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INTERNAL COMBUSTION ENGINE

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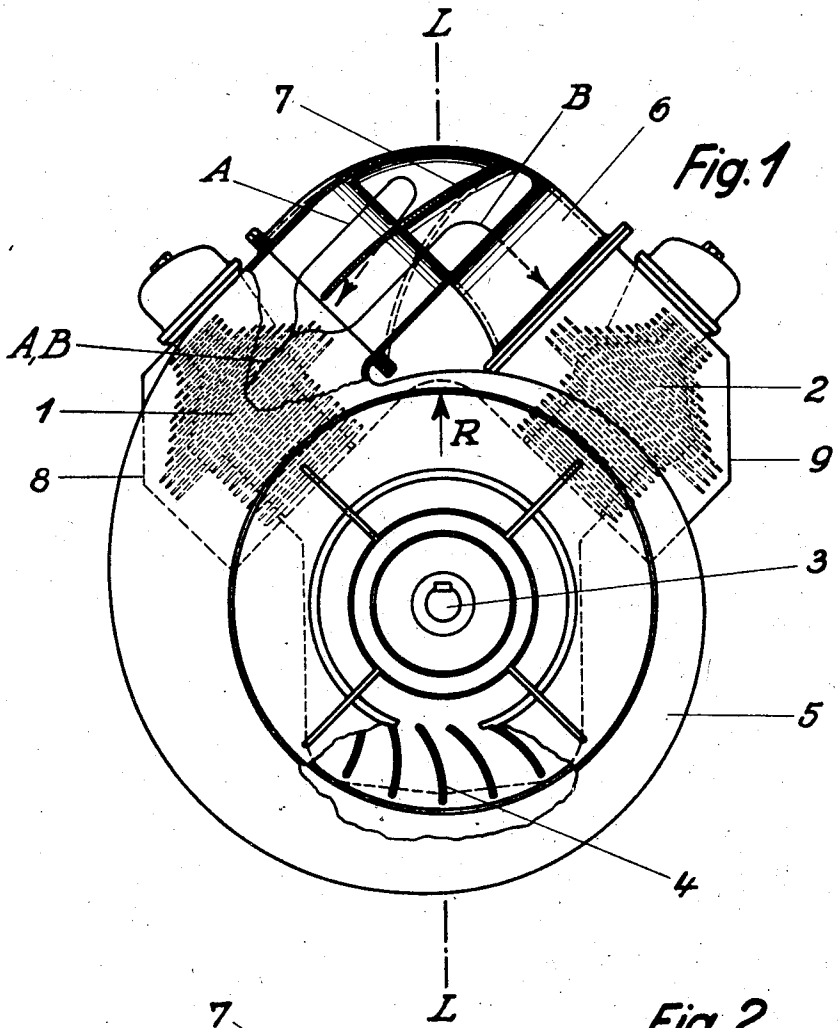


Fig. 1

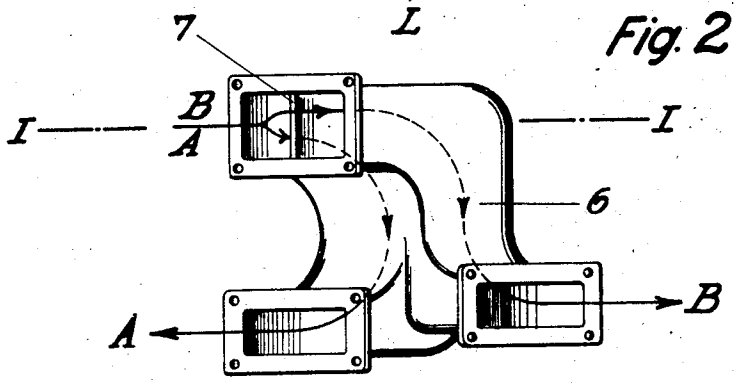


Fig. 2

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INTERNAL COMBUSTION ENGINE

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2 Claims. (Cl. 123—171)

This invention relates to improvements in internal combustion engines, and more particularly to means for easily and efficiently cooling the cylinders of such engines.

An object of this invention is to provide an improved arrangement for readily cooling the cylinders of an internal combustion engine.

Another object of this invention is the provision of a novel arrangement for cooling the cylinders of a V-engine.

Still another object of this invention is to provide an arrangement for cooling the cylinders of an engine in such a manner that each cylinder receives substantially the same amount of cooling air.

A further object of this invention is to provide an arrangement for the cooling of engine cylinders by air, in which the air paths to the cylinders present a minimum resistance to the flowing air stream.

A still further object of this invention is to provide an air cooling arrangement for the cylinders of an internal combustion engine, in which the guiding means for the air stream are so mounted that the constructional size of the engine is not materially increased.

With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts which are set forth in the appended claims, and a preferred form of embodiment whereof is hereinafter described with reference to the drawing which accompanies and forms part of the specification, wherein:

Fig. 1 is a front view, partially in cross-section, illustrating the application of the present invention to an engine having its cylinders positioned in the form of a V; and

Fig. 2 is a bottom view of the air dividing and guiding means illustrated in Fig. 1, as seen in the direction R of Fig. 1.

