

“Feuerhand Sturmlaternen”

A Brief History and Description of the German post-war Kerosene Storm-Lanterns patented by Hermann Nier

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1 Introduction

In 1877 the silver ware maker Carl Hermann Nier (* **March 11th, 1854** - + **February 17th, 1921**) began to produce minor's lamps and household lanterns at Beierfeld, Saxonia, East-Germany (16, see # in References). On Jan. 2nd, 1902 he established the Nier-Feuerhand company at his home town which has produced kerosene lanterns since its foundation (1, 2). His three sons, Bruno, Curt, and Woldemar Nier brought the company up to the largest lantern producer in the 1930ies. The engineer Bruno Nier held many patents. He was the inventor of the hot blast lantern type Nr.201 and developed the small cold blast lantern "Baby" type. The lantern production was interrupted by World War II consequences and ceased at the end of 1944 because of the shortage of materials and the advancing Russian army. After the second World War the company restart the lantern production in 1947 at Luedenscheid and Hohenlockstedt north of Hamburg where the company was re-established in 1950. Figure 1.0 shows a recent view of the village Beierfeld during winter time looking form the eastern hills to the center with the prominent silhouette of the old FEUERHAND-NIRONA factory buildings.

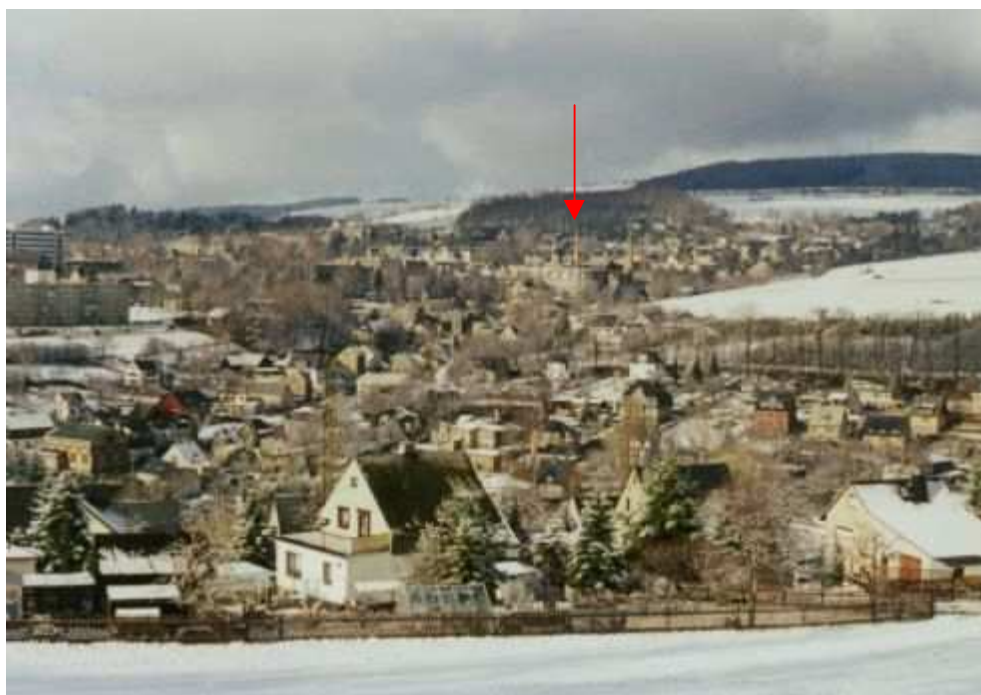


Figure 1.0: *Beierfeld/Sa., Winter time impression, view form the eastern hills (before 1999). The red arrow points to the buildings of the former FEUERHAND-NIRONA factories*

The visitor to Beierfeld can still see all the former real estates of the founder family and the factory halls built between 1902 and 1924 which were used by the Feuerhand company until 1946. In the year 2000 the condition of the buildings appear just as they look like in 1945. The following figure 1.1 shows a photo taken in summer 2000. The family grave of the founder family is located at the village cemetery.

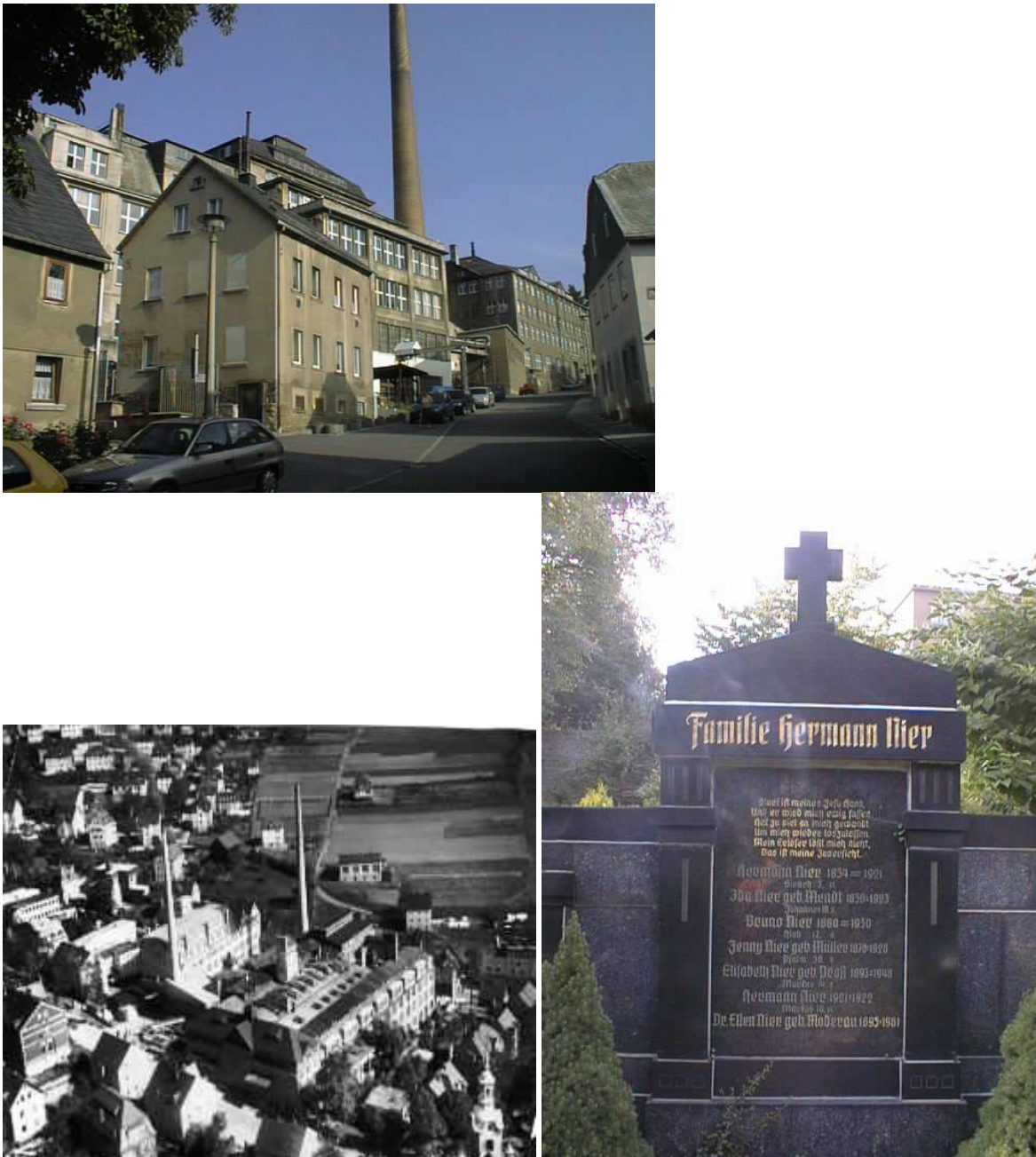


Figure 1.1: View of the FEUERHAND factory in summer 2000, aerial view from 1934, and the tomb of the founder family at the local graveyard in 2000

Hermann Nier and the company held many patents (3) which are listed in table 1. The first known patents date from 1902 and 1906 (figures 1.2 and 1.3). In 1933 the new series of "small storm lanterns" was developed called "Baby" (12). The smallest lantern of this series was the "Atom" Nr.75 which measured only 6.10 inch (15,5 cm). It was produced from 1938 to 1944. Offered as a bicycle tail light lantern for civil purposes, the "Atom" was also produced as military version with storm cap for the German Army (Wehrmacht). While marching on road traffic lines, soldiers had to fix the signal lanterns at their belts. The Nr.75 is a very rare and desired lantern today. The largest model of small lantern series is the "Baby Special" Nr.276 which is 10 inch tall (25,5 cm). The post-war production of small storm lanterns started in 1950 at Hohenlockstedt near Hamburg (2). The company "Reco-Feuerhand" has the exclusive right of the world wide distribution of Feuerhand lanterns and offers the +276+ "Baby Special" in different RAL-colors (10) besides a variety of other products, among them were electric road-construction signal lights (4). Refer to **Appendix A** for complete list of kerosene lantern models produced.

The collector can easily distinguish pre- and postwar production of Feuerhand Storm-lanterns by the origin-mark imprinted on the dome roof or in the fount, respectively. The production until 1945 was marked "Made in Germany". Lanterns produced from 1950 until today are embossed with the sign "W.Germany". Ten years after the German reunion the company has not revised their stamping tools on demand of the main customer of the company in Afghanistan who orders 100.000 lanterns per year.

