June 24, 1930 E. J. G. PHILLIPS 1,768,267

FOLDING DOOR

Filed Dec. 14, 1925

Fig. 1.

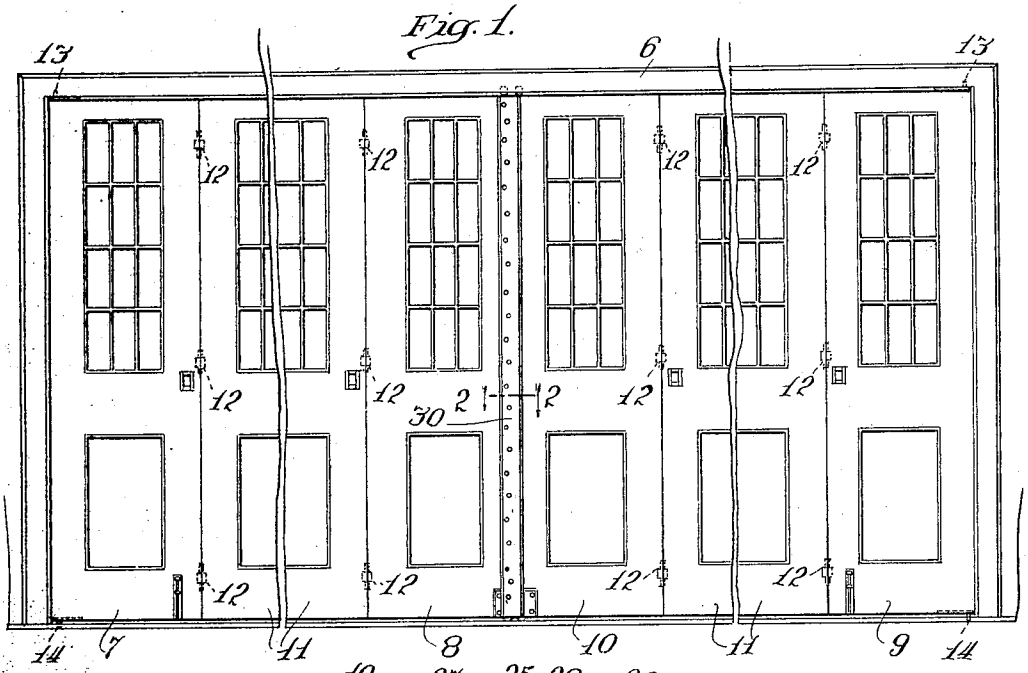


Fig. 2.

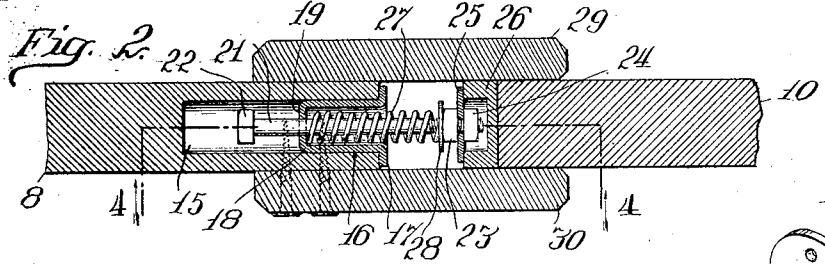


Fig. 5.

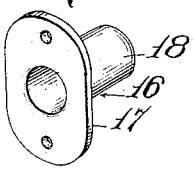


Fig. 3.

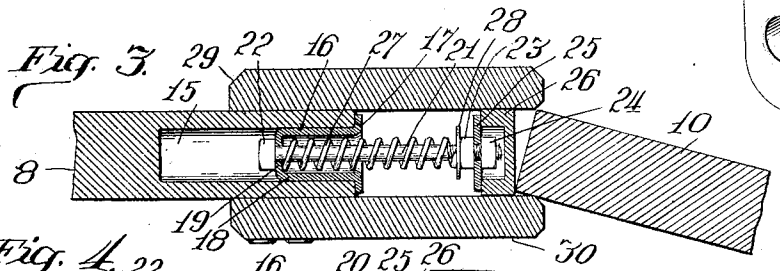
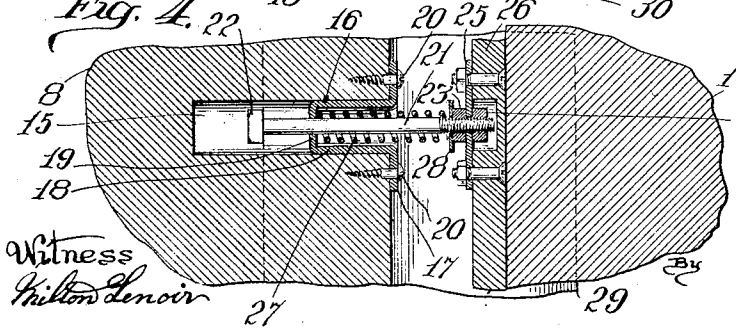


