T. W. JENKINS.

SAFETY DEVICE FOR ELEVATORS.

APPLICATION FILED JUNE 19, 1908.

**1,009,972.**

**Patented Nov. 28, 1911.**

2 SHEETS—SHEET 1.

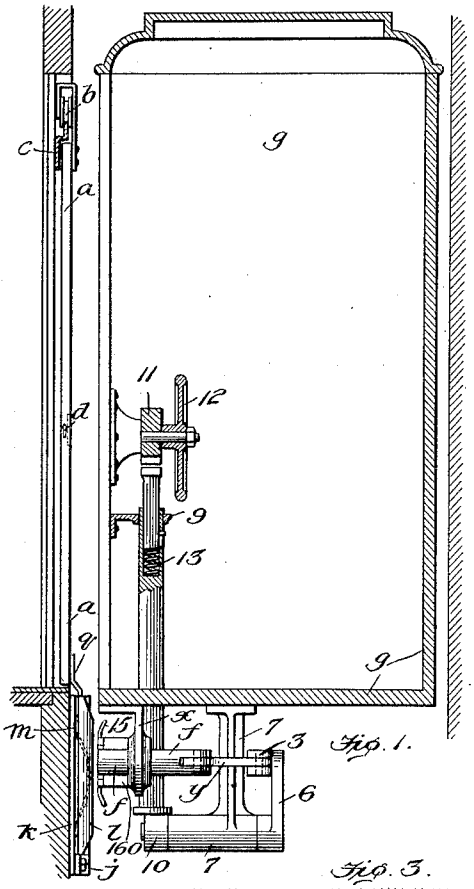


Fig. 1.

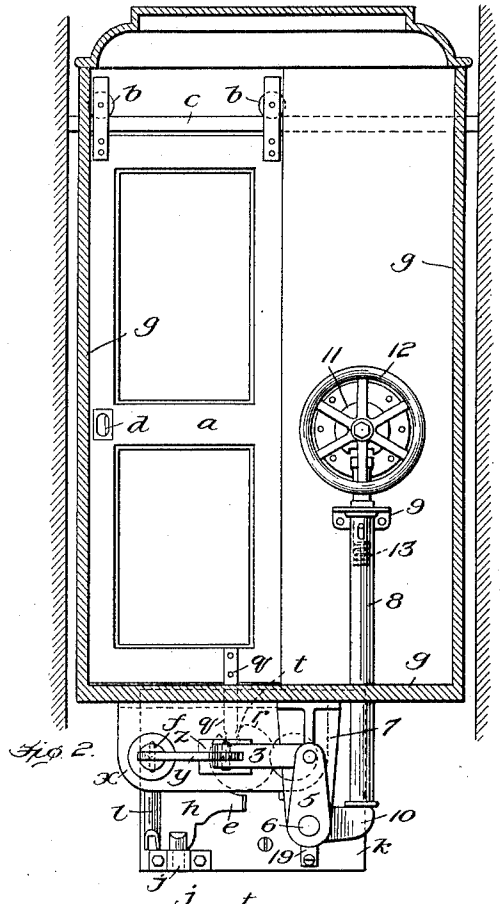


Fig. 2.

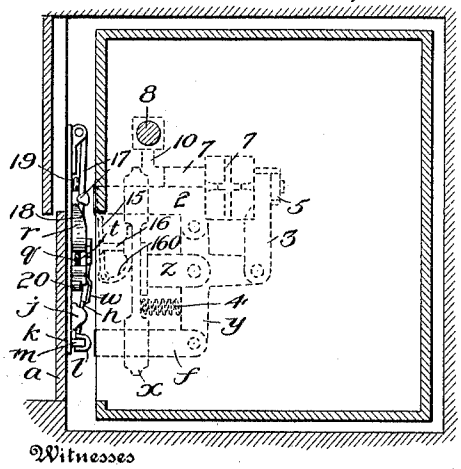


Fig. 3.

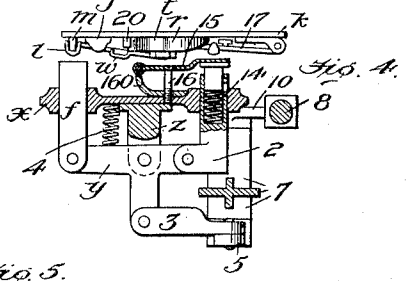


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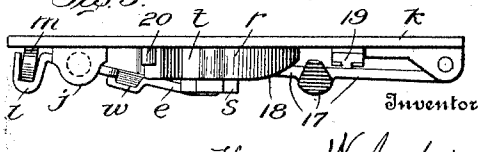


Fig. 5.

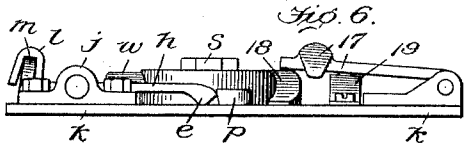


Fig. 6.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 7.

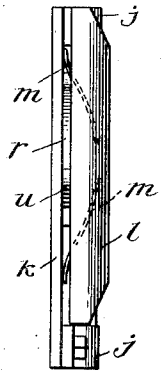



Fig. 8.

