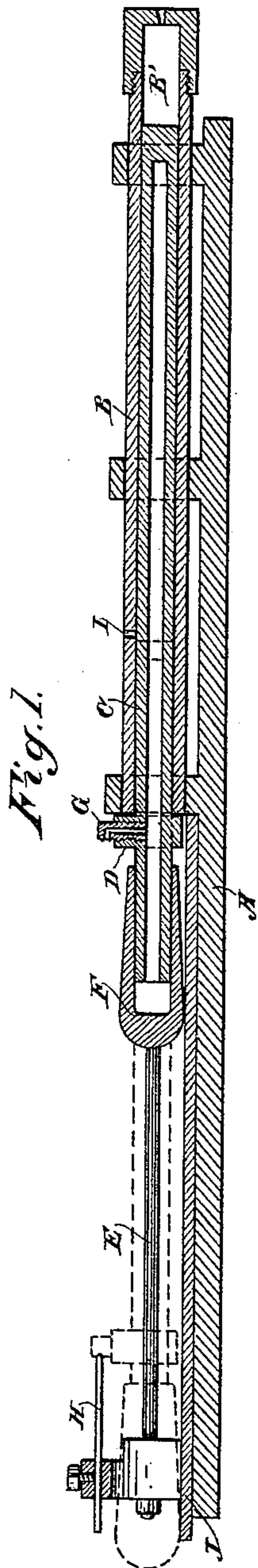


(No Model.)

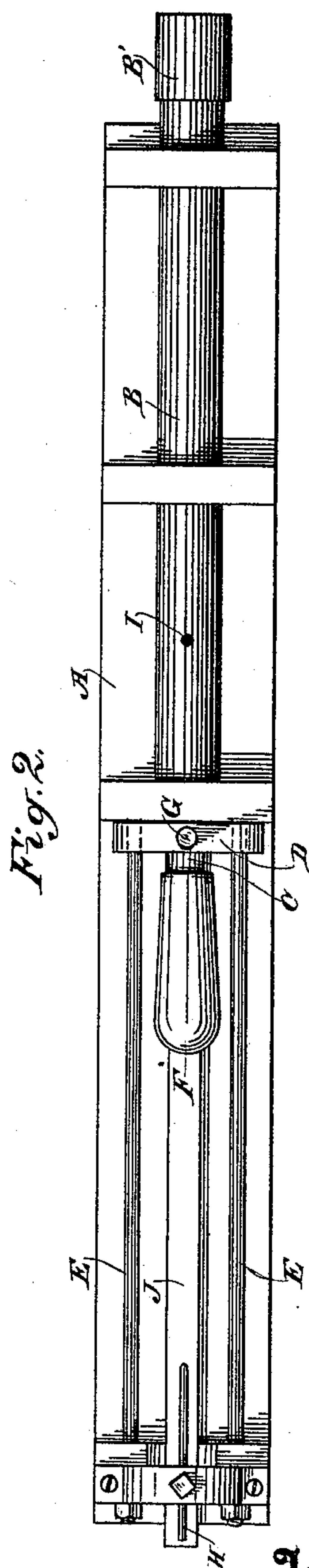
A. W. LIVINGSTON & S. E. STARRETT.
GUN.

No. 477,946.

Patented June 28, 1892.



Witnesses,
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UNITED STATES PATENT OFFICE.

ANDREW W. LIVINGSTON AND STEPHEN E. STARRETT, OF SAN FRANCISCO,
CALIFORNIA.

GUN.

SPECIFICATION forming part of Letters Patent No. 477,946, dated June 28, 1892.

Application filed November 11, 1891. Serial No. 411,630. (No model.)

To all whom it may concern:

Be it known that we, ANDREW W. LIVINGSTON and STEPHEN E. STARRETT, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Guns; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to certain improvements in guns and machines for throwing projectiles.

It consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—
Figure 1 is a longitudinal vertical section through the gun. Fig. 2 is a plan view of the same.

The object of our invention is to construct a gun in which the inertia of the projectile is first overcome by a moderate charge of an explosive or of some propelling gas or vapor under pressure and after the inertia has been thus overcome to apply the force of the final propelling charge to give the projectile its final impulse. In order to accomplish this, we have here shown the following-described apparatus:

A is a base or carriage upon which is mounted a cylindrical barrel B, which may be suitably secured and supported. The rear of this barrel is provided with a chamber B', capable of receiving any suitable charge of an explosive or a gas or vapor at sufficiently-high pressure.

Within the barrel B the barrel C is fitted to slide and reciprocate. The rear end of the barrel C is closed and the explosive or gas within the chamber B' acts upon the rear end of the barrel C, thus driving it forward within the barrel B. The front end of the barrel C has a cross-head D, through which it passes, said cross-head being supported upon the guides E, which extend from the front end of the barrel B parallel with the line of motion of the barrel C. By means of these guides the barrel C is caused to move in a perfectly-straight direction when the impulse is given to its rear end.

The barrel C is adapted to contain an explosive charge, by which the projectile is finally impelled.

