H. KOCOUREK.

ELEVATOR TRAVEL REGISTERING DEVICE.

APPLICATION FILED OCT. 5, 1914.

1,178,078.

Patented Apr. 4, 1916.

2 SHEETS—SHEET 1.

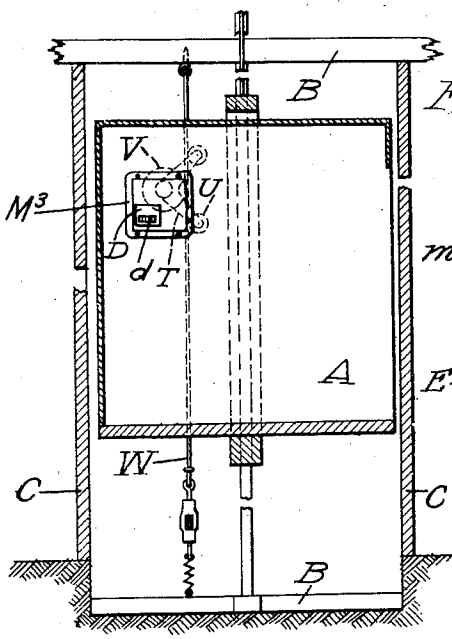


Fig. 1

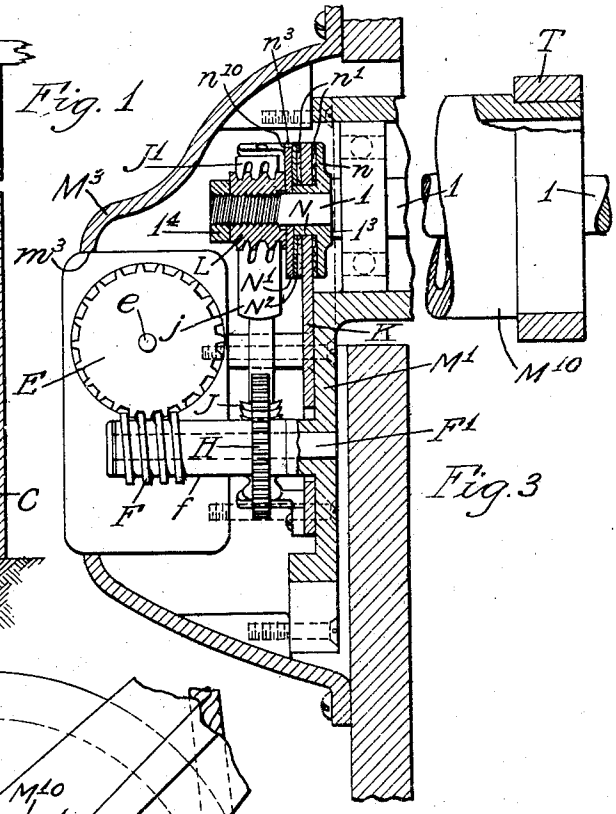
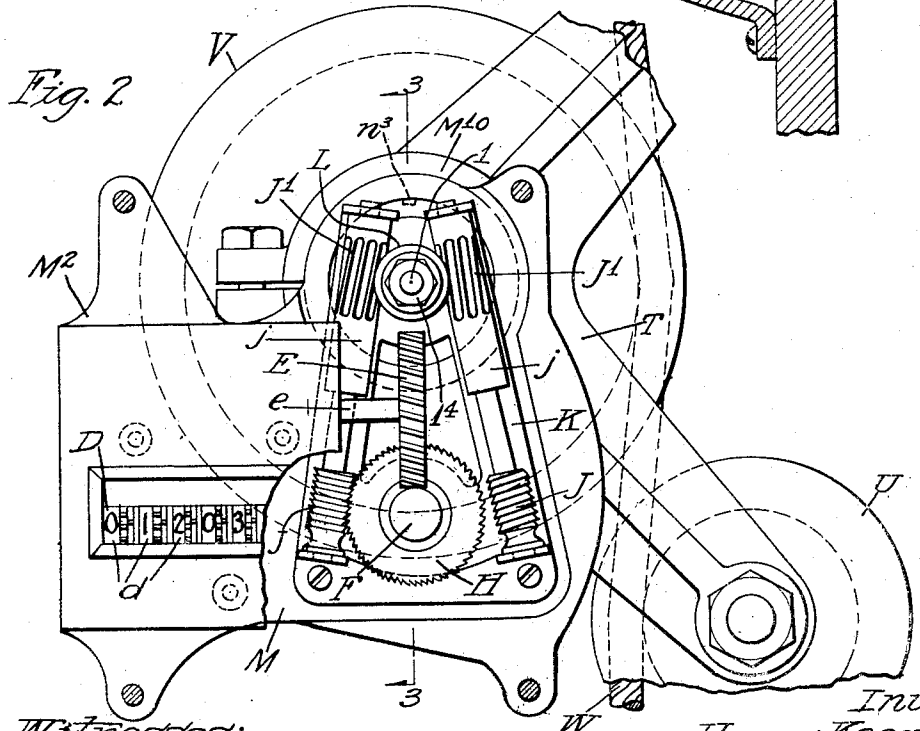


