

Oct. 7, 1969

F. HOWARD
DISPLAY CABINET

3,471,209

Filed Aug. 15, 1967

2 Sheets-Sheet 1

Fig. 1.

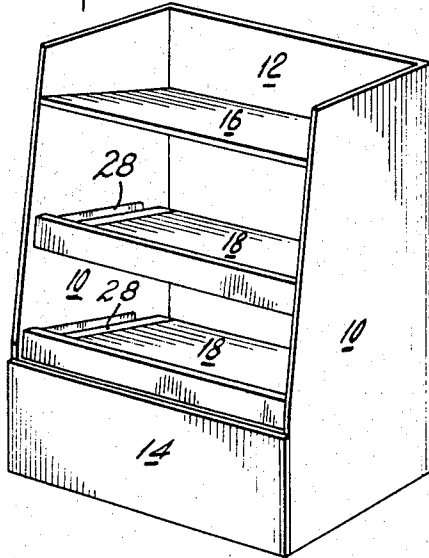


Fig. 2.

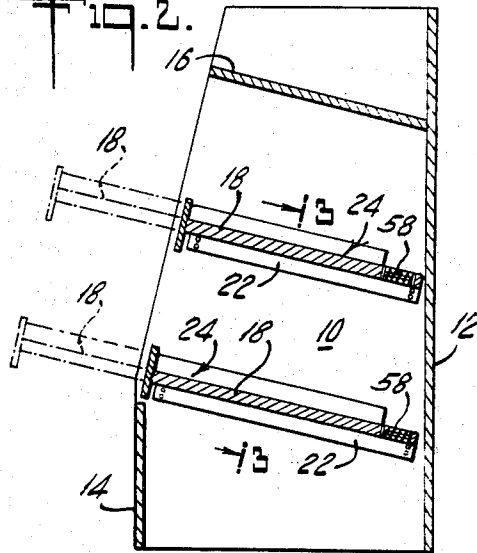
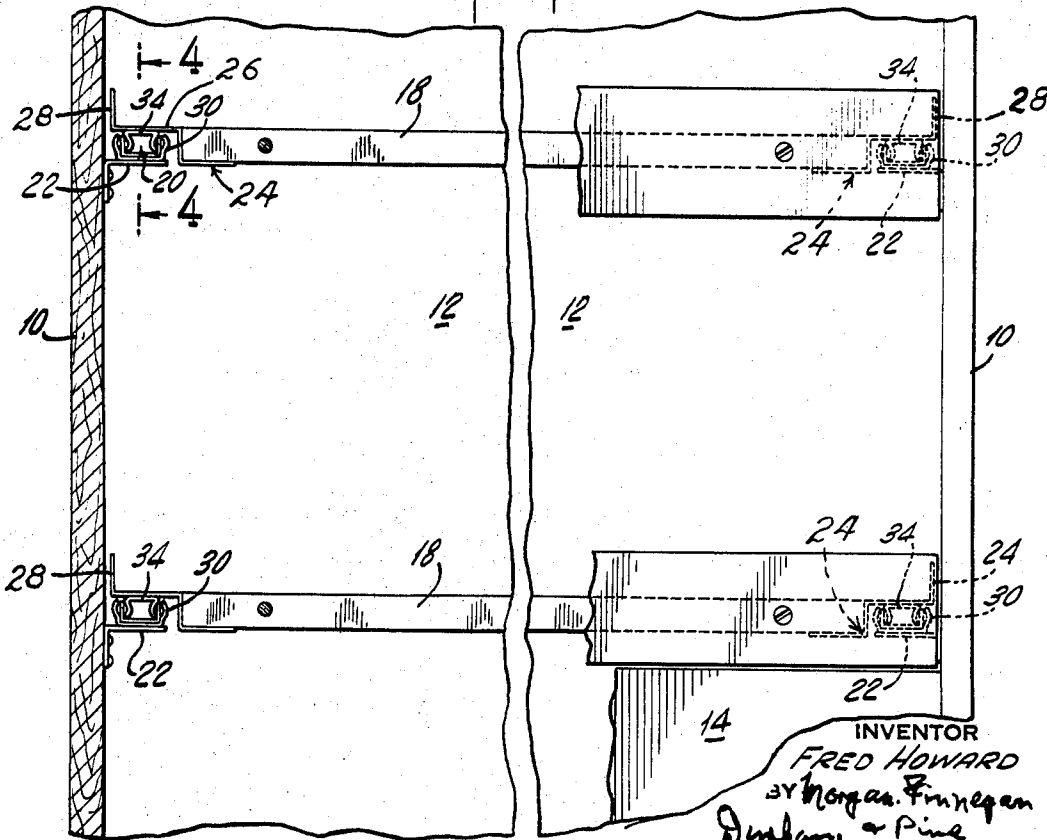


