May 19, 1964 C. R. D'OLIVE ETAL 3,133,644

REFRIGERATOR SHELF STRUCTURE

Filed Nov. 13, 1961

FIG. 1

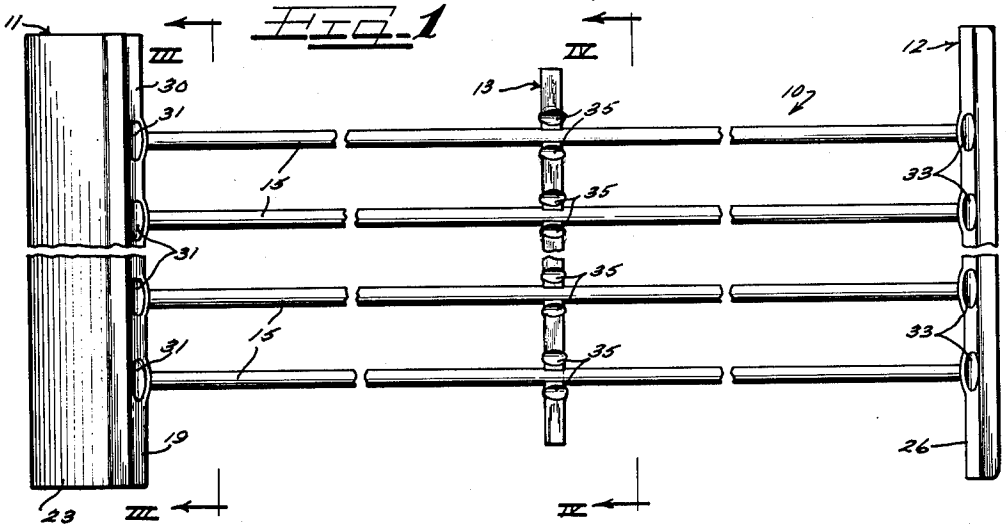


FIG. 2

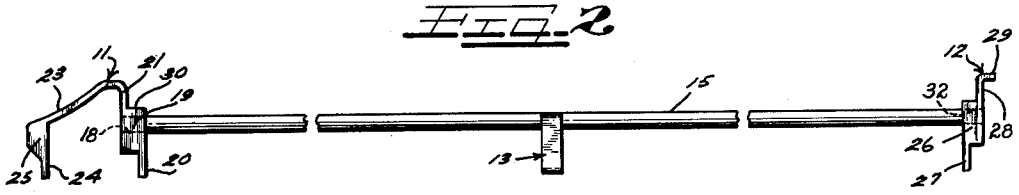


FIG. 3

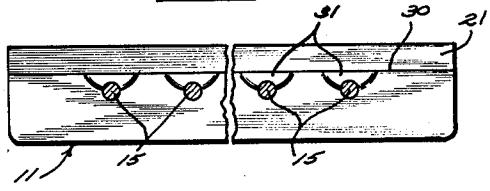


FIG. 5

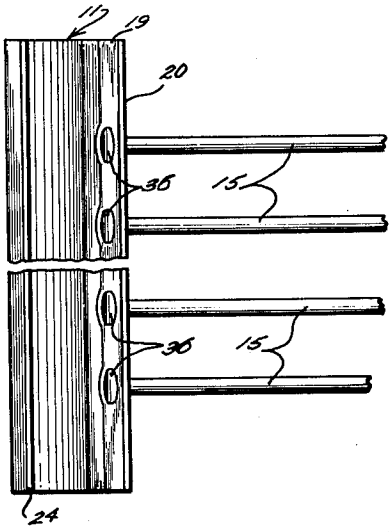
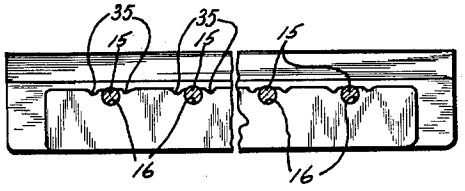


FIG. 4



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REFRIGERATOR SHELF STRUCTURE

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This invention relates to improvements in shelf structures and more particularly relates to an improved shelf structure particularly adapted for refrigerators and the like.

A principal object of the present invention is to provide a new and improved form of shelf structure arranged with a view toward utmost simplicity in construction and ease of assembly.

A further object of the invention is to provide a simpler method of making refrigerator shelves and the like, eliminating the riveting operation heretofore used in the manufacture of refrigerator shelves.

Still another object of the invention is to provide a simpler and less expensive method of making refrigerator shelves and the like in which longitudinal wires are secured to end and intermediate bars of the shelf to form the supporting structure for the shelf, and all connections between the longitudinal wires and the end and intermediate bars of the shelf, are drilled and staked connections.

A further object of the invention is to provide an improved form of end rail structure for refrigerator shelf structures, so constructed and arranged as to accommodate staking of the longitudinal wires to the rail from either the top or bottom of the rail.

