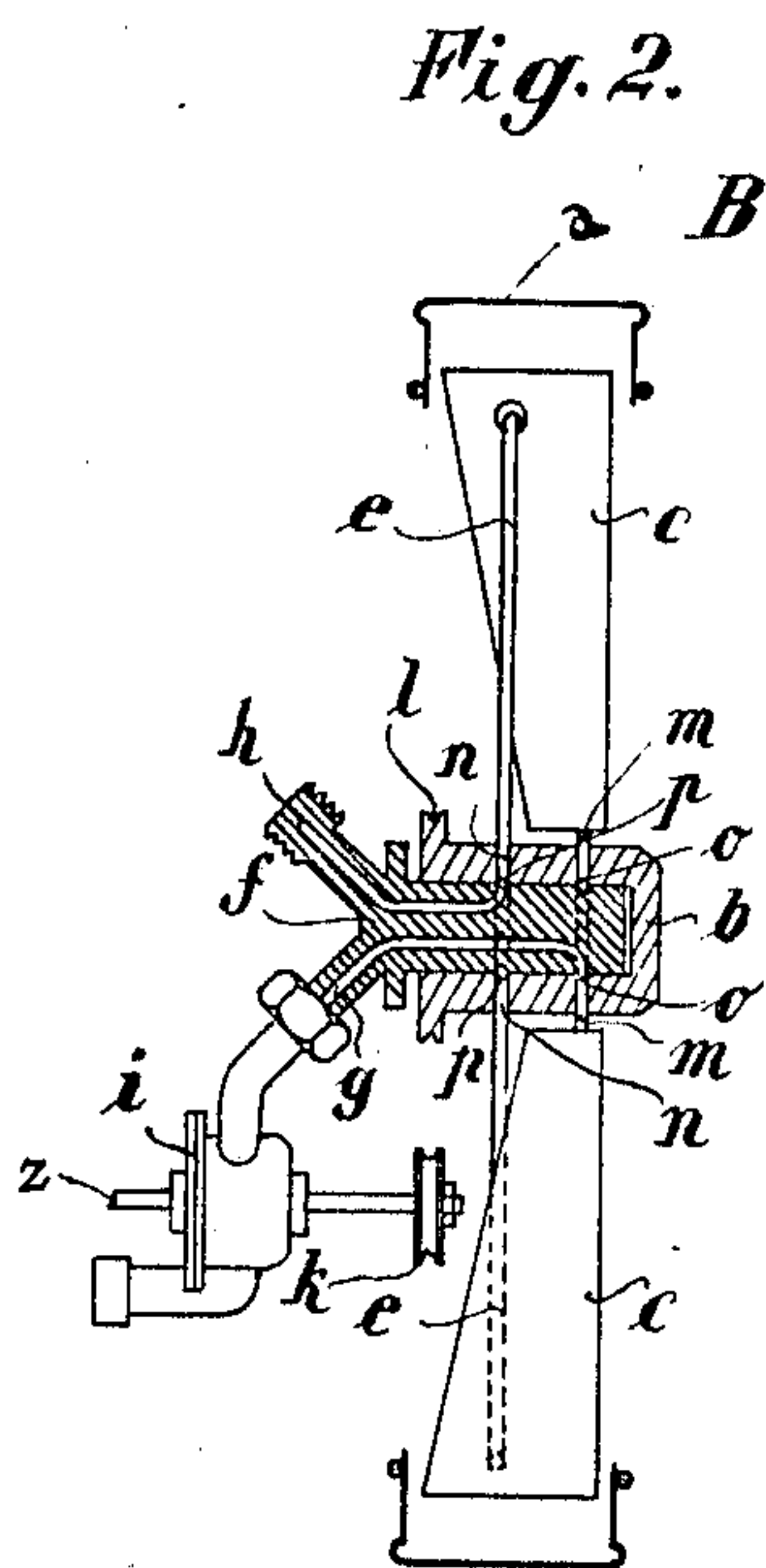
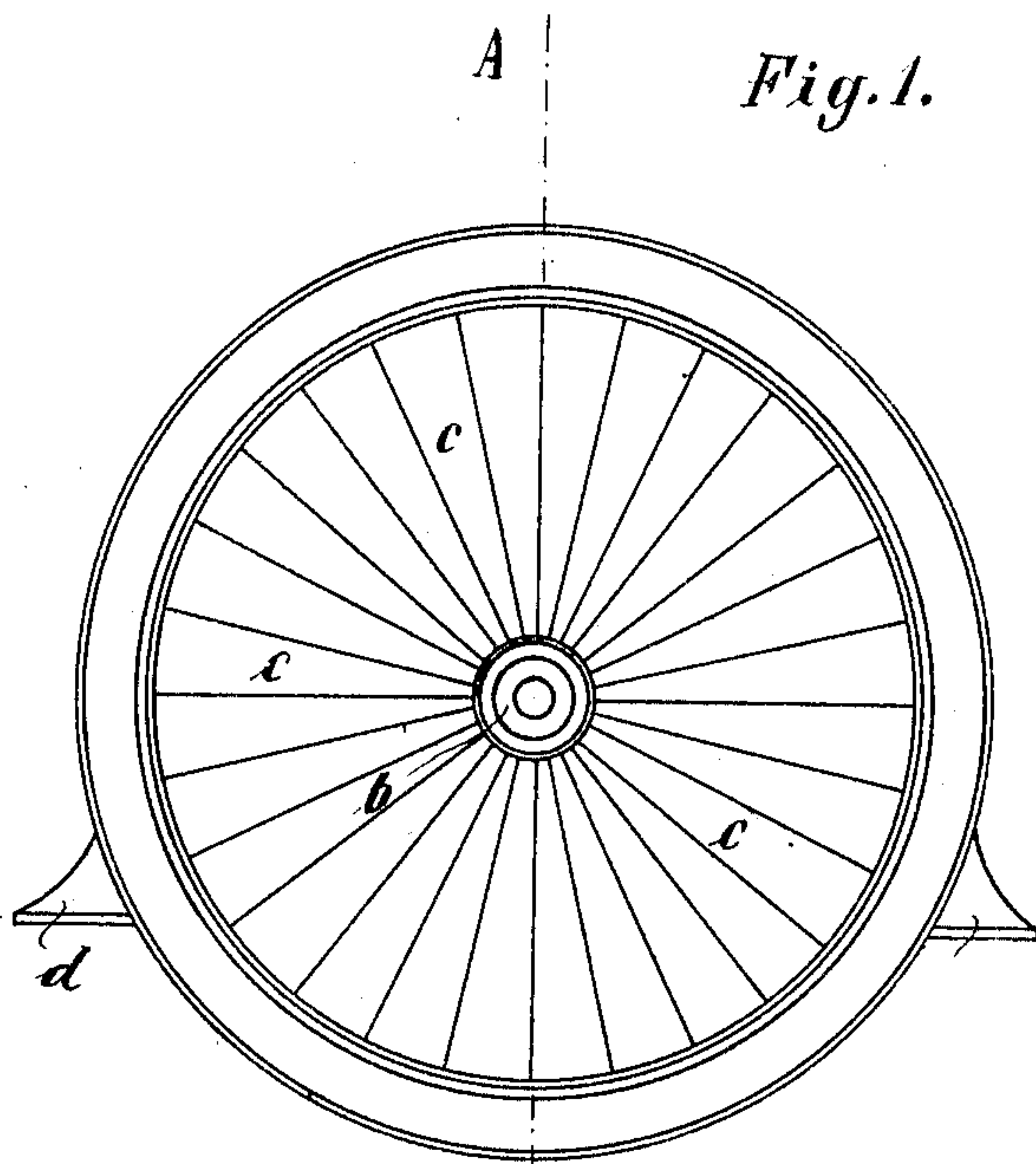


