

Clark Patent Blasting Tubing

Jerry Cestkowski

Describing the evolution of Saxon mining practices, the book *Black Powder and Hand Steel* relates that, “In 1685, Bergmeister (Superintendent) Carl Zumbe, of the Clausthal mines, invented clay stemming, whereby clay, sand, or drill cuttings were used to stem the hole.”¹ Then, “Hans Luft, a bookbinder of the same district, in 1687 devised the paper powder cartridge, which ended the necessity of dealing with loose powder and made the loading of ‘up’ holes easier.”² The two concepts were combined, and stemming, as well as blasting powder, was wrapped into paper cartridges.



Tamping bags.

DuPont, in the 1911 edition of *DuPont Blasting Products*, wrote, “Tamping Bags of heavy paper are used in many places as containers for tamping and save time and trouble when loading bore holes, particularly the pitching ones and the ‘uppers.’ They are also employed as containers for blasting powder when the miner or blaster desires to make up the charge in cartridge form, as is generally the custom when it is used in mines or in open work that is damp.”³ (Technically, “containers for tamping” should be “containers for stemming.” Tamping is the act of compacting cartridges and stemming materials. Stemming refers to the dirt, clay, or other filler at the top of the hole, whether packed into tamping bags or not.)

According to the April 1, 1918 issue of *Coal Age*, “In mining, and sometimes in light charges in open work, blasting powder is made into cartridges by means of a paper tube or cylinder sealed at one end, which is known as a tamping bag. Sometimes the paper cylinder is made by the miner, by coiling a section of heavy paper, known as

blasting paper, around a wooden pin, called a cartridge pin, and securing it with what is called cartridge soap. The removal of the pin leaves a cylindrical cartridge open at one end, into which the powder is poured, the top being then folded and sealed with soap.”⁴

Scrap paper was used until the debut of commercial blasting paper in the 1850s. In 1853 Virginia merchant Wortham, McGruder & Company sold “wrapping and blasting paper” while mining supplier Voyle & Davies of Carbondale, Pennsylvania, offered blasting paper by the ream. These were almost certainly sheets of ordinary wrapping paper like those used by all sorts of merchants. The June 14, 1856 *London Journal* reported that,

We understand that an American has discovered what he designates a “blasting paper,” which is pronounced by old timers a desideratum; it is thin, flexible, and perfectly solid, impervious to water or moisture, and not a pore exists in it. Water may be kept in it for twenty four hours without losing a drop; and further an egg can be boiled in it, on a stove, and yet the paper will not be wetted through by the boiling water. In a drill hole it will not occupy so much room as the thick paper usually made use of in wet places; and whatever length of time it may be kept there, by accident, the powder will be kept dry, and thereby not only is the price of the powder saved, but the labor of drilling out and recharging the blast.⁵



Roll of blasting paper.

By 1858 A. E. Smith of Philadelphia was advertising waterproof blasting paper. This was doubtless vegetable parchment paper, as paper made of wood pulp did not come into wide use until the 1870s. Prior, paper was made from plant fibers and recycled textiles. Vegetable parchment was invented in 1847 and is made by briefly dipping sheets of pressed plant fiber in sulfuric acid. The acid melts some of the pulp in the paper and converts it into a natural, waxy substance.

(Another type of “blasting paper” debuted in the 1880s, and consisted of gunpowder-impregnated paper that was rolled into very small-diameter cartridges. According to an article in 1891, “Almost any good unsized paper can be made into an explosive compound by coating it with a hot mixture of yellow prussiate of potash and charcoal. It may then be dried, rolled into cartridges and fired in the ordinary manner.”⁶ [Sized papers have chemicals added to make them less absorbent.]

Commercial tamping bags were available by the 1890s. The major explosives producers (DuPont, Hercules Powder Company, Atlas Powder Company, and Aetna Powder Company) all offered tamping bags beginning in the 1910s. Smaller producers like King Powder Company and National Powder Company also sold bags. The Tamping Bag Company of Mt. Vernon, Illinois, was founded in 1935 by Alfred E. Pickard, and provided bags in “sixty-five stock sizes”⁷ in 1951.

