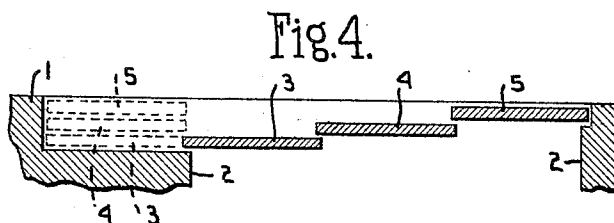
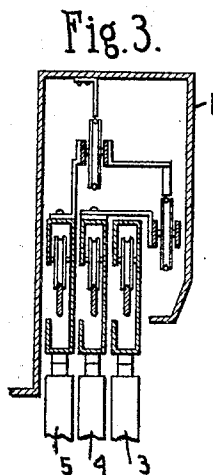
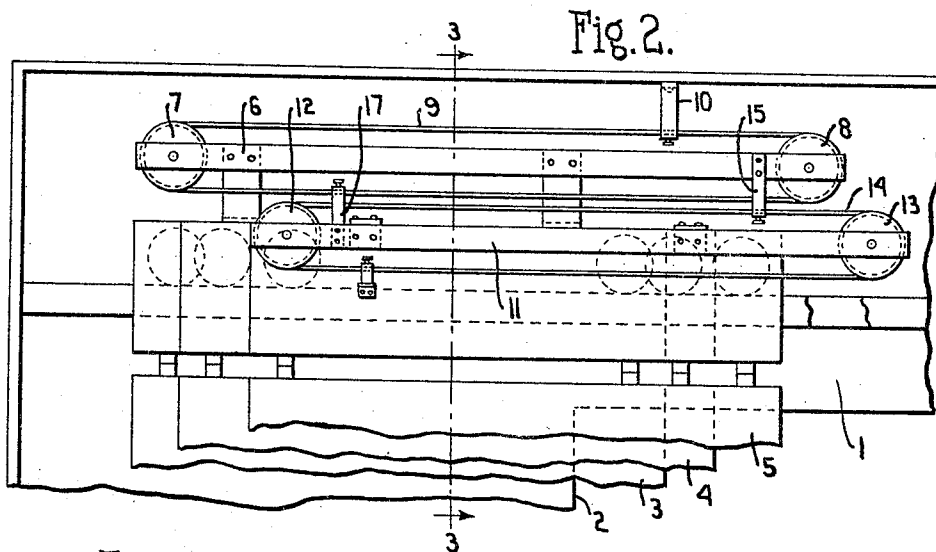
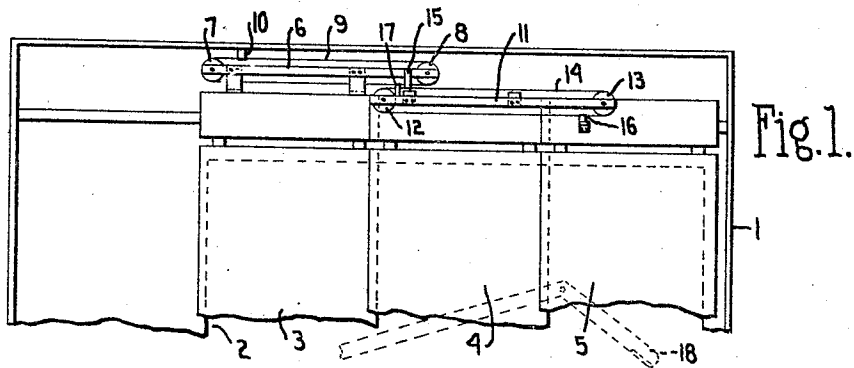


April 21, 1925.

1,534,210

T. E. GRIFFITH ET AL
OPERATING MECHANISM FOR ELEVATOR DOORS

Filed June 16, 1923



INVENTORS.
Thomas E. Griffith
Lee L. Dodds
BY
Fay, Oberlin & Fay
ATTORNEYS.

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UNITED STATES PATENT OFFICE.

THOMAS E. GRIFFITH AND LEE L. DODDS, OF CLEVELAND, OHIO, ASSIGNORS TO THE
W. S. TYLER COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

OPERATING MECHANISM FOR ELEVATOR DOORS.

Application filed June 16, 1923. Serial No. 645,833.

To all whom it may concern:

Be it known that we, THOMAS E. GRIFFITH and LEE L. DODDS, both citizens of the United States, and residents of Cleveland, county of Cuyahoga, and State of Ohio, have jointly invented a new and useful Improvement in Operating Mechanism for Elevator Doors, of which the following is a specification, the principle of the invention being herein explained, and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention, relating, as indicated, to operating mechanism for elevator doors, is more particularly directed to an improved system of connections between the individual members of a series of doors used in elevator enclosures for the purpose of effecting simultaneous opening and closing of the several separate doors, where there are more than two. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is an elevation of an elevator enclosure showing the doors thereof; Fig. 2 is a similar view on an enlarged scale showing the connections between the various doors; Fig. 3 is a section on the line 3—3 in Fig. 2; and Fig. 4 is a plan view showing the doors in both open and closed position.

