

UNITED STATES COINS

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PHOTOS: HERITAGE AUCTIONS



A BRIEF HISTORY OF UNITED STATES PROOF COINS

Starting in the 1790s, certain American coins have featured polished fields and unpolished relief.

THIS TWO-PART ARTICLE is designed to provide a complete, simple, and accurate description of the manufacture of proof coins from the early 19th century to the present. My purpose is to offer a factual basis for understanding why and how these popular coins were made, and to dispel confusion caused by differences in terminology, equipment, and erroneous past assumptions.

Proof coins and medals are closely associated by purpose and manufacture. Medals have a long-established historical background, but both are ultimately intended for a very small segment of the population. This might include award recipients, military honors, creative expression, samples for official approval, or examples that might appeal to collectors of special coins that differ from common coinage. The same types and sizes of presses are used to make medals and proofs, with the primary differences being design relief and/or surface appearance.

There is one other critical, yet often-overlooked difference: proof coins normally have

flat or uniformly curved fields. This is called a “uniform basin” or “uniform radius of curvature.” It makes coins easier to strike and allows proof coin dies to be polished evenly over the entire surface. Medals have irregular curvature to the fields in part because they are not intended for mass production, and because sculptors use the field as active parts of the design. This “technicality” created significant problems in manufacturing proof coins from 1908 to 1916.



▲ **PIECES SUCH AS** *this 1794 1-cent token produced in New York were some of the first U.S. examples to have a proof finish.*

Not Actual Size

The Soho Mint Approach

One of Americans’ earliest general exposures to coins or tokens with polished, mirrorlike fields and unpolished relief came from the company Talbot, Allum & Lee (owned by William Talbot, William Allum, and James Lee and located at 241 Water Street in New York City). Dated 1794, these pieces were struck by Peter Kempson & Co. of Birmingham, England, and imported into America by the partners.¹ Some of the tokens had reflective fields created by polishing to remove surface damage to the dies intentionally for collectors.

PHOTOS: HERITAGE AUCTIONS

The infant United States Mint was a **shoestring operation** with only basic equipment for manufacturing circulating coins.

Stage 1: Master Coin or Specimen (c. 1818-55)

In 1796 the Philadelphia Mint contracted with Matthew Boulton's works in Birmingham, England, to supply cent and half-cent planchets. Always looking for new customers, along with planchets Boulton sent specimens of his merchant tokens and monetary substitutes produced to facilitate daily purchases made by ordinary English citizens.² He also sought to keep his Soho Mint in the public eye and gain customers by producing medals and proof coins for collectors.³

In Boulton's terminology, pieces struck specifically for sale to collectors or as gifts for influential persons were called "specimens" and referred to by that term in his letters and accounts:

Nothing can be got by coining unless a very great number of Tons are coined of the same die & even then more may be got than is possible, by specimens although they are charged at 12 times the price of current money.⁴

A specimen coin was struck on a large medal-type press from dies that had been carefully polished to a mirrorlike finish in the field. Boulton struck his specimen coins using two blows as shown by common slight double outlines to the relief. The modern term "proof" was used by the Royal Mint in London well before 1765 but was not used in the United States until the late 1840s or early 1850s.⁵

To prevent fishtail distortion of inscriptions on specimen coins, Boulton used a close collar to hold a planchet in place for specimen (and pattern) coins. When ordinary coins were made, no collar (or a loose-fitting one) was used.⁶ This allowed metal to flow "away from the bases of letters. Those with vertical uprights are distorted most as the upright tends to act as a channel and therefore encourages the flow of metal, leaving a hollow which gives the letter a fishtailed appearance."⁷

The Soho Mint used eight steam-powered coin presses in 1799. These could reliably produce about 70 coins per minute that were of much higher quality than any Royal Mint product. Similar presses were offered to the Philadelphia Mint, but nothing came of the discussions. The U.S. Mint was barely surviving political attacks in Congress, the English equip-

ment was expensive compared to the irregular deposits of gold and silver at the mint, and there was little enthusiasm for using British technology at our national coining facility.

