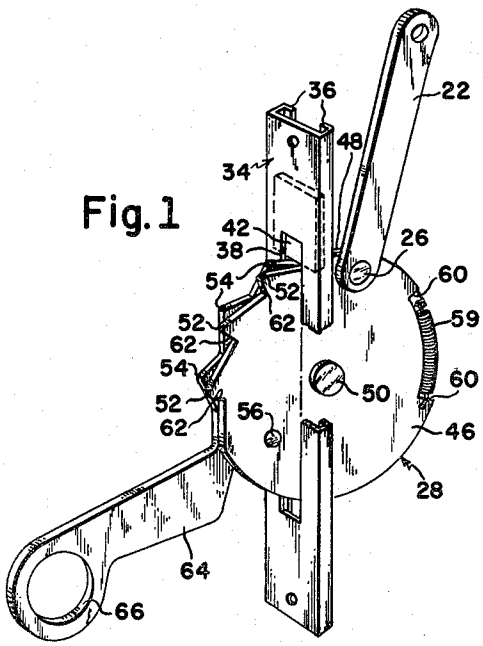
June 8, 1965 P. F. REVITZ ETAL 3,188,074

JALOUSIE OPERATOR

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Fig. 1



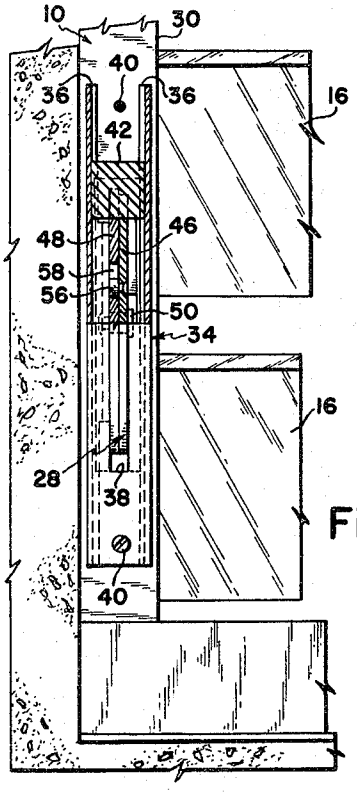


