

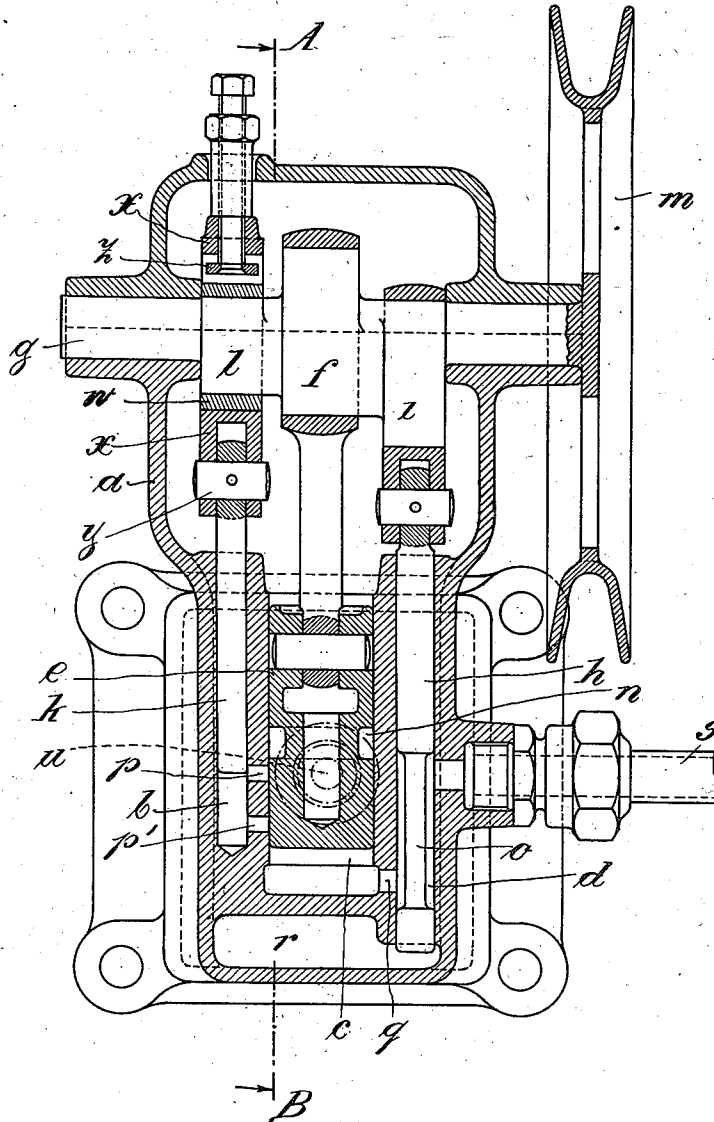
P. DAIMLER.
OIL CIRCULATORY SYSTEM OR APPARATUS.
APPLICATION FILED NOV. 15, 1910.

1,012,332.

Patented Dec. 19, 1911.

3 SHEETS-SHEET 1.

Fig 1



Witnesses:
Corinne Myers.
Vera Paulsen.

