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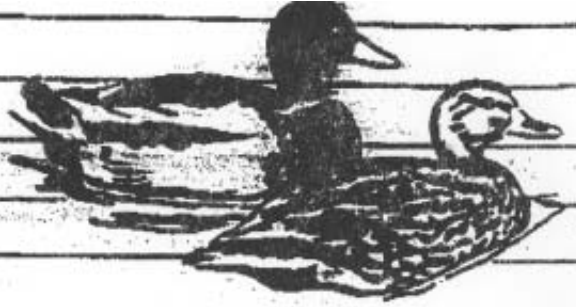

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A Simplified Radio-controlled Detonator for Rocket Net Traps

Nets projected by rockets or cannons are widely used by biologists to capture many species of wildlife. Normally, insulated wire is laid out from the rockets to a location where an observer can connect an electrical power source and fire the rockets from concealment. However, wire can be cumbersome to lay and is often unreliable, especially in instances where it must be laid over long distances, barriers or animal trails. We present instructions for construction and use of an inexpensive and reliable remote detonator to capture large numbers of wintering waterfowl from a point of concealment located up to a half-mile from the net.

Built From Model Remote-Control Components

The transmitter, servo, and receiver for our detonator were from a remote-control system developed for guiding model automobiles and boats (Futaba Corporation of America, 555 West Victoria Street, Compton, Calif.) Other components were obtained at local hardware stores. The entire mechanism fit in a weatherproof ammunition canister, available at most army surplus stores (Fig. 1). We placed a 12-V automobile battery adjacent to the canister to fire nine rockets wired in series and propel three 30' × 60' nets. However, this system can be altered to fire one 30' × 60' net. Total cost for one complete firing system, not including batteries, was approximately $90.

Detonator Assembled in an Hour

Refer to Fig. 1 (A–P) as follows:

1. Drill a 2-mm hole through the wall switch toggle (L) for the pull cord.
2. Align the servo (H) and wall switch (G) horizontally, 1 cm below the top edge on the inside of the canister (C) and 1 cm from the cover hinge end. The wire connections for the wall switch (G) should face upward. Mark and drill three 3-mm holes to secure the servo and switch with 5-cm-long bolts.
3. Drill 5-mm exit holes for the antenna (I) in the cover (D) and the detonator wires in a side wall. Install plastic "mollies" (used to anchor screws in plaster walls) in drilled holes to protect the wires.
4. Tie a 10-cm-long nylon cord to the servo arm (M) and thread it through the hole in the wall switch toggle (L). With the toggle in the "off" position, tighten the cord and knot it in place.
5. Cut the two wires between the receiver switch (F) and four-AA-battery pack, leaving approximately 5–10 cm; discard the pack, and solder 25 cm of two-strand insulated 14-gauge speaker wire to the wires.
6. Tape the receiver (E) and receiver switch (F) together and attach to the styrofoam base (B).

Place these in the canister and slide below the servo (H).

7. Attach 1.5 m of 14-gauge speaker wire to each contact of the wall switch (G) and tape over the screws. Feed the wires through the detonator wire exit hole.
8. Place the 6-V battery (A) in the canister (C) and surround with closed cell foam to prevent movement during transport.
9. Attach the soldered wires (step 5) from the receiver switch (F) to the 6-V battery (A) (positive to positive).

Testing the Detonator

(Note: test the unit as follows before attaching wires to the rockets.) Test for correct installation of the components. Turn on the receiver switch (F) and send a 2-second signal from the transmitter unit (N) (a longer signal may damage the servo). The servo arm (M) should rotate freely and the wall switch toggle (L) should turn on. Turn off the transmitter control lever (O), the transmitter switch (P), and receiving unit switch (F), in that order. Turn off the transmitter control lever (O) first to reset the servo (H) before turning the transmitter switch (P) off. (Note: always return the wall switch toggle (L) to the "off" position after testing.)

To ensure that the trap can be seen and remotely detonated, repeat the above testing procedure with the receiving unit at the trap site and the transmitter at the viewing site. Then proceed to lay the nets and rockets.

Follow Safety Procedures When Setting Trap

Lay, bait, and camouflage the rocket net and post warning signs. Place charges in the rockets, position the rockets, and attach the charge wires to the insulated speaker wire in series (only one side of the two-stranded speaker wire) with electrical tape. Connect the speaker wires to close the circuit at the end of the trap opposite the detonator and test the wiring with an ohm meter. (Note: never work or walk in front of or directly behind the rockets after detonator wire is connected to rockets.) Place the canister and automobile battery ≥ 5 m behind the set and to the side from which you will approach the set. Erect a 1-m wire stake next to the canister, slip the antenna wire through the exit hole on the canister, and tape the antenna wire to the stake.

Clear all personnel and vehicles from the site. Turn the receiver (E) back on, checking that the wall switch toggle (L) is off, and close the canister lid. Connect one wire from the wall switch to the automobile battery and the other wire to one of the detonator wires leading to the rockets. Connect the second detonator wire from the rockets to the other terminal on the car battery. Camouflage the battery and ammunition canister. (Note: before approaching the set, with or without firing the rockets, always disconnect the wires from battery and detonator box and join together the two rocket lead wires).

