Converted Blank and Gas Pistols - Their Constructions and Forensic Examination

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ABSTRACT

The increase in the number of converted blank-fire pistols being received for examination in the authors' laboratory has required in-depth research into their construction. Different methods and ways of conversion are presented and discussed, as well as cases of unsuccessful conversions which have caused catastrophic failures of the pistol's components. Different models of blank-fire and gas pistols were examined to investigate the possibility of group classification by the marks left on cartridge cases. Examples of class characteristics for popular models of blank-fire pistols converted to discharge live ammunition are provided. Also, the possibility of subclass characteristics occurring was explored and is presented.

Introduction

One of the types of firearms that have proliferated in the last decades are blank-fire and gas pistols that have been converted to discharge a projectile. The legislative systems of many countries have no restrictions or control over this type of pistol, leading to their wide-spread purchase. The construction of blank-fire and gas pistols is similar to the construction of conventional firearms, allowing them to be easily modified to discharge cartridges loaded with bullets. The conversion of blank-fire and gas pistols has become a problem in Europe **[1–4]**, the USA **[5]**, and in other regions. Different models of blank-fire pistols made in Turkey have been widely spread around the world, with their number exceeding eight million in 2016 **[6]**. This has led to a large number of converted pistols being used in crime. For this reason, the forensic examination of converted pistols deserves special research.

Blank-Fire and Gas Pistols

There are different constructions of blank-fire and gas pistols and they include semi-automatic pistols, revolvers, and non semi-automatic double-action only pistols. Some of them, such as Perfecta or Rohm blank-fire pistols, discharge blank-fire cartridges in 6 mm caliber (**Figure 1**), with mechanisms very different from other handguns that do not easily allow a conversion to enable discharge of a projectile. Other constructions of blank-fire and gas pistols have a simple blow-back mechanism, however the size of the chamber and the construction of the barrel make them unsuitable for shooting cartridges loaded with bullets.

Figure 1: Rohm RG3s blank pistol in caliber 6 mm Flobert

Some blank-fire and gas pistols look very similar to well-known semiautomatic pistols such as Beretta (**Figure 2**) or Glock (**Figure 3**). Others are marked with misleading information purporting to be an original well-known semi-automatic pistol, even though some of the features are different (**Figure 4**).

Most gas and blank-fire semi-automatic pistols use cartridges (**Figure 5**) in calibers 8 mm K (8 mm Knall) and 9 mm PA (9 mm P.A.K). These cartridges have no bullets or other projectiles fitted. They are loaded with fast-burning propellant and may contain different (irritant) chemical substances which are projected during discharge.

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Figure 2: Ekol Firat Magnum gas pistol (left) in comparison with the Beretta 92F (right)

Figure 3: Blank pistol Retay 17 (left) in comparison with Glock 17 (right)

Figure 4: Gas pistol with inscriptions "Beretta Px4" (left) and the original Beretta Px4 (right) [12]

Figure 5: Calibers from left to right: 8 mm K (8 mm Knall), 32 Auto (7.65x17SR), 9 mm PA (9 mm P.A.K), 380 Auto (9x17), 9 mm Luger (9x19)

Blank-fire and gas semi-automatic pistols can be divided into three groups by their intended use and by the construction of their barrel:

1. Blank-fire pistols also known as Alarm pistols. In their construction, the barrel bore is completely closed, usually undrilled (**Figure 6**). These pistols have a special hole placed in the front of the chamber (**Figure 7**), used to release the gas pressure. These pistols operate in semi-automatic action like a genuine pistol and are designed to generate a sharp report upon discharge.

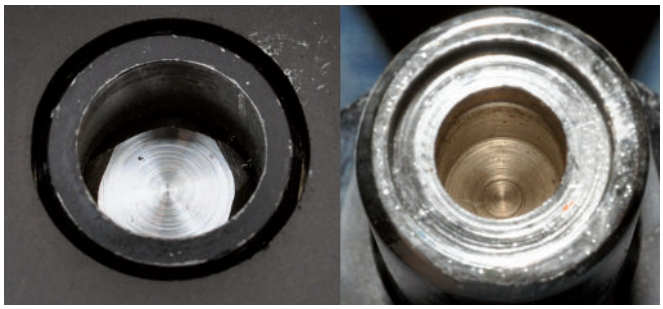

Figure 6: A completely closed barrel bore of Retay 17 (left) and Blow TR92 blank pistols (the muzzle side view)

