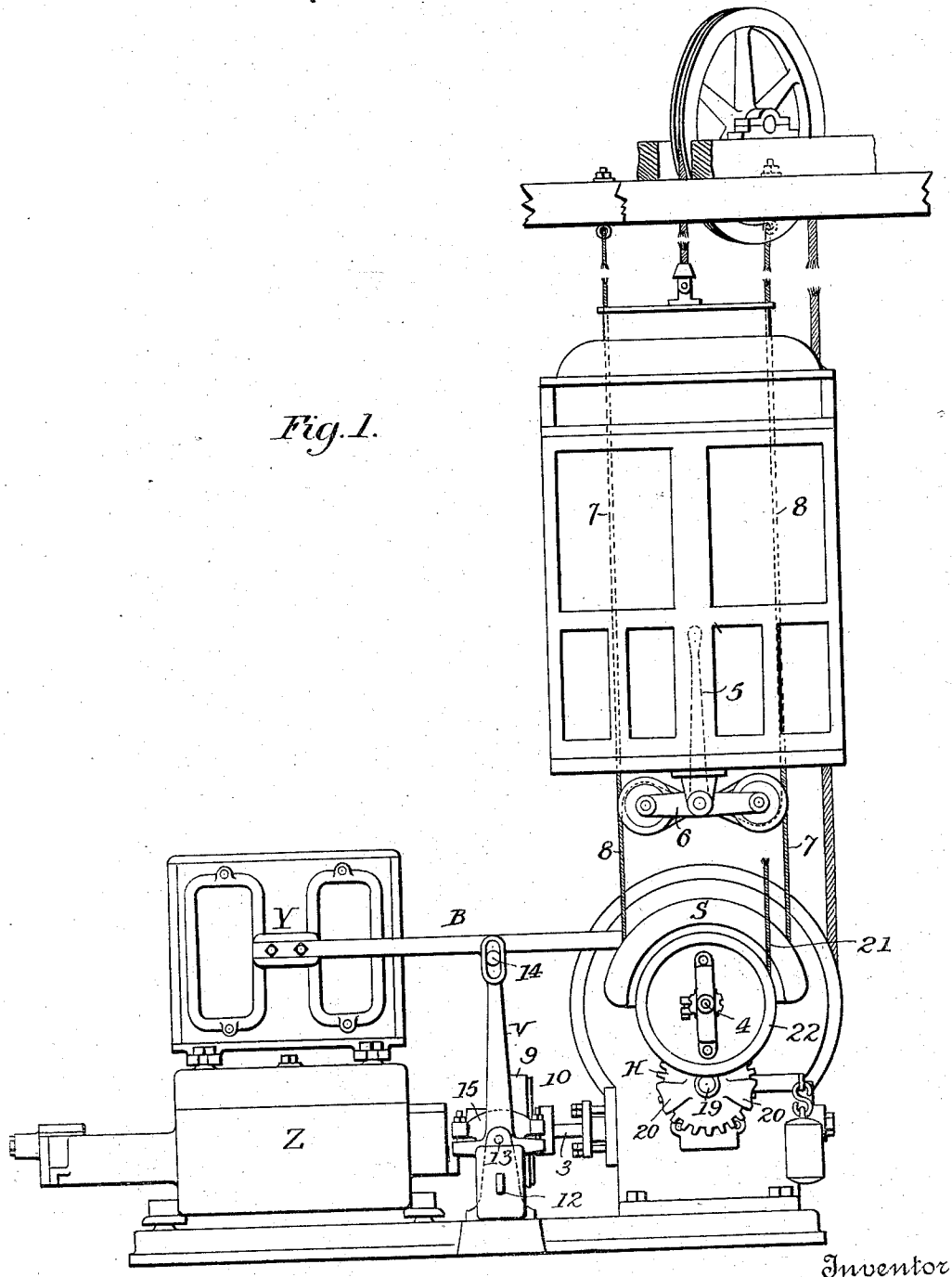
(No Model.) 3 Sheets—Sheet 1.

J. D. IHLDER.

CONTROLLING DEVICE FOR ELEVATORS.

No. 558,075. Patented Apr. 14, 1896.

Fig. 1.



Witnesses
Jno. G. Hinkel
J. A. Fairgrieve

Inventor
John D. Ihlder
by Foster Freeman
Attorneys

(No Model.) 3 Sheets—Sheet 2.

