No. 744,918. PATENTED NOV. 24, 1903.

J. P. HULL.

DOOR.

APPLICATION FILED JAN. 16, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.

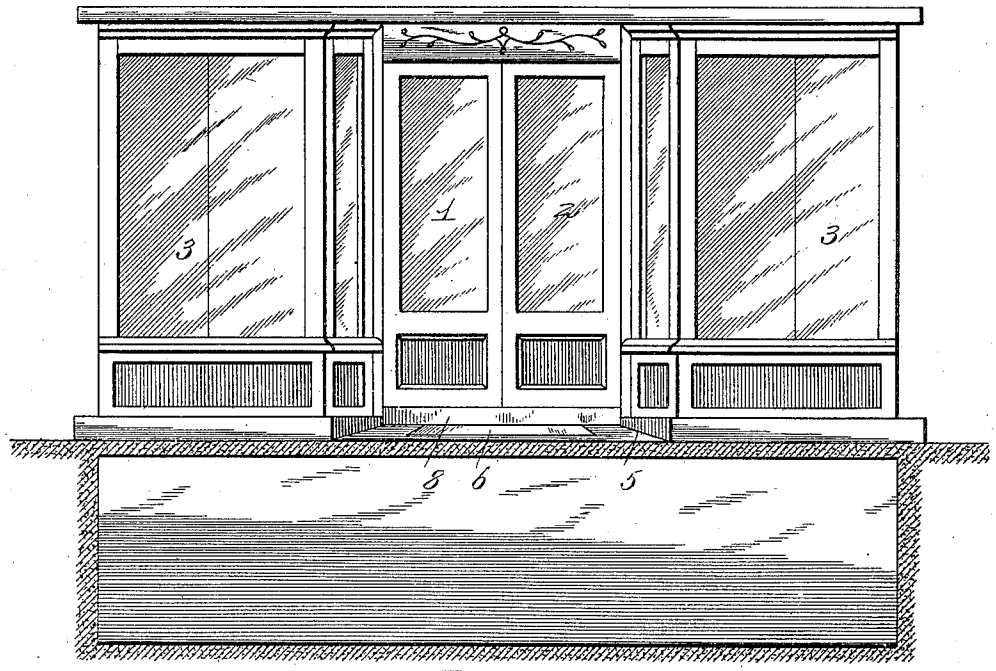
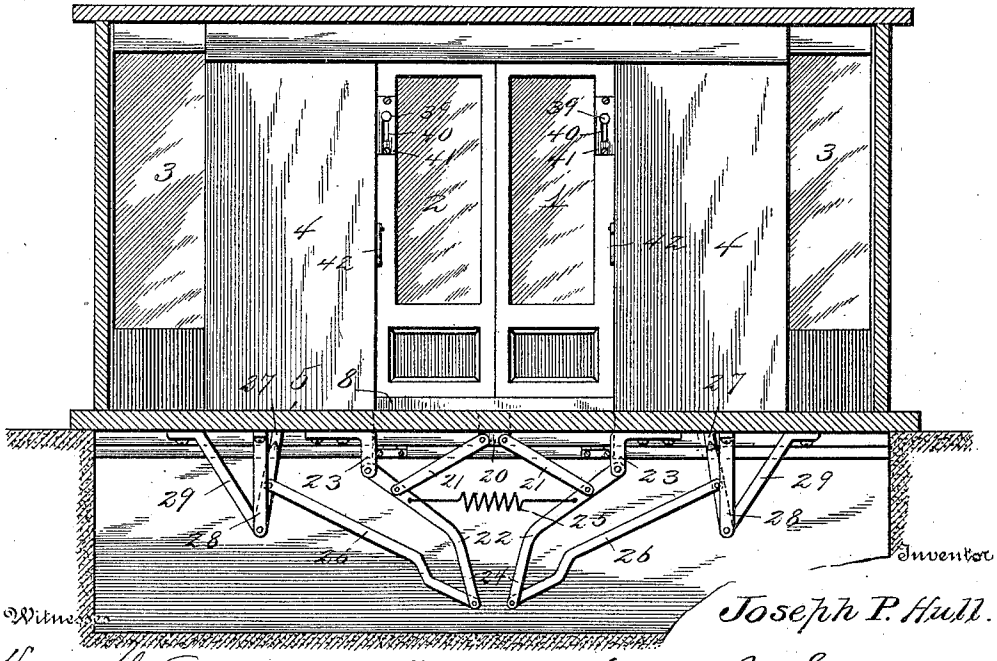


FIG. 2.



Witnesses:

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NO MODEL. 2 SHEETS—SHEET 2.

FIG. 3.

