

# **Nailed in Georgia**



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By Daniel T. Elliott

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## **Introduction**

This short monograph is a preliminary context study of nails and their availability in Georgia in the historical period. It is written for archeologists but may also be of interest to historians, architectural historians and the general public. While archaeologists constantly encounter nails in the archaeological record, surprisingly little detailed information is available concerning nails in the literature (cf., Fontana 1965; Nelson 1965; Loveday 1983; Edwards and Wells 1993; Kreilick 1999; Visser 1996; Moyer 2002). Four main categories of nails are recognized for chronological purposes and these are hand wrought or wrought (dating from earliest contact to circa 1790), machine cut nails with hand wrought heads (circa 1790-1830), machine cut nails (circa 1830-1870s), and wire (circa 1865-Present). Details on how, when, and where nails were introduced to Georgia or produced in Georgia are largely unexplored. The basic facts on nails in Georgia are compiled here for general reference.

## History of Nails

What is a nail and what is their history? *Appleton's Cyclopaedia*, published in 1870, provides this informative entry for "nail":

NAIL (Sax. *naegel*; Ger. *Nagel*), a piece of metal, more or less sharp at one end with a head at the other, used to fasten together pieces of wood or other material by being driven into or through them. The principal division of nails is into wrought and cut, the former being made from tough wrought iron, the latter from rolled plates. The different sorts of nails are named either from the use to which they are applied or from their shape, as shingle, floor, ship carpenters', and horse-shoe nails, rose-heads, diamonds, &c. The small, sharp nails used by saddlers and others are called tacks. The small, sharp, taper nails, without heads, used by shoemakers, are sprigs. Those used for nailing floors and ceilings, with head only on one side, which in the cut nail is made in the operation of cutting, are brads. Very large nails are called spikes. The term penny, when used to mark the size of nails, is supposed to be a corruption of pound. Thus, a 4-penny nail was such that 1,000 of them weighed 4 pounds, 10-penny such that 1,000 weighed 10 pounds, &c. Originally, the "hundred" when applied to nails was 6 score or 120; consequently the thousand was 1,200. — The making of nails is one of the oldest of the handicraft arts, probably dating as far back as the art of working metals. Before the invention of machinery an immense number of persons were employed in making the nails required for use, there having been no fewer than 60,000 nailers in the neighborhood of Birmingham alone. It is only within the last 60 years that machinery has been employed to supersede to any extent hand labor in nail making. However, one of the earliest grants from the British patent office was in 1618 to Clement Dawbeny for an 'engine, worked by water, for cutting iron into small bars or rods for making nails.' Afterward other machines were invented for forging and drawing nail rods, the form in which the nailer receives the iron. The nailer requires for his trade a small forge fire, an anvil, and several hammers and heading tools, or bores, for the different sorts and sizes of nails. In the United States the making of wrought nails is commonly a part of the blacksmith's business, except the larger bolts and spikes of wrought iron, which are now generally made by machinery. The end of the nail rod is first heated in the forge fire, the smith having two or more rods in at the same time, according to his skill. The body of the nail is then formed on the heated end, and cut off by a chisel fixed in the anvil block. While still hot the nail is placed in a bore, or heading tool, and the head fashioned with the hammer. The bore is a piece of strong iron with a steel knob at each end, perforated to the size of the shank of the nail, and countersunk to correspond with the head. About 1790 the first machine for dispensing with hand labor in nail making was invented in England. It was however only proposed to use water, or other mechanical power, to move hammers and other appliances for making nails similar to those made by hand. The next step in advance was the machine of Thomas Clifford of the city of Bristol, patented in 1790. He used two iron rollers, faced with steel, in which were sunk impressions, or forms of the nails, half of the form being in each roller, and arranged circumferentially, so that a bar of iron, being passed between the rollers,

came through a string of nails, the head of one nail being slightly joined to the point of the next; these were then separated by shears or nippers. Sometimes several rows of indentations were made in the surface of the rollers, and, instead of bars, a slip of sheet iron was passed through, and being forced into the dies was formed into nails. Still another method was to form nails by casting, but these were too brittle to be of much service. — Nails made by either of the processes already mentioned were very expensive, and in the United States, where so many wooden structures had to be erected by the settlers, the obtaining of cheap nails was of the utmost importance. It was under the stimulus of this pressing necessity that about the year 1790 ingenious men set to work to invent nail machines. It is difficult at the present day to ascertain who it was that first conceived the idea of cutting nails from slips or rolled plates of iron. At first the nails were cut from a slip or hoop, and headed by a few blows of a hammer while grasping them in a vice worked by the foot. But very soon the machines were made to cut and head the nail at one operation. Between 1794, the date of the first patent, and 1817, more than 100 patents had been issued for nail machines and improvements. The first patent was for a machine for cutting nails.

