United States Patent

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[15] **3,682,521**

[45] **Aug. 8, 1972**

[54] **ADJUSTABLE DOOR SHELVING**

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[22] Filed: **Oct. 16, 1970**

[21] Appl. No.: **81,223**

[52] **U.S. Cl.**.....**312/138 A,** 312/306, 297/153

[51] **Int. Cl.**.....**A47b 96/02**

[58] **Field of Search**.....312/138 A, 351; 297/153; 211/153; 249/225, 223

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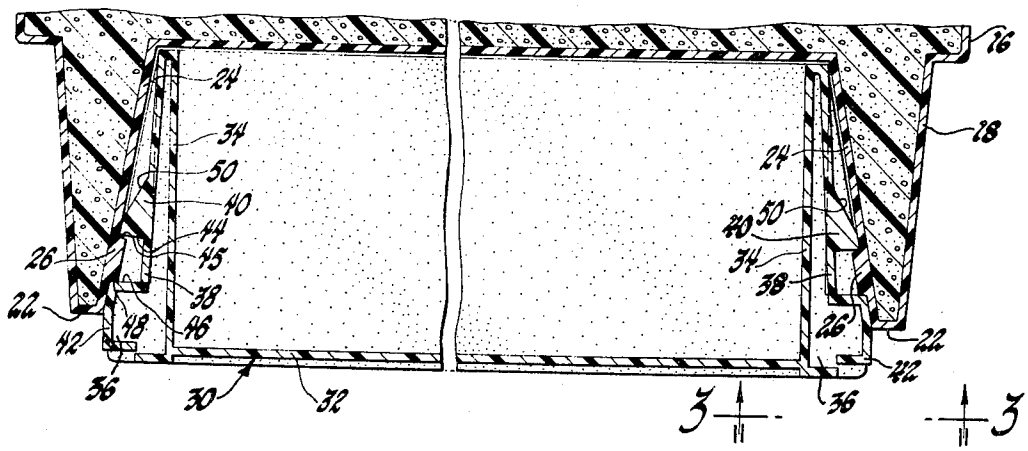
[57] **ABSTRACT**

An adjustable shelf having vertical end walls with depressible tabs secured to the outer surfaces thereof, the depressible tabs in turn having retaining lugs mounted thereon. A plurality of mounting lugs are secured to cooperating fixed vertical surfaces adjacent to which the shelf is to be mounted whereby the retaining lugs engage the mounting lugs to retain the shelf in a particular position. The tabs can be molded integral with the shelf so as to be inherently biased outwardly into normal engagement with the mounting lugs. In one embodiment the retaining lugs comprise a cam surface allowing the shelf to be vertically adjusted upwardly without depressing the tabs. In all embodiments, however, it is necessary to depress the tabs to withdraw the shelf from the fixed supporting structure having the mounting lugs secured thereto.

