

No. 822,408.

PATENTED JUNE 5, 1906.

W. S. TUTTLE.
HOT AIR REGISTER.

APPLICATION FILED FEB. 16, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

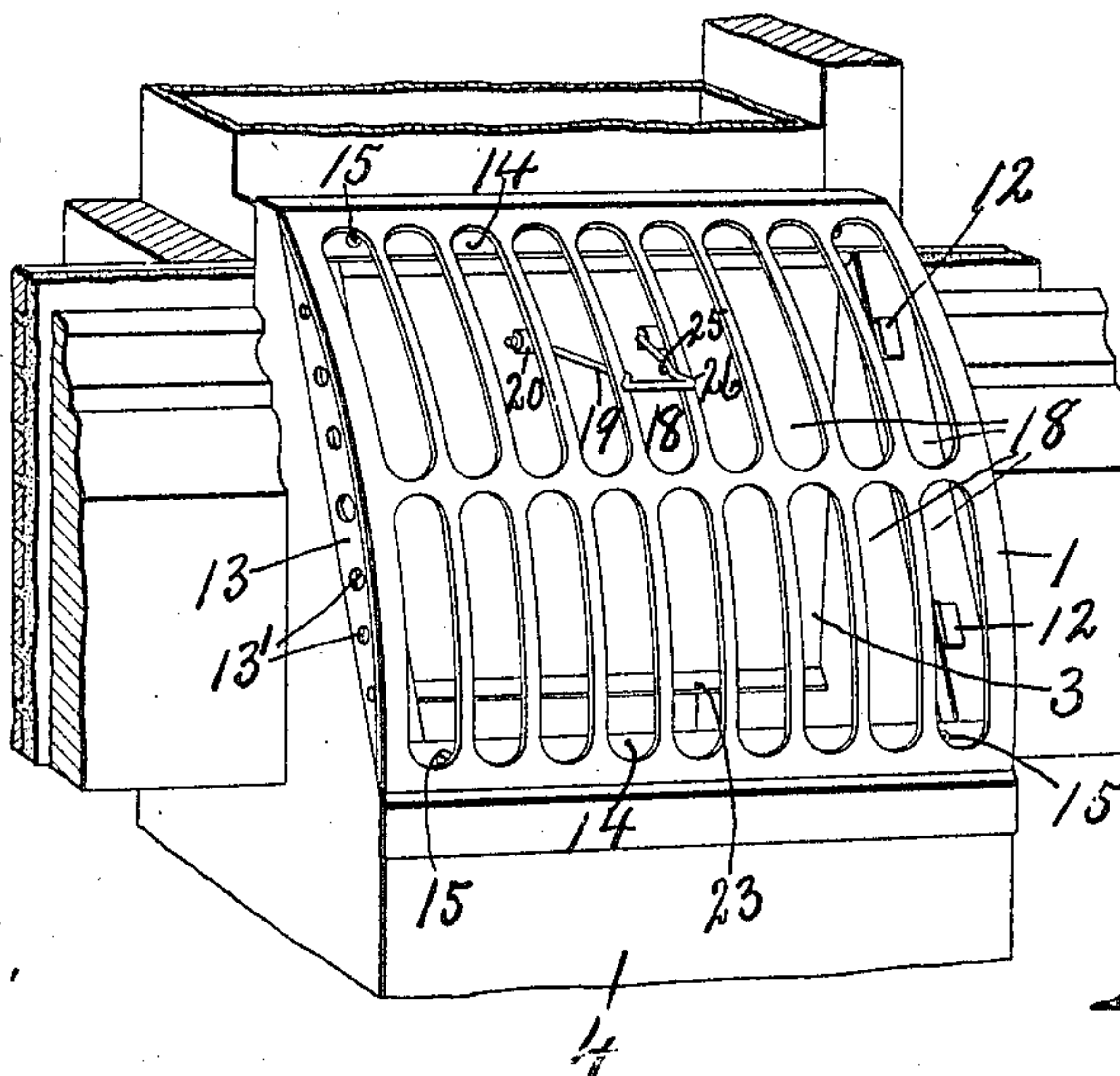


Fig. 2.

