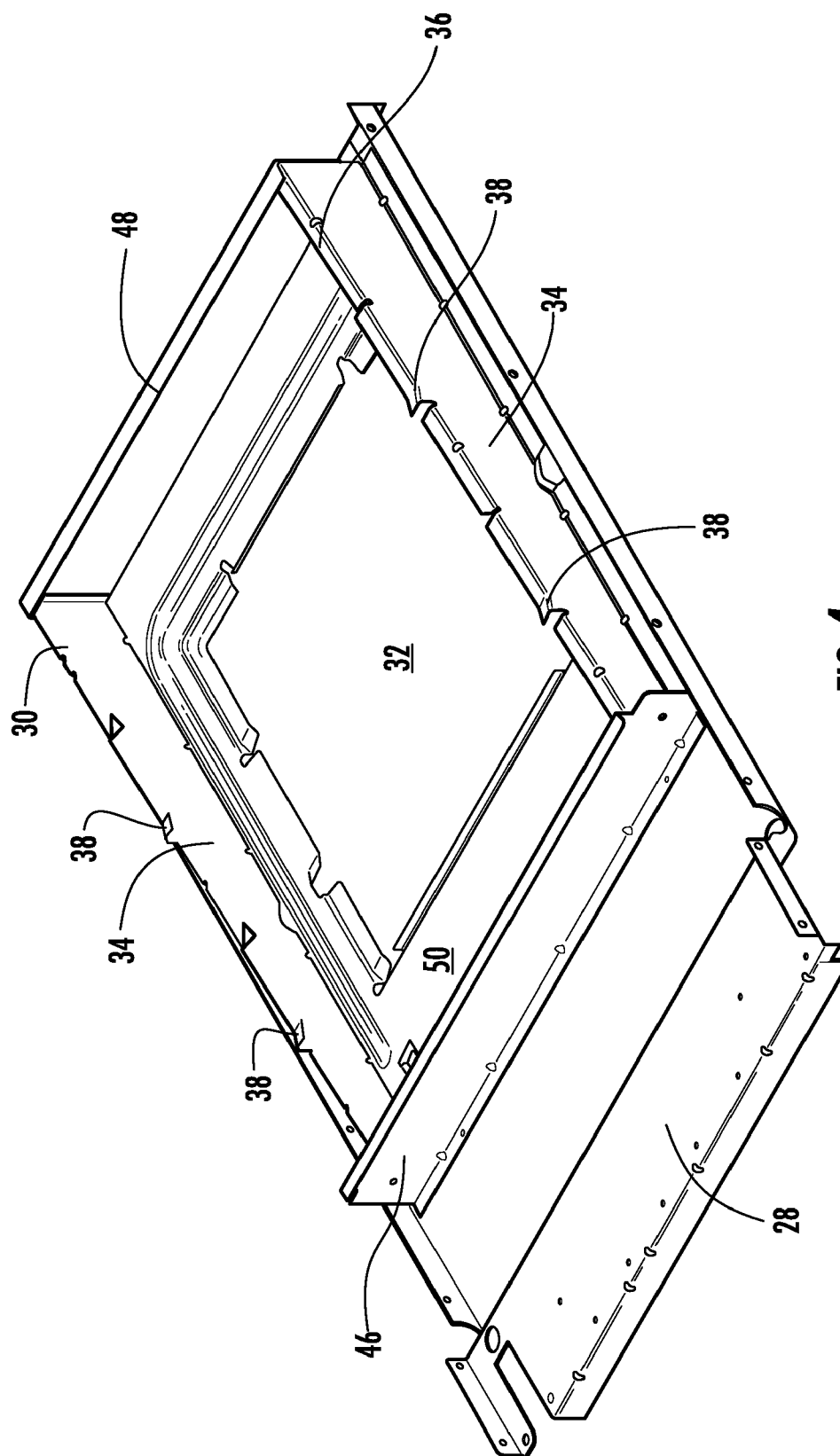
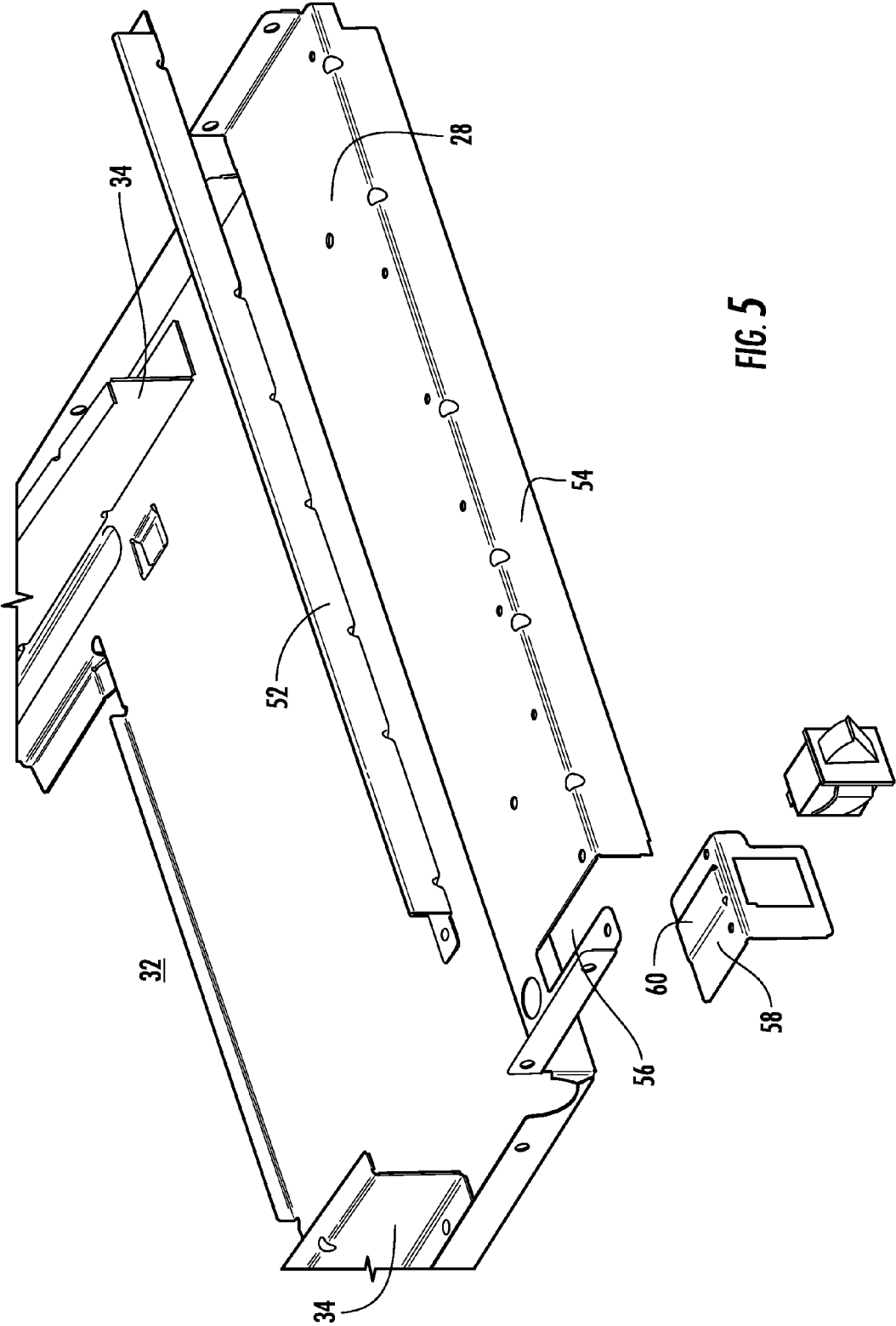


