June 12, 1934. A. H. R. FEDDEN 1,962,987

CYLINDER HEAD FOR INTERNAL COMBUSTION ENGINES

Filed Aug. 28, 1931 2 Sheets-Sheet 1

Fig. 1.

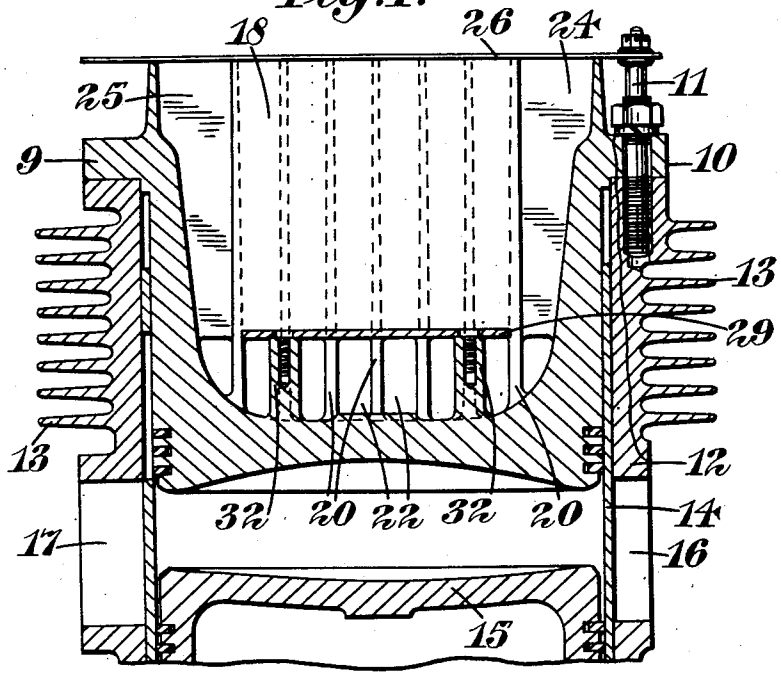
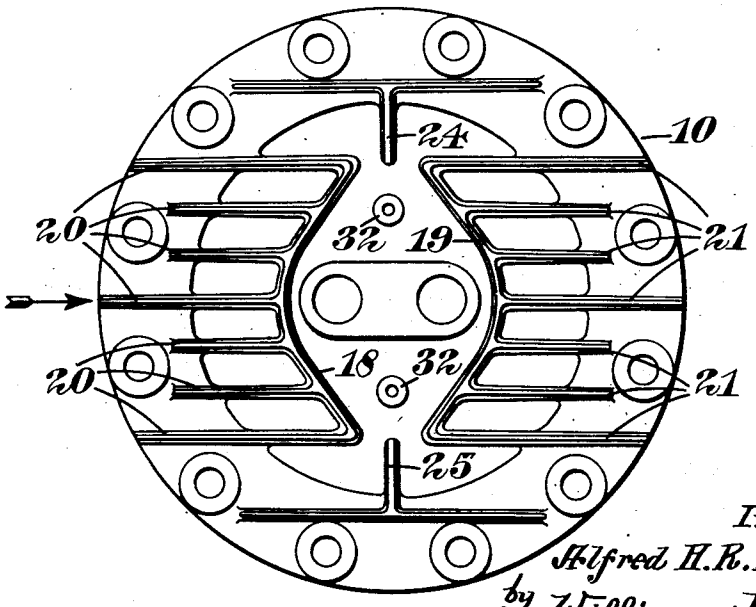


Fig. 3.



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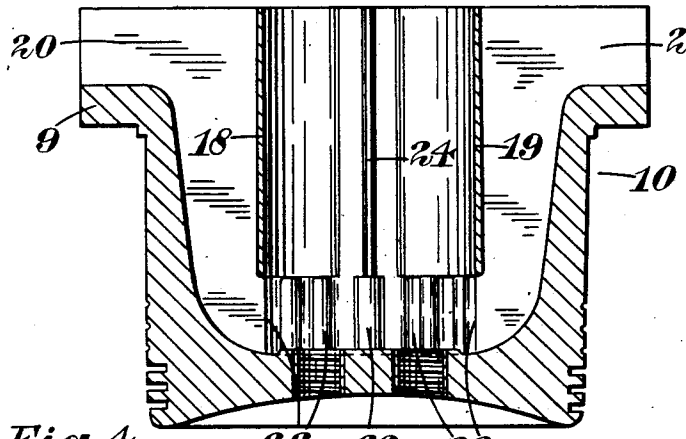


Fig. 2.