The United States Mint Approach

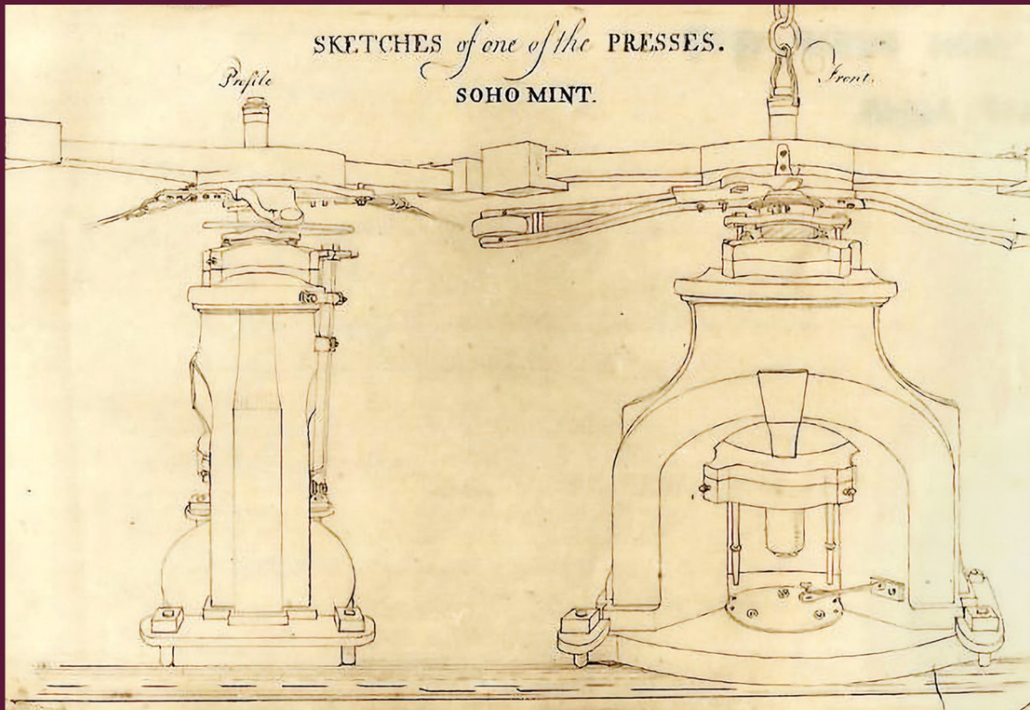
The infant United States Mint was a shoestring operation with only basic equipment for manufacturing circulating coins. Its largest screw press (also called a fly or lever press) was barely sufficient to strike silver dollars and was completely inadequate for medals of high relief. The first Indian Peace medals of President George Washington were struck in England because our own mint could not make them.⁹ The addition of a larger press proved to be insufficient, and when striking medals for the U.S. Navy in 1815, it "was so much injured by the operation that it can be no longer employed for that purpose."¹⁰

A new, much larger medal press was delivered to the mint in early 1820 and used for striking medals awarded by Congress to certain naval officers. Chief Coiner Adam Eckfeldt supervised production and finishing.¹¹ This same medal press was also used for making "specimen pieces" of circulating coinage. Some of these were added to Eckfeldt's nascent U.S. Mint collection of coins and medals,¹² and others were made as favors for coin collectors along the Atlantic coast.¹³