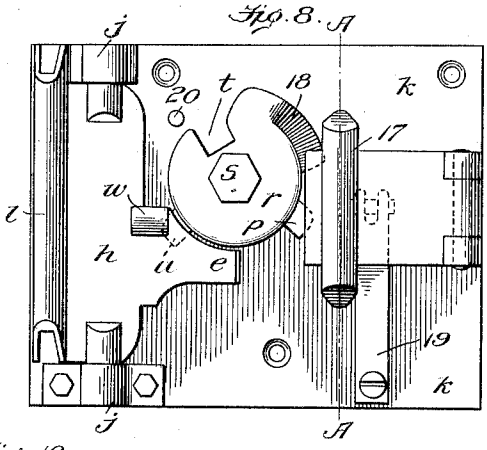



Fig. 9.

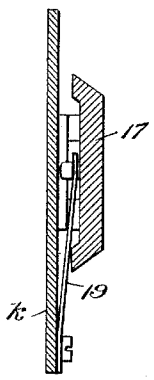



Fig. 10.

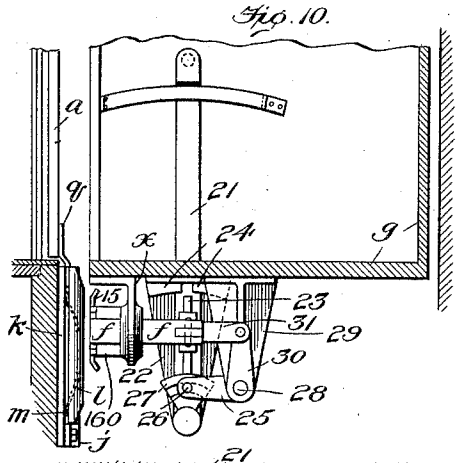
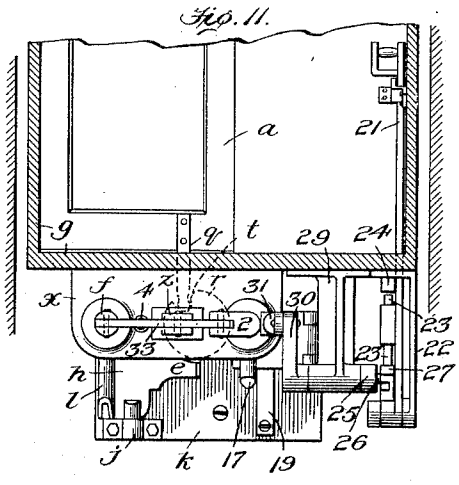
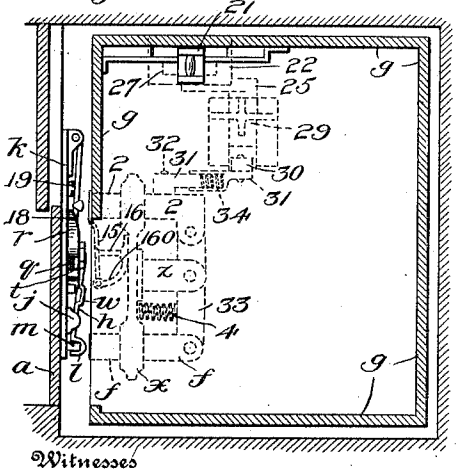



Fig. 11.



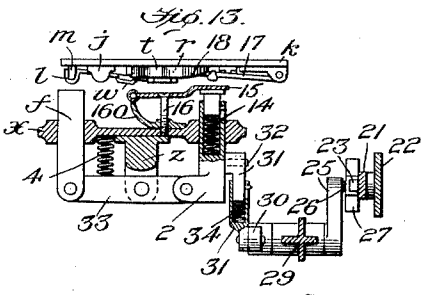

Witnesses

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Fig. 12.

Fig. 13.




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## SAFETY DEVICE FOR ELEVATORS.

1,009,972. Specification of Letters Patent. **Patented Nov. 28, 1911.**

Application filed June 19, 1908. Serial No. 439,384.

*To all whom it may concern:*

Be it known that I, THOMAS W. JENKINS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Safety Devices for Elevators, of which the following is a specification.

This invention relates to means for enabling transportation in elevators to be carried on with safety, and has reference more particularly to means for preventing access to the elevator shaft except at a landing at which a car is present.

The improvements composing the invention are advantageously embodied in a system in which latches for the landing doors for keeping them closed while latched and for allowing them to be opened when unlatched and a lock for the controller for starting and stopping the elevator car at the will of the attendant are combined with interconnecting mechanism partly on the car and partly on the elevator shaft in such manner that the unlatching of the door at each landing is dependent not only upon the presence of the car at the same landing, but also upon the position of the controller at the proper point for stopping the car and that the controller is locked to prevent the car being started when the door is opened after arrival of the car at a landing and is only unlocked when the door has been closed and latched. Nevertheless, some at least of said improvements can be used otherwise than in a system having all the features mentioned; and each of said improvements is intended to be secured for all the uses to which it can be applied.

In the accompanying drawings, which form part of this specification: Figures 1 and 2 are views in vertical section and elevation in planes at right angles to each other of an elevator car and part of the elevator shaft in which it moves, the car being provided with a controller lock and the shaft with a latch for a landing door and each of them with appropriate connecting mechanism, all in accordance with the invention; Fig. 3 is a view of the same in horizontal section and plan; Fig. 4 is a plan of devices on the car and the elevator shaft, those on the car being shown partly in horizontal section in a plane below the car floor; Figs. 5, 6, 7, 8 and 9 are views of mechanism which belongs on the elevator shaft, Fig. 5 being a top view, Fig. 6 a bottom view with parts in a different position, Fig. 7 an edge view from the left of Fig. 5 with parts in the position of Figs. 1, 2, 3, 4 and 5, Fig. 8 a face view with parts in same position, and Fig. 9 a view in vertical section on line A A of Fig. 8; and Figs. 10, 11, 12 and 13 are views corresponding, respectively, with Figs. 1, 2, 3 and 4 and showing another form of controller.

