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V. VASKOV ET AL

3,236,171

AIR CIRCULATION REGISTER ATTACHMENT DEVICE

Original Filed Jan. 19, 1962

2 Sheets-Sheet 1

FIG. 1.

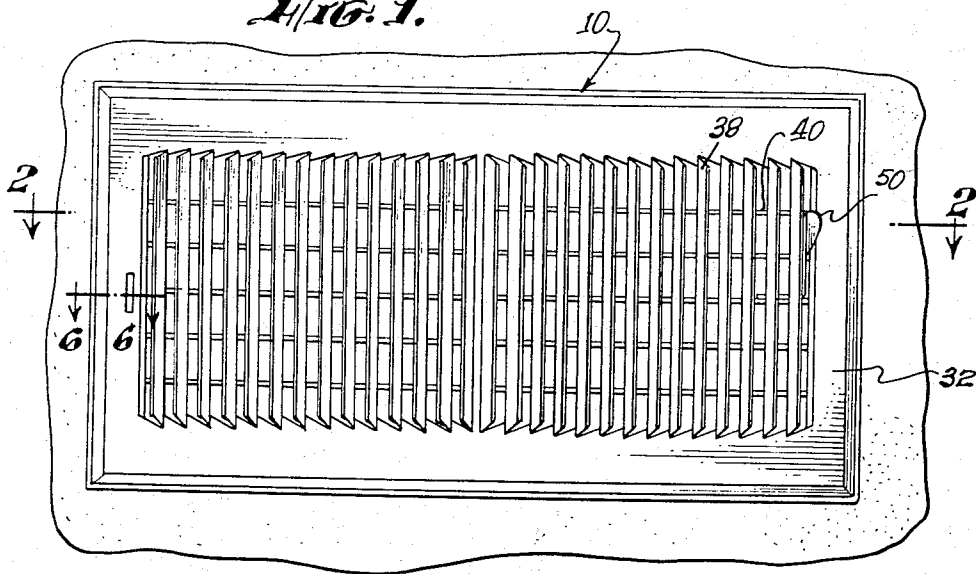


FIG. 2.

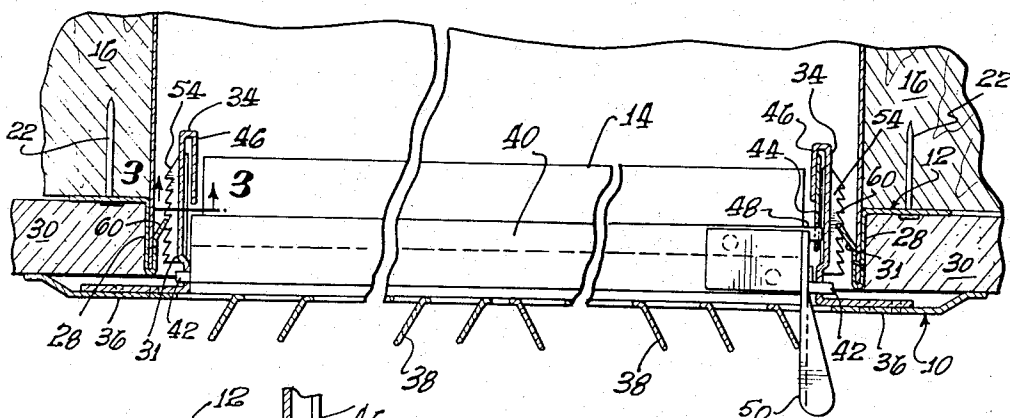
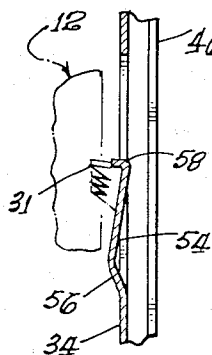


FIG. 3.



