NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

United States Department of the Interior
National Park Service

FEB

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name **Bell Ford Post Patented Diagonal "Combination Bridge"**

other names/site number Bell Ford Covered Bridge 071-581-30009

2. Location

street & number SR 258 1.5 miles West junction SR 258 and Community Drive N/A ☐ not for publication

city or town Seymour ☒ vicinity

state Indiana code IN county Jackson code 071 zip code 47274

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☒ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36CFR Part 60. In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☒ nationally ☐ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

J. C. Sh 2.3.05

Signature of certifying official/Title Date

Indiana Department of Natural Resources

State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

☑ entered in the National Register. ☐ See continuation sheet.

Signature of the Keeper: Patrick Andrus

Date of Action: 3/25/2005

☐ determined eligible for the National Register ☐ See continuation sheet.

☐ determined not eligible for the National Register

☐ removed from the National Register

☐ other, (explain:)

5. Classification

Ownership of Property
(Check as many boxes as apply)

- ☐ private
- ☒ public-local
- ☐ public-State
- ☐ public-Federal

Category of Property
(Check only one box)

- ☐ building
- ☐ district
- ☐ site
- ☒ structure
- ☐ object
- ☐ landscape

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
0	0	buildings
0	0	sites
1	0	structures
0	0	objects
1	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Functions
(Enter categories from instructions)

TRANSPORTATION: Road-Related

Current Functions
(Enter categories from instructions)

WORK IN PROGRESS

7. Description

Architectural Classification
(Enter categories from instructions)

OTHER: Combination Truss

Materials
(Enter categories from instructions)

foundation: STONE: Limestone
walls: WOOD: Weatherboard
roof: WOOD: Shake
other: METAL: iron
WOOD: Log

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [x] **A** Property is associated with events that have made a significant contriibution to the broad patterns of our history.
- [ ] **B** Property is associated with the lives of persons significant in our past.
- [x] **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [ ] **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)
Property is:

- [ ] **A** owned by a religious institution or used for religious purposes.
- [ ] **B** removed from its original location.
- [ ] **C** a birthplace or grave.
- [ ] **D** a cemetery.
- [ ] **E** a reconstructed building, object, or structure.
- [ ] **F** a commemorative property.
- [ ] **G** less than 50 years of age or achieved significance within the past 50 years.

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

Areas of Significance
(Enter categories from instructions)
ENGINEERING
TRANSPORTATION

Period of Significance
1868

Significant Dates
c.1885

Significant Person
(Complete if Criterion B is marked above)
N/A

Cultural Affiliation
N/A

Architect/Builder
Blish, John (engineer)
Pattison, Robert (builder)
Hull, W. H. (designer)

9. Major Bibliographic References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- [ ] preliminary determination of individual listing (36 CFR 67) has been requested
- [ ] previously listed in the National Register
- [ ] previously determined eligible by the National Register
- [ ] designated a National Historic Landmark
- [ ] recorded by Historic American Buildings Survey #
- [x] recorded by Historic American Engineering Record # IN-46

Primary location of additional data:

- [ ] State Historic Preservation Office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [x] Other

Name of repository:
Jackson County Parks and Recreation Department

Bell Ford Post Patented Diagonal
Name of Property

Jackson IN
County and State

10. Geographical Data

Acreage of Property Less than 1 acre

UTM References (Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	16	431416	4912750
2			
3			
4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Barker Engineering; Fleeta K. Arthur, Angie R. Krieger and Dr. Loren Noblitt

organization Jackson County Park and Recreation Board date 05-01-00

street & number 6594 West State Road 58 telephone 812-497-2424

city or town Brownstown state IN zip code 47220

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white** photographs of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of SHPO or FPO.)

name Jackson County Commissioners

street & number Brownstown Courthouse telephone 812/ 358-6121

city or town Brownstown state IN zip code 47220

Bell Ford Post Patented Diagonal "Combination Bridge", Jackson County, Indiana

Narrative Description

The Bell Ford Covered Bridge is located over the East Fork of the White River in rural Jackson County, about 20 feet above ordinary water level. This highway bridge connected Hamilton Township to Jackson Township on the Seymour and Cortland road, which eventually became State Road 258. The bridge is located in an agricultural area with few parcels less than .8 acre. It includes one abutment and two piers. There are two 160'0 spans (c-c of bearings). The West span blew down in 1999 during a freak windstorm. Most of the west span components have been saved. The East span remains in place. There are no nearby buildings. Upriver, within sight are piers from an abandoned railroad bridge. Down river 125 feet from Bell Ford is an 1969 concrete and steel bridge structure, which now carries SR 258. There is a DNR boat ramp to White River between the bridges with drainage and erosion control measures.

The Bell Ford Bridge is a parallel-chord, nineteenth century, two lane, two span through truss. The bridge's superstructure consists of wood, wrought iron eyebars and rods, and cast iron joint blocks. The wooden components consist of an oak deck, white pine upper chords and white pine kingposts. White pine, probably from New York, was utilized because of scientific theory, ease of construction and availability. The substructure consists of locally quarried limestone for two piers and one abutment placed upon oak grillage sunk in the riverbed, and surrounded with stone rip rap.

This bridge is a covered Post Patented Diagonal "Combination" Bridge with shake roof and yellow popular siding. The siding does not protect the lower chord members. There is a 2-foot gap between the siding and roof that allows light to filter into the bridge. At the center pier an opening thru siding exists on the North side to allow access to the center pier from the bridge. The Post truss is characterized as comprising wrought iron tension diagonals and non-vertical compression struts inclined towards midspan. In this "combination" truss all compression members are made from timber and all tension members are made from wrought iron.

The wooden struts of Bell Ford have an angle of about 19 degrees from vertical. The bridge length was 325 feet. Each span consists of fifteen 10-foot panels plus a half-length panel at each end for total span length of 160 feet from bearing to bearing. The oak deck width is 16 feet 2 inches wide, and 325 feet long. Vertical clearance is 13 feet. Construction depth will be 431 feet when rehabilitated including roadway approach.

A major alteration to this bridge is the gabled, shingled wooden roof and siding. When first built the top chords were individually covered with open sides. This is indicated by the original 1868 contract that state's "the top chords to be covered", and by a newspaper account eight years later noting two bridges in Jackson County, one being "the Bell Ford Bridge was not covered." [1] However, the top chords extended 18 inches past the end post at each corner of the bridge. When "enclosed" c. 1885, the roof was extended to the end of the top chords, while the siding stopped at the portal posts.

