

Feb. 15, 1966

L. M. KING ET AL

3,234,996

SOUND RETARDING FOLDING PARTITION

Filed Aug. 26, 1963

3 Sheets-Sheet 1

Fig. 1

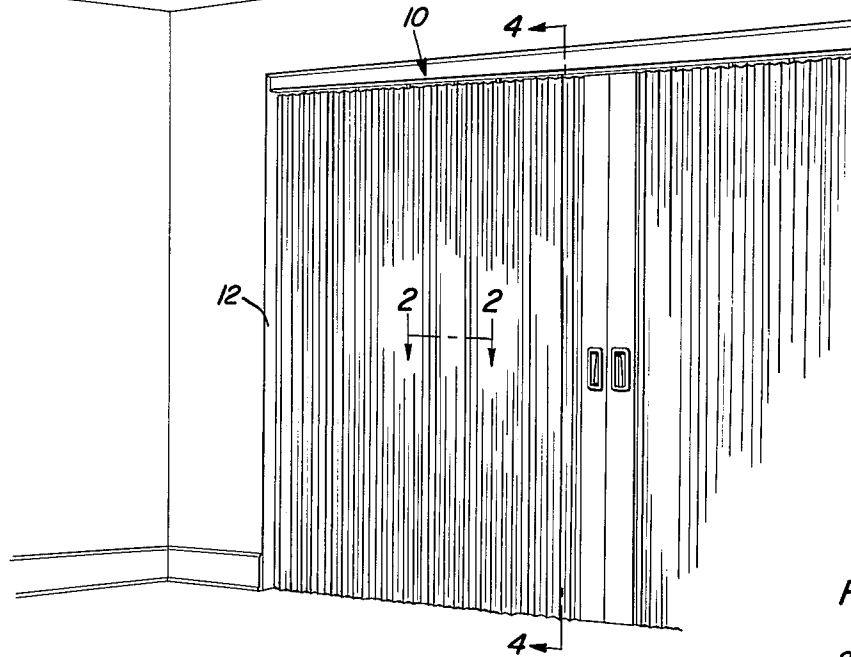


Fig. 2

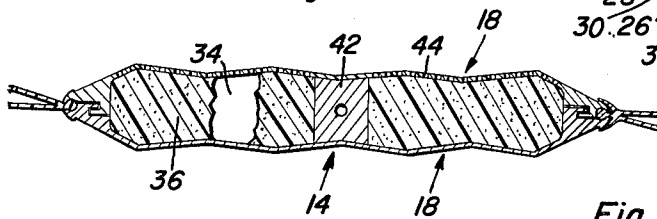


Fig. 7

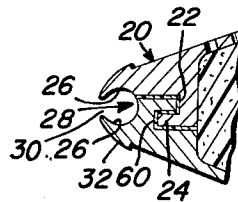


Fig. 3

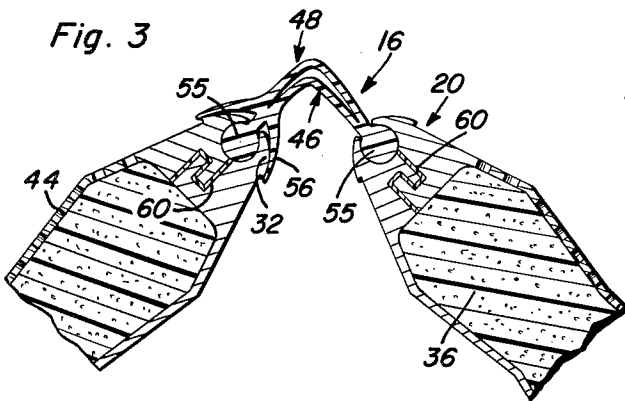
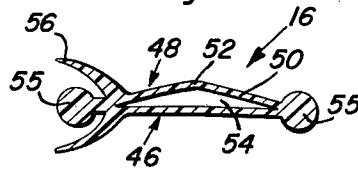