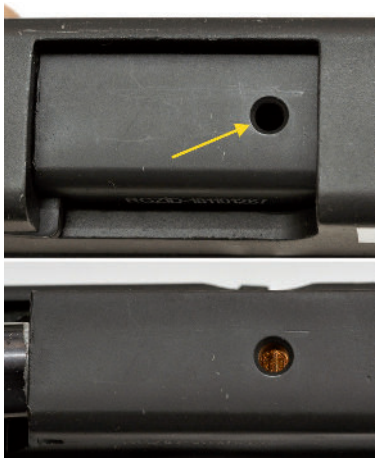

Figure 7: The gas releasing hole in the front of the chamber of Retay 17 blank pistol

2. Gas pistols are similar to blank-fire pistols with the only difference being that their barrel is constructed to allow gases to pass through the barrel and vent at the muzzle. They are still not capable of propelling projectiles (**Figure 8**), as the bores have small diameters or other partial obstructions preventing a solid object being propelled. Gas pistols operate exactly like blank-fire pistols but additionally emit irritant gases such as CS, CN, pepper, etc. Shooting tear gas cartridges places gas pistols into the category of a non-lethal self-defense firearm.

3. Flare pistols are gas pistols with an internal thread in the muzzle. This thread can be used for attaching a special flare adaptor (**Figure 9**) for discharging flares. A similar adaptor can be fitted for shooting rubber balls **[7]**.

Figure 8: The construction element in the barrel of Ekol Firat Magnum gas pistol which prevents projectile shooting (the muzzle end view)

Figure 9: The flare adapter assembled to the pistol and flares

Conversions

The construction of blank-fire and gas pistols is similar to real firearms with a simple blowback mechanism and a non-detachable barrel, such as the Walther PPK pistol **[8]** and others. The similarity in design makes the conversion quite simple, including when only the caliber is changed **[9]**. In order to turn a blank-fire/gas pistol into one capable of discharging bullets, all that is required is to increase the bore diameter (or remove any obstruction) and adjust the chamber shape.

Based on the authors' experience, three main methods of conversion have been noted:

1. Drilling the bore to the required diameter to allow passage of a projectile. In blank-fire pistols the gas vent is closed by welding or in some other way. However, converted blank-fire pistols with the gas vent still present have occasionally been submitted to the laboratory for examination. It was found the open gas vent didn't prevent the pistol being able to propel a bullet of sufficient velocity to potentially cause a lethal wound.

2. Insertion of a liner or sleeve inside the barrel. The bore is drilled to a diameter larger than the diameter of the bullet and a steel tube inserted with an inner diameter corresponding to the bullet's diameter. This liner usually seals the gas vent.

3. Replacing the whole barrel. The original barrel is replaced by a homemade barrel (**Figure 10**). A significant aspect of all converted blank-fire/gas pistols with a replacement barrel examined in the authors' laboratory was they had home-made rifling (**Figure 11**, **Figure 12**, **Figure 13**). The rifling can twist either right or left, with a different number of lands and grooves. The land and groove widths can vary within the same barrel. The quality of the bore finish as well as the quality of the rifling is poor and it is not difficult to identify the barrel as being homemade during the examination of the pistol, or from bullets fired through them.

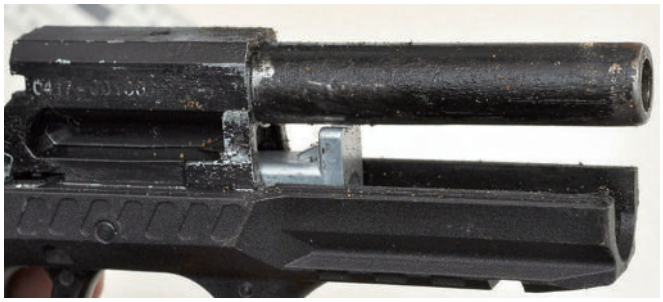

Figure 10: Blank pistol Stalker 4918-UK in which the barrel is replaced by a homemade part

