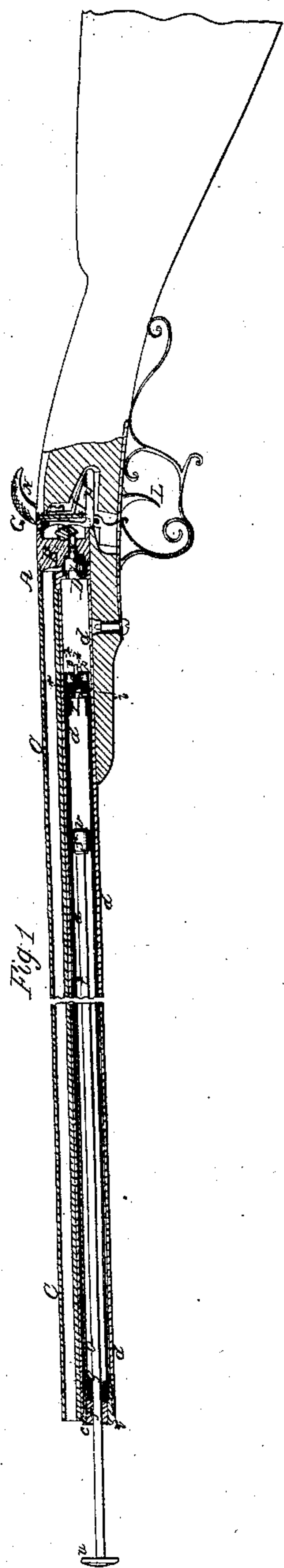


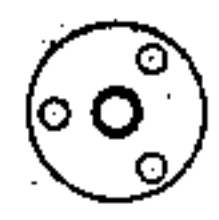
*P. Giffard,*  
*Air Gun,*

*Nº 41,500,*

*Patented Feb. 9. 1864.*



*Fig. 7.*



*Fig. 6.*



*Fig. 5.*



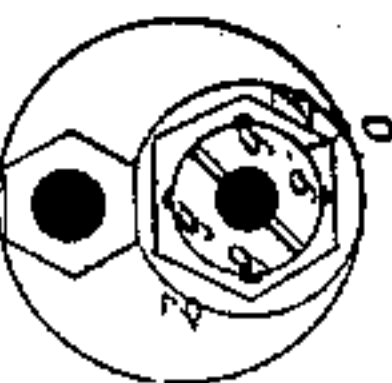
*Fig. 4.*



*Fig. 3.*



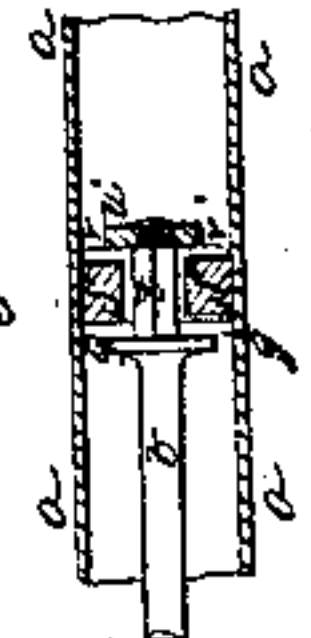
*Fig. 2.*



*Fig. 14.*



*Fig. 13.*



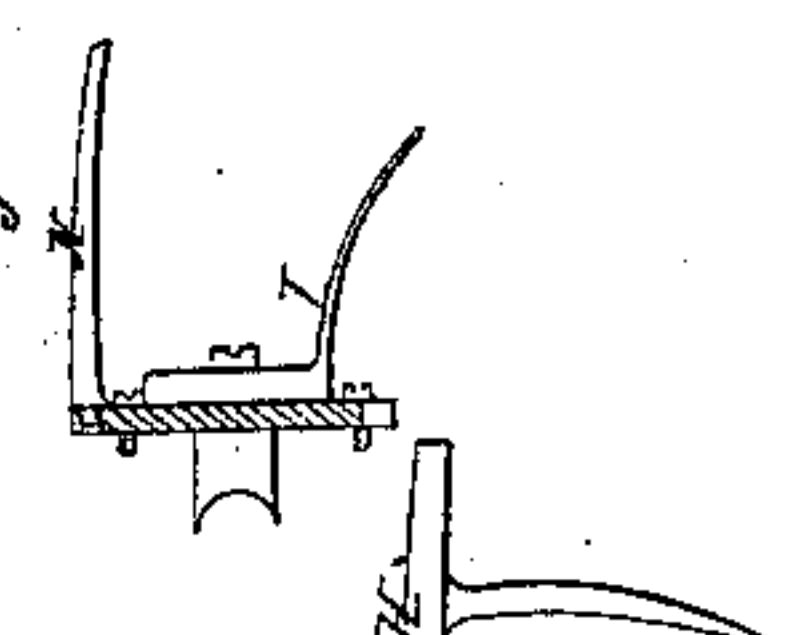
*Fig. 12.*



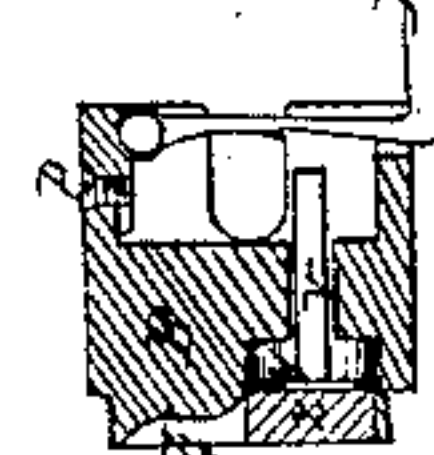
*Fig. 11.*



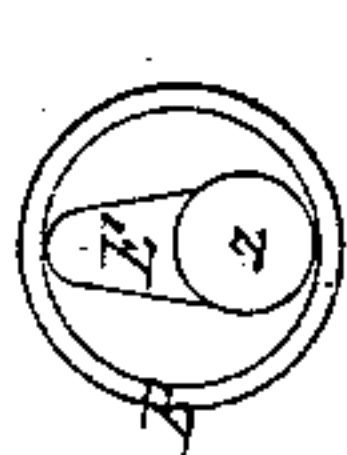
*Fig. 10.*



*Fig. 9.*



*Fig. 8.*



*Witnesses*  
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*his atty.*

# UNITED STATES PATENT OFFICE.

PAUL GIFFARD, OF PARIS, FRANCE.

## IMPROVEMENT IN AIR-GUNS.

Specification forming part of Letters Patent No. 41,500, dated February 9, 1864.

*To all whom it may concern:*

Be it known that I, PAUL GIFFARD, of Paris, in the Empire of France, have invented certain new and useful Improvements in Air-Guns and other Air-Arms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon.

My invention consists in improvements in the construction and action of air-guns, as hereinafter described. I utilize all the compressed air by means of a valve arrangement hereinafter described, and render the action of the compressed air on the projectile instantaneous.

Figure 1 of the accompanying drawings is a longitudinal section of a gun constructed according to this invention, and Figs. 2 to 12 show the different parts of the gun in detail.

The air-pump lies parallel with the barrel of the gun, and consists of a metal tube, *a*, having a screwed enlargement, *b*, at one end for screwing the tube to the air-reservoir *d*. The joint is made tight by means of a caoutchouc ring, tow packing, or other material. The tube *a* extends almost the whole length of the gun-barrel, sufficient space being left at the rear for a valve and a portion of the air-reservoir, as hereinafter described. It has an even surface inside, and is of sufficient thickness to allow a screw-thread to be cut in it. Its front end has a metallic stopper, *f*, screwed