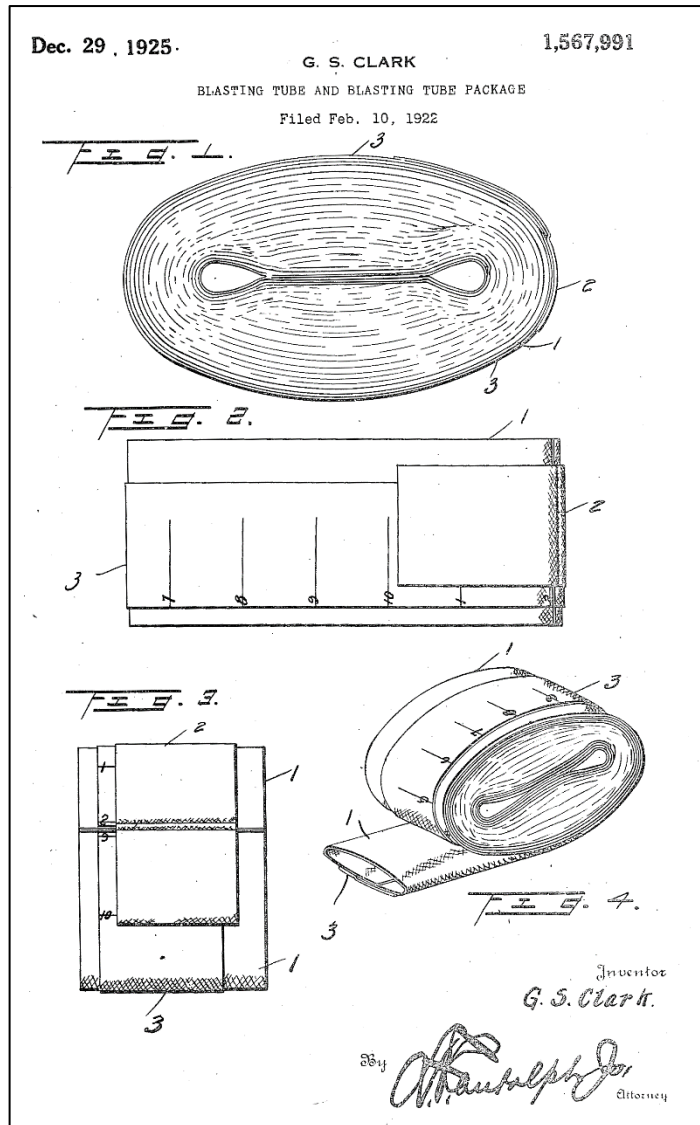
In addition, companies like Bemis Brothers, National Mine Services Company, and Fulton Bag and Cotton Mills manufactured and sold tamping bags. Tamping shells, which resembled dynamite sticks but were filled with sand or clay, were sold by Apache Powder Company and others. Modern tamping bags are just as likely to be plastic as paper, but paper bags are still widely used.

In 1873 an inventor from Pennsylvania patented a “Package of Powder Charges for Blasting,” which consisted of cartridge blasting powder. In 1876 an article reported, “Some time ago some of our powder manufacturers thought well of introducing powder already prepared in paper cartridges, in quantities equivalent to the usual keg – about twenty-five pounds.”⁸

However, it does not appear that large amounts of ordinary blasting powder were sold in already-cartridge form until the advent of pelletized powder in the mid 1920s. “Railroad Powders” like Judson Powder, which was nitroglycerin-coated black powder, were sold both in bags and in pre-cartridge form.

In 1926 a Kentucky inventor named G. Farris Templeman was granted a patent for “a roll of blasting paper having adhesive material on its longitudinal edges, said roll being adapted so that a sheet of paper can be taken therefrom with adhesive material on two edges thereof for forming a tube by rolling the sheet from either of its said two edges whereby one of the edges may be used for sealing the sheet in tube formation.”⁹

Clark Paper Products was incorporated by George Sherman Clark on May 22, 1922. Just two weeks later, on June 5, the name of the corporation was formally changed to Clark Patent Tubing Company. The location of the business was 3625 McColloch Street, Wheeling, West Virginia. In 1926 the firm listed four employees.



