July 18, 1933. H. C. TURNBULL 1,918,504

ELEVATOR CONTROL SWITCH

Filed July 18, 1931 2 Sheets-Sheet 1

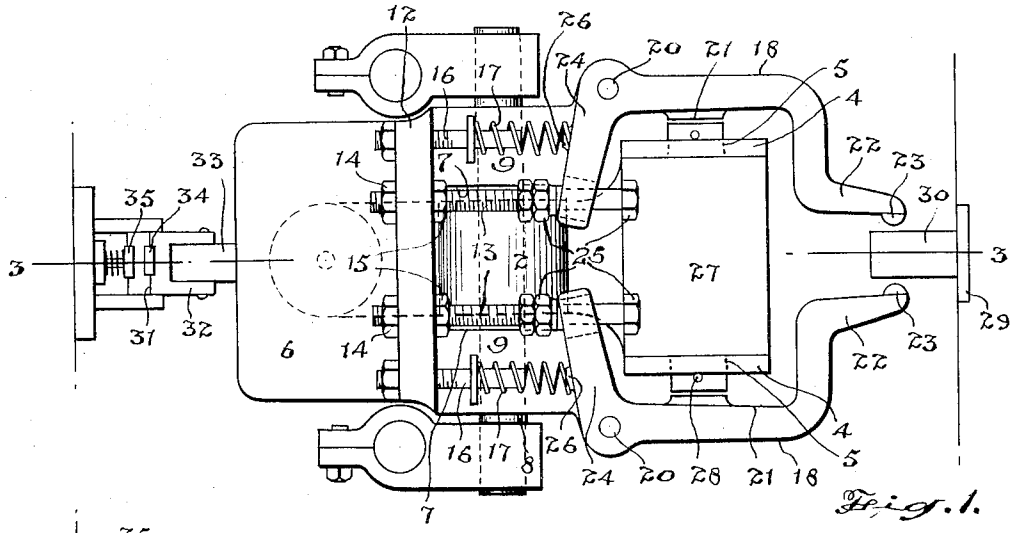


Fig. 1.

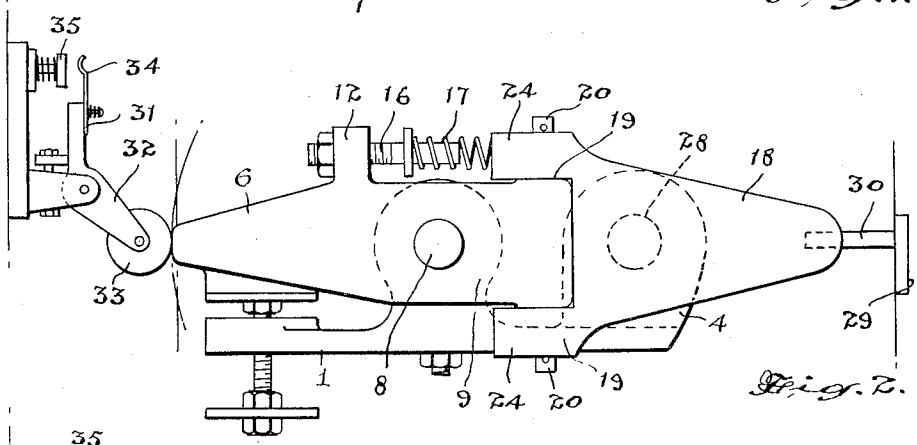


Fig. 2.

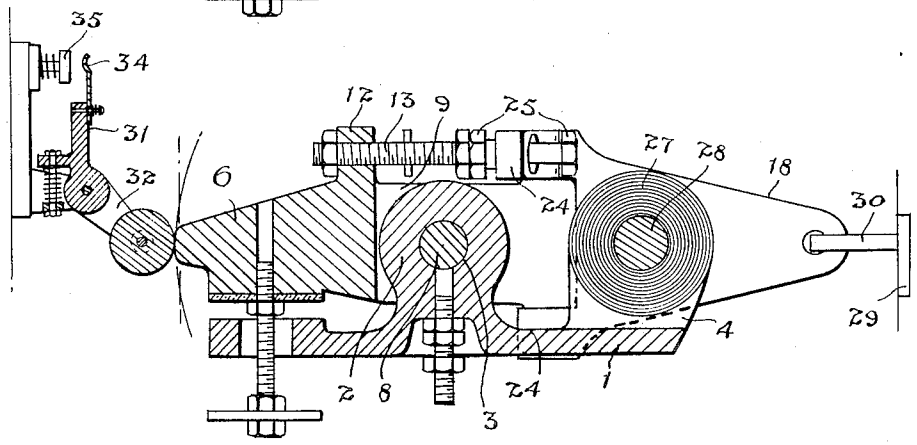


Fig. 3.

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ELEVATOR CONTROL SWITCH

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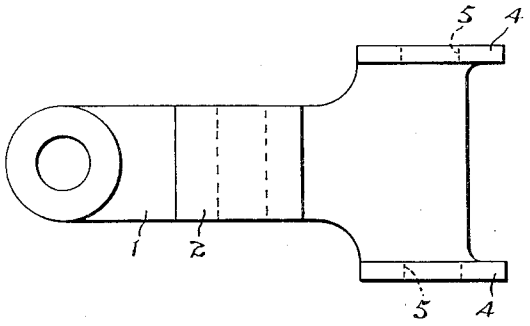


Fig. 4.

