March 2, 1937. A. L. GOETZMANN 2,072,300

SLIDING DOOR SEAL FOR REFRIGERATING APPARATUS

Filed Nov. 25, 1935 2 Sheets-Sheet 1

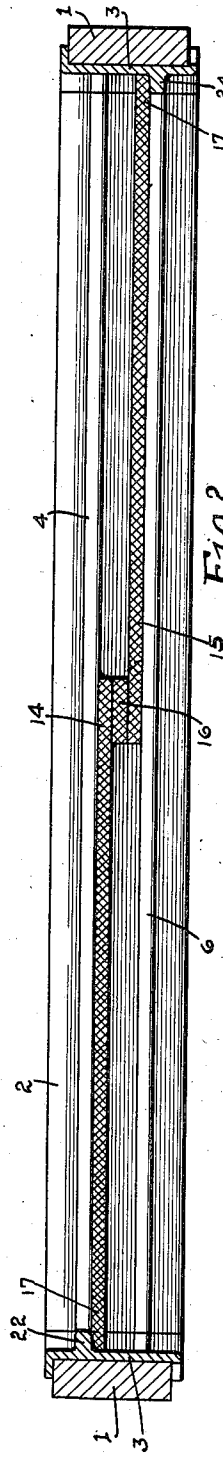


Fig. 2

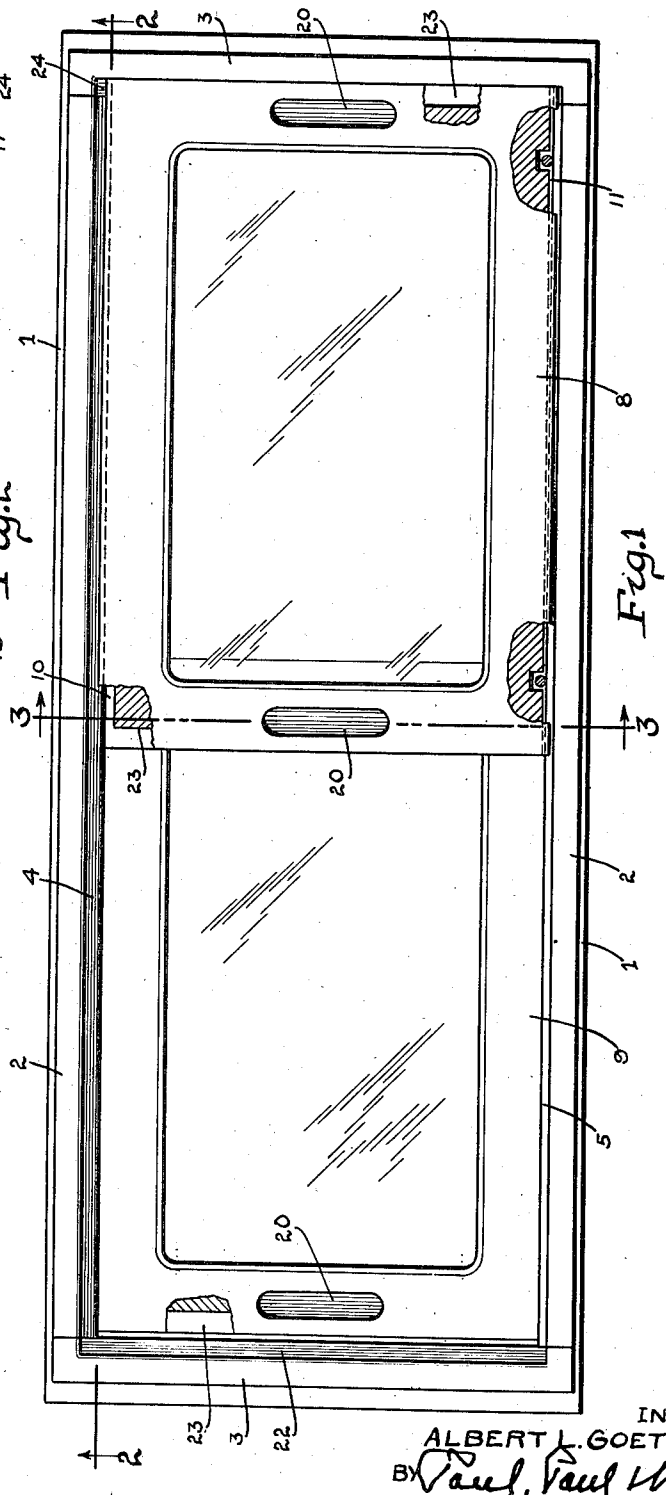


Fig. 1

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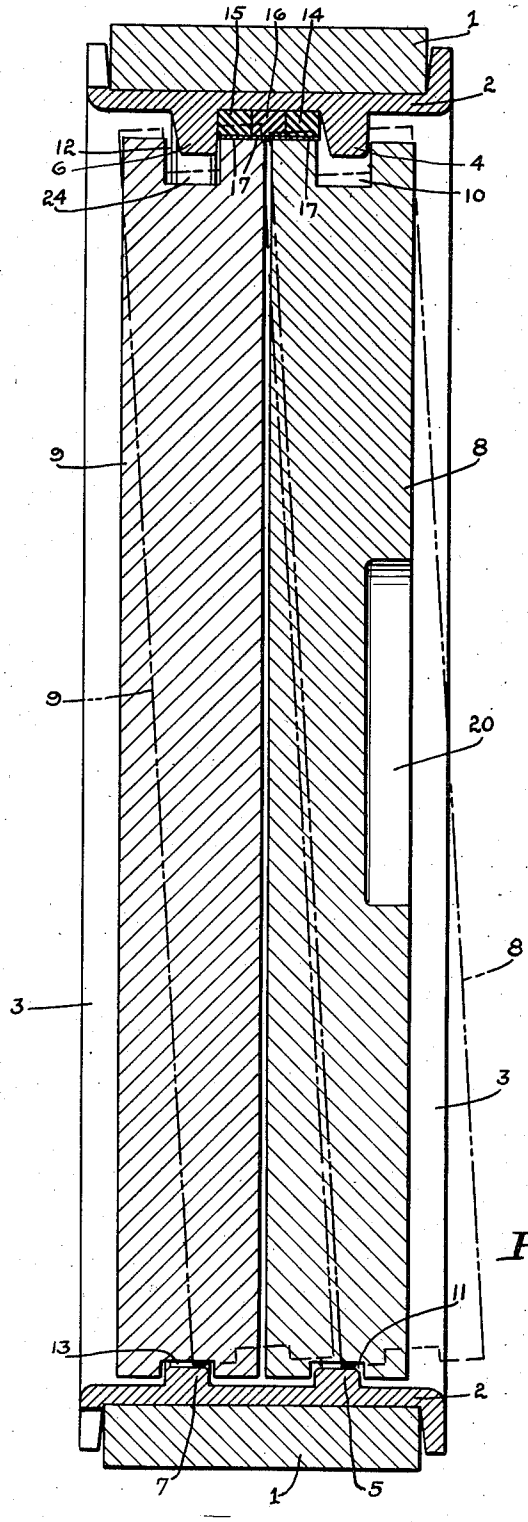


Fig.3

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Patented Mar. 2, 1937 2,072,300

UNITED STATES PATENT OFFICE

2,072,300

SLIDING DOOR SEAL FOR REFRIGERATING APPARATUS

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Application November 25, 1935, Serial No. 51,487

10 Claims. (Cl. 20—19)

This invention relates to improvements in means for sealing the sliding doors of refrigerating apparatus, particularly refrigerator show cases, and has for its principal object to provide for assembly and disassembly of the doors without the use of tools, and to provide means which will unfailingly maintain a sealed relation of the tops of the doors with their guides.

Features of the invention include: the use of resilient highly compressible material for the sealing purposes; the use and arrangement of such material to facilitate assembly and disassembly of the doors without the use of tools; specifically the use of sponge rubber; the use of sponge rubber with a permanent facing engageable with the door to facilitate sliding and maintaining a seal; and all details of construction shown, along with the broader ideas of means inherent in the disclosure.

Objects, features and advantages of the invention will be set forth in the description of the drawings forming a part of this application, and in said drawings

Figure 1 is a front view showing the doors positioned as immediately before or after assembly;

Figure 2 is a section on line 2—2 of Figure 1 with the doors removed showing the positions of the sealing strips; and

Figure 3 is a vertical section on line 3—3 of Figure 1, illustrating the mode of assembly.

Numeral 1 indicates a frame which is part of a refrigerator show case or other refrigerating structure in association with which this invention is applied. The refrigerator show case has not been shown, but it is to be understood that the frame 1 is properly connected with the other elements of the case and this frame may be considered to be the case. It will be further understood that the main advantage of the present invention is its ability to provide a seal at the top of the sliding doors of such a case, and, insofar as I am aware, no one has provided a good seal of a nature allowing easy and quick assembly or disassembly of the doors without the use of tools.

