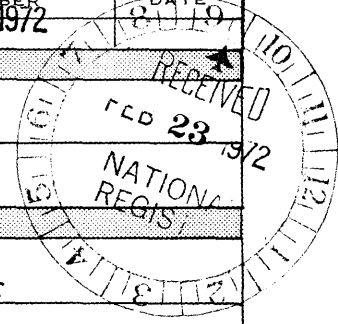


**NATIONAL REGISTER OF HISTORIC PLACES  
INVENTORY - NOMINATION FORM**

(Type all entries - complete applicable sections)

STATE: Maryland	
COUNTY: Howard	
FOR NPS USE ONLY	
ENTRY NUMBER OCT 18 1972	DATE 8/11/72



SEE INSTRUCTIONS

**1. NAME**

COMMON:  
Bollman Truss

AND/OR HISTORIC:  
Bollman Railroad Truss

**2. LOCATION**

STREET AND NUMBER:  
Gorman Road and Savage Road, Little Patuxent River

CITY OR TOWN:  
Savage

STATE Maryland	CODE 24	COUNTY: Howard	CODE 027
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**3. CLASSIFICATION**

CATEGORY (Check One)	OWNERSHIP	STATUS	ACCESSIBLE TO THE PUBLIC
<input type="checkbox"/> District <input type="checkbox"/> Site <input type="checkbox"/> Building <input checked="" type="checkbox"/> Structure <input type="checkbox"/> Object	<input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> Both	Public Acquisition: <input type="checkbox"/> In Process <input type="checkbox"/> Being Considered	<input type="checkbox"/> Occupied <input type="checkbox"/> Unoccupied <input checked="" type="checkbox"/> Preservation work in progress
PRESENT USE (Check One or More as Appropriate)			
<input type="checkbox"/> Agricultural <input type="checkbox"/> Commercial <input type="checkbox"/> Educational <input type="checkbox"/> Entertainment	<input type="checkbox"/> Government <input type="checkbox"/> Industrial <input type="checkbox"/> Military <input type="checkbox"/> Museum	<input checked="" type="checkbox"/> Park <input type="checkbox"/> Private Residence <input type="checkbox"/> Religious <input type="checkbox"/> Scientific	<input type="checkbox"/> Transportation <input type="checkbox"/> Other (Specify)

**4. OWNER OF PROPERTY**

OWNER'S NAME:  
County Executive, Howard County, Howard County Courthouse

STREET AND NUMBER:  
21043 Court Place

CITY OR TOWN: Ellicott City	STATE: Maryland	CODE 24
--------------------------------	--------------------	------------

**5. LOCATION OF LEGAL DESCRIPTION**

COURTHOUSE, REGISTRY OF DEEDS, ETC.:  
Howard County Courthouse

STREET AND NUMBER:  
21043 Court Place

CITY OR TOWN: Ellicott City	STATE: Maryland	CODE 24
--------------------------------	--------------------	------------

**6. REPRESENTATION IN EXISTING SURVEYS (SEE CONTINUATION SHEET)**

TITLE OF SURVEY:  
Maryland Register of historic sites and landmarks

DATE OF SURVEY: 1970  Federal  State  County  Local

DEPOSITORY FOR SURVEY RECORDS:  
Maryland Historical Trust

STREET AND NUMBER:  
94 College Avenue

CITY OR TOWN: Annapolis	STATE: Maryland	CODE 24
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STATE: Maryland
COUNTY: Howard
ENTRY NUMBER OCT 18 1972
DATE

FOR NPS USE ONLY

7. DESCRIPTION

CONDITION	(Check One)					
	<input type="checkbox"/> Excellent	<input checked="" type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Deteriorated	<input type="checkbox"/> Ruins	<input type="checkbox"/> Unexposed
	(Check One)			(Check One)		
	<input type="checkbox"/> Altered	<input checked="" type="checkbox"/> Unaltered		<input checked="" type="checkbox"/> Moved	<input type="checkbox"/> Original Site	

DESCRIBE THE PRESENT AND ORIGINAL (if known) PHYSICAL APPEARANCE

On an abandoned Baltimore and Ohio Railroad spur in the village of Savage, Maryland, approximately three miles northeast of Laurel, halfway between Washington and Baltimore, is one of America's more significant civil engineering relics. This two-span iron truss bridge is the sole surviving example of a type that played a critical role in railroad development, a story that has characteristically been dominated by the parallel progress of the locomotive.

The 1850 structure, patented in 1852, was a small span of seventy-six feet and to some extent experimental. The design was undoubtedly inspired by the classical method of strengthening a wood beam by the addition of an iron truss rod below. The Bollman truss was invariably of composite construction: those members subjected to tensile stresses were of wrought iron; those in compression were of cheaper cast iron.

