The "Krupp" shell case drawing numbering system

By: Kornel Hoekerd, version 2.0, dated 1st of April 2024

Introduction:

Most collectors of shell cases will recognize the numbers investigated in this article, where number 119 [A] is the best known example, on a 37x94R44 shell case made by "Patronenfabrik Karlsruhe". In this study the approach was to collect as many examples of these numbers as possible and look for correlations to understand what they represent. It was hypothesized based on the results, and in the mean time verified by an original Krupp drawing, that these numbers represent a Krupp shell case drawing number. Every unique shell case manufactured for Krupp will have its own drawing number. There are still several mysteries in the system to be cleared up, hypothesizes are given in the meantime. In the future I hope to extend this study with original Krupp shell case drawings, as it is now clear these numbers are indeed a shell case drawing number and can be found on original Krupp drawings. If time allows I intend to visit several archives and look for additional Krupp shell case drawing numbers, hoping to ever find a complete overview of all Krupp shell case numbers.

An additional purpose of this article is to create an overview of the currently known numbers, their shell case dimensions and for which artillery piece they are expected to be used. Due to many assumptions made, errors are to be expected, and by publishing the results I also hope to receive corrective and/or new information on the subject from the collectors world.

If a significant amount of new information is available I will update the publication and post it on www.bocn.co.uk. www.forum.cartridgecollectors.org and www.nvbmb.nl.

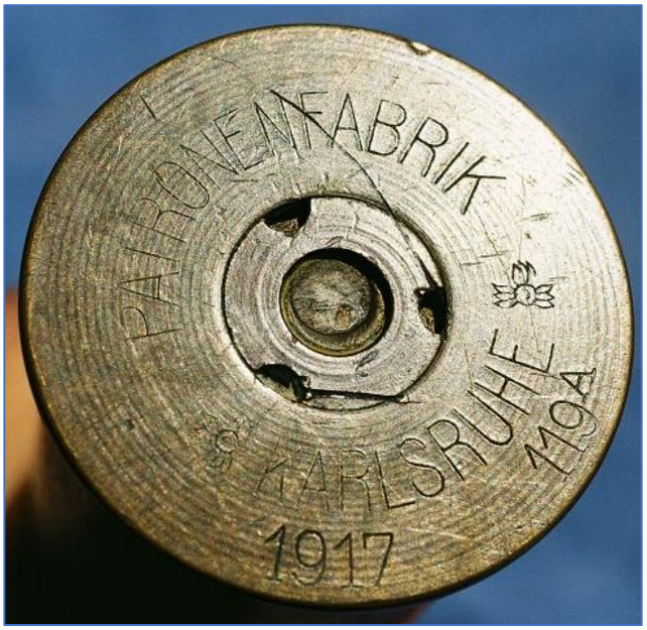

Figure 1: Headstamp of a 37x94R44 shell case, Patronenfabrik Karlsruhe, with Krupp shell case number 119 [A].

Note: There is some confusion among collectors who assume the number discussed in this article is the same as what is commonly referred to as the "DWM number". DWM, like RWS and later Polte, indeed had a comparable numbering system but as will be shown in this article, the Krupp shell case number is a different and easily recognizable numbering system. I included these DWM numbers on large caliber shell cases for completeness (see appendix B and C).

Manufacturers for Krupp ordnance.

Before we go to the overview of the Krupp shell case numbers an introduction is needed for the different manufacturers that supplied to Krupp, including Krupp themselves, for their ordnance.

Deutsche Waffen- und Munitionsfabriken, Aktiengesellschaft (DWM): shell cases [1,2,3]

The main shell case manufacturer for Krupp was DWM ("Deutsche Waffen- und Munitionsfabriken Aktiengesellschaft"), created in 1896 in Karlsruhe. The company DWM was originally founded in October 1872 as "Patronenhülsenfabrik Henri Ehrmann & Cie", and renamed June 22nd 1878 to "Deutsche Metallpatronenfabrik Lorenz", Karlsruhe. In the same year production shifted from only small arms ammunition to both small arms ammunition and artillery shell cases. From literature it is known that Krupp did their first order for large calibre shell cases on November 30th 1878, for 10 shell cases for the 25 mm Hotchkiss navy Revolver-Kanone (DWM number 43). It is safe to assume this 25 mm shell case had Krupp shell case number 1. The first solid drawn 37x94R44 brass cases were manufactured and delivered in 1879 [4], it is unclear if the first 25 mm shell cases were delivered in 1878 or 1879. So from literature it is clear the relation between Krupp and DWM started in 1878. Other early shell cases, that most likely have Krupp number 2, 3 and 4 are the 25 mm Nordenfelt Revolver-Kanone (DWM number 174), the 5 cm Berg-Kanone (DWM number 56) and the 4 cm Berg-Kanone (DWM number 74). The lowest verified Krupp shell case number is number 5 for the 3,7 cm Hotchkiss Revolver-Kanone (DWM number 172) with Hotchkiss press-in primer. See appendix B for images of these shell cases with known DWM numbers from original DWM catalogues [5].

On February 14th 1889 the company became "Aktiengesellschaft Deutsche Metallpatronenfabrik" under Ludwig Loewe & Cie.. On November 4th 1896 the company was restructured and renamed "Deutsche Waffen- und Munitionsfabriken Aktiengesellschaft", in short "DWM", as I will mainly refer to in this article. After the first World War the name changed on May 30th 1922 to Berlin Karlsruher Industrie-Werke A.G., more commonly known as "BKIW" or "Berkawerke".

Shell cases manufactured by DWM since 1896 are mainly head stamped "Patronenfabrik Karlsruhe" with the famous commercial "flaming bomb" logo. On some products you will find "D.W.M." or "D.W.u.M.", like on 25 mm Nordenfelt Revolver-Kanone shell cases or factory made 3,7 cm Hotchkiss Revolver-Kanone dummy rounds. Shell cases for Bulgaria are sometimes in Cyrillic Bulgarian, then the typical headstamp is "year of manufacture – ФРИДЪКРУПЪ (Friedrich Krupp) – Krupp shell case number – Карлсруе (Karlsruhe)".

Before 1896 shell cases were head stamped "Lorenz Karlsruhe" (1878-1888), later "Patronenfabrik Karlsruhe" without a "flaming bomb" (1889-1894) and in 1895 "Patronenfabrik Karlsruhe" with a simple " * ". The "flaming bomb" was introduced in 1896. Limited examples exist where only a letter "K" is stamped, for example on very early but undated 47x158R64 export shell cases and a relatively late 1904 dated 75x215R90 export shell case for Brazil has been found. On the next page the development of the head stamps is shown to be able to time-stamp the shell cases.

Figure 2: The well known DWM "flaming bomb".

Figure 3a (1878-1894): Left is presumed the oldest example found with a 5-pointed “snow flake” (40x150R51, ~1878-1879); Middle is probably the oldest 37x94R44 shell case with a 6-pointed “snow flake” and a German army acceptance stamp (~1879-1881); Right a 37x94R44 dated 1894 without this mark. *Note: My observations/interpretations for dating deviate slightly from Mellichamp [4].*

Figure 3b (1895-1896): Left the new style 6-pointed “snow flake”, only used in 1895, on a 37x94R44 dated 1895. Middle, an undated case with the same mark, but can be dated as 1895. Right a 37x94R44 with the introduction of the “flaming bomb” in 1896.

The head stamps below of “R.W.S. A.G.” (Rheinisch-Westfälische Sprengstoffwerke Aktiengesellschaft, Troisdorf) are interesting to show as they mimic the Lorenz and DWM head stamps. It is most likely a product of DWM marketed as RWS, not often found.

Figure 4: Left a 4-pointed “snow flake” on a 53x175R64 (5,3 cm Gruson) with a Swiss acceptance mark (“+”) and right an alternative “flaming bomb” on a 1899 dated 78x100R91 (blank for 7,7 cm FK96 nA, the additional “A” on the shell case is for “Ausschuss” (reject)). Clearly a “copy” of the Lorenz and DWM marks.

Figure 5: Examples of DWM head stamps after 1896. Left an export case dated 1898 without Krupp shell case number, middle a 1916 dated case with Krupp shell case number 21 (for Turkey) and right a 1916 dated shell case with Krupp shell case number 73 with Cyrillic Bulgarian text (for Bulgaria).

Berndorfer Metallwarenfabrik: shell cases and primers

"Berndorfer Metallwarenfabrik", in this article mainly referred to as "BMF", was founded in 1843 in Berndorf, Niederösterreich and was fully owned by "Friedrich Krupp Aktiengesellschaft" (head office located in Essen, Germany) already in 1890. Early shell cases made by BMF are mainly head stamped "BMF". Around 1890 they are head stamped "Berndorf" or, in much less frequency, simply "B" (2 examples found on 1909 dated 75x215R90 cases for Brazil). Examples exist of Berndorf export cases, identified by the lack of an army acceptance stamp, without Krupp shell case number.

Figure 6: Examples of BMF manufacture. Left an example of a 1910 dated export case without Krupp shell case number, in the middle a 1909 dated shell case with Krupp shell case number 21 ^{II} (for Belgium), on the right a shell case dated 1909 with Krupp shell case number 42 $^{II\,A}$ for Brazil where only a letter "B" is stamped.

BMF also made primers and are described separately on the next page.

The letter "B": Berndorf or can it also mean something else?

BMF did make primers for artillery shell cases, but BMF marked primers are uncommon. Many primers are unmarked and it is therefore not always possible to tell who made them. For a long time I thought Berndorf made primers for Krupp products can be recognized by the letter "B" stamped into one of the primer cavities. The letter "B" in a primer cavity also is not very common, as I have only found 4 examples. They were found in 1905 and 1906 dated shell cases intended for Turkey, as all 4 primers had Ottoman text. None of the primers have a hint towards Krupp. They exist on primers marked "7,5 cm" and "10,5 cm" in Ottoman, they do not hint towards a specific shell case. I found a Krupp primer marked "G" recently which made me doubt if the "B" really represents BMF.

