

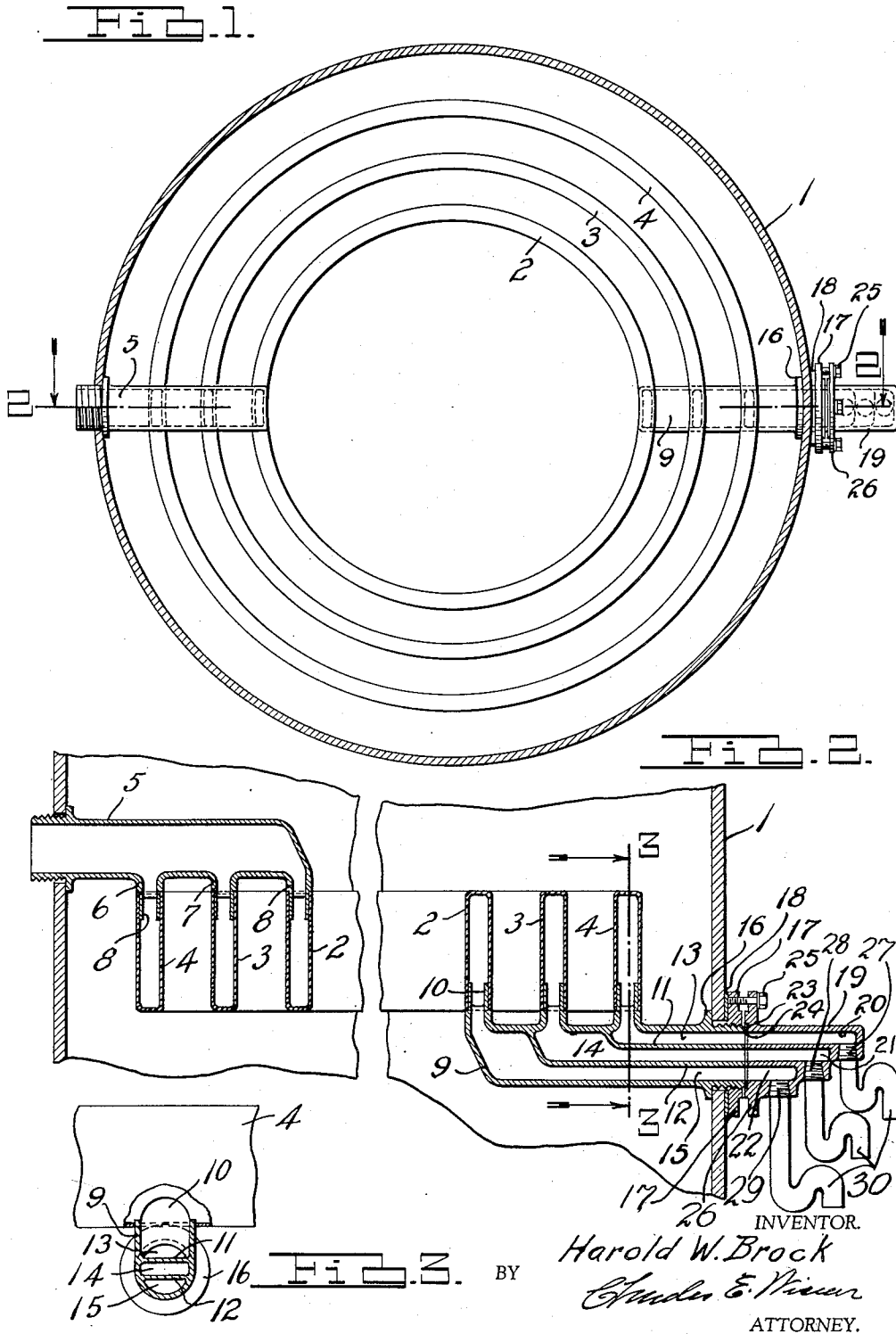
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VACUUM PAN FOR CONDENSING MILK PRODUCTS

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VACUUM PAN FOR CONDENSING MILK
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tion of Michigan

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2 Claims. (Cl. 257-248)

This invention relates to heating coils for use in vacuum pans for the condensation of milk and like fluids, alcohol shells, boiler feed water heaters and other uses, and the object of the invention is to provide heating coils arranged in banks and so constructed as to prevent trapping of air in the coils and overheating or underheating of the sections of the coils or variation in volume of flow of steam in each of the coils forming the bank. This object of the invention is attained through the provision of a common inlet to the coils forming the bank and a separate outlet for each of the coils.

Coils heretofore used in the general character of devices stated have always, so far as I know, been provided with a common outlet. Such arrangement causes inequality in steam flow in the several coils of a bank and the formation of air pockets resulting in the overheating or underheating of one coil in respect to another coil or overheating a portion of a coil in respect to other portions due to steam being transmitted through the outlet of one into another and trapping of air therein and the purpose of this invention is to provide an improved heating coil devoid of such undesirable results.

These and other objects and various novel features of the invention are hereinafter more fully described and claimed, and the preferred form of construction of vacuum heating coils embodying my invention is shown in the accompanying drawing in which—

Fig. 1 is a section taken through a condensing pan showing a bank of heating coils in plan view.

Fig. 2 is an enlarged section of the coils taken on line 2-2 of Fig. 1.

Fig. 3 is a section through one of the coils and the outlet taken on line 3-3 of Fig. 2.