Fig. 3.



INVENTOR
FRED HOWARD
BY Morgan, Finnegan
Dunham & Pine
ATTORNEYS

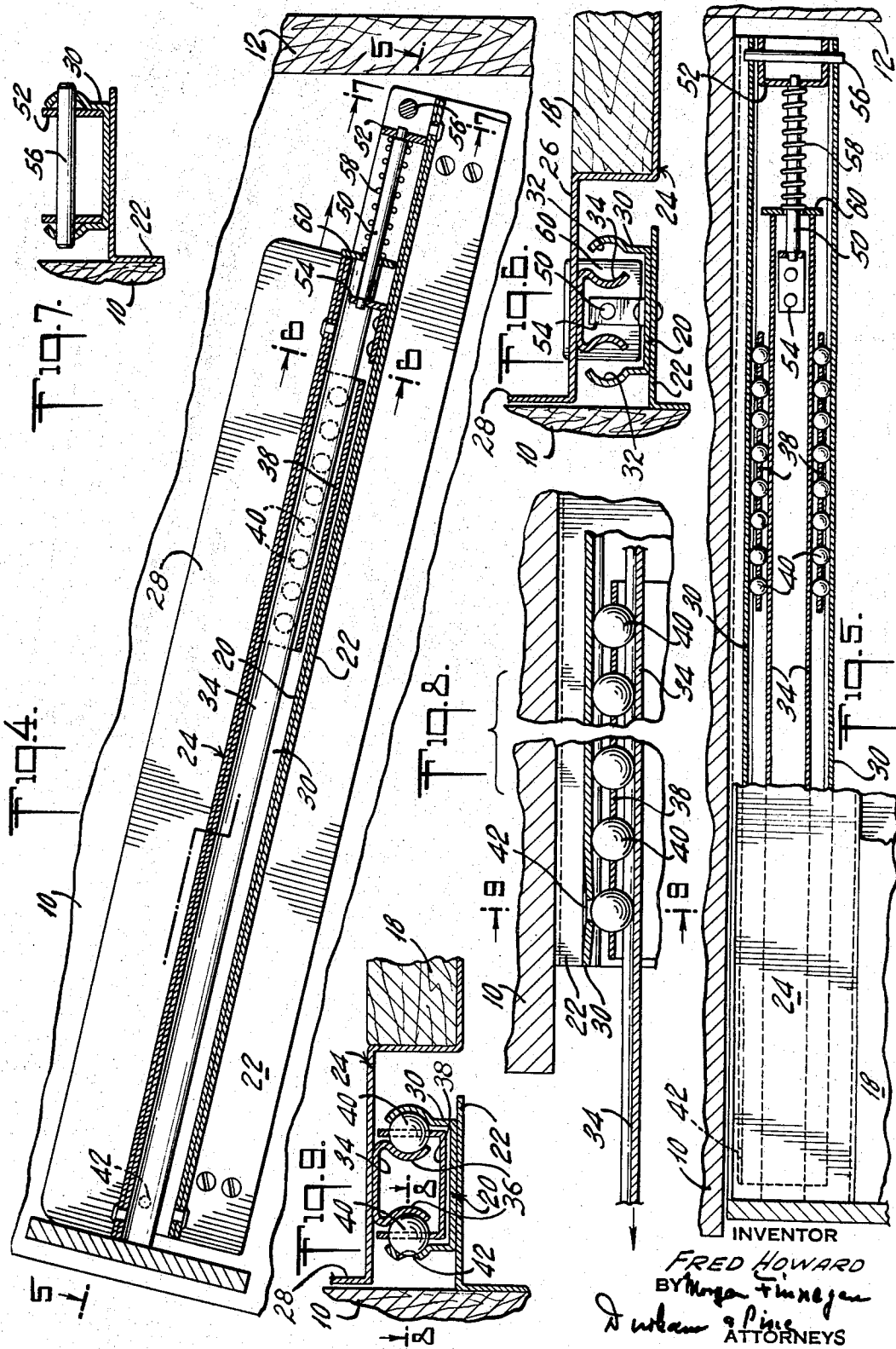
Oct. 7, 1969

F. HOWARD
DISPLAY CABINET

3,471,209

Filed Aug. 15, 1967

2 Sheets-Sheet 2



1

2

3,471,209

DISPLAY CABINET

Fred Howard, New York, N.Y., assignor to Howard Displays, Inc., New York, N.Y., a corporation of New York

Filed Aug. 15, 1967, Ser. No. 660,719

Int. Cl. A47f 3/06

U.S. Cl. 312—122

6 Claims

ABSTRACT OF THE DISCLOSURE

A display cabinet is provided having downwardly and rearwardly inclined shelves mounted on linear ball bearings to slide in a cabinet frame. To retain the shelf in its extended position for removal or replacement of merchandise on the shelf one of the races of at least one of the ball bearings is provided near one of its ends with a recess and is resiliently urged towards the adjacent race, so that as the shelf is extended, one of the balls enters the recess and forms a detent to hold the shelf until it is to be returned to its initial closed position. To expand the capacity of the shelf, the linear ball bearings are preferably no thicker than the thickness of the shelf member. The shelf has at each of its lateral ends a sheet metal plate or extension overlying the respective ball bearings and terminating in an upwardly extending portion close to the frame, said portion serving to keep the merchandise from contacting on the frame.

Summary

The invention provides a display cabinet having inclined slidable shelves supported and guided by linear ball bearings, the shelves inclined downwardly and rearwardly so that they tend to return to the closed position by gravity, and yet may be easily pulled out for removal or replacement of