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FINNED ENGINE CYLINDER

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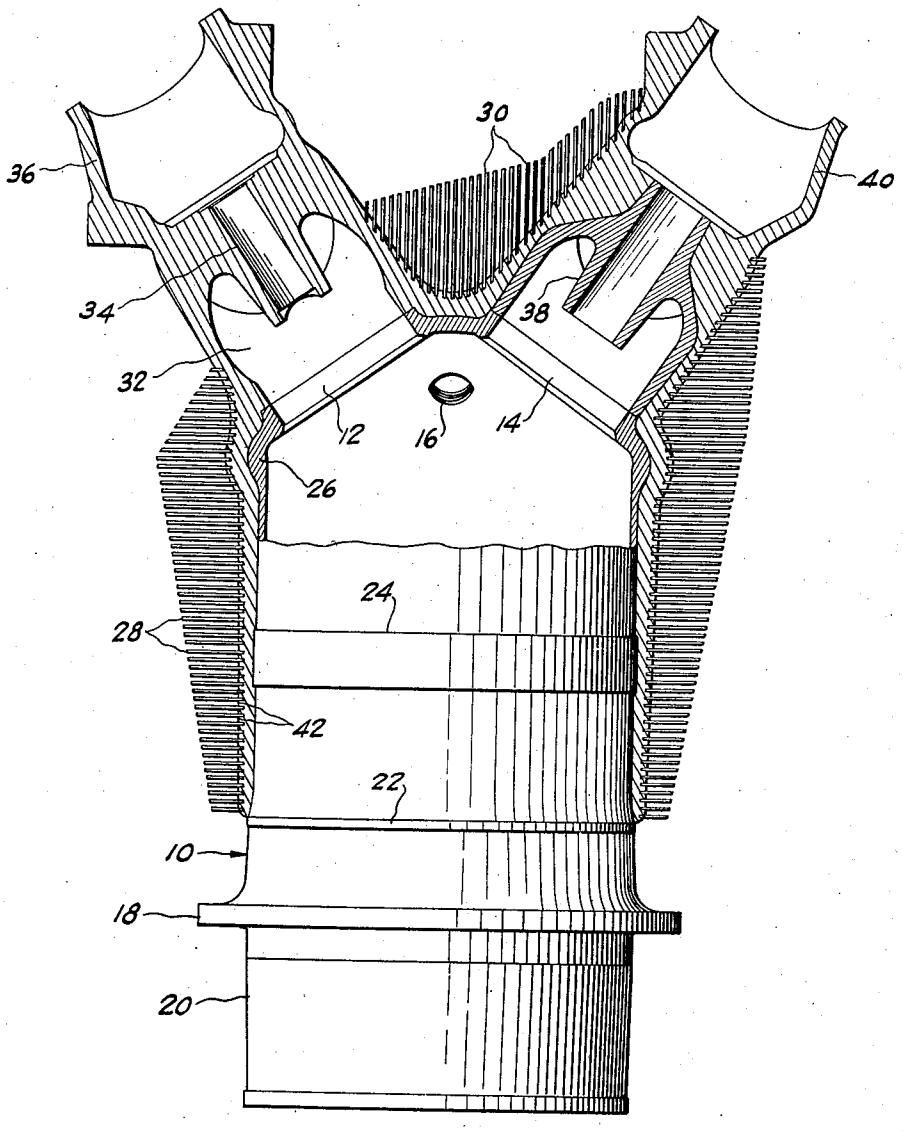

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FINNED ENGINE CYLINDER

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1 Claim. (Cl. 123—171)

This invention relates to an improved construction for finned engine cylinders and has for an object the provision of improved means for producing a composite engine cylinder.

A further object of the invention resides in the provision of an improved cylinder construction having a steel barrel portion, sheet metal fins and an aluminum intake duct and valve mechanism supports.

A still further object resides in the provision of improved means for securing aluminum fins to a steel cylinder barrel and providing suitable supports for the valves and valve operating mechanism.

Other objects and advantages will be more particularly pointed out hereinafter or will become apparent as the description proceeds.

In the accompanying drawing, in which like reference numerals are used to designate similar parts throughout, there is illustrated an example of an improved cylinder constructed according to the invention. The drawing, however, is for the purpose of illustration only and is not to be taken as limiting or restricting the scope of the invention.

