Oct. 7, 1930. O. H. SPENCER 1,777,534

COOLING MEANS FOR ENGINES

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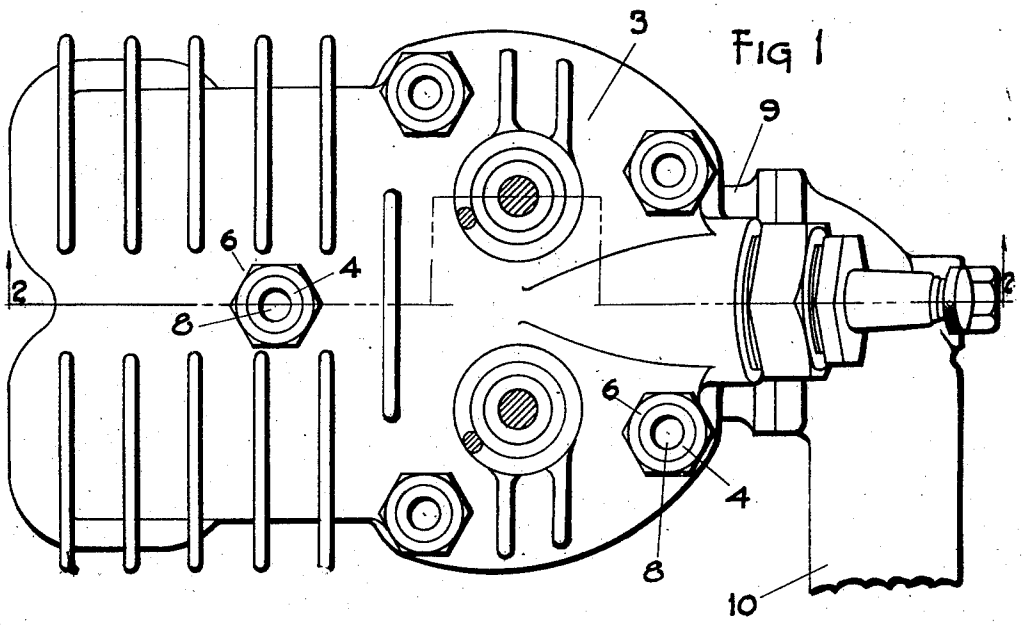

Fig 1

Fig. 3.

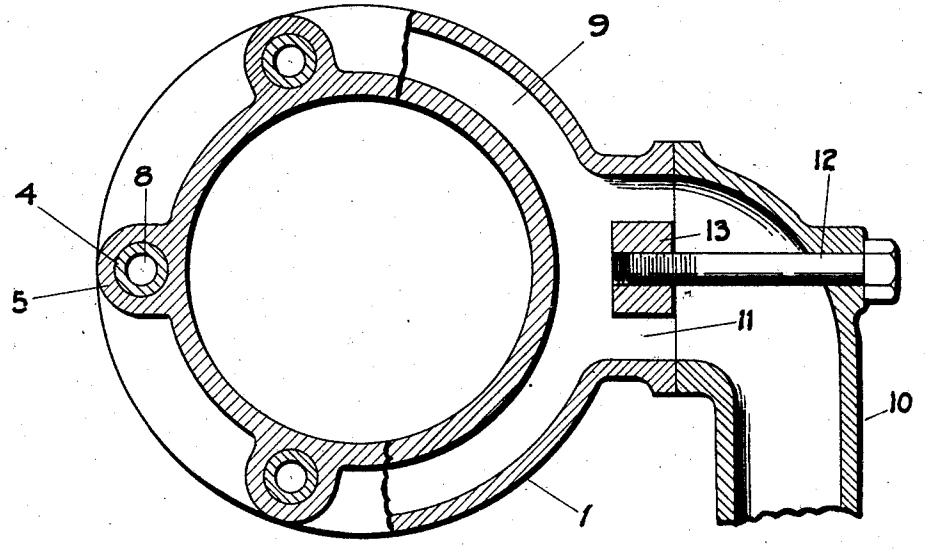

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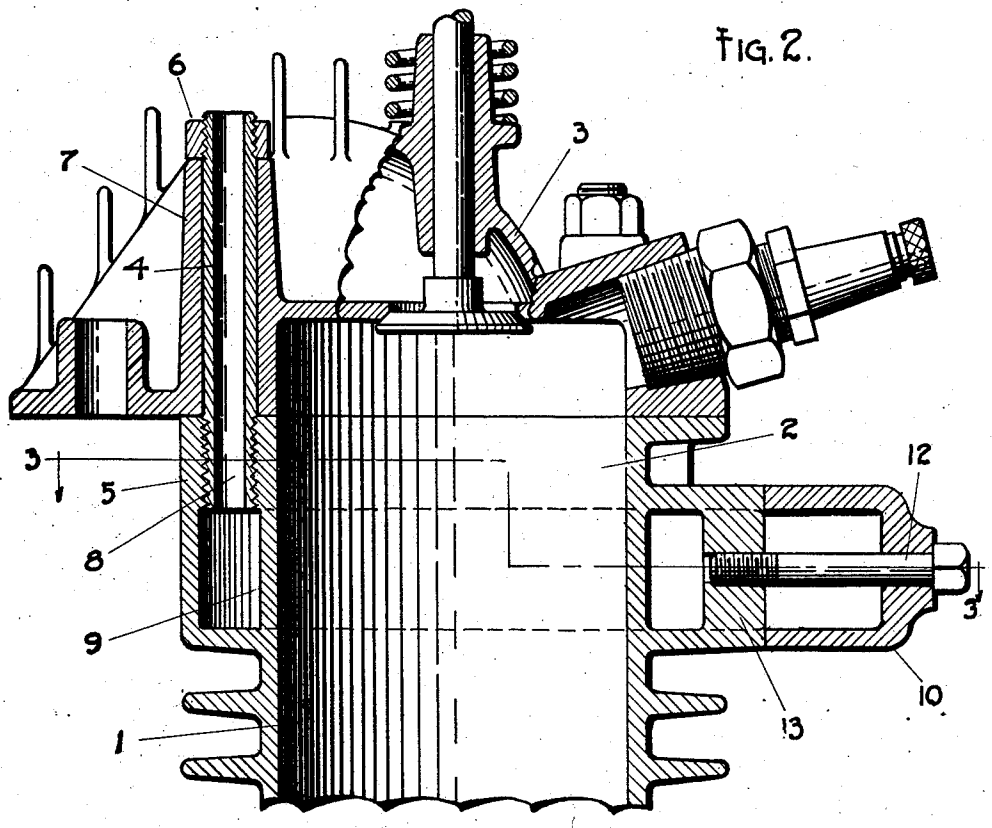
Fig. 2.