A further object of the invention is to provide a fabricated shelf structure particularly adapted for refrigerators, in which the shelf comprises front and rear bars, an intermediate bar parallel to the front and rear bars and a plurality of longitudinal wires connecting said bars together, so constructed and arranged as to eliminate riveting of the longitudinal wires to the end and intermediate bars of the shelf and concealing the front ends of the longitudinal wires by the hand grip for the shelf, formed integrally with the front end bar of the shelf structure.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawing wherein:

FIGURE 1 is a fragmentary plan view of a portion of a refrigerator shelf structure constructed in accordance with the invention;

FIGURE 2 is a side view of the shelf structure shown in FIGURE 1;

FIGURE 3 is a sectional view taken substantially along line III—III of FIGURE 1;

FIGURE 4 is a sectional view taken substantially along line IV—IV of FIGURE 1, and;

FIGURE 5 is a fragmentary bottom plan view of a form of shelf structure constructed in accordance with the invention, showing the longitudinal wires staked to the front end rail of the shelf from the bottom of the front end rail instead of the top, as shown in FIGURE 1.

In the embodiment of the invention illustrated in the drawing, we have shown in FIGURE 1 a refrigerator shelf structure **10** including a front bar or rail **11**, a rear end bar or rail **12** and an intermediate or center bar or rail **13**, and round rods or wires **15** connecting the bars **11**, **12** and **13** together, and forming the supporting structure for the shelf structure.

The center bar **13** has upwardly opening, preferably semi-circular notches **16** formed therein, by punching or drilling, for receiving the longitudinal wires **15** (FIGURE 4).

The longitudinal wires **15** may be placed in said recesses and retained thereto as by staking, as indicated by reference character **35**, along opposite sides of the wire transversely of said center bar, swedging the material in said center bar over the longitudinal wires **15**, to rigidly retain said longitudinal wires to said center bar.

The front bar **11** may be formed from a bar of metal, such as steel, aluminum, or any other suitable metal, and may be an aluminum extrusion. The front bar **11** is shown in FIGURE 2 as having a rectangular body portion **19** extending for the length thereof. The body portion **19** is transversely drilled or punched in registry with the slots **16** to receive the longitudinal wires **15** in openings **18** formed by the drilled or punched portions thereof. A lip **20** is shown as depending from and extending along the inner side of the rectangular body portion **19**, while a lip **21** is shown as extending upwardly of the outer end portion of the rectangular body portion **19**. The lip **21** forms a support for an integral hand grip **23** extending forwardly of the upper end portion of said lip and angularly downwardly and forwardly therefrom and terminating into a generally vertical depending lip **24**, having an enlarged portion or bead **25** extending along the upper forward end portion thereof. The lip **24** is spaced a sufficient distance in advance of the rectangular body portion **19**, to accommodate the fingers to readily fit behind said lip **24** and draw the shelf from a refrigerator cabinet.

The rear bar **12** has a body portion **26** like the body portion **19** of the front bar **11**, and has a lip **27** depending from the inner or forward side thereof, and a lip **28** extending upwardly of the outer or rear side thereof and terminating into a rearwardly extending flange **29**, providing a smooth upper surface for said rear bar.

The rear bar **12** like the front bar **11** has a plurality of holes **32** drilled or punched transversely thereof, of substantially the diameter of the longitudinal wires **15**, and receiving said longitudinal wires.

As shown in FIGURE 1, the longitudinal wires are secured to the front bar **11** by staking longitudinally along a top surface **30** of said front bar over each longitudinal wire **15**, as indicated by reference characters **31**.

In a like manner the longitudinal wires **15** are secured to the rear bar **12** by staking along the top surface of the rectangular body portion **26** of said rear bar over the longitudinal wires, as indicated by reference characters **33**.

The longitudinal wires **15** are further positively secured to the center bar **13** by staking transversely of said center bar along opposite sides of the notches **16**, as indicated by reference characters **35**.

In making the refrigerator shelf structure just described, the notches **16** may first be formed in the center bar **13** by punching or drilling. The longitudinal wires **15** may then be placed in the notches **16**. The front and rear end bars **11** and **12** respectively being drilled or punched in registry with the notches **16** may then be as-

sembled to the ends of the longitudinal wires 15 by placing the longitudinal wires through the drilled or punched portions thereof. The assembled shelf may then be placed on a die (not shown) beneath a staking tool (not shown) which may be carried by and operated by a punch press or like tool (not shown). The longitudinal wires may then be staked as indicated at 31, 33 and 35 to the respective front bar, rear bar and intermediate bar by a single staking stroke of the staking die, from the top side of the shelf.

It may be seen from FIGURE 2 that the rectangular bodies 19 and 26 of the respective front bar 11 and rear bar 12 are so formed that the longitudinal wires may be staked to said bodies from either the top or bottom thereof.

FIGURE 5 illustrates a fragment of a shelf structure in which a front rail exactly like the front rail 11 of FIGURE 1 has the longitudinal wires 15 staked to the rectangular body 19 from the bottom thereof by staking longitudinally of said body, as indicated by reference character 36.