Numeral 2 indicates sections of a liner, the remaining sections of which are indicated by numeral 3. This sectional liner is composed of composition rubber and is easily assembled, by first placing the end or upright section 3 in place, and then placing upper and lower sections 2. The liner sections are secured by screws, not shown. The liner or frame provides on its upper and lower surfaces, guide ribs with which channels of the doors are associated. For the outer door, there are upper and lower guide ribs 4 and 5, and for the inner door there are upper and lower guide ribs 6 and 7. The roller-supported outer door 8 has at its top a groove 10 registered with the rib 4, as best shown in Figure 3, and the lower surface of the door has a groove 11 related to the guide rib 5, as shown. The roller-supported inner door 9 has at the top a guide groove 12 associated with the rib 6 and at the bottom a guide groove 13 associated with the rib 7.

The ribs 4 and 6 are so spaced as to form a channel therebetween, and in this channel are arranged three strips of resilient compressible material preferably sponge rubber. Whatever material is used, it should be highly compressible and resilient. The strips are secured by cement, not shown. The cement-receiving surface of each strip is suitably treated to prevent absorption of the cement by the sponge rubber. This structure has not been shown.

Each strip is faced with a fabric tape 17 which is vulcanized thereto, and the tape provides means allowing the doors to slide easily, while the rubber is under compression and acting with expansive force to maintain a seal. Figure 3 is a central section through the frame and therefore all the rubber strips are shown. Their relation is also shown clearly in Figure 2, and it will be noted that there is a short strip 16 arranged between the others and at the longitudinal middle of the groove. This strip is of a length about equal to the length of overlap of the doors when they are in normally closed position.

Referring to Figure 1: The doors are shown in the position that they assume either just before assembly or preparatory to disassembly. After assembly and when the device is in use and the doors are in their normal or closed positions, the door 8 is at the extreme left instead of at the right, and the door 9 is at the extreme right instead of at the left of the figure.

Assembly operation

In assembling, the inner door 9 is placed at the left end of the frame or case 1, as in Figure 1, and its upper groove 12 is then engaged over the inner upper rib 6, as shown in dot-and-dash lines in Figure 3. The door is then forced upwardly to compress the rubber elements 15 and 16, sufficiently to permit the lower end of the door to be swung inwardly and to clear both lower guide ribs 5 and 7, and bring the bottom groove 13 in opposition to inner bottom rib 7, after which the door is released to assume the operative relation shown in the figure, the rubber elements 15 and

16 expanding, but remaining under compression to maintain yieldable friction contact with the outer portion of the upper surface of the door 9, as shown in full lines in Figure 3.

The outer door 8 is assembled in the same manner at the right side of the frame. Its upper groove 10 is caused to assume that relation with upper rib 4 and with the compressible elements 14 and 16, as shown in dot-and-dash lines of Figure 3, whereafter it is swung inwardly to the full line position of this figure to cause the groove 11 to register with the rib 5 after which it is released to assume the operative relation shown. In this case, it is only necessary that the bottom of the outer door 8 clear the front bottom rib 5 to arrive at the proper position. The rubber expands as in the first case, but remains under compression to maintain yielding frictional contact with the upper surface of the upper rail of the outer door 8. The outer or front door is now slid from its right-hand position of Figure 1 to an extreme left-hand position, and the inner or rear door 9 is slid from its left-hand position to an extreme right-hand position. In these normal closed positions of the doors, the strip 14 is pressing against the top of door 8 through its length and the strip 15 is similarly pressing against the door 9. The short strip 16 is pressing against the inner portions of both doors. The doors, as shown in Figure 1, may be considered to be positioned either as immediately after assembly and before being slid from one substantially extreme position to the opposite extreme or normal closed position, or as just before disassembly and after having been slid from their normal extreme position to substantially the opposite limits.

It is noted that when the doors are in the assembly or disassembly positions, shown in Figure 1, only a small portion of the end of each door is engaged with two of the strips, and, therefore, compression of the strips, as a preliminary to assembly or disassembly, is facilitated. After assembly and when the door is slid to its normal sealing position, the strip 14, for example, engages along the entire upper surface of the outer door 8, and the strip 15 engages in the same way with the upper surface of the inner door 9.

Each door is made interchangeable and each is provided in each vertical end face with a groove 23, see Figure 1, which may engage with a corresponding vertical rib 22, see Figure 2, when the doors are closed, and the door 9 is provided with a similar groove, not shown, which may engage with the vertical rib 24, see Figure 2. In this instance, the rib 22 is at the left side of the frame and the rib 24 is at the right. Of course, there is no intention to limit the invention by these statements.

Each door has in the outer face of each vertical end portion, a finger-receiving depression 20, by which the door is operated.

I claim as my invention:

1. A sliding door structure for refrigerating apparatus including, a door, a frame having means for guiding the door, and resilient highly compressible material interposed and compressed between the frame and door and serving as sealing means, said door-guiding means, frame and compressible material being so related that said door can be moved to further compress said resilient material sufficiently to allow the door to be released from its guiding means and swung free of said guiding means and frame while the resilient material is under compression, while said guiding means remains immovable in the original guiding position.

