Dec. 27, 1955 L. SIMON 2,728,389

SLATTED SCREEN

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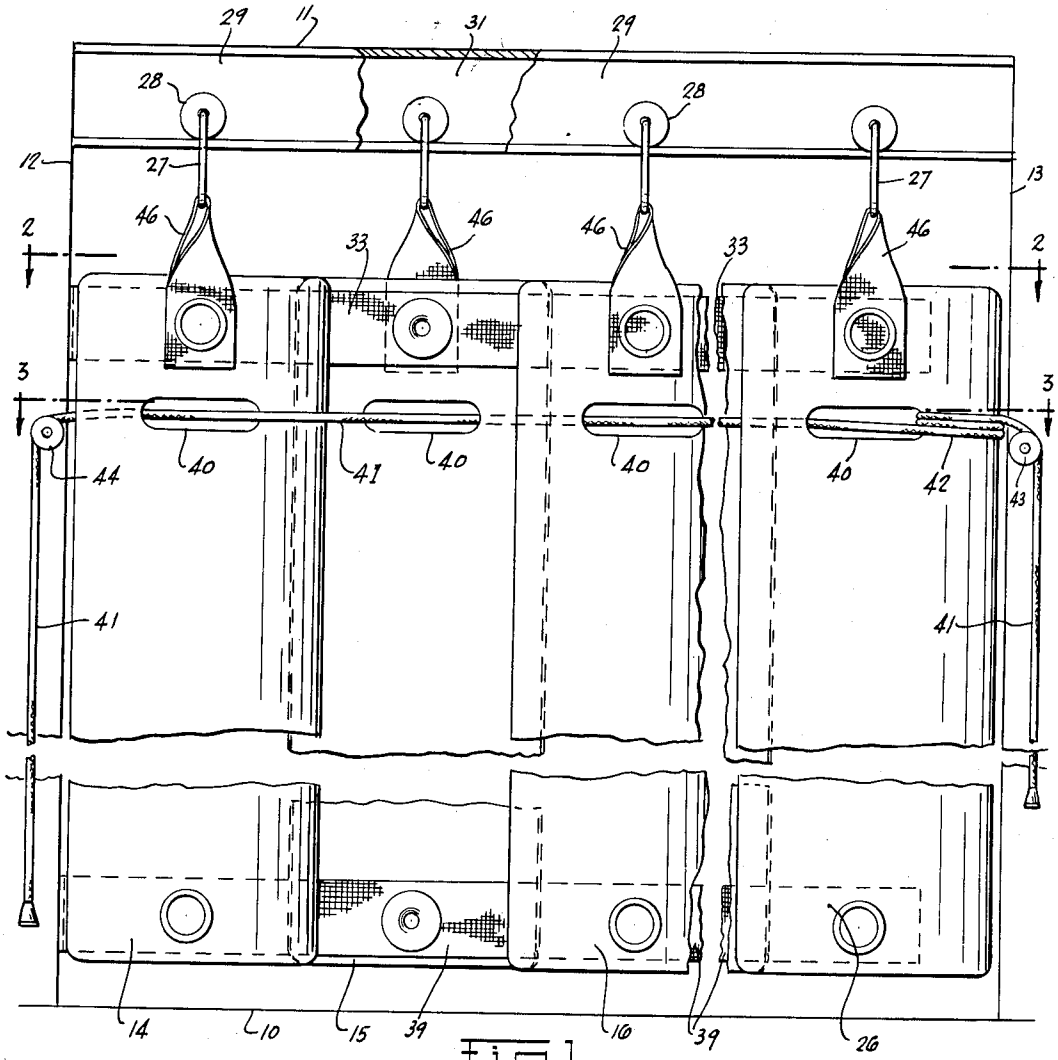


fig. 1.

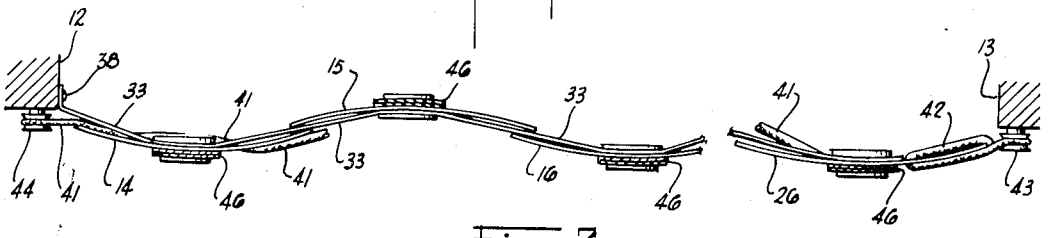


fig. 2.