The landing door *a* is shown in the customary form of a sliding door. It is hung from rollers *b*, which travel on track *c;* and it is represented in the closed position. Ordinarily it would best be provided with the customary hand operated latch at *d*, accessible only from the car side of the door. This latch *d* (if used) does not, however, sufficiently insure that the door shall be closed at all times when the car is not present at the same landing; therefore, a latch *e* which is less subject to the manipulation or neglect of the elevator attendant is provided. It is arranged to be operated across the gap (or dividing space between the wall of the elevator shaft and the adjacent side of the elevator car) by means of the piece *f* on the car *g*. With a view to such operation, the latch *e* is best carried by the reciprocating piece *h*, which is mounted on vertical pivots between lugs *j* on a portable plate *k* for attachment to the wall of the elevator shaft, and which is provided with an elongated tail portion *l*, beveled at the ends and provided with a holding spring *m* tending to move the latch *e* toward and the tail portion *l* away from the wall plate *k*. The tail portion *l* is best made U-shaped in cross section in order to receive the holding spring *m*.

The latch *e* is combined with a latch engaging device *p* (Figs. 6 and 8) which is mounted with the latch upon the wall of the elevator shaft, both of them being mounted most advantageously on the same portable support or wall plate *k*, which is best secured to the wall after the latch and its engaging device have been assembled thereon in proper relation to each other. One of said parts (the device *p* as shown) has a mechanical connection for shifting it relatively to the other (the latch *e* as shown) through the movement of the door *a;* so that when said parts are engaged the door's motion is arrested.

The latch *e* is best arranged between the engaging device *p* (when in latching position as shown in all the figures) and the axis of pivoting of the reciprocatory piece *h* by which the latch *e* is carried; instead of being arranged (as shown in Figs. 19 and 20 of my patent of February 21, 1905, No. 783,205 for the therein represented latch 64 in reference to its engaging device 65 and the axis of pivoting of the corresponding reciprocatory piece 66) so that the engaging device (when in latching position) and such axis are on the same side of the latch; but this latter arrangement is not necessarily excluded from use in connection with other features of the present invention.

The connection shown for shifting the device *p* consists of the bar *q* and disk *r*, the former fastened to the door *a* and the latter carrying the device *p* and turning on the pivot pin *s*. The lower end of bar *q* takes into a notch *t* in the edge of disk *r*; and the pin *s* is fast on the wall plate *k*. Whenever the door *a* is moved to the right, as shown in Fig. 2, the bar *q* turns the disk *r* until the device *p* (Fig. 8) strikes the latch *e* (Fig. 6); whereupon the movement is arrested; or else, if the latch *e* should be out of engaging position, the movement continues until the door is fully opened, the bar *q* escaping from the notch *t* when the disk *r* has been turned sufficiently to permit this escape. There should be sufficient friction between the parts to retain the disk *r* in place; until upon closing the door *a*, by sliding it to the left (as shown in Fig. 2) the bar again enters the notch *t* and turns the disk *r* until the device *p* is carried again into position to engage the latch *e*.

To mount both the latch and the latch engaging device on the elevator shaft, instead of one of them on the door and the other on the elevator shaft has the important advantage of enabling a smaller movement of the latch to suffice for latching and unlatching; because, when thus mounted, allowance does not have to be made for the customary and probably unavoidable play or looseness of the door or of the door connections. Moreover, by mounting both latch and latch engaging devices on the wall of the elevator shaft the adjustment of them relatively to each other is independent of the arrangement of the landing doors. These are not always located uniformly with respect to the edges of the landing floors. By mounting both latch *e* and its engaging device *p* on the same portable support (as wall plate *k*) adapted to be secured to the wall of the elevator shaft, they can be adjusted in the shop; so that, when brought to the building, nothing is required but to attach the support to the wall of the elevator shaft, and to provide the landing door with the proper mechanical connection. It is also considered an important simplification and special improvement to employ a pivoted disk (as *r*) for carrying the latch engaging device and an operating bar (as *q*) for the mechanical connection between the landing door and the latch mechanism. The arrangement of the latch, its pivoted carrier, and its engaging device so as to have the latch between the latch engaging device and the axis of pivoting of the latch carrier is also a feature of importance.

Another feature of the invention employed with a view to minimizing the latch motion consists in so shaping the meeting faces of the latch and its engaging device that the one overlaps the other on the side to prevent unlatching. Thus, referring to Fig. 6, when the device *p* is brought against the adjacent end of the latch *e* it overlaps the latter slightly on the outside; because the face of device *p* is so beveled as to make the outer edge overhang. Consequently, however strongly said device *p* may be pressed against the latch *e*, there is no danger of the pressure forcing the latch away from the wall plate *k* and thereby unlatching the door.

