March 31, 1964 C. GIORDANI 3,126,943

ACCORDION TYPE FOLDING CLOSURE

Filed Jan. 4, 1961

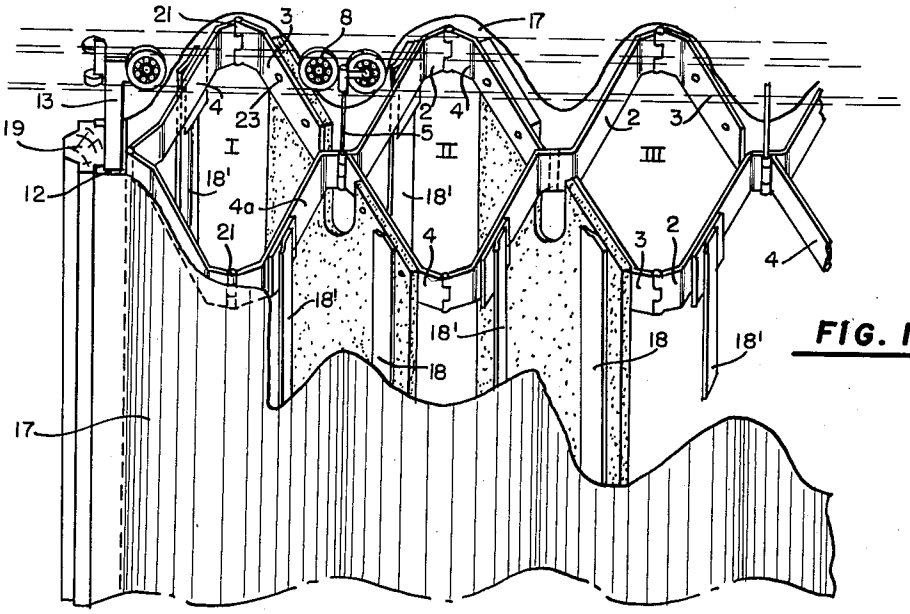


FIG. 1.

FIG. 2.

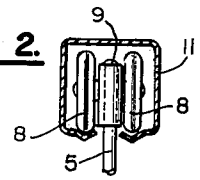


FIG. 3.

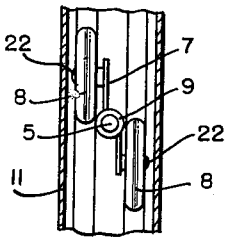


FIG. 4.

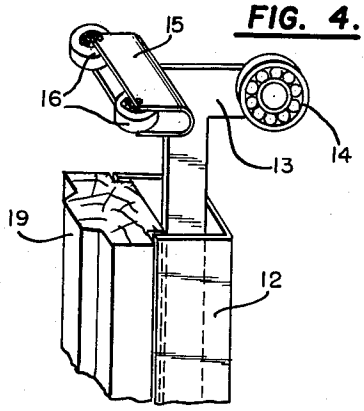
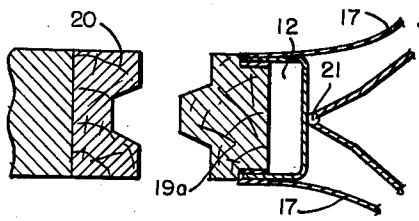


FIG. 5.



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ACCORDION TYPE FOLDING CLOSURE

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This invention relates to a folding structure partition of the so-called accordion type .

The invention is characterized by the use of a number of panels or strip-type vertical elements, on which a flexible lagging material is fixed and kept together by a system of hinged metallic elements connected through the mentioned panels and so set as to form connecting horizontal bands, the number of which could be varied according to the height of the door or partition. Means for hanging of the door are provided at its top by a special close U shaped guide by means of suitable wheeled small trailers or ball bearings and vertical rods connected to same small trailers as well as to the hinge elements composing the top band of the horizontal connection system. In addition in order to obtain a proper shutting on the vertical jamb the partition is provided with a suitable profile made of wood or any other material.

As set forth, owing to its characteristics hereinafter described in detail, the door or folding partition according to the invention is highly functional, easy to set and elegant, fully answering the exigencies of the up-to-date buildings.

In the attached drawing a preferred manner is shown for the realization of the invention by way of illustration and not limitative of the invention. In the drawings:

FIGURE 1 is a fragmentary view, in a top perspective, of the upper part of a door or partition according to the invention, with a portion of the outer flexible covering removed.

FIGURE 2 is a transverse section view showing the U shaped guide provided to set the door or the partition, and the overhead wheel with the associated vertical rod which acts as a connection for the hinged parts;

FIGURE 3 is a plan view of the FIGURE 2, in which the upper part of the inverted U shaped guide has been removed;

FIGURE 4 is an enlarged perspective view of the upper part of the movable stanchion of the folding door with vertical hanging wheel and horizontal guide wheels suitable to slide inside on the vertical walls of the inverted U shaped guide;

FIGURE 5 is a horizontal section view showing one form of jamb provided for receiving the vertical end of the accordion door or partition.

