

[54] **RACK MOUNTED ELECTRONIC MODULE
SUPPORT MECHANISM**

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[58] Field of Search **248/277, 324;
211/105; 312/273, 320**

[56] **References Cited**

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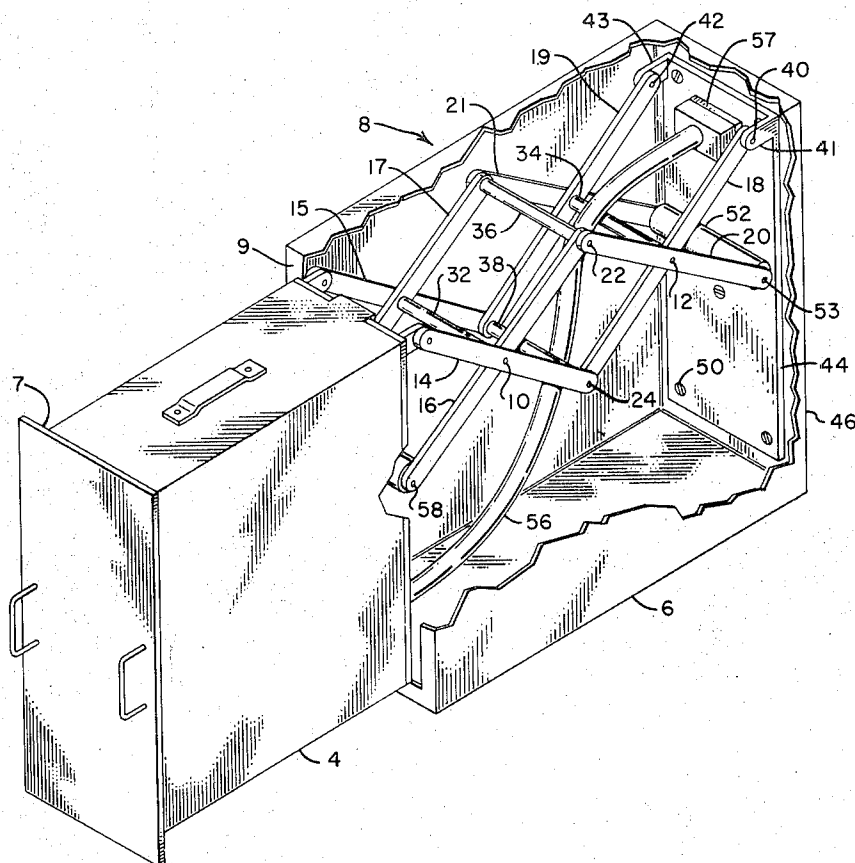
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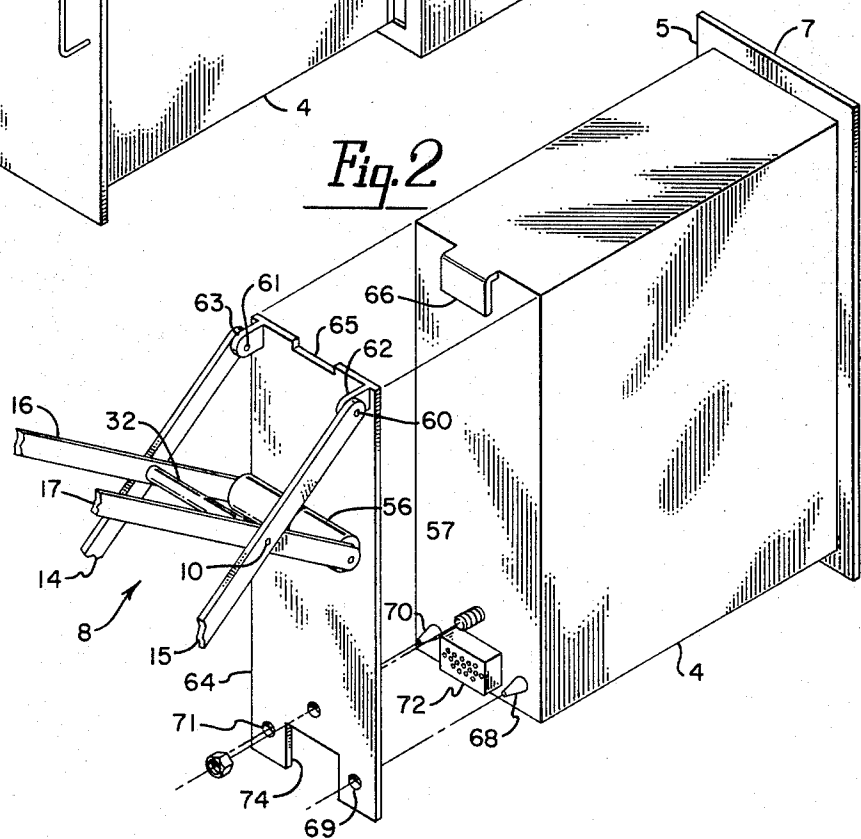
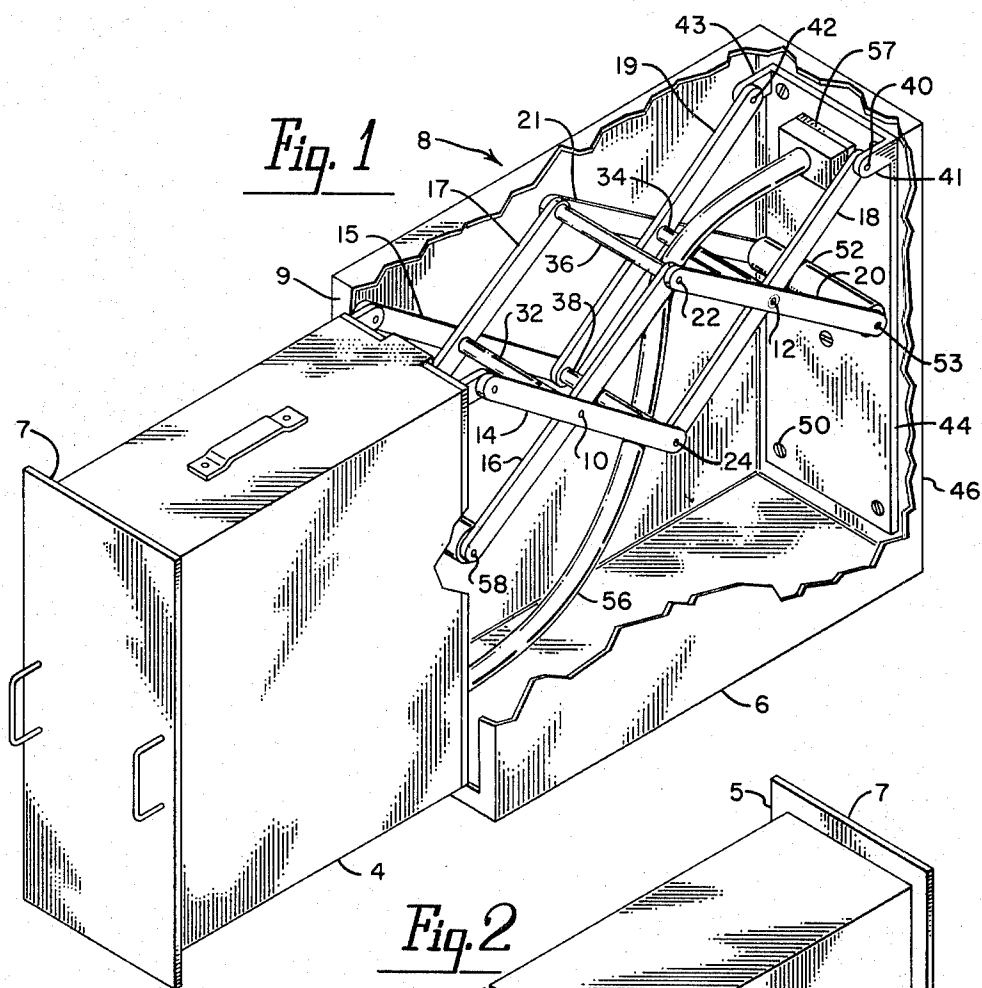
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[57] **ABSTRACT**

A mechanism for supporting a rack mounted electronic module during both storage and access is disclosed. The mechanism includes side-by-side pairs of scissor-like two-bar linkages. Each of the front and rear ends of the mechanism includes four pivot points: on the rear end of the mechanism the two top pivot points are pivotally coupled to the rear of the rack while the two bottom pivot points support a rolling member that rolls vertically along the rack rear wall; on the front end of the mechanism the two top pivot points are pivotally coupled to the rear of the module while the two bottom pivot points support a rolling member that rolls vertically along the module rear wall.

4 Claims, 2 Drawing Figures





RACK MOUNTED ELECTRONIC MODULE SUPPORT MECHANISM

BACKGROUND OF THE INVENTION

In the prior art, rack mounted electronic modules are generally supported by a pair of horizontally retracting slide members, each of the slide members being mounted on opposite side walls of the supporting rack structure. The electronic module is then secured to the sliding member of the slide assembly for movement into and out of the rack structure. The side mounted slide assemblies, in this configuration, occupy width dimensions making the rack structure wider than desirable. This is especially true in configurations of multiple side-by-side rack installations. In narrow, high electronic modules top and bottom side assemblies have been used; however, because the slide assemblies are then installed with the flat sliding member horizontally oriented excessive bending movements in the slide assembly are generated. Accordingly, it is desirable that a support be provided for electronic modules that requires no additional width or height dimensions over those of the supported electronic module but which can be incorporated in the area between the rear of the electronic module and the rack structure.

SUMMARY OF THE INVENTION

The present invention is directed toward a mechanism that supports a rack-supported electronic module while in both its stored and open positions while not requiring any width or height dimensions over those of the supported electronic module. The mechanism is comprised of at least a pair of scissor-like two-bar linkages each of which are pivotally coupled at their centers. The pair of two-bar linkages are, in turn, pivotally coupled at their centers forming similar X-like configurations about which common center the bars rotate freely. Each of the front and rear ends of the mechanism includes four pivot points one on each end of each of the four bars: on the rear end of the mechanism the two top pivot points are pivotally coupled to the rear of the rack while the two bottom pivot points support a rolling member which rolls vertically along the rack rear wall; on the front end of the mechanism the two top pivot points are pivotally coupled to the rear of the module while the two bottom pivot points support a rolling member that rolls vertically along the module rear wall.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the rear end of the mechanism of the present invention illustrating how it is attached to the rear wall of the rack structure.

FIG. 2 is an isometric view of the front end of the mechanism of the present invention illustrating how it is attached to the rear wall of the electronic module.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With particular reference to FIG. 1 there is presented an isometric view of the rear end of the mechanism of the present invention illustrating how it is attached to the rear wall of the rack structure. In this illustration, electronic module 4 is shown in its open position substantially drawn out of rack structure 6 with mechanism 8 in its extended position and supporting electronic module 4 free of the front and side walls of the

rack structure 6. In its closed position, the rear surface 5 of flange 7 is against the front surface of the front wall 9 of rack structure 6—mechanism 8 is then in its compressed condition between the rear walls of electronic module 4 and rack structure 6. Electronic module 4 is then locked in place by attaching hardware through front flange 7 and front wall 9.

The mechanism 8 is comprised of: a pair of single pivot points 10 and 12; two-bar linkages 14, 16 and 18, 20, respectively, that are pivotally intercoupled at their ends at mating pivot points 22 and 24 to form a four-bar linkage of four pivot points 10, 12, 22, 24; a similar pair of two-bar linkages 15, 17 and 19, 21 are pivotally intercoupled at their ends at similar mating pivot points to form a similar four-bar linkage of similar four pivot points; the two similar four-bar linkages are then intercoupled by spacers 32, 34, 36, 38 at their similar four pivot points 10, 12, 22, 24, respectively, to form an accordion-like box structure in which the four free ends of the mechanism on each end are said to describe the front and rear ends, respectively. At the rear end, the mechanism 8 pivotally couples two top rear ends of bars 18, 19 at their pivot points 40, 42 to associated flanges 41, 43 of rear support panel 44 which is affixed to the rear wall 46 of rack structure 6 by hardware 50. Also at the rear end of mechanism 8, a roller 52 is pivotally coupled to the two bottom rear ends of bars 20, 21 at their pivot points 53, 54 for rolling vertically along the surface of rear panel 44 whenever mechanism 8 is compressed or extended by the storage or opening, respectively, of electronic module 4. Also illustrated is a cable 56 for electrically coupling the electronic module 4 to electrical connector 57 that is mounted on the rear wall 46 of rack structure 6.