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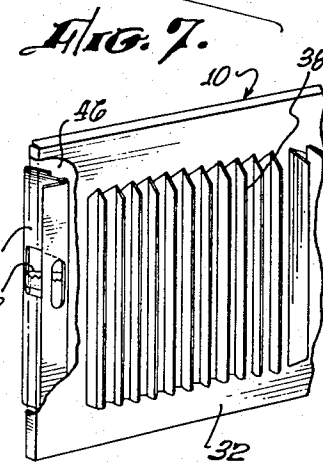
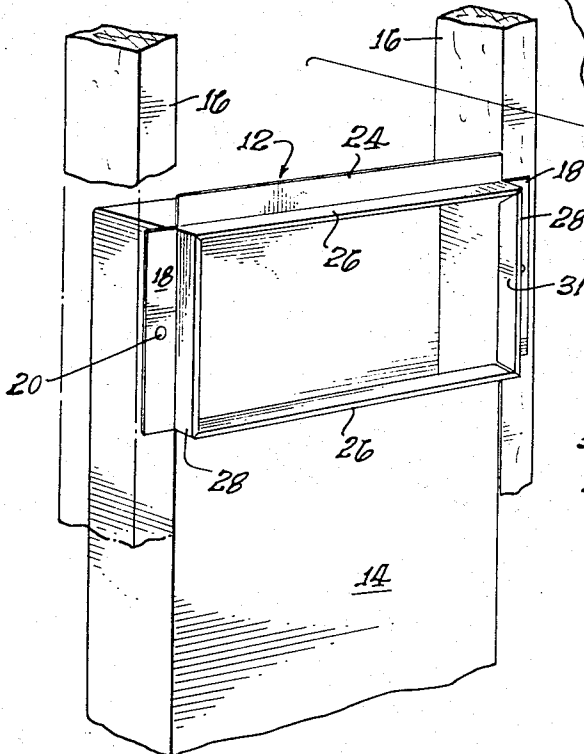
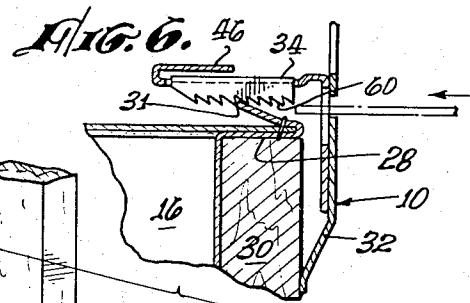
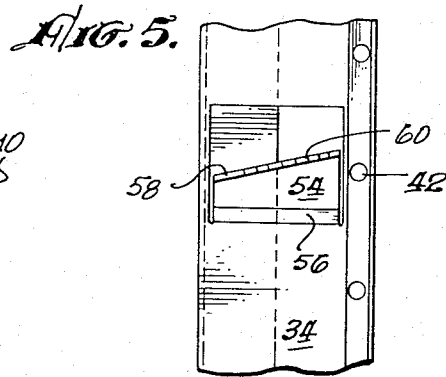
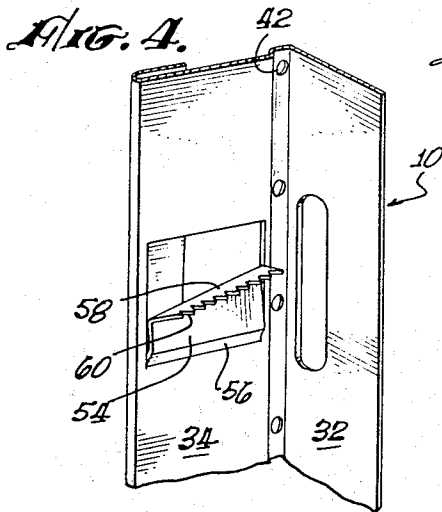
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AIR CIRCULATION REGISTER ATTACHMENT DEVICE

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2 Sheets-Sheet 2



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3,236,171

AIR CIRCULATION REGISTER ATTACHMENT DEVICE

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Continuation of application Ser. No. 167,236, Jan. 19, 1962. This application June 29, 1964, Ser. No. 387,257
7 Claims. (Cl. 98—114)

The present application is a continuation of application Serial No. 167,236, filed on January 19, 1962.