6 Claims, 7 Drawing Figures



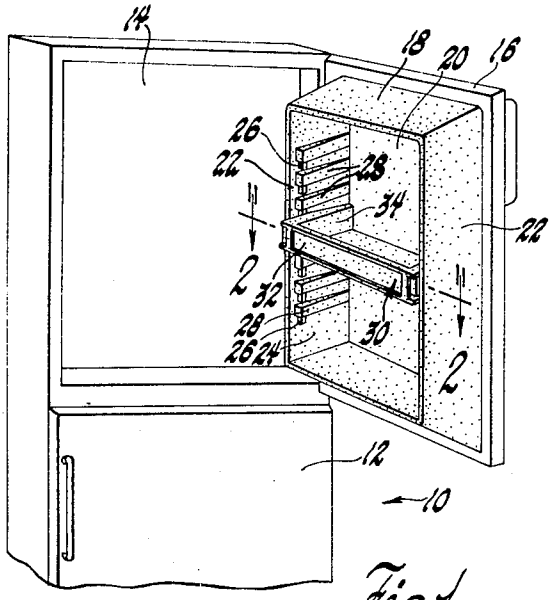


Fig. 1

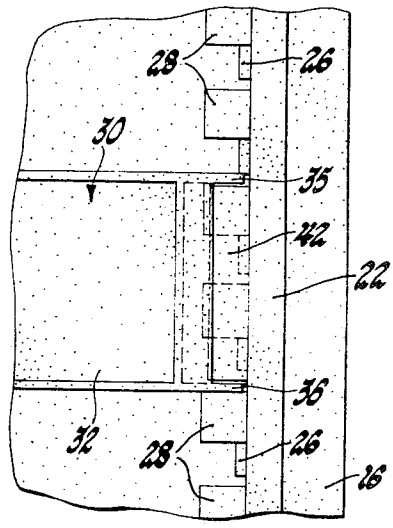


Fig. 3

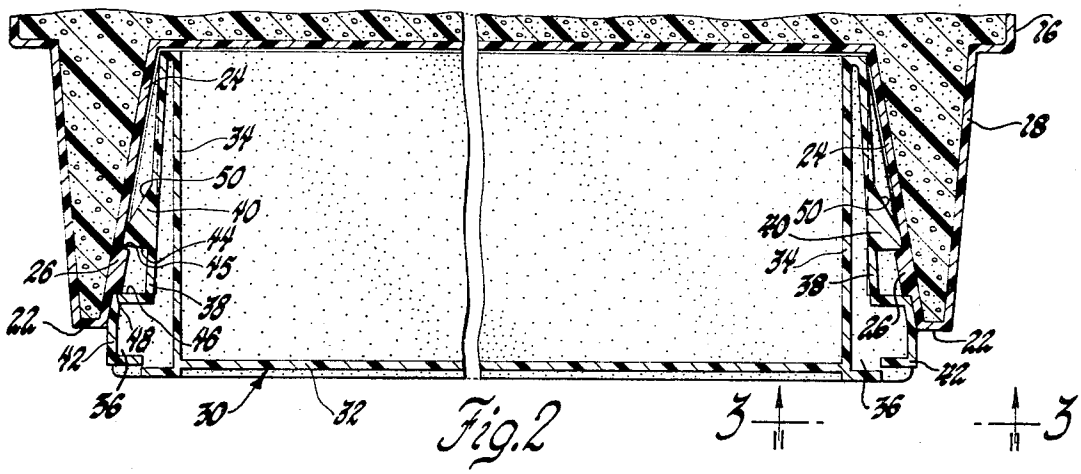


