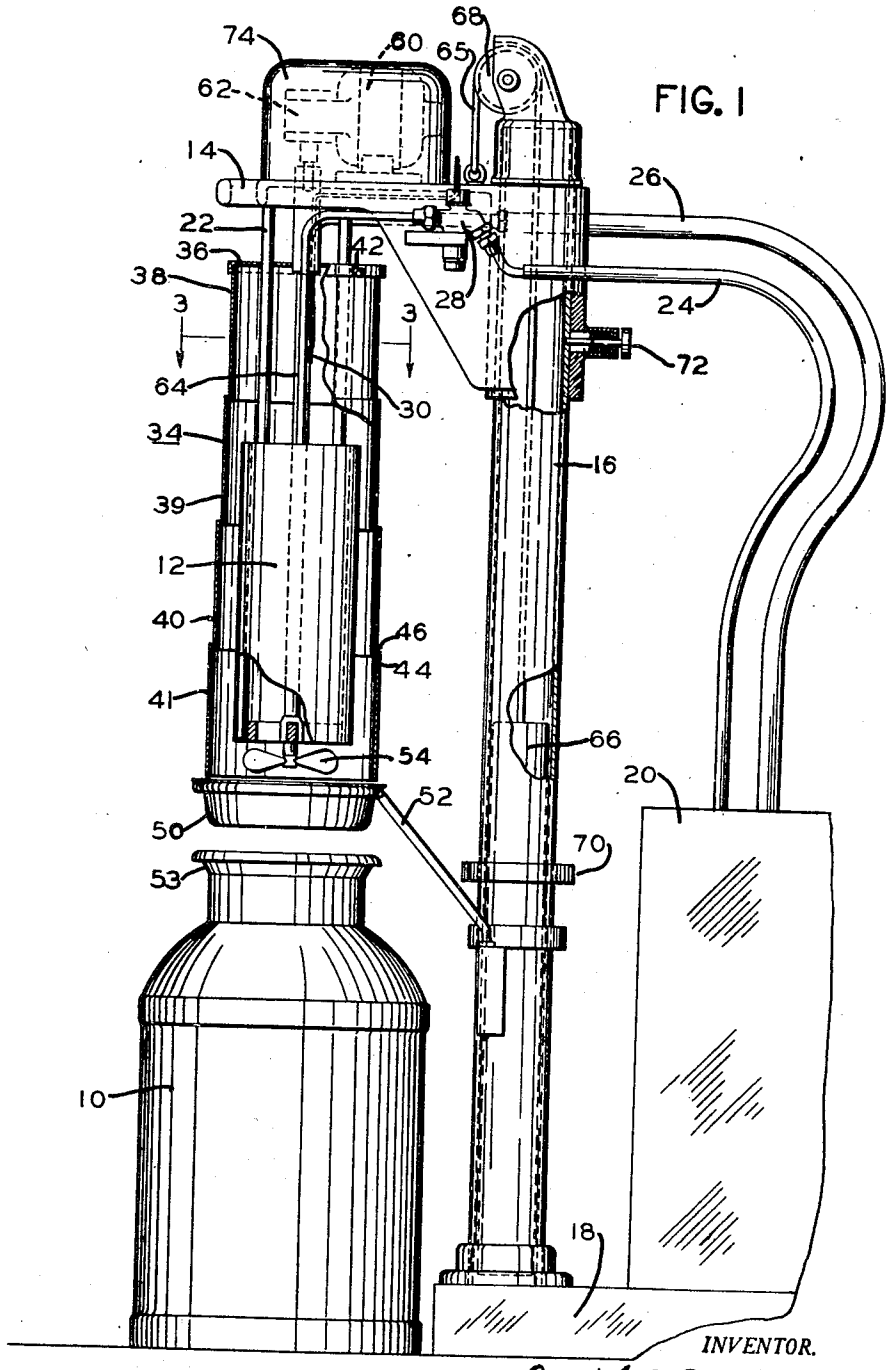
Nov. 25, 1947. D. L. KAUFMAN 2,431,484

LIQUID COOLING UNIT

Filed July 2, 1945 2 Sheets-Sheet 1

FIG. 1



INVENTOR.

Daniel L. Kaufman.

BY Spencer, Hardman & Fehr

His Attorneys.