The present invention relates generally to air circulation registers; more particularly, the invention relates to means for the installation of such registers in openings in walls or panels.

Prior to the present invention it has been the general practice to secure air circulation registers in walls or panels, or the like, by attaching them to register boxes or outlets by the insertion of screws in matching openings in the registers and in the boxes or outlets. Such prior practices are disadvantageous in that considerable time and work are involved in assembling a register to a register box or outlet initially, and in that time and difficulty are involved in subsequent removal and replacement of a register when such removal and replacement are necessary, as for repairs, or in the redecoration of the wall or panel in which the assembly is mounted. Moreover, the surfaces of the walls or panels in which registers are mounted are defaced by the arrangements utilized prior to the present invention, because the boxes or outlets are generally attached to studding which is in turn covered by plaster or panelling. Hence, the attachment screws must be inserted through the plaster or panelling to the register boxes or outlets. This is disadvantageous and undesirable for the obvious reason that the plaster or panelling is defaced or damaged by such practices and for the further reason that the difficulty in locating the screw opening in the embedded box or outlet causes additional loss of time in assembly as well as further possible defacement of the surfaces surrounding the opening.

Structures according to the present invention overcome the above stated disadvantages of the prior art by providing cooperating means, on register boxes or outlets and on registers, which permit assembly and disassembly of the registers in walls or panels by simple insertion or removal. Thus the use of screws is dispensed with and the attendant disadvantages are obviated.

It is therefore an object of the present invention to provide improved means for the attachment of air circulation registers to register boxes or outlets.

An object of the present invention is the provision of means for the attachment of air circulation registers on the surfaces of walls or panels wherein no external defacement of the surfaces around the register opening is necessary.

It is an object of the invention to provide cooperating attachment means on air circulation registers and on outlets for register boxes whereby the use of screws to attach the registers to said outlet or register boxes is obviated.

An object of this invention is the provision of registers and register boxes or outlets which have cooperating means whereby assembly may be effected without the use of tools by mere insertion of the register into the box or outlet.

An object of the present invention is to provide cooperating register and outlet or box constructions whereby the registers may be easily disconnected without the necessity of removing screws or other attachment means.

Another object of the invention is to provide means

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for removably attaching plates or closures over openings in walls or panels wherein the attachment or removal does not require defacement of the surfaces around the openings and wherein screws or other attachment means are not required to be inserted or removed to effect such attachment or removal.

Other objects, features and advantages of the present invention will become apparent to those versed in the art from a consideration of the following description, the appended claims and the accompanying drawings, wherein:

FIGURE 1 is a front elevational view of an air circulation register according to the present invention.

FIGURE 2 is a cross-sectional view of the register of FIGURE 1, taken along line 2—2 of that figure.

FIGURE 3 is a fragmentary sectional view, taken along line 3—3 of FIGURE 2, showing details of attachment means according to the present invention.

FIGURE 4 is a fragmentary perspective view of a portion of the register of FIGURE 1, showing the attachment means thereon.

FIGURE 5 is an elevational view of the register portion shown in FIGURE 4.

FIGURE 6 is an enlarged sectional view taken at line 6—6 of FIGURE 1; and

FIGURE 7 is an exploded perspective view showing a register partially in section, and showing an air outlet or register box and the manner of its attachment between studding members.

Referring to the drawings, there is illustrated an example of structure according to the present invention, as applied to an air circulating register assembly and the attachment thereof in an opening in a wall or panel. As is the general practice in this art, the air circulation register assembly includes an external face plate or diffuser assembly (generally designated by the reference numeral 10), and a register box or outlet (generally designated by the reference numeral 12).