[1] Seymour Weekly Times, "Cover the Bridges", July 8, 1876, Col. 3, p. 1.

Narrative Description

The east pier of the Bell Ford Bridge is lacking the cutwater present on the center pier. Pier damage was reported in newspaper accounts in 1893 and 1913 but the exact damage and repair in both cases was not recorded. The original contract specifications indicated both piers were identical.

The bridge was constructed in 1868. It was one of the first Post Patented "Combination" bridges built after the issuance of two bridge patents to Andrew J. Post. The September 1, 1868, patent no. 81, 817. (Exhibit B) improvement in wooden bridges by Andrew J. Post is almost identical to the Bell Ford Post Diagonal "combination" design. This patented design is patterned after the 1863 iron bridge patent of Andrew's father, Simeon S. Post (Exhibit A) Andrew's patent specifies the wooden kingpost be rounded at the lower chord ends alleviating compression destruction of the wooden "vertical" timbers. This patent element is absent in the Bell Ford Bridge. Bell Ford has double portal members connected by H. M. Claflen's 1865 (Exhibit E) patent for improved mode of splicing timbers at the portals of each span. The top chord, panel posts, and lower chord arrangement of Bell Ford is identical to the original patented design of Andrew J. Post. (Exhibit B) The inclined kingposts were not present in the 1863 patent but the cast iron joint block and lower chord design arrangement appear identical to Bell Ford.

Bell Ford uses wrought iron eyebars for the lower chords, similar to an all-metal, pin connected truss. But in the one and a half panels at each end, Bell Ford possesses unique lower chords consisting of wrought iron straps on each side of a cast iron compression joint block. The abutment end is pinned to the portal struts. Each lower chord consists of four wrought iron eyebars in each panel, except near the ends of each span, where two eyebars per panel suffice.

Numerous replacement floors have been recorded. Reported bridge closings in 1895 and 1897 were due to structural approach repairs. Pictures indicate that some wooden "verticals" were reinforced during the Indiana Highway Commission's stewardship. It was closed due to structural bridge damage September 8, 1967 and reopened November 1967 when two (2) sixteen inch wooden floor beams were replaced in junction with wooden wedges for structural support. It remained open from November 15, 1967 until it was bypassed in 1969. Mr. Robert Harrell, a former Seymour district IHC supervisor indicated no major alterations had been made to the bridge structure during Indiana Highway Commission's possession. The bridge was replaced due to its narrowness for modern traffic and the 3-ton load limit.

Repairs to siding and roof in the 1980's by Jackson County Park and Recreation Board and application of turnbuckles in 1998 helped preserve the remaining span. The park board has maintained the bridge as a historic transportation structure for pedestrian traffic since its return to the county. After the windstorm, the collapsed span was salvaged and iron repair of this span is presently nearing completion under the National Historic Covered Bridge Grant. Wood repair, partial replacement, and replacement of wooden members will follow when rehabilitation construction occurs. The standing span has a bow in the lower chord, which has to be repaired. Wooden "verticals' will be inspected for structural damage from age and repaired. Structural repair will include more lateral bracing, roof replacement, and replacement of hanger bolts and replacement of lower chord lateral bracing. Reconstruction of roadway approaches for vehicular traffic is planned.

Narrative Description

Ninety percent of the remaining timber will remain, except for lower end repair on the East span. All tension rods will be used and approximately 90% of the iron tension eyebars will be used. Floorbeams, stringers, & deck boards will be replaced. All of the cast iron connection joint blocks will be reused. Twenty-five percent of the original timbers will be repaired and reused on the West span. Ninety-five percent of the tension rods are repaired and will be reused. A portion of the eyebars will be used which meets the test load requirement. All of the cast iron joint blocks will be reused. All floorbeams, stringers, and deck boards will be replaced. Additional documentation will be submitted upon completion of the restoration of the collapsed East span of the Bell Ford Bridge.

The Park board will rehabilitate the bridge when we meet our required TE match to preserve the "combination" bridge as a historic structure and more importantly restore the bridge for light vehicular traffic. Future plans include a recreational site consisting of a grass/stone amphitheater, landscaping, and primitive restroom facilities for all recreational visitors. We will be seeking financial assistance from Indiana Department of Natural Resources for this site.

Statement of Significance

The Bell Ford Bridge Post Patented Diagonal "combination" bridge is being nominated to National Register of Historic Places under criterion C. Nationally significant, this bridge is the best representation of the American engineering "combination" bridge form as all tension members are metal while all compression members are wood. This bridge is the only remaining "combination" Post truss, and one of four Post trusses of any type of construction in the United States. Historically important, Bell Ford was the first fixed transportation structure that provided access across the East Fork of White River in Jackson County. It connected Hamilton Township and Jackson Township in the county. The bridge was officially opened January I869 according to original company records, Commissioners' Record and newspaper accounts. Animal and vehicular transportation continued for about a century through this long span through truss bridge until I970. It has continued as a historical structure with pedestrian access until I999. The bridge is currently closed due to unsafe conditions. However, the one standing span of the bridge still represents a rare, transitional form of bridge building. The West collapsed span will retain its structural characteristics when rehabilitated.

Early settlement of Jackson County, established by territorial legislature in I8I5, was between the forks of White River and the Muscatatack River. To export agricultural products from Hamilton Township, a bridge to Seymour was necessary. The opening of the Ohio and Mississippi Railroad at the newly created village of Seymour, in I854; intersected with the Jeffersonville and Indianapolis Railroad created both a North and South transportation route, and an East and West transportation route. There are twelve bridges, which cross White River in Jackson County today, illustrating the division, which this river created in the development of the county. By I887, six of eight long span county bridges bordered Hamilton Township, illustrating the importance of this agricultural area to the development of the county. A good road is a necessity for any agricultural society.

An old farmer recalled, "farmers west of White River had to feed their produce into stock principally hogs because they could

Statement of Significance

not afford to "wagon it to market". We then had to cross the river on ferryboats when not fordable, and the condition of the roads seldom admitted more than fifteen to twenty-five bushels of corn or wheat for a two-horse load. The ferry fees would cost forty cents for the round trip." [2] The bridge toll like the ferry fees depended upon the traveler's mode of transportation and was established by the county commissioners each year.

