

No. 624,089.

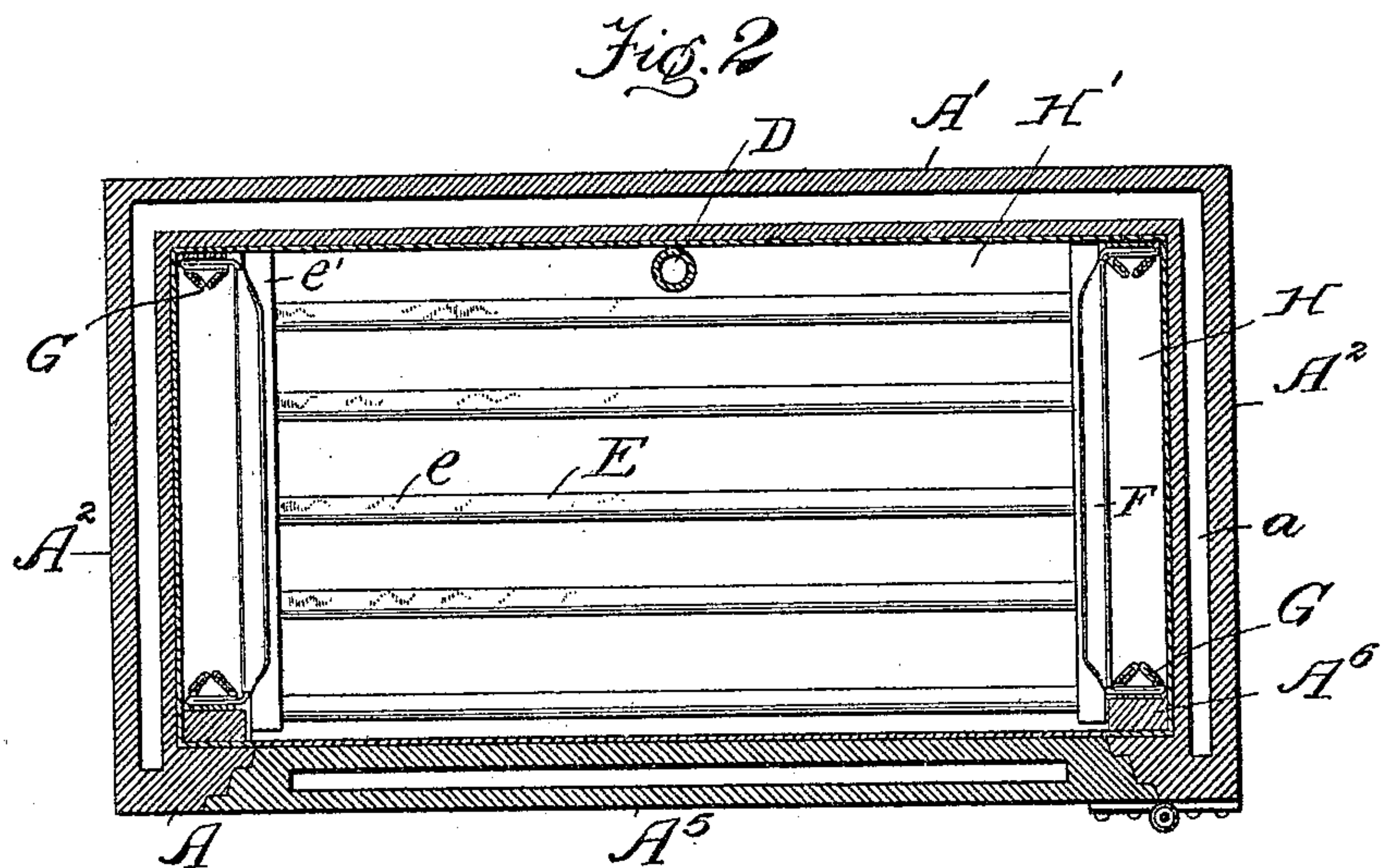
