N° 23,830 A.D. 1910

Date of Application, 14th Oct., 1910
Complete Specification Left, 11th May, 1911—Accepted, 16th Oct., 1911

PROVISIONAL SPECIFICATION.

An Improved Two Cycle Internal Combustion Motor.

I, FREDERICK LAMPLOUGH, of Albany Works, Cumberland Park, Willesden Junction, in the County of Middlesex, Managing Director, do hereby declare the nature of this invention to be as follows:—

The invention relates to that type of two cycle motor having a pair of cylinders with a common combustion head, the inlet and outlet ports being arranged in the walls of the cylinders and being covered and uncovered by the pistons. In such engines a pump is employed to force a charge into an intermediate chamber with which the inlet port communicates.

The objects of the present invention are:

1. To improve the motor proper whereby I am enabled to get a larger charge into the cylinders than is usual with this type of engine and at the same time to thoroughly scavenge the cylinders without loss of the incoming charge.
2. To improve the pump used to charge the cylinders.
3. To provide simple and efficient means of lubricating the motor.

According to the present invention, I arrange the cylinders at right angles to the crank shaft and I connect both connecting rods to one crank. These connecting rods are preferably curved and one connecting rod is pivoted to the other rod or to a lateral projection thereon.

The inlet and outlet ports are the same width but, owing to the construction of the connecting rods and the arrangement of the cylinders, the exhaust port will open before the inlet port opens and will again close before the inlet port closes.

This prevents loss of the incoming charge and enables a larger charge to enter the cylinder. To ensure tight fitting pistons, I provide each piston with a cup ring at its inner end and adjacent to the cup ring, I place a spring ring of the usual form. Such rings are located in a groove formed near the end of the piston, one side of the groove being partly cut away to accommodate the cup.

The pump employed in carrying the invention into effect is of that type in which the piston fits the cylinder at its two ends, leaving an annular chamber between its centre and the cylinder, and in which the piston has an internal sleeve provided with a cross web. In such pumps the piston has been connected to the crank shaft by a connecting rod which has been formed with a projection or lever at the point where it is connected to the piston, and such projection or lever has been connected by a link with the internal sleeve. In the present construction of pump I place the projection or lever near to the crank shaft end of the connecting rod, which necessitates a longer link to operate the sleeve. On the opposite side of the connecting rod I place a counter-balance weight to enable the correct balance to be obtained between the pistons and connecting rods of the motor and the pump rods and pump piston.

The improved lubricating pump employed in this motor consists of a ring driven by the main shaft, said ring being mounted in a bearing which is slightly eccentric to the main shaft. The ring has a pin which engages a plunger located in a cylinder diametrically arranged in a disc rotating in a

[*Price 8d.*]

pump body. As the disc rotates the plunger receives a reciprocating motion. The pump body has a number of holes on the suction side, which holes communicate with a channel communicating with the suction pipe. The plunger is hollow and has a lateral passage communicating with the oil duct running through the crank shaft. In the interior of the plunger is a valve seating, a lift valve and a spring to retain the valve on its seat. As the end of the cylinder passes across the openings on the suction side of the pump body, a charge is drawn in by the plunger. When the cylinder arrives at the other side of the pump body, the plunger moves outwards radially, but as that side of the cylinder body has no opening, the valve in the plunger is lifted and the oil is driven into the usual oil duct in the crank shaft.

Pipes convey the oil to the top ends of the connecting rods. The oil suction pipe connects the pump with a tray carried by the crank chamber. It carries at its end a filter which is preferably in the form of a dished disc having cross bars on the under side which are covered with gauze. The oil rises through the bars, passing through the gauze and leaving any dirt on the under side of the bars. The dirt then falls onto the tray and is removed from time to time.

Dated this 14th day of October, 1910.

HARRIS & MILLS,
23, Southampton Buildings, London, W.C., and at
Sheffield and Llanelly,
Agents.

COMPLETE SPECIFICATION.

An Improved Two Cycle Internal Combustion Motor.

I, FREDERICK LAMPLOUGH, of Albany Works, Cumberland Park, Willesden Junction, in the County of Middlesex, Managing Director, 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:—

The invention relates to that type of two cycle motor having a pair of cylinders arranged in a plane at right angles to the shaft, with a common combustion head, the inlet and outlet ports being arranged in the walls of the cylinders and being covered and uncovered by the pistons which are connected to a common crank. In other engines provided with this kind of cylinders arranged in the same plane as the crank shaft, a pump is employed to force a charge into an intermediate chamber with which the inlet port communicates.

