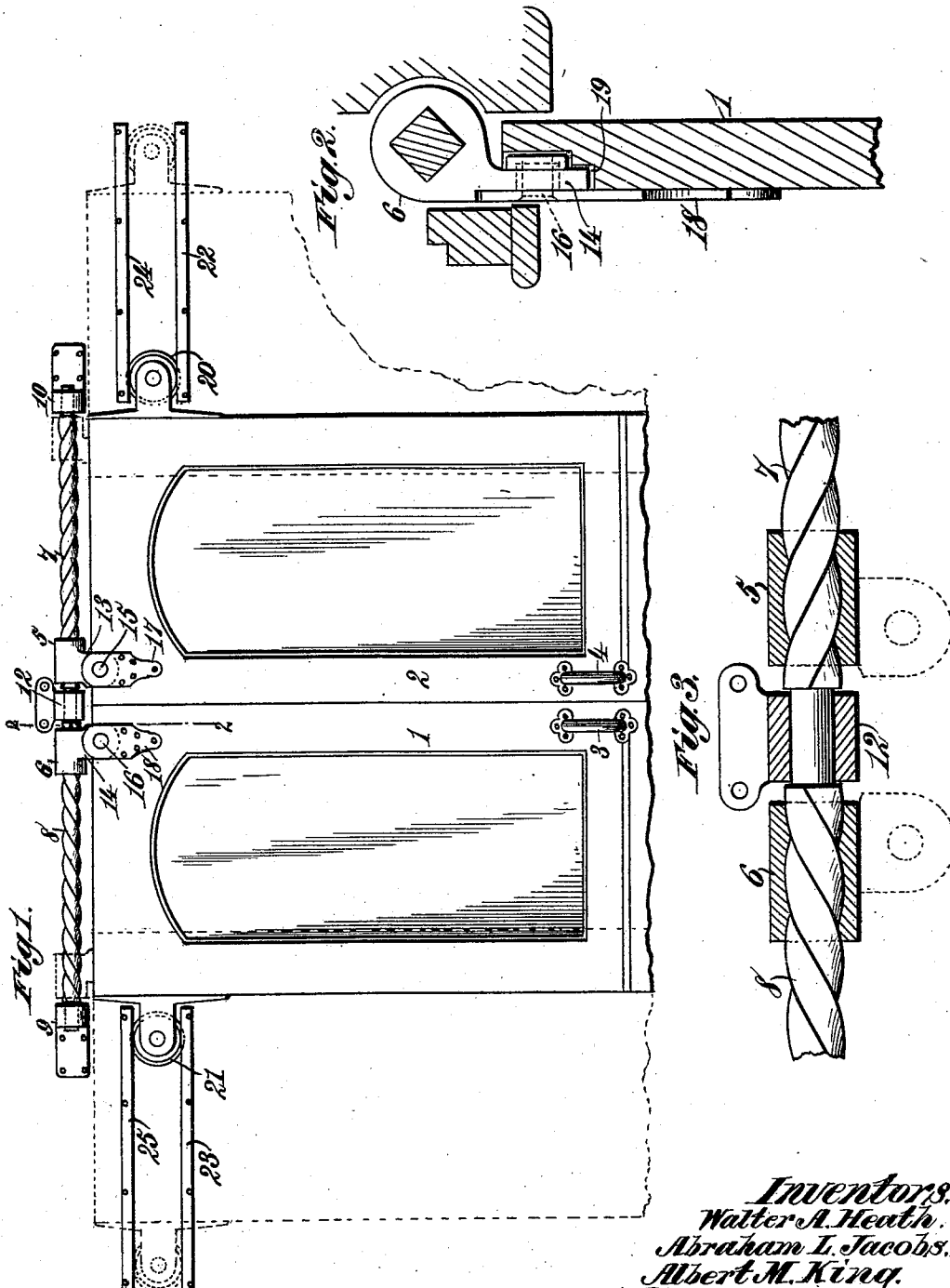


(No Model.)

W. A. HEATH, A. L. JACOBS & A. M. KING.
SLIDING DOOR OPERATING MECHANISM.

No. 575,644.

Patented Jan. 19, 1897.



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UNITED STATES PATENT OFFICE.

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WILMINGTON, DELAWARE; SAID HEATH ASSIGNOR TO SAID JACOBS
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SLIDING-DOOR-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 575,644, dated January 19, 1897.

Application filed February 27, 1896. Serial No. 580,977. (No model.)

To all whom it may concern:

Be it known that we, WALTER A. HEATH, ABRAHAM L. JACOBS, and ALBERT M. KING, citizens of the United States, residing at Wilmington, in the county of New Castle and State of Delaware, have invented new and useful Improvements in Sliding-Door-Operating Mechanisms, of which the following is a specification.

10 This invention relates to sliding doors, and has for its objects to provide new and improved means whereby the sliding movement of one door is transmitted to another door in such manner that both doors open or close
15 simultaneously and to provide novel means whereby either of the doors is susceptible of yielding or giving slightly at the bottom for the purpose of effectually preventing any binding of the devices by which the motion
20 of one door is transmitted to the other door.

To accomplish these objects, our invention consists in the features of construction and in the combination or arrangement of parts hereinafter described and claimed, reference
25 being made to the accompanying drawings, in which—

Figure 1 is a front elevation of two sliding doors provided with our invention and shown in their closed position. Fig. 2 is a detail vertical sectional view taken on the line 2 2, Fig. 1; and Fig. 3 is a detail sectional view of the non-rotary nuts, showing portions of the screw-threaded shaft on a larger scale than
35 Fig. 1 for the purpose of more clearly illustrating the parts.