It is also considered an advantage and special improvement to make the latch rather thick and to bevel it on the side to be acted on by the latch engaging device, should the latch be operated sufficiently for unlatching but without being removed wholly from the path of said engaging device. Thus, referring to Fig. 6, there is a bevel on the inside of the latch at its meeting face; and should the latch be moved only far enough away from wall plate *k* to allow the device *p* to clear the extremity of the latch, a continued movement of said device *p* (to the left as shown in Fig. 6) would bring it against this inside bevel and force the latch *e* out of the path of said device *p*. Thus a very small movement of the latch *e* toward or away from the wall plate *k* will shift it from the latching position shown in Fig. 6 to the unlatched position in which it will allow the device *p* to pass and the door *a* to be opened; while at the same time, by reason of the overlap of the device *p* outside the latch, there is no danger of the attendant's forcing the latch by increasing the pressure of the device *p* against the latch *e* when this is in latching position.

In systems of safety devices which employ latches to be operated across the gap by a latch operating piece on say the elevator car, it is important to avoid idle contact of parts on opposite sides of the gap; as such contact not only makes a disagreeable noise, but involves also a certain element of danger. The devices on the elevator shaft with which the latch operating piece (piece *f* as shown) on the elevator car makes contact for unlatching the landing doors are particularly lia-

ble to such idle contact. In accordance with the present invention, means are provided for withdrawing these contact devices when the doors are closed, unless their projection should be required in order to retain the doors under latch. Thus idle contact with them can be lessened or avoided. As shown, the tail portion *l* of the reciprocating piece *h* constitutes the contact device of the latch *e;* and it is withdrawn by pin *u* (Fig. 8) when the door *a* is fully closed. At such times the pin *u* interposes itself between the piece *h* and the wall plate. When the door is moved to the right, the pin *u* passes out from behind the piece *h* and allows the contact device *l* to be projected, should the projection of it be required in order to hold the door *a* under latch. If, however, at this time the car should be at the landing as shown, with the latch operating piece *f* in position to resist the projection of said device *l*, the latter would remain withdrawn, thereby causing the door to be unlatched.

As shown, the pin *u*, when it withdraws the contact device *l*, also removes the latch *e* from the path of the latch engaging device *p;* for it presses the latch *e* away from wall plate *k*, and in so doing it brings the portion *l* of piece *h* nearer thereto; but the pin *u* is so placed in respect to the device *p* that, when the disk *r* is turned to the right (clockwise), the latch *e* is released in season to place itself in the path of device *p* and so to arrest the motion of it and of the door *a*, should the piece *f* on the car not be then in place to cause the unlatching of the door.

At *w* the top edge of the reciprocating piece *h* is bent outward to form an inclined surface, against which (on occasion) the pin *u* can act in order to press out the latch *e* and to withdraw the contact device *l*. Ordinarily, however, the contact device *l* may well be withdrawn at all times, namely, by the latch operating piece *f* when the car is at a landing with the door *a* open and by the pin *u* when the door is fully closed; the intermediate (or not fully closed) position of the door being exceptional when the car is not at the landing; but if, for any reason, the pin *u* should release the contact device *l* when there should be no piece *f* in position to receive it, then the device *l* would be projected by spring *m* and when the pin *u* should be returned said pin *u* would act upon the incline *w* to withdraw the contact device *l*.

Apart from the avoidance of idle contacts, there is an advantage in providing means for withdrawing the before mentioned contact devices (as device *l*), especially if the arrangement is such that each of them can be held withdrawn until the piece *f* on the elevator car is in position to receive it; because in this way the necessity is avoided of transmitting motion across the gap between car and shaft in order to retract the holding springs (as spring *m*). In such case, all that the latch operating piece *f* on the car would need to do would be to retain the contact device *l* in substantially the position which it would occupy when the door is fully closed.

The latch operating piece *f*, if stationary on the car, could operate to unlatch the door *a;* and, in view of the withdrawal of the contact device *l* by pin *a*, it might so operate without contacting idly with such device so long as the door *a* is fully closed; but it is important to have the piece *f* movable on the car for each of at least two reasons. First, its movability by allowing withdrawal when not required for unlatching insures more perfectly against its striking (or making idle contact with) anything on the elevator shaft; and, second, it enables the placing of said piece *f* in unlatching position to be made dependent upon the placing of the car controller in stopping position. Appropriate movement of the piece *f* can be provided for in various ways. Thus, for example, in my said Patent No. 783,205 I have shown means for governing the position of a corresponding latch operating piece on the elevator car in some instances by the joint operation of the door and the controller, and in other instances by the sole operation of the controller. As shown herein, the position of piece *f* is governed by the joint action of the door and the controller; but its governance by the sole operation of the controller is not excluded from use in carrying out parts of the present invention. Either way the position of the latch operating piece depends upon that of the controller; one way upon the position of the controller without reference to that of the door; the other way upon the position of the controller in connection with that of the door. It could be made to depend upon the position of the door without reference to that of the controller.

