

No. 652,893.

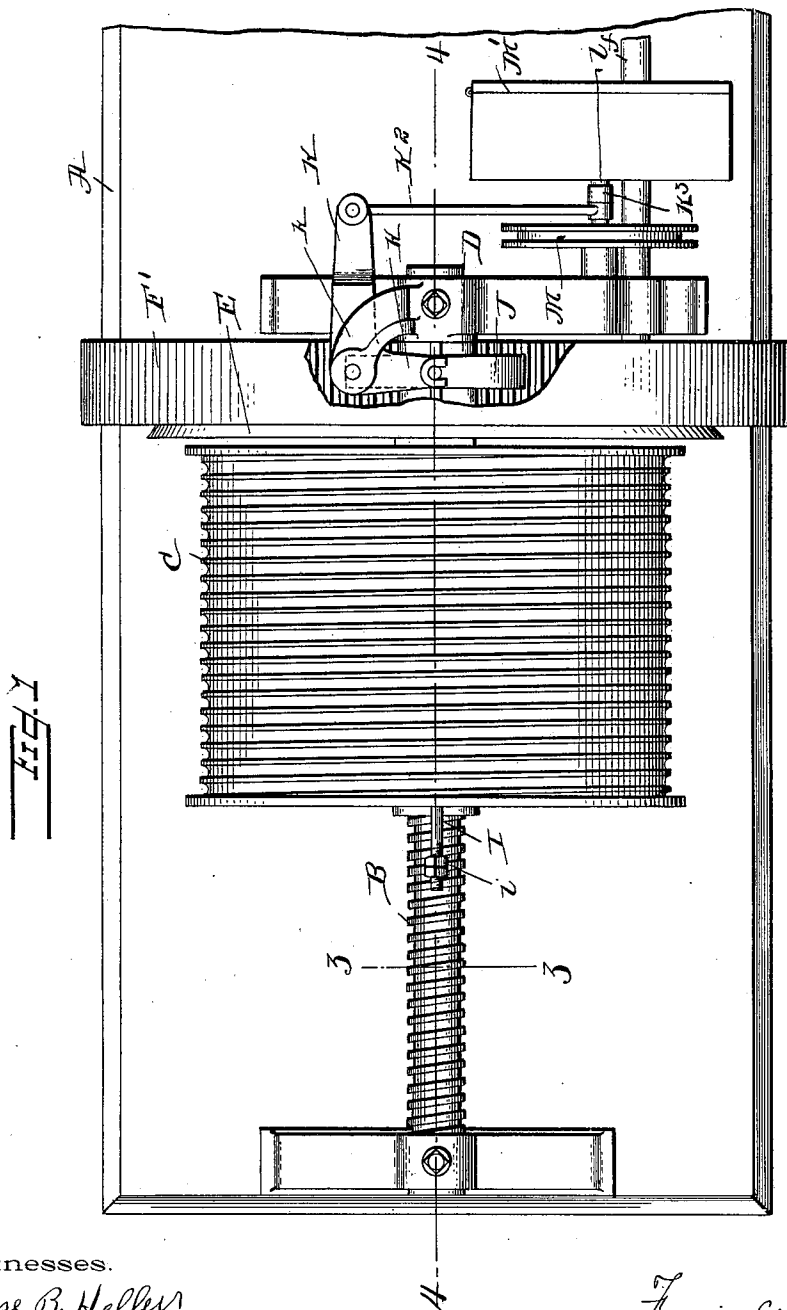
Patented July 3, 1900.

F. E. HERDMAN.
ELEVATOR.

(Application filed Feb. 14, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.

