Feb. 25, 1969 J. H. EUBANKS 3,429,307

AIR SUPPLY AND VENT SYSTEM FOR FURNACE

Filed July 19, 1967 Sheet 1 of 2

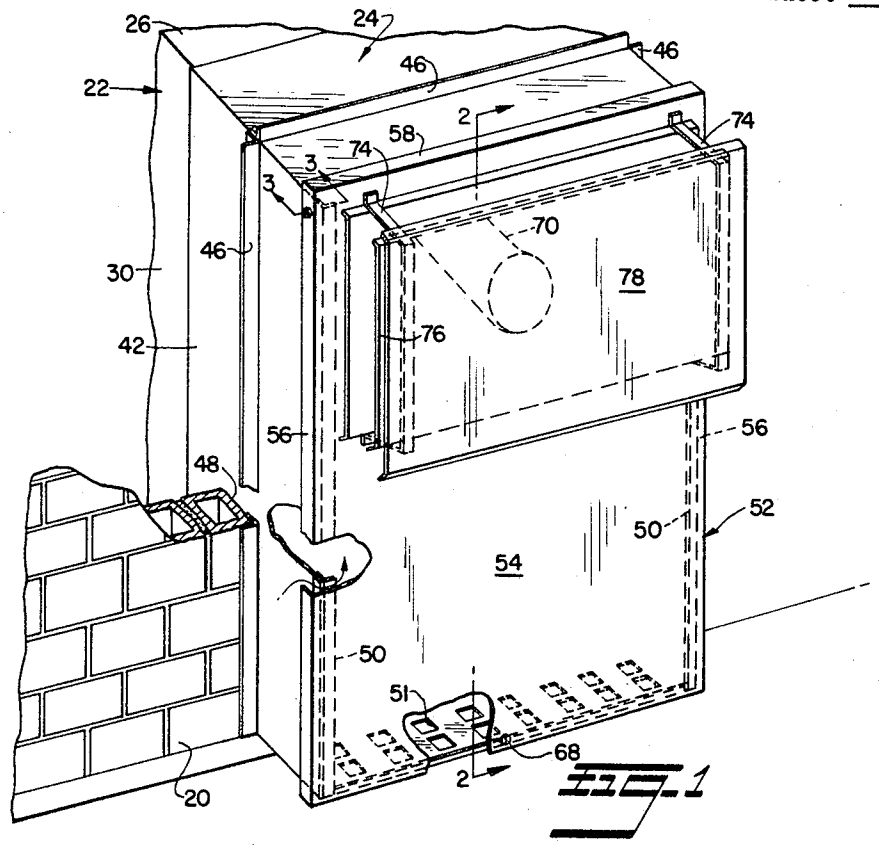

FIG. 1

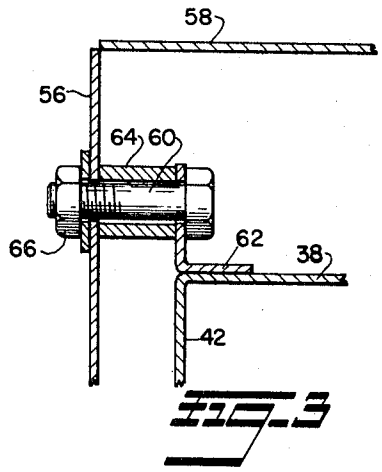

FIG. 3

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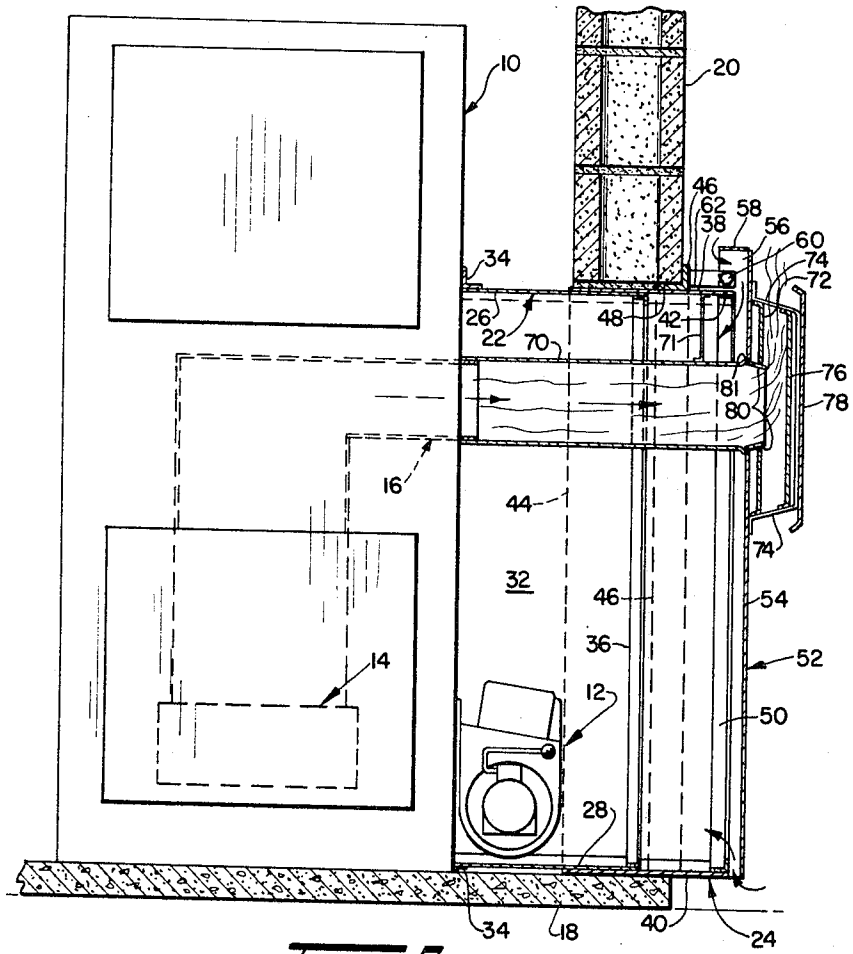

FIG. 2

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United States Patent Office 3,429,307
Patented Feb. 25, 1969

3,429,307

AIR SUPPLY AND VENT SYSTEM FOR FURNACE

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Filed July 19, 1967, Ser. No. 654,555
U.S. Cl. 126—94 5 Claims
Int. Cl. F24c 5/00, 3/00

ABSTRACT OF THE DISCLOSURE

An air supply and vent system for a furnace extending through the wall of the room in which the furnace is positioned. Fresh air is supplied through a peripheral opening formed by an access plate movably mounted on the outer end of a large air duct through which the flue for the combustion products extends.

BACKGROUND OF THE INVENTION

This invention relates to domestic furnaces and more particularly to improvements in through-the-wall duct systems for supplying combustion air to the furnace and delivering combustion products to the exterior of the dwelling or building. A prior through-the-wall system is disclosed in U.S. Patent 2,632,435 and somewhat similar systems in which the air duct and combustion products flue extend through a window opening are disclosed in U.S. Patents 2,582,066 and 2,160,883.

Many prior proposals of this general type are of limited utility since they are applicable only to a furnace of special design. Further, they are relatively complex and costly and require expensive specialty sheet metal fabrication. For this and other reasons they have not come into general use and the construction of air supply and vent systems for domestic central heating furnaces continue to follow a practice which is as old as central heating itself. Thus, in accordance with conventional practice, combustion air is supplied directly from the interior of the dwelling which the furnace serves. Surprisingly, the air supply to the furnace contains sufficient dust, lint, animal hair and other dirt to seriously contaminate the combustion air and, particularly in the case of oil burning furnaces, has caused inefficient combustion with resulting soot and smoke and has greatly increased the frequency of required cleaning and repair. Also, the overall cost of the furnace installation has been relatively high due to the requirement of a conventional flue or chimney system which is not only relatively expensive initially but consumes a substantial amount of valuable interior space.

SUMMARY OF THE INVENTION

With the foregoing considerations in mind it is a principal purpose and object of the present invention to eliminate the foregoing problems and provide a relatively inexpensive, simple and yet effective combined air supply and vent system applicable to a wide variety of conventional central heating furnaces.

