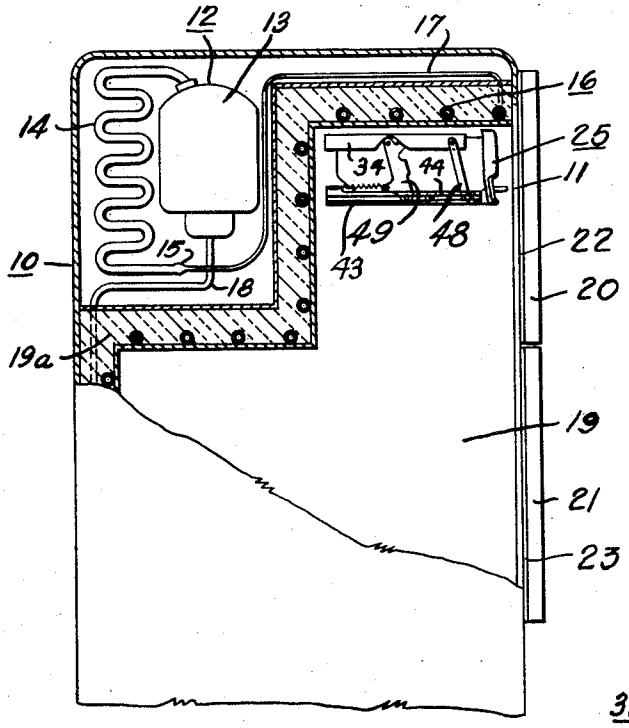
Oct. 7, 1958 V. G. SHARPE 2,855,262

REFRIGERATOR STORAGE TRAY

Filed Jan. 19, 1954 3 Sheets-Sheet 1

Fig. 1



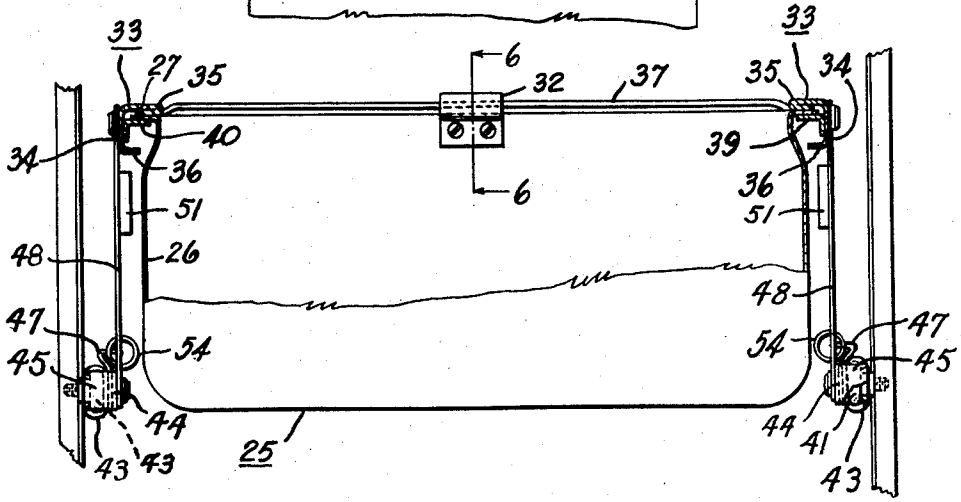


Fig. 2

INVENTOR.
Verlos G. Sharpe
BY R. R. Condon
Attorney

Oct. 7, 1958 V. G. SHARPE 2,855,262

REFRIGERATOR STORAGE TRAY

Filed Jan. 19, 1954 3 Sheets-Sheet 2

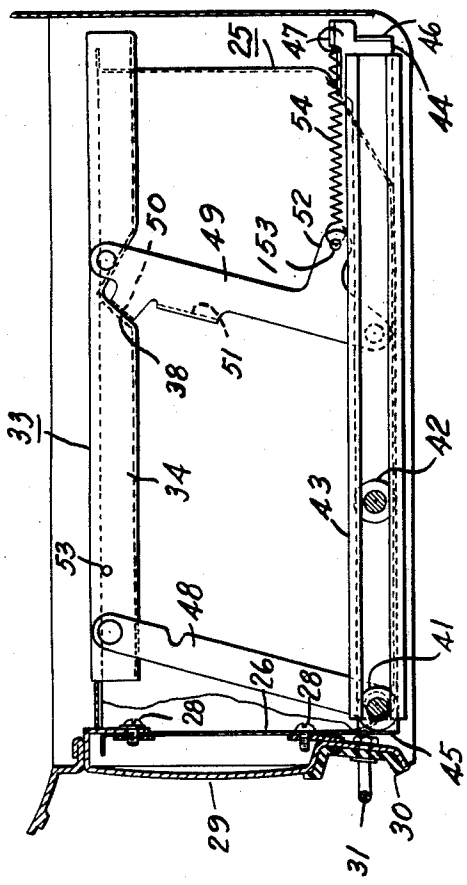


Fig. 3

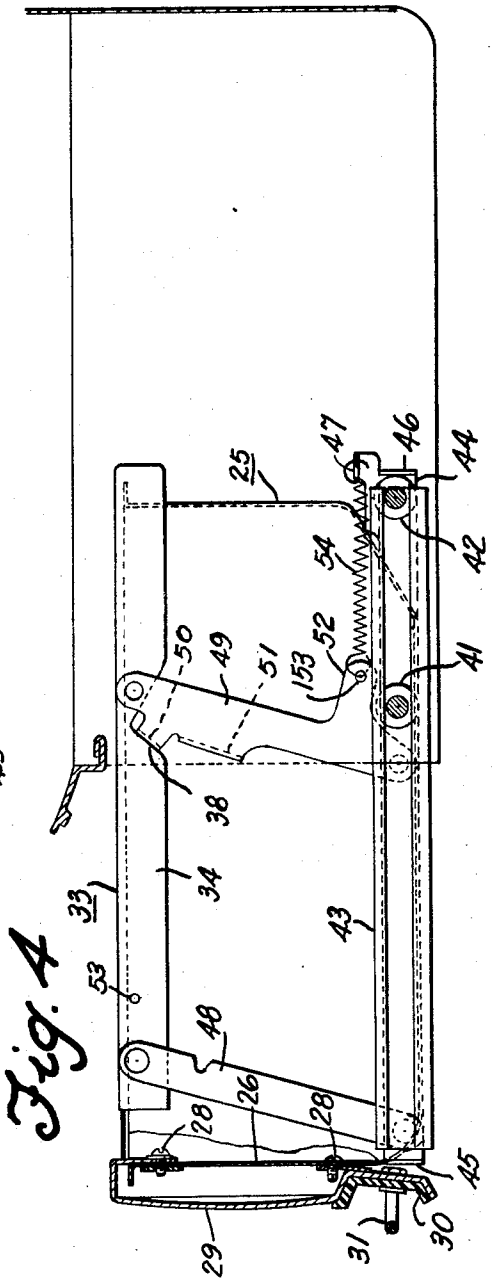


Fig. 4

INVENTOR.
Verlos G. Sharpe
BY R. R. Condon
Attorney

Oct. 7, 1958 V. G. SHARPE 2,855,262

REFRIGERATOR STORAGE TRAY

Filed Jan. 19, 1954 3 Sheets-Sheet 3

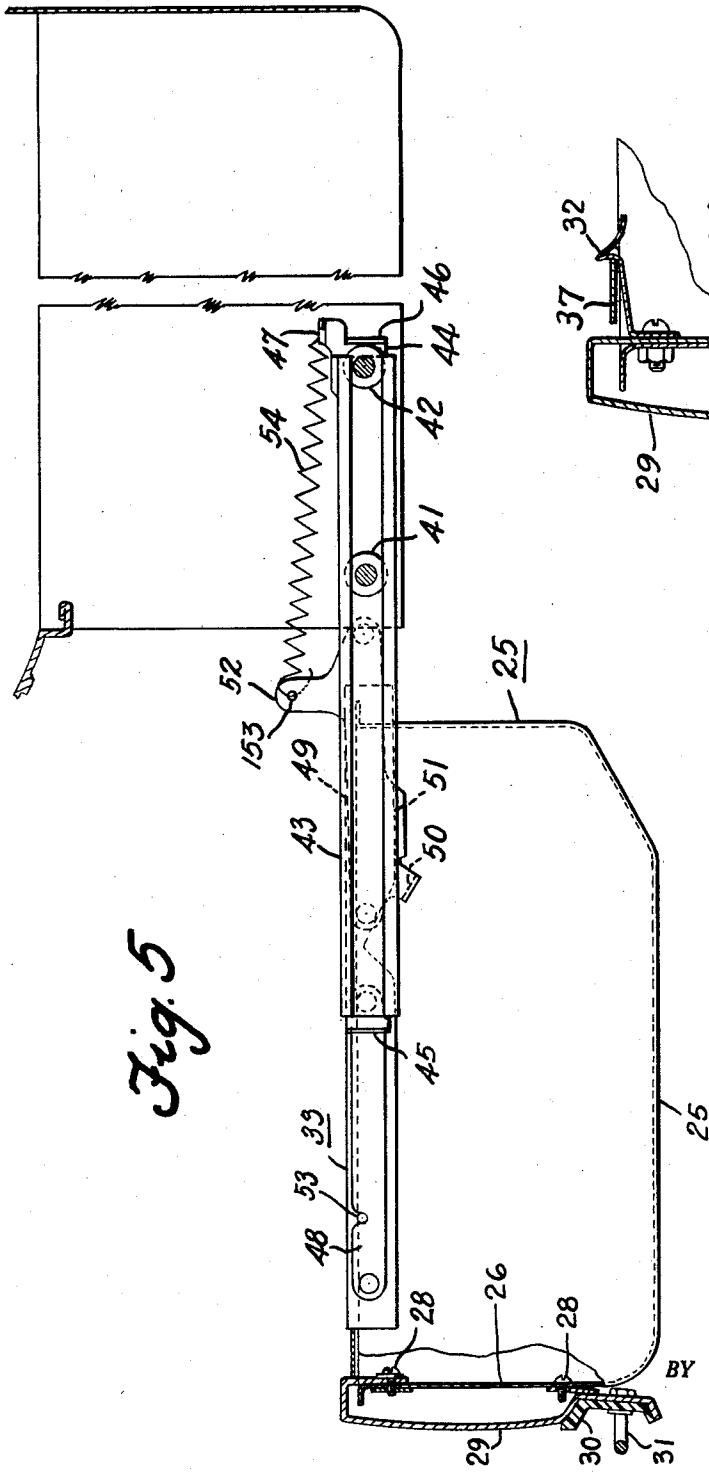


Fig. 5

Fig. 6

INVENTOR.
Verlos G. Sharpe
BY
R. R. Candor
Attorney

United States Patent Office

2,855,262

Patented Oct. 7, 1958

2,855,262

REFRIGERATOR STORAGE TRAY

Verlos G. Sharpe, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application January 19, 1954, Serial No. 404,921

4 Claims. (Cl. 312—325)

The present invention pertains to refrigerators, and particularly to a storage tray for refrigerators capable of horizontal and vertical movement relative thereto.