Commonly the register box or outlet 12 is arranged at the outlet frame end of air circulation conduit means 14 (see FIGURE 7) and is proportioned to be nailed between studs 16. For this purpose the register box or outlet 12 is provided with side flanges 18 having openings 20 adapted to receive nails 22 for securement of the box to the studding prior to completion of the wall. Outlet or register frame 12 is also provided with a backing flange 24 at the top thereof and with outwardly protruding flanges in the form of top and bottom flanges 26 and side flanges 28. Flanges 26 and 28 protrude outwardly (forwardly of the studding) a distance which is preferably equal to the thickness of the wall intended to be attached to the studding. Thus, for plastered walls, the flanges 26, 28 form a so-called "plaster ring" and plaster 30 may be applied to the wall to the outer extremity of the ring (as best seen in FIGURES 2 and 6).

Each of the side flanges 28 has an inwardly directed spring engaging means in the form of a tongue 31 to serve as a means for effecting detachable connection with the register assembly in a manner which will be fully described hereinafter.

A register assembly 10, according to the present invention, comprises a face plate or diffuser portion 32, having internal flanges 34 attached at opposed sides, inwardly of the edges thereof, by welding or other appropriate means, as shown at 36. Preferably such diffusers have openings in the front faces thereof with fixed vertical vanes 38 directed in such manner as to diffuse air emanating through the plate from the conduit 14.

The flanges 34 are arranged to support movable louvers 40 internally of the face plate 32 and between the

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flanges 34, for control or valving of the passage of air through the register. The details of such movable louvers and of their means of attachment or control are not an essential part of the present invention and any louver assembly may be installed between the flanges 34, as described. For illustrative purposes, the drawings herewith show movable louver means which include individual louvers 40 having laterally extending pins 42 which extend through openings 42 in the flanges 34 (see FIGURES 4 and 5), to support the louvers for pivotal motion. A control bar 44 is mounted in at least one flange 34 for sliding vertical movement in the flange, it being notable that the inner ends of the flanges are bent back upon themselves, as at 46, to provide retaining and guide means for such control bars and to give added rigidity to the register box construction. Control bar 44 has openings spaced apart the same distance as the horizontal separation of the pivotal mountings of the louvers 40 are from one another. Each louver has a projection 48 extending through one of said last mentioned openings. One of said louvers 40 has a control handle 50 thereon extending forwardly and outwardly of the diffuser plate 32 whereby adjustment of the louvers may be effected by movement of said handle 50. The control bar 44 may be a spring element to retain the louvers in any given position.

An important feature of the present invention is the mode of attachment of the register assembly 10 to the register box 12. For this purpose attachment means 54 are provided on the outwardly facing sides of the side flanges 34, said means being adapted to engage the spring tongues 28 for adjustable detachable association of the register with the box. Attachment means 54 each comprises a tongue portion struck from the material of the flange 34, with the root thereof bent outwardly relative to the center line of the register from the plane of the flange 34, as at 56, and the main body portion thereof bent slightly inwardly beyond the plane of the flange 34, as best seen in FIGURE 3. A portion of the tongue is cut away and the end portion 58 thereof is bent outwardly as shown. The outwardly directed edge of end portion 58 is provided with saw-teeth 60, the teeth being of a form to provide holding surfaces for cooperation with the spring edges 31 of the outlet box 12. For this purpose, each tooth has an acute angled surface directed inwardly from the face plate 32 and an outwardly directed edge which is substantially parallel with the face plate, whereby the spring edges 31 of the register box 12 and the spring-mounted saw-teeth 60 may be cammed to slip over one another as the register assembly is pushed into the outlet box and whereby movement in the opposite direction is inhibited by the outwardly directed edges which are substantially parallel to the face plate.

While the saw-teeth 60 may be on a line perpendicular to the face plate, it is preferable that they be inclined relative to such a line so that each tooth may engage a different portion of the edges 31 to avoid excessive wear or cutting of said edges. An example of such a preferred construction is shown in the drawings, wherein the portion 58 is bent along an inclined line.

