July 1, 1930. M. P. VUCASSOVICH 1,769,088

FREEZING APPARATUS

Filed July 9, 1929

Fig. 1.

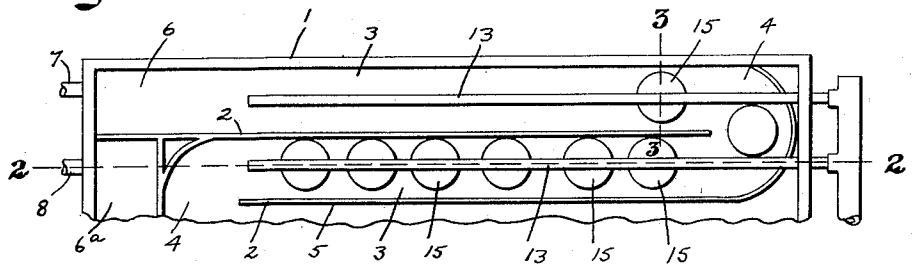


Fig. 2.

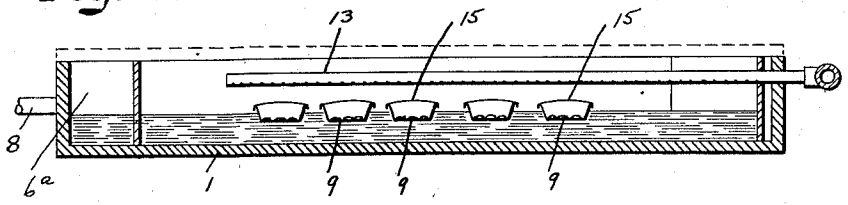


Fig. 3.

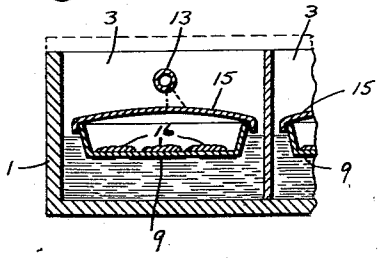


Fig. 4.

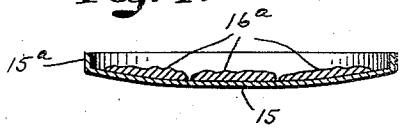
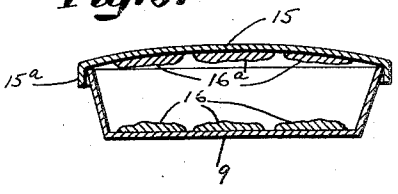


Fig. 5.



Inventor
M. P. Vucassovich
by Wright Brown Quinby & May
Attys.

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UNITED STATES PATENT OFFICE

MICHEL P. VUCASSOVICH, OF GLOUCESTER, MASSACHUSETTS

FREEZING APPARATUS

Application filed July 9, 1929. Serial No. 376,963.

This invention relates to apparatus for freezing fish and other comestibles, the apparatus being adapted to practice a method which consists in establishing a moving liquid having a freezing point below that of the material to be frozen, and with a movement from a loading point to a discharge point, said liquid having a temperature below the freezing point of the material, arranging said material in buoyant receptacles and subjecting the receptacles to movement through the flow of the liquid and to the temperature of the liquid as it is moved.

The apparatus to which my invention relates comprises a substantially horizontal container internally partitioned to form a sinuous runway which includes elongated major portions extending side by side, and shorter neck portions connecting the major portions in pairs, the runway being adapted to conduct a moving refrigerating liquid and buoyant receptacles floating thereon, in a sinuous path from a loading point to a discharge point, all as disclosed by Patent No. 1,641,441, dated September 6, 1927. In the operation of the apparatus disclosed by said patent, latent heat transference from material to be frozen in the floating receptacles is wholly downward through the bottoms and portions of the sides of the receptacles, to the liquid supporting the same, so that the freezing commences at the lower sides of the charges of material in the receptacles, and progresses upwardly.

It has been found that to ensure the freezing of the charges from their bottom to their top surfaces by said apparatus, a runway of such length is required as to render the apparatus undesirably bulky, and cause it to occupy an objectionably large area of floor space.

It has also been found that when the charges are more than usually thick, the time required for complete freezing is undesirably protracted, and that complete freezing is sometimes difficult of accomplishment.

In my pending application filed June 1, 1929, Serial No. 367,619, I have disclosed an apparatus organized as above stated and characterized by means for causing an upward transference of latent heat from the top surfaces of the charges while the above-described downward transference is going on, so that the freezing progresses simultaneously from the bottom surfaces upward, and from the top surfaces downward, said means being embodied in fixed heat-conducting deflectors located in the major portions of the runways above the path of the receptacles, and means for discharging a refrigerating liquid on upper surfaces of the deflectors.