George K. Fitch in the Baltimore Engineer says:

The idea of an all iron bridge was not original with Bollman. Such bridges were fairly common in England, the material at first being cast iron. The development of wrought iron and its use in combination with cast iron made a satisfactory structure but the idea failed to interest American designers principally because of the abundance of timber and the difficulty of obtaining sufficient quantities of usable iron.

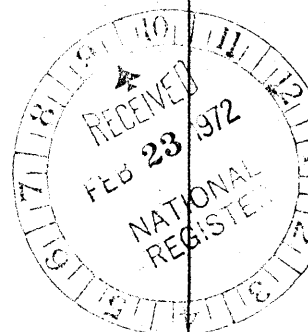
By 1850, manufacturing of iron products in America had overcome any shortage.

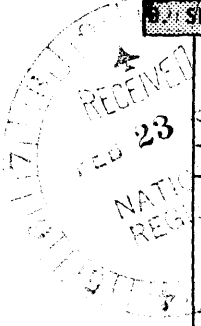
The truss designed by Bollman was not in a true sense a truss. Rather it partook of the nature of a suspension bridge. It has been said that Latrobe, under whom Bollman worked, was skeptical of the prevalent trussing system in which the separate panel loads were accumulatively carried back to the end posts. In the Bollman design each panel load was individually carried back to the end of the bridge.

Bollman adopted the familiar "king post" method of strengthening a beam by placing a short post underneath the beam at the center point and supporting the bottom end of the post by diagonal tension rods attached to the ends of the beam. This is exactly what Bollman did

(SEE CONTINUATION SHEET)

SEE INSTRUCTIONS





**SIGNIFICANCE**

PERIOD (Check One or More as Appropriate)

<input type="checkbox"/> Pre-Columbian	<input type="checkbox"/> 16th Century	<input type="checkbox"/> 18th Century	<input type="checkbox"/> 20th Century
<input type="checkbox"/> 15th Century	<input type="checkbox"/> 17th Century	<input checked="" type="checkbox"/> 19th Century	

SPECIFIC DATE(S) (If Applicable and Known) 1869

AREAS OF SIGNIFICANCE (Check One or More as Appropriate)

<input checked="" type="checkbox"/> Aboriginal	<input type="checkbox"/> Education	<input type="checkbox"/> Political	<input type="checkbox"/> Urban Planning
<input type="checkbox"/> Prehistoric	<input checked="" type="checkbox"/> Engineering	<input type="checkbox"/> Religion/Philosophy	<input checked="" type="checkbox"/> Other (Specify)
<input type="checkbox"/> Historic	<input type="checkbox"/> Industry	<input type="checkbox"/> Science	<u>Bridge construction</u>
<input type="checkbox"/> Agriculture	<input type="checkbox"/> Invention	<input type="checkbox"/> Sculpture	<u>Iron technology</u>
<input type="checkbox"/> Architecture	<input type="checkbox"/> Landscape Architecture	<input type="checkbox"/> Social/Humanitarian	_____
<input type="checkbox"/> Art	<input type="checkbox"/> Literature	<input type="checkbox"/> Theater	_____
<input type="checkbox"/> Commerce	<input type="checkbox"/> Military	<input checked="" type="checkbox"/> Transportation	_____
<input type="checkbox"/> Communications	<input type="checkbox"/> Music		_____
<input type="checkbox"/> Conservation			_____

STATEMENT OF SIGNIFICANCE

The Bollman bridge at Savage, Maryland, is the sole surviving Bollman truss in the United States, and possibly in the world.

The system of bridge trussing invented by the Baltimore engineer Wendel Bollman (1814-1884) was the first to be used with consistency on an American railroad in which all of the principal structural members were of iron.

The direct and intimate relationship of this bridge to two present National Historic Landmarks should be noted. The Thomas Viaduct, Howard and Baltimore Counties, and the Baltimore and Ohio Transportation Museum, Baltimore City, have been so designated as fitting recognition of the vital role played by the Baltimore and Ohio Railroad in America's internal communication and transportation. The Bollman truss, it can be fairly stated, played as vital a role in the railroad's development as did any other single aspect of its early plant.

The Bollman truss bridge at Savage is the only structure in Maryland designated as a National Historic Civil Engineering Landmark (1966) by the American Society of Civil Engineers.

Bollman, serving under Benjamin H. Latrobe as "Master of Road" for the Baltimore and Ohio Railroad, gave form to the concept with what he termed a "suspension" truss.

