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Improvised firearms in the collection of the Forensic Laboratory, Voivodeship Police Headquarters in Kraków and the Department of Forensic Medicine, Collegium Medicum, Jagiellonian University — towards a systematics

Summary

Despite a very large variety of improvised firearms, repeatability of certain actions of the manufacturers can be observed, reflecting the purpose to which such weapons are produced (e.g. poaching), and the availability of appropriate technologies. The aim of this article is to make an attempt to systematize improvised firearms on the basis of the expert opinions elaborated at the Weapon Research and Ballistics Department of the Voivodeship Police Headquarters in Kraków (LK KWP) as well as studies carried out on weapons belonging to the collection of the Department of Forensic Medicine (ZMS) in Kraków. Research material included both primitive devices made by using simple methods and without concern for accuracy or aesthetics, as well as fine-tuned pieces with individual design solutions or copies of factory-made weapons.

Improvised firearms can generally be divided into conversions and own designs. The conversion most frequently applies to alarm, gas or pneumatic weapons. It consists in removing factory safety mechanisms or, in the case of pneumatic weapons, in introducing technical modifications, which enable to blast off the cartridge and discharge the projectile by means of gas pressure arising during combustion of the propellant. Own designs may contain certain factory elements, most frequently the barrel, however, in most cases, they are manufactured from scratch. Improvised firearms, even those without the original elements, typically use ammunition with projectiles or, in some cases, the so called blank ammunition converted into live ammunition by adding projectiles.

Keywords: firearms, pneumatic weapon, alarm weapon, gas weapon, improvised weapon

Introduction

The term improvised firearms refers to the items that meet the criteria of the statutory definition of firearms and are home-made by unauthorized persons (Czeczot, Tomaszewski, 1996). In forensic practice, improvised firearms are most often the conversions of factory-produced weapons, e.g. pneumatic, alarm and gas weapons. Less frequently, they are manufactured with the use of one or more elements of a typical firearm, usually the barrel or breech. In rare cases, improvised firearms are made from scratch, without using any elements of factory-produced weapons. Due to domestic manufacturing process, these devices are usually simple in design, single-shot, produced in an imprecise manner and without concern for accuracy and aesthetics.

As regards the intentions behind manufacturing improvised firearms, the most common is the desire to acquire the tools used for pouching, i.e., typically long guns In forensic medicine practice, the handling of improvised firearms is associated with postmortem examinations of the victims thereof. Among fatal cases involving the use of improvised firearms are primarily suicides (Konopka, 2003; Fiedorczuk, Skórniewski

1992; Krajewski, 1959) and the deaths associated with accidents while handling these devices, which are, after all, primitive (Pohl, Konopka 2000; Aries, 1984; Marcinkowski, 1963; Stachura, Zralek, 1989). Murders with the use of improvised weapons are very rare. Over the past 30 years, the Department of Forensic Medicine in Kraków handled only one such case, i.e. an extended suicide, committed with the use of an improvised rifle compatible with hunting ammunition, used previously for poaching, Probably, the majority of cases involving the manufacturing of improvised firearms occurring in Poland before the political changes were materializations of a dream of owning weapons at times when legal access was restricted.

Aim of the study

The aim of the work is to make an attempt to systematize improvised firearms.

Materials and methods

The analysis of improvised weapons was conducted based on forensic opinions issued at the Weapon Research and Ballistics Department of the Voivodeship Police Headquarters (LK KWP) in Kraków as well as on examination of weapons belonging to the collection of the Department of Forensic Medicine (ZMS UJ CM) in Kraków. In total, the analysis involved forensic opinions on 59 firearms issued at the LK KWP in Krakow over the last 10 years, and 19 firearms that were in the collection of the ZMS UJ CM in Kraków.

Results

Improvised firearms included in this study can be generally divided into the conversions of factory-made weapons and own designs. Among the techniques most frequently used in the household-based manufacturing process were metalworking technologies such as drilling, cutting and turning. Welding and milling were rarely used, most likely due to lower accessibility. Large differences in the precision of workmanship were observed, beginning with primitive designs, making an impression as if they were intended for single use. The aesthetic finishing was occasional. Among the converted weapons, the simplest technologies were applied to alarm revolvers. Most often, they were converted by simple metalworking techniques. In one case, a tube intended to replace the original barrel was attached with glue. More advanced techniques were used for conversions of pneumatic and deactivated weapons.

