March 14, 1933. O. BAUR 1,901,838

PISTON FOR INTERNAL COMBUSTION ENGINES

Filed March 1, 1929

Fig. 1.

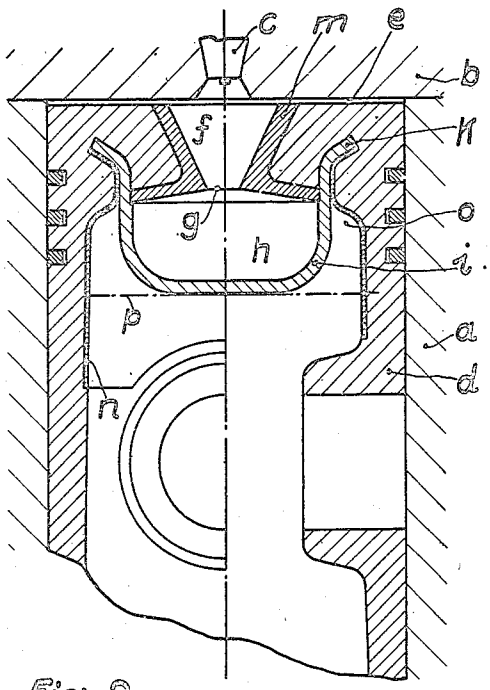
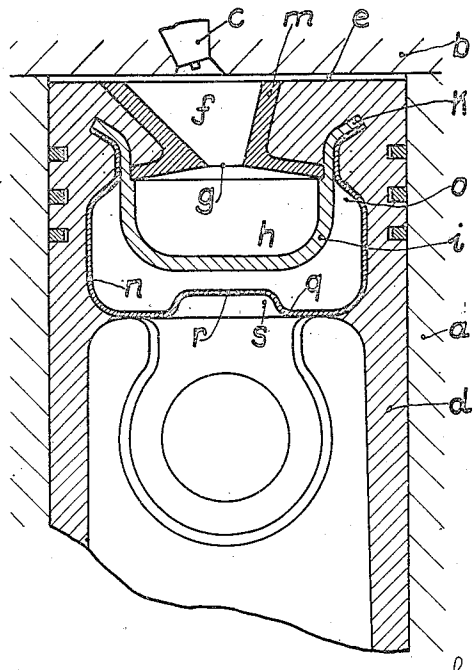


Fig. 2.



Inventor
Ottmar Baur
by Steward & McKay
his attorneys

Patented Mar. 14, 1933 1,901,838

UNITED STATES PATENT OFFICE

OTTMAR BAUR, OF STUTTGART, GERMANY, ASSIGNOR TO ACRO AKTIENGESELLSCHAFT, OF KUSSNACHT-ON-RIGI, SWITZERLAND

PISTON FOR INTERNAL COMBUSTION ENGINES

Application filed March 1, 1929, Serial No. 343,725, and in Germany July 13, 1928.

The present invention relates to internal combustion engines of the type in which the compression chamber comprises partly the actual cylinder chamber and partly an auxiliary chamber connected therewith, the base and side walls of which are formed by a shell which is cast at its edges only in a casting forming one bounding surface of the cylinder chamber.

In such constructions and particularly where the shell is cast in the piston itself a very narrow space is left between the side wall of the shell and the adjacent cast wall of the piston so that that portion of the core used on casting which has to occupy this space is very weak and can only be removed with difficulty after casting. The result is that the grains of sand left behind on removing the core become loose on running of the engine and drop into the lubricating oil fed to the crank casing and contaminate such oil.

These disadvantages are overcome according to the invention by means of a guard shell which may be in the form of a sleeve, preferably stamped out of sheet metal, and also cast in position, which encloses the cast shell and contacts with it at its cast-in edge, but leaves a space between this and the side wall of the cast shell. The guard shell therefore acts to a certain extent as a casting core for the narrow portion between the cast shell and the adjacent cast wall.

The invention is more particularly described with reference to the accompanying drawing which shows two suitable forms of construction and in which:—

Figure 1 is a longitudinal sectional view of one form with the auxiliary chamber mounted in the piston. The right hand half of the drawing in a longitudinal section turned through 90° relative to the left hand half.

Figure 2 is a longitudinal sectional view of a modified form of construction.

In Figure 1, *a* indicates a cylinder, *b* the cylinder head and *c* an injection nozzle mounted in the head. A cast piston operating in the cylinder is indicated by *d* and the cylinder chamber varying on the piston stroke by *e*. The latter is connected with an auxiliary chamber *h* provided in the piston, by means of a frusto-conical chamber *f* and a throttling orifice *g*. The cylinder chamber *e*, frusto-conical chamber *f* and auxiliary chamber *h* together form the compression chamber.

The base and side walls of the chamber *h* are formed by an insert in the form of a metal shell *i* which is only cast into the piston at its edge *k*. The cover of the chamber *h* and also the walls of the frusto-conical chamber *f* are formed by a metal casing member *m* pressed into the shell *i*. The cast shell *i* itself is inserted in a guard shell preferably in the form of a sleeve *n* pressed out of sheet metal which encloses the shell and only contacts with the cast-in edge thereof. A free narrow annular space *o* is left between the sleeve and the side wall of the shell *i*.

The core inserted in the casting and defining the interior of the piston need only extend, in the form of construction shown, up to the dotted line *p*.

The main difference between the second form of construction shown in Figure 2 and the first is that the sleeve *n* is provided with a base *q* which is arranged at a short distance from the base of the auxiliary chamber. Thus a separate air insulating chamber is formed round the portion of the edge of the outer wall of the chamber which is not cast in. Further the base *q* prevents oil coming into contact with the base of the chamber, which is heated during running, and vapourizing there to form carbon deposit.

A small hole *r* is provided in the centre of the base *q* of the sleeve through which the variations in pressure set up in the air insulating chamber, as a result of the temperature differences obtaining on casting and running, can be equalized. A depression *s* is also pressed out in the base *q* which acts as a bottom for the core used on casting.

The application of the invention is of course not limited to engines in which the auxiliary chamber *h* is provided in the piston or in which the auxiliary chamber is connected with the actual cylinder chamber by a throttling member and a frusto-conical chamber. The auxiliary chamber can also

be provided in a cast shell arranged in the cylinder head or in the cylinder.

What is claimed is:

1. A piston of an internal combustion engine comprising cylindrical side walls, a perforated end wall adapted to form one bounding surface of the cylinder chamber of the internal combustion engine, a shell cast at its edges only in the perforated end wall of said piston to form a pocket with said perforation and a guard shell cast at its edges only with the edges of said first mentioned shell in said perforated end wall of said piston, and an extension of said guard shell adapted to closely follow the inner surface of said cylindrical wall of said piston.

2. A piston for an internal combustion engine comprising a cast piston having an orifice in that face which forms a bounding surface for the engine compression chamber, a shell cast within said piston at its edges only in that wall of the piston having said orifice and about said orifice to form an auxiliary chamber leading to said compression chamber through said orifice, a cast in guard sleeve for the inner wall of said piston, said sleeve contacting with said shell at one end only and extending from the points of said contact to closely follow the inner surface of the cylindrical wall of the piston and to leave a space between said sleeve and said shell, said sleeve having a transversely extending end portion enclosing said space.

In testimony whereof I have hereunto affixed my signature.

OTTMAR BAUR.