

L. HICKS.
HEAT INSULATING CONTAINER.
APPLICATION FILED MAR. 25, 1918.

1,334,302.

Patented Mar. 23, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

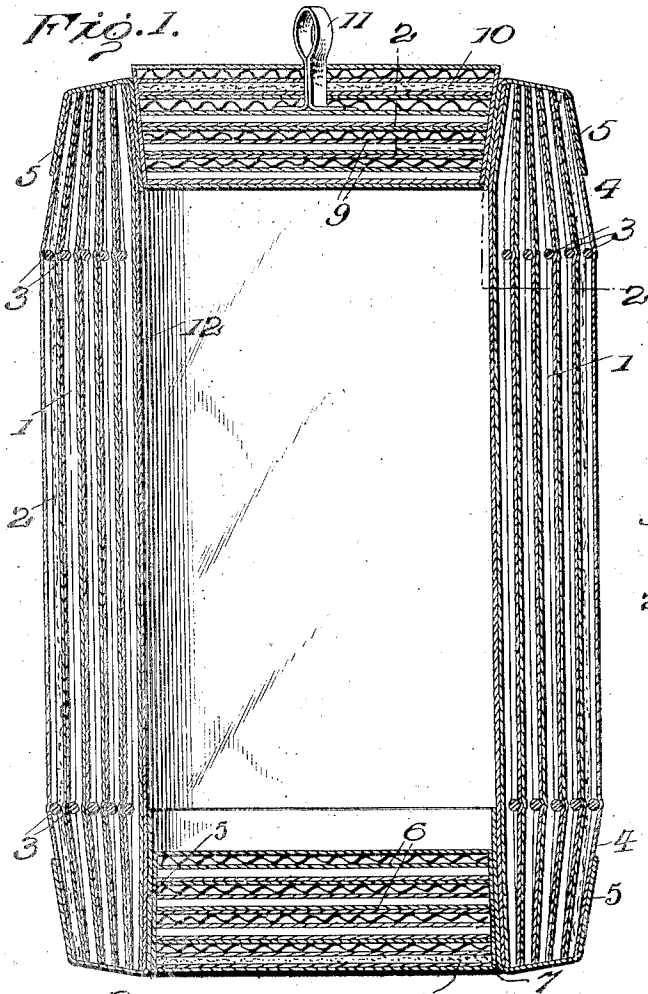


Fig. 3.

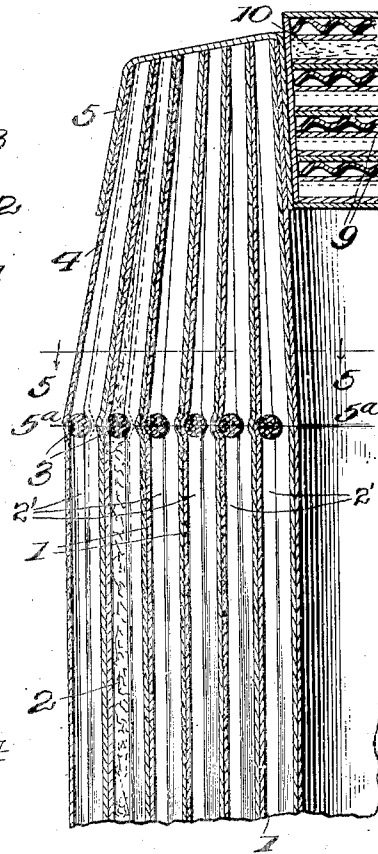


Fig. 2.

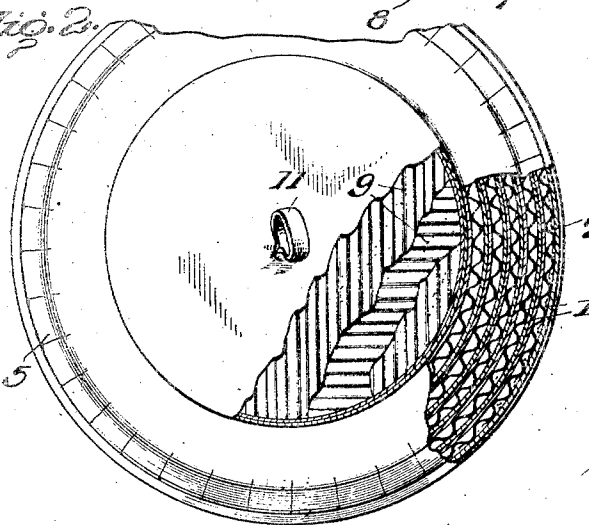
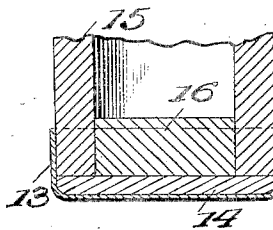


Fig. 4.



