Oct. 8, 1968 O. J. DUNDR 3,404,887

BULLET TRAP WITH UPWARDLY INCLINED IMPACT PLATES

Filed Oct. 24, 1965 2 Sheets-Sheet 1

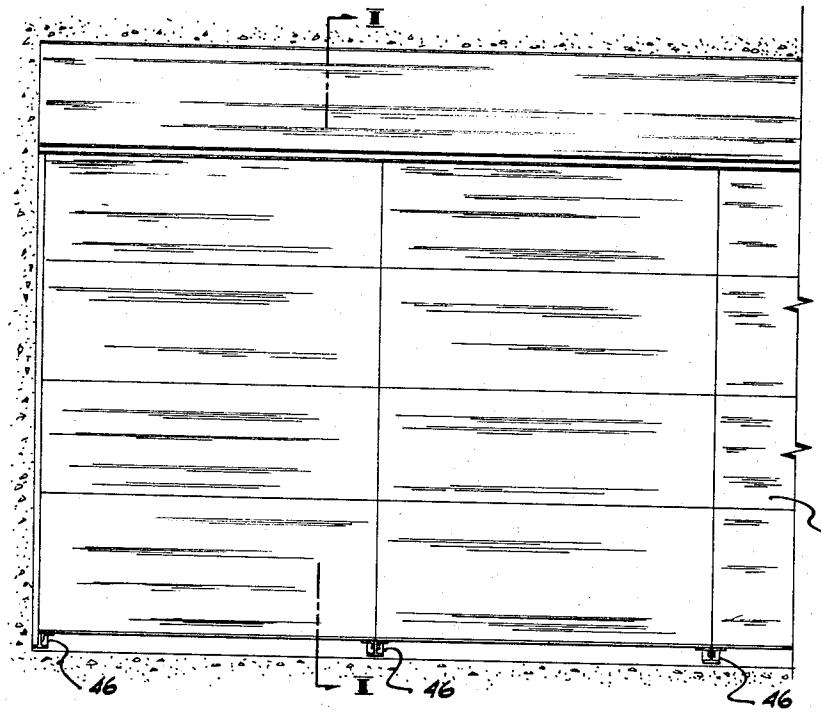


Fig. 1

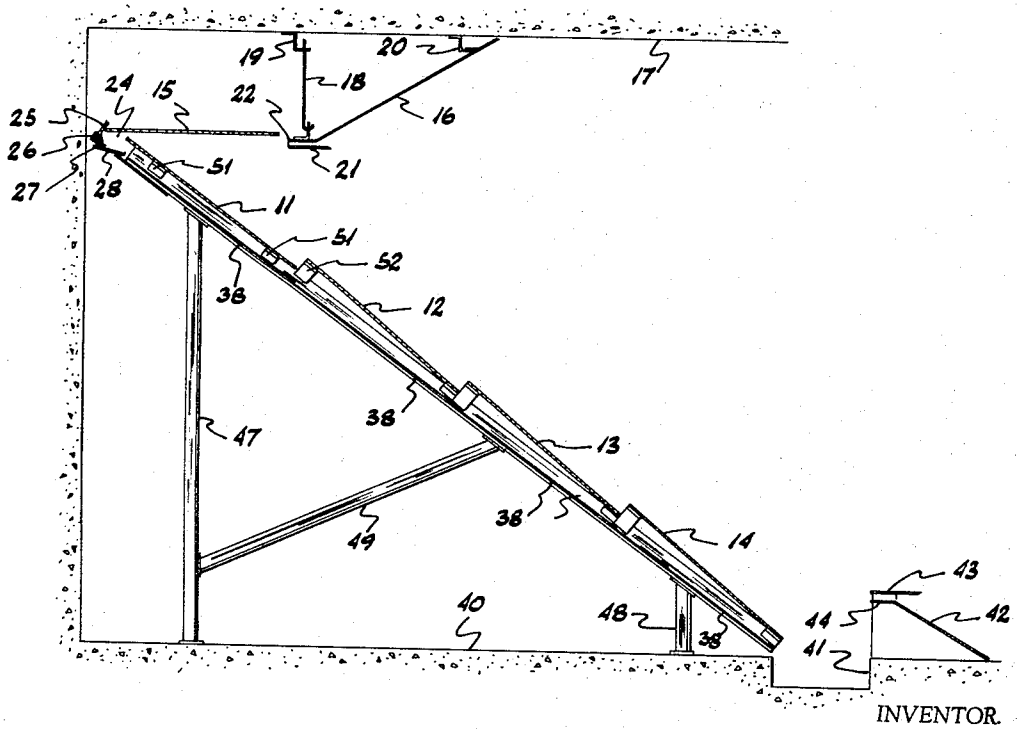


Fig. 2

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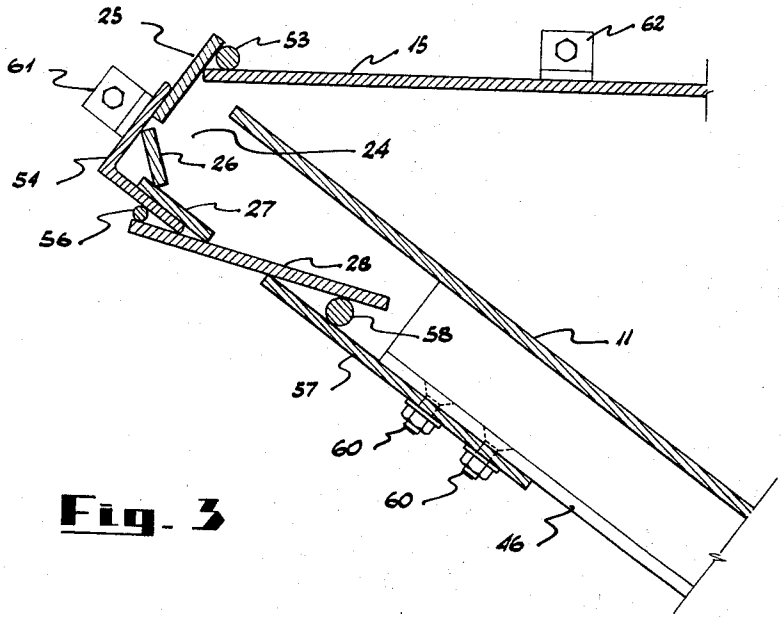


Fig. 3

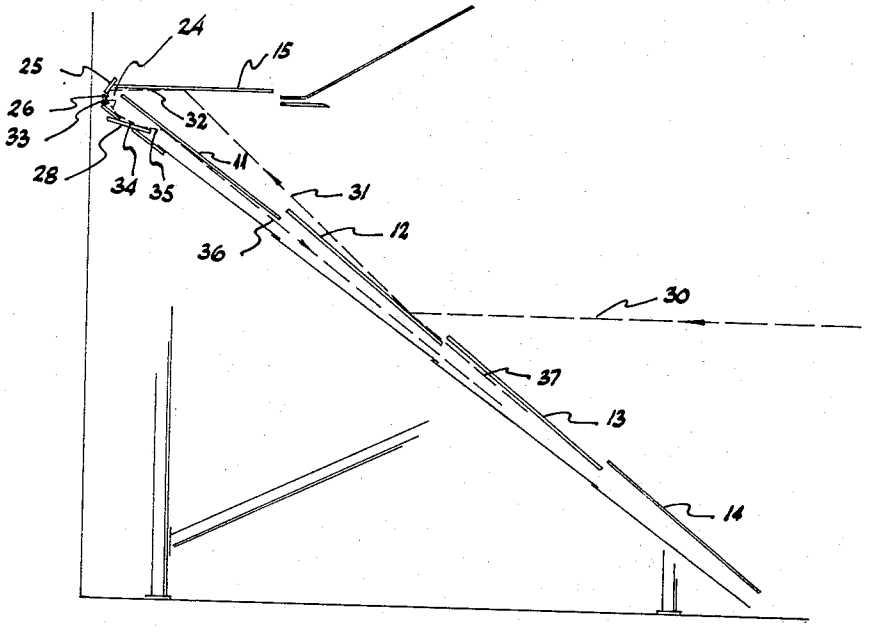


Fig. 4

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BULLET TRAP WITH UPWARDLY INCLINED IMPACT PLATES

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ABSTRACT OF THE DISCLOSURE

A bullet trap having an upwardly inclined impact surface and a collecting trap at the top of the impact surface. Spent bullets return to a point adjacent the front end of the trap. Horizontal plates reduce splatter of bullet fragments.

