This invention relates to improvements in current rectifying and controlling systems and more particularly to such as are adaptable for use in systems for recharging storage batteries—one object of the invention being to provide a system of the character specified in which the resistance coils shall be so arranged that the greatest possible number of batteries can be recharged by a 110 volt current at the same time and thus insure great economy.

A further object is to provide a rectifying and recharging system in which necessity for the use of an induction coil shall be eliminated and thus obviate difficulties incident to the use of such coil, which frequently, owing to bad connections, causes the line to stop charging while the rectifier bulb is still consuming current.

With these and other objects in view, the invention consists in certain novel features and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings—

Figure 1 is a front elevation of an instrument bracket or board and devices associated therewith.

Figure 2 is a rear view of the same showing the arrangement of various instrument features.

Figure 3 is a plan view, and

Figure 4 is a diagrammatic view.

The circuit controlling devices and connections are supported by an instrument bracket or board 1 having a rearwardly projecting shelf 2, on which latter a sheet of insulating material 29 is secured for supporting a plurality of elements or coils 5 of a variable resistance, six such coils being shown in the drawings. These coils are connected with each other in series and respective ends of said coils are connected by conductors 24 successively with a plurality of binding posts 5 of a segmental series of contacts 6. A spindle 7 having a knob 8 is mounted in the vertical member of the instrument bracket and carries a switch arm 9 to be moved over the contacts 6 for excluding resistance coils from or including the same in the circuit. A spring 10 may be located on the spindle 7 in such manner as to cause the switch arm to engage the contacts with yielding pressure.

A socket member 11 (such as a lamp socket) is supported on post 12 secured to the shelf portion of the instrument bracket, (an insulating block 13 being interposed between said post and the socket member) and said member is provided with circuit terminals as is customary with lamp sockets. The socket member 11 supports a rectifier bulb 14 which, in the embodiment of the invention shown in the drawings, may be of type in which anode and cathode members are located within a closed container, two of the terminals of which cooperate with two of the lamp socket terminals.

The vertical member of the instrument bracket also supports an ammeter 15 and a push button circuit closer 16 and these are included in circuits as hereinafter explained.

The leading-in conductors 17—18 of the 110 volt A. C. circuit are connected respectively with binding posts 19 and 20. The binding post 19 is connected by conductor 21 with the upper terminal of the rectifier 14 and a lower terminal of the latter is connected by a conductor 22 with the circuit closer 16. This circuit may be traced by a conductor 31 from the rectifier to the circuit closer 16; from the latter by a conductor 32 to a binding post 33 and from the latter by a conductor 34 to the battery 25 and connected with the latter at such point as to include two cells of said battery.

It has been found that with the use of a system such as hereinafter described, we are enabled to recharge a maximum number of battery cells at the same time and that great economy in the use of the charging current has been obtained. With the use
of our improvements, we are enabled to recharge any number of battery cells from 3 to at least 45.

It will be observed that our improved system does not include an induction coil and hence we are enabled to obviate difficulties encountered in charging systems employing induction coils—such difficulties often arising by reason of imperfect connections which will cause the line to stop charging while the bulb is still consuming current.

Having fully described our invention what we claim as new and desire to secure by Letters-Patent, is:

1. In a battery charger, comprising an electron tube having a filament and an electrode, and a battery placed in circuit with said tube and a source of alternating current, means for initially exciting the filament from the battery.

2. A battery charging system, comprising an electron tube and a battery to be charged placed in circuit with a source of alternating current, said tube having a filament and an electrode, and means for initially exciting said filament from the battery to be charged.

3. The method of charging a battery, which comprises connecting said battery in circuit with a source of current and the electrode and filament of the electron tube, and using the charge remaining in the battery to initially excite the filament.

4. The method of charging a battery from a source of alternating current through a rectifier, which comprises initiating the action of the rectifier by the charge remaining in the battery.

5. In combination, an electron tube having an electrode and filament, a battery and a main source of alternating current with which said battery and tube are adapted to be placed in series circuit, and means for connecting certain cells of the battery to said filament to initially excite the same.

6. A battery charging system comprising a circuit, including a main source of alternating current, and a battery to be charged, and an electron tube placed in series therewith, said electron tube having a filament and an electrode, a second circuit connecting certain of the battery cells to the filament, and means for making and breaking said circuits.

7. In combination, a battery to be charged and a rectifying electron tube, having a filament and an electrode, means for placing said battery and tube in series circuit with a source of alternating current of relatively high voltage, and means for placing the filament in circuit with certain cells of the battery to initially excite the same by a current of relatively low voltage.

8. The method of charging a battery from a source of alternating current which comprises placing said battery in series circuit with the source of current, and an electron tube having a filament and an electrode, and placing certain cells of the battery in circuit with the filament to initially excite the same by the charge remaining in the battery.

In testimony whereof, we have signed this specification.

BRUCE THOMAS UMSTED.

EDWARD NATHANIEL HARRIS.