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Pencyla

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[54] SHOOTING RANGE BULLET TRAP STRUCTURE

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[51] **Int. Cl.**.....**F41j 1/20**

[58] **Field of Search**.....273/102.4; 73/167

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Primary Examiner—Richard C. Pinkham

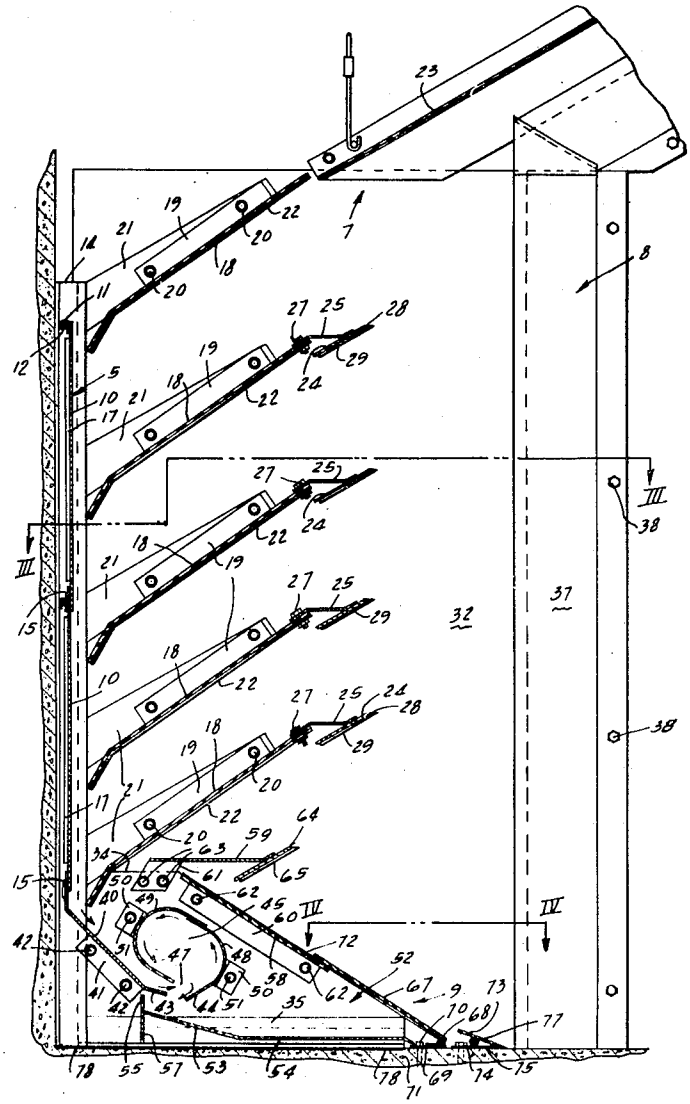
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[57] **ABSTRACT**

Freedom from exposed partition edges is attained by means of concealed cantilever supporting bracket arm structure on one or more vertical bars behind and in supporting relation to downwardly and rearwardly oblique deflector plates located forwardly from back plate means with which a downward bullet chute is provided to a spent bullet chamber defined behind upwardly and rearwardly sloping bottom plates. A bullet deenergizing device within the upper rear portion of the spent bullet chamber receives bullets deflected into a downward opening from which the spent bullets drop into the chamber. Great flexibility for multi-section installations is afforded, with unusually ample tolerance allowances for dimensional variations in the available space for the installation, and assured assembly stability.

