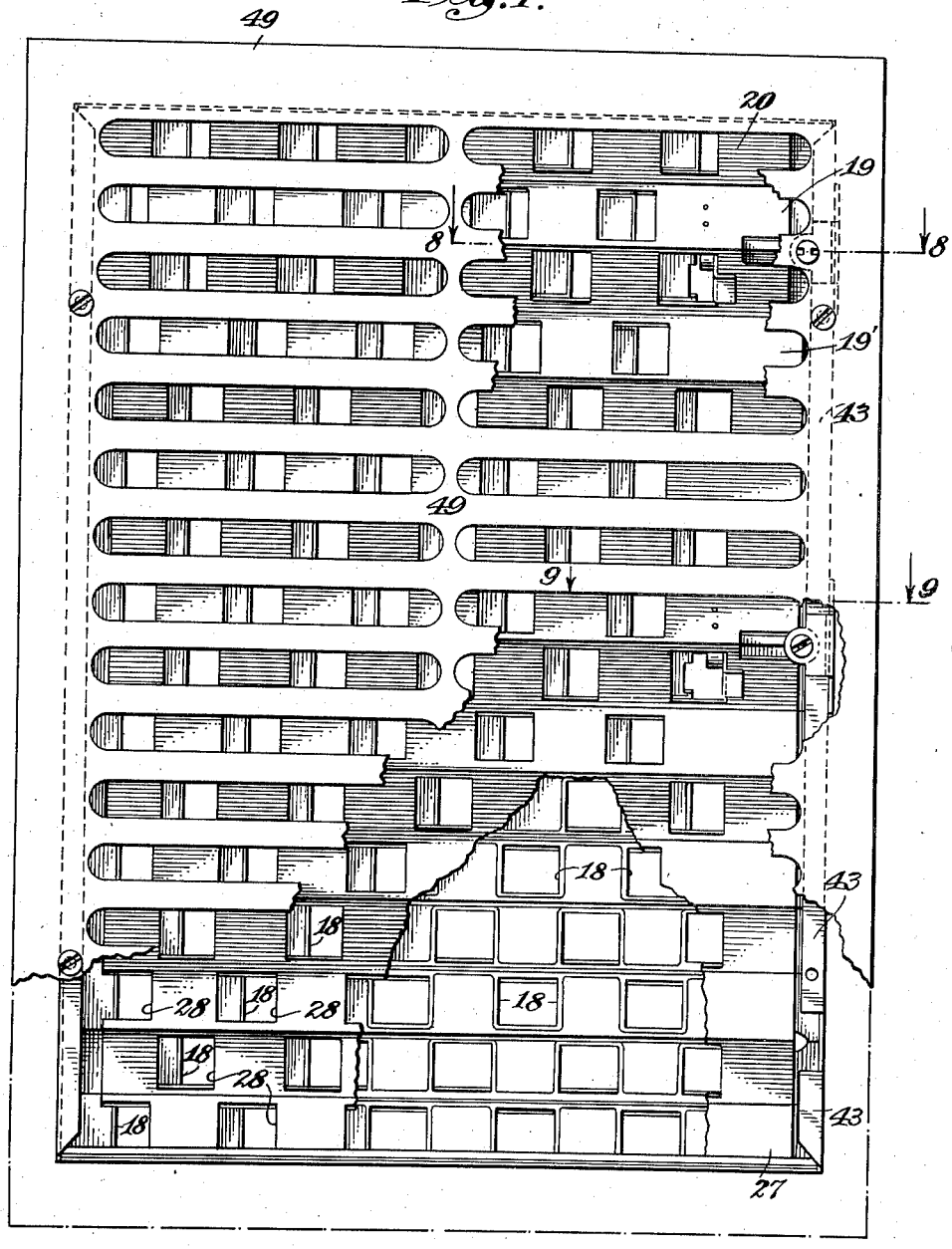
Dec. 4, 1934. J. H. BAILEY 1,983,015

AIR CONTROL REGISTER

Filed Feb. 21, 1933 4 Sheets-Sheet 1

Fig. 1.



