No. 793,129. PATENTED JUNE 27, 1905.

J. F. GRACE.

APPARATUS FOR COOLING OR EVAPORATING LIQUIDS.

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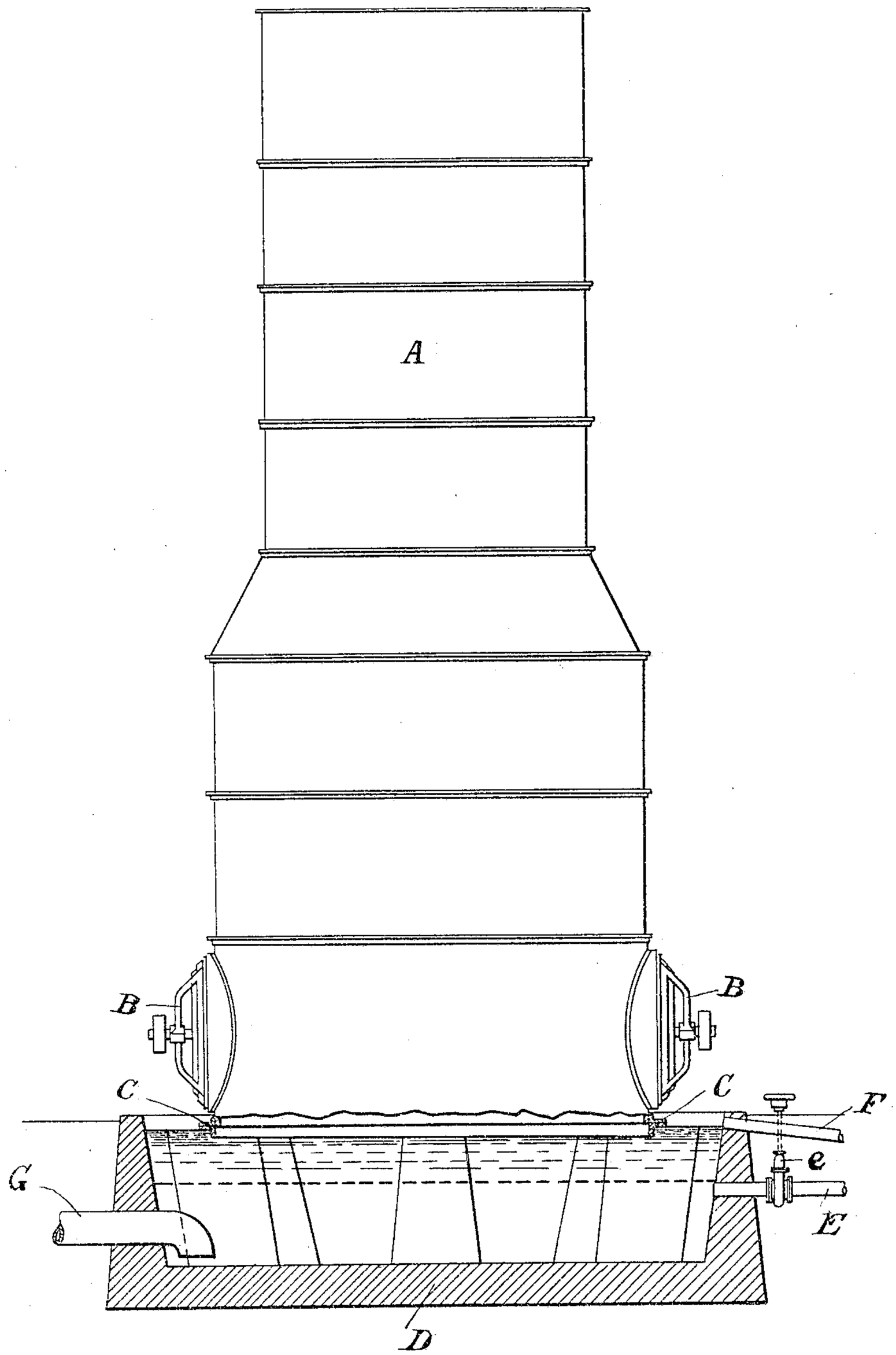

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No. 793,129. Patented June 27, 1905.

