Dec. 26, 1933. R. DYMOCK 1,940,677

REMOVABLE CYLINDER

Filed May 2, 1932

Fig. 1

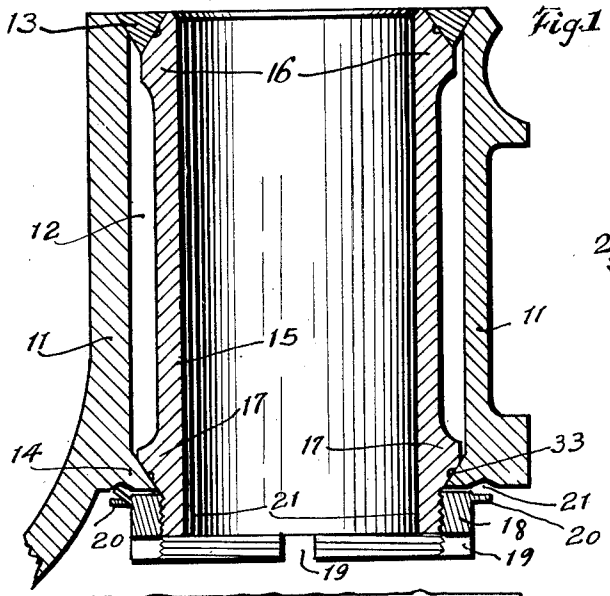


Fig. 3

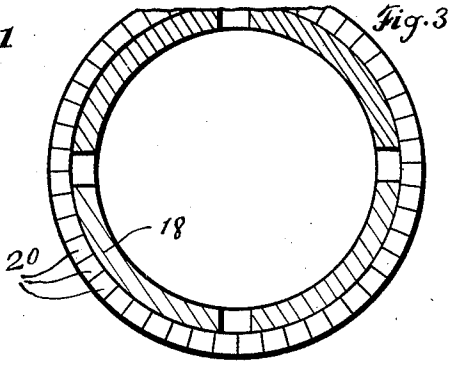


Fig. 4

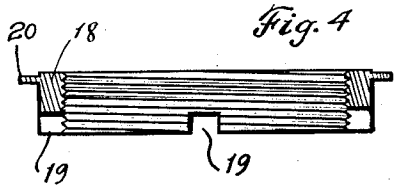
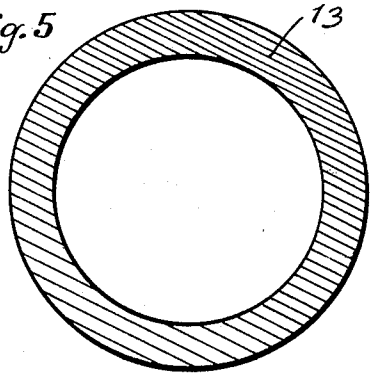


Fig. 5



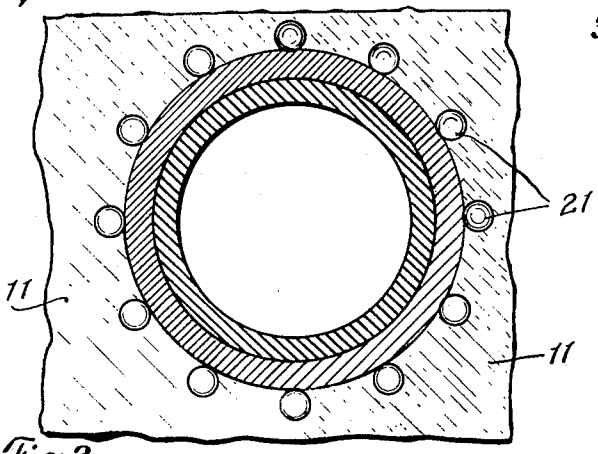
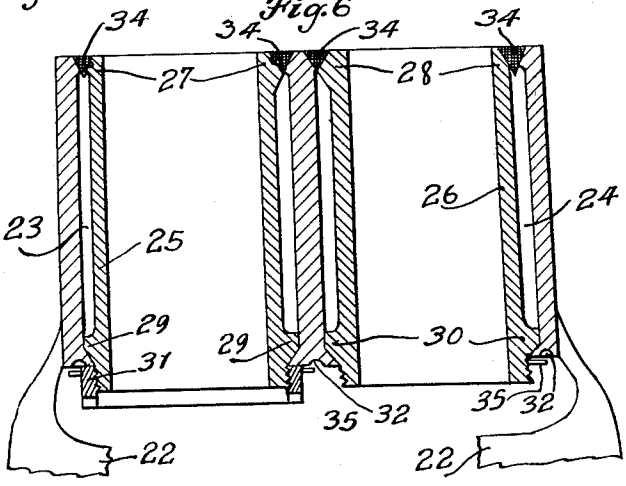


Fig. 2

Fig. 6



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UNITED STATES PATENT OFFICE

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REMOVABLE CYLINDER

Raymond Dymock, Hamburg, N. J.

