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54 Device for varying the direction in which fuel flows into an engine cylinder, in particular of a two-stroke motorcycle engine.

57 An engine, in particular a two-stroke motorcycle engine, comprises a cylinder (1) containing a chamber (3) in which a piston (4) moves; a fuel composed of air and the usual oil-gasoline mixture reaches said chamber (3) via feed passages (7). Movable deflector means (8) are arranged in at least one of said passages (7) in proximity to its entry (14) into the chamber (3) to orientate the fuel jet in such a manner as to result in improved scavenging of the chamber (3) during the appropriate phase of the engine cycle, said deflector means (8) varying the geometry of the passage (7) in which they are located as a function of the engine rotational speed and/or the position of the piston (4) within the cylinder chamber (3) or the engine cycle and/or the degree of opening of the accelerator.

The movement of said deflector means (8) occurs by the effect of the pressure in the cylinder chamber (3) and in the feed passage (7), and the fuel throughput through said passage (7) or rather the thrust generated by it on said deflector means (8).

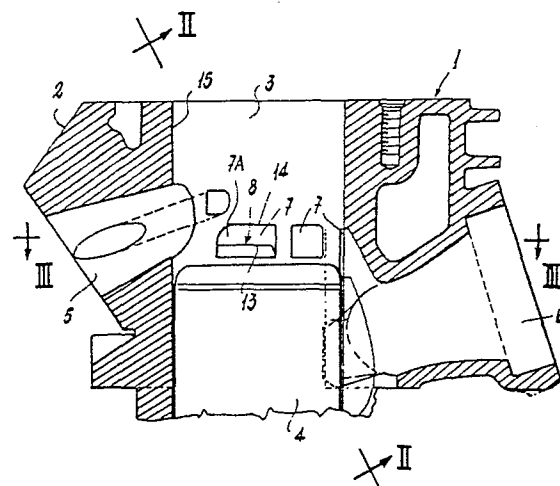


Fig. 1

This invention relates to an engine, in particular a two stroke motorcycle engine.

Such an engine comprises a normal cylinder, in the chamber of which the associated piston moves; the fuel in the form of air plus mixture, this latter comprising gasoline and oil, reaches said cylinder chamber through feed passages. These feed passages are known as transfer passages or induction passages according to whether the fuel reaches said chamber from the crankcase or directly from outside the engine.

In an engine of the described type there is a requirement for facilitating burnt gas discharge from the cylinder without causing remixing of said gas with the fuel, by suitably directing the fuel feed into the cylinder during the known scavenging phase. In this respect, the more the burnt gas is discharged from the cylinder without it mixing with the fuel, the better the engine performance.

In known engines the fuel feed is suitably directed into the cylinder or rather into its chamber by giving the feed passages a suitable fixed geometry to attain the required object.

This method involving a fixed geometry for said passages does not allow fuel feed into the cylinder chamber to be optimized as a function of the engine operating conditions (rotational speed and/or degree of accelerator opening). Consequently, good engine performance is obtained only for example for a certain engine speed or, more generally, for particular engine operating conditions.

An object of the present invention is therefore to provide an engine of improved performance compared with engines of the state of the art, and in particular an engine in which mixing between the fuel (or fresh gas) and the burnt gas present in the cylinder chamber is reduced to a minimum under any engine operating condition, ie for any rotational speed or for any degree of opening of the accelerator.

This and further objects which will be apparent to the expert of the art are attained by an engine, in particular a two-stroke motorcycle engine of the stated type, characterised by comprising in at least one of the feed passages movable deflector means arranged to vary the geometry of said passage and to orientate the fuel jet within the cylinder chamber in such a manner as to enable said jet to urge the burnt gas towards the usual exhaust port provided in said cylinder, said deflector means being arranged on a wall of said feed passage in proximity to its entry into said chamber, the movement of said deflector means and thus the variation in the geometry of said passage being obtained as a function of the engine rotational speed and/or the position of the piston within said chamber of engine cycle and/or the degree of opening of the accelerator.

The present invention will be more apparent from the accompanying drawing which is provided by way of non-limiting example and in which:

Figure 1 is a longitudinal section through a cylinder of an engine constructed in accordance with the invention;

Figure 2 is a section on the line II-II of Figure 1; and

Figure 3 is a section on the line III-III of Figure 1.

With reference to said figures a two-stroke engine comprises a cylinder 1 having a barrel 2 defining a chamber 3 in which a piston 4 moves.

