To all whom it may concern:

Be it known that I, GASTON RUFFIER, a
citizen of the Republic of France, residing
at No. 28 West Twentieth street, in the
5 county, and State of New York, have in-
vented certain new and useful Improve-
ments in Apparatus for Heating Auto-
mobiles, of which the following is a full, true,
and concise specification.

This invention is a heater or foot-warmer
for automobiles, of the type wherein the ex-
hast gases of the propelling engine are uti-
6 lized as the source of heat, and the inven-
tion resides in the combination, relative
position and construction of the heater and
its supply connections, whereby the exhaust
8 gases are used before they are cooled by ex-
pansion or radiation and without disturb-
ing the effective operation of the engine, and
whereby certain other advantages, hereinafter
explained, or made apparent, are ob-
tained.

In the accompanying drawings forming
a part of this specification, Figure 1 repre-
sents in side elevation a form of heating
apparatus constructed according to my in-
vention, together with so much of the ordi-
nary automobile exhaust pipe as will be nec-
necessary to indicate the principle and opera-
tion thereof; Figs. 2 and 3 are respec-
tively horizontal and vertical sections through the heater on an enlarged scale; Figs. 4 and 5
are enlarged sectional details of the control-
ling valve mechanism indicating two ex-
reme adjustments thereof; Figs. 6 and 7
are cross-sections of a form of heater of this
invention more specially adapted for use
with open automobile bodies.

Referring to Fig. 1, the exhaust ports of
the propelling engines of the automobile
are marked 1, and the exhaust pipe which
conducts the gases from said ports to the
rear of the vehicle, underneath the floor 3
thereof, in the usual manner, is marked 2.

The heater 4 is located within the auto-
mobile body preferably upon the floor 3, and
consists of any suitable construction which
will provide a free but tortuous passage for
the hot gases. The heater is preferably
formed as a flat coil of piping and is con-
tained within a casing 5 and embedded in a
body of fireproof heat-conducting material
6 therein, such as sand or cement. The inlet
connection of the coil, marked 4*, is con-
45 nected through a two-way valve mechanism
7 with a pipe 8, through which the gases for

the heater are derived from the engine.

This pipe extends toward the engines in
parallel relation to the main exhaust pipe,
and is so arranged that the heat from said
pipe, or the gases therein, will serve to heat
the exterior of the supply pipe. Preferably
the supply pipe is contained within the ex-
hast pipe and is completely surrounded
and insulated by the gases therein. The
said pipe extends well forward within the
exhaust pipe and preferably into close pro-
ximity to the exhaust ports 1, so that the ex-
hast gases it receives are taken while they
are hottest. The length of the supply pipe
8 that is within the exhaust pipe will be de-
termined by the distance from the engine at
which the heater is installed, and by the
degree of heat required, as will also the rel-
ative diameters of the two pipes which may
advantageously be as 1 to 3 for the ordi-
nary exhaust pipe.

The two-way valve mechanism 7, shown
more clearly in Figs. 4 and 5, is of the slide-
valve type, and comprises a hollow sliding
80 valve member 9, operable by means of a ver-
tical rod and handle 4* which extends up-
wardly through the floor of the car at one
side of the heater, and is held in an adjust-
able position by means of the friction of the
slide-valve, or by any other suitable agency.
In its position shown in Fig. 9, the hot gases
from the supply pipe 8 are directed into the
inlet 4* of the heater coil and, in the ad-
justment of Fig. 4, they are directed into a
lateral port or passage 10 which leads rear-
wardly, joining the main exhaust pipe, in
the nature of a by-pass with respect to the
heater. Intermediate positions of adjust-
ment will allow the gas to divide, part pass-
95 ing through the heater and its outlet 4*, and
part through the by-pass 10, thereby pro-
viding regulation of the temperature of the
heater, but in either extreme adjustment,
and in all intermediate adjustments of the
valve, a continuously open passage is pro-
vided for the escape of the exhaust gases,
so that the presence of the supply pipe
within the exhaust pipe does not constitute
an appreciable obstruction to the normal
flow of gases therein, nor affect the opera-
tion or efficiency of the engine. The heater
outlet 4* may extend to the rear of the car,
providing escape for the discharged gases
at about the same point where the main ex-
haust passage terminates. The forward end
of the interior gas supply pipe opens to-
ward the exhaust ports of the engine, so that the expansive movement of the exhaust gas will serve to propel it into and through the pipe while the heat of such gases will be conserved by the surrounding or adjacent layer of gases in the main exhaust pipe.

In Figs. 6 and 7 the heater consisting of a flat coil of pipe embedded in a block of concrete or similar material, is provided with a removable heat-insulating covering 11 of carpet or the like, this being flexibly connected at the side of the heater so as to fall over and cover the same when not in use, but allowing the occupant of the car to thrust his feet underneath it and upon the heater. At such times as the engine is not running, and the car not occupied, the heat insulating covering serves to maintain the temperature of the heater so that it will be immediately available for further use.

I claim as my invention the following:

1. The combination with an internal combustion propelling engine of a self-impelled conveyance, having one or more exhaust ports and a main exhaust pipe leading therefrom, of a gas conducting heater, a gas-supply pipe adapted to receive and conduct a portion of the exhaust gases to said heater, said supply pipe being located within and co-extensive with said main exhaust pipe between the heater and the engine and means for controlling the said heater independently of the flow of gases in said main exhaust pipe.

2. A heating apparatus for automobiles, comprising in combination with the main exhaust passage of the propelling engine, a gas-receiving supply pipe located within said passage and provided with connections affording a continuous escape of the gases received therein, a heater constituting one of said connections, a by-pass to said heater constituting another of said connections, and a controlling valve operative to deflect all the gas supplied by said pipe into one or the other or both of the said connections.

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

GASTON RUFFIER.

Witnesses:

H. G. KIMBALL,
CLIFFORD H. KLOS.