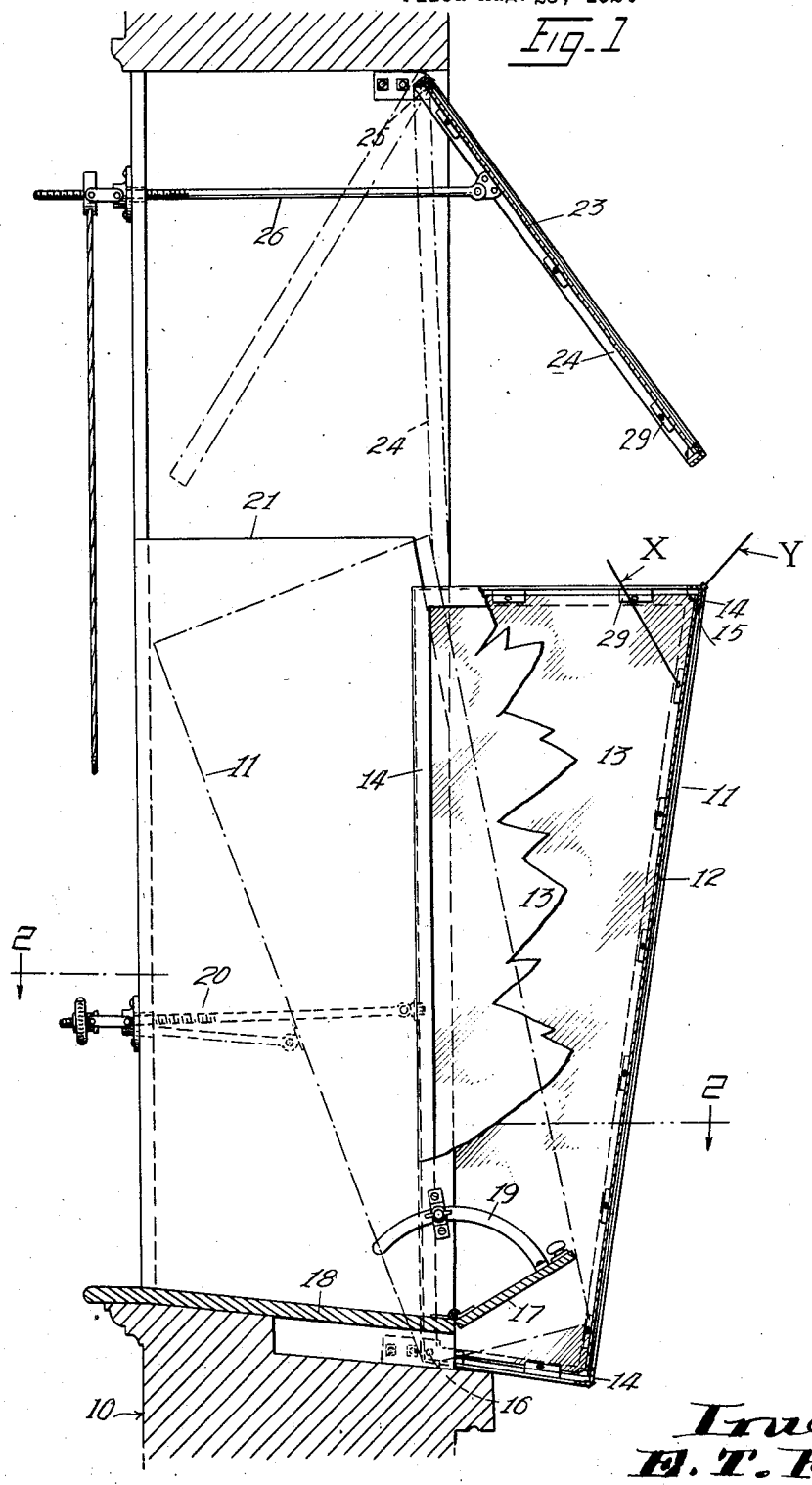
Feb. 15, 1927. 1,617,384

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SOUND SCREENING ATTACHMENT FOR WINDOWS AND DOORWAYS

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Fig. 1



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SOUND