May 9, 1933. R. K. WINNING 1,908,205

FOOT OPERATED SWITCH MECHANISM

Filed March 29, 1930

FIG. 1.

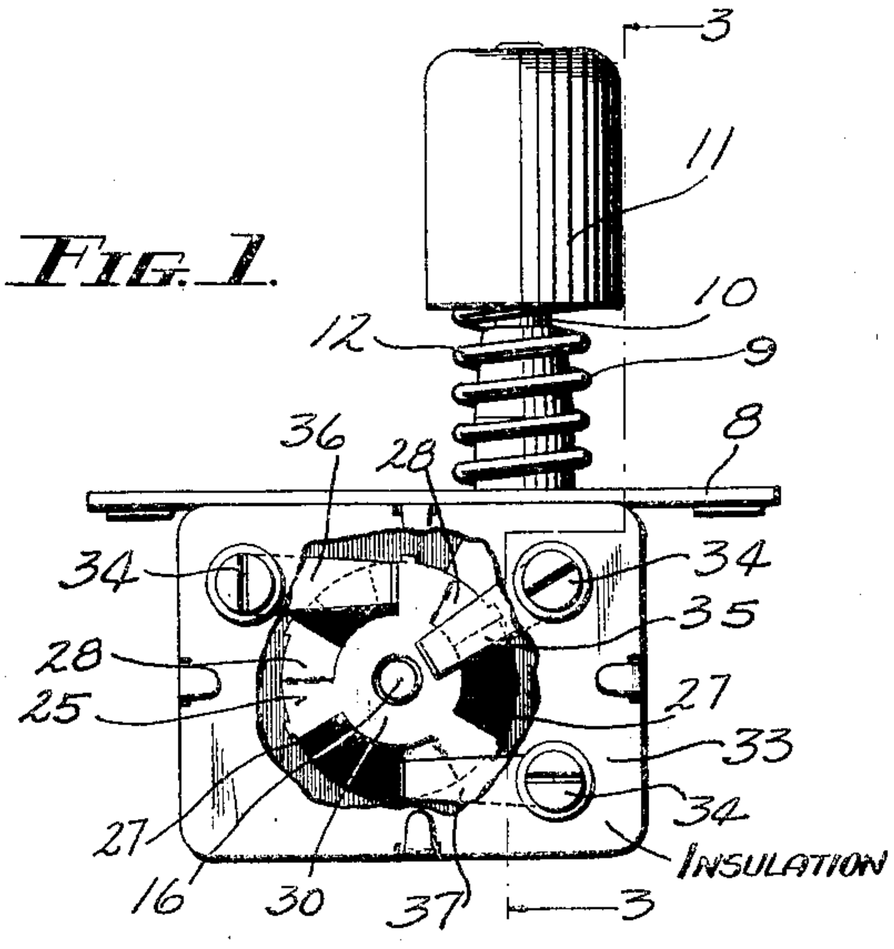


FIG. 2.

