Feb. 11, 1941. L. GORDON 2,231,005

CONTAINER

Filed Jan. 11, 1938

FIG. 1

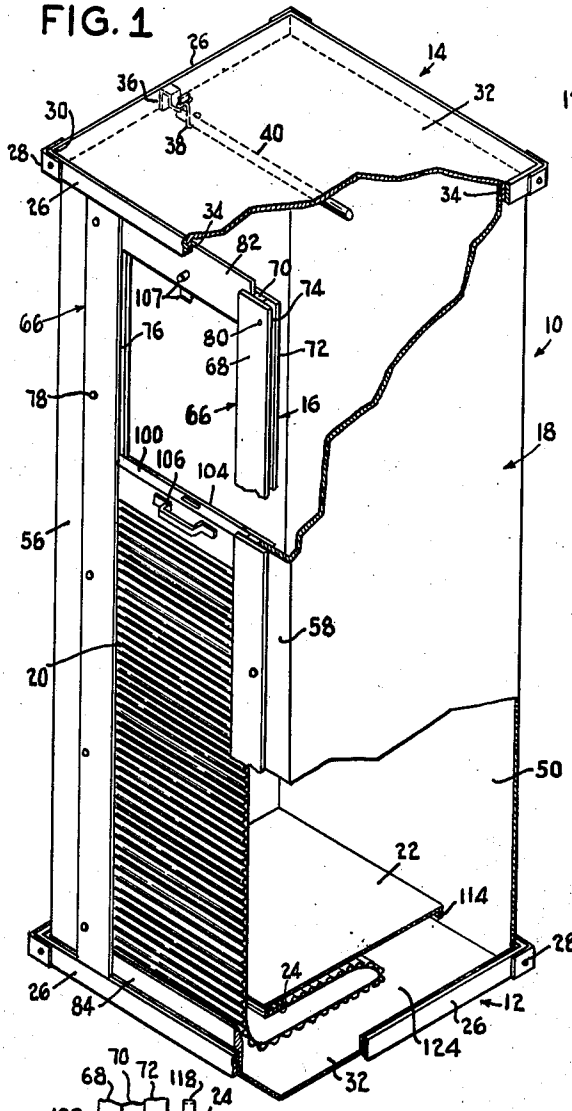


FIG. 3

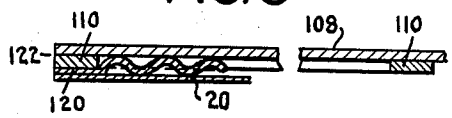


FIG. 4

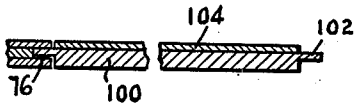


FIG. 5

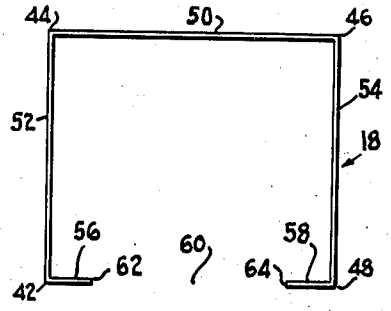
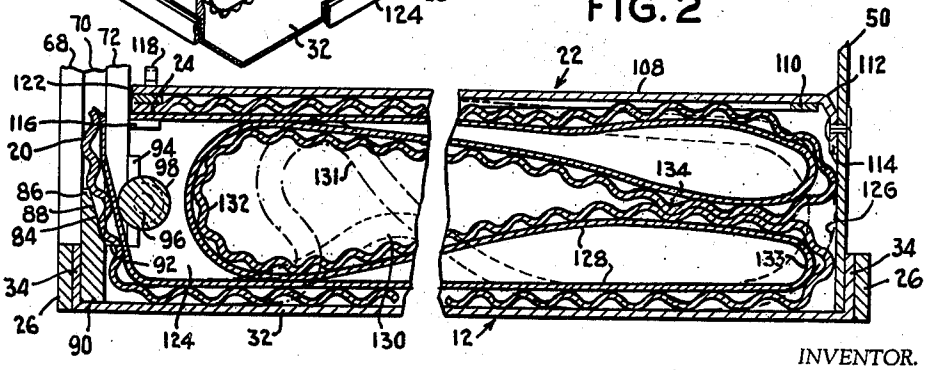


FIG. 2



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2,231,005

CONTAINER

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19 Claims. (Cl. 312—190)

This invention relates to containers.

