

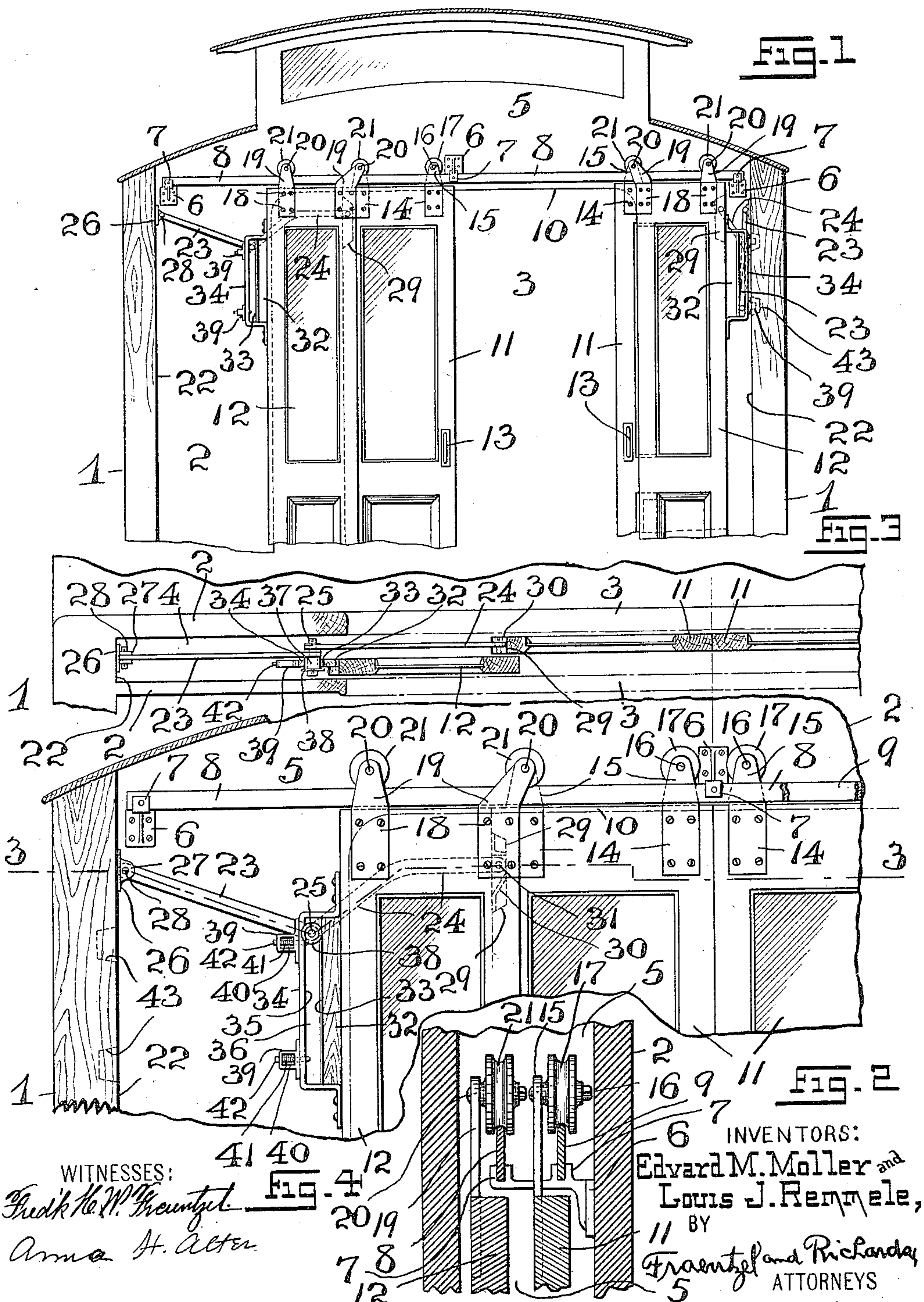
E. M. MOLLER & L. J. REMMELE.

SLIDING DOORS FOR PASSENGER CARS.

APPLICATION FILED DEC. 18, 1909.

994,182.

Patented June 6, 1911.



UNITED STATES PATENT OFFICE.

EDVARD M. MOLLER, OF HOBOKEN, AND LOUIS J. REMMELE, OF NEWARK, NEW JERSEY.

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994,182.

Specification of Letters Patent.

Patented June 6, 1911.

