

Explosive Coal: Bombs Hiding in Plain Sight

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Thomas Courtenay, Irish-born Confederate officer and inventor of the coal bomb, 1864.

National intelligence agencies, military forces, insurgent subversives, and criminals have long worked to create covert sabotage devices to achieve their ends. Some of these are clumsy and nearly overt—like throwing a Molotov cocktail or similar explosive hidden chiefly by darkness—while others are often ingenious, such as the diverse items CIA developed that remain highly classified or that the OSS used during World War II. In that vein, one of history’s most ingenious, yet disarmingly simple covert sabotage explosives was similarly developed right here in the US: explosive coal.

Coal has been used as an energy source for thousands of years, but it was not until the late 18th century and the invention of the coal-fired steam engine that coal became a main driver of industry and transportation. By the early 19th century, coal fueled homes, factories, ships, railroads, and other vital machines around the globe. The pervasiveness of coal as an essential, common fuel persisted well into the 20th century, and even today coal provides about 25 percent of global energy requirements.

Coal was often stored openly in huge piles or bins with no security protecting it. Each lump was roughly the same size and color so that in bins or from a short distance, one lump looked like a thousand others. At the same time, each lump’s uniquely

individual nature—particularly its rough and irregular shape, resulting from the mining and processing that broke deposits into a transportable, useable form—ensured that no two pieces were exactly alike.

These attributes make finding a particular lump in a bin literally like finding a needle in a haystack and enable concealing any single lump in even a small coal bin or hopper. What might be surprising is not that someone sought to exploit it as an instrument of violence and war, but rather that it took so long to develop a bomb disguised as a lump of coal.

Idea Born of War

With the advent of the US Civil War on April 21, 1861, the secessionist Confederate States of America quickly established its own military forces, governing bodies, and laws—in part to demonstrate it was a legitimate political entity and would abide by the “civilized rules of warfare.” In May 1861, the Confederacy approved issuing letters of marque—legitimizing piracy—and in April 1862, Confederate Major General Sterling Price assigned “destructionists” to sabotage Federal river boats and property in the war’s western theater.

On April 21, 1862, the Confederate Congress called for the invention of “any new machine or engine, or . . . any new method for

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destroying the armed vessels of the enemy,” promising that the inventor would receive half the value of any vessel destroyed. With the Union ironclad USS *Monitor* valued at \$250,000, it was clear that anyone able to do so stood to become very wealthy.¹

Spurred by this incentive, Thomas Edgeworth Courtenay—who emigrated from Belfast, Ireland, to Baltimore, Maryland, in 1842—first conceived an explosive disguised as coal. Serving on General Price’s staff in 1863, Courtenay might have been inspired by accounts of Union steamboats destroyed by explosives hidden in firewood. In early November 1863, Courtenay arrived in Richmond, Virginia, to pitch his “coal torpedo”—a variety of explosive devices were then termed “torpedoes”—to Confederate officials.²

Confederate President Jefferson Davis was favorably impressed, and his Secretary of War, James A. Seddon, though skeptical, approved constructing and testing Courtenay’s explosive on December 4, 1863. One month later Courtenay wrote a friend: “The castings have all been completed...and the coal is so perfect that the most critical eye could not detect it. The President thinks them perfect, but Mr. Seddon will do nothing without Congressional action.” As a subsequent account in the *Times* (London) detailed, the device was produced by the Tredegar Foundry in Richmond:

The castings were three-eighths-inch thick with a reinforced threaded hole to accommodate

*a fuse or plug. Patterns were fashioned from random pieces of coal and sized so that they would not require trimming by a fireman before shoveling into the furnace. After the shell body was filled with powder and plugged, it was dipped into a boiling mixture of coal tar, resin or beeswax, leaving a final product resembling a lump of coal in weight, smell, and general appearance.*³

Final hurdles to the device’s field use were crossed when testing was completed by January 20, 1864, at City Point, east of Richmond, and formal legal approval came soon after on 17 February. Final operational questions were resolved in late February when Davis appropriated \$5 million for secret service activities, similarly authorizing Courtenay to construct several coal torpedoes and recruit 25 men to deploy them against Union military targets.⁴