Inventor

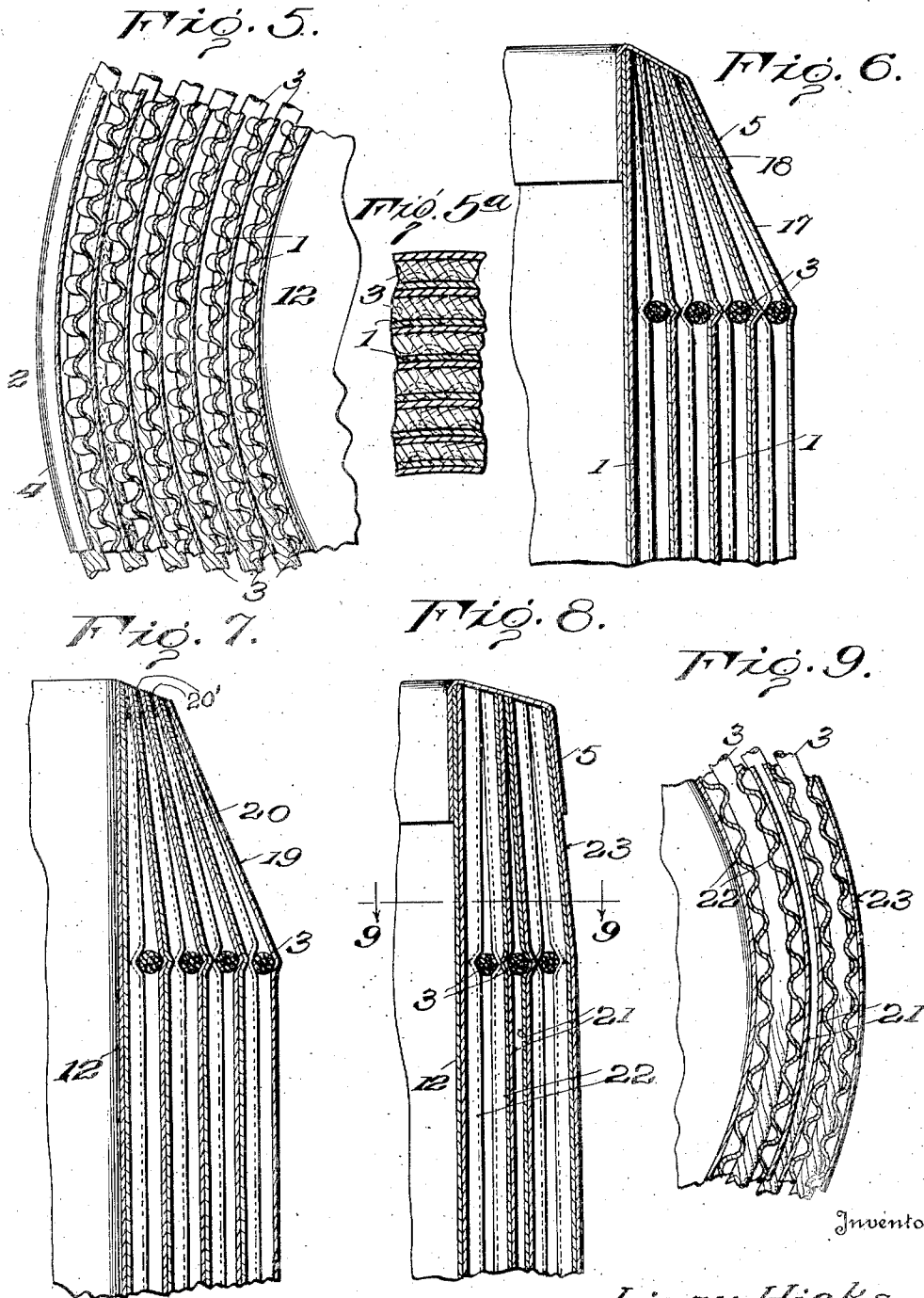
Lizzy Hicks.
By Edgar W. Kitchen,
His Attorney

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2 SHEETS—SHEET 2.



