No. 606,857. Patented July 5, 1898.

R. T. CRANE.

AUTOMATIC ELEVATOR SAFETY STOP.

(Application filed May 29, 1897.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

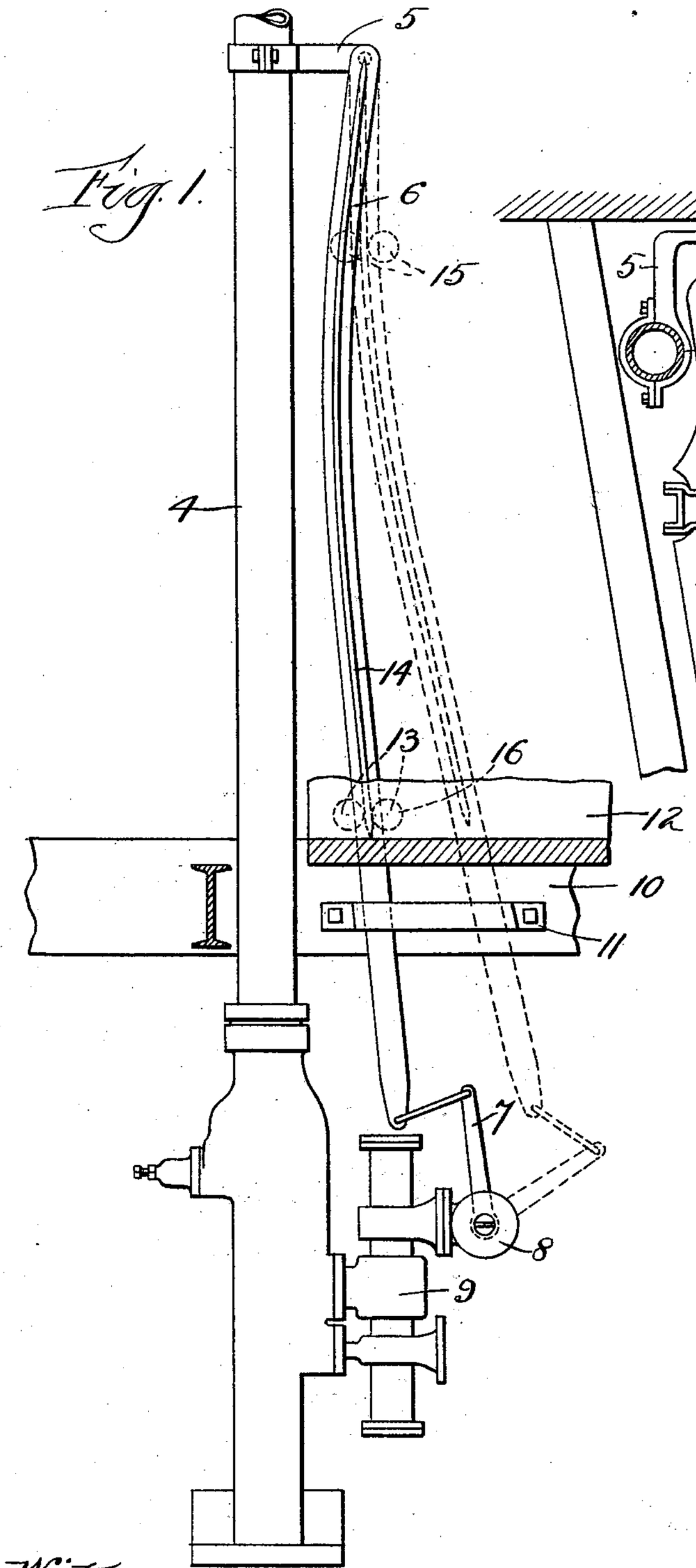
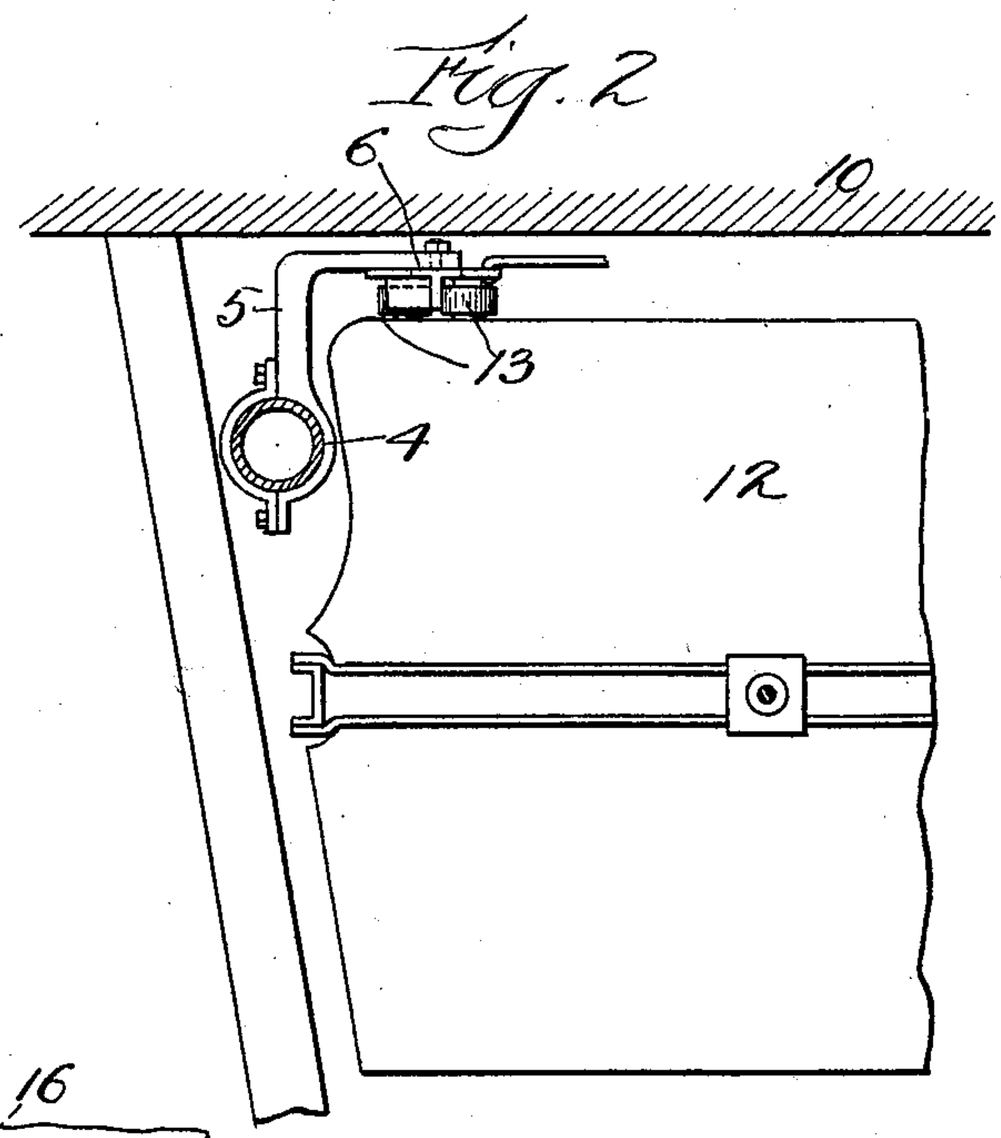


