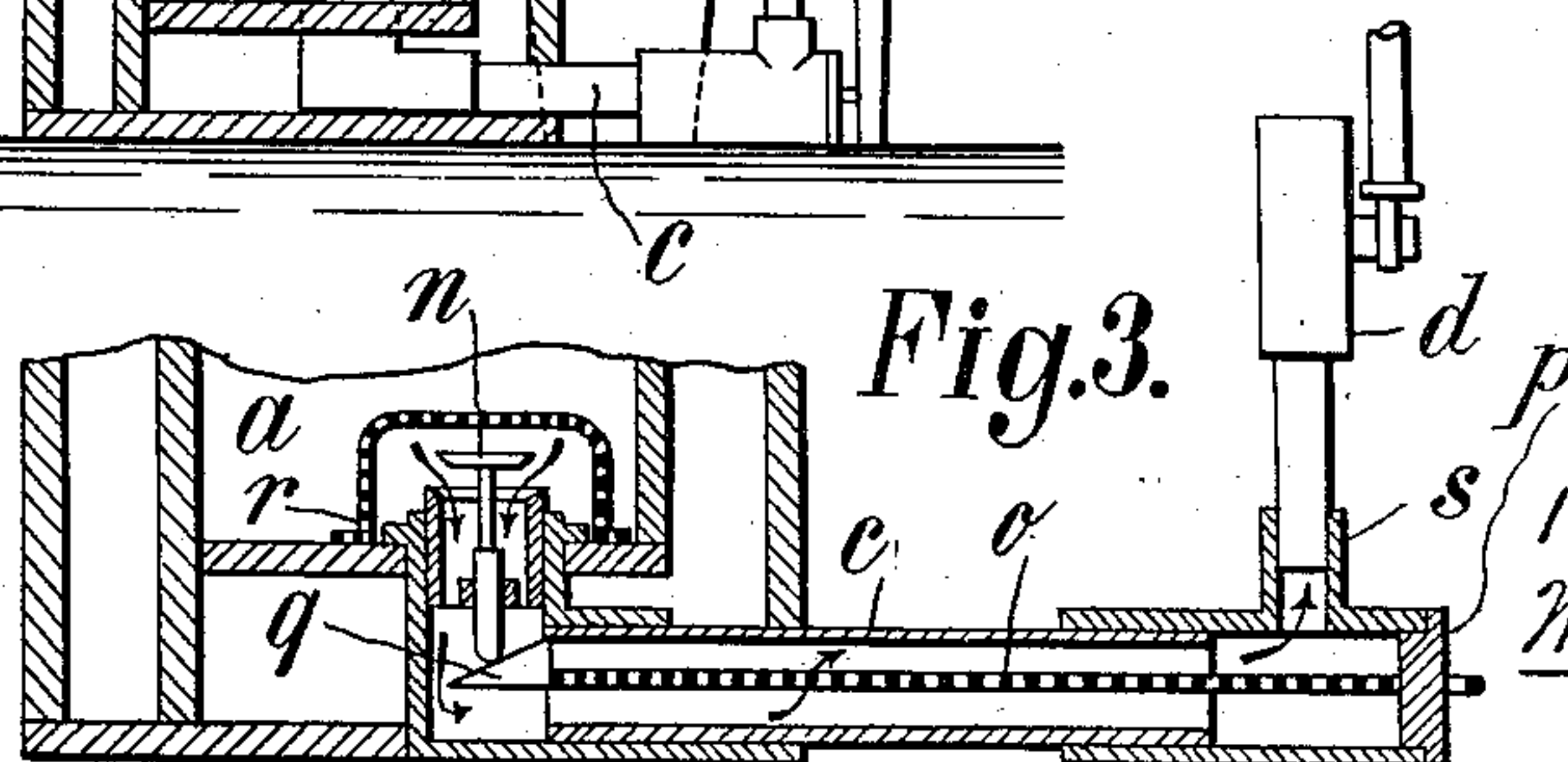
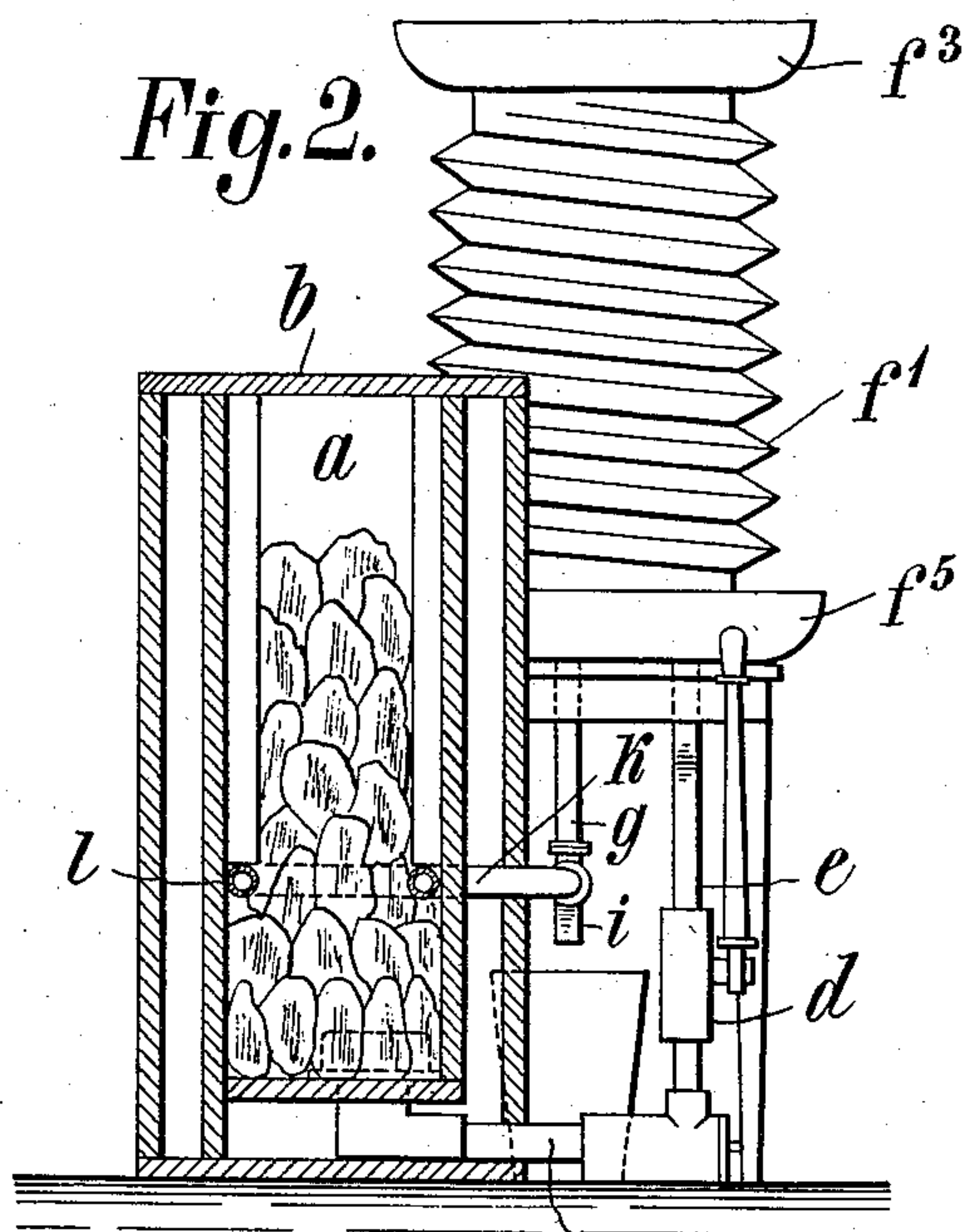