An object of this invention is to provide bullet traps which will prevent the ricochets of bullets or bullet fragments forwardly out of the trap.

Another object of this invention is to provide bullet traps in which the collection and retrieval of bullets and bullet fragments is simple and clean.

A further object of this invention is to provide bullet traps which are easy and inexpensive to manufacture and install.

Bullet traps of prior designs have included one or more impact plates which are forwardly and upwardly inclined at an angle on the order of 45° to deflect bullets and bullet fragments downwardly. It has been found that a disadvantage of such traps is that as the shooter assumes a lower firing position, such as a prone or crouch position, the angle of incidence between the line of fire and the impact plates increases in a manner such as to increase the chance of a bullet or bullet fragments ricocheting forwardly and out of the trap. The combination of short distances between the shooter and the impact plates, and low shooting positions occurs frequently in indoor shooting ranges used for training military or police personnel or others.

Bullet traps of prior designs have also included bullet de-energizer chambers in which a swirling action is imparted to bullets or bullet fragments. In such swirl chambers, impacts between bullets or bullet fragments swirling in the chamber and bullets or fragments entering the chamber occur, to cause fragments to be expelled outwardly and forwardly from the trap toward the shooter.

According to an important feature of the invention, main plate means are provided such that all surface points thereof in position to be impinged by bullets are rearwardly and upwardly inclined at an angle on the order of 40° relative to a supporting surface, to cause bullets and bullet fragments to travel upwardly and rearwardly therealong. An important advantage of this arrangement is that as the shooter assumes a crouch or prone position, the angle of incidence between the path of a bullet entering the trap and the surface of the main plate means is reduced, to thereby cause bullets and bullet fragments to more closely follow the surface of the main plate means, substantially obviating the possibility of ricochet of bullets or fragments forwardly out of the trap.

This arrangement has the further advantage that the bullets and bullet fragments initially travel upwardly after which they may travel downwardly to ultimately enter a collection area, the effect being to obtain a longer path for de-energization of the bullets, without however requiring a swirl chamber such as used in some prior art traps.

The main plate means could consist of a single large plate inclined rearwardly and upwardly, but preferably, to facilitate shipment and assembly, the main plate means comprises a plurality of plates each inclined rearwardly and upwardly. In one embodiment of the invention, the plates are arranged with a lower edge of all except a lowermost plate being behind and slightly below an upper edge of a next lower plate to catch backsplatter. In another embodiment, the plates are disposed one above another with the lower edge of all except the lowermost plate being in front of and below the upper edge of the next lower plate.

Further important features of the invention reside in the provision of deflecting plate means extending forwardly from a point adjacent the upper end of the main plate means and preferably extending angularly upwardly, and to the provision of a relatively small horizontal plate underlying the rearward end of the deflector plate means for directing the bullets rearwardly. The provision of the small horizontal plate is quite important in that otherwise bullet fragments traveling along the deflecting plate means can enter into the path of bullets traveling along the main plate means, to cause impacts which can result in expulsion of fragments forwardly out of the trap toward the shooter.

Another feature of the invention is in the provision of collection means adjacent the lower end of the main plate means. The collection means may comprise a transversely extending pit in a supporting surface. In addition, or in the alternative, the collection means may comprise an additional plate extending rearwardly and upwardly from a point spaced forwardly from the lower end of the main plate means, a small horizontal plate being preferably disposed in overlying relation to the upper edge of the additional plate for directing bullets rearwardly.

Further important features of the invention relate to the provision of a de-energizer chamber adjacent the upper end of the main plate means to receive bullets therefrom and to direct the bullets and bullet fragments downwardly without, however, creating a swirling action.

Still another feature of the invention is in the provision of means for directing bullets and bullet fragments from the de-energizer chamber to collection means.

