H. T. HUTTON.

EXHAUST SILENCER FOR USE IN CONNECTION WITH INTERNAL COMBUSTION ENGINES.

APPLICATION FILED FEB. 20, 1913.

1,162,064.

Patented Nov. 30, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

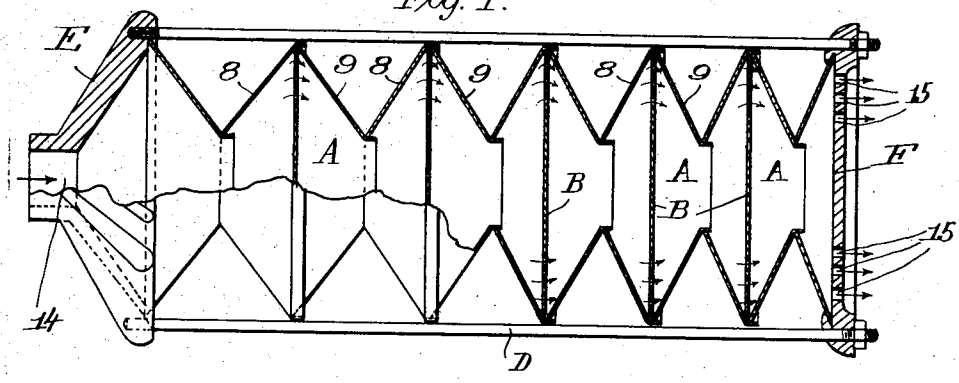


Fig. 2.

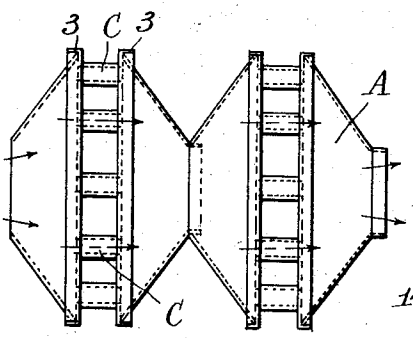


Fig. 4.

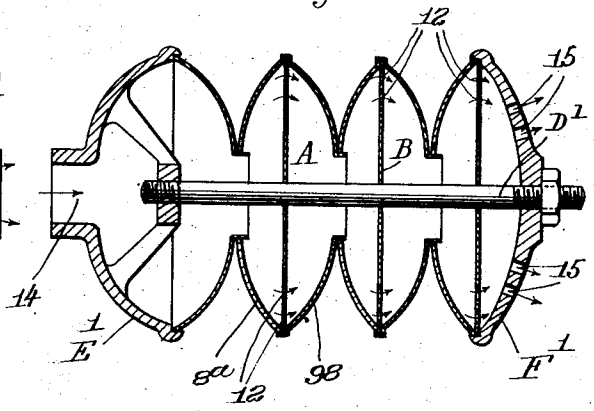


Fig. 3.

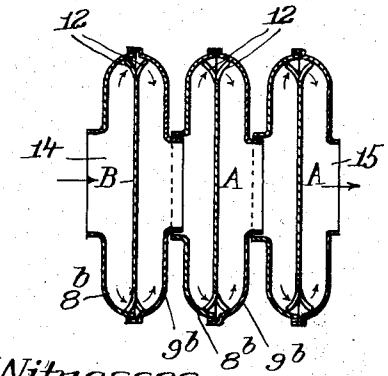
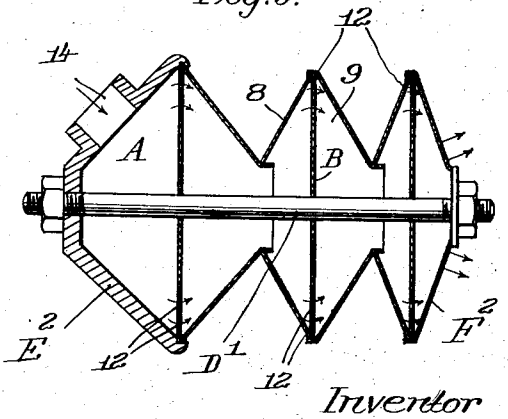


Fig. 5.



Witnesses.
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2 SHEETS—SHEET 2.

Fig. 6.

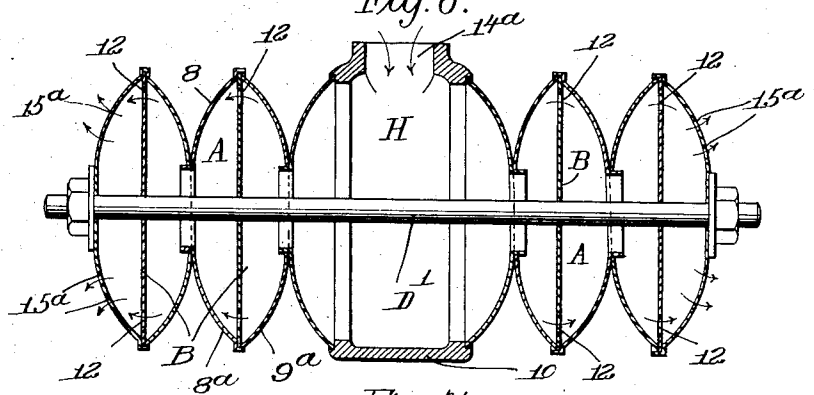


Fig. 7.

