

No. 752,386.

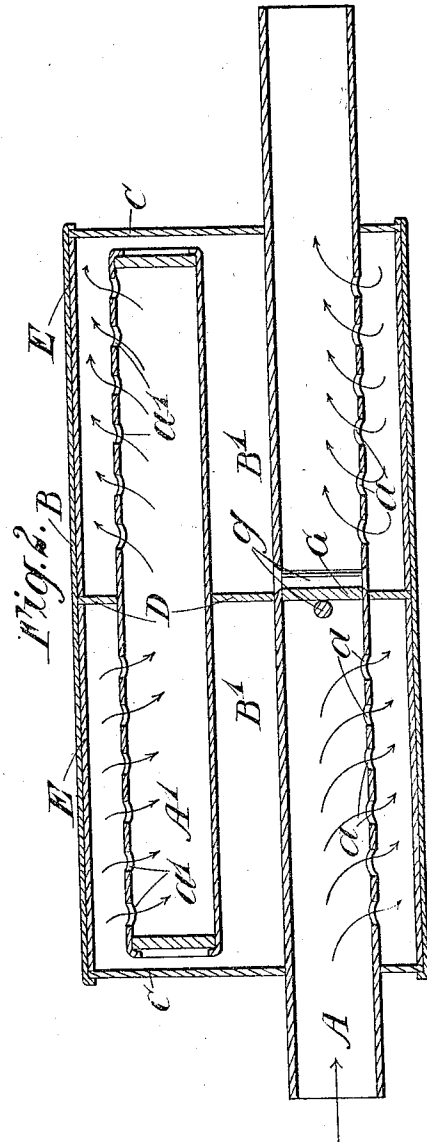
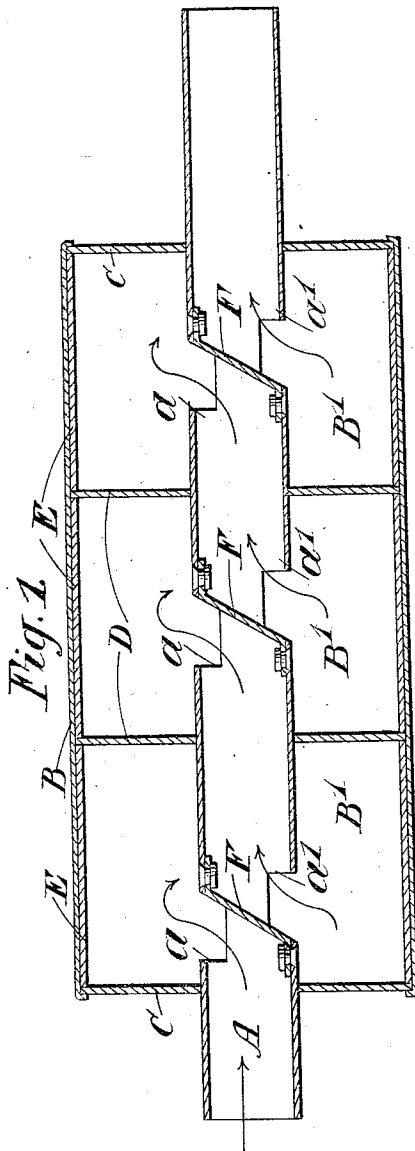
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J. B. DUNLOP & J. B. DUNLOP, JR.

EXHAUST SILENCER FOR INTERNAL COMBUSTION ENGINES.

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NO MODEL.



Witnesses
Am. Gillman, Jr.
C. R. Clement.

Inventors,
John Boyd Dunlop
John Boyd Dunlop, Jr.
by *John Freeman Walker*
Attorneys

UNITED STATES PATENT OFFICE.

JOHN B. DUNLOP AND JOHN B. DUNLOP, JR., OF DUBLIN, IRELAND.

EXHAUST-SILENCER FOR INTERNAL-COMBUSTION ENGINES.

SPECIFICATION forming part of Letters Patent No. 752,386, dated February 16, 1904.

Application filed April 30, 1903. Serial No. 155,043. (No model.)

To all whom it may concern:

Be it known that we, JOHN BOYD DUNLOP and JOHN BOYD DUNLOP, JR., subjects of the King of England, residing at Dublin, Ireland, have invented certain new and useful Improvements in or Relating to Exhaust-Silencers for Internal-Combustion Engines, of which the following is a specification.

This invention relates to exhaust-silencers for internal-combustion engines, and has for its chief object to produce an improved silencer for reducing the noise of the exhaust and to allow the burned gases to escape freely.

According to this invention the silencer comprises a series of expansion-chambers, into which the exhaust-gases are led and are caused to expand in each chamber successively before passing to the next chamber of the series. A box or casing, conveniently of cylindrical shape, is divided into a series of compartments by suitable partitions, and the chambers communicate with each other in series by one or more conduits, the openings in which are so situated that the gases entering one chamber expand therein before reaching the conduit leading to the next chamber.

