No. 781,315. PATENTED JAN. 31, 1905.

W. S. TUTTLE.

REGISTER.

APPLICATION FILED FEB. 11, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

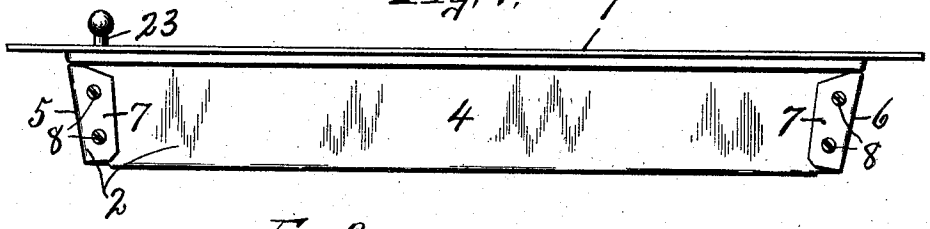


Fig. 2.

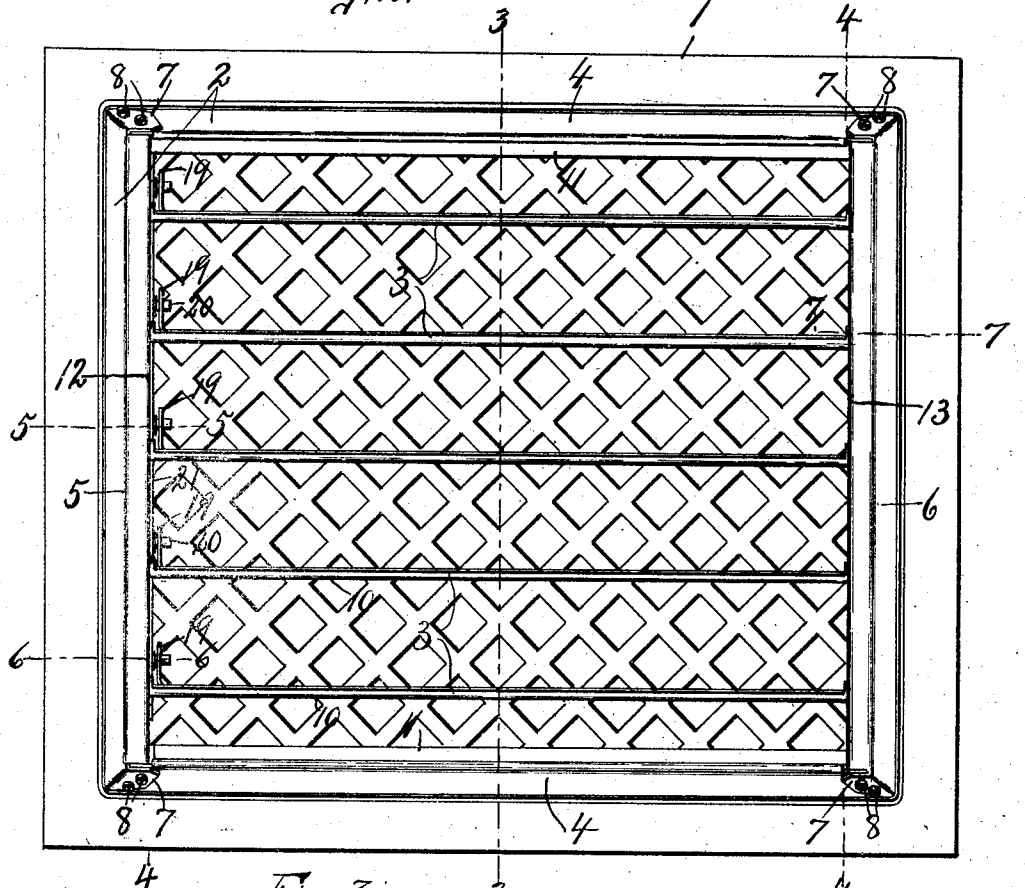
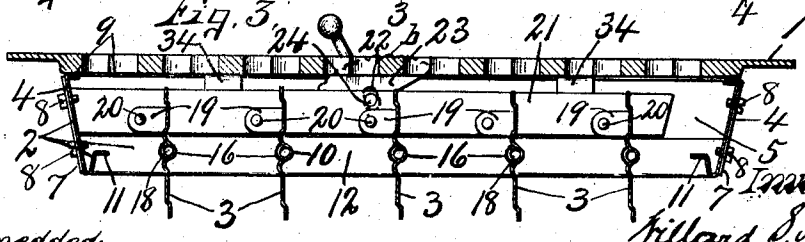


