2 Sheets—Sheet 1.

W. M. STORM.

Air-Gun.

No. 210,976. Patented Dec. 17, 1878.

Fig. 2.

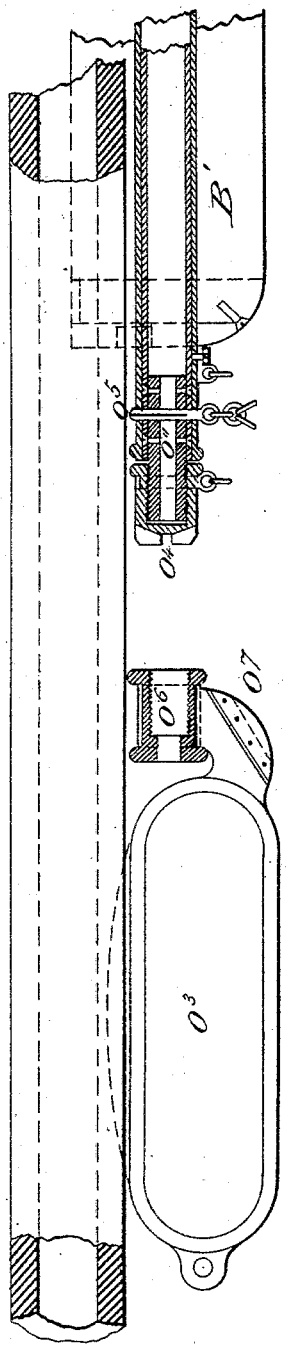
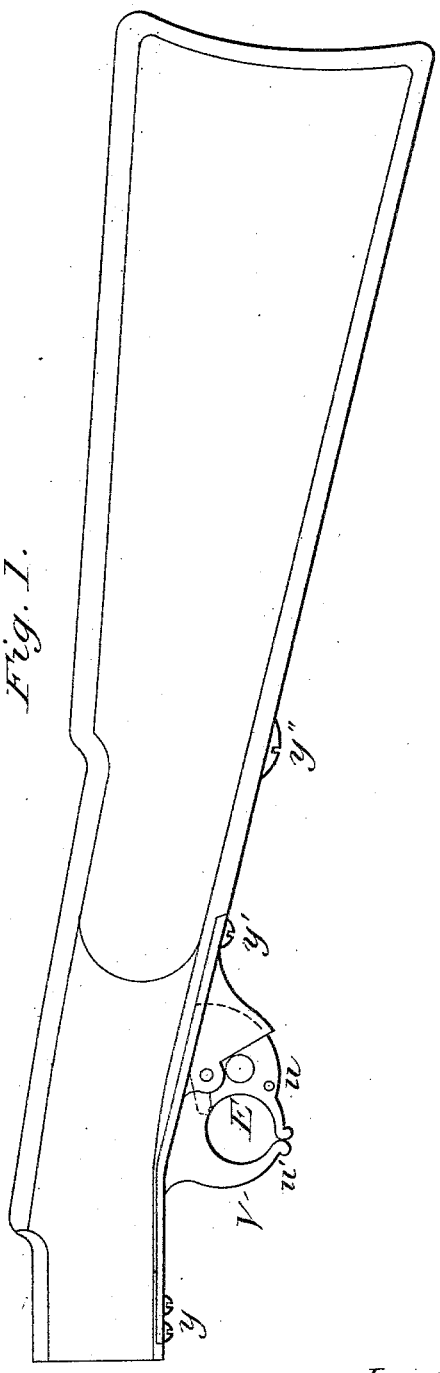


Fig. 1.



Attest:

John D'Oyley. Hutchins

A. MontStorm

Inventor.

Wm MontStorm

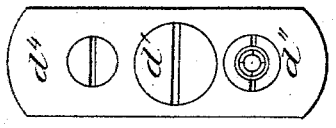
2 Sheets—Sheet 2.

W. M. STORM.

Air-Gun.

No. 210,976. Patented Dec. 17, 1878.

Fig. 3.



