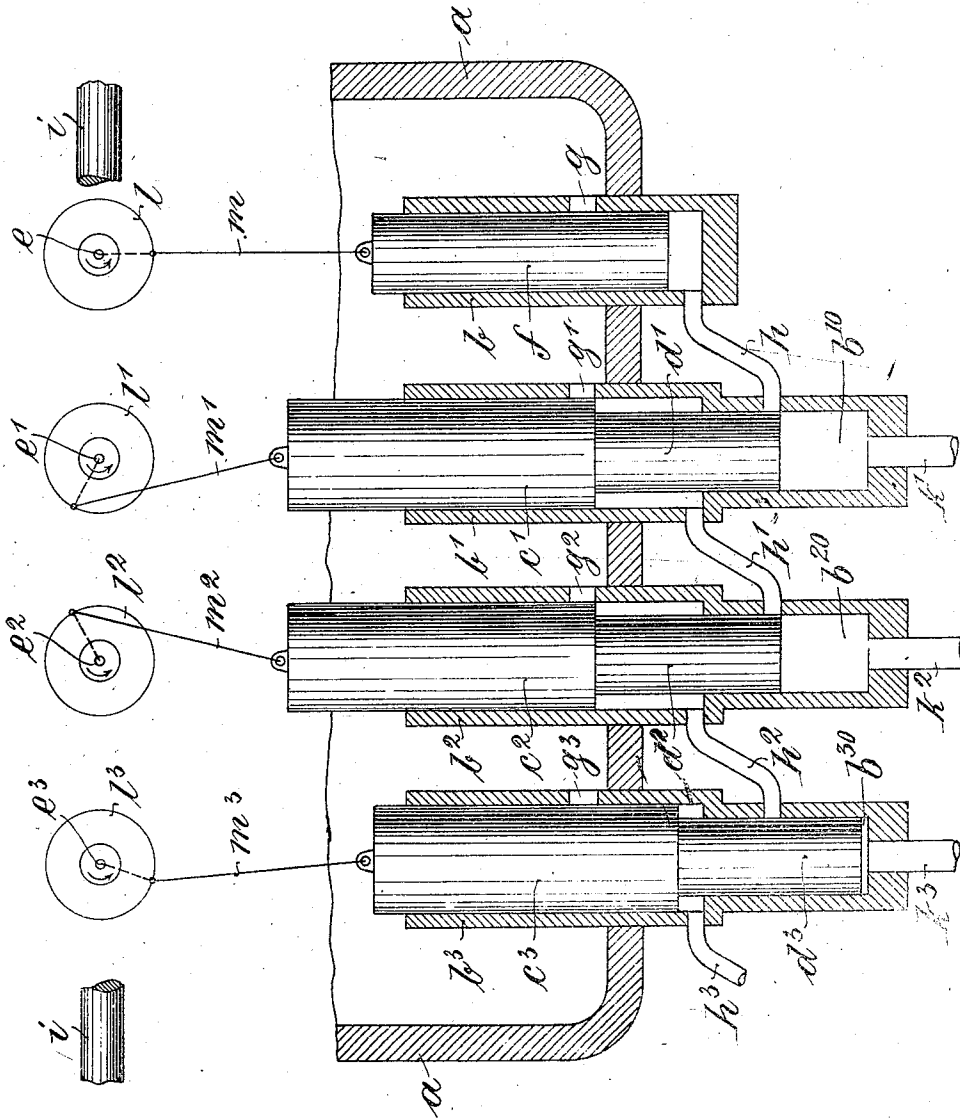


P. DAIMLER & A. HEESS.
LUBRICATING SYSTEM.
APPLICATION FILED APR. 8, 1912.

1,050,108.

Patented Jan. 14, 1913.



Witnesses:
L. J. Harkness
C. A. Brown

Inventors:
Paul Daimler
Albert Heess
By
Foster Freeman Watson & Co.
Attorneys

UNITED STATES PATENT OFFICE.

PAUL DAIMLER AND ALBERT HEESS, OF CANNSTATT, GERMANY, ASSIGNORS TO THE FIRM OF DAIMLER MOTORENGESELLSCHAFT, OF STUTTGART-UNTERTÜRKHEIM, GERMANY.

LUBRICATING SYSTEM.

1,050,108.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed April 8, 1912. Serial No. 689,317.

To all whom it may concern:

Be it known that we, PAUL DAIMLER, a subject of the King of Württemberg, and resident of 87 Waiblingerstrasse, Cannstatt, Kingdom of Württemberg, German Empire, and ALBERT HEESS, a subject of the King of Württemberg, and resident of 36 Hohenstaufenstrasse, Cannstatt, Kingdom of Württemberg, German Empire, have jointly invented a new and Improved Lubricating System, of which the following is a specification.

This invention relates to an improved lubricating system of the type in which a plurality of pumps are provided, each connected to the respective part to be lubricated.

Hitherto it has been usual to employ pumps of the type in which the supply of lubricant to the pump cylinder is controlled by a separate piston valve, such as is described for example in the specification of the prior United States Patent No. 1012332. In such cases however, a separate piston valve is required for each pump, thus considerably complicating the lubricating system.

The object of the present invention is to simplify the construction of such lubricating systems by dispensing with the auxiliary piston valves and for this purpose the pistons of the pump cylinders are so constructed and arranged that each piston constitutes the controlling valve for the next succeeding pump.

