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[54] SHOOTING RANGE CEILING PROTECTION DEVICE

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[73] Assignee: **Detroit Bullet Trap Corp.**, Schaumberg, Ill.

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[52] **U.S. Cl.** **109/49.5**
[51] **Int. Cl.** **E06b 9/00**
[58] **Field of Search** 109/49.5, 85; 52/39, 29, 52/484, 486

[56] **References Cited**

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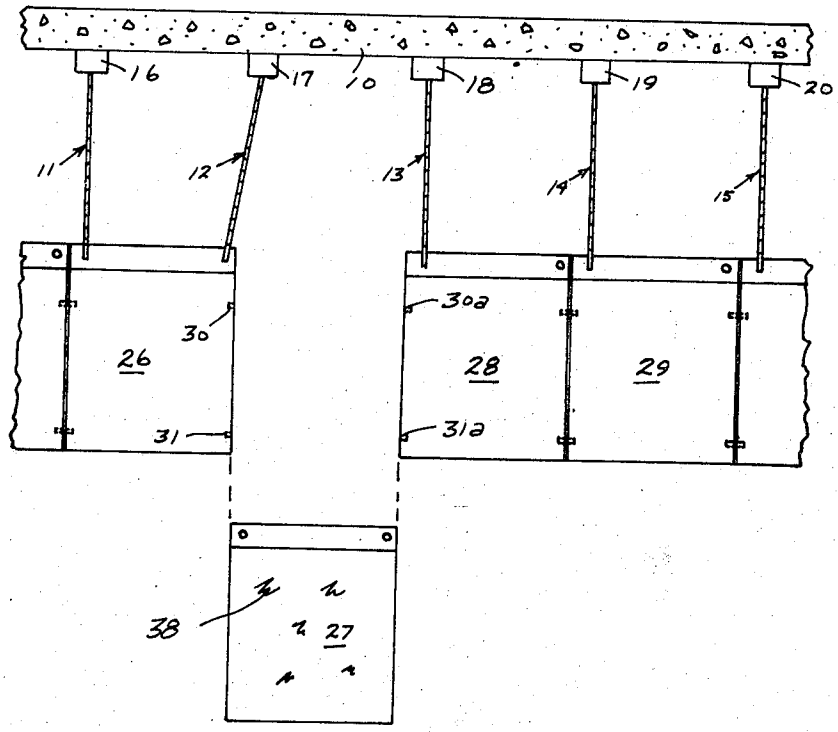
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Attorney, Agent, or Firm—Hill, Gross, Simpson, Van Santen, Steadman, Chiara & Simpson

[57] **ABSTRACT**

A ceiling protection device for a shooting range which includes a plurality of rectangular ceiling modules locked together at the sides and being suspended at the top and bottom edges. Each one of the modules has two positions for being hooked by a suspension chain. Normally only one chain is coupled to one of the hooks, leaving the other hook unused. When it is desired to remove and replace one of the modules due to excessive damage, the chain is merely unhooked from its normal position and connected to an adjacent hook means of another module. Once this is accomplished the module which is being replaced is free to be readily disconnected from the remaining ceiling structure. When the module is replaced, the chain is merely restored to its original position in the new module.

