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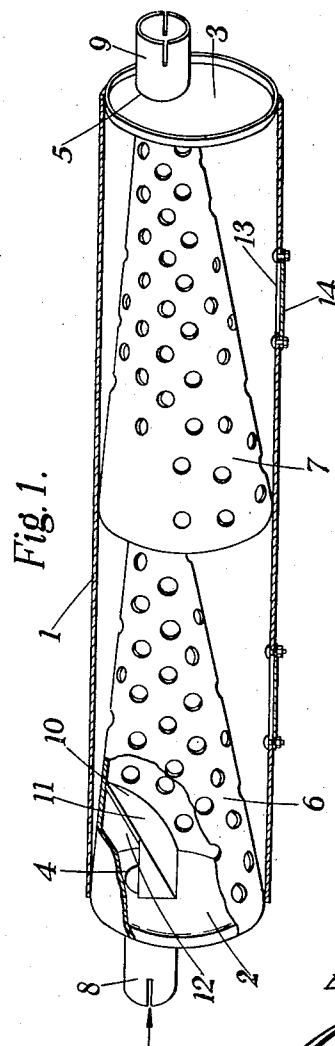
J. BLANCHARD

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APPARATUS FOR SILENCING PULSATING GASEOUS CURRENTS

Filed Nov. 28, 1933

2 Sheets-Sheet 1



INVENTOR

J. BLANCHARD

BY

*Prohvirie*

ATTORNEY

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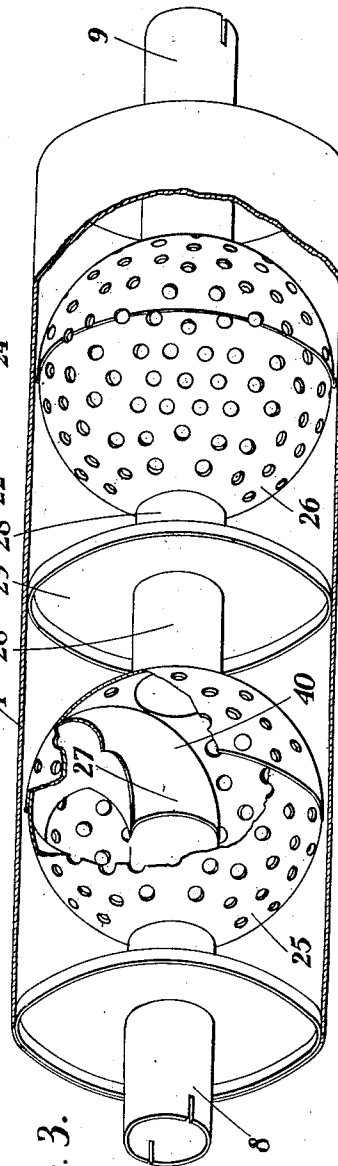
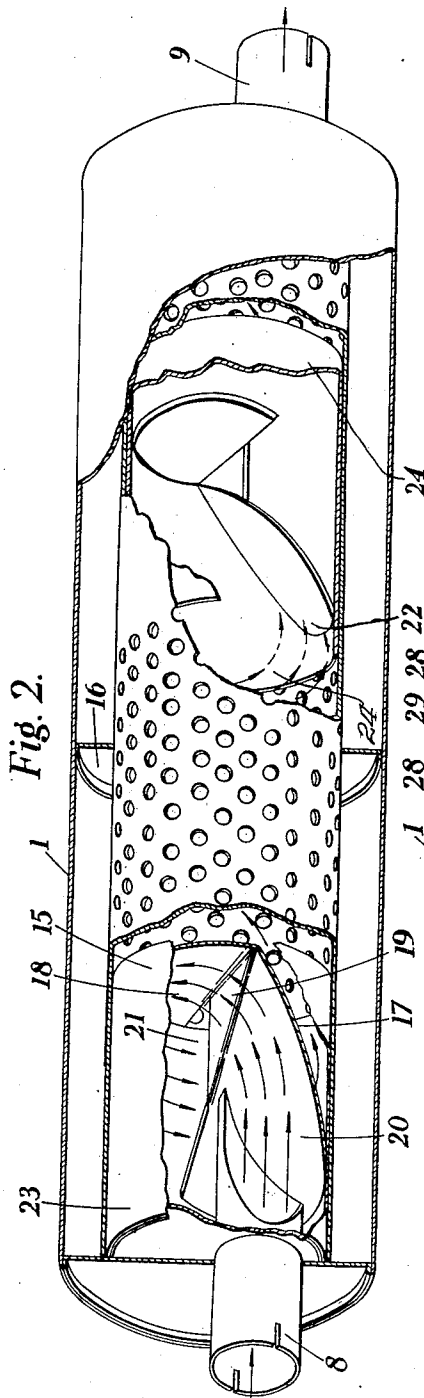
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2 Sheets-Sheet 2



INVENTOR  
J. BLANCHARD  
BY *Johnnie*  
ATTORNEY

## UNITED STATES PATENT OFFICE

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APPARATUS FOR SILENCING PULSATING  
GASEOUS CURRENTSJoseph Blanchard, London, England, assignor of  
one-half to Cecil Gordon Vokes, London, Eng-  
landApplication November 28, 1933, Serial No. 700,135  
In Great Britain June 2, 1933

7 Claims. (Cl. 181—58)

This invention relates to apparatus for silencing pulsating gaseous currents.