According to the present invention the piston of each pump is constructed of differential diameter adapted to work within a corresponding pump cylinder in such a manner that one part of the piston forces the lubricant to the next succeeding pump cylinder, while the other part of the pump piston forces the oil in the pump cylinder to the part to be lubricated. By this means the provision of an auxiliary piston valve for each pump is dispensed with, it being only necessary to provide one pump more than the number of parts to be lubricated, which additional pump is arranged to supply the lubricant to the first pump of the series. It will thus be readily understood that when it is desired to lubricate ten different parts, it is only necessary to provide ten pumps, each connected respectively to the parts to be lubricated and to arrange an

auxiliary pump supplying the lubricant to the first of the series of ten pumps.

In order that our invention may be more clearly understood, reference is made to the accompanying drawings, whereon the invention is illustrated, by way of example, as constructed for supplying lubricant to three different parts to be lubricated, the drawing showing the lubricating system in vertical section.

a designates the reservoir for the lubricant and *b* the pump cylinder of the auxiliary pump. The cylinders of the main pumps are constructed of differential diameter, the larger part of the main pumps being designated by *b'*, *b''* and *b'''* respectively, and the smaller parts by *b¹⁰*, *b²⁰* and *b³⁰* respectively in the accompanying drawings. Arranged within the pump cylinder *b* is an ordinary piston or plunger *f* adapted to draw oil into the cylinder through the ports *g* and to force the oil through the connection *h* to the interior of the smaller part *b¹⁰* of the first main pump cylinder. Within the main pump cylinders are adapted to work the differential pistons *c'*, *c''*, *c'''* and *d'*, *d''*, *d'''* respectively. The pump cylinders are connected in series by means of connections *h'*, *h''*, connecting the larger part of one cylinder to the smaller part of the next cylinder, while the larger part *b³⁰* of the last pump cylinder may be connected to an additional pump or to the reservoir *a* by means of a connection *h³*. The pump pistons are adapted to be driven from a main driving shaft *i* through any suitable reciprocatory motion illustrated diagrammatically on the drawings as comprising shafts *e*, *e'*, *e''* and *e'''* driven from the shaft *i* and carrying eccentrics *l*, *l'*, *l''* and *l'''* respectively, to the pump pistons by means of the connecting rods *m*, *m'*, *m''* and *m'''* respectively. The oil in the smaller parts *b¹⁰*, *b²⁰* and *b³⁰* respectively of the pump cylinders is adapted to be supplied to the parts to be lubricated through the delivery pipes *k'*, *k''* and *k'''* respectively.

The operation of the foregoing lubricating system is as follows:—On the rotation of the eccentrics *e*, *e'*, *e''*, *e'''* the pistons are reciprocated within their respective pump cylinders. The piston *f* draws in lubricant through the port *g* and on its downward stroke forces the lubricant through the con-

nection h to the interior of the smaller part b^{10} of the first main pump cylinder, where it is supplied through the pipe h' on the down stroke of the piston $c' d'$. During the up-stroke of the piston $c' d'$ lubricant is drawn into the larger part b' of the first main pump cylinder through the port g' and on the down-stroke of the piston the lubricant in the larger part b' is discharged through the connection h' into the smaller part b^{20} of the next succeeding pump cylinder. The pistons $c^2 d^2$ and $c^3 d^3$ operate in their corresponding pump cylinders in a manner similar to the operation of the piston $c' d'$ in the first main pump cylinder. It will be readily understood that any number of such main pumps may be arranged in series, and that it is only necessary to provide an auxiliary pump for supplying lubricant to the first pump cylinder b' of the series of main pumps.

We claim:—

1. A lubricating system for supplying lubricant from a plurality of pumps to a plurality of parts to be lubricated, comprising a plurality of pump cylinders connected in series and to the parts to be lubricated, each pump cylinder having an oil inlet port, and a piston reciprocated in each cylinder and overrunning the inlet ports therein so that each piston supplies oil to the next succeeding cylinder on its compression stroke.

2. A lubricating system for supplying lubricant from a plurality of pumps to a plurality of parts to be lubricated, comprising a plurality of main pump cylinders connected in series and to the parts to be lubricated, each pump cylinder having an oil inlet port, a piston reciprocated in each cylinder and overrunning the inlet port therein, an auxiliary pump cylinder having an oil inlet port, and a piston reciprocated in said auxiliary pump cylinder and overrunning the inlet port thereof so as to supply oil to the first of the series of main pump cylinders on its compression stroke, the piston of

each main pump cylinder overrunning the inlet port therein so as to supply oil to the next succeeding main pump cylinder on its compression-stroke.

3. A lubricating system for supplying lubricant from a plurality of pumps to a plurality of parts to be lubricated and connected respectively thereto, comprising a plurality of main pump cylinders of differential diameter connected independently to the parts to be lubricated and in series with each other, means for supplying lubricant to each of said main pump cylinders and differential pistons working in said cylinders, one part of each of said differential pistons forcing the lubricant to the parts to be lubricated and the other part of each of said differential pistons supplying lubricant to the next succeeding pump cylinder.

4. A lubricating system for supplying lubricant from a plurality of pumps to a plurality of parts to be lubricated and connected respectively thereto, comprising a plurality of main pump cylinders of differential diameter connected independently to the parts to be lubricated and in series with each other, means for supplying lubricant to each of said main pump cylinders, differential pistons working in said cylinders, one part of each of said differential pistons forcing the lubricant to the parts to be lubricated and the other part of each of said differential pistons supplying lubricant to the next succeeding pump cylinder, an auxiliary pump cylinder, means for supplying lubricant to said auxiliary pump cylinder and a piston working in said auxiliary pump cylinder and supplying lubricant to the first of said series of main pump cylinders.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

PAUL DAIMLER.
ALBERT HEESS.

Witnesses:

CARL GAERTTNER,
ROBERT UHLAND.