W. A. HEILPRIN.

AIR GUN.

APPLICATION FILED DEC. 7, 1909.

1,067,984. Patented July 22, 1913.

Fig. 1.

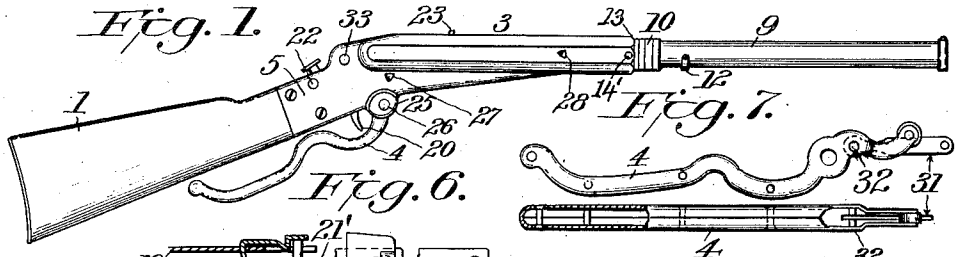


Fig. 6.

Fig. 7.

Fig. 2.

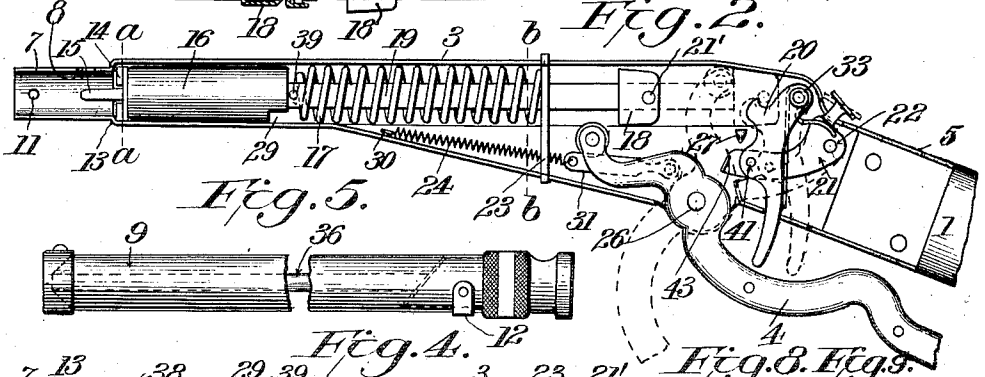


Fig. 5.

Fig. 4.

Fig. 8. Fig. 9.

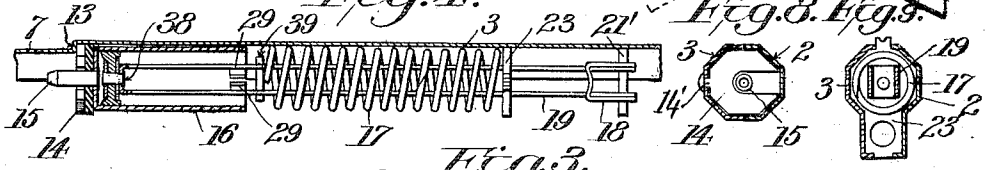


Fig. 3.

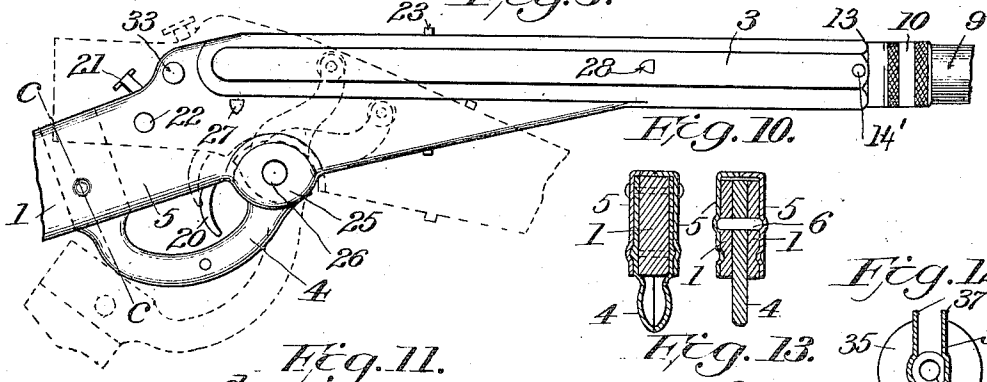


Fig. 10.

Fig. 12.