2 Claims, 4 Drawing Figures



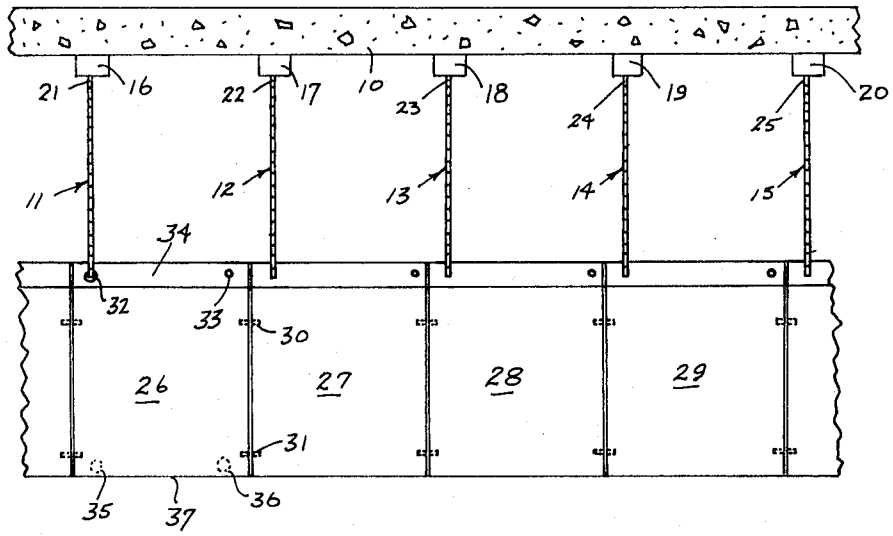


Fig. 1

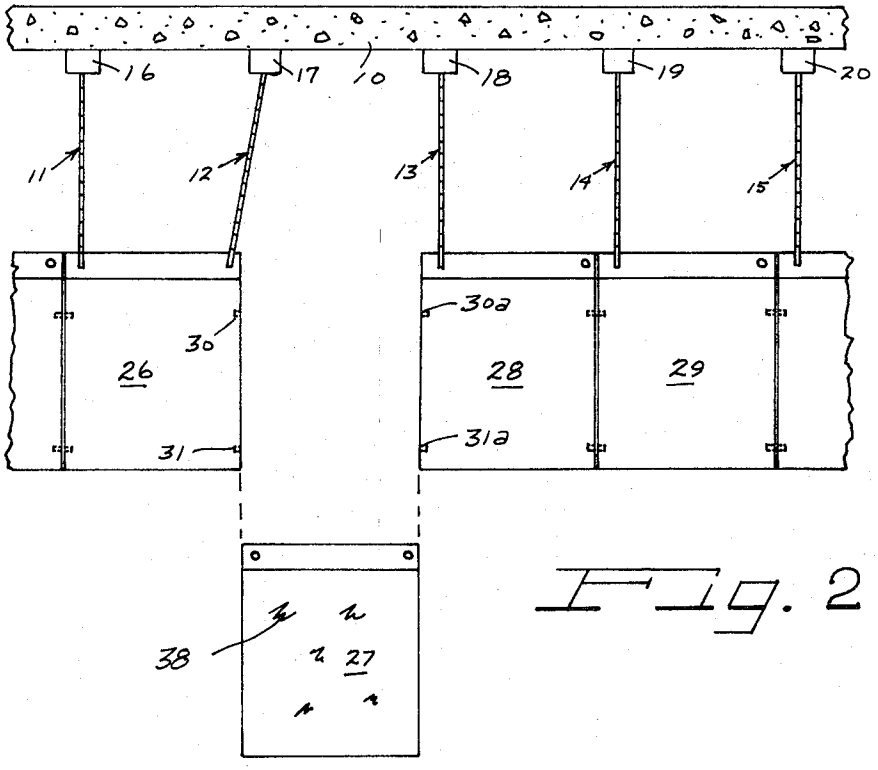


Fig. 2

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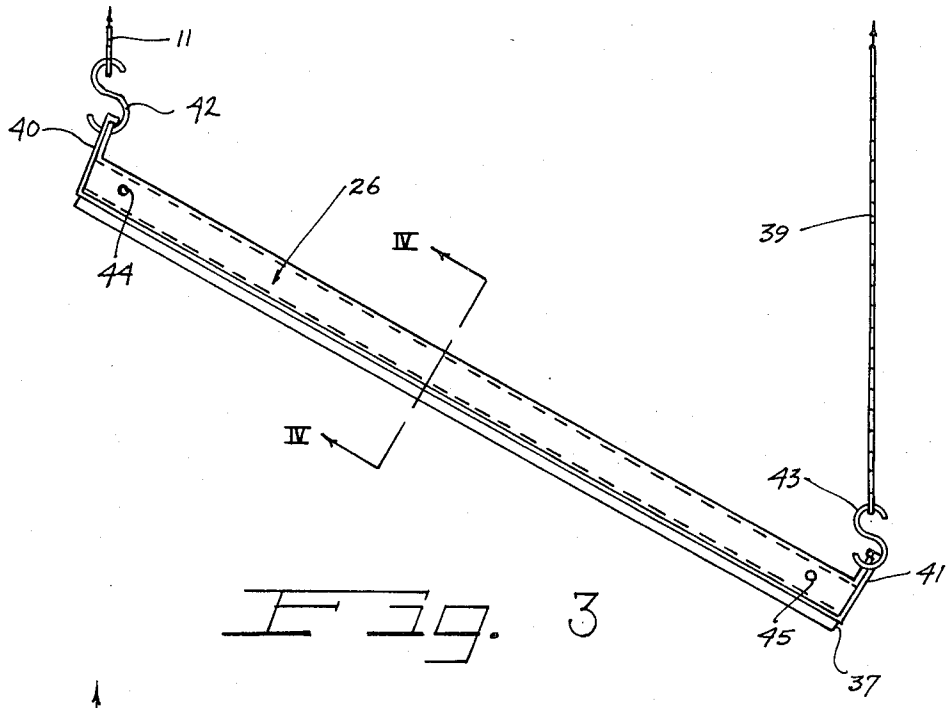


