July 28, 1936. F. H. OTT 2,048,888

COOLING DEVICE

Filed Sept. 8, 1934 4 Sheets-Sheet 1

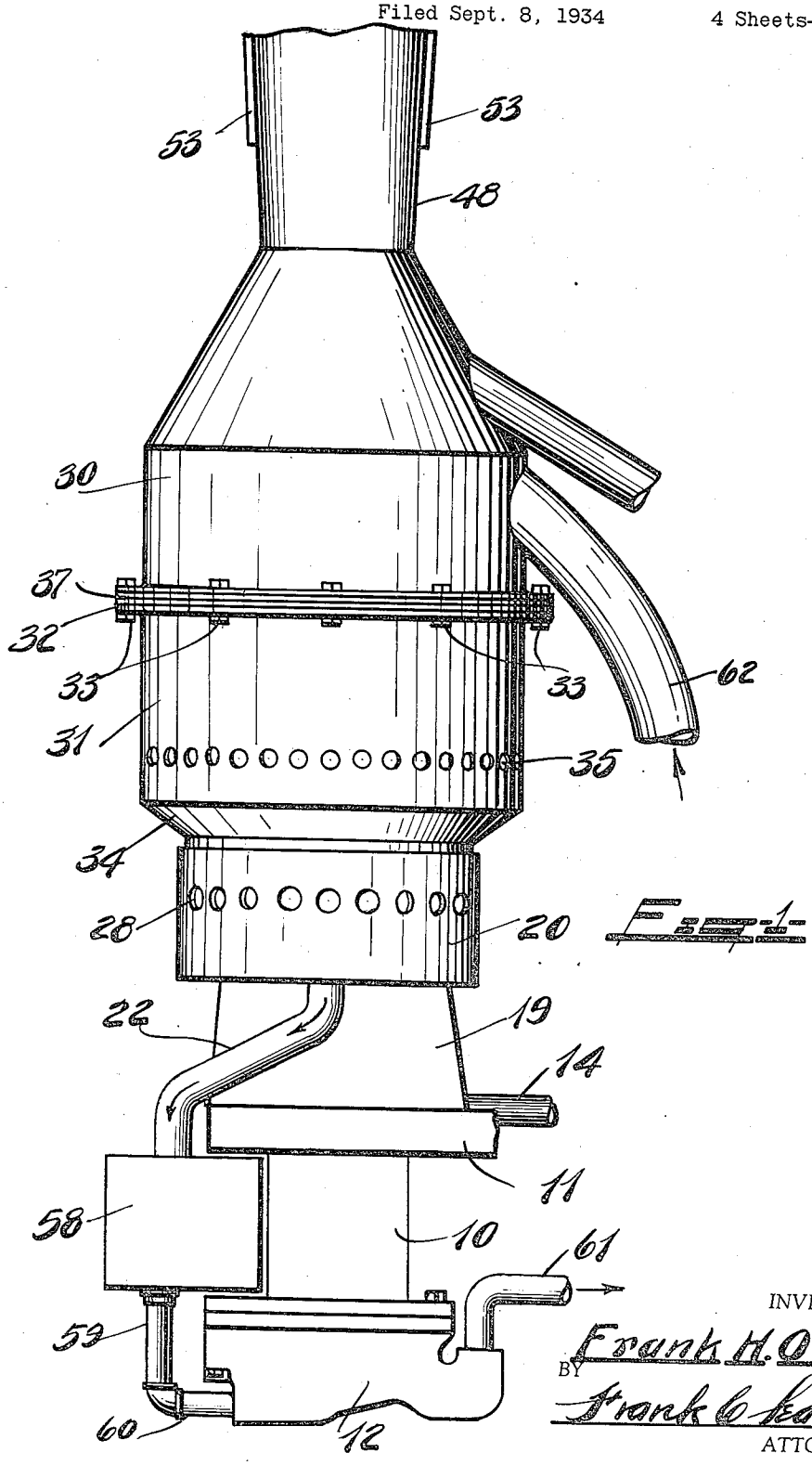

Fig. 1.

