

200 + Years of Innovative Bridge Construction in America



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Miami, FL
November - 2019

Evolution of Bridges



With the advancement of civilization,
Bridges become essential to transcend barriers

Influence of Patents on Bridges

“Thomas Jefferson’s views on patents should not surprise those who are aware of his views about democracy and equality. He opposed patents strongly because he considered it an unfair monopoly. He would later become more in favor when he discovered the power they had to encourage invention.” Jefferson was subsequently instrumental in helping to pass the Patent Act of 1790.

Thomas O. Jewett

Article I, Section 8 United States Constitution

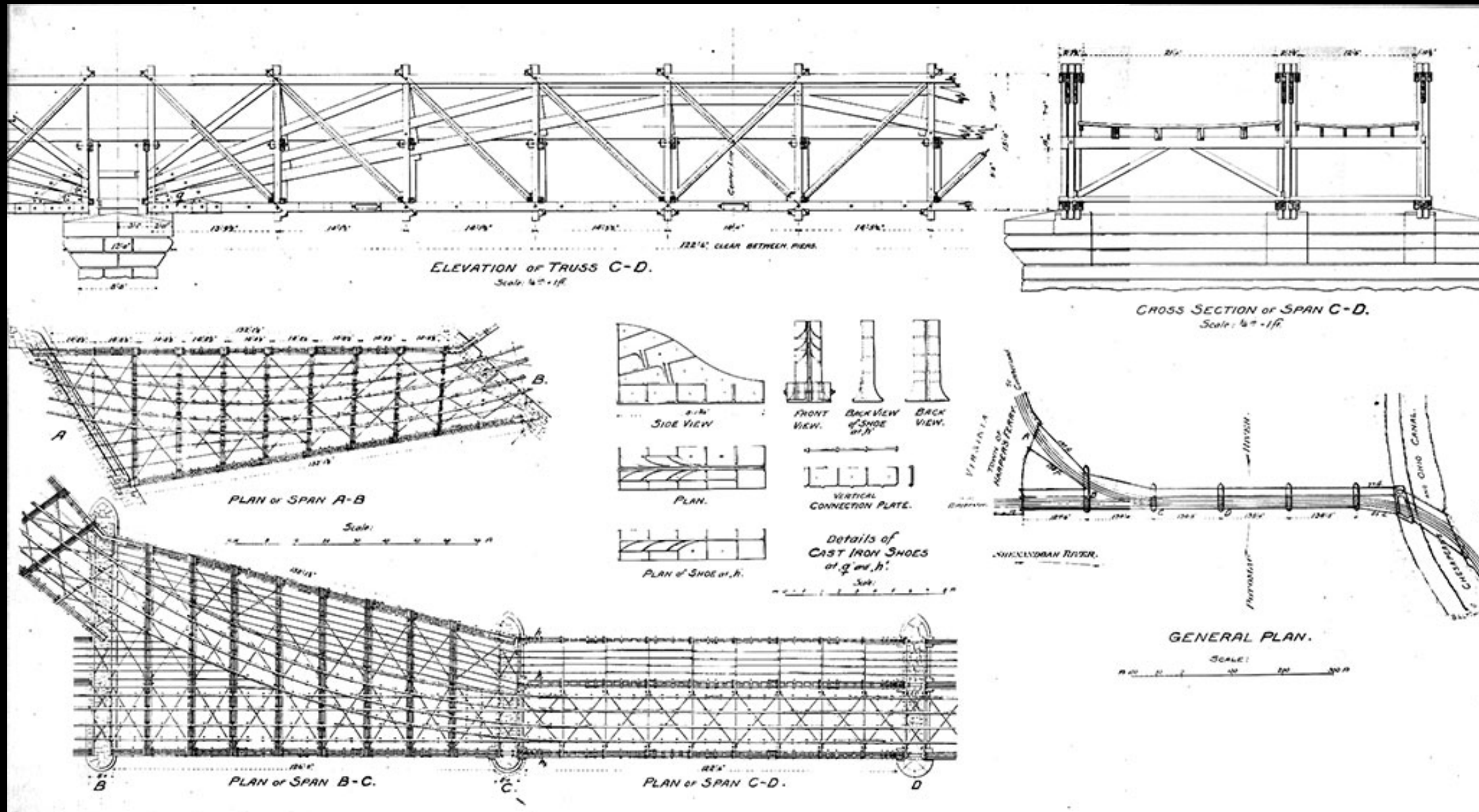
“The Congress shall have Power...To promote the Progress of Science and useful Arts, by securing for limited times to authors and inventors the exclusive right to their respective Writings and Discoveries.

