

(No Model.)

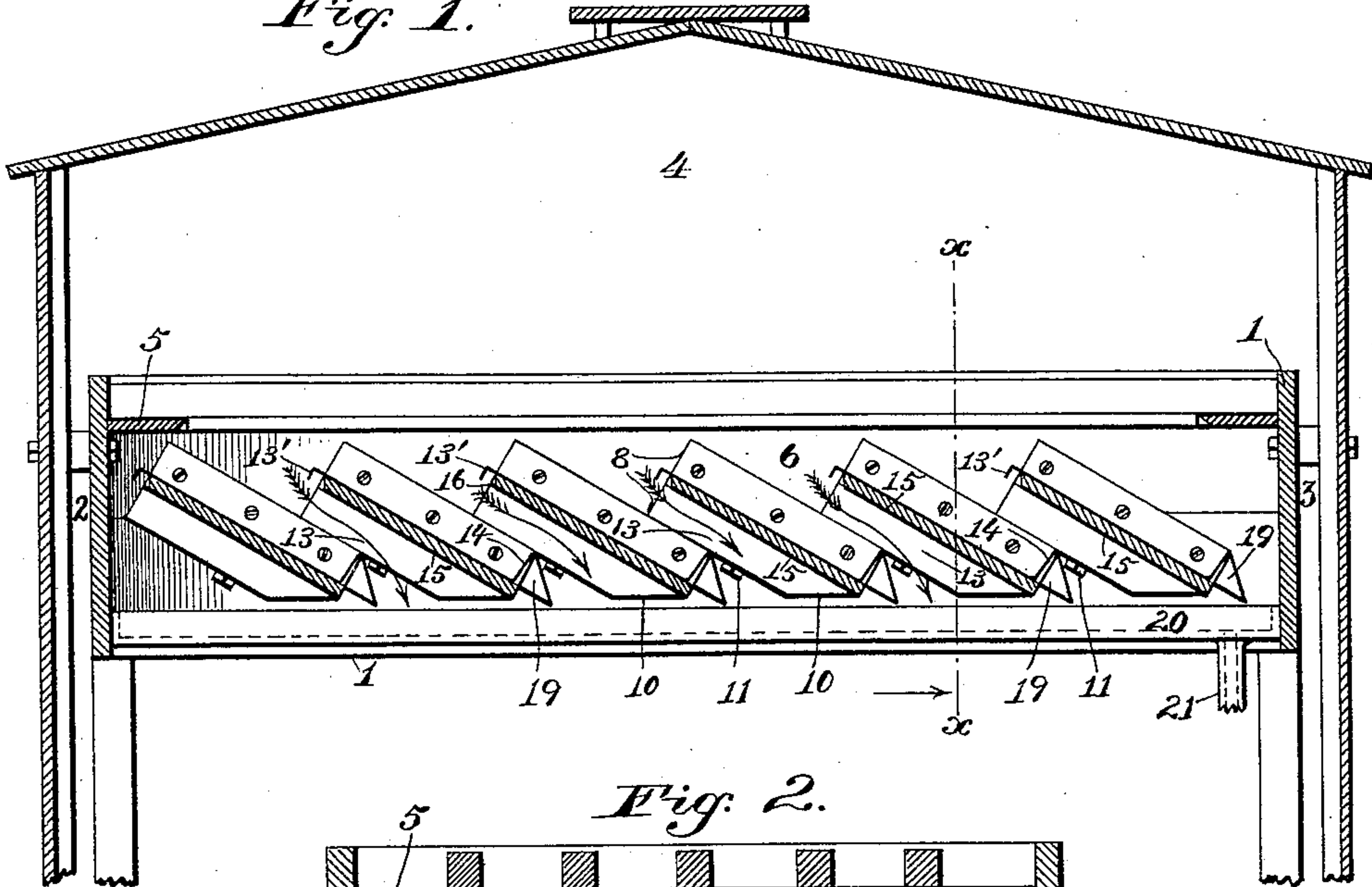
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M. S. MILLARD.  
REFRIGERATOR.

