Oct. 22, 1963 J. A. MAXWELL, JR 3,107,959

SLIDING AND ROTATING SHELF

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Fig. 1.

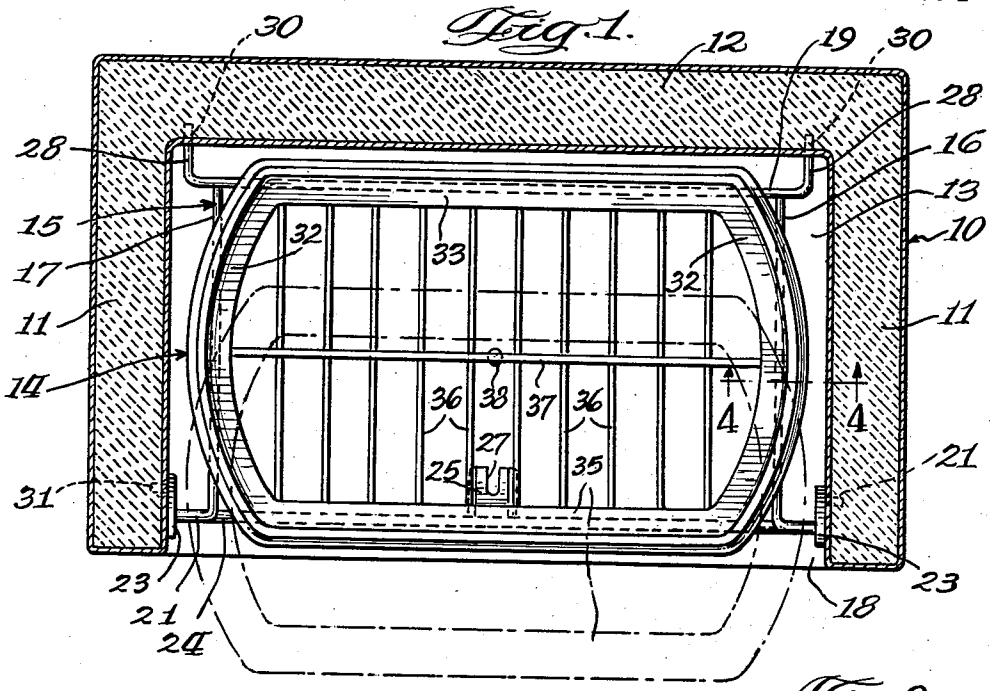


Fig. 2.

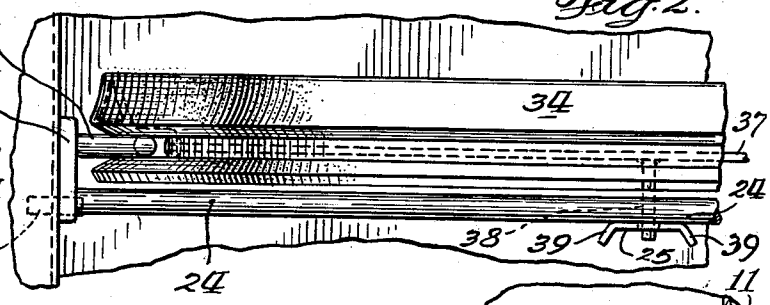


Fig. 3.

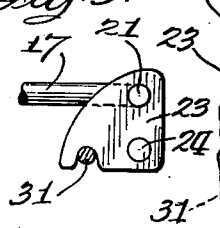
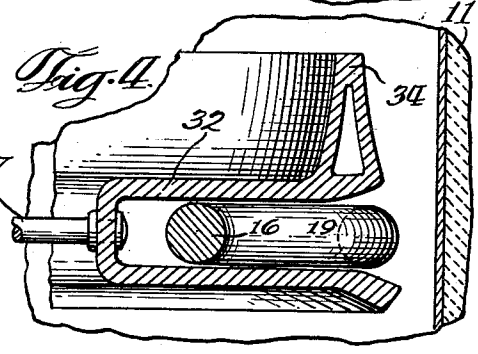


Fig. 4.