In 1920, Wheeling was a thriving industrial hub, boasting nearly 60,000 residents. The city has experienced a gradual decline in population, which is currently estimated at about half the 1920 figure.

A 1926 Wheeling city directory lists J. B. Hald as president of the Clark Patent Tubing Company, and C. F. Neugart as secretary-treasurer. Hald was a businessman operating in Ohio and Indiana. Neugart was a West Virginia investor who also had interests in Standard Automobile Company of Wheeling, and Fenry Photography Company of Columbus, Ohio. Given the extremely small size of the Clark Patent Tubing Company, the positions of the two men were probably purely titular; they were likely just shareholders in the firm, which was capitalized at \$175,000.

Clark obtained four United States patents related to his blasting tubing. An application for a patent for a Blasting Paper Sheet was filed March 1, 1921, and US Patent 1,464,865 was issued August 14, 1923. An application for a patent for a Blasting Shell was filed March 15, 1921, and US Patent 1,464,866 was issued August 14, 1923. An application for a patent for Blasting Tube and Blasting Tube Package was filed February 10, 1922, and US Patent 1,567,991 was issued December 29, 1925. And, an application for a patent for a Tube-winding Machine was filed on November 3, 1921 and US Patent 1,591,658 was issued on July 6, 1926.



Roll of Clark Blasting Tubing. Note the printed marks to the right of the label for measuring lengths of tubing.

In addition, on June 22, 1922, Clark was granted Canadian Patent 219,232 for a Blasting Shell. This was a version of the blasting tubing that was designed to be folded to any size diameter.

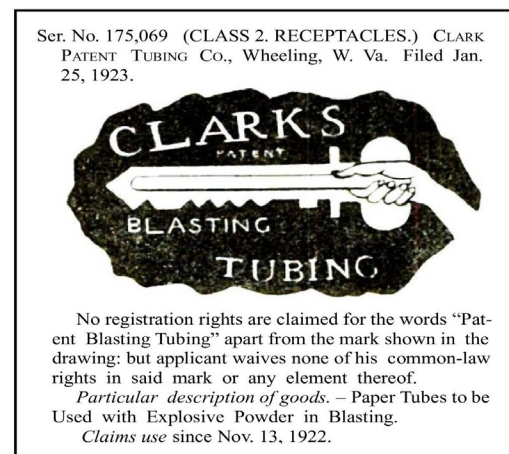
Clark also obtained US Patent 1,588,472 on June 15, 1926, for a lamp holder for mining caps.

Finally, James McElwain, on behalf of Clark Patent Tubing Company, was granted US Patent 1,608,331 for a Paper Tube Package on November 23, 1926. This was a self-sealing version of the original tubing, with adhesive strips along the

length of the paper. McElwain was a West Virginia inventor with at least two other patents: one for an engine, and one for a candy-filling machine.

In his patent applications, Clark lists his home variously as Bowling Green, Kentucky, or Portsmouth, Ohio. A short article in the March 3, 1923 edition of the *Portsmouth Daily Times* reported that, "Mr. George S. Clark, of 421 Bond Street, who is at the head of the 'Clark Patent Tubing Co.,' of Wheeling, W. Va., has gone to Cincinnati, where he will operate a branch factory manufacturing his patent blasting tubing. For the present he will make his home with his son, Emerald R. Clark, who is connected with the Julian Kenge Shoe Co., in the Queen City, and who lives in Newport, Ky."¹⁰ The "Queen City" is Cincinnati. Newport, Kentucky, is just across the Ohio River, which divides the two states. Bowling Green, Kentucky, is over 200 miles southwest of Cincinnati.

According to an article in the March 16, 1923 issue of *The Coal Trade Bulletin*, Clark Patent Tubing "is a strong paper tube with a permanent seam and an established diameter. No powder can be lost. The tube fits around the neck of the powder jack. Powder packs perfectly, evenly, and uniformly in the tube. A solid tube of perfectly uniform diameter is the result every time. This slips into the drill hole with ease. There is no guesswork, no loss of time, no waste of powder, no danger of a blow-out shot."¹¹ The article features four photographs showing the difference between a cartridge rolled with blasting paper and one made with blasting tubing. Of course, the cartridge rolled with tubing was much neater looking. The tube was also quite long, measuring at least two feet.



