

## **A FIREPROOF EXHAUST SYSTEM FOR A MULTI-STOREY BUILDING**

### **FIELD OF INVENTION**

The present invention relates to a fireproof exhaust system for a multi-storey residential building. More particularly, the present invention relates to a fireproof vent  
5 installed on individual residential exhaust channel which immediately closes and shuts off the exhaust channel during fire break out, prevents fire and smoke from spreading through the exhaust conduit.

### **BACKGROUND OF THE INVENTION**

Fire, anywhere, will always be a major cause of damage to property, injury and loss of  
10 life. Fire, accompanied with smoke within enclosed places such as buildings of any type, will pose even greater threats. Fighting a fire in order to save property and life is rather belated and ineffective whatever the facilities that are available. It is also of common knowledge that if the electrical and communication wires are destroyed or damaged, this may have severe consequences due to impossibility of establishing any  
15 kind of communication with persons in the building and because electrical appliances which are sometimes essential cease to operate.

Thus, the most appropriate solution against risk of fire is to adopt adequate safety measures incorporating prevention, early detection and control means if fire does occur.

20 All buildings should be designed and provided with the appropriate level of safety measures in accordance with engineering and legislative requirements and thereafter be continuously maintained. Prevention should include proper design and installation of systems to mitigate against all potential causes of fire.

At present, the exhaust channel of individual resident unit in a building is installed with one-way vent, preventing the reverse flow of smoke, maintaining hygiene of the indoor environment. However, if there is a fire break out at a resident unit, smoke with high temperature and high pressure will result. When fire break out, indoor  
5 smoke pressure will increase to 300 Pa, pushing open the one-way vent at the individual exhaust channel of kitchen and toilet, allowing high temperature air flows to common exhaust conduit, which result in the fire spreading to other storey. Hence, creating a hidden fire hazard.

Accordingly, there is a need to provide fireproof exhaust system on a multi-storey  
10 residential building, with a fireproof vent installed on individual residential exhaust channel. When fire break out, the fireproof vent from the affected resident unit exhaust channel will be closed, preventing fire from spreading.

#### SUMMARY OF INVENTION

15 The present invention relates to a fireproof exhaust system for a multi-storey building comprises at least one exhaust channel mounted on an exhaust conduit, the exhaust channel having an inner portion embedded in the exhaust conduit to release fume, and an outer portion connected to a fume duct, and a fireproof vent mounted on the exhaust channel, wherein the fireproof vent has a temperature sensor mounted at one  
20 end which on reaching a given temperature limit causes the fireproof vent to be closed immediately during fire break out preventing fire and smoke from spreading through the exhaust conduit. Each exhaust channel provides an air passage to direct fume and smoke exiting to a common exhaust conduit and releasing through chimney top of a building.

25 Preferably, the exhaust channel have an inner portion embedded in the exhaust conduit to release fume, and an outer portion connected to a fume duct. The fume duct is connected to extractor hood of kitchen or wash room extractor fan.

Preferably, the exhaust channel comprises a fume duct, a one-way vent, an air flow guide, and a fireproof vent.

Preferably, the fireproof vent is located above air flow guide inside exhaust conduit, or located at outside of the exhaust conduit between the fume duct and air flow guide  
5 on the exhaust channel. The fireproof vent is electromagnetic or mechanical type with temperature sensor.

At room temperature, the fireproof vent is in open mode, allowing air to pass through. When fire break out, the room temperature increases, once reaches the trigger limit, the fireproof vent will automatically closed and shut-off, ensure exhaust channel of  
10 affected resident unit is shut-off from common exhaust conduit, thereby preventing the fire from spreading. In general, the trigger limit of fireproof vent is set at 150°C, or any desired temperature.

When extractor hood of individual resident is in operation, air flow smoothly through fireproof vent, and push open one-way vent, then passing through air flow guide to  
15 exit. Therefore, eliminate smoke-forming caused by resistance of air flow, exhaust flows upwards in exhaust conduit with no resistance.

The exhaust channel is curved vertical upwards to prevent exhaust flow exiting in an upwards direction from colliding with the upwards exhaust flow from lower floors in the exhaust conduit.

20 The invention has the advantage of providing a fireproof vent at exhaust channel of individual resident unit. When fire break out, fireproof vent is closed immediately and shut-off the affected resident exhaust channel, prevent fire from spreading.

## BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of facilitating an understanding of the invention, there is illustrated in the accompanying drawings the preferred embodiments from an inspection of which when considered in connection with the following description, the invention, its  
5 construction and operation and many of its advantages would be readily understood and appreciated.

Fig. 1 is cross-section of the fireproof exhaust conduit of the invention in a multi-storey building.

Fig. 2 is a cross-section view of the position of the fireproof vent and one-way vent on  
10 an exhaust channel.

Fig. 3 is a table of the selection of exhaust conduit dimension based on floor level and application.

## DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to fireproof exhaust system (100) of multi-storey  
15 residential buildings. More particularly, the present invention relates to fireproof vent installed on individual residential exhaust channel which immediately closes and shut-off during fire break out, preventing fire and smoke from spreading through common exhaust conduit. Hereinafter, the fireproof exhaust system (100) shall be described according to the preferred embodiments of the present invention and by referring to  
20 the accompanying description and drawings. However, it is to be understood that limiting the description to the preferred embodiments of the invention and to the drawings is merely to facilitate discussion of the present invention and it is envisioned that those skilled in the art may devise various modifications without departing from the scope of the appended claim.

