J. FLEISCHER.

SLIDING DOORS.

APPLICATION FILED NOV. 25, 1910.

987,123.

Patented Mar. 21, 1911.

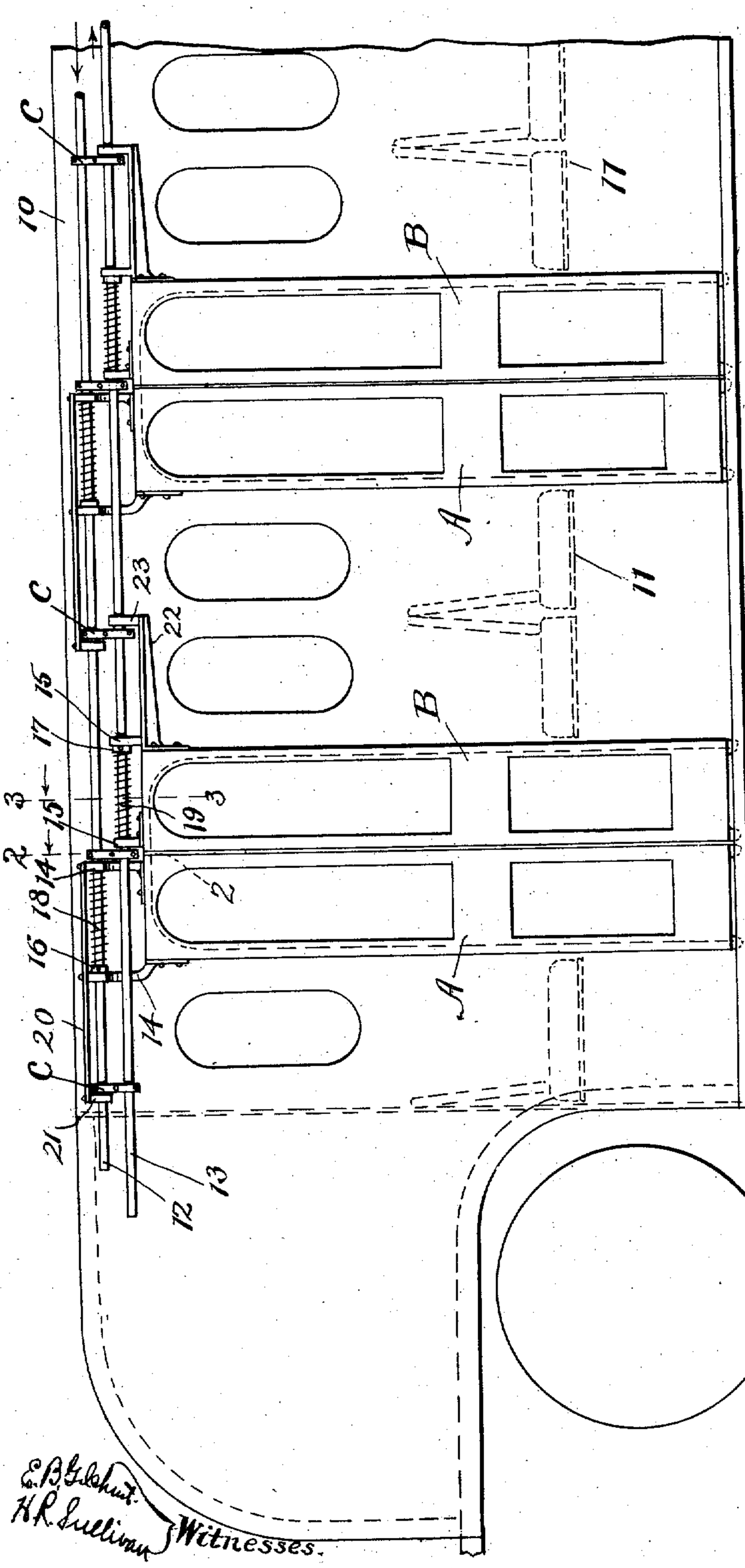

Fig. 1.

