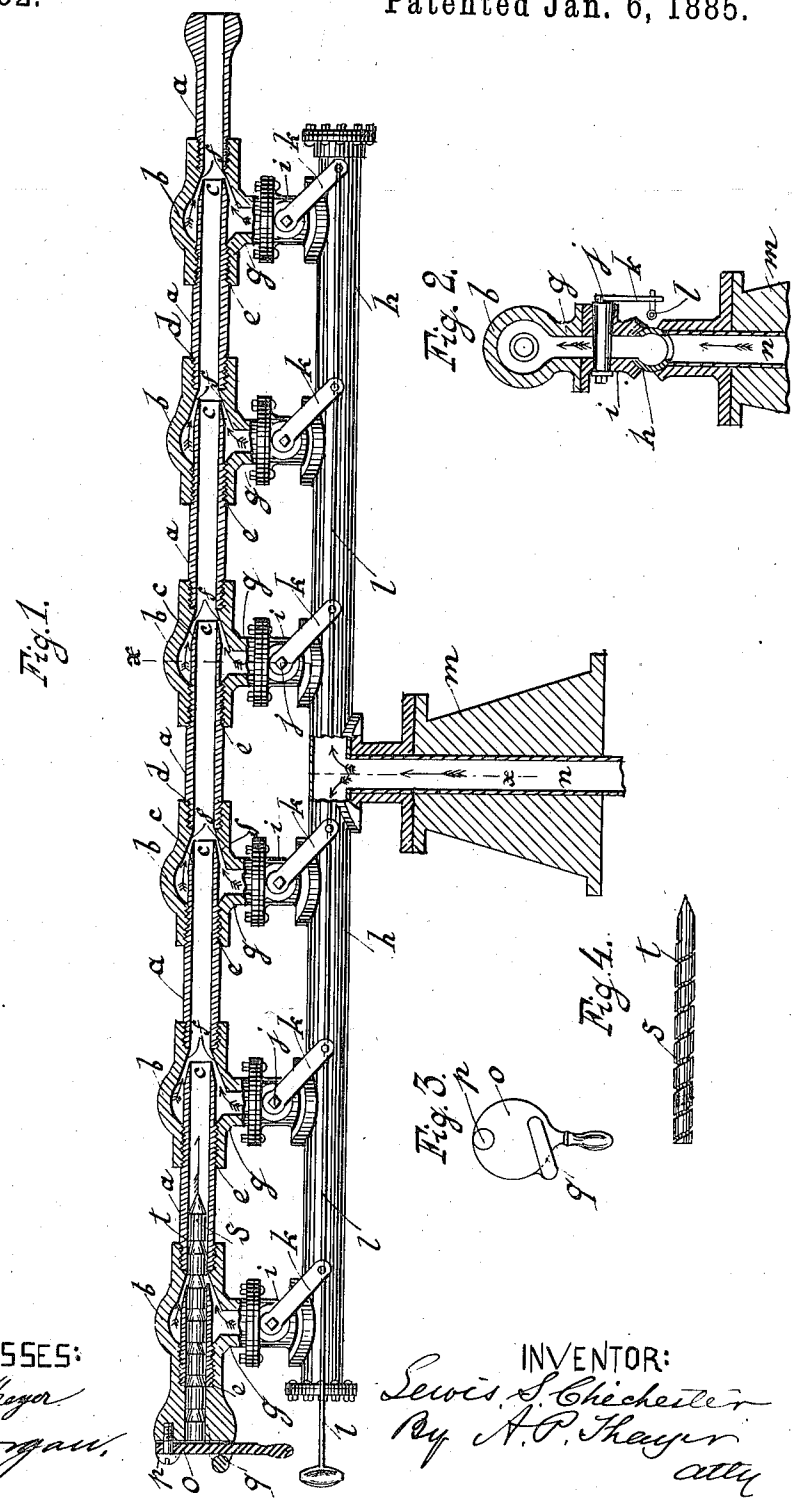
(No Model.)

L. S. CHICHESTER.

COMPRESSED AIR MULTIPLE GUN.

No. 310,382. Patented Jan. 6, 1885.



WITNESSES:
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UNITED STATES PATENT OFFICE.

LEWIS S. CHICHESTER, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO ROBERT BROWN SYMINGTON, OF NEW YORK, N. Y.

COMPRESSED-AIR MULTIPLE GUN.

SPECIFICATION forming part of Letters Patent No. 310,382, dated January 6, 1885.

Application filed May 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, LEWIS S. CHICHESTER, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented new and useful Improvements in Compressed-Air Multiple Dynamite Guns, of which the following is a specification.

My invention consists of an improved contrivance of annular nozzles for the application of the air in the barrel by annular air-jets for the forcing of the projectile or cartridge.

It also consists of the said nozzles located at intervals along the barrels and connected with the compressed-air chamber, so that some of the air discharges in advance of the cartridge to produce a vacuum thereat, some discharges along the cartridge itself for impact upon the sides and to carry it along in the annular jet, separating the cartridge by a thin film of air from and preventing contact of it with the walls of the bore, and the rest discharges behind the cartridge through the series of nozzles as the cartridge passes them, and thus follows up the cartridge more continuously and effectively till it leaves the gun, and thereby effects safer discharge by such gradual initial movement as to greatly lessen the shock, and projects the cartridge through much greater range of flight by more effectual impact upon the projectile after being started.

