(No Model.) 2 Sheets—Sheet 1.

A. L. PLUSH & G. H. NOBLIT.

SAFETY DEVICE FOR ELEVATORS.

No. 605,911. Patented June 21, 1898.

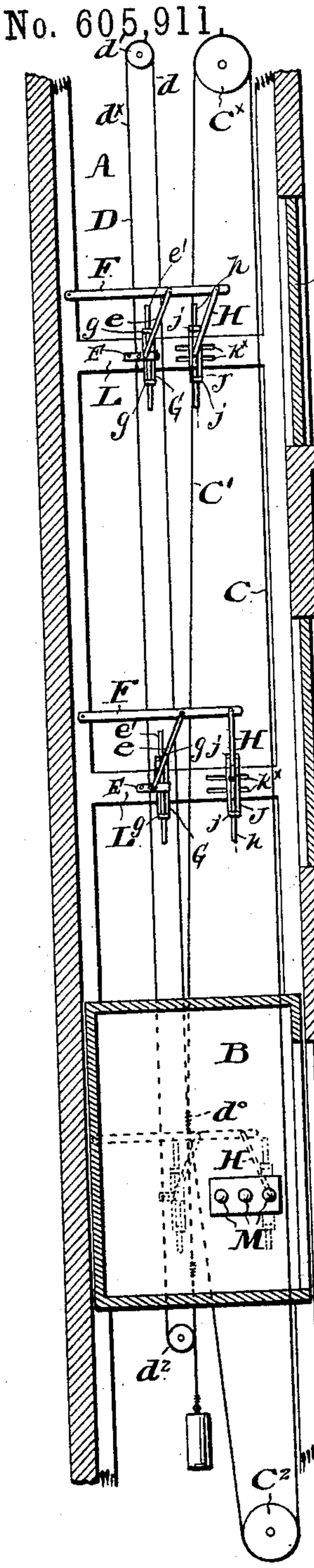

FIG. 1.

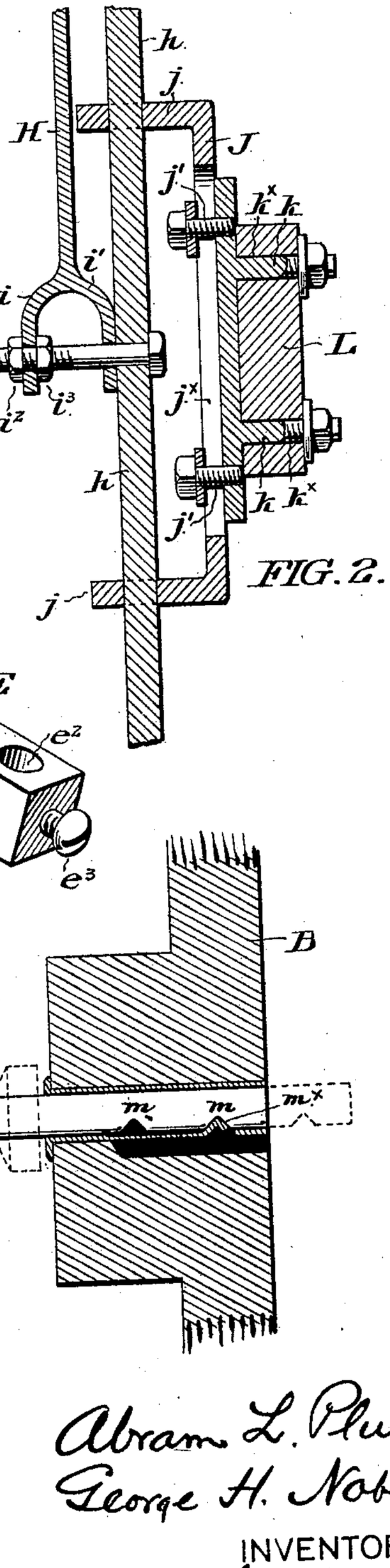

FIG. 3. FIG. 2.

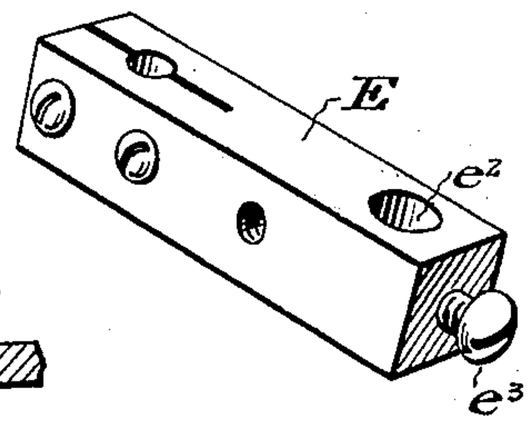

FIG. 4.