Bell Ford is significant in the context of mid-nineteenth economic growth in Seymour, Indiana. Seymour was platted in I852, late in the history of Jackson County. The town's development is directly linked to the construction of the Ohio & Mississippi Railroad. The prosperity of the city developed around the O & M machine shop, the mill, and the O & M railroad; which junctioned with the J, & I (J, M, I) railroad at Seymour. The O & M rail line was projected and located to link with all mill sites along the route to export agricultural products from the White River Valley and Wabash River Valley in Indiana. Heretofore, agricultural products had been left to waste due to an inadequate transportation infrastructure to available markets.

The Bell Ford Bridge derives its name from an early Hamilton Township settler and one of the first resident ministers in Hamilton Township who resided near a slate bottom ford half-mile (1/2) downstream from the Bell Ford Bridge. Early settlers crossed at this river ford by swimming, riding and finally by "ferryboat in I858" upon Meedy W. Shield's property on the east bank and Samuel Fearn's property on the west bank." [3]on White River. The Seymour Bridge Company was authorized by commissioners to construct the White River Bridge July 7, I868. The Bell Ford Bridge "contract was signed July 23, I868 by the company and Robert Pattison for a Post's Patent Diagonal Combination Bridge."[4]

Statewide, Bell Ford is one of ninety-one (91) remaining Indiana covered bridges. It was "enclosed" c. 1885 by the Seymour, Cortland and Freetown toll road company that provided maintenance for the bridge until I896 when it was returned to the county. Bell Ford became a transportation structure for the Indiana Highway Commission from "October, I934" [5]as part of SR. 258 until it was returned to Jackson County Commissioners' in I970. It was one of three; documented Indiana highway "Post" bridge structures manufactured by McNairy, Claflen & Co. of Cleveland, Ohio for Indiana highways. It is the one of two identified Post "combination" structure built in Indiana. Furthermore, it is one of ten documented "Post" trusses manufactured by the above company for Indiana railroads and highways. (Exhibit D) Due to pictorial information and preliminary research the Indiana railroad structures were primarily iron; although one "combination" structure existed at Aurora for the Ohio and Mississippi Railroad. Three of the O & M railroad structures were presumably built under the supervision of the Bell Ford contractor, Robert Pattison, O & M road master/contractor between I868-I871.

It is the "only extant Post patented diagonal "combination" bridge in the United States representing the nineteenth century transitional engineering period between I840-I896. Today, there are only three iron extant Post trusses in the United States:"

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[2] Seymour Daily Democrat, "Then and Now", September 14, I886, Col. 3, p. 3.
[3] Jackson County Commissioners' Records, May 22, I858, p. 34 and June 10, I858, p. 140.
[4] Original contract of Seymour Bridge Company dated July 23, I868.
[5] Brownstown Banner, "Another County Road in State Highway System", October 31, 1934, Col. 2, p. 1.

Statement of Significance

the Atherton (I870, Massachusetts), the Ponakin (I871 Lancaster vicinity Massachusetts), and the Falling Rock (I872 Licking County, Ohio)." [6] Richard Sanders Allen has identified several highway Post trusses constructed after Bell Ford. One "iron highway structure was built in I867-I868 at Wheeling, West Virginia by the McNairy, Claflen & Co." [7] Many "Post" trusses were built upon the Erie railroad and some for the following identified railroad lines: Harlem Railroad, New York Central, Chicago & Alton, Chicago & Northwestern, "Lake Shore and Michigan, and Southern Railroad," [8] Ohio and Mississippi Railroad, Indianapolis and St. Louis Railroad, Mobile and Montgomery Railroad, Kansas, Atchison, and Santa Fe Railroad and the Union Pacific Railroad. The latter two rail lines recorded the longest iron Post Patent bridges constructed in the United States and presumably all rail structures are extinct in the United States, although there may be existing structures in Latin America and South America.

The Post" combination" bridge was built as through trusses, open deck, and trestle. Highway structures included the pony truss as exemplified by the Licking County, Ohio Bridge. One of the more interesting "combination" Post truss designs was the "1873 Baring Cross Post Truss bridge built across the Arkansas River" [9] connecting Little Rock and Argenta, Arkansas. This was a deck wagon and through truss railroad bridge with a pivot span. The deck wagon roadway passed atop the top chords of the railroad bridge. The longest identified highway Post "combination" truss was over the "Connecticut River at Holyoke, Massachusetts spanning the river for I600 feet." [10] Reportedly, the Post "combination" truss was constructed "out West" more frequently than in the East in the I870"s. Other identified "combination" Post designs were built at "Devil's Gate and Bear River both for the Union Pacific Railroad,"[11] "New York & Midland Railroad I870-I872," [12] "Central Pacific Railroad over Long Ravine in California," [13] "Mobile bridge in Alabama for Mobile and Montgomery Railroad" [14] "Clear Creek Canyon for Colorado Pacific Railroad," [15] and a highway design at "Cohoes, New York over Mohawk River (I872)." [16]

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[6] Letter from Eric Delony to Carter Keith 1995.

[7] Letter of Cleveland Bridge and Car Works dated February 1, I868 from Richard Howe Papers, OHS, Box 4, folder 4. Courtesy of David A. Simmons.

[8] Berg, Walter G. Ed. American Railway Bridges & Buildings. Official reports: Association Railroad Superintendents, Bridges and Buildings. 1898, p. 188.

[9] Allen, Richard S. "Simeon S. Post's Patent Truss Bridges", The North Jersey Highlander, Ringwood: North Jersey Highlands Historical Society, 1995, p. 21.

[10] The Paterson Daily Press, "The iron Bridge Business," November 29, I870, Col. 3, p. 3. HAER No. MA-18, 1986, pp. 9-10. Courtesy of Lola Bennett, NPS, HAER documenter for Bell Ford Bridge verified that the Holyoke, Mass. Bridge was constructed.

[11] Business papers of L. B. Boomer dated March I869, Levi O. Leonard papers. Box 5. Courtesy of University of Iowa Libraries Special Collections of Iowa City, Iowa. Further investigations into these papers regarding the Omaha Post truss bridge are available. Other investigations into the UP division records should identify other Post trusses.

[12] Post, Andrew J., "Criticism upon Bridge Designs," American Railway Times, June 1, I872, p. 170.

[13] Savage Photo-Central Pacific Railway-California-Long Ravine, No date.

[14] The American Railway Times, from the "Mobile Register" entitled "The Mobile and Montgomery Bridges", March I6, I872, p. 81.