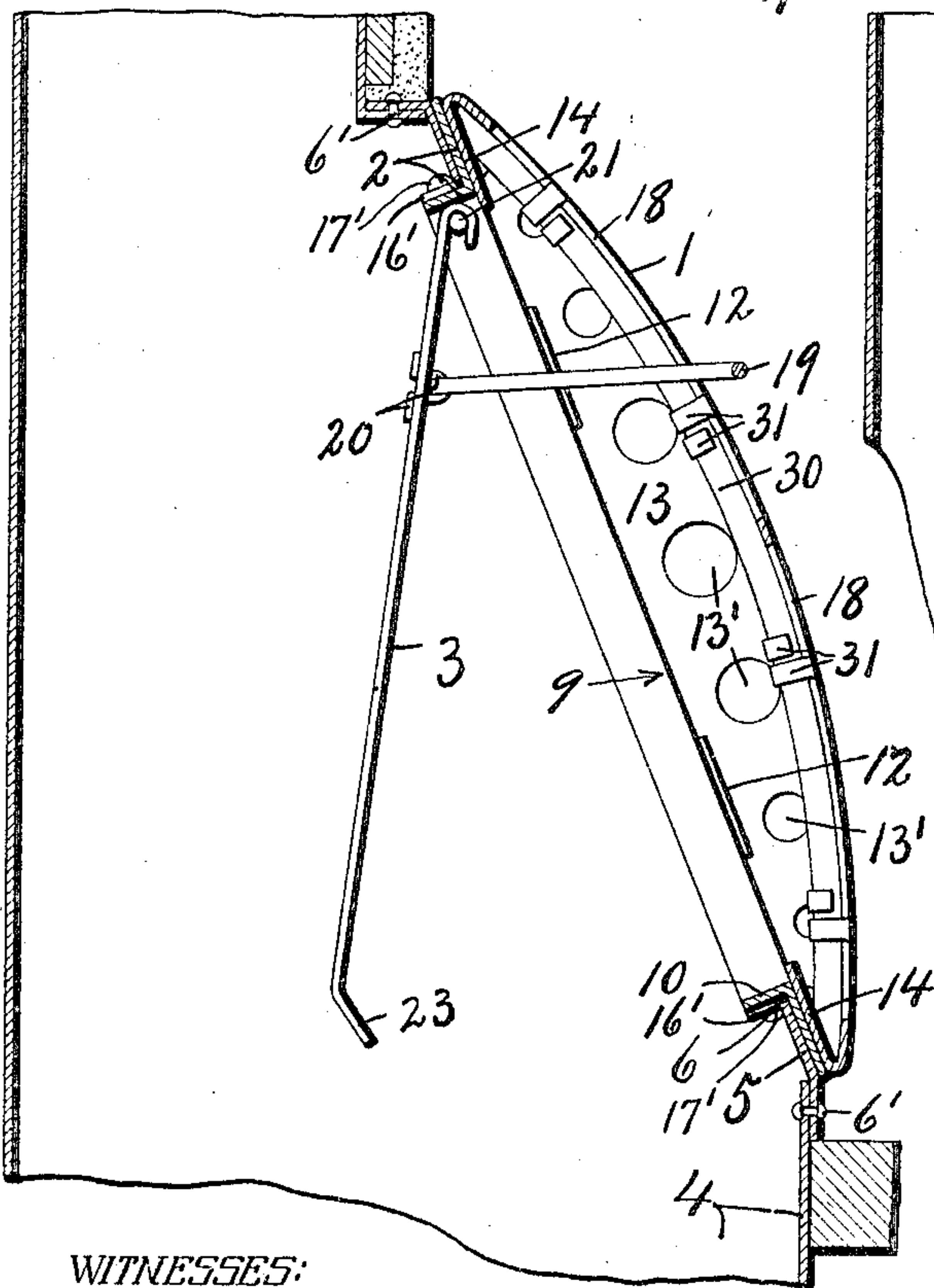
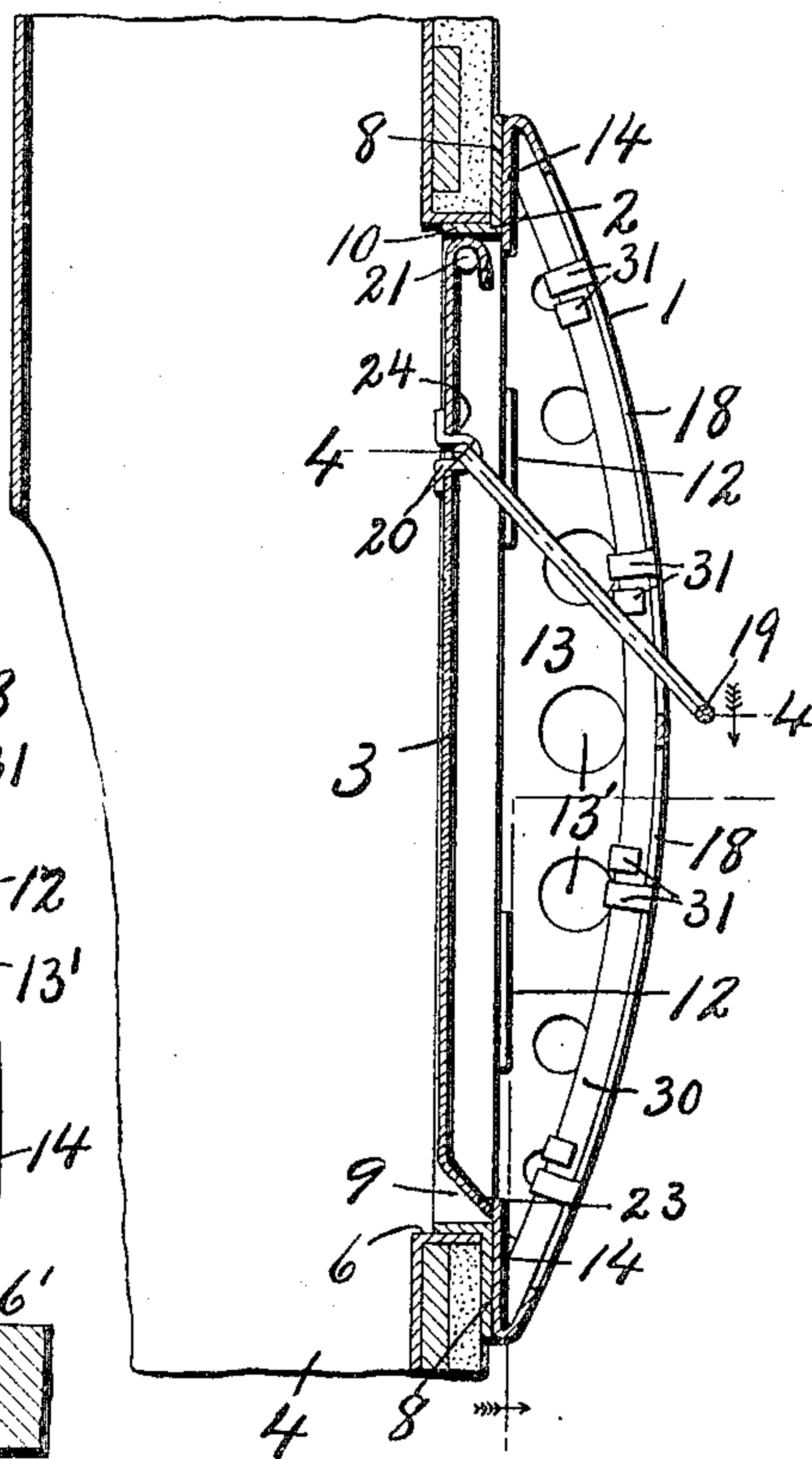


