B. F. SEYMOUR.

IMPELLING MECHANISM FOR CONVEYANCES.

APPLICATION FILED DEC. 21, 1907.

920,191.

Patented May 4, 1909.

3 SHEETS—SHEET 1.

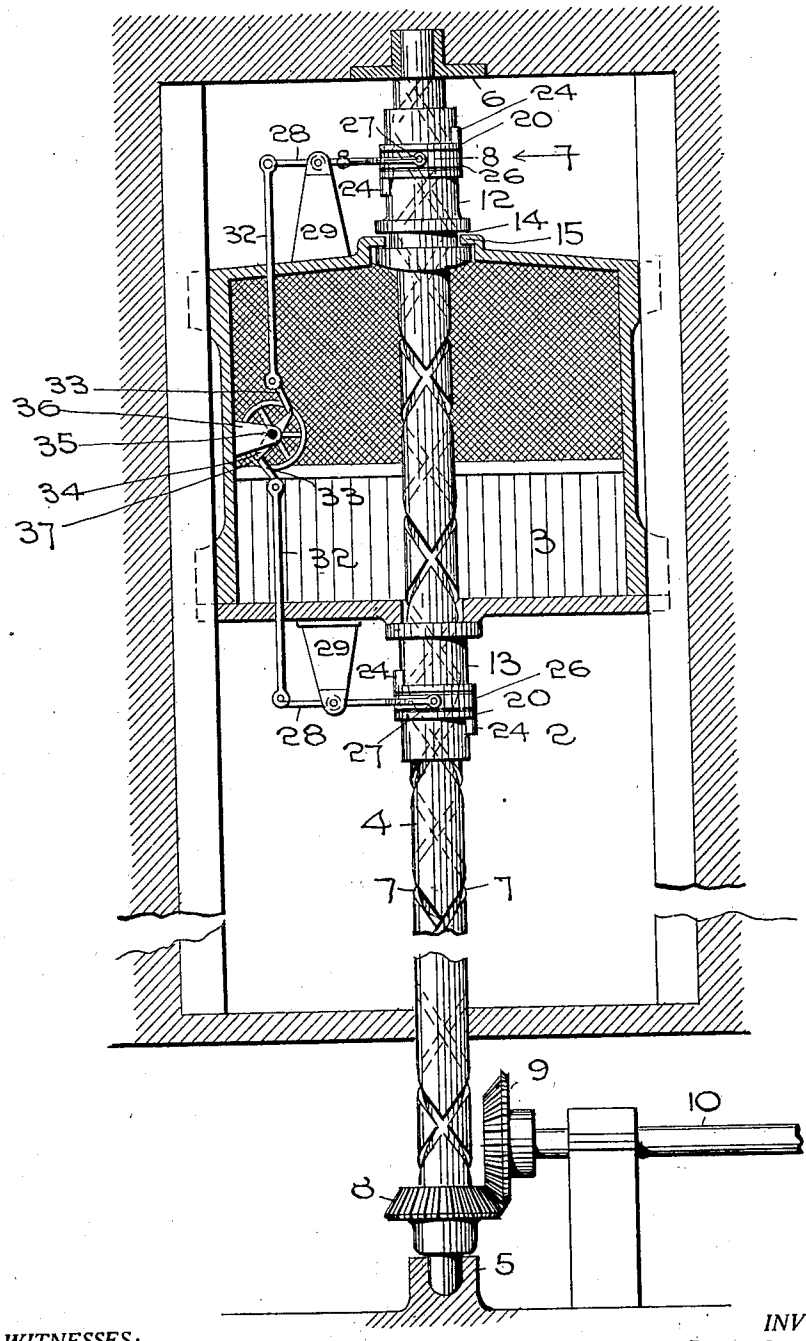


