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CASE REPORT

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Homemade Battery-Operated Multi-barreled Muzzle-Loading Gun

ABSTRACT: In a recent shootout by a terrorist group against a law enforcement agency, some unusual firearms were seized. On examination, these firearms were found to be homemade, battery-operated, multi-barreled muzzle-loading guns, analogous to a repeater. Reference to battery-operated firearms is rather scanty in the literature. Hence, the unique design features, electrical circuit, and the operation system of these unusual guns are described.

KEYWORDS: forensic science, battery-operated gun, multi-barrels, jack plug–filament assembly, circuiting for shooting, rotary switch

The authors, in the past, have encountered battery-operated handguns with improvised cartridges (1) and a variety of homemade handguns designed to fire 0.22 in./0.32 in./0.38 in./9 mm/0.303 in./7.62 × 39-mm calibre revolver/pistol/rifle and shotgun cartridges. Some of the unusual homemade firearms have been reported in the literature (2–7). In a recent shooting case, some homemade, battery-operated, multi-barreled muzzle-loading guns used by the terrorists to free their associates from police custody were submitted for examination. The firearms submitted for examination were found to be rather uncommon guns, not seen before by the authors and not reported earlier in the literature.

The Case

A terrorist group (organization) armed with some unusual firearms indiscriminately fired at the security personnel who were escorting two terrorists en route to a court for criminal trial proceedings. In the shootout, a police officer received multiple pellet injuries. The attackers subsequently made good their escape along with the prisoners. After a few hours, the police secured an abandoned "TATA SUMO" automobile in a nearby city. Eight guns were found concealed in the automobile.

Examination of the Firearms

Description

The eight submitted guns were all similar in their construction and design features. Figure 1 shows the design features of a representative gun. Each gun had eight cylindrical barrels made of iron pipes arranged in two columns of four rows (total length of the gun—64.1 cm; barrel length—45.7 cm; bore diameter of the barrels—1.400 ~ 1.476 cm). The barrels were welded together and in turn enclosed in a welded iron case. A small threaded hollow metallic piece was found welded to the rear end of each of the barrels at a right angle to each other. A box-like metal grip was welded to the rear lower end of the barrel casing. The firing mechanisms of these guns were found to be by electrical (battery) and not by mechanical means. The line diagram depicting the individual components of the gun is shown in Fig. 2.

Electrical Circuit

Figure 3 shows the general layout of the electrical circuit provided in the guns. The positive and negative terminals of the battery were connected, respectively, through an "on-off" switch and a common negative terminal to an indicator lamp. One of the terminals of the on-off switch was connected in parallel to the pole of one pole—a twelve-way rotary switch through a buzzer switch. The connecting leads from the twelve-way rotary switch and the leads from the common negative terminal were connected to the respective jack plugs. The leads from the jack plugs were, in turn, connected to the respective filament assemblies fixed inside the rear end of each of the barrels with a nut.

The battery, the rotary switch, the on-off switch, and the buzzer switch were housed inside the box-type metal grip. The filament and the jack-plug assemblies were housed on either side of each of the guns at the rear end and covered with a sliding metallic cover.

Filament Assembly

The filament assembly (Fig. 4) consists of two thin connecting plates made of brass. The incoming leads, from the battery, were soldered to the lower end of the connecting plates and were insulated by a white plastic piece with a metallic sleeve. A bit of thin, high-resistance fuse element (Nichrome wire) was fixed across the two connecting plates by crimping. Potassium chlorate and arsenic sulfide (a sensitive explosive mixture commonly used in homemade bombs) were found coated on each of the filaments.

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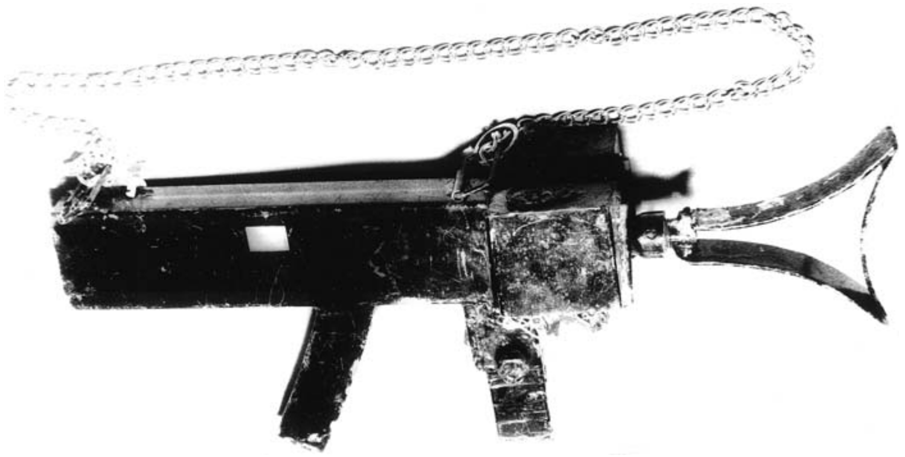