It is an object of the invention to provide silencing apparatus combining ease and cheapness of construction combined with efficient operation.

It is a further object of the invention to provide a silencer wherein high silencing capability is combined with low back pressure.

A further object of the invention is to provide a silencer wherein the main path of the gaseous currents is no more restricted than at the inlet.

Various other objects and advantages will be apparent from the following descriptions of embodiments of the invention, and the novel features will be particularly pointed out in connection with the appended claims.

In the accompanying drawings,

Figures 1 to 3 are perspective views respectively of three different forms of silencer in accordance with the invention, parts being broken away in these views to show the construction of the silencers.

In the form shown in Figure 1, the silencer comprises an outer cylindrical casing 1 having end plates 2 and 3 provided with eccentric inlet and outlet orifices 4 and 5 respectively. Within the casing 1 there are arranged a pair of frusto-conical chambers 6 and 7 having reticulated walls. The chamber 6 connects with an inlet pipe 8 associated with the orifice 4, and the frusta are so formed that the smaller end of the chamber 6 connects with the chamber 7 by means of an eccentric aperture in the base of the latter, and the smaller end of the chamber 7 connects with an outlet pipe 9 by way of the aperture 5. A deflector plate 10 is situated in the chamber 6 immediately within the aperture 4 and comprises two portions 11 and 12: the portion 11 of the plate is inclined to the longitudinal axis of the chamber and has an edge in contact with the internal surface of the chamber, while the portion 12 is arranged parallel to the longitudinal axis of the chamber.

Gases entering the silencer by the inlet pipe 8 strike the portion 11 of the deflector plate and are deflected on to the wall of the chamber 6, which they follow with a gyratory movement. After the gases have made a substantially complete circuit of the inner surface of the container, they impinge upon the under surface of the portion 11 of the plate whereby the gyratory motion and forward pitch is accentuated. That portion of the wall of the chamber onto which the incoming gases are deflected by the deflector plate

is left imperforate. The function of the portion 12 of the deflector plate is to prevent gas from escaping impingement upon the inclined deflecting surface by lateral motion after passing through the aperture 4.

A second deflector plate similar to plate 10 is arranged within the chamber 7 to impart gyratory motion therein to the gases entering from chamber 6. This plate may be arranged to impart to the gases a gyratory motion similar to that of which they partake in the chamber 6, or to impart a gyratory movement in the opposite sense.

The holes in the silencer chamber have little if any effect upon the general gyratory course of the flow, but tend to permit the formation of a partial vacuum or zone of relatively low pressure in the centre of the gyratory flow; the effect is to regularize the flow by absorbing the excess of pressure of the peaks of the pulsations. The space between the reticulated walls and the outer casing thus serves as a closed or substantially closed cushioning space, also serving as a sound insulator where it is most required. The space may, if desired, be filled with sound absorbing material e. g. steel wool or fibrous asbestos, or it may be filled with material adapted to absorb or react with any poisonous components of the gaseous mixture passing through the silencer.

Where the silencer is to be used with heavy oil or other engines requiring the silencer also to act as a spark arrester, openings 13 with cover plates 14 may be provided for the removal of solid deposits from the outer cylindrical casing.

The form of silencer shown in Figure 2 also comprises an outer cylindrical casing 1 provided with end plates in which inlet and outlet pipes 8 and 9 are eccentrically mounted. In this form, however, an inner cylindrical chamber 15 is provided, supported within the casing 1 by a diaphragm 16. At the inlet end of the chamber 15 there is provided a deflector plate 17 formed from a substantially ovoid sheet by bending to form a substantially semi-circular portion 18 which is situated in a plane at right angles to the longitudinal axis of the chamber, a substantially triangular portion 19 parallel to the longitudinal axis, and a portion 20 inclined to this axis in two planes as shown in the drawings. Some of the portion 19 is cut away to form an aperture 21.