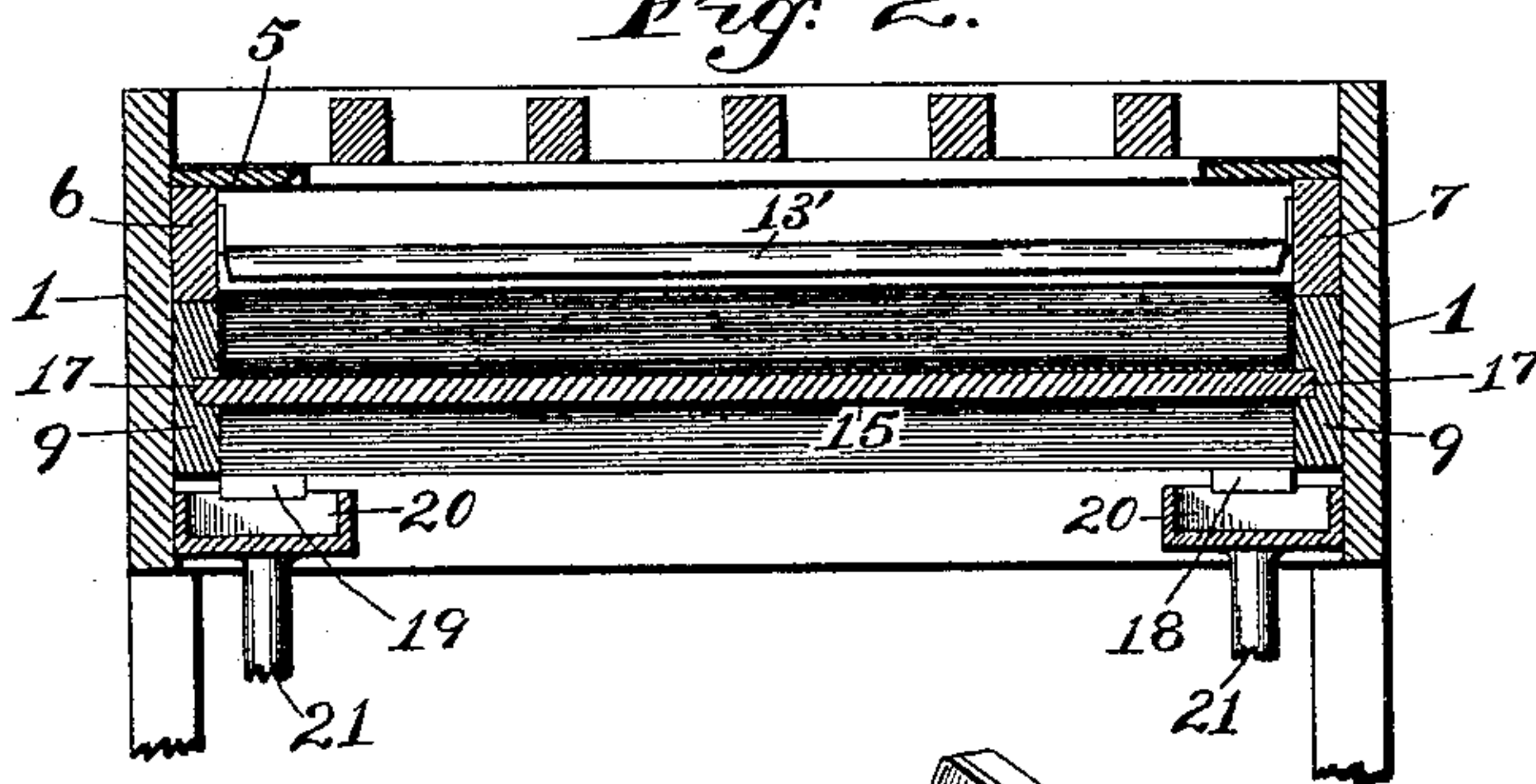
No. 475,591.

Patented May 24, 1892.

