C. J. KLEIN.

CIRCUIT CONTROLLER.

APPLICATION FILED OCT. 3, 1914.

1,222,215. Patented Apr. 10, 1917.

Fig. 1.

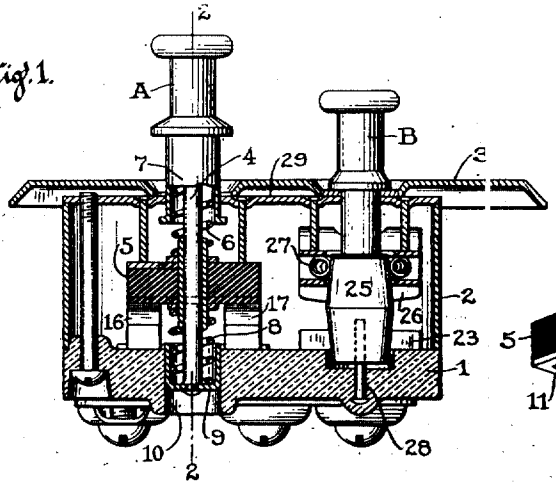


Fig. 4.

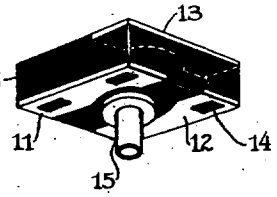


Fig. 2.

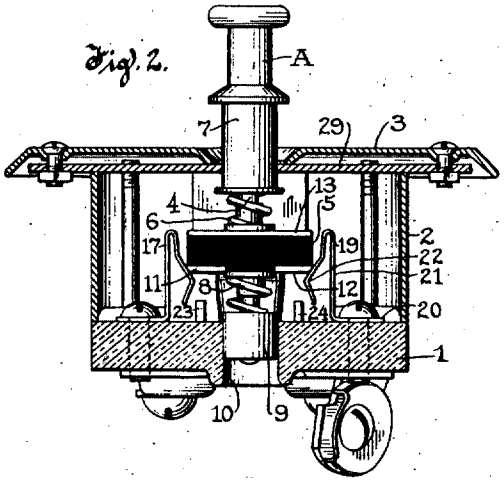


Fig. 3.

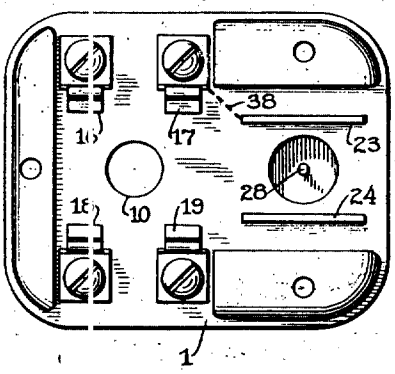


Fig. 5.

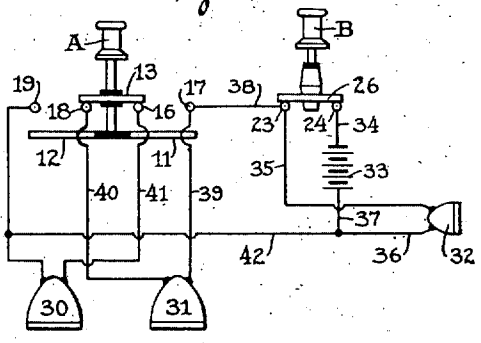
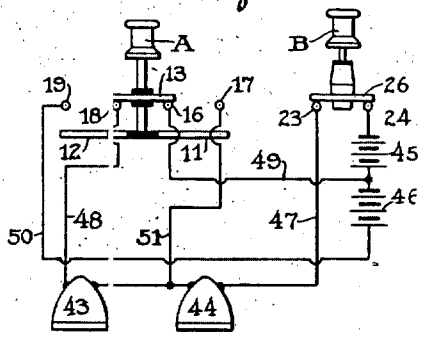


Fig. 6.



Witnesses
J. L. Johnson
H. Wadhow

Inventor
Charles J. Klein
By Fitch & Hubbard
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES J. KLEIN, OF MILWAUKEE, WISCONSIN.

CIRCUIT-CONTROLLER.

1,222,215. Specification of Letters Patent. Patented Apr. 10, 1917.

Application filed October 3, 1914. Serial No. 864,801.

To all whom it may concern:

Be it known that I, CHARLES J. KLEIN, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Circuit-Controllers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to circuit controllers and more particularly to an improved device for controlling automobile lighting systems.

One of the objects of the invention is to provide a simple push button operated controller adapted to establish either series or parallel circuit connections upon operation of a single push button.

Further objects and advantages will appear hereinafter in connection with the description of an embodiment of the invention which is illustrated in the accompanying drawing, wherein,

Figure 1 is a central sectional view of the controller.

Fig. 2 is a sectional view on line 2—2 of Fig. 1.

Fig. 3 is a plan view of the supporting base and terminal contacts thereon.

Fig. 4 is a perspective view of one of the parts.

