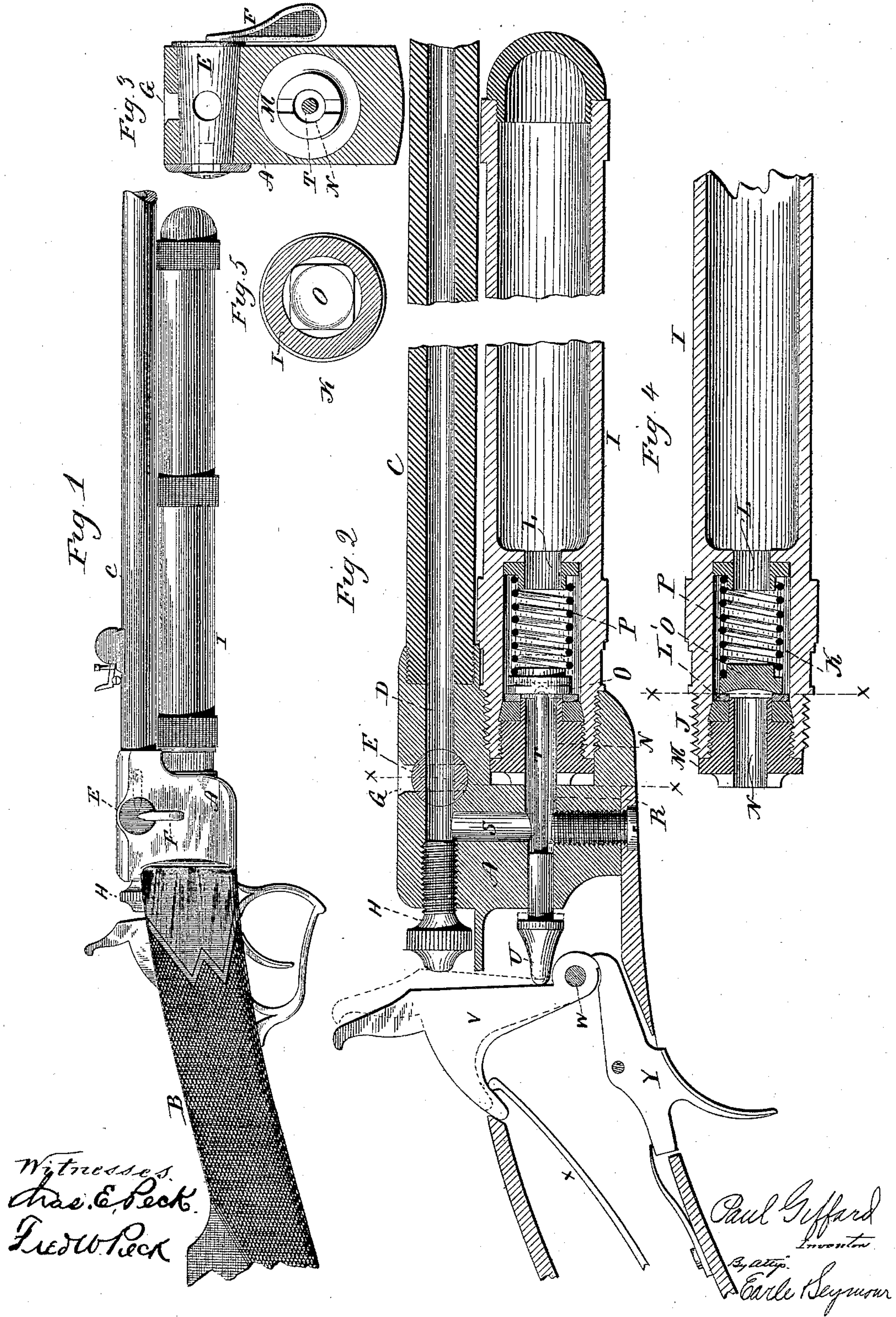


(No Model.)

P. GIFFARD.
GAS REPEATING GUN.

No. 452,882.

Patented May 26, 1891.



UNITED STATES PATENT OFFICE.

PAUL GIFFARD, OF PARIS, FRANCE.

