A. MONSEN.

OILING SYSTEM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED DEC. 20, 1918.

1,416,490. Patented May 16, 1922.

3 SHEETS—SHEET 1.

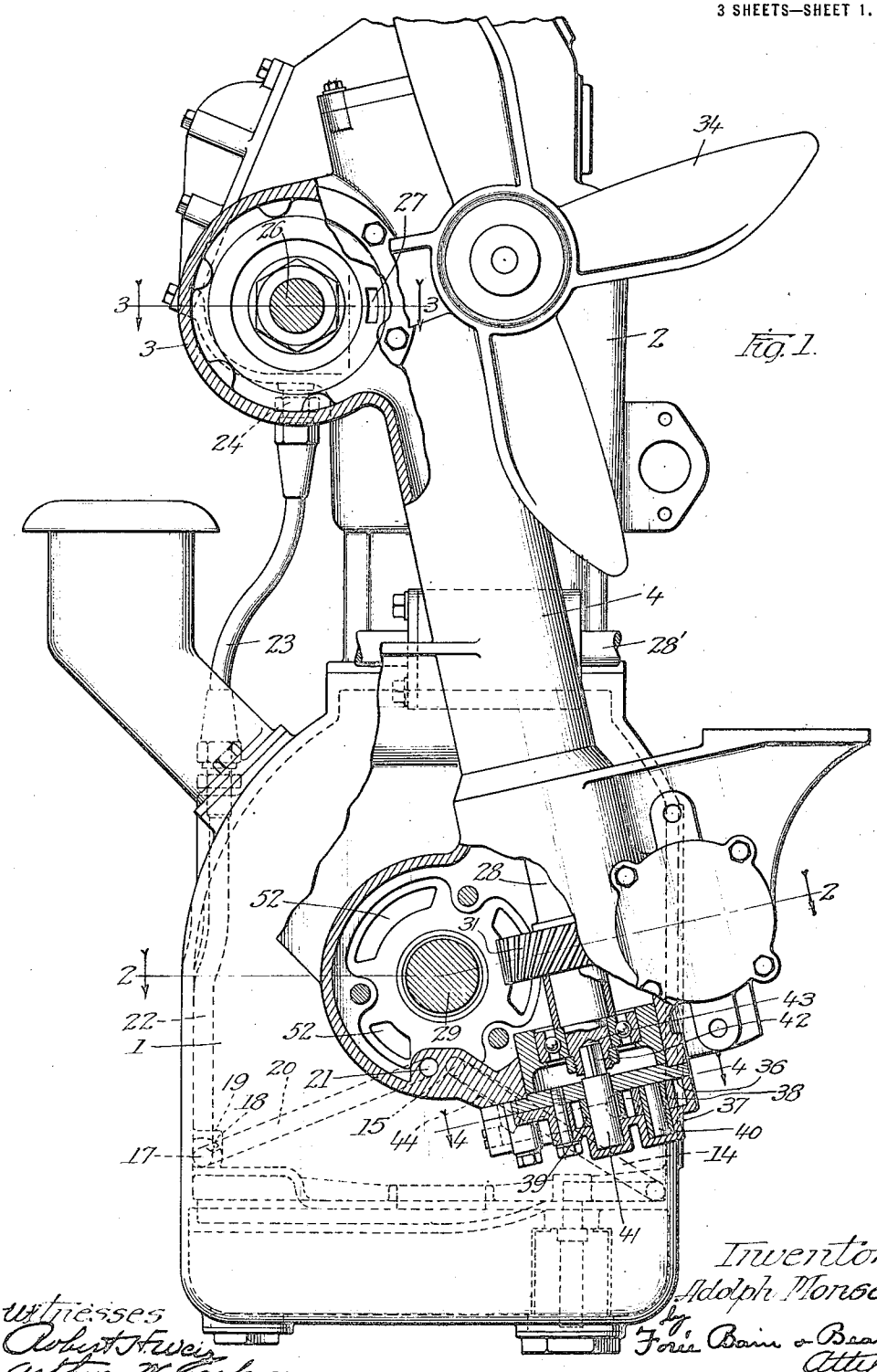


Fig. 1.