The latch operating piece *f* (as shown) slides in an opening in the bracket *x* (Figs. 1, 2 and 4) on the bottom of the elevator car and is connected at its inner end by a hinge joint with an arm of lever *y* which is fulcrumed on the projection *z* (Fig. 4) on the inside of said bracket and which has other arms connected by hinge joints, one of them with the reciprocating piece 2 and the other of them with a connecting rod 3. The piece 2 slides in an opening in bracket *x*, and is arranged to receive motion across the gap from an appropriate instrumentality on the wall of the elevator shaft. When the piece 2 is thus moved, its motion is communicated through lever *y* to latch operating piece *f* so as to project it and to the connecting rod 3 so as to move it to the left (as shown in Figs. 2 and 4);

and when the piece 2 is allowed to return to its shown position the spring 4 (shown as a spiral compression spring) turns the lever $y$, thereby withdrawing the latch operating piece $f$ and moving the connecting rod 3 to the right. This connecting rod is hinge jointed to the arm 5 of rock shaft 6, which is journaled in bracket 7 under the car. The upright bar 8 slides in bracket 9 on the front of the car and in a hole in the car floor and rests upon the arm 10 of rock shaft 6, so as to be raised and lowered as the rod 3 is moved back and forth. Above the bar 8 is a notched disk 11 fast on the shaft of the car controller 12, which disk is utilized as shown to make the position of the piece $f$ dependent upon that of the controller 12; for which purpose said disk 11 is so arranged in reference to the end of said bar 8 as to prevent this latter from rising when the notch in disk 11 is not directly over the bar 8. The upper end of this latter is shaped to enter said notch; when the latter is presented thereto and the bar 8 is raised. The bar 8 then locks the controller 12.

As shown, the upper end of the bar 8 is formed separate; and there is a spiral compression spring 13 between this separate end and the body of bar 8. The outer end of a pin, fast in the separate end of bar 8, moves in a slot in the body of the bar and prevents the separate end from being pushed out by the spring. As shown also, the outer end of the piece 2 is made separate and is held by a spiral compression spring 14, a pin and slot preventing the end being forced out by the spring. Either or each of these springs can yield should occasion require and so prevent breakage of parts; but the yielding of spring 14 in piece 2 has the further function of allowing the end of piece 2 to be pushed in while the latch releasing piece is held withdrawn by the pressure of spring 4 aided by the contact of the upper end of bar 8 with the disk 11. To accomplish this, if springs 13 and 14 should both be used, the springs 4, 13 and 14 should be of such stiffness that spring 14 will yield before the aggregate resistance of springs 4 and 13 is overcome. It is not necessary to use both springs 13 and 14. The spring 14 in piece 2 (when said spring 14 is used) should be stiff enough to overcome the aggregate effort of spring 4 on the car and spring $m$ on the wall of the elevator shaft.

The plate 15, hinged to an arm 160 of bracket $x$, lies against the end of the piece 2; and its motion away from the bracket $x$ is limited by the stop screw 16; which does not interfere with its movement toward said bracket.

The motion bar 17 on the wall of the elevator shaft at each landing is actuated by the cam 18; and if such bar at any landing should be moved by its cam 18 away from the wall of the elevator shaft, while the car is at the same landing, the bar 17 imparts motion across the gap to the plate 15. Should the controller then be in mid position, the motion is communicated through the motion receiving piece 2 and lever $y$ to latch releasing piece $f$ and through said piece 2, said lever $y$, the connecting rod 3 and the rock shaft 6 to bar 8. The piece $f$ is thus placed in its unlatching position and the upper end of bar 8 is engaged with the disk 11 to lock the controller. Should the car be at the landing and the controller not be in said position, the motion communicated across the gap to the plate 15 and end of piece 2 is taken up by the spring 14 and there is no motion of the body of piece 2 and consequently none of the latch releasing piece $f$; and the controller remains unlocked. Should the cam 18 move the motion bar 17 away from the wall of the elevator shaft when the car is not at the landing, no effect is then produced on the mechanism carried by the car; and should the car pass while the motion bar 17 is thus placed, the bevels (Fig. 9) at its top or bottom will force the plate 15 toward bracket $x$ and will either compress spring 14 (if the controller is not in mid position) or will project piece $f$ and raise bar 8 (if it is).

In my said Patent No. 783,205 a pneumatically operated motion bar, as well as one actuated by a cam, is shown. Either of these forms, or any other suitable form, could be used in connection with various portions or features of the present invention (such modification of arrangement being made as may be necessary); but the present invention covers also certain new features or improvements in respect to the motion bar (more especially a cam actuated bar) and its actuating means.

Instead of mounting the motion bar's actuating cam on the landing door (as shown in said patent), it is more advantageously mounted on the wall of the elevator shaft, best on the wall plate $k$, or same portable support on which the latch $e$ and its engaging device $p$ are both of them mounted. And it is also a further improvement to have such cam carried by a pivoted disk, best the same disk $r$ which carries the latch engaging device $p$. It is also to be observed that the actuation of the motion bar is facilitated by the withdrawal of the contact device $l$ through the pin $u$, especially if (as shown for cam 18) the cam's action takes place while said device is thus withdrawn; because the cam is relieved by pin $u$ of the work of overcoming the resistance of spring $m$. Such relief is not necessarily restricted to the case of a cam mounted on the wall of the elevator shaft, as distinguished from one which is mounted on the elevator door, as in my said Patent No. 783,205. It allows

the actuating incline of the cam to be made abrupt so as to give a quick motion to the motion bar.

Another new feature of the present invention consists in mounting the motion bar 17 on a vertical hinge or pivot, as distinguished from the horizontal hinge or pivot shown in connection with the cam actuated motion bars in my said Patent No. 783,205. A spring 19 (a leaf spring as shown; see Figs. 8 and 9) retracts the motion bar 17 when the cam 18 permits. It draws the bar 17 toward the wall plate *k*.

At 20 is a stop which limits the motion of the disk *r* to the right (clockwise) by contact of the pin *u* therewith.

