

April 12, 1938.

J. F. WINN, JR

2,114,198

AUTOMATIC DOOR ELEVATING CONTROL

Filed Feb. 5, 1935

3 Sheets-Sheet 1

Fig. 1.

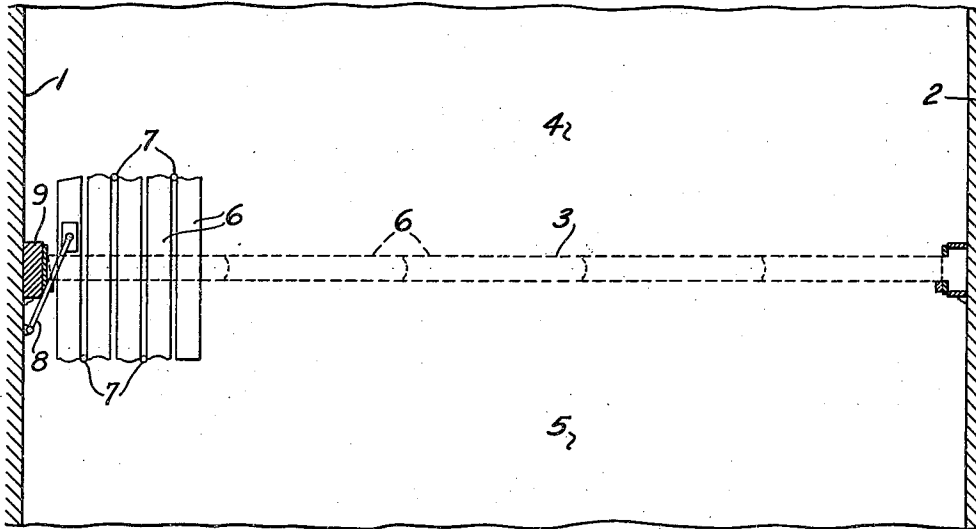
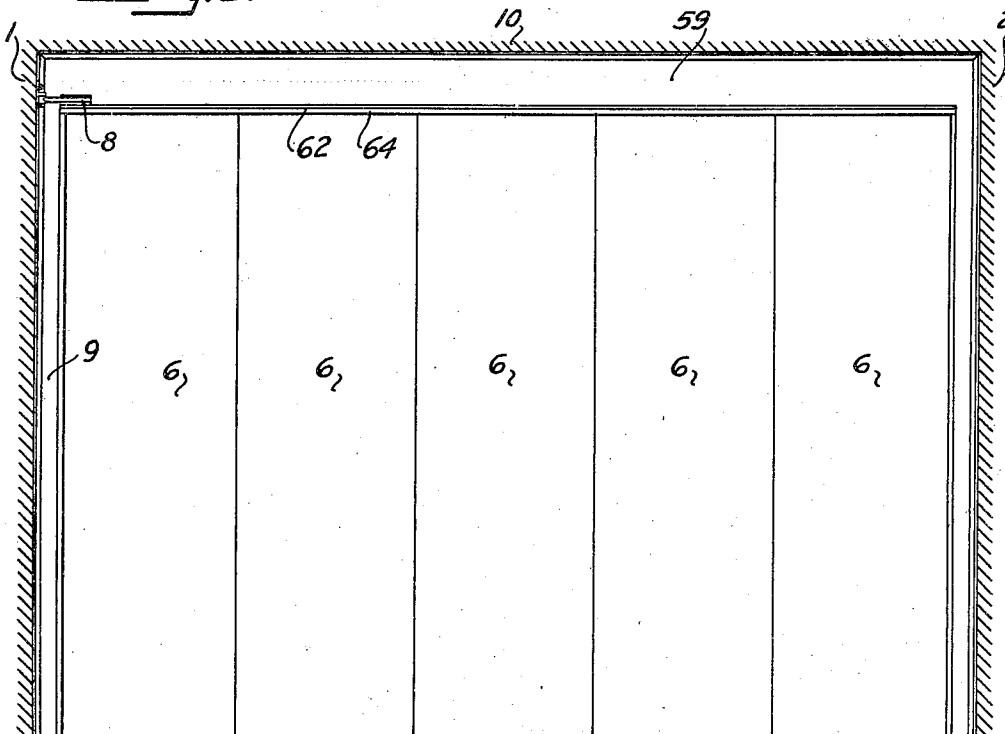


Fig. 2.