Food storage trays in refrigerators are often-times located at a height which makes it difficult to load and unload the same. In particular, meat storage trays are usually located in the upper portion of the refrigerator in heat exchange relationship with the evaporator. The tray of this invention is supported for horizontal movement relative to the refrigerator cabinet, and when the tray is moved out to a predetermined horizontal position, it may be swung downwardly to a lower horizontal plane, thereby facilitating easier access to the contents thereof. Accordingly, among my objects are the provision of a refrigerator cabinet having means for supporting a storage tray for horizontal and vertical movement relative thereto; the further provision of means for detachably connecting a refrigerator storage tray to supporting structure capable of horizontal and swinging movement relative to a refrigerator cabinet; the still further provision of a parallel link arrangement for supporting a refrigerator storage tray for swinging movement to a different vertical position than it normally occupies; and the still further provision of means permitting downward swinging movement of a refrigerator storage tray only when the tray has been moved horizontally to a predetermined position.

The aforementioned and other objects are accomplished in the present invention by providing interconnected upper and lower assemblies, the upper of which is detachably connected to a food storage tray and the lower of which is supported for horizontal movement in a refrigerator cabinet. Specifically, the upper and lower assemblies are interconnected by two pairs of parallel links, one pair of links being disposed on each side of the tray. Opposite ends of each link are pivotally connected to the assemblies, and the upper assembly supports the tray and is detachably connected thereto by means of a spring latch. The lower assembly comprises a pair of C-shaped channel members, each of which is connected to a bracket member to form a track assembly. One track assembly is disposed on each side of the tray adjacent the bottom thereof. The C-shaped member of each track assembly receives a pair of spaced rollers which are carried by the refrigerator cabinet. The bracket member of each track assembly is formed with tangs that cooperate with their respective C-shaped members to confine the rollers within the C-shaped members, and, consequently, form stops for limiting relative horizontal movement between the track assemblies and the rollers.