In carrying out this invention there is provided a box or casing in the form of a cylinder, which is preferably divided into two or more compartments by means of internal disks or plates. There is also provided a tube which passes through the compartments. The cylinder may be secured in position by means of a clip, and the tube is secured to the exhaust-pipe of the engine by means of a clip or otherwise. Within each compartment two holes are cut in the opposite sides of the tube, and a disk, cone, cup, or other suitable baffle or stop is placed in the tube between the two holes, so as to cause the gases in their passage to pass out of the tube into the chamber and after expanding therein back into the tube through the other hole and into the next expansion-chamber. For simplicity of manufacture preferably one tube only is employed and the disks are connected to the tube in any convenient manner and are placed in an oblique or inclined position. In place of one tube two or more tubes may be employed and

the gases caused to pass through one tube to enter in each compartment. The outlet and inlet holes which are in the sides of the tube are turned away from each other in order to cause the gases to divide around the tubes and to unite again on entering, and thus break up the sound-waves.

Referring to the drawings, Figure 1 is a longitudinal section of the silencer divided into three compartments or chambers and having one tube, and Fig. 2 is a similar view of a silencer having two chambers or compartments and two tubes.

Referring more particularly to Fig. 1, A is the tube, and B is the cylinder. C represents the end disks or plates. D represents the internal disks or plates dividing the cylinder into compartments B' and held in position by lining cylinders or sleeves E. F represents disks or plates having lugs which are riveted to the tube and direct the flow of the gases out of the tube through the opening *a*, the gases passing into the tube again by the opening *a*.

Referring now to Fig. 2, the tube A passes through the cylinder B eccentric thereof and has one internal disk or plate G held in position conveniently by two pins *g*, as shown. The second tube A' is mounted within the casing preferably diametrically opposite to the tube A and extends from one compartment to the other, having its ends closed. The exhaust-gases pass out of the tube A through holes *a*, as shown by the arrows, and into the tube A' through the openings *a'* in the same compartment and out of the tube A' by the openings *a'* in the second compartment and back into the tube A through openings *a*, finally escaping from the tube, as shown by the arrow.

The disks or plates D in addition to having a hole or holes for the tube or tubes may with advantage be perforated with very small holes. These perforations allow a small portion of the exhaust-gases to pass directly from one chamber to another and have the effect of still further breaking up the sound-waves and reducing the back pressure. In all cases the disk or disks D divide the cylinder into com-

partments, so as to cause the whole or nearly the whole of the gases to pass through the disk or disks D by the tube A or A'.

What we claim as our invention, and desire to secure by Letters Patent, is—

- 5 1. In an exhaust-silencer, the combination with a casing, of a partition, forming compartments within the casing, a tube extending through the partition and having openings in its side walls on opposite sides of the partition, and a baffle arranged transversely across the interior of the tube between openings therein.
- 10 2. In an exhaust-silencer, the combination with a casing, of partitions dividing the casing into a series of compartments, a tube extending through all of the compartments and having within each a plurality of openings in its side walls, and baffles arranged within said tube and dividing it into sections each having two or more of said openings in its side walls.
- 15 3. In an exhaust-silencer, the combination with a casing, of partitions dividing the casing into compartments, sleeves within said compartments holding the partitions in position, a tube extending through the casing and establishing communication between the compartment by openings in its side walls, and a baffle disposed between the openings in the tube in each compartment substantially as described.
- 20 4. In an exhaust-silencer, the combination with a casing, of partitions dividing the casing into compartments, a tube extending through the casing and having within each compartment openings diametrically opposed to each other, and a baffle disposed between the openings in the tube in each compartment, substantially as described.
- 25 5. In an exhaust-silencer, the combination with a casing provided with an interior trans-

verse partition, a tube extending through the casing and the said partition, and having openings in its side walls communicating with the compartments on both sides of the partition, a baffle dividing the tube into two sections, and a second tube closed at its ends, extending through the partition and provided with a series of openings in each compartment between which the partition is arranged.

6. In an exhaust-silencer, the combination with a casing divided into two compartments by a central partition, sleeves holding the partition in position, a tube extending through the casing and having openings communicating with each compartment, a baffle dividing the tube into two parts, and a second tube having closed ends and two series of openings communicating with the respective compartments substantially as described.

7. In an exhaust-silencer, the combination with a casing divided into two compartments by a central partition, sleeves holding the partition in position, a tube extending through the casing and having openings communicating with each compartment, a baffle dividing the tube into two parts, and a second tube having closed ends and two series of openings communicating with the respective compartments, the openings in the two tubes being turned away from each other, substantially as described or illustrated in the accompanying drawings.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

J. B. DUNLOP.

J. B. DUNLOP, JUNR.

Witnesses:

F. W. K. WILSON,

ROBT. RUXTON.