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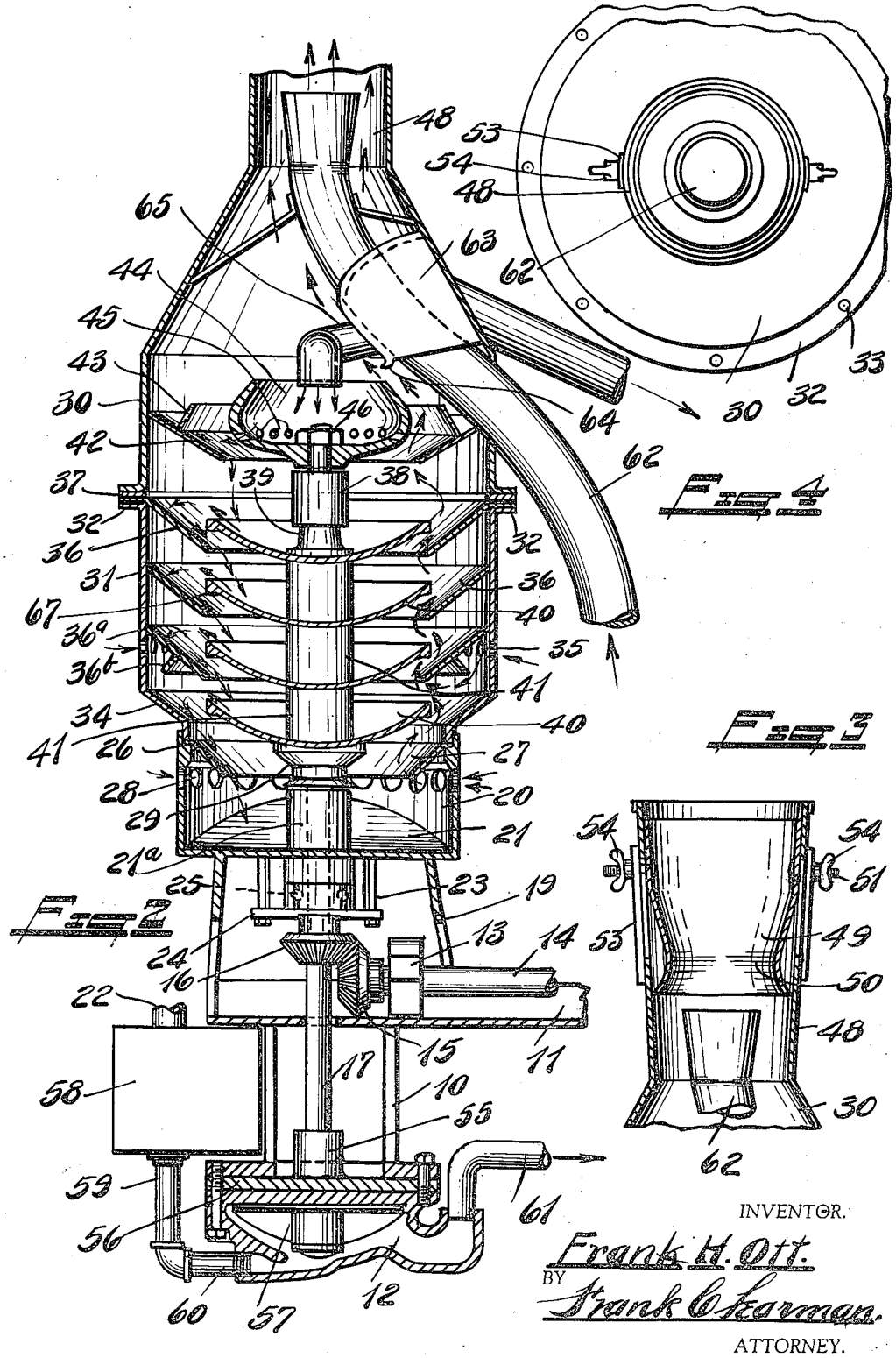

