

UNITED STATES PATENT OFFICE.

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SLIDING-DOOR CONSTRUCTION.

No. 841,378.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ARTHUR R. CURTIS, a citizen of the United States, residing at Golden, in the county of Jefferson and State of Colorado, have invented certain new and useful Improvements in Sliding-Door Constructions; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in constructions where sliding doors are employed, as in bookcases or other cases or cabinets where it is desirable to slide the doors past each other when opening and closing the same. Heretofore, so far as I am aware, in constructions of this character each door moves in its own individual groove or way at the top and bottom, and the doors which slide past each other are at all times in different planes. Hence in the old construction each door constantly maintains the plane of its groove and has neither a rearward nor forward movement in the case. This construction gives an appearance that is not at all pleasing to the eye and, moreover, makes it difficult to make all joints around the doors dust-tight.

In the invention herein described the doors are so mounted and guided that when closed they are pressed firmly at all times by spring-pressure against the front faces of the grooves in which they move and are thus held exactly in line—that is, exactly in the same plane with all joints tightly closed when all the doors are in the closed position.

This invention also includes means for allowing one door to pass another without injury to either, each being brought automatically to the front and into line with the other doors when all are closed.

This invention also includes a novel feature to facilitate the removal of doors, making it practicable to stack cases fitted with such doors one above another, it still remaining possible to remove the doors of any section readily and without disturbing any of the others.

Having briefly outlined my improved construction, together with its function, I will proceed to describe the same in detail, refer-

ence being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a front elevation of a case provided with two doors shown in the closed position. Fig. 2 is a sectional plan taken on line 2 2, Fig. 1, showing the doors closed. Fig. 3 is a sectional plan taken on the same line, showing door A moved partly past door B. Fig. 4 is a sectional plan taken on the same line showing door A moved over completely in front of door B. Fig. 5 is an enlarged section on line 3 3, Fig. 1. Fig. 6 is an enlarged section on the line 5 5, Fig. 1. Fig. 7 is a top view of a removable strip I shown in detail. When the parts are assembled, a strip of this character is attached to the top rail of each door. Fig. 8 is a sectional plan view corresponding to Fig. 2 and showing the arrangement of parts when more than two doors are used.

The same reference characters indicate the same parts in all the views.

Let A designate one complete door and B the other, each consisting of an upper rail C, a bottom rail D, and end rails E.

F is the upper guide slot, groove, or way provided with the front guide R, and G the lower guide slot, groove, or way.

H indicates vertical slots located at each end of the case and against the outer walls of which the sides of the doors abut.

I is a removable strip secured to the top rail C by means of screws J.

K is a hole through the top guide of such size as to allow screws J to enter. L is a similar hole through the lower guide.

M is a spring of any suitable construction or a yielding guide pressing at all times against the rear side of the rail D, the said spring or yielding guide having a slight projection N, which engages the back side or rear surface of the rail D below and the strip I above, thus forming a yielding rear guide for the doors. As here shown, these yielding guides take the form of flat springs curved, as shown, and having a rounded end at N; but any form which would press on the doors at a point N and allow of compression and extension backward and forward as the doors are pressed backward or along their guides would answer the same purpose.

O is a notch or recess in the side of strip I, into which point N drops when the door is in its extreme right or left position.

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P is a removable strip secured to the lower front edge of rail D.

Q is a roller or caster set in the bottom of rail D, and so located as to allow doors A and B to move freely at right angles to the direction in which they slide.

From the foregoing description the use and operation of my improved device will be readily understood. Commencing with the doors closed, as shown in Fig. 2, suppose it is desired to move door A to the right. This is done by pressing the left-hand edge of the door B back or inwardly until door A will just pass this edge and draw door A to the right, at the same time removing all pressure from door B. The result of these movements is shown in Fig. 3. Further motion of door A to the right will terminate or result in the positions of the doors A and B shown in Fig. 4. It is evident that doors A and B may now be moved together to any position from extreme right to extreme left, the curved shape of the yielding back guides M allowing the same to be accurately moved back as the doors either singly or together are moved against them.

