

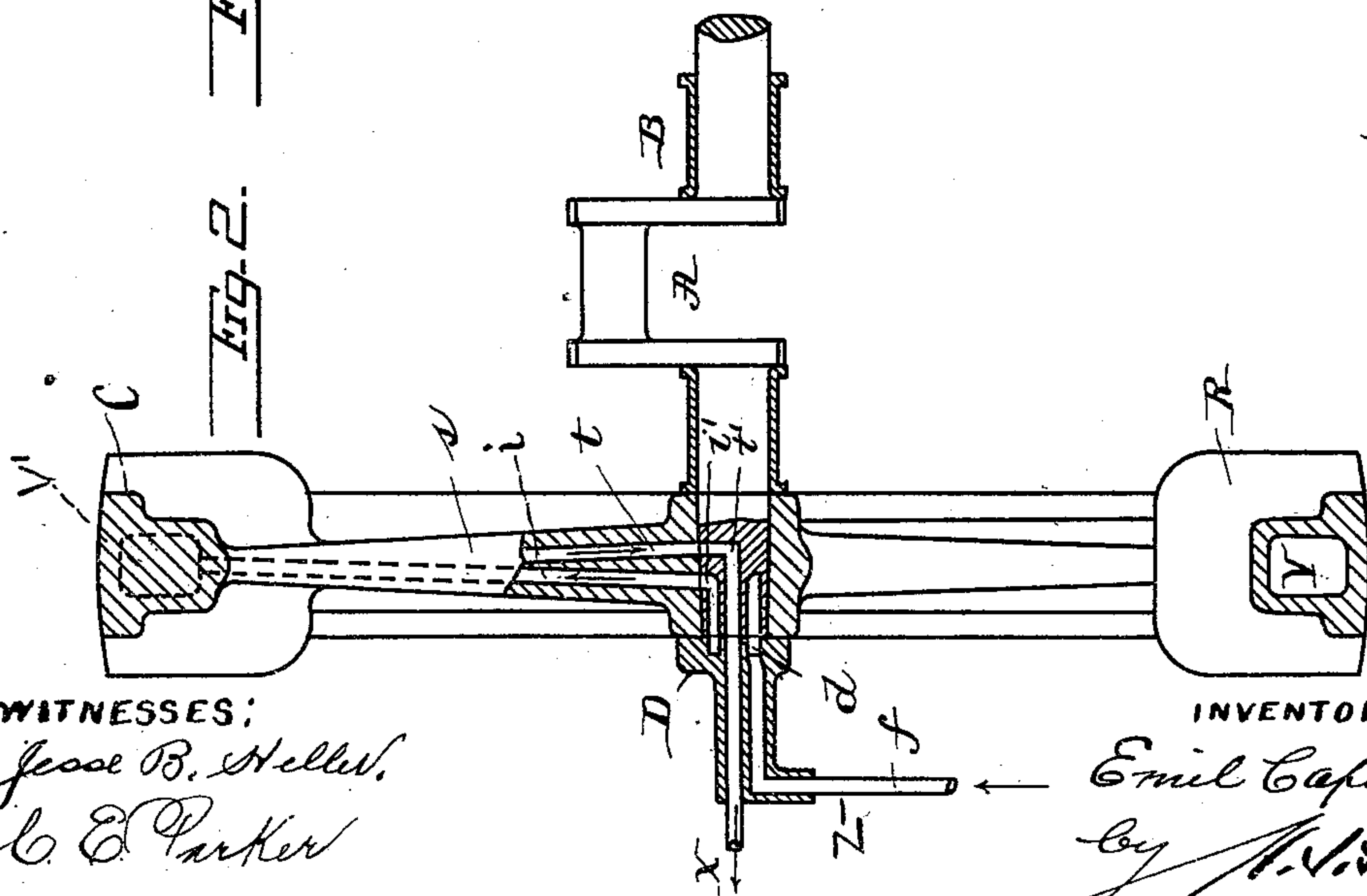
