

No. 634,229.

Patented Oct. 3, 1899.

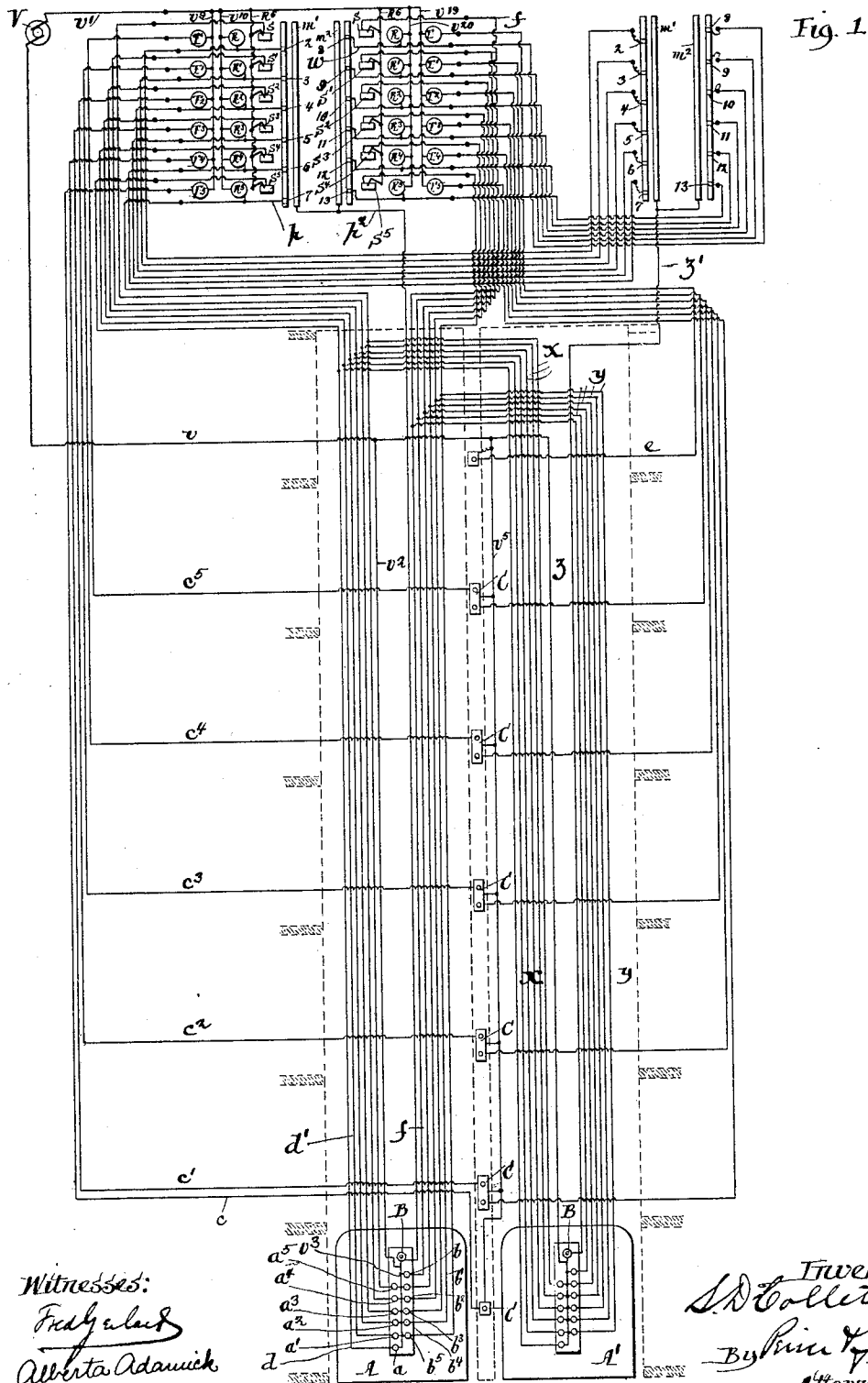
S. D. COLLETT.

ELECTRIC SIGNALING APPARATUS FOR ELEVATORS.

(Application filed Sept. 3, 1898.)

(No Model.)

