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[54] **SHELF CONVEYOR APPARATUS**
7 Claims, 9 Drawing Figs.

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 198/158
 [51] Int. Cl. **H02k 1/22,**
 B65g 19/00
 [50] Field of Search 198/140,
 148, 150, 154, 158; 312/91, 268

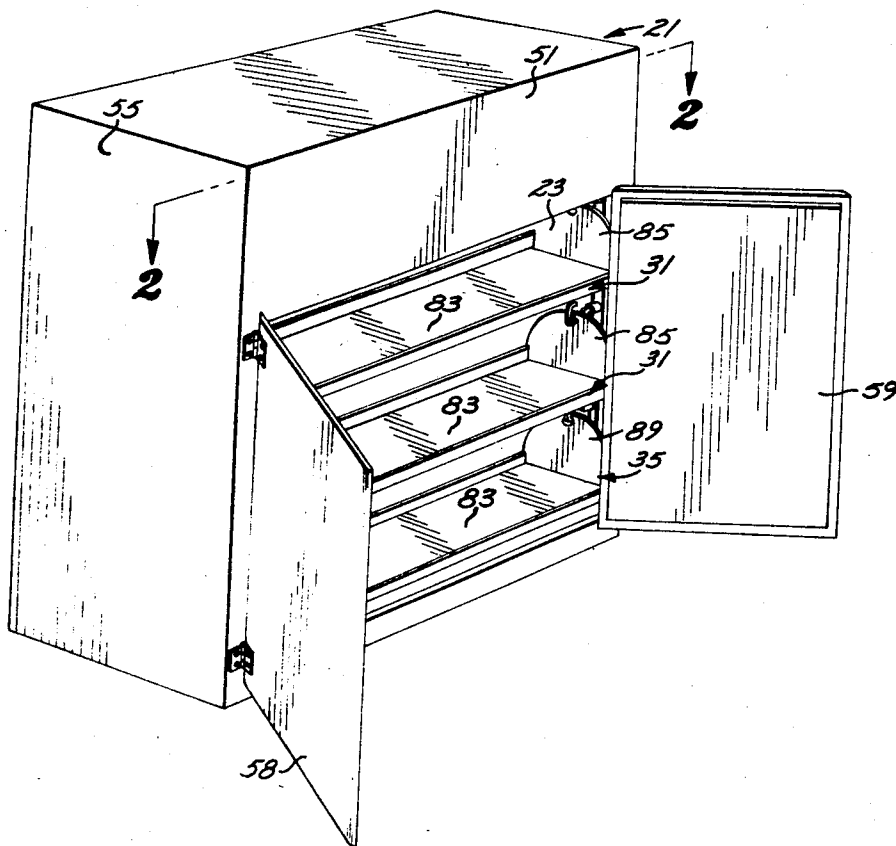
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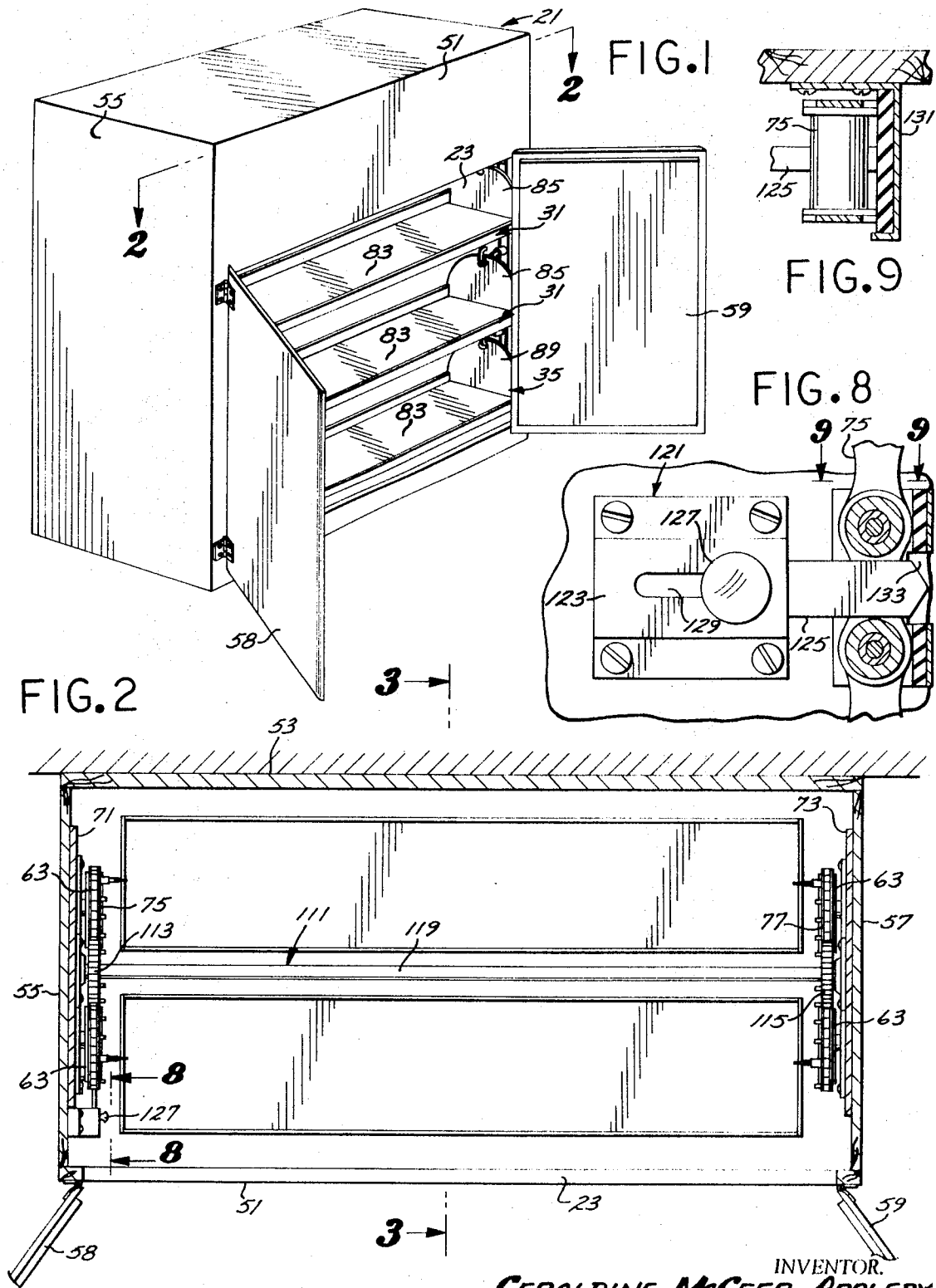
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ABSTRACT: A shelf conveyor apparatus for use with a kitchen cabinet formed with an access opening in its front wall and adapted for storage of a plurality of various height articles. The apparatus includes a vertically disposed endless conveyor means for disposition in said cabinet and including a series of connectors spaced therealong. A plurality of shelves are provided with hangers for interchangeable connection with the respective connectors whereby the hangers of certain shelves may be connected with connectors spaced at predetermined distances to space such certain shelves apart for convenient receipt therebetween of articles of one height and the hangers of other shelves may be connected with connectors spaced apart at different distances to space such other hangers apart for convenient receipt therebetween of articles of another height. Thus the conveyor means may be operated to selectively advance selected ones of the shelves into registration with the access opening for convenient viewing of the articles stored thereon and for ready access to such articles. The shelves may be substantially narrower than conventional kitchen cabinet shelves while still utilizing the entire depth of a conventional cabinet thereby eliminating the inconvenience of having certain of the articles stored at the back of a relatively deep shelf and making it difficult to view such articles from the front of the shelf and necessitating reaching and groping over and between articles disposed at the front of the shelf to acquire such articles located at the rear of the shelf.





