Feb. 1, 1955 W. C. COLEMAN 2,701,103

AIR SUPPLY FOR HOT AIR FURNACES

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Fig. 1

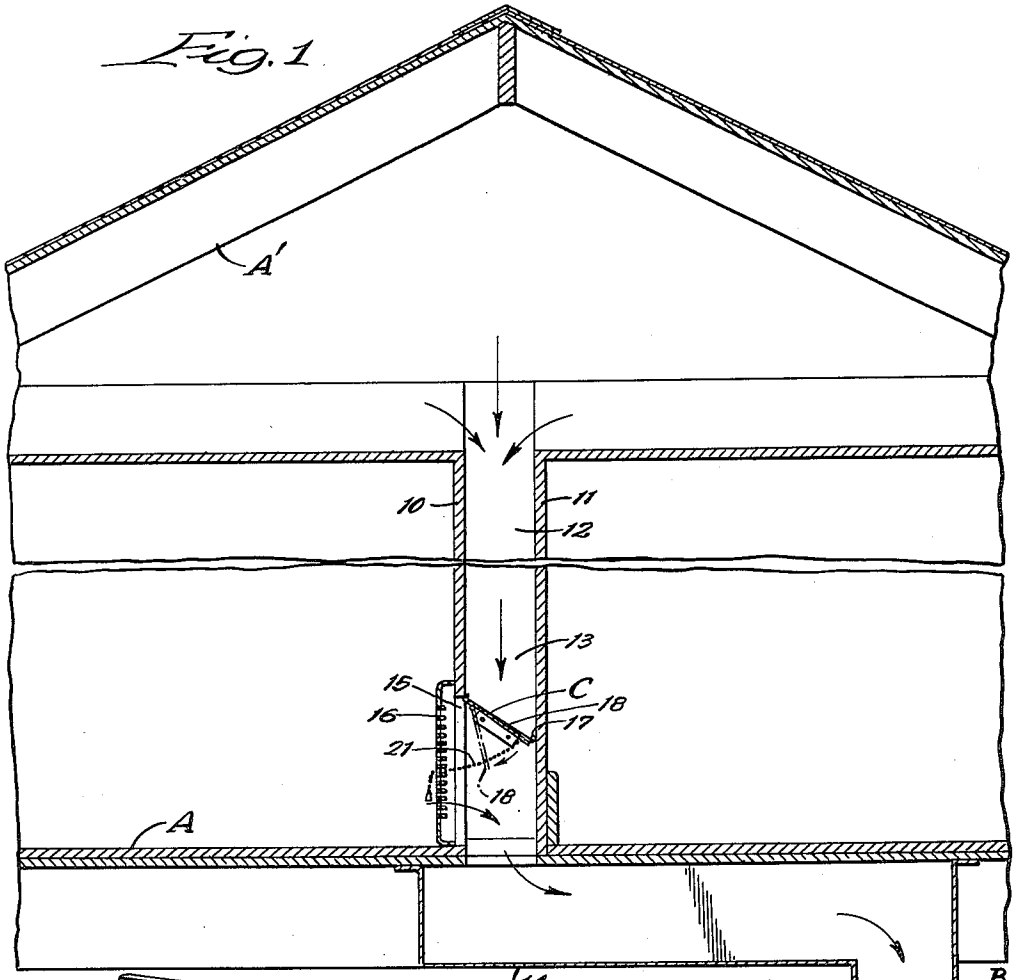


Fig. 2

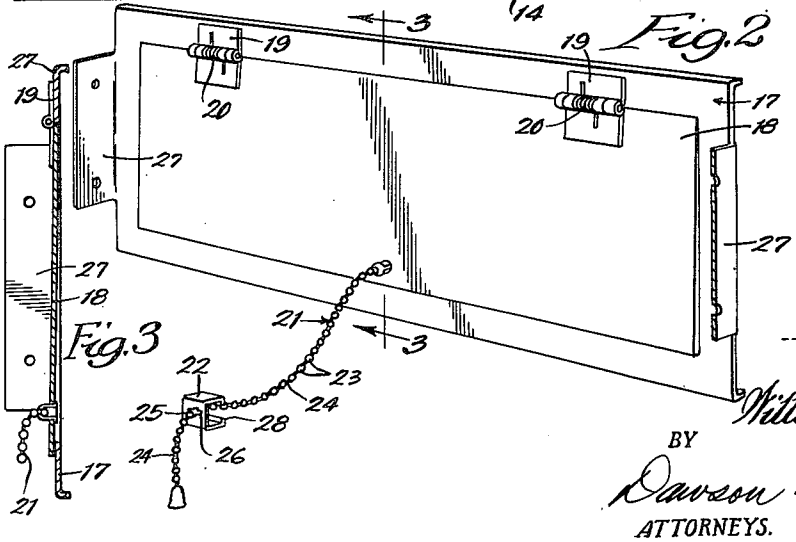


Fig. 3

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AIR SUPPLY FOR HOT AIR FURNACES

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This invention relates to the air supply for a hot air furnace, and more particularly to the supply of air from the attic and from a room in combined volumes to the air inlet side of a hot air furnace.