Fig. 6



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Fig. 5

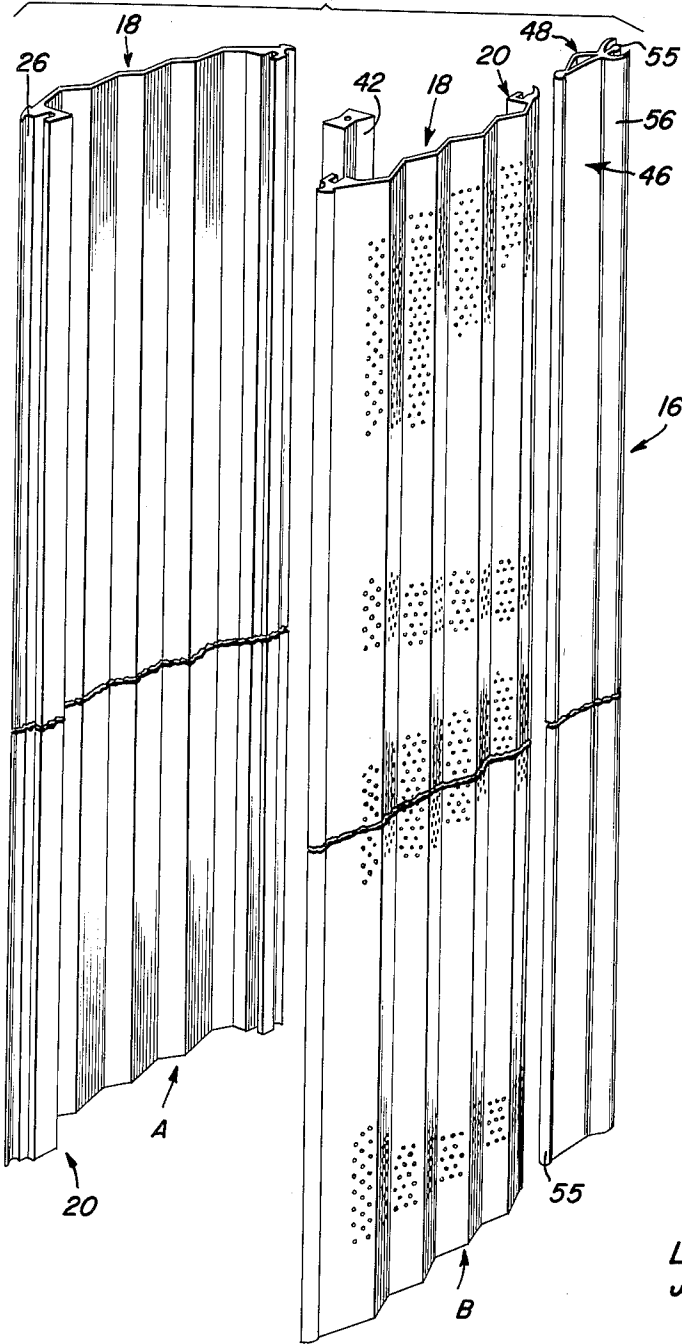
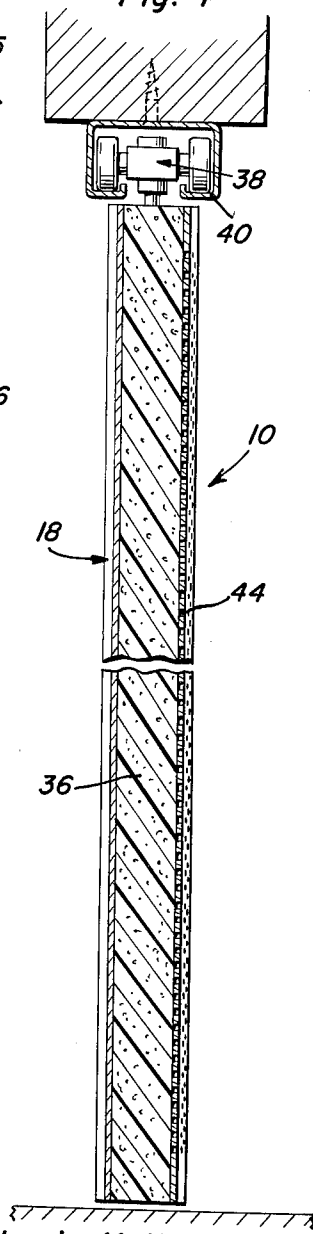