The objects of the present invention are:

1st. To improve the motor proper whereby I am enabled to get a larger charge into the cylinders than is usual with this type of engine, and at the same time to thoroughly scavenge the cylinders without loss of the incoming charge.

2nd. To improve the pump used to charge the cylinders.

3rd. To provide simple and efficient means of lubricating the motor.

According to the present invention I employ a pair of firing cylinders arranged in a plane at right angles to the shaft and having a common combustion head, the two pistons being connected to one crank in combination with a charging pump located adjacent to the firing cylinders and communicating with the common combustion head by means of an intermediate chamber, the charging pump being driven by a crank on the main shaft adjacent to the crank driven by the firing cylinders. This design of engine has been found to give very satisfactory results. The charging pump employed in carrying the inven-

tion into effect is an improved form of a pump shown and described in the Specification of my Patent No. 19,610 of 1909.

Improved means are provided for lubricating the crank shaft and other parts of the motor.

I will describe my invention by the aid of the accompanying drawings, in which:—

Fig. 1 is a vertical longitudinal section partly in elevation, and

Fig. 2 is a vertical transverse section on the line 2—2 of Fig. 1 of my improved two cycle internal combustion motor.

Fig. 3 is a vertical section drawn at right angles to Fig. 1, showing the charging pump piston and its connections with the crank shaft.

Fig. 4 is a vertical section on the line 4—4 of Fig. 1 through the improved lubricating pump.

Fig. 5 is a sectional plan on the line 5—5 of Fig. 1.

In carrying the present invention into effect I arrange the cylinders a, a^1, on a plane at right angles to the crank shaft b, and I connect both connecting rods c, c^1, to one crank b^1 in known manner. These connecting rods are preferably curved near to their connection with the crank, and one connecting rod, c, may be pivoted to the other rod, c^1, or, as shown, to a lateral projection c^2 thereon.

A somewhat similar effect will, however, be obtained if both connecting rods are connected directly to the same crank.

The inlet port a^2 and exhaust port a^3 are the same width and level with each other, but, owing to the construction of the connecting rods c, c^1, and the arrangement of the cylinders a, a^1, the exhaust port a^3 will open before the inlet port a^2 opens, and will again close before the inlet port closes.

This construction prevents loss of the incoming charge, enables a larger charge to enter the cylinders and a longer power stroke to be obtained. In the drawings the cylinders are arranged equally on each side of the crank shaft, but the crank shaft can be arranged to the right or to the left, that is to say, more under one cylinder, for the purpose of varying the timing of the opening and closing of the ports.

To ensure tight fitting pistons I provide each piston d, d^1, with a cup-ring d^2 at its inner end, and adjacent to the cup ring I place a spring ring d^3 of the usual form. Such rings d^2, d^3, may, as shown in the drawing, be located in a single groove formed near the inner end of the piston, one side of the groove being partly cut away to accommodate the cup ring. The spring ring d^3 may, however, be located in a separate groove closely adjoining that in which the cup ring d^2 is located. The charging pump employed in carrying the invention into effect is of that type described in the Specification of my Patent No. 19,610[09], in which the piston e fits the cylinder e^1 at its two ends, leaving an annular chamber e^2 between its central part and the cylinder, and in which the piston e has an internal sleeve e^3 provided with an inverted cone e^4 to reduce the space in the pump. In such charging pumps the piston e has been connected to the crank shaft b by a connecting rod which has been formed with a projection or lever at the point where it is connected to the piston e, and such projection or lever has been connected by a link with the internal sleeve e^3. In the present construction of charging pump, I place the projection or lever e^6 near to the crank shaft end of the connecting rod e^5, which necessitates a longer link e^7 than heretofore to operate the sleeve e^3. On the opposite side of the connecting rod e^5, I place a counter-balance weight e^8, to enable the correct balance to be obtained between the pistons and connecting rods of the motor and the charging pump rods and pump piston.

The air compressed in the pump e^1 passes through the non-return valve closing the head of the cylinder into the intermediate chamber E whence it passes into the cylinders a^1 and a through the port a^2 as soon as this latter is uncovered by its piston d^1.

An Improved Two Cycle Internal Combustion Motor.