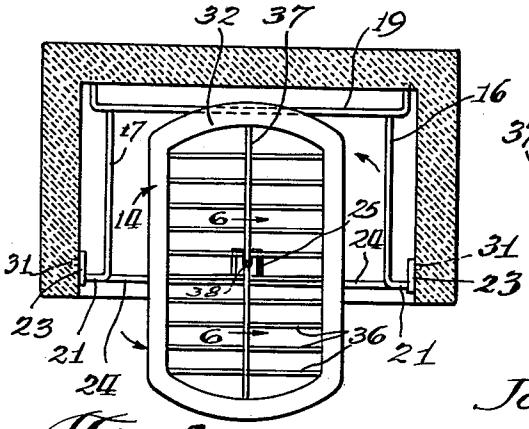


Fig. 5.

Inventor
Joseph A. Maxwell, Jr.
By
Hofgren, Brady, Wegner, Allen & Stellman
Attorneys

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Fig. 7.

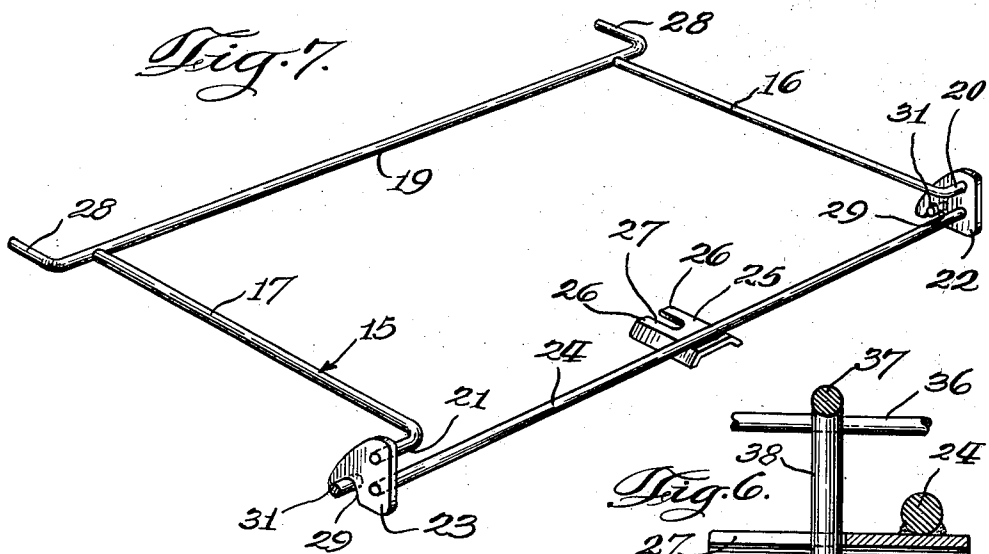
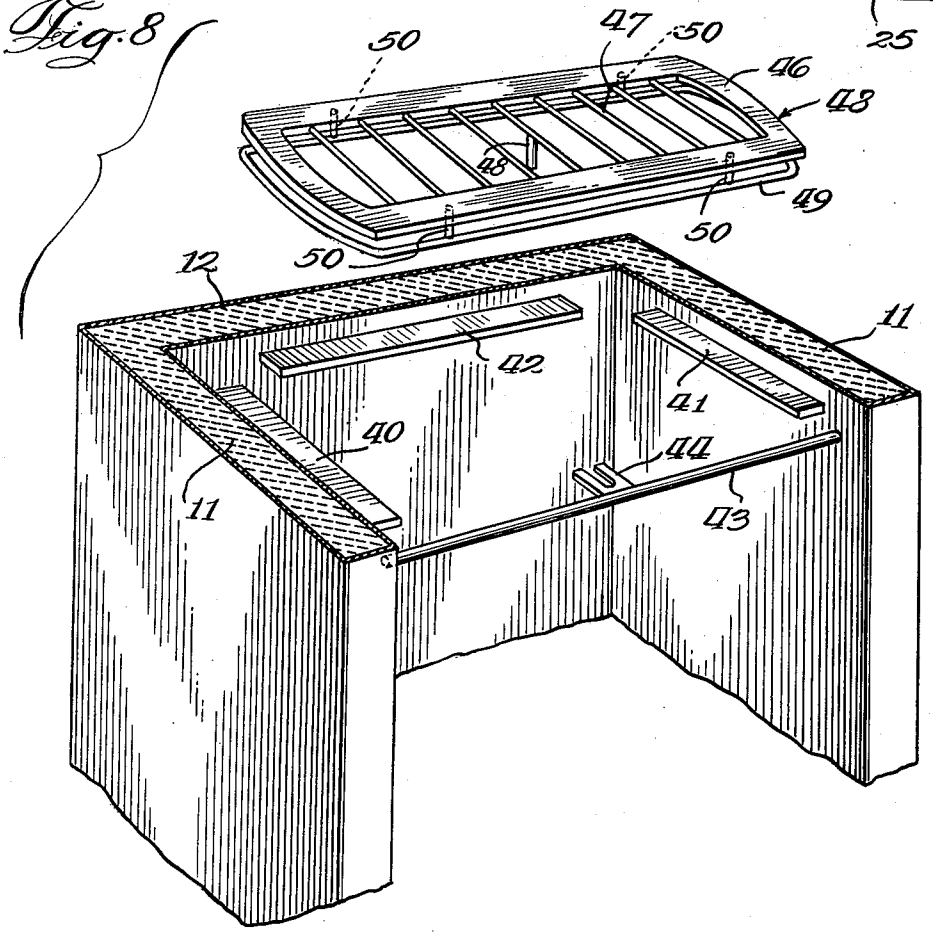