28 Claims, 4 Drawing Figures



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SHEET 1 OF 2

Fig. 2

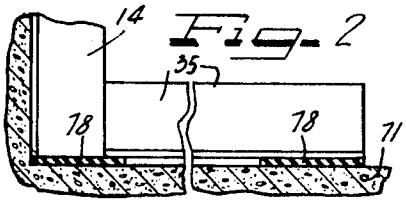


Fig. 1

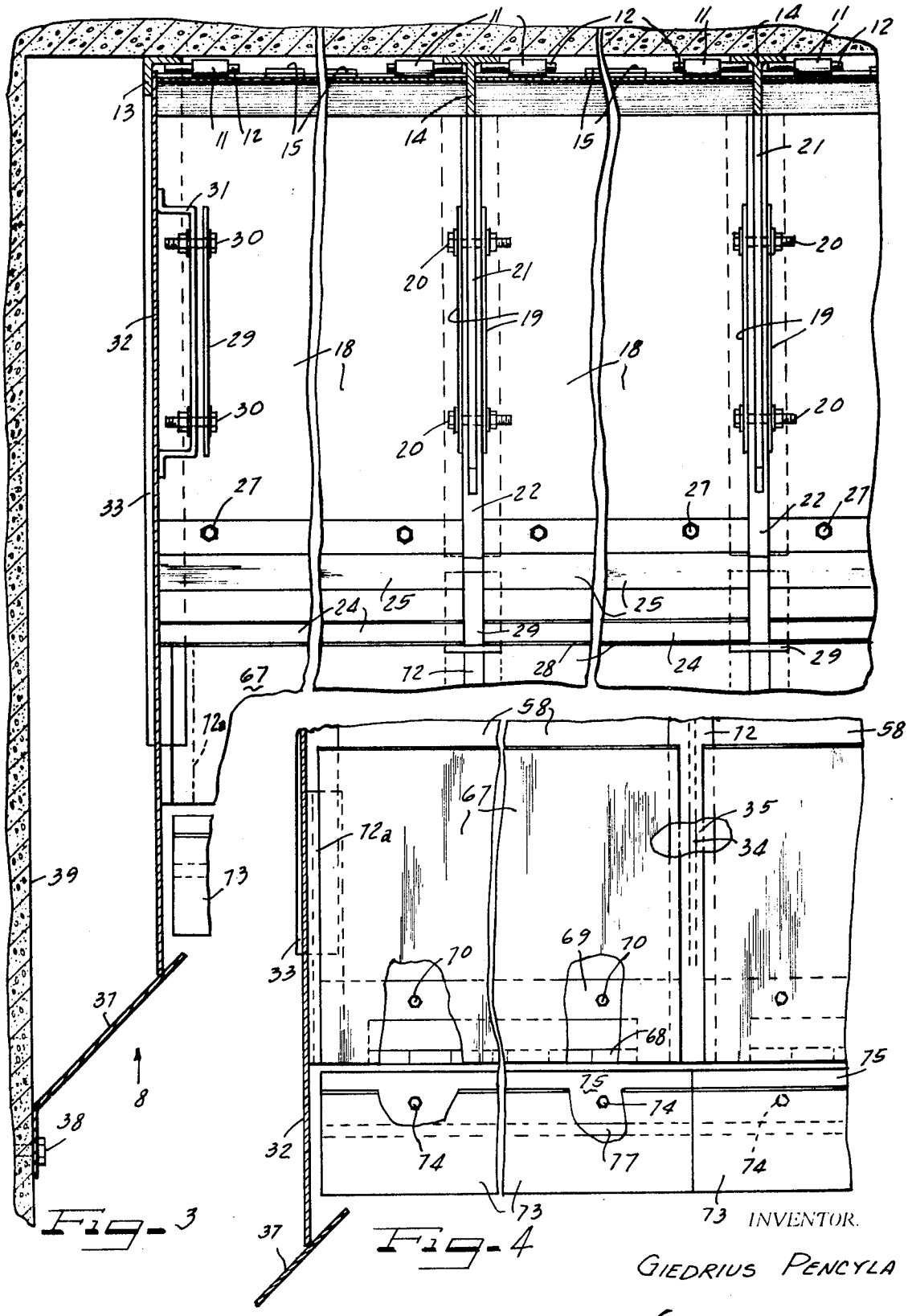


Fig-3

Fig-4

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SHOOTING RANGE BULLET TRAP STRUCTURE

This invention relates to bullet traps and is more particularly concerned with traps of the kind that are adapted to be multi-sectional for indoor pistol and rifle range purposes.

Prior arrangements of bullet traps have been proposed in which there has generally been the rather serious objection that edges of divider and supporting partitions have been exposed to the liability of being hit by bullets inexpertly or inadvertently fired thereagainst, with consequent shattering and possibly dangerous spattering of bullet particles. Such partitions also complicate the deflectional control of bullets at the joints between deflector plates and the partitions. Prior arrangements have also lacked flexibility in construction of multi-section assemblies for diverse locations and requirements and have often required rather precise prefabrication for particular installations. There has also been undue structural complexity and lack of efficiency in various features of prior bullet trap assemblies, and more particularly in the bullet spending structures thereof.

According to the present invention, the foregoing and other disadvantages, defects, inefficiencies, shortcomings and problems in prior structures are overcome by providing a new and improved shooting range bullet trap structure embodying the principles of the present invention as will be hereinafter more particularly described. An important object of the present invention is to provide a novel shooting range bullet trap structure which eliminates exposed partitions between adjacent sections assembled together.

Another object of the invention is to provide new and improved supporting means for deflector plates in a shooting range bullet trap structure.

A further object of the invention is to provide new and improved back plate and supporting structure in a shooting range bullet trap assembly.

Still another object of the invention is to provide new and improved bullet spending or deenergizing means for shooting range bullet traps.

A yet further object of the invention is to provide new and improved spent bullet collecting chamber means for shooting range bullet trap structures.

Other objects, features and advantages of the invention will be readily apparent from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts embodied in the disclosure, and in which:

FIG. 1 is a vertical sectional detail view through a shooting range bullet trap structure in accordance with principles of the present invention;

FIG. 2 is a fragmental enlarged detail view showing a feature of the base portion of the structure;

FIG. 3 is a fragmental sectional plan view taken substantially along the line III—III of FIG. 1; and

FIG. 4 is a fragmental sectional plan view taken substantially along the line IV—IV of FIG. 1.