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To all whom it may concern:

Be it known that we, EDVARD M. MOLLER, a subject of the King of Norway, residing at Hoboken, county of Hudson, and State of New Jersey, and LOUIS J. REMMELE, citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Sliding Doors for Passenger-Cars; and we do hereby 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 characters of reference marked thereon, which form a part of this specification.

The present invention relates, generally, to improvements in passenger cars; and, the invention has reference, more particularly, to a novel arrangement of sliding doors for the entrance from a platform into the interior of the car, the doors being arranged in such a manner so as to move simultaneously, but with different speeds, to more quickly open the entrance into the interior of the car, and the doors in their finally opened positions being located one beside the other, so as to occupy a minimum space at each side of the car-body.

The present invention, therefore, has for its principal object to provide a novel arrangement of sliding doors for the entrance between the platforms and the interior of a car, the sliding doors moving with different speeds and the faster moving door being adapted to slide alongside of or so as to overlap the slower moving door, so that when both doors have been fully opened and are at rest at the side of the car-body, they will register with one another, and will occupy a minimum space, with a view of providing an increased entrance-opening into the car-body.

The invention has for its further object to provide a simple arrangement of and effectively operating system of differentially moving or sliding doors for railway cars which, while providing an enlarged opening between the platform and the interior of the car, for the entrance and exit of the passengers, also provides a better means for the conductor, when upon the platform

of the car, to constantly observe the interior of the car.

The invention has for its further object to provide a simple, cheap and effectively operating mechanism for producing the differential movements of the doors, the said mechanism being reduced to a minimum, so as to take up but very little space, and at the same time provides a mechanism which cannot readily get out of order and become inoperative, and the parts of which can be quickly replaced if they should get out of order.

Other objects of this invention not at this time more particularly enumerated will be clearly understood from the following detailed description of the said invention:

With the objects of the present invention in view, the said invention consists primarily, in the novel arrangement of differentially sliding doors for passenger cars; and, the invention consists, furthermore, in the novel arrangements and combinations of the various devices and parts as well as in the details of the construction of the same, all of which will be more fully described in the following specification, and then finally embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

The invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a detail view, showing a transverse sectional representation of a portion of the body of a car, looking through the entrance and exit-opening toward the platform of the car, said view illustrating in connection therewith, and in elevation, portions of two sets of differentially sliding doors, the hangers and rollers connected with said doors, the rails upon which said rollers move, and a mechanism for producing a differential sliding movement of the doors, said view showing, also, one set of doors in their closed positions and another set of doors in their opened positions. Fig. 2 is a similar detail view, made on an enlarged scale, said view representing the differentially sliding doors in their closed relations; and Fig. 3 is a horizontal sectional representation taken on line 3—3 in said Fig. 2, with certain parts of the mechanism which produce the differentially sliding movements of the doors, being shown in

top-edge view. Fig. 4 is a detail vertical section of the upper portions of a pair of said sliding doors, and the rails, and also the rollers movable upon said rails, said
5 rolls being represented in elevation.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to the said drawings, the
10 reference-character 1 indicates the framework or body of a street-railway or other railway car of any usual type, and 2 indicates one of the end-walls or partitions located at the end of the car-body between the
15 platform and said body, said partition or wall being provided with a suitable opening 3 forming a passageway between the said platform and the interior of the car. In the opposite end-portions of said wall
20 or partition, near each side-wall of the car-body, and so as to be located at each side of the interior of the car, are suitable spaces, as 4, which provide suitable runways into which each set of differentially sliding doors
25 can be moved, when the passageway 3 is to be opened, and into which the doors are moved in such a manner so as to occupy a space approximately equal to the width of a single door, and at the same time to be
30 hidden from view, when the end-wall or partition 2 is made solid, as well as moving the doors out of the way and guarding against all danger of injury to the persons seated near the end-wall or partition, or the
35 catching of the garments of such persons between the differentially moving doors.

Suitably arranged and secured in the upper space 5 of the end-wall or partition 2 are a number of suitably constructed brackets 6, usually three of such brackets being
40 employed, substantially in the manner illustrated in Fig. 1 of the drawings, said brackets being made with holding members, as 7, to which are secured, in any suitable manner, a pair of rails 8 and 9. Said rails extend laterally across and approximately the entire width of the interior of the car-body, and are located at or near and above the
45 upper edge-portion 10 of the opening 3, as clearly indicated in Figs. 1 and 2 of the drawings.

