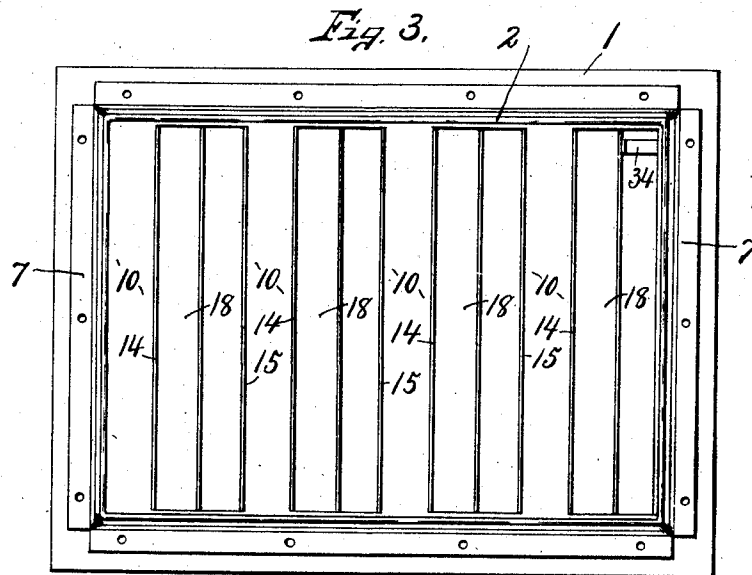
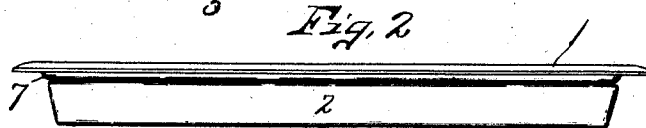
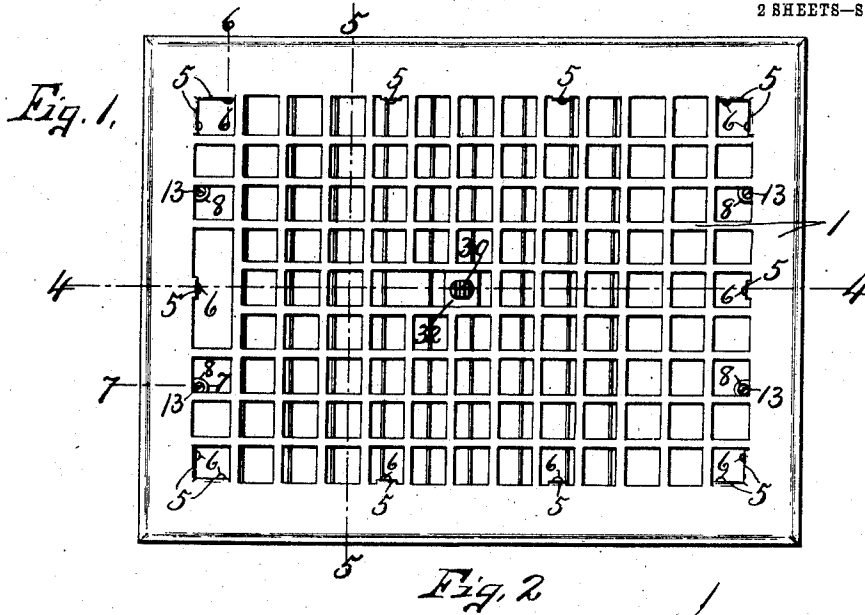


W. S. TUTTLE.
HOT AIR REGISTER.
APPLICATION FILED APR. 5, 1906.

901,756.

Patented Oct. 20, 1908.

