P. W. FOSTER.

COOLING DEVICE.

APPLICATION FILED JUNE 28, 1912.

1,048,516. Patented Dec. 31, 1912.

Fig. 1

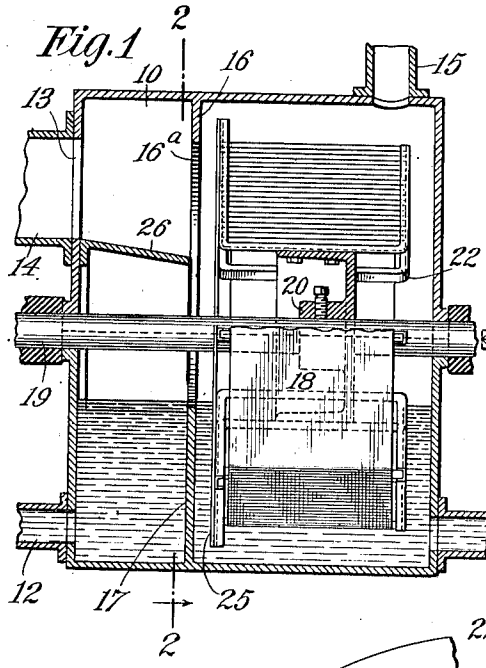


Fig. 2

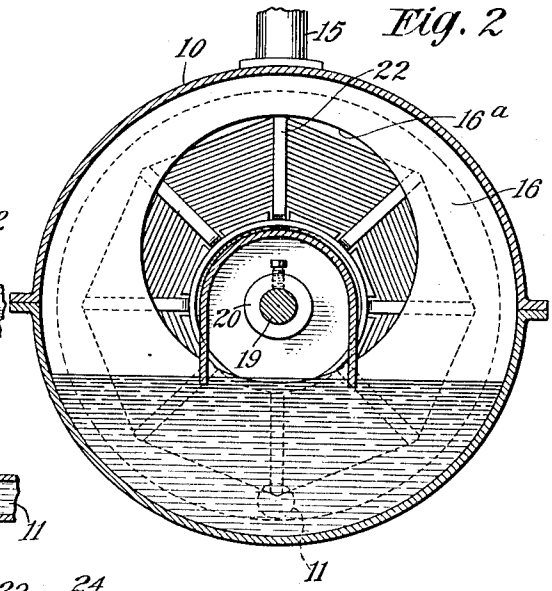
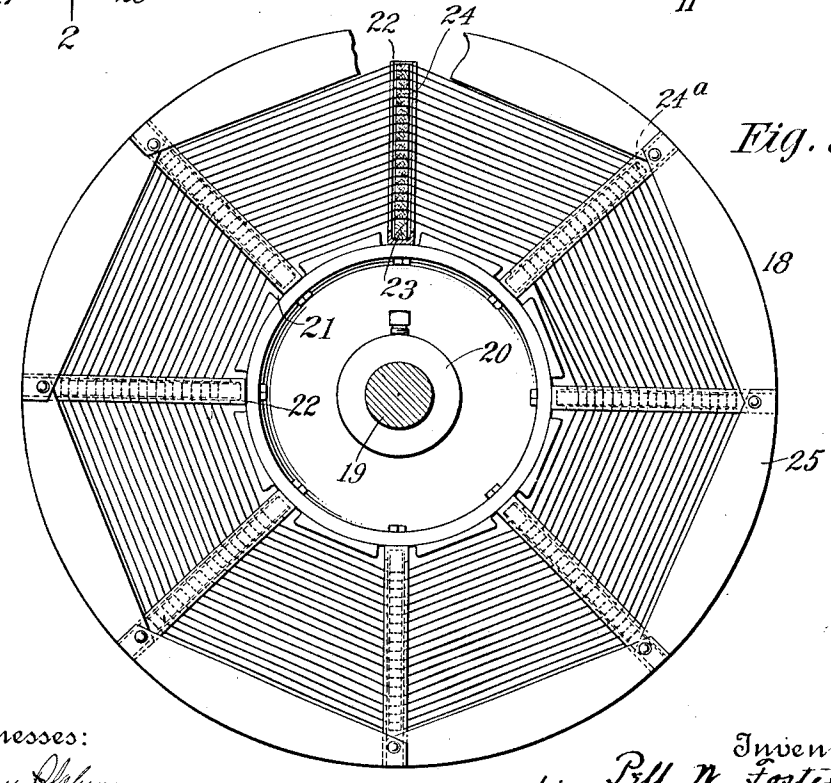


Fig. 3



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UNITED STATES PATENT OFFICE.