FIG. 4



FURNACE ASSEMBLY

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. provisional application, 61/390,913, filed Oct. 7, 2010, the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The subject matter disclosed herein relates to furnaces. More specifically, the present disclosure relates to a heat exchanger assembly of a furnace.

[0003] In a typical furnace, a fuel, for example, natural gas, is combusted in a burner. The combustion gas, flue gas, is routed through one or more heat exchangers which extract the heat therefrom. The flue gas heats the surface of the heat exchanger and air is blown across the exterior of the heat exchanger from a blower thus removing heat from the heat exchanger. The blower, burner and heat exchanger are all enclosed in a furnace cabinet. In a typical furnace cabinet, the heat exchanger is located between the blower and a top plate of the cabinet with ductwork and other components located at the top plate. To remove a heat exchanger bundle from the typical cabinet for service, the top plate must be removed, also requiring removal of the top plate and disconnection of the ductwork and other components. This procedure is time consuming and inefficient.

BRIEF DESCRIPTION OF THE INVENTION

[0004] According to one aspect of the invention, a furnace includes a cabinet having a top plate and a blower located in the cabinet. A blower shelf is located in the cabinet and has a first side supportive of the blower and a second side including one or more canted slide rails. A heat exchanger is located in the cabinet between the blower and the top plate and is securable to the one or more canted slide rails. The one or more canted slide rails are configured to allow removal of the heat exchanger from the cabinet along the canted slide rails without removal of the top plate from the cabinet.

[0005] According to another aspect of the invention, a blower shelf assembly for a furnace includes a blower shelf having a first side supportive of a blower of the furnace and one or more canted slide rails located at a second side of the blower shelf and supportive of a heat exchanger. The one or more canted slide rails are configured to allow removal of the heat exchanger from the cabinet along the canted slide rails without removal of a top plate from a furnace cabinet.

