Oct. 7, 1924. 1,511,023

A. T. BROWN

INTERNAL COMBUSTION ENGINE

Filed April 6, 1917 2 Sheets-Sheet 1

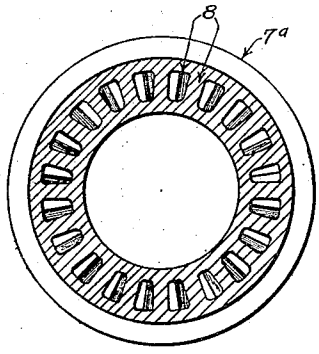

Fig.2.

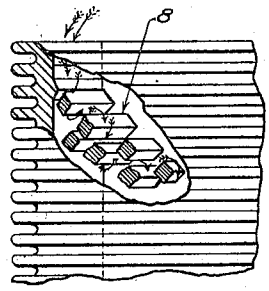

Fig.3.

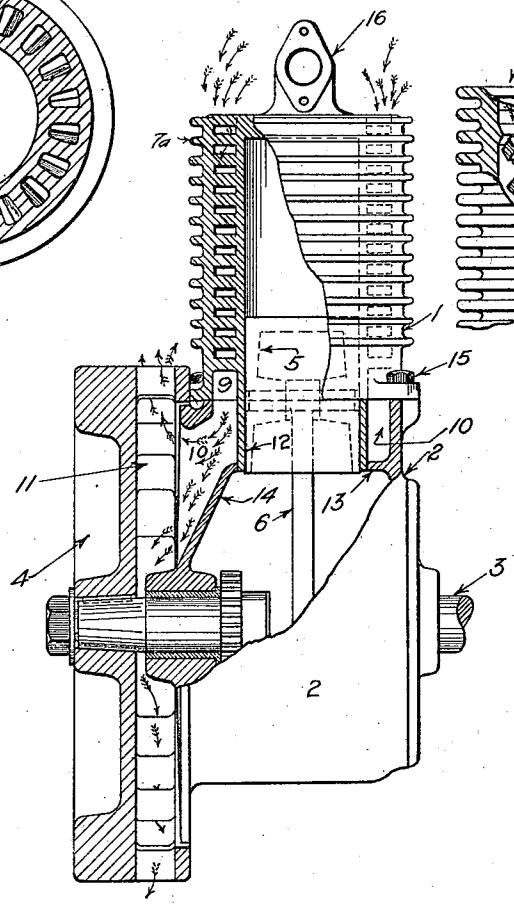

Fig.1.

INVENTOR.
Alexander T. Brown
BY Parsons & Bodell.
ATTORNEYS.

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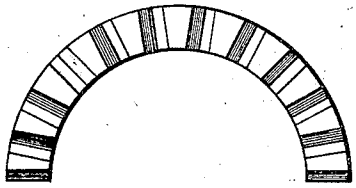

Fig. 4.

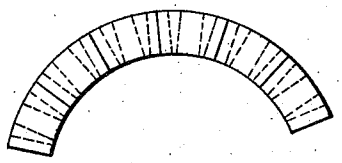

Fig. 6.

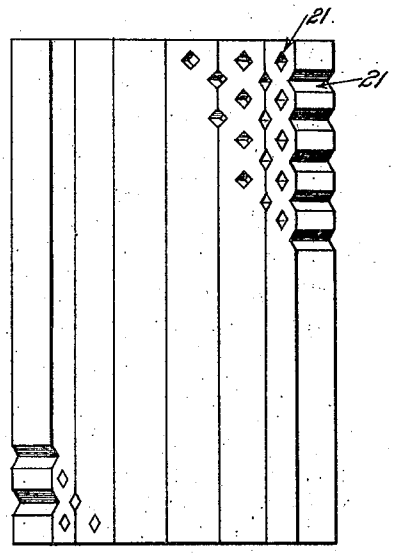

Fig. 7.

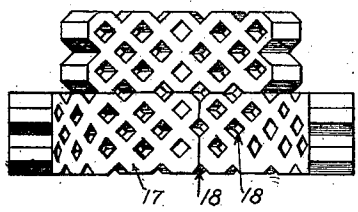

Fig. 5.

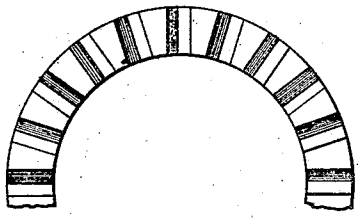

Fig. 8.

Fig. 9.

INVENTOR.
Alexander T. Brown.
BY Parsons & Bodell.
ATTORNEYS.

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UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

INTERNAL-COMBUSTION ENGINE.

Application filed April 6, 1917. Serial No. 160,092.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Internal-Combustion Engine, of which the following is a specification.

