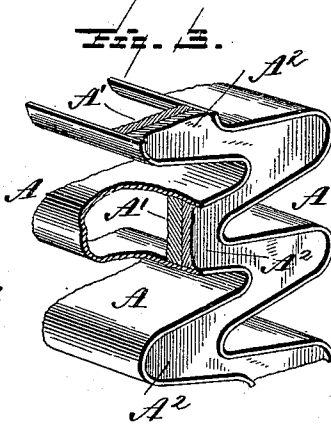
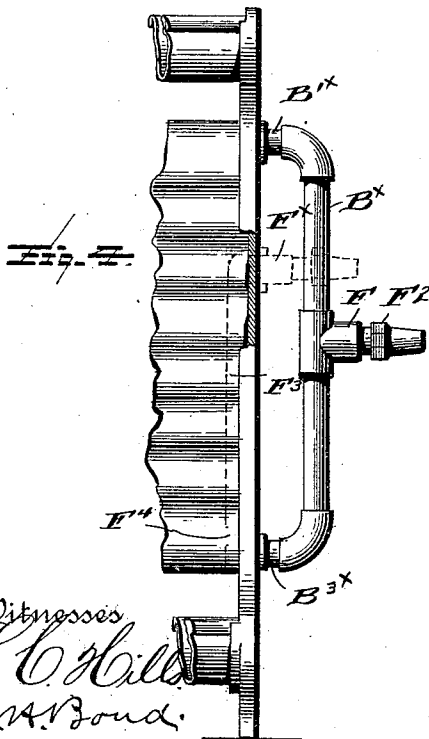
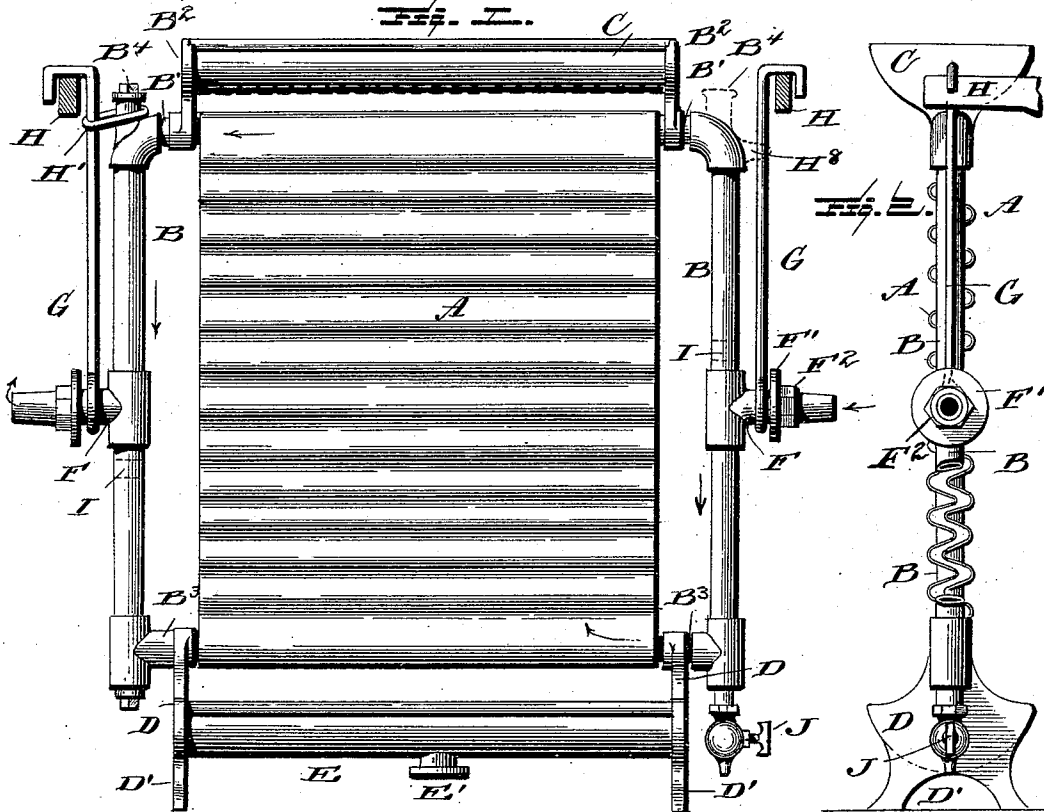


(No Model.)

