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950,279

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Date of Application and filing Complete

Specification: February 22, 1960. No. 6170/60

Application made in Australia (No. 46,266) on February 25, 1959.

Complete Specification Published: February 26, 1964.

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Index at Acceptance:—E1 J1X; E2 F (1K2C, 3A3, 3A4); E2 M1A; F4 V (A1B, A2A2, A2C1).

International Classification:—E 04 f (E 05 d, f, F 24 f).

COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Improvements in and relating to Adjustable Louvre Assemblies

We, CHRIS TURNER & SCOTT PTY. LTD., a Company incorporated under the Laws of the State of Queensland, Commonwealth of Australia, and carrying on business at Cambridge Street, Coorparoo, Brisbane, Queensland, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to improvements in and relating to adjustable louvre assemblies.

The most common type of adjustable louvre assembly currently employed consists basically of a pair of channel-section metal jambs adapted to be positioned vertically in opposed relationship at either side of a window opening; a series of channelled louvre clips associated with each jamb and adapted to support the respective ends of glass louvre blades, and pivot discs rotatably mounted in bearing apertures in the jambs in equally-spaced, co-linear arrangement and each having a louvre clip secured thereto at about the middle of the latter. The arrangement is such that the lowermost portion of each louvre clip overlaps in front of the uppermost portion of the louvre clip next below when the louvre clips are in closed positions.

To effect opening and closing of the louvre clips and blades, there is commonly provided a pair of parallel operating bars extending longitudinally within one of the jambs and pivotally secured to respective, diametrically-opposed pivot pins on the back of each pivot disc, while an operating lever is connected pivotally to the operating bars in such manner that it may be moved to cause desired longitudinal movement of the operating bars in opposite directions to rotate the pivot discs in unison and so effect opening or closing of the clips and the

louvre blades. In many cases, there is employed a very simple type of operating lever, together with a separate locking lever.

An example of this type of adjustable louvre assembly is to be found in the specification of our British Patent Appln. No. 25,355/59 (Serial No. 858,478).

In order that the louvres may be both operated between open and closed positions and locked in closed position by one movement of a single, manually-controlled lever, it has been proposed to provide a toggle mechanism, consisting of a primary operating lever pivotally secured to one of the operating bars and extending rearwards from the jamb to form a handle, and a secondary lever located within the jamb and having its respective ends connected pivotally to the other operating bar and to the primary operating lever, the toggle being arranged so that the three aforementioned pivotal connections become co-linear and then pass slightly beyond "dead-centre" position in a substantially longitudinal direction when the primary operating lever is moved to fully-closed position.

It will be apparent that the operating bars will then be prevented by the levers from moving longitudinally relative to one another, so that it will be impossible to turn the pivot discs by exerting pressure on the edges of the closed louvre blades. Thus, automatic, burglar-proof locking is effected in the final closing movement.

While toggle mechanisms of this nature have proved relatively satisfactory, we have found that, with the use of thick blades, of glass/overlapping one another in the usual manner in their louvre clips, the blades and clips may assume closed, contacting positions before the primary operating lever has been moved to the normal, fully-closed position. In consequence, the three pivotal connections

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of the two levers will not have become aligned or passed beyond "dead-centre" position, and it will be possible to move the bars to open the louvres by exerting pressure on the edges of the louvre blades. Alternatively, if undue force were to be exerted on the primary operating lever, the latter might be forced to the fully-closed position, but this would cause wear of the components and resultant slackness. In any event, this type of arrangement having three fixed pivotal connections to the toggle cannot provide for the same closing action whatever may be the thickness of glass selected for the louvre clips.

It has been proposed to overcome this difficulty by providing spring means associated with at least one of the pivot points or levers so that movement of the levers past "dead-centre" position may also take place against the action of the spring means after the blades have fully closed. However, we have found that springs are unreliable in many ways and may break after constant use, leaving considerable undesirable free movement of the levers and rattle in the blades.

Our present invention has therefore been devised to provide such improvements in toggle mechanisms in adjustable louvre assemblies as will enable a firm and positive closing action with blades of various selected thicknesses, without the use of springs or other unreliable devices for this purpose.

With the foregoing and other objects in view, our invention resides broadly in an adjustable louvre assembly comprising a toggle locking mechanism operatively connected to the louvres for moving same between open and closed positions, the mechanism being of the type having three pivotal connections which are substantially aligned beyond "dead-centre" in a locked attitude when the louvres are moved to their closed positions by actuation of the mechanism, characterized in that means are provided for adjustably varying the position of one of the pivotal connections in the direction of alignment. Various features of the invention associated with different embodiments thereof will become apparent from the following description.