[15] Miller, Terry "Bell's Ford and the Post Truss," Indiana Covered Bridge Society, Covered Bridge Topics I968 Photo by George Ball, 1870. Courtesy Colorado Highway Department.

[15] Masten, Arthur H. The History of Cohoes, New York from its earliest settlement to the present. P. 211.

Statement of Significance

Simeon S. Post began his career with Vermont's leading civil engineer, John Johnson; soon associating with Johnson's son Edwin Ferry Johnson in the construction of the Auburn & Syracuse Railroad. Subsequently, both were employed with the New York & Erie Railroad. The development of the Post truss evolved from the practical experience, which Post received through this relationship as chief engineer of transportation probably traceable to the Rider iron bridge disaster. He left the NY & E for the O & M and served as the chief engineer and superintendent actually operating the "first excursion train to Seymour June 29, 1854." [17]

He returned east about February 1856 and engaged in railroad construction projects associated with the Erie Railroad until 1859. In 1859, Simeon and his sons, Andrew J. Post and Levi W. Post established a civil engineering firm specializing in iron bridge building at Jersey City, New Jersey concentrating on iron bridge building. Andrew J. Post was trained as a machinist but apprenticed with his father adopting a civil engineering career. He continued with his father until Simeon's death. Andrew continued bridge engineering with the Watson Manufacturing Company of Paterson, New Jersey from 1873-1877. He embarked upon structural engineering for fireproof buildings establishing the firm of Post and McCord of Greenpoint, New York until his death in 1897. He also continued licensing the Post truss in association with Grant Wilkins of the Atlanta Bridge Works of Atlanta, Georgia through the 1880's.

Simeon S. Post patented his iron bridge in 1863. This design was for cast iron joint boxes for iron bridges. Reportedly, the first iron bridge was built upon the Newburgh branch of the New York and Erie Railroad at South Washingtonville, New York in 1865. According to Theodore Cooper, an Erie superintendent in late nineteenth century, this bridge had upright "verticals".

At the conclusion of the Civil War, the Posts', Simeon and Andrew J., Simeon's son established the Atlantic Bridge Works firm in 1866 in New York City with D. C. McCallum, Andra Anderson (McCallum's aide-de-camp). William S. Smith was a western agent at L. B. Boomer's Chicago, Illinois bridge building company. This firm had advertised both an iron and combination Post bridge design promoting both L. B. Boomer and McNairy, Claflen & Co. as licensees of the Post truss. Subsequently, L. B. Boomer did complete the first iron Post patented diagonal bridge "out West" over the Kankakee River at Wilmington, Illinois for the Chicago and Alton Railroad." [18] "McNairy, Claflen & Co. of Cleveland, Ohio provided the components for this bridge to L. B. Boomer." [19] McNairy, Claflen & Co. were successors of Thatcher-Burt bridge company-a successful Ohio bridge building firm of Howe trusses (1851) for highways and railways which they continued to build.

On February, 1868, McNairy, Claflen and Co. issued an advertising letter promoting an "Improved" Post truss. On May 1868, the American Railway Times reported that " S. S. Post's "Improved" combination bridge was tested somewhere around Chicago, Illinois which gave satisfaction." [20] Afterward, on September 1, 1868 Patent No. 81,817 Andrew J. Post was issued a patent for an improvement to wooden bridges. This patent is a configuration of Simeon's earlier lower iron chord and a

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[17] Vincennes Gazette, August 5, 1854, via Cincinnati Daily Gazette, July 30, 1854 "Excursion on the Ohio and Mississippi Railroad to Seymour", p. unknown.
[18] The American Railway Times, "Iron Bridge over the Kankakee River", January 18, 1868. p. 23.
[19] Letter of Cleveland Bridge and Car Works dated February 1, 1868 from Richard Howe Papers, OHS Box 4, folder 4. Courtesy of David A. Simmons.
[20] The American Railway Times, "Post's Combination Bridge," May 16, 1868, p. 158.

Statement of Significance

wooden upper chord clearly a "combination" bridge design. (Exhibit B)

This patented bridge truss illustrates "the innovations of early Americans, never formally trained as engineers yet contributed to American engineering advancements..." [21] Prior to 1845, "wooden and iron bridges were built in the same manner as the ancient Roman bridges, in accordance with empirical rules, by practical men who had to depend upon their own resources and natural instincts, experimenting with (different) models and profiting by previous failures. Practice always preceded the science..." [22] "Simeon S. Post's patented design incorporated the modular arrangements of iron rods and struts. Like other (successful) patents, this was an improvement of art. Post's arrangements of the components allowed for expansion and contraction of iron so that traffic and temperature changes would not produce injurious effects upon the structure, and in this manner obliterate such bridges." [23]

Bell Ford is representative of a later, more scientific era of bridge design. It illustrates the application of nineteenth century scientific engineering theory to bridge design. Referring to a collapsed Post "combination" bridge upon the New Jersey and Midland Railroad, Andrew J. Post, the patentee states "white pine was used in dimensions of Squire Whipple." [24]

Bell Ford was one of four documented "combination" highway bridges built in Jackson County, but was the first long span built over White River and the only surviving "combination". J. J. Daniels built a wooden Howe truss at Ewing in 1869. The following year another iron "combination" bridge was built over White River at Rockford by D. H. & C. Morrison of Dayton, Ohio; another well-known nineteenth century Ohio bridge building firm. The fourth structure was built in 1883 in Salt Creek by Indianapolis Bridge Company. Bell Ford was the County Commissioners first authorized bridge project across White River. The Indiana General assembly restricted bridges on the river, beginning in 1819, until the railroads reached Indiana.

The transitional period of American bridge engineering began with the introduction of iron rods for upright members in the Howe truss and continued until the introduction of the steel bridge in the 1890's. According to Edwards the "combination" bridge was American technological advancement necessary bridge engineering. "Seven patents were issued by the U. S. Patent Office for "combination" bridges." [25] Bell Ford represents this transitional period as the best extant "combination" example of the nineteenth century. Due to its rare patented design and the best representation of the "combination" form Bell Ford is nationally significant. Bell Ford is an extant transitional model of nineteenth century American civil engineers who contributed to America's transportation system utilizing the most economical creation they could devise for the period. Technological advances drove patent bridge designers.