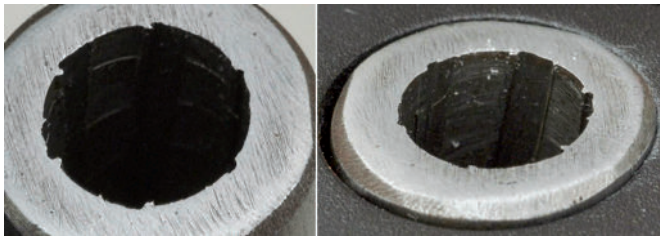

Figure 11: The homemade rifled barrel assembled on Zoraki 917-T blank pistol

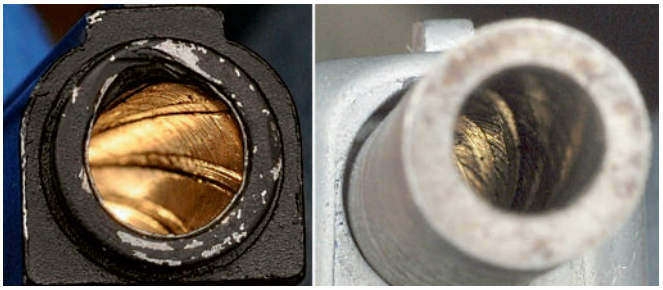

Figure 12: The homemade rifled barrels of converted Stalker 914-UK (left) and Stalker 4918-UK (right)

Figure 13: The rifling in the homemade barrel of Zoraki 2918-T blank pistol and a bullet's jacket fragment extracted from it

The examined conversions were made in calibers similar in dimensions to the original caliber of blank-fire/gas pistol (**Figure 5**). Therefore, most blank-fire or gas pistols in caliber 8 mm K were converted to cartridges in 32 Auto caliber. Pistols in caliber 9 mm PA were converted to cartridges in 380 Auto or 9mm Luger caliber. In some cases, the size of the chamber made it possible to load and discharge cartridges in both calibers 380 Auto and 9 mm Luger.

Conventional cartridges in 32 Auto and .380 Auto/9mm Luger are longer than the blank-fire/gas cartridges in caliber 8 mm K or 9mm PA (**Figure 5**). For this reason, they can't be loaded into the original magazines from these pistols. The magazines of converted pistols usually need to be modified by bending the front part of the magazine, as shown in **Figure 14**, to accommodate the longer cartridge.

Examination of Pistols

The first stage in the examination of converted pistols is

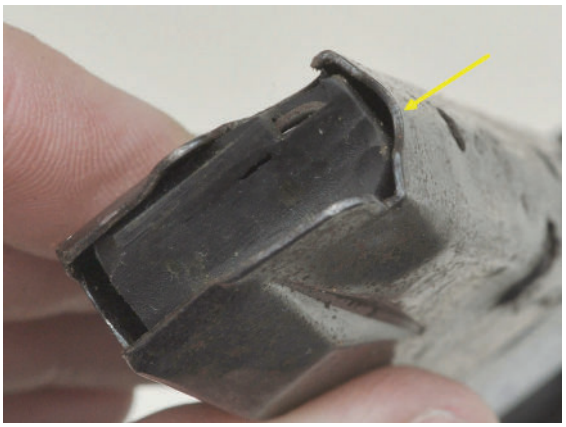

Figure 14: The modification of the magazine for loading cartridges with bullets

noting the changes made from the original construction. After this, the caliber which can be used in the converted pistol is determined. It is important to keep in mind that in some cases more than one caliber can be loaded and discharged from the same homemade or converted barrel.

After taking photos and a mechanical examination, test firing is performed to determine muzzle velocity and to collect cartridge cases and bullets for further examination and microscopic comparison, if the chamber can accept a bulleted cartridge.

The examination of dozens of converted pistols in different calibers has shown the velocity of bullets discharged from them is relatively high and comparable to the velocities given for the same calibers in the literature **[10]**. This is summarized in **Table 1**.

Caliber	Measured bullet velocity		Literature data	
	m/sec	ft/sec	m/sec	ft/sec
32 Auto (7.65x17)	198-283	650-928	305	1001
380A Auto (9x17)	221-303	725-994	285	935
9 mm Luger (9x19)	185-333	607-1093	396	1299

Table 1: Measured bullets' velocity for converted pistols in comparison with the data from literature

Although converted pistols may look like original firearms, they were not designed to discharge bullets through their barrels. Even when replaced with a homemade barrel, they sometimes do not withstand the chamber pressure generated by conventional ammunition. The authors have seen multiple cases of catastrophic failure of converted pistols (**Figures 15**, **16**, **and 17**), showing the importance of maintaining safety protocols and the necessity to test fire them remotely when conducting the examination.

