

# BOOK PREVIEW



## Rediscovering Theodore Burr and “His Bridges”

**Ron Knapp & Terry Miller**

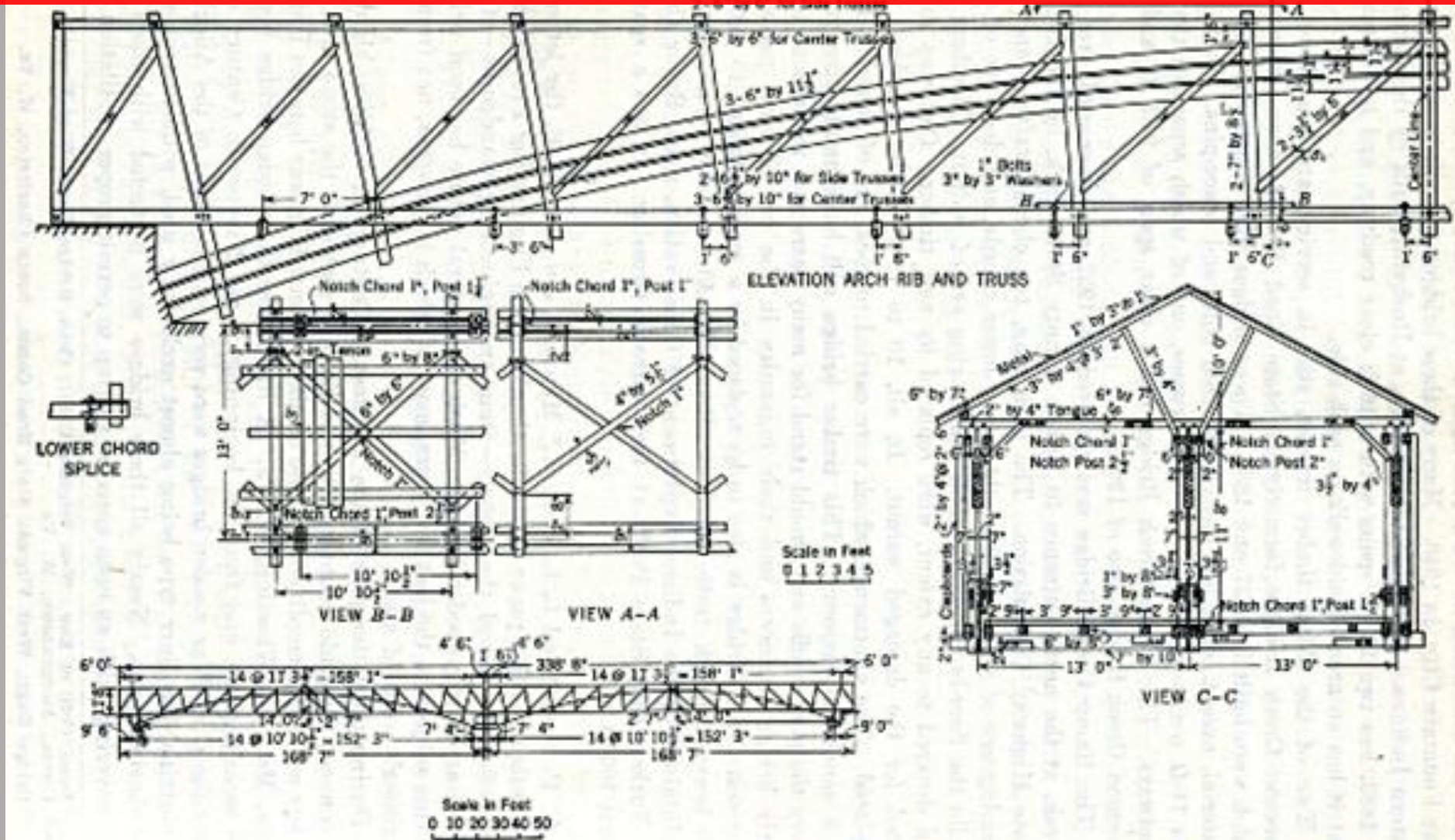
[knappron@gmail.com](mailto:knappron@gmail.com)

[tmiller1@kent.edu](mailto:tmiller1@kent.edu)

Source: Stott Anderson Collection, New York State Covered Bridge Society



**Our Acknowledgments list is very long. However, we want to thank now especially  
Trish Kane Bill Caswell Todd Clark Jan Lewandoski Richard Sanders Allen**



Source: Diagram of the Cheat River Bridge in Preston County, WV built c.1834 by Josiah Kidwell but possibly designed by Wernwag. Note the flared or radial arrangements of posts. (Robert Fletcher and J. P. Snow. "A History of the Development of Wooden Bridges." *Proceedings of the American Society of Civil Engineers, Paper no. 1864 60*, no. 8 (October, 1934: 372)

This PowerPoint presentation is only representative of what was presented at the Covered Bridge Summit held at Oxford NY on June 11, 2022

That presentation included many slides with images and documents that we obtained from archives mainly in New York and Pennsylvania.