Table 1: *Compilation of Hermann Nier's German patents/trade marks (continued on next page)*

Date	Patent / tm /utility model	German Patent / tm-, utility model numbers:
1902	Globe lifting crank mechanism	138941
1906	Globe lifting mechanism storm lantern	194290 (see figure 1.3)
1911	Pucca lamps	143791
1911	The Ourbar Lantern	144082
1912	drawing of a turtle etc.	153868
1912	Sunstar	154326
1912	Meine Freude (drawing of horses and a man)	159796
1913	Wegetrost	169114
1913	The Conqueror	176542
1913	Feuerhand trade mark	198871
1920	Feuerhand	257199
1920	Drawing of fire on a hand	257200 (see figure 4)
1922	Feuerhand and a drawing of different lanterns all together in a circle	279774
1923	Feuerhand Nr.252	297141
1923	drawing of a man working in a foundry	298738
1925	Feuerhand No.223 (drawing of the box for that lantern)	337391
1925	Feuerhand No.223 (other drawing of the lanternbox)	337392
1925	Feuerhand No.252 (other drawing of the lantern box)	337393
1925	Drawing of a burner, flame, light beam	339542
1926	Feuerhand Nr.202	355474
1926	Feuerhand Nr.201	355475
1926	Feuerhand Nr.327	357109
1926	Feuerhand Nr.305	357110
1926	Feuerhand Nr.323	357111
1926	Drawing of fire on a hand	357228
1926	Sturmlaterne (Storm Lantern)	424458 (see figure 2)
1928	Superflam	390105
1929	Drawing of fire on a hand	411201
1929	Drawing of lantern No.999, Chinese characters M&Co on the globe, hot blast lantern	404532 (for Melchers China Export at Bremen)
1933	Feuerhand Sempal-Glas (heat proof)	456975
1933	Drawing of a hurricane lantern top	457028
(1932 Start of new 'Baby'-series "small Baby lanterns")		
1933	Feuerhand Super Baby	461998
1937	Atom (Nr.75)	490623
1937	Feuerhand Baby	497162
1937	Feuerhand Medium	491917
1938	Name Feuerhand on hurricane lantern top	503838
1938	Feuerhand on a ring	503839
1939	Feuerhand on the globe	513167
1939	Drawing of lantern Nr.75	513168
1939	Feuerhand Lanterns (tm for carbide lamps)	513169
1939	Feuerhand burner	515278
1939	Feuerhand oil-sealed burner & wick 'Olalab'=Öl-Absperrung	515663
1939	Blaues Band - Blue Ribbon	517347 (see figure 3)
1940	Feuerhand carbide lamp	518854
1940	Feuerhand (drawing of 2 lanterns)	519476

Bruno Nier' US patents corresponding to previously listed German patents

US Patent	Subject of Claim	Acceptance Date	German patent No.
1,649,178	Burner Reflector	1927	424458
1,965,051	Side Tube Construction	1934	457028
2,004,826	Small Lantern Efficiency	1935	
2,101,409	Wick Tube/Burner Efficiency	1937	
2,105,292	Wind Proof against storm/shock	1938	503838
2,123,794	Wick Tube/Burner Efficiency	1938	
2,148,215	Sealing Fount against fuel spill	1939	515663

The first patent of Herman Nier (figure 1.3) describes a globe lifting crank system and was issued by the German Imperial Patent Office (Kaiserliches Patentamt) in 1902. This construction was applied to the hot blast lanterns Nr.323, Nr.423, and Nr.427.

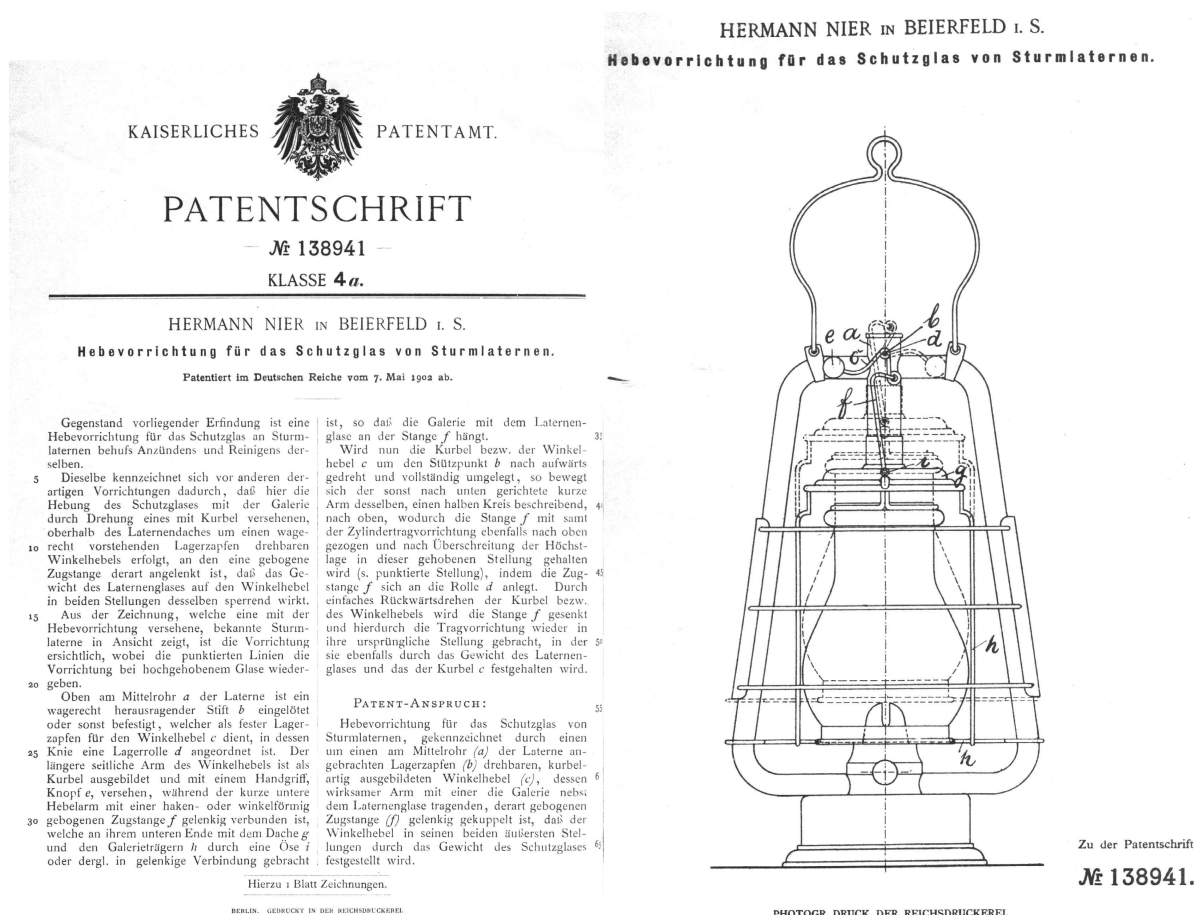
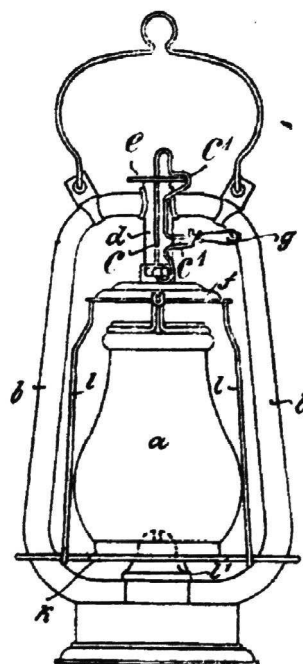


Figure 1.3: German Imperial Patent of Hermann Nier of Beierfeld/Saxonia, Nr. 138941, dated May, 27th 1902. The patent describes a new globe lifting crank system for the standard hot blast storm lantern. The lever *e* has to be turned right to lift the globe. This construction is characteristic for the pre-war hot blast lanterns Nr.323, Nr. 327, Nr.423, and Nr.427.

Figure 1.4 shows the second known patent of Hermann Nier which dates from 1906. It describes a globe lifting device for a typical hot blast lantern which were common at that time. The device is made from a specially bent steel wire to facilitate the handling to light the lantern. No known numbered Feuerhand hot blast lantern was produced with such a lifting device.

The essential objective of all patents by Hermann Nier was to simplify the production. Feuerhand to has gone through a multitude of changes over the years to enhance to performance of their lanterns and reduce production costs.

Gruppe 42. Nr. 194290 vom 25. September 1906.
Hermann Nier in Beierfeld i. S. — Hebevor-
richtung für das Schutzglas von Sturm-
laternen, bei der Kröpfungen oder
Ausbiegungen die Feststellung
der Schutzglocke
sichern.



1. Hebevorrichtung
für das Schutzglas
von Sturmlaternen,
bei der Kröpfungen
oder Ausbiegungen
die Feststellung der
Schutzglocke sichern,
dadurch getrennt,
net, daß die wie üb-
lich an dem Plater
befestigte Hebevor-
richtung als eine
bügelförmige Kuliße
(c) ausgeführt ist,
deren eine Seite eine
gerade Führungs-
stange bildet, während
die andere Seite eine
Ausbiegung (c') hat,
welche beim seitlichen
Drehen der Kuliße
um eine auf dem
Luftrohr befestigte
Platte (e) greift.

Figure 1.4: German Imperial Patent of Hermann Nier of Beierfeld/Saxonia, Nr. 194290, dated September, 25th 1906. The patent describes a new globe (Schutzglas, a) lifting device (Hebevorrichtung C, C', e, g) for easy handling. Note the Fraktur print type which was commonly used in Central Europe during the first half of the 20th century. The previous sentence in Fraktur lettering appears like that: Note the Fraktur print type which was commonly used in Central Europe during the first half of the 20th century.

A relevant patent from 1926 describes an improved type of storm lantern by means of a sieved reflector ring chamber. This construction which was the result of intensive research can be found in recent Feuerhand storm lanterns still in production. Although many constructive details are copied by other producer this particular improvement is not fitted to storm lanterns of other brands. The light output of a storm lantern depends on height and whiteness of the non smoking flame. To achieve this aim the producer must know and understand the secret of the exact dimension and constructive relations of the air-draft system. The relation between the number of holes in the globe holder plate, the shape of the cone and slit, and the wick arrangement are crucial for the brightness, shape, and height of the flame.