In order that the invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings, wherein:—

Fig. 1 is a front perspective view of part of an adjustable louvre assembly in accordance with the invention;

Fig. 2 is a side elevational view of part of the nearside jamb assembly of the louvre assembly shown in Fig. 1, and showing the locking mechanism arranged to cater for thin louvre blades, the latter being in fully-closed positions;

Fig. 3 is a side elevational view of the jamb assembly, similar to Fig. 2, but showing the locking mechanism arranged to cater for thick louvre blades, the latter being in fully-closed attitudes;

Fig. 4 is a perspective view of the adjustment bush of the locking mechanism shown in Figs. 1 to 3 and

Fig. 5 is another side elevational view of the jamb assembly, similar to Figs. 2 and 3, but showing an alternative form of locking mechanism, the blades being in fully-open positions.

Referring initially to Fig. 1 of the drawings, there is shown a portion of an adjustable louvre assembly of the type described and illustrated in the specification of our British Patent Appln. No. 25,355/59 (Serial No. 858,478). The louvre assembly has a pair of jamb assemblies 10 and 11 with glass louvre blades 12 there-between, the jamb assemblies being adapted to be mounted in spaced, vertical, opposed relationship at either side of a window opening. The jamb assembly 10 includes a channel-section jamb 13, while the jamb assembly 11 has a jamb 14 of similar but opposed construction.

The jambs 13, 14 have pivot discs 15 rotatably mounted in bearing apertures with louvre clips 16 secured to the inner faces of the discs 15, while the rear ends of the latter are enlarged to bear against the rear faces of the jambs. The jambs 13, 14 are also provided with weather-proofing means as described in the aforementioned patent specification, consisting of parallel weather beads 17 disposed at a slight angle to the vertical from the rear to the front of the louvre assembly in a downward direction. The beads 17 are arranged in pairs extending between adjacent pairs of louvre clip pivots 15, one weather bead of each pair being disposed at or near to the front of the louvre clips 16 and the other at or near to the rear of the clips when the latter are in their closed positions, an upper section of each rear bead and a lower section of each front bead protruding further from the jamb surface than the lower section of each rear bead and upper section of each front bead, as illustrated. The louvre clips 16 are pivoted to move over the less-protruding sections of the beads but engage against the more-protruding sections. When the louvre clips 16 and blades 12 are closed, the lowermost portion of each overlaps in front of the uppermost portion of the clip and blade next below, the clips and blades thus lying at slight angles to the vertical corresponding to the angles of the beads 17.

In the case of the jamb 14, the outer portions of the pivot discs 15 are connected by diametrically-opposed pins 18 to a pair of oppositely-reciprocable front and rear

operating bars 19 and 20 arranged longitudinally within the channel of the jamb 14 and adapted to be actuated by an operating and locking toggle mechanism consisting of a primary operating lever 21 and a secondary lever 22. The primary operating lever 21 has its rear end extending through a recess 23 in the jamb 14 and is shaped to form a handle 24, while its front end is connected by a pivot pin 25 to the upper end of the secondary lever 22, the lower end of the latter being connected by a pivot pin 26 to the front operating bar 19.

Referring now to Figs. 1 to 4, for the pivotal connection of the primary operating lever 21 to the rear operating bar 20, the lever 21 has at an intermediate position an oversize circular aperture (not shown) within which there fits closely but rotatably a cylindrical bush 27 (shown in Fig. 4) of an adjustment member 28, an hexagonal head 29 of the latter being coaxial with the bush 27 and adapted to bear on top of the lever 21 about the said oversize circular aperture therein. Also, the bush 27 has an off-centre bore 30 through which there passes a pivot pin 31, fixed at its inner end to the rear operating bar 20 while its free outer end is threaded to accommodate a spring washer and lock-nut 32.

It will be noted that the toggle mechanism has three pivot axes, namely, those of the pivot pins 25 and 26 and that of the adjustment bush 27. When the primary operating lever 21 has its handle 24 raised to the uppermost, locked position, as shown in Figs. 2 and 3, the secondary lever 22 will be pushed down until the three pivot axes or points become aligned, the design allowing for the middle axis to pass the "dead-centre" position, as illustrated by the dotted line, indicated by the numeral 33, passing through the uppermost and lowermost of the three axes.