Permission was granted specifically for publication of these in our forthcoming book *Theodore Burr & The Bridging of Early America*.

The book has more than 200 illustrations,  
a majority of which have never been published.



# *THEODORE BURR & THE BRIDGING OF EARLY AMERICA*

## The Need to Re-evaluate Theodore Burr's Work and Legacy

**COMING IN LATE 2023**

### **Part I: Theodore Burr's World and Life**

Chapter 1: Theodore Burr's World

Chapter 2: Burr's Life at Oxford and Beyond

### **Part II: Theodore Burr's Bridges**

Chapter 3: Early American Bridge Building and Burr's Mills and Bridges

Chapter 4: Bridging the Hudson River between Lansingburgh and Waterford

Chapter 5: Burr the Innovator: Bridging New York State and Elsewhere

Chapter 6: Bridging the Susquehanna River at Northumberland and Harrisburg:

Chapter 7: Burr's Other Susquehanna Bridges: Triumph and Disappointment

### **Part III: Theodore Burr's Legacy**

Chapter 8: Burr After Burr: Legacy and Lawsuits

Chapter 9: The "Burr Truss" in Later Bridges in the United States and Canada

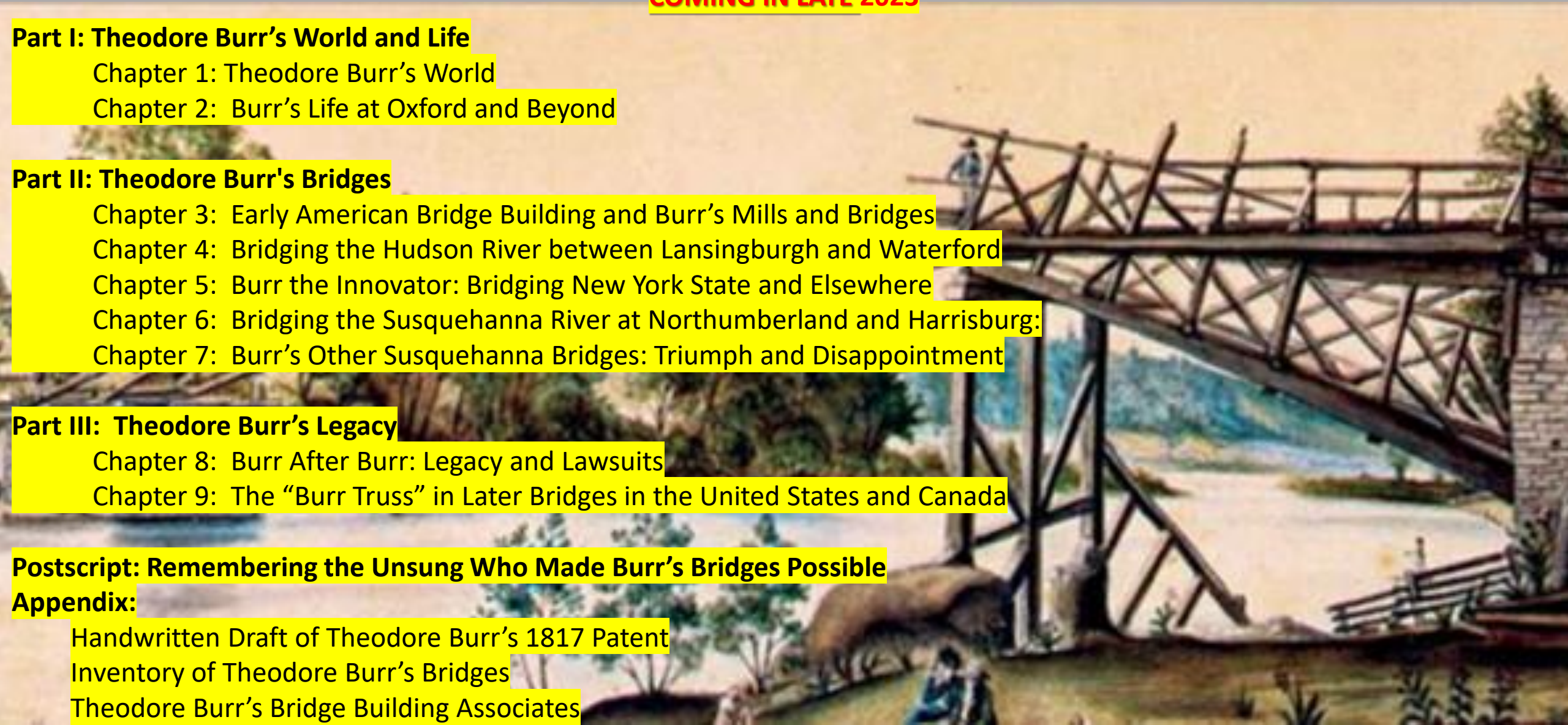
### **Postscript: Remembering the Unsung Who Made Burr's Bridges Possible**

