

July 23, 1963

C. R. MYERS ET AL

3,098,519

ACOUSTICALLY SEALED TRACK SYSTEM FOR MOVABLE PARTITIONS

Filed Nov. 7, 1960

3 Sheets-Sheet 1

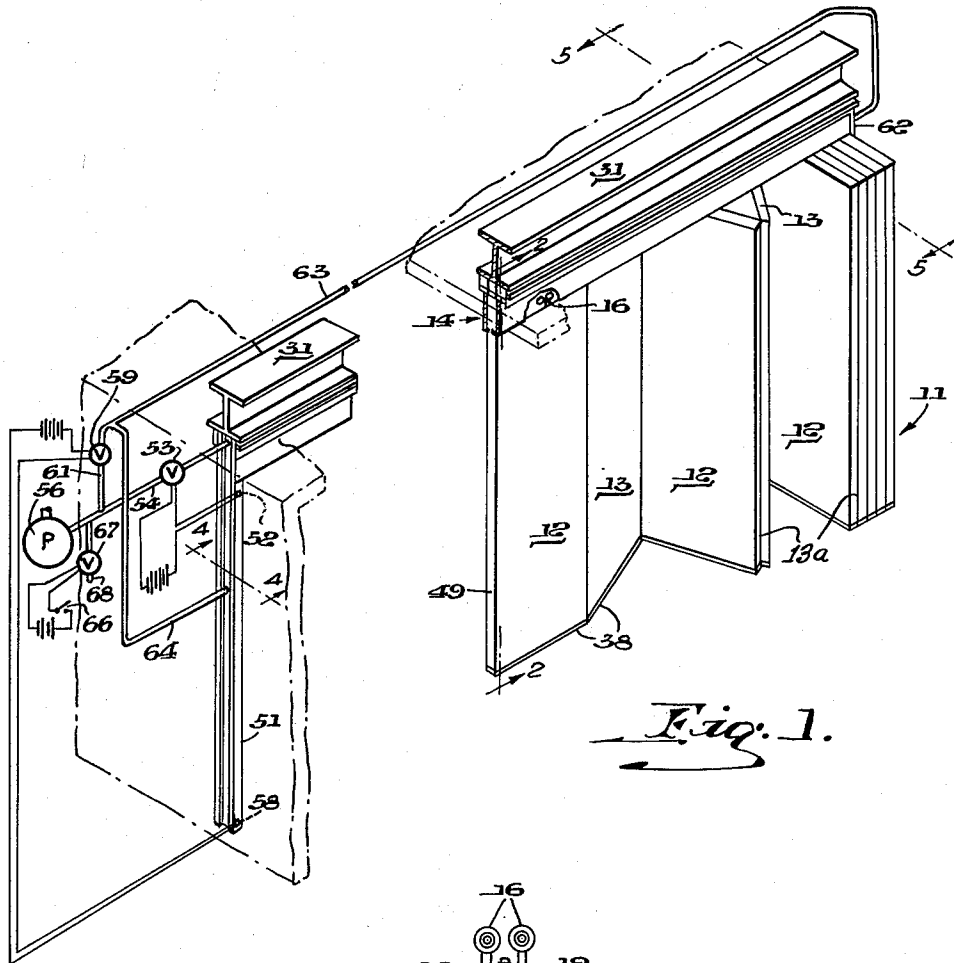


Fig. 1.

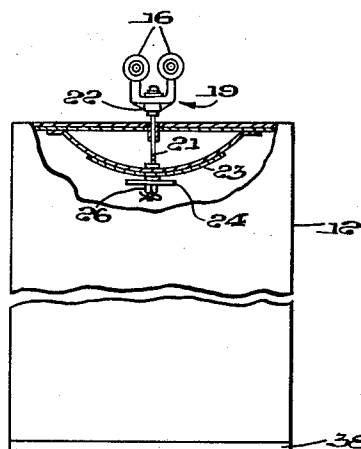


Fig. 3.

INVENTORS:
CHARLES R. MYERS,
FRANK K. HEDLER.

BY
Leo J. MacLassi.
their
ATTORNEY.