In the form of the invention illustrated in Fig. 1, the internal combustion engine is illustrated as having its cylinders or cylinder rows 1 and 2 positioned at approximately 90° to one another in the form of a V. Upon an extension of the engine crank shaft 3 there is drivably connected an impeller wheel 4 of a cooling blower having a spiral discharge housing 5 whose mouth is illustrated as being positioned between the angle of the cylinders, as seen in the longitudinal direction of the engine.

For guiding the air from the mouth of the spiral housing 5 to the cylinders 1 and 2, there is preferably provided a member 6 which may be in the form of an integral casting, as illustrated in Fig. 2. A single entrance opening is formed at one end of the casting 6 which communicates with the delivering mouth of the spiral housing 5, and the air coming from the housing 5 is divided in the casting 6 by means of a dividing wall 7 positioned substantially in the central longitudinal plane of the engine L—L. Accordingly, the air which enters the casing 6 as a single stream now becomes divided into two streams of equal size which individually discharge upon the respective engine cylinders. In Figs. 1 and 2 the entering cooling air has been designated as A, B which resolve itself into the two separate streams A and B. The casing 6, being positioned between the cylinders, while providing a simple and efficient means for guiding the stream of air from the blower to the cylinders, at the same time does not add materially to the constructional size of the engine. The discharge mouths from the casing 6 are, of course, longitudinally displaced from the entrance, and the air coming from these mouths to the separate cylinders is guided about the cylinders by suitable guide plates indicated at 8 and 9.

In Fig. 2, it will be noted that the paths for the separate air streams A and B are of substantially the same length and furthermore, the air stream A follows a semi-circular path of substantially constant radius. The air stream B, on the other hand, first follows a quarter circle in one direction and then a quarter circle in the opposite direction, but the radii of the semi-circular paths for air stream A and for the two quarter circular paths of air stream B are all equal. In this manner discharge of the separate air streams in opposite directions is made possible, while at the same time the resistance of the two paths is maintained substantially the same. By this means, the flow of equal amounts of air to each cylinder (or cylinder rows) is assured, and thus the cylinders are equally cooled.

Because of the fact that the path of the air stream from the discharge of the blower housing to the cylinders is both smooth and short, the efficiency of the air-guiding system is raised to such an extent that a smaller air blower can be used to obtain the same amount of cooling, as compared with comparable arrangements of the prior art. As a result, the efficiency of the entire engine is improved, since less power will be required to drive the smaller blower.

It is to be clearly understood that the application of the said invention is not limited to a V-

engine having two cylinders, but the latter has been used merely by way of illustration. Each of the cylinders 1 and 2, illustrated in Fig. 1, may represent a cylinder row in which the air being discharged from the casing 6 may be distributed in any manner well known to the art. Furthermore, the principles of the invention are not limited to an engine in which the cylinders are positioned at a V to one another, but to any engine in which there are separate cylinders or two separate rows of cylinders. In the extreme case, the principles of the invention are applicable to the case in which the cylinders or cylinder rows are parallel to one another and each row is provided with a separate crank shaft. In this case, the blower would be operated by its own crank shaft interconnected to the crank shaft of each cylinder row.

While the air-guiding and dividing casing 6 is illustrated in its preferred form as integral casting, it is also to be understood that this casing may be built up and fabricated in any manner well known to the art.

Accordingly, while I have described an illustrative embodiment of the invention, it will be obvious that various changes and modifications therein may be made without departing from the invention as set forth in the following claims.

I claim:

1. In combination with an internal combustion engine having a pair of cylinders positioned relatively to one another in the form of a V, and having a common crank shaft positioned substantially at the apex of said V, a rotary air pump mounted on and driven by said crank shaft, a spiral housing about said pump having a tangential delivery mouth positioned within the longitudinal projected inner boundaries of said V and in a plane parallel to the longitudinal axis of one of said cylinders, and an integral air guide having a single entrance connected to the delivery mouth of said spiral housing, said entrance being of substantially the same size and extending in the same tangential direction as said mouth, and a pair of delivery mouths on said air guide for respectively directing air against said cylinders, said air guide having a dividing wall at the entrance for separating the air stream into two smooth equi-air-resistant and equi-voluminal air paths of equal length, the path for said one cylinder following a semi-circular course to one delivery mouth, substantially in a plane transverse to the longitudinal axis of said one cylinder, and the path for the other cylinder following a quarter-circular course substantially parallel to the plane of said semi-circular course, the end of said quarter-circular course extending in a direction substantially parallel to the axis of said crank shaft, and then a quarter-circular course substantially in a plane transverse to the longitudinal axis of said other cylinder to the other delivery mouth, the radii of said semi-circular and said quarter circular courses being the same.

2. The combination according to claim 1, in which the angle between the cylinders is approximately 90°.

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