Fig. 6.

Fig. 8



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SLIDING AND ROTATING SHELF

Joseph A. Maxwell, Jr., Royal Oak, Mich., assignor to Whirlpool Corporation, a corporation of Delaware

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This invention relates to a cabinet structure having a movable shelf that is adjustable, movable relative to the cabinet and rotatable.

In cabinets, and particularly refrigerator cabinets, a plurality of shelves are provided on which articles are placed. In the ordinary cabinet structures of this type articles on the front of the shelf hamper access to the articles on the rear of the shelf. It has been proposed, particularly in refrigerator cabinets, to make the shelves movable, such as rotatable, in order to make the entire shelf more accessible.

The cabinet structure of this invention provides a movable and rotatable shelf that is firmly held on a plurality of sides in normal storage position but that can be easily pulled forwardly with respect to an access opening and than can be rotated to various positions in order to make all portions of the shelf readily accessible. The cabinet structure of this invention permits moving the shelf vertically to various predetermined positions and also uses a much simplified structure to provide rotational movement of the shelf about a pivot.

One of the features of this invention is to provide an improved cabinet structure comprising walls forming a chamber having an access opening, a movable shelf in the chamber, support means for supporting the shelf for movement in a path within the chamber forwardly and rearwardly with respect to the support means and to the opening and pivot means in the path engaged by the shelf on this forward movement to support the shelf for pivotal movement about the pivot means.

Other and more specific features of the invention will be apparent from the following description of certain embodiments thereof as illustrated in the drawings. Of the drawings:

FIGURE 1 is a sectional view through a cabinet structure containing an embodiment of the invention with the shelf and associated structure being shown in plan.

FIGURE 2 is an enlarged fragmentary elevational view showing the front of one end of the shelf and associated structure.

FIGURE 3 is a fragmentary elevational view partially in section of one detail of the support means for the shelf.

FIGURE 4 is a fragmentary sectional elevational view taken substantially along the line 4—4 of FIGURE 1.

FIGURE 5 is a view similar to FIGURE 1 but reduced in size and showing the shelf at 90° to its position in FIGURE 1.

FIGURE 6 is an enlarged detailed sectional view taken substantially along the line 6—6 of FIGURE 5.

FIGURE 7 is a perspective view of the support structure for the shelf of this embodiment.

FIGURE 8 is an exploded view illustrating a second embodiment of the invention.

In the embodiment of FIGURES 1–7 inclusive there is illustrated a cabinet structure 10 including side walls 11 and a rear wall 12 defining a chamber 13. The structure is particularly adapted for use in a refrigerator but may of course also be used in other cabinet structures wherever shelves are employed.

Positioned within the chamber 13 is a shelf 14 that is movably mounted on support means in the form of a support structure 15. This support structure comprises a pair of side support means 16 and 17 in the form of heavy

wire for supporting the shelf at the sides for movement in a path forwardly and rearwardly with respect to the support structure 15 and to a front access opening 18. The support structure also includes a rear support means for the shelf in the form of a heavy wire 19. The rear support means 19 is normally adjacent the rear wall 12 and the side support means 16 and 17 are normally adjacent the side walls 11.

As is shown most clearly in FIGURE 7, the wires 16, 17 and 19 of the support structure 15 are attached to each other. The forward ends of the wires 16 and 17 are bent outwardly as illustrated at 20 and 21 and are linearly aligned. These wire ends 20 and 21 are attached to side bracket plates 22 and 23 respectively which are substantially parallel to each other with each being of generally triangular shape. Extending between the plates 22 and 23 at a level beneath the aligned wire ends 20 and 21 is a cross wire 24 which supports at about its center a rearwardly extending bifurcated plate 25 having a pair of substantially parallel arms 26 and notch 27 therebetween. The plate 25 constitutes a pivot member that is part of a pivot means whose function is described hereinafter.

