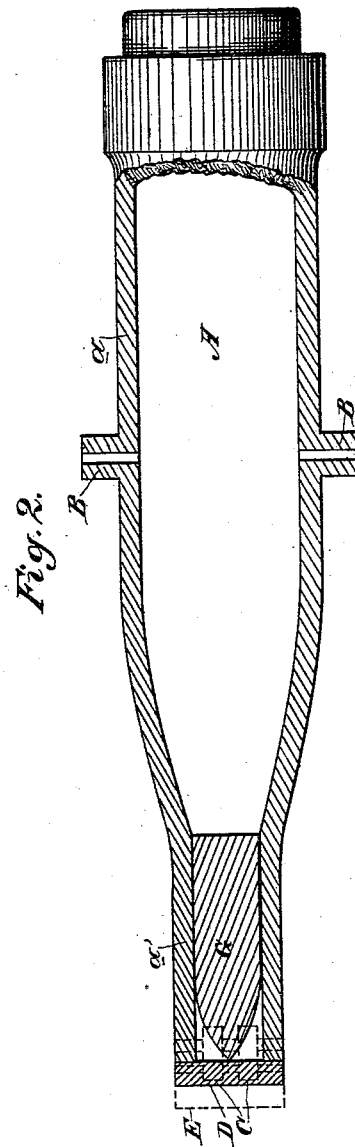
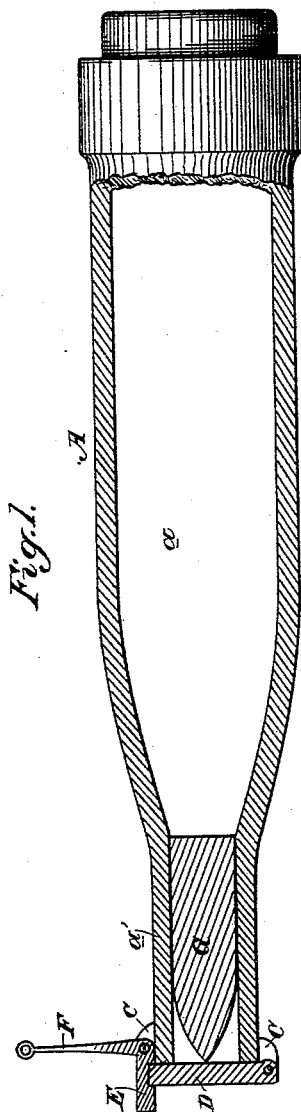


(No Model.)

J. R. N. OWEN.  
PNEUMATIC GUN.

No. 458,329.

Patented Aug. 25, 1891.



Witnesses,  
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# UNITED STATES PATENT OFFICE.

JOSEPH R. N. OWEN, OF EUREKA, NEVADA.

## PNEUMATIC GUN.

SPECIFICATION forming part of Letters Patent No. 458,329, dated August 25, 1891.

Application filed November 12, 1890. Serial No. 371,226. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH R. N. OWEN, a citizen of the United States, residing at Eureka, Eureka county, State of Nevada, have invented an Improvement in Pneumatic Guns; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of guns designed to throw, by means of compressed air or gas, shells charged with dynamite or other sensitive high explosives.

The object of my invention may be generally stated to be the provision of a gun of this class which on account of its construction and the principle upon which it operates will fire its projectile or shell effectively and with safety both to the gun and to those serving it.

My invention consists in the novel construction of the gun and in the mode or method of charging and firing it, hereinafter fully described, and specifically pointed out in the claims.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a vertical section of my gun. Fig. 2 is a horizontal section of the same.

Experiment and observation in the use of small-arms have convinced me of three demonstrable facts: first, that the powder gases do not cease to affect the shot after it leaves the muzzle of the gun; second, that the velocity which a shot attains at the muzzle of the gun is not its maximum velocity, as it is usually assumed to be, and, third, that friction up to a certain point, if regular, so far from being detrimental, is one of the most important factors in developing the full power of the gun. These facts have led me to infer that the only office of the bore of the gun, besides that of giving direction, is to retain the shot and restrain its motion during the combustion of the charge and until the full complement of elastic gas has been generated to throw it from the muzzle; that at this critical instant of time the shot, for the best effect, should be released from the muzzle, and

that any prolongation of the bore beyond this point, under the mistaken idea that the column of gas throwing the shot needs lateral support, is a mistake, as it can only serve to obstruct the full and free action of the gases in throwing the projectile and thereby impair the power of the gun.

While it is evident that a certain length of bore in a powder-burning gun is advantageous and necessary to give time for the gases to form before the shot escapes, in the air-gun the case is quite different, as here the entire charge is already in a gaseous form when it is introduced into the gun and in a state of compression ready to throw the shot at the instant of release. This essential difference in the condition of its charge demands a different arrangement in the air-gun. As there is no other office here for the bore to perform than that of giving direction to the projectile, the smallest extent of bore in front of its seat is all that is required, and any prolongation beyond that will only impair the power of the gun more and more as that prolongation is carried out. Wherefore in the torpedo-gun instead of seating the projectile within the re-enforce and back near the breech, as usual, and leaving a long extent of bore to be traversed before it leaves the gun, I have determined, first, to seat it within the chase of the gun and as near to the muzzle as practicable; second, to reserve all that part of the bore behind it to serve as a chamber to accommodate and hold the charge of compressed air or gas which is to throw it, allowing the full pressure of the charge when it is admitted into the chamber to bear directly upon the base of the projectile without the intervention of any mechanism to prevent it; third, to retain the projectile immovably in its seat by means of some suitable mechanism on the outside of the gun sufficiently strong to restrain it against the full pressure of the charge behind it and so arranged that it may be instantly released at the proper moment to open a free passage for the exit of the projectile from the muzzle of the gun.

