United States Patent

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[54] **FOLDING DOORS**
9 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **160/118,** 160/206
[51] **Int. Cl.** **E05d 15/26**
[50] **Field of Search** 160/206, 118, 199

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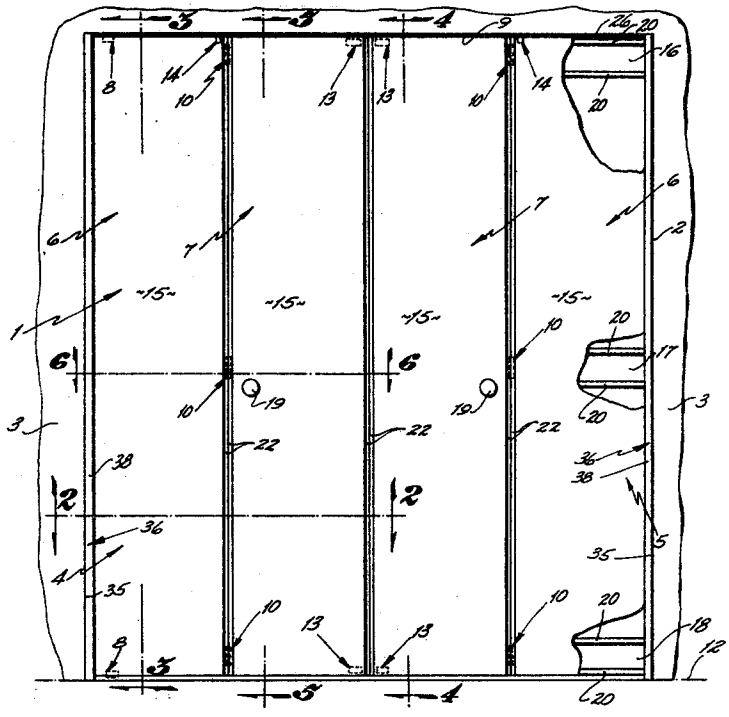
Primary Examiner—Kenneth Downey
Attorney—Wood, Herron & Evans

ABSTRACT: A folding door formed of sheet metal and intended for indoor use, such as a closure for closets and similar storage areas. The folding door preferably is constructed in the form of two independent-folding sections, each section comprising a hinged door pivotally connected to one side of the door opening and having a sliding door hingedly connected to the free edge of the hinged door. The outer edge of the sliding door includes guide block assemblies at top and bottom and the door opening at top and bottom is provided with tracking rails in which the blocks are slidably engaged.

The arrangement is such that each folding section may be pivoted to an open position in accordian fashion, with the hinged door and sliding door substantially parallel with one another and projection from the side of the door opening into the room.

In order to facilitate installation, the edges of the hinged doors include pivot screws which provide a bearing engagement with pivot blocks secured to the door opening at top and bottom. The pivot location is such that the pivoted edge portion of the door swings outwardly in lever fashion when the door is closed so as to engage a trim strip and provide a neat finished appearance.

The slide blocks, which guide the outer edges of the sliding doors for straight line motion, are spring-loaded and may be released from the tracking rails, permitting the entire door section to be swung about the pivot screws to an open position for access into the closet for cleaning or painting.



