T. H. TUTWILER & A. D. McWHORTER.

DOOR OPERATING MECHANISM.

APPLICATION FILED SEPT. 29, 1911.

**1,040,817.**

Patented Oct. 8, 1912

3 SHEETS—SHEET 1.

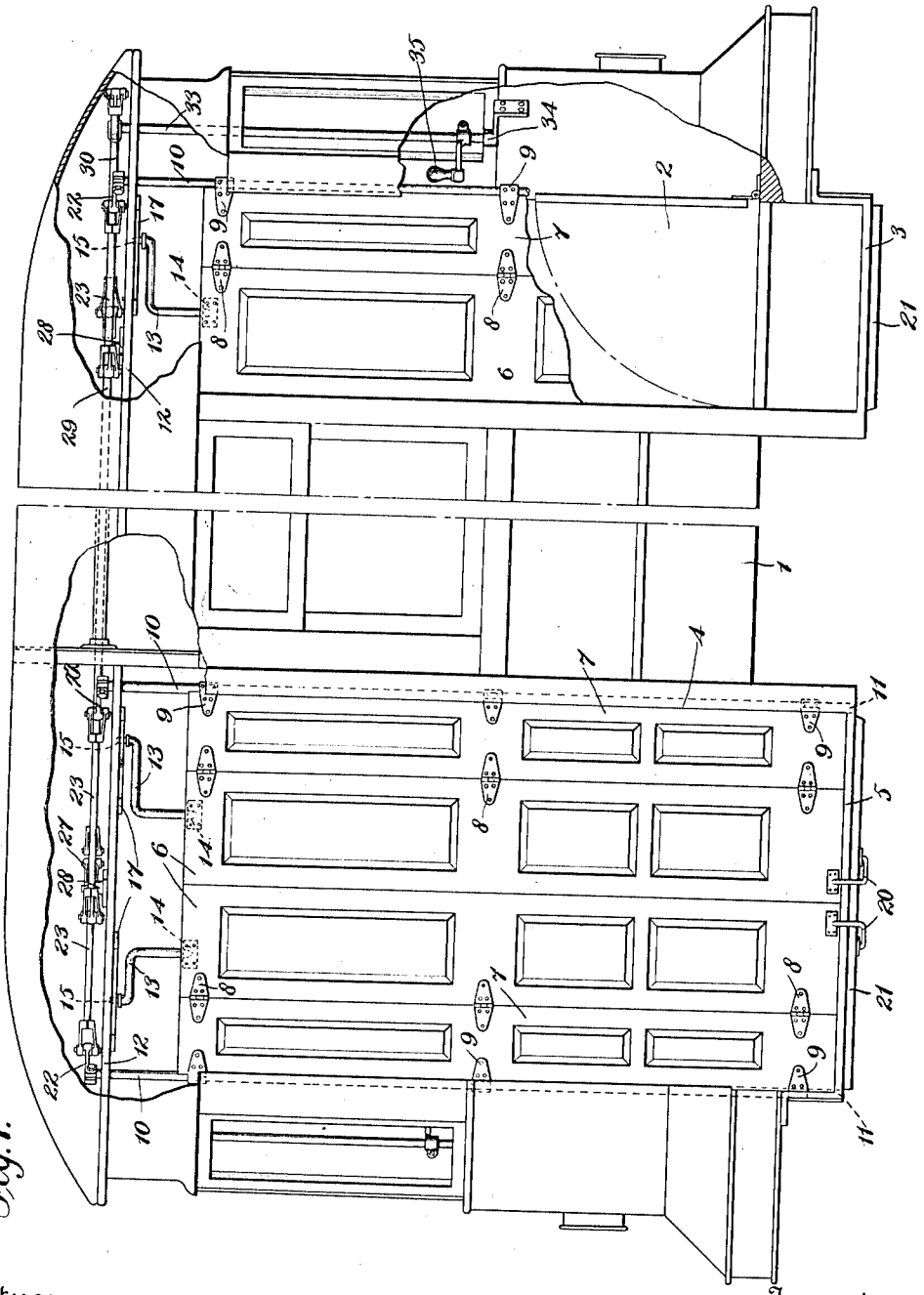

Fig. 1.