On reference to FIGS. 1 and 3, a shooting range bullet trap structure pursuant to and embodying features of the present invention comprises an arrangement of bullet-impact resistant steel plates constructed and arranged for ready set-up from a knock-down condition without requiring welding at the assembly site but enabling the various components to be bolted together. To this end, the structure comprises an assembly including back plate means **5** and top plate means **7**, opposite side plate means **8** and bottom plate means **9** providing surfaces for deflecting bullets rearwardly toward the back plate means.

In a practical, easily assembled construction, the back plate means **5** comprise one or more generally vertically disposed plate panels **10** and means for detachably hanging the panels in place and against swinging under bullet impact. As will become clear, direct bullet impact is not to be expected but only deflected bullet impact which though of sufficient consequence to require an impenetrable back plate surface nevertheless enables the panels **10** to be constructed from lighter gauge and less costly steel plate material than those surfaces of the assembly which are designed to receive direct bullet impact. For example, while the panels **10** may be constructed from ten gauge hot rolled steel, those surfaces which are designed to receive direct impact of fired bullets may be constructed from quarter inch high alloy steel. Each of the panels **10** has hanger means on the back upper margin thereof comprising downwardly opening hook-shaped rigidly attached hangers **11** respectively located adjacent to the vertical edges of the panel. Supportingly receptive of the hangers **11** are means comprising respective horizontal pins **12** projecting rigidly laterally from vertical supporting frame means comprising at the sides of the assembly vertical angle frame bars **13** and intermediate the side frame bars vertical parallel T-bars **14**, wherein the T-head flanges of the bars **14** are located in a plane with one another where there is a plurality of the bars **14** and in a plane with a flange of each of the side bars **13**. Attachment of the hanger supporting pins **12** to the respective bar flanges may be in any suitable manner but is desirably by means of welding the pins to the flanges to project in axial alignment cantilever fashion from the supporting bar flange.

For not only preventing swinging of the panels **10** under the velocity of bullet impact, but also to guide bullets deflected against the panels downwardly without any obstruction along the lower edges of the panels, the lower margin of each of the panels **10** is in lapping engagement with the front face of the upper margin of a subjacent panel margin. Further the lower margins of the panels **10** are desirably provided with clip means comprising one or more downwardly directed clips **15** secured as by welding to the back face of the lower margin and receptively engageable with the upper margin of the subjacent panel. For example, the subjacent panel may be another of the panels **10**, depending upon the overall height of the assembly. Sound deadening or damping material such as rubber-like sheets or strips **17** may be applied to the back faces of the panels **10**.

Whether one or more of the vertical frame bars **14** is employed, depending upon the number of sections desired for the particular installation, each such bar has in addition to its back plate supporting function, the function of supporting oblique deflector plates **18** of which there are a suitable number spaced one above the other and inclined in a downwardly and rearward direction to deflect live bullets generally rearwardly and downwardly toward the back plate panel means **5** which cooperates with the deflectors to provide, in effect, a downward chute for the deflected bullets. For this purpose, each of the deflector plates **18** has on its

back face means in the form of a bent up or rigid welded-on side edge attachment flange **19** which is adapted to be secured by means of bolts **20** to a supporting cantilever bracket arm **21** comprising a flat bar disposed in a vertical plane and secured as by butt welding to the forward edge of the intermediate flange of the associated bar **14.** The construction and arrangement are such that the arms **21** are completely concealed from the line of fire into the bullet trap, the upper terminal ends of the arms extending sufficiently short of the upper forward edges of the deflector plates **18** to be out of the line of fire from any angle at the firing position toward the bullet trap. Further, the upper edges of the arms **21** slope downwardly from the front ends of the arms, and the lower edges of the arms extend in the same oblique direction as and are within the same oblique plane as the associated deflector plates **18,** thus enabling complete protective concealment of the lower edges by a respective joint-bIDGING guard strip **22** bridging across the joint between the edges of the coplanar deflector plates **18** attached to the arm. By having the guard plates **22** secured along one margin to one of the associated deflector plates **18,** as by means of welding to the front marginal face, while lappingly engaging the front marginal face along the adjacent side edge of the remaining deflector plate, relatively wide tolerance adjustments are permitted between the deflector plate edges. For example, as shown in FIG. **3,** neither of the attachment flanges **19** need be in abutment with the associated arm **21,** nor do the adjacent edges of the deflector plates **18** have to be in abutment, because the guard strip **22** fully protectively bridges across the joint and throughout the length of the joint, and cooperatively with the deflector plates **18** deflects live bullets downwardly and toward the back plate means **5.** Downward and rearward deflection of the bullets is improved by having the rear marginal portions of the deflector plates **18,** inclusive of the associated end portions of the guard strips **22** angled downwardly and rearwardly at a steeper oblique angle than the major portions of the deflector plate, as shown. It will be observed that the space along the bullet deflection surface provided by the plates **18** and guard strip plates **22** between the side plates is free from any vertical obstruction against which a bullet might hit, and more particularly there is freedom from vertical partition or partitions as has been common heretofore.