Particular reference is had herein to containers which are made up from paper board and are capable of being collapsed into small space, as, for instance, for shipping and like purposes. In certain of its aspects, however, it is to be understood that the invention may have application to containers of other types.

One particular use made of containers involving features of the invention here to be described is as a wardrobe. Such wardrobe, of course, requires some means to permit ready access to the interior of the cabinet. Such access-permitting means, which may be in the form of a panel constructed from corrugated paper board, although other materials having similar properties may be used for this purpose, is mounted to slide relatively to an opening provided in a wall of the cabinet. When the panel is slid to open position, it is possible to have access to the interior of the cabinet. The panel is so constructed that, as it is propelled in its sliding movement, it is flexed transversely of its length.

Flexing panels, similar in material to the one here to be described, have been found to reach a stage of fatigue, and to become fixed, in their flexures. Such results of fatigue in flexure may impede proper operation of the apparatus. Many attempts have been made to overcome this condition of fatigue, but none with a particular degree of success.

It is an object of the invention to provide means to cooperate with closures of the type indicated so as to make flexure of the closure ineffective in setting up a condition of fatigue which would affect the proper operation of the closure towards and away from opening-governing position.

Many methods have been used in attempting to remedy this defect in operation. However, such remedies have introduced means positively to guide and retain substantially the entire closure in its movement into its several positions. Since the height of the cabinet is generally much greater than its depth, provision has to be made for disposition of the closure in more than one plane if it is to be retained properly when the closure has been moved to open position, and if the space within the cabinet is not to be obstructed when such closure assumes its various positions. In one case, the closure was retained in guides; in another, it was rolled upon a roller; in still another, a weight was attached to an end of the closure in an endeavor to overcome an inherent tendency of the material of the closure to assume an unflexed condition.

It is an object of the invention to provide means in a cabinet of the type set forth to control the movement of a closure for an opening to open position without requiring guides throughout the extent of movement of the closure, and without any weighting element to overcome the results of the inherent elasticity of the closure.

One factor, found present in a cabinet using a flexing panel as the closure for its opening, was the necessity for providing space into which the panel might move. Such space, of course, had to be subtracted from the depth of the cabinet, and, therefore, for a requisite capacity, increased the space required for a cabinet of this type. Since, as a general rule, the height of the cabinet is not as important a factor as the dimensions of the base of the cabinet, as the latter dimensions determine the amount of space required in small quarters, whereas such cabinets, of course, are not as high as the ceilings of the rooms in which they are to be placed, the provision of means for housing the closure in its movement, without consuming available space provided by the extent of the base, becomes of considerable value.

It is an object of the invention to provide a cabinet of the type set forth in which, for the movement of the closure to its several positions, no increase is required in the extent of the base, and in which, when the closure is moved to open position, the closure is collapsed into such small compass as not to change materially, if at all, the entire dimensions of the usable space of the cabinet. It is an object of the invention to provide a closure for a cabinet of the type set forth, in which the closure is provided a housing by a member which may function as a shelf within the cabinet, where, however, such shelf does not destroy the factors of depth or width as they determine the effective storage space of the cabinet.

It is an object of the invention to provide a closure for a cabinet of the type set forth which permits that the closure be moved so that substantially the entire interior of the cabinet is presented for direct access, without the necessity of reaching over fixed panels, and such elements found necessary in other constructions. Since such a closure requires no compensation for rearward extensions or provision for moving weights, the closure can be capable of movement to open the cabinet throughout substantially its entire height.

Other objects of this invention will hereinafter

be set forth, or will be apparent from the description and the drawing, in which is illustrated an embodiment of apparatus for carrying out the invention.

The invention, however, is not intended to be restricted to the particular construction and arrangement of parts, nor to particular applications of such construction, nor to specific methods of operation, nor to various details thereof, herein shown and described, as the same may be modified in various particulars, or be applied in many varied relations, without departing from the spirit and scope of the invention, a practical embodiment of which has been herein illustrated and described without attempting to show all the various forms and modifications in which the invention might be embodied.

On the drawing, in which the same reference characters refer to the same parts throughout, and in which is disclosed an embodiment of the invention:

Fig. 1 is a perspective view of a cabinet embodying features of the invention, portions of the top, base and frame, and of a side wall, being broken away, more clearly to illustrate the construction of the device;

Fig. 2 is a view to enlarged scale, in cross-section, showing the arrangement of the panel in its collapsed condition and in several of the intermediate positions, to illustrate the operation of the apparatus, the view being in vertical cross-section taking transversely of the bottom in the direction of the depth of the device;

Fig. 3 is a detail view, illustrating the relationship of the secondary wall and the panel as they are secured together;

Fig. 4 is a detail view, illustrating the arrangement of the slide for the panel in the guide grooves of the frame; and

Fig. 5 is a detail plan view of the wall-defining element.