The cylinder 1 comprises a usual burnt gas exhaust port 5 and a known induction port 6 for the fuel or fresh gas.

Feed passages 7 connected to the induction port 6 open into the chamber 3 of the cylinder 1, said feed passages 7 being formed in the barrel 2.

The feed passages 7 can derive either from the pump sump (not shown), in which case they are known as transfer passages, or (as in the illustrated example) from the induction port 6 connected to the environment external to the engine, in which case they are known as induction passages.

According to the invention, in at least one of said feed passages 7 there are provided movable deflector means 8 arranged to modify the geometry of said passage and consequently to throttle it. In this manner a varying orientation of the fuel (or fresh gas) jet leaving said passage is obtained based on the position of the deflector means in said passage.

More specifically, the deflector means 8 are at least one flexible blade 8A fixed at one end 9, mechanically or by adhesive, to the wall 10 of the feed passages (of only two passages 7A and 7B in the example) in a position corresponding with a seat 11 formed for example by milling.

Said blades 8A can be located either on the convex walls 10 of the passages 7 (as shown in the example) or on the concave walls 12 of these passages, or on the lateral walls of the passages.

These blades are provided in each passage 7 such that when in the position which gives maximum passage opening they rest against the walls 10 of said passages or as close to them as they can reach. In this case the free end 13 of the blades 8A is in line with the port 14 in the wall 15 of the chamber 3 into which the passage 7 opens, but without projecting from this latter. This prevents the moving piston 4 being able to touch said end 13, with obvious resultant problems.

It will now be assumed that an engine provided with a cylinder 1 constructed in accordance with the invention is to be used.

With the engine in operation, during the scavenging phase the fresh gas reaches the cham-

ber 3 of the cylinder 1 by passing through the feed passages 7. In these passages the said gas encounters the blades 8A and is directed by them into said chamber 3 in such a manner as to prevent its mixing with the burnt gas and facilitate discharge of the burnt gas through the exhaust port 5.

The fresh gas is therefore fed into said chamber with a certain inclination which is a function of the position of the blades 8A in the passages 7.

Depending on the effect of the pressure in the chamber 3 and in the passages 7, and the thrust exerted on them by the fresh gas flowing through these passages, the blades 8A can automatically assume any position between the position corresponding to maximum passage opening (as described) and that corresponding to minimum passage opening. These positions (or inclinations) can also vary during the scavenging phase according to the instantaneous fresh gas flow through the passages 7. It can be generally stated that the higher the engine rotational speed the more the blades approach the position corresponding to maximum opening of the relative passage.

The various said positions are attained (as stated, automatically) as a function of the engine rotational speed and/or degree of opening of the accelerator, and of the position of the piston 4 in the cylinder chamber 3, and enable the fuel to be directed in the best possible manner into said chamber 3. In this manner the burnt gas present in said chamber is discharged through the port 5 without mixing (or only to a very small extent) with the fresh gas, so enabling the engine to give high performance.

In particular, to facilitate burnt gas discharge the blades 8A are arranged in the feed passages in such a manner as to move (and consequently direct the fresh gas) towards the upper end of the chamber 3 of the cylinder 1 or towards its wall 15. This further improves burnt gas discharge and prevents the fresh gas mixing with the exhaust during fresh gas feed into the chamber 3, so further increasing engine performance.

## Claims

1. An engine, in particular a two-stroke motorcycle engine comprising a cylinder containing a chamber in which a piston moves, a fuel or fresh gas composed of air and the usual oil-gasoline mixture reaching said chamber via feed passages, characterised by comprising in at least one of the feed passages (7) movable deflector means (8) arranged to vary the geometry of said passage (7) and to orientate the fuel jet within the cylinder chamber (3) in such a manner as to enable said jet

to urge the burnt gas towards the usual exhaust port (5) provided in said cylinder (1), said deflector means (8) being arranged on a wall (10) of said feed passage (7) in proximity to its entry (14) into said chamber (3), the movement of said deflector means (8) and thus the variation in the geometry of said passage (7) being obtained as a function of the engine rotational speed and/or the position of the piston within said chamber or engine cycle and/or the degree of opening of the accelerator.

2. An engine as claimed in claim 1, characterised in that the movement of the deflector means (8) occurs automatically, said movement being caused by the pressure difference between the cylinder chamber (3) and the feed passage (7) and the thrust exerted by the fuel flowing through said passage (7).