Examination of Cartridge Cases

The chambers of converted pistols are modified to accept conventional cartridges or the chamber is integral to a home-made barrel. Differences in size or shape between the cartridge and the chamber may therefore occur. These differences can cause cartridge case wall deformation ("fire-forming" to the chamber dimensions) which is common in homemade firearms **[11]**. This deformation can be used as an identifying characteristic.

Blank-fire/gas semi-automatic pistols are manufactured in Turkey in extremely large numbers and in different models. From the design of these pistols and their manufacturing processes, markings can be found on most cartridge cases discharged from pistols of the same model. These characteristics can be used for identification of the specific model of pistol which was converted.

The analysis of the markings left on fired cartridge cases by converted pistols allows for the determination of class characteristics for groups of blank-fire/gas pistols. Some examples of these groups are provided:

1. Blow TR-92 pistols imprint a mark from the firing pin aperture located below the center of the primer, a firing pin impression with circular marks, and an ejector mark of a specific shape (**Figure 18**).

2. Stalker 914-UK pistols leave firing pin aperture and ejector marks (**Figure 19**) in a shape different from the Blow pistols.

3. Retay X1 pistols, apart from the shape and the location of the ejector mark, have an easily recognizable firing pin impression (**Figure 20**).

The marks observed on the cartridge cases discharged in converted pistols can also include subclass characteristics. During the examination of a converted Blow TR-17 blank-fire pistol, similarity of breech face marks with another cartridge case was found in the IBIS database (**Figure 21**). The examiner who took the cartridge case from the open crimes collection for microscopic comparison found that this cartridge case had already been "identified" as being discharged from another converted Blow pistol. The similarity of the marks observed on both cartridge cases was, however, found to be due to subclass characteristics. The source of the subclass characteristics is thought to be from manufacture of the slide, which can be a cast component. However, further investigation is needed to determine the exact cause of these subclass characteristics.

Summary

The widespread manufacture of blank-fire and gas pistols by companies located in Turkey has led to an increase in the number of converted pistols submitted to forensic laboratories for examination. Their construction allows them to be easily converted for shooting bulleted ammunition. The methods of modification observed in case work have been described. In some cases, the modifications cause catastrophic failure of the pistol. But when the bullet was successfully discharged, its velocity and energy were found to be sufficient to potentially cause a lethal wound.

Blank-fire and gas pistols are manufactured in different models. Some of these models show differences in class characteristics presented on the cartridge case, which can be

Figure 15: The catastrophic failure in a converted pistol with a homemade barrel

used for group classification as to the model used. In addition, it was demonstrated that subclass characteristics can be found on cartridge cases discharged in some converted pistols.