Fig. 8

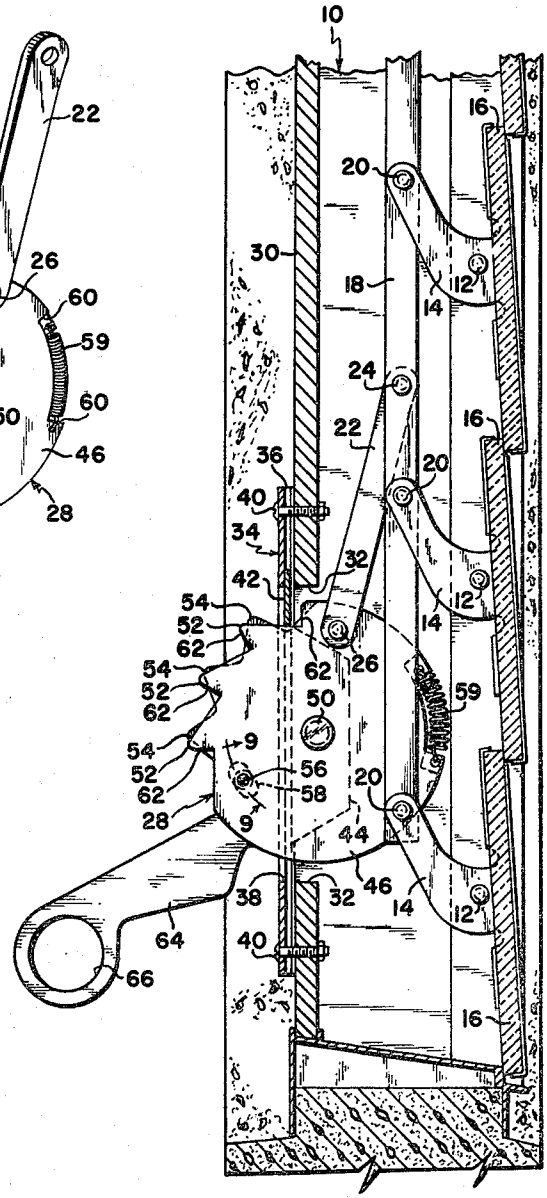


Fig. 2

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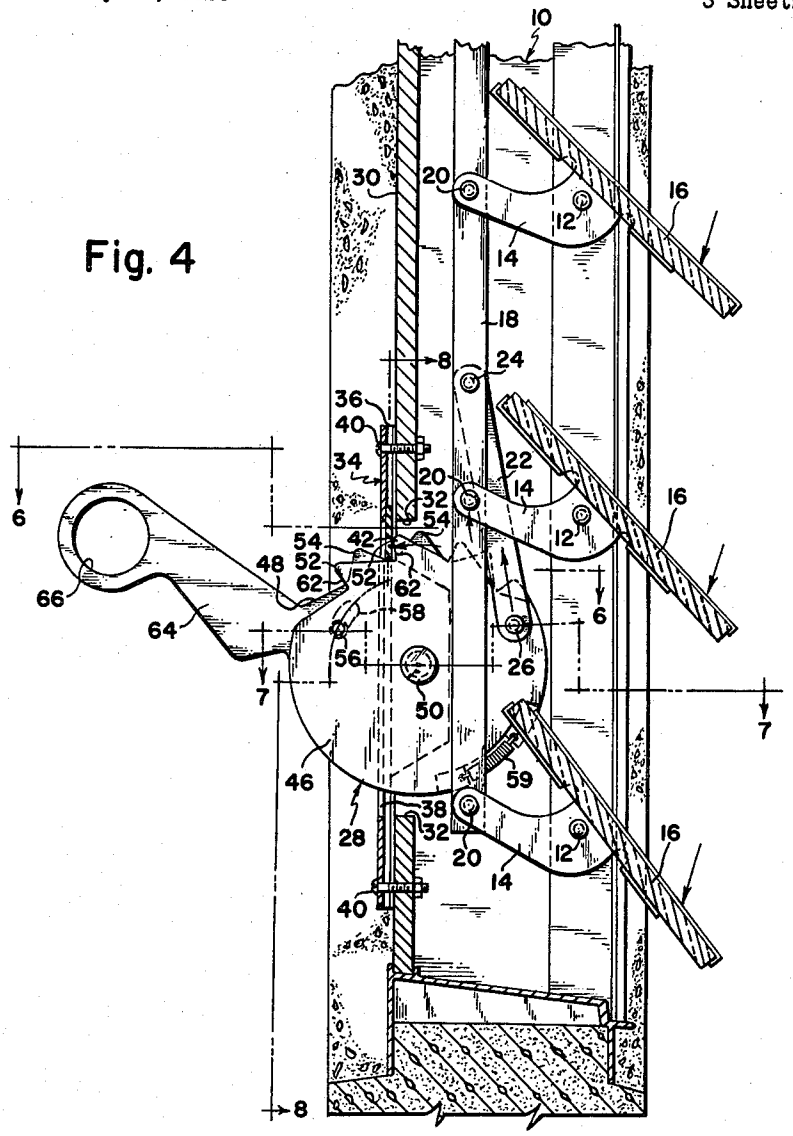
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Fig. 4



