

March 16, 1926.

R. CONKLIN

1,576,950

SAFETY SHOE TRIPPING MECHANISM FOR DOORS

Filed April 11, 1921

2 Sheets-Sheet 1

Fig. 2.

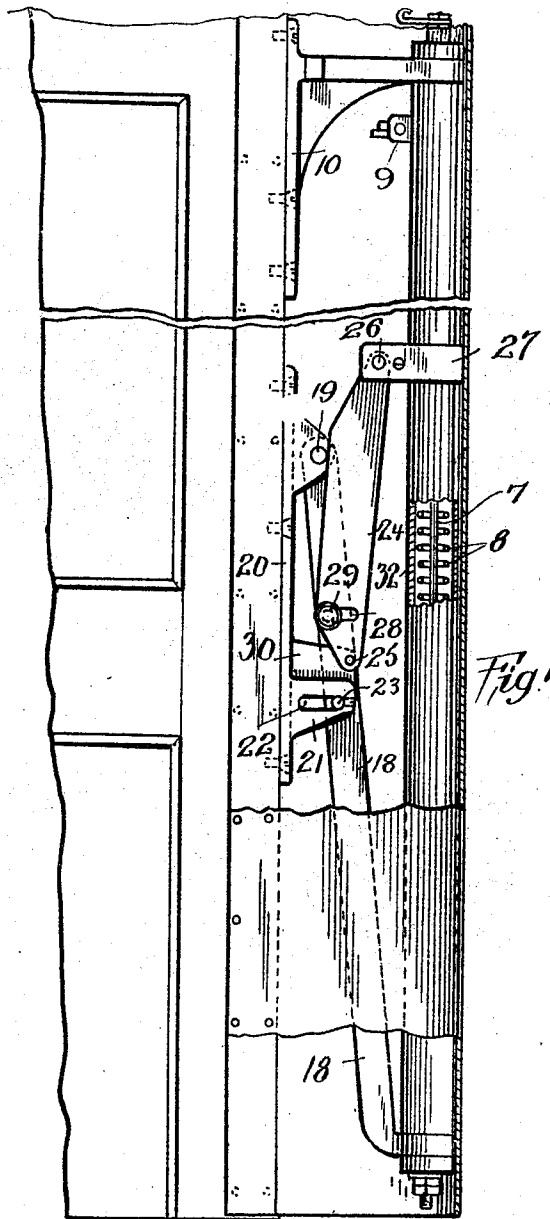


Fig. 1.

Inventor
Ramon Conklin
by Harry Marby & Marby

March 16, 1926.