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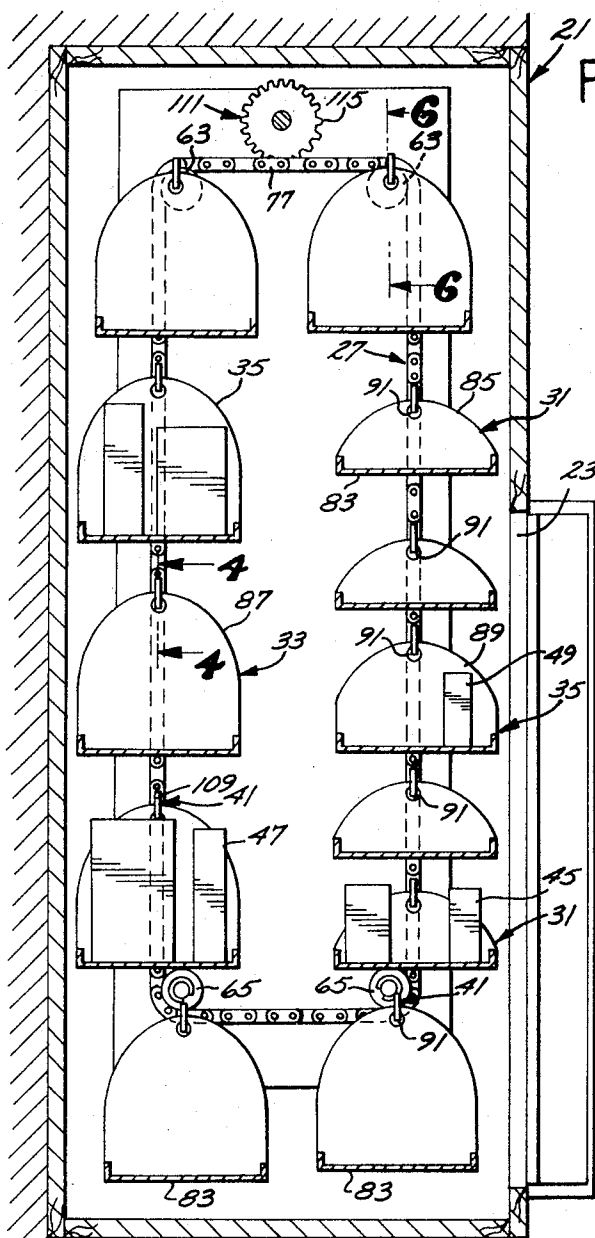


