TURN-SWING TARGET ADAPTER

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(54) TURN-SWING TARGET ADAPTER

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ABSTRACT
A turn-swing target adapter allows increased flexibility in moving and controlling a target for use in shooting ranges and ballistic training areas. In particular, the adapter allows an operator to rotate the target, swing the target forwards and backwards, or any combination thereof. The adapter allows for convenient mounting to a separate base or to an existing target mounting system.
FIG. 2a
FIG. 3
TURN-SWING TARGET ADAPTER

RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. Provisional Application No. 60/670,305, filed Apr. 12, 2005, which is incorporated herein in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. The Field of the Invention

[0003] The present invention relates to a device used for targets for shooting and ballistic training. More specifically, the present invention relates to a turn-swing target adapter for moving a target during a shooting or ballistic training exercise.

[0004] 2. State of the Art

[0005] In conducting shooting exercises or ballistic training it is often desirable to move the target. Moving targets can increase the challenge presented to the shooter as he or she must aim accurately at the target and track its movement.

[0006] Likewise, a target can be moved between a position where the target is not presented to the shooter (i.e., extending generally parallel to the line of fire) and a position where the target is presented to the shooter (i.e., generally perpendicular to the line of fire). The sudden presenting and withdrawing of the target tests the shooter’s reaction time and may simulate the appearance of a sudden threat.

[0007] The movement not only increases the shooter’s skills generally, but may be made to simulate various scenarios which increase the shooter’s specific skills. For example, the target may be made to resemble an animal and to move like an animal which is standing up or otherwise moving. Alternatively, the target may be made to represent a person, such as an armed criminal, and made to move similar to a person exiting a door, popping up from behind something, etc. It will be appreciated that the target may be made to represent many different objects and scenarios. It is thus desirable to have increased flexibility in moving a particular target. It is often desirable to have multiple directions of movement, and to be able to thus vary the movement of a particular target.

[0008] In addition to providing valuable training, a movable target system often increases the enjoyment of the shooters. Individual shooters often grow tired of shooting at stationary targets, especially as this skill is mastered. Thus, a moving target system provides new challenges which are more difficult to master, and provides increased incentive and enjoyment for continued shooting.

[0009] While movement in one direction is an improvement over a stationary target, targets which move only in one direction are often somewhat predictable. These targets offer less of a challenge to a shooter than a target which moves in multiple directions.

[0010] While movable target mounts are available, target mounts or systems with movement in multiple directions, i.e., multiple types of movement, are often quite costly. These mounts are also typically not portable, and as such can not be taken to different areas. These target systems are thus not well suited for purchase by individuals. Available target mounts which are portable and relatively inexpensive are typically limited in the ways that they may be made to move. Many movable targets will only move in one direction, such as turning or swinging forwards and backwards. Many individual shooters, however, desire a target mount which is capable of moving the target in a way which is not easily predictable, and which is also portable and relatively inexpensive.

[0011] There is thus a need for a target mount or target adapter which is both portable and relatively inexpensive, and which allows a shooter to move the target in multiple directions to provide the desired shooting enjoyment and complexity.

SUMMARY OF THE INVENTION

[0012] It is an object of the present invention to provide an improved turn-swing target adapter for shooting and ballistic training. It is a further object of the present invention to provide a target adapter which is relatively inexpensive, portable, and easy to operate.

[0013] According to some aspects of the present invention, a target adapter is provided which allows a user to move a target in a variety of directions. A target adapter is provided with multiple pivot points such that a user may turn a target back and forth, swing a target side to side, or any combination thereof.

[0014] According to another aspect of the present invention, a target adapter is provided which is portable. The adapter may be made so as to be compact and relatively lightweight, allowing a user to take the target adapter to a variety of locations for use.