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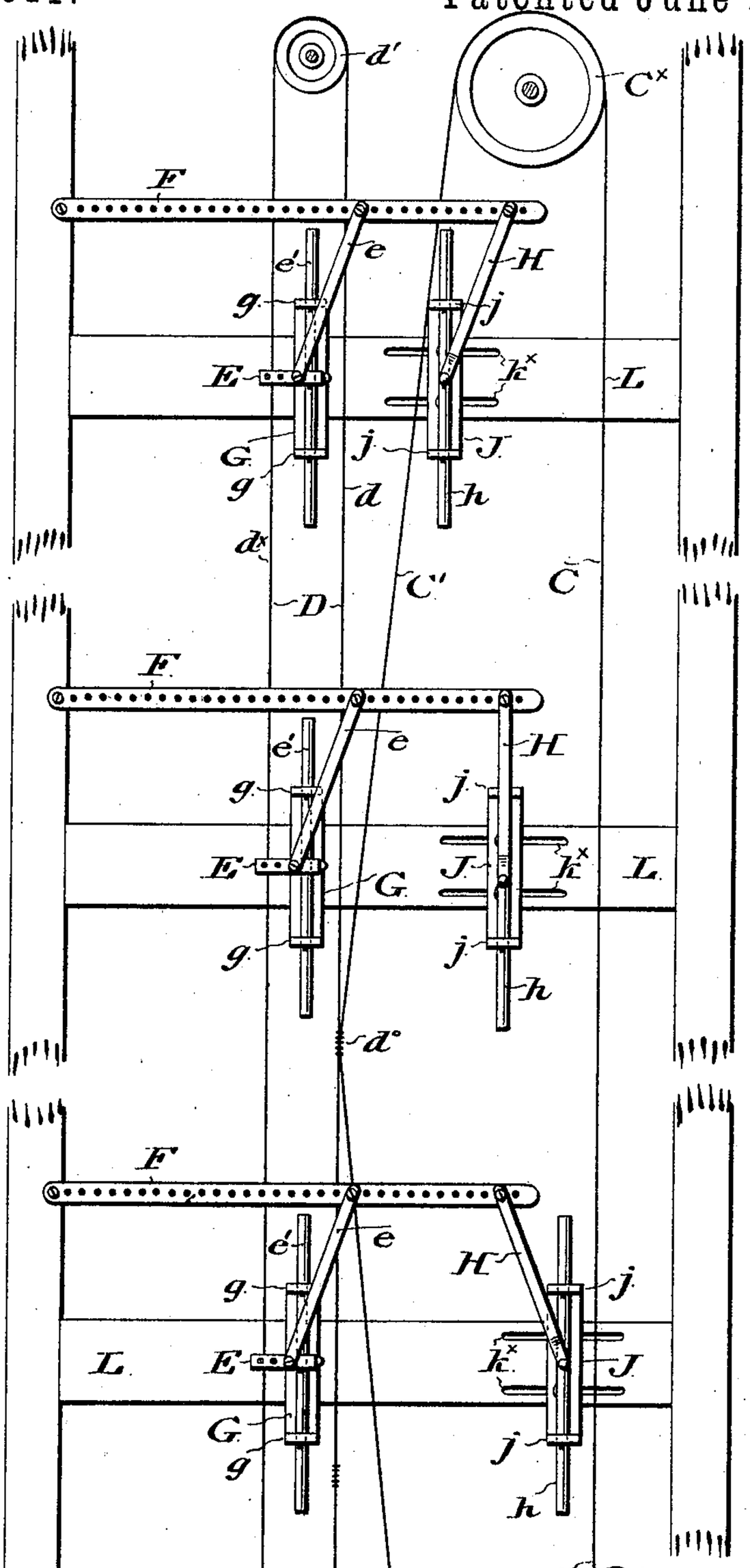
FIG. 5.



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UNITED STATES PATENT OFFICE.

ABRAM L. PLUSH AND GEORGE H. NOBLIT, OF BRYN MAWR, PENNSYLVANIA, ASSIGNORS OF ONE-THIRD TO WALTER BEVAN, OF ROSEMONT, PENNSYLVANIA.

SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 605,911, dated June 21, 1898.

Application filed May 18, 1897. Serial No. 637,083. (No model.)

To all whom it may concern:

Be it known that we, ABRAM L. PLUSH and GEORGE H. NOBLIT, citizens of the United States, residing at Bryn Mawr, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Safety Devices for Elevators, of which the following is a specification.

Our invention relates to means for controlling the travel of elevators, and its object is to provide a system of safe and positive devices by which the elevator car may, by suitable manipulation of one of a set of keys, be caused to stop at any selected landing of a series.

In the accompanying drawings, we show, and herein we describe, a good form of a convenient embodiment of our invention, the particular subject matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings,

Figure 1 is a view, of an elevator shaft or well showing an elevator car as in place therein.