#### **Appendix:**

Handwritten Draft of Theodore Burr's 1817 Patent

Inventory of Theodore Burr's Bridges

Theodore Burr's Bridge Building Associates



## **Major Misunderstandings:**

- 1) Burr invented the arch and the truss
- 2) Burr's bridges all used the trussed arch
- 3) Burr built 45 bridges
- 4) Waterford-Lansingburg Union Bridge history
- 5) Northumberland and Harrisburg history
- 6) Columbia-Wrightsville Bridge history



**EVIDENCE**—textual archives, letters, plans; photo archives; laws of NY & PA; bridge company documents; county histories; contemporary newspapers; carpenters' manuals

Burr's first bridge 1800  
across the Chenango River at Oxford



Central part of the Village of Oxford.

4<sup>th</sup> on the site: Lithograph c. 1842

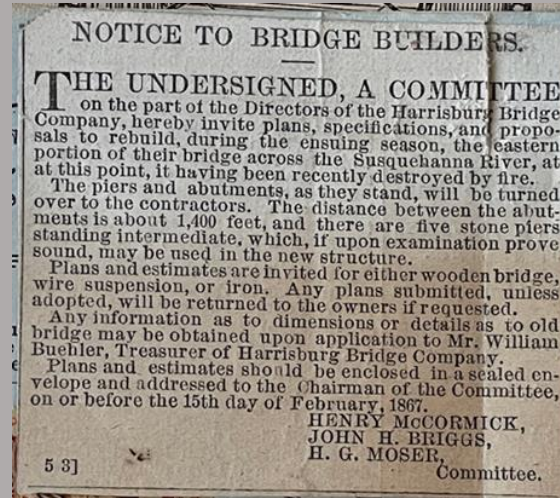
## Union Bridge Company.

### Stone Masons Wanted.

THE Union Bridge Company wish to employ *FORTT* STONE MASONS, to build the Butments and Piers of a Bridge across Hudson's-river, between the villages of *Lansingburgh* and *Waterford*, the ensuing season; the work to commence on the first day of May next. None but good workmen need apply; to such liberal encouragement will be given, by application to either of the Subscribers.

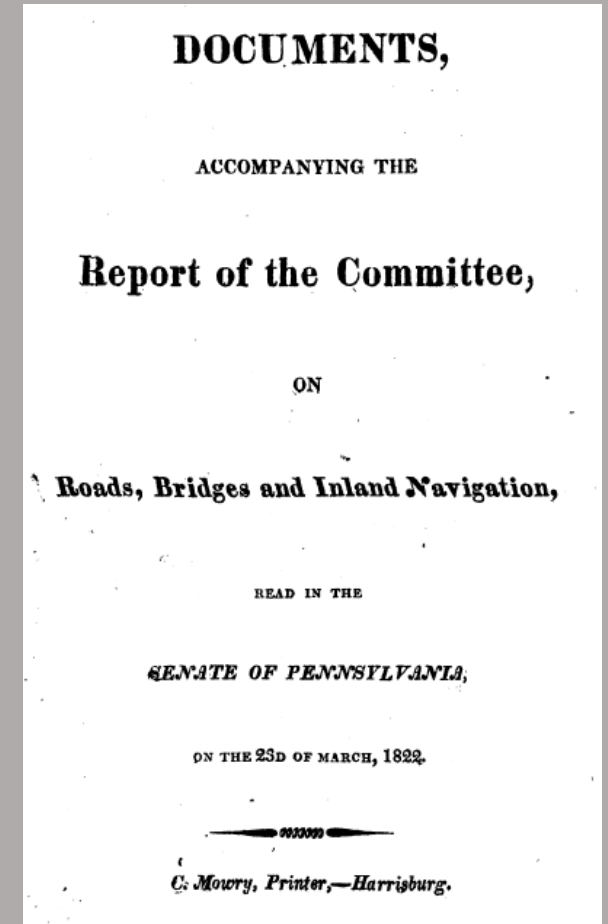
JNO. D. DICKINSON.  
CHARLES SELDEN.

Lansingburgh, March 5, 1804.