The relationship of the upper front edges of the deflector plate panel assemblies to the rear lower edges of the immediately superjacent deflector panel assembly in each instance is so related to the firing points or stations in front of the bullet trap as to assure live bullet interception by the deflector plate and avoidance of direct live bullet impact against the rear panel means **5.** Since this assurance increases as the elevation increases, the vertical spacing between the deflector plate assemblies is also increased, thereby minimizing the total number of vertically spaced deflector panel assemblies required. In the arrangement shown, having five vertically spaced deflector plate assemblies, the distance between the second and third assemblies from the bottom is greater than the distance between the first and second assemblies, while the distance between the third and fourth assemblies is greater than that between the second and third assemblies and the distance between the fourth and fifth assemblies is greater than that between the third and fourth assemblies.

Protection against bullets striking and possibly ricocheting from the front edges of the deflector plates **18** of the uppermost tier or assembly is avoided by the relationship thereto of the top plate means **7** including a downwardly and rearwardly oblique canopy plate structure **23** having its lower rear edge relatively close to and offset downwardly relative to the adjacent upper front edge of the deflector plate structure such that live bullets will be effectively deflected downwardly and rearwardly by either the deflector plate structure or the canopy plate structure when striking anywhere near the gap between these structures.

As to the deflector plates **18** below the topmost of such plates, means to guard against bullets striking the upper edges of the deflector plates comprise edge guard deflectors **24** which are supported in suitably spaced downwardly and rearwardly oblique relation forwardly adjacent to the respective edges of the deflector plates by means of angular supporting bracket flange members **25** secured as by means of welding to the back of the respective deflector **24** in each instance and secured as by means of bolts **27** to the upper margin of the associated deflector plate **18.** In a preferred arrangement, the side-to-side dimensions of the deflectors **24** and the bracket flanges **25** are identical with the associated deflector plate **18** in each instance. Ricochet of bullets from the upper edges of the deflectors **24** is avoided by having those edges sharply chamferred as shown at **28.** Across the joints between the sides of adjacent deflectors **24** are guard strips **29** desirably welded to the margin of one of the adjacent deflectors and lappingly engaging the companion deflector.

Connection of the sides of the deflector plates **18** nearest the side plate means **8** at each side of the assembly connects the frame bars **13** and **14** in a unitary assembly. To this end, each of the sidemost deflector plates **18** carries on its back surface an integrally welded-on vertical front-to-rear attachment flange **29** (FIG. **3**) attached as by means of bolts **30** to a generally U-shaped attachment bracket **31** secured as by means of welding to the inner face of a side panel **32** which has its rear vertical edge portion secured as by means of welding to the contiguous side frame bar **13** and its lower edge portion secured as by means of welding to a forwardly extending angle base bar **33.** Desirably the rear end of the base bar **33** is welded to the lower end portion of the vertical frame bar **13.** Additional stability in the unitary assembly is attained by means of vertical generally triangular bracing panels **34** welded on edge in the angle between the lower end portions of the frame bars **14,** the lowermost arm **21** and forwardly projecting base bar extensions **35** welded at their rear ends to the lower portions of the bars **14.**

To protect the front edges of the side plates **32** from bullet impact, deflector members **37** are provided which may be secured as by means of anchor or expansion bolts **38** to respective side walls **39** of the building containing the shooting range within which the bullet trap is housed.

Bullets and bullet fragments deflected towards and moving downwardly along the back panels **10,** on reaching the bottom margin of the lowest of the back panels **10,** are deflected downwardly and forwardly by means of a bottom deflector flanges structure **40** having an upper marginal edge lapped by the contiguous back panel **10** and engaged by the clips **15** thereof. By preference, there is one of the deflector flanges **40** in

each of the sections of the trap assembly between the side panels **32** and the nearest bracing panel **34** in each instance as well as in each section between the bracing panels **34.** For mounting the deflector flange **40** in each location, it has as its opposite sides respective downwardly extending attachment flanges **41** which are secured as by means of bolts **42** to the respective panels **32** or **34,** as the case may be, thereby contributing to the stability of the trap unit assembly.

Bullets or fragments travelling downwardly and forwardly along the deflector flange **40** with any velocity will be diverted by a lower end less steep shunting flange portion **43** across a drop gap onto an upwardly and forwardly inclined ramp **44** into a bullet spending, dissipating, deenergizing, develocitating chamber **45** wherein the bullets or fragments are confined to move within a restricted area in a generally oval path about a horizontal axis such that centrifugal force will cause the bullets and fragments to hug decelerating surfaces until they drop as virtually dead weights from the chamber **45.** For this purpose, the chamber **45** is defined within a complete enclosure except for a single combination entry and exit opening **47.** The structure for this purpose comprises a pair of complementary cooperating generally U-shaped plate members **48** and **49,** wherein the member **48** has the ramp **44** from which the body of the member **48** extends arcuately to a terminal flange which is in lapping engagement with the inner surface of a terminal flange portion of the member **49** the body of which is generally arcuate and has an opposite terminal flange portion spaced from the lower portion of the deflector flange **40** and the shunting flange **43** to provide a funnel having its opening at one side of the gap **47** and directed toward the ramp flange **44.** By preference, there is one of the chambers **45** in each of the sections of the trap assembly between the side panels **32** and the nearest bracing panel **34** in each instance as well as in each section between the bracing panels **34.** For mounting the members **48** and **49** in each location they have at their respective opposite sides suitable attachment flanges **50** which are adapted to be secured as by means of bolts **51** to the supporting plates **32** or **34,** as the case may be, thereby contributing to the structural stability of the trap assembly.