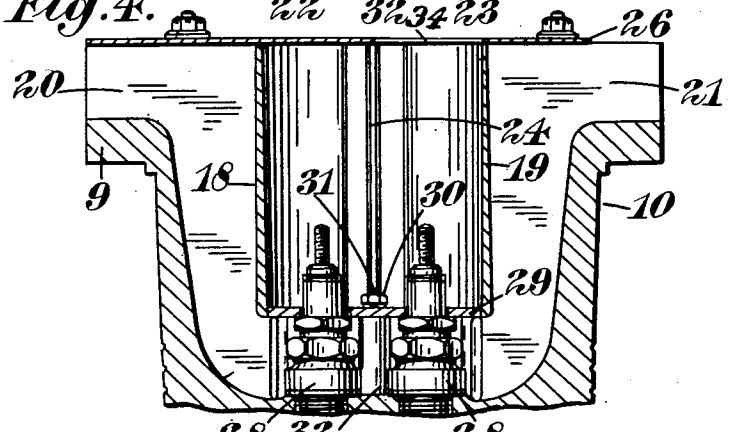


Fig. 4.

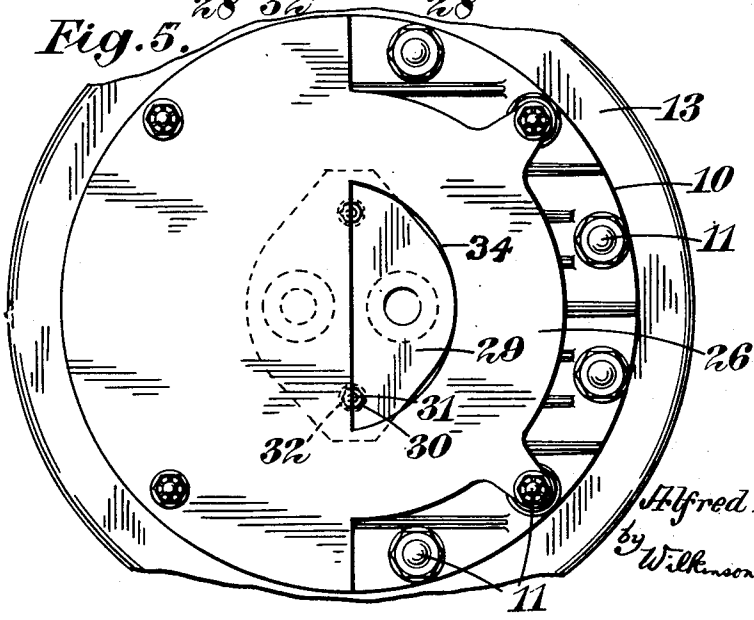


Fig. 5.

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UNITED STATES PATENT OFFICE

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CYLINDER HEAD FOR INTERNAL COMBUSTION ENGINES

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Application August 28, 1931, Serial No. 560,030
In Great Britain September 30, 1930

6 Claims. (Cl. 123—171)

This invention is for improvements in or relating to cylinder heads for internal combustion engines and has for its object to provide an improved construction of cylinder head of the kind having a recess extending into the cylinder. Such cylinder heads are commonly used in internal combustion engines of the kind in which the inlet and exhaust ports are controlled by a reciprocating and/or rotating sleeve, and it is found difficult to provide efficient cooling for the cylinder head of an engine of this kind, since there is no flow of air or gas through the cylinder head.

It has been proposed to provide means for directing a stream of air into the recess of a cylinder head of the kind described but, according to this invention, a recessed cylinder head for an internal combustion engine is provided with a guide or deflector for directing a stream of air into the recess, which guide or deflector is formed integrally with the cylinder head. An advantage of such a construction is that heat is conducted from the cylinder head to the guide or deflector which thus assists in the cooling.

Preferably, according to the invention, a deflector or guide constitutes, with the walls of the recess, two chambers whereof one is disposed round the sides and bottom of the recess and the other occupies the central part of the recess. With a cylinder head constructed in this way two streams of air may be caused to enter the recess, one passing round the wall of the recess and the other passing into and out of the central part of the recess.

A particular form of construction of cylinder head according to this invention will now be described as applied to an air-cooled sleeve-valve aeroplane engine, with reference to the accompanying drawings, of which:

Figure 1 is a sectional elevation of a cylinder head according to the invention showing parts of the cylinder, a piston and sleeve-valve in position,

Figure 2 is a sectional elevation at right-angles to Figure 1 but with certain parts omitted,

Figure 3 is a plan view of the cylinder head corresponding to Figure 2,

Figure 4 is a view similar to Figure 2, showing the sparking plugs and cover plates in position, whilst

Figure 5 is an elevation corresponding to Figure 4, showing the shapes of the cover plates.

As shown in Figure 1, the cylinder head 10 is attached to the cylinder 12 by bolts 11 passing through its flange 9; the bolts 11 are also shown in Figure 5. As shown, the cylinder head 10 enters the upper end of the cylinder, leaving the annular space into which the sleeve 14 passes. A piston 15 reciprocates inside the sleeve 14 and ports 16 and 17 are uncovered and covered at the proper times by the sleeve 14 in known manner. The cylinder 12 is furnished with radiating vanes 13.