Witnesses
Robert F. Keep
Arthur W. Carboy

Inventor
Adolph Monsen
by Foss Bain & Bean
Attys

A. MONSEN.

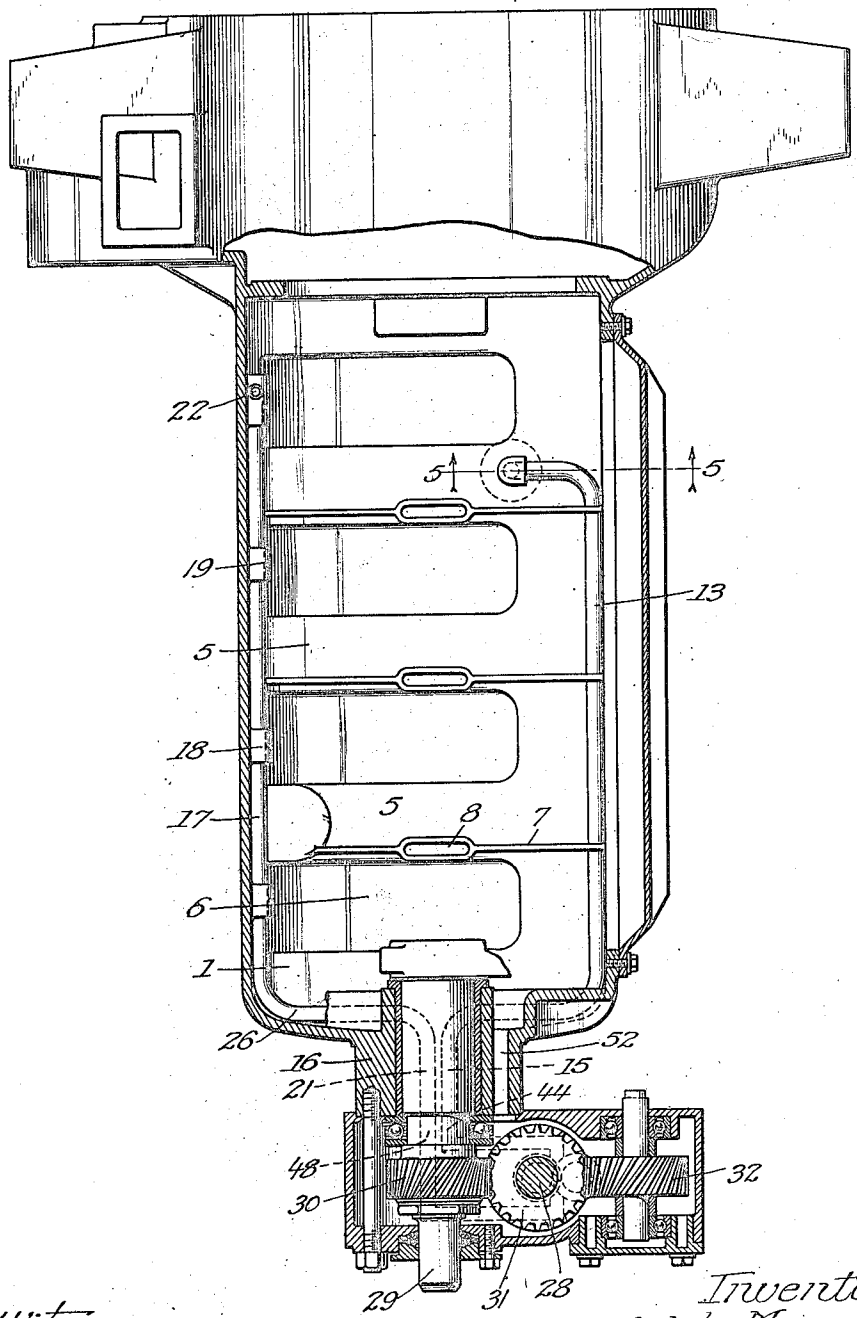
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
Robert H. Weir
Arthur N. Cashow

Inventor
Adolph Monsen
by Foote Bain & Beary Attys.

A. MONSEN.

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3 SHEETS—SHEET 3.

Fig. 3.