1. Own designs

1.1. Improvised shotguns compatible with hunting ammunition

This group consisted of nine weapons. In the case of the shotguns, the original barrels were only rarely used. Most often, a barrel was made of a metal tube with an appropriate internal diameter. In addition to metalworking, a dominant technology used was welding, which was less common in other types of improvised weapons, due to a higher endurance requirement associated with the type of ammunition used. The rule for this group was the lack of careful finishing. As these weapons are manufactured for pouching purpose, there is no concern for their external appearance.

Fig. 1. Improvised shotguns compatible with hunting ammunition.

1.2. Improvised rifles

Improvised rifles (8 pieces) were more frequently than shotguns manufactured with the use of factory-made elements, predominantly breech chambers and barrels. Despite coming from various manufacturers,

Fig. 2. Improvisd rifles.

they maintained a high precision of workmanship. These weapons were usually compatible with rimfire cartridges cal. .22/(5.6 mm).

1.3. Improvised pistols

This group consisted of as many as sixteen weapons, out of which ten pieces originated from the ZMS collection from the 1970s. Among the remaining six pieces, four were produced by a manufacturer of submachine guns (see below). Despite being classified into a single group, improvised pistols differed both in the production method (ranging from primitive designs to faithful copies of factory-made weapons), design of weapon's mechanisms and precision of workmanship. The above group was very heterogenous and, as indicated by the decreasing number of requested forensic opinions, becoming increasingly rare.

Fig. 3. Improvised pistols.

1.4. Shooting pen guns

Shooting devices which resemble pens in terms of external appearance (seven pieces) were characterized by a simple design and a straightforward triggering-firing mechanism with a spring and a tensioning lever moving within the L-shaped cutout in the body. In some of the weapons, a fragment of the original barrel from a pneumatic gun was used, which increased their effectiveness. The above devices were usually made with high precision.

Fig. 4. Shooting pen guns.

1.5. Other improvised weapons

This group consisted of nine weapons, which could not be attributed to any of the above groups. These were improvised weapons that did not have an appearance of a pistol or rifle, usually of a very simple design, although, in some cases, they were manufactured and finished with high precision. The above weapons show the manufacturers' resourcefulness in converting simple objects into shooting devices. Exemplary designs are shown in figure 5.

a) „Shooting umbrella" – the shaft made of metal tubing constitutes a barrel; the weapon has a simple triggering mechanism; an ammunition are rimfire nail gun cartridges or rimfire cartridges with an attached bearing ball.
b) Weapon difficult to classify, resembling a pistol; a design consisting of hydraulic tubing and connectors, with a barrel cal. 8.2 mm and a complex triggering and firing mechanism.
c) Device for firing signal cartridges cal. 26 mm (primitive flare gun), constructed from two tubes connected by a thread. One of the tubes constitutes a barrel and a chamber, while the second tube contains a firing pin.
d) Weapon utilizing a medical lancing device used to draw blood from the finger as the triggering mechanism - the barrel is a tube with an internal diameter of 5.6 mm, while the body is a cube with pre-drilled holes for the barrel and the attached triggering mechanism.
e) „Shooting can" – currently without a handle; entirely self-constructed, compatible with rimfire cartridges cal. 5.6 mm, with a concealed, foldable trigger; in order to lock the bolt and compress the firing pin spring, a breech-like element needs to be moved forward and rotated 90°.
f) Improvised weapon compatible with rifle cartridges – a very simple design consisting of two tubes connected by a thread. One of the

tubes constitutes a barrel with a chamber, while the second contains a firing pin with a spring that can be compressed and released in order to fire the weapon.

g) A toy cap gun converted to a firearm by adding a barrel and a substitute for a chamber with a firing pin.

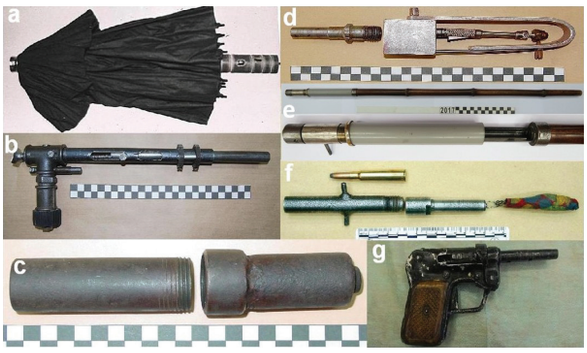

Fig. 5. Other improvised weapons.

1.6. Submachine guns

All submachine guns analyzed (four pieces) were produced by a single manufacturer, who additionally held a number of finished components of this type of weapon as well as several different weapons. This weapon, produced with high precision and focus on finishing, as a hobby or on request, was intended to make a professional impression. Despite its professional appearance and own complex design, this weapon is prone to malfunctions. It is compatible with improvised ammunition, i.e. shells and projectiles from intermediate cartridges cal. 7.62 mm and rimfire nail gun cartridges, which provide the primer and propellant.

