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CYLINDER HEAD CONSTRUCTION

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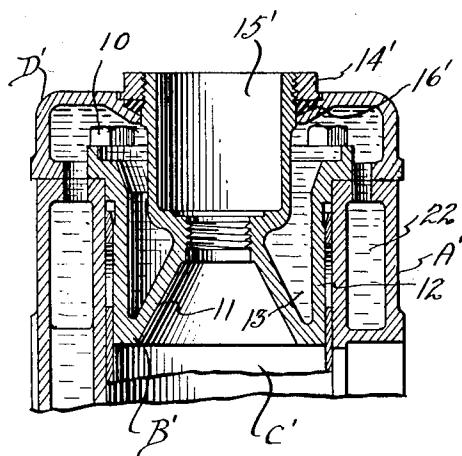


Fig. 4

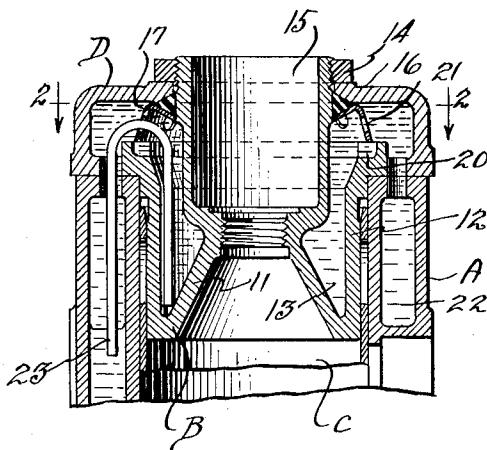


Fig. 1

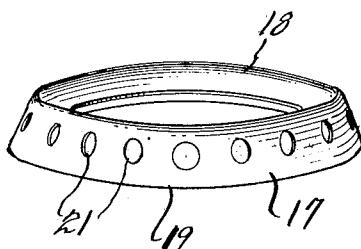
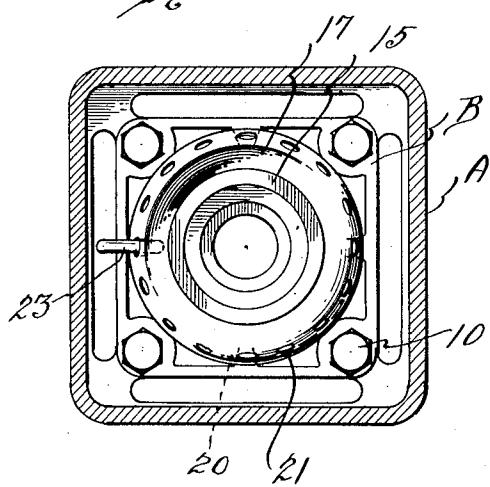


Fig. 3

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# UNITED STATES PATENT OFFICE.

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## CYLINDER-HEAD CONSTRUCTION.

Application filed February 21, 1927. Serial No. 169,741.

This invention relates to internal combustion engines and refers more particularly to an improved cylinder head construction especially adapted, although not necessarily limited, to the sleeve valve type of engine.

One of the objects of the invention resides in providing an improved sealing means between the cylinder head and the cylinder cover of an engine. A further object is to provide a simply constructed cylinder head in combination with means for effectively sealing the joint, but which will not interfere with the circulation of the cooling liquid, ordinarily water.

15 A further feature of the invention resides in the provision of a cylinder head water joint sealing means adapted to locate a siphon tube for draining the cylinder head of its cooling water.

20 My invention also provides a cylinder head construction capable of being machined easily and at low cost.

Other features of my invention will be apparent from the following description 25 with reference to the accompanying drawings in which I have illustrated specific embodiments of my invention, it being understood that modifications within the limits of my claims may be resorted to without departing from the spirit of my invention.

With reference to the drawings in which like characters indicate similar parts,

Fig. 1 is a sectional fragmentary view, in elevation, of an engine cylinder showing my 30 improved cylinder head construction,

Fig. 2 is a plan view along 2-2 of Fig. 1,

Fig. 3 is a detail perspective view of the joint ring supporting member, and

Fig. 4 is a view corresponding to Fig. 1, 35 illustrating a modified form of my invention.