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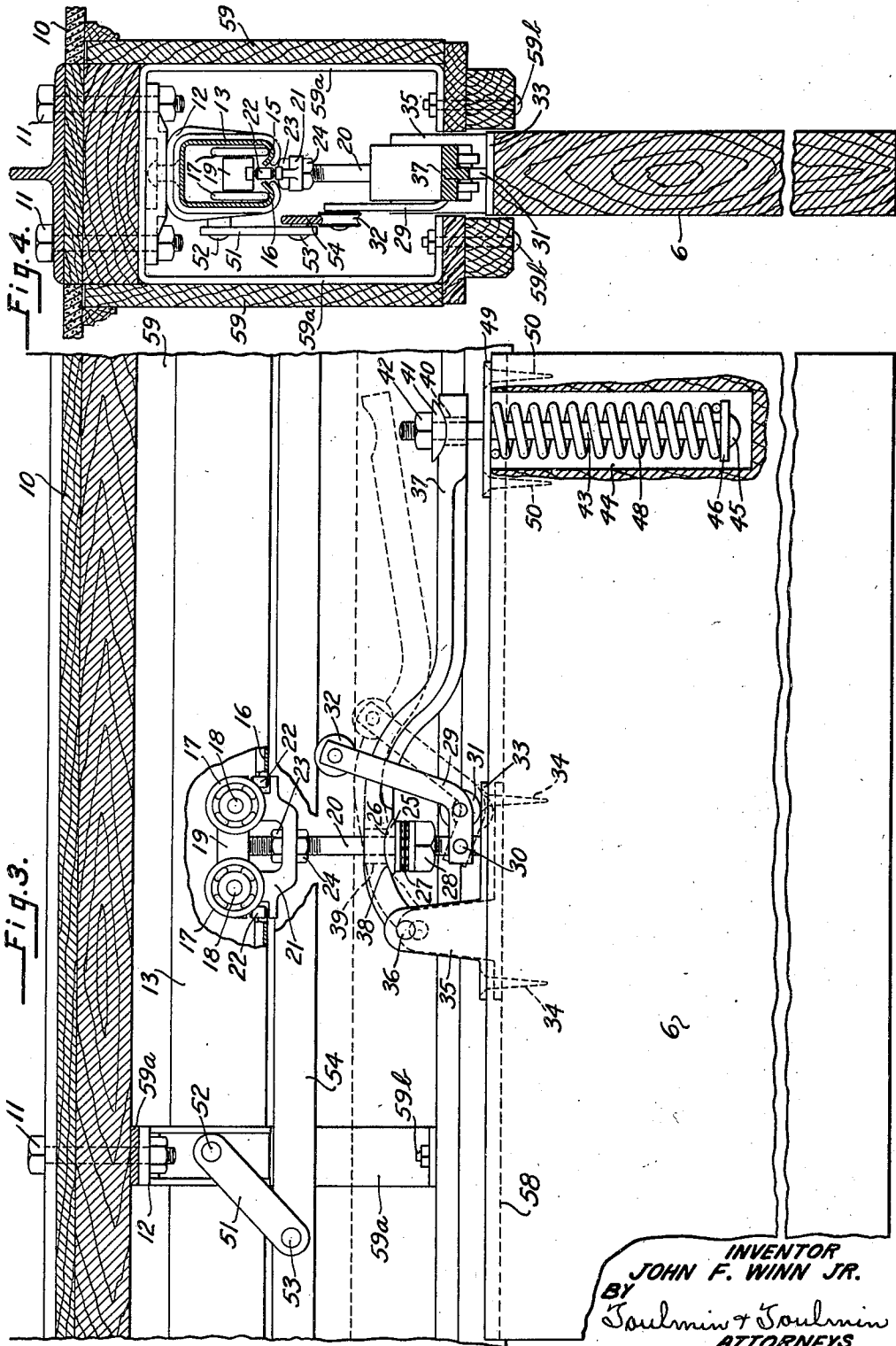
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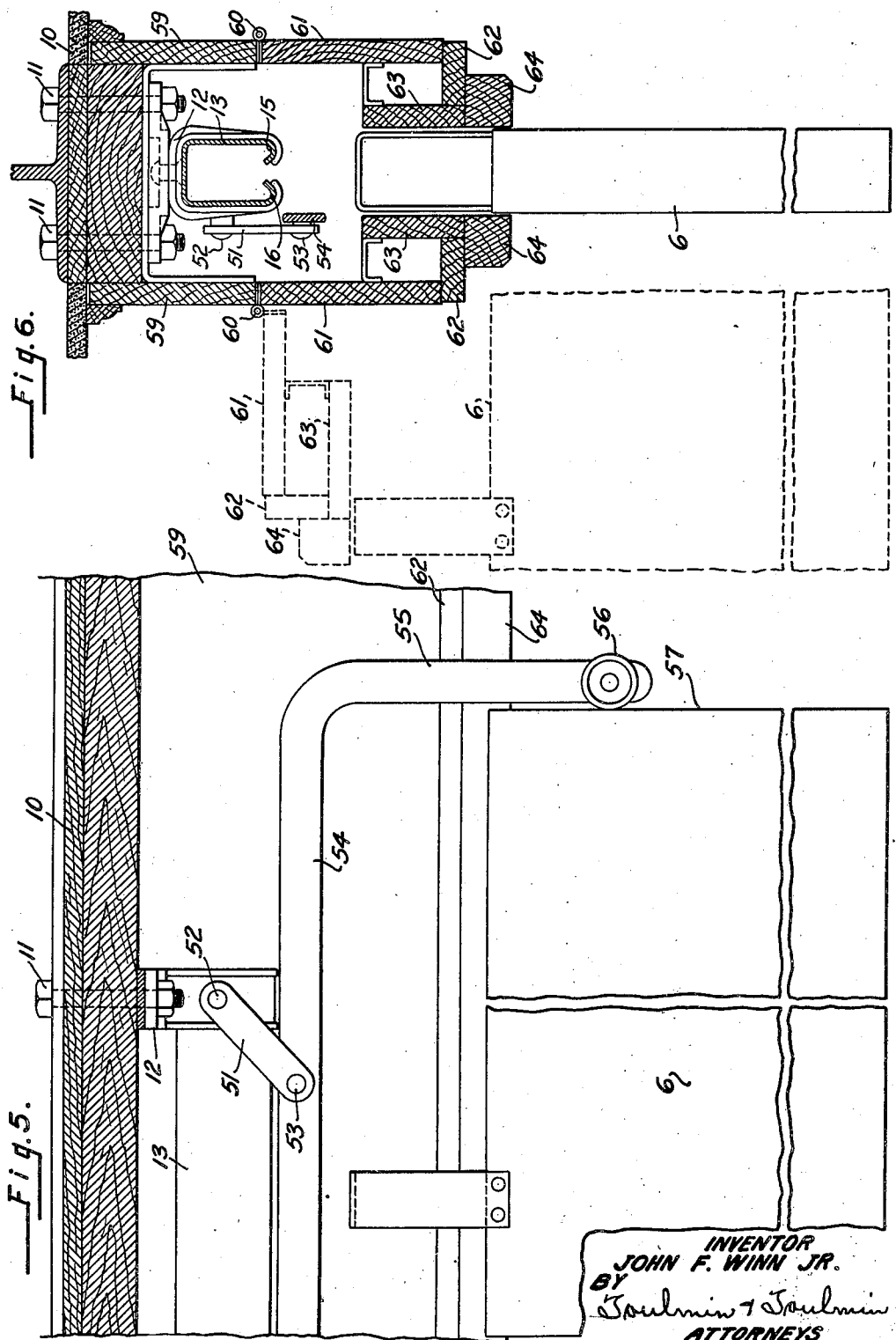
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,114,198