July 23, 1963

C. R. MYERS ET AL

3,098,519

ACOUSTICALLY SEALED TRACK SYSTEM FOR MOVABLE PARTITIONS

Filed Nov. 7, 1960

3 Sheets-Sheet 2

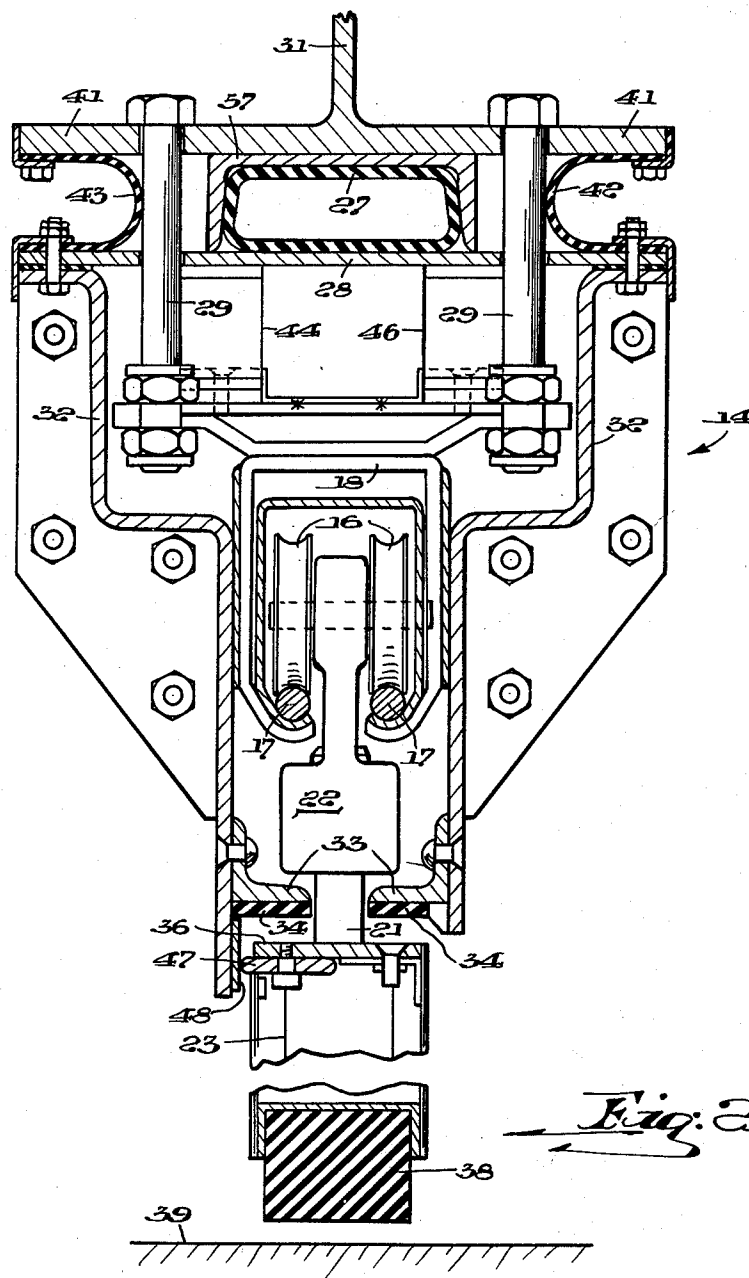


Fig. 2.

INVENTORS.
CHARLES R. MYERS,
FRANK K. HEDLER.
BY
Leo J. MacLennan,
their ATTORNEY.

