July 31, 1934. W. HEFTI 1,968,449

CYLINDER LINER FOR INTERNAL COMBUSTION ENGINES

Filed Nov. 19, 1932

Fig. 1.

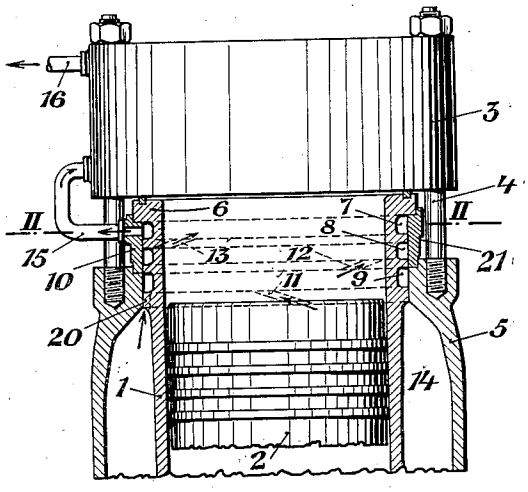
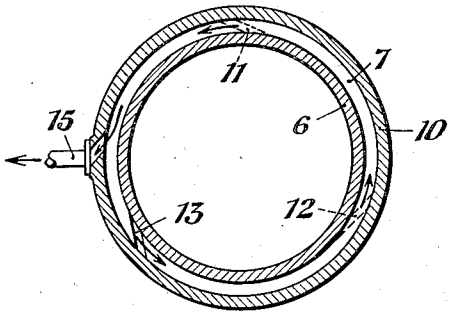


Fig. 2.



INVENTOR:
Wilhelm Hefti
BY
Pennie Davis Marvin & Edmonds
ATTORNEY.

Patented July 31, 1934 1,968,449

UNITED STATES PATENT OFFICE

1,968,449

CYLINDER LINER FOR INTERNAL COMBUSTION ENGINES

Wilhelm Hefti, Winterthur, Switzerland, assignor to the firm of Sulzer Frères Société Anonyme, Winterthur, Switzerland

Application November 19, 1932, Serial No. 643,367
In Switzerland November 26, 1931

4 Claims. (Cl. 123—173)

This invention relates to cylinder liners for internal combustion engines and of the kind in which the outer end portion of the liner is furnished with a flange or shoulder adapted to engage an annular member which embraces the liner adjacent to the flange and in turn engages the cylinder casing. The invention has for its object to provide an improved construction whereby the space beyond the outer end of the cylinder casing necessary to permit withdrawal of the liner, will be reduced.

To this end according to the invention the annular member embracing the liner is arranged to bear at its inner end upon the outer end of the cylinder casing so that the annular member and that part of the liner embraced thereby project beyond the outer end of the cylinder jacket.

An internal combustion engine cylinder embodying one construction of liner according to the invention is illustrated somewhat diagrammatically and by way of example in the accompanying drawing, in which

Figure 1 shows a part of the cylinder and liner in section, and

Figure 2 is a section on the line II—II of Figure 1.

In the construction illustrated the cylinder liner 1 in which the engine piston 2 reciprocates is closed at its outer end by a cylinder head or cover 3 which is secured by bolts or studs 4 to the engine casing or jacket 5. The outer end of the liner 1 is furnished with a flange 6 and the outer surface of the liner adjacent to this flange has three annular grooves 7, 8 and 9. The flange 6 engages an annular member 10, preferably of stainless steel, which embraces the liner adjacent to the flange and bears at its inner end on the outer end of the engine casing 5 as shown, the bolts or studs 4 lying wholly outside the annular member 10.

The annular member 10 and that part of the liner embraced thereby thus project beyond the outer end of the engine casing 5, whereby the head room above the cylinder necessary to permit withdrawal of the liner 1 is reduced by an amount substantially equal to the length of that part of the liner which projects beyond the outer end of the cylinder casing.

When the liner and annular member 10 are in position the grooves 7, 8 and 9 are converted into conduits for the passage of cooling medium, communication between adjacent conduits being established through passages 11, 12 and 13 circumferentially spaced apart and each of which is inclined as shown in Figure 1. Cooling water thus passes from the cooling chamber 14 of the cylinder through the passage 11 to the conduit 9 and thence through the passage 12 to the conduit 8 from which the medium flows through the passage 13 to the conduit 7. From the conduit 7 the medium passes out through a pipe 15 to the cooling jacket of the cylinder head 3 and is discharged through a pipe 16. In this way effective circulation of the cooling medium around that part of the liner which projects beyond the outer end of the engine casing is ensured.

The grooves 7, 8 and 9 in the liner are preferably machined with a view not only to improving the transmission of heat but also to enable the thicknesses of the walls 20 separating adjacent grooves, and which are thinner than the remaining walls of each conduit, to be accurately maintained throughout. For the purpose of facilitating withdrawal of the cylinder liner the annular member 10 is provided with a shoulder 21 which can be engaged by the apparatus employed for withdrawal.

It will be understood that the invention may, if desired, be applied to the liner at both ends of a double-acting cylinder. Further, instead of the annular member being merely gripped between the liner flange and the outer end of the engine casing, the annular member may be shrunk or welded on to the liner.

I claim:

1. In an internal combustion engine, a cylinder casing, a liner, the outer end portion of the liner being provided with a flange or shoulder, an annular member engaged thereby and embracing the liner adjacent to the flange, the inner end of the annular member bearing upon the outer end of the cylinder casing so that the annular member and that part of the liner embraced thereby project beyond the outer end of the cylinder casing, and a series of conduits for cooling medium between that part of the liner adjacent to the flanged end and the annular member embracing that part of the liner.

2. In an internal combustion engine, a cylinder casing, a liner, the outer end portion of the liner being provided with a flange or shoulder, an annular member engaged thereby and embracing the liner adjacent to the flange, the inner end of the annular member bearing upon the outer end of the cylinder casing so that the annular member and that part of the liner embraced thereby project beyond the outer end of the cylinder casing, a series of conduits for cooling medium between that part of the liner adjacent to the flanged end and the annular member embracing that part of the liner, and passages for the flow of cooling

medium between adjacent conduits, said passages being circumferentially spaced apart.

3. In an internal combustion engine, a cylinder casing, a liner, the outer end portion of the liner being provided with a flange or shoulder, an annular member engaged thereby and embracing the liner adjacent to the flange, the inner end of the annular member bearing upon the outer end of the cylinder casing so that the annular member and that part of the liner embraced thereby project beyond the outer end of the cylinder casing, a series of conduits for cooling medium between that part of the liner adjacent to the flanged end and the annular member embracing that part of the liner, and a cylinder head secured to said cylinder casing by bolts spaced apart and arranged outside said annular member.

4. In an internal combustion engine, a cylinder casing, a liner, the outer end portion of the liner being provided with a flange or shoulder, an annular member engaged thereby and embracing the liner adjacent to the flange, the inner end of the annular member bearing upon the outer end of the cylinder casing so that the annular member and that part of the liner embraced thereby project beyond the outer end of the cylinder jacket, a series of conduits for cooling medium between that part of the liner adjacent to the flanged end and the annular member embracing that part of the liner, a cylinder head secured to said cylinder casing by bolts spaced apart and arranged outside said annular member, and passages for the flow of cooling medium between adjacent conduits, said passages being circumferentially spaced apart.

WILHELM HEFTI.