This invention relates to a sliding door assembly for a pressure chamber and including means by which a flush threshold or sill is provided.

In hyperbaric chambers for medical and other uses space limitations make it desirable that the door be of sliding rather than of hinged construction. In the ordinary sliding door construction for pressure chambers, the door, on the inside of the chamber, moves to a position in alignment with the opening in the door frame and is clamped therewith to initiate sealing. Pressure within the chamber will thereafter hold the door in place while the clamp drops free. In opening, the door is slid to one side.

A problem arises because the door must be larger than and fit over the door frame on all sides including the bottom to assure proper seal. This means that a recess must be provided in the floor for the bottom of the door. In the past this has required a recess or trough between the door sill and the floor structure. In many installations the trough in the floor structure provided for the sliding door can be tolerated. However, it will be understood that when the pressure chamber is used for medical purposes and must permit the entry of a wheeled litter bed, a trough cannot be tolerated because it may cause the bed to rattle or worse to get hung up.

There has been a need, therefore, for means to cover the trough in the floor structure provided for the sliding door. Heretofore a simple plate has been provided which is placed over the recess after the door is opened. However, it has been awkward and because it has not been automatic it has been bothersome and has become a source of annoyance to hospital personnel.

The present invention provides cover means which automatically move into place upon the opening of the door to insure a flush surface at the door threshold.

At the same time the means of the invention assure that the recess for the door will be covered on each and every opening of the door and hence prevent any possibility that foreign objects will fall into the recess and jam the door.

Other objects of the invention will be apparent from the reading of the following specification including the drawings in which:

FIGURE 1 is a perspective view from the inside of a chamber of a door arrangement embodying the invention;

FIGURE 2 is a sectional view taken on the line 2-2 of FIGURE 1 and showing a preferred version of structure embodying the invention and in flat or extended form;

FIGURE 3 is a view taken on the same section line but showing the cover means in partially retracted form with the door moved partly towards its closed position;

FIGURE 4 is a fragmentary sectional view taken on the line 4-4 of FIGURE 2; and

FIGURE 5 is a fragmentary sectional view taken on the line 5-5 of FIGURE 2.

Briefly, the invention relates to a sliding door for a pressure chamber, the door extending below the pressure chamber threshold in a trough so that the door may seal against all sides of the door frame, and a cover means for the trough so that when the door is open the trough will be covered and present a flush part.

Referring more specifically to the drawings, the overall arrangement embodying the invention is shown in FIGURE 1 and generally designated 10. As shown from the inside of the pressure chamber it includes a vertical wall member 12 having a door frame 14 or lip extending inward of the chamber about the door opening. A sliding door 16 is suspended from a wheeled carriage 18 which rides on a support track 20. The carriage may be driven by suitable hydraulic or pneumatic means 22, not part of this invention.

The door may mount a closing clamp 24 which cooperates with structure 26 which may be mounted on the wall 12.

Floor structure 28 comprises a horizontal surface which is at the same level as the door frame sill 30. The floor structure 28 is provided with a recess 32 adapted to receive the lower end of the door so that the lower end of the door may overlap the door frame sill 30 to effect a seal therewith.

Cover means 34 shown in a preferred embodiment comprise an essential part of the invention. As shown in FIGURE 2 the cover means 34 may include a set of links 36 which are pinned together in pairs as at 38 which are biased toward the folded position (FIG. 3) by axial springs 40 having their ends disposed in pockets 42 provided in the link structures. As shown in FIGURE 4 the ends of the pinned links 36 are engaged by a pin 44 on alternate sides of the pin to assure that the links form a planar surface when the cover means is extended and that they will not deflect downward from this planar surface in use.

The pairs of links 36 are formed into a continuous assembly by being connected to carriages 44 which also may be regarded as links and which are supported on trunnions 46. The trunnions 46 may be plastic coated and ride in grooves 48 or tracks in the side walls of the recess 32. The carriages provide the support for the links intermediate the ends of the cover means. The opposite ends of the cover means 34 are connected respectively to the floor structure at the end of the recess in a hinged connection 50 and a similar connection 52 on the door. These connections are made at the same level and arranged so that the upper surface of the cover means (FIG. 2) is flush with the structure 28 and the frame sill 30 of the door.

In operation as shown when the door is moved toward its closed position from the open position axial springs 44 bias the links toward the zig-zag accordion arrangement shown in FIGURE 3. When the door is completely closed the links form a tight and compact block out of the way of structure around the door. The door may then be clamped shut by means 24, 26. In opening the door the means 24, 26 are disengaged and the door is driven to the position shown in FIGURE 1. Since the cover means is attached to the door it automatically unfolds to the position shown in FIGURE 2 and provides a flat surface completely flush with the floor surface comprising structure 28 and the sill 30 of the door frame.

If desired, the opposite end of the door, that is the rightward end as shown in FIGURE 1, may have attached thereto cover means similar to cover means 34. These second means will assure that the recess left as the door is slid to closed position will not become a collecting place for dirt and foreign objects which could jam the door and prevent its opening. The structure of the second cover means may be similar to that shown in FIGURES 2 through 5.

It should also be understood that many other arrangements are possible for the automatic positioning of the cover means over the door recess 32. Such cover means can comprise a simple sliding plate attached to the end of the door which can move on trunnions or simply in the grooves on the side walls of the recess. However, the illustrated embodiment is preferred.

Further, it is clear that the invention may be applied to the door of a sub-atmospheric chamber, that is, a partial
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vacuum chamber. In such case the door would conveniently be on the outside of the chamber.

Therefore, the present invention may be embodied in other specific forms without departing from the spirit or central attributes thereof and, accordingly, reference should be made to the appended claims rather than the foregoing specification as indicating the scope of the invention.

1. A door frame having an opening, a floor structure extending up to the door frame, a door adapted to move laterally with respect to the opening to a second position to one side of the opening, the floor structure having a recess along the path of the door, the recess amply receiving the lower end of the door, and cover means for said recess adapted to cover the portion of the recess in front of the opening when the door is in the second position and to present a surface flush with the top of the floor structure, one end of the cover means being secured to the end of the door closest to the opening when the door is in the second position, said cover means comprising a plurality of pivotally connected links, the opposite ends of the plurality of links being respectively connected to the floor structure and the door, and spring means at some of the link points to bias adjacent links toward a given disposition.

2. The combination as described in claim 1 wherein the pivotally connected links are hinged together at link points.

3. The combination as described in claim 1 wherein some of the links are provided with laterally extending trunnions and tracks receiving the trunnions are provided in the opposite sidewalls of the recess.

4. The combination as described in claim 3 wherein the trunnions are provided with Teflon covered rollers.

5. A door sill comprising a structure having an elongated opening therein, the opening adapted to receive the lower end of a sliding door, a cover means for the opening comprising a series of pivoted-together links, one end of which is attached to the structure at one end thereof and the other end is adapted to be attached to the end of such door, track means provided on the opposite side walls of the opening, some links having laterally extending trunnions constrained for sliding movement in the oppositely disposed tracks, and means biasing some adjacent links toward a folded disposition.

6. A door sill as described in claim 5 wherein the links include at least one carriage to which the trunnions are attached.

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