To close the doors in the position shown in Fig. 4, door A is simply moved to the left back to its original position, when spring-guide M will push door B forward into its previous position. It is also evident that I could start with the door B, moving it to the left and pass it through the same operation or manipulate it in the same manner.

While the above explains the principle of operation of my improved construction, there are certain details that have been found necessary for a successful operation of the same. These may be enumerated as follows:

First. Fig. 3 shows that as soon as the door A begins to pass in front of the door B the friction set up between these doors, due to the pressure from the yielding guide M, will jam the door B against the outer wall of groove H, and the friction there set up will prevent the door B from moving back freely as door A is advanced. Again, when door A is moved back to the left, the friction between doors A and B tends to drag door B back slightly, so that it will not move back into its original position exactly. These difficulties are both remedied by making the groove H deeper at the back than at the front, as shown, so that as door B moves back it can have a slight motion to the right, preventing jamming, and on its return it can have a slight motion to the left and still come to its original position.

Second. With a slight excess of friction between doors A and B when door A is moved to the left to close it, the door B may follow a part or all of the way. This is prevented by projection N of guide M resting in the notch O of strip I at the top of the doors whenever a door is at its extreme position at the right

or left. Point N is rounded, and notch O is of such depth as to not wholly prevent the movement of the door.

Third. Since the doors come into actual contact with each other, means must be provided to prevent the finish on each from being injured and at the same time provide suitable bearing-surfaces to stand wear resulting from the rubbing. The removable strip I at the top and strip P at the bottom of the doors may be made of any material to reduce friction and wear, and, as shown, these strips are made to project a certain distance beyond the door-rails, thus separating the rest of the doors and preventing contact except along these strips.

Fourth. As the doors increase in size the weight becomes so great that such pressure as can be allowed in guides M will not be sufficient to overcome the friction on the bottom of the doors, due to their weight, and thus prevent the return of the doors when once pushed back. This difficulty is overcome by placing rollers or casters Q at the bottom of each door, the same being embedded in the lower rail D in such a manner as to carry the weight by rolling when the doors move forward and back.

The method of removing the doors is as follows: The screws J are removed one at a time through a hole K, formed in the upper wall of the case, releasing the strip I from the top rail C of the door. This allows the top of the door to swing out past the front guide R, thus releasing the whole door. Should one set of doors be arranged above another, a hole L, exactly in line with hole K, is made at the bottom, as shown, thus allowing screws J to be removed, the same as before.

While this description has been confined to the operation of two doors only, it is evident that any number of such doors may be similarly mounted in a single line or plane provided yielding guides M are so shaped as to allow all the doors to approach the same from either direction. Such a guide is shown at S in Fig. 8.

Having thus described my invention, what I claim is—

1. The combination of a case having undivided top and bottom grooves or ways extending the entire length of the case, and a pair of interchangeable sliding doors whose top and bottom rails respectively enter said grooves, the door-space between the sides and the top and bottom of the case being entirely unobstructed, and the doors being of such width as to exactly fill said space, and means attached to the case and acting from the rear to automatically bring the doors into the same plane when properly adjusted.

2. The combination of a case having undivided top and bottom grooves or ways, and a pair of doors entering said ways, the latter being provided with a yielding rear guide and a

rigid front guide, the doors being interchangeable and each door being adapted when at either side of the case, to move to the front of the case and into the same plane with the other door under the influence of the yielding guide.

3. A case having an undivided groove or way of sufficient width to accommodate two doors one in front of another, and a yielding rear guide attached to the case and adapted to protrude into the groove or way, two interchangeable doors adapted to engage the groove of the case and arranged to slide freely independently of each other, the door-space between the sides and the top and bottom of the case being entirely unobstructed, either door being adapted when on either side of the case to move automatically forwardly into position flush with the other door, under the influence of the yielding rear guide.