Fig. 2.



Witnesses.
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Wm. F. Fleming

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by Paul Synnestvedt. Atty.

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(No Model.) 4 Sheets—Sheet 2.

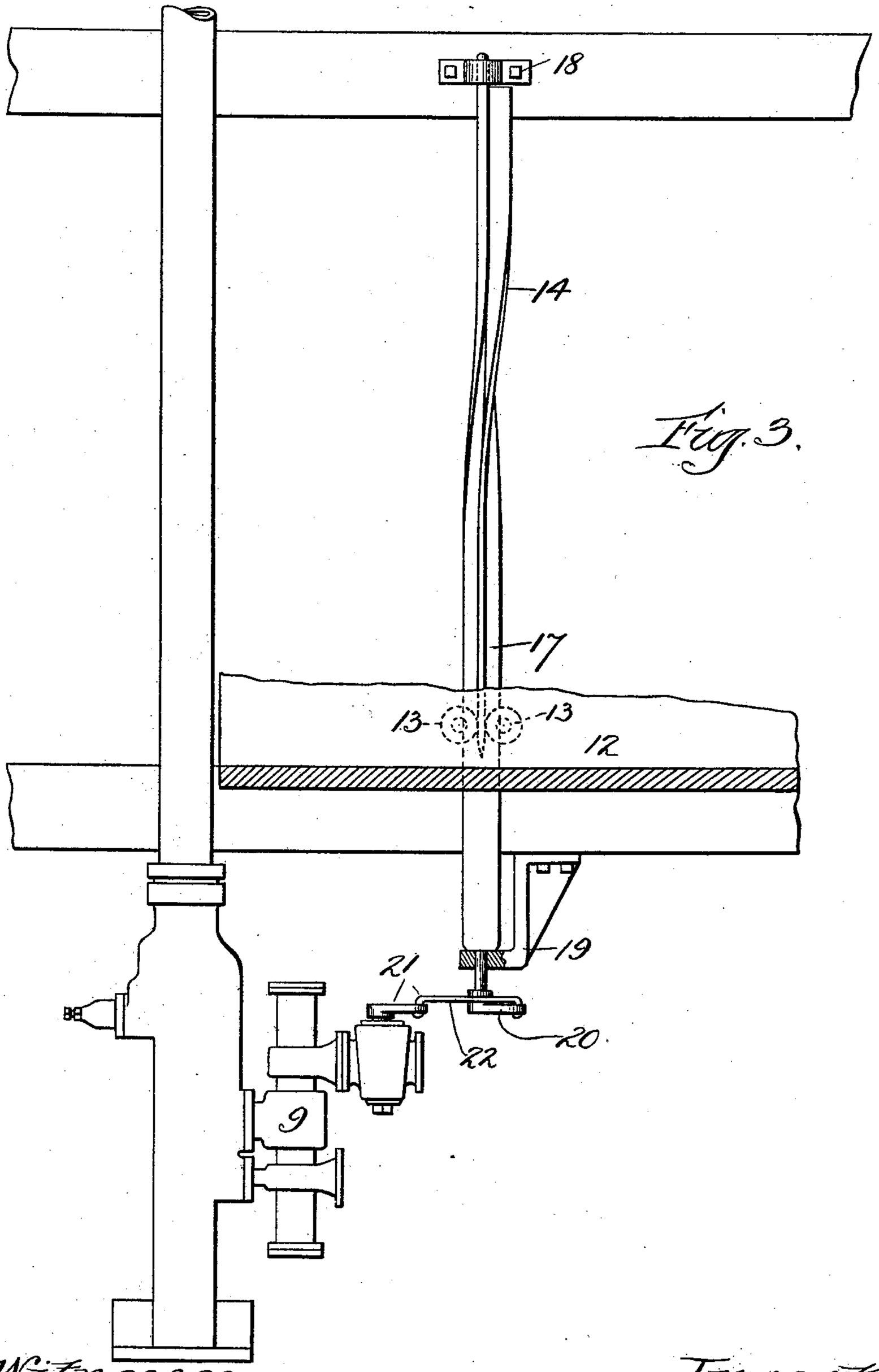

Fig. 3.

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AUTOMATIC ELEVATOR SAFETY STOP.

(Application filed May 29, 1897.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 4.