FIG. 1—*The gun examined.*

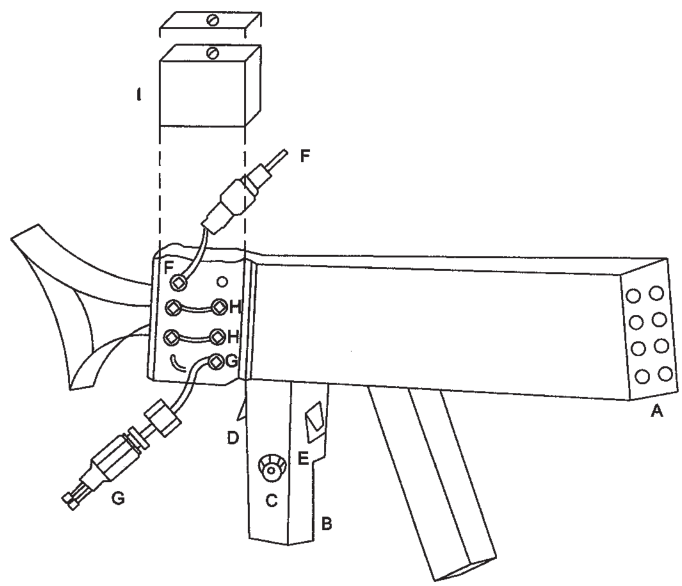

FIG. 2—*Perspective view of the gun: A = barrel assembly; B = grip; C = knob of the rotary switch; D = switch (on-off); E = switch (buzzer type); F = filament assembly in position, jack-plug in view; G = jack-plug in position, filament assembly in view; H = jack-plug with filament assembly in position; I = sliding metallic cover).*

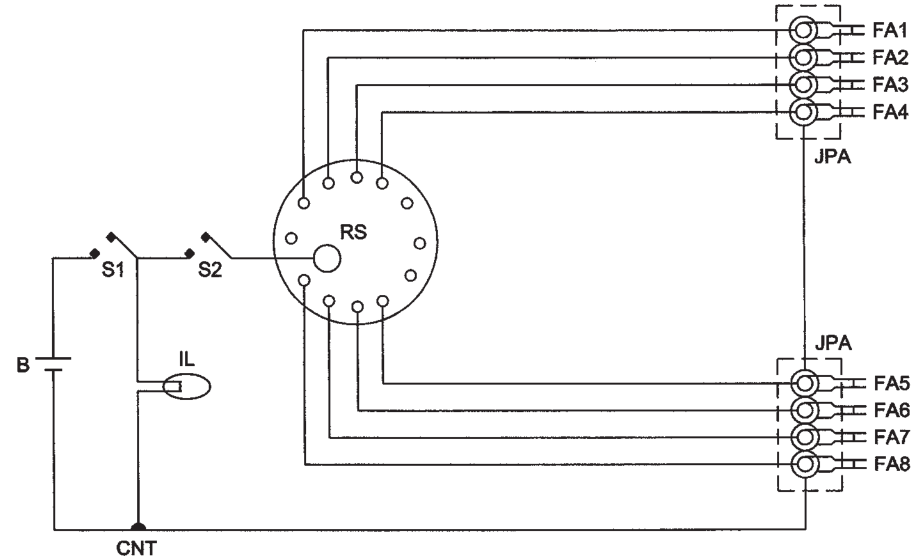

FIG. 3—*Firing mechanism—circuit: B = battery; S1 = switch (on-off); S2 = switch (buzzer type); IL = indicator lamp; CNT = common negative terminal; RS = rotary switch; JPA = jack plug assembly; FA1 to FA8 = filament assemblies).*

