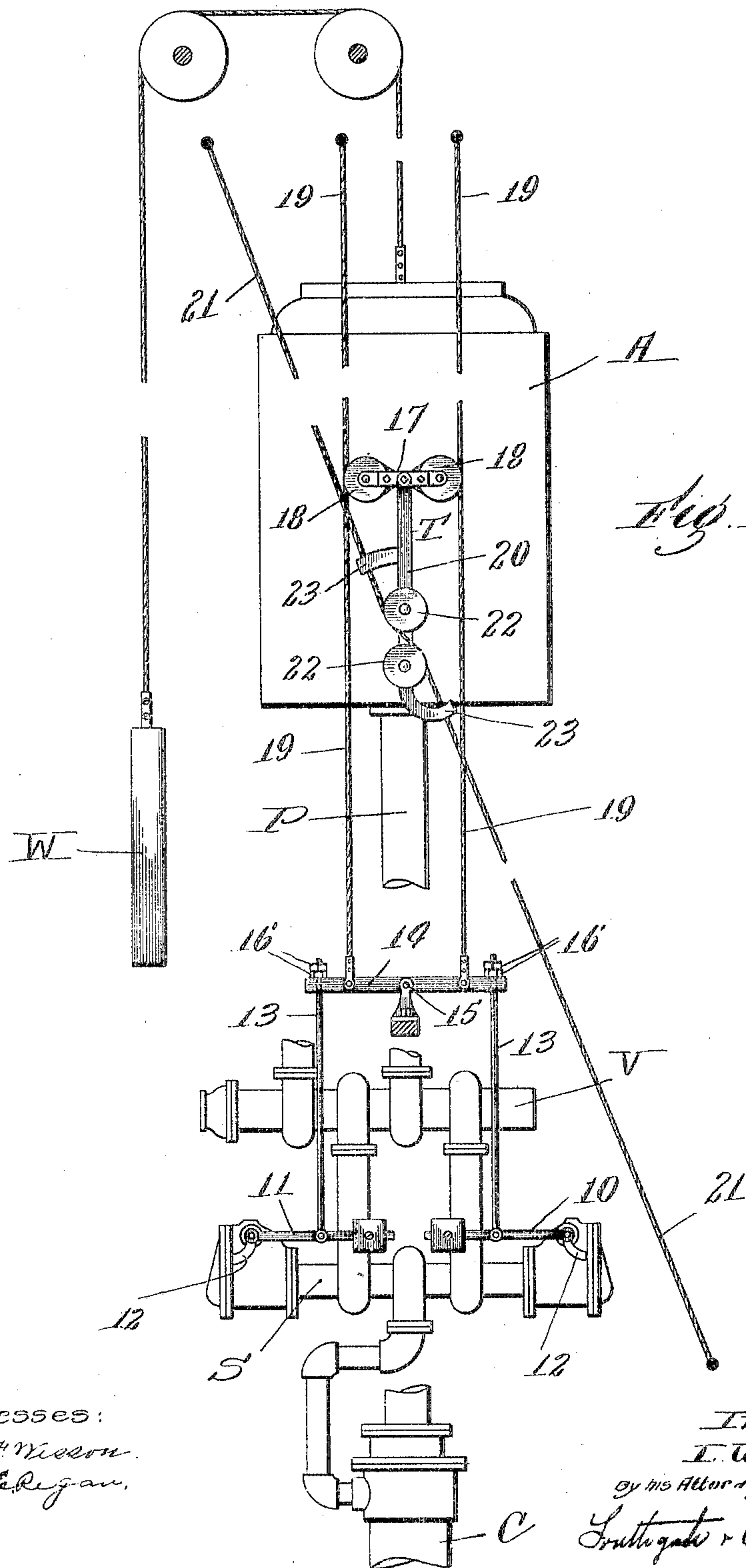


L. W. SOUTHGATE.
STOPPING MECHANISM FOR ELEVATORS.

APPLICATION FILED MAR. 28, 1905.