It will thus be seen, as indicated by directional arrows, that bullets and fragments entering the chamber **45** will ride up the ramp **44** and then spin along the decelerating surfaces provided by the members **48** and **49** in a continuous circuit, jumping across the gap **47** until all momentum incident to firing velocity has been dissipated. Thereupon, the dead weight spent bullets and particles exit through the gap **47** either by dropping straight down or by sliding generally downward and backward along the ramp **44,** and dropping down into a recovery chamber **52** provided behind the bottom plate means **9.** As the spent bullet and particle material drops down from the deenergizing chamber **45,** the material is gravitationally biased forwardly along the descending slope of a ramp **53** extending downwardly and forwardly to a generally horizontal collecting plate **54** in the bottom of the recovery chamber **52.** Desirably the rear end of the ramp **53** is located rearwardly and below the shunting flange **43** and has a vertical backstop flange **55** which prevents particles from escaping rearwardly and which is an upward extension from a downwardly extending supporting flange **57** for the rear end of the collection plate structure.

Not only do the bottom plate means **9** provide the recovery chamber or pit **52** therebehind, but provide a bullet deflecting guard protectively concealing the bullet-decelerating chamber means therebehind. To this end, the plate means **9** comprise a generally upwardly and rearwardly oblique deflecting panel **58** which is in a plane generally intersecting the back face plane of the lowermost of the deflectors **18** located thereabove and with which the upper edge of the panel **58** provides a gap so that live bullets and fragments deflected upwardly and rearwardly will be intercepted and directed rearwardly by an intercepting generally horizontally extending plate member **59** which overlies the panel **58** and has an inner end portion extending rearwardly into the gap beyond the inner end of the panel **58** and disposed in suitably spaced relation to both such edge and the underface of the superjacent deflector **18** to permit relatively free entry of live bullets through the gap toward the downwardly angled inner end portion of the deflector and thence onto the deflector flange **40.** By preference, there is one of the panels **58** and plate **59** in each of the sections of the trap assembly between the side panels **32** and the nearest bracing panel **34** in each instance as well as in each section between the bracing panels **34.** For mounting the members **58** and **59,** in each location, they have at their opposite sides respective downwardly extending attachment flanges **60** and **61** adapted to be secured as by means of bolts **62** and **63,** respectively, to the panels **32** or **34,** as the case may be, and contributing to the sturdy stability of the bullet trap assembly unit.

To avoid live bullet impact against the front edge of the panel **59,** or against the edges of the attachment flanges **61** thereof, a fore or lead deflector panel **64** extending the full width of the panel **59** but relatively short in a front-to-rear direction is secured to the front margin of the panel **59** to extend above and below such margin and is directed at an oblique angle downwardly and rearwardly in a plane generally intersecting the plane of the deflector panel **58.** To bridge across the joint between adjacent ones of the panels **64,** respective bridging strips **65** lappingly engage the adjacent margins of the panels, being welded to one such margin and freely lapping the other such margin.

To enable clean-out of the recovery pit chamber **52,** the deflector panel **58** at its lower front edge is spaced substantially rearwardly and above the receiving plate **54** so that an access opening is provided in the front of the chamber **52.** This access opening is normally closed by a combination swinging door and deflector plate panel **67** which extends in generally the oblique upwardly and rearward plane of the panel **58,** with the upper margin of the panel **67** overlapping the lower margin of the panel **58.** At is lower margin the panel **67** is attached to hinge means such as a piano hinge **68** which is desirably attached to an anchor plate **69** secured as by means of anchoring or expansion bolts **70** to the underlying supporting surface such as a concrete floor **71.** Through this arrangement, each of the recovery pit chambers **52** can be readily cleaned out by swinging the panel **67** open about its hinge for access into the recovery chamber **52.** Bridging across the joint between the deflector panels **58** and the deflector door panels **67** of the adjacent sections, in each instance, is a joint-closing strip **72** which is desirably welded to the

margin of one of the adjacent panels **58** and freely overlaps the margin of the other of the adjacent such panels, and extends in free underlapping relation to the margins of adjacent ones of the deflector door panels **67** whereby the door panels may be individually opened for clean-out as desired. Joint closure between the panels **67** and the side panels **32** is effected by respective ledges **72***a* carried by the panels **32.**