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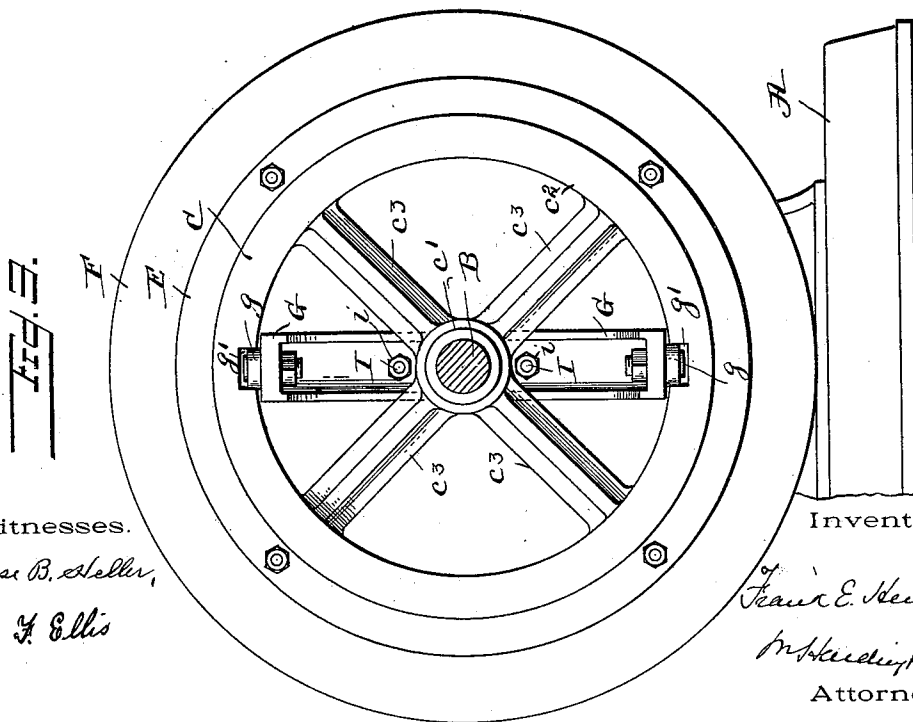
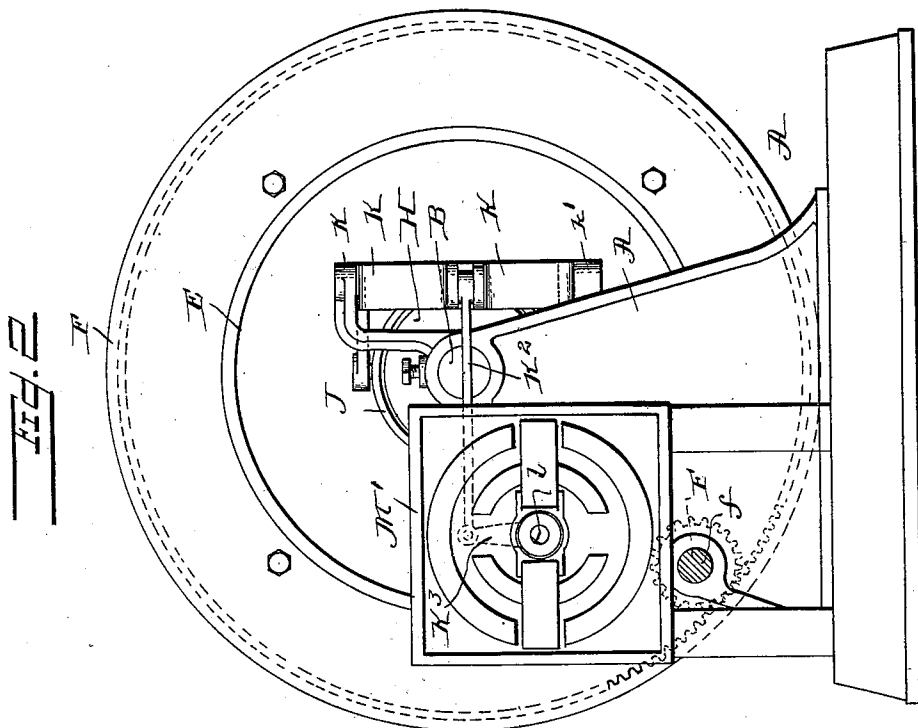
