July 15, 1952 T. E. KALHOEFER 2,603,071

PORTABLE ELECTRIC REFRIGERATOR

Filed July 7, 1950 2 SHEETS—SHEET 1

FIG. 1.

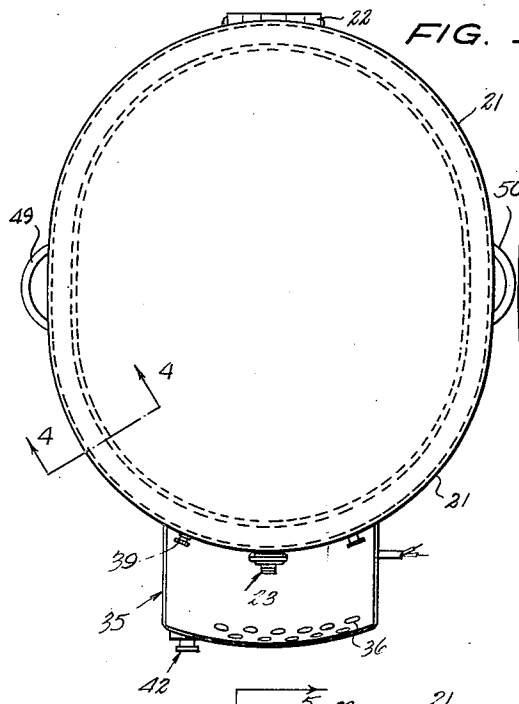
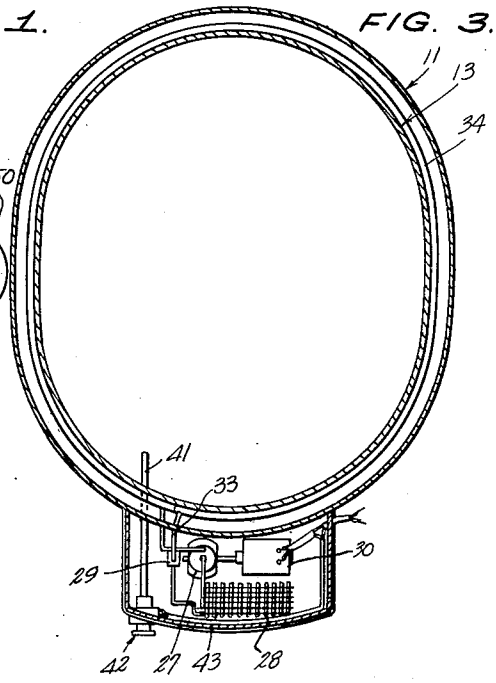


FIG. 3.



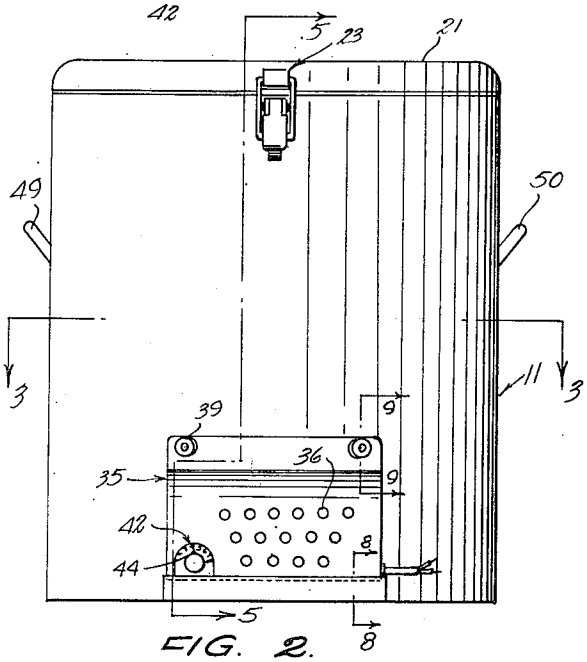
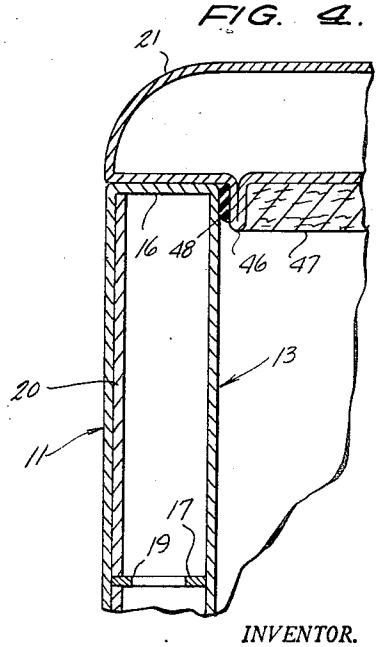


FIG. 2.