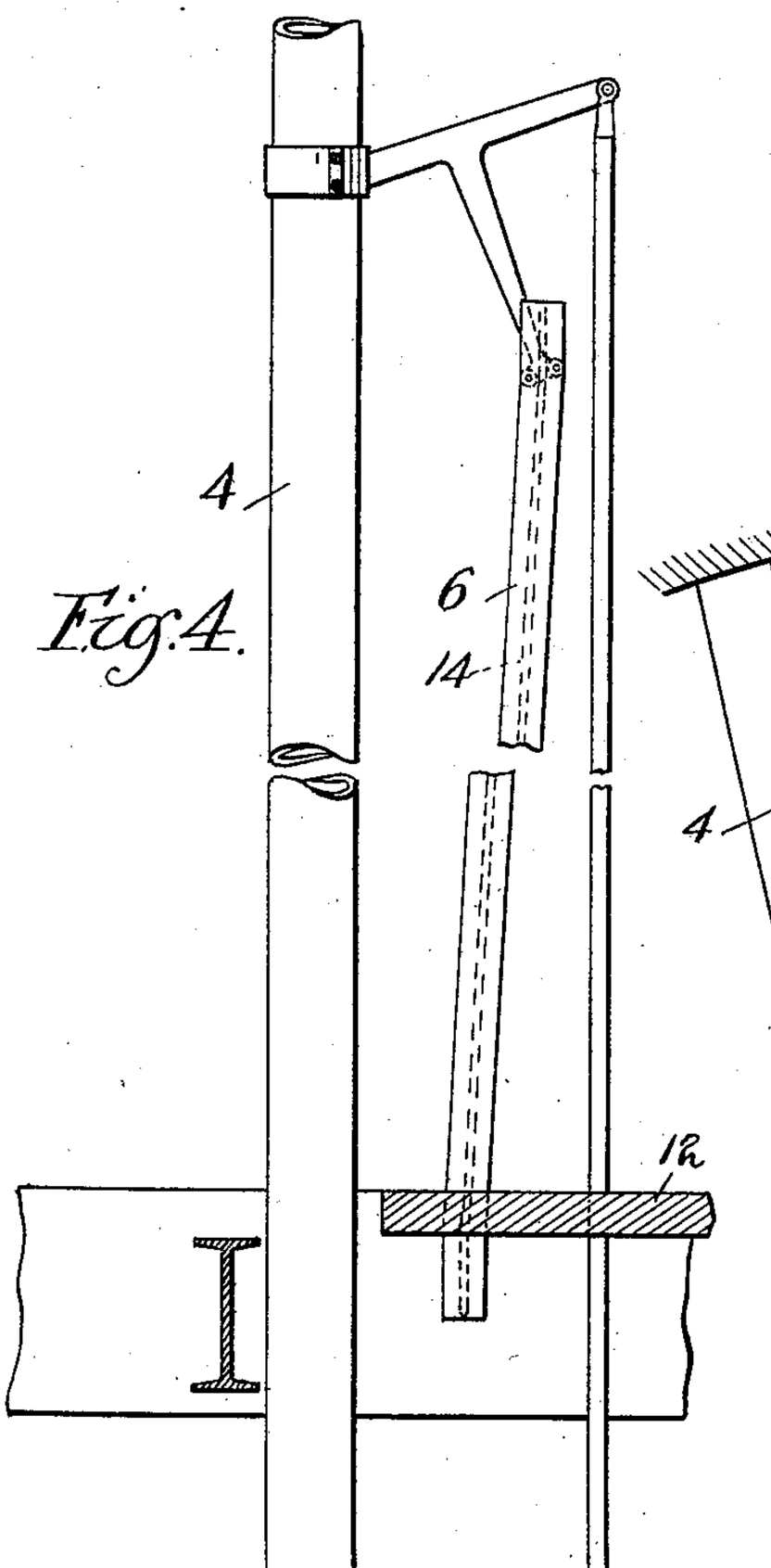
