

Feb. 1, 1955

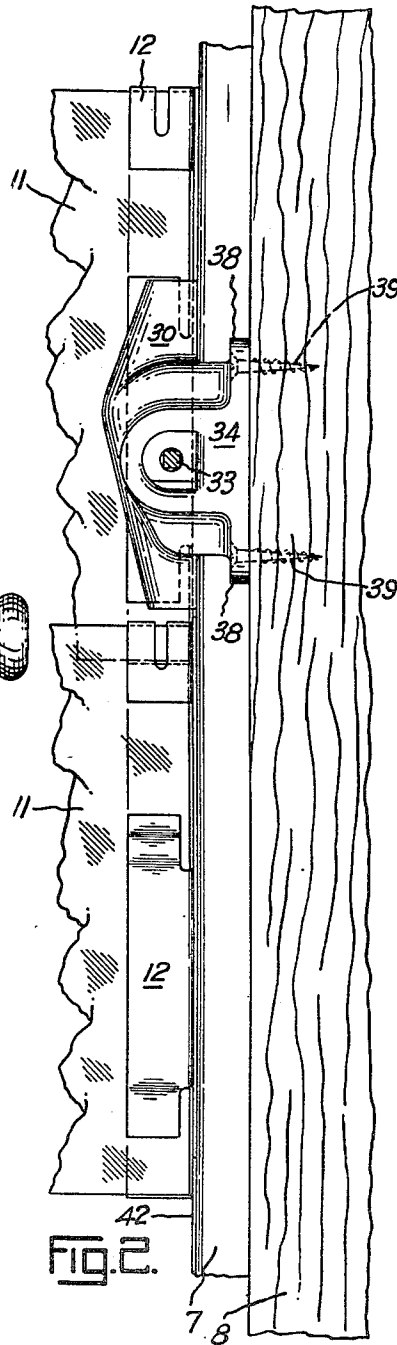
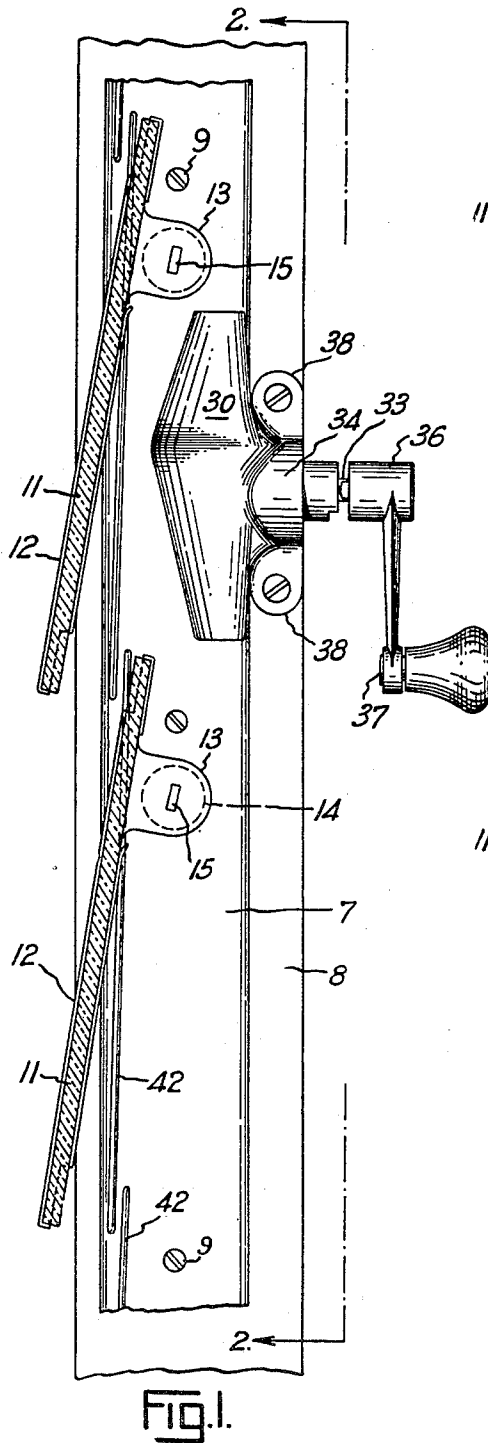
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2,700,802