The rear link of each pair of parallel links is formed with a plurality of tangs, one of which limits downward swinging movement of the tray and upper supporting assembly, and another of which serves as a stop to limit upward swinging movement of the tray. A third tang on each of the rear links is attached to one end of a coil spring, the other end of the coil spring being attached to the bracket member of each track assembly. Inasmuch as a lesser force is required to move the tray horizontally than to effect swinging movement of the tray and links

when the tray is in the food compartment, the springs associated with the rear links maintain the tray in its normal vertical position until the tray is moved to its outermost horizontal position in the normal vertical position thereof. Thereafter, continued pulling effort on the tray will result in swinging movement of the tray, the upper supporting assembly and the links. The force required to effect initial swinging movement of the tray increases during the first portion of its swinging movement inasmuch as the lever arm, through which the spring acts, is increased. After this first portion of the downward swinging tray movement, the lever arm, through which the spring acts, decreases and, hence, the weight of the tray and contents thereof will be sufficient to move the tray to its lowermost vertical position.

Conversely, when it is desired to move the tray back to its original position in the cabinet, a manual lifting force is required to effect upward swinging movement of the tray until the lever arm is of its maximum length, after which, the weight of the tray and the contents thereof will position the tray in the proper position for movement back into the cabinet. The spring latch, which interconnects the tray, and the upper channel assembly may be manually disengaged to permit removal of the tray from its upper supporting assembly, and from the refrigerator cabinet, for cleaning purposes.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown, and wherein similar reference characters denote similar parts throughout the several views.

In the drawings:

Fig. 1 is a view, partly in section and partly in elevation, of a refrigerator cabinet incorporating the food storage tray of this invention.

Fig. 2 is an end view, partly in section and partly in elevation, of the tray and its supporting structure.

Fig. 3 is a side view, partly in section and partly in elevation, of the tray and its supporting structure with the tray disposed in the food compartment of the refrigerator.

Fig. 4 is a side view, similar to Fig. 3, with the tray and its supporting structure in the outermost horizontal position in the normal vertical position thereof.

Fig. 5 is a side view, similar to Fig. 3, with the tray and its upper supporting structure swung downwardly to the lower vertical position.

Fig. 6 is a fragmentary sectional view taken along line 6—6 in Fig. 2.

With particular reference to Fig. 1, a refrigerator is shown including a cabinet **10** having an access opening **11**. The cabinet **10** encloses a refrigerating system, depicted generally by the numeral **12**, which comprises a compressor **13**, a condenser **14**, a fixed restrictor **15** and an evaporator **16**. The fixed restrictor and one end of the evaporator **16** are interconnected by a capillary tube **17**, and the inlet of the compressor **13** is connected by a tube **18** to the other end of the evaporator, not shown. The cabinet **10** has insulated walls **19***a*, which surround a food storage compartment **19**, the evaporator **16** being disposed in heat exchange relationship to the contents of the food storage compartment. The cabinet **10** also includes a pair of swinging doors **20** and **21** suitably connected to the cabinet and adapted to close the access opening **11**. The doors **20** and **21** have attached thereto gaskets **22** and **23**, respectively, for sealing the food compartment **19** from the air surrounding cabinet **10**.

As is shown in Fig. 1, the food compartment **19** has disposed therein a food storage tray **25**. The tray **25** is normally situated in the upper portion of the cabinet, and, as will be pointed out more particularly hereinafter, the tray is capable of movement out of the compartment **19** and through the access opening **11** when the door **20**

is opened. In addition, the tray 25 is adapted for swinging movement to a lower vertical position, after it has been moved to its outermost horizontal position in the horizontal plane it occupies in Fig. 1.

With particular reference to Fig. 2, the food storage tray 25 comprises a pan 26 having an outwardly directed flange 27 around its upper peripheral edge. The pan 26 is connected by means of screw devices 28 to a front panel 29. The front panel 29 carries a bracket 30 adjacent its lower edge surface, as shown in Fig. 3, to which a handle 31 is attached. In addition, the front of the pan 26 carries a spring latch 32, as shown in Fig. 6, the purpose of which will be described more particularly hereinafter.

