No. 862,071. PATENTED JULY 30, 1907.

C. E. A. GRONBECH.

HOT AIR REGISTER.

APPLICATION FILED NOV. 20, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

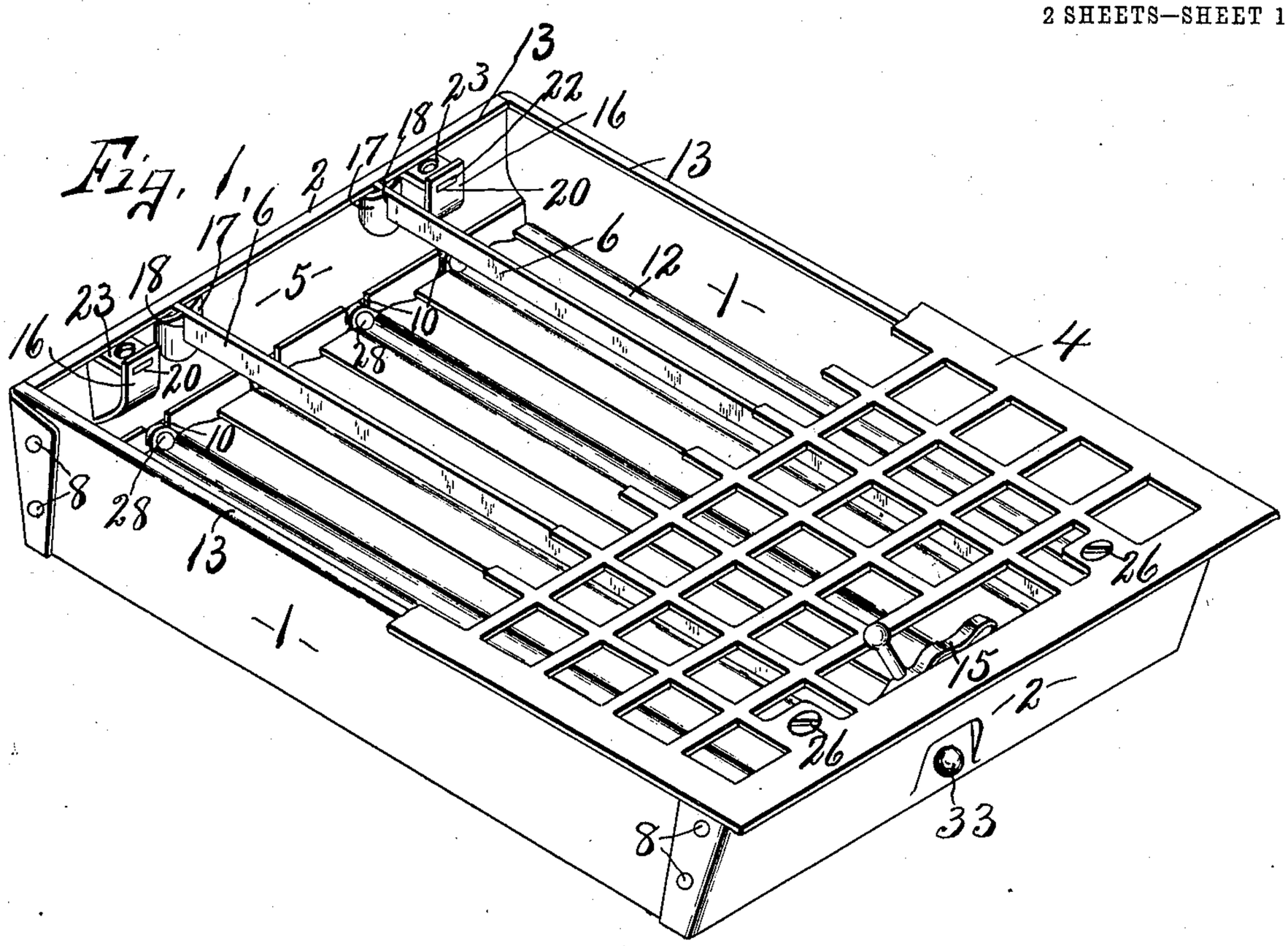


Fig. 2.