The end of the inlet pipe 8 is extended into the chamber 15 and is shaped as shown to direct the incoming gases on to the portion 20 of the deflector plate on the side remote from the aperture 21. These gases then pass through the aperture

21, as shown by the arrows and continue along the inner surface of the chamber with a gyratory motion. A second deflector plate 22, constructed in a similar manner to the first, is situated in the chamber 15 and may be arranged to accen-  
 5 tuate the gyratory motion given to the gases by the first deflector or to impart a gyratory flow in the reversed sense. The wall of the chamber 15 is reticulated except in the regions occupied by the deflector plates, and, as shown, the deflector  
 10 plates are mounted in cylindrical sleeves 23 and 24 which are slipped into the chamber and fastened in position.

The form of silencer shown in Figure 3 is of simple construction and comprises a pair of hol-  
 15 low spheres 25 and 26 mounted in the outer cylindrical casing 1. These spheres are each formed of two hemispherical stampings and have reticu-  
 20 lated walls. The inlet pipe 8 projects into the left hand sphere 25, and is provided with a deflector 27 shaped as shown with a part spherical portion 40  
 25 which deflects the incoming gases and causes them to partake of gyratory movement within the sphere. The two spheres are joined by a tube 28, which is supported centrally within the cas-  
 30 ing 1 by a diaphragm 29, and the sphere 26 discharges into the outlet tube 9.

It will be understood that in any of the silencers shown in the drawings, the space between the in-  
 35 ner and outer chambers may be filled with various substances as described with reference in Fig. 1 or that provision such as there described may be made for removing solid deposits from the outer casing if required. It will further be understood  
 40 that the openings 13 for the removal of solid deposits may be provided in any position suitable to their purpose and that inclined plates may be provided within the outer casing for example  
 45 when the silencer is used vertically, for causing the deposits to collect at these openings.

Although the silencers shown in Figures 1 and 3 have been described as being provided with two chambers with reticulated walls and that in Fig-  
 50 ure 2 with two deflector plates, it will be understood that any desired number of such cham-  
 55 bers or deflector plates may be employed.

I claim:

1. Apparatus for silencing pulsating gaseous currents comprising in combination a relatively  
 50 restricted inlet leading into a spherical reticulated chamber, means to impart a tangential component to the flow within and close to the wall of the said spherical chamber, and an outer casing en-  
 55 closing the said spherical chamber.

2. Apparatus for silencing pulsating gaseous currents comprising in combination a relatively  
 60 restricted inlet leading into a chamber having a reticulated wall, a deflector plate within said chamber having a portion inclined at an acute

angle to the longitudinal axis of the said cham-  
 65 ber and adapted to deflect the incoming gases on to the inner surface of the wall of the said cham-  
 70 ber and a portion substantially parallel to the longitudinal axis of the said chamber adapted to prevent gases escaping deflection by the said first  
 75 portion, and an outer casing enclosing the said reticulated wall of the said chamber.

3. Apparatus for silencing pulsating gaseous currents comprising in combination a relatively  
 80 restricted inlet leading into a chamber having 10 a reticulated wall, a deflector plate within said chamber formed by bending from a substantially  
 85 ovoid plate and having a substantially semicir-  
 90 cular portion at right angles to the longitudinal axis of the chamber, a substantially triangular  
 95 portion substantially parallel to the longitudinal axis of the chamber, and a portion inclined in two  
 100 planes to the said axis, an aperture being left between the base of the substantially triangular  
 105 portion and the wall of the chamber, and an outer  
 110 casing enclosing the said reticulated wall of the said chamber.

4. Apparatus for silencing pulsating gaseous currents comprising in combination a relatively  
 115 restricted inlet leading into a chamber having a 25 curved reticulated wall through which the inlet  
 120 passes, means to direct the currents to flow within and close to the said reticulated wall of the said  
 125 chamber, an outlet to said chamber and an outer casing enclosing the said reticulated wall of the 30  
 130 said chamber.

5. Apparatus for silencing pulsating gaseous currents comprising a chamber having a base  
 135 formed with an eccentric aperture, a conical guide passage converging to and terminating substan- 35  
 140 tially coincident with said eccentric aperture to guide gases into said chamber, and means for im-  
 145 parting rotary motion to the gases within said chamber about their main forward direction of 40  
 150 flow.

6. Apparatus for silencing pulsating gaseous currents comprising a substantially cylindrical  
 155 casing, a series of conical chambers housed with-  
 160 in said casing, the base of one of said chambers being formed with an eccentric aperture, at least  
 165 one of said conical chambers having its axis in-  
 170 clined so as to lead to said eccentric aperture, and means within one of said chambers for impart-  
 175 ing gyratory motion to the gases therein.

7. Apparatus for silencing pulsating gaseous currents comprising a pair of conical chambers  
 180 one having a base formed with an eccentric orifice, the other one of which discharges into the other  
 185 through said eccentric orifice, and a deflector 55  
 190 plate to impart a gyratory motion within one of said chambers to the gases so discharged.

JOSEPH BLANCHARD.