[0015] According to another aspect of the present invention, a target adapter is provided which is both durable and relatively inexpensive. The target adapter may be made from steel plate which is formed and welded as needed to create the adapter. The adapter is thus resilient to the impacts and associated shock and vibrations which are associated with target shooting. Additionally, the adapter is relatively inexpensive as it does not require expensive machining or expensive parts, such as motors or electronic parts. The target adapter is typically operated by levers which may be connected to strings or cables.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Various embodiments of the present invention are shown and described in reference to the numbered drawings wherein:

[0017] FIG. 1 shows a perspective view of a target adapter according to aspects of the present invention;

[0018] FIGS. 2a-2b show top and side views of a base portion of the target adapter of FIG. 1, and according to the present invention;

[0019] FIG. 3 shows a top view of the body and base portion of the target adapter of FIG. 1 and according to the present invention;

[0020] FIG. 4 shows a side view of the body and base portion of the target adapter of FIG. 1 and according to the present invention;

[0021] FIG. 5 shows a front view of a target mount portion of the target adapter of FIG. 1 and according to the present invention;
FIG. 6 shows a side view of a target mount portion of the target adapter of FIG. 1 and according to the present invention;

FIG. 7 shows a side view of another target mount portion of the target adapter of FIG. 1 and according to the present invention;

FIG. 8 shows a side view of another target mount portion of the target adapter of FIG. 1 and according to the present invention; and

FIG. 9 shows another perspective view of the target adapter of FIG. 1 and according to the present invention.

It will be appreciated that the drawings are illustrative and not limiting of the scope of the invention which is defined by the appended claims. The various embodiments shown accomplish various aspects and objects of the invention.

DETAILED DESCRIPTION

The drawings will now be discussed in reference to the numerals provided therein so as to enable one skilled in the art to practice the present invention. The drawings and descriptions are exemplary of various aspects of the invention and are not intended to narrow the scope of the appended claims.

Turning to FIG. 1, a perspective view of a turn-swing target adapter according to the present invention is shown. The adapter, indicated generally at 10, is formed from a base 14, a body 18, and a target mount 22. The body 18 may be pivoted about a horizontal axis by lever 26 to thereby pivot target 30. A spring 34 is typically attached to the base 14 and body 18 and used to bias the target into a predetermined pivotal orientation. Depending on how the target adapter 10 is oriented to the user, the adapter 10 may be made to present the target 30 to the user and turn away from the user when the lever 26 is moved, or as is more common, remain with the target 30 turned away from the user and present the target 30 to the user when the lever 26 is moved.

The target mount 22 may be swung from vertical as shown to the right by moving lever 38. Spring 42 is attached to the target mount 22 via arm 46 and to the base 14 to bias the target 30 upright as shown. Typically, levers 26, 38 are moved by cords or cables (not shown) which are attached to holes 50, 54. The cables may extend along the ground towards the shooter, or may extend sideways or away from the user, pass through a pulley, eyelet, etc. to change the direction of the cable and direct the cable towards the user, to a shooting range operating location, or any location that is desired. The target adapter 10 may also be provided with a deflection plate 58 to prevent bullets from hitting the pivoting or bending mechanism of the target adapter 10. The deflection plate 58 may be made from angle steel as shown so that a bullet is not deflected towards a shooter. Additionally, semicircular or even flat pieces of steel work as deflection plates. Various deflection plates may be mounted to the target adapter 10 as is necessary to prevent damage to the various parts of the adapter 10.

Turning now to FIG. 2a, a side view of the target adapter base of the adapter of FIG. 1 is shown. The base 62 is attached to a vertical pivot member 66 which forms a pivot for the body of the target adapter (not shown). The base 62 is shown with holes 70 which may be used to attach the base to legs or to an existing stand (not shown) and thereby stabilize the adapter for use. The base may also be formed with a stop 74 which can be used to limit the rotation of the body of the target adapter. The base is also formed with a mounting location for a spring. For the embodiment shown, the flange 78 and hole 82 are used to mount the spring (not shown).

Turning to FIG. 2b, a top view of the base of FIG. 2a is shown. Of particular interest, the flange 78 and hole 82 are more clearly shown. It will be appreciated that while the pivot member 66 is shown as a cylindrical rod, a square pivot member will also work, as the body will typically have a round hole or tube which is placed over the pivot 66 to form a hinge. The stop 74 may also be replaced with a larger flange, and may be provided with an adjustable bolt which contacts a flange on the adapter body to limit rotation of the body and allow the amount of rotation to be adjusted.

