







(No Model.)

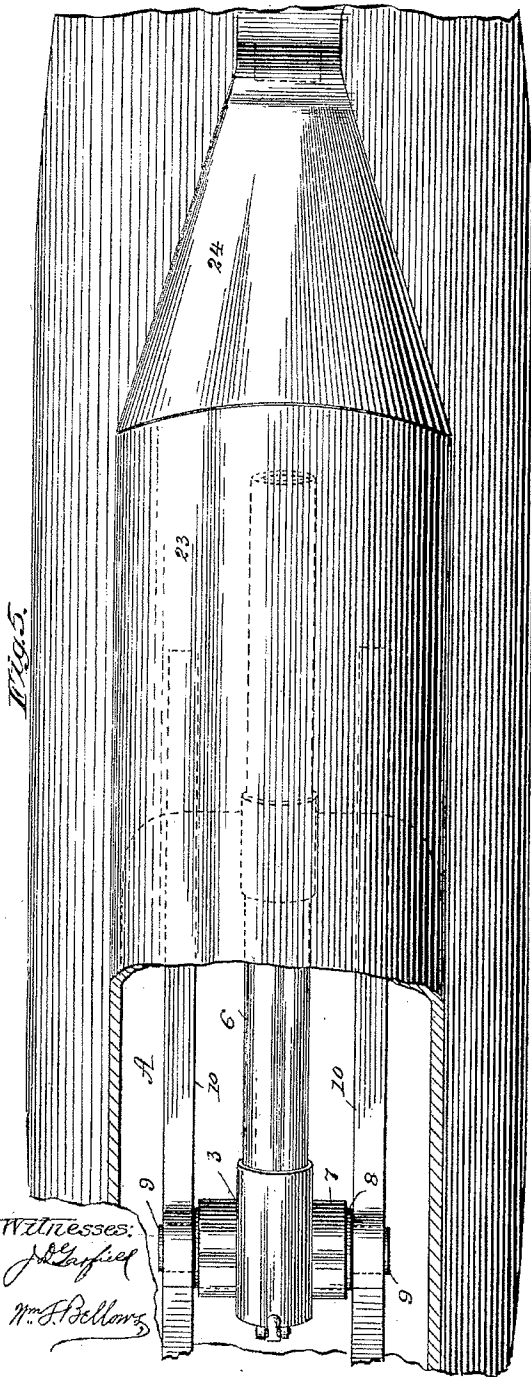
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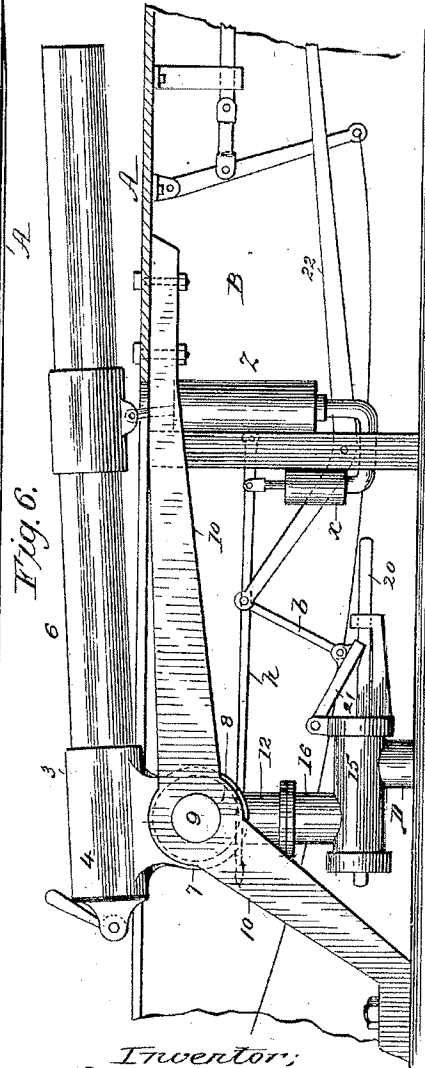
PNEUMATIC GUN AND OPERATING MECHANISM.

No. 427,848.

Patented May 13, 1890.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## PNEUMATIC GUN AND OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 427,848, dated May 13, 1890.

Application filed June 20, 1889. Serial No. 314,959. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD J. GATLING, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented new and useful Improvements in Pneumatic Guns and Operating Mechanism, of which the following is a specification.