SCREENING ATTACHMENT FOR WINDOWS AND DOORWAYS

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Fig. 2

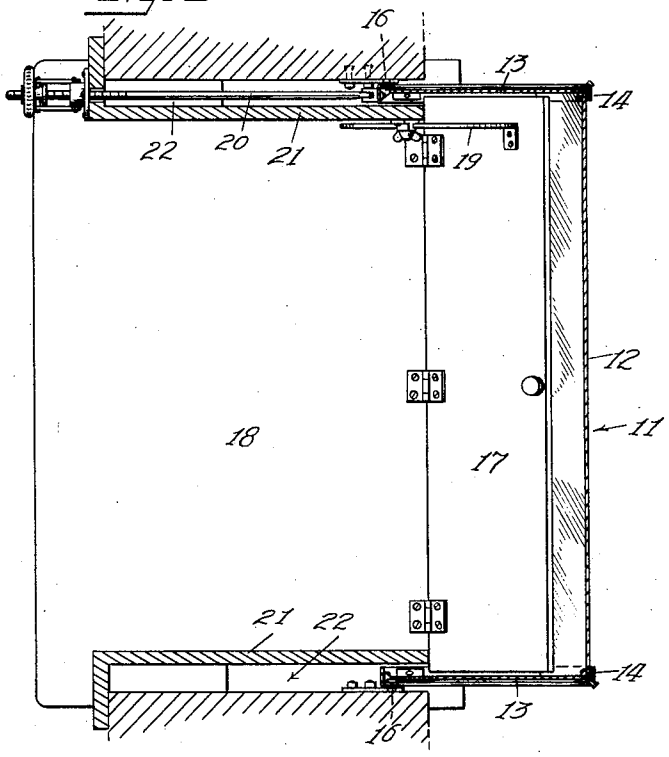


Fig. 3

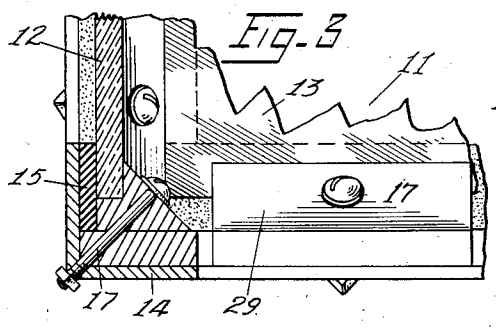


Fig. 4

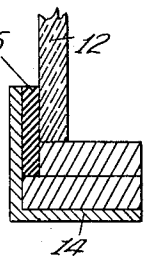
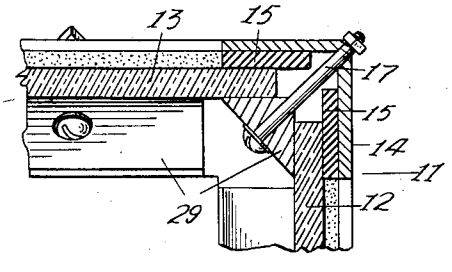


