

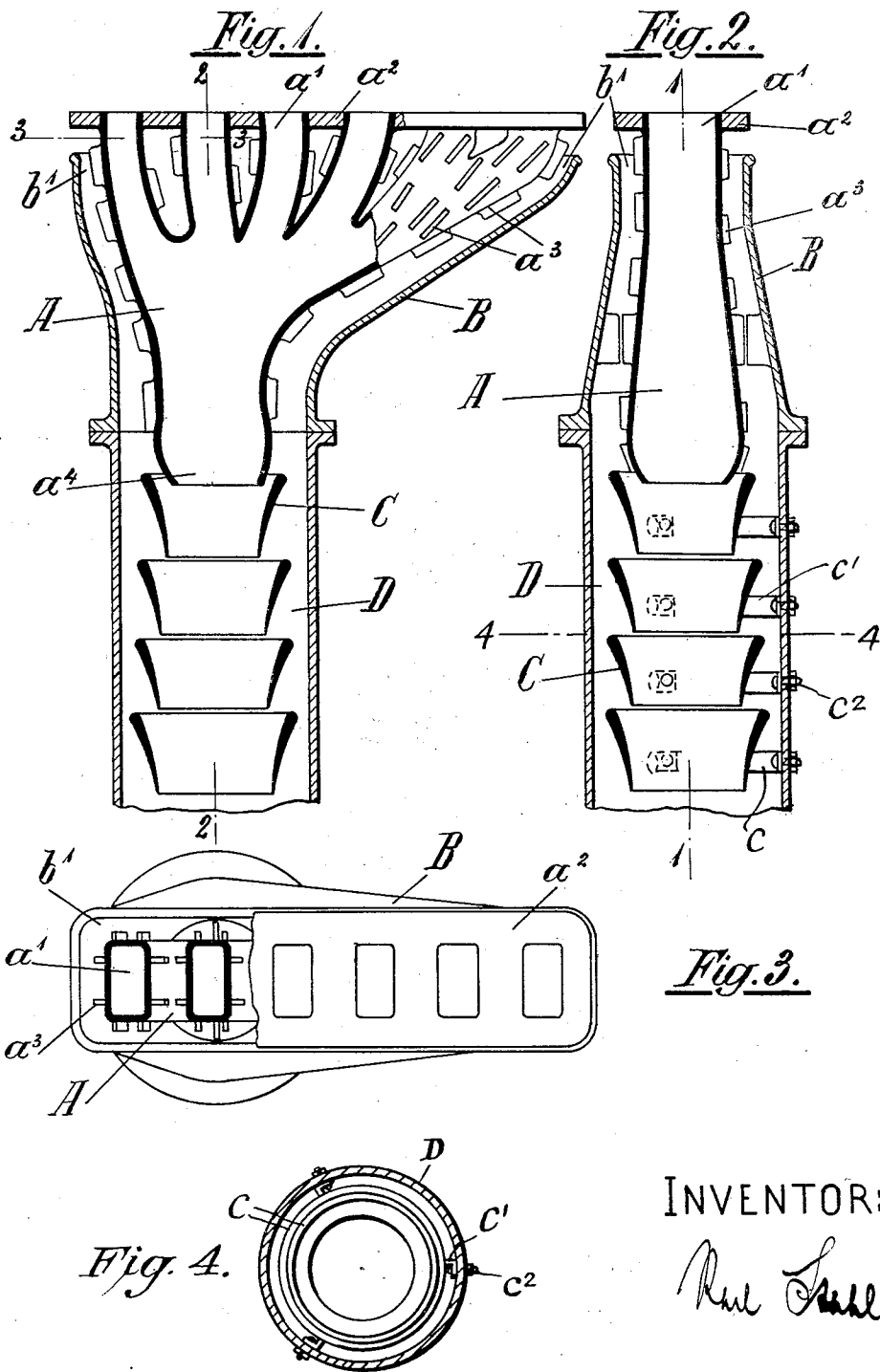
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K. STAHL

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SILENCER FOR MULTICYLINDER INTERNAL COMBUSTION ENGINES

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INVENTOR:

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UNITED STATES PATENT OFFICE.

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SILENCER FOR MULTICYLINDER INTERNAL-COMBUSTION ENGINES.

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To all whom it may concern:

Be it known that I, KARL STAHL, a citizen of Germany, residing at Friedrichshafen, Germany, have invented certain new and useful Improvements in Silencers for Multicylinder Internal-Combustion Engines, of which the following is a specification.

My invention refers to multicylinder internal-combustion engines, and more especially to the silencers thereof. Silencers, as everybody knows, are employed in order to make it possible to discharge exhaust gases without troublesome increase in pressure with as little noise as possible and at a low temperature. For this purpose it is necessary above all to reduce the volume of the exhaust gases by cooling and to avoid all unnecessary resistance in doing so by conducting the exhaust gases and the cooling medium in an appropriate manner.

