May 19, 1925. 1,538,469

L. G. COPEMAN

REFRIGERATOR

Filed June 25, 1923 5 Sheets-Sheet 1

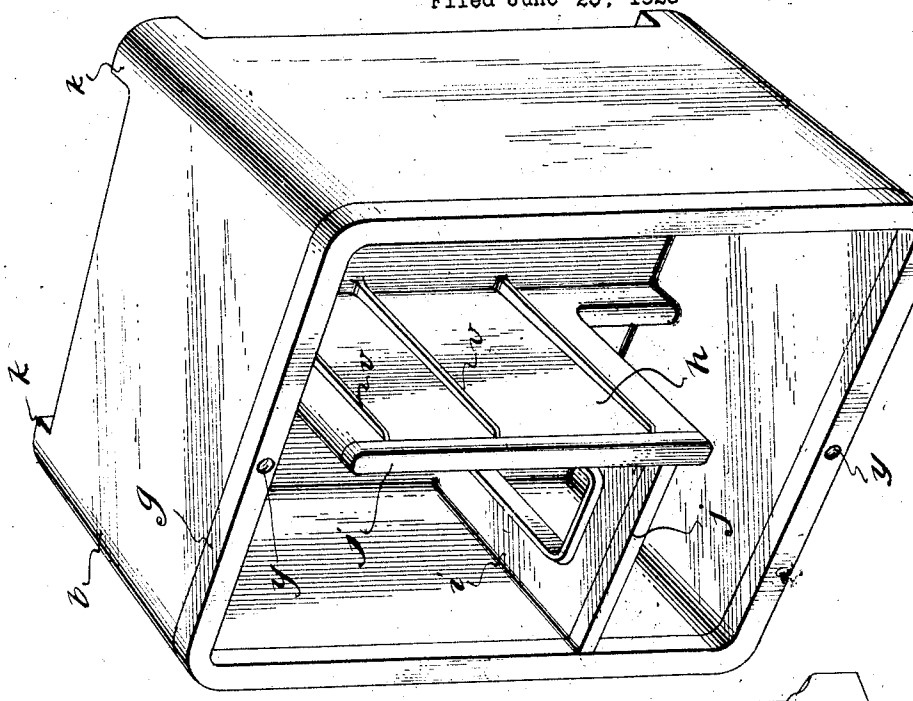


Fig. 2.

