No. 811,913. PATENTED FEB. 6, 1906.

S. T. FOSTER, JR.

ELECTRIC GUN.

APPLICATION FILED DEC. 10, 1902.

Fig. 1

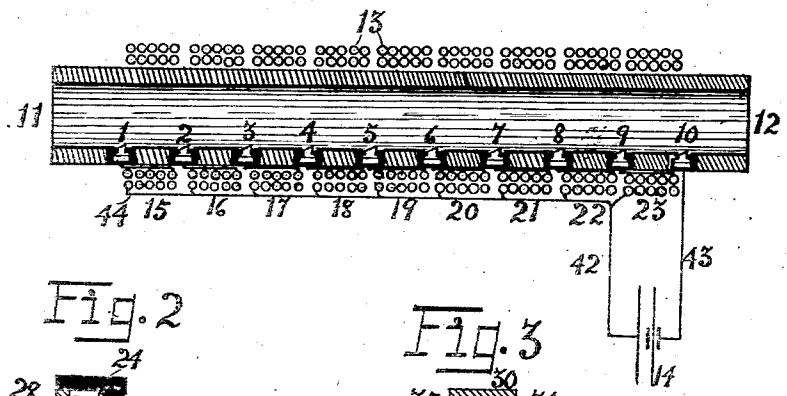


Fig. 2

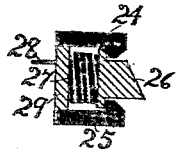


Fig. 3

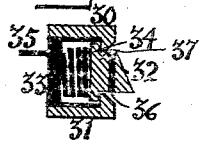
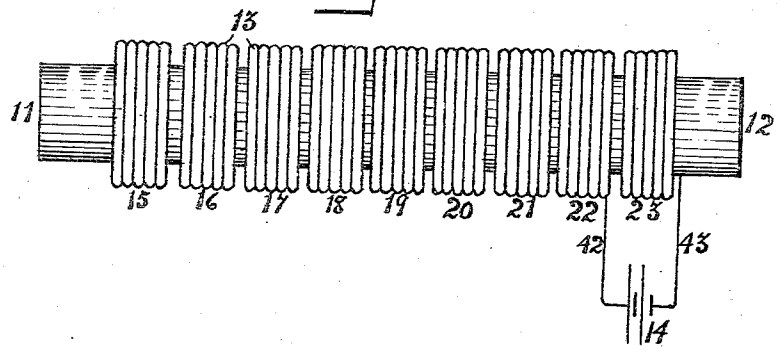


Fig. 4



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UNITED STATES PATENT OFFICE.

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ELECTRIC GUN.

No. 811,913. Specification of Letters Patent. Patented Feb. 6, 1906.

Application filed December 10, 1902. Serial No. 134,725.

To all whom it may concern:

Be it known that I, SAMUEL T. FOSTER, Jr., a citizen of the United States, residing at Victoria, in the State of Tamaulipas and Republic of Mexico, have invented a new and useful Electric Gun, of which the following is a specification.

My invention relates to improvements in electric guns in which the projectile has magnetic properties and which gives force to the projectile by the action of magnetic lines of force on the projectile; and the objects of my invention are to provide a more economical and a more powerful gun than any heretofore invented and to provide against smoke and noise which are a nuisance in the guns that are in present use in the world's armies and navies.

With these ends in view the invention consists in the novel construction hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

Referring to the accompanying drawings, forming a part of this specification, Figure 1 is a diagrammatical longitudinal sectional view of my improved gun. Fig. 2 is a detail sectional view of one of the connector-plugs 1, 2, 3, 4, 5, 6, 7, 8, and 9 of Fig. 1. Fig. 3 is a detail sectional view of the circuit-breaker plug 10 of Fig. 1. Fig. 4 is a plan view of the improved gun.

Similar numerals of reference indicate like parts throughout all the figures of the drawings.

Referring to the drawings, 11 12 is the barrel of the gun and is open at both ends.

11 is the entrance, and 12 is the exit.

13 designates coils of insulated electric wire wound around the gun-barrel to form a helix or several electromagnetic coils.

1, 2, 3, 4, 5, 6, 7, 8, and 9 are electric connector-plugs, and each is connected to one end of one of the coils wound around the barrel and is normally insulated from the barrel, but in operation is electrically connected with the barrel through the projectile.

10 designates the circuit-breaker plug permanently connected to the battery 14, normally connected to the barrel of the gun, completing the connection between the battery and the barrel and in operation is pressed down by the projectile and opens the connection between the battery and the barrel.

14 designates an electric battery or a dynamo or some other suitable and convenient source of electric power, one side of which is normally in connection with the barrel through 43 and 10 and the other side permanently in connection with one end of each of the coils 15, 16, 17, 18, 19, 20, 21, 22, and 23.

15, 16, 17, 18, 19, 20, 21, 22, and 23 designate coils, each of a number of turns of insulated electric wire wound around the barrel, having one end of each connected permanently to a connector-plug 1 2 3 4 5 6 7 8 9, respectively, and the other end of each connected permanently through 42 to the battery 14.