The operation of the safety devices herein above described can be understood from such description of them; but a brief statement of the operation of the mechanism as a whole seems desirable.

The door *a* at each landing, when the car is not at the same, should be completely closed. The ordinary hand latch *d*, if used, tends to insure this; and so would the pressure of the motion bar 17 against the cam 18, under the tension of spring 19; because the disk *r* carrying said cam is mechanically connected with the door *a* through the bar *q*. With the door thus closed, the device *l* is held withdrawn by the pin *u* on disk *r* against the force of spring *m;* but the door *a* is not thereby released from latch *e;* although this last (under the arrangement shown) is not then in the direct path of the latch engaging device *p* carried by said disk *r;* for any motion of door *a* will be communicated by bar *q* and disk *r* to pin *u;* and this movement of pin *u* will allow the latch *e* to drop into the direct path of said device *p*.

The mechanism on the car *g*, when this is traveling, is held by the spring 4 in such position that the latch operating piece *f* is withdrawn (being thus clear of everything in the wall of the elevator shaft), provided the door *a* is fully closed. The spring 4 also causes the bar 8 to be lowered (leaving the controller 12 free to be turned) and the motion receiving piece 2 to be projected (in position to be acted on across the gap by the appropriate instrumentality on the wall of the elevator shaft). With door *a* fully closed, the motion bar 17 would be retracted by its spring 19 out of the path of the piece 2.

When the car *g* comes to a landing, the elevator attendant brings the controller 12 to mid position for stopping; and he then opens the door *a* (releasing latch *d* by hand as usual and moving the door to the right, as shown in Fig. 2). The movement of the door is communicated by bar *q* to disk *r* and causes the cam 18 to push the motion bar 17 against the plate 15 on the car and thereby to push in the piece 2 and through it and its connections on the car to project piece *f* into latch releasing position and to raise the bar 8 into engagement with the notch in disk 11. The turning of disk *r* also withdraws pin *u* so as to release the piece *h* with latch *e* and contact device *l* from the influence of said pin *u;* but before the latch is thus released the device *l* makes contact across the gap with the piece *f*, which has previously been projected by cam 18 sufficiently to hold the latch *e* far enough away from plate *k* to prevent the arrest by latch *e* of the engaging device *p*. As the door *a* is opened, the bar *q* leaves the notch *t* in disk *r* when the latter has been sufficiently turned; and the cam 18 remains in engagement with the motion bar 17 to hold it away from the wall plate *k*, thus keeping the controller 12 locked.

The engagement of the bar 8 with the notch in disk 11 prevents the elevator attendant from starting the car while the door *a* remains open. When he wishes to proceed, he closes the door (by a movement to the left, as shown in Fig. 2); whereupon the bar *q* reëngages the notch *t* in disk *r* and turns the latter to the left (counter clockwise), thereby placing the pin *u* behind the piece *h* (so that the contact device *l* is forced in against the pressure of the spring *m*) and withdrawing the cam 18 from behind the motion bar 17 (so that the spring 19 draws the latter in). The spring 4 on the car turns the lever *y* and withdraws the latch operating piece *f* and lowers the bar 8 out of engagement with the notch in disk 11, thereby unlocking the controller 12 and allowing it to be operated. If, after the car has left a landing, attempt should be made to open the door *a*, the latch *d* (if used) should prevent any movement of the door; but, if the door should not be held by said latch *d*, only a small movement of the door is permitted; for the opening movement being communicated by bar *q* to disk *r* withdraws pin *u* from behind the piece *h* and allows the latch *e* to be brought by spring *m* into the direct path of the device *p* (as in Fig. 6); and its consequent engagement with the device *p* arrests the further opening of the door. With the parts in this position, should the car pass, the latch operating piece *f* thereon in its withdrawn position should not touch the contact device *l;* but the motion bar 17, being pushed out by the cam 18, would act upon the plate 15 and push in the separate end of the motion receiving piece 2 against the pressure of the spring 14; but the body of said piece 2 and the therewith connected parts on the car would not be moved; because the notch in disk 11 being out of line with the bar 8, this would be held down by the periphery of said disk 11. The noise of contact should

be noticed by the attendant; and he may well stop his car, in order to close the door *a* completely.

In Figs. 10 to 13, instead of a wheel controller, as in Figs. 1 to 4, a lever 21 is employed. The lever and the wheel are the most common forms of controller. The lever, as shown, is fulcrumed on the bracket 22 under the car; and it carries an upright bar 23, which corresponds with the before described bar 8. On the bracket 22, at the top, is a notched segment 24, which corresponds with the above described notched disk 11. At its lower end the bar 23 is connected with arm 25 by a pin 26 working in a curved slot in segment 27 at the bottom of bar 23. The arm 25 belongs to a rock shaft 28, which corresponds with the above described rock shaft 6, and is journaled in bearings in the bracket 29 under the car. The upright arm 30 of this rock shaft is connected by rod 31 with a pin 32 on the back of piece 2. The pieces 2 and *f* are the same as in Figs. 1 to 4 and are connected by the lever 33 which, with pin 32 and the connections with pieces 2 and *f*, is in effect a three armed lever and corresponds with the above described lever *y*. Three reciprocating pieces, namely, the motion receiving piece 2, the latch operating piece *f* and the bar 23 co-acting with the controller 21 and segment 24 are connected with the three arms of such lever. Three reciprocating pieces; namely, the motion receiving piece 2, the latch operating piece *f* and the bar 8, co-acting with the controller 12 and disk 11, are connected with the three arms of the lever *y* of Figs. 1 to 4. The connecting rod 31 is shown as in two parts fitted one within the other at their meeting ends and provided with a slot and pin connection and a spiral compression spring 34, which corresponds with the above described spring 13. The parts on the wall of the elevator shaft are the same as in Figs. 1 to 9; and the operation of the mechanism is so similar to what has been described with reference to Figs. 1 to 9 that no further description is necessary.