Nov. 25, 1947. D. L. KAUFMAN 2,431,484

LIQUID COOLING UNIT

Filed July 2, 1945 2 Sheets-Sheet 2

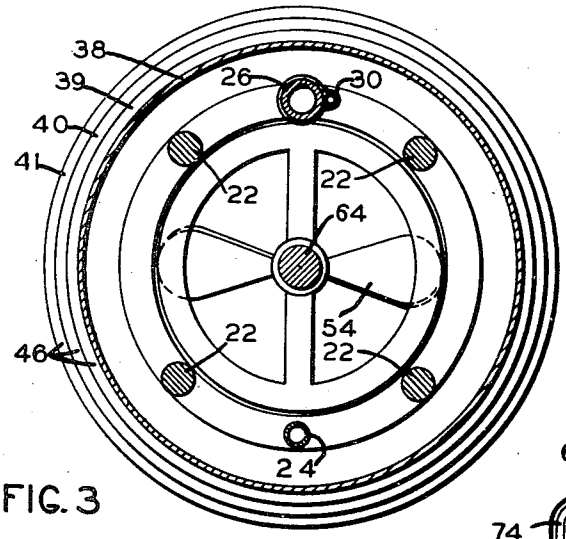


FIG. 3

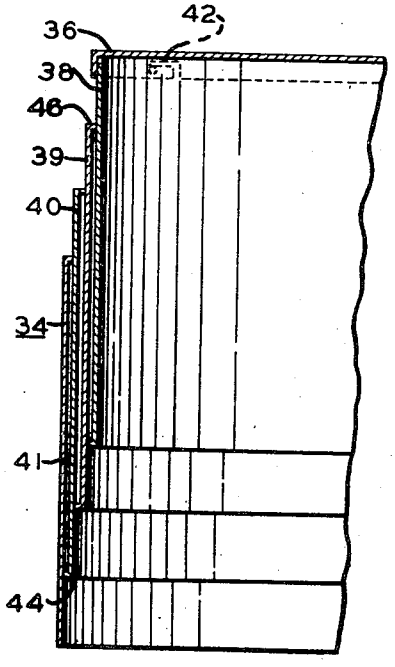


FIG. 4

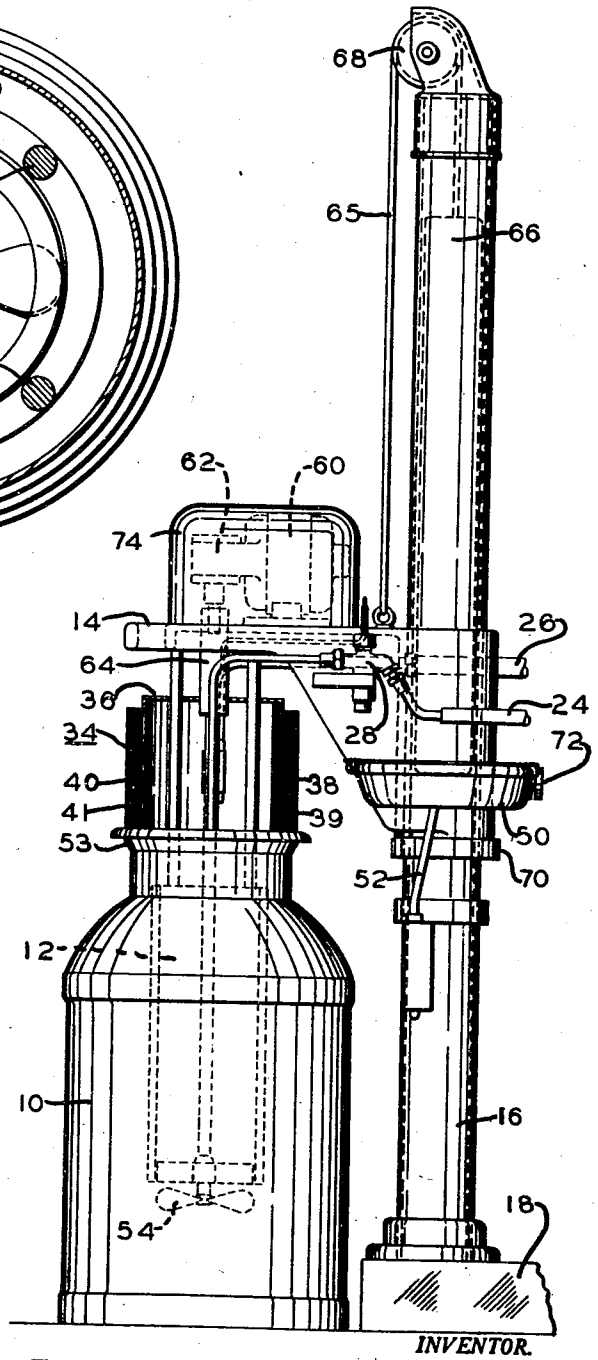


FIG. 2

INVENTOR.

Daniel L. Kaufman.

BY Spencer, Hudnut & Fish.

His Attorneys.

Patented Nov. 25, 1947

2,431,484

UNITED STATES PATENT OFFICE

2,431,484

LIQUID COOLING UNIT

Daniel L. Kaufman, Dayton, Ohio, assignor to General Motors Corporation, Dayton, Ohio, a corporation of Delaware

Application July 2, 1945, Serial No. 602,773

7 Claims. (Cl. 62—141)

1

This invention relates to refrigerating apparatus and more particularly to an improved liquid cooling unit having a movable evaporator which is transferred from one body of liquid to another.