Fig. 5



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Fig. 6

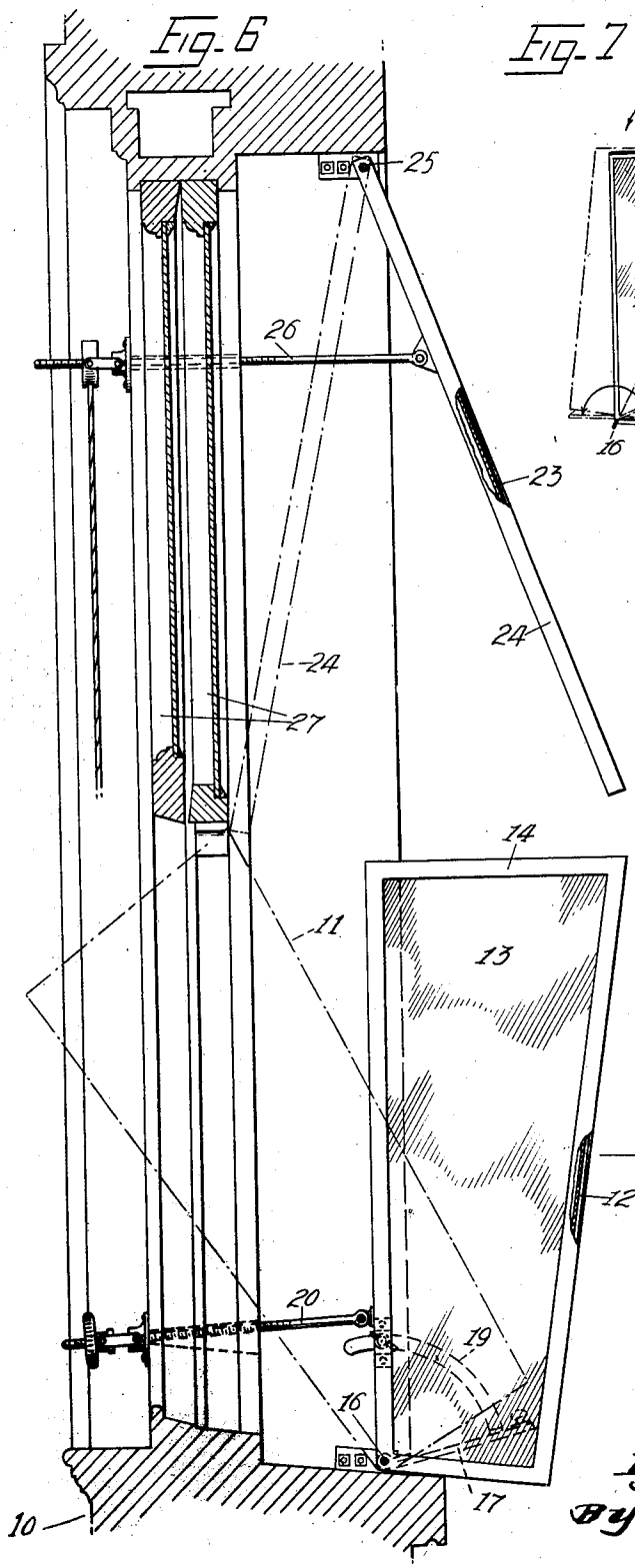


Fig. 7

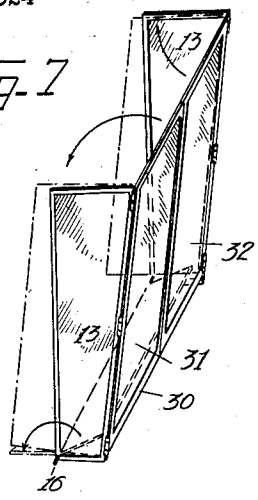
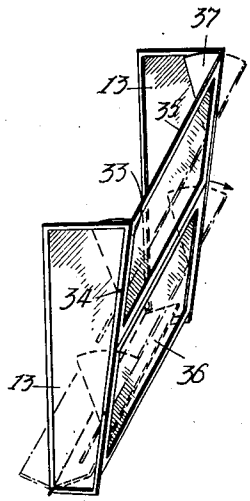


Fig. 8



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UNITED STATES PATENT OFFICE.

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SOUND-SCREENING ATTACHMENT FOR WINDOWS AND DOORWAYS.

Application filed August 29, 1924, Serial No. 735,044, and in Australia September 10, 1923.

In the busy quarters of cities, ventilation must frequently be sacrificed by the closing of windows and transoms when it is desired to exclude penetration of street noises into office apartments. These noises reach the window openings either directly from the propagation source or by reflection from opposite buildings or from other reflecting bodies in the location.

Similarly, in the case of residential flats and hotels, annoyance is experienced from traffic and other street noises and from noises proceeding from other apartments in the same or adjacent buildings.

In all cases the desideratum is to maintain facility for ventilation and/or illumination whilst providing against transmission of externally generated noises into apartments.

This object is accomplished by fitting to the external window apertures in the walls of the apartment a sound screening device, which may be a fixture or may be removable, and which may be adjustable in position. This device is adapted structurally for deflecting and/or absorbing external noises, and, optionally, is also adapted for reflecting natural light into the apartment and for promoting ventilation through the wall aperture.