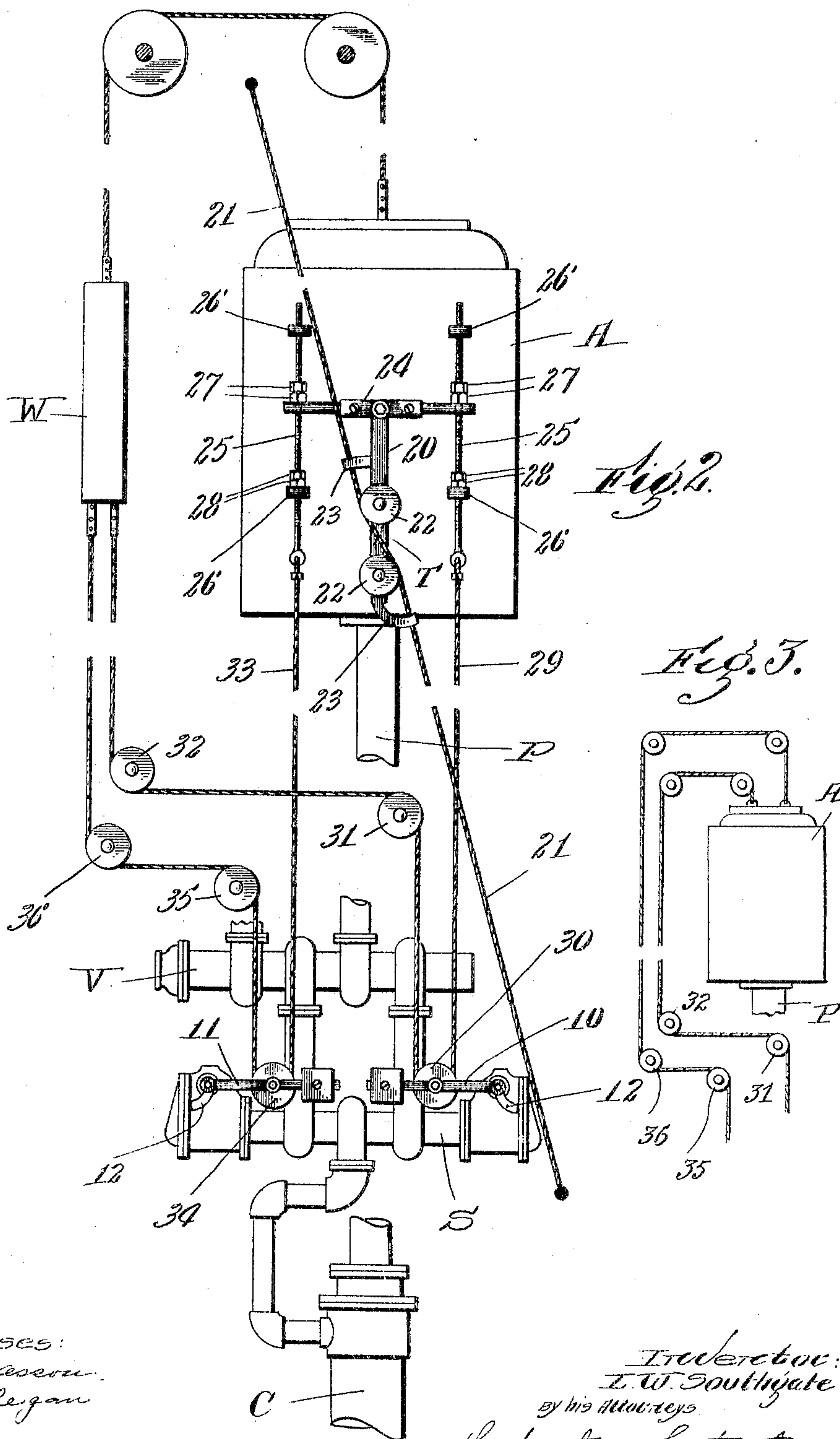
2 SHEETS—SHEET 1.



L. W. SOUTHGATE.
STOPPING MECHANISM FOR ELEVATORS.

APPLICATION FILED MAR. 28, 1905.

2 SHEETS—SHEET 2.



Witnesses:
G. F. Mason
McRigan

Inventor:
L. W. Southgate
By his Attorneys
Southgate & Southgate

UNITED STATES PATENT OFFICE.

LOUIS W. SOUTHGATE, OF WORCESTER, MASSACHUSETTS.

STOPPING MECHANISM FOR ELEVATORS.

No. 804,634.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed March 28, 1905. Serial No. 252,523.

To all whom it may concern:

Be it known that I, LOUIS W. SOUTHGATE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Stopping Mechanism for Elevators, of which the following is a specification.

The object of this invention is to provide a new and improved mechanism for operating the stopping mechanism of elevators, by which the car is automatically slowed down and stopped at the end or ends of its run. A form of this mechanism which has been heretofore proposed consists in arranging a take-up device on the car, in connecting the same by standing or running cables with the stopping mechanism of the elevator, and in arranging cams at the ends of the elevator-well, so that the take-up device will be operated through contact with said cams to slow down and stop the car at the ends of the runs.