My invention also consists of cartridges contrived with circumferential ledges for the better impact of the annular air-jets upon the sides of the cartridges, as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of my improved compressed-air multiple gun. Fig. 2 is a transverse section on the line *x x*. Fig. 3 is a detail of the end-gate of the breech, and Fig. 4 is a side elevation of a cartridge or shell to be fired from the gun.

I construct the barrel with pipe-fittings consisting of a series of short nipples, *a*, and globe-T's *b*, making the nipples *a* with a taper nozzle, *c*, on the front end, also with a shouldered screw-section, *e*, back of the nozzle, and also with a shouldered rear end, *d*, and screwing said nipples and T's together in any approved number suitably for making the barrel of any desired length, and so that the nozzle of each nipple terminates in a throat, *f*, of a T, and thus forms an injector for discharging an annular jet of compressed air into the barrel, said barrel being of uniform size in the bore through its entire length, except where these injector issues open into it. The T's have flanged inlets *g*, which connect with the compressed-air reservoir *h* by suitable pipe-connections, *i*, in each of which is a faucet-valve, *j*, said valves having an arm, *k*, and all being connected to a rod, *l*, extending to the breech of the gun, to be pulled for opening the valves to admit the compressed air to the barrel for discharging the projectile. The reservoir *h* consists of a tube about as long as the barrel, and forms the support for the barrel, said tube being supported on any desired form of stand, *m*, through which the air is to be supplied to it from a compressor or from a main reservoir by a pipe, *n*. In this case the reservoir-tube *h* is represented as fixed on a permanent stand, *m*, so as only to be trained horizontally; but it is to be understood that the gun is to be swiveled like other guns for universal training. The breech-T has a breech-extension, *o*, fitted with an end-gate for closing behind the projectile, said gate being fitted to swing on a pivot, *p*, on the end of extension *o*, and closing behind a retaining-lug, *q*, of said extension, for holding it against the reaction of the air. The cartridge or projectile *s* is made a trifle smaller than the bore of the barrel, and with a series of circumferential ledges, *t*, at intervals along its sides from end to end, for intercepting the annular jets of air flowing along the annular space between the projectile and the bore of the gun at numerous places along the cartridge, and thus affording very much larger area for the impact of the air for the propulsion of the projectile than the end affords, and in addition thereto, so that with a given amount of air-pressure much greater force will be applied to the projectile. When it is desired to cause the projectile to rotate in the manner of shot from a spirally-rifled gun, I make spiral ledges *t* in the projectile, as in Fig. 4, but make them concentric when such rotation is not required. The annular jets discharging into the barrel

in advance of the projectile produce powerful suction and relieve the atmospheric pressure in front of the projectile, so that it starts with a gentle movement and acquires greater velocity before issuing from the barrel. Besides this inductive effect of the jets in advance of the projectile, they also re-enforce the film surrounding and carrying the projectile and acting on the ledges *t* as each nozzle is passed by the projectile, besides finally taking effect behind the projectile instantly on the passage of the nozzles by the hind end of the projectile. By the direction of the annular jets from the injector-nozzles along the barrel the jets are enabled to be thus let out into the barrel in advance of the projectile, not only for the inductive effect and the effect on the sides of the projectile, but also to insure the instant action of the successive jets behind the projectile, which it is difficult to accomplish, and is of doubtful certainty in any contrivance for the successive discharge of a series of charges during the flight of the projectile along the barrel, and the series of jets entering along the barrel maintain higher pressure behind the projectile throughout its movement along the barrel than a single jet entering wholly behind the projectile and following it to the end of the barrel, even though large as the bore of the same, because in the serial arrangement the distance of the travel of the air is much less through the short passages from the reservoir into the barrel, which lessens the friction, and there is less length of run, and consequent expansion and rarefaction, which lessens the pressure.

What I claim, and desire to secure by Letters Patent, is—

1. In a compressed-air gun for dynamite and other projectiles, an annular nozzle surrounding the bore of the gun, to deliver the compressed air therein in an annular jet, substantially as described.

2. In a compressed-air gun for dynamite and other projectiles, a series of annular nozzles arranged at intervals along the bore of the gun, to deliver the air in a series of annular jets behind, along the sides of, and in advance of the projectile, substantially as described.

3. The combination of a projectile having a series of circumferential ledges on its exterior, with a compressed-air gun having one or more annular nozzles surrounding the bore of the gun, and discharging the air therein by annular jets which impinge on the ledges, and also surround the projectile with a thin film that separates it from the bore of the barrel during its flight along the barrel, substantially as described.

4. The combination, in a compressed-air gun, of a series of tubes and hollow globe T's, forming the barrel, annular nozzles, and annular jet-orifices surrounding the bore of the gun, substantially as described.

5. The combination, with the barrel in a compressed-air gun having annular nozzles and air-passages along the same, of a compressed-air holder extending wholly or partly along the barrel, and having valved passages at intervals corresponding with the said annular nozzles and air-passages and connecting therewith, substantially as described.

6. The combination, with the barrel in a compressed-air gun having annular nozzles and air-passages along the same, of a compressed-air holder extending wholly or partly along the barrel, and having valved passages at intervals corresponding with the said annular nozzles and air-passages and connected therewith, and also having valves suitably connected for being opened simultaneously, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LEWIS S. CHICHESTER. [L. S.]

Witnesses:
W. J. MORGAN,
A. P. THAYER.