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SLATTED SCREEN

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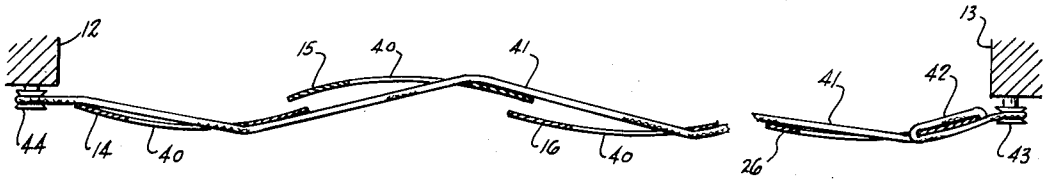


Fig. 3.

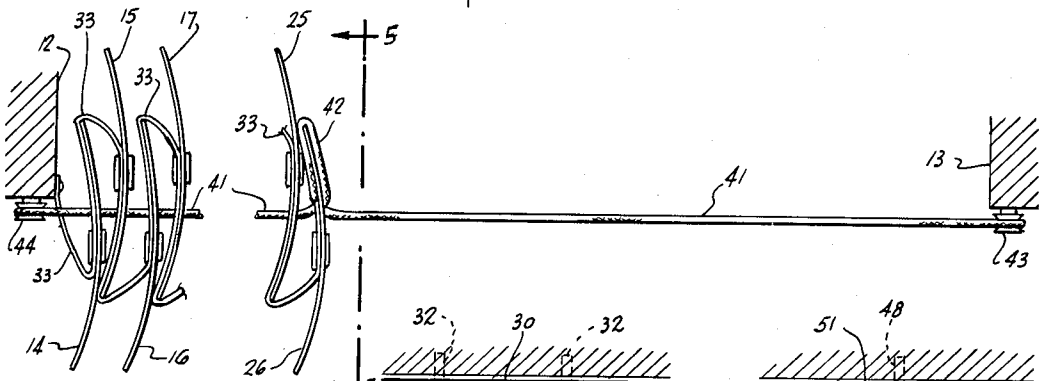


Fig. 4.

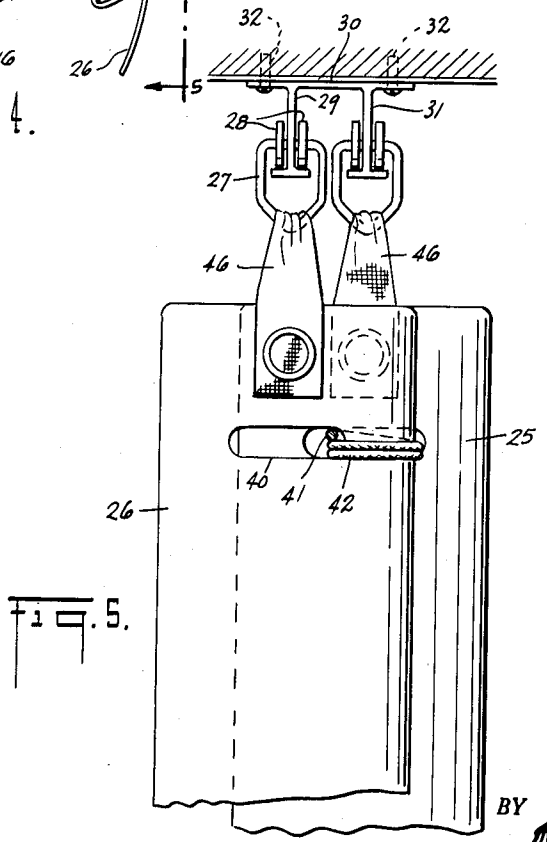


Fig. 5.

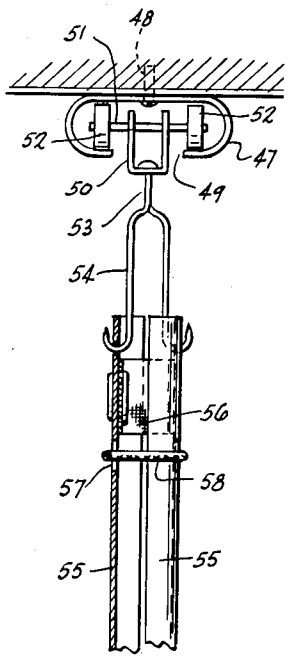


Fig. 9.