In the present construction, we have shown two sets of differentially moving or sliding doors 11 and 12, the doors 11 being adapted
55 to move faster than the doors 12, and each door 11 being provided with a suitably constructed hand or pull-piece, as 13. Suitably secured to the said doors 11 are plates 14 which are preferably countersunk in the
60 upper portion of one of the faces of the doors 11, said plates 14 being made with bearing-portions 15, each bearing portion having a pin 16 upon which is rotatably mounted a suitable roller 17, and said rollers
65 17 resting in rolling contact upon the upper

edge-portion of the rail 9, whereby said doors are placed in their properly suspended positions and can be moved back and forth, laterally in the direction of the width of the car, in front of the opening 3 and into the
70 runways with which the end-wall of the car-body is provided. In a similar manner, suitably formed plates 18 are suitably secured to the doors 12, said plates 18 being preferably countersunk in the upper portion
75 of one of the faces of said doors 12, said plates being made with bearing-portions 19, and each bearing-portion having a pin 20 upon which is rotatably mounted a roller 21, and said rollers 21 resting in rolling contact
80 upon the upper edge-portion of said rail 8, whereby said doors 12 are also placed in their properly suspended positions and can be moved back and forth, laterally in the direction of the width of the car, in front
85 of the opening 3 and into runways with which the end-wall of the car is provided. The positions of the rails 8 and 9, and the suspended arrangements of the said pairs of doors 11 and 12 are such that each pair
90 of doors 11 and 12 can be moved in opposite directions toward and from the side-walls of the car-body, and also that each door 11 can be slid directly along the side of a door 12, as will be clearly evident from an inspection
95 of the several figures of the drawings.

To produce the differential sliding movements of the doors 11 and 12 of each pair of doors, with relation to each other, we have provided between each pair or set of doors
100 and each side-wall 22 of the car-body, a toggle-connection or a controlling and actuating mechanism consisting of a system of levers or links arranged and operating somewhat in the manner of lazy-tongs.
105 Each mechanism consists, essentially, of a pair of levers or links 23 and 24, said links being arranged at an angle to each other, substantially in the manner illustrated in Figs. 1 and 2 of the drawings, and being
110 pivotally connected by means of a suitable bolt or pin 25. Suitably secured upon the inner face of each side-wall 22 is a plate 26 provided with perforated ears or lugs 27, carrying a pin 28 upon which is pivotally
115 mounted the opposite end-portion of the lever or link 23. Suitably secured to the vertical edge-portion of each door 11, that is in the edge-portion nearest each side-wall 22, and by being secured preferably in a
120 recessed portion 29 in each edge-portion, is a securing means or element 30 which carries a pivot-pin or bolt 31, and upon which is pivotally mounted the opposite end of the other lever or link 24. Suitably secured to
125 the vertical edge-portion, (nearest each side-wall 22,) of each door 12 is a block 32, each block having secured thereon a vertically disposed riding-plate or rail 33. Also suitably secured to the same vertical edges of
130

the doors 12, preferably as shown so as to straddle the end-portions of each block 32, is a yoke-shaped piece or member, as 34, the inner surface-portion 35 of which also provides a suitable riding-plate or rail. As shown more particularly in Fig. 3 of the drawings, each pivot-pin 25 of each set of pivotally connected levers or links 23 and 24 extends into the space 36 formed between each pair of riding-plates 35 and 33, and revolubly mounted upon the portion of each pin 25 which extends into the space 36 is a roller 37, the cylindrical surface-portions of which are in rolling-contact with the said riding-plates 35 and 33. Lateral displacement of each roller 37 is prevented on the one hand by the end-portions of the levers or links 23 with which the pins 25 are connected, and on the other hand by plates or disks, as 38, which are suitably mounted upon and secured to said pins 25, substantially in the manner shown. The workings and operations of the parts of each toggle-connection just described, in order to produce the differential movements of the doors 11 and 12, when pulled back and forth by means of their hand or pull-pieces 13, will be fully understood from an inspection of said Figs. 1 and 2 of the drawings, and need not be further dwelt upon.