It is common practice to return air from rooms in a house and to add to such air at the furnace a certain amount of cold or fresh air from the exterior of the house. In the wintertime when the heating system is most needed, the air drawn in from the outside of the building is usually quite cold and the volume needed is necessarily restricted in amount. Further, the air drawn in from the outside is often charged with dust or other suspended particles, smoke, soot and other foreign particles.

I have discovered that the attic provides a source of relatively clean air which may be utilized in the supply of air to the cold air return inlet of the furnace because of the tendency of dust and other particles suspended within the air to settle from the air in the relatively quiescent space found in the attic. Further, due to the unavoidable leakage of heat into the attic space, there is recovered from the attic air so circulated a certain amount of such otherwise lost B. t. u. units. I have further discovered that by utilizing already prepared spaces in the walls of the house that such air from the attic can be returned and accurately combined with a desired volume of air from a room by employing a very simple and compact structure that can be easily and inexpensively installed within the studding space of the house.

An object of the invention is to provide means for effectively supplying air from the attic and a room in selected relative volumes to the inlet of an air heating device. Another object is to provide means for drawing attic air downwardly and mixing the same with room air and returning the mixture to the cold air inlet of a hot air furnace which heats the house. A further object is to provide a method for heating a house by utilizing attic air. Yet another object is to provide a structure adaptable to the stud space of a house for effectively mixing attic air with room air for return to heating equipment for supplying the heat to the house. A still further object is to provide improved means for controlling the relative volumes of attic air and room air returns to the furnace. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated in a single embodiment by the accompanying drawing, in which—

Figure 1 is a broken vertical sectional view of a house equipped with apparatus and means embodying my invention; Fig. 2, a perspective view of the control valve or damper employed; and Fig. 3, a vertical sectional view, the section being taken as indicated at line 3—3 of Fig. 2.

In the illustration given, A designates a house equipped with an attic A'; B designates a portion of a hot air furnace provided with an inlet B'; and C designates means for controlling the relative amount of attic air and room air returned to the furnace inlet.

The house A may be of any type or construction. It may be provided with any type of interior wall structure and the conduits employed for bringing attic air downwardly may be inside or outside of such interior walls.

In the specific illustration given, the house shown is provided with hollow walls of a commonly used type in which studs are placed at spaced intervals between two walls to provide therein a vertical space commonly known as the studding space. In the illustration given, one of the wall panels is designated by the numeral **10**

and the other by the numeral **11**, and the stud extending between the walls is designated by the numeral **12**. It will be understood that there are a plurality of such studs at spaced intervals and which provide therebetween and with the walls **10** and **11**, enclosed vertical passages. In the illustration given, I employ one of the studding passages designated by the numeral **13** and open this passage so that it will communicate at the upper side with the attic A' and at the lower side with the basement space. The building may be of one or several stories, and the passage **13** will extend all the way from the basement to the attic.

In the basement I provide a duct **14** which carries the air to the inlet B' of hot air furnace B.

In one of the rooms of the house I provide an opening **15** through the wall **10** and enclose the port thus formed with a grill **16** which may be of any suitable construction. The passage **13** thus has its upper end opening into the attic A' and at an intermediate point a port **15** opening into one of the rooms. In order to control the relative amounts of air that flows from the attic and the amount of air that flows from the room into the return duct **14**, I provide valve or damper apparatus which will now be described.

In the studding space **13**, I place a frame member **17** having an opening therein controlled by the valve plate or damper **18**. The valve plate is supported by hinges **19** upon frame **17** and springs **20** urge the valve plate **18** normally toward closed position. When the plate is in closed position, air from the attic is excluded from entering the return duct **14** and all the air flowing into duct **14** will be from the room in which the grill control port **15** is located.

The valve plate **18** is equipped at its lower and free side with a chain **21** which passes through a slotted fitting **22** secured upon the grill **16**. In the specific illustration given, the chain **21** consists of balls **23** connected by narrow necks **24**. The fitting **22** is provided with an enlarged portion **25** through which the balls easily slide, and with narrow portions **26** through which the balls will not slide but which receive the narrow necks **24** so as to lock the chain in a selected position. The narrow portion or portions **26** of the slot may extend in a horizontal plane laterally of the opening **25**, or in a vertical plane below the opening **25**.

The frame **17** may be equipped with lateral flanges **27** for securing the frame **17** at any desired angle to the walls **10** and **11**.

The frame **17** may be advantageously secured within the space **13** at the inclination illustrated in Fig. 1 so that the valve plate **18** as it swings downwardly to open the passage **13** also is effective in partially closing the air port **15**. Thus, the single valve plate is effective in reducing the quantity of air flowing through port **15**, while simultaneously opening the passage through the plate **17**.

The fitting **22** is provided with forwardly-extending sides having upwardly-extending ledges **28**. With this structure, the fitting can be attached to the grill **16** at any selected point by pressing the side walls over two of the spaced vanes of the grill so that the ledges **28** extend slightly over the inner edges of the vanes, thus securing the fitting in place. Similarly, by slightly spreading the sides of the fitting, it may be readily withdrawn from the grill.