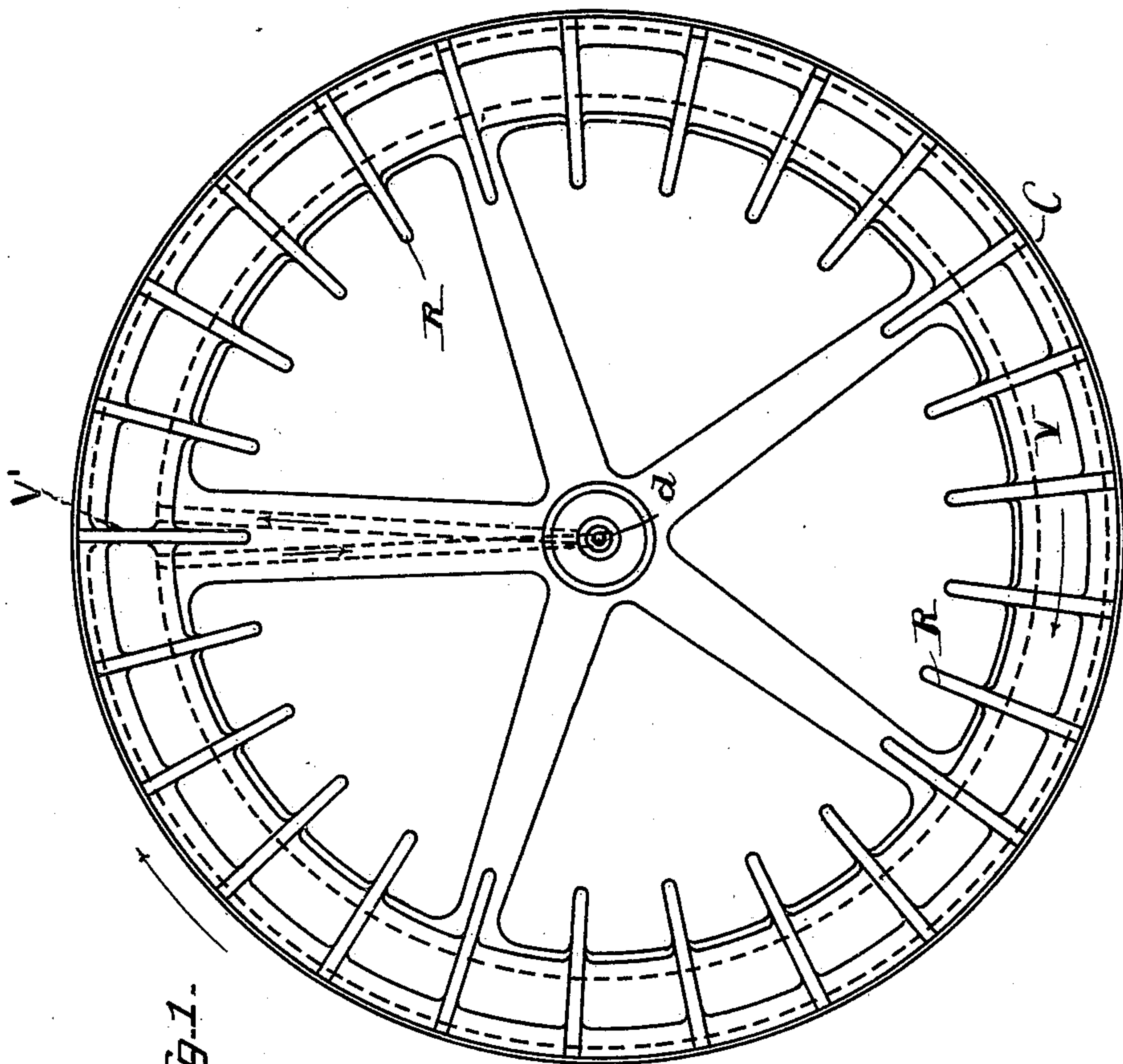
(No Model.)

