

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improved Locking Means for Adjustable Louvres

5 We, N. V. APPLETON PTY., LTD., of 128, Gerler Road, Hendra Brisbane, in the State of Queensland, Commonwealth of Australia, an Australian Company, 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:—

10 This invention relates to improved locking means for adjustable louvres, and its primary object is to provide releasable locking means for adjustable louvres whereby the louvre blades may be held firmly in fully closed position in such manner that they cannot be forced open from outside.

15 Other objects of the invention are to provide locking means which are associated with the actuating means of the louvres, which are adapted to hold the louvres closed in spring loaded manner and which are simple and economical to manufacture.

20 With the foregoing and other objects in view, the present invention broadly resides in an adjustable louvre assembly having louvre clips adapted to be moved pivotally in unison by at least one actuating handle operatively connected thereto, locking means comprising a toggle having spring loading and arranged so that in effecting closure of the louvres closure takes place before the toggle is moved into the in-line position, and thereafter distortion of the said spring loading is effected while the toggle moves into and past the in-line position, means limiting movement of the toggle past the in-line position to a predetermined position at which the said spring loading is still distorted, and means limiting additional distortion of the said spring loading when the toggle is in said predetermined position.

25 The spring loading may be provided by employing a resilient connection of one arm of the toggle or by making the arm itself of a resilient nature. Thus according to one feature of the invention, the spring loading

may consist of a spring engaging between an arm of the toggle and a stud or the like on an actuating member, while according to another feature of the invention one arm of the toggle may comprise a length of spring material which is bowed or otherwise shaped to enable it to shorten resiliently under a compressive force.

30 Other objects and features of the invention will be evident from the following description of particular forms thereof. In this description reference is made to the accompanying drawings, wherein:—

35 Figure 1 is a view in side elevation of part of a jamb assembly of a panel of louvres according to the invention, the louvre clips being partly opened,

40 Figure 2 is a view similar to Figure 1, the louvre clips being fully closed,

45 Figure 3 is a perspective view of parts of the assembly shown in Figures 1 and 2,

50 Figure 4 is a view in cross-section on the line 4—4 of Figure 1,

55 Figures 5 and 6 are views similar to Figures 1 and 2 respectively showing a modified form of spring loading.

60 Figure 7 is a view in side elevation of part of a mullion assembly of a panel of louvres according to the invention showing another modified arrangement, the louvre clips being partly open,

65 Figure 8 is a view similar to Figure 7, the louvre clips being fully closed,

70 Figure 9 is a view in cross-section on the line 9—9 of Figure 7,

75 Figure 10 is a view similar to Figure 7, showing a further modified arrangement, the louvre clips being partly open.

80 Figure 11 is a view similar to Figure 10, the louvre clips being fully closed, and

85 Figure 12 is a view in cross section on the line 12—12 of Figure 10.

90 Referring firstly to Figures 1 to 4, the jamb shown therein is made of sheet metal bent to form a main longitudinal channel 21, the front flange of which is bent at right

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projects

angles along two parallel longitudinal lines to provide a front channel 22 which is narrower than the main channel 21 and opens to the opposite side. The front flange 23 of the front channel 22 is wider than the flange 24 which is common to the two channels so that when the jamb is secured to a door frame member 25 (as shown in Figure 4) the flange 23 slightly overlaps the edge of the frame member 25. The jamb is secured to the frame member by screws which pass through holes 26 formed at intervals in the main channel. The width of the jamb is greater than that of the frame member so that the jamb protects to the rear of the frame member. The rear flange 27 of the main channel 21 is bent at right angles along three parallel lines so that it is of stepped formation, having a rectangular recess with sides 28 and 29 and a forwardly directed lip 30.