S. M. HEULINGS, Jr. & E. EVANS.
MILK COOLER.

No. 471,974.

Patented Mar. 29, 1892.



Witnesses
L. C. Hill
E. A. Bond.

Inventors:
Samuel M. Heulings, Jr.
Ellwood Evans,
by E. B. Stocking
Attorney

UNITED STATES PATENT OFFICE.

SAMUEL M. HEULINGS, JR., AND ELLWOOD EVANS, OF HADDONFIELD,
NEW JERSEY.

MILK-COOLER.

SPECIFICATION forming part of Letters Patent No. 471,974, dated March 29, 1892.

Application filed August 3, 1891. Serial No. 401,551. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL M. HEULINGS, Jr., and ELLWOOD EVANS, citizens of the United States, residing at Haddonfield, in the county of Camden, State of New Jersey, have invented certain new and useful Improvements in Milk-Coolers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention has reference to milk or other liquid coolers of that class which comprises a corrugated cooling-surface and means connected therewith for applying water or any other refrigerant, and in detail in
15 some respects the invention refers to such coolers when adapted for suspension.

Among the objects of the invention are to provide such a construction as will permit of a ready access throughout the entire surface
20 of the corrugated plates for cleaning purposes and the rotation or semi-rotation of the entire apparatus to give access to both sides and all parts, thus further facilitating the operation of cleansing the same.

25 A further object is to provide means for suspension which will not only be pendulous, whereby the apparatus will automatically assume a perpendicular position, but which shall serve at the same time to receive and
30 conduct in a desired circuit or direction and deliver from the apparatus the refrigerant employed.

It is also an object of the invention to firmly unite the two adjacent corrugated cooling-
35 plates by some means which shall leave the ends of said plates free and unobstructed, so that the hand or any cleaning device may pass completely along the corrugations when cleaning the plates. Heretofore such plates have
40 terminated against standards or other parts, thereby forming at the end and within the corrugations recesses or places which were more or less difficult to be cleaned. Our improvement in this regard obviates this ob-
45 jection.

Other objects and advantages of the invention will be hereinafter described, and the novel features thereof will be particularly pointed out in the claims.

50 Referring to the drawings, Figure 1 is a side elevation of a cooling apparatus con-

structed in accordance with our invention.

Fig. 2 is an end elevation with a portion of the frame-work removed. Fig. 3 is a detail in perspective illustrating one manner of se-
55 curing the ends of the corrugated plates. Fig. 4 is an elevation of one end of an apparatus, illustrating a modification of our invention. Like letters refer to like parts in all the figures.

60 A A represent the cooling-surfaces of the apparatus, and each consists of a corrugated plate usually of sheet metal. For the purpose of uniting these plates we first place between them a filling A', which may be of
65 metal, paper, or paper-pulp, plaster-of-paris, cement, or any other suitable material. This filling conforms to the inner surfaces of each of the plates and extends from one to the other and is arranged at such a distance from
70 the end as will leave a pocket or recess extending from end to end, and into said pocket or recess we pour or flow or otherwise place solder or other liquid metal A² and allow the same to harden. In this manner the two plates
75 are secured firmly together, and no obstruction whatever remains within the corrugations or along the edges and upon the outer surfaces of the plates, so that every portion of said sur-
80 faces is readily accessible for cleaning purposes. We also by this method provide a filling-piece which exactly conforms to any irregularities in the corrugations of the plate, and thus produce not only a water-tight connection, but provide a support from all points for
85 the plates. These results cannot practically be secured by cutting and fitting by hand a filling or spacer. When the filling A' is of metal we find it necessary only to flow the solder or other liquid metal along the lines of juncture
90 between said filling and the corrugated plates. This method of uniting the parts secures the same advantage of preventing any obstruction upon the outer surfaces and within the corrugations of the plates, whereby they are
95 readily cleaned.

