H. A. HIGGINS.

ROTARY RADIATOR.

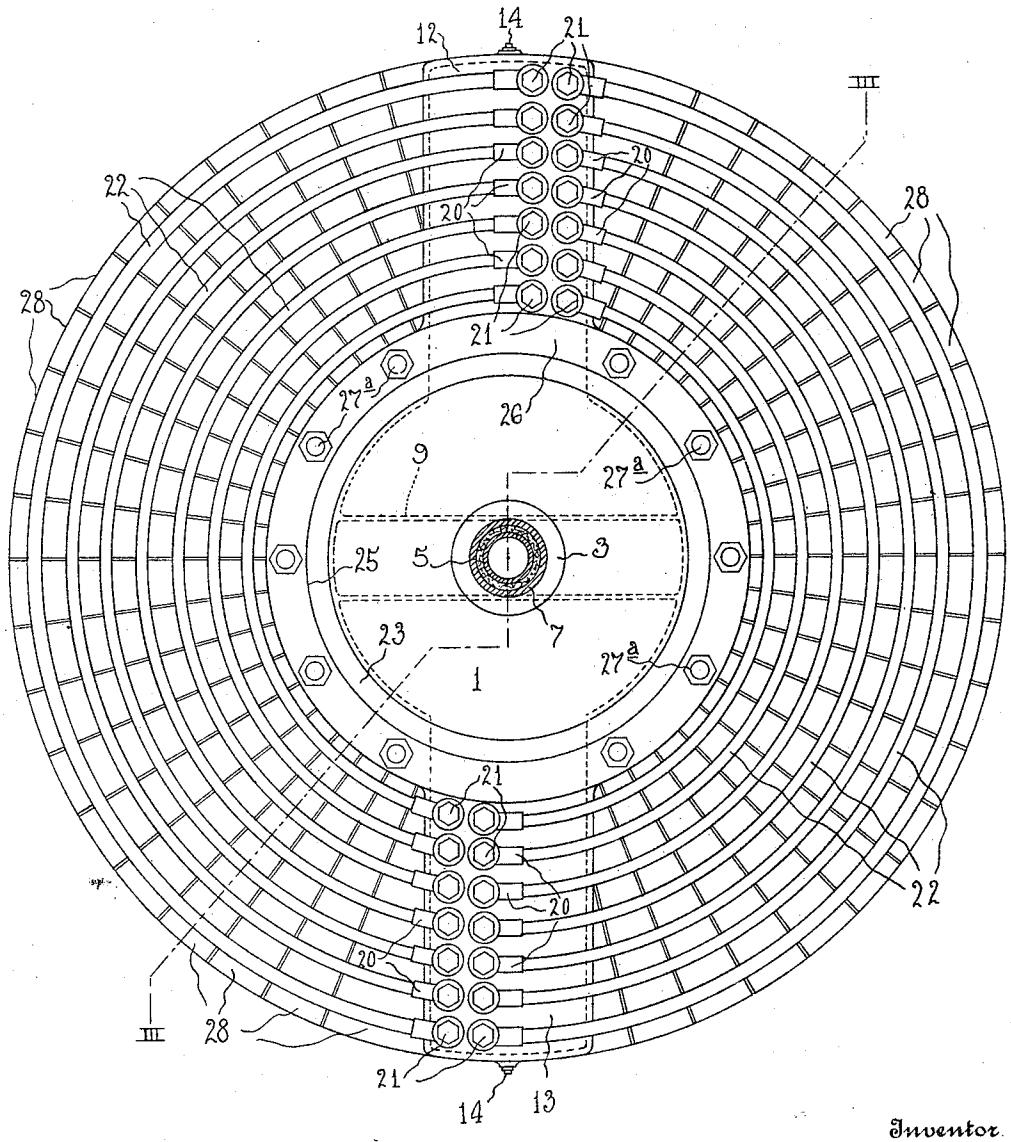
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1,260,194

Patented Mar. 19, 1918.

2 SHEETS—SHEET 1.

Fig. 1



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Witnesses

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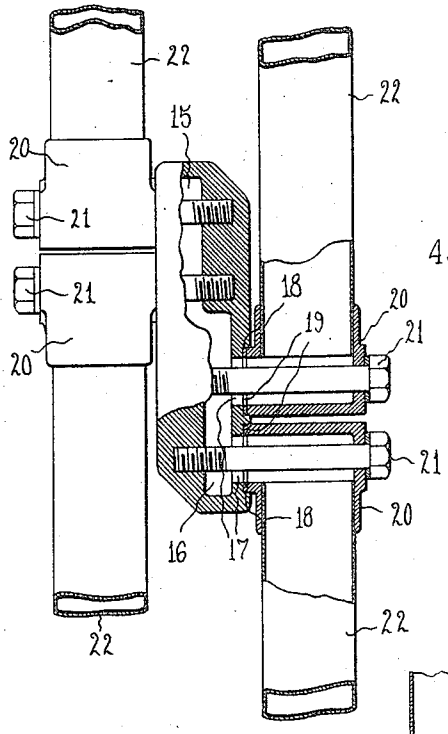