2. A sliding door structure for refrigerating apparatus including, a sliding door, a frame having upper and lower means for guiding the door, a strip of resilient highly compressible material interposed and compressed between the frame and upper surface of the door and serving as sealing means, said door-guiding means, frame and compressible material being so related that the door can be moved to further compress said resilient material sufficiently to allow the door to be released from its guiding means, and allow its lower end to be swung free of said guiding means and frame while the resilient material is under compression, while said guiding means remains immovable in the original guiding position.

3. A sliding door structure for refrigerating apparatus including, a pair of sliding doors overlappingly arranged, a frame having upper and lower means for guiding the doors, and strips of resilient highly compressible material interposed and compressed between the frame and upper surfaces of the doors and contacting those surfaces and serving as sealing means, said door-guiding means, frame and compressible material being so related that after the doors are moved from their normal closed position to their extreme opposite limits the said doors can be raised to further compress said resilent material sufficiently to allow each door to be released from its lower guiding means, and allow its lower end to be swung free of the lower guiding means and of said frame while the resilient material is under compression, while said guiding means remains immovable in the original guiding position.

4. A sliding door structure for refrigerating apparatus including, a pair of sliding doors overlappingly arranged, a frame having upper and lower means for guiding the doors, strips of resilient highly compressible material interposed and compressed between the upper surface of each door and the frame, one strip being provided for each door and said strips respectively extending from opposite ends of the frame to a point not far beyond the middle of the frame and a third short strip disposed at the middle of the frame between the other strips, the door-guiding means and compressible material being so related that said resilient material can be further compressed to allow sufficient raising of each door to release it from its lower guiding means to permit its lower end to be swung free of the lower guiding means and frame, while the resilient elements are under compression.

5. A sliding door structure for refrigerating apparatus including, a pair of sliding doors overlappingly arranged, a frame having upper and lower means for guiding the doors, strips of resilent highly compressible material interposed and compressed between the upper surface of each door and the frame, one strip being provided for each door and said strips respectively extending from opposite ends of the frame to a point not far beyond the middle of the frame and a third short strip disposed at the middle of the frame between the other strips and of a length substantially corresponding to the length of overlap of the doors when in closed position, the doors, guiding means and compressible material being so related that said resilient material can be further compressed to allow sufficient raising of each door to release it from its lower guiding means to permit its lower end to be swung free

of the lower guiding means and frame, while the resilient elements are under compression.

6. A sliding door structure for a refrigerating apparatus including a sliding door and plural guiding means therefor and compressible resilient means with which one side of the door slidably engages and which is normally compressed by the door, the guiding means and the compressible means being so arranged and proportioned that the opposite guided side of the door can be detached from the guiding means when the door is moved to additionally compress said compressible means, while said guiding means remains immovable in the original guiding position.

7. A sliding door structure for a refrigerating apparatus including two overlapped sliding doors and plural guiding means for each door, and compressible resilient means for each door with which the top of the door slidably engages and which is normally compressed by the door, the guiding means and compressible means being so arranged and proportioned that the lower part of the door can be detached from one guiding means when the door is moved to additionally compress said compressible means while said guiding means remains immovable in the original guiding position.

8. A sliding door structure for a refrigerating apparatus including a pair of overlapped, sliding doors and opposed guiding means for each door, resilient compressible material for each door associated with one of its guiding means and against which the door slides, and which is normally under compression by the door, said door-guiding means and said compressible material being so releated that the door can further compress the resilient material sufficiently to allow the door to be released from the other guiding means and swung free thereof while the resilient material is under compression so that the door can then be entirely removed, while said guiding means remains immovable in the original guiding position.

9. A sliding door structure for a refrigerating apparatus including, a pair of overlapped sliding doors and permanently stationary upper and lower guiding means for each door, resilient compressible material for each door against which the door slides and which is normally under compression by the door, to hold the door against one of its guiding means, said permanent door-guiding means and said compressible material being so related that the door can further compress the resilient material sufficiently to allow the door to be released from the other permanent guiding means and swung free thereof while the resilient material is under compression, so that the door can then be entirely removed, while said guiding means remains immovable in the original guiding position.

10. A sliding closure structure including two overlapped sliding elements and upper and lower guides for each element, each guide including a groove, and compressible resilient means arranged in each upper groove and with which the slidable element engages and which is normally compressed by the element, the guides, said compressible means and said element being so arranged and proportioned that the element can be raised to additionally compress said compressible means and permit its lower part to be swung free from the guide, while said guides remain immovable in the original guiding position.

ALBERT L. GOETZMANN.