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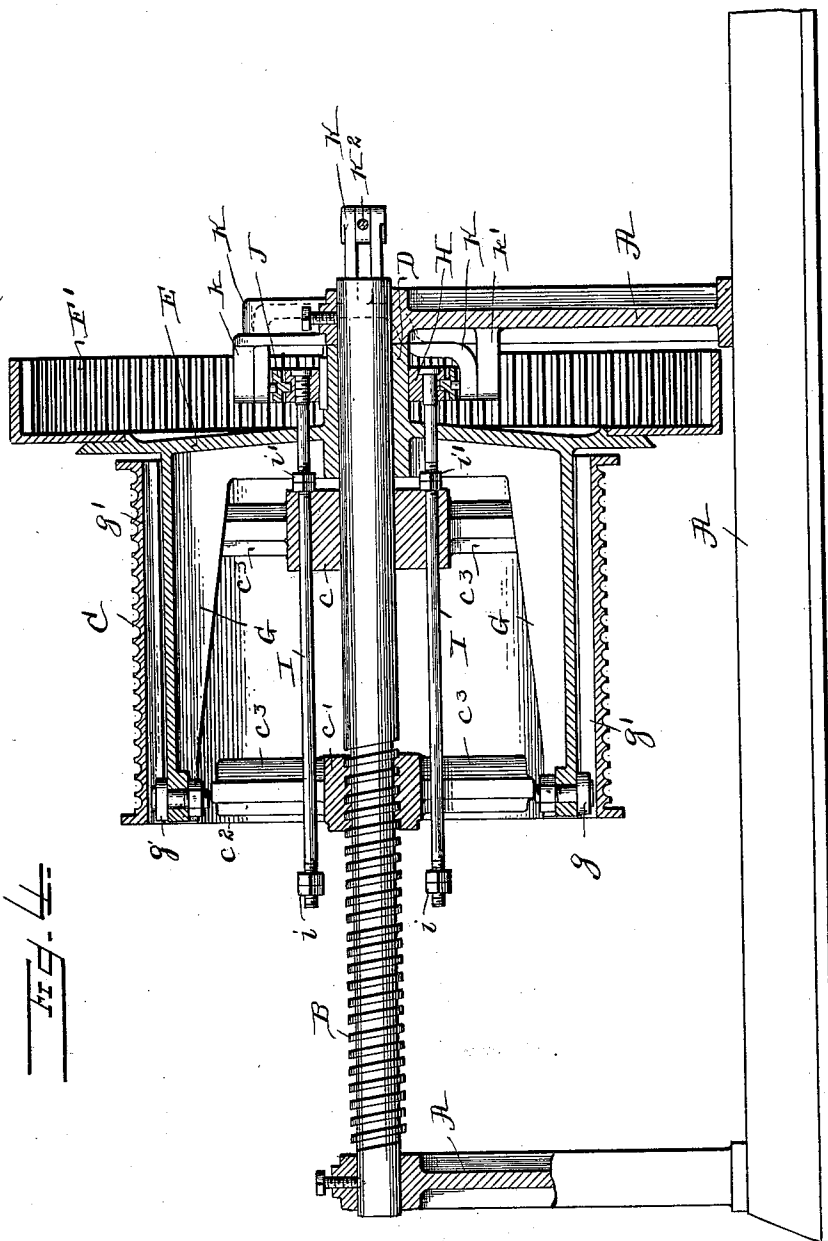
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UNITED STATES PATENT OFFICE.