Fig. 4



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Fig. 8

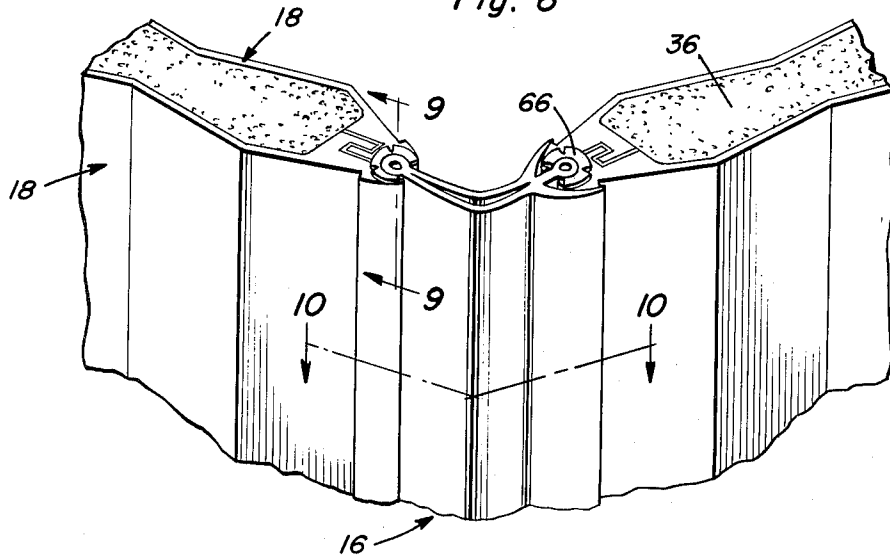


Fig. 9

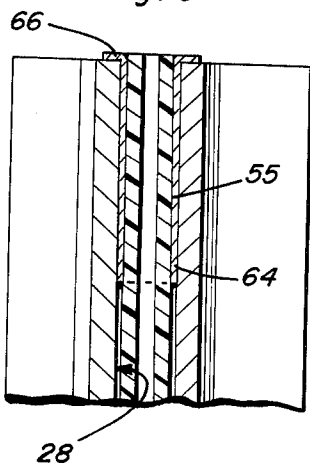


Fig. 10

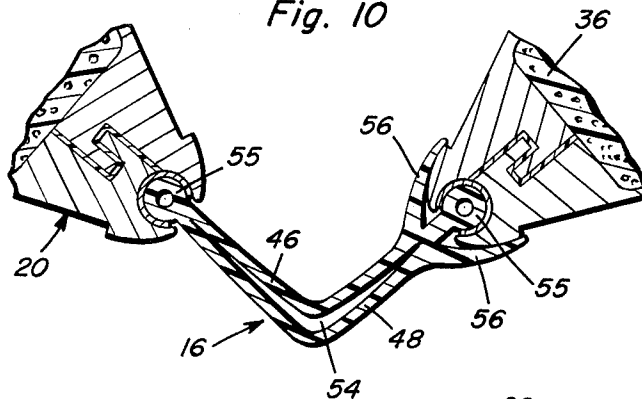
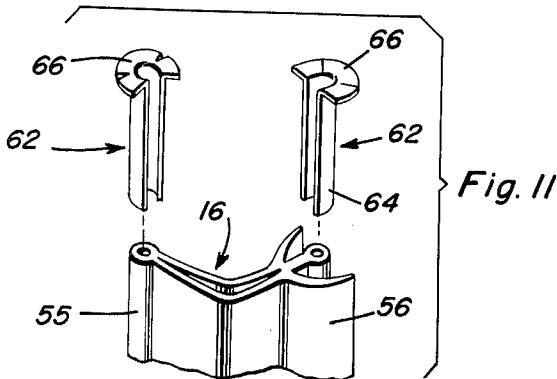
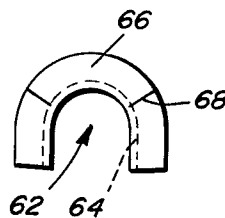


Fig. 12



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SOUND RETARDING FOLDING PARTITION

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4 Claims. (Cl. 160—199)

The present invention, a continuation-in-part of application No. 263,902 filed March 8, 1963, now abandoned generally relates to folding doors or partitions, and is more particularly concerned with the provision of a folding partition utilizing both novel sound insulating rigid panels and sound insulating flexible hinges interconnecting the panels.

There has long been a need for an effective sound retarding folding partition both for use in the home and, on a larger scale in, for example, school gymnasiums or auditoriums for the partitioning off of small areas. Accordingly, it is a primary object of the present invention to provide such a sound retarding partition, this sound retarding feature being in addition to those advantages normally residing in folding partitions.

In conjunction with the above noted primary object, it is also an object of the present invention to provide a folding partition which is extremely strong and durable as well as fire retarding and easily cleaned and maintained.

It is further an object of the present invention to achieve the desired sound retarding by the use of both hollow core panels and hollow core flexible hinges therebetween.

In addition, it is a significant object of the instant invention to provide a simple though highly novel means for locking the flexible hinges to the hollow core panels.