4. In a sliding-door construction, the combination with the case having upper and lower undivided grooves or ways, a pair of doors whose top and bottom rails respectively engage the said ways, the door-space between the sides of the case and between the top and bottom thereof being entirely unobstructed, and the doors being interchangeable whereby either may perform its function at either side of the case, and yielding means attached to the case and engaging the doors from the rear to cause them to assume automatically the same plane in the ways when one has completely passed the other.

5. The combination of a case having undivided top and bottom ways provided with yielding guides fixedly attached to the case in the rear and rigid guides in front, and a pair of doors whose upper and lower edges respectively engage the said ways and are acted on by the yielding guides to cause either door to assume automatically the same plane as the other door, as soon as it has stopped in an unobstructed door-space or opening, the two doors being interchangeable, and the door-space between the sides of the case and the top and bottom thereof being entirely unobstructed.

6. A case provided with upper and lower undivided grooves of sufficient width to accommodate two doors one in front of another, the vertical sides of the case adjacent the door-space being provided with grooves forming a part of the door-space and increasing in depth from front to rear, the depth in the rear making the door-space slightly wider than is necessary to accommodate two doors, while the space in front is just sufficient to accommodate the two doors when occupying the same plane, and yielding means engaging the doors from the rear whereby they are caused to move to their forward position, the side grooves causing the doors to have a

slight movement toward the vertical center of the case simultaneously with the forward movement imparted by the yielding means.

7. A case provided with an unobstructed door-space in front and having undivided vertical side grooves or ways of sufficient width to accommodate a pair of doors, the said grooves increasing in depth from front to rear, interchangeable doors located in the door-space, and yielding means engaging the doors from the rear and causing them to move forwardly whereby they are flush with each other, the side grooves cooperating with the yielding means to cause the doors to approach the vertical center of the case simultaneously with their forward movement.

8. A case having grooved side abutments, the grooves increasing in depth from front to rear, the said case having an uninterrupted door-space both between the grooved side abutments and between the top and bottom of the case, interchangeable doors located within the space, and means located in the rear of the doors to cause them to move forwardly to the flush position when properly adjusted, the said grooves cooperating with the rearwardly located actuating means, to cause the doors to approach the vertical center of the case simultaneously with their forward movement.

9. The combination with a case having top and bottom undivided grooves or ways, and an unobstructed door-space between the vertical sides of the case and the top and bottom thereof, interchangeable doors engaging said grooves and occupying said space, the said doors being provided with recesses in the rear, and yielding guides attached to the case and having projections adapted to engage the said recesses of the doors whereby the latter are temporarily locked in place when moved completely past each other.

10. The combination with a case having top and bottom undivided grooves or ways, doors slidingly mounted in said ways and adapted to move past each other, the doors having rollers or casters at their bottom rails to facilitate their front and backward movement in the grooves, the doors being interchangeable and the door-space in front of the case being entirely unobstructed between the vertical sides as well as between the top and bottom thereof, and means attached to the case and located in the rear of the doors for causing them to move forwardly automatically into the same plane when properly adjusted.

11. The combination with a case having grooves or ways, and doors engaging said grooves and provided with removable top strips held in place by fastening devices, the case having an opening above the strips to facilitate the removal of the strips by giving access to their fastening devices.

12. The combination with a case having
undivided grooves or ways, interchangeable
doors engaging said ways and adapted to
slide past each other, the doors being rein-
5 forced on the front side of their lower groove-
engaging rails to reduce friction, the door-
space in front of the case being entirely unob-
structed between the top and bottom of the
case and between the vertical sides thereof,
10 and means attached to the case, and located

in the rear of the doors for causing them to
move forwardly automatically into the same
plane when properly adjusted.

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

ARTHUR R. CURTIS.

Witnesses:

DENA NELSON,
A. J. O'BRIEN.