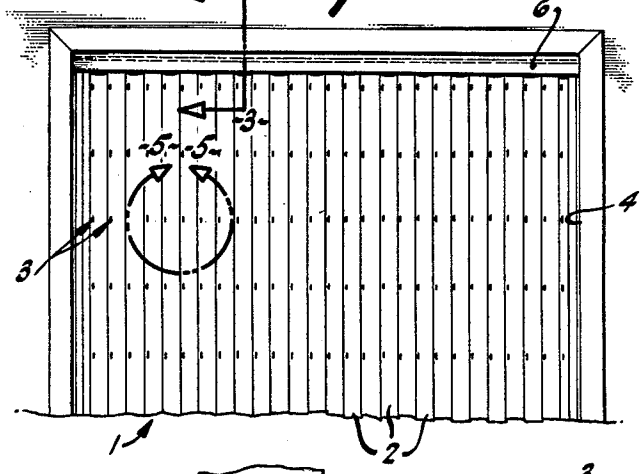
July 27, 1965 A. J. TOTI 3,196,931

EXPANSIBLE AND RETRACTABLE PANEL STRUCTURE

Filed Oct. 23, 1962 2 Sheets-Sheet 1

FIG-1



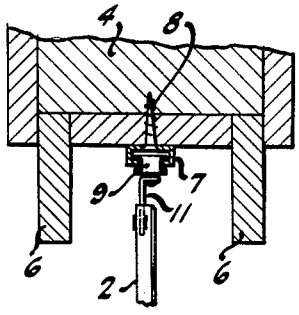
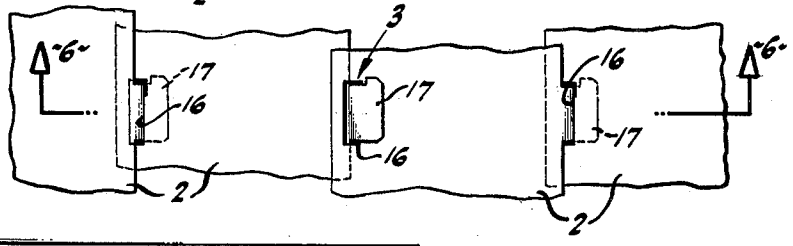


FIG-3

FIG-5



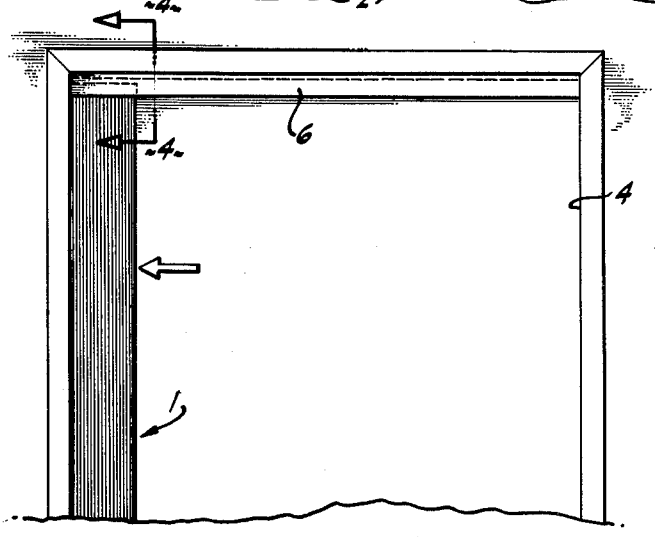


FIG-2

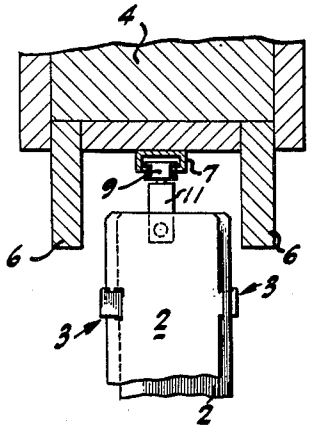


FIG-4

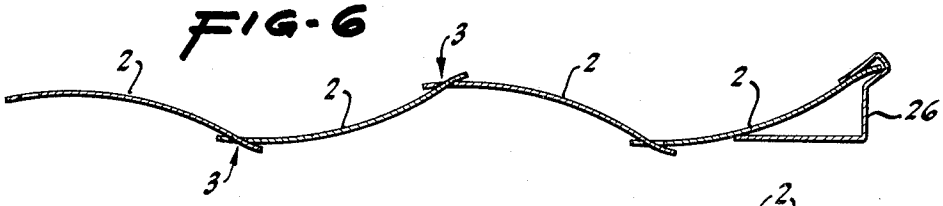
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July 27, 1965 A. J. TOTI 3,196,931