Likewise, it is a significant object of the present invention to provide a sound retarding folding partition or door which, while containing all of the above desirable features, is generally simple in construction and capable of being economically manufactured on a commercial scale.

Basically, the following partition of the present invention consists of a plurality of panels formed by interlocking the longitudinal edges of two generally parallel spaced face members, these panels being flexibly interconnected by elongated strip hinges which are in turn formed with two elongated substantially parallel spaced walls the corresponding edges of which are integral with a single bead, including a lock pin fixed to the upper end portion thereof, being received within an elongated slot on the edge of the adjoining panel in a manner so as to both secure the hinge to the panel and also prevent disengagement of the panel face members from each other.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a view of the folding partition comprising the present invention installed within a wall opening and being in its closed position;

FIGURE 2 is an enlarged cross-sectional view taken substantially on a plane passing along line 2—2 in FIGURE 1 and illustrating, in cross section, one of the partition panels;

FIGURE 3 is an enlarged partial cross-sectional view of a hinge and portions of two adjacent panels in a partially opened orientation;

FIGURE 4 is an enlarged cross-sectional view taken substantially on a plane passing along line 4—4 in FIGURE 1;

FIGURE 5 is an exploded perspective view of both the flexible hinge and the various elements comprising one of the panels;

FIGURE 6 is a cross-sectional view through one of the elongated flexible strip hinges;

FIGURE 7 is a partial sectional view of one end of a panel illustrating the interlock between the face members and the elongated bead-receiving socket;

FIGURE 8 is a partial perspective view of the upper end of the pair of hinge joined panels illustrating the orientation of the locking pins thereon;

FIGURE 9 is an enlarged partial cross-sectional view taken substantially on a plane passing along line 9—9 in FIGURE 8;

FIGURE 10 is an enlarged partial cross-sectional view taken substantially on a plane passing along line 10—10 in FIGURE 8;

FIGURE 11 is an exploded perspective view of the upper end of one of the flexible hinges and two locking pins, one being shown in a deformed or clamping condition; and

FIGURE 12 is a top plan view of a locking pin prior to its deformation into clamping engagement with the hinge means.

Referring now more specifically to the drawings, reference numeral 10 is used to generally indicate a folding partition or door mountable within a suitable wall opening 12 as indicated in FIGURE 1, this door consisting essentially of elongated panels 14 and flexible elongated strip hinges 16 interconnecting the adjacent edges of the elongated panels 14.

As brought out in the objects supra, it is a primary intention of the present invention to provide a particularly effective sound retarding folding partition. Accordingly, the panels 14, comprising a major portion of the partition 10, are specifically constructed of opposed spaced elongated facing members 18, these facing members 18 being preferably of extruded aluminum, but not necessarily limited thereto. The main body of each facing member 18 is preferably provided with longitudinally extending corrugations or undulations both for decorative purposes and for increasing the sound retarding ability of the panel as shall be gone into in detail presently. Each longitudinal edge 20 is inwardly enlarged or thickened and formed so as to both present a laterally opening longitudinally extending groove 22 and an adjoining rib 24 formed by the groove 22, along with an arcuate recess 26 extending longitudinally the full length of the facing member 18 and being spaced laterally outward from the groove 22 and rib 24. As will be appreciated from FIGURE 2 of the drawings, the groove 22 along one longitudinal edge 20 of the facing members 18 opens laterally outwardly while the groove along the other edge thereof opens laterally inwardly thus enabling the interlocking of two facing members 18 by reversing one facing member and sliding it laterally relative to the other facing member so as to bring the ribs 24, which are of substantially the same size as the grooves 22, into frictional engagement therein.

Referring again to the arcuate recesses 26, it will be noted that upon an interlocking of the facing members 18, such recesses 26 complement each other so as to form an elongated bead-receiving socket or groove 28, this socket 28 having a restricted opening 30. Also, if so desired, the present invention contemplates the reinforcing of the ends 20 in the area of the recesses 26 by longitudinally extending projections 32 which include an arcuate surface.

Inasmuch as the facing members are, aside from the extreme edges thereof, spaced from each other, a hollow core 34 is formed within the panel 14 which, while in itself constituting an insulating means, is preferably filled with a suitable expanding type insulation 36. Further,

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in order to both provide additional rigidity to the panel 14 and also provide a means for mounting the support rollers 38, these rollers 38 being engaged in a suitable manner in an overhead track 40, an elongated brace or rib 42 is provided centrally between the facing members 18 within the hollow core 34, this bracing member, also of aluminum if so desired, naturally has the faces thereof shaped so as to conform to the rear surfaces of the facing members 18 which are abutted thereagainst.

