July 28, 1931. A. KNAPEN 1,816,592

MEANS TO RECUPERATE THE ATMOSPHERIC MOISTURE

Filed Nov. 23, 1927

Fig. 1.

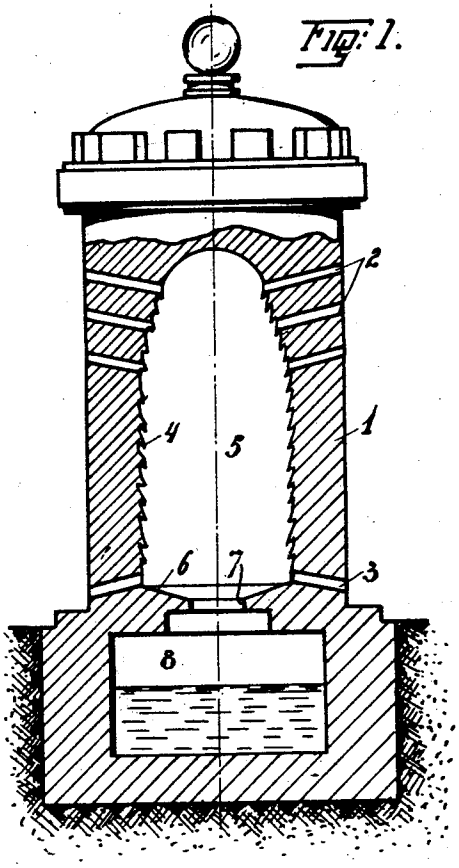


Fig. 2.

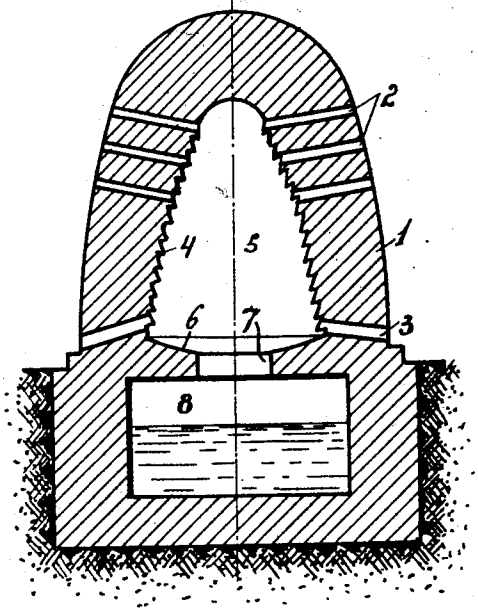
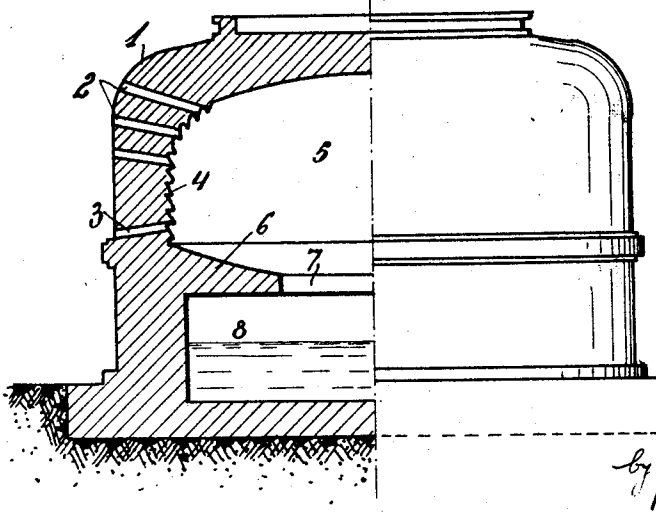


Fig. 3



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UNITED STATES PATENT OFFICE

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MEANS TO RECUPERATE THE ATMOSPHERIC MOISTURE

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This invention relates to means for collecting atmospheric moisture by condensing the gaseous moisture carried by warm air. It has for its purpose to provide, in the warm or desertic countries, atmospheric condensers adapted to be used as aerial wells. To this end, the atmospheric air is caused to circulate in a closed structure the inner walls of which are coated with stones or other materials forming sharp edges and projections. Gaseous moisture and the water vapor contained in the air condenses on coming in contact with these sharp edges or angles, and deposits the water of condensation which accumulates in the form of drops, and is collected in a tank at the lower part of the construction.

My invention is based upon the well known phenomena of radiation of heat, that is, the law which states that bodies radiate and absorb heat simultaneously and continuously and when the radiation exceeds the absorption, the temperature of the body decreases, and vice versa. As regards the earth, it is well known that during the night the surface cools very rapidly due to the radiation of heat received from the sun during the day. Furthermore, bodies which are on the surface of the earth are also lowered in temperature accordingly, and it has been observed that the temperature of bodies in contact with the surface of the earth falls below that of the atmosphere. In consequence of this difference in temperature between the earth and the atmosphere, water vapor carried by the surrounding air is deposited on the ground and the bodies in contact therewith. These deposits of water constitute the dew. It has also been observed that the sharp edges of materials having a prismatic configuration such as ordinary broken stone or burnt earth reach their dew point well before the entire mass and the gaseous moisture or water vapor contained in the air in contact with these sharp edges or angles deposit their water of condensation as soon as they have reached their dew point.