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SHEET 1 OF 3

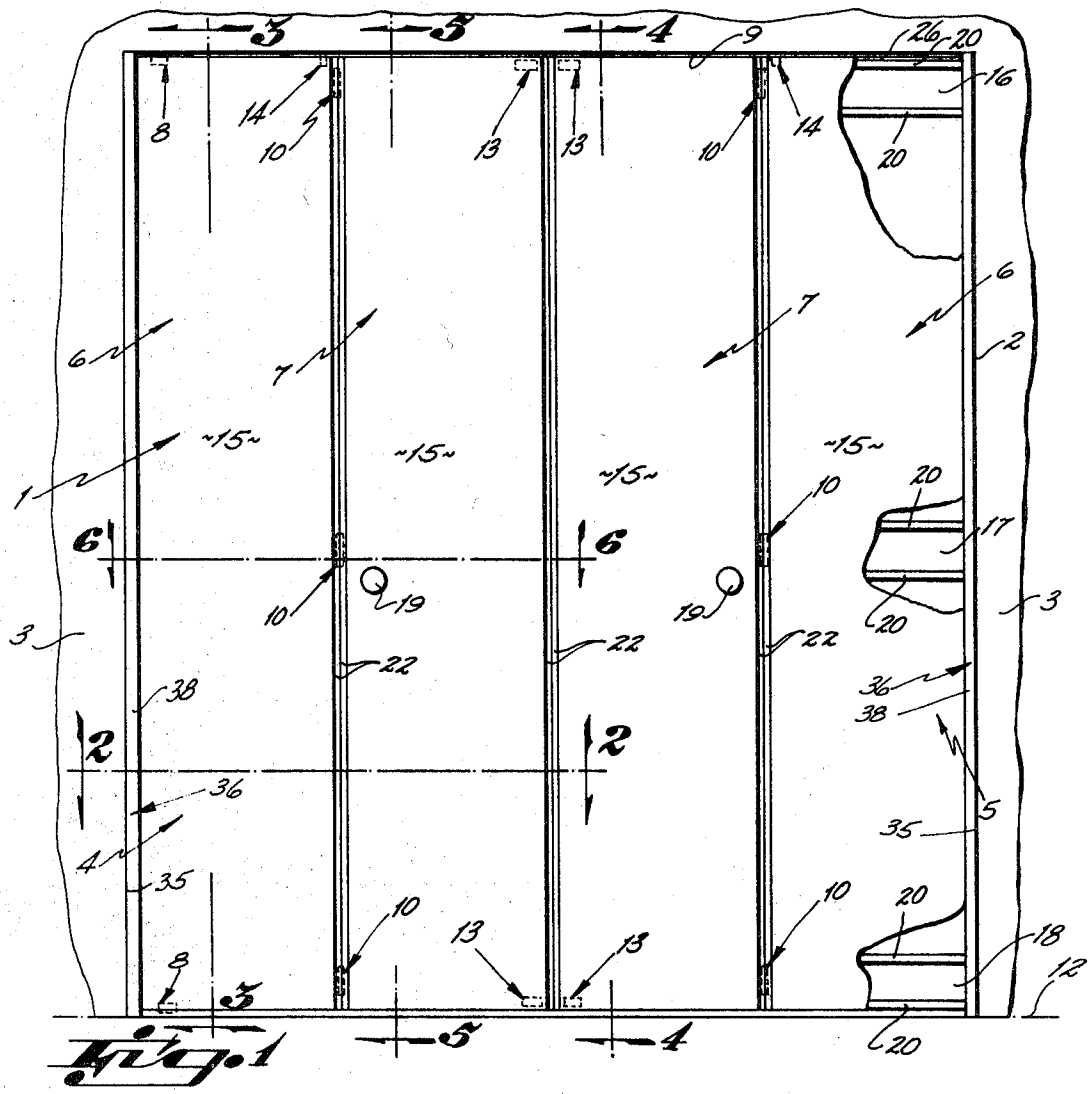


Fig. 1

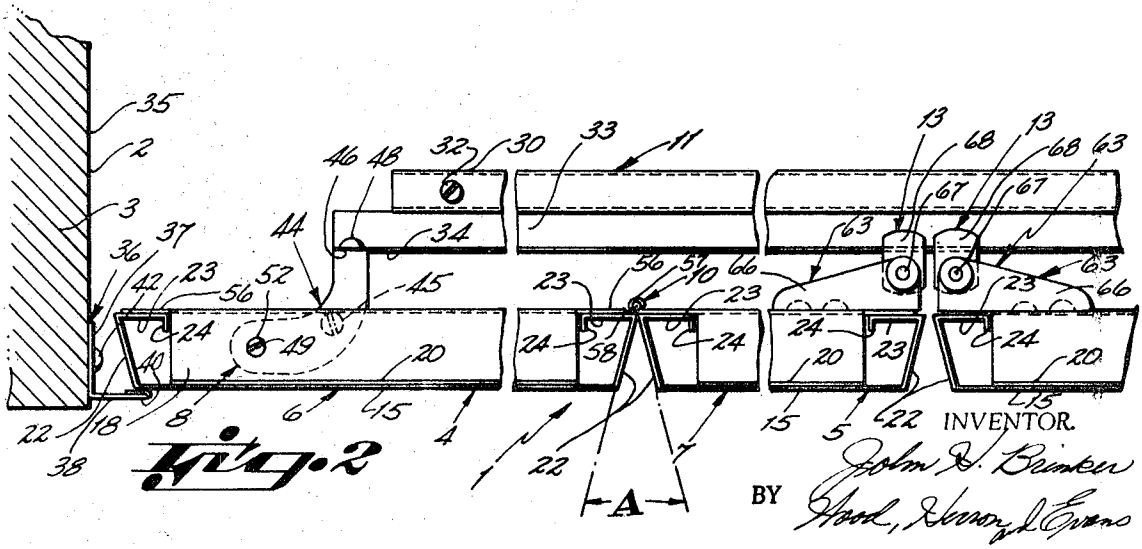


Fig. 2

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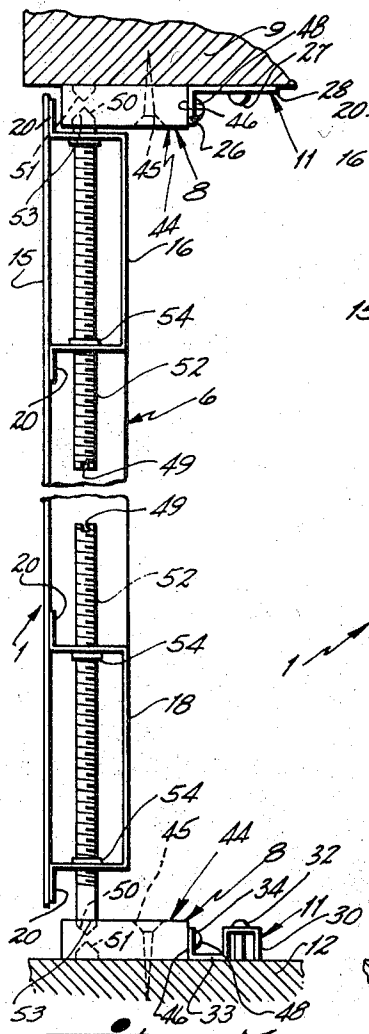