Referring to Fig. 1, in a multi-storey residential building, there would be a plurality of exhaust conduits (3) installed on every floor of the building vertically to provide passages to exhaust flow releasing from each resident unit. Each resident unit has an exhaust channel (1) to provide a passage for the exhaust flow from the kitchen  
5 extractor hood or from wash room extractor to an exhaust conduit (3) and release through the chimney top of the building. The release of the exhaust flow is to ensure the hygiene of the building.

In a preferred embodiment, the present invention comprising at least one exhaust channel (1) mounted on the exhaust conduit (3) having an inner portion embedded in  
10 the exhaust conduit (3) to release fume, and an outer portion connected to fume duct (7). The fume duct (7) is connected to extractor hood of kitchen or wash room extractor fan.

A fireproof vent (2) mounted on the exhaust channel (1) is in open mode at room temperature, allowing air flow in the exhaust channel (1). A one-way vent (5)  
15 mounted on the exhaust channel (1) is in close mode by its own weight at normal condition. function to prevent reverse flow of smoke, when extractor hood is in operation, air flow smoothly through fireproof vent (2), and push open the one-way vent (5), allow exhaust to pass through air flow guide (4) to exit. Therefore, eliminate smoke-forming caused by resistance of air flow. Exhaust flows upwards in exhaust  
20 conduit (3) with no resistance. An air flow guide (4) mounted on the exhaust channel (1) direct the exhaust flow to the exhaust conduit (3).

Referring now to Fig. 2, there is shown the fireproof vent (2) having a temperature sensor (8) mounted at one end of the fireproof vent (2) which on reaching a given temperature limit causes the fireproof vent (2) to be closed immediately, preventing  
25 fire and smoke from spreading through the exhaust conduit (3). A spring (9) is connected between the other end of the fireproof vent (2) and the one-way vent (5). When a fire broke out and the temperature of the resident unit reached the trigger

limit of the temperature sensor (8), the material of temperature sensor (8) will be melted to release the holding force on the fireproof vent (2) against the tension force of the spring (9). The tension force of the spring (9) will pull the fireproof vent (2) to close the exhaust channel immediately during fire break out and shut-off air flow in the exhaust channel (1). Preferably, the trigger limit of fireproof vent (2) is set at 150°C. However, it can be set at any desired temperature.

Preferably, the fireproof vent (2) is located above air flow guide (4) inside exhaust conduit (3) (inner portion) or located at outside of the exhaust conduit (3) between the fume duct (7) and air flow guide (4) (outside portion) on the exhaust channel (1).

- 10 The exhaust channel (1) inner portion embedded in exhaust conduit (3) is curved vertical upwards to allow exhaust flow exiting in upwards direction to prevent colliding with the upwards exhaust flow from the lower floor in the exhaust conduit (3). For kitchen installation, the one-way vent (5) further comprises an oil container (10) mounted at its lower end for collecting the residue oil dropping from the exhaust
- 15 fume when condensation occurs at the one way vent to avoid the residue oil enters back to the kitchen.

- By calculation and experiment, the dimension of the exhaust conduit (3) can be decided to balance the exhaust flow existing from exhaust channel (1) of each floor in order to achieve a uniform flow in the exhaust conduit (3). This can be referred to the
- 20 table shown in Fig. 3. The exhaust conduit (3) occupies a small area of the kitchen and wash room space, and raw material required to fabricate the exhaust conduit (3) is low and light weight.

## CLAIMS

1. A fireproof exhaust system (100) for a multi-storey building comprising:  
at least one exhaust channel (1) mounted on an exhaust conduit (3), the exhaust  
channel (1) having an inner portion embedded in the exhaust conduit (3) to release  
5 fume, and an outer portion connected to a fume duct (7); and  
a fireproof vent (2) mounted on the exhaust channel (1);  
wherein the fireproof vent (2) has a temperature sensor (8) mounted at one end of the  
fireproof vent (2) which on reaching a given temperature limit causes the fireproof  
vent (2) to be closed immediately preventing fire and smoke from spreading through  
10 the exhaust conduit (3).
2. A fireproof exhaust system (100) according to claim 1, wherein the exhaust channel  
(1) comprises a one-way vent (5) to prevent reverse flow of smoke.
3. A fireproof exhaust system (100) according to claim 1, wherein the exhaust channel  
(1) further comprises an air flow guide (4) to direct the exhaust flow to the exhaust  
15 conduit (3).
4. A fireproof exhaust system (100) according to claim 1, wherein the exhaust channel  
(1) inner portion embedded in exhaust conduit (3) is curved vertical upwards to  
prevent exhaust flow exiting in an upwards direction from colliding with exhaust flow  
from lower floors in the exhaust conduit (3).
- 20 5. A fireproof exhaust system (100) according to claim 1, wherein the fireproof vent  
(2) is electromagnetic type of fireproof vent.
6. A fireproof exhaust system (100) according to claim 1, wherein the fireproof vent  
(2) is mechanical type of fireproof vent.