Figure 7: Left a primer marked "BMF", middle a primer marked "B" (written in Ottoman "10,5 cm") and right a 1918 Krupp primer marked "G".

When writing on primers with letter markings, I realized I also know of shell cases with single letters. For example, the letter "B", "h" and "g" exist on several DWM made cases. The main difference is that the letter "B" is added later while "g" and "h" are in the original stamp. The letters "g" and "h" are also found on Krupp projectiles and are known as Krupp acceptance stamps. My hypothesis therefore is that indeed the letter "B" represents a BMF acceptance and/or manufacture mark. Like Krupp, and knowing BMF was part of Krupp, it is likely BMF also manufactured complete rounds using DWM shell cases. To differentiate from Krupp it can make sense to add a letter "B".

Figure 8: Left a DWM shell case marked "B", middle marked "g" and right marked "h".

Note that although only 1918 dated cases are shown in figure 8, several examples exist of much earlier DWM shell cases with the added letter "B" without German army acceptance stamp (for export). The letters "g" and "h" on shell cases I only know from shell cases dated 1918 and with German army acceptance stamp "Sp255".

Rheinische Metallwaaren- und Maschinenfabrik, Aktiengesellschaft: shell cases and primers

"Rheinische Metallwaaren- und Maschinenfabrik Aktiengesellschaft", or in short "RhMF", was founded in Düsseldorf in 1889 by Heinrich Ehrhardt. In 1901 they took over the "Munitions- und Waffenfabrik Aktiengesellschaft" (formerly von Dreyse weapons factory) in Sömmerda. RhMF is a direct competitor of Krupp (and its subsidiary Berndorf) hence they did not supply shell cases to Krupp. Yet for the purpose of this article it adds value to discuss RhMF as well.

RhMF exported a lot of shell cases over the period 1909-1918. These shell cases do not have a shell case number. RhMF, like Krupp, also exported during World War 1 to e.g., Bulgaria and Turkey.

RhMF shell cases are stamped "Rh.M.F. year of manufacture" at 12-o-clock and "Düsseldorf" at the 6-o-clock position. Some shell cases are stamped in Cyrillic Bulgarian text, stamped "year of manufacture - ДЮСЕЛОРФЪ (Düsseldorf) – lot number - РЕЙНСКА ФАБРИКА (Rheinische Fabriken)". Sometimes RhMF products are marked "Ehrhardt" representing the founder of RhMF.

Figure 9: Left a 1916 dated RhMF shell case for export with a typical RhMF primer marked "R.M.F. 1916", right a 1914 dated export shell case for Bulgaria with lot (not shell case) number 33.

RhMF manufactured primers are stamped "R.M.F." at the 12-o-clock position and "year of manufacture" at the 6-o-clock position (see figure 9). In addition, RhMF primers with Turkish Ottoman text exist.

Figure 10: Ottoman text found on 33 mm primers. Left, reading right to left (order of reading Ottoman text), the first letter is the letter "R" written "ر" and pronounced "re". The second letter is most likely "h" written as "ح" and pronounced "ha". Although this does not make much sense, the fact it starts with the letter "R" hints towards RhMF. A Ottoman linguist also proposed "12/C" which would make sense, but I do not see this. The primer on the right states in Ottoman at the top "Ehrhardt" and at the bottom "7,5 cm mountain"; without doubt a RhMF primer for Turkey.

Polte Armaturen- und Maschinenfabrik, offene Handelsgesellschaft: shell cases

Just before publication of this article existing information was linked that indicates also Polte supplied shell cases to Krupp with use of the Krupp shell case numbers. It is unclear of this also happened during 1908 – 1918 (scope of the article) as only a single shell case was found, dated 1919.

Wikipedia:

The company was founded in 1873 as a metal foundry and fittings factory under the Jürgens & Co. company. It was taken over by Eugen Polte in 1885 and entered in the commercial register in 1887 as Armaturenfabrik Polte ('Fittings Factory Polte'). The company operated under the name of Polte (often referred to as Polte-Werke) from 1885 to 1945. During this 60-year period, the company remained a family business and was owner-managed. On Eugen Polte's death in 1911, running the Polte works was continued by his sons-in-law Martin Nathusius and Arnulf Freiherr von Gillern; it expanded to become one of the largest German ammunition suppliers before and during the Second World War.

In contemporary catalogues, price lists and advertisements, the company appeared under names such as Polte metal goods factory, Polte fittings and machine factory, Polte machine tools, Polte aluminium factory, Polte fittings and water meter factories, Polte cartridge, ammunition machine and fittings factory, Polte fittings and cartridge factory or Polte Munitions Factory – with or without the addition of 'Magdeburg'.

C. Louis Strube AG of Magdeburg belonged to Polte-Werke from 1913 onwards.

From 1931, around a dozen other production facilities outside Magdeburg, mainly in central Germany at the time, were taken over, built or leased and operated as branches or subsidiaries; in addition to the main plant (“old plant”) in Magdeburg-Sudenburg, another plant in Sudenburg (the Fichtestraße plant) and the “plant II” (or “new plant”) in Magdeburg-Wilhelmstadt, the Polte works operated 15 other factories in Germany until 1945. These plants were partly subsidiaries and partly Reich-owned or third-party plants that were leased and operated by Polte oHG.

Figure 11: Head stamp of a 1919 dated Polte made 75x168R90 shell case for the Netherlands. The mark “Mh. 843” refers to Krupp “Metallhülse Nummer 843”; Krupp shell case number 843.

In figure 12 an original Krupp drawing of a 75x278R90 shell case is shown, as found in the Dutch national archives, The Hague. The shell case for the Dutch 7,5 cm Krupp L/30 M1903 export artillery piece is already known as Krupp shell case number 21 (or 21[II]) as intended for Turkey and Belgium. It could be coincidence but this drawing has "Mh." and "21" written at the top left and top right. This is actually what is to be expected based on the hypothesis of the Krupp shell case numbering system; the numbers must refer to a Krupp drawing of the shell case. This is proof that indeed original Krupp shell case drawings have the same number printed on drawings as these numbers head-stamped on shell cases. The abbreviation "Mh." is for "Metallhülse" (metal shell case) and not Messinghülse (brass shell case), as Krupp drawings for shells are marked "Mg." (Metallgranate; metal shell) and drawings for fuses are marked "Mz." (Metallzünder; metal Zünder).

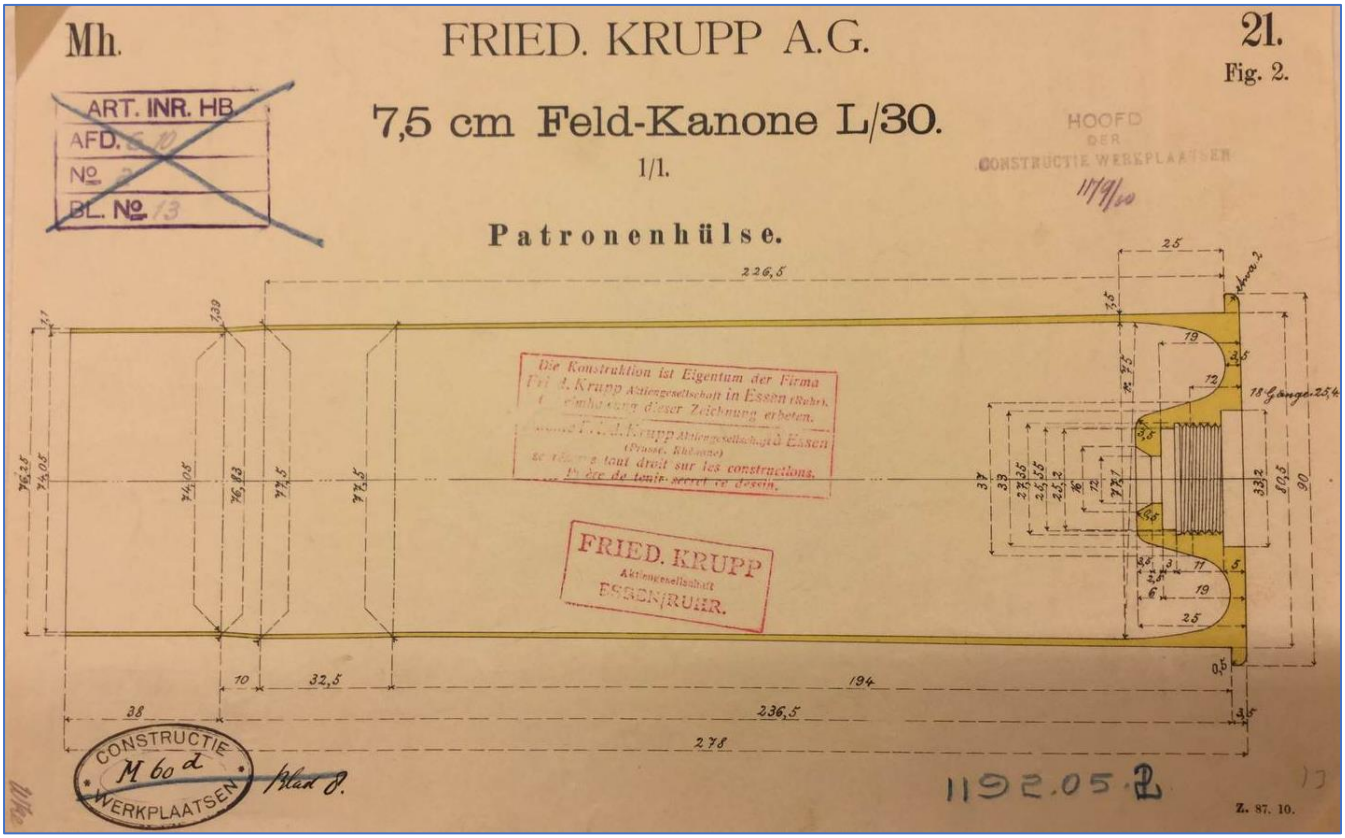

Figure 12: Original Krupp drawing for "Metallhülse 21", a 75x278R90 shell case for the 7,5 cm Krupp L/30 M1903 export field gun.