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

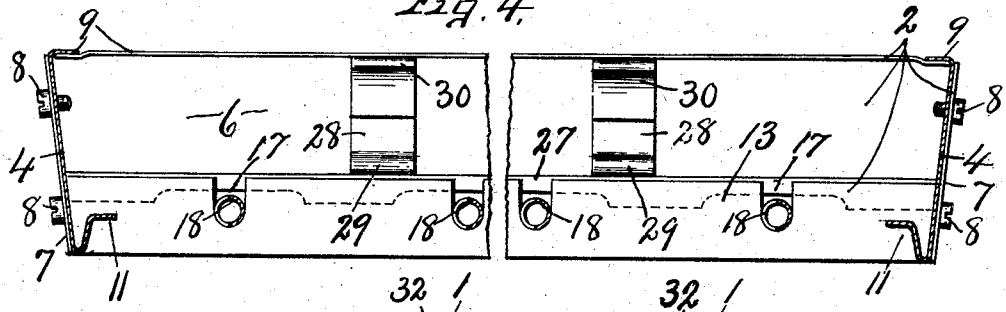


Fig. 5.

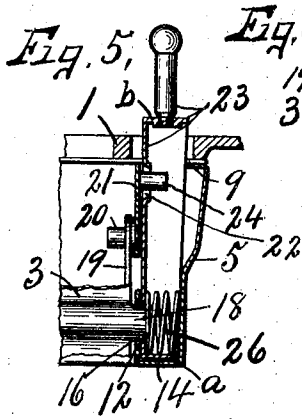


Fig. 6.

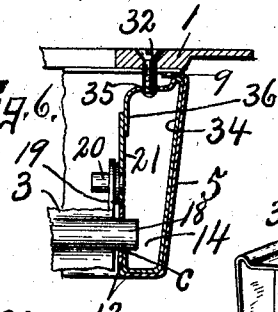


Fig. 7.

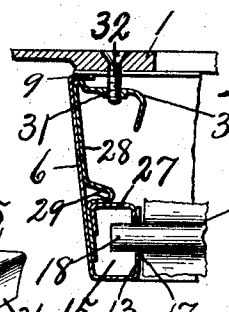


Fig. 12.

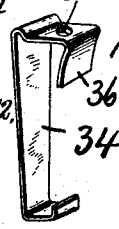


Fig. 13.

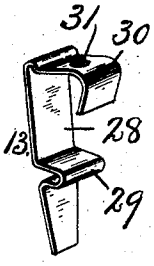


Fig. 8.

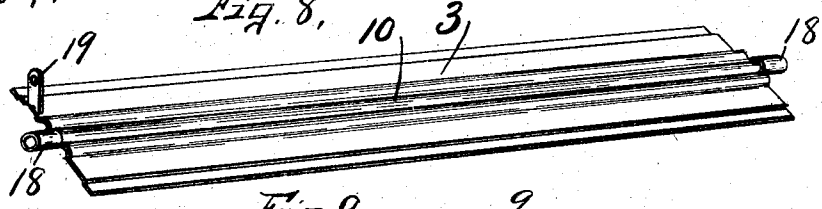


Fig. 9.

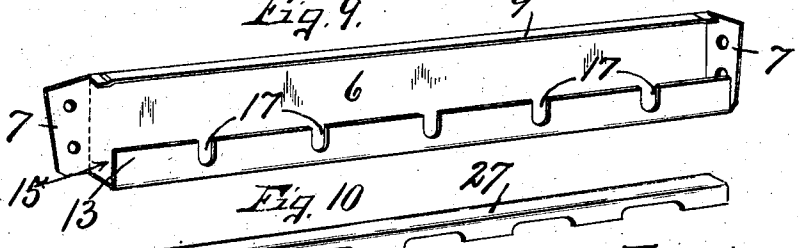


Fig. 10

Fig. 11.

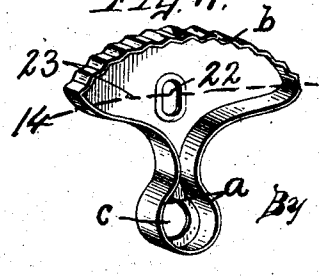
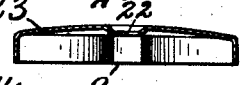


Fig. 14.



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No. 781,315. Patented January 31, 1905.

UNITED STATES PATENT OFFICE.