Fig. 2

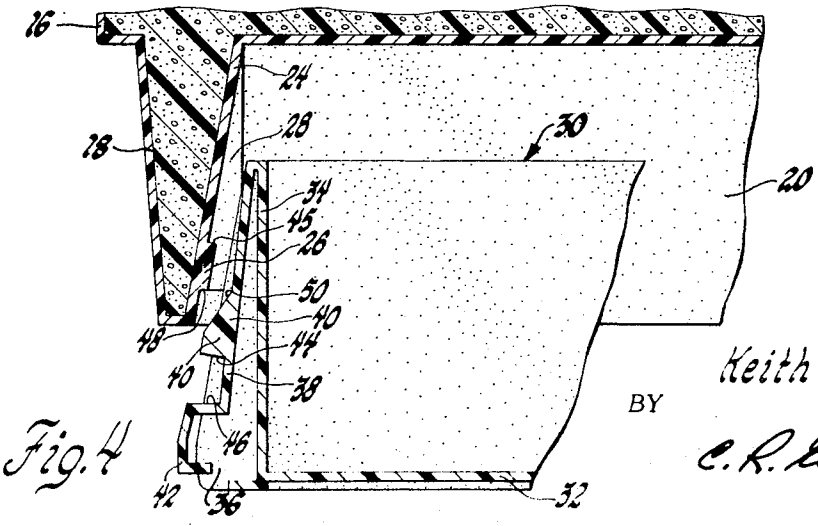


Fig. 4

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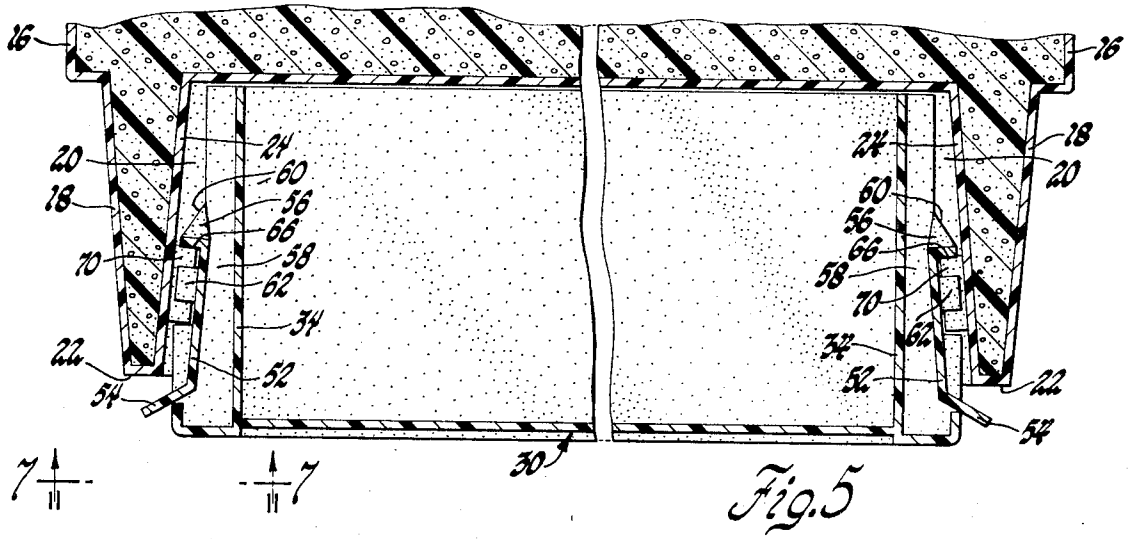