It is an object of this invention to provide an improved arrangement for covering the movable evaporator when the evaporator is not submerged in the liquid.

More particularly it is an object of this invention to provide a shield for protecting the evaporator from unnecessary contact with air-borne bacteria.

A further object of this invention is to provide a protective shield arrangement which is simple and inexpensive.

Another object of this invention is to provide a movable shield which is easy to manipulate.

Still another object of this invention is to provide an evaporator shield which is easy to remove and clean.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is an elevational view, with parts broken away, showing my invention applied to a cream or milk cooler;

Fig. 2 is a view similar to Fig. 1, but showing the evaporator in its lower position;

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary sectional view showing the evaporator shield in a partially raised position.

The apparatus shown herein may be used for cooling cream, milk, syrup or other fluids while in the container within which the fluid is normally stored. For purposes of illustration an embodiment of the invention suitable for use in cooling cream in a conventional cream can has been shown in the drawings, whereas an apparatus of this type is equally suitable for use in cooling liquids in other types of containers.

Referring now to the drawing wherein I have shown a preferred embodiment of my invention, reference numeral 10 designates a conventional cream can which is adapted to be placed directly beneath the evaporator 12. The evaporator 12 is preferably made up in cylindrical form having smooth inner and outer surfaces which may be easily cleaned. The evaporator 12 is rigidly supported on a movable bracket 14 which is vertically slidable on the post 16 carried by the base 18. The base 18 also serves to support a refrigerant liquefying unit 20, which supplies liquid refrigerant to the evaporator 12. The refrigerant liquefying unit 20 may be of any conventional design and may be either water cooled or air cooled.

2

The evaporator 12 is supported below the bracket 14 by means of a plurality of depending rods 22 which space the evaporator 12 from the bracket 14 in the manner shown. Liquid refrigerant is supplied to the evaporator 12 by the refrigerant liquefying unit 20 through the flexible liquid line 24 and the vaporized refrigerant is conveyed from the evaporator to the refrigerant liquefying unit through the flexible vapor line 26. The flow of refrigerant through the liquid line 24 is controlled by a thermostatic expansion valve 28 which includes a thermostatic bulb 30 secured in thermal exchange relationship with the vapor line 26 at a point directly above the evaporator 12 so as to throttle the flow of refrigerant into the evaporator when the temperature of the vapor line 26 indicates that an excessive amount of refrigerant is being supplied to the evaporator.

A protective shield generally designated by the reference character 34 has been provided for enclosing the evaporator when the evaporator is in its elevated position. This shield comprises a top cover member 36 which is permanently held in place relative to the evaporator 12 by the evaporator supporting rods 22. The cover member 36 may be brazed or otherwise secured to the evaporator supporting rods 22. The shield also comprises a plurality of telescopic sections 38, 39, 40 and 41, the upper one of which is secured to the top member 36 by means of one or more bayonet connections 42. The bayonet connections permit the removal of the telescopic sections for cleaning purposes. As best shown in Fig. 4 the telescopic sections are slidable relative to one another so as to occupy either the position shown in Fig. 1, the position shown in Fig. 2, or any intermediate position. As best shown in Fig. 4, the sections 38, 39 and 40 are provided with out-turned flanges 44 which cooperate with the in-turned flanges 46 provided on the sections 39, 40 and 41 respectively so as to limit the downward movement of the telescopic sections. It is obvious that these flanges do not prevent separation of the sections when the sections are removed from the cover. The inturned flanges 46 and the out-turned flanges 44 also serve as bearings for guiding the adjacent telescopic sections.

A drip pan 50 is mounted to swing into a position directly beneath the shield 34, as shown in

Fig. 1, so as to substantially close the bottom end of the shield. The drip pan 50 is carried by the swinging bracket 52 which allows swinging the drip pan away from the bottom end of the shield when it is desired to lower the evaporator into the receptacle 10. As shown in Fig. 2, the shield 34 also serves as a convenient means for closing the upper end of the liquid receptacle during the cooling operation.

Upon lowering the evaporator into the receptacle 10, the telescopic sections 41, 40 and 39 engage the flange 53 formed at the opening of the can so as to limit the downward movement of the sections as shown in Fig. 2. It so happens that the standard cream can is provided with a flange which may conveniently be used for the purpose of limiting the downward movement of the telescopic sections. When the apparatus is used for cooling liquids in other types of cans which are not provided with such a flange, any form of suitable stop means (not shown) may be provided. Such a stop means may be provided either on the containers in which the liquid to be cooled is placed or a stop means may be provided on the post 16 which would project from the post into the path of the telescopic sections.