Application May 2, 1932. Serial No. 608,652

2 Claims. (Cl. 309—3)

This present invention refers to cylinder-containing machines of any kind, and more particularly it consists in a new and improved arrangement of removable and replaceable cylinders or cylinder walls in such machines.

The costs of building cylinder-containing machines, such as steam- or gas-engines, piston-pumps, compressors, and the like, are rather high, because the manufacturing factory must provide for a great variety of casting-forms, and other accessories to supply all kind of such machines for different sizes, and furthermore because in the manufacturing of such a machine as one solid piece a rather great number of faulty castings, distorted or otherwise misfit machines are liable to happen; and the repairing of faulty or misfit machines requires much and rather expensive labor. On the other hand the owner of such machines is often inconvenienced and put to great expenses, as soon as the necessity of such repairs or of substituting another machine of larger size occurs.

Thus the object of this invention is to provide an engine block with a separate removable cylinder, or cylinder wall, that may be conveniently replaced and renewed, as, according to my invention, both the cylinder and the engine block are made or shaped so that the cylinder or cylinder wall can easily, quickly and readily, and with but little milling or machining of the block and cylinder, be made to fit properly in the engine block and line up perfectly with the crank-shaft of the engine, at the same time forming an equal cooling space all around the cylinder with an equal expansion around the latter, incidentally sealing the said cylinder, or water jacket casing, thus formed, against leakage of water.

Another advantageous feature of the present invention consists therein, that the removable cylinders or cylinder walls allows the manufacturing of different parts of the machine out of different materials, thus for instance combining a machine-bed or frame made out of cast-iron with cylinders made out of steel or aluminum, or metallic alloys, exactly as the specific conditions of the use of the machine may require.

In order to obtain the aforesaid and other useful effects in carrying my inventive idea into practice, I have devised a machine-frame or engine block provided with preferably conically slanting fixed shoulders or adjustable collar-rings, and on the cylinders or cylinder walls to be built into the said block I provide other preferably likewise conical shoulders to cooperate with the first-said shoulders or rings, and in assembling the machine I fix the cylinders or cylinder walls in the machine-frames or engine blocks by means of setting and locking-rings, screw-bolts or other suitable fastening means. In consequence of such construction quite a number of cylinders of different sizes may be built into the same machine-frame or engine block simply by using corresponding variations in the thickness and size and slant of the cylinders, and of the setting shoulders, collar-rings, and locking-rings.

In order to make the invention more clear, I have shown in the accompanying drawing two embodiments of my device, whereby in the drawing:

Figure 1 is a longitudinal section of a cylinder-holding part of a machine-frame or engine block with one cylinder built into it.

Figure 2 is a cross-section according to the line II—II in Figure 1.

Figures 3 and 4 are a section according to the line III—III, and a cross-section respectively of a slightly modified locking-ring for fixing the cylinder on the machine-frame or engine block.

Figure 5 is a top view of the collar-ring to be used for setting the other end of the cylinder into the machine-frame or engine block.

Figure 6 is a longitudinal sectional view, similar to that of the Figure 1, but showing two cylinders side by side built into a single machine-frame or bed.

Referring more particularly to the drawing, in the first-shown embodiment of the invention the end-part of the machine-frame or engine block 11, which may be made out of cast-iron, has a wide cylindrical bore 12, with a slight conical chamfer at its extreme end, into which chamfer is inserted and fastened the collar or abutment-ring 13 of a triangular cross-section. The said ring acts as an efficient seal against the leakage of water, and further serves to bring the cylinder wall in perfect alignment with the crank-shaft, and other corelated parts. At the other end of the cylindrical bore the machine-frame or engine block is provided with an inner thickening or shoulder 14, having likewise a conically slanting ring-face.

