S. J. VAN KUREN.

APPARATUS FOR PASTEURIZING, COOLING, AND RIPENING MILK, CREAM, AND OTHER LIQUIDS.

APPLICATION FILED JUNE 5, 1915.

1,224,981.

Patented May 8, 1917.

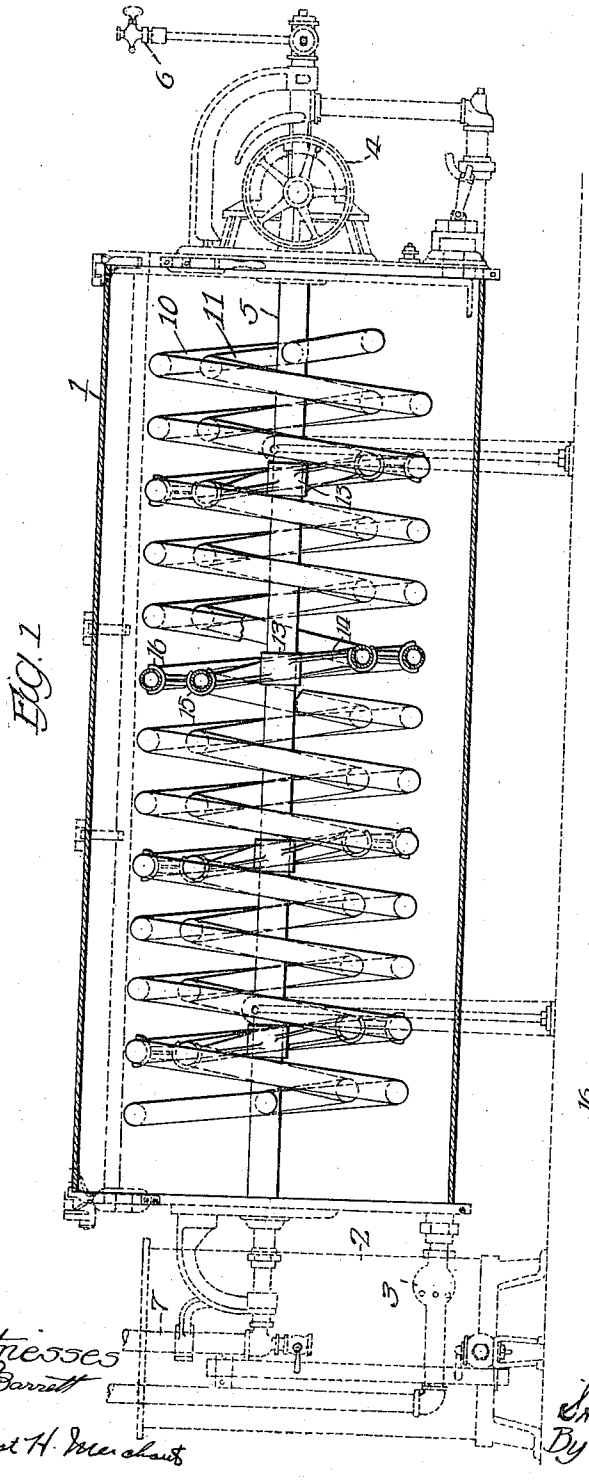


FIG. 1

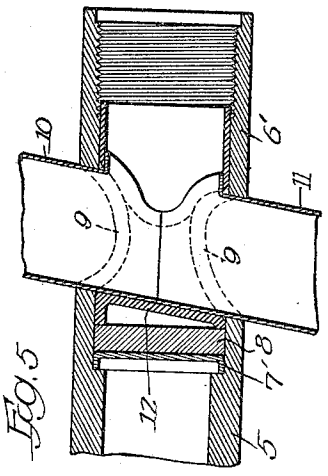


FIG. 5

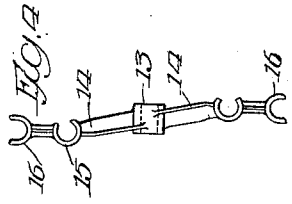


FIG. 4

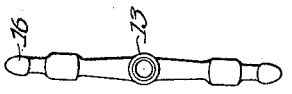


FIG. 3

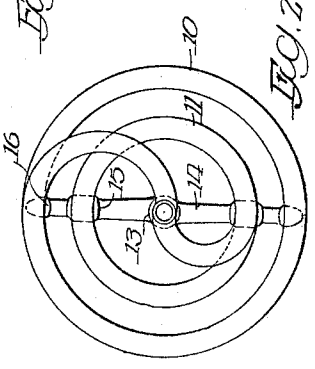


FIG. 2

Witnesses

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PASTEURIZING, COOLING, AND RIPENING MILK, CREAM, AND OTHER LIQUIDS.

1,224,981. Specification of Letters Patent. Patented May 8, 1917.

Application filed June 5, 1915. Serial No. 32,277.

To all whom it may concern:

Be it known that I, STEPHEN J. VAN KUREN, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Apparatus for Pasteurizing, Cooling, and Ripening Milk, Cream, and other Liquids, of which the following is a specification.