merchandise on the shelf. Easily released detent means are also provided, preferably as part of the ball bearing assembly so that the shelf is lightly held in its extended position, and yet may be easily returned to its closed position. Preferably, one or more of the shelves have the ball bearings mounted at the lateral ends of the shelf, which bearings are no thicker than the thickness of the shelf, and the bearings are mounted on the vertical upright side frame members of the cabinet, while the shelf is provided at each lateral end with a sheet metal extension having an upturned portion close to the frame member, thereby extending the surface area of the shelf proper and expanding the capacity of the cabinet as a whole, while preventing the merchandise on the shelf from rubbing on the adjacent frame member.

Brief description of the drawings

FIGURE 1 is a perspective view of a display cabinet in accordance with the present invention;

FIGURE 2 is a vertical cross section of the cabinet shown in FIGURE 1;

FIGURE 3 is a fragmentary front elevation, partly in section of the display cabinet shown in FIGURE 1;

FIGURE 4 is a longitudinal section on an enlarged scale taken on the line 4—4 of FIGURE 3;

FIGURE 5 is a fragmentary top plan view, partly in section taken along the line 5—5 of FIGURE 4;

FIGURE 6 is a fragmentary sectional view taken on the line 6—6 of FIGURE 4;

FIGURE 7 is a fragmentary sectional view taken on the line 7—7 of FIGURE 4;

FIGURE 8 is a fragmentary sectional view, taken on the line 8—8 of FIGURE 9, and showing the linear ball bearing and associated parts in a fully extended position; and

FIGURE 9 is a fragmentary sectional view taken on the line 9—9 of FIGURE 8.