FIG. 4.



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FIG. 5.

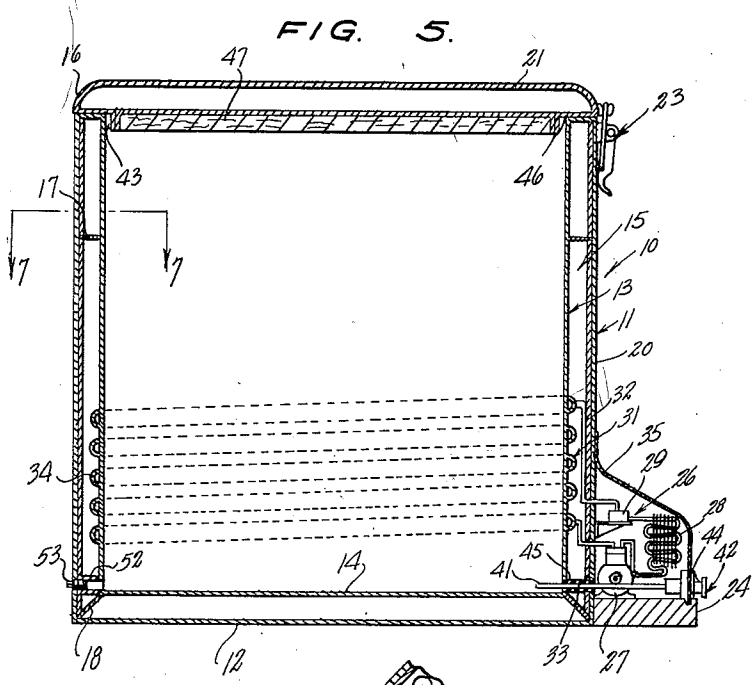
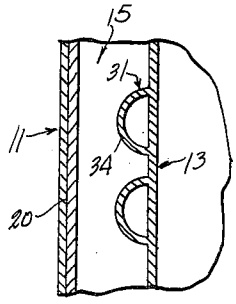


FIG. 6.



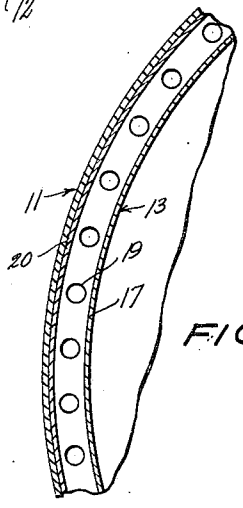


FIG. 7.

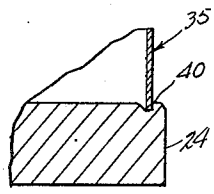


FIG. 8.

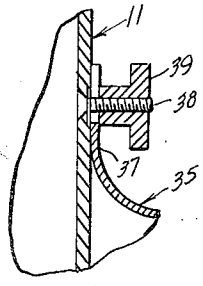


FIG. 9.

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PORTABLE ELECTRIC REFRIGERATOR

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Application July 7, 1950, Serial No. 172,467

3 Claims. (Cl. 62—116)

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This invention relates to a refrigeration device, and more particularly to a portable electric refrigerator.

An object of this invention is to provide a refrigeration device which is particularly adapted for use in automobiles for storage of foodstuffs or beverages while traveling.

Another object of this invention is to provide a refrigeration device which is particularly adapted for operation from the electric system of a motor vehicle.

A further object of this invention is to provide a portable electric refrigerator which is provided with suitable insulation to thereby effectively decrease the power consumption of the device.

A still further object of this invention is to provide a portable electric refrigerator which can be thermostatically controlled.

A still further object of this invention is to provide a portable electric refrigerator which is relatively simple in structure and cheap to manufacture.

The above and still further objects and advantages of this invention will become apparent upon consideration of the following detailed description of the invention, when taken in conjunction with the drawings, wherein:

Figure 1 is a top plan view of the portable electric refrigerator of the present invention;

Figure 2 is a side elevational view of the portable electric refrigerator of the present invention taken from the front of Figure 1;

Figure 3 is a sectional view taken along the line 3—3 of Figure 2;

Figure 4 is an enlarged fragmentary sectional view taken along the line 4—4 of Figure 1;

Figure 5 is a sectional view taken along the line 5—5 of Figure 2;

Figure 6 is an enlarged fagmentary sectional view showing a part of the coil structure for the passage therethrough of the refrigerant;

Figure 7 is an enlarged fragmentary sectional view taken along the line 7—7 of Figure 5;

Figure 8 is an enlarged fragmentary sectional view taken along the line 8—8 of Figure 2; and

Figure 9 is an enlarged fragmentary sectional view taken along the line 9—9 of Figure 2.

