Nov. 15, 1966 L. HOFFMAN 3,285,206

COLLAPSIBLE SHELF

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Fig. 1

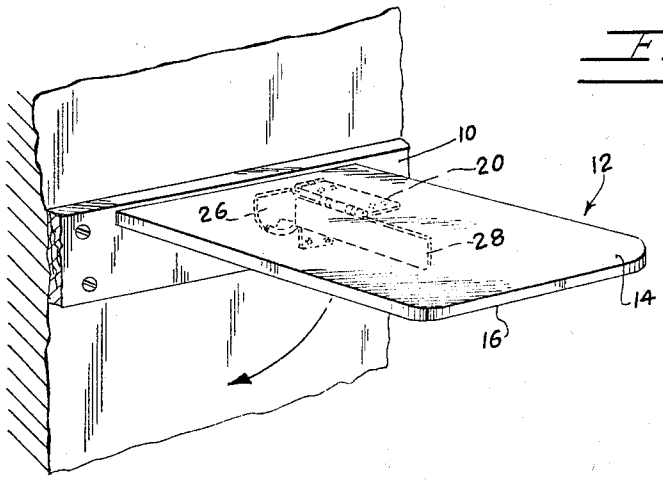


Fig. 2

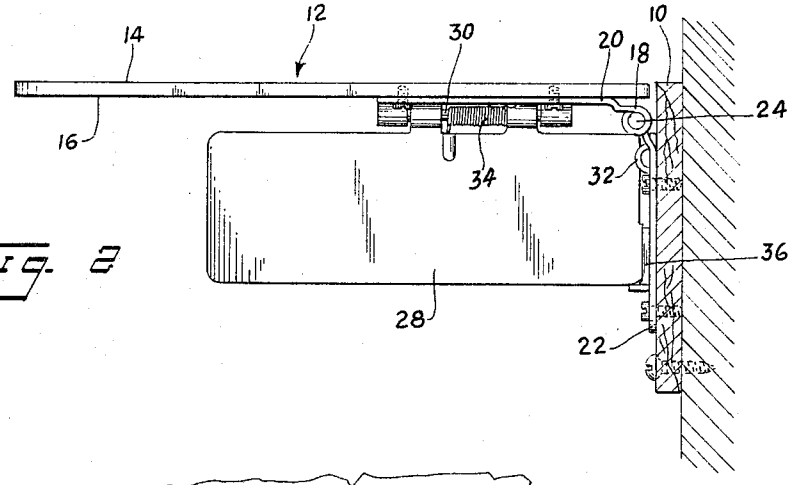
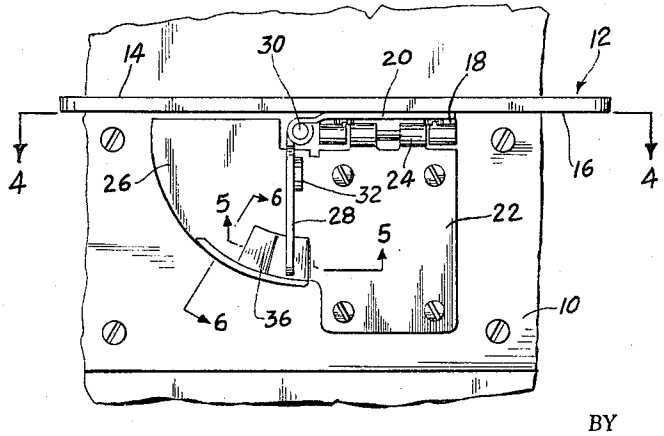


Fig. 3



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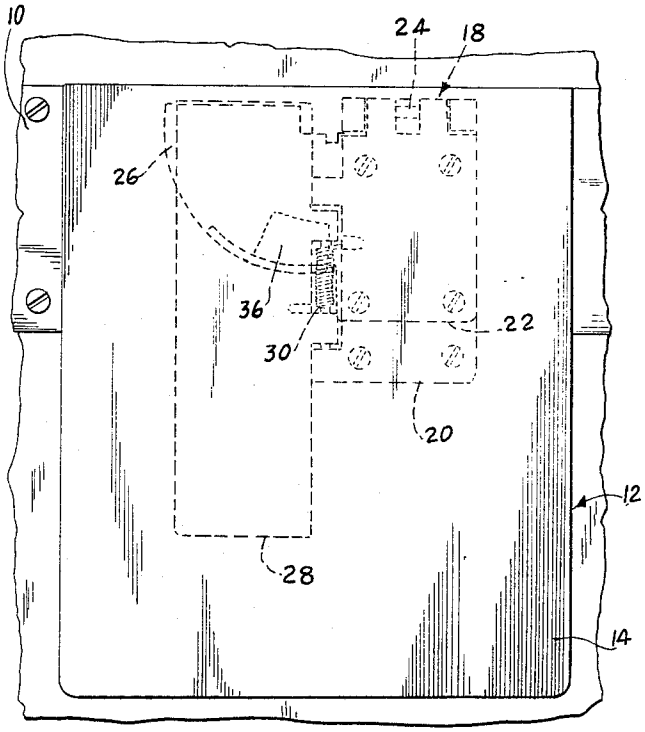
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COLLAPSIBLE SHELF

