

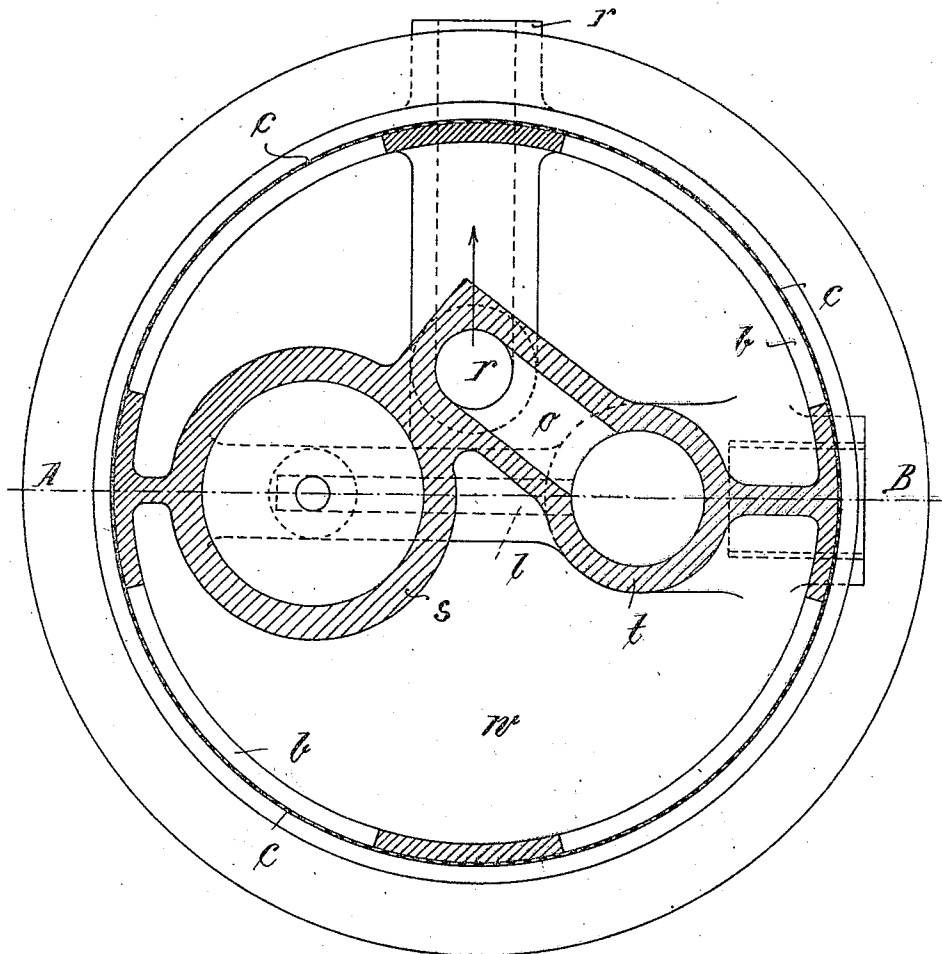
P. DAIMLER.
LUBRICATING SYSTEM.
APPLICATION FILED SEPT. 5, 1912.

1,050,811.

Patented Jan. 21, 1913.

4 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

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Inventor:

Paul Daimler
by E. Lloyd Marks
Attorney

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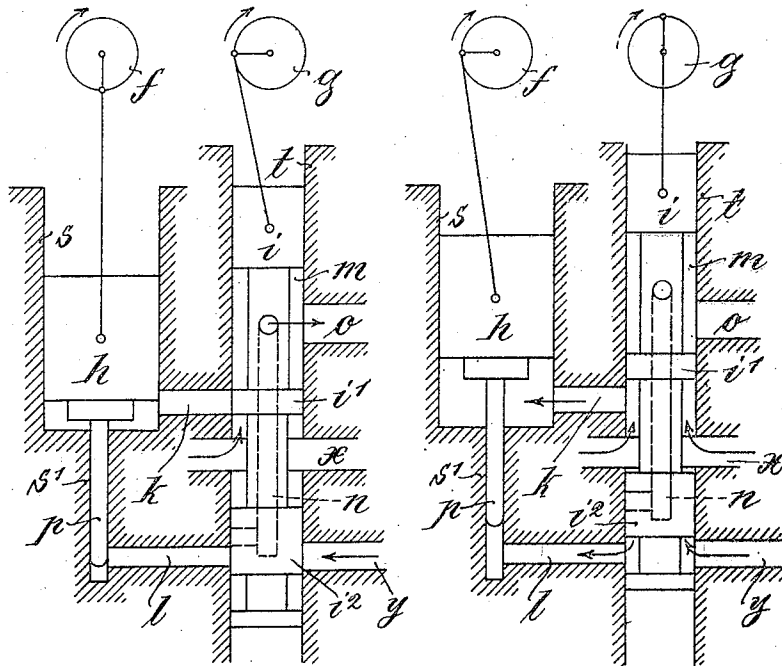
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4 SHEETS—SHEET 3.