2 SHEETS—SHEET 1.



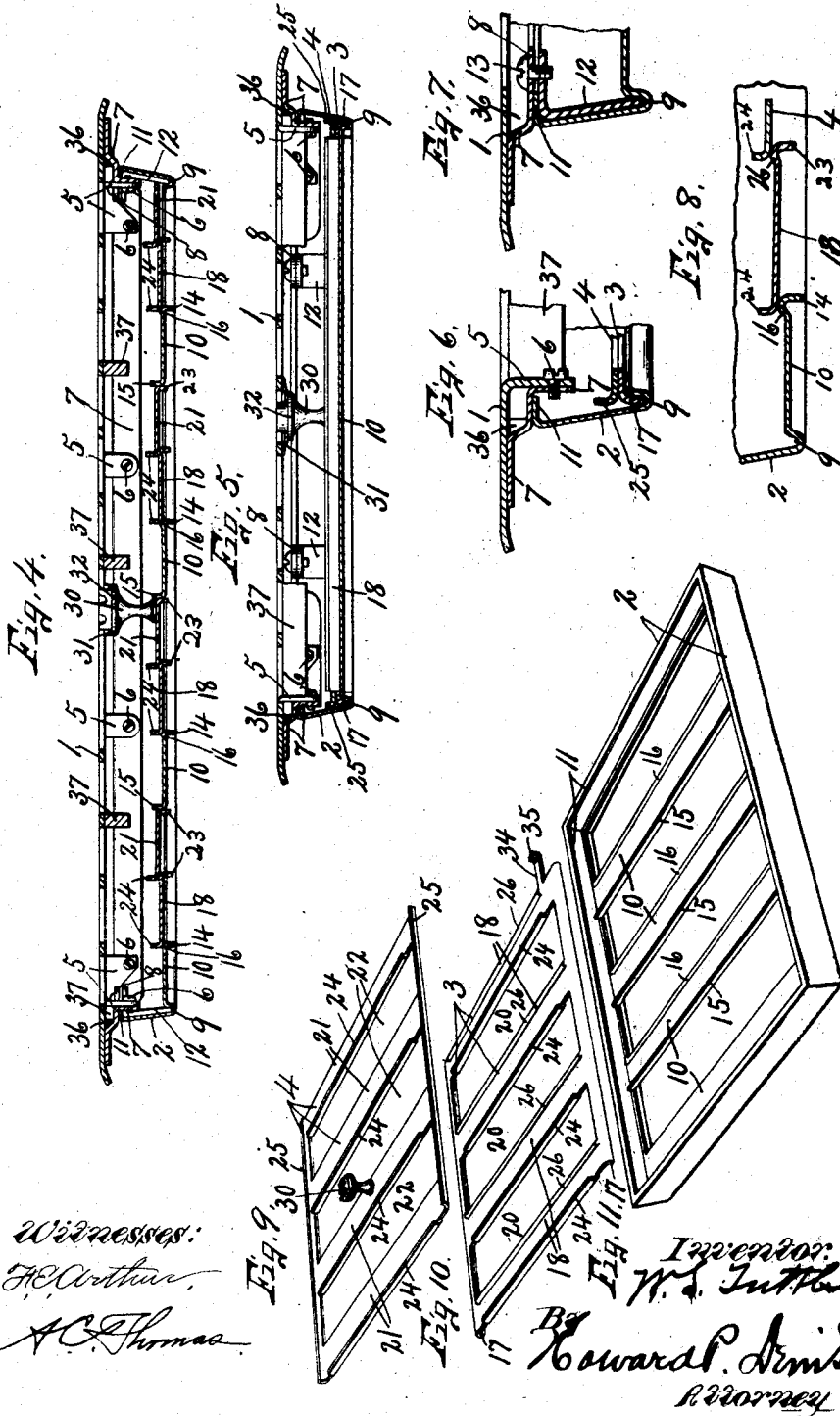
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLARD S. TUTTLE, OF BROOKLYN, NEW YORK.

HOT-AIR REGISTER.

No. 901,756.

Specification of Letters Patent.

Patented Oct. 20, 1908.

Application filed April 5, 1906. Serial No. 310,085.

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 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 certain improvements in hot air registers of the slide-valve type, and is especially adapted for use in comparatively thin side walls, or in the floors of a building.

One of the essential objects of this invention is to produce a comparatively light shallow register with as few parts as possible by making the box of less depth than the width of any one of the other damper blades and arranging said blades wholly within the box close to the back bars so that the whole device may be used in comparatively thin walls without obstructing the hot air flues, and at the same time to afford comparatively large openings by a relatively small movement of the damper-plates.

A further object is to enable the parts to be readily stamped or pressed to the desired form and quickly assembled without special fitting.

Other objects and uses will be brought out in the following description.