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Fig. 7



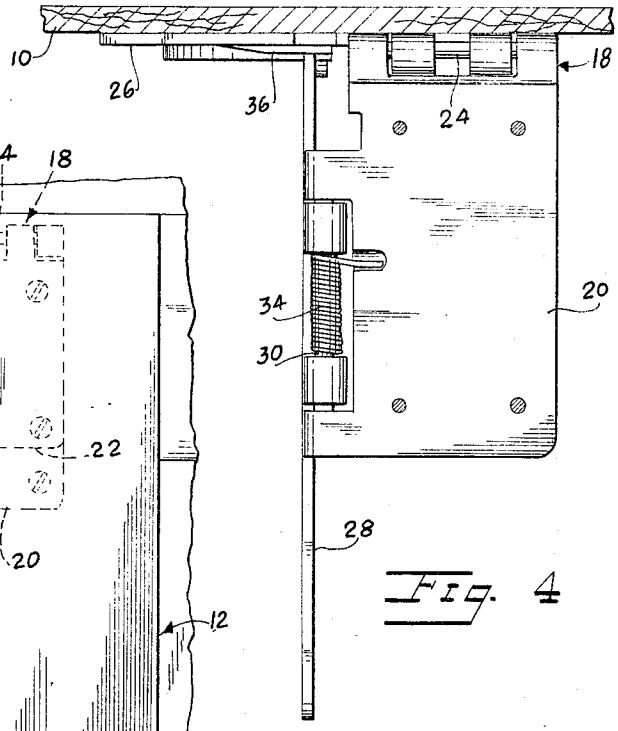


Fig. 4

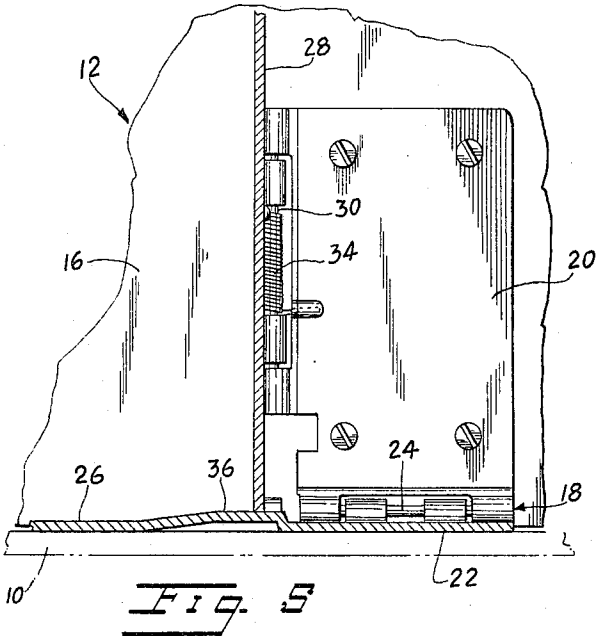


Fig. 5

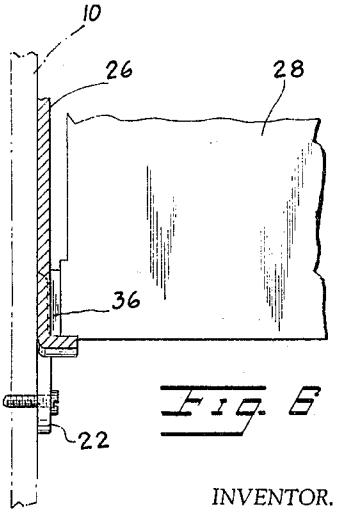


Fig. 6

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COLLAPSIBLE SHELF

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Filed Aug. 16, 1965, Ser. No. 479,883
2 Claims. (Cl. 108—134)

This invention relates to foldable and collapsible structures. More particularly, it relates to an improved collapsible shelf adapted to be used in conjunction with a wall, a table and the like.