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

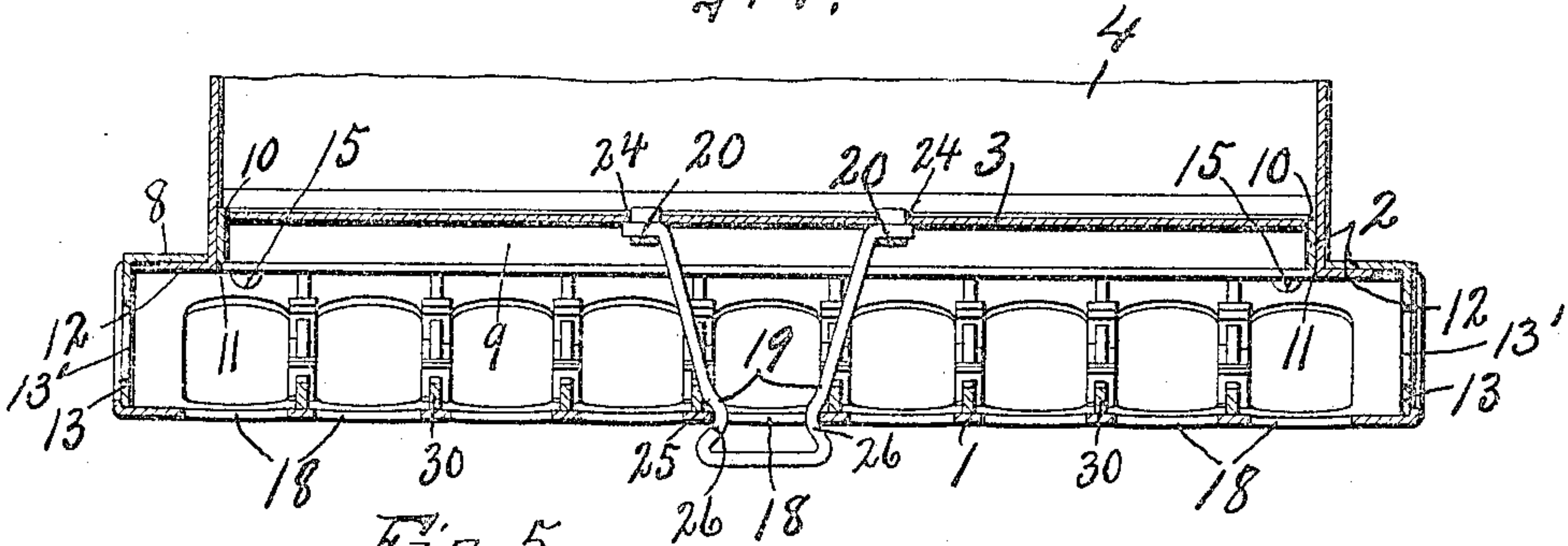


Fig. 5.

