Nov. 17, 1936. P. CROSLEY, JR., ET AL 2,061,453

SHELF UNIT FOR REFRIGERATOR DOORS

Original Filed April 26, 1933 2 Sheets-Sheet 1

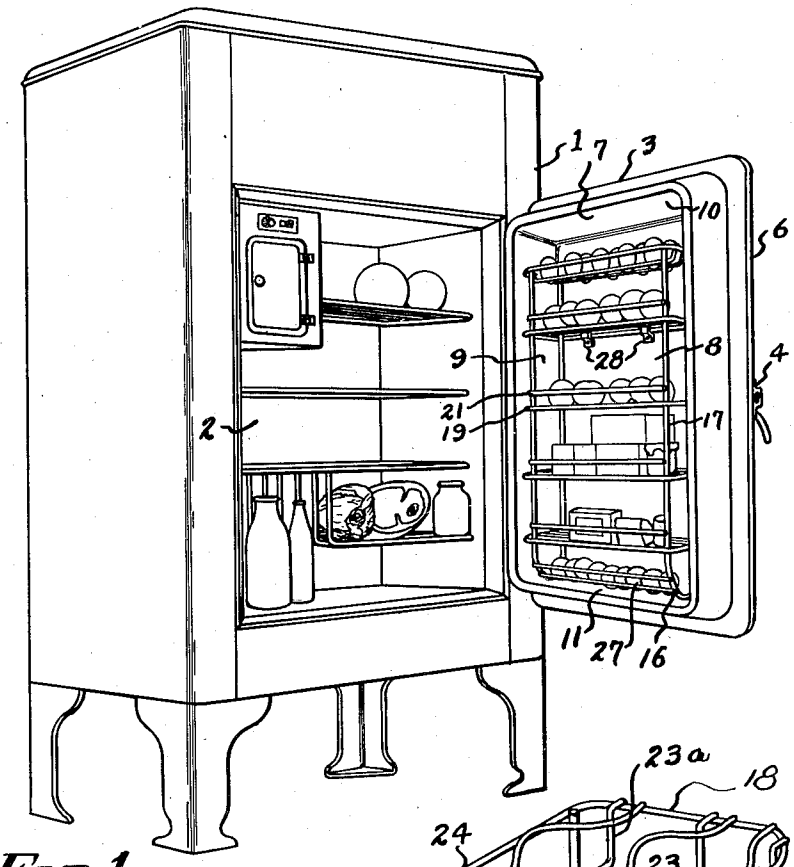


FIG. 1

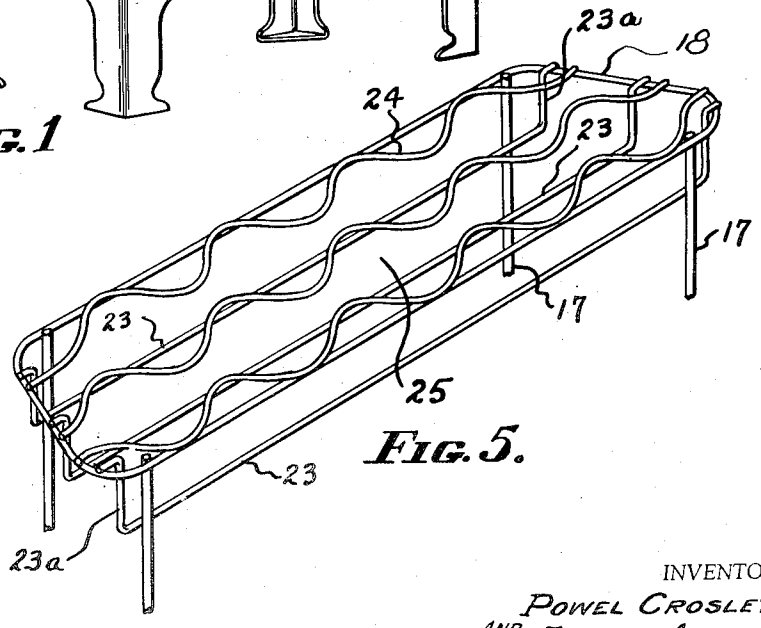


FIG. 5.

