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2,854,070

MEMBRANE DOOR

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Fig. 1.

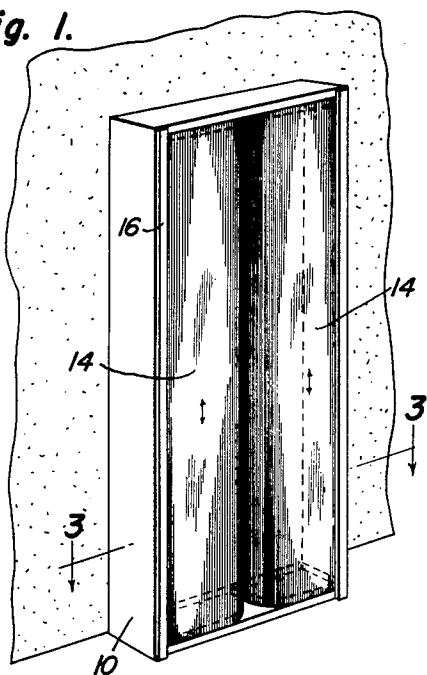


Fig. 2.

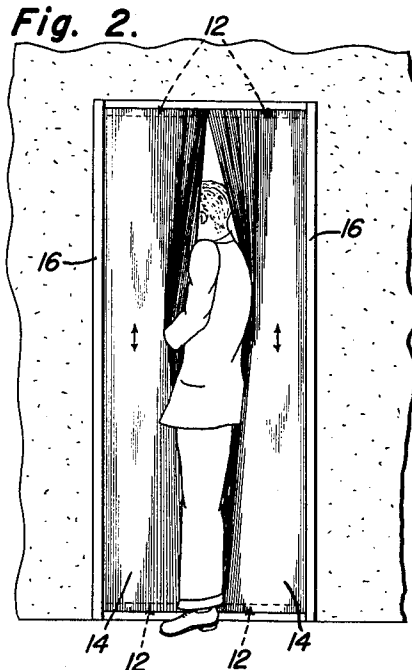


Fig. 3.

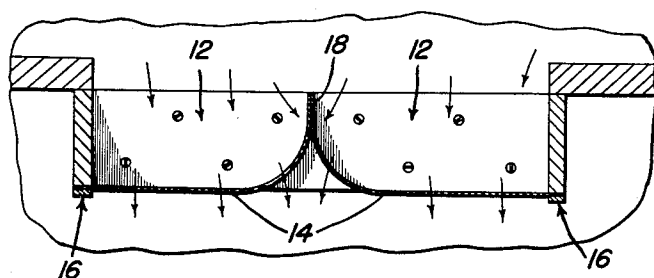


Fig. 5.

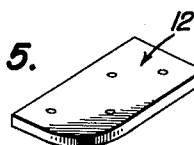


Fig. 4.

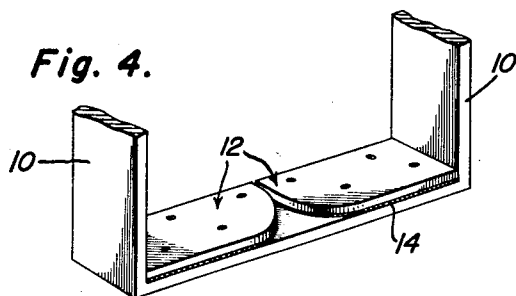


Fig. 6.

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2,854,070

MEMBRANE DOOR

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3 Claims. (Cl. 160—113)

This invention relates to a membrane door. More particularly, it relates to a door opening that is closed by means of two curved elastic curtain members under tension. More specifically, this invention relates to a door member composed of two curved porous elastic curtains under tension, which curtains permit a pressure differential to exist on the two sides of the door and serve to permit persons to pass through the curtained opening.

Fig. 1 shows a downstream view of the membrane door in position in a wall. Fig. 2 shows a corresponding downstream view of the same door with the elastic curtain members spread apart to permit a person to pass therethrough. Fig. 3 shows a transverse section of the door at 3—3 of Fig. 1. Fig. 4 shows a section of the door frame including the forming strips for giving the elastic members their curved shape. Fig. 5 shows one of the forming members. Fig. 6 shows a modification of such a forming member using a steel section in place of the wooden member of Fig. 5.

The membrane door is composed of a rectangular frame work 10 which encircles the wall opening. At each end of this frame work are shown a pair of the forming members 12, 12 which are screwed to the ends of the frame and have their curved portions adjacent the center of the door opening. The door is formed by fitting porous elastic curtain material to said forming plates 12, 12 in each end of the door frame. The elastic material may be tucked under the plates and the plates screwed down tight to the door frame or the curtains may be fastened directly to the respective edges of the forming plates. The outside edges of the elastic curtain is attached to the door frame 10 by means of molding 16 and the inside central portion of the respective elastic curtains have their edges lapped together parallel as shown at 18. The elastic curtain material has a longitudinal stretch only, with the result that when placed in the opening it is cut somewhat shorter than the height of the opening. The material is then stretched to each end of the door frame and attached to the curved forming plates 12. It is desirable to have the elastic curtain material of a porous nature, whereby the membrane door will permit a steady diffusion of air in the direction shown by the arrows in Fig. 3. Due to the curved shape of the meeting edges of the elastic door members, any differential in air pressure will serve to further seal the meeting edges at 18. Again, due to the curved downstream shape of the elastic members, a person can readily

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force one's way through the opening as shown at Fig. 2. In the event that passage both ways is desired, it is preferable to arrange two membrane doors side by side, one facing upstream and the other facing downstream. By having the curved or downstream side of the door appearing on the right, passage will always be through the door on the right.

This membrane door has a multitude of uses, particularly where it is desired to maintain a small pressure differential between two rooms or between a room and the outside air. Thus, it is especially useful in biological or radiological laboratories where a pressure differential is maintained to prevent contamination passing through the door opening. The passage of a person through the door is accompanied by so little excess opening that little differential air pressure is lost and little opportunity is offered for contamination to pass. Moreover, due to the continual slow passage of air through the door, contamination is further prevented from entering the high pressure side.

The door may also be utilized in air raid and other shelters where it will permit ready access to the shelter even under panic conditions and yet will be effective to keep biological or radiological contamination from entering. The door has further utility as opening into a tent or other temporary structure since it serves to keep out vermin as well as to provide continuous ventilation. When used in this manner, the porosity of the door members may be regulated to allow any reasonable flow of air to pass and yet to keep out all insect life.

In temporary structures or those designed to be dismantled, the door frame may be made of tubing or other structural shapes as shown in Fig. 6. This permits the door to be readily dismantled and moved with the rest of the structure.

I claim:

1. A membrane door for maintaining an air pressure differential between two compartments, comprising a framed opening, two longitudinally elastic curtains, each closing a portion of said opening, each of said curtains being attached to the two opposing ends and one side of said frame opening, the other edge of said curtains meeting in said opening in tangentially curved sections.

2. A membrane door in accordance with claim 1 wherein the inner edges of the respective elastic curtains are curved at right angles to the main body of the curtains, said inner edges terminating in parallel tangential sections.

3. A membrane door in accordance with claim 1 wherein the elastic curtain material is porous to permit the passage of air therethrough.

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