2 Sheets—Sheet 1.

S. E. CHUBBUCK.

ELEVATOR.

No. 185,895. Patented Jan. 2, 1877.

Fig. 1.

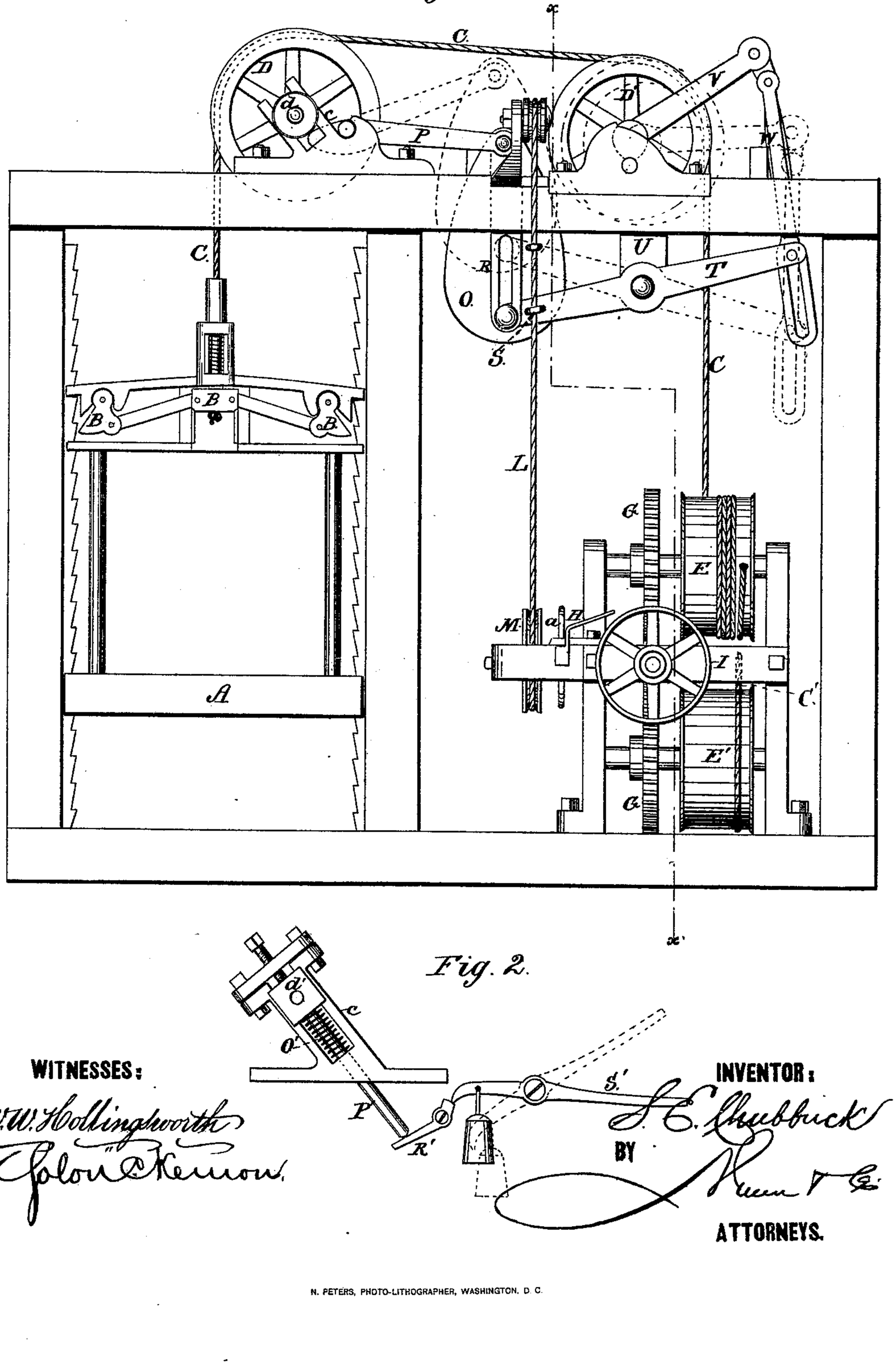

Fig. 2.