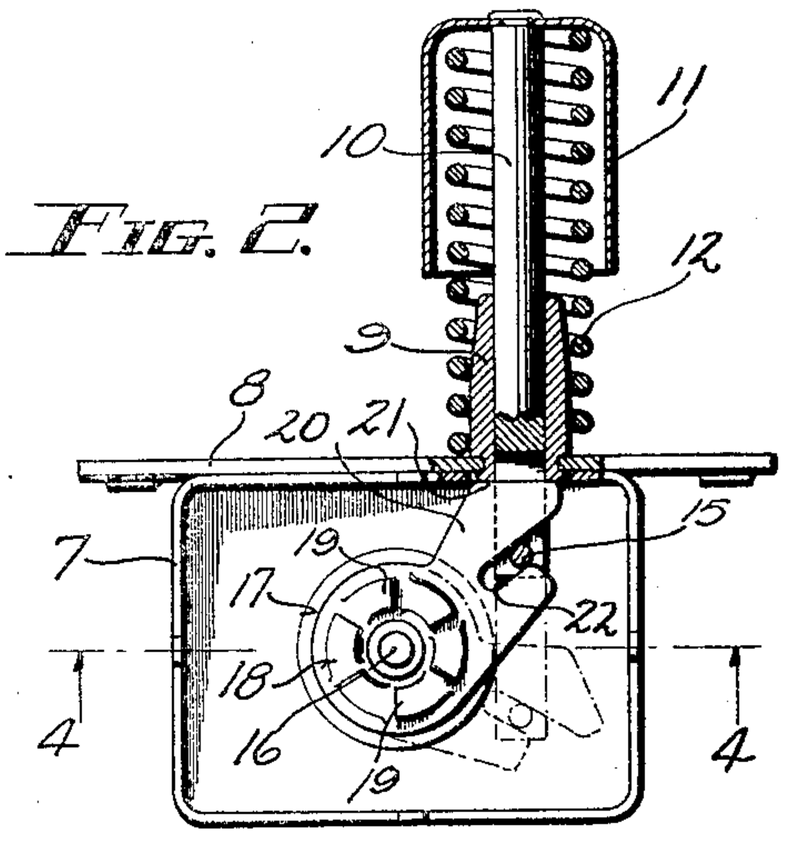


FIG. 3.

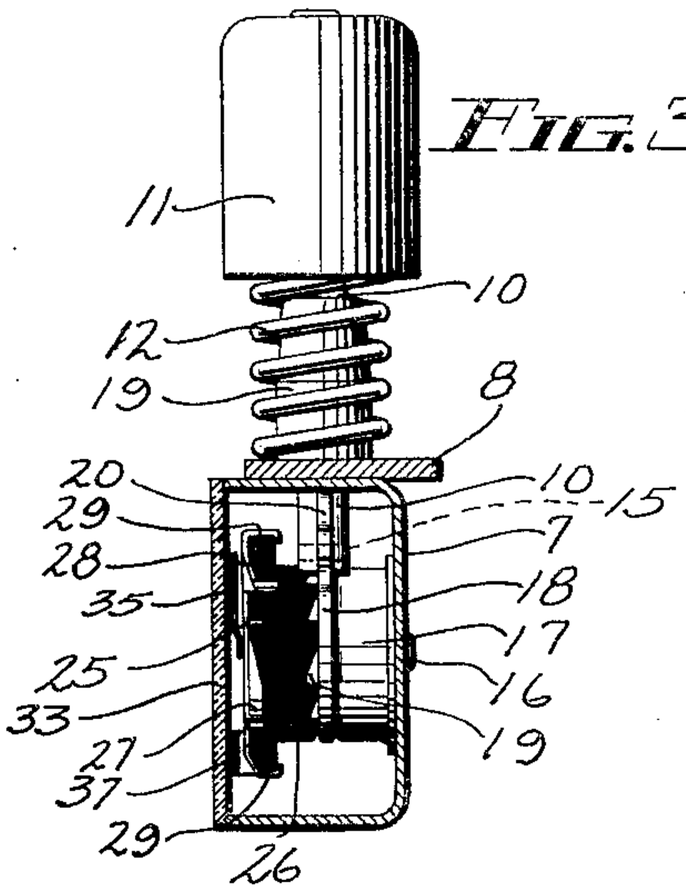


FIG. 4.

