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BULLET TRAP

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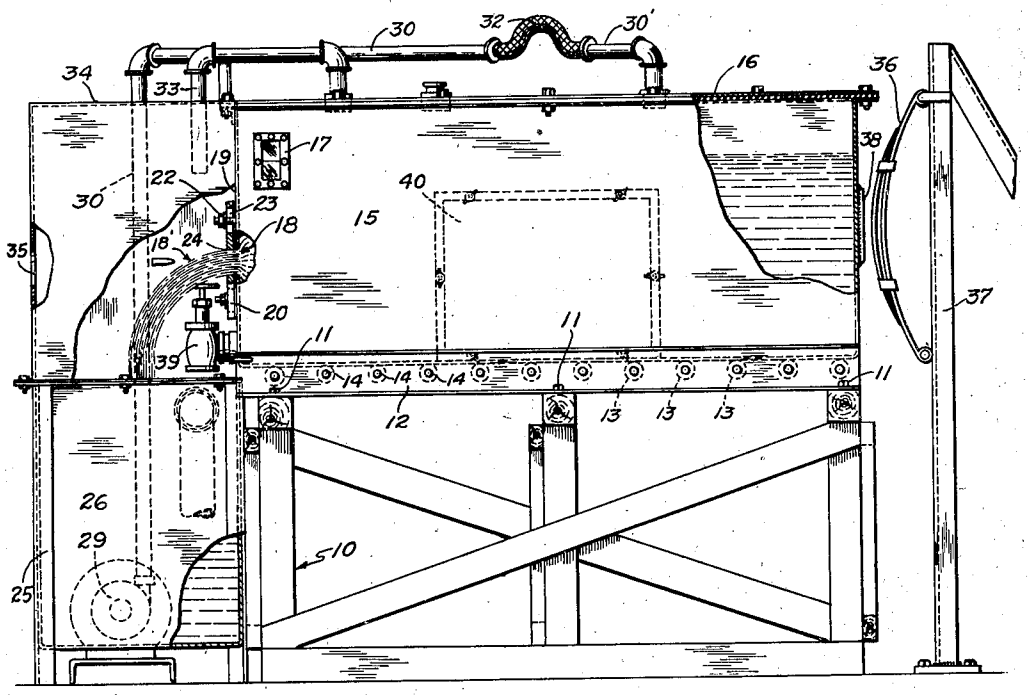


Fig. 1

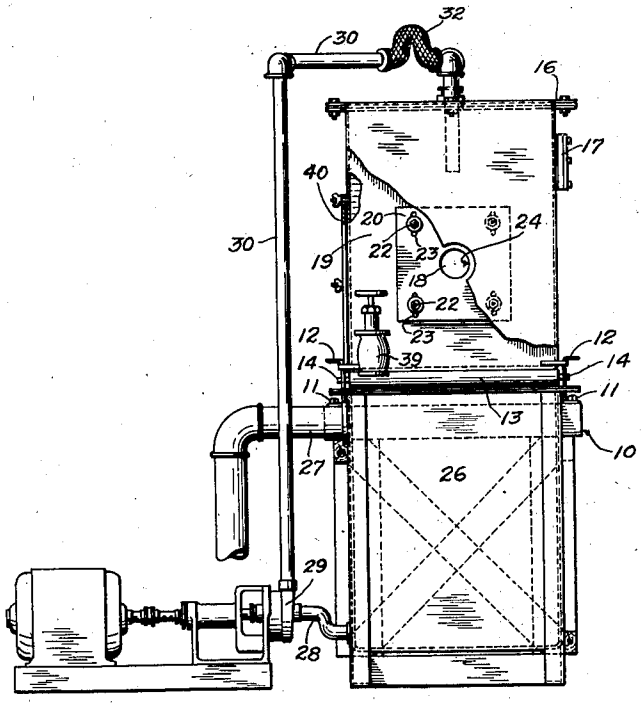


Fig. 2

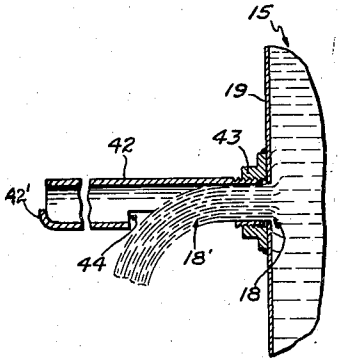


Fig. 3

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BULLET TRAP

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The present invention relates, in general, to bullet traps, and, in particular, to an improved water trap for receiving and stopping projectiles fired in testing firearms and ammunition.