Fig. 3

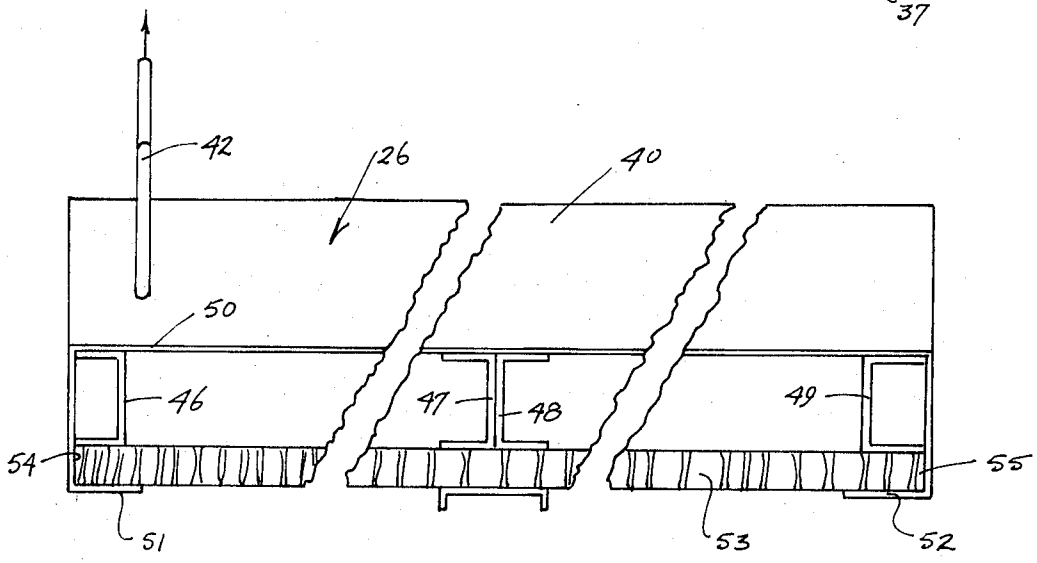


Fig. 4

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SHOOTING RANGE CEILING PROTECTION DEVICE

BACKGROUND OF THE INVENTION

Field of the Invention

The field of art to which this invention pertains is a ceiling protection device for shooting ranges and in particular to ceiling protection devices being made of acoustical material which may be readily removed and replaced due to excessive damage caused by normal use of the shooting range.

SUMMARY OF THE INVENTION

It is an important feature of the present invention to provide an improved ceiling device for a shooting range.

It is another feature of the present invention to provide a ceiling protection device for a shooting range which is formed of individual modules which may be readily removed and replaced.

It is an important object of the present invention to provide an integral ceiling structure made of individual modules or baffle sections where each section may be readily removed by simply coupling or uncoupling a suspension chain which supports the ceiling structure.

It is another object of the present invention to provide an acoustical ceiling device for a shooting range which is comprised of a plurality of rectangular ceiling modules connected together at the sides and suspended by link chains at the top and bottom edges where each of the modules has a hook position normally unused so that a link chain of one module may be readily coupled to an unused hook position of an adjacent module, thereby permitting the ready removal and replacement of separate ones of the modules without disturbing the entire ceiling structure.

It is also an object of the present invention to provide a series of acoustical panels as a shooting range ceiling protector where the panels are connected together to form an integral ceiling structure and wherein each panel has two positions for being connected to a suspension chain, and wherein suspension chains are normally connected to alternate ones of these positions with means being provided to readily remove the chain from its normally coupled position to the position of an adjacent unused coupling point to permit the ready removal of any one of the acoustical panels.

These and 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 of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a front view of a ceiling protection device according to the present invention showing the normal way of connecting the suspension means.

FIG. 2 shows a ceiling arrangement similar to that shown in FIG. 1 illustrating the repositioning of one of the suspension chains to permit the ready removal of one of the acoustical ceiling panels or modules.

FIG. 3 shows a side view of the ceiling structure according to the present invention.

FIG. 4 shows a section of the ceiling structure taken along the lines *a–a* of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to a ceiling protection device for a shooting range which is comprised of a series of rectangular ceiling modules which are connected in side-by-side relation to form an integral ceiling structure. The modules consist of a light weight metal frame which supports an acoustical panel. The acoustical panel acts as the finished ceiling.