4 Sheets—Sheet 1.



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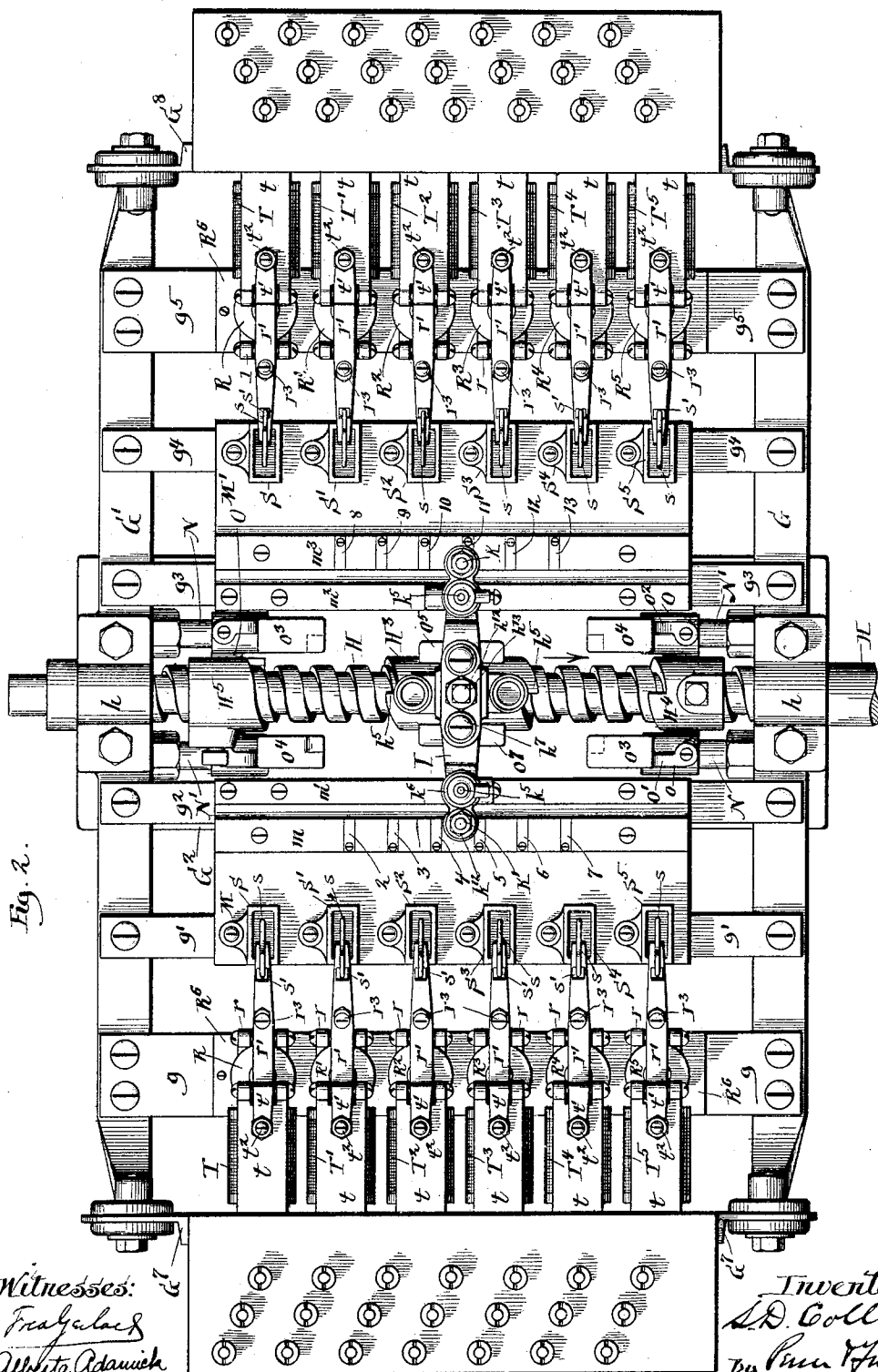


Fig. 2.

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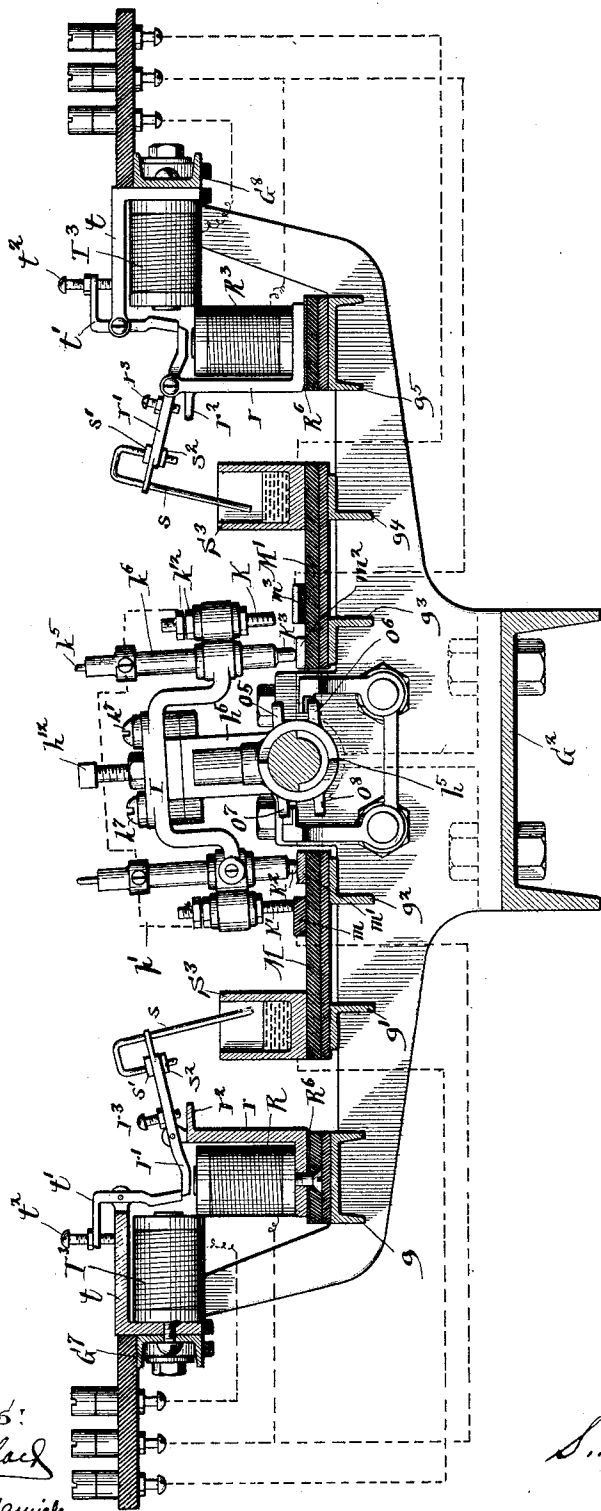
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4 Sheets—Sheet 3.

Fig. 3.