Fig. 5

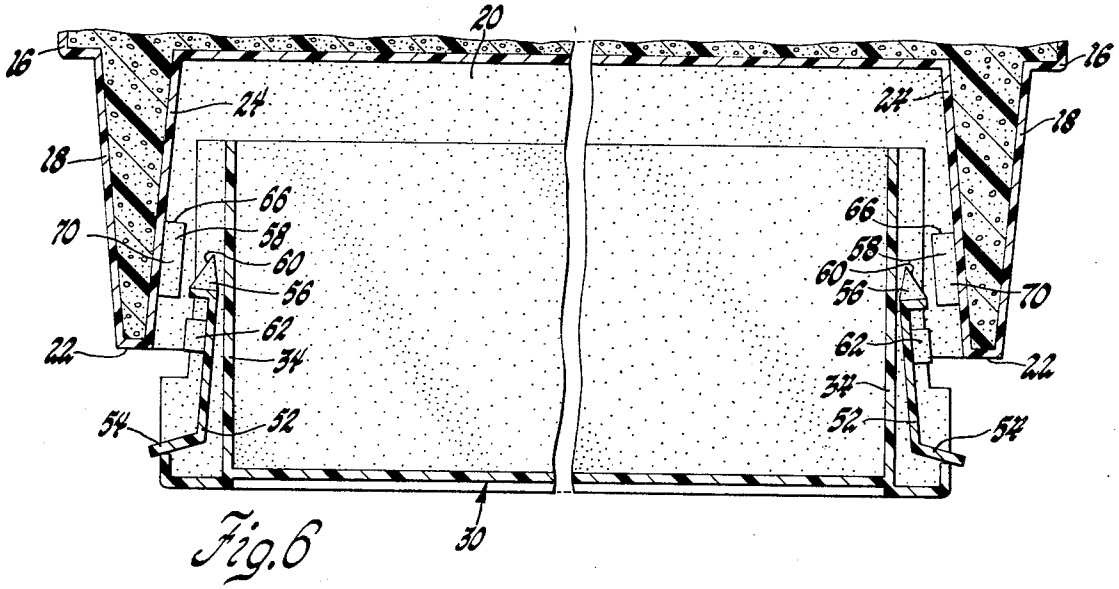

Fig. 6

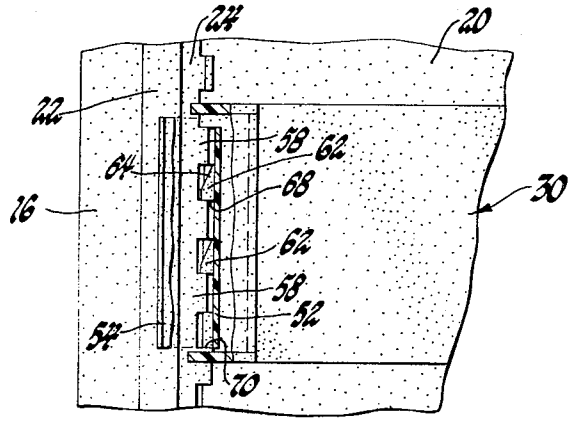

Fig. 7

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ADJUSTABLE DOOR SHELVING

BACKGROUND OF THE INVENTION

This invention relates to the adjustably mounting of a shelf upon fixed vertical side walls adjacent cooperating vertical shelf end walls. More specifically, this invention relates to the mounting of an adjustable shelf on the inner surface of a refrigerator cabinet door wherein the shelf may be quickly removed or adjusted vertically to accommodate stored items.

While adjustable shelves as such are not new, many adjustable shelves in the past have failed to provide the convenience of easy adjustment to accommodate articles of varying height. The means of securing such shelves in place has involved relatively complicated fastening devices necessarily increasing the difficulty of production. Therefore, it is a purpose of this invention to provide an adjustable shelf arrangement wherein the securing means can be integrally molded with the end walls of the shelf to include a retaining lug that releasably engages a fixed mounting lug on a supporting wall. In one form, the retaining lugs have a cam surface providing automatic release during insertion of the shelf and in another form have a cam surface allowing upward adjustment of the shelf without manually releasing the retaining lugs.

SUMMARY OF THE INVENTION

It is a first object of this invention to provide an adjustable shelf that can be easily removed from a fixed position by merely depressing tabs attached to the end walls of the shelf.

Another object of this invention is the provision of an adjustable shelf capable of being constructed of molded plastic wherein all the components retaining the shelf in place are molded integrally with the shelf.

Another object of this invention is the provision of a molded plastic shelf having depressible tabs molded integrally therewith at each side, the depressible tabs having a lug molded integrally thereon for releasable engagement with mounting lugs on a fixed supporting wall.

A still further object of this invention is the provision of an adjustable shelf having integrally molded plastic depressible tabs on the end walls of the shelf and comprising retaining lugs on the depressible tabs for releasable engagement with mounting lugs molded on the inner surface of side walls of a cabinet receiving the shelf.

Yet another object of this invention is the provision of a molded plastic shelf comprising integrally molded plastic depressible tabs on the ends of the shelf, the tabs having retaining lugs integrally molded thereon for releasable engagement with mounting lugs formed on the interior surfaces of side walls of a refrigerator door.

Another object of this invention is the provision of a molded plastic adjustable shelf having depressible tabs molded integrally with the end walls, retaining lugs integrally molded on the tabs and having cam surfaces engaging mounting lugs secured to a fixed supporting wall during the insertion of the shelf whereby the tabs are depressed and are resiliently biased outwardly behind said mounting lugs retaining the shelf in a fixed position.

A still further object of this invention is the provision of a molded plastic adjustable shelf comprising resilient depressible tabs molded integrally with the end walls of the shelf and comprising retaining lugs on the tabs for engagement with mounting lugs on the inner surfaces of supporting walls, the retaining lugs having a cam surface engaging said mounting lugs and biasing said tabs inwardly when said shelf is adjusted vertically upwardly eliminating the necessity of removing the shelf during such adjustment.

IN THE DRAWINGS:

FIG. 1 is a fragmentary perspective view illustrating a refrigerator door including the subject shelf arrangement.

FIG. 2 is a sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is a partial sectional view taken on line 3—3 of FIG. 2.

FIG. 4 is a partial sectional view illustrating the adjustable shelf being partially removed from the cabinet.

FIG. 5 is a sectional view illustrating a modified form of the subject adjustable shelf.

FIG. 6 is a partial sectional view illustrating the adjustable shelf in a partially withdrawn position.

FIG. 7 is a partial sectional view taken on line 7—7 of FIG. 5.

