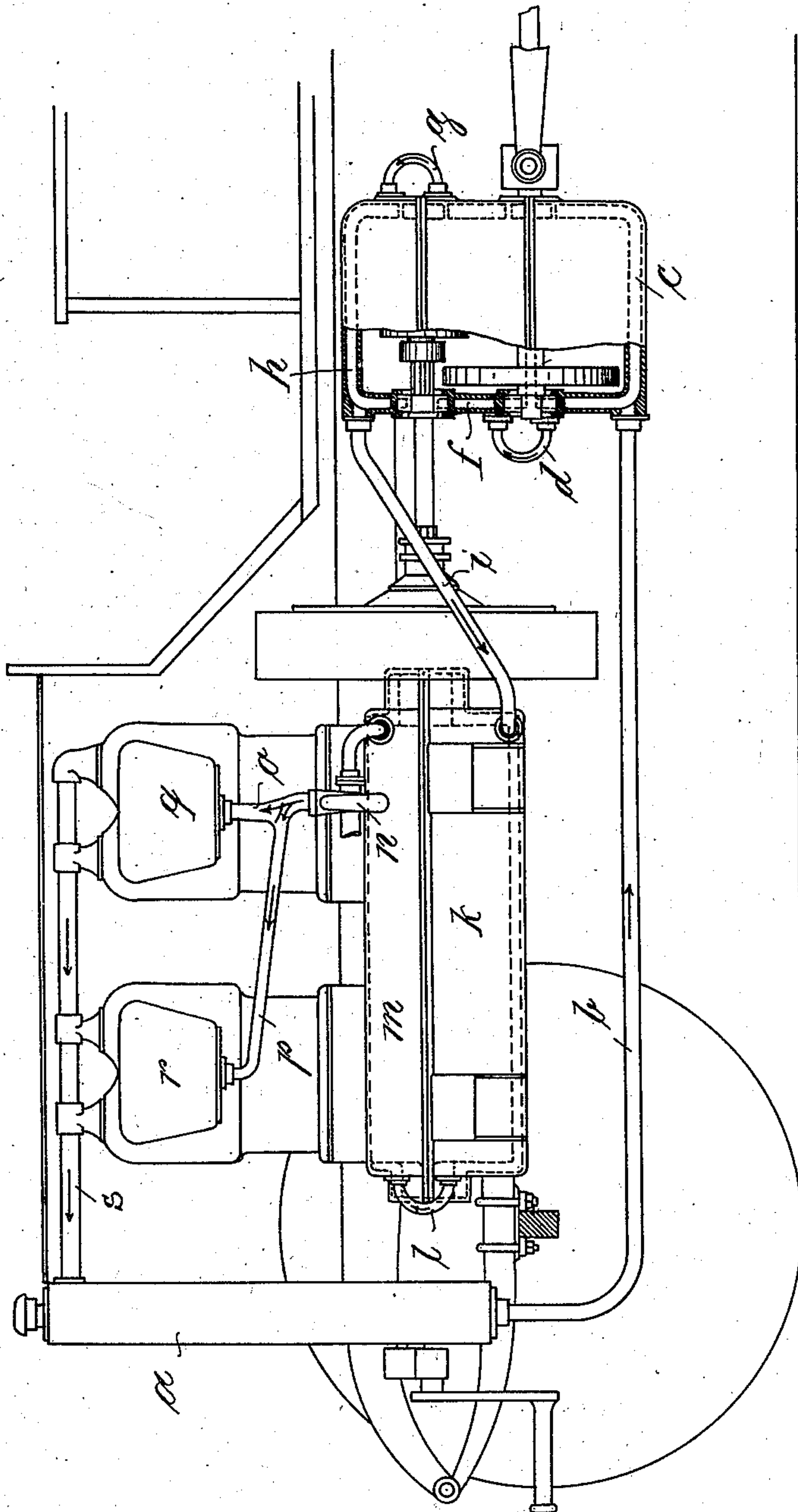


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COOLING APPARATUS FOR MOTOR VEHICLES.  
APPLICATION FILED NOV. 5, 1907.

998,876.

Patented July 25, 1911.



Witnesses:  
Arthur Scholz  
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# UNITED STATES PATENT OFFICE.

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COOLING APPARATUS FOR MOTOR-VEHICLES.

998,876.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed November 5, 1907. Serial No. 400,812.

