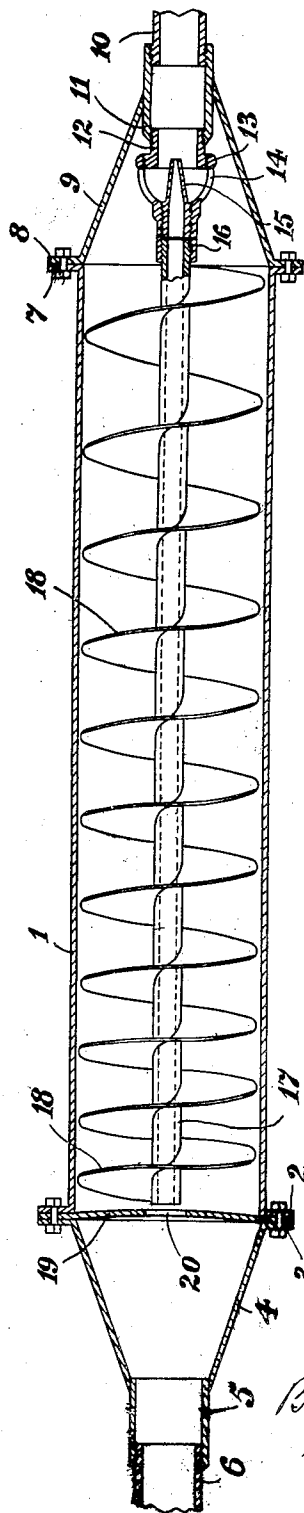


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W. HUNTER ET AL
SILENCER FOR INTERNAL COMBUSTION ENGINES

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Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM HUNTER AND MAY GILL, OF BLACKPOOL, ENGLAND.

SILENCER FOR INTERNAL-COMBUSTION ENGINES.

Application filed March 6, 1920. Serial No. 363,808.

To all whom it may concern:

Be it known that we, WILLIAM HUNTER and (Miss) MAY GILL, subjects of the King of Great Britain, and both residing in Blackpool, in the county of Lancaster and Kingdom of England, have invented certain new and useful Improvements in Silencers for Internal-Combustion Engines, of which the following is a specification.

The present invention relates to improvements in silencers for internal combustion engines, and generally to arrangements adapted to be connected with the exhaust of an internal combustion engine.

The object of the invention is to provide an arrangement which is capable of absorbing the energy of the gases and further to provide an arrangement which assists in removing the last portions of the exhaust gases. The invention will be described with reference to the accompanying drawing and the scope will be indicated in the appended claims. The single drawing represents a longitudinal section through one form of the improved silencer.

In the drawing, 1 is a cylindrical member provided at one end with a flange 2, which is bolted to a flange 3 carried by a conical member 4 having a tubular portion 5 within which is screwed a tubular member 6 leading to the exhaust manifold.

At the other end, the cylinder is provided with a flange 7 which is bolted to a flange 8 on a conical member 9 provided with a tubular member 10 extending within and without the narrow end of the cone. The outer portion of this tubular member 11 is internally threaded to receive a discharge pipe 10. The internal portion of the tube 11 is internally threaded to receive a tube 12 which is externally threaded to receive an annular member 13 provided with arms 14 carrying a tubular member 16. Into this tubular member at one end there is threaded a tube provided with an ejector nozzle 15 at one end, and into the other end is threaded a tube 17 extending throughout the length of the cylinder and carrying a spiral vane 18. This spiral is arranged so as to act as a baffling member for the gases and it will be seen that the outer part of the spiral is close to the inner wall of the cylinder 1; it will also be seen that the successive curves of the spiral 18 are closer together at the inlet end than at the outlet end so as

to allow of the expansion of the gases as they pass through the device.

Between the flanges 2 and 3 there is also secured a flexible diaphragm 19 which is centrally perforated at 20 for example so that the perforation is of the same size as one exhaust valve, not shown. The open end of the tubular member 17 is located centrally opposite the perforation 20.

In operation the gases enter at 6 and impart a portion of their energy to the resilient member placed in their path which in the preferred embodiment shown in the drawing consists of the centrally perforated flexible diaphragm 19. After passing the resilient member, the gases are baffled by baffling means, which as shown in the drawing consist of a spiral vane mounted on a central support in such manner that the cross sectional area of the passage gradually increases. An ejector is preferably provided in such manner that a portion of the gases enters the inlet end of the ejector, which is shown as placed immediately opposite and subsequent to the central perforation 20 of the diaphragm 19, whereupon a portion of the gases passes through the ejector and creates a suction on leaving the nozzle 15, thus assisting in the removal of the exhaust gases.

We claim as our invention:—

1. In a silencer for internal combustion engines, a cylindrical tube and a circular resilient centrally perforated diaphragm whose outer edge is attached to the wall of the tube and whose inner edge is free to vibrate in a direction at right angles to the plane of said diaphragm.

2. In a silencer for internal combustion engines, the combination of a cylinder and a resilient perforated diaphragm therein with an ejector tube concentric with said diaphragm and so arranged that part of the gas passes through the ejector and part passes around the ejector.

3. A silencer for internal combustion engines comprising a cylindrical tube partially closed by a resilient diaphragm having a central perforation, an ejector tube opposite said perforation and adapted to receive part of the gases and baffling means to baffle the other part of the gases.

4. A silencer for internal combustion engines comprising a cylindrical tube, a centrally perforated resilient diaphragm there-

in, a central ejector tube opposite said perforation, and spiral vanes mounted on said central tube to provide a spiral passage for the gases.

- 5 5. A silencer for internal combustion engines comprising a cylinder, a centrally perforated resilient diaphragm therein, an ejector tube coaxial with said cylinder and opposite said perforation, and spiral vanes
10 situate between said tube and the inner wall of said cylinder to provide a baffling passage for the gases and so disposed that the cross section of the passage increases from its inlet to its outlet.
- 15 6. A silencer for internal combustion engines comprising a cylinder, a tube concentric with said cylinder and adapted to form

an uninterrupted passage for the exhaust gas, an ejector connected to said tube and a continuous uninterrupted spiral baffle extending between the outer wall of said tube and the inner wall of said cylinder in order that the gas sucked through the spiral by the ejector will move in a smooth uninterrupted path. 20 25

In witness whereof, we have hereunto signed our names this 5th day of February 1920, in the presence of two subscribing witnesses.

WILLIAM HUNTER.
MAY GILL.

Witnesses:

HAROLD E. POTTS,
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