In the practical embodiment of the invention, channels are provided in a building placed above a tank formed with a suitable material, such as ordinary stone or other material having substantially the same density and specific warmth as ordinary stone. The channels are used as inlets and outlets. The inlet channels are inclined from the exterior to the interior surface in order to aid the entrance of the air, and the outlet channels are inclined from the interior to the exterior to aid the exhaust of the air after it has been conducted along the inner walls of the condensation room which are coated with sharp and vertically arranged edges so as to favour the condensation action.

The annexed drawing shows, by way of example, an embodiment of the invention.

Fig. 1 is a vertical cross section through a construction forming an aerial well and placed above a tank.

Figs. 2 and 3 show two other forms of embodiment of the invention.

As shown on those figures, the atmospheric condenser comprises a construction extending upwardly above the ground and formed of any material, such as ordinary or artificial stones. This construction may take the form of a circular, square, oval or pentagonal tower (Fig. 1), or of a cupola (Fig. 2), or an elongated form such as a stack or an elongated tumulus (Fig. 3). The specific construction will depend upon the local climatic conditions.

In the upper portion of the walls, channels 2 are provided, which are inclined from the outer to the inner surface. In the lower half, similar channels 3 are provided which are inclined from the inner to the outer surface. The walls are covered or coated with broken stones 4 or other material having sharp edges. The lower part of the room 5 has the shape of a funnel and communicates by means of an aperture 7 with a tank 8. In some cases the tank 8 is put under ground. These structures may be built with any available means, or with stones gathered together on the spot, on condition that, if they are composed of pebbles or round stones, the pebbles or stones will be broken to coat the inner wall of the condensation

room 5. The spot, on which the well is erected, must be chosen, if possible, on elevated ground, otherwise they must be raised above the ground by means of foundations.

The shape and the thickness of the structure depends upon the density and the specific warmth of the materials which are used. The thicknesses of the walls also depends upon the extremes of temperature of the local climate, so as to have the greatest possible calorific inertia.

The working is the following:

The warm air enters the condensation room 5 through the inlets 2. The moisture contained in the air gathers and is condensed on the sharp edges 4 so that the drops fall into the funnel 6 passing through the aperture 7 into the tank 8. It is obvious that this tank can be provided with an overflow pipe and a man-hole.

After circulating in the condensation room 5, the air, separated from its moisture by the cooling action of the walls, escapes through the lower channels 3 arranged in one or more rows, depending upon the predominating winds, in the lower half of the aerial well 1.

The dimensions of the outlet channels may be proportionately smaller than those of the inlet channels 2. Experiments have shown that, in view of the action of the sharp edges of the materials which are used, as indicated, hereabove, the condensation is sufficient, to produce in the tank 8 a suitable accumulation of water, so that the building constitutes in reality an aerial well for the production of a reserve of water.

In sandy countries, deserts and the like, dams formed of plants, wind screens of dry stone, etc., may be established in order to avoid the gathering of the sand. Even when partly in the sand, the aerial wells built according to this invention continue to provide drinkable water.

I claim:

1. An atmospheric air condenser comprising a building having a condensation chamber in the upper portion thereof and a moisture chamber below the condensation chamber in which the moisture deposited on the walls of the condensation chamber is collected, the walls of said building having air inlet and outlet openings through that portion thereof constituting the walls of the condensation chamber, the inlet openings being inclined downwardly from the outer to the inner surface of the walls, and the outlet openings being inclined downwardly from the inner to the outer surface of the walls.

2. An atmospheric air condenser comprising a building having a condensation chamber in the upper portion thereof and a moisture chamber below the condensation chamber in which the moisture deposited on the walls of the condensation chamber is collected, the walls of said building having air inlet and outlet openings through that portion thereof constituting the walls of the condensation chamber, the inlet openings being near the top of the condensation chamber and being inclined downwardly from the outer to the inner surface of the walls, and the outlet openings being at the bottom of the condensation chamber and being inclined downwardly from the inner to the outer surface of the walls.

3. An atmospheric air condenser comprising a building having a condensation chamber in the upper portion thereof and a moisture chamber below the condensation chamber in which the moisture deposited on the walls of the condensation chamber is collected, the walls of said building having air inlet and outlet openings through that portion thereof constituting the walls of the condensation chamber, and a partition wall between the condensation chamber and the moisture chamber having an opening through the center thereof, the upper surface of said partition wall being inclined toward the opening therethrough.

4. An atmospheric air condenser comprising a building having a condensation chamber in the upper portion thereof, the inner surface of the walls of which are coated with sharp and vertically arranged edges and a moisture chamber below said condensation chamber in which the moisture deposited on the inner surface of the walls of the condensation chamber is collected, the walls of said building having air inlet and outlet openings through that portion thereof constituting the walls of the condensation chamber.

5. An atmospheric air condenser comprising a building having a condensation chamber in the upper portion thereof, the inner surface of the walls of which are coated with sharp and vertically arranged edges and a mixture chamber below said condensation in which the moisture deposited on the inner surface of the walls of the condensation chamber is collected, said condensation chamber being below the surface of the earth, the walls of said building having air inlet and outlet openings through that portion thereof constituting the walls of the condensation chamber.

In testimony whereof I have affixed my signature.

ACHILLE KNAPEN.