My invention achieves this object in a particularly advantageous manner inasmuch as the whole of the conduit-piping which connects the flanged exhaust sockets of the various cylinders with some system of mixing and cooling nozzles which as much is already known, is encircled by the same current of cooling air which is also fed to the nozzles. In the above every individual exhaust pipe coming from any one cylinder (or the other) may be enclosed in a separate cooling pipe and all the exhaust pipes and all the cooling pipes can finally be united to form one joint hollow body. Better results, however, are gained, if the whole of the conduit-piping is enclosed in one joint casing which is open in the vicinity of the flanged exhaust sockets.

A particularly simple silencer is attained in accordance with my invention by not leading the exhaust pipes of the various cylinders to the mixing space separately, but by uniting them in a joint conduit-pipe casing shortly after leaving the flanged exhaust sockets. In accordance with the invention the latter, for the purpose of further increasing the cooling effect, may be equipped on the outside with radiator projections projecting into the space through which the cooling air flows and at the same time serving to guide the air provided they are designed to correspond to the streamlines as far as possible.

In the drawings attached to this specification and forming part thereof, a silencer in accordance with the invention is illustrated by way of example.

In the drawings Fig. 1 is a cross-section of a silencer in the plane of symmetry 1—1 of Fig. 2 whilst

Fig. 2 is a cross-section in the plane 2—2 of Fig. 1 and

Fig. 3 a view from the front, part of which is shown as a cross-section in the plane 3—3 of Fig. 1. Fig. 4 is a section on the line IV—IV in Fig. 2.

The silencer consists of a conduit-pipe casing A, conducting the exhaust gases, and an outer casing B. In the case exemplified the conduit-pipe casing A is subdivided in the vicinity of the entrance-side of the exhaust-gases into six entrance pipes, a' corresponding to the various cylinders. The conduit-pipes end in a flange-plate a^2 for fastening which makes it possible to connect up with the six exhaust openings of the cylinders not shown in the drawing. The real conduit-pipe casing A as well as the entrance pipes a' branching off from it, but situated within the outer casing B are fitted with a number of radiator projections a^3 . The latter partly also serve to stay the outer casing B against the conduit-pipe casing A. At a^4 the conduit-pipe casing A opens into the first of four cooling nozzles C, in which the mixing of the exhaust gases with air takes place at the same time. The outer casing B does not connect up tight with the flange plate a^2 for fastening, but leaves a space b' open all around as an entrance for the air. At the other end the outer casing B connects up with the casing D of a mixer which, however, does not form the object of the invention.

The form of the whole silencer casing can vary widely according to the number of cylinders and type of motor employed. The connection with a special mixer casing for the purpose of further deadening the noise is not absolutely necessary. For reasons of simplifying the drawing it is assumed that the silencer has a plane for its surface of symmetry. In the case of a construction for practical use it is advisable to deflect at least the part containing the nozzle arrangement in such a way as to make the total surface of resistance of the exterior become as small as

possible and to render it possible to lead the exhaust gases as well as the cooling air mixed with them, further in a direction opposite to that in which the craft or conveyance is moving. Especially in the case of silencers for internal-combustion engines of air-craft it is recommended to shorten the various entrance pipes very much or to cut them out entirely and to lead an undivided conduit-pipe casing up to just in front of the flange-plate for fastening instead. Of course the arrangement may also be designed in a manner differing from that of Fig. 1, inasmuch as the section through the surface of symmetry can also possess a line of symmetry.

I claim:

1. In a silencer for multicylinder internal-combustion engines in combination, a fixing plate, a plurality of exhaust pipes, one for each cylinder, each pipe having one end mounted in said plate, the other ends merging into a tapered tube, a plurality of nozzles disposed in series to the rear of said

tube and an open-ended tapered jacket spaced apart from said plate so as to offer a substantially annular air inlet, said jacket surrounding with a clearance all said single pipes, said tube and said nozzles.

2. In a silencer for multicylinder internal combustion engines in combination, a plurality of exhaust pipes united to form a single conduit, a plurality of air nozzles disposed in series to the rear of said conduit, ribs on said pipes and an open jacket surrounding with a clearance all said pipes, said conduit and said nozzles.

3. In a silencer for multicylinder internal combustion engines in combination, a plurality of exhaust pipes united to form a single conduit, a plurality of air nozzles disposed in series to the rear of said conduit, ribs on said pipes and said conduit and an open jacket surrounding with a clearance all said pipes, said conduit and said nozzles.

In testimony, whereof I affix my signature.

KARL STAHL.