

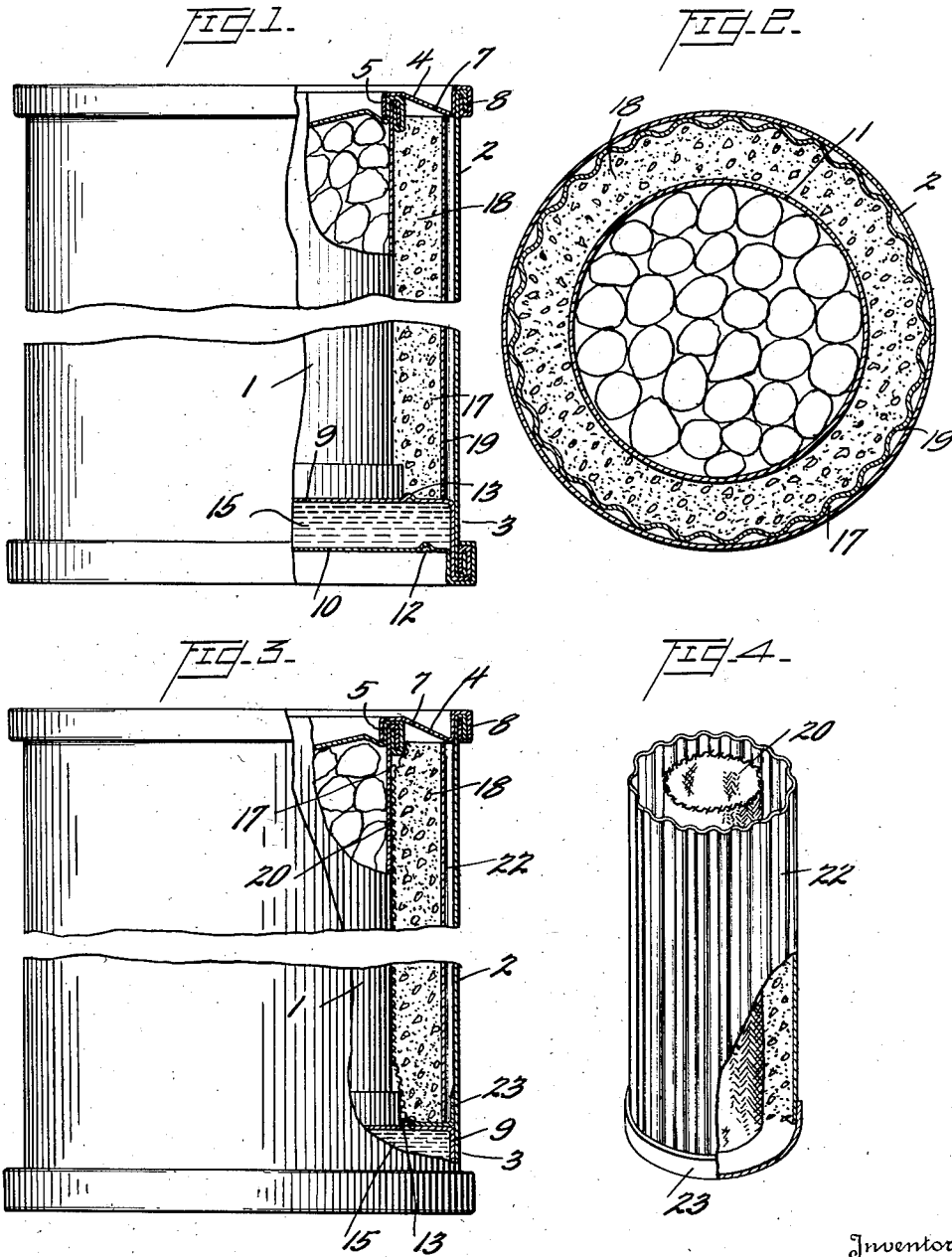
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SELF-HEATING CONTAINER

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SELF-HEATING CONTAINER

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This invention relates to self-heating preserving containers, such as cans for foodstuff, having attached to or formed therewith one or more compartments for containing a chemical or chemicals adapted to generate heat when desired by the user.

In general, containers or cans of this kind are known but are subject to disadvantages and defects incident to constructional features in that the mixing of the chemicals and resulting heat generation is non-uniform, and further in that many of these known constructions are liable to develop unduly high pressures by expansion and leakage of the chemicals internally or externally or even possibly to bursting with violence.

It is an object of this invention to provide for uniform distribution and admixing of the heat-generating substances to obtain uniform and sufficient heating throughout the entire heating compartment of a self-heating can of the type in question and at the same time and by the same means also provide space for allowing ample expansion of the chemicals upon reacting for the generation of heat.

