

A. LLOYD-HORRY.

SILENCER.

APPLICATION FILED SEPT. 18, 1911.

1,031,943.

Patented July 9, 1912.

2 SHEETS-SHEET 1.

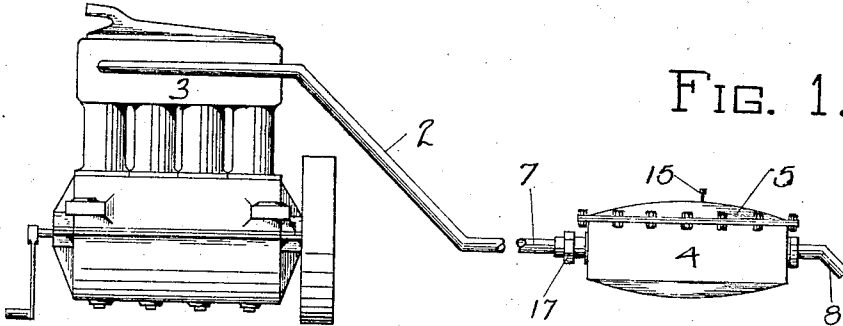


FIG. 1.

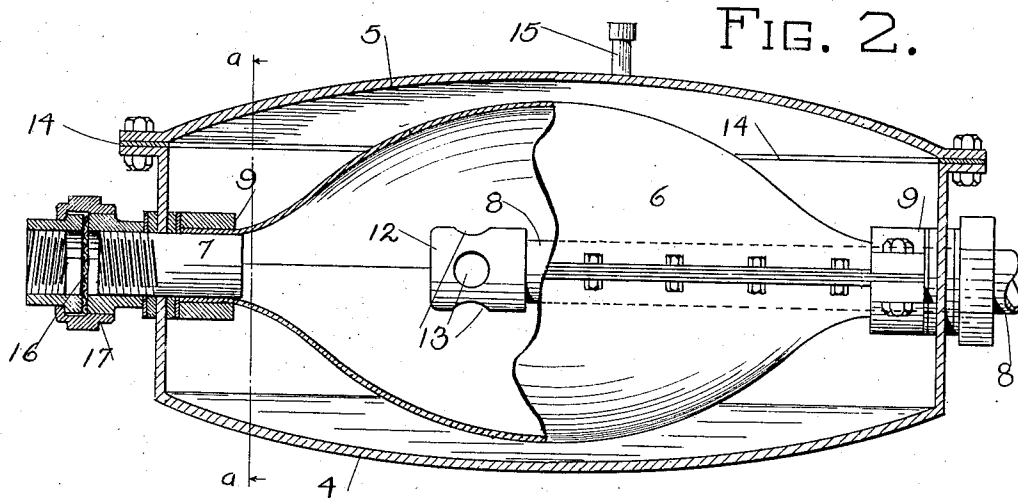


FIG. 2.

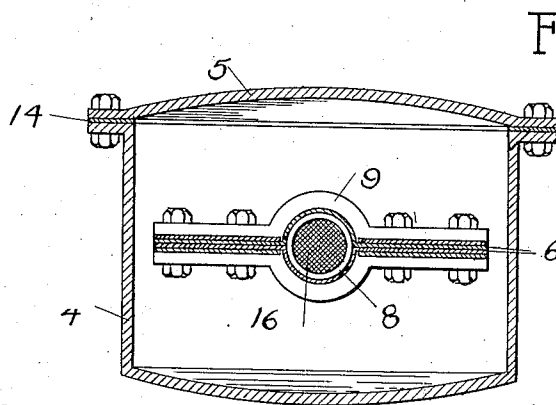


FIG. 3.

WITNESSES:

H. G. Post

T. S. Pidwell

INVENTOR

ALFRED LLOYD-HORRY

BY

Miller & White
his ATTORNEYS

A. LLOYD-HORRY.

SILENCER.

APPLICATION FILED SEPT. 18, 1911.

1,031,943.

Patented July 9, 1912.

2 SHEETS-SHEET 2.

FIG. 4.

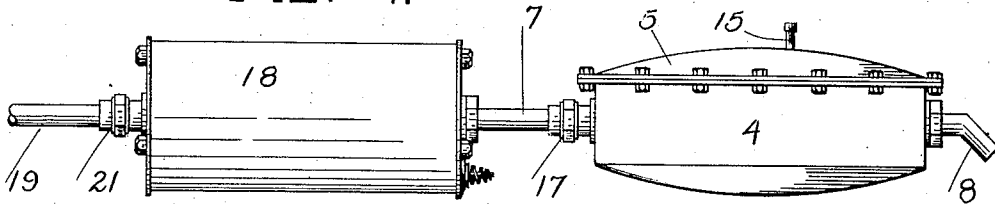


FIG. 5.