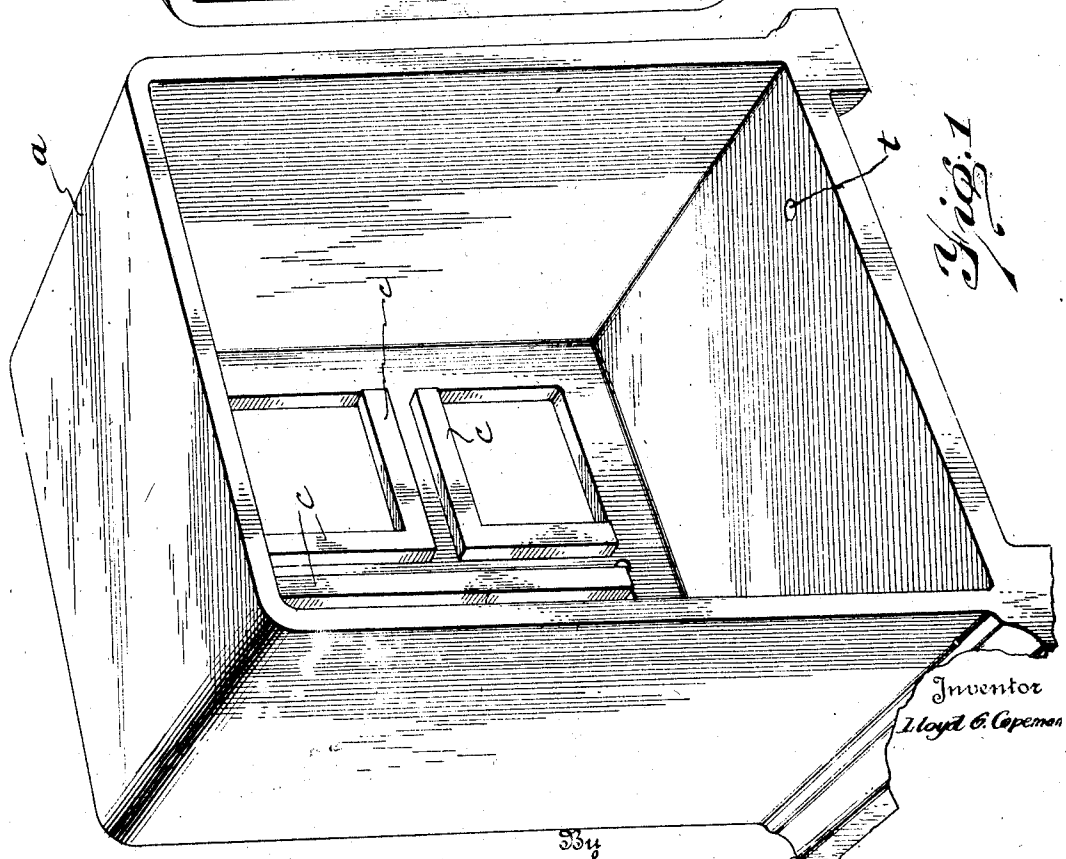


Fig. 1.

Inventor
Lloyd G. Copeman

By
Stuart G. Barnes
Attorney

May 19, 1925.

1,538,469

L. G. COPEMAN

REFRIGERATOR

Filed June 25, 1923

5 Sheets-Sheet 2

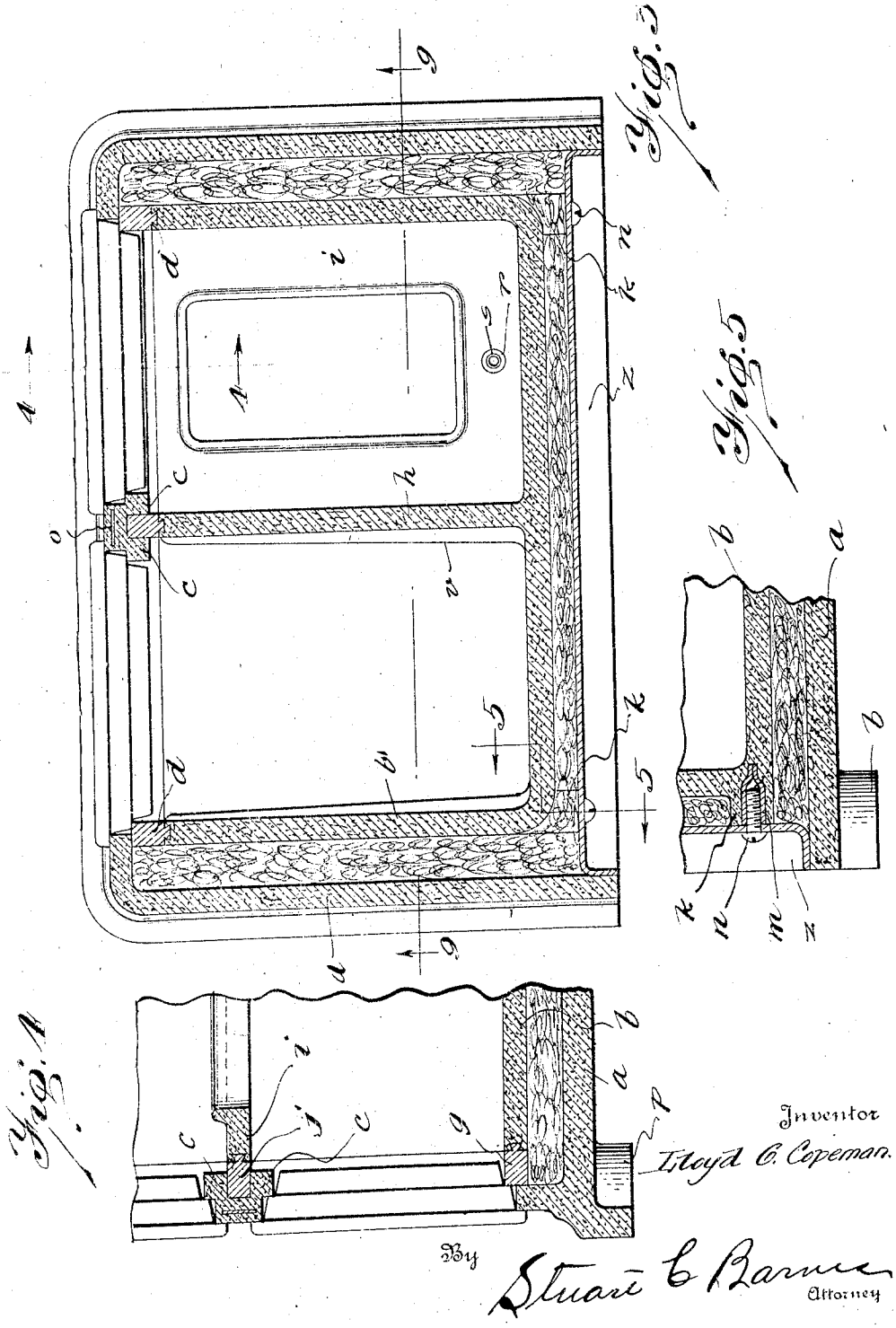


Fig. 3

Fig. 5

Fig. 4

Inventor
Lloyd G. Copeman.

