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J. SCHICK

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ENGINE

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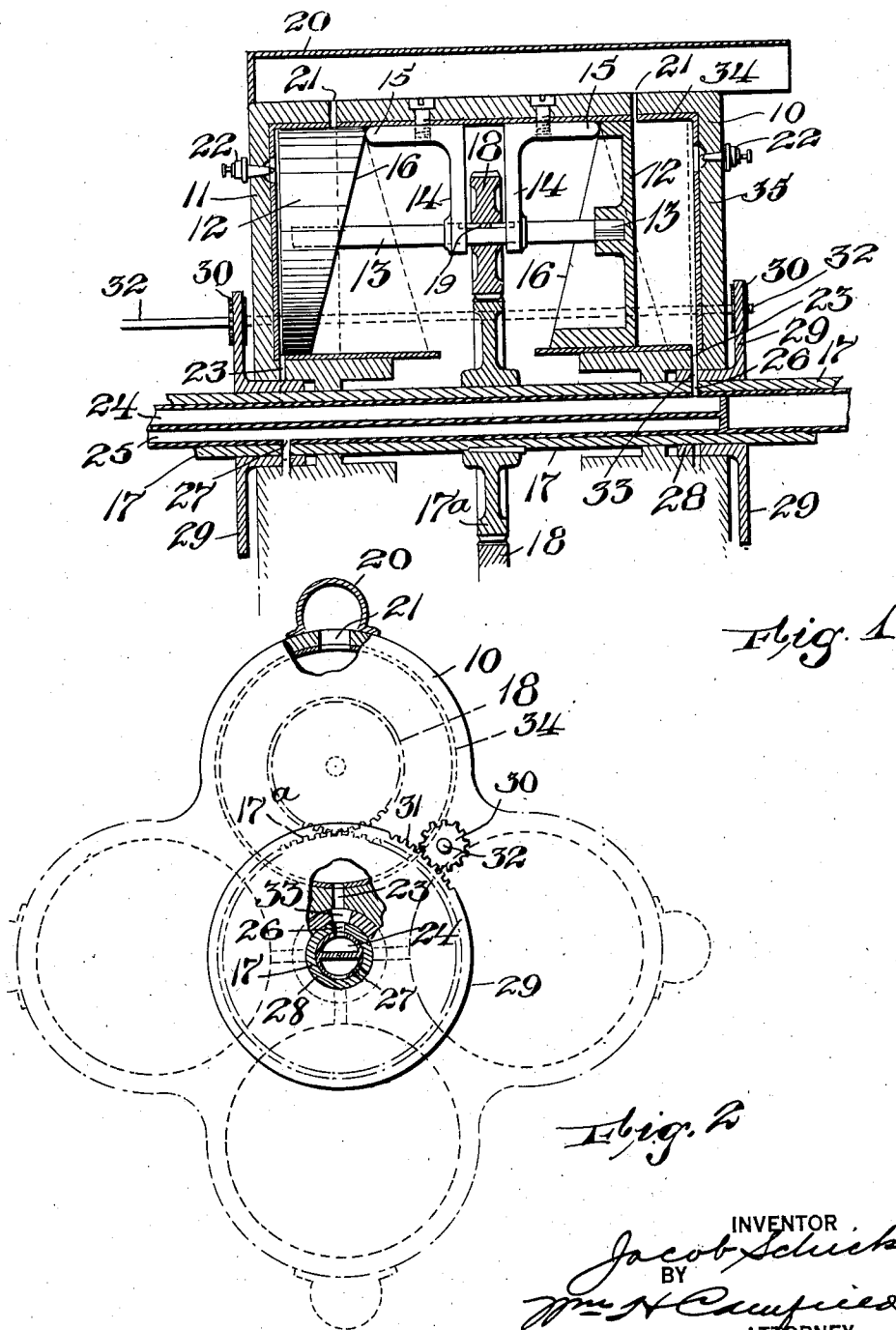


Fig. 1

Fig. 2

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ENGINE

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The object of this invention is to provide an engine either an internal combustion engine or a steam engine or a pump which has but few moving parts and which eliminates the uneven wear on pistons that are used in connection with connecting rods or similar apparatus for converting reciprocating motion into rotary motion.

The object of this invention is, further, to provide a piston in a cylinder which when it is reciprocated on its power stroke is forced to rotate, the piston uncovering ports which control the exhaust and admission of exhausted gases and fuel respectively.

A further object of the invention is to provide an engine in which the initial exhaust is rapid but a complete scavenging is accomplished on the return stroke of the piston, these gases, later evacuated, being conducted past the inlet manifold to heat the incoming fuel. This exhaust passage and intake manifold are preferably located within the hollow main shaft of the engine.

The invention will be more fully understood from an inspection of the accompanying drawings in which Figure 1 is a section through the cylinders of an engine of my improved type and also showing the main shaft in section. Figure 2 is an end view of an engine such as shown in Figure 1 and consisting of four units, the upper one being shown in full lines and partly broken away to show the interior construction.