The invention will be described particularly as it may be applied in connection with a knock-down cabinet **10**. Such a cabinet may include a base **12** and a top **14**, into which are fitted a frame **16** and a wall-defining element **18**. Seated on the top of the wall-defining element and the frame is top **14**, while the element and the frame are seated in base **12**. A panel **20** may be carried in frame **16**, while a secondary wall **22** may be associated with wall-defining element **18**. An end **24** of panel **20** may be secured to secondary wall **22** in such manner that movement of panel **20** in frame **16** may be governed, and thus, as shown in Fig. 2, when the panel is moved to open position, the panel will be collapsed between secondary wall **22** and base **12** into a particular disposition further to be described herein.

It is, of course, to be understood that, although the invention is described specifically herein in connection with a knock-down cabinet, certain elements thereof are capable of application, and may be used, in cabinets other than those of this specific type. However, the ability to collapse into small compass a cabinet of the type here to be described, for the purpose of shipment, is, of course, a matter of great importance in industry, where transportation charges are based, in great point, upon the volume taken up by the subject shipped.

Base **12** and top **14** may be of substantially similar construction. For instance, a plurality of wooden strips **26** may have their ends secured together to form substantially open oblongs, corner straps **28** being provided to engage the strips at corners **30** to rigidify and sustain the oblong formation. A section **32** of corrugated paper board may be provided to define a wall closing the opening of the formed oblong, the edges **34** of section **32** being bent inwardly to be retained within the bounds of the opening, and being anchored in position on the strips by being riveted or otherwise secured thereto. Bracket members **36** may be secured in position upon a pair of opposed strips of top **14**, to extend downwardly into the cabinet from top **14**, and, by the means securing the members to the strips, may provide additional means for anchoring the section to the strips. These bracket members may provide pivot bearings for hangers **38**, which, in turn, may carry a hanger bar **40**. Thus bar **40** may swing freeely from the brackets, if desired, and provides a support for the hooks of coat hangers and similar apparatus.

Wall-defining element **18** may, if desired, be made up from a single sheet of paper board such as hereinbefore indicated; in such case, the sheet of paper board may be bent along fold lines **42**, **44**, **46** and **48** to define a back wall **50**, side walls **52** and **54**, and front flaps **56** and **58**. Flaps **56** and **58** extend, when element **18** is properly folded to define a portion of a cabinet, towards each other, but do not come into engagement with each other, leaving an opening **60** between end edges **62** and **64** of the respective flaps for the reception of frame **16**.

Frame **16** may be constructed in any desired manner. The construction illustrated shows a pair of uprights **66** defined by a plurality of flat boards **68**, **70** and **72**, which may be of wood, the boards being secured together with board **70** acting as a spacer so that vertical grooves **74** and **76** are defined in the side edges of the columns. Boards **68**, which are shown as outermost, may be provided with suitable ornamentation to enhance the outward appearance of the cabinet. End edges **62** and **64** are fitted into grooves **74**, and are so retained positioned by any suitable means, such as nails **78** driven through openings **80** which have been prepared in uprights **66** at the time of their fabrication, so that the nails may extend between boards **68** and **72** and through edges **62** and **64** engaged in grooves **74**, in order to retain flaps **56** and **58** in position.

At the top of frame **16**, a transverse slat **82** may be seated in grooves **76** between boards **68** and **72**, and extend across between uprights **66**, the slat being anchored in that position by any suitable securing devices. This slat extends beyond the upper extent of boards **68** and **72** so that its edge will be substantially in the same plane with the top edges of element **18** to provide a rest for cooperation with top **14** which seats thereupon and has its strips **26** extending down to and resting upon the top edges of boards **68** and providing a finished appearance for the top of the cabinet.

Another transverse slat **84** may be disposed at the bottom of frame **16** in substantially the same manner as slat **82** so that its bottom edge may cooperate with the bottom edge of element **18** and base **12** in providing a finished appearance for the bottom of the cabinet. Slat **84** extends but a short distance above strips **26** of base **12**, when assembled, and has the inner face of its top edge **86** bevelled, as at **88**, to cooperate in guiding the panel in its movement, as hereinafter described.