F is the projectile, which is in the present case shown elongated, having a tubular opening made in it from the rear of such a size as to fit over the exterior of the barrel C, so that the projectile may be pushed down over the barrel C until the front end of the barrel is in close proximity to the inner end or bottom of the opening in the projectile.

It will be manifest that whenever the propelling charge within the barrel C is exploded it will act to force the projectile off the end of the barrel and drive it in the direction desired.

The object in moving the barrel C by the initial charge of powder is to overcome the inertia of the heavy projectile, and when this has been accomplished the charge of powder within the barrel C is exploded. This is effected as follows: An opening is made through the cross-head D, and a post G extends upward above the top. An opening is made downward through this post, communicating with the interior of the barrel C, and the front of the post is provided with a nipple to receive a cap, primer, an electric contact-point, or other means by which the charge of powder within the barrel C may be ignited. Above the front support of the guides E is fixed a rod or pin H, which is in line with the nipple or contact-point of the standard G.

The operation will then be as follows: The barrel C is pushed back into the barrel B, the projectile is fitted over the outer end of the barrel C, which has previously been loaded with a suitable propelling charge, and the chamber B' of the barrel B is also provided with its propelling charge. This latter charge being ignited or applied to the rear end of the barrel C, the latter, with its projectile, will be forced forward at a rate of speed depending upon the charge by which it is impelled. When the rear end of the barrel C has nearly reached the front portion of the tube B, the charge of the gas or vapor by which it was impelled is allowed to escape through an opening I in the barrel B. At the same instant the front of the standard D will come in contact with the pin H and the charge within the barrel C will be ignited, thus acting to discharge the projectile from the end of the barrel C, over which it fits. The recoil

of the barrel C is then received upon the gas remaining in the rear portion of the barrel B, which is compressed by this recoil and forms an elastic cushion to receive it. It will be
 5 manifest that the interior of the projectile and that portion of the exterior of the barrel over which it fits may be rifled, so as to give the projectile rotary motion upon its own axis as it leaves the barrel; but we prefer to rifle
 10 the exterior of the barrel C and provide corresponding riflings or lugs within the barrel B, so that as the barrel C moves forward in the barrel B it and the projectile will receive the initial rotary motion before the final ex-
 15 plosive charge is applied to the projectile itself. The front end of the projectile is supported upon a suitable guide J, over which it travels in its forward movements before its final discharge. The object of all this con-
 20 struction is to overcome the inertia of the heavy projectile, to relieve the barrel of the gun of the strain of heavy propelling charges, and to transfer the great part of the strain which is caused by the explosion of the heavy
 25 charge from the barrel of the gun to the projectile itself, which, being once discharged, is of no further use, and any strain which may take place within it will be of no consequence. By fitting the projectile over the end of the
 30 gun the barrel of the latter may be made of comparatively small diameter and greater strength with correspondingly less strain from the explosion of the charge.

The projectile may be made to carry a high
 35 explosive upon its front end, which will be effective when the projectile strikes any object. It may also be used for firing life-lines in case of shipwreck, and the weight of the gun is so small in proportion to that of the
 40 projectile that it may be readily transported to points difficult of access. The gun can also be easily dismounted and assembled. It will also be manifest that it can be mounted upon any suitable carriage with means for
 45 obtaining the proper angle of elevation.

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

1. In a gun, the main barrel C, containing
 50 a powder charge, a projectile fitting over said

barrel, guides upon which the barrel is supported and directed, and a second barrel within which the rear end of the first barrel is adapted to reciprocate, whereby an explosive charge
 55 may be applied to first impel the barrel and projectile at a low degree of speed and a higher explosive charge applied from the sliding barrel to impel the projectile, substantially as herein described.

2. A gun consisting of a fixed barrel with a
 60 chamber for a low explosive charge, a second barrel adapted to receive an explosive charge by which a projectile is impelled, said barrel sliding within the first one, guides by which the front of said barrel is caused to move in
 65 a direct line, a hollow elongated projectile fitting over the front end of the second barrel, and a mechanism by which the charge within the second barrel is exploded at the instant when said barrel reaches the end of its for-
 70 ward movement caused by the explosion of the charge within the first barrel, substantially as herein described.

3. In a gun, a stationary barrel having a
 75 chamber at the rear for the reception of an explosive charge, a second barrel having its front end supported and traveling upon guides parallel with the axis of the first and its rear end extending into the first barrel, so as to be acted upon by the explosive charge
 80 therein, a hollow elongated projectile fitting over the front end of the second barrel so as to be propelled by the explosion of a charge within said second barrel, a standard mounted upon a second barrel movable therewith, and
 85 a primer or connection between said standard and the powder charge within the barrel, and a firing-pin fixed upon the supports at the front, whereby the charge within the second barrel is exploded by contact with said pin when the
 90 barrel reaches the end of its forward movement, substantially as herein described.

In witness whereof we have hereunto set our hands.

ANDREW W. LIVINGSTON.
 STEPHEN E. STARRETT.

Witnesses:

S. H. NOURSE,
 H. F. ASCHECK.