INVENTOR:
James H. Bailey
BY
Ramsey and Kent
ATTORNEYS

Dec. 4, 1934. J. H. BAILEY 1,983,015

AIR CONTROL REGISTER

Filed Feb. 21, 1933 4 Sheets-Sheet 2

Fig. 2.

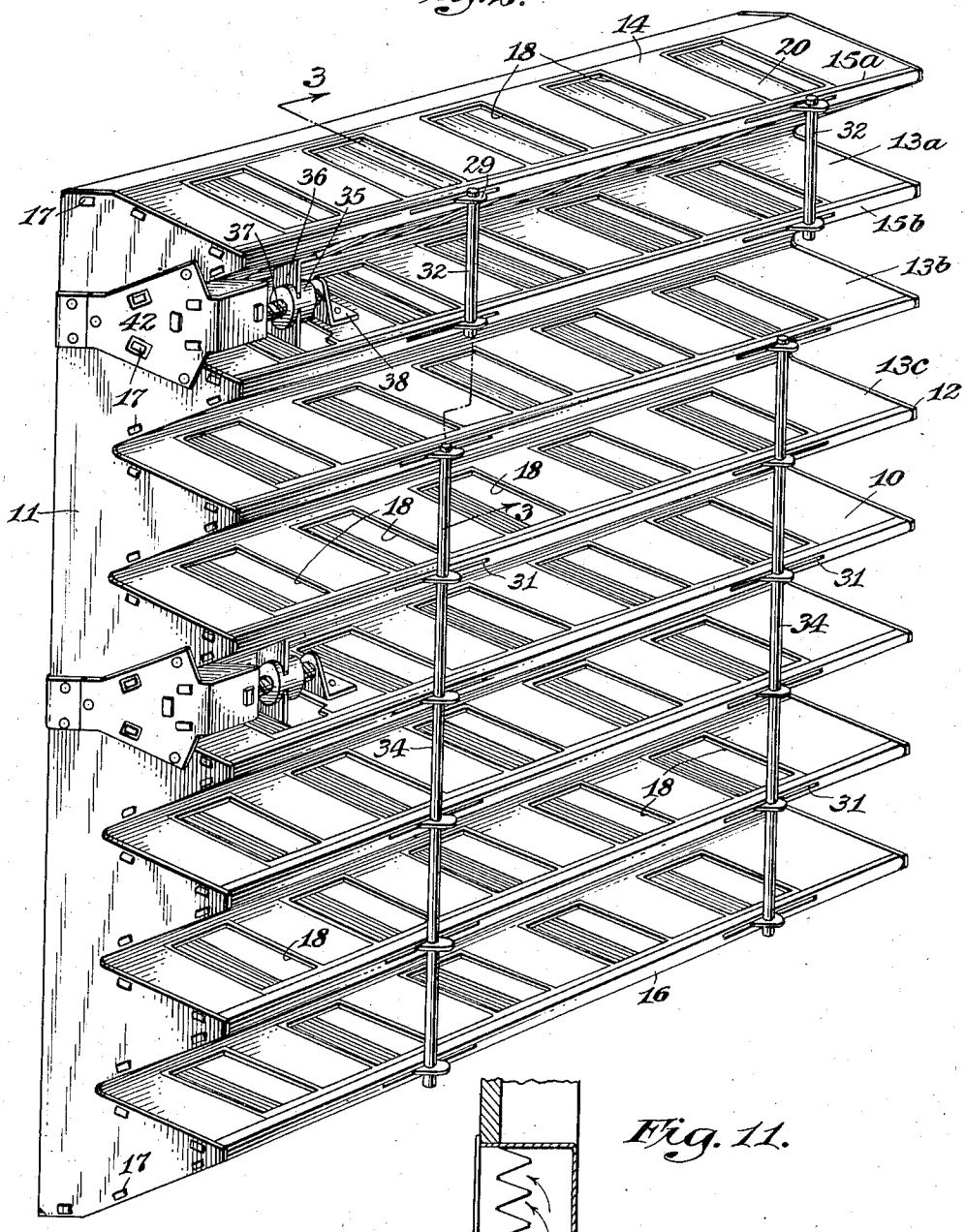
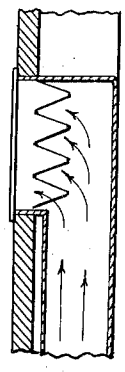


Fig. 11.