Collapsible shelves and table leaves of the type which, when not in use, are collapsed to hang in vertical disposition adjacent a wall or table end and which, when in use, are brought into a horizontal position, have generally presented the problem of ready susceptibility to malfunction and to undesirably short useful lifetimes. A common failure in this connection has been the eventual assuming of a separate leaf for such collapsible structure of a position other than its desired proper position to maintain the shelf in a true horizontal plain. Such change of position may be caused by a warping or detaching of a hinge from a surrounding supporting structure, a scaffing and scoring of a supporting structure and the wearing and corrosion of moving parts. Consequently, in its horizontal disposition the shelf tends increasingly to deviate from a true horizontal plane whereby the utility thereof is greatly diminished.

Another problem often encountered with collapsible shelves is the failure of a support leaf to rapidly and precisely assume its desired position for maintaining it horizontal when the shelf is moved from the vertical to the horizontal. In addition, with the repeated movements from the vertical to the horizontal, and vice versa, the end edge of the support leaf disposed adjacent the vertical wall or structure to which the shelf is attached tends to scuff and score such wall or structure, with consequent damage thereto.

Accordingly, it is an important object of this invention to provide an improved collapsible shelf which is maintained in a true horizontal position and which has a desirably long lifetime.

It is another object to provide a collapsible shelf in accordance with the preceding object in which the surrounding structure to which the shelf is attached is preserved from damage due to the operation of the shelf.

It is a further object to provide a collapsible shelf in accordance with the preceding objects in which the shelf is rapidly and precisely brought from the vertical position to the horizontal position.

Generally speaking, and in accordance with the invention, there is provided a collapsible structure comprising a planar member having an upper and an under surface and adapted to normally assume a vertical position adjacent a wall and be brought into a horizontal position in substantially abutting relationship with the aforesaid wall. There is further provided hinge means comprising first and second hinge plates and pintle to which an end edge of each of the plates is hingedly connected, the first and second plates being affixed to the aforesaid undersurface and wall respectively at locations whereby the pintle is located where the member abuts the wall. There is further included a support leaf having an edge thereon pivotally connected to a side edge of the first plate to adapt it to be rotatably moved about a horizontal axis, and a stop is provided on the second plate for halting the movement of the support leaf when it attains a position in a plane perpendicular to the aforesaid undersurface and wall. Tensioning means associated with the connection between the leaf end and the first plate is provided for normally urging the support leaf into the aforesaid perpendicular position and an extension piece is included affixed to the wall adjacent the second plate and covering the path swept by the aforesaid end edge of the support leaf and opposing the wall as it is rotated from the horizontal to the aforesaid perpendicular position.

To insure that the support leaf continually attains the desired perpendicular disposition when the shelf is moved from the vertical to the horizontal, a ramp may be included on the aforesaid extension piece and bearing against the edge of the support leaf adjacent the wall. With this latter arrangement, the support leaf is prevented from deviating from its desired position, i.e., perpendicular to the undersurface of the shelf and to the wall.

For a better understanding of the invention together with other and further objects thereof, reference is had to the following description taken in conjunction with the accompanying drawing and its scope will be pointed out in the appended claims.

In the drawing, FIGURE 1 is a three-dimensional view of an illustrative embodiment of a collapsible shelf constructed in accordance with the principles of the invention and showing the shelf in the horizontal position;

FIGURE 2 is a side elevational view of the shelf shown in FIG. 1;

FIGURE 3 is a front elevational view of the shelf shown in FIGS. 1 and 2;

FIGURE 4 is a section taken along lines **4**—**4** of FIG. 3 looking in the direction of the arrows;

FIGURE 5 is a section taken along lines **5**—**5** of FIG. 3 looking in the direction of the arrows;

FIGURE 6 is a section taken along lines **6**—**6** of FIG. 3 looking in the direction of the arrows;

FIGURE 7 is a view similar to that of FIG. 3 but showing the shelf in its collapsed, i.e., vertical position.

Referring now to the drawing, the structure designated by the numeral **10** represents a wall, a table end and like member against which a collapsible shelf **12** or leaf abuts when it is in the horizontal position and from which it hangs vertically when it is in its collapsed position. Shelf **12** is suitably a planar member which, when it is in the horizontal position, has an upper surface **14** and a lower surface **16**.

A hinge generally designated by the numeral **18** comprises a hinge plate **20** suitably affixed to the undersurface **16**, a plate **22** suitably affixed to wall **10**, an end edge extension of each of plates **20** and **22** being disposed around a pintle **24**, whereby shelf **12** is rendered rotatable about pintle **24** about a horizontal axis of rotation. Hinge **18** is so affixed to undersurface **16** whereby pintle **24** is located substantially at the junction of lower surface **16** and wall **10**.