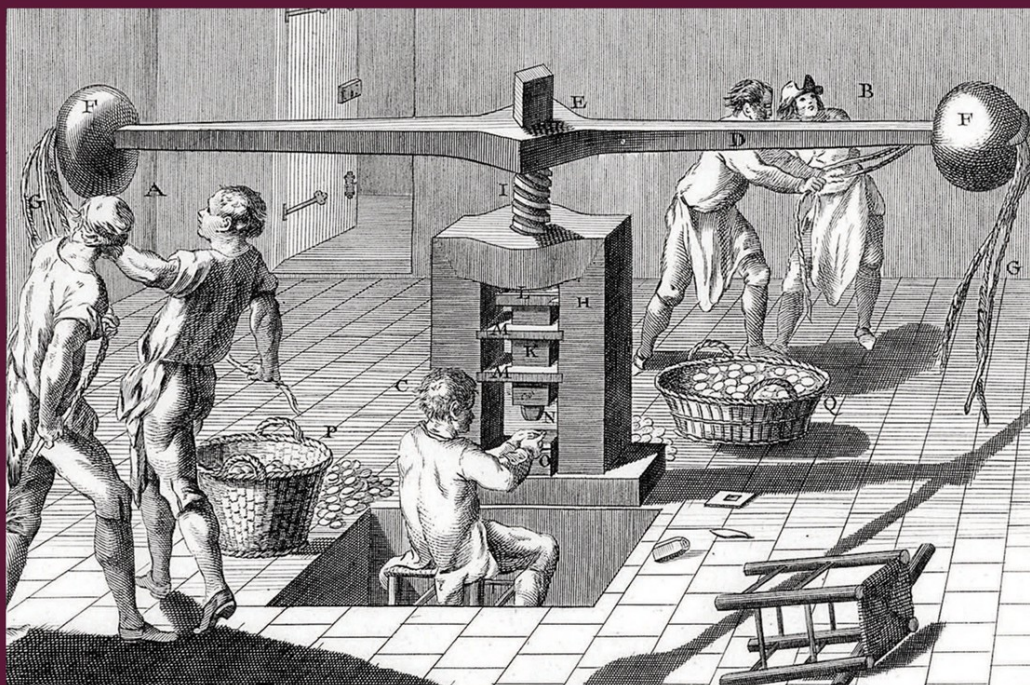
Dies for specimen coins were produced normally to the point where they were hardened and tempered, then dipped in acid to remove any oxide from heating. Next, they were carefully polished using an emery stick or jeweler's rouge (iron oxide). It was common to polish only the fields and not the relief. This was the only special treatment given to specimen coin dies, although it is possible that stronger acid or longer exposure were used occasionally.

The resulting coins had mirrorlike fields and lightly frosted relief—something we now refer to as cameo proofs. These coin surfaces quickly deteriorated when the dies were used to strike ordinary planchets, and the polish had to be renewed frequently. The relief was usually left untouched by the die-sinker.

The first Philadelphia Mint specimen coin—using Boulton's definition—is not documented, but many experts agree that it was struck sometime between 1818 and 1821. The Smithsonian's National Numismatic Collection includes a



THE DRAWING above shows profile and front views of Englishman Matthew Boulton's steam-powered screw press in 1797, before vacuum pumps were added to improve performance.⁸ The illustration below portrays a typical large 18th-century screw press in which workmen pulled weights attached to a horizontal lever that was connected to a vertical screw. The dies met in the middle near the seated boy's hands. Boulton's version was faster, more consistent, and slightly safer.



specimen quarter and half dollar dated 1818. These might be the first legitimate examples among U.S. coinage. There are cents (“coppers”) dated 1820 and ’21, along with a gold quarter eagle (\$2½) and half eagle (\$5) of 1821, all of which are considered true specimen coins.¹⁴ These coins all have sharp, virtually full detail, mirrorlike fields, and clearly defined rims. At the time, they were called specimen coins, or more specifically, master coins.¹⁵ This terminology reflected Eckfeldt’s attitude that these coins were the best, or “master,” examples of ideal coinage specimens.