The cylinder 15, to be built-in into the machine-frame or engine block, is near both ends provided with outer circular enlargements 16, 17, which possess slanting ring-faces to correspond to the inner slanting-faces of the abutment-ring 13 and of the shoulder 14, respectively. The end of cylinder 15 beyond the enlargement 17 has an outer screw-thread, on which is screwed the ring-shaped lock-nut 18. Into the accessible face of this ring-

nut 18 are cut four or more recesses 19, to catch the claws of the wrench, which is to be used for the screwing-fast or for the unscrewing of the ring-nut. The cylinder fastening ring-nut 18 has further at its circumference a great number of radially extending fins 20, to be used for locking this ring-nut in its cylinder-fastening position, so that it cannot be unscrewed accidentally by the vibrations of the machine in operation. To this end the front-face of the enlargement or shoulder 14 is provided with a number of slight grooves 21, arranged in a circle round the ring-nut 18, just below the path of the fins 20, when the ring-nut is screwed on the screw-threaded end 21 of the cylinder. When the cylinder 15 is set into absolutely correct position within the machine-frame or engine block 11, and the ring-nut 18 is screwed fast to keep it in this position, then the fins, which up to that moment are extended straight radially as shown in Figures 1 and 4, are bent down into the said grooves 21, thus locking the ring-nut 18 in its cylinder-fastening position.

The hollow space 12 between the cylindrical end-part 11 of the machine-frame or engine block and the cylinder 15 built-in into it may be used as a jacket for a circulating medium, such as water or steam either to cool or to heat the working-cylinder 15 according to the special needs of that particular type of machines, in which the construction is to be used.

Gasket-rings 33 may be inserted between the cooperating slanting-faces on the abutment-ring 13, and on the rear-ends of the cylinder 15, and likewise between the front-end thickenings 14 and 17, and further between the cooperating front-faces of the shoulder 14 and the ring-nut 18; these gasket-rings will facilitate at the same time the true setting of the cylinder during the assembling operation, and will help to tighten the heating or cooling jacket, after the machine has been assembled.

In the second embodiment of the invention, shown in Figure 6, the end-part of the machine-frame or bed 22, contains two cylindrical bores 23, 24 side-by-side, into which are inserted the two parallel working cylinders 25, 26. The broadened and conically slanting rear-ends 27, 28 of the two cylinders are with interposition of abutment rings 34 set into the conically chamfered ends of the bores in the machine frame or engine block, whereas the slanting front faces of the front-end thickenings 29, 30 of the cylinders are set into corresponding inner slanting faces at the front-ends of the cylinder-bearing part of the machine-frame or bed. Ring-nuts 31 of the before described type are screwed on the threaded extreme front ends of the cylinders 25, 26; and the radially extending peripheric fins 35 of the ring-nuts may be depressed into corresponding grooves 32 on the front-faces of the cylinder-bearing part of the machine-frame or engine block, exactly in the same manner and with the same result as it has been described in detail with reference to the first embodiment of the invention. Further, in this embodiment likewise gasket rings may be inserted in the different pairs of co-operating slanting-faces, or front-faces of the machine-parts to be assembled.

It is obvious that changes may be made in the form, construction and arrangement of the several parts, as shown, within the scope of the appended claims, without departing from the spirit of the invention, and I do not therefore, wish to limit myself to the construction and arrangement shown and described herein.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. The combination with an engine block of a removable cylinder wall formed with outwardly extending enlargements at its top and near its bottom, the said engine block being at its top upon its inner side formed with an outwardly slanting edge portion, and near its bottom with a projection for engaging the lower enlargement of the cylinder wall; the said engine block projection being formed with a lower substantially plain face provided with a plurality of small grooves therein, a lock-nut threaded upon the lower end of the cylinder wall, the said lock-nut being formed with a number of fins for engagement with the said grooves in securing the engine block and cylinder wall together, and a triangular abutment ring mounted at the top between the said engine block and cylinder wall.

2. The combination with an engine block of a removable cylinder wall formed with outwardly extending enlargements at its top and near the bottom, the said engine block being at its top upon its inner side formed with an outwardly slanting edge portion, and near its bottom with a projection adapted to snugly engage the said lower enlargement of the cylinder wall, a triangular shaped collar mounted between the engine block and the cylinder wall, the projection upon the engine block having a lower substantially plain surface formed with a plurality of slight depressions therein, a lock-nut provided with a number of recesses upon its side and being threaded upon the lower end of the cylinder wall against the projection of the engine block, gasket-rings arranged at the joints above and below, and a plurality of fins formed upon the said lock-nut and adapted for engagement with the depressions in the said projection of the engine block in securing the latter to the cylinder wall, substantially as shown and described.

RAYMOND DYMOCK.