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A louvre operating mechanism comprising link members, a rack member and a gear member

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ABSTRACT

A louvre operating mechanism for opening and closing a louvre which is pivotally mounted to a support, the mechanism comprising link members, at least one rack member, at least one gear member and a gear rotating member, the link members comprising a first link member and a second link member which are pivotally connected to each other, the first link member also being pivotally connected to the louvre, the second link member also being connected a said gear member, the said gear member and a said rack member being meshed together, the said rack member able to adopt reciprocal movement upon rotation of the said gear member, the said gear member being rotated by the gear rotating member.

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COMPLETE SPECIFICATION
FOR A PETTY PATENT

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Invention Title:	A LOUVRE OPERATING MECHANISM COMPRISING LINK MEMBERS, A RACK MEMBER AND A GEAR MEMBER

The following statement is a full description of this invention including the best method of performing it known to us:

A LOUVRE OPERATING MECHANISM COMPRISING LINK MEMBERS, A RACK MEMBER AND A GEAR MEMBER

This invention relates to a louvre operating mechanism to open and close louvre blades in a louvre window. The invention will be described with reference to a louvre window but it should be appreciated that the invention may also be applicable to other types of louvre arrangements such as louvre doors or louvres in other types of partitions.

Louvre windows consist of a surround frame formed of upper and lower horizontal frame portions and opposed side frame portions which are fastened together. The frame supports an array of horizontal louvres which pivot about horizontal pivot pins between louvre open and louvre closed positions. It is known to tip the frame on its side such that the louvres extend vertically, however the invention will be described with respect to horizontally extending louvre blades.

For louvre windows, the blades are formed of glass and are rectangular when viewed in plan. The blades can have a length of anywhere between 20 to 100cm, a width of between 10 to 40cm, and a thickness of between 5 to 10mm.

As it is not practical to drill holes in glass blades, it is usual for the glass blades to be supported by end clips. One end clip is pivotally attached to one side frame portion and the other end clip is pivotally attached to the other side frame portion. It is normal for the end clips on one side frame portion to be functionally attached together such that all the end clips can be rotated by a louvre operating mechanism. The end clips on the other side frame portion can usually pivot independently.

Conventional louvre operating mechanisms simply rotate the end clips on one side frame portion by engaging with and rotating the pivot pins. The mechanism is simple as the louvre pivots about a central portion which means that the pivot pin is easily accessible to the mechanism.

However, such mechanisms are not very effective for louvre blades which do not pivot about a mid-point. For instance, one type of louvre blade is of the type having a top pivot which means that the blade pivots

about an upper portion, usually adjacent the junction between the upper longitudinal edge of the blade and the side edge of the blade. When pivoted in this manner, conventional louvre operating mechanisms are not very effective.

A particular disadvantage with conventional louvre mechanisms is the rather large load placed on the operating mechanism when opening or closing a louvre window of the type described above. This requires components to be made of strong material, usually steel which adds to the manufacturing cost. As well, it can be difficult for a person to manipulate a conventional operating mechanism due to the larger loads.

It is known to open larger louvre structures using assistance from pneumatic rams, but this requires pressure piping to be installed around the frame and greatly adds to the cost. Large helical springs have also been used to assist in movement of larger louvres (typically steel or metal louvres) for fire ventilation.

The present invention is directed to a louvre operating mechanism which uses a combination of link members, one or more rack members, and one or more gear members to allow louvres to be opened and closed in a more convenient manner.

It is an object of the invention to provide a louvre operating mechanism which may overcome the abovementioned disadvantages or provide the consumer with a useful or commercial choice.

In one form, the invention resides in a louvre operating mechanism for opening and closing a louvre which is pivotally mounted to a support, the mechanism comprising link members, at least one rack member, at least one gear member and a gear rotating member, the link members comprising a first link member and a second link member which are pivotally connected to each other, the first link member also being pivotally connected to the louvre, the second link member also being connected a said gear member, the said gear member and a said rack member being meshed together, the said rack member able to adopt reciprocal movement upon rotation of the said gear member, the said gear member being rotated by the

gear rotating member.

