

Researching Historic Metal Structures: Unlocking the Treasure of Free Online Digitized Texts

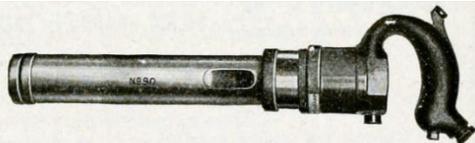
Nathan Holth, HistoricBridges.org

The historic metal bridges, buildings, and other structures we seek to preserve and learn about today were often the subject of books and periodicals of the period in which they were built. Unlocking the secrets that these publications offer has traditionally entailed exhaustive work of visiting libraries or archives and blindly digging through their holdings in an attempt to find anything of interest. In recent years however, thanks to expired copyrights and computer technology, many of these texts are being scanned (digitized) so they can be posted onto the Internet where they are made available to the public for free search, viewing, and download. There are several benefits to this. First, this makes it easy to search these texts from the comfort of your home computer. Second, because they have been scanned into a digital format, you can simply download or print your own copy to keep. Finally, computers are able to index all the words within these texts, enabling you to quickly search not only the contents of a single book, but of many books all at once.

<p>Labeled diagram of what was once a common type of rivet forge, appearing in a supply company's illustrated catalogue that was dated 1917. Forges like this were used to heat up modest quantities of rivets in the field. Source: "Geo B Carpenter & Co Catalogue No. 110", 1917. Digitized By Internet Archive.</p>	<p>A book about steel construction provided these images of rivet furnaces, which were used to heat up larger quantities of rivets than the smaller rivet forges. Source: Farnsworth, A. W., <i>Constructional Steelwork</i>, 1905. Digitized By Google.</p>

The two largest sources of free texts are Google Books and the Internet Archive. Each website has many texts that the other does not, so researchers will want to utilize both websites. The Internet Archive offers much higher quality scans however. The freely downloadable texts they offer are out of copyright and are in the public domain. Each website has its own quirks that need to be overcome to make the best use of each resource.

The Boyer Riveting Hammer



Is **PREFERRED** by the **MAN** who **KNOWS**

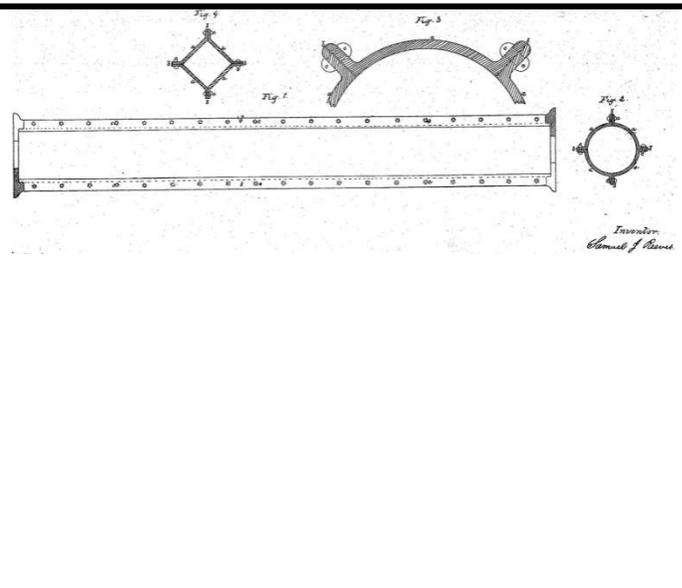
Because it drives rivets better than any other.
 Because it vibrates less and is not so hard on the nerves.
 Because he knows that when he undertakes a piece of work he will finish it, not by hand, not with some other pneumatic hammer, but with the same **BOYER HAMMER** with which he started.
 Because the rapidity with which it drives the rivets, and the skillful, untiring way in which **IT WORKS**, commands his respect.
 Because the energetic way in which it performs its duty inspires him and thrills him with the **TRUE DIGNITY OF LABOR**.
OUR SPECIALTY is the manufacture and sale of Pneumatic and Electric Tools that **WORK**.
 Read our catalogues and see how our Boyer Hammers, Little Giant Drills, Duntley Electric Drills and Chicago Pneumatic Air Compressors will save you labor and reduce your costs.

Chicago Pneumatic Tool Co.