Fig. 6. Improvised submachine guns (one piece dissassembled, offering a detailed view of the mechanism) and improvised ammunition.

2. Conversions

2.1. Improvised pneumatic weapons / devices

A pneumatic rifle converted to live ammunition is the most frequently encountered type of improvised weapon. In most cases, the conversion consisted in reaming of a barrel cal. 5.5 mm to the diameter of 5.6 mm, which allowed for loading rimfire cartridges cal. .22/(5.6 mm). The compressed air outlet channel was reamed and the firing pin was attached directly to the compression piston or inserted into the reamed channel. The compression piston served as the hammer for the firing pin. The impact mechanism had different levels of precision: beginning form a precisely made firing pin moving inside the channel, through a nail welded to the piston, ending with a wooden dowel with metal finishing. In one case, an improvised breech of own design was used (eleven pieces).

Fig. 7. Exemplary design of an improvised pneumatic weapon: reamed compressed air outlet channel; a thin metal rod welded to the compression piston serves as the firing pin (A).

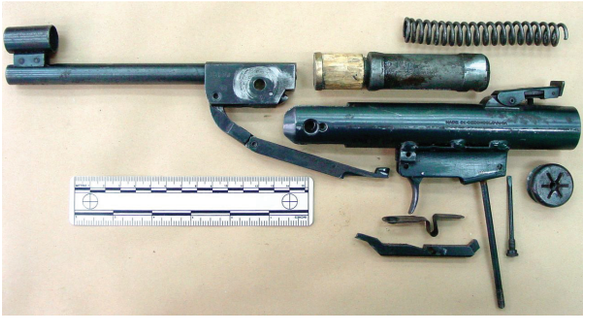

Fig. 8. Exemplary design of an improvised pneumatic weapon: reamed initial segment of the barrel, a wooden dowel with an attached copper disc punching the primer of a rimfire cartridge was mounted inside the compression chamber.

2.2. Converted alarm/gas weapons

This group encompassed alarm revolvers (six pieces) and gas pistols and revolvers (six pieces). In most cases, the conversions consisted in removing the partitions from the barrel bore (gas tube) or replacing the barrel with another and, in the case of alarm revolvers, converting the cylinder chambers by removing the partitions, so as to allow firing the projectiles. These revolvers were frequently loaded separately with a blank or alarm cartridge and a pneumatic gun projectile.

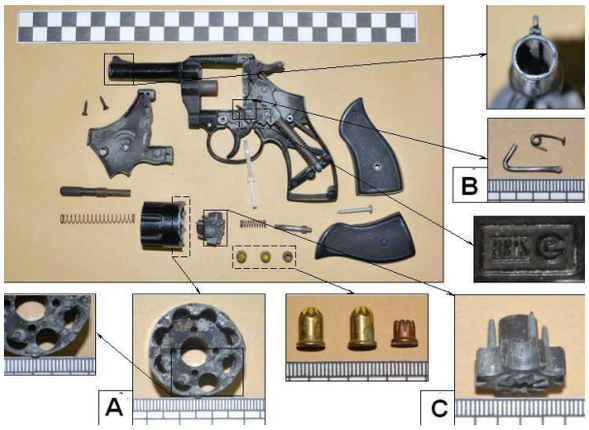

Fig. 9. Exemplary design of a converted alarm revolver: one of the chambers was reamed (A), thus allowing firing rimfire cartridges cal. 5.6 mm.

Fig. 10. Exemplary design of a converted alarm revolver: a partition was removed form the barrel bore; a blind part of the cylinder was cut off, while simultaneously attaching a disc with six holes.

2.3. Removal of factory safety mechanisms

Two factory-deactivated (by an authorized manufacturer) weapons were analyzed. In the first one - the Makarov pistol - the original barrel (blind-pinned and cut) has been replaced by a factory-made barrel with an attached improvised chamber. In addition, a tip of the firing pin was self-made, a fragment of the breech shaft serving as the projectile feeder was welded on, and the notch in the cock was closed by welding. The second weapon - the TT pistol - was converted by welding the removed breech face back on and removing the weld that connected the breech with the frame.

Discussion

Improvised weapons constitute a relatively small percentage of illegally owned firearms. According to Kasprzyk and Brywczyński (2013), they made up 15% of all the weapons seized under 1926 cases pertaining to illegal possession of firearms in the years 2000-2007.