MOVABLE-FLAP LOUVER WINDOW

Filed June 24, 1952

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

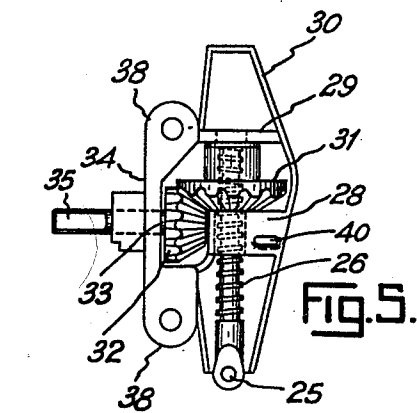


FIG. 5.

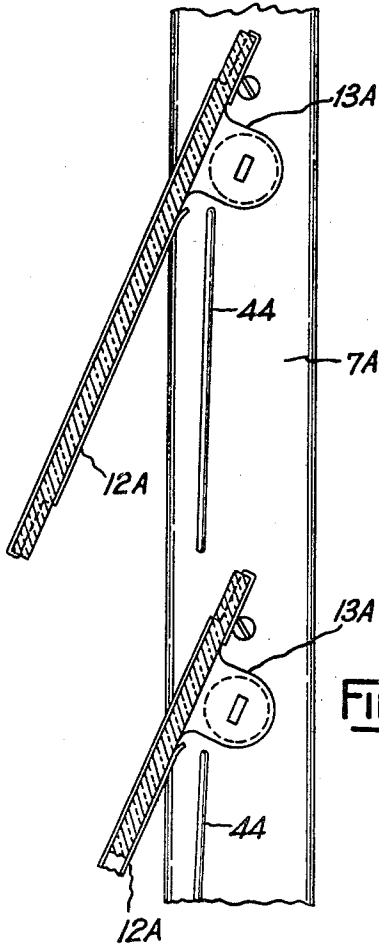


FIG. 6.

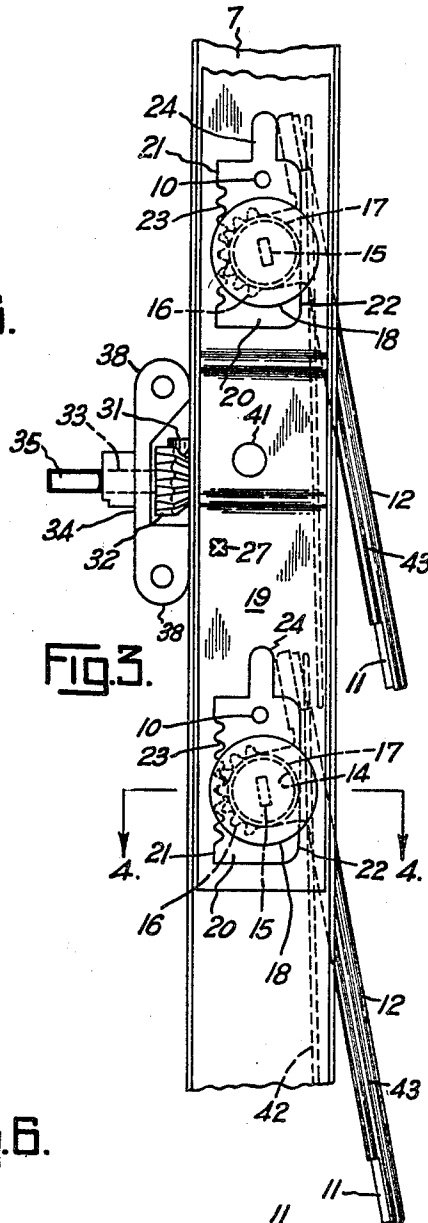


FIG. 3.