The device is structurally modified to meet the particular circumstances of each case, so as to function with maximum efficiency in those circumstances, and it may be so constructed that its position may be varied conformably to the direction from which noise reaches it, thus to obtain the best effect. In the case of windows in a "flat" building opening on to an area for instance, the device when adjustable may be arranged so that it will operate with best efficiency as may be required to screen noise proceeding from either right or left, or from below, or even from an upper position in the area.

In the case of windows opening on to a street where the source of objectionable noise arises only from the road traffic, provision for adjustment is usually not necessary. The device is in such cases preferably a fixture arranged for deflecting noises which come upwardly from the road and come by reflection transversely from opposite buildings.

Tests made with apparatus constructed according to the present invention applied to window apertures overlooking a street carrying heavy traffic have shown that incoming noise may be diminished by as much as 80% without injuriously affecting the ventilation or the lighting of an office apartment.

In its simplest fixed form the device consists of a deflector or sound screening plate angularly disposed from the vertical and positioned in front of a window aperture, with its bottom edge located a few inches out from the window sill or a few inches below the window sill. The angular spaces between either side of this deflector and the wall are closed with filler panels, thus producing a hopper-like structure which is open at top and bottom and at the back of it. Light may pass downwardly into this "hopper" and suffer reflection from its interior surfaces into the apartment; this reflection of light may be augmented by facing the interior surfaces of the hopper with a white finish or otherwise making it an efficient reflector. The deflector plate and the wing plates may be structurally devised to absorb within their substance more or less of the energy of the sound waves which impinge on their external surfaces. The external surfaces of the plate and wings may be either curved or corrugated or plane, and may be either smooth or rough. If the "hopper" be made of wood, it may be lined interiorly with kapok or other sound absorbing material covered with canvas to form a surface which may be painted white or in any light tint to augment light reflection. If a transparent screen is preferred it may be constructed as a frame filled with glass panels in the outer side and if desired also in the lateral portions of it. In such cases it is preferable to use two panes of glass separated by an air space; the glass, whether single or double, may be divided into panels of small area. If a pane of large area is preferred, its sound screening efficiency may be enhanced by placing studs or cross pieces of sound absorbent material on its surface in such manner as to dampen any vibration in the pane and thus minimize its tendency to transmit sound waves.

The frontal deflector plate may be made

up of louvered sections or hinge mounted "casement") sections and the several sections in each part interlinked to enable them to be swung simultaneously to open or closed position.

The complete structure may be mounted so that it may be oriented as a whole to set the hopper mouth either upwardly or to either side. Normally, as in the case of office buildings, the hopper would stand erect, so that sky-light will be reflected directly into the apartment and noises proceeding laterally and from below and opposite will be screened and deflected outward.

In the preferred arrangement for office building windows, the deflector panel is made of rectangular shape and is hingedly mounted on fixed pivots at or near its bottom end and is fitted with an adjustable stay by which its vertical angular position may be varied so that its top edge may be approached towards the window aperture or set out more or less from it so as to leave an open space of greater or less area at the top to facilitate ventilation and to admit top light. By sub-dividing this panel transversely and separately mounting the sections of it on pivotal supports, the respective sections of it may be disposed at different angles. Or it may be divided vertically and the two sections of it then made to fold as "casements".

The hopper, being open bottomed and open topped, is a flue-like structure which encloses the otherwise open window aperture in the apartment wall. External heat from the sun's rays acting on its surfaces promotes an upward circulation of air through the hopper, thus inducing ventilation currents out of the apartment and up through the hopper. Ventilation may also be facilitated, whether or not the deflector plate is jointed or made adjustable in position, by hinging the lateral wing panels so that either or both of them may be swung either outward or inward. "Scoop" ventilation to take advantage of passing currents of air may be obtained by directing the open end (top) of the hopper towards a natural air current.

To obtain the best advantage the structure should be of sufficient size to surround the whole of the window opening laterally, or to surround laterally the whole of the lower part of the window aperture when the upper part of it is closed by window sashes.

Appropriate provision is made for intercepting and draining rain water so that it will not be directed into the apartment by the deflector. The open space at the bottom of the hopper is fitted with a hinged flap or a sliding flap which may be opened or closed at will to govern ventilation, to check upwardly directed noise, and to allow rain which falls into the hopper to pass out.