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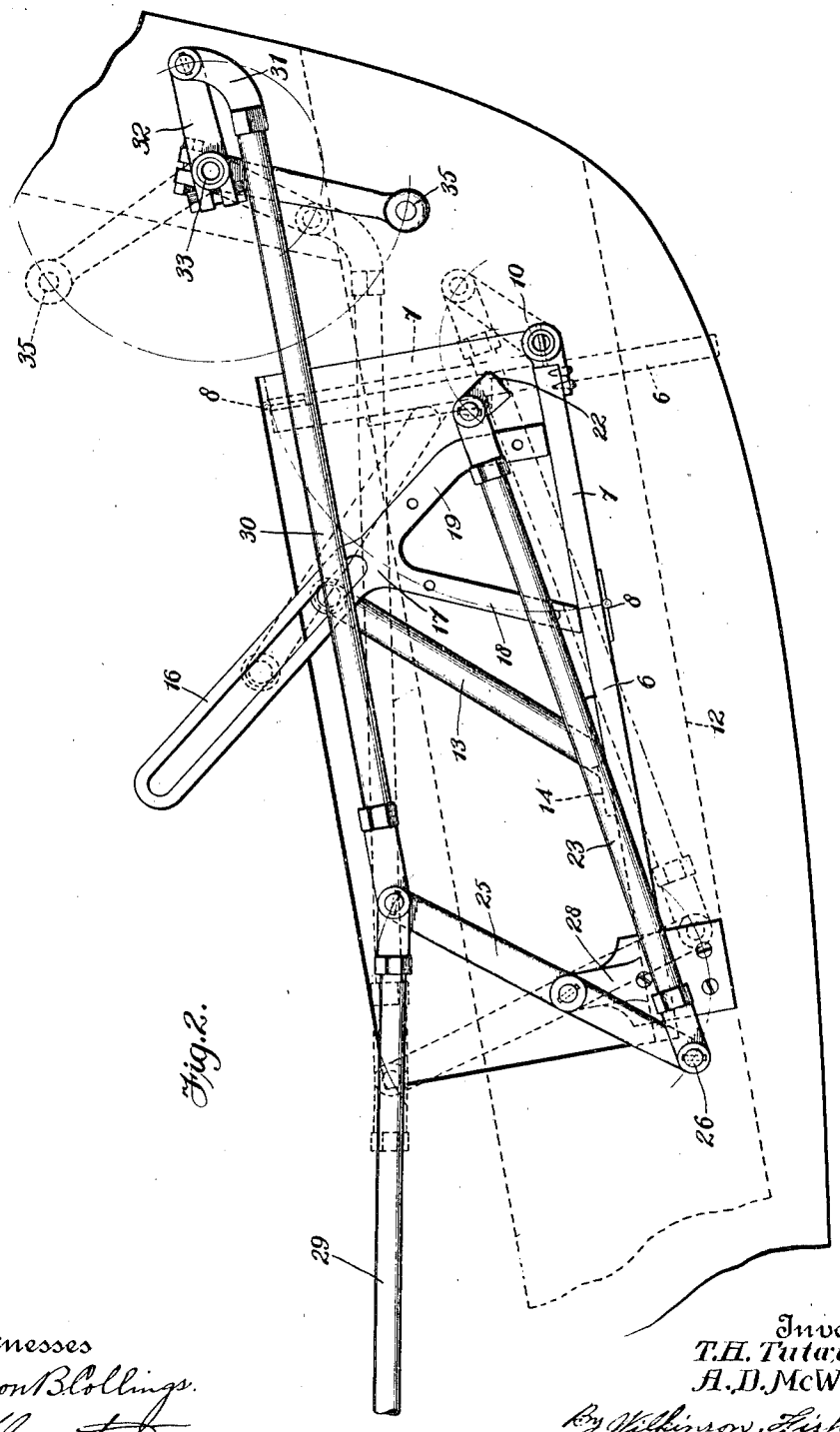


Fig. 2.