R. CONKLIN

1,576,950

SAFETY SHOE TRIPPING MECHANISM FOR DOORS

Filed April 11, 1921

2 Sheets-Sheet 2

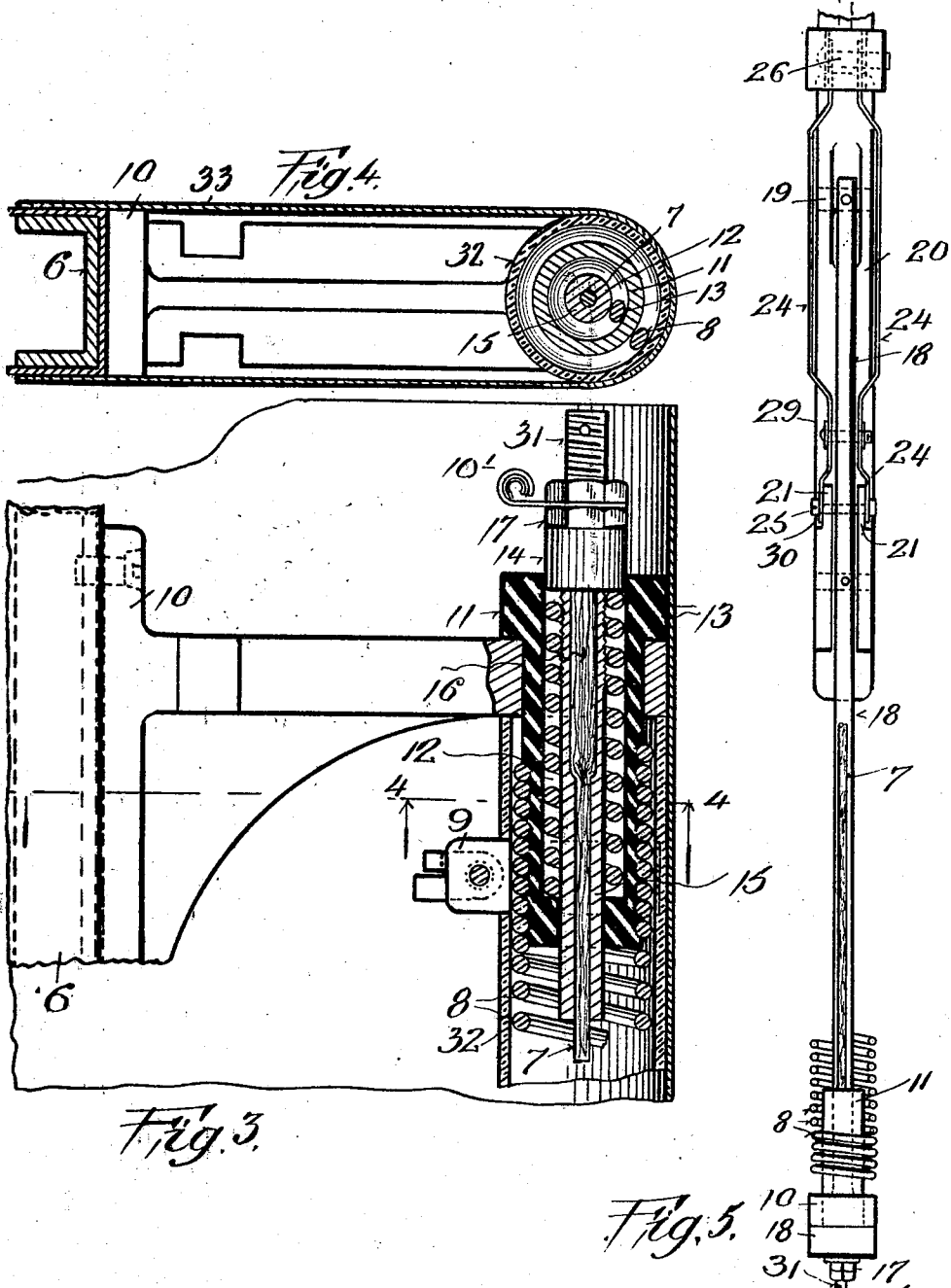


Fig. 5.

Inventor
R. Conklin

by his atty Darby & Darby

UNITED STATES PATENT OFFICE.

ROSCOE CONKLIN, OF RAHWAY, NEW JERSEY, ASSIGNOR TO NATIONAL PNEUMATIC COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

SAFETY SHOE-TRIPPING MECHANISM FOR DOORS.

Application filed April 11, 1921. Serial No. 460,415.

To all whom it may concern:

Be it known that I, ROSCOE CONKLIN, a citizen of the United States, residing at Rahway, in the county of Union and State of New Jersey, have made a certain new and useful invention in Safety Shoe-Tripping Mechanism for Doors, of which the following is a specification.

This invention relates to safety shoe tripping mechanism for doors.

The object of the invention is to provide a mechanism which is simple in structure and efficient in operation applied to the front edge of a door to effect the closing of an electric circuit in case the door, in closing, encounters an obstruction.

A further object of the invention is to provide a safety shoe tripping mechanism of the character referred to, which will cause the desired circuit contact to be made where the encountered obstruction is at the lower edge of the door, such, for instance, as the foot or heel of a person.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination and location, and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings and finally pointed out in the appended claims.

Fig. 1 is a view in side elevation showing the edge of a door with the safety shoe tripping mechanism embodying my invention applied thereto, parts being broken and parts in section;

Fig. 2 is a view in elevation looking towards the edge of the door;

Fig. 3 is a broken view in vertical central section showing the construction for mounting and securing the coil and wire contact members at the upper edge of the door;

Fig. 4 is a view in section on the line 4—4 Fig. 3, looking in the direction of the arrows;

Fig. 5 is a view in edge elevation of the door showing the application of the safety shoe tripping mechanism thereto, the contact members being broken off.