From its inception, as the first commercially organized railroad in the United States, the Baltimore and Ohio was a pioneer venture. Its innovations in railway construction, motive power and structural engineering, influenced and led the thinking of railroads around the world. No single departure was more crucial than the decision of Benjamin H. Latrobe, the Railroad's Chief Engineer, in about 1848, to substitute iron for timber in all major bridges along the line, both old and new, to eliminate fire hazard, rot and the other defects and hazards inherent in timber construction.

(SEE CONTINUATION SHEET)

SEE INSTRUCTIONS

9. MAJOR BIBLIOGRAPHICAL REFERENCES

Recorders: Michael Bourne, Maryland Historical Trust, Annapolis, Maryland, 1968; Nancy Miller, Historian, Maryland Historical Trust, 1969.

Biographical Cyclopedia of Representative Men of Maryland and the District of Columbia. Baltimore: National Biographical Publishing, 1879.

(SEE CONTINUATION SHEET)

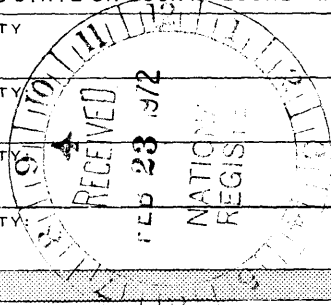
10. GEOGRAPHICAL DATA

LATITUDE AND LONGITUDE COORDINATES DEFINING A RECTANGLE LOCATING THE PROPERTY			O R	LATITUDE AND LONGITUDE COORDINATES DEFINING THE CENTER POINT OF A PROPERTY OF LESS THAN TEN ACRES		
CORNER	LATITUDE	LONGITUDE		LATITUDE	LONGITUDE	
	Degrees Minutes Seconds	Degrees Minutes Seconds		Degrees Minutes Seconds	Degrees Minutes Seconds	
NW	° ' "	° ' "		39 ° 06 ' 55.5"	76 ° 49 ' 31.0"	
NE	° ' "	° ' "				
SE	° ' "	° ' "				
SW	° ' "	° ' "				

APPROXIMATE ACREAGE OF NOMINATED PROPERTY: 4 acres (SEE CONTINUATION SHEET)

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE:	CODE	COUNTY	CODE



SEE INSTRUCTIONS

11. FORM PREPARED BY

NAME AND TITLE:  
Mrs. Preston Parish, Keeper of the Maryland Register

ORGANIZATION: Maryland Historical Trust      DATE: Dec. 22, 1971

STREET AND NUMBER:  
94 College Avenue

CITY OR TOWN: Annapolis      STATE: Maryland      CODE: 24

12. STATE LIAISON OFFICER CERTIFICATION

NATIONAL REGISTER VERIFICATION

As the designated State Liaison Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service. The recommended level of significance of this nomination is:

National  State  Local

Name Orlando Ridout IV  
Orlando Ridout IV  
Title State Liaison Officer for Maryland  
Date December 23, 1971

I hereby certify that this property is included in the National Register.

Robert M. Utley  
Chief, Office of Archeology and Historic Preservation

Date 10/18/72

ATTEST:  
Orlando Ridout IV  
Keeper of The National Register  
Date 10/12/72

NATIONAL REGISTER OF HISTORIC PLACES  
INVENTORY - NOMINATION FORM

(Continuation Sheet)

STATE Maryland	
COUNTY Howard	
FOR NPS USE ONLY	
ENTRY NUMBER	DATE
007 2 23 1972	

Number all entries

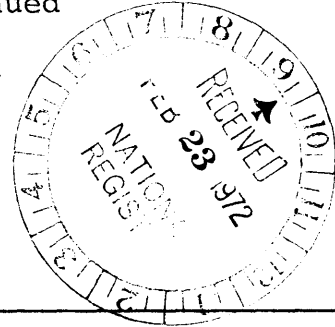
Bollman Truss

## #6. REPRESENTATION IN EXISTING SURVEYS continued

National Historic Civil Engineering Landmark

1966 Federal

American Society of Civil Engineers  
345 E. 47th Street  
New York, New York code: 36



## #7. DESCRIPTION continued

at each lower panel point of his truss. It should also be noted that the truss had no bottom chord and the downward stress in each vertical post was carried directly to the end posts by flat bars of wrought iron. In other words the vertical load in each post was suspended from the end posts.

This confusion of diagonal bracing gave the truss a spider-web looking elevation, but the theory was correct with one exception. Only the diagonals attached to the center post of the bridge were equal in length. All other diagonals had different lengths, which affected any distortion of material due to temperature changes causing unequal expansion in the diagonals making it difficult to keep the bridge in line.