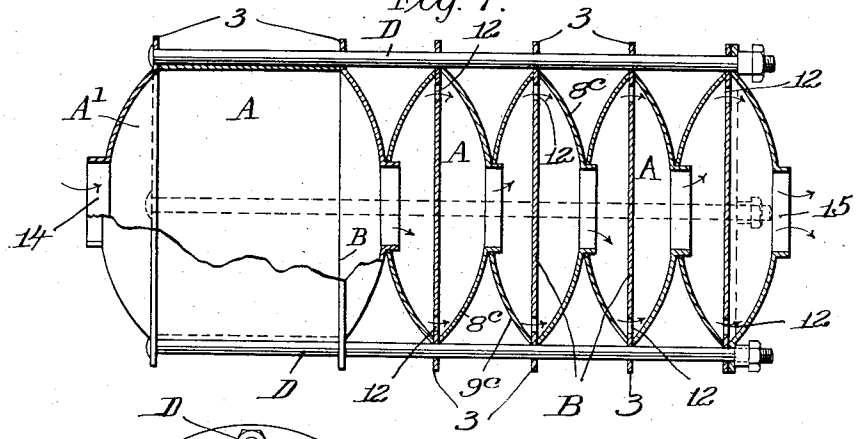


Fig. 8.

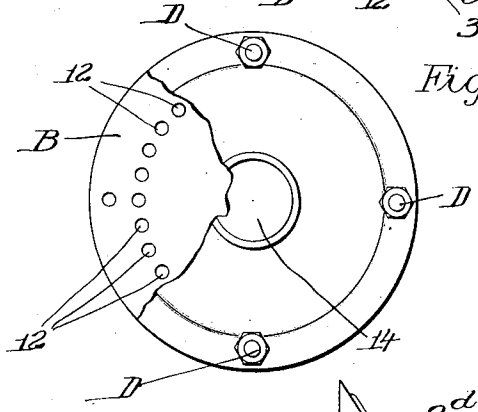
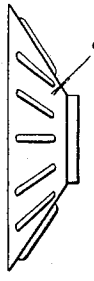


Fig. 9.



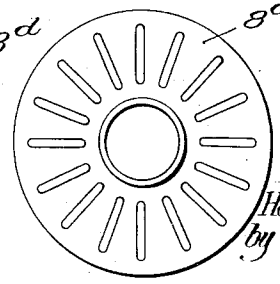


Fig. 10.

Witnesses.
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UNITED STATES PATENT OFFICE.

HENRY THOMAS HUTTON, OF DONAGHADEE, IRELAND.

EXHAUST-SILENCER FOR USE IN CONNECTION WITH INTERNAL-COMBUSTION ENGINES.

1,162,064. Specification of Letters Patent. Patented Nov. 30, 1915.

Application filed February 20, 1913. Serial No. 749,571.

To all whom it may concern:

Be it known that I, HENRY THOMAS HUTTON, a subject of the King of Great Britain and Ireland, residing at Donaghadee, county Down, Ireland, have invented new and useful Improvements in Exhaust-Silencers for Use in Connection with Internal-Combustion Engines, of which the following is a specification.

This invention has reference to improvements in and relating to silencers for use in connection with internal combustion engines and more particularly to silencers of that type in which a number of approximately lenticular-shaped communicating chambers are arranged in series, these chambers having a central inlet and outlet from one to the other and a perforated partition which divides each chamber into two compartments that communicate with each other through the perforations in the partition.

The known silencers of the type in question are rigid structures which cannot be readily cleaned, and the main object of my invention is to provide a silencer which can be very quickly taken to pieces and the members of which can be as quickly reassembled, the only tool required for doing this being a spanner for screwing and unscrewing a nut or nuts. Further advantages attained by constructing a silencer in accordance with my invention are that it has a certain amount of springiness or longitudinal flexibility, and that the length of the silencer can be very readily varied by removing one or more sections.

I have illustrated my invention in the accompanying drawing in which—

Figure 1 shows a construction in which the chambers are assembled by means of bolts which are outside the chambers; Fig. 2 shows a construction in which tube plates and tubes take the place of the perforated partitions; Fig. 3 shows a variation in the construction of the partitions; Figs. 4, 5 and 6 show a construction in which the chambers are assembled by means of a bolt which passes centrally through the chambers; Fig. 7 shows a construction in which the perforated partitions project beyond the chambers for the purpose of assisting in radiating some of the heat imparted to them by the hot gases; Fig. 8 is an end view of Fig. 7 with the end plate partly broken away; Figs. 9 and 10 show the dished members of the chambers formed with indentations for the purpose of assisting in radiating the heat.