In the drawings reference character A represents the cylinder, B the cylinder head, C the sleeve, and D the cylinder cover. The cylinder head B may be secured in place to cylinder A by suitable means such as bolts 10, and may further be provided with inner and outer walls 11 and 12 respectively, spaced to form a cooling jacket 13. The cylinder cover D may be securely clamped in place by 40 any convenient means such as the nut 14 threaded to the upper portion of the cylinder head barrel 15. In order to provide a water tight joint I have provided a joint ring 16 of customary composition preferably

located below cylinder cover D where it will 55 not be acted upon by heat, which in many other instances, tends to vulcanize the joint ring and make removal thereof inconvenient. 17 is a joint ring supporting member which may be formed with a face 18 engagable with 60 ring 16 and having an edge 19 suitably supported as by ribs 20 formed at convenient intervals on the cylinder head. Openings 21 permit free passage of cooling water between the jacket 13 and the cylinder jacket 22. Conveniently located in an opening 21 is a siphon tube 23 whereby, upon draining the water from the cylinder jacket, the water in the cylinder head jacket will also be removed.

The member 17 is preferably made of sheet 70 metal conveniently pressed to shape with the openings 21 cut in the side wall. In such an instance the resilience of this member serves to increase the sealing qualities of the joint since the nut 14, on seating the cylinder cover 75 D, places the member 17 under a tension. Thus the member 17 in tending to resume its normal shape forces the ring 16 tightly in place. Obviously the member 17 need not be 80 of a resilient character but may be of a non-yielding nature.

The siphon 23 may be loosely supported in an opening 21, or in order to form a unit assembly with the member 17 may be fixed therewith as by soldering in place. Obviously 85 any number of siphon tubes may be provided.

While I have shown my invention applied to an engine of the sleeve valve type, it will be understood that it is equally adapted to 90 other types of engines where a cylinder head water joint is desirable. It will also be apparent that while I am illustrating my invention in the form of a single cylinder engine, it is obviously in no manner so limited and 95 the unit shown may be repeated for as many cylinders as might be used in an engine.

Instead of employing a joint ring supporting member as a separate element, I have shown in Figure 4 a modified construction in 100 which the joint ring 16' is located between the clamping nut 14' and the inwardly turned end of the cylinder cover D'.

In both Fig. 1, and Fig. 4, it will be noted that the outer wall of the cylinder head barrel 105 15 is so formed as to permit substantially uninterrupted machining, this being one of the features of my invention. In some instances

heretofore the outer wall of the cylinder has been formed with an integral annular projection for supporting the sealing ring. Such a structure gives rise to difficult machining of the outer barrel surface, other objections lying in difficult coring of the cylinder head water jacket and restriction to the flow of cooling water.

What I claim as my invention is:

10 1. A device of the character described comprising in combination, cooperating elements together forming an engine cylinder and head therefor, a cover, and means providing a fluid tight joint between the cover and one 15 of said elements, said means comprising a sealing structure located within the cover enclosure.

20 2. A device of the character described comprising in combination, cooperating elements together forming an engine cylinder and head therefor, a cover, means providing a fluid tight joint between the cover and one of said elements, said means comprising a sealing structure located within the cover enclosing 25 sure, and means yieldingly acting on said sealing structure tending to maintain a fluid tight joint.

30 3. A device of the character described comprising in combination, cooperating elements together forming an engine cylinder and head therefor, a cover, means acting on said cover to seat the same and reacting on one of said elements, said elements and cover cooperating to provide for circulation of cooling 35 liquid, and a sealing structure providing a fluid tight joint between the cover and the cylinder head, said sealing structure being positioned to be cooled by the said liquid.

40 4. A device of the character described comprising in combination, cooperating elements together forming an engine cylinder and head therefor, a cover, means acting on said cover to seat the same and reacting on one of said elements, said elements and cover cooperating to provide for circulation of cooling liquid, a sealing structure providing a fluid tight joint between the cover and the cylinder head, said sealing structure being positioned to be cooled by the said liquid 45 and means supported by one of said elements and supporting the sealing structure for producing the tight sealing joint upon a clamping 50 actuation of the first said means.

55 5. A device of the character described comprising in combination, cooperating elements together forming an engine cylinder and head therefor, a cover, means acting on said cover to seat the same and reacting on one of said elements, said elements and cover cooperating to provide for circulation of cooling liquid, a sealing structure providing a fluid tight joint between the cover and the cylinder head, said sealing structure being positioned to be cooled by the said liquid, and 60 resilient means supported by one of said elements and supporting the sealing structure for producing the tight sealing joint upon a clamping 65 actuation of the first said means.

ments and supporting the sealing structure for producing the tight sealing joint upon a clamping actuation of the first said means.