March 23, 1794, to Josiah G. Person, or Pearson, of New York. Jan. 16, 1795, Jacob Perkins of Boston obtained a patent for a cutting machine. The following year patents were issued to Peter Cliff and to Amos Whittemore of Massachusetts, and to Daniel French of Connecticut. The first patent for a cutting and heading machine (Nov. 11, 1796) was granted to Isaac Garretson of Pennsylvania; and on Dec. 12, 1796, a patent for a similar machine to George Chandler of Maryland. Afterward several patents were granted to Jesse Reed, Samuel Rogers, and Melville Otis of Massachusetts, to Mark and Richard Reeve of Philadelphia, to Roswell Noble of Baltimore, and others. The machine invented by Jesse Reed, with some later improvements, is that still most largely used. The manufacture of cut nails was soon established in Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, and Maryland. In 1810 Joseph C. Dyer of Boston, but then a merchant in London, took out patents in England for the nail machinery invented in Massachusetts, and large manufacturing establishments were soon put in operation. Some in the neighborhood of Birmingham are able to make over 40,000,000 nails per week. In 1856 there were in the United States 2,645 machines, producing 81,462 tons of nails. It is quite possible that the persons mentioned above were not the first to invent machines for cutting nails. In 'Hunt's Merchants' Magazine' it is stated that Benjamin Cochran, a shop mate of Eli 'Whitney, who died at Batavia, N. Y., in 1846, made the first machine of the kind about 1790. Many of the first inventors spent large sums of money on their machines. It has been estimated that it cost more than \$1,000,000 to bring them to the perfection arrived at in 1810, when a machine made about 100 nails per minute. It was at this time that the full value of this American invention was brought prominently before the world in the well known report of Albert Gallatin, then secretary of the treasury. Large nail factories were early established in different parts of Massachusetts, and at Ellicott's Mills, near Baltimore. At the present day the business is carried on very extensively in the Schuylkill iron region of Pennsylvania. There the pigs from the furnace go immediately to the

bloomary, thence to the rolling mill, and so on through the slitting and nail cutting machines, so that all the operations from the crude ore to the finished nail are carried on at the same place.—During the year ending June 80, 1859, the exports of nails from the United States amounted to 4,686,207 lbs., valued at \$188,223; and the imports to 860,366 lbs., valued at \$84,504 (Ripley and Dana 1870:87-88).

Nails were used to build America, both literally and figuratively. Nails were used to secure two or more boards together. They are not absolutely necessary for wood frame construction, as evidenced by the use of dovetail joints and wooden dowel pegs. Iron was scarce on the Georgia frontier, particularly in the 18<sup>th</sup> century and earlier. With the advent of railroads and more developed inland transportation routes, nails become more frequent, cheaper, and easier to obtain.

In the colonial period Great Britain produced more nails than any country in the world—a distinction that would be passed on to the United States by the 19<sup>th</sup> century. In 1792, Tench Coxe authored a study on American commerce, in which he critiqued an earlier study with a British bias by Lord Sheffield. Coxe calculated that more than half of the nails and spikes consumed in America were domestically produced. He wrote,

Nails, spikes, and other manufactures of iron, and those of steel, are placed second on the list of articles, in which it is alleged Great Britain will sustain little competition: and Lord Sheffield remarks, that ‘whatever we make of them, is at the expence of at least three times the amount of what the same articles could be imported from Europe.’ The iron branch is highly important and growing in the United States. In Massachusetts, there were seventy-six iron works, many of them small, in 1784. The Virginia works make above 5,300 tons of iron. The slitting and rolling mills of Pennsylvania, are ascertained to cut and roll 1560 tons or 3,300,000 lbs; per annum: and so completely do they obviate the objection of manual labour, which is constantly urged against American manufactures, that they employ but twenty-five hands. In that state, there are also sixteen furnaces and thirty seven large forges: in New Jersey alone, in the year 1789, the number of forges were seventy-nine and of furnaces eight. And though the details are not so well known, they are very numerous in Maryland and most of the states. These works are annually increasing, and particularly in interior situations. The nails and spikes consumed yearly in the United States, (calculating on 4,000,000 people, at ten to a house, including negroes, which gives 400,000 houses) allowing ten pounds for the average use of all the persons living in each house, building, repairing, fencing, and in their business, and manufacturing, would be 4,000,000 lbs. Of this quantity there were imported in the returned year, 1,800,000 lbs: and about 2,200,000 pounds must, therefore, have been made at home (Coxe 1792:25-26).