FRANK E. HERDMAN, OF WINNETKA, ILLINOIS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 652,893, dated July 3, 1900.

Application filed February 14, 1900. Serial No. 5,128. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. HERDMAN, a citizen of the United States, residing at Winnetka, county of Cook, and State of Illinois, have invented a new and useful Improvement in Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to that type of elevators wherein the lifting-cable is actuated by a drum about which the cable is wound. The ordinary drum is provided with a spiral groove or a series of them, which accommodate the cable, and by the revolution of the drum the cable is wound or unwound, dependent upon the direction in which the drum is turned. As the drum is stationary, this operation necessarily produces a side motion of the cable in the shaft, or means have to be provided to impart to the pulleys about which the cable passes a side motion corresponding to the side motion of the cable as it is fed onto or off of the drum.

The object of the invention is to prevent or obviate the necessity for this side motion.

To this end the invention consists in so constructing the drum and its actuating mechanism that the drum will have imparted to it as it revolves an endwise movement corresponding to the pitch of the cable-grooves, whereby as the cable winds or unwinds it will be constantly maintained in the same lines.

The invention also consists in certain details of the construction which I have devised to produce this side motion of the drum, all of which will now be particularly described.

In the drawings, Figure 1 is a plan view of the drum and actuating mechanism. Fig. 2 is an end view of the same. Fig. 3 is a section on line 3 3 of Fig. 1. Fig. 4 is a section on line 4 4 of Fig. 1.

A is the supporting-framework for the drum and its immediate actuating mechanism.

B is a stationary shaft, screw-threaded toward one end and secured at each end to the frame.

C is the drum, having the bearings $c c'$, one of which, c' , is internally threaded and engages the screw end of the shaft. Both bear-

ings are connected with the periphery c^2 of the drum by the radial arms $c^3 c^3$.

D is a sleeve loose on one end of the shaft B.

E is a disk secured to or integral with the sleeve.

F' is an internal gear secured to the disk.

F is a pinion secured in bearings on the frame and meshing with the internal gear.

f is the driving-shaft upon which the pinion is mounted. This driving-shaft has mounted upon it or geared to it an electric motor, (not shown,) or it may be actuated by any desired means.

Projecting from the disk E and extending close to and parallel with the periphery of the drum are the drum-actuating arms G, having bosses at their ends, within which are journaled rollers g , extending into longitudinal grooves g' in the inner side of the drum-periphery. These rollers engage the side walls of the groove.

It will be understood that axial motion is imparted to the drum by the driving-shaft through the medium of pinion F, gear F', disk E, and arms G. It will also be understood that as the drum turns it will be fed upward along the screw, the rollers g moving relatively backward within the groove g' . The pitch of the screw coincides with the pitch of the spiral grooves on the drum-periphery, and it is obvious that as the drum rotates and feeds forward the unwinding cable will be maintained in the same line.

To provide for automatically throwing the controlling mechanism to the center toward the end of travel of the drum in either direction—that is, when the cable is nearly completely unwound on the forward movement and nearly completely unwound on the backward movement—I have devised the following mechanism:

H is a ring splined upon the sleeve D, so as to rotate therewith and be capable of longitudinal movement thereupon.

I designates rods secured to ring H and extending longitudinally of the drum-shaft.

$i i$ are stops secured to the rods and in line of travel of the drum-bearing c .

J is a collar having an internal flange projecting into a circumferential groove on the ring H. This permits the ring to revolve

while the collar remains stationary; but any side motion of the ring is imparted to the collar.

K is a bell-crank lever pivoted upon the brackets k k' , extending from the frame of the machine. The free ends of this lever are pivoted to the collar J at its upper and lower sides, respectively. The opposite ends of this lever are connected by a link K^2 . The other end of the link K^2 is connected to an arm K^3 , which is secured to the operating-shaft l . This operating-shaft is controlled by any well-known means from the car, a sheave M being shown in Fig. 1, which may be engaged by a control-cable extending through the car. The operating-shaft controls the motor by any well-known means, a switch-box M' being shown in diagram in Fig. 1. No control mechanism is shown or described in detail, as the invention is applicable to any form of control mechanism. The shaft l may represent or be connected with the control mechanism for brake apparatus instead of the main controller-shaft of the switch-box. As the drum 25 nears the end of its forward travel the bearing c strikes the stops i , drawing forward the rods I, ring II, and collar J, and thereby tilting the bell-crank K and through the link K^2 and arm K^3 throwing the operating-shaft to its central position, and thereby stopping the motor or applying the brakes. When the operating-shaft is thrown to the other side of the center to reverse the direction of travel of the drum, the stop i' is in a position to be struck and moved by the drum-bearing c , thereby through the same connecting mechanism again throwing the operating-shaft to its central position.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In an elevator, the combination, with the cable-wound drum and its actuating mechanism, of means for imparting to the drum a movement parallel to its axis, the control mechanism, a stop or stops in line of travel of the drum, and connections between the stop or stops and the control mechanism, substantially as described.