Turning now to FIG. 3, a top view of a target adapter body 86 of the adapter of FIG. 1 is shown. The body 86 is shown mounted on the base 62 of FIG. 2. The body 86 is formed with a plate 90 which has a pivot hole, indicated at 94. The plate 90 is attached to a tube 98, the bore of the tube being aligned with the hole 94 and placed over pivot 66 forming a hinge. The plate 90 has an arm 102 and hole 106 for attaching a spring 110 to the base 62 at hole 82. The spring 110 urges the plate 90 to rotate in a clockwise direction. The plate 90 is also formed with lever 114 and hole 118 to which a cord or cable may be attached. The cord would be used to rotate the plate 90 in a counterclockwise direction and thereby rotate the target. Plate 90 is also formed with a semicircular section 122. Section 122 is formed with a semicircular slot indicated at 126. Slot 126 fits over stop 74 and is used to limit the rotation of the adapter body 86. As shown, the slot allows the adapter body 86 to rotate within a 90 degree range relative to the base 62. It will be appreciated that the slot 126 may be formed in a variety of sizes so as to allow for different amounts of rotation of the adapter body 86. However, 90 degrees is a preferred amount of rotation as it allows a target to be rotated such that it is fully presented to or directly sideways to a user. The edge of plate section 122 has a hole 130 formed therein. The hole 130 is used to mount another spring which connects the plate 90 to the target mount assembly.

Turning now to FIG. 4, a side view of the target adapter body 86 of FIG. 3 is shown. It can be seen with greater clarity how slot 126 fits over stop 74, and how the plate 90 and tube 98 fit over the pivot member 66 to form a pivotal hinge. Also shown is a bracket 134 which is mounted to the top of tube 98. The bracket 134 is typically formed with holes 138 which are used to attach the target mount assembly. The base 62 may also be formed with a flange 136 having holes 140 formed therein, allowing the target adapter to be mounted onto a stand. Similarly, the flange 136 and holes 140 may be used to mount the adapter onto an existing target stand or target system, converting a conventional target to a target which is capable of turning and swinging. Thus, an existing target may be unbolted from the existing stand, and the target adapter attached to the stand and target to make a moving target system.
[0034] Turning now to FIG. 5, a front view of a target mount assembly of the adapter of FIG. 1, indicated generally at 142, is shown. The target mount 142 is shown attached to bracket 134 via holes 138. The target mount 142 has a shaft 146 which extends through holes 138 and forms a pivot which allows a target to be pivoted forward and backward. A mounting plate 150 is attached to the shaft 146 to which a target is mounted. The target may be a paper target attached to a frame, or may be a sturdier target such as one made from cardboard. It is, however, advantageous for the target to be attached to a frame to provide a strong and secure attachment as the target is moved during operation of the target adapter. The mounting plate 150 is typically provided with holes 154 to thereby attach a target.

[0035] The mounting plate and other components of the target adapter may typically be constructed by welding the metal pieces together. While welding weakens the metal somewhat, it is not anticipated that the target adapter will receive too many direct hits by bullets because the target is held apart somewhat from the target adapter. A lever 158 having a hole 162 is attached to the shaft 146 and used to pivot the shaft and thereby swing the target forward and backward, or side to side depending on orientation. The hole 162 is typically used to attach a cord or cable that a user may pull on to swing the target, but may also be used to connect the adapter to a mechanized target moving apparatus or a pushrod or lever extending from such an apparatus or another target control system.

[0036] The shaft 146 is also connected to an arm 166 which extends sideways from the shaft 146 and has a hole 170 formed in the end of the arm. The hole 170 is typically used to connect a spring to the hole 130 formed in the plate 90. This spring biases the shaft 146 to swing a particular direction. Thus, a user may pull on a cable attached to lever 158 and thereby swing the target mount 142 in one direction, and the spring will swing the target mount 142 back upon releasing the cable. The arm may also have a flange 174 which is used to limit the motion of the target, in particular to limit how far the spring may pull the target in one direction. The bolt 178 passes through a threaded hole in the bracket 134, stopping the rotation of the target mount 142 when the flange 174 contacts the bolt 178. Adjusting the amount of the bolt 178 passing through the bracket 134 will adjust where the target mount 142 stops moving. If desired, a nut 182 may be used to fix the position of the bolt 178.