Adjacent plate **20** and suitably integral therewith is an extension piece **26**, the size of extension piece and its contour being chosen to at least cover an area of wall **10** which is swept out by an end edge of a support leaf **28** as leaf **28** is reciprocally rotated about a horizontal axis from a position parallel to and substantially against undersurface **16** to a disposition substantially perpendicular to wall **10** and undersurface **16** as is further explained hereinbelow.

Support leaf **28** is a rectangular plate, having extensions from its upper edge which engirdle a pintle **30**, pintle **30** also being engirdled by extensions from the inner side edge, i.e., the side edge of plate **20** substantially aligned with the edge of plate **22** adjacent extension piece **26**. With the arrangement of leaf **28**, hinge plate **20** and pintle **30**, leaf **28** is pivotable about a horizontal axis, its arc of travel terminating at one end of a location parallel to and abutting the undersurface **16** of shelf **12** and at the other end in a plane which is perpendicular to undersurface **16** and wall **10** to insure that the arc of travel of leaf **28** terminates at its other end in the latter plane,

a projection or lug **32** is provided on plate **22** as shown.

To provide rapid and precise action in the arcuate movement of support leaf **28** as it moves from its horizontal to its vertical position, there is suitably provided a torsion spring **34** connected to leaf **28** which is arranged to urge leaf **28** to move from the horizontal to its vertical position about pintle **30**. It can now be appreciated that extension piece **26** should have an area substantially equal to the area swept out by the end edge of leaf **28** adjacent wall **10** as it moves in its arcuate path from the horizontal to the vertical position and vice versa.

In considering the operation of the invention as described thus far, if it is assumed that self **12** is hanging in its collapsed position, leaf **28** is held flat against wall **10** by shelf **12** and plate **20** is resting against plate **22**. Now, as shelf **12** is lifted from its lower end to the horizontal position, leaf **28** rapidly and precisely rotates toward its vertical disposition around the horizontal axis provided by pintle **30** and is aided by torsion spring **34**, coming to a halt as it encounters lug **32**, the presence of extension piece **26** preventing scuffing or scoring of wall **10** during such movement. To collapse the shelf from the horizontal to the vertical position, leaf **28** is rotated toward undersurface **16** to permit shelf **12** to be rotated against wall **10** around pintle **24** whereby shelf falls into its collapsed position, extension piece **26** again preventing the scuffing and scoring of wall **10** during the movement of leaf **28**. With this arrangement there is provided a collapsible shelf which is rapid and precise acting and wherein the underlying supporting wall is substantially preserved from damage.

In the operation of a collapsible shelf, a common disability which occurs is the weakening and wearing of the hinge and support structure for the shelf with the result that the shelf does not assume the desired horizontal position when required but tends to slope downwardly whereby its upper surface no longer lies in a horizontal plane. In accordance with the invention, such contingency is prevented by providing a ramp **36** on extension piece **26** adjacent plate **22**. Ramp **36** by its structure and its resilience functions to continually bear against the end edge of leaf **28** adjacent wall **10** whereby leaf **28** is always precisely maintained in the desired disposition perpendicular to undersurface **16** and wall **10** when shelf **12** is moved from the vertical to the horizontal position. Thus, with the arrangement of ramp **36**, shelf **12** is endowed with an enhanced lifetime, since its continually assuming a true horizontal position despite wear of and strain on the support structure is thereby assured.

While there has been described what is considered to be a preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes may be made therein without departing from the invention and it is, therefore, aimed in the appended claims, to cover all such changes and modifications as fall within the spirit and scope of the invention.

What is claimed is:

1. A collapsible shelf comprising a planar member having an upper and under surface and adapted to normally assume a vertical position adjacent a wall and to be brought into a horizontal position in substantially abutting relationship with said wall comprising hinge means comprising first and second plates and on first pintle on which end edge extensions of each of said plates is pivotedly mounted, said first and second plates being affixed to said undersurface and said wall respectively at locations whereby said pintle is located at the abutting junction of said shelf and said wall, a support leaf, a second pintle, a side edge extension of said support leaf and a side edge of said first plate being pivotedly mounted on said second pintle to adapt said leaf to be rotatably moved about a horizontal axis, stop means provided on said second plate for preventing movement of said support leaf about beyond the point where said leaf attains a position perpendicular to said undersurface and said wall, tensioning means jointly operatively associated with said second pintle and said support leaf for urging said leaf into said perpendicular position, an extension piece affixed to said wall adjacent said second plate and substantially covering at least the path swept out by the end edge of said leaf adjacent said wall as said leaf is rotated between its horizontal and vertical positions, and a ramp on said extension piece adjacent said second plate bearing against said end edge of said leaf.

2. A collapsible shelf as defined in claim **1** wherein said tensioning means is a torsion spring and wherein said extension piece is integral with said second plate.

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