A further object of this invention is to provide a self-heating can of the present kind having an interiorly located food preserving container and an external chemical-containing jacket, one end of the food container being accessible at one end of the combined structure and the other end being located within the limits of the compartment or compartments for the heat-generating chemicals, but in which said interiorly located end of the food container is held securely in position against lateral dislocation, for instance by means of a transversely extending wall having an embossed ring or other formation engaging and holding said end of the can.

A further object of this invention is to provide a separate package for the chemicals adapted to be prepared before the insertion into the space provided therefor in the can jacket, this package being formed of porous material adapted to facilitate distribution of liquid to the chemical when heating is to take place, and said package being formed at least partly of corrugated material which allows space for expansion of the chemicals when reacting to generate the heat.

In the accompanying drawing, which serves to illustrate the invention, two embodiments thereof are shown.

Fig. 1 is an elevational view partly in section of a first embodiment of self-heating can according to the present invention.

Fig. 2 is a horizontal sectional view of the self-heating can shown in Fig. 1.

Fig. 3 is an elevational view partly in section of a second embodiment according to the invention.

Fig. 4 is a perspective view of the package for containing the dry chemical.

In the drawing, numeral 1 designates a preserving food receptacle, such as an ordinary tin can. This can is associated with an exterior jacket for containing a chemical and an end chamber for containing another substance which when brought into contact with the chemical in the exterior chamber reacts therewith to generate heat. The exterior jacket 2 is of substantially greater diameter than the food receptacle, and also extends longitudinally beyond it at one end designated 3. At the end where the food receptacle or can is accessible, the ordinary crimped flange thereof is connected with the end of the jacket by a ring 4 of sheet metal having its inner edge 5 turned inwardly within the flange of the can and its intermediate portion 7 sloping downwardly outwardly. The outer edge of this ring is secured to the upper edge of the jacket 2 by being inter-crimped therewith, as at 8, much in the same way as the ends of ordinary cans are secured to the side walls thereof.

At the opposite end the jacket 2 is connected by inter-crimping with the edges of an inverted cup-shaped member 9, and with a cup closure disc 10. The cup-shaped member is provided with a circularly extending embossed projection ring 13 which forms a seat for the lower or inner end of the can and prevents lateral displacement thereof.

In the space 15 between the cup member 9 and end closure 10 a quantity of water or other liquid may be stored, and in the space 17 between the can 1 and jacket 2 a chemical 18 is provided, for instance, unslaked lime or other material adapted to generate heat when in the presence of the water or other liquid from the space 15.

Between the chemical 18 and the jacket 2 is located a cylinder 19 of corrugated paper or other compressible, porous substance which serves when the liquid is admitted to the space 17 to distribute the liquid longitudinally and evenly to all the outer portions of the chemical. As the thickness of the mass of chemical is rather small, the entire mass of chemical is soon supplied with the reacting liquid.

Many substances, for instance lime, have a tendency to expand when undergoing such exothermic reactions and by the presence of the

compressible corrugated paper or cardboard cylinder, space is provided for this expansion without there being a free space in which the chemical could shake about when dry.

The cup closure disc 10 is preferably provided with one or more small indentations 12 at a point or points opposite the end of the chemical compartment 17, serving as an indication of where the disc 10 and cup 9 should be punctured in order to allow the liquid to enter the chemical compartment, and serving as a seat or seats for the end of the puncturing instrument to prevent slipping.

In use the can is placed in inverted position from that shown in the drawing and a sharp instrument is forced through the walls of cup 9 and disc 10 at the point or points indicated by dent or dents 12 adjacent the chemical chamber so that the liquid may flow from space 15 into the chemical-containing space 17. The liquid will flow length-wise of the chemical space along the channels formed by the corrugations of cylinder 19 and will soak through and be supplied to the chemical within at a uniform rate, so that uniform heating throughout is obtained. As the chemical expands, the paper is compressed, thus providing space for the expansion so that the possibility of some of the chemical being displaced through the opening that has been provided by the sharp instrument, or of the can bursting in case the said opening should become choked, is avoided.

After the contents have become sufficiently heated, the can is inverted and may be opened in the same manner as an ordinary can by cutting out the cover of the food container. Since the accessible cover is at the opposite end from that at which the puncture was made, there is no danger of any of the chemical getting into the food.

In the embodiment of the invention shown in Figs. 3 and 4, the arrangement of the metal parts and the several compartments is substantially the same. However, for the purpose of facilitating the filling of the chemical into the chamber 17, the dry chemical is first put in a package formed of a cylinder 20 of porous material, such as paper, or cloth, such as linen, and an external cylinder 22 of similar material, for instance corrugated porous paper, closed at one end by an annular cap 23. When filled with the chemical, the package may be readily inserted in the jacket of the can before applying the cover ring 4.