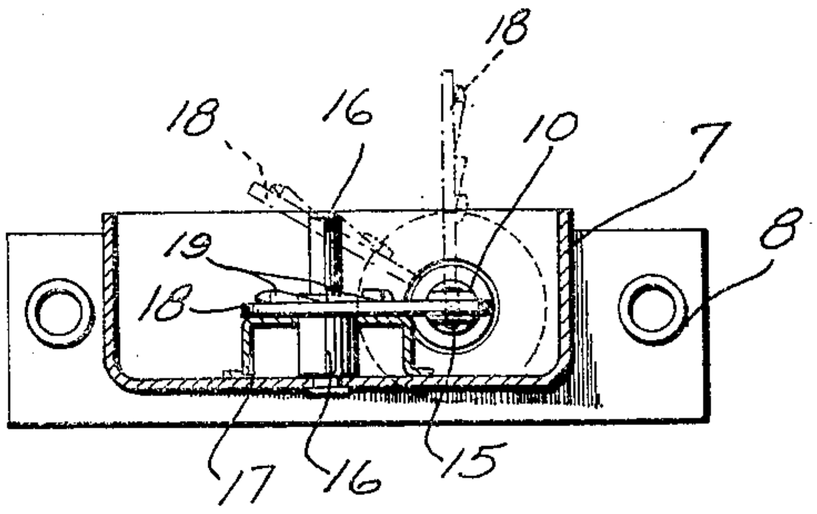


FIG. 5.

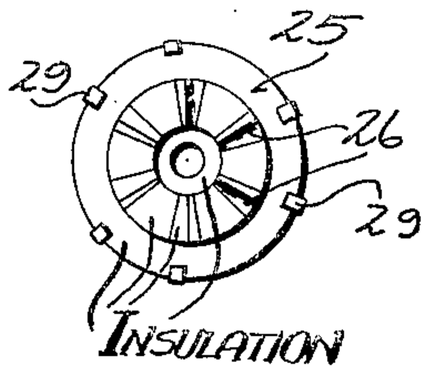
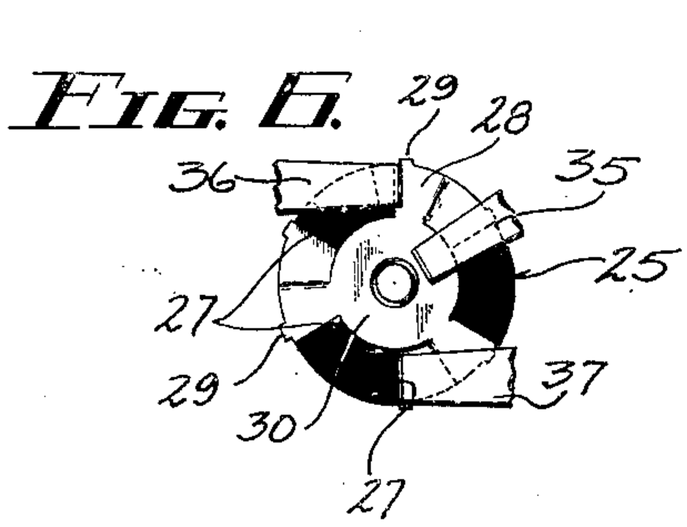


FIG. 6.



Inventor

Robert K. Winning

By Wheeler, Wheeler & Wheeler

Attorneys

Patented May 9, 1933 1,908,205

UNITED STATES PATENT OFFICE

ROBERT K. WINNING, OF WAUWATOSA, WISCONSIN, ASSIGNOR TO CLUM MANUFACTURING COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN

FOOT OPERATED SWITCH MECHANISM

Application filed March 29, 1930. Serial No. 439,914.

This invention relates to improvements in foot operated switch mechanisms. The type of switch herein disclosed is particularly adapted for controlling head light and dimming circuits in automotive work, and the present application constitutes a companion to my application 370,249 now Patent No. 1,763,028, dated June 10, 1930.

It is the primary object of the present invention to provide further simplification of structure, to facilitate the manufacture of the individual parts and their assembly. It is also my purpose to eliminate rack mechanism heretofore used in the operation of a switch of this character, and to provide for the positive pedal operation of the switch while eliminating any possibility of an open circuit. It is also my purpose to provide for a positive snap action in "making" as well as "breaking" the circuits.

In the drawing:

Figure 1 is a side elevation of a switch embodying this invention, with portions of its terminal head broken away to expose the interior mechanism.

Figure 2 is a similar view with the terminal head and contacts wholly removed, the pedal and associated parts being shown in section.