It is contemplated that the facing members 18 be of basically two types, one type, referred to by reference letter A, being imperforate, and the other type, indicated by reference letter B, being perforated, that is, having a plurality of relatively small apertures 44 therethrough, these apertures 44 covering a major portion of the face member B. The particular face member 18 used, or the particular combination of members 18, is dependent upon the result sought, that is, if it is intended that the partition absorb a major portion of the sound within a room, perforated facing members B are used on at least that side of the partition facing inwardly of the room, this allowing for the passage of the sound into the hollow core 34 wherein it can be effectively absorbed by the insulation 36. On the contrary, if it is desired that the sound be reflected, imperforate panels A can be used, the hollow core 34 and insulation 36 in such instances greatly reducing the sound transmission through the partition 10 resulting from conduction. The undulations or corrugations, in addition to being decorative, are of significance in the imperforate reflecting facing members A as a means for insuring a complete diffusing of the sound waves, and in the perforated panels B as a means for presenting a maximum amount of surface area through which the sound waves may pass for subsequent absorption by the insulation 36. Of course, it will be appreciated that any suitable decorative effect can be applied to the exposed surfaces of the facing members 18, such as for example simulated wood paneling, leather grain paneling, various fabrics, etc. While it is preferred that the facing members 18 have these corrugations or undulations, it should be noted that the present invention also contemplates the use of flat facing members including of course the above-described edge structure so as to provide the desired hollow core.

Turning now to the elongated strip hinges 16, preferably formed of relatively flexible vinyl plastic, it will be appreciated that such hinges 16 interconnect the adjacent ends of the panels 14 in a manner so as to allow for a folding of the partition between a first open position wherein the panels are in substantially face-to-face relation to each other and a second position wherein the partition is closed, the panels assuming a generally shallow angular relation to each other. The hinges 16, extending substantially the full length of the panels 14, consist basically of coextensive spaced walls 46 and 48, the wall 46 being generally planar while the wall 48 includes two outwardly converging portions 50 terminating in a centrally located ridge 52 thus also providing each hinge 16 with an interior insulating space 54. It will also be appreciated that the wall 48, formed in such a manner, tends to introduce additional rigidity into the hinge 16 without detracting from the ability of the hinge 16 to flex in the desired manner upon an opening of the partition, the hinges 16 being orientated so as to provide that the wall 46 fold inwardly toward the wall 48, this being illustrated in FIGURES 3, 8 and 10.

The hinges 16 each additionally includes an elongated enlarged bead 55 formed along each edge thereof and being integral with the corresponding edges of the two walls 46 and 48, this bead 55 being snugly received within the bead slot 28, preferably by a longitudinal sliding of the hinge 16 relative to the adjoining panels 14. A lock pin 62, which shall be described in more detail presently, is used to lock the bead 55 within the bead slot 28. It will be noted that upon positioning of a bead 55 within a socket 28 formed by the arcuate recesses 26, lateral

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movement of the bead 55 out of the socket 28 is prevented because of the reduced opening 30 of the socket 28, and consequently, lateral movement of one facing member 18 relative to the other facing member 18 of the panel 14 is prevented thus effectively maintaining the facing members 18 in interlocked relation with each other. It will be appreciated that the locking of the members 18 to each other by the beads 55 is effected in conjunction with the aforementioned rib and groove interlock.

Yet a further strengthening of each hinge 16 and locking of the adjoining panels 14 is effected by the instant invention, this resulting from the provision of a pair of wings 56 extending in generally opposite directions from each side of the hinge 16 adjacent one edge thereof slightly rearward of the elongated bead 55, these wings 56 being generally arcuate and engageable with the arcuate surfaces of the projections 32 of the adjoining panel 14 so as to effect a slight clamping force on the panel 14.

Turning again to the manner in which the facing members 18 are connected, attention is directed to the fact that the present invention also contemplates the provision of a full length insulating separation gasket 60 between the interlocked ribs 24 and grooves 22 so as to preclude any direct sound transfer through the metal itself, similar gaskets further being provided on opposite sides of the brace 42, if deemed desirable.

The hinge beads 55 are maintained in their corresponding slots by the locking pins 62 referred to supra, these locking pins 62 being specifically illustrated in FIGURES 8-12. With reference to these figures, it will be noted that the locking pin 62, in its unclamped or preliminary form, consists of an elongated generally semi-cylindrical portion 64, this portion 64, as will be appreciated from FIGURE 12, is essentially U-shaped in cross section. The upper end of the elongated portion 64 is provided with an integral radially outwardly projecting flange 66.