into it, with an aperture, *e*, in the center to admit the piston-rod. There are other holes *g* in the stopper *f*, (see Figs. 2 and 3,) leading inside the pump-barrel, for admitting at each stroke of the piston the quantity of air required. Grooves *g'* are formed in the pump-barrel *a* parallel with the holes *g*, which grooves act as valves for the piston at the time of its admission into the mouth of the barrel, by which air is allowed to enter the pump-barrel *a*. The rear end of the pump-barrel is closed by a metal box, *p*, containing a valve, *i*, for allowing air pumped by the piston to enter a reservoir, hereinafter described, and to prevent it entering the barrel *a* while the air is being compressed.

The valve *i* is by preference made of caoutchouc, or of any other material capable of producing a tight joint, and is held between metal plates. (See Fig. 6.) A helical spring,

*k*, presses lightly against the valve *i*, so that at the time the air is compressed there shall be no delay in its action. The valve-box is composed of two parts, *lm*, united by a screw in such manner that the valve inside the box can be withdrawn when required. The valve consists of a rod, *o*, carrying a ring on which the caoutchouc is fixed, and screwed up by a ring-joint, *q*, screwing onto the part carrying the caoutchouc. The spring *k* presses on the valve and insures the action. Grooves *r* are formed longitudinally at the rear of the pump-barrel *a*, as well as in front, for allowing the superfluous air contained in the spaces to escape, which would otherwise reascend around the piston-rod. The air is compressed by means of a leather or other piston, *s*, moving to and fro in the barrel. It is united to a rod, *t*, of the same length as the barrel *a*, and the outer end of which terminates in a button, *u*. The piston *s* must be slightly lubricated to facilitate its motion. There is a small catch, *v*, Fig. 1, at the end of the barrel *a*, which holds the button and prevents its falling out when the arm is directed toward the ground.

