M. E. HOLMES.

FLASH LIGHT BATTERY.

APPLICATION FILED MAR. 2, 1914.

1,264,520. Patented Apr. 30, 1918.

FIG. 1

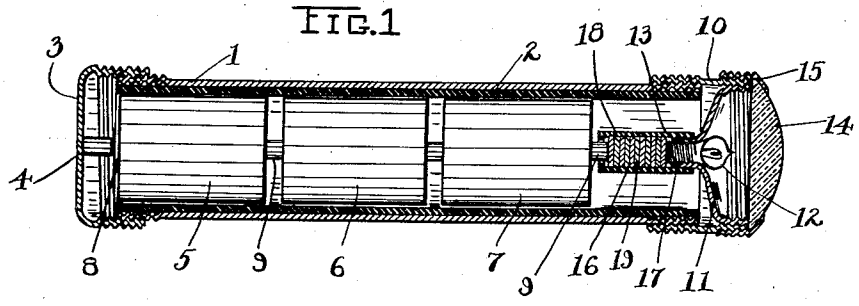


FIG. 2

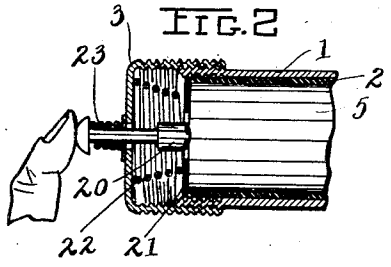


FIG. 3

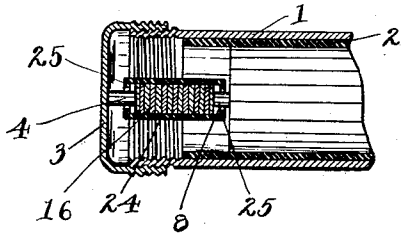


FIG. 4

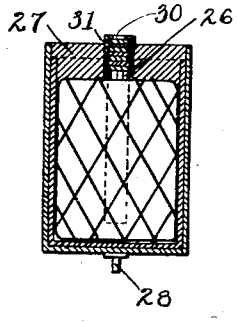


FIG. 6

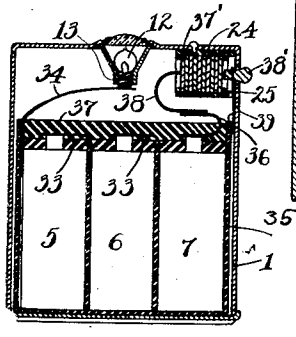


FIG. 5

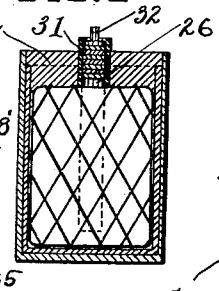
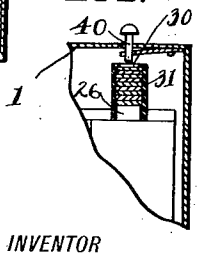


FIG. 7



WITNESSES:

D. F. Brewer

H. G. Grover

INVENTOR

MAJOR E. HOLMES

BY Ira J. Adams.

ATTORNEY

UNITED STATES PATENT OFFICE.

MAJOR E. HOLMES, OF LAKEWOOD, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NATIONAL CARBON COMPANY, INC., A CORPORATION OF NEW YORK.

FLASH-LIGHT BATTERY.

1,264,520. Specification of Letters Patent. Patented Apr. 30, 1918.

Application filed March 2, 1914. Serial No. 822,002.

To all whom it may concern:

Be it known that I, MAJOR E. HOLMES, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Flash-Light Batteries, of which the following is a full, clear, and exact description.

This invention relates to the combination of a flashlight battery with a rheostat, preferably in the form of a pile built up of a plurality of thin disks. The resistance of such a pile rheostat may be varied in the usual manner by adjusting the pressure applied thereto.