FIG. 3

FIG. 4

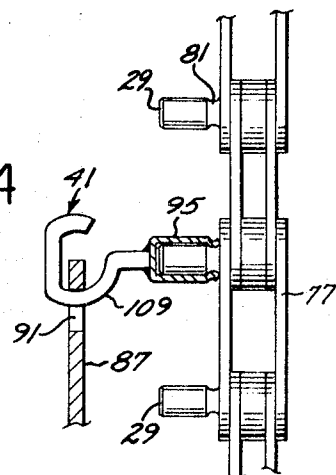


FIG. 5

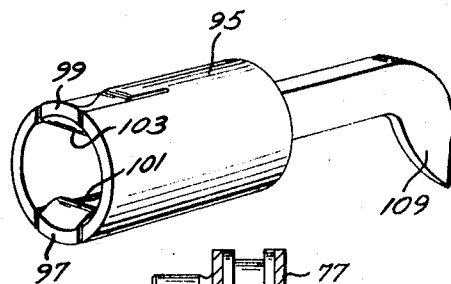


FIG. 6

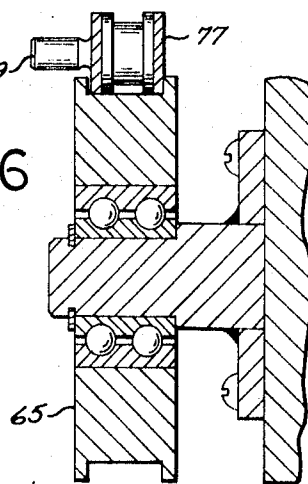
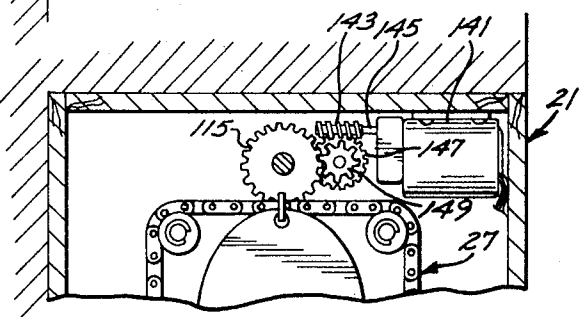


FIG. 7



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SHELF CONVEYOR APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to kitchen cabinets, and more particularly to a shelf conveyor apparatus for a kitchen cabinet and including shelves suspended from a conveyor which is selectively advanced to register selected ones of the shelves with an access opening formed in the front of the cabinet.