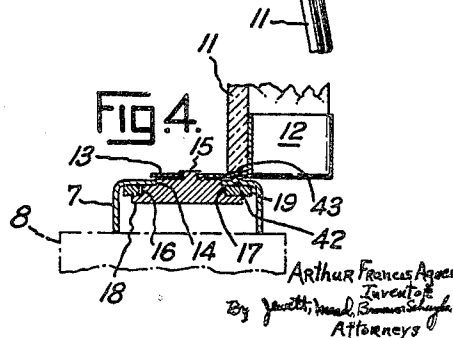


FIG. 4.

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MOVABLE-FLAP LOUVER WINDOW

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Application June 24, 1952, Serial No. 295,242

Claims priority, application Australia July 11, 1951

4 Claims. (Cl. 20—62)

This invention relates to louver windows of the kind in which the flaps (usually consisting of glass or other slats in channel-sectioned end brackets or holders) are pivotally supported in a pair of side members or stiles which are adapted for affixture to the sides of the window frame and which include means enabling the flaps to be turned about their pivot supports for opening and closing movement.

More specifically, the invention is directed to louver windows of the general kind referred to above in which the flaps have one of the stiles constituting a housing for a flap operating mechanism. In this housing stile the slat holders related thereto are pivotally mounted by journals, bosses or pins which pass through holes in the stile web and internally thereof are furnished with gear pinions. These pinions mesh an operating rod which has rack teeth thereon and is longitudinally movable within the stile. The actuating rod is usually carried in guide members which are intended to ensure the rod remaining in mesh with the pinions. Endwise movement of the operating rod has usually been provided for by furnishing it with a lever or like devices which are accessible on the indoor side of the window for manual operation when the angular disposition of the flaps is to be varied.

The prior louver devices referred to above are defective in several respects. For example:

(A) Relatively complex keeper arrangements are required to ensure that the operating rod rack teeth remain in mesh with the pinion teeth, and even with such keeper arrangements the teeth sometimes become forced out of mesh. When this difficulty arises it is necessary to dismantle the louver parts and either replace them with new parts or bend the distorted elements back to proper form. The latter expedient is seldom satisfactory because the previous overstraining of the parts, and restoration to their original form, weakens them and this is conducive to further occurrence of the same trouble.

(B) The slat holder and stile arrangements are seldom completely or sufficiently weatherproof.

(C) It is difficult in the prior arrangements to ensure that in closed position the slats make sufficiently close contact to ensure against ingress of air draughts, rain or dust.

(D) There is always likelihood of some freedom for rattling in the closed flaps.

(E) Special locking arrangements are necessary to prevent unauthorized opening of the flaps from the outdoor side thereof.

(F) It is difficult to move the flaps in a sufficiently controlled manner to give complete assurance against slat breakage.

The object of this invention is to provide movable flap louver window devices which overcome the above stated disabilities in a particularly simple manner.

The present invention may be broadly summarised as the provision, in a louver of the kind referred to above, of flap operating devices comprising (a) for each of the flap journals in the housing stile, an integral pinion on the journal and inside the housing stile, whereof the least radius is greater than the journal radius and whereof the periphery has a toothed part and a smooth circular part (b) a keeper disc on the inner end of each of the pinions, whereof the radius is greater than the tooth-tip radius of its pinion (c) an actuating strip extending longitudinally of the housing stile between the stile web and the keeper discs, which for each of the pinions, has a hole therein

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having two longitudinally extending straight sides one of which has rack teeth projecting therefrom and between which the associated pinion extends thereby to mesh its toothed part with said rack teeth on one of said straight sides and to ride its said circular part against the other said straight side, and (d) manually operable means for moving the actuating strip longitudinally within the housing stile.

An example of the invention is illustrated in the drawings herewith.

Figure 1 is a side elevation of a housing stile with two flaps shown in end section.

Figure 2 is an end elevation projected from Figure 1 in the direction indicated by 2—2.

Figure 3 is a reverse side elevation of a housing stile showing the interior of the stile.

Figure 4 is a sectional plan taken on line 4—4 in Figure 3.

Figure 5 is a side elevation showing the inside of a gear box containing gearing for operation of the actuating strip.

Figure 6 substantially repeats a portion of Figure 1 showing a minor modification.