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2 Sheets—Sheet 2.

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Fig. 3.

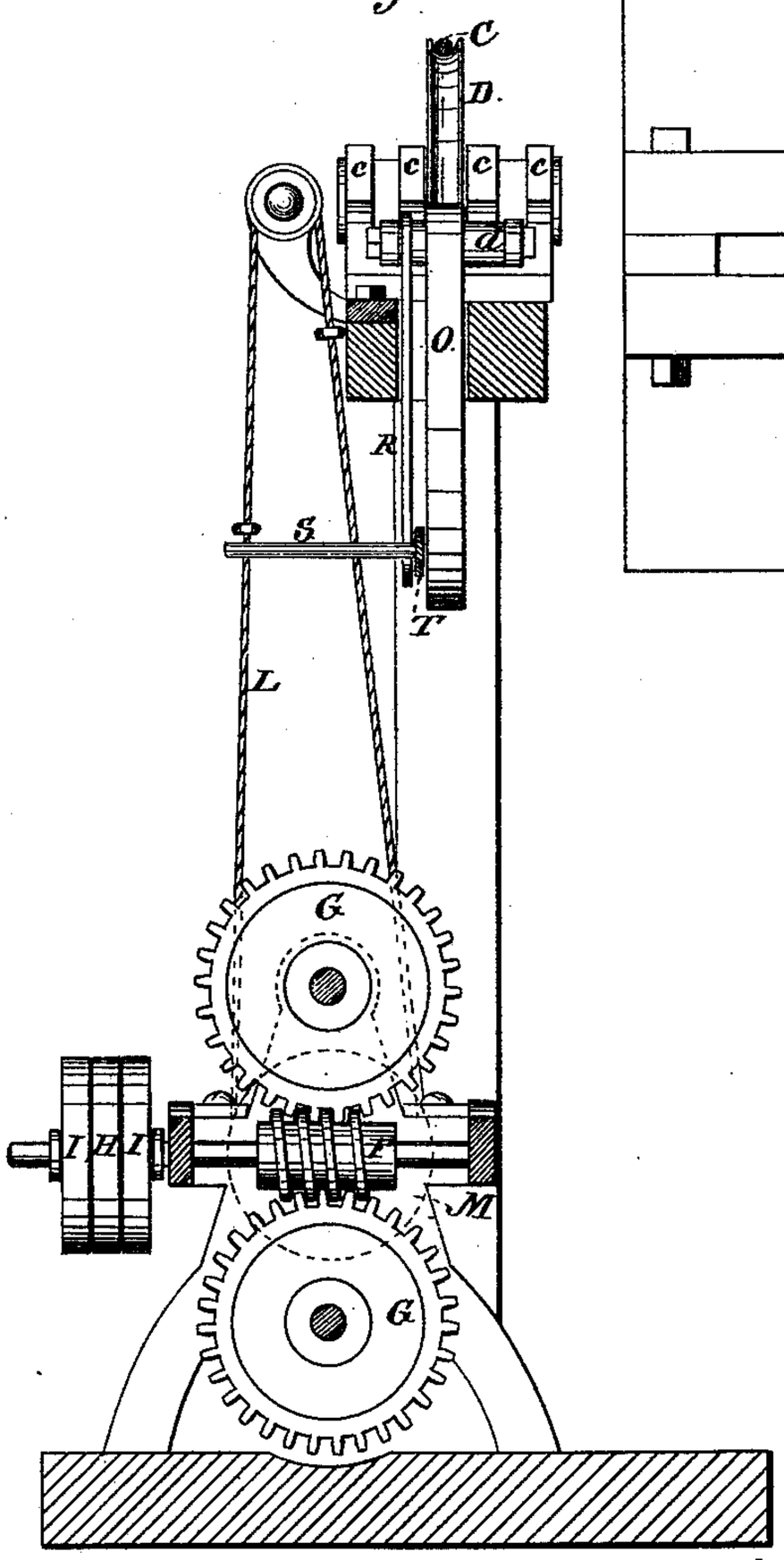


Fig. 4.