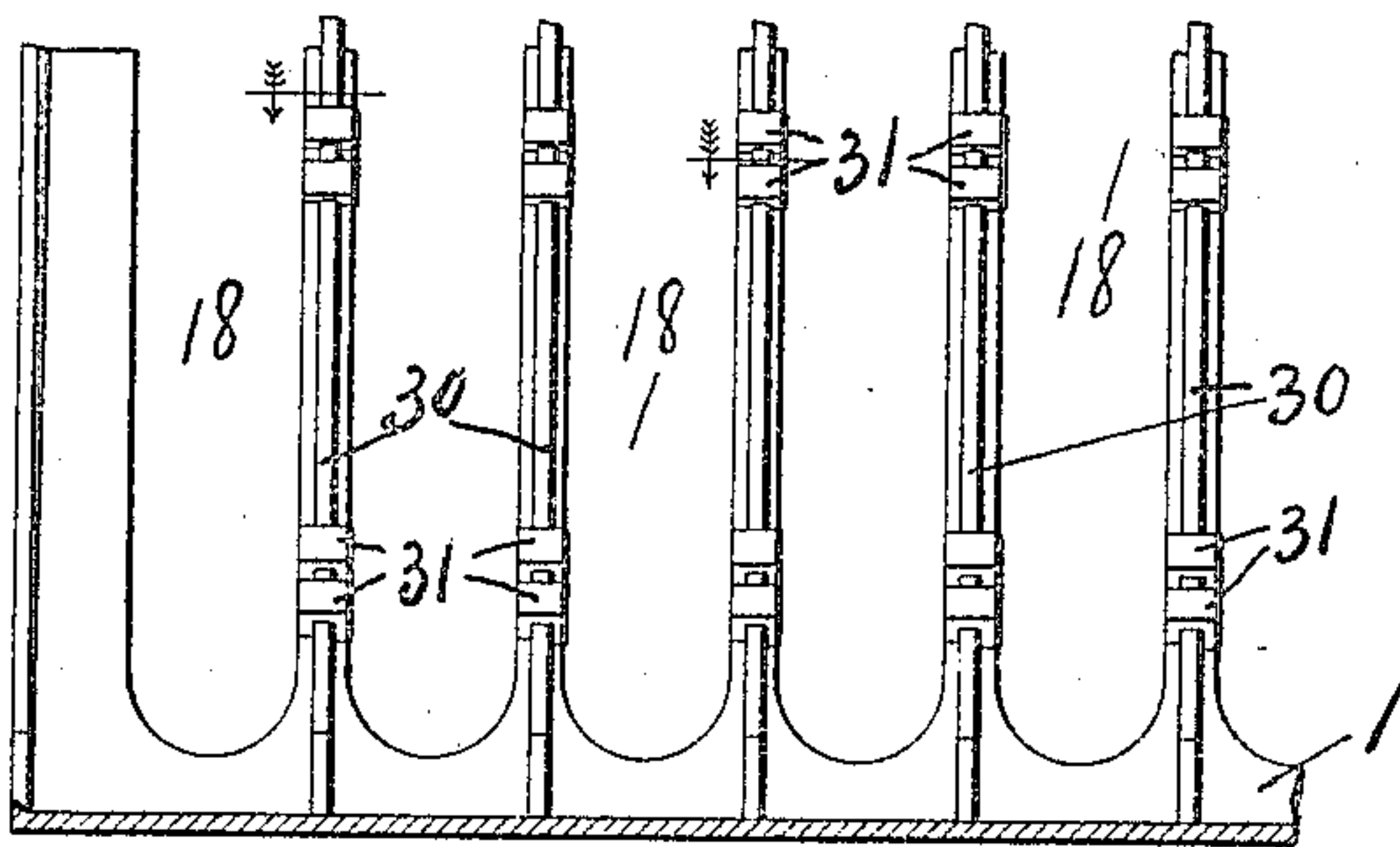


Fig. 6.

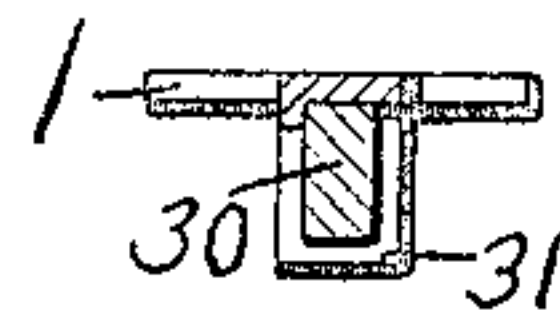


Fig. 7.

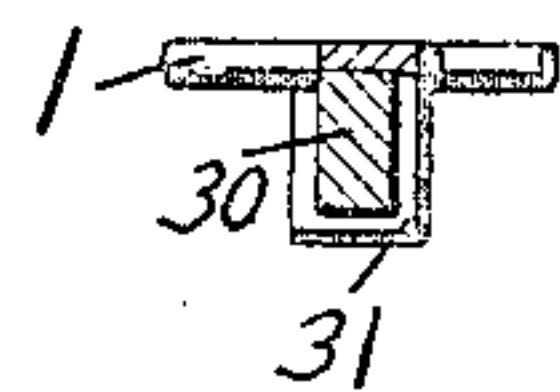


Fig. 8.

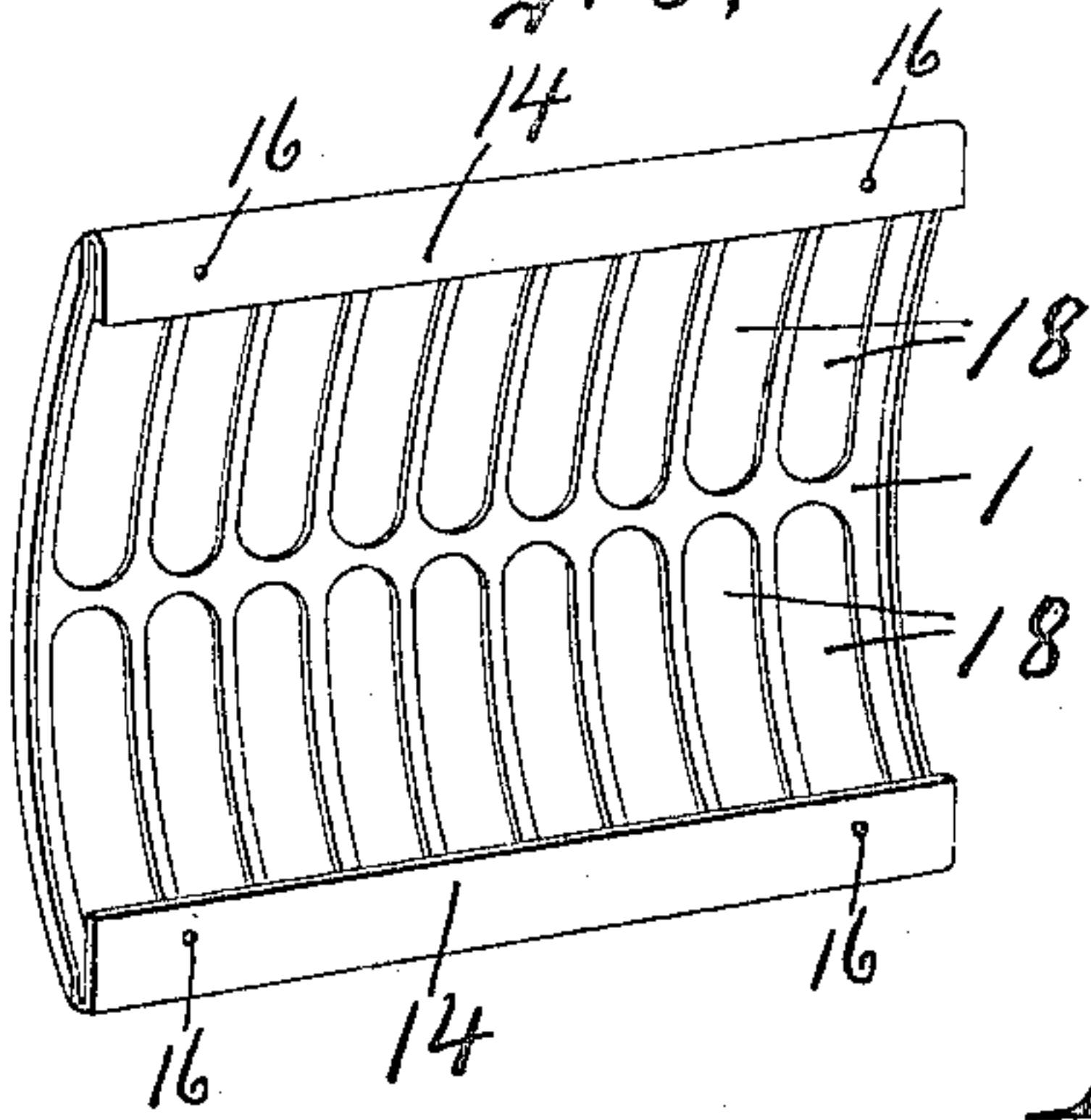


Fig. 9.