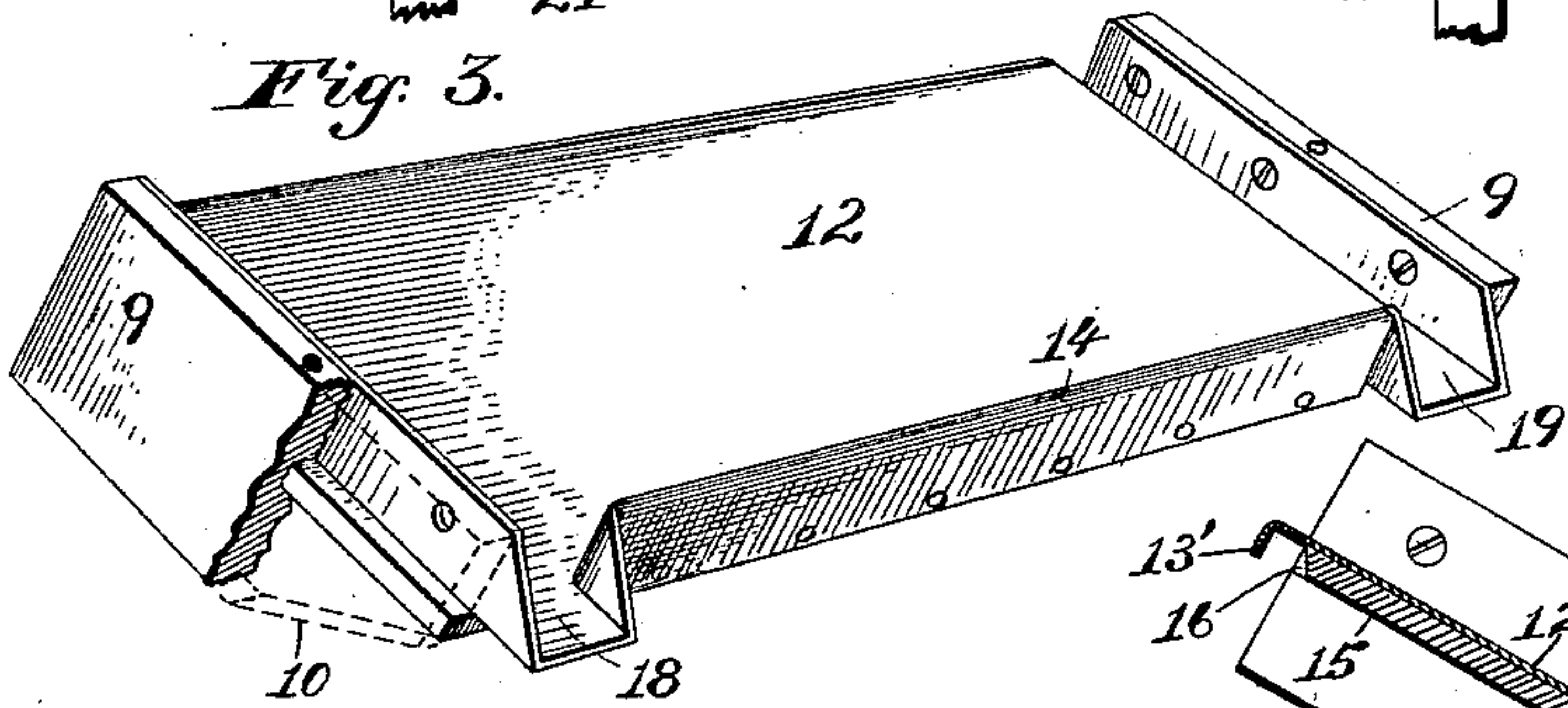
*Fig. 1.*



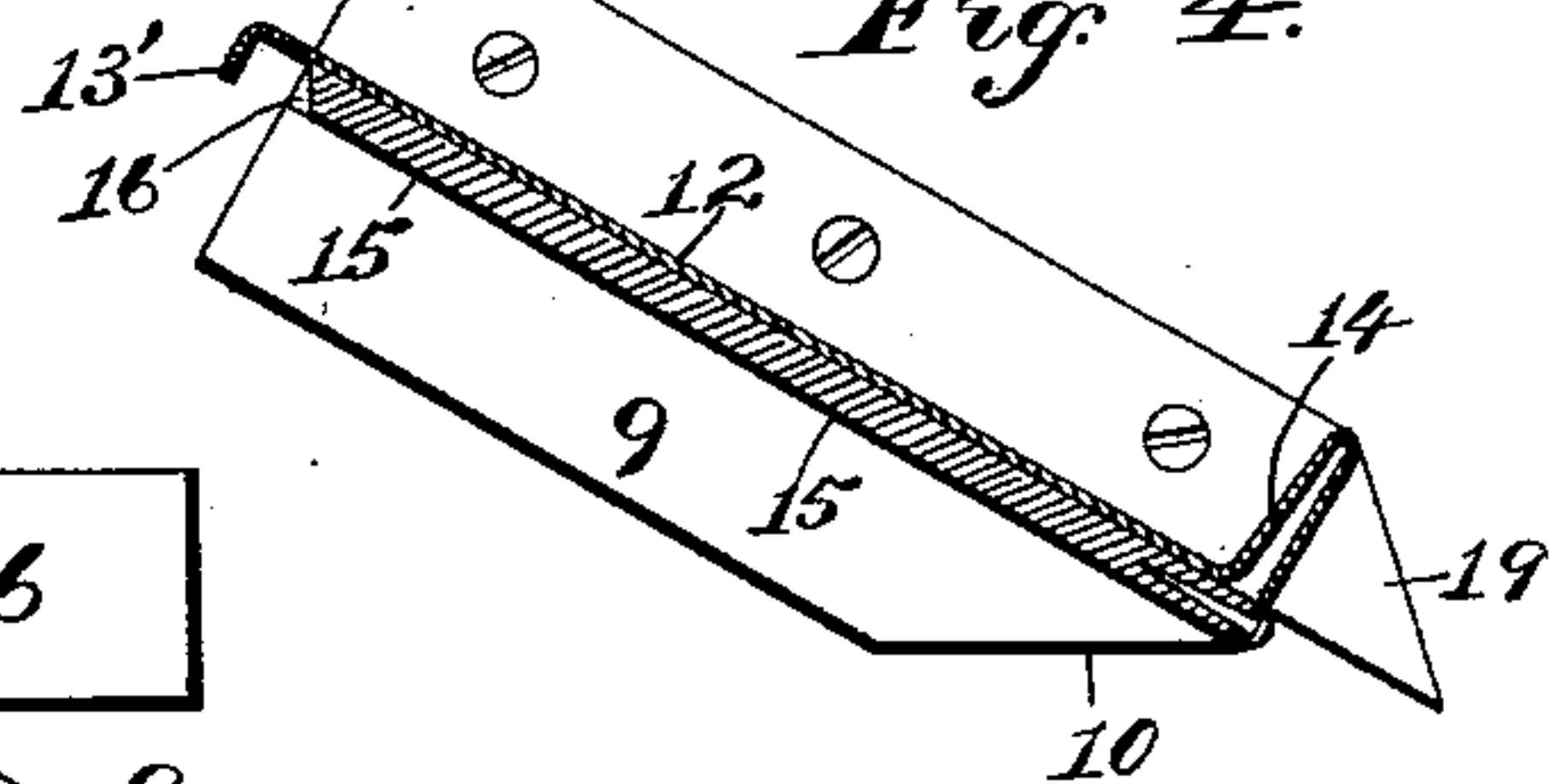
*Fig. 2.*



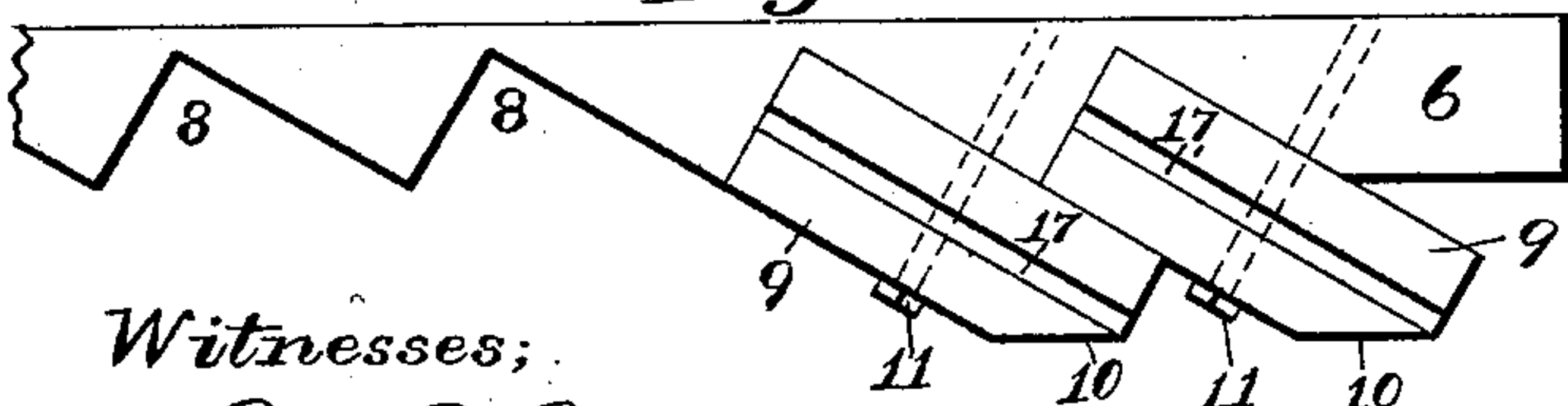
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



Witnesses;

*Rey C. Bowen.*  
*H. O. Bernhard*

Inventor;

*Martin S. Millard*  
By *Edson Bros.*,  
Attorneys.

(No Model.)

