March 19, 1935. S. S. BATTLES 1,995,167

EVAPORATOR

Filed Jan. 14, 1933

FIG. 1.

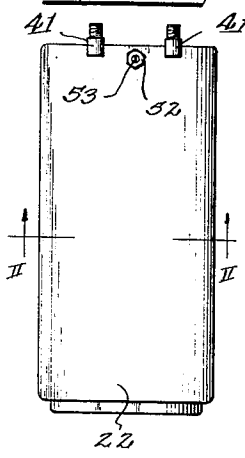


FIG. 3.

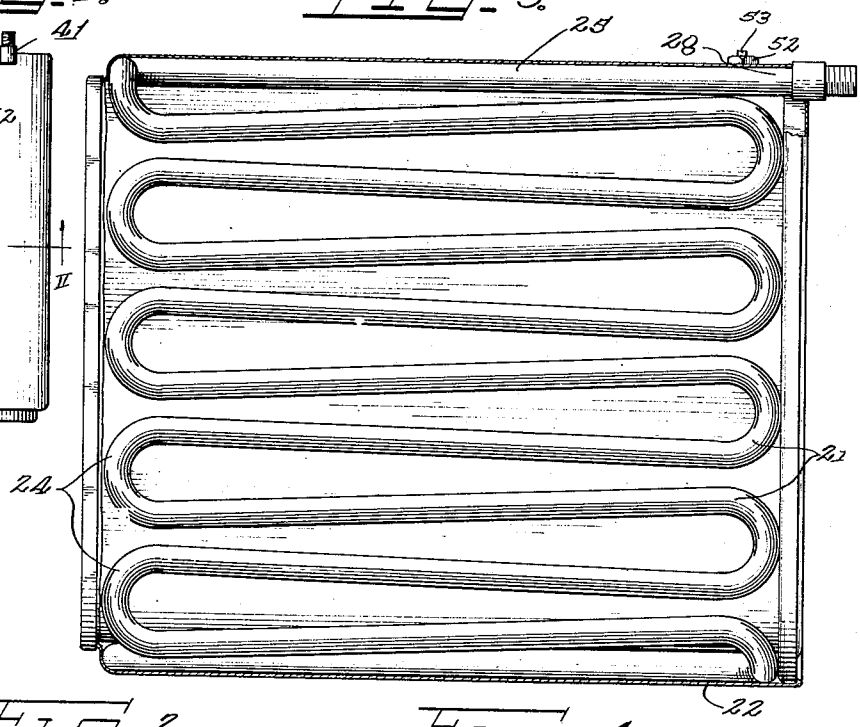


FIG. 2.

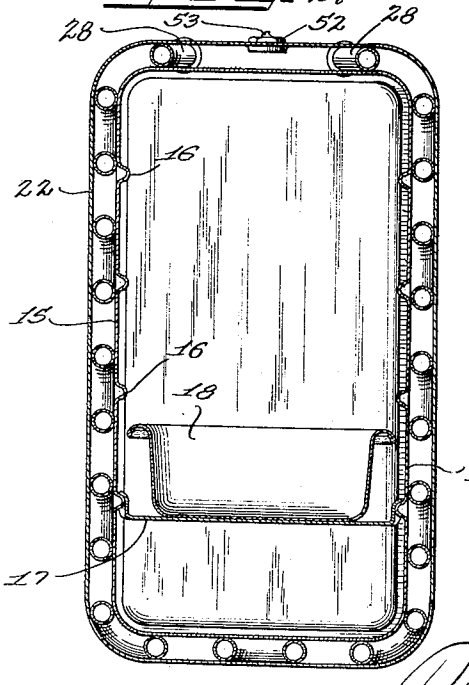


FIG. 4.

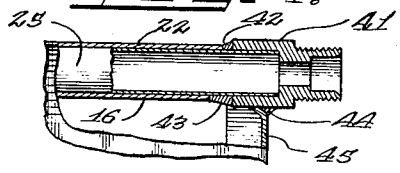


FIG. 6.

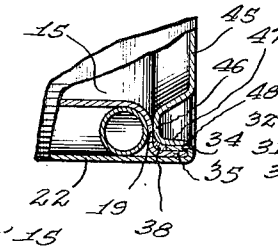
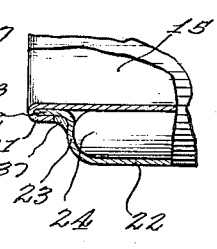


FIG. 5.



Inventor

STEWART S. BATTLES.

by: Charles R. Hill Attys.

Patented Mar. 19, 1935

1,995,167

UNITED STATES PATENT OFFICE

1,995,167

EVAPORATOR

Stewart S. Battles, Chicago, Ill., assignor to Ingersoll Steel and Disc Co., Chicago, Ill., a corporation of Illinois

Application January 14, 1933, Serial No. 651,715

13 Claims. (Cl. 62—126)

This invention relates to refrigeration and will be described as incorporated in a cooling unit for a refrigerator and the method of constructing the same.