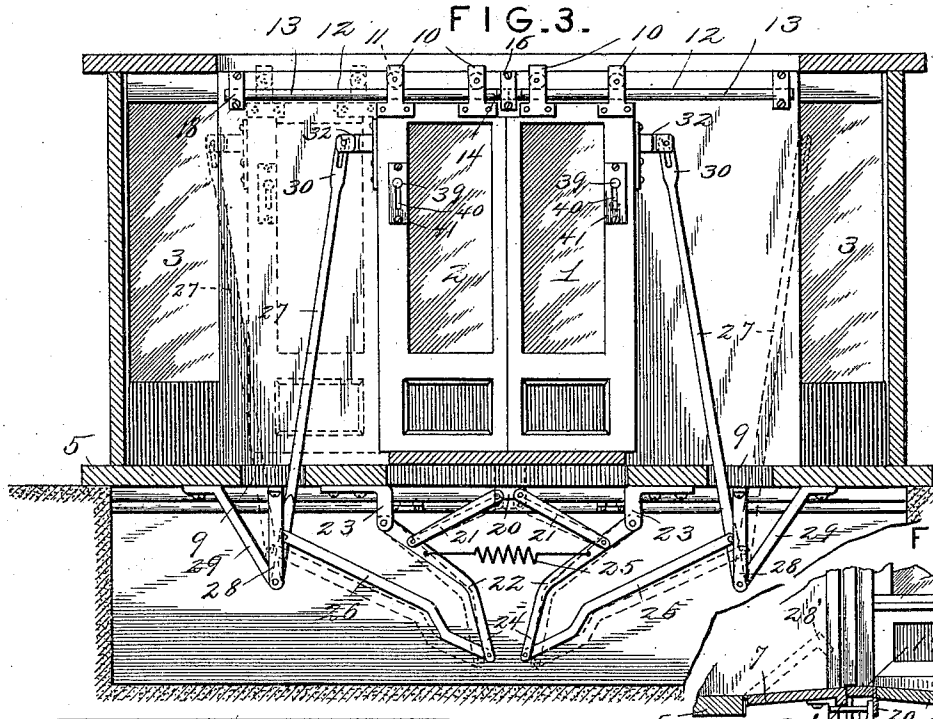


FIG. 7.

FIG. 4.

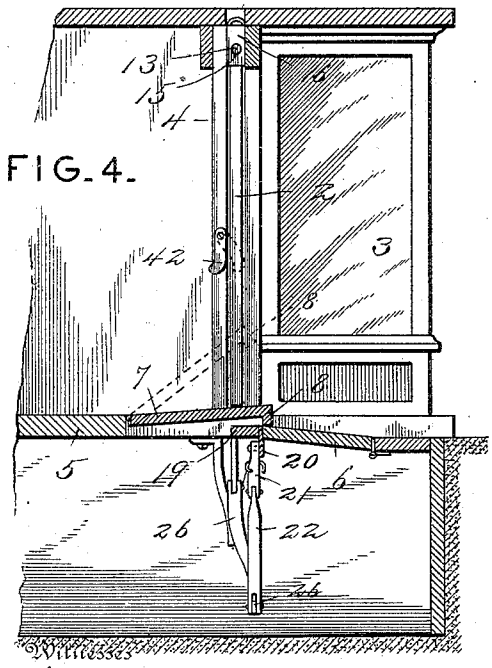


FIG. 5.

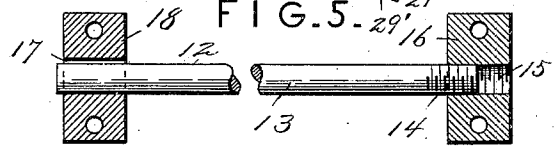
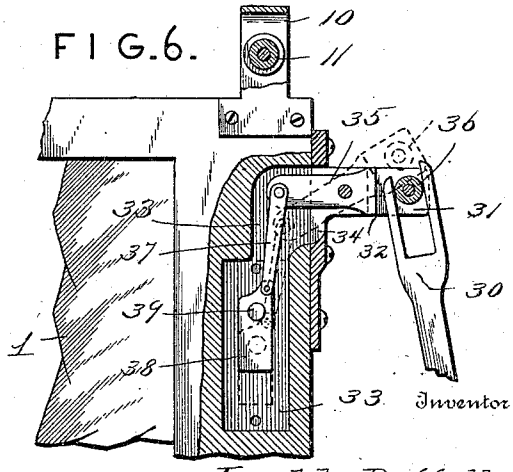


FIG. 6.



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No. 744,918. Patented November 24, 1903.

UNITED STATES PATENT OFFICE.