The best way to extend the investigation is to collect original Krupp drawings which means archives need to be visited. Possibly a complete overview of Krupp shell case numbers exists, comparable to the known listings of DWM numbers [5].

Friedrich Krupp Aktiengesellschaft: primers and sub-caliber training devices

"Friedrich Krupp Aktiengesellschaft", Essen, Germany, did not manufacture shell cases directly. However, as owner of Berndorf since 1890 and owner of Gruson since 1893, they indirectly manufactured shell cases as well. Krupp did manufacture artillery, projectiles, primers and sub-caliber training devices for the respective artillery piece. For this article the primers and sub-caliber training devices are of interest to describe in more detail.

Krupp primers:

Krupp exported large amounts of ammunition, and as a result several types of Krupp made primers are exported as well. During the investigation several different sizes and writings have been found. A lot of primers are unmarked, hence it is unclear who manufactured these primers. Because shell cases are often re-used, primers are swapped frequently as well. This means you can never be sure if a certain primer in a shell case was delivered together with the shell case or swapped later, making identification a bit more challenging.

For 3,7 cm Krupp shell cases 119, 119 ^{A} and 917 mostly the 16 mm Krupp primers are used where the inner part is separated for easy re-loading with a press-in primer. Until early 1918 these primers were unmarked. Only during 1918 Krupp primers are marked "Kp. Month (1 digit) Year (2 digits)", where only the months February and April through September 1918 were found. Now and then, I only found 4, you will find a 37x94R44 case with a single piece (solid) 16 mm primer. One primer was most likely a hole-filler (error from a collector), the other 3 like shown in figure 13, on the left, are unmarked solid primers for export. Very rare are solid 16 mm Krupp marked primers (only found 2), they were found in a Dutch 50x338R77 and a German 100x845R145 shell case.

Figure 13: Left a solid 16 mm primer for export in a 1911 dated 37x94R44 shell case marked with Krupp shell case number 119 ^{A}; middle the typical Krupp marked 16 mm primer with inner press-in primer, dated April 1918; right a very rare 1914 dated "Kr." marked Krupp primer.

For 5,7 cm shell cases with Krupp shell case number 10, also 16 mm primers are used, but as the found examples are unmarked and the shell cases are BMF made it is unclear who made these primers. In addition, these are always single piece solid primers unlike the 16 mm Krupp primers mentioned before. The primer resembles the one on the left in figure 13.

For 7,6 cm shell cases with Krupp shell case number 904, 13 mm primers are used, but as the 2 found examples have unreadable primers it is unclear if they are marked and who manufactured them.

For large artillery shell cases the common large 33 mm Krupp primer was used, that I know as C/95, C/98, C/98 n.A. (neue Art) and later the C/12. The most common examples are stamped “Fried. Krupp A.G.”, “C/12” or “12” or combinations of these stamps, besides unmarked primers. Much less common are 33 mm Krupp primers marked like the small 16 mm Krupp primers, “Kp. Month. Year.”, these are only found in 1918 dated cases for the German army or export to German allies. The only 6 examples I found were manufactured June 1918 (3 x), July 1918 (2x) and August 1918 (1 x).

Figure 14: Left a 33 mm Krupp primer with less common late war stamp on shell cases; right a 33 mm Krupp primer with the more typical stamp.

For export to Turkey the Krupp made 33 mm primers are most of the time stamped with Turkish Ottoman text. Interestingly, although Krupp exported enormous amounts of ordnance to Bulgaria, I have not found any primers with Cyrillic Bulgarian text. In total 4 different Krupp primers with Turkish Ottoman text have been found. Ottoman text is extremely hard to translate as it is a complex mix of Persian, Arabic and Turkish. Note that the text (not numbers) have to be read right-to-left. To translate I got help from the academic linguistic world (Turkish and Persian) and even then most is interpretation but not exact science. But it was possible to come up with logical translations.

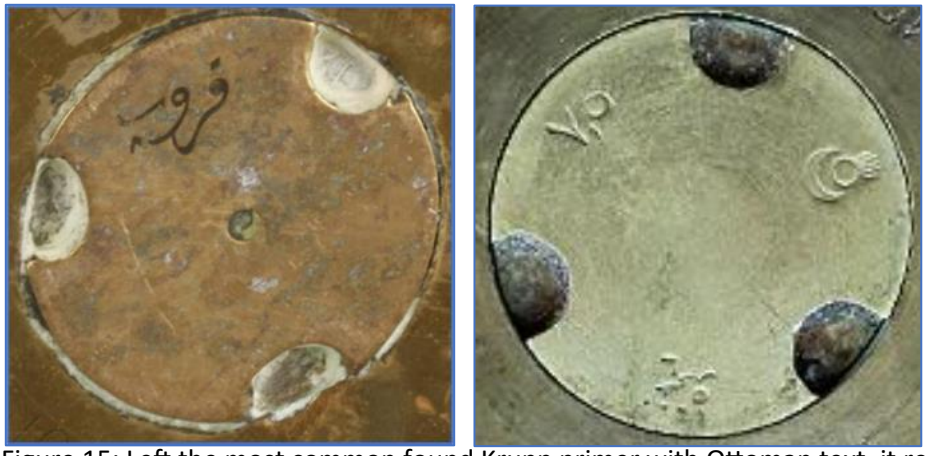

Figure 15: Left the most common found Krupp primer with Ottoman text, it reads phonetically “Krupp”. Right a very rare Turkish primer (only found 2) with Ottoman army acceptance mark and written in Arabic (٧,٥) which is “7,5” with an unreadable writing at 6-o-clock position (I suspect the year of manufacture according the Islamic calendar).

The 2 other primers found with Ottoman text, where I assume they are Krupp made, are an example of how hard it is to interpret Ottoman. When asked to several people, I got completely different interpretations. My proposed interpretation is that the 2 letters represent something like “Sa Mer”, which has no meaning. However, from previous translations I know that in Turkish “centimeter” is written “santimetre”. When proposed that “Sa Mer” potentially represents the phonetic

abbreviation for “sm” (cm) this was considered a possibility. This also makes sense from a shell case head stamp point of view. The 2 types of primers found with “7,5 cm” and “10,5 cm” written on them are indeed in a shell case of that caliber. Most likely this is on request of Turkey as these primers are typically interchangeable. I was not able to verify if they are indeed interchangeable.

Figure 16: Ottoman writing on primers, left “7,5 cm” (٧,٥), right “10,5 cm” (١٠٫٥).

Krupp sub-caliber training devices:

On the website www.bocn.co.uk the images below are found. Shown are the head stamps of 2 Ottoman sub-caliber training devices. Both are made by “Fried. Krupp A.G.” in 1905 and are most likely supplied together with the artillery pieces at the same time.

Figure 17: Sub-caliber training rounds for the 7,5 cm Krupp L/14 mountain gun (left) and the 5,7 cm Krupp L/40 navy gun (right).

Text location	7,5 cm Krupp L/14	5,7 cm Krupp L/40	Meaning
top line, top half	7,5 cm L/14 mountain	5,7 cm L/40	Designation of the gun
bottom line, top half	“with firing barrel” or “with disposable barrel”		Describes the barrel used
top line, bottom half	training cartridge		What the device is
bottom line, bottom half	1323, number 104	1323, number 19	1323 (Islamic calendar) represents 1905, followed by the serial number

Table 1: Translation of the Ottoman text on Krupp sub-caliber training rounds.

The 4 general shell case head stamp layouts with Krupp shell case number: description

In total 4 general head stamp layouts are recognized, which will help the reader to easily identify the Krupp shell case number. On the next page images are shown. Deviations from this layout are rare.

Type 1 layout: for export, 1908 only (only 2 examples found)

- Shell case is dated 1908 at 6-o-clock position
- Only the year of manufacture is stamped, not the month
- Shell case is manufactured by DWM, possibly BMF also exists
- Shell case does not have a German acceptance mark
- Krupp number is stamped in the original stamp (not afterwards) at 12-o-clock position

Type 2 layout: for export 1909 – 1918, and war-time production for Germany 1917 – 1918 (most common layout)

- Shell case is dated between 1909 and 1918
- Only the year of manufacture is stamped, not the month
- Krupp number is stamped in the original stamp (not afterwards)
- Krupp number is on the same radius and in the same font as the year of manufacture
- Krupp number is always right from the year of manufacture (1 possible deviation found, see figure 20)
- Krupp number and year of manufacture are always on the 6-o-clock position
- Shell case is manufactured by DWM or BMF
- Shell case does not have a German acceptance mark

Type 3 layout: export specific for Bulgaria, 1914 - 1918, with Cyrillic Bulgarian text

- Shell case is dated between 1914 and 1918
- Only the year of manufacture is stamped, not the month
- Shell case is manufactured by DWM (without "flaming bomb"), possibly BMF also exists
- Krupp number is never head stamped afterwards but always stamped in the original stamp
- Head stamp layout is "year of manufacture – ФРИДЪКРУПЪ (Friedrich Krupp) – case number – Карлсруе (Karlsruhe)"

Type 4 layout: war-time production for Germany, 1918, only Krupp number 119 ^{A} and 917

- Shell case is dated 1918
- The year (3-o-clock position) and the month (9-o-clock position) of manufacture are stamped
- German army acceptance stamp "Sp255" is stamped on the left side of the 6-o-clock position
- Krupp number "119 ^{A} " or "917" is stamped on the right side of the 6-o-clock position
- Both army acceptance stamp and Krupp number are stamped in the original stamp (not afterwards)
- A Krupp acceptance stamp "h" is stamped under the army acceptance stamp (every 37x94R44 shell case since lot 3 of May 1918; lot 1 and 2 from May 1918 have no 119 ^{A} Krupp number and a different Krupp acceptance stamp "g")
- Krupp number is on the same radius and in the same font as the army acceptance stamp
- Shell case is manufactured by DWM, represented by the letter "K" for Karlsruhe left side on the 12-o-clock position, combined with a lot number right side on the 12-o-clock position

The 4 general shell case head stamp layouts: typical examples (all manufactured by DWM)

Figure 18: Layout number 1 (left), export 1908. Layout number 2 (right), export 1909-1918.