INVENTOR:
James H. Bailey
BY
Ramsey and Kent
ATTORNEYS

Dec. 4, 1934. J. H. BAILEY 1,983,015

AIR CONTROL REGISTER

Filed Feb. 21, 1933 4 Sheets-Sheet 3

Fig. 3

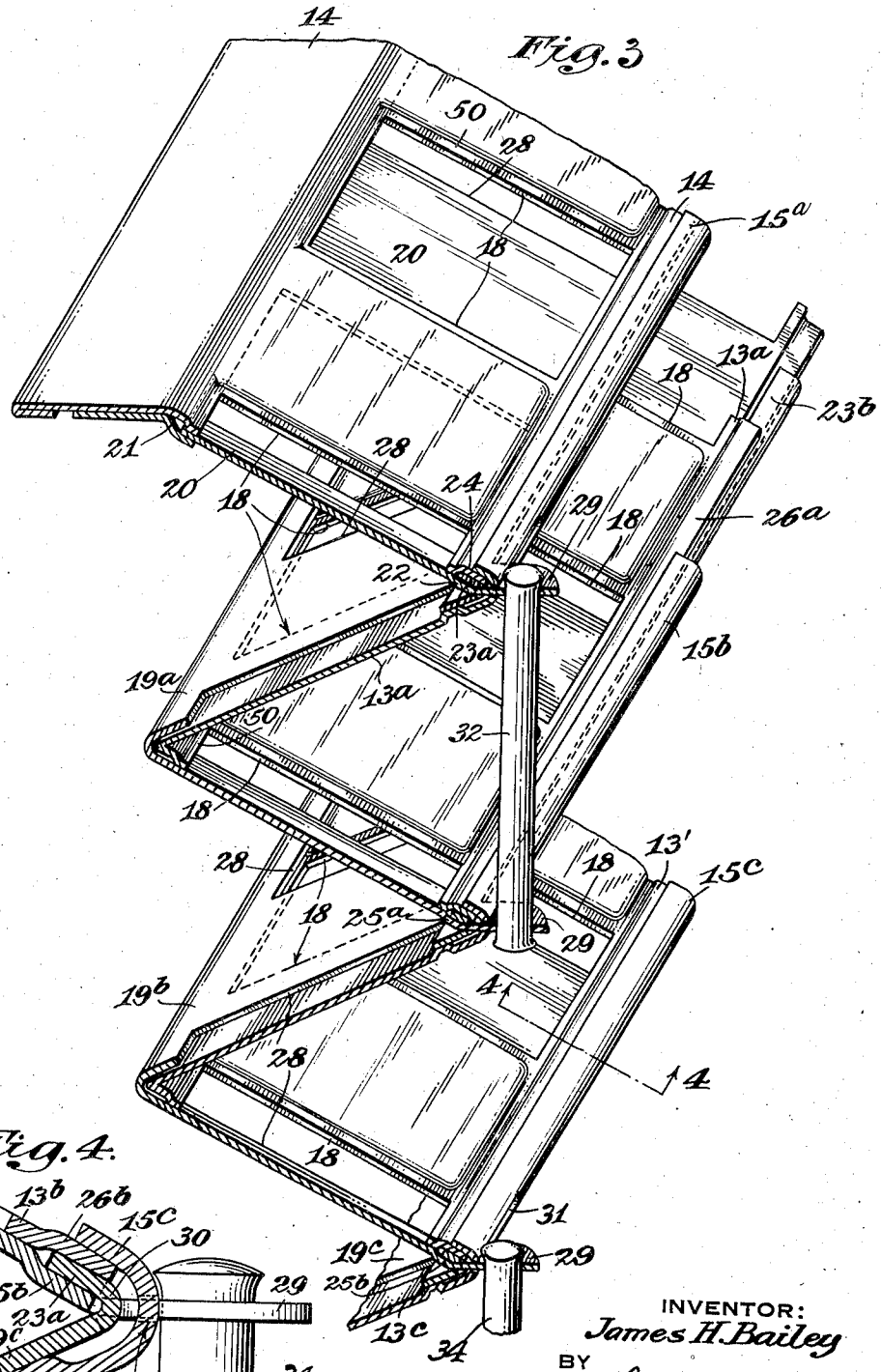


Fig. 4.