Inventor

Lizzy Hicks.
By Edgar W. Kitchen
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UNITED STATES PATENT OFFICE.

LINZY HICKS, OF OMAHA, NEBRASKA, ASSIGNOR TO THE O'BRIEN-HICKS ICELESS CONTAINER COMPANY, A CORPORATION OF NEBRASKA.

HEAT-INSULATING CONTAINER

1,334,302.

Specification of Letters Patent.

Patented Mar. 23, 1920.

Continuation of application Serial No. 120,775, filed September 18, 1916. This application filed March 25, 1918. Serial No. 224,661.

To all whom it may concern:

Be it known that I, LINZY HICKS, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Heat-Insulating Containers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in heat insulating wall material and containers made therefrom, and more particularly to the class of containers especially adapted for storage and transportation of substances requiring maintenance of substantial uniformity of temperature different from atmospheric temperature.

This application is a continuation of my application Serial No. 120,775, filed September 18, 1916.

The principal objects in view are simplicity and inexpensiveness of construction and efficiency in use; the provision of containers of paper or other fibrous material formed with dead air spaces in the wall thereof and constructed with the dead air spaces as a part of the wall; and the provision of a wall structure possessing innumerable dead air cells inherent in its formation.

With these and other detail objects in view as will in part hereinafter become apparent and in part be stated, the invention comprises certain novel constructions, combinations and arrangements of parts as subsequently specified and claimed.

In the accompanying drawings,—
Figure 1 is a vertical central section taken longitudinally through a container embodying the features of the present invention.

Fig. 2 is a top plan view of the parts seen in Fig. 1, parts being broken away and parts being seen in section approximately on the planes indicated by line 2—2 of Fig. 1.

Fig. 3 is a detail, fragmentary view taken on the same plane as Fig. 1, and shown on a greatly enlarged scale.

Fig. 4 is a detail, fragmentary vertical section of a further embodiment of the in-

vention, the parts being shown conventionally and on a reduced scale.

Figs. 5 and 5^a are transverse sections taken on the planes indicated respectively by lines 5—5 and 5^a—5^a of Fig. 3 and looking downward.

Figs. 6, 7 and 8 are views similar to Fig. 3 of slightly modified embodiments of the invention.

Fig. 9 is a transverse section taken substantially on the plane indicated by line 9—9 of Fig. 8.

The invention is particularly applicable to containers for the transportation and other handling of substances which must be retained at a temperature differing from that of the atmosphere, and the invention is also useful in the formation of wall structures of general application.

The container may have any desired contour but is preferably cylindrical as shown in Fig. 2, since the cylindrical form enables the use of a continuous sheet of corrugated material rolled into spiral form, producing successive layers 1, 1. A sheet of asbestos or other appropriate heat insulating material 2 is disposed between two of the layers 1 at one place in the wall, other portions of the wall being constructed without the extra intervening sheet, and it is apparent, of course, that the sheet may be entirely omitted where its insulating properties are not required. The sheet of which the several layers 1 are formed is initially constructed the same as ordinary commercial corrugated paper with one sheet of corrugated paper backed by one sheet of smooth flat paper, the two sheets being caused to adhere by adhesive applied along the ridges of the corrugated sheet. This presents the appearance of two sheets, as clearly seen in Fig. 5^a for each layer 1.

The several layers 1 are spaced apart for forming dead air spaces 2' additional to the air spaces provided by the grooves of the corrugations, and, in order to insure the maintenance of the dead air spaces 2', cords 3, 3 are arranged between the several layers 1, the said cords being of sufficiently hard material to sustain the sheets of corrugated paper against coming into intimate contact. When the device is constructed as

shown, the body part of the container is formed of a continuous strip of corrugated paper rolled spirally upon itself to provide the layers 1, the cords 3 being formed of a continuous strand wound with the strip and thus interposed between the layers 1 of the completed article to hold the layers from contact with one another, and to form dead air spaces between the cords.

When the layers 1 are brought into intimate contact with the cords 3, the cords extend across the corrugations of the layers and break the corrugations down crosswise and thus seal not only the spaces 2' but also the longitudinal grooves of the corrugations. The corrugated layers are preferably moist during the rolling operation to prevent cracking or breaking of the corrugated cells when they are crushed by the cords 3. This cross crushing of the ridges of the corrugations produces a cross groove which is filled with cord 3, but it is the material of the crushed-down ridge in each instance which blockades the inner grooves and divides them into longitudinal cells with sealed ends. By the inner grooves is meant the grooves next to the flat sheet to which the corrugated sheet is adhered.