Robert M. Vogel in an interview states in "Engineering Contributions of Wendel Alan Bollman":

A feature of the Bollman system was the independence of its structural units. Each floor beam was supported by two separate pairs of diagonal wrought-iron ("I") eye-bars or ties on each side of the bridge, so that if those carrying one beam should for any reason fail, the others would continue to carry their load undisturbed, preventing total collapse. Much was made of this point in an era when structural failures were not uncommon, and the spindly appearance of ironwork, contrasted with the familiar massiveness of works in timber

NATIONAL REGISTER OF HISTORIC PLACES  
INVENTORY - NOMINATION FORM

(Continuation Sheet)

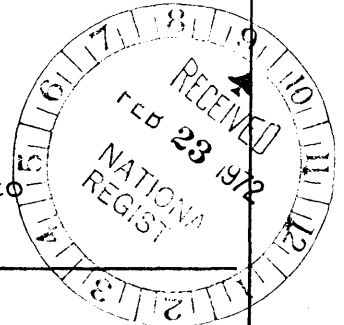
STATE Maryland	
COUNTY Howard	
FOR NPS USE ONLY	
ENTRY NUMBER OCT 18 1972	DATE

(Number all entries)

Bollman Truss

## #7. DESCRIPTION continued

and masonry, was a source of some uncertainty to the traveling public.



## #8. SIGNIFICANCE continued

In view of the primitive state of structural theory and practice with iron construction material at the time, plus the high cost and limited supply of the material, the proposal was an awesome one.

Gradually Bollman improved his truss bridge design which the Baltimore and Ohio used exclusively for cast iron railroad bridges until 1873 when heavier railroad trains demanded a different, more durable, structural material. Approximately one hundred Bollman-designed spans, erected either by the Baltimore and Ohio or by Bollman's company, the Patapsco Bridge and Iron Works, were constructed in the United States and in Latin America. As an example of the durability of the Bollman truss, the bridge over the Potomac at Harper's Ferry--where Bollman's cast iron trusses gradually replaced the wooden bridge (1852 to 1870)--served the Baltimore and Ohio and, later, highway traffic until destroyed by a flood in 1936.

The commitment of the Baltimore and Ohio Railroad to the Bollman truss is significant in that this decision helped reduce world suspicion about cast iron for bridge construction. The Baltimore and Ohio's confidence in cast iron induced many people in America and abroad to experiment with this then revolutionary material.

Wendel Bollman was born in Baltimore in 1814. His connection with the Baltimore and Ohio Railroad Company began on July 4, 1828 (aged 14): Bollman, before he was eighteen years old, was present when Charles Carroll of Carrollton (1737-1832) turned the first spade of earth beginning the construction of the Baltimore and Ohio Railroad. For the next two years Bollman worked as a carpenter's apprentice laying track for the Baltimore and Ohio. From 1830 to 1837 Bollman studied carpentry and became a journeyman. In 1838, while working on a house in Harper's Ferry, Bollman was asked to help repair the wooden Baltimore and Ohio Railroad bridge over the Potomac. After completing the repairs Bollman was given a permanent job at age twenty-two with the Baltimore

Form 10-3006A  
(July 1969)UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICENATIONAL REGISTER OF HISTORIC PLACES  
INVENTORY - NOMINATION FORM

(Continuation Sheet)

STATE Maryland	
COUNTY Howard	
FOR NPS USE ONLY	
ENTRY NUMBER 001 8	DATE 18 1972

Bollman Truss

## #8. SIGNIFICANCE continued

and Ohio as foreman of the bridge construction. Through self education and native ability, Bollman worked himself up to assistant, working as bridge designer for the Chief Engineer, Benjamin H. Latrobe. In 1848 Bollman was made "Master of the Road" for the Baltimore and Ohio Railroad Company which put him in charge of all construction. During his service in this position the Baltimore and Ohio completed the arduous continuation of the railroad across the mountains to the Ohio River.

His contribution to engineering is the design of more than one hundred bridges, erected by the Baltimore and Ohio Railroad Company before 1880. More significant at the time, however, were the advances Bollman made in structural theory: the rods on the Bollman truss were forerunners, in theory, to the cables used in suspension bridges. Bollman's iron columns for a bridge in Havana, Cuba, provided the inspiration for the rolled-iron columns, known as the "Phoenix" form which circumvented the brittle qualities of wrought iron. Bollman's name is not as familiar as that of John Augustus Roebling, designer of the Brooklyn Bridge, however, his influence in the development of iron bridges is equal to Roebling's.