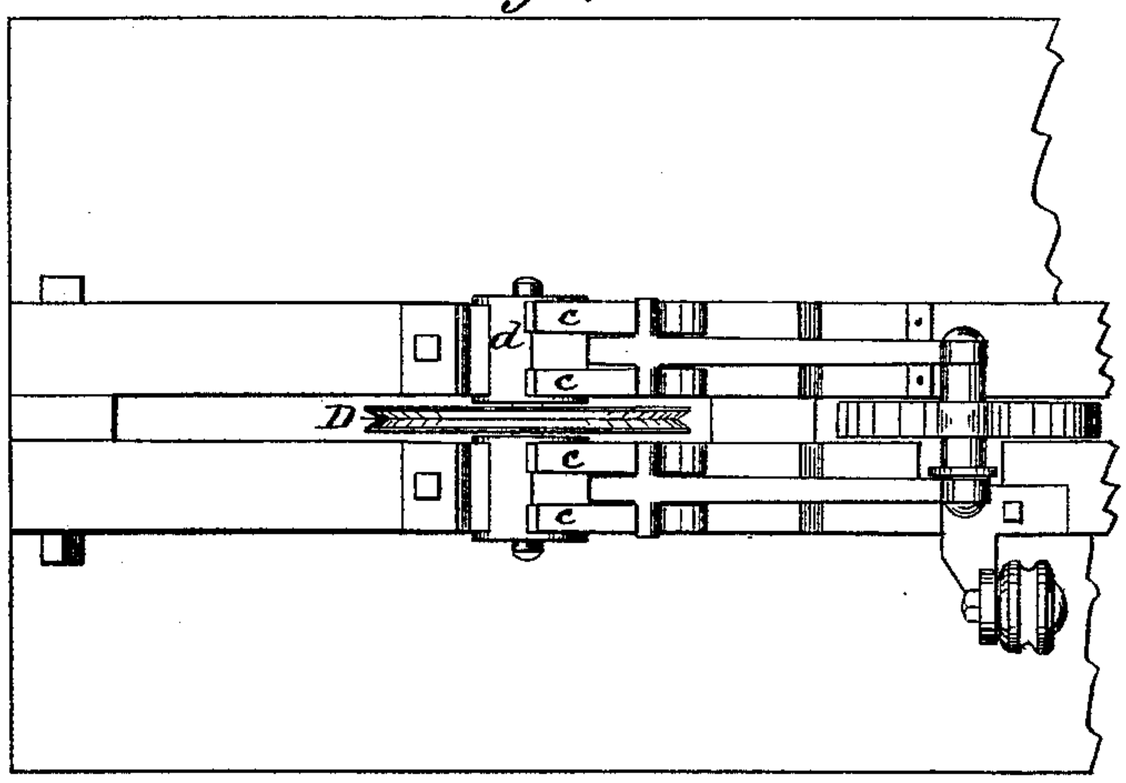


Fig. 5

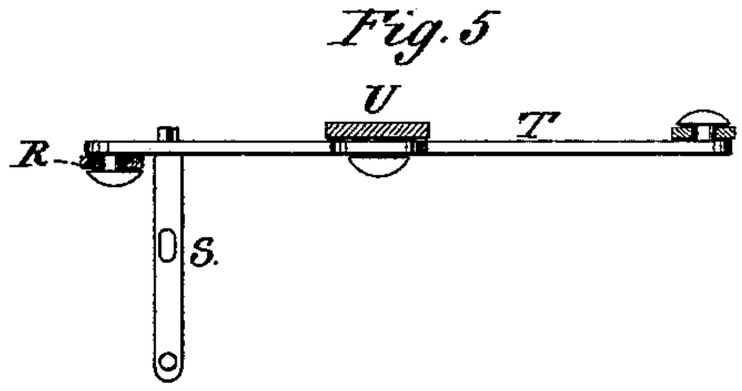


Fig. 6.

