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OILING SYSTEM FOR GAS ENGINES

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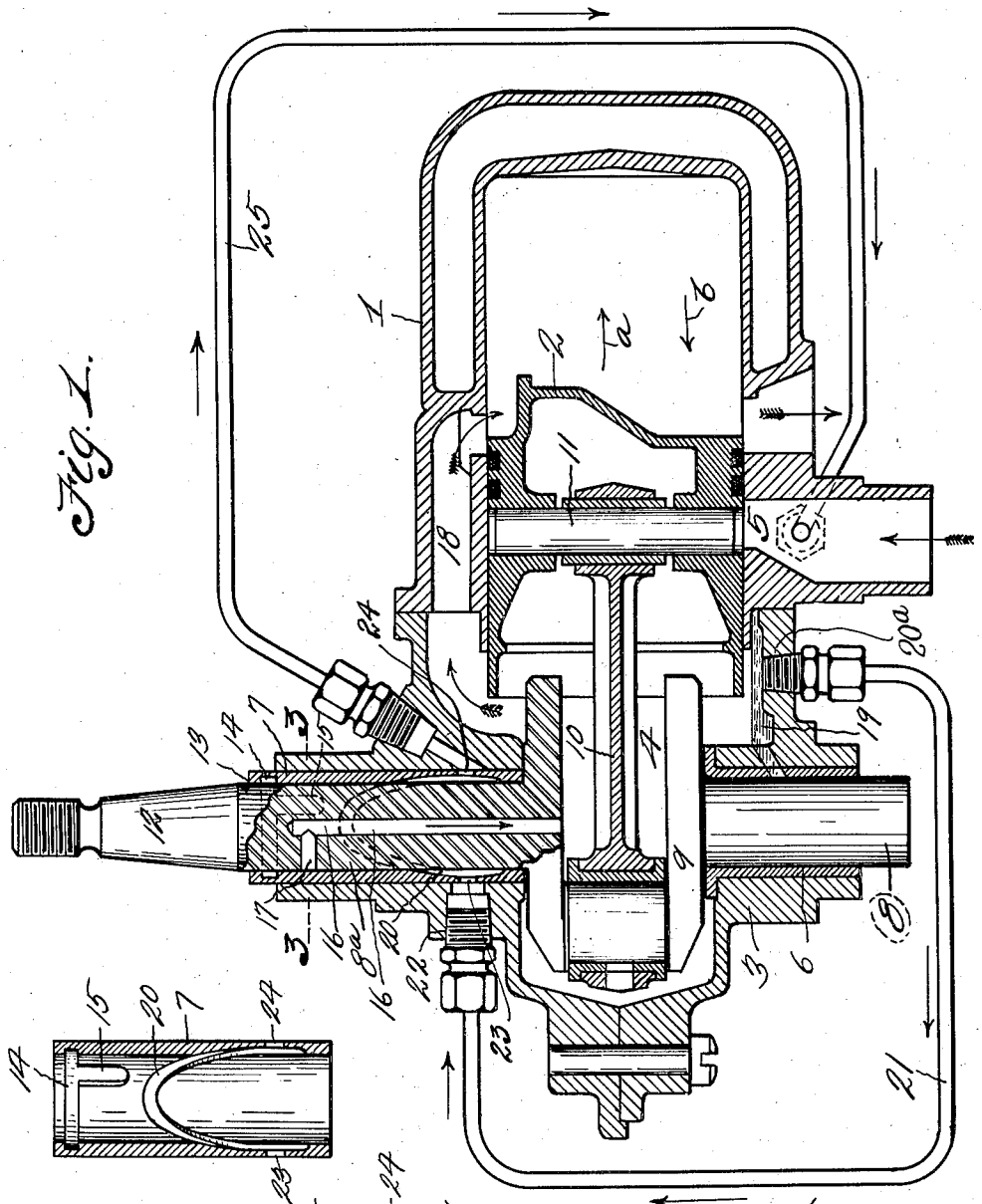


Fig. 1.

Fig. 2.

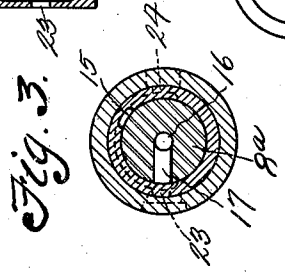


Fig. 3.

