

D. H. MOORE.  
LIQUID COOLING DEVICE.  
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963,009.

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Fig. 3.

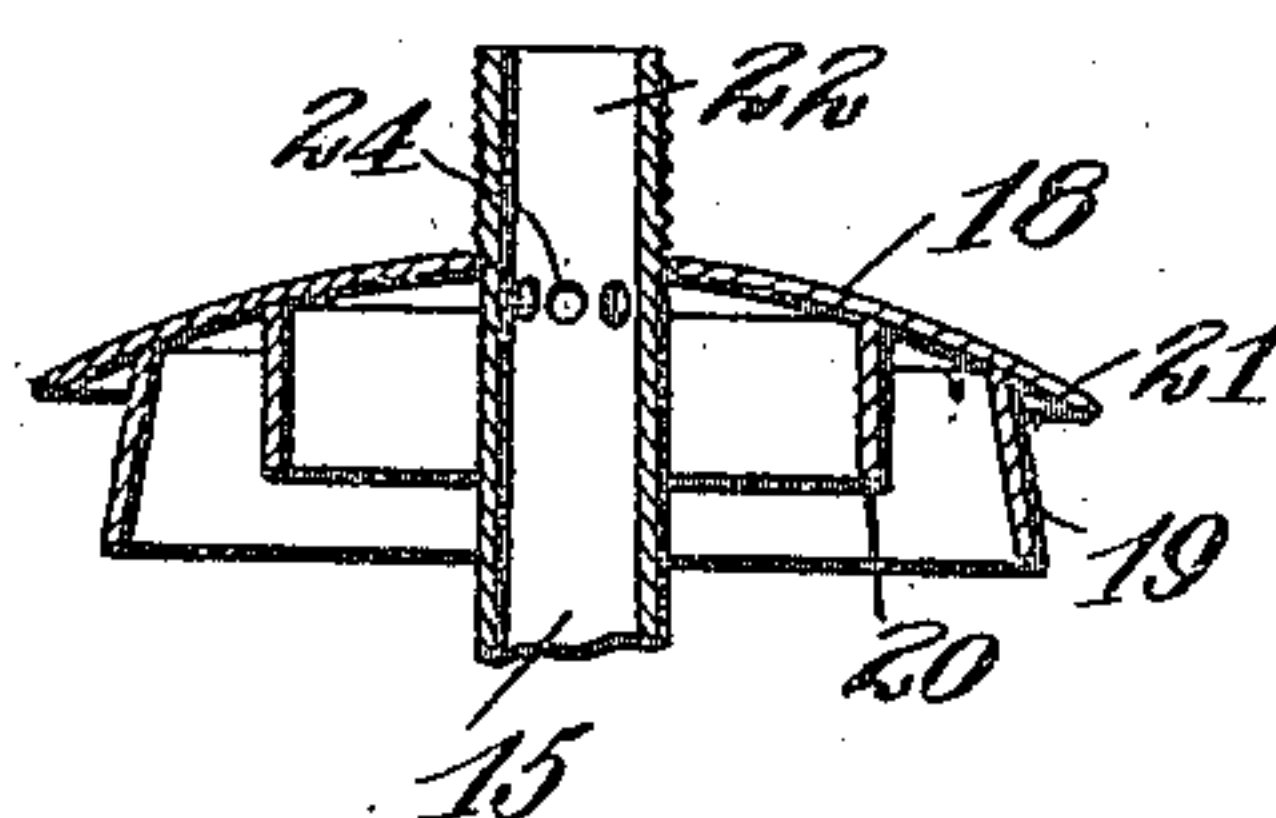


Fig. 1.