WILLARD S. TUTTLE, OF BROOKLYN, NEW YORK.

REGISTER.

SPECIFICATION forming part of Letters Patent No. 781,315, dated January 31, 1905.

Application filed February 11, 1904. Serial No. 193,089.

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 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 registers of the class commonly known as "hot-air or ventilating" registers, and refers more particularly to the supporting-frame, the tilting blades and manner of mounting the same, and also to the mechanisms for holding the blades in operative position and for operating the same.

The general object of this invention is to construct the above-mentioned parts entirely of sheet metal, but in such manner as to preserve the established outlines of the registers now in common use, so that no special fitting in the floors or side walls is required in substituting one for the other.

A more specific object is to permit the blades to be inserted into the frame or removed therefrom without removing the frame from the floor or wall or without taking the parts of the frame apart.

Further objects and uses will appear in the following description.

In the drawings, Figures 1 and 2 are respectively a side elevation and an inverted plan view of a register embodying the features of my invention. Figs. 3, 4, 5, 6, and 7 are sectional views taken, respectively, on lines 3 3, 4 4, 5 5, 6 6, and 7 7, Fig. 2, the tilting blades being shown in their open position in Figs. 2 and 3, but as closed in Fig. 1, the grille-plate being removed in Fig. 4. Figs. 8, 9, 10, and 11 are perspective views, respectively, of one of the blades, one of the end pieces of the frame, the retainer, and the rocking operating member for the blades; and Figs. 12 and 13 are perspective views of the brackets used at opposite ends of the frame. Fig. 14 is a sectional view taken on line 14 14, Fig. 11.

Similar reference characters indicate corresponding parts in all the views.

My improved register consists, essentially, of a grille or face plate 1, a blade-supporting frame 2, a series of tilting blades 3, and suitable mechanism, hereinafter described, for operating the blades. The grille-plate 1 is preferably formed of cast-iron of any well-known open pattern or type, to which is secured the frame 2. This frame is formed of sheet metal and comprises separate side pieces 4 and separate end pieces 5 and 6, all of which parts are secured together to form a substantially rectangular open frame projecting inwardly from the inner face of the grille-plate 1. This constitutes a sheet-metal box-frame; but the cross-sectional area of its inner end is somewhat less than that of its outer end where it abuts against the inner face of the grille-plate, so that the sides and ends incline inwardly toward the center to facilitate its connection with a hot-air or other flue with which it may be used. The sides and ends are of substantially the same depth, and their outer and inner edges are disposed in parallel planes; but the end pieces abut against the end faces of the sides and are formed with lateral extensions 7, which lap upon the outer faces of the adjacent ends of the sides and are removably secured thereto by fastening means, as rivets or screws 8. The outer edges of the sides and ends are bent or turned inwardly to form marginal flanges 9, which not only serve to receive and support the grille-plate 1, but also coöperate with clamping devices presently described for securing the frame to said plate and for holding the blades 3 in their bearings. The inner lengthwise edge of each side is bent or turned inwardly upon itself and terminates in a lengthwise ledge or shoulder 11, which forms a limiting stop or abutment for the edge of the adjacent blade, the blade at one side engaging the inner face of one ledge and that at the opposite side engages the outer face of the other ledge when the blades are closed; but another important feature of these ledges is that they reinforce or strengthen their respective sides against buckling or lateral compression and allow the use of very thin sheet metal. The inner edges of the end pieces are also bent or turned inwardly toward each other and then outwardly toward the grille-plate in substantially parallel planes to form

lengthwise flanges 12 and 13 of less depth than the frame and also channels or grooves 14 and 15. These flanges 12 and 13 reinforce the end pieces against buckling and are formed with a series of openings 16 and 17, which constitute bearings for the tilting blades 3; but the sides of the bearings 17 toward the grille-plate are open to permit the insertion and removal of the blades when desired without taking the frame 2 apart. This may be done by simply lifting the blades radially out of the open-sided bearings and then drawing them axially out of the bearings at the other end. These bearings 16 and 17 are arranged in pairs, one pair for each blade, and they are therefore disposed in axial alinement with each other, so that the axis of one blade is parallel with that of another, and the bearings and blades are disposed and arranged so as to cause the meeting lengthwise edges of the blades to slightly overlap one upon the other when they are closed.

The blades are identical in form and size, and each consists of a thin sheet-metal plate corrugated longitudinally to form one or more lengthwise reinforcing-ribs—such, for instance, as a central lengthwise rib 10—and the ends of these plates are reduced in width and rolled into tubular trunnions 18, which are journaled in and project beyond the bearings 16 and 17 into the grooves 14 and 15.