Description of the preferred embodiment

Referring now in detail to the present preferred and illustrative embodiment of the invention, the display cabinet comprises two upright side frame members 10, a back member 12, and a bottom front panel 14 and a top fixed shelf 16, all permanently connected together to form a rectangular cabinet.

One or more sliding shelves 18 are provided within the cabinet, and are inclined downwardly and rearwardly at a slight angle to the horizontal, and preferably parallel with the fixed top shelf member 16. Shelf 18 is slidably mounted by means of linear ball bearing assemblies one at either lateral end of the shelf, the bearing assemblies 20 being carried by support means or elongated angle brackets 22 fixed to the inner face of the upright frame members 10. The ball bearing assemblies are preferably no thicker than the thickness of the shelf 18 and extend substantially from front to back of the shelf. The shelf is supported and fixed to the ball bearing assemblies, each of the lateral shelf ends being extended by means of an elongated sheet metal extension 24 which is secured to the under side of the shelf 18, extends upwardly and outwardly towards the side frame 10 and then upwardly a short distance so as to completely cover the ball bearing assembly and substantially conceal the same. Each horizontal extension portion 26 increases the load capacity of the shelf 18, while the upturned edge or rim 28 serves to contain the merchandise on the shelf, to prevent it rubbing on the frame as the shelf is slid back and forth and thus defines the enlarged usable shelf area.

Heretofore, sliding shelves in display cabinets have had the sliding bearing or slidable shelf support located beneath the shelf thereby occupying a great deal of space between adjacent shelves, which space diminishes the amount of merchandise that can be stored on a given total shelf area of a cabinet.

The linear ball bearing assemblies used in the present shelf structure are shown in detail in FIGURES 4 to 9 and comprise an outer elongated generally U-shaped sheet metal trough member 30 formed with longitudinally extending grooves 32 in the leg portions of member 30, facing each other to serve as raceways for the balls of the bearing. Within trough member 30 is tucked a similar but smaller inner generally U-shaped metal trough member 34 also formed with longitudinally extending raceways forming grooves 36 which complement raceways 32 for the bearing balls. The spacing of the grooves or raceways 32 and 36 is such as to accommodate the bearing balls 40 and to allow them to run freely as the members 30 and 34 are moved longitudinally with respect to each other from fully telescoped or initial position to fully expanded or extended position. The members 30 and 34 are made of relatively light gauge metal so that the side members carrying the grooves 32, 36 have a considerable degree of resiliency. Nested between the two trough members 30 and 34 is a third trough member 38 which is provided on each of its legs with a plurality of openings in which the balls 40 are seated, this member serving as a sliding ball cage to maintain proper spacing of the balls as they roll in their raceways. The third trough member 38 is preferably relatively short so as not to unduly limit the telescopic extension of the bearing assembly, and it is usually sufficient to provide for only about eight balls 40, as shown. As the shelf 18 is pulled out, the upper race forming member 34 moves with the shelf, the ball cage 38 moves at half speed, while the lower race member 30 via bracket 22 remains fixed on the side frame member 10.

Near its outer end, outer trough member 30 is bent

3

slightly inwardly towards its cooperating race and is provided with a small recess or hole 42 into which one of the balls 40 can enter as the ball cage 38 moves when the shelf is fully in extended position. The resiliency of the trough members 30 and 34 is such that the ball is lightly held in the position shown in FIGURES 8 and 9, and yet can be easily released by pushing slightly on the outer edge of the shelf 18 to allow the shelf to roll back by gravity into its initial of closed position.