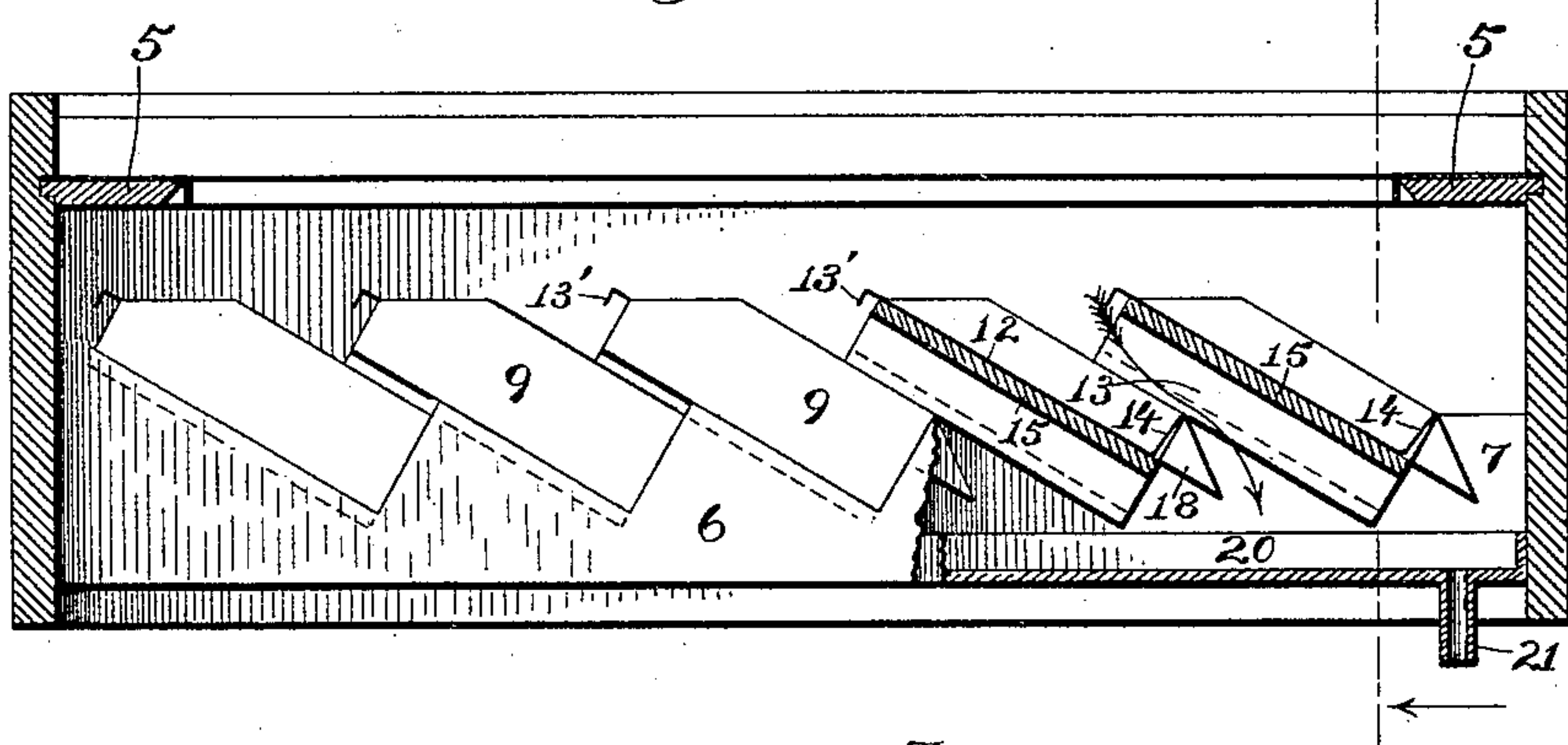
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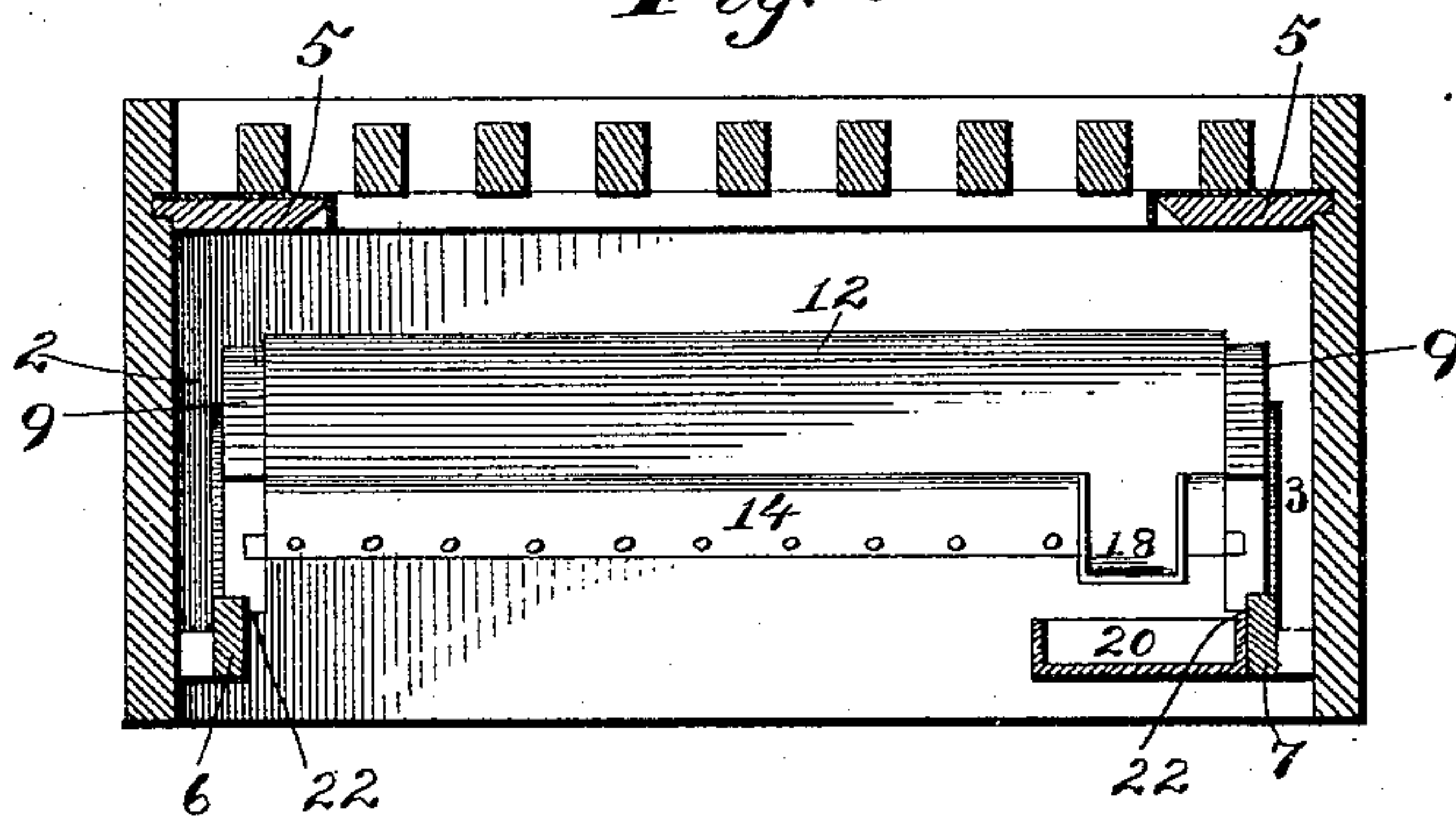
