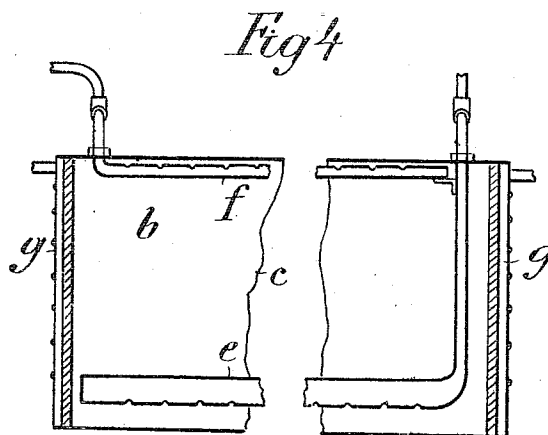
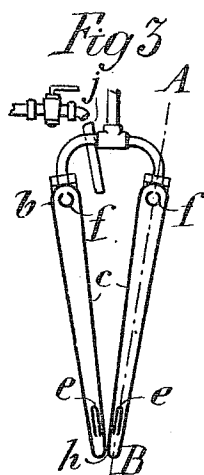
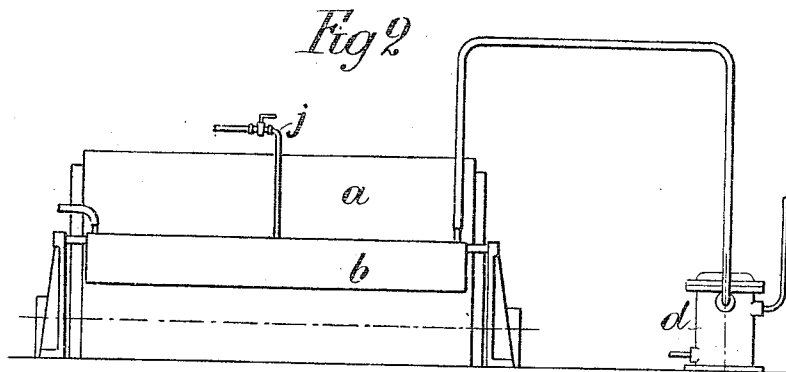
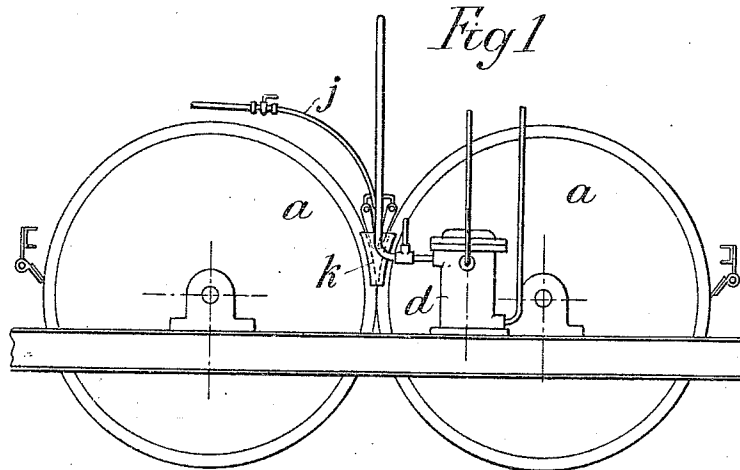


E. SCHOU.  
 COOLING APPARATUS FOR FLUID OR SEMI-FLUID SUBSTANCES.  
 APPLICATION FILED FEB. 25, 1909.

957,629.

Patented May 10, 1910.



Witnesses  
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# UNITED STATES PATENT OFFICE.

EJNAR SCHOU, OF LONDON, ENGLAND.

COOLING APPARATUS FOR FLUID OR SEMI-FLUID SUBSTANCES.

957,629.

Specification of Letters Patent.

Patented May 10, 1910.

Application filed February 25, 1909. Serial No. 479,922.

*To all whom it may concern:*

Be it known that I, EJNAR SCHOU, a subject of the King of Denmark, residing at London, England, have invented certain new and useful Improvements in Cooling Apparatus for Fluid or Semi-Fluid Substances, of which the following is a full, clear, and exact description.

This invention relates to apparatus for cooling fluid or more or less fluid substances such as fats, margarine-emulsion, soap etc. of the type in which the substances in question are spread out in thin layers on relatively movable surfaces, the minimum distances apart of which surfaces determine the thicknesses of the layers of the substances in question and which layers are exposed to cooling on the surfaces until removed therefrom by means of knives or scrapers. It is generally of importance not only that the layers should be effectively cooled throughout their entire thickness, but also that the cooling should take place as suddenly as possible, that is to say in such manner that the shortest possible space of time passes between the moment at which the substance has its relatively high temperature, and the moment, at which it is spread out in thin layers to cool.