This invention relates to apparatus for pasteurizing, cooling and ripening liquids and more particularly to improvements in the apparatus disclosed in the application of Frank Chadima, Serial No. 22,780, filed April 21, 1915.

It is the object of my present invention to provide a rotatable heat interchanging member which combines great efficiency with strength and rigidity and which has numerous other advantages, as will appear as the invention is better understood by reference to the following specification when read in connection with the accompanying drawing in which—

Figure 1 is a side elevation of a heat interchanging member according to my invention, the receptacle with which it operates together with the attendant mechanism being outlined for the purpose of more clearly defining the objects of the invention;

Fig. 2 is an end elevation of the heat interchanging member;

Fig. 3 is an end elevation of one of the coil supporting members;

Fig. 4 is a side elevation of the same; and

Fig. 5 is an enlarged detail in section of a portion of the shaft end, showing the method of connecting the ends of the coils thereto.

Referring to the drawings, the receptacle 1 may be of any suitable construction well known in the art as may also be the attendant mechanism indicated in dotted lines on the drawing and for example may be identical with the structure disclosed in the co-pending application above referred to, which structure includes the liquid reservoir 2; the injector 3; the driving mechanism 4; the shaft 5, journaled in the ends of the receptacle 1 for supporting the heat interchanging coils; means 6 for admitting air to the heat interchanging member, and the outlet pipe 7 for returning the liquid to the reservoir 2.

The heat interchanging member comprises the shaft 5 having hollow end portions 6′, the shaft being preferably hollow throughout and plugged at the ends by inserting a copper disk 7′ and pouring a layer 8 of lead thereover. The hollow end portions 6′ are provided with diametrically opposite openings 9 into which the ends of the heat interchanging coils 10 and 11 are inserted. The coils 10 and 11 are helical in form and consist of copper pipe, well-tinned to prevent corrosion, and preferably the coil 10 is of greater diameter than the coil 11 so that the coils may be disposed one within the other. By reference to Fig. 2 it will be readily understood that one end of the coil 10 enters one of the openings 9 in the hollow end portion 6′ of the shaft 5 while the corresponding end of the coil 11 enters the diametrically opposite opening 9 in the end portion 6′. The arrangement of the ends of coils 10 and 11 at the opposite ends of the shaft 5 is identical.

To provide a more rigid connection between the ends of the coils 10 and 11 and the end portions 6′ of the shaft 5 I provide cast metal fillers 12, which are sweated into the hollow end portions 6′ and partially surround the ends of the coils which are sweated into the fillers and flanged, as indicated in Fig. 5. To support the coils intermediate their ends I secure upon the shaft 5 a plurality of members 13 having oppositely extending arms 14, each provided with coil supporting sockets 15 and 16, the socket 15 being adapted to receive and support the pipe of the coil 11 and the socket 16 receiving and supporting the pipe of the coil 10. The pipe coils are secured in the sockets 15 and 16 in any suitable manner and the entire construction is such that a rigid heat interchanging member is formed which will continue to perform its functions almost indefinitely with a minimum of attention and necessary repair.

I have discovered that a heat interchanging member comprising a plurality of coils arranged in accordance with the preceding description presents numerous advantages over a heat interchanging member made up

of a single coil as in the copending application referred to. Liquid is drawn through the coils during the operation of the machine by the action of the coil itself, a certain amount of air being drawn into the coil, together with the liquid, at each revolution thereof. The result is that where a single coil is used the discharge from the coil to the reservoir is intermittent, since the liquid passes through the coil in slugs separated by air spaces. By combining two coils and particularly where the coils are connected to the shaft at diametrically opposite points the delivery of liquid from the coils is found to be continuous. Obviously with the construction disclosed a considerably greater amount of liquid can be passed through the machine in a given time and hence material in the receptacle 1 can be treated more rapidly and more evenly than with a single coil apparatus.

It will be obvious that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing any of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A rotatable heat interchanging member for pasteurizers, coolers, ripeners and the like comprising a shaft having a central portion closed against the passage of fluids and hollow end portions, openings in the opposite sides of said shaft adjacent both ends thereof, hollow metal fillers in said hollow end portions having openings registering with the openings in said shaft, a plurality of helical pipe coils disposed one within the other about said shaft with their convolutions arranged in substantially parallel relation and their ends secured within said fillers, said hollow end portions forming, respectively, the inlet and outlet of said coils, and means on said shaft for supporting said coils.

2. A rotatable heat interchanging member for pasteurizers, coolers, ripeners and the like comprising a shaft having a central portion closed against the passage of fluids and hollow end portions, openings in the opposite sides of said shaft and adjacent both ends thereof, hollow metal fillers in said hollow end portions having openings registering with the openings in said shaft, a pair of helical pipe coils disposed one within the other about said shaft with their convolutions arranged in substantially parallel relation, the ends of said parallel pipe coils being disposed through said openings and flanged within said fillers, said hollow end portions forming, respectively, the inlet and outlet of said coils, and a plurality of arms secured to said shaft, each having means thereon to embrace the pipes of the respective coils.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."