GAS REPEATING-GUN.

SPECIFICATION forming part of Letters Patent No. 452,882, dated May 26, 1891.

Application filed August 6, 1890. Serial No. 361,158. (No model.)

To all whom it may concern:

Be it known that I, PAUL GIFFARD, of Paris, in the Republic of France, have invented a new Improvement in Repeating-Guns; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of the arm complete; Fig. 2, a longitudinal section enlarged, portions broken away for convenience; Fig. 3, a vertical central section on line $x x$ of Fig. 2 on the same scale; Fig. 4, a longitudinal section of the rear portion of the magazine detached; Fig. 5, a transverse section through the magazine on line $x x$ of Fig. 4.

This invention relates to an improvement in that class of guns which employ compressed air or gas as the force for discharge; and the invention is an improvement upon the gun for which Letters Patent of the United States No. 134,048 were granted to me December 17, 1872. Patented in France June 20, 1889; Great Britain, July 9, 1889, No. 11,050. In that patent a cartridge was constructed of tubular shape, closed at one end, open at the other, and provided with a valve upon the inside, so as to open inward, with a spring adapted to yieldingly hold the valve in the closed position. This cartridge was charged with air, and it was stated in the specification that "liquefied gas" might be employed. The gun was constructed with the barrel hinged to the receiver, so as to turn downward and forward, exposing a chamber in the receiver adapted for the insertion of the charged cartridge, and so that a bullet or projectile introduced into the rear end of the barrel and the cartridge introduced into the chamber in the receiver with the valve rearward and the barrel then closed the arm was charged. The chamber was of such dimensions as to permit the air when it escaped from the cartridge to pass forward and expand against the projectile to drive it from the barrel. A hammer was arranged to strike a spindle longitudinally placed in the receiver, so that the blow of the hammer would open the valve for the escape of the air. While that patent described the employment of liquefied gas in

the cartridge, the construction is of such a character as to prevent the practical use of liquefied gas: first, because the cartridge was so small as to render it impracticable to charge with liquefied gas; second, because the communication of the gas to the projectile was necessarily from the rear end of the cartridge around the cartridge through its entire length to the projectile, thus making a seriously-obstructed passage for the gas, and, third, because the cartridge could practically contain but a single charge.

In a subsequent patent, No. 136,315, granted to me February 25, 1873, I devised an arm with a magazine made as a permanent part of the arm, intending to charge that magazine with air and to make it of a capacity sufficient for several charges. The magazine opened into the receiver at the rear, the barrel, like the magazine, being also rigidly connected to the receiver and opening therein. The magazine was provided with a valve at its rear end opening inward, similar to that of the cartridge before referred to, the opening from the magazine communicating through a passage to the rear end of the barrel. A spindle was arranged to be struck by the hammer to open the valve sufficiently for the escape of a portion of the air in the magazine, and so that such air escaping would pass into the barrel in rear of a projectile which had been previously placed therein, and so as to force the projectile from the barrel under the pressure or expansion of the air. This arm, while containing several charges and so as to some extent operate as a repeating-gun, was incapable for obvious reasons of being charged with liquefied gas.

The object of my present invention is the construction of a gun combining with it a magazine capable of storing a quantity of liquefied gas sufficient for a large number of charges, and which may be employed as a practical repeating-gun for any purpose for which guns are ordinarily employed; and the invention consists in a receiver, a barrel attached to the forward end of the receiver and opening at the rear into the receiver, combined with a magazine, the magazine and receiver constructed for rigidly but detachably connecting the magazine, the magazine provided with a valve at the receiver end open-

ing inward, the receiver constructed with a passage leading from the said valve to the open rear end of the barrel, the said passage provided with means for the introduction of a projectile into line with the barrel with a hammer, and mechanism between said hammer and valve, whereby the blow of the hammer will cause an opening movement of the said valve to permit the escape of a small portion of the gas with which the magazine may be charged, the reaction of the pressure upon the inside of the valve overcoming the force of the blow of the hammer, so as to close the valve so soon as the requisite quantity of gas for the discharge shall have escaped, thus holding in reserve the remainder of the gas for succeeding charges, and as more fully hereinafter described.

