

J. F. MURPHY.

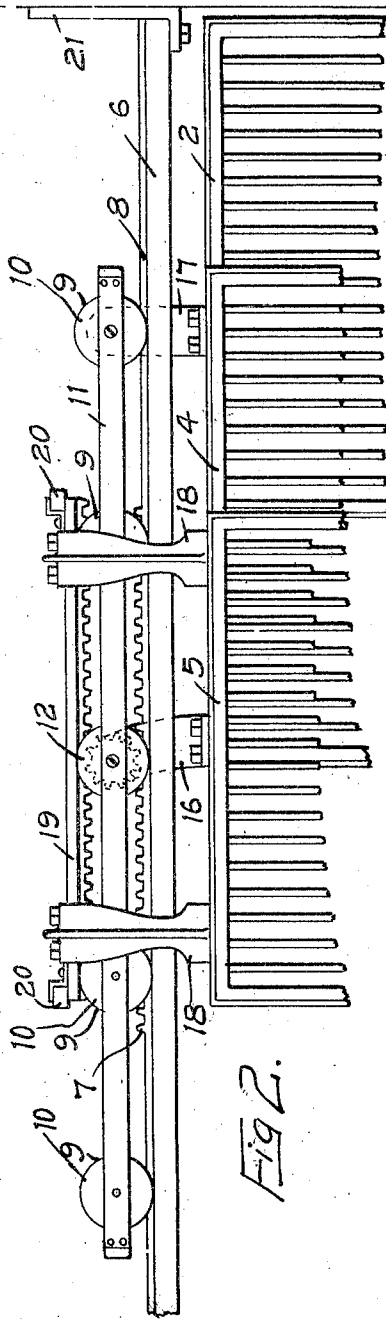
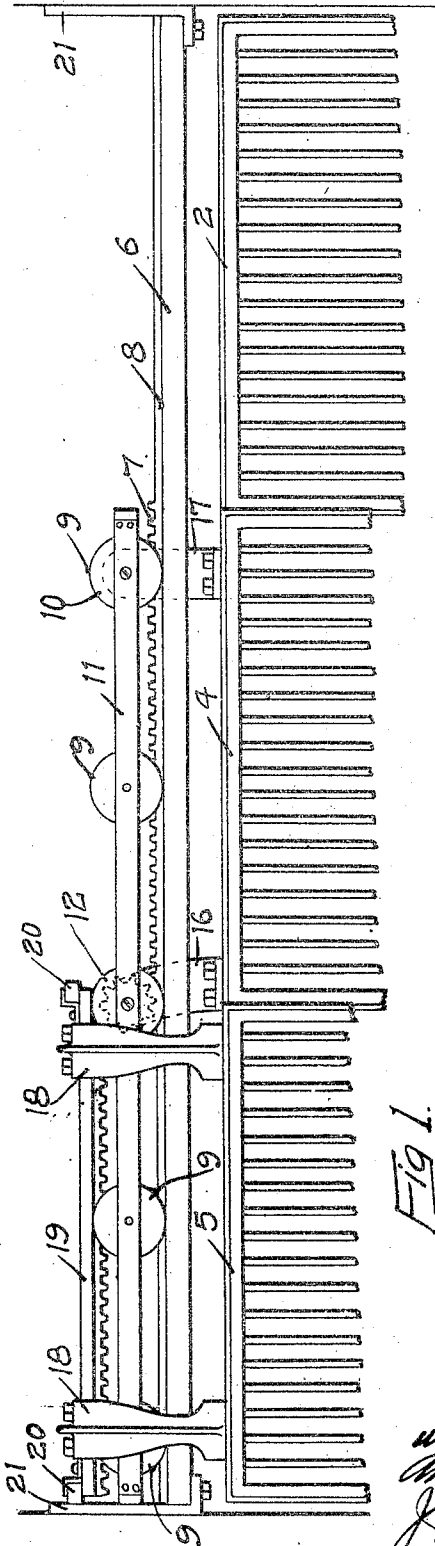
DOOR HANGER.