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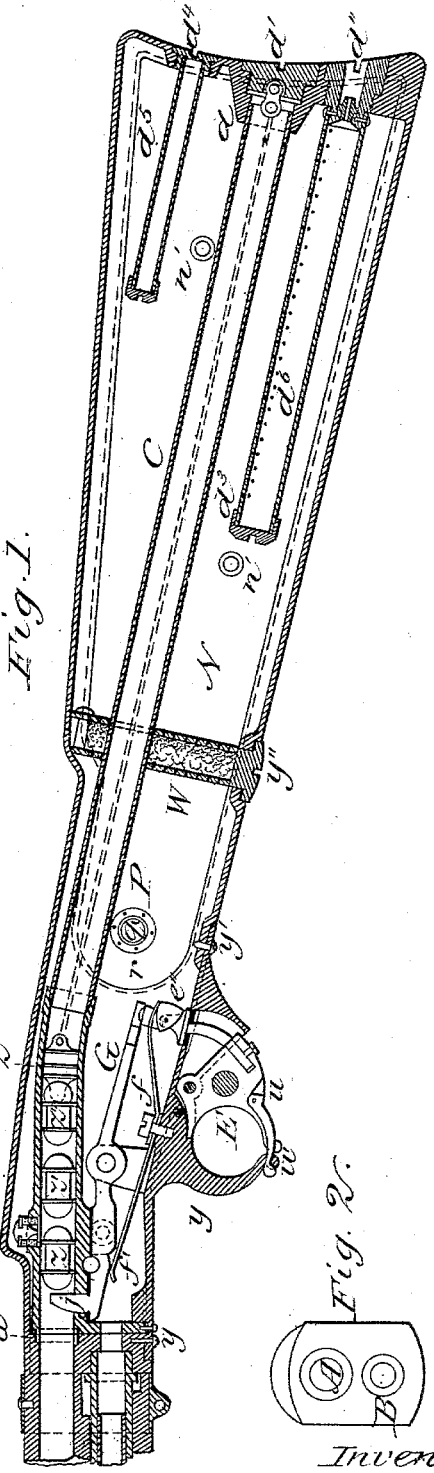

Fig. 8.

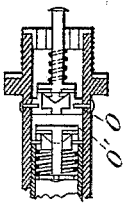

Fig. 9.

Fig. 6.

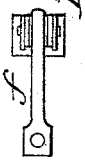

Fig. 4.

Fig. 5.

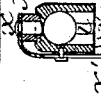

Fig. 7.

Fig. 2.

Attest:
John D'Oyley Hutchins
A. Montstorm

Inventor:
Wm. Montstorm.

UNITED STATES PATENT OFFICE.

WILLIAM MONTSTORM, OF NEW YORK, N. Y., ASSIGNOR TO WALTER DEADY, OF SAME PLACE.

IMPROVEMENT IN AIR-GUNS.

Specification forming part of Letters Patent No. **210,976**, dated December 17, 1878; application filed March 23, 1878.

To all whom it may concern:

Be it known that I, WM. MONTSTORM, of New York, in the county and State of New York, have invented a new and useful Air-Rifle, of which the following is a specification:

Figure 1, Sheet 1, of the accompanying drawings represents a central longitudinal section of the metallic hollow stock (which is to serve, among other things, as the compressed-air reservoir) and of the "works," &c., of my gun. Fig. 2, same sheet, is a front-end view of the hollow stock, into which the barrel screws at A, and the air-compressing pump at B. Fig. 3 is a rear-end view of the stock. Fig. 4 is a central longitudinal section of a portion of the muzzle end of the barrel. Fig. 5 is a cross-section, opposite X, Fig. 1, through a portion of the works governing the delivery of the bullets and through the ports or openings K, through which passes the compressed air from the stock to project the bullets out of the gun.

There are two ports, K, in lieu of a single port, equal in area to both—for instance, so as to leave the solid division *l* between them, to serve as a bridge for the support of the bullets in passing this point, so that they may not sag down out of the line of the axis of the bore. These air-ports may be, together, equal in area to the cross-section of the bore; but practically this is more than is necessary or desirable at most times, and a removable plate, with openings or ports of a modified size, may be fastened over the fixed or permanent ones K, thus modifying the expenditure of air per shot to suit the requirements of the kind of shooting anticipated on a given occasion or "hunt," all as will be understood.

The gun having a reservoir for compressed air consistently has one for bullets. Z is the particular bullet that is in position to be immediately shot out of the gun, bullet Z′ then taking its place, being pushed forward by the "dummy" bullet Z″, of the same size and form, but made of a harder metal. To the dummy or "follower" Z″ is jointed a little piston, Z‴, to be packed or wound around (as are the bullets also around their cylindrical portion) with a fillet of buck or other skin or string sufficiently soft to absorb and retain grease for lubrication and to prevent air escaping past, yet permitting Z‴ to be easily moved onward by the pressure of the air behind it in the bullet-magazine tube C, into which the compressed air enters from the hollow stock near its farther end through the small holes *d*.

