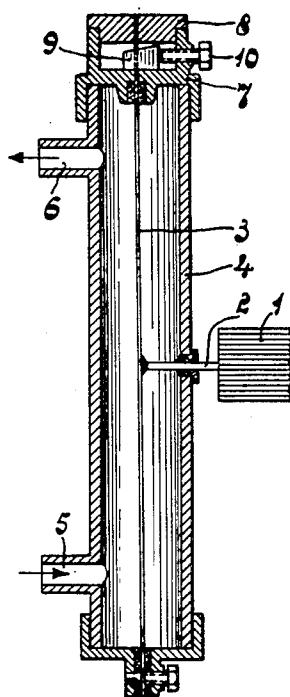


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DEVICE FOR THE TRANSMISSION OF MECHANICAL
VIBRATIONS TO A MATERIAL MEDIUM
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DEVICE FOR THE TRANSMISSION OF MECHANICAL VIBRATIONS TO A MATERIAL MEDIUM

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2 Claims. (Cl. 259—1)

The invention relates to the transmission of mechanical vibrations, more particularly ultrasonic vibrations, to a material medium, such as a gas or a liquid.

It is well known that ultrasonic vibrations exert particular mechanical actions upon gases, liquids and solid materials. Thus, the said vibrations will allow determined solid materials to be dispersed in a liquid under certain conditions, and a different choice of the conditions enables materials dispersed in a liquid to be precipitated under the action of such vibrations. It is also possible to precipitate mists in gases under the action of ultrasonic vibrations.

For an effective treatment of gases or liquids, which generally have a lower wave resistance than the exciting resonator, it is desirable for the working area of the medium required to be treated to be enlarged. This could be insured by a vibrating member, for example a resonator, being connected mechanically to a rigid body having a large surface area. However, the fact that such a body should have a certain mass, presents difficulty in view of the high frequency. A sufficiently light body will be too resilient for the vibration to be transmitted by the body as a whole.

According to the invention the vibration of the vibrating member, such as a resonator, is transmitted by mechanical means to a second member of such construction that it may be tuned to a vibration and in this case vibrates in a number of stationary half-waves. The vibration is transmitted to the medium required to be treated from the several amplitude maxima. The body may have a large surface area without the mass required to be moved directly by the resonator becoming excessive.

In a preferred embodiment of the present invention the body is constituted by a tape which is immovably secured to a frame at both ends. This body is able to vibrate in a number of half-wavelengths in a manner such that a number of stationary waves is produced on the tape in the axial direction.

The tape may be arranged in a pipe comprising inlets and outlets for the gas or liquid required to be treated so that the gas or liquid is led through the pipe and a continuous treatment is insured.

The invention will now be explained with reference to the accompanying drawing in which the figure is a schematic diagram of an embodiment of the device of the present invention.

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Referring to the figure, a member vibrating at a very high frequency, for example 20,000 to 30,000 cycles per second, is designated 1. The member 1 may be, for example, a piezo-electric crystal or a bar made of magnetostrictive material. The vibrations are transmitted by a rod 2 to a tape 3 arranged in a pipe 4. The pipe 4 comprises inlets and outlets 5 and 6 allowing the medium required to be treated, for example a gas or a liquid, to be led through the pipe.

The tape is fixed at either end and preferably is at an adjustable tension enabling it to be tuned by any suitable means, for example, by elements 7, 8, 9 and 10. The conditions have been so chosen that the vibrations transmitted to the tape by means of the member 2 cause it to vibrate in a number of stationary half-wavelengths. The device described proved to be very effective in precipitating a mist consisting of very fine particles of silicon oxide in a gas. In this case the frequency was approximately 20,000 cycles per second, the length of the tape 30 centimeters, its width 1.5 centimeters and its thickness 0.5 millimeters. The tape 3 may be made of steel and will vibrate in the case described in approximately 30 wavelengths.

It is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. A device for treating a material medium with ultrasonic vibrations comprising a pipe having spaced inlet and outlet ports, a ribbon-like member, means for securing said ribbon-like member to opposite ends of said pipe to extend said member substantially parallel to the axis of said pipe, means for adjusting the resonating frequency of said member, a vibrating member, and mechanical means for transmitting vibrations from said vibrating member to said ribbon-like member to vibrate said ribbon-like member in a given number of stationary half-waves.

2. A device for treating a material medium with ultrasonic vibrations comprising a pipe, cap members closing the ends of said pipe, inlet and outlet ports spaced apart intermediate to said cap member, a tape member disposed within said pipe and extending substantially parallel to the axis of said pipe, one of said cap members being provided with means for securing one end of said tape member, the other of said cap members being provided with means for securing the other end of said tape member and for adjusting the resonating frequency of said tape member, a vibrating member, and mechanical means for transmitting vibrations from said vibrating member to said tape member at a portion thereof intermediate to said inlet and outlet ports to vibrate said tape member in a given number of stationary half-waves.

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