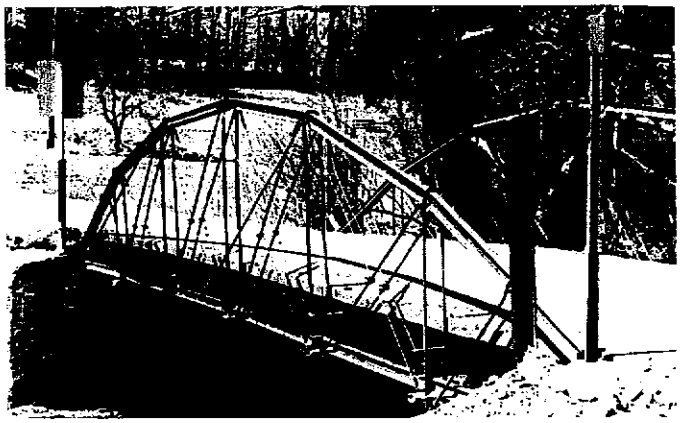
ODDITIES (continued from page 17)

cent of another curious subset of bridges that also adapted for their principal members a different product from another industry, in this instance, iron railroad rails. The railroad iron bridges of the Lane Bridge Works of Painted Post, NY (*SIAN*, Nov. 1977) and John Greiner (*SIAN*, Fall 2000) have been reported. A lesser known example is the diminutive patented (1877) *Railroad Iron Bowstring Truss* of the emerging Groton Iron Bridge Co. of Groton, NY in which bent rails formed both the upper and lower chords. This innovation was the "signature" product of the new company, appearing on its first letterhead, but the design was soon abandoned in favor of a more practical variation in which railroad rails were replaced by bent I-bars.

We will likely never know exactly what the thought processes were that resulted in most of these oddities but, thankfully, examples of many have been preserved for our appreciation and enjoyment and, yes, to tease our curiosity. For this, we are thankful for the efforts of the established preservation community as well as individuals and small groups that share a fondness for what these unusual examples can teach about one aspect of our transportation heritage. The bridges of Charles H. Ball, one of which has now been removed to the campus of the University of Massachusetts by Alan Lutteneger, are an important contribution to this legacy.



Bill Chamberlin

Patented Railroad Iron Bowstring Truss Bridge, Nubia, NY, built c. 1877 by the Groton Iron Bridge Co.

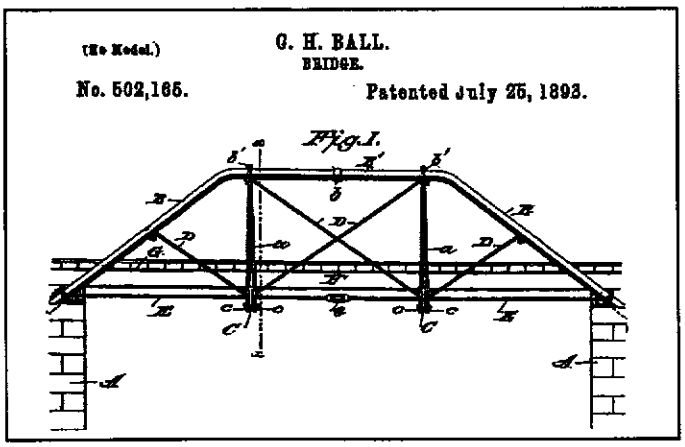
Bill Chamberlin

Iron Pipe Bridges of Charles H. Ball

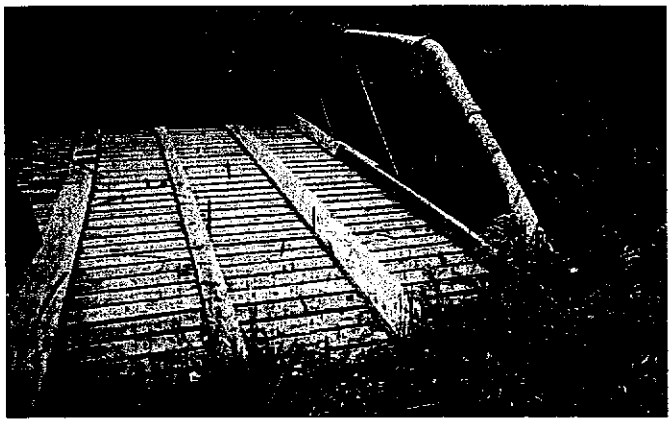
In 1893, an enterprising mechanic and inventor from East Windsor, MA, named Charles H. Ball, patented a design for a small pony-truss bridge using iron pipes for the upper chords (Patent No. 502,165, July 25, 1893). At least 25 such bridges are known to have been built between about 1888 and 1896, principally for small towns throughout western New England, in Massachusetts, Vermont, and Connecticut. The design and construction illustrate the inventiveness and ingenuity of the designer, and, for their time, represent an uncommon approach to catalog iron bridges for local roads, being one of the unusual patented forms, using wrought-iron pipe for the main truss members. Like many entrepreneurs, Ball served as both designer and builder, thus ushering in the design-build concept well before the beginning of the last century.