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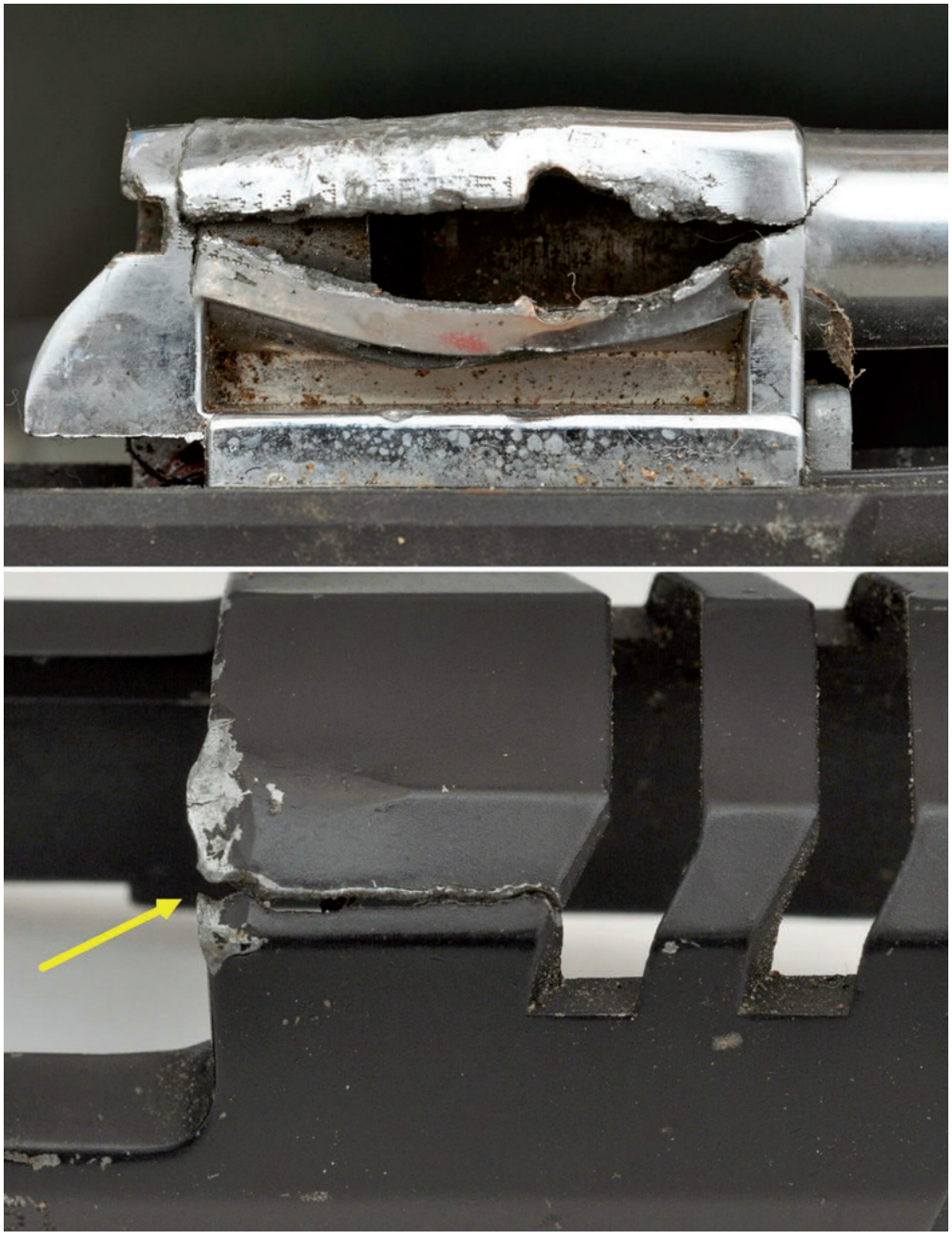

Figure 16: The catastrophic failure in a converted pistol with a liner inserted into the barrel (arrow pointing to the crack)

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Figure 17: The catastrophic failure in a converted pistol (arrow pointing to the crack)

Figure 18: Blow TR92 and the examples of its class characteristics (ejector mark shown in the lower left and firing pin impression shown in the lower right)

Figure 19: Stalker 914-UK and the examples of its class characteristics (ejector mark shown in the lower left and firing pin impression shown in the lower right)