Fig. 3

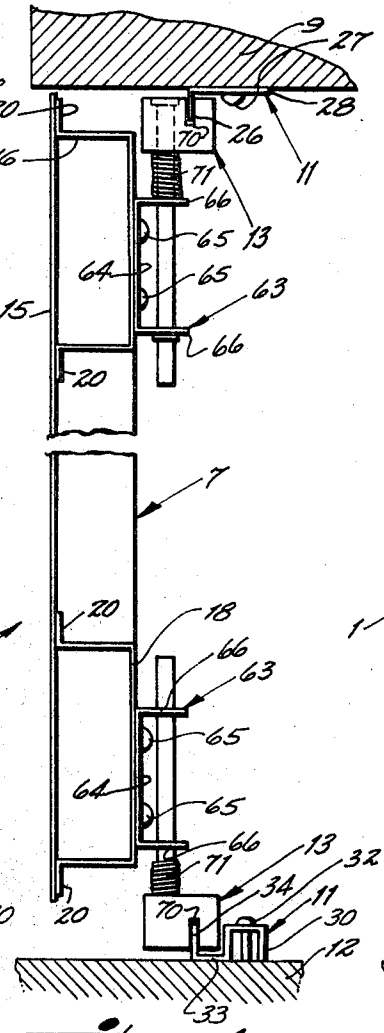


Fig. 4

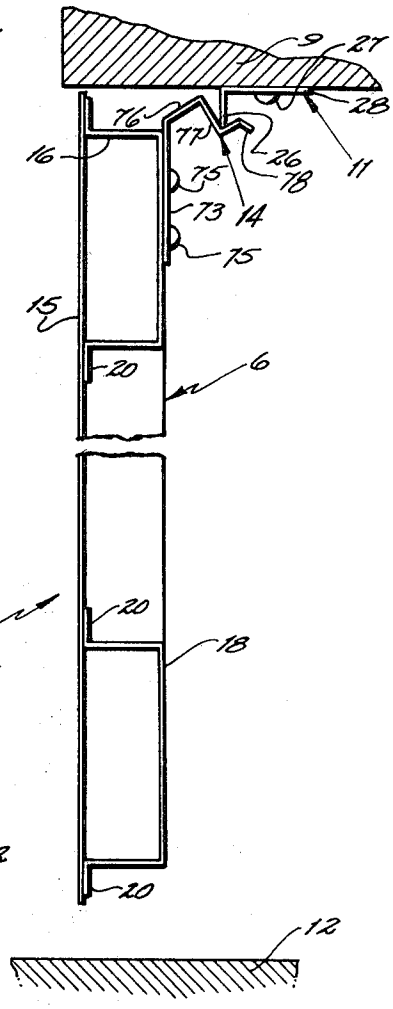


Fig. 5

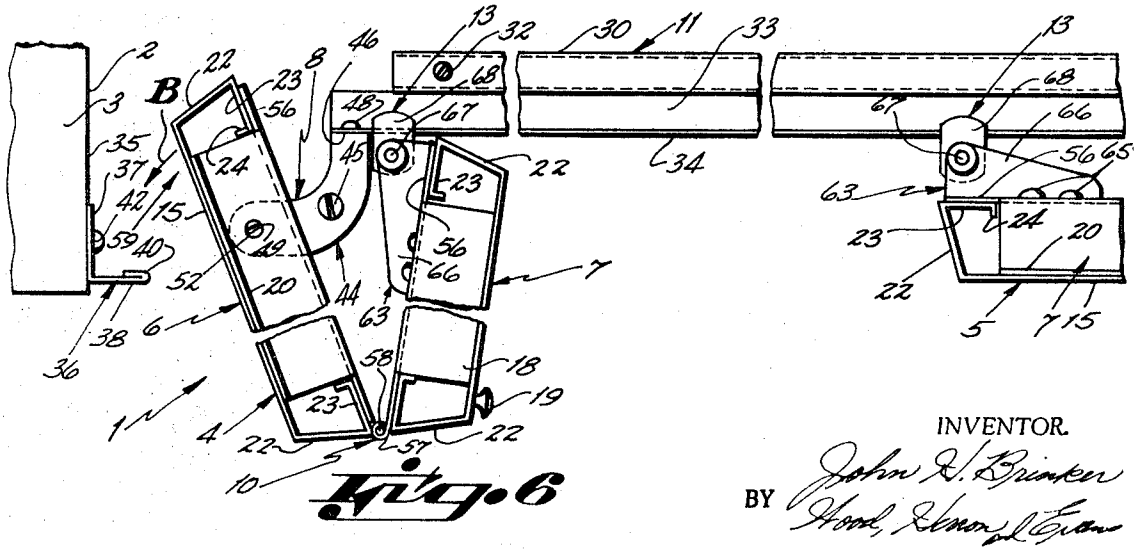


Fig. 6

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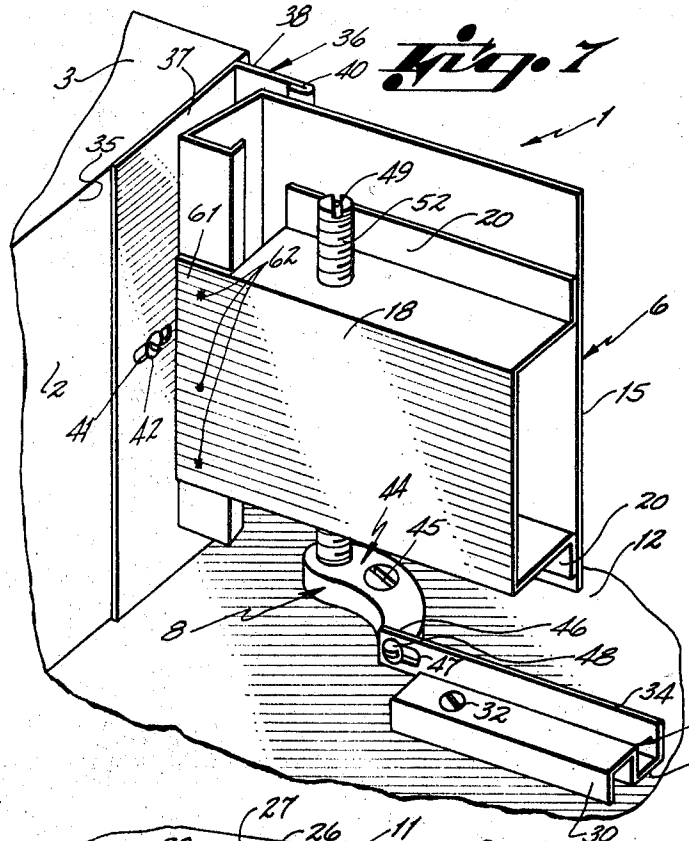