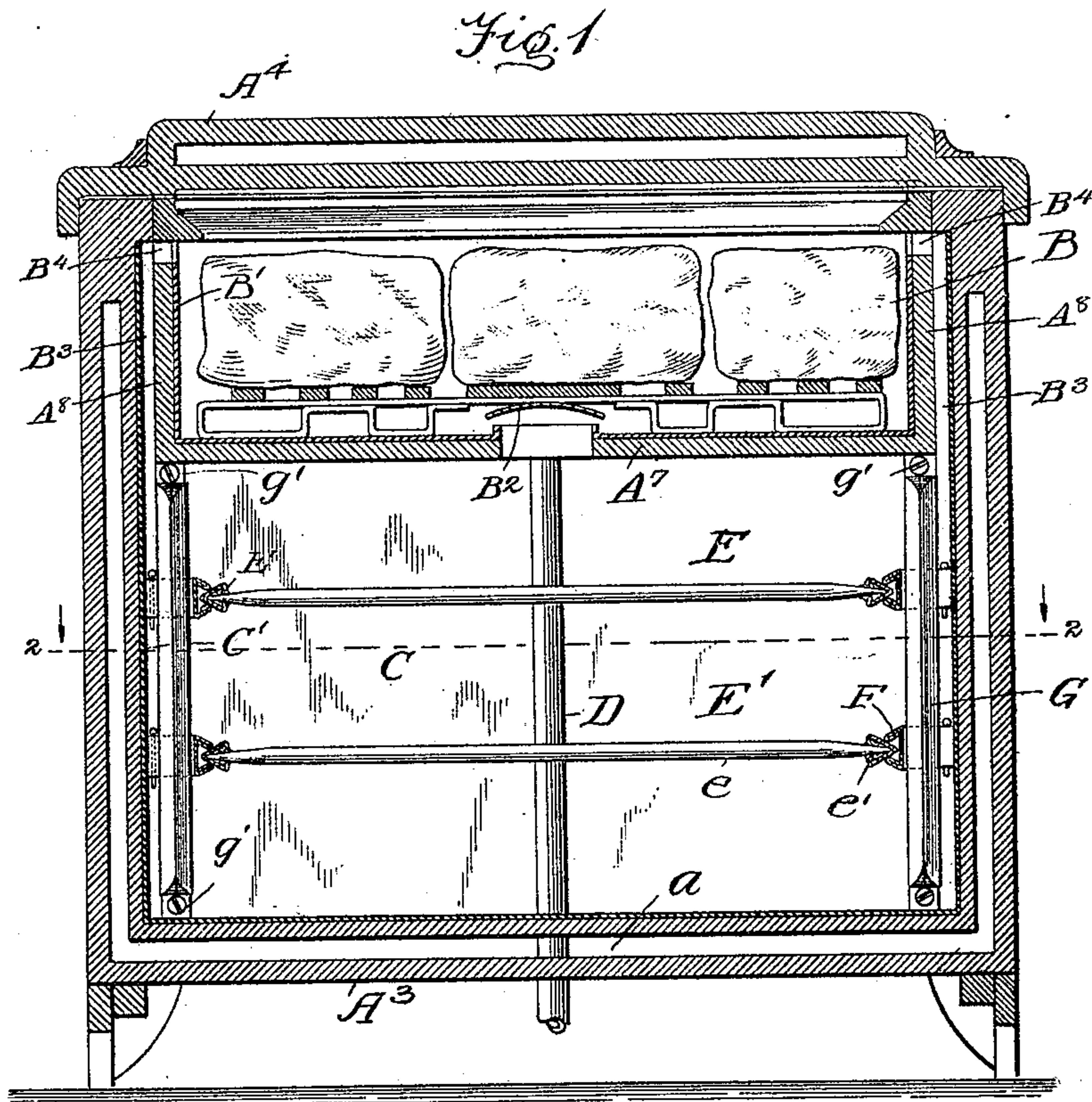
Patented May 2, 1899.