6. A device of the character described comprising in combination, a water jacketed cylinder, a water jacketed cylinder head, a cylinder head cover, the said water jackets being in communication, a siphon tube having portions communicating with the said jackets respectively, and an element serving to position the siphon tube in its proper location beneath the cylinder head cover.

7. A device of the character described comprising in combination, a water jacketed cylinder, a water jacketed cylinder head, the said water jackets being in communication, a siphon tube having portions communicating with the said jackets respectively, and an element serving to position the siphon tube in its proper location, said element provided with passageways permitting circulation of the cooling water between the said jackets.

8. In an internal combustion engine the combination with a water jacketed cylinder and water jacketed cylinder head having a barrel portion, of a cylinder cover surrounding the barrel portion and forming with the said jackets means permitting circulation of cooling water between the jackets, a sleeve valve operable between the cylinder and cylinder head, a sealing ring structure surrounding the barrel portion in contact with the cylinder cover, means engaging the barrel for seating the cylinder cover, and means supporting the lower side of the sealing ring against the thrust exerted from a point above the ring by the said barrel engaging means.

9. In an internal combustion engine the combination with a water jacketed cylinder and water jacketed cylinder head having a barrel portion, of a cylinder cover surrounding the barrel portion and forming with the said jackets means permitting circulation of cooling water between the jackets, a sleeve valve operable between the cylinder and cylinder head, a sealing ring structure forming a fluid tight joint between the barrel structure and the cylinder cover and positioned to be cooled by the said cooling water, and a sealing ring supporting element surrounding the barrel portion and having a portion extending across the path of travel of the cooling fluid circulating between said jackets, said supporting element having openings permitting passage of the cooling fluid therethrough.

10. In an internal combustion engine the combination with a water jacketed cylinder and water jacketed cylinder head having a barrel portion, of a cylinder cover surrounding the barrel portion and forming with the said jacket means permitting circulation of cooling water between the jackets, a sleeve valve operable between the cylinder and cylinder head, a sealing ring structure forming

a fluid tight joint between the barrel structure and the cylinder cover and positioned to be cooled by the said cooling water, a sealing ring supporting element surrounding the barrel portion and having a portion extending across the path of travel of the cooling fluid circulating between said jackets, said supporting element having openings permitting passage of the cooling fluid therethrough, and a siphon tube having end portions lying in the respective jackets aforesaid and an intermediate portion positioned in one of said openings.

11. In an internal combustion engine the combination with a water jacketed cylinder and water jacketed cylinder head having a barrel portion, of a cylinder cover surrounding the barrel portion and forming with the said jackets means permitting circulation of cooling water between the jackets, a sleeve valve operable between the cylinder and cylinder head, a sealing ring structure surrounding the barrel portion in contact with the cylinder cover, and means engaging the barrel for seating the cylinder cover, the outer wall of the cylinder head barrel being formed free of sealing ring supporting projections and other projections so as to permit substantially uninterrupted machining thereof.

12. In an internal combustion engine the combination with a water jacketed cylinder and water jacketed cylinder head having a

barrel portion, of a cover forming a passageway relatively between the cylinder jacket and cylinder head jacket, said barrel portion extending through the cover, sealing means for the cover and barrel portion of the cylinder head, said barrel portion having an exterior wall formed substantially cylindrical so as to permit substantially uninterrupted machining thereof.

13. In an internal combustion engine the combination with a water jacketed cylinder and water jacketed cylinder head having a barrel portion, of a cover forming a passageway relatively between the cylinder jacket and cylinder head jacket, sealing means for the cover and cylinder head, and means separate from the cover and cylinder head in contacting supporting relation with the sealing means.

14. In an internal combustion engine the combination with a water jacketed cylinder and water jacketed cylinder head having a barrel portion, of a cover forming a passageway relatively between the cylinder jacket and cylinder head jacket, and an annular cylinder head joint sealing ring supporting element within the said water passageway, said element having a water passage aperture.

In witness whereof, I hereunto subscribe my name this 31st day of January, A. D. 1927.

ARCHIE MACPHAIL NIVEN.