In a more particular form, the invention resides in the mechanism as described above for opening and closing a plurality of louvres in a louvre window, wherein each louvre in the window has a pivotally attached said first link member and said second link member, each said second link member is rigidly attached to a said gear member, each said gear member is meshed to a said rack member, the rack members being interconnected to reciprocate as a single unit, one of the gear members being rotated by the gear rotating member.

The arrangement described above allows a bank of louvres to be opened and closed without placing large loads on the components. This allows the components to be made of less expensive materials such as plastic rather than steel. However, it should be appreciated that the components can be made of any desired material.

The mechanism can also allow the louvres to be closed more tightly against each other than may have been possible with conventional louvre operating mechanisms. The arrangement can also allow a louvre to be pivoted to an almost fully open position in a convenient manner.

The mechanism can be used for operation of a single louvre but finds more practicality in operating a plurality of louvres together for pivoting movement between open and closed positions. The mechanism also finds particular use with louvres of the type that are pivotally mounted to the surround frame adjacent a corner of the louvre as opposed to a mid-point of the louvre which is more conventional.

The mechanism comprises link members and preferably comprises two link members being a first link member and a second link member. The link members may be formed of any convenient material including but not limited to metal and plastics. The link members are typically elongate plate-like in configuration and have opposed ends which are rounded to facilitate pivotal attachment to other members. The size and shape of the link members can vary depending on the size, shape and type of louvre in the louvre window.

The first link member and the second link member are pivotally connected to each other. It is typical for the link members to be connected together adjacent their ends.

The first link member is pivotally connected to a louvre. Typically, the link member is pivotally connected adjacent its end to the louvre. For glass louvres, end clips are typically used and the first link member can be pivotally attached to the end clip of the louvre. It is preferred that the first link member is attached to the louvre adjacent the end edge of the louvre and in a region approximating the mid-point region of the end edge of the louvre.

The second link member may be elongate and substantially plate-like in configuration and may also have rounded opposed ends. Typically, second link member has a length which is less than the length of the first link member. The second link member is connected to a gear member. Preferably, the second link member is rigidly attached to the gear member such that rotation of the gear member causes the link member to rotate about its attachment to the gear member.

The mechanism further comprises at least one rack member. It is preferred that a rack member is provided for each louvre. Thus, if a louvre window has a plurality of louvres. A rack member or a rack portion should be provided in the vicinity of each louvre. In a simple form, a single elongate rack plate or rod can be provided to which the gear member of each louvre can be meshed. Alternatively, separate rack members may be provided with the rack members being somehow interconnected to act as a single unit.

The gear member and the rack member are meshed together such that rotation of the gear member causes the rack member to adopt sliding movement. The gear member can preferably be rotated in each direction which can cause the rack member to adopt reciprocal motion.

A gear rotating member is provided to rotate the gear member. The gear rotating member can be a worm gear or some other form of arrangement to turn the gear member. The gear rotating member can have a portion which extends out of the louvre surround frame and which can be

turned or otherwise manipulated by a person to operate the louvres.

An embodiment of the invention will be described with reference to the following figures in which

Figure 1 is a section view through a louvre surround frame illustrating two louvres (there typically being more) in a closed position.

Figure 2 illustrates the arrangement of Figure 1 where the louvres have been moved to an open position.

Figures 3A-3H show a progressive opening of a single louvre and illustrating the position of the link members in the progressive opening steps.

The embodiment of the invention is illustrated with respect to a louvre window of the type having a plurality of louvre blades which can pivot between open and closed positions. The louvre blades are typically rectangular when viewed in plan and can be formed of glass, although the blades may be formed of other materials such as metal, wood, plastics, composites and the like. If the blades themselves are formed of glass, the blades are held at their end edges by a pair of louvre clips. However, if the blades are formed of materials other than glass (for instance wood or metal), end clips may not be necessary as the various attachments can be attached directly to the end edge of the blade. Therefore, a reference made to a louvre clip is not meant to be limiting to the invention as a clip required for glass blades may not be required for other types of blades. Where mention is made of an attachment or a part which is attached to or forms part of an end clip, it should be appreciated that this can be equally applicable to the edge of a non-glass blade where a clip may not be required.