The improved lubricating pump employed in this motor consists of a ring *f* surrounding the main or crank shaft *b*, said ring *f* being mounted in a bearing *g* which is slightly eccentric to the crank shaft *b*. The ring *f* has a pin f^1 which engages a plunger *h*, located in a cylinder i^1, diametrically arranged in a disc *i*, keyed on the shaft *b* and rotating in the pump body *j*, fitting on the crank shaft *b*. As the disc *i* rotates, it, by means of the pin f^1, causes the eccentric ring *f* to rotate and the plunger *h* receives a reciprocating motion. The pump body *j* has a number of holes j^1 on the suction side, which holes communicate with a channel *k*, communicating with the suction pipe *l*. The plunger *h* is hollow and has a lateral passage h^1, communicating with the oil duct b^2, running through the crank shaft *b*. In the interior of the plunger *h* is a valve seating h^2, a lift valve h^3 and a spring h^4 to retain the valve h^3 on its seat. As the end of the cylinder i^1 passes across the holes j^1, a charge is drawn in by the plunger *h*. When the cylinder i^1 arrives at the other side of the pump body *j*, the plunger *h* moves outwards radially, but as that side of the pump body has no opening, the valve h^3 in the plunger *h* is lifted and the oil is driven into the usual oil duct b^2 in the crank shaft *b*.

It will be understood that while the plunger *h* is driving oil into the oil duct b^2, the solid end of the plunger is sucking another charge of oil into the cylinder i^1. To enable this oil to escape from the cylinder i^1, a groove b^3 is cut through the cylinder i^1 and an extension of the disc *i* forming a gear wheel I. Through this groove b^3, the oil sucked in by the solid end of the plunger *h* is, on the return stroke, forced back into the crank chamber.

Pipes *m* convey the oil from the duct b^2 to the top ends of the connecting rods *c*, c^1, c^5, and links c^7. The oil suction pipe *l* connects the pump with a tray *n* carried by the crank chamber. It carries at its end a filter *o*, which is preferably in the form of an inverted dished disc having cross bars o^1 on the underside which are covered with gauze o^2. The oil rises through the bars o^1, passing through the gauze o^2 and leaving any dirt on the underside of the bars and gauze. The dirt then falls into the tray *n* and is removed from time to time.

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 two cycle internal combustion motor having two cylinders arranged in a plane at right angles to the crank shaft, a common combustion chamber, an inlet port in the wall of one cylinder and an exhaust port in the wall of the other cylinder, both ports being of equal size and at the same level, the two connecting rods being connected to one crank, so that the exhaust port will open before the inlet port opens and will close before the inlet port closes, in combination with a charging pump located adjacent to the firing cylinders and communicating with the common combustion head by means of an intermediate chamber, the charging pump being driven by a crank on the main shaft adjacent to the crank driven by the firing cylinders, substantially as shown and described.

2. A two cycle internal combustion motor as claimed in Claim 1, in which the charging pump piston has an internal sleeve provided with an inverted cone to reduce the space in the pump, the piston connecting rod having a counter-balance weight and a lateral projection near to the crank end thereof, to which lateral projection the connecting rod operating the sleeve is connected, substantially as shown and described.

3. The combination with a two cycle internal combustion motor as claimed in Claim 1, of a lubricating pump comprising an eccentric ring, a pin thereon, a plunger operated by said pin, a cylinder in which said plunger works, a rotating disc in which said cylinder is located, a pump body in which said disc rotates, a number of holes on the suction side of said pump body, and a lift

valve in said plunger allowing the oil drawn in at one end of the cylinder to pass into the oil duct in the crank shaft, and a groove connecting the other end of the cylinder with the crank chamber, substantially as shown and described.

4. The combination with a two cycle internal combustion motor as claimed in Claim 4, of a tray carried by the crank chamber, a pipe connecting said tray to the pump, and a filter on said pipe consisting of an inverted dished disc having cross bars on the underside covered with gauze, substantially as shown and described.

Dated this 11th day of May, 1911.

HARRIS & MILLS,
23, Southampton Buildings, London, W.C., and at Sheffield and Llanelly,
Agents.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1911.

A.D. 1910. Oct. 14. N° 23,830.
LAMPLOUGH'S Complete Specification.

(2 SHEETS)

SHEET 1.