In the drawings—Figures 1, 2 and 3 are, respectively, top plan, side elevation, and inverted plan of a hot air register embodying the various features of my invention. Figs. 4, 5, 6 and 7 are enlarged sectional views taken respectively on lines 4—4, 5—5, 6—6, and 7—7, Fig. 1. Fig. 8 is a further enlarged longitudinal sectional view through a portion of one end of the frame, and adjacent portions of the slide valves. Figs. 9, 10 and 11 are perspective views respectively of the outer and inner valves and the box frame for receiving and supporting the same.

This hot-air register comprises essentially a grille-plate —1—; a comparatively shallow box-frame —2— and a plurality of slide-valves —3— and —4—, all of which parts are preferably formed of sheet metal so as to lighten the unitary structure, and thereby cheapen the cost of transportation.

The central portion of the plate —1—, substantially equal to the area of the frame-box —2—, is grilled or perforated, leaving

an imperforate substantially flat margin projecting some distance beyond the perimeter of the frame and adapted to abut against the face of the wall or floor around the opening through which the frame is inserted.

The inner edge of the margin of the grille-plate is provided with a series of inturned lugs or ears —5— to which is secured by rivets —6—, a marginal flange —7— lying against the back face of the margin of the grille plate and which is fitted within and retains the box frame —2— in operative connection with said grille-plate.

The box-frame —2— is preferably made of a single piece of sheet-metal having its sides and ends bent outwardly and fitted around the marginal flange —7— and its bottom depressed outwardly a slight distance, forming at its junction with the sides and ends, a marginal groove —9— which is co-extensive with the length of said sides and ends.

Portions of the bottom of the frame —2— are cut away at intervals forming a series of separated parallel transverse bars —10— and intervening spaces which are substantially equal to twice the width of the bars and across which the slide valves —3— and —4— are movable in a manner presently described.

The outer edges of the box-frame —2— are turned inwardly towards each other forming marginal abutment flanges —11—, as best seen in Figs. 6 and 7. A series of separate angle-straps or braces —12— are arranged at intervals along the ends of the frame —2—, each in alinement with one of the ears or lugs —8—, and have their lower ends seated in the grooves —9— and their upper portions abutting against the inner faces of the flange —11— and projecting inwardly therefrom for receiving suitable fastening means, as screws —13—, which are passed through apertures in the lugs —8— and engage with threaded apertures in the inwardly projecting ends of the braces —12— so as to impinge the marginal flange —11— between the lugs —8— and braces —12—, thereby firmly securing the frame —2— to the grille-plate.

Portions of the flange —7— are cut away to allow the entrance of the braces into close proximity to the ears or lugs —8— although the inner edges of the marginal flange —11—

abut against the outer faces of the flange —7— to prevent relative lateral movement of the frame and grille-plate, one upon the other, thereby relieving in a measure the strain upon the bolts or screws —13.

One of the transverse bars —10— of the bottom of the frame —2— is united directly to one of the ends of the frame and has its opposite longitudinal edge bent downwardly forming a reinforcing flange —14—. The remaining bars 10 are united at their ends to the sides of the frame —2— and have their front and rear edges bent in opposite directions, forming reinforcing flanges 14— and 15—.

The front edges of the bars —10— to which the flanges 14— are united are pressed upwardly a slight distance, forming lengthwise beads —16—, which are disposed in a plane slightly above the remaining portions of the bars, and serve as bearing faces upon which the damper —3— slides so as not to mar or disfigure the exposed outer surface of the bars 10.

The slide valves —3— and —4— are each formed of sheet metal of substantially the same width as the inner width of the frame —2—, but are shorter than the interior length of the frame a distance substantially equal to the width of one of the openings between the bars —10— so as to allow for a limited lengthwise movement of the slide-valves in said frame.

The inner sides of the grooves —9— are deflected or offset inwardly a slight distance to form a guide and bearing for the inner valve —3— and the opposite longitudinal edges of the valve —3— are off-set or deflected outwardly, forming flanges —17— which enter and ride in the lengthwise grooves —9— in the opposite sides of the frame —2—. This slide-valve —3— is substantially flat and provided with a series of, in this instance, four transverse bars —18—

which are spaced apart forming intervening spaces —20— of substantially the same width as the spaces between the bars —10—, while the bars 18— are of substantially the same width as the bars —10—. In like manner the sliding valve —4— is substantially flat and rests upon the outer face of the valve —3— and is provided with a series of parallel bars —21— and intervening spaces —22—, the bars —21— being of

substantially the same width as the bars —18— and 10— of the valve —3— and frame —2— respectively, while the spaces —22— are of substantially the same width as the spaces between the bars 10—, and are, therefore, equal in area to the spaces —20—. The front and rear edges of the bars —21— and —18— are deflected in opposite directions forming lengthwise reinforcing flanges or abutments —23— and —24—, and the longitudinal edges of the damper

—4— are also bent upwardly forming additional lengthwise flanges —25—.