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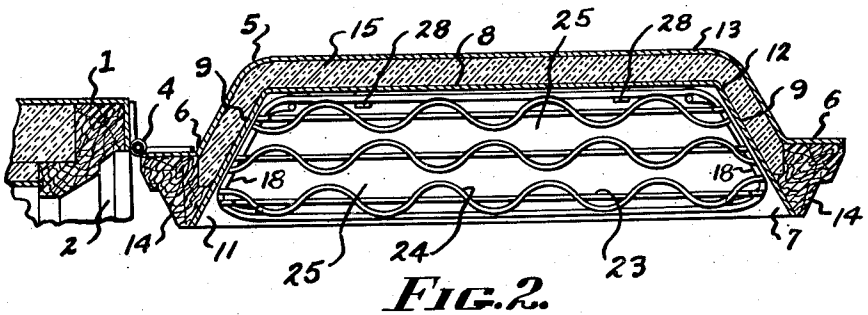


FIG. 2.

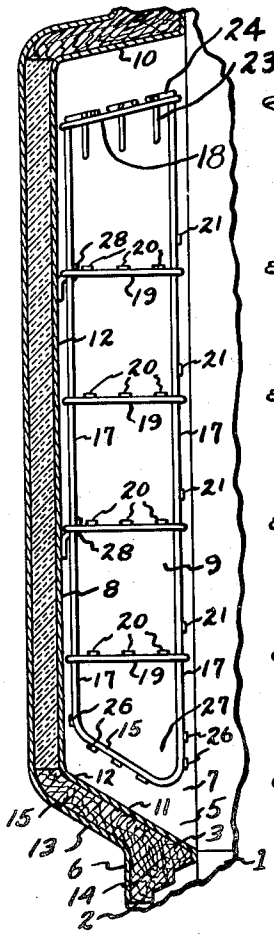


FIG. 3.

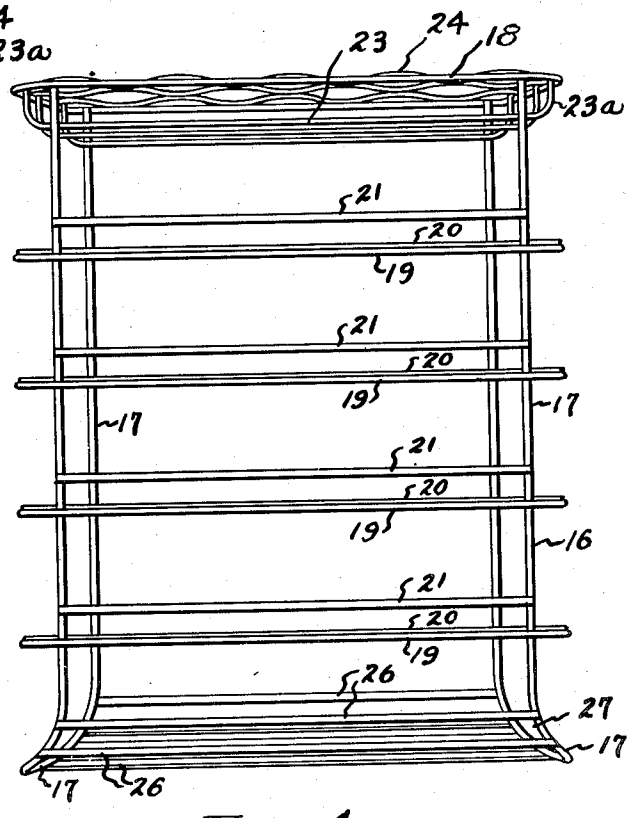


FIG. 4.

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UNITED STATES PATENT OFFICE

2,061,453

SHELF UNIT FOR REFRIGERATOR DOORS

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Continuation of application Serial No. 668,091, April 26, 1933. This application April 5, 1935, Serial No. 14,892

11 Claims. (Cl. 312—173)

This application is a continuation of our application Serial No. 668,091, filed April 26, 1933, made for the purpose of correcting a mistake in the original showing and description as to the part now illustrated in Figure 5.

Our invention relates to shelved refrigerator doors forming additional storage means available to the circulating cold air within the cabinet. Such doors are disclosed and claimed in the patent to Constance Lane West, Reissue No. 19,008, dated November 21, 1933.

Our invention is an improvement upon the shelving for such doors, and its object is to provide for especially convenient and efficient storage of the articles in such doors. A further object is to provide a structure for this purpose in a form permitting ready cleaning and affording ample ventilation of the contents. Other objects will appear in the course of the following description.

