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## TEST BULLET RECOVERY IN WATER

Earle Cross

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—EDITOR.

Firearms identification deals to a large extent with the comparison of known fired test bullets with the evidence or exhibit bullet. As the signature of a firearm is established from an analysis of the effect of pertinent class and accidental characteristics resultant from an intimate contact of the bullet with the bore of the firearm on discharge, it is paramount that the test bullets have as few impertinent engravings on their bearing surface as possible. Many extraneous marks, scratches, deformations, and engravings are caused during recovery of the bullet after the projectile has left the muzzle of the weapon. To obtain bullets in the most ideal condition is to recover them in water. Such a procedure necessitates the use of specific equipment comprising a tank, automatic aperture, trestle, and splash basin.

A rust proof tank may be constructed of stainless steel or dural metal. Sheet iron will be found quite satisfactory, providing the tank is given a primary coat of water proof paint. The tank should be at least two feet by two feet by eight feet long and provided with a cover, metal or wood, of sufficient weight to guard against ricochets. All seams should be welded. A tank built of 12 gauge sheet iron will be found quite satisfactory for recovery of high velocity type revolver, pistol, and rifle bullets. Technicians and others using a water tank for bullet recovery are warned that the tank as described should not be used for recovery of bullets from full automatic arms or military type rifles. The tank should be built on a trestle of wood or steel, approximately 2 feet high. The tank should be near a water supply and sewerage to facilitate filling and drainage. An electric light may be fastened to the tank just above the water, under the cover. This light will greatly aid in the sighting of the weapon as well as lighting the tank for the finding of the bullet.

The automatic aperture, situated centrally in the end of the tank, enables one to fire into the receptacle with a minimum escape of water. A circular hole  $4\frac{1}{2}$  inches in diameter, is cut in the tank, centrally, in one end. Bolted to either side of this opening by sixteen  $\frac{1}{4}$  inch brass sink bolts and separated by a quarter inch plumber's rubber gasket, are two 12 inch by 12 inch by  $\frac{1}{4}$  inch aluminum alloy plates (dural) which likewise have circular openings of  $4\frac{1}{2}$  inch diameter, centrally cut, these openings to align with the cut opening in the tank. Before the two plates are bolted to the tank, they are built up with hinged gates. The inner or shut-off gate is made from  $6\frac{1}{2}$  inch by  $6\frac{1}{2}$  inch by

$\frac{1}{8}$ th inch dural metal. This plate will have an  $\frac{1}{8}$ th inch rubber gasket cemented to the surface that comes in contact with the 12 inch by 12

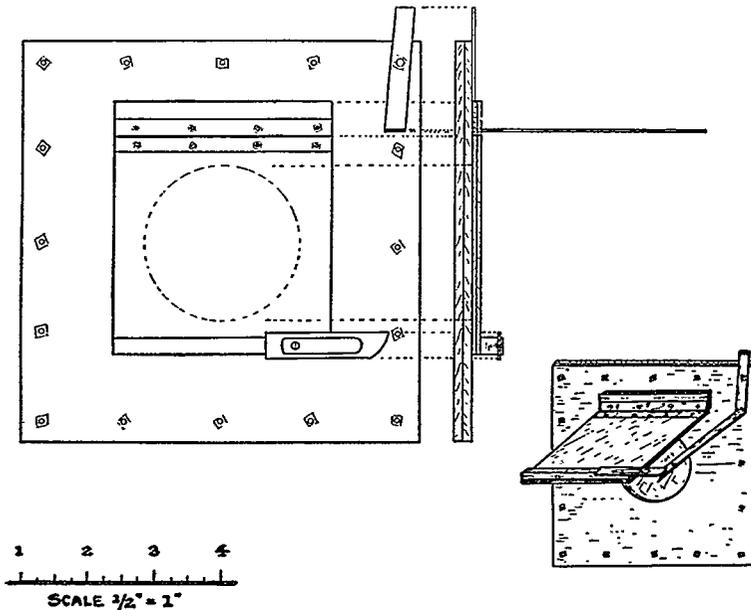


Figure 1.

inch by  $\frac{1}{4}$  inch plate. The gate is hinged to the plate by a piano cover hinge and fastened by four brass bolts with nuts. The lower extremity of the gate is weighted with  $\frac{1}{2}$  inch section brass or lead bar. The gate must be so adjusted that the force of the water against it, when closed, will prevent any escape of water from the tank. Projecting from the side of the gate and attached to it, is a thin springlike piece of metal (rustproof). This catch rests on a projecting arm when the gate is raised 90 degrees. The adjustment must be made when the tank is filled with water as the buoyancy of the water will affect the setting. (See figure 1.)