The same part is designated by the same reference number wherever it occurs throughout the several views.

In modern passenger transit operation it is a common practice to employ motor actuated doors, that is, subway, surface and

elevated cars or trains are equipped with doors which are operated by motors to move to closed or else to opened position. It is a common practice, in order to secure safety of the passengers in boarding and alighting from cars or trains employing such power actuated doors, to provide means whereby, if the door in closing encounters an obstruction, such, for instance, as the arm, shoulder, leg or other portion of a person's body, the motor which is acting to effect the closing movement of the door is automatically arrested or reversed so that the obstruction to the closing movement of the door may be disengaged and removed. For this purpose it has been customary to mount upon the free edge of the door a safety shoe tripping device which, when an obstruction is encountered, yields towards the door, and such yielding movement is designed to effect necessary control of the door operating motor. The desired motor control is effected, according to modern practice, electrically, the shoe mounted at the free edge of the door operating to yield and such yielding movement being employed to close an electric circuit, which circuit contains the motor control devices. In one form of contact mechanism, for safety shoe tripping purposes, a coil spring is employed which forms one terminal of the electric circuit, and a wire is mounted to extend longitudinally through the coil spring, and constitutes the other terminal of the electric circuit. The coil spring terminal and the wire terminal disposed longitudinally through the coil are both mounted at the edge of the door in suitable brackets connected respectively at the upper and lower edges of the door, said terminals being offset from the edge of the door so that if the door in closing encounters an obstruction, the coil spring terminal being suspended only at its ends under tension, yields sufficiently for it to contact with the wire terminal, which likewise is maintained under endwise tension, by suspension at its ends. While this arrangement has been proven to be exceedingly delicate and satisfactory in practice, where an obstruction is encountered at a considerable distance above the lower or the upper edge of the door, the danger is incurred by reason of the longitudinal tension under which the coil and wire are required to be held, at upper and lower ends, of failing to effect contact be-

tween the coil terminal and the wire terminal where the obstruction is encountered at a point close to the lower edge of the door, such, for instance, as the foot or heel of a person. It is among the special purposes of my present invention to provide means whereby this danger is avoided, and the desired electrical contact established between the coil terminal and the wire terminal, even though the obstruction is encountered at the extreme lower edge of the door.

It is also among the present purposes of my invention to provide a simple and effective means for securing and supporting under tension the ends of the coil and wire terminals.

Referring to the drawings, reference numeral 6 designates a door, preferably of the sliding type, at the front edge of which the safety contact shoe device is attached. The safety contact shoe device includes a coil spring 8, and a wire 7, constituting, respectively, the terminals of an electric circuit, the circuit being connected to said coil terminal through a suitable contact clip device indicated at 9, Figs. 1 and 3, and to the wire terminal 17, through a suitable clip device indicated at 10, Figs. 1 and 3. The contact wire 7 extends longitudinally through, but is maintained normally out of, electric contact with the coils of the contact terminal 8, and in accordance with my invention said wire 7 and coil 8 are supported and maintained under longitudinal tension so that when the safety contact shoe device is mounted upon a door employed in connection with the operation of street cars, railways or the like, the ordinary vibrations to which the door and shoe device are subjected by the operation of the cars will not cause accidental contact to be effected between the wire and the coil. The longitudinal tension under which these terminals 7 and 8 are maintained, however, will not prevent the coil yielding laterally under comparatively light pressure at points intermediate the ends of said terminals, and sufficiently to effect contact with the terminal wire 7, thereby closing the electric circuit including said terminals. This circuit is designed to include suitable control devices for the motor through which the door is operated to effect control of such motor, in a manner now well understood and in extensive use.