AUTOMATIC DOOR ELEVATING CONTROL

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Application February 5, 1935, Serial No. 5,097

5 Claims. (Cl. 20—20)

This invention relates to a combination of a plurality of doors hinged one to the other on their sides and suspended on a track from their tops so they may be moved from a folded position, one on the other, to one side of an inclosure, to a position across the inclosure to close an opening in the inclosure.

It is a particular object of this invention to provide means of guiding these doors from folded to unfolded position and back again; and when the doors have been moved to their unfolded position to close the door opening, they will then be lowered into engagement with the floor and rest upon the floor, forming therewith a tight engagement. The tops of the door sections are suitably engaged in order to form with the ceiling, or with members supported from the ceiling, a tight engagement so that noises cannot pass from one side of the partition, thus formed by the doors, to the other side.

The automatic door elevating control of this invention has for its primary object the provision of mechanism for use with one door or a series of doors hinged together to lower the door, or several doors, a predetermined amount when they are brought to closing position, or to lift them a predetermined amount before being moved to open position.

A series of doors hinged together forms what is commonly known in the art as a partition. Such doors are used extensively to divide large room space into smaller spaces, or upon opening the doors smaller rooms may be transformed into a larger room by folding the doors to the side of the inclosure, resulting in a clear opening. When the partition is used in school buildings, or in a church, where large gatherings of people assemble, it is desirable that the partition be as sound-proof as possible. The present invention provides this sound-proof feature.