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OILING SYSTEM FOR GAS ENGINES.

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The invention relates to oiling systems for gas engines and particularly for a single cylinder two cycle type of engine, and also a horizontal type, and has for its object to provide an oiling system whereby a continuous supply of lubricant is maintained for the upper bearing of the crank shaft, and forced from the engine casing through pipe connections upon the power stroke of the engine, thereby insuring adequate lubrication of said upper bearing at all times.

A further object is to provide means whereby excess lubricant which may be forced upwardly through the bearing of the upper end of the crank shaft will be collected and periodically sucked from a collecting chamber back into the crank casing upon the suction strokes of the piston through a duct in the crank shaft. The duct registers with the chamber when the piston approaches the end of the suction stroke, and is out of registration with said chamber upon the power stroke, thereby insuring a suction during the suction stroke, and preventing pressure in the lubricant collecting chamber on the power stroke.

A further object is to provide a lubricating system for a single cylinder two cycle type of gasoline engine, horizontally disposed, which system will maintain a constant lubricant supply to the upper bearing of the crank shaft of an engine of this character, which engine is preferably of the type used in connection with outboard motors, which have mounted on the crank shaft a magneto adjacent the bearing, and in which type there has been found that sufficient lubrication is not maintained at all times, and at times an over supply of lubricant is forced through the bearing to the magneto and renders the same inoperative.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawing, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawing:—

Figure 1 is a vertical longitudinal sectional view through a horizontal single cylinder two cycle type of internal combustion engine, of the outboard motor type.

Figure 2 is a vertical transverse sectional view through the upper bearing sleeve, showing the lubricant collecting groove and chamber, and the arcuate liquid supply groove therein.

Figure 3 is a horizontal sectional view taken on line 3—3 of Figure 1.

Referring to the drawing, the numeral 1 designates a horizontally disposed cylinder and 2 a piston mounted therein. The cylinder 1 is provided with a crank casing 3 in the chamber 4 of which gases from the intake manifold are sucked by the vacuum created in the chamber 4, upon the movement of the piston 2 in the direction of the arrow *a* on its suction stroke. The suction stroke referred to is the movement of the piston 2 to its outer position in the direction of the arrow *a*, and at which time the intake manifold port 5 is uncovered whereby gases are sucked into the crank case chamber 4 by the vacuum within the chamber 4 created by the outward movement of the piston 2 in the direction of the arrow *a*. Rotatably mounted in the bearing sleeves 6 and 7 is a vertically disposed crank shaft 8, which crank shaft is provided with a crank 9, to which is connected the connecting rod 10. Said connecting rod is in turn connected to a conventional form of wrist pin 11 carried by the piston 2, therefore it will be seen that as the piston 2 is reciprocated in the cylinder 1, the crank shaft 8 will be rotated. The upper end of the crank shaft 8 is provided with a mounting 12 for a conventional form of fly wheel magneto, which mounting is directly above the bearing sleeve 7.

It has been found in motors of this character, particularly outboard motors, that oil seeps, or is forced through the bearing sleeve 7 at 13, and this excess oil often reaches the magneto on the magneto mounting 12, thereby rendering the magneto inoperative. To obviate this difficulty the suction in the crank casing chamber 4, upon the suction stroke of the piston 2 is utilized. The bearing sleeve 7 adjacent its upper end is provided with an annular channel 14, in which lubricant collects during the rotation of the crank shaft. The lubricant which collects in the annular channel 14 flows into a downwardly extending chamber 15 in communication with the channel, therefore it will be seen that the excess lubricant which is

gathered by the channel 14 is collected in the chamber 15. Extending axially through the portion 8^a of the crank shaft 8 is an oil duct 16, the upper end of which terminates in a radially disposed duct 17, which duct is positioned, whereby when the piston 2 approaches the end of its suction stroke, it will register with the chamber 15, and the suction in the chamber 4 of the casing 3 will suck the oil, collected in the collecting chamber 15 through the ducts 17 and 16 back into chamber 4 of the engine casing. As the piston 2 completes its suction stroke in the direction of the arrow *a* the duct 17 moves out of registration with the oil collecting chamber 15 and consequently when the piston 2 moves in the direction of the arrow *b* on its power stroke for transferring the charge in the usual manner through transfer port 18, oil and gas will not be forced through the ducts 16 and 17 to the chamber 15, and have a reverse result from that desired, which would obviously be the case as the change previously set forth is compressed in the chamber 4 before being transferred through the transfer port 18.

