

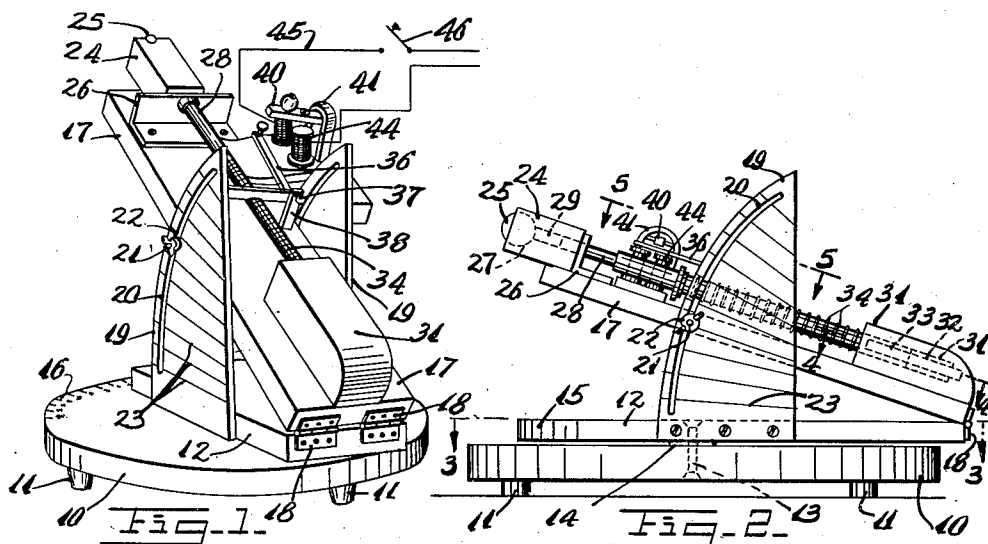
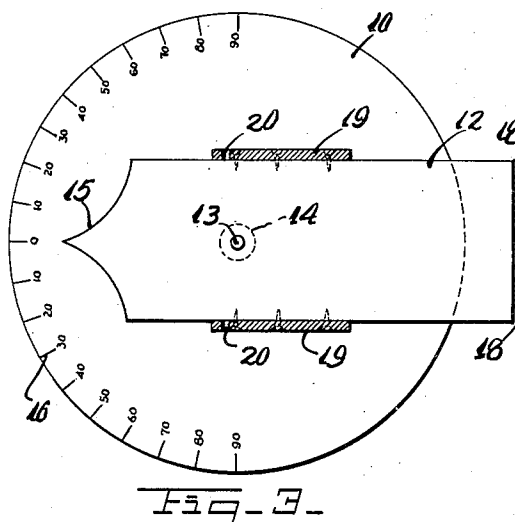
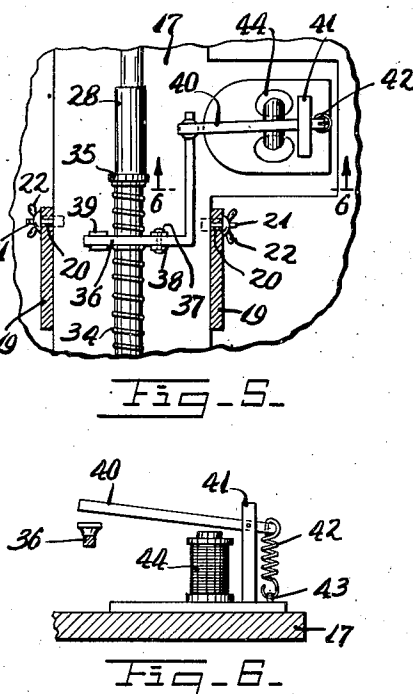
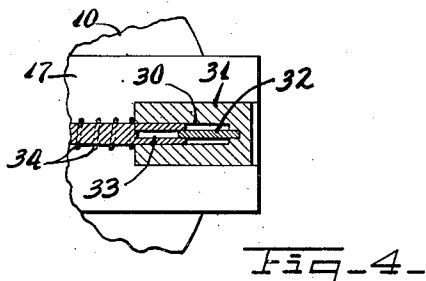
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ELECTRIC RELEASE FOR TOY GUNS

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ELECTRIC RELEASE FOR TOY GUNS

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5 Claims. (Cl. 124—32)

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This invention relates to new and useful improvements in an artillery trainer.

More specifically, the invention proposes the construction of an artillery trainer characterized by an adjustable plane element carrying a support for a projectile and a firing bolt. The adjustable plane is supported in a manner to be set to various azimuth angular positions and the various angles of elevation in a manner to be adjusted to be aimed at a target at a specific position with relation to the location of the trainer.