As previously stated, my improved heating coil may be used for various purposes in the heating of liquids and for the purpose of illustration only and not by way of limitation, I have shown a portion of a container which I have herein sometimes termed a "vacuum pan", the wall of which is indicated at 1 and within the wall is a bank formed of three steam coils 2, 3 and 4. These, as shown in Fig. 2, are circular in form and rectangular in cross section but it is to be understood that other shapes, both in form and cross section, may be used. While only one bank of coils is here shown, several banks one above the other may be provided, depending upon the size and capacity of the vacuum pan.

In the bank of coils as shown more clearly in Fig. 2, there is a steam inlet conduit 5 positioned

above the upper edge of these coils and having outlets 6, 7 and 8 for the coils 4, 3 and 2 respectively. These outlets may be of any approved form preferably having portions 8 thereof inserted in between the two side walls of the respective coils and welded or otherwise secured in steam tight relation thereto. The inlet 5 has the three outlets and thus provides a common source of steam supply for the coils of a bank and successive banks would have independent steam inlet members if more than one bank of coils were used.

The outlet is formed preferably of a single casting although separate castings or conduits could be used. In its preferred form, the outlet conduit, indicated generally at 9, has portions 10 thereof inserted in the bottom edge of the respective coils 2, 3 and 4 and secured thereto in the same manner as the portions 8 of the inlet member 5.

The outlet conduit, as shown in Figs. 2 and 3, is formed with the dividing walls 11 and 12 on the interior thus providing three channels indicated at 13, 14 and 15 each opening to a single coil only. This casting is formed with a flange 16 which is welded or otherwise securely attached to the wall of the pan and has an end projecting through an aperture in the wall of the pan and threaded to receive a flanged packing nut 17. This packing nut, by threading onto the said end, compresses the packing 18 between the flange 17 and the wall 1. The flange 17 has a series of threaded apertures and the outer end of the casting is machined to form a finished end surface. To this is secured a continuation conduit 19 having the separate channels 20, 21 and 22 registering with the channels 13, 14 and 15 of the member 9. A gasket 23 is provided in a recess 24 formed in the face of the member 19, the gasket having apertures registering with the apertures at the finished end of the member 9. This gasket, it will be understood has webs registering with the wall members forming the separate conduits and when the bolts 25 provided in apertures in the flange 26 of the member 19 are inserted in the threaded apertures of the nut 17 and the parts 9 and 19 drawn tightly together, they form a continuous outlet element. The portion 19 has threaded apertures indicated at 27, 28 and 29 for three conduits as indicated at 30 in Fig. 2. The steam at the time it leaves these conduits or prior thereto is mostly condensed and flows as water through the apertures 27, 28 and 29. These conduits are each to be understood as having a trap individual thereto. The traps are

here shown as U traps in the conduit 30 but any type of trap may be used tending to prevent an escape of steam to atmosphere or to a common outlet and prevent air entering the coils 8 for instance as a steam trap shown in the U. S. Patent to C. E. Rogers, No. 1,417,943.

I have here shown only a portion of the vacuum pan and as such pans are common in the art no further illustration of the pan is here given as the invention resides solely in the character of construction of the heating coils.

In operation, steam is introduced into the inlet member 5 in the usual manner and it will be noted that the steam enters on one side of the coils and is discharged on the diametrically opposite side. Thus steam enters these coils and flows each way from the inlet 5 connected therewith. Thus any air that is in the coil is forced ahead of the steam each way to the outlet in each case. Heretofore, with a common steam outlet, steam will flow around the inner coil of a bank to the outlet in a less period of time than it will flow through the next coil to the same outlet. Thus, with a common outlet as is usually made, the steam would flow into the outlet conduit from the coil 2 and thence pass upwardly into the coil 3 before steam could reach the outlet and thus trap air in the coil. I have avoided the trapping of air and consequent overheating of portions of the heating coils by the provision of a separate outlet individual to each coil and therefore each coil heats evenly and remains under a practically constant temperature once the coil is in operation and all parts of each coil are similarly heated and can be maintained constantly at the desired temperature.

It will be observed that, with an uneven heating of the coils or with an air pocket in any one or more of the coils, there will be some portions of the coil more highly heated than others and the operator has no control of this condition in the older structures having a common outlet for

the coils. With my improved arrangement and with the conduits connected with the apertures 27, 28 and 29 each having its own trap 30, such troubles as heretofore occurred in the use of the common outlet are avoided.

The device is not materially greater in cost, if any, than any of the older devices, operates more efficiently, and it is believed evident from the foregoing description that the various objects and features of the invention are attained by the construction described.

Having thus briefly described my invention, its utility and mode of operation, what I claim and desire to secure by Letters Patent of the United States is:

1. A heating coil for the purpose stated comprising a bank of several coils positioned within a container in concentric relation, an inlet for heating fluid having an opening to each of the coils, and a trapped outlet for each coil providing a construction wherein each coil functions wholly independent of the other coils.

2. A heating unit for vacuum condensing pans comprising a bank of several coils circular in form and positioned therein in concentric relation, an inlet conduit having an inlet end thereof extending through the wall of the pan and having openings therein corresponding in number to the number of coils, a connection between each opening and the upper side of a coil providing a passageway for steam, and an outlet conduit for the bank of coils having a connection with the bottom side of each coil at a point diametrically opposite the inlet connections, said outlet conduit being formed to provide channels therein with which the respective outlet connections communicate, said outlet conduit having a portion extending to the exterior of the pan and terminating in a portion having an opening for each channel for connection of an independent extension to a waste line.

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