Fig. 2

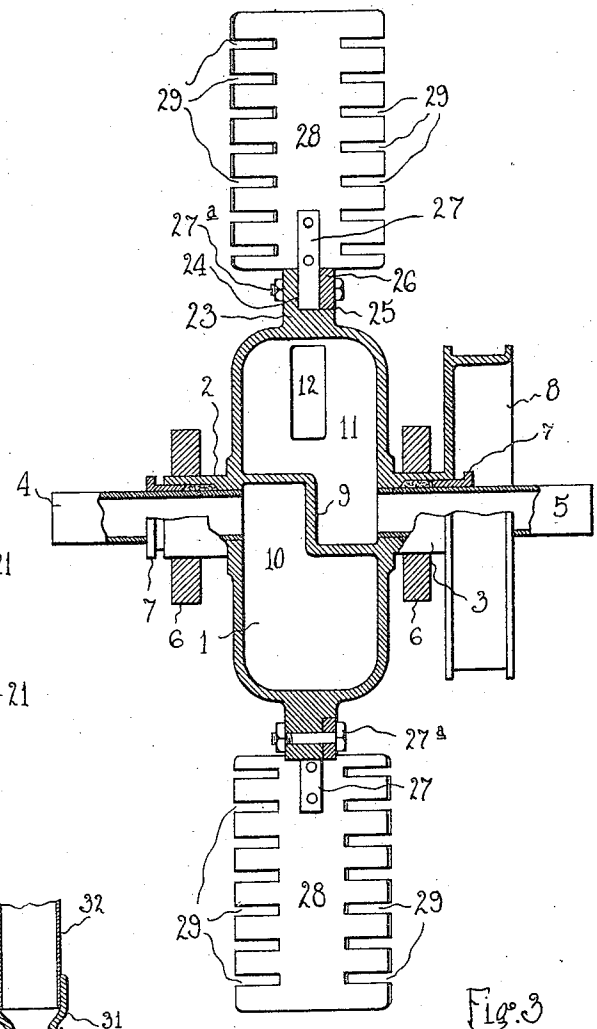


Fig. 3

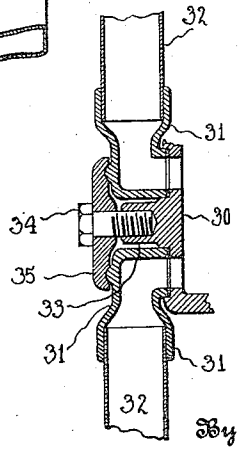


Fig. 4

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UNITED STATES PATENT OFFICE.

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ROTARY RADIATOR.

1,260,194. Specification of Letters Patent. Patented Mar. 19, 1918.

Application filed December 22, 1915. Serial No. 68,161.

To all whom it may concern:

Be it known that I, HARRY A. HIGGINS, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Rotary Radiators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a rotary radiator, and the primary object of my invention is to provide a novel water cooling device which may be advantageously used in connection with the internal combustion engine of automobiles, aeroplanes and various parts of conveyances using high power explosive engines which require an expeditious and economical cooling device for the cooling agent of the engine.

A further object of my invention is to provide a rotary cooling device embodying liquid circulating tubes which present a large air impinging surface, and associated with said tubes are supporting vanes or fins adapted to deflect air on and around the tubes and radiate or disseminate heat and act as radiator fins whereby the contents of said tubes will be quickly and thoroughly cooled.

A still further object of my invention is to provide a cooling device wherein the parts are constructed with a view of reducing cost of manufacture and at the same time retain the features by which accuracy, safety, durability, simplicity and ease of assembling are secured, and with such ends in view, my invention resides in the novel construction to be hereinafter specifically described and then claimed.

Reference will now be had to the drawings, wherein—

Figure 1 is a front elevation of the cooling device;

Fig. 2 is an enlarged detailed sectional view of a water leg and tubes in communication therewith;

Fig. 3 is a cross sectional view of the cooling device taken on or about the line III—III of Fig. 1, and

Fig. 4 is a detail sectional view illustrating a portion of a water leg and a manner of connecting tubes thereto.

In the drawings, the reference numeral 1 denotes a cylindrical drum-like casing having axial hubs 2 and 3 to receive water supply and outlet pipes 4 and 5 respectively. The hubs 2 and 3 are journaled in suitable bearings 6, and glands 7 insure a non-leakable connection between said pipes and the hubs 2 and 3. The hub 3 has a pulley or belt wheel 8 representing an element of power transmission whereby the casing 1 may be revolved.

In the casing 1 is a transverse stepped partition 9 providing chambers 10 and 11 with which the pipes 4 and 5 communicate. Communicating with the chambers 10 and 11 are radial water legs 12 and 13, having the outer ends thereof closed, with the exception of detachable plugs 14 which permit of the water legs being drained, flushed and thoroughly cleansed. Each water leg has offset communicating longitudinal channels 15 and 16 and the sides of each water leg have openings 17 in communication with the channels 15 and 16, and seats 18 for gaskets 19. The openings 17 at each side of the water legs are arranged in sets and rows extending from the inner ends of the water legs to the outer ends thereof, with the rows of openings at one side of the water legs in an alternate position relative to the openings in the opposite sides of the water legs whereby the openings on one side of the water legs communicate with the channel 15 and the openings upon the opposite side of the water legs with the channel 16.