Operation

In the operation of the method and structure shown, the chain **21** may be drawn forwardly to open the valve plate **18** to any desired extent, and when the chain is released or drawn into the narrow portion **26** of the slot, the valve plate **18** will be held in the selected position against the force of springs **20**. Air will then flow from the attic downwardly through space **13** and will combine with the air drawn from the room through that portion of the port **15** which is not restricted by the downward movement of valve plate **18**. The combined volumes of air then pass through the duct **14** to the return inlet B' of air furnace B. Air passes from the air furnace in the usual manner through ducts supplied to the various parts of the house. I prefer to employ an air furnace and heating ducts therewith arranged in

the order shown in the co-pending application of Jack W. Kice, Serial No. 760,572, filed July 12, 1947, and the application of Jack W. Kice, Serial No. 760,573, filed July 12, 1947.

The valve **18** may be released when desired to exclude all attic air so that room air only is recirculated, or the valve plate **18** may be moved to any selected position for apportioning the volume of attic air which is to be mixed with the room air.

Since the attic provides a large, quiescent chamber in which dust and other particles tend to settle from the air therein, I find that a source of clean air and air which contains some heat units as a result of leakage of heat to the attic is thus provided. Such air may be effectively returned at little cost and combined with any desired amount of room air, thus effecting a recovery of such heat units which would be otherwise lost while, at the same time, protecting the heating apparatus against particulate and contaminating material found in outside air. If desired, the attic may be equipped with filters for excluding such particulate matter from the attic itself. However, it is usually found that the large space of the attic is ample to take care of the incoming air and to provide a settling therefrom of the bulk of particulate matter therein.

The valve plate **18** may be operated by any desired means, such as, for example, a solenoid, pneumatically or hydraulically operated devices, and may be controlled either automatically or by hand. In the illustration given, a simple means for manual operation is shown.

While in the specific illustration given I have shown a specific embodiment in great detail for the purpose of illustrating the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In heating apparatus for a house equipped with an attic and hot air furnace having a cold air return inlet, said house having also a hollow interior wall with studs therein providing a vertical passage, said vertical passage being in communication with the attic space, a duct leading from the lower portion of said vertical passage to said furnace return inlet, said passage being provided at an intermediate point with a port providing communication with a room of said house, and a movably mounted valve supported in said passage above said port for controlling the flow of air from said attic.

2. In heating apparatus for a house equipped with an attic and hot air furnace having a cold air return inlet, said house having also a hollow interior wall with studs therein providing a vertical passage, said vertical passage being in communication with the attic space, a duct leading from the lower portion of said vertical passage to said furnace return inlet, said passage being provided at an intermediate point with a port providing communication with a room of said house, a movably mounted valve supported in said passage above said port for controlling the flow of air from said attic,

said valve being equipped with a valve plate hingedly mounted in said passage adjacent the upper end of said port for movement downwardly across a portion of said port, spring means normally urging said valve toward closed position, preventing the downward flow of attic air, and means for drawing the valve plate downwardly toward open position and for locking the valve plate in any selected angular position.

3. In heating apparatus for a house equipped with an attic and hot air furnace having a cold air return inlet, said house having also a hollow interior wall with studs therein providing a vertical passage, said vertical passage being in communication with the attic space, a duct leading from the lower portion of said vertical passage to said furnace return inlet, said passage being provided at an intermediate point with a port providing communication with a room of said house, a movably mounted valve supported in said passage above said port for controlling the flow of air from said attic, said valve being equipped with a valve plate hingedly mounted in said passage adjacent the upper end of said port for movement downwardly across a portion of said port, spring means normally urging said valve toward closed position, preventing the downward flow of attic air, and means for drawing the valve plate downwardly toward open position and for locking the valve plate in any selected angular position, said means comprising a grill over said opening equipped with an apertured plate, and a chain secured to said valve plate and receivable through the aperture of said plate, said aperture being restricted on one side to lock a constricted portion of the chain therein.

4. In apparatus for conditioning air for a house equipped with an attic and having an air treating unit equipped with a cold air return inlet, said house having also a hollow interior wall with studs therein providing a vertical passage, said vertical passage being in communication with the attic space, a duct leading from the lower portion of said vertical passage to said air inlet, said passage being provided at an intermediate point on the level of a room with a port providing communication with said room of said house, and a movably mounted valve supported in said passage above said port for controlling the flow of air from said attic.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 20,397	Germonprez	June 8, 1937
353,111	Bailey	Nov. 23, 1886
657,049	Auer	Aug. 28, 1900
2,127,095	Strong	Aug. 16, 1938
2,246,602	Schultz et al.	June 24, 1941
2,247,896	Wagner	July 1, 1941
2,300,848	Shelton	Nov. 3, 1942
2,364,220	Johnson	Dec. 5, 1944
2,468,234	Ratcliff	Apr. 26, 1949
2,559,869	Guy	July 10, 1951