To avoid stray bullet impact against the lower edge of the door panel **67,** a protective deflector guard **73** is desirably mounted adjacent thereto on the floor **71** and comprises a generally upwardly and forwardly oblique panel having its upper edge spaced above and forwardly relative to the door panel lower edge in a manner to extend sufficiently above the line of fire toward the lower door edge for protection purposes but located sufficiently forwardly relative to such door edge as to avoid interference with free opening movement of the door and, in fact, serving as a door stop to hold the open door in a generally upwardly and forwardly inclined convenient position. At its lower edge the plate **73** is desirably chamferred to approach the surface of the floor **71** as cleanly and gap-free as practicable to avoid an edge that might catch a stray live bullet. Attachment of the guard deflector **73** to the floor **71** is effected by suitable means such as anchor or expansion bolts **74** which secure a base plate **75** welded to the forward margin of the plate **73,** with the desired divergent angularity between the plates being maintained by a spacer device such as a piece of rod **77** extending horizontally therebetween and welded thereto. Desirably, the deflector guard **73** is of a width equal to one section of the bullet trap assembly, with as many of the guard deflectors mounted edge-to-edge as there are sections in the assembly.

Vibration damping means are desirably interposed under at least the base structure of the trap assembly. In a desirable form of vibration damping, synthetic or natural rubber pads **78** are located under the vertical frame bars **13** and **14** and the forwardly extending base bars **33** and **34** (FIGS. **1** and **2**).

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

I claim as my invention:

1. A shooting range bullet trap structure, comprising:

back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;

a spent bullet collecting chamber defined behind said bottom plate means;

at least one vertical frame bar located along the back plate means intermediate and spaced from rear portions of the side plate means;

oblique deflector plates extending from the side plate means above said bottom plate means and providing bullet deflection front surfaces slopping toward said back plate means with rear portions of the deflector plates cooperating with said back plate means to define a downward bullet chute to said chamber;

said deflector plates having side edges adjacent to one another at a joint generally aligned with and forwardly from said frame bar;

cantilever supporting bracket arm means on said bar concealed behind and supportingly secured to said deflector plates adjacent to said edges; and

a joint-bridging guard strip plate lapping margins of said front surfaces along the length of said joint;

the space forwardly along said deflector plate surfaces between said side plates thus being free from any vertical obstructions.

2. A structure according to claim **1,** including additional spaced vertical frame bars, said back plate means comprising at least one panel, and means on said spaced frame bars and said panel removably hanging the panel on and between said spaced bars.

3. A structure according to claim **2,** including a plate member located between said spaced frame bars and having an upwardly extending margin lappingly disposed behind a lower margin on said panel, and clip means on said lower margin engaging said upper margin.

4. A structure according to claim **1,** said top plate means comprising a canopy panel sloping downwardly and rearwardly towards and having an edge adjacent to said deflector plate means, said deflector plate means having an upper edge adjacent to and located in upwardly offset relation to said edge of the canopy panel.

5. A structure according to claim **1,** including bullet deenergizing means below said deflector plate means and adjacent to the lower end portion of said back plate means including deenergizing bullet-spin surfaces and providing a chamber having said surfaces continuous about a horizontal axis except for a single entry and discharge gap at the bottom of the chamber, a ramp leading to said gap, and means providing a bullet-directing funnel opening toward said ramp and leading from said lower end portion of the back plate means.

6. A structure according to claim **5,** said bullet deenergizing means comprising plate members of generally U-shape form assembled together to provide a deenergizing chamber and providing said bullet-spin surfaces about a generally horizontal axis, with upper margins of said members in lapping relation and lower margins of said members spaced apart to provide a gap into said chamber with one of said margins providing said ramp.

7. A shooting range bullet trap structure, comprising:

back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back means;

a spent bullet collecting chamber defined behind said bottom plate means;

at least one vertical frame bar located along the back plate means intermediate and spaced from rear portions of the side plate means;

oblique deflector plate means between the side plate means above said bottom plate means and providing bullet deflection surface sloping toward said back plate means with rear portions cooperating with said back plate means to define a downward bullet chute to said chamber;

cantilever supporting bracket arm means on said bar concealed behind and supporting said deflector plate means;

there being a space along said surface between said side plate means which is free from any vertical obstructions;

attachment flange means on respectively opposite back side margins of the deflector plate means;

attachment bolts securing the flange means along one margin adjustably to said arm means;
an attachment bracket on said side plate means; and
bolt means securing the remaining attachment flange means on said deflector plate means adjustably to said bracket.

8. A shooting range bullet trap structure, comprising:
back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;
a spent bullet collecting chamber defined behind said bottom plate means;
at least one vertical frame bar located along the back plate means intermediate and spaced from rear portions of the side plate means;
oblique deflector plate means between the side plate means above said bottom plate means and providing bullet deflection surface sloping toward said back plate means with rear portions cooperating with said back plate means to define a downward bullet chute to said chamber;
cantilever supporting bracket arm means on said bar concealed behind and supporting said deflector plate means;
there being a space along said surface between said side plate means which is free from any vertical obstructions;
said deflector plate means being attached to said bracket arm means at one side of the bracket arm means;
additional oblique deflector plate means attached to the opposite side of said arm means; and
a joint covering strip overlapping adjacent front margins of said deflector plate means.

