

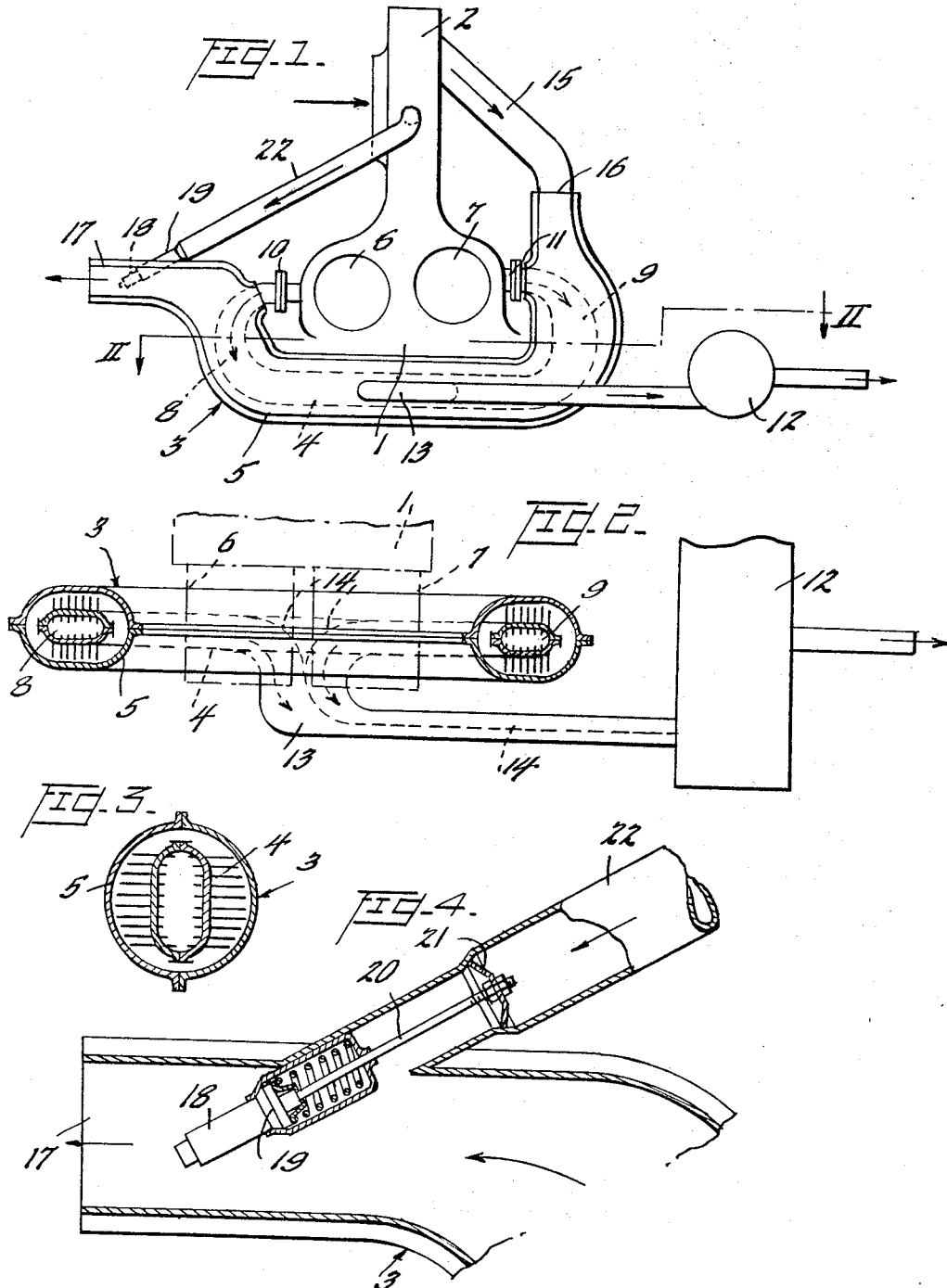
June 27, 1967

R. KÖRSCHNER

3,327,773

FRESH AIR HEATING ARRANGEMENT FOR A MOTOR VEHICLE

Filed Jan. 22, 1965



INVENTOR.