Heretofore in the art, due to the fact that the door or doors must be suspended above the floor in order to permit their movement across the floor, it has been difficult and usually impossible to sound-proof this partition because of the space necessarily left beneath the door or doors. The present invention provides for the lowering of the door when it is in closed position, and the lifting of it at about the time it is moved into its open position. Thus, by letting the door rest upon the floor when it is in a closed position, a complete seal against noise and drafts is accomplished.

Referring to the drawings:

Figure 1 is a top plan view showing diametri-

cally the position of the doors in their folded position to one side of a door opening.

Figure 2 is a front elevation of the doors in their closed position.

Figure 3 is a detail elevation showing the door raising and lowering mechanism in association with the door-supporting mechanism, the track and the trolley on the track supporting the door.

Figure 4 is a section on the line 4—4 of Figure 3.

Figure 5 is an elevation partially in section, showing the operating arm used for controlling the raising and lowering of the door as it proceeds into closing position, or is starting to open.

Figure 6 is a section through the head trim where the doors fold.

Referring to the drawings in detail, and in particular to Figures 1 and 2, the numeral 1 designates the side wall of a building on one side, and 2 the side wall of a building on the other side. The dotted line 3 indicates the line that the folded doors assume when they are unfolded in order to form the two rooms 4 and 5. The door leaves 6 are hinged together at 7 and the last door leaf is hinged by any suitable type of hinge 8 to the door jamb 9 or the wall 1.

I have shown a plurality of door leaves hinged together, but this invention is equally applicable to a single door.

Referring to Figures 3 and 4, the door leaf 6, either by itself or having other door leaves hinged on one or both sides, is suspended above the floor so that it may travel across the floor, preferably about a half-inch above the floor, by the following mechanism.

Suspended from the ceiling 10 by bolts 11 is a series of supporting brackets 12, which carry the continuous overhead track 13. This track is an inverted U-shaped track forming the grooves 15 and 16 for receiving the wheels 17, which are arranged in pairs on axles 18 that are mounted in the frame or head 19. This frame or head is connected by the stem 20 to the yoke 21 which carries vertical rollers 22 in the slot between the grooves 15 and 16. This yoke 21 is adjustably positioned on the stem 20, between clamping nuts 23 and 24.

The stem 20 has mounted upon it a collar 25, the top of which is arcuate at 26 and the bottom of which is mounted on the ball bearing 27. This ball bearing rests upon an adjustable nut 28 threaded on the stem 20. The bottom of the stem 20 is provided with an angular arm or lever 29, pivoted to the stem 20 at 30 and carrying at the angle of the arm the roller 31. The free end of the arm is provided with a roller 32.

The roller 31 bears upon the plate 33 that is attached by screws 34 to the top of the door 6. This plate is provided with bracket arms 35, to which is pivoted at 36 the suspension arm 37, which has an arcuate under face 38 resting upon the arcuate surface 26 of the member 25. The stem 20 passes through an aperture 39 in the arm 37.

The free end of the arm is provided with an eye 40 that receives on its upper side an arcuate washer 41, the top of which carries the adjusting nut 42. The nut carries the threaded suspension bolt 43 that projects into a space 44 in the door 6. The bottom of this bolt is provided with a head 45 and a washer 46.

For supporting the helical spring 48 that is mounted around the bolt 43, and between the washer 46 and a cap plate 49 which is attached by screws 50 to the top of the door 6 and which also receives through it the suspension bolt 43 and closes the space 44 in the door. Thus the door is suspended by the spring 48. The suspension of the door is accomplished by adjusting the nut 42, and thereby adjusting the condition of the spring 48.

Operating mechanism

Pivotaly supported upon the brackets 12 is a series of links 51. Pivoted on the brackets 12 at 52 and pivotaly connected at 53 is a shiftable continuous operating arm 54. This arm extends along beneath the continuous overhead track 13. When it is in its upper and inoperative position the under side of the operating arm is engaged by the roller 32.