Figure 19: Layout number 3 (left), export for Bulgaria with Cyrillic Bulgarian text. Layout number 4 (right), war-time production for Germany with army acceptance stamp Sp255.

Deviations from the general layout: rare but they do exist

Very few deviations from the general layout have been found, and with some examples this is also a reason to doubt if it really is a Krupp shell case number. During the study some numbers, originally wrongfully identified as Krupp shell case numbers, were later identified as lot numbers. This study has shown you really need to see several examples before you can be sure about the interpretation of a number.

Figure 20: The only 2 deviations from the general layout found. Left a shell case where number 431 is stamped left of the year (significant chance this number is not a Krupp number, more details in Appendix A). Right a shell case with a unique layout where the number 40 matches the shell case that goes with this number (theoretically it can still be a lot number but this would be highly unlikely).

Figure 21: Post-WW1 shell case manufactured by Polte with Krupp drawing number 843 with different layout.

Overview of currently known Krupp shell case numbers (page I of II) [5,6,7,8,9,10]:

Abbreviations used:

- Shell case shape: s = straight (most are actually tapered), n = necked.
- M = Manufacturer: K = Karlsruhe, B = Berndorf, L = Lorenz, P = Polte
- All cases have 33 mm screw-in primers unless stated otherwise at "remarks".

No.	Shell case (mm) and shape (x)	Artillery piece	Country	M	Years found	Remarks
1?	25x106R36? (n) (estimated)	25 mm Hotchkiss Revolver, navy gun	Germany	L		Introduced 1878/1879?
5	37x94R44 (n)	3,7 cm Hotchkiss, Maxim-Nordenfelt, Krupp license; L/23 revolver, navy; L/23 mountain gun; L/20 sub-caliber; TAK M1918	Belgium?	K	1910, 1912	8 mm Hotchkiss press-in primer
119?			Germany			Introduction 16 mm screw-in primer, September 1897.
119 A			Germany, Turkey (other?)		1911 1914-1918	Krupp 16 mm screw-in primer. Introduced February 1899.
917	37x101SR43 (n)	3,7 cm Krupp L/14,5 M1917, anti-aircraft gun	Germany (and allies?)	K	1917, 1918	Krupp 16 mm screw-in primer
15	57x250R73 (n)	5,7 cm Gruson L/25 M1892, field gun	Bulgaria	B	1910	16 mm screw-in primer
178	57x359R69 (s)	5,7 cm Krupp L/40 SK M1902?, navy gun	Turkey	K	1905,1910, 1916	
31	70x134R82 (s)	7 cm Krupp L/14 M1898, mountain gun	Dutch East-Indies?	K	1910	
835	75x117R87 (n)	7,5 cm Krupp L/14 M1912, mountain gun	Bulgaria	B	1914, 1915	
				K	1914, 1916	
40	75x117R88 (s)	7,5 cm Krupp L/14 M1904, mountain gun	Turkey, China	B	1911, 1913	
73			Bulgaria	B	1911	
				K	1916, 1917	
654	75x129R85 (s)	7,5 cm Skoda L/13 M1915, mountain gun	Turkey	K	1917	
785	75x211?R90 (?)	?	Paraguay?	B	1909, 1911	Possibly cut down
843	75x168R90 (n)	7,5 cm Krupp L/13 M19??	Netherlands	P	1919	
42 II A	75x215R88 (s)	7,5 cm Krupp L/28 M1905, light field gun	Brazil	B	1909	
21	75x278R90 (s)	7,5 cm Krupp L/30 M1903, field gun	Turkey	B	1909, 1914	Krupp primer with Ottoman text
				K	1916, 1917	
21 II	75x278R90 (s)	7,5 cm Krupp L/30 M1905 (F.R.C. license build M1903), field gun	Belgium	B	1909	Always Belgium made primer
				K	1912	
858	75x278R90 (s)	7,5 cm Krupp L/30 M1903, field gun	Bulgaria	K	1912, 1913, 1915, 1916	

Table 2a: Overview of known Krupp shell case numbers (I of II).

Overview of currently known Krupp shell case numbers (page II of II):

No.	Shell case (mm) and shape (x)	Artillery	Countries	M	Years found	Remarks
660	75x278R90 (n)	7,5 cm Krupp L/30 M1909, field gun	Argentina	K	1909, 1910	
			Chile	B	1910, 1911	
			Turkey	B	1913	
112	75x278?R90? (n?)	7,5 cm Krupp L/30 M1909, field gun?	Bulgaria	K	1912	
93	75x455R116 (n)	7,5 cm Krupp L/40 M19??, navy gun	Turkey	K	1910	
904	76x697R93 (s)	7,6 cm Schneider-Canet L/45 M1912, anti-aircraft gun	Turkey?	K	1915	13 mm primer
845	76,2x382R95 (n)	Ex-Russian 76,2 mm L/30 Putilov M1914/1915, anti-aircraft gun	Bulgaria	K	1917, 1918	
913	80x586R100 (n)	8 cm Krupp L/45 M1916, anti-aircraft gun	Turkey	K	1916	
650	98x280R112 (n)	8,8 cm Krupp M1895 L/35/40/45, navy gun (salute)	Turkey	K	1916	
914	88x563R112 (n)	8,8 cm Krupp L/45 M1916, anti-aircraft gun	Turkey	K	1916	
914 A				K	1917, 1918	
784 II	105x120R109 (n)	Captured 10,5 cm Krupp or Schneider mountain howitzer?	Bulgaria	B	1915	
807 III A	105x136R122 (n)	10,5 cm Krupp L/16 M1911, howitzer	Chile	K	1911	
		10,5 cm Krupp L/14 M1912, howitzer	Romania	B	1913	
698 II	105x148?R121 (n)	Unknown 10,5 cm Krupp	Brazil	K	1908, 1909	
44	105x395R125 (s)	10,5 cm Krupp L/30 M1905, siege gun	Bulgaria	K	1916	44 A not found yet, but must exist dated 1916 and/or 1917
44 A				-	-	
44 B				K	1917	
915	105x650R129 (n)	10,5 cm Krupp L/35 L/45 M1895, navy gun? 10,5 cm Krupp field gun?	Turkey	K	1916	
164	105x655R129 (n)	10,5 cm Krupp L/35 L/45 M1895, navy gun	Greece?	K	1914, 1916	
670	149.1x237R170 (n)	14,91 cm Schneider-Canet L/12 M1897/1905, howitzer?	Bulgaria?	B	1912	
300	150?x560?R170? (s?) Maybe 150x575R176 (s)?	15 cm Krupp L/40 L/45 M1895, navy gun?	Turkey	B	1911	
166 A	???x641?R176? (?) Maybe 150x742R175 (s)?	15 cm Skoda L/40 L/45 M1896, navy gun?	?	B	1914	22 mm primer, case probably cut down
690	?x?R~90 (?)	?	Siam?	K	1908	
431?	170?x960?R220? (?) Maybe 170x1051R203 (s)?	17 cm Krupp L/40 M1895, navy gun?	?	K	1913	Not sure if 431 is a Krupp number

Table 2b: Overview of known Krupp shell case numbers (II of II).

Superscript capital letter used in the Krupp numbering system…. and does Krupp number 119 exist?

Hypothesis: Superscript capital Latin letters are used to indicate a (minor) modification to the shell case, with the need for a new drawing, while remaining backwards compatible with the designated gun. The letters are used chronologically according the Latin alphabet. Only "A" and "B" have been found. I consider this hypothesis very likely to be correct.

Due to the approach of this investigation by looking for many examples and look for correlations, it took a long time before it became clear to me what the superscript letters most likely represent. There are a few examples where Krupp numbers are used with and without a superscript letter. For example, Krupp number 914/914 ^{A} and 44/44 ^{B}. I noticed that shell cases with a higher superscript letter are never of an earlier date than the shell cases without or with a lower superscript letter. My hypothesis is therefore, that the superscript indicates a minor modification, or modernization, of the shell case that required a new drawing. The shell cases are backwards compatible for the same gun.

Does Krupp shell case number 119 for the 37x94R44 shell case exist?

Hypothesis: The 37x94R44 shell case with Krupp number 119 was introduced in September 1897 with the introduction of the 16 mm Krupp screw-in primer. Krupp number 119 ^{A} was introduced in February 1899 with the introduction of the "C.97/98" head stamp and a 0.1 mm longer shell case.