Functioning tests of new firearms and acceptance tests of ammunition require a great deal of shooting in which the projectile is ordinarily not directed at a particular target, and the stopping and salvaging of the projectile is a troublesome problem. Heretofore the most common method of stopping projectiles fired in such casualty shooting was to direct them into an appropriately disposed and sufficiently extensive body of sand. The kinetic energy of the rapidly moving projectile is under these conditions expended partly in pulverizing and displacing the sand and partly in heat. The pulverizing action produces a quantity of silica dust, thus creating an unhealthy condition in the ranges, even when elaborate and expensive ventilating systems are provided. The heat tends to fuse the silica into extensive solid masses which may cause bullet ricochet and may be broken up in subsequent shooting, with the production of further dust. The sand is very quickly pulverized and lost through ventilators or fused into solid masses and must be replaced with the expenditure of considerable labor. Bullets are distorted and broken up, and in admixture with remaining dust and embedded in fused masses their salvage becomes difficult.

An object of the present invention is to provide an improved bullet trap or butt in which projectiles may be fired without detriment to the shape of the projectile; which can be maintained at minimum expense; and does not give rise to health or other hazards. A further object is to test firearms and ammunition by firing a projectile into a moving stream of water. A further object is to provide a water butt for testing firearms and ammunition comprising a water tank mounted to be displaced by an impact of the projectile fired into a column of water issuing from the tank.

These and other objects, features and advantages of the invention will be more particularly described in the following specification which is descriptive of an exemplary embodiment of the invention. It will be understood, however, that the invention contemplates all modifications and improvements thereof within the scope of the appended claims.

In the drawings:

Fig. 1 is a side elevation partly in section of the improved water butt of this invention.

Fig. 2 is an elevation partly in section of the left-hand end hereinafter termed the "front" of the apparatus of Fig. 1.

Fig. 3 is a modification in section of an anti-splash shield for use on the water tank.

Referring to the drawings, the improved bullet trap or water butt comprises a rectangular frame, indicated generally by the wooden structure 10 on the top of which are secured by bolts 11 a pair of spaced substantially parallel channel-shaped rails 12. Supported between the parallel rails 12 in a substantially horizontal plane are a plurality of spaced parallel or cylindrical rollers 13, each roller having a trunnion 14 at opposite ends thereof adapted to rotatably engage in suitable bearing apertures in the vertical walls of the respective rails 12.

Supported freely on the bed formed by the rollers 13 is a substantially rectangular receptacle or trap tank 15 having a cover 16 bolted thereover. A window 17 is provided in one side of the tank to indicate the level of water therein and an aperture 18 is provided in the front end 19 of the tank.

In the present embodiment, the diameter of the aperture 18 is substantially three inches, but it will be understood that the size of the aperture 18, hereinafter termed the target aperture, may vary depending upon such considerations as the cubic capacity of the tank, the head of water provided, frequency of firing, and other factors. A substantially square, flat, relatively thick metal plate 20 is adjustably mounted on the end 19 of the tank by means of a plurality of screws 22 which are inserted in longitudinal slots 23 in the plate 20 and are threadedly secured in the adjacent face of the tank. The plate 20 has an aperture 24 substantially equal in diameter to the aperture 18 and is adapted to be located in axial alignment therewith by means of the aforesaid adjusting screws 22 and slots 23. The plate 20 constitutes armor to protect and reinforce the front end 19 of the tank adjacent the aperture 18 against puncturing by stray or deflected bullets. For convenience in use, the height of the target aperture 18 with respect to the base of the frame 10 should be substantially equal to the height of the muzzle of the horizontally disposed gun being fired.