Fig. 3

Fig. 4.



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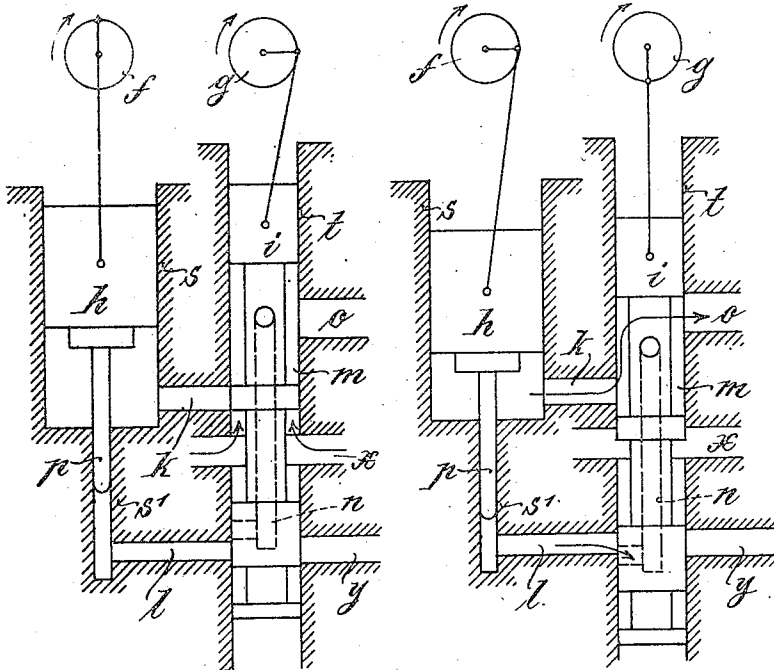
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4 SHEETS—SHEET 4.

Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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LUBRICATING SYSTEM.

1,050,811.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed September 5, 1912. Serial No. 718,665.

To all whom it may concern:

Be it known that I, PAUL DAIMLER, subject of the King of Württemberg, residing at 87 Waiblingerstrasse, Cannstatt, Kingdom of Württemberg, Germany, have invented certain new and useful Improvements in Lubricating Systems, of which the following is a specification.

This invention relates to improvements in the lubricating pumps of oil circulatory lubricating systems and the object of the present invention is to enable fresh oil to be supplied by the pump to the oil in the circuit, so that in this manner the quality of the lubricating oil will be improved.

According to the present invention the pump comprises a pump cylinder of differential diameter and a similar piston working therein, the oil being drawn into one part of the pump cylinder from the reservoir in the oil circuit while the other part of the pump cylinder (preferably the smaller part) receives oil from a fresh oil supply pipe. The oil contained in the different parts of the pump cylinder is forced out on the compression stroke of the piston into a common pipe in which the oil from the oil circuit mixes with the fresh oil whereupon it is supplied to the parts to be lubricated.

The supply of oil to the pump from the fresh oil supply and from the oil circuit is controlled by means of a piston valve which simultaneously connects both parts of the differential cylinder with the oil circuit reservoir and fresh oil supply respectively during the suction stroke of the piston and simultaneously establishes communication between both parts of the cylinder and the common oil delivery pipe during the compression stroke of the piston.

As the pump is preferably driven from the motor to be lubricated, the velocity of the oil circulation and the quantity of fresh oil supplied by the pump to the oil circuit will vary in proportion to the speed of the motor.

In order that the invention may be more clearly understood, reference is made to the accompanying drawings, whereon—

Figures 1 and 2 show an embodiment of my invention by way of example, Fig. 1 shows the pump in vertical section on the line A—B of Fig. 2, and Fig. 2 is a horizontal section through the line C—D of Fig. 1.

Figs. 3 to 6 are diagrammatic views showing the different positions of the pump piston and piston valve.

In the construction illustrated in Figs. 1 and 2 it is assumed that the reservoir *a* for the oil from the oil circuit is situated in the motor casing. The lubricating pump is fitted in this reservoir in such a manner that the oil will flow into the cylinder of the pump by gravity. For this purpose the pump casing is provided with the openings *b* covered with sieves *c*, so that the oil entering the pump may be freed from dirt therein.