APPLICATION FILED JULY 18, 1910.

1,005,281.

Patented Oct. 10, 1911.

2 SHEETS—SHEET 1.



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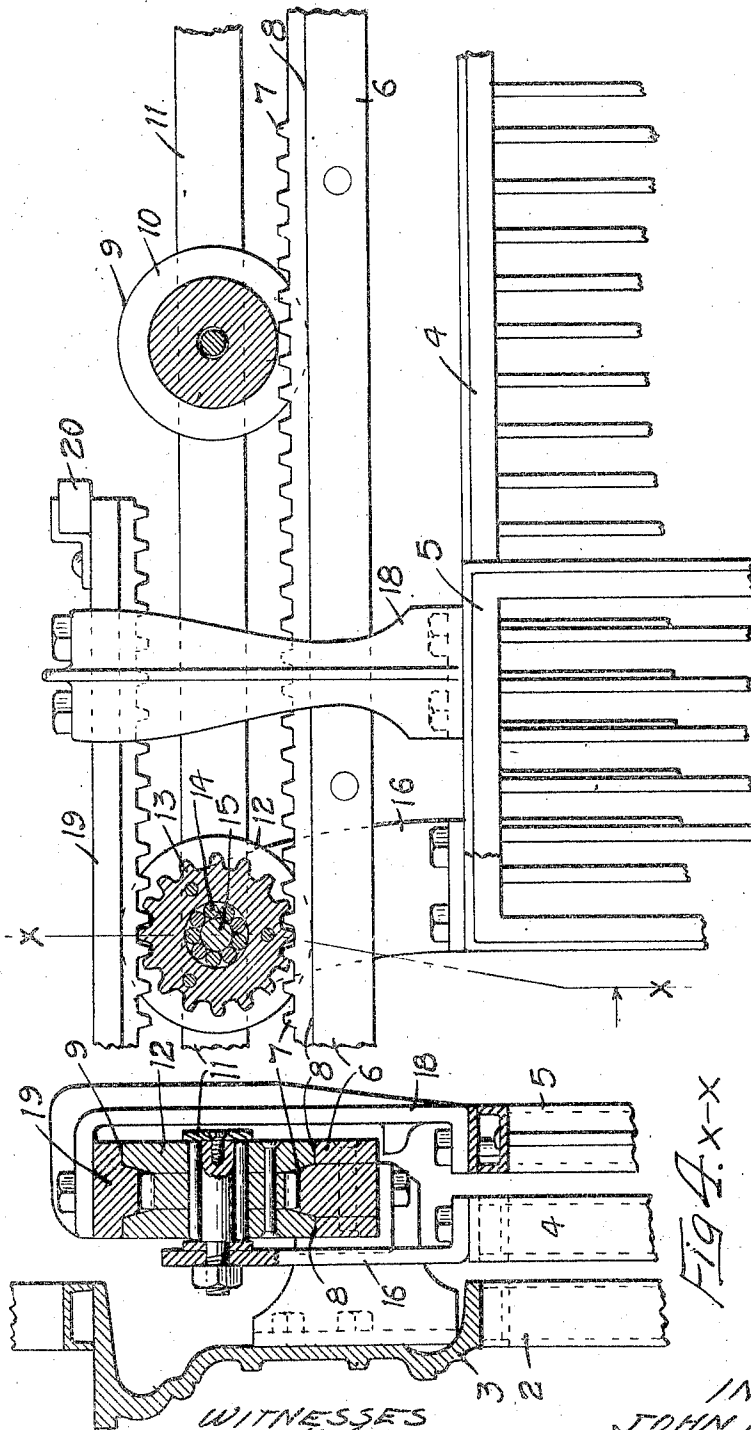


Fig. 3.

Fig. 4. x-x

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UNITED STATES PATENT OFFICE.

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DOOR-HANGER.

1,000,281.

Specification of Letters Patent.