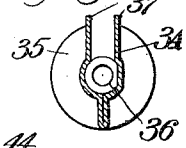


Fig. 13.

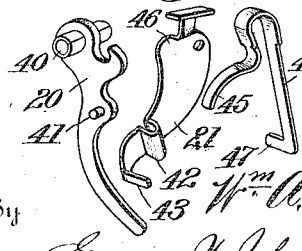
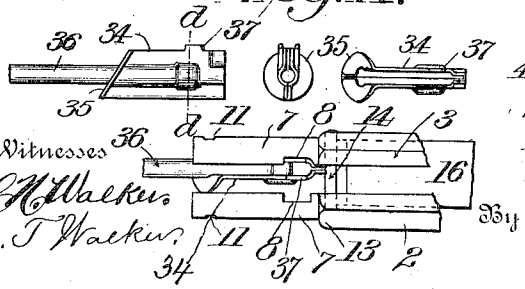


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM A. HEILPRIN, OF PHILADELPHIA, PENNSYLVANIA.

AIR-GUN.

1,067,984. Specification of Letters Patent. Patented July 22, 1913.

Application filed December 7, 1909. Serial No. 531,840.

To all whom it may concern:

Be it known that I, WILLIAM A. HEILPRIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Air-Guns, of which the following is a specification.

This invention relates to improvements in air-guns, more particularly to that type of toy-guns in which a lever retracts a spring actuated piston-rod to compress the driving spring thereof and effect engagement of the piston-rod with the trigger, movement of the piston-rod toward the trigger actuating means whereby a shot or pellet may be admitted to a point in the rear of the barrel and forward of an air tube carried by a cylinder that is reciprocated by the movements of the piston attached to the piston rod, the invention disclosed in this application and claimed therein being an improvement upon the invention set forth in an application filed by me on November 30, 1908, which application bears Serial Number 465,301, which since the filing of this application has matured into Letters Patent No. 944,188, dated December 21, 1909.

In the accompanying drawings, Figure 1 is a side elevation of an air-gun embodying my invention, such gun being of the lever type. Fig. 2 is a side elevation of a part of the gun, as it appears when one of the side pieces of the housing has been removed. Fig. 3 is a side elevation of a part of a gun when made up to accord with the type known as "breakdown" guns. Fig. 4 is a detail horizontal section, showing a part of one of the side pieces of the housing, the piston, the piston-rod, the spring and adjacent parts. Fig. 5 is a side elevation of the magazine. Fig. 6 comprises views of the rear end of the piston rod showing one means of attaching trigger engaging roller thereto. Fig. 7 comprises side and plan views of the lever. Fig. 8 is a section on the line *a*—*a* on Fig. 2. Fig. 9 is a section on the line *b*—*b* on Fig. 2. Fig. 10 comprises sectional views on line *c*—*c* on Fig. 3, one view showing a light sheet-metal construction and the other view showing a lever made from a solid plate. Fig. 11 includes several views of the shot race. Fig. 12 is a section on the line *d*—*d* of Fig. 11 and Fig. 13 comprises detail perspective views of the trigger, the trigger-lock and the spring that engages said parts.

The stock 1, has its fore-end reduced to be overlaid by the rear ends of side pieces 2 and 3, which together constitute a housing for the movable parts of the operating mechanism, the lever, trigger, trigger-lock and one of the abutments having parts that extend through the housing. When the gun is of the type shown by Fig. 1 the rear end portions of the side pieces are attached to the stock by screws, so that the stock may be readily removed in order to pack the stock, housing and barrel which have been detached one from the other in comparatively small space longitudinally, and when it is desired to remove one of the side pieces it may be accomplished by detaching that side piece from the stock, removing the magazine and screws that engage studs carried by the opposite side piece of the housing, and when the side piece is removed the movable parts will be exposed.

When the gun is made up to accord with the type or style known as "breakdown" guns, as shown by Fig. 3 of the drawings, the rear end of the lever and trigger-guard 4 is fastened to the fore end of the stock, and when the part 4 is made of sheet metal, the sides of the end of the stock are overlaid by extensions 5, of the lever and such parts may be attached to the stock by screws the heads of which will project sufficiently to provide engaging means that enter recesses in the overlying end portions of the side pieces 2 and 3. When the lever and trigger-guard 4 is made up from a flat piece of metal, as shown by the alternative form, the rear end may be seated in a slot or kerf formed in the fore end of the stock, and a pin or pins 6 will connect the parts and provide projections to enter recesses in the side plates. It will be seen that the mechanism incased by the housing is the same in both types of guns, and in both types the stock may be removed or detached from the lever and trigger guard. In a gun of the break down type the spring attached to the lever and to the housing may be dispensed with and if desired a positive

lock instead of the friction lock shown may be used.