In Fig. 2, the operating bars 19 and 20 are shown contacting one another, as will be the case where sheets of glass of minimum practical thickness are employed as blades, while Fig 3 shows the bars 19 and 20 spaced apart, indicating that thick blades of glass are preventing full turning of the louvre clips 16 and pivot discs 15. Thus, for the same firm and positive closing action of the primary operating lever 21 with both thin and thick blades, the distance between the pivot axis at 26 and the axis of the bush 27 should be the same in both cases, as illustrated by Fig. 2 and 3. However, the distance from the axis at 26 to the pin 31 will be greater in Fig. 2, because the bars 19 and 20 will have been moved to a maximum distance in opposite directions, whereas they will not have been moved the same relative longitudinal distances in Fig. 3. To correct this difference, the adjustment bush 27 is

set in Fig. 2 so that its axis lies below the axis of the pin 31, while in Fig. 3 the bush 27 is set with its axis above the axis of the pin 31. The distance between the axis at 26 and the axis of the bush 27 will thus be the same in both cases, desired adjustment being facilitated by the provision of the hexagonal head 29 of the adjustment bush 27, the latter acting as an eccentric.

When the lock-nut 32 is tightened, the bush 27 will be fixed in desired position relative to the pin 31, then acting as a pivot axis for the primary lever 21. If desired, the louvre assembly may be sold with a setting suitable for certain thicknesses of glass, and any unskilled operative may make easy adjustments merely by slackening the nut 32, turning the hexagonal head 29 of the adjustment bush 27 to a desired extent, and then retightening the nut 32 with the adjustment bush 27 in its new position. Naturally the adjustment bush 27 and associated parts could be provided at any one of the pivot axes, while the bush need not have a hexagonal head 29 but could be provided instead with a round head having a finger lug or the like for digital or other adjustment.

It will be seen that the feature of the invention is the provision of means for varying the setting of the distance between any two of the pivot axes in their longitudinally-aligned positions in accordance with the thickness of the glass in the louvre blades, and this may be accomplished by means other than the eccentric adjustment bush. For example, as shown in Fig. 5, the lowermost pin 26, secured to the bar 19, may pass through an elongated slot 34 in the lower end of the secondary lever 22, the latter having above and below the slot 34 tapped blocks 35 through which screws 36 pass adjustably to enable the longitudinal position of the pin 26 relative to the lever 22 to be adjustably varied.

Then again, there could be used an adjustment bush similar to that previously described but having an oversize, concentric bore instead of the eccentric bore described and illustrated. The bush could be set in desired position relative to the pin 31, but considerable force would be required in tightening the nut 32 to ensure that there was no likelihood of the position altering during use.

In addition to the above-mentioned alternative forms of the invention, it will be apparent that the levers 21 and 22 may be arranged quite differently from the attitudes described and illustrated insofar as their pivotal connections are concerned. For example, the primary lever may have its front end pivotally connected to the front operating bar 19, the upper end of the secondary lever 22 then being pivoted to an intermediate position on the primary lever 21. Also, the

secondary lever could extend upwards from the primary lever instead of downwards. Then again, only one operating bar need be employed for the effective operation of the assembly, and the primary lever could in such cases be pivotally connected to a fixed pin associated with the jamb.

WHAT WE CLAIM IS:—

1. An adjustable louvre assembly comprising a toggle locking mechanism operatively connected to the louvres for moving same between open and closed positions, the mechanism being of the type having three pivotal connections which are substantially aligned beyond "dead-centre" in a locked attitude when the louvres are moved to their closed positions by actuation of the mechanism, characterized in that means are provided for adjustably varying the position of one of the pivot axes in the direction of alignment.
2. An adjustable louvre assembly comprising a toggle locking mechanism including a primary operating lever adapted for manual control and a secondary lever pivotally connected thereto, the two levers being further pivotally connected to control members for opening and closing the louvres, thereby forming three pivot axes which are substantially aligned beyond "dead centre" in a locked attitude when the primary lever is brought to closed position to close the louvres, means being provided for adjustably varying the position of one of the pivot axes in the direction of alignment in accordance with the thickness of the louvre blades.
3. An adjustable louvre assembly according to Claim 2, wherein the control members comprise a pair of front and rear operating bars arranged in parallel longitudinal relationship within a jamb member and pivotally connected at respective diametrically-opposed positions to pivot discs rotatable in bearings in the jamb member and carrying louvre clips for supporting the ends of the louvre blades, longitudinal movement of the operating bars in opposite directions causing rotation of the pivot discs to open or close the louvres.
4. An adjustable louvre assembly according to Claim 3, wherein the primary operating lever has its rear end extending rearwards from the jamb member to constitute a handle and its front end is pivotally connected at one position to one end of the secondary lever and at another position to one of the operating bars, the other end of the secondary lever being pivotally connected to the other

operating bar, and wherein the means for varying the position of one of the pivot axes comprises means for varying the position of the pivotal connection of the primary operating lever to the respective operating bar.