Patented Oct. 10, 1911.

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To all whom it may concern:

Be it known that I, JOHN F. MURPHY, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Door-Hangers, of which the following is a specification:

My invention relates to door hangers designed for use where two or more movable door sections are employed and adapted to slide past one another to open or close the opening, and the invention is designed particularly for an elevator cage or shaft where sectional sliding doors are usually provided for closing the openings leading from the elevator cab or car to the different floors.

The object of my invention is to simplify and improve the mechanisms in general use for supporting the door sections and permitting them to slide back and forth past one another.

A further object is to provide a mechanism which can be easily operated and being composed of but few parts will be inexpensive to install and cannot easily get out of order.

A further object is to provide a mechanism which will be positive and reliable in its action and one in which the wear or change of the parts resulting from continued use will be so comparatively small that the working of the door will be practically unaffected thereby.

Further objects of the invention will appear from the following detailed description.

The invention consists generally in a toothed track, a carriage having supporting wheels and a gear to engage said track, a door section that is movable with said carriage, and a second door section having a rack bar that engages said gear and travels thereon with said carriage.

Further the invention consists in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification, Figure 1 is a side elevation of the upper portion of the fixed and sliding door sections with my improved hanger attached thereto, showing the doors in their closed position. Fig. 2 is a similar view, illustrating the doors partially open. Fig. 3 is a detail sectional view illustrating the toothed track, the gear thereon and the

rack bar engaging the gear and supporting one of the door sections. Fig. 4 is a sectional view on the line $x-x$ of Fig. 3.

In the drawing, 2 represents the stationary panel section having a suitable support 3 and past which stationary panel the movable sections 4 and 5 are adapted to slide.

6 represents a track having a toothed section 7 extending along for a predetermined distance the middle portion of the track. On each side of this toothed section ways 8 are preferably provided in the track whereon flanges 9 of the wheels 10 are adapted to roll. These wheels are journaled in a carriage 11 which comprises side rails or bars with suitable end connections between which side rails the wheels are journaled. These wheels are idle in the sense that they roll back and forth on the ways 8, supporting and guiding the carriage and the rack bar, (to be hereinafter described) without engaging the toothed section of the track. 12 is a wheel having flanges corresponding to those of the wheel described and provided between said flanges with a gear 13 which has roller bearings 14 on a stud 15. This stud is mounted in the carriage 11 and supports a hanger 16 which is secured to the door section 4 near one of its vertical edges, while a similar hanger 17 is secured near the other vertical edge and is supported by the axis of one of the wheels 10. The gear 13 has its teeth meshing with the teeth of the rack 7 and said gear is preferably of less diameter than the wheel and consequently the teeth 7 are spaced apart so that there will be sufficient lost motion for the teeth of the gear 13 to compensate for their position with respect to the periphery of the wheel. That is, the gear 13, meshing with the spaced teeth 7, will have the same speed as a gear with the pitch-line of its teeth flush with the periphery of the wheel. The gear 13 moves with the carriage 11 and the wheels 10 and consequently, when pressure is applied to the door section 4, the carriage will ride on the guide-ways 8 and move past the stationary door section 2.

The door section 5 has hangers 18 to which a rack bar 19 is secured, said rack bar meshing with the teeth of the gear 13 and being movable thereon when the door sections are operated. The rack bar depends between the flanges of the idle wheels and is