Our invention in its preferred embodiment comprehends the provision of a shelf structure mounted on the inner side of a refrigerator door, preferably so as to be readily removable therefrom as a complete unit. Preferably, such a unit is made up of a series of wires or rods rigidly assembled to form a vertical series of shelves. The door may be formed with a recess in its inner side, such as the door disclosed and claimed in the patent to Constance Lane West, Reissue No. 19,008, dated November 21, 1933. In such case, the recess is preferably formed with inwardly diverging top, bottom and side walls, with the shelf structure shaped accordingly, to fit the side walls.

Our invention is not limited to provision of a shelf structure in a recess of the door, however. The door may be one with a recess in its interior, or it may be the usual unrecessed door, and by curtailing the depth of the shelves in the body of the refrigerator, or increasing the depth of the refrigerator body, or both, room may be left for the shelving on the interior of the door. Our invention is novel in this broader aspect as affording the convenience above noted; and especially when constructed as a unit readily removable from and replaceable on the door.

An example of a preferred embodiment of our invention is illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of a refrigerator with our invention embodied therein.

Figure 2 is a transverse cross-section of a refrigerator door and adjacent portions of the refrigerator walls, the door being open, and the shelf structure being shown in top plan, the door flange being slightly modified over that shown in Figure 1.

Figure 3 is a corresponding vertical section, the door being closed, and the shelf structure being shown in end elevation.

Figure 4 is an inner side elevation of the shelf structure.

Figure 5 is a detail perspective view showing the egg compartment.

The refrigerator body 1 has the front door opening 2 of the usual beveled and stepped formation. The door 3 is mounted as usual on hinges 4 at one side of the door opening 2, and it will be understood that it may have the usual lock or latch 4', or any other details usual in refrigerator doors.

The door 3, as herein shown, is similar to that in the above mentioned application, the forward extension 5 corresponding to the shape of the door, and with a rim 8 all around, to which the hinges 4 and the latch or other details may be conveniently attached in the usual manner.

The extension 5 has a hollow interior or recess 7, with a flat back wall 8 and inwardly diverging side walls 9, top wall 10, and bottom wall 11. The door as shown is made up of the interior plate 12, outside plate 13, and edge parts 14 shaped to fit the beveled and stepped door opening, and the space thus enclosed is filled with any suitable insulation material 15.

The recess 7 therefore will be seen to have a smooth, widely opening interior adapted for ready cleaning. To fit removably in this recess, the shelf structure or unit 16 is made up, as herein illustrated, of two upright members 17, each formed of a wire or rod bent into U-shape with its bottom slanted at the angle of the bottom wall 11 of the recess. The inner or rear side of the U-shape has its upper end lower than the upper end of the front side. To the tops of these legs is fixed the top member 18, formed by bending a wire or rod into an approximately trapezium shaped closed loop, with the sides of the upright U-shaped member 17 at the front and rear of the member 18, at considerable distances from its corners. The angles of the ends of the loop correspond to those of the side walls 9 of the recess, and the upright U-shaped members 17 are correspondingly disposed, so that their rear or inner sides are considerably closer together than their front sides. Also, due to the difference in heights of the front and rear sides of these members 17, the top loop member 18 slopes backwardly or inwardly; its angle of

slope corresponding to that of the top wall 10 of the recess. The height of this structure thus determined is considerably less than the height of the recess.

Additional loop members 19, as here shown four in number, are of approximately the same trapezium shape as the top loop member 18, and are arranged in vertical series at approximately equal intervals from the bottom of the structure and from each other and from the top member 18, and the sides of the upright U-shaped members 17 are fixed to them in the same relation thereto that they have to the top member 18. These additional loop members 19 are not rearwardly or inwardly slanted, however, but lie in horizontal front to rear planes. Intermediate transverse rods or wires 20 have their ends fixed to the ends of these additional loop members 19 at intervals between the front and rear sides of the upright U-shaped members 17, as here shown being three in number of each member 19. These form the lower shelves of the structure. A short distance up from the front of each loop member 19, a guard wire or rod 21 extends transversely, with its ends fixed to the front sides of the upright U-shaped members 17.