Fig. 7

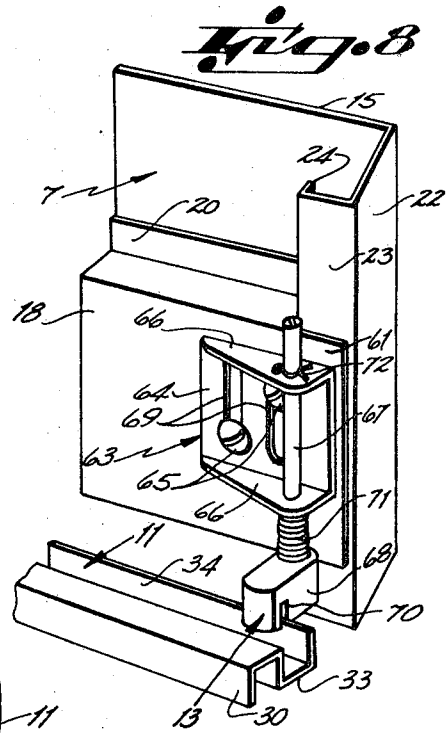


Fig. 8

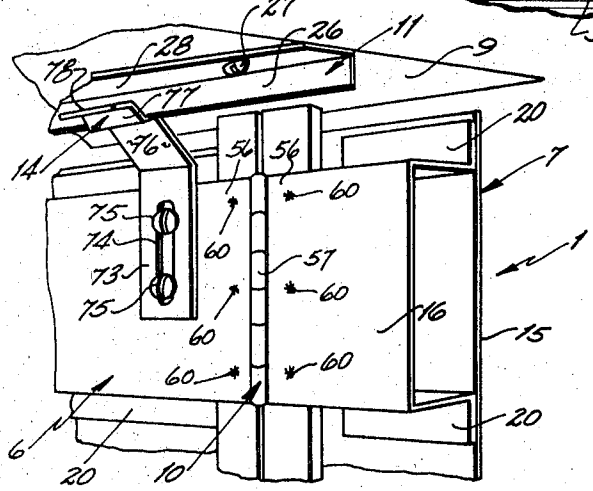


Fig. 9

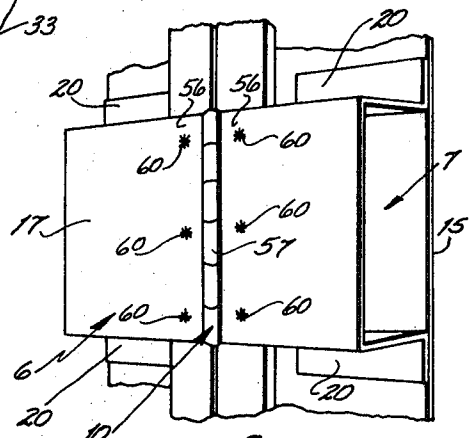


Fig. 10

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FOLDING DOORS

BACKGROUND OF THE INVENTION

The folding door structure of the invention, as noted earlier, is intended particularly for indoor use either in commercial or residential buildings which involve the use of closets and which require convenient access to the closet area. In the present example, the doors, both hinged and sliding, are fabricated from sheet metal, suitably reinforced and of simplified construction. As noted above, the doors preferably are furnished in two folding sections, each comprising a hinged door and a sliding door which open in accordion fashion. In some instances involving a small door opening, a single door section (hinged door and sliding door) may be desirable.

One of the primary objectives of the invention has been to provide a folding door which is prefabricated and which may be installed in the field quickly and conveniently in a standard door opening without the use of special tools and without the necessity of fitting the parts.

According to this aspect of the invention, the sets of folding door sections are self-contained, each comprising a hinged door and a sliding door. The edge portion of the hinged door, which is connected to the side of the door opening, is provided with a pair of adjustable pivot screws, the outer ends of which are tapered or conical to form journals. Respective pivot blocks are secured t to the top and bottom of the door opening, each including a cone-shaped bearing to receive the cone-shaped journals of the pivot screws.

To install the hinged door, the upper and lower pivot screws (which are retracted) are screwed outwardly by screw driver engagement, to bring their tapered ends into bearing engagement with the cone-shaped recesses of the pivot blocks at top and bottom, thus hanging the door section within the door opening. The vertical position of the door section may be adjusted by setting the pivot screws to raise or lower the door.

In order to provide a neat and trim appearance, the pivot screws are located inwardly from the edge of the hinged door, such that the edge portion of the door beyond the pivot screws act as a lever portion and swings forwardly as the body of the door is swung to its closed position. A trim strip is secured to the side of the door opening, and is adjustably secured thereto. The arrangement is such that the lever portion of the hinged door swings into engagement with the trim strip when the hinged door is closed.

A further objective of the invention has been to provide an improved guide structure which slidable engages the free edge of the sliding door for straight line motion and also to provide an arrangement whereby the free edge of the sliding door may be disengaged from the guide structure to permit both the hinged and sliding doors to be swung to an open position. This arrangement permits access to the interior of the closet for painting or cleaning.

According to this concept, there is provided upper and lower horizontal tracking rails extending across the door opening. The outer edge of the sliding door includes upper and lower guide blocks spring-loaded outwardly, which are slotted to provide a sliding engagement with the tracking rails to provide the straight line motion as the doors are actuated. In order to open the folding section for access to the closet space, the spring-loaded guide blocks are simply shifted out of engagement relative to the tracking rails, permitting the hinged and sliding doors as a unit, to be swung to the open position.

A further objective has been to provide a simplified sheet metal door construction for the hinged and sliding doors in which all the doors of an installation may be of duplicate construction.

This aspect of the invention involves the use of sheet metal panels of single thickness which form the exposed face of the door, combined with reinforcing channels extending horizontally across the internal surfaces of the panels for stiffening the purposes. The meeting ends of the horizontal channels include endwise projections which are slotted and curled, such that

the ends of the channel-shaped rails form hinges between the hinged door and sliding door. A hinge pin is inserted through the curls to complete the hinges in the usual way.

In order to further stiffen the doors, the vertical edges of each door panel include a vertical flange bent inwardly from the panel at an obtuse angle to the plane of the panel. The angle of the end flanges provides a V-shaped opening between the doors when they are closed, thereby to prevent pinching of the fingers.

It will be understood that the respective folding sections are in duplicate and are installed in the same manner. The slide blocks, above-described, project inwardly from the doors, such that the upper and lower tracking rails are displaced inwardly and are concealed by the upper and lower edge portions of the doors to provide a neat and trim appearance.

The various features and advantages of the invention will be more clearly apparent to those skilled in the art from the following detailed description taken in conjunction with the drawings.

In the drawings:

FIG. 1 is a general front elevation illustrating the folding closet door assembly mounted within the door opening.

FIG. 2 is an enlarged fragmentary cross section taken along the line 2–2 of FIG. 1, detailing the guide blocks, hinges and pivots by means of which the doors fold to the open position as indicated in FIG. 6.

FIG. 3 is a longitudinal sectional view taken along line 3–3 of FIG. 1, further illustrating the pivot construction by means of which the hinged doors are pivoted with respect to the door opening.

FIG. 4 is an enlarged sectional view taken longitudinally through one of the sliding doors, further illustrating the construction of the slide fixtures by means of which the intermediate panels are held in alignment as the doors are swung to the open position.

FIG. 5 is an enlarged sectional view taken along the line 5–5 of FIG. 1 illustrating one of the panel latches by means of which one folding section is held in closed position in the event that the second folding section is opened.

FIG. 6 is a fragmentary sectional view taken along the line 6–6 of FIG. 1, showing the positions assumed by the individual doors in the open position.

FIG. 7 is a fragmentary perspective view, further illustrating the construction of the bottom pivot as shown in FIG. 3, the upper pivot being of the same construction.

FIG. 8 is a fragmentary perspective view further illustrating the guide block previously illustrated in FIG. 4, showing the construction at the lower edge of the door, a similar arrangement being mounted at the top portion of the door.

FIG. 9 is a fragmentary perspective view, further illustrating the door latch previously illustrated in FIG. 5.

FIG. 10 is a fragmentary perspective view showing one of the door hinges and also illustrating the panel stiffeners which are mounted to the inside surface of the door panel.

CONSTRUCTION GENERALLY

Referring to FIG. 1, the folding closet door of the invention is indicated generally at 1 and is mounted in the opening 2 of a wall indicated generally at 3.

The door 1 is in the form of two independent-folding sections indicated generally at 4 and 5. The folding sections 4 and 5 are of duplicate construction, each comprising a hinged door 6 and a sliding door 7. Each of the doors 6 and 7 is of the same construction, consisting of a panel formed of sheet metal suitably reinforced for stiffness as described later in detail.