Eckfeldt took pains to preserve master coins of the mint’s various annual issues.¹⁶ A description written by Mint Director James Ross Snowden in December 1859 states:

The master-coins, which are struck from polished dies, and with extra labor and care, have hitherto been given out at their intrinsic value. In view of the great and increasing demand for these coins, it is deemed not just to the public service that so much labor should be given away. In order to cover this expense, and to put it in the power of any individual to obtain these coins on equitable terms, the set of gold coins, whose intrinsic value is \$41.50, will be given for \$43.00; and the set of silver coins, with the cent, whose intrinsic value is \$2.02, will be given for \$3.00: but no person or institution shall obtain more than one set of said coins.¹⁷

PHOTOS: HERITAGE AUCTIONS



▲ A QUARTER dated 1818, such as this one, was likely among the first master coins (or specimens) struck at the U.S. Mint.

Actual Size: 27mm

half inches. The strength of the blow was equivalent to 250 tons or about 40 tons per square inch. A four-inch diameter bronze medal might have required up to fifty blows to complete the design. The press required three men to operate it: one to place the planchets/blanks on the press between the dies, and two to swing the arms and duck as the arms rebounded.¹⁹

Master coins were sold at face value (not intrinsic value, except for silver dollars and gold) to anyone who requested them. Rufus Tyler, chief coiner of the New Orleans Mint, suggested he should have samples made at the “Mother Mint” in Philadelphia of all the denominations he was expected to manufacture—these pieces could also be sent to other branch mints as quality-control samples:

I beg leave to suggest that it appears to me highly important that I should have fair samples of all the coins intended to be struck at this Branch, furnished by the Mother Mint. They would be immediately useful to me.²⁰

U.S. Mint master or proof coins were made by the chief coiner’s department, not by the engraver. The engraving department provided only the hubs until about the early 1860s.

To produce dies with deliberately frosted devices, George Eckfeldt of the medal department used the following acid mixture:

- 1/3 of muriatic acid
- 1/3 of nitric acid
- 1/3 of sulfuric acid
- 1/4 of the whole, spirits of wine
- 1/4 water of the whole mixed²¹

There are no further instructions. Muriatic acid is an impure form of hydrochloric acid (HCl). Spirits of wine is now

called ethyl alcohol, grain alcohol, ethanol, or fermentation alcohol (C₂H₅OH). It is a colorless, volatile, and flammable water-miscible liquid that has an etherlike odor and pungent, burning taste. It is the intoxicating portion of fermented and distilled liquors and is commonly produced by yeast fermentation of certain carbohydrates, such as grains, molasses, starch, or sugar. The following is my interpretation of the recipe. To avoid boiling and spattering the acid, mix the ingredients backward, beginning with 37.5ml

Master coins were struck on a large medal press incorporating a closed collar, with one blow from the dies. By using a large press, the mint avoided problems with trying to keep the planchet and low-relief dies accurately aligned within an inherently unstable screw press.

The large screw press for medals and proof coins was described as follows:

We use a screw press which strikes medals from 10/16-inch to 4-inch in diameter, which has 3 threads with a pitch of 15/16-inch; 6½-inch diameter of screw, and length of lever 15 feet with 300 lb. balls on each end. This press gives us every satisfaction...¹⁸

Applying the maximum force of [two] men, the screw rotated through two and one-half revolutions for a maximum travel of seven and one-

deionized water. Add 37.5ml ethyl alcohol, 50ml hydrochloric acid, 50ml nitric acid, and 50ml sulfuric acid. The mixture should now total 225ml.

Stage 2: Proof Coin (c. 1850-93)

The term “master coin” was routinely used at the mint and in numismatic circles through the 1850s, when it began to be supplanted by the term “proof coin” by nascent coin dealers and auctioneers. By the mid-1860s, Boulton’s “specimen” and the mint’s “master” had become known as a “proof coin” to general coin collec-

tors and remains that today; all three terms describe the same product.

As the number of coin collectors rose during the 1850s, the demand for proof coins also increased. By 1859 the Philadelphia Mint routinely sold individual gold proof pieces and silver-denomination proof sets that also included the cent. This increase in public interest evidently stimulated experimentation in manufacturing proofs, and evidence shows that polished planchets were used along with polished dies during this period. By polishing both, a much greater number of pieces could be struck with mirrorlike fields before it was necessary to repolish the proof dies.