It is evident that the target aperture 18 has no closure, and that, hence, as long as water is maintained at the proper level in the tank, a relatively solid stream of water 18' will flow continuously from the target aperture 18.

Supported in a relatively fixed frame 25 at the front end of the bullet trap tank 15 in position

to receive the water passing from the target aperture 18 is a sump tank 26 which is open at the top and provided with an overflow drain pipe 27 in one side adjacent the rim thereof. A pipe 28 is connected at an opening adjacent the bottom of the sump tank 26 by which water flowing into the sump 26 from the target aperture 18 is delivered to a power driven pump, indicated generally at 29, which pumps the water from the sump 26 back up into the trap tank 15 through suitable pipe connections 30 and 30'. A flexible section 32 comprising a suitable piece of hose, such as fire hose, is provided between the connections 30 and 30' to enable relatively free movement of the trap tank 15 with respect to the fixed connections 30. A suitable overflow pipe, such as indicated at 33, may be provided in the top of the tank 15.

Secured on the front end of the trap tank 15 so as to substantially enclose the target aperture 18 and the open end of the sump 26 is a hood 34 comprising two sides, a top and a substantially vertical front plate having an aperture 35 therein in axial alignment with the target aperture 18 of the trap tank 15 and of somewhat greater diameter. The hood 34 is adapted to prevent the water from splashing out of the sump 26 onto the floor and to confine the splash and spray resulting when a bullet strikes the stream of water 18' issuing from the target aperture 18.

Mounted at the rear end of the tank 15 is a resilient stop 36 which, in the present embodiment, comprises an automobile type of leaf spring supported substantially vertically on a fixed frame or post 37. A suitable bearing plate 38 is shown welded or otherwise fastened on the back end of the tank 15 for engaging the spring 36.

In operation, a firearm (not shown) is supported in a fixed mount in front of the tank 15 in line with apertures 35 and 18 and at a distance such that all bullets fired will pass through aperture 18. The pump 29 is started so that a substantially solid stream of water 18' flows continuously from the target aperture into the sump 26 from which it is pumped back into the trap tank 15. Bullets are then fired into the stream of water 18'. As a bullet travels through the stream of water 18' and on into the body of water in the trap tank 15, its energy is rapidly dissipated so that the bullet is brought to a stop after travelling no more than three or four feet rearwardly from the target aperture 18. It has been found that, if the water tank 15 is substantially six feet long, the body of water is sufficiently great for stopping substantially all calibers of small arms ammunition. The force resulting from the impact of the bullet with the substantially solid body of water in the tank 15 moves the tank 15 rearwardly, the latter being free to move on the rollers 13. The spring 36 constitutes a resilient stop which is adapted to be engaged by the bearing plate 38 of the tank and to limit the rearward movement thereof. The resilient mounting is especially desirable for machine gun firing, in which the regular and rapid succession of impacts, each of substantial energy is very damaging to a rigid mounting. After running a number of tests, the water may be drained out of the tank 15 by means of a drain cock 39 and the bullets in the tank recovered by unfastening a suitable hatch 40 in the side of the tank. It will be evident that the bullets will be undamaged and in substantially the condition in which they left the gun muzzle, thus facilitating certain ballistic studies. Moreover, no health hazards are incurred in the operation of the water butt and the cost of maintenance is relatively insignificant in comparison to the cost of maintaining a sand butt.

An alternative antisplash construction, replacing hood 34, is shown in Fig. 3. As mentioned above, it is advisable that the firearm be mounted at a comparatively short distance from the target aperture, lest, at greater distance, a "flyer" miss the target aperture 18 and puncture the wall of the tank 15.

The hazard of injury to equipment and personnel due to flyers and possible ricochets may be eliminated by the modification of the equipment above described which is illustrated in Fig. 3. For the reinforcing plate 20 there is substituted an interiorly threaded boss or pipe flange 43 which receives the threaded end of a pipe 42 of appropriate length. The lower part of the free end of pipe 42 is turned upwardly or a suitable barrier 42' is otherwise provided for preventing the outflow of splash water. The muzzle of the gun is placed within a few inches of the free end of pipe 42 or may actually be inserted therein. Adjacent the boss 43, the lower half of pipe 42 is cut away to form an opening 44 of such size as to permit the unobstructed outflow of the stream of water 18'. Any flyers or ricochets from the surface of the water will impinge on the interior surface of the pipe at a small angle and be safely directed back into the water stream.