Still further, the invention proposes the construction of a simple device adapted to be used by students in classrooms under simulated battle conditions to receive training in setting large artillery pieces in both azimuth angular positions and angles of elevation.

Still another object of the invention proposes the provision of a compression spring for firing a bolt and which is adapted to be engaged by a latch arm in a manner to retain the bolt in an inoperative position.

Still another object of the invention proposes constructing the latch arm in such a manner that it may be engaged between selected turns of the spring. This selected engagement of the latch arm with the coils of the spring will tend to hold the firing bolt loaded to shoot forward with a desired selected force when the latch arm is moved to a disengaged position with relation to the spring.

Still another object of the invention proposes the provision of an internal electro-magnetic means mounted upon the inclined plane element and connected with the latch arm in a manner to move the latch arm to an inoperative position to release the bolt when the circuit to the electro-magnetic means is closed.

A further object of the invention proposes the construction of an artillery trainer which is simple and durable and which may be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

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Fig. 1 is a perspective view of an artillery trainer constructed in accordance with this invention.

Fig. 2 is a side elevational view of Fig. 1.

Fig. 3 is an enlarged horizontal sectional view taken substantially on the line 3—3 of Fig. 2.

Fig. 4 is a horizontal sectional view taken substantially on the line 4—4 of Fig. 2.

Fig. 5 is a partial horizontal sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is a partial lateral horizontal sectional view taken on the line 6—6 of Fig. 5.

The artillery trainer, according to this invention, includes a flat base 10. The flat base 10 is preferably disc-shaped and is provided with downwardly projected rubber foot portions 11 by which it is adapted to be rested upon a table, desk or other similar flat surfaces. A member 12 is turnably mounted upon the base 10 to be set at various azimuth angular positions. The member 12 is turnably supported upon the center of the base 10 by means of a rivet 13 which is engaged through the base 10 and through the member 12. A washer 14 is disposed coaxially upon the rivet 13 and is interposed between the adjacent faces of the base 10 and the member 12 to reduce the frictional contact between these surfaces to permit the member 12 to be freely turned.

The front end of the member 12 is provided with a pointer 15 which registers at a calibrated scale 16 formed on the adjacent peripheral portion of the base 10. This scale 16 is designed to cooperate with the pointer 15 to set the member 12 at various azimuth angular positions to the right and left of a point directly in front of the trainer and designated by the character "zero" on the scale 16.

An inclined plane element 17 is hingedly mounted on the member 12 to be set to various angles of elevation. The inclined plane element 17 has its rear end pivotally attached to the rear end member 12 by means of several spaced hinges 18. This permits the plane element 17 to be pivoted to various angular positions about the back end of the member 12. Means is provided for holding the plane element 17 in various inclined angular positions. This means comprises upwardly extending bracket portions 19 which have their bottom ends securely attached to the sides of the member 12.

The top ends of the bracket portions 19 extend freely upwards along the sides of the plane element 17. Each of the bracket portions 19 is provided with an arcuate slot 20 arranged concentric with the pivot pins of the hinges 18. Screw members 21 extend from the sides of the plane element 17 and pass freely through the arcuate slots 20. Thumb nuts 22 are threadably engaged upon the projected ends of the screws 21 and are adapted to be tightened against the sides of the bracket portions on opposite sides of the arcuate slots 20. The thumb nuts 22 when tightened against the bracket portions act to fixedly maintain the plane element 17 in various adjusted angles of elevation within the confines of the length of the arcuate slots 20.

The outer faces of the bracket portions 19 are provided with angular scale marks 23 which radiate from the center of the pivot pins of the hinges 18 to assist in determining the angular position at which the plane element 17 has been set.

A support 24 is provided at the front end of the plane element 17 for a projectile 25. The support 24 comprises a block of wood mounted upon the plane element 17 adjacent the front of an angle member 26 also mounted upon the plane element 17. The projectile 25 is characterized by a steel ball which is adapted to be rested into a complementary cavity 27 formed in the front of the block 24.

A firing bolt 28 is provided upon the plane element 17 for shooting the projectile 25 out of the block 24. The bolt 28 has its front end slidably passed through an opening provided in the angle member 26 and extended into a passage 29 formed in the block 24 and which communicates with the cavity 27. The rear end of the bolt 28 is slidably extended into an opening 30 formed in a support block 31 mounted upon the plane element 17 at its rear end. A pin 32 is mounted within the opening 30 and slidably extends into a complementary opening 33 formed in the back end of the bolt 28. The engagement of the pin 32 with the opening 33 acts to retain the bolt 28 fixedly in a center position in which its front end will squarely strike the projectile 25.

A compression spring 34 is mounted coaxially upon the bolt 28. This compression spring 34 operates between the adjacent faces of the back support 31 and a collar 35 formed on the bolt 28. This compression spring 34 is provided for supplying the required force to shoot the bolt 28 forward to shoot the projectile 25 out of the block 24 which will become clear as the specification proceeds.