EXPANSIBLE AND RETRACTABLE PANEL STRUCTURE

Filed Oct. 23, 1962 2 Sheets-Sheet 2

FIG-6



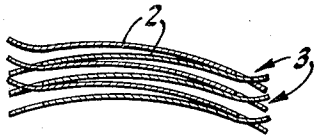
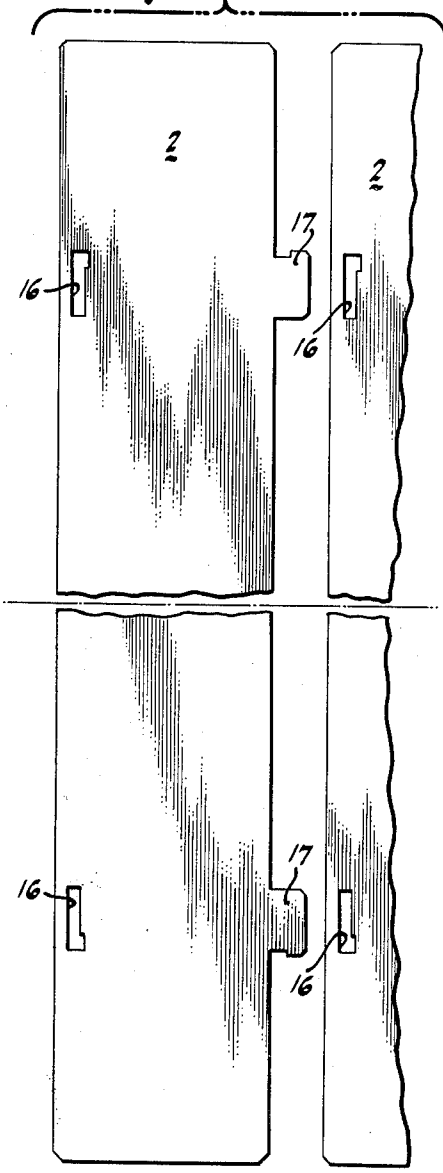


FIG-7

FIG-8



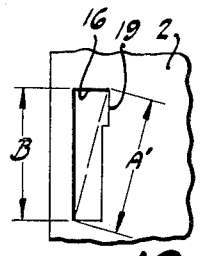


FIG-10

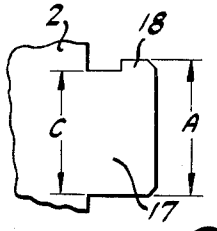


FIG-9

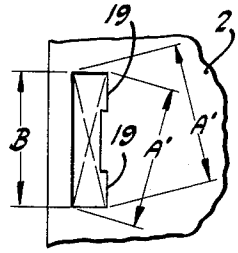


FIG-11

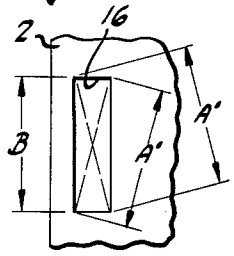


FIG-12

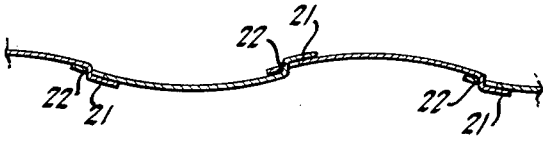


FIG-13

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United States Patent Office 3,196,931 Patented July 27, 1965

3,196,931
EXPANSIBLE AND RETRACTABLE PANEL STRUCTURE

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Filed Oct. 23, 1962, Ser. No. 232,526
10 Claims. (Cl. 160—183)

This invention relates to an expansible and retractable panel structure. More particularly, this invention relates to a panel structure which is expansible and retractable by unfolding or folding in accordion style. Still more particularly, this invention relates to an accordion-type foldable traverse panel structure in which the panels which define the structure are hingedly connected with each other along their adjacent edges by hinge means integral with the respective adjacent panels so that the need for separate hinge constructions of the type employed in the art heretofore is obviated.