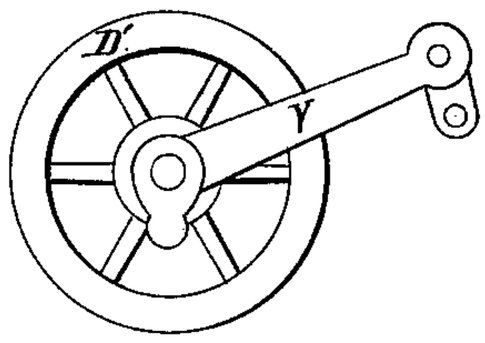
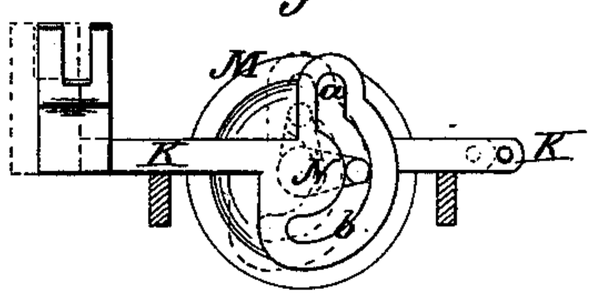


Fig. 7.



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UNITED STATES PATENT OFFICE.

STILLMAN E. CHUBBUCK, OF BOSTON, MASS., ASSIGNOR TO HIMSELF, ISAAC Y. AND STILLMAN E. CHUBBUCK, JR., OF SAME PLACE.

IMPROVEMENT IN ELEVATORS.

Specification forming part of Letters Patent No. **185,895**, dated January 2, 1877; application filed November 9, 1876.

To all whom it may concern:

Be it known that I, STILLMAN E. CHUBBUCK, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Elevators; and I do hereby declare that the following is a full, clear, and exact description of the same.

To prevent injury to persons and property it is requisite elevators designed for raising or lowering persons, goods, or material to or from different floors or levels should be so constructed that the belt will be shifted, or the motor mechanism otherwise thrown out of gear, in the event of the parting of the hoisting-rope, as well as from the movable platform, or objects placed thereon, coming in contact with the floors or timbers of a hatchway while ascending through it.

The object of my invention is to furnish an improved machine of this class; and to this end the invention relates, first, to the automatic mechanism employed for throwing the hoisting apparatus proper out of gear, or arresting its operation when the ascending platform is overweighted, or when any object or material placed thereon comes in contact with the floors or timbers of a hatchway, so that the hoisting-rope will not continue to be wound up, and so that no injury can result to persons or the elevator, or the building in which it is located; second, to the automatic mechanism employed for throwing the hoisting apparatus proper out of gear, or arresting its operation whenever the said hoisting-rope parts, or the platform is arrested in its descent, thereby preventing the rope continuing to unwind; third, to the belt-shifting mechanism proper, and the arrangement of the driving worm-shaft, with two drums, for winding and unwinding the hoisting-rope.

In the accompanying drawing, forming part of this specification, Figure 1 is a side elevation of my improved elevator. Fig. 2 is a detail view, showing a modification of the tripping mechanism for shifting the driving-belt and throwing the motor out of gear with the elevator proper. Fig. 3 is a sectional elevation on line *x x*, Fig. 1. Fig. 4 is a plan view of a fragment of the elevator proper. Figs. 5, 6, 7 are detail views, which are hereinafter explained.