The entire structure is supported from a main ceiling by a series of suspension chains. These chains are coupled to the top and to the bottom edge of the acoustical ceiling structure. The acoustical ceiling structure has coupling means in each of the modules for being attached to the suspension chains. While each module has two such coupling means, only one is used, and only one suspension chain is used for each module. The chains are coupled to alternate ones of the coupling means so that when it is desired to remove and replace one of the modules, it is merely necessary to reposition one of the chains from the module which is to be removed to the adjacent unused coupling means of another nearby module. The modules are held together in side-by-side relation by a series of screws which may also be readily removed. In this way individual modules may be removed and replaced without disturbing the support for the other modules. This is a great convenience to a shooting range where the modules are often damaged and replacement is a matter of routine.

Referring to the drawings in greater detail, FIG. **1** shows a front view of the ceiling arrangement according to the present invention. A main ceiling structure is illustrated generally by reference numeral **10** and may be either of concrete construction or may be a bar joist arrangement. Regardless, the acoustical ceiling is supported from the main ceiling by a series of flexible suspension chains **11, 12, 13, 14** and **15** which may be simple link chains. In this case, a series of L brackets **16, 17, 18, 19** and **20** are shown as being suitably fastened to the concrete ceiling **10.** The suspension chains **11** through **15** are then coupled to the L brackets by a series of "S" hooks **21** through **25.**

The acoustical ceiling structure includes a plurality of individual modules **26, 27, 28** and **29** which are coupled together to form an integral ceiling structure. The modules, such as the modules **26** and **27** are coupled together in side-by-side relation by a number of pins or screws **30** and **31.** Each of the modules **26** through **29** has a pair of coupling or connector means at the top and bottom edges of the module. For instance, the module **26** has coupling means **32** and **33** at the top edge **34,** and additional coupling means **35** and **36** at the bottom edge **37.** The coupling means may be brackets with holes to connect to an S type hook such as is shown in FIG. **3.**

Referring to FIG. **2,** reference numerals for FIG. **1** have been carried to FIG. **2** to show similar features. However, in FIG. **2,** one of the modules **27** is shown as being damaged as at **38** and has been removed from its connected position with the adjacent modules **26** and **28.** The module **27** was removed by first disconnecting the screws **30** and **31** as well as their counterparts **30***a* and **31***a*. With the screws removed, it was then merely necessary to reposition the suspension chain **12** from

the position shown in FIG. **1** to the position shown in FIG. **2**. A similar suspension chain was repositioned at the bottom of the module, thereby freeing the module to be removed and replaced. A new module is then merely inserted by repositioning the suspension chains and reconnecting the screws **30, 30**a, **31** and **31**a.

The configuration of the individual modules is shown in greater detail in FIGS. **3** and **4.**

In FIG. **3,** the module **26** is shown as being supported by the chain **11** and a further chain **39** which is connected at the bottom edge **37** of the module **26.**

The module is supported approximately at a 30° angle facing the shooter, and is supported by brackets **40** and **41** which are coupled to S hooks **42** and **43.** Also, the module **26** is shown as having a pair of holes **44** and **45** for receiving the screws **30** and **31** in order to join together with an adjacent module in the side-by-side relation shown in FIGS. **1** and **2.**

In FIG. **4,** a cross section of the module of FIG. **3** is shown. The scale of the drawing in FIG. **4** is approximately four times the scale of the drawing in FIG. **3.** The module **26** is shown in FIG. **4** as being constructed of a metal frame which includes a plurality of C-shaped channel spacers **46, 47, 48** and **49.** A sheet metal cover **50** is caused to overlie the spacers **46** through **49** and extends around the spacers, terminating in a flange **51** at one edge and a flange **52** at the other edge. Flanges **51** and **52** are spaced from the bottom edges of the members **46** through **49** to provide an opening to receive an acoustic panel **53.** The panel **53** may be one-half inch thick vinyl clad acoustic material which is friction fit into the spaces **54** and **55** which are formed by the flanges **51** and **52.**

Accordingly, the present invention provides a means for assembling an integral ceiling structure of separate modules which may be readily removed without disturbing the support for the remaining modules.

I claim as my invention:

1. In a shooting range, the combination of: a plurality of rectangular ceiling modules locked together at the sides and being free at the top and bottom edges, said modules being angled rearwardly and downwardly, two hook means in each module along the top edge, said hook means being spaced apart toward the sides of the module so that a hook means of one module is positioned near a hook means of an adjacent module, a plurality of suspension means, each of said suspension means being normally coupled to alternate ones of said hook means along the length of said top edge, means for suspending the rear edge of the modules, and the remaining hook means being normally unused, whereby any one of said suspension means may be readily transferred to an adjacent hook means of another module to permit the ready replacement of the module from which the suspension means has been transferred.

2. The combination in accordance with claim **1** wherein two hook means are provided in each module along the bottom edge thereof, said hook means being disposed similarly to the hook means at the top edge and suspension means being arranged for the bottom edge in the same manner as for the top edge.

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