INVENTOR:
James H. Bailey
BY
Ramsey and Kent
ATTORNEYS

Dec. 4, 1934. J. H. BAILEY 1,983,015

AIR CONTROL REGISTER

Filed Feb. 21, 1933 4 Sheets-Sheet 4

Fig. 6.

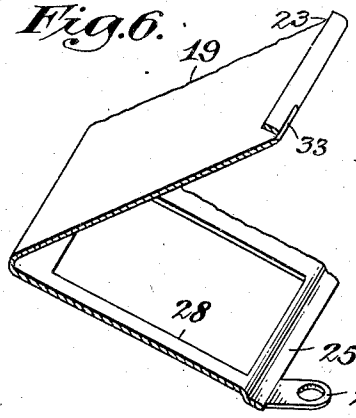


Fig. 5.

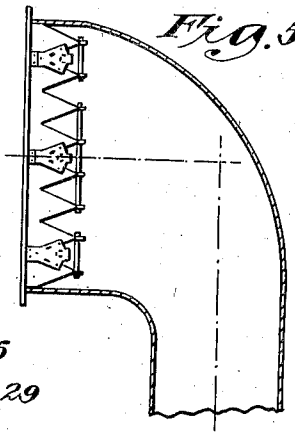


Fig. 7.

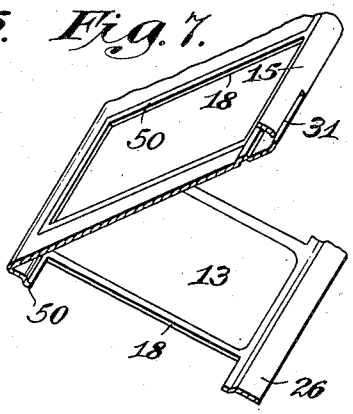


Fig. 8.

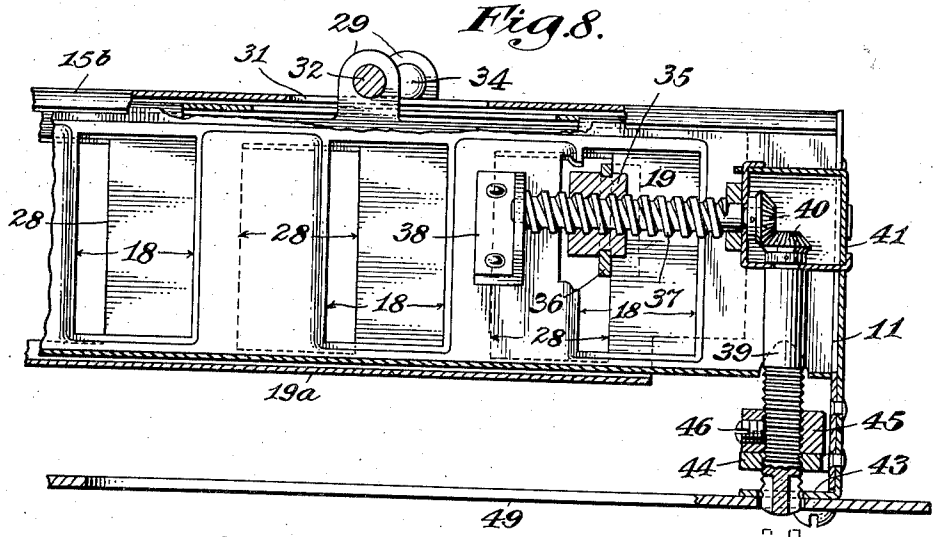
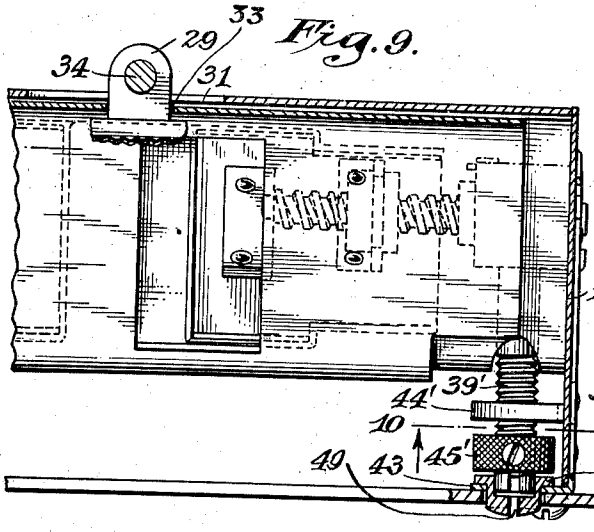


