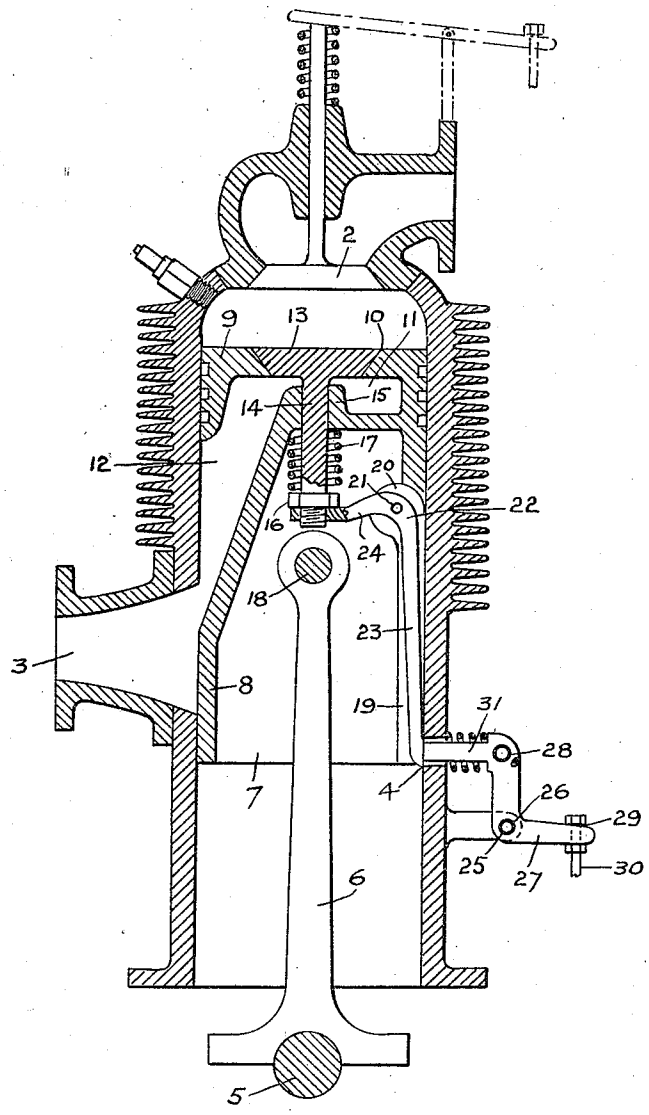
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A. M. IRISH

INTERNAL COMBUSTION ENGINE

Filed May 4, 1923



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INTERNAL-COMBUSTION ENGINE.

Application filed May 4, 1923. Serial No. 636,734.

To all whom it may concern:

Be it known that I, ARTHUR MILROY IRISH, a subject of the King of Great Britain, and a resident of Royston Station, in the Province of British Columbia, Canada, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My invention relates to improvements in internal combustion engines, the objects of which are to provide means whereby the exhaust gases may be discharged from the combustion head with a minimum of frictional resistance, and whereby the scavenging of the head is more effectually performed than with the arrangement of exhaust valves in common use, and which consists essentially of a poppet valve and valve chamber disposed within the piston head, and an exhaust port in the cylinder wall disposed intermediately of the stroke of the piston, as will be more fully described in the following specification in which:—

The drawing is a sectional view of a cylinder showing my valve mechanism.

The numeral 1 indicates an internal combustion engine cylinder of the usual air-cooled type having an overhead inlet valve 2. 3 is an exhaust port disposed intermediately of the length of the cylinder body. 4 is an aperture in the cylinder wall opposite the exhaust port. 5 is a crank pin by which the drive of the engine is communicated to the crank shaft (not shown). 6 is a connecting rod connecting the wrist pin 18 to the crank pin 5.