The main body of each blade is of substantially the same length as the distance between the flanges 12 and 13 of the end pieces, but are sufficiently free to swing without friction, and the end adjacent to the end piece 5 of the frame 2 is provided with a laterally-projecting lug or ear 19 between its trunnion and the grille-plate, said ears or lugs projecting in the same direction from their respective blades and are pivotally connected by studs 20 to a connecting bar or link 21. This link 21 is movable endwise in substantially the same plane as the flange 12 between said flange and the grille-plate and parallel with the end 5 of the register-frame, and the studs 20 are preferably secured to and project inwardly from the link into suitable apertures in the ears 19, so that by reciprocating the link endwise the blades 3 are rocked on their trunnions.

An operating member 23 is pivotally mounted between the flange 12 and wall 5 in the groove 14 and projects outwardly between the link 21 and wall 5 and through an opening in the grille-plate, where it may be engaged by the hand or foot and rocked upon its pivot.

The link 21 is provided with an additional stud 24, which projects into a slot 22 in the operating member 23, whereby reciprocal endwise movement is transmitted to the link by said operating member for rocking the blades 3. This rocking member 23 preferably consists of a sheet-metal plate in the form of a sector having its marginal edges turned or bent at substantially right angles to the main body to form a tubular hub *a* and a peripheral flange *b*, the latter being corrugated circumferentially and is exposed through the opening in the grille-plate to be engaged by the foot or hand when it is desired to tilt the blades.

The hub *a* fits closely between the flange 12 and wall 5 in the groove 14, and its inner end, which is a part of the upright main body, is provided with an aperture *c*, which in this instance receives the adjacent trunnion 18 of the central blade 3, and therefore this trunnion forms the fulcrum of the part 23. It is evident, however, that when an even number of blades are used this operating member 23 may be fulcrumed on a stud or part separate from the trunnions of the blades. The main body of this operating member 23 is concavo-convex transversely or at right angles to a line drawn through its axis and the slot 22, and its convex face is disposed next to the link 21, so that the only friction with the link is in said line, and this serves to hold the center of the link from buckling or springing laterally and tends to keep the studs 20 from withdrawing from the apertures in the ears 19.

A coil-spring 26 is fitted snugly upon the trunnion on which the operating member 23 is fulcrumed, and this spring also fits snugly in the tubular hub *a*, and it is therefore obvious that the member 23 has a bearing the full length of the hub, and at the same time the spring bears against the inner face of the wall 5 and also against the main body of the member 23 and tends to force said main body into frictional contact with the flange 12 to frictionally hold the member 23 and parts connected thereto in their adjusted positions. It now appears that these blades and their operating mechanisms are supported wholly within the frame 2 and that when the grille-plate is removed the blades may be readily removed by lifting them through the open-sided bearings and drawing them slightly endwise out of the bearings 16 in the flange 12.

When the blades are assembled in operative position in the bearings 16 and 17, they are held from accidental displacement and rattling by a retainer 27, which in this instance consists of a sheet-metal bar U shape in cross-section and inserted in the outer open side of the groove 15 and extends across the open sides of the bearings 17 and also across and upon the outer faces of the adjacent trunnions, and therefore operates to hold all of the blades in operative position and prevents them from shaking or rattling in their bearings. This retainer 27 is separate from the frame and is removable to permit the removal of the blades when desired and is held in position between the flange 13 and the main body of the end piece 6 by removable brackets or locking devices 28. Any number of these brackets may be used; but I have shown only two of them, and each consists of a sheet-

metal plate having its intermediate portion depressed inwardly to form a loop 29, which serves the double purpose of affording a spring action to hold the retainer against the trunnions under yielding pressure and also forms an adjustable anchorage to which the grille-plate is secured, the inner end of said bracket being inserted between the inner face of the end piece 6 and adjacent face of the retainer 27, while its outer end abuts against the inner face of the flange 9, but is formed with a lateral extension 30, projecting inwardly beyond the flange 9 and provided with a threaded aperture 31 to receive the clamping-screws, as 32, by which the grille-plate 1 is secured to the frame 2. It now appears that the locking devices 28 are held between the flange 9 and retainer 27 and that they also serve as nuts for the clamping-screws 32 to hold the grille-plate and frame 2 together and that when these two parts are secured together the flange 9 is impinged between the grille-plate and locking members 28. At the opposite end of the frame are similar brackets 34, in this instance two, having their lower ends inserted in the grooves 14 and their upper ends abutting against the flange 9 and projecting inwardly beyond said flange and provided with threaded apertures 35 to receive additional clamping-screws 32 for further securing the grille-plate to the frame 2, the inwardly-projecting portions of said brackets having depending portions 36, which bear upon the outer side face of the link 21 and further prevent lateral buckling of said link and keep the studs 20 in the ears 19. These brackets 28 and 34 are movable endwise along the end pieces 6 and 5, respectively, and therefore may be adjusted to register with the apertures in the grille-plate which receive the screws 32.