In attaining this and other objects, the present invention provides a combined air supply and combustion products vent system which extends from a conventional central heating furnace through the exterior wall of the room in which the furnace is positioned and terminates at its outer end in a hinged or movable panel of sufficient size to provide access to the furnace for cleaning, maintenance and repair.

It is, accordingly, a further object of the present invention to provide an improved air supply and vent system for furnaces which permits the furnace to be serviced from the exterior of the building.

It is a further object of the present invention to provide an improved air supply and vent system for a domestic furnace which eliminates variations in the draft causes in prior conventional systems by atmospheric conditions, wind shifts and down drafts thereby producing increased combustion efficiency and eliminating smoke, particularly from oil burning furnaces.

It is also an object of the present invention to provide improved air supply and vent systems for furnaces which reduce the overall cost of the building in which they are installed, reduce the total space requirements for furnace equipment and which substantially reduces interior noise and odors.

Additional objects and advantages of the present invention will become apparent as the description proceeds in connection with the accompanying drawings.

THE DRAWINGS

FIGURE 1 is a perspective view of the projecting outer portion of the combined air supply and combustion products vent system of the present invention;

FIGURE 2 is a vertical section taken along line 2—2 of FIGURE 1 also showing a conventional furnace; and

FIGURE 3 is a fragmentary enlarged view taken along line 3—3 of FIGURE 1 showing details of construction.

PREFERRED EMBODIMENT

While the invention is of general utility and wide application it will be shown herein as utilized with an essentially conventional furnace indicated generally at **10** equipped with an oil burner **12**. The combustion chamber, indicated diagrammatically at **14**, is vented by a flue pipe **16**, the flanged projecting outer end of which is normally connected by an elbow fitting to a vertical flue leading to a chimney of conventional construction extending through the roof of the dwelling. The usual warm air or hot water supply and return ducts have been omitted for clarity. Preferably, though not necessarily, the furnace **10** is supported on the ground floor of the dwelling, for example, on a concrete slab **18** and to conserve space is positioned as closely as possible to an exterior building wall **20**.

Preferably, the combined air supply and vent system of the present invention is fabricated from sheet metal and is of generally rectangular form. To increase its versatility and permit standardization of the parts it is preferably of telescoping construction. In the illustrated embodiment, the principal structure comprises an inner duct assembly indicated generally at **22** telescoped within an outer duct assembly **24**. The inner duct assembly comprises top, bottom and side panels **26**, **28**, **30** and **32**, respectively, suitably secured together to form an essentially sealed structure. At its inner end, the duct assembly **22** is secured to the furnace **10** by angle irons **34** which preferably extend entirely around the periphery of the duct assembly **22** to provide secure sealed attachment of the duct to the furnace.

As most clearly appears from FIGURE 2, the duct assembly **22** extends from a point above the outlet of the flue **16** to a point below the burner **12**. The duct **22** is of sufficient width to provide adequate space at the opposite ends of the burner **12** for service, inspection and repair. At its outer end the duct assembly **22** is provided with a series of inwardly projecting angle irons **36** to increase the structural rigidity of the duct.

The outer duct assembly **24** is of similar construction and comprises top, bottom and side sheet metal panels **38**, **40**, **42** and **44**, respectively, which telescope with a close sliding fit around the outer portion of the inner duct assembly **22**. Ordinarily, it is not necessary to secure the outer duct **24** positively to the inner duct, since the weight of the unit and frictional engagement will hold the parts in their assembled position. Preferably, however, the outer duct is provided with a peripheral angle iron frame

46 which fits snugly within the opening 48 in the building wall 20. Grout or similar sealing compound may be provided to insure a weather tight joint at this point. To provide structural rigidity the outer end of the outer duct assembly is lined with angle irons 50. Drain openings 51 are provided in the bottom wall 40 to dispose of any accumulated moisture.

The outer end of the duct is closed by cover assembly 52, the main portion of which is formed by a panel 54 having rearwardly turned side and top flanges 56 and 58.