July 23, 1963

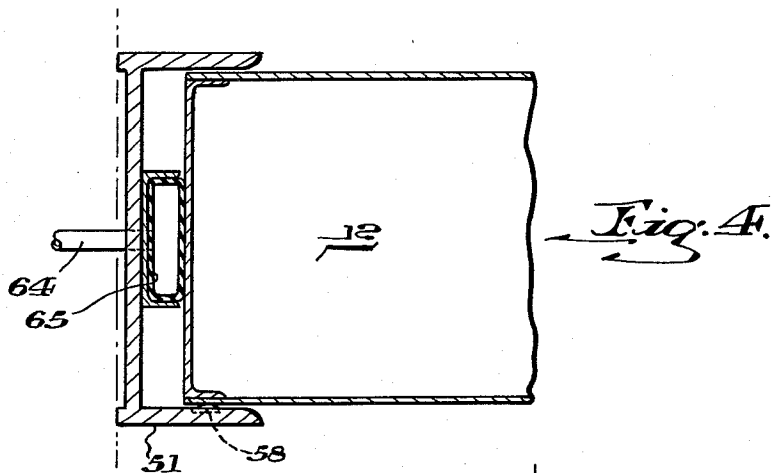
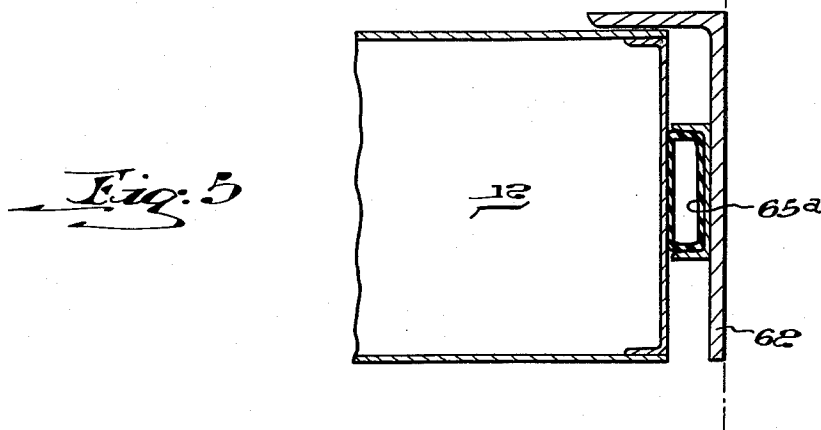
C. R. MYERS ET AL

3,098,519

ACOUSTICALLY SEALED TRACK SYSTEM FOR MOVABLE PARTITIONS

Filed Nov. 7, 1960

3 Sheets-Sheet 3



INVENTORS.
CHARLES R. MYERS,
FRANK K. HEDLER.

BY

Leo J. MacLassi.
their
ATTORNEY.

1

3,098,519

ACOUSTICALLY SEALED TRACK SYSTEM FOR MOVABLE PARTITIONS

Charles R. Myers, Glenarm, and Frank K. Hedler, Baltimore, Md., assignors to Koppers Company, Inc., a corporation of Delaware

Filed Nov. 7, 1960, Ser. No. 67,595

10 Claims. (Cl. 160—40)

The present invention relates to movable or retractable partitions and more particularly to means for providing an effective acoustical seal around the perimeter of a movable partition in extended position.

It is commonly known that to achieve flexibility in the use of the space within modern buildings such as auditoriums, dining rooms, school rooms etc. a very useful architectural product is the movable partition. By having available a partition of the type often referred to as being a retractable or folding partition, the most efficient use of available space may be realized by having the ever present capacity to bring forth or remove a visual and physical barrier at will.

Unfortunately, in those situations in which it is desirable to effectively reduce sound transmission between areas separated temporarily by the interposition of a movable partition one of the critical problems confronting designers has been that of securing adequate acoustical sealing between the extended partition and adjacent surfaces. Although a partition may be composed of individual panels having a moderate or even a high degree of sound transmission loss, such performance is readily compromised in the event of poor sealing between the outer edges of the partition and adjacent room surfaces forming a frame about such extended partition.

Consequently, it is an object of the present invention to provide means for sealing between the perimeter of a folding partition in its extended position and the framing surfaces adjacent thereto to provide a degree of sound transmission loss commensurate with the efficiency of the sound proof panels themselves.

Another object of the present invention is the provision of means for suspending, conveying and maintaining alignment of the plurality of hinged panels comprising a movable partition.

A further object of the present invention is the provision of a sealing mechanism for folding partitions including means for applying pneumatic or hydraulic pressure whereby sealing can be simultaneously achieved along both the top and the bottom of a movable partition in its extended position.

Still a further object of the present invention is the provision of means for insuring the straight-line alignment of the plurality of panels comprising a movable partition moving into or out of the extended position.

The present invention is directed to an overhead track system including means for suspending a plurality of hinge-connected panels comprising a movable partition, means for conveying these panels into retracted or into extended position, means for maintaining these hinge-connected panels in straight-line alignment during carriage into or from the extended position and unique means for employing pneumatic or hydraulic pressure to the tops of the panels when in the extended position so as to effect simultaneous acoustical sealing of both the top and the bottom of the extended folding partition. To complete the seal about the perimeter of the extended folding partition the system includes the application of pneumatic or hydraulic pressure within vertical wall seals (one at each end of the extended partition) to completely seal the exposed vertical edges of the first and last panels to the adjacent wall surfaces.