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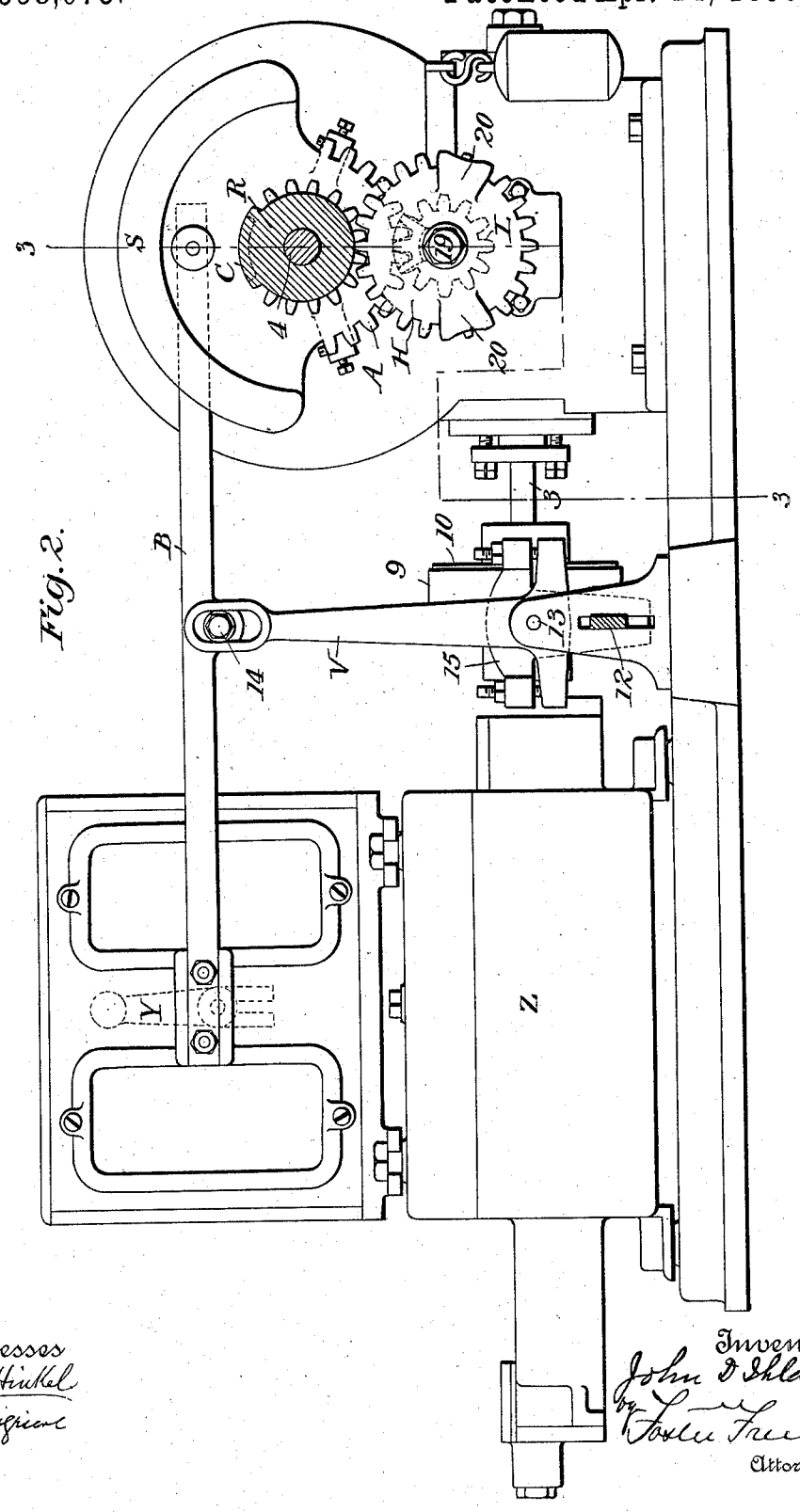

Fig. 2.

Witnesses
Jno. G. Hinkel
J. A. Fairgrieve

Inventor
John D. Ihlder
by Foster Freeman
Attorneys

(No Model.) 3 Sheets—Sheet 3.

J. D. IHLDER.

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Fig. 3.