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UNITED STATES PATENT OFFICE

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COOLING MEANS FOR ENGINES

Application filed March 21, 1929. Serial No. 348,904.

This invention relates to cooling means for internal combustion engines and one feature of the invention is the provision of means for conducting a part of the blast of air used for cooling the external surface of the engine, thru ducts and around the parts of the engine receiving the greatest amount of heat.

A further feature of the invention is the character and arrangement of the threaded studs for securing parts of the engine together, so that they will permit the air passing thru the ducts to escape outwardly thru the parts of the engine attracting the greatest amount of heat.

Other objects and advantages will be hereinafter more fully set forth and pointed out in the accompanying specification.

In the accompanying drawings which are made a part of this application,

Figure 1 is a top plan view of one cylinder of an engine, with the cooling medium attached thereto.

Figure 2 is a detail sectional view thereof as seen along line 2—2, Fig. 1, and,

Figure 3 is a horizontal sectional view as seen along line 3—3, Fig. 2.

Referring to the drawings in which similar reference numerals designate corresponding parts thruout the several views, 1 indicates the cylinder of an engine, the upper portion 2 of which forms an explosion chamber, and 3 indicates the removable head for the cylinder. The head 3 is attached to the cylinder 1 by means of the threaded studs 4, the lower ends of which thread into bosses 5, on the peripheral surface of the cylinder, the outer ends of the studs receiving nuts 6.

As the wall of the cylinder is comparatively thin, hollow bosses 7 are formed on the head 3, thru which the bolts 4 pass, and as the forming of the bosses naturally thicken or require added material, and as the addition of material naturally attracts a greater amount of heat than the thinner walls, the studs 4 are provided with bores 8, thru which air may pass from the inner end to the outer end of the bolts, thus cooling the bolts and bosses and keeping them at substantially the same temperature as the remaining portion of the engine; and thus indirectly cooling the adjacent walls the heat from which is attracted by bosses 5 and 7.

In order to convey air around the explosion chamber 2, a duct 9 is formed circumferentially around the cylinder 1, in proximity to the explosion chamber, the inner ends of the bores 8 communicating with the duct 9, so that air will be forced from the duct outwardly thru said bolts, and thus cool the bolts and contiguous parts of the engine.

Air from any suitable source is conveyed to the duct 9, thru a manifold 10, said manifold being secured in position over the mouth 11 of the duct 9 by means of a bolt 12, which passes thru the manifold and threads into a rib 13 extending vertically across the mouth 11 and centrally thereof. The rib 13 not only forms an anchor for the inner end of the bolt 12, but also serves to split the volume of air entering the duct, thus causing the air to travel in each direction around the duct.

With this arrangement, the upper portion of the cylinder, which receives the greatest amount of heat, will be cooled to substantially the same degree as the remainder of the cylinder, and by causing the air to move upwardly as it discharges from the duct 4, such movement will coordinate with the natural movement of the air, when the engine is mounted with the cylinder 1 in vertical position as shown.

It is understood that additional cooling means may be used on the engine, such as the fins 14, in conjunction with this invention.

While the description and drawings illustrate in a general way certain instrumentalities which may be employed in carrying the invention into effect, it is evident that many modifications may be made in the various details without departing from the scope of the appended claims, it being understood that the invention is not restricted to the particular examples herein described.

I claim as my invention:

1. Means for cooling an engine comprising an air receiving duct adjacent the outer end of the engine cylinder, and means encased in the wall of the engine cylinder for

carrying the air from the duct in an outward direction.

2. The combination with the cylinder of an engine, and a head therefor, of hollow bolts for securing the head to the cylinder, and means for conveying a confined volume of air around said cylinder and causing the same to discharge in an outward direction thru said bolts.

3. The combination with the cylinder of an engine, and a head therefor, of hollow bolts for attaching said head to said cylinder, and an air conveying duct communicating with the inner ends of said bolts, whereby the air will discharge in an outward direction, and means for conveying air to said duct.

4. The combination with the cylinder of an engine, and a head therefor, of hollow bolts for securing the head to said cylinder, an air conveying duct circumferentially of said cylinder and communicating with the inner ends of said bolts, means for conveying air to said duct in a manner to cause the air to move outwardly in escaping from said duct, and means for causing the air to travel in opposite directions thru said duct.

5. The combination with the cylinder of an engine having hollow bosses externally thereof, and a head for said cylinder, of hollow bolts adapted to pass thru said bosses, a duct for causing air to pass outwardly thru said bolts and bosses, means for conveying air to said duct, and a rib in the mouth of said duct for splitting the volume of air entering said duct and causing it to travel thru the duct in opposite directions.

In testimony whereof, I have hereunto set my hand on this the 18th day of March, A. D., 1929.

OWEN H. SPENCER.