

- [54] FIREARMS TRAINING APPARATUS AND METHOD
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- [52] U.S. Cl. 35/25; 273/105.2
- [51] Int. Cl. F41j 7/00
- [58] Field of Search 35/25; 273/105.2, 105.6

[56] References Cited

UNITED STATES PATENTS

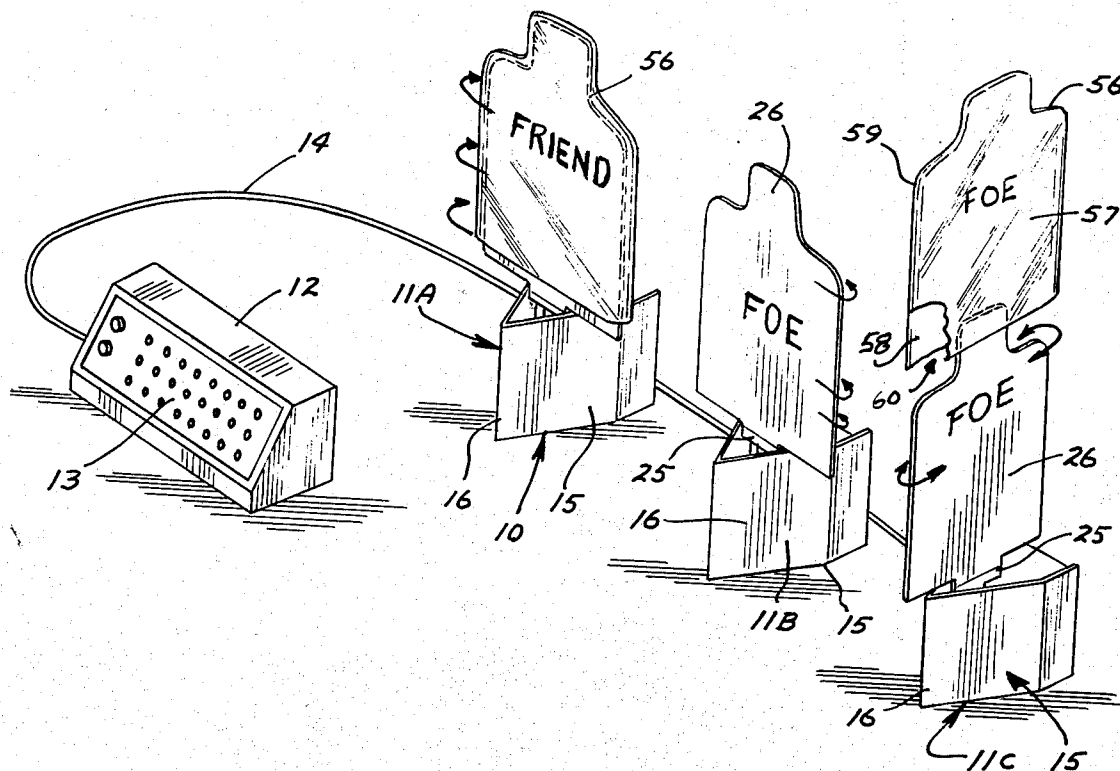
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|-----------|--------|----------------|-----------|
| 2,104,171 | 1/1938 | Schwerin | 273/105.6 |
| 2,494,210 | 1/1950 | Smith | 273/105.2 |

