May 13, 1924. 1,494,061

L. CHRISTIANSEN

AUTOMATIC ELEVATOR GATE

Filed June 30, 1919

Fig. 1

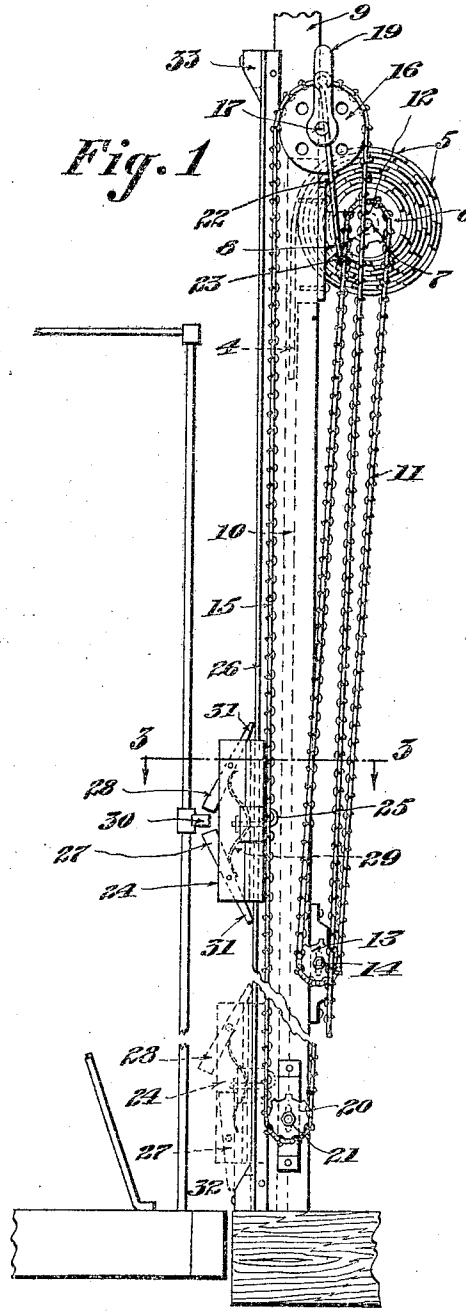



Fig. 2

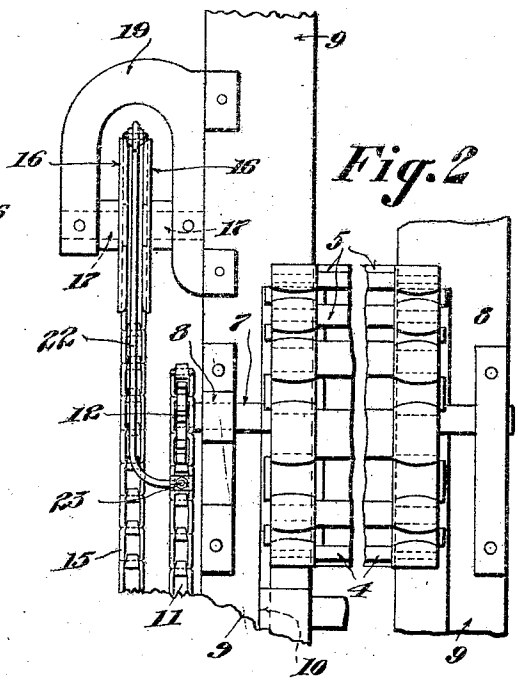
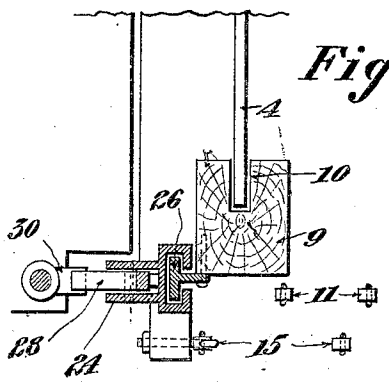



Fig. 3




Inventor

Ludwig Christiansen

by his attorneys

Van Eaton, Fish & Fieldsmith

Patented May 13, 1924. 1,494,061

# UNITED STATES PATENT OFFICE.

LUDWIG CHRISTIANSEN, OF LYNN, MASSACHUSETTS.

## AUTOMATIC ELEVATOR GATE.

Application filed June 30, 1919. Serial No. 307,812.

*To all whom it may concern:*

Be it known that I, LUDWIG CHRISTIANSEN, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Elevator Gates; and I 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 automatic gates such as are used in connection with freight elevators to prevent accidental entrance into the elevator well when the elevator car is not in position.

The object of the invention is to provide novel and improved means, actuated by the movement of the elevator car in approaching or leaving a floor, for operating the gate to respectively open or close the doorway leading to the elevator well at that floor.

To this end the invention consists in the features of construction, arrangement and combination of parts hereinafter described and referred to in the claims.

