Jan. 13. 1925. 1,523,199

G. HOFMANN

BLOWER AND AIR COOLING SYSTEM FOR MOTORS

Filed April 13, 1921

Fig. 1.

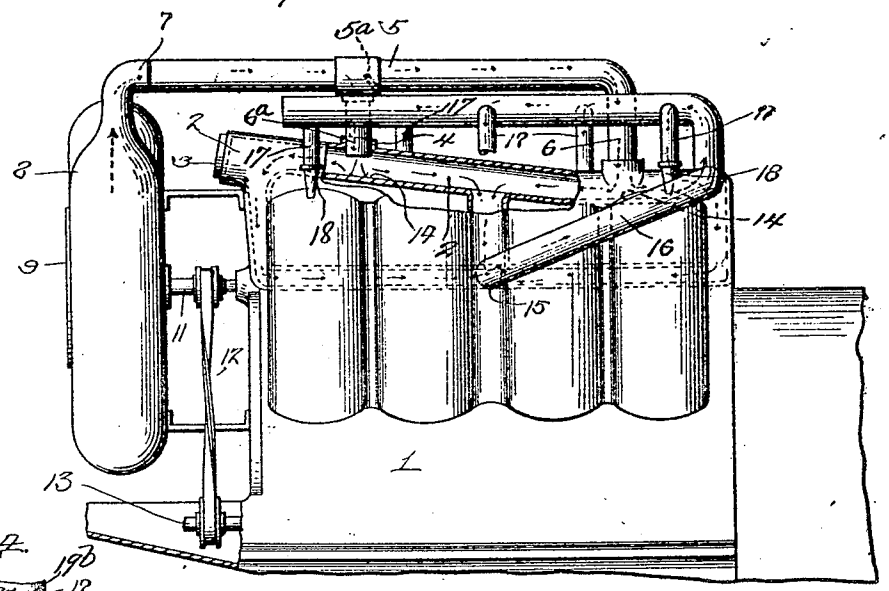


Fig. 4.

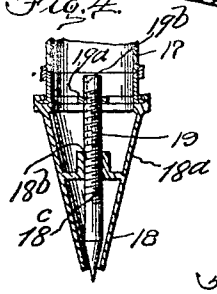


Fig. 2.

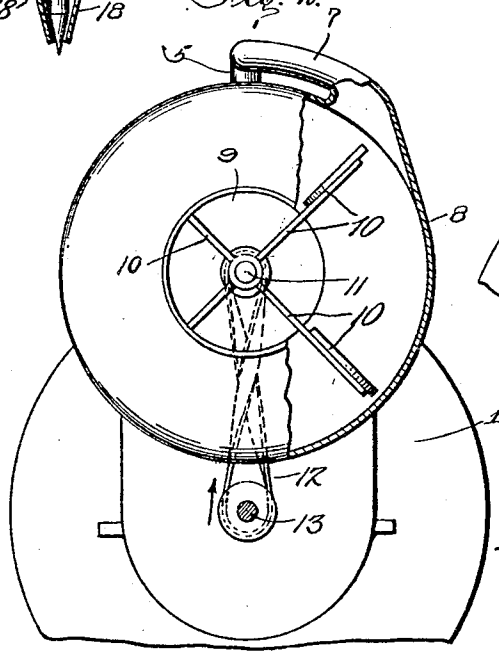
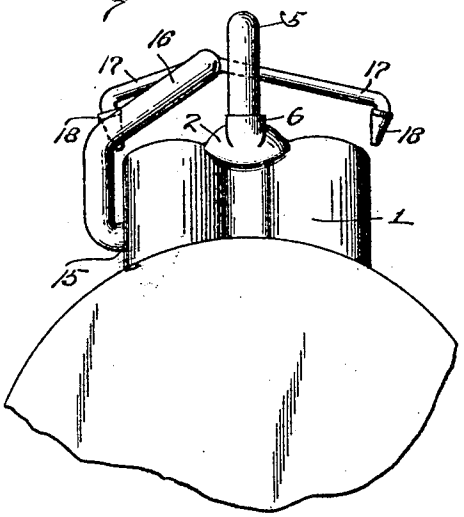


Fig. 3.



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Patented Jan. 13, 1925. 1,523,199

UNITED STATES PATENT OFFICE.

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BLOWER AND AIR-COOLING SYSTEM FOR MOTORS.

Application filed April 13, 1921. Serial No. 461,134.

To all whom it may concern:

Be it known that I, GUSTAV HOFMANN, a citizen of the United States, residing at Belgrade, in the county of Stearns and State of Minnesota, have invented certain new and useful Improvements in Blower and Air-Cooling Systems for Motors, of which the following is a specification, reference being had to the accompanying drawings.

It is the purpose of the present invention to provide a device of this kind especially adapted for use in connection with motors in substitution for the usual water cooling system, wherein the radiator and fan are employed.

Another purpose involves the elimination of the radiator and also the fan, whereby the present form of air cooling system including a blower may be installed, so as to direct the air from the blower through the same channel, heretofore used for the circulation of water.

Still another purpose is to provide a device of this kind, wherein means is afforded for directing the air, which passes through the usual passage formerly used for water, upon the exterior of the motor, thereby cooling the motor externally as well as internally.

Another purpose is to utilize the usual form of fan belt shaft, fan belt, coupled with the motor shaft, for driving the fan of the blower, instead of employing a specially designed means for driving the blower.