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SLATTED SCREEN

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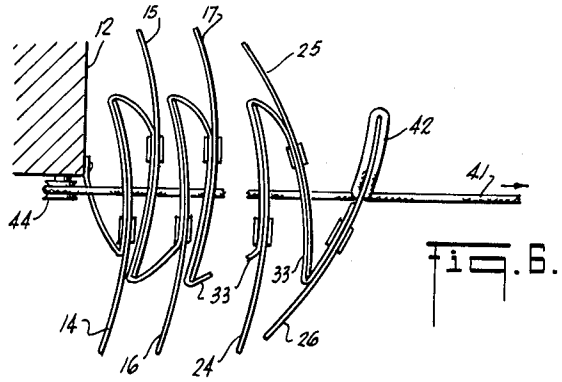


Fig. 6.

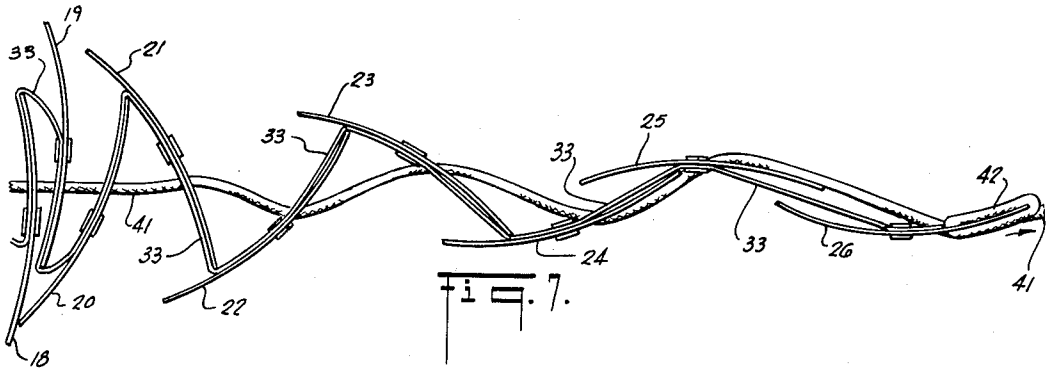


Fig. 7.

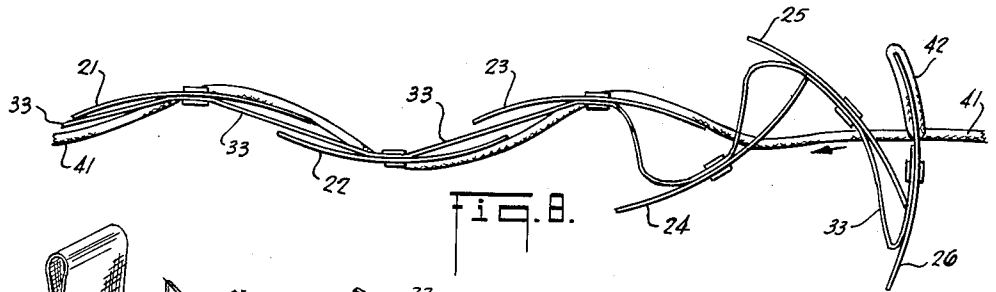


Fig. 8.

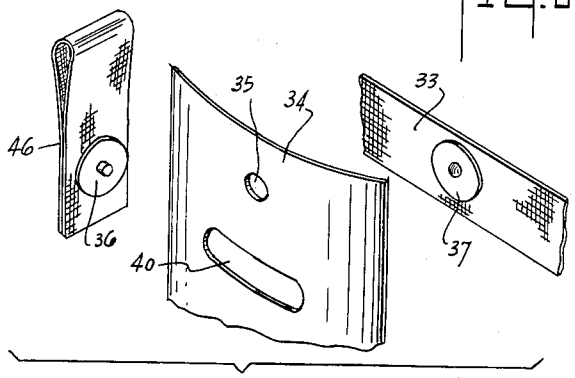


Fig. 10.