In use, the heating is brought about in substantially the same manner as in the first-described embodiment. The inner porous cylinder 20, however, also serves for distributing the liquid to the solid chemical.

When the liquid has passed into the chemical compartment and has been absorbed by the chemical and paper or other material and the contents have been sufficiently heated, the can may again be inverted so that the accessible end of the food receptacle may be opened in the same manner as an ordinary can without danger of contaminating the food with the chemical.

When the liquid is first introduced into the chemical compartment, some of it will be absorbed by the porous paper or the like so that it is not all immediately accessible to the chemical and the rate of heating is somewhat less than it would otherwise have been. As the chemical expands and exerts pressure on the paper, the absorbed liquid is squeezed out of the paper and taken up by the chemical. In this way the pe-

riod of heat generation is prolonged to some extent which aids in heating the contents of the food receptacle thoroughly, even to the center thereof.

I claim:

1. In a self-heating preserving container, a receptacle for material to be preserved and heated, means secured to said receptacle forming the outer wall of a chamber for heat-generating chemical in heat exchange relationship to said preserving container, the outer wall of said receptacle serving as the inner wall of said chamber, means forming a chamber adjacent the chemical chamber for containing liquid adapted to react with said chemical to generate heat, and a corrugated porous member extending longitudinally in the chemical chamber adjacent one of said walls from the liquid chamber for distributing the liquid to the chemical and providing free spaces between said corrugated member and said wall for expansion of the chemical.

2. In a self-heating preserving container, means forming a closed food compartment, an exterior jacket secured about said food compartment forming therebetween a space for containing heat-generating chemical, means forming a liquid receptacle at one end of the chemical space, and a porous, corrugated member extending longitudinally in the said space adjacent said jacket from the end adjacent the liquid space to distribute liquid to the chemical and provide free spaces adjacent said jacket for expansion of chemical.

3. In a self-heating preserving container, means forming a closed cylindrical food compartment, an exterior cylindrical jacket secured about said food compartment forming therebetween a space for containing heat-generating chemical, means forming a liquid receptacle at one end of the chemical space, and a cylinder of porous, compressible, corrugated material extending longitudinally within the chemical container adjacent the outer jacket from the end adjacent the liquid space to distribute liquid to the chemical uniformly and to provide free spaces between said material and the jacket for expansion of the chemical.

4. In a self-heating preserving container, means forming a closed food compartment, an exterior jacket secured about said food compartment forming therebetween a space for containing heat-generating chemical, one end of said jacket extending longitudinally beyond the corresponding end of the food compartment, means comprising a cup-shaped element having its edge in engagement with the edge of the jacket which is beyond the end of the food compartment and its bottom spaced inwardly of the jacket and forming a transverse wall thereacross adjacent the end of the food compartment, the bottom of said cup being formed with a seat for the end of said food compartment to support said end of the food compartment against lateral displacement, and a porous, corrugated member extending longitudinally in the chemical-containing jacket adjacent said jacket from the bottom of said cup to distribute liquid to the chemical and to provide free spaces between said member and the jacket for expansion.

5. In a self-heating preserving container, means forming a closed food compartment, a rigid wall forming an exterior jacket secured about said food compartment forming with the outer wall of the food compartment a space for containing heat-generating chemical, means

forming a liquid receptacle at one end of the chemical space, a package for chemical comprising a longitudinal cylindrical member of porous material fitting closely within the jacket, a longitudinal cylindrical member of porous material fitting closely about the food compartment, a closure at one end of said package having a transverse end extending between said cylindrical members and connected at its edges to said members, said package fitting within the space for containing heat-generating chemical, one of said members being corrugated so as to form with the wall adjacent thereto free spaces for expansion of chemical, and a chemical in said package adapted to react exothermically with the liquid in said vessel.

6. In a self-heating preserving container, means forming a closed food compartment, a rigid wall forming an exterior jacket secured about said food compartment forming with the

outer wall of said compartment a space for containing heat-generating chemical, means forming a liquid receptacle at one end of the chemical space, a package for chemical comprising a longitudinal cylindrical sheet of porous linen fitting closely about the food compartment, a longitudinal cylindrical sheet of porous, corrugated, compressible paper fitting closely within the jacket, a closure at one end of said package comprising a transverse member extending between said longitudinal sheets and connected at its edges to said sheets, said package fitting within the space for containing heat-generating chemical, the corrugations of said paper sheet forming with the adjacent wall of the jacket free spaces for expansion of chemical, and a chemical in said package adapted to react exothermically with the liquid in said vessel.

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