The side pieces 2 and 3 which constitute the housing or casing for the movable parts of the operating mechanism, are each shaped to provide at the fore-end semi-cylindrical ends 7, the upper edges thereof being cut away to provide recesses 8 which together form an opening through which shot may be passed to charge the magazine or false barrel 9, when the band 10 is moved forward. The recesses 8 receive projections 37 formed on the upper edges of the shot-race 34, which carries the rear end of the barrel 36. Each of the semi-circular ends 7 have indentations or perforations 11, which register with perforations through the magazine when in place, and through which pass pins on a clip 12, the pins holding the magazine against turning and against longitudinal movement. The contraction of the side pieces in the formation of the reduced ends 7 produces shoulders 13 and adjacent to the shoulder there is secured an abutment 14, preferably by upsetting a lug or projection 14′ thereon after the same has been passed through an opening in the side piece 3. The abutment 14 has an open ended slot for the passage therethrough of the air-tube 15 of the cylinder 16.

The side pieces 2 and 3 are stamped or pressed from sheet metal and are each of corresponding shape, and in the rear of the shoulders 13 there is a part that incases and guides the cylinder 16, the semi-octagonal formation extends rearward to provide a casing for a spring 17, and a way for the plate 18 on the piston-rod 19. The flat sides of the side pieces extend to a point adjacent to the trigger 20, and against these sides the roller-pin 21′ will abut, when such a pin as is shown by Fig. 4 of the drawings is used to connect the plate 18 to the piston-rod 19. The side pieces have inward projecting upper and lower edges which abut when the gun is assembled, and just forward of the grip the side pieces are shaped to have a curved portion, one or both of the edges of the side plates being cut away to provide an opening through which is passed the upper portion of a trigger-lock or safety device 21. The edges of the side pieces are both recessed to receive the upper portion of an abutment-plate 23, against which the rear end of the spring 17 bears and the projecting upper end of the abutment-plate serves as the rear sight of the gun. The abutment-plate not only serves as a bearing for the spring and as a rear sight; for incidentally it is utilized as a guide for the piston-rod 19 and will prevent compression of the side plates adjacent to its point of attachment.

The lower edges of the side pieces are each formed with downward extending lugs 25 which are pressed inward to be closer together than the flat sides with which they are integral, and between these lugs the trigger-guard and lever 4 is pivoted. To the rear of the lugs the inturned edges of the side pieces are cut-away for the passage of the lower end of the trigger 20, and in the rear of this opening, when the gun is of the breakdown type the inturned flanges are also cut away, to permit of the attachment of the lever and trigger guard to the stock. In advance of the lugs 25 there are recesses for the lower portion of the abutment 23. Either one or both of the side pieces are exteriorly indented to provide inward projecting stops 27 and 28, the stop 27 being in line with the lower edge of the plate 18 that is carried by the rear portion of the piston-rod, so that when the pin or roller 21′ engages the hook of the trigger downward movement of the plate will be prevented by such stop or stops, and the other stop 28 will arrest rearward movement of the cylinder 16; the cylinder being moved rearward either by the frictional engagement therewith of the piston or by the piston engaging with inward projecting portions formed at the end of the cylinder, for in a gun of the type shown the cylinder is reciprocated to move the air-tube 15 in the shot-race 34 toward and away from the barrel 36.

The side piece to which the abutment 13 is attached, is provided with a prong 30 for engagement therewith of the forward end of a spring 24, which spring is passed through an opening in the rear abutment 23 and is fastened to the forward end of a link 31 that is pivoted to the inner end of the lever 4, to hold the outer end of the lever against the stock, when the lever is susceptible of movement independent of the stock. The lever and trigger guard, and the trigger are mounted or fulcrumed upon studs 26, and 33 which are each rigidly secured to the side piece that carries the abutment 14, the studs or pins are slightly reduced adjacent to their ends to form shoulders. In practice the ends are upset after being passed through openings in the side piece and the opposite ends have internally threaded apertures for screws that pass through openings in the opposite side piece.

The side pieces 2 and 3 may be varied as to shape, the principal feature thereof being to provide a longitudinally separable housing with centrally located abutting edges, one of the side pieces being made up to carry all the movable parts and to retain them in position when the other side piece is removed, and with such construction access can be had to the movable parts without liability of disorganization of the parts.