Figure 2 is a transverse sectional elevation of the driver link and the carrying devices upon which it is mounted.

Figure 3 is a view in perspective of the rope clamp.

Figure 4 is a view in side elevation of a trip key, shown as mounted in its socket in the car wall.

Figure 5 is a view in side elevation of the parts of our apparatus exterior to the car, showing their arrangement within the elevator shaft.

Similar letters of reference indicate corresponding parts.

In the accompanying drawings,

A, Figure 1, illustrates the elevator shaft, *a* the door openings in said shaft, *a'* the floors or successive landings, past which said elevator shaft extends, and B represents an elevator car of any ordinary construction disposed for travel in said shaft.

In the drawings the cables which support the elevator car are, for simplicity of description and illustration, omitted, as being not connected with the subject matter of our invention, and well understood in the art.

The operating rope which controls the car motor, is shown as extending in two divisions C C' from end to end of the elevator shaft, being at the top of said shaft bent upon the pulley wheel $C^{\times}$ and at the bottom of said shaft upon the pulley wheel C^{2}.

In the ordinary construction and arrangement of elevator mechanism, traction exerted downward upon that division C of said rope which passes through or in the vicinity of the car, so manipulates the operating motor or engine as to occasion the stoppage of the car if it be descending, or if it be at rest then the ascent of the car; while traction exerted upwardly upon said rope causes the stoppage of said car if it is ascending, or its descent if it be at rest.

Our invention comprehends the provision of improved devices of such construction and arrangement that the movement of the car itself, is, when the parts are given the appropriate set, caused to exert traction upon and shift the operating rope to bring the car to a standstill at a predetermined landing.

D is what we term the automatic rope, being a rope extending in the two divisions d $d^{\times}$ from suitable pulleys d' d^{2} situated at the top and bottom respectively of said shaft, and connected as to one division at for instance the point d^{0} with the adjacent division of the operating rope.

Obviously, movement imparted to the automatic rope will necessarily be communicated to the operating rope in equal measure, and, in carrying out our invention, we provide said automatic rope with tripping devices adapted to be encountered by the car, or a projection of the car, to occasion the movement of said automatic rope and therefore the desired manipulation of the operating rope, and we provide such a tripping mechanism in connection with each landing of the series.

E, Figures 3 and 5, is a clamp attached to the division $d^{\times}$ of the automatic rope and pivotally connected to a follower link *e*, which is in turn pivotally connected to a lever F hingedly connected to the frame work of the elevator shaft, and extending transversely of the same, in such position however as to be out of the path of the car.

In order that said clamp E, which is movable as hereafter explained, may be prevented from moving in other than a vertical direction, we provide it with a vertical guide rod e', conveniently passing through an aperture e^2 formed in its body and secured to it by a thumb screw e^3,—the respective extremital portions of which guide rod pass through eyes conveniently formed in the upturned ends g of a guide plate G attached to the frame work of the elevator well.

H is a driver link, the upper end of which is pivotally connected to the outer end of the lever F, and the lower end of which is pivotally connected to a guide rod h, the respective extremities of which rod extend through suitable eyes formed in the outwardly turned extremities j of a guide plate J adjustably secured to the wall of the elevator shaft.

Said plate J, see Figure 2, embodies a vertical slot $j^\times$ through which extend screw studs j' which enter a base plate K, as shown in Figure 2.

By reason of the vertical slot $j^\times$ referred to, the guide plate J is adapted for slight vertical adjustment with reference to said base plate.

The base plate K is adjustably mounted within the elevator shaft, being provided with legs k which project through horizontally extending slots $k^\times$ formed in a transversely extending bracket L in the elevator shaft, as shown in Figure 5, the extremities of said legs being threaded and equipped with clamp nuts, with the result that said base plate, carrying the guide plate referred to, may be moved longitudinally of said slots, and secured in any desired position of adjustment.

The lower end of the driver link is bifurcated as shown in Figure 2, and the two arms $i\,i'$ are, by virtue of openings formed in them, mounted upon a trip stud N secured free for rotation to and projecting outwardly from the guide rod h.

The arm i' of said driver link encompasses an unthreaded portion of said trip stud, but the other arm, i, is seated between a pair of clamp nuts $i^2\,i^3$ on a threaded portion of said trip stud, so that by the tightening up of said nuts, said arm may be fixedly secured to said trip stud.

The driver link and the trip stud N are therefore rigidly secured together, and have pivotal or rocking movement with respect to the pivotal connection of the trip stud with the guide rod.

The lever F is provided with a series of apertures so that the pivots of the driver and follower links may be entered in any selected apertures as may be desired.

M are a series of keys corresponding in number with the number of landings, and mounted in the wall of the elevator car, the inner ends of which are provided with suitable heads, said pins being of length in excess of the thickness of said wall, and arranged in openings or sockets extending entirely through said wall, being adapted for longitudinal movement in said openings.