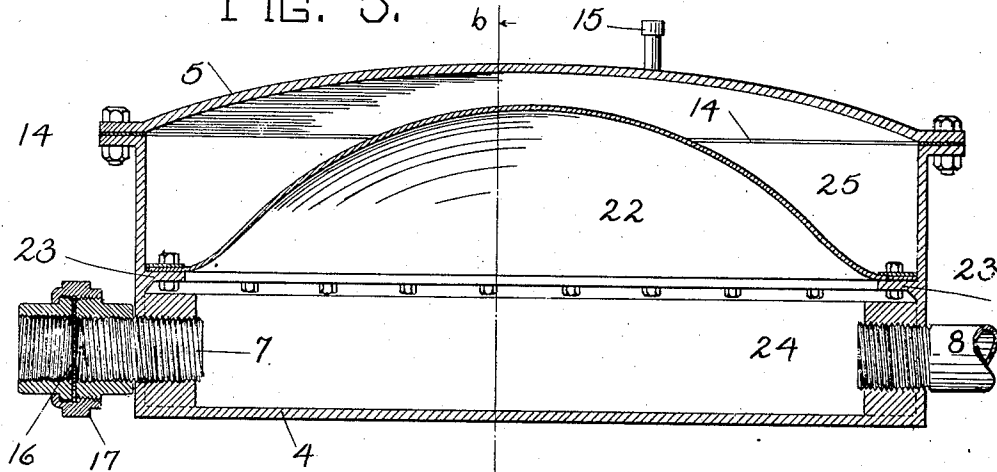
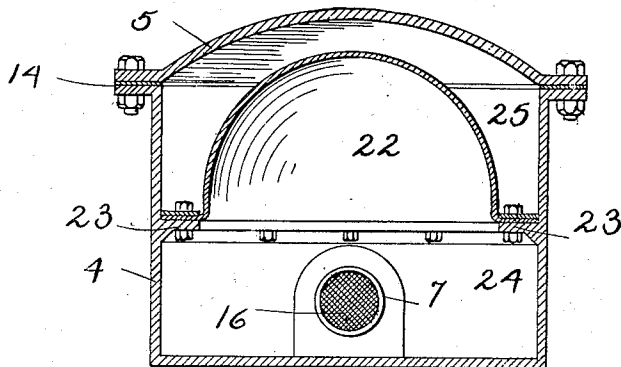


FIG. 6.



WITNESSES:

H. J. Cant.

P. S. Pidwell

INVENTOR

ALFRED LLOYD-HORRY

BY
Miller White
his ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALFRED LLOYD-HORRY, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO
HORACE OTTO LITTLE, OF SAN FRANCISCO, CALIFORNIA.

SILENCER.

1,031,943.

Specification of Letters Patent.

Patented July 9, 1912.

Application filed September 18, 1911. Serial No. 649,797.

To all whom it may concern:

Be it known that I, ALFRED LLOYD-HORRY, a subject of Great Britain, and a resident of the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Silencers, of which the following is a specification.

The invention relates to silencers, or mufflers which are used in connection with internal combustion engines to reduce or silence the noise of the exhaust.

The object of the invention is to provide a device which will silence the exhaust of an internal combustion engine, without subjecting the engine to the high back pressure produced by the mufflers at present in general use.

Another object of the invention is to provide a silencer which converts the pulsations of an engine discharge into a continuous stream.

Another object of the invention is to provide a silencer which operates of itself to exhaust the gases contained therein when the engine has ceased operating.

A further object of the invention is to provide a silencer arranged to prevent the ignition and explosion of the unburned gases contained therein.

The device possesses other advantageous features, which, with the foregoing will be set forth at length in the following description, where I shall outline in full that form of embodiment of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. The novelty of the invention will be included in the claims succeeding said description. From this it will be apparent that I do not restrict myself to the showing made by such drawings and descriptions, as I may adopt many variations within the scope of my invention as expressed in said claims.

Referring to the drawings:—Figure 1 is a view of the silencer of my invention attached to the exhaust pipe of an internal combustion engine. Fig. 2 is a longitudinal section through a silencer of my invention showing the operating parts thereof. Fig. 3 is a cross section taken on the line *a—a* of Fig. 2. Fig. 4 is a view showing an expansion chamber interposed between the engine and the silencer. Fig. 5 is a longitudinal section through a modified form of silencer.

Fig. 6 is a cross section taken on the line *b—b* of Fig. 5.

The silencer of my invention is attached to the exhaust pipe 2 of an internal combustion engine 3 in direct communication with the engine or may be used in combination with the ordinary mufflers, by placing a muffler between the silencer and the engine.