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[21] Petroski, Henry, Engineers of Dreams-Great Bridge Builders and the Spanning of America, New York: Alfred A. Knopf, 1995, pp. 22-65.

[22] Cooper, Theodore, "American Railroad Bridges," American Wooden Bridges, New York: ASCE Publication, 1980, p. 5.

[23] Petroski, Henry, Engineers of Dreams-Great Bridge Builders and the Spanning of America, New York: Alfred A. Knopf, 1995, pp. 22-65.

[24] Post, Andrew J. "Criticism Upon Bridge Designs," American Railway Times, New York: Haven, June 1, 1872, p. 170.

[25] Edwards, Llewellyn, "The Evolution of Early American Bridges," American Wooden Bridges, New York: American Society of Civil Engineers, 1876, p. 137.

United States Department of Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section 8 Page 8

Bell Ford Post Patented Diagonal "Combination" Bridge, Jackson County, Indiana

Statement of Significance

Economics, heavier locomotives, and the necessity for crossing wider rivers encouraged patented bridge designs. The patented Post Diagonal truss bridge was designed as a railroad structure, addressing lateral movement problems associated with rail transportation. Railroad construction brought knowledgeable early American civil engineers and craftsmen along with a better transportation system, which increased the wealth of the White River Valley. Both John H. Blish and Robert Pattison were such representatives. John H. Blish had relocated from civil engineering on Vermont's Rutland and Burlington railroad locating the Jeffersonville and Indianapolis Railroad. Blish returned to the career stability of a third generation miller, becoming a leading Indiana miller in addition to his railroad pursuits. He served as civil engineer for and president of the Seymour Bridge Company, which built Bell Ford in association with the Jackson County Commissioners.

Robert Pattison was a first generation Irish immigrant carpenter who probably began with the O & M. He became a railroad contractor for the Louisville and Nashville Railroad from Fink's Green River Bridge to Gallatin, Tennessee, returning to the O & M at the beginning of the Civil War as an Ohio and Mississippi road master headquartered at Seymour, Indiana. The roadmaster was responsible for all permanent structures, including bridges for the railroad until I869. He returned to railroad contracting in I869 and remained in private business until his death.

The third figure in the construction of Bell Ford was W. L. Hull. He provided the design specifications for the Post truss over White River. "McNairy, Claflen & Co. provided the superstructure." [26] Hull had built a "magnificent all iron railroad bridge at Rockford, Indiana for the Jeffersonville and Indianapolis Railroad in I864." [27] He did independent bridge contracting for local governmental units in addition to his railroad employment as bridge superintendent as did most other bridge builders. Further information is sketchy on this individual although he continued bridge construction with various rail lines across the country until after the I880's.

While the last known "Post bridge was built at Pine Brook, New Jersey in I905," [28] Bell Ford is the only Post Diagonal "combination" survivor of the nineteenth century patented by Andrew J. Post. In this context, Bell Ford is an extant engineering model of the nineteenth century American civil engineer driven by technological advances, which developed as a result of railroad construction. The selection of the Post "combination" truss for the Bell Ford Bridge was a community's response to community progressiveness, necessity, and economic frugality.

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[26] Seymour Democrat, December 30, I868. p. unknown.

[27] Seymour Times, October 27, I864.

[28] Allen, Richard S., "Simeon S. Post's Patent Truss Bridges", The New Jersey Highlander. Ringwood, New Jersey Historical Society, 1995, p. 21. Courtesy of North Jersey Highlands Historical Society. Personal Correspondence between Mr. Allen and Fleeta K. Arthur 2003.

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Cleveland Daily Leader (Ohio) 1866-1867
Cleveland Herald (Ohio) 1866
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Vincennes Gazette (IN) 1854, 1857, 1869-1870 courtesy of Indiana State Library

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Verbal Boundary Description

An area of Hamilton Township and Jackson Township, Jackson County, Indiana centered on the above UTM point including the right of way of Bell Ford Covered Bridge, its superstructure, west abutment and wingwall; and east and west piers in White River. On West bank of White River, in a rectangle of ten feet (10) feet behind the wingwall and abutment: also include 30 feet of right-of-way. Include one hundred eleven feet of approaching right-of-way from the Bell Ford Bridge to the East side of White River.

Boundary Justification

The boundary will include the existing Post Diagonal "Combination" span and piers, the site of the restored collapsed span with the historic stone abutment and center pier, and the reestablishment of eastern and western roadway approaches to the Bell Ford Bridge.

Bell Ford "Combination" Bridge Jackson County, Indiana

UNITED STATES PATENT OFFICE.

SIMEON S. POST, OF JERSEY CITY, NEW JERSEY.

IMPROVEMENT IN IRON BRIDGES.

Specification forming part of Letters Patent No. 38,910, dated June 16, 1863.

To all whom it may concern:

Be it known that I, S. S. POST, of Jersey City, county of Hudson, State of New Jersey, have invented a new and Improved Method of Constructing Iron Bridges; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon.

The nature of my invention consists in constructing an iron bridge in such a manner as that the expansion and contraction of the material will not produce injurious effects upon the structure, and in this manner obviating one of the most serious objections to the universal use of such bridges.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction more minutely.

Figure 1 shows a side elevation of two panels of one end of a truss or girder. Fig. 2 shows a plan of the chord and its attachments. Fig. 3 shows an end view of a post with the attachment of the chord and top plate. Fig. 4 shows a side view of a post. Fig. 5 shows a plan of the upper plate or chord used by me.

I fasten the pedestal A by means of suitable bolts to the masonry or proper abutment, which pedestal is made to receive the end post of the bridge, which post is rounded at the bottom, as shown at B, and held in the pedestal (which has a lip, *d*) by the bolt *g*, passing through both, the pedestal and the slot *e* in the chord F, to which chord I attach the brace *g'*, which is fastened with the strut or post H to the top chord or plate, J, by means of a bolt, *k*, passing through the joint box L, as shown in Fig. 3, *k*. The joint-box is used for the purpose of connecting the sections of the top chord or plate in such a manner that by passing the bolt *k* through the struts and braces will allow both to revolve upon said bolt to an extent corresponding to the degree of the expansion or contraction. The joint-box may be placed upon the struts, and the braces *g'* and *h'* may be introduced, as shown in Fig. 3, at l, and the bolt *k* passed through, as shown in Fig. 1 at P, after which the sections of the plate or upper chord may be attached to the box by bolts *m m*.

