P. MONTBARBON.

COOLING SYSTEM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED MAY 11, 1912.

1,155,950.

Patented Oct. 5, 1915

2 SHEETS—SHEET 1.

Fig. 1.

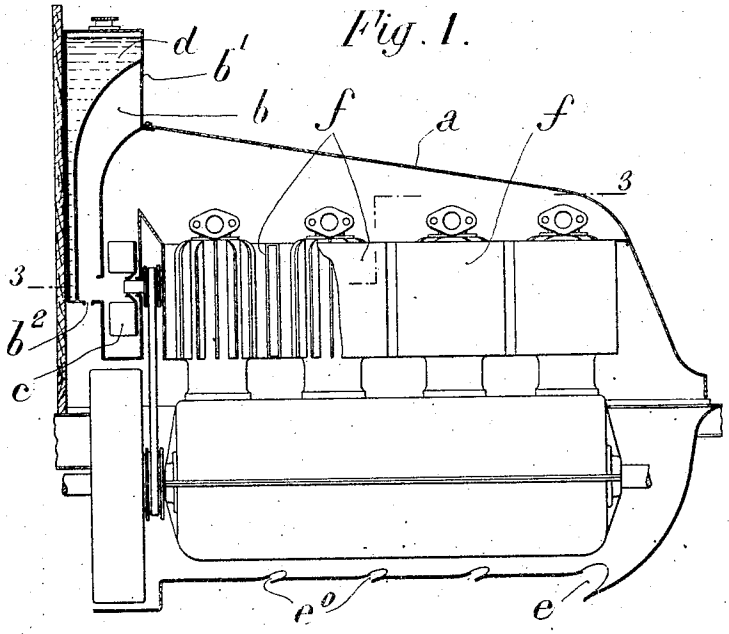
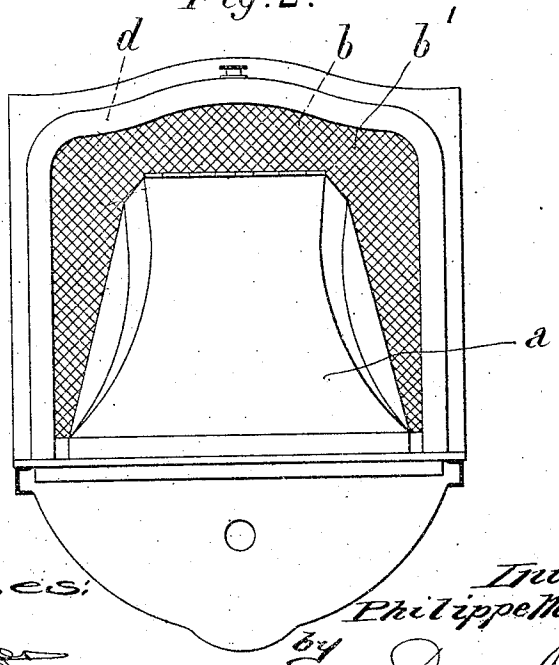


Fig. 2.



Witnesses:

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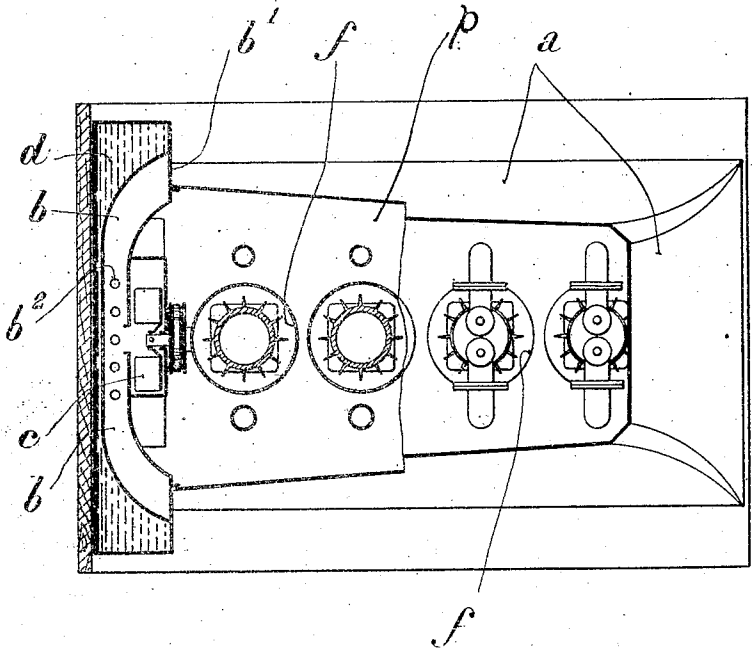
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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COOLING SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

1,155,950. Specification of Letters Patent. Patented Oct. 5, 1915.

Application filed May 11, 1912. Serial No. 696,763.

To all whom it may concern:

Be it known that I, PHILIPPE MONTBARBON, citizen of the Republic of France, and residing at Neuilly-sur-Seine, Seine, France, have invented certain new and useful Improvements in Cooling Systems for Internal-Combustion Engines, of which the following is a specification.

This invention relates to systems for cooling the engine in motor vehicles with explosion engines, and relates more particularly to air-cooling systems for stationary multi-cylinder engines.

It has chiefly for its object to improve the efficiency of the systems in question, and more particularly those of the air cooling type and to render them easier to design and of a more pleasing appearance.