Trademark registration from April 10, 1923.

On June 2, 1925 *The Coal Trade Bulletin* carried a one-and-a-half-page writeup of the invention featuring four photographs of a miner using the tubing. The first page of the article is reproduced here. The article also claimed that,

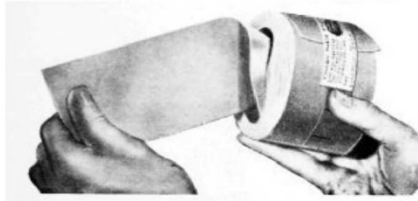
Blasting cartridges made from this patent blasting tubing are as distinctly an advance over those made by hand out of regular blasting paper or newspapers, as the electric cap lamp is over the old miners' oil lamp and is rapidly being adopted; something one of the foremost industries has been looking for, vainly, for the past decade, something efficient, superior, and far more revolutionary in its own field than anyone can imagine without a knowledge of the complete facts.¹²

Patent Cartridge For Explosives Makes For More Safety in Coal Mines

The Cartridge Tubing is Ingeniously made in Suitable Lengths and of Strong Paper. The User may Use One, Two, Ten or Fifty inches without Danger of the Cartridge Bulging or Sticking in the Hole The Roll is Simply Unrolled and Desired Amount Torn Off.

A new invention in the way of an explosive cartridge is seen in the production of Clark Patent Tubing for blasting in mines.

In the use of this paper there are no loose, bulging seams to leak powder. No waste, like in "rolling



your own" under the old primitive methods, therefore, you save both labor and powder. This is a uniform, correct way of making an exact cartridge, which in-



The entire roll of Clark Tubing is marked off into inches in the process of manufacture. This enables the miner to tear off the exact length of tubing required for each shot. It is simply a matter of counting off the desired number of inches of tubing, tearing from the roll - and it is ready for use. No crude fashioning of the tube from newspapers, no bulge in the middle, no loose seams - just a perfect, uniform tube, ready for immediate and efficient use.

sure accuracy, promotes safety and increases efficiency. Always, equally good in "Wet or Dry" holes.

To determine the size of blasting tubing to be used, ascertain the size of auger twists used and apply as follows:

For 1 1/4 inch auger twists use 13/16 inch tubing, class A

For 1 1/2 inch auger twists use 15/16 inch tubing, class A.



After tearing off the required length of tubing and folding over one of the ends, as shown in Figure 2, leaving only one end open for filling the tube, it but remains for the miner to blow into the open end as one does into a paper bag - and there he has the tube ready to receive the powder. No shot-firer, having once been shown how simple is the use of the Clark Blasting Tubing, will ever again be content to follow the old, time-worn method of making his cartridge by hand.

For 1 3/4 inch auger twists use 1 1/2 in. tubing, class A.
For 2 inch auger twists use 1 3/4 inch tubing, class B.
For 2 1/4 inch auger twists use 2 inch tubing, class B.
For 2 1/2 inch auger twists use 1 1/2 in. tubing, class B.
For 2 3/4 inch auger twists use 2 1/2 in. tubing, class C.
For 3 inch auger twists use 2 3/4 inch tubing, class D.

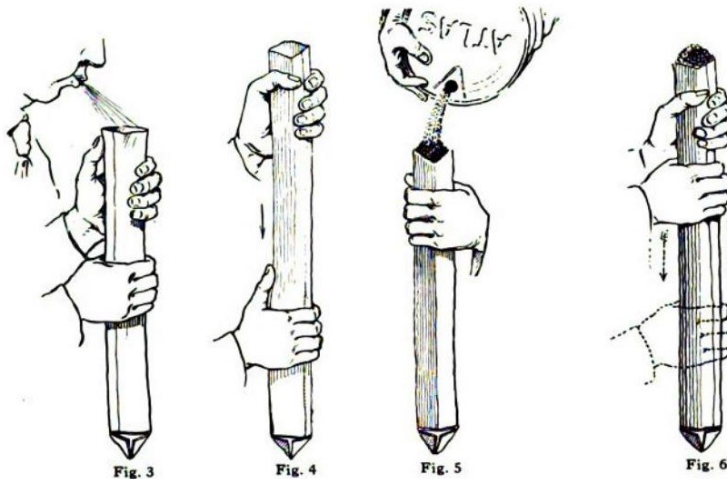
Under the rubric of "SOME CLAIMS FOR IT," the article lists,