guided thereby and prevented from oscillating on the teeth of the gear wheel. It is desirable in an apparatus of this kind to provide a door section supporting mechanism which will allow the sections to be operated at different speeds to compensate for their difference in travel, so that in opening or closing the door the sections will assume an open or closed position simultaneously. I have accomplished this by the foregoing described mechanism, for when the operator slides the section 5 past the section 4 the two sections, through their gear connections, will move simultaneously and as the point of engagement of the teeth of the rack bar 19 with the teeth of the gear 13 is twice the distance of the axis of the gear from the point of engagement of the gear with the toothed section 7, it follows that the door section 5 will travel twice as fast as the door section 4 and consequently, when the doors are opened, the section 5 will overtake the section 4 and the two sections will arrive at their extreme open position at the right hand end of the track at substantially the same time. In closing the door, the section 5 will travel faster than the section 4 and move ahead of it, so that the two doors will assume their closing position simultaneously. The door sections will move very easily and smoothly and very little effort will be required to open and close them. The free movement of the door sections is due largely to the fact that the power transmitted through the hanger rack bar is applied to the centers of the carriage supporting wheels through the gear which is mounted directly above the toothed track section and midway, substantially, of the vertical faces of the wheels. I regard this as an important feature of the invention, for if the power is applied outside the planes of the wheels there will be a tendency to twist the wheels and cause them to bind on the track. The parts are positive in their action and the movement of the door sections will be uniform, which does not always follow when cables or sprocket chains and wheels are relied upon for producing a variable speed for the door sections.

From an examination of Fig. 4 it will be noted that the flanged wheels have bearing surfaces on each side of the toothed section of the track, and the rack bar has bearing surfaces on the flanges of the wheels on both sides of its teeth, so that the load is carried by these flanges and bearing surfaces while the meshing of the teeth of the bar with the wheel surfaces merely prevents one hanger from slipping with respect to the other or prevents independent movement of the second hanger. The device constructed in this way is much more durable than where the load is carried directly by the gear wheel and the teeth of the rack bar.

From the foregoing description it will be noted that the movement of the door sections is positive and reliable and that there will be no slippage of one door section with respect to the other section, which might result if a mechanism other than the toothed bars and gear were employed. By using this combination I am able to prevent independent movement of the sections and insure a positive and easy movement of the door at all times.

The rack bar 19 may have yielding buffer-blocks 20 to engage stops 21 at the ends of the track to relieve the door sections of shock or jar incidental to the sudden stopping of the sections.

I do not wish to be confined in this application to the door sections or the arrangement of the hangers and their connections, as in various ways the details of construction may be modified without departing from the spirit of my invention.

I claim as my invention:—

1. The combination, with a track having a raised toothed section and bearing surfaces on each side of said section, of a carriage, wheels mounted in said carriage and having flanges adapted to straddle said toothed section and roll on said bearing surfaces, one of said wheels having a gear between its flanges to mesh with said toothed section, a door section having hangers supported by said carriage, a second door section and hangers therefor, a bar secured to said second door section and having bearing surfaces adapted to rest on said flanges and support said bar and hanger thereon, said bar also having a toothed central portion depending below said bearing surfaces and adapted to mesh with the teeth of said gear, the teeth of said gear and bar preventing independent movement of said second door section.

2. The combination, with a track having a toothed section, of a carriage, wheels mounted in said carriage and having flanges adapted to roll on said track, a gear wheel mounted between the flanges of one of said wheels and meshing with the teeth of said track section, a door section having hangers supported by said carriage, a second door section and hangers therefor, a bar secured to said second door section and arranged to slide between the flanges of said wheels and having teeth to mesh with said gear wheel and bearing surfaces on each side of said teeth to rest upon the flanges of said wheels and support said bar thereon, substantially as described.

3. The combination, with a track having a toothed section, of a carriage, wheels mounted in said carriage and having flanges adapted to roll on said track, a gear wheel having flanges and teeth meshing with the teeth of said track section, a door section having

hangers supported by said carriage, a second door section and hangers therefor, a bar secured to said second door section, said bar having teeth to mesh with the teeth of said gear wheel and bearing surfaces adapted to rest on the flanges of said wheels and support the load of the doors and hangers thereon, the meshing of the teeth of said bar with the teeth of said wheel preventing inde-

pendent movement of said second door section. 10

In witness whereof, I have hereunto set my hand this 15th day of July 1910.

JOHN F. MURPHY.

Witnesses:

GENEVIEVE E. SORENSEN,

J. A. BYRNES.