9. A structure according to claim **8,** including forward edge protecting oblique deflector members carried by and along forward edge portions of both of said deflector plate means and having respective but adjacently located sides, and a joint-covering strip overlapping said sides along the front thereof and closing the joint therebetween.

10. A shooting range bullet trap structure, comprising:
back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;
a spent bullet collecting chamber defined behind said bottom plate means;
at least one vertical frame bar located along the back plate means intermediate and spaced from rear portions of the side plate means;
oblique deflector plate means between the side plate means above said bottom plate means and providing bullet deflection surface sloping toward said back plate means with rear portions cooperating with said back plate means to define a downward bullet chute to said chamber;
cantilever supporting bracket arm means on said bar concealed behind and supporting said deflector plate means;
there being a space along said surface between said side plate means which is free from any vertical obstructions;
said oblique deflector plate means including a panel having a front margin and edge;
an oblique deflector guard panel disposed forwardly adjacent and extending above and below said edge;
a mounting bracket carried by the back of said guard panel; and
means detachably securing said bracket to said front margin.

11. A shooting range bullet trap structure, comprising:
back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;
a spent bullet collecting chamber defined behind said bottom plate means;
at least one vertical frame bar located along the back plate means intermediate and spaced from rear portions of the side plate means;
oblique deflector plate means between the side plate means above said bottom plate means and providing bullet deflection surface sloping toward said back plate means with rear portions cooperating with said back plate means to define a downward bullet chute to said chamber;
cantilever supporting bracket arm means on said bar concealed behind and supporting said deflector plate means;
there being a space along said surface between said side plate means which is free from any vertical obstructions;
said frame bar having a forwardly projecting flange; and
said bracket arm means comprising a flat bar disposed in a vertical plane, and having a rear edge welded to said flange.

12. A structure according to claim **11,** said bar having a forwardly extending base bar extension welded to and projecting from a lower end portion of the frame bar and providing a forward support for the frame bar, said cantilever arm means and said deflector plate means.

13. A structure according to claim **12,** including a brace panel having respective edges welded to said frame bar flange and to said forward base extension.

14. A structure according to claim **13,** including means connecting said brace panel and said side plate means and contributing to stability of the structure in the assembly.

15. A structure according to claim **13,** including bullet deflecting means carried by said bracing panel and protectively related to an edge thereof.

16. A structure according to claim **13,** including means supporting said bottom plate means on said bracing panel.

17. A shooting range bullet trap structure, comprising:
back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;
a spent bullet collecting chamber defined behind said bottom plate means;
at least one vertical frame bar located along the back plate means intermediate and spaced from rear portions of the side plate means;
oblique deflector plate means between the side plate means above said bottom plate means and providing bullet deflection surface sloping toward said

back plate means with rear portions cooperating with said back plate means to define a downward bullet chute to said chamber;

cantilever supporting bracket arm means on said bar concealed behind and supporting said deflector plate means;

there being a space along said surface between said side plate means which is free from any vertical obstructions;

said bottom plate means comprising a pair of panels disposed in an oblique upward and rearward plane intersectingly related to said deflector plate means;

one of said panels being fixedly mounted and having an upper edge in adjacent spaced relation below said deflector plate means to provide a bullet-receiving gap, said one panel having a lower edge spaced upwardly relative to a supporting floor;

the other of said panels having an upper margin overlapping said lower edge and having a lower margin adjacent to said floor; and

hinge means connecting said lower margin to said floor whereby said remaining panel is movable as an access door to space behind said panels providing a bullet recovery pit.

18. A structure according to claim **17**, including a bullet deflector guard mounted on the floor forwardly adjacent to said lower margin.

19. A structure according to claim **17**, including a bullet decelerator located behind said one panel, means for guiding bullets moving down said back panel means into said decelerator, and means for directing spent bullets from said decelerator toward said door panel.

20. A shooting range bullet trap structure, comprising:

back plate means and cooperating plate means providing surfaces for deflecting bullets rearwardly toward the back plate means so that the back plate means serves generally as a chute along which bullets fired theretoward travel downwardly;

means defining a bullet-deenergizing chamber which is fully closed except for a bottom combination entry and discharge gap;

means for directing bullets from the chute generally under said chamber and into said gap to spin out within said chamber until deenergized to drop from said gap;

means for receiving the spent bullets dropping from said gap;

a receiving ramp at and facing toward said gap and toward which said directing means is trained; and

said directing means comprising members defining a funnel leading from said chute and trained toward but in spaced relation to said ramp to avoid interference with dropping of spent bullets from said chamber.