First Field Use

Although Courtenay quickly recruited a team familiar with ships and ports to deploy his coal bombs, by February 9, 1864, the Union acquired intelligence of the devices’ existence. When a refugee who had worked on Courtenay’s devices, Joseph Leuty, was picked up by the crew of the USS *Jacob Bell*, he readily declared:

I am an Englishman by birth, a molder by trade; have lived in the South for the last four years; for the last eight months I have been working in the artillery shop of Seventh Street,

*Richmond, where they are now making a shell which looks exactly like a piece of coal, pieces of which were taken from a coal pile as patterns to imitate. I have made these shells myself. I believe they have power enough to burst any boiler. After they were thrown in a coal pile, I could not tell the difference between them and coal myself.*⁵

Corroboration came in mid-March 1864 when the gunboat USS *Signal* captured mail bearing Courtenay’s letter describing the coal bombs in detail. These twin intelligence finds prompted Rear Admiral David Porter to advise Washington on 20 March of the explosive coal and other “devilish devices.”

The coal bomb’s first impact was in tying up Union manpower to guard previously ignored coal stocks when Porter issued General Order No. 184 to his Mississippi Squadron, which also threatened with death anyone caught placing a coal bomb. Further complicating Courtenay’s sabotage efforts were newspaper accounts first carried in the *Chicago Tribune*, on April 12, 1864, that described the coal bomb, intended targets, and named him as the inventor.⁶

Explosive coal’s first operational use might have occurred on April 15, 1864, when the gunboat USS *Chenango*’s boiler burst during her maiden voyage in New York City, killing 33 sailors, scalding several more, and forcing the vessel out of action. Although the incident was officially blamed on a faulty boiler, Thomas Courtenay nonetheless wrote on May 21, 1864, that “My work is beginning to tell on the Yankees—a short time since the *Chenango* U.S.

gunboat was blown up at Brooklyn by one of my coal torpedoes...”⁷

Sinking the Greyhound

The first definite explosive coal attack occurred on November 27, 1864, after a meeting of top Union leaders near Richmond, Virginia, when an explosion shattered Major General Benjamin Butler’s personal steamer *Greyhound*. On board with Butler was Admiral Porter, commander of the North Atlantic Blockading Squadron; Brigadier General Robert Schenck; and several staff officers. They quickly boarded a lifeboat while the crew and others jumped into the chilly James River.

Within minutes, burning coal scattered by the explosion set *Greyhound* afire, and it quickly burned to the waterline. Eyewitness accounts of the unexpected explosion and *Greyhound*’s recent coaling while docked near Richmond pointed to a coal bomb having unknowingly been put into the furnace. Although only the ship and several horses were lost, the death or serious injury of these three senior leaders by the coal bomb certainly could have altered the Civil War’s closing months.⁸

While Courtenay stepped up operations in Virginia, several devices were shipped to Toronto, Canada, where Confederate Commissioner Jacob Thompson was running sabotage and other operations harassing the Union war effort in mid-1864. Along with hatching plots to burn New York City, raid into Vermont, and free Confederate prisoners on Ohio’s Johnson Island, Thompson directed the sabotage of Massachusetts’ Springfield Arsenal, the North’s main small arms manufacturer.

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On December 1, 1864, a watchman discovered a piece of coal on a stairway landing between floors. It proved to be a bomb, and a sheet of paper was found connecting it to Canada. Other such attacks were probably planned because on April 7, 1865, Canadian police searching the Montreal home of suspected Confederate agents found several boxes containing explosive coal and other sabotage devices.⁹

Another attack might have occurred on December 11, 1864, when the steamboat *Maria* suddenly exploded while docked on the Mississippi River at Carondelet, Missouri, near a Union ironclad shipyard. Like Butler’s ship, *Maria*’s furnace suddenly exploded after coaling, and burning lumps spread across the deck.