This invention relates to improvements in the construction of pneumatic guns, the object being to provide an improved gun of this description for torpedo-boats, ships, or shore defense; and the invention consists in the peculiar construction of the gun relative to its air-induction conduit and means for hanging the gun to permit of adjusting its elevation, all as hereinafter fully described, and pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a side elevation, partly in section, of a pneumatic gun and co-operating mechanism constructed according to my invention, said gun being represented in said figure as located in a protecting-inclosure, the latter having its forward end protected by a movable shield, the said shield and inclosure being shown in section. Fig. 2 is a rear elevation of the gun, showing its inclosure in cross-section. Figs. 3 and 4 illustrate, in perspective views, details of the construction of parts of the gun hereinafter fully described. Fig. 5 is a plan view of the said gun inclosure and shield and a portion of the deck of the boat on which the latter are located, said shield having its rear upper portion broken away, thereby showing a top plan view of the breech of the gun and its supports. Fig. 6 is a side elevation of the gun and its operating mechanism.

In the drawings, A indicates a portion of the deck of a boat, and B the hold of the boat, in which the below-described pneumatic gun and its operating mechanism may be mounted. It is obvious, however, that said gun may be mounted in like manner in a fort or any other suitable place for purposes of defensive or offensive warfare, it being understood that wherever said gun is located there will be provided suitable engines and air-compressing mechanism for supplying said gun with air under a high pressure for the purpose of discharging projectiles therefrom.

The said pneumatic gun consists of the breech-piece 3, cast, preferably, from steel or gun-metal, having a cylindrical body 4, in which is screwed the breech-block 5 and in its opposite end the gun-tube 6, and a hollow cylinder 7 extending at right angles to said cylindrical body 4, which, together with a solid metal cylinder 8, (excepting a transverse perforation *a* therethrough,) constitute the rolling support for the breech of the gun, in place of the trunnions usually provided therefor. The said hollow cylinder 7 has an opening *c* through its lower side and a similar opening *e* through its upper side, (said openings *c* and *e* being about midway between its ends,) which extends from the interior of the cylinder 7 through the side of the cylindrical body 4, communicating with the interior of the latter and from the latter with the said gun-tube 6, which is screwed or otherwise secured thereto. The operative position of the said cylinder 8 is within the cylinder 7, as shown in Figs. 1, 2, and 5, and when so placed the perforation *a* through it transversely registers or is in line with the said openings *c* and *e* through the opposite sides of said cylinder 7, and on the opposite ends of the said cylinder 8 project two short bearing shafts or studs 9, which support, in connection with the trusses or frame-pieces 10, of heavy metallic construction, the breech portion of the gun, the said shafts or studs 9 entering proper circular perforations in said trusses, as shown. The said cylinder 8 and hollow cylinder 7 are so fitted, the former within the latter, that the breech-piece 3 and the gun-tube connected therewith may have a suitably free oscillating movement on said cylinder 8 to provide for the requisite elevation and depression of the gun, the said cylinder 8 being so fixed in the trusses 10 and by its connection with an air-conduit, as below described, that it is perfectly rigid and can have no oscillating or rocking motion whatever.

Figs. 1, 2, 5, and 6 illustrate in various positions the breech of the gun, the said breech-piece 3, the cylinder 8, and the said supporting-trusses of the gun in assembled and operative positions. A tube 12, for conducting compressed air through the said cylinder 8, and thence through the said opening *e* to the

interior of the breech-piece 3 of the gun, is screwed into or otherwise secured to said cylinder, the said tube 12 being secured to the cylinder 8 after the latter shall have been placed in the hollow cylinder 7 by passing the end of said tube through the opening *c* in the under side of said cylinder 7, the latter-named opening being made somewhat larger than the external diameter of the tube 12, in order to permit the cylinder 7 and the breech-piece of the gun to have the necessary oscillating motion on the cylinder 8; but this motion is never sufficient to materially interfere with the area of the air-conducting passage *e* above mentioned, through which air passes to the interior of the said breech-piece.

Compressed air for discharging a projectile from the within-described gun is conveyed from any suitable air-compressing mechanism through a conduit D into a cylindrical valve-box 15, said valve-box having on its upper side a short conduit 16, communicating with said tube 12, having a flange-connection at one end by means of suitable bolts with said tube 12, as shown. The said valve-box 15 is provided with a valve 19, fixed on a stem 20, having bearings in the opposite ends of said box, the said valve being shown in a position in Fig. 1 which obstructs the passage of compressed air from said conduit D through the valve-box and the said conduit 16 and tube 12 into the gun, said valve being held in that position prior to the discharge of the gun by a brace 21, pivotally connected to the end of said valve-box or other fixed point, and having one end engaging with said valve-stem 20, as shown, whereby the valve is retained in the above-mentioned position. The said brace 21 is attached to the end of a lever 22 by a link *b*, said lever being pivotally hung to a fixed part of the boat or other place, and having its free end extending under one end of the gun-shield below described, whereby by the dropping of the end of said shield against the lever 22 said lever is moved to the position indicated by dotted lines in Fig. 1, and the brace 21 is disengaged from the valve-stem 20, thereby permitting the valve to slide in its box and permit compressed air to pass freely to the gun. The said gun-inclosing shield or housing 23 consists of a strong metallic construction, of substantially semicircular form in cross-section, secured in a fixed position over said gun, whether upon the deck of a boat or elsewhere. Said inclosure 23 is open at the rear end to afford conveniences for loading said gun through the breech with any suitable highly-explosive shell. Said inclosure 23 is open at its forward end, and to protect the last-named open end of the inclosure and the gun from injury from shot or shell fired toward the gun a shield 24, having preferably the form of a conic section, as shown in Fig. 5, is suitably pivoted at *d* to the deck A of the boat or other suitable place, and from said pivoted point said shield extends normally in an upwardly-