Early American Bridges



Theodore Burr was awarded US Patent No. 2769 on April 4, 1817
for his arch and truss bridge design

Early American Bridges



Lewis Wernwag

Early American Bridges



Stephen Harriman Long – Pioneer of Bridges
and Steam Locomotives

Early American Bridges



Ithiel Town – “The Town Bridge”

“The bucolic covered bridge; the ethereal appearance of prefabricated metal trusses thrown across numerous streams; traditional arch and girder forms appearing in the garb of a new material, reinforced concrete — these altogether elicited more than eight hundred patents during the first century of the U.S. Patent Office.”

Kemp, Emory, L. *American Bridge Patents – The First Century 1790-1890*, West Virginia University Press, 2005



Along Comes the Iron Horse



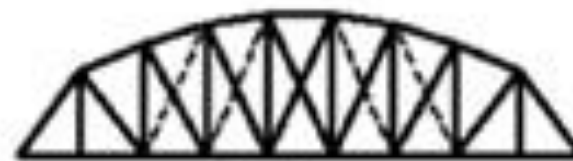
The Union Pacific “Big Boy”

Between 1871 and 1900, over 170,000 miles of track were added to the nations railroad system. This ushered in a whole new wave of patented bridge technologies.

Patented Bridge Trusses



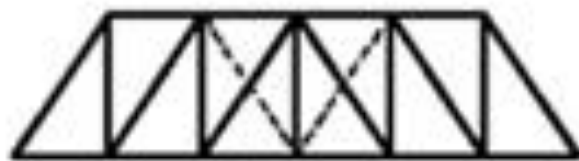
Pratt



Parker



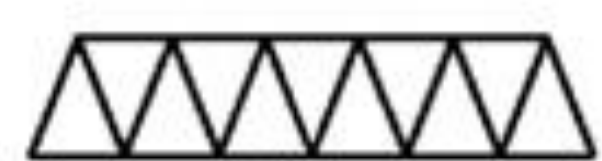
K-Truss



Howe



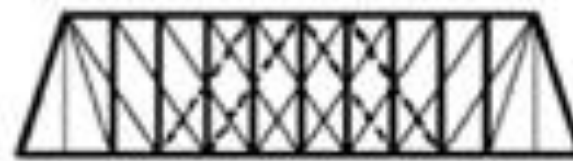
Camelback



Warren



Fink



Double Intersection Pratt



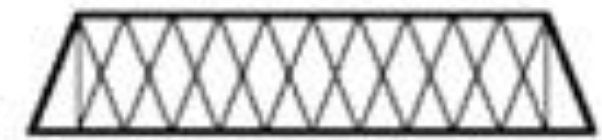
Warren (with Verticals)