By Stuart G. Barnes
Attorney

May 19, 1925. 1,538,469

L. G. COPEMAN

REFRIGERATOR

Filed June 25, 1923 5 Sheets-Sheet 3

Fig. 6

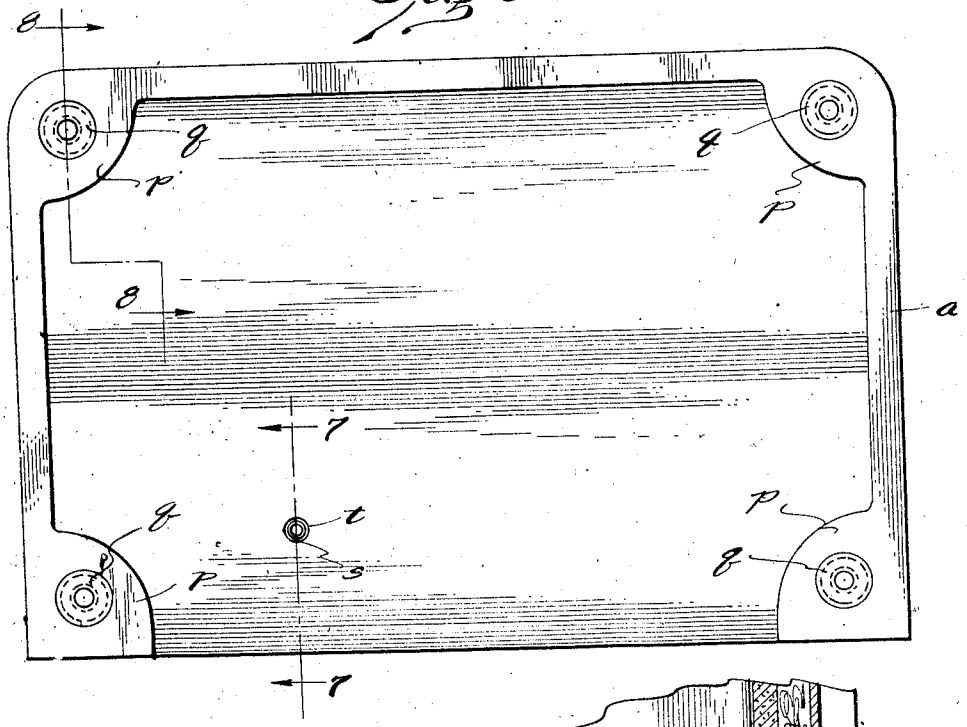


Fig. 7

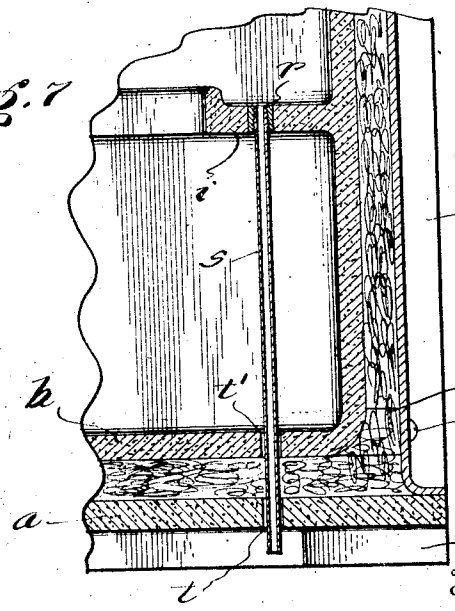
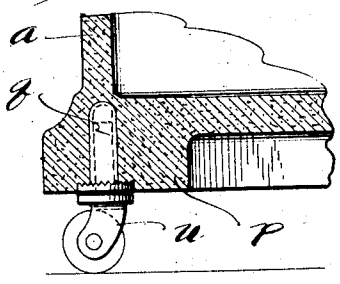


Fig. 8



Inventor

Lloyd G. Copeman

By Stuart G Barnes

Attorney

May 19, 1925.