Rudolf Korschner,
BY

Watson, Cole, Grindle & Watson
ATTORNEYS

1

3,327,773

FRESH AIR HEATING ARRANGEMENT FOR A MOTOR VEHICLE

Rudolf Körschner, Wolfsburg, Hannover, Germany, assignor to Messrs. Volkswagenwerk Aktiengesellschaft, Wolfsburg, Hannover, Germany, a corporation of Germany

Filed Jan. 22, 1965, Ser. No. 427,263

Claims priority, application Germany, Jan. 28, 1964, V 25,262

4 Claims. (Cl. 165—39)

The invention relates to a fresh air heating arrangement for a motor vehicle by means of the exhaust gases of two adjacently disposed cylinders of an internal combustion engine.

A fresh air heating arrangement is known in which the exhaust gases of a cylinder are fully utilised for heating purposes, the heat exchanger surrounding substantially only the exhaust pipe of one cylinder. The exhaust gases of a second cylinder arranged in juxtaposition open by way of a short pipe directly into the silencer box, so that these exhaust gases serve to only a small extent for heating the fresh air in the heat exchanger, which does indeed surround this short pipe. Fresh air sent through this heat exchanger is not able to absorb the heat necessary in very cold weather and obviously is not able sufficiently to heat the interior of the vehicle.

In order to increase the capacity of such a heating arrangement and to keep the hot air temperature at the outlet nozzles within limits which may be required by the passengers, a heat exchanger is provided according to the invention which is disposed beneath or adjacent the two cylinders, the said exchanger being supplied at the inlet and at the outlet with fresh air from a common fan or blower, while the exhaust gases from the outer opposite sides of the cylinders are supplied in a short pipe bend to the heat exchanger disposed therebetween and are led outwardly again separately from one another in the middle of the heat exchanger and laterally from the latter.

The exhaust gases of the two juxtaposed cylinders are guided by a light metal casting provided internally and externally with fins through the heat exchanger on both sides to the middle thereof. Therefore, the exhaust gases of both cylinders are used simultaneously for heating the fresh air, and the latter thereby experiences a considerable rise in temperature. In connection with engines having the exhaust ports of the two juxtaposed cylinders arranged opposite one another in a common plane, this arrangement has the particular advantage that the casting can be connected by pipe bends in mirror-image arrangement to the exhaust ports, whereby it becomes symmetrical and less costly to manufacture. This heating arrangement is also characterised by the fact that only one heat exchanger is necessary for two cylinders and as a consequence it is more simple in design and lighter in weight and also has a higher heating power.

The fresh air supplied to the heat exchanger at the outlet through a valve controlled by a thermostat maintains the heated air temperature at the outlet nozzles within the necessary limits. It is an additional advantage that, through a certain adjustable heated air temperature at the nozzle outlet, the quantity of the hot air fed into the vehicle is greater, whereby the interior is more quickly heated and the temperature is effectively maintained therein.

The discharge of the exhaust gases from the heat exchanger as far as the exhaust box is preferably effected in two separate streams by means of a partition in a connecting pipe. With the separate discharge of the exhaust gases, the exhaust pressure of one cylinder does not cause any rise in pressure in the exhaust pipe of the other

2

cylinder, so that thereby there is no loss in power of the engine.

The invention is more fully explained hereinafter by reference to one constructional example which is shown diagrammatically in the drawing.

FIGURE 1 shows a four-cylinder opposed cylinder-type engine with the heat exchanger in side elevation,

FIGURE 2 is a section on the line II—II of FIGURE 1,

FIGURE 3 is a cross-section through the heat exchanger, and

FIGURE 4 is a section showing the thermostat-controlled fresh air supply arrangement on an enlarged scale.

