

HAER  
IOWA  
77-DESMO,  
27-

SOUTHWEST FIFTH STREET BRIDGE  
(Raccoon River Bridge)  
Iowa Bridges Recording Project  
Spanning Raccoon River at  
Southwest Fifth Street (Jackson Street)  
Des Moines  
Polk County  
Iowa

HAER No. IA-71

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WRITTEN HISTORICAL & DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
Department of the Interior  
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SOUTHWEST FIFTH STREET BRIDGE  
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**Location:** Spanning Raccoon River at Southwest Fifth Street; Des Moines; Polk County, Iowa  
UTM: 15.448425.4602790  
USGS: Des Moines SE, Iowa quadrangle (7.5 minute series, 1976)

**Date of Construction:** 1898

**Designer:** L. Higgins, Des Moines City Engineer

**Contractor:** J. H. Killmar, Des Moines, Iowa

**Present Owner:** City of Des Moines, Iowa

**Present Use:** Closed

**Significance:** The Southwest Fifth Street Bridge ranks among Iowa's most significant vehicular spans. It is one of Iowa's few remaining pinned Pratt through trusses with three or more spans. As one of only three pinned through trusses located in an urban setting, the Southwest Fifth Street Bridge is exceptionally important in its representation of early urban wagon bridge construction. The controversies which surrounded the construction of the bridge also illuminate patterns of development in Des Moines and the nature of bridge contracting at the turn of the century.

**Historian:** Leslie Pitner, August 1995

**Project Information:** This document was prepared as a part of the Iowa Historic Bridges Recording Project performed during the summer of 1995 by the Historic American Engineering Record (HAER). The project was sponsored by the Iowa Department of Transportation (IDOT). Preliminary research was performed by Clayton B. Fraser of Fraserdesign, Loveland, Colorado.

Spanning the Raccoon River in the city of Des Moines, the Southwest Fifth Street Bridge, constructed in 1898, had a contentious early history. Built by J.H. Killmar, a Des Moines-based contractor, it consists of three pin-connected Pratt trusses and is a fine example of the steel urban truss in Iowa. Both its location and the contractor selected caused great controversy in the city. The contract dispute over the bridge was one of the most important court cases in Iowa over a bridge in the nineteenth century, one which revealed the bid-rigging that surrounded bridge contracts.

In the late nineteenth century, metal truss bridges became more and more common. Stronger and more durable than timber bridges, wrought iron became the material of choice, until it was superseded by steel in the 1890s. The business of providing these metal bridges fell to bridge fabrication companies and bridge contractors. Many of these contractors were local firms, but the bridge fabrication industry was dominated by a few large companies whose reach was nationwide. Companies such as the King Iron Bridge Company, Cleveland, Ohio, and the Wrought Iron Bridge Company, Canton, Ohio, created specialized organizations to market and sell their bridges across the United States.

The King Iron Bridge Company was begun by Zenas King in 1871. King had first worked as an agent, a key role in bridge companies, for the Moseley Bridge Company in Cincinnati. King soon began to experiment with bridge designs, and in 1861, he patented a tubular iron bowstring arch-truss. From his work with Moseley, King knew the importance of marketing by using advertisements and promotional catalogs. To facilitate sales, King had a system of agents (or representatives) who acted for King Iron in local bridge biddings. His network was extensive, and by 1878, he had agents in Boston, Philadelphia, Des Moines, Cortland (New York), Bloomington, Kansas City, and San Antonio.<sup>1</sup> A contract to build a bridge was awarded through competitive bidding by contractors on specifications provided by the county or city desiring a bridge. The local government supervisors would inspect the plans and bids submitted and award contracts to the lowest bidder. Through its agents, the King Iron Bridge Company could participate in biddings throughout the country and became one of the most successful companies in the industry.