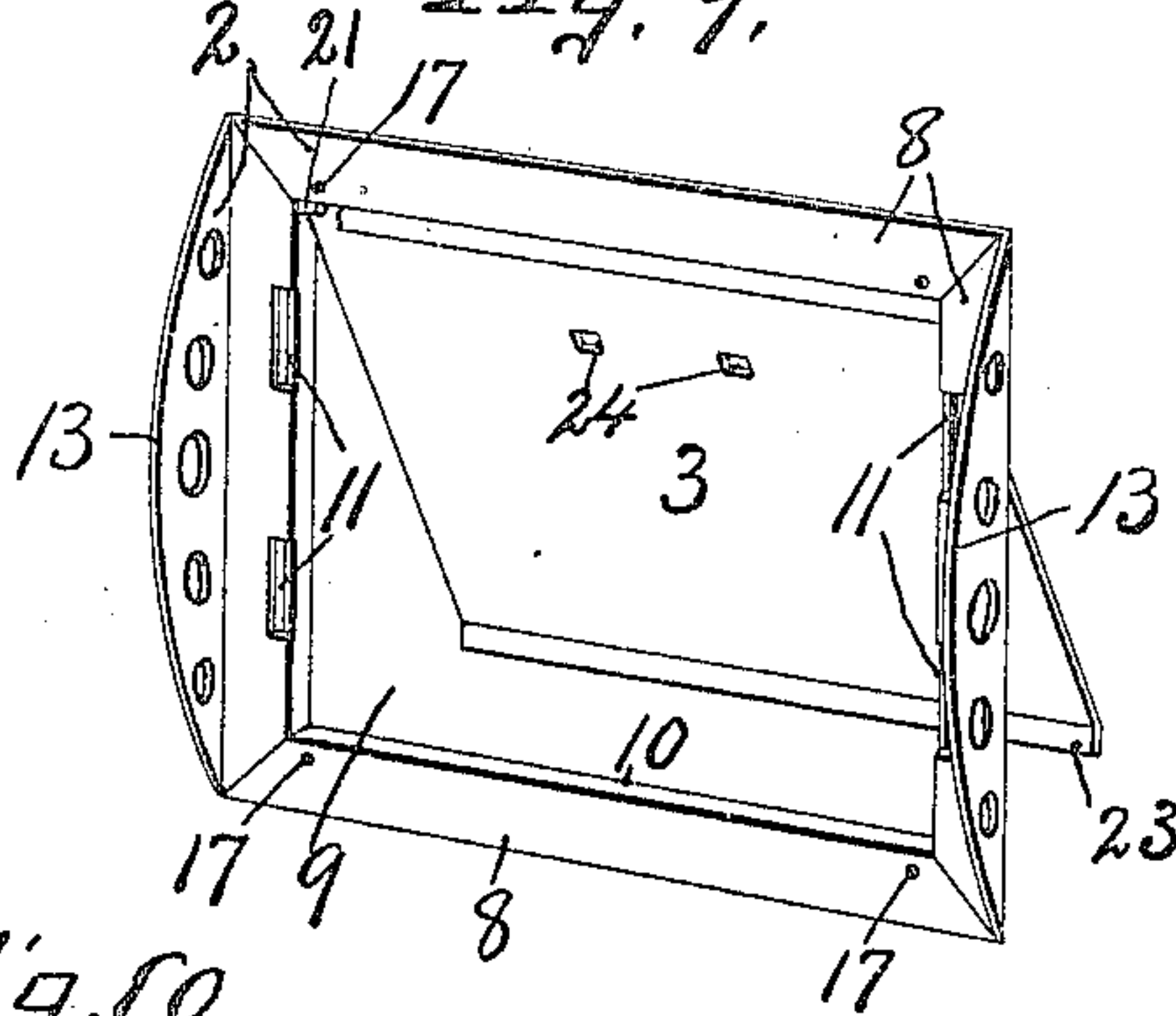
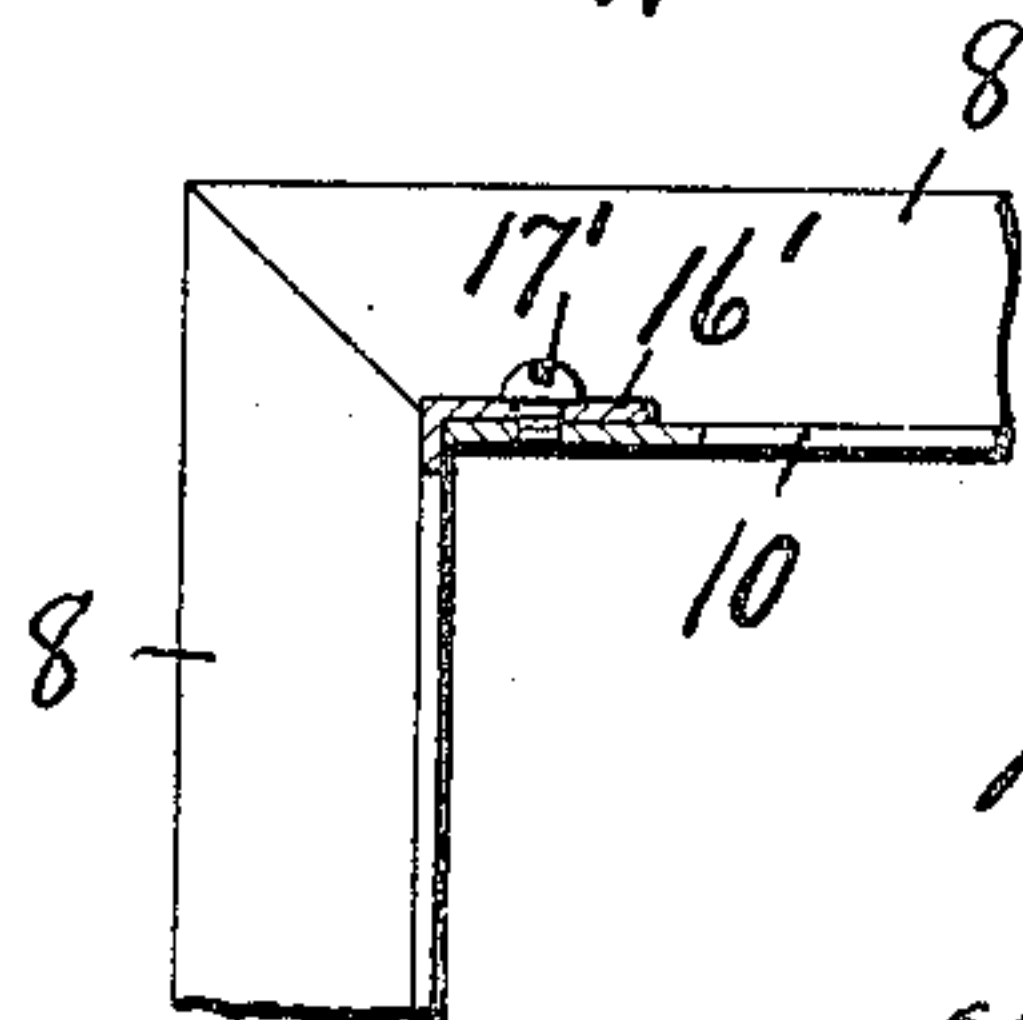