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2,728,389

SLATTED SCREEN

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Application November 8, 1952, Serial No. 319,548

14 Claims. (Cl. 160—199)

My present invention relates generally to screens, and has particular reference to a screen or partition formed of a series of slats.

It is a general object of the invention to provide an improved type of slatted closure for a wall opening such as a window or doorway, the slats being adjustable in unique fashion, along a direction of travel at right angles to the longitudinal axes, between an inoperative nested bundle and an extended screen-defining relationship. In accordance with my invention the slats automatically adjust themselves to lie in planes substantially transverse to the direction of travel when they are nested, and to lie in planes substantially parallel to such direction when they are fully separated, the adjusting mechanism being specially devised to effectuate the necessary rotative movements of the slats as they are separated and brought together.

A more particular object is to provide a screen construction of the character referred to, in which the parts are so designed and associated that the slats in their extended relation are staggered so that the side edges of each slat overlap but remain disconnected from the side edges of the adjacent slats. This provides a uniquely effective visual barrier provided with openings for ventilation and light diffusion between the slats.

The invention is especially well adapted to an array of slats individually suspended with their longitudinal axes vertical, and I have therefore chosen to illustrate the features of my invention, in connection with a screen of this kind, although it is to be understood that some phases of the invention are not necessarily restricted to vertically arranged slats.

In the preferred design, each slat has an outer convex face and an inner concave face, and the slats are so mounted and assembled that in the nested condition all the convex faces face in the same way whereas in the extended screen-defining relationship the convex faces face alternately outward in opposite directions.

A feature of the invention contributing to the desired operation of the device resides in the provision of slat suspension elements engaging with an overhead trackway and adapted to support one set of alternate slats with their vertical axes in one plane of travel and the other set of alternate slats with their axes in an adjacent parallel plane of travel. In the preferred embodiment of the invention the trackway comprises parallel rails with one set of suspension elements depending from one rail and another set from the other. However, the practice of the invention does not necessarily require a double trackway of this particular kind, as will be pointed out hereinafter.

Another feature of the invention lies in the provision of special flexible connectors between the slats, one for each pair of adjacent slats, arranged in such a way that as the slats are separated they are individually rotated in the contemplated manner. The connectors may be in the form of tapes made of woven fabric or its equivalent and it is advantageous to arrange one set of connectors near the upper end of the slat assembly and another set near the bottom. Each connector extends from the inner face of one slat to the inner face of the adjacent slat, and in order to achieve the operation contemplated by the invention the connectors extend alternately in opposite lateral directions.

To facilitate the opening and closing of the screen or partition, the slats are provided with slots through which a pull-cord extends. The cord is secured to the end slat at one end of the series; and the slat at the other end is positionally anchored. Accordingly a pull on the cord in one direction serves to draw the slats apart while a pull in the opposite direction urges them together.

Several ways of achieving these general objectives are illustratively exemplified in the accompanying drawings, in which

Figure 1 is an elevational view of an illustrative wall opening in which a screen of the present character is mounted, the screen being shown in its extended condition, parts being broken away for the sake of compactness of illustration;

Figure 2 is a cross-sectional view taken substantially along the line **2—2** of Figure 1;

Figure 3 is a cross-sectional view taken substantially along the line **3—3** of Figure 1;

Figure 4 is a view along the line of Figure 2, but showing the screen in its collapsed or nested condition;

Figure 5 is a fragmentary end view of the nested assembly, taken substantially along the line **5—5** of Figure 4;

Figures 6 and 7 are views similar to Figure 4, showing successive stages of the screen adjustment as the slats are drawn into extended relationship;

Figure 8 is a view similar to Figures 6 and 7, showing the initial stage of the adjustment that takes place when the screen is drawn into the nested condition;

Figure 9 is a view similar to Figure 5, illustrating a modification; and

Figure 10 is an exploded view of a detail of the assembly.

The wall opening in which the present screen can be employed may be a window, a doorway, or any other aperture across which it may be desirable to establish a temporary partition or screen. The wall opening in Figure 1 is depicted as having a horizontal lower edge **10**, an upper edge **11**, and side edges **12** and **13**. The slats defining the screen structure are elongated substantially rectangular elements composed of wood, metal, or equivalent material, and the number of slats employed is optional, depending upon the width of the space to be screened. The slats shown in Figures 1, 2 and 3 are designated by the reference numerals **14**, **15**, **16** and **26**. Slat **14** is intended to represent the end slat at the left end of the series shown; and slat **26** represents the end slat at the right of the series.