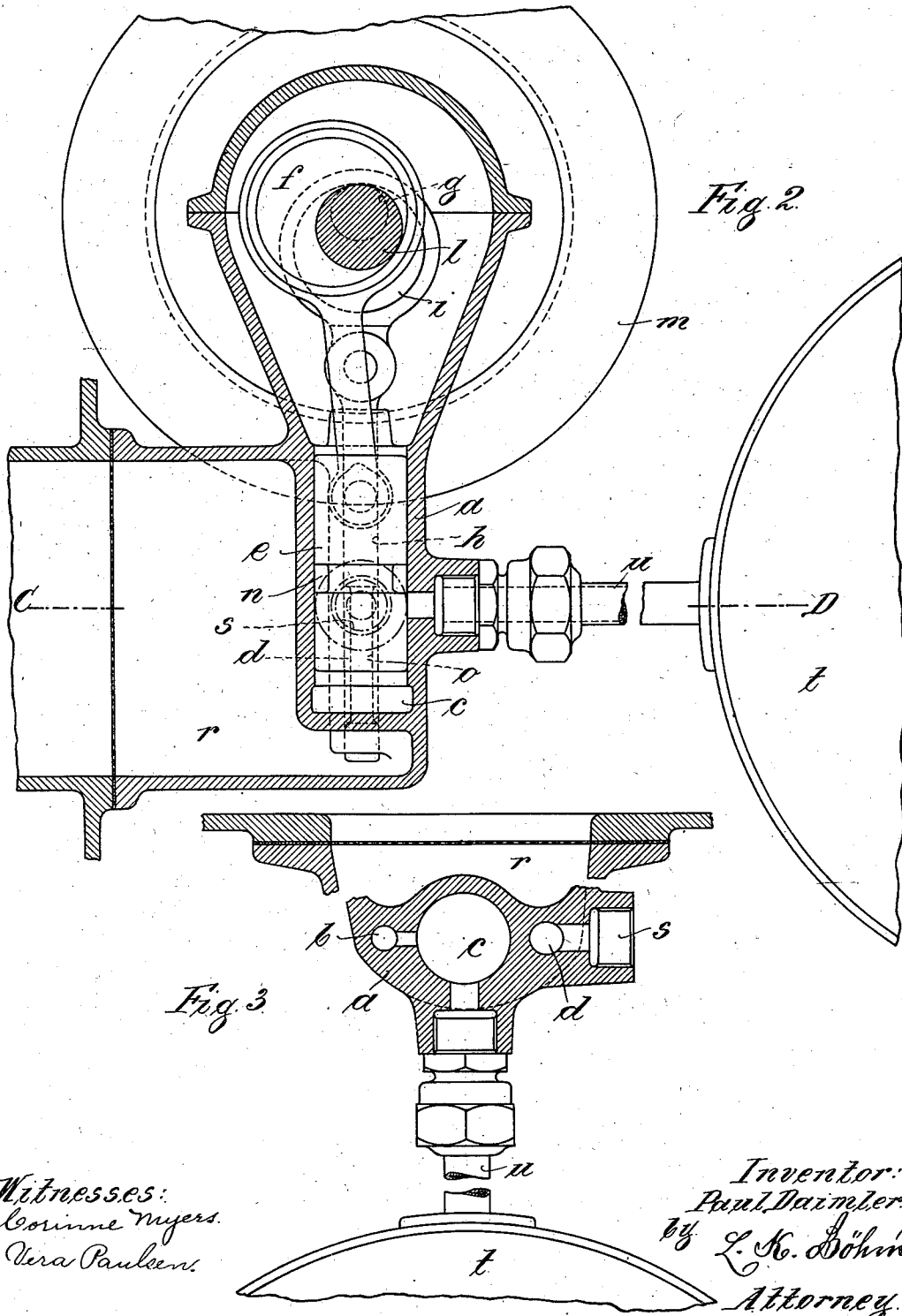
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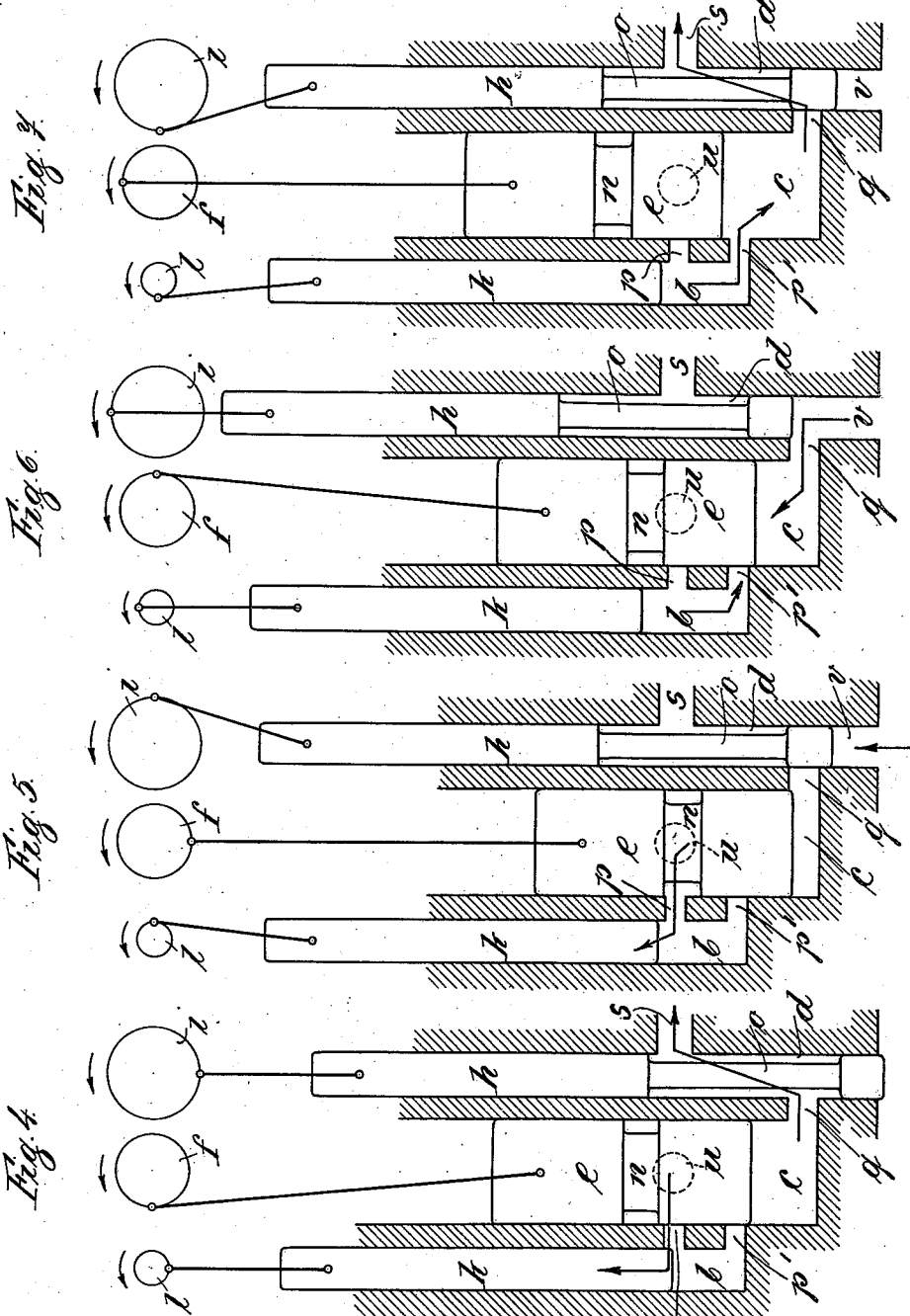
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3 SHEETS—SHEET 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