Fig. 3

Fig. 2



Witnesses:

Lucy J. Stone

Inventor:

Henry Kocourek.

by Burton & Burton

his Attys.

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2 SHEETS—SHEET 2.

Fig. 4

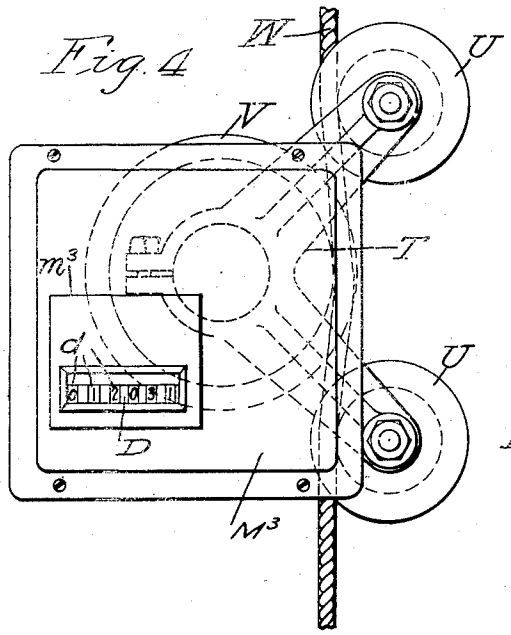


Fig. 5.

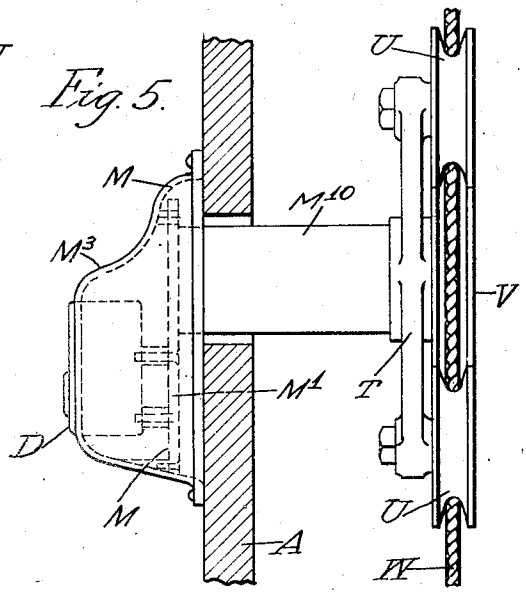


Fig. 6

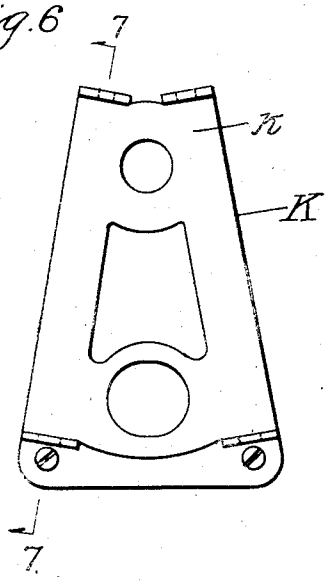
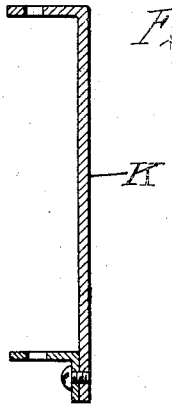


Fig. 7.