Bowstring



Baltimore



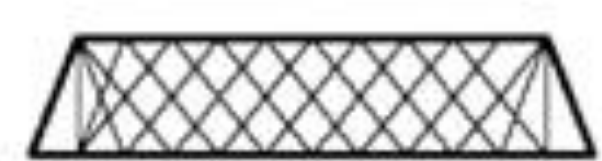
Double Intersection Warren



Waddell "A" Truss

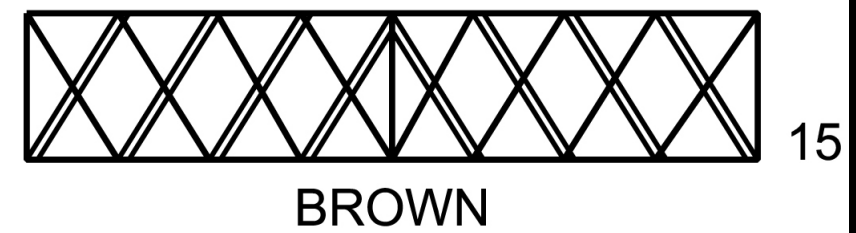
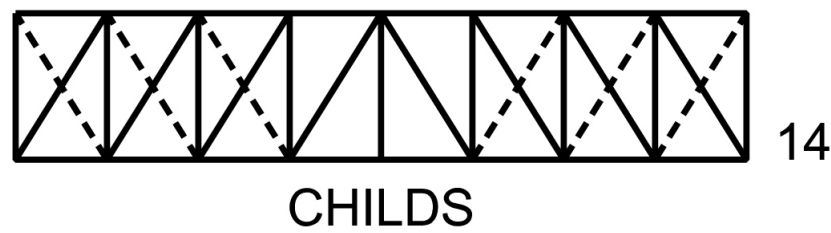
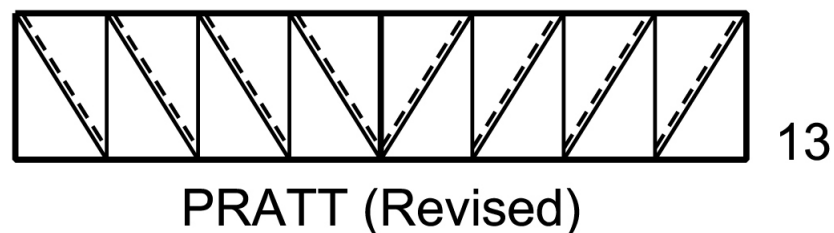
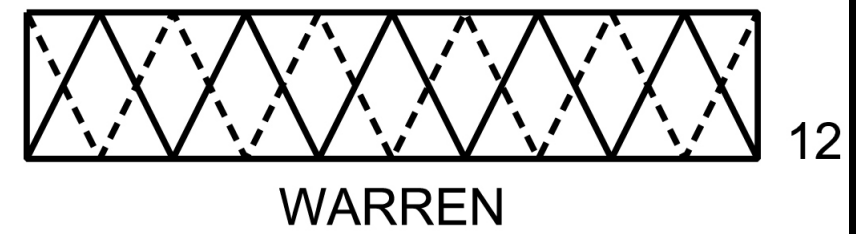
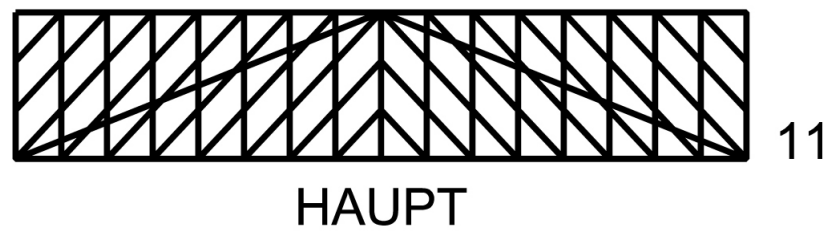
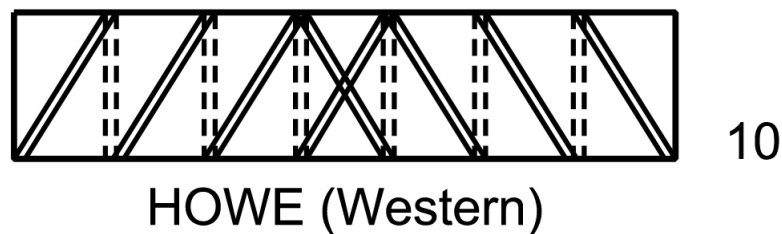
