(No Model.)

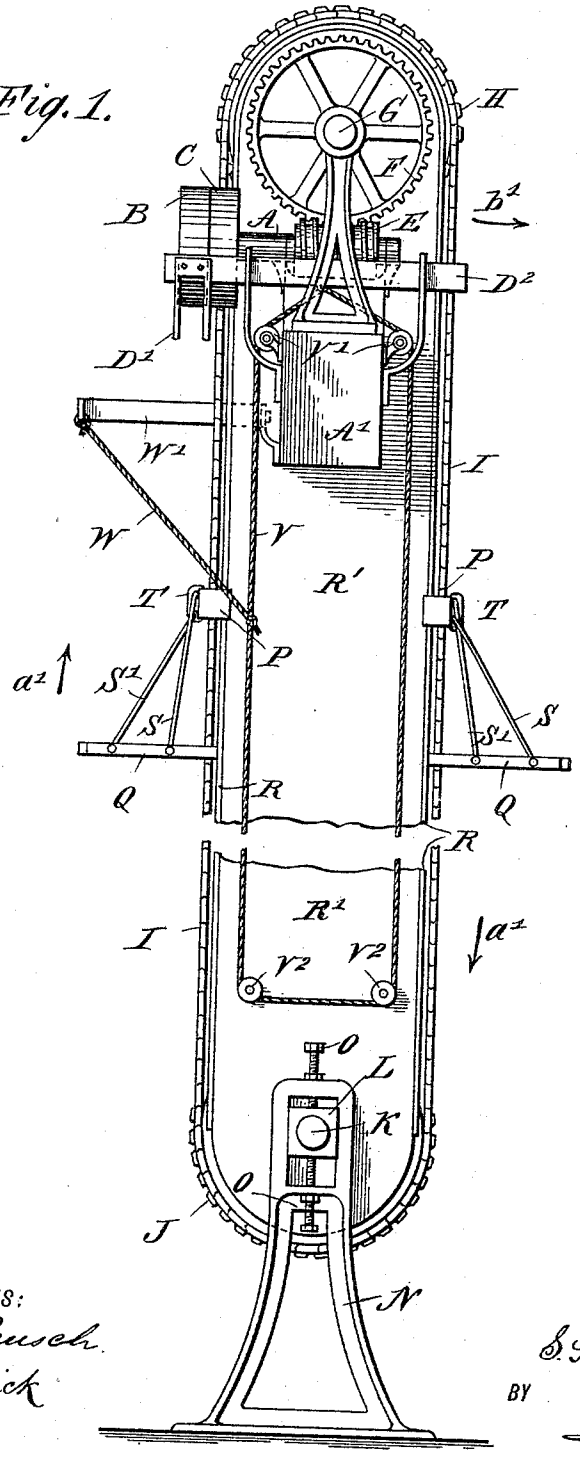
3 Sheets—Sheet 1.

S. K. HUMPHREY.

ELEVATOR.

No. 412,956. Patented Oct. 15, 1889.

Fig. 1.



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(No Model.)

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Fig. 2.