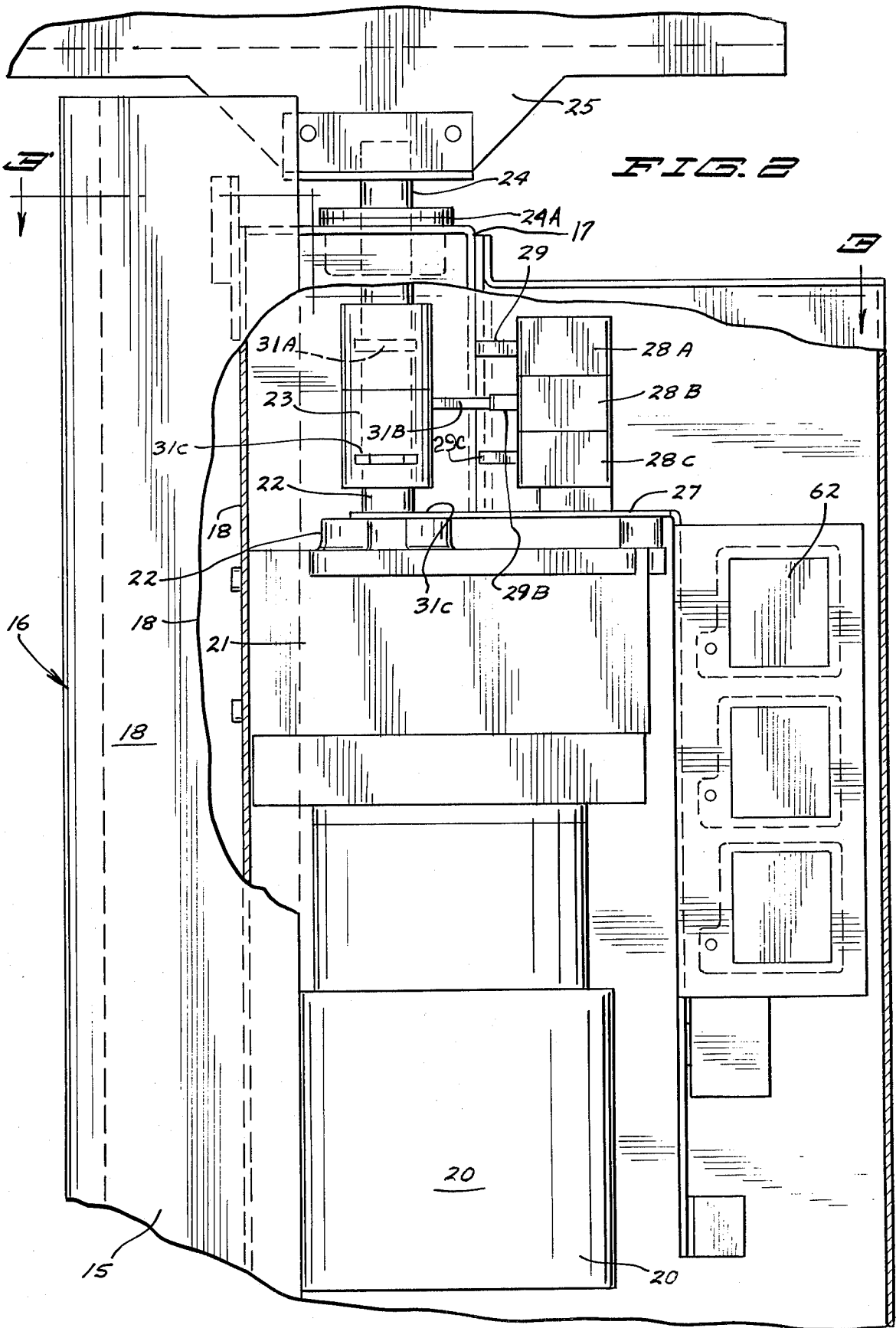
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Assistant Examiner—John H. Wolff
Attorney, Agent, or Firm—Dugger, Johnson & Westman

[57] ABSTRACT

A combat firearm training system which may be made portable, or installed in the stationary indoor range, and which includes mechanism for moving each target into either one of two positions from a central position so that in any training exercise each of the targets can be selectively presented as either a friend or a foe. A trainee must then make a decision to identify the target before firing. The unit can be programmed for random selection and operation and may include timers and/or time delays so that the interval between exposures of the targets, the time of exposure of the target, and the category of each target can be changed as desired.

13 Claims, 4 Drawing Figures





FIREARMS TRAINING APPARATUS AND METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a firearm training system including target supports which will permit rotating the target between two individual target positions from a center position, and a method of using the same.