1,538,469

L. G. COPEMAN

REFRIGERATOR

Filed June 25, 1923

5 Sheets-Sheet 4

Fig. 9

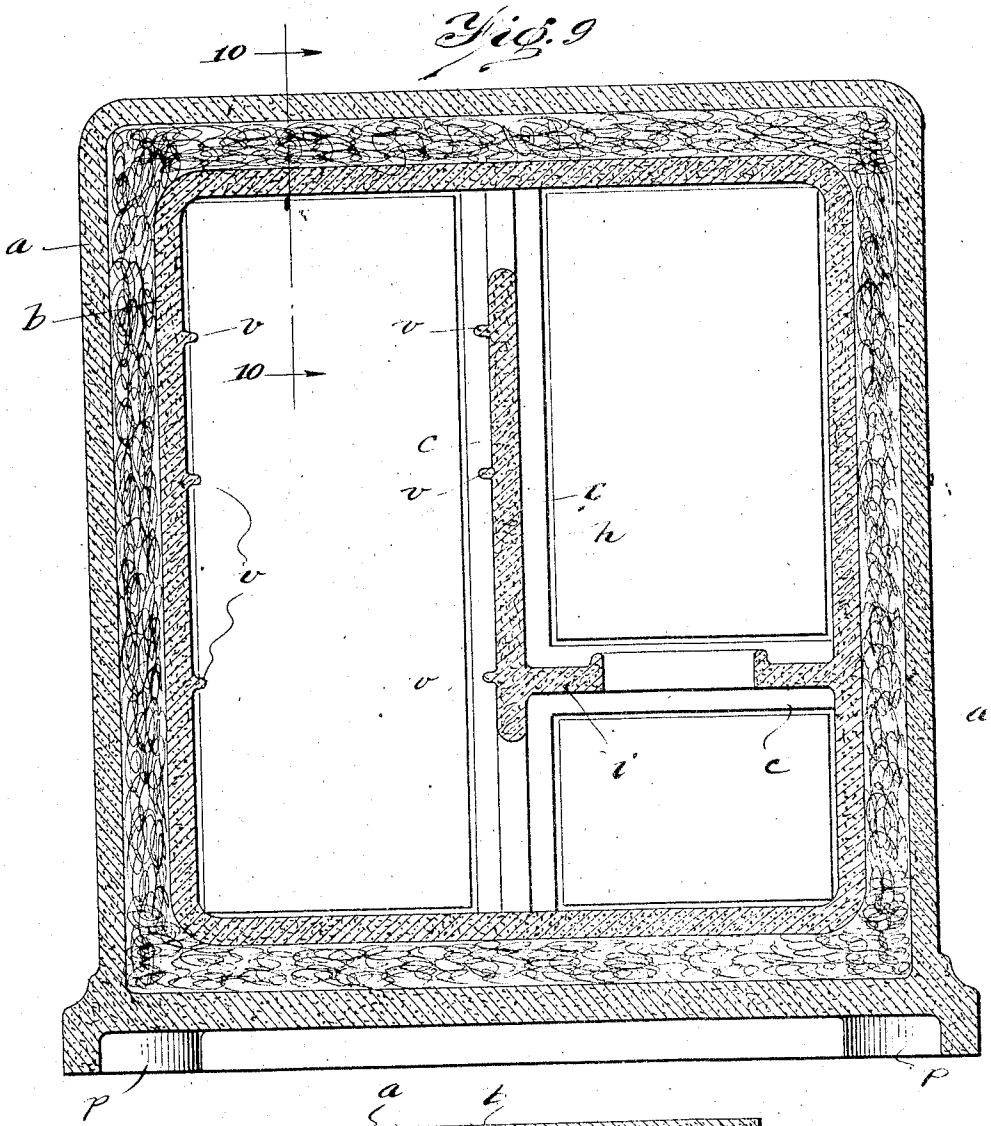
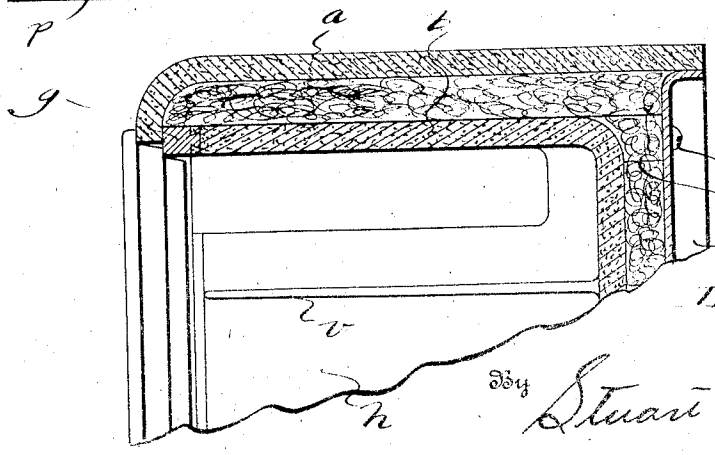