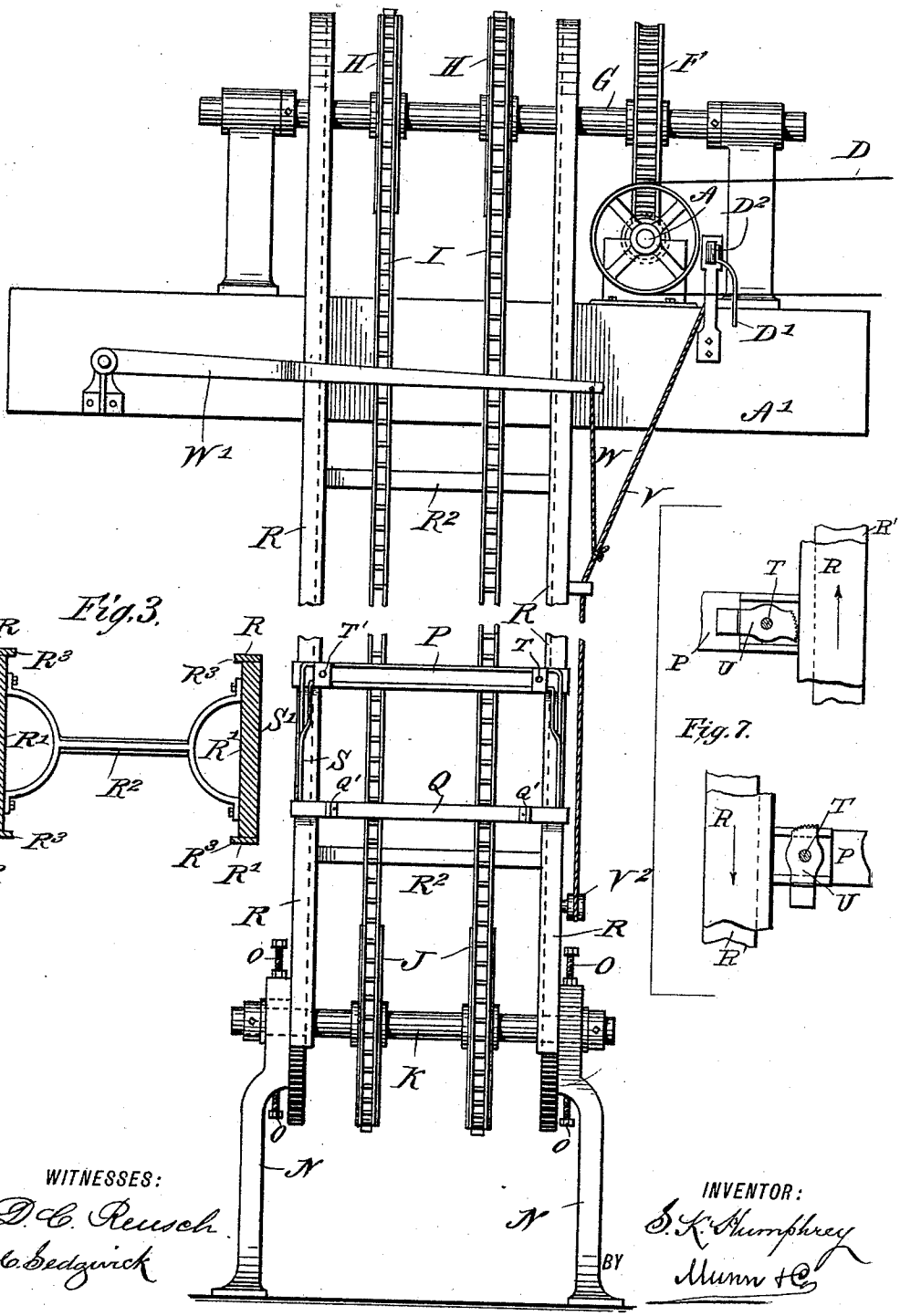

Fig. 3.

Fig. 7.

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Fig. 4.

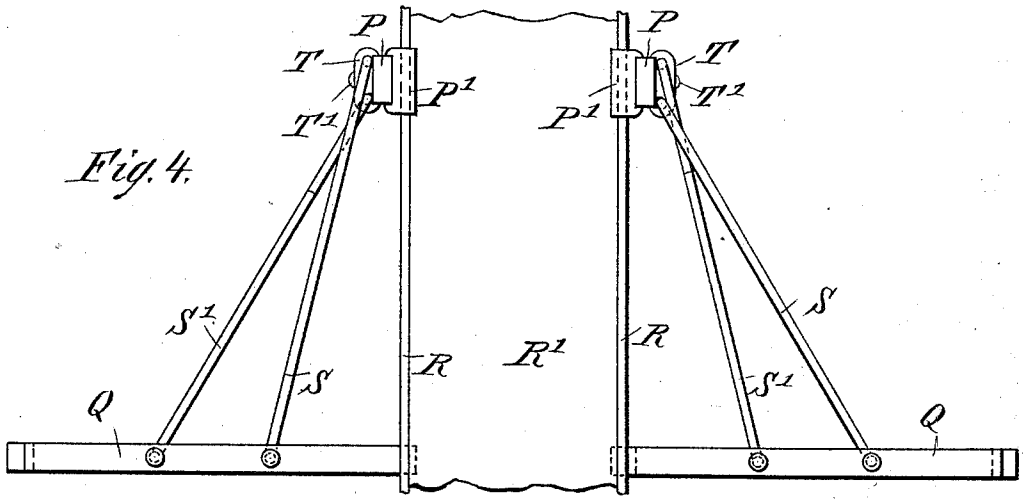


Fig. 5.