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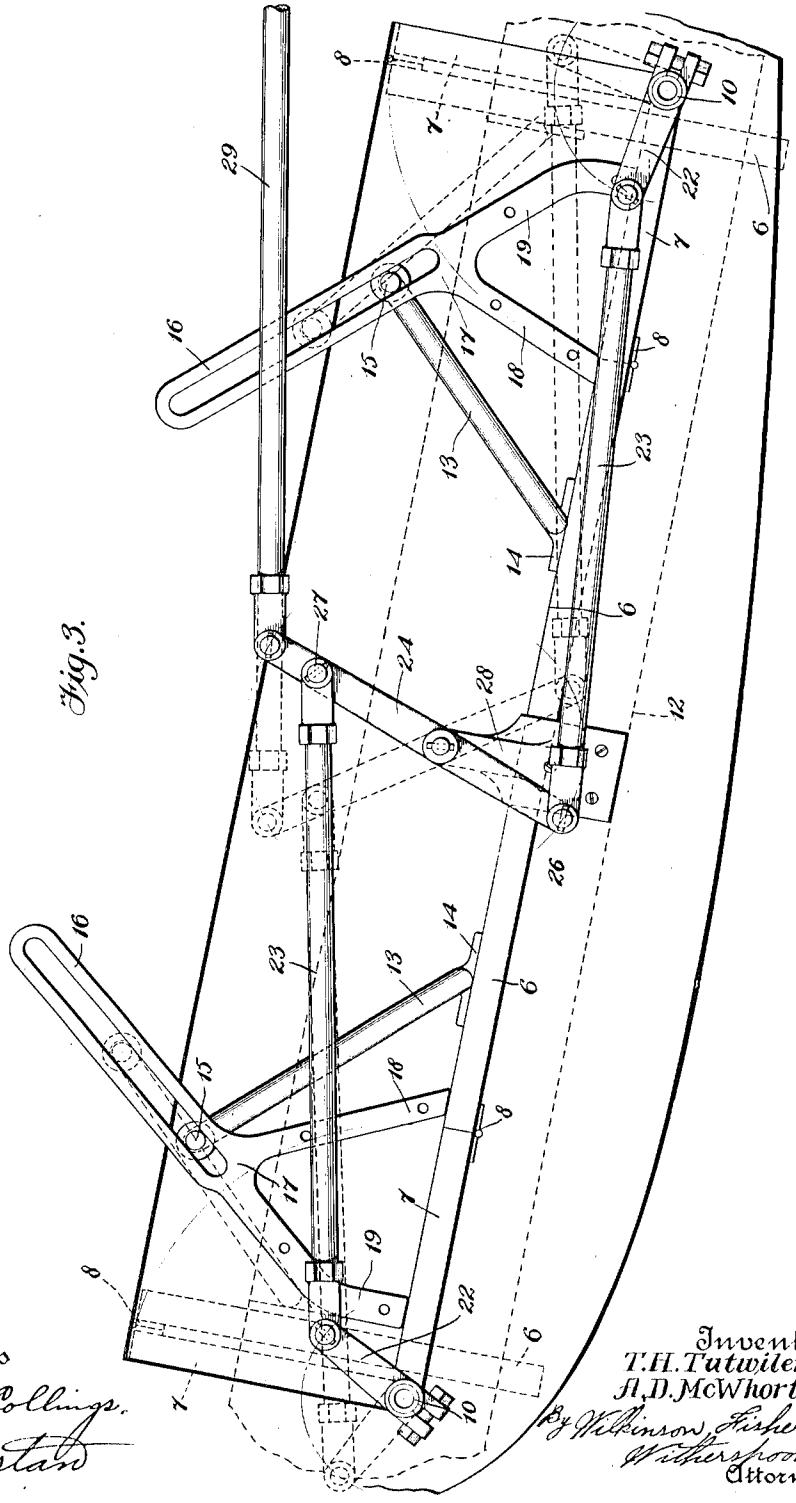

Fig. 3.

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# UNITED STATES PATENT OFFICE.

THOMAS H. TUTWILER AND ALFRED D. McWHORTER, OF MEMPHIS, TENNESSEE.

## DOOR-OPERATING MECHANISM.

1,040,817. Specification of Letters Patent. Patented Oct. 8, 1912.

Application filed September 29, 1911. Serial No. 652,017.

*To all whom it may concern:*

Be it known that we, THOMAS H. TUTWILER and ALFRED D. McWHORTER, citizens of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Door-Operating Mechanism; 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.

This invention relates to improvements in door operating mechanism, and is designed especially for controlling the entrance and exit doors of electric railway cars.

The object of the invention is to provide mechanism which is operated by the motorman for opening and closing a series of doors at one side of the car, thereby preventing the starting of the car while the passengers are boarding or alighting therefrom.