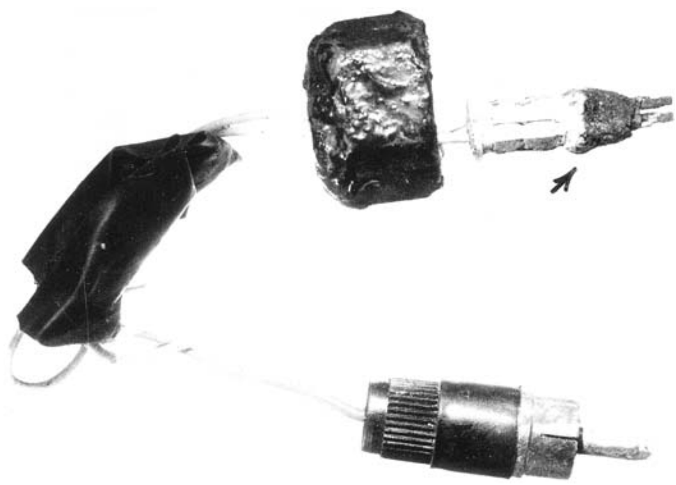

FIG. 4—*Filament assembly (indicated by an arrow) with jack-plug.*

Condition of the Barrels

All the barrels of two of these guns and most of the barrels in the other six guns were found to be loaded from the muzzle end with a mixture of black powder and double-base, smokeless powder as propellant, hemispherical iron pellets as projectiles, and rolled coir pieces as wadding. The weight of the propellant and the pellets loaded in each of the barrels of the guns was found to vary (0.187 ~ 6.938 g and 8.91 ~ 46.307 g, respectively). In two guns, the rear end of one of the barrels was blown off, and these barrels were found to be empty. Combustion products of the propellant used (viz., nitrite, sulphite, sulphate, thiosulphate, thiocyanate, etc.) were detected in the empty barrels of the six guns. The filaments fixed at the rear end of the empty barrels of the guns were severed, while the filaments at the rear end of all the loaded barrels were intact.

Operation/Firing Mechanism

It was apparent that guns had been loaded with a mixture of double-based smokeless powder and black powder as propellant, rolled coir pieces as wadding, and hemispherical iron pellets as projectiles. Switching the on-off switch to the "on" position closed the circuit, and the indicator lamp glowed to indicate that the 9-V battery in the circuit was within the required power. Rotating the rotary switch to the desired position and pressing the buzzer switch (when the on-off switch is in "on" position) activated the circuit of the corresponding filament in the barrel. The activation of the filament produced sufficient heat to produce a mini detonation of the mixture of potassium chlorate and arsenic sulfide, which was coated on the filament assembly; the resultant flame ignited the propellant loaded inside the barrel. The ensuing gaseous pressure propelled the projectiles out of the barrel. The above procedure was repeated for subsequent firing of the next barrel by simply rotating the rotary switch to the next position and pressing the buzzer switch.

Test Firing Experiments

The above guns were found to be highly unsafe for firing, and hence no attempt was made to carry out actual test-firing experiments. However, the following procedures were adopted to ascertain whether the electrical devices provided in the guns were capable of firing the charges in the barrels of the guns: the filament assembly from the rear end of the barrel was removed; the fuse element segment was coated with the paste of potassium chlorate and arsenic sulfide; it was kept in contact with a mixture of gunpowder and smokeless powder in a metallic tray; the battery was fixed in the circuit; the rotary switch was rotated to select the chosen filament assembly; the "on-off" switch and the buzzer switch were operated; it was found that on closing the circuit, the filament initiated the arsenic sulfide and potassium chlorate mixture first and then ignited the propellant. This procedure was repeated with the other filament assemblies, and it was observed that the propellant was ignited in all the experiments. Thus, the working condition of the above guns was satisfactorily established.

Discussion

The above guns were found to be homemade, battery-operated, multi-barrel muzzle loading guns (Figs. 1 and 2). An examination of the circuit present in the guns (Fig. 3) clearly revealed that all the barrels in each of the guns can be discharged one after the other in quick succession by selecting the desired barrel with the rotary switch and then pressing the buzzer switch. The guns were found to function almost like a repeater. Detection of propellant residues inside the empty barrels and the complete severance of the fuse element of the filament assembly fixed at the rear end of the respective empty barrels in six guns indicated that the six guns had been used for firing; further, in two of these guns, the rear end of one of the barrels at the welded joint was found to be blown off and that such bursting is due to the fact that the weak welded joint of the barrel could not withstand the pressure developed during the combustion of the propellant. No attempt was made to conduct actual test-firing experiments with the guns, considering the safety aspects; however, the improvised procedure outlined earlier established the working condition of the guns with reasonable accuracy. The general design features suggested that the guns could be reloaded (including a new filament assembly into the barrels) for future use after successful firing.

Homemade muzzle-loading shotguns with percussion lock are encountered quite frequently in criminal cases in this part of India. However, in this case, the perpetrators, by applying some improvisation and ingenuity, had made a simple but effective battery operated, multi-barreled muzzle-loading guns (analogous to a repeater) for terrorist activities. The elucidation of the design features, circuitry, and the operating mechanisms of these unusual battery-operated guns would certainly be helpful for the firearm examiners while dealing with firearms with similar design features.

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References

1. Ramiah R, Rajan P, Srinivasan R, Chandrasekharan P. Electrically operated pistols and ammunition. Ind J Forensic Sci 1991;5:131–6.
2. Gary J. Management of gunshot wounds. New York: Elsevier Science Publishing Co. Inc., 1988.
3. Di Maio JM. Gunshot wounds. Florida: CRC Press, 1999.
4. Greenspan AB. An unusual weapon submission. AFTE J 1999;31(1):20–1.
5. Dutton G. Brief case gun. AFTE J 1999;31(1):58–61.
6. Dutton G. Simple homemade shotgun used in suicide. AFTE J 2000;32(4):357–8.
7. Tygniengco J, Toves E. A homemade firearm. AFTE J 2001;33(3):259–60.

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