Explosive coal also was suspected in the explosion and fire aboard the steamboat *Sultana* on the April 27, 1865, which claimed some 1,700 lives, including many men just released from Confederate prisoner-of-war camps. Although poor steam-plant maintenance was officially blamed for the disaster, several newspapers of the day claimed a coal bomb was responsible, fueling suspicions that persist today.¹⁰

Perhaps reflecting the significance of Courtenay’s “coal torpedo,” when Union troops entered Confederate President Jefferson Davis’ office after Richmond’s fall in April 1865, they found an inert coal bomb on his writing desk. Although with the war over explosive coal’s role might have

seemed to close, it was in fact taking on a new form.¹¹

Courtenay’s Device Lives On

Seeking a fresh start by the war’s close, Thomas Courtenay returned to England and marketed his coal bomb to various nations potentially interested in the novel weapon. In spring 1866, he pitched his weapon to British Royal Navy officials, who reportedly called it “the greatest invention of the age.” Courtenay apparently had several inert samples made in England about that time. The move soon backfired when in early 1866, metalworker George Sanders, who had worked on Courtenay’s new models, built and sold his own coal bombs despite pleas to keep the process secret.¹²

In the meantime, Courtenay cast his commercial net increasingly widely. When British interest waned, he reached out to Chile, Austria, Prussia, Italy, and Turkey, the latter interested because Greece already reportedly possessed explosive coal of its own. By 1870, Courtenay was back in England marketing his coal bomb to a new round of British officials, this time possibly including an improved version that employed flammable liquids or other more powerful explosives. Regardless, no nation offered Courtenay a contract.¹³

In July 1868, Courtney offered 10 kegs of coal bombs to the Fenian Brotherhood, the US-based Irish Republican group that in 1866–71 staged a series of ineffectual raids on Canada. This, too, failed to generate a sale. Thomas Courtenay died on

September 1, 1875, after returning to the United States, never having sold his invention to any potential clients. Courtenay's idea, however, lived on.¹⁴

Coal bombs soon reappeared in the schemes of insurance fraudsters, where they could be used to sink over-insured ships at sea. France's former Marine Minister Admiral Pothman warned insurance agents of the coal bomb's potential use in a June 9, 1873 newspaper article, and the following month a New York journal warned of an American offering coal bombs to "destroy over-insured steamers with impunity."¹⁵

Coal bombs featured in the 1873–76 conflict between British ship owners and Parliament when Samuel Plimsoll advanced legislation to monitor and prevent dangerously overloading vessels. Standing to lose considerable sums, ship owners and merchants turned to violence, and in 1875 an unnamed person—perhaps George Sanders, who had built several coal bombs for Courtenay in 1866—offered to sell several such devices to a coal supplier caught up in the fight.¹⁶

That Little Square Box

Details of explosive coal's design and manufacture spread widely as the century drew to a close. Retired Admiral Porter wrote an extensive account of the *Greyhound* explosion and Courtenay's device, while newspapers periodically featured explosive coal's past uses and detailed descriptions of its design and presumed methods of manufacture.

Publications also became interested in coal bombs; an 1869 journal included the first accurate

technical cutaway drawings of Courtenay's bomb, while an 1877 publication added updated details of the weapons's design, construction, and prospective applications.¹⁷ Explosive coal became a plot twist in Arthur Conan Doyle's short story "That Little Square Box." Published in December 1881, the characters discuss the real-life sinking of the HMS *Dotterel* on April 26, 1881:

"Excuse me," returned Flannigan, "but is there not some room for doubt yet as to the fate of the Dotterel? I have met men in America who asserted from their own personal knowledge that there was a coal torpedo aboard that vessel."