A louver assembly according hereto comprises a channel-sectioned housing stile 7 and a carrier stile (not shown) which may be similar to the housing stile in all respects. The two stiles are adapted for face-to-face affixture to the opposite sides of a window frame one side member of which is indicated at 8. The means of affixture may be ordinary wood screws 9 which extend through holes 10 in the stile webs.

Each of the flaps consists of a glass or other slat 11 and two channel-sectioned slat holders 12 (only the slat-holders adjacent the housing stile are shown in the drawings). The slat holders are substantially of conventional design except that for preference, the flap pivot points are offset relative to the slat (being in lugs 13 projecting sidewardly from the slat holder webs) so that the pivoting axes do not coincide with the longitudinal centre lines of the slat holders.

The slat holders are affixed, by their lugs 13, to journal and operating members each of which consists of a journal portion 14 which extends through and is neatly rotatable within a bearing hole in the stile web. Outside the stile the journals 14 have rivet stubs 15 whereby the journals are fixed to the slat holder lugs 13. Inside the stile each of the journals 14 has a pinion 16 thereon. The least radius of each pinion is greater than the radius of its journal, so that a marginal side portion of the pinion may bear against the inner face of the stile web. The pinions are toothed along somewhat less than half their peripheries (as shown in the drawings) in order to provide a smooth riding face 17 as referred to below.

Each of the pinions has a keeper disc 18 thereon. The radius of these discs is greater than the tooth-tip radius of the pinions for a purpose referred to later herein.

An actuating strip 19 extends longitudinally, and is longitudinally movable, within the housing stile 7. This strip is located between the stile web and the keeper discs, and for each of the pinions has a hole 20 therein. These holes 20 each have two longitudinally extending straight sides 21 and 22. Side 21 has rack teeth 23 thereon to engage the related pinion teeth, and side 22 is smooth to constitute a riding surface for the untoothed portion 17 of the pinion. The width of the holes 20 is, of course, no greater than is necessary to provide neat but running clearance for the pinions, and the thickness of the strip 19 is less than the depth of the pinions only by an amount just sufficient to give the strip running clearance between the stile web and the keeper discs 18. It will be apparent that the neat fit of the pinions in the holes 20 and the presence of the keeper discs 18, without other support for the strip 19, effectively restrain that strip against any movement other than longitudinal movement and at the same time ensure that the teeth on the pinions will remain positively in mesh with the rack teeth on the strip.

The strip holes 20 have bay extensions 24 therein to clear the stile holder screws (9) which extend through the holes 10.

The parts (numbered 14, 15, 16 and 18) of the journal and operating members are preferably made as single one-

piece members, as they thus lend themselves to simple manufacture by die-casting or the like: moreover the pinion teeth 16 are thus greatly strengthened by being integral with the keeper discs 18. It will be appreciated, however, that parts 14, 16 and 18 could easily be made separately and joined together co-axially by flush-riveting, spot-welding or otherwise.

Manually operable means for moving the actuating strip longitudinally within the housing stile may consist of a simple lever of the kind (for example) marked 19 or 28 in the drawings forming part of the specification belonging to Australian Letters Patent No. 131,062 in the name of present applicant. For preference however such means are of the kind shown in the drawings herewith.

The web of the housing stile is suitably gapped or holed to enable a stub 25, on a lead screw 26 to be secured to the actuating strip 19 as by riveting indicated at 27 (Figure 3). Screw 26 is freely movable in holes formed in two abutments 28 and 29 forming part of a gear casing 30. A "nut" bevel gear 31 is rotatable between abutments 28 and 29 and is internally threaded to accommodate screw 26. A driving pinion 32 meshes the nut bevel gear 31 and is fixed to an operating shaft 33 borne in a side portion 34 of the casing 30. The shaft 33 is squared (35) or otherwise adapted to receive the driving boss 36 of a crank handle 37. The casing has holed lugs 38 enabling affixture of the casing, as by screws 39, to the window frame member 8; and for preference, the casing also has a locator stub 40 which may be riveted over after insertion in a hole (not shown) in the housing stile web. An access hole 41 may be provided in the actuating strip to enable this riveting to be carried out after the actuating strip has been assembled in the stile.