In order to throw off rain when the hopper is swung outwardly so that the deflector plate is disposed angularly to overhang the street, a folding canopy or shield is pivotally hung from the top part of the wall aperture and arranged so that it may be set out over the open top of the hopper. This canopy or shield is usually constructed of glass in order to minimize light transmission loss. This canopy or an additional one may be used to protect the upper part of the wall aperture against intrusion of sound waves from below and thus permit the ordinary window sashes to be dispensed with while avoiding an undesirable lengthening of the main screening plate.

When the deflector plate and the wings and the top shield or one or more of those elements are constructed of glass, the device functions as a heat trap which promotes a ventilation current of air outward.

In the accompanying drawings:—

Fig. 1 is a vertical section showing the deflector fitted in a full open wall aperture, the main deflector occupying the lower portion of the aperture and the top shield the upper portion of the aperture; the position of the parts when inclosed is shown in dotted lines;

Fig. 2 is a horizontal section on the line 2—2 Fig. 1;

Figs. 3, 4, and 5, are fragmentary sections showing various details of construction of the deflector frame and the deflector panel and its lateral wings;

Fig. 6 is a vertical section similar to the section shown in Fig. 1, but showing also the arrangement used when sliding sashes are fitted in the wall aperture;

Fig. 7 is a perspective view indicating the structure of the hopper deflector when the main deflector plate is divided vertically to form two casement-like folding sections; and

Fig. 8 is a fragmentary perspective view of the hopper when constructed with the main deflector plate divided horizontally and the sections of it respectively pivot mounted so that they may be set either in alignment or in louver arrangement.

In Fig. 1, 10 is the wall, in the aperture in which the deflector is fitted. As here shown the wall aperture is not fitted with a sash. It might be fitted with sashes at the inner face of the wall in the case of very thick walls, but in the case of walls of normal thickness the deflector device shown is used in an open aperture not fitted with sashes. The hopper 11 is constituted of a main deflector plate 12, and two lateral wing plates 13. The plates 12 and 13 are mounted in frames which may be constructed as indicated in Figs. 3, 4, and 5; these show the frame as consisting of an angle iron surround 14, having the deflector plate constructed of glass and fitted into the frame with rubber packing pieces 15, the fixing being effected by means of filleted cor-

ner pieces 29 which are secured by light bolts 17. The invention is not, however, directed to the detail construction of the frames, which may be varied in any manner so long as they form an effective carrier for the main deflector panel 12 and for the wing panels 13. The wing panels 13 may be constructed of sheet metal or wood, but it is usually preferable to conserve light by constructing them of glass. The deflector plate 12 and the wing plates 13 may be double walled with an unfilled interstitial space, or said space may be filled with a sound absorbing substance, or pads or bars of non-resonant material may be fixed to the glass surface to minimize vibration. When it is not necessary to conserve light, all the plates 12 and 13 may be constructed of metal or of fibro cement or of wood. The frame is mounted at the inner bottom corners of it on fixed pivots 16 which are positionally disposed so that when the frame is swung outward, the wall aperture (or the lower part of it) will be surrounded frontally and laterally by the plates 12 and 13; these plates together forming a hopper-like structure which is open at the bottom and open also at the top, the plate 12 standing out more or less beyond the outer face of the wall 10, and its bottom end if desired being brought more or less below the sill level. The open bottom of this hopper-like structure is provided with a closure which may take the form of a hinged flap 17 mounted on the sill lining 18 and provided with a stay by which its position may be adjusted and fixed. The hopper structure is also provided with a stay 20 at either or both sides of it, these stays being of appropriate mechanical construction for effecting the inward and outward swinging movement of the hopper and for supporting the hopper when outswung and holding it locked when inswung. The bottom flap 17 is opened as required for the purpose of permitting ventilation upward through the hopper or for the purpose of allowing rain falling into the hopper to pass through without flooding the apartment. In order to provide a neat arrangement, the wall aperture is lined on either side with casings 21 offering behind each of them a clearance space 22 in which the wings 13 of the hopper-like structure, and the stay mechanism, are accommodated and facility offered for moving the hopper inward from full line position Fig. 1 to the dotted line position, Fig. 1.