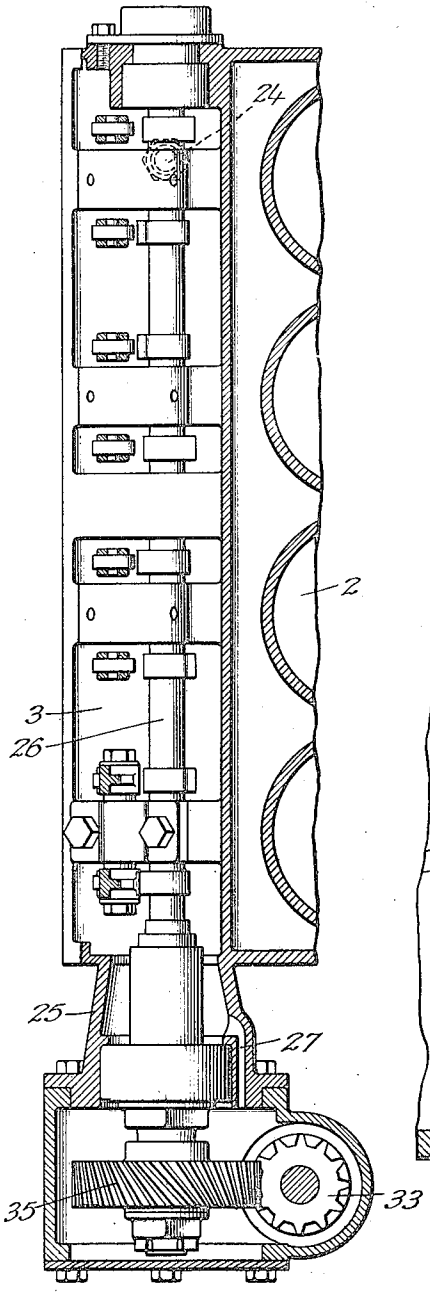


Fig. 4.

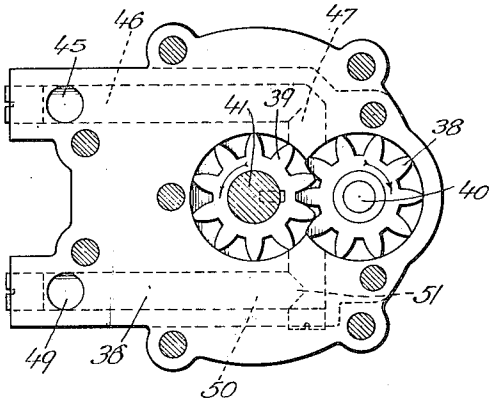
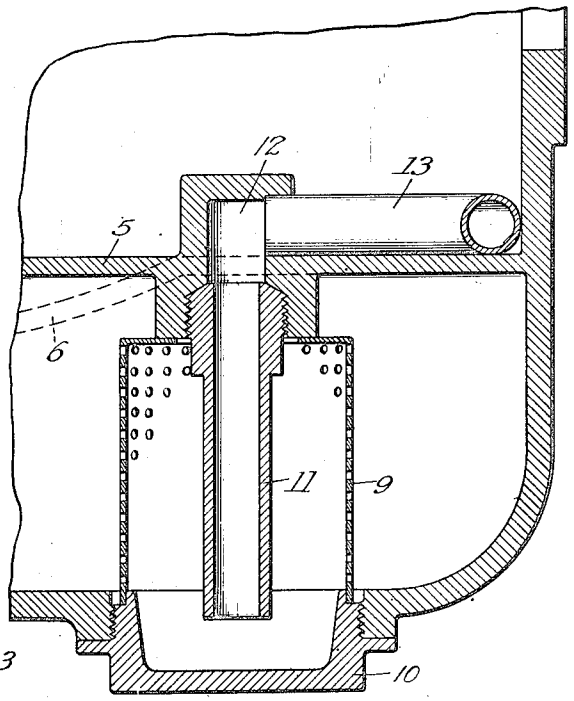


Fig. 5.



Witnesses:
Robert F. Weir
Arthur W. Carboy

Inventor
Adolph Monsen
by Foster Bain & Bagley
Attys.

UNITED STATES PATENT OFFICE.

ADOLPH MONSEN, OF LOGANSPORT, INDIANA.

OILING SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

1,416,490. Specification of Letters Patent. Patented May 16, 1922.

Application filed December 20, 1918. Serial No. 267,622.