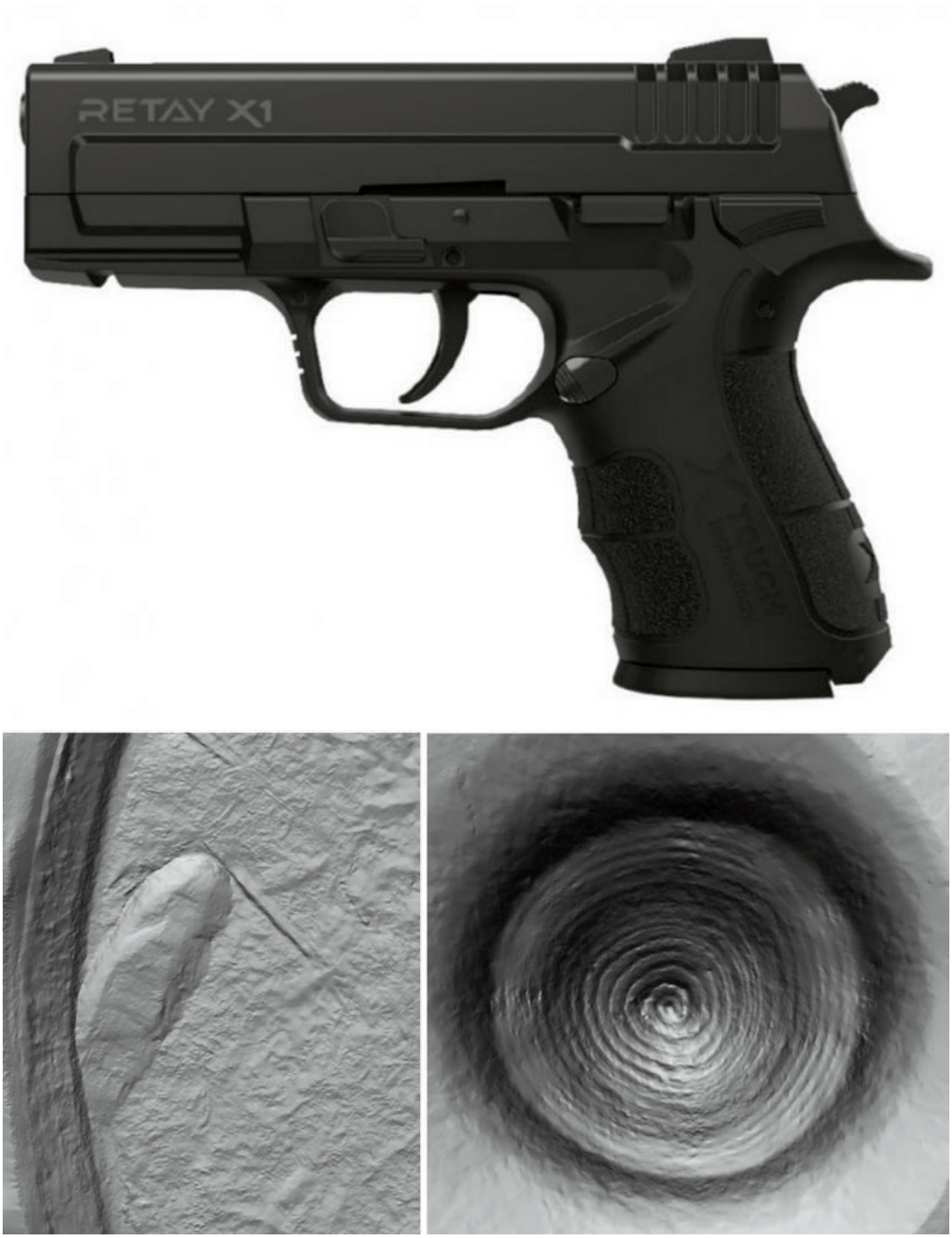

Figure 20: Retay X1 and the examples of its class characteristics (ejector mark shown in the lower left and firing pin impression shown in the lower right)

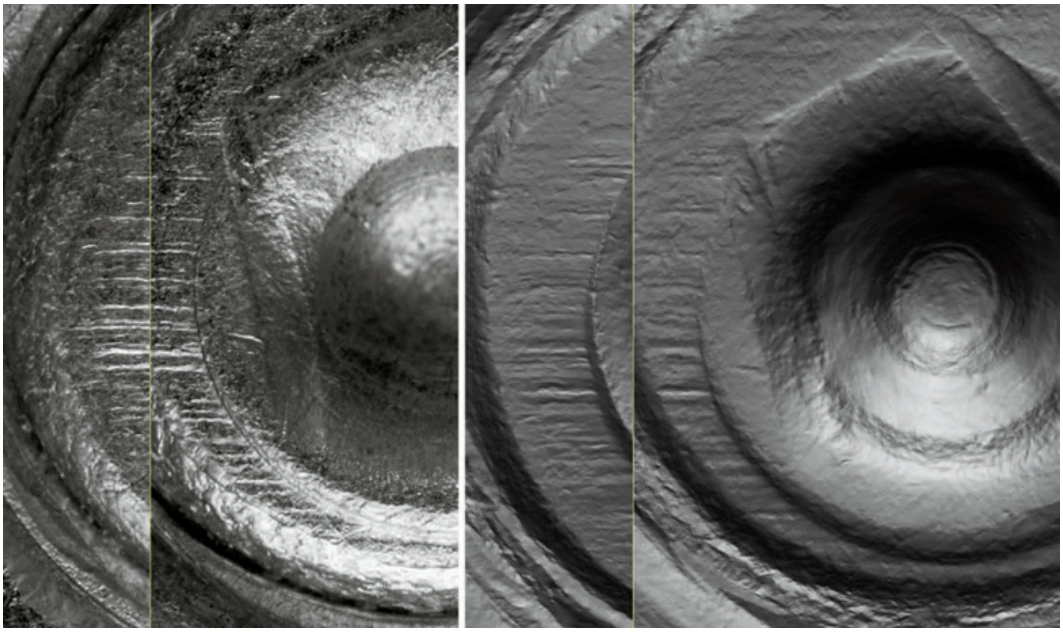

Figure 21: The subclass characteristics observed on cartridge cases discharged from two different converted Blow pistols