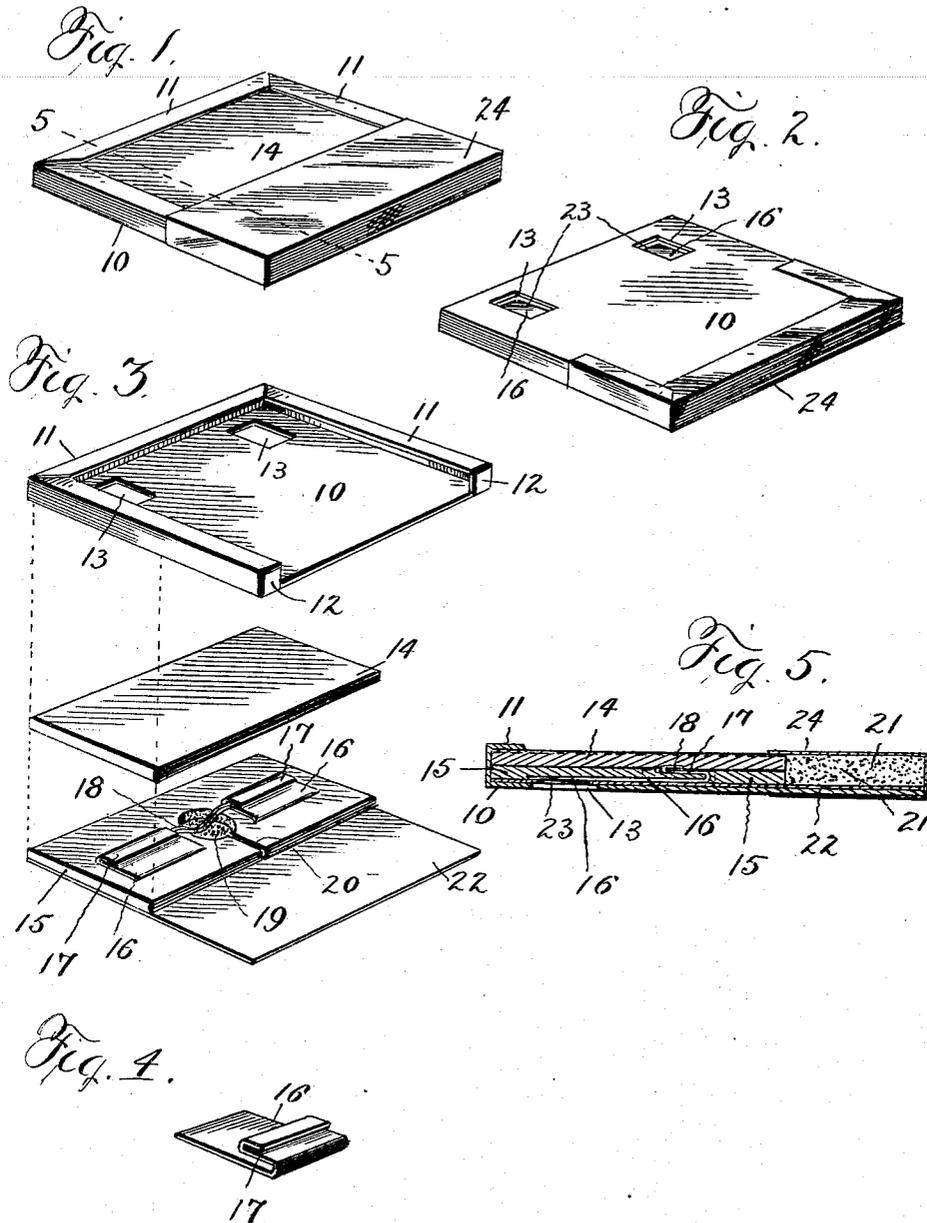


F. C. SCHOFIELD.
 CARTRIDGE FOR FLASH LIGHT APPARATUS AND LAMPS.
 APPLICATION FILED JULY 24, 1911. RENEWED APR. 7, 1915.

1,166,265.

Patented Dec. 28, 1915.



WITNESSES

E. H. Gilbert

A. T. Hayes

INVENTOR
Frederick C. Schofield,
 by *Chas. J. Williamson*
 Attorney

UNITED STATES PATENT OFFICE.

FREDERICK C. SCHOFIELD, OF RICHMOND, VIRGINIA, ASSIGNOR TO THE TOWLES-SCHOFIELD COMPANY, INCORPORATED, OF ALEXANDRIA, VIRGINIA; FRED S. SWINDELL, OF WASHINGTON, DISTRICT OF COLUMBIA, TRUSTEE IN BANKRUPTCY OF SAID COMPANY.