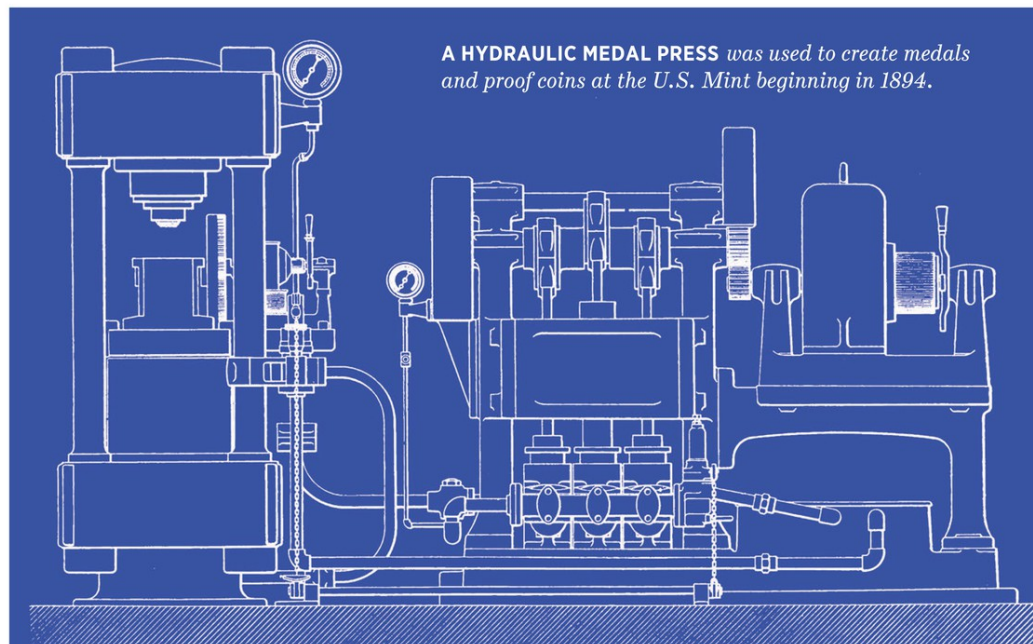
Stage 3: Proof Coin (c. 1894-present)

In 1894 a hydraulic medal press was installed at the Philadelphia Mint. Electronic controls created consistent strike pressure that permitted more uniform proof coin quality. The effective length of the press stroke was only half an inch, and it required a 7¹/₂-horsepower, slow-speed electric motor.²²

This press was faster than the old screw press and needed just one operator. During initial tests in 1893, a 3-inch medal was crushed on the second blow. Thereafter, Philadelphia Mint engineers spent almost a full year experimenting with the best pressure to use for different alloys and diameters of medals and coins.

STAGES OF PROOF COINS PART 1		
Stage 1 (c. 1818-55)	Master coin/ Specimen	Dies of uniform radius, mirrorlike polish, struck on medal press, frequent repolishing
Stage 2 (c. 1850-93)	Proof coin	Dies of uniform radius, mirrorlike polish, struck on medal press, polished planchets, occasional repolishing
Stage 3 (1894-present)	Proof coin	Dies of uniform radius, mirrorlike polish, struck on hydraulic medal press, polished planchets, occasional repolishing

ILLUSTRATION: ANNUAL REPORT OF THE DIRECTOR OF THE U.S. MINT, 1902 (MODIFICATIONS BY OLIVIA MCCOMMONS)



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Conclusion

In Part 1, I've examined the origin and gradual evolution of United States proof coins from almost casual products sold at face value to a few interested coin collectors, to pieces produced by the thousands on modern hydraulic presses and sold at a premium to eager numismatists. Next month, I will highlight the conflict between the country's best artists and collectors in determining the appearance of proof coins, and later, in the application of 21st-century technology to proof coin manufacturing.