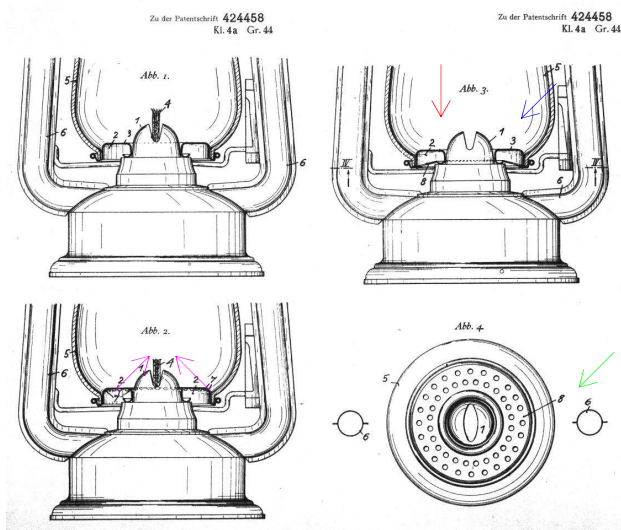
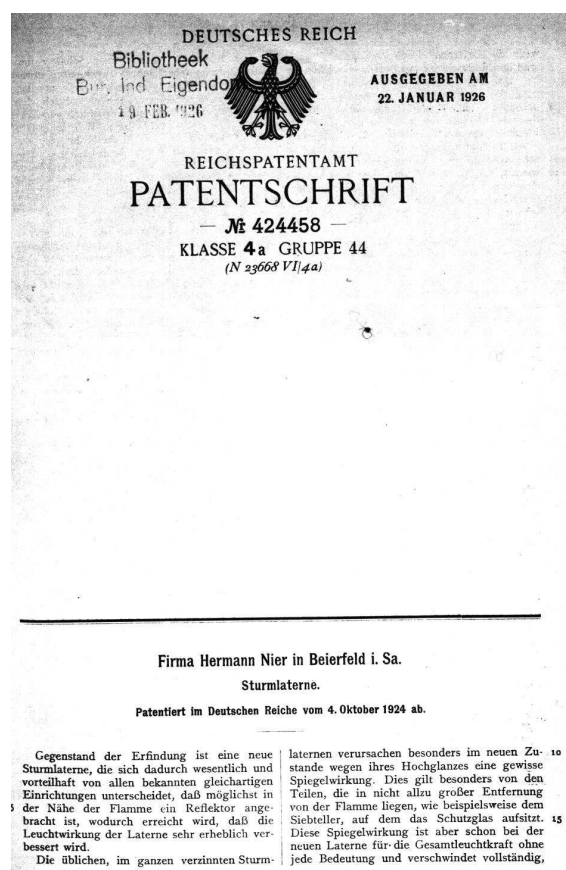


Figure 2: German Reichs Patent of Hermann Nier of Beierfeld/Saxonia, Nr. 424458, dated January, 22nd 1926. The patent describes an improved type of storm lantern by means of a sieved reflector ring chamber (2, red arrow). The reflector ring with polished surface forms a compartment around the cone (1, blue arrow) above the sieved globe holder plate (8, green arrow). The compartment a) prevents the flame from wind shocks, and b) warms up the fresh air which ventilates to the flame. The arrangement channels the air in such a manner to enhance the brightness of the flame and to enable a flicker free burning. The construction additionally centers the draft inside the lantern to reduce the development of a soot patina on the inside surface of the globe (violet arrows).

The trade mark banner "Blaues Band – Blue Ribbon" was patented in 1939 which is shown in figure 3. The name of the Nier-Company is separated by the trade mark logo. The English translation of the German trademark reads "Firehand" which was registered by the US Patent Office.

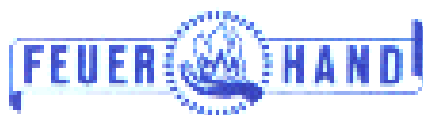


Figure 3: Feuerhand banner (Blue Ribbon)

Figure 4 shows the Feuerhand trade mark tag in the upper section. A new lantern Nr.+276+ sold since 1953 is shown in the lower section. The pictured lantern is the limited edition "TITAN"

Millennium Special" of the standard Nr.276 "Baby Special" and was exclusively sold in the first half of the year 2000. The model Nr.276 was issued for the first time in 1932.



Figure 4: *Front and rear side of Feuerhand trade mark tag and recent +276+ "Baby Special". The lantern is a limited edition issued in 2000, lacquered with titanium silver color on the bright tinned surface. It has attached an additional tag which reads: "ORIGINAL FEUERHAND, TITAN, Millennium Special".*

2 Storm Lantern Characteristics

All lanterns are cold-blast types (see appendix) and are constructed for outside use. I call in question whether a cold-blast lantern will really survive a roaring hurricane, so I prefer to speak of storm lanterns. They are completely made of 0.3 mm stamped steel sheet metal and steel wire. The parts were crimped or overlapped by machine. The two post-war basic lantern sizes Nr. 175/6 and Nr. 27/56, built since 1950 and 1952 respectively, correspond to two differently sized globes and two burner types of identical construction principle. Presumably, the trademark name FEUERhand stems from the finishing procedure of the lantern's assembled steel frame: The frame or lantern body is so-called FIRE-tinned; that is, the steel frame is dipped into melted tin. This protects the lantern frame from corrosion *and stabilizes the construction* (2). From the fire-tinning or dip-tinning procedure results a chrome-shining bright tin surface when the lantern is new. Stored permanently outside or in a humid atmosphere, over the years the lanterns get rusty scars and the tinned surface tends to become steel-gray. It is risky to buy a lantern with a rusty surface. Such offers inhere the high probability that rust has eaten through the metal. The fount can be perforated by numerous pin-prick holes. In this case a sophisticated restoration is inevitable. The painted versions are better protected from weather conditions. If the original varnish is carefully removed one can get an impression of what the brand new lantern might have looked like.

3 Types of Globes and Burners

Globes: Schott & Gen(ossen) – 'Genossen' means comrades - was located in Jena and produced globes for most of the German lantern producers until 1945. Like the most German companies Schott went to Mainz in 1946 located in the allied occupied sector because there was no future under communist government. The Auer GmbH (Inc.), now Schott-Auer, was founded at Berlin by the chemist *Carl Auer Freiherr von Welschbach* the inventor of the mantle or incandescent light, at first used for gas lights (14). The principle is the white catalytic glowing of ashes and salts of rare heavy metals - the newer mantles do not use radioactive materials now. Max Graetz and his brother developed the kerosene gas mantle lamp (still Petromax) in 1910. The Auer GmbH, Berlin, had produced everything from tooth paste to high tech-glass for jet pilot spectacles, artillery optics, and armored tank optics and windows (14). The company at Berlin went down in the 60ies. The section Auer-Glas had moved to West Germany in 1948 to Gandersheim. In the hangars of an abandoned air plane factory they restart the production of industrial glass products for all kinds of light purposes (vacuum bottles, bulbs, reflectors, globes for street lamps etc.). Between 1950 and 1960 Auer had a 10-years contract with Nier and Graetz for the production of heat proof globes for storm lanterns and mantle lamps. After this period the globe production went back to Schott.

The glass mixture for JENAer Glass made by AUER since 1950 is called P40, compare the Feuerhand globe made by Auer in figure 5. The glass mixture consists of the same chemicals like the glass for laboratory glass tubes and bottles (Bor-Silicate-Glass). Colored glass is made by adding the following oxides:

blue	Cobalt-oxide
bright green	Chromium ₂ -oxide ₃
aqua-blue/green	Copper-oxide
green	Ferrum-oxide
yellow-brown	Ferrum ₂ -oxide ₃ (like the colored globe of a military Nr.176 storm cap from 1943)
violet	Magnesium-oxide
yellow/amber	Uranium-oxide
ruby red	Aurum (Gold)

An analogous pre-post war difference as with the fount embossment described in chapter 1 appears with the globes, except with the AUER-made type. All globes show heat printed or annealed markings. These markings cannot be removed without destroying the globe, or leaving nasty scars on the surface of the glass. As well, I believe it is impossible to fake the markings on a globe. Early globes of the fifties are made by AUER marked "A", "heat proof", "registered trademark", "Made in Germany" (2). All globes carry the typical banner of the trademark name "Feuerhand" separated by the Feuerhand logo (figure 3). The left section a) of figure 5 shows the fine and hardly visible heat printed marking of an AUER globe N^o.1175 from the 50ies. The globe has a ruby-red transparent varnish. In the right section b) of figure 5 the heat printed marking of a vat-shaped early version of globe Nr.1275 is shown.

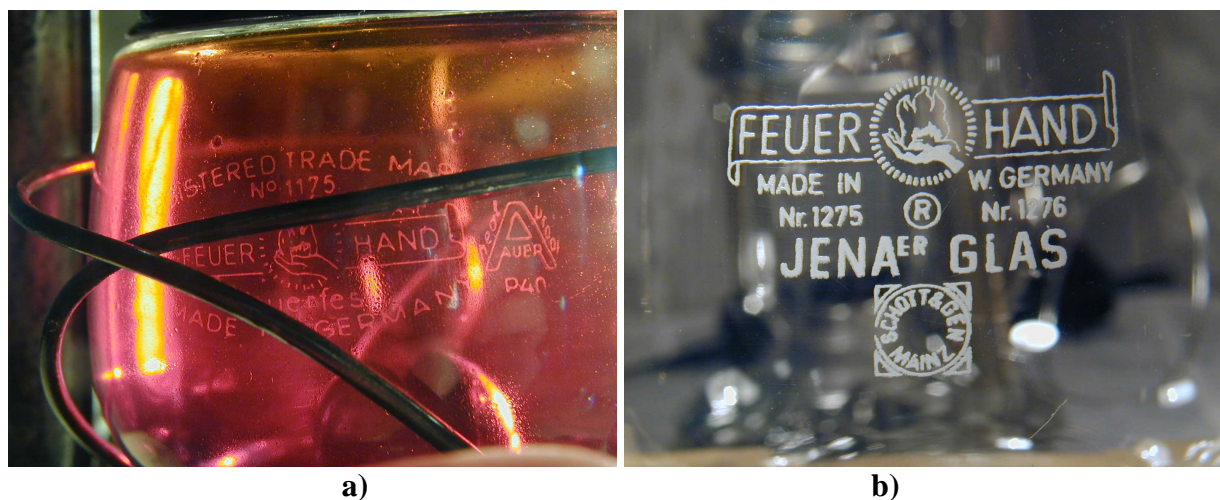


Figure 5: *Markings Feuerhand of globes of the 50ies: Left section a) AUER globe "A P40, heat proof, REGISTERED TRADE MARK N^o1175, feuerfest". Right section b) Clear globe "Nr.1275 ® Nr.1276, JENA^{er} GLAS". The quadratric insignia holds the name of the producer "SCHOTT & GEN MAINZ" in circled lettering.*

Globes from the sixties and seventies are made by SCHOTT-Glas at Mainz and are marked "Made in W.Germany". The "JENAer Glas" type is a special heat-proof glass originally produced by the company Schott at Jena (east-Germany) since 1933. These globes are shaped by air pressure technique and are not cast in a mould. Globes made until 1945 appear in a slight elliptic shape. Since 1950, early versions of globe Nr.1275/1276 are more vat- or barrel-shaped, later versions appeared to be more egg-shaped. The recent globes by SCHOTT are called "Suprax" and looked cylindrically. A further difference between vat- and egg-shaped globes concerns the quadratric insignia of the manufacturer. The circled maker's name reads "SCHOTT & GEN MAINZ" on vat-shaped types. Egg-shaped globes read "SCHOTT MAINZ", and just below the bottom line of the square you exclusively find on these globes the words "JENAER GLAS" printed in letters of 1.5 mm height. All globes are made of extremely resistant thin clear glass with melted brims (figure 6). Since 1950 red, green, and amber glass globes were produced by AUER for short period. Later, all colored globes were basically made from clear glass and then coated or annealed which is a sort of enamelling. The enameled opaque red and amber coated globes show a black heat printed marking. The following colors are known: diffuse/transparent red, amber/yellow, green, and milk white.