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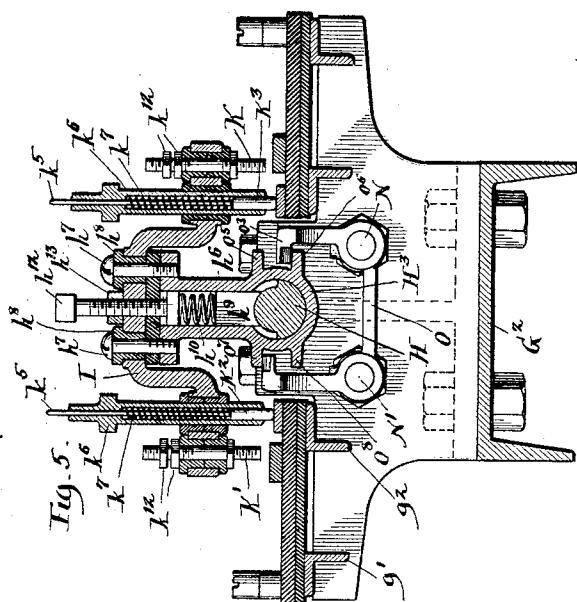


Fig. 5.

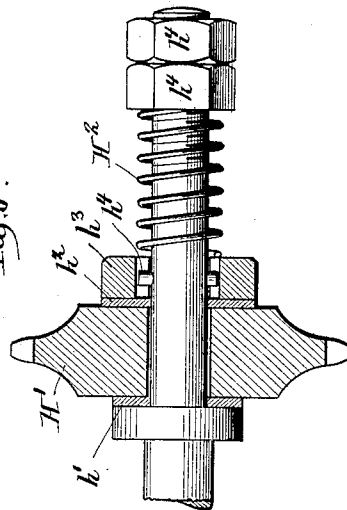


Fig. 6.

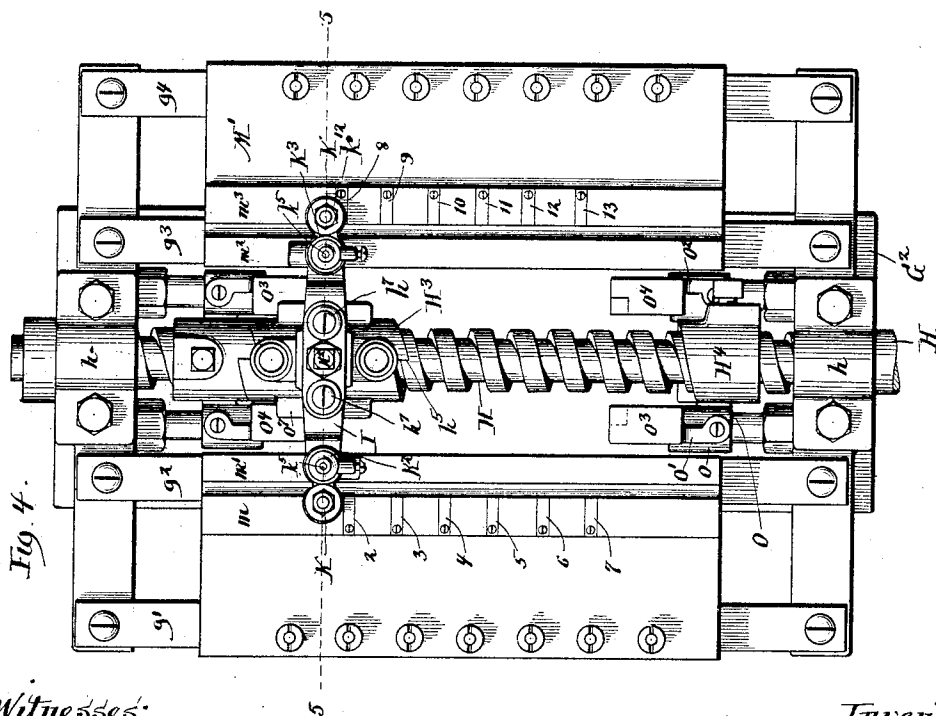


Fig. 4.

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UNITED STATES PATENT OFFICE.

SAMUEL D. COLLETT, OF NEW YORK, N. Y., ASSIGNOR TO THE ELEVATOR
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ELECTRIC SIGNALING APPARATUS FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 634,229, dated October 3, 1899.

Application filed September 3, 1898. Serial No. 690,180. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL D. COLLETT, a resident of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Electric Signaling Apparatus for Elevators, of which I do declare the following to be a full, clear, and exact description.

This invention has for its object to provide improved means whereby intending passengers may indicate to the operators of passenger-elevators the particular floor at which a stoppage of the car is desired and from which the signal is transmitted.

In carrying out the invention the elevator-car, or each of the cars, if there be several, is provided with two sets of signals, preferably incandescent electric lamps, corresponding in number and arrangement with the several floors of the building, one set of lamps serving to indicate where it is desired that the car should stop during its downward movement and the other set indicating to the operator at what points intending passengers desire an upward-moving car to stop.

In carrying out the invention I employ push-button mechanism at each floor of the building, the push-button mechanism on each floor serving to control an individual circuit for the corresponding lamp or lamps within the elevator-car, so that when a push-button at a floor is operated it will serve to close the normally-open circuit in which the corresponding lamp within the car is placed, and thus cause such lamp to burn and indicate to the operator that an intending passenger is awaiting service. In order to control the various circuits in which the signal-lamps within the cars are placed, I employ the commutator mechanism hereinafter described.

The features that are distinctive of my present invention will hereinafter be described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of this specification.

Figure 1 is a diagrammatic view showing my invention as applied to two adjoining passenger-elevator cars. Fig. 2 is a detail plan view of the "master-commutator." Fig. 3 is a view in vertical longitudinal section through the commutator shown in Fig. 2.

Fig. 4 is a plan view of one of the supplemental commutators. Fig. 5 is a view in vertical section on line 5 5 of Fig. 4. Fig. 6 is a detail view showing the outer end of the commutator-shaft with parts mounted thereon, the sprocket-wheel being shown in section.