Fig. 10



Inventor

Lloyd G. Copeman

By Stuart G. Barnes

Attorney

May 19, 1925. 1,538,469

L. G. COPEMAN

REFRIGERATOR

Filed June 25, 1923 5 Sheets-Sheet 5

Fig. 11

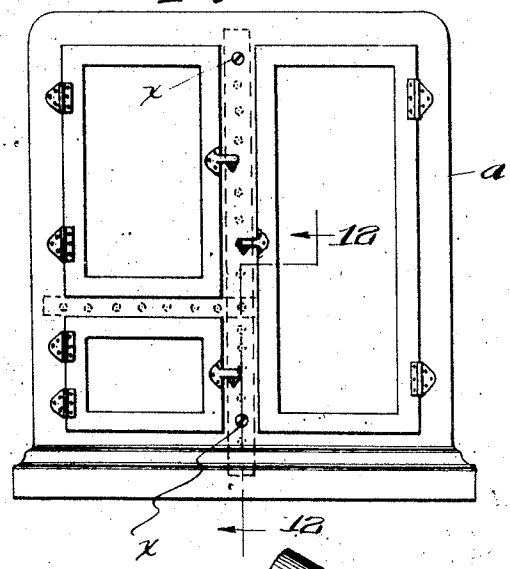
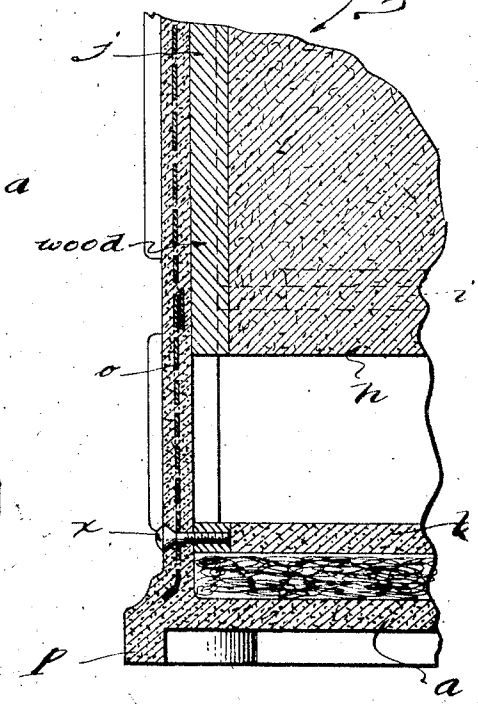


Fig. 12



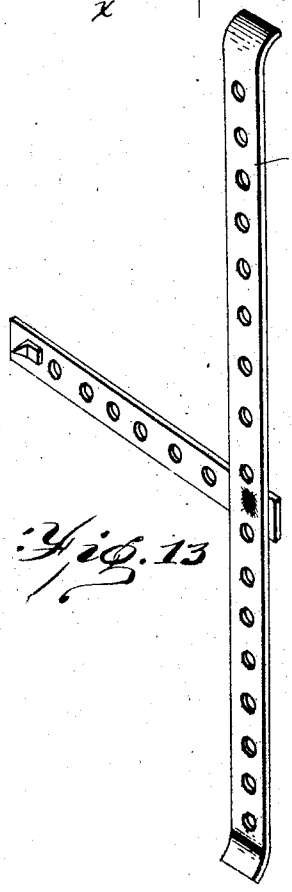


Fig. 13

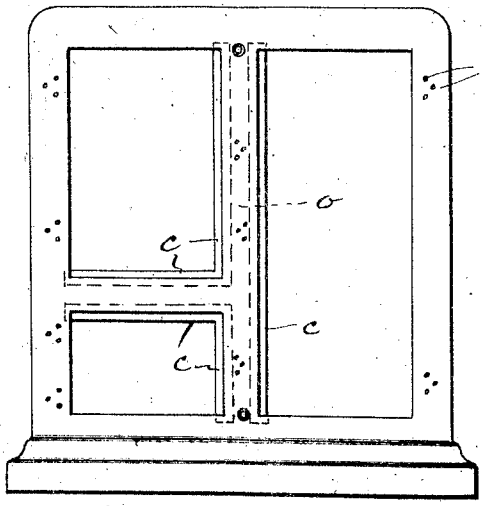


Fig. 14

Inventor

Lloyd G. Copeman.