*"Then they lied," said the Captain. "It was proved conclusively at the court-martial to have arisen from an explosion of coal-gas."*¹⁸

World War I Sabotage

The Civil War-era coal bomb seems quaint in comparison to many of the battlefield weapons used in the "war to end all wars," but its covert nature and utility still made it attractive for sabotage. Every nation involved in World War I was highly dependent on coal for energy, transportation, and manufacturing, including armaments. Germany, in particular, employed a wide range of covert explosive devices throughout the war, such as booby traps left in abandoned trenches, as depicted in the recent film *1917*.²⁰

Weak federal law enforcement and intelligence capabilities had left the US vulnerable to sabotage even before President Wilson finally declared war on Germany on April 6, 1917. German saboteurs caused a massive explosion at the Black Tom Island munitions depot in New York Harbor on July 30, 1916, killing four and causing \$480 million in damages



File card showing damage to the Black Tom Island munitions depot, New York Harbor. (Source: National Archives and Records Administration.)

in today's dollars.^a (The perpetrators were not caught until after the war.) In March 1917, explosive coal was discovered aboard a steamer leaving New York for Buenos Aires. In June 1917, eight more were found aboard the Norwegian freighter *Olderney*, bound for New York.

The following year, in March 1918, a coal bomb was discovered in a load of coal being delivered to Michigan's Con Edison Del Ray coal-fired power plant. News reports at the time speculated that an explosion could have severely damaged the plant and affected war materials production in most plants west of Detroit.²¹ German agents were suspected in each of these operations, although no one was implicated by subsequent investigations.

World War II Innovations

Most major combatants in World War II developed bombs disguised as coal for use in covert sabotage operations. Perhaps the most significant change in the coal bombs was the use of newly improved moldable ("plastic") explosives in place of black powder, which increased each device's explosive power while eliminating the need for an iron casing. This single change also simplified production and decreased the weight of each device, making it more useful for sabotage operations.

Similarly, new types of fuses—such as timed and remotely detonated—made the coal bomb potentially more useful, enabling for the first time its use in specifically

a. See Michael Warner, "The Kaiser Sows Destruction," *Studies in Intelligence* 46, no. 1 (2002), 3–9.

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targeted and timed attacks. No longer was the coal bomb solely a random weapon, dependent on the unwitting assistance of someone shoveling it into a boiler.

Perhaps the most famous appearance of coal bombs during this period was in Nazi Germany's Operation *Pastorius*, under which the Abwehr II (German military intelligence's sabotage organization) landed eight saboteurs from U-boats on beaches in New York and Florida on June 12–17, 1942. Once ashore, the two teams buried boxes of explosives, weapons, money, and other equipment. Compromised shortly after landing when the New York team's leader revealed their plans to the FBI and police, all eight men were arrested before any sabotage occurred.

Upon uncovering their caches, the FBI and police found several coal bombs and related fuses. George Dasch, the New York team leader, later told the FBI that the coal bombs were to be thrown into US railroad coal cars as part of Abwehr plans to damage US transportation networks and other industrial targets assigned to the group.²²

Agent Zigzag

The Abwehr also provided Eddie Chapman—a criminal and volunteer spy, doubled by Britain and named "Agent Zigzag"—with coal bombs to sabotage the British merchant ship *City of Lancaster* in March 1943. Although the Abwehr had instructed Chapman during his initial training in France to construct coal bombs by drilling holes in real lumps of coal

and then filling them with explosives and a detonator, for this plot Chapman was provided with two German-manufactured coal bombs.

Chapman, now a *Lancaster* crewman to enable him to travel to and from neutral Portugal, had proposed to his German handlers using coal bombs to destroy the ship, but he compromised the plan shortly after leaving Lisbon. With the coal bombs safely locked in the captain's safe, the *Lancaster* arrived in Glasgow where alerted British officials staged a furious search of the ship's coal bunkers before emerging with two purported coal bombs, part of efforts to protect the double agent Chapman.²³

OSS

The Allies also designed coal bombs during World War II. Stanley P. Lovell's Research and Development Branch in the Office of Strategic Services sometime before 1944 developed a coal bomb similar to Thomas Courtenay's device. Described as "high explosive (60-40 Pentolite) cast into molds formed originally from actual lumps of coal. The coal is...reinforced against breakage by black enameled scrim. Once the igniter of lead styphnate is sealed in the end...with waterproofing material, and when coated with plastic cement containing lampblack, is well concealed while at the same time being readily ignited."