A latch arm 36 is pivotally supported by means of a pin 37 in a bracket 38 on one side of the bolt 28. The opposite end of the latch arm 36 is freely supported within a complementary bracket 39 mounted on the plane element 17 on the opposite side of the bolt 28. The latch arm 36 is adapted to be engaged with selected convolutions of the compression spring 34 to hold the bolt 28 in an operative position to be shot forward with a desired selected force. Supporting the latch arm 36 on the opposite sides of the bolt 28 prevents tension of the spring 34 from bending the latch arm 36. The free end of the latch arm 36 which extends from the pivoted end thereof is disposed beneath an arm 40. This arm 40 is supported in a U-shaped bracket 41 and is adapted to be maintained in a position in which it is slightly spaced from the adjacent end of the latch arm 36. This means comprises a contraction spring 42 mounted

between the free outer end of the member 40 and a lug 43 projected from a fixed portion of the plane element 17.

An electro-magnetic means is provided for urging the member 40 against the action of the spring 42 to strike the end of the latch arm 36 and trip it to disengage it from the compression spring 34 and free the spring to permit it to shoot the bolt 28 forward. This means comprises a pair of electro-magnets 44 mounted upon the plane element 17 beneath an intermediate portion of the member 40. These electro-magnets 44 are connected in a circuit 45 (illustrated schematically in Fig. 1) and which includes a manually controllable switch 46 for closing the circuit 45 to energize the electro-magnets 44. The bar 40 is constructed of magnetic material and when the electro-magnets 44 are energized, they will draw downwards upon the free end of the member 40 against the action of the spring 42 causing this free end to strike the end of the latch arm 36. This will pivot the latch arm 36 and disengage its opposite end from between the coils of the compression spring 34.

The operation of this invention is as follows:

The artillery trainer is set up as shown on the drawing and the member 12 is turned to the desired angular position and the plane element 17 is set to the desired angle of elevation to aim the artillery trainer at a desired target. With the projectile 25 resting in the block 24 the bolt 28 is urged rearwards against the action of the compression spring 34. The latch arm 36 is engaged with a desired convolution of the spring 34 to hold the bolt 28 set at a desired tension. The artillery trainer is now set to be fired. To fire the artillery trainer it is merely necessary to close the switch 46 to supply current to the electro-magnets 44 to energize them. This will draw downwards upon the member 40 tripping the latch arm 36 to free the spring 34. The spring 34 will then shoot the bolt 28 forwards and eject the projectile 25 from the block 24 and send it on its way towards the target. The results are observed and if the projectile 25 hits the target, the trainer has been properly set up. If the projectile 25 falls short or overshoots the target, an adjustment to compensate therefor will have to be made to the angle of elevation of the plane element 17. Similarly, if the projectile 25 falls to the right or the left of the target, the angle of azimuth will have to be adjusted by turning the member 12 on the base 10.

The velocity of the movement of the projectile through the air may be determined by taking about one hundred recordings of the time required for the projectile to move from the block 24 to the target. These recordings should be made by a stop watch synchronized to start when the projectile 25 leaves the block 24 and to stop when the projectile reaches the target. The time consumed for the projectile to move this given distance may then be compared with the distance between the trainer and the target to determine the rate at which the projectile is being shot through the air by the compression spring 34 when set at different tensions.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I

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claim as new, and desire to secure by United States Letters Patent is:

1. In an artillery trainer having an inclined plane slidably supporting a firing bolt and having a coiled expansion spring engaged concentrically upon the bolt and operating between a collar fixed on the bolt and a fixed portion of the inclined plane for urging the bolt forward to shoot a projectile, means for holding the coiled spring under varying tension to control the forward velocity of the coiled spring, comprising an elongated latch arm, means on the inclined plane at one side of the bolt pivotally supporting said latch arm intermediate of its ends so that one end of said latch arm extends across the top of the bolt to be pivoted toward the bolt to be engaged with a desired convolution of the coil spring, means on the inclined plane on the other side of the bolt for supporting said one end of said latch arm when engaged with the desired convolution of the coil spring, and an electro-magnetic means engageable with the other end of said latch arm for pivoting said latch arm to disengage said one end of said latch arm from said one end supporting means and from the desired convolution of the coil spring freeing the coil spring to shoot the firing bolt forward.