Figure 3 is a sectional view taken in the plane indicated at 3—3 in Fig. 1.

Figure 4 is a sectional view taken in the plane indicated at 4—4 in Fig. 2, and illustrating in dotted lines the method of assembly.

Figure 5 is a detail view in elevation, of the rear of the moving contactor showing the ratchet teeth thereof.

Figure 6 is a detail view showing the preferred construction for establishing one circuit before the other is broken.

Like parts are identified by the same reference characters throughout the several views.

The switch case 7 carries a mounting plate 8 which is welded thereto, the tubular guide 9 being riveted to the mounting plate before the welding operation. The pedal rod 10 is reciprocable through guide 9 in the usual way and carries a combined pedal and spring guard 11 within which, and about the guide 9, is a compression spring 12 for raising the pedal.

The inner end of rod 10 is bifurcated, and a pin or rivet 15 crosses the slot between the legs thus formed at the end of the rod.

Centrally riveted in the case 7 is a stud or post 16 upon which I mount a cup-shaped spacer 17 at the level of the slot which bifurcates the end of rod 10. Centered upon this stud, and positioned by the spacing member 17, is a contact actuator 18 best shown in Figs. 2 and 4. The actuator comprises a sheet metal plate of generally disk-like contour upon which are formed ratchet teeth 19 and a radially extending arm 20 which is in pivotal connection with the pedal rod 10 upon the pin 15 thereof. Margin 21 of this arm is finished to engage a wall of casing 7 to limit the outward movement of the pedal.

A slot at 22 in the arm is engaged over pin 15. The arm itself fits closely into the slot of the pedal rod and serves to fix the rotative position thereof. The parts are assembled by thrusting arm 20 into the slot of the rod with the actuating disk or plate 18 held erect, as shown in dotted lines in Fig. 4. The assembled actuator 18 and pedal are then rotated upon the axis of the pedal through the intermediate dotted line position of Fig. 4 to the full line position thereof, the central opening in the actuator being engaged upon pin 16 in the course of the movement described.

The moving contact carrier is now positioned on stud 16, upon which it rotates with an intermittent step movement. The contact carrier 25 has a dielectric body portion which may conveniently be made of a phenol condensation product. The rear of this body portion has ratchet teeth at 26 complementary to the teeth 19 of the actuator.

The front face of the contact carrier 25 is likewise provided with ratchet teeth at 27. The entire approaches to alternate teeth are covered with the sheet metal contact 28 which has tongues at 29 extending about the margins of the contact carrier to anchor the contact thereon. The radial portions of the moving contact are connected by a central disk at 30.

Case 7 is closed by a dielectric terminal head 33 which carries terminals 34 and contact springs 35, 36 and 37. These springs act as dogs for engagement with ratchet teeth 27 of the moving contact carrier. They also furnish the necessary resilient pressure for proper interaction of the ratchet teeth 19 of the actuator and the complementary teeth 26 at the rear of the moving contact carrier. Finally, they serve as fixed contacts with which the moving contact 28 interacts to establish circuits alternately between the current supply terminal spring 35 and the current delivery springs 36 and 37. The supply spring 35 is in permanent engagement with the central disk 30 of the moving contact 28, whereas contacts 36 and 37 are alternately engaged with the moving contact except at the moment of change, when they are both temporarily engaged therewith at the same time.

The construction is such that one of the springs 36 or 37 passes over one of the teeth 27 slightly in advance of the other. By referring to Fig. 6 it will be observed that spring 37 has dropped from its nonconducting tooth into engagement with the portion of the moving contact 28 therebeneath. The snap action resulting from the passage of the spring over the tooth has eliminated arcing. At this moment contact spring 36 is still engaged with the moving contact 28 at the top of the tooth over which this spring is about to pass. Thus circuits are closed from spring 35 to both of springs 36 and 37 momentarily.