The present invention has been designed to make this class of mechanism more simple and efficient in operation and less expensive and difficult to install. I have accomplished this purpose by using in place of ordinary cams a rope attached to fixtures and stretched on an incline in the well to engage and operate the take-up device. This rope thus becomes, in effect, a stationary cam and is hereinafter termed a "cam-rope." A cam-rope of this nature is easy to install, as it can be simply secured to fixtures at the top and bottom of the well, is efficient in operation, as it can be easily adjusted, and is practically noiseless in operation.

I have shown in the accompanying two sheets of drawings two ways of practicing my invention.

Referring to the drawings, Figure 1 is a diagrammatic view of one arrangement embodying my invention. Fig. 2 is a similar view illustrating a modification. Fig. 3 is a detailed view showing another modification.

In the drawings I have shown the invention as applied to a plunger-elevator, although, of course, the same is adapted to any elevator wherein a stopping mechanism is employed.

Referring first to the mechanism shown in Fig. 1 and in detail, A designates the car; P, the plunger; C, the cylinder; V, the main valve, and S the double safety or stopping valve of an approved form of plunger-elevator now well known in the art. The car is usually counterweighted, as by counterweight W, connected thereto by ropes passing around

overhead sheaves. The double safety-valve is provided with two arms or operating-levers 10 and 11, which connect to valves so arranged that when the arm 10 is raised the exhaust from the cylinder C is cut off and so that when the arm 11 is raised the pressure from the cylinder is cut off. These arms are weighted and are provided with suitable stopping-fingers 12, which limit the downward motion thereof. Extending up from the arms 10 and 11 are links 13 13, the ends of which pass freely through holes in the ends of a lever 14, fulcrumed at 15. Nuts 16 16 are threaded on the ends of the links 13 13. By this arrangement when the right-hand end of the lever 14 is raised the arm 10 will be raised, the lever 14 sliding down on the left-hand link 13, and when the left-hand end of the lever 14 is raised the arm 11 will be raised, the right-hand end of the lever 14 sliding on the right-hand link 13. A take-up device, as T, is arranged on the car. This take-up device consists of a lever 17, centrally pivoted to the car and having two pulleys 18 18 journaled on studs at each end thereof. Stationary or standing ropes 19 19 are secured to fixtures at the top of the well, extend down and across between the pulleys 18 18, and are connected to the lever 14 at opposite sides of its fulcrum 15, whereby the take-up device is connected to operate the double stopping mechanism. Depending from the lever 17 is an arm 20. A rope 21 is secured to fixtures at the top and bottom of the well and is adjusted to stand at an angle in the well, so as to constitute what is hereinafter termed the "cam-rope." This cam-rope is arranged to engage the depending arm 20 of the take-up device. Preferably pulleys 22 22, pivoted to studs on the depending arm 20, are used for this purpose. Guiding-eyes 23 23 are usually arranged on the depending arm 20 to prevent the cam-rope from jumping off the pulleys. In some cases the lower guiding-eye 23 is the only means employed to cause the cam-rope to engage the depending arm; but in practice it is usually preferred to employ the pulleys 22 22 and not have the cam-rope touch the guiding-eyes 23 23.

In operation as the car reaches the top of its run the cam-rope 21 will cause the depending arm to follow the same, whereby the lower end of said depending arm will be moved to the left. This will take up the left-hand standing rope 19 and pay out the right-hand rope 19. This will rock the lever 14 so that its

left-hand end is lifted, which through the left-hand link 13 will raise the arm 11 and cut off the supply from the cylinder C and will thus stop the car. This operation will
 5 take place gradually and easy, as the mechanism can be properly designed and adjusted for this purpose. As the car reaches the limits of its downward movement the depending arm will be swung to the right, the left-hand
 10 stationary rope paid out, the right-hand stationary rope taken up, the lever 14 operated so that its right-hand end will be taken up, which through the right-hand link 13 will lift the arm 10, which will cut off the exhaust
 15 from the cylinder C and will gradually bring the car to a stop at the limits of its downward movement. These starting and stopping operations will take place only as the car reaches the limits of its upward and downward move-
 20 ments, as the sway of the rope when the car is in the middle part of its movement will be sufficient to prevent the cam-rope operating the take-up device.

By properly designing and adjusting the
 25 parts described a very efficient mechanism is provided. The ropes 19 or the lever 14, of course, can be connected to operate any kind of a stopping mechanism.