Built in the recess in the cylinder head 10 are two vertical curved walls 18, 19 (see particularly Figure 3). These walls are so curved as to enclose a space in the middle of the recess, which, in transverse section, is approximately elliptical, and are formed integrally with a series of parallel partition walls 20, 21, which being formed integrally with the cylinder head, give rigid support to the curved walls 18, 19. The walls 20 and 21 extend from above the open end of the recess right to the bottom, whereas the walls 18, 19 are stopped short before they reach the bottom of the recess, thus forming a series of ports 22, 23 at the bottom of the recess (see Figures 1 and 2).

In addition to the walls or vanes 18, 19, 20 and 21, above-mentioned, the cylinder head is formed with two T-shaped vanes 24, 25 and, as may be clearly seen from Figures 1 and 3, the leg of the T is a vertical wall, the inner edge of which approaches the elliptical space above-mentioned.

The walls 18, 19, 20, 24 and 25 constitute a guide or deflector for the air entering the cylinder-head recess, as is described below.

All the walls and vanes above-mentioned project a substantial distance above the flange 9 of the cylinder head and a thin plate 26 (see particularly Figure 5) is bolted across the cylinder head by extensions from some of the bolts 11. Half of the plate 26 is semi-circular, completely covering its half of the cylinder head while the other half is annular, leaving a semi-circular aperture 34 over one side of the central elliptical space on the cylinder-head recess. The sparking plugs 28 are covered by a smaller plate 29 which drops into the elliptical space between the walls 18 and 19 and fits over the insulation of the plugs and is held in position by nuts 30 engaging studs 31 fitted to upstanding projections 32. It will be seen from Figure 4 that the plate 29 divides the recess of the cylinder head into two main spaces, one of which passes round the walls of the recess past the bodies of the sparking plugs and up the other side; the other space is the elliptical chamber in the centre of

the recess formed between the walls 18 and 19.

The cylinder head above described is applicable to radial cylinder engines or to other kinds of engine, and in either case a current of air reaches the cylinder head in the direction of the arrow in Figure 3. Part of the air passes down between the walls 20 across the bottom of the recess and up the other side between the walls 21 and out to the atmosphere and another part of the air passes inside the T-shaped vanes 24 into the elliptical chamber and out again through the aperture 34. The cover plate 26 serves to guide the air in the desired directions and to spread it over as large an area as possible of the walls 20, 21, 24, 25 etc., and since all the parts of the cylinder head are in intimate metallic contact, heat is rapidly and efficiently conducted away from the cylinder head, especially, the sparking plug bodies are effectively cooled.

Where the invention is applied to a radial cylinder engine the cylinders will be arranged with the walls 20 and 21 parallel to the direction of flight. In other types of engines the cylinders are so arranged and suitable baffles or guides provided, that the air enters each cylinder head in the desired direction, as above described.

I claim:

1. An air-cooled internal combustion engine comprising in combination a recessed cylinder head, a deflecting member formed integrally with the cylinder head situated in the recess so as to provide a shallow passage adjacent the walls of the recess and a central space within the said deflecting member, guiding means for causing a flow of air into the recess on one side of the deflecting member and out of the recess on the other side of the deflecting member and additional guiding means for causing an additional flow of air into the central recess.

2. An air-cooled internal combustion engine comprising, in combination, a recessed cylinder head, a deflecting member formed integrally with the cylinder head and situated in the recess so as to provide a shallow passage adjacent the walls of the recess for cooling air, walls in the adjacent passage, formed integrally with the said deflecting member and with the cylinder head and arranged parallel to the direction of air flow and a detachable cover plate surmounting the said deflecting member.

3. An air-cooled internal combustion engine comprising, in combination, a recessed cylinder head, a deflecting member formed integrally with the cylinder head and situated in the recess so as to provide a shallow passage adjacent the walls of the recess for cooling air, walls in the shallow passage parallel to the direction of air flow and a detachable plate to close the bottom of the central space enclosed by the deflecting member.

4. An air-cooled internal combustion engine comprising, in combination, a recessed cylinder head, two curved walls formed integrally with the cylinder head and situated within the recess and lying parallel to the axis of the cylinder so as to enclose a central space in the recess and so as to provide a shallow passage adjacent the walls of the recess for cooling air, integrally formed walls within the shallow passage and parallel to the direction of the air-stream for subdividing the shallow passage, and a cover plate surmounting the said curved and parallel walls.

5. An air-cooled internal-combustion engine comprising, in combination, a recessed cylinder-head, a deflecting member formed integrally with the cylinder-head, situated in the recess so as to provide a shallow passage adjacent the walls of the recess for cooling air and protruding above the top of the cylinder-head, and a cover-plate surmounting the said deflecting member and extending beyond it laterally to provide an inlet for air into the shallow passage.

6. An air-cooled internal-combustion engine comprising, in combination, a recessed cylinder-head, a deflecting member formed integrally with the cylinder-head, situated in the recess so as to provide a shallow passage adjacent the walls of the recess for cooling air and protruding above the top of the cylinder-head, walls in the shallow passage parallel to the direction of air-flow, and a detachable cover-plate surmounting the said deflecting member and extending beyond it laterally to provide an inlet for air into the shallow passage.

ALFRED HUBERT ROY FEDDEN.