NOTES

¹ Q. David Bowers, "Half Cents Struck on Talbot, Allum & Lee Tokens," *Mint News Blog*, (September 9, 2020).

² Sue Tugate, "Matthew Boulton and the Soho Mint: Copper to Customer," Ph.D. diss. (University of Birmingham, 2010), note no. 34, p. 10: "There are about sixty different types of medals and at least thirty-five versions of the twenty or so token orders made at Soho, plus fifty-five varieties of coins from at least fifteen different countries, and numerous pattern and proof coins made between 1787 and 1795 for the regal coinage contract, and for other countries to evaluate proposed coin designs. Boulton then carried out three contracts for the government in 1797, 1799 and 1806-7. Only pieces made up to Boulton's death in 1809 are considered."

³ Tugate, "Matthew Boulton," 215.

⁴ Matthew Boulton, Soho, to Richard Chippindall, London (March 12, 1793), MS 3782-12-59, Item 48, Library of Birmingham, England, as cited in Tugate, "Matthew Boulton," 220.

⁵ Graham P. Dyer and Peter P. Gaspar, "The Striking of Proof and Pattern Coins in the Eighteenth Century," *British Numismatic Society Journal*, 50, (1980): 121.

⁶ The common screw press for coining had a die attached to the descending screw. Since this vertical screw had considerable play—usually packed with stiff lubricant—it is unlikely that the wiggle of the screw could have been controlled well enough to prevent the die from occasionally smashing against the collar.

⁷ Dyer and Gaspar, "Striking," 121-122.

⁸ Tugate, "Matthew Boulton," 147.

⁹ James McHenry, Secretary of War, to Rufus King, Ambassador to Britain (October 10, 1876). *Papers of*

the War Department, 1784-1800. Indiana Historical Society library [Arthur G. Mitten Collection].

¹⁰ Robert M. Patterson to William H. Crawford (December 1, 1818). RG104, E-2, Journals to 1837, "1818-1819 fair copies," National Archives and Records Administration, College Park, MD.

¹¹ Robert M. Patterson to William H. Crawford (March 6, 1820). RG104, E-162, "Letter books 1796-1837," National Archives and Records Administration, College Park, MD.

¹² William E. DuBois, *Pledges of History: A Brief Account of the Collection of Coins belonging to the Mint of the United States, More Particularly of the Antique Specimens*. (Philadelphia: self-pub, 1846), 6.

¹³ Joel J. Orosz and Lance Humphries, "New Research Illuminates Robert Gilmor Jr.," *The Numismatist*, November 1996.

¹⁴ Jeff Garrett, "Early Proof United States Coinage," ngccoin.com/news/article/3212/US-proof-coins.

¹⁵ In most U.S. Mint documents, the term "specimen" may be understood within context as a sample or randomly chosen coin. When used to mean a master coin or mirror-polished piece, it is usually accompanied by modifiers suggesting quality or specialness.

¹⁶ DuBois, *Pledges of History*, 6.

¹⁷ Public circular signed by Snowden (December 20, 1859). RG104, E-1, Box 57, National Archives and Records Administration, College Park, MD.

¹⁸ William Steel, Coiner, to Frank Kurtze (July 23, 1886). RG104, E-1, Box 141, National Archives and Records Administration, College Park, MD.

¹⁹ "Old and New Coining," *The Bankers' Magazine*, March 1894, 695.

²⁰ Rufus Tyler, Coiner, New Orleans Mint, to Robert Patterson (February 14, 1838). RG104, E-11, "New Orleans Letters 1835-1846," National Archives and Records Administration, College Park, MD. This might explain the so-called "branch mint proof coins" that have long confused the numismatic landscape. Only Philadelphia had a large screw press capable of striking legitimate master coins.

²¹ "Recipe for Frosting Dies," George J. Eckfeldt's notebook (description dated between December 19, 1858 and July 25, 1860), pp. 3, 12. Courtesy of Alan M. Meghrig.

²² "Old and New Coining," *The Bankers' Magazine*, March 1894, 695-96.