The shot race 34, is made from a single piece of sheet-metal that is shaped to provide inclined flanges 35, a longitudinal recess that is enlarged at its rear to receive the banded end of the barrel 36. In line with the bore of the barrel there is an opening to receive the air-tube 15 of the cylinder 16, and above the rear tubular formation the upper edges are crimped together to close the end above where the air-tube reciprocates. Projections 37 formed on the sides of the shot-race engage the recesses 8, to hold the barrel and shot-race in place when the semi-circular ends 7 are embraced by the magazine, said magazine having an opening for charging or filling the magazine with shot. The construction of the shot-race is such that when the magazine tube is detached from the ends of the side pieces of the housing and said ends are separated the barrel and the shot-race may be disconnected from the housing.

The piston rod 19 is made up of a single strip of sheet metal that is bent at its forward end and perforated for the passage of a rivet 38 that connects thereto the piston-head, and at a distance from the piston-head greater than the length of the cylinder the sides of the piston-rod are apertured to receive a pin 39 against which the forward end of the spring will bear. The spring 17 may be of a diameter that is practically the same diameter as the exterior of the cylinder, for the spring does not enter the cylinder, and by reason of the construction shown a spring of large diameter may be used and all liability of the spring buckling under compression and of compressing the sides of the piston rod is avoided, the internal diameter of the spring being greater than the cross area of the piston-rod.

The trigger 20 at its upper end has an aperture in which is seated a split tube 40 of hard metal to provide lateral extensions, the tube being practically the same length as the distance between the side pieces of the housing, and the trigger below the hook carries a pin 41, for engagement with a projection on the safety device. The safety device or trigger-lock 21, is fulcrumed upon the rivet 22 and is made up to provide a projecting part 42, with which the pin on the trigger will engage to hold the trigger against movement when the lock is in its normal position, and the end of the trigger-lock has a lateral extended portion 43 that is adapted to be engaged by the lever 4 to move the trigger-lock and position the part 42 out of the path of the pin 41 so that the trigger will be free to move when the piston-rod is moved rearward by the inner end of the lever, to compress the spring and cause the pin or roller 21′ to move the trigger and to then engage the hook. Preferably the trigger and the trigger-lock are both actuated by a single spring, 44, of any suitable construction, preferably as shown by Fig. 13 in which instance the spring is bent to partially overlie one of the extensions of the split tube 40, the end 45 being shaped to engage a shoulder 46 on the trigger-lock, and the other end of the spring has an offset 47, that bears against the rear edge of the trigger. The form of spring shown is cheap and effective as well as being self sustaining.

The lever 4, as shown by Fig. 7 is made up of similar side pieces which are connected by rivets, the part beyond the fulcrum being oval in cross section and within the housing the side pieces are connected by a rivet 32 which carries one end of a link 31, the lever spring 24 at one end being attached to the link, the other end of the spring engaging the prong 30. Beyond the rivet 32 the side pieces of the lever and trigger guard 4 are bent inward to reduce the width so that such reduced end portion may readily pass between the sides of the piston-rod to engage the transverse portion of the plate 18 attached thereto by the roller or pin 21′. The lever within the housing is shaped to have a curved portion above its fulcrum which when the lever is moved to retract the piston-rod and compress the spring 17, such part will engage the laterally extending part 43 of the trigger-lock to move the same out of the path of the pin 41 on the trigger so that the pin or roller 21′ on the piston-rod may move the trigger to permit the roller to engage the hook, and when the inner end of the lever is returned to position the trigger-lock will be positioned to engage the trigger and hold the same at safety.

To charge the magazine the sleeve or band 10 is pushed forward to uncover the shot opening, the muzzle of the gun is pointed downward and shot is poured into the magazine and occupies the space about the barrel 36. To load the muzzle is raised, a shot will then pass from the magazine through the way formed by the sides of the shot race to a point in the rear of the barrel 36 and above the air tube 15 upon which the shot will rest, and as the lever, or the stock, is moved the piston-rod will be retracted by the inner end of the lever, the piston moving the cylinder or air chamber rearward for a distance sufficient to allow a shot to pass to a point in the rear of the barrel and in advance of the air tube and by simultaneously pressing upon the safety and trigger, the piston-rod will be released, and forward movement of the cylinder or air chamber 15 and its attached air tube will first mechanically move the shot into the barrel and force the end of the air tube or seat the same into the reinforced end of the

barrel so that the shot will be driven by the air that is compressed by forward movement of the piston.