Fig. 1

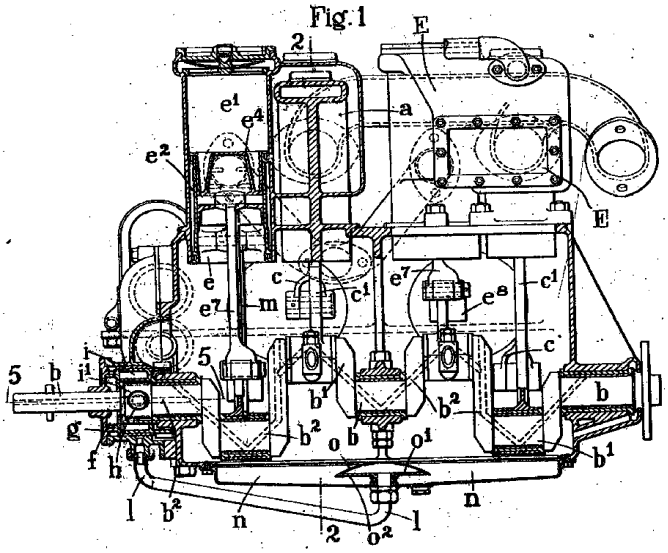
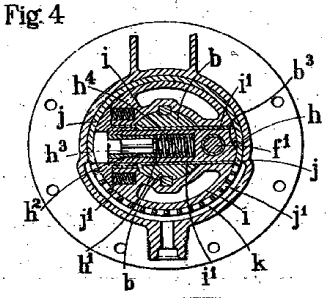


Fig. 4



SHEET 2.

Fig. 3

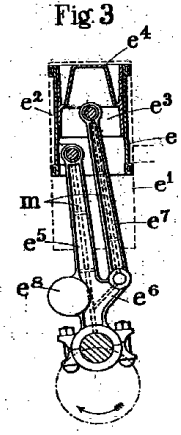


Fig. 2

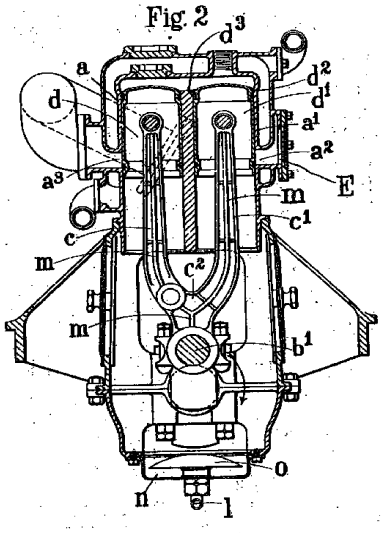
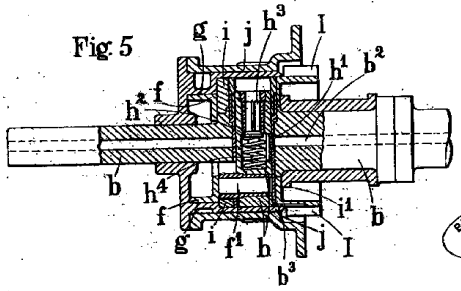


Fig. 5



Malby & Sons, Photo-Lith.