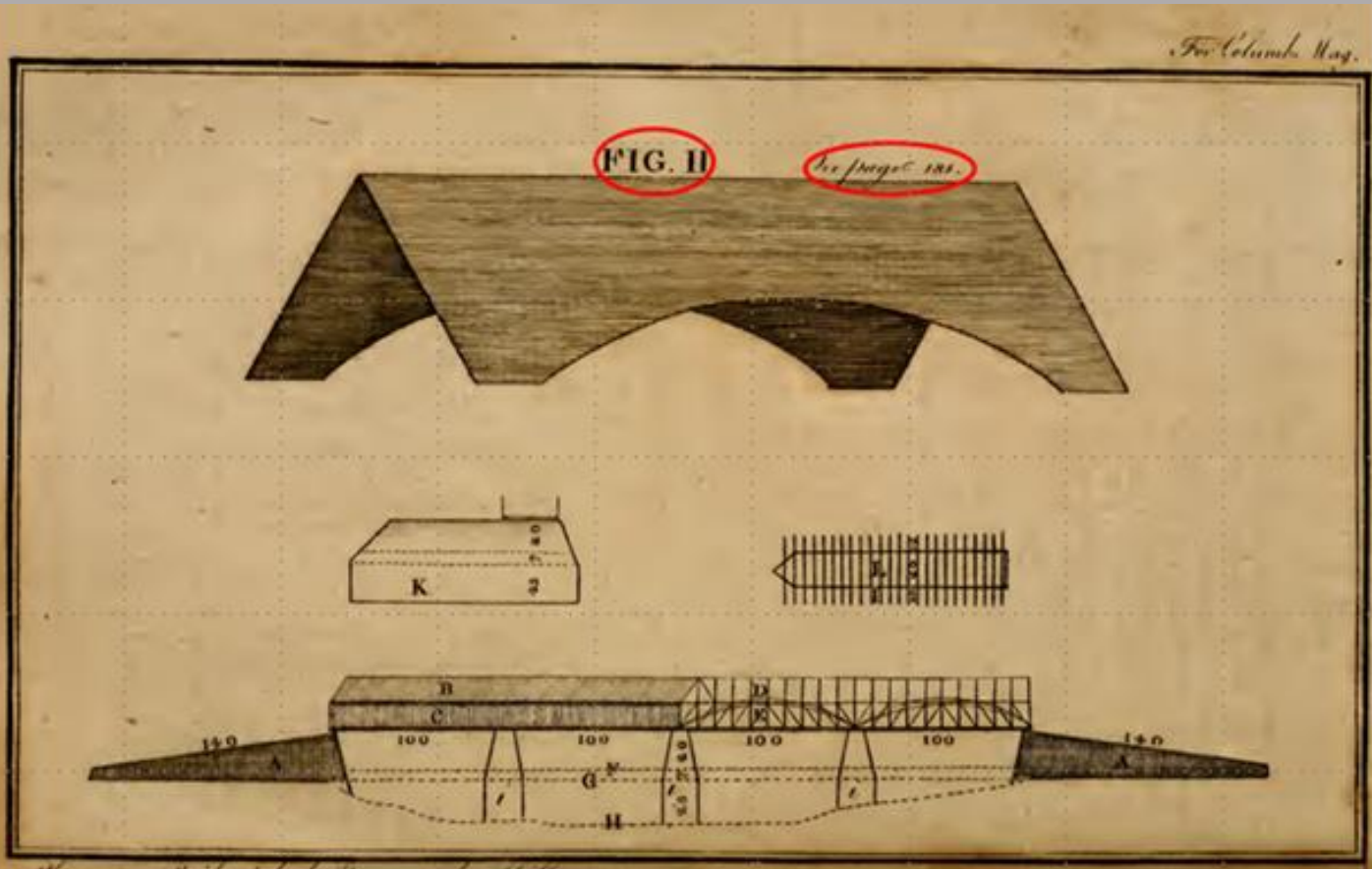
After the 1866 fire, the Harrisburg Bridge Company sought "plans and estimates for either wooden bridge, wire suspension, or iron." (*Harrisburg Telegraph*, February 5, 1867, p. 1;

A handwritten note in cursive script that reads: "I am as heretofore your Cordial Friend." followed by a large, stylized signature that appears to be "Theodore Burr".





# Ubiquity of Arches



*Columbian Magazine* **January 1787**

first-known drawing

of an American arched covered bridge

**NOTE:** Multiple Kingpost Truss

Source: *Columbian Magazine or Monthly Miscellany: Containing a View of the History, Manners, Literature, Characters of the Year 1787* 1, no. 4

## PATENT ARCH BRIDGE.

The citizens of Albany are respectfully invited to attend the opening the Patent Arch Bridge, over the Norman's kill, 2 miles south of this city, built by that ingenious architect, Col. King, of Troy, at 12 o'clock on Monday next. This beautiful piece of mechanism, is a wooden bridge, of a single arch, 185 feet in length, divided into two equal passages, and about 25 feet above the surface of the water, and is the first of the kind ever constructed in the United States. We are told a number of gentlemen propose attending on this occasion.

*Alb. Cen.*

Advertisement for Brown and Fowler's bridge design to be built by Abel King.