2. Prior Art

In the prior art various firearm training devices including target manipulators or movers have been advanced. For example, U.S. Pat. No. 3,502,334 shows an indoor combat firing trainer which has targets mounted on a continuous chain and which are thereby moved across the target area.

A type of a reversible target supported on guide lines or strings is shown in U.S. Pat. No. 2,494,210. The structure in this particular patent reverses the targets when the direction of movement of the targets along the trolley support is changed.

An automatic target stand is also shown in U.S. Pat. No. 3,348,843 and this patent illustrates the rotation of a target from an edge position wherein the target face is hidden from the trainee, to a full face on position where the target will be fired at. The target rotator travels 90°. A further portable target raising mechanism which tilts the target from a down position to an up position is shown in U.S. Pat. No. 3,515,388, which continuously rotates a target from an up to a down position when the unit is energized.

In other prior art it is known to mount two targets on a common shaft behind a wall having a separate window for each of the two targets. The shaft is rotatable from a center position with neither target appearing, 90° in one direction wherein a first target appears in one window with the second target hidden, and 90° in the other direction wherein the wherein the target appears in a second window and the first target is hidden. In this sytem, the same target will always appear in the same window until manually changed, and only one side of each target is exposed.

SUMMARY OF THE INVENTION

The present invention relates to a firearms training system which includes mechanism for moving targets from a neutral or nonfiring position selectively to either one of at least two separate identifiable firing positions. As shown the mechanism rotates the substantially planar targets about an upright axis from an edge position in either direction of rotation substantially 90° in either direction so that the plane of target is perpendicular to the direction of fire and is thus viewed by the trainee or shooter when in a firing position.

The controls are such that the operator can select which side of the target will face the shooter, and when more than one target is used, the operator can select the target that will be operated. The different sides of the target will have different indicia thereon, for example a figure representing a "friend" (no shooting) or a "foe" (shooting). The random selection available insures that the shooter does not have any way of identifying whether a particular target will always be a friend or a foe which should be fired at. In this way, a trainee or shooter is forced to visually identify whether the target presented is friend or foe, and to make a decision as to whether the target should be fired at or not.

In this manner, the target system presents a training device which will aid law enforcement officials, and others, in training shooters to visually identify targets before firing each time a target appears.

In previous systems, targets have been rotated 90° from an edge position to a full face on position, but the individual targets would only rotate in this 90° mode so that a particular target will always be a friend or a foe until the target had been changed. This repeating position could be memorized by the trainee, so that the decision making process was eliminated, and the trainee would know that each time a particular target was turned it would always be a friend or always be a foe so that his firing could be commenced without making visual identification and the attendant decision as to whether or not it was proper to fire.

The power unit as shown is made self-contained for each of the targets, and individual controls can be used for each target so that the number of targets can be varied as desired. Further, the units can be made portable with a portable power supply so that the targets can be placed in an outdoor environment without the need for a high priced complex indoor range. The mechanism and the method also can be utilized with a fixed installation in an indoor range.

Suitable programming controls may be used for controlling the target operation automatically.

In addition, a slip on, target cover sleeve to mount over the target is shown. The sleeve comprises an envelope formed of two side panels, and joined together much like a bag, with an open end. The open end is slipped over the target support. One panel of the sleeve may have one type of indicia thereon, for example a friend representation and a foe can be depicted on the other panel. In this way the individual target representations can be easily replaced without replacing the entire stand. The sleeve also makes it easy to provide two different types or classification of targets on one target support.

