

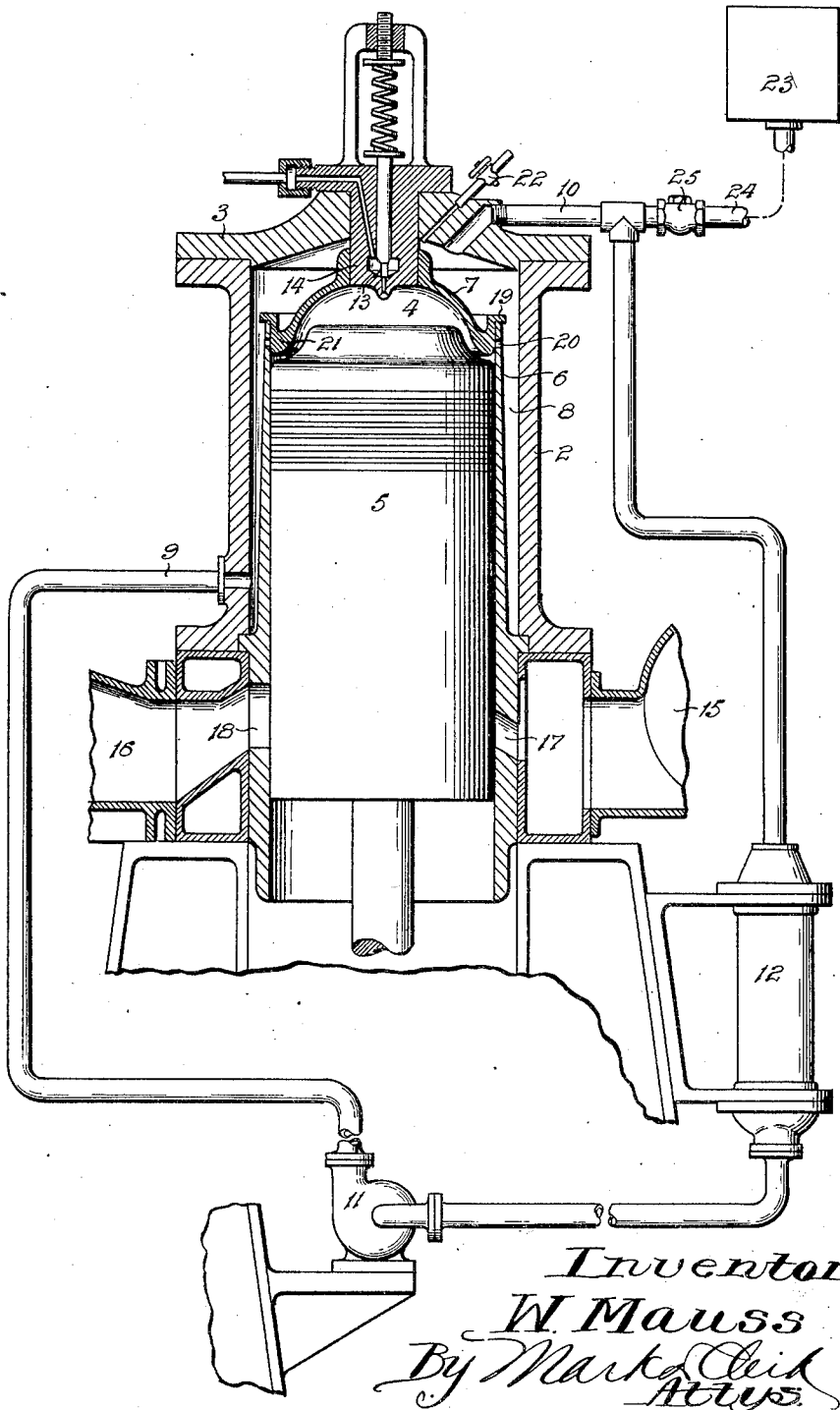
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JACKETING ARRANGEMENT FOR INTERNAL COMBUSTION ENGINES

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JACKETING ARRANGEMENT FOR INTERNAL-COMBUSTION ENGINES.

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The present invention is an internal combustion engine cylinder adapted to maintain substantially equal pressure between the gas within the cylinder and the fluid in the cylinder jacket.

The invention is illustrated in the accompanying drawing which shows a vertical section of a two stroke Diesel engine cylinder.

2 indicates the cylinder barrel and 3 its cover. The cylinder chamber 4 within which the working gas is enclosed and within which the piston 5 reciprocates, is provided by a liner 6 and a liner cover 7. The space 8 between the liner and the cylinder forms the jacket chamber containing cooling water which is circulated through said chamber 8, the inlet pipe 9, the outlet pipe 10, the circulating pump 11, and the cooler 12.