Fig. 9.



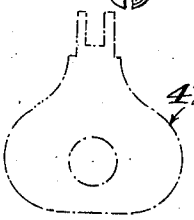
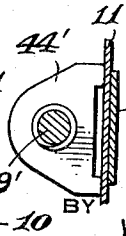


Fig. 10.



INVENTOR:
James H. Bailey
BY
Ramsey and Kent
ATTORNEYS

Patented Dec. 4, 1934 1,983,015

UNITED STATES PATENT OFFICE

1,983,015

AIR CONTROL REGISTER

James H. Bailey, New Canaan, Conn., assignor to Hart, Cooley, Highton, Co., New Britain, Conn.

Application February 21, 1933, Serial No. 657,786

8 Claims. (Cl. 98—101)

This invention relates to an air control register that is particularly adapted to control the flow of air from a duct into a room. In some respects the invention is an improvement upon that disclosed in my copending application Serial No. 615,491 filed June 6, 1932.

Particular objects of the invention are to provide for approximately uniform air flow through all parts of the register, and for a diffused flow of air straight outwardly from the register. Other objects are to improve and simplify the mechanical construction and reduce the cost of air registers.

These objects are attained by the construction and arrangement disclosed herein.

One feature of construction which contributes to these results is the arrangement of two relatively moving control members in corrugations with the ridges of the corrugations running horizontally. With this arrangement the lower corrugations deflect part of the air flow outwardly and insure a volume of air flow through the lower part of the register substantially equal to the flow through the upper part of the register.

Another feature which contributes to the desired results is the provision of a plurality of sliding dampers controlling different horizontal zones of the register. With this arrangement it is possible to reduce the amount of discharge opening in the upper part of the register to provide static pressure which assists in forcing air through the lower part of the register.

The invention also provides certain detailed improvements in mechanical construction, such as the construction and arrangement of V-shaped units, from which both of the relatively sliding members are built up. This arrangement permits the building of registers of different capacities from a relatively small number of standard parts.

Another structural improvement resides in the provision of embossed ridges around the openings through the register. These ridges serve to reduce the friction between the relatively moving parts, as well as stiffening the parts and preserving the finish on the exposed flat surfaces.

Another feature of the invention resides in an improved operating mechanism, which includes an adjustable stop mechanism by which the movement of the sliding dampers are controlled.

In the drawings:

Fig. 1 is a front elevation of a register embodying the invention, parts being broken away.

Fig. 2 is an isometric view of the rear side of a register embodying the invention.

Fig. 3 is a detail isometric view cut on the line 3—3 of Fig. 2.

Fig. 4 is a detail section taken on the line 4—4 of Fig. 3.

Fig. 5 is a vertical section of an air duct, showing more or less diagrammatically a slightly modified form of register installed therein.

Fig. 6 is a fragmentary isometric view showing the construction of one of the sections of the sliding damper.

Fig. 7 is a fragmentary isometric view showing the construction of one of the sections of the stationary plate.

Fig. 8 is a section on line 8—8 of Fig. 1.

Fig. 9 is a section on line 9—9 of Fig. 1.

Fig. 10 is a section on line 10—10 of Fig. 9.

Fig. 11 is a view similar to Fig. 5, showing a register installed in a relatively narrow vertical air duct.