The upper and lower ends of the cooling surfaces are rounded, as shown in Fig. 1, as is usual, and communicate with a frame-work B, which is hollow. In this instance we have
100 illustrated in Fig. 1 and by full lines in Fig. 4 such a frame-work made up of pipe and pipe-

fittings; but we do not limit our invention in
 this regard. At the top we mount or form
 the branches B' and castings B², which con-
 form on their inner surfaces to the contour
 5 of the perforated receiving-trough C, the ends
 of which are soldered or otherwise secured to
 the castings. At the lower end and upon the
 branches or pipes B³ and we form castings D,
 which upon their inner surfaces conform to
 10 the contour of the trough E, provided with
 the discharge-pipe E', and said castings may
 or may not, as desired, be provided with feet
 D', upon which the apparatus may rest when
 15 placed upon the floor. Trunnions F are pro-
 vided on the frame-work and serve for the
 pivotal connection with the apparatus of sus-
 pension links or hooks G, that are to be con-
 nected with brackets H, extending from a
 wall or other support. A ring H', or it may
 20 be lugs H⁸, only one of which is shown formed
 on the frame-work, is or are provided for the
 purpose of connecting the links with the
 frame at a point above the trunnions, so as
 to prevent any undue oscillation of the ap-
 25 paratus. The ring is intended to remain in
 connection with the frame-work while the ap-
 paratus is suspended and disconnected and
 while it is being rotated or semi-rotated for
 access to opposite sides for cleaning purposes.
 30 It will be noted that in rotating the appa-
 ratus the pivotal connection of the links with
 the trunnion permits a movement away from
 the wall sufficient to allow the apparatus to
 turn. This could not take place if the links
 35 were rigidly connected at the trunnions. The
 ring H' is lifted from the boss or projection
 B⁴ in order to permit of the turning of the
 apparatus, and when the lugs H⁸ are em-
 ployed a sidewise movement will release them
 40 from the link in order to permit the appa-
 ratus to be turned. The ring connection may
 be preferable as being less rigid than the lugs
 unless the latter are spaced so as to permit of
 a slight oscillation of the apparatus upon the
 45 trunnions in order that it may seek automati-
 cally its perpendicular; but in either case the
 apparatus would find its own perpendicular
 by reason of its suspension upon the brack-
 ets being practically pivotal. The trunnions
 50 F are hollow, as is the frame-work, and in or-
 der to secure a passage of the cooling-liquid
 from bottom to top and within the cooling-
 plates a plug I is placed above one of the
 trunnions and below the opposite trunnion,
 55 so that the liquid takes the course indicated
 by the arrow.

We do not limit our invention to the exact
 construction of trunnion shown, but illustrate
 one form which is acceptable. This form com-
 60 prises a washer F' and a coupling F², placed
 upon the trunnion in the order named and
 outside of the link G, the coupling being screw-
 threaded or otherwise mounted upon the trun-
 nion and adapted for connection with or in-
 65 sertion into a hose or other pipe.

It is evident that any of the well-known
 pipe connections which are employed where

one part remains stationary and another ro-
 tates may be used at the trunnions of our ap-
 paratus.

Instead of employing a frame-work of pip-
 ing, and in order to provide trunnions and
 links to apparatus of this class in which there
 are standards at the ends of the corrugated
 plates, we propose to apply trunnions F^x, 75
 either solid or hollow, to said standards, as
 illustrated by dotted lines in Fig. 4. These
 trunnions may be placed either at or above
 the middle lengthwise of the standard, if de-
 sired, because the excess of weight of the cool- 80
 ing-liquid below the trunnions might facili-
 tate the finding of an exact perpendicular
 when the apparatus is suspended. When hol-
 low trunnions are provided upon the stand-
 ards, they may be hollow and communicate 85
 either directly with the space between the
 plates or with a hollow chamber F³, cast or
 otherwise formed in the standard and extend-
 ing down to the bottom of the plates and com-
 municating with their interior, as at F⁴. In 90
 this manner we secure an upward circulation
 of the cooling-liquid.