Where the targets are rotatable to either one of the two (or more) positions for presenting their opposite sides to the trainee, the different category of target indicia on opposite sides of the sleeve or bag simplifies the changing of targets and insures that the desired type of target may be used.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a typical firearm training apparatus arranged for use, and showing a target sleeve in position on one of the target supports, and another sleeve about to be mounted over another of the target supports;

FIG. 2 is a vertical side elevational view of the drive mechanism of the target turner used in the training system of the present invention;

FIG. 3 is a sectional view taken as on line 3—3 in FIG. 2; and

FIG. 4 is a schematic representation of a typical control used with one of the target turners made according to the present invention and a schematic representation of an optional programming system utilized therewith.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The firearms training system apparatus illustrated generally at 10 in FIG. 1 includes a plurality of individual targets which can be spaced apart and positioned as

shown, or in other desired arrangements, and are indicated 11A, 11B and 11C respectively. The targets are placed in a suitable location for firearms training, such as an outdoor location, or an indoor firing range. A suitable target control panel 12 is used for an operator to select the operation of the target units, as will be more fully explained. The control panel includes various switches on the dial indicated at 13. A suitable remote cord 14 can carry the necessary wires for the controls to the individual targets 11A, 11B and 11C.

Each of the targets is identically constructed, and includes a lower support frame 15 which, as shown, has a v shaped leading member 16 which serves as a bullet deflector, and protects the components behind member 16. The member 16 can be made of any desired material to prevent damage to the components behind it.

Referring now specifically to FIGS. 2 and 3, it can be seen that the support 15 and member 16 also support a framework 17. A panel 18 is fixed to the member 16 and a suitable reversible electric motor 20 is mounted thereto. A gear reducer drive unit 21, of a conventional design is driven by motor 20 and has a driven output shaft 22. The output shaft is drivably mounted into a coupling 23 that extends along an upright axis (the output shaft 22 also extends along an upright axis) and the coupling 23 is drivably coupled to a junction shaft 24. A clip 25 that is of configuration to support cardboard or rigid upright target support 26 (see FIG. 1) is drivably attached to shaft 24. The clip 25 can be a spring clip that will resiliently hold a planar target support 26, or the clip could use bolts or screws or other fastening elements for attaching the target support 26 thereto. The target supports 26, as shown, are well known in the art and are used in many firearms training devices. These target supports may be made of heavy cardboard which permits the supports to stand upright when supported by a clip 25 at the bottom thereof. Shaft 24 is rotatably mounted in a bearing 24A mounted on a portion of the frame 17.

A support member 27 is attached to the top of the gear reducer 21 and has a leg supporting three individual vertically stacked limit switches, 28A, 28B and 28C, respectively and these limit switches each have actuating arms and rollers 29A, 29B, 29C, respectively thereon which are positioned to be engaged by rotary cam elements 31A, 31B and 31C, respectively. The cam elements are mounted on the coupling 23 and extend radially outwardly therefrom and are shaped so that they will engage the roller actuators of the respective switches 28A, 28B and 28C. As shown, the cam elements are vertically spaced apart, to correspond with the spacings of the actuators for the switches 28A, 28B and 28C. The switches 28A, 28B and 28C are used for controlling the motor 20 as will be more fully explained in connection with the schematic diagram of the control circuit. It should be noted that the motor is controlled so that it will rotate between the normal centered nonfiring position of the targets on edge with respect to the shooter, as shown with target 11C, and will rotate in either direction as indicated by double arrows from this nonfiring position so that the targets support 26 will be faced toward the shooter in a firing position. Either a first target side having indicia representing one class of target such as a friend as shown at 11A is presented, or each of the targets can be rotated in the opposite direction of rotation from their edge nonfiring position (as shown by 11C) so that a second different indi-

cia representing a second class of target such as a foe would be presented, as shown by 11B.

The type of target would determine whether a shot should be fired or not and because the class of target presented at each station can change between each presentation (at least two classes of targets on each support) the shooter must identify the target before shooting.

Referring to FIG. 4, a schematic representation of one of the control circuits utilized with the target is shown. Each target can be operated manually, as will be first explained, or can also be controlled by a programmer which would permit an operator to select the sequence of an individual operation of the targets, such as with a drum programmer, or similar programmer that merely will close circuits to actuate devices in a particular sequence.

In FIG. 4 there is shown a switch member 36, which has a center or off position, which is connected to a direct current voltage source 35, such as a portable 12 volt battery. The switch 36, in its centered position does not directly energize any of the circuit. Thus, power to the motor 20, which is also shown schematically, is determined by the position of the individual micro switches 28A, 28B or 28C.