This is a nice bridge to the discussion on Krupp shell case number 119 ^{A} and the question if the Krupp shell case number 119 also existed, although no shell cases have been found with 119 stamped. I believe Krupp shell case number 119 was introduced in September 1897 (see figure 22), with the introduction of the 16 mm Krupp screw-in primer. The oldest 37x94R44 shell cases with 16 mm Krupp screw-in primer I found are dated September 1897. Interestingly all the 3 cases I found that are dated September 1897, have a very specific and unique head stamp. I believe this is from the first testing phase for the German navy. The shell cases have "1D" (where the number 1 is for lot number 1) and the letter "D" stamped afterwards at the 6-o-clock position, and 2 out of the 3 shell cases have a double German navy acceptance mark. The double German navy acceptance mark is extremely rare and after seeing ~ 500 different 37x94R44 head stamps I can safely say this is the only date found with a double German navy acceptance mark on 37x94R44 shell cases. I currently have no idea what the letter "D" indicates, but it is clear the shell cases have been re-used since they have double German navy acceptance marks and/or punch holes indicating re-load.

I first suspected that during this testing phase, using only lot 1, slight modifications were made to the shell case on request of the German navy, resulting in Krupp shell case number 119 ^{A}. The letter "D" and the double German navy acceptance mark are not present anymore with lot 2, manufactured in October 1897. I first believed that the shell cases of lot 2 and up, are all Krupp shell case number 119 ^{A} and only lot 1, dated September 1897, is Krupp shell case number 119. I have not been able to measure a statistically significant difference between these lot 1 shell cases and later shell cases, as the weight and dimensions vary a lot. I am convinced a (minor) difference is there, I suspect only the original documents will tell us what the actual difference is.

Note: In Mellichamp [4], volume 1, page 383 there is an erroneous drawing where a shell case with 16 mm Krupp primer from January 1897 is depicted (with lot number 12). That would make it significantly older than the shell cases from September 1897 (with lot number 1) that I stated are the first. I am convinced the depicted shell case is actually from January 1898, as lot 12 is indeed from January 1898. This shell case as drawn by Mellichamp cannot exist (see figure 23).

Figure 22: The earliest 37x94R44 shell cases existing with a Krupp 16 mm screw-in primer, dated September 1897. All 3 found examples are marked with “1D” and show signs of re-loading.

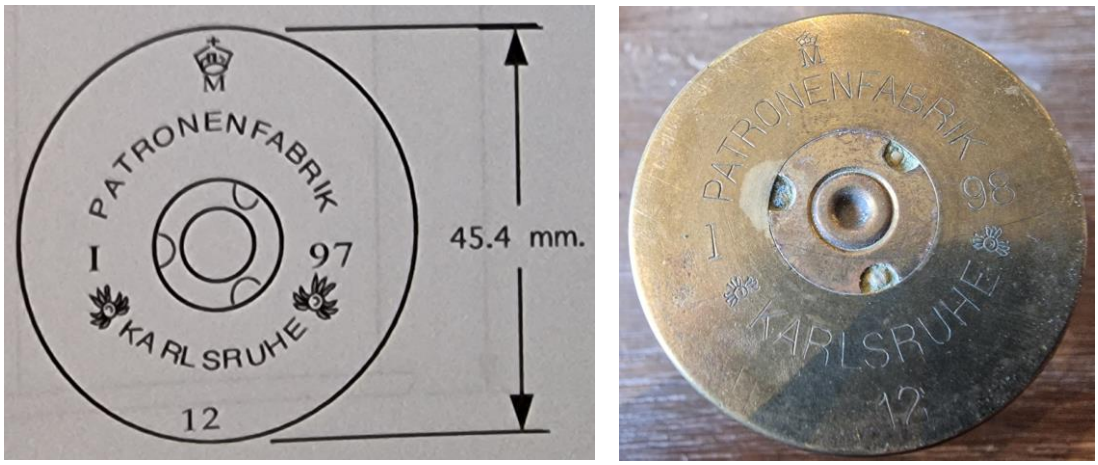

Figure 23: Left the drawing from Mellichamp with the wrong year, right shows proof of lot 12 dating January 1898.

Later I realized that in February 1899, all of a sudden, the head stamp layout changed and the lot numbering re-started at 1. The head stamp before this date showed a German navy acceptance mark at the 12-o-clock position, per February 1899 the text “C/97.98” was added. With the introduction of the Krupp 16 mm screw-in primer the lot started at 1 in September 1897, and ran up consecutively to lot 68 in January 1899. It is remarkable that all of a sudden they re-started lot numbering, unless there is a good reason. It seems likely this is the actual introduction of Krupp shell case 119 ^{A} and also Mellichamp states this on page 385. I have not been able to measure a statistically significant difference explaining what the actual change is that required a new drawing number. Mellichamp states the introduced change was a 0.1 mm longer shell case. I can only assume he found a reference for this statement, based on the fact that he shows on page 396 a drawing from original Krupp blueprints. It would be a valid reason to introduce a new drawing number 119 ^{A}. Due to the large variability in dimensions of these 37x94R44 shell cases this small change could not be verified by me (variation between cases is larger than 0.1 mm).

The new layout for Krupp shell case 119 ^{A} was used until lot 186 in May 1906 (consecutive lots). Although the head stamp layout changed after this date, the Krupp shell case number presumably remained the same until the end of WW2.

Figure 24: Left the layout introduced September 1897 (lot 1) with the introduction of the 16 mm Krupp primer, Krupp number 119, used until January 1899 (lot 68). Right the layout since February 1899 (lot 1) with the introduction of the modified Krupp shell case 119 ^{A}, used until May 1906 (lot 186).

Although Mellichamp (probably based on archive material) and myself (based on logic) agree about the existence of Krupp shell case 119 and 119 ^{A}, including their respective dates of introduction, there is a remark in his book that needs discussion.

Mellichamp states in volume 1, page 359, that Krupp shell case number 119 ^{A} was introduced with the C/97.98 shell case (correct) combined with a C/13 primer (not correct). There is no relation to the C/13 primer, as this primer was introduced in 1913 and there is proof of a 119 ^{A} marked 37x94R44 shell case from before that date (see figure 13). Additionally, the 16 mm Krupp primer introduced in September 1897 is fit compatible with the C/13 primer and does not require a new drawing. It is also against his own (correct) statement that Krupp shell case number 119 ^{A} was introduced with the "C/97.98" stamped shell case in 1899 on page 385.

Note: I am planning a second article on the German made 37x94R44 shell case where I will discuss the existing head stamps chronologically in more detail. During this investigation I collected ~ 500 different head stamps worthwhile of a separate article to share with the collector world.

Roman numerals in the Krupp numbering system

Hypothesis: Latin superscript numerals are used to indicate the primer configuration of the shell case. No Latin numeral indicates delivered with fixated primer, Latin numeral "II" indicates delivered without primer and Latin numeral "III" most likely indicates delivered with transport dummy primer or delivered with separated primer. I seriously doubt this hypothesis but I have nothing better (yet).

For the Roman numerals used in the Krupp numbering system it is a bit less obvious. Several Krupp numbers exist with Roman numerals "II" and "III". However, only 1 Krupp number is known with and without Roman numeral. This is Krupp shell case number 21/21 ^{II} for the 75x278R90 shell case for the 7,5 cm Krupp L/30 M1903 field gun, where number 21 is for Turkey and number 21 ^{II} is for Belgium. A different Krupp number means a different shell case drawing and therefore there must be a difference from a manufacturing point of view. I was able to measure both cases (several examples) and was unable to find any measurable significant difference in dimensions and weight. My statement is therefore the Roman numeral is not directly related to the shell case manufacturing process, as they are exactly the same. In favour of this statement is that I also found a shell case with Krupp number 21 ^{II} with a Turkish primer normally found in Krupp number 21. This shows the shell cases with Krupp number 21 and 21 ^{II} are interchangeable, including the primer.

The only difference I am aware of is that shell cases with Krupp number 21 for Turkey are always supplied with a Krupp primer, while the shell cases with Krupp number 21 ^{II} for Belgium are always fitted with a Belgium made primer. My hypothesis is therefore, that Roman numerals are used to indicate shell cases that are shipped as final Krupp product with a different primer configuration on customer request. For the example of Krupp number 21 and 21 ^{II} it means Krupp number 21 is shipped with fixated Krupp primer while Krupp number 21 ^{II} is the same shell case, but shipped without primer.

So what about Roman numeral "III" as found with Krupp number 807 $^{III\,A}$? Currently I can only guess as I have not found the same case with Krupp number 807 or 807 ^{II} to verify a difference. Based on the hypothesis for Roman numerals I can imagine these shell cases are fitted with a transport dummy primer, as often found in South-America. Alternatively, it could also indicate that the primers are delivered with the shell case but not fixated but separated.

Figure 25: Left shell case number 21 for Turkey, then number 21 ^{II} for Belgium with Belgium made primer, then number 807 $^{III\,A}$ presumably for Romania, right a typical dummy transport primer found frequently in South-American counties like Argentina, Chile and Paraguay.

Shell cases with Roman numeral "I" are not found, what could indicate that "configuration I" with fixated primer is the baseline configuration and therefore not added to the head stamp. Shell cases with Roman numerals "IV" or higher are also not found.

Bulgaria: a special customer?

From the overview in table 2a and 2b it is clear that shell cases intended for Bulgaria have unique Krupp shell case numbers, and this is something I was not aware of before this investigation. It actually helps identification sometimes, meaning that if you find exactly the same shell cases but with 2 different Krupp shell case numbers, one of them must therefore be for Bulgaria.

Some Krupp shell case numbers can be directly linked to Bulgaria, e.g., number 835 is a well-known example only used by Bulgaria and no other countries (unless captured or used after WW1).