PELL W. FOSTER, OF NEW YORK, N. Y., ASSIGNOR TO POWER SPECIALTY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COOLING DEVICE.

1,048,516. Specification of Letters Patent. Patented Dec. 31, 1912.

Application filed June 28, 1912. Serial No. 706,391.

To all whom it may concern:

Be it known that I, PELL W. FOSTER, a citizen of the United States, residing in New York, county and State of New York, have invented certain new and useful Improvements in Cooling Devices, of which the following is a full, clear, and exact description.

This invention relates to devices for cooling air or water, and its chief object is to provide for the purpose a simple and effective apparatus which can be manufactured at low cost and in which any parts subject to deterioration can be easily and cheaply renewed.

To this and other ends the invention consists in the novel features of construction and combinations of elements hereinafter described, and more particularly set forth in the appended claims.

One form of the invention is illustrated in the accompanying drawing, in which—

Figure 1 is a longitudinal sectional view of the complete device. Fig. 2 is a cross section of the same, about on line 2—2 of Fig. 1. Fig. 3 is a front view of the rotor or revolving element of the device.

The apparatus in its preferred form comprises a casing 10, preferably of cylindrical form, having at its bottom an inlet pipe 11 and an outlet pipe 12, by which a current of water is kept flowing through the casing, with the water level maintained at about the height shown. In the front wall at the top is an opening 13, to which a pipe or conduit 14 is connected for delivering a current of air, and at the opposite end of the casing, at the top, is an air outlet pipe 15. Across the casing is a partition 16 having a circular opening 16^a the upper portion of which is behind the air inlet opening. The lower part of the partition, indicated by 17, constitutes a dam, by which the desired depth of water is maintained in the casing, as will be readily understood.

In the chamber or compartment formed by the partition and the rear wall of the casing is a revolving element or rotor 18, in the form of a drum mounted on a shaft 19 extending axially through the casing and rotated in any convenient manner not shown. The drum, partially submerged in the water as shown, is provided with a multiplicity of cells or spaces the walls of which, covered with a film of water as the drum revolves, are carried across the current of air through the upper part of the casing, so that the air, flowing through the cells, is brought into intimate contact with the water over a very large area. The result is a rapid transfer of heat from the warmer to the cooler medium, as the case may be.

The rotor comprises a shaft 19, on which is mounted a hub 20, provided on its periphery with axially extending slots 21. Arranged in these slots and bolted to the hub is a series of U-shaped members 22, formed of channel irons bent to shape with their flanges disposed inwardly, as shown. These members thus provide radially extending spokes with deep radial grooves on the inside.

The framework described is set up in horizontal bearings so as to revolve easily in a vertical plane. A starting and spacing bar 23, of wood or other suitable material, is provided, the length of the bar being such as to permit the bar to be slipped down one of the U-shaped members, between the arms or spokes and into the groove at the bottom. This bar has fastened to it one end of a long strip of woven fabric, for example burlap, or heavy, loosely woven canvas, and after the bar is properly positioned, the rotor is turned slowly to wind thereon the strip of fabric mentioned, which is slightly narrower than the space between the spoke-flanges. As each pair of spokes passes the operator he drops into the groove a bar similar to the one described, until the starting point is reached, after which similar but thinner bars, 24, are used. Proceeding in this manner, with the strip of fabric held under suitable tension, a cellular structure is built up between the spokes, consisting of a spirally wound fabric with its turns or layers held apart by the spacing bars, the outer end of the strip being fastened securely to the last spacing bar, 24^a.