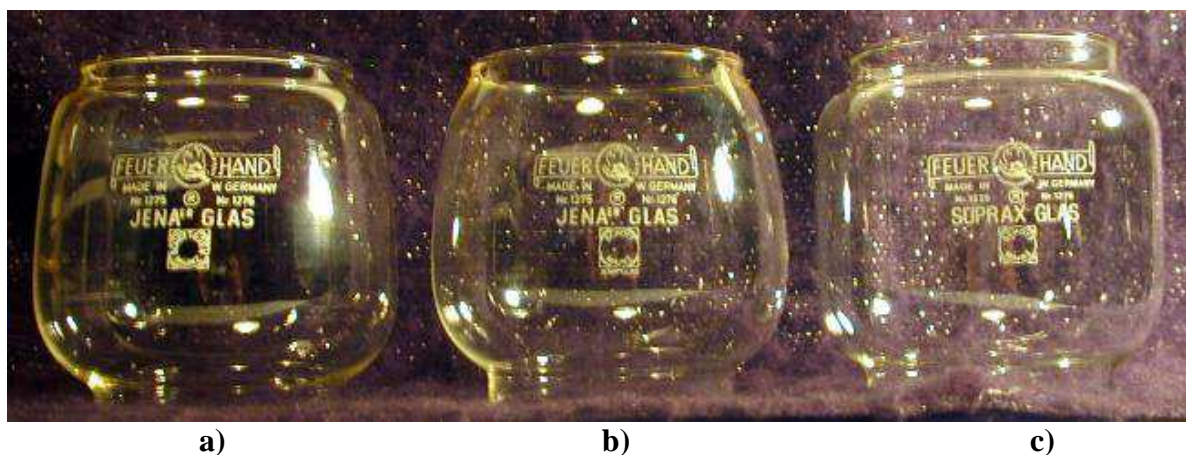


Figure 6: Shapes of Feuerhand Globe Nr.1275/76. **a)** Vat-shaped model 'JENAer-Glas' of the 60ies, **b)** Egg-shaped model 'JENAer-Glas' of the 70ies and 80ies, **c)** Cylindrical 'SUPRAX-Glas' since the 90ies. All globes were produced by SCHOTT-GLAS, Mainz, Germany.

Feuerhand globes of colored glass (not coated!) exist but are extraordinarily rare. Ruby red, green, blue, and amber-yellow globes were listed in 1934 catalogue (1) and were sold until 1944. During World War II darkened globes of deep brown colored or blackened clear glass were produced for military camouflaged lights of the Luftschutz. It is not known to the author whether they were sold in relevant quantities and for which purpose a blue globe was used in Germany. Blue globe lanterns were offered in Great Britain as party illumination. Besides the well-known color requirements for road traffic-, ship-, and rail-road signal lights some conclusion for the use of colored globes can also be drawn from aviation history (8). During the first period of the aviation era planes used to start and land on grass runways. Prior to the era of electric flash lights and radio controlled approach at night time the runways were marked or illuminated by rows of white, red, and green kerosene lanterns. The pilots have to touch down near the white or green line (8). Weather resistant storm lanterns with a capacity of 12 or 14 hours had the capabilities required for airfield marking purposes. To prevent the hot glass from cracking when it gets in touch with rain, snow, or hail a heat proof globe was highly desired. Cast globes were too sensitive. They often cracked in extreme weather conditions. Feuerhand used heat proof globes since 1933. The general meanings of globe colors with lanterns and signal lights are (English, German):

White/natural clear, Weiss/natur hell	-> Here is someone, Hier ist jemand
Yellow/amber, Gelb/bernstein	-> Attention/watch-out, Achtung
Red, Rot	-> Stop, Halt
Green, Grün	-> Keep on, Weitermachen
Blue, Blau	-> Do not move, Nicht bewegen

There is a chance to find a ruby-red or original blue globe. The use of blue lights and blue or blackened globes was prescribed law for civil protection purposes (Luftschutz) during war-times. In Germany also road construction sites had to be indicated by blue warning lights at the end of the 30ies. Nevertheless, a green or even blackened or amber globe is still rare to find on the German/European market which is probably the consequence of the last disaster in European history and the low quantities sold, depending also on administrative regulations for colored light signals in the sections of ship-, air-, and road traffic. The situation in the USA may be less extreme (6, pp. 2).

The colored globes applications in the USA and for international naval purposes are listed in the following table.

Globe Color	Fire Department	Marine/Naval	Railroad/Highway
Clear/White	General Illumination	Anchor, Mast & Running Lamps	Hand Signals
Red	Chief Engineer, or Danger/ Do Not Cross Hoses	Port Lamp	Stop/Danger
Blue	Assistant Chief Engineer, or Volunteer Company	Captain on Board	Do Not Move/Men at Work
Green	Foreman	Starboard Lamp	Proceed
Amber/Yellow	Assistant Foreman, or Chief Hoseman	Running/Side Lamps	Proceed at Reduced Speed, Prepare to Stop

Feuerhand Globes:

Since 1950 two globe models of different size were provided for the two basic lantern types Nr. 175/6 and Nr. 275/6 (table 2).

Table 2: *Dimensions of Feuerhand storm lantern globes*

Globe No. 1175/1176 for Nr.175 "Super Baby" and Nr.176 "Super Baby Special":

Height: 5.0 cm; Outer bottom diameter: 5.0 cm; Outer top diameter: 4.7 cm; Weight 30g (appr.)

Globe No. 1275/1276 for the Nr.275 "Baby" and the Nr.276 "Baby Special":

Height: 8.3 cm; Outer bottom diameter: 6.0 cm; Outer top diameter: 6.8 cm, Weight 60g (appr.)

The Feuerhand globes previously described also fit to two well known cold blast lanterns of US-American origin. The smaller Feuerhand globe Nr.1175 fits to the Dietz and V&O lantern No.50 "Little Camper" while globe Nr.1275 is suitable for Dietz or V&O No.76 "Original / Centennial".

Burners: The two basic Feuerhand lantern types Nr.175 "Super Baby" and Nr.275 "Baby" are supplied with rising cone burners of different efficiency (2) (table 3). The width of kerosene Burners and wicks is measured by the old French unit "Line" or "Ligne". The unit designator is written as a row of three apostrophes '''. One **Line** ''' equals 2.26 millimeter (mm) of the metric system which approximately is 3/32". The light power of a burner is measured in **HK (Hefner-Kerzen = Hefner-candles)**. The German electric-mechanical engineer *Friedrich von Hefner-Altenbeck* (Apr. 27th, 1845 to Jan. 7th, 1904) was employed at *Siemens & Halske*, Berlin. He invented a lamp to define a photo-metric unit (13). One **HK** equals 0.903 candles (cd) and corresponds to the light power of a 4 cm (1 5/8") high flame of a round cotton wick of 8 mm (5/16") diameter fueled with amylacetate (chemical formula: C₆H₁₃COOC₆H₁₃).

Table 3: *Rising cone burner types of Feuerhand storm lanterns*

Burner type lines '''	Wick mm (inch)	Light power HK*	Kerosene consumption ccm/h	Lantern type
3'''	10 (3/8")	3.7	12.5	Nr.175, Nr.176
5'''	13 (1/2")	7	17-20	Nr.275, Nr.276
7'''	16 (5/8")	7	26	Nr.252

*HK = 'Hefner-Kerze', 1 HK = 0.903 cd

4 Basic Lantern Types and Variants

Depending on the purposes and needs of the customer the lanterns are produced and delivered in different constructive versions and colors (4, 10). They were definitely not in official or regular use by the German federal railroad company (Reichs-, or Bundes-Bahn). They had it's own very heavy constructions of kerosene-, gas-, carbide-, pressure lamps, and hand-lanterns: Usually, a carbide burner or Kosmos burner with a chimney - comparable to a caboose lamp construction - was built in a stable housing which never had the appearance of a classic cold-blast storm lantern. So it is incorrect to call the "Feuerhand" a Rail-Road-lantern. "Feuerhand"s were made for general outside/inside illumination purposes and for the installation of steady road-traffic signals or anchor and position lights on small boats (1, 2, 4). Special wall mounts, clips and bars were offered for use as red and white car and bicycle lights or to attach to a horse collar. To stimulate the national customer's market and private use of storm lanterns an electrified 275 model in different colors was offered during the 1970ies, as well as a 276 model made from copper coated steel sheet. Also a 275 model for tee-candles is known made as a presentation lantern for a manufacturer cooling trucks (Linde, Zanner Fahrzeugbau).

Feuerhand lanterns were shipped all over the world, and the Nr.276 "Baby Special" actually is. The recent production comprises several thousands lanterns per month (4) which seem to indicate a rapid consumption of this product. The production of colored globes has stopped (4). Table 4 depicts a commented systematic overview of the basic lantern types and variants (1, 2, 5).