Newcomb (1998) summarized the history of the nail industry in the northeastern United States:

Nail making was one of the more important industries that heralded in the Industrial Revolution, and many were the inventors in a number of eastern states who vied with each other in producing a time saving and economical machine for



the manufacture of various sizes of nails. Most of the early nail factories were built in the period 1796-1810 in places such as Fairmont, near Philadelphia as well as Pittsburgh, Pennsylvania and several locations in New York State. Massachusetts had its share with factories at Wareham, Weymouth, Bridgewater, Dover and Newton Upper Falls. Inventors of nail machines included Benjamin Cochrane, Ezekial Reed of Bridgewater, Jacob Perkins of Newburyport, Walter Hunt of New York, Jesse Reed (son of Ezekial), a Mr. Ripley, Thomas Odiorne of Milford, Seth Boyden of Foxboro (brother-in-law of Otis Pettee) and our own Upper Falls men mentioned in the above news item. Jonathan Newell and Jonathan Ellis could be considered pioneers in the industry when we note that the first invention by Jacob Perkins was perfected in 1790 and the first patent for nail-cutting machinery was granted to Joseph G. Pearson in 1794. At Upper Falls where the Newell and Ellis equipment was first used, the original machinery had been made by Odiorne, a type that was securely fastened to the tops and sides of heavy oak posts, each about a foot and a half square. These were replaced by the Reed machine with Mr. Ripley's improvements.

Four major types of nails are recognized as chronological markers (Nelson 1963; Visser 1996). These are illustrated in Figure 1 and are: A. Wrought nails-entirely wrought by hand, prior to 1790 nearly all nails were made by this process; B. Machine cut with hand wrought head nails-circa. 1790-1830; C. Machine cut nails-1830-Present (although increasingly uncommon after 1870); and D. Wire nails-1860-Present.

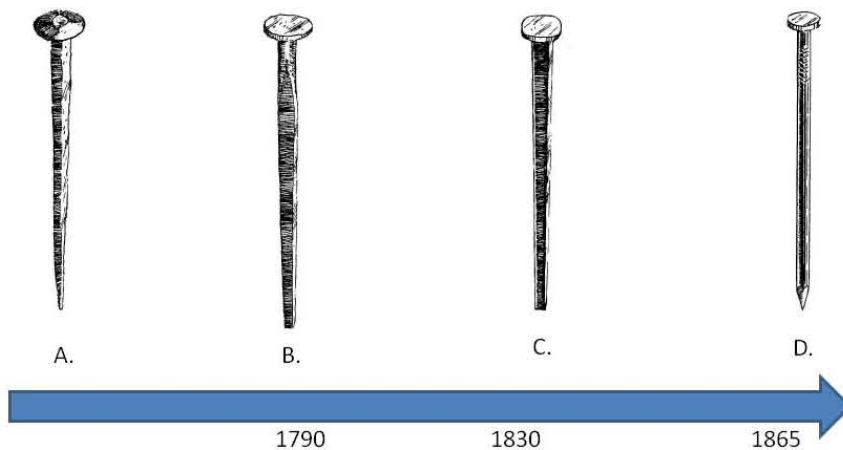


Figure 1. Timeline of Nail Varieties (adapted from Visser 1996).

## Nails in Georgia

Nail manufacturing in the southern states is less well documented than in the north. Production in the south was not on the scale of the northern nail factories in the early years of the United States, as is evident from Coxe's lack of comments on southern nail production in 1792. An iron industry was developed early in Tennessee where the first nail factory was at King's Ironworks, established south of Bristol in Sullivan County in 1784 (Tennessee Historical Society 2010). A nail factory with three cutting machines was in operation at William Hill's Ironworks in York County, South Carolina by 1802 (SCDAH 2009:66). The Swedish Manufacturing Company had a nail factory with six cutting machines in the central South Carolina piedmont by the mid-19<sup>th</sup> century (Shepard and Jones 1866:17). A nail factory was producing nails in Lincolnton, North Carolina prior to 1840 (McCulloch and Haskel 1844:186; Greeley and Benjamin 1846:127).