Having thus described my invention, what I claim, and for which I desire to secure Letters Patent, is—

1. The joint-box connecting segments of the top chord or plate, and also receiving the heads of the posts or struts and braces, with the base pin *k* passing through the whole.

2. A cylindrical joint in the construction of a bridge, as shown at B, irrespective of its location, when used for the purpose of obviating the dangers of expansion and contraction.

3. The slotted chord, when used in connection with the cylindrical joint and for the same purposes.

4. The construction of the chord, when used in combination with the cylindrical joint, substantially as described and shown.

S. S. POST.

Witnesses:
ANDREW J. POST,
O. A. STEVENS.

S. S. Post.
Iron Bridge.
No. 38,910. Patented June 16, 1863.

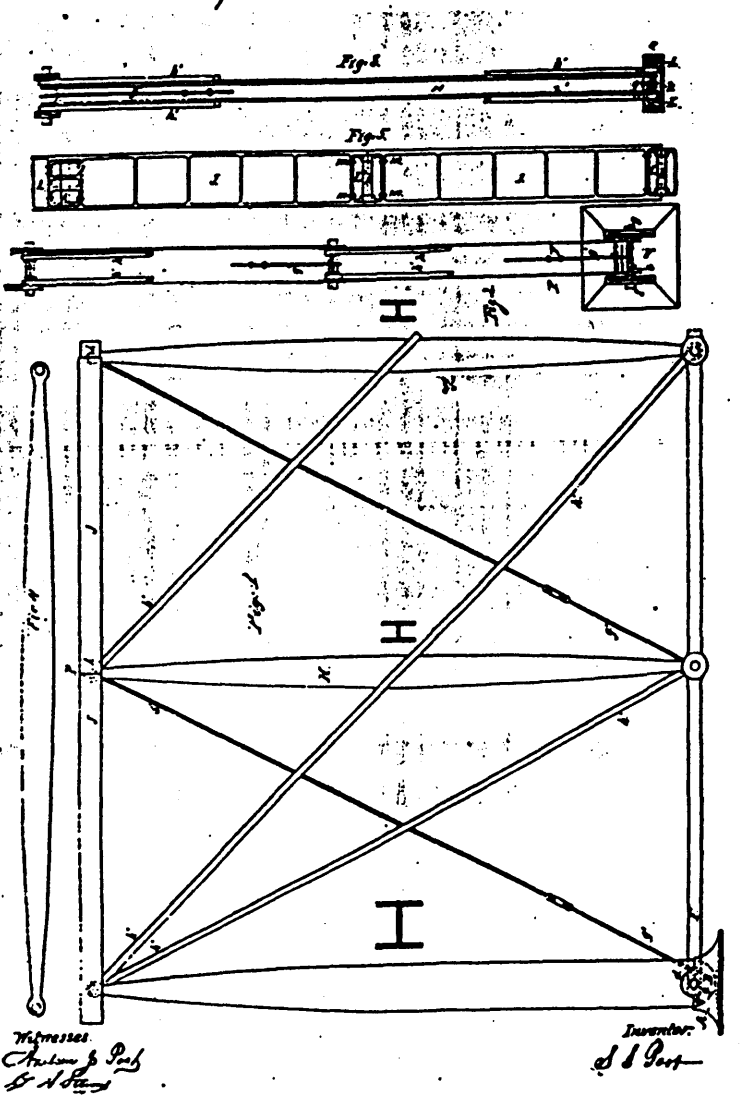


Exhibit A

Bell Ford Post Diagonal "Combination" Bridge

Jackson Co. Indiana

UNITED STATES PATENT OFFICE.

ANDREW J. POST, OF HUDSON CITY, NEW JERSEY.

IMPROVEMENT IN BRIDGES.

Specification forming part of Letters Patent No. 81,817, dated September 1, 1868.

To all whom it may concern:

Be it known that I, ANDREW J. POST, of the city of Hudson, county of Hudson and State of New Jersey, have invented certain new and useful Improvements in the Construction of Bridges; and I do hereby declare that the following is a full and exact description thereof.

My invention is an improvement in wooden bridges. It applies to the varieties of what are known as truss-bridges. Its object is to fortify the wood against crushing strains at the ends of the several pieces, and to form suitable places for the reception of the several strains.

I will first describe what I consider the best means of carrying out my invention, and will afterward designate the points which I believe to be new.

The accompanying drawings form a part of the specification.

Figure 1 is a plan view of part of a bridge. Fig. 2 is a side elevation thereof, partly in section. Fig. 3 is a horizontal section, or rather a top view, of the iron-work which is at and near the base of the bridge. Fig. 4 is a cross-section looking toward the end, and Fig. 5 is a cross-section looking toward the middle of the bridge.

The figures show one side or truss. Fig. 5 shows also a portion of the cross-timber or flooring. It will be understood that two or more of such trusses are laid parallel, and suitably connected across in any approved manner to complete a bridge; also, that the ends are supported upon abutments or piers in any approved style.

Similar letters of reference indicate like parts in all the figures.

A A are the chord-timbers, B B are the uprights, sometimes designated "struts;" C D, &c., are braces, and c d, &c., are nuts.

M is a casting, formed, as represented, with flanges m m. The strut B is received in a hollow in the lower part of the casting M, as indicated by strong lines in Figs. 2, 4, and 5. The braces C D, &c., are received in corresponding holes provided therefor, and fair bearings are provided for the nuts c d on the upper surface. The ends of the timbers A A are cut to match the flanges m m, and bear against the sides of the casting M and also against the edges of the flanges m. In putting the parts together, the flanges m m support the weight of the timbers a a. At the base of the strut B is a hollow cast-iron shoe, formed as indicated by N. The base of the strut is received in the hollow interior of the shoe, as indicated by dotted lines. The several braces, ties, &c., are connected to the cross-bolt n, which traverses the base of the casting N, as represented.

In subjecting wood to strain, it is very important to preserve it from a crushing strain crosswise of the fibers, and to allow the fibers to bear fairly with their ends against the surface at right angles thereto. My invention not only provides for this very [illegible], but also provides, by the flanges m m, for supporting the timber of the upper chord, and [illegible] while the work is being applied together. My shoe N serves the same purpose, and provides a better fastening for the braces, tension-chords, &c., than is afforded by the ordinary arrangement.

It will be understood that my castings can be coated or otherwise protected in any approved manner against oxidation or other injury, and that the wood may be prepared to resist decay or to resist access of air and moisture by any of the ordinary means, either at the point of contact with the casting or throughout its whole extent.