The register illustrated in Figs. 1 and 2 comprises a stationary back plate 10 and side plates 11 and 12. The back plate is corrugated into a plurality of V-shaped corrugations with the ridges running horizontally, and is a composite member formed of a plurality of stationary individual V-plates 13 (see Fig. 7) which correspond in shape with the V-shaped recesses formed on the rear edge of the side plates 11 and 12. In Figs. 2 and 3 particular ones of the stationary V-plates are designated by 13^a, 13^b and 13^c.

The stationary back member has a top element 14 which extends from the front edge of the casing to the apex of the first rearwardly extending ridge, as clearly shown in Fig. 3. The uppermost stationary V-plate 13^a has a roller edge 15^a which extends around the rear edge of top plate 14, and this stationary V-plate 13^a extends from the apex of the uppermost rearwardly extending ridge through the uppermost valley (viewing the structure from the rear) to the top of the second rearwardly extending ridge. The next stationary V-plate 13^b is shaped exactly like plate 13^a and is arranged with a rolled edge 15^b overlapping the edge of plate 13^a. The next succeeding V-plate 13^c bears the same relation to plate 13^b as 13^b bears to 13^a. Thus the stationary V-plates are arranged on down to the top of the lower ridge; and the lower slope of the lower ridge is covered by a bottom plate 16 which extends from the front of the casing to the apex of the lower ridge and has a rounded edge extending over the apex of the ridge.

Each of the plates 13, 14 and 16 is provided with ears 17 at its opposite ends, the ears 17 extending through holes in the side plates 11 and 12 and being riveted over to hold these parts rigidly in assembled position.

Each of the V-shaped members of the stationary back plate 10 is formed with a plurality of rectangular openings 18 on both of its slopes. The openings 18 on one slope may be in alignment with the openings 18 on the other slope, but are preferably in staggered relation, as clearly shown in Fig. 1.

The sliding damper which controls passage of

air through the openings 18 of the stationary back member is built up from V-shaped plates 19 (see Fig. 6). In Fig. 3 successive individual V-plates of the sliding damper are designated by 19^a, 19^b, and 19^c. The damper also embodies a top control plate 20 which is arranged on the inside of the stationary top plate 14, a retaining member 21 being secured to plate 14 in such a manner as to form a channel in which the upper end of plate 20 slides. The lower edge of the top control plate 20 extends into the valley of the first corrugation and is formed with an offset flange 22, as shown in Fig. 3. One edge of the sliding V-plate 19^a is formed with a rolled edge 23^a (same as edge 23 in Fig. 6) which also extends into the valley of the first corrugation and is hooked around the lower edge of the top control plate 20, in engagement with the offset flange 22. The lower end of stationary top plate 14 is formed with a flange 24, offset oppositely from the flange 22, so that the oppositely offset flanges 22 and 24 form a channel between them, which receives the edge 23 of plate 19^a.

The opposite edge of the sliding V-plate 19^a is formed with an offset flange 25^a (same as 25 in Fig. 6) which corresponds to flange 22 of top control plate 20. The lower edge of stationary V-plate 13^a is formed with a flange 26^a offset oppositely to flange 25^a, so that flanges 25^a and 26^a between them form a channel which receives the edge 23^b of damper plate 19^b.

The joints between the successive elements from which the stationary back plate and sliding damper are built are all similar. In Fig. 4 there is shown in detail the joint between stationary V-plates 13^b and 13^c and sliding V-plates 19^b and 19^c. Sliding V-plate 19^b and stationary V-plate 13^b have, respectively, oppositely offset flanges 25^b and 26^b, which form a channel that receives the upper edge of sliding V-plate 19^c. Stationary V-plate 13^c has its upper edge rolled and lapped over stationary plate 13^b at 15^c.

The lower slope of the bottom corrugation of the sliding damper is formed by a bottom control plate 27, which is similar in construction and arrangement to top half of the V-shaped plates of the damper.

Each of the sliding V-plates of the damper is provided with a plurality of apertures 28 which correspond in size and location to the openings 18 in the stationary V-plates of the back member; and the openings 28 are so arranged that they coincide with the openings 18 when the damper is at the extreme right hand end of its travel, viewed as in Fig. 1. The sliding V-plates are of sufficiently less horizontal width than the stationary back member to permit the sliding damper to move to completely open and close the openings 18.