E. CAPITAINE.

COOLING DEVICE FOR GAS OR PETROLEUM MOTORS.

No. 584,920.

Patented June 22, 1897.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

EMIL CAPITAINÉ, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR TO  
GEORGE T. HARRIS, OF PHILADELPHIA, PENNSYLVANIA.

## COOLING DEVICE FOR GAS OR PETROLEUM MOTORS.

SPECIFICATION forming part of Letters Patent No. 584,920, dated June 22, 1897.

Application filed November 7, 1896. Serial No. 611,328. (No model.)

*To all whom it may concern:*

Be it known that I, EMIL CAPITAINÉ, a citizen of the German Empire, residing at Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in Cooling Devices for Gas and Petroleum Motors, shown in the accompanying drawings, of which the following is a specification.

My invention relates to means for cooling the cylinders of combustion-engines, such as gas and petroleum engines, in which the cylinder is usually surrounded by a water-jacket.

In the employment of such engines for propelling vehicles or in any special use where the weight of the engine and its appurtenances must be considered in determining its adaptability for the purpose it is obvious that any means which will obviate the necessity for carrying a large supply of water will possess decided advantages. Formerly the cylinders of such engines were kept cool by water alone, which was allowed to boil away, and it was therefore necessary either to carry a comparatively large quantity of water stored on the vehicle or to make frequent stops for the purpose of renewing the exhausted supply. In the arrangement herein described the cooling medium is also water, but the actual cooling is done by the air, and it is therefore necessary to carry only a very small quantity of water, and this water need not be renewed. It is made to circulate constantly back and forth, carrying away the heat from the cylinders and giving it off to the air and never reaching the temperature of the boiling-point.

To this end my invention consists in means to cause the cooling-water to enter and discharge from the water-jacket of the cylinder in unison with each power and return stroke of the power-piston, respectively, and to circulate intermediately in its passage from and to the same through annular recesses in the rim of the fly-wheel and through passages connecting said recesses with the water-jacket of the power-cylinder.

In the accompanying drawings, illustrating my invention, Figure 1 is a plan view of a fly-wheel of an engine provided with recesses and passages best adapted to carry my invention into effect, and Fig. 2 is a section designed to show the connecting-passages through one

spoke and the hub and through connecting-passages leading from the hub to the water-jacket of the power-cylinder.

By reference to the drawings it will be seen that A illustrates a crank-shaft journaled at B and that C is a fly-wheel the rim of which has therein an annular passage or chamber V, closed at the point V'. One spoke of said wheel has therein internal passages *i* and *t*, which communicate at their outer ends with the chamber V upon opposite sides of the partition V'. The other end of the passage *i* communicates with an annular passage or chamber *i'* in the end of the crank-shaft, while the corresponding end of the passage *t* communicates with a central passage *t'* in said shaft.

D is a stationary portion which is held against the end of the crank-shaft in such a manner as to form a water-tight joint and is provided with an inlet-passage Z and an outlet-passage X. The inner end of the passage Z registers with the chamber *i'*, while the corresponding end of the passage X registers with the passage *t'*. These inlet and outlet passages are in practice connected with the inlet and outlet pipes of the cooling-chamber (not shown) of the engine-cylinder.

The operation is as follows: At each power impulse from the piston acting through the crank-shaft the speed of the fly-wheel is momentarily accelerated, and the inertia of the water contained in the chamber V and the inability of the fly-wheel to instantly communicate to it its accelerated speed cause an excess of pressure upon one side of the partition V' and a reduction of pressure upon the opposite side in proportion to the degree of the acceleration of the wheel. It follows that the water contained in said chamber by reason of this pressure will be forced out through the passages *t*, *t'*, and X and that a suction action will be set up to cause more water to be drawn in through the passages Z, *i'*, and *i*. In this manner a circulation is maintained through said passages, the chamber V, and the cooling chamber or jacket.

During the progress of the water through the rim of the fly-wheel the heat which it has acquired in the water-jacket of the cylinder is given off to the fly-wheel rim and from it



carried off by radiation, and to facilitate this the rim of the wheel is provided with radial wings R, which answer the double purpose of increasing the cooling-surface as well as causing the air to be energetically moved over the cooling-surfaces, so that when the water arrives at X it has been sufficiently cooled.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the water-jacket of an explosion-engine cylinder, of a rotating fly-wheel having an annular chamber in its rim, inlet and outlet passages in its spoke leading to said annular chamber in the rim, and connecting-passages between the fly-wheel and the water-jacket whereby the rotation of the wheel will cause a constant circulatory flow of water through the rim of the same and through the connected water-jacket; substantially as described.

2. In a petroleum-motor, the combination of a fly-wheel having an annular chamber in its rim, said rim having an increased superficial area, a shaft upon which said wheel is

mounted and which is designed to be driven by the piston of the motor, said shaft having passages which communicate with the said chamber through one of the spokes of the wheel, and means whereby said passages may be put in communication with the water inlet and discharge pipes of the water or cooling jacket of the motor-cylinder, substantially as specified.

3. The combination with the fly-wheel having an annular passage or chamber V in its rim, and inlet and outlet passages in one of its spokes, of a shaft with passages communicating with the passages in the spoke and a metal body D with inlet and discharge passages; said parts and passages being combined and arranged substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMIL CAPITAINE.

Witnesses:

VIGGO V. TORBENSEN,  
JEAN GRUND.