This simultaneous electrification of both of the output circuits cannot continue however, since, if the actuating pedal is given a full stroke, the contact carrier will rotate to a point where spring 36 must clear the tooth with which it is interacting at the moment. If pedal 11 is not given a full stroke, but its stroke is sufficient to engage spring 37 with its tooth, the return movement of the pedal will nevertheless causes a slight additional rotation of the contact carrier sufficient to engage spring 36 behind its tooth also.

The slight additional rotation of the contact carrier produced in the return movement of the pedal is partially attributable to the flattening, and thereby the lengthening, of spring 37 as teeth 19 and 26 pass each other in the return movement of the parts. As these ratchet teeth pass, they force the contact carrier forward axially of stud 16, thereby compressing spring 37. While the spring contacts are thus compressed, the pedal approaches the limit of its outward stroke, and the ratchet teeth 19 and 26 reach the point where they intermesh in a new position of engagement. These teeth, particularly the stamped or formed teeth 19, do not have clearly defined margins and consequently, under the pressure of the contact springs, there is a cam action tending to advance the contact carrier slightly. In its advance, contact spring 36 falls from the elevated position in which it appears in Fig. 6, thereby breaking its circuit with a snap action substantially eliminating arcing.

I have thus provided a double ratchet mechanism which is effective even though the pedal is not moved for a full stroke and which, in either of a plurality of positions, is sufficient to hold the parts for a change of circuit. I have likewise provided a mechanism in which a distinct snap action occurs both in the "make" and "break" of the electrical circuits, ensured by the fact that contact is established at the bottom of the respective teeth instead of being broken at the bottoms thereof, as in the device shown in my previous application above identified.

The mechanism herein disclosed operates with little friction, its parts are simple and easily manufactured, and its assembly is greatly facilitated, the last item being very important as compared with any existing structures for similar purposes.

I claim:

1. A switch comprising the combination with a support carrying a tubular guide and a pivot stud anchored at one end to said support and having its opposite end free, of an axially slotted rod reciprocable in said guide and provided with a pin extending transversely of the slot therein, a contact actuator fulcrumed upon the stud and provided with a bifurcated arm engaged within the slot of said rod and extending at each side of the pin, together with relatively fixed and movable contacts of which the latter is arranged to receive movement from said actuator, said rod being dependent upon said actuator for its rotative position when the parts are assembled, and being free to rotate to allow said contact actuator to swing onto and off of the free end of said stud.

2. A switch comprising an apertured case provided with a central pivot stud anchored at one end to said case, a rod reciprocable through the aperture of the case and the following elements disposed on said stud in the order recited, a positioning member apertured to receive the stud, a contact actuator oscillatable upon the stud and bearing upon said member, an arm pivotally connecting said actuator with said rod, and a set of relatively fixed and movable contacts of which the former are mounted on the case and the latter are mounted on said stud and operable by said actuator.

3. A switch comprising an apertured case provided with a central pivot stud anchored at one end to said case, a rod reciprocable through the aperture of the case and the following elements disposed on said stud in the order recited, a positioning member apertured to receive the stud, a contact actuator

1931, in the name of Walter H. Wedger, and the sole applied to the shoe bottom and held under pressure while the cement sets. The softener may be applied both to the sole and to the shoe bottom, though under most conditions it is entirely satisfactory to apply it only to the sole. The pressure can advantageously be applied to the shoe and sole with the aid of a machine of the character disclosed in an application for Letters Patent of the United States Serial No. 388,739, filed August 27, 1929 in the name of Milton H. Ballard.

After the sole has been attached its edge is trimmed, set, etc., a heel 52 attached, the last removed and the shoe treed in the usual manner.