Fig. 10.



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UNITED STATES PATENT OFFICE.

WILLARD S. TUTTLE, OF BROOKLYN, NEW YORK.

HOT-AIR REGISTER.

No. 822,408.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed February 16, 1905. Serial No. 245 905.

To all whom it may concern:

Be it known that I, WILLARD S. TUTTLE, of Brooklyn, in the county of Kings, in the State of New York, have invented new and useful
5 Improvements in Hot-Air Registers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in
10 hot-air registers, and while the general structure is more particularly adapted for wall-registers, yet by slight modifications hereinafter described it may be adapted for floor-registers and still embody certain features of
15 the invention.

My main object is to produce a sheet-metal register which may be manufactured at a minimum cost and at the same time possess all of the strength and greater simplicity than
20 the general class of cast-iron registers.

One of the specific objects is to construct and apply the register to the hot-air flue so as to obtain a heating area in the register which is as large as or larger than the flue-
25 opening to which the register is applied, it being understood that the area of outlet in the average hot-air registers now in use is some, if not considerably, less than the area of the flue-opening, thereby materially restricting the free passage of the hot air into the room. This is particularly true of wall-
30 registers, where the tendency of the current of air is directly upward and where it is advantageous to make the lateral passage as free
35 from obstructions as possible.

A further object is to provide the register-frame with a sheet-metal damper which may be swung into the flue-opening to deflect the hot air through the register.

40 A still further object is to provide a simple means for adjusting this damper and holding it in its adjusted position.

Other objects and uses relating to the specific structure of the device will be brought
45 out in the following description.

In the drawings, Figure 1 is a perspective view of a wall-register embodying the features of my invention shown as applied to a hot-air flue. Fig. 2 is a transverse sectional
50 view through the register and flue seen in Fig. 1. Fig. 3 is a similar sectional view in which the register is disposed in a vertical position and applied directly to the flue instead of to the wall-frame seen in Figs. 1 and 2. Fig. 4

is a horizontal sectional view taken on line 4 55 4, Fig. 3, showing particularly the damper-operating device and, further, showing the manner of assembling the sheet-metal parts of the register. Fig. 5 is an inverted plan view of a portion of the plate seen in Fig. 4. 60 Figs. 6 and 7 are enlarged detail sectional views through a portion of the grille-plate, showing the reinforcing-bars and means for holding them in place. Figs. 8 and 9 are perspective views, respectively, of the de- 65 tached grill-plate and its supporting-frame carrying the damper, both of these parts being the same as shown in Figs. 1 to 4, inclusive. Fig. 10 is a rear view of one of the corners of the frame seen in Fig. 9. 70

This hot-air register, as seen in Figs. 1 to 4, 8, 9, and 10, comprises, essentially, three sheet-metal parts—namely, a grille-plate 1, a supporting-frame 2 for said plate, and a damper 3 in said frame—all of which are as- 75 sembled in a manner hereinafter described and applied to a hot-air flue, as 4, or when used in an inclined position, as seen in Figs. 1 and 2, to be secured to a suitable base or wall-frame 5. 80

In Fig. 2 I have shown a flue 4 as passing through the floor of a building and as being of greater area at the floor-line than above the register, and this flue is provided with an opening 6, disposed in an inclined plane in- 85 clining upwardly and rearwardly from the floor-line, and is surrounded by a wall or floor frame 5, which also has an opening 6 disposed in the same inclined plane for receiving portions of my improved register. 90

As shown in Fig. 10, this opening is rectangular to conform to the shape of the register, and the frame may be secured in any well-known manner to the adjacent walls of the flue, as by bolts or rivets 6'. 95

The sheet-metal frame 2 is rectangular in general outline and of slightly greater outside dimensions than the opening in the wall-plate 5, so as to bear flatwise against the front face of the portions of said wall-plate sur- 100 rounding the opening, and for this purpose the frame 2 is provided with a substantially flat marginal flange 8, which surrounds the central rectangular opening 9 of substantially the same size as the opening 6 in the 105 wall-plate 5.

The inner edges of the marginal flanges 8 are bent rearwardly at substantially right

angles to form a rearwardly-projecting marginal flange 10, which also surrounds the opening 9 and is inserted through the opening 6 in the wall-plate 5, so as to hold the register from vertical or lateral displacement.

