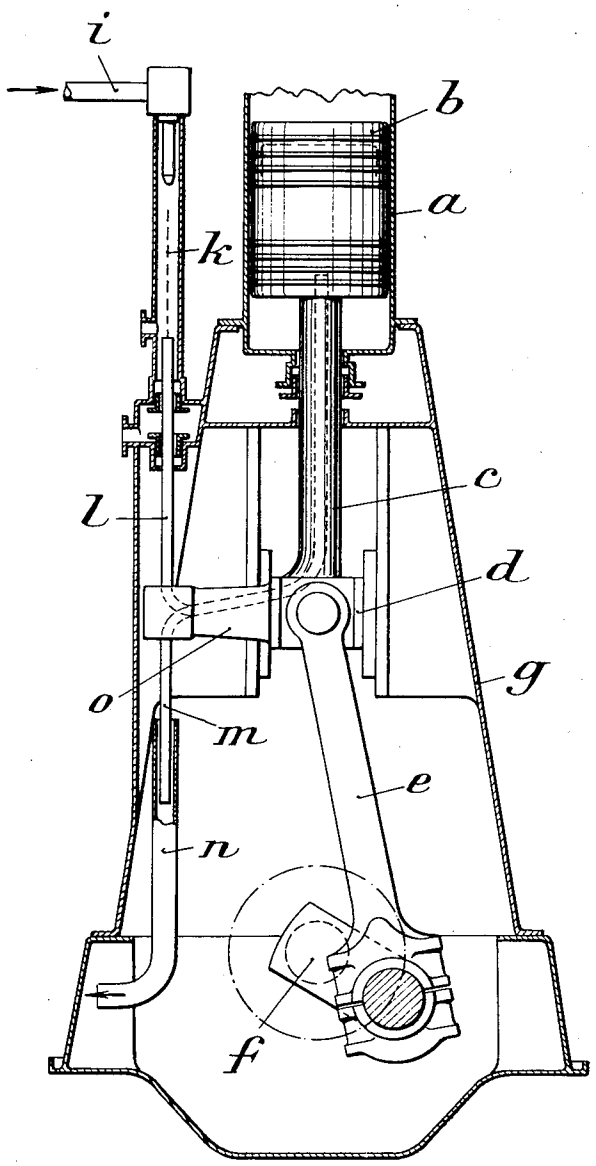
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COOLING APPARATUS FOR RECIPROCATING PISTONS

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COOLING APPARATUS FOR RECIPROCATING PISTONS

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4 Claims. (Cl. 123—176)

This invention relates to apparatus for cooling reciprocating pistons of the kind in which the cooling liquid is delivered from a fixed nozzle in a jet which is parallel to the path of the piston and enters a receiving orifice carried by the piston or a member connected thereto, this orifice communicating with the interior of the piston.

According to this invention the jet of liquid is directed in a downward direction towards and into the receiving orifice whereby dispersion of the liquid jet is reduced to a minimum.

One construction of a double acting vertical internal combustion engine according to this invention is illustrated somewhat diagrammatically and by way of example in the accompanying drawing and comprises the cylinder *a*, within which reciprocates a water-cooled piston *b* connected by a hollow piston rod *c* to a crosshead *d* which is in turn connected by a connecting rod *e* to the crankshaft *f*. The engine is supported on the frame *g*.

The cooling water is supplied through a pipe *i* and injected in the form of a jet *k* in a downward direction towards the receiving orifice of a pipe *l* carried by an arm *o* formed integral with or secured to the crosshead *d*. Water entering the pipe *l* as this reciprocates with the crosshead *d* passes up the hollow piston rod *c* to the interior of the piston *b* whence it is discharged through the telescopically arranged pipes *m* and *n*. The conduit 1 preferably takes the form of a continuous bore in and for that portion of it which is associated with the arm *o* and the piston rod *c*; and the conduit *m* takes the form of a similar bore parallel to, and spaced laterally from the continuous portions of the conduit 1, in the members *c* and *o*, as shown in front elevation in the figure in dotted lines.

In this way, since the jet *k* is directed downwards the column of water constituting the jet does not tend to be dispersed into spray as the receiving pipe moves in the opposite direction to that of the jet and, in addition, the water in the column will not tend to flow back under the action of gravity towards the injection nozzle and thereby tend to disperse the jet as is the case when an upwardly directly jet is employed.

I claim:

1. In an engine having a reciprocating piston, a pipe for supplying cooling fluid to the piston-interior, said pipe being reciprocated vertically and having a receiving orifice at the free end thereof, and a fixed piping system adapted to deliver the fluid in a downwardly-directed, freely falling, unbroken column and inject it downwardly, unbroken, into said orifice.

2. In an engine having a vertically reciprocating, hollow piston, a piston rod, and an arm extending laterally from the lower end of the piston rod, a conduit for supplying a cooling medium to the interior of the piston, said conduit being directed upwardly in the piston rod into the bottom of the piston and having its other end extending and opening vertically outside the engine, a liquid-jet associated with the outer end of said conduit and injecting the cooling medium downwardly into the reciprocating free end of said conduit, said conduit reciprocating vertically towards and away from said jet, whereby excess medium is urged to fall downwardly away from the jet and the jet is caught by said reciprocating orifice before it can break, thereby preventing dispersion of the jet.

3. In an engine having a vertically reciprocating, hollow piston, a piston rod, and an arm extending laterally from the lower end of the piston rod, a conduit for supplying a cooling medium to the interior of the piston, said conduit being directed upwardly in the piston rod into the bottom of the piston and having its other end extending and opening vertically outside the engine, a liquid-jet associated with the outer end of said conduit and injecting the cooling medium downwardly into the reciprocating free end of said conduit, said conduit reciprocating vertically towards and away from said jet, whereby excess medium is urged to fall downwardly away from the jet and the jet is caught by said reciprocating orifice before it can break, thereby preventing dispersion of the jet, and an outlet conduit extending in said piston rod parallel to and spaced laterally from said first conduit and having an end opening outside the engine for draining cooling medium from said piston.

4. In an engine having a reciprocating piston, a downwardly directed jet of cooling medium for cooling the piston, a conduit for conducting the medium from said jet into the interior of the piston, said conduit having one portion extending vertically into the lower part of the piston, an intermediate portion and another portion extending substantially vertically into alignment with said jet, said last portion having an aperture for intercepting the down-falling pressureless jet, and the intermediate portion giving, with the other portions, a substantially U-shape to the conduit whereby the jet is relieved from back-pressure reactions tending to come onto it at the receiving orifice of the conduit when the piston passes dead center, thereby preventing loss of cooling agent.

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