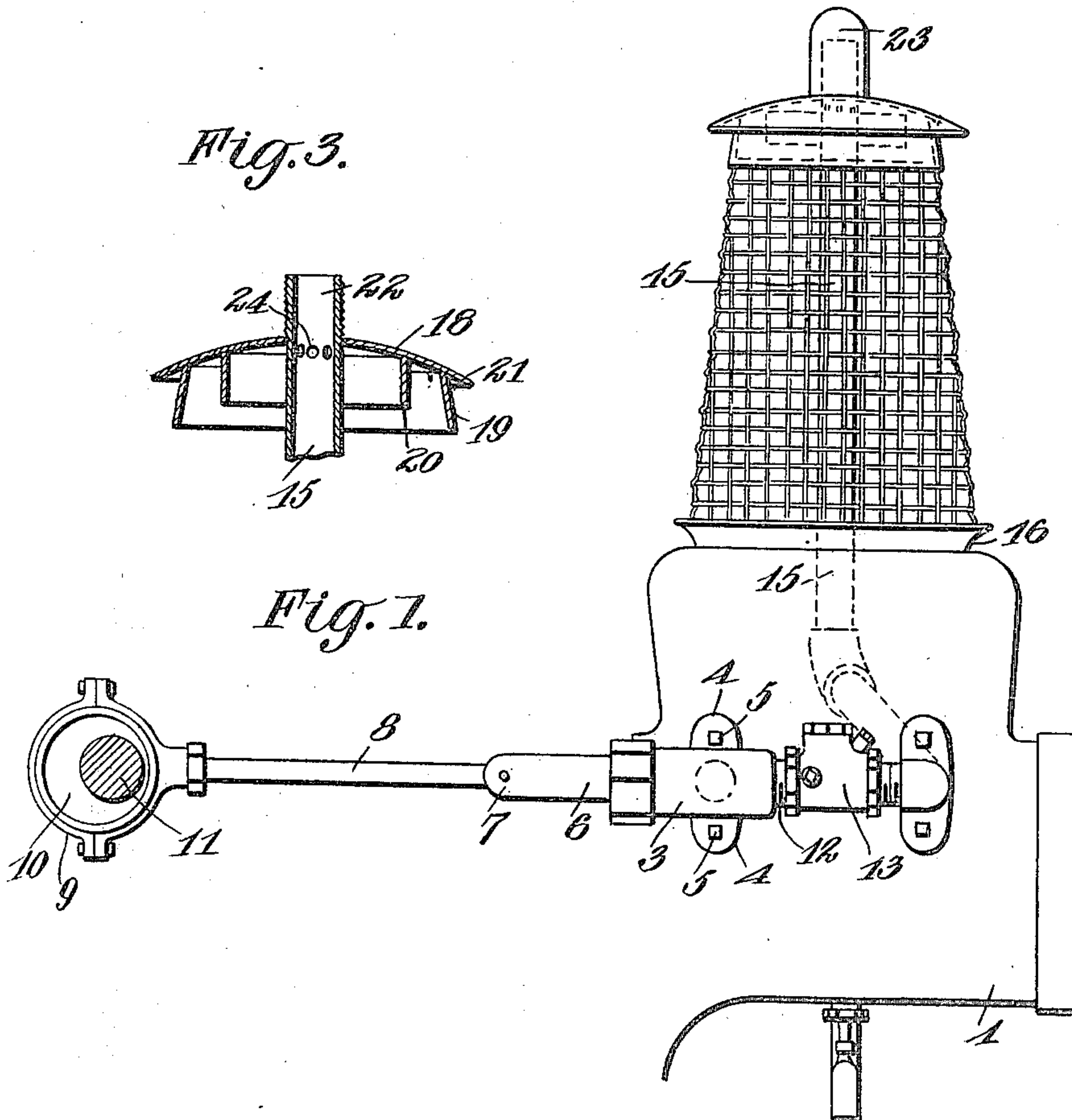
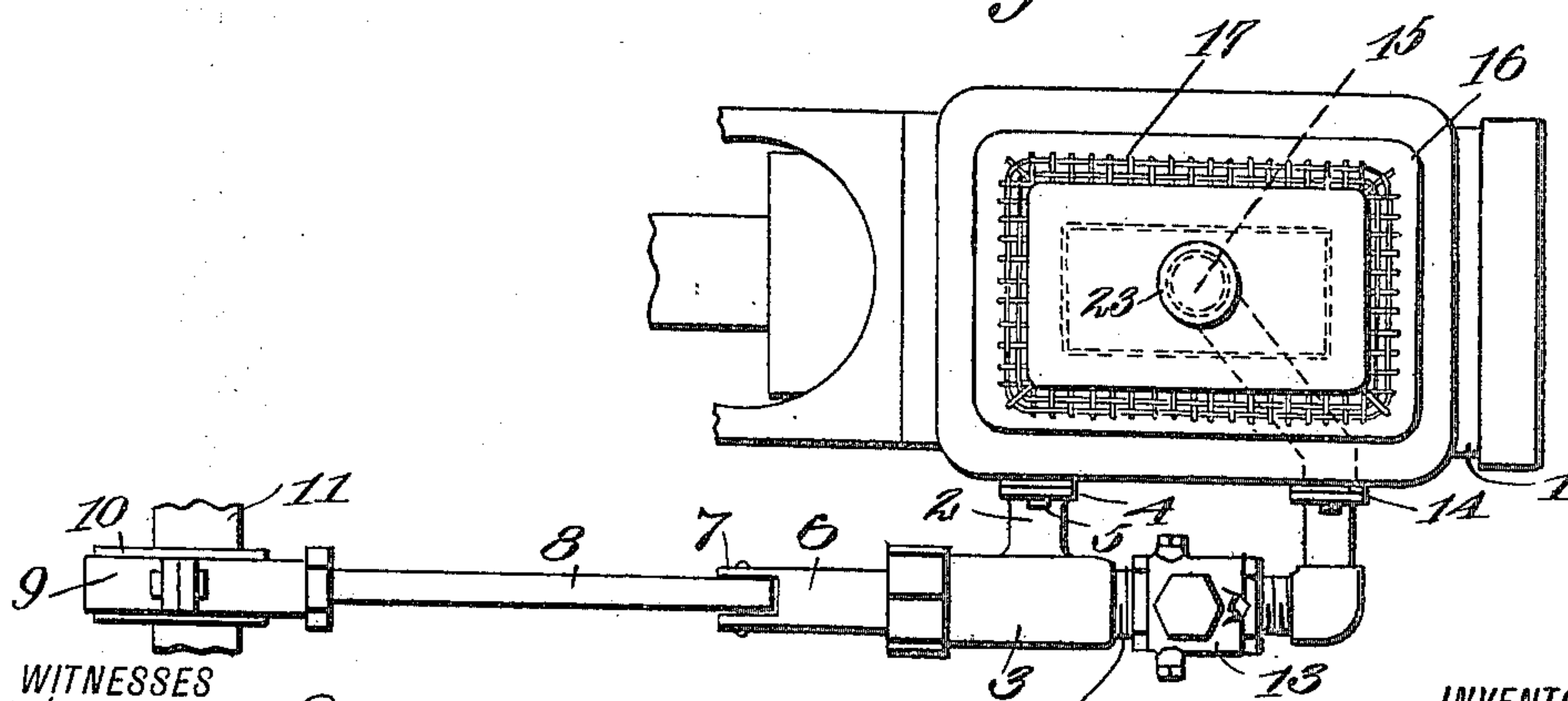