Each of the openings 17 has an angle connection 20 held in place by a screw bolt 21 extending through the opening 17 and its communicating channel into the body of the water leg, as best shown in Fig. 2. The angle connections of each set of openings oppose each other whereby the ends of tubes 22 can be mounted in said angle connections. The tubes 22 are circumferentially disposed with the tubes at one side of the device in a plane parallel with the tubes at the opposite side of the device, and with such tubes comparatively flat and oblong in cross section, it is possible to assemble a large number of tubes in a given circumference, thus presenting a large air impinging surface whereby water or other liquid circulated in the tubes may be quickly cooled.

The drum-like casing 1 is formed with a peripheral rib 23 having spaced pockets 24 and a seat 25 for a retaining ring 26, said ring being secured to the rib 23 by bolts 27^a or other fastening means. The retaining ring 26 holds the stems 27 of vanes or fins 28 within the pockets 24 of the rib, and said

vanes or fins have edges thereof slotted, as at 29, to receive the circumferential tubes 22. These tubes are frictionally held in the slots, but may be soldered or otherwise secured in the slotted edges of the vanes or fins with the outer walls of the tubes flush with the edges of the vanes or fins. The vanes or fins are radially disposed relative to the axis of the drum-like casing 1 and are set diagonally on the peripheral rib 23, thus retarding air sufficiently to contact with the tubes and cool the contents thereof. With the tubes loose relative to each vane or fin, said tubes will bind against the vanes by centrifugal force during the operation of the rotary cooling device, and by the time water or other liquid circulates through the tubes from one water leg to the other, the water or liquid has become sufficiently cooled to be used in the water jacket of an explosive engine.

From the foregoing it will be observed that the rotary cooling device embodies two sets of tubes at each side thereof with a means admitting water to all of the tubes opposed to a means of removing water from the tubes, and assuming that water passing through the pipe 4 into the chamber 10 and through the channels 15 and 16 of the water leg 13 enters the tube 22, the same water passes into the channels 15 and 16 of the water leg 12 and exhausts through the chamber 11 and the pipe 5. It is therefore apparent that the supply of water of the water leg 12 is divided to enter the tubes and that the water circulates half way around the device and has sufficient time to cool when the device is placed in operation.

In Fig. 4 there is illustrated a slight modification of my invention, showing the manner of connecting the confronting ends of tubes to a water leg by a clamping device, thus obviating the necessity of using a screw bolt at each end of a tube, also eliminating considerable machining in connection with a water leg. In this view 30 denotes a portion of a water leg in communication with elbows 31 connected to the ends of tubes 32. The water leg 30 has a boss 33 and detachably connected thereto by a screw bolt 34 is a clamping member 35 engaging the elbows 31 and holding said elbows in position relative to the water leg.

When the cooling device is used in connection with an aeroplane, it may be driven by a current of air impinging the vanes or fins when the aeroplane is in action, and sufficient power may be derived from the driven radiator to operate a small pump employed for circulating water through the rotary radiator and the water jacket of an engine. In view of the fact that the rotary cooling device may be utilized for liquid cooling purposes in connection with various kinds of apparatus, I do not care to limit my invention to any specific circulation of water or other liquids in the device.

The preferred embodiments of my invention have been illustrated, but it is to be understood that the structural elements are susceptible to such variations and modifications as fall within the scope of the appended claims.

What I claim is:—

1. A water cooling device comprising a casing adapted for rotation, said casing having chambers therein adapted to receive water, opposed water legs in communication with the chambers of said casing, angle connections on opposite sides of said water legs, tubes having the ends thereof connected to said angle connections and said tubes concentrically disposed about said casing, said casing having pockets in the periphery thereof, and radially disposed slotted vanes supporting said tubes intermediate said water legs and having stems in the pockets of said casing, and a retaining ring holding the vane stems in the casing pockets.

2. A water cooling device comprising a casing adapted for rotation and adapted to receive water, opposed water legs in communication with said casing and each having communicating channels, angle connections at opposite sides of each water leg communicating with the channels thereof, means extending the angle connections and channels of said water legs to engage in said water legs to hold said angle connections in place, circumferentially disposed flat tubes having the ends thereof connected to said angle connections and diagonally disposed vanes on the periphery of said casing connected to and supporting said tubes intermediate the ends thereof.

3. A water cooling device comprising a rotary casing having chambers formed therein, water legs communicating with said chambers, parallel sets of concentric flat tubes connecting said water legs and adapted to conduct water from one of the chambers of said casing to the other chamber, and vanes carried by said casing and having the side edges thereof slotted to receive said tubes and support said tubes relative to said water legs.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY A. HIGGINS.

Witnesses:

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