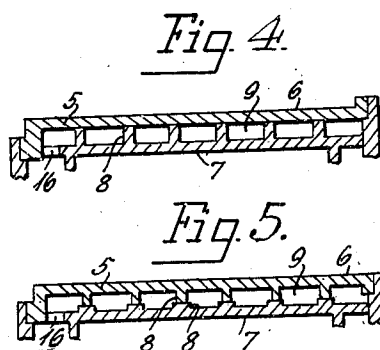
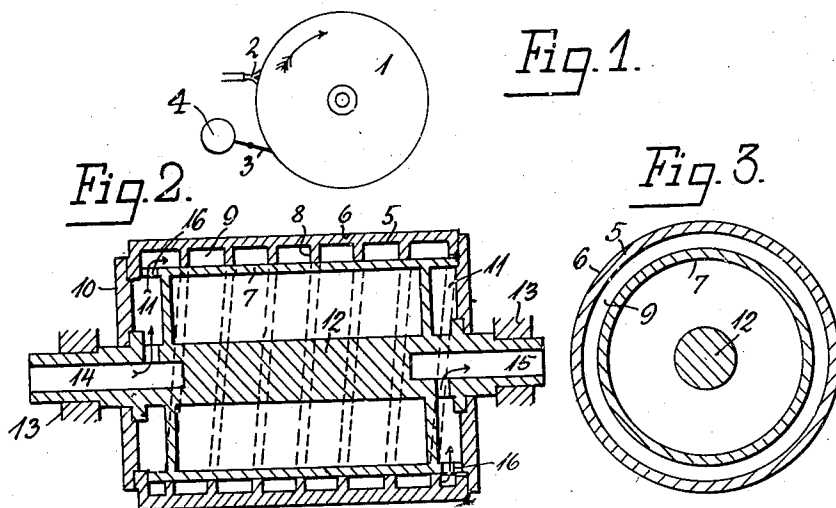


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H. J. J. BIGUM
 ROTARY COOLING DRUM
 Filed June 8, 1920



Inventor
 Hans Jorgen Jensen Bigum
 By *Knight* *Nov 1925*

UNITED STATES PATENT OFFICE.

HANS JØRGEN JENSEN BIGUM, OF COPENHAGEN, DENMARK.

ROTARY COOLING DRUM.

Application filed June 8, 1920. Serial No. 387,386.

To all whom it may concern:

Be it known that I, HANS JØRGEN JENSEN BIGUM, subject of the King of Denmark, residing at Copenhagen, Denmark, have invented certain new and useful Improvements in Rotary Cooling Drums, of which the following is a specification.

The invention relates to an improvement in rotary cooling devices for cooling, solidifying or crystallization of liquids, melted substances, emulsions, gelatine or the like, for instance margarine emulsion.

In apparatuses of this kind the substance is fed into the working surface of the rotary body, and is taken along on the same for a fraction of a revolution from the feeding point to a scraper which scrapes away the substance solidified on the working surface during the said portion of a revolution.

The rotary body is ordinarily shaped as a circular cylindrical drum whose cylindrical surface is the working surface. The latter may also be conical, however, or quite plane, but a common feature for most of the rotary cooling bodies of this kind is that the cooling fluid used is ordinarily a salt solution entering at one end of the axis of revolution of the cooling body and passing directly through the cooling body inside of the working surface of the same in order to escape at the other end of the axis of the cooling body.

As it is well known, the coefficient of heat transmission, for the heat passing from a wall to a liquid flowing along the same, depends on the speed of flow of the liquid. It is very important that speed should not be too low, and the present invention has for its object to give the cooling liquid in cooling apparatuses as high a speed as possible during its flow along the inside of the working surface.

In cooling drums of the above mentioned kind, the cross-sectional area of the drum is several times as large as the area of the supply channel for the cooling liquid and, for this reason, the liquid passes only slowly through the cooling drum. Even if there be provided a cylindrical body within the same and co-axially thereto, it will be impracticable, for purely constructional reasons, to make the cylindrical space between

the inside of the drum and the said cylindrical body so narrow that the cooling fluid passing through the said space will attain a suitably high speed, because such narrow channel will easily become clogged.

According to the present invention a very considerable speed of motion may be attained, simultaneously with a suitable depth of channel, for the cooling liquid flowing along the inside of the working surface by directing the liquid through one or more winding or meandering channels provided inside of the working surface, this surface forming one of the limiting walls of the channels.

The drawing shows various constructions of the invention.

Fig. 1 showing, in outline, a cooling drum in end elevation,

Fig. 2 shows a longitudinal section of a cooling apparatus with a helical channel for the cooling liquid,

Fig. 3 a cross-section of the same,

Figs. 4 and 5 longitudinal sections of the outer portion of two different constructions of the cooling drum shown in Figs. 2 and 3.

Referring to Fig. 1, 1 is a rotary body which is here supposed to be a cylindrical drum, 2 is the point of supply for the substance to be cooled, and 3 is the scraper which scrapes the cooled substance, and is forced towards the outer face of the drum 1 by a counter-weight 4.

Figs. 2 and 3 show one manner of constructing the cooling device of the cooling body. 5 is here a cylindrical jacket or drum whose outer surface 6 forms the working surface. Within the drum 5 and, preferably, coaxially thereto there is provided a hollow body 7, while 8 is a helical rib provided between the inner face of the drum 5 and the outer cylindrical surface of the hollow body 7. 9 is a helical channel formed between the windings of the rib and the bodies 5 and 7 and terminates, at each end of the hollow body 7, in a cavity 11 formed between the body 7 and the end walls 10 of the drum 5.

12 is the axis of revolution of the bodies 5 and 7 and is here, by way of example, shown made in one with the body 7. 13 are bearings for the shaft 12. 14 is a supply-

channel for the cooling liquid, and passes through the shaft 12 and opens into one of the chambers 11, whence the liquid flows, in the directions indicated by the arrows, through the channel 9 to the other chamber 11 from where it escapes by way of a discharge channel 15 at the other end of the shaft 12. 16 are openings in the cylindrical wall of the hollow body 7, and connect the chambers 11 with the channel 9.

Instead of one single helical channel 9, several such may be provided between the bodies 5 and 7, and all these channels must then terminate in the chambers 11.

In the constructions shown in Fig. 2, the ribs 8 are made integral with the drum 5 and fit tightly about the outer cylindrical face of the body 7.

As shown in Fig. 4, the ribs 8 may also be made integral with the body 7 and fit tightly against the inner face of the drum 5. As shown in Fig. 5, ribs 8 may also be provided both on the member 5 and the member 7, which ribs must then fit tightly against each other.

Having now particularly described and ascertained the nature of my said invention

and the manner in which the same is to be performed, I declare that what I claim is:—

1. A rotary drum for cooling fatty substances and emulsions comprising a cylinder on which the material to be cooled is supplied in a thin layer, a scraper for removing said material from the cylinder, a second cylinder inserted in the first cylinder, an annular narrow space between said two cylinders and a rib arranged in said annular space so as to form a narrow helical channel through which a cooling liquid may flow.

2. A rotary drum for cooling fatty substances and emulsions comprising a cylinder on which the material to be cooled is supplied in a thin layer, a scraper for removing said material from the cylinder, a second cylinder inserted in the first cylinder, an annular narrow space between said two cylinders and a rib integral with the first cylinder and arranged in said annular space so as to form a narrow helical channel through which a cooling liquid may flow.

In testimony whereof the foregoing specification is signed.

HANS JØRGEN JENSEN BIGUM.