FIG. 1

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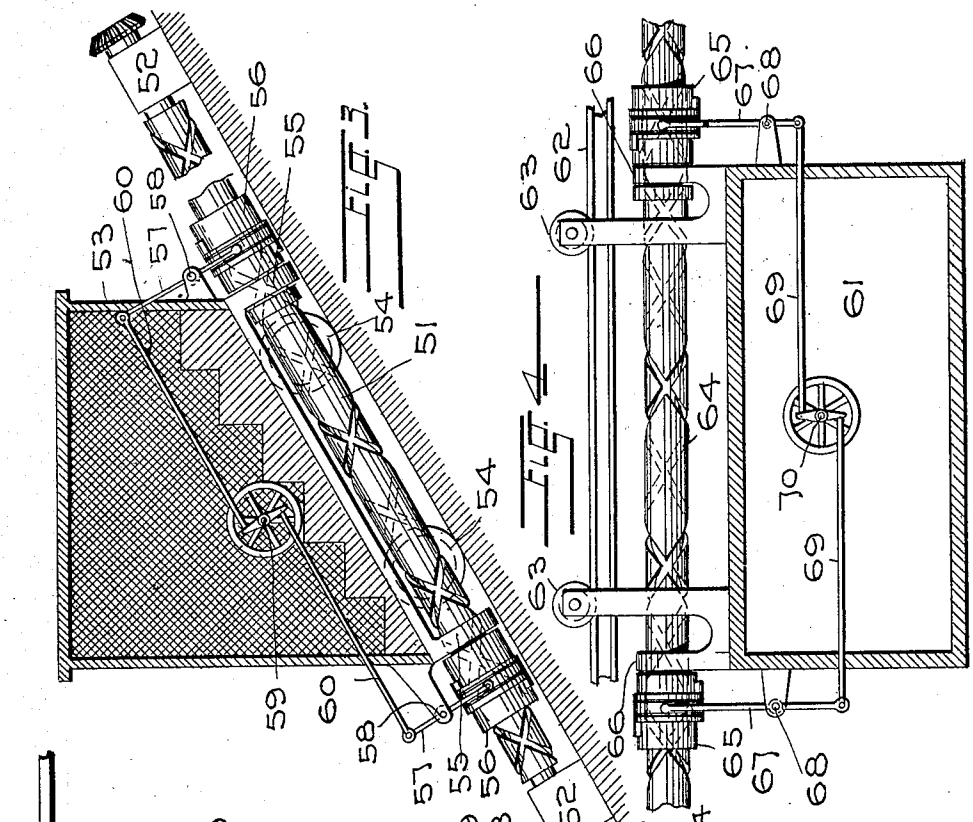


FIG. 3.

FIG. 4.

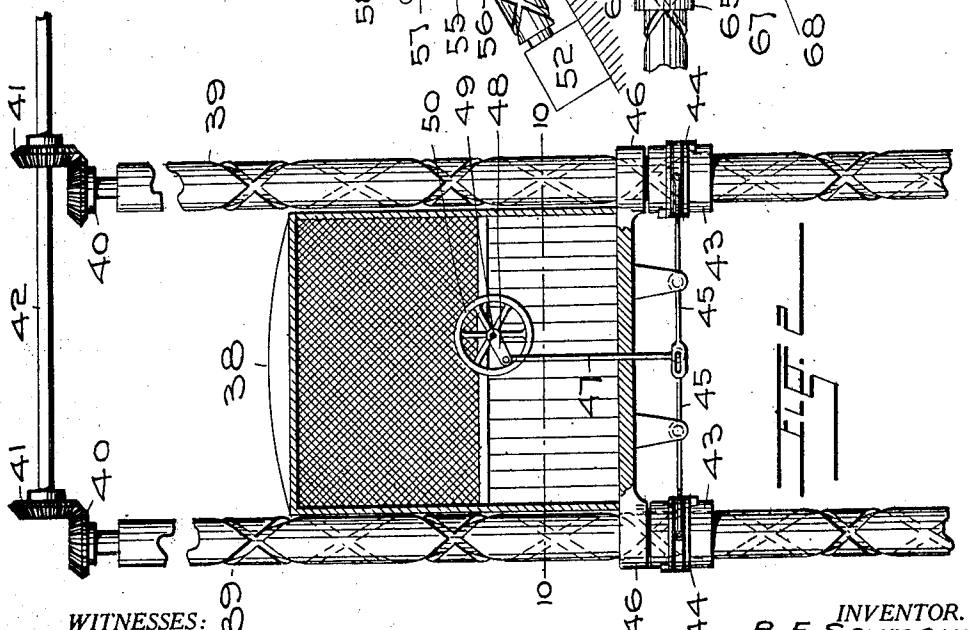


FIG. 2.