The opposite ends of the rear support means wire 19 extend beyond the side wires 16 and 17 and are bent rearwardly and substantially parallel to each other as illustrated at 28. The bottoms of the parallel bracket plates 22 and 23 rearwardly of the wire 24 are provided each with a bottom notch 29. The wire ends 28 and the notches 29 permit mounting the shelf support structure 15 removably within the cabinet 10 so that the shelf can be arranged at different levels. This is accomplished by having the ends 28 extend into holes 30 in the rear wall 12 of the chamber. The notches 29 are adapted to engage inwardly directed studs 31 in the side walls 11 for supporting the front end of the support structure 15.

The shelf 14 is provided with outwardly arcuate channels 32 at the lateral edges which normally embrace the side wires 16 and 17 while the rear of the shelf is provided with a channel 33 that normally embraces the rear wire 19 when the shelf is in its normal position as illustrated in FIGURE 1. The outer edge of this shelf around its entire periphery is provided with an upwardly extending flange 34 as an aid in retaining articles on the shelf.

In addition to the side channels 32 and rear channel 33 as well as a front channel 35 the shelf comprises parallel back-to-front wires 36 and a side-to-side center wire 37. Extending downwardly from the center of the wire 37 and thus the center of the shelf itself is a first pivot member 38 that is aligned with the notch 27. When the shelf 14 is moved forwardly by sliding on the side wires 16 and 17 to the position shown in broken lines in FIGURE 1, the first pivot member 38 engages the notch 27 in the plate 25 which thereupon becomes the second pivot member. The engagement of the first pivot member 38 with the second pivot member 25 supports the shelf at substantially its center for rotational movement to any desired position through 360°. A pivotal movement at right angles to the normal position of the shelf is illustrated in FIGURE 5. In this position the rear support wire 19 is engaged by a side channel 32 to support the inner end of the shelf. In addition, the intermediate portion of the shelf tends to be supported by the cross wire 24. As can be seen, throughout the rotational movement of the shelf 14 the shelf is supported by at least one of the side wires 16—17 or the rear wire 19.

In order to permit the full movement of the shelf about its pivot and to give adequate support the sides 32 of the shelf are arcuately curved with the center of the arc substantially coinciding with the pivot member 38. In addi-

tion, when the pivot member 38 is in engagement with the pivot member 27, the distance from the pivot member 38 to the outer edge of the side channels 32 is substantially equal to the distance between the pivot member 25 and the rear wire 19.

The shelf may be completely removed from the chamber 13, if desired, by distorting the shelf upwardly so that the pivot member or pin 38 clears the member 25. When reinstalling the shelf in place, the shelf may be similarly distorted so that the pivot member 38 may slide up on the top of the member 25 in order to get beyond this member. In order to aid this, the sides of the member 25 are sloped outwardly and downwardly as indicated at 39. This permits the downwardly extending pivot member 38 to slide upward of the sides 39 and over the top of the member 25 in reinserting the shelf.

A second embodiment of the invention is illustrated in FIGURE 8. In this embodiment the sides 11 and 12 of the cabinet are provided with three coplanar inwardly extending flange members 40, 41 and 42. The flange members 40 and 41 are attached to the sides 11 while the member 42 is attached to the side 12. Extending across the front of the cabinet is a wire 43 similar to the wire 24 with the wire 43 also carrying a bifurcated pivot member 44 similar to the member 25 of the first embodiment. In this embodiment, the shelf 45 has substantially the same shape as the shelf of the first embodiment. The shelf 45 comprises a flat frame 46 with spaced wires 47. The wire in the center is provided with a downwardly extending pin 48 that is similar to the pivot member 38 of the first embodiment. Positioned beneath the frame 46 is a continuous peripheral wire 49 which has the same contour as the outer edge of the frame 46. This wire 49 is fastened to the frame as by a plurality of spacer wires 50.

The operation of this second embodiment of the invention is similar to that of the first embodiment. Here the shelf 45 is supported by the flanges 40, 41 and 42 located between the frame 46 and the peripheral wire 49. The shelf 45 can slide forwardly on the side members 40 and 41 and the engagement of the pivot member 48 with the pivot member 44 permits rotation of the shelf in the manner previously explained in connection with the first embodiment.