As best seen in FIGS. 1, 2 and 6, the hinged doors 6–6 have their outer edge portions pivotally connected to the sides of the door opening 2 by means of the pivot assemblies indicated generally at 8 (FIGS. 1, 6 and 7). The inner edges of the hinged doors 6–6 are hingedly connnected to the sliding doors 7 by means of hinges, indicated generally at 10 (FIGS. 2, 9 and 2 10). The inner edges of the hinged doors 7–7, which or-

dinarily would be free to swing, are held within the door opening 2 for straight line sliding motion by means of horizontal tracking rails 11–11 extending across the top 9 of the opening and across the floor 12 (FIG. 4).

The free edge of each sliding door includes a slide assembly at its upper and lower edge portion, indicated generally at 13. The slide assemblies 13 engage the upper and lower tracking rails 11 of the door opening so as to permit the edges of the sliding doors 7 to move in a straight line as the hinged doors 6 are swung outwardly to an open position, as shown in FIG. 6.

Each folding section 4 and 5 further includes a spring latch clip, indicated generally at 14, located at the upper edges of the sliding doors 7 and engaging the upper tracking rail 11 (FIGS. 5 and 8). The latch clips prevent both folding sections from springing open in the event only one section is to be opened.

Each sliding door 7 includes a door pull or knob 19 of conventional design (FIG. 1). In opening the folding section or sections, the two sliding doors 7 of each section are drawn outwardly by the door pulls 19 so as to fold in accordion fashion, projecting outwardly into the room, as shown in FIG. 6. It will be noted in this view, that the hinged panels 6, at their outer edges thus pivot within the door frame (pivot assemblies 8) and that the inner edges of the doors 6 and 7 articulate with reference to one another by means of the hinges 10, previously noted, while the free edges of the doors 7 follow the horizontal trackways and remain in the same plane as the wall opening.

DOOR CONSTRUCTION

The doors 6 and 7 of the folding sections 4 and 5 are similar in construction, as detailed in FIGS. 2—6. The doors are of sheet metal construction, each comprising a flat outer sheet metal panel 15. Each panel 15 is reinforced at three points along its length by horizontal channel-shaped stiffener rails, comprising a top stiffener 16 (FIG. 1), an intermediate stiffener 17, and a bottom stiffener 18. Each channel-shaped stiffener includes along its upper and lower edges respective flanges 20—20 which are secured, preferably by spot welding to the outer panel 15.

The upper and lower stiffeners 16 and 18 have the additional function of providing a mounting for the guide block assemblies 13. The guide block assemblies are secured to the upper and lower stiffeners at the free edge portions of the sliding doors 7—7 which fold in accordion fashion with reference to the hinged panels 6—6 when the door panels are shifted to their open position (FIG. 6), as noted earlier.

The vertical edges of each of the doors 6 and 7 are enclosed and reinforced by flanges 22 (FIGS. 2, 6 and 8) forming a part of the outer panel 15 of each composite door. Each flange 22 is bent inwardly from the outer panel 15 at an obtuse angle, preferably 20° to the plane of the outer panel 15. The inner edge of each flange 22 has a return bend 23 parallel with the plane of the outer panel 15 and including a reinforcing lip 24. The parallel flange 23 are spot welded to an edge portion of the channel-shaped reinforcement rails 16—18 and extend for the full length of the door panels 6 and 7, as described later.

The angulation of the vertical flanges 22 provides, in the present example, an included angle of 40° with the doors closed, as indicated at A in FIG. 2. The V-shaped opening thus delineated at the door joints, provides sufficient clearance to prevent pinching of the fingers should they accidentally enter the joints when closing the door. The clearance A naturally opens when the doors are shifted to their open position, as shown in FIG. 6.

As best seen in FIGS. 3—5, the upper tracking rail, previously indicated at 11, is formed of sheet metal and is angle-shaped in cross section, providing a vertical track or flange 26. The tracking rail is secured by screws 27 passing upwardly through horizontal flange 28 of the trackway and into the top 9 of the door opening 2. The upper slide block assembly 13 interfits the vertical track 26 tracking rail 11.

The lower tracking rail 11 (FIGS. 3 and 4) is generally S-shaped in cross section, providing a stiffener channel 30 which is secured to the floor 12 within the door opening by screws 32. The lower rail includes a second reverse channel section 33 which provides a vertical track 34 rising upwardly from the floor level 12. The upper and lower tracks 26 and 34 are in vertical alignment with one another.

As explained later, the upper and lower slide block assemblies 13–13, which are in duplicate, are slotted to establish a slidable engagement with the vertical tracks 26 and 34 of the upper and lower tracking rails. Since the upper and lower slide block assemblies 13–13 are of duplicate construction, they are used interchangeably with the upper and lower edge portions of the door. The slide blocks are held in engagement with their tracks 26 and 34 under spring pressure and may be disengaged from the tracks if necessary.

As best shown in FIG. 7, the vertical sides 35–35 of the door opening 2 are provided with trim strips 36 against which the edge portions of the hinged door 6–6 seat when the folding sections are in closed position. Each trim strip 36 of sheet metal of right angular shape comprising a mounting flange 37 and a closure flange 38. The closure flange 38 has its outer edge portion doubled over as at 40 (FIG. 7). The closure flange 37 is located in or near the plane of the wall 3 surrounding the door opening so as to conceal the edge portion of the hinged doors 6 in their closed position.

In order to provide adjustment (FIG. 7), the mounting flange 37 of each trim strip 36 is provided with several elongated slots 41 to provide adjustment in the location of the trim strips with reference to the vertical sides of 35 of door opening 2. The trim strips are secured in adjusted position by screws 42 passing through the slots 41 and into the side 35 of the door opening.

In the present example, the door pulls 19, previously noted, are preferably fitted in the field after the door is installed. No latch mechanism is connected with the door pulls, the independent folding sections 5 and 6 being held in their closing position by the spring latches 14 as previously described.

PIVOT ASSEMBLIES OR HINGES

The pivot assemblies, indicated previously at 8 (FIGS. 3, 6 and 7), are of duplicate construction at top and bottom and connected the edge portion of the hinged panels. The pivot assemblies 8, being of duplicate construction may be installed interchangeably with the upper and lower edges of the hinged door panels 6.