Referring now to Figs. 1 and 4 there is shown an elevator enclosure 1 provided with an opening 2 normally closed by a series of door elements 3, 4 and 5. The purpose of the present invention is to provide interconnecting means between these three door elements which will cause the door when opened to reach the full open position shown in dotted lines in Fig. 4 at the same time. The connections which I have designed to effect this result include the following mechanism.

Mounted above the door 3 on a suitable frame 6 are sheaves or sprockets 7 and 8, over which extends an endless chain or other

flexible element 9. This chain is fixed to the enclosure at the point 10. Mounted on the door 4 is a second framework 11 carrying sprockets or sheaves 12 and 13, over which extends a second flexible element or chain 14, which is anchored to the first door 3 by means of a bracket 15 extending from the frame 6. This chain 14 is also anchored to the last door 5 by means of a bracket 16, while the door 4 is anchored to the chain 9 by a bracket 17, provided on the framework 11.

The operation of the foregoing mechanism is as follows. When the doors are opened by means of any suitable handle mechanism 18 the door 5 is moved toward its open position in the recessed portion of the enclosure 1. For clearness of description it will be simpler to describe the operation of the various doors 3, 4 and 5, beginning with the door 3 first. First the door 3 moves to the left. The chain 9 is anchored at the point 10 and hence revolves on the sprockets 7 and 8 and draws the second door also to the left at a rate of speed which will bring this door to an entirely open position at the same time as the door 3. The point of the chain 9 to which is anchored the second door by means of the bracket 17 is moved to the left at a rate of speed which is equal to the speed of the first door 3 plus the distance which this point of anchorage is moved to the left during the opening movement of the door 3. In other words, the movement of the door 4 is twice as fast as that of the door 3 and hence both of these doors arrive at the fully open position at the same instant.

The third door 5 is actuated by the movement of the second door 4, plus the movement of the door 3 by reason of the double connection of the door 5 to the chain 14 through the bracket 16, and the door 3 to the chain 14 through the bracket 15, so that the movement of the last door 5 is a compound movement and is equal in speed to the speed of movement of the door 3 plus the speed of movement of the door 4. If we consider the door 3 as moving to the left one space, then the door 4 is moved to the left two spaces and the sum of these movements is equal to three spaces, through which distance the door 5 has been moved, and this movement is simultaneous with that of the doors 3 and 4.

If we consider the movement of the doors 4 and 5 together, we find that movement of the door 3 to the left moves the two doors 4 and 5 also to the left, and each through a distance equal to the movement of the door 3. This action is effected through the engagement of the bracket 15 with the chain 14, which in turn is anchored to the last door 5 at the point 16 so that these two doors may be considered as being first moved without any relative movement between them through a distance equal to the entire movement of the door 3. There is added to the above movement, a movement of the door 4, by reason of the engagement of the bracket 17 with the chain 9. This chain 9 is moved to the left as far as the door 3 moves in passing to its open position, and the door 4 is thus given an additional movement which doubles its rate of speed and brings it to its fully open position at the same instant as the door 3. The final movement of the door 5 is effected by the movement of the chain 14 as the sprocket 12 is drawn away from the anchorage point 15 through the movement of the door 4 by the bracket 17 and chain 9. This movement of the chain past the anchorage point 15 moves the third door 5 to a third space to the left, that is, a distance equal to the amount of movement of the sprocket 12 away from the anchorage point 15, and thus gives the third door 5 a rate of travel three times the rate of travel of the first door 3, and one and one-half times the rate of the travel of the door 4.

When the doors are closed the reverse of the foregoing action takes place, the door 5 returning at one and one-half times the speed of the door 4, or three times the speed of the door 3, and the door 4 returning at twice the speed of the door 3 so that all the

doors reach their closing position at the same time.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention:—

1. Speed actuating mechanism for three parallel traveling doors comprising a framework mounted on the first door, sheaves carried at each end of said framework, a flexible element passing around said sheaves, said element being anchored at one point and being connected to the second door, a second framework mounted on the second door, sheaves carried at each end of said second framework and a second flexible element passing around said last-named sheaves, said second element being connected to the first and third doors.

2. Speed actuating mechanism for three parallel traveling doors, comprising flexible means carried at the top of the first door for connecting said first door to the enclosure and to the second door, and flexible means carried at the top of said second door, said last named means connecting said third door to said first and second doors, both of said flexible means being operable in the plane of the movement of the doors and being adapted to cause the second door to travel twice as fast as the first door, and to cause the third door to travel three times as fast as the first door.

Signed by us, this 8th day of June, 1923.
THOMAS E. GRIFFITH.
LEE L. DODDS.