These and other important objects, features and advantages will become more fully apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate a preferred embodiment and in which:

FIGURE 1 is a front elevational view of one preferred form of bullet trap constructed in accordance with the principles of this invention;

FIGURE 2 is a sectional view taken substantially along line II—II of FIGURE 1;

FIGURE 3 is a sectional view corresponding to an upper portion of the sectional view of FIGURE 2, but on an enlarged scale, to illustrate parts in better detail; and

FIGURE 4 is a view diagrammatically illustrating the path of deflection of a typical bullet entering the trap of FIGURES 1–3.

Reference numeral **10** generally designates a bullet trap constructed according to the principles of this invention and designed for use in indoor or outdoor practice ranges, to receive bullets fired toward a target which may be placed in front of the trap. It will be understood that the term "bullet" is used herein in a generic sense to include any form of projectile which may be fired toward a target.

The illustrated trap **10** is arranged in sections in side-by-side relation, with each section comprising a main plate assembly including four plates **11**, **12**, **13** and **14**, each inclined upwardly and rearwardly, away from the shooting position, at an angle on the order of 40°. The plates are so supported that the lower edges of plates **11**, **12** and **13** are slightly below the upper edges of plates **12**, **13** and **14** respectively.

A feature of the trap **10** is in the provision of deflecting plate means extending forwardly from the upper end

of the main plate assembly, including a plate **15** disposed generally horizontally, and a fairing plate **16** extending forwardly and upwardly from the forward end of plate **15** to a ceiling **17**, fairing plate **16** being supported from the ceiling **17** by means including a hanger rod **18** and brackets **19** and **20**. An important feature is in the provision of a small horizontal plate **21** underlying the lower, forward edge of the fairing plate **16**. Bullets impinged on the fairing plate **16** produced fragments which travel along the under surface of the plate **16** to impinge on the plate **21** and to be directed rearwardly along the lower surface of the plate **15**. Preferably, a horizontal plate **22** may be disposed in spaced relation above the plate **21**, between the forward edge of the plate **15** and the rearward edge of the plate **16**.

Another important feature of the invention is in the provision of a de-energizing chamber generally designated by reference numeral **24** and disposed adjacent the upper end of the main plate assembly. The de-energizer chamber **24** is defined in part by the lower surface of the rearward end portion of the plate **15**, the rearward edge of the plate **15** being disposed behind the plane of the upper main plate **11**.

The de-energizer chamber **24** is further defined by a plate **25** inclined rearwardly and downwardly from an upper edge spaced upwardly from the rearward edge of the deflecting plate **15** to a lower edge spaced behind and below the upper edge of the upper main plate **11**, a plate **26** extending downwardly, and slightly forwardly, from an upper edge spaced behind the plane of the plate **25** to a lower edge spaced forwardly from the plane of the plate **25**, a plate **26** extending downwardly and forwardly from an upper edge behind the plane of the plate **26** to a lower edge spaced forwardly from the plane of the plate **26**, and finally a plate **28** extending forwardly from a rearward edge behind the plane of the plate **27** to a forward edge spaced forwardly from the plane of the plate **27**.

In operation, bullets impinged on any of the plates **11–14** of the main plate assembly are either deflected without fragmentation, or produce fragments, which travel upwardly generally parallel to the plates **11–14** to impinge on the plate **15**. In some cases, fragments may impinge on the plate **16** to be deflected therealong toward the plate **21** and to thence be deflected to move rearwardly along the underside of the plate **15**. In any event, as bullets are fired toward the trap, they are deflected, or produce fragments which are deflected, to ultimately impinge on the plate **15** and to thence be deflected to move therealong toward the plate **25**. Bullets, or fragments, impinging on the plate **25** are thence deflected to the plate **26**, thence to the plate **27**, and thence to the plate **28** to travel along the underside of the plate **11**.

Thus, as shown diagrammatcially in FIGURE 4, a bullet fired along line **30** to impinge on the plate **12** may produce fragments including a fragment traveling along dotted line **31** to impinge on the plate **15**. That fragment may in turn produce another fragment which travels along line **32** to impinge on plate **25** to be deflected along line **33** and impinge on the plate **26**, to thence be deflected along line **34** to impinge on the plate **28**, and to thence be deflected along line **35** to impinge on the underside of the plate **11**, and finally to be deflected from the plate **11** to move along the line **36**.