This invention further relates to a simple and comparatively low cost foldable panel structure in which the adjacent panels of the structure are hingedly interconnected with each other by novel hinge means defined by spaced tongues along an edge of one panel which are integral with and preferably formed directly from the panel material. These tongues project from the panel edge and are hingedly received in spaced slots formed along and directly in the material of the adjacent panel. In this manner, no separate hinge constructions are required with the subject invention in that the hinge means interconnecting adjacent panels are formed directly by such panels themselves.

The slots provided in one panel preferably are dimensioned relative to the tongues formed on the adjacent panel so that such tongues are not insertable into or removable from the slots in a straight line direction, yet distortion of the tongues is not necessary. That is, tongues preferably must be tilted and inserted on the bias, in a diagonal direction, relative to the longitudinal axis of the slot. In this way, secure foldable interengagement may be effected while accidental disassembly of adjacent panels is precluded due to the dimensional relationship provided between the tongues and slots.

Because the hinge means in the preferred embodiment of this invention are formed directly from the panels themselves, a structure is provided which is compactible into a very small and compact folded structure. That is, the subject panel structure may be compactly folded due to the fact that no separate hinge constructions are interposed between adjacent panels which would unnecessarily take up space and increase the overall thickness of the panel structure when folded.

In the embodiment illustrated and described herein, the panel structure is described with relation to a window opening so that the structure in such an installation provides a foldable traverse drape. However, the applicability of this invention is not limited to the installation shown and the invention disclosed herein has application in a wide variety of other arrangements, such as in foldable room dividers or doors and the like. Nor is this invention limited to use with panel structures of any particular size.

It is preferred that the cost of the subject panel structure be held to a minimum. To this end, preferably the structure is built up from a plurality of substantially identical panels. In this regard, if the panels are transversely curved, as is true of Venetian blind type slats which may be employed with certain embodiments, adjacent panels may be oppositely oriented in the assembled structure so that special filler panels are not required so that all panels used may be substantially identical.

With the foregoing in mind, objects of this invention include the provision of an expansible and retractable

panel structure; the provision of an accordion-type traverse foldable panel structure; the provision of hinge means in a foldable panel structure which are integral with and interconnect adjacent panels of the structure; the provision of tongue and slot hinge means formed directly from and hingedly interconnecting adjacent panels; the provision of a foldable panel structure which may be fabricated at low cost and which does not require separate hinge constructions of the type known in the art heretofore; the provision of a panel structure which when extended is capable of covering a large opening but which when compacted may be folded into a small compact pack; and the provision of a panel structure which may be built up and assembled of any desired size from a supply of substantially identical panels.

With the foregoing objects in mind, attention is directed to the accompanying drawings which illustrate a preferred embodiment of this invention.

FIG. 1 is a front elevational view of a structure of the subject invention shown traversed to the extended or closed position in a window opening.

FIG. 2 is a front elevational view of the structure compactly folded to the retracted or open position in a window opening.

FIG. 3 is a vertical sectional view taken in the plane of line 3—3 of FIG. 1 showing means for supporting the structure in the window opening.

FIG. 4 is a vertical sectional view taken in the plane of line 4—4 of FIG. 2 showing the structure in retracted position.

FIG. 5 is an enlarged cutaway view along the line 5—5 of FIG. 1 showing details of the hinge means of this invention.

FIG. 6 is a horizontal sectional view of a portion of the structure taken in the plane of line 6—6 of FIG. 5.

FIG. 7 is a horizontal sectional view of a series of panels of the subject structure shown in compactly folded retracted position.

FIG. 8 is a broken front elevational view of two panels of the structure illustrating details thereof.

FIG. 9 is a partial front elevational view of a panel edge showing a tongue construction of a type found suitable for the hinge means of this invention.

