INVENTION

The Colt Revolver

"A Classic Invention"

"The Principle of Locking and Turning the Cylinder" Summarizes This Famous Ancestor of Most Modern Guns

IMPROVEMENT IN FIRE-ARMS —REVOLVING GUN, Samuel Colt, of Hartford, Connecticut. Specification forming part of Letters Patent [*no number*] *dated February* 25, 1836. *This is an exact reprint of extracts from the original patent.*

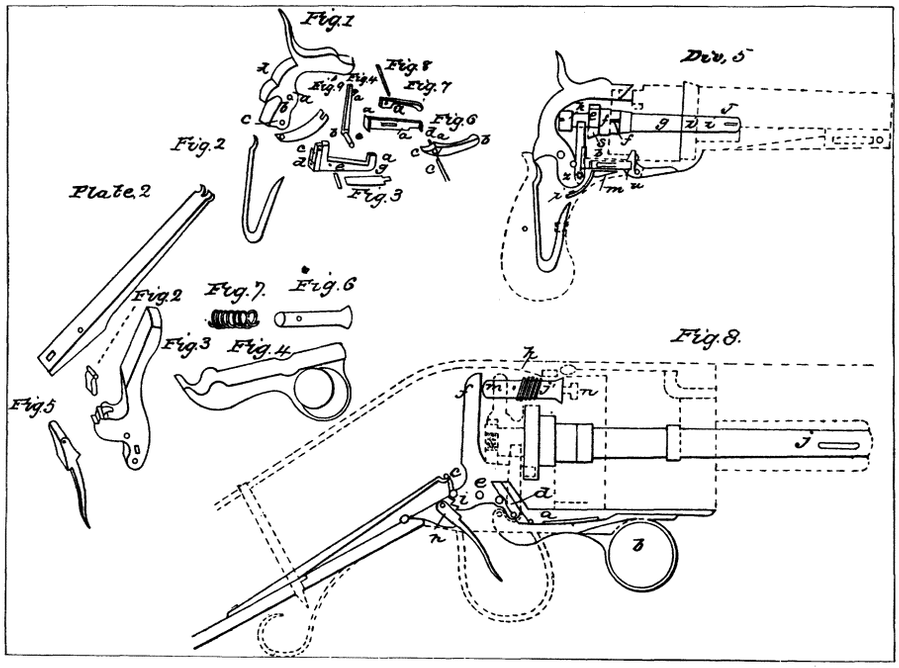
To all whom it may concern:

BE IT KNOWN that I, SAMUEL COLT, of Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Fire-Arms; and hereby declare that the following, with the accompanying drawings, is a full and exact description of the construction and operation of the said improvements as invented by me. . . .

In Division 5 the hammer is hung at the fulcrum *a*. The key which holds the cylinder is hung at the fulcrum *b*. The lifter that works the ratchet has a working connection with the hammer on the left side at *c*. The arm *d* of the lifter works into the teeth of the ratchet on the left. *e* represents the ratchet when connected with the shackle. *f f* is the middle and forward part of the shackle on which the ratchet is placed. *g* is the arbor on which the cylinder revolves. The end *h* is the nut that holds the pin in its place when in the shield. *i i* represent the forward end of the arbor which passes through the plate and the projection on the lower part of the barrel, and by a key at *j* it is secured to the barrel. *k* represents the fulcrum of the trigger. *l* is the spring which forces the connecting rod against the end of the hammer. *m* is the spring which forces the key that holds the cylinder. O is the mainspring. By drawing back the hammer the pin *p* operates upon the after end of the key (that locks the cylinder) and rises. Consequently the other end, *r*, is drawn from the cylinder, and the arm *d* of the lifter commences to act on a tooth, *s*, on the left side of the ratchet, which, being connected to the cylinder by means of the shackle, turns it until the next chamber is brought opposite to the barrel. When the pin *p* is relieved from the key by passing over its upper end, *t*, the pin allows the end *r* of the key to be forced by means of the spring *m* into the succeeding ward of the cylinder. At the same time, by the action of the lower end of the hammer *u* upon the connecting rod at *v*, it produces a forward horizontal motion of the rod, when the end *w* is brought in contact with the upper projection of the trigger and forces it down to a proper position for the finger, when a claw at *x* of the trigger hooks into the connecting rod, which holds the hammer when drawn back or set by means of the end *r* entering the lower catch, *y*, on the hammer. To discharge the pistol, by pulling the trigger the connecting rod is drawn from the catch of the hammer, when the mainspring forces the hammer forward, the upper end of which strikes the percussion-cap, during which the lifter, by means of lateral motion to the left, falls below a succeeding tooth on the ratchet, when, by means of the lateral motion of the after end *q* of the key which holds the cylinder, the pin *p* of the hammer is permitted to fall below it again. By repetitions of the same motion of the hammer the same effect is produced until each succeeding chamber is discharged. . . .