[0037] It will also be appreciated that the holes 154 may be sized and spaced similarly to holes 140 in the base flange shown in FIG. 4. Furthermore, the target mounting holes 154 and the base flange holes 140 may be formed of a predetermined size and position so as to attach to currently existing target systems. Thus, where a shooting range has a target line, individual targets may be removed from the line and a target adapter according to the present invention may be attached in their place, with the target being reattached to the upper target mount of the target adapter. Thus, many targets may be adapted for use as a turn/swing target by using the target adapter of the present invention.

[0038] Turning now to FIG. 6, a side view of the target mount 142 of FIG. 5 is shown. It can more clearly be seen how the lever 158 is oriented relative to the mount 142, and how rotation of the lever 158 will swing the mount 142 sideward to the side. The hole 162 in the lever 158 is also more clearly seen. The arm 166, spring mounting hole 170, and flange 174 may also be more clearly seen. The flange 174 is shown in contact with bolt 178, limiting the movement of the target mount 142. It will be appreciated that the mounting plate 150 may be made a variety of different sizes and the holes 154 may be placed in different locations as may be suitable to mounting various targets.

[0039] Turning now to FIG. 7, an alternate side view of the target mount of FIG. 5, indicated generally at 186 is shown. The target mount 186 is formed similar to the mount of FIGS. 5 and 6, having a bracket 190 attached to a tube 194 which is attached to a base plate similar to that of FIG. 3. The bracket has holes formed therein to allow a shaft 198 to be mounted, forming a hanger. One end of the shaft is attached to a lever 202 having a hole 106 which allows for swinging of a target. As discussed before, the hole 206 is typically used to attach a cable or thin rope to the lever 202 for movement of the target. The target mount 186 is also shown with an arm 210 having a hole 214 for attaching a spring to thereby bias the target mount 186 in the orientation shown. A flange 218 is used in combination with a bolt 222 and nut 226 to limit the rotation of the target mount 186. Also shown is a second flange 230 shown attached to the arm 210 and shaft 198 which may be used to limit the rotation of the target mount 186 to the left. The flange 230 may be designed to contact a part of the bracket 190 as shown, or may also use an adjustment bolt similar to bolt 222. A user may thus select how far the target will swing to each side.

[0040] Turning now to FIG. 8, a side view of another target mount of the adapter of FIG. 1, indicated generally at 234 is shown. The target mount is constructed with a bracket 238 similar to those previously discussed, the bracket 238 having holes formed therein for receiving a shaft 242. The shaft has a lever 246 attached to the far end, the lever 246 having a hole 250 for attaching a rope or cable to swing the target. An arm 254 is attached to the near end of the shaft 242 and a hole 258 is formed in the arm 254 to attach a spring 262. The spring extends downwardly from the shaft 242 and attaches to the plate (such as plate 90 of FIG. 3). A mounting plate 266 having holes 270 formed therein is attached to the top of the shaft 242, and used to attach a target, usually via a frame. In operation, a user will pull a rope or cable attached to lever 250, causing the target to swing to the right. The movement of the target to the right also moves arm 254 and thereby stretches the spring 262. The restoring force of the spring 262 causes the target to swing back to the left, and, if the spring is not used to stop the target, an oscillatory motion is established where the target swings forward and backward, or side to side, depending on how the target adapter is oriented relative to the user.

[0041] Turning now to FIG. 9, another perspective view of the target adapter of FIG. 1 and according to the present invention is shown. While FIG. 1 shows a view generally from the front of the adapter, FIG. 9 shows a view generally from the rear of the adapter and as such details structures not clearly visible from FIG. 1. As such, FIG. 9 shows the various subassemblies and structures of the adapter as shown in FIGS. 1-8 in an assembled form so as to present the relationships therebetween. The target adapter 274 has a base 278 to which a body plate 282, tube 286, bracket 290, and mount 294 have been attached, as previously discussed. From the present view, it is more apparent how a spring 298 may be attached to the target mount arm 302 and body plate 282. Also shown are feet 306 which may be attached to the base 278 to secure and stabilize the target adapter 274. The feet may be formed with flanges 310 having holes 314 to allow the target to be staked to the ground if used outside, or bolted to a fixed object such as a mounting rail or the floor.
if used in an inside shooting range. It will also be appreciated that different types of support structures may be attached to the base 278 to secure the apparatus in many different shooting environments. Two ropes or cables 318 are shown attached to the rotational lever 322 and swing lever 326. Pulling on the cables allows a user to operate the target adapter and move the target. As previously discussed, however, the levers may be connected to various other control structures such as control motors or levers which may already exist at a shooting range. Additionally, multiple target adapters may be connected to a single cable or control device.