JOSEPH P. HULL, OF NEWARK, DELAWARE.

DOOR.

SPECIFICATION forming part of Letters Patent No. 744,918, dated November 24, 1903.

Application filed January 16, 1903. Serial No. 139,332. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH P. HULL, a citizen of the United States, residing at Newark, in the county of Newcastle and State of Delaware, have invented new and useful Improvements in Doors, of which the following is a specification.

This invention relates to automatically opening and closing doors for use in stores, private dwellings, offices, street-cars, or in connection with other structures where found applicable and also capable of use for controlling exterior door-openings or openings between communicating apartments.

The advantages of the present invention reside in the comparatively simple operating mechanism and the facility with which it can be applied without affecting the general structure or requiring a precise arrangement of the door-framework and adjacent flooring or show-windows, which may be arranged in contiguity to the door-opening; the adaptation of the mechanism to the entrances of stores or the like where a step or slight rise exists; the capability of actuating either one or both members of a pair of sliding doors and of rendering the operating mechanism inactive in warm weather when it is desired to have both door members remain open; the disposition of the mechanism in such manner that access thereto from the exterior by persons having a nefarious intent will be obstructed, but said mechanism may be easily reached from the interior if repair of the parts thereof becomes necessary, and in having the operating mechanism reliable in its actuation of the door members and sensitively responsive to the movement of tread-sections disposed on opposite sides of the said door members.

The invention, broadly stated, consists in a pair of sliding door members, either one or both of which may be rendered inactive and which are controlled in their movement through the medium of depressible tread devices arranged at opposite sides thereof.

The invention also consists in the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is a front elevation of a store-entrance, showing the invention applied thereto. Fig. 2 is a longitudinal vertical section of the interior of the store-entrance arrangement shown by Fig. 1. Fig. 3 is a view similar to Fig. 2, taken in a plane closer to the door. Fig. 4 is a transverse vertical section taken through the center of the entrance arrangement shown by Fig. 1 with the doors open. Fig. 5 is a longitudinal vertical section through a portion of the suspending means for the doors. Fig. 6 is an enlarged sectional elevation of the upper outer corner portion of one door, showing the shifting mechanism for controlling the engagement of the door with the operating devices. Fig. 7 is a transverse section through a portion of the mechanism, showing a modification.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numerals 1 and 2 designate door members or sliding closures fitted in operative relation to an entrance-opening, as shown in the accompanying drawings; but it will be understood, as before indicated, that the invention is applicable to interior compartments. The door members 1 and 2 in the present instance are shown applied to a store-entrance, and contiguous thereto are show-windows 3, with vertical hollow partitions 4 at the inner or rear portions thereof to receive the door members and conceal the mechanism directly connected to said members, and which will be more fully hereinafter explained. The hollow partitions 4 do not obstruct access to the show-windows 3, and when the door mechanism embodying the features of the invention is applied to other entrances these partitions 4 may be set in the wall at opposite sides of the door-frame or replaced by suitable receptive openings formed in the wall, similar to the ordinary folding-door construction.

The main operating mechanism for the door members 1 and 2 is located below the flooring 5, wherein on opposite sides of the door members tread-sections or operating devices 6 and 7 are disposed, as clearly shown by Fig. 4. Both of the tread-sections 6 and 7 at their edges farthest from the door members are hinged to the flooring 5, and where a step is necessary between the exterior or pavement surface adjacent to an entrance and the in-

terior flooring the outer edge of the tread-section 7 will be provided with a depending flange 8, which normally overlaps and bears upon the inner edge of the tread-section 6, as shown by Fig. 4. This disposition of the two sections 6 and 7 prevents the exterior section 6 from being elevated by burglars or other improper persons in order to tamper with the operating mechanism at a time when the door members are locked closed or in immovable relation to each other. In order to repair the operating mechanism, the inner section 7 will be raised by an authorized person, as indicated by dotted lines in Fig. 4, and thereby render the mechanism below the flooring easily accessible. When the improved door-opening mechanism is applied in operative relation to a store-entrance where show-windows are used, the outer tread-section 6 will be of less width than the distance between the inner terminals of the show-windows, as clearly shown by Fig. 1, to permit approach to the inner portions of the show-windows without actuating the said tread-section 6 or disturbing the normal closed condition of the door members. The flooring 5 immediately under the hollow partition 4 has slots 9 formed therein, one on each side, for a purpose which will be presently set forth.