Fig. 5 is a schematic view of the controller connected with automobile head and tail lamps and one battery.

Fig. 6 is a similar view of the controller connected in a three-wire lighting system supplied by a pair of batteries.

Referring more specifically to the drawing, the controller is illustrated as comprising an insulating base 1 having two independently operable push-and-pull snap switch mechanisms A and B mounted thereon and housed by a tubular casing 2 and face plate 3.

The mechanism A is, in general, of the type described and claimed in my co-pending application filed March 11, 1914, Serial No. 824,003, and the switch mechanism B is of the type disclosed in my Patent No. 985,421 of Feb. 28, 1911. Briefly described, the switch A comprises a reciprocable operating member 4 journaled through a relatively reciprocable contact carrying member 5 and having therewith a lost motion energy storing connection comprising a spring 6 coiled about the spindle 4 and confined between the inner surface of the member 5 and a fixed shoulder 7 on the operating member, and a second spring 8 confined between the outer surface of the member 5 and a cap 9 fixed to the outer extremity of the operating spindle. This connection is such that, with the contact carrying member 5 releasably held against movement by its stationary contacts as hereinafter set forth, depression of the operating member stores energy in the spring 6 for imparting a subsequent acceleration to the member 5 when released. In the same manner elevation of the operating member stores energy in the spring 8 for effecting snap movement of the contact member in the other direction. A bore 10 is also provided in the base 1 to receive the cap 9 on the operating spindle for guiding the latter. The member 5 is preferably of insulating material and rectangular in shape. Two contact plates 11 and 12 are mounted on one face of the block flush with opposite edges, while a single contact plate 13 is mounted on the other face at right angles to the plates 11 and 12. In practice the contact plates mentioned are molded in the block 5 and anchored therein by offset lugs which extend into the insulation and provide recesses 14 for insuring firm grip of the insulating material. A metal sleeve 15 is also preferably inserted through the block to insure accurate movement of the contactor and to resist wear on the spindle 4. Four stationary contacts 16, 17, 18 and 19 are mounted in pairs on opposite sides of the supporting base 1 and arranged to be interconnected in various relations by the contactor 5, as will appear. Fig. 2 clearly illustrates the form of the stationary contacts 16—19, wherein each is shown as comprising a stamped piece having a base 20, an upright portion 21 and a reflexed resilient portion with a peaked extremity 22. The mounting of the contacts on the base (Fig. 3) is such that the contactor 5 normally rests against the four extremities, either above or below the apex of the peaks. These stationary contacts are also utilized to exert an initial restraint on the contactor while energy is being stored in one of the springs 6, 8.

In operation of the mechanism, the stationary contacts bear against the contactor 5 and restrain the same against circuit changing movement until a preponderating

energy is stored in one of the springs 6, 8 sufficient to overcome the inherently releasable lock of the contacts, whereupon the contactor is snapped ahead under the influence of the stored energy. With the switch in "out" position as illustrated in Figs. 1 and 2 the contact plate 12 engages and closes circuit between stationary contacts 18 and 19, while the opposite contact plate 11 similarly engages and closes circuit between the two other stationary contacts 16 and 17. Movement of the operating member to "in" position effects a rapid break of the circuits mentioned and a rapid closure of circuit between contacts 16 and 18 across plate 13.

Switch B is designed to open or close circuit between two stationary contacts 23 and 24 mounted at the other end of the supporting base 1. This switch mechanism, briefly described, consists in a reciprocable operating cam 25 having a relatively reciprocable contactor 26 actuated with acceleration through the medium of a garter spring 27 which surrounds the cam and is inclosed by the contactor. An upright spindle 28 is molded in the insulating base to fit within and guide the cam 25. It is to be noted, in respect to both the switches A and B, that all the operating parts thereof are freely removable by removal of the face plate 3 and cover plate 29 of the casing 2. Easy access to the mechanism is thus insured, if required.

In Fig. 5 the device is shown as employed for controlling a pair of automobile head lamps 30 and 31 and a rear lamp 32 all supplied by a battery 33. In this embodiment switch B functions solely to open and close circuit to the translating devices while switch A functions to connect the lamps 30 and 31 either in series or parallel for controlling the light produced thereby. As shown the switch B is in "out" position and switch A is in "in' position, circuit for the lamps being traceable as follows; the rear lamp 32 is connected across the battery by conductor 34 through switch B, by conductors 35, 36 and 37 to the other pole of the battery. A second circuit is also established through switch B by conductor 38 to the terminal 17 of switch A by conductor 39 to lamp 31, by conductor 40 to stationary contact 18 across the contact plate 13 of the contactor 5 to stationary contact 16, and thence by conductor 41 to the other lamp 30, and by conductors 42 and 37 again to the battery. The two head lamps are thus connected in series. Operation of switch A to "out" position connects the lamps in parallel, circuit for lamp 31 being traced through switch B by conductor 38 to terminal 17 along conductor 39 through the lamp, by conductor 40 to stationary contact 18, across contact plate 12 of the contactor to stationary contact 19, and thence by conductor 42 to the battery. A parallel circuit of lamp 30 may similarly be traced from terminal 17, where the current divides, across contact plate 11 of the contactor to stationary contact 16, along conductor 41 to the lamp and to return wire 42. The change from series to parallel is thus effected by operation of the switch A alone, while disconnection of the lamps is effected by switch B irrespective of switch A. It is further to be noted that the series and parallel connections are completed by interconnection in different relations of the four stationary contacts 16 to 19, and that in all cases a two-point make and break is obtained. In practice, the conductor 38 is preferably in the form of a conducting plate carried on the base 1 and joining terminals 17 and 23.