In the operation of my invention, assuming that the parts are assembled as seen in Figs. 1 to 3, inclusive, and it is desired to remove one or all of the blades, it is simply necessary to remove the screws 32, whereupon the grille-plate may be taken off, and the brackets 28 are then sprung inwardly out of interlocking engagement with the adjacent shoulders 9 and drawn outwardly away from the retainer 27, which operation in most instances will draw the retainer out of the groove 15; but if not the retainer may be readily removed by hand or with any prying-tool, and the blade or blades may then be removed in the manner previously described.

The operation of reassembling the parts will be apparent, as the parts will be replaced in the reverse order from that described for disassembling.

This construction of register is particularly light, strong, and durable and affords an easy and quick method of assembling and of removing one or all of the blades without displacing the frame from the flue or detaching the parts of the frame, and it will be noted that the retainer is held against the trunnions under yielding pressure by the spring-loop 29, which keeps the blades from shaking or rattling in their bearings, and that the link 21 is held in position by the blades 3 on one side and by the rocking member 23 and brackets 34 on the opposite side.

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

1. In a register of the class described, the combination of a blade-supporting frame and a grille-plate, of means for securing the frame and grille-plate together comprising brackets detachably interlocked with the frame and provided with threaded apertures, and screws engaging the grille-plate and brackets.

2. In a register of the class described, the combination with a grille-plate and blade-supporting frame, of brackets adjustable in the frame and operatively interlocked therewith, and means for securing the grille-plate to the brackets.

3. In a register of the class described, the combination with tilting blades having end trunnions, a frame having end pieces having apertures receiving said trunnions, the apertures in one of the end pieces being open at one side to permit the removal of the blade, a rocking operating member pivoted between the other end piece and frame and connected to the blades, and means extending across the open sides of the apertures for holding the adjacent ends of the blades in said apertures.

4. In a register of the class described, the combination with a grille-plate, of a frame having opposite blade-supporting flanges disposed edgewise with reference to the grille-plate, and each provided with a series of apertures therethrough, the aperture in one flange being open at the edge adjacent the grille-plate, a rocking, operating member pivoted between the other flange and frame and connected to the blades, and a series of tilting blades journaled in said apertures.

5. In a register of the class described, the combination of a frame, a frame having blade-supporting flanges at the inside of the frame and provided with apertures, those of one flange being open at one side, tilting blades mounted in the apertures and a retainer-piece between the flange having the open-sided apertures and the adjacent side of the frame for holding the adjacent ends of the blades in operative position, and a rocking operating member pivoted between the other flange and frame and connected to the blades.

6. In a register of the class described, the combination with a frame and a grille-plate, of tiltable blades removably mounted in the frame, a retainer-piece holding the blades in operative position, and a bracket separate from the frame and detachably interlocked therewith to hold the retainer in place.

7. In a register of the class described, the

combination with a frame and a grille-plate, of tiltable blades removably mounted in the frame, a retainer-piece holding the blades in operative position, a bracket separate from the frame and detachably interlocked therewith to hold the retainer in place, and means to clamp the grille-plate to the bracket.

8. In a register of the class described, the combination with the grille-plate and a blade-supporting frame having open-sided bearings at one end, a rocking operating member at the opposite end of the frame, tiltable blades having corresponding ends journaled in said opposite end of the frame and their opposite ends journaled in said open-sided bearings, and a link operatively connected to the rocking member and blades to tilt the blades simultaneously.

9. In a register of the class described, the combination with the grille-plate and a blade-supporting frame having open-sided bearings at one end, tiltable blades having corresponding ends journaled in the opposite end of the frame and their opposite ends journaled in said open-sided bearings, a link operatively connected to tilt the blades simultaneously, and a manually-operated rocking member pivotally mounted on one of the trunnions and operatively connected to move the link.