The platform A is shown provided with a safety locking apparatus, B, for arresting its descent and holding it suspended in case of parting of the hoisting-rope C. The rope passes over grooved wheels or pulleys D D′, and is attached to a drum, E, in the usual way. A similar rope, C′, is shown wound around a second drum, E′, placed beneath the other, and is designed to be also attached to the platform and passed over wheels or pulleys, (not shown,) which will, in practice, be arranged alongside the wheels D D′. The two drums are rotated by a worm, F, Fig. 3, which meshes with spur-gears G, mounted on the respective drum-shafts.

By the use of two ropes, and by the arrangement of the worm, spur-gears, and drums, as shown, the danger of accident is materially lessened, since the pressure is distributed so that each side of the worm and each of the gears G takes but half the load or strain.

This arrangement differs materially from that heretofore employed, wherein two gears were placed with their axes in the same horizontal plane, and meshed with separate worms formed at different points on the same shaft. By my arrangement one worm is made to mesh with both gears, and a long worm-shaft is dispensed with.

The worm and driving shaft are one and the same, and fast and loose band-pulleys H I I are mounted thereon in the usual manner. The belt is shifted from the fast or driving pulley H to either of the loose pulleys I by means of a sliding horizontal forked bar, K, having a slotted yoke, *a*, and the endless hand-rope L, which passes around the pulley M, mounted on a cranked shaft, N, whose wrist-pin works in the yoke *a*, as shown in detail in Fig. 7. A portion of the outer side of the slot of said yoke is curved, as represented at *b*, so that the wrist-pin of shaft N will, so to speak, lock the bar K, and prevent the shifting of the belt except when the crank is turned up and the wrist-pin thereby carried over into contact with the other side of the slot *a*. These two positions are represented in Fig. 7, the

full lines indicating the position of the crank for locking the belt-shifter K, and the dotted lines the position of the crank for operating it.

Having now described, so far as I deem necessary, the hoisting apparatus proper, I will next describe the particular means for preventing accidents by automatically changing the position of the wheels or pulleys D D′, and thereby shifting the belt, arresting the motor, and stopping the platform, ascending or descending. First, the means for shifting the belt and stopping the platform when ascending, in case any object or material placed thereon should project too far, and come in contact with the flooring or timbers of a hatchway. For this purpose the wheel or pulley D, Figs. 1 and 4, over which the hoisting-rope C passes directly from the platform-head, is supported adjustably in inclined bearings *c*, and set to sustain a certain number of pounds, and to shift, when that number is exceeded, by means of a weight, O, which is suspended from the longer arms of levers P. The journals of the wheel D are fitted in boxes *d*, which slide in the inclined bearings *c*. The short arms of the levers P bear against the under side of the boxes, and the weight O thus sustains the wheel D in its elevated or normal position, as indicated in full lines, Fig. 1. In case the platform A and hoisting-rope C be calculated to sustain a weight of two thousand pounds, the weight O is made to balance or weigh the pulley D at that amount, and thereby prevent its shifting or changing position when the platform sustains a less number of pounds pressure. If, however, a greater pressure should be applied by means of any object or material which may by accident project from the platform, and thereby come in contact with the floor or timbers of a hatchway, and the resistance thus offered should reach two thousand pounds, it is obvious the weight O will be overbalanced and raised as the wheel D simultaneously falls or shifts to a lower position by its journal-boxes *d* sliding down in the bearings *c*. This movement of the wheel D effects the shifting of the belt from the fast pulley H to one of the idlers I, and instantly stops the rotation of the winding-drums, and thereby arrests the platform and prevents any injury resulting to the elevator or the building in which it is located.

The particular means for connecting the pulley with the belt-shifting rope L for effecting this result are the slotted link R, pendent from one of the levers P, and an arm, S, through which the rope passes, the same projecting horizontally from one end of a bar or lever, T, which is pivoted to a fixed bracket, U. When the wheel D falls in its bearings the link R and arm S are raised, and the rope thereby shifted sufficiently to turn the pulley on the crank-shaft, and thus move the bar R′ to shift the belt.