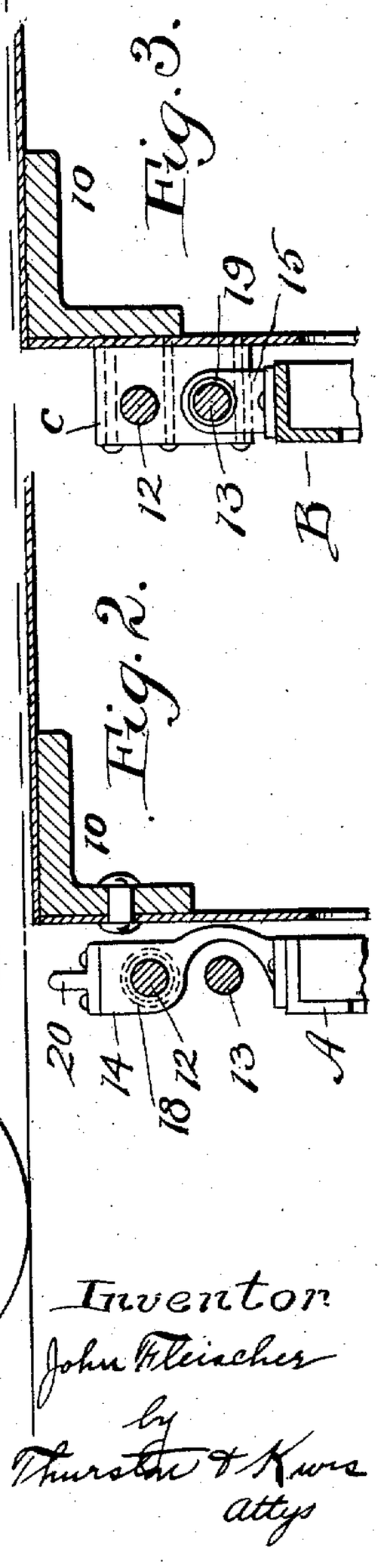

Fig. 3.

Fig. 2.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN FLEISCHER, OF CLEVELAND, OHIO, ASSIGNOR TO ANTOINE B. DU PONT, OF CLEVELAND, OHIO.

SLIDING DOORS.

987,123. Specification of Letters Patent. **Patented Mar. 21, 1911.**

Application filed November 25, 1910. Serial No. 594,063.

To all whom it may concern:

Be it known that I, JOHN FLEISCHER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Sliding Doors, of which the following is a full, clear, and exact description.

This invention relates to sliding doors and to supporting and operating mechanism adapted particularly for a number of pairs of oppositely sliding simultaneously operated doors for passenger carrying cars such as disclosed in the patent to Antoine B. du Pont, No. 945,247, of Jan. 4th, 1910, for cars adapted for subway use.

One of the objects of the invention is to provide supporting and operating mechanism for sliding doors which is very efficient but simple in construction and free of any complications which may be the cause of trouble and unsatisfactory operation.

A further object is to provide mechanism for supporting and operating simultaneously a plurality of sets of oppositely sliding doors adapted for use in the sides of cars for the ingress and egress of passengers, this mechanism being such that in case anything, such as the body or clothing of a passenger is caught between two of the doors, these doors so obstructed may yield in their closing movements without interfering with the complete closure of the remaining doors and without causing any injury to the passenger.

These and other minor objects which will appear in the detailed description are accomplished by my invention, which may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the drawings, wherein I have shown my invention applied to a car of the type disclosed in the Du Pont patent above referred to, Figure 1 is a side elevation of a portion of the car showing two sets of doors supported and operated in accordance with my invention, parts of the car being shown conventionally and parts of the operating mechanism not essential to an understanding of the present invention being omitted; Fig. 2 is a partial transverse section slightly enlarged, substantially along the line 2—2 of Fig. 1, looking in the direction indicated by the arrow; and Fig. 3 is a similar sectional view substantially along the line 3—3 of Fig. 1, looking in the direction indicated by the arrow.

Referring now to the figures of the drawings, 10 represents the passenger carrying car body which, as shown, extends downwardly between the trucks adjacent to the track, and which is provided with pairs of oppositely facing seats 11, shown by dotted lines, and between the pairs of facing seats with sets of oppositely sliding doors A and B, only two sets being shown in Fig. 1. It will be understood that the sets of doors as shown will be arranged along the entire length of the car body, the number of sets depending upon the length of the car body, and the number of oppositely facing seats therein.

To support and also in this case to simultaneously operate the sliding doors, or to move the doors of each set away from each other to open the same, and toward each other in closing, I employ two longitudinally movable supporting and operating rods 12 and 13, which extend along the side of the car near the top thereof and are arranged in this case one directly above the other. The rods 12 and 13 are supported by a number of brackets C which are arranged at intervals along the side of the car and are provided with openings through which the rods are adapted to slide. These rods are adapted to be operated in any suitable manner by mechanism, preferably under the control of the motorman, but as the present invention does not relate to this part of the operating mechanism, the latter has been omitted. The doors A are in this case all supported from the operating rod 12 by hangers 14, which loosely engage said rod and which as shown particularly in Fig. 2, are curved inwardly so as to clear the lower operating rod 13, and the doors B which move oppositely with respect to the doors A are all supported from the rod 13 by means of hangers 15 which loosely engage said rod. For operating all the doors A of the different sets, rod 12 is provided with a plurality of abutments in the form of collets 16, each of which is arranged between two hangers