The tray 25 is supported by the outwardly directed flange 27 of the pan in an upper supporting assembly 33. As shown in Figs. 2 and 3, the upper supporting assembly comprises a substantially U-shaped member 34 having an inwardly directed upper flange 35 and an inwardly directed lower flange 36. The open end of the U-shaped member 34 has attached thereto a U-shaped member 37, which constitutes a keeper for the spring latch 32. The lower flange 36 of each leg of the U-shaped member 34 is deformed upwardly at 38 to form a stop, which defines the normal vertical position of the tray 25. In addition, each leg of the U-shaped member 34 has attached thereto a pair of inwardly directed flanged members 39 and 40, which are located on opposite sides of the deformed portion 38. The flanged members 39 and 40, together with the upper flange 35 of the member 34, constitute a guide within which the outwardly directed flange 27 of the pan 26 is received. Specifically, the pan 26, and, hence, the tray 25 are supported by the flange members 39 and 40, upon which the flanged portion 27 of the pan rests.

The tray 25 and the upper supporting assembly 33 are detachably interconnected by the spring latch 32. As is shown particularly in Fig. 6, the hooked end of the spring latch 32 projects upwardly behind the member 37 and, thus, interconnects the tray 25 and the upper supporting assembly 33. The tray 25 and the upper supporting assembly 33 may be separated by concurrently deflecting the member 37 upwardly and deflecting the end of spring latch 32 downwardly. In this manner, the tray 25 may be removed from the refrigerator cabinet for any desired purpose, such as cleaning.

With particular reference to Figs. 2 and 3, it may be seen that the sidewalls of the cabinet between which the tray is supported, carry pairs of spaced rollers 41 and 42. The two pairs of rollers 41 and 42 are received in C-shaped channel members 43, constituting part of a track assembly, to be described, the members 43 being parallel with the support assembly 33. Each channel member 43 is attached to a bracket member 44, the bracket member 44 having a pair of outwardly directed tangs 45 and 46, which tangs are arranged to effectively close the open ends of the member 43 and confine the rollers therein. The rollers support the track assemblies for horizontal movement, and prevent vertical and swinging movement of the track assemblies. In addition, the tangs 45 serve as stops by engaging rollers 41 to thereby limit inward movement of the tray 25, while the tangs 46 serve as stops by engaging rollers 42 to thereby limit outward movement of the tray 25. The brackets 44 are also formed with struck-up portions 47 having peripheral indentations, the purpose of which will be described more particularly hereinafter.

As is shown particularly in Figs. 2 and 3, the upper supporting assembly 33 and the track assemblies are interconnected by two pairs of parallel links adjacent the sides of the tray, each pair of links including a front link 48 and a rear link 49. The front links 48 are pivotally interconnected to both the member 34 and the bracket 44 adjacent the front edges thereof. The rear links 49 are also pivotally interconnected with the member 34 and the bracket 44, so as to be in a parallel relationship with the front links 48. Each rear link 49 is formed with three tang portions 50, 51 and 52. Tang portion 50 has an inwardly directed flange portion, which is adapted to engage the deformed portion 38 of the member 34 and thereby serve as a stop limiting clockwise movement of the links 48 and 49 about their pivotal connections with the bracket 44, as shown in Fig. 3. The tang 51 is also formed with an inwardly directed flanged portion adapted to engage the lower surface of flange 36 on the member 34 when the tray 25 is swung downwardly to the position shown in Fig. 5. The legs of member 34 also carry a pair of pins 53, which engage the links 48 when the tray is swung to its downward position, the pins 53 preventing the tray 25 from tilting through the supporting assembly 33 when the tray is swung downwardly to its lower vertical position, and out of a horizontal plane.

The tangs 52 on the rear links 49 are formed with openings 153 within which the ends of coil springs 54 are hooked. The other ends of coil springs 54 are hooked around the struck-up portions 47 of the brackets 44, and retained therein by reason of the surface indentations thereon. In addition, the tangs 52, in effect, constitute lever arms through which springs 54 may be stretched through counterclockwise pivotal movement of the rear links 49 about their pivotal connection with the brackets 44, as shown in Fig. 3. More specifically, the effective lever arm through which the spring 54 acts to restrain counterclockwise movement of the rear link 49 about its pivotal connection with bracket 44, increases until the tray reaches a predetermined position, after which the lever arm decreases. This arrangement of parts is desirable since a greater force is required to initiate swinging movement of the tray 25, and after a predetermined swinging movement thereof, the weight of the tray and contents will be sufficient to continue swinging movement of the tray 25 to its lower vertical position. Conversely, when the tray is swung from its lower vertical position to its upper vertical position, a manual lifting force is required until the tray is swung to a predetermined position, after which the weight of the tray and contents will of themselves be sufficient to reposition the tray in its upper vertical position for horizontal movement back into the food storage compartment.