The micro switches are normally closed micro switches, and if for example the switches are positioned as shown in solid lines in FIG. 4 the target would be in the edge nonfiring position as shown by target 11C. The micro switch 28B would be actuated and opened by cam 31B and there thus would be no power to the motor 20. The relay contacts would be in their positions as shown with normally closed contacts represented by the parallel lines with a cross line in the circuit diagram.

The switch 36 could be moved to its dotted line position as shown in FIG. 4, and this would complete a circuit from the power source to a line 37 that would energize a relay coil 38, and also energize a relay coil 39. This relay coil 39 opens a set of normally closed contacts 39A to open the contacts in series with the micro switch 28B. The energizing of the relay coil 38 opens a set of normally closed contacts 38A, and also opens another set of normally closed contacts 38B in the motor circuit, and the coil 38 closes a set of normally open contacts 38C also in the motor circuit to energize the motor in a selected direction of rotation. Switch 28C is closed because the target is in its edge position and the cam 31C is not contacting its associated switch 28C, so power will then be supplied from the power source 35 along a line 40, through the contacts 38C, to the motor 20. The motor is also connected through normally closed contacts 42B to ground to complete the circuit. This will rotate the motor in a counterclockwise direction as shown in FIG. 3, and as indicated by the arrow 43, until the cam member 31C contacts the roller 29C for the switch 28C, and opens the micro switch 28C.

Opening switch 28C will break the circuit to relay coil 38, which is grounded through the switch 28C thereby returning the contacts 38A, 38B and 38C to their normal positions. The opening of contacts 38C will break the power circuit to the motor 20 stopping the motor in a first firing position with the target rotated so that the face of the target for friend is facing the shooter as shown. The manual switch 36 can be held closed all during this time (it can be a three posi-

tion snap switch with a center off), and it should be noted that the target motor will be stopped in the proper position even if the switch 36 is closed. The coil 39 will be energized all the time the switch 36 is in position to supply power to the line 37. The motor 20 is stopped when the cam 31C opens switch 28C. The speed of movement of the target may be controlled by the motor speed and the gear reduction in the gear box. The target should rotate fairly rapidly, for example about three fourths to one second for rotation from an edge position to a firing position is acceptable.

The switch 36 can then be released when the target has been in the friend position the desired time which is manually controlled by the range officer or instructor.

When the switch 36 is released and permitted to return to its normal position as shown in solid lines in FIG. 4, the coil 39 will be deenergized permitting contacts 39A to close. Because the cam member 31B will have been rotated 90° from the position shown in FIG. 3, and cam 31B will be clear of switch 28B, the switch 28B will be closed completing a circuit from line to a line 44, and then through a diode to a line 45, and through normally closed contacts 38A to a relay coil 42. The switch 28A will be closed (the switch 28C is open) and this will complete a circuit to ground to energize the relay coil 42, opening the contacts 42A, closing the contacts 42C and opening the contacts 42B. The closing of the contacts 42C with contacts 42B open will reverse the direction of the motor 20, because the circuit will be completed from the line 40 through the contacts 42C, and contacts 38B which are now closed, to ground. The motor will rotate the coupling 23 and target and as soon as the target reaches its edge position with the cam 31B contacting the switch roller 29B the switch 28B will be opened breaking the circuit again to the motor 20 and stopping the target in its edge nonfiring position. This will also then deenergize the coil 42 and return the contacts to their normal positions.

The direction of rotation of motor 20 is reversed when the switch 36 is moved to position to supply power from the power source 35 to line 45. When this is done, with the switch 36 energizing line 45 being held manually in position, the coil 42 will be energized through switch 28A, opening contacts 42A and 42B, and closing contacts 42C. Because switch 28B will be opened, the motor will be energized to rotate the cams in opposite direction from arrow 43, through the contacts 42C. The motor 20 will rotate until the cam 31A opens the switch 28A. Coil 39 is also energized opening contacts 39A.