3. An engine as claimed in claim 1, characterised in that the deflector means (8) comprise at least one blade element (8A) fixed at one end (9) to a wall (10) of the feed passage.

4. An engine as claimed in claim 3, characterised in that the blade element (8A) is fixed to the wall (10) of the feed passage (7) advantageously mechanically or by adhesive.

5. An engine as claimed in claim 3, characterised in that the end (9) of the blade element (8A) is positioned in a seat (11) provided in the wall (10) of the feed passage (7).

6. An engine as claimed in claim 1, characterised in that the blade element (8A) is arranged in the relative feed passage (7) so as to move advantageously in a different manner according to whether said blade element (8A) is disposed in a passage close to the exhaust port (5) or distant from it, said movement and the consequent orientation of the fuel jet being towards the upper end of the cylinder chamber (3) or towards the wall (15) of said chamber respectively.

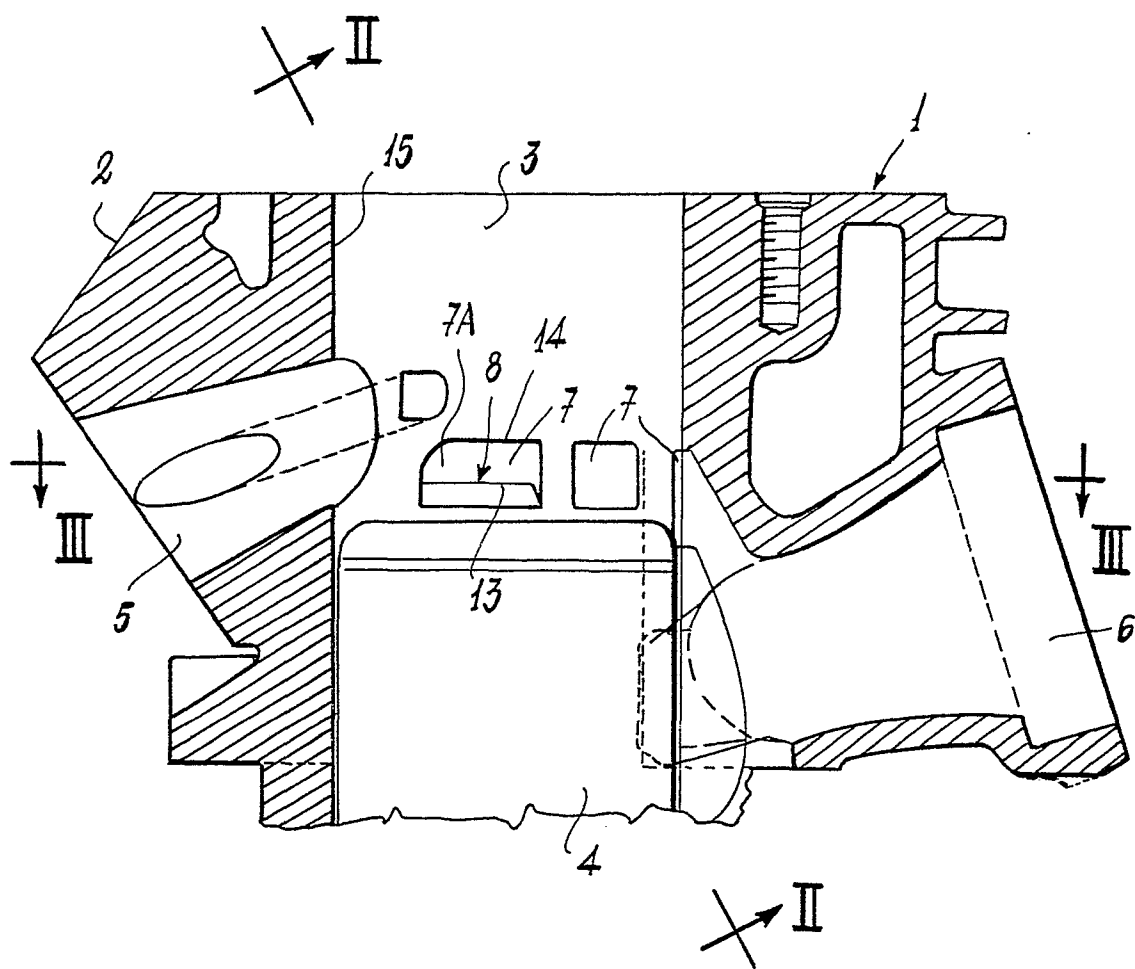


Fig. 1