F. E. RANNEY.
REFRIGERATOR.

(Application filed Feb. 4, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

Edmund H. Stanso.
Harold E. Barrett,

Inventor,
Fred E. Ranney.

by Pooler Brown his Atty.

No. 624,089.

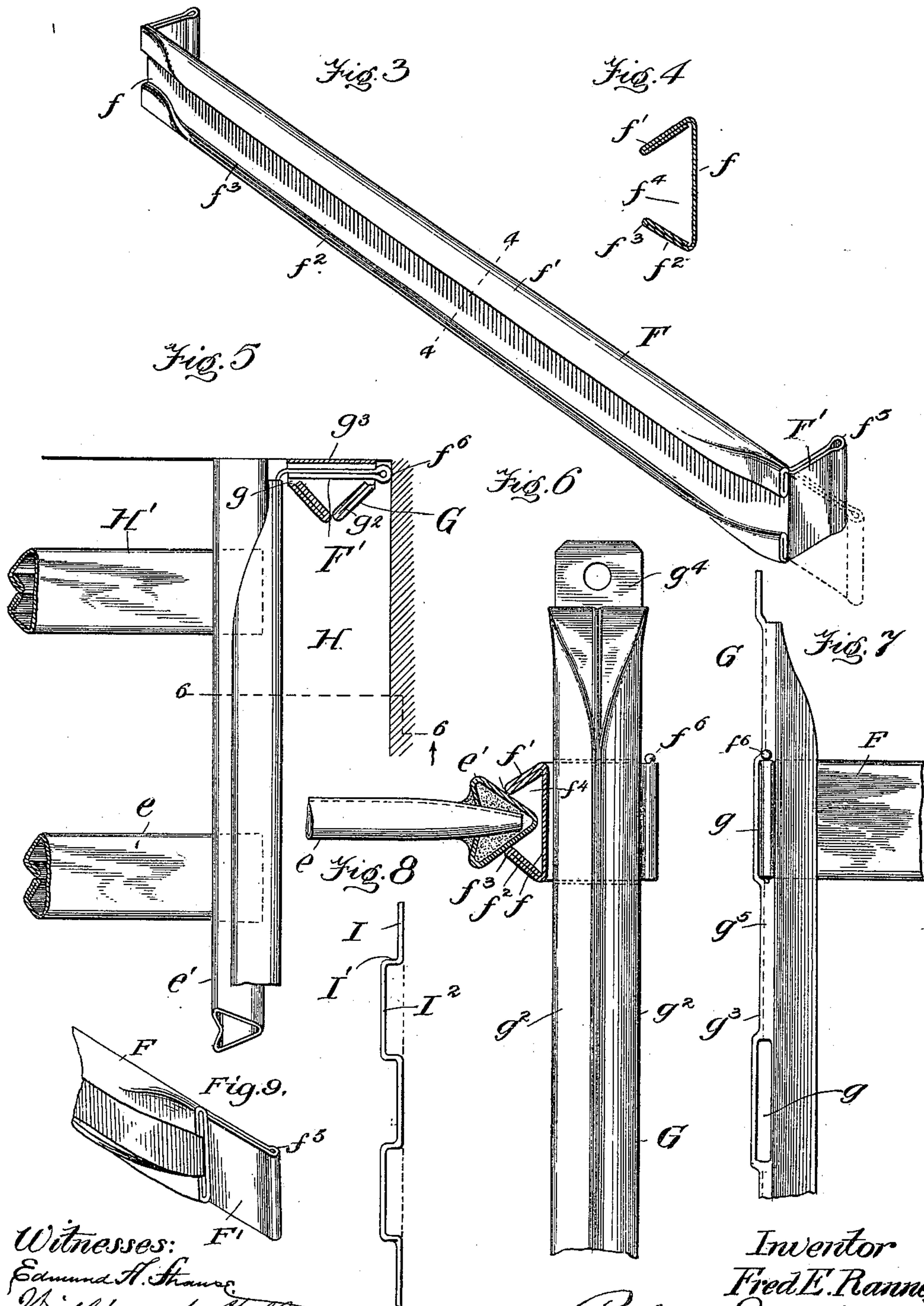
Patented May 2, 1899.

F. E. RANNEY.
REFRIGERATOR.

(Application filed Feb. 4, 1898.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:
Edmund H. Shaver
William H. Hall

Inventor
Fred E. Ranney
by Pool & Brown
his Attorneys

UNITED STATES PATENT OFFICE.

FRED E. RANNEY, OF GREENVILLE, MICHIGAN.

REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 624,089, dated May 2, 1899.

Application filed February 4, 1898. Serial No. 669,143. (No model.)

To all whom it may concern:

Be it known that I, FRED E. RANNEY, of Greenville, in the county of Montcalm and State of Michigan, have invented certain new and useful Improvements in Refrigerators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in dry-air refrigerators and is herein shown as applied to that class of refrigerators known as "household-refrigerators."