It is evident from the foregoing description, and the accompanying drawing, that each sliding damper or valve is provided with a series of, in this instance four, substantially parallel bars united at the ends, and forming a series of, in this instance, three intervening spaces and that the flanges at the edges of the side pieces and cross-bars of each valve serves to stiffen and strengthen the same against compression or torsional strains. The front edges of the bars —18— of the valve 3— are also pressed outwardly a slight distance above the plane of the remaining portions of the bars forming beads or lengthwise bearings —26— for the outer slide valve —4— to prevent marring of the exposed surfaces of the outer faces of the bars —18—.

The upturned flanges —15— on the rear edges of the bars —10— form abutments or limiting stops for limiting the opening movement of the slide valve —3— and the inwardly turned flanges, as —23—, of the slide valve —3— perform similar function by engaging the front edges of the bars —10— to additionally limit the open sliding movement of the valve —3—. In like manner the front and rear flanges —23— and 24— of the slide valve —4— form suitable abutments for engaging respectively the front and rear edges of the bars —18— of the valve —3— for limiting the movement of the valve —4— relatively to the valve —3—, and also for affording means for operating said valve —3— upon the bars —10—.

The slide valve —4— is provided with an operating member 30— projecting through an elongated slot in the grille-plate —1— and provided with a spring friction disk —31— which is seated upon a shoulder —32— and frictionally engages the inner face of the grille-plate —1— to hold the sliding dampers or valves —3— and —4— in their adjusted position.

In order that the inner slide valve —3— may be forced to its closed position by the closing of the valve —4—, I provide one end of the valve —3— with a forwardly projecting arm —34— of substantially the same length as the width of the bar to which it is attached and terminating in an out-turned shoulder or abutment —35—.

The inner portions of the flange —7— are depressed inwardly from the grille-plate a sufficient distance to form an interposed groove or space —36— for receiving the reduced ends of a series of transverse reinforcing bars —37— which are usually made of steel, and bear against the inner face of the sheet-metal grille-plate to support the same against inward depression, the reduced ends of said bars being best shown in Fig. 6, as seated in the groove —36—. Assuming

now that the valves —3— and —4— are closed, as seen in Figs. 3 and 4, in which position the bars —18— and 21 cover the spaces between the bars —10—, as best seen in Fig. 4, that is, each bar covers substantially half of said space and by moving the hand-piece —30— to the left of Fig. 4, it is evident that the slide valve —4— will be moved in a similar direction independently of the valve —3— until the abutments —23— and —24— of the valve —3— engage the corresponding abutments —23— and —24— of the valve —4—, whereupon the continued movement of the valve —3— by the operating member —30— causes the abutments —23— and —24— of the valve —4— to engage and slide the valve —3— to the limit of its movement, or across the bars —10—, so that the bars —10—, 18— and 21— lie one over the other, thereby registering the openings between said bars with each other. On the other hand, when it is desired to close the valves, the operating member —30— is moved in the opposite direction, thereby sliding the valve —4— in the same direction until the front bar —21— engages the abutment —35— and moves the valve —3— to the limit of its movement.

The grille-plate —1— and frame —2— are secured together by the screws 13— and the flanges —7— project inwardly in close proximity to the outer face of the slide valve —3— sufficient to prevent undue displacement of the valves from the seats of the frame —2— upon which they slide, but these valves are further held against displacement by the friction disk —31— having sliding frictional engagement with the underside of the grille-plate, the pressure of said spring being sufficient to retain the slide valves in operative position relatively to each other. It is now evident that by removing the screws 13—, the grille-plate with its flange —7— may be readily removed, after which the valves —3— and —4— may be readily withdrawn through the open side of the frame —2—, thus affording a simple and comparatively inexpensive means for assembling the parts of the register, and materially reducing the cost of manufacture.