As illustrated in Figs. 2, 3, 4 and 6, the V-shaped damper plates are each formed with rearwardly extending ears 29 which project through short slots 30 in the adjoining damper unit and through long slots 31 in the stationary back plate 10.

In the register illustrated the top damper plate 20 and the upper V-shaped damper plate 19^a are connected together for simultaneous operation by vertical bars 32 which pass through suitable openings formed in the ears and are retained in place by any suitable means as by having their ends riveted over. The remainder of the sliding damper plates are similarly connected together by a vertical bar 34.

The operating means for the upper portion of the damper includes a worm nut 35 (Fig. 2) which is non-rotatively mounted in a bracket 36. The upper and lower ends of the bracket 36 extend through two of the openings 18 which are extended for the purpose and are riveted or otherwise secured to the opposite legs of the sliding V-plate 19^a. The worm 37 which operates nut 35 has one end journaled in bracket 38 which is secured to the stationary back plate 10 of the casing, and the opposite end of worm 37 is driven from shaft 39 by beveled gears 40 mounted in gear housing 41. The gear housing is secured to the register casing in any suitable manner as by attachment plate 42 (see Fig. 2).

The forward edge of each of the side plates 11 and 12 is bent inwardly to form a flange 43, and the operating shaft 39 extends through an opening in the flange 43 of side plate 11. A stop nut 44 has threaded engagement with shaft 39 and is held against rotation by means of a flat face engaging the inner wall of side plate 11. An adjustable detent collar 45 also is threaded on shaft 39 and is held in adjusted position by a set screw 46. The outer end of shaft 39 is suitably formed for cooperation with an operating key 47 which is preferably removable.

When the operating key is used to rotate shaft 39, the stop nut 44 travels between detent collar 45 and the inner face of flange 43. The parts are so arranged that when the stop nut 44 is against the inner face of flange 43 the damper is closed and by adjusting the position of the detent collar 45 upon shaft 39 any desired limit can be set upon the amount the damper can be opened. The pitch of worm 37 is sufficiently shallow to give "irreversible" relative movement between the worm and nut 35, i. e., while the worm can drive the nut, the nut can not drive the worm by being forced longitudinally thereof. Thus, the sliding damper is automatically locked in any adjusted position, and it can not be moved by building vibration originating at machinery or other sources.

An alternate method of mounting the stop nut 44 is illustrated in connection with the operating mechanism for the lower damper in Fig. 9. Here the detent collar 45' is mounted between the stop nut and the flange 43 and the stop nut 44' travels between the detent collar 45' and the forward ridge of one of the V-plates of the stationary back member. This figure also shows how a rotatable mask stud may be mounted over the outer end of the operating shaft in order to render it more difficult for unauthorized persons to tamper with the adjustment of the register. This mask shown at 48 has a slot 49 which may be turned to the position shown in Fig. 9 to permit the operating key 47 to be inserted into engagement with the shaft. After the adjustment has been made the mask 48 may be rotated to another position to baffle the uninitiated.

Any preferred type of grill 49 can be secured to the front face of the register.

Embossed ridges 50 are preferably pressed forward around all sides of each of the openings 18 in the stationary back plate. These ridges then form the contact between the stationary back plate and the sliding dampers and reduce the amount of friction between the two. The spacing effected by the ridges 50 prevents scratching of the finish on the forward faces of the back plate by the sliding of the damper.

All of the sliding damper elements can be connected together to operate simultaneously as one sliding damper as illustrated in Fig. 11:

or they may be connected to operate in as many groups as desired. Two groups are shown in Fig. 2, and three groups in Fig. 5. Where adjacent damper elements are to be operated in unison, the slot 30 which receives the ear 29 (see Fig. 6) has a length equal to the width of the ear so that the adjacent damper elements are locked together; but where the adjacent damper elements are not to be operated in unison, slot 30 is lengthened to the length of slot 31 in the stationary back plate.

The advantage of having two independently operatable horizontal damper sections is that through separate control of the upper and lower parts static pressure may be caused to build up behind the upper part, which pressure will assist in forcing the air through the lower part of the register, thereby aiding in equalizing the flow throughout the area of the register.