To take the gun apart, the spring clip is removed and the magazine is withdrawn from the housing, and by separating the forward ends of the side pieces of the housing the barrel 36, with its attached shot race may be removed, then by removing the screws that engage the studs and stock the left hand side of the housing can be lifted off to expose the movable parts that are inclosed by the housing.

I claim;—

1. In an air gun, a frame, a spring actuated piston, a trigger fulcrumed to the frame and provided with a laterally projecting portion for engagement with a trigger lock, a trigger lock fulcrumed to the frame and provided with a laterally extending portion with which the laterally projecting portion of the trigger engages to hold the trigger against movement and a spring mounted upon the fulcrum of the trigger and shaped so that the ends of the spring engage with the trigger and the trigger lock.

2. In an air gun, a housing to which a stock and a barrel incasing magazine are connected, a reciprocatory cylinder maintained within the housing and provided at one end with an air tube, an apertured abutment fixedly attached to the housing to receive forward thrust of the cylinder and to permit of the passage of the air tube therethrough, a piston-rod, a spring mounted on a part of the piston rod that is entirely in the rear of the cylinder, an abutment to receive the thrust of the spring, means for effecting compression of the spring and engagement of the piston-rod with the trigger, a shot-race located forward of the abutment for the cylinder and in which the forward end of the air tube is seated, a barrel held by the shot-race and means for holding the shot-race in fixed engagement with the housing.

3. In a gun, a pair of sheet metal side pieces shaped to provide when connected a cylindrical forward end, and in the rear thereof a polygonal part of greater diameter which extends to a point above the hook of the trigger, such parts overlying a cylinder, a piston-rod, and a spring, flat side and end portions between which are maintained parts of a lever and parts of a trigger, the side pieces being attached to a stock and to a magazine.

4. A piston-rod for air guns comprising side portions having apertures adjacent to the ends thereof, a plate mounted on the side portions and provided with a part that extends across the space between the side portions and with sides that are parallel with the side portions, and a trigger-engaging roller pin that passes through the apertures in the piston-rod and holds the plate in fixed engagement with the piston-rod.

5. A piston-rod for air guns comprising a flat metal strip which is bent upon itself to provide parallel side members, a piston attached to the transverse portion of the strip, apertures through the end portions of the strip, a plate which is bent upon itself to provide a transverse portion and attached parallel sides, slots through the plate for the passage of the side members of the piston-rod, a trigger-engaging roller of greater length than the distance between the side pieces said roller connecting the plate to the piston-rod and means for preventing displacement of the roller.

6. In an air gun, a spring actuated piston, a trigger, and a trigger lock, a laterally projecting portion on the trigger for engagement with the trigger lock, a trigger-lock having a laterally extending portion for engagement with the laterally projecting portion on the trigger and a laterally projecting end portion disposed to be in the path of a lever, a lever shaped to engage the laterally projecting end portion of the lock after the external portion of the lever has been moved forward of the trigger.

7. In an air gun, a frame, a spring actuated piston, means for retracting the piston to compress the spring, a trigger fulcrumed to the frame to be engaged by the piston to hold the same in retracted position, a laterally extending part on the trigger, a trigger lock carried by the frame the same having above its fulcrum a part that extends through the frame and below its fulcrum with a laterally extending portion which will be normally in the path of the laterally projecting portion on the trigger and a spring maintained by engagement with the fulcrum of the trigger so that one end thereof will engage with the trigger below its fulcrum and the other end with the trigger lock above its fulcrum to effect movement of the trigger and trigger lock so that they will be normally maintained in interlocking positions.

8. In an air gun, side pieces constituting a housing with semi-circular end portions and a recess formed in the edge of one of the semi-circular end portions, and a shot-race having a part that projects to lie in the recess to hold the shot-race against longitudinal movement when the gun is assembled.

9. In an air gun, a shot-race, a housing which overlies the shot-race, recesses in the edges of the housing and projections integral with the shot-race to enter the recesses and hold the shot-race against movement.

10. In an air gun, a frame, a spring actuated piston, means for retracting the piston to compress its spring, a trigger fulcrumed

to the frame and provided with a hook for holding the piston in a retracted position and with a laterally extending portion for engagement with the trigger lock, a trigger lock having a laterally extending portion and a part that extends through the frame and a spring which is bent to engage the fulcrum of the trigger and is shaped so that the opposite ends will engage the trigger and the trigger lock.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM A. HEILPRIN.

Witnesses:

JOSEPH B. LEVY,

M. L. DAWSON.