In order to enable those skilled in the art to make and use our invention, we will now describe the same in detail, referring to the drawings, wherein—

40 The numerals 1 and 2 indicate the two sliding doors or door-sections, which may be of any desired construction or form and be provided, respectively, with any suitable handles 3 and 4. The doors are provided at their upper
45 per ends with non-rotary right and left hand internally-screw-threaded nuts 5 and 6, which respectively engage the right and left screw-threads 7 and 8, formed on or in the exterior of a horizontal shaft arranged directly above
50 the top edges of the two doors. This shaft is

supported at its ends in metallic bearing-blocks 9 and 10, secured by screws or otherwise to the door-frame, and centrally between its ends the shaft extends through and is sustained by a hanger 12 on the door-frame, the
55 construction of all these parts being such that the externally right and left hand screw-threaded shaft is free to be rotated.

The shaft may be a cylindrical bar or rod having the right and left hand screw-threads
60 cut directly into the surface thereof, or the shaft may be square or triangular in cross-section and twisted in reverse directions from about its central portion in such manner as to form the external right and left hand screw-
65 threads.

The non-rotary nuts are each provided with a jointed, or pivotal connection with one of the sliding doors, and, as shown, this is accomplished by providing the nuts with pendent
70 tailpieces 13 and 14, which are pivoted by pins, bolts, or rivets 15 and 16 to the upper ends of metallic door-hanger plates 17 and 18. The pivot-pins, bolts, or rivets 15 and 16 are
75 arranged at right angles to the plane of motion of the doors in such manner that either door is susceptible of yielding in a plane parallel with the line of motion of the doors. The hanger-plates are firmly attached by
80 screws or other devices to the upper end portions of the sliding doors, and the doors themselves are preferably recessed, as at 19, Fig. 2, for the purpose of accommodating the tailpieces 13 and 14 and the pivots which connect the tailpieces to the door-hanger plates.
85

As shown in the drawings, the non-rotary screw-threaded nuts 5 and 6 are arranged in proximity to the inner or meeting edges of the two doors, and supplemental devices are
90 provided which will maintain the perpendicularity of the doors and enable them to be slid freely back and forth to their opened or closed positions.

The supplemental supporting devices are preferably arranged near the upper ends of
95 the doors at the outer edges thereof, and are composed of roller-bearings or wheels 20 and 21, and rails or tracks 22 and 23 on which the roller-bearings or wheels travel when the doors are moved. The roller-bear-
100

ings or wheels may also bear against guide rails or strips 24 and 25, arranged above and parallel with the rails or tracks 22 and 23 for the purpose of more securely retaining the roller-bearings or wheels in operative connection with the rails or tracks.

The rails or tracks and the guide rails or strips are secured to the door-frame and the roller-bearings or wheels are mounted in brackets 26 and 27, attached to the edges of the doors and offset sufficiently to support the roller-bearings or wheels, so that they can traverse the rails or tracks while permitting the doors to move beside or in front of these rails or tracks, as will be obvious without further explanation.

The external right and left hand screw-threads of the shaft and the internal screw-threads of the non-rotary nuts should be accurately and nicely formed and fitted together, so that the parts will easily operate when either door is moved.

The jointed or pivotal connections between the doors and the non-rotary nuts render it possible for the door to yield or give slightly at the bottom in a plane parallel with the line of motion of the doors to effectually prevent binding of the nuts on the screw-threaded shaft, which binding would be likely to result if the roller-bearings were not so constructed and arranged as to permit a slight tilting motion perpendicularly of the doors when power is applied to either door to slide the same.

The screw-threads of the shaft may be single or double, but preferably we employ double screw-threads, as such construction secures a more rapid movement of the nuts, and consequently the doors can be more swiftly opened or closed.

The invention is particularly useful at the front and rear ends of railway passenger-cars, but we wish it clearly understood that we do not limit ourselves to any particular use of our improved door-operating mechanism, as obviously it can be applied to sliding doors designed for barns, dwellings, freight and other railway cars, and, in fact, wherever sliding doors are employed.

In manufacturing the screw-nuts we prefer to cast hollow blanks of brass or bronze metal, then place these blanks on a metal pattern

having screw-threads of the same pitch as the rotary shaft and pour or cast in Babbitt metal to form the screw-threads in the nuts. This produces an accurate fit of the nuts and shaft, so that these parts will easily, nicely, and smoothly work.

Having thus described our invention, what we claim is—

1. The combination with a pair of sliding doors, of a right and left hand screw-threaded shaft, right and left hand internally-screw-threaded nuts engaging said shaft, and jointed connections between the nuts and the upper ends of the doors, whereby the lower end of either door is susceptible of yielding in a plane parallel with the motion of the doors to prevent binding between the nuts and the shaft, substantially as described.

2. The combination with two sliding doors, of a right and left hand screw-threaded shaft, right and left hand internally-screw-threaded nuts engaging said shaft and serving to rotate the same when moved longitudinally thereof, door-hanger plates secured to the upper ends of the doors, and pivot-pins arranged at right angles to the line of motion of the doors and pivotally connecting the door-hanger plates with the screw-threaded nuts, substantially as and for the purposes described.

3. The combination with two sliding doors, of a right and left hand screw-threaded shaft, screw-threaded nuts engaging said shaft and constructed with pendent tailpieces, and door-hanger plates secured to the upper ends of the doors and pivotally connected with the said pendent tailpieces of the screw-threaded nuts, whereby the motion of either nut serves to rotate the shaft and either door is susceptible of yielding in a plane parallel with the plane of motion of the doors, substantially as and for the purposes described.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

WALTER A. HEATH.
ABRAHAM L. JACOBS.
ALBERT M. KING.

Witnesses:

WALKIN L. STRAHORN,
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