

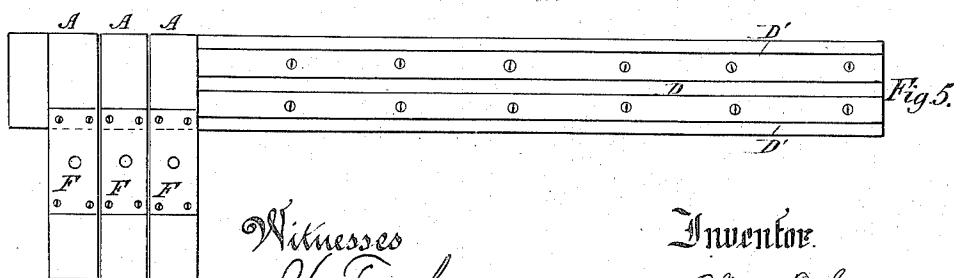
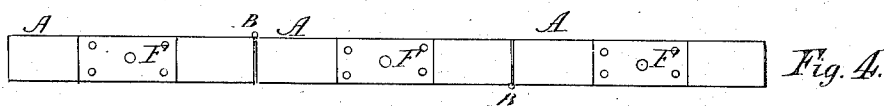
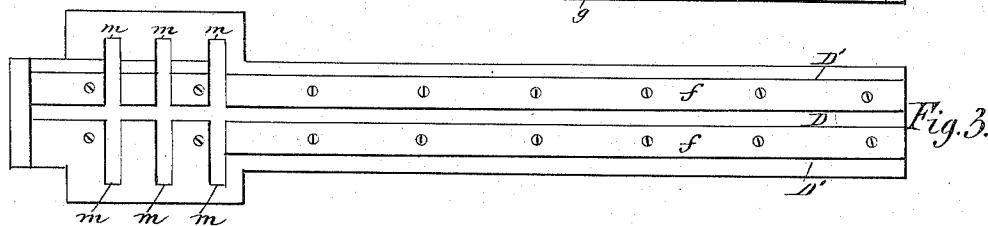
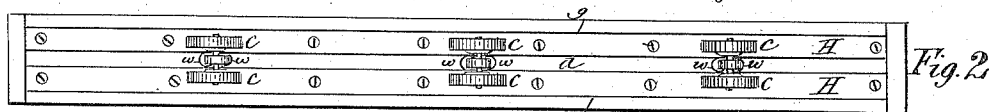
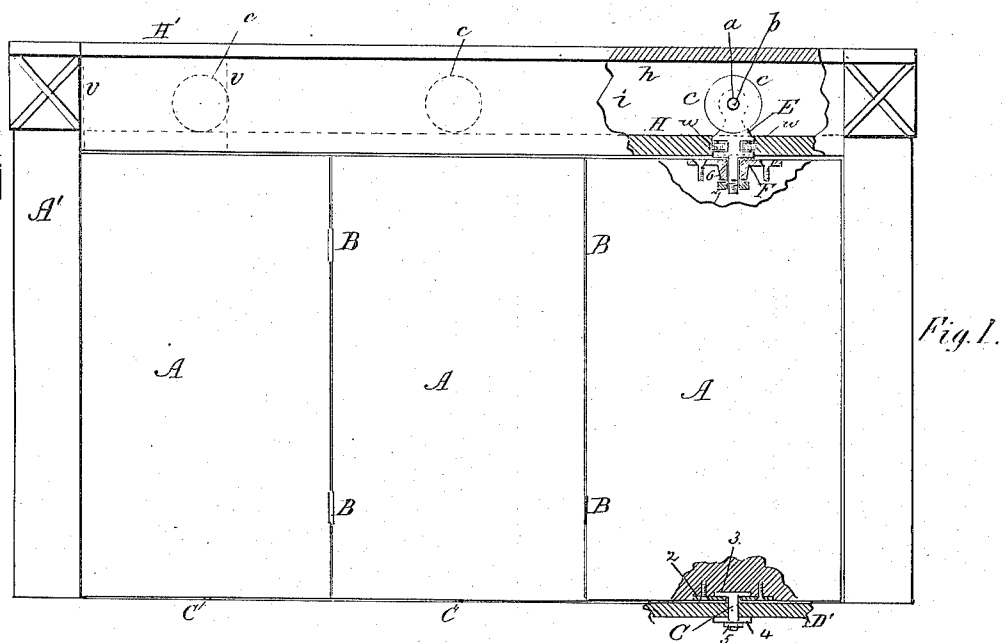
(No Model.)