The assembly 52 is hinge mounted at its upper end by a pair of aligned pins 60 carried by flanges 62 rigidly mounted on the top wall of the outer duct assembly 24. The pins 60 extend through spacers 64 against the outer ends of which the side flanges 56 of the panel 52 are held by nuts 66. The spacers 64 are preferably approximately an inch long so as to provide a gap of this width from top to bottom between the side edges of the cover assembly 52 and the side edges of the outer duct structure 24. The panel is so mounted by the pins 60 as to provide a similar opening between the top flange 58 and the top wall of the duct assembly 24. Further, as shown particularly in FIGURE 2, the panel 54 is spaced from the front of the duct assembly 24, the spacing thus providing an air opening of substantial size extending around the periphery of the cover assembly 52. At its bottom edge the cover assembly 52 is provided with a lock 68 to prevent enry into the duct by unauthorized personnel.

The combustion products are vented through a flue pipe 70, the inner end of which is sealingly secured to the projecting end of the furnace flue outlet 16. A strap 71 carried by the top duct panel 38 supports the flue pipe just inwardly of its outer end which extends freely through the panel 54 and a heat shield 72 secured by a pair of straps 74 to the panel 54. The straps 74 also carry additional outer heat shields 76 and 78 which are spaced apart to provide a free flow of cooling air between them. Thus, the products of combustion exhaust into the space provided between the two shields 72 and 76, the former prevending overheating of the panel 54 and the latter preventing overheating of the outer panel 78. Thus, all the exposed parts of the apparatus always remain cool. To facilitate the swinging movement of the cover assembly 52, the outer end of the flue pipe 70 is tapered as at 80 outwardly of a shoulder 81 against which the panel 54 abuts when the door is closed.

The operation of the furnace 10 is entirely conventional, combustion air being supplied through the space between the marginal flanges and the bottom edge of the panel assembly 52 and the adjacent duct structure 24, this space being large enough to permit the free flow of the necessary combustion air but being small enough and sufficiently sheltered to prevent the entry of foreign matter such as leaves, dirt or moisture. The combustion products exit into essentially the same region from which the combustion air is drawn so that pressure changes in the combustion air are immediately reflected at the outlet of the flue pipe 70, thus materially reducing the danger of backfire. The location of the combustion products outlet and the construction of the sheltered inlet are such as to eliminate any possibility of contamination of the incoming air.

When inspection or repair of the burner 12 is required it is not necessary for the serviceman to enter the dwelling. Instead the cover 52 is swung by its hinge to an elevated position which provides free access to the burner and associated components and at the same time provides a shield for the serviceman.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. A combined air supply and vent system for a furnace positioned adjacent an exterior building wall, said furnace having a burner and a flue outlet, comprising, a duct extending from said furnace through said wall and enclosing said burner and said flue outlet, a flue pipe extending from said flue outlet through said duct, and a movable cover assembly covering the outer end of said duct, said cover assembly and the outer end of said duct being spaced apart to provide a substantially annular air inlet opening, said flue pipe extending through at least a portion of said cover assembly to isolate the products of combustion issuing from said flue pipe from the interior of said duct.

2. The combination according to claim 1 wherein said cover assembly comprises a main panel, at least a portion of the periphery of which projects beyond the edges of said duct assembly, said projecting portions of said panel having flanges extending over the adjacent walls of said duct is spaced relation thereto to provide said air inlet opening.

3. The combination according to claim 1 wherein said duct assembly is of sufficient size to permit the entry of personnel into said duct for service of said furnace, and said cover assembly is hinged at its upper edge to said duct assembly whereby said cover may be swung to an open position to substantially completely expose the outer end of said duct.

4. The combination according to claim 1 wherein said cover assembly comprises a main body panel essentially coextensive with the outer end of said duct, a heat shield assembly carried by the outer surface of said panel, the outer end of said flue pipe extending through said main body panel into said heat shield assembly.

5. The combination according to claim 4 wherein said heat shield assembly comprises a first plate spaced outwardly of said main body panel, a second plate spaced outwardly of said first plate, said first and second plates forming a flue section and said flue pipe extending through said first plate into said flue section, and a third plate spaced outwardly of said second plate to provide an outer relatively cool cover for said heat shield assembly.

References Cited

UNITED STATES PATENTS

1,541,512	6/1925	Kniseley.
2,830,574	4/1958	Shafer.
3,028,843	4/1962	Carlson et al.
3,056,400	10/1962	Hammersley et al.

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U.S. Cl. X.R.

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