The outer operating end of the operating arm 54 is formed in a right-angled depending member 55, which carries on its lower end a roller 56 that engages with the free outer edge of the last door leaf at 57. When this free edge or end of the door 6, designated 57, engages with the roller 56, it shifts the operating arm to the right-hand and the arm travels downwardly, due to the link supports 51, so that the roller 56 travels downwardly on the surface 57. When this occurs the roller 32 on the arm 29 is engaged and moved downward to the dotted line position, as indicated in Figure 3. The weight of the door is supported by the trolley through stem 20, and is stationary insofar as any up and down movement is concerned. When the roller 31, which is pivoted at 30, bears upon the plate 33 it forces the door 6 downward to a position indicated in dotted line at 59. During the downward movement of the door 6 the arm 37 is lifted and the spring 48 is compressed.

It will be noted that the distance from the center of the stem 20 to the center of the spring 48 is approximately four times greater than the distance from the stem 20 to the center of the bearing 36. Therefore, the spring 48 supports approximately one-fourth the weight of the door. Since the weight of the door is partially supported by the compression spring 48, with space between its coils, it is evident that any pressure downwardly on the top of the door will cause the door to descend and the spring 48 to compress further. Simultaneously, the arm 37 will describe a radius about the bearing 35 upwardly, as shown in dotted lines.

The convex washers 25 and 41 are provided to insure easy swivelling action as the arm is positioned. As the door must rotate about the

axis of the stem 20 the ball bearing 27 provides a free swivelling action.

The bottom of the door is provided with a sealing strip, preferably of rubber, which may be of any desired character. If this strip is made of soft, sponge rubber it will take up any unevenness between the bottom of the door and the floor surface.

Top door trim

As a space of six to twelve feet or more is usually required at the folding end for the doors, a mechanism to clear a portion of the head casing nearest the folding end must hinge upwardly. This is shown in Figure 6. The head casing is provided with spaced depending side trim plates 59, which are supported and positioned by the brackets 12, supported from the bolts 11. It is this same bracket 12 that supports the track 13 and the pivotal links 51.

The lower halves of the trim at the folding end are hinged at 60, and are designated 61. They carry the horizontal wood member 62, the box member 63 and the molding 64. The box member 63 is used as a bumper at the folding end only. In Figure 6 one of these hinged trim members is shown in the open position in dotted lines, with the door in the open position in dotted lines. Elsewhere than at the folding end the top trim is arranged as indicated in Figure 4, where the side members 59 are continuous, and are supported by the bracket 59a, the bottom member and molding being attached thereto by the bolts 59b.

I desire to comprehend within my invention such modifications as may be clearly embraced within my claims and the scope of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In combination, a door, an overhead track, a trolley having a supporting stem, a lever pivoted to the door and engaging said stem, yielding means between the end of said lever and said door for yieldingly supporting the door off of the floor, means engaging the top of the door, and an actuating means for compressing said yielding means and lowering said door with respect to said overhead track and trolley.

2. In combination, a door, an overhead track, a trolley having a supporting stem, a lever pivoted to the door and engaging said stem, yielding means between the end of said lever and said door for yieldingly supporting the door off of the floor, means engaging the top of the door, an actuating means for compressing said yielding means and lowering said door with respect to said overhead track and trolley, and means engageable by the door when it is moved to closing position to engage said actuating means to force the door downwardly against the yielding means when in closing position until it engages the floor.

3. In combination, an overhead track, a trolley mounted thereon having a depending stem, a door having a pivoted lever thereon pivoted at one end to the door, yielding means between the other end of the lever and the door, means on said stem for pivotaly supporting said lever, a second lever pivoted to said stem having means engaging the top of the door, and means engaging an operating arm, and a shiftable operating arm engageable with the free end of said last-mentioned lever and with said door, whereby as the door is brought to closing position the door will engage said shiftable operating arm to cause

the door to be lowered into engagement with the floor.

4. In combination, a continuous overhead track, a trolley mounted thereon having a depending stem, a door, a lever pivoted on said door on the top thereof, yielding means at the free end of the door and of the lever interposed between the door and the free end of the lever, means for swivelly supporting said lever on said stem, a pivoted depressing lever mounted on said stem engageable with the top of the door, and a shiftable operating arm supported beneath said track to engage said depressing lever to cause the door to be depressed when reaching a predetermined position.

5. In combination, a continuous overhead

track, a trolley mounted thereon having a depending stem, a door, a lever pivoted on said door on the top thereof, yielding means at the free end of the door and of the lever interposed between the door and the free end of the lever, means for swivelly supporting said lever on said stem, a pivoted depressing lever mounted on said stem engageable with the top of the door, a shiftable operating arm supported beneath said track to engage said depressing lever to cause the door to be depressed when reaching a predetermined position, and means on said shiftable operating arm for engaging with the door when it is brought to closing position to cause it to engage with the floor.

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