In order to support the terminals 7 and 8 under longitudinal tension, I provide a bracket 10, which is fastened to the front or free edge of the door 6, at the upper end of such edge. Mounted vertically in this bracket is a shouldered sleeve 11, of suitable insulating material, the lower end of which is preferably corrugated spirally to receive the windings of the terminal coil 8, said

windings being tightly applied around the exterior surface of the lower end of the sleeve 11, and in the exterior corrugations of said sleeve, clearly shown in Fig. 3. The interior bore of sleeve 11 is formed with a chamber 12, in which is received a coiled tension spring 13, which seats against the lower end wall of the chamber 12, at one end, and at its other end against the head 14 of a metallic sleeve 15, which extends longitudinally through the insulating sleeve 11. The end of the wire terminal 7 is preferably stranded, as shown at 16, and the strands are received in the head or block 14, and preferably soldered or otherwise fixedly secured therein. The tension of spring 13 is exerted to maintain a longitudinal tension upon the wire terminal 7, such tension being adjustable by means of a nut 17 mounted upon a threaded end portion 31, of the metallic sleeve 15.

It is to be understood that the same tension structure is to be employed at the lower end of the coiled and wire terminals, thereby securing the desired longitudinal tension of these members. A description of the terminal connections at the upper ends of the coiled and wire terminals, however, will answer for both ends thereof. Instead of the longitudinal tensioning connections for the lower ends of the wire and coil terminals being mounted upon a fixed bracket extending from the front edge of the door, said tensioning structure is mounted in an arm of a lever 18, which is pivotally mounted at its upper end as at 19 upon a bracket 20 secured to the front edge of the door, so that said lever may swing towards and from the front edge of the door and in the plane of the door. The bracket 20 is formed with ears 21, which are slotted as indicated at 22, and a guide pin 23 carried by the lever 18 extends into the slots 22. A yoke 24 is pivotally mounted at its lower ends as at 25 upon the ears 21, and at its upper end is pivotally connected as at 26 to a strap 27, which engages around the coiled terminal 8. The arms of the yoke 24 are slotted as indicated at 28, and studs 29 carried by the lever 18 work through said slots.

The pivots 25 of the yoke arms 24 are studs which are tapped into ears 21. The relative lengths of the long lever 18 and the comparatively short yoke 24 are such that when the lever 18 is rocked about its pivot 19 and towards the edge of the door, the pins 29 engage the yoke 24 and rock said yoke also towards the edge of the door, thereby causing the band or strap 27 to move towards the door and hence pulling the coiled terminal 8 laterally towards and eventually into contact with the terminal 7, the latter not being affected by the pull exerted upon the coil terminal through the operation of the lever system referred to.

It is desirable that the safety shoe contact device and its supporting connections shall lie within the planes of the opposite sides or surfaces of the door, and to secure this result the outer side surfaces of the ears 21 of bracket 20 are recessed as indicated at 30, to receive the ends of the yoke members or arms 24.

The lower end of the arm or lever 18, in which are mounted the tension connections for the coil and wire terminals, extends to a point closely adjacent the lower end of the front edge of the door, and in proximity with the floor of the car or other structure in which the door is employed. While, under ordinary circumstances, the longitudinal tension imposed upon the wire and coil terminals, particularly at their points of connection or suspension, is so great as to require a very considerable pressure in order to laterally displace the surrounding coiled terminal into contact with the wire terminal, particularly in the region of their points of tension connection, the resistance of the coil terminal to lateral displacement increases from its mid-length towards its ends. By reason of this, should the foot or heel of a person be caught between the front edge of the door at the lower end of such edge as the door is closing, the serious danger is incurred of injuring the foot or heel or other part of the body so caught before the circuit connection is completed between the coil and the wire. With an arrangement, however, such as above described, with the lower ends of the coil and wire terminals connected to the lower end of the rocked lever 18, it will be observed that if the foot or heel of a person, for instance, should be encountered at the front edge of the door in closing, comparatively light pressure is required to rock the lever 18, and such rocking movement through its comparatively long leverage effects a lateral displacement of the coil 8, at a point nearer its mid-length, and hence at a point where it is more flexible and sensitive to lateral displacement by means of the combined lever structure afforded by the yoke 24 loosely connected to the lever 18, as above described.

If desired, and ordinarily, the wire and coil terminals are enclosed within a tubing 32 of suitable fabric, and a strap 33 of canvas or similar material is looped around the terminal or safety shoe contact device, and secured to the side surfaces of the door.