In FIGURE 1, the engine is indicated at 1, the cooling air fan at 2 and the heat exchanger at 3. The heat exchanger 3 consists of a light metal casting 4 which is provided internally and externally with fins and through which the exhaust gases flow and of a casing 5 consisting of pressed sheet metal parts surrounding the casting 4, said casing serving to conduct the fresh air from the fan 2. The straight middle portion of the casting 4 situated beneath the cylinders 6, 7 is connected by means of short pipe bends, to the oppositely disposed exhaust ports 10, 11, so that the exhaust gases flow as far as the middle of the casting 4 and where the discharge of the exhaust gases from the casting 4 into the silencer box or muffler 12 is effected by means of a connecting pipe 13, which is developed from an elongated aperture in the middle of the casting 4 and passes through the casing 5 of the heat exchanger 3. In order to be able to conduct the exhaust gases from the cylinders 6 and 7 without turbulence into the silencer box 12, a partition 14 arranged so as to promote a favourable flow separates the connecting pipe 13 into two pipes as far as the silencer box 12, starting from the point where the two exhaust pipes meet in the casting 4 in the middle of the heat exchanger.

The fresh air conveyed by the cooling air fan 2 through the supply pipe 15 to the inlet 16 into the heat exchanger 3 is first of all heated by the exhaust gases of the cylinder 7 at the pipe bend 9 and then by the exhaust gases of the cylinder 6 at the pipe bend 8. The fresh air heated in this way acts on a sensing member 18 of a thermostat 19 projecting into the outlet 17 of the heat exchanger 3, the said thermostat opening a valve 21 by means of the rod 20 when the fresh air supplied by the fan 2 is too hot and is to be reduced with fresh air to the required heating temperature.

What is claimed is:

1. Fresh air heater for motor vehicles provided for the heating of fresh air through which the waste gases of adjacent cylinders are directed, comprising a casing having two ends forming a heat exchanger and through which the waste gas passes, waste gas pipes one for each cylinder provided in twin arrangement and leading directly into the heat exchanger casing, an exhaust port for each gas pipe near its cylinder and facing away from each other, said gas pipes being guided inside said heat exchanger, each pipe having a semi-circular section and having a common straight section of pipe below the cylinders, an outlet section approximately in the middle of said straight section emerging from the casing laterally thereunder from the heat exchanger, and means connected to the casing in the immediate vicinity of one of the exhaust ports at one end of the casing to force fresh air into the heat exchanger at said one end and out at the other end of the casing and around the waste gas pipes.

2. Fresh air heater according to claim 1, in which a fan is provided above the cylinder and in which a by-pass pipe is connected to the fan and the casing at the other end of the casing and having a valve with a thermostat therein to be in the exhaust stream of air from the casing to control the injected air into the casing.

3

3. Fresh air heater according to claim 1, in which the waste gas pipes inside the heat exchanger consist of sheet metal stampings, comprise a casting made of light metal and are provided with inside and outside longitudinal ribs in one piece.

4. Fresh air heating system for a motor vehicle for heating the fresh air comprising a casing through which the waste gases of adjoining cylinders pass, waste gas pipes passing through the casing, the fresh air that is to be heated flows through a space between the waste gas pipes and the surrounding casing to act as a heat exchanger, the waste gas pipes from cylinders of the motor emptying directly into the heat exchanger from their release valve studs, said pipes being guided within said heat exchanger each time in semi-circular arches and subsequent a straight section of pipe underneath the cylinders of the motor up to about the middle of the casing where they emerge, still separated, laterally from the heat exchanger and run separately up to their junction of an exhaust muffler, means to direct fresh air into the heat exchanger at one end and at the other end of the heat exchanger a by-pass branch pipe leading from the fresh

4

air supply, prior to its junction with the heat exchanger and empties immediately behind the heat exchanger through a valve into a pipe for the heated fresh air, said pipe leaving the heat exchanger, a valve and a thermostat in said by-pass pipe to scan the temperature of the heated fresh air, and the exhaust pipes inside the heat exchanger, consisting of sheet metal stampings and the casing, constituting a casting made of light metal, and longitudinal ribs inside and outside of the exhaust pipes consisting of an integral construction.

References Cited

UNITED STATES PATENTS

2,062,509	12/1936	Francisco et al.	165—44
2,240,474	4/1941	Welch	165—179
2,551,697	5/1951	Palmatier	165—56

MEYER PERLIN, *Primary Examiner*.

ROBERT A. O'LEARY, *Examiner*.

C. SUKALO, *Assistant Examiner*.