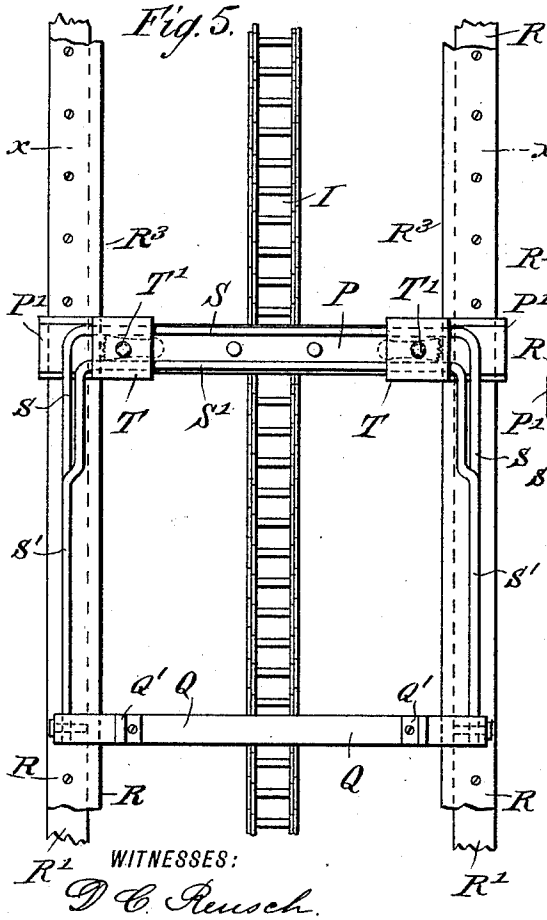
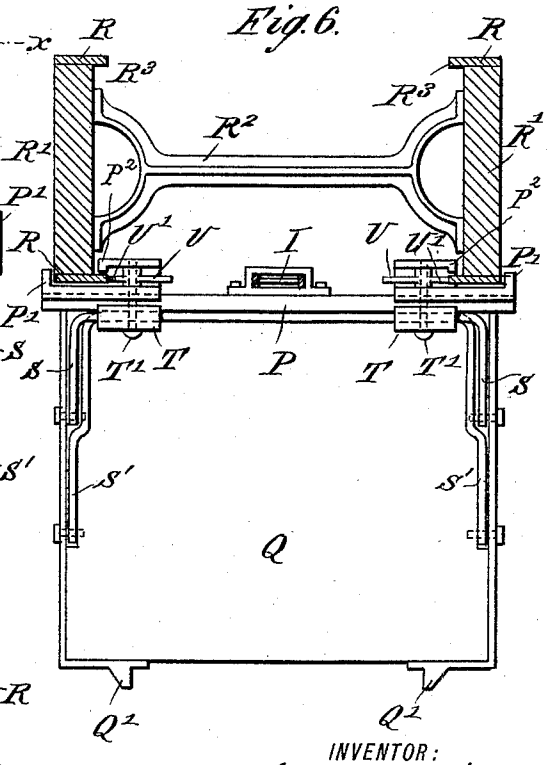


Fig. 6.



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UNITED STATES PATENT OFFICE.

SETH K. HUMPHREY, OF FARIBAULT, MINNESOTA.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 412,956, dated October 15, 1889.

Application filed November 19, 1888. Serial No. 291,185. (No model.)

To all whom it may concern:

Be it known that I, SETH K. HUMPHREY, of Faribault, in the county of Rice and State of Minnesota, have invented a new and Improved Passenger-Elevator, of which the following is a full, clear, and exact description.

The improvement relates to passenger-elevators such as shown and described in Letters Patent No. 375,293, granted to me December 20, 1887.

The object of the present invention is to provide a new and improved passenger-elevator more especially designed for mills and factories, to be used by employés.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement. Fig. 2 is a front elevation of the same. Fig. 3 is a sectional plan view of the guide-frame. Fig. 4 is an enlarged side elevation of the guide-frame and platform. Fig. 5 is a front elevation of the same. Fig. 6 is a sectional plan view of the same on the line $x\,x$ of Fig. 5, and Fig. 7 is a detail view of the safety-dog hereinafter referred to.

