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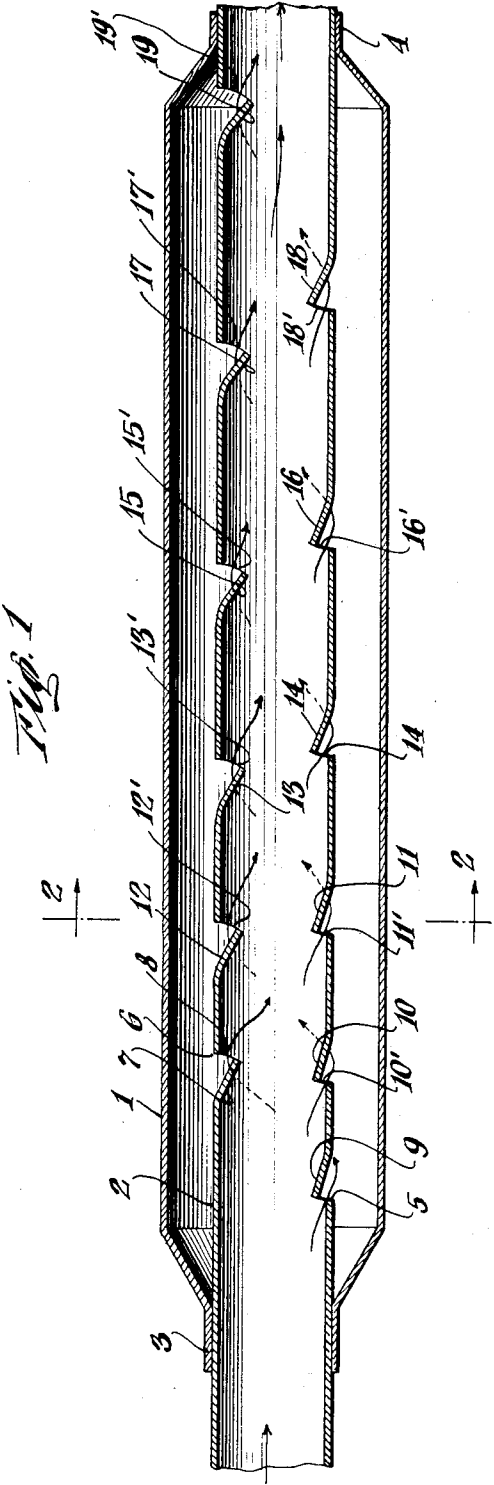
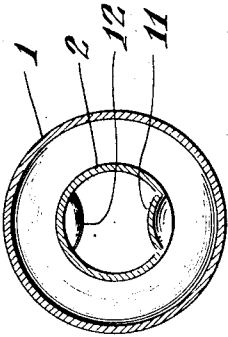


Fig. 2



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6 Claims. (Cl. 137-160)

This invention relates in general to silencers and more particularly to silencers for internal combustion engines.

An object of the invention is to provide a silencer which will be of simple and durable construction, easy and inexpensive to make and assemble.

Another object is to provide a silencer which allows for a continuous but retarded flow of exhaust gases and to provide an induction system which will insure a helical airflow without the necessity of impeding helical louvers which would tend to build up prejudicial back pressure in the engine to which the silencer may be connected.

It is a further object to provide a silencer wherein there will always be a direct air passage to the discharge end and wherein a series of relatively small louvers not sufficient to build up any appreciable back pressure will constitute an induction system which will not structurally limit the flow of gases, but which will cause the flow to follow a helical path.

It is a still further object to provide a silencer that will effectively break down the frequency which may set up by the explosions of the engine so as to silence the effect of the explosions.

With the foregoing and other objects in view, the invention consists in the combination of parts and in the details of construction set forth in the following specification and appended claims, certain embodiments being illustrated in the accompanying drawing, in which:

Figure 1 is a view in longitudinal section through the silencer;

Figure 2 is a section taken along line 2-2 of Figure 1.

Referring more particularly to the drawing, the silencer consists in an outer casing 1 and an inner casing 2, which may be suitably secured at 3 and 4 to the outer casing. The inner casing is provided with a series of louvers, each of which may be formed by cutting transversely through the preferably malleable metal for a relatively slight distance, and hammering the casing immediately behind the cut until a louver is formed which projects to a degree into the casing and predetermined by the size of the cut and the extent of hammering. The hammering does not affect the general overall dimensions of the casing. These louvers are formed both in the upper and lower sides of the inner cylindrical casing and the upper and lower louvers are arranged in staggered relation.

For instance, as shown in Figures 1 and 2, the lower side of the casing having been cut at 5 and the wall having been hammered down behind the

cut to form a louver 9 instead of ahead of the cut, as is the case in the upper louvers, where the casing is cut at 6 and the wall hammered inwardly an inclined louver 7 is formed which will deflect the gases through the opening 8 provided for in the forming of the louver. The upper louver 7 is substantially parallel to louvers 9 and 10, as is the case of all louvers and is arranged in sufficient staggered relation to lower louver 9 so as to provide for a direct flow of gases injected through the upper opening 8 from the lower opening 9 through the inner casing and out through the lower opening 11' and again into the outer casing.