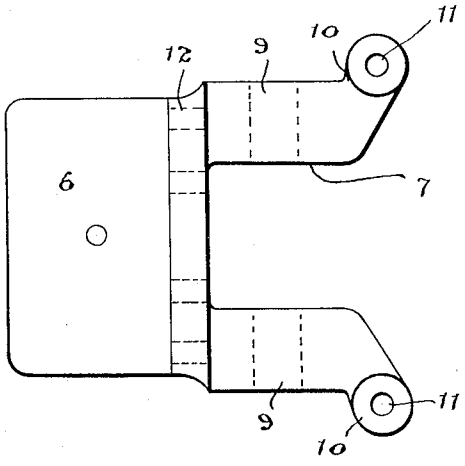


Fig. 5.

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UNITED STATES PATENT OFFICE

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ELEVATOR CONTROL SWITCH

Application filed July 18, 1931. Serial No. 551,737.

The principal object of this invention is to effect the automatic slowing down of the elevator car at a predetermined distance from the point of stopping, thereby ensuring the rapid but extremely smooth stopping of the car and the resultant saving of time and elimination of false stops.

A further object is to accomplish these desirable results without the necessity of the arrangement of wiring in the hatchway and there will be no physical contact of parts arranged in the hatchway with the elevator car.

The principal feature of the invention consists in the simple and novel construction of a tilting switch controlling member mounted on an elevator car, whereby a pair of arms pivotally mounted on the tiltable member are, through the energization of a magnet carried on the member and connected with the control device, operated to move into extremely close relationship to members arranged within the hatchway, to utilize the maximum value of magnetic flux created in said arms through the energizing of said magnet to effect the tilting of the switch operated member.

In the drawings, Figure 1 is a plan view of my improved switch operating device.

Figure 2 is a side elevational view of the device shown in Figure 1.

Figure 3 is a longitudinal sectional view through the line 3—3 of Figure 1.

Figure 4 is a plan view of the pivot bracket supporting the tilting member.

Figure 5 is a plan view of the rocking member illustrated in plan in Figure 2 with the magnetic arms removed therefrom.

In the operation of electrically controlled elevators it is desirable that means be provided to automatically operate a circuit controlling switch at a time predetermined in relation to the floor level to ensure the proper slowing down of the car and its being stopped at such floor level.

In the construction herein shown a base 1 adapted to be secured to the elevator car is formed with a horizontally disposed boss 2 having a central cylindrical recess 3, the base extending beyond the boss 2 being formed with a pair of vertically arranged and parallelly disposed circular lugs 4 each provided with a centrally arranged hole 5.

A rocker member 6 is formed of a substantially jaw shape having a central opening member 7 at one end adapted to receive the boss 2 and a pivot pin 8 extends through said boss and the side lugs 9 of the jaw portion of the rocker.

Outwardly flaring arms 10 extend from the ends of the lugs 9 and are formed with vertical pin holes 11.

A flange 12 is formed on the upper side of the rocker member 6 and a pair of bolts 13 are secured therein, being locked on either side by the lock nuts 14 and 15.

A pair of studs 16 are secured in the outer ends of the flange 12 and on their inner ends are supported the spiral compression springs 17.

A pair of clapper arms 18, each formed with a jaw-shaped end 19, embrace the outer ends of the flared arms 10 and having pin holes therein to be secured to said arms by the pins 20 passing therethrough.

The flat portion 21 of each of the clapper arms tapers outwardly from the pivot pin portion and is offset inwardly, the terminal ends 22 being arranged substantially parallel and having the contact points 23 arranged on the inward sides.

Tail arms 24 form part of each of the clapper arms extending inwardly from the pivot sections thereof substantially at right angles and in alignment with the upper pivot portions.

The inward ends of the tail arms are slotted longitudinally and loosely embrace the bolts 13.

Adjusting nuts 25 are arranged on the bolts 13 at either side of the tail arms to adjust the limit of movement of said tail arms and the compression springs 17 engage studs 26 on the tail arms, exerting a pressure thereagainst, tending to hold the tail arms engaging the nuts on the outward ends of the bolts and the offset terminal ends at their farthest extended position.

Mounted between the circular lugs 4 on the base 1 is an electro-magnet 27 which is

wired to the elevator controller and the fastening pin 28 forms the core of the magnet with the ends extending into close proximity to the flat side portions of the clapper arms 18.

A metal plate 29 secured to the inner wall of the hatchway in which the car operates is provided with an extension lug 30 which extends between the substantially parallel terminal ends 22 of the clapper arms, and said clapper arms pass thereby in the normal operation of the elevator.

The springs 17 normally hold the clapper arms the maximum distance apart, but when current is shunted through the coil of the magnet 27 through the operation of the control of the elevator, the magnetic flux pulls upon the clapper arms drawing them inwardly so that the contacts 23 thereof will pass in very close proximity to the lug 30 of the metal plate 29.