I claim as my invention or discovery:

1. The combination with an elevator door, an elevator car, and a latch operating piece of said car, of a latch, and a latch engaging device, the meeting faces of which latch and engaging device are one of them inclined to the plane of motion of said latch engaging device in the direction to prevent unlatching, substantially as described.

2. Latching mechanism for an elevator door, composed of a latch, a latch engaging device, and a support, the meeting faces of which latch and engaging device are one of them inclined to the plane of motion of said latch engaging device in the direction to prevent unlatching, and both of which are mounted on said support, substantially as described.

3. The combination with an elevator door, an elevator car, and a latch operating piece on said car, of a latch, and a latch engaging device, said latch being beveled on the side to be acted on by said engaging device should the latch be operated sufficiently for unlatching but not sufficiently to be removed wholly from the path of said engaging device, substantially as described.

4. Latching mechanism for an elevator door, composed of a latch, a latch engaging device, and a support, said latch being beveled on the side to be acted on by said engaging device should the latch be operated sufficiently for unlatching but not sufficiently to be removed wholly from the path of said engaging device, substantially as described.

5. The combination with an elevator door, an elevator car, and a latch operating piece on said car, of a latch, and a latch engaging device, the meeting faces of the two last mentioned parts being shaped for one of them to overlap the other on the side to prevent unlatching, and the latch being beveled on the side to be acted on by said engaging device should the latch be operated sufficiently for unlatching but not sufficiently to be removed wholly from the path of said engaging device, substantially as described.

6. Latching mechanism for an elevator door, composed of a latch, a latch engaging device, and a support on which both of the last mentioned parts are mounted, the meeting faces of said parts being shaped for one of them to overlap the other on the side to prevent unlatching, and the latch being beveled on the side to be acted on by said engaging device should the latch be operated sufficiently for unlatching but not sufficiently to be removed wholly from the path of said engaging device, substantially as described.

7. The combination with an elevator door, an elevator car, and a latch operating piece on said car, of a latch, a device connected with said latch and arranged to make contact across the gap with said piece, and means for withdrawing and releasing said contact device, substantially as described.

8. Latching mechanism for an elevator door, composed of a latch, a contact device connected with said latch, a latch engaging device, means for withdrawing and releasing said contact device, and a support on which said latch and said latch engaging device and said withdrawing and releasing means are all of them mounted, substantially as described.

9. The combination with an elevator door, an elevator car, and a latch operating piece on said car, of a latch, a device connected with said latch and arranged to make contact across the gap with said piece, a latch engaging device connected mechanically

with said door, and means for withdrawing and releasing said contact device according to the position of the door, substantially as described.

10. The combination with an elevator door, an elevator car, and a latch operating piece on said car, of a latch mounted on the wall of the elevator shaft, a device connected with said latch and arranged to make contact across the gap with said piece, a latch engaging device mounted on said wall and connected mechanically with said door, and means for withdrawing and releasing said contact device according to the position of the door, substantially as described.

11. The combination of a latch, a contact device connected with said latch, a pivoted disk, a latch engaging device carried by said disk, and a pin also carried by said disk for withdrawing and releasing said contact device, substantially as described.

12. The combination with an elevator door, an elevator car, and a latch operating piece on said car, of a bar fastened to said door, a pivoted disk engaged by said bar, a latch, a device connected with said latch and arranged to make contact across the gap with said piece, a latch engaging device carried by said disk, and a pin also carried by said disk for withdrawing and releasing said contact device, substantially as described.

13. Latching mechanism for an elevator door, composed of a latch, a contact device connected with said latch, a pivoted disk, a latch engaging device carried by said disk, a pin carried by said disk for withdrawing and releasing said contact device, and a support on which said disk and said latch are mounted, substantially as described.

14. The combination with an elevator door, an elevator car, and a latch operating piece mounted movably on said car, of a latch, a device connected with said latch and arranged to make contact across the gap with said piece, and means for withdrawing and releasing said contact device, substantially as described.

15. The combination with an elevator door, an elevator car, a car controller, and a latch operating piece mounted movably on said car, of means for moving said piece while making its position depend upon that of said controller, a latch, a device connected with said latch and arranged to make contact across the gap with said piece, and means for withdrawing and releasing said contact device, substantially as described.

16. The combination with an elevator door, an elevator car, a car controller, and a latch operating piece movably mounted on said car, of means for moving said piece while making its position depend upon that of said door as well as upon that of said controller, a latch, a device connected with said latch and arranged to make contact across the gap with said piece, and means for withdrawing and releasing said contact device, substantially as described.

17. The combination with an elevator door, an elevator car, and a latch operating piece movably mounted on said car, of means for moving said piece while making its position depend upon that of said door, a latch, a device connected with said latch and arranged to make contact across the gap with said piece, and means for withdrawing and releasing said contact device, substantially as described.