2. Description of the Prior Art

Filing cabinets have been proposed which include shelves carried on a conveyor whereby the conveyor may be advanced to register a selected shelf with an access opening in the front of such cabinet for convenient access to material filed on such selected shelf. However, there are no kitchen cabinets known to applicant which include a conveyor on which shelves may be suspended at selected spacings for accommodating different height articles on different ones of the shelves thereby making most advantageous use of the total length of the conveyor and rendering the articles stored on such shelves readily accessible from an opening in the front of the cabinet without the general clutter of multiple rows of articles on relatively deep shelves.

SUMMARY OF THE INVENTION

The present invention is characterized by a shelf conveyor apparatus including a vertical endless conveyor for disposition in a kitchen cabinet having an access opening in the front wall thereof. The conveyor includes a plurality of connectors spaced therealong and a plurality of shelves are provided with hangers for being selectively connected with selected ones of the connectors. Thus, the shelves may be selectively spaced at different distances along the conveyor means for receipt of different height articles between different pairs of the shelves to thereby efficiently utilize the entire length of the conveyor.

An object of the present invention is to provide a shelf conveyor apparatus for a kitchen cabinet wherein the shelves are supported from a vertical endless conveyor whereby the entire depth of a kitchen cabinet may be utilized while providing relatively narrow shelves which are easily advanced to an access opening at the front of the cabinet for convenient access to such articles stored thereon.

Another object of the present invention is to provide a shelf conveyor apparatus of the type described which includes means for locking the conveyor means in position with a selected shelf registered with the access opening.

These and other objects and the advantages of the present invention will become apparent from a consideration of the following detailed description when taken in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a kitchen cabinet including a shelf conveyor apparatus embodying the present invention;

FIG. 2 is a horizontal sectional view, in enlarged scale, taken along the line 2-2 of FIG. 1;

FIG. 3 is a vertical sectional view taken along the line 3-3 of FIG. 2;

FIG. 4 is a vertical sectional view, in enlarged scale, taken along the line 4-4 of FIG. 3;

FIG. 5 is a perspective view, in enlarged scale, of a hanger included in the shelf conveyor apparatus shown in FIG. 4;

FIG. 6 is a vertical sectional view, in enlarged scale, taken along the line 6-6 of FIG. 3;

FIG. 7 is a vertical sectional view similar to FIG. 3 of a modification of the shelf conveyor apparatus shown in FIG. 1;

FIG. 8 is a vertical sectional view, in enlarged scale, taken along the line 8-8 of FIG. 2; and

FIG. 9 is a horizontal sectional view taken along the line 9-9 of FIG. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 3, the shelf conveyor apparatus of present invention is intended for use with a kitchen cabinet, generally designated 21, formed with a front access opening 23. The shelf conveyor apparatus includes a conveyor, generally designated 27, which includes a plurality of connector pegs 29 (FIG. 4) spaced therealong and a plurality of shelves, generally designated 31, 33 and 35, are suspended from the connectors 29 by means of hangers, generally designated 41. The hangers 41 are interchangeably connectable with any of the connector pegs 29 whereby the shelves 31, 33 and 35 may be adjusted to any desired spacing for receipt thereon of different height articles, for example, relatively short articles 45 on the rather closely spaced shelves 31, relatively tall articles 47 on shelves 35 spaced at greater distances and intermediate height articles 49 on the shelves 33 which are spaced apart intermediate distances. Thus, as best seen in FIG. 3, the shelves 31, 33 and 35 are disposed in front and rear vertical columns within the cabinet 21 and any one thereof may be selectively advanced into registration with the front access opening 23 for convenient access to the articles 45, 47 or 49 on any one of the shelves to be conveniently viewed from the access opening 23 for selection thereof.