The diagrammatic view, Fig. 1, of the drawings shows two elevator-cars A and A' arranged within shafts that extend through seven floors of a building. Within each of the elevator-cars A and A' is placed two series of electric incandescent signal-lamps, the series consisting of the lamps *a*, *a'*, *a*², *a'*², *a*³, *a'*³, and *a*⁵, serving for "up" signals, and the lamps *b*, *b'*, *b*², *b'*², *b*³, *b'*³, and *b*⁵, serving for "down" signals. Upon each floor of the building is placed push-button mechanism C, the push-button mechanism upon the first or bottom floor being obviously adapted to bring into operation the "up" signal *a* within the car, while the push-button at the top floor of the building is adapted to bring into operation the "down" signal *b* of the corresponding series. Each of the floors between the bottom and top floors is provided with two push-buttons, one serving to control the operation of a corresponding "up" signal *a'*, *a*², or the like, and the other serving to control the operation of a corresponding "down" signal *b'*, *b*², or the like. Within each elevator-car is also shown a transfer push-button B, the purpose of which is to enable an operator in event his car is already so crowded that he cannot stop to take on a passenger that has signaled to insure that the next car approaching the intending passenger in the desired direction shall receive the signal.

The commutator mechanism shown in Figs. 2 and 3 of the drawings is the same as that illustrated in Figs. 4 and 5, with the exception that the commutator shown in Fig. 2 is the main or "master" machine, and upon this machine are preferably mounted the electromagnets that serve to control the circuits in which the signal-lamps are interposed. It will be apparent, however, that these electromagnets and the mercury-pots corresponding therewith might be placed in any other convenient position without departing from the spirit of the invention. The commutator-frame, however, is regarded as the preferred

location, since it affords convenient access to the magnets and is economical with respect to the wiring of the circuits.

The commutator mechanism is located for convenience at the top of the elevator-shaft, and each commutator comprises a main shaft II, that is journaled within suitable bearings h , mounted upon the top of the side bars G and G' of the commutator-frame. Between the side bars G and G' extend the bars g , g' , g^2 , g^3 , g^4 , and g^5 . The upturned ends of the bars G and G' are connected by cross-bars G⁷ and G⁸, while the lower parts of the side bars G and G' are connected by a channel-bar G². The commutator-shaft H will be driven from the overhead shaft of the corresponding elevator, and preferably a friction mechanism will be interposed at a point between said overhead shaft and the shaft H for the purpose to be presently stated.

One suitable form of mechanism whereby motion may be transmitted to the shaft H is illustrated in Letters Patent No. 511,987, granted to Fred Andrews January 22, 1894, or preferably the outer portion of the elevator-shaft H will have loosely mounted thereon a sprocket-wheel H', at the opposite sides of which are placed friction-disks h' and h^2 , the disk h' being interposed between an annular shoulder of the shaft H and the sprocket-wheel, while the friction-disk h^2 is interposed between the sprocket-wheel and a collar h^3 . As shown, the collar h^3 is formed with grooves to receive the pin h^4 , projecting from the shaft, and against the collar bears a coil-spring H², the tension of which is controlled by suitable threaded nuts h^4 at the outer end of the shaft. It will thus be seen that the sprocket-wheel is held upon the shaft H in frictional engagement with the collar and the shoulder at opposite sides thereof, so that when the parts carried by the screw-threaded body of the shaft H reach the end of their travel any further revolution of the shaft will not endanger the breakage of the parts, and any tendency of the elevator-cable to "creep" will not influence the movements of the parts carried by the threaded body of the shaft.

Upon the threaded portion of the shaft II is mounted an interiorly-threaded carrier-nut II³, that is provided at its opposite ends with the shoulders h^3 , and upon the shaft II adjacent the ends of its body-thread are fixed the nuts II⁴ and II⁵. As shown, the nut II³ serves to sustain a cross-arm I, and for this purpose the carrier-nut is preferably provided with a raised standard h^6 , (see Figs. 3 and 5,) to which the cross-arm I is attached by screws h^7 . A suitable insulating-plate is interposed between the standard h^6 and the cross-arm I, and suitable insulating-sleeves h^8 encircle the screws h^7 where they pass through the cross-arm. The standard h^6 is shown as hollow, and within this standard is set a friction-block h^9 , that will fit between the screw-threads of the shaft II and bear frictionally upon the shaft. In order to give the proper

frictional bearing upon the block h^9 , a coil-spring h^{10} is set within the standard h^6 , and upon this spring bears a plate that is carried upon the lower end of an adjusting-screw h^{12} , that passes through a correspondingly-threaded hole in the cross-arm I, the position of the screw with respect to the cross-arm being determined by the set-nut h^{13} . The friction-block h^9 serves to insure the accurate movement of the carrier-nut II³ and parts supported thereby and avoids any danger of accidental slipping of the carrier-nut and insures also the prompt response of the carrier-nut to the reversal of the screw-shaft II in correspondence with the reversal of the elevator-car.

Each end of the cross-arm I is provided with openings in which are set sleeves of insulating material. Within these sleeves and at opposite ends of the cross-arm I are placed the contact points or brushes K and K', and within the adjoining sleeves and at opposite ends of the contact-arm I are placed the contact points or brushes K² and K³. The contact points or brushes K and K' are shown as screw-threaded and as provided with nuts that engage the opposite ends of the insulating-sleeves, supplemental nuts k^{12} being also employed for attachment of electric wires. The contact points or brushes K² and K³ are shown as provided with rods k^5 , extending upwardly therefrom and through the metallic sleeves k^6 , coil-springs k^7 being placed within the sleeves and serving to force the contact points or brushes K² and K³ normally downward. Upon the cross-bars g' and g^2 is mounted a plate M, (the plate being shown as of double thickness,) of insulating material, and upon the cross-bars g^3 and g^4 a similar plate M', of insulating material, is fixed. On the plate M is mounted a bar m , of insulating material, provided at intervals along its length with metallic contact-plates 2, 3, 4, 5, 6, and 7. Adjacent the bar or rail m is mounted a metal contact-bar m' . In like manner upon the opposite side of the screw-shaft II is a contact-bar m^2 , corresponding to the contact-bar m' , and a bar or rail m^3 , corresponding to the rail m and provided with contact-plates 8, 9, 10, 11, 12, and 13. The rail or bar m and the contact-bar m' lie beneath the path of travel of the contact points or brushes K and K², while the contact-bar m^2 and the rail or bar m^3 extend beneath the path of travel of the contact points or brushes K and K³. The carrier-nut II³ is so mounted on the screw-shaft II that as the shaft is revolved in one direction the cross-arm I will be so tilted downward and the brush or contact-point at the depressed end of the bar will bear against the rail or bar beneath it; but when the direction of travel of the screw-shaft II is reversed the cross-arm I will be tilted in the opposite direction, thereby lifting the contact-brush previously in operation and depressing and bringing into operation the contact point or brush that was before