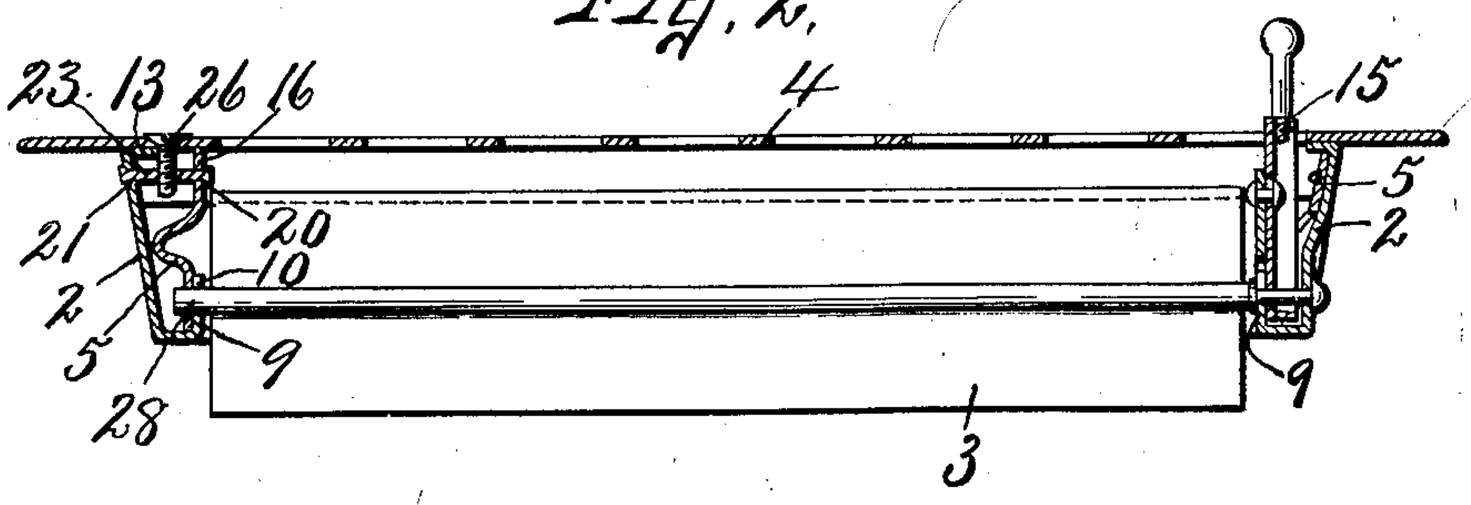
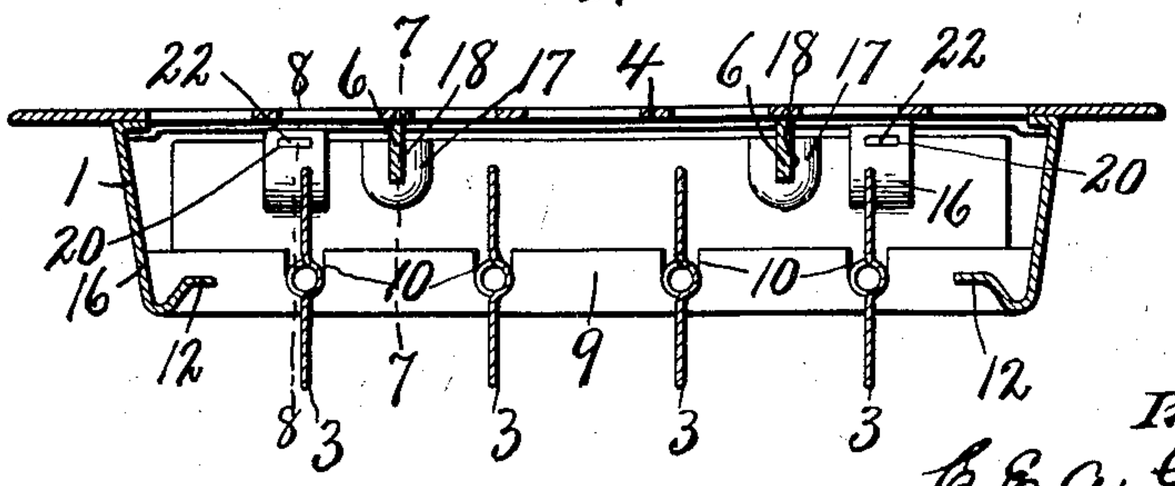


Fig. 3



Witnesses.