The door members 1 and 2 have pairs of hangers 10 secured to their upper ends, and said hangers have antifrictional rollers 11 therein, which engage the upper portion of a suspending track or rail 12. For convenience in assembling and disassociating the door members the track or rail 12 is composed of two rods 13, each of which has an inner screw-threaded end 14 (see Fig. 5) to removably engage a portion of a longitudinal screw-threaded bore 15 in a center bracket 16, the outer smooth end of the rod loosely engaging and slidable through a smooth bore 17 in an outer bracket 18, the bores 17 of the brackets 18 being in longitudinal alinement with the bore 15 in the center bracket. By rotating the rods 13 in opposite directions they may be readily disposed in operative position, as clearly shown by Fig. 3, or detached, as circumstances may require. The track or rail 12 extends through and within the upper portions of the hollow partitions 4, and likewise the hangers 10 are fully inclosed by the said partitions.

The door members 1 and 2 slide over what may be termed a "sill" 19, (clearly shown by Fig. 4,) the tread-section 7 projecting over the said sill and being nearest to the lower edges of the door members. Depending from the inner edge of the tread-section 6 and movable close to the outer edge of the sill 19 is a pressure plate or element 20, having the upper ends of a pair of divergent expanding levers 21 movably attached to the opposite sides of the lower extremity thereof. The lower outer ends of the expanding levers 21 are movably attached to the upper portions of controlling-levers 22, having their upper ends pivotally connected to depending members of hangers 23, the lower extremities of the levers 22, as at 24, being deflected at such an angle as to obtain the proper throw or movement for operating the parts connected thereto. The controlling-levers 22 below the points of attachment of the expanding levers 21 thereto have the opposite extremities of a retractile spring 25 secured thereto, the said spring operating to return the parts of the door-actuating mechanism to normal position and close the door members automatically when pressure is removed from either one or both of the tread-sections 6 and 7. The controlling-levers 22 have the lower ends of upwardly-inclined links 26 movably attached thereto and also pivotally connected at their outer ends to the lower extremities of oscillatable elements 27 in the form of rods or bars, which extend through the slots 9 and are fulcrumed at their lower ends to hangers 28, having outer braces 29 to strengthen the same. Each door member has the upper end of one of the elements 27 connected thereto, and by means which will be more fully hereinafter explained one or both of the door members may be detached from and connected to the upper ends of the elements to provide for having either one or both doors inactive or irresponsive to the depression of the tread-sections 6 and 7. The tread-sections 6 and 7 serve as the prime operating means, the expanding levers 21, controlling-levers 22, and links 26 comprise the secondary actuating mechanism, and the elements 27 the direct operating means for the door members.

The operation of the mechanism thus far described is as follows: A depression of the section 6 causes the section 7 to gravitate or follow the section 6 downwardly, and at the same time the expanding-levers 21 push outwardly on the controlling levers 22, and the latter exert an outward pushing force on the lower extremities of the elements 27 through the medium of the links 26 and force the door members 1 and 2 into open position, as shown by Fig. 3 in dotted lines. This opening movement of the door members 1 and 2 is effected against the resistance of the spring 25, and the door members will remain open as long as the sections 6 and 7 are depressed by the weight of the person walking thereover. As soon as pressure is removed from the sections 6 and 7 the spring 25 restores the several parts to normal position and closes the door members. The same operation will ensue on approaching the door members from either side.

In some instances where the flooring on opposite sides of the door-opening is on the same level or in the same horizontal plane the tread-section 7 will be used without the step-flange 8, and the outer edge of said tread-section, or that edge which is free for movement, will be located close to the edge of the sill 19 opposite that adjacent to which the free edge of the tread-section 6 has move-

ment, and the connecting pins or bolts for the upper ends of the levers 21 will be extended far enough for engagement by the free edge of the tread-section 7 or a projection on the latter, as clearly shown by Fig. 7, wherein the tread-section 7 is shown as having a projection 28′ depending therefrom and the pins or bolts 29′, connecting the levers 21 to the plate 20, lengthened for engagement with the said projection 28′.