The invention relates more specifically to improvements in the means for supporting the shelves of the provision-chamber by means of which they may be adjusted vertically therein to answer the various requirements of different classes of users and at the same time to so arrange said supports that they will not interfere with the circulation of air through the refrigerator.

The invention refers, further, to a novel form of cleat or guide by which the shelf is sustained within the provision-chamber and to standards by which said guides are supported.

To these ends the invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a vertical longitudinal sectional view of a refrigerator embodying my invention. Fig. 2 is a plan section taken on line 2 2 of Fig. 1. Fig. 3 is a perspective detail of one of the cleats or ledges for supporting the shelves. Fig. 4 is a cross-section thereof, taken on line 4 4 of Fig. 3. Fig. 5 is an enlarged detail section of one of the cleat-supporting standards, showing a fragmentary portion of a cleat and a shelf thereon. Fig. 6 is a detail section taken on line 6 6 of Fig. 5, showing a front elevation of a portion of one of the standards. Fig. 7 is a side elevation of a portion of one of the cleat-supporting standards, showing one end of a cleat therein. Fig. 8 shows a modified form of supporting-standard. Fig. 9 is a detail view of a modified form of shelf-cleat.

In said drawings the letters A A' designate the front and back walls of a refrigerator, A² its side walls, and A³ the bottom wall there-

of. Said walls are rigidly secured together to form a right-angle box or chest and will preferably be made of two separate thicknesses of material to provide a space *a* between them adapted to contain a suitable insulating material. The top A⁴ of the chest may be hinged to the rear wall thereof to afford access to the ice-chamber B, which is formed in the usual manner and consists of a rectangular compartment in the top of the refrigerator, having a bottom A⁷ and side walls A⁸ A⁸. The said compartment is shorter than the provision-chamber, and an air-space is left between its ends and the end walls of the said refrigerator, and the front wall is provided with an opening closed by a door A⁵, hinged to the front wall, as shown, and by means of which access may be had to the interior of the provision-chamber C.

D designates a drip-pipe which leads from the ice-chamber down through the rear part of the provision-chamber and through the bottom wall A³ thereof to take off the drip from the ice-chamber. The ice and provision chambers are shown as provided with a lining B' C' of zinc or other suitable material, as is common in refrigerators of this class.

In the refrigerator illustrated and thus briefly described the well-known arrangement for the circulation of air therein is provided, comprising a central aperture B² in the floor of the ice-chamber for the exit of cold air into the provision-chamber, uptake-flues B³ B³ between each end wall and the ends of the ice-chamber and the refrigerator-walls for the return of the warm air to said ice-chamber, and suitable side passage-ways B⁴ B⁴, leading from the upper ends of said uptake-flues to the ice-chamber. My improvements, however, are applicable to other styles of refrigerators.

Referring now more particularly to the parts constituting my invention, the letters E E' designate provision-shelves, which are located in the provision-chamber and upon which the articles of provision are placed. Two shelves are herein shown; but it will be observed that the number thereof may be increased as found convenient or desirable. Said shelves consist of longitudinally-arranged slats *e* and transverse end pieces C', rigidly attached to the outer ends of said lon-

gitudinal slats. Said shelves are adapted to be supported upon cleats F, which are supported at each end thereof from the opposite walls of the provision-chamber and, as shown, in upright supporting-standards G, removably secured upon the opposite wall of the refrigerator. These supporting-standards G are provided with a plurality of apertures or recesses g , with which the opposite ends of the cleats are shown to have engagement. In the drawings the supporting-standards are each provided with five vertically-separated apertures or recesses g , by means of which the shelves may be adjusted with relation to each other and to the standards, as found necessary or desirable. With this arrangement the shelves may be adjusted to accommodate different-sized articles which it may be desired to place within the provision-chamber, or a number of shelves may be placed within the provision-chamber equal to the number of apertures g , so as to thereby increase the capacity of the refrigerator for relatively small articles of provision to the fullest extent. The rear standards G will preferably be secured directly to the inner surface of the rear wall A' , while the standards to which the forward ends of the cleats are attached will conveniently be attached to the posts A^6 , secured inside the provision-chamber adjacent the sides of the door and which serve to strengthen the walls of the chamber at these points. Said forward end of the cleat may obviously be attached directly to the front wall of the provision-chamber, if desired. Said standards will be secured in place by screws g' , and by making the standards of slightly less length than the height of the provision-chamber said standards may be bodily shifted to provide a still further adjustment of the shelves carried thereby. With the construction and arrangement described the refrigerator may be employed equally well for the largest as well as for the smallest articles of provision used in a household, and for such smaller articles the capacity of the refrigerator may be greatly increased over that of the refrigerators now in common use, wherein the shelf-supports are secured permanently in place and are not capable of being adjusted by the user.