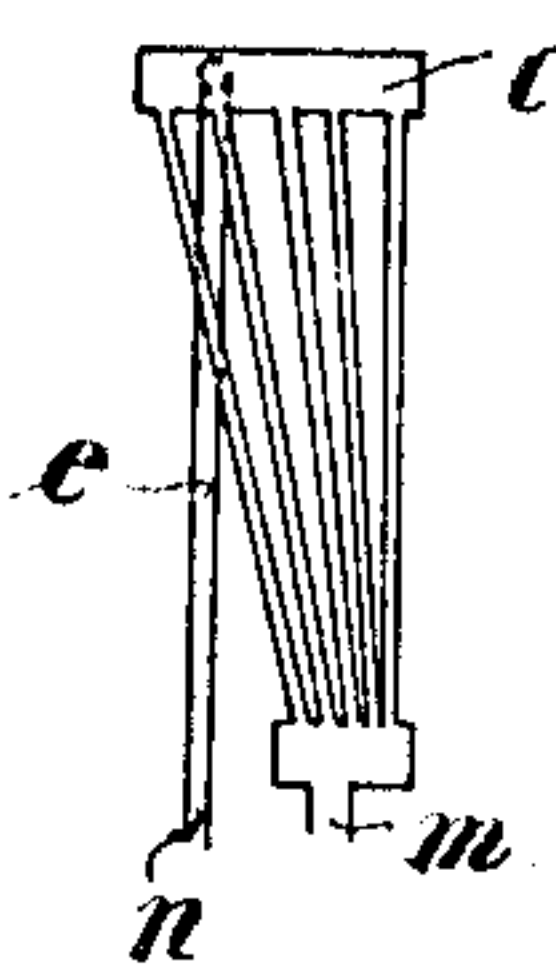
P. WEBER.  
COOLER FOR INTERNAL COMBUSTION ENGINES.  
APPLICATION FILED OCT. 22, 1907.

947,424.

Patented Jan. 25, 1910.



*Fig. 3.*



Attest  
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By *[Signature]*



# UNITED STATES PATENT OFFICE.

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COOLER FOR INTERNAL-COMBUSTION ENGINES.

947,424.

Specification of Letters Patent.

Patented Jan. 25, 1910.

Application filed October 22, 1907. Serial No. 393,563.