*Albany Gazette*, November 14, **1799**

## Stickney's Patent Arch Bridge.

ANY person desirous of information respecting this new construction, may obtain it without delay, by application per letter, or otherwise, to John Stickney, merchant, of Worcester, Massachusetts—who will make known the many advantages arising from this manner of building; and upon application, he will either vend a patent right, or attend personally to superintend the building of any bridge required.

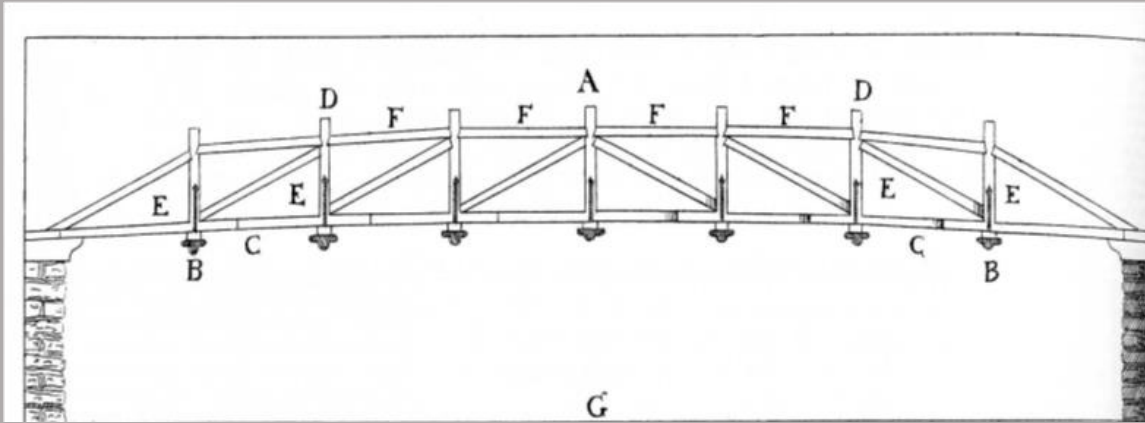
tuths2w

June 10.

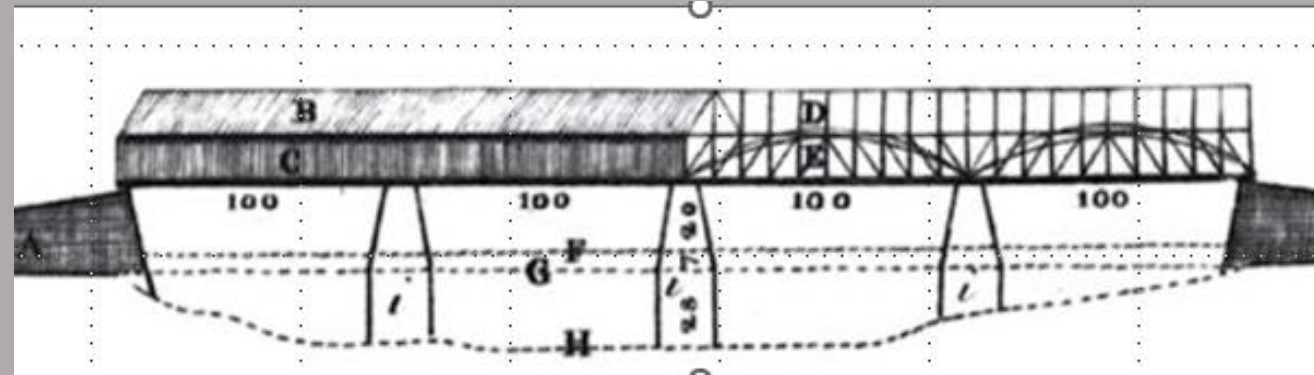
Advertisements for Stickney's "new" bridge design appeared in the *Philadelphia Gazette* and *Universal Daily Advertiser*, June 9, **1797**, p. 2

# Historic Precedents for Multiple King Post Trusses

Not original with Burr



Andrea Palladio's multiple kingpost drawing.  
*The Four Books of Architecture*.  
Venice, **1570**; London **1738**



“Robert Smith’s proposal for a bridge over the Schuylkill River in Philadelphia proposed on January 30, **1767**.” *Votes and Proceedings of the House of Representatives of the Province of Pennsylvania, October 14, 1767 to September 26, 1776*. (Reprinted in *Columbian Magazine* 1, no. 4 (January **1787**).)