PAUL DAIMLER, OF UNTERTÜRKHEIM-STUTTGART, GERMANY, ASSIGNOR TO THE FIRM OF DAIMLER-MOTOREN-GESELLSCHAFT, OF UNTERTÜRKHEIM-STUTTGART, GERMANY.

OIL-CIRCULATORY SYSTEM OR APPARATUS.

1,012,332.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed November 15, 1910. Serial No. 592,415.

To all whom it may concern:

Be it known that I, PAUL DAIMLER, a subject of the King of Wurttemberg, and resident of Untertürkheim-Stuttgart, in the Kingdom of Wurttemberg, German Empire, have invented certain new and useful Improvements in and Relating to Oil-Circulatory Systems or Apparatus, of which the following is a specification.

This invention relates to an oil circulating system or arrangement especially applicable for lubricating the various parts to be lubricated in the motors of automobiles. In such lubricating arrangements the renewing of the lubricant or the addition of fresh oil thereto has been effected heretofore in such a manner that fresh oil from time to time was supplied to the vessel wherein the oil was collected from the various lubricated parts, this fresh oil commingling with the circulating oil in the vessel and being then mixed with such old or dirty oil was conveyed by means of a circulating pump to the parts to be lubricated.

The object of the present invention is to renew or replenish the lubricating oil in a circulation system in such manner that fresh oil is continuously or intermittently supplied directly to the parts to be lubricated. For this purpose, this invention provides in addition to the circulating pump, a pump which draws from a fresh oil container and conveys the oil into the pipe that leads from the circulating pump to the parts to be lubricated. By this arrangement the fresh oil pump can be so combined with the circulating pump that the piston of the latter at the same time forms a piston valve for the fresh oil pump, and that the fresh oil is conveyed into the pipe for supplying lubricating oil. In order to be able to regulate the feed or fresh oil at any time the stroke of the fresh oil pump may be made adjustable.

In order to enable this invention to be readily understood reference is made to the accompanying drawings in which:—

Figure 1 is a side view of a constructional form of the invention, partly in section. Fig. 2 shows a section through the system

or apparatus according to the line A—B of Fig. 1, certain parts being omitted and others broken away. Fig. 3 is a section according to the line C—D of Fig. 2, certain parts being omitted and others broken away. Figs. 4–7 are diagrams illustrating the several pistons of the pump arrangement in various positions.

Referring to Figs. 1–3 the casing *a* of the circulating pump is provided with three barrels *b*, *c*, *d*. In the middle barrel *c* works the piston *e* of the circulating pump. This piston *e* is driven by an eccentric *f* from the shaft *g* mounted in suitable bearings of the upper portion of the casing *a*. In the barrel *d* is provided a piston slide-valve *h* which is suitably worked by an eccentric *i* from the same shaft *g* as the piston *e*. In the barrel *b* is working a piston *k* which receives movement by an eccentric *l* from the shaft *g*. The shaft *g* is driven by a pulley *m* or the like.

The piston *e* and the slide-valve *h* are each provided with a reduced portion or neck *n*, *o*, respectively. The barrel *c* is in communication by suitable openings *p* *p'* with the barrel *b* and at its bottom by the opening *q* with the barrel *d*. The latter is in communication with a receptacle *r*, wherein the oil collects from the various parts to be lubricated. The barrel *d* is at or near its middle portion connected with a pipe *s* leading to the various parts to be lubricated. The barrel *c* is at or near its middle portion in communication with a fresh oil tank *t* by means of a pipe *u*.

The working of the apparatus according to the present invention will now be explained with reference to Figs. 4–7. In Fig. 4 the piston *e* of the circulating pump is in the middle of its forcing stroke. The lower part of the piston-valve *h* closes the passage to the oil collecting receptacle *r* so that the circulating oil below the piston *e* is forced by the latter into the lubricant supply pipe *s*, as indicated by the arrow in Fig. 4. The piston valve *h* is here in its lowest position and so also is the piston *k* of the fresh oil pump. As the piston *e* moves still farther and descends from the position shown

in Fig. 4 it continues to force the circulating oil into the pipe *s*. At the same time the piston *k* of the fresh oil pump effects the first part of its suction stroke, and as soon as the reduced portion or neck *n* in the piston *e* uncovers the openings or ports *p* *u* the piston *k* sucks in fresh oil from the port *u*. The several pistons are now in the position shown in Fig. 5, where the piston *e* of the circulating pump is at the end of its pressure stroke. In this position the piston valve *h* closes the passage *v* to the oil collecting receptacle *r* and, at the same time, shuts off communication with the port to the oil supply pipe *s*, while the fresh oil pump is in the middle position of its suction stroke. During further movement the piston *k* of the fresh oil pump continues to suck, while the sliding piston valve *h* moves upward so as to open the connection between the barrel *c* of the circulating pump and the passage *v* which leads to the collecting vessel or receptacle *r*. Consequently, the piston *e* in its upward stroke may draw oil from the collecting vessel. Fig. 6 shows the position when the piston *k* of the fresh oil pump has completed its stroke and the piston *e* of the circulating pump is in the middle of its suction stroke. The fresh oil which has been drawn in by the piston *k* is now forced into the barrel or cylinder *c* of the circulating pump, as shown in Fig. 7. When the port or opening *q* connecting the lower portion of the cylinder or barrel *c* with the passage *v* or pipe *s* is uncovered by the piston valve *h* the fresh oil now contained in the cylinder *c* is forced by the descending piston *e* to the parts to be lubricated through the pipe *s*, as indicated by the arrow in Fig. 7.

