19th Century Iron Lenticular Truss Bridges from the Berlin Iron Bridge Company
(and Other Historic Bridges of Western Ma.)

Dr. A. Lutenegger
Professor of Civil & Environmental Engineering
University of Massachusetts
Amherst, Ma
Pre-1878
Iron Lenticular Bridges

• G. Stephenson – 1824 Gaunless Bridge
• R. Stephenson – 1838 Kilsby Bridge
• Von Pauli – 1857 Isar Bridge
• Brunel – 1859 Saltash Bridge
• Gerber – 1860 Mainz Bridge
• Lohse – 1868 Hamburg Bridge
Gaunless Bridge
Gaunless Bridge
Gaunless Bridge
Brunel’s Saltash Bridge
Brunel’s Saltash Bridge
Mainz Bridge
Hamburg Bridge
Lindenthal’s Monongahela Bridge
Monongahela Bridge
Patents Prior to 1878

• Barnes – 6,230 – 1849
• Stanley – 8,337 – 1851
• Hervey & Osborne – 13,461 – 1855
• Dieckmann – 113,030 – 1871
• Harding – 132,398 – 1972
• Eads – 142,381 – 1873
G. E. HARDING.

Improvement in Bridges.

No. 132,398.

Patented Oct. 22, 1872.

Fig. 1.

ELEVATION AND PLAN
Douglas 1877

DESIGN FOR AN ELLIPTICAL TRUSS BRIDGE.
A TREATISE
ON THE
STRENGTH
OF
BRIDGES AND ROOFS,
WITH
PRACTICAL APPLICATIONS AND EXAMPLES,
FOR THE USE OF
ENGINEERS AND STUDENTS.

BY
SAMUEL H. SHREVE, A. M., CIV. ENG.

NEW YORK:
D. VAN NOSTRAND, PUBLISHER,
23 MURRAY ST. AND 27 WARREN ST.
1873.
CHAPTER X.

LENTICULAR TRUSSES.

214.—The form of this peculiar truss, known also as the Pauli System, is shown in the following figure:

![Diagram of Lenticular Truss]

Fig. 81.

It is composed of two equal parabolic arcs for chords meeting at the ends, and braced with vertical and inclined braces. It is not capable of supporting any greater weight than a Bow String Truss of equal depth and length, and practically possesses many disadvantages.
THE CORRUGATED METAL CO.,
EAST BERLIN, CONN.

IRON BUILDERS.
Engineers and Contractors for Douglas Patent Wrought Iron Bridge,
ROOF TRUSSES, CORRUGATED IRON SHUTTERS, ROOFING, CEILING, SIDING,
And General Iron Construction.
WORKS OF THE BERLIN IRON BRIDGE COMPANY, 1878.
The Driving Force

Send for Illustrated Catalogue.

CHAS. M. JARVIS, BURR K. FIELD, GEO. H. SAGE, F. L. WILCOX,
Pres’t and Chief Engineer, Vice-Pres’t, Secretary, Treasurer.

Office and Works: EAST BERLIN, CONN.
THE BERLIN IRON BRIDGE CO.

Engineers, Architects, and Builders
of Iron and Steel Bridges, Roofs
and Buildings.

The above illustration, taken direct from a photograph, shows a Double Track Railroad Bridge designed and built by us at Cos Cob, Conn., on the N. Y. N. H. & H. R.

The above illustration is taken direct from a photograph and shows the interior of a Force Shop designed and built by us for Wm. Cramp & Sons Ship and Engine Building Co., at Philadelphia, Pa. The Force Shop is 32 ft. in width and 50 ft. in length, the adjacent Boiler Shop (shown on the right) being 55 ft. in width and 350 ft. in length. The Smith Shop is controlled by a Traveling Crane as shown. The building is covered with Corrugated Iron.

CHAIRMAN, BURR H. FIELD, GEO. H. SAGE, F. L. WILCOX,
Chairman and Chief Engineer, Vice-President, Secretary, Treasurer.

Office and Works: EAST BERLIN, CONN.
THE BERLIN IRON BRIDGE CO.,

Bridge at Jamestown, Chautauqua County, N.Y.
Spen, 70 feet. Roadway, 10 feet wide.

East Berlin, Conn. Binghamton, N.Y.
THE BERLIN IRON BRIDGE CO.

Engineers, Architects and Builders of Iron and Steel Bridges, Roofs and Buildings.

The above illustration is taken direct from a photograph, and shows the interior of Car Shed designed and built by us for the New Orleans and Chattanooga Railroad Co., at New Orleans, La. The building is constructed entirely of steel and covered with corrugated steel. It is 80 ft. wide and 200 ft. long. The sides are left open for a distance of 50 ft. from the surface of the ground, and the ends are left open entirely from the tie beams to the ground.

The above illustration shows a Parabolic Truss Bridge, designed and built by us at Danbury, Conn. The bridge consists of one span of 140 ft. with a roadway 20 ft. wide in the clear, and two sidewalks each 5 ft. wide in the clear.

CHAR. M. JARVIS, BURR H. FIELD, GEO. H. SAGE, P. L. WILCOX,
Pres'nt and Chief Engineer, Vice-Pres'nt, Secretary, Treasurer.