Other objects and advantages of the invention will

2

hereinafter become more fully apparent from the following description of the annexed drawings, which illustrate the preferred embodiment, and wherein:

FIG. 1 is a isometric view of a typical folding partition shown in partially extended position and employing a preferred embodiment of the present invention,

FIG. 2 is a sectional view taken on line 2—2 of FIG. 1 showing the details of the sealing mechanism,

FIG. 3 is an elevational view of an individual panel with a portion of the panel broken away to show the system for suspending the panel from the overhead track system,

FIG. 4 is a sectional view taken on line 4—4 of FIG. 1 with the folding partition in extended position prior to sealing against the lead panel and

FIG. 5 is a sectional view taken on line 5—5 of FIG. 1 with the folding partition in extended position prior to sealing against the last panel.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1 a folding partition 11 comprising a plurality of hinge-connected panels 12 and 13 employing continuous hinges 13a often referred to as "piano" hinges. These panels are preferably of a design having a high sound transmission loss. Panels 12 differ from adjoining panels 13 in that panels 12 depend directly from the overhead track system 14 while panels 13 are joined to panels 12 by means of hinges (not shown) and are supported thereby.

The suspension means for panels 12 is shown in greater detail in FIGS. 2 and 3 wherein it is seen that carriage means such as rollers 16 riding on rails 17 of track 18 support alternate panels (panels 12) of folding partition 11 since they are arranged in four wheel trucks such as truck 19 (FIG. 3). From each truck 19 there depends a truck pin or shaft 21 seated in a swivel 22 at its upper end and attached to leaf springs 23 at its lower end thereby carrying the weight of the attached panel 12. As indicated above, panels 13 are supported by panels 12 through hinge connections (not shown) and in this manner it can be seen that the entire folding partition 11 is supported by the suspension system described. The height of panels 12 and 13 above the floor can be adjusted by changing the position of adjusting plate 24 and nut 26 on truck pin 21.

Overhead track system 14 in addition to providing for the suspension and carriage of folding partition 11 also provides means for acoustically sealing folding partition 11. To effectuate this sealing operation the system is provided with a flexible pneumatic tube 27 shown in the unexpanded position in FIG. 2, which tube 27 when caused to expand acts to force pressure plate 28 downwardly slipping along mounting bolts 29 which are provided to transmit the load of folding partition 11 to an overhead support such as structural steel I beam 31 without changing the position of rails 17 and track 18. The downward movement of pressure plate 28 is transmitted to closure walls 32 and from thence to pressure angles 33.

Pressure angles 33 are fitted on the underside thereof with rubber strip gaskets 34 which are generally affixed thereto by means of an adhesive and when pressure angles 33 have been moved down sufficiently, rubber strip gaskets 34 engage panel tops 36 of all panels 12, 13 along the length of the extended folding partition 11. Continued downward movement of this upper sealing means or closure assembly comprising pressure plate 28, closure walls 32, pressure angles 33 and gaskets 34 forces panels 12, 13 down against the upward force of panel springs 23 in panels 12 until lower sealing means, foot gasket 38 of rubber or similar resilient material, has been compressed to the desired degree against floor 39. Once this has been accomplished folding partition 11 has been sealed both

top and bottom since as pneumatic tube 27 expands and the distance between flange 41 of I beam 31 and pressure plate 28 increases the integrity of the acoustical seal is maintained both by expanded tube 27 and by flexible seals 42, 43. Since the objective is to prevent the passage of sound over the top of partition 11 in the space between the partition 11 and structural support 31, flexible seals 42, 43 are considered part of the upper sealing means or closure assembly. In the closed, sealed position of partition 11 the passage of air thereover is prevented together with the sound which would be transmitted therewith.

When the downward force exerted by expanded pneumatic tube 27 has been removed preparatory to retracting folding partition 11, leaf closure assembly springs 44, 46 lift the closure assembly clear of panel tops 36 to the position shown in FIG. 2 to prevent any interference between the closure assembly and the panel tops 36 during carriage of panels 12 and 13. Also, in the absence of force from above, panels 12 (and thereby panels 13) are lifted clear of floor 39 by means of panel leaf springs 23.