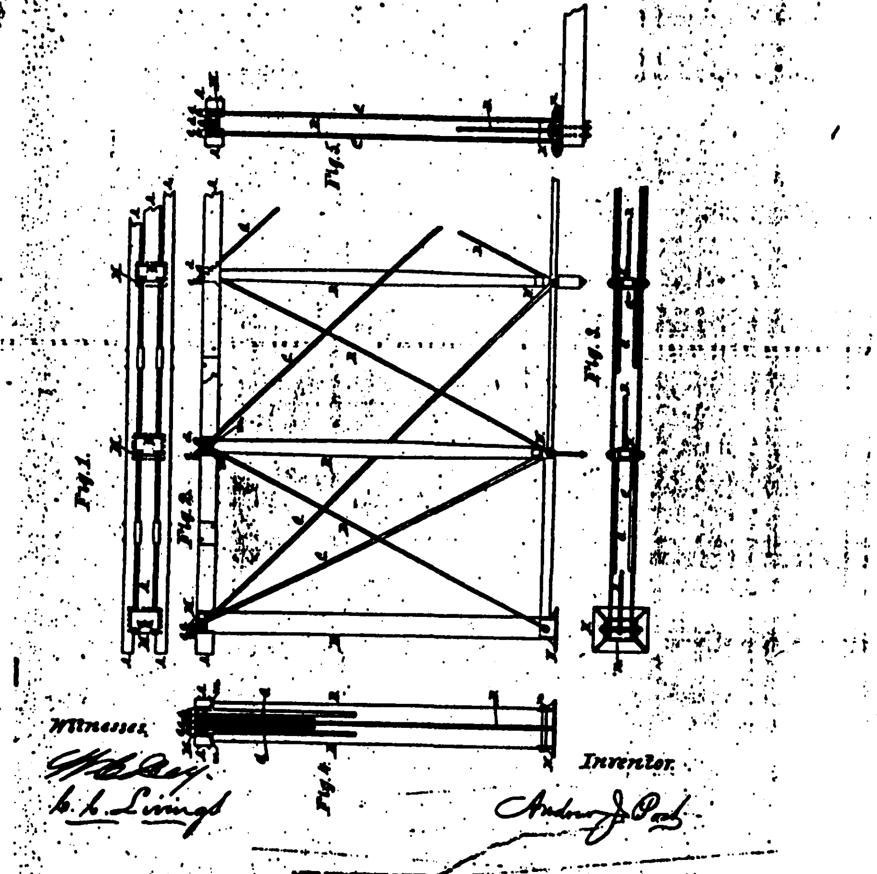
The hollow rounded saddle provided for the top of each strut A allows it to roll therein, in the act of [illegible], and [illegible] a fair bearing over the whole surface of the [illegible]. The flanges m support the weight of the chord-timbers while putting the parts together, and during all adjustments, without subtracting from the fair end bearing afforded for the chord-timbers. No part of any timber is crushed transversely. The several braces are accessible and adjustable with ease, and any brace or tie, as also any strut, chord-timber, or floor-timber, may be easily taken out and replaced or another substituted.

These important qualities are not combined, and cannot be to the same degree in any other construction known to me.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is as follows:

The castings M m, fitted in the top chord,

A. J. Post
Truss Bridge.
No. 81,817 Patented Sept. 1, 1868.



as specified, and extending up to the upper surface thereof, having inclined surfaces forming fair bearings for the nuts on the diagonal ties, and recesses at the base adapted to receive the round ends of the struts B, all constructed, combined, and arranged substantially as and for the purposes herein set forth.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

ANDREW J. POST.

Witnesses:

W. C. DEY,

C. C. LIVINGS.

Exhibit B

12

Ohio & Mississippi Railroad Company,

Lynn Station, Jan 12th 1869

R. Pattison Please pay J.B. Shields twenty five dollars to be Credited on freight bill of McNairy Claflin + Co

Jno Keaton Agt

Exhibit C

President.

Jno. Coon, Secretary.

H. T. Clafler, Superintendent.

Simeon Sheldon, Engineer.

Highway Bridge, Crawfordsville Road, Indianapolis, Indiana.

Highway Bridge, Kentucky Ave., Indianapolis, Ind.

Indianapolis & St. Louis R'y, over White River.

Vincennes Bridge, over Wabash River, O. & M. R'y.

O. & M. R'y. Jeffersonville Branch, over Big Creek.

O. & M. R'y, Jeffersonville Branch, over Muscatitack River.

Carlyle Bridge, over Kaskaskia River, O. & M. R'y.

Lawrenceville Bridge, over Embarras River, O. & M. Railway.

Sholes Bridge, over White River, O. & M. Railway.

Aurora Bridge, Aurora, Ind., O. & M. Railway.

O. & M. Railway Bridge, over Hogan River.

The Subject on this Card is Underlined.

THOS. T. SWEENY,

Landscape and Mechanical Photographer,

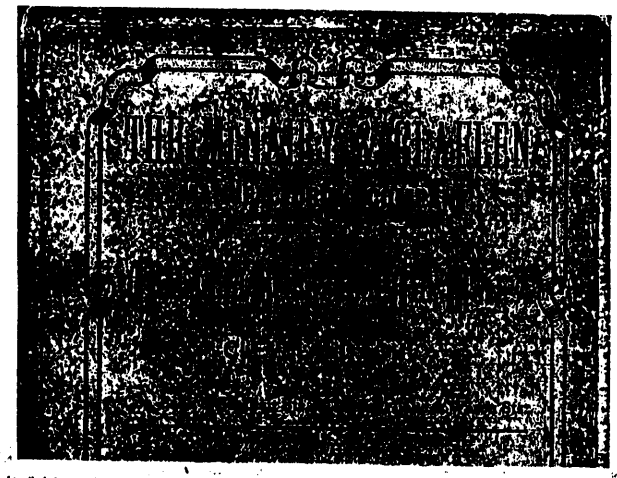
No. 300 Superior Street, Cleveland, O.