Table 4: *Technical data, types and variants of post-war Feuerhand storm lanterns*

Type No.....:	175	275	276	276	276	252
Name.....:	Super Baby	Baby	Baby Special	Baby Special "FEUERHAND" STURMKAPPE* Garantiert sturmsicher	Baby Special "FEUERHAND" STURMKAPPE* Garantiert sturmsicher	
Burner.....:	3'''	5'''	5'''	5'''	5''' **	7'''
Colors/finish.....:	bright tin, black, red, green	bright tin, various	bright tin, various	yellow, bright tin, olive green	usually yellow, rarely red or bright tin	bright tin
Globe No.:	1175	1275	1275	1275	1275	452
Globe colors.....:	clear, red glass, red transparent yellow/red diffuse coated	clear, red glass, yellow/red diffuse coated	clear, probably all types	yellow/ red diffuse coated, clear	yellow/ red diffuse coated clear	clear
Height mm.....:	203	245	255	255	330	300
Weight g.....:	330	496	560	600	755	750
Fount capacity cm ³	175	260	340	340	1230	350
Burning-time h....:	14	12	20	20	72	13
Production dates:	1933-45	1933-45	1933-45			1928-1934(?)
Remarks.....:	1950-80(?) relief print on fount wall 'K1491/ 1'. Best for campers, bright bowl-shaped flame	1949-80(?) brightest flame and light because of dense dome perforation with 21 small holes in early versions and NOTBEL case	1953-present since the 90ies various colors	1955(?) -80(?) primary for road-construct. signals. Military olive green version in steel case marked NOTBEL ⁺ , additional red and yellow coated globe	1955(?) -80(?) exclusively for road-construction signals (traffic guard), extra fount capacity	1954-? ⁺⁺

* **This model has a storm-shield around the dome**, word to word translation of the raised lettering: Storm cap, guaranteed storm-safe

** Note! The burner of this lantern is equipped with an extra long wick of 25 centimeters (10 inches) which is pierced through a felt support wick immediately prior to the wick raiser. This strip of felt supplies the consumed wick with additional kerosene. The capillary effect of the consumed wick is too small to feed the flame sufficiently when the kerosene level falls below the horizon of half of the fount height. Users of this lantern should be aware of this or an analogue wick arrangement. Otherwise, the complete kerosene capacity and burning time can not be used and the wick consumes rapidly.

⁺ **NOT BEL** – Abbreviation for the German term 'Notbeleuchtung' – emergency light

⁺⁺ The post-war model is only offered for a few years and is very rare to find.

As for the military lantern sets made for the German army between 1955 and 1970, three different lots or versions are known. The first supply contingent consist of a lantern Nr.275 with early AUER Glas globes listed under the Versorgungsnummer (supply number) 6260-12-120-5947. The lanterns show a red decal tag at the fount wall and were carefully laquered. The second supply contingent consists of the Nr.276 *Sturmkappe* in the same metal case with spare globes made by SCHOTT Glas. The Versorgungsnummer (supply number) of this set was also Versorg Nr 6260-12-120-5947 which was embossed to the font wall. All these lanterns were dip painted. The metal case was additionally ink-stamped "Laterne Petroleum 250 mm hoch mit Zubehör". The third lot had the supply number 6260-12-120-1437 showing the supply number and the raised letters "BUND" for Bundeswehr at the fount wall. These lanterns Nr.276 were sprayed NATO olive green and are not dip varnished.

The models Nr.175 and Nr.275 with an additional storm-cap are known from the catalogue (7) but they are extremely rare. A rather rare model is the Nr.176 "Super Baby Special Sturmkappe" which is the Nr.175 with a larger fount capacity of 20 hours (5, 7). Some of the Nr.175/176 variants which were originally sold with ruby-red globes have a relief print on the fount wall which reads "K1490", "K1491/1", or "K1452" showing a wavy line above the digits (5). This is the test mark of the German Lichttechnisches Institut, Tech. Univ. Karlsruhe. The test mark indicates the permission to use the lantern as vehicle light and fulfills the conditionen of the traffic laws. A typical raised imprint of the test mark demonstrates figure 7. Comparable markings appear on the glasses of the car-lights of German automobile production of that time.



Figure 7: Raised imprint of the test mark of the German "Lichttechnisches Institut Karlsruhe" on the fount of a Nr.175 "Super Baby" with ruby-red globe. This lantern is allowed for use as a rear light for any kind of vehicles.

Figure 8 shows a collection of basic lantern models produced since 1950. The photo can only provide an orientation to compare the outer appearance of the models. It cannot depict the characteristics and details of the lanterns previously described. The reader sees from left to right:

Nr.175 "Super Baby", half clear/half red transparent varnished Auer-Globe, early fifties, nearly new, tinned surface with clear varnish, test mark, condition A- ("Skater's Lantern")

Nr.176 "Super Baby Special Sturmkappe", ruby-red Feuerhand Schott-Globe Jenaer Glas Nr.1175 of pre-1945 production, early fifties, tinned surface turned steel gray, condition A-

Nr.275 "Baby", ruby-red Feuerhand Schott-Globe Jenaer Glas Nr.1275 of pre-1945 production, early fifties, iron-gray metallic paint over tinned metal, condition B

Nr.276 "Baby Special", clear Suprax Schott-Globe, 1998, tinned metal, new from reco-feuerhand company, condition A+

Nr.276 "Baby Special Sturmkappe", tinned surface, early seventies, Condition A

Nr.276 "Baby Special Sturmkappe", big fount for 72 hours, road-traffic signal in yellow color RAL 1018, clear Schott-Globe Jenaer Glas, early seventies, condition A+

Note in figure 8 that the three lanterns on the left side have mounted a larger D-ring at the chimney roof top than those three lanterns on the right. The larger trapezoid D-ring is characteristic for lanterns produced between 1949 and 1955.



Figure 8: *Basic models of FEUERHAND storm lanterns produced since 1950*

It is interesting to note for historical reasons that the Nier company must have been able to save a fair amount of ruby-red globes over the disastrous year 1945 in Germany. These globes went to lantern production five years later. Such globes were found in the Nr.176 "Super Baby Special", the second lantern from the left in figure 8, and with the Nr.275 "Baby", the third lantern from the left.

Remarks on Nr.276 Sturmkappe: This version equals to the Dietz Fire-Department lanterns having a wind shield around the dome called Sturmkappe (storm cap, Stk), but, the Nr.276Stk might be a more effective construction. Models Nr. 276 Stk with 70 hours fount made since the 70ies show a special property. Face the side of the lantern opposite to the filler cap (back side) and have a closed look at the upper part of the sideways vertical crimped rims on the left of the storm cap. You will discover a **stamped 2 or 3 digit number which is the coded date of production (1 or 2 digits for month - over 1 digit for the year in the 1970ties)**. This I was told by an old production engineer of the Nier stamping works in the year 2000. The following numbers or codes are known. In sorted order of the last digit they indicate the production period from September 1970 until Aug.

1979: 90, 12, 32, 92, 52, 13, 53, 113, 14, 34, 114, 115, 76, 19, 39, 59, 89 (compare Fig. 8.1). On demand, the producer stamped the owner's name or initials on the font wall.



Fig. 8.1: Date of production code 92 (9 over 2) at the folded rim of the Sturmkappe on a Nr.276 "Baby Special" 70-hours traffic guard indicating September 1972 (month over year)

5 Comment and Conclusion

The data provided in the tables are based on reliable sources, on my own investigations and on personal experiences and observations (1, 2, 5). Specifications of height and weight of the Feuerhand lanterns only refer to post-war models. Further research is needed to evaluate the production dates and the colors of the lanterns and globes originally delivered. The shapes and materials of parts vary slightly over the years within the same lantern type (9). A comprehensive description is required to provide the collector with information for the exact evaluation of the piece he holds at hand. Especially the series of very solid storm Lanterns Nr.260, Nr.270, Nr.277, and Nr.280 awaits a systematic description (11). Their globes exactly measure Dietz D-LITE globes. Lanterns of this large cold blast type were built before the "Baby"-type was developed in 1933.

Nier-Feuerhand (1902-today) is one of the oldest German most famous and still well-known storm lantern producer on the European and international market - among other German metal works which had offered kerosene storm lanterns, too, but closed production decades or half a century ago. The ranking of significance according to my estimation is: **1) BAT (1843-1945)**, Lanterns of the trade mark BAT or German 'Fledermaus' were produced by **Friedrich Stübgen, Erfurt**, Thuringia, estab. 1843. The production closed in May 1945 like that of the rare **PAN** lanterns during W.W.2. The BAT brand was then used by the former German Democratic Republic between 1948 and 1990 for the production of hot blast lanterns based on Nier's blue prints at the 'Division Lantern Factory Beierfeld', the former Nier-Feuerhand factory; after all of these production facilities were dismantled by the Russians and transferred to the Ukraine in 1946; **2) Froehlich & Wolter (FROWO), (1878-1990)**, was also located at Beierfeld, Saxonia, but did not move to West Germany after WW2 like Nier-Feuerhand. In the first half of the 20 century FROWO was one of the powerful competitors of Nier which both resided in the same town and shared the international market at this time (a parallel to the history of Dietz and Embury in the USA). The company could stay in private property until 1972 since it was "socialized". The lantern production ceased in 1990. In 1991 the company was re-established under a new name (Metallwarenfabrik, Beierfeld GmbH & Co. KG) and produces heavy metal stamping products now. They still take care for their tradition: At the reception old advertisement sheets of FROWO lanterns are presented; **3) RHEWUM (Rheinische Werkzeug und Maschinen Fabrik 1926-today)**, post-war lantern production 1949-1960). RHEWUM was established September 26th, 1926 and currently produces high-tech sieves,

location Remscheid). Two cold blast and two hot blast 'barn' lanterns were produced, the ST5 and 6 and the ST2 and 11; **4) HASAG, Hugo-Schneider-AG** (17), Leipzig, founded in **1863–1945**, became a A(ktien) G(esellschaft) in 1899. Largest lamp producer between 1880 and 1933 with own metal works and a brass milling, owner of airplane production and assembly plant SIEBEL-FLUGZEUGWERKE until 1945, location Annaberg. The HASAG company was liquidated by the Allies in 1945, all production facilities were blown off in 1947. HASAG's 'Colibri' and 'Panzer' (cuirass) storm lanterns were trade marks of the lantern producer **Kaestner&Toeblmann (K&T)** (estab. **1845-1945**, Erfurt, Germany), the lantern production went down and was taken over by HASAG around 1935. K&T developed trade marks like 'Winged wheel' and 'Swallow (Sturm-vogel)'. Their most famous hot blast lantern, later HASAG 'Panzer' compares to Feuerhand Nr.201, and the K&T 'Colibri' compares to Feuerhand Nr.405, **5) ASA, A. Sartorius**, Wuppertal, a traditional rail road lantern producer, offered the cold blast 'Automatic ASA682 Sturmsicher DR (since 1950 DB-) Patent angemeldet' during the 40ies and 50ies, **6) Albert Frank (FRANKONIA-AG)**, Beierfeld until the factory was sold to the Nier-Feuerhand and **NIRONA** (Nier & Ehmer) works at Beierfeld in 1937. **7) The 'PANZER'='CUIRASS' lanterns** were made by **Kaestner & Toeblmann**, Erfurt in Thuringia, since 1887 (17), the same brand was later offered by HASAG until 1945.