Described in detail, each pivot assembly comprises a pivot block 44 preferably fabricated from a plastic material, such as nylon. The mounting or pivot block 44 is secured to the top 9 of the door opening by a flat head screw 45 passing through the pivot block 44 and into the top of header of door opening 2. As shown, the pivot block is generally curved in outline configuration and includes a squared end portion 46. The squared end portion 46 extends into abutment with the end portion of the vertical track 26 which is slotted as at 47. A screw 48 passes through the slot 47 and into threaded engagement with the squared end portion or tail piece of the pivot block 44. The upper mounting block 44 is thus secured in adjusted position by the two screws 45 and 48.

The lower pivot or mounting block 44 is secured to the floor 12 of the door opening in a similar manner by screws 45 and 48. In this case, the vertical track 34 is provided with a similar slot 47 (FIG. 7) to receive the screw 48 which anchors the squared end 46 of block 44 to the track 34. The end portion of each pivot block 44 is provided with a cone-shaped bearing recess 50 (FIG. 3). In order to make the blocks 44 interchangeable, a similar cone-shaped recess 51 is formed in the opposite side of the block. The edge portion of each hinged door 6 includes a pivot screw 52 (FIG. 3) having a tapered or cone-shaped journal 53 interfitting the cone-shaped bearing of the pivot block, so as to provide a pivot bearing between the screw 52 and pivot block 44.

The pivot screw 52 for the upper pivot block passes in threaded engagement through the upper channel-shaped reinforcement rail 16 (FIG. 3), the limbs of the rail being threaded to receive the screw 48. The threaded holes are extruded as at 54 to increase the length of thread engagement. The ends of the screws 52 opposite the cone-shaped pivot ends 53, are slotted as at 49 for screw driver engagement. The hinged door 6 at the opposite side of the door opening is pivotally mounted in a similar manner.

In installing the doors within the opening, the pivot screws 52 at the upper and lower portions of the hinged doors are retracted sufficiently to permit the cone-shaped journal portions 53 of the screws to be received into the cone-shape bearings 50 of the pivot blocks. The upper and lower screws are then threaded outwardly by screw driver engagement with the slot until the cone-shaped journal portions 53 are fully seated within the cone-shaped recesses 50 of the bearing blocks 44. By adjusting the upper and lower screws properly, the vertical position of the hinged door panel 6 may be adjusted vertically with reference to the door opening.

It will be noted in FIGS. 2 and 6, that the portion of each hinged door, which extends outwardly beyond the pivot screw 52 toward the side 35 of the door opening, forms a lever portion indicated at 59. Thus, as the hinged door proper is pivoted inwardly toward its closed position, as indicated by the arrow B, the lever portion 59 pivots outwardly toward and into contact with the trim strip 36 to provide a neat finished appearance.

The swinging edge of each hinged door 6, opposite its pivoted end is hingedly connected to the mating edge portion of its companion sliding door 7 (FIGS. 2, 6 and 10). The arrangement is such, as noted earlier, that both the hinged door 6 and the sliding door 7 swing outwardly in accordion fashion, while the inner edge of the sliding door 7 travels in a straight line, as delineated by the upper and lower tracking rails 11.

As best shown in FIG. 10, the hinged connections, previously indicated at 10, between the the hinged doors 6 and sliding doors 7, are formed as an integral part of the three horizontal reinforcement rails 16, 17 and 18. In forming the hinges 10, the side flanges at the end portions of the reinforcing rails 16, 17 and 18 are removed in the hinged areas (FIGS. 2 and 6) leaving a projection 56 extending from the web. To form the hinged connections 10, the end portions of the projections 56 are slotted to form spaced tongues, the tongues of the mating projections 56 being located alternately so that the tongues and slots interfit one another at the mating ends of the rails. The tongues are then curled as at 57 (FIG. 10) to form the hinges. To complete the connection, a hinge pin 58 is inserted through the mating curls 57 in the customary fashion. As best seen in FIGS. 9 and 10, the flat endwise projections 56 of the reinforcing rails are spot welded as at 60 to the return bend or flange 23 of the reinforcing flanges 22 as described earlier.

As best shown in FIGS. 6 and 7, the opposite ends of the reinforcing rails 16, 17 and 18 have end portions similarly relieved, such that the web portion of the rail provides the flat endwise projection 61. The endwise projection 61 is spot welded as at 62 to the return bend or flange 23 at the edge portion of the doors opposite their hinged edges.

In installing the doors by means of the pivot screws 52, as outlined above, the sliding doors 7 may be disconnected from the hinged doors 6 by omitting the hinge pins 58 at the hinged connections 10. After the hinged doors 6 are installed, then the sliding doors 7 may be connected by inserting the hinge pins 58 through the mating curls 57 in the usual way.

SLIDE BLOCK ASSEMBLY

The slide block assembly, previously indicated at 13, is of duplicate construction for the upper and lower edge portions of each sliding door panel 7. The slide block assemblies are mounted at the edge portions of the horizontal reinforcement rails 16 and 18 (FIGS. 6 and 8). As shown in FIGS. 1 and 4, the 1 slide block assemblies are located at the free edges of the sliding doors 7 so as to guide the edges for straight line motion as the folding sections 4 or 5 are swung to their open positions.

Described in detail (FIGS. 2 and 8) each slide block assembly 13 is mounted within a generally U-shaped bracket 63 formed of sheet metal and having a web portion 64 seated against the surface of the horizontal rails 16 or 18 at the return flange 23 of the sliding door 7. The web portion 64 is provided with a pair of vertical slots 69 traversed by screws 65 for installing the brackets. The horizontal ears 66–66 of the bracket 63 project inwardly from the web and are drilled to provide bearings for the block mounting rod 67.

Each slide block 68, which engages the vertical track (top track 26 or lower track 34) is secured to the lower end portion of the mounting rod 67. As stated earlier, the slide block 68 is fabricated from a plastic material such as nylon to provide a lubricated sliding fit with reference to the tracks 26 and 34.

Again referring to FIGS. 2, 4 and 8, the outer face of each slide block 68 is slotted as at 70, the slot being slidably engaged with respect to the track 26 or 34. A compression spring 71 is interposed between the lower ear 66 and the slide block 68 to urge the block into sliding engagement with the track 26 or 34. To control the position of the block, the upper end portion of rod 67 is grooved and spring clip 72, of commercial design (FIG. 8), is engaged in the groove of the rod and rests upon the upper ear 66.