The slats are preferably identical in basic shape, dimensions, and nature. Each is constructed or embellished in such a way that it possesses what may be termed an outer face and an inner face. In the preferred construction illustrated in the present drawings, each slat is substantially concavo-convex in transverse cross section, whereby it has a convex face and a concave face. In the description which follows, and in the claims, the convex face will be referred to as the "outer" face of the slat, and the concave face will be considered the "inner" face.

Each of the slats is individually suspended from above, with the longitudinal axis of the slat vertical. The suspension is of such character that the slats may be adjusted from a separated to a nested relationship, and vice versa, and may also be individually rotated on their vertical axes.

One way of achieving the desired suspension is to provide each slat, adjacent its upper edge, with a flexible

hanger loop 46 composed, for example, of a strip of tape doubled upon itself. The lower end of the hanger 46 is secured to the mid-portion of the slat, preferably on its outer face. Each loop 46 engages at its upper end with a U-shaped hanger 27 (see Figure 5) whose upper ends turn toward each other and are provided with rollers 28. These rollers rest upon and run on a rail 29 of inverted-T construction.

In the embodiment of the invention illustrated in Figures 1 and 5, the rail 29 forms part of an overhead trackway 30 which is formed also with a second or duplicate rail 31 parallel to and alongside of the rail 29. The trackway 30 is secured, by fasteners 32 or otherwise, to the top horizontal margin of the wall opening.

The trackway 30 is representative of one expedient for supporting the slats so that one set of alternate slats has its vertical axes lying in one plane of travel, while the other set of alternate slats has its vertical axes lying in an adjacent parallel plane of travel. Thus, the slats 14, 16 . . . 26 hang from the rail 29, whereas the alternate slats 15, 17 . . . 25 hang from the adjacent rail 31.

Extending from slat to slat are a series of flexible conductors, each connector extending from the inner face of one slat to the inner face of the adjacent slat. These connectors may be formed of fabric tape or its equivalent, and although each connector functions separately it is possible and practical to form the entire series of connectors by means of a single length of tape which I have designated 33. At spaced intervals, preferably equidistant intervals, the tape or equivalent element is provided with means for establishing connections with the successive slats.

One convenient way of securing the connectors to the slats, which facilitates also the attachment of the hanger loops 46, is indicated in Figure 10. At 34 I have indicated the upper end of a typical slat of the series. Near this upper end, in the mid-part of the slat, an opening 35 is provided. The hanger loop 46 is provided at its lower end with one element 36 of a pair of cooperable snap fasteners. The other element of the pair of snap fasteners is shown at 37 and is secured to the tape 33. The connectors 36 and 37 are brought into engagement through the opening 35, and this brings all the parts into the desired relationship.

The connectors defined by the successive lengths of the element 33 extend alternately in opposite lateral directions. This is most clearly indicated in Figures 2 and 4. It is to be observed that the end of the element 33 at the left hand end of the assembly of slats (as viewed in the present drawings) is secured at 38 to the margin 12 of the wall opening. This effectively anchors the end slat 14, positionally, and the movements of this slat during the functioning of the screen are limited to the two extremes indicated in Figures 2 and 4. As indicated in Figure 4, the connector from the slat 14 to the slat 15 extends around one side edge of the slat 14 (the uppermost edge, as viewed in Figure 4), while the connector from the slat 15 to the slat 16 extends around the opposite side edge of the slat 15 (the lower edge as viewed in Figure 4), and so on.

It is desirable that the slats be provided with connectors near their bottom ends also, and I have indicated an element 39 in Figure 1 which is associated with the slats near their lower ends in the same way as the element 33 is connected to the slats near their upper ends. The dispositions of the connectors are the same, top and bottom, i. e., the connectors extend around the slat sides in identical zigzag fashion, as indicated in Figure 4, both at the top and at the bottom.

In order to adjust the slats from the nested relationship shown in Figure 4 to the extended relationship indicated in Figures 1 and 2, a pulling force is applied to the end slat 26. One convenient and practical way

of accomplishing this result is to provide each of the slats with a transverse elongated slot 40, preferably near the upper end of each slat, and to thread a pull cord 41 through these slots as indicated in Figure 3. The pull cord is anchored to the end slat 26 in any convenient manner, as by wrapping it around the slat margin as shown at 42. The pull cord passes over a guide roller 43 carried by the margin 13 of the wall opening, and at the opposite wall opening edge 12 there is a similar guide roller 44.

