United States Patent [19]

Otsuka et al.

[11] **3,800,686**

[45] **Apr. 2, 1974**

[54] **AIR SUPPLY AND EXHAUST DUCT SYSTEM IN A BUILDING**

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[22] Filed: **Aug. 29, 1972**

[21] Appl. No.: **284,755**

[30] **Foreign Application Priority Data**

Mar. 28, 1972 Japan 47-31016

[52] **U.S. Cl.** **98/32,** 98/33

[51] **Int. Cl.** **F24f 13/00**

[58] **Field of Search** ..... 98/32, 33 A, 33 R

[56] **References Cited**

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[57] **ABSTRACT**

Air supply and exhaust duct system for a combustion apparatus having upper and a lower parallel ducts passing horizontally through a building at the upper and the lower part thereof and a vertical duct connecting the upper and lower horizontal ducts within the building and having an "I" shape structure.

1 Claim, 3 Drawing Figures

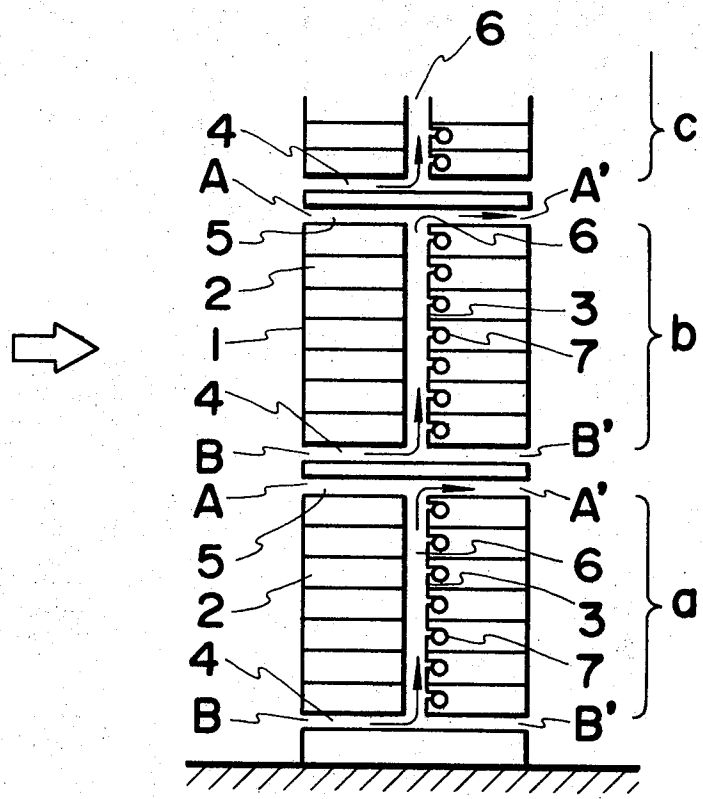


FIG. 1

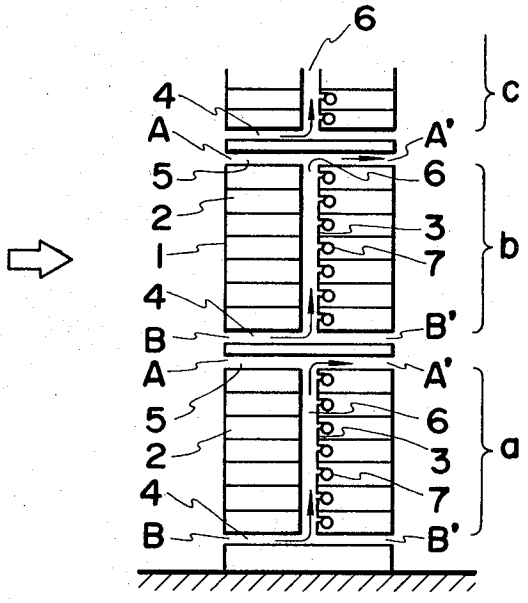


FIG. 2

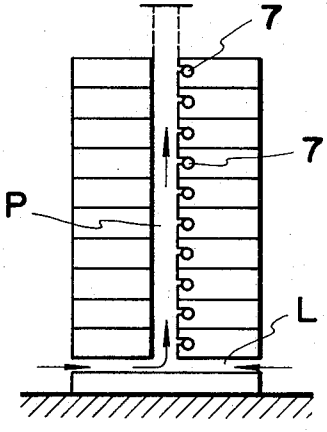
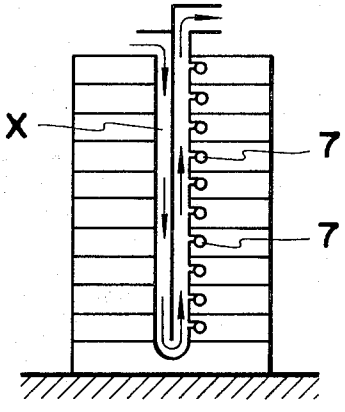


FIG. 3



AIR SUPPLY AND EXHAUST DUCT SYSTEM IN A BUILDING

SUMMARY OF THE INVENTION

The present invention relates to an air supply and exhaust duct system for a combustion apparatus which is used in a multistoried building or a skyscraper.

Closed type combustion apparatus, such as boilers, stoves and ranges, are supplied with air for combustion through the pipeline from the open air and the exhaust gases of combustion are exhausted through the pipe line into the open air.

Such combustion systems have several benefits. First, they don't pollute air within a the room, and secondly they are quite safe in use and do not cause, fires. Consequently there are many kinds of combustion apparatus of this type using oil or gas as fuel.

The system has disadvantages however. As the closed type combustion apparatus are provided with their own inlet and exhaust ports, a lot of inlet and exhasut ports are exposed on the walls of the building where many closed-type apparatus are used, which may spoil the beauty of the building. In addition, a multi-storied building or a skyscraper is apt to be influenced by wind pressure, which has an adverse influence on combustion apparatus.

There have been heretofore proposed some common duct systems in a building in order that the problems mentioned above may be solved, which are described below.