The jamb supports a number of channelled louvre clips 31 which are each pivoted to the web 32 of the front channel 22 by means of rivets 33 passing through the web 32 and through the webs of the clips 31 intermediate of their ends. The clips 31 are each adapted to receive the end of a louvre blade 34 and they are cut away at the top and bottom of the front and rear flanges 35 and 36 respectively to enable the louvre blades 34 to engage in surface contact when the louvre assembly is fully closed. The rear flanges have integral spring leaves 37 for holding the blades 34. The lower end of each front flange 35 is bent rearwardly to form a support for the blade and a lug 38 is provided at the upper end of each clip for bending over to hold the blades in position. Each clip has an integral arm 39 which projects rearwardly from its upper end. The arms 39 are all connected pivotally to an operating bar 40 by rivets 41 with spacing washers 42 interposed. Thus when the operating bar is raised the clips 31 are all moved towards the closed position and when it is lowered they are all moved towards the fully open position.

Movement of the operating bar is effected through an actuating handle 43 which is made of sheet metal and has an integral lug 44. The lug 44 is inserted through appropriately sized slots formed diametrically in two discs 45 and 46. The disc 46 fits rotatably in a circular hole in the web of the main channel 21 to the rear of the frame member 25, and the other disc 45 which is of larger diameter bears against the web. Within the channel, the lug 44 extends through a further slotted hole in one end of an actuating lever 47 and is riveted over. Thus the actuating lever 47 is constrained to turn with the actuating handle 43. The other end of the actuating lever 47 is connected by a pivot pin 48 to the lower end of a link or arm 49.

The arm 49 has a lug 50 which projects rearwardly from its lower end, and it is cranked inwardly, i.e. away from the web of the main channel, near its upper end, as shown in Figure 3, thus providing a shoulder 51. Above the shoulder 51 a slotted hole 52 is provided, and a rivet 53 which is fitted in a circular hole in the operating bar 40 is engaged in the hole 52. Thus the arm 49 may move a slight distance in the direction of the length of the slot, relative to the operating bar 40. The rivet 53 extends beyond the face of the arm 49 and is engaged by an eye 54 on one end of a wire loop spring 55. The other end 56 of the spring 55 is bent at right angles and is inserted through a hole in the shoulder 51 of the arm 49, to anchor it. The spring 55 is constructed and arranged so that it urges the rivet 53 towards the upper end of the slot 52.

In Figure 1, the actuating handle 43 is shown midway between its extreme positions, with the louvre clips partly open. On raising it from this position the arm 49 is drawn downwardly causing the operating bar 40 to move downwardly also and the louvre clips 31 to move closer to the horizontal position. On lowering the handle 43 the toggle formed by the lever 47 and the arm 49 is caused to move nearer to the in-line position and in doing so the arm 49 is raised causing the operating bar 40 to rise and the clips to move towards the closed position. The lengths and positions of the parts are arranged so that the louvre clips 31 are brought to the fully closed position before the toggle is fully in line. Then as the handle is depressed still further and the toggle continues to straighten, the arm 49 is raised relative to the rivet 53 and the arm 40 thereby compressing the ends of the spring 55 towards each other. When the toggle passes over the in-line position, i.e. when the centres of the rivets 48 and 53 are in a straight line with the axis of the lug 44 and discs 45 and 46, the effect of the spring 55 causes the toggle to continue to move until the lug 50 engages against the inside of the flange 27 of the jamb, which prevents further movement. At this stage the spring 55 is still under compression and therefore it continues to exert an upward force on the operating bar 40 tending to hold the louvre clips 31 closed in a spring loaded manner. Moreover the louvre clips cannot be forced open more than a short distance which is determined by the amount of movement which the rivet 53 can make in the slot 52.