# Part I: Theodore Burr's World and Life

## Chapter 1: Theodore Burr's World

## Chapter 2: Burr's Life at Oxford and Beyond

Burr, His Journey, His Family, His Growing Bridge-building Business, including Burr's Buddies



Sources: Richard Sanders Allen. "Theodore Burr—Torrington, Connecticut, *The Lure of the Litchfield Hills* 7, no. 4 (December 1, 1943): 11–15  
"Sketch of the Town of Kaats'-Kill, Hudson's River." *New York Magazine, or Literary Repository*, (September 1797): vol. 2, plate following p. 448;  
Theodore Burr Covered Bridge Resource Center



# Part II: Theodore Burr's Bridges

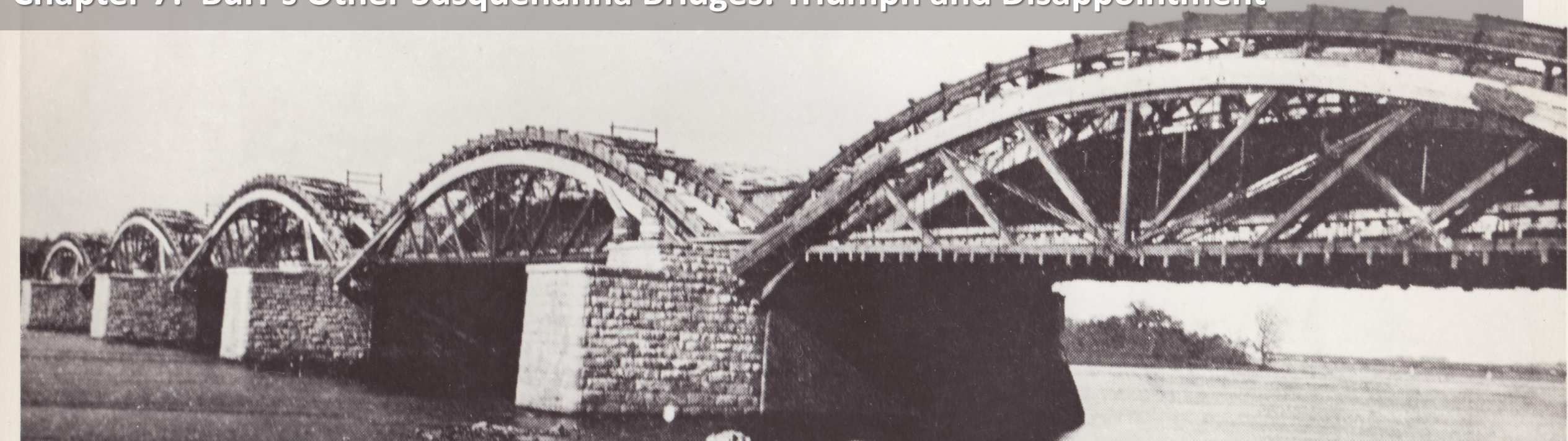
Chapter 3: Early American Bridge Building and Burr's Mills and Bridges

Chapter 4: Bridging the Hudson River between Lansingburgh and Waterford

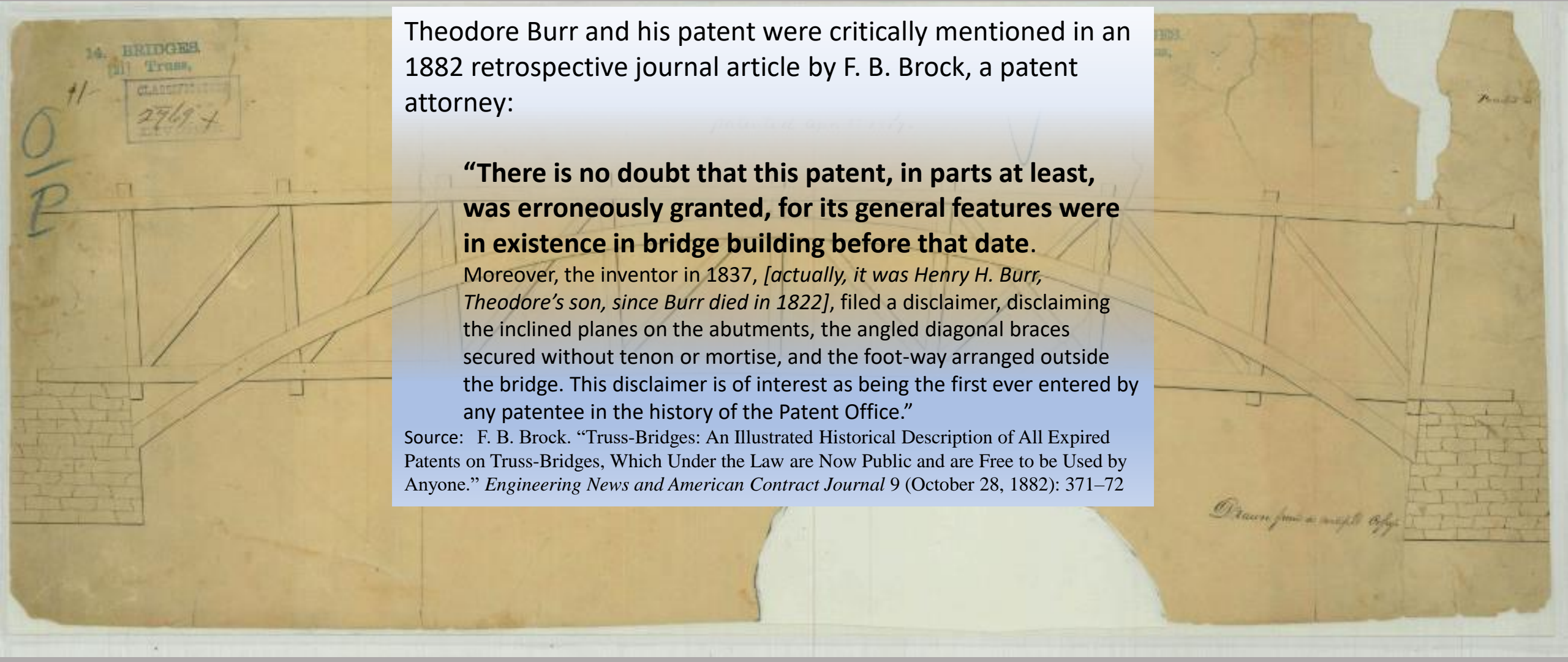
Chapter 5: Burr the Innovator: Bridging New York State and Elsewhere

Chapter 6: Bridging the Susquehanna River at Northumberland and Harrisburg:

Chapter 7: Burr's Other Susquehanna Bridges: Triumph and Disappointment







Theodore Burr and his patent were critically mentioned in an 1882 retrospective journal article by F. B. Brock, a patent attorney:

**“There is no doubt that this patent, in parts at least, was erroneously granted, for its general features were in existence in bridge building before that date.**

Moreover, the inventor in 1837, *[actually, it was Henry H. Burr, Theodore’s son, since Burr died in 1822]*, filed a disclaimer, disclaiming the inclined planes on the abutments, the angled diagonal braces secured without tenon or mortise, and the foot-way arranged outside the bridge. This disclaimer is of interest as being the first ever entered by any patentee in the history of the Patent Office.”

Source: F. B. Brock. “Truss-Bridges: An Illustrated Historical Description of All Expired Patents on Truss-Bridges, Which Under the Law are Now Public and are Free to be Used by Anyone.” *Engineering News and American Contract Journal* 9 (October 28, 1882): 371–72

# Theodore Burr's Restored 1817 Patent

{ \* \* Discovered entered 31st March 1837 }

Theodore Burr

The Article referred to in these Letters Patent and distinct part of the same containing a description in the words of the said Theodore Burr himself of his improvement in building Bridges

To make a horizontal geometrical extension, or way by or over water bridges, in the following manner, the card or lower timbers to be elevated by abutments or piers, or by abutments and piers sufficiently high to bear the arch of high floods, and as much higher as circumstances may require. On these cards or piers are laid beams, on these beams the joists and floor; the crown plates require to be raised above the <sup>floor</sup> sufficiently high to admit waggon or carriages with any common load to pass under the beams that lie cross wise and on top of the crown plates. Both the card and crown plates may be of two pieces, each embracing the king post between them, and are put together by lock-work, or they may be single units put together by iron or wrought-iron or partly on the one plan and partly on the other, as may suit the builder. When put together put into the king post or diagonal braces. They may be put into the corners where the posts are inserted in the card and crown plates without iron or rivets, by cutting the angle of the ends of the beams to correspond with the lines of the cards plates and king posts, allowing the angle to be partly on each as may suit in equal proportion or both, or by square or shoulders or with iron and rivets. After this is done and the bridge is so far raised, attach cross beams on the cards and on the crown plates as have

gentle beams, either by iron bolts, spikes or by pinning, locking or by mortises and tenons so as to keep the bridge from one side way or lateral motion. There may be two, three or four sides, segments or sections to make the bridge of any width required for carriage ways and foot walks, the foot walks may be anywhere on the bridge where it will best suit even on the out side of the main bridge if thought proper, by letting the beams project over or beyond the out side section of cards, arches, &c. and may be across a hanging gallery, the arches are the last principle timber that are to be raised; they may be notched a little where they cross the cards and where they cross the king posts and beams of the king posts but seldom mortising on the posts or beams. The arches may take their rise from below the card, or at the card line, as may be required to give the desired curve and to rise to the top of the crown plate or towards it, and even above it on very long spans if desired, and may be double or single, if double one arch on each side of the king post and braces; they are put on so as to leave the king post between the arches when double, if they are left single be put on that side of the king post that suits best. More or broad wooden piers are where there are inclined planes that may be applied to any bridge, and on which the superstructure rests, ought to be made at the upper end, or the end that strikes; - the flatter the angle of the inclined plane the easier the ice is broken as the ice slides up the plane it meets on angles or cuts that throw it off the planes on each side of the pier. The superior advantage this bridge has over others,

is that it unites strength with convenience and durability, can be built at one third the expense than any other of the same span and magnitude, there being two great principles simplified and compounded, so that in uniting the materials a man is able to despatch as much work in one day as he could in two in the ordinary mode of framing, the timber is not so much cut of course has greater strength and it must be allowed a large quantity of materials will answer the purpose. To make as my present intention is improvement the manner of raising the arch to rise at or near the plate stem the floor, and being double or single, and may be bent or cut to the curves the inclined planes in the abutments and piers joining the king or diagonal braces, without iron, be made as shoulders in the post and the walk or foot ways on the outside of the <sup>main</sup> bridge.

Witness  
William Elliott  
John Cochran

Theodore Burr

820 Words



# To Bridge Builders and Others

Published a year after the granting of his 1817 patent

First appearance in *Oxford Gazette*, **April 22, 1818**, p. 2

Repeated weekly through **March 31, 1819**

- “devoted 18 years of his life to the theory and practice of bridge building”
- “has built 45 bridges of various magnitude
- “with arches from 40 to 367 feet span”
- “best practical principles ... combined ... in a model [now in patent office]  
... “and obtained a patent from the United States”
- “warns all persons against an infringement of his patent”

## To Bridge Builders and Others.

THE Subscriber gives notice, that having devoted eighteen years of his life to the theory and practice of bridge building exclusively, during which time he has built 45 bridges of various magnitude, with arches from 60 to 367 feet span; and that in the progress of his business he has thoroughly examined all plans in use, invented new ones, and varied all the bridges he has built more or less in their construction, in order that he might acquire a perfect experimental knowledge of the science. And having selected the best practical principles, he has combined them in a model, (now in the model office at the city of Washington.) and obtained a patent from the United States for the same. This model is composed of chords, crown-plates, king-posts, and king-braces, united together and supported by arches, each segment or section of which is formed double, united to the chords, posts and braces, and confined with iron bolts or spikes. The piers are formed with an inclined plane at their head, the surface of which may be either of wood, iron or stone, and the angle varied from 25 to 45 degrees, as the strength of the ice and rapidity of the current may require. The bridge over the Susquehannah, at the head of tide and great Gunpowder, in Maryland, are constructed upon this plan; which, for convenience, strength, durability, economy and elegance, combined, he is convinced cannot be materially improved. He therefore warns all persons against an infringement of his patent, and at the same time would inform those interested in the erection of bridges of any considerable importance, that all communications made to him on the subject, will be promptly attended to.

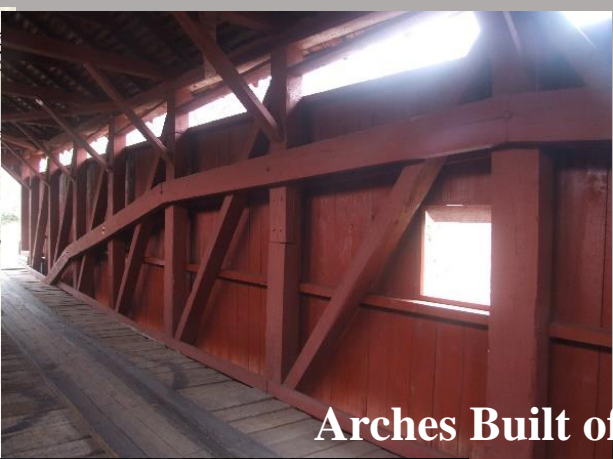
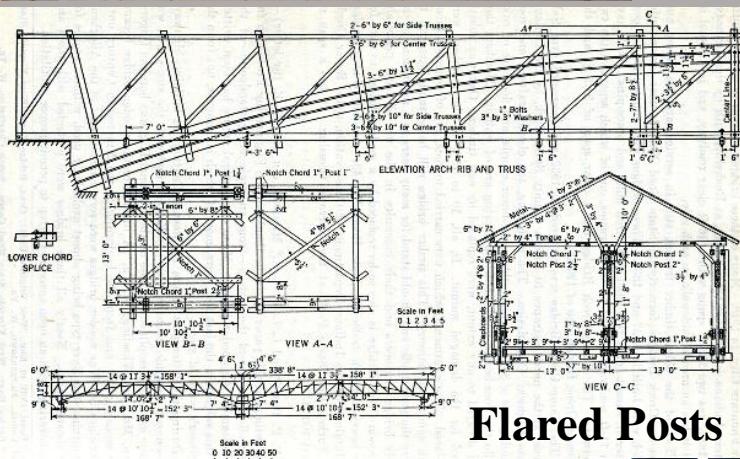
THEODORE BURR:

*Oxford, N. Y. April, 1818.*

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# Chapter 9: The “Burr Trussed Arch” Family in Later Bridges





COMING IN LATE 2023

***THEODORE BURR &  
THE BRIDGING OF EARLY AMERICA***

with an Introduction

“The Need to Re-evaluate Theodore Burr’s Work & Legacy”