The piston Z‴ is connected by a fine wire cord, to be practically inelastic, rudely represented by the broken double lines, to the air-tight screw-plug *d′* in the heel of the stock, the length of such wire cord being adjusted to permit, when fully extended, the dummy Z″ to take the place now occupied, as shown on the drawing, by bullet Z′.

When it is desired to replenish the bullet-magazine tube C, in whole or part, *d′* is unscrewed, and with it Z‴ and Z″ are drawn out, and after the insertion of the bullets all are replaced.

Though the tube C may be readily cleaned, yet to prevent it more surely from becoming corroded and rough, particularly on the inside, it would be better, perhaps, if tinned or nickel-plated.

The stock may be cast of bronze or hard brass, and plated also, and the portion back of that containing the works may be cast open or be "skeleton," as often termed, the sides ultimately being closed by plates of moderately-stout sheet-brass N, setting in a little below the level of the skeleton portion of the stock, then soldered in air-tight all around the edges, and braced by transverse screws taking into bosses *n′*, and finally there being cemented over all a plate of polished veneer, the same size and outline as N, leaving the stock flush and smooth outside.

When the gun is fully charged and everything in place ready for action, the bullet-magazine tube will contain fifteen bullets, such as shown, the entire number of which may be discharged in as many seconds, if desired, without taking the gun from the shoulder, it being only necessary to pull back to its stop and reslacken to its place the trigger E for each shot.

Starting with ninety pounds per square inch, or six atmospheres plus the natural, of air-pressure in the stock-butt reservoir, and assuming that the lever-valve G, more fully referred to hereinafter, which opens to admit

the compressed air behind the bullet to be projected, closes again at about the instant the bullet shall have left the barrel, then the first six bullets of the fifteen would be discharged under an absolute pushing force on the bullet itself of over one hundred and twenty times its own weight, which is one ounce avoirdupois, and the remaining nine bullets of the fifteen with an average pushing or projecting force on each of over seventy-two times its own weight, the whole fifteen under an average absolute projecting force on the bullet itself of ninety-six times its own weight, and the last of the fifteen with a force on it of nearly fifty-six times its own weight; but even if the lever-valve G did not close at the precise instant the bullet left the barrel, the extra expenditure of air would be effectually met by having the fore part of the stock, or that portion spanning the barrel, also made of metal, hollow, and to communicate (as a supplementary reservoir, so to express it) with the main stock, thereby very greatly increasing, as it positively would, the capacity of the air-reservoir as a whole.

I would here particularly allude to the fact that a bullet thus projected by compressed air must leave the muzzle at a much less velocity than it would if projected by gunpowder, and so proportionately at that instant by the escape past it of the air in a divergent annular jet. As it would be not absolutely uniform or equal entirely around the terminus of the bore and the butt of the bullet, the latter is almost certain to be "canted" or deflected out of the line of the axis of the bore, and consequently to take a line of flight increasingly divergent from that leading to the object aimed at.

Now, I obviate this detrimental result by having near the muzzle (see Fig. 4, Sheet 1) small vent-holes v' through the barrel from the bottom of the riflings or creases, by which most of the air can escape instantaneously while the bullet is yet held true in the bore.

Inserted in the top of the rearward-projecting shank or shoulder of trigger E is a small curved shaft or piece, e', which has at its top inside of the stock a broad head with a packing-disk under it. Its head has projecting up from it a pair of jaws or lugs, between which is hung or swiveled on a pin, so it may turn a certain distance, a peculiar piece, e'', whose upper portion is bifurcated, for reasons presently evident, and which I will term the "tumbler."

The head, just mentioned, of e', with its jaws embracing e'', is shown in plan view by Fig. 6, as also is the flat steel spring f, which, after the trigger has been pulled to discharge a bullet, serves to force back to the position shown on the drawing both the tumbler e'' and the trigger E, ready for reoperation. The upper portion, or bifurcations of e'', between which projects the free end of spring f, bear under the correspondingly-bifurcated end of the lever G, a plan view of which is shown by Fig. 7. G moves on a fulcrum between two flat standards about midway of its length, as shown on Fig. 1, Sheet 1.

