

PATENT SPECIFICATION



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230,914

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PROVISIONAL SPECIFICATION.

Double Acting Two Cycle Internal Combustion Marine Heavy Oil Engine.

I, ALFRED THOMAS GROVES, 90, Queens Crescent, Sunderland, English, do hereby declare the nature of this invention to be as follows:—

5 The bedplate is of the usual box type fitted with two main bearings for each engine, on this bedplate there are single columns one front and one back, on top of these columns rests an entablature which also forms part of the lower cylinder water jacket and exhaust manifold, on top of this entablature there are two short columns one front and one back, on top of which rests an entablature in which the exhaust end of the upper cylinder water jacket is fitted, which also forms part of the exhaust manifold, in each of these water jackets the cylinder liners are fitted and have scavenging and exhaust ports in each liner, inside of these cylinder liners work an extended piston. This piston is made in two portions, one portion working in each cylinder, and being attached to a fitting which takes the piston gudgeon pin, the part of the pistons which are attached to the gudgeon fitting are made spherical to allow the pistons to adjust themselves to suit temperature conditions without danger or fracture, the pistons being secured to the gudgeon fitting with studs nuts and flat spring washers, in the top end of the upper cylinder, and bottom end of the lower cylinder, there is an auxiliary piston in each which works up and down in the opposite direction to the extended main piston. The extended piston controls the exhaust ports in each cylinder, and the two auxiliary pistons control the scavenging air ports in each cylinder, all pistons being fitted with gas tight packing rings. The drive is taken from the extended gudgeon pin to a cast steel crosshead which works in guides on the lower columns by two rods each of them passing through an orifice in the lower entablature, this crosshead being connected to the main crank by a connecting rod, on each side of the main crank there is an auxiliary crank of about seven inch stroke and at an angle of 180°, these auxiliary cranks are connected to the auxiliary pistons by two connecting rods, two crosspieces, and two side rods, the side rods are always in tension, each one being connected at centre by a coupling, the auxiliary and main crank working in opposite directions takes pressure off main bearings, and transmits all the power to the crank shaft, and no tension stress in the engine framing, the pressure in the cylinders being entirely taken by the forged moving parts, the travel of the two auxiliary pistons remains a constant irrespective of the stroke of the main crank, the auxiliary pistons take the place of cylinder covers, the scavenging air is delivered to the front column by a scavenger pump or blower in the ordinary way, the air passing through the scavenging ports situated at the bottom of the lower cylinder, and in through top ports of the upper cylinder, forcing the burnt gases through the exhaust ports into the upper portion of the back column and through the exhaust manifold to silencer, the entablatures and the short back column are water cooled, also cylinders and pistons. The fuel valves for each cylinder are worked by levers from the side rods, the starting air valve is automatically controlled, there being only fuel valve working when engine is running, the engine being braced to the adjoining one at the entablatures and by exhaust manifold.

Dated this 18th day of December, 1923.

ALFRED THOMAS GROVES.

[Price 1/-]

COMPLETE SPECIFICATION.

Double-acting Two Cycle Internal Combustion Marine Heavy Oil Engine.

I, ALFRED THOMAS GROVES, 90, Queens Crescent, Sunderland, Marine Engineer, English, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to single cylinder two stroke double-acting internal combustion engines of the type in which fixed cylinder heads are replaced by auxiliary pistons working in the open ends of each cylinder, these two pistons being connected by links so that they may be moved in unison by auxiliary cranks one on each side of the main crank and the rod of the main piston passing through one of the auxiliary pistons. According to this invention in single cylinder heavy oil engines of the above type the exhaust ports are situated at the centre of the cylinder and the scavenging or air inlet ports near each end.

The centre piston controls the exhaust ports and the auxiliary pistons the scavenging or air inlet ports.

In order that the said invention may be clearly understood and readily carried into effect I will describe the same more freely with reference to the accompanying drawing.

Three pistons B1, B, B2 are arranged in an open ended cylinder A the two auxiliary pistons B1 and B2 being rigidly connected together by means of two side rods L and two cross beams L1 and L2; the piston rod V passes through a stuffing box in the auxiliary piston B1 and is connected to the main crank by a connecting rod; the auxiliary pistons are

connected to the auxiliary cranks one on each side of the main crank by two connecting rods which join the crossbeam journal F; the main piston B controls the exhaust ports G and the two auxiliary pistons B1 B2 control the scavenging air ports D2 D3; the cylinder casing M1 forms the water jacket. At the base of the cylinder casing there is an entablature M. Inside of the entablature is a chamber D1 into which the scavenging air is delivered by a scavenging pump or blower. Surrounding the scavenging or air inlet ports D2 is fitted an air chamber D which is in communication with the air chamber D1 being connected by a pipe W the fuel oil is injected between the main piston B and auxiliary pistons B1 B2 there being two fuel valves H on each side of the piston rod for one combustion chamber and one fuel valve H for the other combustion chamber.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A single cylinder heavy oil internal combustion engine of the type set forth characterised in that the exhaust ports are placed at the centre of the cylinder and are controlled by the main piston, and that the scavenging or air inlet ports are placed near the end of the cylinder and are controlled by the auxiliary pistons.

2. A single cylinder heavy oil internal combustion engine substantially as here-described and shown on the drawing.

Dated this 17th day of January, 1925.

ALFRED THOMAS GROVES

[This Drawing is a reproduction of the Original on a reduced scale]