By virtue of the spring-loaded engagement of the slide block with the tracks 26 and 34, the blocks may be shifted upwardly so as to disengage their slotted portions 70 with respect to the tracks 26 and 34. This permits the entire folding section 4 or 5 to be swung outwardly into the room to provide access into the closet or other enclosure for cleaning or painting. As seen in FIG. 4, the slide blocks 68 and their tracks 26 and 34, are displaced rearwardly from the outer panels 15 of the doors 6 and 7. This arrangement conceals the tracks from view when the doors are in their closed position.

LATCHES

The spring latches 14 are located on the upper edges of the sliding doors 7 at their upper edge portions adjacent the hinges 10 as indicated diagrammatically in FIG. 1. Described in detail, (FIGS. 5 and 9), each spring latch comprises a flat strip of spring metal having a vertical shank portion 73 including a longitudinal slot 74. Each latch is adjustably secured to the upper reinforcement rail 16 by screws 75 passing through the slot and in threaded engagement with the web of the rail 16. The spring latch 14 includes an upper portion 76 extending inwardly at an angle with reference to the shank portion 73. The free end portion of the angular extension 76 is V-shaped as at 77 to engage the track 26 of the upper rail (FIGS. 5 and 9). The free end of the V-shaped portion 77 includes a downwardly inclined lip 78 which engages the lower edge of the track 26 so as to cam the V-shaped portion 77 downwardly then into latching engagement with the lower edge of the track 26.

From the foregoing, it will be seen that the latches 14 hold the folding sections 4 and 5 in their closed position and are disengaged at automatically when the folding section is drawn outwardly by pulling upon the knob or door pull 19. By latching the sections individually, the two sections 4 and 5 operate independently of one another, leaving one section closed unless it is drawn to its open position.

I claim:

1. A folding door for the door opening of a closet or other area, said door opening having a top, a pair of vertical sides, and a bottom adjacent the floor of the building, said folding door comprising:

a pair of folding sections;

each folding section comprising a hinged door and a sliding door hingedly connected to the swinging edge of the hinged door;

upper and lower pivot elements mounted at the upper and lower edge portions of the hinged door adjacent the side of the door opening;

bearing means mounted at the top and bottom of the door opening at opposite sides;

said pivot elements having outer ends pivotally connected to the said bearing means; 23

hinge means connecting the swinging edge portion of the hinged door to an adjoining edge of the sliding door, whereby the hinged door and sliding door may be articulated along said hinge means relative to one another;

respective upper and lower horizontal trackways extending across the door opening at the top and bottom thereof;

said trackways each including respective upper and lower tracks, said tracks disposed in a common vertical plane and projecting upwardly toward one another from the top and bottom of the door opening;

upper and lower guide elements mounted on the free outer edge portions of said sliding doors at the upper and lower portions thereof;

said upper and lower guide elements each having a respective vertical slot normally engaging the vertical tracks of the upper and lower trackways;

the open slots of said guide elements providing a shiftable engagement with reference to the vertical tracks of said upper and lower horizontal trackways, whereby the outer edge of each sliding door is guided for straight line motion when the hinged door and sliding door of said folding sections are articulated relative to one another to the closed or open position;

the guided edges of said sliding doors being disposed adjacent one another when the said folding sections are shifted to the closed position; and

spring means connected to said upper and lower guide elements for biasing the guide elements outwardly and thereby engaging the slots of the guide elements with the upper and lower tracks, said spring means yielding under pressure to provide inward movement of the guide means for disengaging the guide elements with reference to the said upper and lower tracks of the horizontal trackways, whereby the said folding sections comprising the hinged and sliding doors may be swung about the pivot elements to an open position relative to the door opening for access into the interior of the closet or other area.

2. A folding door for the door opening of a closet or other area, said door opening having a top, a pair of vertical sides, and a bottom adjacent the floor of the building, and said folding door comprising:

a hinged door and a sliding door interfitted within said door opening;

upper and lower pivot elements mounted at the upper and lower edge portion of the hinged door;

coacting bearing means secured to the top and bottom of the door opening adjacent one side thereof and interfitting the said pivot elements of the hinged door, thereby hingedly connecting the edge portion of the hinged door to the side of the door opening for a swinging motion;

said bearing means and coacting pivot elements including for positioning the hinged door vertically within the door opening;

hinge means connecting the swinging edge of the hinged door to an adjoining edge portion of the sliding door, adapting the hinged door and sliding door to be articulated relative to one another;

respective upper and lower horizontal trackways extending across the door opening at the top and bottom thereof;

said trackways each including respective upper and lower flanges projecting at right angles to the trackways, said flanges forming tracks disposed in a common vertical plane projecting outwardly toward one another from the top and bottom of the door opening;

elongated upper and lower guide elements secured to the free edge of the sliding door at the upper and lower edge portions thereof;

said elongated upper and lower guide elements each having a respective vertical slot facing outwardly, said vertical slots disposed in a common vertical plane and normally engaging the upper and lower tracks;

said elongated guide elements providing a shiftable engagement relative to the said upper and lower horizontal trackways for guiding the free edge of the sliding door in straight line motion when the hinged door and sliding door are articulated to the closed or open position; and

compressible spring means connected to said upper and lower guide elements for biasing the same outwardly and thereby engaging the slots of the guide elements with the edge portions of the upper and lower tracks, said spring means providing inward motion counter to the biasing effect of the spring means for disengaging the guide elements with respect to the said upper and lower horizontal trackways, whereby the hinged door and sliding door may be swung about the pivot elements to an open position relative to the door opening for access into the interior of the closet or other area.

3. A pivot structure for the hinged edge portion of a hinged door as set forth in claim 2 in which there is provided respective threaded elements secured to the upper and lower edge portions of the door, respective pivot screws passing in threaded engagement through said threaded elements and disposed on generally vertical axes, each of said pivot screws having an outer end which provides a journal, respective upper and lower bearing means mounted at the top and bottom of the door opening adjacent the vertical side thereof and displaced outwardly from the door opening, said journals of the pivot screws projecting outwardly and into bearing engagement with the said bearing means, thereby hingedly connecting the edge portion of the hinged door to the side portion of the door opening in a plane displaced outwardly from the opening, said pivot screws adapted to be adjusted vertically with reference to the opposite edges of the door, thereby to locate the door vertically with reference to the door opening, and means projecting inwardly from the door toward the door opening for mounting the upper and lower guide element in positions displaced inwardly from the plane of the doors, said upper and lower horizontal trackways and tracks, which are engaged by the slots of said guide elements, thereby being displaced inwardly and concealed from view by the doors.

4. A pivot structure for the hinged edge portion of a hinged door as set forth in claim 2 in which there is provided a pair of pivot mounting elements secured to the edge portion of the hinged door at the upper and lower portions thereof, said pivot mounting elements each having a threaded hole formed therein, said threaded holes being located in a horizontal direction inwardly from the hinged edge of the hinged door, a pair of upper and lower pivot screws disposed on vertical axes and threaded through the threaded holes of the mounting elements, said pivot screws projecting outwardly in opposite directions with respect to the upper and lower edge portions of the door, the outer ends of said pivot screws providing journals, respective bearing means mounted at the top and bottom of the door opening in positions spaced in a horizontal direction inwardly from the vertical side of the door opening and displaced outwardly from the door opening, said pivot screws and bearing elements providing a fulcrum point, whereby the edge portion of the door which extends in a horizontal direction from the pivot screws toward the vertical side of the opening forms a lever portion, said pivot screws and bearing means mounting the door for swinging motion, whereby upon swinging the door inwardly toward a closed position with reference to the door opening, the lever portion of the door beyond the pivot screws swings outwardly, and a trim strip secured to the vertical side of the door opening and engaging the said lever portion of the door in the closed position thereof, said pivot screws and bearing elements locating the door in a plane displaced outwardly from the upper and lower trackways and thereby concealing the trackways from view when the doors are in closed position.

5. A pivot structure for the hinged edge portion of a hinged door as set forth in claim 2 in which the hinged door includes horizontal channelsshaped reinforcement rails extending along the upper and lower edge portions thereof and projecting inwardly from the plane of the door toward the door opening, in which the hinge elements comprise upper and lower pivot screws threaded through the said channel-shaped rails adjacent the hinged edge portion of the door upon axes displaced inwardly from the plane of the door toward the door opening, said pivot screws having outer ends which are generally cone-shaped, and a pair of pivot blocks mounted at the top and bottom of the door opening adjacent the vertical side thereof, said pivot blocks being located outwardly relative to the trackways and having cone-shaped recesses formed therein, the cone-shaped ends of the pivot screws being in bearing engagement with the recesses of the bearing blocks at top and bottom and thereby providing a hinged connection at the swinging edge portion of the door, whereby the door is displaced outwardly relative to the trackways and guide elements to conceal the same from view when the doors are closed, said pivot screws being adjustable relative to one another whereby the hinged door may be raised or lowered with reference to the door opening by relative rotation of the said pivot screws.

6. A guide structure for the free edge portion of a sliding door as set forth in claim 2 in which there is provided a bracket element secured to the free edge portion of the sliding door at the upper and lower edge portion thereof, said guide elements being in the form of elongated slide blocks including said slots, shiftably mounted within each of said mounting brackets at the upper and lower edge portions of the door, each of said guide blocks being mounted for movement along a substantially vertical axis, the axis of each of said guide blocks being displaced inwardly from the plane of the door and projecting toward the door opening, said trackways and tracks engaged by the slots of said guide blocks, and being displaced inwardly to a concealed position relative to the doors when the doors are in closed position, said guide blocks adapted to be retracted to a disengaged position with respect to said tracks, thereby disengaging the free edge of the sliding door with respect to the said tracks, whereby the sliding door and hinged door may be swung about said pivot elements outwardly to an open position with respect to the door opening.

7. A guide structure for the free edge portion of a sliding door as set forth in claim 2 in which a mounting bracket is secured to the free edge of the sliding door at the upper and lower portion thereof, a slide rod mounted on a generally vertical axis for sliding movement relative to each of said mounting brackets, said guide elements being in the form of elongated slide blocks including said vertical slots, a respective guide block being mounted upon the outer end portion of said slide rod, a compression spring disposed between the mounting bracket and guide block and urging the guide blocks outwardly at the upper and lower edge portions of the door, each of said trackways having a horizontal track extending in a vertical plane outwardly from the top and bottom of the door opening, the slots of said guide blocks being slidably engaged upon said tracks and thereby guiding the free edge of the sliding door in straight line motion, said compression springs adapting the upper and lower guide blocks to be retracted for disengagement with respect to said tracks, whereby the hinged and sliding doors as a unit may be pivoted about said pivot elements to an open position with respect to the door opening.

8. A guide structure for the free edge portion of a sliding door as set forth in claim 2 in which a mounting bracket is secured to the free edge of the sliding door at the upper and lower portion thereof, a slide rod mounted on a generally vertical axis for sliding movement relative to each of said mounting brackets and including outer end portions projecting outwardly, the axes of said slide rods being displaced inwardly from the plane of the door by said mounting brackets, each of said guide elements comprising a slide block mounted upon the outer end portion of said slide rod, a compression spring disposed between the mounting bracket and slide block and urging the slide blocks outwardly at the upper and lower edge portions of the door, each of said slide blocks having said slot formed in the outer face thereof and displaced from the axis of the guide rod toward the tracking rail, each of said tracking rails having a base structure attached to the top and bottom of the door opening with said tracks extending in a vertical plane outwardly from the top and bottom of the base structure, the said slots of the slide blocks being slidably engaged upon said tracks and thereby locating the door in a plane displaced outwardly from the tracking rails for concealing the rails when the doors are closed, said slide blocks guiding the free edge of the sliding door in straight line motion, said compression springs adapting the upper and lower slide blocks to be retracted for disengagement with respect to said tracks, whereby the hinged and sliding doors as a unit may be pivoted about said pivot elements to an open position with respect to the door opening.

9. A door construction as set forth in claim 2 in which there is provided two folding sections, each folding section comprising a hinged door and a sliding door hingedly connected to the swinging edge of the hinged door and in which the edge portions of the hinged doors are pivotally connected to the door opening along the opposite vertical sides thereof, each of said sliding doors having a spring latch located adjacent the meeting hinged edges thereof, said spring latch constituting a strip of flat spring material having a vertical shank attached to the door and projecting upwardly above the upper edge of the door, the vertical shank having an angular extension projecting from the upper end thereof, said angular extension including a camming portion which establishes a latching engagement with the trackway at the top of the door opening when the folding sections are closed, whereby the folding sections are latched independently in closed position, and hand grip means on said folding sections for pulling the sections individually to the open position.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,554,267 Dated January 12, 1971

Inventor(s) John H. Brinker

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1, Column 7, line 7, after "means" delete "23"

Claim 2, Column 7, line 59 after "including" insert "means

Claim 5, Column 9, line 3, change"channelsshaped" to "chanel-shaped"

Signed and sealed this 6th day of April 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER,
Commissioner of Paten