Fig. 1

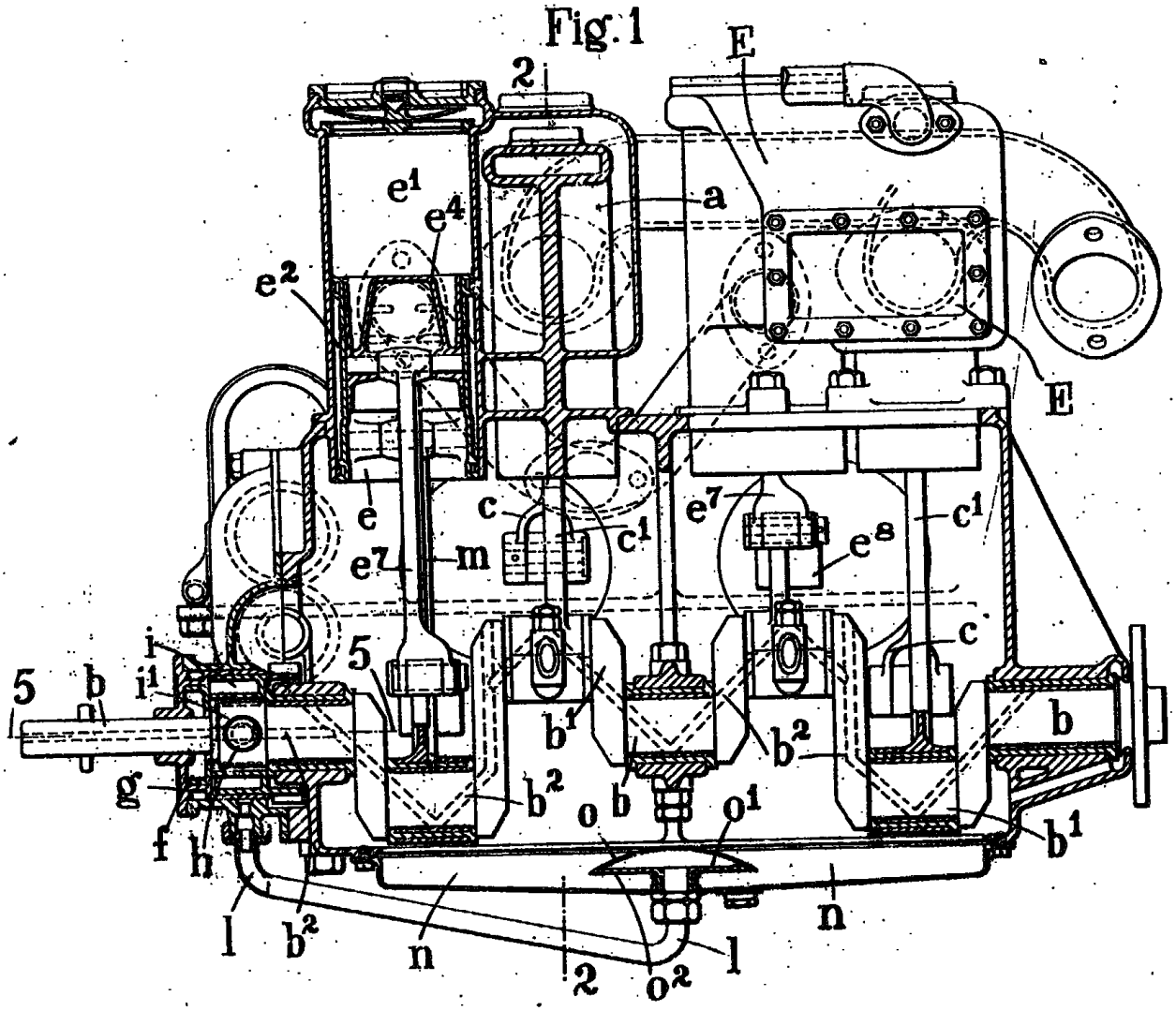
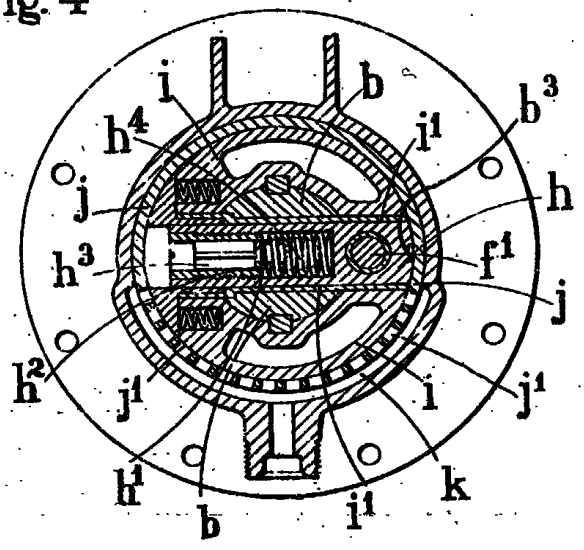