Several other Krupp shell case numbers for Bulgaria, e.g., 858, are used for a shell case that also exists under another Krupp shell case number 21/21 ^{II} (for Turkey and Belgium).

It is unclear why Krupp has decided to have specific Krupp shell case numbers for Bulgaria. It could be dimensional tolerances (including strengthening) or deviating brass material composition. Original Krupp shell case drawings will be needed to find the difference.

Summary and final words

By collecting many examples and looking for correlations it became clear for me these numbers represent a numbering system by Krupp that describes the shell case. Just before publication an original Krupp drawing was found that supports this hypothesis. It also became clear shell cases for Bulgaria had a different Krupp number than the same shell case for other countries. Hypothesises are given for the meaning of superscript capital Latin letters and Roman numbers. Although I suspect in the early days the Krupp numbering system was simple and chronological (1,2,3,4,5, …), it seems already around 1900 logic disappeared and I see no logic system anymore in the given shell case numbers.

In theory all Krupp shell case numbers can be found in archives, by finding the original Krupp drawings. Although I do intent, if time allows, to visit archives in The Netherlands, Belgium and Germany I do not suspect or intend to find all of them, but it would be great if an original Krupp listing of all the shell case numbers would be found!

For now I hope you liked this publication, and that you will share any feedback or new information you have on the subject!

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First I want to thank all active members on the BOCN, NVBMB and IAA websites! Special thanks goes to the following people who really helped me out by access to their collections and/or fruitful discussions on the subject.

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Appendices

Appendix A: Detailed description of shell cases found with Krupp shell case numbers

In this chapter I will show details found on the shell cases with Krupp shell case numbers, in order of the caliber of the shell case. The artillery piece for these shell cases is not discussed, it can be found in Table 2a and 2b. I will also comment on the experienced rarity of the shell case, and how to recognize a specific country.

37x94R44: Krupp number 5 and 119 [A].

Only 3 shell cases have been found with Krupp shell case number 5, dated 1910 (2x) and 1912 (1x). This is for a 37x94R44 shell case with a 8 mm Hotchkiss press-in primer. They are all found in Belgium or near the Dutch/Belgium border. The Netherlands stopped importing these shell cases around 1900, therefore it is most likely a shell case for Belgium. It is even more likely this is a general Krupp number for the 37x94R44 with Hotchkiss press-in primer, but most countries did not use this gun anymore or had their local shell case manufacturing by this time. I consider this shell case rare.

Number 119 [A] is the most common Krupp number you can find. Most cases are dated war-time (1915-1918) and have German army acceptance marks ("Sp255") but one example has been found dated 1911 with a solid primer that is intended for export. In Mellichamp [4] examples are given of shell cases without German acceptance stamp for Turkey, identified by the Ottoman navy acceptance mark (see figure 27) and/or Turkish made primers (As.Fb., see figure 26). These shell cases are found all over the world and I have seen many foreign primers (Dutch, Norwegian, Swedish, …) in German army accepted cases making actual country identification nearly impossible.

Figure 26: Left a 37x94R44 with Krupp number 5 dated 1912 (Belgium?), middle a 37x94R44 with Krupp number 119 [A] dated 1911 (export), right a Turkish example dated 1915 [4].

Note: I will publish a separate article on the German made 37x94R44 shell cases.

37x101SR43: Krupp number 917.

This second most common shell case, after the 37x94R44, is found dated 1917 and 1918 only. This shell case is not found without Krupp shell case number 917 and all shell cases are intended for Germany as they all have a German army acceptance mark "Sp255".

57x250R73: Krupp number 15.

This shell case is only found dated 1910 (3x). As this shell case is for a relative outdated gun, and most countries made their own shell cases around 1910, I suspect this shell case to be for Bulgaria. Bulgaria always has unique Krupp numbers, so it is possible the same shell case exists with a different Krupp number.

57x359R69: Krupp number 178.

This shell case is for the Ottoman navy and can be found (not always) with an Ottoman navy acceptance mark. Hard to find as they only are used in Turkey, but I have seen several examples (4x).

Figure 27: Two examples of an Ottoman (Turkish) navy acceptance marks.

70x134R82: Krupp number 31.

This shell case is used by the Royal Netherlands East Indies army (currently known as Indonesia) but also found in South-Africa without Krupp number. As the Germans had colonies in South-Africa during this time frame, and cases found in South-Africa have a German acceptance mark, a Krupp shell case number is less logical. Therefore I suspect Krupp number 31 was for the Royal Netherlands East Indies army. Only 1 shell case with Krupp number 31 was found.

Figure 28: Left a Royal Netherlands East Indies army 1902 dated shell case, recognized by the primer (P.W. is for “Pyrotechnische Werkplaatsen”, “H” is unknown but suspected to mean “hervuld” meaning re-filled), middle a German 1908 dated shell case with zinc transport primer found in South-Africa, right a 1910 dated shell case with Krupp number 31.

75x117R87: Krupp number 835.

This shell case is for Bulgaria. Although 1 shell case was found with Ottoman primer, I do not think this shell case was delivered to Turkey. The primers are interchangeable and Bulgaria used many Ottoman artillery and ordnance captured from the Ottomans during the Balkan wars. Interesting is the image below showing this shell case depicted in an official Spanish 1941 dated manual. This shell case is common (> 20 found).

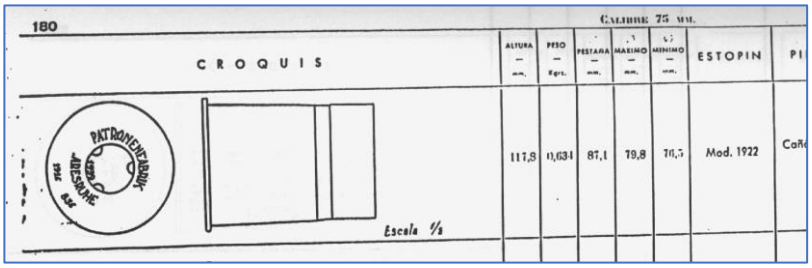

Figure 29: Shell case with Krupp number 835 shown in Spanish 1941 dated ordnance manual.

75x117R88: Krupp number 40.

This shell case is found in Turkish use and in Chinese use. Turkish cases are uncommon (4x found) but show up frequently, also a sub-caliber device was found. Chinese cases are harder to find (1x found) and harder to recognize as such. China also made their own cases. This shell case is also depicted in Japanese World War 2 manuals showing Chinese captured ordnance.

Figure 30: Chinese shell case Krupp number 40 next to a Chinese made shell case. Right a Turkish shell case with Krupp number 40 and an Ottoman army acceptance mark.

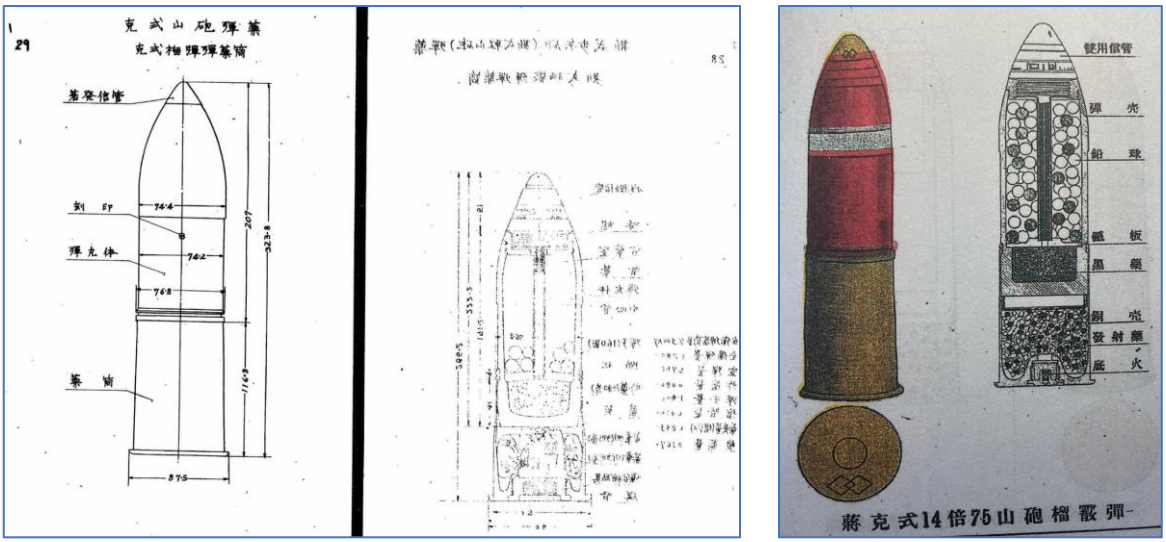

Figure 31: Left, images from Japanese captured ordnance report; right, images from a Chinese ordnance manual.

75x117R88: Krupp number 73.

As stated before it seems Bulgaria is the only country that has unique Krupp shell case numbers. This is shown by Krupp shell case number 73 for Bulgaria, which is the same shell case as Krupp shell case number 40 for Turkey and China. I have found ~10 examples with 2 head stamp layouts, classical layout and Bulgarian Cyrillic layout.

Figure 32: Bulgarian shell cases with Krupp number 73 in classic layout and in Bulgarian Cyrillic (Patronenfabrik Karlsruhe).

75x129R85: Krupp number 654.

Only 1 shell case with Krupp number 654 has been found. The shell case is dated 1917 and has an Ottoman primer.

75x211?R90: Krupp number 785.

Only images of 2 cases where found, where 1 shell case had a zinc transport primer and was found in Paraguay. The other shell case came with dimensions, I am not sure if the shell case has been cut down, but I do suspect so.

75x215R88: Krupp number 42 $^{II\,A}$.