It is preferable to provide means for adjusting the stroke of the piston *k* of the fresh oil pump. In the constructional form illustrated in Fig. 1 an adjustable abutment is shown. The eccentric *l* works in a slider *w* movable up and down in a frame *x* which is connected by an eye *y* with the rod of piston *k*. In the upper bar of the frame *x* an abutment *z* is adjustably mounted by means of a screw. By adjusting the abutment downward in the frame *x* the clearance between the slider *w* and the abutment *z* may be reduced and the stroke of the pump increased, and vice versa.

I claim:

1. In an oil circulatory lubricating system, a main pump circulating oil to and from the parts to be lubricated and an auxiliary pump parallel to and arranged at the side of said main pump, said auxiliary pump sucking oil from a fresh oil supply and directly supplying it to said main pump.

2. In an oil circulatory lubricating system, a main pump circulating oil to and from the parts to be lubricated, an auxil-

iary pump parallel to and arranged at the side of said main pump, said auxiliary pump sucking oil from a fresh oil supply and directly supplying it to said main pump, a driving shaft, eccentrics on said shaft for operating the pump pistons and means for adjusting the stroke of said auxiliary pump comprising a frame connected to the piston of the auxiliary pump, a block sliding in said frame and fitting on the eccentric of the driving shaft, and an adjustable abutment for said block, said abutment being carried by the frame.

3. In an oil circulatory lubricating system, a main pump circulating oil to and from the parts to be lubricated, an auxiliary pump parallel to and arranged at the side of said main pump, said auxiliary pump sucking oil from a fresh oil supply and directly supplying it to said main pump, and a piston valve parallel to and arranged at the side of said main pump, said piston valve controlling communication between said main pump and the oil circuit.

4. In an oil circulatory lubricating system, a main pump circulating oil to and from the parts to be lubricated, a fresh oil supply, and an auxiliary pump for sucking oil from said fresh oil supply and supplying the fresh oil to the oil circuit, the piston of said main pump being adapted to control communication between said auxiliary pump and the fresh oil supply.

5. In an oil circulatory lubricating system, a main pump circulating oil to and from the parts to be lubricated, a fresh oil supply, and an auxiliary pump for sucking oil from said fresh oil supply and supplying the fresh oil to the oil circuit, the piston of said main pump being adapted to control communication between said auxiliary pump and the oil circuit.

6. In an oil circulatory lubricating system, a main pump circulating oil to and from the parts to be lubricated, a fresh oil supply, and an additional pump for sucking oil from said fresh oil supply and forcing the fresh oil into the oil circuit, the piston of said main pump being such that communication is cut off between said additional pump and the fresh oil supply, when communication is established between the circulating pump and the parts to be lubricated, so as to deliver oil to the latter, and communication established between said additional pump and the fresh oil supply when the circulating pump is cut off from the parts to be lubricated.

7. In an oil circulatory lubricating system, a pump circulating oil to and from the parts to be lubricated, a fresh oil supply, an additional pump for sucking oil from said fresh oil supply and forcing the fresh oil into the oil circuit, and valve means so

arranged that communication is established
between said pumps during the pressure
stroke of said additional pump so as to de-
liver the fresh oil to the circulating pump
5 and thereby mix the fresh oil with the oil
drawn in by the circulating pump from the
oil circuit.

In witness whereof I have hereunto set
my hand in the presence of two witnesses.

PAUL DAIMLER.

Witnesses:

ROBERT UHLAND,

ERNEST L. ENTENMANN.