By Stuart & Barnes

Attorney

Patented May 19, 1925. 1,538,469

UNITED STATES PATENT OFFICE.

LLOYD G. COPEMAN, OF FLINT, MICHIGAN.

REFRIGERATOR.

Application filed June 25, 1923. Serial No. 647,603.

To all whom it may concern:

Be it known that I, LLOYD G. COPEMAN, a citizen of the United States, residing at Flint, in the county of Genesee and State of Michigan, have invented certain new and useful Improvements in Refrigerators, of which the following is a specification.

This invention relates to refrigerator construction, and has for its object a refrigerator constructed entirely of stonework with the exception of the back. The originally semi-fluid plastic material is moulded into an outer stone shell and into an inner stone shell. The inner stone shell is floated in the outer stone shell by means of a flanged back plate; suitable heat-insulated packing is secured in between the two shells.

A construction of this kind has numerous advantages over the ordinary wooden refrigerator construction. The wooden refrigerator is a built up proposition which requires a large amount of lumber that has to be suitably placed and finished. This all has to be cut, trimmed and prepared for fitting together. The same then has to be properly joined together with glue and otherwise fastened joints requiring a large amount of labor, which involves the major portion of the cost of the refrigerator. Furthermore, the wooden refrigerators are quite unsatisfactory for the reason of the opening of the joints. A refrigerator is subject to severe heat changes and also moisture-content changes. Wood is very sensitive to changes of this kind and it is well known that wood easily warps and swells and the joints open, resulting in not only unsanitary conditions but the final wrecking of the box. This condition is recognized today as the best and highest priced refrigerators contain sheet metal shells which are enameled on the outside.

It is the object of the present invention to design a refrigerator which can be made by two moulding operations, one to mould the outside shell and the other the inside shell. These two shells may then be telescoped one within the other and packed with ground cork, mineral wool or any other suitable insulation. The back plate which serves to permanently float the inner shell in the outer shell may then be secured in place, completing the box structure. This gives a refrigerator construction which is much cheaper to manufacture and which will practically never wear out. It makes an absolutely sanitary box inside and outside and avoids all exposed joints except at the back, employing there joints of a material that will not swell or open. This material may be easily enameled outside and inside, giving an extremely pleasing appearance, and making an absolutely sanitary easily cleaned cooler. These features will be better understood as the detailed construction is developed.

In the drawings:

Fig. 1 is a perspective view of the outer shell.

Fig. 2 is a perspective view of the inner shell.

Fig. 3 is a horizontal sectional view through the refrigerator.

Fig. 4 is a section on the line 4—4 of Fig. 3, showing the location of the inner shell with respect to the outer shell.

Fig. 5 is a section on the line 5—5 of Fig. 3, showing the method of fastening the back of the refrigerator.

Fig. 6 is a plan view of the bottom of the refrigerator.

Fig. 7 is a section taken on the line 7—7 of Fig. 6, showing the drain pipe.

Fig. 8 is a section on the line 8—8 of Fig. 6 showing the castor construction.

Fig. 9 is a vertical section taken on the line 9—9 of Fig. 3.

Fig. 10 is a detail section of the top construction taken on the line 10—10 of Fig. 9.

Fig. 11 is a front elevation of the refrigerator showing in dotted lines the reinforcement for the front wall construction of the outer shell.

Fig. 12 is a section on the line 12—12 of Fig. 11 showing the reinforcing embedded therein.

Fig. 13 is a detail in perspective of the reinforcing members.

Fig. 14 is a front elevation of the outer shell with the inner shell removed.

The refrigerator is made up of an outer shell *a*, and an inner shell *b*; each of these is a moulded shell. It is moulded or cast from a cementitious or concrete material in suitable moulds which are described and claimed in my copending application No. 647,599. I prefer to use a composition material of which the base is an oxy-chloride cement. For instance, I find that composition material made up of magnesium oxide,

soft "silex" (ground flint), sand, (crystal flake), ground asbestos, lithopone and magnesium chloride dissolved in water affords an admirable stonework when it sets. However, I do not limit myself to any particular composition material, as it will be apparent that various originally-liquid compositions may be used to afford a complete stonework when they have set after the moulding operation. I find that composition material made up of the ingredients I have named forms a very satisfactory stonework that is not only hard but possesses great tensile strength so as not to crack or break.