I may here mention that by sufficiently retracting the screws y and y', and their counterparts in the under side of the stock, the entire works, together with the ball-magazine tube C, may be withdrawn from the stock for any desired purpose.

I should also mention that to render the junction of the front of the bullet-channel and the back end of the barrel air-tight, there is set into a circular groove in the latter a ring of some semi-elastic material—such as close-grained leather a'.

When the trigger E is drawn back, e'' bearing up under spring f and under G, the latter is lifted (and its opposite end depressed) until the upper projections or bifurcations of e'' sweep forward and past the corresponding bifurcations of G and come opposite the wider space between them, (see Fig. 7,) when e'', no longer supporting G, is forced back to its original position by the spring f' bearing under its opposite end, and the spring f bearing, as before mentioned, on the tumbler e'' and, through e', on the trigger E, causes the latter, as it is slackened, to move back to its original position shown, and simultaneously causes e'' to rock or turn back to its original position shown, and so on repeatedly.

Projecting up from the forward end of lever G is a flat stud or prong, j, against which the foremost bullet, Z, is held when all parts are at rest; but when lever G is operated, as explained, to shoot, j, being a part of it, is retracted clear of the way of Z, while simultaneously the stud X, fixed in the curved end of the little flat rod or bar X', (see Fig. 5,) and the other end of which loops over or spans a smooth screw-stud projecting from the side of lever G, (see X'', Fig. 7,) is drawn down in the way of bullet Z', arresting its movement and that of all behind it.

X is snugly surrounded by a short cylinder of vulcanized india-rubber, X''', (see Fig. 5,) one end of which bears tightly under the end of X', and the other end bears the same in a fitting recess in the upper side of the bullet-delivery channel, as seen, its purpose being to prevent the compressed air from passing around X into the space between the bullets Z and Z' while the parts are at rest.

It may be surperfluous to mention that the wide flat portion M of the lever G, which serves as a valve to the ports K, is covered with some proper material to make its junction with the ports, when it is at rest, air-tight.

Fig. 8, Sheet 1, is a central section of that end of the air-pump which screws into the stock, showing its valves. The outlet-valve has its seat on an annular piece secured inside of the barrel of the pump at O. The inlet-valve O' has its seat on the end of the piston of the pump, which is a tube, the air entering to pass through it at its opposite end by a central channel, O'', (Fig. 2, Sheet 2,) in a piece fixed in it, onto which screws a handle,

O^3, (same figure,) by which to work the pump. Both valves of the pump are pressed to their seats by weak spiral springs, and carry with them disks of leather to bear between them and their seats, to insure tightness.

In the stock side plate N, at P, Fig. 1, Sheet 1, is a little device that I will term the "pressure-button," as by pressing upon it the comparative degree of tension of the compressed air in the stock may be felt. It is shown in section by Fig. 9.

Projecting inward from N is an annular boss, across which is placed a disk of vulcanized india-rubber, *q*, held down tightly upon it by a little flat ring, *r*. Within the boss and bearing on the rubber disk is a piece, *s*, which projects slightly beyond the outside of the stock. The pressure from within on the disk *q* forces *s* outward. It is restrained from being pressed out too far by having around it a groove, into which project little stop-screws.

Hung at *u* in trigger E (see also Fig. 1, Sheet 2, which is intended to represent an outside view of the stock-butt portion of my gun, and to lie, when not in use, in a fitting groove in E) is an auxiliary trigger, *u'*, which projects beyond it and into and past a suited notch in the end of the solid guard V, where it fits with sufficient tightness to retain its place till released by a little force. While this quasi-concealed trigger is in its position shown the gun cannot be discharged, as the main trigger E cannot be retracted, as will be clear; but when it is released it will project at such an angle from E as to afford good gripe for another finger, thus making the pull for discharge still easier.

Fig. 2, Sheet 2, is a view of a portion of the barrel of the gun and, in central longitudinal section, of the forward part of the stock B', and of the forward part of the air-pump, both in place, and of the removable handle O^3, before referred to, by which the pump may be worked, showing also certain devices that pertain to these.