In Fig. 2 a modification is shown, the principal feature thereof as distinguished from the mechanism shown in Fig. 1 being the use of running ropes to connect the take-up device with the stopping mechanism. In this arrangement the take-up device consists of a
 30 lever 24, pivoted to the car and having the depending arm 20 and the parts coöperating with the cam-rope, as previously described. Rods 25 25 are fitted to slide in arms or bearings 26 26, carried by the car. The ends of
 40 the lever 24 loosely engage these rods. Nuts 27 27 are threaded on said rods so that a movement of the lever will take up one of the rods and not the other. Nuts 28 28 are secured on each rod just above the lower bearing thereof, so that the downward movement
 45 of the rods on the car is limited. The right-hand rod is connected by running rope 29 to operate the arm 10, said rope passing over a pulley 30 on said arm and then over stationary pulleys 31 and 32, so as to pass up in the
 50 well. The left-hand rod 25 is connected by a similar running rope 33 to operate the arm 11, said rope passing over a pulley 34 on said arm and then over stationary pulleys 35 and
 55 36, so as to pass up into the well. From the stationary pulleys the running ropes may be connected to the counterweight or may be led up around pulleys at the top of the well and then down and connected to the car, as
 60 shown in Fig. 3. In this construction when the car reaches the limits of its upper movement the depending arm will be swung to the left, the left-hand rod 25 lifted, and the rope 33 taken up to operate the arm 11 to stop the
 65 car. When the car reaches the limits of its

downward travel, the depending arm will be swung to the right, the rope 29 taken up, and the arm 10 raised to stop the car.

The essential feature of the present invention is the use of a rope arranged to operate
 70 as a cam. By using a rope to perform the function of a cam it can be rigidly secured between its fixtures, and, as the same does not have to be connected to the stopping
 75 mechanism, but merely acts to serve the purpose of the ordinary stationary cams, the same can be easily installed at small expense to operate in a simple and efficient way.

The details and arrangements as herein shown are merely illustrative of the inven-
 80 tion, and the same may be worked out in many different ways by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

Having fully described my invention, what
 85 I desire to secure by Letters Patent is—

1. The combination of an elevator-car, a stopping mechanism therefor, a take-up device, a rope connecting the take-up device to the stopping mechanism, and a cam-rope for
 90 actuating the take-up device.

2. The combination of an elevator-car, a stopping mechanism therefor, a take-up device, and a cam-rope stretched at an angle between fixtures for actuating the take-up de-
 95 vice as the car reaches the ends of its run.

3. The combination of an elevator-car, a stopping mechanism, a take-up device, two ropes connecting the take-up device to the stopping mechanism, and a cam-rope actuat-
 100 ing the take-up device.

4. The combination of an elevator-car, a stopping mechanism, a take-up device, two stationary ropes connecting the take-up device to the stopping mechanism, and a cam-
 105 rope for actuating the take-up device.

5. The combination of an elevator-car, a stopping mechanism therefor, a take-up device, a rope connecting the take-up device to the stopping mechanism, sheaves arranged on
 110 the take-up device, and a cam-rope engaging said sheaves for actuating the take-up device.

6. The combination of an elevator-car, a stopping mechanism therefor, a take-up device comprising a lever having pulleys, sta-
 115 tionary ropes crossed between said pulleys and connected to actuate the stopping mechanism, a depending arm from said lever, and a cam-rope engaging said depending arm.

7. The combination of an elevator-car, a
 120 stopping mechanism therefor, a take-up device comprising a lever having pulleys, stationary ropes crossed between said pulleys and connected to actuate the stopping mechanism, a depending arm from said lever,
 125 sheaves arranged on said depending arm, and a cam-rope engaging said sheaves.

8. The combination of an elevator-car, a stopping mechanism, a take-up device con-
 130 nected to the stopping mechanism, sheaves

arranged on said take-up device, a cam-rope engaging said sheaves, and guiding means for keeping the cam-rope on said sheaves.

5 9. The combination of an elevator-car, a double stopping mechanism therefor, a take-up device, two ropes connecting the take-up device to the stopping mechanism, a cam-rope engaging the take-up device, and connections whereby one part only of the stopping mechanism will be actuated as the car reaches the limit of its travel in one direction.

10 10. The combination of an elevator-car, a double stopping mechanism therefor, a take-up device carried by the car, two ropes actuated by the take-up device, a cam-rope en-
15 gaging the take-up device, a lever actuated

by said ropes and connections from said lever to the double stopping device arranged so that a movement of the lever in one direction will actuate one part thereof without affecting the other and so that a movement of the lever in the opposite direction will operate the other part of the stopping mechanism, without affecting the first-named part thereof.

20
25 In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LOUIS W. SOUTHGATE.

Witnesses:

C. F. WESSON,

PHILIP W. SOUTHGATE.