out of action. Hence it will be seen by reference more particularly to Figs. 3 and 5 of the drawings that when the screw-shaft II is turned in one direction the contact point or brush K will be in position to engage the contact-plates beneath it, while at such time the contact point or brush K' will be out of action; but when the direction of travel of the carrier-nut H³ is reversed the cross-arm I will be tilted to the position seen in Fig. 3 of the drawings, and the contact point or brush K' will be brought in position to engage the contact-plates beneath it, while the contact point or brush K will be thrown out of action. The contact points or brushes K² and K³ are designed to remain at all times in engagement with the contact-bars *m*¹ and *m*² beneath them.

It will be understood, of course, that the movement of the carrier-nut H³ in one direction corresponds with the upward movement of the elevator-car, while the movement of this nut in the opposite direction corresponds with the downward movement of the elevator-car, it being understood that the friction-gear mechanism, whereby the commutator-shaft H is driven from the overhead shaft of the elevator, is a reducing-gear, so that a very short travel of the carrier-nut H³ will occur even where elevators are moving through floors of tall buildings. When the carrier-nut H³ reaches the end of its travel in one direction, its shoulders *h*⁵ will contact with corresponding shoulders on the fixed nut or sleeve H⁴, and when the carrier-nut H³ is moving in opposite direction the shoulders *h*⁵ at its opposite end will in like manner contact with corresponding shoulders formed upon the end of the fixed nut H⁵, so that the nuts H⁴ and H⁵ serve to arrest the movement of the carrier-nut H³ in both directions. Hence it will be seen that if there is any tendency of the elevator-car (by reason of the creeping of its cable or other cause) to move the carrier-nut H³ farther than the fixed nuts H⁴ and H⁵ the sprocket-wheel H' will turn upon the shaft H, the frictional engagement of the sprocket-wheel on the shaft being merely adequate to drive the shaft H. The nuts H⁴ and H⁵ are adjustable upon the threaded portions of the shaft H, so that the carrier-nut H³ can be arrested at any desired point adjacent the end of the movements of the elevator-car.

In order to insure the tilting of the cross-arm I and of the carrier-nut H³, whereby this arm is carried, for the purpose of alternately bringing the contact-brushes at the respective ends of the cross-arm I into and out of operative position and as well also to relieve the arm and the contact-brushes from all strain when the movement of the carrier-nut H³ is arrested, the means next to be described are employed, viz: Through each of the side bars G and G' of the commutator-frame extend inwardly the screw-bolts N and N', the unthreaded inner ends of which bolts pass through the bosses *o* of the bracket O. From

the bosses *o* of the bracket O extend upwardly the arms *o*¹ and *o*², the arm *o*¹ being formed at its top with a bearing-head *o*³, while the arm *o*² is formed at its top with a bearing-head *o*⁴. The bearing-head *o*³ has the under side of its inner end beveled, (see Figs. 2, 3, and 5,) while the bearing-head *o*⁴ has the upper face of its inner end beveled. From one side of the carrier-nut H³ project the flanges *o*⁵ and *o*⁶, and from the opposite side of the carrier-nut project similar flanges *o*⁷ and *o*⁸.

The bearing-heads *o*³ and *o*⁴ are arranged in different horizontal planes, (the purpose of which will hereinafter appear,) and these bearing-heads serve to engage the laterally-projecting flanges *o*⁵, *o*⁶, *o*⁷, and *o*⁸ in order to insure the shifting of the carrier-nut H³ and of the cross-arm I and as well also to relieve the cross-arm from strain in event of any tendency of the shaft II to revolve after the carrier-nut has been arrested by either of the fixed nuts H⁴ or H⁵ at the end of its travel. Thus, for example, if the carrier-nut H³ be assumed as moving in the direction of the arrow, Fig. 2, then as the carrier-nut reaches the end of its travel the flange *o*⁵ at one side of the carrier-nut will ride up the inclined end and onto the top of the bearing-head *o*⁴, while at the same time the flange *o*⁸ at the opposite side of the carrier-nut will contact with the lower inclined surface at the end of the bearing-head *o*³. Hence as the carrier-nut H³ completes its travel in the direction of the arrow, Fig. 2, this nut and the cross-arm I will be oscillated, so as to cause the cross-arm to tilt to a position opposite that shown in Fig. 3 of the drawings and in so doing to throw the contact point or brush K into operative position and the contact point or brush K' out of operative position. It will also be seen that if after the carrier-nut H³ has thus reached the end of its travel there is any tendency of the shaft II to further revolve the flanges *o*⁵ and *o*⁸, bearing, respectively, against the heads *o*³ and *o*⁴, will take the strain incident to such further thrust on the shaft II and cause the slipping of the sprocket-wheel H' upon the outer end of the shaft H, thus preventing the strain from being thrown upon the contact-brushes upon the ends of the cross-arm.