With the above and other objects in view, the invention consists in certain combinations and arrangements of the parts hereinafter described, and the novel features thereof will be distinctly pointed out in the appended claims.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which like characters of reference indicate corresponding parts.

Figure 1 shows a car in side elevation, with our invention applied thereto, certain parts of the car being broken away to more clearly show the invention; Fig. 2 is a plan view, on an enlarged scale, of the mechanism at one side of the forward end of the car; and Fig. 3 is a similar view of the mechanism at the rear end of the car.

The car is represented by 1, having a front or exit doorway 2, provided with a step 3, and a rear or entrance and exit doorway 4, with a step 5. The rear doorway 4 is adapted to be closed by a pair of doors, each consisting of the parts 6 and 7 hingedly connected together by means of a suitable number of butt hinges 8. The front doorway 2 is provided with a single door of similar construction, to each of the rear doors. All of the doors are arranged to come flush with the outer edges of the steps when in their closed positions.

As the arrangement of the doors and the operating mechanism therefor is the same at each side of the car, only that at one side of the car will be described for the sake of simplicity. The part 7 of each door is securely fixed by straps 9 to a vertical shaft 10, preferably steel tubing, arranged near the side frame of the doorways, and pivoted in the steps 3 and 5 at 11, and in the hood plate 12 of the car; said straps being secured by screws to the door and rigidly fixed to the vertical shaft 10 in any well known manner, as by set screws. The doors are guided in their movements by means of crank rods 13 having their lower ends, which terminate in flanges 14, secured to the upper inside portions of the parts 6 of the doors, and their upper free ends 15 work in slotted arms 16 of horizontal guides 17, having forked feet 18 and 19, which are fixed to the hood plate 12. The slotted arms of the guides project inwardly of the car on an inclination and extend toward the front edges of the doors, and the upper ends of the crank rods 13 engage the rear ends of the slotted arms 16 when the doors are in their closed positions. To the outside of the lower portions of the parts 6 of the doors, near their front edges, are fixed depending members 20, which slidably engage longitudinally extending guide rails 21 secured to the under sides of the steps 3 and 5 for frictionally holding the doors in either their closed or open positions.

The doors are opened by means of a system of levers and connecting rods as follows:—Crank levers 22 are rigidly secured to the projecting upper ends of the vertical shafts 10, and to the crank levers are pivotally connected short connecting rods 23 having their other ends similarly connected to levers 24 and 25, at 26 and 27, which levers are pivoted to supporting brackets 28 carried by the hood plate 12 of the car. The free ends of the levers 24 and 25 are connected by a long connecting rod 29, and to the lever 25 is pivotally secured a forwardly extending short connecting rod 30 having a curved forward end 31. The curved end of the connecting rod 30 is pivotally connected to a crank lever 32 fixed to the upper end of a vertical rod 33 journaled in the hood plate 12, and having its lower end journaled in a bearing bracket 34 secured to the car body. An operating handle 35, within convenient reach of the motorman, is detachably fixed to the vertical rod 33. When the operating handle 35 is rotated to the dotted

position, Fig. 2, the upper ends of the crank rods 13 will slide toward the front ends of the slotted arms 16, and the system of connecting rods and levers and also the parts 6 and 7 of the doors will take the positions shown in dotted lines, Figs. 2 and 3.

It is to be understood that slight changes in the details of construction and combinations and arrangements of the parts may be resorted to without sacrificing any of the advantages or departing from the spirit of the invention.

Having fully described our invention what we claim is:—

1. In a door operating mechanism, the combination of a door consisting of two parts hinged together, a shaft fixed to one of said parts, means for rotating said shaft, independent stationary guides extending angularly to one another, and slides on the other of said parts for engaging said guides.

2. In a door operating mechanism, the combination of a door consisting of two parts hinged together, a shaft fixed to one of said parts, means for rotating said shaft, independent stationary guides, and slides at different distances from the hinged connection on the other of said parts for engaging said guides.

3. In a door operating mechanism, the combination of a plurality of doors consisting of parts hinged together, shafts fixed to one of said parts of each door, a common means for simultaneously actuating said several shafts, slides on the other of said parts of each door, and independent stationary guides for engaging said several slides.

In testimony whereof, we affix our signatures, in presence of two witnesses.

THOMAS H. TUTWILER.
ALFRED D. McWHORTER.

Witnesses:
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E. J. Karr.