5. An adjustable louvre assembly according to Claim 3, wherein the primary operating lever has its rear end extending rearwards from the jamb member to constitute a handle and its front extremity is pivotally connected to one end of the secondary lever, the other end of the secondary lever being pivotally connected to the front operating bar, the primary lever being pivotally connected at an intermediate position to the rear operating bar, and wherein the means for varying the position of one of the pivot axes comprises means for varying the position of the pivotal connection of the primary operating lever to the rear operating bar.

6. An adjustable louvre assembly according to any one of the preceding claims, wherein the means for adjustably varying the position of one of the pivot axes includes eccentric-type adjustment means.

7. An adjustable louvre assembly according to any one of the preceding Claims 1 to 5, wherein the means for adjustably varying the position of one of the pivot axes includes screw-threaded adjustment means.

8. An adjustable louvre assembly according to either of Claims 4 or 5, wherein the means for adjustably varying the position of the pivotal connection of the primary operating lever to the respective operating bar includes a cylindrical pivot bush engaging closely within an aperture in the primary operating lever and having an off-centre bore through which there passes a pivot pin secured to the operating bar, means being provided for securing the pivot bush relative to the pivot pin.

9. An adjustable louvre assembly substantially as herein described with reference to Figs. 1 to 4 of the accompanying drawings.

10. An adjustable louvre assembly substantially as herein described with reference to Fig. 5 of the accompanying drawings.

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secondary lever could extend upwards from the primary lever instead of downwards. Then again, only one operating bar need be employed for the effective operation of the assembly, and the primary lever could in such cases be pivotally connected to a fixed pin associated with the jamb.

WHAT WE CLAIM IS:—

1. An adjustable louvre assembly comprising a toggle locking mechanism operatively connected to the louvres for moving same between open and closed positions, the mechanism being of the type having three pivotal connections which are substantially aligned beyond "dead-centre" in a locked attitude when the louvres are moved to their closed positions by actuation of the mechanism, characterized in that means are provided for adjustably varying the position of one of the pivot axes in the direction of alignment.

2. An adjustable louvre assembly comprising a toggle locking mechanism including a primary operating lever adapted for manual control and a secondary lever pivotally connected thereto, the two levers being further pivotally connected to control members for opening and closing the louvres, thereby forming three pivot axes which are substantially aligned beyond "dead centre" in a locked attitude when the primary lever is brought to closed position to close the louvres, means being provided for adjustably varying the position of one of the pivot axes in the direction of alignment in accordance with the thickness of the louvre blades.

3. An adjustable louvre assembly according to Claim 2, wherein the control members comprise a pair of front and rear operating bars arranged in parallel longitudinal relationship within a jamb member and pivotally connected at respective diametrically-opposed positions to pivot discs rotatable in bearings in the jamb member and carrying louvre clips for supporting the ends of the louvre blades, longitudinal movement of the operating bars in opposite directions causing rotation of the pivot discs to open or close the louvres.

4. An adjustable louvre assembly according to Claim 3, wherein the primary operating lever has its rear end extending rearwards from the jamb member to constitute a handle and its front end is pivotally connected at one position to one end of the secondary lever and at another position to one of the operating bars, the other end of the secondary lever being pivotally connected to the other

operating bar, and wherein the means for varying the position of one of the pivot axes comprises means for varying the position of the pivotal connection of the primary operating lever to the respective operating bar.

5. An adjustable louvre assembly according to Claim 3, wherein the primary operating lever has its rear end extending rearwards from the jamb member to constitute a handle and its front extremity is pivotally connected to one end of the secondary lever, the other end of the secondary lever being pivotally connected to the front operating bar, the primary lever being pivotally connected at an intermediate position to the rear operating bar, and wherein the means for varying the position of one of the pivot axes comprises means for varying the position of the pivotal connection of the primary operating lever to the rear operating bar.

6. An adjustable louvre assembly according to any one of the preceding claims, wherein the means for adjustably varying the position of one of the pivot axes includes eccentric-type adjustment means.

7. An adjustable louvre assembly according to any one of the preceding Claims 1 to 5, wherein the means for adjustably varying the position of one of the pivot axes includes screw-threaded adjustment means.

8. An adjustable louvre assembly according to either of Claims 4 or 5, wherein the means for adjustably varying the position of the pivotal connection of the primary operating lever to the respective operating bar includes a cylindrical pivot bush engaging closely within an aperture in the primary operating lever and having an off-centre bore through which there passes a pivot pin secured to the operating bar, means being provided for securing the pivot bush relative to the pivot pin.

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