Aug. 4, 1931. H. AUSTIN 1,816,819

CYLINDER OF INTERNAL COMBUSTION ENGINES

Filed Aug. 28, 1928

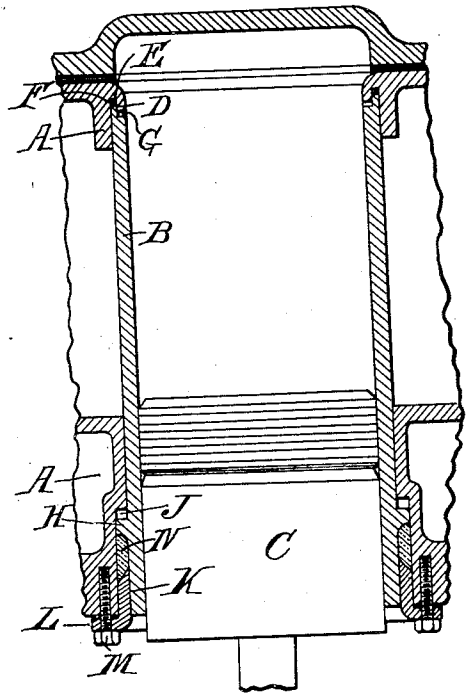


Fig. 1.

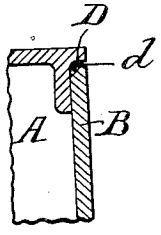


Fig. 2.

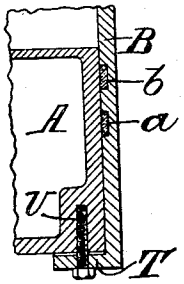


Fig. 3.

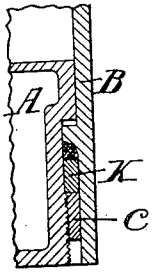


Fig. 4.

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UNITED STATES PATENT OFFICE

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CYLINDER OF INTERNAL COMBUSTION ENGINES

Application filed August 28, 1928, Serial No 302,465, and in Great Britain September 20, 1927.

This invention relates to internal combustion engine cylinders generally; but is more especially applicable to the cylinders of tractor engines where the wear of the internal surfaces of the cylinders is considerable; and owing to this fact, it is expedient to provide means whereby the cylinder liners can be readily detached and replaced in an efficient manner.

Internal combustion engine cylinder liners, as heretofore or usually arranged, have been inserted from above and have been provided each with an external flange around its top edge adapted to fit down upon a packing arranged at the bottom of a recess in the top of the cylinder block. The bottom of the liner has been provided with a packing ring or rings to make a water-tight joint between the liner and a corresponding inner surface at the bottom of the cylinder block. The liner has been secured within the cylinder block either by set-pins passed through the flange at the top of the liner and screwing into the cylinder block or else by providing a screw-thread at the periphery of the flange to engage with an internal screw thread in the recess at the top of the cylinder block.

According to the present invention, the liner is put in from the bottom of the cylinder block and bears upwards, at or near its upper edge, against a packing of an internal shoulder of the cylinder block, the liner being pressed upwards against such packing by a screw device preferably situated at the bottom of the cylinder block.

In order that the invention may be clearly understood convenient adaptations thereof are described with reference to the drawings herewith, of which:—

Figure 1 is a vertical section of a tractor engine cylinder constructed according to one convenient arrangement.

Figure 2 is a similar view of another arrangement of packing for the upper end, the screw device in this case being arranged below as in Figure 1.

Figure 3 is a fragmentary sectional view showing an alternative arrangement of screw device and packing for the lower end; and,

Figure 4 is a similar view to illustrate another arrangement of screw device and packing for the lower end.

Referring first to Figure 1, A is the cylinder block, B the liner and C the piston, the latter being of any convenient construction. The cylinder block A is formed at the top with an internal shoulder D rabbetted at E and within the rabbet is placed a packing F. The liner is shaped at its upper edge as the counterpart of the rabbet E and an additional packing may, if desired, be placed in the space G. The liner, near its lower end, is provided with an external collar H lying within an enlarged bore J formed in from the bottom of the cylinder block. K is a ring adapted to fit within the bore H between the cylinder block and the liner and the ring K has, at its foot, an external flange L through which pass set-pins M screwing into the bottom of the cylinder block. N is a packing placed between the top of the ring K and the collar H.

The packing F is first inserted in the rabbet E and then the liner is put in from underneath with its top edge up against the packing F. The packing N is then put in followed by the ring K and then the set pins are passed through the flange L and screwed up tight. This compresses both the packing N and the packing F and makes a good water joint at the top and bottom of the liner.

Figure 2 shows an alternative form of packing device for the top of the cylinder, the screw device being below as in Figure 1. In this case the shoulder D is quite plain and the outer top edge of the liner B is somewhat chamfered where it bears on the packing *d*.

In Figure 3 the liner B is provided with an external flange T at its foot through which are passed set pins U. In this case the packing at the top may be as shown in Figure 1 or as in Figure 2, but the lower packing consists of the usual packing rings *a* in external grooves *b* of the liner.

Figure 4 shows a lower screw device very similar to that shown in Figure 1 except that the ring K is pressed up by a serrated nut *c*

having an external thread to screw into the bottom of the cylinder block.

In lieu of the set pins M of Figure 1 or U of Figure 3, studs with nuts may, of course, be utilized.

Having fully described my invention what I claim and desire to secure by Letters Patent is:—

1. A cylinder for an internal combustion engine comprising a liner which is put in from the lower end of the cylinder, an annular abutment at the top of the liner, a packing, an internal shoulder at the top of the cylinder against which said annular abutment bears through the medium of said packing, a screw device at the bottom of said cylinder, through the agency of which device said liner is pressed up without rotation against said packing, and means for packing the lower end of said liner in the cylinder.

2. A cylinder for an internal combustion engine, comprising a liner which is put in from the lower end of the cylinder, an annular abutment at the top of the liner, an upper packing for the top of the liner, an internal shoulder at the top of the cylinder against which said annular abutment bears through the medium of said packing, an external shoulder near the bottom of said liner, a lower packing beneath said external shoulder, and a screw device adapted to press upwards against said packing, whereby the bottom of the liner and the top of the liner are simultaneously packed by the action of said screw device.

3. In an internal combustion engine cylinder of the class described, a liner insertable into the cylinder from the bottom thereof, an external shoulder near the bottom of said liner, a lower packing beneath said external shoulder, a plain ring placed beneath said lower packing, a screwed ring screwing in the bottom of the cylinder and bearing upwards against said plain ring to secure the packing at the bottom of the cylinder, and means to permit of the turning of said screwed ring.

In witness whereof I have hereunto signed my name this 14th day of August, 1928.

HERBERT AUSTIN.