It is quite advantageous to provide an egg pocket or compartment in the topmost shelf of the unit. The eggs will here be out of the way and in the safest position against accidental contact and breakage. The compartment is formed by a series of wires or rods 23 bent up at their ends at 23a and there secured by welding to the loop 19 similar to that forming the other shelf, which loop is secured by welding to the upper end of the vertical members 17, thus forming a continuous closed loop of the vertical members 17 which are, as stated, formed of a single piece of wire bent into a U-shape. Secured by welding to the top loop 19 are a series of sinuous wires or rods 24 arranged so as to form a series of staggered apertures; in this instance two series, since three of the sinuous wires 24 are used. The staggered pockets are indicated at 25. The result of this structure is to provide places where eggs can be inserted lying in the spaces 25, and resting on the rods 23.

At the bottom of the structure, transverse wires or rods 26 have their ends fixed to the U-shaped upright members 17 and are spaced at suitable intervals in a series from the rear corner, along the bottom and up around the front sides of these members 17, so that these bottom wires or rods 26 thus form a bottom pocket-shaped shelf 27.

Fixed to the back wall 8 of the recess 7 are upwardly opening hook-shaped holders 28, as here shown four in number, so located that when the rear sides of two of the additional or lower shelf loop members 19, as here shown the second and fourth from the bottom, fit down into these holders 28, the shelf structure or unit will hang in the recess 7 with its top and bottom spaced from the top wall 10 and bottom wall 11 of the niche. Each holder 27 preferably has a backwardly bent upper lip part, and is resilient, so that this lip part springs firmly over the wire or rod of the respective loop member 19. The structure is thus firmly held, yet may be readily removed from the niche 7, for cleaning of the structure and of the interior of the recess.

The bottom of the structure is spaced up from the bottom wall 11 of the recess sufficiently to permit ample ventilation of the contents of the bottom shelf or pocket 27. The top of the structure is spaced down from the top wall 10 of the recess sufficiently to permit ready access to the top shelf or pocket 22 for placing therein and removing therefrom the contents thereof.

The intermediate shelves formed by the members 19 and their rods or wires 20 are suitable for storage of any articles, and being flat, serve to support vessels such as bottles or cans. The top and bottom pocket-shaped shelves 22 and 27 are more especially convenient for storage of such articles as eggs, fruit and the like; the compartments 25 being well adapted to receive spherically shaped articles and prevent them from rolling about. The pocket shape of these shelves 22 and 27 and the guards 21 of the intermediate shelves are adapted to insure against accidental displacement of the stored contents as the door is opened and closed.

It will be seen that by our improvement the utility of a refrigerator is greatly enhanced, due to the easy access to smaller articles stored on the door instead of scattered among larger articles in the body of the refrigerator, whether on a door with a recess as described, or not. Also the capacity of the refrigerator is increased, when the recess is provided, as to quantity of articles stored; and in any case, as to refrigerating effect, since the articles are exposed apart from the articles stored in the body and the refrigerating air currents have considerably freer access thereto. The shelving, constructed as a unit, is readily removable as a unit, for cleaning of the shelving and the door. It is extremely light but rigid and durable. It thus serves its purpose without adding undue weight to the door or complicating and increasing the cost of the refrigerator.

The rods or wires are preferably of steel and fixed together by welding, the whole shelf structure being tinned. The intermediate wires or rods 20, guards 21, and all but the rear one of the bottom pocket wires or rods 26, are preferably of rectangular cross section, all of the others being round.

We prefer the construction and details thereof as shown and described, wherein the shelving is in a recess, but it will be understood that these are exemplary only, and that modifications may occur, such as use of the unit on an unrecessed door, or modifications of the details of construction of the unit. Therefore, we are not limited to the precise disclosure herein, but what we claim as new and desire to secure by Letters Patent, is:—

1. A shelf structure made up of a vertical series of transverse wires or rods, each in the form of a closed loop lying in a plane transverse to the structure, upright wires or rods fixed to said transverse wires or rods, inside of and spaced in from the ends of the loops, and intermediate transverse wires or rods fixed to end portions of the loops.

2. A shelf structure made up of a vertical series of transverse wires or rods, each in the form of a closed loop lying in a substantially horizontal plane transverse to the structure, except the topmost loop, which lies in a transverse plane inclined down to the rear, the end portions of the loops converging from front to rear, upright wires or rods fixed, respectively, to front and rear corner portions of the loops, and intermediate transverse wires or rods fixed to intermediate end portions of the loops.