Inspection of Fig. 1 together with the other figures, will make apparent the character of the outer shell. It comprises a five-wall rectangular enclosure, the back being open. Along two sides of each door opening is a reinforcing rib *c*, which forms part of the door frame, the remainder of the door frame being formed by the edge of the inner shell abutting against the edge of the door opening. This will be apparent in viewing Figs. 3 and 4, where it will be apparent that the cast rib *c* of the outer shell forms part of the door post while on the other sides of the door openings, the corresponding part of the door post is formed by the front edges of the inner shell designated *d*, in this case, dovetailed wooden strips that act as the heat-insulating contact between the outer and the inner shell.

The inner shell *b* is a more intricate casting than the outer shell, and the suitable dies and method for securing this one unitary casting are described and claimed in detail in the copending application already referred to. A dovetailed wooden strip *g* is locked into the inner shell at the front to form an insulating contact. This strip is laid in the mould and the inner shell cast upon the dovetail rib shown on the back of the strip, thereby locking the strip securely to the inner shell. The inner shell comprises the four side walls and a back wall and is open at the front. It includes a vertical partition wall *h* and a horizontal partition wall *i*, that forms the ice chamber. The front of each of these partition walls is provided with an insulating strip *j* to form as already described, a heat insulating contact between the inner shell and the outer shell. The back of the inner shell is provided with four horizontally projected legs *k*. Into these legs there are moulded tapped bushings *m* to receive the machine screws *n*.

Preferably, perforated reinforcing bars *o* are used in the outer shell casting at the front to run between the three door openings to reinforce the stonework casting at the weakest point. These are simply laid in the mould in the manner described in my copending application, so that they become a part of the integral casting. The outer shell is provided with vertical legs *p* into which are moulded the metal castor sockets *q*. Into the horizontal partition wall is moulded a tapped bushing *r*, adapted to receive the drain pipe *s* that is projected up through the aligned hol *t* and *t'* in the outer and inner shell. The end of this drain tube is threaded so that it may be turned into the threads of the bushing. The castors *u* may be easily fastened into the legs by simply slipping the castor spindles into the sockets.

It will be noticed that the door openings are formed with the usual stepped construction, by reason of the casting of the outer shell being provided with the ribs *c* already mentioned. These ribs *c* on two sides of the door opening are offset from the door opening to give the step construction. On the other hand, a portion of the step construction of the door post on the other two sides is formed by the abutting edge of the inner shell. This is clearly shown in Fig. 3. The central vertical partition wall fits nicely between the reinforcing ribs *c* of the outer shell so as to help in centering the inner shell in the outer shell. The partition wall of the main food chamber of the inner shell is horizontally ribbed as at *v* to provide shelf supports as is also the side wall of the inner shell.

It will be apparent that the inner shell may be telescoped into the outer shell. A pair of bolts *x* may be inserted at the top and bottom of the munnion of the outer shell, passing through the threaded openings *y* in the inner shell. This will temporarily support the inner shell in the outer shell. If the strain is too great on these bolts because of the leverage, suitable blocks may be inserted as temporary spacers to relieve the load. The space between the outer and inner shell may now be rammed with suitable packing material. The assembly is then completed by simply fitting in the flanged back plate *z* which is provided with a relatively deep flange, which nicely fits into the rear opening of the outer shell. Machine screws *n* may now be passed through holes in this back plate: these can be screwed in bushings *m*, (see Fig. 5). This will properly center and float the telescoping inner shell in spaced relation with respect to the outer shell. This completes a remarkably simple assembly and does away with a large labor cost.

The refrigerator may be coated both inside and out, either by simple paint or by a high grade enamel such as an air drying enamel; such air drying enamel as is afforded by some of the pyroxylin or celluloid compounds, namely, an air drying lacquer such as is known by the trade name of "Pyrolin" an enamel put out by the E. I. Du Pont De Nemours Co.

The door constructions may likewise be of stonework, but inasmuch as I have described and claimed these in my copending applications, it will be unnecessary to detail these here, for obviously they could be of wood or any other material. The outside hardware, such as latches, latch strikers and hinges are secured to the stonework by screws that engage in the bushings *l*, that are cast into the shells in the same way as the bushings *m*.

