

No. 782,659.

PATENTED FEB. 14, 1905.

E. F. HULBERT.  
WATER COOLER FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAY 25, 1904.

Fig. 1.

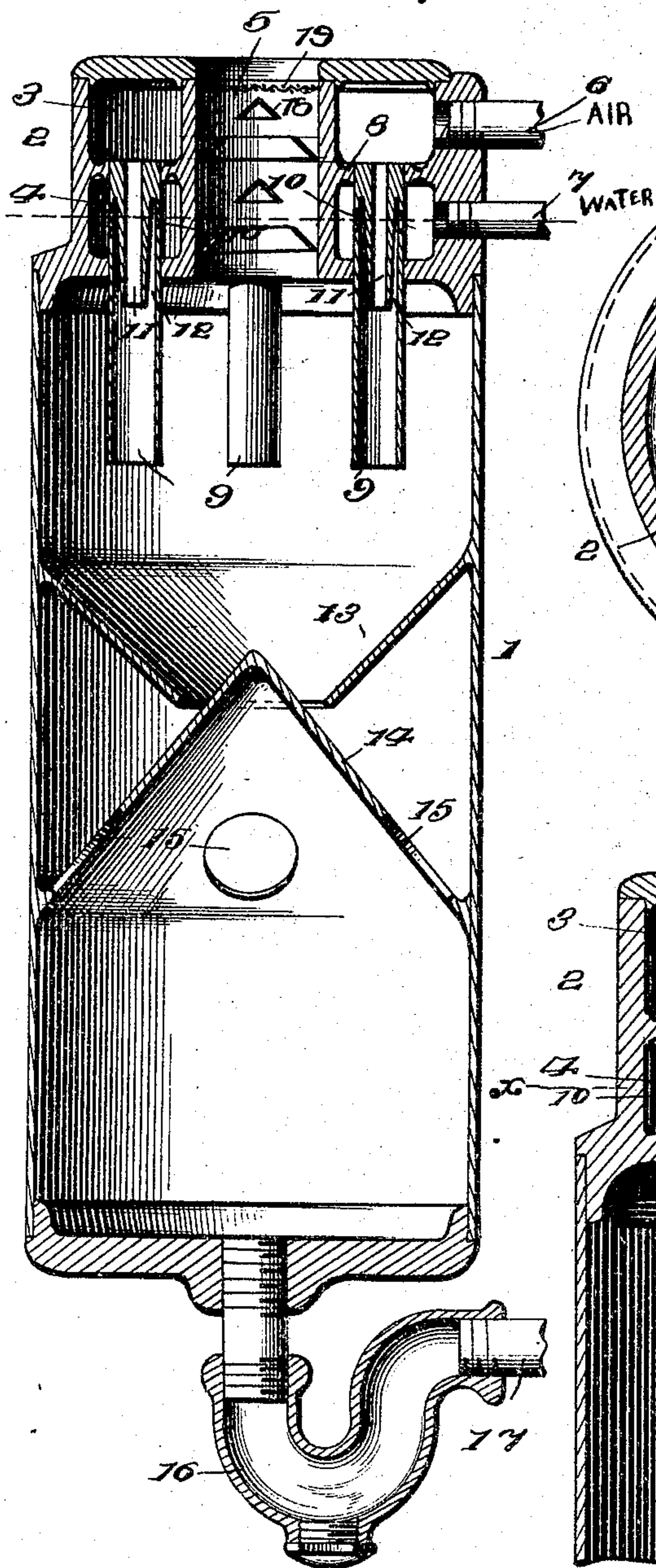


Fig. 3.