The jamb is provided with a latch 57 for the purpose of allowing the louvre blades to be opened to a sufficient extent to permit a current of air, but such as to prevent them from being forced to the fully open position. The latch 57 is made of sheet metal and is

solidably mounted in a slotted hole in the web of the main channel below the actuating handle. The inner end 58 passes through an aperture in the lip 30 and is bent downwardly to retain the latch in position while permitting it to move by a limited amount in a horizontal direction. The latch also has a projecting lug 59 which is arranged to be moved into and out of the plane of movement of the operating bar 40. When the latch is moved so as to bring the lug 59 into the path of movement of the operating bar 40 the latter member is prevented from moving downwardly and rearwardly to its lowermost position and consequently the amount by which the louvre clips may open is limited.

It will be understood that the jamb illustrated in Figures 1 to 4 is employed in conjunction with another jamb of opposite hand which is also provided with pivotally mounted louvre clips and which is of similar cross-section to the jamb illustrated, except that it is reversed left for right, and actuating mechanism is not required. The two jambs may be used in conjunction with upper and lower frame members (not illustrated) which are connected at their corners by mitred joints and which are of similar cross-section to the jamb illustrated. The frame thus provided has a recess extending around its interior front edge defined by the surfaces 28 and 29 and this recess may receive a fly wire screen. Figure 4 illustrates the frame 60 of a suitable screen, the frame being made of extruded metal having a longitudinal opening 61 to facilitate attaching the side, top and bottom pieces together, and a slot 62 to receive the edges of the wire screen 63 held by wire 64.

The screen may be held in position by means of clips each consisting of a length of rod 65 extending through holes in the flanges 24 and 27 and having an enlarged head 66 within the front channel 22. A spring 67 is fitted on the rod between the head 66 and the flange 24 so as to urge the rod forwardly and the rear end of the rod is bent at right angles and flattened to provide a retaining piece 68. The spring 67 draws the retaining piece forwardly into engagement with the flange 27 and the frictional engagement causes the clip to remain in a position to which it is turned. When the fly wire screen is positioned in the recesses in the main frame, the clips are turned so that the retaining pieces lie against the back of the frame of the fly wire screen.

Any moisture which may pass between the louvre blade clips of the jambs will tend to run down the jambs and may be drained to the front of the jambs through a suitable outlet.

We refer now to Figures 5 and 6 of the drawings which illustrate an adjustable louvre assembly suitable for a door, and

comprising a jamb with a main channel 21 and a smaller front channel 22, a series of louvre clips 31 and an operating bar 40 similar to the corresponding parts shown in Figures 1 to 4. The jamb is also provided with an actuating handle 43 similar to that shown in Figures 1, 2 and 4 and secured to a similar actuating lever 47. The actuating lever 47 is provided with lugs 69 and 70 projecting to either side of its free end and a rivet or pivot pin 71 is connected to the free end midway between the lugs 69 and 70. The pivot pin 71 passes through an eye 72 on a spring member 73 which is slightly bowed in its unstressed condition as shown in Figure 5. The other end of the spring member 73 is also formed as an eye 74 and is connected by a further rivet or pivot pin 75 to the operating bar 40. The lever 47 and the spring 73 form the two arms of a toggle, and on raising the actuating lever the toggle draws the operating bar 40 downwardly so as to open the louvres. The downward movement is limited by the lug 70 engaging the rear flange 27 of the jamb. On moving the actuating handle downwardly the toggle is caused to straighten, and the parts are made and arranged so that the louvre clips 31 move to the fully closed position before the toggle reaches the in-line position. As the actuating handle is lowered a further amount and the toggle device is moved into the in-line position, the spring 73 is compressed between its two pivots and it is bowed into greater curvature. As soon as the toggle device moves over dead centre the stress on the spring member 73 causes it to continue to move until the lug 69 engages the flange 27 in the position as shown in Figure 6. The arrangement is such that the spring member 73 is still stressed in this condition so that there is a residual force tending to move the actuating bar 40 upwardly so as to hold the louvre clips 31 closed in a spring loaded manner. Moreover it will be observed from Figure 6 that if it is attempted to force the louvre clips open from outside the spring member 73 will be bowed slightly further and will then engage the flange 27 to prevent further movement of the louvre clips. Consequently while the louvres may be forced to a very slight extent they cannot be forced fully open from outside.