I show in Fig. 2 an alternative device or modification for effecting the same result. The principle consists in the substitution of a spring for a weight. The journal-boxes *d′* of the wheel D rest on springs O′, which are compressed by set-screws to the tension required to enable them to yield at a given pressure—say two thousand pounds. Rods P′ are attached to the journal-boxes *d′*, and their lower ends bear on a pivoted trip-lever, R′, which supports the weighted end of a lever, S′. It will be seen that the overweighting of the platform will cause the rods P′ to trip the lever R′, and thereby allow the lever S′ to raise the arm S and assume the position shown in dotted lines, Fig. 2.

I will now describe the means for shifting the belt and stopping the winding apparatus, and thus preventing the hoisting-rope C from unwinding and becoming slack in case it should part or become detached from the platform-head, or in case the platform itself should encounter any obstacle and be thereby stopped in its descent. The said means are the shifting wheel or pulley D′, Fig. 1, having eccentric journals, the arms or levers V, rigidly attached to the latter, the slotted link W, and the bar or lever T, carrying the arm S, before described. The wheel D′ is held in the normal position (shown in full lines, Fig. 1) by the tension of the hoisting-rope C. It will hence be perceived that if the platform reaches the limit of its descent, or is otherwise arrested, or if the rope C breaks, the latter will be relieved of tension and the wheel D′ allowed to fall backward and downward, carrying with it the levers V and link W to the position shown in dotted lines, Fig. 1, thereby tilting the lever T and shifting the hand-rope in the same manner as before described in reference to the mechanism D O P R. The rotation of the drums will then be arrested instantly the platform is arrested or the rope C breaks, so that the drums will not continue to unwind the rope or ropes, as they would otherwise do if left free or uncontrolled. The slots in links R W permit the movement of lever T with or independently of the pulleys or wheel D or D′, and yet obviate the necessity of employing two separate levers to connect the respective pulleys or wheels with the belt-shifter.

By the construction and arrangement of parts above described I am enabled to automatically regulate the action of the hoisting apparatus proper, and arrest the winding and unwinding of the hoisting-rope in case of accident to the platform, either in ascending or descending, and thereby prevent the injury to persons or property otherwise liable to ensue.

What I claim is—

1. In an elevator, the combination, with a rising and falling platform and hoisting-rope and suitable hoisting apparatus, of a wheel or pulley having adjustable bearings, and supported upon a weighted lever, or its equivalent, whereby it is adapted to fall or shift its position to throw the hoisting apparatus out

of gear and arrest the platform, substantially as shown and described.

2. In an elevator, the combination of the levers P, weight O, link R, arm S, hand-rope L, and pulley D, adapted to shift vertically, with the hoisting-rope, platform, and belt-shifting mechanism, substantially as shown and described.

3. In an elevator, the combination, with a rising and falling platform, a hoisting apparatus, and rope connecting the same, of a wheel or pulley, D′, mounted on a shaft having eccentric journals, and mechanism for connecting the said wheel with the hoisting apparatus, substantially as shown and described, whereby the latter may be thrown out of gear simultaneously with the parting of the hoisting-rope, or the arrest of the platform in its descent, as set forth.

4. In an elevator, the combination of the bar or lever T, carrying the arm S, the slotted links R W, the shifting pulleys D D′, arms or levers P V, the hoisting-rope, the platform, and belt-shifting mechanism, substantially as shown and described.

5. The combination of the shifting-bar K, provided with the slotted yoke *a*, having one side curved, as shown, the crank-shaft and pulley, the hand-rope, and the fast and loose pulleys of the hoisting apparatus, substantially as shown and described, to operate as specified.

6. The gears G G, arranged in the same vertical plane and in different horizontal planes, the worm-shaft placed between them, and the drums E E′, all combined as shown and described.

STILLMAN E. CHUBBUCK.

Witnesses:

EVERETT K. DEXTER,

FRANK L. BYRNE.