Epilogue

It is the nature of history that research on the performance of kerosene fueled storm lanterns has probably ceased now. Kerosene storm lanterns can be seen as proxies for a certain era of industrial history, even as representatives of a historic epoch in general: Everyone has used them to shed a light in the dark. Proved concepts are still in production and copied by Chinese Companies. A decline of quality and performance of the copies is obvious (5) because Asian copiers do not know about the physical principles of storm lanterns and do not possess the knowledge and skills of the ancient producers Dietz and Nier-Feuerhand. Assessment procedures to objectively determine the quality and performance of storm lanterns are not published but would be helpful (18). The knowledge about physics and principles of storm lantern technology is now dying out and hides in the patent archives. Howsoever, this report may contribute to the history of illumination.

6 References

- (1) *Feuerhand* (1934). Catalogue O.P.114.VII.34 *Die neuen Feuerhand Sturmlaternen*. Photocopy by curtesy of Dr. Ralf Schoenborn, e-mail: rasc003@stud.uni-sb.de, Saarbrücken, Germany
- (2) *Feuerhand* (1954). Faltblatt O.P.93 (flyer) Storm lanterns Nr.175, 275, 276, 252. Photocopy by curtesy of Dr. Ralf Schoenborn, Saarbrücken, Germany
- (3) Trade mark listing Hermann Nier (1999). Compilation by curtsy of Anton Kaim, e-mail: wilant@gironet.nl, Rotterdam, Netherlands
- (4) *Feuerhand* (1999). Personal communication between the Reco-Feuerhand production manager and the author, June 1999, Internet: <http://www.reco-feuerhand.de>
- (5) D. Bunk's small *Feuerhand Sturmlaternen* collection (2000). Part 3: Original models, Cold Blast Lanterns and foreign copies since 1950.
- (6) Hobson A. *Lanterns that lit our world*. Golden Hill Press, New York (1998)
- (7) *Feuerhand* (1954). Faltblatt O.P.106 (flyer) *Sturmlaternen mit Sturmkappe* (Storm lanterns with storm-cap, Stk) Nr.175Stk, 176Stk, 275Stk, 276Stk. Photocopy by curtesy of Dr. Ralf Schoenborn, e-mail: rasc003@stud.uni-sb.de, Saarbrücken, Germany
- (8) *Deutschland Radio Berlin* (2000). *Zeichen in der Finsternis: „Die lange Nacht“ vom Licht* (Signals in the Dark: „The long Night“ of the Light). Radio feature about the history of illumination. AM radio transmission 6005 kHz Berlin transmitter, March 24th /25th, 2000, 10:00 to 2:00 hours UTC +1h.

- (9) Bunk, D. (2000) "Feuerhand Sturmlaternen, Models since 1947". Light International, Vol. 3, No.1, pp 3-5.
- (10) *Reichs-Ausschuss für Lieferbedingungen (RAL)* (1935-1945). Reichs-Committee for the conditions of industrial supply, Basic Colors. Internet: <http://www.ral.de>.
- (11) D. Bunk's *Feuerhand Sturmlaternen* collection (2000). Part 1: Original models, Cold Blast Lanterns before 1933
- (12) D. Bunk's *Feuerhand Sturmlaternen* collection (2000). Part 2: Original models, Cold Blast Lanterns, Storm lanterns "Baby" type between 1933 and 1945.
- (13) *Brockhaus, F.A.* Der Volks-Brockhaus A-Z. Brockhaus-Verlag, Leipzig, Germany (1938).
- (14) *Schott-Auer GmbH*: 50 Jahre AUER. Zwischen Tradition und Technologie (50 Years Auer Glass. Tradition and Technology). Schott-Auer GmbH, D-37581 Bad Gandersheim, Germany (1998)
- (15) *Touché, Werner*: Leuchtende Vergangenheit. Ausstellungskatalog Hamaland Museum Vreden (1999), 172 pp, ISBN 3-927851-50-7
- (16) *Beyer, Gustav*: Ernst Nier. Sein Leben und Wirken. E.M. Gaertner, Schwarzenberg, Germany (1927)
- (17) *Goldberg, Jacques*: Die deutsche Lampe in Wort und Bild. Eine Zusammenstellung saemtlicher Petroleum- und Spiritus-Brenner sowie Zylinder. Rundschau fuer die Installations-, Beleuchtungs- und Blechindustrie. Verlag Ebner & Ungerer, Berlin S.42, Prinzenstr. 26, Germany (1911).
- (18) Bunk, D (2001) Gas Oil (Diesel) Burner for the Feuerhand Storm Lantern. Light International, Vol. 4, No.2, pp 1-3.
- (19) *UFZ-Umweltforschungszentrum Leipzig-Halle GmbH*: Leipzig Permoserstrasse (Hugo Schneider Str.) Zur Geschichte eines Industriestandorts. ISBN 3-932900-61-8, Passage-Verlag Leipzig (2001)
- (20) *Pearson, Dennis*: Classic Lanterns: A Guide and Reference. Schiffer Publishing Ltd., Atglen, PA, USA (1998).

All references hold in the author's archive

Appendix A

List from the year 2000 of all known 26 Feuerhand kerosene lanterns models by ascending type number:

Nr.75, Nr.175, Nr.176, Nr.201, Nr.202, Nr.223, Nr. 227, Nr.225, Nr.227, Nr.235, Nr.252, Nr. 253, Nr.257, Nr.260, Nr.262, Nr.270, Nr.271, Nr.275, Nr.276, Nr.277, Nr.280, Nr. 282, Nr.301, Nr.303, Nr.305, Nr.323, Nr.327, Nr.351, Nr.352, Nr.375, Nr.405, Nr.423, Nr.427, Nr.452

Table A1: Type numbers of Hot and Cold Blast Feuerhand kerosene lanterns

Cold Blast type FrischlufT Typ	Name	Remarks	Hot Blast type MischlufT Typ	Remarks
Nr. 75	ATOM	'Baby' type ¹	Nr. 201	robust traffic guard
Nr. 175	SUPER BABY	---	Nr. 202	
Nr. 176	SUPER BABY SPECIAL	Military Storm cap Shade to dim the lantern	Nr. 223 Nr. 227	
Nr. 225	MEDIUM		Nr. 257	= old Dietz Monarch
Nr. 235	MEDIUM	Large fount Nr.225	Nr. 305	
Nr. 252			Nr. 323	
Nr. 260			Nr. 327	
Nr. 262		Long globe ²	Nr. 351	cooker/heater
Nr. 270			Nr. 352	cooker/heater
Nr. 271	(special type, extremely rare)	201 fount w/ horizontals	Nr. 405	
Nr. 275	BABY		Nr. 423	
Nr. 276	BABY SPECIAL	Also large fount 70 hrs.	Nr. 427	
Nr. 277		1" wick burner Nr.270	Nr. 452	
Nr. 280		Large fount Nr.260 ²	Nr. 301	Carbide Nr.305
Nr. 375		5/8" wick Baby type	Nr. 303	Carbide house lamp

¹ The 'Atom' **Nr. 75** is only 6" high and has a 1.5" burner with a 3/16" wick. It is **the smallest cold blast lantern ever made**. Lanterns of the 'Baby' series were produced with and without 'Sturmkappe', i.e. storm cap. A special bell-shaped storm cap was developed for the military version of the Nr.176 to protect the user from the hot dome (chimney roof).

² Largest / heaviest cold blast lantern

The original Feuerhand globes can be replaced by globes produced for lanterns of different origin. A wide range of replacement globe offers W.T. KIRKMAN, P.O. Box 2166, Ramona CA 92065,
<http://www.lanternnet.com/lanterns6.html>

Table A2: List of globes offered by Woody T. Kirkman which fit to old and new Feuerhand lanterns.

<u>Kirkman globe #</u>	<u>-fits to -</u>	<u>Feuerhand lantern</u>
#00 hot blast-----		Nr.405, 423, 427
#0 hot blast-----		Nr.201, 257, 323, 327, 305
#838 V&O #50 -----		Nr. 175 Super Baby, models since 1933
#850 Dietz D-Lite-----		Nr. 260, 280
#851 Dietz Little Wizzard -----		Nr. 270, 277
#852 Dietz Fitzall -----		Nr. 201, 257, 305, 323, 262,
#856 Dietz #76-----		Nr. 275 Baby, 276 Baby Special, models since 1933
#857 Dietz Junior-----		Nr. 252, 405, 423, 427

Appendix B

Lantern types: Technical Explanations

EXCLUSIVELY use Lamp Oil, Paraffin Oil, or Kerosene!

Definitions: A Lamp can be defined as any artificial device to hold something which produces light. The term Lantern describes a housing with more or less transparent openings or windows to protect a light producing device from weather conditions.

There are basically four types of kerosene lanterns/lamps:

Dead Flame, House Lamps and Tubular Lanterns of Hot Blast and Cold Blast type

Dead Flame (Stille Flamme) **Lanterns** have no channeled air supply to the flame, like the older U.S.-American Rail-Road lanterns Adlake #300, Dietz #39, or HANDLAN (**Figure A**). Note that the DIETZ VESTA is a cold blast type. The air supply of dead flame lanterns compares to that of a candle.



Figure A: **Adams & Weslake (Adlake):** Dead flame lantern technology, US-American Rail-Road lantern

The history of **House Lamps** with simple flat wick or Kosmos burner is a separate chapter in the history of illumination (15) (**Figure B**).



Figure B: **Dressel:** House lamp technology, US-American Rail-Road bunk-car lamp

Tubular Lanterns are roughly classified under the captions "Hot Blast" and "Cold Blast". R.E.Dietz made the first "Hot Blast" Lanterns in 1868, and the first "Cold Blast" Lanterns in 1880 (15, pp. 82). The company was founded by the son of a German immigrant and was in business from 1868 to 1992 at Syracuse, New York, USA (6, p 5).