When the hopper is not constructed for the full height of the wall aperture, a canopy or shield 23 is provided; this canopy or shield is preferably a plate of glass mounted in a frame 24 which is pivotally top hung at 25 in the sides of the aperture, 26 being a stay of appropriate type for regulating the position of the shield plate 23. When the hopper is projected outwardly to the position shown in the full lines, Fig. 1, the shield 23 may be swung out as shown in that figure, in which case it will deflect falling rain and prevent flooding of the hopper whilst still permitting light to pass transversely and downward into the apartment. Alternatively it may be swung fully inward to the position shown in the inner dotted lines 24, Fig. 1, thus to cause it to act also as a sound deflector. When the hopper is inclosed and the shield swung in to contact with its top edge, they take up the respective positions shown in dotted lines, and together form a complete closure which fills the wall aperture. When the hopper 12 is constructed for the full height of the wall aperture the shield 23 is omitted from the arrangement.

As an additional security against the intrusion of noise into an apartment when the hopper is set out as seen in Fig. 1, an additional top edge deflector may be fitted in either position shown diagrammatically by the full lines X and Y Fig. 1.

It is to be understood that two or more hopper deflectors may be used in tier arrangement in the case of tall window apertures, and that any one or more of such deflectors may be either fixed or movable according to the desired arrangement.

The modified arrangement indicated in Fig. 7 requires the fitting of subframes 30 in the main frame of the hopper, and the vertical subdivision of the plate 12 to form two panels 31 and 32 which may be swung inward, and if desired outward also, in the maner of a casement, to offer a free opening in the front of the wall aperture.

The same purpose is served by the arrangement indicated in Fig. 8, where again swinging subframes 33, mounted on horizontal pivots 34, are fitted in the main frame, which, in the arrangement shown in Fig. 1, carries the deflector plate 12. The two transom-like panels 35 and 36 thus formed may be set as louvers, or may be set in alignment, to provide in the one case an open space fronting the wall aperture, and in the other case to constitute what is in effect a single deflector panel. In this louver arrangement the ends of the swinging panels are fitted with sector plates 37 which enclose the angular spaces at the ends of those panels when they are disposed in louver arrangement.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A sound screening device for a wall aperture comprising a hopper-like structure closed in front and at either side and open at the top and bottom of it, the lower edges of the hopper sides being extended substantially beyond the outer face of the wall.

2. A sound screening device consisting of a hopper-like structure closed in front and at either side and open at the top and bottom

in which the lower edges of the hopper sides are extended below the level of the bottom of the wall aperture and substantially beyond the outer face of the wall.

3. A sound screening device comprising a hopper-like structure closed in front and at either side and open at the top and bottom and having an opening between the wall and the bottom end of the hopper with a movable closure in the form of a flap for said opening to admit air for ventilation and to deflect sound waves arriving from below.

4. A sound screening device according to claim 1 fitted with sound non-transmitting plates.

5. A sound screening device according to claim 1 movably mounted on fixed pivotal centres to overhang the outer face of the wall, and to permit angular adjustment of said device in relation to the plane of the wall.

6. A sound screening device according to claim 1 mounted at its bottom end on fixed pivotal centres which are located near the outer face of the wall and having lateral plates disposed in clearance spaces between the sides of the wall aperture and liners within said aperture.

7. A sound screening device according to claim 1 supported for adjustment in a vertical plane about fixed pivots, said structure being disposed substantially beyond the outer face of the wall, and adapted to be swung inwardly about said pivots towards the wall to completely close the aperture and outwardly from the wall to enclose a space in front of the aperture frontally and laterally.

8. A sound screening device according to claim 1 having the main deflector plate divided and its parts pivotally mounted and adapted to be moved angularly about the pivots.

9. A sound screening device according to claim 1 including a shield above it, said shield being hung at its top end on pivotal supports which are fixed within the wall aperture above the movable hopper.

10. A sound screening device according to claim 3 characterized in that said device may be angularly disposed to the vertical towards or away from the wall aperture, thereby to render it efficient as a deflector for sounds coming from sources located either below, opposite to, or above the wall aperture, whilst at the same time permitting adequate ventilation.

In testimony whereof I affix my signature.

ERNEST THOMAS FISK.