The cabinet 21 is formed by front wall and backwall 51 and 53, respectively, which are spaced apart at the conventional width of approximately 16 inches and end walls 55 and 57. The access opening 23 is formed in the front wall 51 and is normally closed by a pair of conventional hinged doors 58 and 59. Referring to FIGS. 2 and 3, the conveyor 27 conveniently includes two pairs of upper and lower pulleys 63 and 65 carried from a framework formed by false end walls 71 and 73 which are mounted on the inner sides of the respective end walls 55 and 57. A pair of endless link chains 75 and 77 are threaded over the pulleys 63 and 65 and have the pivot pins connecting adjacent links together formed with the inwardly projecting connector pegs 29.

The connector pegs 29 are formed at their bases with respective annular grooves 81, the purpose of which will appear hereinafter.

The shelves 31, 33 and 35 include respective bottom walls 83 and different height oppositely disposed pairs of end walls 85, 87 and 89, respectively, whereby such shelves may be spaced apart at different distances. The end walls 85, 87 and 89 of the respective trays 31, 33 and 35 are conveniently flexible to facilitate connection of the respective hangers 41 with the connector pegs 29 and are formed in their upper extremities with apertures 91 for receipt of such hangers.

Referring to FIGS. 4 and 5, the hangers 41 include open-ended barrels 95 for telescopic receipt over the connector pegs 29. The barrels 95 have their walls formed on opposite sides with resilient holding tabs 97 and 99 which are formed with radially inwardly extending protuberances 101 and 103 which selectively register with the respective grooves 81 in the connector pegs 29 for positively holding the hangers 41 thereon. The hangers 41 also include C-shaped hooks 109 which are received through the apertures 91 in the respective shelf walls 85, 87 or 89.

Referring to FIG. 3, a coordinating assembly, generally designated 111, is included for coordinating the chains 75 and 77 and includes a pair of sprockets 113 and 115 engaged with the respective chains and rigidly connected together by a shaft 119 extending lengthwise of the cabinet 21.

Referring to FIGS. 2, 8 and 9, a latch, generally designated 121, is mounted on the cabinet end wall 55 adjacent the chain 75 and includes a housing 123 formed with a passage which receives a telescopically slidable bolt 125 which is selectively extendable for engagement with selected links of the chain 75 which are registered therewith. The bolt 125 includes a finger grasp nob 127 which projects through a slot 129 in the housing 123 for convenient gripping by the operator. Disposed in confrontation with the bolt 125 and on the opposite side of the

chain 75 is a backing plate 131 which has a through opening 133 therein for passage of the tip of the bolt 125.

From the foregoing description it will be clear that the false walls 71 and 73 may be conveniently installed in a conventional kitchen cabinet 21 which has had the stationary shelves removed therefrom. Thus, assuming that the overall depth of the cabinet 21 is approximately 16 inches, the individual shelves 31, 33 and 35 may be approximately 7 inches in width and the two vertical columns thereof will utilize substantially the full depth of the cabinet 21 while allowing any one of such shelves to be readily advanced into registration with the opening 23 for convenient access to articles stored thereon. The shelves 31, 33 and 35 will then be chosen in the selected combination for the heights of the particular articles to be stored thereon. In this regard, it will be obvious that the shelves 31 may be utilized throughout the apparatus for all different height containers 45, 47 and 49 by merely spacing such shelves 31 apart at the desired distances rather than also employing the different height shelves 33 and 35. The shelves 31, 33 and 35 are suspended by hooking the respective hooks 109 through the apertures 91 of the sidewalls 85, 87 or 89 of the respective shelves 31, 33 or 35. The respective shelf end walls 85, 87 and 89 may then have their upper extremities flexed inwardly to enable the barrels 95 to be inserted telescopically over the pegs 29 to register the holding tab protuberances 101 and 103 with the respective peripheral grooves 81 to hold the hangers 41 firmly on the respective connector pegs 29.