What I claim:

1. A hot air register comprising a sheet metal box frame having integral bottom bars spaced apart forming intervening ports, a slide valve movable upon the inner faces of said bars and itself provided with transverse bars spaced apart forming intervening ports adapted to be registered with the first named ports, the bottom being depressed inwardly beyond the marginal edges of the frame and a grille-plate across the open side of the box.

2. A hot air register comprising a box frame having bottom bars spaced apart

forming intervening ports and depressed inwardly beyond the inner marginal edges of the frame, a slide valve movable upon and across the inner faces of said bars, a second slide valve movable across and upon the first named valve, the slide valves having transverse bars spaced apart forming intervening ports and movable across the ports in the bottom of the box and a grille plate across the open side of the box.

3. A wall register comprising a sheet metal box frame having its bottom depressed within the sides and forming therewith lengthwise grooves between the longitudinal edges of the bottom and sides of the box, and provided with transverse bars spaced apart forming intervening ports, a sheet metal valve plate having its longitudinal edges provided with outturned lengthwise flanges guided in said lengthwise grooves, said valve having a series of transverse bars spaced apart forming intervening ports and slidable upon the inner faces of the bottom bars of the box, and a grille plate across the open side of the box.

4. A wall register comprising a sheet metal box frame having its bottom integral with its sides and depressed in a plane wholly within said frame and provided with integral parallel bars spaced apart forming intervening ports, said frame having grooves at the junction of its bottom with its sides, a slide valve movable upon the bottom of the box and provided with opposite lengthwise flanges guided in the adjacent grooves in the sides of the box, and a second slide valve movable across and upon the first named valve and provided with out-turned flanges running along its opposite longitudinal edges, and a grille plate across the open side of the box.

5. A wall register comprising a box frame having parallel bottom bars spaced apart forming intervening ports each bar having a raised rib, a slide valve resting on the ribs of each bar and a grille plate across the open side of the box.

6. A wall register comprising a box frame having a raised bottom formed with integral parallel bars spaced apart forming intervening ports, each bar having a raised rib, a slide valve movable transversely of and upon said ribs, and a grille plate across the open side of the box.

7. A hot air register comprising a sheet metal box frame having a raised bottom forming lengthwise grooves between the sides and adjacent edges of the bottom of the box and provided with integral parallel bars spaced apart forming intervening ports, each bar having a raised lengthwise bearing, a slide valve movable across and upon said bearings and having its longitudinal edges formed with flanges guided in

the adjacent grooves between the bottom and sides of the box, and a grille plate across the open side of the box.

8. A hot air register comprising a sheet metal box frame having a bottom provided with parallel bars spaced apart forming intervening ports, a slide valve movable across and upon said bars and itself provided with integral parallel bars spaced apart forming intervening ports, each of the valve bars having a raised bearing, and a second slide valve movable upon said bearings across the bars and spaces of the first named valve, and a grille plate across the open side of the box.

9. A wall register comprising a box frame having a bottom provided with integral parallel bars spaced apart forming intervening ports each of said bars having a raised bearing, a slide valve movable on said bearing and itself provided with a series of integral bars spaced apart forming intervening ports each of the valve bars having a raised bearing, a second valve slidable upon bearings of the first named valve, and a grille plate across the open side of the box.

10. A wall register comprising a sheet metal box frame having a raised bottom provided with integral parallel bars spaced apart forming intervening ports, said bottom and sides forming lengthwise grooves at their junctions, each of the bottom bars being provided with a raised lengthwise bearing, a slide valve resting on said bearings and itself provided with raised bearings, a second slide valve resting upon the bearings of the first named slide valve, and a grille plate across the open sides of the box.

11. A wall register comprising a sheet metal box frame having a bottom provided with parallel bars spaced apart forming intervening ports, the outer edges of the sides and ends being provided with integral intumed flanges, a slide valve movable across and upon the bottom, and provided with opposite lengthwise flanges guided between said intumed flanges and sides of the box, and a grille plate across the open side of the box.