What is claimed is:

1. A bullet trap comprising a receptacle having an aperture; a body of liquid in said receptacle; and a target consisting of a stream of liquid continuously issuing from said aperture, the flow of liquid from said aperture being in a direction to oppose the movement of a bullet into said target stream.

2. A bullet trap comprising a receptacle having a target aperture; a body of liquid in said receptacle; a stream of liquid continuously issuing from said target aperture; and supporting means for said receptacle arranged to enable said receptacle to move in response to the impact of a bullet with the stream of liquid.

3. A bullet trap comprising a receptacle having a target aperture; a body of liquid in said receptacle; a stream of liquid continuously issuing from said target aperture; and means for relieving the trap from the force of impact of a bullet on the body of water in said trap comprising trap supporting members constructed and arranged to enable the receptacle to move in response to said impact.

4. A bullet trap comprising a receptacle having a target aperture; a body of liquid in said receptacle; a stream of liquid continuously issuing from said target aperture; means for relieving the trap from the force of impact of a bullet on the body of water in said trap comprising trap supporting members constructed and arranged to enable the receptacle to move in response to said impact; and a resilient member to resist the movement of said receptacle.

5. A bullet trap comprising a receptacle having an aperture; a body of liquid in said receptacle; a target consisting of a stream of liquid continuously issuing from said aperture; and an antisplash member over the aperture of said receptacle, said antisplash member having a second aperture in axial alignment with the first aperture, and a third aperture at substantially right angles thereto to permit said stream of liquid to escape from said antisplash member.

6. A bullet trap comprising a trap tank having a target aperture; a body of water in said tank; a stream of water continuously issuing from said target aperture; a sump tank supported beneath said target aperture to receive the water issuing therefrom; means for returning the water from said sump into said trap tank; and means for supporting said trap tank, said supporting means being constructed and arranged to enable said trap tank to move freely in response to the impact of a bullet with the body of water in said trap tank and in the direction of flight of said bullet.

7. A bullet trap comprising a trap tank having a target aperture; a body of water in said trap tank; a stream of water continuously issuing from said target aperture; a sump supported beneath said target aperture to receive the water issuing therefrom; means for returning the water from said sump into said tank; means for supporting said tank, said supporting means being constructed and arranged to enable said tank to move freely in response to the impact of a bullet with the body of water in said tank and in the direction of flight of said bullet; and resilient means adapted to be engaged by said tank to resist the movement thereof.

8. A bullet trap comprising a trap tank having a target aperture; a body of water in said tank; a stream of water continuously issuing from said target aperture; a sump supported beneath said target aperture to receive the water issuing therefrom; means for returning the water from said sump into said tank; and an antisplash member comprising a hood supported on said tank over said target aperture and said sump, said hood having an aperture in axial alignment with the target aperture of said tank.

9. A water butt comprising a frame, a plurality of rollers rotatably mounted in said frame; a trap tank freely supported on said rollers and having a target aperture in one end thereof; a body of water in said tank; a stream of water continuously issuing from said target aperture; a sump supported beneath said aperture to receive the water issuing therefrom; means for returning the water from said sump into said tank; and resilient means adapted to be engaged by said tank to resist displacement thereof due to the impact of a bullet in the stream of water at said target aperture.

10. A water butt comprising a frame, a plurality of rollers rotatably mounted in said frame; a trap tank freely supported on said rollers and having a target aperture in one end thereof; a body of water in said tank; a stream of water continuously issuing from said target aperture; a sump supported beneath said aperture to receive the water issuing therefrom; means for returning the water from said sump into said tank; resilient means adapted to be engaged by said tank to resist displacement thereof due to the impact of a bullet in the stream of water at said target aperture; and an antisplash hood over the apertured end of said tank.

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