The arms or spokes at the front of the wheel are made slightly longer than those at the rear, to support a circular rim 25 composed of metal plates riveted to the projecting ends of the spokes. The rotor is arranged in the casing 10 with this rim directly behind the partition 16, so that the rim serves to close the spaces which would otherwise be left between the circular edge of the opening 16^a and the polygonal profile of the cellular structure. Between the

front wall of the casing and the partition 16 is a curved guide plate 26, partially surrounding the shaft 19 and having its inner or rear edge in line with the outer surface of the hub 20, so as to confine the current of air to the space between the hub and the rim 25.

As the drum revolves in the casing the cellular structure moves continuously across the current of air, bringing the wet walls of the cells into contact with the air over a large surface, thus permitting a rapid transfer of heat from the warmer to the cooler medium. When the fabric with which the drum is wound is made of organic material, as is usually the case, it eventually deteriorates but can be renewed easily and cheaply at any time, the spacing bars being removed as the old fabric is unwound and replaced as the new fabric is wound on. The spacing bars may be of wood or metal, but for the sake of lightness are preferably made of wood and soaked in paraffin or otherwise treated to protect them from the water.

The spacing slats or bars 24 in conjunction with the fabric and the spokes 22 form pockets which as the rotor revolves are filled with water. As the pockets move through the current of air the water contained therein is spilled out and upon the fabric so that the latter is wetted not only while submerged in the water in the bottom of the casing or chamber 10 but also while in the air.

The construction herein specifically illustrated and described is the preferred form, but the invention is of course not limited thereto. On the contrary it can be embodied in other forms without departure from its proper spirit and scope as defined by the following claims.

I claim:

1. In a cooling device, a revolving drum comprising a hub, a plurality of axially spaced spokes or arms arranged in pairs, a fabric wound spirally between the spokes, and axially extending spacing bars removably mounted between the spokes and located between the turns of the fabric to provide a cellular structure, the spokes and bars coöperating to hold the latter in position and prevent displacement thereof by the tension of the fabric.

2. In a cooling device, a revolving drum comprising a hub, a plurality of outwardly extending spokes at the ends of the hub and alined axially in pairs, a fabric wound spirally around the hub between the alined spokes, and spacing bars extending axially from spoke to spoke between the turns of the fabric to space said turns apart and provide a cellular structure, the spokes and bars coöperating to hold the latter in position and prevent displacement of the bars by the tension of the fabric.

3. In a cooling device, a revolving drum comprising a hub, a plurality of spokes alined axially in pairs and provided with grooves on their inner faces, a strip of fabric wound spirally between the alined spokes, and spacing bars extending axially between the alined spokes and into said grooves, the bars being arranged between the turns of the fabric to provide a cellular structure.

4. In a cooling device, a revolving drum comprising a hub, a plurality of spokes axially alined in pairs and composed of channel irons with their flanges disposed inwardly to form grooves on the inner faces of the spokes, a fabric wound spirally between the alined spokes, and spacing bars arranged between the turns of the fabric and extending into said grooves whereby the bars are positioned and held against displacement by the tension of the fabric.

5. In a cooling device, a revolving drum comprising a hub, a plurality of U-shaped members mounted on the hub with their arms extending outwardly therefrom to form spokes, the said members being formed of channel irons bent to shape with their flanges disposed inwardly, a fabric wound spirally around the hub, and spacing bars between the turns of the fabric and extending between the flanges of the spokes.

6. In a cooling device, a revolving drum comprising a hub, a plurality of spokes alined axially in pairs, a fabric wound spirally between the alined spokes, axially extending spacing bars between the turns of the fabric to space the turns apart and provide a cellular structure of polygonal contour, the spokes and bars coöperating to position the latter and prevent displacement thereof by the tension of the fabric, and a circular rim on a face of the drum, mounted on the outer ends of the spokes and having its inner edge shaped to the polygonal contour of the cellular structure.

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

PELL W. FOSTER.

Witnesses:

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