The contact-plates located beneath the path of travel of the contact points or brushes K and K' are arranged in correspondence with the floors of the building through which the elevator-cars pass, the contact-plates at one side of the commutator-shaft being designed for operation as the car is moving in upward direction, while the contact-plates at the opposite side of the shaft are designed to operate when the car is moving in downward direction. Inasmuch as there will be no "up" signal transmitted from the top floor of the building and no "down" signal transmitted from the bottom floor of the building, it is manifest that the number of contact-plates at

each side of the commutator-shaft will be one less than the total number of floors through which the elevator-cars pass.

Upon the cross-bars g and g^5 at opposite sides of the commutator-frame are supported a series of electromagnets R , R' , R^2 , R^3 , R^4 , and R^5 . Between the magnets R , R' , &c., and the cross-bars G and G' are interposed strips of insulating material, upon the tops of which respectively extend the contact-plates R^6 , whereon rest the brackets r , to which the magnets R , R' , &c., are shown as connected. Each of the brackets r has its upper end bifurcated and provided with an offset r^2 , and in the bifurcated end of the bracket is pivotally mounted the armature r' of the corresponding magnet, a set-screw r^3 serving to engage with the stop r^2 and limiting the pivotal movement of the armature. Through the end of each armature r' passes contact-rod s , preferably provided with a reverted threaded end, with which engage set-nuts s' and s^2 , by which the position of the contact-rod s can be accurately determined. Opposite the magnets R , R' , &c., are placed the mercury-pots S , S' , S^2 , S^3 , S^4 , and S^5 , that rest upon the insulating-plate M or M' , that extends across the top of the commutator-frame. The magnets R , R' , &c., are the "restoring-magnets," and their function and mode of operation will presently appear.

Adjacent the magnets R , R' , &c., and preferably arranged as shown are the "releasing-magnets" T , T' , T^2 , T^3 , T^4 , and T^5 , these magnets being suitably attached to the cross-bar G^7 or G^8 of the commutator-frame. A bracket t extends adjacent the releasing-magnets T , T' , &c., and to the end of the bracket is pivoted the armature t' of the corresponding magnet. Each armature is shown as provided with an angular end having a threaded opening to receive a set-screw t^2 , that will engage with the bracket t , and thus limit the extent of movement of the armature t' . By reference to Fig. 3 of the drawings it will be seen that the armature t' of each of the magnets T is so arranged that it will engage with the end of the armature r' of the corresponding magnet R , and when in such position it will hold the armature r' elevated, as shown in Fig. 3 of the drawings, and will thus retain the contact-rod s out of the mercury of the corresponding pot S . When, however, current is caused to pass through one of the magnets T , for example, thereby energizing the same, the armature t' will be attracted and will pass from engagement with the armature r' , thereby releasing the armature r' and permitting the contact-rod s to dip into the mercury-pot and establish passage of current through such pot, as will presently appear.

By reference to Fig. 1 of the drawings it will be seen that current is supplied by a rotary transformer V , which is connected by a wire v and suitable branch wires to the push-buttons of the several floors of the building. Upon the bottom floor of the building there

is but a single push-button, and from it a wire c leads to the corresponding releasing-magnet T^5 at the left-hand side of the commutator mechanism, and by means of a wire v^9 the magnets T , T' , &c., are connected with a wire v' , that leads back to the rotary transformer V . In like manner the "up" push-buttons of the second, third, fourth, fifth, and sixth floors are connected, respectively, by wires c' , c^2 , c^3 , c^4 , and c^5 with the releasing-magnets T^1 , T^2 , T^3 , T^4 , and T^5 at the left-hand side of the commutator mechanism, these magnets being also connected by the wire v^9 with the wire v' . The circuits are normally open at the several push-buttons; but it will be seen that when a push-button is operated the circuit will be closed at such point. Thus, for example, if the push-button on the bottom floor is operated by a person desiring elevator service the circuit will be closed at such point and current will then pass from the rotary transformer V by wire v to such push-button, thence by wire c to magnet T^5 , thence by wire v^9 to wire v' and to the transformer V . The releasing-magnet T^5 will thus be energized, causing it to attract its armature t' , thereby releasing the armature r' of the corresponding magnet R^5 and permitting the contact-rod s to drop into the mercury within the pot S^5 . Current will then be caused to flow through the signal-lamp a as follows: Starting at the lamp a , current will pass by wire d to the mercury-pot S^5 , to the rod s , dipping therein, thence by armature r' of the magnet R^5 to the corresponding bracket r and to the contact-plate R^6 , whereon this bracket rests, thence to wire v' , to rotary transformer V , thence by wire v and branch wire v^3 to the wire v^2 , and thence by wire v^3 to the lamp a . The lamp a will thus be caused to burn, thus indicating to the operator within the car that a passenger desires service at the first floor. In like manner if the "up" push-button upon the second floor be operated current will be caused to pass through the releasing-magnet T^1 , thereby energizing this magnet and permitting the contact-rod s , carried by the armature r' of the corresponding magnet R^1 , to drop into the mercury-pot S^1 adjacent thereto. Current will then pass through the lamp a' from the rotary transformer V as follows, (starting at the lamp a'), viz: by wire d' to mercury-pot S^1 , by contact-rod s within said pot to the armature of the magnet R^1 , thence by bracket r and contact-plate R^6 to wire v' , to rotary transformer V , thence by wire v and branch wire v^3 to the wire v^2 , thence by wire v^3 to lamp a' . In like manner the operation of the "up" push-button at any floor will energize the corresponding releasing-magnet, and thus cause the corresponding signal-lamp within the elevator-car to burn.