The equalizing of flow between the upper and lower parts of the register is also assisted by the horizontal arrangement of the corrugations, since the lower corrugations will deflect some of the vertically approaching air forwardly through the lower part of the register, as illustrated in Fig. 11. This feature is of special importance when the register is located in a relatively shallow duct, as shown in Fig. 11. This form of duct is particularly useful in residential installations where the available duct-receiving space in the walls is only that between the usual studding which is not over four inches deep.

The mechanical embodiment of the invention disclosed herein provides for building up both the stationary back plate and the sliding damper from a plurality of V-shaped units, all of the units of the back plate (except the end elements) being identical and all of the units of the sliding damper (except the end elements) being identical. With this construction registers of various capacities can be produced by merely varying the height of the register. This is done by making the side plates of the required length and assembling the necessary number of V-shaped units. The practical commercial advantages of such unit assembly are very considerable.

The combination of end plates with V-shaped units as described herein produces a simple construction, flexible as to size, and exceptionally rigid as to construction. The operating mechanism provides smooth operation and fine adjustment of the damper.

The present invention may, of course, be embodied in forms other than the ones particularly disclosed. Accordingly, the foregoing construction is illustrative only, in compliance with the patent statutes, and is not to be considered as limiting the scope of the appended claims.

What is claimed is:

1. An air discharge register comprising an actuator operable to adjust the register, a removable key to engage and drive the actuator, and masking means operable to impede engagement of the key and actuator.

2. Air discharge apparatus comprising a conduit having a discharge end located in a substantially vertical plane and having a substantially vertical approach to the discharge end; and air control means positioned substantially vertically adjacent said discharge end, said control means having substantially horizontal corrugations projecting into the conduit and exposed to air flowing through said conduit, said corrugations having discharge openings in the sides of the corrugations.

3. Air discharge apparatus comprising a conduit having a discharge end located in a substantially vertical plane and having a substantially vertical approach to the discharge end; and air control means positioned substantially vertically adjacent said discharge end, said control means having substantially horizontal corrugations projecting into the conduit and exposed to air flowing through said conduit, said corrugations having discharge openings in the sides of the corrugations with adjustable means to vary the effective size of the discharge openings.

4. Air discharge apparatus comprising a conduit having a discharge end located in a substantially vertical plane; a corrugated plate positioned transversely of the conduit adjacent said discharge end, the corrugations extending substantially horizontally, projecting into the conduit, and having discharge openings in their sides; and corrugated damper plates nesting with upper and lower zones of the first plate, the damper plates having discharge openings corresponding to those of the first plate and being independently slidable to control the effective discharge area in the upper and lower zones independently.

5. An air discharge register comprising a pair of plates having corresponding air discharge openings therein, the plates being slidable relative to one another to produce various degrees of registration between corresponding openings in the two plates, one of said plates having embossed spacing ridges around the peripheries of its openings.

6. In an air discharge register, a sliding damper comprising a plurality of unit V-shaped damper plates, the individual plates having ears on one longitudinal free edge and slots adjacent the other longitudinal free edge, the ears of one unit extending through slots of the adjacent unit.

7. An air register comprising: an apertured stationary damper plate formed of successive V-shaped sheet metal elements secured in juxtaposition; an apertured sliding damper plate also formed of successive V-shaped sheet metal elements secured in juxtaposition, the elements of the sliding plate being provided with ears and the stationary plate being provided with corresponding slots through which the ears project; and means connecting together the ears of different sliding elements for simultaneous sliding movement of the connected sliding elements.

8. An air register comprising: an apertured stationary damper plate formed of a series of V-shaped sheet metal elements secured in juxtaposition; an apertured sliding damper plate also formed of a series of V-shaped sheet metal elements secured in juxtaposition, the elements of the sliding plate being provided with ears and the stationary plate being provided with corresponding slots through which the ears project; means connecting together the ears of certain successive sliding elements for simultaneous movement of such elements; and means connecting together the ears of other successive sliding elements for simultaneous sliding movement thereof.

JAMES H. BAILEY.