These locking pins 62 are utilized by applying one such pin 62 to the upper portion of each bead 55 so as to orientate the flange 66 substantially flush with the upper end of the bead 55 and consequently the entire hinge 16. It is intended that the pin 62 both lock and position the hinge relative to the adjacent panels, this being accomplished by clamping the tubular portion 64 of each hinge 62, which incidentally is formed so as to snugly receive the bead 55, tightly about the upper end portion of the bead thus preventing relative movement therebetween. This clamping of the tubular portion 64 will result in the splitting of the flange 66 substantially as illustrated in FIGURE 8 and in the left hand pin of FIGURE 11. If deemed desirable, this splitting of the flange 66 can be facilitated by the provision of slits or lines of weakness. The tubular portion 64, in its clamped or gripping form, is to be of a size which results, upon the insertion of the bead 55 within the slot 28, in a tight, frictional interlocking, eliminating any tendency for movement therebetween. Further, in this position it will be noted that the outwardly projecting radially extending flange 66 is engaged with the top edge of the panel thus properly orientating the hinge relative to the panel and further preventing or eliminating any tendency for the hinge to slip relative to the panel.

It is considered readily apparent from the foregoing that a novel folding partition has been defined, this folding partition utilizing insulated panels and insulated strip hinges interconnecting the panels and locked thereto by novel lock pins so as to provide a maximum degree of sound retarding while incorporating all of the desirable features identified with folding partitions, this being accomplished in a manner intended to also provide a partition of both decorative appearance and structural stability.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention

to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a folding partition, a plurality of panels, and elongated flexible strip hinges inter-connecting said panels for a folding of the door between a first open position wherein the panels are substantially face-to-face and a second closed position wherein the panels assume a generally shallow angular relation to each other, said panels each consisting of two generally parallel spaced facing members defining a hollow core therebetween, and means integral with the longitudinal edges of the facing members locking said members to each other, each edge of each facing member being inwardly enlarged, said means interlocking the members consisting of a longitudinally extending groove in each inwardly enlarged edge, the grooves in one member of a panel opening toward one edge of the panel, and the grooves in the other member of the panel opening toward the other edge of the panel, and a rib on each inwardly enlarged edge consisting of that portion of the inwardly enlarged edge between the groove and the inner face of the edge, the grooves and ribs being of substantially the same size with the ribs of each member being frictionally engaged within the grooves of the other member.

2. The structure of claim 1 including a longitudinally extending arcuate recess in the inner face of each inwardly enlarged edge, the recesses in the corresponding edges of the adjoining members of each panel complementing each other so as to form a longitudinally extending internally enlarged socket within each edge of each panel, and a longitudinally extending restricted opening communicating with each socket, each socket being laterally enlarged to both sides of the corresponding restricted opening, each of said hinges including an integral enlarged longitudinally extending bead along each edge thereof, said beads being received within and substantially filling the panel sockets so as to prevent a side sliding of the members relative to each other and a corresponding disengagement of the ribs and grooves.

3. The structure of claim 2 including a lock means fixed to the upper end portion of each bead, said lock means including a generally semi-cylindrical portion clampingly engaged about the upper portion of the corre-

sponding hinge bead, and an integral radially outwardly projecting flat flange coextensive with the upper end of the generally semi-cylindrical portion and in engagement with the upper edge of the panel surrounding the socket.

4. For use in a folding partition including elongated flexible strip hinges, an elongated hollow core panel, said panel consisting of a pair of generally parallel spaced facing members, said members having inwardly enlarged longitudinal edges with the corresponding edges of the members being in abutting engagement with each other, each inwardly enlarged edge including a longitudinally extending groove therein, the grooves in one member of the panel opening toward one edge of the panel, and the grooves in the other member of the panel opening toward the other edge of the panel, and a rib on each inwardly enlarged edge consisting of that portion of the inwardly enlarged edge between the groove and the inner face of the edge, the grooves and ribs being of substantially the same size with the ribs of each member being frictionally engaged within the grooves of the other member, and a longitudinally extending arcuate recess in the inner face of each inwardly extending edge, the recesses in the corresponding edges of the adjoining members of the panel complementing each other so as to form a longitudinally extending internally enlarged socket within each edge of each panel, and a longitudinally extending restricted opening communicating with each socket, each socket being laterally enlarged to both sides of the corresponding restricted opening.

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