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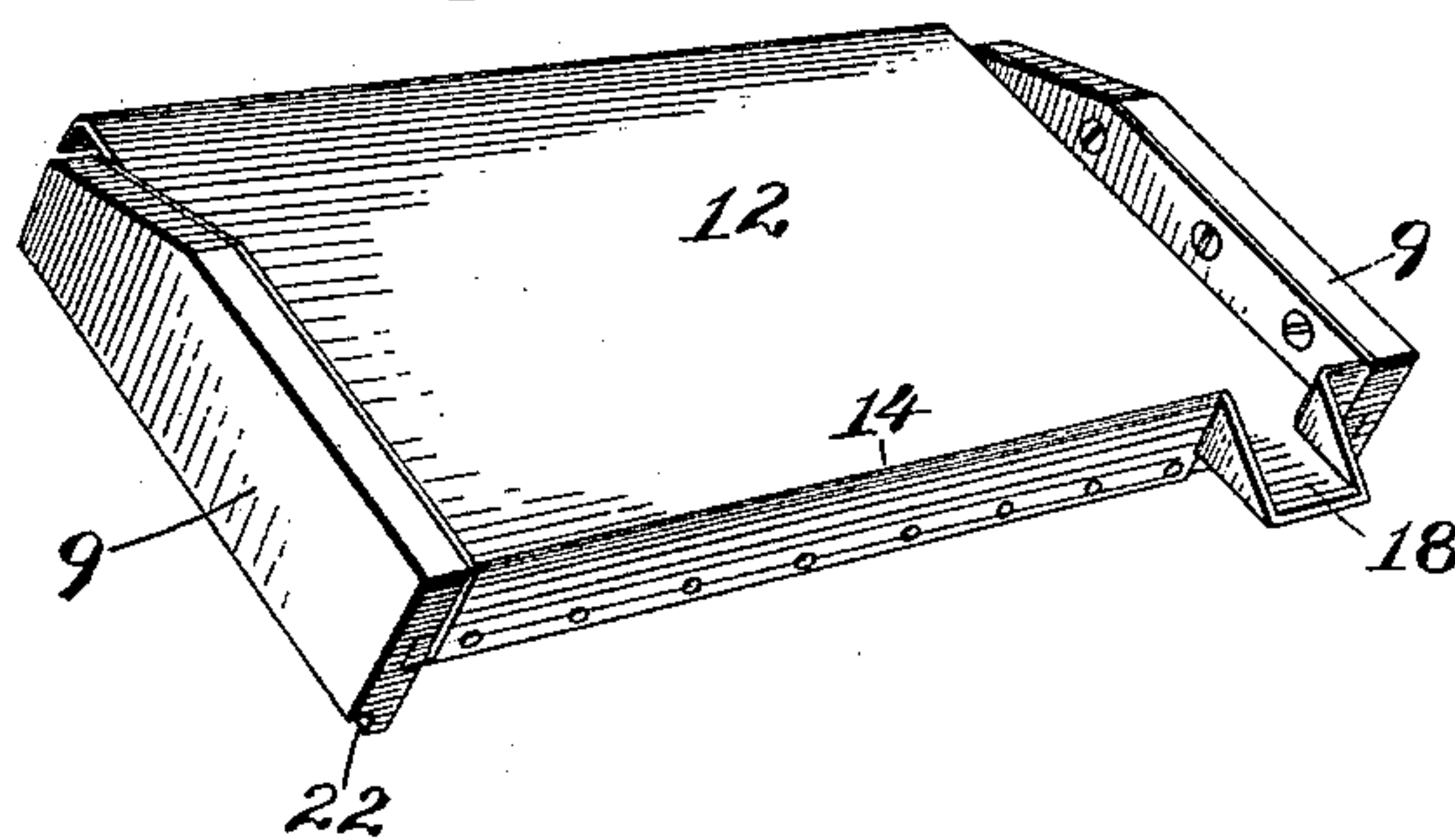
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



