July 10, 1928. 1,676,500

C. C. McGINNIS

SLIDING DOOR

Filed June 27, 1927 2 Sheets-Sheet 1

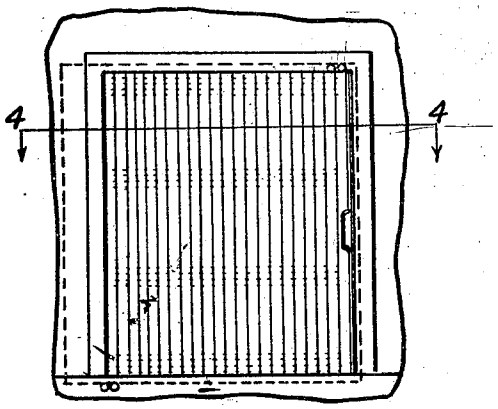


Fig. 1

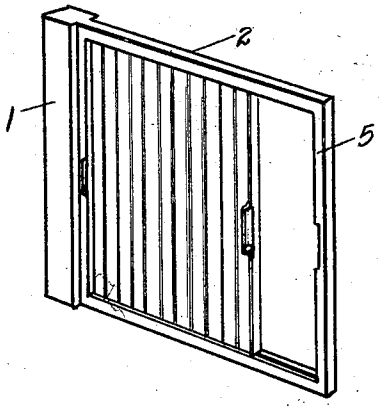


Fig. 2

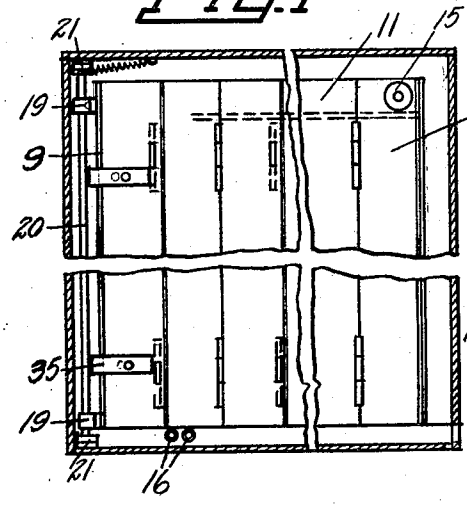


Fig. 3

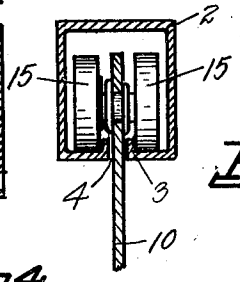


Fig. 5

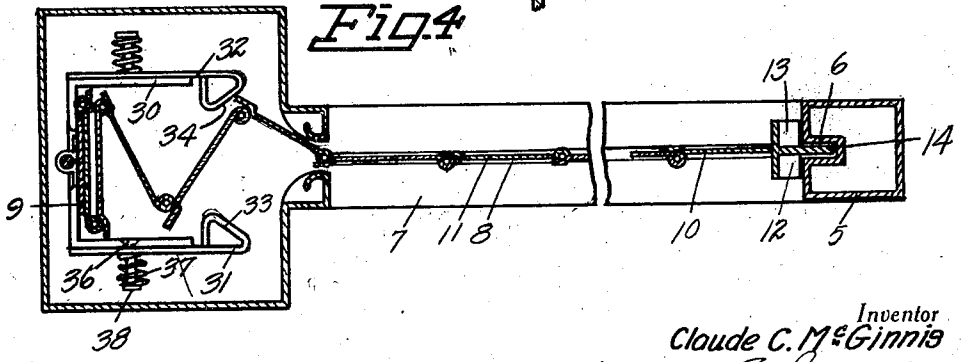


Fig. 4

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C. C. McGINNIS

SLIDING DOOR

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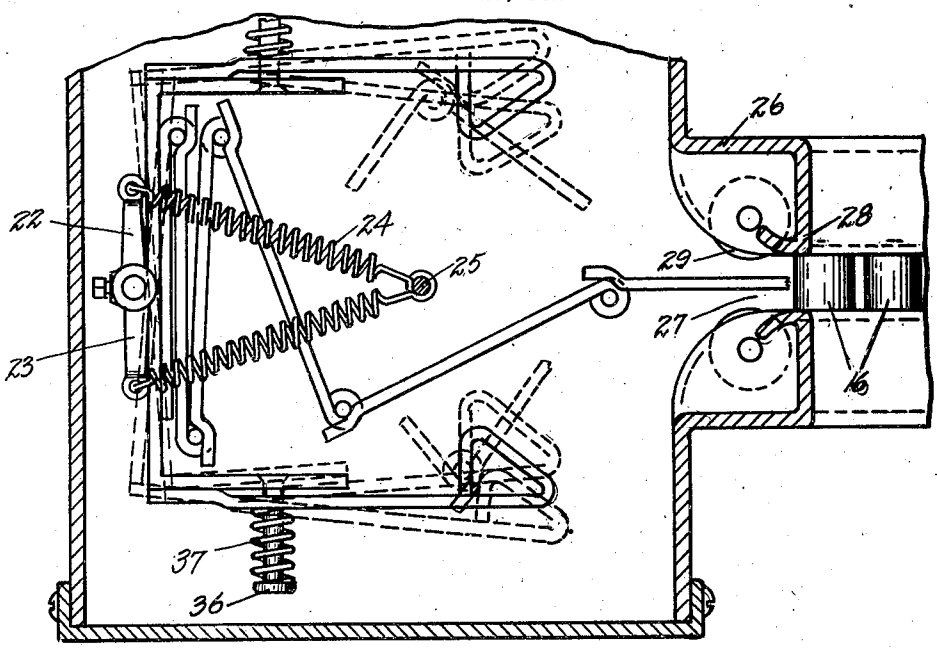