As shown in FIGURES 4, 5 and 7, at the rear edge of the shelf 18, there is provided a bumper to avoid slamming of the shelf as it returns to its closed position. A guide rod 50 is supported parallel to the outer member 30 by means of brackets 52 and 54. Bracket 52 is fixed by a pin 56 passing through the upstanding portions of the trough member 30, while the forward bracket 54 is riveted to the bottom portion of trough member 30. Surrounding the rod 50 and freely slidable thereon is a light compression spring 58 and a washer 60, the washer engaging the rear edge of U-shaped member 34 connected to shelf 18 when the shelf is in closed position. Thus, as the shelf returns by gravity, it is snubbed by engagement of member 34 with washer 60 (see FIGS. 4 and 5) and brought to rest without slamming by means of the guided spring 58.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. A display cabinet comprising in combination a downwardly and rearwardly inclined shelf which is displaceable from an initial position to an extended position and vice versa, a frame in which the shelf is supported by ball bearings carried by the frame, each ball bearing comprising a U-shaped inner member having a pair of first bearing ball races located at its lateral opposite ends, a U-shaped external member which has second bearing ball races facing said first ball races in opposed formation, bearing balls located in said races for rolling movement therebetween, an intermediate strip member extending between said races and apertured to form cages for said bearing balls to seat the latter and space the same from each other, at least one of said races of said ball bearings being provided with a ball receiving recess resiliently urged towards the adjacent opposed race, whereby, when one of the bearing balls enters the recess in extended position of the shelf the shelf is retained in said extended position against the return of the shelf by gravity to its initial position.

2. A cabinet according to claim 1, including buffer means spring-supported in said U-shaped external member and defining said initial position of said shelf, said U-shaped inner member having a portion abutting said buffer means in said initial position of said displaceable shelf.

4

3. A display cabinet according to claim 1, wherein the shelf proper has lateral ends each provided with a plate extension overlying the respective ball bearings and terminating in a rim portion substantially perpendicular to said plate extensions, whereby the usable shelf top surface area is enlarged beyond the shelf proper.

4. In a slidable structure for a shelf and like carrier of a cabinet, which structure is equipped with first support means carrying a first U-shaped member, second support means connected to a second U-shaped member, said U-shaped members terminating in complementarily shaped opposite curved lateral ends, which form raceways between which strip-shaped cage means are located having spaced apart openings, which retain and space ball elements from each other, which in assembled condition of the structure are in rolling contact with said curved lateral ends and afford slidable connection of said U-shaped members with each other; the improvements essentially characterized in that each of said support means includes a cover portion arranged to extend, respectively, above and beneath said U-shaped members, thereby to conceal at least part of the latter in their assembled condition, said second support means being shaped to mount thereon a shelf with the top surface of the latter substantially flush with that of the corresponding cover portion, thereby to expand the usable shelf area, and that a recess is provided in one of said curved lateral ends near one extremity of one of said U-shaped members for effectuating engagement of one of said ball elements with said recess to function as a detent, thereby to releasably stop sliding movement of said second U-shaped member relative to said first U-shaped member at said one extremity.

5. In a structure according to claim 4, wherein resilient bumper means are arranged near the opposite extremity of the first U-shaped member and confine said sliding movement in a direction away from said recess.

6. In a structure according to claim 4, wherein said cover portion of said second support means has a rim portion projecting from said cover portion and substantially in perpendicular direction thereto.

References Cited

UNITED STATES PATENTS

886,192	4/1908	De Canio	312—333
2,328,835	9/1943	Motter	312—333
2,534,350	12/1950	Gussack	312—340
2,564,658	8/1951	Jakeway	312—343
2,624,094	1/1953	Smith	312—340
3,022,129	2/1962	Manson	312—343

CASIMIR A. NUNBERG, Primary Examiner

U.S. Cl. X.R.

308—3.8; 312—319, 333