The standards G are preferably made of a single piece of metal, and the construction thereof is shown in detail in Figs. 5, 6, and 7. These standards each consist of a middle section g^3 and two edge sections g^2 , and are formed by bending the extreme edges of the blanks from which they are made upon each other to form at the edge thereof double thicknesses of metal and by bending said double-edge sections together to form the two converging sides g^2 g^2 of a triangular-shaped body, the middle section g^3 of the blank forming the opposite or plane side of the standard. The ends of the middle section g^3 of the standard are extended beyond the ends of the edge sections, thus forming lugs g^4 , by means of which

the standards may be secured in place by the screws g' , which pass through suitable apertures in said lugs, or by other suitable means. Said standards G in each end of the provision-chamber are mounted with the rear side or wall g^3 thereof engaging the posts to which they are attached and with the converging sides g^2 directed laterally toward each other.

The sides g^2 of the standards G do not converge directly from the rear wall g^3 , but at the intersection thereof with said rear wall said sides are extended at right angles to said rear wall, as shown at g^4 . Between said converging portions of the sides g^2 and said rear wall g^3 are formed the supporting apertures or recesses g . Said apertures or recesses are directed longitudinally of the standards G, and as the latter are vertically positioned in the refrigerator the said apertures g are therefore adapted to be engaged by the horizontally-extending right-angle portions of the cleats F, whereby said cleats are supported upon the standards. The construction described provides a light, strong, and practically indestructible standard which takes up little room in the refrigerator and which can be made at a very small expense.

The cleats or ledges by which the shelves are immediately supported are of novel construction and are made as follows: Said cleats are preferably made of a single strip or blank of metal and comprise a central section f and two outer or edge sections f' f^2 . The side or edge sections are shown as bent or folded upon themselves to form a double thickness of metal, and the sides thus doubled are then bent toward each other at an acute angle to the middle portion f of the blank. Said sides f^2 of the cleat or ledge do not come in contact with each other, but are separated a desirable distance, thereby forming between the margins f^3 thereof a guide-groove f^4 for the reception of the transverse end piece e' of the shelf E. The central section of the cleat or ledge is provided at each end with an integral right-angle extension or lug F' , which engages the supporting apertures or recesses g of the standards G or other part to which they are attached and by means of which they are supported. The edge sections f' f^2 are made of double construction in order to provide greater lateral strength, and if the cleats be made of metal of heavier gage such double construction may be omitted. In order to provide greater strength in said lug F' , it is herein shown as made of double thickness by making the right-angle portion of the cleat of such length that it may be bent or folded back upon itself the full length of the lug, (and preferably soldered thereto,) as shown in Figs. 3 and 5. In order to prevent the cleats from becoming disengaged from the standards G when the shelves are not in position and when the refrigerator is being moved about from place to place, the outer ends of said lugs F' are formed or provided with guide holes or slots f^5 , adapted to

be engaged when in place upon the standards by a key or pin f^6 , as shown in Figs. 6 and 7. Such means for holding the cleats in place will not, however, be necessary when the shelves are in position, as at such time it is impossible for the cleats to be moved out of engagement with the supporting-standards. Said shelves, moreover, when in place within the guides or cleats crowd or force the guides into position where the greatest possible strength and firmness are obtained. When, however, the shelf is removed, the cleats may be easily disengaged from the standards and located in other supporting-apertures to accommodate the different-sized articles above mentioned. The cleats made as thus described while exceedingly light are very strong and rigid in their construction and occupy little space in the refrigerator. They are, furthermore, very economical to manufacture and, while capable of adjustment, are as strong and rigid when in place as though permanently secured thereon. The construction by which the guide-groove f^4 is formed in the cleat is of very great practical importance in devices of this character. It serves to support the shelves when withdrawn almost entirely out of the provision-chamber, which is not true in the common construction, wherein the shelves are mounted upon the upper surfaces of supporting cleats or ledges.