In some instances we provide the standards
 with a frame-work B^x, Fig. 4, communicating
 with the space between the cooling-plates at 95
 the top or bottom by means of the pipe B^x
 B^{3x}. In this manner the trunnions and links
 and cooling-liquid-supply pipes may be ap-
 plied to old forms of standards which have
 no chamber F³ formed thereon, whereby said 100
 forms of apparatus are adapted to be rotated
 for cleaning purposes without removing them
 from their brackets. The link-suspension
 and link-and-frame-connecting devices H' H⁸
 permit of the use of trunnions for turning the 105
 apparatus and at the same time retain pendu-
 lous support and action of the apparatus.

It is apparent to persons skilled in the art
 that the unobstructed corrugations may be
 secured without the use of the filling A' in the 110
 operation of closing up the ends with molten
 metal by placing the plates and maintaining
 them by any desired means at the proper dis-
 tance apart and dipping them into molten
 metal or solder a desired depth to secure the 115
 desired thickness of the metal filling A². In
 this operation it is of course understood that
 while the inner surfaces of the plates are at
 their ends properly fluxed their outer surfaces
 are either oiled or in any other well-known 120
 manner treated, so as to prevent the adher-
 ence of the molten metal thereon. We there-
 fore do not limit our invention to a particu-
 lar manner or method of forming the unob-
 structed corrugated cooling-plates and their 125
 end fillings.

What we claim is—

1. The combination, with a rotatable cool-
 ing apparatus, of suspension-links, substan-
 tially as specified.

2. The combination, with a cooling appa-
 ratus having trunnions, of suspension-links
 and removable link-retaining devices, sub-
 stantially as specified.

3. The combination, with the cooling-plates, of a hollow frame-work provided with hollow trunnions and suspension-links loosely connected to said trunnions, substantially as specified. 5
4. The combination, with the cooling-plates, of a hollow frame provided with hollow trunnions located between the ends of the frame, substantially as specified.
- 10 5. The combination, with the cooling-plates, of a hollow frame provided with trunnions and means for supporting the same on said trunnions, located between the ends of the frame, substantially as specified.
- 15 6. A cooling apparatus comprising plates corrugated transversely and supported in operative position by means located between the plates, whereby the ends of the corrugations on their outer surfaces are left free and unobstructed for cleaning purposes, substantially as specified. 20
7. The combination of corrugated cooling-plates and an intermediate filling of metal, limited to the space between and simultaneously uniting the plates, substantially as specified. 25
8. The combination, with the cooling-plates, of a hollow frame-work having hollow trunnions, links pivoted on the trunnions, and nozzles connected with the trunnions, substantially as specified. 30
9. The combination, with the cooling-plates, of the frame B, having pipes B', the trough ends B², fitted to the pipes, and the trough C, substantially as specified. 35
10. The combination, with the corrugated plates A, of the frame B, having pipe B', the trough C, and trough ends for supporting and shaping the trough, mounted on the pipes, substantially as specified. 40
11. The combination, with the plates A, of the frame B, having the pipes B³, the trough ends having feet D, and the trough E, substantially as specified.
12. The combination, with the cooling-plates, of a frame-work provided with trunnions and suspension-links loosely connected to the trunnions between the ends of the frame-work, as set forth. 45
- In testimony whereof we affix our signatures 50
in presence of two witnesses.
- SAMUEL M. HEULINGS, JR.
ELLWOOD EVANS.
- Witnesses:
JAMES M. CASSADY,
THOMAS B. FENER.