Referring now more particularly to the drawings, wherein like reference numerals have been used throughout the several views to designate like parts, there is shown the portable electric refrigerator of the present invention, generally designated by the reference numeral 10, which embodies an outer casing 11 having a closed bottom 12 and an open top.

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Disposed within the outer casing 11 and supported in the latter is an inner casing 13 having a closed bottom 14 and an open top, the inner casing being supported in spaced relation with respect to the outer casing, to thereby provide an insulating dead air space therebetween, generally designated by the reference numeral 15. The inner casing 13 is supported on the outer casing 11 by means of an annular ledge 16 which extends between the open tops of the casings and is secured therebetween. Disposed contiguous to and spaced from the ledge 16 and secured transversely of the dead air space 15 is a spacer ring 17. Disposed in the dead air space 15 and extending between the closed bottom 12 of the outer casing 11 and the closed bottom 14 of the inner casing 13 is a second spacer ring 18. As clearly shown in Figures 4 and 7, the spacer ring 17 is provided with a plurality of apertures, generally designated by the reference numeral 19. The spacer ring 18 is similarly provided with apertures, not shown, the aforementioned apertures cooperating to maintain the adjacent portions of the dead air space 15 in communication with each other.

Disposed within the dead air space 15 in abutting relation with the adjacent face of the outer casing 11 is an insulating sleeve 20. Since the inner casing 13 has its bounding wall contiguous to a dead air space, and the bounding wall of the outer casing 11 is insulated, it is apparent that little heat will pass through the walls of the refrigerator 10 of the present invention.

Disposed in bridging relation with respect to the open top of the inner and outer casings 13, 11 is a cover 21 which is mounted by means of the hinge 22 for pivotal movement out of its position of bridging relation with respect to the open top of the refrigerator 10.

Disposed exteriorly of the outer casing 11 and supported on the latter is a latch, generally designated by the reference numeral 23 which is engageable with the cover 21 for detachably securing the latter in the position of bridging relation.

Extending transversely of the outer casing 11, and secured exteriorly thereof is a supporting base 24. Positioned upon the supporting base 24 and secured thereon is an electrically operable refrigeration unit of the direct expansion type, generally designated by the reference numeral 26, which embodies a compressor 27, a condenser 28, a float chamber 29, and a motor 30 coupled to the compressor 27.

Circumposed about the inner casing 13 and positioned within the dead air space 15 is a re-

frigerant-circulating means, generally designated by the reference numeral 31 which has one end in communication with the high pressure side of the refrigeration unit 26 by means of the conduit 32, and has its other end connected to the low pressure side by means of the conduit 33. The refrigerant-circulating means embodies a strip 34 channel-like in cross-section wound about the inner casing 13 with its open side facing the latter and secured thereto and cooperating with the adjacent portion of said inner casing to provide a continuous passageway for the refrigerant.

Accordingly, the refrigerant can pass from the high pressure side of the refrigeration unit 26 into the upper end of the refrigerant-circulating coil, downwardly through the coil, and back into the low pressure side of the refrigeration unit.

Circumposed about the refrigeration unit 26 and detachably secured to the outer casing 11 is a protective hood 35. The hood 35 is provided with a plurality of apertures, generally designated by the reference numeral 36, for the circulation therethrough of air to maintain the refrigeration unit 26 at a temperature relatively close to that of the surroundings. The hood 35 has its upper end 37 abutting against the wall of the outer casing 11, as clearly shown in Figure 9, and detachably secured thereto by means of a threaded nut 38 and a bolt 39 circumposed about the nut and bearing against the hood. As clearly shown in Figure 8, the base 24 is provided with a longitudinally extending notch 40 for embracingly receiving and supporting the lower end of the hood 35.

Disposed contiguous to the bottom of the inner casing 13 is a thermoresponsive element 41 which forms a part of a thermocontrol, generally designated by the reference numeral 42. The thermocontrol is operatively connected to the motor 30 by means of the connecting wires 43, Figure 3, and control the motor in response to the temperature of the inner casing 13. The thermocontrol 42 is provided with a pointer 44 which is disposed exteriorly of the hood 35 and supported on the latter, the pointer cooperating with the adjacent numerical indicia to give a visual indication of the setting of the thermocontrol. As clearly shown in Figure 5, the thermoresponsive element 41 of the thermocontrol 42 is insulated from the dead air space 15 by the insulating sleeve 45 which is circumposed about the portion of the element 41 which extends transversely through the dead air space 15. Accordingly, the thermocontrol 42 will permit an accurate and speedy control of the temperature within the casing 13.