Safety Considerations and Inadvertent Firings

Safety is paramount while working around the rocket net set. We have one person supervise the setup procedure and ensure that (1) proper safety procedures are being followed and (2) the set is clear before arming. Personnel that may be in the trap area should be warned against approaching the set, and danger signs should be posted to further prevent people and vehicles from approaching the set. Barricades should be placed on roads in the vicinity of the trap site. If trespassing near the trap site is a possibility, the supervisor is advised to have the area patrolled regularly.

We were careful not to operate two-way or citizen band radios near the detonator sets or to place a set near an area where hobbyists use remote control units. However, we experienced several inadvertent firings. We found that a late model pickup truck, with electronic ignition, could cause detonation if driven within 5 m of some armed sets; therefore, we recommend keeping all vehicles at least 30 m from an armed set. We also experienced two inadvertent firings during lightning storms; therefore, we recommend disarming sets if lightning is predicted. Additionally, we suspect that three inadvertent firings that occurred during fair weather resulted from radio transmissions during overhead passes by crop-dusting spray planes. If remote detonators are to be used in the vicinity of low-level airplane activity, we recommend that each be tested beforehand during crop duster overflights.

This remote detonator has proven to be a reliable and useful system to fire rocket nets. As long as safety considerations are followed, the detonator is safe for use in a wide range of situations to trap many species of wildlife.

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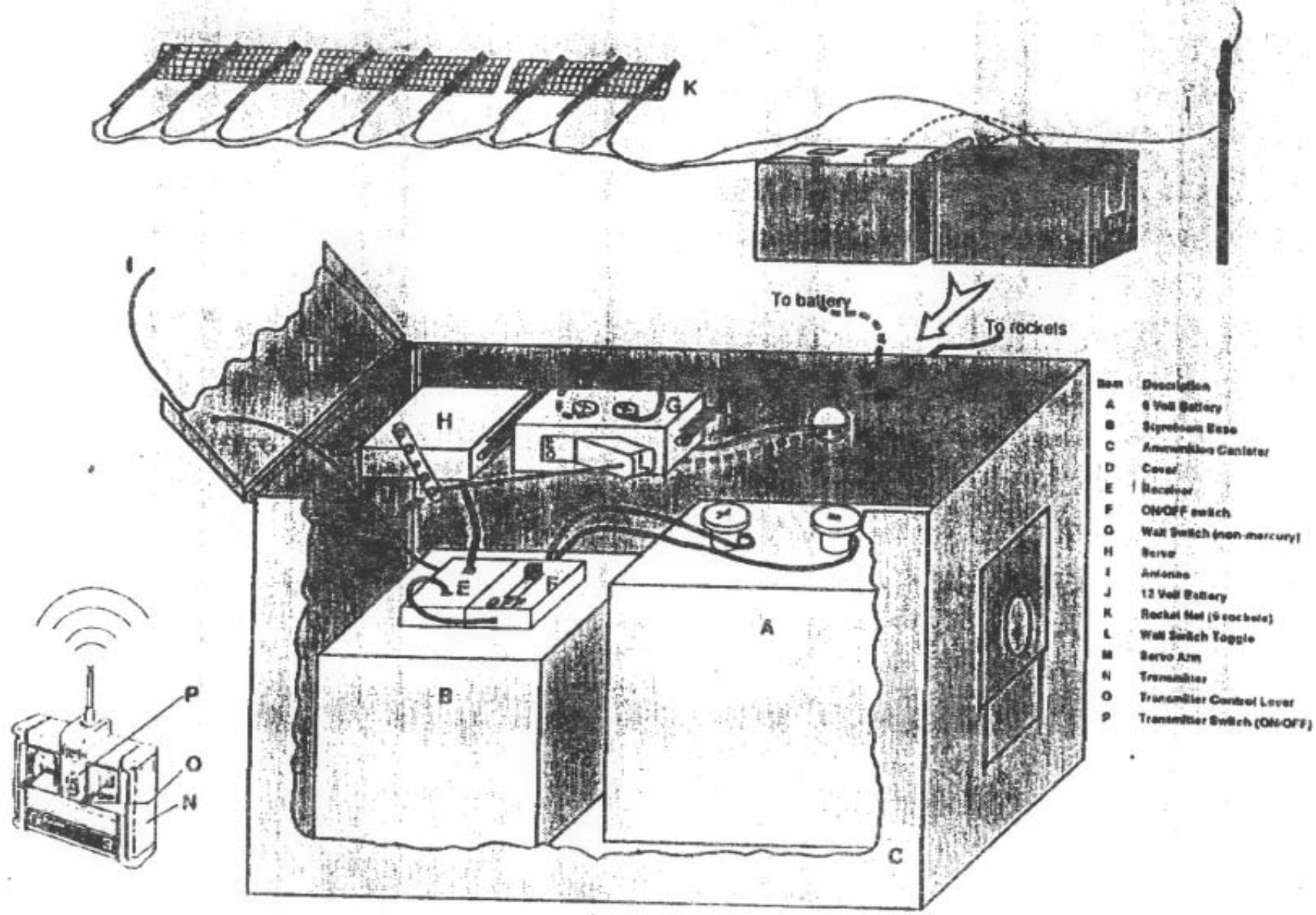

Figure 1. Diagram for assembly of the radio-controlled rocket detonator for net traps.