What I claim is:

1. In a refrigerator, the combination of an outer moulded shell, an inner moulded shell telescoping therein, and a back plate for carrying the inner moulded shell and holding it in spaced relation with respect to the other moulded shell.

2. In a refrigerator, the combination of an outer moulded shell provided at the rear with an opening and at the front with one or more door openings, an inner moulded shell provided at the front with an opening and telescoping into the outer shell and held in spaced relation with respect to the outer shell except at the front.

3. In a refrigerator, the combination of an outer moulded shell having an opening at the back, an inner moulded shell opening at the front and telescoping into the outer moulded shell and a flanged back plate fitted into the opening in the outer shell and holding the inner shell in floating relation with respect to the outer shell.

4. In a refrigerator, the combination of an outer shell having four side walls and a door-apertured front wall, an inner moulded shell forming the lining of the refrigerator, and divided by a partition into a plurality of chambers, the said inner shell having four side walls, a back wall and being open at the front, and means for floating the inner shell in the outer shell in spaced relation with the side walls of the outer shell.

5. In a refrigerator, the combination of an outer shell, the outer shell provided with a door opening comprising a moulded structure of four side walls, a door-apertured front wall and opening at the back, a moulded and chambered inner shell telescoping into the outer shell, fastening devices for removably securing the inner shell to the apertured front wall of the outer shell, and means for floating the inner shell in spaced relation with respect to the outer shell.

6. In a refrigerator, the combination of an outer shell, having a door-apertured front wall and four side walls with an opening at the back, an inner moulded and chambered shell having four side walls and a back wall provided with horizontally projecting legs and open at the front, means for removably securing the front of the inner shell to the front of the outer shell, and a back plate for floating the inner shell in spaced relation with respect to the side walls of the shell by means of removable fastening devices passing through the back plate and into the horizontally projected legs of the inner shell.

7. In a refrigerator, the combination of a moulded outer shell, a telescoping moulded inner shell having an open front adapted to contact with the front wall of the outer shell and provided with insulating material about the front edges where contact is made with the outer shell, and means for floating the inner shell in the outer shell in spaced relation with respect to the side walls.

8. In a refrigerator, the combination of a moulded outer shell provided with side walls and a front wall having on the inside portions of door frames formed in the way of integral ribs, and a moulded inner shell adapted to fit into the outer shell in telescoping relation, the inner shell provided with a back wall side wall and front edges arranged to complement the ribs of the inside of the front wall of the outer shell to provide complete door opening frames.

9. In a refrigerator, a moulded outer shell provided with four side walls and an apertured front wall including a central mullion and a reinforcing bar embedded in said mullion.

10. In a refrigerator, the combination of a casting forming an outer shell, a second casting forming an inner shell secured to the outer shell in spaced relation, and a closure secured to the opening in the outer shell through which the second casting is introduced, the inner shell forming one or more preserving chambers for the refrigerators, the outer shell provided with door openings in the front through which access may be had to said preserving chambers in the inner shell.

11. In a refrigerator, the combination of an outer moulded shell provided with a front, with one or more door openings, and provided with a plurality of remaining walls with one of the remaining sides having a relatively large opening, a moulded inner shell passed through the said opening and having a front opening registering with the door opening or openings in the front wall, means for holding the moulded inner shell against the front wall of the moulded outer shell and in spaced relation with some of the other walls, and a closure for the opening through which the inner shell is introduced.

12. In a refrigerator, the combination of an outer moulded shell provided with one or more door openings in the front and having a plurality of remaining walls and sides one of which is provided with a large opening, a moulded open front inner shell which can be passed through said opening and held in spaced relation with the several of the walls

of the refrigerator, and means for closing said opening when said moulded inner shell has been passed therethrough.

13. In a refrigerator, the combination of an outer moulded stone shell provided with one or more door openings at the front and having a plurality of walls and an open space, a moulded stone inner shell having an open front which can be passed into the open space and the open front caused to register with the door opening or openings, means for holding said moulded inner shell in spaced relation with the outer shell, and means for insulating the two stone shells.

14. In a refrigerator, the combination of an outer moulded stone shell provided at one face with one or more door openings and provided at another side with an open space, a moulded stone inner shell having an open side, which shell can be passed through the open space and such open side caused to register with the door openings, means for holding the moulded inner shell in spaced relation with the outer shell, and means for drawing the inner shell tightly against the outer shell on the side of the outer shell provided with the door opening.

In testimony whereof I affix my signature.

LLOYD G. COPEMAN.