To Set the Lock

To set the lock, the fulcrum of the lever being at *a*, by drawing down on the end *b* the end *c* operates upon the end *d* of the hammer, whose fulcrum, being at *e*, throws back its end *f*, when the trigger at *g* (whose fulcrum is at *h*) operates upon the catches of the hammer at *i* to hold the lock when set. When the end *f* of the hammer is removed from the adopter (whose bearings are at *j j*) it is drawn back by means of the coiled spring *k* until its end *l* is drawn back (*Turn to Page* 204)



THE PARTS OF THE REVOLVER

Colt's patent drawing of the gun and its many jig-saw-like parts. The diagram shows how the mechanism works.

sufficient to allow the cylinder to turn, which is effected as described in the pistol. After the finger is relieved from the lever (when the lock is set) a small spring draws it back to its former place to make room for the end *d* of the hammer, so that its force may not be impaired. By pulling the trigger from the catch of the hammer the mainspring (which is connected to the hammer by the stirrup *o*) forces its end *f* forward against the end *m* of the adopter, the end *l* of which is brought in contact with the percussion-cap placed upon the tube *n*, which discharges the load. To load, it is only requisite to draw the key *j*, which will liberate Section 4. Then by drawing the key that locks the cylinder (which may be effected by drawing back the hammer) the cylinder may be taken from the arbor.

Many Advantages

Among the many advantages in the use of these guns, independent of the number of charges they contain, are, first, the facility in loading them; secondly, the outward security against dampness; thirdly, security of the lock against the smoke of the powder; fourthly, the use of the partitions between the caps, which prevent fire communicating from the exploding cap to the adjoining ones; fifthly, by the hammer's striking the cap at the end of the cylinder no jar is occasioned, deviating from the line of sight; sixthly, the weight and location of the cylinder, which give steadiness to the hand; seventhly, the great rapidity in the succession of discharges, which is effected merely by drawing back the hammer and pulling the trigger.

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age developed, all of the other devices upon which physicists had been working diligently in a half dozen other laboratories.

So striking was the success of the 1,500,000-volt model that Research Corporation funds were obtained under the auspices of the Massachusetts Institute of Technology to build the ten-million-volt machine which is now about to go into the service of physics.

In principle the Van de Graaff generator is simple. From near the surface of the ground to the elevated hollow cylinders there run moving belts. Electricity is picked up upon these belts at the ground level and it is then conveyed, like water in a bucket pump, to the hollow spheres where it is dumped into them and travels to their surfaces. It is not even necessary to provide a source of low voltage electricity to spray upon the belts as the belts can create and pick up the necessary electricity without aid. One of the hollow cylinders thus has its surface charged positively and the other is charged with negative electricity. How much electricity the hollow cylinders will hold without spilling over, or sparking like artificial lightning, one from the other, depends upon their size and the atmosphere conditions.

A relatively large amount of electricity, a thousand kilowatts, will be generated by the ten million volt machine when it operates. This is as much as the power plant of a small town generates. Actually the current amounts to 100 milliamperes at a potential of ten million volts.

The generator would light 90,000 ordinary 10 watt, 110 volt incandescent electric lamps, if connected in series, and there would be ten per cent. current margin to spare. If these lamps were set as close together as possible, say eight to the foot, they would string out to about two miles.

The conductivity of the air prevents the generation of voltages much higher than ten million. The experimenters are therefore at work upon a Van de Graaff generator which will be immersed in a gigantic vacuum tank. With this electrical machine they expect to develop fifty million volts.

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ASTRONOMY

First Direct Photographs of Sun's Hydrogen Flames Made

SOLAR PROMINENCES, great flames of hydrogen that shoot out from the sun's surface, often to heights of hundreds of thousands of miles, have recently been photographed from the Meudon Observatory, near Paris, without waiting for an eclipse, or using a spectroscope, which has been required hitherto. At a recent meeting of the Academy of Sciences, M. B. Lyot, astronomer at the observatory, described the methods that he had used to accomplish this result, which is considered of great scientific importance.

At the time of a total eclipse of the sun, like that seen in New England last August, the prominences may be seen as brilliant spots of red around the moon's dark disc. Nearly forty years ago Dr. George Ellery Hale, famous American astronomer, and Dr. Henry Deslandres, a Frenchman, independently invented the spectroheliograph, which made it possible to photograph them solely by the hydrogen light which they emit. In this way the intensity of the surrounding glare, which is of all colors, was eliminated. Since the prominences are only about five millionths as bright as the sun itself, the glare that surrounds it usually hides them.

A few years ago M. Lyot made some experiments from the summit of the Pic du Midi to record the sun's corona without waiting for an eclipse. This was successful. Because of the extreme clarity of the atmosphere, the diffuse light around the sun was almost completely absent, and by screening the sun's disc from the plate, it was possible to photograph the prominences directly. It was also possible to see them. Even on poorer days, M. Lyot reported, they could be seen by looking through a red glass filter, which eliminated the diffuse light.

When the experiments were repeated at Meudon, the greater amount of atmospheric haze and dust prevented results being obtained so easily. However, M. Lyot constructed a special filter, consisting of an acid solution of the chemical neodymium nitrate, which was contained in a tube covered at one end with plain glass and at the other with a special red filter. The sun's light was passed through this combination filter, and practically all of the light was removed with the exception of a narrow band of waves in the red, which included all of the red hydrogen light. With this apparatus, revealed M. Lyot, the prominences were photographed successfully. Even on misty days, it was possible to photograph them in an exposure time of one second, with the sun's image 8 centimeters (about 3⅛ inches) in diameter.

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