When the pull cord 41 is drawn toward the left (as viewed in Figures 1–4) it draws the slats into the nested condition shown in Figure 4; and when the pull cord 41 has a force exerted upon it in the opposite direction, it draws the slats into the extended relationship shown in Figure 2. The functioning of the parts during these adjustments is best indicated in Figures 2, 4, 6, 7 and 8.

In Figure 6, I have shown what happens when the slat assembly is in the nested condition of Figure 4, relatively closely adjacent to the side edge 12 of the wall opening, immediately following an initial pull toward the right on the pull cord 41. Not only is the end slat 26 drawn away from the adjacent slat 25, but a rotation is imparted to it in a clockwise direction (as viewed in Figures 4 and 6). In moving away from the slat 25, a tension is exerted upon the connector between these two slats, as a result of which a pull is also imparted to the slat 25. In this case, since the connector extends around the lower side edge of the slat (as viewed in these figures) a rotation is imparted to the slat 25 in a counterclockwise direction. This separation of the slats, and rotation of the successive slats first in one direction and then in the other, is represented at a further stage in Figure 7. Ultimately the parts arrive at the fully extended relationship shown in Figure 2. In this condition, the connectors between the slats are fully tensioned and straight, extending in zigzag fashion between the inner faces of the slats. The length of these connectors are so chosen, with respect to the distance between the two parallel planes of travel of the two sets of alternate slats, and with respect to the slat width, that when the elements are in the fully extended relation the side edges of each slat overlap but remain out of contact with the side edges of the adjacent slats. This enables the extended screen to serve as an effective visual barrier or partition, without completely cutting off ventilation, such ventilation being afforded by the gaps or spaces between the slats as indicated in Figure 2.

When a pull is exerted upon the cord in the opposite direction, the parts adjust themselves as shown in Figure 8. A counterclockwise rotation is imparted to the end slat 26, as well as to all other slats in that set; and a rotation in a clockwise direction is imparted to the slat 25 and the other slats in that set. This is a direct result of the fact that the cord 41 is in the zigzag position shown in Figure 3 when the screen is extended, and tends to straighten out when it is pulled. Also, as the pulling force is continued, the end slat 26 encounters the adjacent slat as indicated, that slat in turn encounters the next adjacent slat, and so on, causing the slats ultimately to be drawn into the nested relationship of Figure 4 in which the inner face of each slat faces the outer face of the adjacent slat, with all the outer faces directed the same way.

In Figure 9 I have illustrated a modification which is representative of an overhead trackway of the single-rail type, as distinguished from the double-rail trackway shown in Figure 5. The rail is in this case provided by the element 47 secured to the upper margin of the wall opening by a fastener 48 or its equivalent, the element 47 having a medial slot 49 in its lower face. Projecting upwardly into this slot is a U-shaped hanger 50 suspended from a shaft 51 having rollers or wheels 52 at its ends. Extending downwardly from each hanger 50 is a swivel 53 on which an S-shaped hook 54 is formed. Each hook

engages with one of the slats **55**, and the hooks are alternately arranged to extend laterally in opposite directions, whereby one set of alternate slats has its vertical axes arranged in one plane of travel while the other alternate set of slats has its axes arranged in a parallel adjacent plane of travel.

Because of the fact that there is only a single trackway, the slat supporting elements are arranged in a single line within the trackway, and this may make it a little more difficult to bring the slats into maximum proximity when they are in the collapsed or nested relationship. In other respects, however, the functioning of the screen indicated in Figure 9 is the same as that hereinbefore described. The slats are provided with connectors **56** extending from one slat to the next, and the slats are also provided with the elongated slots **57** through which the pull cord **58** is threaded.

Other types of overhead suspension mechanisms may be found to be appropriate, the essential characteristic of the trackway and its associated parts being merely that the slats may be adjusted along the trackway to separate them and bring them together, and may at the same time rotate individually on their vertical axes.

It will be understood that the slats do not necessarily have to be concavo-convex, as illustrated, nor is it essential in the practice of the invention that the slats or the connectors have the particular dimensions and proportional relationships indicated in the present drawings.