2. In an elevator, the combination, with the cable-wound drum, of actuating mechanism for imparting to the drum simultaneously a movement of rotation and a movement parallel to its axis, the control mechanism, a stop or stops in line of axial travel of the drum, and connection between the stop or stops and the control mechanism, substantially as described.

3. In an elevator, the combination with the cable-wound drum, provided with longitudinally-extending grooves, arms parallel to the drum-shaft and engaging said grooves, actuating mechanism for revolving said arms around said shaft, whereby the drum is rotated, and means for imparting to the drum a simultaneous movement parallel to its axis, substantially as described.

4. In an elevator, the combination with the cable-wound drum, provided with longitudinally-extending grooves, arms parallel to the drum-shaft and engaging said grooves, actuating mechanism for revolving said arms around said shaft, whereby the drum is rotated, and means for imparting to the drum a simultaneous movement parallel to its axis, a stop or stops in line of axial travel of the drum, and connection between the stop or stops and control mechanism, substantially as described.

5. In an elevator, the combination with the cable-wound drum, of a stationary shaft threaded along part of its length, the drum having a plurality of bearings on said shaft, one bearing being internally threaded and engaging the threaded part of the shaft, the other bearing being loose on the unthreaded part of the shaft, and means for imparting a movement of rotation to said drum, substantially as described.

6. In an elevator, the combination, with the drum, of a stationary shaft threaded along part of its length, the drum having a plurality of bearings on said shaft, one bearing being internally threaded and engaging the threaded part of the shaft, the other bearing being loose on the unthreaded part of the shaft, means for imparting a movement of rotation to said drum, the drum being grooved spirally for the reception of the lifting cable or cables, the pitch of the screw coinciding with the pitch of the spiral grooves, whereby the cable will be maintained in a constant line during the combined rotary and side movement of the drum, substantially as described.

7. In an elevator, the combination, with the cable-wound drum, of a stationary screw-shaft, an internally-threaded bearing on the drum engaging said shaft, the drum being provided with longitudinally-extending grooves, a revoluble disk, arms projecting therefrom and engaging said grooves, and means for rotating said disk, substantially as described.

8. In an elevator, the combination, with the cable-wound drum, of a stationary shaft threaded along part of its length, the drum having a plurality of bearings on said shaft, one bearing being internally threaded and engaging the threaded part of the shaft, the other bearing being loose on the unthreaded part of the shaft, the drum being provided with longitudinally-extending grooves, a revoluble disk, arms projecting therefrom, rollers carried thereby engaging said grooves, the driving-shaft, and gearing between said driving-shaft and the disk, substantially as described.

9. In an elevator, the combination, with the cable-wound drum, of a stationary screw-shaft, an internally-threaded bearing on the drum engaging said shaft, means for rotating said drum, the control mechanism, a stop or stops in line of travel of the drum, and

connections between said stop or stops and the control mechanism, substantially as described.

10. In an elevator, the combination, with the cable-wound drum, of a stationary shaft, threaded along part of its length, the drum having a plurality of bearings on said shaft, one bearing being internally threaded and engaging the threaded part of the shaft, the other bearing being loose on the unthreaded part of the shaft, means for rotating said drum, a stop or stops in line of travel of the last-named bearing, and connections between said stop or stops and the control mechanism, substantially as described.