Fig. 4.



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UNITED STATES PATENT OFFICE

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FOLDING DOOR

Application filed December 14, 1925. Serial No. 75,210.

My invention relates to folding doors of the accordion type, or doors composed of a plurality of leaves hinged together so that the several leaves may be folded together in an accordion-like manner, and when so folded will occupy a transverse position relative to the door opening, and be bunched together part at one end and part at the other. Such doors are usually suspended from hangers connected with alternate leaves and arranged to run on a track extending longitudinally of the doorway immediately above its upper or head jamb, the lower portion of the door being guided by some form of guiding means attached to the lower margins of alternate leaves and running in a slot in the floor, or on a slotted rail set into the floor, and extending longitudinally of the doorway. The leaves at the ends of the door opening of such doors are usually mounted on fixed pivots or hinges so that they do not travel longitudinally of the doorway, but are free to swing laterally as the leaves of the door are folded or unfolded, while the remaining leaves constituting each of the two sections of the door as a whole must, of course, travel longitudinally of the doorway as they are moved into or out of operative position. In doors of this type much difficulty has been encountered in obtaining a proper engagement of the meeting edges of the two innermost leaves owing to the fact that the leaves are apt to shrink or swell, which, of course, alters the over-all length of each door section comprising the several leaves that are hinged together, and the object of my invention is to provide means by which variations in such over-all length of the two door sections will be automatically compensated for, so that regardless of shrinkage or swelling the door as a whole will always close properly. I accomplish this object as illustrated in the drawings and hereinafter described. What I regard as new is set forth in the claims.

In the accompanying drawings,—

Fig. 1 is a front elevation, partly broken away, showing a multiple leaf door of the type referred to in its closed position;

Fig. 2 is a detail, being a partial horizontal section on line 2—2 of Fig. 1;

Fig. 3 is a similar view illustrating the position of the parts when the door is being closed or opened;

Fig. 4 is a vertical section on line 4—4 of Fig. 2; and

Fig. 5 is a perspective view of one of the thimbles which form a part of the compensating devices.

Referring to the drawings, 6 indicates the frame of the door opening, 7, 8 indicate respectively the inner and outer end leaves of one of the door sections, and 9, 10 indicate respectively the inner and outer end leaves of the other door section. The intermediate leaves of the two door sections are indicated by 11, and it will be understood that any suitable number of such intermediate leaves may be provided, such number depending, of course, on the width of the doorway and the width of the several leaves. As shown at 12, the several leaves of each section are connected by hinges, such hinges being so designed that the leaves of each section may be folded together in an accordion-like manner. The end leaves 7, 9 are mounted at their outer margins on fixed pivots 13, 14, so that they may swing laterally, and the remaining leaves are supported to move longitudinally of the doorway in the manner above mentioned. The arrangement is such that when the door sections are unfolded, or moved into position to close the doorway, the proximate margins of the outermost leaves 8, 10 abut, but manifestly if the leaves shrink or swell, unless provision is made for variation in the total width of the door sections incident thereto,

the door will not close properly. In my improved construction such compensation is provided for in the manner that will now be described.

As best shown in Figs. 2, 3 and 4, one of the outermost leaves, as 8, is provided in its free margin with recesses 15 in the form of cylindrical bores in each of which are fitted thimbles 16 comprising a face plate 17 and a cylindrical portion 18 having a head 19 at its inner end. The thimbles 16 are adapted to be fitted in the recesses 15 and are of such length that their heads 19 are removed a considerable distance from the inner ends of said recesses, as shown in said figures. The thimbles are secured in position by screws 20, as shown in Fig. 4.