Fig. 2.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## LIQUID-COOLING DEVICE.

963,009.

Specification of Letters Patent. Patented June 28, 1910.

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*To all whom it may concern:*

Be it known that I, DELMER H. MOORE, a citizen of the United States, and a resident of Greenville, in the county of Montcalm and State of Michigan, have invented certain new and useful Improvements in Liquid-Cooling Devices, of which the following is a specification.

My invention is an improvement in cooling devices for gasoline engines, and consists in certain novel constructions and combinations of parts hereinafter described and claimed.

The object of the invention is to provide a device of the character specified, which may be cheaply constructed while efficient for the purpose, and which will dispense with the greatest possible amount of piping, and wherein both the fluid to be cooled and the cooling fluid will meet under the most favorable conditions.

Referring to the drawings forming a part hereof Figure 1 is a side view of the improvement. Fig. 2 is a plan view, and Fig. 3 is a sectional view of the top of the cooler.

The embodiment of the invention shown in the drawings, consists of a hopper connected with the water jacket of the cylinder, a cooler above the hopper, and a pump drawing the water from the jacket, and delivering it over and through the cooler to the hopper, from whence it returns to the jacket. The pump is of any suitable or desired construction, and is secured to the side of the cylinder 1 of the engine, by means of a pipe 2 integral with the cylinder 3 of the pump, and provided with a flange 4, which is secured to the cylinder by lag or cap screws 5. The piston 6 of the pump is provided at its outer end with spaced ears 7, between which is received one end of an eccentric rod 8, connected at its other end to a strap 9, which encircles an eccentric 10 on the engine shaft 11. The pipe 5 forms a communication between the water jacket of the engine cylinder and the pump cylinder forming the inlet port, and at the opposite end from the eccentric, the cylinder is provided with a discharge pipe 12 forming the outlet port. A valve casing 13 is interposed in the said pipe, and within the casing is a check valve of ordinary construction, for which reason it is not deemed necessary to illustrate it further, and the pipe 12 beyond the valve casing enters the

water jacket as at 14, and extends upwardly as at 15, through the center of the hopper 16 and the cooler to be now described.