To all whom it may concern:

Be it known that I, ADOLPH MONSEN, a citizen of the United States, residing at Logansport, in the county of Cass and State of Indiana, have invented certain new and useful Improvements in Oiling Systems for Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in oiling systems for internal combustion engines and the principal object thereof is the provision of such a system which is of simple and uniform construction and arrangement, whereby all of the operating parts of the mechanism are subject to the proper application of lubricant at all times.

A further object of this invention is the provision of an internal combustion engine having a vertical driving shaft for operating the oil pump, water pump, generator, magneto, cam shaft and fan, this shaft being enclosed in a hollow post which cooperates with the crank casing and the engine casing to form a complete covering or casing for the various operating mechanisms, having suitable conduits, pipes or passages provided to and from the oil pump to apply the lubricant at the proper places to insure adequate and efficient lubrication of the operating parts of the mechanism.

Further objects of this invention include improvements in details of construction and arrangement, whereby the above objects are accomplished.

To the accomplishment of the foregoing and such other objects as may hereinafter appear my invention consists in the construction, combination and arrangement of parts hereinafter described and then sought to be defined in the appended claims, reference being had to the accompanying drawings forming a part hereof and which show, merely for the purpose of illustrative disclosure a preferred embodiment of my invention, it being expressly understood, however, that various changes may be made in practice within the scope of the claims without digressing from my inventive idea.

Fig. 1 represents a front end elevation of a motor constructed to embody my invention, parts being shown in section and in dotted lines to facilitate the disclosure.

Fig. 2 is a longitudinal and horizontal sectional view taken substantially on line 2—2 of Fig. 1.

Fig. 3 is a longitudinal and horizontal sectional view taken substantially on line 3—3 of Fig. 1.

Fig. 4 represents a horizontal sectional view taken substantially on line 4—4 of Fig. 1, showing in detail the oil pump and the means for supporting the same.

Fig. 5 is a vertical sectional view on an enlarged scale on line 5—5 of Fig. 2, showing the construction of the oil sump.

Referring now to the drawings, the numeral 1 designates the crank case, 2 the cylinder and 3 the valve case which is formed on one side of the cylinder. 4 designates a hollow post which is positioned on the front end of the motor and contains the operating gear mechanism. The crank case is provided with a sort of false bottom 5 positioned above the real bottom thereof, this false bottom 5 being provided with a series of depressions 6 adapted to receive and contain the oil for lubricating the cranks which operate therein. I provide the webs or partitions 7 extending transversely across the crank case which have an intermediate opening 8 leading down through the false bottom into the bottom proper of the crank case. Positioned in one end of the bottom of the crank case is the oil sump which includes the strainer 9 held in place by the plug 10 and the supply tube 11 which is secured in a boss extending downwardly from the false bottom 5 of the crank case. This boss is provided with an opening 12 therethrough and the tube 13 is connected to the upper opening of this passage 12. This tube 13 passes along one side of the crank case and partially across one end of the same in a slightly inclined direction, as at 14, leading to the passage 15 formed in the boss or projection 16 which is provided on the front end of the crank case, as shown. On the other side of the crank case I provide the horizontally extending tube 17 which extends through the loops or straps 18, discharge apertures 19 being provided therethrough. This tube extends diagonally upward in the front part of the crank case, as at 20, to communicate with the horizontal passage 21 through the boss or projection 16 in the front end of the crank case. The passage 15 communicates with the intake side of the oil pump and the passage 21 communicates with the discharge side of the oil pump.

At the rear end of tube 17, I connect the vertically extending tube 22 which passes

through the crank case and is connected to exterior tube 23 which communicates with the inside of the valve case 3 at or near the rear end of the same, as at 24. As seen particularly in Figs. 1 and 3, the front end of the valve case 3 is provided with the boss projection 25 which receives the bearings for the cam shaft 26, as illustrated. This boss or projection 25 is provided with the port 27 which extends horizontally therethrough.

The post 4 is hollow and extends vertically across the front end of the motor, as shown in Fig. 1, and has mounted therein the vertically arranged shaft 28. This shaft 28 is driven from the crank shaft 29 by means of the spiral gear 30 of the crank shaft meshing with spiral gear 31 on the vertical shaft. As shown in Fig. 2 of the drawing this gear 31 of the vertical shaft also meshes with another spiral gear 32 on a short or stub shaft which is arranged to operate the water circulating pump (not shown). This vertical shaft is also provided with a spiral gear 33 at or near the top thereof which has operative connection to drive the fan 34 and which also meshes with the spiral gear 35 on the front end of cam shaft 26. A similar gear connection, not shown, is provided at an intermediate part of shaft 28 for driving shaft 28′ which operates the magneto and also the generator. The post 4 is provided with suitable enlarged parts to form casings or coverings for these various mechanisms in connection with the crank case and the piston and valve case construction, so that an oil tight casing is provided for the entire mechanism.