Witnesses:

R. F. Hunter

Lucy J. Stone

Inventor.

Henry Kocourek

by Burton & Burton

his Attys.

UNITED STATES PATENT OFFICE.

HENRY KOCOUREK, OF CHICAGO, ILLINOIS, ASSIGNOR TO STEWART-WARNER SPEEDOMETER CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

ELEVATOR-TRAVEL-REGISTERING DEVICE.

1,178,078. Specification of Letters Patent. Patented Apr. 4, 1916.

Application filed October 5, 1914. Serial No. 864,979.

To all whom it may concern:

Be it known that I, HENRY KOCOUREK, a citizen of the United States, residing at 2411 South Clifton Park avenue, Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Elevator-Travel-Registering Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved device for registering the travel of an elevator in its shaft, in order to indicate the amount of service to which the hoisting cables are subjected in the intervals of inspection.

It consists of the elements and features of construction shown and described as indicated in the claims.

In the drawings, Figure 1 is a vertical section of an elevator and its shaft, condensed as to length, the shaft being broken away and showing a device embodying this invention mounted on the elevator and in connection with its shaft. Fig. 2 is a front elevation of the mechanism for transmitting movement from the actuating cable to the counter train, the cover of the transmitting train case being removed. Fig. 3 is a section at the lines, 3—3, on Fig. 2, the cover being present. Fig. 4 is a front elevation of the entire instrument with the cover of the case in place. Fig. 5 is an edge elevation of the same shown in relation to the elevator car wall which is shown in vertical section. Fig. 6 is an elevation of an oscillating frame for the transmitting train. Fig. 7 is a section at the line, 7, 7, on Fig. 6.

In the drawings there are shown an elevator car, A, and frame timbers of its shaft, B, B, and C, C. These parts of customary elevator construction may be in any suitable form, the representations of them in the drawings being substantially conventional. On the car there is mounted a main frame, M, which carries upon it, positioned for being read from the inside of the car, a counter, D, having any customary form of counter-train with its wheels graduated for indicating the travel of the elevator in its shaft in feet, yards or miles, as desired. The primal shaft, *e*, of the counter-train is arranged to be continuously rotated by means of a wheel, E, positioned thereon outside the counter-train case, said wheel meshing with a worm, F, on a sleeve or hollow shaft, *f*, journaled on a post, F^1, which is rigid with the back-plate, M^1, of the main frame, M. Rigid with the sleeve shaft, *f*, is a worm wheel, H, which is arranged to be actuated alternately by two worms, J, J, on the worm shafts, *j*, *j*, said worm shafts having rigid with them worm pinions, J^1, J^1. The worm shafts, *j*, are journaled in a frame, K, which is mounted for slight oscillation about a shaft, *l*, journaled on the main frame, M, parallel with the sleeve shaft, *f*, and having at its inner end a worm, L, meshing with the two worm pinions, J^1, J^1, which are engaged with it at opposite sides, the worms, J, J, being similarly positioned for engagement at opposite sides of the worm wheel, H. The frame, K, is not only pivoted upon the shaft, *l*, but is frictionally engaged therewith so as to be turned with the shaft within the range of its oscillation thereabout when the shaft starts to rotate in either direction after having been rotated in the opposite direction. The range of oscillation of the frame, K, is determined by the excess of spread of the two worms, J, J, over the diameter of the worm wheel, H, which is positioned upon them. This excess is sufficient to permit only one of the worms to be engaged at a time with the worm wheel. As the shaft, *l*, starts to rotate in one direction it swings one of the worms, J, into mesh with the worm wheel, H, and the shaft continuing its rotation in the same direction, the worm wheel, H, is rotated in one direction by the worm shaft, *j*, deriving its rotation from the worm J^1, at the upper end and transmitting it through the worm, J^1, at the lower end of said worm wheel, H; whereby through the movement of the worm, G, and worm wheel, E, the counter train is rotated. When the rotation of the shaft, *l*, is reversed, its first movement in the opposite direction carries the worm, J, which has been engaged with the worm wheel, H, out of such engagement, and carries the opposite worm, J, into engagement with the opposite side of the worm wheel. But since the two worm shafts, *j*, *j*, are rotated in opposite directions by the engagement of the worms, J^1, with the worm on the shaft, *l*, the engagement of the worms, J, at opposite sides of the worm wheel, H, serves to rotate said worm wheel always in

the same direction; thus whichever way the shaft, *l*, rotates it causes the counter-train to be driven always in the same direction, thereby registering the total movement of the shaft, *l*, without regard to direction.