This invention relates to internal combustion engines, and has for its object an air cooled engine which is provided in a particularly simple and efficient manner with heat radiating pins or studs so arranged that the engine is particularly simple and economical in construction and highly efficient and durable in use, and it further has for its object the method or art of casting cylinders; and the invention consists in the combinations and constructions and in the operations hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a longitudinal sectional view, partly in elevation, of an engine embodying my invention.

Figure 2 is a transverse sectional view through the cylinder and its jacket.

Figure 3 is a fragmentary view, partly broken away, illustrating the arrangement of the heat radiating studs.

Figures 4 and 5 are, respectively, a plan and an elevation of one arrangement of cores used in producing the cylinder and forming the heat radiating studs.

Figures 6 and 7 are views similar to Figs. 4 and 5 of another form of cores used in casting the cylinder of my engine.

Figures 8 and 9 are plan and edge views of another form of core used in casting the cylinder.

This engine comprises generally a cylinder having a jacket and heat radiating studs extending between the cylinder wall and the jacket, and extending over the greater area of the cylinder or the wall of the expansion space thereof, and means for circulating the air through the jacket about the cylinder and around the studs.

1 designates the cylinder which is mounted upon a base or crank case 2 in which the crank shaft 3 is journaled.

4 is the fly wheel mounted on the crank shaft.

5 is the piston movable in the cylinder and connected to the crank of the shaft 3 by a connecting rod 6.

7 is a jacket surrounding the cylinder, and 8 are the radially extending studs covering substantially the area of the cylinder wall or the wall of the expansion chamber thereof, these studs extending between the cylinder wall and the jacket 7.

As here shown, the studs are arranged in rows or series and the studs of each row are arranged staggered with those of the next row, as seen in Figs. 2 and 3. Each stud is angular in cross section and is usually square. By reason of the angularity of the studs the external surface thereof is greater than that of round studs and also the angles offer greater obstruction to a cooling air current than smooth round surfaces.

In this embodiment of my invention, the jacket is open at its top in order to permit the inlet of air, and opens at its lower end into an outlet passage 9 communicating with a passage 10 in one end of the crank case 2, the passage 10 opening through the end face of the crank case, in order to deliver to a suction or centrifugal fan 11 associated with the fly wheel 4. The lower end 12 of the cylinder wall is unprovided with projections or studs, extends below the wall of the jacket, and opens into the crank case, the space around the lower end of the extension being separated from the interior of the crank case by the walls 13, 14, the latter forming the lower side of the outlet passage 10. The jacket may also be provided with external heat radiating projections or flanges 7^a.

The cylinder is secured to the base in any suitable manner as by screws 15 extending through flanges on the jacket and threading into the top of the crank case. The cylinder is provided with suitable intake and exhaust valves one of which is indicated at 16.

As the studs are integrally united to the cylinder wall and to the jacket, the heat is more quickly conducted from the cylinder walls than when the studs are otherwise secured in position, and owing to the fact that the studs join the jacket, a greater heat conducting and radiating surface is provided than when the outer ends of the studs are not joined to the jacket.

In operation, during the turning of the fly

wheel fan, the air is drawn into the jacket from the top thereof and around the heat radiating studs, through the passages 9 and 10, thus effectively cooling the engine.

Preferably, the studs are cast integral with the cylinder and the jacket but may be pieces, as rods which are integrally united with the walls of the cylinder and the jacket during the casting operation as when rods are inserted in the sand core with their ends extending into the mold cavities in which the metal is poured to form the cylinder wall and the jacket. In some instances, it may be preferable to coat such rods with a suitable fluxing metal as tin. However, in either construction, the studs connect the cylinder wall and the jacket and are either integral therewith or integrally united thereto.

The cylinder may be provided with integral studs by the use of core sections 17 having the openings 18 therethrough and also in their edges, these core sections being in the form of arc-shaped bricks laid in tiers, one upon the other, or as seen in Figs. 6 and 7, they may be in the form of lengthwise perforated strips or slats extending the full length of the mold space in which the cylinder is to be formed, the strips being arranged side by side and provided with stud forming openings 21 in the bodies thereof and also in their meeting edges. Or as seen in Figs. 8 and 9, the cores may be thin rings 22 having notches 23 in their upper and lower faces which register with the notches of the contiguous rings to form the stud forming perforations. Owing to the use of sectional cores, or cores in the form of bricks, the casting operation is much more simplified and cheapened, than when the usual core is used.

What I claim is:

An internal combustion engine comprising a cylinder, a jacket surrounding the cylinder and open at its ends, the jacket having peripheral heat radiating projections and heat radiating studs connecting the cylinder wall and the jacket, the studs being integral with the cylinder and the jacket, and means for forcibly circulating air through the jacket from one end to the other thereof and then discharging said air into the atmosphere substantially as and for the purpose described.

In testimony whereof, I have hereunto signed my name, at Syracuse, in the county of Onondaga, and State of New York, this 29th day of March, 1917.

ALEXANDER T. BROWN.