In order to further retain the register in operative position, I provide portions, as the ends of the flat marginal flange 8, with one or more slots or apertures 11, which receive lugs or projections 12 of the wall-plate 5. These projections 12 may be formed upon the wall-plate 5 or upon the adjacent portions of the tin hot-air flue 4, and while the register is being placed in position upon the flue these projections are disposed at substantially right angles to the plane of the opening 6, so as to readily enter the apertures 11, after which they are bent laterally upon the outer face of the flat marginal flange 8, thereby locking the frame 2 against withdrawal from the opening 6.

It is now seen that the sheet-metal frame 2 is held firmly in operative position with the marginal flange 8 resting against the outer face or wall plate 5 around the opening 6, while the intumed flange 10 projects through said opening.

In order to afford as large an area as possible for the escape of hot air into the room and also for the purpose of deflecting the hot air upwardly, as well as downwardly, the grille-plate 1 is bent in the form of a segment of a cylinder or concavo-convex vertically, and the opposite upright side edges of the frame 2 are cut in curved lines to conform to the curvature of the grille-plate 1 and are bent forwardly at substantially right angles to the plane of the frame 2, so as to form upright end flanges 13 close to the ends of the grille-plate, which would otherwise be open.

The upper and lower longitudinal edges of this grille-plate are bent inwardly toward each other to form lengthwise flanges 14, which lie in substantially the same flat plane and are adapted to fit between the end flanges 13 and to rest against the outer face of the flat marginal flange 8, it being understood that the outer dimensions of the grille-plate are substantially the same as the frame 2.

The opposite upright edges of the grille-plate 1 are turned inwardly at substantially right angles and fit upon the outer end faces of the curved flanges 13, so as to cover the joints and prevent endwise movement of the grille-plate upon its supporting-frame, said grille-plate being further secured to the supporting frame by suitable means, as screws 15, which enter apertures 16 and 17 in the flanges 14 and 8, respectively, of the grille-plate and said supporting-frame.

The grille-plate is formed from a single piece of sheet metal, and its supporting-frame 2 may also be formed from a single piece of sheet metal; but for reasons of economy the lower and upper sides and ends are formed

from separate pieces or strips and the extremities of the rearwardly-turned flanges 10 of the end pieces are extended a short distance and are bent at substantially right angles to form shoulders 16', which lap upon the outer faces of the flanges 10 of the upper and lower sides of the frame 2 and are secured thereto by suitable screws 17', Fig. 10.

It is now seen that the forwardly-projecting curved flanges 13 of the frame 2 support the grille-plate 1 some distance from the plane of the flat marginal flange 8 and that the area of the space between the grille-plate and supporting-frame 2 is somewhat greater than the area of the opening 9 in the frame 2 and is therefore larger than the flue-opening which discharges into the register. This is a particularly important feature of my invention, for the reason that I am enabled to obtain a register-outlet of greater area than the flue-opening in which the register fits, which facilitates the free entrance of hot air into the room as distinguished from the restricted opening in the registers now in use. In other words, the openings in the grille-plate may extend over its entire area, even to the marginal edges of the grille-plate, for the reason that the flanges by which the register is secured to the flue are within the margin of the grille-plate and a considerable space is left between the grille-plate and damper. I do not wish, however, to limit myself to the curved face-plate, as it is evident that it may be otherwise formed—as, for instance, it may be flat and still produce an air-chamber between the face-plate and the damper which is of greater area than the flue-opening. The discharge area of the register is also further increased by perforating the sides 13 with apertures 13', it being understood, of course, that the face-plate 1 is also perforated or provided with a series of openings, as slots 18. One of these openings, as 18, in the face-plate is preferably elongated for receiving one end of a damper-operating member 19, the other end being pivotally attached at 20 to the damper.

The damper 3 is made of sheet metal of substantially the size of the opening 9 and is hung upon its upper edge upon pivotal pins or studs 21, which project from opposite sides of the opening 9. The upper edge of the damper 3 lies in close proximity to the upper side of the opening 9 and is turned or bent over into the form of a hook to form open-sided bearings to receive the pivotal pins 21 and permit the damper to be removed or replaced when desired by simply removing the grille-plate 1 and then rocking the damper forwardly to a substantially horizontal position and then forcing the damper rearwardly to allow the pins 21 to pass through the open sides of their bearings, thereby disengaging the damper from the pivotal pins, or by reversing this movement

the damper may be reengaged with its pivotal pin and allowed to gravitate to its normal position.

The lower edge of the damper is deflected 5 or bent forwardly to stiffen the main body and also allows the damper to be shortened or lengthened slightly by varying the angle of this bend to conform to slight variations in the depth of the opening 9 in different 10 frames, so that the damper may always substantially fill the opening.

When the grille-plate and damper are assembled in operative position, the upper portion of the open-sided bearing of the damper 15 is interposed between the pivotal pins 21 and top side of the opening 9, and the open side of the bearing being at the bottom or beneath said pivotal pins the damper is held from accidental displacement from said pins.

20 The flanges 14 of the face-plate 1 are somewhat deeper vertically than the flanges 8, the upper flange serving to cover the upper hinged edge of the damper, while the lower flange 14 projects slightly above the lower 25 flange 8 of the frame 2 and forms an abutment for the lower deflected edge, as 23, of the damper, so that when the damper is closed it lies in a plane substantially parallel with the front face of the frame 2, as best 30 seen in Fig. 3.

The damper-operating member 19 consists of a single piece of spring-wire bent into the form of a loop with its ends extending in substantially the same direction, but slightly divergent and the extremities offset laterally 35 and inserted into suitable eyes or hinge-pieces 20, which consist of pieces of sheet metal, each bent into the form of an eye and having its ends inserted through an aperture 40 24 in the damper 3 and its ends bent laterally against the inner face of the damper to hold the eyes 20 in operative position against withdrawal through said apertures, it being understood that the ends of the damper-operating member 19 hold said eyes against rearward displacement. 45

The front or looped portion of the damper-operating member is passed through and movable vertically in the central slot 18, and 50 at this point the opposite arms of the member 19 are depressed inwardly for forming inner and outer shoulders 25 and 26, which frictionally engage the rear and front faces of the plate 1 so as to hold the member 19 from 55 withdrawal through the slot 18.