The main frame, M, comprises a cylindrical hub, M^1, designed to extend through the wall or a frame element of the elevator car, A, from inside to outside thereof, and on the inside of the car said frame has a bracket extension, M^2, upon which the counter, D, is mounted with the wheel, E^1, positioned for engagement with the worm, F, as described. Both the counter, D, and the transmitting train above described, are completely housed in by means of a cap, M^3, which is bolted to the frame, M, and to the car wall and apertured at m^3, to disclose the counter wheels, *d*.

The means of frictional connection of the frame, K, with the shaft, *l*, comprises a sleeve, N, on the shaft, *l*, having a hub, *n*, which is passed on to the reduced end of the shaft, *l*, back to a shoulder, l^3, and a flange plate or washer, n^1, which is passed on to the shaft against the hub, *n*, the sleeve and flange plate together forming a sort of spool, which is bound tightly on the shaft by the worm, L, operating as a nut being screwed onto the threaded end of the shaft against the flange plate, N^1, clamping the spool against the stop-shoulder, l^3, and the jam-nut, l^4, being applied outside the worm, L. Between the flanges of the spool, lodged, of course, before the flange plate, N^1, is applied, there are engaged a portion, *k*, of the back-plate of the frame, K, which is thereby pivoted about the shaft, *l*, and, at opposite sides of such portion, *k*, friction washers, n^1, n^1, these three elements being clamped together by the spool flanges firmly enough for driving frictional engagement, when the flange-plate, N^1, is bound as described against the hub of the sleeve, N, binding the entire sleeve firmly to the shaft as stated. For convenience in assembling these parts on the spool, it is preferable to employ a thin metal washer, n^2, which is made fast at its inner circumference with the end of the hub, *n*, of the sleeve, N, and is preferably engaged at its periphery with the flange-plate, N^1, by means of a lug, n^3, on said washer, engaging a notch, n^{10}, in the periphery of the flange-plate.

Outside the car, that is upon the outer end of the hub, *n*, there is mounted a bracket, T, carrying two guide-pulleys, U, U, which are situated substantially in the plane of the sheave-pulley, V, which is mounted onto the outer end of the shaft, *l*, for rotating said shaft.

W, is a cord or cable which is stretched from the bottom of the elevator shaft alongside the path of the car substantially in the plane of the sheave-pulley, V, and the guide-pulleys, U, U. The axes of the pulleys, U, U, are so located with respect to the axis of the sheave-pulley, V, that the cable guided over the two guide-pulleys on the same side thereof is deflected out of a straight line in order to lodge in the groove of the sheave-pulley and extend therein through a sufficient segment to give it adequate frictional engagement with the sheave, to insure rotation of the sheave and the mechanism operated by the shaft, *l*, on which the sheave is mounted, without slippage of the cable on the sheave-pulley. It will be understood that the cable, W, is secured at its upper and lower ends fixedly with respect to the elevator shaft, so that as the car moves up and down in its shaft the sheave-pulley, V, rolls along the cable, and thereby the peripheral movement of the sheave-pulley corresponds to the distance traveled by the elevator, and becomes a measure of the service to which the elevator hoisting cables are subjected, and is measured and registered by the counter train through the mechanism described.

I claim:—

1. A frame for a mechanism, adapted to be mounted on the wall of an elevator car, and comprising a protruding journal bearing adapted to extend through the wall of the car from the inner to the outer side of said wall so as to be exposed outside the car when the body of the frame is mounted within the latter; mechanism carried by the frame comprising a shaft which is journaled in said bearing and protrudes therefrom; a sheave mounted on the protruding end of said shaft; a bracket mounted on the protruding journal bearing and two guide pulleys mounted on the bracket situated substantially in the plane of the sheave pulley.