Extending longitudinally through each thimble is a bolt 21, the inner end of which is supported by the head 19 thereof to move longitudinally, and is provided with a head 22 at its inner end, which lies between the head 19 and the inner end of the recess 15. At its outer end the bolt 21 is screw threaded and carries nuts 23, 24 screwed thereon at opposite sides of a plate 25 which is secured to a strip 26, preferably of wood, that extends the full length of the leaf 8 and is of corresponding width. Thus the strip 26 is supported by the several bolts 21, and is movable toward and from the adjacent margin of the leaf 8, this being permitted by longitudinal movement of said bolts. Upon each bolt is mounted a spring 27, the inner end of which bears against the inner face of the head 19, while its outer end bears against a washer 28 fitted on the bolt 21 adjacent to the nut 23. The several springs 27, therefore, tend to move the strip 26 away from the adjacent margin of the leaf 8 and cushion it against inward movement. The head 22 of the bolt 21 limits the extent to which the strip 26 may move away from the leaf 8, as shown in Fig. 3. By adjusting the nuts 23, 24 on the bolt, obviously the extent to which the strip 26 may be moved away from said leaf may be adjusted.

At opposite sides of the leaf 8 adjacent to the outer margin thereof are two panels 29, 30 that are secured to said leaf and extend beyond the outer margin thereof, as shown in Figs. 2 and 3, forming a groove to guide the strip 26 in its movement toward and from the leaf 8. Said panels also guide the margin of the leaf 10 as it moves during the closing of the door. Fig. 3 illustrates the position of the leaf 10 at the time the door is being closed, at which time the leaves 8 and 10 assume an angular position with relation to each other. For convenience of illustration the leaf 8 is shown in its closed position while the leaf 10 is turned to a pronounced angular position with relation to it, so that its outer margin can enter the space between the panels 29, 30. As the leaf 10 is swung into alinement with the other leaves of its door section and with the leaf 8 the strip 26 will be pressed back, thereby compressing the springs 21 until the parts assume the position shown in Figs. 2 and 4. The strip 26 will, therefore, be held in close contact with the leaf 10, and the space between said strip and the leaf 8 will be closed by the panels 29, 30, which, as shown, then overlap the outer margin of the leaf 10, thus providing a complete closure of the door opening. The panels 29, 30 are preferably of ornamental character so as to give a finished effect to the door as a whole.

By the construction described the door will always close properly regardless of any shrinkage or swelling of the leaves of either section of the door. Furthermore, the construction described allows for projection of the corners of the inner leaves beyond the position they normally occupy when the door is closed, incident to their swinging on their hinges, so that the door always closes easily.

Any desired number of bolts may be used to connect the strip 26 with the leaf 8, but ordinarily three or four of such bolts will suffice.

What I claim as my invention and desire to secure by Letters Patents, is—

1. The combination of a swinging and sliding folding door leaf having pockets in its outer margin, a strip disposed opposite said outer margin, a metallic plate secured to the inner face of said strip, bolts movable longitudinally in said pockets, thimbles mounted in said pockets and forming bearings for said bolts, said bolts having threaded ends passing through holes in said metallic plate, nuts engaging over said threaded ends on opposite sides of said metallic plate, springs mounted on said bolts between said thimbles and said nuts for normally pressing said strip away from said leaf, and plates secured at opposite sides of said leaf and forming a channel to receive said strip.

2. In combination, an abutment member, plates secured at opposite sides of said member, a door movable toward and away from the abutment member and adapted to enter between the plates, a strip disposed between the plates for contact with the entering edge of the door, slidably mounted bolt and nut means for supporting the strip for movement toward and away from the abutment member and for adjusting the strip toward or away from the abutment member, and resilient members confined between the strip and the abutment member and yieldingly opposing movement of the strip toward said abutment member.

3. In combination, an abutment member having pockets in one edge, plates secured at opposite sides of the abutment member at said edge thereof, thimbles secured to the abutment member and extending into said

pockets, bolts passing through the inner ends of the thimbles, a strip slidable between the plates, securing plates secured to the inner face of said strip, the bolts passing through the securing plates, nuts threaded onto the bolts at opposite sides of said securing plates and coacting therewith for adjustably securing the strip to the bolts, and expansion coil springs mounted about the bolts and confined between the thimbles and the nuts at the inner side of the securing plates.

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