In the type of engine set forth, lubrication is had by mixing a certain proportion of lubricating oil with the gasoline, and it is obvious that oil is precipitated in the bottom of the crank casing as shown at 19, which oil is utilized for maintaining a constant lubricant supply to the bearing sleeve 7 and the arcuate groove 20 therein. The arcuate groove 20 in combination with the lubricant collecting channel 14, and lubricant chamber 15 extends substantially the full length of the bearing, therefore the upper end 8^a of the shaft will be thoroughly lubricated during its rotation. Connected at 20^a to the under side of the crank casing 3 is a pipe 21, which pipe has its other end connected at 22 to the crank casing where lubricant discharged therefrom will be forced through the aperture 23 in the sleeve 7 into the arcuate groove 20. Therefore it will be seen that on the power stroke, when the piston 2 moves in the direction of the arrow *b* a portion of the lubricant 19 will be forced through the pipe 21 to the bearing groove 20. Upon the suction strokes, when the piston 2 moves in the direction of the arrow *a*, the suction within the chamber 4 of the crank casing 3 sucks lubricant from the bearing groove 20, through the aperture 24 in the sleeve 7, the pipe 25, and thence through intake port 5 into which the pipe 25 discharges, and is mixed with the other gases and lubricant sucked through the port 5. During the reciprocation of the piston 2, oil is forced to the bearing groove 20 on the power stroke and sucked therefrom on the suction stroke. It will be seen that a constant supply of lubricant and circulation of lubricant will be maintained at all times.

From the above it will be seen that an oiling system for an internal combustion engine bearing is provided, and the power created on the suction and power strokes of the piston is utilized for maintaining a constant lubricating supply to the bearing through a continuous circulation of lubricant, and excess lubricant is sucked from the bearing, thereby preventing damage to adjacent mechanism, for instance a magneto.

The invention having been set forth what is claimed as new and useful is:—

1. The combination with the upper crank shaft bearing of a horizontally disposed two cycle internal combustion engine having a reciprocating piston for rotating a vertically disposed crank shaft, a crank casing in which lubricant is precipitated, a pipe connecting said crank casing and discharging into said bearing, an intake port, a pipe connecting said bearing and said intake port, said piston forming means whereby a continuous flow of lubricant is maintained and circulated to said bearing.

2. The combination with a crank shaft bearing of a two cycle internal combustion engine having a reciprocating piston for rotating a crank shaft, a crank casing in which lubricant is precipitated, of a pipe connecting said crank casing and crank shaft bearing and discharging into said bearing, an intake port, a pipe connecting said bearing and said intake port, said piston forming means whereby a flow of lubricant is maintained to and from said bearing.

3. The combination with a crank shaft bearing of an internal combustion engine having a reciprocating piston for rotating the crank shaft, a crank casing in which lubricant is precipitated, of a pipe connection, between the casing and the crank shaft bearing and discharging into said bearing, an intake port, a pipe connection between said bearing and said intake port, said piston forming means whereby a flow of lubricant is maintained to and from said bearing through the pipes.

4. The combination with a crank shaft bearing, of a two cycle internal combustion engine having a reciprocating piston for rotating a crank shaft, a crank casing in which lubricant is precipitated, a pipe connecting said crank casing and crank shaft bearing and discharging into said bearing, an intake port, a pipe connecting said bearing and said intake port and connected to the bearing at the opposite side to the connection thereto of the first mentioned pipe, said piston forming means whereby a flow of lubricant is maintained to and from said bearing.

5. The combination with a crank shaft bearing, of a two cycle internal combustion engine having a reciprocating piston for rotating a crank shaft, a crank casing in which

lubricant is precipitated, a pipe connecting said casing and crank shaft bearing and discharging into said bearing, a sleeve surrounding the crank shaft and forming the bearing and having an arcuate lubricant chamber therein with a port of communication with said pipe, a pipe connecting said bearing and intake port and having communication with the lubricant chamber of the bearing sleeve through a port, said last named pipe being connected to the intake port, said piston forming means whereby the flow of lubricant is maintained to and from said bearing.

In testimony whereof we affix our signatures.

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