F. GROEN.

HEATING TANK OR CONTAINER.

APPLICATION FILED JAN. 28, 1915.

1,198,536.

Patented Sept. 19, 1916.

Fig. 1.

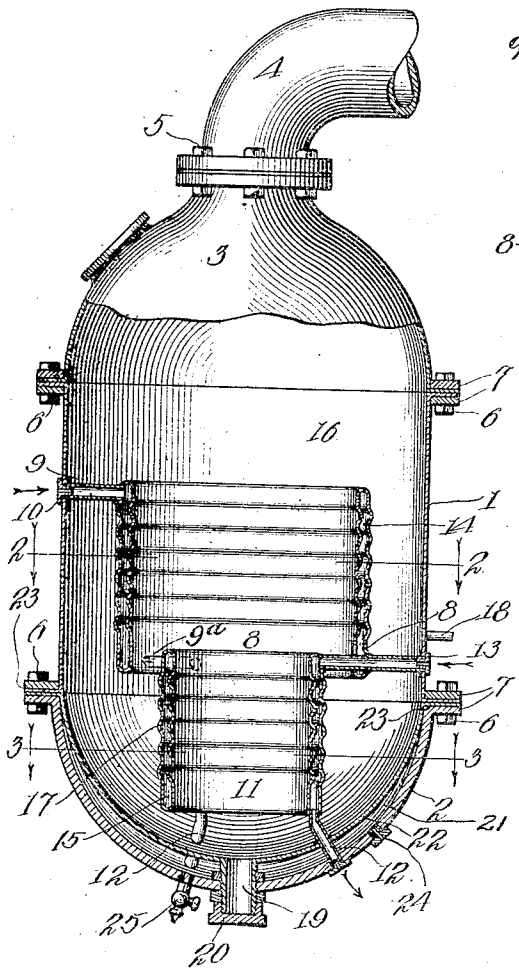


Fig. 2.

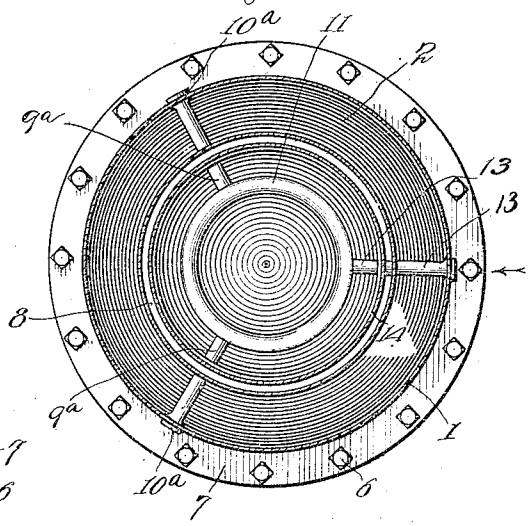
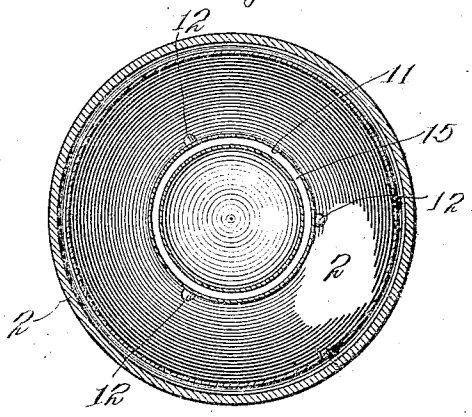


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

FREDRICK GROEN, OF CHICAGO, ILLINOIS.

HEATING TANK OR CONTAINER.

1,198,536. Specification of Letters Patent. Patented Sept. 19, 1916.

Application filed January 28, 1915. Serial No. 4,933.

To all whom it may concern:

Be it known, that I, FREDRICK GROEN, a citizen of the United States, residing at 2113 North Kenneth avenue, in the city of Chicago, county of Cook, and State of Illinois, one of the United States of America, have invented certain new and useful Improvements in Heating Tanks or Containers, of which the following is a specification.

My invention relates to improvements in tanks or containers and particularly to tanks or containers of this class which are utilized in the evaporation and condensation of milk and other fluids.

The principal objects of my invention are to so arrange and dispose the heating elements, within the tank, that the smaller will project within the larger and will be properly located within the converging walls of the lower part of the tank, to so connect the heating elements that the heating agent will circulate from one to the other and to provide a simple, efficient and durable device of this class.

With the above and other objects in view, this invention consists in the construction, combination, and arrangement of parts as hereinafter fully described and claimed and as shown in the accompanying drawings in which a preferred embodiment and adaptation thereof is illustrated.

In the drawings, Figure 1 represents a side view of my improved tank or container, partly in side elevation and partly in vertical section to show the interior construction; Fig. 2 represents a transverse horizontal section through the improved tank or container on line 2—2, Fig. 1, looking downwardly or in the direction of the arrows in said Fig. 1; and Fig. 3 represents a transverse horizontal section through the improved tank or container on line 3—3, Fig. 1, looking downward or in the direction of the arrows in said Fig. 1.

In the following detailed description of the preferred embodiment or adaptation of my invention, like letters, characters, and symbols refer to and indicate similar parts and elements in the accompanying drawings.

The preferred embodiment of my improved tank or container as illustrated, comprises a body which is constructed in a plurality of parts or members suitably joined or bolted to each other.