In illustrating the gun I show it as applied to an arm. A represents the receiver, constructed for attachment to a stock B at the rear in the usual manner for attaching the receiver to the stock of fire-arms. To the forward end of the receiver the barrel C is attached, also in the usual manner of rigidly attaching barrels to the receiver of fire-arms, the barrel opening rearward into a corresponding passage D in the receiver. In the receiver, transversely across this passage, a rotating projectile-holder E is arranged, (see Figs. 2 and 3,) it being provided upon its outer end with a suitable handle F, by which the projectile-holder may be rotated. This holder has an opening diametrically through it corresponding to the passage D, as seen in Fig. 2, and through the top of the receiver is an opening G onto this projectile-holder, so that when the holder is turned to bring the opening through it into line with the opening G of the receiver, as indicated in broken lines, Fig. 2, the projectile may be dropped through the said opening G into the holder and then the holder returned, as seen in Fig. 2. The passage D extends by preference directly through the rear end of the receiver, and into that rear end a breech-pin H is screwed, which securely closes the rear end of that passage, the breech-pin also serving a second purpose, which will be presently described.

I represents the magazine. (Shown detached in Fig. 4.) This magazine is a strong tube, closed at its forward end, and at its rear end is constructed for firm and rigid attachment to the receiver. As here illustrated, this attachment consists of a screw-thread J on the rear end of the magazine adapted to enter a correspondingly screw-threaded recess in the forward end of the receiver, as seen in Fig. 2. This construction permits the ready detachment or application of the magazine, as occasion may require.

The rear end of the magazine is open, and is constructed with a valve-chamber K, with a communication L from the magazine proper into said valve-chamber, and into the rear end of the valve-chamber a valve-seat L' is introduced, held by a tubular plug

M, screwed into the rear end of the magazine upon the valve-seat, there being a passage N through the valve-seat and plug into the valve-chamber.

O represents the valve which stands in the valve-chamber against the valve-seat L', and is yieldingly supported in that position by a spring P in the said valve-chamber, as seen in Fig. 4, but so that the valve may yield under a force applied from the outside for the admission of gas into the magazine.

The receiver is constructed with a passage R, leading rearward from the rear opening into the magazine, as seen in Fig. 2, and this passage R is connected by a passage S to the passage D, leading to the barrel, thus forming a continuous passage from the magazine to the barrel through the projectile-holder E.

Through the receiver at the rear a spindle T is introduced, extending through the passage R, and so as to enter the rear end of the magazine through the passage N and rest against the valve O, as seen in Fig. 2. This spindle extends through the rear end of the magazine, where it is provided with a suitable head U. In the receiver in rear of the head U of the spindle T the hammer V is hung upon a pivot W in the usual manner of hanging the hammer of fire-arms, and the hammer is provided with the usual mainspring X, and a trigger Y is also arranged, which is adapted to engage the hammer in the cocked position or release it therefrom, as usual in the locks of fire-arms. The pivot of the hammer is below the head U of the spindle T, but so that the hammer may strike the said head of the spindle under the reaction of the mainspring. The normal position of the hammer is represented in solid lines, Fig. 2, where it rests against the head of the spindle T, the pressure upon the inside of the valve serving to hold the hammer in that position from the front, while the mainspring opposes such action of the valve-spring. As the hammer is discharged from the cocked position the momentum which it attains under the action of the mainspring is sufficient, for instance, to overcome the power of the valve-spring, so that the hammer under such momentum will move forward, as indicated in broken lines, Fig. 2, and which forward movement will impart a corresponding forward movement to the spindle, and thereby open the valve to the extent of such movement, but immediately the reaction of the pressure upon the inside of the valve will overcome this momentum and return the hammer to its normal position, as before described. Thus upon the discharge of the hammer a slight opening of the valve will be produced, the valve being automatically closed.

The breech-pin H, as before described, extends to the rear, so that the hammer may strike the said breech-pin when under its momentum it reaches the desired position to open the valve, and this position may be adjusted by turning the breech-pin H outward

when a less extent of movement of the opening of the valve is required, or inward when a greater extent of opening is required. This construction of the breech-pin H as both the
 5 regulator and breech-pin permits the construction of the receiver with the passage D directly in line with the barrel and open at the extreme rear, so that by removing the breech-pin at any time the interior of the barrel will be exposed from front to rear. This
 10 is a great convenience in the use of the arm.