As may be seen from inspection of the drawings (especially FIGURES 2 and 6), a register assembly 10 and an outlet box 12, as described herein, may be assembled by merely pushing the register assembly into the outlet box. Such insertion causes the saw-tooth 60 to be cammed inwardly (against the spring bias of the tongue portion of attachment means 54) by the spring edges 31 of the register box 12 as said edges ride over the teeth, and such action may be eased and assisted by resilience in the edges 31. By virtue of the shape of the saw-teeth 60, as previously described, the spring edges 31 slide over successive angular faces of the teeth and would be engaged by the flat forming of the outer surface of the engaged tooth if withdrawal were to be attempted.

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The insertion of the register is continued until the face plate 32 engages the outer surface of the wall 30, as shown in FIGURE 2 and the register is then held securely in this position by engagement of the edges 31 at the sides of the outlet box with the saw-teeth 60 at the sides of the register, because withdrawal of the register is inhibited by abutment of the edges 31 with the outwardly directed surface of the saw-teeth. Thus, attachment is effected without the use of tools or screws and without defacement of the wall surrounding the opening.

In order to provide means for effecting disengagement of the register from the register box or outlet, the face plate 32 of the register is provided, at one side thereof, with a tool insertion opening or slot 62 which overlies one of the attachment means 54, as shown. As may be best seen in FIGURE 6, a flat tool (such as a screwdriver) may be inserted into the slot 62 to pry the saw-teeth 60 and the flange 31 on that side of the register apart from one another. The resilience of the attachment means 54 then permits the register to be shifted toward that side to disengage the attachment means at the other side, and the register may then be withdrawn from the register box. Thus, the register may be removed without the need for removing screws or the danger of defacing the wall surface, and removal and reinstallation may be accomplished readily with a minimum of time and effort.

From the above, it may be seen that the present invention provides improved means for the attachment of instrumentalities to outlets or openings in wall surfaces. Such improved means are characterized by the fact that they eliminate the use of screws or other tool-operated fastening means for effecting installation, whereby the time required for installation or removal is greatly reduced. Moreover, it should be obvious that the present invention provides means for attachment of instrumentalities to wall openings or outlets wherein installation and removal may be readily accomplished without defacement of the wall surface surrounding the opening or outlet.

While the specific example described and illustrated herein relates to an air register having movable louvers therein, it should be obvious that the means for effecting connection may be utilized to removably attach a diffuser plate which has no movable louvers assembled thereon or a closure plate to an outlet or a register box.

Although a specific embodiment of the present invention has been illustrated and described herein, it will be understood that the same is merely exemplary of presently preferred embodiments capable of attaining the objects and advantages hereinbefore mentioned, and that the invention is not limited thereto; variations will be readily apparent to those versed in the art, and the invention is entitled to the broadest interpretation within the terms of the appended claims.

The inventors claim:

1. In combination, a rectangular outlet frame adapted to be supported in an opening in a wall, a plate adapted to be attached to said outlet frame, said plate being configured to overlie a wall about an opening, said plate having upstanding flanges on one face thereof adapted to be inserted into said outlet frame, spring tongues cut from and integral with the plate flanges and extending outwardly therefrom, and inwardly and rearwardly directed integral spring engaging means on said outlet frame which provide gripping edges for engagement by said spring tongues, said spring tongues having outwardly directed free edges with saw-teeth formed thereon, whereby to provide a plurality of stop levels for said gripping edges of the frame, whereby the plate is attached to the outlet frame in a position to overlie said wall opening.