2. In combination with an elevator car, and the shaft in which it travels; a mechanism frame mounted on the car comprising a protruding journal bearing adapted to extend through the wall of the car from the inner to the outer side of said wall so as to be exposed outside the latter when the frame is mounted inside said wall; a train of mechanism in said frame, comprising a shaft which is journaled in said protruding bearing and protrudes therefrom; a sheave pulley mounted on the protruding end of the shaft and two guide pulleys mounted on the car substantially in the vertical plane of the sheave pulley; a cord stretched from end to end of the elevator shaft along the path of movement of the car, the sheave pulley being positioned for operative frictional engagement with such cord as the car travels, and the guide pulleys being so positioned with respect to the cord and the sheave pulley that the cord is deflected from the common tangent of the guide pulleys to engage the sheave.

3. In combination with a car and a cord

extending along its path of travel; a casing mounted on the inner side of the car wall comprising rigidly a journal bearing which extends through the car wall and protrudes at the outer side thereof; a train of mechanism mounted in said casing and comprising a shaft journaled in said journal bearing extending out therethrough; a sheave-pulley mounted on the outwardly-protruding end of said shaft and positioned for engagement with said cord, said mechanism train comprising an actuated member and two actuating members which derive rotation in opposite direction from the same rotative movement of said shaft, and means by which the engagement of said actuating members with said actuated member is alternated as the direction of rotation of said shaft by the sheave-pulley is alternated by the alternating directions of travel of the car.

4. In combination with a car and a cord extending along the path of travel of the car; a mechanism having its main frame mounted upon the car and comprising a shaft protruding from the frame, and a sheave pulley on the protruding end of the shaft positioned for engagement with the cord as the car travels, whereby the direction of rotation of the sheave pulley is reversed as the direction of travel of the car is reversed, said mechanism comprising a frame member which is pivoted on the sheave pulley shaft; means by which said frame member is frictionally engaged with said shaft so as to turn therewith about the axis of the shaft: two rotative actuating members mounted on said frame member for movement therewith about said sheave pulley shaft and operatively engaged with said shaft for rotation thereby in opposite directions: a rotative actuated member journaled on the main frame positioned for engagement alternately by said two actuated members as said actuated members are moved in one direction or the other by the frame member on which they are mounted; whereby the reversal of direction of rotation of the sheave pulley shifts the engagement of said actuating members with said actuated member.

5. In combination with a car and a cord extending along the path of travel of the car; a mechanism having its main frame mounted upon the car and comprising a shaft journaled in said frame and protruding therefrom and a sheave mounted on the protruding end of the shaft positioned for engagement by the cord as the car travels; said mechanism comprising a frame member which is pivoted on the sheave pulley shaft; means by which said frame member is frictionally engaged with said shaft so as to be turned therewith about the axis of the shaft; a worm on said shaft; a pair of shafts mounted on said frame member having each a pinion engaged with the worm on the sheave pulley shaft; a gear wheel which is to be rotated always in the same direction, said shafts having respectively means for engaging said gear wheel at opposite sides thereof and positioned for such engagement one at a time at the respectively opposite limits of oscillation of said frame member about the sheave pulley axis, whereby the reversal of direction of oscillation of the sheave pulley shifts the engagement of said two oppositely revolving shafts with said gear wheel when the directions of rotations of said two shafts are reversed by the reversal of rotation of the sheave pulley.

6. In combination with a mechanism main frame, the sheave pulley shaft journaled therein and the sheave pulley thereon outside the frame: a frame member pivoted on the sheave pulley shaft comprising a plate or disk through which the shaft passes; washers or disks on the shaft between which said disk of the frame is positioned: one of said disks or washers being engaged with the shaft for rotation, and means for clamping the frame disk between the washers for frictional engagement of the frame disk thereby; a worm on said shaft; a pair of shafts mounted on said frame member for movement therewith about the sheave pulley shaft; a gear wheel to be rotated always in the same direction, each of said pair of shafts having means for engaging said gear wheels at opposite sides of the latter positioned for such engagement one at a time at the respectively opposite limits of the oscillation of said frame member about the sheave pulley axis.

In testimony whereof I have hereunto set my hand at Chicago, Illinois, this 3rd day of October 1914.

HENRY KOCOUREK.

Witnesses:
EDNA M. MACINTOSH,
LUCY I. STONE.