12. A wall register comprising a sheet metal box having a raised bottom forming with the sides intervening lengthwise grooves and provided with parallel bars spaced apart forming intervening ports, a slide valve movable across and upon the bottom and provided with lengthwise flanges running in said grooves, a second valve slidable upon the first named valve and provided with out-turned flanges along its longitudinal edges, and a grille plate across the open side of the box and provided with intumed lengthwise flanges extending beyond the longitudinal edges of the valve.

13. A wall register comprising a sheet metal box frame having a raised bottom and intumed flanges on the outer edges of its

sides and ends, the bottom being provided with integral parallel bars spaced apart forming intervening ports, each bar having a raised lengthwise rib near one edge, a slide valve movable transversely of the bars and ports upon said ribs, a second slide valve movable on the first named valve and a grille plate across the open side of the box and provided with intumed flanges running transversely across the ends of the bottom doors and valves to prevent displacement of the valves when the grille plate is in operative position.

14. A wall register comprising a box frame having a raised bottom provided with parallel bars spaced apart forming intervening ports, a slide valve movable across and upon the bottom bars of the box and provided with integral transverse bars spaced apart forming intervening ports, each of the valve bars having a raised lengthwise bearing near one edge and an outwardly projecting stop flange running along its opposite lengthwise edge, a second slide valve movable on said bearings and against the stop flanges of the first named valve, whereby motion is transmitted to the first named valve when the second valve is movable in one direction, means for moving the first named valve, a stop on the first valve adapted to be engaged by the second valve when moved to its closed position, and a grille plate across the open side of the box.

15. A hot air register comprising a sheet metal box frame having a bottom provided with integral parallel bars spaced apart forming intervening ports, the slide valve movable across and upon said bars, a second slide valve movable across and upon the first named bar, stop shoulders on said bars to limit the opening movement of the first named valve, additional stop shoulders on the first valve to limit the opening movement and a grille plate across the open side of the named valve, and an additional shoulder upon the first valve adapted to be engaged by the second valve when moved to its closed position to close the first named valve and a grille plate across the open side of the box frame.

16. A wall register comprising a box frame having a bottom provided with parallel bars spaced apart forming intervening ports, slide valves movable across said ports, a sheet metal grille plate across the open side of the box frame, flanges on the grille plate and reinforcing bars having their ends seated on said flanges, and their intermediate portions lying against the inner face of the grille plate.

17. A wall register comprising a box frame, a grille plate extending across the open side of said box frame, flanges attached to opposite sides of the grille plate

and resting upon the outer edges or the sides of the box and having their inner portions spaced apart some distance from the inner face of the grille plate, and reinforcing bars 5 for the grille plate having their ends inserted between the grille plate and adjacent flanges.

18. A hot air register comprising a sheet metal box frame having a raised bottom provided with parallel bars spaced apart forming intervening ports, said raised bottom forming with the sides intervening grooves, valves movable across the ports in the bottom of the box, one of said valves having 15 lengthwise flanges guided in said grooves, braces having their inner ends seated in said grooves and their outer ends offset inwardly, flanges on the sides of the box engaging the outer faces of the offset portions of the 20 braces, and a grille plate across the open side of the box and secured to the offset portions of said braces.

19. A hot air register comprising a sheet metal box having a bottom provided with 25 parallel bars and intervening ports, the outer edges of the sides of the box being bent inwardly toward each other forming inward turned flanges, braces having their inner ends seated in the bottom of the box and 30 their outer ends offset inwardly against the

inner faces of the said flanges, slide valves wholly within the box, a grille plate across the open side of the box and connections between the grille plate and inwardly offset portions of the braces whereby the grille 35 plate is secured to the box.

20. A hot air register comprising a sheet metal box having a raised bottom forming with the sides and ends intervening grooves, said bottom being provided with ports, a 40 slide valve having its longitudinal edges provided with flanges guided in the adjacent grooves, a second valve slidable on the first named valve, braces having their inner ends seated in the end grooves and their outer 45 ends offset inwardly toward each other, the outer edges of the box frame being also offset inwardly and engaging the outer faces of the offset portion of the braces, whereby the braces are retained wholly within the 50 box, a grille plate across the open side of the box, and means for attaching the grille plate to the inwardly offset portions of the braces.

In witness whereof I have hereunto set my hand this 27th day of March 1906.

WILLARD S. TUTTLE.

Witnesses:

WILBUR F. SMITH,
VINCENT LOESER.