2 Sheets—Sheet 1.

O. T. SPRINGER.
SLIDING OR FOLDING DOOR.

No. 567,570.

Patented Sept. 8, 1896.



Witnesses
H. Taylor
W. H. Lammes

Inventor
Oliver T. Springer
By W. Bruce Atty

(No Model.)

2 Sheets—Sheet 2.

O. T. SPRINGER.
SLIDING OR FOLDING DOOR.

No. 567,570.

Patented Sept. 8, 1896.

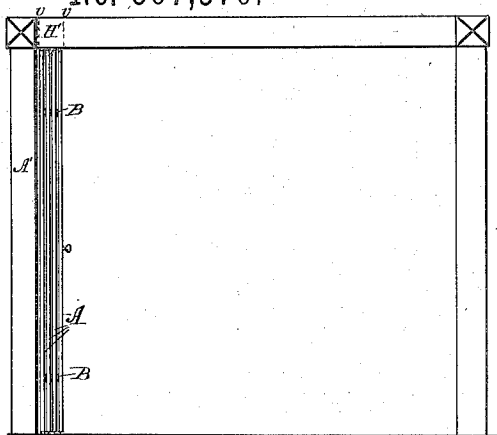


Fig. 15.

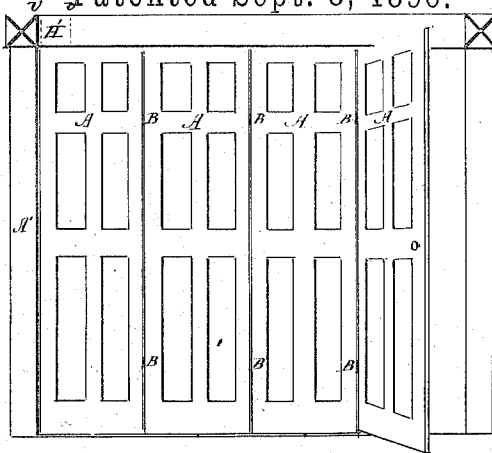


Fig. 14.

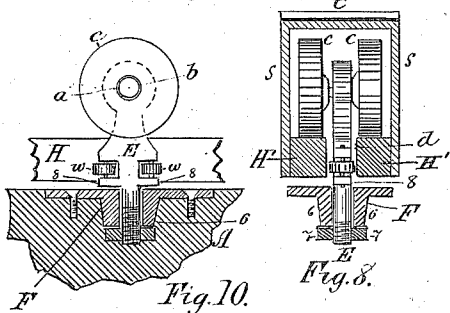


Fig. 10.

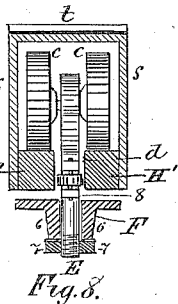


Fig. 8.

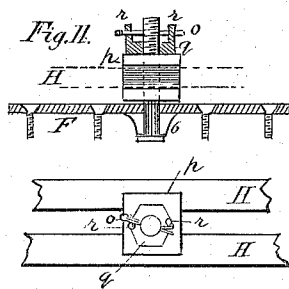


Fig. 12.

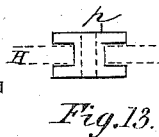


Fig. 13.

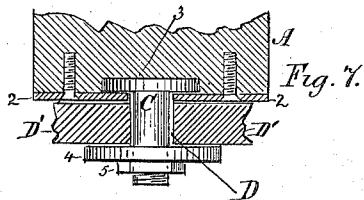


Fig. 7.

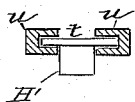


Fig. 9.

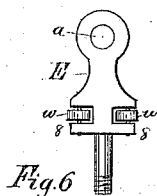


Fig. 6.

Witnesses
O. Taylor
Wm. H. Gamble

Inventor
Oliver T. Springer
By W. Bruce
Atty

UNITED STATES PATENT OFFICE.

OLIVER TIFFANY SPRINGER, OF BURLINGTON, CANADA.

SLIDING OR FOLDING DOOR.

SPECIFICATION forming part of Letters Patent No. 567,570, dated September 8, 1896.

Application filed February 23, 1894. Serial No. 501,291. (No model.)

To all whom it may concern:

Be it known that I, OLIVER TIFFANY SPRINGER, a citizen of the Dominion of Canada, residing at Burlington, in the county of Halton, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Sliding and Folding Doors, of which the following is a specification.

My invention relates to such improvements in folding or sliding doors or movable partitions which will always be perpendicular, cannot sag, easily operated to open or close, can be moved to either side of a room or left in the center, are particularly adapted for schools, churches, private houses, or any building where folding or sliding doors or movable partitions are required.

The invention consists in, first, a series of doors, frames, or panels hinged together on oppositesides. Each one has a pivot-pin in the center of the bottom portion which slides in a groove or track in the floor or frame. The top of each door is provided with a swivel-pin let into each. The lower part of each pin is round and the upper part flat-shaped, with a hole through each for a pin to carry two rollers for each door, and made to run on a horizontal track above the doors. One end of the track being movable allows the doors to be instantly folded side by side out of the way. Side friction-rollers attached to the said pin remove side friction of the track. I attain these objects by mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of three doors and frame. Fig. 2 is a plan view of the top track. Fig. 3 is a plan of the bottom track. Fig. 4 is a top view of the doors without frame. Fig. 5 is a top view showing doors folded to one side. Fig. 6 is a perspective view of the top swivel-pin. Fig. 7 is a cross-section of bottom pivot-pin track and door. Fig. 8 is a cross-section of upper track with rollers, &c. Fig. 9 is a side view of movable section of track. Fig. 10 is a side view, detached, of one roller, pivot-pin, socket-plate, and track. Fig. 11 is a sliding block and fastening, being a slight modification in lieu of the rollers. Fig. 12 is a top view. Fig. 13 represents the end view of the sliding block. Fig. 14 is a side view of doors closed as a partition. Fig. 15 represents the same folded back.

A A A, Fig. 1, represent doors hinged together on each side alternately by hinges B. Each door has a plate 2, secured to the central bottom portion, having a circular opening through which is made to pass a round pin C, having a flat head 3 above the plate 2. The said pin slides in the groove D, which may be made in the floor or between the bottom rails D', covered with metal strips *ff*, as shown at Fig. 3. The lower portion of the pin C may have a flange or disk 4 attached thereto or the pin passed through it and a nut 5 screwed on the threaded end of the pin C, as shown at Fig. 7, or riveted, allowing each pin C to slide horizontally with its door and prevent them from being raised out of place.

The device for hanging each door at the top may be described as follows: E is a swivel-pin, shown at Fig. 6 detached, and attached at Fig. 1, to the center top of each door, and made to pass through a metal plate F, having a central boss 6 countersunk in the top of each door. The said swivel-pin is screw-threaded at the bottom and held in place by a nut 7. The upper end of the said pin has a hole *a* through it to receive a spindle *b*, which carries two rollers *c c* for each door. The said rollers run on the upper track H above the doors, and may be covered with rubber to prevent noise. There are two projections on the sides of the said swivel-pin for a bearing on the plate F, and the flat portion of the swivel-pin E slides in the space *d* between the two portions of the track H. Two friction-rollers, *w w* are held in the swivel-pin E to prevent side friction when the doors are opened or closed. *g g* are metal strips screwed on the top of the upper track for the rollers *c* to run upon. *h* is a cover for the chamber *i* above the upper track to allow room for the rollers to operate. A portion H' of the top track H will be movable between the dotted lines *v v*, Fig. 1, to allow the doors when pushed back to slide at or about right angles to the main track to make the doors flush with the frame A' on either side, slots *m* being made on both sides of the bottom track to admit the pins C at the bottom of the doors to allow them to be placed in the position as shown at Figs. 5 and 15, when they are out of the way.

Fig. 8 shows a section of one end of the movable portion H' of the track to allow the doors

to be moved sidewise at the end of the track, *s* representing a metal plate, $\square$ -shaped, fastened to the track on both sides, and *t* a top plate secured to the frame as most convenient. *u u* are two separate grooved plates into which the plate *t* slides and carries the movable portion II' of the track and doors to either side of the partition, as desired.

In operating the doors it will be seen that assuming them all closed, as in Fig. 1, in a straight line forming a partition, to open them they are pressed sidewise at their hinged portions, which causes them to fold together flat, when they may be moved to any desired side of a room, as seen at Fig. 15, the slots *m m m* (as many as are pinned doors) in the side extensions of the lower track and the movable portion of the top track between the dotted lines *v v* enabling the pin *C* at the bottom of each door to slide in the said slots *m*, and make the edges of the doors flush with the frame *A'* on one side, as in many cases so desired to be out of the way in one portion of a room, or as in front of a stage, &c.; otherwise the slots *m* may not be needed, and the doors will fold in the center of the frame or in a recess in a partition against which they abut.

To close the doors, they are moved out to the line of partition and closed together. To make tight joints on their edges for a tight partition, each door will be alternately tongued and grooved, which fills up the space between the doors.

The doors can be made of wood in any manner with paneling, &c., or frames with glass, as desired.

I have shown the doors operated on a double track, but do not confine myself to that construction, as they could be operated on a single track by omitting one of the rollers *c* over each door and using the same pins or slightly altering them to suit the requirements, but I prefer two rollers *c c* to each swivel-pin, as balancing the doors more effectually.

It will be observed that if a recess is made in the wall or partition against which the doors fold, corresponding in width to the width of the doors and in depth to the thickness of the doors, the whole general width of the room may be preserved, as the doors could be folded in the recess.

It will further be observed that I have shown the doors capable of being moved along the

track by means of the swivel-pins and rollers, but the rollers could be replaced by a double-grooved slide block *p* and made to slide upon corresponding projections on the track, as shown at Figs. 11, 12, and 13, the latter being an end view. The upper end of the pin *E* in this case would be screw-threaded, upon which, after passing through the slide block *p*, would be screwed a pronged nut *q*, having two vertical projections *r r*, and held from turning by means of a split pin *o*, passing through a hole in the swivel-pin *E* and the ends of the split pin pressing on opposite sides of the prongs *r r*. The said swivel-pin in this case would be attached to the plate *F*, secured to the top of each door.

It will be understood that the said apparatus is capable of modification in various ways other than described. The modified arrangement, as shown in Figs. 11, 12, and 13, which correspond to Figs 8 and 10, does not materially change the operation of the several details; but I prefer to use the rollers instead of the slide-block device in practical operation. For private houses, or places where the bottom track would be an objection, about eighteen inches of track only may be laid, and bolts may be used at the bottom of the other doors to render them rigid when drawn out, and one door may be left free, as in Fig. 14, without attachment at either bottom or top, and be operated as an ordinary door.

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

The combination with the sliding doors *A*, of the upper track *H*, suitable means for hanging and guiding the doors thereon, the lower track *D'* having the longitudinal groove *D*, the lateral grooves *m* communicating therewith, the guide-pins *c* operating therein, the construction and arrangement being such that the doors *A* may be moved out of the way after having been slid to one side, substantially as and for the purpose set forth.

Dated at Hamilton, Ontario, Canada, this 23d day of January, 1894.

OLIVER TIFFANY SPRINGER.

In presence of—

WM. BRUCE,

C. RIGGS.