2. In an artillery trainer having an inclined plane slidably supporting a firing bolt and having a coiled expansion spring engaged concentrically upon the bolt and operating between a collar fixed on the bolt and a fixed portion of the inclined plane for urging the bolt forward to shoot a projectile, means for holding the coiled spring under varying tension to control the forward velocity of the coiled spring, comprising an elongated latch arm, means on the inclined plane at one side of the bolt pivotally supporting said latch arm intermediate of its ends so that one end of said latch arm extends across the top of the bolt to be pivoted toward the bolt to be engaged with a desired convolution of the coil spring, means on the inclined plane on the other side of the bolt for supporting said one end of said latch arm when engaged with the desired convolution of the coil spring, and an electro-magnetic means engageable with the other end of said latch arm for pivoting said latch arm to disengage said one end of said latch arm from said one end supporting means and from the desired convolution of the coil spring freeing the coil spring to shoot the firing bolt forward, said pivotally supporting means comprising a bracket supported on said inclined plane, and a pin pivotally connecting an intermediate portion of said latch arm to the top end of said bracket.

3. In an artillery trainer having an inclined plane slidably supporting a firing bolt and having a coiled expansion spring engaged concentrically upon the bolt and operating between a collar fixed on the bolt and a fixed portion of the inclined plane for urging the bolt forward to shoot a projectile, means for holding the coiled spring under varying tension to control the forward velocity of the coiled spring, comprising an elongated latch arm, means on the inclined plane at one side of the bolt pivotally supporting said latch arm intermediate of its ends so that one end of said latch arm extends across the top of the bolt to be pivoted toward the bolt to be engaged with a desired convolution of the coil spring, means on the inclined plane on the other side of the bolt for supporting said one end of said latch arm when engaged with the desired convolution of the coil spring, and an electro-

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magnetic means engageable with the other end of said latch arm for pivoting said latch arm to disengage said one end of said latch arm from said one end supporting means and from the desired convolution of the coil spring freeing the coil spring to shoot the firing bolt forward, said means supporting said one end of said latch arm comprising a bracket mounted on the inclined plane on the said other side of said bolt and formed at its top end with a groove into which the said one end of said latch arm is adapted to be engaged.

4. In an artillery trainer having an inclined plane slidably supporting a firing bolt and having a coiled expansion spring engaged concentrically upon the bolt and operating between a collar fixed on the bolt and a fixed portion of the inclined plane for urging the bolt forward to shoot a projectile, means for holding the coiled spring under varying tension to control the forward velocity of the coiled spring, comprising an elongated latch arm, means on the inclined plane at one side of the bolt pivotally supporting said latch arm intermediate of its ends so that one end of said latch arm extends across the top of the bolt to be pivoted toward the bolt to be engaged with a desired convolution of the coil spring, means on the inclined plane on the other side of the bolt for supporting said one end of said latch arm when engaged with the desired convolution of the coil spring, and an electro-magnetic means engageable with the other end of said latch arm for pivoting said latch arm to disengage said one end of said latch arm from said one end supporting means and from the desired convolution of the coil spring freeing the coil spring to shoot the firing bolt forward, said electro-magnetic means comprising an arm of magnetic material having one end overlying the said other end of said latch arm, means on said inclined plane pivotally supporting said arm of magnetic material intermediate of its ends, means operating between the other end of said arm of magnetic material and said inclined plane urging said latter arm into a position in which its said one end will be free of said latch arm, and a manually closable circuit including an electro-magnet beneath said one end of said arm of magnetic material to pivot said one end downward to engage and pivot said latch arm.

5. In an artillery trainer having an inclined plane slidably supporting a firing bolt and having a coiled expansion spring engaged concentrically upon the bolt and operating between a collar fixed on the bolt and a fixed portion of the inclined plane for urging the bolt forward to shoot a projectile, means for holding the coiled spring under varying tension to control the forward velocity of the coiled spring, comprising an elongated latch arm, means on the inclined plane at one side of the bolt pivotally supporting said latch arm intermediate of its ends so that one end of said latch arm extends across the top of the bolt to be pivoted toward the bolt to be engaged with a desired convolution of the coil spring, means on the inclined plane on the other side of the bolt for supporting said one end of said latch arm when engaged with the desired convolution of the coil spring, and an electro-magnetic means engageable with the other end of said latch arm for pivoting said latch arm to disengage said one end of said latch arm from said one end supporting means and from the desired convolution of the coil spring freeing the coil spring to shoot the firing bolt

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forward, said electro-magnetic means comprising an arm of magnetic material having one end overlying the said other end of said latch arm, means on said inclined plane pivotally supporting said arm of magnetic material intermediate of its ends, means operating between the other end of said arm of magnetic material and said inclined plane urging said latter arm into a position in which its said one end will be free of said latch arm, and a manually closable circuit including an electro-magnet beneath said one end of said arm of magnetic material to pivot said one end downward to engage and pivot said latch arm, said magnetic arm urging means comprising a contraction spring operating between the said other end of said magnetic arm and a lug fixedly mounted on said inclined plane.

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