Working as an agent was a great stepping stone for a man into the bridge building business. In Iowa, the King Iron Bridge Company

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<sup>1</sup>David A. Simmons, "Bridge Building on a National Scale: The King Iron Bridge and Manufacturing Company," IA: The Journal for the Society for Industrial Archaeology, 15:2: 23-33.

had many agents who went on to success in their own bridge building activities. George King, a nephew of Zenas King, worked as an agent for King Iron and founded his own company, the George King Bridge Company, based in Des Moines. His company remained part of King Iron until 1890, when he broke off from King Iron and merged with the new firm Chicago Bridge and Iron.<sup>2</sup> Others who worked for King Iron in Iowa include James Marsh and N.M. Stark, both of whom went on to form major Iowa bridge companies. J.H. Killmar, the contractor for the Southwest Fifth Street Bridge and key to the dispute, served as bookkeeper for the Des Moines office of King Iron during the 1890s, working with both Marsh and Stark.<sup>3</sup>

#### BACKGROUND

The Southwest Fifth Street Bridge was conceived in controversy. Des Moines is enclosed on two sides, on the east by the Des Moines River and by the Raccoon River on the south. The original plan of Fort Des Moines lay within these natural boundaries. As Des Moines grew as the capital of Iowa, the city began to expand across the rivers. These natural boundaries created factions as the residents of each area wanted city resources to enhance their location and support their connection to the downtown.

The dispute over the bridge began in the city council with the East Side aldermen versus the West Side. First proposed in early 1896, the ordinance for the bridge was held up in a special session on April 9, 1896. The four aldermen from the West Side supported the bridge at the Fifth Street location, while the East Siders wanted the bridge to be built at East Sixth Street. That ordinance was defeated, but a new ordinance was introduced providing for the Fifth Street bridge, but added plans for a bridge at East Sixth Street to be built in 1897.<sup>4</sup> This plan was supported by South Side residents who thought the connection of South and West Fifth Street was of the greatest importance.<sup>5</sup> On April 21, the Mayor signed this ordinance, which was passed by the lame duck city council. The city engineer, L. Higgins, was

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<sup>2</sup>The Bridge Works: A History of Chicago Bridge & Iron Company (Chicago: The Mobium Press, 1987), 9.

<sup>3</sup>"A Good Bridge Man," Des Moines Saturday Review, 11 February 1893, 3.

<sup>4</sup>"Bridge Case Tangled," Des Moines Leader, 10 April 1896, 3.

<sup>5</sup>"At the City Hall," Des Moines Daily News, 9 April 1896.

ordered to prepare plans to be let out for bidding for an iron bridge 400' long and 30' wide, including 6' sidewalks.<sup>6</sup>

This decision was not well received by some residents of Des Moines. The Fifth Street location had been pushed by the Clifton Land Company, which owned large areas on the South Side of Des Moines.<sup>7</sup> Plain Talk, an East Side weekly paper, stated the opposing view:

One of the most questionable transactions which the retiring council ventured on after the municipal election was that ordering a new bridge at Fifth street. Yet the first action of the council to receive the approval of the new mayor was the ordinance providing for that bridge. It is an expenditure not at all demanded now, and probably will not be for years to come. There are already four bridges over the Raccoon, one of them within a stone's throw of that proposed. There is some need of a bridge across the Des Moines River at East Sixth street, and also of one across that river above the dam. But for another bridge over the 'Coon there is not the least particle of necessity. There is certainly no public demand for it.<sup>8</sup>

Plans for the bridge pushed on nonetheless. In July, proposals for the bridge were received by the city council. At \$19,100.00, J.H. Killmar was easily the low bidder and was awarded the contract for the Fifth Street Bridge.<sup>9</sup> This contract was the spark for the second and most heated controversy over the bridge.

After the contract was awarded, the other bidders immediately protested, arguing that the specifications had been too general and Killmar's plans were incorrect. This unusual protest was the voice of the bridge combine against Killmar, who had underbid the combine by over \$5000 to obtain the contract. The combine, or pool, was an established feature of the bridge building industry. As the number of bridge companies had expanded, competition

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<sup>6</sup>"The City," Des Moines Leader, 22 April 1896, 5. The newspaper articles refer to the bridge being iron, while it was constructed of steel. "Iron" seems to have been the appellation given to all metal trusses, regardless of material.

<sup>7</sup>"Local," Des Moines Capital, 17 June 1898.

<sup>8</sup>"A Bridge That's Not Wanted," Plain Talk, 25 April 1896, 1.