3. A shelf structure made up of a vertical series of transverse wires or rods, each in the form of a closed loop lying in a plane transverse to the

structure, upright wires or rods fixed to said transverse wires or rods, and intermediate transverse wires or rods fixed to end portions of the loops, the intermediate transverse wires or rods fixed to the end portions of the topmost loop being of wide, low U-shape, depending from said end portions, forming a pocketed top for said structure, said U-shaped wires or rods being sinuated in front-to-rear planes in their horizontal portions, and assembled with the sinuations of each wire inverse to the sinuations of each adjacent wire, forming compartments in said pocketed top for said structure.

4. A shelf structure made up of a vertical series of transverse wires or rods, each in the form of a closed loop lying in a plane transverse to the structure, upright wires or rods fixed to said transverse wires or rods, being joined at their bottoms by front to rear portions, intermediate transverse wires or rods fixed to end portions of the loops, and extending parallel with the front and rear members of the loops, and transverse guard wires or rods fixed to the upright wires at the front of the structure above and parallel with the front members of respective ones of said transverse loops.

5. A shelf structure made up of a vertical series of transverse wires or rods, each in the form of a closed loop lying in a plane transverse to the structure, wires or rods bent into upright U-shape lying along a front-to-rear upright plane, and having their side portions fixed, respectively, to front and rear corner portions of the loops, intermediate transverse wires or rods fixed to intermediate end portions of the loops, and transverse wires or rods fixed to the bottom portions of the upright U-shaped wires or rods and to the front upright sides of the U-shaped wires or rods near said bottom portions, forming a pocketed bottom for said structure.

6. A rack to fit in a recess of a door or like closure, comprising a series of closed loops lying along substantially parallel planes, the ends of the loops being shaped to conform closely along opposite walls of the recess, and members extending from loop to loop and fixed to the respective loops at substantial distances in along the loops from said ends, to form a unitary structure with the loops, with a minimum of structure close to the opposite walls of the door or closure recess, for ready cleaning and circulation of air.

7. A rack as set forth in claim 6, in which a terminal one of the series of closed loops lies along a plane that is inclined to the planes of the other loops, and including sinuated members joining the ends of said terminal loop and forming pockets.

8. A shelf structure made up of a vertical series of transverse wires or rods, each in the form of a closed loop lying in a plane transverse to the structure, wires or rods bent into substantially U-shape, lying along front-to-rear upright planes and having their side portions fixed, respectively, to front and rear corner portions of the loops, the front-to-rear bottoms of the substantially U-shaped wires inclining up to the rear, intermediate transverse wires or rods fixed to intermediate end portions of the loops, and transverse wires or rods fixed to the upwardly rearwardly inclined bottom portions of the substantially U-shaped wires or rods.

9. In combination with a cabinet door having a recess in its wall that is to face inwardly of the cabinet, one end of which recess inclines toward the middle portion of the door from the outer edge of the recess substantially in a single plane, a rack supported on a wall of the recess and having a transverse series of pockets in one end opening toward the adjacent end of the recess, said end of the rack having the pockets inclining substantially in a single plane substantially parallel with the plane of inclination of said adjacent end of the recess, and the bottoms of the pockets being so related to the inclined end of said rack that the tendency is for the articles in the pocket to gravitate inwardly of the recess rather than to fall therefrom, said rack having its said end, when supported as aforesaid, spaced away from said adjacent end of the recess only substantially the distance which will admit articles that will fit in the respective pockets, whereby the articles may be readily individually removed but are not readily accidentally dislodged from said pockets.

10. In a refrigerator a door element having a cavity therein of relatively narrow depth respective to the depth of the refrigerator compartment, and a shelf unit consisting of a composite wire rack having wires forming shelves, and wires forming guard rails located above the shelf forming wires and at the edges of the shelves facing outwardly of the cavity, the said shelves being also narrow with their main extent lying within the cavity, and the side walls of the cavity serving as sides for the rack of shelves, and the cavity wall serving as the back for the shelves, said rack mounted upon said door element so as to be removable as a unit.

11. An article-supporting metal rack for attachment to the door of a refrigerator, having a series of shelves at the top provided with an egg receiving element formed of a series of sinuous wires arranged to form a series of staggered openings, a frame to which said sinuous wires are secured, and a series of spaced rods or wires of shallow U-shape secured to said frame so as to depend therefrom, for the purpose described.

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