A structure such as above described, while simple, is exceedingly efficient and sensitive, and without interfering with the ordinary lateral displacement of the coil terminal at points of contact therewith, where it is sufficiently flexible and yielding, also effects such lateral displacement even though the obstruction encountered thereby is at the lower end of the shoe where otherwise its

resistance to lateral displacement would be greatest.

It will be understood that many changes and variation in the details of structure might readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the details shown and described.

But having now set forth the objects and nature of my invention, and a construction embodying the principles thereof, what I claim as new and useful and my own invention and desire to secure by Letters Patent is:

1. In a safety shoe contact device for power operated doors the combination with a suspended coil spring and a wire located longitudinally therein and constituting circuit terminals, means for maintaining said circuit terminals under longitudinal tension, a mounting for one end of said terminals, including a rock lever associated with a strap, said strap embracing said coil terminal, and loose motion connections intermediate said lever and strap member.

2. In a safety shoe contact mechanism for power actuated doors, a coil and a wire arranged to extend longitudinally through the coil, the said coil and wire constituting circuit terminals, means for supporting the upper ends of said terminals at the upper end of the front edge of the door, of a lever pivotally connected to the door adjacent the lower end of its front edge, said lever at its lower end forming a support for the lower ends of said terminals, a band or strap embracing the coil terminal member, and connections intermediate said lever and strap whereby, when said lever is rocked, said coil member is laterally displaced to effect circuit contact with said wire terminal member.

3. A safety shoe contact device for power actuated doors including suspended relatively movable circuit terminals mounted at the front edge of the door, and a support for the lower ends of said terminals, including a pivotally mounted lever and an independently mounted yoke connected to one of said terminals, and having connection with said lever whereby, when said lever is displaced, said circuit terminals are moved relatively to each other at points intermediate the ends thereof to complete circuit connection between them.

4. A safety contact shoe device for power actuated doors, including suspended relatively movable contact members, a lever pivotally mounted on the door, and connected to the lower ends of said members for transmitting vibrations, a yoke also pivotally mounted upon the door, and connected to one of said members, and connections between said lever and yoke whereby, when said lever is rocked, intermediate portions of

said members are relatively moved into contact relation with each other.

5 A safety shoe contact device for power actuated doors, including a coil terminal member and a wire terminal member extending longitudinally through the coil, and means for imposing a longitudinal tension upon said members, said members including a sleeve upon which a coil member is wound, a tubular member extending through said sleeve, and within which the end of the wire member is anchored, and a tension spring interposed between said sleeve and tubular member.

15 6. A safety shoe contact device for power actuated doors, including a coil terminal member and a wire terminal member extending longitudinally through the coil, and means for imposing a longitudinal tension upon said members, said members including a sleeve upon which a coil member is wound, a tubular member extending through said sleeve, and within which the end of the wire member is anchored, and a tension spring interposed between said sleeve and tubular member, and means for adjusting the tension of said tension spring.

20 7. A safety shoe contact device including a coiled contact member and a wire contact member, said wire member extending longitudinally through the coiled member, an insulating sleeve, a support secured to the

edge of the door, and adapted to receive said sleeve, said coiled contact member being coiled at its end upon said sleeve, said sleeve having an interior chamber, a tubular member extending through said sleeve, and into which the end of the wire contact member extends and is anchored, a head for said tubular member, and a spring arranged within said chamber and interposed between the end wall of said chamber and said head.

8. A safety shoe contact device including a coiled contact member and a wire contact member, said wire member extending longitudinally through the coiled member, an insulating sleeve, a support secured to the edge of the door, and adapted to receive said sleeve, said coiled contact member being coiled at its end upon said sleeve, said sleeve having an interior chamber, a tubular member extending through said sleeve, and into which the end of the wire contact member extends and is anchored, a head for said tubular member, and a spring arranged within said chamber and interposed between the end wall of said chamber and said head, and means for adjusting the tension of said spring.

In testimony whereof I have hereunto set my hand on this 4th day of April, A. D. 1921.

ROSCOE CONKLIN.