Fig. 4

Fig. 3

Fig. 2

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COOLING DEVICE

Filed Sept. 8, 1934 4 Sheets-Sheet 3

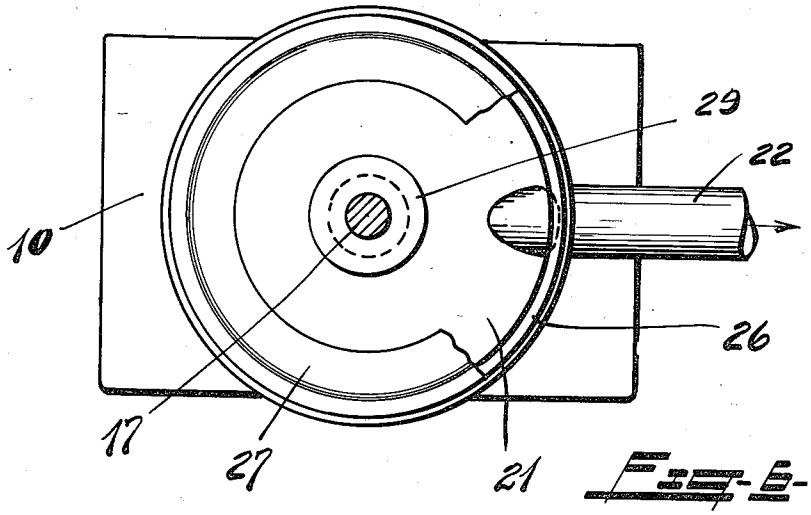

Fig. 6.

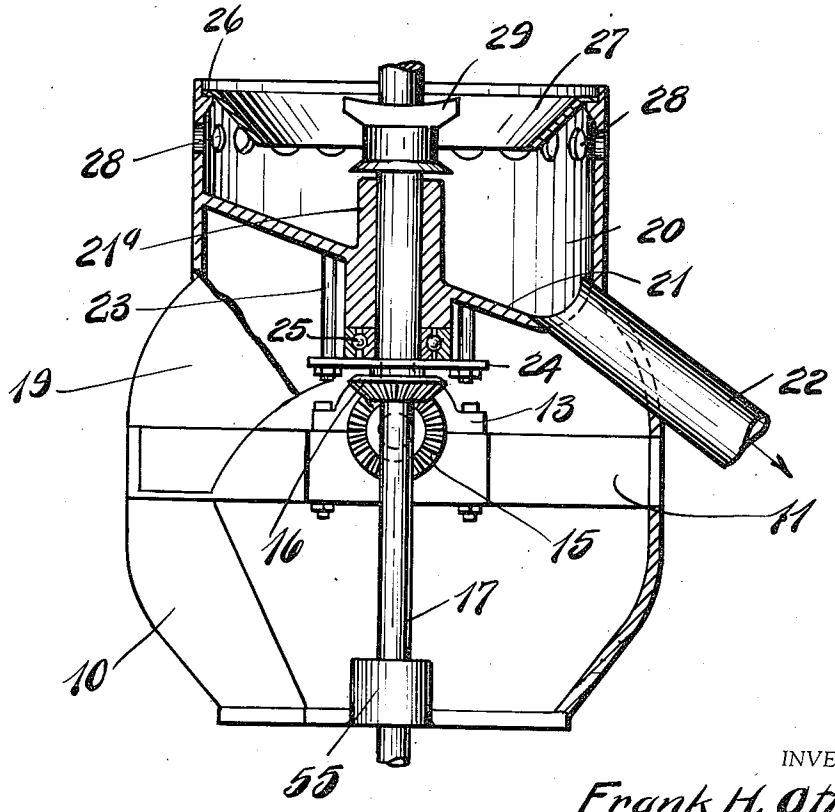

Fig. 5.

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COOLING DEVICE

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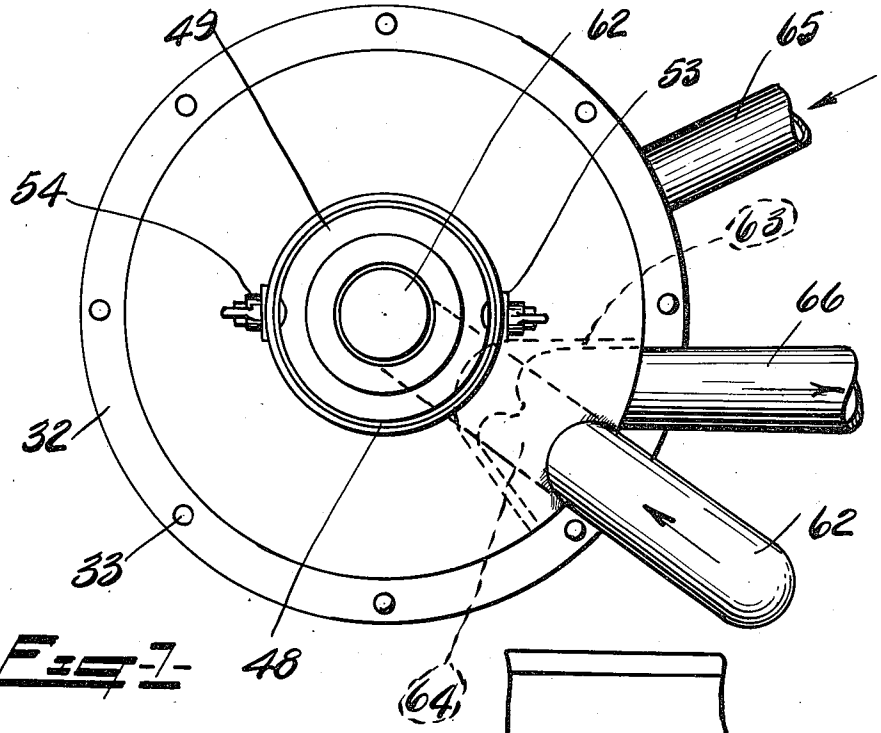