14 of the corresponding door A, and is adapted to engage one of the hangers, so as to positively move said door to the left, as viewed in Fig. 1, when the rod 12 is moved in the same direction, or in the direction indicated by the arrow in said figure. In a similar manner, the operating rod 13 is provided with collets 17 which are arranged between the hangers 15 of the doors B and which likewise engage hangers 15 of the doors B so as to positively shift said doors to the right, as viewed in Fig. 1, or in the direction indicated by the arrow in said figure. Therefore, if these two rods are moved in opposite directions or in the directions indicated by the respective arrows, all the doors will be positively opened, the doors A moving in one direction, and the doors B moving in the other. In order, however, that the doors of any of the sets may yield in case their complete closure is prevented by some means, such as the body of the passenger, without interfering with the closure of the other doors, and without injuring the passenger, I provide means whereby the closure is effected by rods 12 and 13, together with yielding devices interposed between the rods and the doors. In this case, this is accomplished by coil springs 18 and 19 which surround the rods 12 and 13 respectively and are arranged between the collets 16 and 17, and those hangers 14 and 15 of the doors A and B respectively, toward which the collets are moved in closing the doors. Thus, to close the doors simultaneously, the rods 12 and 13 are shifted oppositely to the directions indicated by the arrows in Fig. 1, and by thus moving the rods, the collets 16 and 17 engage the springs 18 and 19 which by pressing on the hangers 14 and 15, cause the closure of the doors.

Inasmuch as in the particular embodiment of my invention here shown, the doors must be rather narrow and of considerable length, I find it advisable to employ additional bearing or supporting members for the doors than are ordinarily employed in order to avoid any danger of the doors binding in case they are opened manually by one grasping the same at or near the lower portions thereof,—such, for example, as by a passenger who wishes to spread the doors to free clothing or a part of his body which may have been caught between the doors. This is accomplished in this case by brackets or rods 20 which are secured to the hangers 14 of the doors A and extend laterally beyond the doors and are provided at their ends with bearing members 21 which loosely or slidingly engage the rod 12, and by brackets 22 which extend laterally from the doors B and are provided at their ends with bearings 23, which loosely engage the rod 13. In this manner, each door has bearings, the spacing or distance between which is considerably greater and in this case more than twice the width of the door.

Having thus described my invention, what I claim is:

1. In combination, a sliding door, a longitudinally movable rod for supporting and operating the same, said door having hangers loosely engaging the rod, an abutment on the rod adapted by engagement with a hanger to positively open the door when the rod is moved in one direction, and a spring connection between the rod and the door for transmitting movement between the former and the latter so as to yieldingly close the door, when the rod is moved in the opposite direction.

2. The combination with a sliding door, a longitudinally movable rod for supporting and operating the door, the latter having supporting hangers loosely engaging the rod, an abutment on the rod adapted by engagement with one hanger to positively open the door when the rod is moved in one direction, and a spring between the abutment and another hanger adapted to transmit movement between the former and the latter when the rod is moved in the opposite direction so as to yieldingly close the door.

3. In combination with a pair of oppositely sliding doors, a pair of longitudinally movable rods for operating and supporting the same, said doors having hangers loosely engaging the rods, abutments on the rods adapted to engage hangers of the doors so as to positively open the latter when the rods are moved in opposite directions, and spring connections between the abutments and hangers of the two doors for yieldingly closing the doors when the directions of movement of the rods are reversed.

4. In combination with a pair of oppositely sliding doors, a pair of longitudinally movable rods for operating the same, the doors having hangers loosely engaging the rods, said rods having abutments which engage hangers of the doors and positively move the doors when the rods are shifted in opposite directions to open the same, the coil springs surrounding the rods and arranged between the abutments and hangers of the doors so as to constitute yielding connections between the abutments and the doors for the closure of the latter when the directions of movement of the rods are reversed.

5. In combination with a plurality of sets of oppositely sliding doors, a pair of longitudinally movable rods for operating the same, one half of the doors having hangers loosely engaging one of the rods and the other half having hangers loosely engaging the other rod, collets fixed to the rods, each being located between two hangers of one of the doors and adapted by positive en-

gagement with the hanger on one side of the same to open the door when the corresponding rod is shifted in one direction, and a plurality of coil springs surrounding the rods, each spring being located between a collet and the hanger of a door toward which the collet is moved to close the door so as to constitute a yielding connection between the collet and the door for the closure for the same when the rod is moved in the proper direction.

6. The combination with a pair of oppositely sliding doors, a pair of longitudinally movable rods for operating and supporting the same, said doors having hangers extending upwardly therefrom and loosely engaging the rods, collets on the rods adapted to directly engage certain hangers of the doors to open the same, and springs between the collets and other hangers of the doors whereby the doors may be opened positively and closed yieldingly by said rods, and said doors having lateral extensions provided at their ends with bearing members which also loosely engage the rods.

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

JOHN FLEISCHER.

Witnesses:
H. R. SULLIVAN,
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