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3 SHEETS—SHEET 3.

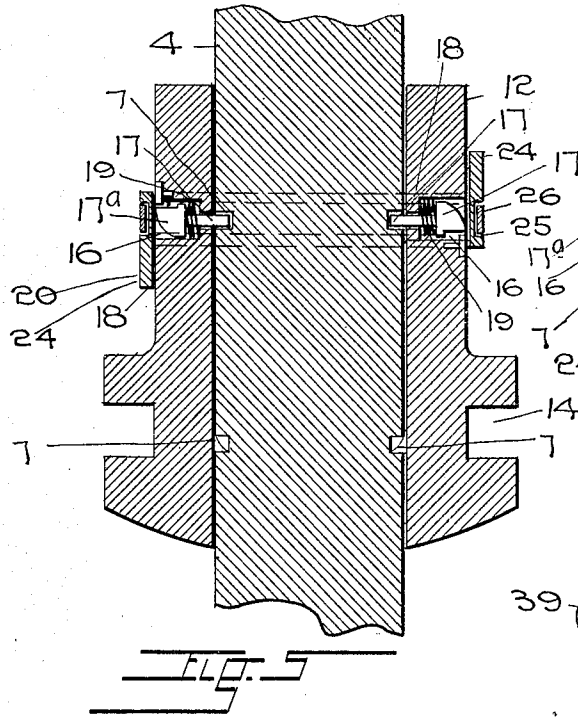


FIG. 5

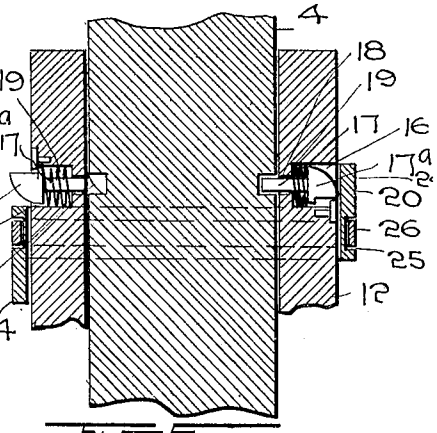


FIG. 6

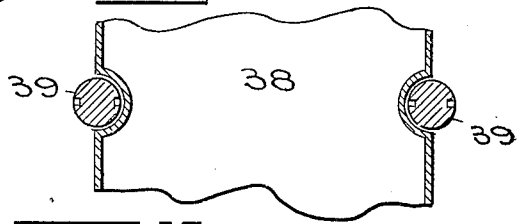


FIG. 10.

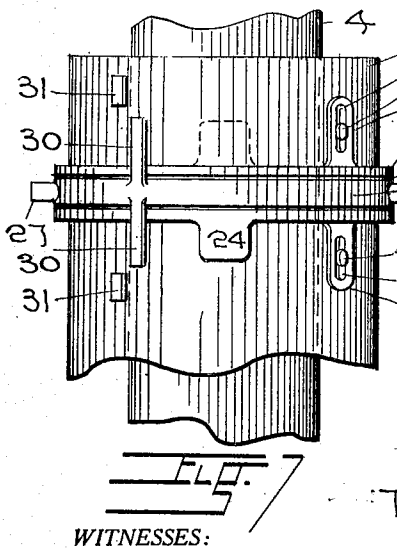


FIG. 7

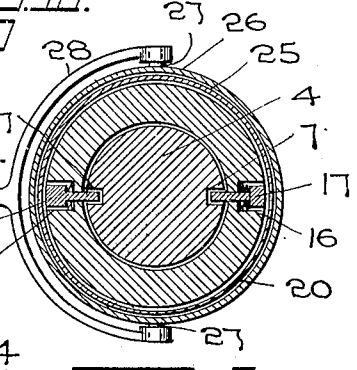


FIG. 8

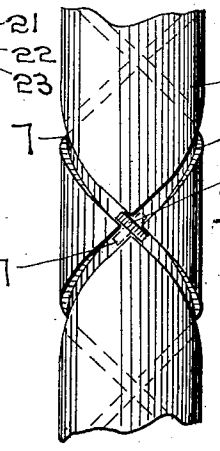


FIG. 9.