Each key is provided with recesses m and each of the sockets is provided with a spring detent $m^\times$ adapted to engage in said recesses; said keys have two positions of adjustment, namely; the normal position or that indicated in full lines of Figure 4, and the protruding position or that indicated in dotted lines in said figure. The spring detent and the recesses are so arranged that said detent enters one of said recesses, when the key is in either of these positions.

The keys M are, as shown in Figure 1, mounted in adjacency to each other in the side of the car. One of said keys may be numbered "1" to designate the first floor, the second designated "2" to indicate the second floor, and the third designated "3" to indicate the third floor, &c.

A series of levers F and the associated parts described are mounted in the elevator shaft, one being arranged in adjacency to each of the landings or floors, the several sets of parts differing only in respect to the positions of the trip studs,—the trip stud N at the first floor being in line with the key M numbered "1," the trip stud N at the second floor being in line with the key M numbered "2," and the trip stud N at the third floor being in line with the key M numbered "3," with the result that when any one of said keys is pushed or forced outward to its protruding position, (as indicated by dotted lines in Figure 4,) it will encounter the trip stud at the floor or landing corresponding to the number of the key thus pushed, and, through the mechanism hereinbefore described occasion the stoppage of the car at that landing.

The operation of the devices is as follows: Assuming the elevator car to be at the bottom of the shaft, and the key number 3 to be the one pushed or forced to a protruding position,—the said protruding key will in the ascent of the car, pass the trip stud at the second floor without touching it, but will just before the elevator car reaches the third floor or landing encounter the trip stud N at said third floor or landing, and the continued upward movement of the car will, through said key, occasion the elevation of the said trip stud, and consequently, through the elevation of the driver link, the tilting of the lever F, and the elevation of the driven link.

The driven link will, in its ascent, elevate the rope clamp, and consequently draw upward the branch $d^\times$ of the automatic rope, and this movement of the automatic rope will through its connection with the operating rope, occasion the shifting of the operating rope in the same manner as it would be shifted by the operator to stop the car, that is to say, said operating rope will be so drawn upon by the automatic rope that the division C will be drawn upward and therefore the elevator car will come to rest at the third floor or landing.

The proportioning of the parts is of course such that the proper amount of movement is imparted to the operating rope to bring the elevator car to rest just at the point at which the floor is level with the landing.

After a key has been thus forced outward to encounter one of the trip studs, and has operated in the manner described, it is of course to be manually drawn back into the position shown in full lines in Figure 4.

The operation of the device to stop the elevator at a certain landing during the descent of the car is precisely the same,—the key corresponding to the floor at which it is desired the car shall stop is forced outward, and, encountering the trip stud just before reaching the floor, the car carries the trip stud downward, and, through the driving link, the lever F, the driven link, and the rope clamp, and automatic rope occasions the shifting of the operating rope at the required time and to the required extent.

As will be understood our improved devices are simple and inexpensive in construction, and, with the exception of the keys, concealed from the view of the passengers in the car, and, while utilizing the motion of the car itself to shift the operating rope, do not interfere with the shifting and use of the operating rope by the elevator attendant in the ordinary manner.

Having thus described our invention, we claim—

1. In combination, an elevator car, an operating rope, an automatic rope connected with said operating rope, a lever mounted in the elevator shaft and connected to said automatic rope, a trip stud, connections between said trip stud and said lever, and a key mounted in the elevator car and adapted to be protruded to encounter said trip stud,—substantially as set forth.

2. In combination, an elevator car in the wall of which are situated a series of keys adapted to be protruded, an operating rope, an automatic rope connected therewith, a series of levers connected to said automatic rope, a series of trip studs, connections between each trip stud and one of the levers, each trip stud being arranged in vertical alinement with one of the keys of the car,—substantially as set forth.

3. The combination, in an elevator shaft, of the operating rope, the automatic rope secured thereto, a lever, a clamp mounted upon the automatic rope, a link connecting said clamp and lever, a guide rod for said clamp, a trip stud, a link connecting said trip stud and said lever, a guide rod for said trip stud, and guide plates for said guide rods,—substantially as set forth.

4. In combination, the operating rope, the automatic rope, the levers F, the driver links, the driven links, the trip studs, a guide rod for each driver link, and to which the driver link is connected, guide plates in which said guide rods are mounted for vertical movement, base plates upon which said guide plates are mounted free for vertical adjustment, and frames upon which said base plates are secured free for lateral adjustment,—substantially as set forth.

In testimony that we claim the foregoing as our invention we have hereunto signed our names this 13th day of May, A. D. 1897.

ABRAM L. PLUSH.
GEORGE H. NOBLIT.

In presence of—
GEO. W. REED,
F. NORMAN DIXON.