FIGS. 10, 11 and 12 are parital front elevational views of a panel edge showing various forms which the tongue receiving slots of the hinge means of this invention may take, and further illustrating the dimensional relationship which preferably exists between the tongues and the slots of the hinge means.

FIG. 13 is a horizontal sectional view corresponding generally to FIG. 6 of a modified embodiment of this invention.

The panel structure of this invention, as shown in FIGS. 1 and 2, comprises a panel assembly 1, including a series of foldably interconnected, discrete elongated panels or slats 2, each of which is hingedly and foldably interconnected with its adjacent panel by hinge means 3. The hinge means employed are integral with and preferably formed directly by the panels themselves so that the need for separate hinge constructions of the type employed with foldable panel structures heretofore known is completely eliminated. The preferred hinge means employed will be discussed in detail hereinafter.

The panels of the subject structure may take various sizes, i.e., length and width, depending upon the installation in which the panel structure is to be employed. In FIGS. 1 and 2, what may be termed a traverse drape panel structure is illustrated which is mounted on the casing 4 of a window opening for traverse movement thereacross between an open and closing position. The subject structure is foldable in accordion fashion which, as used herein, is intended to mean that alternate panels of the struc-

ture are foldable in opposite directions relative to a median vertical reference plane so that the structure when viewed from either side takes on the general appearance of the bellows of an accordion.

The foldable panel structure illustrated is supported in the window casing 4 in a decorative or other suitable valance 6 in which an elongated channel shaped track 7 is secured transversely of the window opening by means of spaced screws 8. See FIGS. 3 and 4. Slide members 9 are movably received in the track 7 and each such slide member is operatively connected with a panel by means of a link 11 riveted, pinned or otherwise suitably secured to its associated panel.

It should be understood that it is not necessary to directly support each panel of the structure by means of a slide 9 engaged with the track 7. Intermittent support of the panel structure by engaging alternate or sequential panels with the track member 7 normally will suffice. Those panels not directly engaged with the tracks are supported by their adjacent panels.

However, in heavier panel structures, such as in foldable room dividers or doors, it may be preferred to directly engage each panel of the structure with the track member through a suitable supporting arrangement, such as that shown by way of example in FIGS. 3 and 4. Alternatively, other suspension systems for traverse type Venetian blind or panel arrangements may be employed in place of the simple arrangement shown in FIGS. 3 and 4.

An important feature of this invention resides in the fact that, because no separate space consuming hinge constructions are required between adjacent panels, an extremely compact panel assembly results when the structure is folded. Comparing FIGS. 1 and 2, it is seen that the opening across which the panel structure of this invention is positioned may be substantially completely open and free of restriction when the panel structure is retracted. Yet, a minimum number of panels may be employed to completely close off the opening as provided.

In this regard, it has been found that the overall transverse dimension of the subject panel structure when extended compared to that of the panel structure when fully retracted and compacted may be as great as 20–40:1. The overall thickness of the panel structure when retracted fully depends primarily on the thickness of the respective panels. That is, the thickness of the structure when retracted is measured essentially by the combined thickness of the respective panels in that the integral hinge means employed do not add appreciably to the thickness of the compacted structure.

It should be understood that the number of panels required to cover, when extended, a given opening will be determined by the width of the individual panels. For example, only about half as many four inch wide panels are required to cover a given opening as would be required if two inch panels were used.

In the embodiment illustrated plain flexible panels formed from thin sheet stock of the type commonly employed for Venetian blinds are shown. However, it should be understood that decorative motifs may be applied to the respective panels to enhance their appearance. For example, decorative embossing may be formed on the panels. Also, separate strips of fabric may be applied to the respective panels so that, when the structure is fully extended, an appearance of a pleated fabric drape is presented.

Additionally, the subject construction may be employed in conjunction with fabric traverse draperies to protect the same from the effects of sunlight. That is, the panel structure of this invention may be positioned between the fabric draperies and the glass window of a building so that, when the panel structure is extended, it precludes contact of the sun's rays with the draperies positioned interiorly thereof.

Further in this regard, referring to FIG. 1, it should be understood that the panel structure of this invention generally would be employed to insure privacy. That is when the panel structure is completely traversed, a substantially imperforate structure is presented which may not be seen through because the edges of adjacent panels overlap slightly.

