

NR LISTED 7-29-88

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United States Department of the Interior
National Park Service

National Register of Historic Places
Registration Form

7-21

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name Springfield Bridge

other names/site number FA0852

2. Location

street & number County Road 222 at Cadron Creek

not for publication

city, town Springfield

vicinity

state Arkansas

code 05

county Faulkner

code 045

zip code 72157

3. Classification

Ownership of Property

- private
- public-local
- public-State
- public-Federal

Category of Property

- building(s)
- district
- site
- structure
- object

Number of Resources within Property

Contributing	Noncontributing
_____	_____ buildings
_____	_____ sites
<u>1</u>	_____ structures
_____	_____ objects
<u>1</u>	_____ Total

Name of related multiple property listing: _____

Number of contributing resources previously listed in the National Register N/A

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, 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 36 CFR Part 60. In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Cathy J. Boyd
Signature of certifying official

6-25-88
Date

Arkansas Historic Preservation Program
State or Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.

Signature of commenting or other official

Date

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

entered in the National Register.
 See continuation sheet.

determined eligible for the National Register. See continuation sheet.

determined not eligible for the National Register.

removed from the National Register.

other, (explain): _____

Signature of the Keeper

Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)
Transportation / Road-Related

Current Functions (enter categories from instructions)
Transportation / Road-Related

7. Description

Architectural Classification
(enter categories from instructions)

Materials (enter categories from instructions)

Other: Tubular Bowstring Arch

foundation Stone

walls

roof

other Metal / Wrought Iron

Cast Iron

Describe present and historic physical appearance.

The Springfield Bridge is located on County Road 222, approximately 2.5 miles east of Springfield, Conway County, Arkansas. It crosses Cadron Creek close to the junction of the creek floodplain and the uplands to the west.

The Springfield Bridge is a cast and wrought iron bowstring arch bridge whose main span measures 146 feet. Two timber stringer approach spans, one on each end and without guardrails, give the bridge a total length of 188 feet. The upper compression chord rises to a maximum height of 15'3" above the bottom chord. This tubular chord is linear, rectangular in section, and consists of relatively short sections of curved parallel strips of wrought iron boiler plate riveted to a top and bottom channel bar. These sections are bolted together with splice plates to form the simple arch. An additional channel bar is riveted into the center of the arch tube and runs from each end up to the middle of the fourth panel. This member is for additional lateral stiffness and was a necessary component when approaching a maximum span length of around 200 feet in this type of bowstring design. Each end of the arch sits in a cast iron bearing shoe that is anchored to the top of the stone masonry piers.

The bearing shoe connects the arch to the bottom tension chord. This chord consists of two 5" X 3/4" eyebars that are forged at the ends, threaded, and attached to the bearing shoe with cast iron nuts. The bottom chord contains five sections, each measuring roughly 29 feet in length.

Fifteen cast iron vertical columns of varying lengths are suspended from the arch top to the bottom chord and are in compression. These columns are cruciform in section, 3" in diameter, and threaded on each end. The top of the column passes through a cut hole in the arch tube and is secured on top with a nut. The verticals divide the arch into sixteen panels of varying lengths, each crossed with a pair of 7/8" round wrought iron diagonal tension bars. Attached to the bottom end of the vertical columns at L4, L6, L8, L10, and L12 (See Drawing #1), and resting on top of the bottom chord, are channel bar floor beams that extend 4'6" out from the bottom chord.

The lateral stability of the Springfield Bridge is maintained in several ways. An angular bracing bar, cast and cruciform in section, extends from the end of each metal floor beam up to the side of the arch. In addition, four remaining

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top struts (there were originally six) are spaced across the top between the arches and are perpendicular to the roadbed. These struts are 3" diameter round, wrought iron bars, threaded on each end, and attached to a cast iron strut post with a nut. Each strut post is further secured by top lateral bracing consisting of a pair of 5/8" round wrought iron rods that cross diagonally between each strut. 5/8" round wrought iron rod is also utilized as diagonal bracing between the bottom chords and are attached at each vertical compression member.

3" X 8" treated timber floor beams layed across the bottom chords at twenty inch intervals, along with the five metal floor beams, support the 3" thick timber plank decking in the 11'7" wide roadway.