This shell case is found in Brazil but has no clear identifiers for Brazil. I also found several of these cases in Brazil dated 1906 and 1908 without Krupp number.

75x168R90: Krupp number 843.

This shell case is found once, made by Polte dated 1919. It is the first and only shell case found that has “Mh.” head stamped where I believe this means “Metallhülse” and is the same as the Krupp shell case numbering system. The same shell case was also found once manufactured by the Dutch “Hembrug Artillerie Inrichtingen”, dated 1928. These shell cases are extremely rare, these are the only 2 examples I know of.

75x278R90: Krupp number 21, 21 II and 858.

All three cases are pretty common and are for specific countries, identifiable by their Krupp shell case numbers. Krupp number 21 is for Turkey (supplied with primer), Krupp number 21 II is for Belgium (supplied without primer) and Krupp number 858 is for Bulgaria. I have not been able to measure a significant difference in weight or dimensions between the three shell cases and I consider them interchangeable. I have found Turkish shell cases with Belgium primers in Belgium.

Turkish shell cases with Krupp number 21 typically have primers with in Ottoman the word “Krupp” (see figure 15), Belgium shell cases with Krupp number 21 II always have Belgium made primers (see figure 33) and Bulgarian shell cases with number 858 are found in many different layouts. Typical Bulgarian identifiers are the Bulgarian lion, Cyrillic Bulgarian text and/or typical reload marks like the Cyrillic letter “T”. In addition, you will often find acceptance marks or digits indicating the year of reloading (see figure 34).

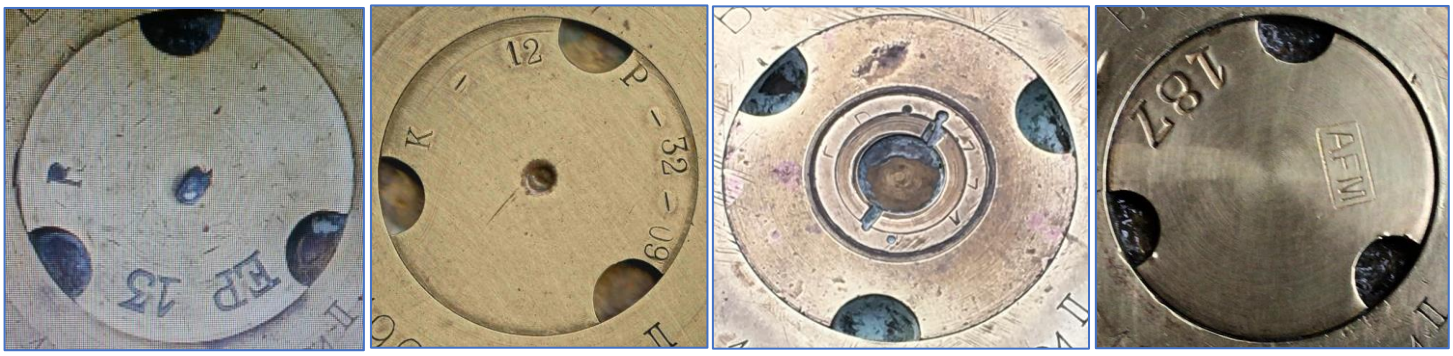

Figure 33: Several examples of Belgium primers found in the 75x278R90 with Krupp number 21 II.
(EP = Ecole Pyrotechnique, Antwerp; AFM = Ateliers de Fabrications Militaires)

Figure 34: Typical Bulgarian identifiers on the 75x278R90 with Krupp number 858. Left Cyrillic Bulgarian text, middle Bulgarian lion, right a typical Cyrillic letter “T” (actual meaning unknown but most likely a re-loading indicator).

75x278R90: Krupp number 660 and possibly 112.

Krupp number 660 is found in several countries, like Argentina, Chile and Turkey and they are pretty common. Krupp number 112 is very rare, I only found 1 image, and is intended for Bulgaria. As Bulgaria had significant amounts of captured Ottoman artillery from the Balkan war, it is known Bulgaria also used the Ottoman 7,5 cm Krupp L/30 M1909 field gun that uses shell cases with Krupp number 660. I suspect Krupp number 112 is for the Bulgarian shell case, as from this study it became clear Bulgaria always received unique Krupp shell case numbers. Hopefully I will find such a shell case with Krupp number 112 to verify the dimensions and neck as found on Krupp number 660.

Chilean and Argentinean shell cases have recognizable marks. On shell cases from Chile you will find a typical shield with inside a 5-pointed star. On Argentinean shell cases you will find “RA” in a circle, for “República Argentina”, and often a sun-like mark (5 stripes in a circular pattern with increasing thickness of each stripe).

Figure 35: Left a Chilean shell case, middle and right a Argentinean shell case with respectively “RA” for República Argentina and the sun-like mark.

75x455R116: Krupp number 93.

Only 1 shell case has been found, dated 1910. The shell case has the acceptance mark of the Turkish navy (see figure 27).

76x697R93: Krupp number 904.

Only 2 shell cases have been found, dated 1915. They are not for a Krupp artillery piece, but for captured artillery. They have a 13 mm primer.

76,2x382R95: Krupp number 845.

Only 2 cases have been found, dated 1917 and 1918, intended for Bulgaria. They are not for a Krupp artillery piece, but for captured artillery.

80x586R100: Krupp number 913.

Only 2 shell cases have been found, dated 1913.

88x390R112 and/or 98x280R112: Krupp number 650.

Only 1 shell case has been found, dated 1916. It is a factory cut down 88x390R112 shell case intended for salute. It is unclear if the Krupp shell case number 650 is for the factory cut down salute shell case, or for both the original and cut down shell case. This will become clear if a 88x390R112 with Krupp shell case number is found.

88x563R112: Krupp number 914 and 914 ^{A}.

Four cases in total have been found, only one with number 914. The difference between Krupp shell case number 914 (first model) and 914 ^{A} (slightly modified shell case) was not measurable.

105x120R109: Krupp number 784 ^{II}.

Only 1 shell case has been found. It is most likely for a captured Krupp or Schneider howitzer.

105x136R122: Krupp number 807 $^{III\,A}$.

Three shell cases have been found with number 807 $^{III\,A}$. One of the cases is marked with the Chilean shield (see figure 35, left), the other shell cases have a specific "ЯR" marking which is Romanian.

Figure 36: Shell cases with Krupp shell case number 807 $^{III\,A}$, left for Romania and right for Chile.

105x148?R121: Krupp number 698 ^{II}.

698 ^{II} is typically found in Brazil and has no clear identifiers. The length is an estimate based on a single available image. Three cases have been found.

105x395R125: Krupp number 44 and 44 ^{B}.

Only 1 shell case of both Krupp shell case numbers has been found. Several of these shell cases are found in Bulgaria and Turkey dated before 1908 and hence without Krupp shell case number. They are used for captured Ottoman artillery by Bulgaria. Krupp shell case number 44 ^{A} will exist as well, but has not been found yet.

105x650R129: Krupp number 915.

Only 1 shell case has been found. Possibly this is the same shell case as Krupp shell case number 164 (105x655R129), and if that is the case, one of these shell cases was intended for Bulgaria as Bulgaria had unique Krupp shell case numbers. However, this specific shell case dimension is referenced [6] as a field gun and may possible be a different shell case after all.

105x655R129 : Krupp number 164.

Three shell cases have been found. One shell case has a very specific mark, a “double arrow pointing to each other”, which I suspect to be Greek as I found a faint but comparable mark on a Greek 1918 dated shell case (no sharp image available). I also found this mark on a 47x158R64 export case made by Patronenfabrik Karlsruhe (indicated by the letter “K”). It is not clear if these shell cases were intended for Greece, or that the Greek marking was added later when ammunition was captured from Turkey or Bulgaria. Finding more examples will probably help to identify this shell case.

Figure 37: Left the unknown mark on shell case with Krupp number 164 (suspect Greece), middle the same mark found on a 47x158R64 shell case, right a shell case with zinc transport primer.

149.1x237R170: Krupp number 670.

Only 2 shell cases have been found. They are for captured artillery.

150?x560?R170?, probably 150x575R176: Krupp number 300.

Only 1 shell case has been found. Besides the possibility the shell case has been cut down (trench art), I also doubt the given measurements making identification very difficult. The shell case does have a Ottoman navy acceptance mark. I suspect the shell case actually measures 150x575R176. Reliable measurements will be needed to positively identify this shell case.

150? x 641? R ~176, probably 150x742R175: Krupp number 166 [A].

Only 1 shell case has been found dated 1914, and the measurements are unreliable. The shell case has a zinc dummy primer of 22 mm. This smaller primer size is typical for Austro-Hungarian shell cases. As Austro-Hungary did not have to order Krupp shell cases due to their own ordnance industry, this is most likely a war-time shell case for a captured gun or a gun delivered by Austro-Hungary to support Turkey. Based on the primer size I estimated the rim diameter to be around 176 mm. Purely based on the estimated dimensions my best guess, looking at my references, would be the 150x742R175 shell case, which happens to be an Austro-Hungarian 15 cm Skoda L/40 L/45 M1896 navy gun. Reliable measurements will be needed to positively identify this shell case.

? x ? R ~90: Krupp number 690.

Only 1 shell case has been found in Thailand, formerly Siam. The rim diameter is estimated based on the standard 33 mm primer. Reliable measurements will be needed to positively identify this shell case.

170?x960?R220?, probably 170x955R203 and/or 170x1051R203: Krupp number 431?