Office and Works: EAST BERLIN, Conn.
THE BERLIN IRON BRIDGE CO.,

Engineers, Architects and Builders of Iron and Steel Bridges, Roofs and Buildings.

The above illustration is taken direct from a photograph, and shows the construction of an Iron Truss Roof, designed and built by us for The Cor Stain Mfg. Co., at Torrington, Conn. The roof is over their Rolling Mill, which is a building 156 feet in width and 235 feet in length. The line of brick arches, shown on the right, connects with an adjoining Muffle Room, which is also covered with an iron truss roof, designed and built by us.

Send for Illustrated Catalogue.

Office and Works, EAST BERLIN, CONN.
The above illustration is taken direct from a photograph made during the construction and shows the details of an iron building designed and built by us for the Newport News Ship-Building and Dry Dock Company, at Newport News, Va. The building is 60 ft. in width by 330 ft. in length, and is two stories high—the lower floor being used for a Ship Shed for punching, bending, riveting, etc., the upper floor being used as a Mold Loft. Outside of the building, extending entirely around it on all four sides, is an overhang 12 ft. wide, thus affording additional shop room outside of the building, where raw material may be stored and still protected from the weather. Wide openings are placed every 40 ft., so that raw material may be taken in, and finished product moved out, cheaply and quickly. The supporting frame is all iron throughout, and between the iron posts on the sides is a light brick wall.
THE BERLIN IRON BRIDGE CO.
Engineers, Architects and Builders of Iron and Steel Bridges, Roofs and Buildings.

The above illustration is taken direct from a photograph of an iron Truss and Plate Girder Bridge designed and built by us to carry the M. W. & C. R. R. over the Naugatuck River at Waterbury, Conn.
THE BERLIN IRON BRIDGE CO.,

ENGINEERS, ARCHITECTS AND BUILDERS OF
Iron and Steel Bridges, Roofs and Buildings.

This illustration is taken direct from a photograph, and shows an Iron Water Tower designed and built by us for The Newport News Water Works, at Newport News, Va. The tower is 154 ft. high, surmounted by a tank 30 ft. in diameter and 39 ft. high. The construction particularly commends itself as being much more economical and much more scientific than an ordinary water tower, consisting of simply a steel tank supporting itself, the stress under which are uncertain and problematical. Send for Illustrated Catalogue.

Office and Works, EAST BERLIN, CONN.
THE BERLIN IRON BRIDGE CO.

Engineers, Architects and Builders of Iron and Steel Bridges, Roofs and Buildings.

PARABOLIC TRUSS BRIDGE, AT BINGHAMTON, N. Y.

FOUNDRY BUILDING, FOR FARRELL FOUNDRY AND MACHINE CO., AT ANSONIA, CONN.
Layout of BIBCO Plant
Inside BIBCO Plant

FIG. 3. VIEW OF INTERIOR OF NEW SHOP
Styles of Lenticular Bridges

Suspended Deck

Suspended Deck

Mid Deck

Under Deck
Configurations of Bridges
Thanks for card. This is a nice, lively place. I am having a delightful vacation. S.B.
• Through Truss Bridges

• Pony Truss Bridges
The Success of BIBCO Bridges

• From 1879 to 1900 over 600 Lenticular Bridge Structures Built
• Aggressive Marketing
• Modular Design & Construction
• Mass Production of Components
• Rapid Construction Schedule
About 55 Extant Bridges

- Massachusetts
- Connecticut
- New Hampshire
- Vermont
- Rhode Island
- New York
- Pennsylvania
- New Jersey
- Texas
What's the Current Status of BIBCO Lenticular Brides?

1. Some bridges have been refurbished.
2. Some bridges are waiting for refurbishment.
3. Some bridges are waiting for discovery.
Bardwell’s Ferry Bridge, Shelburne, Ma.
Rhule Road. Malta, N.Y.
Depot Rd. Bridge, Colchester, N.H.
Candor, N.Y.
Melrose Rd. E. Windsor, Ct.
2007 Lenticular Truss Bridge
Other Historic Bridges of Western Ma.

- Suspension Bridges
- Iron Truss Bridges
- Steel Arch Bridges
- Concrete Arch Bridges
Stillwater Bridge – Deerfield 1870
Lower Bridge – Turner’s Falls 1872
Upper Bridge – Turner’s Falls - 1878
B & M Connecticut River Bridge - Hadley 1887
Clement Street Bridge – Northampton
1894
Hotel Street Bridge – Florence
Bridge of Flowers and Main Street Bridges - Shelburne
Main Street Bridge
Bridge of Flowers
French King Bridge – Irving Steel Deck Arch Bridge 1932
Farley Rd. Bridge – Erving
(Phoenix Bridge Co.)
Shattuckville Rd. Bridge
East Mineral Road Bridge – Montague
1888
11th Street Bridge – Double Intersecting Warren Truss 1915
Adamsville Rd. Bridge - Colrain
Ct. River Bridge - Springfield
Rt. 2 Bridge - Zoar
1st Avenue Bridge – Turner’s Falls
Ball Pipe Bridges