The terms "Hot Blast" and "Cold Blast" are used solely in conjunction with tubular Lanterns and with regard to the method of supplying air to the flame. All tubular Hot Blast and Cold Blast lanterns made since 1912 will self extinguish if tipped over. This safety feature is not found in any other type of oil burning lamp or lantern.

Hot Blast (Misch-Luft) Lanterns channel the flames own exhaust back to it (**Figure C**). This type of lantern produces an orange type flame and tends to flicker more than the cold blast. This design produces a **steady yellow flame**. Inherent in the design of the Hot Blast Lantern, **the burning time is approximately 10% greater than a Cold Blast Lantern** of the same wick size. Also, due to there-circulating of combustion products, the Hot Blast Design is well suited **for use indoors**.

Robert Edwin Dietz (Jan. 5th, 1818 - Sept. 19, 1897), the grandson of a German immigrant at New York, introduced the hot blast principle to lantern produced in 1868 according to a patent of James H. Irwin on tubular lanterns. J. H. Irwin also described a lantern of the cold blast principle in 1870 (**Figure C, a and b**).

UNITED STATES PATENT OFFICE.

JOHN H. IRWIN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN LANTERNS.

Specification forming part of Letters Patent No. 99,412, dated February 1, 1870.

To all whom it may concern:

Be it known that I, JOHN H. IRWIN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Lanterns; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and the letters and figures marked thereon, which form a part of this specification, and in which—

Figure 1 represents a side elevation of my improved lantern, with one of the tubes cut away at the base to show how it is joined to the lantern; and Fig. 2 is a vertical sectional view, taken at the line *x* in Fig. 1.

The object of this invention is to improve upon my tubular lantern heretofore patented, as regards simplicity and cheapness, so as to be able to meet any demands there may be for a cheap lantern; and I have also attached a thumb-piece to the movable top of the lantern, to facilitate raising it to remove the globe or glass.

The nature of my invention consists in inserting the air-tubes C into the top of the air-space B, thereby effecting a great reduction in cost of manufacture by avoiding the use of elbows at the lower ends of said tubes; and it further consists in the thumb-piece for moving the top glass or globe-holder, hereinafter fully described.

In the annexed drawings, A represents the oil-pot, and B an air-chamber on the top of the oil-pot, which serves the double purpose of keeping the oil in the oil-pot cool, though near the flame, and also to receive air from the air-tubes C and conduct it to the burner. By extending the air-tubes C directly into the air-chamber B the elbow usually used at the bottom of said air-tubes is dispensed with.

D is a perforated disk, with its edge turned up to receive the glass or globe E, and rests on the cone, as clearly shown in the drawings. The glass or globe E is held at the top by the open adjustable globe-holder F, which is held pressed down upon the top of the globe by the spring H.

There is a wire, I, attached to the adjustable globe-holder F, and extending up through the guides J to a convenient place for the

operator to seize it with the thumb or one of the fingers of his hand with which he holds the lantern, and raise it to the position indicated by the dotted lines in Fig. 1, thereby raising the globe-holder F from the top of the globe, so that it can be readily removed from the lantern.

The globe-holder F, in the annexed drawing, is suspended from the inverted-saucer-shaped air-gatherer P, which is raised and lowered with the globe-holder F, and the spring H and thumb-piece I are connected directly with it—the air-gatherer—and only indirectly with the globe-holder; but the prime object of the adjustability is to move the globe-holder for the purpose of removing the globe, as above described.

I do not desire to limit myself to the precise construction and arrangement of the wire or rod I, as it will be readily seen that any light wire or strip of metal extending up from the globe-holder F to a position where it would be sufficiently removed from the heat of the lamp to be always cool, and where it could be conveniently reached to raise the globe-holder, would serve every purpose, and it may be attached directly to the globe-holder, so as to move that without the air-gatherer; but I deem the form shown in the annexed drawings the simplest and best, as it is kept well in place by the guides J.

The currents of air passing through this lantern are the same as in my tubular lanterns heretofore patented, and need not be described here; nor do I claim anything new in the construction of the cone or burner; but

What I do claim as new, and desire to secure by Letters Patent, is—

1. The air chamber or space B, in combination with the air-tubes C, when said tubes are inserted in the top of said chamber, as and for the purpose specified.

2. The thumb-piece I, in combination with the globe-holder F, when constructed and arranged substantially as and for the purposes described.

J. H. IRWIN. [L. S.]

Witnesses:

FRANCIS S. BOND,
WM. T. FARNHAM.

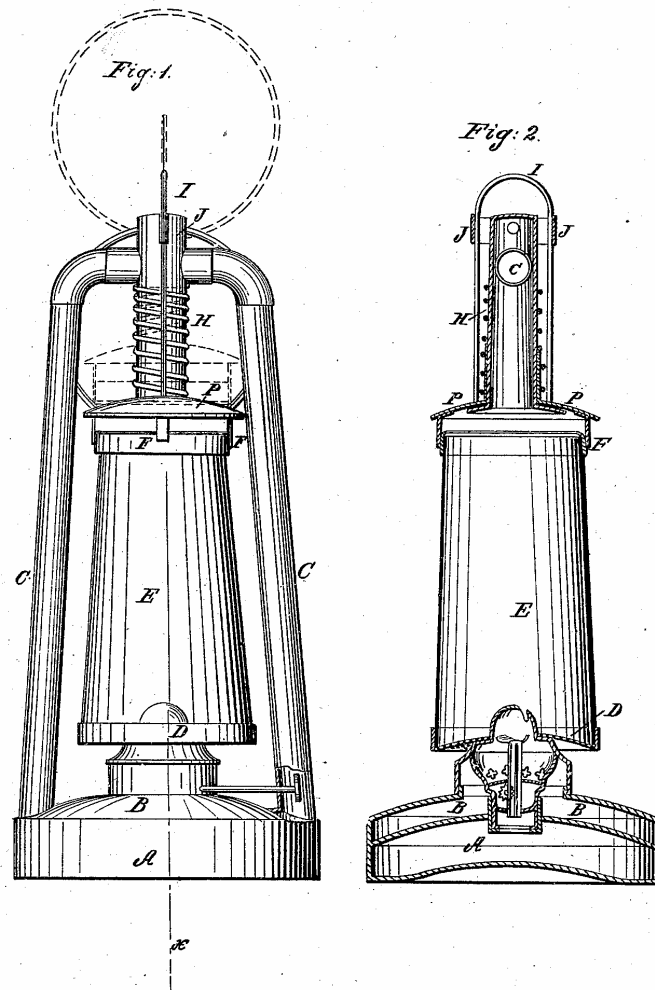
Figure C: a)

J. H. IRWIN.

Lantern.

No. 99,442.

Patented Feb. 1, 1870.



Witnesses:
M. Munday
Chas. Brown

Inventor:
John H. Irwin
by Lewis H. Coburn
Atty.

N. PETERS, Photo-Lithographer, Washington, D. C.

Figure C: b)

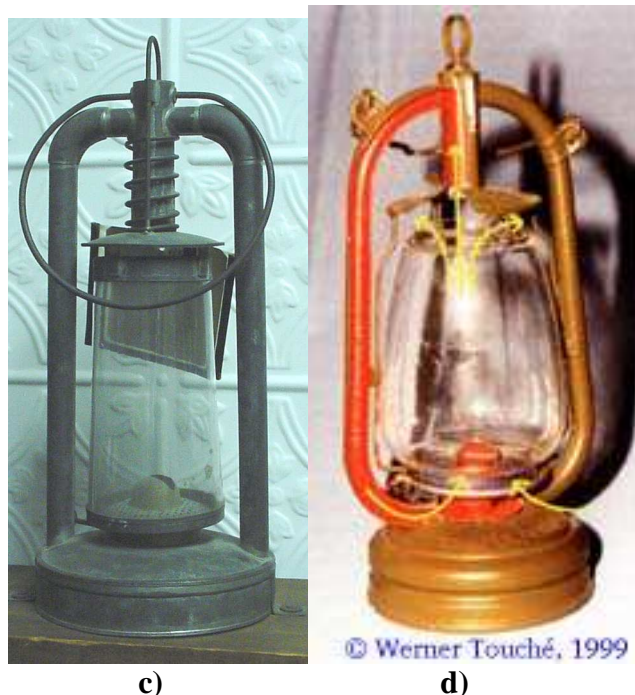


Figure C: Hot-blast lantern technology: c) First hot blast lantern invented 1869 and patented 1870 by John H. Irwin, Chicago, Inventor's prototype from the US Patent Office, Photo © 2001 by Woodward Kirkman
d) Feuerhand lantern Nr.201 from 1914 – 1944.

Cold Blast (Frisch-Luft) Lanterns channel fresh air to the flame (**Figure D**) through the side tubes and the sieved globe holder plate. This type produces an almost **white type of flame**. It is the **brightest** of the two lantern technologies and the most efficient. Roughly refined cheap kerosene contains many chemical by-products like paraffin aromatics which cause the typical nasty odor of a kerosene lantern. The hot white flame of a Cold Blast lantern has the advantage to burn most of the aromatics which reduces the odor of the combustion gas. The reader can easily test this effect by comparing the odor of a burning Cold Blast lantern and a lit Dead Flame US-Rail-Road lantern, both fueled with crude kerosene. With the advent of modern fuels, Cold Blast lanterns can be used **inside or out**. A storm- or wind shock ring at globe holder plate was patented by Hermann NIER in 1926. The fresh outside air is warmed-up by the ring and channeled to the flame in such a manner to enhance the brightness and heat. This wind shock ring also centers and improves the draft of the combustion gas to prevent the globe from inside soot patina (see the Introduction in the text section). The secret is the knowledge of the exact dimension and constructive relations of the air-draft system and the burner construction. The relation between the number of holes in the globe holder plate, the shape of the cone and slit, the wick arrangement and employed materials are crucial for the brightness, shape, and height of the flame. The light output of a storm lantern exclusively depends on height and whiteness of the non smoking flame.

Bruno Nier's patent filed at the US-patent office May 6, 1933 was the beginning of the small cold blast lantern technology, the 'Baby'-series. This lantern type was frequently copied by numerous other producers: In 1939 Dietz issued the No. 50 "Comet". In 1976 the Dietz No.76 "The Original" was designed which shared all the features of the Feuerhand Nr. 275 "Baby". Pearson (see Ref. 20, p. 118) hypothesized that the Dietz No.76 was made by tooling bought from Feuerhand.