To prevent any sudden jar upon the doors when rapidly or forcibly moved into their opened positions, each yoke-shaped piece or member 34 may have suitably mounted thereon a buffer-element, as 39, each buffer-element being made with an open part or receiving portion, as 40, in which is arranged a coiled spring 41. Suitably mounted in each spring is a reciprocatory pin or bar 42, having one end-portion slidably disposed in a perforated part of the buffer-element 39 and projecting therefrom, so as to be brought in yielding engagement with the side-wall 22, when the buffer-element enters a receiving socket or recess 43 in said side-wall, as will be evident. The opposite end-portion of each pin or bar 42 is likewise slidably arranged in suitably disposed perforated portions in the buffer-plate 39 and the yoke-shaped piece or member 34, so as to extend slightly beyond the riding-surface 35 of said member 34, in a manner shown more particularly in said Fig. 2 of the drawings, and which yield to the rolling movements of the rollers 37 during their up and down movements in the space 36. In practice, we prefer to use with each yoke-shaped piece or member 34 two buffer-members and two reciprocatory pins or bars 42, these being arranged in the manner shown, so as to respectively yieldably engage with each roller 37 at its uppermost and lowest positions, to thereby act as an auxiliary retaining or holding means for holding the sliding doors in their entirely closed and

entirely opened positions against movement which might be caused by the swaying of a moving car, or when passing over curves.

We are aware that some changes may be made in the general arrangements and combinations of the various devices and parts, as well as in the details of the construction of the same, without departing from the scope of the present invention as set forth in the foregoing specification, and as defined in the claims which are appended to the said specification. Hence, we do not limit our present invention to the exact arrangements and combinations of the devices and parts as described in the said specification, nor do we confine ourselves to the exact details of the construction of the said parts as illustrated in the accompanying drawings.

We claim:—

1. The combination with a pair of sliding doors, of a pair of links, one of said links being pivotally connected with a portion of the door casing, said other link being pivotally connected with one of said doors, said links being pivotally connected with each other, and means connected with the other door with which said pivotally connected links are in slidable engagement for producing differential sliding movements of said doors, and buffer-elements connected with said means, each buffer-element being provided with a spring-controlled reciprocatory bar.

2. The combination with a pair of sliding doors, of a pair of links, one of said links being pivotally connected with a portion of the door casing, said other link being pivotally connected with one of said doors, a pivot-pin for pivotally connecting said links with each other, a block secured to the other door, a riding-plate upon said block, a yoke-shaped member arranged over said block and riding-plate, and a roller upon said pivot-pin, said roller being movably arranged between said yoke-shaped member and the riding-plate of said block, buffer-elements connected with said yoke-shaped member, and a spring-controlled reciprocatory bar connected with each buffer-element.

3. The combination with a partition formed at its end-portions with runways and an intermediate opening forming an entrance or exit, of a pair of laterally extending rails within said partition, two pairs of oppositely moving doors, brackets connected with said doors, and rollers mounted upon said brackets, said rollers resting and moving upon said rails, two sets of pairs of links, one link in each set of links being pivotally connected with a side-wall of the said partition, the other link in each set of links being pivotally connected with a door, a pivot-pin for pivotally connecting said

links with each other, a block secured to the other door in each set of doors, a riding-plate upon each block, a yoke-shaped member arranged over each block and riding-plate, rollers upon the pivot-pins of said
5 connected links, each roller being movably arranged between a yoke-shaped member and the riding-plate of the block, buffer-elements connected with said yoke-shaped
10 member and a spring-controlled reciprocatory bar connected with each buffer-element.

4. The combination with a partition formed at its end-portions with runways
15 and an intermediate opening forming an entrance or exit, of a pair of laterally extending rails within said partition, two pairs of oppositely moving doors, brackets connected with said doors, and rollers
20 mounted upon said brackets, said rollers resting and moving upon said rails, two sets of pairs of links, one link in each set of links being pivotally connected with a side-wall of the said partition, the other link in

each set of links being pivotally connected 25 with a door, a pivot-pin for pivotally connecting said links with each other, a block secured to the other door in each set of doors, a riding-plate upon each block, a yoke-shaped member arranged over each 30 block and riding-plate, and rollers upon the pivot-pins of said connected links, each roller being movably arranged between a yoke-shaped member and the riding-plate of a block, buffer-elements connected with 35 each yoke-shaped member, and a spring-controlled reciprocatory bar connected with each buffer-element, substantially as and for the purposes set forth.

In testimony, that we claim the invention 40 set forth above we have hereunto set our hands this 16th day of December, 1909.

EDVARD M. MOLLER.
LOUIS J. REMMELE.

Witnesses:

FREDK. C. FRAENTZEL,
FREDK. H. W. FRANTZEL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