Figures 7, 8 and 9 illustrate another form of the invention which is suitable more particularly for a window. The assembly illustrated comprises a mullion 75a consisting of a channel-section member adapted to be connected to a window frame member with the flanges 76 and 77 directed towards the frame member. A number of louvre clips 78 are pivotally mounted on the mullion 75a by means of bearing members 79 which are fixed to the clips and rotatably mounted in bear-

ing apertures in the mullion. Each bearing member has a flange on which two oppositely placed pivot pins 80 are formed and these pins are all engaged in apertures in a pair of actuating bars 81 and 82. Thus the louvre clips are constrained to open and close in unison, the forward actuating bar 81 moving upwardly and the rear actuating bar 82 moving downwardly to open the louvre clips and *vice versa* to close them.

An actuating handle 83 is connected by a pivot pin 84 to the forward actuating bar 81. The handle 83 comprises a length of plate shaped to provide a lower portion 85 and an integral upper portion 86 which extends from it to provide an included angle of about 160°. The upper end of the upper portion 86 is turned at right angles and then parallel to the direction of the lower portion and part of the tip 87 thereof is bent over to provide a finger piece 88. The arrangement is such that when the actuating handle is placed with its lower portion 85 vertical as shown in Figure 8 the upper portion 86 is inclined upwardly and rearwardly so that the tip 87 thereof is in contact with the rear flange 77 of the mullion 75a. Part of the flange 77 is cut away as shown to permit the actuating handle to operate. The actuating handle is also cranked outwardly at 89 to provide clearance for the spring member 90 hereinafter described.

The spring member 90 comprises a length of spring steel which is bowed and provided with an eye at each end. The lower eye 91 is fitted over a pivot pin 92 which is fastened to the actuating handle beyond the cranked portion 89, and the other eye 93 is connected by a further pivot pin 94 to the rear actuating bar 82.

In the operation of the form of the device shown in Figures 7, 8 and 9, as the actuating handle 83 is drawn downwardly it moves the rear actuating bar 82 downwardly and the front actuating bar 81 upwardly thereby opening the louvre clips 78. In the reverse movement of the actuating handle 83 the louvre clips are moved towards the closed position. The arrangement of the parts is such that the clips are completely closed before the toggle made up of the spring member 90 and the lower portion 85 of the actuating handle is in the in-line position. As the actuating handle is moved further towards the in-line position in which the centres of the pivot pins 84, 92 and 94 are in a straight line the ends of the spring member 90 are compressed towards each other and the curvature of the member 90 is increased. As soon as the actuating handle is moved beyond the in-line position the member 90 forces it to move into the extreme position shown in Figure 8 wherein the tip 87 is held against the rear flange 77 of the mullion. The spring member 90 is still under compression in this posi-

tion so that it exerts an upward force on the rear operating bar 82 and a downward force on the front operating bar 81, whereby the louvre clips are held closed under spring loading. If it is attempted to force the clips open the spring member 90 is compressed by a further amount until it engages against the front flange 76 of the mullion thereby preventing further movement.

Figures 10, 11 and 12 illustrate another construction according to the invention which is similar to that shown in Figures 7, 8 and 9 in that a mullion 75a of channel cross-section carries louvre clips 78 which are pivotally mounted thereon by means of pivots 79 and are operated in unison by operating bars 81 and 82. An actuating handle 95 is connected intermediate of its ends to the rear operating bar 82 by a pivot pin 96 and is cranked outwardly at 97 and 98 on each side of the pin 96. One end of the handle is turned at right angles and then parallel to the body of the handle and the tip 99 thereof is provided with a finger piece 100 for operating the handle. The other end of the handle 95 is connected by a pivot pin 101 to an eye 102 on the upper end of a curved spring member 103. This member has another eye 104 formed on its lower end and engaged by a pivot pin 105 which is fastened to the front operating bar 81. With this arrangement when the actuating handle is drawn downwardly the front operating bar 81 is drawn upwardly and the rear operating bar 82 is drawn downwardly thereby opening the louvre clips as before. On moving the actuating handle upwardly the louvres are first closed and thereafter the toggle device formed by the spring member 103 and the operating handle is moved into and past the in-line position thereby locking the louvres in position under spring loading as before. If it is attempted to force the clips open the spring member 103 is compressed by a further amount until it engages against the rear flange 77 of the mullion, thereby preventing further movement.