In carrying out my invention I provide a plurality of separate lenticular-shaped communicating chambers which are separable from each other and which are arranged in abutting relation and provide a tie-rod or tie-rods which connect the various chambers together, the construction being such that by simply loosening the nuts on the tie-rods the various chambers can be separated from each other. In my invention the separate chambers simply rest loosely against each other and are maintained in their proper position by the tie-rods.

Referring now to the drawings, A indicates the lenticular chambers or vessels, B a diaphragm or equivalent within said chambers having apertures, slots or other passages 12 whereby the hot exhaust gases will be compelled to travel substantially along the walls of the chambers in their passage through the series of chambers or vessels. Instead of a single diaphragm, adjacent chambers or vessels may be divided by two of these (as indicated in Fig. 2) in the form of tube plates carrying tubes C through which the gases pass, said tubes being located near the periphery of the plates.

Usually all the chambers would be of the same dimension because by this cheapness of manufacture and assembling is attained, but in special circumstances it may be desirable to make the chambers of varying sizes, for example of successively increased diameter or of successively decreased width as shown in Fig. 1, but I do not limit myself in any way to this.

As stated above, the various lenticular chambers A are all separable from each other, are assembled in abutting relation, and are held in proper relation by tie-rods. In assembling the various chambers, they are placed so that the openings therein are in alinement with each other.

Referring first to Fig. 1, each chamber A is comprised of the two dish-shaped disks 8 and 9, each disk having a central opening, and the disk 9 of each chamber A is provided with a flange surrounding the opening, which flange enters the opening in the disk 8 of the next adjacent chamber A. These flanges simply loosely enter the openings and serve to hold the adjacent cham-

bers A in proper position relative to each other. At one end of the assembled chambers is a head E having an inlet port 1, and at the opposite end is a head F having outlet ports 15. These heads are tied together by tie-rods D which are situated exterior to the chambers A and hold them in their proper abutting relation.

In Fig. 4 the same general construction is provided, that is, each of the dish-shaped disks 98 has the flange surrounding the opening which enters the axial opening in the dish-shaped disk 8^a in the adjacent chamber A. In this embodiment of the invention the various chambers A are tied together by a centrally-situated tie-rod D′ which extends from the head E′ at the inlet end to the head F′ at the exhaust end.

In Fig. 5 substantially the same construction is shown with the centrally-arranged tie-rod D′, but the head E^2 at the inlet end is provided with a lateral inlet opening 14, while the head F^2 at the outlet end is in the form of sheet metal.

Fig. 3 shows a variation in the construction of the baffle plates, the apertures 12 at the periphery of same being formed by making slits in the edge of the plate and bending back successive marginal portions in opposite directions.

In the constructions shown in Figs. 2 and 7, the projecting edges 3 of the baffle plates serve to radiate some of the heat imparted to said baffle plates by the hot gases. The edges 3 of the baffle plates shown in Fig. 7 are slotted to receive the tie-bolts D.

In Fig. 6 a construction is shown wherein the entrance opening 14^a is at the central portion of the muffler and leads into an enlarged central chamber H. A plurality of lenticular chambers A are situated each side of this central chamber H and the end chambers have the exhaust chambers 15^a. These chambers are all held together by the tie-rod D′.

Figs. 9 and 10 show the dished members 8^d of the chambers formed with indents which can be made by means of stamps or dies, these indents serving to strengthen the disks.

It will be noted that in all my constructions each of the lenticulated chambers A has on one side thereof a projecting flange surrounding the opening, which flange loosely enters the opening in the side of the adjacent chamber, and that all of the chambers are tied together by one or more tie-rods. By means of this construction the muffler can be very readily taken apart by simply removing the nuts from the tie-rods, for when this is done the separate chambers A can be readily removed and each independently cleaned.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In an exhaust silencer, the combination with a plurality of lenticular chambers, each presenting two convexly-dished disks arranged rim to rim and an intermediate baffle plate provided with apertures, each disk having a central opening, one disk of each chamber having a flange surrounding said opening which loosely enters the opening of the adjacent disk of the adjacent chamber and is removable therefrom, of a tie-rod tying said disks together.

2. In an exhaust silencer, the combination with a plurality of lenticular chambers, each having an opening in each side, said chambers being separable from each other and arranged in abutting relation with the openings in alinement and each chamber having means for maintaining the adjacent chamber properly centered, of a tie-rod connecting said chambers and constituting the means by which they are held in proper relation.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY THOMAS HUTTON.

Witnesses:
JOHN MCQUADE,
EDMUND LLOYD-EDWARDS.