13 is the fuel injection valve, housed in a nozzle 14 extending downwardly from the cylinder cover. 15 and 16 are the inlet and exhaust trunks, communicating with the working chamber 4 by the ports 17 and 18 respectively.

It is usual for the water in the jacket chamber 8 to be at approximately atmospheric pressure; but as the gas pressure within the cylinder chamber 4 reaches very high values at the end of the compression stroke and the beginning of the working stroke, the jacket has to be made thick enough to withstand the difference of pressure within and without it. The permeability of the jacket to heat is correspondingly reduced and the practicable diameter of the cylinder is limited.

If however arrangements are made to maintain the pressure in the jacket chamber 8 at all times substantially equal to that within the cylinder chamber 4, the pressure resisting function of the jacket is transferred to the wall 2 and cover 3 of the cylinder proper, with the result that the jacket can be of thin metal and the limitation of the diameter of the cylinder is removed.

According to this invention such equality of pressure is attained through the medium of a floating liner element having working fluid on one side and jacketing fluid on the other side, and movable towards one fluid or the other according to the direction of the effective pressure.

In the preferred construction the liner comprises a barrel 6 and a cover 7 respec-

tively spaced from the barrel 2 and cover 3 of the cylinder proper.

The cover 7 is movable axially to transmit the pressure and for this purpose it is preferred to make it separate from the barrel 6. It accordingly fits piston-wise in the top end of the jacket so as to cut off communication between the interior of the cylinder chamber 4 and the jacket chamber 8; there being little tendency for fluid to leak past it since there is no material difference of pressure at its two faces. Similarly it fits fairly closely but freely around the fuel injection nozzle 14, the exterior of which is made cylindrical.

The cover is formed with a flange 19 which seats on the upper end of the liner barrel 6, and limits its downward movement. Its upward movement is unrestricted within reasonable limits but to prevent any tendency for it to be displaced too far the barrel 6 is formed with holes 20 which are ordinarily closed by the piston portion 21 of the cover, but are uncovered after an upward movement of the cover 7 in excess of normal.

22 is an outlet by which gas is passed out of the jacket chamber. 23 indicates a reservoir into which water can pass by way of the pipe 24 into the jacketing system under a pressure rather above the normal minimum pressure in the cylinder chamber 4. In the pipe 24 is the non-return valve 25 which allows water to flow through it only towards the jacketing system.

In operation, as the pressure within the cylinder chamber 4 increases, said pressure is transmitted to the water in the jacket chamber 8 through the floating cover 7 which rises according to the yielding of the walls of the jacket chamber and of the jacket water circulating system generally. As the pressure within the cylinder falls again the floating cover returns to place. Should any jacket water have been lost, as by leakage during the period of high pressure, fresh liquid flows in from the pipe 24 as soon as the pressure in the jacket chamber 4 has fallen below the pressure due to the reservoir 23, so enabling the cover to seat itself fully. Any gas which accumulates in the jacket chamber and which, on account of its compressibility, would result in excessive lift of the cover 7, is passed off by the outlet 22.

Should the cover 7 lift excessively for any reason, it opens the holes 20 through which

pressure is directly equalized and further lifting of the cover is thus prevented.

I claim—

- 5 1. In an internal combustion engine, an outer cylinder structure and an inner liner forming between them a jacket chamber, and a freely floating liner element adapted to transmit pressure between fluid within the liner and fluid within the jacket chamber.
- 10 2. In an internal combustion engine, an outer cylinder structure, an inner liner, and a liner cover, the liner and liner cover being spaced from the cylinder structure to provide a jacket chamber between themselves
- 15 and the cylinder structure, said liner cover being adapted to float freely on the liner and thereby transmit pressure between fluid within the liner and fluid within the jacket chamber.
- 20 3. In an internal combustion engine, an outer cylinder structure, and a liner structure, the space between said structures forming a jacket chamber, said liner struc-

ture comprising an inner liner barrel, and a freely floating liner cover, means limiting 25 movement of the cover towards the liner barrel, and means tending constantly to feed cooling fluid into the jacket chamber.

4. In an internal combustion engine, an outer cylinder structure, an inner liner 30 barrel, and a freely floating liner cover fitting the end of the liner barrel, said end having openings normally closed by the cover.

5. In an internal combustion engine, an 35 outer cylinder barrel, a cylinder cover, a cylindrical member associated with the cylinder cover and extending axially into the cylinder, a liner and a liner cover spaced from the cylinder barrel to form a jacket 40 chamber between themselves and the cylinder barrel, said cover sliding freely on the liner and on the cylindrical member.

In testimony whereof I affix my signature.

WILHELM MAUSS.