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IMPELLING MECHANISM FOR CONVEYANCES.

No. 920,191. Specification of Letters Patent. Patented May 4, 1909.

Application filed December 21, 1907. Serial No. 407,464.

To all whom it may concern:

Be it known that I, BENJAMIN F. SEYMOUR, a citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Impelling Mechanism for Conveyances, of which the following is a specification.

My invention relates to certain new and useful improvements in impelling mechanisms for conveyances and its object is to provide a mechanism in which simplicity of construction and operation is combined with thorough practicability in use and by means of which the movement of a conveyance may be reversed or stopped at any desired point within predetermined limits without reversal or cessation of the movement of the actuating element.

My invention is particularly adapted for use in connection with elevators, mine cages, inclined or horizontal tram roads, hoists and other contrivances of the class in which a carrier has a linear, intermittent movement in either direction between predetermined terminals.

I attain the above named object by the mechanism illustrated in the accompanying drawings in the various views of which like parts are similarly designated and in which—

Figure 1— represents a sectional view of a vertically moving elevator, operated by my improved mechanism, Fig. 2— a fragmentary view of a similar device actuated by two shafts, mounted to act in unison, Fig. 3—a fragmentary elevation of my improved mechanism in connection with a conveyance moving in an inclined plane, Fig. 4— a similar view of the mechanism as applied to the suspended carrier of a horizontal tram road, Fig. 5— an enlarged vertical section through the vertical shaft illustrated in Fig. 1 and the upper feed nut connected with the cage, Fig. 6— a similar view, showing the said nut in its unlocked condition, Fig. 7— an enlarged fragmentary elevation of the shaft and feed nut looking in the direction of the arrow 7, Fig. 1, Fig. 8— an enlarged horizontal section taken along the line 8—8, Fig. 1, Fig. 9— a fragmentary elevation of the shaft employed in my invention showing the relative shapes and positions of the detents engaged therewith, and Fig. 10— a fragmentary horizontal section taken along a line 10—10, Fig. 2.

In the form illustrated in Fig. 1, let the reference character 2 designate the elevator shaft or well of a building or other structure and 3 the therein movable cage or carrier. Revolubly mounted in central relation to the shaft and extending through openings in the top and bottom of the cage, is a vertical shaft 4, the lower extremity of which is supported in a step 5, while its opposite end projects into a suitable journal box 6, disposed at the upper portion of the well 2. The shaft 4 is formed in its peripheral surface with two grooves 7, winding spirally in opposite directions between points in adjacency to its extremities and is provided with a bevel gear wheel 8, into which meshes a coöperative wheel 9, at the end of a horizontal shaft 10, which may connect by any desired means with a conveniently located motor or engine. The rotary movement of the shaft is transposed into a vertical movement of the cage in either direction, through instrumentality of two cylindrical nuts 12 and 13, which encircling the shaft, coöperatively sustain the cage. The upper one, 12, of the nuts is, to this end, provided at its lower extremity with an annular groove 14 into which projects a correspondingly shaped flange 15 on the upper portion of the cage, while the lower nut, 13, merely engages with its enlarged end, the lower surface of the bottom of the cage. It will be understood that, to lessen the friction between the engaging surfaces of the last named parts, a suitable anti-friction appliance such as a roller bearing may be employed.