Referring to Fig. 1, it will be noted that the tank is a closed vessel substantially cylindrical in shape with rounded ends and consists of an intermediate cylindrical member 1, a rounded lower terminal member 2, and a rounded and reduced upper terminal member 3 to which a suction pipe 4 is suitably fastened by bolts 5 or the like.

The members or parts are detachably fastened to each other by bolts 6 which are fitted through the contacting outwardly-extending horizontal annular flanges 7 formed on the abutting edges or ends of the members as shown in Fig. 1.

The heating elements are arranged within the tank or container and in their preferable form, as shown, comprise an upper hollow walled annular element 8, which is rigidly supported within the intermediate member and concentric with said member by a series of equidistant pipes or tubes 9 extending from the wall of said element to and through the circular wall of the intermediate member, being firmly clamped thereto as shown at 10 in Fig. 1, and a lower hollow walled annular element 11 concentric with the upper annular element but of considerably smaller circumference than said upper annular element disposed principally within the lower rounded member 2 and having its upper portion projecting slightly within the upper annular member as shown in Fig. 1.

The lower annular element 11 is supported from the rounded member 2 by a series of depending tubes or pipes 12, which extend from the lower edge of the element 11 down to and through the wall of the member 2, and is additionally supported at its top from the intermediate cylindrical member by one or more horizontal tubes or pipes 13.

Both the upper element 8 and the lower element 11, though they differ in size, are of similar construction, each having annular concentric walls which extend fairly close to each other and are joined together at the upper and lower edges to a narrow annular closed space for the heating fluid indicated by 14 in the upper element and 15 in the lower element in Fig. 1. To increase the heating area of the elements, both the inner and outer walls thereof are provided with a series of corresponding horizontal corrugations, substantially as shown at 16 in the upper element and 17 in the lower element.

The steam or other heating fluid is conducted to the upper element through one or more of the pipes or tubes 9 which are suitably connected to a source of supply (not

shown) and is exhausted either through one of the remaining pipes or tubes 9 or into the lower element through lower connecting tubes 9^a which connect the lower element 11 to the upper element 8. I prefer to conduct this steam or other heating agent to the lower element through the pipe or pipes 13, which are suitably connected to a source of supply and to exhaust the same through the depending pipes 12.

As shown in Fig. 2, the lower end of the upper heating element is supported from the shell of the tank or container by three equidistant tubes or pipes, one of which indicated by the numeral 13, forms a conducting pipe for the heating agent and the two others of which indicated by the numerals 10^a serve merely as supports for the heating element. A suitable inlet 18 for the milk or other fluid to be condensed is located in the intermediate cylindrical member of the tank and is connected to a source of supply. The outlet 19 for the concentrated fluid is preferably centrally located in the rounded lower member and is closed by a suitable cap 20. To increase the heating capacity, I may provide the rounded member with a hollow space 21 for containing heating fluid. As shown in Fig. 1, I form this space by arranging a rounded wall 22 of comparatively thin metal above and within the member 2, securing it in place by clamping its outwardly extending horizontal annular top flange 23 between the flaps of the intermediate member 1, and the rounded member. The wall 22 is shallower than the member 2, and is curved to a slightly greater circle so that the space 21 between said wall and member varies in depth, gradually decreasing from the center outwardly to the surrounding contacting edges of the wall and member and presenting substantially a crescent shape in cross-section, as shown in Fig. 1. The member 2 is provided with a suitable steam inlet 24 and an outlet cock 25. In operation the milk or other fluid is introduced through the inlet 18 and the condensed fluid is drawn off through the outlet 19. The steam and lighter fluid elements arising from the heated fluid within the tank or container are drawn off by suction through the pipe 4.

It will be noted the heating elements as previously described are of cylindrical form, and are arranged within the container in a position concentric with the middle cylindrical member thereof. Notwithstanding the fact that they are double walled, said heating elements are not very thick and owing to their position and arrangement, offer but comparatively slight resistance to the circulation of the fluid in the container while heating. The upper heating element is made considerably larger in circumference than the lower element as shown in Fig. 1, so that the upper portion of the lower element may project within the lower portion of the upper element and also to provide an annular circulating space between the concentric lapping portions of said elements. In this manner provision is made for evenly uniformly and efficiently heating the fluid throughout without materially interfering with or impeding the circulation of the same.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of a wide range of variation and modification without departing from the spirit of the invention, I therefore, do not wish to be limited to the details of construction herein set forth, but desire to avail myself of such variations and modifications as fairly fall within the scope of the appended claims.

I claim as my invention:

1. In a device of the class described, the combination with a closed tank for the fluid to be heated; said tank having converging end walls, of an upper cylindrical double walled heating element disposed concentrically within the closed tank, a lower cylindrical double walled heating element considerably smaller in size than the upper heating element and arranged within the tank and below the upper element with its upper extremity projecting concentrically within the lower end of said upper element, and its lower portion properly located in the converging lower portion of the tank and means for conducting a heating agent to the heating elements.

2. In a device of the class described, the combination with a closed tank for the fluid to be heated, said tank having a converging lower portion, of an upper cylindrical double walled heating element adapted to be disposed concentrically within the closed tank, a lower cylindrical double walled heating element considerably smaller in size than the upper heating element and adapted to be arranged within the tank and below the upper element with its upper extremity projecting concentrically within the lower end of said upper element, and its lower portion properly located within the converging lower portion of the tank, and means for conducting a heating agent to the heating elements.

In testimony whereof I have hereunto affixed my name in the presence of two witnesses.

FREDRICK GROEN.

Witnesses:
ANTON GROEN,
FRED ENGELHARDT.