Nails and spikes date to the earliest period of European contacts with Native Americans in Georgia. The volume of nails traded to Georgia increased substantially in the British trading period, or after the formation of the Carolinas in 1670. By the 1730s nails were made locally by blacksmiths. Machine cut nails were imported to Georgia as early as 1796 and a cut nail factory was operating in Augusta, Georgia by 1807. The end production dates for wrought and cut nails was followed by a significant lag-time in nail consumption dates. This lag time was 50 years or more after new nail manufacturing technologies were introduced. By the 1870s large quantities of nails were manufactured in several inland Georgia cities, including Atlanta and Rome.

The earliest nails found in Georgia were likely those brought by Spanish explorers and Spanish missionaries. While DeSoto and the other explorers were not particularly interested in supplying native societies with nails, some spikes (and possibly nails) made their way inland by the 1540s.

Wrought nails were also supplied to the area later to become Georgia by British traders by the late 1600s. One example where nails have been documented from this period is at the Macon Trading Post site on the Ocmulgee National Monument (Mason 2005).

Indirect evidence for nails is found in the distribution of hammers in archaeological contexts. Sherwood (1860) noted an example of an early discovery of a hammer near Shoulderbone Mounds: "In Greene, near the mouth of Harris's creek, 10 miles above Greenvboro', on the east side of the Oconee, are several mounds and forts. Near a fort an iron claw hammer was found in 1787, just after the country was settled, and well burnt brick were plowed up! On the forts were trees at least 200 years old".

By the 1730s a number of blacksmiths were making wrought nails in Georgia for local consumption. During the colonial era in Ebenezer, for example, more than seven blacksmiths plied their trade. Most likely all of these men made nails in their slack times. One well-documented blacksmith, Rupert Schrempff, made many nails in his Ebenezer blacksmith shop (Elliott and Elliott 1991).

Throughout the colonial period nails were commonly imported to Georgia from England. The ratio between imports and local production is a worthy subject of study for which no statistics have been compiled.

Despite the widespread local production of wrought nails by blacksmiths, however, merchant's newspaper advertisements from the colonial period show that quantities of nails were imported in casks. The source of these nails is not usually specified in the advertisements but many of the announced shiploads of goods hailed from England.

Prior to 1790 all nails were hand wrought. The first machine cut nail manufacturing devices were patented in 1790. Numerous machine designs were introduced. None of these patents or designs have been traced to Georgia or the other southern states. Machine cut nails were imported to Georgia through the port of Savannah as early as 1796. This was only six years after the first nail making machines were in operation.

The earliest nail factory in Georgia was at Augusta, where a factory, operated by Ephraim Welch produced machine cut nails by 1807. This factory is likely the same one cited in a letter by Benjamin Hawkins to Secretary of War Henry Dearborn on June 15, 1807 (cited in Delfino and Gillespie 2002). Welch's Augusta newspaper advertisements provide information on this operation:

CUT NAIL  
Manufactory.

EPHRAIM WELCH,  
WITH due respect, informs the Citizens of Augusta, and the public, that he has erected a Manufactory of Cut Nails, Brads and Tacks, in Mr. Clayton's House on broad street, next door to Mr. Jaillet, where he has on hand, for sale, at reduced prices, a constant supply of  
4, 6, 8, 10, 12 and 20 penny Nails.  
2, 3, 4, 6, 10, 12 and 20 penny Brads,  
Saddle Tacks of every fixe & hoop Iron.

As the cut nails hold faster and longer than the wrought ones, and come cheaper, a general trial is recommended to the inhabitants of this country; and no doubt, every citizen will feel a satisfaction by encouraging an American Manufactory, which will prove useful to the public.

N.B. Any article which may not please the purchaser can be returned, and he receive his money back.

Augusta, April 4. (*Augusta Chronicle* 1807:1).

Two years later, Welch placed a similar advertisement, which included prices and some additional information about his factory and the goods produced there. His operation was located "on the West End of Broad Street" and, "He has extended the Factory on a larger scale adequate to complete 500lb per day". He sold 8d, 10d, 12d, 20d and 24d nails at 7d per pound, and 2d, 3d and 4d Nails and Sprigs at fifty cents per thousand; and Sadler's tacks 50 cents per thousand. He also advertised "Four and a half and six inch Spikes wrought for Mill and Boat building", and

“Tacks suitable to make Negro Shoes with at 25 cents per thousand” (*Augusta Chronicle* 1809:2).

Who was Ephraim Welch? A brief biographical search yielded no definite answers to this question. He may be the same person as Ephraim Wesley Welch, who was born on September 22, 1771 in Surry County, North Carolina to David Welch and Hanna Lnu Welch. That Ephraim Welch died in Bledsoe County, Tennessee in 1835 and none of the family records place him in Georgia (Ancestry.com 2010). Ephraim Welch (or any variant spellings) is not enumerated in any Federal census for Georgia in 1800-1860.