With the exception of their extreme portions which engage the cage, the two nuts 12 and 13 are identical and the following description of the construction of the therewith associated parts will therefore reflect not only on the one as well as on the other but also on the nuts forming part of the impelling mechanism as arranged in the modified methods of application illustrated in Figs. 2, 3 and 4 of the drawings. Each nut or sleeve is provided in its peripheral surface with diametrically opposite sockets 16, adapted to receive the heads 17^a of detents 17, the opposite ends of which project continually through correspondingly shaped openings 18 in the bottom surface of the sockets and normally into the two spiral grooves 7 in the shaft 4. Spiral springs 19 encircling the detents in engagement with the opposed surfaces of the heads 17^a and the sockets into which they project, are ap-

plied to force the respective detents outwardly free from engagement with the grooves 7, when their heads which normally are engaged by a depressing element, are released from contact therewith. The element referred to consists of a collar 20 which encircling the shaft, is connected with the latter by means of screws or pins 21, which being secured in corresponding openings in the peripheral surface of the nut, project through laterally extending slots 22 in lugs 23 on the collar and which thus permit a limited lateral movement of the collar on the nut in opposite directions while causing it to rotate therewith. The collar 20 is furthermore provided with laterally ranging wings 24 which extend along the surface of the nut in opposite directions at the points of the collar where its internal surface engages the heads of the detents 17 and the function of the said wings is to prevent simultaneous disengagement of the adjustable element with both the detents when it is moved into one or the other of its extreme positions.

To adjust the position of the collar from the inside of the cage, the former is provided with a circumferential, annular depression 25, to provide a seat for a ring 26 which connects by means of therewith integral trunnions 27, with the bifurcated extremity of a lever 28 fulcrumed upon a stationary support 29 on the cage, to move about a horizontal axis. The ring 26 is provided with oppositely and laterally extending fingers 30 one of which engages, while the collar is in either of its extreme positions, one of two lugs 31 upon the circumferential surface of the nut, for the purpose of holding the latter against rotation with the shaft. The outer extremities of each of the two levers 28, which respectively connect with the collars on the nuts above and below the cage, are connected by means of rods 32 and links 33 with oppositely ranging arms 34 on a rocker shaft 35 which being revolubly mounted in bearings 36 on the inside of the cage, may be manipulated by means of a therewith associated hand wheel 37.

In the form illustrated in Fig. 2, the cage 38 moves intermediate two vertical shafts 39 each identical to the one shown in Fig. 1 and mounted to move in unison by means of beveled gears 40 at one of their extremities which mesh into corresponding gears 41 upon a common powershaft 42. The shafts in this instance, act as guides for the cage during its vertical movements as is clearly shown in Fig. 10 and the nuts 43 engage collars 46 which extending from the cage, loosely encircle the shafts. The two bifurcated levers 45 which connect with the adjustable collars 44, are slotted at their extremities and engage with a connecting rod 47, the upper extremity of which connects with the arm 48 of a rocker shaft 49 mounted within the cage and manipulated by the hand wheel 50.

In the inclined tramroad illustrated in Fig. 3, the shaft 51 is mounted in bearings 52 to rotate about an inclined axis; and the conveyance 53 may be supported upon wheels 54 or guided in any other desired manner; it being arranged in superposed relation to the shaft and having depending collars 55, loosely encircling the latter and operatively engaged by the nuts 56. The bifurcated levers 57 are fulcrumed at 58 and connect with the rock shaft 59 by means of rods 60.

In Fig. 4 is illustrated a conveyance 61 movably suspended from a guide rail 62 by means of wheels 63. The spirally grooved shaft 64 is mounted to rotate about a horizontal axis intermediate the rail and the cage and the nuts 65 engage collars 66 which surround the shaft as in the preceding form. The forked levers 67, fulcrumed at 68 connect by means of rods 69 with the rock shaft 70.

It will be understood that in the form illustrated in Fig. 1, either the upper or lower nut may be dispensed with in case the service for which the elevator is intended, is such as to require little strength of the sustaining element, and that in each of the forms illustrated the arrangement of the various elements and the construction of the subordinate parts may be varied within the spirit of my invention and that in its broader aspects, the present invention may be embodied in various other forms.