UNITED STATES PATENT OFFICE.

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APPARATUS FOR COOLING OR EVAPORATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 793,129, dated June 27, 1905.

Application filed October 1, 1904. Serial No. 226,761.

To all whom it may concern:

Be it known that I, JOHN F. GRACE, a citizen of the United States, residing at New York city, county of Kings, and State of New York, have invented certain new and useful Improvements in Apparatus for Cooling or Evaporating Liquids, fully described and represented in the following specification and the accompanying drawing, forming a part of the same.

The especial object of the present invention is to provide an improved cooling-tower which may be used either as a forced or natural draft tower and which shall be efficient in either use and provide for the change from one use to the other readily and by means not materially increasing the cost of the construction. In such cooling-towers, which are now largely used in steam and other condensing plants and for similar purposes, it is desirable that the same tower should be used under some conditions with a forced draft, while under other conditions the less expensive natural draft is sufficient. In using natural draft, however, it is necessary to increase largely the air-inlet as compared with forced draft, the size of the fans and fan-openings used for forced draft not having sufficient cross-area for natural draft.

I provide a construction in which the air for natural draft is admitted through the bottom of the tower, through which the water passes from the tower to the reservoir below the tower, and when the forced draft is to be used simply close the bottom of the tower against the entrance of air by raising the level of water in the reservoir above the bottom of the tower, so as to seal the bottom opening of the latter.

In the accompanying drawing, forming a part of this specification, I have shown a simple and convenient embodiment of the invention as applied to a cooling-tower of common form, and this construction will now be described in detail and the features forming the invention then specifically pointed out in the claims.

In the drawing, which shows the cooling-tower in elevation and the hot-well or reservoir in section, with the lower part of the cooling-tower partly broken away, A is the cooling-tower, which may be of any common or suitable construction and which is shown as provided with the usual fans B for forcing air upward through the tower and which is supported by the frame C above the reservoir D, the bottom of the cooling-tower being open, so as to permit the liquid to pass downward into the reservoir. The reservoir D is shown as provided with a low overflow-pipe E, having valve *e* for opening and closing it, this overflow-pipe being for use with natural draft, and an upper overflow-pipe F for use with forced draft. The usual suction-pipe G, leading from the hot-well or reservoir D to the pump, is shown. When the cooling-tower is to be used with forced draft, the fans B are in operation, the overflow-pipe E closed by valve *e*, and the level of the water in the reservoir D is maintained above the bottom of the cooling-tower, as illustrated in the drawing, so as to seal the bottom of the tower against the passage of air from the tower under the pressure of the forced draft. When the tower is to be used with natural draft, the fans are stopped, the overflow-pipe E opened by opening valve *e*, and the level of the water is then as shown by the dotted line in the drawing, giving the whole area of the bottom of the tower for the admission of air.

It will be understood that the invention is not limited to towers for use in cooling liquids, but that it may be used also in connection with towers employed for evaporating liquids or other purposes in which a current of air is to be passed upwardly through a tower under forced or natural draft.

What I claim is—

1. The combination with a tower and means for forcing air upward through the tower, of a liquid-reservoir below the tower into which the bottom of the tower opens, and means for varying the level of liquid in the reservoir to seal the bottom opening of the tower or to open it to the atmosphere.

2. The combination with the tower A hav-

ing one or more fans B, of the liquid-reservoir D below the tower and overflow-pipe E adapted to be opened for maintaining a low level of the liquid for natural draft or a high level of the liquid to seal the bottom of the tower for forced draft.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN F. GRACE.

Witnesses:
C. J. SAWYER,
J. A. GRAVES.