In flashlight batteries as well as in all other dry cell batteries it is well known that the E.M.F. of a single cell decreases a great deal during its use. Cells having an initial E.M.F. of from 1.5 to 1.6 volts are serviceable until the voltage drops to below ¾ volt. In fact, the major portion of the period of service of such batteries occurs at voltages considerably below an E.M.F. of 1 volt. In selecting the lamp to be used in such batteries it is therefore practicable to design it, not for utilization at the initial or final voltage, but at some intermediate point. For instance, a battery composed of three dry cells each having an initial E.M.F. of 1.5 to 1.6 volts is known as a 4 volt battery and is accordingly used with a 4 volt lamp. From this it will be evident that the incandescent lamp is subjected to a considerable excess voltage when used in combination with a new battery. When such an excess voltage is applied the filaments are often burned out or the life of the incandescent lamp is considerably decreased. An increased consumption of electrical energy will also occur with consequently a decrease in the life of the battery. By the use of an adjustable rheostat in series with the battery and incandescent lamp, a maximum life of both lamp and battery may be secured by cutting down the excess E.M.F. in the first part of the cell life. In addition to prolonging the usefulness of the combination, I also find it advantageous to be able to readily vary the illumination produced. By use of the simple device shown in the accompanying drawings, I am able to quickly and uniformly vary the quantity of light by adjusting the pressure upon the rheostat.

In the drawings:

Figure 1 shows cross section view of a combined lamp, casing battery and rheostat.

Fig. 2 is a modified form of contact member.

Fig. 3 is a further modification.

Fig. 4 is a battery with a rheostat as a single unit.

Fig. 5 is a modification of the battery of Fig. 4.

Fig. 6 shows the modification in vertical cross section of my invention adapted for use with a "vest pocket" battery.

Fig. 7 is a further modification of the type shown in Fig. 6.

Referring to Fig. 1 which is illustrative of one completed development of the idea, the flashlight consists of a cylindrical metal casing 1 having a lining 2 of heavy paper or some other insulating material. One end of the metal tube is screw threaded to receive a metal cap 3 having a central projection 4. The dry cells 5, 6 and 7 are placed in series in the tube, contact being made between the adjoining cells through the bottom 8 of the zinc container and a projection 9 of the carbon electrode. To the open end of the casing 1 the nipple 10 is attached and the reflector 11 is threaded inside the nipple. The lamp 12 is similarly threaded into an opening 13 in the center of the reflector. The tube is closed by means of a lens 14 and ferrule 15, threaded over the nipple. This arrangement is well known and need not be further described.

To adapt this form to my invention the casing is made somewhat longer to afford a space for the compression rheostat 16 which I place in one form between the carbon 9 of the dry cell 7 and the base 17 of the lamp. The compression rheostat consists of an insulating tube 18 containing a plurality of thin disks 19. The disks are preferably, though not necessarily made of carbon plates which have a high contact resistance depending upon the pressure and are particularly well adapted for this purpose. The complete circuit of the flashlight then consists of the three cells 5, 6, 7, the rheostat 16, lamp 12, reflector 11, nipple 10, casing 1, cap 3 and is closed through the contact 4 and zinc bottom 8.

It will be evident that the contact is closed by screwing the metal cap 3 on the casing 1.

Further adjustment produces a variation in the pressure on the rheostat which will vary the resistance to produce the results previously described.

In Fig. 2 pressure is applied to the rheostat by manipulating the push button contact 20 placed in the end of the cap. An insulating washer 21 is inserted in the casing and a light spring 22 may be used to keep the batteries together with the desired maximum resistance. The push button is returned by means of a spring 23.

Figs. 3, 4, 5, show various ways of placing the rheostat in the casing. In Fig. 3 it is placed at the same end as the cap, and is contained in an insulating casing 24 having a rim 25 at each end to hold the disks in place. One advantage of placing the rheostat at the bottom adjacent the push button is that pressure can be applied thereto without moving the cells in the casing.