It may be noted that a bullet fired along line **30** and impinged on the plate **12** may produce fragments traveling downwardly and forwardly along the surface of the plate **12**, along dotted line **37** as diagrammatically illustrated. Such fragments will move between the upper edge of the plate **13** and the lower edge of the plate **12**, to move behind the plate **13**.

It is also noted that the de-energizer chamber operates to reverse the direction of movement of the fragments, but does not produce a swirling action, which might produce collisions in the entrance of the chamber, and which might produce expulsion of fragments back toward the shooter.

Another feature of the invention is in the provision of guide means for directing bullets or bullet fragments from the de-energizer chamber **24** behind the main plate assembly to a collection means at the lower end of the main plate assembly. In the illustrated trap **10**, the guide means is in the form of a chute, which is defined by a plate **38** in spaced relation behind the plates **11–14**.

To define the collection means, a supporting floor **40** for the trap may be formed with a transversely extending collection chamber or pit **41** below the lower end of the plate **38**, and the lower end of the plate **14**. In the alternative, or in addition, a plate **42** may be provided inclined upwardly and rearwardly from a point on the floor **40** in front of the lower end of the main plate assembly, through a distance sufficient to allow accumulation of bullets on the floor **40**, without using the pit **41**, or to allow overflow of the pit **41** if used. A generally horizontal plate **43** is disposed in spaced relation above the upper edge of the plate **42** to deflect bullets rearwardly, a plate **44** being preferably disposed in spaced relation below the plate **43**, and extending rearwardly from the upper edge of the plate **42**.

To support the main plates **11–14**, a series of beams **46** of inverted T-shaped cross section are provided each beam supported by means of vertical posts **47** and **48**, with a strut **49** extending between a lower point of the post **47** and an intermediate point of the beam **46**. The plates **11–14** are supported from the beams **46** by means of suitable angle brackets **51** and **52** which may be welded to the plates **11–14**, and bolted or otherwise secured to the beams **46**. The plate **38**, is preferably formed in a plurality of sections and is secured against the sidewardly extending leg portions of the beams **46**.

In fabrication of the plates forming the de-energizer chamber **24**, the plate **27** may be welded to one leg of an angle beam member **54**, after which the plate **26** may be welded in position between the plate **27** and the other leg of the angle beam **54**. The plate **25** may then be welded to a leg of the angle beam member **54**. Then the plate **25** may be welded to the plate **15**, preferably with a pipe or rod being disposed in a V between the plates **15** and **25**, and welded in position to provide a reinforced joint. The plate **28** is then welded to plate **27** and the angle beam **54**, preferably with another rod or pipe **56** being provided to reinforce the joint. A plate **57** is welded to the plate **28**, preferably with another rod or pipe **58** provided for reinforcement. Plate **57** is secured by bolts **60** to the beams **46**. For additional support, a bracket **61** may be welded to the angle beam **54**, for connection to a bracket support from the ceiling, or from a rear wall. Another bracket **62** may be welded to the plate **15**, for support from the ceiling.

It will be understood that modifications and variations may be effected without departing from the spirit and scope of the novel concepts of this invention.

I claim as my invention:

1. In a bullet trap for a practice range wherein bullets are fired over a generally horizontal supporting surface toward a target from a gun held in positions ranging from a prone position close to the supporting surface to a shoulder-height position, main plate means positionable behind the target having the lower end adjacent the supporting surface and an upper end at least as high as said shoulder-height position with all surface portions of said main plate means in position to be impinged by bullets fired from said positions being rearwardly and upwardly inclined at an angle on the order of 40 degrees relative to the supporting surface, deflector plate means substantially in a horizontal plane having a rearward edge portion spaced a short distance above and behind said upper end of said main plate means, said deflector plate means extending forwardly a substantial distance with respect to said upper end of said main plate means, and means

including said rearward edge portion of said deflector plate means for defining a de-energizer chamber to receive bullets and bullet fragments and to direct the same downwardly behind said main plate means.