http://cgi.ebay.com/ws/eBayISAPI.dll?ViewItem&item=3233973325

Description

The Highway Bridge, Kentucky Ave.,Indianapolis, Ind. Indiana. (Thos. T. Sweeny Landscape and Mechanical Photographer)The McNiry & Claflen Manufacturing Company, Cleveland Bridge and Car Works, Cleveland, Ohio. On back of stereoview list of bridges (1) Highway Bridge, Crawfordsville Road, Indianapolis,Indiana (2) Highway Bridge, Kentucky Ave.Indianapolis,Ind. (3) Indianapolis & St.Louis R'y., over White River (4)Vincennes Bridge, over Wabash River,O.& M.R'y. (5)O.& M.R'y.,Jefersonville Branch over Big Creek. (6)O. & M. R'y., Jefersonville Branch, over Muscatitack River. (7)Carlyle Bridge, over Kaskaskia River, O. & M. R'y. (8)Lawrenceville Bridge, over Embarras River, O.& M. Railway. (9)Sholes Bridge, over White River, O.&M. Railway. (10)Aurora Bridge, Aurora, Ind.O.& M.Railroad. (11)O.& M.Railway Bridge, over Hogan River. Of interes also to Railways,railroads & railroad, Trains, cast and wrought iron bridges, advertising on back of stereo or stereos. Add $2.00 to ship. Condition very good with small mark center by edge on left image and scratchon left image and corner wear to mount.

On Wed Jul 16 20:12:54 PDT 2003, seller added the following information:



http://cgi.ebay.com/ws/eBayISAPI.dll?ViewItem&item=3233973325

Page 1 of 3

Bell Ford Post Diagonal "Combination" Bridge Jackson Co., Ind.

Exhibit D

UNITED STATES PATENT OFFICE.

H. M. CLAFLEN, OF CLEVELAND, OHIO.

IMPROVED MODE OF SPLICING TIMBERS.

Specification forming part of Letters Patent No. **47,395**, dated April 25, 1865.

To all whom it may concern:

Be it known that I, H. M. CLAFLEN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Splicing Timber for Bridges, Roofs, &c.; and I do hereby declare that the following is a full and complete description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of a section of a chord of a bridge. Fig. 2 is a longitudinal section. Figs. 3, 4, 5, and 6 are detached sections that will be referred to in the description.

Like letters of reference indicate like parts in the different views.

My improvement relates to the mode of joining or splicing timbers together, whereby the fiber of the wood is not injured or its strength impaired, making a safe and secure splice for any wood structure.

Fig. 1, representing a section of a chord of a bridge, shows the timbers as they are secured together with my improvement, the manner of which is clearly represented in the other figures, together with Fig. 1, and will be described as follows:

Fig. 2 is a section of timbers A and B of a chord. The timbers B are joined or spliced at B′. C is a link, formed at the ends into heads *a a*, represented detached from the timbers in Fig. 3. The link fits into a groove in the timber A and the heads fit into depressions in the timbers B, clasping round under one edge of the plates C′, which are secured on the timbers, as will be described. A perspective view of both sides of these plates is shown in Figs. 4 and 5. *b* represents a groove on one side in which the link C fits, and the sides or flanges *b′* of the plate extend up on both sides of the link, as shown and indicated by the dotted lines in Fig. 3. The plate can be solid or recessed out, as at *e*, and there can be openings *d* for the bolts to pass through. On the other side of the plate are knobs *c*, that fit into the timbers so that the face of the plate is flush with the surface of the timber, as shown in Fig. 2. The knobs are some distance apart, and may or may not be placed alternately with each other, so that the fiber or grain of the wood is not broken in any way to injure or weaken the structure, for, as the knobs may be so placed in relation to each other that there need be no two of them in a direct line, and the grain of the wood between the knobs across the timbers being entire, it is found by practical tests that the timber is not at all weakened by the use of these plates. Instead of these knobbed ribbed plates may be used, as represented in Figs. 1 and 6, H being the plate and *h′* the ribs projecting on each side; but the objection to this plate is that there has to be a groove entirely across the timber, which cuts the fiber off so as to materially weaken the structure, and, the strength of each timber being thus diminished, greatly impairs the strength of the chord.

When timbers are joined together, as at B′, the knobbed plates C′ fastened on the timbers, and the link C or its equivalent in place, there is a key, *g*, (seen in Figs. 2 and 3,) driven in at one end or head of the link on one side of the plate, which draws the timbers B still closer together and holds them more firm and securely in place.

In place of the link C one or more rods may be used and connected to the knobbed plates by screws, so arranged that by turning the rods the plates and timbers will be secured together.

G are bolt-heads, the bolts extending entirely through the section of timbers and plates, securing the structure together.

In some cases a knobbed plate may be used without the link by making the plate of sufficient length so as to lap over or extend across the joint of the timbers.

What I claim as my improvement, and desire to secure by Letters Patent, is—

1. The knobbed plates C′, as and for the purpose set forth.

2. The knobbed plates C′, in combination with the link C, or its equivalent, substantially as and applied to the purpose specified.

H. M. CLAFLEN.

Witnesses:
W. H. BURRIDGE,
J. HOLMES.

Exhibit E

H. M. Claflin,

Splice for Timber.

No. 47,395. *Patented Apr. 25. 1865.*

Fig. 1.

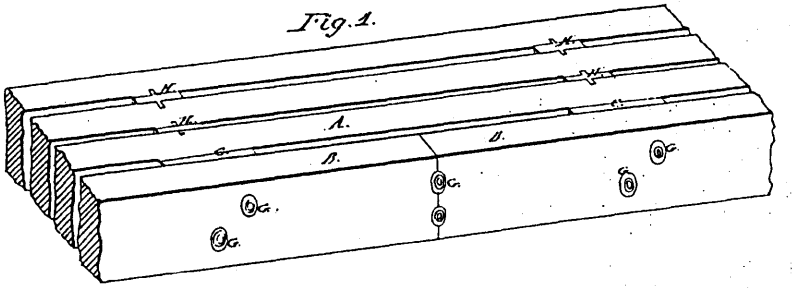


Fig. 2.

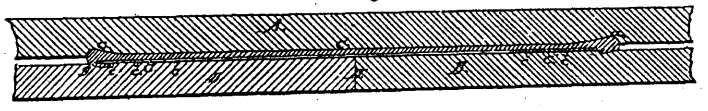


Fig. 3.

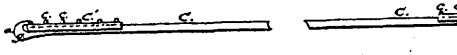


Fig. 5.

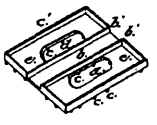
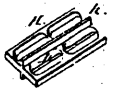


Fig. 6.



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