A still further purpose is the provision of a conduit or piping connected to the motor casing and having one end terminating in a plurality of branch tubes or conduits. These branch tubes or conduits are arranged in diagonal directions toward the motor, there being supports on the motor, for the reception of and supporting the branch tubes or conduits in position. These branch tubes are arranged on either or both sides of the motor, and are disposed in alternate positions, in such wise that one nozzle will direct jets of air toward the motor at a point directly opposite a space of the motor casing, which is not provided with an air projecting jet on the opposite side. In this way the casing of the motor is thoroughly cooled, without the use of cooling fluid, such as water.

While the design and construction at present illustrated and set forth is deemed preferable, it is obvious that as a result of a reduction of the invention to a more practical form for commercial purposes, the invention may be susceptible of changes, and the right to these changes is claimed, provided they are comprehended within the scope of what is claimed.

The invention comprises further features and combination of parts, as will be hereinafter set forth, shown in the drawings and claimed.

In the drawings:—

Figure 1 is a view of a conventional form of motor, preferably the Ford type, though the system may be applied to any other form of motor, showing the improved air cooling system as applied.

Figure 2 is an end view of the motor, showing the blower as coupled to the usual fan shaft, the belt usually employed acting to drive the blower, and showing the connections with the motor, and also showing part of the casing of the blower broken away, to show the interior.

Figure 3 is a view in elevation of the opposite end of the motor, showing the air circulating system as applied.

Figure 4 is an enlarged detail sectional view through one of the nozzles, showing the means for increasing and decreasing the size of the jet of air.

Referring to the drawings, 1 designates the conventional form of motor having the usual passage 2 formerly employed for receiving a cooling fluid, such as water, for the purpose of cooling the engine. The usual outlet to this passage 2 is closed by means of a plug 3, and other openings 4 are located in the upper part of the wall, and constitute intakes, to which a pipe or tube 5 is coupled as shown at 6 and 6a. The tube or pipe 5 communicatively connects at 7 to the usual blower casing 8, of the type, which receives its draft or air concentrically through the opening 9 in the side wall of the casing of the blower.

Mounted in the casing 8 is a fan 10, which is carried by the usual fan shaft 11 of the motor, there being the conventional form of belt 12 connecting the fan shaft and the motor shaft 13, whereby revoluble movement may be imparted to the fan 10. The fan draws air through the opening 9 of the blower casing and discharges it through the pipe or tube as at 7, and into the passage of the motor usually employed for receiving cooling fluid such as water. Where the tube

5 unites with the motor casing as at 6, and 6^a, the air enters the passage of the motor, substantially equally divides by striking or contacting with the lower wall of the passage as at 14, and travels in opposite directions through the passage of the motor, and exits or passes out as at 15, and then travels through the pipe or tube 16, which terminates in a plurality of branches 17. These branches terminate in medium size nozzles 18, which are arranged alternately so as to project jets of air upon opposite sides of the motor casing in substantially diagonal directions. It will be noted that the air in passing through the usual passage formerly employed for receiving a cooling fluid such as water, acts to cool the interior structure of the motor, while the air passing out through the nozzles act to cool the motor externally, thereby avoiding the use of a water cooling system, consequently avoiding the necessity of filling the radiator, when the usual supply of water has evaporated or diminished.

It will be noted that the opening 9 of the blower faces forwardly in the direction of the travel of the automobile, therefore the air readily enters, being assisted materially in its entrance into the air cooled system, as well as being forced through the passage. The nozzles, though it is not imperative, may be provided with means for controlling the jets of air at the branch terminals, hence controlling the cooling effect of the motor. In other words if the air is allowed to exit in heavy jets, the motor will be more readily and quickly cooled, especially in cold weather. By restricting the outlets of the nozzles and diminishing the jets of air, the motor will not become cooled too rapidly, though it is obvious, on long trips, especially when traveling at a rapid rate of speed for a long distance, it is the aim to adjust the controlling means 19 of the nozzles to permit the heaviest jets of air to be directed upon the motor, to insure cooling the motor externally as well as internally, and hence preventing the motor from becoming too hot.

The tube or pipe 5 is provided with a deflector 5^a as indicated in dotted lines in Figuse 1, and which extends partly across the passage through the pipe, in order to insure deflecting a portion of the air into the coupling or extension 6^a.

Each nozzle comprises a swivelled conical sleeve 18^a, which is threaded at 18^b to a needle valve 18^c, which is guided by a key and key way 19^a and 19^b. Obviously by rotating the sleeve 18^a in one direction or the other the jet of air may be increased or decreased. Furthermore several nozzles are arranged, as shown in Figure 3, so as to direct the jets of air substantially upon the corners of the motor, so that the air divides substantially equally, a portion of the air as sweeping over the top of the motor, and a portion over the side of the motor externally to insure cooling the casing.

The invention having been set forth, what is claimed as being useful is:

The combination with an internal combustion engine having a plurality of cylinders, each cylinder being provided with a cooling jacket extending down to the sides of the cylinders and a radiator return pipe extending longitudinally over the tops of the cylinders and communicating at a plurality of points with said jacket, of a fan casing disposed in advance of the cylinders, a shaft extending into the casing and adapted to be operatively driven from the driving shaft of the engine, a centrifugal fan disposed within said fan casing, the casing having a central air inlet opening, a conduit connected to the upper end of the fan casing and extending rearwardly above said return pipe and connected thereto by a plurality of branches discharging against the bottom of the return pipe, and a discharge pipe extending upward and rearward from said jacket and medially toward the forward end of the engine, said discharge pipe having a plurality of laterally and downwardly directed pipes leading therefrom carrying at their ends downwardly and inwardly directed nozzles discharging against the outer walls of the jacket, each of said nozzles having means whereby the discharge from the nozzle may be regulated.

In testimony whereof I hereunto affix my signature.

GUSTAV HOFMANN.