To protect the top of the pump-barrel and the top of its tubular piston when not in use, there is a cap, O^4, that screws on the latter; and to keep the pump and its piston relatively thus in place there is a split key-pin, O^5, transfixing them. The cap and pin are secured by a little ring-and-chain connection to the barrel of the pump, to prevent them from becoming entirely detached and lost. That the cap may be unscrewed readily, although so connected, it is spanned by a swivel-ring, in which it can turn, and from which its connection with the key-pin is made. The key-pin being split, as shown, to have a certain expanding tendency and bind in its bearings, will keep its place irrespective of the position in which the gun is being carried till forcibly withdrawn. As evident, cap O^4 being taken off, the little tubular cylinder O^6, which turns in the handle O^3, screwed on in its place, and the pin O^5 being withdrawn, the pump may be worked.

In the shank of the pump-handle at O^7 is riveted a thin piece of steel, to serve as a screw-driver, more particularly with the plugs *d'*, *d''*, and d^4, Fig. 1, Sheet 1. At the other end of the handle is an eye, through which to pass a lanyard by which to sling it to the person.

d^4 is an air-tight plug, holding a tube, d^5, covered at its inner end with a screw-cap. Its capacity and purpose are to hold readily a couple of long strong needles, several hundred feet of strong thread, and, say, a dozen friction-matches, the probable great utility of all of which to the hunter or trapper in the wilds will be evident.

To meet an occasion when it might be desirable to shoot with extra force, or when time was too pressing or the position too unfavorable, or all together, for the adequate use of the air-pump to sufficiently charge the stock-reservoir, I have devised means for quickly charging it to a high tension with gas.

Fastened over the inner end of plug *d''* is a tube of, say, tinned copper, d^6, perforated about half-way around with many small holes, and covered at its inner end by a screw-cap, *d'''*. The whole being withdrawn from the stock, and *d'''* removed, the tube is to be filled with mealed gunpowder, best mixed with an extra portion of pulverized charcoal or some fine ashes, to diminish to a suitable degree its rapidity of combustion. The whole device is then replaced in the stock.

The combustion of the compound in the tube will generate gas enough to fill the stock-butt reservoir to a pressure of about one hundred and eighty pounds per square inch, or twelve atmospheres plus the natural, and then, under the conditions before mentioned in relation to the air-pressures, the pressure of gas on the bullet itself would equal three hundred and fifty-two times its own weight, average, for the whole fifteen shots.

To prevent, while the gas is being generated, particles that would be of an injurious nature from being carried with it to contact with the works, I have designed to interpose and fit across the inside of the stock at W a double perforated diaphragm, properly fixed in place, and filled in between its plates with cotton, or preferably with raw wool, which may be passed in by removal of the air-tight screw-plug *y''*, all as will be understood. I term this device the "gas-filter."

As means for igniting the gas-generating compound there is sunk in the center of *d''* a cavity, into the bottom of which is screwed an ordinary nipple communicating with the compound for the reception of an ordinary percussion-cap, which, having been placed upon it, may be there held; and further protected from weather, &c., by a little soft resin or wax, which may be easily removed when it is desired to renew or explode the cap, which last may be readily done by driving upon it almost any bit of metal rod of a size to reach it freely and protrude a little beyond the stock.

Although I have described herein such a

device, I quite disclaim, in a magazine-gun, a double detent located in the passage leading from the magazine to the barrel, in combination with the trigger and a spring, to regulate the flow of cartridges or bullets from the magazine, and to release them, one at a time, by the movement of the trigger in the act of shooting the gun; but

What I claim in my gun is as follows:

1. In combination with the stock-butt reservoir, the channel-piece through which the bullets are delivered into the barrel, the bullet-magazine tube C, the bullet-follower Z″, and piston Z‴, connected with the screw-plug d', and the lever-valve G, carrying the bullet-stopping prong or projection j, and actuating the piece X, all substantially as and for the purposes set forth.

2. In combination, the trigger E, piece e', tumbler e'', spring f, and the lever-valve G, all substantially as and for the purpose set forth.

3. In combination with the trigger E and its guard, the auxiliary trigger U′, substantially as and for the purpose set forth.

4. The pressure-button consisting of the movable piece s, the rubber disk q, and the ring r, clamping the latter tightly in place, all in combination, substantially as and for the purpose set forth.

5. In combination with the stock-butt reservoir, the screw-plug d'', carrying the perforated and capped tube d^6, all substantially as and for the purpose set forth.

WM. MONTSTORM.

Witnesses:

JOHN D'OYLEY HUTCHINS,

A. MONTSTORM.