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DEVICE FOR EXTINGUISHING THE FLAME AND DEADENING THE NOISE OF THE
EXHAUST GASES IN INTERNAL COMBUSTION ENGINES

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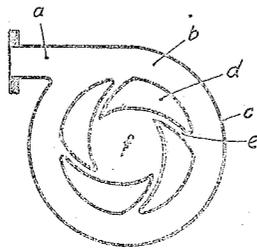


Fig. 1

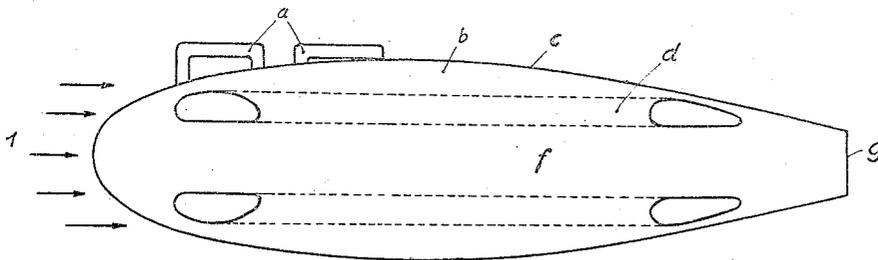


Fig. 2

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DEVICE FOR EXTINGUISHING THE FLAME
AND DEADENING THE NOISE OF THE EX-
HAUST GASES IN INTERNAL COMBUSTION
ENGINES

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4 Claims. (Cl. 181—58)

This invention relates to a device for extin-
guishing the flame and deadening the noise of
the exhaust gases in internal combustion engines.

For this purpose it has been proposed to sub-
ject the exhaust gases to strong cooling down,
as, for instance, by conducting cooling-pipes
through the chamber into which the exhaust
gases after leaving the cylinders are passed,
or by surrounding the said chamber by a cool-
ing-jacket. The cooling medium may be a gas
or a liquid. In motor cars and especially in air-
craft mostly the draft of air or in some cases
also water is used for this purpose.

Furthermore it is well known to promote the
transmission of heat through the walls of the
cooling lines or through the outer jacket of the
exhaust chamber by corrugating the said walls.
This method of cooling is imperfect in as much
as for obtaining a satisfactory result large sur-
faces would be required as well for doing away
with the exhaust flames as for deadening the
exhaust noise, whereby the weight and the cost
would be increased to such an extent that this
method is especially excluded in connection with
airplane motors.

According to the present invention the cham-
ber, into which the exhaust gases coming from
the cylinders are passed, is traversed by lines
through which gaseous or liquid cooling media
are conducted and which are so arranged that
at the same time, besides the cooling action,
deadenening of the gas oscillations by molecular
friction and reflexion is obtained, the exhaust
gases being farther compelled in a direction op-
posed to the direction of transmission of the
sound waves in the exhaust gas.

The invention is illustrated by way of exam-
ple in the annexed drawing of which

Fig. 1 is a vertical cross-section and

Fig. 2 is an elevation of an exhaust box.

The exhaust gases enter the chamber *b* sur-
rounded by a jacket *c* by an inlet pipe *a*. The
jacket *c* is streamlined to offer the least possible
resistance to the cooling medium flowing in the
direction of the arrow *f*. Within the chamber *b*
are arranged channels *d* extending parallelly
to the longitudinal axis which channels are trav-
versed by the cooling medium. The slots *e* left free
between the different channels conduct the ex-
haust gases, opposite their initial direction of
flow, to the channel *f* left free inside the chan-
nels *d*. In the channel *f* the gases flow off
to the rear end of the deadening device where
they escape through the opening *g* into the open
air.

By this particular arrangement of the chan-
nels *e* a double effect is obtained in view of the
sound-deadenening. The sound waves taken along
in the direction of the gases flowing in the inlet
pipes *a* can only enter the channels *e* after
reflexion at the inner surface of the jacket *c*.
Also in these channels owing to their curvatures
again a multiple reflexion of the gas oscillations
(arriving as it is only reflected) takes place, so
that no other oscillation can reach the inner
channel *f* than such which have been twice sub-
jected to repeated reflexion and thereby satis-
factorily deadened. Owing to the molecular fric-
tion resulting from the flowing in these channels,
and besides to the strong cooling down simulta-
neously obtained by the cooling medium flowing
in the channels *d*, an intensive deadening of os-
cillations is additionally effected in each of the
partial gas currents which are, in accordance
with the shape of the channels, very flat. Fur-
thermore a cooling is effected on the outer jacket
c. Therefore the entire effect of the device form-
ing the object of the present invention—consist-
ing in a perfect suppression of the exhaust flames
combined with high-grade deadening of the os-
cillations—is obtained by the combination of a
far extending reflexion and an intense reduction
of the energy of the exhaust gases owing to mo-
lecular friction and cooling-down.

The above-described contrivance simultane-
ously entails an essential technical progress in
consequence of the fact that the inner parts of
the device are no more permanently exposed to
high temperatures as they were in the devices
hitherto used. Hereby the life of these parts
and therewith that of the entire contrivance is
considerably increased.

I claim:—

1. A device for doing away with the exhaust
flames and deadening the oscillations in the ex-
haust gases of internal combustion engines,
comprising a casing, spaced cooling ducts longi-
tudinally passing therethrough and dividing the
interior of the casing into an inner tubular and
an outer annular channel, an inlet for the ex-
haust gases entering the side of the device near
one end and discharging tangentially into the
said outer channel, and an outlet at the other
end of the casing, the spaces between the cool-
ing ducts diverging from the way of the gases
in the annular channel at an acute angle in back-
ward direction.

2. A device for doing away with the exhaust
flames and deadening the oscillations in the ex-
haust gases of internal combustion engines, com-

- prising a casing, spaced curved cooling ducts longitudinally passing therethrough and dividing the interior of the casing into an inner tubular and an outer annular channel, an inlet for the exhaust gases entering the side of the device near one end and discharging tangentially into the said outer channel, and an outlet at the other end of the casing, the spaces between the cooling ducts diverging from the way of the gases in the annular channel at an acute angle in backward direction.
3. A device for doing away with the exhaust flames and deadening the oscillations in the exhaust gases of internal combustion engines, comprising a streamlined casing, spaced cooling ducts longitudinally passing therethrough and dividing the interior of the casing into an inner tubular and an outer annular channel, an inlet for the exhaust gases entering the side of the device near one end and discharging tangentially into

the said outer channel, and an outlet at the other end of the casing, the spaces between the cooling ducts diverging from the way of the gases in the annular channel at an acute angle in backward direction.

4. A device for doing away with the exhaust flames and deadening the oscillations in the exhaust gases of internal combustion engines, comprising a streamlined casing, spaced curved cooling ducts longitudinally passing therethrough and dividing the interior of the casing into an inner tubular and an outer annular channel, an inlet for the exhaust gases entering the side of the device near one end and discharging tangentially into the said outer channel, and an outlet at the other end of the casing, the spaces between the cooling ducts diverging from the way of the gases in the annular channel at an acute angle in backward direction.

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