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2 SHEETS—SHEET 2.

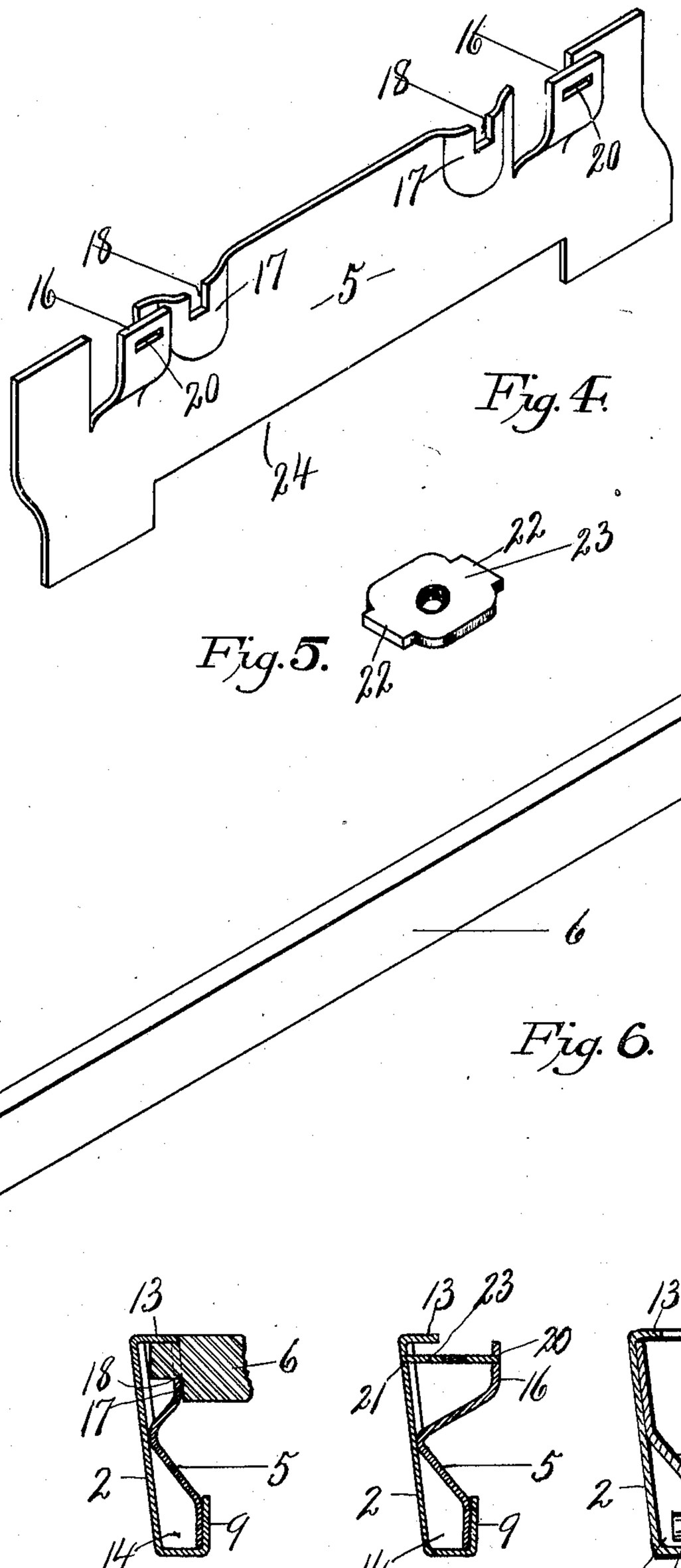

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

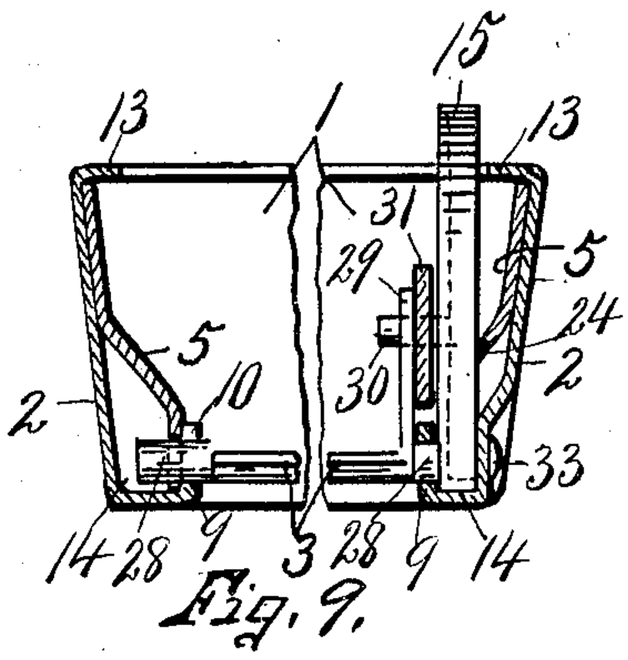

Fig. 9.

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UNITED STATES PATENT OFFICE.

CHRISTIAN E. A. GRONBECH, OF NEW YORK, N. Y., ASSIGNOR TO TUTTLE & BAILEY MANUFACTURING COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

HOT-AIR REGISTER.

No. 862,071. Specification of Letters Patent. Patented July 30, 1907.

Application filed November 20, 1906. Serial No. 344,230.

To all whom it may concern:

Be it known that I, CHRISTIAN E. A. GRONBECH, of New York, in the county of Westchester, 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 which are also adapted to be used as cold air registers, or as ventilators, to be placed either in the floors, ceiling or side walls of a building. In manufacturing this class of registers the general tendency is to simplify and cheapen the structure by making the register with as few pieces as may be consistent with the work required, and at the same time reducing the cost of the material and labor of assembling the elements.

My object therefore, is primarily to reduce the cost of manufacture and weight of the register and at the same time to enable the parts to be readily and easily assembled without special fitting. In other words, I have sought to retain the tilting damper plates, grill-plate and such reinforcing bars, as may be necessary, in operative position with a minimum number of fastening devices, so that the means by which the grill-plate is fastened to the box frame serves also to retain the reinforcing bars and damper-retaining plates in operative position.

A further object is to retain the plates in open-sided bearings in the box frame by brackets extending across the open sides of the bearings.

Another specific object is to provide the brackets with seats for the reinforcing bars which sustain the central portion of the grill-plate.