As shown most clearly in Fig. 2, 24 and 25 designate sections of the insulating-wall, and 26 is a cam-connector made to slide between walls 24 and 25 and arranged to make electrical connection with the projectile and to be pressed down by the projectile to allow the projectile to pass and to make good connection between cam and projectile while the latter is passing over the cam. 27 designates a spring for keeping the cam-connector 26 pressed up against the collar of the insulating-lining 24 25, normally, and to allow cam-connector 26 to be pressed down by the projectile passing over the same. 28 designates an electric wire having connection through 27 to 26 and is connected directly to one end of the respective coils of that connector-plug.

As shown most clearly in Fig. 3, 30 and 31 designate sections of metal wall. 33 designates an insulating lining and base. 32 designates a cam operated by the projectile passing over it and pressing it down out of its normal position, which latter is just above the inside surface of the barrel. 37 designates the circuit-breaker normally in connection with the barrel and in operation is pressed down by the projectile and breaks the connection at this place. 36 is insulation and keeps 32 and 37 permanently insulated from each other. 32, 36, and 37 are permanently connected together. 34 designates a spring and keeps 37 normally in connection with the barrel through 30 and 31. 35 is an electric wire permanently connected to 37 through

34 and connected to the source of power 14 by means of the electric wire 43.

The operation of my invention is as follows: All projectiles used in this gun must have magnetic properties, and projectiles of iron or containing large portions of iron are preferable. That projectile having the greatest magnetic permeability is most suitable for this gun. The projectile to be shot by the gun is put in the barrel at 11—the entrance end of the barrel—and shoved forward until the forward end of the projectile comes in contact with the nearest or rear connector-plug 1. Helix 15 is then energized, having its circuit completed through the projectile, through the barrel, through 10 43 14 42 44 15 1, and again to the projectile, exerting an electromagnetic action on the projectile and pulling the projectile forward into the magnetic field of 15 until the projectile reaches the center of 15, and just before that position is reached the forward end of the projectile makes contact with 2 and the rear end of the projectile leaves 1, and then another electromagnetic pull is exerted on the projectile forward by 16 being energized, and 15 is deënergized at about the same instant, and thus step by step the projectile is carried forward through the barrel, those electromagnetic coils behind it being cut out of circuit as the projectile reaches their centers and those electromagnetic coils just ahead being cut in circuit until the projectile reaches the center of the last helix, when the projectile depresses the circuit-breaker plug 10 and opens the battery-circuit, and then the projectile is free from all further action by the gun and must spend force that it has received while in the barrel in overcoming resistance encountered outside of the gun. The first pull gives the projectile a certain velocity, and this velocity is increased by the second pull, and this second new velocity is increased by the third pull, and so on through the several coils the velocity is increased until the projectile reaches the center of the last coil—that is, the most forward coil—when the gun ceases to exert a force on the projectile by the battery-circuit being opened through 10, and the projectile then leaves the mouth of the gun with its accumulated force and continues to travel until that force is equalled by resistance encountered along its path of travel. The velocity attained by a projectile of a given weight and size and of a given magnetic permeability is directly proportional to the number of turns per coil, to the number of coils, and to the amount of current sent through the coils and is indirectly proportional to the resistance to be overcome by the projectile while in the gun-barrel. By increasing the length of the barrel, so as to increase the number of coils, there is no limit to the velocity which can be given a projectile except the limit of practicability in keeping the projectile from heating so much as to damage the bore of the gun by the friction encountered therein.

The projectiles may be longer than any section of the barrel occupied by a single coil; but when such is the case then the said projectiles should not present an electric conducting-surface to the barrel nor to any of the plugs, except a space almost the length of the space along the barrel occupied by a coil, and this space on the projectile that presents an electric conducting-surface should have its center on or near a line drawn through the center of the projectile perpendicular to the length of the projectile—that is, to another line drawn through the end centers of the projectile.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principles or sacrificing any of the advantages of this invention.

Having explained the nature of the invention and described a way of constructing and using the same, although without having attempted to set forth all the forms in which it may be made or all the modes of its use, I declare that what I claim is—

1. In an electromagnetic gun, the combination with a suitable barrel, a series of openings arranged along said barrel, and insulated walls formed within said openings; of a series of connector-plugs mounted in said openings and normally insulated from said barrel and adapted to contact with a projectile having magnetic properties, a spring adapted to normally hold said connector-plugs in contact with said insulated walls, an insulated electric wire wound about said barrel to form a series of helices connected to said connector-plugs, and an electric generator connected to said connector-plugs and said barrel through said helices.

2. An electromagnetic gun for shooting magnetic projectiles, comprising a suitable barrel, a series of surrounding coils or helices, a series of openings arranged along said barrel, insulated walls formed about said openings, a series of connector-plugs mounted in said openings and normally adapted to be engaged by the projectile, a series of springs mounted in said openings and adapted to normally hold said connector-plugs in contact with said insulated walls, and an electric generator connected to said helices and barrel.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL T. FOSTER, JR.

Witnesses:
V. C. ULMER,
C. F. HALEY.