Fig. 7.

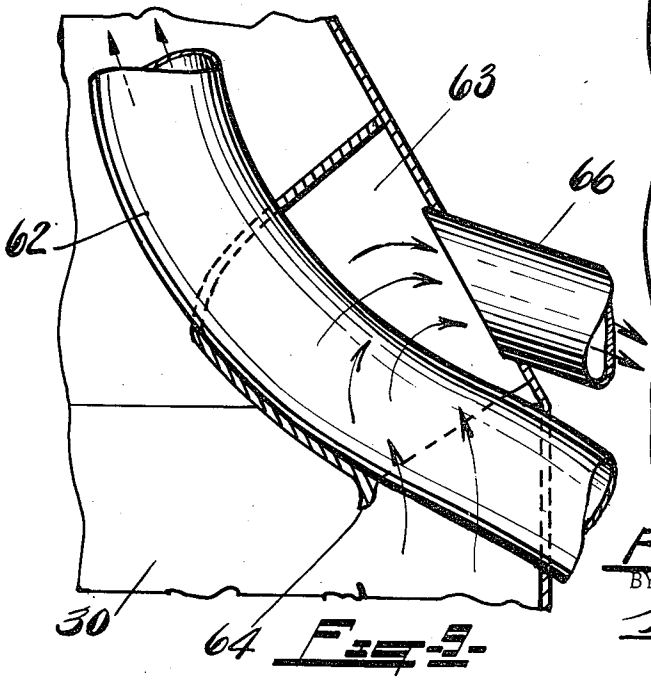

Fig. 9.

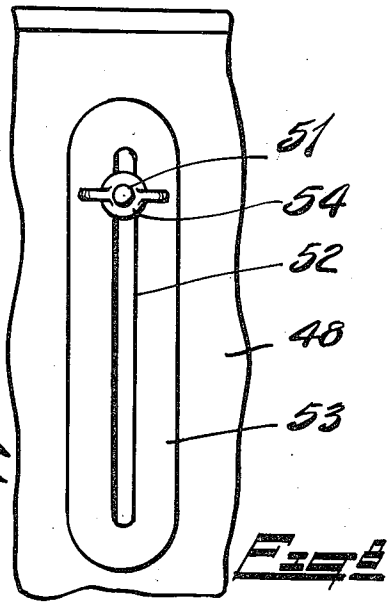

Fig. 8.

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Patented July 28, 1936 2,048,888

UNITED STATES PATENT OFFICE

2,048,888

COOLING DEVICE

Frank H. Ott, Saginaw, Mich.

Application September 8, 1934, Serial No. 743,204

6 Claims. (Cl. 261—89)

This invention relates to cooling devices, and more particularly to devices for use in connection with internal combustion engines and other mechanical equipment where a liquid is used as a cooling agent.

One of the prime objects of the invention is to design a simple and efficient cooling device which readily cools the liquid circulating through it, and which when used in connection with internal combustion engines eliminates the conventional radiator and the fan used in connection therewith.

Another object is to design a simple, practical, and economical device which can be readily connected to an engine or other apparatus, and pro- merous arrows showing the direction of flow of air through the device.

A further object is to provide a liquid cooling means so designed that washed air can be supplied to the carburetor of the engine.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes may be made in the form, size, proportion, and minor details of construction, without departing from the spirit, or sacrificing any of the advantages of the invention.

In the drawings—

Fig. 1 is a side elevation of my cooling device, the venturi being omitted.

Fig. 2 is a fragmentary sectional side elevation, also with the venturi eliminated, the numerous arrows showing the direction of flow of the air and water.