An object of this invention is the provision of an improved method of constructing a cooling unit for a refrigerator so as to minimize the time and labor required and to simplify and reduce the number of operations necessary for the production of an improved cooling unit.

Another object of this invention is the provision of an improved method of constructing a cooling unit of two metal shells with an expansion coil interposed therebetween, in a manner to facilitate the assembly and insure efficient heat transfer engagement between the expansion coil and the shells both on the outer and inner faces of the coil and at the ends of the coil to hold the coil permanently in position and to increase the efficiency of the unit.

A further object is the provision of a cooling unit for a refrigerator comprising means integral with the sheet metal shells, for securely holding the ends of the coil loops in position adjacent the ends of the unit and providing means for permanently sealing the shells together and to the ends of the coil to prevent displacement of the same and form an airtight space between the shells in which the coil is disposed, which may be evacuated to increase the efficiency of the engagement between the coil and the shells.

Other objects and advantages of this invention will become apparent from the following detail description together with the accompanying drawing.

On the drawing:

Figure 1 is a top plan view of a cooling unit for a refrigerator incorporating my invention.

Figure 2 is a vertical section through the unit, taken on the line II—II of Fig. 1.

Figure 3 is a side elevation of that shown in Figure 2 with portions of the outer shell broken away and portions shown in section.

Figures 4, 5 and 6 are fragmentary sections illustrating details of construction which will be hereinafter described more in detail.

As shown on the drawing:

The details of construction of this invention will be best understood from a description of the method of constructing the same. The cooling unit illustrated in the drawing comprises an inner metal shell 15 which is preferably formed of a single sheet of metal having formed integrally therewith, inwardly extending corrugations 16 which serve to support a shelf 17, capable of holding a tray or container 18 for materials to be refrigerated. The inner shell 15 as illustrated in Figures 5 and 6 has formed adjacent the rear end, an outwardly flared flange 19, for engagement by the ends 21 of the coil loops. The outer shell 22 is similarly formed of a single sheet of metal and has formed thereon an inwardly extending flange 23 for engagement over the ends 24 of the coil loops. With the shells thus formed, the coil 25 formed of a single metal tube by bending portions intermediate the ends, back and forth forming loops, shorter than the shells, and adapted for firm engagement with the flanges 19 and 23 of the shells, is then placed upon the inner shell, with the ends 28 of the coil extending beyond the rear end of the shells. While the expansion coil is in this position, the outer shell is sleeved over the inner shell and the coil, from the front end of the inner shell, until the flange 23 firmly engages the end 24 of the coil loop. With the shells in this position, the marginal edge at the front end of the inner shell is rolled over the marginal edge 32 of the outer shell thereby forming a reversely extending flange 31 engaging over the marginal edge 32 of the outer shell. In a similar manner the marginal edge of the outer shell at the rear end of the unit is rolled over the marginal edge 35 of the inner shell, thus forming a reversely extending flange 34 engaging over the marginal edge 35 of the inner shell.

With the shells thus secured together by interlocking of the edges, they are sealed together by solder or similar readily fusible metal as indicated at 37 and 38. In order to securely hold the coil 25 in place, and to provide means for connecting a pipe thereto, a suitable pipe coupler 41 is fitted over each end of the coil and securely soldered as illustrated at 42, 43 and 44, to the coil 25, to the outer and inner shell 22 and 16 and to a rear wall plate 45, thereby holding them all rigidly together. The rear wall plate 45 is preferably formed of a single sheet of metal, with an inwardly offset portion 46 engageable with the flange 19 on the inner shell and with the flange 34 and the solder 38 as illustrated in Figure 6. The plate 45 is also provided with a flange 47, the rearward edge of which is sealed to the flange 34 by solder as indicated at 48.

In order to permanently press or collapse the shells 15 and 22 upon the coil 25, the shells are formed of relatively flexible material. A suitable socket member 52 is sealed in the outer shell 22, which socket member is adapted to receive a plug 53 or the like for closing the same. After the unit

has been otherwise completed, the air is evacuated from between the shells 15 and 22 and the plug 53 placed in the socket 52 to maintain a vacuum between the shells and securely hold the shells in a firm and intimate contact with the coil 25.

Having described my invention together with the process of constructing the same, it will be understood by those skilled in the art, that various changes and modifications may be made without departing from the principle of the invention and I desire that the patent to be granted hereon shall not be limited in any manner except as necessitated by the prior art.

I claim as my invention:

1. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, each said shell including a flanged portion snugly engaging the ends of the loops, means sealing the shells together at their marginal edges to form an air-tight space between the shells which may be evacuated.

2. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, each said shell including a flanged portion snugly engaging the ends of the loops, means sealing the shells together at their marginal edges to form an air-tight space between the shells which may be evacuated, the ends of the expansion coil extending from the shells and coupling means permanently sealed to the shells and to the ends of the coil.

3. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, each said shell including a flanged portion snugly engaging the ends of the loops, means sealing the shells together at their marginal edges to form an air-tight space between the shells which may be evacuated, a metal plate closing one end of the unit and soldered in place to form a permanent rear wall.

4. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, each said shell including a flanged portion snugly engaging the ends of the loops, means sealing the shells together at their marginal edges to form an air-tight space between the shells which may be evacuated, the ends of the expansion coil extending from the shells, coupling means permanently sealed to the shells and to the ends of the coil, a metal plate closing the rear end of the unit and soldered in place to form a permanent wall.

5. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, each said shell including a flanged portion snugly engaging the ends of the loops, means sealing the shells together at their marginal edges to form an air-tight space between the shells which may be evacuated, and means integral with the inner shell providing shelf supports for holding materials to be refrigerated.

6. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, each said shell including a flanged portion snugly engaging the ends of the loops, means sealing the shells together at their marginal edges to form an air-tight space between the shells which may be evacuated, the ends of the expansion coil extending from the shells, coupling means permanently sealed to the shells and to the ends of the coil, and means integral with the inner shell providing shelf supports for holding materials to be refrigerated.

7. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, each said shell including a flanged portion snugly engaging the ends of the loops, means sealing the shells together at their marginal edges to form an air-tight space between the shells which may be evacuated, a metal plate closing one end of the unit and soldered in place to form a permanent rear wall, and means integral with the inner shell providing shelf supports for holding materials to be refrigerated.

8. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, the inner shell including an outwardly curved flange adjacent the rear end snugly fitting over the rear end of the coil loops, the outer shell including an inwardly curved flange adjacent the front end snugly fitting over the front end of the coil loops, the marginal edge of the inner shell at the front end reversely extending and engaging over the corresponding marginal edge of the outer shell, the marginal edge of the outer shell reversely extending and engaging over the corresponding edge of the inner shell, means for sealingly securing the shells together adjacent the ends of the coil loops to provide an air-tight space therebetween which may be evacuated.

9. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, the inner shell including an outwardly curved flange adjacent the rear end snugly fitting over the rear end of the coil loops, the outer shell including an inwardly curved flange adjacent the front end snugly fitting over the front end of the coil loops, the marginal edge of the inner shell at the front end reversely extending and engaging over the corresponding marginal edge of the outer shell, means for sealingly securing the shells together adjacent the ends of the coil loops to provide an air-tight space therebetween which may be evacuated.

10. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitu-

dinally extending loops, the inner shell including an outwardly curved flange adjacent the rear end snugly fitting over the rear end of the coil loops, the outer shell including an inwardly curved flange adjacent the front end snugly fitting over the front end of the coil loops, the marginal edge of the inner shell at the front end reversely extending and engaging over the corresponding marginal edge of the outer shell, means for sealingly securing the shells together adjacent the ends of the coil loops to provide an air-tight space therebetween which may be evacuated, the ends of the expansion coil extending from the shells and coupling means permanently sealed to the shells and to the ends of the coil.

11. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, the inner shell including an outwardly curved flange adjacent the rear end snugly fitting over the rear end of the coil loops, the outer shell including an inwardly curved flange adjacent the front end snugly fitting over the front end of the coil loops, the marginal edge of the inner shell at the front end reversely extending and engaging over the corresponding marginal edge of the outer shell, the marginal edge of the outer shell reversely extending and engaging over the corresponding edge of the inner shell, means for sealingly securing the shells together adjacent the ends of the coil loops to provide an air-tight space therebetween which may be evacuated, the ends of the expansion coil extending from the shells, coupling means permanently sealed to the shells and to the ends of the coil, and a metal plate closing one end of the unit and soldered in position to form a permanent wall.

12. In a cooling unit for a refrigerator, an inner metal shell and an outer metal shell, said shells being substantially rectangular in cross-section, a metal expansion coil disposed between the shells and including a plurality of longitudinally extending loops, the inner shell including an outwardly curved flange adjacent the rear end snugly fitting over the rear end of the coil loops, the outer shell including an inwardly curved flange adjacent the front end snugly fitting over the front end of the coil loops, the marginal edge of the inner shell at the front end reversely extending and engaging over the corresponding marginal edge of the outer shell, means for sealingly securing the shells together adjacent the ends of the coil loops to provide an air-tight space therebetween which may be evacuated, the ends of the expansion coil extending from the shells, coupling means permanently sealed to the shells and to the ends of the coil, a metal plate closing the rear end of the unit and permanently fixed in position to form a wall, and means integral with the inner shell providing shelf supports for holding materials to be refrigerated.

13. A cooling unit for a refrigerator comprising an inner metal shell and an outer metal shell in spaced relation from each other, each of said shells having a flange joined with the other shell to hold the same in spaced relation therefrom, and a metal expansion coil looped longitudinally between the shells and having curved portions thereof snugly engaging the flanges of the shells to hold the coil in position.

STEWART S. BATTLES.