Then as long as the switch 36 is held energizing line 45 the target will remain in its second firing position or, as shown, its foe position. When the switch 36 is again released and returned to its normal position, the target turner motor 20 will be energized in opposite direction, power will be carried by switch 28B and contacts 39A to energize the coil 38, through the switch 28C which will now be closed again, opening the contacts 38A and 38B, and closing the contacts 38C to drive the motor in direction as indicated by arrow 43 until the motor returns the target to its edge nonfiring position. It should be noted that diodes are provided to prevent the coil 39 from being energized while power is being supplied along the line 44 to the respective coils 42 and 38 through the normally closed switch 28B.

When the cam 31B returns to its position as shown in FIG. 3 and opens the switch 28B, the motor 20 will be stopped, and the target will be returned to its edge position.

The switch 36 also could be timer controlled directly so that it would remain in a closed position for a preset time and then automatically go back to a nonfiring position.

Schematically shown is a sequence programmer 50 that can be used in connection with each of the individual targets. The sequence programmer could be a programmer that would be used for selecting the sequence of operation of the targets to a firing position. The programmer could control a timer 51 of usual design, which would energize a manually selectable mode control relay or switch 52 so that the friend or foe mode could be selected for a target. The mode control could be merely a relay with a reversing switch for selection of the foe in one position and the friend in the other position. An actuator 53 then can be used to control switch 36 to its desired position supplying power either to line 45 or to line 37. The mode control will hold the switch 36 in its desired position for the desired length of time as controlled by the timer. If desired the mode control can be a cycling mode control that could be set so that it would alternate between friend and foe positions, or go to the friend position for two times in a row and then to the foe position. In addition, suitable time delays can be built in to increase the element of surprise. The mode control also could control separate relay switches between the power source and line 37 or 45 in accordance with the mode selected.

The programmer is shown only schematically because it can be adapted to fit existing conditions as desired. The units can be controlled by logic circuits or many different types of programmers. While a DC motor is shown, a reversible AC motor also can be used. An electric brake can be incorporated into the controls for the AC motor if desired.

Suitable target cover sleeves or envelopes 56 can be used over the target supports 26. The sleeves include first and second sheets of material 57 and 58, respectively, which are joined together along a seam or junction 59 around the periphery thereof but with an open bottom side indicated at 60 to permit the sleeves to be slipped over a target support 26 as shown with target 11C in FIG. 1. These sleeves can be made of a thermo plastic material that is heat sealed along its edges to form the envelope, or could be made out of two sheets of paper joined along the edges if desired. The outer surfaces of the sheets 57 and 58 could then carry graphic indicia representing a friend or a foe, or other suitable graphic display, and usually the sleeves would have a friend on one side and a foe on the other. Thus indicia of two different classes of target are on the exposed faces of the sleeves, while the words friend and foe are written for illustrative purposes, it is to be understood that a figure will normally be represented to provide the indicia. An added benefit is that the sleeves can be reversed between applications so that for example if the target 11C, when it is rotated 90° to the right from its edge position normally showed the foe as shown, the sleeve could be changed so that the friend would be on that side to further prevent any learning by the shooter or trainee that when a particular target rotated in a particular direction a friend would always appear.

The sleeves are easily manufactured, and reduce the cost of operation by providing quick interchange of the target sleeves without replacing the entire target support. The sleeves further can be imprinted with any desired indication of two different types of targets on the surfaces thereof thus insuring that the low cost target of the desired configuration can be used.

It should be noted that scoring on the target can be done in a known manner with electrical scoring devices that would be energized in accordance with whether a friend or a foe was presented, and the scoring does not form a part of the invention.

It should also be noted that the frame 17 has suitable means for supporting the relays and motor controls illustrated generally at 62 thereon so each set of controls may be separate for each of the target members to greatly increase the portability or utility of the unit.

The controls may be modular also to permit adding on timers, programmers and additional targets.