Fisher Building
CHICAGO

Branches Everywhere

50 Church St.
NEW YORK

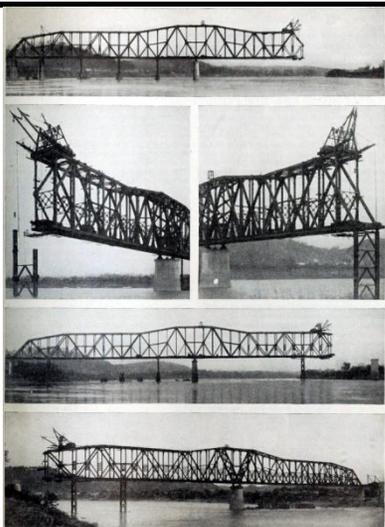


When researching, do not overlook the advertisements in old periodicals. This 1912 ad for Chicago Pneumatic Tool Company shows a riveting hammer, which is very similar in appearance to riveting hammers used today.

Source: *Official Proceedings of Railway Club of Pittsburgh*, Vol. 12, No. 1, 1912. Digitized by Internet Archive.

The 2012 Iron and Steel Preservation Conference will include a demonstration that shows how to replicate a special type of patented built-up iron column that was used on some bridges and buildings called the Phoenix Column. Pictured here is a drawing of a Phoenix Column as it appeared in the patent for the design.
 Source: United States Patent #35582

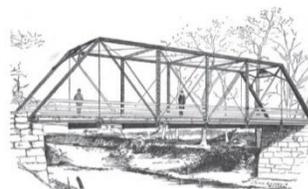
Because Google Books lists both free historical texts and modern books in the same database, the easiest way to navigate Google Books is to use the Advanced Search tool located here: http://books.google.com/advanced_book_search. On this page, be sure to select "Full View Only" in the Search options to eliminate books that cannot be viewed online or downloaded. For a basic search, type either the title of a book or periodical, or text you wish to find within any books, into the "Find results with all of the words." When navigating results, note that the search results for periodicals will have a "More Editions" link that is useful if wishing to browse a list of available volumes. When viewing a specific book, you will find options to search within the book, and a link to download a PDF version to keep on your computer or print.



These photos show the construction of the great Sciotoville cantilever bridge over the Ohio River, a masterpiece designed by Gustav Lindenthal.

Source: *Engineering News-Record* Vol. 80, 1918. Digitized by Internet Archive

WROUGHT IRON BRIDGE CO.



IRON AND STEEL BRIDGES,
GIRDERS, TURNABLES,
BUILDINGS AND ROOFS.

PRICES MADE FOR IRON WORK OF "EUDALY"
AND OTHER FORMS OF BRICK KILNS.

TRUSS RODS, BOLTS AND GENERAL
WROUGHT AND CAST-IRON WORK.

We do not build "any kind of iron bridges" but the best only.

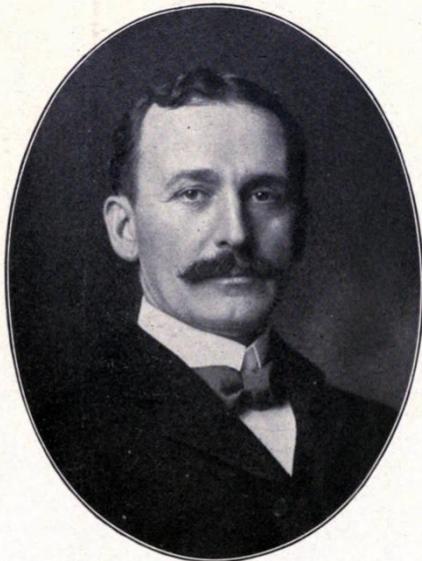
OFFICE AND WORKS, CANTON, OHIO.

PLANS AND ESTIMATES FREE. WRITE FOR ILLUSTRATED CATALOGUE.

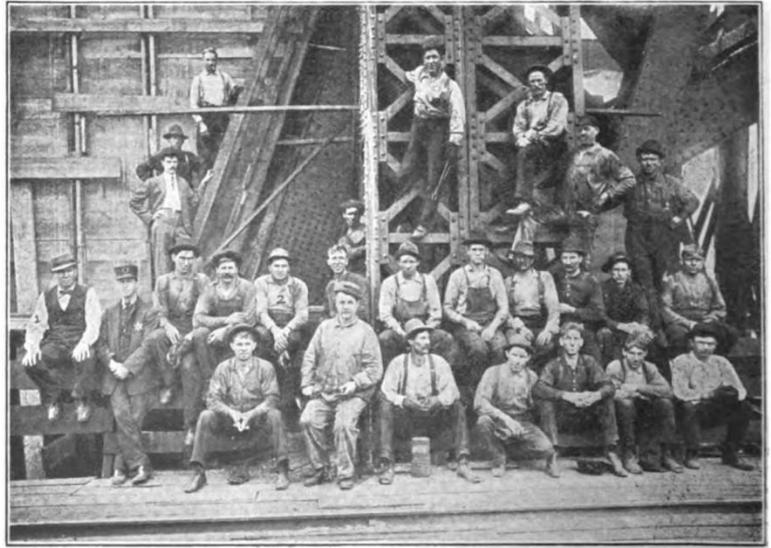
Advertisements for the prolific 19th Century bridge company Wrought Iron Bridge Company appeared in a number of engineering periodicals. This ad states, "We do not build 'any kind of iron bridges' but the best only."

In addition to the books, Google also has cataloged and made available for download all United States patents. This database is separate from the book database and can be searched at this address: <http://www.google.com/patents> In the second half of the 19th Century, many patents relating to structural iron and steel, bridges, and tools like pneumatic riveting hammers were filed. Many of these patents contain beautiful and informative drawings that illustrate the product. Using Google, you can search for patents by name, author, patent number, or date range.

The Internet Archive is a little more difficult to search because it does not offer an easy way to search within the contents of multiple books like Google. If you know the exact title of the book or periodical you want to view, use the main “Texts” search here: <http://www.archive.org/details/texts> to type in part or all of the title. Clicking on a result takes you to the main page where various viewing and downloading options are available. When reading online, there is an option to search within the text for words you specify. If you wish to search within the text of all available books, there is a way to use Google to search the Internet Archive. From the main www.google.com page, type the text you wish to search for, type a space, then type site:www.archive.org/stream (example: **steel mill site:www.archive.org/stream**). This will give you results from the Internet Archive. Note that clicking on a result takes you directly to a plain text version of the book. Click the “See Other Formats” button to get to the main page where you can read online or download the book.



CHARLES LOUIS STROBEL, Chicago.
 Born in Cincinnati, Oct. 6, 1852. Studied engineering at Stuttgart, Germany, 1869-73; Bridge Engr. Cincinnati Southern Ry. 1874-8; Chief Engr. Keystone Bridge Co. and Consulting Engr. of the Carnegie firms 1878-93; since 1885 has been a resident of Chgo., and since 1894 has been in business for himself as a Consulting and Contracting Engr.



Members of Local No. 1 working for Kelly-Atkinson Construction Company, on Northwestern Railroad Bascule Bridge at Kinzie street. (1) T. E. Riley, Supt. (2) Bro. J. B. Jones, Foreman

Charles Louis Strobel created the Strobel Steel Construction Company, which was an engineer and contractor for bridge building in the Chicago area. Many of Chicago's metal truss bascule bridges were erected by his firm.
 Source: Witherspoon, H., *Men of Illinois*, 1902.
 Digitized By Internet Archive.

This photo shows some of the workers who built the railroad bascule bridge in Chicago next to Kinzie Street.
 Source: *Bridgemen's Magazine*, Volume 8, 1908. Digitized By Google.

One of the intriguing aspects of conducting research in these materials is the perspective it gives. Consider historic metal bridges. For example, finding articles and information about cast and wrought iron bowstring bridges is very difficult. Although the cast and wrought iron bowstring bridges that survive today are among the most rare and historically significant bridges in the country, these surviving bridges were not unusual or noteworthy when they were built. As such, very few if any articles can be found discussing these bridges. It is those bridges which were the first of their kind or

Album of designs of the Phoenixville Bridge-works was produced by the company and has numerous images and drawings of the bridges the company produced. http://www.archive.org/details/cihm_26602

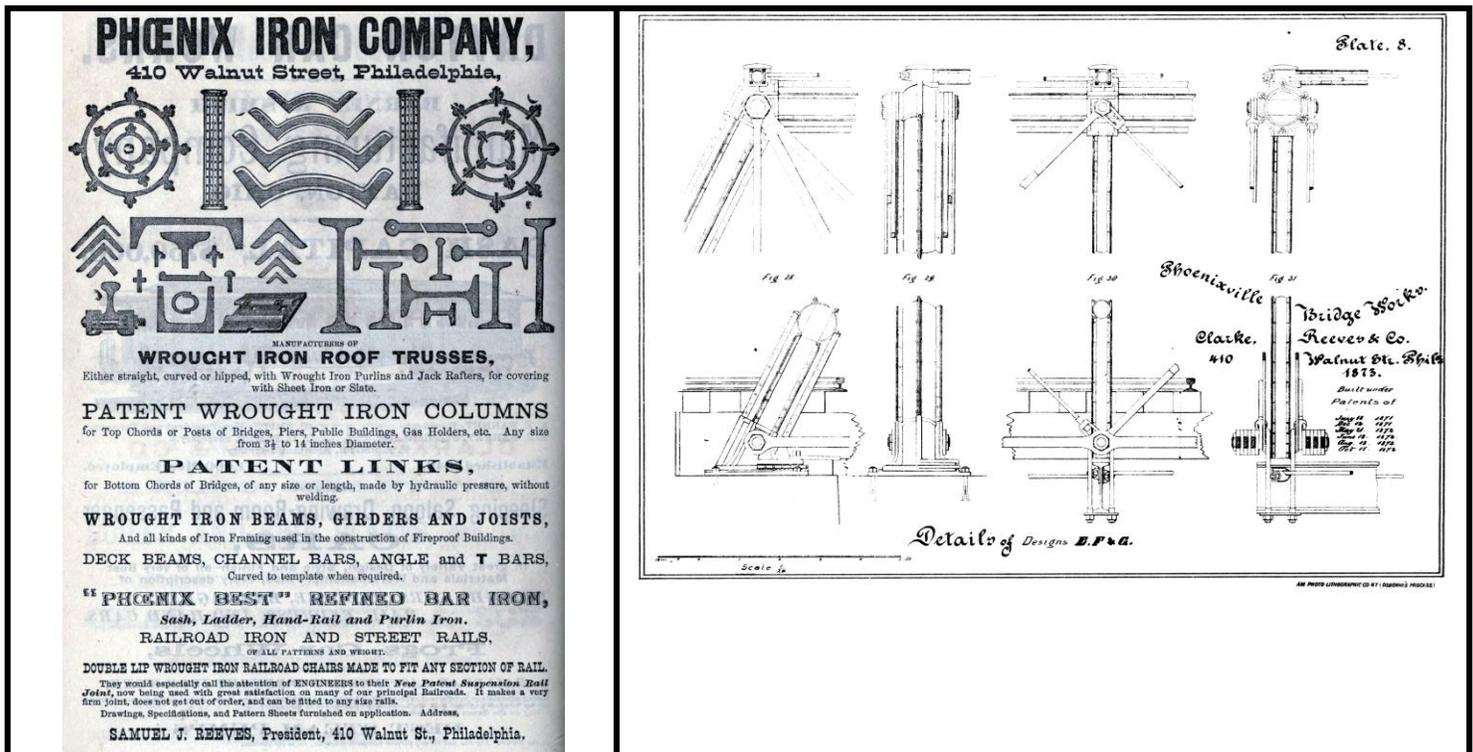
Otis Ellis Hovey's *Movable Bridges* Volume 1 and 2 date to 1926 and are one of the best known sources of information on movable bridges. Volume 1: <http://www.archive.org/details/movablesbridges01hove> and Volume 2: <http://www.archive.org/details/movablesbridges02hove>

William Aiken Starrett's *Skyscrapers and the Men Who Build Them* (1928) This book has many illustrations, and its discussion includes steel frame buildings. <http://www.archive.org/details/skyscraperstheme00starrich>

Milo Ketchum produced *The Design of Steel Mill Buildings and the Calculation of Stresses in Framed Structures* (1903). This book includes detailed drawings and calculations behind mill buildings, including details of the steel construction. <http://www.archive.org/details/designofsteelmil00ketchrich>

James Howard Bridge's 1903 *The inside history of the Carnegie Steel Company : a romance of millions* tells the story of one of the most important steel mills in history. <http://www.archive.org/details/insidehistoryofc00briduoft>. He also produced another book in the same year: *The Carnegie millions and the men who made them; being the inside history of the Carnegie Steel Company*. <http://www.archive.org/details/carnegiemillions00briduoft>

Growing With America (1948) was a booklet produced by the Carnegie-Illinois Steel Corporation, subsidiary of the United States Steel Corporation. It contains numerous photos with captions that detail the operation of a steel mill. <http://www.archive.org/details/growingwithameri00carn>. Later in 1951, similar production was also produced by United States Steel entitled *Steel Serves the Nation, 1901-1951 : The Fifty Year Story of United States Steel* <http://www.archive.org/details/steelservesnatio00fishrich>



Here, Phoenix columns are among products advertised in an 1875 advertisement for the Phoenix Iron Company.
Source: *Poor's manual of railroads, 1874-75*.
Digitized By Internet Archive.

This Phoenixville Bridge Works drawing shows the construction details of some of the truss bridges that the factory produced using Phoenix columns.
Source: "Album of designs of the Phoenixville Bridge-works," 1873
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