At the inner face of frame **16**, boards **72** terminate short of bottom edge **90** of slat **84**, as do

boards 68 at the outside face, for proper cooperation with base 12. However, just immediately above bottom edges 92 of boards 72, supports 94, shown as formed from strap metal, bent to provide bearing openings 96, may be secured in position to provide means for retaining a roller 98, which may be of wood or any other suitable material. This roller extends between the two bearings, and, therefore, totally across the extent of the opening between uprights 66. Panel 20 is threaded between bevelled edge 88 and roller 98, and then turns to extend transversely away from frame 16 and immediately over base 12, without any further guiding means other than that hereinafter to be described.

Guided in grooves 76 may be a transverse bar 100, the edges of which may be reduced in cross-section to provide guide portions 102 for engagement in grooves 76. The upper edge 104 of panel 20 may be secured to bar 100 in any desired manner, as, for instance, by being secured to the inner face of the bar. Below bar 100 the edges of panel 20 extend into grooves 76, and the panel is thereby retained and guided. A suitable handle 106 and catch 107 may be attached to bar 100 and slat 82 so as to facilitate the manipulation of the panel, and also to secure it in closed position.

Panel 20 may be made up from any desired material; preferably corrugated paper board, defined as shown in Fig. 2, where it will be seen that the face disposed inwardly, when the panel is in its closed position, is substantially smooth, while the face disposed outwardly has the usual corrugations of such paper board, is used. A panel capable of flexing transversely of its length, and to take part in certain of the movements here to be defined, is thus provided. As can be seen clearly from Fig. 1, bar 100 together with the attached edge 104 may be moved downwardly completely to clear the opening in frame 16, the bar being brought directly into abutment with slat 84 which serves as an end stop.

Secondary wall 22, attached to back wall 50, may also be formed from a sheet 108 of corrugated paper board, to the bottom face of which a plurality of wooden strips 110 may be fastened to impart desired rigidity to the wall for purposes here to be set forth. The method of attachment of wall 22 to wall 50 is preferably such that wall 22 may be swung towards and away from back wall 50. The capability of swinging this secondary wall in this manner may be derived solely from a fold line 112 in sheet 108 for forming a small strip 114 at the edge of wall 22, which strip is secured to back wall 50 in any desired manner. Thus, when the device is to be shipped, wall-defining element 18, together with its secondary wall 22, may be disposed flat, the latter folded against the former, and thus require a minimum of space. However, in use, when element 18 is disposed to form walls 50, 52 and 54, and flaps 56 and 58, wall 22 may be permitted to fall downwardly, and thus provide a substantial shelf. In fact, immediately above suports 96 on boards 72, ledges 116 may be provided upon which wall 22 may rest, or such ledges may be a part of supports 96. A handle 118 may be provided to facilitate the manipulation of the secondary wall as desired.

Panel 20, in one construction embodying features of the invention, is so turned, beyond bevelled edge 88 and roller 98, that its extreme lower end 24 forms a return bend and is disposed over other portions of the panel body, end 24 being directed towards frame 16. End 24 is secured in this position, and preferably is secured to, and is thus retained by, secondary wall 22. In one construction found to function efficiently, end 24 was secured to bottom face 120 of secondary wall 22 immediately adjacent forward edge 122 of that bottom face, which edge, when wall 22 was lowered towards base 12, was, of course, immediately at frame 16.

It was found that, by this relationship of elements, when panel 20 was moved downwardly, the retention of end 24 by forward edge 122 functioned to force the panel to be guided into space 124 between secondary wall 22 and base 12. This guiding action was such that the panel was compelled to extend itself the complete length of base 12 to form loop 126 before any distortion of the panel could take place. The result was that smooth face 128 of the panel, being continuously presented towards itself in such movement, reduced restraint upon movement as the panel was moved into this collapsed position.