The cooler consists of one or more concentric annular casings or screens 17 of woven wire, or similar perforate material, which will permit the free passage of air therethrough, and are secured at their lower end in any suitable manner to the hopper 16. At their upper ends the casings are secured to a cap or cover 18, which extends beyond the outer surface of the casings as shown at 21, in Fig. 1, and is provided with a plurality of concentric rims, the outer one 19 of which incloses the outer casing, which may be secured thereto, and the inner rim 20 is within the casing. The pipe 15 extends above the cover as at 22, and is closed by a cap 23, and just below the cover 18, the pipe is provided with a plurality of radial openings 24, through which the water is discharged onto the screens.

The screens as will be evident from an inspection of Fig. 1, are tapering in form, and are arranged with their large ends downward, and as many may be arranged between the hopper and cover as may be desired, and the size of the openings may vary in accordance with the conditions to be subserved.

In operation, the cooling liquid is drawn from the jacket by the pump, and passed by the check valve into the pipe 15, the valve preventing the return of the liquid to the pump. The continued operation of the pump, which is driven by the eccentric, forces the liquid out through the openings 24 onto the screen, down which it flows to the hopper, and is returned to the jacket. As it trickles down the screens, it is subdivided into small streams, and drops, thus bringing it into contact with a maximum amount of cool air, which is also subdivided by the screens, both air and liquid being in the most favorable condition to act upon each other in the manner required.

It will be evident from the description, that the improved cooler while simple in construction is very efficient. There is no possibility of leakage since the piping is all within the cooler, where it cannot be injured. Even should the pipe leak, it would not impair the efficiency of the cooler to any great extent. Should the screens become injured through external violence, they may be re-



placed with but little trouble, and but slight expense, by an ordinary mechanic. The position of the cooler with respect to the engine permits free access to the cooler, and  
 5 also permits the free circulation of the air therethrough.

It will be observed that all of the mechanism of the cooler proper which is subject to internal strain is within the cooler, so  
 10 that should breakage occur, the cooler will not be put out of commission, but at the worst will be only slightly impaired in efficiency, while the return of the liquid is on the outside of the conductor and entirely by  
 15 gravity.

The only leakage possible in the cooler proper is from the pipe 15, and leakage from such pipe, must be very great to appreciably affect the operation of the device.  
 20 The greater part of the travel of the liquid to be cooled is on the outside, thus dispensing with a maximum of piping, gravity being utilized to the greatest possible extent.

I claim:

25 1. A liquid cooler comprising a hopper having an opening in the bottom thereof, a plurality of annular concentric screens of perforate material supported in the hopper, a cover for the screens, said cover having a  
 30 central opening and depending rims to which the upper ends of the screens are secured and projecting beyond the screens, a discharge pipe extending upwardly within the screens and through the opening in the  
 35 cover, said pipe having radial openings immediately below the cover, a cap closing the upper end of the pipe, and a pump receiving from the hopper and delivering to the discharge pipe.

40 2. A liquid cooler comprising a hopper having an opening in the bottom thereof, a plurality of annular concentric screens of perforate material supported in the hopper, a cover for the screens, said cover having a  
 45 central opening and depending rims to which the upper ends of the screens are secured and projecting beyond the screens, a

discharge pipe extending upwardly within the screens and through the opening in the cover, said pipe having radial openings im- 50  
 mediately below the cover, and being closed above the cover, and a pump receiving from the hopper and delivering to the discharge pipe.

3. A liquid cooler comprising a hopper 55  
 having an opening in the bottom thereof, a plurality of annular concentric screens of perforate material supported in the hopper, a cover for the screens, said cover having a  
 60 central opening and depending rims to which the upper ends of the screens are secured and projecting beyond the screens, a discharge pipe extending upwardly within the screens and through the opening in the  
 65 cover, said pipe having radial openings immediately below the cover, and a pump receiving from the hopper and delivering to the discharge pipe.

4. A liquid cooler comprising a hopper 70  
 having an opening in the bottom thereof, a plurality of annular concentric screens of perforate material supported in the hopper, a cover for the screens, said cover having a  
 75 central opening, and depending rims to which the upper ends of the screens are secured and projecting beyond the screens, and a discharge pipe extending upwardly within the screens and through the opening in the  
 80 cover, said pipe having radial openings immediately below the cover.

5. A liquid cooler comprising a hopper, a plurality of annular concentric screens supported in the hopper, a cover for the screens having a central opening and depending  
 85 rims to which the upper ends of the screens are secured, the cover projecting beyond the screens, and a discharge pipe extending upwardly within the screens and through the opening in the cover, and having radial openings below the cover.

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Witnesses:

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