It will be understood that with both the constructions of Figures 7 to 9 and 10 to 12 the mullion illustrated is used with another mullion carrying louvre clips of opposite hand which may or may not have separate actuating means therefor.

WHAT WE CLAIM IS:—

1. An adjustable louvre assembly having louvre clips adapted to be moved pivotally in unison by at least one actuating handle operatively connected thereto, locking means comprising a toggle having spring loading and arranged so that in effecting closure of the louvres closure takes place before the toggle is moved into the in-line position, and thereafter distortion of the said spring loading is effected while the toggle moves into and past the in-line position, means limiting move-



ing apertures in the mullion. Each bearing member has a flange on which two oppositely placed pivot pins 80 are formed and these pins are all engaged in apertures in a pair of actuating bars 81 and 82. Thus the louvre clips are constrained to open and close in unison, the forward actuating bar 81 moving upwardly and the rear actuating bar 82 moving downwardly to open the louvre clips and *vice versa* to close them.

An actuating handle 83 is connected by a pivot pin 84 to the forward actuating bar 81. The handle 83 comprises a length of plate shaped to provide a lower portion 85 and an integral upper portion 86 which extends from it to provide an included angle of about 160°. The upper end of the upper portion 86 is turned at right angles and then parallel to the direction of the lower portion and part of the tip 87 thereof is bent over to provide a finger piece 88. The arrangement is such that when the actuating handle is placed with its lower portion 85 vertical as shown in Figure 8 the upper portion 86 is inclined upwardly and rearwardly so that the tip 87 thereof is in contact with the rear flange 77 of the mullion 75a. Part of the flange 77 is cut away as shown to permit the actuating handle to operate. The actuating handle is also cranked outwardly at 89 to provide clearance for the spring member 90 herein-after described.

The spring member 90 comprises a length of spring steel which is bowed and provided with an eye at each end. The lower eye 91 is fitted over a pivot pin 92 which is fastened to the actuating handle beyond the cranked portion 89, and the other eye 93 is connected by a further pivot pin 94 to the rear actuating bar 82.

In the operation of the form of the device shown in Figures 7, 8 and 9, as the actuating handle 83 is drawn downwardly it moves the rear actuating bar 82 downwardly and the front actuating bar 81 upwardly thereby opening the louvre clips 78. In the reverse movement of the actuating handle 83 the louvre clips are moved towards the closed position. The arrangement of the parts is such that the clips are completely closed before the toggle made up of the spring member 90 and the lower portion 85 of the actuating handle is in the in-line position. As the actuating handle is moved further towards the in-line position in which the centres of the pivot pins 84, 92 and 94 are in a straight line the ends of the spring member 90 are compressed towards each other and the curvature of the member 90 is increased. As soon as the actuating handle is moved beyond the in-line position the member 90 forces it to move into the extreme position shown in Figure 8 wherein the tip 87 is held against the rear flange 77 of the mullion. The spring member 90 is still under compression in this posi-

tion so that it exerts an upward force on the rear operating bar 82 and a downward force on the front operating bar 81, whereby the louvre clips are held closed under spring loading. If it is attempted to force the clips open the spring member 90 is compressed by a further amount until it engages against the front flange 76 of the mullion thereby preventing further movement.