In general, it is to be understood that the devices herein illustrated and described are merely representative, and that those skilled in the art will be enabled to modify many of the details referred to without necessarily departing from the spirit and scope of the invention as expressed in the appended claims.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. In a screen for a wall opening, a series of individually supported slats arranged with their axes parallel, each slat having an inner face and an outer face, a trackway, slat supporting means movable along said trackway and effective to allow separation and nesting of the slats as well as rotation of the slats individually on their axes, said slats in their nested relationship lying generally transverse to the direction of travel along said trackway with the outer face of each slat facing the inner face of the adjacent slat, and means effective during separation of the slats for rotating one set of alternate slats in one direction and the other set in the opposite direction, to bring them all into a generally parallel relation to said direction of travel with the outer faces of the slats facing alternately outward in opposite directions, said rotating means comprising a series of flexible connectors, one between each pair of slats, each connector extending from the inner face of one slat to the inner face of the adjacent slat, one set of alternate connectors extending around one set of the side edges of the nested assembly of slats, the other set of alternate connectors extending around the other set of side edges.

2. In a screen for a wall opening, a series of individually supported slats arranged with their axes parallel, each slat having a convex face and a concave face, a trackway, slat supporting means movable along said trackway and effective to allow separation and nesting of the slats as well as rotation of the slats individually on their axes, said slats in their nested relationship lying generally transverse to the direction of travel along said trackway with the convex face of each slat facing the concave face of the adjacent slat, and means effective during separation of the slats for rotating one set of alternate slats in one direction and the other set in the opposite direction to bring them all into a generally parallel relation to said direction of travel with the slats in staggered relation and with the convex faces directed alternately outward in opposite directions, said rotating means comprising a series of flexible connectors, one between each pair of slats, each connector extending from the mid-part of the concave face of one slat to the mid-part of the concave face of the adjacent slat, said connectors in the nested assembly of slats extending alternately in opposite lateral directions.

3. In a screen for a wall opening, a series of vertically arranged individually suspended slats, an overhead trackway, slat suspension means movable along said trackway and effective to allow separation and nesting of the slats as well as rotation of the individual slats on their vertical axes, said suspension means including suspension elements supporting one set of alternate slats with their vertical axes in one plane of travel and the other set of alternate slats with their vertical axes in an adjacent parallel plane of travel, said slats in their nested relationship lying generally transverse to said planes of travel, and means effective during separation of the slats for rotating them into staggered dispositions generally parallel to said planes of travel.

4. In a screen for a wall opening, a series of vertically arranged individually suspended slats, an overhead trackway, slat suspension means movable along said trackway and effective to allow separation and nesting of the slats as well as rotation of the individual slats on their vertical axes, said suspension means including suspension elements supporting one set of alternate slats with their vertical axes in one plane of travel and the other set of alternate slats with their vertical axes in an adjacent parallel plane of travel, said slats in their nested relationship lying generally transverse to said planes of travel, and means effective during separation of the slats for rotating one set of slats through about 90 degrees in one direction and the other set through about 90 degrees in the opposite direction so as to bring the slats into a staggered relation and generally parallel to said planes of travel.

5. In a screen for a wall opening, a series of vertically arranged individually suspended slats, an overhead trackway, slat suspension means movable along said trackway and effective to allow separation and nesting of the slats as well as rotation of the individual slats on their vertical axes, said suspension means including suspension elements supporting one set of alternate slats with their vertical axes in one plane of travel and the other set of alternate slats with their vertical axes in an adjacent parallel plane of travel, said slats in their nested relationship lying generally transverse to said planes of travel, flexible connectors between said slats to limit the extent of separation thereof, each connector extending from one face of one slat to the corresponding face of the adjacent slat, successive connectors extending around the slats first in one direction and then in the other whereby separation of the slats is accompanied by a rotation of one set of alternate slats in one direction and a rotation of the other set in the other direction, the slats in their fully separated relation being staggered and lying generally parallel to said planes of travel.