While the embodiment will be described with reference to a louvre window, the term "louvre window" need not be restricted to windows only and may include other arrangements such as doors containing louvres, partitions containing louvres, and the like.

Louvre windows are typically rectangular when viewed in plan and consist of a surround frame, typically formed of metal and which consists of top of bottom horizontal frame members and a pair of opposed vertical side frame

members which are attached together to form a rigid surround frame. The side frame members are formed with channels and the like to accommodate the various louvre operating mechanisms. For glass blades, a pair of plastic end clips are pivotally attached to each vertical side frame member and a glass blade is then inserted between the clips. Usually, the clips on one side wall are linked inside the frame to some form of operating member, while the clips on the other side wall can pivot freely. An operating member in the form of an extending handle can be pulled or rotated to open and close the louvre blades. This type of arrangement is conventional.

Referring to Figures 1 and 2, there is illustrated, in section, a novel louvre operating mechanism attached to two louvres pivotally mounted to a support. Specifically, there is illustrated a surround frame comprising a top horizontal extrusion 10, a bottom horizontal extrusion 11, and a side vertical extrusion 12. Attached to extrusion 12 are two louvre end clips 13, 14 (better illustrated in Figure 2). The louvre end clips hold the edge of a glass louvre blade. In the embodiment, only two end clips are illustrated but it should be appreciated that a more typical situation would have a louvre window consisting of more than two blades.

Clips 13, 14 each have an upper longitudinal edge 15, 16 and each upper longitudinal edge is pivotally attached through pivot points 17, 18 to or relative to extrusion 12.

Each louvre clip 13, 14 (and therefore each louvre) is pivoted between a closed position illustrated in Figure 1 and a partially open position illustrated in Figure 2 via two link members being a first link member 19 and a second link member 20. In Figure 1, the two link members are partially superimposed, but in Figure 2 the link members can be seen clearly.

First link member 19 is pivotally attached to a respective end clip 13, 14 via a pivot point 21. Pivot point 21 is in the middle region along the end edge of the respective clip 13, 14. The opposed end 22 of first link member 19 is pivotally attached to one end 23 of second link member 20. Thus, the two link members are pivotally attached together and first link member 19 is also pivotally attached to its respective end clip 13, 14.

Second link member 20 is attached to a toothed gear member 24 in such a way that it rotates with the gear member. That is, second link member 20 is not pivotally attached to gear member 24 although, if required, a degree of lost motion can be built in to the attachment between second link member 20 and gear member 24. In the embodiment, the second link member is attached to the rotational axis 24 of gear member 24. Gear member 24 is rotatably attached to or relative to extrusion 12 to hold it in place.

Each gear member 24 meshes to a rack member 26, 27. Each rack member 26, 27 is mounted in extrusion 12 for reciprocating movement. The rack members are interconnected such that movement of one rack member 26, 27 will result in the same movement of the other rack member 26, 27. If the louvre window has a larger number of louvres, all the rack members in the embodiment are connected to move as a single unit.

One of the gear members 24 is rotated by a gear rotating member 30. The gear rotating member 30 has a worm gear 31 which meshes with the teeth on gear member 24 and has a shaft 32 which extends out of the surround frame and can be fitted with a turn knob (not illustrated) to allow it to be turned by a person.

In use, a person can rotate shaft 32 (via the turn knob not illustrated) which rotates worm gear 31 which in turn causes gear member 24 to rotate. As gear member 24 rotates, it slides the meshed rack member 27, and as rack member 27 is connected to rack member 26 (this not being illustrated in Figure 2), rack member 26 will also move which will rotate its attached gear member 24. As well, rotation of the gear members 24 will cause rotation of each second link member 20 which in turn pushes up (or pulls down depending on the direction of rotation of the gear member), each first link member 19 which results in the louvre blades being opened and closed.

Figures 3A-3H show progressive opening of a louvre and illustrates the angled relationship between the link members.