2. In combination, a rectangular outlet frame adapted to be supported in an opening in a wall, a plate adapted to be attached to said outlet frame, said plate being configured to overlie a wall about an opening; said plate hav-

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ing upstanding flanges on one face thereof adapted to be inserted into said outlet frame, spring tongues cut from and integral with the plate flanges and extending outwardly therefrom, inwardly and rearwardly directed integral spring engaging means on said outlet frame which provide gripping edges for engagement by said spring tongues, said spring tongues having outwardly directed free edges with saw-teeth formed thereon, whereby to provide a plurality of stop levels for said gripping edges of the frame, the outwardly directed edges containing said saw-teeth each being disposed at an angle other than perpendicular to the plate, whereby each of the saw-teeth engages a different portion of the gripping edge of the frame as the flanges are progressively inserted into the outlet frame, whereby the plate is attached to the outlet frame in a position to overly said wall opening, and means defining at least one opening in the plate and overlying at least one of the spring tongues, whereby a tool may be inserted through the opening to disengage the saw-teeth of the spring tongue from said outlet frame gripping edges to permit withdrawal of the plate from the outlet frame.

3. The combination according to claim 2, wherein said saw-teeth comprise rearwardly directed portions disposed at an acute angle to the tongue edge and forwardly directed portions substantially parallel to the plate, whereby the edges of said sheet metal members slide over said rearwardly directed portions of the saw-teeth during insertion of the flanges into the outlet frame and are engaged by the forwardly directed portions of the saw-teeth to prevent relative movement of the flanges in a withdrawal direction.

4. In combination, a hollow outlet frame of rectangular configuration adapted to be supported in an opening in a wall in air-conducting relationship with an air duct, a register adapted to be attached to said outlet frame, said register comprising an apertured plate configured to overly said opening and having a rim adapted to engage the surfaces of a wall about an opening, said plate having a pair of opposed upstanding flanges on one face thereof adapted to be inserted into said outlet frame, spring tongues cut from and integral with the flanges and defining saw-teeth outwardly therefrom, and inwardly and rearwardly directed integral engaging means on opposed walls of the outlet box, said engaging means providing gripping edges for engagement by said spring tongue teeth, whereby said register is attached to the outlet frame in a position to overly a wall opening with said rim engaging the outer surface of a wall and means defining at least one opening in the plate and overlying at least one of the spring tongues, whereby a tool may be inserted through the opening to disengage the spring tongue from said outlet frame member gripping edges to permit withdrawal of the plate from the outlet frame.

5. In combination, an outlet frame of rectangular con-

figuration adapted to be supported in an opening in a wall in air conducting relationship with an air duct, a register adapted to be attached to said outlet frame to cover an opening, said register comprising an apertured plate configured to overly an opening and having a rim adapted to engage the surfaces of a wall about an opening, said plate having a pair of opposed upstanding flanges on one face thereof adapted to be inserted into said outlet frame, spring tongues cut from and integral with the respective flanges and defining saw-teeth outwardly therefrom, and inwardly and rearwardly directed integral engaging means on opposed walls of the outlet frame, said engaging means providing gripping edges for engagement by said spring tongue teeth, having outwardly directed free edges with saw-teeth formed thereon, whereby to provide a plurality of stop levels for the interengaging outlet frame gripping edges, whereby said register is attached to the outlet frame in a position to overly a wall opening with said rim engaging the outer surface of a wall.

6. The combination according to claim 5, wherein said saw-teeth comprise rearwardly directed portions which are disposed at an acute angle to the tongue edges and forwardly directed portions which are substantially parallel to the apertured plate, whereby the gripping edges of said engaging means slide over said rearwardly directed portions of the saw-teeth during insertion of the flanges into the outlet frame and are engaged by the forwardly directed portions of the saw-teeth to prevent relative movement of the flanges in a withdrawal direction, and wherein the outwardly directed edges of said spring tongues containing said saw-teeth are at angles other than perpendicular to the apertured plate, whereby each saw-tooth engages a different portion of the edge of the cooperating sheet member as the flanges are progressively inserted into the outlet frame.

7. The combination of claim 5, further characterized in that movable louvers are supported in said flanges, a control bar interconnecting the louvers for parallel pivoted movement from positions blocking the passage of air through the register to positions permitting the passage of air therethrough.

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