The invention will be readily understood from an inspection of the accompanying drawings and the following detailed description of the construction illustrated therein.

In the drawings, Figure 1 is a view, in side elevation, of an elevator gate embodying the invention in its preferred form and showing the elevator car in position and the gate raised to give access to the car; Fig. 2 is a detail view, in elevation, of a portion of the gate, looking from the outside of the elevator well; and Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Referring to the drawings, the gate comprises an apron or curtain 4, consisting of a plurality of slats 5, arranged side by side and so connected together as to permit the apron to be wound upon a shaft, roller or drum 6, extending transversely across the top of the doorway of the elevator well. The roller 6, to which the upper end of the apron is secured, may be of any suitable construction and is provided with trunnions 7, that are journaled in brackets 8, on uprights 9, at either side of the doorway, and it is adapted to be rotated in opposite directions to wind up or unwind the apron, thereby raising or lowering it. The apron is guided to move vertically in the doorway, as it is raised or lowered, by means of grooves 10 in the inner sides of the uprights into which the ends of the slats 5 extend when they are unwound from the roller.

The means for operating the gate comprises two endless chains, one of which serves to rotate the roller and is moved by the other to which it is connected and which is, in turn, moved by the elevator car. The two chains are arranged adjacent each other on the outer side of one of the uprights 9 in the relative positions illustrated in the drawing. The chain which rotates the roller is indicated at 11, and passes over a sprocket wheel 12 that is secured to one of the trunnions of the roller, and over a similar sprocket wheel 13 that is mounted to turn on a stud 14 which is adjustably fixed in a bracket on the upright. The chain which is operated directly by the elevator car is indicated at 15. The upper portion of the chain 15 passes over and is guided by two disks 16, which are separated sufficiently to engage opposite sides of the links of the chain, and are severally mounted to turn on the inner ends of two studs 17, which project inwardly from the oppositely extending arms of a bracket 19 on the upright 9. The disks 16 are spaced apart a sufficient distance to permit the thickened joints of the links in the chain 15 to project between them thus preventing the chain from slipping sidewise from the disks and holding the disks apart. In order that an uninterrupted passage may be provided between the disks 16 the studs 17 are constructed so that their inner ends do not project beyond the inner surfaces of the disks. The lower portion of the chain 15 passes over a sprocket wheel 20 that is mounted to turn on a stud 21, which is adjustably fixed in a bracket on the upright.

In order that the movements of the chain 15 may be transmitted to the chain 11, the two chains are connected by means of a link or bar 22. The upper end of the bar 22 is hooked around the joint of a pair of links in the chain 15 between the sides of the links, while the lower end of the bar is secured to one of the links of the chain 11 by means of a bolt 23. The greater part of the upper portion of the bar 22 extends in the central vertical plane of the chain 15 and is

capable of swinging freely between the disks 16 whenever the links to which it is connected pass over the top of the disks 16.

To permit the chain 15 to be actuated by the elevator car, a carriage 24 is provided, which is secured to the chain by means of a hooked bolt 25 and is mounted to slide vertically upon a T-bar 26 which is secured to one of the uprights 9. Two dogs 27 and 28 are pivoted between the sides of the carriage 24 and are engaged by the opposite ends of a leaf spring 29, which is secured to the carriage, so that they are normally held in the positions shown in Fig. 1, with their opposed ends projecting in the path of a finger 30 on the elevator car, and with the opposite or tail ends 31 bearing against the bottom of the carriage 24.

When the elevator car is in position at the doorway, the finger 30 will be located between the opposed projecting ends of the dogs, and the upper pivoted end of the bar 22 will be located at the top of the disks 16, directly above the studs 17, as represented in Fig. 1. A downward movement of the elevator car will cause the finger 30 to engage the dog 27, pushing the carriage 24 and the adjacent side of the chain 15 downwardly and rotating the disks 16 in a counter-clockwise direction, viewing Fig. 1, thus moving the bar 22 downwardly on the left-hand side of the disks 16, and operating the chain 11 to lower the gate.

In order that the dog 27 may be disengaged from the finger 30 after the gate has been lowered, a trip block 32 is secured to the lower part of the T-bar 26, in the path of the dog 27, and in the proper position to trip the dog when the gate has reached the required closed position. The tripping of the dog is effected by the riding of the tail 31 over an inclined face on the trip block, which causes the dog to be swung on its pivot, against the tension of the spring 29, withdrawing the projecting lower end of the dog from contact with the finger 30 and permitting the elevator car to continue downward without imparting further movement to the carriage 24. The position of the carriage 24 and the dog 27 after the gate has been lowered by a downward movement of the elevator car is shown clearly by dotted lines in Fig. 1.