When the storage tray 25 is positioned in the refrigerator cabinet, as shown generally in Fig. 1, and the door 20 is open, the tray 25 may be moved horizontally through the access opening 11. Outward movement of the tray is permitted since the track assemblies are free to move relative to the rollers 41 and 42. Moreover, inasmuch as a lesser force is required to move the tray horizontally and to effect swinging movement of the tray, the springs 54 will maintain the tray in the position shown in Fig. 1 until the tray and its associated supporting assembly 33 and track assemblies have been moved horizontally to their outermost position within the access opening 11, as depicted in Fig. 4. At this time, continued pulling effort on the handle 31 will result in swinging movement of the tray 25 and the upper supporting assembly 33, thereby stretching springs 54, inasmuch as the tangs 46 on the brackets 44 abut the rear pair of cabinet carried rollers 42. Thus, continued pulling effort on the handle 31 will result in counterclockwise pivotal movement of the pairs of links 48 and 49 about the bracket members 44, as viewed in Fig. 4, thereby lowering the tray 25 and the upper supporting assembly 33 to the position shown in Fig. 5, at which time the flanged tangs 51 will engage flange 36 of the member 34, and at the same time, the pins 53 will engage the links 48 to thereby limit downward movement of the tray 25 and support the tray in its lower vertical position. It should be noted that by reason of the parallel link arrangement interconnecting the upper supporting assembly and the lower track assemblies, the tray 25 is maintained in a horizontal

position during its entire swinging movement. Consequently, the contents of the tray will not be misplaced during swinging movement thereof.

When it is desired to reposition the tray within the food storage compartment, as shown in Fig. 1, it is only necessary to apply lifting force to the handle **31**, which will then effect clockwise pivotal movement of the two pairs of parallel links **48** and **49**, as viewed in Fig. 5, so as to move the tray **25** to its upper vertical position, with the tray extending through the access opening **11**, as shown in Fig. 4. Thereafter, the tray may be moved horizontally back into the food storage compartment **19**, after which the door **20** may be closed.

From the foregoing it is manifest that the present invention provides a refrigerator storage tray which may be moved horizontally out of the food storage compartment and, thereafter, swung downwardly to a more convenient vertical position for loading or unloading the same. In addition, the present invention provides a supporting assembly for a food storage tray such that the tray may be removed from the food storage compartment by merely releasing a spring latch.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. Means for supporting a tray in a cabinet comprising a track assembly disposed on each side of said tray, a plurality of rollers carried by said cabinet, said rollers being confined within said track assemblies and supporting said track assemblies for horizontal movement relative to said cabinet, a support to which said tray is operatively connected, a pair of parallel links disposed on each side of said tray, said links being pivotally connected with said support and said track assemblies and

arranged to effect horizontal movement of said track assembly when said tray is pulled outwardly relative to said cabinet, said links also being arranged to permit swinging movement of said tray and said support relative to said track assemblies when said tray is moved horizontally outward to a predetermined position, and resilient means associated with said links for opposing swinging movement of said tray.

2. The combination set forth in claim 1 wherein the support and the track assemblies are disposed in parallel relationship, and wherein the operative connection between said tray and said support comprises a releasable latch.

3. The combination set forth in claim 1 wherein each pair of links comprises front and rear links, and wherein said resilient means include a pair of springs, opposite ends of which are connected to the rear links and to said track assemblies.

4. The combination set forth in claim 1 wherein each track assembly comprises a channel member within which the cabinet carried rollers are disposed, and wherein each channel member has attached thereto a bracket having tang portions which limit horizontal movement of the track assemblies and confine the rollers within the channel members.

References Cited in the file of this patent

UNITED STATES PATENTS

806,277	McKee	Dec. 5, 1905
2,265,421	Donnelly	Dec. 9, 1941
2,375,359	Hedlund	May 8, 1945
2,486,564	Kamin	Nov. 1, 1949
2,565,784	Sheean	Aug. 28, 1951
2,585,566	Lundstrom	Feb. 12, 1952
2,598,266	Kamin et al.	May 27, 1952