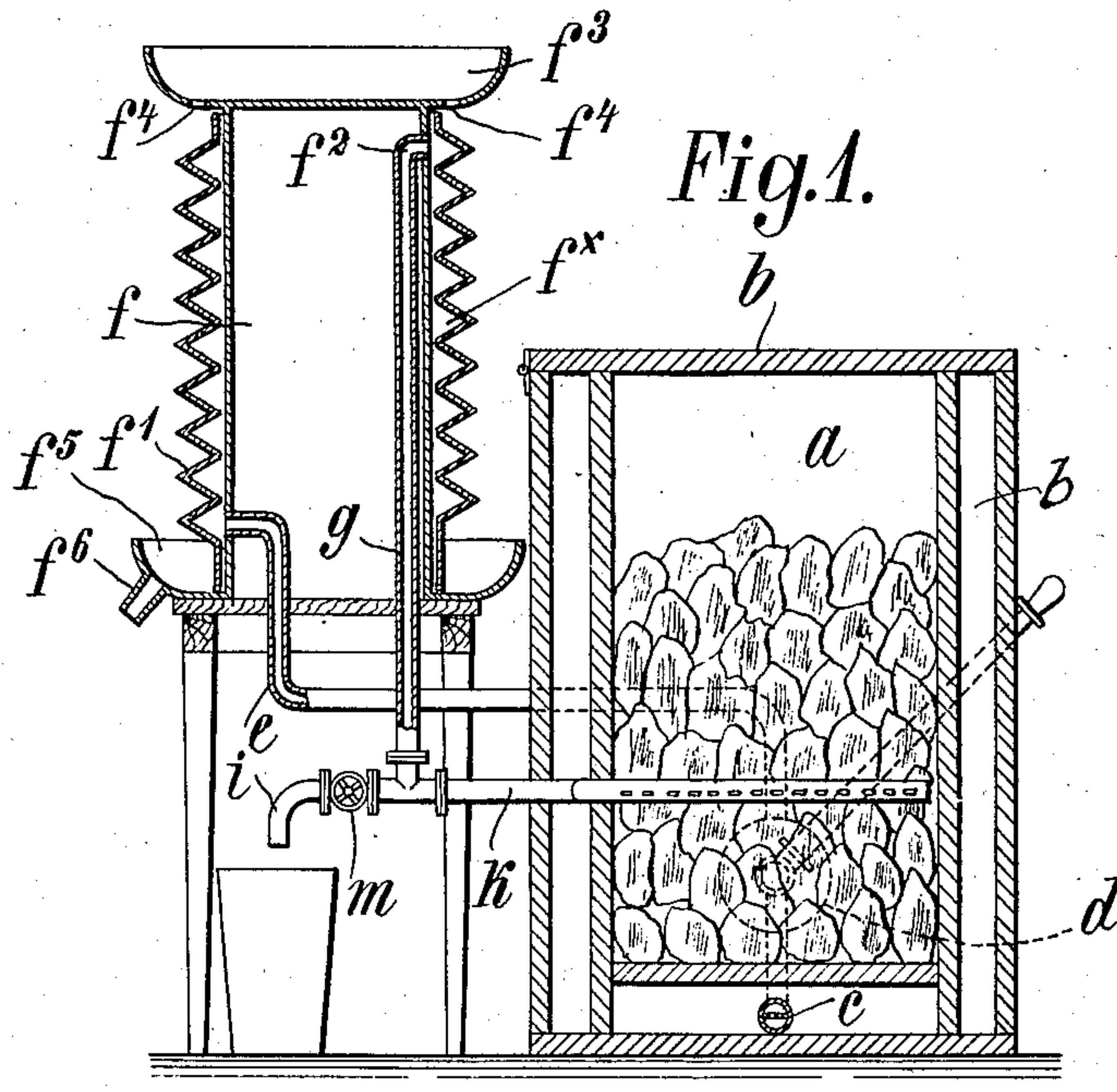