Other objects and uses will appear in the following description.

In the drawings—Figure 1 is a perspective view of my improved register, portions of the grill-plate being broken away to disclose the underlying mechanism. Figs. 2 and 3 are respectively transverse and lengthwise sectional views of the register seen in Fig. 1, except that the damper-plates are shown as open. Fig. 4 is a perspective view of one of the detached damper-retaining brackets. Fig. 5 is a perspective view of one of the nuts by which the grill-plate is locked to the box and brackets. Fig. 6 is a perspective view of one of the detached reinforcing bars. Figs. 7 and 8 are enlarged detail sectional views taken respectively on lines 7—7 and 8—8, Fig. 3. Fig. 9 is a lengthwise sectional view through opposite ends of the box frame, the central portion being broken away.

This register consists essentially of a rectangular box-frame composed of side pieces —1— and end pieces —2—; suitable damper plates —3— in the bottom of the box-frame, a grill-plate —4— forming the outer side or top of the frame; brackets —5— extending along the inner faces of the end pieces —2— from side to side of the box for retaining the damper plates in operative position; reinforcing bars —6— bridging the space between the ends —2— and loosely seated in the brackets —5—, and suitable fastening means hereinafter described for securing the grill-plate to the box frame and to the brackets —5—.

The sides and ends —1— and —2— are preferably formed of separate pieces of sheet metal, the side pieces terminating against the inner faces of the end pieces and the end pieces having their extremities bent laterally and overlapping upon the outer faces of the adjacent ends of the side pieces —1— to which they are secured by rivets —8—, said side and end pieces flaring outwardly from their inner edges so that the outer face of the box is of greater area than the innner side.