The air-reservoir consists of a metal tube, *d*, of the same length as the barrel of the gun. The pump-barrel is screwed into the fore end thereof, and round the pump-barrel and between it and the tube is an annular space extending the whole length of the arm, forming the reservoir for the compressed air. For small-arms this arrangement may be modified. The reservoir-tube *d* is smooth on the inside to allow of the free escape of the air. It is fixed to the barrel of the arm by solder and metal bands. The trigger-box is screwed onto the rear end of the reservoir, and the joint must be made perfectly air-tight. The trigger-box (see Figs. 1, 8, 9, 10, 11, and 12) is made in two pieces, A B, screwing into one another, the part A abutting against the butt of the arm through which the reservoir-tube *d* and barrel C pass. The other part, B, carries the lock. A valve-seat, D, is formed on the end of the reservoir-tube *d*. The barrel C of the arm is in communication with the inside of the trigger-box, in the interior of which is a valve-piston consisting of a steel rod, *x*, carrying a ring, *y*, fitted with a caoutchouc disk, *z*, for closing communication. Air enters the barrel C by a bell-shaped channel, E. The caoutchouc disk *z* is united to the piston-



valve, which is free to move from top to bottom in the interior of the trigger-box. The rod of the piston slides in the thickness of the metal of the box, and passes outside thereof, to enable pressure to be exerted on it. By pressing strongly on the extremity of the rod the caoutchouc disk is compressed, and exactly closes the reservoir-orifice. If the piston-valve is then suddenly released, the elasticity of the caoutchouc, combined with the pressure of the compressed air, causes the sudden opening of the reservoir-orifice and allows the compressed air free action on the projectile.

To effect the rapid passage of the compressed air from the reservoir *d* to the barrel *C*, I adopt the following arrangement: At the rear end of the valve-rod *x* there is a spindle, *F*, on which the hammer of the lock is fixed, and carrying an eccentric nut, *M*, (see Figs. 11 and 12,) which, when the gun is cocked, exerts a strong pressure against the rod *x*. The back of the nut *M* has notches formed in it to receive the claws of a bent lever, *H*, which latter keeps the nut pressed up against the air-exit orifice from the reservoir. Up to the time that the discharge takes place the elasticity of the caoutchouc forces the trigger to fly down quickly so soon as the tumbler is touched, and thereby hermetically closes the passage of the valve-rod into the rear end of the trigger-box. The force of the compressed air is then sufficient to push back the caoutchouc, and to free the exit orifice from the reservoir. The spindle *F*, as before stated, carries the hammer *G*, and by cocking the latter the nut *M*, by its eccentricity, presses against the outer end of the valve piston-rod, the caoutchouc becomes compressed, and closes the reservoir. The bent lever *H*, being constantly pressed against the nut by a spring, *I*, takes into a notch on the nut and maintains the caoutchouc compressed until the discharge. The discharge is caused through the trigger *L*, on pulling which the nut becomes released, and, being driven back by the valve-piston, the discharge is rapidly produced. The reservoir may also be closed by caoutchouc taking the place of the piston and sliding in a

cylinder with a lateral hole in it, through which the volume of compressed air is allowed to pass. By this arrangement an unlimited compression of air may be obtained. The upper part of the trigger-box has a tail-piece, *N*, screwed thereto by a strong screw, which, together with the trigger-guard, fastens the breech and barrel to the stock of the gun.

For small-arms the body of the air-pump enters the barrel of the arm but for a short distance only, and the annular space between the pump and the reservoir is dispensed with, the space between the bottom of the body of the pump and the reservoir forming a reservoir for the compressed air.

An ordinary ramrod is fitted to the gun, which is secured between the reservoir and the barrel of the arm by loops. A bayonet may be fitted to the front of the barrel in the ordinary manner. The gun may be made breech-loading by fitting to it a slide free to move on the breech part of the barrel, whereby the projectiles may be inserted.

My invention may be applied to walking-sticks and canes in the following manner: The upper part of the stick carries the air-pump and the reservoir. The trigger-box is hidden in the interior of the stick near the handle, the only part visible being the trigger. The loading may be effected by a rod which lies parallel to the stick, and the stick itself forms the barrel.

Having now described the nature of my said invention and in what manner the same is to be performed, I claim—

The construction of air-guns in which all the compressed air is utilized, and the action thereof on the projectile rendered instantaneous, and with the air-reservoir and air-pump arranged substantially as hereinbefore described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

P. GIFFARD.

Witnesses:

E. SHERMAN GOULD,  
E. JAUME.