Having described my invention as related to the embodiments shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A cabinet structure, comprising: walls forming a chamber having an access opening; a movable shelf in said chamber; side support means supporting said shelf at the sides for movement in a path within the chamber forwardly and rearwardly with respect to said support means and to said opening, said shelf having outwardly arcuate edge means embracing said side support means during said forward and rearward movement; rear support means in said chamber opposite said opening; a first pivot member on said shelf; and a second pivot member supported in said cabinet structure in said path for engagement by said first pivot member on said forward movement, the engagement of said pivot members supporting said shelf for pivotal movement about said second pivot member, each of said arcuate means having a center of curvature substantially coinciding with said second pivot member when said pivot members are in said engagement and a radius of curvature substantially equal to the distance between said second pivot member and said rear support means whereby said shelf will be supported by said second pivot member and at least one of said side support means and rear support means at all pivotal positions of said shelf.

2. A cabinet structure, comprising: walls forming a chamber having an access opening; a movable shelf in said chamber; side support means separate from said shelf supporting said shelf at the sides for movement in a path within the chamber forwardly and rearwardly with respect to said support means and to said opening; rear support means in said chamber separate from said shelf opposite said opening, said side and rear support means being attached together to form a support structure; a first pivot member on said shelf; a second pivot member supported on said support structure in said path for engagement by said first pivot member on said forward movement, the engagement of said pivot members supporting said shelf for pivotal movement about said second pivot member and said shelf being supported by at least one of said side and rear support means at all pivotal positions of said shelf; and means on said walls releasably supporting said support structure.

3. A cabinet structure, comprising: walls forming a chamber having an access opening; a movable shelf in said chamber; side support means supporting said shelf at the sides for movement in a path within the chamber forwardly and rearwardly with respect to said support means and to said opening, said shelf having outwardly arcuate edge means embracing said side support means during said forward and rearward movement; rear support means in said chamber opposite said opening, said side and rear support means being attached together to form a support structure; a first pivot member on said shelf; a second pivot member supported on said support structure in said path for engagement by said first pivot member on said forward movement, the engagement of said pivot members supporting said shelf for pivotal movement about said second pivot member, each of said arcuate means having a center of curvature substantially coinciding with said second pivot member when said pivot members are in said engagement and a radius of curvature substantially equal to the distance between said second pivot member and said rear support means whereby said shelf will be supported by said second pivot member and at least one of said side support means and rear support means at all pivotal positions of said shelf; and means on said walls releasably supporting said support structure.

4. A cabinet structure, comprising: walls including side walls forming a chamber having an access opening; a movable shelf having sides in said chamber; side support means adjacent and mounted on said side walls supporting said shelf at said shelf sides for movement in a path within the chamber forwardly and rearwardly with respect to said support means and to said opening; pivot means in said path engaged by said shelf on said forward movement for pivotal movement of said shelf about said pivot means; and rear support means at the side of said chamber opposite said opening engaged by the shelf for supporting the shelf upon said pivotal movement.

5. A cabinet structure, comprising: walls including side and rear walls forming a chamber having a front access opening; a movable shelf in said chamber; rear support means on said rear wall; side support means separate from said shelf supporting said shelf at the sides for movement in a path within the chamber forwardly and rearwardly with respect to said side and rear support means and to said opening; a first pivot member on said shelf; and a second pivot member supported in said cabinet structure in said path for engagement by said first pivot member on said forward movement, the engagement by said first pivot member on said forward movement, the engagement of said pivot members supporting said shelf for pivotal movement about said second pivot member, said shelf being supported by at least one of said side support means and said rear support means as

well as said pivot members at all pivotal positions of said shelf.

6. A cabinet structure, comprising: walls forming a chamber having an access opening; a movable shelf having sides in said chamber and a substantially horizontal upper article supporting area; fixed side support means separate from said shelf and adjacent said sides for supporting said shelf substantially continually during movement of said shelf in a substantially horizontal path within the chamber forwardly and rearwardly with respect to said support means and to said opening; a first pivot member on said shelf beneath said article supporting area and intermediate said shelf sides; a second pivot member engaged by said first pivot member on said forward movement; and means for positioning said first and

second pivot members with respect to said shelf and said fixed side support means for permitting rotational movement of said shelf in a substantially horizontal plane about said second pivot member after said forward movement of the shelf while maintaining said supporting engagement of said shelf with said side support means.

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