

April 15, 1941.

W. GENEST

2,238,167

APPARATUS FOR PREVENTING OR DIMINISHING SOUND TRANSMISSION

Filed Jan. 10, 1938

Fig. 1.

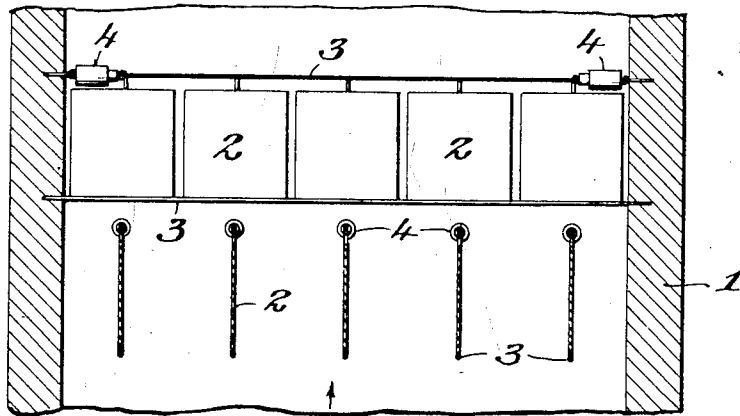


Fig. 2.

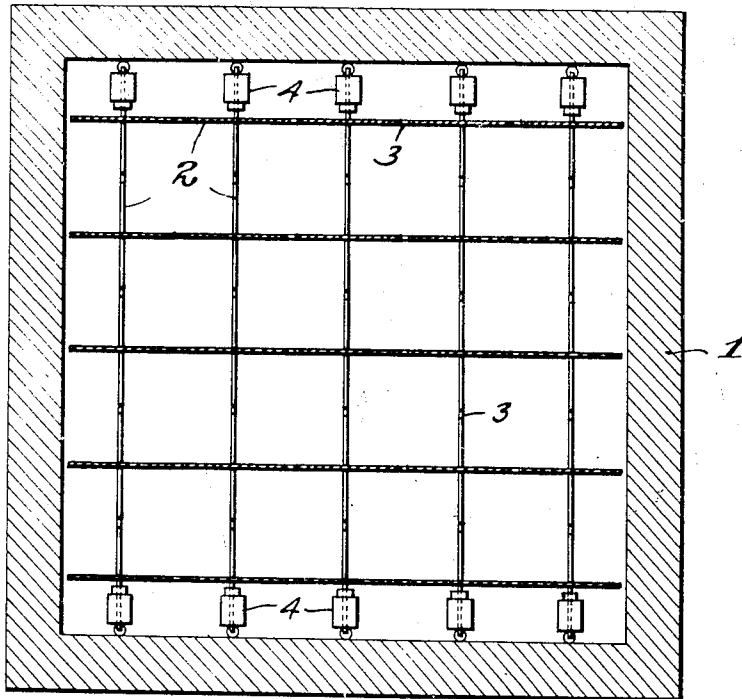
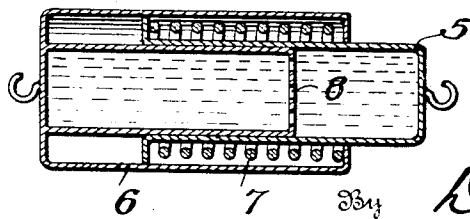


Fig. 3.



Inventor

Werner Genest,

D. P. Wolhaupter

Attorney

UNITED STATES PATENT OFFICE

2,238,167

APPARATUS FOR PREVENTING OR DIMINISHING SOUND TRANSMISSION

Werner Genest, Berlin-Steglitz, Germany

Application January 10, 1938, Serial No. 184,343
In Germany January 28, 1937

2 Claims. (Cl. 181-46)

This invention relates to a method of preventing or diminishing sound transmission through space more particularly in confined spaces for directing air or gas streams such as flues, ducts, air vents, or similar hollow shafts whose walls reflect sound successively.

Considerable noise is produced and transmitted for example, by motor test stands, erected and operating in air ducts, and also, ventilating shafts leading from machinery rooms or shops carry disturbing noises to adjacent surroundings.