The pump comprises a differential pump cylinder *s s'* within which works a differential piston *h p* connected by means of a connecting rod *u* to an eccentric *f* mounted upon a rotatable shaft *e* which is driven by means of a worm wheel *d* from any suitable source of power, such as the motor to be lubricated. The driving shaft *e* also carries an eccentric *g* driving a connecting rod *v²* connected to a triple piston valve *i, i', i²*, the parts *i³* and *i⁴* intermediate the valve heads *i i' i²* being reduced in thickness. The piston valve *i i' i²* slides within a valve casing *t* which is provided with a port *x* communicating with the oil chamber *w*, into which the oil enters from the reservoir *a*; the port *x* is controlled by the piston valve head *i²*, while the port *h* leading from the smaller part *s'* of the pump cylinder is controlled by the piston valve head *i'*. The smaller part *s'* of the pump cylinder *s* is likewise in communication with the valve chamber *t* through a port *l*, which is likewise controlled by the piston valve head *i²* which also controls the entrance of fresh oil into the valve chamber from a fresh oil supply pipe *y* through a port *y'*. The piston valve is also provided with a central port *n* which is adapted to periodically connect the bore *l* with the annular space *m* formed between the reduced part *i³* and the valve casing *t*, this annular space being in communication through a port *o* with the pipe *r* supplying the oil to the parts to be lubricated.

The operation of the pump will be more clearly understood by reference to Figs. 3 to 6. In the position illustrated in Fig. 3 the differential piston *h p* is shown at the end of its compression stroke, while the piston valve is in its midway position on the

up-stroke, the fresh oil supply pipe *y* being cut off from communication with the part *s'* of the pump cylinder. The piston valve head *v'* closes the port *k* and this prevents the entrance of oil from the oil circuit into the part *s* of the pump cylinder. On the further upward movement of the piston valve, the ports *k*, *l* and *y* are opened so that oil from the reservoir *a* can enter by way of the port *x* through the port *k* into the larger part *s* of the pump cylinder while fresh oil enters by way of the ports *y* and *l* into the smaller part *s'* of the pump cylinder, the piston *h p* being now on its suction stroke. Fig. 4 shows the parts in this position with the piston midway of its suction stroke. On the piston *h p* completing its suction stroke, as illustrated in Fig. 5, the piston valve is midway of its return movement, having again cut off connection between the ports *l* and *y* and between the ports *k* and *x*, but on the further downward movement of the piston valve and the simultaneous compression stroke of the piston *h p* the piston valve establishes connection by way of the annular space *m* between the port *k* and the oil delivered by *o* so that the oil taken from the oil circuit into the larger part *s* of the pump cylinder will be supplied through the pipe *o* to the parts to be lubricated. Simultaneously the central port *n* of the piston valve connects the port *l* with the annular space *m* and delivery pipe *o*, so that the fresh oil within the smaller part *s'* of the pump cylinder will be simultaneously supplied to the delivery pipe *o* and mix therein with the oil from the larger part *s'* of the pump cylinder. Fig. 6 shows this position of the parts. It will be seen that on the piston valve again commencing its upward stroke communication will continue to be established between the ports *k* and *o* and between the ports *l* and *o* until

the piston *h p* has almost or entirely reached the end of its compression stroke.

I claim:—

1. In combination with the oil circuit and reservoir of oil circulatory lubricating systems, a differential cylinder, a differential piston working in said cylinder, a fresh oil supply, connections from said cylinder to said fresh oil supply, oil circuit and reservoir respectively, and a piston valve for controlling said connections.

2. In combination with the oil circuit and reservoir of oil circulatory lubricating systems, a differential cylinder, a differential piston working therein, a valve chamber, connections from said valve chamber to the parts of said cylinder of different diameter, a fresh oil supply to said valve chamber, connections from said valve chamber to said oil circuit and reservoir and a piston valve in said valve chamber controlling said connections.

3. In combination with the oil circuit and reservoir of oil circulatory lubricating systems, a differential cylinder, a differential piston working therein, a valve chamber, connections from said valve chamber to the parts of said cylinder of different diameter, a fresh oil supply to said valve chamber, connections from said valve chamber to said oil circuit and reservoir, and a piston valve in said valve chamber controlling said connections and having a central port in said valve adapted to periodically establish communication between the smaller part of said cylinder and said oil circuit.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL DAIMLER.

Witnesses:

ROBERT MILANO,
FRIDA KLAIBER.