The prior art duct shown in FIG. 2 is provided with a horizontal duct L at the lower part of a building which passes through the building and a vertical duct P thereon, in which the inlet and the exhaust port of the closed type combustion apparatus 7 are so designed as to burn air supplied through the lower horizontal duct L in the vertical duct and exhaust the exhaust gas into the vertical duct P and then from the top thereof into the open air.

But the inlet port of the lower horizontal duct L, through which air is supplied, and the top of the vertical duct P are situated far apart and particularly in a multistoried building where the lower horizontal duct L is far away from the top of the vertical duct P, there is a big difference between the wind pressures, which may adversely effect the combustion of the apparatus.

Another defect of this type of duct system is that the amount of usable building space is diminished enlargement of the cross-sectional area of the duct as the number of stories of the building increases.

FIG. 3 illustrates a second type of prior art duct, where air inlet and exhaust ports are provided on the roof of the building, and U-shape duct X is constructed within the building so as to expose the inlet and exhaust ports of the closed type combustion apparatus in said duct like the first described duct.

The second duct is less influenced by wind pressure than the first described duct is, but it has the same shortcomings in that the cross-sectional area of the duct must be enlarged proportionally to the number of floors of the building.

The present invention is proposed to overcome the defects of the above described prior art ducts, and the following will be its objects.

The first object of the present invention is to propose an air supply and exhaust duct system which is least influenced by wind pressure.

The second object of the present invention is to control the proportional enlargement of the cross-sectional area of the duct to the number of stories of the building.

BRIEF EXPLANATION OF THE DRAWINGS

FIG. 1 shows an embodiment of the present invention, where an I-shape duct consisting of an upper and a lower horizontal duct and a vertical duct is provided on each block consisting of several stories of a high-storied building.