As stated before, the louvers only extend a relatively short distance into the casing so that there is a substantially uninterrupted central bore for free passage of the gases unobstructed by anything which would cause the building up of back pressure. The gases near the inner periphery of the casing will, however, be deflected downwardly by the front louver 9 through the outlet 9'. The subsequent lower louvers 14, 16 and 18 likewise deflect such peripheral gases through the corresponding openings 14', 16' and 18'. The upper louvers are inclined in the opposite direction so that upper louver 7 in forcing the gases downwardly give them an impetus in the direction of the lower opening 11. Furthermore, an induction effect is obtained in that the gases of the inner casing, in being deflected downwardly by louver 7, create a suction at the upper opening 8, causing the gases which have been deflected by the lower louver 9 into the outer casing through the lower opening 9' to be drawn in through the upper opening 8. The path taken by the gases under such induction is helical, even though there is no impeding spiral louver. The staggered relation of the simple inwardly extending upper and lower louvers brings about the induction and tortuous or helical flow of the gases.

The formation and disposition of the lower louvers is such as to provide an efficient deflector, without impeding the gas flow sufficient to build up any appreciable prejudicial back pressure. The same formation but reverse disposition of the upper louvers provides for several necessary advantageous results. First they allow for a central substantially uninterrupted flow, and secondly they are so disposed as to deflect the peripheral gases in a direction toward the lower corresponding outlet. A further feature is that the upper curved surface of each upper louver simulates the curvature of an aerofoil which makes for an acceleration of flow as the gases flow toward the rear end. As this acceleration

builds up, so does the induction of the gases from the preceding lower louvers. The upper and lower louvers are so arranged in such staggered relation that not only are the gases of the inner casing deflected by the upper louvers toward the lower openings aided by the lower louvers, but the upper louvers also cause the inducted gases to be directed toward the lower openings whence they are additionally guided by the lower louvers.

This construction provides for an effective silencing with the minimum retardation of the discharge of the gases. There is always a direct substantially uninterrupted flow of the centrally disposed gases. The helical flow of the peripheral gases is accelerated in nature and being brought about inherently rather than strictly structural does not produce disadvantageous back pressure but merely provides a steady helical flow which efficiently destroys sound frequencies which would otherwise be set up by the intermittent explosions and the consequent central gas flow.

In carrying out the above principles, I further progressively diminish the impeding effect on the gases from the inlet toward the outlet end of the silencer. To bring this about, I in reality increase the size of the upper louvers and the corresponding upper apertures, the size of the lower louvers and apertures remaining uniform, and I also increase the distance between the upper louvers and between the lower louvers as well, with the diameter of the inner casing remaining uniform throughout. The increased spacing between the louvers brings about a longer helix of flow or, in other words, has a tendency to straighten out the tortuous or helical flow. The increase in the size of the upper louvers and apertures compensates for the increase in space between the louvers and is found to be desirous in obtaining efficient induction to maintain the helical flow throughout and the blending of the gases in such a manner as to break down any frequency which may be set up by engine explosions.

I claim:

1. A silencer comprising an inner and an outer casing, said inner casing being open at its inlet and discharge ends and provided with a substantially uninterrupted central passageway, a plurality of rows of louvers with adjacent apertures arranged in substantially the opposite walls of said inner casing, the louvers of one of said rows extending diagonally toward the discharge end with adjacent apertures arranged toward said end, the louvers of the other of said rows extending toward the inlet end with adjacent apertures arranged toward said end.

2. A silencer comprising an inner and an outer casing, said inner casing being open at its inlet and discharge ends and provided with a substantially uninterrupted central passageway, a plurality of rows of louvers with adjacent apertures arranged in substantially the opposite walls of said inner casing, the louvers of one of said rows extending diagonally toward the discharge end with adjacent apertures arranged toward said end, the louvers of the other of said rows extending toward the inlet end with adjacent aper-

tures arranged toward said end, the depth of the louvers of both of said rows and adjacent apertures being progressively increased toward said discharge end.

3. A silencer for fluids comprising an inner and an outer casing, said inner casing being open at its inlet and discharge ends, means for inducing a substantially helical flow of said fluids through said outer casing and transversely through said inner casing, said means including a plurality of rows of louvers and apertures in substantially the opposite walls of said inner casing, each of the louvers of one row extending inwardly from the wall of said inner casing and behind an adjacent aperture and each of the louvers of the other row extending inwardly from the wall of said inner casing in advance of an adjacent aperture, the louvers of one row extending in an opposite direction to the louvers of the other row.

4. A silencer for fluids comprising an inner and an outer casing, said inner casing being open at its inlet and discharge ends, means for inducing a substantially helical flow of said fluids through said outer casing and transversely through said inner casing, said means including a plurality of rows of louvers and apertures in substantially the opposite walls of said inner casing, each of the louvers of one row extending inwardly from the wall of said inner casing and behind an adjacent aperture and each of the louvers of the other row extending inwardly from the wall of said inner casing in advance of an adjacent aperture, the louvers and apertures of one row being staggered with respect to those of the other row.

5. A silencer for fluids comprising an inner and an outer casing, said inner casing being open at its inlet and discharge ends, means for inducing a substantially helical flow of said fluids through said outer casing and transversely through said inner casing, said means including a plurality of rows of louvers and apertures in substantially the opposite walls of said inner casing, each of the louvers of one row extending inwardly from the wall of said inner casing and behind an adjacent aperture and each of the louvers of the other row extending inwardly from the wall of said inner casing in advance of an adjacent aperture, the louvers of one row being staggered with respect to those of the other row, said louvers being struck out of the walls of said inner casing and arranged to extend diagonally with respect thereto.

6. A silencer comprising an inner and outer casing, said inner casing being open at its inlet and discharge ends and provided with a substantially uninterrupted central passageway, a plurality of opposed rows of louvers with adjacent apertures arranged in substantially the opposite walls of said inner casing, the louvers of one of said rows extending diagonally inwardly toward the discharge end with adjacent apertures arranged towards said end, the louvers of the other of said rows extending toward the inlet end with adjacent apertures arranged toward said end.

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