This is for several reason a very strange shell case and unfortunately I only found images with unreliable measurements. The Karlsruhe made shell case is dated 1913 and number 431 is written left of the year. This is different than all other shell cases with Krupp shell case numbers, as these are always written right from the year. However, you can clearly see the year 1913 is printed off-centre compared to the word “Karlsruhe” and has the same layout as typical shell cases with a Krupp shell case number. Only the order is different. Therefore I think it is likely a Krupp shell case number.

The primer in this shell case deviates from the typical Krupp style or Austro-Hungarian style primers found, it actually is British which is something I have never seen before. The primer is marked “V.A.D. Mk E*” which is a layout for export. The naming “V.A.D.” for “Vickers Armstrong, Dartford was introduced in 1927. An intriguing example where primers are swapped long after the manufacture of the shell case.

Last but not least, this German made shell case has typical British navy style “cuts” or “slots” at the mouth of the shell case.

Summarized, it seems as if this is an original German made 17 cm L/40 shell case (170X1051R203 original length or 170x955R203 for the drill shell case) that was later adapted to a GB shell case that seems to resemble the US 6 inch L/47 shell case (170X972R199). Very confusing……

The shell case seems to be straight and due to the size I expect it to be for a 17 cm navy gun. With the given length of 960 mm, which could be cut down, only the 17 cm Krupp L/40 model 1895 is a likely candidate. This shell case measures 170x1051R203 mm. In my references I also have a 170x955R203 shell case as “EX” (German abbreviation for “Exerzier”, meaning drill). This is the best match with the given information.

Figure 38: Shell case with Krupp number 431?

Appendix B: DWM numbers[5]

Due to the availability of digital versions of original DWM catalogues covering 1882-1938 most collectors are aware of the so-called DWM numbers, used for all their items. From this you can easily deduce the numbers in this article are not DWM numbers. Several numbers are found in these catalogues representing small arms ammunition, e.g., number 40. In DWM this is a Henry Martini for Romania, while in the Krupp numbering system number 40 is a shell case for the 7,5 cm Krupp L/14 M1904 mountain gun. All images in appendix B come from the same original catalogue (~1885).

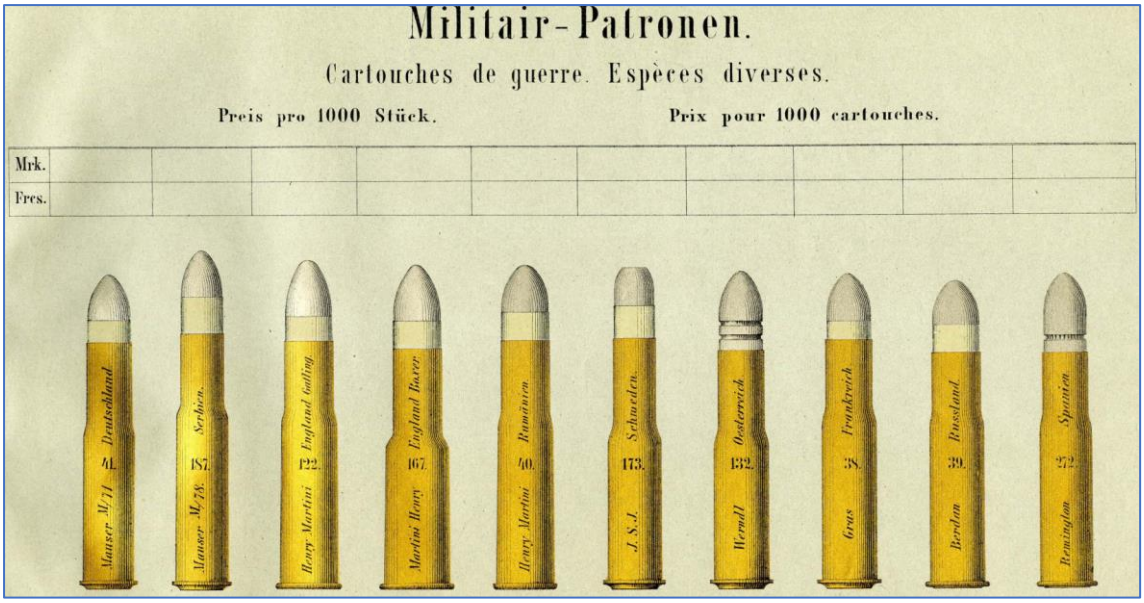

Figure 39: Overview of DWM numbers showing DWM number 40 for the Romanian Henry Martini.

Figure 40: Shown is DWM shell case number 172 for a 37x94R44 shell case. In the Krupp system this is number 5 (press-in primer), later modernized to number 119 and 119 ^{A} (16 mm screw-in primer).

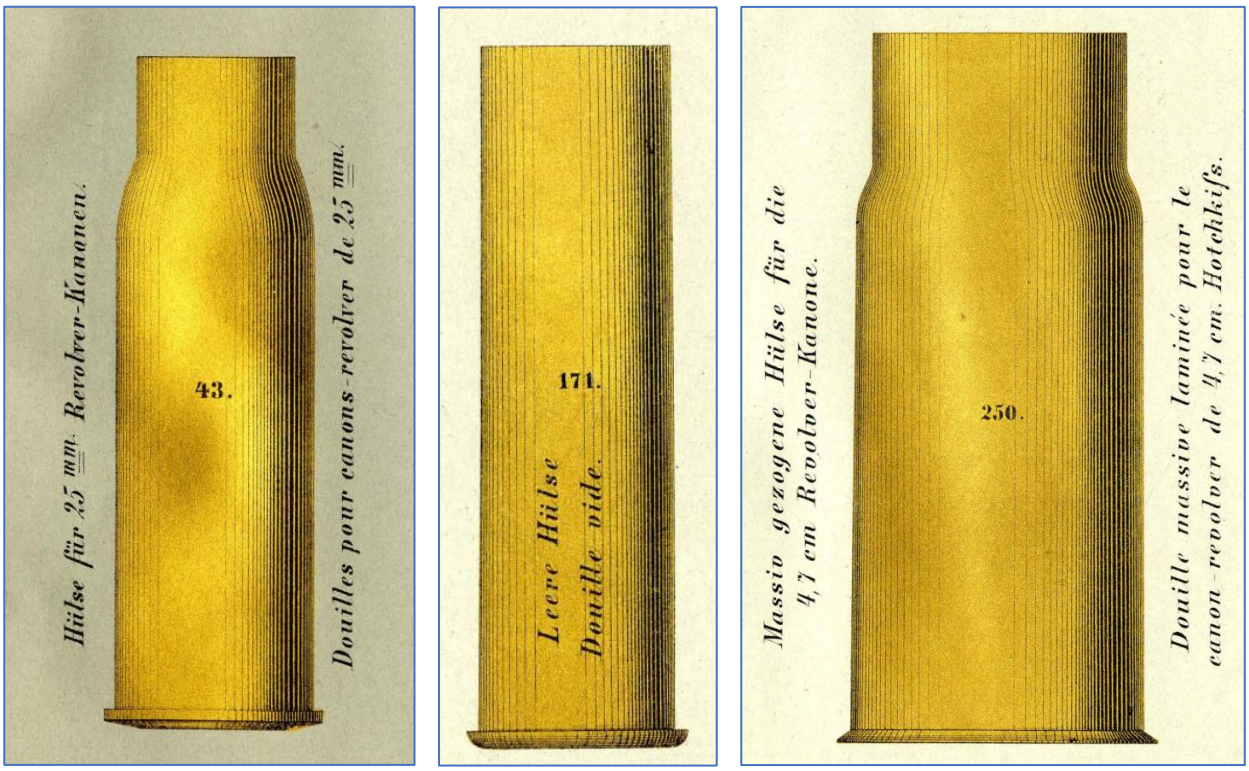

Figure 41: Left a 25 mm Hotchkiss revolver gun shell case (assumed to be Krupp number 1), in the middle a 25.4 mm (1 inch) Nordenfelt revolver gun shell case and right a 4,7 cm Hotchkiss revolver gun shell case.

Figure 42: Top a 4 cm mountain gun shell case, bottom a 5 cm mountain gun shell case.

DWM number	Shell case (mm)	Gun
43	25x106R36 (estimation based on drawing)	25 mm Hotchkiss revolver gun
56	50x197R63 (estimation based on drawing)	5 cm mountain gun
74	40x148R51	4 cm mountain gun
171	25,4x95R31	25,4 mm Nordenfelt revolver gun
172	37x94R44	3,7 cm Hotchkiss revolver gun
250	47x131R60	4,7 cm Hotchkiss revolver gun

Table 3: Overview of known DWM numbers for large caliber shell cases.

Appendix C: Another unknown numbering system on DWM cases

To make things even more confusing, another numbering system is well known among collectors that both does not fit the Krupp numbering system nor the DWM numbering system. Most likely this numbering system is related to a yet unknown customer for DWM shell cases, where they requested this specific head stamp. It is most probably a manufacturer of shell cases for civil use (e.g., civil shot shell guns, flare guns, salute guns, punt guns, etc.). These numbers are used until at least 1925.

Shell case number	Shell case (mm)	Weapon
18 C/2	37x94R44	3,7 cm Hotchkiss
47 A.E.	26x82R/100R/120R/135R	4 gauge shot shell and/or flare
93 and/or 93 D/3	55x100R64	salute
142 A	47x115R57	unknown
274	37x254R43	Canardiere caliber 2 duck punt gun
341	42x122R51	1.65 inch salute
366 A	51x155R57	2 inch punt gun

Table 4: Shell cases that are part of the unknown civil numbering system on DWM shell cases.

Figure 43: Four different head stamps for the unknown civil numbering system on DWM shell cases.

References

General sources for ordnance used for this article: www.bocn.co.uk, www.nvbmb.nl, www.forum.cartridgecollectors.org, Wikipedia, general internet search.

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