Two masonry stone piers at each end of the bridge measure approximately 13' long, 3' wide, and 12 feet high support the bridge roughly 19' above normal Cadron Creek levels.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

nationally statewide locally

Applicable National Register Criteria A B C D

Criteria Considerations (Exceptions) A B C D E F G

Areas of Significance (enter categories from instructions)

Transportation

Engineering

Period of Significance

1871 - 1900

Significant Dates

1871 - 1874

Cultural Affiliation

N/A

Significant Person

Mr. Zenas King

Architect/Builder

Mr. Zenas King / King Iron Bridge Manufactory
and Iron Works

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

SUMMARY

The Springfield Bridge is nominated under Criteria A and C. Under Criterion A, this bridge is the last remaining 19th century cast and wrought iron bowstring arch bridge and the oldest documented highway bridge in Arkansas according to a recent Arkansas Highway and Transportation Department study. It is one of only two 19th century highway bridges in existence and is possibly one of the first all metal truss bridges in the state. The Springfield Bridge is also significant under Criterion C. It is an unaltered example of a cast and wrought iron tubular arch bridge that was patented in 1861 by Zenas King and Peter M. Frees. It was manufactured by one of King's companies, the short lived King Iron Bridge Manufactory and Iron Works of Iola, Kansas, in 1871. King created one of the largest and most diversified bridge building operations in the United States in the last decades of the 19th century. He is credited with using extensive labor saving devices and the standardization of several manufacturing processes to develop the first practical and simple system to mass produce metal bowstring bridges in this country. The Springfield Bridge is a significant example of Zenas King's contribution to 19th century civil engineering in the United States and to the history of 19th century bridge construction in Arkansas.

ELABORATION

The Springfield Bridge is located east of Springfield, Arkansas, the Conway County seat from 1850 to 1873, and crosses Cadron Creek on the old Springfield - Des Arc Road. Beginning in 1985, the Arkansas Highway and Transportation Department (AHTD) in cooperation with the Arkansas Historic Preservation Program (AHPP) conducted an historic bridge project that eventually evaluated over 2,600 historic bridges built in Arkansas prior to 1941. Of these, 241 were recorded as metal truss bridges and the Springfield Bridge was the only metal bowstring arch bridge in the inventory and the oldest highway bridge identified.

See continuation sheet

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Research in Conway County Court records show that in the October, 1871 term several petitions were presented to the court urging the county to build two iron bridges, one at Springfield and the other on the Fort Smith Road where it crossed Point Removed Creek. Timber bridges at these locations were considered "insufficient in strength and durability for these streams." The presiding County Judge, A. B. Gaylor, appointed himself, Dr. J. A. Westerfield, and A. D. Thomas as bridge commissioners with full authority to "contract with the most reliable Company of Wrought Iron Bridges Manufactures for two wrought iron bridges." County warrants were to be issued for their construction and funded with bonds bearing eight percent interest and payable in ten years. Mr. J. A. Allen was awarded the contract to build the masonry stone piers for both bridges and immediately began their construction.

Another contract was awarded on November 8, 1871, with agent John K. Good of the "King Wrought Iron Bridge Company of Iola, Kansas" for the construction of the two new bridges. Mr. Zenas King, the company founder, came to Iola in the fall of 1870 as one of the largest and most successful bridge builders in the country and proposed the construction of a new bridgeworks to supplement his main operation in Cleveland, Ohio. The citizens of Iola, in the grip of a national depression, took this proposal as a real opportunity and pushed through a \$50,000 bond issue partly to finance the new company. The corporate charter for the "King Wrought Iron Bridge Manufactory and Iron Works" was filed February 20, 1871, and the main unit of the company was soon built east of town.

The Springfield Bridge was one of a very few bridges to be manufactured at the new Iola bridgeworks and survives today as an outstanding example of King's own innovative bridge design. His all metal, tubular arch bridge was to become the basis upon which King built his national bridge building business. Working in Cincinnati, Ohio, with Mr. Peter M. Frees, a metal worker experienced with wrought iron boiler plate, King built his first bowstring prototype in 1859 with no formal training in bridge engineering. King and Frees received a patent on this design in 1861 and began to manufacture these all metal bowstring bridges out of a small plant in Cleveland, Ohio, in 1862. King's bowstring bridge, light in weight with relatively high carrying capacity, soon became extremely popular in Ohio and other surrounding states. This early success enabled King to incorporate his business in 1871, resulting in a corporate expansion that included the Iola bridgeworks. King is credited as being the first to develop a practical and simple system to mass produce bowstring bridges using wrought iron boiler plate and resulted in his company becoming the largest highway bridgeworks in the United States by 1884.