The improved passenger-elevator is provided with a main driving-shaft A, mounted to rotate in suitable bearings fastened on a longitudinal beam A′, located in the upper story of the building in which the elevator is located. On the shaft A are held a fast pulley B and a loose pulley C. Over these pulleys is adapted to pass a belt D, connected with suitable machinery for driving it. On the shaft A is also secured a worm E, which meshes into a worm-wheel F, secured on a longitudinal shaft G, mounted to rotate in suitable bearings secured on the beam A′. On the shaft G are fastened one or more sprocket-wheels or pulleys H, over which pass corresponding chains or belts I, extending downward through the several floors of the building and passing over sprocket-wheels or pulleys J, secured on a shaft K, mounted to turn in vertically-adjustable bearings L, held in standards N, secured to the lower floor of the building. The bearings L are vertically adjustable in the standards N by means of screws O, as is plainly shown in Figs. 1 and 2. The bearings are made adjustable, so as to take up any wear or slack of the endless chains or belts I.

On the chains I are secured at suitable intervals longitudinally-extending bars P, each supporting a self-reversing platform Q, provided on two opposite sides with lugs Q′, fitting onto the inner edge of U-shaped guide-bars R, secured on correspondingly-shaped vertical beams R′, fastened on the wood-work of the building in which the elevator is located. The beam A′, previously mentioned, passes through the beams R′. The two beams R′ are connected with each other by horizontal brackets R^2, of which any desired number is employed, according to the distance between the shafts G and K. The inner ends R^3 of the U-shaped guide R project somewhat over the inner edges of the beams R′, as is plainly shown in Figs. 3 and 6. The upper end of each guide-plate R is semicircular, having its center in the shaft G. The lower ends of the said guide-bars R terminate a short distance below the shaft K.

Each of the bars P is provided with guide-lips P′ and P^2, projecting over the outer and inner edges, respectively, of each guide-bar R, so as to prevent said bars P from having sidewise movement. Each platform Q is supported from its corresponding bar P by means of U-shaped rods S and S′, pivotally connected at their ends with the sides of the platform Q and mounted to swing at their middle parts in castings T, each secured by a bolt T′ to the bar P. The bars S and S′ have their middle parts located one above the other, as is plainly shown in Figs. 4 and 5. The lower ends of the bars are pivotally connected with the sides of the platform Q in such a manner that when the platform is swung on the opposite side at an angle of one hundred and eighty degrees the outermost bar becomes the innermost bar, and at the same time the platform again stands in a horizontal position, as shown in Fig. 4. Thus it will be seen that the platforms Q, when reversed, assume the same horizontal

position that they had previously. At the same time the outermost lugs Q′ engage the projecting sides R^3 of the guide-bars R, so as to prevent sidewise motion of the platform Q. At the rear of each bar P are pivoted weighted dogs U, fulcrumed on horizontal bolts T, projected rearwardly from the bar P. These dogs (which are clearly illustrated in Fig. 7) are each provided with an eccentric or cam face 1, the end faces of which are provided with fine serrations 2, which engage the edge of the projecting side pieces R^3 of the corresponding bar R when on the ascending movement. When on the descending movement, the weighted ends of the dogs will cause the same to assume a vertical position, as shown in Fig. 7. By this construction it will be seen that, should the chain break, the dogs on the ascending side will, through their peculiar cam-face, bind against the sides R^3 and hold the elevator in a suspended position, and thereby prevent the possibility of the accidental fall of the elevator.

The driving-belt D, previously mentioned, is shifted from the fast pulley B to the loose pulley C, and vice versa, by means of a fork D′ engaging the said belt D. The fork D′ is fastened on a horizontal bar D^2, mounted to slide transversely in suitable bearings secured to the beam A′. In the middle of the bar D^2 are fastened the ends of a rope V, passing over pulleys V′, secured on the beam A′, and also passing over pulleys V^2, held on the outside of one of the vertical beams R′ near its lower end, as is plainly shown in Fig. 1. From the rope V extends a short connecting-rope W, fastened to the free end of the lever W′, fulcrumed on the beam A′, and extending in front of the elevator in such a manner as to give sufficient room for the passage of the platforms Q.