In order to assure the straight alignment of panels 12 and 13 when folding partition 11 is conveyed into and from the extended position, panel-aligning guide rollers 47 are supplied. During the extension of folding partition 11 as panels 12 and 13 unfold and proceed along track 18, these rollers 47 engage inner surface 48 mounted on a downward projection of closure wall 32. Rollers 47 together with truck 19 astride rails 17 complete the geometry required to properly position the panels and assure partition alignment. Inner surface 48 with the accompanying downward projection does not extend the full length of overhead track system 14 but stops about eight feet from the stacking position to allow panels 12 and 13 to pivot to permit orientation to the stacking position. Although the drawings disclose the location of only one panel alignment guide roller 47, the particular arrangement employed is a matter of choice, as for example, two guide rollers 47 may be employed for every panel, one being located in the upper corner of each panel or the guide rollers 47 may be arranged with two sets of rollers for panels 12 and none for panels 13 relying on the hinge-connections between panels 12 and 13 to suitably align panels 13.

In operation, folding partition 11 is extended from the stacked position by pulling the lead panel 12 along the track-defined span line. Extension may be accomplished either by manual or power-driven means (not shown) and full extension of folding partition 11 occurs when leading edge 49 contacts vertical seal assembly 51 which is affixed to the opposite wall. At this time leading edge 49 engages and closes limit switch 52 located in vertical seal assembly 51 thereby actuating to open position the solenoid-operated air valve 53 in compressed air supply line 54, a conduit which connects pump 56 with flexible pneumatic tube 27 admitting compressed air thereto causing tube 27 to expand. Since pneumatic tube 27 is housed in channel 57, any expansion of pneumatic tube 27 is limited to movement in the downward direction whereby a downward force is exerted on folding partition 11 sufficient to compress foot gasket 38 into sealing position against floor 39.

At the same time that the sealing of foot gasket 38 against floor 39 is effected an acoustic seal along the full span of the top of extended partition 11 is also completed as explained above, thereby eliminating sound leakage between panel tops 36 and the supporting structural steel 31 overhead.

Final sealing action occurs as downward panel movement is completed, at which time limit switch 58 is closed by the downward movement of folding partition 11 thereby actuating solenoid-operated air valve 59 in air line 61 to open position to admit air under pressure from pump 56 to pneumatic vertical seal assemblies 51 and 62 through air lines 63 and 64. Thus, by pneumatic action the gaps between the leading and trailing butt edges of folding partition 11 at the far ends thereof and the walls adjacent thereto will be sealed by the expansion of pneumatic tubes 65, 65a similar to pneumatic tube 27.

To reverse the process outlined above the first step, prior to retracting folding partition 11, is to vent the compressed air from the sealing system by closing manual switch 66 thereby actuating solenoid-operated valve 67 in vent line 68 to open position. Relaxation of the downward force previously exerted by pneumatic tube 27 enables panel springs 23 to lift panels 12 (and thereby panels 13) clear of the floor. In order to completely free folding partition 11 for the retraction thereof the system is provided in addition with springs 44, 46 which lift the closure assembly (comprising pressure plate 28, closure walls 32, pressure angles 33 and gaskets 34) clear of panel tops 36. As soon as folding partition 11 has been moved away from limit switches 58, 52 in that order the solenoid-operated air valves 59, 53 are closed and once folding partition 11 is prepared for retraction, the manual switch 66 should once again be opened thereby closing solenoid-operated air valve 67 in vent 68.

It may be seen from the above discussion that the present invention offers means for simple, positive and substantially simultaneous acoustical sealing about the perimeter of an extended folding partition and also provides for promptly disengaging the acoustical sealing mechanism to facilitate unencumbered retraction of the folding partition when necessary.

It is to be noted that by solving these problems in the particular unique manner employed rails 17 and track 18 are still permitted to remain rigidly fixed in position depending from I beam 31. Since rails 17 and track 18 support the entire folding partition 11, the maintenance of this rigid, fixed relationship is vital for the elimination of panel drag during the retraction of folding partition 11 and for the prevention of track sway during the extension of folding partition 11.

It should be understood, of course that the foregoing disclosure relates to only a preferred embodiment of the invention and that numerous modifications or alternations may be made therein without departing from the spirit and the scope of the invention as set forth in the appended claims.