<sup>9</sup>"Proposals for Iron Bridge and Abutments," Daily Iowa Capital, 6 July 1896, 4.

became ruthless and was only deepened by the Depression from 1873 to 1879. To keep from destroying each other, the bridge companies created the bridge pools.

There were many variations on how the bridge pool worked. The simplest and most common was the "add-on," where the winning contractor built in enough additional costs into the contract to keep his usual rate of profits and still split part with the other companies. The night before bids were to be submitted on a contract, the bridge agents would meet and try to reach an agreement on the type of pool. If they could not agree, the bids were then honestly competitive. If they reached a consensus, however, the chosen winner would add in a fixed sum which was to be split with the other members of the pool.<sup>10</sup> Other pools were more formalized, such as the agreement from 1883 between King Iron and 16 other companies to create a pool fund. This pool was funded by each firm contributing 13 percent of its proceeds to this fund. This agreement was renewable annually and continued for at least three years.<sup>11</sup>

Whatever method the pool chose for this bridge contract, J.H. Killmar underbid them and raised their fury. There is no documentation to tell us whether Killmar chose not to participate in the pool or had been in the pool and then purposely underbid. Certainly Killmar knew the other bridge builders. The other bidders included James Marsh and N.M. Stark, recent coworkers from King Iron.<sup>12</sup> Killmar must have known George King, Des Moines' largest bridge contractor, who was the force of the fury as the next lowest bidder and chosen winner for the bridge combine. As bookkeeper for King Iron in Iowa, Killmar must have had intimate knowledge of how the combine worked. His personal motivations are now obscure, but his bid must have been seen as a direct insult by George King.

In response, on August 10, 1896, a petition was filed for an injunction against the bridge, naming Killmar, the city council, and the board of public works in the suit. The suit was filed by

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<sup>10</sup>Eli Woodruff Imberman, "The Formative Years of the Chicago Bridge & Iron Company," (Ph.D. Dissertation, University of Chicago, 1973), 153-7. Imberman has one of the most extensive discussions of how the bridge pool worked by focusing on the case study of Chicago Bridge & Iron.

<sup>11</sup>Simmons, 33.

<sup>12</sup>C. Jenney v. The City of Des Moines, et al., Appellant's Abstract of Record, Supreme Court of Iowa (January Term, 1897).

a C. Jenney, secretary and treasurer for Oak and Highland Park Coal Company. As reported in the Des Moines Leader:

No one seemed to know yesterday what interest Mr. Jenney has in the matter, or why he should be named as plaintiff in the suit. Mr. Killmar said: "I think Jenney is a figure head plaintiff for the bridge combine, and that the George King Bridge Company, which bid next to me, is the real plaintiff. I am sure my plans and strain sheets are correct, and that the specifications on which we figured were all that could be desired, and do not anticipate that the suit will amount to much."<sup>13</sup>

The next week, the case was called before a judge. The argument against Killmar and the city council alleged that the city council had not provided identical plans to all the bidders. The council admitted that Killmar had access to more detailed plans, but maintained that any other company could have requested such plans.<sup>14</sup> On August 27, the judge granted the injunction on the basis that the plans submitted to the other bidders were not detailed enough to comply with competitive bidding. The case was then appealed by the city to the Iowa Supreme Court.<sup>15</sup>

Over the next year, the bridge dispute lay fallow as the case pended before the Supreme Court. Finally, on October 20, 1897, the Supreme Court ruled that the plans and specifications let out by the city were fully adequate and reversed the lower court's decision. In the opinion, the court stated "No one is claiming that the work was let for too large a sum, and, in fact, the whole case impresses us as one wherein pure technicalities are relied upon by appellant which go to the form rather than to the substance of the provisions of the statute and ordinances."<sup>16</sup> The decision opened the door for work to finally begin on the bridge, and Killmar planned for the erection of the piers that fall.

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<sup>13</sup>"Fifth Street Bridge, "Des Moines Leader, 11 August 1896, 8.

<sup>14</sup>"Jenney vs. The City," Des Moines Leader, 18 August 1896, 4.

<sup>15</sup>"Bridge Injunction Granted," Des Moines Leader, 28 August 1896, 7.

<sup>16</sup>C. Jenney v. City of Des Moines, et al., Appeal from Polk District Court, Reports of Cases at Law and in Equity Determined by the Supreme Court of Iowa, October 7, 1897-December 15, 1897.