It should be appreciated that various other changes and

modifications may be made to the embodiment described without departing from the spirit and scope of the invention as claimed.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A louvre operating mechanism for opening and closing a louvre which is pivotally mounted to a support, the mechanism comprising link members, at least one rack member, at least one gear member and a gear rotating member, the link members comprising a first link member and a second link member which are pivotally connected to each other, the first link member also being pivotally connected to the louvre, the second link member also being connected a said gear member, the said gear member and a said rack member being meshed together, the said rack member able to adopt reciprocal movement upon rotation of the said gear member, the said gear member being rotated by the gear rotating member.

2. The mechanism of claim 1, for opening and closing a plurality of louvres in a louvre window, wherein each louvre in the window has a pivotally attached said first link member and said second link member, each said second link member is rigidly attached to a said gear member, each said gear member is meshed to a said rack member, the rack members being interconnected to reciprocate as a single unit, one of the gear members being rotated by the gear rotating member.

3. The mechanism of claim 1 or claim 2, substantially as hereinbefore described with reference to the drawings.

DATED this 2nd day of June 2000

JAMES HARDIE RESEARCH PTY LIMITED
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By their Patent Attorneys
CULLEN & CO.

Fig 1

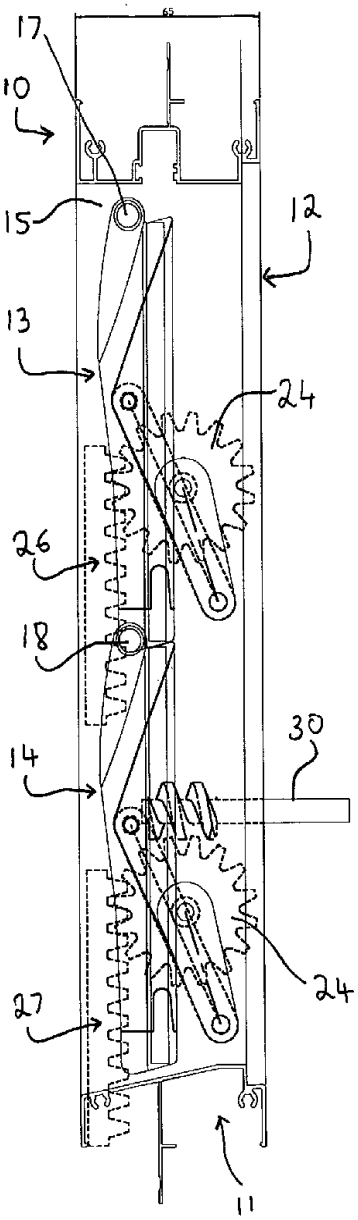
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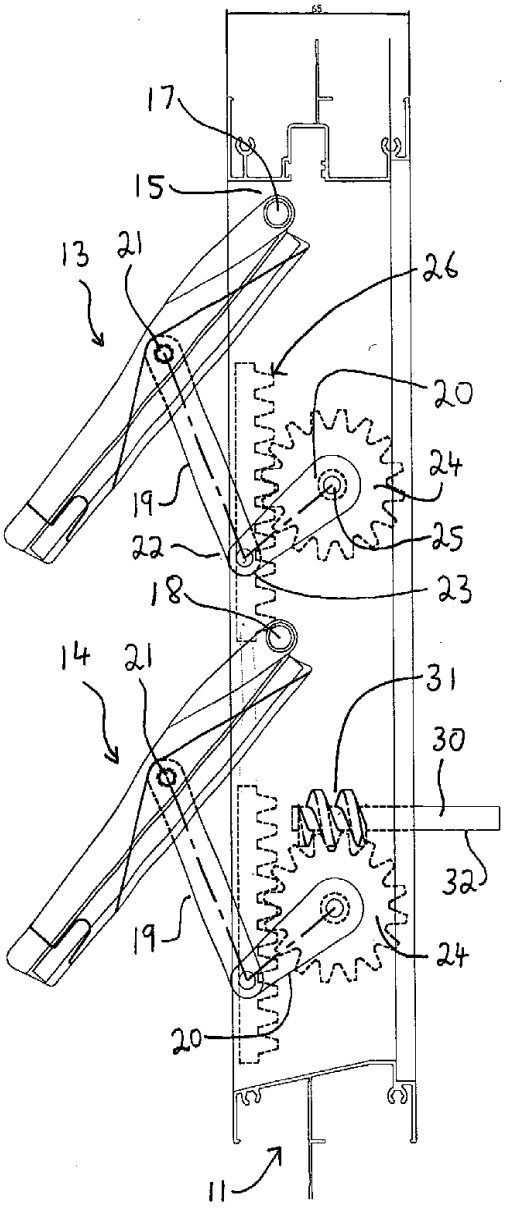
Fig 2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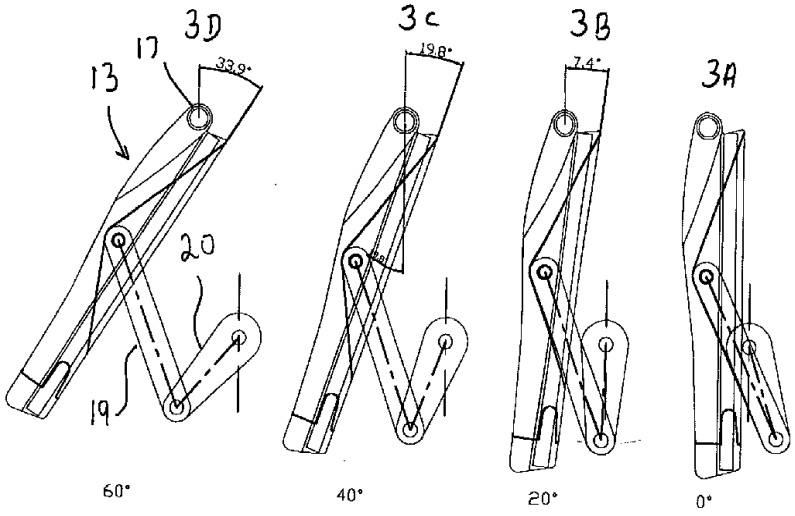
11