In use, turning of handle 37 causes endwise movement of the lead screw 26. This movement causes longitudinal movement of the actuating strip thus causing opening or closing movement of the flaps. The lead screw and nut gear arrangement prevents opening of the flaps other than by rotation of shaft 33. The lead screw operation of the actuating strip also enables gentle closing of the flaps while enabling them to be closed relatively tightly in overlapping arrangement for weatherproofing purposes.

To give further weatherproofing assurance the stiles and the slat holders may be longitudinally and complementarily "tongue-and-grooved" so that when the flaps are closed the tongues or ridges 42 and the grooves 43 are in longitudinal register thus to form a barrier practically prohibiting entrance of rain between the stiles and the slat holders. The depth of the tongue and grooving would, of course, not be so great as to impede opening or closing of the flaps, but because the flaps are pivotally mounted in an offset manner there may be sufficient resilience in the lugs 13 to give a lightly loaded snap fastener effect when the tongues enter the grooves, thus to ensure close weatherproofing contact therebetween.

If desired the slat holders may be ungrooved, weather ridges 44 (see Figure 6) being provided only upon the stile 7A, and being so positioned that as the slat-holders 12A arrive in closed position they bear against the ridges. The ridges 44 may extend for only part of the slat holder length, as shown in Figure 6, or; with some resilience in the lugs 13A, the ridges may extend for the full slat holder length as is the case with the ridges 42 shown in Figures 1 to 4.

I claim:

1. In a louvre of the kind comprising a channel-sectioned housing stile and a carrier stile both adapted for face-to-face affixture to the opposite sides of a window frame, and a plurality of flaps each consisting of a slat mounted by its ends in two channel-sectioned holders re-

spectively pivotally supported by journals extending through bearing holes in said stiles; flap operating devices comprising (a) for each of the flap journals in said housing stile, an integral pinion on the journal and inside the housing stile, whereof the least radius is greater than the journal radius and whereof the periphery has a toothed part and a smooth circular part (b) an integral keeper disc on the inner end of each of said pinions, whereof the radius is greater than the tooth-tip radius of its pinion (c) an actuating strip extending longitudinally of said housing stile between the stile web and said keeper discs, which for each of said pinions, has a hole therein having two longitudinally extending straight sides one of which has rack teeth projecting therefrom and between which the associated pinion extends thereby to mesh its toothed part with said rack teeth on one said straight side and to ride its said circular part against the other said straight side, and (d) manually operable means for moving said actuating strip longitudinally within said housing stile.

2. Devices according to claim 1 wherein said manually operable means for moving said actuating strip comprise, a lead screw connected to said strip, a nut bevel gear on said lead screw, a driving pinion meshing said bevel gear, means for restraining axial movement of said bevel gear and for retaining said pinion in mesh therewith, a shaft for said pinion and a turning lever for said shaft.

3. In combination, a louvre comprising a channel-sectioned housing stile and a carrier stile both adapted for face-to-face affixture to the opposite sides of a window frame, weatherproofing ridges formed in the webs of said stiles, a plurality of flaps each consisting of a slat mounted by its ends in two channel-sectioned holders each having an offset lug thereon and each able to seat against one of said ridges, a journal fixed to each of said lugs which extends through a bearing hole in one of said stiles, and flap operating devices comprising (a) for each of the flap journals in said housing stile, an integral pinion on the journal and inside the housing stile, whereof the least radius is greater than the journal radius and whereof the periphery has a toothed part and a smooth circular part (b) an integral keeper disc on the inner end of each of said pinions, whereof the radius is greater than the tooth-tip radius of its pinion (c) an actuating strip extending longitudinally of said housing stile between the stile web and said keeper discs, which for each of said pinions, has a hole therein having two longitudinally extending straight sides one of which has rack teeth projecting therefrom and between which the associated pinion extends thereby to mesh its toothed part with said rack teeth on one said straight side and to ride its said circular part against the other said straight side, and (d) manually operable means for moving said actuating strip longitudinally within said housing stile.

4. The combination according to claim 3 wherein said lugs are resilient and said holders each have a groove formed therein into which one of said ridges may enter.

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