FIG. 2 illustrates a prior art duct.

FIG. 3 is a view of a second type of prior art duct.

DETAILED DESCRIPTION OF THE INVENTION

This invention relates to an air supply and exhaust duct system which is provided with upper and lower horizontal ducts passing through a building and a vertical duct connecting the upper and the lower horizontal ducts within the building, designed to supply air from the lower horizontal duct and exhaust it from the upper horizontal duct.

Specifically 1 designates a high-storied building, 2 designates a floor thereof and 3 shows an I-shape duct provided on each block, *a*, *b*, *c*, consisting of seven stories of the multistoried building, which I-shape duct is constituted as follows. Upper horizontal duct 5 and the lower horizontal duct 4 pass through the building and the vertical duct 6 connects the upper horizontal duct 5 and the lower horizontal duct 4 within the building. A—A′ show the open parts of the upper horizontal duct 5 and B—B′ show the open parts of the lower horizontal duct 4. In the vertical duct 6, a fan may be attached in order to generate an ascending air current within the duct 6.

Reference numeral 7 denotes a closed type combustion apparatus, whose inlet and exhaust ports are exposed respectively inside the vertical duct 6.

In this closed type combustion apparatus using gas or oil as fuel, the combustion parts of portions of the system them are closed and air for combustion is supplied through the pipeline from the open air and the exhaust gas of combustion is exhausted through the pipeline into the open air.

The air for combustion may be supplied forcibly by fan or through a widened pipeline naturally due to pressure differential. The closed type combustion apparatus are used for boilers, ranges and stoves and so on at present, as described above.

The embodiment mentioned above is the one in which an I-shape duct system is constructed on each block consisting of several stories of a high-stories building. In such a case, it is also considered that the I-shape duct is constructed on every floor. in which the cross-sectional area of the bust can be small.

The following will explain how the present invention works.

Each closed type combustion apparatus 7 is supplied with air for combustion through the vertical duct 6 and exhausts the exhaust gas of combustion into the vertical duct 6. According to the temperature of the exhausted gas, an ascending air current is generated in the vertical duct 6, and it is exhausted from the open part of the upper horizontal duct 5, A or A′ into the open air.

In addition, in order to accelerate the ascending air current, a fan may be attached in the vertical duct **6** or in the upper horizontal duct **5**, by which an ascending air current may be generated.

Next, when the open part A of the upper horizontal duct **5** and the open part B of the lower horizontal duct **4** on the wall of the building are influenced by wind pressure from the direction of the arrow shown in FIG. **1**, this wind pressure has no influence in the vertical duct **6** and merely passes horizontally through the building from A to A′ and from B to B′. Therefore, that this wind pressure does not adversely influence apparatus **7**.

The present invention comprises an I-shape duct system consisting of the upper horizontal duct **5** and the lower horizontal duct **4** and a vertical duct **6** connecting said ducts, in which wind pressure has no influences in the vertical duct. Each apparatus **7** is able to maintain stable combustion with no influence of wind pressure on combustion.

Moreover, it is possible to minimize the volume which the duct in a building occupies by providing I-shape duct on each block, consisting of several stories of a skyscraper.

We claim:

1. A system for supplying air to and exhausting gases from a closed combustion apparatus for use in a multi-storied building, comprising:

a first horizontal pipe extending completely through said building and open on both sides thereof;

a second horizontal pipe extending completely through said building, said second pipe being above said first pipe and being open on both ends thereof;

a vertical pipe located within said building and connected between said first and second horizontal pipes; and

a combustion apparatus located within said building and operatively connected to said vertical pipe, whereby air is supplied to said apparatus from said first horizontal pipe and gases of combustion are exhausted from said apparatus into said vertical pipe, thereby creating an ascending air current whereby said gas of combustion are carried to said second horizontal pipe and exhausted therefrom.

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