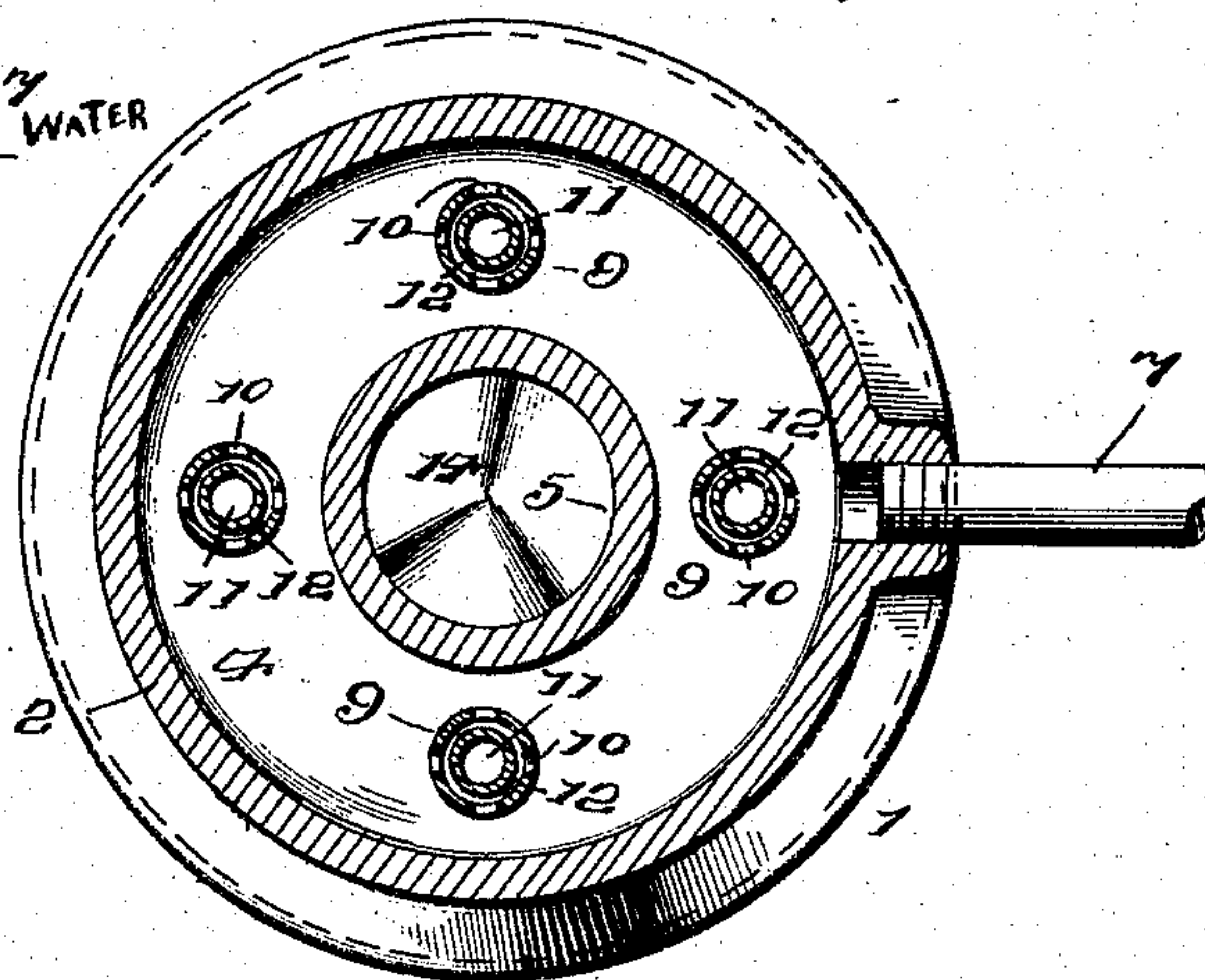
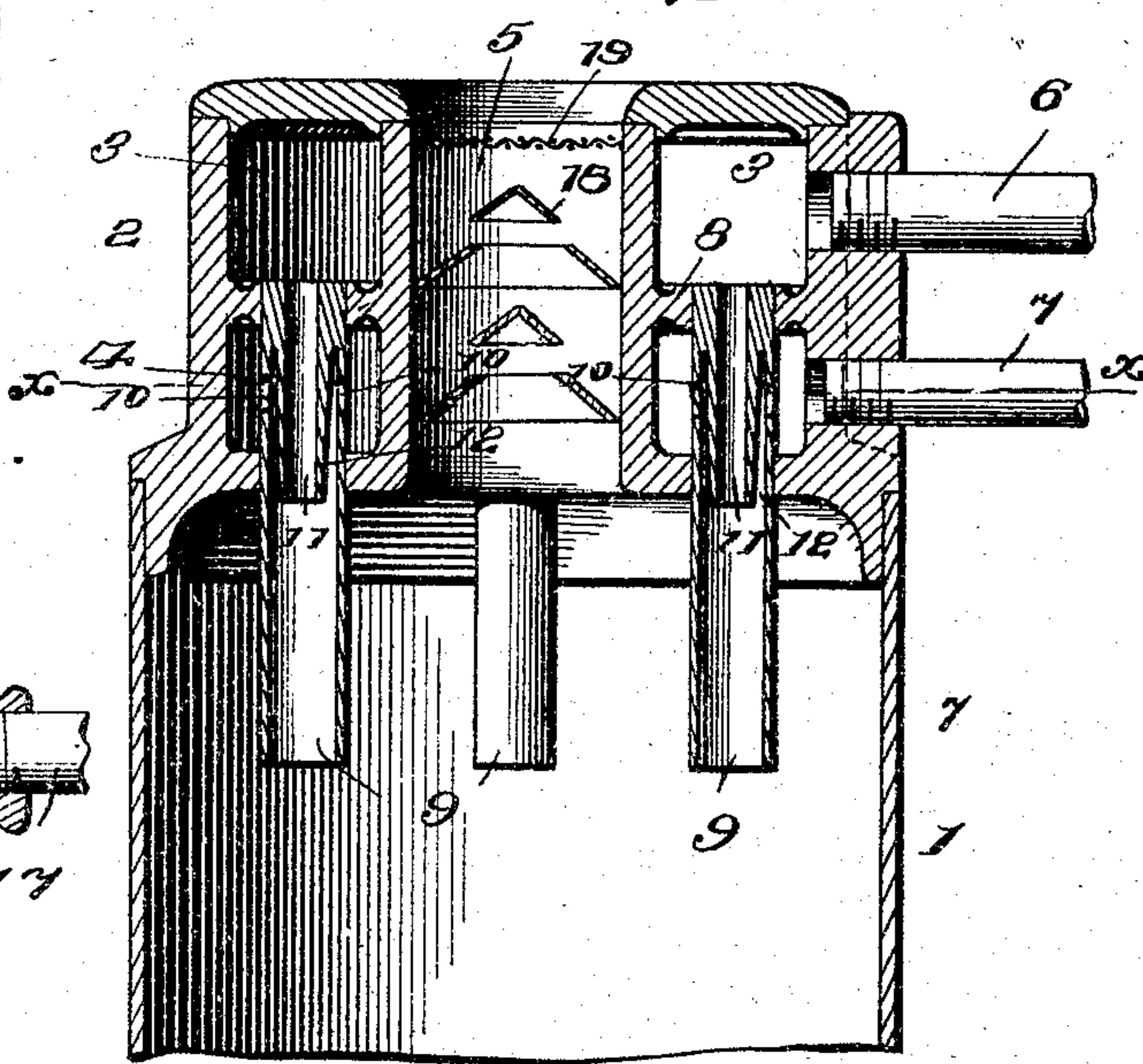