Again, however, more problems and delays beset the Fifth Street Bridge. No work was done in the fall as Killmar waited for the steel for the piers and superstructure. In February of 1898, the Des Moines Leader speculated on the reasons behind the delay:

It has been reported that the delay in the arrival of the material was due to the fact that the eastern company having the contract for furnishing iron work was smothered with orders, and that returning prosperity left it unable to fulfill all demands upon it promptly. This does not appear to be correct. The iron for the bridge is obtained from the King Bridge company, which has, in reality, been making good time in getting it out. Any delay thus far is due to the litigation.<sup>17</sup>

The article explains that King Bridge delayed work on the bridge materials until after the sixty days that the plaintiff had to demand a rehearing, and since December had been at work on the order. Work continued to be delayed until late spring, and the bridge was finally completed on June 17, 1898.

#### DEVELOPMENT OF THE STEEL TRUSS BRIDGE

The Southwest Fifth Street Bridge ranks among Iowa's most significant vehicular spans. With a 401' length, it is one of Iowa's few remaining pinned Pratt through trusses with three or more spans. As one of only three pinned through trusses located in an urban setting, the Southwest Fifth Street Bridge is exceptionally important in its representation of early urban wagon bridge construction.

The bridge consists of three six-panel, pin-connected steel Pratt through trusses. Each span is 135', for a total bridge length of 401', and has a 30' roadway width. It rests on stone abutments and steel cylinder piers which are filled with concrete. The upper chord and inclined end posts are two channels connected by a cover plate and lacing. The lower chords are punched rectangular eyebars. The verticals consist of two channels with lacing, and the diagonals are two punched rectangular eyebars. The deck is asphalt-covered timber on steel stringers.

The truss used for the Fifth Street Bridge, the Pratt, was one of the mainstay truss types in the nineteenth century. Thomas Pratt was one of first designers in America of a truss based on scientific analysis. Born in 1812, he studied engineering at

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<sup>17</sup>"Fifth Street Bridge," Des Moines Leader, 3 February 1898, 6.



Rensselaer Polytechnic Institute in Troy, New York. After graduation, he was hired by the United States Army Engineers to work on the construction of dry docks. After a few years, he left the Corps to begin work as a bridge engineer for the railroad.<sup>18</sup> Pratt received his truss patent with his father in 1844. It had parallel chords with the posts, top chord and end posts in compression, and the bottom chord and diagonals in tension.

The Pratt truss became the primary truss for highway bridges in the late nineteenth century because of its economy of fabrication and construction, and many still exist in Iowa. Built in 1898, the Southwest Fifth Street Bridge is constructed of structural steel, as wrought-iron production dropped after 1894 when mills began switching to the exclusive manufacture of steel.<sup>19</sup> Among the Pratt truss bridges in Iowa, the Southwest Fifth Street Bridge is distinguished by its multiple spans and significant urban location.

The Southwest Fifth Street Bridge stands as one of the most important bridges in Des Moines, as an example of a multiple span steel Pratt truss and for its role in the history of bridge building in the city. The controversies which surrounded the construction of the bridge illuminate patterns of development in Des Moines and the nature of bridge contracting at the turn of the century. The bridge was closed in 1993 and is in jeopardy of being destroyed.

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<sup>18</sup>Carl W. Condit, American Building Art: The Nineteenth Century, (New York: Oxford University Press, 1960), 109-10.

<sup>19</sup>Charles C. Schneider, "The Evolution of the Practice of American Bridge Building," Transactions of the American Society of Civil Engineers, Paper No. 993 (1905), 222-3.

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ADDENDUM TO  
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This appendix is an addendum to a 10-page report previously transmitted to the Library of Congress.

#### **APPENDIX: ADDITIONAL REFERENCES**

Interested readers may consult the Historical Overview of Iowa Bridges, HAER No. IA-88: "This historical overview of bridges in Iowa was prepared as part of Iowa Historic Bridges Recording Project - I and II, conducted during the summers of 1995 and 1996 by the Historic American Engineering Record (HAER). The purpose of the overview was to provide a unified historical context for the bridges involved in the recording projects."