The operation is as follows: When the belt D is over the fast pulley B, a continuous rotary motion is imparted to the driving-shaft A. The latter, by its worm E, imparts a rotary motion through the worm-wheel F to the shaft G, which by its sprocket-wheels or pulleys H imparts a continuous traveling motion to the chains or belts I in the direction of the arrows a'. The continuous motion of the endless chains or belts I carries along the several bars P, supporting the platforms Q, so that the latter ascend on one side of the elevator and descend on the other in the direction of the arrows a', as is plainly shown in Fig. 1. When the ascending platforms pass over the sprocket-wheels or pulleys H, said platforms will swing downward on their bars S and S′, so as to assume a horizontal position similar to that which they had previously. Employés stepping on an ascending platform are carried upward to whatever floor they desire, and at the same time other employés may travel downward to a lower floor by stepping on one of the descending platforms. If an employé on an ascending platform desires to stop the elevator, he pulls upward on that part of the rope V located nearest the said ascending platform. This upward pull causes a sliding of the bar D^2 in the direction of the arrow b', so that the belt D is shifted from the fast pulley B to the loose pulley C, and the rotary motion of the shafts E and G is interrupted.

When an employé standing on a descending platform desires to stop the elevator, he pulls downward on that part of the rope V closest to the descending platform to accomplish the same result as above described. When the elevator is stopped and an employé desires to start again, the rope V is pulled down or up, according to whether the employé is standing on an ascending or descending platform. If an employé standing on an ascending platform forgets to get off, his head will strike against the lever W′, so that the latter will swing upward and exert an upward pull on the rope V in a manner similar to the pull which would have been exerted if the operator had pulled on the corresponding part of the rope. The belt D is then shifted from the fast pulley B to the loose pulley C, and the motion of the elevator is interrupted.

In case of accident the sharp end U′ of the weighted pawl U will impinge on the edge of the projecting side R^3 of the guide-bar R, so that a downward motion of the usually ascending platforms is prevented.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a passenger-elevator, the combination, with a traveling endless chain, of bars held on the said chain at suitable intervals, rods pivoted on each of the said bars, one above the other, and a platform pivoted on the lower ends of the said rods, substantially as shown and described.

2. In a passenger-elevator, the combination, with a traveling endless chain, of bars held on the said chain at suitable intervals, rods pivoted on each of the said bars, one above the other, platforms pivoted on the lowermost ends of the said rods, and fixed guide-plates, against which one end of each of the said platforms rests, substantially as shown and described.

3. In a passenger-elevator, the combination, with the traveling endless chain, the vertical guide-bars, and the transverse bars hung on the endless chains at suitable intervals, said transverse bars provided with guide-lips projecting over the outer edges of the vertical guide-bars, of rods pivoted one above the other on each of said transverse bars, and a platform pivoted on the lower ends of said rods, substantially as and for the purpose described.

4. In a passenger-elevator, the combination, with a traveling chain, of bars held on the said chain at suitable intervals, a self-reversing platform hung on each of said bars, fixed guide-plates, against which rest one end of each of the said platforms, and gravity-catches

pivoted on the inner end of each of said transverse bars, said catches having cam-faces adapted to normally engage the fixed guide-plates on the ascending side of the elevator, and adapted to swing from contact with the guide-plates when on the descending side, all arranged substantially as and for the purpose described.

5. In a passenger-elevator, the combination, with the upper and lower drive-shafts carrying sprocket-wheels, an endless chain passing over said sprocket-wheels, said chain carrying self-reversing platforms, a worm secured on the upper drive-shaft, a worm-wheel meshing into said worm, a shaft carrying said worm-wheel provided with a loose and fast pulley, and the stopping and starting rope, of a belt-shifter operating over the said fast and loose pulleys, a rope connecting the said shifter and starting and stopping rope, a lever pivoted to the frame of the elevator, projected over the path of the platforms, and a rope connecting the free end of said lever with the starting and stopping rope, said lever arranged for contact with the body of the ascending passenger, substantially as and for the purpose described.

SETH K. HUMPHREY.

Witnesses:
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IDA M. LANE.