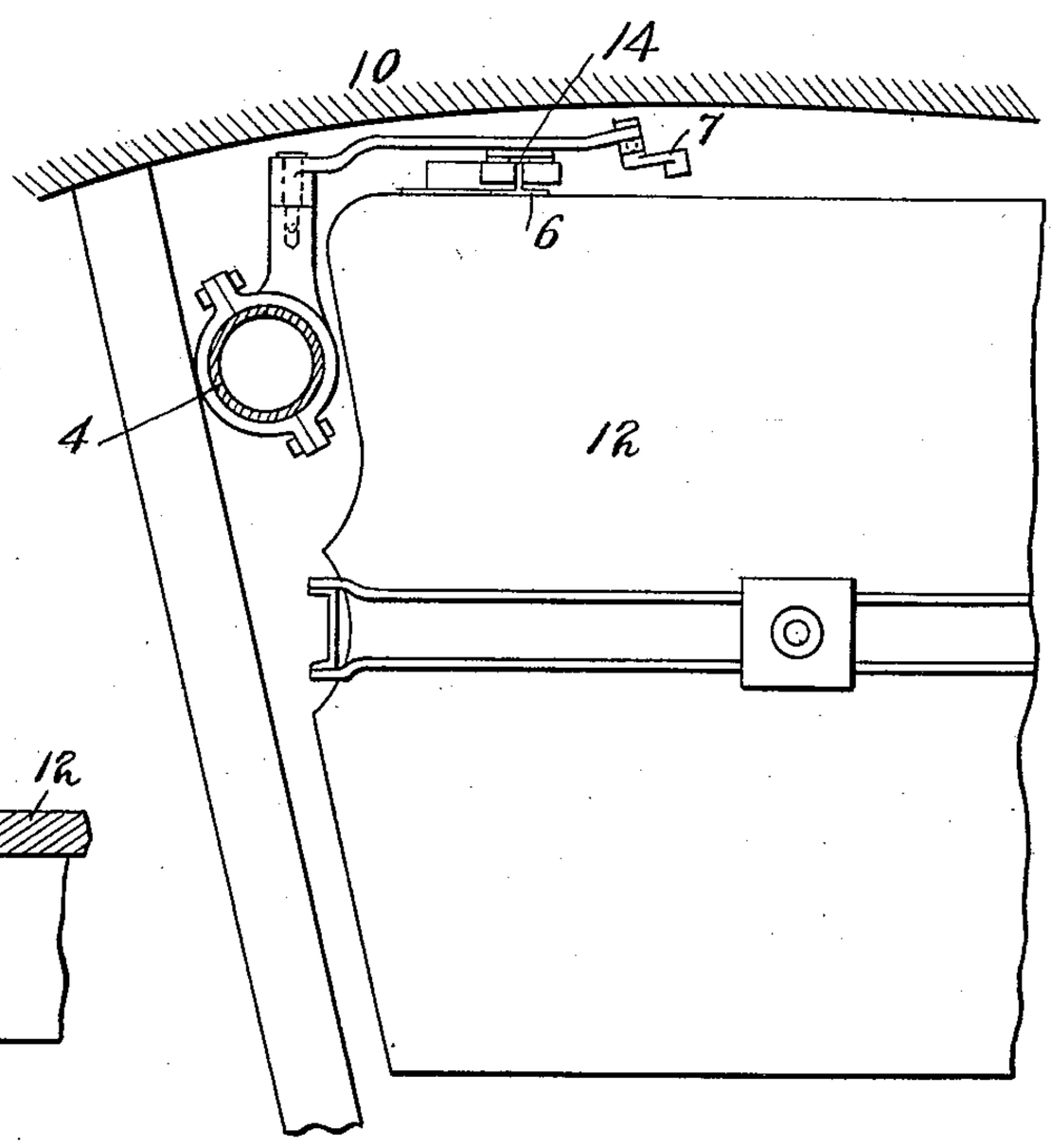


Fig. 5.



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(No Model.) 4 Sheets—Sheet 4.

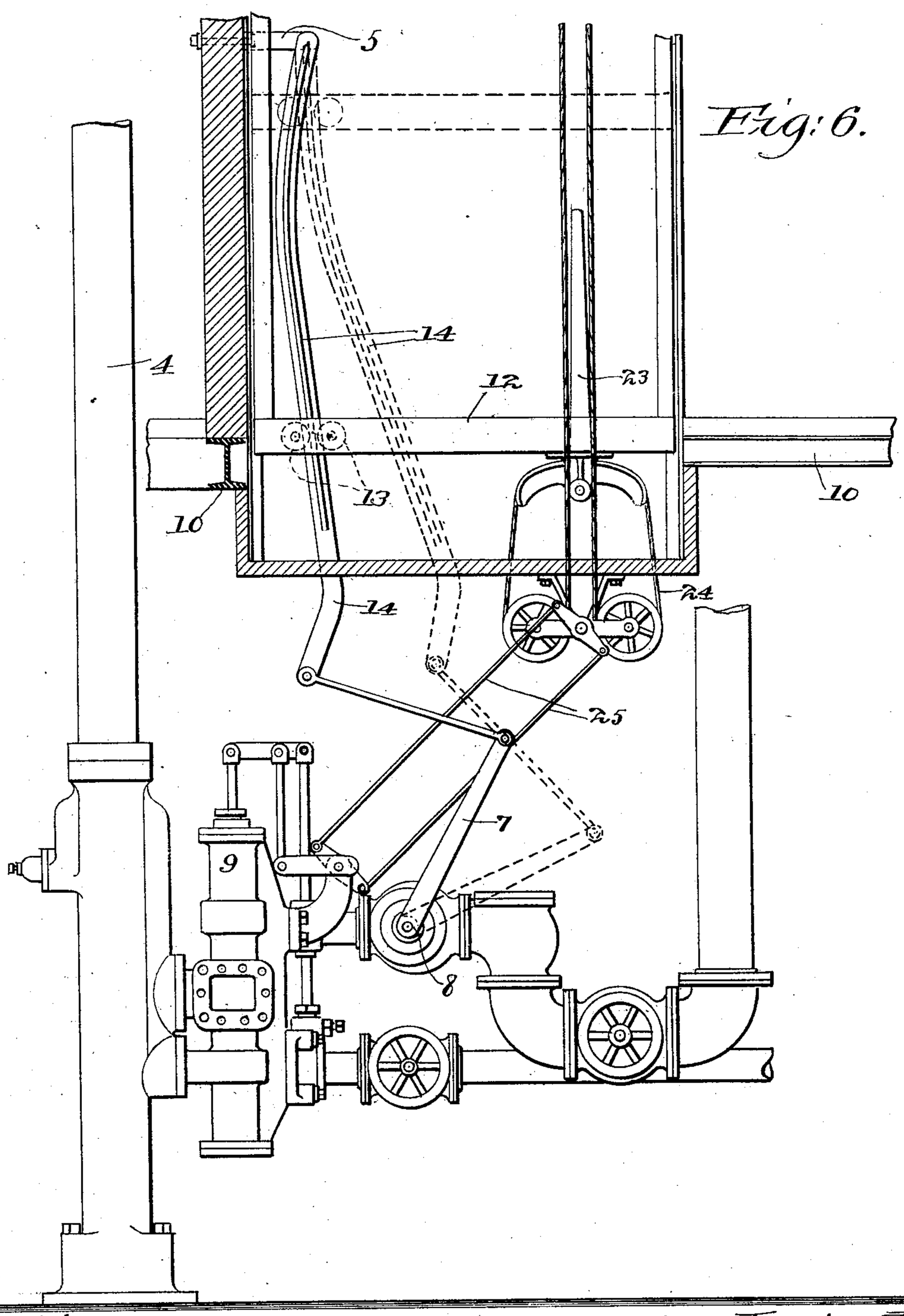

Fig. 6.

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Wm. N. Rheem.

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UNITED STATES PATENT OFFICE.

RICHARD T. CRANE, OF CHICAGO, ILLINOIS.

AUTOMATIC ELEVATOR SAFETY-STOP.

SPECIFICATION forming part of Letters Patent No. 606,857, dated July 5, 1898.

Application filed May 29, 1897. Serial No. 638,828. (No model.)

To all whom it may concern:

Be it known that I, RICHARD T. CRANE, a citizen of the United States, residing in Chicago, Cook county, Illinois, have invented a new and Improved Automatic Elevator Safety-Stop, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is the provision of means upon the elevator-car which when brought into operation against certain devices at the ends of the well will serve to stop the movement of the car, and thus prevent possibility of accident.

A further object of my invention is the construction of an elevator safety-stop which will be positive and reliable in its action at all times.

The above, together with such other objects as may hereinafter appear, I attain by the use of, first, an automatic stop device which is separate from the usual controlling mechanism, which when applied to a hydraulic elevator controls the admission and escape of the fluid to or from the controlling-valve of the operating-cylinder, and which I shall hereinafter term a "stop-motion device," and, second, mechanism for actuating such stop-motion device, consisting mainly of two elements, one a cam and the other a pair of rollers or studs adapted to engage the cam at the limits of movement of the car, one of said elements being operatively connected with the stop-motion device and the other being carried by the car.

For a better understanding of my invention reference may now be had to the accompanying drawings, in which—

Figure 1 is a side elevation of the lower end of an elevator-cylinder, showing the controlling-valve in place with my improvements applied thereto. Fig. 2 is a plan section of a portion of the elevator car and well. Fig. 3 is an elevation of the lower end of an operating-cylinder having my improvements applied thereto in a somewhat modified form. Fig. 4 is a view in elevation of a reversal of my invention. Fig. 5 is a plan view of the same, and Fig. 6 is a view showing the car and the controlling mechanism.

Referring now more particularly to Fig. 1, it will be seen that to the operating-cylinder 4 is attached a bracket 5, from which by a pivot is suspended a curved or inclined arm 6, which at its lower end is connected to the crank 7 of a stop-motion device. The stop-motion device 8 is arranged adjacent to the controlling-valve 9 and in position to govern the passage of fluid to the operating-cylinder. The lower floor of the building is indicated at 10, and to one of the beams thereof is fastened a guide-trap 11, within which the lower end of the arm 6 moves. A small portion of the corner of an elevator-car is indicated at 12, and to this are attached a couple of rollers or studs 13, adapted to coact with a cam 14, projecting out from the arm 6.

The controlling-lever in the car, together with the connections by which it is attached to the controlling-valve 9, is more fully shown in Fig. 6, in which 23 designates the controlling-lever, 24 the running cable, and 25 the rod connections by which the movement of the lever is transmitted to the actuating arms or rods of the controlling-valve 9.

It will be observed that the parts already above described, which constitute what has been called the "stop-motion device," are separate from the controlling mechanism and constructed to control the movement of the car independently of the controlling mechanism. By this arrangement an additional safeguard is provided, because if through any accident the controlling mechanism or any part thereof should get out of order the stop-motion device will still be in condition to perform its allotted function.

The operation of my invention is as follows: When the car approaches the bottom of the well, the arm 6 is in the position indicated by the dotted lines in Fig. 1, and the two rollers 13 are so attached to the car that they will pass down on opposite sides of the cam 14 of the arm 6. As at the upper end of the arm 6 the cam stands vertically, no movement of the arm will be produced until the roller has reached the position indicated in dotted lines at 15, but as the rollers continue to descend in a vertical line the arm is moved to the left until finally when the car has reached the bottom of the well (the roller standing in the position indicated at 16) the arm 6 will have

reached the position indicated in full lines in Fig. 1, and the crank 7 of the valve 8 will have been pulled over sufficiently far to cut off the supply of operating fluid. As the car begins its ascent the arm 6 and the crank 7 move back to the normal position (shown in dotted lines) and remain in such position until the car again approaches the end of the well, when the stop-motion device is again brought into operation.

In Fig. 3 I have represented a modification of my invention, in which in place of an inclined cam upon the arm 6 I have substituted a piece 17, having a spiral cam thereon. This is formed of a T-iron pivoted in brackets at 18 and 19 in the position clearly shown in the drawings and connected to the stop-motion device by means of the arms 20 and 21 and the link 22. In this arrangement, as in that first described, when the car 12 approaches the bottom of the well the rollers or studs 13 engage the spiral cam of the T-iron, and the T-iron, being twisted a quarter-turn, is moved by the descent of the rollers to the position shown in the drawings, in which the supply of operating fluid has been cut off from the controlling valve and cylinder. In this form of construction, as also in the construction previously described, the spiral incline or curve of the cam 14 is more gradual at its upper end than at its lower end, so that in checking the most rapid speed of the car the parts will not operate with too great rapidity or produce the violent shocks which would be encountered if the operating plane of the cam were regular throughout its length.

While I have shown my invention as applied to a hydraulic elevator and in connection with a fluid-pressure valve, it is obvious that it is equally applicable to elevators employing other forms of motors, as electricity or steam, the essence of my invention being in the cam and rollers and not in the valve or other form of stop-motion device by means of which the operation of the cam and rollers is made effective.

While I have illustrated and described my invention as having the cam arranged at the bottom of the well and the rollers attached to the car, it is obvious that substantially the same results could be secured were the incline attached to the side of the car and the rollers connected to a lever by which the valve could be moved. Such a construction I have illustrated in Figs. 4 and 5, from which it is thought the suggested arrangement will be clearly understood without further description. This, which would be a mere reversal of my invention, I desire to be understood as including within the scope of my claims, my invention, broadly stated, being—

1. In an automatic elevator-stop, the combination with a stop-motion device, of a cam having one end pivoted on a fixed fulcrum and its other end operatively connected to such stop-motion device, and a pair of rollers or studs carried by the car and adapted to engage said cam when the car is at the limit of its movement, substantially as described.

2. In an elevator, the combination of a car, controlling mechanism operative from the car, a stop-motion device separate from said controlling mechanism and constructed to control the movement of said car independently of said controlling mechanism, and mechanism for actuating said stop-motion device comprising two elements, one of said elements being a cam and the other a pair of rollers or studs adapted to engage said cam at the limit of movement of the car, one of the elements being operatively connected with such stop-motion device and the other being carried by the car, substantially as shown and described.

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