1. Its practicability recommends it to every use.
2. It is of benefit to Miners and Operators alike.
3. It makes a rigid, uniform cartridge which is guaranteed to fire in "wet" holes.
4. It does away with cartridge pins or blasting barrels, soap or wax and is ideal to use for tamping bags.
5. It is a handy roll that fits the hand or pocket and stays neat to the last inch. All rolls must always be started from the inside.
6. It saves labor, time and powder. Costs no more than regular blasting paper.
7. It does away with guess-work and is safer than the old way.
8. It will insure contact and produces 100 percent explosion when used to enclose any of the permissibles.¹³

The last advantage would only apply to free-running permissible dynamite formulations; already-cartridged permissible dynamites would not benefit from another layer of paper.

An ad in the 1926 *Report of the Colorado State Inspector of Coal Mines* claimed that the tubing was, "Ideal for tamping – Makes lump coal easier to get – No powder spilled along drill hole – Made in diameters to suit all drills – Tubing marked in inches – For use in wet holes – No cartridge stick needed – Promotes safety in mines."¹⁴

Atlas Powder Company sold a continuous roll of blasting paper in tube form called Sureshot Blasting Shells. The July 7, 1923 issue of *Manufacturers Record* related that, "The Atlas Powder Company, manufacturers of explosives, Wilmington, Del., describes the Sureshot blasting shells which have recently been placed on the market, as being intended to be used in place of blasting paper by individuals and others who employ explosives for mining purposes. They can also be used very satisfactorily, it is stated, for tamping bags."¹⁵



Instructions for using Atlas Sureshot Blasting Tubing.

When the charge is pressed in the borehole the tamping expands the shell without breaking the paper, the charge fills the hole completely, yet the powder is protected from water or moisture in the hole. The best results are, therefore, obtained from the explosive and "lost holes" or misfires are reduced to a minimum.¹⁶

The shells were expanded by blowing into them and came creased along their length to allow for further expansion in the borehole upon tamping. The tubing was sold in three standard "unexpanded diameters" of 1 ¼", 1 ½", and 2". According to Atlas, "Each shell is 40 feet in length, folded in 10-inch folds. This is the standard length of blasting paper used for some coal fields. Packed 100 shells in a package. Any size desired can be furnished. Any length in any size can be supplied."¹⁷

Giant Powder Company, Consolidated, also sold Sureshot Blasting Shells in the 1920s. After acquiring Giant Powder, Consolidated, in 1915, Atlas divided the country into two sales territories. Products sold in western states would have the Giant logo, and those sold in eastern states would carry the Atlas logo. Regardless of sales point, many cases of Giant products were marked "Giant Powder Co. Consolidated Controlled by Atlas Powder Company." Atlas

In the 1924 edition of *Atlas Blasting Supplies*, Atlas Powder Company devotes two full pages of text and illustrations to Sureshot Blasting Shells, writing,

The Sureshot Blasting Shell is a continuous, expansible paper tube made of the stoutest waterproof paper. Its patented construction gives it many advantages over the method of loading black powder with blasting paper. The shell is loaded in the usual way. When the charge is

and Giant shared many products, and some advertisements and catalogs from the two companies are virtually identical save for the company name.

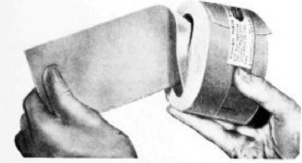
It is remarkable that both the Clark and Atlas versions of blasting tubing were introduced at exactly the same time. Not as surprising is the fact that blasting tubing faded from the scene almost immediately. Complexity and added expense were antithetical to the simplicity and economy of black powder. Having to order specific diameters of tubing offset its convenience; conventional blasting paper could be rolled into any diameter and done so consistently by use of a correct-sized mandrel. For the Clark product, offering “classes” of diameters, with more than one diameter per class, was confusing. Moreover, the added expense of tubing versus blasting paper, no matter how small, was enough to prevent its use in all but the most well-financed mines. The claim by Clark that the tubing “cost no more than regular blasting paper” took into account the expected time and labor savings.