Figures 10, 11 and 12 illustrate another construction according to the invention which is similar to that shown in Figures 7, 8 and 9 in that a mullion 75a of channel cross-section carries louvre clips 78 which are pivotally mounted thereon by means of pivots 79 and are operated in unison by operating bars 81 and 82. An actuating handle 95 is connected intermediate of its ends to the rear operating bar 82 by a pivot pin 96 and is cranked outwardly at 97 and 98 on each side of the pin 96. One end of the handle is turned at right angles and then parallel to the body of the handle and the tip 99 thereof is provided with a finger piece 100 for operating the handle. The other end of the handle 95 is connected by a pivot pin 101 to an eye 102 on the upper end of a curved spring member 103. This member has another eye 104 formed on its lower end and engaged by a pivot pin 105 which is fastened to the front operating bar 81. With this arrangement when the actuating handle is drawn downwardly the front operating bar 81 is drawn upwardly and the rear operating bar 82 is drawn downwardly thereby opening the louvre clips as before. On moving the actuating handle upwardly the louvres are first closed and thereafter the toggle device formed by the spring member 103 and the operating handle is moved into and past the in-line position thereby locking the louvres in position under spring loading as before. If it is attempted to force the clips open the spring member 103 is compressed by a further amount until it engages against the rear flange 77 of the mullion, thereby preventing further movement.

It will be understood that with both the constructions of Figures 7 to 9 and 10 to 12 the mullion illustrated is used with another mullion carrying louvre clips of opposite hand which may or may not have separate actuating means therefor.

WHAT WE CLAIM IS:—

1. An adjustable louvre assembly having louvre clips adapted to be moved pivotally in unison by at least one actuating handle operatively connected thereto, locking means comprising a toggle having spring loading and arranged so that in effecting closure of the louvres closure takes place before the toggle is moved into the in-line position, and thereafter distortion of the said spring loading is effected while the toggle moves into and past the in-line position, means limiting move-



ment of the toggle past the in-line position to a predetermined position at which the said spring loading is still distorted, and means limiting additional distortion of the said spring loading when the toggle is in said predetermined position.

2. An adjustable louvre assembly comprising louvre clips, an actuating handle operatively connected to said clips for opening and closing said clips in unison, and locking means including a toggle movable towards the in-line position as the clips are movable towards the closed position, characterised in that the distance between the end pivot points of the toggle when the clips are fully closed is less than the sum of the distances of the intermediate pivot of the toggle from the end pivot points thereof, and in that said locking means embodies spring loading adapted to be distorted to enable the said toggle to be moved into and past the in-line position, said assembly including means limiting movement of the toggle past the in-line position to a position at which the said spring loading is still distorted, and means limiting additional distortion of the said spring loading when the toggle is in said predetermined position.

3. An adjustable louvre assembly comprising louvre clips, an actuating handle, an arm pivotally connected to said actuating handle and forming therewith a toggle for effecting movement of said clips in unison, said toggle being movable towards the in-line position as the clips are moved towards the closed position, characterised in that the distance between the end pivot points of the toggle when the clips are fully closed is less than the sum of the distances of the intermediate pivot of the toggle from the end pivot points thereof, and in that said locking means embodies spring loading adapted to be distorted to enable the said toggle to be moved into and past the in-line position, said assembly including means limiting movement of the toggle past the in-line position to a position at which the said spring loading is still distorted, and means limiting additional distortion of the said spring loading when the toggle is in said predetermined position.

4. An adjustable louvre assembly according to any preceding claim, wherein the spring loading comprises a resilient connection to one arm of the toggle.

5. An adjustable louvre assembly according to any one of Claims 1 to 3, wherein one arm of the toggle is connected at one of its ends by a longitudinal slot engaged with a pin, stud or the like, and wherein the spring loading comprises a spring engaged between said pin, stud or the like and a part of said arm.