In Figs. 4 and 5, the rheostat is permanently fastened to the carbon 26 of the dry cell and sealed therein by means of the pitch seal 27. A pin 28 attached to the bottom of the zinc container 29 makes contact with the rheostat of the adjoining cell through an opening 30 in a casing 31. The protrusion 28 may be punched directly from the bottom of the can if desired. In Fig. 5 the construction is identical with that of Fig. 4 except that a pin 32 is inserted in the casing 31 instead of being secured to the base of the container.

The modifications shown in Figs. 6 and 7 relate primarily to a "vest pocket" type of battery in which three dry cells 5, 6 and 7 are placed along side each other and joined in series by strips 33 connecting the zinc containers of 6 and 7 with the carbon electrodes of 5 and 6 respectively. One end of a flat spring 34 is soldered to the side of the zinc container of the dry cell 5 and engages the base of the lamp 12. The dry cells are inclosed in an insulating case 35 having separating walls for the individual cells. A flat spring 36 is attached to the carbon electrode of the dry cell 7 and a seal 37 is applied over the top of the dry cells as shown. The rheostat member 16 of the combination consists of an insulating casing 18 containing a plurality of resistance disks 19 retained by rims 25. At the base of the disks is placed a metal plate 37′ soldered or otherwise fastened to the short end of a spring 38. When the rheostat is attached to the metal casing by means of screws for instance the projecting end of the spring 36 is adapted to yieldingly engage the long end of the spring 38 to make electrical connection between the battery and rheostat. A push button 38′ is attached to a spring 39 which is riveted to the metal casing. By depressing the push button the circuit is closed through rheostat 16, plate 37′, springs 38 and 36, dry cells 7, 6 and 5, spring 34, incandescent lamp 12, socket 13, casing 1, spring 39 and push button 38′.

In the modification shown in Fig. 7 the rheostat is affixed to the carbon pole 26 of the dry cell as in Fig. 4. The arrangement consists of an insulating casing 31 containing resistance disks. Contact is made through an opening 30 of the casing 31 by means of push button 40 soldered to a spring 41 which is riveted to the casing 1. This arrangement differs from that of Fig. 6 only in the position of the push buttton and manner of applying pressure to the rheostat.

In each of the modifications, it will, of course, be understood that it is not necessary to use a rheostat upon each dry cell, as in most instances one rheostat would be sufficient. Instead of using these carbon disks, I may use disks of other material or granular material may be used if desired.

While I have shown several ways of attaching the rheostat, and applying pressure thereto, it will be evident that other variations could be used and the invention is not limited to the examples given.

Having described my invention, what I claim is:

1. The combination with a dry cell having zinc and carbon electrodes of an insulating tube attached to one end of the carbon electrode and adapted to contain a plurality of conducting disks.

2. The combination with a dry cell having zinc and carbon electrodes of an insulating tube containing a plurality of carbon disks, said tube having openings at each end, one opening being adapted to fit over said carbon electrode, and the other opening being adapted to receive a contact for making electrical connection with an adjoining element and a seal for holding the tube on the carbon electrode.

3. The combination in a flashlight of an outer casing, an insulating casing therein containing a dry cell having a projecting terminal, an incandescent lamp having a projection, an insulating tube containing a plurality of disks, being adapted to receive respectively said dry cell terminal and lamp projection and a cap adapted to be adjusted upon said first mentioned casing to compress the disks in said tube.

4. The combination in a flashlight of an outer conducting casing, an insulating casing therein containing a dry cell having a projecting terminal, a reflector in contact with said casing, an incandescent lamp having one terminal in contact with said reflector, an insulating tube containing a plurality of disks, said tube being adapted to receive the projecting terminal at one end and the second terminal of the lamp at the other end, and a conducting cap having an inner projection adapted to be adjusted by means

of threads upon said cap and conducting casing to compress the disks in said tube.

5. A portable electric lamp comprising a tubular casing adapted to contain an electric lamp at one end, a cap attached to the opposite end, said cap formed with an opening, and a metal push-button within the casing in which it is longitudinally movable, said button having a finger-piece projecting outward through the opening in said cap.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

MAJOR E. HOLMES.

Witnesses:
IRA J. ADAMS,
H. G. GROVER.