The "down" push-buttons upon the several floors of the building are connected with the rotary transformer V and feed-wire v , leading therefrom, by a wire v^5 and suitable branches therefrom, and from the "down" push-button

upon the top floor a wire e leads to the releasing-magnet T at the right-hand side of the commutator-shaft, the wire v^9 , to which this magnet is connected, being in circuit with the wire v' , that leads to the rotary transformer. Hence it will be seen that if an intending passenger upon the top floor operates the push-button at such point current will pass from the rotary transformer V by wire v and wire v^5 to the push-button, thence by wire e to the releasing-magnet T at the left-hand side of the commutator, thence by wire v^9 to wire v' and to the rotary transformer. The magnet T being thus energized will attract its armature t' , thereby causing the release of the armature r' of the corresponding magnet R and permitting the contact-rod s to drop into the mercury-pot S. Current will then be caused to pass through the signal-lamp b within the car as follows, (starting at the lamp,) viz: From lamp b current will pass by a wire f to mercury-pot S at the right-hand side of the commutator, thence to the contact-rod s within said pot to the armature r' of the corresponding magnet R, by bracket r on said armature to contact-plate R^6 , whereon the magnet R rests, to wire v' , to rotary transformer V, to wire v , to branch wire v^2 , to wire v^3 , and by wire v^3 to lamp b . The signal-lamp b will thus be caused to burn and so indicate to the operator of the car that a passenger is awaiting service upon the top floor. It will be seen that in like manner also the operation of the "down" push-button upon any floor will cause the energization of its corresponding releasing-magnet and the closing of the circuit at the corresponding mercury-pot, thus causing passage of current from the rotary transformer to the corresponding signal-lamp within the car.

The automatic breaking of the circuits at the several mercury-pots, so as to cause the extinguishing of the signal-lamps within the car, is accomplished as follows, viz: Assuming that the car is traveling in upward direction, the contact point or brush K' will pass over the contact-plates 2, 3, 4, 5, 6, and 7 at the left-hand side of the commutator-shaft H. If, for example, an intending passenger has operated the "up" push-button upon the first floor, thereby causing the corresponding signal-lamp within the car to burn, then as the car moves upward from the first floor the cross-arm I of the commutator will begin to move in the direction of the arrow, Fig. 2. As soon as the contact point or brush K' bears against the contact-plate 7 current will be caused to pass from the rotary transformer through the restoring-magnet R^5 , as follows: from the transformer V by wire v' to a wire v^{10} , connected to one side of the magnets R^5 , (and to the other restoring-magnets,) thence through the magnet R^5 by wire p to the contact-plate 7, thence by the contact point or brush K' to a wire p' , that connects this contact point or brush with the sleeve k^6 of the contact point or brush K^3 , thence to contact-

bar m^2 , to a wire p^2 , that leads to the transfer-button B within the elevator-car, thence by wire v^2 and wire v to the rotary transformer. The restoring-magnet R^5 will thus be energized by passage of current therethrough and will attract its armature r' , thereby lifting the contact-rod s from the mercury within the pot S^5 and breaking the electric circuit at such point. Hence the passage of current through the signal-lamp a will cease and such lamp will be extinguished. At the same time also the armature t' will automatically engage the armature r' of the magnet R^5 and hold the armature r' in position, as seen in Fig. 3. It will be apparent that in like manner also as the car proceeds in its upward travel the contact point or brush K' will bear against each of the contact-plates 6, 5, 4, 3, and 2 and will cause the passage of current through the corresponding restoring-magnets that are in circuit with such plates. When the cross-arm I reaches the end of its upward travel and is reversed, the contact point or brush K will be brought into action, and during the downward movement of the elevator-car this contact point or brush will successively bear against the contact-plates 8, 9, 10, 11, 12, and 13 and establish passage of current through these plates and through the restoring-magnets in circuit therewith. Thus, for example, if an intending passenger upon the top floor has depressed the "down" button at such point current will be caused to pass, as hereinbefore described, through the corresponding releasing-magnet T at the right-hand side of the commutator-shaft, thereby closing the circuit at the mercury-pot S and causing the light b within the elevator-car to burn. As soon, however, as the contact point or brush K engages the contact-plate 8 current will pass from the rotary transformer V by wire v' to wire v^{10} , to restoring-magnet R, thence by wire w to contact-plate 8, to contact point or brush K by wire p' , to sleeve k^6 of contact point or brush K^3 , (or to the sleeve of the contact point or brush K^2 ,) to contact-plate m^2 , thence by wire p^2 to the transfer-button B, thence by wires v^2 and v to the rotary transformer. Passage of current through the restoring-magnet R at the right-hand side of the commutator will thus energize the magnet and will cause it to attract the armature r' and raise the corresponding contact-rod s from the mercury-pot S. The electric circuit will thus be broken at the mercury-pot S and the light b within the car will be extinguished. The purpose in using two contact-plates m' and m^2 and corresponding contact points or brushes K^2 and K^3 is to better balance the contact-arm I and insure greater certainty of contact, although it will be understood that a single contact-brush K^2 or K^3 and a single contact-plate might be employed.

By reference to the diagrammatic view Fig. 1 of the drawings, in which two elevator-cars and two commutators are shown, it will

be seen that car A' is provided with a series of signal-lamps identical with those in the car A, and from the "up" signal-lamps wires x lead to the corresponding wires that connect the "up" signal-lamps of the car A with the mercury-pots on the frame of the "master-commutator." In like manner also wires y connect the "down" signal-lamps of the elevator-car A' with the corresponding wires whereby the "down" signal-lamps of the car A are connected to the mercury-pots at the right-hand side of the master-commutator. So also the car A' is provided with a transfer-button corresponding to the button B within the car A, and this button is connected by a wire z with the wire v , leading to the rotary transformer, and is connected by a wire z' with the contact-bars of the corresponding commutator (shown at the right-hand side of Fig. 1) and corresponding to the contact-bars m' and n' hereinbefore described. By reference to Fig. 1 also it will be observed that the several contact-plates shown in the commutator at right-hand side of Fig. 1 are connected with the corresponding restoring-magnets of the master-commutator by suitable cross-wires, and by reference to Figs. 4 and 5 of the drawings it will be seen that the construction of commutator at the right-hand side of Fig. 1 of the drawings is the same as the commutator hereinbefore described, with the exception that as a matter of convenience the frame of the master-commutator is employed as a support for the several magnets and mercury-pots. It will be understood also that the mode of operation of the commutator to be used at the right-hand side of Fig. 1 (being the commutator illustrated in Figs. 4 and 5 of the drawings) will be the same as the mode of operation of the commutator illustrated in Figs. 2 and 3 of the drawings.