Now this invention has for its object to provide apparatus whereby this desirable action can be obtained.

The present invention may be used to carry out the method of Patent No. 904,231, issued jointly to me and Hans H. Schou, to which reference may be made for further details of description.

Apparatus of the type referred to which I believe to be most suitable for effecting such cooling, comprises two horizontal hollow rollers of metal arranged in a known manner parallel and near to each other, through which rollers flows a cooling medium and between which the fluid or semi-fluid substance is poured. As this substance is sometimes not very fluid a considerable quantity is delivered into the trough formed between the rollers so as to assure the dispersion of the substance over the entire length of the rollers, and it will be easily understood that the fluid in such position is exposed to the cooling effect of the rollers so that the final cooling as the material

passes into the bight of the rollers is effected less suddenly than desirable.

According to the present invention, this drawback is avoided by preventing or counteracting the cooling to which the substance is exposed before being spread out into the thin layers on the cold surfaces in question. For this purpose the substance can be delivered into a special chamber with insulating or heated walls, or the substance can be caused to flow down the outer surface of a hollow body which is heated from inside or constructed of some heat insulating material whereby the quantity of heat lost through the radiation is replaced by supply of heat from inside or the radiation is so much reduced that it becomes insignificant.

A construction of apparatus embodying this invention is shown by way of example in the accompanying drawing.

Figure 1 is an end view of the apparatus arranged in connection with two rollers of known kind. Fig. 2 is a side view of the same, one roller being removed. Fig. 3 is a sectional view of part of the apparatus on larger scale, and Fig. 4 is a section corresponding to the line A—B of Fig. 3.

Between the rollers *a* is arranged a narrow trough *b* of approximately the same length as the rollers and which is suspended in a suitable manner as clearly shown in Figs. 1 and 2. The trough consists of two flat hollow bodies *c*, Fig. 3, constructed of metal plate and through which water at a suitable temperature can flow. The water, which for instance can be heated by steam in an apparatus *d*, Figs. 1 and 2, provided for this purpose, flows through flat pipes *e*, Figs. 3 and 4, into the bodies *c*, the undersides of these pipes being perforated and leaves the bodies through pipes *f*, which are also perforated but at their upper sides. The ends of the bodies *c* are connected by means of triangularly shaped plates *g* so as to form a narrow trough. Between the bottom part of the bodies a slit *h* is left, Fig. 3, of suitable breadth to allow the substance to be cooled to flow through.

When a trough constructed as set forth is arranged as deep as possible between the rollers without, however touching the same, and the substance to be cooled, specifically a liquid emulsion including fatty matters

and liquids such as milk, is supplied thereto by some suitable means, such for example as a pipe *j*, the substance will be kept at the desired temperature by the hot water circulating in the hollow walls of the trough until shortly before it is gripped between the rollers and spread out on the same.

If necessary a couple of small triangularly shaped plates *k*, Fig. 1, of known kind, may be pressed against the ends of the rollers so as to prevent the substance from flowing out at the ends of the rollers.

Owing to the rotation of the rollers the substance flowing from the trough will not rise outside the trough between the rollers to the same level as inside the trough, so that in attending to the apparatus it is only necessary to watch that the substance shall not flow to the trough so quickly that it flows over its edges.

As hereinbefore stated, instead of the substance being delivered into a space or chamber formed between two heated bodies *c*, a single heated body can be used and the fluid substance be caused to flow down one or both surfaces thereof until caught by the rollers, the inside heating replacing the amount of heat lost through radiation.

The constructions described are only to be considered as given by way of example as various alterations may be made without departing from the invention. In many cases a sufficiently effective protection against the premature cooling can be obtained by simply making the walls of the trough *b* of wood or some other heat insulating material.

Having thus described my invention, I claim as new and desire to secure by Letters Patent.

1. In a cooling apparatus of the class described, a pair of rolls separated by a minute definite gap, means for cooling said rolls, means for supplying liquid emulsion above said rolls, and means for conducting said emulsion into the bight of said rolls, said means acting to prevent cooling contact of the emulsion with the rolls prior to entering the bight thereof.

2. In a cooling apparatus of the class described, a pair of rolls separated by a minute definite gap, means for cooling said rolls, means for supplying liquid emulsion above said rolls, and two heated bodies acting to conduct said emulsion between them into the bight of said rolls, said bodies acting to prevent cooling contact of the emulsion with the rolls prior to entering the bight thereof.

3. In a cooling apparatus of the class described, a pair of rolls separated by a minute definite gap, means for cooling said rolls, means for supplying liquid emulsion above said rolls, and a heated body for conducting said emulsion into the bight of said rolls, said body acting to prevent cooling contact of the emulsion with the rolls prior to entering the bight thereof.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

EJNAR SCHOU.

Witnesses:

J. HALLEY,

THOS. DUNKERLEY.