Fig. 3 is a fragmentary sectional view of the upper end of the device illustrating the venturi.

Fig. 4 is a fragmentary top plan view.

Fig. 5 is an enlarged fragmentary part sectional view of the lower end of the device.

Fig. 6 is a top plan view of the mechanism shown in Fig. 5, the baffle being broken away to show the drain pipe.

Fig. 7 is an enlarged plan showing air, water, and exhaust connections.

Fig. 8 is a fragmentary side elevation illustrating the slotted guides.

Fig. 9 is a fragmentary sectional view illustrating the hooded air intake.

Referring now specifically to the drawings in which I have shown the preferred embodiment of my invention, the numeral 10 indicates a preferably cast pump supporting bracket which is mounted on a vehicle frame 11 or other suitable support. This is formed as clearly shown in Figs. 2 and 5, and a pump 12 is secured thereto by means of bolts or the like. A bearing 13 is mounted on the frame 11 in any approved manner, and a drive shaft 14 is journaled therein, a bevel gear 15 being mounted on said shaft, meshing with and driving a miter gear 16 which is mounted on a vertically disposed shaft 17, said shaft being journaled in bearings as usual.

A drain base support 19 is mounted on the frame 11, and includes the drain base 20, said base being formed with an inclined bottom 21 to which a drain spout 22 is connected, bolts 23 being welded or otherwise secured to the bottom and support a plate 24 on which the bearing 25 is mounted, the shaft 17 being journaled in said bearing.

The upper end of the drain base 20 is shouldered as at 26, and a baffle 27 is mounted on said shoulder, a plurality of openings 28 being provided in the side wall of said base for admitting air thereto, and a collar 29 is mounted on the shaft 17 above the hub 21a for a purpose to be presently described.

A preferably sheet metal shell is mounted on the drain base and comprises upper and lower sections 30 and 31 respectively, the ends being flanged as at 32, and bolts 33 serve to secure them rigidly together, the lower end of the section 30 being conical shaped as at 34 to fit the shouldered end of the drain base, a plurality of openings 35 being provided in this lower section, and vertically spaced baffles 36 are secured therein, the baffle 36a being formed with a rim 36b to confine the spray and water as it circulates through the device.

A spider 37 is interposed between the flanges 32 of the shell sections and is formed with a hub 38 in which a taper bearing 39 is mounted, the upper end of the shaft 17 being journaled therein.

A plurality of disc shaped cones 40 are mounted on the shaft 17 in spaced apart relation, and separators 41 are interposed between said cones to properly space them on the shaft, the rims of the cones being disposed beneath the edges of the baffles so that water and spray dripping from the baffles 36 successively drip from one cone into the next.

A similar baffle 42 is mounted in the upper shell section 31, and this is also formed with a rim 43, said baffle surrounding a spray cup 44 which is formed with a plurality of spray openings 45, said cup being mounted on the upper end of

the shaft 17, which is threaded to receive the nut 46, so that the parts are rigidly held in assembled relation.

The upper end of the section 30 is also conical shaped and opens into a flared extension 48 in which a venturi 49 is adjustably mounted, the throat of the venturi being constricted as at 50, and bolts 51 are secured to the side walls thereof, these bolts projecting through slots 52 provided in the walls of the extension 48, guides 53 being also secured to the extension and are slotted in a similar manner, so that the venturi can be raised or lowered as desired, wing nuts 54 serving to secure it in adjusted position.

A bearing 55 is provided on the plate 56 which is interposed between the end of the bracket 10 and the pump, and the end of the shaft 17 is journaled therein, the pump rotor 57 being secured on said shaft.

A filter 58 is mounted on the frame directly adjacent the bracket 10, and the discharge pipe 22 discharges thereinto, a pipe 59 being connected to the bottom of the filter and leads to the pump intake pipe 60, the pump discharge pipe 61 leading to the water jacket of the engine (not shown).

An engine exhaust pipe 62 leads through the side wall of the section 30, the end being slightly flared and terminates directly adjacent the lower end of the venturi, and by adjusting the venturi, it will be obvious that the velocity of air traveling through the device can be regulated accordingly. A hanger 63 serves to secure the pipe in position, a lip 64 being provided as shown so that liquid and condensation will drip into the spray cup.