However, for decorative effects, if desired, apertures in any predetermined pattern may be provided in the respective panels to create a novel decorative effect if privacy is of no concern. Such decorative effect may be desired, for example, if the structure is employed as a room divider or decorative foldable screen.

So that panel structures may be produced and assembled at minimum cost, each panel employed is substantially identical with each other panel employed. To this end, referring to FIG. 8, each panel 2 is provided along one of its opposite longitudinal edges with a series of two or more spaced elongated narrow preformed slots 16. The slots are provided closely adjacent the edge but are spaced inwardly from such edge a predetermined distance.

Generally aligned with such slots along the opposite longitudinal edge of each panel, and projecting from such opposite edge, are a series of two or more spaced elongated tongues. It is these tongues and slots which together provide the integral hinge means of this invention between adjacent slats. The exact longitudinal spacing between the slats and tongues may vary with the type and size of panel structure but, by way of example, in a structure for window installation, a spacing of six inches has been found suitable.

Because each panel of the preferred embodiment of the structure preferably is substantially identical, if flat planar panels are employed, the tongues of one panel may be positioned to enter the slots of the adjacent panel merely by arranging the panels as shown in FIG. 8. To produce the accordion foldable structure, it is only necessary to insert tongues into slots alternately from opposite sides of alternate panels as seen in FIG. 5.

However, in the species shown in the drawings, non-flat panels are employed. In this regard, conventional flexible metal or plastic Venetian blind slats have been found suitable for use in a window structure as shown. Because such slats are transversely curved, adjacent panels must be oppositely oriented to present a generally straight structure when extended. Because, preferably, all panels are identical, such opposite orientation may be easily effected.

When such a construction is retracted the convex side of each panel is received in substantial contacting engagement in the concave side of the adjacent panel, as shown in FIG. 7, so that a neat and compact foldable arrangement results. Such compact folding is permitted by the thin construction of the panels and the directly interconnected hinge means formed integral with the respective adjacent panels of the structure.

A structure of substantially any expansible size desired may be built up rapidly and easily from a supply of panels. Because no separate hinge constructions are required, and because numerous different type panels are not required, a low cost, easy to assemble panel structure may be produced. Furthermore, because the hinge means of this invention are formed directly from the panels, individual panels may be formed inexpensively, in a high speed commercial operation on automatic machinery from available strip stock, such as aluminum, steel or plastic stock commonly employed for Venetian blind slats.

While, as mentioned previously, it is desirable that the subject panels be formed from flexible material, the hinge means employed herewith have been specifically designed so that the tongues thereof can be inserted without distortion into their associated slots but cannot become accidentally disengaged from their associated slots during normal usage of the structure. The hinge features

to be described are particularly important if the panels are formed from generally rigid material in which the tongues may not be flexed or bent during insertion or removal from their associated slots. But, because bending of the tongues, even if the panels are formed from flexible material, would tend to distort the tongues and diminish their effectiveness, it is preferred that all bending of the tongues be precluded during insertion of the tongues into or removal thereof from their associated slots.

Referring to FIGS. 9–12, each panel 2 is provided along one of its longitudinal edges with a series of tongues which preferably project therefrom. Each tongue 17 includes at least one projection 18 along an end edge thereof which is spaced from the adjacent longitudinal edge of the panel. Preferably, the projections on those tongues which are closest to the opposite ends of each panel extend in opposite directions, as shown in FIG. 8, to facilitate use of the panels in reverse orientation when required. It should be understood, of course, that such projecion could be formed on each end edge of the tongue if desired.

The overall longitudinal dimension of each tongue is designated A and is defined by the overall length of the tongue including its associated projection 18. The length of each tongue without its associated projection is defined by dimension C.

Each tongue receiving slot 16 has a preformed narrow configuration which is generally of elongated shape designed to accommodate the elongated configuration of the tongues 17. To this end, the maximum longitudinal or axial dimension B of each slot is slightly greater than the dimension C of its associated tongue. However, the overall longitudinal dimension A of each tongue, which includes its associated projection, is slightly greater than the maximum longitudinal dimension B of its associated slot. Accordingly, a tongue may not be moved directly in a straight line direction into a slot.