Manufacturing and possession of improvised weapons is illegal. Pursuant to Art. 263 par. 1 PC, manufacturing of firearms and ammunition is punishable by deprivation of liberty for a period between one and ten years. The definition of manufacturing firearms also includes the conversions referred to in Art. 6 of the Arms and Ammunition Act of 21.05.1999 (as amended), i.e. those altering the type, caliber or purpose of the weapon, in particular the conversions of weapons compatible with ammunition filled with incapacitating chemical agents or blank ammunition, to weapons capable of firing projectiles out of the barrel.

While improvised, self-designed firearms prevailed among the collection of the Department of Forensic Medicine, it is nowadays the conversions of pneumatic, alarm and gas weapons that are most frequently encountered.

Pursuant to Art. 8 of the Arms and Ammunition Act of 21.05.1999 (as amended) „pneumatic weapon is a device dangerous to life or health, which as a result of compressed gases, is capable of firing a projectile out of the barrel or an item replacing the barrel, and thus hitting a target at a distance, while kinetic energy of the projectile leaving the barrel or an item replacing the barrel exceeds 17 J". Both pneumatic weapons and „pneumatic devices" (kinetic energy of the projectile below 17 J) utilize compressed air generated by the compression piston moving under the pressure of the spring as a propellant. When such devices are converted to live ammunition firing weapons, the energy of the spring is used to punch the cartridge primer. Obviously, other components of the pneumatic device must also be modified (embedding a firing pin, making the chamber inside the barrel). There are also pneumatic devices, which use the compressed carbon dioxide (CO_2) fed from replaceable cartridges as a propellant, however, to date, no conversions of such devices have been encountered, neither at the LK KWP in Krakow nor at the ZMS UJ CM.

Pursuant to Art. 7(3) of the Arms and Ammunition Act of 21 May 1999 (as amended), „Alarm weapon is

a reusable device, which as a result of compressed gases resulting from the combustion of propellant, generates an acoustic effect, while the substance fired out of the barrel or an element replacing the barrel hits a target at no greater distance than 1 meter".

Each firearm generates an acoustic effect during firing. However, in the case of alarm weapons, the acoustic effect should be the only phenomenon accompanying firing. It should be noted that most of the alarm weapons do not fulfill the criterion of one meter distance for gunshot residues. Additionally, the vast majority of the alarm weapons allow firing gas cartridges. In the case of alarm/gas weapons converted to live ammunition firing weapons, the barrel is modified by removing safety partitions or it is entirely replaced by a barrel from live ammunition firing or pneumatic weapon. In turn, when converting alarm/gas revolvers, also the partitions inside the cylinder need to be removed.

As regards the weapons analyzed in the present study, the factory-deactivated (by an authorized manufacturer) pieces were converted rarely, but with the use of very advanced techniques. The restoration of the original properties of firearms that were deactivated in accordance with Polish law, without the use of specialized technology, is difficult. Firearms, which are illegally converted in Poland, usually originate from the Czech and Slovak markets. In these countries, the procedure of deactivation is much less invasive and, consequently, the deactivated weapons can be easily restored to the original condition.

In view of the above, illegally-manufactured firearms represent a minority of the contemporary weapons. The systematics of this group resembles that of the remaining firearms, which are classified according to the length (small vs. long firearms) and the type of ammunition used. A clearly separate group encompassed the so called shooting pen guns. Improvised machine guns constitute only a small margin of illegally-manufactured firearms. The present study included only the submachine guns produced by a single manufacturer. A high failure rate of his products suggests a leisure activity rather than acting as a supplier for criminal organizations. His weapons could have been manufactured on the basis of the instructions and diagrams for building a submachine gun, which can be purchased through Internet auctions in the hard copy form or even downloaded from the Internet (Brown 1999, Metral, 1985, Luty 1998).

Due to their unique designs, a fairly large group of improvised weapons were difficult to classify according to the generally accepted systematics of firearms. Therefore, these weapons were classified as „other" by the authors, although the term „specific designs" may seem more appropriate. This group of weapons gives an indication of the imagination and ingenuity of people who desire to own firearms.

Conclusions

1. The following self-designed improvised weapons were analyzed in the current study: shotguns compatible with hunting cartridges, rifles compatible with rimfire cartridges cal. 5,6 mm and shooting pen guns.
2. The prevalent converted weapons analyzed were pneumatic weapons and devices, alarm revolvers and gas pistols.
3. In the case of small arms, own designs have been largely replaced by the conversions of alarm and gas weapons, which are much easier to perform.

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