The upper ends of the elements 27 are formed with forks 30 or bifurcated and project into the outer bifurcated or slotted ends 31 of opposite arms or brackets 32, securely fastened to the upper portions of the outer edges of the door members 1 and 2. Each door member adjacent to the arm or bracket 32 thereon is formed with a slot 33, having an outlet 34 through the bracket. Pivoted at an intermediate point within each bracket or arm is a catch 35, carrying an antifrictional roller 36 at its outer end to removably engage the upper fork 30 of the adjacent element 27, and to the inner end of the said catch a link 37 is movably secured at its upper end and at its lower end pivotally attached to the upper extremity of a slide 38, vertically movable in the slot 33. The slide 38 has a headed stud 39 secured thereto and exteriorly accessible from the interior sides of the door members, and the shank of the headed stud moves in a slot 40 of a face-plate 41, secured over the lower portion of the slot 33. By pushing upwardly on the headed stud 39 the slide 38 is correspondingly elevated, and through the medium of the link 37 the catch 35 is disposed in normal position to cause the antifrictional roller thereof to enter the upper forked end 30 of the element 27, as clearly shown by full lines in Fig. 6. By pulling downwardly on the headed stud 39 the inner end of the catch 35 is lowered and the outer end thereof elevated to cause the antifrictional roller 36 and the catch 35 to become disengaged from the upper forked end 30 of the element 27, as shown by dotted lines in Fig. 6. When the catch 35 is disengaged from the element 27, the door member carrying such disengaged catch will remain inactive when the other door member is operated by a depression of either of the tread-sections with evident advantages, particularly when only a portion of the door-opening is desired to be cleared. At times both door members may be disengaged from the elements 27, especially when it is desired to lock them closed, and when the door members are in this condition operation of either of the tread-sections will be ineffective to open the door members.

In warm weather it is frequently necessary to hold the doors or door members of a store or apartment open for the purposes of ventilation and reduction of temperature, and to meet this requirement the door members have been provided with means for holding the latter in permanent open position, consisting of latches 42, one at each side edge of the door-frame, which are turned over the inner edges of the door members, as shown by dotted lines in Fig. 4. When the door members are held open by the latches 42, the tread-sections 6 and 7 will remain depressed and no strain will be imposed upon the mechanism for actuating the door members, as heretofore explained.

From the foregoing it will be seen that comparatively simple and effective mechanism is provided for operating door members and that in the event of slight disarrangement the mechanism as an entirety may be easily reached for repair or adjustment. Moreover, the door members can be readily hung in operative position without mutilating the framework adjacent thereto and any irregularities that may be found to exist in the rod-sections 13 of the track or rail can be quickly rectified by removing one or both of said sections. The improved mechanism has a general application, and to accommodate contingencies which may arise and to render the several parts strong enough to operate in connection with door members of varying dimensions changes in the proportions, form, and minor details may be resorted to without departing from the spirit of the invention.

Having thus fully described the invention, what is claimed as new is—

1. The combination with a sliding door, of suspending means attached to the upper end thereof, shifting mechanism for automatically opening and closing the door comprising oscillating means projected upwardly adjacent the outer edge of the door and freely detachable from the latter, means carried by the door for detaching the oscillating means therefrom, and a tread device connected to and disposed over a portion of the said shifting mechanism.

2. The combination with sliding doors, of suspending means attached to the upper ends thereof, mechanism for automatically opening and closing said doors including a primary operating device for engagement by persons approaching the doors and also having oscillatable means projected upwardly adjacent to the outer edges of the doors and freely detachable from the latter, and slidable devices carried by the doors for releasing said oscillatable means from or attaching them to the doors, whereby one or both of the latter may be rendered inactive.

3. The combination with sliding doors, of shifting mechanism for automatically opening and closing the same, and tread devices on opposite sides of the doors for actuating the shifting mechanism, one of said tread devices having a step projection extending over and bearing upon the other.

4. The combination with sliding doors, of tread devices arranged on opposite sides thereof, shifting mechanism actuated by the said tread devices including upwardly-pro-

jecting oscillating elements, and catch devices detachably holding the said elements in operative relation to the doors.

5. The combination with sliding doors, of tread devices arranged on opposite sides thereof, a pair of divergent expanding levers in operative relation to the tread devices, spring-retracted controlling-levers movably attached to the expanding levers, upwardly-extending oscillating elements movably connected to the controlling-levers, and means carried by the doors for detachably securing the elements thereto.

6. The combination with sliding doors, of mechanism for automatically opening and closing the same including upwardly-extending oscillating elements, catches carried by the doors for removably engaging the upper ends of said elements, and slide mechanism carried by the doors for shifting the catch devices.

7. The combination with sliding doors, of suspending means attached to the upper ends thereof, mechanism for automatically opening and closing the doors including upwardly-extending oscillatable elements freely detachable from the outer side edges of the upper portions of the doors, and means carried by the upper portions of the doors adjacent the outer edges of the latter to removably engage the said elements.

8. The combination with sliding doors, of hangers secured to the upper ends thereof and having antifrictional rollers therein, and a track for engagement by said hangers comprising rods secured at their inner ends and loosely secured at their outer ends.

9. The combination with sliding doors, of hangers secured to the upper ends thereof, and a track comprising two rod-sections having screw-threaded securement at their inner ends and loose retention at their outer ends.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH P. HULL.

Witnesses:
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CHAS. S. HYER.