18. The combination with a car controller, reciprocating pieces arranged one to receive motion from across the gap, another to transmit motion across the gap, and a third to co-act with said controller, of a three armed lever having two of its arms connected to the reciprocating pieces which respectively receive and transmit motion across the gap, and a rock shaft connected with the third arm of said lever and with the third of said reciprocating pieces, substantially as described.

19. The combination with an elevator door, a latch for said door, a device connected with said latch and arranged to make contact across the gap, and door governed means for transmitting motion across the gap, of an elevator car, a car controller, a reciprocating piece receiving motion across the gap from said door governed means, a latch operating piece movably mounted on the car, a reciprocating piece co-acting with said controller, a three armed lever having two of its arms connected respectively with said piece which receives motion from across the gap and with said latch operating piece, and a rock shaft connected with the third arm of said lever and with said piece which co-acts with said controller, substantially as described.

20. The combination with an elevator door, a latch for said door, a device connected with said latch and arranged to make contact across the gap, an elevator car, and a latch operating piece movably mounted on said car, of door governed means for withdrawing and releasing said contact device and for moving said latch operating piece when the car is at the elevator landing, said means being arranged to bring said piece into unlatching position before said contact device is released, substantially as described.

21. The combination with an elevator car, and a piece located on said car and arranged to receive motion from across the gap, of an elevator door, a pivoted disk mounted on the wall of the elevator shaft and mechanically connected with said door, a cam formed by an incline on the face of said disk next the elevator car, and a motion bar mounted on said wall in position to be engaged by said cam and arranged for trans-

mitting motion imparted by said cam across the gap to said piece, substantially as described.

22. The combination with an elevator car, and a piece located on said car and arranged to receive motion from across the gap, of an elevator door, a cam whose movement is governed by said door, and a motion bar mounted to turn on a vertical axis and located in position to be engaged by said cam and arranged for transmitting motion imparted by said cam across the gap to said piece, substantially as described.

23. The combination with an elevator car, a latch operating piece thereon, and a piece thereon to receive motion from across the gap, of an elevator door, a latch for said door, a device connected with said latch and arranged to make contact with said latch operating piece across the gap, a pivoted disk mounted on the wall of the elevator shaft, a bar carried by the door and engaging said disk, a latch engaging device carried by said disk, a cam carried by said disk, and a motion bar mounted on said wall and arranged to transmit motion from said cam across the gap to said motion receiving piece on said car, substantially as described.

24. The combination with an elevator car, a latch operating piece thereon, and a piece thereon to receive motion from across the gap, of an elevator door, a latch for said door, a device connected with said latch and arranged to make contact with said latch operating piece across the gap, a pivoted disk mounted on the wall of the elevator shaft, a bar carried by the door and engaging said disk, a latch engaging device carried by said disk, a pin for withdrawing and releasing said contact device, a cam carried by said disk, and a motion bar mounted on said wall and arranged to transmit motion from said cam across the gap to said motion receiving piece on said car, substantially as described.

25. Mechanism for latching an elevator door and for transmitting motion across the gap between the wall of an elevator shaft and the elevator car, composed of a latch, a device connected with said latch and arranged to make contact across said gap, a pivoted disk, a latch engaging device carried by said disk, a cam carried by said disk, a motion bar engaged by said cam and arranged for transmitting motion across said gap, and a support on which said latch, said disk and said motion bar are all of them mounted, substantially as described.

26. Mechanism for latching an elevator door and for transmitting motion across the gap between the wall of an elevator shaft and the elevator car, composed of a latch, a device connected with said latch and arranged to make contact across said gap, a pivoted disk, a latch engaging device carried said disk, a motion bar engaged by said cam leasing said contact device, a cam carried by said disk, a motion bar engaged by said cam and arranged for transmitting motion across said gap, and a support on which said latch, said disk and said motion bar are all of them mounted, substantially as described.

27. The combination with an elevator car, and a piece located on said car and arranged to receive motion from across the gap, of an elevator door, a bar carried by said door, a pivoted disk mounted on the wall of the elevator shaft and engaged by said bar, a cam formed by an incline on the face of said disk next the elevator car, and a motion bar mounted on said wall in position to be engaged by said cam and arranged for transmitting motion imparted by said cam across the gap to said piece, substantially as described.

28. The combination with an elevator car, and a piece located on said car and arranged to receive motion from across the gap, of an elevator door, a pivoted disk mounted on the wall of the elevator shaft and mechanically connected with said door, a cam formed by an incline on the face of said disk next the elevator car, and a pivoted motion bar mounted on said wall in position to be engaged by said cam and arranged for transmitting motion imparted by said cam across the gap to said piece, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

THOMAS W. JENKINS.

Witnesses:

JOHN E. MCCULLY,

HELEN G. DALEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Corrections in Letters Patent No. 1,009,972.

It is hereby certified that in Letters Patent No. 1,009,972, granted November 28, 1911, upon the application of Thomas W. Jenkins, of Philadelphia, Pennsylvania, for an improvement in "Safety Devices for Elevators," errors appear in the printed specification requiring correction as follows: Page 6, line 53, first occurrence, for the word "of" read *on;* page 8, line 66, strike out the words "said disk, a motion bar engaged by said cam" and insert the words and syllable *by said disk, a pin for withdrawing and re-;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of December, A. D., 1911.

[SEAL.]

E. B. MOORE,

*Commissioner of Patents.*