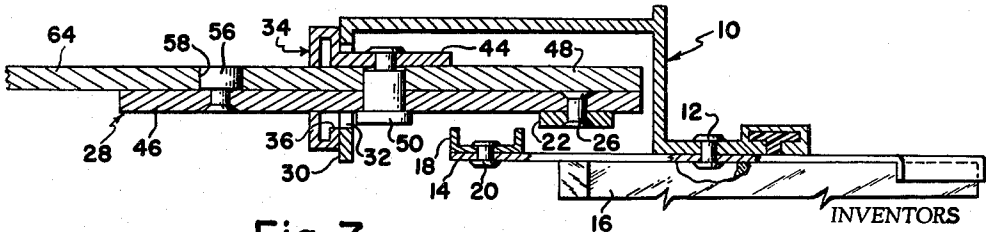


Fig. 7

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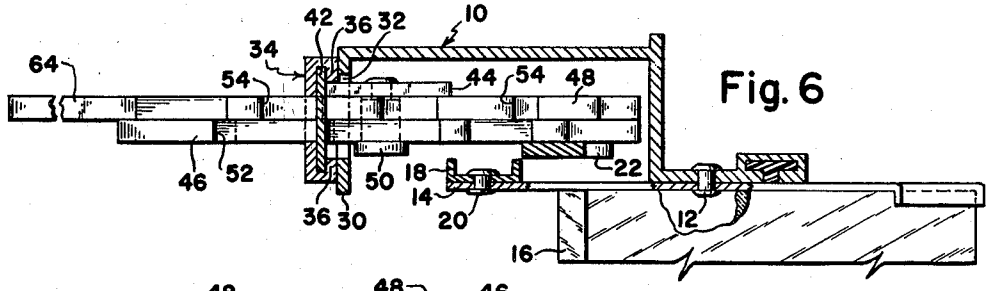


Fig. 6

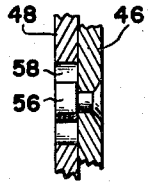


Fig. 9

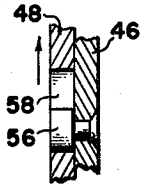


Fig. 10

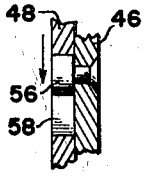


Fig. 11

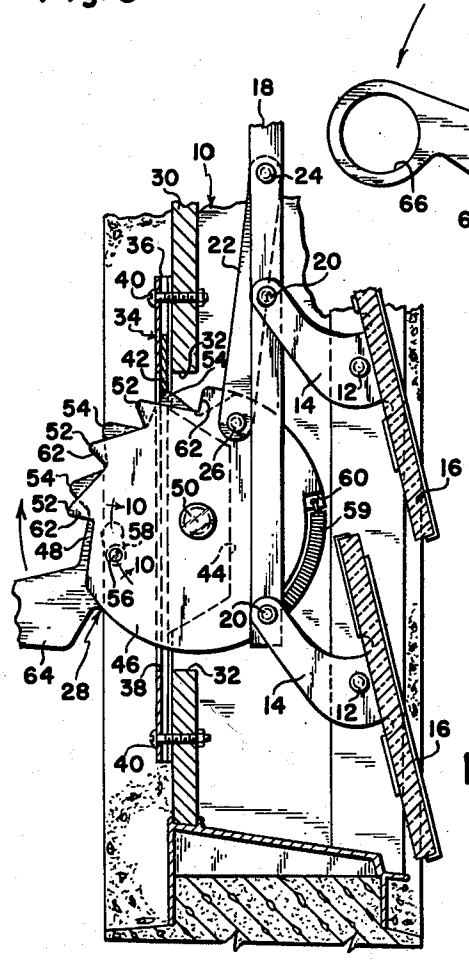


Fig. 3

Fig. 5

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JALOUSIE OPERATOR

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Filed July 31, 1963, Ser. No. 299,019
17 Claims. (Cl. 268—111)

This invention relates to operating mechanism for windows, and, in particular, to a device for opening and closing windows of the jalousie type, or those with multiple canopies, with glassed panel, tiltable in either case, on pairs of horizontally disposed trunnions.

Most mechanisms of this type have certain, conventional elements, such as a common, throw rod connected to lever arms extending from the respective panels, and a link connecting the throw rod to the mechanism which provides the throw, and it is a principal object of the present invention to provide a novel and highly improved form of mechanism for providing the throw.

A currently popular, and widely used form of operator employs a crank-operated worm and gear for the throw mechanism. While this provides a continuous range of adjustment, its use is slow and laborious, and in the absence of extensive and expensive structural features, such as bearings and special materials, is subject to an objectionable degree of friction, leading to early wear, malfunctioning and breakage. Bruised fingers may also result from the crank action in close quarters.

It is therefore a further object of the invention to provide a throw mechanism which is rapid in action, and which is harmless to the operator.

A further object is to provide a throw mechanism with various degrees of throw, arranged stepwise.

Yet another object is to provide a throw mechanism which is compact, and capable of smooth and easy operation without the need for precision as to bearings or other features of structure.

A still further object is to provide a throw mechanism operable in either direction by a simple, swinging movement of a hand lever.