Fig. 2.



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Witnesses

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# UNITED STATES PATENT OFFICE.

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## WATER-COOLER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 782,659, dated February 14, 1905.

Application filed May 25, 1904. Serial No. 209,756.

*To all whom it may concern:*

Be it known that I, EDWIN F. HULBERT, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Water-Coolers for Explosive-Engines, of which the following is a specification.

The primary object of this invention is to devise a novel sprayer for cooling the water circulated through the jacket surrounding the cylinder of engines of the explosive type. However, the invention is susceptible of a wide range of usefulness because of its peculiar formation.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central section of a device embodying the invention. Fig. 2 is a view similar to Fig. 1 of the upper portion of the device on a larger scale. Fig. 3 is a horizontal section on the line X X of Fig. 2.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The device comprises a tank 1, which may be of any capacity and construction, depending upon the particular use of the appliance. A sprayer-head 2 is fitted to the upper end of the tank 1 and comprises annular spaces 3 and 4 and a central opening 5. A blast-pipe 6 connects with the annular space 3 and may lead from an air-compressor or reservoir of any type. A pipe 7 communicates with the annular space 4 and leads from the jacket of the cylinder to be kept cool. An annular partition 8 separates the annular spaces 3 and 4 and a series of tubes 9 are fitted thereto and extend across the annular space 4 and into the upper portion of the tank 1 for a short distance. Open-

ings 10 are formed in the sides of the tubes 9 and establish communication between them and the annular space 4. A nozzle 11 extends into each tube 9 a short distance from the end attached to the partition 8, and an annular space 12 surrounds said nozzle and is in communication with the space 4 through the openings 10. The nozzles 11 deliver a blast through the tubes 9 when the appliance is in operation, with the result that a suction is established in the space 4, thereby causing the water to flow therein from the jacket or other source and through the openings 10 into the tubes 9. The air-blasts through the tubes 9 commingle with the water passing therethrough and atomize the same, thereby insuring a thorough cooling thereof.