The numeral 7 indicates generally a piston having side walls 8 and a head 9 in which is centrally placed a valve aperture 10 and beneath which is provided a valve chamber 11 formed within the piston and provided with an elongated opening 12 which is adapted to register during the entire stroke of the piston with the exhaust port 3. 12 is an exhaust valve of the poppet type seating in the aperture 10 and having a stem 14 projecting downwardly through a bearing 15 into the piston body, the outer end of the stem is tapped and provided with a nut 16 by which a valve closing spring 17 is tensioned. 18 is a wrist pin upon which the small end of the connecting rod is fulcrumed. 19 indicates a slot formed longitudinally of the piston wall 8 opposite the exhaust port 3 of the cylinder, at the upper end of which a pair of projections 20 are provided to carry a pin 21.

The numeral 22 indicates generally a bell crank fulcrumed upon the pin 21 having a substantially vertical leg 23 which lies normally in close proximity to the side of the cylinder body, and a horizontal leg 24 the outer end of which is adapted to engage the valve stem 14. The numeral 25 indicates a further bell crank fulcrumed as at 26 having a horizontal leg 27 and a vertical leg 28, the horizontal leg 27 is provided at its outer end with an eye 29 which is adapted to engage a push rod 30 which is suitably actuated from the cam shaft (not shown) of the engine. The leg 28 of the bell crank 25 is provided with an inwardly directed horizontal pin 31 which is designed to project through the aperture 4 of the side of the cylinder body to engage the leg 23 of the bell crank 22 to actuate the valve 14.

Having thus described the several parts of my invention I will now explain its operation.

At a predetermined period of the firing stroke of the piston, the push rod 30 is raised by the cam mechanism not shown of the engine which rocks the bell crank 25 and thrusts the pin 31 through the cylinder wall to engage the bell crank 22 and to raise the valve 13 from its seat in the aperture 10, permitting the exhaust gases to pass downwardly therethrough and out by the port 3.

It will be noted that the leg of the bell crank 22 is virtually in constant engagement with the pin, so that valve operation is under constant control of the cam action irrespective of the position of the piston within the cylinder.

From the foregoing it will be seen that I have invented a valve mechanism for internal combustion engines which provides a quick scavenging means for the combustion spaces of the cylinder head.

What I claim as my invention is:

1. In an internal combustion engine, the combination with the cylinder of the engine having an exhaust port in its side wall, and a piston located within the cylinder and having a valve chamber formed within the piston and communicating with said exhaust port, of a duct extending between the piston head and periphery of the piston in a line with the exhaust port of the cylinder, a valve controlling said duct a bell crank carried by the piston and connected to the

valve, and means carried by the cylinder for operating the valve crank at any point in the piston stroke.

2. In an internal combustion engine, the combination with the cylinder of the engine having a port in its side wall, and a piston within the cylinder having a valve chamber formed within the piston and communicating with said exhaust port and having a longitudinally slotted opening formed in the piston wall, a bell crank pivotally mounted within the slotted opening so that one arm of the bell crank extends longitudinally of the opening and having the other arm extending horizontally to operate the controlling valve of the aforesaid duct, inwardly depressible means bearing against the long arm of the bell crank, and means for automatically operating the depressible means at pre-determined intervals.

3. An internal combustion engine comprising a cylinder provided with an exhaust port, a piston formed with a duct communicating at one end with said port and at the other end with the combustion space above the piston, a valve normally interrupting communication between the duct and the combustion space, a bell crank lever pivotally mounted in the piston and having one arm connected to the valve, and means acting through an opening in the cylinder wall to periodically engage and actuate the other arm of the bell crank in a direction to open said valve.

4. An internal combustion engine according to claim 3 in which the said means comprises a bell crank lever mounted exteriorly of the cylinder bore and a pin carried by one arm of the lever arranged to operate through the aforementioned opening in the cylinder wall, the other arm of said bell crank lever being positioned for engagement by suitable operating mechanism.

Dated at Courtenay, this 24th day of April, 1923.

ARTHUR MILROY IRISH.

Witnesses:
HARRY CREECH,
JANE WILLIAMSON.