Another object is to provide a throw mechanism which is actuable in either direction by minor, manual forces on an inside hand lever, but which resists closing movement under forces applied anywhere in the system other than directly on the hand lever.

More specifically, it is an object to provide a throw mechanism with dual parts having a lost-motion connection, one of the parts having one-way ratchet teeth cooperating with a gravity-actuated latch, and the other having two-way camming teeth, operable to lift the latch and permit retrograde movement of the said one of the parts.

These and other objects, which will be apparent, are attained by the present invention, a preferred form of which is described in the following specification, as illustrated in the drawing, in which:

FIGURE 1 is a perspective view of a unit embodying the throw mechanism of this invention,

FIGURE 2 is a vertical, sectional view through a jalousie unit, taken substantially at the plane of the disc-form throw unit,

FIGURE 3 is a view similar to FIGURE 2, showing an initial stage of opening of the panels,

FIGURE 4 is a view similar to FIGURE 3, showing a further stage of opening of the panels, and the throw mechanism latched in locking position,

FIGURE 5 is a view similar to FIGURE 4, showing an initial stage of closing movement of the mechanism,

FIGURE 6 is a sectional view taken on the planes of the staggered line 6—6 of FIGURE 4,

FIGURE 7 is a sectional view taken on the planes of the staggered line 7—7 of FIGURE 4,

FIGURE 8 is a sectional view taken on the planes and curved segment of the staggered line 8—8 of FIGURE 4,

FIGURE 9 is a sectional view taken on the surface of the arcuate line 9—9 of FIGURE 2,

FIGURE 10 is a view similar to FIGURE 9, but taken on the line 10—10 of FIGURE 3, and

FIGURE 11 is a view similar to FIGURE 10, but taken on the line 11—11 of FIGURE 5.

Referring to the drawings by characters of reference there is shown generally at 10, in FIGURE 2, a window frame, preferably of aluminum, carrying headed pivots 12, each pivotally mounting a curved arm 14, extending from the middle of a glazed, jalousie unit or panel, 16, at one end thereof, and it will be understood that this trunnion mounting is provided at each end of the unit. A common throw rod 18, of channel section, is pivotally connected, through pins 20, to the outer ends of arms 14, in such manner that units 16 are constrained to swing in unison, with the panels 16 thus remaining in constant parallelism. The common rod 18 is actuated in movement of translation, in the direction of its length, by means of a relatively short link 22, connected by a pivot 24 to rod 18, and by a pivot 26 to the throw mechanism, which is indicated, as a whole, by the numeral 28.

The back wall or flange 30 of the frame 10 has an elongate, vertical, rectangular opening 32, to accommodate the disc portion of the throw unit, and mounted in framing relation to this opening is the latch housing 34, of channel form, with inturned, inner flanges 36, and rectangular opening 38, registering with opening 32 in the window frame, the latch housing being secured to the latter by a pair of bolts 40. A rectangular, metal plate 42, snugly fitted within channel 34, for free, sliding movement, vertically, is gravity-actuated for dropping into a detent position, and cam-actuated, in a lifting action, for unlocking the throw mechanism, as will be seen.

Carried by the channel member 34, and extending inwardly through opening 32, is a perpendicularly disposed tab 44, of trapezoidal form, which serves to mount the discs of the thrown mechanism. These two discs, indicated as 46 and 48, respectively, are mounted on a common pivot pin 50, carried by tab 44. Disc 46 carries the pin 26, and therefore communicates the throw to link 22.

Disc 46 has a series of ratchet teeth 52 over about one-third of its periphery, whereby the disc may move clockwise, as seen in FIGURE 3, by camming the latch 42 upwardly, but is prevented by the latch from moving in the counter clockwise direction. Such return movement is provided for by cooperative action of the other disc 48, in a manner which will now be described. For each ratchet tooth 52 on disc 46, disc 48 has a corresponding and adjacent tooth 54, in the general form of an isoceles triangle, and the two sets of teeth have a limited range of relative positions of angular adjustment by virtue of a slip connection, comprising a pin 56 carried by disc 46 and engaging in a limited, arcuate slot 58 in disc 48. The discs are in the normal position of adjustment, with the vertices of teeth 54 slightly displaced clockwise from the vertices of teeth 52, when the pin 56 is at the top limit of slot 58, and the discs are yieldably retained in this position by virtue of a tension coil spring 59, located in registering, arcuate, peripheral slots 60 in the discs, and with its ends attached to portions of the discs which extend into the grooves. In this position of teeth 54, the front, radial faces 62 of teeth 52 are entirely clear, for reception of the detent plate, or latch, 42, as seen in FIGURE 4.

