

(No Model.)

S. RUSSELL.
ELECTRIC CARTRIDGE.

No. 319,628.

Patented June 9, 1885.

Fig. 1.

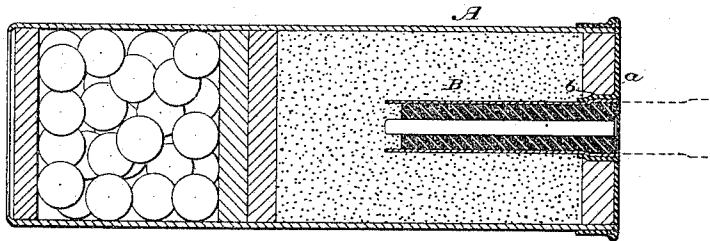


Fig. 2.



Fig. 3.

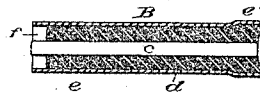


Fig. 4.



Fig. 5.

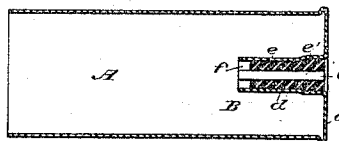
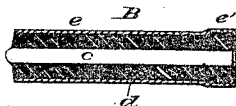


Fig. 6.



WITNESSES:

Geo. H. Fraser
E. B. Bolton

INVENTOR

Samuel Russell
By his Attorneys,

Burke Fraser & Bennett

UNITED STATES PATENT OFFICE.

SAMUEL RUSSELL, OF BROOKLYN, NEW YORK.

ELECTRIC CARTRIDGE.

SPECIFICATION forming part of Letters Patent No. 319,628, dated June 9, 1885.

Application filed November 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL RUSSELL, a citizen of the United States, residing in the city of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Electric Cartridges and Primers for Firing by an Electric Spark, of which the following is a specification.

In my Patent No. 307,071, dated October 21, 1884, I have described an electric cartridge adapted to fire the powder by the incandescing of a platinum wire upon the passage through it of an electric current.

My present invention aims to provide a cartridge which shall fire the powder by the passage of an electric spark between two terminals of electric conductors. It has been before proposed to fire cartridges by a spark or static discharge; but, so far as I am aware, this method has not proved practically successful, except when the spark has been employed to ignite a fulminate which in turn ignites the powder. My invention aims to produce a simple, cheap, and effective cartridge or cartridge-primer, which shall insure the direct ignition of the powder by the electric spark.

Figure 1 of the accompanying drawings is a longitudinal mid section of my improved cartridge. Fig. 2 is a side elevation of the primer removed. Fig. 3 is a longitudinal mid section of the primer. Fig. 4 is an end view thereof. Fig. 5 is a longitudinal mid section of an empty shell, illustrating a modified construction; and Fig. 6 is a view corresponding to Fig. 3, and showing a modified construction of the primer.

Let A designate the cartridge-shell of any suitable construction and having a metallic base, *a*, and B the electric-spark primer. (Shown detached in Figs. 2 and 3.) In the preferred construction (shown in Figs. 1 to 4) this primer is made detachable, and consists of a central pin, *c*, a tubular insulating-sheath, *d*, and an outer metallic tube, *e*, the sheath being shorter than the pin and tube, as shown, so that an annular recess, *f*, is formed in the front end of the primer. The pin and tube are insulated from each other by the sheath, and approach closer together at their front ends than elsewhere. The rear end, *e'*, of the primer is made somewhat larger than its front end, and the metallic base *a* of the cartridge-

shell is made with an inturned neck, *b*, which tightly fits the portion *e'*, holding the primer firmly in position in the cartridge-shell. The primer projects forward into the shell a distance equal to its length, which may be greater or less according as it is desired to ignite the front or the rear of the charge of powder or some intermediate point in the charge.