In a dry-air refrigerator wherein the cold air descends centrally from the ice-box into and through the provision-chamber and in which the warm air rises upwardly at the opposite ends or sides of the provision-chamber through warm-air flues, as previously explained, the arrangement of the cleats F and standards G herein described is of great practical importance for the reason that said cleats are contained wholly within the inside of said standards, thereby leaving a space H between the cleats and the adjacent end walls of the provision-chamber of considerable width for the uninterrupted passage of warm air. This is specially important when the shelves are well filled in the provision-chamber, which latter without the space H would retard the air circulation. This is obviously not true where the cleats or ledges are secured directly to the end walls of the provision-chamber or in such relation thereto that the shelves extend at their opposite ends in contact or nearly in contact with said walls. In such constructions the warm air is deflected upwardly by the construction formed by the shelves and cleats or ledges, with the result of impairing the usefulness of the refrigerator to that extent.

While I have shown the opposite ends of the supporting-cleats F as directed at right angles to the body of said cleats and adapted to have interlocking engagement with the supporting-standards at each end thereof, yet it may be desirable in some cases to secure said cleats directly to the walls of the cham-

ber. In this event the rear end of the cleats will be secured directly to the rear wall of the provision-chamber, while the lug at the forward end thereof will be extended in a direction parallel with the main body of the cleat, as shown in Fig. 9, and may be secured to the post A⁶ or equivalent part of the wall in any convenient or preferred manner. Such arrangement preserves the relation of the cleats and shelves to the end walls of the provision-chamber and the warm-air passages H, and I do not desire to be limited to the particular construction and arrangement herein shown.

The shelves E are of metallic construction, the longitudinal slats and transverse end pieces thereof being made of metal bars similar to the supporting-standards G. The transverse end pieces e' are each made of a single strip of sheet metal, which is bent along its longitudinal center, with its sides arranged at an acute angle to each other, thereby providing on the inner side of the same a groove adapted to receive the ends of the slats or bars e , which are secured therein by soldering or like means. The opposite or converging edges of the transverse end pieces are adapted to readily enter the grooves of the bearing-cleats F, as clearly shown in Fig. 1. The slats e are made in all essential respects like the supporting-standards G and are arranged with their central sections uppermost in the same horizontal plane.

In Fig. 8 I have shown a modified form of supporting-standard. Said standard is made from a single strip I of metal. Said strip is bent or corrugated between its ends in any convenient manner to form a plurality of integral bends I' therein, which when the strip is attached to a wall or post (indicated by the dotted line at the side thereof) forms a plurality of recesses I², adapted to receive the lugs F' of the cleats F.

The improvements herein described have the advantage of cheapness in construction and of being light in weight, while exceedingly strong and rigid, and also of taking up the minimum amount of room in the provision-chamber. Said parts being made entirely of metal do not require to be metal-lined as in the case of wooden parts.

I claim as my invention—

1. In a refrigerator, the combination of the provision-chamber thereof, oppositely-located supporting-standards in the ends of said chamber, each of which is formed of a single strip of sheet metal consisting of a central section and edge sections which are folded longitudinally thereon at acute angles, and provided with a plurality of transverse apertures extending therethrough in a plane parallel with the central section, shelf-supporting cleats each made of a single piece of sheet metal comprising a central section and two converging edge sections forming between the same an inwardly-opening guide-groove, said central section being extended at its ends and one or both of said extended end portions be-

ing bent to form right-angled lugs which engage the apertures of said standards, and a shelf supported and sliding in said grooves of the cleats.

- 5 2. In a refrigerator, the combination of the provision-chamber thereof, supporting standards in the ends of said chamber each of which is formed of a single strip of sheet metal consisting of a central section and edge
10 sections folded longitudinally thereon at acute angles and provided with a plurality of transverse apertures extending therethrough in a plane parallel with the plane of said central section, shelf-supporting cleats provided

in their proximate faces with guide-grooves 15 and at their ends with right-angled lugs adapted to engage said apertures of the standard and a shelf supported, and sliding in said grooves of the cleats.

In testimony that I claim the foregoing as 20 my invention I affix my signature, in presence of two witnesses, this 17th day of December, A. D. 1897.

FRED E. RANNEY.

Witnesses:

W. D. JOHNSON,
WM. H. BROWN.