[0006] These and other advantages and features will become more apparent from the following description taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The subject matter, which is regarded as the invention, is particularly pointed out and distinctly claimed in the claims at the conclusion of the specification. The foregoing and other features, and advantages of the invention are apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

[0008] FIG. 1 is an isometric view of an embodiment of a furnace;

[0009] FIG. 2 is another isometric view of an embodiment of a furnace;

[0010] FIG. 3 is a cross-sectional view of an embodiment of a furnace with heat exchanger partially removed;

[0011] FIG. 4 is an isometric view of an embodiment of a blower shelf;

[0012] FIG. 5 is an isometric view of another embodiment of a blower shelf.

[0013] The detailed description explains embodiments of the invention, together with advantages and features, by way of example with reference to the drawings.

DETAILED DESCRIPTION OF THE INVENTION

[0014] Shown in FIG. 1 is an embodiment of a furnace 10. The furnace 10 includes a cabinet 12 in which the various components of the furnace 10 are located. A burner 14 combusts a fuel such as natural gas. Flue gas exits the burner 14 and flows through a heat exchanger 16. Air is blown from a blower 18 across the heat exchanger 16 which heats the air, and the air then flows into one or more ducts 20 affixed to a top plate 22 of the cabinet 12. As shown, the heat exchanger 16 is located between the blower 18 and the top plate 22. It is to be appreciated that while in FIG. 1 the cabinet 12 is oriented such that the blower 18 is at the bottom of the furnace 10 and the heat exchanger 16 is above the blower 18, the furnace cabinet 12 may be oriented in other directions such that, for example, the blower 18 is above the heat exchanger 16, the blower 18 is to the left of the heat exchanger 16, or the blower 18 is to the right of the heat exchanger 16. Further, as shown partially in FIG. 1, the cabinet 12 includes a cabinet opening 24 on one side to provide access to the components of the furnace 10 for installation, removal, service and/or replacement. Referring now to FIG. 2, the cabinet 12 includes one or more cabinet doors 26 to close across the cabinet opening 24 when desired.

[0015] The blower 18 is secured to a first side 26 of a blower shelf 28. The heat exchanger 16 is located at a second side 30 of the blower shelf 28. The blower shelf 28 includes at least one blower opening 32 to allow a flow of air from the blower 18 to flow through the blower opening 32 and across the heat exchanger 16 toward the one or more ducts 20.

[0016] Referring now to FIG. 3, the heat exchanger 16 is secured to the blower shelf 28 via one or a plurality of slide rails 34. The slide rails 34 have an engagement surface 36 to which the heat exchanger 16 engages and which may include one or more raised tabs 38 that engage one or more heat exchanger flanges 40 of the heat exchanger 16 to positively locate and secure the heat exchanger 16 in position relative to the blower shelf 28, the blower 18 and/or the cabinet 12. The engagement surface 36 is canted relative to the blower shelf 28 such that a first upright portion 42 of the slide rail 34 closest to the cabinet opening 24 is shorter than a second upright portion 44 further from the cabinet opening 24. The effect is that when removing the heat exchanger 16 from the cabinet 12, the heat exchanger 16 slides outwardly toward the cabinet opening 24 and downwardly away from the top plate 22 of the cabinet 12. The angle of the slide rail 34 is such that when sliding the heat exchanger 16 along the slide rail 34, the heat exchanger 16 clears the top plate 22. Thus, removal of the top plate 22, and detachment of the one or more ducts 20, is not required to remove or install the heat exchanger 16.

[0017] Referring now to FIG. 4, a front filler plate 46 and a rear plate 48 are secured to and/or located at the blower shelf 28 forming an enclosure 50 with the slide rails 34. When the heat exchanger 16 is installed and the front filler plate 46 and rear plate 48 are in place, the enclosure 50 acts as a sealed conduit for the flow of air from the blower 18 to the heat

exchanger 16. Leakage is reduced in the flow thereby making operation of the furnace 10 more efficient. In some embodiments, when removing or installing the heat exchanger 16 along the slide rails 34, the front filler plate 46 is first removed to provide clearance for the heat exchanger 16. When the heat exchanger 16 is secured to the slide rails 34, the front filler plate 46 is then installed.

[0018] In some embodiments, as shown in FIG. 5, a top front flange 52 is secured to the blower shelf 28, in some embodiments by a plurality of threaded fasteners (not shown). The top front flange 52, together with a bottom front flange 54 of the blower shelf 28 define a flat surface for the cabinet doors 26 to seal against and also for engagement of knobs (not shown) of the cabinet doors 26. The blower shelf 28 includes a wire harness slot 56 open to the front of the blower shelf 28. The placement of the wire harness slot 56 allows for removal of the heat exchanger 16 without needing to remove or disconnect a wire harness extending through the wire harness slot 56. To seal the wire harness slot 56, a door switch bracket 58 is installed at least partially in or across the wire harness slot 56. The door switch bracket 58 may include an embossment 60 that, when the door switch bracket 58 is installed results in a continuous flat surface across the front of the blower shelf 28. This provides a consistent surface for the top front flange 52 to seal to when the top front flange 52 is installed to the blower shelf 52.