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Another important key to King's success was his utilization of the nation's growing railroad system to tap into regional markets outside of the Ohio area. The construction of the first railroad in Arkansas began in 1853, but the majority of the major lines did not begin until 1870, and were not completely finished until around 1875. It appears unlikely that many metal highway bridges were built in Arkansas before railroad construction began and suggests that the Springfield Bridge could be one of the first prefabricated all metal bridges to be built in the state.

Five months after the Springfield Bridge contract was signed, the Iola bridgeworks closed and moved to Topeka, Kansas. The company's excuse for this move was that their business was increasing so rapidly that it became absolutely necessary to increase their working capacity and improve their transportation facilities. Many accounts stated that the company was virtually broke. The charter for King's new Topeka bridgeworks was filed June 10, 1872, and the Iola plant was officially closed.

The Springfield Bridge was one of a limited number of bridges manufactured at the Iola plant. It was shipped to Lewisburg, Arkansas, for future delivery to the construction site 20 miles north, and there it remained in storage for the next two years. Construction delays began in January, 1872, when J. W. Smith and S. S. Bedinger appeared before Judge Gaylor's court as owners of a bridge located on the Military Road, 1 1/2 miles from the Point Remove Bridge construction site. They brought grievance against the bridge commissioners, claiming that the Point Remove Bridge was completely unnecessary, on a road seldom traveled, and adjacent to property owned by A. D. Thomas, a bridge commissioner. The court found that "contracts were made . . . and no restrictions as to the cost of erecting said bridges were made, thereby leaving the county at the mercy of the commissioners and the bridge company." The court then ordered the contract for the Point Remove Bridge cancelled and a review in the form of a report submitted to the court by the commissioners concerning the Springfield Bridge. Judge Gaylor, not surprisingly, voted against this recommendation.

These investigations eventually resulted in the resignation of A. D. Thomas from the bridge commission, Judge Gaylor lost his bid for re-election and Conway County Clerk W. A. Einkle was eventually sued by Conway County in Circuit Court for the unauthorized issuing of county script. In April, 1873, Faulkner County was formed, in part from Conway County, making Cadron Creek the new county boundary. This action left half the bridge site and half the liability to the newly formed county, which resulted in another law suit to force Faulkner County to pay half the cost. In the same year, the Conway County seat was moved from Springfield to Lewisburg, further complicating the situation.

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Finally, in January, 1874, two years after the stone masonry piers were left standing in Cadron Creek, the county court resolved the Springfield Bridge issue. A new bridge commissioner was appointed and the necessary funding was authorized. On July 21, 1874, the Springfield Bridge was officially completed at a cost of \$12,857.

During the last decades of the 19th century, hundreds of relatively short metal truss bridges were constructed in Arkansas to cross small streams which before had been forded. A variety of bridge companies, with their own varieties of bridge designs, supplied these structures to most counties in the state. It was during this period, before the formation of the Arkansas Highway and Transportation Department in 1923, that the most unique and innovative bridge designs were being built. The Springfield Bridge is the last Arkansas example of this 19th century bridge design.

9. Major Bibliographical References

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 # _____
- recorded by Historic American Engineering Record # _____

See continuation sheet

Primary location of additional data:

- State historic preservation office
- Other State agency
- Federal agency
- Local government
- University
- Other

Specify repository:

Arkansas History Commission

10. Geographical Data

Acreeage of property Less than one acre

UTM References

A

1	5	5	4	4	3	6	0	3	9	0	0	9	6	0
Zone		Easting				Northing								

B

Zone		Easting				Northing								

C

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D

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See continuation sheet

Verbal Boundary Description

The boundary of the Springfield Bridge begins on County Road 222 at the end of the south approach span, extends approximately 188 feet north across Cadron Creek, and terminates at the end of the north approach span.

See continuation sheet

Boundary Justification

The boundary includes the main span, approach spans, and stone piers historically associated with this property.

See continuation sheet

11. Form Prepared By

name/title Michael Swanda, Survey Coodinator
organization Arkansas Historic Preservation Program date June 24, 1988
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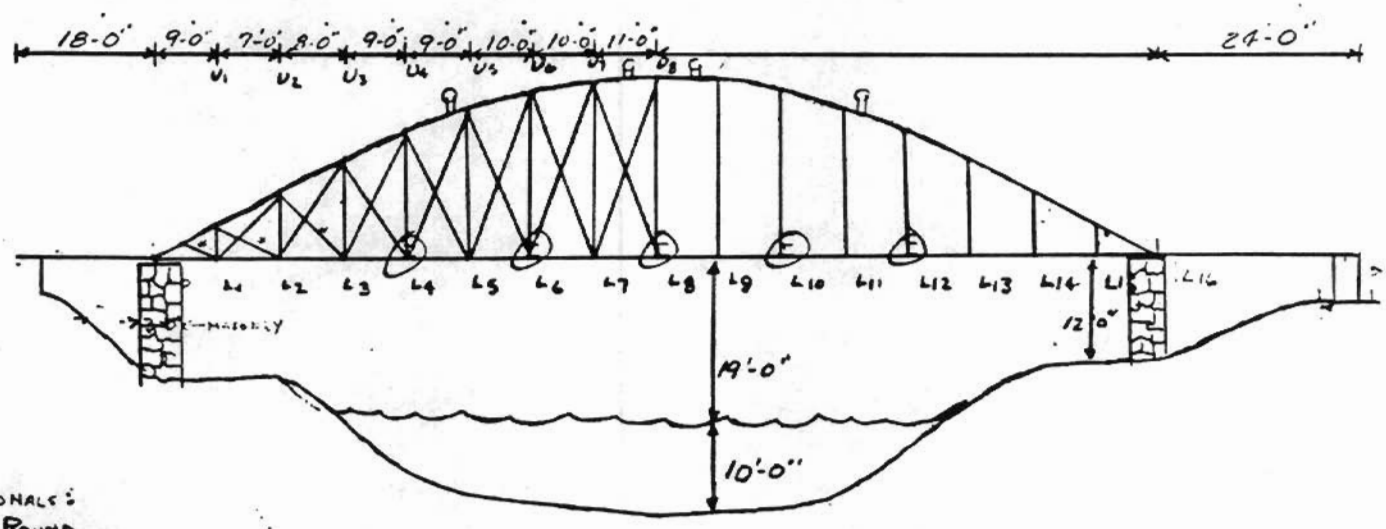
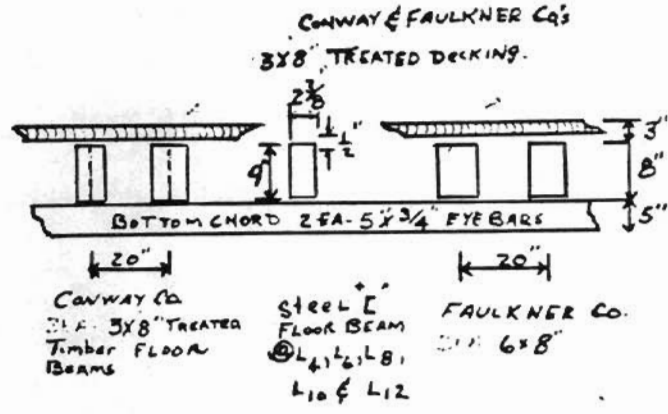
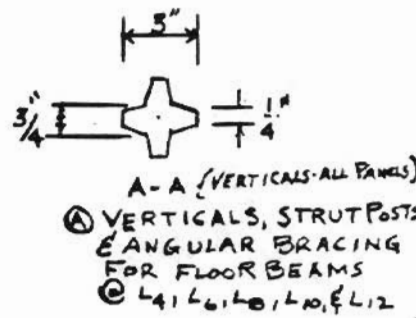
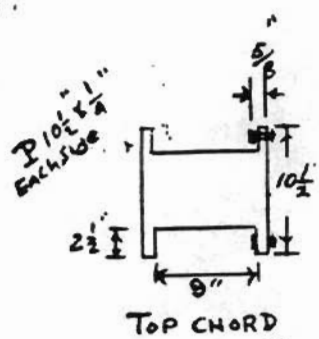
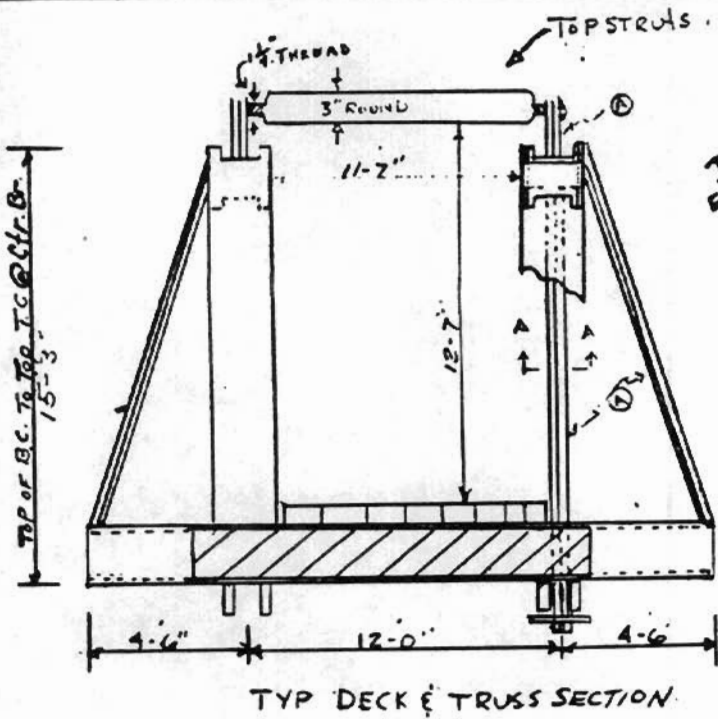
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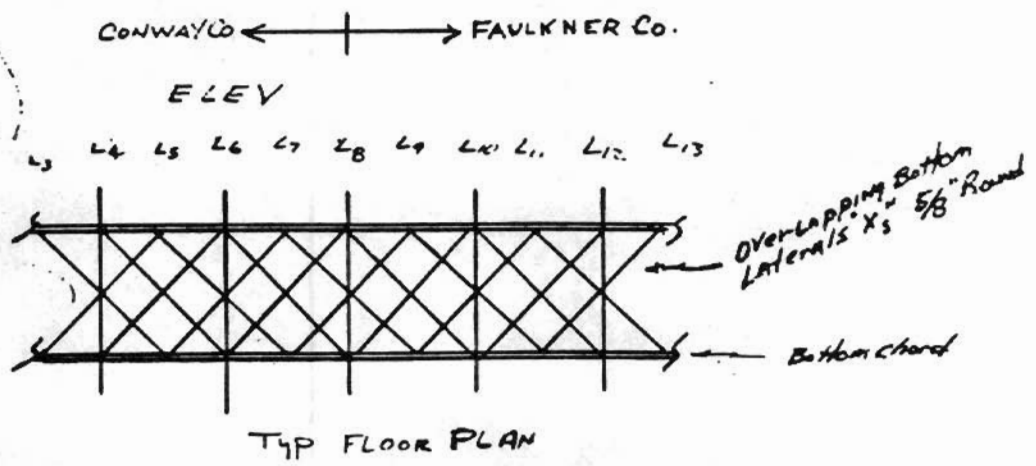
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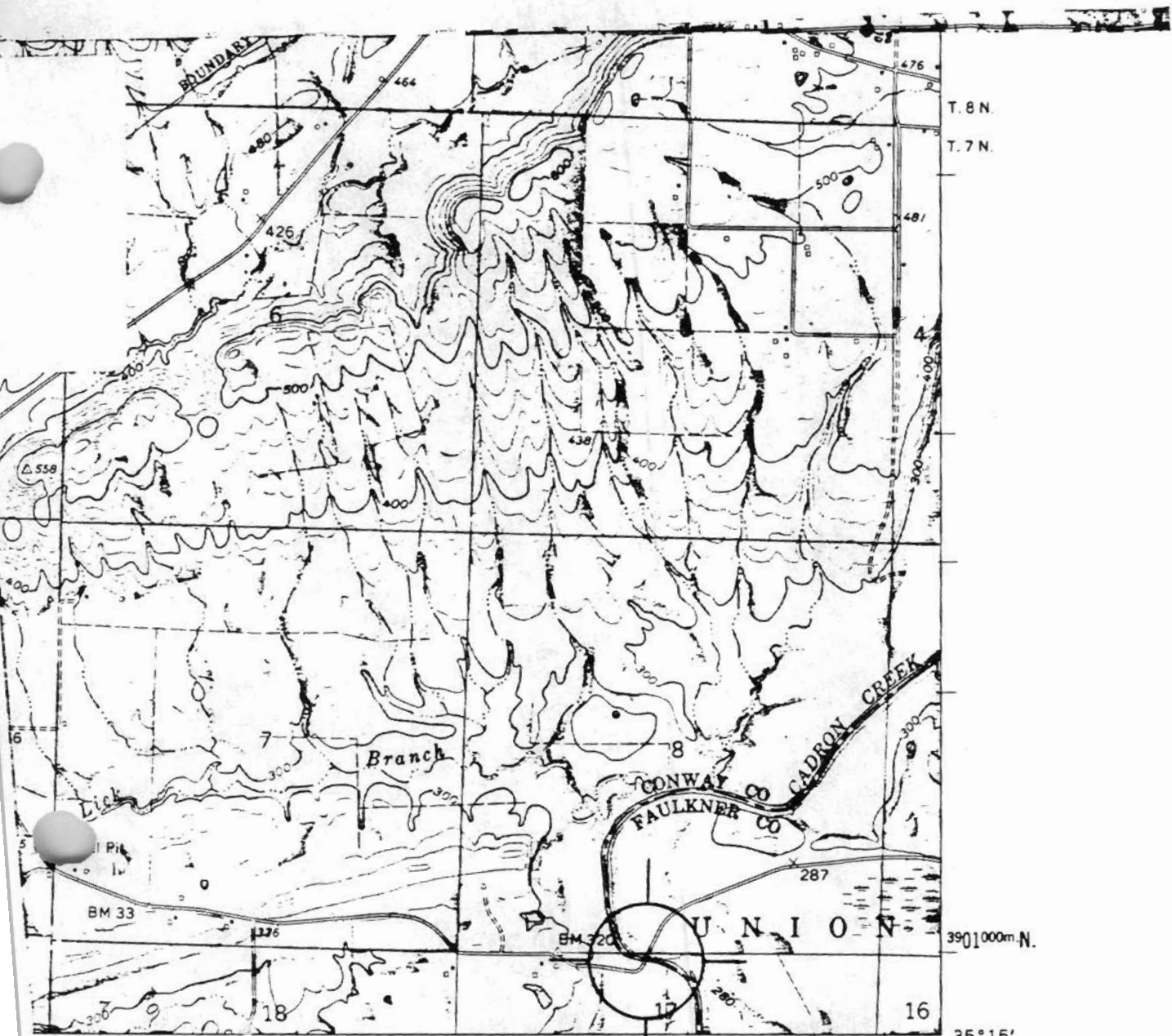
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- Simmons, David A. "Zenas King: A Bridge Builder of National Proportions." Report on file, Ohio Historical Society, Columbus. 1986.
- U. S. Department of Commerce, Office of Patents and Trademarks. "Improvements in Bridges", Letters Patent Issue No. 33384, October 1, 1861; Patent reissue No. 2707, July 30, 1867.



DIAGONALS:
 # 1 1/8" ROUND
 ALL OTHERS 7/8" ROUND
 TOP LATERALS:
 Between L4/L8 Panel
 & L8/L12 Panel ONLY - 5/8" ROUND
 BOTTOM LATERALS:
 5/8" ROUND





INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1962
545000m.E.

T. 8 N.
T. 7 N.

39°10'00"N.

R. 14 W.

35°15'
92°30'

ROAD CLASSIFICATION

Medium-duty ——— Light-duty ———

Unimproved dirt - - - - -

○ State Route

(CONWAY 1:62 500)



QUADRANGLE LOCATION

SPRINGFIELD, ARK.

N3515—W9230/7.5

1962

APR 25 1968