To preclude unnecessary play between the tongues of one panel and the slots of an adjacent panel, the width of each slot is maintained as narrow as possible. However, the slots may take various configurations, as shown by the exemplary shapes illustrated in FIGS. 10–12. Each slot is provided with a maximum diagonal dimension, that is, a dimension lying on the bias relative to the longitudinal axis of the slot. This maximum diagonal dimension is designated A'.

Dimension A' is slightly greater than the maximum overall tongue dimension A. Accordingly, each tongue may be moved on the bias into or out of a slot without bending. That is, each tongue when tilted and moved on a diagonal line relative to the axis of a slot, may be inserted into or removed from a slot so that bending of the tongue during such insertion or removal is not necessary.

After insertion of the tongue into the slot, the bias positioning may be corrected through the naural resilience of the panel, or otherwise, so that the projection 18 on each tongue thereafter precludes inadvertent separation of the tongue from its associated slot.

The bias positioning of a tongue for movement relative to a slot is illustrated in dotted lines in FIGS. 10–12. Because the panels preferably are flexible, such bias positioning of a tongue without bending the tongue is permitted by bending or twisting the body of the panel adjacent the tongue.

As shown in FIG. 12, the diagonal dimension necessary to permit movement of a tongue on the bias into or from a slot may be provided by making the slot of rectangular shape or outline having sufficient width to produce the necessary tongue accommodating diagonal dimension A'. Alternatively, a slot less wide than that shown in FIG. 12, but which may accommodate the same size tongue, also may be provided. Such an alternative slot is provided with the necessary diagonal length by forming a cut-out portion 19 at one or both ends thereof,

as seen in FIGS. 10 and 11. Such cut-out portion thereby increases the width of the slot at its end and also the diagonal dimension of the slot over and above the diagonal dimension of the narrower slot mentioned. Thus, each of the alternative slot constructions disclosed includes means in conjunction therewith which permits the slot to accommodate selective passage of an associated tongue, including its enlarged projection portion, from one side of a panel through the slot to the opposite side of the panel. Thereafter, the enlarged portion of the tongue lies on such opposite panel side and normally precludes inadvertent separation of the thus interconnected panels in the manner discussed herein preivously.

As mentioned previously, preferably all panels of a given structure are substantially identical for low cost, ease of assembly, and to permit maintenance of small stocks. If curved Venetian blind type slats are used as panels, as seen in FIG. 6, and if all panels are substantially identical, it is only necessary to reversely orient adjacent panels (i.e. arrange adjacent panels with their convexity extending in opposite directions) to assemble a structure from a supply of such panels. Because the tongues and slots of all similarly sized panels are aligned, no problems result when such reverse orientation is effected.

As seen in FIG. 6, with Venetian blind type slat panels which are transversely curved, the structure of this invention when extended has a somewhat serpentine but generally straight configuration. If desired, curved Venetian blind type slats may be employed as panels and yet the extended structure may have a more marked generally straight overall configuration by modifying slightly the shape of the tongues on each panel, as seen in FIG. 13. To this end, each modified tongue 21 is provided with a relatively abrupt shoulder 22, so that the body of such tongue is offset relative to and extends generally parallel to the body portion of its associated panel. Such offset tongues permit more straight line overlap between adjacent panels than is true if the tongues follow the natural curve of the panels as shown in the embodiment of FIG. 6.

Furthermore, although not illustrated, it should be understood that if flat planar panels, rather than curved panels, are employed, an even more straight line panel arrangement may be provided by employing the modified tongue construction shown in FIG. 13.

It has been found that during expansion or retraction of a panel structure of the types described and shown herein that the respective panels fold and unfold in sequence during traverse movement. As a result, the window or door opening in which the structure is positioned may be fully closed or partially closed to any extent desired. Because of the sequential folding and unfolding of this arrangement, a neat appearance is insured irrespective of the traverse position of the structure.