As clearly shown in FIGURE 1, the accordion type door or sliding partition according to the invention, includes a plurality of strip type vertical elements or panels 1, which can be made of Masonite, plywood, plastic sheets etc. connected at least on both their top and bottom ends by means of a set of hinge type metallic elements 2 horizontally disposed, so as to create at least two bands adapted to be folded as a connection. In addition elements 2 are suitable to keep the above mentioned panels or vertical elements 1 in a proper vertical position, parallel to each other. Each hinge type metallic element 2 is composed of a central S shaped portion bent and each hinge type metallic element 2 has a plate-like extension 3 and 4 hinged on each of its ends. The members 3 are a bit shorter than the members 4 and both have a certain number of holes to permit securing of the members 3 and 4 by means of screws, rivets, etc. of the vertical panels 1. As shown there are two different forms of the metallic elements 2. Some are provided with a vertical rod 5 acting as a pivot for the hinge 6, and with means to hang the door or partition to the sliding trailer, such hinge being

provided to set in the free end of each member 4. The others of elements 2 not provided with hanging rod 5 have same hinge 6 set on the opposite side to the position where the rod 5 is provided. Consequently it results for every other hinge type element 2 there is a rod 5 to hang the small trailer which is sliding and that the members 3 and 4, hinged on the ends of the elements 2, alternately change their position so as to obtain the proper movement of the central link axis of the door structure. As it is shown by FIGURE 1, while the members 4 are hinged centrally to the element 2 by means of the hinge 6, the members 3 remain free at one end but they are kept in the desired position by the vertical panel elements 1.

The sliding trailer, as shown in FIGURE 3 includes a flat S-shaped iron plate 7 which bears at each end a wheel or ball bearing 8 disposed so as to slide in the inverted U-shaped guide 11, which is set in the upper part of the opening which is to be closed by the door. As shown wheels 8 are offset longitudinally from each other, each wheel being supported on its own axle set in plate 7. In the center the plate 7 is provided with a bushing 9 with a vertical hole wherein the rod 5 is set. This rod is rotatable in the bushing 9 and after being fitted in it is axially jammed on the upper part so as to prevent its getting out. The guide 11 is preferably U shape, with only a narrow longitudinal opening to permit the small rods 5 to pass while supporting and connecting the components of the folding door. The rods 5 collimate with the central link axis of the hinge elements 2. Corresponding to such axis the vertical panels 1 show on each end an indentation 10 suitable to grant free passage of the S shaped portion of the hinge element 2. If the door requires one or more intermediate bands of horizontal connections to hinge elements, instead of an indentation 10 obviously a window would be provided in a proper position.

A vertical stanchion 12 suitable to act as the movable end of the accordion type closure is preferably provided in U section connected by means of a hinge to the hinge elements 2. The opposite vertical stanchion of the door is fixed and so as to grant an easy sliding and a correct guide, as shown in the FIGURE 4, on its upper end it is provided with a square extension 13 which bears a support wheel 14 disposed at the same level as other wheels of the trailers. For the side guide moreover it is provided with a transversely disposed U-shaped piece 15, attached to the extension 13. Piece 15 supports a couple of wheels or ball bearings 16 horizontally positioned so as to slide on the inner vertical walls of the U-shaped guide 11. Because of this construction the stanchion 12 cannot rotate.

The same stanchion includes a wooden lath front extending vertically. Wooden member is properly provided with a shape which is adapted to fit into a corresponding opening in the fixed stanchion 20 composed by a wooden lath as well, permits the realization of a fixed closing as shown in detail by the FIGURE 5. This closing could be perfectioned by means of rubber sections.

Lagging of the compound is attended to by preferably using folding material, like cloth, vinylskin, resinflex and other plastic like textiles of the kind. Securing of such material, marked 17, can be started along the stanchions 12 by any suitable technique. Along the panel vertical elements 1 the lagging 17 can be glued or set in, by means of glueing or other suitable means, through the interposition of a vertical strip of suitable material 18 previously longitudinally fixed in the desired position on the panel elements 1. A set of further strips, marked 18^1, are properly vertically fixed on the hinge elements 2 of the horizontal band for the connection upper, lower and eventually central, always in order to grant setting in of the lagging material 17 in the wanted position. Everything arranged in a way that, when the door or the parti-

tion is shut, the lagging is stretched and provided with light, regular vertical axis undulation. As a general rule the lagging is naturally fixed on both parts of the structure, but the compound works even if the lagging is provided one side only.

It is obvious that the invention with the relevant basic principle cannot be understood as limited to the execution form described and shown, details of which shall possibly undergo changes and perfectioning without getting out any way of the frame of the same invention.

I claim:

In an accordion type foldable door structure:

a plurality of vertically extending panels;

means to support said panels for movement between a fully extended position in which said panels are disposed substantially in a single plane and a fully collapsed position in which said panels are disposed in side by side arrangement;

means to effect movement between said positions and to positions intermediate thereof, including:

a pantograph type of hinge structure consisting of a plurality of horizontally disposed S-shaped members arranged in a first series along the upper portion of said panels, and a second series of horizontally disposed S-shaped members arranged along the lower portion of said panels, and

a short extension member hingedly connected at one end of said S-shaped members and connected to one side of said panels adjacent to the top and bottom thereof,

and a somewhat longer extension member hingedly connected at the other end of each of said S-shaped members and to the opposite sides of said panels adjacent to the top and bottom thereof, each of said longer extension members being hingedly connected to the next adjacent of said S-shaped members at a point approximately midway between its ends, each of said panels being secured to a pair of adjacent longer and shorter extensions so as to cause said hinge members to operate in the manner of a pantograph;

and a flexible material extending continuously across the width of said structure and secured to said panels at spaced areas therealong.

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