An upward movement of the elevator car will bring the finger 30 against the dog 28, and the carriage and adjacent side of the chain 15 will be raised, rotating the disks 16, in a clockwise direction, thus moving the bar 22 downwardly at the right hand side of the disk 16 and operating the chain 11, in the same manner as before, to lower the gate. When the gate has been lowered sufficiently the dog 28 is tripped by means of a trip block 33, which is located at the upper end of the T-bar 26. The trip block 33 is similar to the trip-block 32, which disengages the dog 28 from the finger 30, and operates the dog 28 in the same manner in which the dog 27 is operated.

In returning to the floor which is indicated in Fig. 1, if the elevator car is moving downwardly, the finger 30 will pass freely over the dog 28, which is held out of the path of the finger by the trip block 33, and striking against the projecting end of the dog 27, the finger 30 will move the carriage downwardly from its position adjacent the trip block 33, to the position indicated in full lines in Fig. 1, thereby raising the gate. If, in approaching the floor, the elevator is moving upwardly, the finger 30 will pass over the dog 27 which is held out of the path of the finger by the trip block 32, and engaging the projecting end of the dog 28, the finger will raise the carriage from dotted line position to the position shown by full lines, when the car will be positioned at the doorway and the gate will be raised.

It will be seen that when the elevator car leaves a floor which is equipped with the automatic gate, herein described, the arrangement of the bar 22 with relation to the disk 16 is such that the gate will be lowered, whether the car is moving upwardly or downwardly. Conversely when the elevator car is moving, either upwardly or downwardly, in approaching a floor, the gate will be raised.

The automatic gate hereinbefore described is particularly adapted for use wherever there is not sufficient room between the top of a doorway and the floor above to permit the use of an automatic gate of the usual rigid sliding type which is raised bodily above the doorway to permit access to the elevator car.

While it is preferred to employ the specific construction and arrangement of parts shown and described, it will be understood that this construction and arrangement is not essential, and may be varied and modified without departing from the invention.

Having explained the nature and object of the invention, and specifically described one form of device in which it may be embodied what I claim is:—

1. A gate for the doorways of elevator wells, comprising a roller, a flexible apron secured to the roller for closing the doorway when the elevator car is not in position to be entered, a sprocket wheel connected with said roller, an endless chain passing over said sprocket wheel for rotating the roller to raise or lower the apron, an idle wheel over which said chain passes, a second endless chain adapted to be operated by the movements of the elevator car, means mounted to rotate independently of said idle wheel for supporting and guiding the second

chain, and a link connecting said chains, the link and the chains being so arranged that the upward or downward movement of the car in approaching a floor will cause the roller to be rotated in one direction to raise the apron, and the movement of the car in leaving the floor will cause the roller to be rotated in the opposite direction to lower the apron.

2. A gate for the doorways of elevator wells comprising a roller, a flexible apron secured to the roller for closing the doorway when the elevator car is not in position to be entered, a sprocket wheel connected with said roller, an endless chain passing over said sprocket wheel for rotating the roller to raise or lower the apron, an idle sprocket wheel over which said chain passes, a second endless chain arranged adjacent the first mentioned chain, means for supporting and guiding the second chain in a substantially vertical plane, a member connecting said chains and so arranged with relation to the chains that the motion of the second chain will be transmitted to the first chain, a device on the second chain adapted to be engaged by a member on the elevator car, and means for actuating said device to disengage it from the member on the elevator car when the apron has been lowered to a predetermined extent.

3. A gate for the doorways of elevator wells comprising a roller, a flexible apron secured to the roller for closing the doorway when the elevator car is not in position to be entered, a sprocket wheel connected with said roller, an endless chain passing over said sprocket wheel for rotating the roller to raise or lower the apron, an idle wheel over which said chain passes, a second endless chain arranged adjacent the first mentioned chain adapted to be operated by the movement of the elevator car, means for supporting and guiding the second chain in a substantially vertical plane, a member connecting said chains to transmit the motion of the second chain to the first chain, said member being so arranged that when the apron is raised to its highest point the connection between said member and the second chain will be at the highest point in the second chain.

4. A gate for the doorways of elevator wells comprising a roller, a flexible apron secured to the roller for closing the doorway when the elevator car is not in position to be entered, a sprocket wheel connected with said roller, an endless chain passing over said sprocket wheel for rotating the roller to raise or lower the apron, an idle wheel over which said chain passes, a second endless chain arranged adjacent the first mentioned chain adapted to be operated by the movement of the elevator car, a pair of oppositely arranged disks separated by an unobstructed space and adapted to support and guide the second chain, a pair of opposed projecting studs upon the ends of which the disks are severally mounted to turn, a bar pivoted at one end to the second chain and secured at the opposite end to the first chain and adapted to pass freely between the disks when the portion of the second chain to which the bar is pivoted passes over the disks.

LUDWIG CHRISTIANSEN.