Disc 48 has a generally radially extending, handle lever 64, which may be provided with a finger hole 66.

Assuming the jalousie panels closed, as in FIGURE 2, where the end of the closing operation is illustrated, upon release of the downward force on handle 64, disc 48 will rotate counterclockwise under the urging of spring 59, until the bottom of slot 58 approaches pin 56. Opening of the panels is accomplished simply by an upward, relatively light pressure of the hand on lever 64. Since the pin 56 is at the bottom of slot 58, discs 46 and 48 move in unison. At each ratchet tooth 52, the detent 42 is lifted by a camming action, first by one side of a tooth 54, and then by a small portion of the slant side of tooth 52, at its vertex, before dropping down along the radial edge 62 of tooth 52. This is repeated at each tooth 52, and the operation may be terminated at any desired ratchet tooth, depending upon what degree of opening of the windows is desired. In this position the system is locked open against all forces except a deliberate, downward force on handle 64, but the remarkable fact is that with only a relatively light downward pressure on the handle, the panels close as though no locking detent or latch means were present in the system. This is due to the rotary play, or lost motion, between the two discs, whereby disc 48, which is integral with handle 64, is able to move, in spite of the positive detention of disc 46 by the plate 42 engaging a ratchet tooth 52. Thus, as disc 48 rotates against the pull of spring 59, the slanted, leading face of tooth 54 moves under latch plate 42 and gradually moves it upwardly. As long as the downward pressure is maintained on handle 64 the slanted, leading edges of teeth 54 will remain in advance of the radial edges 62 of ratchet teeth 52, and thus the latch is cammed upwardly to clear each ratchet tooth as it arrives. The unlocking action is thus continuous, and takes place as though no detents were present in the system at all. Yet, in any adjusted, open position of the panels the system is thoroughly locked against any casual forces.

The biasing means for the lost-motion connection may partake of other forms than the circumferential spring shown. For instance, the well-known arrangement of a helically operable coil spring, arranged on the axis of pin 50, may be employed.

The lost-motion connection may also partake of forms other than the particular pin-and-slot arrangement shown. Also, members 46 and 48 need not be constructed as full-size discs, since all that is necessary is a pair of sectors sufficient in extent to accommodate the toothed portions.

The gravity-actuated latch, or pawl, while representing a preferred form, may also be varied by substitution of other means, such as a spring-pressed pawl.

With reference to what has been referred to hereinbefore as the finger hole 66 of the lever 64, it is often the case that windows of the type herein involved are installed in relatively high locations, and the hole is adapted to accommodate a standard window opening device.

Generally speaking, whereas a certain, preferred embodiment has been shown and described, various modifications will be apparent, in the light of this disclosure, and the invention should not, therefore, be deemed as limited, except insofar as shall appear from the spirit and scope of the appended claims.

We claim:

1. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and first means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent means, said first means having a lost-motion connection with said lever.

2. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said means comprising an element mounted for swing co-axially with said detent arrangement, and having a lost-motion connection therewith.

3. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said detent arrangement comprising a series of ratchet teeth circumferentially arranged about the axis of swing of said lever, and a pawl co-operating with said teeth, and said arrangement having a lost-motion connection with said means.

4. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said detent arrangement comprising a series of ratchet teeth circumferentially arranged about the axis of swing of said lever, and a pawl co-operating with said teeth, said means comprising an element mounted for swing co-axially with said detent arrangement, and having a lost-motion connection therewith.

5. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said detent arrangement comprising a pawl, and an arcuately disposed ratchet swingably mounted co-axially with said lever, and said means comprising a cam carried by said lever.

6. A device according to claim 5, said ratchet and said cam comprising relatively thin plates, with closely adjacent surfaces.

7. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said detent arrangement comprising a pawl, and an arcuately disposed ratchet swingably mounted co-axially with said lever, and said means comprising a cam carried by said lever and a lost motion connection between said ratchet and said cam.

8. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said detent arrangement comprising a pawl, and an arcuately disposed ratchet swingably mounted co-axially with said lever, and said means comprising a cam carried by said lever, a lost-motion connection between said ratchet and said cam, and spring means biasing the parts to a limiting position of said lost-motion connection.

9. In a system having multiple panels mounted for

swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said detent arrangement comprising a pawl, and an arcuately disposed ratchet swingably mounted co-axially with said lever, and said means comprising a cam carried by said lever, said cam comprising a series of peripheral serrations, adapted for camming action in both directions of swing of said lever.

10. A device according to claim **9**, said ratchet having teeth with a slant side and a substantially radial side, and said serrations being substantially in the form of isoceles triangles.

11. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said means including a cam carried by said lever, said cam comprising a series of peripheral serrations, adapted for camming action in both directions of swing and a lost-motion connection between said ratchet and said cam.

12. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means comprising a cam associated with said unit, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, said cam comprising a series of peripheral serrations, adapted for camming action in both directions of swing, a lost-motion connection between said ratchet and said cam, and spring means biasing the parts to a limiting position of said lost-motion connection.

13. In a system having multiple panels mounted for swinging in unison, an operating unit comprising a swingably mounted lever, a detent arrangement in said unit comprising a toothed ratchet, yieldable in one direction of swing of said lever and arranged to normally prevent swinging of said lever in the other direction, and means associated with said detent arrangement and comprising a cam having serrations about the axis of swing of said lever, and responsive to swing of said lever in said other direction to inactivate said detent arrangement, a lost-motion connection between said ratchet and said cam, and spring means biasing said ratchet and cam to a first limiting position of said lost-motion connection, said serrations and the teeth of said ratchet having vertices, each vertex of a tooth of said ratchet substantially coinciding with the vertex of a respective one of said serrations at the second limiting position of said lost-motion connection.

14. A device according to claim **13**, said ratchet and said cam comprising relatively thin plates, with closely adjacent surfaces.

15. An operating device for a plurality of interconnected louvers simultaneously operable between open and closed positions, comprising, first and second disc mounted in contiguous relation for pivoting about a common axis, said first disc having a first plurality of circumferentially-spaced teeth in its periphery lost-motion means interconnecting said discs for limited relative pivoting between first and second limiting positions, means yieldingly urging said discs into said first position, a latch yieldingly urged into contact with the peripheires of said discs and effective when said discs are in said first position to releasably engage the teeth of said first disc and lock the same against one direction of pivotal adjustment about said axis, means carried by said second disc and effective when said discs are in said second position of relative pivoting only, to render said latch means ineffective on said first disc, and a lever connected with said second disc and operable to pivot the same.

16. The device of claim **15**, said last-named means comprising a second plurality of teeth in the periphery of said second disc and circumferentially spaced the same as said first plurality of teeth, the tip of each tooth of said first plurality being in coincidence with the tip of a corresponding tooth of said second plurality, when said discs are in said second limiting position of relative pivotal adjustment, each said tooth of said second disc being operable to cam said latch out of locking engagement with the corresponding tooth of said first disc when said discs are pivoted as a unit only in said second position of relative pivotal adjustment thereof.

17. In a closure for a wall opening, an open frame to fit said opening, a plurailty of louvers, each mounted in said frame for pivoting about respective spaced parallel coplaner axes, a rod interconnecting said louvers for conjoint pivoting between open and closed positions, first and second contiguous discs mounted in said frame for pivoting about a common axis centrally of both, an operating connection between said rod and first disc, both said discs having a plurality of equiangularly circumferentially-spaced teeth in their peripheries, a latch yieldingly urged into engagement with the teeth of both said discs, a lost motion connection between said discs and limiting pivoting thereof between first and second positions of relative adjustment, spring means yieldingly urging said discs into said first position of relative pivotal adjustment wherein the teeth of each tooth of said first disc lies between the tips of a consecutive pair of teeth of said second disc and said latch is operative to engage and lock said first disc against pivoting in one direction, means operable to pivot the second disc into said second position in said one direction to move said discs into said second position wherein each tooth of one disc registers with a corresponding tooth of the other disc and continued pivoting of both said discs in said one direction cams said latch out of locking engagement with said first disc.

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