The inner edges of the end pieces —2— are offset inwardly toward each other and are deflected toward the grill-plate forming flanges —9— having open sides bearings —10— for the opposite ends of the damper plates —3—, the open sides of said bearings facing the grill-plate to permit the damper or damper blades to be readily inserted into or removed from the box when the grill plate is removed. These flanges —9— are disposed at substantially right angles to the plane of the grill-plate and inner side of the box, and while they serve as a means for supporting the damper blades, they also serve to reinforce or stiffen the sheet metal sides, and also serve to retain the lower edges of the brackets —5— in operative position as will be presently described. The inner edges of the side pieces —1— are also deflected inwardly toward the grill-plate, and laterally toward each other, forming reinforcing flanges —12— to stiffen the side pieces, said flanges —12— terminating against the inner faces of the flanges —9— to stiffen the latter against inward compression. The outer edges of both side and end pieces —1— and —2— are deflected inwardly forming comparatively narrow marginal flanges 13— upon which the grill-plate rests, leaving a clear open space in the top of the box of greater area than the bottom of the box, and of greater length than the length of the damper blades to allow the latter to be readily inserted into or removed from their bearings.

The flanges —9— are practically co-extensive with the length of the respective end pieces —2— and abut at their ends against the inner faces of the side pieces to further stiffen the latter against inward compression, and are offset a sufficient distance inwardly to form intervening grooves —14— for the reception and retention of the inner edges of the plates or brackets —5—. The damper bearings on one end of the box are simply circular openings and are not open at the top although they may be open sided bearings similar to those shown in

the opposite end of the box if it is found expedient to make them so. I preferably provide one of the brackets —5— for each end of the box, and although they are both similar in essential details, the one at the end adjacent to the operating member, as 15—, is cut away to receive such member. Each bracket is, however, substantially co-extensive in length with the distance between the sides of the box and consists of a thin sheet metal plate having its outer portion lying close to or against the inner face of the adjacent end piece —2— and its inner or lower portion offset inwardly or laterally close to or against the outer face of the flange —9—, as best seen in Figs. 2, 7 and 8.

The upper portion of each bracket or plate is provided with a pair of inwardly and upwardly projecting integral ears or tongues —16— cut or stamped from the main body of the bracket, which is also formed with a pair of inwardly projecting integral bosses or raised projections —17— between the ears or tongues —16—, said bosses or raised projections being pressed inwardly from the main body of the bracket —5— and are formed with open-sided bearings or slots —18— for the reception of the adjacent ends of the reinforcing bars —6—. The outer ends of the ears or tongues —16— and the adjacent end pieces —2— of the box are formed with transverse slots —20— and —21— for the reception of the opposite reduced sides, as —22—, of a sheet metal nut —23—, one for each ear or tongue. The outer longitudinal edges of the plates or brackets —5— lie close to and preferably abut against the inner faces of the adjacent flanges —13— and their inner longitudinal edges, particularly at the ends, are seated in the grooves —14— and rest upon the bottom of the box within the flanges —9—, the central portions of said inner edges being cut away at —24—, to receive the adjacent pivotal ends of the damper blades. The companion slots —20 and —21— for each nut are disposed in substantially the same plane parallel with and near the outer face of the box, and each nut which is interposed between the contiguous faces of the tongue —16— and end piece —2— is therefore disposed in the same plane just inside of the flange 13, best seen in Fig. 8.

The reduced projections —22— of each nut which project through the slots —20— and —21— respectively, are secured to the inner face of the tongue and outer face of the end piece respectively, thereby rigidly securing the nut in place against turning, and at the same time bracing the tongue against lateral displacement. These nuts, four in number, are arranged nearer the side pieces than the center of the box, and are provided with threaded apertures for receiving screws —26— which are passed through alined apertures in the grill-plate —4— and serve as the only means to rigidly secure the grill-plate to the box.

The reinforcing bars —6—, of which there are in this instance, two, have their ends reduced and fitted in the open sided bearings or slots —18— just within the flanges —13— so that their outer edges are disposed in substantially the same plane as the outer faces of said flanges, thereby forming an intermediate support for the grill-plate which may be made of comparatively thin sheet or cast metal.

The damper blades —3— have a combined area, substantially equal to or slightly greater than the bottom of the box, and are preferably formed of sheet metal having their opposite ends reduced and formed into journal bearings or tubular pivots —28— which are seated in the bearings in the flanges —9—.