The magnetic flux of the core flowing through the clapper arms and across the gap between the terminal ends thereof flows through the lug 30 of the metal plate anchored in the hatchway as the car travels and the effect of this flux meeting said lug is to effect a lag on the clapper arms, which thereby causes the tilting of the whole structure upon the pivot pin 8. Mounted in the boss 2 of the base 1, at the opposite end of the device is arranged a switch member 31 fixed on a suitable portion of the elevator car structure and having terminals connected with a car control.

Upon one of the terminals is pivotally mounted an arm 32.

One end of the arm 32 carries a roller 33 which is engaged by the tail end of the rocker member 6 and when so engaged the contact 34 of the switch is held clear of the contact 35, thus opening the control switch on the car which is so arranged as to be opened or closed as may be required in the control system.

The rocker member is brought into engagement with the roller 33 of the switch member when the clapper arms are passing one of the lug plates 30 with the magnet 27 energized.

In the event of the elevator not being required to stop at a certain floor the control will not shunt the current through the magnet, consequently the spring 17 will hold the clapper arms apart their maximum distance, and there is no magnetic flux in said arms and if any permanent magnetism exists in said arms the terminal ends are sufficiently far from the lug 30 in passing so that there will be no tendency to swing the rocker on its pivot.

The device can be very accurately adjusted and it can be assembled as a unit and readily installed in position on a car. Further, the parts are of simple construction and are easily available for inspection, lubrication or adjustment.

The member 30 is herein shown of a fixed nature, but it may be found desirable to pivot said member to accentuate the tilting action of the member 6 or such tilting movement may be utilized for the purpose of operating a switch in the control system.

It may also, in some cases, be desirable to maintain the clapper arm support in a stationary position while the member 30 is movable and such an arrangement is contemplated within the scope of this invention.

What I claim as my invention is:

1. An elevator control switch comprising the combination of a circuit breaking member, a tilting member comprising a pair of relatively movable sections one of which is adapted to be displaced to operate said circuit breaking member, a stationary metallic member arranged in the path of movement of said last-mentioned section, and magnetic means controlling the disposition of said last-mentioned movable section relative to the said other section and to said stationary magnetic member to determine the displacement of said first-mentioned section.

2. An elevator control switch comprising the combination of a circuit breaking member, a tilting member adapted to be moved on its pivot to a position to engage and operate said circuit breaking member, a stationary metallic member, a magnet, and means pivotally and swinging in a plane intersecting the plane of movement of said tilting member under the influence of said magnet to move into close influential relation to said stationary metallic member to determine the position of the tilting member on its pivot.

3. An elevator control switch, comprising the combination of a member mounted on a horizontal pivot on the elevator car, a stationary member arranged in close proximity to said tiltable member in the movement of the car, magnetically controlled means on said tilting member and movable relative thereto into closer association with said stationary member in passing to utilize the magnetic flux to effect the tilting of the horizontal pivot member, said magnetically controlled means being movable bodily with said tilting member in effecting the tilting thereof and a switch operated by the tilting of said member.

4. An elevator control switch comprising the combination with fixed metallic members arranged in the elevator hatchway, a base rigidly secured upon the elevator, a rocker member pivotally mounted on said base to rock in a vertical direction, a pair of arms pivotally mounted on said rocker member and adapted to extend to either side of said stationary members in the movement of the elevator and being movable on said pivots relative to the rocker member to ap-

proach or recede laterally from the fixed metallic members, a magnet arranged between said pivotal arms adapted to concurrently swing them on their pivots into closer relationship with the respective sides of the fixed metallic members in the elevator shaft and to create a magnetic flux therein, to determine the pivotal movement of said rocker member, and a circuit breaking member operatively engaged and disengaged by said rocker member in accordance with its movement.

5. An elevator control switch comprising a base having a horizontal boss, a pivot pin mounted in said boss, a rocker member spanning said boss and mounted on said pivot pin, a pair of arms pivotally mounted on said rocker member to swing laterally thereon, spring means for holding said arms in an outwardly distended position, a pair of spaced lugs extending upwardly from said base between said pairs of arms, an electro-magnet rigidly supported by said lugs and having a core extending therethrough into influential relation to said arms at a point intermediate of their length and adapted to draw them simultaneously inward against the outward thrust of said springs.

6. An elevator control switch comprising a base having a horizontal pivot and an electro-magnet horizontally mounted having its axis parallel to said pivot, a rocker member pivotally mounted on said pivot, a circuit breaking device operatively engaged by said rocker member, a pair of pivots perpendicularly arranged on said rocker member, an arm mounted on each of said pivots having an inwardly offset inner end and an inwardly offset outer end, guide members engaging and limiting the movement of the inner ends of said arms, compression springs engaging the inner offsets of said arms and adapted to hold said arms normally distended but capable of yielding to the magnetic pull of the pull of the magnet on said arms and means adapted to extend between the outer ends of said arms in influential relation thereto and co-operating with said electro-magnet to determine the rocking of the rocker member on its pivot.

HARRY C. TURNBULL.