In Fig. 6 the controller is illustrated as connected in a three-wire lighting system for a pair of head lamps 43 and 44 supplied by two six volt batteries 45 and 46, in series, such, for example, as commonly employed, in automobile starting and ignition systems. In this arrangement, the controller is utilized for establishing series connections of the two lamps either on one battery alone or on both, or for connecting one head light alone to one of the batteries, as will appear. As shown, the switch A is in "in" position and the switch B in "out" position thereby connecting the two lamps in series on the battery 45 alone, circuit being traced from the battery through switch B by conductor 47 through the lamps, along conductor 48 to stationary contact 18, across contact plate 13 of the contactor 5 and thence by conductor 49 to a tap between the batteries. Operation of switch A to "out" position changes the connection to include the two lamps in series on the two batteries together, the circuit being from battery 45 through switch B by conductor 47 through the lamps, along conductor 48 to switch contact 18 across the contact plate 12 of the contactor to contact 19 and thence by conductor 50 to the opposite pole of battery 46. At the same time interconnection is made from a point intermediate the lamps by conductor 51 to switch contact 17 across contact plate 11 of the contactor to switch contact 16 and thence by conductor 49 to the intermediate tap of the batteries. In case, therefore, a circuit is accidentally broken to either of the lamps, the remaining lamp will be supplied across one of the batteries alone. If, now, switch B be moved to "in" position circuit to lamp 44 will be broken but lamp 43 will be supplied from battery 46 by conductor 49 through contact plate 11 along conductor 51 to head light 43, and thence by conductor 48 across contact plate 12 to conductor 50 and the other pole of the battery 46.

In both diagrammatic representations of the controller the circuit variations are ef-

fected through switch A by connection of the four stationary terminals in different combination relations. For example, assuming four terminal contacts to be *a*, *b*, *c*, *d*, the same are electrically connected through switch A either in separate pairs as *a*, *b* and *c*, *d*, for establishing one circuit condition or in a single pair as *b*, *c*, for establishing another circuit condition.

What I claim as new and desire to secure by Letters Patent is:—

1. In combination, current supplying means, a pair of translating devices, and a circuit controller therefor having three pairs of stationary contacts and two movable contactors to electrically connect said contacts in different combinations, said contactors being operable independently for selectively establishing two different circuit connections for said devices and also for disconnecting said devices from circuit.

2. In combination, battery current supplying means, a pair of translating devices, and a circuit controller therefor comprising two independently operable switches, one having four contacts and having two-position means to electrically connect said contacts in pairs and to electrically connect a single pair thereof for selectively effecting two different circuit connections for said devices and the other switch having a pair of contacts and having means to bridge the same for establishing circuit connection to said devices in either condition of said first mentioned switch.

3. In combination, a source of current, translating devices, and a circuit controller therefor having four contacts alined to provide three make-and-break points, and having a two position reciprocable contactor operable to connect different combinations of said contacts selectively for establishing series and parallel circuits including said devices.

4. In combination, a source of current, translating devices, and a circuit controller therefor having three pairs of contacts and having means to electrically connect said contacts in different combinations, said means being operable by two independently movable operating members to establish either series or parallel circuit connections for said translating devices and also to disconnect the latter from circuit.

5. In combination, a current supply, translating devices, a circuit controller therefor having three pairs of contacts, means to electrically connect one pair of said contacts for establishing circuit to said devices and means movable to two positions for selectively connecting said other contacts in different combinations for effecting either series or parallel connection of said devices.

6. In combination, a source of current, translating devices, a circuit controller therefor including one switch to make and break circuit to said devices, two pairs of contacts and a reciprocatory two-position switch to selectively effect series and parallel connection of said devices.

7. In combination, a source of current, translating devices and a circuit controller therefor comprising two independently operable push-and-pull switches, one having two contacts and means to connect and disconnect the same for establishing a supply circuit to said translating devices and for interrupting such circuit, and the other having four contacts such as *a*, *b*, *c*, *d*, and means to selectively connect the same in the combination *a*, *b* and *c*, *d* and the combination *b*, *c*, for effecting variations in the circuit connections between said translating devices and said first mentioned switch.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

CHARLES J. KLEIN.

Witnesses:
L. A. WATSON,
TEKLA BAST.