Fastened to the outer plate by a piano hinge is a 9 inch by 9 inch by  $\frac{1}{4}$  inch dural plate. This gate has a  $4\frac{1}{2}$  inch diameter opening to align with the opening in the plate and the tank. It also has an  $\frac{1}{8}$ th inch rubber gasket to separate it from the larger plate which likewise has a  $\frac{1}{8}$  inch rubber gasket. This gate is kept closed by a  $1\frac{3}{8}$  inch by  $\frac{1}{4}$  inch by  $9\frac{1}{4}$  inch iron bar, tightened by two winged nuts threaded onto two projecting studs. A notched cut in this bar enables it to be swung out of position when the tension is relieved on the nuts, permitting the gate to be raised. (See figure 2.)

A splash basin is placed immediately in front of the aperture. This basin can be an integral part of the tank or can be a separate unit.

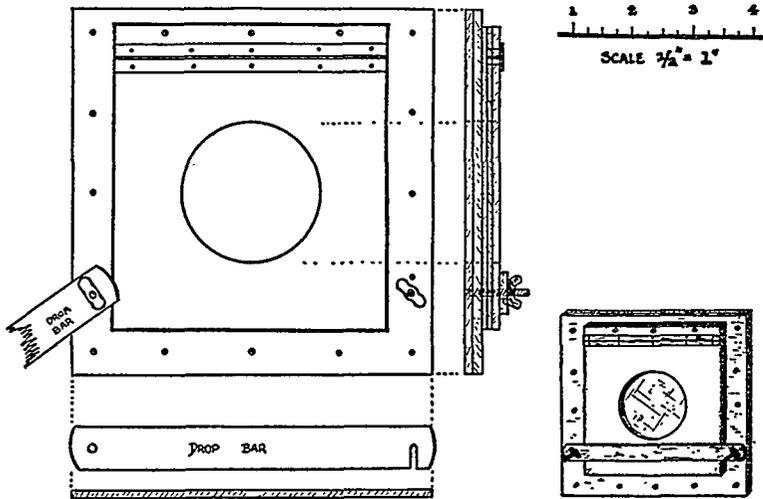


Figure 2.

Its purpose is to drain away the small amount of water, about a quart, that will escape during the interim when the bullet pierces the cellophane and the closing of the shut-off gate. It necessarily must be connected with the drainpipe. A circular hole, 2 inches in diameter, is cut in the end of the splash basin to enable the operator to shoot through the splash basin into the tank. The splash basin need not have a covering. It may be made of light gauge iron with dimensions 2 feet wide by 2 feet high or deep by 3 feet long. This basin also rests on a trestle of wood or steel.

The operation of the bullet recovery tank is very simple. Unscrew the two wing nuts on the retaining bar and swing it out of position. Raise the gate and place a thin sheet of 7 inch by 7 inch cellophane between the rubber gaskets separating the large plate and the gate. The cellophane should be dipped in water to enable it to stick in place until it is held by the pressure of the gate against it. Close the gate, swing the bar into position and tighten the nuts. Fill the tank with water. Raise the shut-off gate and set the trip arrangement. The tank is now ready to be fired into.

The weapon to be test fired can be placed in a machine rest and bore sighted or it can be fired manually.

When the bullet pierces the cellophane and strikes the water, the hydraulic disturbance uncocks the fine setting on the trip arrangement and releases the gate. The weight attached to the gate swings it downward and assisted by the outrushing water, slams it tightly shut against the plate where it is held firmly by the weight of the water.

The bullet, unmarred, can be retrieved from the bottom of the tank by contacting it with a stick tipped with plasticine.