The primer is applied to the cartridge-shell by being forced in from the rear, as indicated by dotted lines in Fig. 1. The shell is then charged, in performing which operation a portion of powder is necessarily and unavoidably filled into the recess *f*, where it occupies the annular space between the end of the pin *c* and the end of the tube *e*. The cartridge, when charged, is placed in the electric gun, which should be of such construction that the opposite terminals of an electric circuit shall be brought in contact with the base *a* and pin *c*, respectively. The circuit on the gun should include a battery and an induction-coil capable of giving a sufficient spark, or the gun may be provided with or connected with any other means by which an electric spark may be produced on the pulling of the trigger. When the cartridge is thus in the gun, the only break in the circuit (except the break to be closed on the pulling of the trigger) is that between the pin *c* and the tube *e*, which are insulated from each other by the sheath *d*, except at their projecting front ends, where they are separated only by the intervening powder, which is a partial conductor of electricity; hence, when the trigger is pulled, the current passes between the front end of the pin *c* and tube *e* in the form of a spark through the powder, thereby igniting the latter and discharging the cartridge. The spark will pass from the pin to whichever side of the tube is nearest or affords the least resistance in its intervening medium. The end of the tube thus forms an annular electric terminal, which, concentrically surrounding the end of the pin, affords a choice of divergent paths to the spark. It is not, however, essential that the end of the pin shall be arranged concentrically within the tube, as it would be equally operative if arranged eccentrically; but the concentric arrangement is preferable, because of the advantage stated and of its greater ease of manufacture.

The arrangement and position of the recess *f* insures its becoming filled with powder in charging the shell. In some electric cartridges for ignition by sparks heretofore invented the terminals have been so arranged that it would be difficult for the powder to enter the space between them, to which fact I attribute in great measure the failure or only partial success of such cartridges. In my cartridge the recess *f* is open toward the front, whereas in the prior cartridges referred to the corresponding recess or space opens toward the rear or side, necessitating that the powder shall execute a lateral or reverse movement in order to enter them.

In this application for patent I make no claim to the separate electric primer B, except as constructed with special reference to firing by the electric spark, as I have claimed the same, broadly, in my application for patent on improvements in primers for electric cartridges, executed this day, and designed to be filed simultaneously herewith. (Application No. 149,157, filed November 29, 1884.)

Fig. 5 shows a modified construction of cartridge, wherein the primer and cartridge-shell are inseparable. The tube *c* of the primer and the inturned neck *b* of the shell are the same. The neck *b* is spun in from the base *a* in the well-known manner, being made very slightly conical, and the sheath *d*, inclosing the pin *e*, is forced into it from the rear. This construction is readily applicable only to those cartridges wherein the charge is to be ignited near the base, as it is impracticable to spin a long neck *b* from the base *a*.

Fig. 6 shows a primer which includes all the features of my invention except the recess in the front. In this construction the spark

passes across the front end of the sheath through the powder, which is filled close around the primer.

I claim as my invention—

1. An electric cartridge for firing by means of an electric spark provided with an annular electric terminal arranged in the powder-space and with the opposite terminal arranged within said annular terminal and substantially equidistant from all sides thereof, whereby the spark passing between said terminals has a choice of radial paths, as set forth.

2. An electric cartridge for firing by means of an electric spark provided with a central electric terminal projecting toward the front, a recess or powder-space, *f*, surrounding said terminal, and the opposite terminal at the margin of said recess, combined substantially as set forth.

3. A spark-primer for an electric cartridge, consisting of a conducting-pin, *e*, a tubular insulating-sheath, *d*, inclosing said pin, and a metal tube, *c*, inclosing said sheath and projecting beyond the front end thereof, thereby forming a recess, *f*, substantially as set forth.

4. A cartridge-shell, A, formed with a metallic base, *a*, and neck *b*, combined with a spark-primer, B, consisting of a tube, *c*, pin *e*, and interposed insulating-sheath *d*, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

SAMUEL RUSSELL.

Witnesses:

ARTHUR C. FRASER,
HENRY CONNETT.