When loop 126 reached wall 50, it was easy for the panel to bulge upwardly at an intermediate point 130, as shown in dotted lines in Fig. 2. This bulge, with continued propulsion of the panel, increased, the bulge finally becoming the extension 131, shown in dot-and-dash lines. With further pressure, the extension would fall over into a new fold or loop 132, in which case the smooth surface of face 128 continued to function for reducing friction even though the corrugations of face 134 now came, to some extent, into engagement. Further propulsion of the panel causes loop 133, newly formed, to ride along, the corrugations rolling upon each other somewhat in the nature of gear teeth so that, to a substantial degree, friction was reduced to a minimum, for the contact of faces 134 amounted merely to two portions of interlocked teeth moving together. It was found by experiment that, by this limitation of the movement of the panel, substantially in every observed case only these two folds or loops were formed, with bulge 130 rising into the cavity of loop 126 and determining the two loops finally formed. It was found simple and to require little effort, therefore, to move panel 20 up and down into its closed and open position, as desired, without the necessity of overcoming any resistance of any appreciable character. The curved lines of movement necessarily entailed by the guides formed by bevelled edge 88 and roller 98, and the curved formation imparted to the panel by its anchorage at the forward edge of the secondary wall, were such that no kinking of the panel could take place to prevent opening or closing movement of the panel. Since, furthermore, when the panel is in closed position, the lower end edge of the panel is in a position such that it must necessarily move between base 12 and wall 22, no kinking may occur at any time in such opening movement. The assembly of the elements is a matter of extreme simplicity, the movability of wall 22 lending itself to the ready adjustment of any of the parts.

Many other changes could be effected in the particular apparatus designed, and in the methods of operation set forth, and in specific details thereof, without substantially departing from the invention intended to be defined in the accompanying claims, the specific description being merely to illustrate an operative embodiment carrying out the spirit of the invention.

What is claimed as new and useful is:

1. A cabinet defined by a plurality of walls,

one of the walls being vertically disposed and having an opening therethrough for providing access to the interior of the cabinet; and a closure for the opening, the closure comprising a single continuous member movable vertically downwardly to clear the opening; the member, on downward movement, assuming a position across the bottom of the cabinet; the lower end of the member being at all times retained in looped form to compel the member to move away from the retained end upon downward movement.

2. A cabinet defined by a plurality of walls, one of the walls being vertically disposed and having an opening therethrough for providing access to the interior of the cabinet; a closure for the opening, the closure comprising a wall-forming sheet movable vertically to clear the opening; the wall-forming sheet, on opening-clearing movement, assuming a position transversely across the cabinet; and means retaining an end portion of the sheet bent back upon itself at all times.

3. A cabinet defined by a plurality of walls, one of the walls being vertically disposed and having an opening therethrough for providing access to the interior of the cabinet; a closure for the opening, the closure comprising a wall-forming sheet movable vertically to clear the opening and capable of flexure transversely of its direction of movement; the wall-forming sheet, on opening-clearing movement, assuming a position transversely across the cabinet; and means retaining an end portion of the sheet bent back upon itself at all times so that the end extends towards the opening.

4. A knock-down cabinet comprising a plurality of wall-defining elements, one of the elements comprising means for defining an opening for providing access to the interior of the cabinet; and a closure for the opening, the closure comprising a single continuous member movable vertically downwardly to clear the opening; the member, on downward movement, assuming a position across the bottom of the cabinet; the lower end of the member being at all times retained in looped form to compel movement of the member away from the retained end.

5. A cabinet defined by a plurality of walls, one of the walls being vertically disposed and having an opening therethrough for providing access to the interior of the cabinet; and a closure for the opening, the closure comprising a single continuous member movable vertically to clear the opening; the member, on opening-clearing movement, assuming a position transversely across the cabinet; one end of the member being anchored to compel the rest of the member to move past that end during movement of the member to its several positions.

6. A cabinet defined by a plurality of walls, one of the walls being vertically disposed and having an opening therethrough for providing access to the interior of the cabinet; and a closure for the opening, the closure comprising a single continuous member movable to clear the opening and capable of flexure transversely of its direction of movement; the member, on opening-clearing movement, assuming a position transversely of the cabinet; one end of the member being anchored immediately adjacent the opening in the wall to compel the rest of the member to move away from the opening and into the cabinet during opening-clearing movement.

7. A cabinet defined by a plurality of walls, one of the walls being vertically disposed and having an opening therethrough for providing access to the interior of the cabinet, and a closure for the opening, the closure comprising means movable to clear the opening and capable of flexure transversely of its direction of movement, the closure being anchored so that, as opening-clearing movement is about to commence, the closure is looped into a convolute form.

8. A cabinet defined by a plurality of walls, one of the walls having an opening therethrough for providing access to the interior of the cabinet, and a closure for the opening, the closure comprising a panel movable to clear the opening and capable of flexure transversely of its direction of movement, one end of the panel being anchored so that said end extends towards the opening.