What is claimed is:

1. An apparatus for supporting and rotating targets from a nonfiring position selectively to two separate firing positions comprising a base independently supportable in a desired location, substantially planar target having at least two oppositely facing surfaces, each surface carrying target indicia different from the other, means to rotatably mount said target on said base, and means mounted on said base and being remotely controllable to rotate said target selectively from a center nonfiring position in a first direction to a first position wherein the first of said two surfaces of said target is in a first firing position and to rotate said target from said center nonfiring position in a second direction to a second different position wherein the other of said two surfaces of said target is in a second firing position, said last mentioned means being independent of any other target and when operated not affecting the position of any other target.

2. The combination as specified in claim 1 wherein said means to rotate said target comprises power actuated means, and control means to selectively operate said power actuated means.

3. The combination as specified in claim 2 wherein said power actuated means comprises a motor member, said motor member having an output shaft rotatable about a substantially upright axis, and said means to mount said target being directly connected to said output shaft and rotatable about said upright axis.

4. The combination as specified in claim 3 and control means including means to selectively operate said motor member in opposite directions of rotation.

5. The combination as specified in claim 4 and programming means including means to time the operation of said motor means when the motor member has moved said target to either of its first and second positions.

6. The combination as specified in claim 5 wherein there are a plurality of individual target supports, and a sequence programmer to selectively operate said target supports in a desired sequence.

7. The combination as specified in claim 1 wherein said targets comprise a main member substantially wider than it is thick to form a narrow edge, said nonfiring position comprising a position with the edge of said target generally facing in a selected direction.

8. The combination as specified in claim 7 wherein

said main member comprises a target support, and a target cover member comprising a sleeve having two sheets of material joined along at least portions of a target outline to provide two outwardly facing surfaces on opposite sides of said sleeve, said sleeve being of size to fit over said target support and having suitable indicia on each of said outwardly facing surfaces to indicate two different types of targets on said outwardly facing surfaces.

9. A target support device for a shooting range comprising a base supportable individually on a surface, a substantially flat target holder of sufficient size to define opposed target areas rotatably mounted on said base about a substantially upright axis when supported in a normal position, said target holder having a narrow edge and being adapted to support a target member having different classes of target surfaces on oppositely facing sides thereof and a narrow edge between said target surfaces, which align with the narrow edge of said target holder, motor means to rotate said target holder about said upright axis, control means for said motor means, said control means including means to rotate said motor means from a normal centered position with the narrow edge of said target holder directed toward a shooter position selectively in each of two opposite directions of rotation from said centered position to two separate positions wherein the opposed target areas of said target holder are selectively displayed as two separate firing positions with different target surfaces carried by said target holder exposed to a desired line of sight in each of said separate positions.

10. The combination as specified in claim 9 wherein said control means comprises switch means actuable to energize said motor means to rotate to a preselected position, cam means driven by said motor means, means actuable by said cam means to disable said motor means when said target holder reaches a preselected position in each of the directions of rotation from its normal position regardless of the position of said switch means.

11. The combination as specified in claim 10 wherein said motor means is an electric motor, and said switch means having a normal position, and said control means for said electric motor means being operable to return said motor means to its normal centered position whenever said switch means is moved to its normal position.

12. The method of operating a target system for training shooters, comprising the steps of providing a plurality of targets, each individually rotatable between a nonfiring position and at least two opposed firing positions, providing two different indicia representing friend and foe, respectively, on each of said targets with a different one of said indicia only visible in each of said opposed firing positions, and selectively moving one or more targets from a nonfiring position to a selected one of the firing positions of the respective target in a manner so that the selection of indicia is unknown to the shooter until the target indicia is visible to the shooter.

13. The method of claim 12 including the further step of individually selecting each of the targets to be rotated, and selecting which indicia should be exposed to a shooter using the target.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,914,879

DATED : October 28, 1975

INVENTOR(S) : Edwin J. Taylor, III et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 22 "from line" should be--from line 40--.
Column 7, line 24, (Claim 1, line 4) before substantially
insert --a--. Column 8, line 24, (Claim 9, line 15)
'directes" should be--directed--.

Signed and Sealed this

tenth Day of February 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks