

HISTORIC RECORDATION
FOURTH STREET BRIDGE
OVER COAL RUN AND BENONI AVENUE
FAIRMONT, WEST VIRGINIA

- Name:** Fourth Street Bridge
- Location:** The bridge is located within the geographical area of West Virginia, Marion County, City of Fairmont, in the neighborhood of Fleming-Watson

USGS *Fairmont West*, WV 7.5 Minute Topographic Quadrangle,
Universal Transverse Mercator Coordinates:
17S 4370544N 573079E (WGS 1984)
- Present Owner/Occupant:** City of Fairmont, West Virginia
- Present Use:** Vehicular and pedestrian bridge—not in use. Closed to all traffic.
- Significance:** The Fourth Street Bridge is individually significant under National Register of Historic Places (NRHP) Criterion C for its engineering technology as an early (1911-12) example of a rigid frame, reinforced concrete cantilevered bridge and for its association with Layton F. Smith, a noted designer of reinforced concrete structures in the first quarter of the twentieth century. Rigid frames make use of continuous concrete connections between beams and substructure columns and/or foundations. This technology made the most of the ability of concrete to be cast monolithically and allowed reduction in material quantities. The bridge is also a contributing element of the Fleming-Watson Historic District, which was listed in the NHRP on November 29, 2001. The district is significant under Criteria A for community planning and development and under Criterion C for architecture.
- Project Information:** The Federal Highway Administration (FHWA) in cooperation with the West Virginia Division of Highways (WVDOH) proposes to replace the Fourth Street Bridge over Coal Run Hollow in Fairmont, Marion County, West Virginia. The new bridge will be located at Third Street, approximately 350 feet northeast of the existing bridge location, resulting in the realignment and construction of new roadway, the demolition of the NRHP-eligible Fourth Street Bridge and the demolition of 901, 903, 911,

and 913 Fourth Street, which are contributors to the Fleming-Watson Historic District.

Because the undertaking will have an adverse effect upon the Fourth Street Bridge, which is eligible for listing in the NRHP, the FHWA, WVDOH, and WV Department of Culture and History (which is the State Historic Preservation Office) agreed that the demolition of the bridge and four buildings would be mitigated partially through historical recordation (this document).

Qualified Professionals: Timothy G. Zinn and Jesse A Belfast, architectural historians at Michael Baker Jr., Inc., a unit of Michael Baker International, prepared this documentation in March 2015.

Part I. Historical Information

A. Physical History

1. **Date of erection:** 1911-12
2. **Architect and Engineer**
Layton F. Smith, Baltimore, Maryland.
3. **Original and subsequent owners, occupants, uses:**
City of Fairmont, West Virginia

B. Historical Context:

The City of Fairmont held an election on May 21, 1910, to issue \$75,000 in bonds for the erection of a bridge at Fourth Street and for improvements to the water system¹. The bridge was erected in 1911-12 by the City of Fairmont, which engaged the engineering firm of Layton F. Smith of Baltimore. In November 1911, the *Monthly Journal of the Engineers Club of Baltimore* reported that "Mr. R.H. Moffitt is now in Fairmont, W. Va., where he has charge of the construction of the Fourth Street Viaduct."² Smith notes that the bridge's unusual cantilevered design resulted from the fact that the City of Fairmont wished to build the two abutments by day labor, so the viaduct is designed not to rest on the abutments at all, "the shore spans being cantilevers and the abutments being used merely to hold back the earthfill at each end."³ It is likely that bridge construction was completed in 1912, as the 1912 Sanborn Fire Insurance Map of Fairmont shows a concrete bridge at Fourth Street.

Layton F. Smith (d. 1936) was a noted engineer-architect of reinforced concrete buildings and structures in the first quarter of the twentieth century. Between 1904 and 1914, Smith was a representative of the Trussed Concrete Steel Company of Baltimore.⁴ In 1914, Smith opened an office at 513 N. Charles Street, Baltimore, for private practice as an engineer-architect specializing in the design of reinforced concrete structures.⁵ In January 1907 Smith patented a reinforced concrete column (Patent No. 841,463), which is similar to the design of the columns used on the Fourth Street Bridge. Smith's patent application notes that improvements of his column design include the distribution of load of column rods to concrete, and the connection between the column and the beam. The object of Smith's improved column design was to provide a construction whereby the column rods may be sustained in a socket or shoe whose base has an area equivalent to the ratio of stress in the steel and concrete, so as to distribute the load in the rods over the concrete base. Novel features covered under the patent are described as a concrete column having a rod embedded and extending vertically therein, a flat base also embedded in said concrete column beneath said rod, and means of engaging the base and said rod

¹ *The Commercial and Financial Chronicle*, Vol. 90 No. 2342 (May 14, 1910).

² *Monthly Journal of the Engineers Club of Baltimore*, Vol. 1 No. 1 (November 1911).

³ *Engineering News*, Vol. 73 No. 16 (April 22, 1915), p. 792. "More Reinforced-Concrete Cantilever Bridges."

⁴ *Engineering News-Record*, February 5, 1914, p. 330.

⁵ *Engineering and Contracting* [Chicago], Vol. 41, No. 7 (1914), p. 42.

whereby the load of the rod may be distributed over the concrete through the base. When rods are placed end to end, they are connected by tubular sockets and plates ⁶ (see Photo 25).

Part II. Architectural Information

The Fourth Street Bridge carries two 10ft vehicular lanes and two 5ft sidewalks over Coal Run and Benoni Avenue in Fairmont, Marion County, West Virginia. The seven-span structure measures 251ft in total length and its deck is 30ft wide. The rigid frame cantilevered structure is entirely of reinforced concrete construction, except for the abutments, which are stone, and the deck's wearing course, which is tan brick. The seven bridge spans measure 20.5ft, 30ft, 60ft, 30ft, 60ft, 30ft, and 20.5ft, respectively. The 20.5ft spans at each abutment and the two 60ft main spans are cantilevered, while the three 30ft spans are at the three cantilever towers. The cantilever towers consist of pairs of two-column bents, which are connected with horizontal concrete beam bracing. The 5ft sidewalks are supported by plain concrete brackets. Alterations to the bridge include the ca. 1998 replacement of the concrete railings with chain-link fencing and the installation of a new concrete sidewalk on top of the original sidewalk, which has resulted the raising of the sidewalk level so that the inner sides of the sidewalk now function as curbs. The majority of the stone on the northeast abutment has been covered in shotcrete, while the southeast abutment is only partly covered with shotcrete.

Part III. Sources of Information

A. Architectural drawings:

Original engineering drawings are not known to exist for this structure.

B. Photographs:

Current and known historic photographs are included in this document.

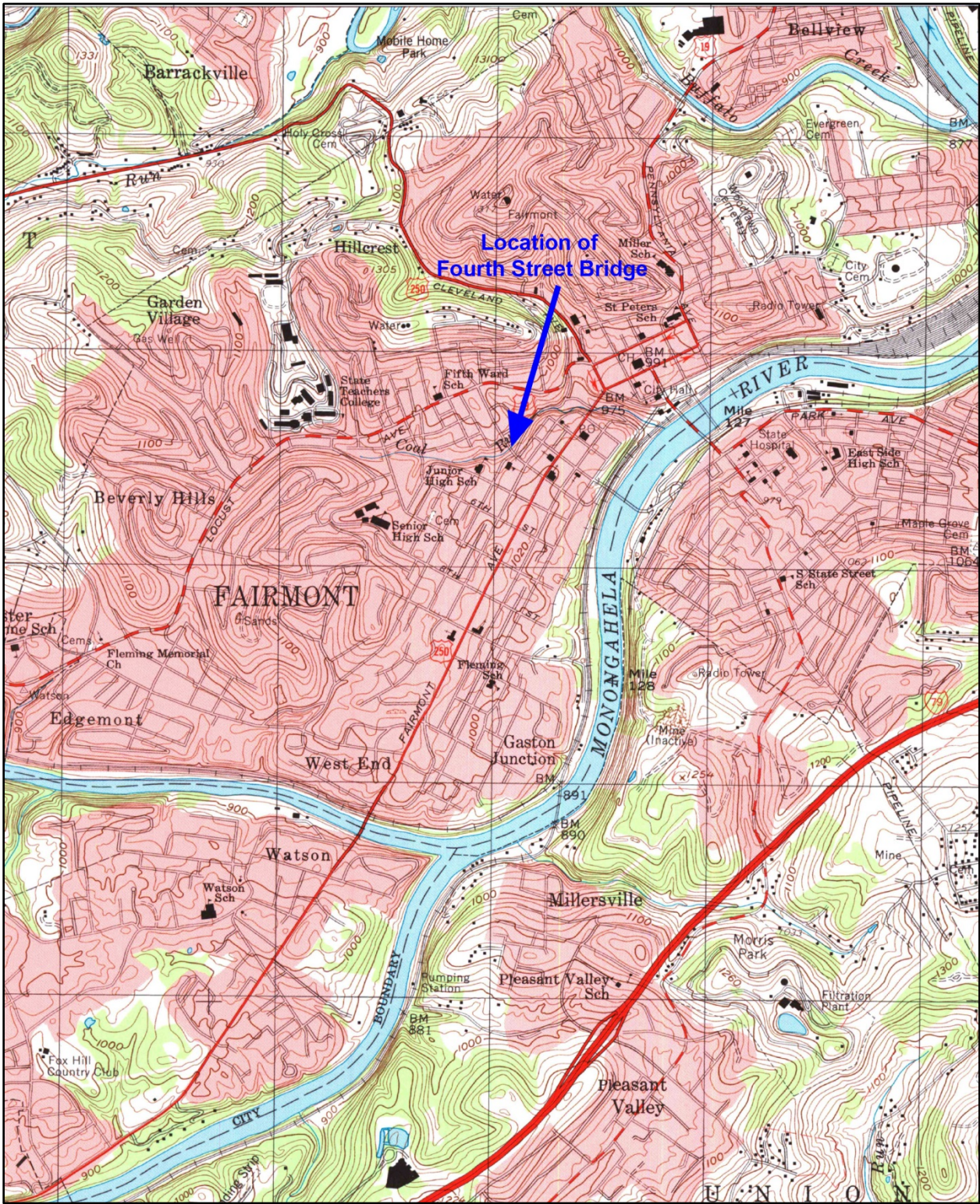
C. Bibliography:

Sanborn Map Company
1912 Fire Insurance Map of Fairmont, Marion County, West Virginia.

Underwood, Rodney
2014 West Virginia Division of Highways Bridge Inspection Report for Fourth Street Bridge, Fairmont, Marion County (Structure No. 25A900). West Virginia Department of Transportation, Division of Highways, Charleston.

⁶ U.S. Patent and Trademark Office, patent no. 841,463.

Location Map (USGS Fairmont West 7.5' Topographic Quadrangle, 1997)



Photograph Information

Name of Property:	Fourth Street Bridge
City or Vicinity:	Fairmont
County:	Marion County
State:	West Virginia
Name of Photographer:	Jesse A. Belfast
Date of Photographs:	December 11, 2014
Location of Original Digital Files:	Michael Baker, Jr. Inc. 100 Airside Drive, Moon Township, PA 15108

Photograph List

Note: In the following descriptions, spans are numbered 1-7 from NW to SE.

Photo 1: NE side of bridge, facing S.

Photo 2: Detail of span 3-5, NE side of bridge, facing S.

Photo 3: Detail of span 2, NE side of bridge, facing S.

Photo 4: Detail of span 1 and NW abutment, NE side of bridge, facing NW.

Photo 5: Bridge deck showing brick pavement, NW end, facing SE.

Photo 6: Bridge deck showing sidewalks and fence, which are modern replacements, NW end of bridge, facing S. Note that original sidewalk was at same level as roadway.

Photo 7: SW side of abutment at NW end of bridge, facing SE.

Photo 8: SE side of abutment at NW end of bridge, facing NW. Note concrete encasement.

Photo 9: View of underside of bridge deck and column and beam details at span 2, NW end, facing SE.

Photo 10: View of underside of bridge deck and bent details, span 3, facing NW.

Photo 11: View of underside of bridge deck and bent details at span 4, facing SE.

Photo 12: View of sidewalk brackets and concrete girders in spans 1-3, facing NW.

Photo 13: Detail of underside of span 3, facing up. Note exposed reinforcing bars on girder; remnants of original sidewalk are visible in right half of photo.

Photo 14: Section of original concrete railing that has fallen off bridge.

Photo 15: Overview of SW side of bridge, spans 4-7, facing E.

Photo 16: Detail of horizontal braces on span 3 column bents, facing E.

Photo 17: Overview of SW side of bridge from Benoni Avenue, facing NE.

Photo 18: SW side of bridge, spans 5-7, facing E.

Photo 19: Underside of span 7, showing concrete column bents, girders, and deck, facing SE.

Photo 20: NE side of bridge, spans 6-7, facing S.

Photo 21: Overview of NE side of bridge from Benoni Avenue, showing spans 4-6, facing SW.

Photo 22: Overview of SW end of bridge from Fourth Street, facing NW.

Photo 23: Detail of stone coping on NE side of SE abutment, facing W.

Photo 24: NE side of SE abutment, showing concrete veneer, facing W.

Photo 25: Layton F. Smith, illustration from patent # 841,463 for reinforced concrete column. Source: U.S. Patent and Trademark Office.

Photo 26: Early view of Fourth Street Bridge, showing SW side, facing E. Source: *Engineering News*, Vol. 73 No. 16, page 791 (April 22, 1915).

Photo 27: Circa 1912 postcard showing SE bridge abutment under construction.

Photo 28: 1921 view of Fourth Street Bridge, showing NE side, facing W. Source: Marion County Historical Society.

Photo 29: Postcard showing SW side of Fourth Street Bridge, facing N. Source: West Virginia Regional History Center, West Virginia University.



Photo 1: NE side of bridge, facing S.

WV_Marion County_Fourth Street Bridge-0001



**Photo 2: Detail of span 3-5, NE side of bridge, facing S.
WV_Marion County_Fourth Street Bridge-0002**



Photo 3: Detail of span 2, NE side of bridge, facing S.
WV_Marion County_Fourth Street Bridge-0003



Photo 4: Detail of span 1 and NW abutment, NE side of bridge, facing NW.
WV_Marion County_Fourth Street Bridge-0004



**Photo 5: Bridge deck showing brick pavement, NW end, facing SE.
WV_Marion County_Fourth Street Bridge-0005**



**Photo 6: Bridge deck showing sidewalks and fence, which are modern replacements, NW end of bridge, facing S.
Note that original sidewalk was at same level as roadway.
WV_Marion County_Fourth Street Bridge-0006**



Photo 7: SW side of abutment at NW end of bridge, facing SE.
WV_Marion County_Fourth Street Bridge-0007



Photo 8: SE side of abutment at NW end of bridge, facing NW. Note concrete encasement.
WV_Marion County_Fourth Street Bridge-0008



**Photo 9: View of underside of bridge deck and column and beam details at span 2, NW end, facing SE.
WV_Marion County_Fourth Street Bridge-0009**



**Photo 10: View of underside of bridge deck and bent details, span 3, facing NW.
WV_Marion County_Fourth Street Bridge-0010**



**Photo 11: View of underside of bridge deck and bent details at span 4, facing SE.
WV_Marion County_Fourth Street Bridge-0011**



**Photo 12: View of sidewalk brackets and concrete girders in spans 1-3, facing NW.
WV_Marion County_Fourth Street Bridge-0012**



Photo 13: Detail of underside of span 3, facing up. Note exposed reinforcing bars on girder; remnants of original sidewalk are visible in right half of photo.
WV_Marion County_Fourth Street Bridge-0013



Photo 14: Section of original concrete railing that has fallen off bridge.
WV_Marion County_Fourth Street Bridge-0014



Photo 15: Overview of SW side of bridge, spans 4-7, facing E.
WV_Marion County_Fourth Street Bridge-0015



Photo 16: Detail of horizontal braces on span 3 column bents, facing E.
WV_Marion County_Fourth Street Bridge-0016



**Photo 17: Overview of SW side of bridge from Benoni Avenue, facing NE.
WV_Marion County_Fourth Street Bridge-0017**



**Photo 18: SW side of bridge, spans 5-7, facing E.
WV_Marion County_Fourth Street Bridge-0018**



Photo 19: Underside of span 7, showing concrete column bents, girders, and deck, facing S.
WV_Marion County_Fourth Street Bridge-0019



Photo 20: NE side of bridge, spans 6-7, facing S.
WV_Marion County_Fourth Street Bridge-0020



**Photo 21: Overview of NE side of bridge from Benoni Avenue, showing spans 4-6, facing SW.
WV_Marion County_Fourth Street Bridge-0021**



**Photo 22: Overview of SW end of bridge from Fourth Street, facing NW.
WV_Marion County_Fourth Street Bridge-0022**



**Photo 23: Detail of stone coping on NE side of SE abutment, facing W.
WV_Marion County_Fourth Street Bridge-0023**



**Photo 24: NE side of SE abutment, showing concrete veneer, facing W.
WV_Marion County_Fourth Street Bridge-0024**

No. 841,463.

PATENTED JAN. 15, 1907.

L. F. SMITH.
REINFORCED CONCRETE COLUMN.

APPLICATION FILED OCT. 3, 1906.

2 SHEETS—SHEET 1.

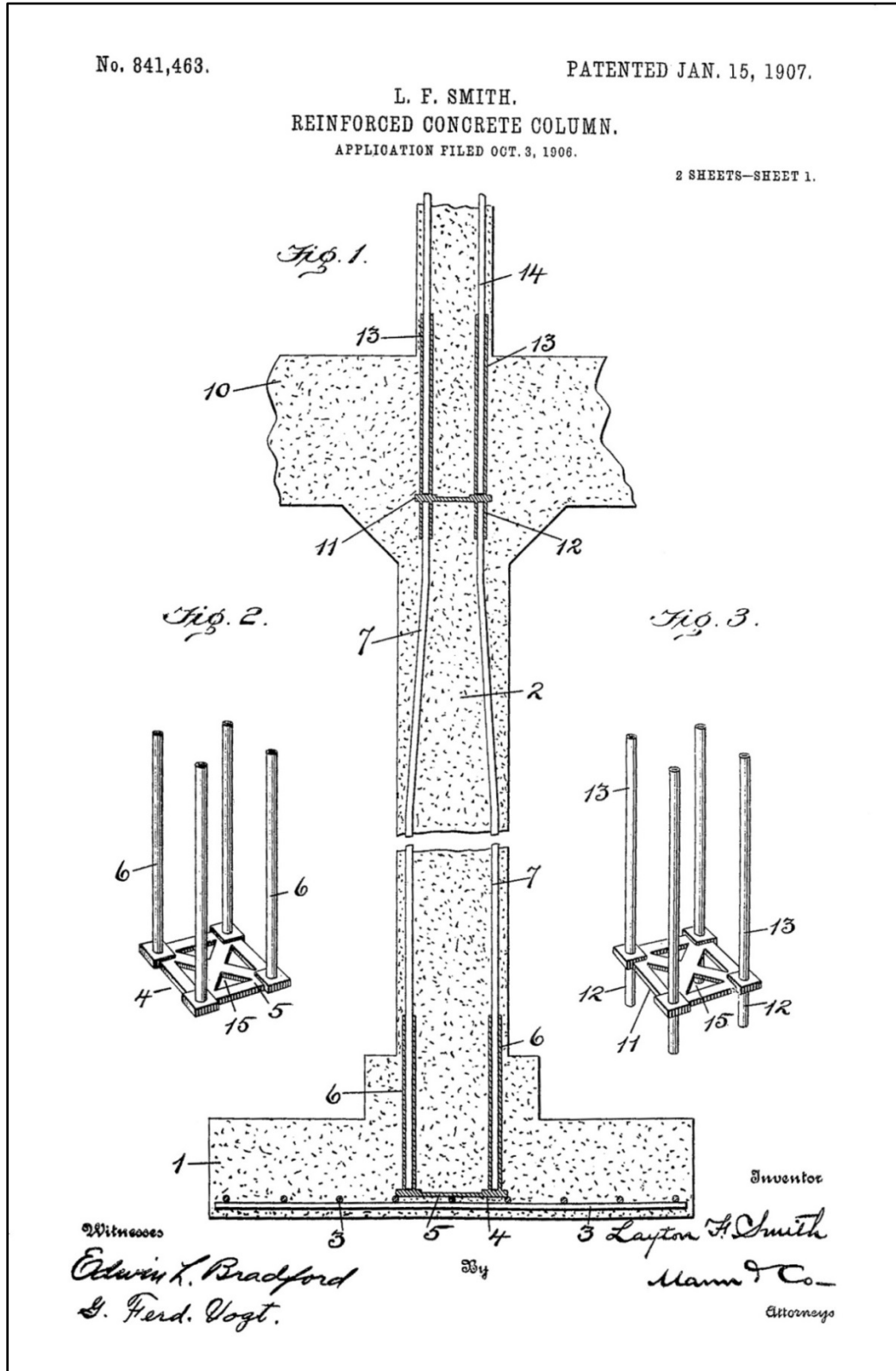


Photo 25: Layton F. Smith, illustration from patent # 841,463 for reinforced concrete column. Source: U.S. Patent and Trademark Office.

WV_Marion County_Fourth Street Bridge-0025



Photo 26: Early view of Fourth Street Bridge, showing SW side, facing E. Source: *Engineering News*, Vol. 73 No. 16, page 791 (April 22, 1915).

WV_Marion County_Fourth Street Bridge-0026

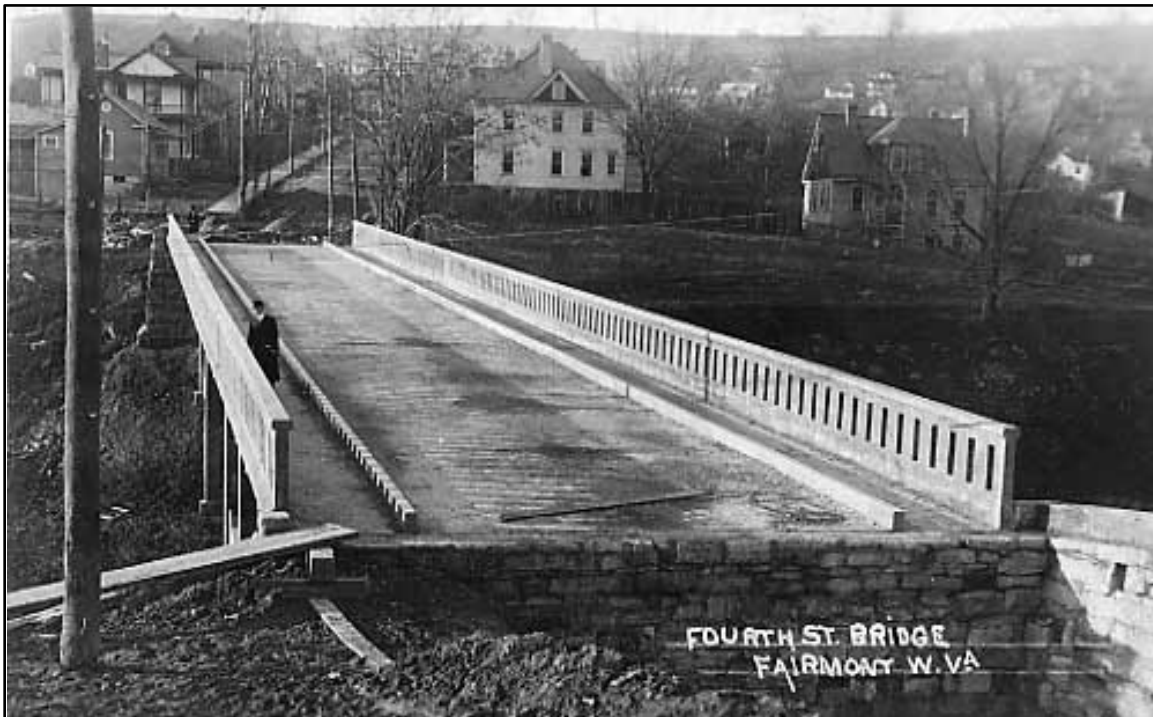


Photo 27: Circa 1912 postcard showing SE bridge abutment under construction.

WV_Marion County_Fourth Street Bridge-0027



Photo 28: 1921 view of Fourth Street Bridge, showing NE side, facing W. Source: Marion County Historical Society.

WV_Marion County_Fourth Street Bridge-0028



Photo 29: Postcard showing SW side of Fourth Street Bridge, facing N. Source: West Virginia Regional History Center, West Virginia University.

WV_Marion County_Fourth Street Bridge-0029

KEY TO PHOTOGRAPHS