[0019] The furnace 10 described herein, including the blower shelf 28, slide rails 34, front filler plate 46 and top front flange 52 provide easier serviceability of the heat exchanger 16 by making the heat exchanger 16 more easily installed to and removed from the cabinet 12, while also better sealing between the blower 18 and the heat exchanger 16 to make operation of the furnace 10 more efficient. Further, utilizing the engagement surface 36 and raised tabs 38 to locate and secure the heat exchanger 16 to the blower shelf 28 provides positive location for the heat exchanger 16 regardless of the orientation of the cabinet 12.

[0020] While the invention has been described in detail in connection with only a limited number of embodiments, it should be readily understood that the invention is not limited to such disclosed embodiments. Rather, the invention can be modified to incorporate any number of variations, alterations, substitutions or equivalent arrangements not heretofore described, but which are commensurate with the spirit and scope of the invention. Additionally, while various embodiments of the invention have been described, it is to be understood that aspects of the invention may include only some of the described embodiments. Accordingly, the invention is not to be seen as limited by the foregoing description, but is only limited by the scope of the appended claims.

1. A furnace comprising:
a cabinet having a top plate;
a blower disposed in the cabinet;
a blower shelf having a first side supportive of the blower and a second side including one or more canted slide rails; and
a heat exchanger disposed in the cabinet between the blower and the top plate and securable to the one or more canted slide rails, the one or more canted slide rails configured to allow removal of the heat exchanger from the cabinet along the canted slide rails without removal of the top plate from the cabinet.

2. The furnace of claim 1, wherein the one or more slide rails include one or more engagement features interactive

with one or more complimentary engagement flanges of the heat exchanger to secure the heat exchanger in the cabinet.

3. The furnace of claim 1, wherein the slide rails are canted toward a cabinet opening.

4. The furnace of claim 1, wherein the slide rails, a front filler plate located at the blower shelf and a rear plate secured to the blower shelf define a sealed enclosure for a flow of air from the blower toward the heat exchanger.

5. The furnace of claim 4, wherein the front filler plate is removable to allow for removal of the heat exchanger from the cabinet.

6. The furnace of claim 1, wherein the blower shelf includes an open-ended slot for routing of a furnace wiring harness.

7. The furnace of claim 6, including a door-switch bracket installed at least partially in or across the open-ended slot.

8. The furnace of claim 7, wherein the door switch bracket includes an embossment such that the door switch bracket is substantially flush with the blower shelf.

9. The furnace of claim 1, including a top front flange secured to the blower shelf providing a sealing surface for one or more cabinet doors.

10. The furnace of claim 1 wherein the blower shelf includes a bottom front flange providing a sealing surface for one or more cabinet doors.

11. A blower shelf assembly for a furnace comprising:

a blower shelf having a first side supportive of a blower of the furnace; and

one or more canted slide rails located at a second side of the blower shelf and supportive of a heat exchanger;

wherein the one or more canted slide rails are configured to allow removal of the heat exchanger from the cabinet along the canted slide rails without removal of a top plate from a furnace cabinet.

12. The blower shelf assembly of claim 11, wherein the one or more slide rails include one or more engagement features interactive with one or more complimentary engagement flanges of the heat exchanger to secure the heat exchanger in the cabinet.

13. The blower shelf assembly of claim 11, wherein the slide rails are canted toward a cabinet opening.

14. The blower shelf assembly of claim 11, wherein the slide rails, a front filler plate located at the blower shelf and a rear plate secured to the blower shelf define a sealed enclosure for a flow of air from the blower toward the heat exchanger.

15. The blower shelf assembly of claim 14, wherein the front filler plate is removable to allow for removal of the heat exchanger from the cabinet.

16. The blower shelf assembly of claim 11, wherein the blower shelf includes an open-ended slot for routing of a furnace wiring harness.

17. The blower shelf assembly of claim 16, including a door-switch bracket installed at least partially in or across the open-ended slot.

18. The blower shelf assembly of claim 17, wherein the door switch bracket includes an embossment such that the door switch bracket is substantially flush with the blower shelf.

19. The blower shelf assembly of claim 11, including a top front flange secured to the blower shelf providing a sealing surface for one or more cabinet doors.

20. The blower shelf assembly of claim 11 wherein the blower shelf includes a bottom front flange providing a sealing surface for one or more cabinet doors.