No. 849,998.

PATENTED APR. 9, 1907.

W. HELM.  
COOLING APPARATUS.  
APPLICATION FILED MAR. 10, 1904.



WITNESSES:

Ired White  
Rene' Ruine

INVENTOR:  
Wilhelm Helm,

By his Attorneys

Arthur C. Mason & Co



# UNITED STATES PATENT OFFICE.

WILHELM HELM, OF BERLIN, GERMANY.

## COOLING APPARATUS.

No. 849,993.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed March 10, 1904. Serial No. 197,453.

*To all whom it may concern:*

Be it known that I, WILHELM HELM, a subject of the King of Prussia, residing in Berlin, Anhaltstrasse 8, Germany, have invented certain new and useful Improvements in Cooling Apparatus, of which the following is a specification.

My invention aims to provide certain improvements in cooling apparatus, and especially in the type of apparatus which uses ice, preferably cracked into small pieces, or a cooling mixture, such as ice and salt. The liquid formed by the melting of the ice is used for the cooling of the desired material. The material to be cooled extracts only a portion of the cold of the liquid, leaving it still at a temperature below that of the material, so that by conducting a portion of it after its first use back into the ice-receptacle and passing it again over the ice it will receive an additional amount of cooling and will at the same time melt down a certain additional quantity of ice. This exceedingly cold liquid may be employed for various purposes—such as the cooling of other liquids or of chambers in which meats, fruits, or the like are kept, such chambers being either in the immediate neighborhood of the ice-receptacle or separated therefrom, or the liquid may be used in places of both such kinds. A portion of the liquid is withdrawn after it is used, the remaining portion being after use conducted back to the ice-receptacle. The embodiment of the invention illustrated operates according to the latter system.

In the accompanying drawings, Figure 1 represents in longitudinal section, and Fig. 2 in cross-section, an embodiment of the invention applied to the cooling of a vessel of milk or other liquid. Fig. 3 illustrates, in section and on an enlarged scale, the connections of the inlet side of the pump.