To the lower end of the post 4 the oil pump construction is detachably connected. Its casing comprises the two plate members 36 and 37, the latter being formed to provide compartments to receive the cog or gear wheels 38 and 39, which form the rotary gear pump. Element 38 is mounted to rotate on the short or stub shaft 40, while element 39 is secured to the short shaft 41, the end of which projects through the plate 36 and is reduced and squared, as at 42, to fit into a correspondingly shaped socket 43 in the lower end of the vertical shaft 28. The pump including its casing is detachably connected to the lower end of the post by means of bolts as shown, so that the same may be readily attached thereto and detached therefrom.

The passage 15 which is formed in the boss or projection 16 of the crank case communicates with a downwardly extending passage 44 provided in the lower part of the post 4, which passage 44 communicates with the upper end of the vertical port 45 provided in the upper plate 36 of the pump casing. This port 45 communicates with the longitudinally extending port or passage 46 in the pump casing which has the right angle turn 47 to the inlet or intake side of the pump. The passage 21 in the boss or projection 16 of the crank case communicates with a similar passage 48 provided in the post 4 which in turn communicates with the port 49 formed in the top plate 36 of the pump construction opposite the port 45, the port 49 communicating with the longitudinal passage 50 which has the right angle turn 51 leading to the exhaust or discharge side of the pump.

In order to provide communication between the lower end of the post 4 and the interior of the crank case, I form in the boss or projection 16 a plurality of ports or passages 52.

The circulation of the oil is as follows. From the oil sump the oil is drawn through the intake tube 11, tube 13, to passage 15 in the boss or projection 16, thence through passage 44 in the lower end of the post 4 to port 45 to passage 46 to the pump and thence through passage 50, port 49, passage 48, in the lower end of the post to passage 21 in the boss or projection 16, thence to tube 17 from which it is sprayed through the discharge openings 19 against the cranks. As stated before, a certain amount of the oil which accumulates on the false bottom will pass through the openings 8 in the partition 7 directly to the bottom of the crank case.

Passing through the tube 17 the oil is forced through tubes 22 and 23 into the valve casing whereby the cam shaft and valves are lubricated. When it reaches the level of the port or passage 27, which it is recalled, is formed in the boss or extension 25 of the valve casing, the oil flows through the same down through the post 4. It then passes through the passages 52 provided in the boss or extension 16 in the crank case, back into the crank case, as is well understood. During this circuit all of the various operating parts and gears are subjected to the action of the oil, either directly or by being splashed or thrown. As the entire mechanism is enclosed in an oil tight casing there is no leakage or waste of the oil at any stage of its circuit. The pump and the strainer may both be readily removed for cleaning or other purposes.

Having described my invention, what I claim is:—

1. An internal combustion engine including in combination, a crank casing and an engine casing, said crank casing having a false bottom provided above the real bottom thereof, said false bottom being provided with a plurality of depressions corresponding to the cranks on the crank shaft, a pipe connection passing through said false bottom and opening near the bottom of the crank casing, a strainer surrounding the

lower end of said pipe and a plug for holding the strainer in position and an oil pump to which said pipe is connected.

2. An internal combustion engine including in combination, a crank casing and an engine casing, said crank casing having a false bottom provided above the real bottom thereof, said false bottom being provided with a plurality of depressions corresponding to the cranks on the crank shaft, a pipe connection passing through said false bottom and opening near the bottom of the crank casing, a strainer surrounding the lower end of said pipe and a plug for holding the strainer in position and an oil pump to which said pipe is connected, a plurality of partitions extending transversely across the false bottom of said crank casing, each partition having an opening formed therein passing through the false bottom so as to provide communication with the bottom part of the crank casing.