By August 4, 1810, Ephraim Welch’s nail factory had been purchased by Jacob Danforth, who advertised in the *Augusta* newspaper: “The Subscriber, having purchased out the cut nail manufactory from Mr. Welch, informs the public that he now carries on the business, at the corner of Washington and Ellis streets, nearly opposite to Calfrey and Buftin’s Tavern, there Cut Nails of all kinds are made, and sold on the same terms as Mr. Welch formerly furnished them (*Augusta Chronicle* 1810a:Section A:1).

The *Augusta* nail factory continued in production as late as 1820. The 1820 manufacturing census for Richmond County records one nail factory operated by one blacksmith and five people who manned a nail forge. The annual value of this business was estimated at \$10,000.00 (NARA 1965).

Other early nail factories were identified in Georgia cities. Sherwood (1860) described the industrial development in Cass [later Bartow] County by the Etowah Manufacturing and Mining Company, where nails were made: “There is at Etowah, a Boiling mill for Merchant Iron of all kinds, now turning out about ten tons of Iron per day. Also a Nail Factory, with ten machines for cutting nails; a machine for Railroad Spikes, machine shops, &c., for fitting up— all propelled by water-power”.

In 1869, John K. Neff, a northern industrialist, became head of the Rome Iron Manufacturing Company, of Rome, Georgia, “which established the extensive iron plant of that place, and which comprises a large rolling mill and nail factory” (Wiley 1892:349). That factory was in operation in the early 1870s.

By 1872, Schofield’s Rolling Mill, which included a nail factory, in Atlanta was producing fifty tons of finished nails and five tons of [railroad] spikes daily (*Macon Weekly Telegraph* 1872:8).

For a period of time, both wrought and cut nails were commonly sold by merchants (or ironmongers). This transitional period lasted many decades, although the efficiency of mass production of cut nails soon outstripped that of wrought nails and the cut nails garnered the lion’s share of the nail market.

Wrought nails refused to die a quick death, however, and they continued as a hardware commodity in Georgia until at least 1857. *Augusta* merchants advertised wrought nails as late as 1834. *Macon* merchants advertised them as late as 1854 and *New York* merchants advertised them as late as 1857. Undoubtedly, the hardware suppliers in the larger cities held large stockpiles of outmoded nails and these had value and they were sold until the market was depleted.

Similarly, machine cut nails continued as a commodity well into the 20<sup>th</sup> century, well after the establishment of a wire nail market. Philips Hardware Company of Columbus, Georgia advertised cut nails for sale [apparently at close-out prices] in a 1915 Columbus newspaper (*Columbus Ledger-Enquirer* 1915:5). It read:

#### NAILS—NAILS

We have the following Cut Nails on hand, which we offer at sacrifice price of  
\$1.00 PER HUNDRED POUNDS

8 Kegs 3d Cut Nails

1 Keg 5d Cut Nails

10 Kegs 12d Cut Nails

1 Keg 20d Cut Nails

13 Kegs 30d Cut Nails

1 Keg 40d Cut Nails

18 Kegs 50d Cut Nails

15 Kegs 60d Cut Nails

2 Kegs 4d Casing Cut Nails

1 Keg 12d Casing Cut Nails.

All in good cooperage.

This hardware store, and likely many others throughout Georgia, held large stockpiles of cut nails. This advertisement, placed more than 50 years after the invention of wire nails, demonstrates the lag time represented in the transition between nail technology and replacement of the goods for sale in the market place. Even today many carpenters recognize the superior aspects of cut versus wire nails for some nailing applications, particularly for flooring.

Bowker (1893:602) noted in his discussion of the steel industry in America: “In 1883 there were produced 7,762,737 kegs of nail, not one of which was steel. In 1890, out of a total production of 8,776,920 kegs, only 1,806,193 were iron nails, all the rest being steel”. This rapid change in the raw material used for nails has important implications for dating nail assemblages, if laboratory analysts can develop a simple method for distinguishing iron and steel nails.

#### **BRASS OR COPPER NAILS AND SPIKES**

By far most nails and spikes encountered in Georgia were made from iron. A lesser category, which is found primarily on coastal sites, are those made from copper or brass. Most of these supplied a maritime boat and ship building industry. Some of these were likely cast rather than hammered by a smith. The areas of production and distribution of this category of nails and spikes is a subject for future study.

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