The opposite arms of the member 19 are, however, slightly compressed where they pass through the slot 18, but are tensioned so as to spring against the sides of the slot to 60 frictionally hold said member and also the damper in its adjusted position. This is a particularly simple and efficient means for holding the damper and may be easily assembled or removed even after the other parts 65 of the register have been placed in operative

position by simply inserting it through the slot 18 and compressing the arms so that their offset ends will enter and spring apart into the eyes 20. It will be observed that the pivotal connection of the member 19 with the 70 damper 3 is below the swinging axis of the damper, and therefore the member 19 not only operates as an adjustable brace to hold the damper in a more or less open position, but actually draws downwardly upon the 75 damper to hold it upon its pivotal axis and prevent the upward displacement of such damper.

I have now described the essential features of the sheet-metal structure; but in 80 some instances I may prefer to reinforce the face-plate, and for this purpose I provide a series of metal reinforcing-bars 30, running vertically along the inside of the face-plate from top to bottom and held in place by any 85 suitable clamping devices, such as straps or tongues 31, which are formed at intervals upon the upright bar of said plate and are bent inwardly around the sides and inner face of each bar to form open loops which 90 firmly lock such bar in operative position. The manner of bending these tongues around the bar is best seen in Figs. 6 and 7, and it will be observed that the adjacent tongues are bent from opposite edges of the upright 95 bars of the face-plate for the purpose of holding the bar more rigidly in place and distributing the strain to both sides of the sheet-metal bars of the face-plate.

The register shown in Fig. 3 is substantially the same as that shown in Figs. 1 and 2, the only difference being that the wall-plate 5 is omitted and the tongues 12, which enter the apertures 11 for holding the register in place, are formed directly upon the 105 adjacent parts of the tin hot-air flue and are bent over upon the outer face of the flange 8 in the manner as previously described.

In assembling and operating my invention the frame 2 and face-plate 1 are formed, respectively, in the manner described, and 110 the damper 3 is operatively mounted, as described, in the frame 2 to swing in the opening 9, after which the face-plate 1 is secured to the front face of the frame 2 by the screws 115 15, and the damper-operating member 19 is then inserted through the slot 18 and attached to the eyes 20, thus completing the register, which is then placed in operative position with the flange 10 projecting 120 through the flue-opening 6, so that the tongues or lugs 12 enter the apertures 11, said tongues being then bent laterally against the outer face of the flange 8 to hold the register in operative position. It is now apparent 125 that by moving the damper-operating member up or down in the slot 18 the damper is caused to move inwardly or outwardly by reason of the engagement of the shoulders 25 and 26 with the sides of the slot 18. 130

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

1. A hot-air register comprising a sheet-metal frame having a central opening and an inturned marginal flange surrounding the opening, a damper hinged to swing in the opening, perforated side or end pieces projecting from opposite sides of the frame, a grille-plate secured to the frame and engaging said side pieces, and a damper-operating member connected to the damper and frictionally engaged with the grille-plate.

2. In a hot-air register, a curved grille-plate of bendable metal terminating at the ends of the curved portion in flat inturned flanges lying in substantially the same flat plane, and a supporting-frame having grilled side pieces projecting outwardly at the ends of said plate.

3. In a hot-air register, a frame having a central opening, grilled flanges projecting from opposite edges of the frame, and a grille-plate across the opening and having its edges lapped upon said flanges.

4. In a hot-air register, a frame having a central opening, grilled flanges of bendable metal projecting outwardly from opposite edges of the frame and having their outer edges disposed in a curved plane, and a curved grille-plate fitted upon the curved edges of said flanges and extending across the opening.

5. In a hot-air register, in combination, a frame having an opening, a grille-plate across the opening, pivots projecting from opposite sides of the opening near its top, and a damper having a hook formed on the front side of its upper edge and hooked upon the pivots, the distance between the pivots and top side of the opening being less than the depth of the hook portion of the damper, whereby the damper is removable only when brought to a substantially horizontal position.

6. In a hot-air register, the combination of a frame having a central opening, a grille-

plate across the opening and having its lower and upper edges folded inwardly toward each other at the back of the open-work of said grille-plate and partially across the opening, the lower edge forming a limiting-stop for the damper, and a damper hinged in the frame at the rear of said edges.

7. A wall-register comprising a sheet-metal wall-frame having perforated end flanges, and a sheet-metal grille-front having top and bottom edges turned toward each other between the flanges and secured to the frame.

8. A wall-register comprising a sheet-metal wall-frame having its inner edges bent inwardly and its ends bent outwardly and perforated, and a sheet-metal grille-front bearing against the outturned edges of the wall-plate and of greater area than the opening in the wall-plate.

9. A wall-register comprising a sheet-metal wall-plate having a damper-opening and a swinging damper therein, a sheet-metal grille-front of greater area than said opening and provided with a slot, and a handpiece pivotally attached to the damper and having laterally-projecting inner and outer shoulders in sliding frictional engagement with the inner and outer sides of the slot of the grille-front.

10. In a wall-register, a frame having a damper-opening, and a damper hinged at one edge to the frame and having its free edge deflected forwardly at an angle with the main body and bendable to fit the opening in which it swings.

11. A wall-register comprising a sheet-metal wall-plate having outturned grilled flanges with convex edges, and a sheet-metal grille fitted against the convex edges of said flanges.

In witness whereof I have hereunto set my hand this 7th day of February, 1905.

WILLARD S. TUTTLE.

Witnesses:

HENRY VON EHR,

R. W. SHELTER.