What is claimed is:

1. Apparatus for acoustically sealing a movable partition comprising in combination a plurality of hinge-connected soundproof panels, an overhead support, substantially horizontal elongated track means depending from said overhead support in fixed position relative thereto, carriage means mounted on said track means, suspension means connecting said carriage means with the alternate panels of said plurality of panels whereby said alternate panels depend from said carriage means, the balance of said plurality of panels being supported by said alternate panels by means of hinge connections thereto, said suspension means including biasing means arranged within said alternate panels to urge said plurality of panels upwardly, said carriage means together with said plurality of panels being movable along said track, a strip of resilient material attached to the length of the under-edge of each panel of said plurality of panels, upper sealing means connected to said overhead support and substantially enclosing said track means throughout the length thereof being movable vertically relative thereto and means located between said upper sealing means and said overhead support for automatically applying positive downward-acting force to said upper sealing means along the length thereof for urging said upper sealing means into sealing engagement with the tops of said plurality of panels and moving said plurality of panels downward to force said strips of material into sealing engagement with the surface below said plurality of panels whereby sound is prevented from flanking said plurality of panels both at the bottom and at the top thereof.

2. Apparatus for acoustically sealing a movable partition comprising in combination a plurality of hinge-connected soundproof panels, an overhead support, substantially horizontal elongated track means depending from

5

said overhead support in fixed position relative thereto, carriage means mounted on said track means, suspension means connecting said carriage means with the alternate panels of said plurality of panels whereby said alternate panels depend from said carriage means, the balance of said plurality of panels being supported by said alternate panels by means of hinge connections thereto, said carriage means together with said depending plurality of panels being movable along said track, lower sealing means attached to the length of the under-edge of each panel of said plurality of panels, upper sealing means connected to said overhead support and substantially enclosing said track means throughout the length thereof being movable vertically relative thereto and means located between said upper sealing means and said overhead support for applying a downward-acting force to said upper sealing means along the length thereof, said upper sealing means being moved downward against the tops of said plurality of panels sealing the space between said overhead support and said tops of said plurality of panels and in addition moving said plurality of panels downward to place said lower sealing means in sealing engagement with the surface below said plurality of panels whereby sound is prevented from flanking said plurality of panels both at the bottom and at the top thereof.

3. Apparatus for acoustically sealing a movable partition comprising in combination a plurality of hinge-connected soundproof panels, an overhead support, substantially horizontal elongated track means depending from said overhead support in fixed position relative thereto, carriage means mounted on said track means, suspension means connecting said carriage means and said plurality of panels whereby said plurality of panels depend from said carriage means, said carriage means together with said plurality of panels being movable along said track means, lower sealing means co-extensive with the under-edge of each panel of said plurality of panels, upper sealing means connected to said overhead support and substantially enclosing said track means throughout the length thereof being movable vertically relative thereto and means located between said upper sealing means and said overhead support for applying a downward-acting force to said upper sealing means urging said upper sealing means downward against the tops of said plurality of panels sealing the space between said overhead support and said tops of said plurality of panels and in addition moving said plurality of panels downward to place said lower sealing means in sealing engagement with the surface below said plurality of panels whereby sound is prevented from flanking said plurality of panels both at the bottom and at the top thereof.

4. Apparatus for acoustically sealing a movable partition comprising in combination a plurality of hinge-connected soundproof panels, an overhead support, substantially horizontal elongated track means depending from said overhead support in fixed position relative thereto, carriage means mounted on said track means, suspension means connecting said carriage means and said plurality of panels whereby said plurality of panels depend from said carriage means, said carriage means together with said plurality of panels being movable along said track means, lower sealing means co-extensive with the under-edge of each panel of said plurality of panels, upper sealing means flexibly connected to said overhead support and resiliently mounted above said track means throughout the length thereof being movable vertically relative thereto and means located between said upper sealing means and said overhead support for applying a downward-acting force to said upper sealing means moving said upper sealing means downward against the tops of said plurality of panels to seal the space between said overhead support and said tops of said plurality of panels and in addition moving said plurality of panels downward to place said lower sealing means in sealing engagement with the surface below said plurality of panels

6

whereby sound is prevented from flanking said plurality of panels both at the bottom and at the top thereof.