With particular reference to FIG. 2 there is presented an isometric view of the front end of the mechanism of the present invention illustrating how it is attached to the rear wall of the electronic module 4. This illustration shows how at the front end the mechanism 8 pivotally couples the two top front ends of bars 14, 15 at their pivot points 60, 61 to the two associated flanges 62, 63, respectively, of front support panel 64. Also at the front end of mechanism 8 a roller 56 is pivotally coupled to the two bottom front ends of bars 16, 17 at their pivot points 57, 58 for rolling vertically along the surface of front panel 64 whenever mechanism 8 is compressed or extended. Front support panel 64 has a notch 65 on its top edge for receiving the mating associated flange 66 that extends rearwardly and downwardly from the top rear edge of electronic module 4. By hooking the flange 66 over the top edge of front support panel 64 and into the mating notch 65, the guide pins 68, 70 pass into the mating associated alignment holes 69, 71 to align electronic module 4 with mechanism 8; attaching hardware then secures one to the other. Electrical connector 72 passes through opening 74 in front support panel 64 to permit the mating connector of cable 56 to attach thereto.

Although mechanism 8 is illustrated as being comprised of two four-bar linkages, each of two intercoupled two-bar linkages, coupled at their pivot points by spacers it is to be appreciated that mechanism 8 may be constructed of N, where N is a positive integer of 1 or greater, pairs of two-bar linkages coupled by the appropriate number of spacers to provide the necessary mechanical strength.

What is claimed is:

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1. A rack mounted electronic module support mechanism, comprising:
- a plurality of two-bar linkages pivotally interconnected for forming an extensible mechanism having front and rear ends;
 - a rear panel having two pivot points for pivotally securing two top ends of two of said two-bar linkages to said rear panel;
 - a front panel having two pivot points for pivotally securing two top ends of two of said two-bar linkages to said front panel;
 - a rear roller pivotally secured to two bottom ends of two of said two-bar linkages;
 - a front roller pivotally secured to two bottom ends of two of said two-bar linkages;
 - said front roller rolling on a surface of said front panel and said rear roller rolling on a surface of said rear panel for maintaining said front and rear panels substantially parallel as said rollers roll along said panels while said mechanism is being extended.
2. The mechanism of claim 1 wherein said front panel includes means for supporting an electronic module.
3. The mechanism of claim 2 wherein said means for supporting an electronic module includes openings for receiving an extension of said electronic module and locating said electronic module on said front panel.

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4. A rack mounted electronic module support mechanism, comprising:
- N pair of two-bar linkages, the bars of each two-bar linkage being pivotally intercoupled at their single pivot point;
- the two-bar linkages of each pair of two-bar linkages coupled in a side-by-side relationship;
- ones of each of said pair of two-bar linkages pivotally intercoupled at corresponding ends for forming an extensible mechanism having front and rear ends;
- a rear panel having two pivot points for pivotally securing two top ends of two of said two-bar linkages to said rear panel;
- a front panel having two pivot points for pivotally securing two top ends of two of said two-bar linkages to said front panel;
- a rear roller pivotally secured to two bottom ends of two of said two-bar linkages;
- a front roller pivotally secured to two bottom ends of two of said two-bar linkages;
- said front roller rolling on a surface of said front panel and said rear roller rolling on a surface of said rear panel for maintaining said front and rear panels substantially parallel as said rollers roll along said panels while said mechanism is being extended.

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