2. In a bullet trap as defined in claim 1, a fairing plate positioned forwardly from said deflector plate means having a rearward edge at least as low as said horizontal plane and extending angularly upwardly and forwardly, and a relatively small horizontal plate spaced a short distance below said rearward edge of said fairing plate and extending forwardly therefrom.

3. In a bullet trap as defined in claim 1, said main plate means comprising a plurality of plates each inclined rearwardly and upwardly at said angle on the order of 40 degrees and arranged with the lower edge of all except the lowermost plate being behind and slightly below an upper edge of a next lower plate.

4. In a bullet trap as defined in claim 1, said de-energizer chamber means including a first transverse plate inclined rearwardly and downwardly from an upper edge spaced upwardly from the rearward edge of said deflector plate means to a lower edge spaced behind and below said upper end of said main plate means.

5. In a bullet trap as defined in claim 4, said de-energizer chamber means further including a second transverse plate extending downwardly and forwardly from an upper edge spaced behind the plane of said first transverse plate to a lower edge spaced forwardly from said plane.

6. In a bullet trap as defined in claim 5, said de-energizer chamber means further including a third transverse plate extending downwardly and forwardly from an upper edge spaced behind the plane of said second transverse plate to a lower edge spaced forwardly from said plane of said second transverse plate.

7. In a bullet trap as defined in claim 6, said de-energizer chamber means further including a fourth transverse plate extending forwardly from a rearward edge behind the plane of said third transverse plate to a forward edge spaced forwardly from said plane of said third transverse plate and spaced downwardly from said upper end of said main plate means, and a chute behind said main plate means for receiving bullets from said fourth transverse plate.

8. In a bullet trap for a practice range wherein bullets are fired over a generally horizontal supporting surface toward a target from a gun held in positions ranging from a prone position close to the supporting surface to a shoulder-height position, main plate means positional behind the target having a lower end adjacent the supporting surface and an upper end at least as high as said shoulder-height position with all surface points of said main plate means in position to be impinged by bullets fired from said positions being rearwardly and upwardly inclined at an angle on the order of 40 degrees relative to the supporting surface, collection means adjacent said lower end

of said main plate means for collection of bullets therefrom, receiving means adjacent said upper end of said main plate means for receiving bullets therefrom, and guide means behind said main plate means for guiding said bullets from said receiving means to said collection means.

9. In a bullet trap as defined in claim 8, said main plate means comprising a plurality of plates each inclined rearwardly and upwardly at said angle on the order of 40 degrees and arranged with a lower edge of all except a lowermost plate being behind and slightly below an upper edge of a next lower plate, and said guide means comprising a plate in spaced generally parallel relation behind said plurality of plates.

10. In a bullet trap as defined in claim 8, deflecting plate means extending generally horizontally and forwardly from a point adjacent said upper end of said main plate means, and de-energizer chamber means including a first transverse plate inclined rearwardly and downwardly from an upper edge spaced upwardly from the rearward edge of said deflecting plate means to a lower edge spaced behind and below said upper end of said main plate means.

11. In a bullet trap as defined in claim 10, said de-energizer chamber means further including a second transverse plate extending downwardly and forwardly from an upper edge spaced behind the plane of said first transverse plate to a lower edge spaced forwardly from said plane.

12. In a bullet trap as defined in claim 11, said de-energizer chamber means further including a third transverse plate extending downwardly and forwardly from an upper edge behind the plane of said second transverse plate to a lower edge spaced forwardly from said plane of said second transverse plate.

13. In a bullet trap as defined in claim 12, said de-energizer chamber means further including a fourth transverse plate extending forwardly from a rearward edge behind the plane of said third transverse plate to a forward edge spaced forwardly from said plane of said third transverse plate and spaced downwardly from said upper end of said main plate means, and a chute behind said main plate means for receiving bullets from said fourth transverse plate.

References Cited

UNITED STATES PATENTS

1,992,001	2/1935	Caswell	273—102.4
2,772,092	11/1956	Nikoden	273—102.4

FOREIGN PATENTS

10,992	1906	Great Britain.
9,223	6/1900	Norway.

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