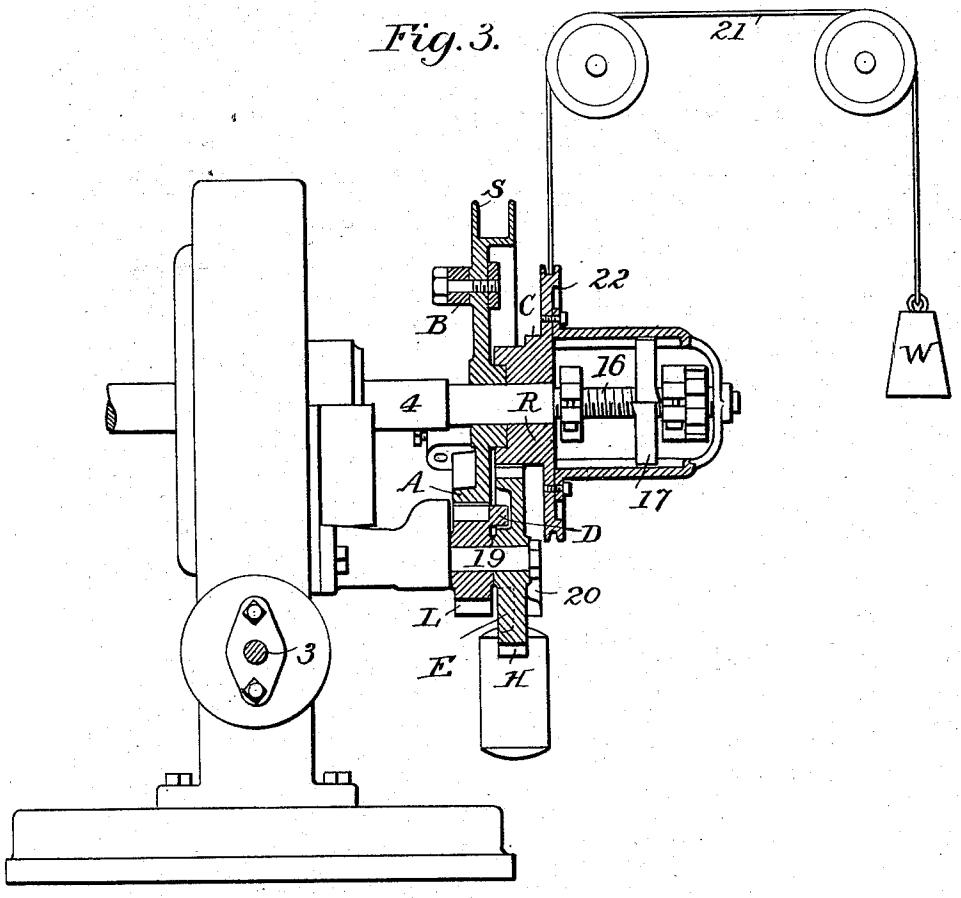


Fig. 4.

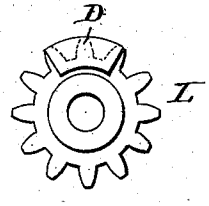
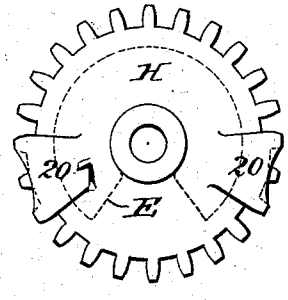


Fig. 5



Witnesses
Jno. G. Hinkel
J. A. Fairgrieve

Inventor
John D. Ihlder
by Foster Freeman
Attorneys

UNITED STATES PATENT OFFICE.

JOHN D. IHLDER, OF YONKERS, NEW YORK, ASSIGNOR TO THE OTIS BROTHERS & COMPANY, OF NEW YORK, N. Y.

CONTROLLING DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 558,075, dated April 14, 1896.

Application filed February 15, 1895. Serial No. 538,559. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. IHLDER, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Controlling Devices for Elevators, of which the following is a specification.

My invention relates to the control devices of elevator apparatus; and it consists of means whereby to shift the switch or its equivalent from the cage without affecting the positions of other operating parts, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 shows in elevation an elevator apparatus embodying my invention. Fig. 2 shows an enlarged view in part section of the motor and winding apparatus. Fig. 3 is an elevation in part transverse section on the line 3 3, Fig. 2. Figs. 4 and 5 are face views of two of the gears.

The motor Z is of any suitable construction, and may be an electric motor, as shown, or a steam or water motor, and it is provided with a motor-control device Y, which may be an electric switch of conventional character, or it may be a control-valve. When an electric motor is used, the shaft thereof is preferably connected with a worm-shaft 3, engaging the gear upon the drum-shaft 4, carrying the drum around which pass the winding-ropes in a manner too well known to need illustration and description.

It is desirable in many instances to make use of a motor-control switch or other device having a comparatively limited movement to thereby necessitate but little movement of the operating devices for the motor-control devices carried by the cage, which operating devices, for instance, may consist of a lever 5 in the cage, rocking a shaft carrying the lever 6 with pulleys at the ends of the lever, around which pulleys pass cables 7 and 8, suspended from eyebolts at the top of the well and extending to a shifter wheel or pulley S, connected with the motor-control device in a suitable manner—as, for instance, by a shifter-bar B.

When the motor-control device is in the form of a switch, as shown, and is in a central position, the current is cut off and a brake is applied to stop and hold the motor, the wheel or pulley S in such case occupying its central position, and when the said wheel is turned in one direction the motor-control switch closes the circuit to revolve the motor in one direction, and when the wheel is turned in the other direction it closes the circuit to revolve the motor in the other direction, and in either case the brake should be removed. As shown, the brake consists of a band 9, bearing upon a pulley 10 upon the shaft of the motor, which band is fixed at one end and is connected at the other to a weighted lever 12, which lever is lifted to remove the brake and lowered to apply it. This lifting is effected by means of a T-lever V, pivoted at 13, slotted at the upper end to receive a pin 14 on the shifter-bar B, and a vertically-moving cross-piece 15, connected with the lever 12, bears upon both the cross-arms of the lever V, so as to be lifted when the said lever is tilted in either direction.

In apparatus of this character it is common to make use of what is termed "automatic stop devices," employing stop devices of such construction that after the drum has been turned to a sufficient extent to carry the cage to its extreme limit at the top or bottom of the well the motor-control device will be automatically shifted to its central or stop position. A common construction consists of a threaded extension 16 of the drum-shaft 4, carrying a nut 17, which is so constructed and arranged as to make contact with and turn a moving part—as, for instance, a part or pinion R—when the said nut is carried upon the screw to the limit of its movement in either direction, and from this moving part R movement is imparted to the motor-control device.

It will be evident that if the moving part or pinion R, whatever may be its character, is directly connected or geared with the motor-control device the said part R and its connections would be necessarily moved at each operation of the motor-control device by the operator within the cage, and I therefore provide for lost-motion connecting devices, so constructed as to permit of a certain degree

of lost motion between the motor-control device and the part R, whereby the operator can shift the motor-control device to one side or the other to any desired extent during the normal operation of the elevator apparatus without in any way affecting the moving part or pinion R and without interfering in any way with the operation of the automatic stop devices if the cage should run beyond its normal travel. The intermediate lost-motion connecting devices may be constructed in different ways; but, as shown, the part R is in the form of a mutilated pinion engaging the teeth of a gear-wheel H, turning upon a stud 19, and in turn rotating a pinion L, which engages a toothed segment A upon the shifter-wheel S. To permit of the lost motion above described, parts of the train of gears are so constructed as to be capable of a limited movement independent of the other parts. Thus the wheel H has on one side a segmental recess, between the ends of which is an abutment E, and the pinion L has a lug D, which is so arranged as to move freely in the recess in the wheel H and to abut upon the abutment E upon one side or the other only after the motor-control device has been shifted to its full extent in one direction or the other. This shifting of the motor-control device, therefore, can be effected without the operator in any way shifting the positions of the automatic stop devices. When, however, the cage travels beyond the limit of its normal movements, the gear R is turned by the automatic stop devices, thereby turning the wheel H until the abutment E makes contact with the lug D, when the pinion L will be rotated and turn the shifting-pulley S and shift the motor-control device back to a central position.

As the abutment E and lug D will only be brought in contact when the lug D is at one side of the central position shown, the movement imparted to the lug D will gradually bring the motor-control device to its central position and cut in the resistance, so that there is no abrupt stoppage to the movement of the case. Inasmuch, however, as it is almost impossible to stop the car and the hoisting-drum the instant that the current is cut off, provision should preferably be made for permitting a limited movement of the winding-drum after the motor-control device has been shifted, but for holding the latter in the position to which it is set. This I effect by providing the pinion or part R with a mutilated gear, a curved projection C, and by providing the gear-wheel H with two projections 20 20, each with a curved face adapted to the face of the projection C, the said projections C 20 20 being upon a different vertical plane from the toothed portions of the gear and pinion. These parts are so arranged that the face of the projection C and the curved face of one of the projections 20 will be brought to coincide after the motor-control device has been shifted fully to one side or the other, thereby preventing the further movement of the motor-control device and locking it against change of position, while permitting the rotation of the winding-drum, which will be brought to rest by the action of the brake before the projection C is carried from the projection 20. When the cage traveling in one direction has been stopped in this manner by the automatic stop devices and it is necessary to start the cage in the opposite direction, the movement of the shifting-pulley S will carry the lug D on the pinion L away from the abutment E and leave the gear-wheel H loose, and the pinion R is then turned to its original position by any suitable means—as, for instance, by a weight W, connected to a cord 21, passing over guide-pulleys and attached to the periphery of a groove-wheel 22 upon the pinion R. When the pinion R is turned by the automatic stop device, the cord 21 is wound upon the periphery of the wheel 22, and when the pinion R is released the weight carries the pulley 22 and pinion R to their normal positions.

It will be evident that the weight or a spring may be differently arranged to restore the pinion R to its normal position as the operating devices of the motor-control devices are operated from the cage. While I have shown the connections between the automatic stop devices and the motor-control device as in the form of gears, any other form of connections securing a partial free movement or lost motion of the lost-motion connecting devices may be employed.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim—

1. The combination in an elevator apparatus, of a motor, a motor-control device therefor, and means for moving the motor-control device from the cage, an automatic stop device for the motor-control device, and lost-motion connecting devices between the automatic stop device and motor-control device, whereby a limited movement of the motor-control device is permitted without affecting the position of the automatic stop devices, substantially as set forth.

2. The combination in an elevator apparatus, of a motor, a motor-control device and operating devices thereof for moving the same from the cage, an automatic stop device for the motor-control device, connections between the automatic stop device and the motor, and lost-motion connecting devices between the automatic stop device and the motor-control device, substantially as set forth whereby to permit the motor-control device to be moved without moving the automatic stop device for the purpose specified.

3. The combination with a motor, and motor-control device, of the moving part or pinion, connections between the motor and pinion, the segment connected with the motor-control device, connections between the segment and pinion constructed to impart movement from the pinion to the segment in one

direction but permit the independent movement of the segment in the opposite direction, substantially as set forth.

4. The combination with a motor, of the moving part, connections between the moving part and motor, the segment, and an intermediate pinion and gear-wheel between the segment and moving part, the intermediate pinion being provided with a lug and the intermediate gear-wheel with an abutment, substantially as described.

5. The combination with the moving part and automatic stop devices for actuating the moving part, of means for restoring said moving part to its normal position as the automatic stop devices are moved to their normal position, substantially as described.

6. The combination of the moving part and automatic stop devices for actuating the moving part, and a weight connected to the moving part to restore it to its normal position as the automatic stop devices resume their normal position, substantially as described.

7. The combination with the motor-control device, automatic stop devices, the segment and moving part, one connected with the motor-control device and the other with the automatic stop devices, of connections between the segment and moving part, a projection upon the moving part, and projections upon the connections constructed to engage and lock the connections at the termination of the movement of the moving part in each direction, substantially as and for the purpose set forth.

8. The combination in an elevator apparatus with the motor-control device and operating devices therefor, automatic stop devices and the moving part, of connections between the moving part and motor-control device and a projection on the moving part engaging the connections as the motor-control device is brought to either limit of its position, and to lock the said motor-control device while permitting a limited movement of the automatic stop devices and parts connected therewith, substantially as set forth.

9. The combination in an elevator apparatus, with the motor-control device, automatic stop devices, of connections intermediate of the motor-control device and the automatic stop devices constructed to permit a movement of the motor-control device independent of the automatic stop devices, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN D. IHLDER.

Witnesses:

JAMES S. FITCH,

C. B. WARING.