Having thus described the mechanical construction of my invention, its operation is as follows:—Referring to Fig. 1 of the drawings, the spirally grooved shaft 4, while the mechanism is in operation, revolves continuously in one direction, by action of the therewith associated power shaft 10 and, assuming that the various adjustable parts connected with the nuts 12 and 13 are in their normal positions, the latter will rotate with the shaft, and thus retain the cage 3 in its adjusted position. When the above referred to parts are in their normal position, the collar 20 is in its central position as illustrated in Figs. 5 and 7 and the two detents 17 being depressed by contact therewith, project into the respective spiral grooves 7 and thus lock the nut with which they are associated, upon the shaft. To impel the nuts and the therewith connected conveyance in either direction, the collars 20 are moved into one of their extreme positions by manipulation of the hand wheel 37 and the lever mechanism, as is shown in Fig. 6 of the drawings. This motion releases one of the detents in each of the nuts which by action of the spiral spring, is at once withdrawn from contact with the spiral groove into which it projected, while the opposite detent is retained in its original position by contact with the adjacent wing 24 on the collar. The nuts

are simultaneously locked against rotation with the shaft by the engagement of one of the fingers 30 on the non-rotative ring 26 with the respective lug 31 with the result that by the action of the spiral way upon the thereinto projecting detents the rotary movement of the shaft is transposed into a vertical movement of the two nuts which in consequence, impel the therewith connected cage to move in the same direction until they are once more locked against vertical displacement by returning the collar to its original position, which by engagement of the latter with the inclined upper surface of the head 17ª of the outwardly projecting detent 17, causes the latter to resume its normal position in the respective groove 7. To maintain the detent in their respective grooves while passing the latter's points of intersection, their extremities have been shaped in conformity with the grooves into which they project as is clearly shown in Fig. 9.

The operation of the devices illustrated in Figs. 2, 3 and 4 being similar to that of the elevator shown in Fig. 1, further explanation will not be necessary.

Having thus described my invention what I desire to secure by Letters Patent is:—

1. The combination with a carrier of an impelling element mounted to revolve in one direction, a member engaging the carrier and coöperative means upon the said element and the said member adapted to impel the latter longitudinally in relation to the other in either direction and to lock the said member upon the said element at any point within predetermined limits.

2. In combination, a revoluble element having peripheral guide ways winding spirally in opposite directions within common limits, a carrier movable in a direction parallel to the said element, a member engaging the carrier, detents associated with the said member and normally engaging the said ways simultaneously, and means to withdraw either of the said detents from contact with its respective way.

3. The combination with a carrier of a revoluble element having peripheral guideways winding spirally in opposite directions within common limits, a member connected with the carrier, detents associated with the said member and normally engaging the said ways, and means to withdraw either of the said detents from contact with its respective way and to simultaneously lock the said member against rotation with the said element.

4. In combination, a revoluble element having peripheral guide ways winding spirally in opposite directions within common limits, a carrier mounted to move in a direction parallel to the said element, a nut upon the said element engaging the carrier and operatively engaging both ways simultaneously and means to disengage the said nut separately from either of the ways.

5. The combination with a carrier of a revoluble element having peripheral guideways winding spirally in opposite directions within common limits, a nut upon the said element, connected with the carrier and operatively engaging both ways and means to disengage the said nut from either of the ways, and to simultaneously lock it against rotation with the shaft.

6. The combination with a carrier of a revoluble element having peripheral guideways winding spirally in opposite directions within common limits, a nut encircling the element, detents resiliently connected with the nut, normally engaging the said ways, and a member having a limited movement upon the nut adapted to maintain the detents in their normal position and to release either of them, when in an extreme position.

7. The combination with a carrier of a revoluble element having peripheral guideways winding spirally in opposite directions within common limits, a nut encircling the element, detents resiliently connected with the nut, normally engaging the said ways, a collar having a limited lateral movement upon the nut, adapted to maintain the detents in their normal position and to release either one of them when in extreme position and a non-rotative member associated with the said collar and mounted to move it in either direction.

8. The combination with a carrier of a revoluble element having peripheral guideways winding spirally in opposite directions within common limits, a nut encircling the element, detents resiliently connected with the nut, normally engaging the said ways, a collar having a limited lateral movement upon the nut, adapted to maintain the detents in their normal position and to release either one of them when in extreme position and a non-rotative member associated with the said collar, and mounted to move it in either direction and adapted to lock the nut against rotation with the shaft.

In testimony whereof I have affixed my signature in presence of two witnesses.

BENJAMIN F. SEYMOUR.

Witnesses:
G. J. ROLLANDET,
K. M. STUMP.