An agitator 54 has been provided for agitating the liquid to be cooled. The agitator 54 may be of any conventional design and may include suitable scraper elements for scraping the surfaces of the evaporator. These scraper elements would not be required in any cooling unit designed for cooling ordinary liquid such as water; but could be used to advantage when cooling more viscous liquids, such as cream. In order to simplify this disclosure, the scrapers have not been shown since scrapers of the general type required are well known and are commonly used in ice cream freezers and the like.

The agitator 54 is driven by a motor 60 carried by the bracket 14. The motor 60 drives the agitator 54 through a reduction gearing mechanism 62 supported directly by the motor 60. The mechanism 62 is provided with a depending rotatable shaft 64 on which the agitator 54 is mounted.

Those parts which must be raised and lowered when the evaporator is transferred from one can to another are counterbalanced by means of the weight 66 which is adapted to reciprocate within the hollow post 16. A flexible cable 65 having its one end secured to the bracket 14 and its other end secured to the weight 66, passes over a guide pulley 68 carried adjacent the upper end of the post 16 as shown. Counterbalancing arrangements of this type are commonly used in elevators and other mechanisms where it is necessary to raise and lower a portion of the mechanism. The downward movement of the bracket 14 is limited by the stop element 70 provided on the post 16. A conventional spring-pressed latch element 72 is provided for latching the bracket 14 in any desired position. A cover element 74 is provided for enclosing the motor 60 and the reduction gearing element 62.

By virtue of the above described arrangement it is obvious that the evaporator shield automatically uncovers the evaporator as the evaporator is lowered into the liquid receptacle. It is also apparent that the evaporator shield is readily removable for cleaning purposes and that it is simple and inexpensive to manufacture.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In a refrigerating system, an evaporator, refrigerant liquefying means for supplying liquid refrigerant to said evaporator, means for supporting said evaporator for movement into and out of a container, the contents of which are to be cooled, and an evaporator shield mechanism including means automatically movable into and out of shielding position as said evaporator is moved out of and into said container.

2. In a refrigerating system, an evaporator, refrigerant liquefying means for supplying liquid refrigerant to said evaporator, means for supporting said evaporator for movement into and out of a container, the contents of which are to be cooled, and an evaporator shield movable into and out of evaporator shielding position, said shield including a plurality of telescopic sections arranged to substantially surround said evaporator when elongated and to uncover said evaporator when telescoped together.

3. In a refrigerating system, an evaporator, refrigerant liquefying means for supplying liquid refrigerant to said evaporator, means for supporting said evaporator for movement into and out of a container the contents of which are to be cooled, an evaporator shield movable into and out of evaporator shielding position as said evaporator is moved out of and into said container, said shield including a plurality of telescopic sections arranged to substantially surround said evaporator when elongated and to uncover said evaporator when telescoped together, and drip pan means carried by said support and movable into a position beneath said evaporator and serving to close the lower end of said shield.

4. In a refrigerating system, an evaporator, refrigerant liquefying means for supplying liquid refrigerant to said evaporator, means for supporting said evaporator for movement into and out of a container the contents of which are to be cooled, an evaporator shield automatically movable into and out of evaporator shielding position as said evaporator is moved out of and into said container, and means for removably supporting said shield relative to said evaporator.

5. In a refrigerating system, an evaporator, refrigerant liquefying means for supplying liquid refrigerant to said evaporator, means for supporting said evaporator for movement into and out of a container the contents of which are to be cooled, an evaporator shield movable into and out of evaporator shielding position as said evaporator is moved out of and into said container, and means for removably supporting the said shield relative to said evaporator, said last named means comprising a plate carried by said evaporator and serving to close the upper end of said shield, and means forming a quick detachable connection between said top plate and said shield.

6. In a refrigerating system, a support, a refrigerant liquefying unit carried by said support, a vertically disposed post carried by said support, an evaporator unit slidably mounted on said post, flexible refrigerant flow connections between said evaporator and said refrigerant liquefying apparatus, said evaporator unit including a shield for said evaporator, said shield having an open bottom end, and a drip tray pivotally carried by said post and movable into and out of alignment with the bottom end of said shield for substantially closing the bottom end of said shield.

7. In combination, a heat exchange unit, means

for circulating a heat transfer medium to and from said heat exchange unit, means for supporting said heat exchange unit so as to project said unit into a container, in one relative position of said heat exchange unit and said container and so as to position said unit outside of said container in a different relative position of said heat exchange unit and said container, and a shield mechanism for said heat exchange unit including means movable into and out of shielding position so as to shield said heat exchange unit while said unit is out of said container and

so as to uncover said heat exchange unit while said unit is in said container.

DANIEL L. KAUFMAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,283,904	Baumgarden	May 26, 1942
2,319,429	Nelson et al.	May 18, 1943