In operation the conveyor 27 may be advanced by merely reaching through the access opening 23 and pressing downwardly on the shelves 31, 33 and 35 registered therewith to advance other shelves into registration with such opening. Articles 45, 47 and 49 may then be stored on the respective shelves 31, 33 and 35, it being realized that the lock 121 may be utilized to lock the conveyor 27 with a selected shelf 31, 33 or 35 disposed in confrontation with the access opening 23. After all the articles to be stored are placed on the respective shelves 31, 33 or 35, ready access can be had to any one of the articles by merely opening the cabinet doors 58 and 59 and disengaging the lock 121 and advancing the conveyor 27 to bring the desired shelf into registration with such opening 23 for convenient viewing thereof. The lock 121 may then be utilized to lock the conveyor 27 in position and the article may be conveniently reached. It will be noted that if the kitchen cabinet 21 is disposed at lower elevations in the kitchen, as for instance under the sink or under a counter or stove, the conveyor 27 may be stopped with the desired shelf 31, 33 or 35 disposed near the top of the access opening 23 whereby the operator may reach the article stored thereon without excessive stooping. On the other hand, if the cabinet 21 is mounted in an elevated position in the kitchen the conveyor 27 may be stopped with the shelves 31, 33 or 35 containing the desired article located near the lower portion of the access opening 23 for convenient access by the operator without climbing on a chair or ladder.

The modification of the shelf conveyor apparatus shown in FIG. 7 includes a motor 141 having a worm screw 143 carried on its drive shaft 145 and engageable with a worm gear 147 which is coupled with a pinion 149 for driving the coordinating sprocket 115. Thus, control buttons may be located exteriorly of the cabinet 21 for convenient actuation of such drive motor 141 to advance the conveyor 27.

From the foregoing detailed description it will be clear that the shelf conveyor apparatus of present invention provides a convenient means for utilizing the entire depth available in a kitchen cabinet while maintaining the articles stored on the

shelves readily accessible from an access opening formed in the front wall of such cabinet. Further, the spacing of the shelves is readily adjusted to accommodate different height articles between different pairs of the shelves thereby utilizing the entire length of the conveyor and/or enabling the shelves to be spaced for optimum distribution of weight around the conveyor length.

Various modifications and changes may be made with regard to the foregoing detailed description without departing from the spirit of invention.

I claim:

1. A shelf conveyor apparatus for use with a kitchen cabinet formed with an access opening and adapted for receiving a plurality of various height articles, said apparatus comprising:

vertically disposed conveyor means for mounting in said cabinet and including a series of connectors spaced therealong;

a plurality of shelves; and

hangers for each of said shelves for interchangeable connection with any of said respective connectors and disconnectable therefrom whereby hangers for certain shelves may be connected with connectors spaced apart at a predetermined distance to space said certain shelves apart a distance for convenient receipt therebetween of articles of one height and hangers for other shelves may be connected with connectors spaced apart a different distance to space said other shelves apart for convenient receipt therebetween of articles of another height thus enabling said conveyor means to be operated to advance selected ones of said shelves into registration with said opening for convenient viewing of and access to articles stored thereon.

2. Shelf conveyor apparatus as set forth in claim 1 that includes:

lock means for locking said conveyor means in selected positions.

3. Shelf conveyor apparatus as set forth in claim 1 wherein: said connectors are formed by pegs projecting from said conveyor means and include respective peripheral grooves; and

said hangers include respective barrels for overfitting said pegs and formed with resilient holding tabs for selective engagement in said grooves to hold said hangers on the respective pegs.

4. Shelf conveyor apparatus as set forth in claim 1 that includes:

a frame for supporting said conveyor means whereby said apparatus means may be conveniently installed in a kitchen cabinet having the conventional shelves removed therefrom.

5. Shelf conveyor apparatus as set forth in claim 1 that includes:

drive means actuable to advance said conveyor means.

6. Shelf conveyor apparatus as set forth in claim 1 wherein: said certain of said shelves include sidewalls of one height and said other of said shelves include sidewalls of a second height.

7. Shelf conveyor apparatus as set forth in claim 1 wherein: said conveyor means includes upper and lower pulleys and a pair of endless chains trained thereover, said conveyor means, further, including a coordinating assembly including a pair of sprockets engageable with said respective chains and a shaft nonrotatably connecting said sprockets together.