The return water line from the motor is indicated at 65 and discharges into the driven spray cup 44, the liquid being thrown, by centrifugal force, through the spray openings 45 and against the baffle 42, the rim 44 limiting the upward flow, the water thence drips down into the upper cone 40, thence being thrown in a thin sheet against the next baffle 36 until it reaches the inclined bottom 21, thence it discharges through the discharge spout 22 into the filter 58 and is pumped back to the engine (not shown) by means of the pump 12.

Air enters through the openings 28 and 35, being drawn upwardly through the sheets of water which are thrown by the cones against the baffle 36, the position of the venturi with relation to the end of the exhaust pipe determining the draft.

An air intake pipe 66 communicates with the hooded intake or hanger 63, said hanger serving as a shield and is cupped as shown in Fig. 9 of the drawings to exclude spray and water, said pipe leading to the carburetor of the engine (not shown) so that washed air is supplied at all times, and the air is further preheated by reason of its circulating around and contact with the exhaust pipe.

It will, of course, be obvious that a fan may be mounted to force air through the shell if desired, and fins 67 may be provided on the cones to agitate and assist in driving air through the shell.

The device can be built of a plurality of sheet metal sections if desired, it is easy to assemble, is extremely efficient in operation, and will cool large volumes of water quickly and efficiently.

From the foregoing description it will be obvious that I have perfected a very simple, practical, efficient, and economical cooling device for engines and the like.

What I claim is:

1. A cooling device comprising a shell formed with a plurality of spaced apart baffles therein, a vertical shaft journaled in the shell, cone shaped receptacles mounted on the shell in spaced apart relation, with their outer rims disposed beneath the inner edge of the baffles, a perforated spray cup on the upper end of the shaft and into which the liquid to be cooled is discharged, means for driving said shaft to throw the liquid against the baffles, openings in the side wall of the shell, an exhaust pipe in the upper end of said shell, and a vertically adjustable venturi above said pipe for regulating the volume of air drawn through the shell.

2. A cooling device including a shell having a plurality of inclined baffles therein in spaced apart relation, a vertical shaft, a plurality of vertically spaced cone shaped receptacles mounted thereon with their outer edges disposed over the inner edges of the baffles, a perforated spray cup mounted on the upper end of the shaft and adapted to receive the liquid to be cooled, means for driving said shaft, an exhaust pipe projecting into the upper end of the shell, and an adjustable venturi above the end of said exhaust pipe for regulating the volume of air drawn through the shell.

3. A liquid cooling device including a shell, vertically spaced conical shaped baffles mounted therein, a centrally disposed vertical shaft, a pump for continuously recirculating the liquid connected thereto, a perforated spray cup mounted on the upper end of the shaft and adapted to receive the liquid to be cooled, means for driving said shaft, spaced apart cone shaped receptacles on said shaft below said cup and extending over the lower edge of the baffles for throwing the liquid outwardly and against said baffles, air intake openings in said shell and shielded by the baffles, and a filter connected to the shell and to said pump.

4. A cooling device comprising a shell having a plurality of vertically spaced baffles mounted therein, a centrally disposed shaft, cone shaped receptacles mounted on said shaft in spaced apart relation and interposed between said baffles, a spray cup on the upper end of the shaft and adapted to receive the liquid to be cooled, means for driving said shaft to successively throw said liquid outwardly against the baffles, air intake openings in the shell and protected by the baffles, and vertically adjustable means for regulating the volume of air drawn through said shell.

5. A cooling device including a shell having a plurality of vertically spaced baffles therein, a centrally disposed vertical shaft, a plurality of imperforate cone receptacles mounted therein in spaced apart relation and interposed between said baffles, a perforated spray cup on the upper end of the shaft and into which the liquid to be cooled is discharged, means for driving said shaft to throw the liquid outwardly, by centrifugal force, against said baffles as it travels through the device, the lower edge of each baffle being disposed to discharge the liquid into the next lowest cone receptacle, and adjustable means for drawing and regulating the volume of air drawn through the shell.

6. A cooling device including a sectional shell having a plurality of vertically spaced baffles therein, a centrally disposed shaft journaled in the shell, a plurality of imperforate cone recep-

tacles mounted on the shaft in spaced apart relation and interposed between said baffles, a perforated spray cup on the upper end of the shaft and adapted to receive the liquid to be cooled, means for driving said shaft to throw the water, by centrifugal force, against said baffles with the lower edge of each cone receptacle disposed and positioned to discharge the liquid into the next lowest receptacle, air intake openings in the shell, means for forcing air through said shell, and an adjustable venturi for regulating the velocity of the air.

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