By staking from the bottom of the body 19, the staking recesses are concealed from the top of the shelf. In staking from the bottom, however, the staking of the center bar 13 to the longitudinal wires 15 is from the top of said center bar. The shelf may then be inverted and the front bar 11 and rear bar 12 may be staked from the bottom instead of the top thereof, in the manner shown in FIGURE 5.

It may be seen from the foregoing that a simple and attractive form of refrigerator shelf has been provided in which the tooling required to assemble and secure the parts of the shelf together is reduced to a minimum, and that the front and rear bar sections are so designed as to accommodate the bar sections to be staked to the longitudinal wires to retain the longitudinal wires in engagement therewith by staking either from the tops or the bottoms of said bar, dependent only upon the desired appearance of of the finished shelf.

While we have herein shown and described one form in which our invention may be embodied, it may be readily understood that various variations and modifications in the invention may be attained without departing from the spirit and scope of the novel concepts thereof, as defined by the claims appended hereto.

We claim as our invention:

1. In a front bar for a refrigerator shelf structure and the like,
   (*a*) an apertured body portion generally rectangular in cross section having
   (*b*) a plurality of round openings extending thereacross in parallel relation with respect to each other, for receiving the longitudinal wires of a refrigerator shelf structure and the like,
   (*c*) and having a lip depending from the side thereof adjacent said longitudinal wires and
   (*d*) a second lip extending upwardly from the side thereof away from said longitudinal wires and providing plane surfaces on opposite sides thereof, accommodating the staking of the longitudinal wires to said bar from either the top or the bottom thereof,
   (*e*) and an integrally formed hand grip portion extending forwardly of the forwardmost of said lips and angularly downwardly therefrom, and terminating in advance of said body to accommodate the gripping of said bar by the hand.

2. In a shelf structure for refrigerators and the like,
   (*a*) a center bar having
   (*b*) a plurality of parallel spaced partially round upwardly opening slots therein,
   (*c*) front and rear end bars having wire receiving openings extending transversely thereacross,
   (*d*) longitudinal wires mounted in said slots intermediate their ends and mounted in said openings in said front and rear bars at their ends,
   (*e*) staking extending transversely of said center bar along opposite sides of said slots and longitudinally of said front and rear bars, above said longitudinal wires retaining the shelf structure in assembled relation,
   (*f*) an integrally formed gripping means for the refrigerator shelf including a reduced cross sectional area lip extending upwardly of said front bar, adjacent the forward end thereof, and forwardly and angularly downwardly therefrom and terminating into a vertically extending lip in advance of said front bar, concealing the adjacent ends of said longitudinal wires and affording a means for readily gripping the shelf structure by the hand.

3. In a shelf structure for refrigerators and the like,
   (*a*) a center bar having
   (*b*) a plurality of parallel spaced upwardly opening slots extending transversely thereof,
   (*c*) longitudinal wires mounted in said slots intermediate their ends and staked to said center bar along opposite sides of said longitudinal wires,
   (*d*) front and rear end bars having body portions generally rectangular in cross section having wire receiving openings extending thereacross, registrable with the ends of said longitudinal wires,
   (*e*) said body portions having plane upper and lower surfaces accommodating the staking of said bars to said longitudinal wires from either the tops or the bottoms thereof,
   (*f*) each front and rear bar having an inner lip depending from said body portion and
   (*g*) an outer lip extending upwardly of said body portion and leaving plane surfaces on the top and bottom of said body portion, accommodating the staking of said longitudinal wires to said body portion from either the top or the bottom thereof,
   (*h*) and said upwardly extending lip of said front rail having a hand grip extending forwardly therefrom and angularly downwardly thereof and terminating in a vertical lip portion spaced from said body portion, and providing a means for gripping said shelf structure by the hand and hiding the ends of said cross wires.

4. The method of making a shelf structure particularly adapted for refrigerators and the like, comprising the steps of
   (*a*) providing a solid cross bar extending the width of the shelf structure
   (*b*) forming a plurality of upwardly opening slots having arcuate walls transversely of said cross bar,
   (*c*) providing front and rear bars having generally solid rectangular body portions and forming round openings therein, registrable with said upwardly opening slots,
   (*d*) placing longitudinal wires in said upwardly opening slots in said center bar,
   (*e*) assembling said front and rear bars to said longitudinal wires,
   (*f*) then staking said center bar to said longitudinal wires along opposite sides of said slots and said front and rear bars to said longitudinal wires along the tops of said longitudinal wires, all in a single staking operation.

5. The method of making a shelf structure particularly adapted for refrigerators and the like, comprising the steps of
   (*a*) providing a solid cross bar extending the width of the shelf structure
   (*b*) forming a plurality of upwardly opening slots having arcuate walls transversely of said cross bar,
   (*c*) providing front and rear bars having generally solid rectangular body portions and forming round

openings therein, registrable with said upwardly opening slots,

(*d*) placing longitudinal wires in said upwardly opening slots in said center bar,

(*e*) assembling said front and rear bars to said longitudinal wires,

(*f*) staking said center bar to said longitudinal wires along opposite sides of said slots

(*g*) and then inverting the partially assembled shelf structure and staking said front and end bars to said longitudinal wires from the bottoms of said bars.

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