As it frequently happens where several elevator-cars are employed that a car is crowded and cannot, therefore, admit an additional passenger who has given a signal, it is desirable that the signal should appear in the next car approaching in the desired direction. It has been already seen that current in passing from the rotary transformer V to the restoring-magnets corresponding to the various signal-lamps passes through the transfer-buttons B of the cars A and A'. The circuits through these transfer-buttons are normally closed; but by operating either of the buttons a corresponding circuit can be broken at such point. Hence it will be seen that if as a car approaches a floor at which a signal has been given the operator within the car breaks the circuit at the transfer-button B then current will not pass from the corresponding restoring-magnet. The result is that as the contact-brush of the commutator engages the corresponding contact-plate no current will pass through the restoring-magnet, and hence the circuit will remain closed at the corresponding mercury-

pot and the signal will continue to burn within the car A' until said car reaches the floor at which a signal was given, when its commutator will cause the passage of current through the restoring-magnet, and thus extinguish the signal in manner hereinbefore described. It will be understood, of course, that when an intending passenger at any floor operates the push-button at such point the corresponding signal-lamp is caused to burn in all the cars, since the lamps of the various cars are connected in multiple series, as hereinbefore described.

While I have illustrated and described the preferred embodiment of my invention, it is manifest that features of the invention may be employed without its adoption as an entirety and that the details of construction may be varied within wide limits by those skilled in the art to which the invention relates. Thus, for example, the idea of employing two series of individual electric signal-lamps within the car (which I regard as broadly new) may be adopted in connection with any suitable means for controlling the passage of current through said lamps, and where the lamps are to be automatically extinguished any suitable means may be employed instead of the construction of commutator mechanism described.

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

1. In electric signaling apparatus for elevators, the combination of two series of individual signals, one series serving for "up" signal service and the other signal serving for "down" signal service and both grouped within the car, electric circuits wherein said signals are placed, said circuits comprising individual wires connecting with the corresponding individual signals within the car, a source of current common to said individual circuits, a commutator operatively connected to said elevator mechanism and provided with devices corresponding with said individual circuits and connected therewith for automatically controlling said signals, and individual push-button or like circuit-controlling mechanism upon the floors of the building whereby the corresponding signals are brought into action.

2. In electric signaling apparatus for elevators, the combination with two series of individual electric lamps, one series serving for "up" signal purposes and the other series serving for "down" signal purposes and both grouped within the car, electric circuits wherein said lamps are placed, said circuits comprising individual wires leading to the corresponding individual lamps and a return-wire common to all of said lamps, a source of current common to said individual lamp-circuits, push-button or like circuit-controlling mechanism upon the floors of the building whereby current is caused to pass through

said lamps, and suitable means whereby the passage of current through said lamps may be broken.

3. In electric signaling apparatus for elevators, the combination with a series of individual "up" signals and a series of individual "down" signals grouped within the car, push-button or like circuit-controlling mechanism upon the floors of the building whereby passage of current through said signals is effected, and a commutator operated by the elevator mechanism, said commutator being provided with plural contact-plates and with brushes whereby the passage of current through the individual signals within the car is broken, and a current-controlling means independent of said commutator whereby the closing of the individual lamp-circuits is controlled regardless of the position of the commutator.

4. In electric signaling apparatus for elevators, the combination with a series of individual "up" signals and a series of individual "down" signals located within the car, push-button or like circuit-controlling mechanism upon the floors of the building whereby said signals are brought into action and a commutator operated by the elevator mechanism whereby said signals are thrown out of action, said commutator comprising contact-plates and contact-brushes and electromagnets for closing the individual signal-circuits and electromagnets for breaking the individual signal-circuits, said first-named magnets being in circuit with the push-button mechanism and said last-named magnets being connected with said contact-plates whereby the breaking of the circuits is automatically effected by the commutator.

5. In electric signaling apparatus for elevators, the combination with a series of individual "up" signals and a series of individual "down" signals located within the car, push-

button or like circuit-controlling mechanism upon the floors of the building whereby passage of current through said signals is effected and a commutator operated by the elevator mechanism and serving to break the passage of current through said signals, said commutator comprising a screw-shaft, a carrier-nut mounted upon said shaft, a series of individual contact-plates at each side of said screw-shaft, a cross-arm upon said carrier-nut, contact-brushes carried by said cross-arm and one or more contact-bars normally in circuit with one or the other of the contact-brushes that travel across the individual contact-plates, and two series of electromagnets, one series serving to complete the circuits for passage of current through the signals and the other series being connected with the commutator and serving to break the passage of current through the signals.

6. In electric signaling apparatus for elevators, the combination with two series of individual incandescent lamps arranged within the elevator-car, corresponding push-button or like circuit-controlling mechanism located upon the floors of the building, two series of releasing-magnets electrically connected with the push-button or like mechanism, two series of restoring-magnets electrically connected with the corresponding lamps within the car and a commutator comprising two sets of individual contact-plates corresponding in number and arrangement with said restoring-magnets and electrically connected therewith and movable contact-brushes operated by the elevator mechanism and adapted to pass over said individual contact-plates and in so doing to cause current to pass through the corresponding restoring-magnets.

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Witnesses:

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