The ends of the tubular body of the container are given an appropriate finish by compressing or forcing the ends of the layers 1 toward each other to render the same more compact and to produce a taper 4 at each end of the container. A cord 3 is arranged at the line of each angle formed by the taper 4 departing from the straight line of the side of the container. The cords at these points are particularly desirable to prevent the layers of corrugated material from becoming forced into intimate contact throughout their area.

A cover sheet or strip of any ordinary material, such as a strong tough sheet of paper 5, is placed about the terminal portions 4 and over the compressed ends of the layers. The several layers 1 and the sheets 5 are glued together or otherwise caused to adhere for holding the parts in their given relations. The cords 3 are also preferably saturated with some form of adhesive, such as glue, so as to effectively connect the several layers 1 and seal the dead air spaces 2'.

The container body is provided with a bottom formed of disks 6, 6, of corrugated material similar to the layers 1, the assembled mass of disks being covered by a sheet of paper 7, or other appropriate material, adhering to the edges of the disks and to the exposed faces of the terminal disks. Asbestos or other similar heat insulating material 8 is disposed between two parts of the bottom, and the entire bottom is retained in position in the lower end of the container body by glue or other similar adhesive.

The container body is provided at its upper end with a plug or closure which is similar in construction to the bottom, being formed of disks 9, 9 of corrugated material and being provided with insulating material 10. The plug or closure is proportioned to fit tightly within the upper end of the container body and to extend preferably within the container for the greater portion of the length of the tapered portion 4. A flexible grip or handle 11 is embedded within and fixed to the plug for facilitating manual removal. The plug may be tapered downwardly when the interior of the crimped or crushed portion 4 is flared so as to insure a close, tight joint between the plug and the container.

The interior of the container is preferably finished with a sheet of paraffin paper or like material 12 for rendering the container impervious to moisture so that food or liquid substances may be deposited directly in the container and stored or transported therein. In the instance of use of the container for the preservation of ice-cream, the can in which the cream is frozen may be set directly in the container if preferred. Of course, the container is useful for storage and transportation of any products whose preservation or preparation requires the maintenance of a temperature different from atmospheric temperature.

It is obvious, of course, that the layers 1 may be distinct cylinders or parts of a continuous spiral where the container is a cylinder, and will be otherwise appropriately shaped where the shape of the container is different from that of a cylinder. It will also be obvious that various means may be employed for protecting the container against injury during shipment, such protecting means being especially desirable for containers of large dimensions.

In Fig. 4 is illustrated, diagrammatically, a container body provided with a protecting guard for the bottom. This guard consists of a band of metal 13 fixed to a block of wood or other appropriate substance 14, the band being designed to receive the lower end of a container body 15 and to sufficiently tightly engage the same to retain the block 14 in position as a false bottom designed to receive shocks and jars during the course of handling the container and to prevent injury to the bottom plug or closure 16 of the container.

In Fig. 6 there is illustrated a modified form of the invention wherein the tapering end 17 of the container is compressed or crimped sufficiently to collapse the corrugations 18 beyond the cords 3. This construction effectually seals the outer ends of the cells of the layers, and they may be held together in crushed position by the strip 5 secured in place by an adhesive or the like.

Another modification is shown in Fig. 7 wherein the tapering portion 19 of the container body is crushed or crimped to break down the corrugations 20, and the ends of the layers are held together by an adhesive with the strip 5 eliminated. The adhesive here used is of cementitious matter having a substantial body so as to fill the interstices at the end of the container, as indicated at 20'. The cement when set and hard adds to the rigidity of the end of the body.