Fig3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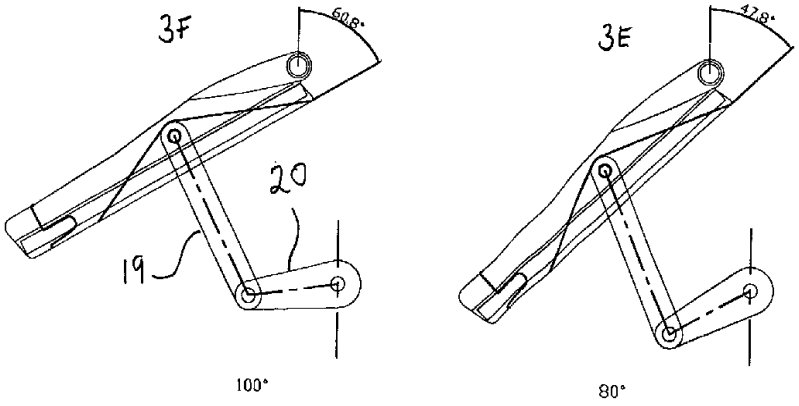
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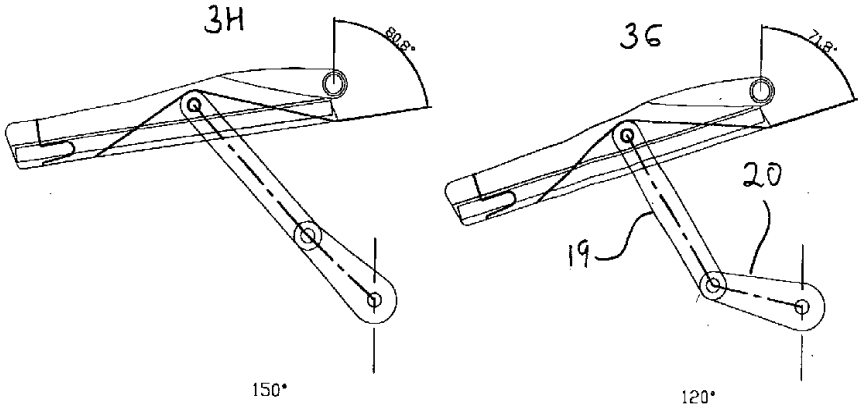
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