The valve O of the magazine is of a shape with relation to the valve-chamber K that when the valve is open there is a free passage from the magazine through the valve-chamber into the passage N, or vice versa.
 15

The plug M is made removable both for the convenience of the introduction of the valve and for the examination of the valve and seat
 20 should occasion require.

The magazine is removed from the receiver and is charged with liquefied gas—that is, with gas such as carbonic-acid gas compressed to liquefaction. Then the magazine
 25 replaced and firmly attached to the receiver, as before described, the gun is ready for use. The projectile-holder is turned to open to the passage G, the projectile is placed in the holder, and then the holder returned, as seen
 30 in Fig. 2. The hammer is then cocked, and upon its discharge will operate through the spindle T to open the valve for the escape of the requisite quantity of the said liquefied gas, which, passing through the passage
 35 against the projectile, expands and produces the discharge of the projectile with a corresponding force.

It is impracticable for individuals to possess and operate the apparatus for charging
 40 the magazines with the liquefied gas.

By making the magazines detachable from the receiver, but yet rigidly secured thereto, as if a permanent part of the gun, the magazines are adapted to be taken to an apparatus
 45 for conveniently charging the same with liquefied gas.

The magazines being so independent of the gun, numerous magazines may be charged to accompany a single gun, or the magazines
 50 may be charged and sold in the market, they being adapted to be interchangeably attached to the gun.

While illustrating the holder E as a means for introducing the projectile, it will be evident that various other equally well known devices may be substituted therefor, such devices being too well known to require illustration; or it may be omitted entirely and the projectile introduced from the muzzle of the
 55 barrel, as a muzzle-loader.

From the foregoing it will be understood that I claim nothing in this application shown or described in my beforementioned prior patent; but

What I do claim as my invention, and desire 65 to secure by Letters Patent, is—

1. A gun composed of a receiver, a barrel attached to the receiver and open at its rear end to the receiver, the receiver constructed with a passage forming substantially a continuation of the barrel, combined with a
 70 magazine adapted to contain liquefied gas and constructed to be removably but rigidly attached to the receiver, the rear end of the magazine opening into the receiver, the receiver constructed with a passage leading
 75 from said opening in the magazine to the barrel, a valve at the rear end of the magazine opening inward against the pressure from within the magazine and adapted to
 80 normally hold the passage from the magazine to the receiver closed, with a hammer and mechanism between said hammer and said valve, substantially as described, and whereby under the blow of the hammer the said
 85 valve is open for the escape of a portion of the gas from the magazine.

2. A magazine for a gun substantially such as described, the said magazine constructed to be removably but rigidly attached to the
 90 gun and constructed at its rear end with a valve-chamber, a valve in said chamber arranged to open inward against pressure from within the magazine, and a spring in said chamber adapted to yieldingly hold the valve
 95 in its closed position, the said magazine being adapted to contain liquefied gas for repeated charges for the gun, substantially as described.

3. The combination, in a gun, of a receiver 100 having a barrel attached at its forward end opening into a passage in the receiver corresponding with the bore of the barrel, the said passage in the receiver opening at the rear of the receiver, a breech-pin screwed into and
 105 so as to close the rear end of said passage, but projecting therefrom, a hammer hung in the receiver and moving in the plane of said breech-pin, the said breech-pin serving as an adjustment for the blow of the hammer, a
 110 detachable magazine adapted to contain liquefied gas and also adapted for rigid attachment to the receiver, a valve in the rear end of said magazine opening inward against the pressure in the magazine, and a passage leading
 115 from said valve and communicating with the said passage from the receiver leading to the barrel, with mechanism between the said hammer and valve, substantially as described, whereby the force of said hammer produces
 120 an opening movement of the said valve and the reaction upon the rear of the valve closes said valve.

PAUL GIFFARD.

Witnesses:

VICTOR VÈYSY,
 JOHN E. EARLE.