In Fig. 8 a further modification of the invention is shown, wherein the layers 21, corresponding to the layers 1 of Fig. 1, are arranged alternately back to back and face to face. In other words, one layer 21 has its smooth surface presented toward the smooth surface of an adjacent layer 21 and has its corrugated surface presented toward the corrugated surface of another adjacent layer. The cords 3 are employed in the same manner and for the same purpose as in the structure above described, but it is obvious that where the cord appears between two adjacent corrugated surfaces it produces the cross groove or crushed-down portion in both corrugated surfaces, and where the cord appears between two smooth surfaces it forms a cross groove by denting in the smooth sheets and crushing the corrugations in the rear of such sheets. The corrugations 22 are thus cross grooved and the longitudinal dead air spaces sealed between the corrugated surfaces. In addition to this, dead air spaces are provided between the smooth surfaces spaced by the interposed cord 3. In this form of the invention, the tapering end 23 of the container body may be formed by compressing the ends of the layers together sufficiently to bring the smooth faces of the layers 21 into surface contact and to bring the ridges of corrugations 22 into contact. The air spaces within the corrugations 21 between the cords 3 and the extremities of the container body are sealed by the strip 5 held in place by an adhesive or the like.

Of course, the container may be built up of any combination of the various above-disclosed forms for sealing the spaces or cells within the wall of the container and providing a plurality of dead air areas to resist the passage of heat units through the walls in either direction.

It should be noted that the range of materials of which the insulating container may be formed is very wide and may include almost any form of fibrous substance, such as above described, and it will be, of course, further apparent that the invention will in no sense be departed from by the employment of fanciful finish or the addition of any appropriate metallic or other receptacle in which the insulating container may be placed for protection, and that various ad-

ditions may be made to the walls of the container for reinforcing and finishing the latter.

What I claim is:—

1. In a heat insulating container, inclosing walls comprising paper sheets arranged in spaced relation throughout substantially their entire lengths and being compressed together at their opposite ends to form dead air spaces therebetween.

2. A fibrous heat insulating container provided with a wall of superposed fiber sheets, the wall having spaces therein and the sheets being compressed at spaced points and secured in such position to close said spaces and form independent dead air cells in the sheets.

3. In a heat insulating container, the combination of inclosing walls comprising corrugated sheets of paper, and means within the cellular spaces of the sheets for sealing the passages of the sheets and thereby creating dead air spaces.

4. In a heat insulating container, the combination of inclosing walls comprising corrugated sheets arranged in closely spaced apart relation, and spacers arranged between the sheets near the opposite ends thereof to hold the same separated, all of said sheets being compressed together at their opposite ends to form dead air spaces in the walls.

5. In a heat insulating container, inclosing walls comprising sheets of corrugated paper spaced at intermediate points in the length of the walls and crimped together at a terminal portion of the walls, thus forming an angle between said terminal portion and the intermediate portion of the walls, and cords interposed between the sheets at said angle.

6. In a heat insulating container, the combination of inclosing walls comprising corrugated sheets arranged in closely spaced apart relation, spacers located between the sheets near the opposite ends thereof to hold the same separated, said sheets being compressed together at their opposite ends to form dead air spaces between the walls and to reinforce the opposite ends of the container and protect the edges of the sheets, and plugs fitting in the opposite ends of the container for closing the same.

7. In a heat insulating container, the combination of inclosing walls comprising sheets arranged in closely spaced apart relation, spacers arranged between the sheets near the opposite ends thereof to hold the same separated, and asbestos sheets arranged between the first sheets, all of said sheets being compressed together at their opposite ends to form dead air spaces in the walls.

8. A wall structure comprising spaced layers of corrugated sheets, the sheets being formed with cross corrugations or grooves depressing the original corrugations of the sheet for choking the space between sheets.

9. A wall structure comprising spaced layers of corrugated sheets, the sheets being formed with cross corrugations or grooves depressing the original corrugations of the sheet, and a filler for said cross grooves.

10. A heat insulating container comprising a wall formed of layers of corrugated material, the terminal portions of the walls having the edges of the layers drawn closer together than intermediate portions of the layers, and means for closing and sealing the interstices at such drawn-together edges.

11. In a heat insulating container, inclosing walls comprising corrugated sheets arranged in spaced relation, portions of the corrugations of the sheets being pressed into the space between the sheets.

12. In a heat insulating container, the

combination of inclosing walls comprising corrugated sheets spaced apart and means arranged between the sheets closing the space therebetween for leaving a dead air space along the sheet between the ends, said sheets being compressed at one end portion.

13. A heat insulating container comprising a wall formed of layers of corrugated material, a terminal portion of the wall having the edges of the layers drawn closer together than intermediate portions of the layers.

In testimony whereof I affix my signature in presence of two witnesses.

LINZY HICKS.

Witnesses:

CHAS. L. DUNDEY,
LAURA GORHAM.