CARTRIDGE FOR FLASH-LIGHT APPARATUS AND LAMPS.

1,166,265.

Specification of Letters Patent.

Patented Dec. 28, 1915.

Application filed July 24, 1911, Serial No. 640,144. Renewed April 7, 1915. Serial No. 19,744.

To all whom it may concern:

Be it known that I, FREDERICK C. SCHOFIELD, of Richmond, in the county of Henrico, and in the State of Virginia, have invented a certain new and useful Improvement in Cartridges for Flash-Light Apparatus and Lamps, and do hereby declare that the following is a full, clear, and exact description thereof.

The object of my invention is to provide a cartridge for flash light apparatus used in photography, such an apparatus, for example, as forms the subject of my United States Patent No. 946,849, issued to me the 18th day of January 1910, which cartridge will have the important characteristics of ease and economy of manufacture, reliability so that it may certainly be depended upon to ignite, not subject to deterioration, and capability of varying the charge of magnesium powder within wide limits without alteration of its external size and shape, and change in size and proportion of any of the essential elements, and to these ends my invention consists in the cartridge constructed substantially as hereinafter specified and claimed.

In the accompanying drawings Figures 1 and 2 are perspective views from opposite sides of a cartridge, with parts assembled, embodying my invention; Fig. 3 a similar view showing certain of the parts separated; Fig. 4 a detail view in perspective of one of the contact pieces; Fig. 5 a longitudinal section on the line 5—5 of Fig. 1.

In the embodiment of my invention selected for illustration, the cartridge has a square form and is comparatively thin, and it has a base member or holder in the form of a pan 10, of sheet metal, that has a bottom and three side walls, one side being thus without a wall, and no top being provided, although, each side wall has a narrow inturned flange 11 at the top, and there is a short inward extension 12 at each end of the two side walls so that the open side is less in width than the distance from one side wall to the opposite side wall, said pan is preferably made of sheet metal because that admits of such economical manufacture. In the bottom near two corners of the pan are holes, or openings, 13 for the purpose of giving access by suitable contacts

of an electric circuit, to contact pieces hereinafter described, for enabling the ignition by electricity of the flash light powder.

Partially filling the pan between the open side thereof and the opposite side wall, are two rectangular flat bodies, preferably of card board, which together have a thickness to fill substantially the space from the bottom of the pan to the top flanges 11, one of which 14 is a blank piece whose purpose is merely that of a filler. Attached to the other piece of the card board 15 are two similar contact pieces 16 of sheet metal having the form best seen in Fig. 4. Each, as will be seen, comprises a main, or body portion that lies wholly on the underside of the piece or carrier 15, an upturned portion that passes through a slit therein, and a reversely folded portion 17 upon the upper side of said carrier 15 to provide a clamp for forming a good electrical connection with an electrical conductor of such resistance that it will be heated on the passage of a current through it. Said conductor I make of numerous fine, or filament-like, wires 18, which between the two contact clamps lie in a cavity 19 that forms, or constitutes, an ignition chamber, and in which is placed gun powder or some other highly inflammable material, which upon the heating of the conductor is ignited. A narrow slit, or fissure 20 leads from said ignition chamber to the space between the edge of the carrier and the open side wall of the pan in which space the charge of magnesium or flashlight powder 21 is contained, said slit, or fissure, being provided for the ready passage of the flame due to the ignition of the gun powder, to the magnesium powder. A sheet of paper 22 covers the bottom of the pan beneath the carrier 16 so as to insulate the carrier contacts therefrom, and said sheet of paper is provided with holes 23 that coincide with the holes 13 in the bottom of the pan so as to expose or uncover portions of the body members of the contact pieces, and said paper also serves to form the bottom of the flash powder chamber. The holes in the insulating sheet are smaller than the holes in the pan bottom, so that there will be a margin of paper on each of the four sides of each hole to make certain that there will be no contact of the pan bottom and

contact pieces that would result in short circuiting. The contacts are some hard strong metal coated with soft metal, such as tin or aluminum so that the circuit closers that are used which have sharp points can readily gouge or plow into the same to make certain of a good connection of contact.

The open side wall of the pan and the top of the space between the same and the filler and carrier 16 which forms the flash powder chamber are closed by tin foil or a sheet of thin metallic foil 24 that is carried at its edges to the underside of the pan and there suitably glued or affixed. I have found that this metallic foil ruptures easily under the force of the explosion and is instantaneously melted or consumed by the heat without the production of sparks. Being instantaneously consumed, no shadows can be formed by fragments or portions as is apt to be the case with paper, for example, which being interposed between the light and the object to be photographed will cause a shadow. The purpose of omitting the side wall of the pan so that the portion of metallic foil extending thereover is the only means for confining the flash powder at that side is that by the instantaneous consumption or destruction of the tin foil there exists no obstruction to the exposure of the light produced, such as the presence of the pan wall would constitute, the result being the whole "crater" of burning magnesium powder is exposed.