Accordingly, the present invention has for its primary object to prevent the transmission of such noises, or at least to considerably diminish them. This is effected by providing a low frequency, damped, mechanical oscillatory system in the air or gas stream, which system is excited by the sound pressure energy to produce forced oscillations without appreciably hindering the flow in the gas stream, while, at the same time, the mechanical energy received by the system is converted, by built-in energy consumers, for example, dampers, into other energy such as heat energy.

Attempts have hitherto been made to attain sound absorption by using sound absorbing materials built into the structure itself, but, according to the present invention an entirely different method is employed, namely an oscillatory system wherein the sound pressure energy is converted by mechanical means into another inaudible form of energy, of the type above referred to. Such an oscillatory system functions most satisfactorily when it works in resonance on excitation. Since the sound exciting source usually comprises a relatively wide frequency band, there may be provided according to the invention, several oscillating systems of varying resonance frequency in the same air or gas stream and these different systems may be connected in parallel or in series. Ideal results are attained when the different oscillating systems are working in resonance, but, the same results are also obtained, although not so perfectly, when the systems are not in resonance, that is when each system has a different natural frequency.

The oscillating systems are preferably built in the gas stream guiding means so as to obtain a regulated flow.

The walls or wall parts of the gas stream guiding means may also be designed as oscillating systems.

An apparatus adapted for carrying out the method is shown diagrammatically by way of

example in the accompanying drawing, in which:

Figure 1 shows a shaft or gas stream channel with two sets of built in oscillatory systems in elevation perpendicularly to the gas stream.

Figure 2 is a horizontal cross section of the arrangement shown in Fig. 1.

Figure 3 is a detail longitudinal section of an oscillatory damper on an enlarged scale.

In the embodiment illustrated, the shaft or channel 1 has arranged therein two systems or sets of oscillatory plates 2, supported on cables, ropes or the like and arranged in a plane parallel to the direction of flow of the gas stream. The plates of one system are at right angles to those of an adjacent system and extend vertically to the plates of the adjacent system, the plates of both systems being provided in several rows extending parallel to each other. The individual oscillatory plates 2 may be formed of iron, or other metals or materials with slight damping properties and may also be formed of materials with greater inherent damping such as aluminum, artificial resins, glass, wood pulp, stiff cloths or the like. The plates may also be made of materials which, in themselves, wholly or partially produce the required damping effect.

According to the example shown in the drawing, the plates are mounted on the wires or cables 3 and are suspended or resiliently connected to the walls of the shaft or flue by the dampers 4. Instead of wires or ropes, other like members may be used. The dampers 4 are of the rope pull type and are shown in detail in Figure 3. This damper consists of the mating housing parts 5 and 6, and a pressure spring 7 is arranged between the beaded edges. The housing parts 5 and 6 are also fitted tightly one within the other and the sealed inner space is filled with a damping substance such as oil, which, during the relative displacement of both housing parts 5 and 6, passes through the perforated head 8 of the housing part 6 in either direction.

From the foregoing it will be apparent that the present invention contemplates a method of absorbing sound vibrations in flues, shafts or other air or gas ducts by mechanical absorbing means which consists of one or more sets or systems of damping devices arranged cross-wise or transversely of the path of flow of air or gas without obstructing or hindering the same. In that connection the sets or systems of absorbing media may be in resonance or have different natural frequencies depending whether or not the sounds emanating from the machinery cover

a relatively narrow or a relatively wide frequency band.

I claim:

1. A sound absorbing apparatus for use in flues or shafts, comprising flexible supports arranged transversely of the flue or shaft, resilient means for connecting said supports to the side walls of said flue or shaft, and plates suspended from said flexible supports and arranged parallel to the flow of air or gas in said flue or shaft.

2. A sound absorbing apparatus for flues or shafts, comprising a plurality of sets of sound absorbing devices arranged at different eleva-

tions transversely of the flue or shaft, said sets comprising flexible members anchored at their ends to the walls of the flue or shaft and disposed across the flue in angular crossing relation, damping means for connecting said flexible supports to the side walls of the flue or shaft, and sound absorbing plate elements carried by said flexible connections, the sound absorbing elements of one system being arranged at right angles to those of another, and the plates of all systems being arranged parallel to the flow of air or gas in the flue or shaft.

WERNER GENEST.