10. In a register of the class described, the combination with the grille-plate and frame secured thereto, of a series of tiltable blades having trunnions journaled in the frame, a sliding link pivotally connected to the blades, a rocking operating member pivotally mounted on one of the trunnions and operatively connected to move the link, and friction means to retard the movement of the rocking member to hold it in any of its adjusted positions.

11. In a register of the class described, the combination with a grille-plate and a frame having marginal flanges, of brackets adjustable along and engaged with said flanges and provided with threaded apertures, and screws engaged with the grille-plate and with said threaded apertures whereby the frame is locked to the grille-plate.

12. In a register of the class described, the combination with the grille-plate and frame, tiltable blades journaled in the frame, the bearings for the blades at one end of the frame having their sides toward the grille-plate open, a retainer extending across the open sides of said bearings, and a bracket detachably interlocked with the frame and provided with a spring-loop engaged with the retainer to hold it in place.

13. In a register of the class described, the combination with the grille-plate and frame, tiltable blades journaled in the frame, the bearings for the blades at one end of the frame having their sides toward the grille-plate open, a retainer extending across the open sides of the bearings, a bracket detachably interlocked with the frame and provided with a spring-loop engaged with the retainer to hold it in place, and means to clamp the grille-plate to the bracket.

14. In a register of the class described, the combination with a grille-plate, of a frame comprising opposite side and end pieces, the end pieces having their inner edges turned inwardly and then outwardly to form flanges projecting toward the grille-plate, tiltable blades journaled in said flanges, one of the flanges having open-sided bearings opening toward the grille-plate for receiving the adjacent ends of the blades, a separate retainer across the open sides of the bearings, and a bracket engaged with the frame and retainer for holding said retainer in place.

15. In a register of the class described, the combination with a grille-plate, of a frame comprising opposite side and end pieces, the end pieces having their inner edges turned inwardly and then outwardly to form flanges projecting toward the grille-plate, tiltable blades journaled in said flanges, one of the flanges having open-sided bearings opening toward the grille-plate for receiving the adjacent ends of the blades, a separate retainer across the open sides of the bearings, a bracket engaged with the frame and retainer for holding said retainer in place, and means for securing the bracket to the grille-plate.

16. In a register of the class described, the combination with a grille-plate, of a blade-supporting frame having its outer edge adjacent to the grille-plate turned inwardly and the inner edges of its sides turned inwardly and then outwardly toward the grille-plate for forming parallel flanges, each of which is provided with a series of openings, the openings in one flange being cut away on the side toward the grille-plate, tiltable blades having trunnions journaled in said openings, a retainer separate from the frame and extending across the cut-outs between the adjacent trunnions and grille-plate, brackets adjustable along the outer flange of the frame and engaged with the inner face of said flange, and means for clamping the brackets to the grille-plate, whereby the flange of the frame is clamped between the grille-plate and brackets, one of the brackets being engaged with the retainer to hold it in place.

17. In a register of the class described, the combination with a grille-plate and a frame, of brackets adjustable on one of the parts, and means for securing the other part to the brackets.

18. In a register of the class described, the combination with a grille-plate and a frame, of brackets adjustably secured to the frame, and means for clamping the grille-plate to the brackets.

19. In a register of the class described, the combination with tilting blades and bearings

therefor, of a retainer holding the blades in their bearings and yielding means for holding the retainer in operative position.

20. In a register of the class described, the combination with tilting blades, of a link connecting said blades, and a rocking operating member at the side of the link opposite to the blades and having its face adjacent to the link convexed in the direction of the extension of the link and bearing against the link to reduce friction and prevent said link from springing from the blades, said operating member being connected to actuate the link.

21. In a register of the class described, the combination of a series of tilting blades, a link connected to tilt the blades, and a rocking operating member having its face adjacent to the link convexed in the direction of extension of said link and connected to operate the same.

22. In a register of the class described, the combination of a series of tilting blades, a sheet-metal rocking member connected to tilt the blades and having a portion thereof bent to form a tubular hub, a bearing in the hub and a coil-spring fitting snugly on the bearing and also in the hub, said spring being operatively connected to frictionally retard the rocking movement of the rocking member.

23. In a register of the class described, the combination with tilting blades, of a link connecting the blades and a bracket removably secured in the register and bearing against the link to hold it from springing out of connection with the blades.

In witness whereof I have hereunto set my hand this 25th day of January, 1904.

WILLARD S. TUTTLE.

Witnesses:

ISAAC O. HORTON,

THOMAS A. CONNOLLY.