Fig. 4



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

Fig. 3

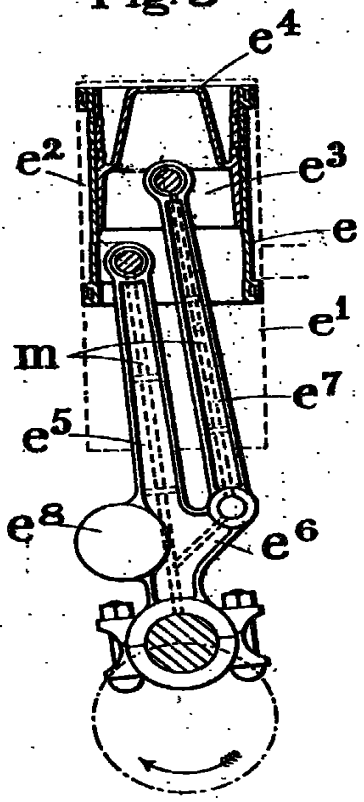


Fig. 2

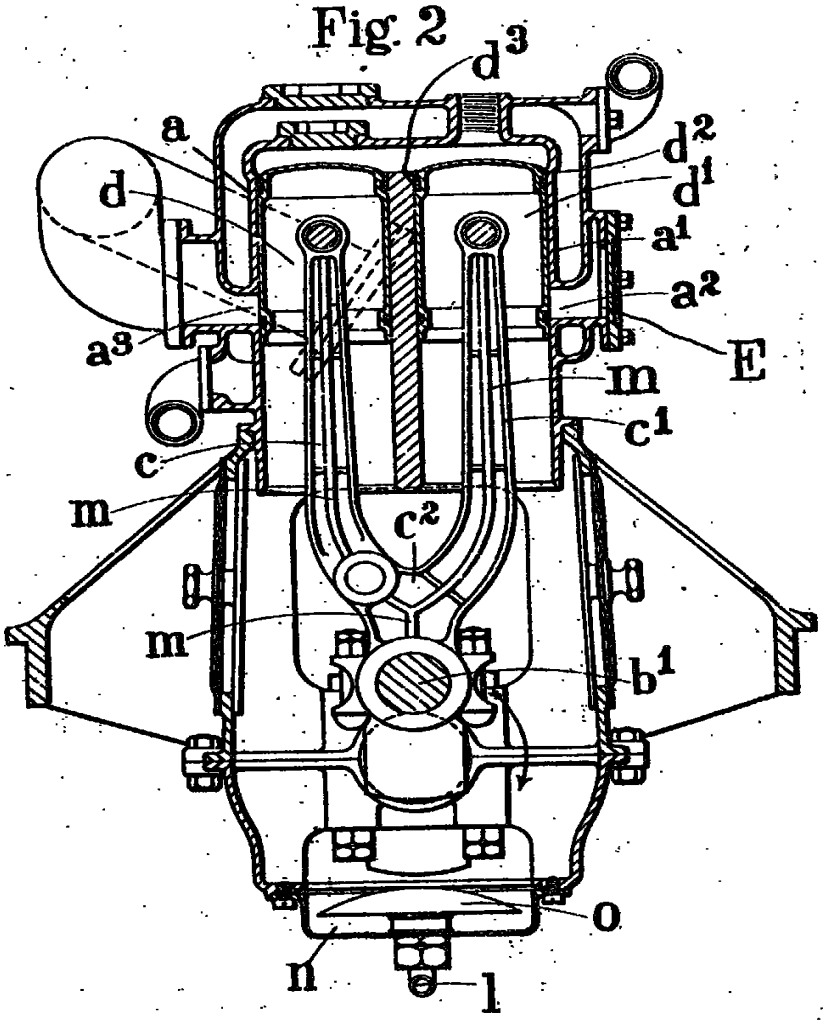
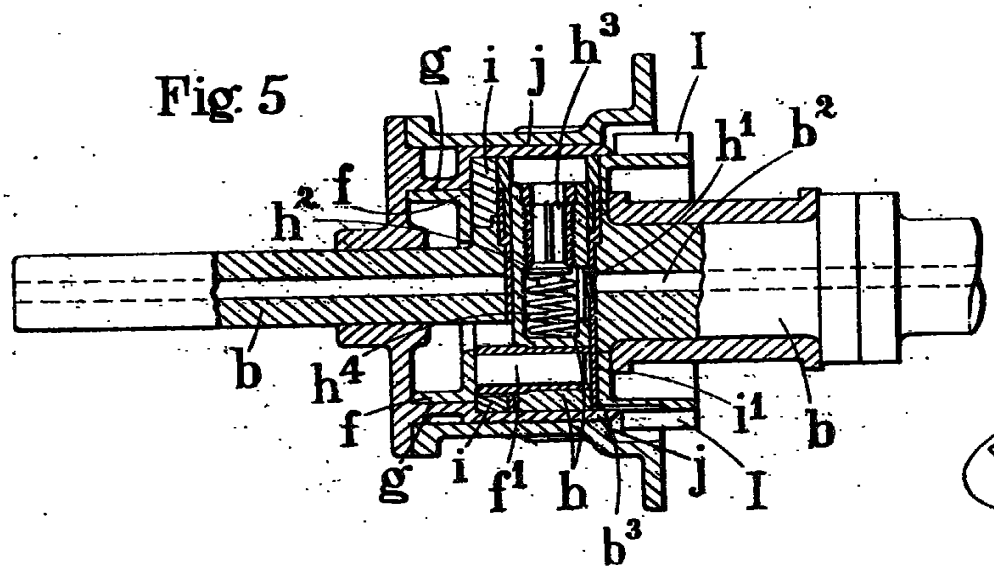


Fig. 5



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