The gun A is designed to be a breech-loading steel rifle, not unshapely in its general

configuration, but presenting the peculiarity of a much longer re-enforce *a* and shorter chase *a'* relatively than usual. It will be much thinner and lighter than the modern long-range steel rifle of the same caliber, and for good service need not be as long. It will be mounted, like any ordinary gun, upon its trunnions B and on a pivoted carriage, so that it may be trained horizontally to any point around a circle and vertically to any angle within an arc of forty-five degrees or more, if necessary. The mounting need not be here shown, as it forms no part of my present invention. On account of the special character of its service its manufacture will probably be confined to the larger calibers, ten to twenty inches, and from its necessary impedimental connections, whether on ship-board or in land defenses, it will be essentially "a gun of position." The bore will not be uniform in its entire length. That section embraced within the chase *a'* will represent the caliber of the gun. Its proportions, generally speaking, will be three and a half times its own diameter in length, and will be made with a slight taper from end to end, the contraction being in the direction of the muzzle. That section embraced within the re-enforce *a* and which forms the chamber for the charge of compressed air or gas will be considerably enlarged to give it more capacity and will be connected with the smaller section in front by an easily-sloping shoulder to allow the shell when pushed forward in loading to glide up readily into its seat within the chase. The rifling will be confined to the bore of the chase, the grooves being deeper at the muzzle and gradually running out at the shoulder of the bore.

The system of breech-loading selected for this gun is for practical and economical considerations the same as that already adopted by the United States Government for the new steel rifles of the service; but a novel and essential feature of my invention is a mechanism at the muzzle of suitable character to hold the shell in place against the full force of the air or gas behind it and to release it at the proper moment. One form of this mechanism I have here shown. Upon the extreme end of the chase and wrought upon the gun are two stout projections C of metal, the one immediately above and the other directly below the muzzle. These are slotted longitudinally down to the outer surface of the gun. To the lower one, which will project a little beyond the muzzle, is hinged a thick lid or valve D of wrought-steel, which, when lifted up, will close the muzzle, not so close as to prevent the free passage of air, but sufficiently to keep out stray missiles. To the upper one is hinged in like manner a strong spring-latch E, which engages the upper edge of the valve D when that is closed against

the muzzle and holds it firmly in that position. From the back part of the latch a strong but more attenuated lever F extends perpendicularly from the latch or at any convenient angle over the gun, and to the upper end of this lever the lanyard is to be attached, by which from the rear of the gun the latch may be lifted to free the muzzle-valve. The air or gas under pressure will be admitted to the chamber of the bore behind the shell and will be wasted through the other trunnion when occasion requires it without discharging the gun.

In loading, the shell G, being introduced into the open breech, is carefully pushed forward through the air-chamber and up into its seat within the chase till its point bears firmly against the closed muzzle-valve D. The breech is then closed, and by means of a suitable throttle the air is carefully admitted to the chamber and the pressure gradually raised to the desired tension, when the throttle is closed and the gun is ready for discharge. A quick strong pull upon the lanyard from the rear of the gun lifts the latch and frees the muzzle-valve. The point of the shell, already pressing strongly against the valve, will simply push the valve away from the muzzle in its first movement without the slightest jar till, by its own weight, the valve falls well below the line of the bore and opens a clear passage for the exit of the shell. In the rear the pressure of the charge, already bearing at its full maximum upon the base of the shell, begins with its first movement to decline and continues regularly to decline without the slightest concussion as long as it acts upon the flying projectile.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A pneumatic gun having a chase in which the shell or projectile is seated and a chamber behind for the charge of compressed air or gas, and a trip-stop or valve over the muzzle of the gun for holding the shell or projectile immovably in place against the full charge of air or gas and for releasing it when desired, substantially as herein described.

2. A pneumatic gun having a relatively short chase in which the shell or projectile is seated at or near the muzzle, a relatively long re-enforce forming the chamber for the charge of compressed air or gas directly behind the base of the shell or projectile, and a trip-stop or valve over the muzzle of the gun for holding the shell or projectile in place against the full pressure of the charge of air or gas and for releasing it when desired, substantially as herein described.

3. In a gun, the chase within which a projectile is seated near the muzzle, a chamber extending from the base of the projectile to

the breech of the gun, means by which a charge of compressed air or gas is admitted to said chamber, so as to press against the base of the projectile, a stop mechanism by  
5 which the projectile is retained in its seat until the full pressure of the charge is exerted upon its base, and a device whereby said stop may be removed to allow the escape

of the projectile, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOSEPH R. N. OWEN.

Witnesses:

OWEN RICE,  
PETER BREEN.