11. In an elevator, the combination, with the cable-wound drum, of a stationary screw-shaft, an internally-threaded bearing on the drum engaging said shaft, a sleeve loose on said shaft, means whereby said sleeve and the drum are rotated, means permitting the drum to move axially on its threaded bearing, a ring keyed to the sleeve so as to revolve therewith and be capable of lateral movement thereupon, rods extending longitudinally of the drum and secured to said ring, stops on said rods in line of travel of the drum, the control mechanism and connections between said ring and the control mechanism, whereby when the drum engages said stops, said ring will be moved along the sleeve and actuate the control mechanism, substantially as described.

12. In an elevator, the combination, with the cable-wound drum, of a stationary shaft threaded along part of its length, the drum having a plurality of bearings on said shaft one bearing being internally threaded and engaging the threaded part of the shaft, the other bearing being loose on the unthreaded part of the shaft, a sleeve loose on the unthreaded part of said shaft, means whereby said sleeve and the drum are rotated, means permitting the drum to move axially on its threaded bearing, a ring feathered to the sleeve so as to revolve therewith and be capable of lateral movement thereupon, rods extending longitudinally of the drum and secured to said ring, stops on said rods in line of travel of the last-named drum-bearing, the control mechanism, whereby when the drum nears its limit of travel in either direction, the said bearing engages said stops and moves said ring along the sleeve to actuate the control mechanism, substantially as described.

13. In an elevator, the combination, with the cable-wound drum, of a stationary screw-shaft, an internally-threaded bearing on the drum engaging said shaft, a sleeve loose on said shaft, means whereby said sleeve and the drum are rotated, means permitting the drum to move axially on its threaded bearing, a ring feathered to the sleeve so as to

revolve therewith and be capable of lateral movement thereupon, rods extending longitudinally of the drum and secured to said ring, stops on said rods in line of travel of the drum, a non-rotatable collar around said ring and engaging the same by a flange-and-groove connection, bell-crank levers secured to said collar, the control mechanism, and connections between the bell-crank levers and the control mechanism, substantially as described.

14. In an elevator, the combination, with the cable-wound drum, of a stationary screw-shaft, an internally-threaded bearing on the drum engaging said shaft, the drum being provided with longitudinally-extending grooves, a revoluble disk, arms projecting therefrom and engaging said grooves, a sleeve loose on said shaft and rotating with said disk, a ring feathered to the sleeve so as to revolve therewith and be capable of lateral movement thereupon, rods extending longitudinally of the drum and secured to said ring, stops on said rods in line of travel of the drum, the control mechanism, and connections between said ring and the control mechanism, whereby when the drum engages said stops, said ring will be moved along the sleeve and actuate the control mechanism, substantially as described.

15. In an elevator, the combination, with the cable-wound drum, of a stationary shaft threaded along part of its length, the drum having a plurality of bearings on said shaft, one bearing being internally threaded and engaging the threaded part of the shaft, the other bearing being loose on the unthreaded part of the shaft, the drum being provided with longitudinally-extending grooves, a revoluble disk, arms projecting therefrom, rollers carried thereby engaging said grooves, the driving-shaft, and gearing between said driving-shaft and the disk, a sleeve loose on the unthreaded part of said shaft and rotating with said disk, a ring feathered to the sleeve so as to revolve therewith and be capable of lateral movement thereupon, rods extending longitudinally of the drum and secured to said ring, stops on said rods in line of travel of the last-named drum bearing the control mechanism, whereby when the drum nears its limit of travel in either direction, the said bearing engages said stops and moves said ring along the sleeve to actuate the control mechanism, substantially as described.

In testimony of which invention I have hereunto set my hand, at Winnetka, Illinois, on this 7th day of February, 1900.

FRANK E. HERDMAN.

Witnesses:

ALBERT S. CAPRON,
J. C. BURKITT.