9. A cabinet defined by a plurality of walls, one of the walls having an opening therethrough for providing access to the interior of the cabinet, guiding means located at the edges of the opening, and a closure for the opening, the closure comprising a panel capable of flexure transversely of its direction of movement, the panel being retained by the guiding means for sliding movement relative to the opening to control access to the cabinet through the opening, one end of the panel being free of engagement by the guiding means, that end of the panel being anchored so that said end extends towards the opening.

10. A cabinet defined by a plurality of walls, one of the walls having an opening therethrough for provoding access to the interior of the cabinet, a secondary wall in the cabinet, and a closure for the opening, the closure comprising a panel movable to clear the opening and capable of flexure transversely of its direction of movement, one end of the panel being anchored to the secondary wall so that said end extends towards the opening.

11. A cabinet defined by a plurality of walls, one of the walls having an opening therethrough for providing access to the interior of the cabinet, a secondary wall extending to a position immediately adjacent said cabinet wall, and a closure for the opening, the closure comprising a panel movable to clear the opening and capable of flexure transversely of its direction of movement, one end of the panel being fastened to the portion of the secondary wall immediately adjacent said cabinet wall.

12. A cabinet defined by a plurality of walls, one of the walls having an opening therethrough for providing access to the interior of the cabinet, a secondary wall extending immediately adjacent said cabinet wall, and a closure for the opening, the closure comprising a panel movable to clear the opening and capable of flexure transversely of its direction of movement, one end of the panel being anchored to the portion of the secondary wall immediately adjacent said cabinet wall so that said end extends towards the opening.

13. A cabinet defined by a plurality of walls, one of the walls having an opening therethrough for providing access to the interior of the cabinet, a secondary wall carried by a wall of the cabinet and capable of movement to be disposed with an edge thereof immediately adjacent said cabinet wall having said opening therethrough, and a closure for the opening, the closure comprising a panel movable to clear the opening and

capable of flexure transversely of its direction of movement, one end of the panel being anchored to said edge so that said end extends towards the opening.

14. A cabinet defined by a plurality of walls, one of the walls having an opening therethrough for providing access to the interior of the cabinet; a secondary wall pivotally mounted on the wall of the cabinet immediately opposite, and capable of movement to dispose an edge of said secondary wall immediately adjacent said cabinet wall having said opening therethrough; and a closure for the opening, the closure comprising a panel movable to clear the opening and capable of flexure transversely of its direction of movement; one end of the panel being anchored to said edge so that said end extends towards the opening.

15. A knock-down cabinet comprising a plurality of wall-defining elements, one of the elements comprising means for defining an opening for providing access to the interior of the cabinet, a secondary wall pivotally mounted on a wall of said element immediately opposite said opening and being capable of movement into a position substantally parallel to another element defining a cabinet wall immediately adjacent said opening, and a closure for the opening, the closure comprising a panel movable to clear the opening and capable of flexure transversely of its direction of movement, one end of the panel being anchored to the secondary wall to compel the panel to move into the space between the two substantially parallel walls.

16. A cabinet assembled from a plurality of wall-defining elements, one of the elements comprising a frame having an opening therethrough for providing access to the interior of the assembled cabinet, and a closure for the opening assembled with the frame, the closure comprising a panel capable of flexure transversely of its direction of movement and slidable in the frame, one end of the panel being anchored so that the panel at said end always assumes a substantially U-shaped form.

17. A cabinet assembled from a plurality of wall-defining elements, one of the elements comprising a frame having an opening therethrough for providing access to the interior of the assembled cabinet, another of the elements defining encircling walls for the cabinet and being engaged with the frame to form the vertical walls of the cabinet, a secondary wall carried by the encircling-wall-defining-element, and a closure for the opening assembled with the frame, the closure comprising a panel capable of flexure transversely of its direction of movement and slidable in the frame, one end of the panel being anchored to the secondary wall when the cabinet is assembled.

18. A cabinet defined by a plurality of walls, one of the walls having an opening therethrough for providing access to the interior of the cabinet, and a closure for the opening, the closure comprising a panel of paperboard one side of which is substantially smooth and the other side corrugated, the panel being movable to clear the opening, one end of the panel being anchored to define a curving formation wherein the smooth surface of the paperboard is innermost.

19. In combination a frame having a pair of spaced curtain guide members and a flexible slidable curtain slidably mounted between said members adapted to cover the opening in the frame; one end of said curtain being in fixed relation to the frame, whereby the curtain at said fixed end thereof extends in a substantially C-shaped formation; such C-shaped portion of the curtain becoming deeper as the curtain is moved to uncover the opening in the frame, and shallower as the curtain is moved to cover said opening.

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