Dependingly supported from the inner face of the cover 21 is an annular flange 46. Abutting against the under surface of the cover 21 and supported within the flange 46 is an insulating disc 47 which cooperates with the dead air space 15 and the insulating sleeve 20 to maintain the interior of the inner casing 13 relatively proof against the temperature of the surroundings of the refrigerator 10. Circumposed about the flange 46 is a gasket 48, the gasket being flexdly secured to the flange 46 and bearing against the adjacent portions of the inner container 13, as clearly shown in Figure 4, to form a relatively air-tight seal between the cover 21 and the casing.

Exteriorly of the outer casing 11 there is provided a pair of opposed handles, designated by the reference numerals 49, 50, which permit the refrigerator to be manually grasped, lifted, and transported from place to place.

Drain tube 52 leads from the bottom of the inner casing 13, across the dead-air space 15, and through the side wall of the outer casing 11 and is provided with a removable drain plug 53 in its outer end.

In actual use, the motor 30 of the refrigeration unit 26 can be connected to any source of electrical energy, such as the electrical system of a motor vehicle, or a small storage battery, to be actuated thereby. The thermoresponsive control 42 is then set at the desired temperature and the refrigeration unit 26 operates to circulate a refrigerant through the circulating coil 34. The device is then ready for the accommodation of foodstuffs or beverages.

From the foregoing, it is readily apparent that the refrigerator of the present invention is particularly adapted for use in automobiles for traveling, or for picnics or the like, where it is desired to keep food and other produce at temperatures well below that of the surrounding atmosphere.

Although only one embodiment of the device of the present invention has been described, it is readily apparent that numerous modifications can be made without departing from the spirit of the invention as set forth in the appended claims.

What I claim is:

1. In a portable refrigerator, an outer casing having a closed bottom and an open upper end, an inner casing, a cover for the open upper end of the inner casing, said inner casing being concentrically spaced within said outer container to define a dead-air space therebetween, said air space entirely surrounding said inner casing, said inner casing having a closed bottom, a first spacer ring spacing the bottom of the inner casing upwardly from the bottom of the outer casing, a second spacer ring spacing the side wall of the inner casing from the side wall of the outer casing, said second spacer ring being located at a point intermediate the upper and lower ends of said dead-air space and being formed with perforations, means extending between the side walls of the inner and outer casings at their upper ends and closing the upper end of said dead-air space, a refrigerant conduit surrounding and in contact with said inner casing at a point below said second spacer ring in said dead-air space, and a refrigerating unit mounted on the exterior of said outer casing and effectively connected to said refrigerant conduit.

2. In a portable refrigerator, an outer casing having a closed bottom and an open upper end, an inner casing, a cover for the open upper end of the inner casing, said inner casing being concentrically spaced within said outer container to define a dead-air space therebetween, said air space entirely surrounding said inner casing, said inner casing having a closed bottom, a first spacer ring spacing the bottom of the inner casing upwardly from the bottom of the outer casing, a second spacer ring spacing the side wall of the inner casing from the side wall of the outer casing, said second spacer ring being located at a point intermediate the upper and lower ends of said dead-air space and being formed with perforations, means extending between the side walls of the inner and outer casings at their upper ends and closing the upper end of said dead-air space, a refrigerant conduit surrounding and in contact with said inner casing at a point below said second spacer ring in said dead-air space, and a refrigerating unit mounted on the exterior of said

outer casing and effectively connected to said refrigerant conduit, said unit comprising a base fixed on the lower part of and projecting laterally from said outer casing, said base being formed in its upper surface with a slot, and a removable hood having a depending lower flange engageable in the slot and an upper flange arranged to engage the exterior of the outer casing side wall at a point spaced above said base, and means removably securing the upper flange in place on the outer casing side wall.

3. In a portable refrigerator, an outer casing having a closed bottom and an open upper end, an inner casing, a cover for the open upper end of the inner casing, said inner casing being concentrically spaced within said outer container to define a dead-air space therebetween, said air space entirely surrounding said inner casing, said inner casing having a closed bottom, a first spacer ring spacing the bottom of the inner casing upwardly from the bottom of the outer casing, a second spacer ring spacing the side wall of the inner casing from the side wall of the outer casing, said second spacer ring being located at a point intermediate the upper and lower ends of said dead-air space and being formed with perforations, means extending between the side walls of the inner and outer casings at their upper ends and closing the

upper end of said dead-air space, a refrigerant conduit surrounding and in contact with said inner casing at a point below said second spacer ring in said dead-air space, and a refrigerating unit mounted on the exterior of said outer casing and effectively connected to said refrigerant conduit, said unit having a thermal control element having a portion extending through the side walls of the outer and inner casings and exposed within the lower part of said inner casing.

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