Internal combustion engines often rotate at a very high speed say 5 to 6,000 R. P. M. The exhausting of the gases at said rate of running should be operated in an extremely rapid manner so as not to produce any counter-pressure in the exhaust which counter-pressure may reduce the efficiency of the engine by 15 to 25%.

In order to remove said drawbacks, the fuel used exclusively in such engines is the so-called superfuel providing burnt gases the specific weight of which is about 6 times less than in the case of ordinary gasoline.

The apparatus forming the object of my invention removes these drawbacks and ensures at the highest speeds the rapid and silent exhaust of the burnt gases.

This result is obtained by associating streamlined baffles plates provided with a plurality of openings arranged along a helical line on all the baffles plates or else said openings are arranged in reverse formation. This system produces an eddy of the burnt gases which are no longer held back but on the contrary sucked outwardly by the depression produced.

This exhaust is still further accelerated by an arrangement fitted at the outer end of the silencer and producing an annular current of air that is proportional to the speed of the vehicle and sucks in a still further amount of gases.

This large amount of air is stirred with the smoke which are thus diluted and decomposed and the residuum passing out of the silencer has no longer the obnoxious character and unpleasant smell that it had not been possible heretofore to remove.

Engines thus equipped yield their highest efficiency even with ordinary gasoline which leads to an increase in the speed of the vehicle and to an economy in fuel.

In accompanying drawings given out by way of example in a diagrammatic manner and without any binding sense I have illustrated several forms of execution of the invention.

Fig. 1 is a front view partly torn off of a silencer for motor-cycles.

Fig. 2 shows a silencer for an automobile.

Fig. 3 is a sectional view of a silencer with a twin pipe for trucks or internal combustion engines having a high cylinder volume.

Fig. 4 is an axial cross-section of a supplementary arrangement secured to the end of the silencer for accelerating the exhaust of the burnt gases.

Fig. 5 is a detail view of two types of cones playing the part of baffle plates in the silencer.

The apparatus illustrated in said drawings includes a tube I for the expansion of the gases, said tube being adapted to be secured to the exhaust pipe. Inside said tube are arranged conical members 2 of metal sheet. These cones are placed either in parallelism with one another or in relative reverse position or else they are secured together through their base; they are provided with longitudinal slots separated from one another and established so as to form a sort of helical pitch which may have the same direction on each cone or else be reversed from one cone to the next.

The slots 3 are formed in the mass of the cone and the metal is urged outwardly when the cones are intended to receive gases through the inside and on the contrary towards the inside when the cones show their apex against the flow of gas.

The arrangement illustrated in Fig. 1 comprises four cones of which one is located at the input into the expansion tube and two are coupled through their base, the latter being directed towards the outlet of the tube.

The apparatus shown in Fig. 2 is designed for automobile vehicles and is also provided with four cones arranged in the same manner as in the apparatus shown in Fig. 1 but the two central cones coupled through their base are separated by a gap from the two other cones of opposed direction.

The apparatus shown in Fig. 3 is intended more particularly for use on large automobiles and trucks. It includes two arrangements similar to that illustrated in Fig. 2 arranged in twin formation and associated with a single input and a single output. Obviously the inputs or outputs of the gases may as well be provided independently for each arrangement.

For very powerful engines, it is possible to couple a plurality of such apparatuses in order to do away with large cross-sections in the expansion tubes.

The arrangement illustrated in Fig. 4 is intended for location at the end of the exhaust
pipe corresponding to the output of the gases. It appears under the shape of a funnel 6 inside which is housed a portion of a tube 5 held by the stays 7. Said tube 5 serves only as a securing means for the exhaust pipe and does not reach the end of the funnel. Thus there is provided between the tube 5 and the walls of the funnel an empty annular space through which the outer air enters with a speed proportional to that of the vehicle. The inner end of the funnel forms a throttle which furthers the stirring of the air and gases. The base of the funnel is welded or secured through any other suitable means to a final chamber of suitable shape that is perforated and opens into the outer atmosphere and into which the mixture of air and smokes arrives and is then after removed outwardly without any substantial smell being perceptible. It is easy to understand the interest of applying such a silencer to engines operating with heavy oil, gas producers and the like, which form heavy smokes.

Obviously many modifications may be brought to such apparatuses both as concerns the number and shape of baffle plates used and the arrangement of the slots without modifying there by the principle of the invention as defined in accompanying claim.

What I claim is:

An exhaust muffler for internal combustion engines comprising an expansion pipe, conical baffle plates opening towards the inlet and outlet respectively and at least one intermediary double cone baffle plate, the bases of the cones of which are in unrestrictedly open contacting relationship and engage through their outer periphery the inside of the expansion pipe wall, the different baffle plates being provided with a plurality of series of slots lying at short distances from one another along substantially helical lines.

GUSTAVE PLASSE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,859,400</td>
<td>Kersey</td>
<td>May 24, 1932</td>
</tr>
<tr>
<td>2,024,834</td>
<td>Rippe</td>
<td>Dec. 17, 1935</td>
</tr>
<tr>
<td>2,061,675</td>
<td>Blanchard</td>
<td>Aug. 8, 1936</td>
</tr>
<tr>
<td>2,069,343</td>
<td>Moore</td>
<td>Dec. 22, 1936</td>
</tr>
<tr>
<td>2,122,086</td>
<td>Chase</td>
<td>June 28, 1938</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>352,142</td>
<td>France</td>
<td>Apr. 24, 1923</td>
</tr>
<tr>
<td>397,697</td>
<td>Italy</td>
<td>Mar. 22, 1928</td>
</tr>
</tbody>
</table>