Place clandestinely in unguarded coal storage bins, eventually the bomb would be shoveled unknowingly into a railroad or ship boiler before exploding. The OSS device came

with a camouflage kit that enabled agents in the field to match the coal bomb to the hue of local coal stocks, which could vary widely throughout the diverse Nazi-occupied areas. Unlike Courtenay, however, the OSS freely shared its coal bomb with its British Special Operations Executive (SOE) partners.²⁴

Field tests showed that the OSS coal bomb could destroy a railroad engine firebox, noting that had the tested boiler been under pressure, “it would have been exploded,” causing additional damage. Another test in a building’s fireplace revealed the bomb exploded, “lifting the roof and blowing out several windows. An examination showed that the interior partitions were broken down, one

exterior wall shattered, the ceiling shattered, and sagging, the porch was loosened from the house by about 3 in., and the fireplace was damaged.”²⁵

How widely the OSS bomb was used during the war remains difficult to determine. However, Yugoslav Home Guards probably used a coal bomb to sabotage a railroad coal car and damage coal barges on the Danube River. OSS officer Elizabeth Peet McIntosh recounted delivering coal bombs to OSS agents in China, and coal bombs might also have been behind various unexplained German railroad and ship explosions that occurred during the war.²⁶

Japan developed a coal bomb that combined elements of Courtenay’s

original design with modern improvements. The Japanese version featured a ceramic shell painted with black bitumen paint and filled with RDX high explosive. Like most explosive coal devices of World War II, it remains unclear if any of these were used in the field.²⁷

A better inventor than entrepreneur, Courtenay probably never imagined that his weapon would still be used nearly a century later. Indeed, given the importance of coal to economies on both sides of the Iron Curtain, future historians may need to explore how explosive coal featured in the covert struggles of the Cold War.



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Endnotes

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2. The steamboat *Missionary* was found to have been destroyed by a firewood bomb in mid-1864. Thatcher and Thatcher, 10, 33–8.
3. “Coal Torpedoes” *Times* (London), December 30, 1879.
4. Thatcher and Thatcher, 38–41, 44–5. Seddon assigned Courtenay the rank of captain in correspondence after March 9, 1864, but Courtenay rejected it—repeatedly replacing the rank with “Mr.”—probably to ensure the Confederate Government did not use this unexpected military title to avoid paying him for any ships sunk by his coal bombs.
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6. *ORN*, Series I, Vol. XXVI, 184–5.
7. Thomas Courtenay to Lachlan MacLean letter, Thatcher Collection; Thatcher and Thatcher, *Confederate Coal Torpedo*, 50–1.
8. David D. Porter, *Incidents and Anecdotes of the Civil War* (Appleton, 1885) 236–67.
9. Thatcher, 55–6, 63–4; *New York Times*, June 17, 1865; *Chicago Tribune*, June 22, 1865; D. Thurston to William Seward letter, April 7, 1865, National Archives, RG59, T491, Reel 1.
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11. This coal bomb is in the Bennington (VT) Museum’s Ripley Family collection. Thatcher and Thatcher, *Confederate Coal Torpedo*, 57–8; <https://bennington.pastperfectonline.com/webobject/F71D797F-9AFC-4B9E-961E-954942970805>.
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14. Fielding to Courtenay letter, July 16, 1868, Courtenay papers, Thatcher Collection; Thatcher and Thatcher, *Confederate Coal Torpedo*, 76–7.
15. *Times* (London), June 9, 1873; *Appleton’s Journal*, New York, July 1873; Thatcher and Thatcher, *Confederate Coal Torpedo* 80–1.
16. *Times* (London), December 27, 1875; Thatcher and Thatcher, *Confederate Coal Torpedo*, 80–2.
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19. David D. Porter, “Torpedo Warfare,” *North American Review*, 1875; J. S. Barnes, *Submarine Warfare* (D. Van Nostrand, 1869), 76, Plate VIII; Thatcher and Thatcher, *Confederate Coal Torpedo*, 82–3; Capt. S. P. Oliver, “Offensive and Defensive Torpedo War,” *Journal of Science*, Vol. 17, March–May, 1880; “Torpedoes and Infernal Machines,” *Chambers’ Journal*, Vol. 54, Pt. 2, 1877, 440–1.
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