The requirement as to the capacity of cartridges varies from three to forty grains of powder. In order to vary the capacity of cartridges, all that is necessary is to vary the space between the edges of the cardboard filler and carrier and the open side of the pan without any other alteration whatever in the parts being required, so that pans, insulating sheets, and contact pieces may be of standard sizes and assembled in the same relation, this end being attained by giving the ignition chamber and the contact pieces a definite position in all cases, that is not affected by the varying capacity of the flash powder chamber.

The sheet of insulating paper applied between the bottom of the pan and the pasteboard carrier is pasted to the underside of the carrier, and thus effectually prevents any powder or products of combustion being blown rearward and coming to the contact points of the circuit closer, so that any danger of fouling the latter and thereby impairing good electrical contact is avoided.

I employ gun powder in the ignition chamber because it does not carry off the heat from the conductor to the degree that magnesium powder does, and which, therefore, requires less strength of current to effect ignition, and I preferably lay the conductor loose upon the gun powder rather than to

embed it therein, although it may be embedded if so desired. The conductor, as I have before described, is composed of a plurality of very fine iron wires, the wires being of such fineness that they will burn when heated by the passage of the current therethrough. To insure their burning, however, I coat them with saltpeter, or mercurial oxid, or some other material that will give off oxygen freely when heated, the presence of oxygen, of course, promoting the combustion of the wires. I tin these wires so as to prevent corrosion, which if happening might render the circuit defective. Instead of gun powder, other material, such, for example, match composition, possessing characteristics of ready inflammability without carrying the heat from the conductor with undue rapidity may be employed. The ignition chamber is comparatively small for the purpose of shortening the high resistance conductor so that the battery may be as small as possible.

I have given such form and so arranged the parts of my cartridge that the same can be made by automatic machinery, and, therefore, the cost of manufacture will be low; the cartridge is moist proof and air tight so that it will last indefinitely without deterioration; and it will give a maximum of light in a way that the light will be utilized to the utmost in taking the picture.

Having thus described my invention what I claim is—

1. A flash light cartridge comprising a shallow pan-form base member, a carrier having a flat form body that partially fills said pan, said carrier having an electric igniting device, flash light powder in the portion of the pan unoccupied by the carrier, and a cover for the powder in the pan.

2. A flash light cartridge comprising a pan-form base member, the walls of the pan being absent at the top and one side of the member, a carrier having an igniting device and which partially fills the pan, flash light powder in the portion of the pan unoccupied by the carrier, and a sheet of destructible material covering the powder in the pan where the pan walls are absent.

3. A flash light cartridge comprising a pan form base member, a carrier having an electric igniting device partially filling said pan, flash light powder in said pan, said carrier having an ignition powder chamber traversed by the heat producing part of said igniting device, a fissure leading from said ignition chamber to the flash powder, and a covering for the powder in the pan.

4. A flash light cartridge comprising a metallic body forming member having holes, an igniting member including a pair of contacts, a carrier to which said contacts are secured overlying the said holes, and an insulating sheet between said carrier and said

body member, and having holes registering with the holes in said body member.

5. A flash light cartridge comprising a metallic body forming member having holes, an igniting member including a pair of contacts, a carrier to which said contacts are secured overlying the said holes, and an insulating sheet between said carrier and said body member, and having holes registering with the holes in said body member, the holes in the sheet being smaller than the holes in the body member.

6. A flash light cartridge comprising a pan like body member having a powder containing chamber, the walls of the pan like member being absent at the top and one side of said chamber, and metallic foil covering said chamber where said walls are absent.

7. A flash light cartridge comprising a pan like body member having a powder chamber, said pan like member being open

so as to be adapted to expose said chamber, and metallic foil covering said open portion of said pan like member.

8. A flash light cartridge comprising a powder chamber, an electric igniting device consisting of a pair of contacts, a carrier for said contacts, each contact having portions on opposite sides of the carrier, and a portion passing therethrough, the portions on one side being exposed for the engagement of a circuit closer, and a conductor attached to the portions of the contacts on the other side of the carrier, the attaching means consisting of clamps formed by bending the contacts.

In testimony that I claim the foregoing I have hereunto set my hand.

FREDERICK C. SCHOFIELD.

Witnesses:

GEO. A. ARHART,
JNO. F. BAUER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."