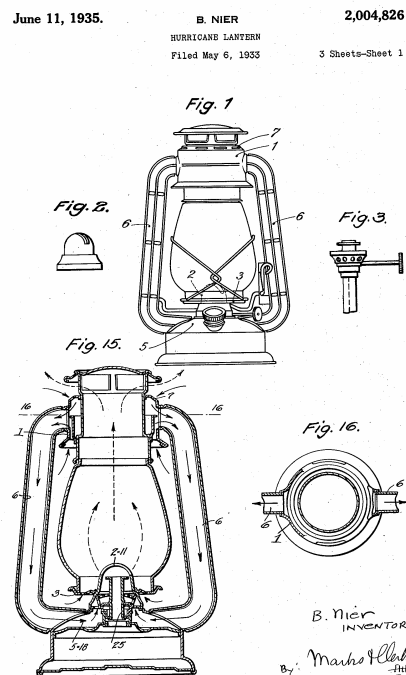
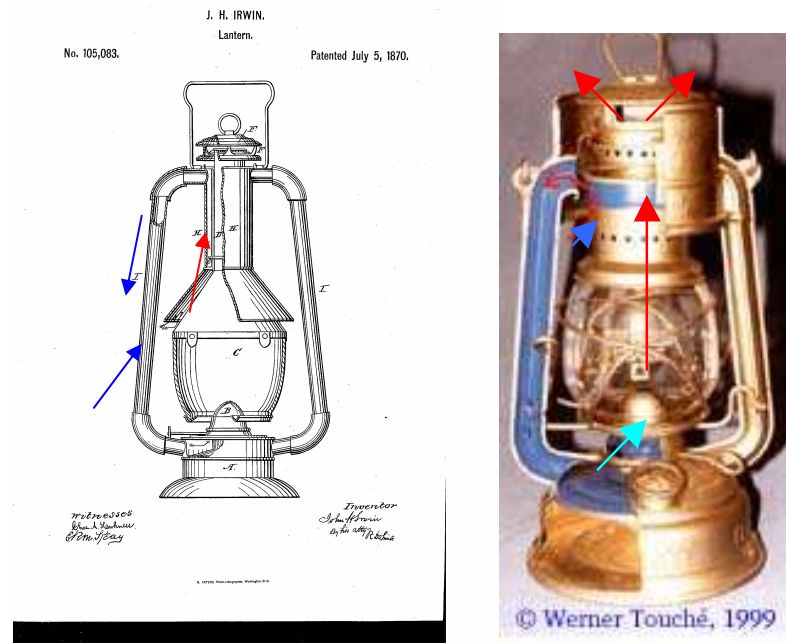


Figure D: Cold-blast lantern technology (15, p. 83): John H. Irwin's patent No. 105083 from July 5, 1870 first describes the cold blast principle. The Nier-Feuerhand Nr.276 'Baby Special' Sturmkappe (above right) based on Bruno Nier's patent filed at the US-patent office May 6, 1933.

Hot- and Cold-Blast lanterns usually have a **chamber above the fount** which has **two functions**: 1) the chamber keeps the air clean and calm which ventilates to the flame, and 2) the fresh air, heated at the hot metal chimney, cools down to enrich with oxygen, but moderately warms up the fount to keep the kerosene at sufficient viscosity when the lantern is used in a cold atmosphere.

Appendix C

General remarks on wicks

Wicks of kerosene Burners are measured in units of line written as ""'. One ""' equals approximately 2/23 of an inch.

'Juergen, The Ever Burning Light', located at Level 1, 319 Parramatta Road, Leichhardt NSW 2040, Australia, gives the following advice to improve the performance of wicks (© 2000).

I have found out that wick manufacturers often use a conditioning agent to make the individual threads run smooth through the loom machinery. The agent is then washed out after weaving. I have noticed that some manufacturers do not wash this agent out completely which means you will not get the best capillary action of the wick. For test purposes on different brands of wicking I suggest boiling the wick in a large quantity of plain tap water. When finished do not cool down in cold water as shrinkage can occur which hardens the wick. Dry the boiled wicks in the oven at 110 degrees Celsius for 30 minutes. I also notice the difference in light output of lamps if the wick is only soaked in kerosene for a short time.

It is recommended to soak the wick for at least one hour or preferably overnight. It also helps to pre-char new wicks to get a smooth surface to glide through the wick tube driven by the wick-raiser sprockets. For optimal performance store the wicks in a sealed jar filled of clear kerosene.

After ten hours of burning time remove coal particles from top of the wick to get the highest and brightest flame.

Some Lantern Tips That Work For Me © 1999 by Dietz-Lanterns, U.S.A.

Use a sharp pair of scissors to *trim wick perfectly flat* with as few stray fibers as possible. Then trim it occasionally to keep it this way removing as little wick as possible. (approximately 1/8 inch). An optimally trimmed wick will produce the most even flame and thus the most light.

Another method that requires a less steady hand, but is somewhat more messy, is to burn the top 1/8 inch or so of the wick even with the burner entrance. You can accomplish this when the lantern is new before you add fuel, or by running the lantern out of fuel. Burn the wick down to the burner entrance then brush off the excess particles. It will then be very even.

Wicks are consumed at 1/4 - 3/8 inch per gallon of fuel burned. This is an approximate generalization and will vary substantially depending upon many variables. Wicks will be consumed rapidly if your lantern is out of fuel. Remove coal particles at the top of the wick after 12 hours of burning time to get the best shaped and most effective flame.

Never fill a lantern *above* the bottom level of *the filler hole* when it is sitting level. They will seep and appear to have a weeping fount. If you do overfill dump some fuel out to bring it to the proper level then set it on some absorbent material it will probably seep for a while.

You can burn kerosene, lamp oil, citronella oil and charcoal lighter. Usually the clear types of fuel burn the best. Clear lamp oil and Ultra pure lamp oil produce little or no odor, kerosene has a slight odor. Most odor is produced when you extinguish the flame. If you do this outdoors you will substantially reduce undesirable odors. Kerosene is the cheapest fuel.

If *you store your lantern outside* in temperature extremes condensation will form inside a full or partially full fount. The kerosene will float on the water and the inside bottom of the fount will rust. If you keep them outside in an unheated garage or outbuilding *dump the fuel out*. If you store them inside dump the fuel every year or so to keep it reasonably fresh.

When first lighting keep the flame low a few minutes and *allow the lantern to warm up* before doing your final flame adjustments. Adjust the flame so no smoke or soot is produced. If your flame is smoking the soot it produces will darken the globe and possibly crack the glass if allowed to continue this way.

To remove the globe from these lanterns do the following:

With the bail in one hand pick up the D ring on top of the lantern with one of your fingers (same hand as the bail). With the other hand tilt the globe out. Then release the bail and D ring and remove the globe.

I prefer to *extinguish the flame* by **slowly** lowering the wick until the flame goes out. This is easier for me than blowing out the flame.

Appendix D

Preservation of the lanterns to resist heat and humidity.

Spray top and inside of chimney with heat proof clear varnish used for motor exhaust pipes.

Coat the rest (burner included) and inside of fount with clear acrylic finish used as last coat for metallic lacquer with automobiles. Let dry for 2 days minimum.

Then slightly grease or oil all gliding metal parts.

Restoration of Old Rusty Lanterns

When you first hold at hand an old piece, the first step is to identify all the markings and embossed signs. In the next step carefully remove the globe, burner and wick, and if the construction allows also remove the bail. Spray the movable parts with thin oil before testing the function. Carry out a dead-true inspection of the inside surfaces of all lantern parts. Take special care for the fount, determine the degree of rust. If insides the parts only some rust spots are seen on the tinned surface the restoration of the visible lantern part is appropriate. Use brass-brushing or glass-beading technique, then polish with steel wool No.00 or No.000. The lantern is prepared for a final polish with chemicals of your household. Prevent the metal from oxidation by coating the lantern with a transparent heat proof lacquer (600 degree Celsius). Switch to the following procedure in case the metal of the lantern frame is completely rusted.

DANGER ! Acids ! The following procedure requires comprehensive knowledge to safely handle acids!

Restoration: © 2000 by George B. Schee my lantern friend living at 227 W 28th Ave., Spokane, WA 99203-1861, U.S.A.

To remove rust from the metal surface Muriatic Acid can be used which is 28% Hydrochloric (HCL) acid. Using this I mix it with water 4:1 in a **plastic container of sufficient dimensions**. Four parts water to one part Muriatic Acid. Soak your rusty old parts in this solution for several hours and rinse off with water. You can also neutralize the acid solution with a solution of baking soda and water.

Detlef Bunk, the author, emphasizes to use concentrated citric acid instead of Muriatic acid.

After rinsing off the acid I use a steel wire brush to go over the rusty parts. If there is still rust back into the acid solution for additional soaking. You have to be careful if the rust has nearly eaten through the metal as the acid solution could eat a hole in your parts. In this case soldering works become inevitable!

I then dry the parts using a hair dryer to remove any moisture. Failure to do this will bring back the rust as you look at the parts. I finish this procedure using No.00 steel wool and finally No.0000 steel wool. As soon as you have cleaned up the parts either spray a paint primer or clear coat of lacquer or plastic coating to prevent the rust attacking the metal again.

I cut a short length of small metal chain, say 6 inches, and put that into the fount. After shaking it around for 20 minutes you will loosen rust in the fount. If the fount has holes in it, out comes the soldering iron. I use thin sheets of brass to solder to the larger holes. You have to use acid flux for this procedure.

Another trick to seal leaks in the font is to pour in a small amount of gas tank sealer. It is available in the US at shops that cater to antique car restorers. This is a silvery colored, thick liquid that will coat the inside of the fount and dries to a hard plastic surface that is hydrocarbon tolerant.

I have also used lime remover (I believe it is phosphoric acid) to take carbide residue from miners lamps. This is sold in the USA to remove lime deposits from plumbing fixtures. A soapy ammonia solution is excellent for removing soot deposits from lantern parts, especially glass. I use it full strength as it comes from the store and soak the parts over night. Rinse with water and the parts are ready for polishing.

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"There are only two ways to live your life: One is as though nothing is a miracle. The other is as if everything is."

Albert Einstein