*To all whom it may concern:*

Be it known that I, PAUL DAIMLER, a subject of the King of Württemberg, and resident of Untertürkheim, near Stuttgart, Kingdom of Württemberg, German Empire, have invented certain new and useful Improvements in the Application of Cooling Apparatus for Motor-Vehicles, of which the following is an exact specification.

The present invention relates to improvements in and in the application of cooling apparatus for motor vehicles and has for object to cool the driving parts which become heated by friction. Hitherto only the cylinders of the explosion engines have been cooled by a water circulation system in which a radiator cools the water heated by contact with the cylinder, and it may be said that only those parts have been cooled which were heated directly by the combustion taking place in the engine.

It is advisable, for efficient working of motor-vehicles, to keep as cool as possible those parts which become heated by friction, the change-speed gear and the crank casing being perhaps the most important in this respect. Of these two parts the crank casing is of course heated in a greater degree, as, besides the heat due to friction, transmission of heat takes place by conduction from the engine cylinder.

Now according to this invention in order to utilize as much as possible the cooling action of the water cooled by the radiator, the water is in the first place conveyed to a jacket surrounding the change-speed gear casing and from this jacket the water, which has then been only comparatively slightly heated, flows to a jacket surrounding the casing of the lower part of the engine. As the temperature of this part is greater, the cooling water becomes more highly heated but the difference between the temperature at this place and in the cylinder jacket is so great that the water may still be used with success for the cooling of the cylinder. By the described simultaneous use of the water for the cooling of the cylinders as well as for the cooling of certain parts heated wholly or partly by friction, such parts are kept cool without having to use special cooling means for this purpose.

The improved cooling apparatus and ap-

plication thereof is represented diagrammatically in the accompanying drawing.

The water cooled in the cooler *a* and passing from the latter from beneath, flows through a conduit *b* into the cooling jacket *c* on the lower part of the change-speed gear casing. From here it enters through a bent pipe *d* which is jointed externally into a cooling jacket *f* surrounding the central part of the casing and from this jacket it passes through a second bent pipe *g* to the cooling jacket *h* of the upper part of the casing. After the water has flowed around this casing and has cooled the oil and parts contained in the same it flows through a conduit *i* into the cooling jacket of the lower part *k* of the crank casing of the engine, and then flows through a bent pipe *l* into the cooling jacket of the upper part *m* of this casing and is then drawn off by the circulation pump *n*, which forces it through conduits *o* and *p* in the usual manner to the cooling jacket of the cylinders *q* and *r*. From this cooling jacket the water returns through a pipe *s* into the radiator or cooler *a*. The described transmission of the cooling water from the cooling jackets of the lower parts of the casings to the jacket of the upper parts of the casings through bent pipes situated exteriorly is advisable in order not to endanger the jointing between the individual parts of the casing. Such a transmission through bent pipes is, however, not absolutely necessary as in suitably contrived joints the passage of the water can be arranged to take place through the joint surfaces.

Instead of conveying the cooling water coming from the upper part of the crank casing through the pump directly to the cylinders it may be allowed to first flow through a cooling jacket surrounding the exhaust box but this is not shown in the drawings.

I claim—

1. In combination, a heat engine and change speed gear, a cooling radiator having an inlet for hot cooling medium and an outlet for cold cooling medium, cooling jacketing around said gear, a connection from the outlet of said radiator to said jacketing, cooling jacketing around the crank chamber of said heat engine, a connection from said jacketing around said gear to the jacketing around the crank chamber



of said heat engine, cooling jacketing around the cylinder of the heat engine, an externally jointed connection from the jacketing around the crank chamber of said heat engine to the jacketing around the cylinder and a connection from the jacketing around the cylinder to the inlet of said radiator.

2. In combination with the prime mover of an automobile, a heat radiator, divided cooling jacketing around the change speed gear case, externally jointed piping joining the parts of said divided jacketing in series, piping leading from the radiator to the first in the series of cooling jackets for the change speed gear casing, a divided jacketing around the crank chamber, externally jointed piping joining in series the parts of said

crank chamber jacketing, a pipe joining the last in the series of jackets around the change speed gear case to the first in the series around the crank chamber, cooling jacketing around the working cylinder, piping leading from the last of the series of cooling jackets around the crank chamber to the cylinder jacketing, means in said piping for producing a circulation, piping leading from the cylinder jacketing to the radiator, substantially as described.

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

PAUL DAIMLER.

Witnesses:

ROBERT UHLAND,  
F. X. HERZET.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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