As far as is known, Ball only produced pony-truss bridges in the King Post and Queen Post configurations. Span lengths were modest, ranging from about 22 ft. to 42 ft. In his advertisement, Ball claimed "As Strong as the Strongest" and "As Durable as Iron and Steel" and "The Cheapest Iron Bridge in the World." His design philosophy was essentially described as follows:

"To meet the demand for a low priced iron bridge having all the important qualities of strength and durability found in the best iron bridges now made, I have perfected a pipe truss bridge.... The question of artistic or architectural effect was not considered



Drawing from Ball's 1893 patent for a pipe-truss bridge.



Alan Lutenegger, all photos

The Windsor Bush Road Ball Pipe-Truss Bridge is abandoned and threatened with loss.

in planning this bridge, the main point being to produce a strong, cheap bridge, that would last as long as any iron bridge, and cost but little, if any, more than a wooden bridge."

The unique feature of Ball's design was in the use of wrought-iron pipe for the upper chord. In his sales pamphlet, Ball stated, "The pipes used are not the ordinary *gas* and *steam pipe* found in the market, but are heavier, and are made for special purpose requiring great strength." Typically, the pipe had an outside diameter of between 5 and 7 in., and it was usually made of two sections joined by a threaded coupling. Legend has it that the pipes were often bent to the required shape with great ceremony on a Saturday night with local boys and men bending the pipe after it had been heated in a fire.

At the ends of the pipe, a cast-iron boss with a bearing plate was placed so that the lower chord members, typically pairs of 1-in. diameter wrought-iron rods with threaded ends could be attached to hold everything together. Beams were suspended from the top chord from wrought-iron hangers that looped over the top chord. Diagonal bracing, also of wrought-iron rods, ran from the upper chord, under or through a beam, and then back to the diagonal end of the upper chord. There were no rivets and essentially no bolts used.

Only three of Ball's bridges are known to have survived; fortunately they represent typical examples of Ball's enterprise and include two Queen Post bridges and a King Post bridge. Ball's bridges were previously described in a brief note in the *SIAN* (Sept. 1977) by Bernard A. Drew. Following is an update on the surviving examples:

The **Holiday Road (Dalton) Bridge**, originally located in Dalton, MA, is a 42-ft.-long, pony-truss bridge of the Queen Post design. The top chord is made from 6-in. diameter wrought-iron pipe. The lower chords are pairs of 1-in. diameter, wrought-iron rods. In 1990, the bridge was moved, intact, to outside storage behind the Windsor (MA) Historical Museum. In 2004, disassembly of the bridge was begun as the first step to move the bridge to the University of Massachusetts-Amherst for reconstruction as a pedestrian bridge. The bridge has undergone a series of crude modifications over the years, but will be rebuilt to its original design. On each truss, there are two, 2¾-in. diameter, wrought-iron posts that are placed between the bottom side of the upper chord and the top of the beams that appear to be original and were probably placed to add strength to the bridge, given the span.

The **Windsor Bush Road Bridge** is a 31-ft.-long, pony-truss bridge of the Queen Post design, and is very similar to the Holiday Road Bridge. Unlike the Holiday Road Bridge, this bridge does not have the vertical posts running between the upper chord and the beams. The upper chords are composed of 5¾-in. diameter, wrought-iron pipe. The lower chords are 1¼-in. diameter, wrought-iron rods. Windsor Bush Road is now abandoned and a protected beaver dam downstream has raised the water level to about 3 in. below the wood deck, raising the possibility that the bridge will soon be submerged and inaccessible. There is currently no plan to preserve it.

The **Cummington Bridge** is a 29-ft.-long, pony-truss bridge of the King Post design. The upper chords are 7-in. diameter, wrought-iron pipe. The bridge has a single floorbeam held in place by a wrought-iron hanger extending over the upper chord. The lower chords are 1¼-in. diameter, wrought-iron rods. The bridge was refurbished a few years ago and is currently a pedestrian bridge behind the Berkshire Trail Elementary School in Cummington, MA.

The Ball pipe-truss bridges represent one man's approach to late-19th-century bridge design. Clearly, the span length was limited, not only in engineering, but in fabrication ability and construction. However, the bridges did fill a need in the local market for inexpensive short-span bridges that could be easily fabricated and quickly constructed. As such, they represent a fascinating era in bridge technology, and it is important to take steps to preserve this engineering heritage. Info: Alan J. Lutenegger, Dept. of Civil & Environmental Engineering, Univ. of Massachusetts, Amherst, MA 01003; *lutenegg@ecs.umass.edu.*

Alan J. Lutenegger

Holiday Road (Dalton) Ball Pipe-Truss Bridge in storage at the Windsor (MA) Historical Museum. The bridge is being disassembled, rehabilitated, and re-erected as a pedestrian bridge at the University of MA—Amherst.

The Cummington (MA) Ball Pipe-Truss Bridge has been rehabilitated and preserved as a pedestrian bridge on a trail behind the local elementary school.