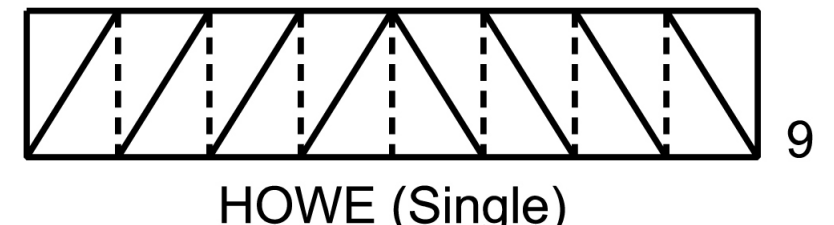
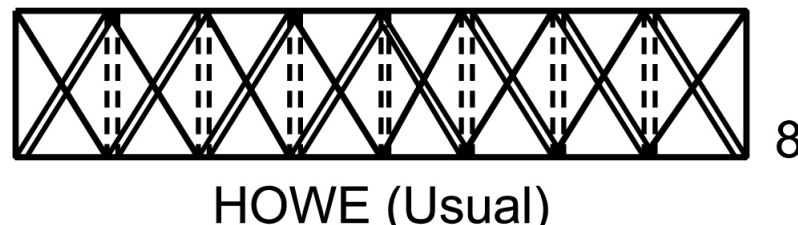
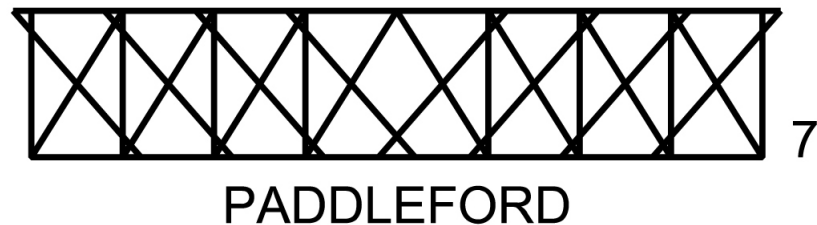
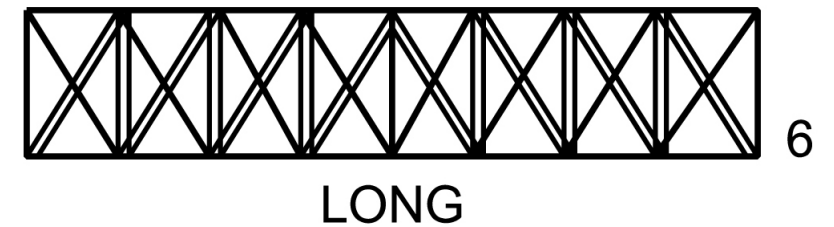
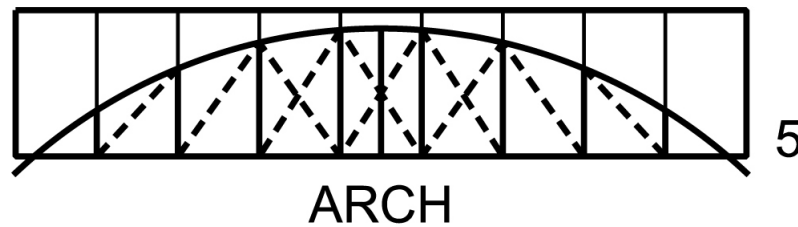
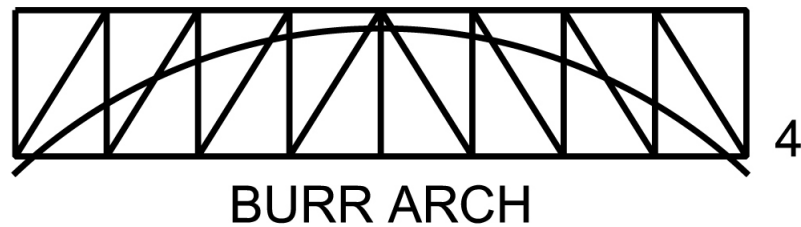


Pennsylvania




Lattice

More Patented Bridge Trusses



Where do I get a Tripple Whipple?