No specific mechanism is illustrated for effecting traverse movement but it should be understood that any suitable traverse mechanism employed for drapes or vertical Venetian blinds may be employed with the subject arrangement. However, for simplicity of operation and low cost, it is contemplated that operation of the structure to fold or unfold the same may be effected by grasping the outermost panel at one edge of the structure and moving it in the direction desired. By way of example, to this end, referring to FIG. 6, an elongated handle panel 26 is shown which may be snapped onto one edge of the outermost panel of the structure to provide a larger grasping surface to facilitate traverse movement of the structure. Handle panel 26 preferably extends for the full length of its associated panel 2. If required, pins or rivets may be employed to hold panel 26 in place. Other handle arrangements different from that shown also obviously may be employed if desired.

Although a single integrated traverse structure of the type which moves the full distance across a window or door opening has been shown in FIGS. 1 and 2, it should be understood that two or more cooperable traverse structures which move in opposite directions relative to a central location also may be employed if preferred.

Having thus made a full disclosure of this compactly foldable and widely extensible panel structure in which hinge means are formed integral with the respective panels of the structure, reference is directed to the appended claims which set out the protection to be afforded hereby. It should be understood, however, that modifications to this invention which may become evident to one skilled in the art after reference has been taken to this disclosure, are contemplated as falling within the purview of the appended claims.

I claim:

1. A series of interconnected panels in an accordion foldable traverse type expansible and retractable panel structure, each of said panels having a series of spaced tongues projecting from one edge thereof and a series of spaced slots along another edge thereof, said tongues on one panel being aligned with and received in the slots of an adjacent panel whereby said panels are hingedly interconnected directly by such tongues and slots so that the need for hinge connections separate from said panels is obviated, each of said slots being of a narrow elongated configuration having a predetermined maximum longitudinal dimension, each of said tongues having an elongated configuration and including a projection on an end edge thereof, the overall length of each said tongue with its projection exceeding the maximum longitudinal dimension of its associated slot so that such tongue is not insertable into and removable from its associated slot in a straight direction, each said slot having a diagonal dimension which slightly exceeds the overall length of its associated tongue so that each tongue may be inserted into or removed from its associated slot on the bias and without bending such tongue.

2. The series of panels of claim 1 in which each said slot is substantially rectangular in outline.

3. The series of panels of claim 1 in which each said slot is laterally wider adjacent an end thereof than intermediate its ends.

4. The panels of claim 1 in which all of the panels of said series are substantially identical in construction, alternate panels of said series being reversely oriented relative to each other to bring the tongues of one such panel into alignment with the slots of another such panel.

5. An expansible and retractable accordion foldable panel structure comprising a plurality of elongated hingedly interconnected panels, adjacent panels of said structure being foldably connected with each other so that such adjacent panels may be folded in accordion fashion into compact relationship with each other when said structure is retracted, and hinge means between adjacent panels formed directly from and integral with such panels; said hinge means for said adjacent panels comprising spaced tongues formed along an edge of one adjacent panel received in a corresponding number of spaced slots formed along an edge of the other adjacent panel, each of said tongues including an enlarged portion thereon which imparts a maximum dimension to such tongue in one direction, each of said slots having a maximum dimension in a direction which corresponds to said one tongue direction which is less than said corresponding maximum dimension imparted to its associated tongue by the enlarged portion of said tongue so that insertion of such tongue into such slot or removal of such tongue from such slot normally is restricted, each said slot including means in conjunction therewith which enables such slot to accommodate selective passage of its associated tongue therethrough from one side of said other adjacent panel to the other side thereof so that the enlarged portion of such tongue lies at said other side and precludes inadvertent separation of said adjacent panels, whereby controlled insertion of such tongue through such slot during assembly of said panel structure may be effected; the interengaged tongues and slots of the panels of said panel structure securely yet foldably interconnecting said panels and maintaining the same connected against inadvertent separation so that said panel structure may be selectively extended or retracted in accordion fashion.