Fig. 6

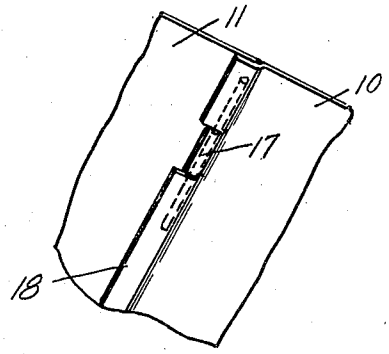


Fig. 8

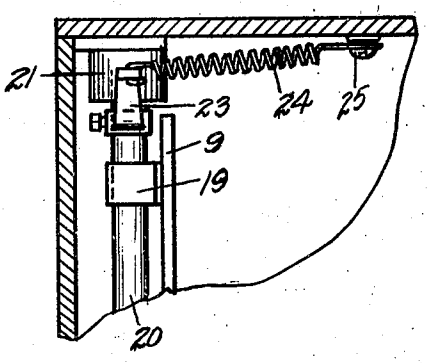


Fig. 7

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Patented July 10, 1928. 1,676,500

UNITED STATES PATENT OFFICE.

CLAUDE C. McGINNIS, OF SEDRO WOOLLEY, WASHINGTON.

SLIDING DOOR.

Application filed June 27, 1927. Serial No. 201,616.

My present invention relates to an improved sliding door of the hinged or jointed-panel type, and adapted when pushed for its opening movement to be folded into a receiver or housing leaving an unobstructed doorway. The panels are of metal or other fire proof material, thus providing a closure for doorways, windows and other openings which will be effective in preventing spread of fire. While the subject matter of my invention is adapted for various uses and may be embodied in different forms, for convenience of illustration and description I shall hereinafter refer to the device as a slidable door that is movable horizontally and its panels are adapted to be folded or unfolded. In folded position the panels are stored compactly in a housing or receiver provided therefor at one side of the doorway and when the door is being closed these panels may successively be unfolded and slid into position to completely close the doorway. Means are provided for guiding the movement of the sliding and folding panels as they enter or pass from their housing in a zig-zag formation, and an oscillatable receiver is provided for the reception of the folded panels, all as will hereinafter be more fully set forth and claimed.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention in which the parts are combined and arranged according to the best mode I have thus far devised for the practical application of the principles of my invention.

Figure 1 is a face view of a door and its frame embodying my invention, the door being closed.

Figure 2 is a perspective view of the door and its frame, the door being partly open.

Figure 3 is a vertical sectional view through the housing and tubular door frame, the door being closed and the door and frame being broken away for convenience of illustration.

Figure 4 is an enlarged, horizontal, broken, sectional view, as at line 4—4 of Figure 1.

Figure 5 is a sectional detail view of the overhead, tubular frame member showing a part of the door and suspending rollers thereon.

Figure 6 is an enlarged horizontal sectional view through the housing showing the zig-zag formation of the folding panels and the position of the folded panels within the oscillatable receiver in the housing.

Figure 7 is a detail view showing the upper end of the oscillatable spindle of the receiver and spring connection therefor.

Figure 8 is a detail perspective view showing a hinge joint between panels and the overlapping edges of adjoining or hinged panels.

The door frame and door are preferably made up of metallic parts, the former being of rectangluar shape and includes, at the left side in the drawings, an upright housing 1, an overhead, tubular top rail 2 with flanged tracks or rails 3 and center slot 4 at the underside of the tubular rail. At the right of the frame a tubular jamb 5 is fashioned with a vertical groove 6 in its inner face, and the bottom tubular bar 7 forming the base of the frame is also provided with a center slot 8. The frame is thus made up of these rigidly connected parts, and the slidable, foldable, door is guided at its upper and lower edges in the slots, and adapted to be folded within the housing 1 when the door is opened.

The slidable door is made up of a number of hinged or jointed panels or slats comprising an inner panel 9, an outer panel 10, and a suitable number of intermediate panels 11. The outer panel 10 has two handles 12 and 13, one at each side of the door, by means of which the door may be slid to open or closed position, and a sealing plate 14, at the vertical edge of the outer panel, is adapted to fit into the groove 6 of the door jamb, when the door is closed, to effectually close the opening.