6. An adjustable louvre assembly according to any one of Claims 1 to 3, wherein one arm of the toggle is of a resilient character and constitutes said spring loading.

7. An adjustable louvre assembly according to Claim 6, wherein said arm comprises a length of spring material capable of shortening resiliently under compressive force.

8. An adjustable louvre assembly according to Claim 7, wherein the said length of spring material is initially bowed and wherein the means limiting additional distortion of the spring loading comprises a stop which is engaged by the length of spring material on becoming further bowed.

9. An adjustable louvre assembly comprising a jamb or mullion, a plurality of louvre clips pivotally connected thereto, an operating bar pivotally connected to said louvre clips and operable to effect closure and opening thereof in unison, an actuating lever pivotally connected to said jamb or mullion, an arm pivotally connected to said actuating lever and said operating bar, said lever and said arm forming a toggle adapted to move toward the in-line position as the louvre clips move towards the closed position, the sum of the distances of the centre of the pivot joining the lever and arm from the centres of the pivots joining the lever to the jamb or mullion and the arm to the operating bar being greater than the distance between the centre of the pivot joining the lever to the jamb or mullion and the centre of the pivot joining the arm to the operating bar when the louvre clips are closed, and spring loading incorporated in said toggle adapted to be strained resiliently to allow the toggle to move to the in-line position, wherein part of the toggle is arranged to engage a part of the jamb or mullion after passing the in-line position so as to limit further movement and to maintain the spring loading in a strained condition, and wherein means are provided for limiting further straining of the spring loading when said part of the toggle is engaged with said part of the jamb or mullion.

10. An adjustable louvre assembly according to Claim 9, wherein the pivot connecting the arm to the operating bar is movable within limits longitudinally relative to the arm and the spring loading is effected by a spring engaged between said pivot and a part of said arm.

11. An adjustable louvre assembly comprising a jamb or mullion, a plurality of bearing members rotatably supported in said jamb or mullion, a plurality of louvre clips mounted one on each bearing member, a pair of parallel actuating bars pivotally connected to said bearing members and operable to open and close said louvre clips, an actuating handle pivotally connected to one actuating bar, and an arm pivotally connected to the actuating handle and the other actuating bar, the arm and the part of the actuating handle between the pivots thereof forming a toggle and arranged so that as the toggle moves towards the in-line position the clips

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position



- move towards the closed position, the sum of the distance between the centres of the pivots on the actuating handle and the distance between the centres of the pivots of the arm being greater than the distance between the pivots connecting the actuating handle and the arm to the actuating bars when the clips are fully closed, and spring loading adapted to be strained resiliently when the actuating handle is moved to move the toggle to the in-line position, said assembly also having means for limiting motion of the actuating handle after the toggle has passed the in-line position and before the strain on the spring loading is entirely relieved, and means for limiting further straining of the spring loading when the actuating handle is in the limit position past the in-line position.
12. An adjustable louvre assembly according to Claim 9 or Claim 11, wherein the arm comprises a length of spring wire shaped to enable it to shorten resiliently under a compressive force so as to provide the spring loading.
13. An adjustable louvre assembly according to Claim 12, wherein the said length of spring wire is initially bowed and wherein the means for limiting further straining of the spring loading comprises part of the jamb or mullion which is engaged by the said length of spring wire on becoming further bowed.
14. An adjustable louvre assembly according to Claim 12, wherein the said arm is bowed and is provided with an eye at each end.
15. An adjustable louvre assembly substantially as hereinbefore described with reference to Figures 1 to 4 of the accompanying drawings.
16. An adjustable louvre assembly substantially as hereinbefore described with reference to Figures 5 and 6 of the accompanying drawings.
17. An adjustable louvre assembly substantially as hereinbefore described with reference to Figures 7, 8 and 9 of the accompanying drawings.
18. An adjustable louvre assembly substantially as hereinbefore described with reference to Figures 10, 11 and 12 of the accompanying drawings.

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