5. Apparatus for acoustically sealing a movable partition comprising in combination a plurality of hinge-connected soundproof panels, an overhead support, substantially horizontal elongated track means depending from said overhead support in fixed position relative thereto, carriage means mounted on said track means, suspension means connecting said carriage means with the alternate panels of said plurality of panels whereby said alternate panels depend from said carriage means, the balance of said plurality of panels being supported by said alternate panels by means of hinge connections thereto, said suspension means including biasing means disposed within said panels to urge said panels upwardly, said carriage means together with said plurality of panels being movable along said track, a strip of resilient material attached to the length of the under-edge of each panel of said plurality of panels, upper sealing means connected to said overhead support and substantially enclosing said track means throughout the length thereof being movable vertically relative thereto, alignment means mounted on said plurality of panels for co-acting with said upper sealing means to retain said plurality of panels in straight-line alignment when said movable partition is in extended position and means located between said upper sealing means and said overhead support for automatically applying positive downward-acting force to said upper sealing means along the length thereof, said upper sealing means being moved downward against the upward force of said biasing means into sealing engagement with the tops of said plurality of panels sealing the space between said overhead support and said tops of said plurality of panels and in addition moving said plurality of panels downward to force said strip of material into sealing engagement with the surface below said plurality of panels whereby sound is prevented from flanking said plurality of panels both at the bottom and at the top thereof.

6. Apparatus for acoustically sealing a movable partition substantially as described in claim 5 wherein the track means comprises dual rails.

7. Apparatus for acoustically sealing a movable partition substantially as described in claim 5 wherein the carriage means comprises a four-wheel truck and the suspension means and biasing means are interconnected comprising a vertical shaft swived-mounted in said truck at its upper end and attached to leaf springs at its lower end, said leaf springs being convex downwardly and being affixed at their ends to the top of the alternate panels.

8. Apparatus for acoustically sealing a movable partition substantially as described in claim 5 wherein the means for applying positive downward-acting force to the upper sealing means comprise a source of fluid under pressure, expandable tubing extending substantially the length of said upper sealing means and a conduit connecting said source of fluid under pressure with the interior of said expandable tubing.

9. A track system for acoustically sealing a movable partition in extended position comprising in combination an overhead support, elongated track means depending from and rigidly affixed to said overhead support, said track means extending the length of said movable partition being located above and substantially parallel to the top thereof, carriage means mounted on said track means for reciprocal movement therealong, suspension means connecting said top of said movable partition with said carriage means whereby said movable partition depends from said track means, said suspension means including first biasing means to urge said movable partition upward with the underside thereof clear of the surface adjacent thereto, a closure assembly connected to said overhead support and enclosing said track means throughout the length thereof being movable vertically relative thereto, and means interposed between said closure assembly and said overhead support for moving said closure assembly

7

downward against said top of said movable partition until the space between said overhead support and said top of said movable partition is sealed and the bottom of said movable partition is pressed into sealing engagement with the surface adjacent thereto.

10. A track system for acoustically sealing a movable partition in extended position comprising in combination an overhead support, elongated track means depending from and rigidly affixed to said overhead support, said track means extending the length of said movable partition being located above and substantially parallel to the top thereof, carriage means mounted on said track means for reciprocal movement thereon, suspension means connecting said top of said movable partition with said carriage means whereby said movable partition depends from said track means, said suspension means including first biasing means to urge said movable partition upward with the underside thereof clear of the surface adjacent thereto, a closure assembly connected to said overhead support and enclosing said track means throughout the length thereof being movable vertically relative thereto, second biasing means located within said closure assembly to

8

urge said closure assembly away from said top of said movable partition and means interposed between said closure assembly and said overhead support for moving said closure assembly downward against said top of said movable partition against the upward force of said second biasing means and moving said upper sealing means and movable partition both downward against the upward force of said first biasing means until the bottom of said movable partition is pressed into sealing engagement with the surface adjacent thereto.

References Cited in the file of this patent

UNITED STATES PATENTS

2,469,131	Ross	May 3, 1949
2,694,840	Smith	Nov. 23, 1954
2,728,119	Norwood	Dec. 27, 1955
2,827,957	Haws	Mar. 25, 1958
2,829,244	Feig et al.	Apr. 1, 1958
2,913,783	Bright	Nov. 24, 1959
2,945,535	Haws	July 19, 1960
2,987,121	Haws	June 6, 1961