In the tubular overhead rail 2, a pair of suspending wheels 15 on the top of the outer panel, are designed to travel over the tracks 3, and the bottom edge of the door travels over a pair of supporting rollers 16 having stationary bearings in the base bar 7 of the door frame, said bar forming the sill for the door. As best seen in Figure 8 the adjoining panels are jointed or hinged to each other, as at 17, and one of the panels has an overlapping edge or strip 18 to effectively close the joint between the adjoining panels when the door is closed.

The inner panel 9, which is normally disposed at right angles to the plane of the door when the latter is closed, forms part of an oscillatable receiver for the folded panels, and is fixed by brackets 19 to a ver-

tical spindle 20 that is designed to oscillate in its top and bottom bearings 21 fixed to the top and bottom of the housing.

Near the top of the spindle a pair of diametrically extending arms 22 and 23 are fixed to extend approximately parallel with the inner panel 9, and each arm has attached at its free end a spring 24 that is anchored at 25 to the inner side of the top of the housing.

The anchorage 25 for the springs is alined with the spindle and the top edge of the closed door, and the springs provide an equalized, resilient means for holding the inner panel and the receiver of which the panel forms a part, in position transversely of the line of the closed door, and when this receiver is oscillated by the closing movement of the door as the latter is folded into closed position, the springs cushion the movement of the oscillating receiver.

As seen in the drawings, when the closed door is pushed open, the folding panels take a zig-zag position, and the succeeding panels are laid against the preceding panels as the receiver oscillates.

The inner face of the housing is provided with an offset portion or box 26 having a vertical slot 27 therethrough for the passage of the panels, and guide flanges 28 are provided at the sides of the slot for the passing panels. To prevent excessive friction and noise, a pair of spaced guide rollers 29, having vertical axes, are located at the bottom of the slot 27 and the rollers prevent undue wobbling movement of the jointed panels as they pass through the slot of the housing.

The oscillating receiver in addition to the inner panel 9 includes a pair of horizontal U-shaped yokes 30, two of which are shown, spaced above and below the middle of the spindle, and rigidly secured to the panel and spindle to oscillate with them. On their outer faces the pairs of arms of these yokes are all provided with resilient guide arms as 31 and 32 having at their free ends cam faces 33 and 34, against which the zig-zag folding panels contact, as indicated in Figures 4 and 6 as the successive panels are moved into or out of the housing. These guide arms are allowed to "give" under impact from the folding panels, and for this purpose they are hinged to their yokes at 35 and provided with guide bolts 36 and cushion springs 37. The bolts pass through the yoke arms and through openings in the resilient arms, and the springs are coiled about the bolts and interposed between the outer faces of the perforated, resilient guide arms and the nuts 38 on the ends of the bolts.

Thus it will be apparent that the door may be closed by pulling on a handle 12 or 13 to unfold the panels from their receiver in the housing, (and the receiver may or may not oscillate with this unfolding movement) and as the zig-zag panels pass through the slot 27 of the housing the guide rollers 29 and flanges 28 guide the panels into a straight line as they pass into the guide slots in the overhead tubular rail and the sill of the frame, and of course the wheels 15 and rollers 16 guide the sliding door to closed position.

By pushing in on the sliding door, the panels are forced into and through the slot 27, and as the hinge between the inner panel 9 and the first intermediate panel is off center, or out of alinement with the straightened, closed door, the first intermediate panel is laid against the inner panel and the succeeding panels follow this course with their hinges at alternately opposite sides of the receiver.

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

1. The combination with a door frame and housing and an oscillatable receiver in the housing, of a sliding door comprising jointed panels one of which is hinged to the receiver in off-center position, and means for guiding the door, in closing and opening movements.

2. The combination with a door frame and housing and an oscillatable spindle in the housing, of a sliding door comprising jointed panels one of which is rigidly secured to the spindle and disposed in a plane transverse to the line of the closed door with, one hinged panel in off center position relative to the rigid panel, whereby a zig-zag motion is given to the folding panels as they are "laid" against the transversely disposed panel, and means for guiding the closing and opening movements of the hinged panels of the door.

3. The combination with a door frame and housing and an oscillatable spindle in the housing, of a sliding door comprising hinged panels one of which is fixed to the spindle transversely to the line of the closed door, resilient equalizing means for cushioning the oscillating movement of the spindle as a zig-zag motion is given to the folding panels, and means for guiding the sliding movement of the door.

4. The combination with a folding door comprising hinged panels, of an oscillatable spindle and a transversely disposed panel of said door secured to the spindle, spaced guide yokes rigid with said transversely disposed panel, and resilient guide arms on said yokes, whereby the folding panels are guided with a zig-zag motion.

In testimony whereof I affix my signature.

CLAUDE C. McGINNIS.