inclined direction to the plane of the upper side of said inclosure 23, as shown in Fig. 1. To the upper or free end of said shield 24 there pends a lip or apron 25, which when said shield is in its normal position, as shown in Figs. 1 and 5, covers and protects the front end of said inclosure 23 and the muzzle of the gun, thus fully protecting the parts and things so covered from damage, as aforesaid, for any shots striking the inclined side of the shield 24 would be thereby given an upward flight without producing any material damage. The said lip or apron 25 of the gun-shield 24 extends or hangs from the end thereof adjoining the open end of the inclosure 23 through an opening in the deck A or the floor of the place where the gun is located, the lower end of said lip having a position normally opposite a metallic abutment 26, which is fixed to said deck or floor. The free end of said gun-shield 24 is held in its upward normal position (shown in Fig. 1) by a sliding bolt 27, supported under said deck or floor in a horizontal position, as shown, one end thereof passing through said abutment 26 and entering a socket in said apron 25 of the gun-shield, whereby the latter is held in its said upward normal position.

The said gun is adapted to be discharged by means of a cord or chain 29, which is pulled by an operator, one end of which cord is attached to the end of a lever 28, which is pivotally attached to said floor or deck and with which said sliding bolt is connected as shown. Upon pulling the cord 29 the bolt 27 is drawn out of engagement with the apron 25, letting the free end of the shield 24 drop to the position indicated in dotted lines in Fig. 1, thereby uncovering the forward end of the inclosure 23 and the muzzle of the gun, striking one end of the pivoted lever 22, lifting its opposite end, and thereby the brace 21, out of engagement with the valve-stem 20, and permitting the pneumatic pressure through the conduit D to act, as aforesaid, to admit compressed air to the gun, whereby the requisite pneumatic force is applied behind a projectile in the gun to discharge the same. Said projectile may be provided with any suitable percussion-fuse to cause its explosion upon striking an object.

The said gun, having the above-described oscillatory motion on the fixed cylinder 8, may have its muzzle elevated or depressed by any suitable mechanism, one means for elevating the gun being shown in the drawings, which consists of a pump *x*, having a suitable connection with a cylinder *z*, the latter and the pump being supplied with any suitable liquid, a piston *y*, having a movement in said cylinder *z* induced by the movement of said liquid, and a connection between the piston *y* and the gun, as shown, whereby the movements of said piston are imparted to the gun. Said pump is operated by a hand-lever *h* or other suitable means.

The above-described construction of the

breech-piece of the gun and its supporting cylinder 8, together with the trusses or frame-pieces 10, the latter being, as shown, firmly bolted to the deck and the lower part of the hold of the boat or to other fixed objects, constitute a rigid and strong support for the gun under all conditions of service. Furthermore, the cylindrical construction of that portion 7 of the breech-piece which almost entirely envelops the circumference of the cylinder 8, provides such strength of parts for the resistance of air-pressure as obviates the danger of the leakage of air under great pressure when it is admitted to the gun as aforesaid, and the said breech construction is of such a nature that its cost, as compared with similar constructions heretofore produced, is greatly reduced.

In my application, Serial No. 312,322, filed May 27, 1889, I show and claim substantially the same shield, tripping, and firing mechanism herein shown, but not herein claimed.

What I claim as my invention is—

1. A breech-piece for a pneumatic gun, consisting of a cylindrical body to receive the breech-plug and to which the rear end of the gun-tube is connected, a hollow cylinder on

one side of said body and at right angles thereto, and an opening between said cylinders, combined with a cylinder 8, having an opening therethrough fitting within said hollow cylinder, on which the last-named cylinder has an oscillating motion, supports for cylinder 8, and an air-tube conducting air through said cylinder 8 to said body, substantially as set forth.

2. Supporting devices for guns, consisting of fixed parallel frame-pieces 10, a non-rotatable cylinder having an opening therethrough, and a shaft-like projection at each end entering said frame-pieces, combined with a breech-piece having a cylindrical body, to which the gun-tube is attached, having a hollow cylinder thereon at right angles to said body, and an opening between the cylinders of the breech-piece, said hollow cylinders being fitted to said non-rotatable cylinder and having an oscillating motion thereon, substantially as described.

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