For the mines that could afford it, pellet powder was available in the United States beginning in 1926. Even though producers charged an eight- to ten-percent premium over black powder, many mines clearly saved time and money overall, as evidenced by the rapid climb in sales of pellet powder, which captured forty percent of the blasting powder market by 1930. By 1936, more pelletized black powder was sold than loose powder. Pellet powder was a serious blow to blasting tubing, largely rendering it obsolete.

The short lifespan of commercial blasting tubing makes for a very scarce collectible. The website Hal’s Lampost (halslamppost.com) has pictures of a roll of Clark tubing which is marked, “DIA 1 5/16 In.” My example is also 1 5/16 inch in diameter, as are the two others listed as sold on the auction-record website WorthPoint. Surely, if the tubing was widely used, there would be a variety of surviving examples. Atlas offered its Sureshot Blasting Shells until about 1930. A search of WorthPoint for “Sureshot” yields no matches.

Notes

1. Otis E. Young, Jr., *Black Powder and Hand Steel* (Norman, Oklahoma: University of Oklahoma Press, 1976), 30.
2. *Ibid.*
3. E. I. DuPont de Nemours & Co., *DuPont Blasting Products* (Wilmington, Delaware: E. I. DuPont de Nemours & Co., 1911), 81.
4. H. J. Brighton, “Coal, Explosives, War – II,” *Coal Age*, April 1, 1918, 214.
5. “Blasting Paper for Miners,” *London Journal*, June 14, 1856, 207.
6. “Blasting Paper,” *Stone*, August 1891, 124.
7. “American Mining Congress Equipment Show Report,” *Coal Age*, June 1951, 115.
8. *Report of the Inspector of Mines of the Anthracite Coal Region of Pennsylvania for the Year 1876* (Harrisburg, Pennsylvania: E. F. Meyers, 1877), 123.
9. G. Farris Templeman. Blasting Paper. US Patent 1,682,639, filed July 10, 1926 and issued August 28, 1926.
10. *Portsmouth Daily Times* (Ohio), March 3, 1923, 3.
11. “Important Features of Blasting Powder and Modern Permissible Explosives,” *The Coal Trade Bulletin*, March 16, 1923, 341.
12. “Paper Cartridge for Explosives Makes for More Safety in Coal Mines,” *Coal Trade Bulletin*, June 2, 1925, 119.
13. *Ibid.*, 120.
14. Clark Patent Tubing Company, advertisement, *Fourteenth Annual Report of the Colorado State Inspector of Coal Mines* (Denver, Colorado: Eames Brothers, 1927), 44.
15. “Blasting Shells for Mining,” *Manufacturers Record*, July 7, 1923, 114.
16. Atlas Powder Company, *Explosives and Blasting Supplies* (Wilmington, Delaware: 1924), 91.
17. *Ibid.*



The entire roll of Clark Tubing is marked off into inches in the process of manufacture. This enables the miner to tear off the exact length of tubing required for each shot. It is simply a matter of counting off the desired number of inches of tubing, tearing it from the roll – and it is ready for use. No crude fashioning of the tube from newspapers, no bulge in the middle, no loose seams – Just a perfect, uniform tube, ready for immediate and efficient use.

Always start Roll of Clark Tubing, as Above, from Inside.
Roll remains handy and near to the last foot.

BLASTING and TAMPING TUBING

FOR

SHOT FIRING—CUSHION BLASTING—ROCK DUST STEMMING

Endorsed by Miners, Mine Officials, Powder and Quarry Companies

SAFETY — SERVICE — SAVING
Are accomplished through the Accuracy, Economy, Efficiency and Practicability in using this Patent Cartridge Tubing.

CLARK PATENT TUBING CO.
No. 3625 MCCOLLOCH STREET,
WHEELING, W. VA.
Send for Samples and Prices

Ad from the November 16, 1925 *Coal Trade Bulletin*.