Witnesses;

*Percy C. Bowen*  
*W. J. Burkhard*

Inventor;

*Martin S. Millard*  
By *Edson Bros.*  
Attorneys,



# UNITED STATES PATENT OFFICE.

MARTIN S. MILLARD, OF KANSAS CITY, MISSOURI.

## REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 475,591, dated May 24, 1892.

Application filed September 10, 1891. Serial No. 405,331. (No model.)

*To all whom it may concern:*

Be it known that I, MARTIN S. MILLARD, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Refrigerators; 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.

The present invention relates to improvements in refrigerators; and the objects of the invention are, first, to provide for the retention of the drip or water from the ice and effect its discharge without passing through the cooling-chamber, and, secondly, to regulate the circulation of the air-currents in the cooler.

With these and other ends in view the invention consists in the combination, with a series of parallel vertically-inclined pans arranged to overlap one another and form a series of spaces between themselves for the descent of the condensed vapors and air, of notched stringers arranged at the ends of the inclined pans, and supports or blocks which are secured to the notched stringers and which have the pans secured thereto.

My invention further consists of the pans arranged in the inclined positions and each provided at its lower side with one or more individual discharge-spouts and one or more conveying-troughs arranged below the series of discharge-spouts and provided with education-pipes for the waste water and drippings from the ice or refrigerant.

My invention further consists of the peculiar construction of the pan, and, further, in the novel construction and arrangement of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

I have illustrated my improvements in the accompanying drawings, in which—

Figure 1 represents a vertical sectional view through a portion of a car with my improved refrigerator embodied therein. Fig. 2 is a transverse sectional view through the refrigerator on the plane indicated by the line  $xx$  of Fig. 1. Fig. 3 is a detail view of the pan, partly in perspective and section. Fig. 4 is a cross-sectional view through the pan. Fig. 5 is a

detail view of one of the stringers, the pan-supporting blocks, and means for holding the blocks in place. Fig. 6 is a view, partly in side elevation and partly in longitudinal section, through a portion of the refrigerator especially adapted for cold-storage apparatus, butchers' refrigerators, &c. Fig. 7 is a cross-section of the apparatus shown in Fig. 6 on the plane indicated by the dotted line  $yy$  of Fig. 6, and Fig. 8 is a perspective view of one of the pans and the supporting-blocks thereof.

Like numerals of reference denote corresponding parts in all the figures of the drawings.

In the accompanying drawings I have illustrated two embodiments of my invention, one being especially adapted for use in refrigerator-cars for the transportation of meats and other perishable substances, and the other for stationary refrigerators, such as large butchers' refrigerators, cold-storage apparatus, and the like.

In the construction for refrigerator-cars it is desirable that the parts shall be so firmly secured together as to obviate their displacement under the motion of a car or other moving object and that the refrigerant or ice shall be supported in the upper part of the car, so that the cold air and condensed vapors can descend into the cooling-chamber below the refrigerant-chamber and at the same time the dripping from the ice carried off without passing through the cooling-chamber. I will first describe this form of embodiment of my invention. (Shown in Figs. 1 to 5, inclusive.)

I employ a stout supporting-frame 1, rectangular in form and secured within a car in the upper part thereof in any substantial way. This frame is skeleton-shaped and arranged within the car so as to leave passages 2 3 between its sides and the walls of the car for the upward passage of the currents of warm air which are displaced by the descent of the condensed or cold air from the refrigerant-chamber 4. The skeleton frame is provided within itself with a horizontal ledge or flange 5, which extends continuously around the inner sides thereof and is of substantial construction to support the ice rack or bars on which the refrigerant rests. Below the horizontal ledge or flange are arranged two hori-



zontal stringers 6 7, which are suitably secured in place to the sides of the open frame. These stringers are at the sides of the frame and parallel with each other, and in the lower  
 5 sides or edges of the stringers I provide a series of notches 8, forming inclined seats for the reception of the inclined pan-supporting blocks 9. These supporting-blocks are arranged in vertically-inclined positions with  
 10 their upper ends fitted snugly in the V-shaped seats in the stringers and with their lower ends protruding or extending below the lower edges of the stringers. The upper end of one  
 15 inclined block laps over the adjacent block on one side, while the lower end of the block laps the upper end of the adjacent block on the other side, and said lower ends of the blocks are beveled or inclined, as at 10, so that they all lie in the same horizontal plane. The  
 20 inclined supporting-blocks are secured to the stringers by means of inclined bolts, which pass through openings in the blocks and the stringers, as shown at 11.

12 designates the pan, a series of which are  
 25 provided to form a water-shed and a ventilating-roof for the cooling-chamber. The pans are arranged in series between the sides of the open frame and the series of inclined blocks, and each pan lies in a vertically-inclined po-  
 30 sition, with its upper edge overlapping the lower edge of the forward pan and its lower edge overlapped by the rear pan. The edges of the pans do not contact; but, on the contrary, they are arranged so as to form spaces  
 35 13, through which the cold air or condensed vapors can pass to the cooling-chamber below the refrigerant-chamber. Each pan is provided at its upper edge with a depending lip 13' and at its lower edge with an upwardly-  
 40 extending flange 14. The pan is constructed out of strong sheet metal, and its edges are bent to form the flanges 13' 14, and the bottom of the pan is reinforced by means of a wooden board or plank 15, the upper edge of  
 45 which reinforce is beveled at 16, and which is protected by the depending flange 13' of the bottom of the pan. The edges of the board or plank 15, which reinforces the pan, are fitted  
 50 in grooves or recesses 17, cut in the opposing faces of the inclined supporting-blocks, and the ends of the pan are bent up and attached to the inner faces of the supporting-blocks by any suitable means. The upward flange  
 55 14 of the pan is doubled or bent over so as to lap the lower edge of the reinforce 15, and said flange is united to the reinforce by means of nails driven through the flange and into the reinforce, as shown. The upturned flange  
 60 14 forms the means for preventing the drippings from passing into the cooling-chamber, and said flange is bent to provide the two discharge-spouts 18 19, which are situated at the ends of the pan on the lower side thereof and extend between the two pans in the space  
 65 13, so as to discharge the drippings at the sides of the pans and into the horizontal troughs 20. These troughs are arranged be-

low the pans at the ends thereof and within the sides of the frame 1, and said pans are supported by the frame 1, being secured  
 70 thereto by any suitable means. These troughs are each provided with one or more spouts or eduction-pipes 21, which lead the water to the outside of the car and prevent the same from passing through the cooling-chamber. 75