The outer longitudinal edges of the blades at the ends of the series lap respectively against the inner and outer faces of the opposite flanges —12— of the side pieces —1— when the blades are closed, and the adjecent edges of said blades lap upon each other so as to form practically an air tight closure in the bottom of the box. One end of each blade is provided with an outturned ear —29— having an aperture which receives a stud —30— on a reciprocatory bar —31—, the latter being eccentrically connected with the operating member —15—. This operating member is pivotally mounted upon a pin —33— extending through the adjacent end piece —2— and its flange —9—, said operating member extending outwardly through the grill-plate, and is adapted to be operated by either the hand or the foot.

It will be seen from the foregoing description, that the register comprises comparatively few parts, namely, the box, the grill-plate, the damper-blades and damper-retaining brackets, and that all the parts, except the grill-plate, are mounted within the box, and are self-retained so that there is no liability of any of the parts inclosed within the box becoming displaced by the removal of the grill-plate; that is, the damper blades are held in place by the retaining plates or brackets, which in turn, are held in place by the flanges —9— and 13—, while the nuts, as —23—, are rigidly secured to the brackets and end pieces of the frame, forming additional means for retaining the brackets in place, and also serving to brace the tongues 16.

In assembling the parts of the register, the sides and ends of the box are secured together in the manner previously described, and the damper blades are then placed in operative position in their respective bearings in the flanges —9—, after which the brackets or retaining plates —5— are inserted between the flanges —9— and 13— to lock the damper blades in operative position, and the nuts —23— are then assembled in the manner described, as are also the reinforcing bars —6—, whereupon the grill-plate is secured in operative position by the screws —26—.

What I claim is:

1. In a register of the class described, a box, damper-retaining brackets seated in opposite ends of the box, a grill-plate and a sustaining bar therefor seated on the brackets.

2. In a register of the class described, a box, a grill-plate, damper-retaining brackets in opposite ends of the box, and sustaining bars for the grill-plate having their ends seated in said brackets.

3. In a register of the class described, a box, a grill-plate, damper retaining brackets in opposite ends of the box having open sided bearings, and bars having their ends seated in said bearings and supporting the central portion of the grill-plate.

4. In a register of the class described, a box having its ends formed with inner and outer lengthwise flanges. brackets secured between and engaging said flanges, a grill plate, and bars across the outer side of the box and back of the grill plate and having their ends seated on said brackets.

5. In a register of the character described, a box having the inner and outer edges of its ends formed with inturned flanges, brackets in the ends of the box wholly between and retained by said flanges, nuts securing the brackets

to the adjacent ends of the box, and a grill-plate secured to the nuts.

6. In a register of the character described, a box, damper-blades pivoted in the bottom of the box, a damper-retaining bracket in one end of the box, a tie piece connecting the bracket to the adjacent end of the box, and a grill-plate secured to said tie-piece.

7. In a register of the character described, a box having open-sided bearings, damper-blades pivoted at one end in said bearings, a bracket extending across the open side of said bearings and from side to side of the box to retain the damper-blades, a tie piece for securing the bracket to the box and a grill plate secured to said tie piece.

8. In a register of the character described, a box, damper-blades pivoted in the bottom of the box, a damper-retaining bracket in one end and terminating against the sides of the box, a separate tie piece securing the bracket to the box, a grill-plate, and means for securing the grill-plate to the tie piece.

9. In a register of the class described, a box, brackets in the ends of the box, nuts between the brackets and adjacent ends of the box, and a grill-plate secured to the nuts.

10. In combination with a box and damper blades therein, a damper-retaining bracket having open sided bearings, and reinforcing bars having one end seated in said bearings.

11. In a register of the class described, a box, and damper blades therein, a bracket in one end of the box and having inwardly projecting tongues, nuts secured to the tongues and to the adjacent end of the box, and a grill-plate secured to the nuts.

12. In a register of the class described, a box, damper-blades pivoted in the bottom of the box, brackets in the opposite ends of the box, nuts tying the brackets to adjacent ends of the box, and a grill-plate secured to the nuts.

13. In a register of the class described, a box, brackets in opposite ends of the box provided with open sided bearings, bars having their ends seated in said bearings, tie pieces securing the brackets to the box and a grill-plate secured to the tie pieces and resting upon the bars.

In witness whereof I have hereunto set my hand this tenth day of November 1906.

CHRISTIAN E. A. GRONBECH.

Witnesses:
H. C. STUART,
J. H. BAILEY.