*To all whom it may concern:*

Be it known that I, PAUL WEBER, a subject of the Duke of Anhalt, and residing at Geneva, 4 Chemin du Colombier, in the canton of Geneva, Switzerland, have invented certain new and useful Improvements in Coolers for Internal-Combustion Engines, of which the following is a full, clear, and exact description.

10 This invention relates to an improved construction of rotary coolers or radiators for internal combustion engines, in which the cooling water of the cylinder jackets is cooled to the lowest possible degree by forcing it through the hollow vanes of a fan-like rotary cooler. The hubs that have been in use heretofore for the same purpose show the great disadvantage, that they were either not watertight in consequence of their deficient construction or that they required more room than could be spared for them on an automobile, in which the greatest restriction as to space is required.

25 With the hub according to my invention these disadvantages are avoided by placing the rotating hub carrying the hollow vanes and their tube connections on a stationary axis or stud containing the necessary passages for the hot and the cooled water.

30 In the accompanying sheet of drawings: Figure 1. is a front view of a rotary cooler with a hub constructed in accordance with the present invention; Fig. 2. a sectional elevation, taken on the line A—B of Fig. 1; and Fig. 3. shows a modified construction of a fan vane.

35 A stationary inner stud or axis *f* contains two passages *g* and *h*, leading to grooves *o* and *p* respectively of the hub *b*. On the stud or axis *f* is journaled a hub *b*, capable of rotating thereon, the joint between them being watertight. At the inner end of the rotatable hub *b* is fixed or formed therewith a drawing pulley *l*, which is driven from the pulley *k* on the shaft *z* of pump *i*.

40 With the hub *b* are connected a number of hollow vanes *c* by means of short tubes *m* communicating with the inner ends thereof, and secured in corresponding holes of the hub *b*. Tubes *e* connect the outer ends of the hollow vanes *c* with the hub by a second series of openings therein leading to the annular groove *p*.

55 The openings for the short tubes *m* and

the tubes *e* lead to the grooves *o* and *p* respectively, forming a connecting passage for each series of tubes. The grooves *o* and *p* may be formed either in the axis *f* or in the hub *b* or in both, as preferred.

60 Instead of solid faced vanes such as those above described and shown in Figs. 1 and 2, vanes such as are shown in Fig. 3 may be employed, which consists of an upper and a lower chamber connected together by intervening tubes. The cooler is surrounded by a mantle *a* which may have supports *d*.

65 The cooler operates as follows: The pump *i* forces the hot water through the passage *g*, the groove *o* and tubes *m* into the rotating hollow vanes *c*. Here the water is cooled down and then passes back to the cylinder jacket of the engine (not shown) through tubes *e*, groove *p* and passage *h*.

70 Having now described my invention what I claim and desire to secure by Letters Patent, is:

1. In a rotary cooler for internal combustion engines, the combination of a stationary stud having passages for hot and cooled water, with a hub journaled on the stud and provided with two annular passages respectively in communication with the passages for hot and cooled water in the stud, a series of hollow vanes secured to and rotated by the hub, a series of passages connecting with the inner ends of the hollow vanes with the annular passage receiving the hot water, and a second series of passages from the outer ends of the hollow vanes connecting with the annular passage receiving the cooled water.

2. In a rotary cooler for internal combustion engines, the combination of a stationary stud having passages for hot and cooled water, with a hub journaled on the stud and provided with two annular passages respectively in communication with the passages for hot and cooled water in the stud, a series of hollow vanes secured to and rotated by the hub, a series of passages connecting the inner ends of the hollow vanes with the annular passage receiving the hot water, a second series of passages from the outer ends of the hollow vanes connecting with the annular passage receiving the cooled water, and a pump for circulating the water through the passages.

3. In a rotary cooler for internal combustion engines, the combination of a stationary



stud having passages for hot and cooled water, with a hub journaled on the stud and provided with two annular passages respectively in communication with the passages for hot and cooled water in the stud, a series of hollow vanes secured to and rotated by the hub, a series of passages connecting the inner ends of the hollow vanes with the annular passage receiving the hot water, a second series of passages from the outer ends of the hollow vanes connecting with the annular passage receiving the cooled water, a pulley on the hub by which it may be rotated, and a pump for circulating the water through the passages having a driving pulley for driving the hub and vanes.

4. In a rotary cooler for internal combustion engines, the combination of a fixed stud having two water passages, and a rotary cooling device comprising a central hub journaled on the fixed stud, a series of hollow cooling vanes secured to the hub hot water passages connecting one end of the

vanes with one of the water passages in the stud, and a series of passages for cooled water connecting the other end of the vanes with the other of the passages in the stud.

5. A rotary water cooler for internal combustion engines having a hub provided with water passages, combined with a series of radial hollow vanes having air passages between them, the inner ends of the hollow vanes communicating with a portion of the water passages of the hub, and water conduits from the outer ends of the hollow vanes independent of the body of the vanes, and connecting with another portion of the water passages in the hub, whereby water circulating in the vanes is, during its passage through the vanes, subjected to two exposed surfaces which are directly cooled by the air.

PAUL WEBER.

Witnesses:

BARTHÉLEMY FEULJUY,  
F. VILLIER.