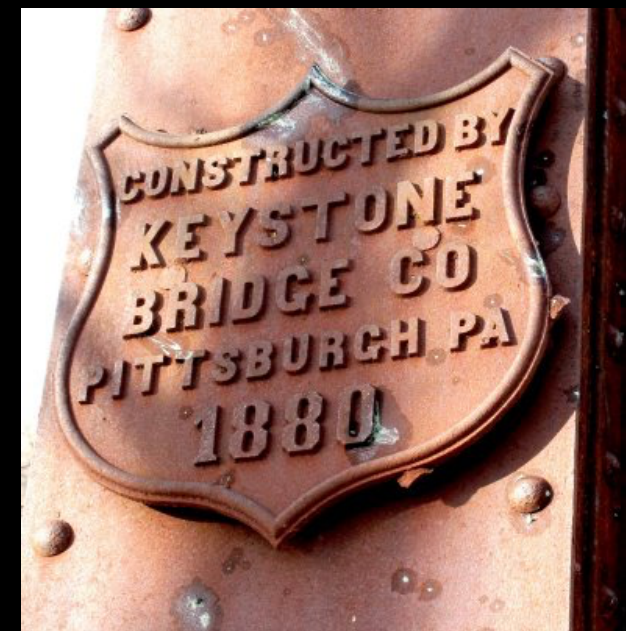


**WROUGHT IRON
BRIDGE CO.,**
CANTON, - - OHIO.
C. Aultman, Pres.; A. Hurford
Vice-Pres.; C. H. Jackson, Sec
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MANUFACTURERS OF
Iron Bridges & Roofs.
Have their work in use in
twenty-seven different States,
Canada and Mexico.
New York Office 89 Tribune Building.
T. W. SHIPMAN, Agent

1884 Wrought Iron Bridge Company Advertisement Featuring The Bridge

The advent of the Catalogue Bridge Company

High Tech Companies in the 1800's



The King of Catalogue Bridges

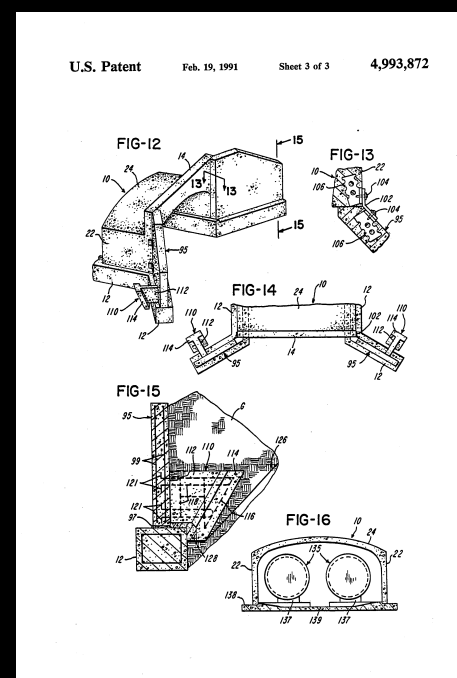
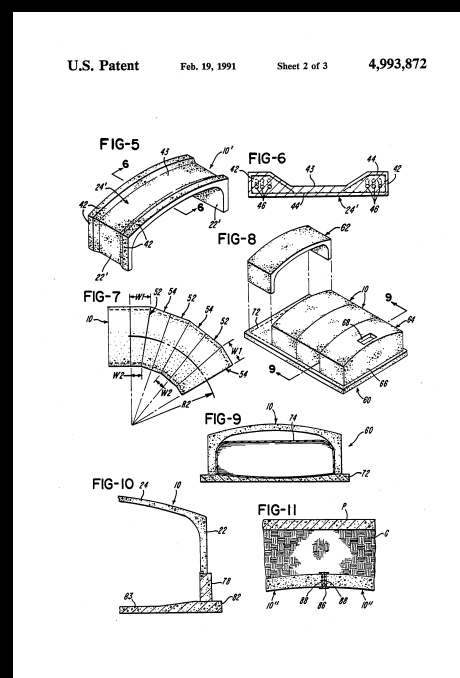
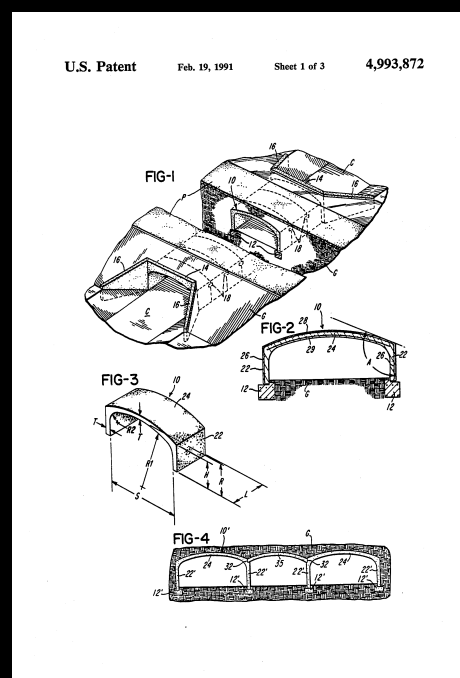