The present invention is an improvement on that disclosed by said pending application, the chief object being to eliminate the loss of time required to occasionally defrost said fixed deflectors, it being necessary to stop the freezing operation during the operation of defrosting.

I attain this object by providing a plurality of movable deflectors adapted to cover and float with the receptacles, the deflectors being removable with the receptacles from the runway, so that each frosted deflector may be defrosted outside the runway while the freezing operation is progressing, non-frosted deflectors being substituted for removed frosted deflectors.

Figure 1 is a fragmentary top plan view.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is an enlarged section on line 3—3 of Figure 1.

Figure 4 shows in section one of the movable deflectors inverted to receive a charge.

Figure 5 shows in section a container and a movable deflector assembled for use, each having a charge.

The same reference characters indicate the same parts in all of the figures.

In the drawings, 1 designates a substantially horizontal container or tank, having internal partitions 2 and 5 forming a sinuous runway composed of elongated major portions 3 located side by side, and shorter neck portions 4, connecting the major portions 3 in pairs.

The inlet end 6 of the runway is extended to the end of the container, to form a loading end, and the opposite end 6ª is extended to a

point adjacent the loading end, to form a discharge end.

A liquid such as brine, having the temperature desired, is delivered through a pipe 7, and discharged through an overflow 8, maintaining a constant level through the apparatus. Buoyant receptacles 9 are provided, adapted to contain charges of material to be frozen, and to be moved by the liquid in the runway from the end 6 to the end 6a.

The apparatus thus far described and its operation, are fully described by the above-mentioned patent, latent heat being transferred downwardly from the charges to the liquid.

My above-mentioned pending application discloses means for causing an upward transference of latent heat from the top surfaces of the receptacle charges, so that freezing progresses from the top surfaces downward, as well as from the bottom surfaces upward, said means being embodied in fixed heat conducting deflectors, or roofs of thin sheet metal located in the major portions of the runways above the path of the receptacles 9, and conduits 13 supported above the deflectors and adapted to discharge a refrigerating liquid upon the deflectors and thereby subject the receptacles and their charges to the temperature of the discharged liquid, said temperature being practically the same as that of the moving liquid in the runway.

I have found that frost accumulating on the fixed deflectors requires occasional stoppage of the freezing operation while the deflectors are being defrosted. To prevent the delay thus involved, I substitute for said fixed deflectors a plurality of movable deflectors 15, the number of which is equal to, and preferably greater than the number of receptacles 9.

Each deflector is formed as a cover adapted to bear separably on and float with a receptacle 9, and provided with a marginal flange 15a. The body of the deflector has a slightly curved or crowning liquid distributing top surface, so that liquid discharged by a conduit 13 on the central portion of said surface flows radially to the margin thereof.

The deflectors are movable with the receptacles through the receiving and discharge ends of the runway, so that when each receptacle reaches the discharge end, it may be removed with the accompanying deflector, its frozen charge being then removed, and the deflector defrosted outside the runway, if its condition so requires. The removed receptacle may be provided with a charge 16, and with another deflector free from frost, and inserted in the loading end without waiting for the defrosting of the removed deflector.

If desired, the removed frosted deflector may be only partially defrosted and left with a sufficient coating of frost on its under surface to cause the adhesion thereto of another charge 16a while the deflector is inverted, as shown by Figure 4, the charge 16a adhering to the deflector when the latter is turned right side up and placed on a receptacle, as shown by Figure 5. The frost coating of the deflector is, therefore, utilized to hold a charge 16a in close proximity to the deflector and above the charge 16 on the bottom of the receptacle.

I claim:

Freezing apparatus comprising a substantially horizontal container internally partitioned to form an elongated runway having a landing end and a discharge end, and adapted to conduct a moving refrigerating liquid, and buoyant receptacles floating thereon, from the loading to the discharge end, said apparatus being characterized by movable heat-conducting deflectors, formed as covers adapted to bear separably on and float with said receptacles, and having liquid distributing upper surfaces, and means for discharging a refrigerating liquid upon said surfaces and thereby causing upward transference of latent heat from the contents of the receptacles through the deflectors, said deflectors being movable with the receptacles covered thereby through the receiving and discharge ends of the runway, to permit the defrosting of the deflectors outside the runway, and the utilization of portions of the frost coatings on the under sides of the deflectors, to hold charges placed thereon in close proximity to the deflectors and above charges placed on the bottoms of the receptacles.

In testimony whereof I have affixed my signature.

MICHEL P. VUCASSOVICH.