The cylinders are shown at 10 and 11 and are opposed and axially aligned. Each cylinder contains a piston 12 and these pistons are connected by a shaft 13 which may have a central support such as the bearing 14 in which the shaft both rotates and slides. Abutments 15 are placed where the rear cam faces 16 of the pistons bear on them to cause the rotation of the piston when the piston is reciprocated toward the abutment. In the form shown these abutments are provided by the bases of the bearings 14. The main shaft is shown at 17 and is rotated by a gear 17^a in mesh with a pinion 18 on the shaft 13, the shaft 13 being arranged so that it can rotate the pinion 18 but slide therein, and I show a feather 19 for such function. A main ex-

haust pipe 20 is shown on the outer side of the cylinder and an exhaust port 21 of each cylinder communicates from the inside of the cylinder to this exhaust pipe.

The unit operates as a four cycle engine and when one cylinder piston is moving on its power stroke the other piston is operating on its compression stroke or its scavenging stroke. The ports 21 are opened by reason of the piston moving far enough to uncover the port 21.

The engine I illustrate is an internal combustion engine and I show spark plugs 22 to indicate the power end of the pistons. At the inner side of each piston is a port 23 and within the shaft is an exhaust passage 24 and an inlet manifold 25, the latter carrying the fuel mixture. This exhaust passage and the intake manifold rotate with the shaft so that the exhaust opening 26 of the exhaust passage 24 and the inlet passage 27 of the intake manifold functionally register with the port 23 in a cylinder.

In the case of four units, each consisting of two cylinders as shown in Figure 2, the main shaft 16 is rotated at half the speed of the rotation of the shaft 13 and this operates these cylinders in their proper sequence so that they may successively operate to rotate the main shaft. As these cylinders can be arranged to have their operation overlapping and in the absence of unbalanced valves and crank shafts, vibration is eliminated.

A manually operated control member is interposed between the passages in the shaft and the port 23 of the cylinder. This is illustrated as a sleeve 28 which has a flange 29 regulated by a pinion 30 which meshes with the teeth 31 on the flange.

The pinion 30 is on a shaft 32 which operates a similar pinion on the other end of the engine. The sleeve 28 has the port or passage 33, one for each cylinder, and as the sleeve is advanced or retreated the duration of the exhaust and, more particularly, the point of cut-off of the fuel can be controlled.

In this engine the exhaust at first is through the major opening 21 and when this is closed by the return of the piston the gases are forced out through the ports 23, 26 and 33

and thus through the exhaust passage 24. This insures a complete scavenging and also heats the intake manifold 25 and thus heats the incoming fuel. As the shaft turns it presents the intake manifold, the port 27 comes around to port 23, the piston is on its suction stroke and the cylinder is changed. The sleeve 28 by its adjustment varies the amount of fuel to be supplied.

- 10 The engine I have illustrated shows a steel cylinder lining 34 inside an aluminum cylinder block 35.

Various modifications can be made in the machine without departing from the scope of the invention.

- 15 I claim:—

1. An engine comprising a cylinder, a piston having a cam on its rear face, and an abutment in the cylinder for engagement by the cam to cause the piston to rotate in its reciprocation.

20 2. An engine comprising a pair of cylinders axially aligned, a piston in each cylinder, a shaft to which the pistons are secured, each piston having a cam surface, and abutments for said surfaces whereby the pistons and cam are rotated when the pistons reciprocate.

30 3. An engine comprising a pair of cylinders axially aligned, a piston in each cylinder, a shaft connecting the pistons, the pistons having cam surfaces on their opposed faces, abutments in the cylinders to be engaged by the cams to force the cylinders to rotate when they reciprocate, the cylinders having exhaust ports in their walls and disposed so as to be opened and closed by the pistons.

40 4. An engine comprising a pair of opposed cylinders, pistons in the cylinders, a shaft secured to the pistons, abutments in the cylinders, the pistons having cam surfaces to engage the abutments whereby the piston and the shaft are caused to revolve when they reciprocate.

50 5. An engine comprising a pair of opposed cylinders, pistons in the cylinders, a shaft secured to the pistons, abutments in the cylinders, the pistons having cam surfaces to engage the abutments whereby the pistons and the shaft are caused to revolve when they reciprocate, the cylinders having ports opened and closed by the pistons, a main shaft driven from the shaft connecting the pistons, the shaft having an exhaust passage and a fuel passage therein with openings to register with the ports in the cylinders.

60 6. An engine comprising a pair of opposed cylinders, pistons in the cylinders, a shaft secured to the pistons, abutments in the cylinders, the pistons having cam surfaces to engage the abutments whereby the pistons and the shaft are caused to revolve when they reciprocate, the cylinders having ports opened and closed by the

pistons, a main shaft driven from the shaft connecting the piston, the shaft having an exhaust passage and a fuel passage therein with opening to register with the ports in the cylinders and a control member interposed between the cylinder and the main shaft with an opening to be placed in selected positions to control the duration of opening of the cylinder port.

70 7. An engine comprising a cylinder, a piston in the cylinder, the cylinder having a port to be opened and closed by the piston, a shaft rotatable alongside the cylinder, a connection for rotating the shaft from the piston, a manifold in the shaft, the cylinder having a port and the shaft and manifold having an opening to be placed in register with the port as the shaft is rotated, and a control member movable between the shaft and the cylinder and having an opening for regulating the passage of fluid to and from the cylinder.

In testimony whereof I affix my signature.
JACOB SCHICK.

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