6. In a screen for a wall opening, a series of individually suspended slats arranged with their axes vertical, each slat having a convex face and a concave face, an overhead trackway, slat suspension means movable along said trackway and effective to allow separation and nesting of the slats as well as rotation of the slats individually on their vertical axes, said suspension means including suspension elements supporting one set of alternate slats with their vertical axes in one plane of travel and the other set of alternate slats with their vertical axes in an adjacent parallel plane of travel, said slats in their nested relationship lying generally transverse to said planes of travel with all convex faces facing the same way, flexible connectors between said slats to limit the extent of separation thereof and to effect rotations of the slats as they are separated, each connector extending from the mid-part of the concave face of one slat to the mid-part of the concave face of the adjacent slat, one set of alternate connectors extending

around one set of side edges of the nested assembly of slats, the other set of alternate connectors extending around the other set of side edges, whereby upon separation of the slats one set of alternate slats will be caused to rotate in one direction while the other set of alternate slats will be caused to rotate in the opposite direction, the slats in their fully separated relation being staggered and lying generally parallel to said planes of travel with all convex faces facing outward and the concave faces of one set facing the concave faces of the other.

7. In a screen as set forth in claim 6, said connectors being of such sizes relative to the slat width and the distance between said planes of travel that when the slats are in their fully separated relation the side edges of each slat will overlap but remain disconnected from the side edges of the adjacent slats, whereby the screen can provide a visual barrier with ventilation gaps therein.

8. In a screen for a wall opening, a series of vertically arranged individually suspended slats, an overhead trackway comprising a pair of parallel adjacent tracks, slat suspension means movable along said tracks and effective to allow separation and nesting of the slats as well as rotation of the slats individually on their vertical axes, said suspension means including one set of suspension elements on one of said tracks supporting one set of alternate slats and another set of suspension elements on the other of said tracks supporting the other set of alternate slats, said slats in their nested relationship lying generally transverse to the direction of travel along said trackway, and means effective during separation of the slats for rotating them into staggered dispositions generally parallel to said direction of travel.

9. In a screen for a wall opening, a series of vertically arranged individually suspended slats, an overhead trackway comprising a pair of parallel adjacent tracks, slat suspension means movable along said tracks and effective to allow separation and nesting of the slats as well as rotation of the slats individually on their vertical axes, said suspension means including one set of suspension elements on one of said tracks supporting one set of alternate slats and another set of suspension elements on the other of said tracks supporting the other set of alternate slats, said slats in their nested relationship lying generally transverse to the direction of travel along said trackway, and means effective during separation of the slats for rotating them into staggered dispositions generally parallel to said direction of travel, said rotating means comprising flexible connectors which extend in zigzag relation between said staggered slats when they are in fully separated relationship, said connectors being of such lengths that the side edges of each slat overlap the side edges of the adjacent slats.

10. In a screen for a wall opening, a series of slats each of which is individually supported at at least one end, a trackway, slat supporting means movable along said trackway and adapted to allow rotation of each slat on its longitudinal axis, said supporting means including support elements retaining one set of alternate slats with their longitudinal axes in one plane of travel and the other set of alternate slats with their longitudinal axes in an adjacent parallel plane of travel, means for selectively moving said slats into a nested relation and into a relatively separated relation, and means effective during the nesting movement to rotate the slats into positions generally transverse to said planes of travel and effective during the separating movement to rotate them into staggered dispositions with each slat generally parallel to its plane of travel.

11. In a screen for a wall opening, the structure defined in claim 10, said last-named means comprising flexible connectors between said slats, each connector extending from one face of one slat to the corresponding face of the adjacent slat, successive connectors extending around the slats first in one direction and then in the other whereby movement of the slats between the nested and separated relations is accompanied by a rotation of one set of alternate slats in one direction and a rotation of the other set in the other direction.

12. In a screen for a wall opening, the structure defined in claim 11, in which each slat has a convex face and a concave face, and in which each of said connectors extends from the mid-part of the concave face of one slat to the mid-part of the concave face of the adjacent slat, whereby in the staggered separated relation of the slats the convex faces all face outward and the concave faces of one set face the concave faces of the other set.

13. In a screen for a wall opening, the structure defined in claim 10, said last-named means comprising flexible connectors between said slats, each connector extending from one face of one slat to the corresponding face of the adjacent slat, successive connectors extending around the slats first in one direction and then in the other whereby movement of the slats between the nested and separated relations is accompanied by a rotation of one set of alternate slats in one direction and a rotation of the other set in the other direction, said connectors being of such sizes relative to the slat width and the distance between said planes of travel that when the slats are in their fully separated relation the side edges of each slat will overlap but remain disconnected from the side edges of the adjacent slats.

14. In a screen for a wall opening, the structure defined in claim 10, in which said trackway comprises a pair of parallel adjacent tracks, and in which there are two sets of slat supporting elements one engaging with one of said tracks, the other with the other.

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