DESCRIPTION OF PREFERRED EMBODIMENTS

With reference to FIG. 1, a refrigerator cabinet **10** is of the dual compartment type including a freezer portion **12** and the usual food storing compartment **14** being closed by a pivotally mounted door **16**. The door **16** on its inner surface has an inwardly projecting peripheral wall arrangement **18** defining a cavity **20**. Vertical walls **22** of the peripheral wall arrangement **18** have secured to their inner surfaces **24**, a plurality of shelf mounting lugs **26** and shelf supporting guides **28**, the guides being alternately located with respect to the mounting lugs **26**. A shelf member **30** comprises a front wall **32** and end walls **34** best shown in FIG. 2. Horizontal slide flanges **35** and **36** are also provided on the end walls **34** of the shelf to provide vertical support of the shelf when it is installed within the door cavity **20**.

With reference to FIG. 2, the shelf end walls **34**, in preferred form, have a depressible tab **38** molded integrally thereon in a manner that the tab is normally biased outwardly away from the end walls **34**. At least one retaining lug **40** is attached to each of the depressible tabs **38** and in preferred form is also molded integrally with the tab **38**. The depressible tab **38** terminates in an actuating bar or button portion **42** so that the tab may be manually depressed to move the retaining lug **40** inwardly toward the shelf end wall **34** out of engagement with its cooperating mounting lug **26**. A plurality of retaining lugs **40** can be molded upon the depressible tab **38** when the end wall **34** is of sufficient height so that the shelf **30** is securely retained within the door cavity **20**.

The mounting lugs **26** on the side walls **22** of the peripheral wall arrangement **18** are placed in a predetermined position so that the front surface **44** of the retaining lugs **40** engage the rear surface **45** of mounting lugs **26** while the rear surface **46** of the actuating bar **42** engages the front surface **48** of the mounting lug **26** to securely retain the shelf in a horizontal position. The adjustable shelf **30** also in-

cludes the aforementioned flanges **35** and **36** which engage the upper surface of guides **28** to rigidly support the shelf in a vertical direction.

The retaining lugs **40** also include a cam surface **50**, best illustrated in FIG. **4**, which is formed at an angle so that upon insertion of the shelf **30** within the cavity **20**, the cam surface **50** engages a mounting lug **26** and depresses the retaining lug **40** sufficiently to allow insertion of the shelf without manually depressing the tab **38**. When the retaining lug **40** has moved past the mounting lug, the tab **38** biases it outwardly behind the mounting lug.

A modified form of means for retaining the shelf in place is shown in FIGS. **5**, **6** and **7** wherein like parts will be described with like reference numerals. In this embodiment, a depressible tab member **52** is also preferably molded integral with the end walls **34** of the shelf **30** but is configured to have a modified form of actuating button **54** in conjunction with a modified form of a retaining lug **56**. The inner surface **24** of the peripheral side walls **22** have a modified mounting lug **58** secured thereto and in preferred form the lug **58** is molded integrally with the surface **24**. The retaining lug **56** includes a cam surface **60** which engages the mounting lug **58** during horizontal insertion of the shelf **30** within the cavity **20**.

The depressible tab **52** also comprises a second lug **62** which includes a cam surface **64** best illustrated in FIG. **7**. When the shelf **30** is positioned within the cavity **20** the lug **56** is positioned adjacent the rearward side **66** of the lug **58** while the lug **62** is displaced relative to the lug **56** and includes a surface **68** in engagement with top surface **70** of an adjacent lug **58** supporting the shelf vertically. This arrangement requires at least two mounting lugs **58** to support the shelf **30**.

While in each of the respective embodiments a single lug retaining assembly on each depressible tab has been described for purposes of illustration only, it is readily apparent that any number of lugs may be incorporated upon the depressible tabs so as to provide adequate support for the particular weight bearing load applied to the shelf **30**.

From the description of the embodiment illustrated in FIGS. **5**, **6** and **7**, it is obvious that the lug **56** retains the shelf **30** horizontally due to its engagement with the rear surface **66** of mounting lug **58**. The shelf **30** is vertically supported as a result of the lug **62** and its surface **68** engaging the top surface **70** of a lug **58**. Should it be desired to move or adjust the shelf **30** vertically upwardly, the shelf can be manually moved in an upward direction without depressing the tabs **52** due to the engagement of the cam surface **64** with a mounting lug **58** during such movement. A space of width sufficient to accommodate releasing movement of the tab **52** toward end wall **34** when the cam surfaces engage a mounting lug during movement of the shelf is provided. It is apparent that since the supporting surface **68** of the lug **62** engages surface **70** of a mounting lug **58**, the tabs must be depressed to adjust the shelf downwardly. However, this can be accomplished without removing the shelf horizontally of the side supporting walls. In both of the above described embodiments however it is necessary to depress the respective tabs **38** and **52** in order to withdraw the shelf from the cavity **20**.