It chiefly consists also in arranging the systems in question so that the circulation of air is produced by the simultaneous action of pressure at the admission end of the system and suction at the discharge end thereof which enables the circulation in question to take place under the best conditions; and in so arranging the systems in question that when a multi-cylinder engine is to be cooled, the said cylinders are cooled not in series, as hitherto, but in parallel, which enables a better general cooling to be obtained.

The invention will be clearly understood from the following description and from the accompanying drawings which however are merely given by way of example.

Figure 1 of the said drawings shows, in axial longitudinal section, partly in elevation, the front portion of a motor car with a four-cylinder explosion engine, and with an air cooling apparatus arranged according to this invention. Fig. 2 shows in front elevation the said front part, and finally Fig. 3 shows the same front part in horizontal cross-section on line 3—3 of Fig. 1.

According to this invention, and more particularly according to that method of carrying it out illustrated in the drawings, when for instance a motor car with a four-cylinder explosion engine is available and it is desired for instance to use an air cooling device, the construction of the said air cooling device is carried out as follows or in a similar manner: The said engine is provided with a bonnet a to which is preferably given an outer shape similar to that shown in the drawings. At the back of the said bonnet is provided a kind of nozzle or funnel b of such kind that during the driving forward of the car the air is forced to rush into it under pressure and to subsequently pass either directly or, after its passage through a fan c, toward the rear of the said bonnet. The said nozzle is preferably built in such manner as to have an outside shape similar to that of radiators or hydro-aero-refrigerators of the usual kind arranged at the back of the bonnet, and its mouth is covered with a grating b to imitate that provided on a radiator of the type just referred to, the grating serving partly to stop the dust. The funnel is also provided at a suitable point with one or more openings b^2 to allow the liquids and dust that may have passed through the said mouth, to escape outward without passing through the bonnet a; and, finally, it is surrounded by wall elements of such kind as to form a tank d, which may be utilized for instance, to contain hydrocarbon. The said fan c is of the type of well known fans with its diffuser in the shape of a spiral. The lower part of the said bonnet a which is preferably air-tight, may be provided with either a single opening e facing toward the back in such manner as to form an exhauster during the driving, or, in addition to such an opening e one or more other openings e^0 of the same kind but of smaller size. In the interior of the said bonnet a are provided a series of four pipes f each of which surrounds one of the four cylinders of the engine, and the upper edges of these pipes fit in openings in a horizontal partition plate p that is suitably supported within the bonnet and joined at its edges to the corresponding walls of the bonnet. In consequence of this arrangement, it will be apparent that the air, on being forced into the said bonnet, has to pass from the nozzle b to the said opening or openings e and e^0, by the four conduits formed by the said pipes. The said pipes are at the same time made and arranged either as shown in the drawing, with circular cross section and concentric with the cylinders, in which case, as shown in the drawing, the cylinders have longitudinal ribs; or, unlike in the illustration, the said cylinders may have annular ribs, which may be rectangular or oval in cross-section and may be disposed horizontally. In that way a system is obtained,—more particularly if

care is taken to use as detail arrangements, those clearly shown in the drawings,—which perfectly fulfils the above-mentioned conditions, as will be readily understood without any further explanation.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A system of air-cooling multi-cylinder internal combustion engines for use on motor vehicles, comprising, in combination with the engine; a bonnet wherein said engine is arranged provided at its back with an air-funnel whose mouth opens forwardly and outwardly into the atmosphere above said bonnet and whose discharge end opens into the interior of the bonnet, and at its bottom with a rearwardly-directed air-exhauster, whereby air will be caused to circulate through the interior of said bonnet by the simultaneous action of pressure and suction when the vehicle is in motion, said funnel having its mouth provided with a grating and its lower portion provided with an outlet opening for such liquids and dust as may have passed through said grating.

2. A system of air-cooling multi-cylinder internal combustion engines for use on motor vehicles, comprising, in combination with the engine; a bonnet wherein said engine is arranged provided with an air-admission funnel having a forwardly-directed mouth, and with a rearwardly-directed exhauster, for forcing air to circulate through the bonnet under the simultaneous action of pressure and suction when the vehicle is in motion; an open-ended pipe inclosing each cylinder of the engine; and a horizontal partition on opposite sides of which said funnel and said exhauster are disposed located within the interior of said bonnet and extending to the sides and ends thereof, said partition being formed with openings in which the upper edges of said pipes are fitted, whereby the air will be forced to pass through the spaces between said pipes and the cylinders therein during its passage to said exhauster.

3. A system of air cooling multi-cylinder internal combustion engines for use on motor vehicles, comprising, in combination, with the engine: a hood adapted to shelter said engine, a horizontal partition located within the hood and extending to the sides and ends thereof dividing the same into upper and lower compartments, said partition being formed with a plurality of openings therein, a plurality of open-end-pipes disposed within the lower compartment and having their upper ends secured and fitted in the openings in said partition whereby said pipes are suspended in position, each pipe being adapted to surround a cylinder of the engine and arranged in spaced relation with respect thereto, an air receiving chamber located in the rear of the hood and below said partition, means for conducting air from said chamber to the upper compartment of said hood, an air funnel arranged to the rear of said hood and having a forwardly directed mouth and having its lower end opening into said air receiving chamber, the lower compartment of said hood being formed with an opening for exhausting the circulating air from said hood.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PHILIPPE MONTBARBON.

Witnesses:
GUSTAVE CHÉDRU,
CLAUDE T. LENGEDDE.