In the drawing, the single figure is a longitudinal sectional view of a finned engine cylinder constructed according to the invention, a portion of the cylinder barrel being shown in elevation.

Referring to the drawing in detail, the numeral 10 generally indicates a cylinder barrel, preferably formed of steel of desired physical characteristics. The cylinder is provided with a closed outer end in the form of a combustion chamber dome within which are provided the valve ports and spark plug apertures, the intake valve port being indicated by the numeral 12, the exhaust port by the numeral 14 and a spark plug aperture by the numeral 16. Near its open end the cylinder barrel is provided with an external flange 18 by means of which it may be secured to an engine crankcase and has below the flange a skirt portion 20 adapted to extend through the cylinder aperture in the crankcase to assist in maintaining the cylinder in position on the crankcase and to bring a portion of the cylinder within the diameter of the crankcase. Above the crankcase the cylinder barrel is provided with external beads as indicated at 22, 24 and 26 for a purpose which will presently appear.

Above the bead 22 the barrel is surrounded by a series of annular fins of varying diameter, as generally indicated at 28. These fins are preferably made of sheet metal in order to provide closely spaced heat radiating fins of great depth which are, at the same time, equally spaced and sufficiently strong to resist the vibratory effect imposed on the cylinder by the engine operation. The cylinder head and the exhaust port casing are also surrounded by similar fins as indicated at 30.

While the advantages of sheet metal fins have long been recognized in the air-cooled engine art, so far this type of heat radiating construction has not been successfully practiced because of the difficulty in securing the fins onto the cylinder barrel and providing a good heat transfer bond between the barrel and the fins. According to the present invention the barrel 10 is mounted in a jig or fixture and the fins are assembled about it and alternated with split spacing rings to provide the proper spaces between the individual fins. The jig preferably has an outer casing the interior of which bears against the peripheries of the fins which are cut to the proper diameters so that as the fins are assembled about the barrel which is held in the jig the proper spacing will be maintained between the inner edges of the fins and the exterior surface of the barrel.

Suitable molds are centered on the intake port 12 to provide the intake conduit 32, intake valve guide 34, and intake valve mechanism housing 36, and a mold is also centered on the combined exhaust conduit liner and valve guide 38, which is preferably made of steel and welded or otherwise secured to the barrel 10 before beginning assembly of the fin, to provide the exhaust valve mechanism housing 40.

After the fins and molds have been assembled about and upon the barrel 10 within the forming jig or external mold, molten aluminum is forced under high pressure into the spaces between the cylinder barrel and the fins and fin spacers, and the spaces about the valve conduits and valve mechanism housing molds to provide a matrix of die cast aluminum between the barrel and the inner edges of the fins, and die cast valve housings. As indicated by the line 42 the fin spacers terminate somewhat short of the inner edges of the fins to permit the cast metal to surround the inner edges of the fins for an appreciable depth to provide a good heat conducting bond between this metal and the fin the same time it perfects the bond with the exterior surface of the cylinder barrel.

The bead 22 may effectively cooperate with the exterior mold to limit the downward extent of the fin securing casting, the intermediate bead 24 extends into the casting to increase the strength

of the bond between the casting and the barrel in a direction longitudinally of the barrel while the bead 26, besides reinforcing the barrel around the exhaust ports 12 and 14, also extends out into the cast metal to assist in securing the casting more firmly to the cylinder barrel.

While a particular cylinder construction has been hereinabove described and illustrated in the accompanying drawing for the purpose of disclosing the invention, it is to be understood that the invention is not limited to the particular construction so illustrated and described but that such changes therein may be resorted to as come within the scope of the sub-joined claim.

Having now described the invention so that others skilled in the art may clearly understand the same, what it is desired to secure by Letters Patent is as follows:

A composite engine cylinder comprising, a steel barrel member having a closed head end providing a combustion chamber, valve ports in said head end, a steel exhaust port liner and valve guide secured to the periphery of the exhaust port in said head end, spaced sheet metal fins surrounding said barrel and overlying the head end thereof around said ports spaced from the outer surface of said barrel, and an aluminum casting filling the space between the finned portion of the surface of said barrel and said fins and including the inner edges of said fins to provide a supporting and heat conducting bond between said barrel and said fins, said casting also surrounding said exhaust conduit liner and valve guide and extending therebeyond to provide a valve mechanism support and extending outwardly from the intake port in said head to provide an intake conduit and valve guide and valve mechanism support for said cylinder.

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