6. In combination, an accordion foldable panel structure for closing off a door or window or like opening, and means positionable in said opening for supporting said structure for movement between an extended and a retracted position therein; said panel structure comprising an expansible and retractable series of hingedly interconnected panels, adjacent panels of said structure being hingedly connected with each other along their adjacent edges by folding hinge means formed integral with and directly by such panels whereby the need for separate hinge constructions to foldably interconnect said panels of said structure and prevent inadvertent separation thereof is obviated; said hinge means for adjacent panels of said structure comprising at least one integral tongue provided along an edge of one such adjacent panel received in a slot provided along an edge of the other adjacent panel, said tongue including an enlarged portion thereon which imparts a maximum dimension to said tongue in one direction, said slot having a maximum dimension in a direction which correspond to said one tongue direction which is less than the corresponding maximum dimension imparted to its associated tongue so that insertion of said tongue by the enlarged portion of such tongue into said slot or removal of such tongue from said slot normally is restricted, said slot including means in conjunction therewith which enables said slot to accommodate selective passage of said tongue therethrough from one side of said other adjacent panel to the other side thereof so that the enlarged portion of said tongue lies at said other side and normally precludes inadvertent separation of said adjacent panels, whereby controlled insertion of said tongue through said slot during assembly of said panel structure may be effected, said hinge means maintaining said adjacent panels against inadvertent separation during accordion folding thereof.

7. In combination, an accordion foldable panel structure for closing off a door or window or like opening, and supporting means positionable across the top of said opening for supporting said structure for traverse movement between an extended and a retracted position therein; said panel structure comprising an expansible and retractable series of hingedly interconnected vertically extending panels supported by and depending from said supporting means, adjacent panels of said structure being hingedly connected with each other along their adjacent edges by folding hinge means formed integral with and directly by such panels whereby the need for separate hinge constructions to foldably interconnect said panels of said structure and prevent inadvertent separation thereof is obviated; said hinge means for adjacent panels of said structure comprising at least two spaced integral tongues provided along an edge of one such adjacent panel received in a corresponding number of slots provided along an edge of the other adjacent panel, each of said tongues including an enlarged portion thereon which imparts a maximum dimension to such tongue in one direction, each said slot having a maximum dimension in a direction which corresponds to said one tongue direction which is less than the corresponding maximum dimension imparted to its associated tongue by the enlarged portion of such tongue so that insertion of such tongue into such slot or removal of such tongue from said slot normally is restricted, each said slot including means in conjunction therewith which enables such slot to accommodate selective passage of its associated tongue therethrough from one side of said other adjacent panel

to the other side thereof so that the enlarged portion of such tongue lies at said other side and normally precludes inadvertent separation of said adjacent panels, whereby controlled insertion of such tongue through such slot during assembly of said panel structure may be effected, said hinge means maintaining said adjacent panels against inadvertent separation during accordion folding thereof.

8. The panel structure of claim 7 in which all of the panels of said structure are substantially identical in construction, alternate panels of said series being reversely oriented relative to each other to bring the tongues of one such panel into alignment with the slots of an adjacent panel.

9. A series of interconnected panels which together define an accordion foldable expansible and retractable panel structure, each of said panels being substantially identical in construction and having a curved configuration in transverse cross section, each of said panels having at least two spaced tongues integral therewith and projecting from one edge thereof and a corresponding number of spaced slots along another edge thereof, each of said slots being enclosed by such panel and spaced slightly inwardly from said another edge thereof, adjacent panels of said structure being oppositely oriented with their curvatures facing generally in opposite directions when said structure is expanded and generally in the same direction when said structure is retracted, the curvatures of said panels snugly nesting with each other when said structure is retracted so that said panels define a compact pack, the tongues on said panels being aligned with and received in the slots of adjacent panels,

each said tongue including an enlarged portion thereon which normally precludes inadvertent separation of such tongue from its associated slot, each said slot including means which permits such slot to accommodate selective insertion of its associated tongue therethrough, said thus interengaged tongues and slots thereby defining integral hinges, said panels being hingedly interconnected directly by such interengaged tongues and slots so that separate hinge connections therebetween are not required.

10. The panel structure of claim 5 in which the enlarged portion of each of said tongues is laterally offset relative to its associated panel and is connected thereto by a relatively abrupt bent shoulder.

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HARRISON R. MOSELEY, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,196,931 July 27, 1965

Andrew J. Toti

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 70, for "closing" read -- closed --; column 4, line 25, for "tongues." read -- tongues 17. --; line 28, for "slats" read -- slots --; column 5, line 56, for "naural" read -- natural --; column 8, line 32, strike out "by the enlarged portion of such tongue" and insert the same after "tongue" in line 31, same column 8.

Signed and sealed this 18th day of January 1966.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents