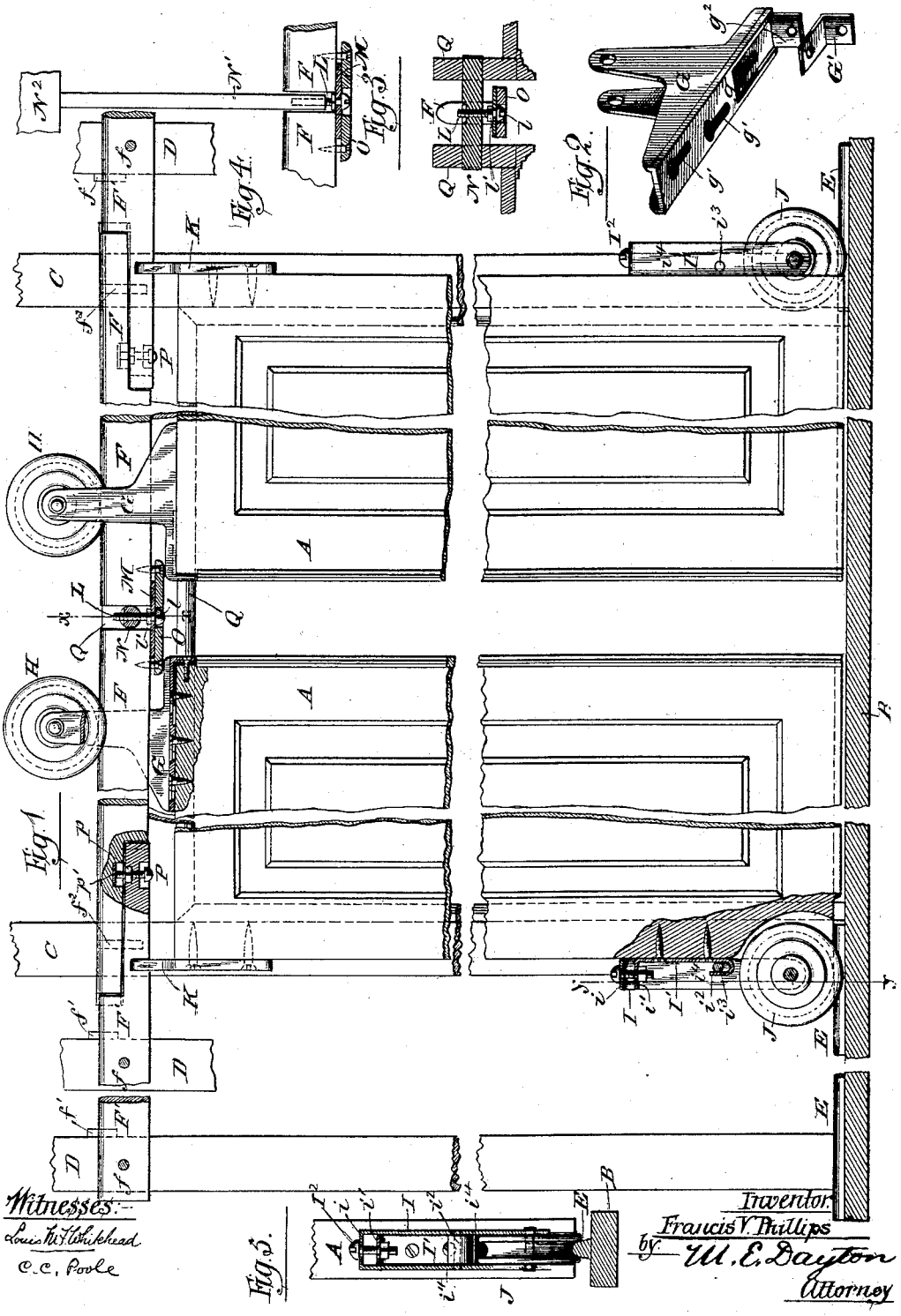
(No Model.) 2 Sheets—Sheet 1.

F. V. PHILLIPS.

SUPPORTING DEVICE FOR SLIDING DOORS.

No. 345,988. Patented July 20, 1886.



Witnesses:
Louis H. Whitehead
C. C. Poole

Inventor:
Francis V. Phillips
by W. E. Dayton
Attorney

(No Model.) 2 Sheets—Sheet 2.

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Fig. 7.

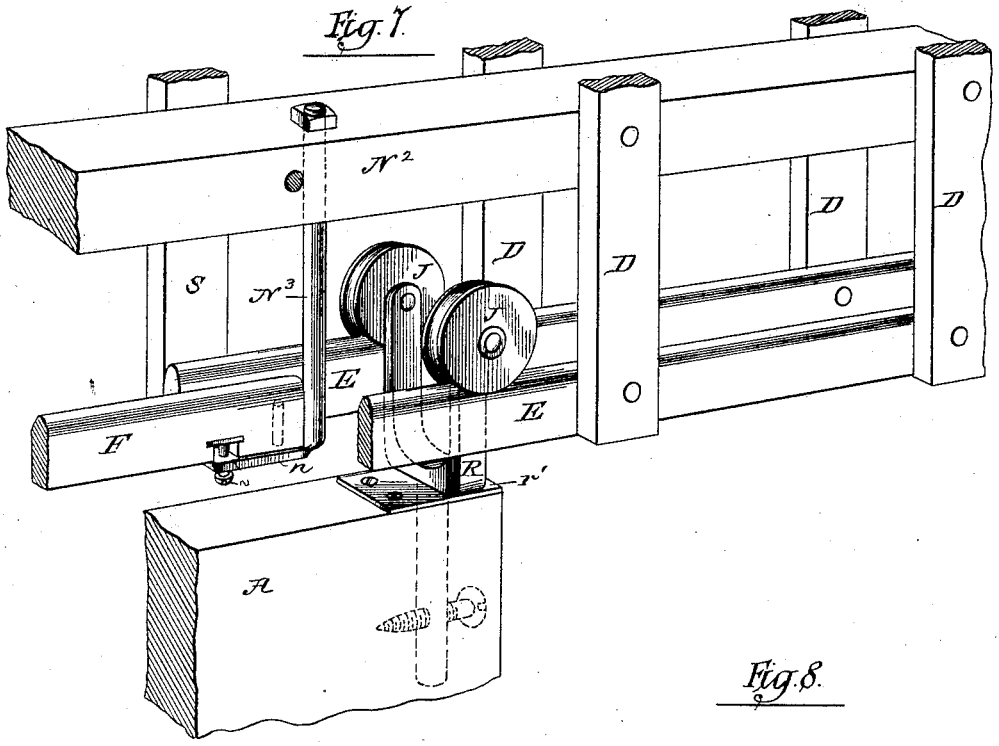


Fig. 8.

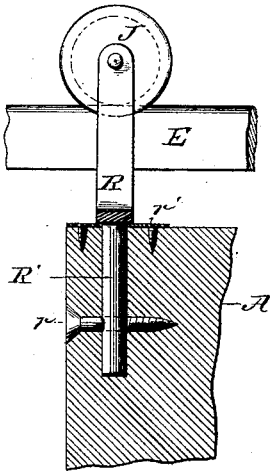


Fig. 6.

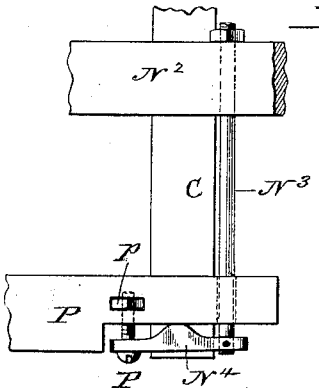
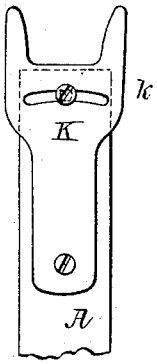


Fig. 9.



Witnesses:-
Louis M. T. Whitehead
O. C. Poole

Inventor:-
Francis V Phillips.-
by W. E. Dayton
Attorney.

UNITED STATES PATENT OFFICE.

FRANCIS V. PHILLIPS, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHARLES H. SMITH AND JOHN HEWITT, OF SAME PLACE.

SUPPORTING DEVICE FOR SLIDING DOORS.

SPECIFICATION forming part of Letters Patent No. 345,988, dated July 20, 1886.

Application filed February 13, 1886. Serial No. 191,814. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS V. PHILLIPS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Supporting Devices for Sliding Doors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention has for its primary object to provide a construction in hangers for sliding doors, whereby the doors may be expeditiously hung, and thereafter adjusted to fairly meet each other or their opposing jambs, and to also register properly with the faces of the frames, through which they slide, even if the latter be not parallel or perfectly vertical.

The invention has minor objects, which will appear in the course of the following description, and the nature of the invention will also clearly appear from said description and the appended claims.

In the drawings, Figure 1 is a view of two oppositely-arranged meeting and sliding doors mounted by means of devices constructed in one desirable and practicable form in accordance with my invention, certain parts being broken away to better show the details of construction. Fig. 2 is a perspective of a bracket which is fastened to the upper and outer edge of the door, and in which is mounted the roller which supports the front part of the door. Fig. 3 is a detail view in transverse section taken in the plane of the line *x x* of Fig. 1. Fig. 4 is a modification of the construction shown in Fig. 3. Fig. 5 is a fragmentary rear view of the door in vertical transverse section of a bracket, which carries the roller which supports the rear part of the door when this roller is located at the bottom of the door, said section being taken in the line *y y* of Fig. 1. Fig. 6 is a fragmentary side view of a modified form of device for adjusting that end of the track supporting the front of the door which is adjacent to the housing into which the door slides when retreated. Fig. 7 shows elevated track or tracks for the support of the rear part of the door, instead of a track on the floor, as in Fig. 1. Fig. 8 is a detail of the construction shown in Fig. 7. Fig. 9 is a rear view of the door, showing the guide seen in side view in Fig. 1 when constructed to be laterally adjustable.

Describing the invention as here shown applied to double doors, and first as seen in Fig. 1, A A are oppositely-arranged meeting and sliding doors.

B is the floor.

C C are the upright parts of the door-frame, into which the doors A A slide.

D D are uprights which support the lath and plaster on both sides of the space in the hollow partition, into which the said doors retreat.

E E are tracks laid on the floor B in the hollow partition or housing, and extending only to or near the uprights of the door-frame, or, in other words, not extending across the doorway.

F F are horizontal tracks extending only across the doorway, and a short distance into the recesses into which the doors retreat.

F′ F′ in Fig. 1 are guide-rails for guiding the upper rear corners of the doors, if it is desired to so utilize them, but more particularly they are supports for the adjacent ends of the adjustable tracks F F.

G G are roller-brackets, which are fastened to the upper adjacent corners of the doors for upholding the front parts of the doors. H H are rollers mounted in said brackets, and fitted to and running on the adjustable tracks F F.

I I are brackets attached to the rear lower faces or corners of the door, in which are mounted the rollers J J, which in Fig. 1 support the doors at these points upon the tracks E E. The brackets supporting the rear parts of the doors are desirably adjustable vertically as to the door, but not necessarily so. They are shown adjustable in Fig. 1 of the drawings, as will be further pointed out.

K K are bifurcated projections secured to the upper and outer corners of the doors and engaged with the guide-strips F′ when the rollers J are placed at the lower rear corners.

L is an adjusting-bolt, threaded into some vertical support, (as the cross-bar N or the depending rod N′,) whereby the adjacent ends

of the tracks F F may be simultaneously and equally raised or lowered.

M is a plate arranged beneath or otherwise engaged with the adjacent ends of the tracks F F, and through which the adjusting-screw L passes, so as to lift said plate and tracks by its head *l* when the said screw is run up.

O is a block, preferably separate from the plate M, secured to the tracks F F, (over the plate M, if not identical therewith,) and of suitable length to form stops for the several doors A A, limiting the distance to which said doors may be severally drawn forward.

P P are screws for the vertical adjustment of the remote ends of the several tracks F F.

Q Q are opposite horizontal and overhead frame-pieces of the doorway.

The tracks F are here shown as single and placed centrally over the doors, and the rails F′ of Fig. 1 are placed in line with them. The latter are illustrated as being supported by means of horizontal pins *f f* thrust through the opposite uprights D D and through said rails. The rails F′, if so placed, may be held at a proper distance from said uprights and in suitably accurate alignment with each other and the intermediate tracks, F F, by blocks *f′ f′*, nailed to the edges of the uprights D and reaching inward into contact with the rails from both sides of the latter. The rails F′ extend out of or to the mouth of the recesses, into which the doors run, and near their outer ends are each made to support a vertical adjusting screw, P, which in turn supports the adjacent end of the track F, the head of said screw being exposed on the under side of the rail F′ in position to be conveniently reached with a screw-driver after the work is set up. Upon these screws rest the outer ends of the tracks F, so that by rotating said screws said outer ends of the tracks F may be severally raised and lowered at will. One of the several practical and familiar constructions for this adjustable screw-connection is shown at the left in Fig. 1, where the screw P is shown threaded through a nut, *p*, which rests on the rail F′, and the end of the screw enters a recess in the superposed track-rail F, in the bottom of which recess a metal plate is placed to take the bearing of the screw. Another form of support for adjustably upholding this end of the track F is shown in Fig. 6, in which a rod, N^3, depends from the upper stationary beam or other fixed part, N^2, and has pivoted to its lower end a lever, N^4, the central part of which rises into contact with the lower surface of the track, and the opposite end of which gives passage to a screw, P, which engages a nut, *p*, set in the track. In this case the burden falls first on the lever and finally on the head of the screw P. Still another form of such support is shown in Fig. 7, wherein the depending rod N^3 has a lateral arm at its lower end, which projects lengthwise beneath the track F, and has threaded through it a screw, P, upon which the track rests, as in Fig. 1. The tracks F in all these cases run far enough into the housings to permit the front rollers, H, to pass beyond the jamb when the doors are fully retreated, while at the same time the adjusting-screw P is in each case accessible from the doorway. The adjacent ends of the track-rails F are raised and lowered by turning the similar adjusting-screw, L, which passes through and bears by its head against a plate, M, on which the ends of the track-rails F rest. A collar, *l′*, on the screw L, above the plate M, prevents the track-rails from lifting at this point when the doors are retreated and the rollers H have passed the points of support at P. The head of screw L may be made accessible through a hole in the stop-block O, as shown, or by removing said block, if it covers the screw.

The screw L is shown in Fig. 1 as being threaded into a cylindric bar of iron, N, which is supported at its ends in the horizontal inner frame-pieces, Q Q. (Shown in section in Fig. 3.) The only reason for using a cylindric instead of other form of bar N has reference solely to convenience in putting it in, a simple auger-hole through the frame-pieces Q being sufficient to receive it. If preferred, the screw L may be threaded into the end of a rod, as N′, Fig. 4, suspended from an overhead support, N^2, or any other form of stationary part may be provided to receive the screw L. So, also, in place of the plate M extending beneath the adjacent ends of the track-rails and supporting their weight and burden by means of the screw L, which passes through it, any other form of support may be provided without departure from my invention. The only reason why this particular arrangement of plate is advised is that the track-rails may be simply cut off straight across at their meeting ends to give them their desired length for a particular doorway, while if the plate or its equivalent were otherwise connected with them additional fitting would be required.

As a desirable form of the tracks and rails F F′ for manufacturing and merchant purposes, and one that will be convenient for a carpenter to fit and adjust in place when arranged as shown in Fig. 1, I prefer to make said tracks and rails of the same sectional dimensions, and to halve or overlap them, as shown, to give the desired prolongation of each for the several purposes stated. A dowel-pin at f^2 will keep the inner end of the track-rail F in place, or the vertical meeting ends of F and F′ may be tenoned or grooved or oppositely V-shaped, as indicated by dotted lines in Fig. 1.

It is an essential feature of my invention that the adjustable tracks F F support only the front or meeting sides of the doors A A, and that the rear portions of said doors are supported by wholly separate tracks, which are within the hollow partitions and need not be accessible for adjustment. As shown in Fig. 1, the doors have their rear rollers, J, at their lower outer corners, and said rollers run on the tracks E, fastened to the floor B. For

several reasons this is the preferable arrangement, though another will be presently described.

The perfect adjustment of the doors A A, both with respect to each other and with reference to the several uprights of the door-frame at any time—as from uneven settling of the house, as well as from the original construction of the door-frame out of square, or of the floors or other parts affecting the doors out of level—is possible by means of the accessible screws L and P alone. Thus if the doors stand apart at bottom when brought together, the screw L will be run up, lifting the adjacent ends of the tracks F till the doors meet perfectly at both ends, and vice versa. If either door, when retreated, stands with its front edge out of line with the face of the frame upright, the screw P will be run up or down, as the case may be, till the face of the jamb and the edge of the door are flush or parallel. In view of the easy adjustments thus obtainable after the doors are hung it is obviously a matter of less care, skill, and labor to set the parts which are confined within the housing and to put up the doors. The tracks E E should of course be placed in line with each other, but if secured to the floor it is not necessary that the floor upon which they rest shall be level or in a plane. The rails F′, if to be used as guides, as is desirable, should also be in the same vertical plane with the tracks E when the latter are upon the floor and high enough to let the doors slide beneath them; but they need not be placed with nice accuracy as to their vertical position, and, as already seen, they may be dispensed with if other support for the screw P be provided.

The brackets for the rollers at the upper and front corners of the doors may be of any approved form so far as relates to the operation of my principal improvement above referred to; but for certain subordinate purposes I prefer to employ the construction shown in Figs. 1 and 2 of the drawings. In this construction the bracket is wholly external to the door, and is intended to be detachable without withdrawing the screws which hold it to the upper edge of the door. To this end the base-plate *g* of the bracket is provided with key-hole-shaped slots *g′*, for the screws, the eyes of the said slots being at the ends of the latter remote from the front edge of the door. A short flange, g^2, depends from the base-plate over the front edge of the door, and has a hole for a horizontal screw. By withdrawing this screw, which is exposed and accessible, the bracket may be drawn forward under the heads of the top screws until the latter reach the eyes of the slots, through which they will escape, releasing the bracket. Broken or imperfect brackets or worn pulleys may thus be replaced easily without disturbing the other parts further than to withdraw the screw L, and thus release the adjacent ends of the tracks F, to permit the old brackets to be taken off and new ones, or brackets containing new pulleys, to be slipped over their said ends. In order to obtain a hold for the horizontal screw which enters the depending flange g^2 without making said flange long enough to extend below the frame, an angle-plate, G′, may be first placed over the corner of the door, as shown in Fig. 1, and held by the outermost vertical screw, which passes through the base-plate *g′*. The horizontal screw will preferably be threaded into the angle-plate G′, to secure a better hold for said screw, and thus prevent the horizontal movement of the bracket.

The roller or rollers J, which support the rear of the door, need not be adjustable for the purpose of bringing the doors to register with each other and the door-frame, since these results, as above pointed out, are obtainable solely by means of the adjustable tracks F, upon which the forward parts of the doors are suspended; but for greater ease in applying the said rollers J accurately to the doors, and for varying the space beneath the door to compensate for changes in elevation resulting from adjustments that may be made of the tracks F, I prefer to provide for such adjustment for the said rear roller-support. A two-part bracket or roller-support is shown in Figs. 1 and 5 for this purpose, in which the part that carries the roller is vertically movable and the other part is fixed to the door. In this case I is a bent strap or inverted-U-shaped casting, between the parallel vertical plates i^4 of which, and at the lower ends thereof, is pivoted the single roller J. The upper ends of said plates i^4 are connected by the cross-plate *i*. I′ is a plate which is secured flatwise against the rear edge of the door, and is as wide as the space between the parallel plates i^4 of the part I. The plate I′ is provided at its upper end with a horizontal projection, *i′*, which stands outward from the door beneath the cross-plate *i* of the part I. Through these two horizontal parts extends a threaded bolt, I^2, the head of which is preferably slotted to receive a screw-driver, and rests exposed on the cross-plate *i*. By running this screw into the part *i′* (or into a nut beneath said part *i′*) the door will of course be raised with respect to its roller J. The lower end of the plate I′ has a transverse and vertically-elongated passage or slot, (in this case formed by bending the lower end, i^2, upward,) in which works a cross-pin, i^3, extending from one to the other of the vertical plates i^4 of the part I, and thus serving to keep the said part I upright. Adaptation of this adjustable bracket to a position at the top of the door is obvious.

When, in the use of a floor-track, E, the rails F′ are utilized as guides for the rear upper corners of the doors, the latter may be engaged with said rails in any one of several suitable and familiar ways. The plate K, bifurcated at its upper end (see Fig. 9) to run on opposite sides of the rail, is a simple and conveniently-applied device for this use, and it may

serve both to keep the door from swinging laterally and to prevent the roller J from rising off the track E. The latter result requires that the lower edge of the rail F′ be set practically parallel with the rail E. I prefer to make the plate K laterally adjustable on the door, as seen in Fig. 9, mainly to compensate to some extent the effect of warping or winding to which such doors are liable.

In Fig. 7 a practical construction is shown, in which the rear of the door is supported by elevated tracks E, which, however, are entirely separate from that or those by which the front part of the door is upheld. In this figure the track F is single, but the track E is double, each of the rails E being secured to the adjacent uprights D, and at their ends passing the end of the track F, with a space between each of them and said track F, whereby the front and rear roller-brackets may, if necessary, reach or pass a common point near the mouth of the recess. The bracket R is bifurcated, and on each of its arms supports a roller for one of the tracks E. It is provided with a pierced shank, R′, that enters the door vertically, and receives through its aperture a horizontal screw, *r*. A plate, *r*′, fastened to the top of the door about the shank, prevents the latter from becoming loose.

It is manifest that the adjacent ends of the tracks F may be separately supported adjustably without departure from my invention—as, for example, by employing two adjusting-screws, L—one for each track. I however prefer to employ only one, for the reason that in any adjustment thereby effected the opposite members of the lock or catch which may be be employed to hold the doors together, once properly placed with respect to each other, will always be at the same height, and will come properly together. It is also manifest that the invention is applicable to a single sliding door by the use of only one track F, instead of two, the opposing frame-jamb in such case answering to the adjacent edge of the opposing one of double doors.

In the application of the invention to doors which do not run into housings, and in which case both tracks are therefore accessible, it will not be material to which of the independent tracks the separate end adjustments are applied.

I claim as my invention—

1. The combination, with a sliding door and its frame, of two independent tracks, from one of which the rear part of the door is supported and from the other of which the front part of the door is supported, each end of one of said tracks being separately adjustable vertically, substantially as described.

2. The combination, with a track supporting the rear part only of a sliding door, of an elevated track supporting the front part only of said door, each end of said last mentioned track being separately adjustable vertically, substantially as described.

3. The combination, with a hollow partition or housing which receives a sliding door, of a track located within said housing and supporting the rear part only of the door, and a separate elevated track supporting the front part only of the door, said elevated track being extended into the housing and provided with two separate vertically-operating adjusting devices—one for each end thereof—both of which adjusting devices are accessible from the doorway, substantially as described.

4. The combination, with a hollow partition or housing which receives a sliding door, of a track supporting the rear part only of the door located within the housing, a track elevated over the doorway supporting the front part only of the door, adjusting-screws accessible from the doorway applied to the opposite ends of the elevated track, and fixed supports for said screws, substantially as described.

5. The combination, with a hollow partition or housing, of a track located within said housing and supporting the rear part only of the door, a track located over the doorway and supporting the front part only of the door, an adjusting device for supporting said last-mentioned track projecting beneath the latter at the mouth of the housing, and a vertically-acting adjusting device at the opposite end of the elevated track, substantially as described.

6. The combination, with a hollow partition or housing, of a track located within said housing and supporting the rear part only of the door, a track located over the doorway and supporting the front part only of the door, a fixed rail arranged in line with said last-mentioned track and projecting beneath the latter at the mouth of the housing, an adjusting device supported by the projection of said rail for raising and lowering the elevated track, and a vertically-acting adjusting device at the opposite end of the elevated track, substantially as described.

7. The combination, with double sliding doors and their housings, of tracks supporting the rear parts only of the doors located within the housings, two proximating tracks over the doorway severally supporting the front parts only of the doors, a vertically-operating adjusting device applied to each of the remote ends of said tracks in position to be accessible from the doorway, and a single adjusting device engaged with both of said tracks at their adjacent ends, substantially as described.

8. The combination, with a track, E, supporting the rear part only of the door and located in the housing, of a track, F, located over the doorway and extending into the housing, a rail, F′, fixed within the housing and underlapping the track F at the mouth of the housing, means for retaining the adjacent end of the track F on the rail F′, a vertically-acting adjusting device supported by the rail F′ in position to be accessible from the doorway and engaged with the adjacent end of the track F, and a vertically-acting adjusting device engaged with the opposite end of the track F,

also accessible from the doorway, substantially as described.

9. The combination, with independent tracks severally supporting the front and rear parts of a sliding door, one of which tracks is adjustable vertically at each of its ends, of an adjustable roller-bracket applied to the door and carrying a roller which rides on one of said tracks, substantially as described.

10. The combination, with a sliding door, of a roller-bracket, G, for an upper roller, having a depending flange, g^2, and key-hole-shaped slots g' in its base-plate, substantially as described.

11. The combination, with a sliding door having headed studs or screws in its upper end, and a bracket, G, provided with key-hole-shaped slots g' in its base-plate, to receive said studs or screws, and having a depending flange, g^2, extending below the top of the door on its front edge, substantially as described.

12. The combination, with a sliding door and a fixed rail, of a laterally-adjustable guide, as K, secured to a corner of the door to which a roller is not applied, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

FRANCIS V. PHILLIPS.

Witnesses:
M. E. DAYTON,
C. CLARENCE POOLE.