It will be observed that the inclined pans, arranged and supported in the manner herein shown and described, form a water-shed and a ventilating-roof for the cold air to pass to the interior of the cooling-chamber and insure the  
 80 escape of the drippings from the ice-chamber, and that the parts are secured firmly together and present a substantial rigid structure. The pans can be readily removed by simply detaching the bolts 11 and then taking the  
 85 blocks and the pan away from the stringers, whereby the pans can be readily cleansed of any impurities. In like manner the pan and its supporting-blocks can be easily replaced and secured firmly in position. 90

In the embodiment of my invention adapted for cold-storage purposes—butchers' refrigerators and the like—I employ the same construction of parts, which, however, are somewhat differently disposed and arranged. The  
 95 longitudinal stringers in this instance are arranged below the pans and provided with the inclined seats in their upper edges, and the supporting-blocks are fitted in the seats and provided with the rabbets 22 in their outer  
 100 faces, which rabbets are fitted over the upper edges of the stringers, whereby the blocks are supported steadily and securely on the stringers without the use of bolts, nails, or other fastenings. 105

I may use one or two conveying-troughs, and each pan may have one or two discharge-spouts; but from my experiments I have found that a single trough and a single series of  
 110 spouts in the pans will serve to thoroughly discharge all the drippings in this class of refrigerators. Hence I prefer to use a single spout on each pan and a single trough common to all the spouts of the series.

In operation the air coming in contact with  
 115 the ice in the refrigerant-chamber loses a portion of its caloric by absorption, and is thereby condensed. The cold air passes through the spaces between the inclined pans to the cooling-chamber, thus displacing the  
 120 warm air therein, which is forced up through the passages outside of the open supporting-frame and upon the ice, thus establishing a circulation of air, the cold air descending through the openings in the ventilating-roof  
 125 and the warm air escaping by the exterior passages. The absorption of heat by the ice gradually melts it, causing a constant drip, which is conveyed by the pans and their spouts to the conveying-troughs and thence  
 130 to the eduction-pipes, the water carrying with it much of the impurities absorbed by the ice from the currents of air. The constant dripping of the ice-cold water upon the metallic



surfaces of the pans and other parts imparts to them a degree of frigidity which renders the pans active absorbents of heat and consequently promoters of atmospheric disturbances. All deleterious gases or vapors arising from perishable substances pass out of the cooling-room and if not actually absorbed by the refrigerant, and thereby neutralized, are at least so modified as to lose much of their destructive properties.

The pans can be readily removed from the stringers for the purpose of cleaning them without removing the ice from the refrigerant-chamber, and the ice rack or bars can also be cleansed from the lower side without removing the ice.

I am aware that changes in the form and proportion of parts and details of construction of the devices herein shown and described as an embodiment of my invention can be made without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such modifications as fall within the scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the fixed stringers having the inclined seats, the vertically-inclined blocks fitted in said seats, a series of overlapping inclined pans supported by the blocks and each provided with an independent discharge-spout, and a trough common to the spouts of the series of pans, substantially as and for the purpose described.

2. In a refrigerator, the combination, with the stringers, of the inclined supporting-blocks having the aligned grooves in their opposing faces, the reinforce fitted in said grooves of the blocks, and a pan having its bottom rest-

ing on the reinforce and secured thereto and to the blocks, substantially as and for the purpose described.

3. In a refrigerator, the combination, with the stringers, of the inclined grooved supporting-blocks, the metallic pan having the depending flange at its upper edge and the upturned flange and the spouts at its lower edge, the reinforce applied to the bottom of the pan and secured in the grooves of the blocks and to the lower flange, and the troughs, substantially as and for the purpose described.

4. In a refrigerator, the combination, with the stringers, of the pan provided with the bottom lead flange and the side exit-spouts, and the blocks to which the pan is rigidly secured, the blocks being detachably connected to the stringers, as and for the purpose set forth.

5. In a refrigerator, the pan having a reinforce at the bottom thereof and the upturned lead flange which is doubled or bent to lap the lower edge of the reinforce and is fastened or secured thereto, substantially as and for the purpose set forth.

6. In a refrigerator, the combination, with the stringers having the inclined seats, of the vertically-inclined blocks fitted in said seats and arranged to overlap each other, and the inclined pans secured to the blocks to overlap each other to form the ventilating-openings and each provided with side exits which lie between the overlapping edges of the pans, substantially as and for the purpose described.

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

MARTIN S. MILLARD.

Witnesses:

E. T. PAGETTI,  
JOHN PORTER.