21. A shooting range bullet trap structure, comprising:

back plate means and cooperating plate means providing surfaces for deflecting bullets rearwardly toward the back plate means so that the back plate means serves generally as a chute along which bullets fired theretoward travel downwardly;

means defining a bullet-deenergizing chamber which is fully closed except for a bottom combination entry and discharge gap;

means for directing bullets from the chute generally under said chamber and into said gap to spin out within said chamber until deenergized to drop from said gap;

means for receiving the spent bullets dropping from said gap; and

said deenergizing chamber means comprising a complementary pair of generally U-shaped plates having adjacent upper flanges in lapping relation and lower flanges in spaced relation providing said gap.

22. A shooting range bullet trap structure, comprising: back plate means and cooperating plate means providing surfaces for deflecting bullets rearwardly toward the back plate means so that the back plate means serves generally as a chute along which bullets fired theretoward travel downwardly;

means defining a bullet-deenergizing chamber which is fully closed except for a bottom combination entry and discharge gap;

means for directing bullets from the chute generally under said chamber and into said gap to spin out within said chamber until deenergized to drop from said gap;

means for receiving the spent bullets dropping from said gap;

said chamber means being located forwardly relative to said back plate means; and

protective guard plate means forwardly from said chamber means providing a spent bullet pit receptive of the spent bullets from said chamber and including a hingedly mounted panel providing a forward clean-out access door.

23. A shooting range bullet trap structure, comprising:

back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;

a spent bullet collecting chamber defined behind said bottom plate means;

at least one vertical frame bar located along the back plate means intermediate and spaced from rear portions of the side plate means;

a plurality of oblique deflector plate means between the side plate means above said bottom plate means and sloping toward said back plate means with rear portions cooperating with said back plate means to define a downward bullet chute to said chamber; and

cantilever supporting bracket arm means along said bar concealed behind and supporting said deflector plate means;

means supporting said deflector plate means spaced one above the other with progressively greater spacing between the successively higher plate means relative to the immediately subjacent plate means.

24. A shooting range bullet trap structure, comprising:

back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;

a spent bullet collecting chamber defined behind said bottom plate means;

spaced vertical frame bars;

oblique deflector plate means between the side plate means above said bottom plate means supported by said frame bars and sloping toward said back plate means with rear portions cooperating with said back plate means to define a downward bullet chute to said chamber;

said back plate means comprising at least one panel extending between the vertical frame bars;

means on said spaced frame bars and said panel for removably hanging the panel on and between said spaced bars and comprising aligned horizontal pins projecting rigidly laterally from upper portions of said frame bars, and hook-shaped hangers on the panel engaging said pins;

a plate member located between said spaced frame bars and having an upwardly extending margin lappingly disposed behind a lower margin on said panel; and

clip means on said lower margin of the panel engaging said upper margin of the plate member.

25. A shooting range bullet trap structure, comprising:

back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;

a spent bullet collecting chamber defined behind said bottom plate means;

a plurality of oblique deflector plate means between the side plate means above said bottom plate means with rear portions cooperating with said back plate means to define a downward bullet chute to said chamber; and

means supporting said deflector plate means in spaced relation one above the other with progressively greater spacing between the successively higher deflector plate means relative to the immediately subjacent deflector plate means.

26. A shooting range bullet trap structure, comprising:

back plate means and top, opposite side and upwardly and rearwardly sloping bottom plate means providing surfaces for deflecting bullets rearwardly toward the back plate means;

a spent bullet collecting chamber defined behind said bottom plate means;

oblique deflector plate means and means supporting the same between the side plate means above said bottom plate means and sloping toward said back plate means with rear portion cooperating with said back plate means to define a downward bullet chute to said chamber;

said bottom plate means comprising a pair of panels disposed in an oblique upward and rearward plane intersectingly related to said deflector plate means;

one of said panels being fixedly mounted and having an upper edge in adjacent spaced relation below said deflector plate means to provide a bullet-receiving gap;

said one panel having a lower edge spaced upwardly relative to a supporting floor;

the other of said panels having an upper margin overlapping said lower edge and having a lower margin adjacent to said floor;

and hinge means connecting said lower margin to said floor whereby said remaining panel is movable as an access door to space behind said panels providing a bullet recovery pit.

27. A structure according to claim **26**, including a bullet deflector guard mounted on the floor forwardly adjacent to said lower margin.

28. A structure according to claim **26**, including a bullet decelerator located behind said one panel, means for guiding bullets moving down said back panel means into said decelerator, and means for directing spent bullets from said decelerator toward said door panel.

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Disclaimer

3,737,165.—*Gierdius Pencyla*, Oak Park, Ill. SHOOTING RANGE BULLET TRAP STRUCTURE. Patent dated June 5, 1973. Disclaimer filed Sept. 2, 1977, by the assignee, *Korhumel Industries, Inc.*

Hereby enters this disclaimer to claims 1, 4, 5, 7, 8, 9, 10, 11, 12, 17, 18, 19, 26, 27 and 28 of said patent.

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