Founded by Zenas King in 1871, this company fabricated and constructed over 10,000 bridges.

“These “catalogue bridges” appeared on the scene after the Civil War and became a ubiquitous feature on the American landscape. Arguably, they had a more profound effect on the development of the American highway system than the justly famous landmark bridges by luminaries such as John. A. Roebling, James B. Eads, Theodore Cooper, or James Finley.”

Emory L. Kemp

Modern Day Innovative Bridge Technologies



CON/SPAN –
William Lockwood,
US Patent
No.4,993,872

Modern Day Innovative Bridge Technologies



“The technology’s inventor and Terre Armee founder, Sir Henri Vidal, had to draw on all his perseverance and charisma to advance his revolutionary idea to become an epic technological, human and entrepreneurial breakthrough.”

Almost every paradigm shift in the evolution of bridge engineering resulted from a patented intellectual property, including:

- Trusses for Wooden Covered Bridges
- Iron & Steel Trusses (catalogue bridges)
- Drawn iron for wire ropes
- Spinning mechanisms for suspension bridges
- Reinforced concrete
- Almost every type of movable bridge
- Prestressing & Post-tensioning systems

23 CFR 635.411



Number One Obstacle to Innovation since 1916

23 CFR 635.411

§ 635.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State transportation department certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

Repealed – Oct 28, 2019

U.S. Department of Transportation

Federal Highway Administration

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News

FHWA 19-19
September 26, 2019
Contact: Mike Reynard
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U.S. Department of Transportation Overhauls Century-Old Rule

Update will give states more flexibility in federally funded highway projects

WASHINGTON – The U.S. Department of Transportation's Federal Highway Administration (FHWA) today published an updated federal rule to give states more flexibility and choice in which products or services can be used on federally funded highway projects. The change is intended to improve safety and increase efficiency while saving taxpayer dollars.

"This much-needed update of a century-old, obsolete rule will benefit state transportation infrastructure projects and save millions of taxpayer dollars," said U.S. Transportation Secretary Elaine L. Chao.

The rule updates an outdated federal requirement that restricts the ability of states to use patented or proprietary technology in their Federal-aid highway projects.

"This final rule promotes innovation by empowering states to choose which state-of-the-art materials, tools, and products best meet their needs for the construction and upkeep of America's transportation infrastructure," said Federal Highway Administrator Nicole R. Nason.

THANK YOU!