Referring to the drawings, the ice or mixture of ice and salt or other cooling mixture is arranged in the receptacle *a*, which is preferably provided with a jacket *b* to retain the cold. It is in this receptacle that the cooling of the liquid takes place. The cold liquid collecting in the bottom of the receptacle *a* passes through a tube *c*, pump *d*, and tube *e*, to a receptacle *f* containing the milk. The cooling liquid passes through a coil or other suitable arrangement within this receptacle. After the extraction of the cold as far as possible from the liquid it passes out of the recep-

tacle *f* through a tube *g*, from which it branches off into two tubes *i* and *k*. The tube *i* is provided with a cock *m* and serves for running off the excess of liquid at a rate controllable by the cock. The tube *k* returns into the receptacle *a* and terminates in this receptacle preferably in a spraying-tube *l*, through which the remaining part of the liquid from the milk-can *f* is again run over and through the ice and melts an additional portion thereof, at the same time lowering its own temperature and with the additional portion so melted passes again through the pump and the milk-can as before. The portion of the liquid which is branched off at *i* is still of somewhat lower temperature than the milk and may be used for other purposes—as, for example, for a preliminary cooling of the milk which is to be conducted into the can or tank *f*. The spraying-tube *l* is preferably arranged in the lower part of the receptacle *a*, and its apertures may advantageously be directed downwardly, so that it is always the lower part of the ice-supply which is being most melted and used, the ice above the spraying-tube being a reserve supply. In order to facilitate cleaning of the spraying-tube, it is preferably made removable.

The apparatus admits of very nice regulation according to the quantity of material to be cooled and the amount of reduction of temperature to be obtained by operating the pump *d* more quickly or more slowly and by opening the cock *m* more or less. Thus the apparatus operates in the manner of a cooling or refrigerating machine. In order to prevent as much as possible the obstructing of the orifices of the spraying-tube, the outlet from the receptacle through which the liquid passes to the pump may be covered with a strainer *r*. Also within the tube *c* is a strainer *o*, fastened to the end plug *p*, which separates the tube *c* into two parts in such a way that the cooling liquid coming from the receptacle *a* has to pass through this strainer *o* in order to enter the branch *s* leading to the pump.

In order that the strainer *o* may be withdrawn without stopping the action of the pump and the other parts of the apparatus so as to clean the strainer, there is provided a projection *q* at the inner end of the strainer which serves as a cam to open a valve *n*, arranged in the inlet end of the tube *c*, leading to the pump. The valve automatically



closes when the strainer is withdrawn and is automatically opened by the insertion of the strainer into position.

A suitable construction of the receptacle *f* is indicated in section in Fig. 1. The cooling liquid passes from the pump *d* through the pipe *e* to the inlet of the helically-corrugated cylinder or "coil" *f x*. After passing through said cylinder the cooling liquid passes from the outlet *f*<sup>2</sup> of the latter into the pipe *g*, from which it branches off, as explained, into the two tubes *i* and *k*. Milk or other material to be cooled is poured into the funnel *f*<sup>3</sup>, whence it runs through the openings *f*<sup>4</sup> downward over the outer surface of the helically-corrugated cylinder *f x*, extracting the gradually-increased cold of the helix and then running into the funnel *f*<sup>5</sup>, from which it can be withdrawn at a very low temperature through the outlet *f*<sup>6</sup>.

Though I have described with great particularity of detail certain embodiments of the invention, yet it is not to be understood that the invention is limited to the particular embodiments described. Various modifications in detail and in the arrangement and combination of the parts may be made by those skilled in the art without departure from the invention.

What I claim is—

1. An apparatus for cooling by means of

ice or a cooling mixture, comprising in combination a receptacle *a* for containing the ice or cooling mixture, a pump for circulating liquid to the material to be cooled and over the ice again, means for withdrawing the melted liquid from the receptacle *a* and passing it to said pump, a removable strainer between said pump and the outlet of the receptacle *a*, a valve in said outlet, and means whereby the removal of said strainer causes the closing of said valve and the insertion of said strainer to its normal position causes the opening of said valve.

2. An apparatus for cooling by means of ice or cooling mixture, comprising an ice-containing receptacle, means for circulating the melted liquid to the material to be cooled and over the ice, said means including a pump, an outlet-valve in the bottom of said receptacle, a removable strainer between said pump and the outlet of the receptacle, and a projection carried by said strainer adapted to engage and open said valve, when said strainer is in place.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILHELM HELM.

Witnesses:

JOHANNES HEIN,  
WOLDEMAR HAUPT.