3. In combination, a crank casing, an engine casing, said crank casing being provided with a false bottom spaced above the real bottom of the casing, an inlet pipe connection passing through said false bottom and having the inlet opening near the bottom of the crank casing, said inlet pipe extending along one side of the crank casing above the false bottom thereof, a pump with which said inlet pipe has connection, a discharge pipe also having connection with said pump, said discharge pipe extending longitudinally along the other side of said crank casing and above the false bottom thereof, said discharge pipe having a plurality of apertures in alignment with the cranks on the crank shaft.

4. In combination, a crank casing, an engine casing, said crank casing being provided with a false bottom spaced above the real bottom of the casing, an inlet pipe connection passing through said false bottom and having the inlet opening near the bottom of the crank casing, said inlet pipe extending along one side of the crank casing above the false bottom thereof, a pump with which said inlet pipe has connection, a discharge pipe also having connection with said pump, said discharge pipe extending longitudinally along the other side of said crank casing and above the false bottom thereof, said discharge pipe having a plurality of apertures in alignment with the cranks on the crank shaft, said engine casing having a valve casing and said discharge pipe having a connection with the valve casing.

5. In combination, a crank casing, an engine casing, said crank casing being provided with a false bottom spaced above the real bottom of the casing, an inlet pipe connection passing through said false bottom and having the inlet opening near the bottom of the crank casing, said inlet pipe extending along one side of the crank casing above the false bottom thereof, a pump with which said inlet pipe has connection, a discharge pipe also having connection with said pump, said discharge pipe extending longitudinally along the other side of said crank casing and above the false bottom thereof, said discharge pipe having a plurality of apertures in alignment with the cranks on the crank shaft, said engine casing having a valve casing and said discharge pipe having a connection with the valve casing and a return conduit from said valve casing to said crank casing.

6. In combination, a crank casing, an engine casing, said crank casing being provided with a false bottom spaced above the real bottom of the casing, an inlet pipe connection passing through said false bottom and having the inlet opening near the bottom of the crank casing, said inlet pipe extending along one side of the crank casing above the false bottom thereof, a pump with which said inlet pipe has connection, a discharge pipe also having connection with said pump, said discharge pipe extending longitudinally along the other side of said crank casing and above the false bottom thereof, said discharge pipe having a plurality of apertures in alignment with the cranks on the crank shaft, said engine casing having a valve casing and said discharge pipe having a connection with the valve casing and a return conduit from said valve casing to said crank casing, said return conduit taking the form of a hollow post in which a shaft is adapted to be mounted for actuating the various parts of the mechanism.

7. A mechanism of the character described including in combination, a crank casing, an engine casing having a valve casing, a crank shaft mounted in said crank casing, a cam shaft mounted in said valve casing, said valve casing having a projection to afford a bearing for said cam shaft, said crank casing having a projection to afford a bearing for said crank shaft, a hollow post having enlargements to provide casings to fit said projections on the cam shaft and crank shaft, respectively, a vertical shaft in said hollow post having gears for driving said cam shaft and other operating parts of the mechanism and also having a gear adapted to be driven from said crank shaft, a passage in said projection of the valve casing for providing communication between the valve casing and the hollow stud and a passage through the projection of the crank casing for providing communication between the crank casing and the hollow port, an oil pump mounted on the lower end of said vertical shaft, inlet and discharge passages provided in the projection from the crank casing, pipes communicating with said passages and extend-

ing through said crank casing, the inlet pipe having an opening near the bottom thereof and the discharge pipe having a plurality of openings corresponding to the cranks on the crank shaft, said discharge pipe also having communication with said valve casing.

8. An internal combustion engine including in combination a crank casing; an engine casing; a hollow, generally vertical post connecting said casings; a shaft axially disposed in said post; means to drive the shaft from the main shaft of the engine; a plurality of laterally extending gear casings communicating with said post; gears within said casings to drive suitable instrumentalities from said shaft and means to pass a lubricating liquid through the hollow post and communicating casings to lubricate the moving members of the structure.

9. An internal combustion engine including in combination a crank casing; an engine casing; a hollow, generally vertical post connecting said casings; a shaft axially disposed in said post; means to drive the shaft from the main shaft of the engine; a plurality of laterally extending gear casings communicating with said post; gears within said casings to drive suitable instrumentalities from said shaft; means to pass a lubricating liquid through the hollow post and communicating casings to lubricate the moving members of the structure and an oil pump driven by said shaft and communicating with said hollow post.

In testimony whereof I hereunto subscribed my name.

ADOLPH MONSEN.