From the above description it is apparent that this invention provides a reliable and easily producible retaining means for an adjustable shelf having particular application in a refrigerator door. The molded plastic components provide a desirable appearance while eliminating a series of connected parts normally utilized in such an arrangement. The above embodiments have been described for purposes of illustration only, such description is not intended to limit the scope of this invention except as required by the appended claims.

I claim:

1. An adjustable shelf comprising: a shelf member having end walls, said shelf being dimensioned to fit between stationary vertical supporting surfaces having mounting lugs and supporting guides thereon, a depressible tab member secured on each of said shelf end walls, a retaining lug on said tab members, said tab members being continuously biased outwardly, and horizontal flanges attached to said end walls and extending outwardly therefrom, said flanges when said shelf is inserted between vertical supporting surfaces engaging the support guides retaining the shelf vertically, said tab retaining lugs being cammed inwardly while moving past the mounting lugs when said shelf is being inserted between the vertical supporting surfaces and moving outwardly behind the mounting lugs in response to the continual biasing force placed on said depressible tab members retaining the shelf horizontally when completely installed.

2. In combination, a refrigerator door having a cavity defined on the inner side thereof by rearwardly extending vertical and horizontal walls attached to the interior finishing surfaces of the door, a plurality of lugs secured to the inner surfaces of said door vertical walls defining said cavity, a shelf member comprising end walls and a front wall, depressible tabs secured to the outer surface of said shelf end walls, and retaining lugs on said tabs engaging said door lugs to retain the shelf in a predetermined vertically adjusted position.

3. In combination, a refrigerator door having an inner surface comprising inwardly extending peripheral walls defining a food storing cavity therein, a plurality of shelf mounting lugs integrally molded on the inner surface of the vertical peripheral walls, a removable food supporting shelf comprising a front vertical wall and end walls cooperating with the cavity side walls defining a food storage surface, depressible tab members molded integral with said shelf end walls, shelf retaining lugs integral with said depressible tabs normally engaging said mounting lugs when said shelf is installed, manually engageable button portions on each of said tabs for actuating said tabs sufficiently to disengage said retaining lugs from said mounting lugs for removing said shelf, a cam surface on one side of said retaining lugs permitting horizontal insertion of said shelf without requiring the depressing of said tab members, supporting guides secured to said side walls, and flanges on said shelf end walls slidably engaging said guides supporting said shelf vertically.

4. A combination as described in claim **3** wherein said tab manually engageable buttons comprise a surface in engagement with said mounting lugs cooperating with said retaining lugs to lock said shelf relative to said mounting lugs when said shelf is installed.

5. In combination, a refrigerator door having an inner surface including inwardly extending peripheral walls defining a cavity, shelf mounting lugs molded integral with the vertical side walls defining said cavity, an adjustable food shelf including a front wall and end walls, a depressible tab molded integral with each end wall, first and second shelf retaining lugs molded integral with said depressible tabs and engaging said shelf mounting lugs on said door side walls when said shelf is installed, said first retaining lugs having a cam surface providing for insertion of said shelf into said food cavity without depressing said tabs, said depressible tabs having sufficient resilience to force the retaining lugs outwardly into engagement with said mounting lugs thereby retaining said shelf horizontally within said door, said second lugs comprising a cam surface allowing vertical movement of said shelf upwardly without depressing said tabs and engaging said mounting lugs supporting the shelf vertically, and button portions formed on the terminal ends of said depressible tabs for manual actuation thereof whereby said first and second retaining lugs can be released during removal and installation of said shelf.

6. The combination as described in claim 5 wherein said shelf end walls further comprise flanges and said vertical side walls of said door further comprise guides mounted on the inner surfaces thereof, said guides being engaged by said flanges providing vertical support of the shelf.

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