A baffle 13 of funnel shape is located within the tank 1 a short distance from the delivery ends of the tubes 9 and is centrally apertured. The tubes 9 have a parallel relation and deliver their jets of water and air upon the baffle 13, which combines the several jets and directs them through the central opening. A spreader 14 is arranged below the baffle and is of conical form, its apex projecting through the opening of the baffle a short distance, so as to leave an annular space between the lower end of the baffle and the upper portion of the spreader, through which the combined jets escape in annular form. A series of openings 15 are provided in the sides of the spreader 14 near its lower end and provide outlets for the annular space. The water separated from the air is precipitated and collects in the lower portion of the tank 1 below the spreader 14, whereas the liberated air passes out through the opening 5. A trap 16 is connected with the lower end of the tank 1 for collection of sediment or foreign matter of any character. A pipe 17 connects the trap 16 with the jacket or other part through which the water is to be circulated.

When utilizing the device for cooling water surrounding the cylinder of the explosive-engine, the contrivance is connected to the jacket of the cylinder by means of the pipes 7 and 17 in any determinate way. When air under pressure is forced through the pipe 6 into the



annular space 3, the jets escaping from the nozzles 11 and passing through the tubes 9 create a suction in the annular space 4 and cause the water to pass therefrom through the openings 10 into the tubes 9, thereby establishing a circulation, as will be readily comprehended. The water drawn through the tubes 9 by the air-blasts is atomized and thoroughly cooled, and the jets issuing from the tubes 9, impinging upon the baffle 13, are in a great measure separated, the liberated air passing off through the outlet 5 and the water passing downward around the spreader 14 and through the openings 15 into the lower portion of the tank to be returned to the jacket.

While it is the primary intention to utilize the appliance as a water-cooler, it may be advantageously employed for delivering sprays for various purposes either for the treatment of disease or for humidifying the atmosphere. The jet may be medicated, heated, or cooled, as required, to meet the requirements for which the contrivance is designed.

When the device is used solely in the capacity of a cooler, it is desirable to eliminate a maximum percentage of moisture from the air escaping through the openings 5 of the sprayer-head. For this purpose a series of deflectors 18 are arranged in the opening 5 and preferably consist of alternately-disposed elements of approximately conical form placed so as to cause the escaping air to take a tortuous path. A screen 19 is located within the opening 5 near the outer end thereof and supplements the action of the deflectors 18 and also serves to prevent foreign matter entering the tank.

Having thus described the invention, what is claimed as new is—

1. In a contrivance of the character described, the combination of a head subdivided by means of a partition into independent spaces, one of said spaces being connected with a source of compressed-air supply and the other space having connection with a source of liquid-supply, and a nozzle joined to said partition and in communication at one end with the space receiving the compressed air and extended across the other space to

create a suction therethrough, substantially as set forth.

2. In a device of the character set forth, the combination of a head subdivided by means of a partition into independent spaces, one of said spaces being connected with a source of compressed-air supply, and the other space having connection with a source of liquid-supply, a series of tubes extended across one of said spaces and having communication therewith, and nozzles projected into the tubes a short distance for delivering jets of air therethrough, substantially as specified.

3. In combination, a sprayer-head comprising annular spaces and a central opening, and a series of tubes extended across one of the spaces and in communication therewith and having nozzles at their inner ends for delivering jets through the tubes, substantially as described.

4. In combination, a tank, a sprayer-head at one end of the tank having a central outlet-opening and annular spaces for connection with, respectively, means for supplying air under pressure and means for supplying a liquid, tubes extended across one of the annular spaces and in communication with each of said spaces, nozzles at the ends of the tubes connected with said head for creating a blast through the tubes, and separating means within the tank consisting of a baffle and spreader, substantially as set forth.

5. In combination, a tank, a sprayer-head at one end of the tank having a central opening, and deflectors arranged within said opening for separating moisture from the escaping air, substantially as set forth.

6. In combination, a tank, a sprayer-head at one end of the tank having a central opening, a series of deflectors located within said opening, and a screen also arranged within said opening near the outer end thereof, substantially as set forth.

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

EDWIN F. HULBERT. [L. s.]

Witnesses:

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