The silencer consists of a casing composed preferably of the two parts 4—5 bolted together. The part 5 is made in the shape of a lid or cover so that it may be removed to allow ready access to the interior. Within the casing is arranged a bag 6 of a flexible impervious material into the opposite ends of which the inlet pipe 7 and the outlet pipe 8 extend. The bag is clamped to these pipes by the clamping bars 9 so that the exhaust gases are confined to the bag and cannot gain access to the chamber surrounding the bag. The outlet pipe 8 preferably extends into the bag and is provided on its inner end with a cap 12 provided with a plurality of holes 13. The object of this arrangement is to prevent the concussion of the exhaust from the engine from passing directly through the bag. The bag being flexible it is readily seen that the volume thereof will vary as the internal pressure varies, thereby acting to absorb the concussions and cause the gases passing therefrom to issue in a steady stream. In order to increase the cushion effect of the bag, the casing is made air tight by means of the gasket 14, and a small amount of air is injected through the valve 15, so that the pressure within the chamber is slightly higher than atmospheric pressure. As the volume of the bag increases, the volume in the casing surrounding it decreases, with a consequent rise in pressure. The bag is thereby prevented from becoming ruptured by sharp shocks or percussions. The pressure on the outside of the bag also tends to collapse it, so that when the engine is stopped all the gases therein are forced out through the outlet pipe. This will prevent explosions in the silencer due to a back-fire from the engine. To further prevent a back-fire from the engine when the bag is inflated, I have arranged a wire gauze 16 in the inlet pipe. The inlet pipe 7 is provided with a detachable connection, such as a union 17, at the point where the gauze 16 is located, so that the gauze may be readily removed and a new piece inserted when it be-

comes fouled or worn. I prefer to make the bag of wire reinforced rubber or asbestos material, such as is used for packing, and as this material may be affected by the high temperature of the exhaust gases, it may be advisable to pass the gases through an expansion chamber 18 to partially cool them, before they enter the silencer. The inlet pipe 19 of the expansion chamber is also preferably provided with a union connection 21 in which is arranged a wire gauze, to prevent a back-fire or the gauze may be placed in the cooling chamber.

In Figs. 5-6 I have shown a modification in which a diaphragm 22 is used instead of the bag 6. The operation of this device is the same as that shown in the other figures. The diaphragm 22 is attached to a ledge 23 extending around the casing, thereby dividing the chamber into two compartments. The chamber 24 below the diaphragm is provided with the inlet and outlet pipes 7 and 8 and the chamber 25 above the diaphragm is air tight and is provided with an air valve 15, for increasing the pressure within said chamber as desirable. As in the first described construction, the volume of chamber 24 will vary with the pressure therein and the concussions of the exhaust will be absorbed. In operation, the diaphragm or bag pulsates with the entrance of the exhaust gases.

I claim:

1. An exhaust silencer comprising a chamber having a wall formed of a flexible material, clamped in place along its edge portions and having its body portion free to move under varying pressures within the chamber.
2. An exhaust silencer comprising a chamber having inlet and outlet openings, one side of said chamber being flexible, and an air tight chamber inclosing said flexible side.
3. An exhaust silencer comprising a flexible receptacle of an impervious material

having inlet and outlet openings, and an air tight casing surrounding said receptacle and spaced apart therefrom transversely.

4. An exhaust silencer comprising a flexible receptacle provided with an inlet opening, an outlet pipe extending into said receptacle and being provided on its end with a plurality of relatively small outlet holes, and an air tight casing surrounding said receptacle.

5. An exhaust silencer comprising a flexible receptacle having inlet and outlet openings, an air tight chamber surrounding said receptacle and adapted to contain air under pressure and a wire gauze in said inlet.

6. An exhaust silencer comprising a receptacle having movable walls of an impervious material, and provided with inlet and outlet pipes, an air tight casing surrounding said receptacle and through which the inlet and outlet pipes pass, and means for admitting air under pressure into said casing.

7. An exhaust silencer comprising a receptacle adapted to change its volume with variations in internal pressure and a surrounding air tight casing having a constant volume, said receptacle being provided with inlet and outlet pipes extending through said casing.

8. An exhaust silencer comprising an expansion chamber, a wire gauze in the inlet pipe thereof, a conductor extending from said expansion chamber to a receptacle formed of a flexible material, a wire gauze in said conductor, an air tight casing surrounding said receptacle and means for varying the pressure within said casing.

In testimony whereof, I have hereunto set my hand at San Francisco, California, this 8th day of September 1911.

ALFRED LLOYD-HORRY.

In presence of—

HORACE OTTO LITTLE,
H. G. PROST.