The welted construction of the forepart of my improved shoe eliminates the tendency to burn the foot which is found in many shoes having cement attached soles and results from the sealing or "air-proofing" action of the film of cement between the outsole and the shoe upper in such shoes. In this respect the shoes manufactured in accordance with my invention resemble Goodyear welt shoes and permit the so-called "breathing" through the inseam which prevents overheating of the foot. On the other hand, the shank construction herein disclosed permits the use, if desired, of soles having extremely narrow shank portions, "cottage roof" shanks or indeed shanks of any other desired character. In this connection it should be noted that molded or conformed soles may be used and that the fitting of wood heels is facilitated in that the construction of the shoe bottom permits the width of the sole at the heel breast line to be governed exactly by the width of the heel.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A shoe having its upper secured in lasted relation to its insole at its shank portion by staples driven through the marginal portion of the upper materials and into the insole in such a manner that the legs of the staples are deflected without passing entirely through the insole, and having its upper at the forepart held in lasted relation to the insole by stitching passing through a welt extending about the forepart of the shoe and through the marginal portion of the shoe upper and the between substance of the insole, the outsole of the shoe being secured to the marginal portion of the shoe upper at the shank and to the welting extending about the forepart of the shoe upper as well as to the adjacent portion of the shoe bottom by pyroxylin cement.

2. A shoe having its upper secured at its shank portion in lasted relation to its insole by fastenings driven through the marginal portion of the upper and into the insole in such a manner that they do not extend entirely through the insole, and having its upper at the forepart held in lasted relation to the insole by stitching passing through the between substance of the insole, the marginal portion of the shoe upper and a welt extending about the forepart of the shoe, the outsole of the shoe being cement attached to the marginal portion of the shoe upper at the shank and to the welting extending about the forepart of the shoe upper as well as to the adjacent portion of the shoe bottom.

3. That improvement in methods of manufacturing shoes which comprises mounting upon the bottom of a last an insole the forepart of which is provided with a peripherally extending lip located a short distance from the margin of the insole, working the marginal portion of the shoe upper into lasted relation to the insole, securing it in lasted relation flat against the shank portion of the insole with permanent fastenings and against the lip at the forepart of the insole, stitching a welt to the marginal portion of the lasted shoe upper and to the lip at the forepart of the insole, trimming the surplus upper, welt and insole-lip material from the shoe bottom, and attaching an outsole to the shoe bottom with pyroxylin cement.

4. That improvement in methods of manufacturing shoes which comprises mounting upon the bottom of a last an insole the forepart of which is provided with a peripherally extending lip located a short distance from the margin of the insole and the shank portion of which is without such a lip, working the marginal portion of the shoe upper into lasted relation to the insole, securing the upper in lasted position flat against the marginal portion of the insole at the shank by inserting permanent fastenings, securing the forepart of the shoe upper also in lasted relation to the insole, thereafter stitching a welt to the marginal portion of the forepart of the lasted shoe upper and to the lip at the forepart of the insole, trimming the surplus material from the lip of the insole, the margin of the shoe upper and the portion of the welt adjacent thereto about the forepart of the shoe, and cement attaching an outsole to the shoe bottom.

5. That improvement in methods of manufacturing shoes which comprises mounting upon the bottom of a last an insole the forepart of which is provided with a peripherally extending lip located a short distance from the margin of the insole and the shank portion of which is without such a lip, working the marginal portion of the shoe upper into lasted relation to the insole and securing it in lasted relation at the shank by staples driven through the marginal portion of the upper into the body of the insole and curving through the substance of the insole without extending to the inner surface of the

insole, securing the forepart of the shoe upper, at least from the forward end of the shank portion to about the tip line, by staples driven through the marginal portion of the upper and the lip of the insole, stitching a welt to the marginal portion of the lasted shoe upper and to the lip of the insole, said welt extending from the forward end of the shank portion of the shoe about the toe and back to the forward end of the shank portion on the other side, trimming the surplus material from the lip of the insole, the margin of the shoe upper and the portion of the welt adjacent thereto about the forepart of the shoe, roughening the overlasted marginal portion of the shoe upper at the shank of the shoe and the welt as well as the trimmed edge surfaces of the insole lip, shoe upper and welt at the forepart of the shoe, and cement attaching an outsole to the shoe bottom.

In testimony whereof I have signed my name to this specification.

OSCAR C. ADAMS.