[0042] One advantage of the present invention shown in FIG. 9 is that the ropes or cables that actuate the rotational lever 322 and the swing lever 326 function generally parallel to each other. This makes it easier to gang a number of the adapters together at a shooting range.

[0043] There is thus disclosed an improved turn-swing target adapter. It will be appreciated that numerous modifications may be made to the present invention without departing from the scope of the invention. The preceding examples are illustrative of the invention, and do not define the scope of the invention.

What is claimed is:

1. A target adapter configured for attachment to a target stand and a bullet target, the adapter comprising:
   a base configured for attachment to a target stand;
   a target mount configured for attachment to a shooting target, wherein the target mount may be independently pivoted about a vertical axis and swung about a horizontal axis relative to the base responsive to inputs from a user.
   2. The target adapter of claim 1, further comprising a plurality of levers for pivoting the target mount relative to the base.
   3. The target adapter of claim 1, further comprising at least one spring to bias the target mount in a fixed position relative to the base.
   4. The target adapter of claim 1, wherein the target mount is pivotal between a first position and a second position and wherein the target mount may be swung between a first position and a second position.
   5. The target adapter of claim 4, wherein the adapter further comprises a spring for biasing the target mount into the first pivotal position.
   6. The target adapter of claim 4, wherein the adapter further comprises a spring for biasing the target mount into the first swing position.
   7. The target adapter of claim 4, wherein the adapter further comprises at least one stop for limiting the motion of the target mount relative to the base.
   8. The target adapter of claim 4, wherein the target adapter further comprises a spring for biasing the target mount into a swinging position between the first and second swing positions.
   9. The target adapter of claim 7, wherein the stop is adjustable.
   10. The target adapter of claim 1 further comprising a bullet deflection plate.
   11. The target adapter of claim 2, further comprising a plurality of cables attached to the plurality of levers and configured such that pulling on the plurality of cables moves the target mount, and wherein the plurality of levers are configured such that the plurality of cables extend from the plurality of levers in a common direction.
   12. The target adapter of claim 11, wherein the plurality of cables extend generally horizontally from the target adapter.
   13. A method of forming an actuable target comprising:
      selecting a target stand;
      selecting a target;
      selecting a target adapter, the target adapter configured for attachment to the target stand and configured for attachment to the target, and further configured to allow pivoting of the target about a vertical axis and rotation of the target about a horizontal axis;
      attaching the target adapter to the target stand; and
      attaching the target to the target adapter.
   14. The method of claim 13, wherein the target adapter further comprises a first lever configured for pivoting the target about the vertical axis and a first cable attached to the first lever, and a second lever for rotating the target about a horizontal axis and a second cable attached to the second lever, wherein the first and second cables are substantially parallel to the ground adjacent the first and second levers.
   15. The method of claim 13, wherein the target stand comprises an existing shooting range target mount.
   16. A method of adapting a target comprising:
      selecting a bullet target;
      selecting a target stand configured for receiving a bullet target;
      selecting an adapter, the adapter having a stand mount configured for attachment to the target stand and a target mount configured for attachment to the bullet target, and the adapter having a first lever configured for rotation of the target mount about a horizontal axis and a second lever configured for pivoting of the target mount about a vertical axis;
      attaching the stand mount to the stand; and
      attaching the target mount to the bullet target.
   17. The method of claim 16, wherein the method further comprises moving the first lever to thereby rotate the bullet target about a horizontal axis relative to the stand and moving the second lever to thereby pivot the bullet target about a vertical axis relative to the stand.
   18. A bullet target system comprising:
      a bullet target;
      a target adapter, the adapter having a first mount configured for attachment to a target stand and having a second mount configured for attachment to a bullet target, the adapter being further configured for pivoting the second mount relative to the first mount and about a vertical axis and for rotating the second mount relative to the first mount and about a horizontal axis;
      a target stand, the stand having a third mount being configured for attachment to either the bullet target or the first mount of the target adapter.
   19. The system of claim 18, wherein the first mount is connected to the third mount.

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