In 1858 Bollman left the Baltimore and Ohio Company to form his own bridge building company. The Baltimore and Ohio Company continued to use Bollman's trusses and his services. In 1864 he designed the Y-shaped Harper's Ferry Bridge, which remained in good working order continuously through 1894. Bollman, working through a company of his own, designed bridges in Iowa, over the Mississippi, in Ohio, over the Ohio River, and in North Carolina, over the Cape Fear River. Bollman's skills were also in demand in Chile, Mexico, and Cuba. In his native city--Baltimore--Bollman designed a dozen bridges, including the water pipe truss over Jones Falls stream, at Lombard Street; the cast iron framework for the dome, as well as the cast iron stairs, of the City Hall, Baltimore (designed in 1873 by George A. Frederick).

The present (1971) Savage bridge was built in 1869 on the main line. As locomotive and train weight increased it became inadequate for this service and in 1888 the 1869 Savage bridge was removed to its present location on the Savage spur.

NATIONAL REGISTER OF HISTORIC PLACES  
INVENTORY - NOMINATION FORM

(Continuation Sheet)

STATE	
Maryland	
COUNTY	
Howard	
FOR NPS USE ONLY	
ENTRY NUMBER	DATE
0018	10/18/72

(Number all entries)

Bollman Truss

## #9. REFERENCES continued

Edwards, Lewellyn Nathaniel. A Record of History and Evolution of Early American Bridges. Orono, Maine: Maine University Press, 1959.

Fitch, George K. "Wendel Bollman . . . and His Times." Baltimore Engineer. Vol. XLI (November 1966), 5-6, 12.

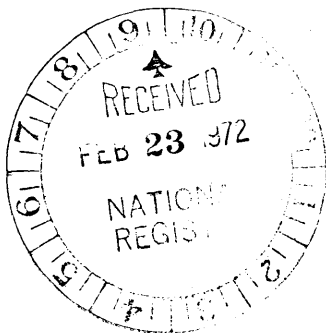
Hungerford, Edward. The Story of the Baltimore and Ohio Railroad 1827-1927. 2 vols. New York: G. P. Putnam's Sons, 1928.

Stover, John F. American Railroads. Chicago: University of Chicago Press, 1961.

Vogel, Robert M., Jr. "Engineering Contributions of Wendel Alan Bollman." Paper #36. U. S. National Museum Bulletin #240. Washington, D. C., 1964.

## #10. GEOGRAPHICAL DATA continued

This bridge, as a significant engineering monument, would require a protective area of four acres to assure that incompatible encroachments do not intrude upon the location.



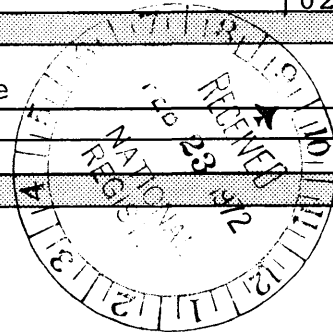


Form 10-301  
(July 1969)UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICENATIONAL REGISTER OF HISTORIC PLACES  
PROPERTY MAP FORM*(Type all entries - attach to or enclose with map)*

STATE Maryland	
COUNTY Howard	
FOR NPS USE ONLY	
ENTRY NUMBER OCT 18 1974	DATE

<b>1. NAME</b>			
COMMON: Bollman Truss			
AND/OR HISTORIC: Bollman Railroad Truss			
<b>2. LOCATION</b>			
STREET AND NUMBER: Gorman Road and Savage Road over Little Patuxent River			
CITY OR TOWN: Savage			
STATE: Maryland	CODE 24	COUNTY: Howard	CODE 027
<b>3. MAP REFERENCE</b>			
SOURCE: U.S.G.S. 7.5 minute map; Savage Quadrangle			
SCALE: 1: 24,000			
DATE: 1957			
<b>4. REQUIREMENTS</b>			
TO BE INCLUDED ON ALL MAPS			
1. Property boundaries where required.			
2. North arrow.			
3. Latitude and longitude reference.			

SEE INSTRUCTIONS



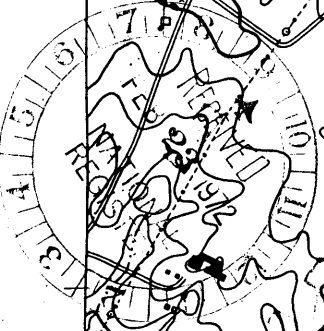
WASHINGTON D.C. 23 MI.  
SCAGGSVILLE 218 MI.

Savage Quadrangle  
USGS 7.5 minute map  
scale: 1:24,000  
1957

(Maryland)

10'

480 000  
FEET



5.8 MI. TO MD. 108  
SCAGGSVILLE 1.7 MI.



lat. 39° 06' 51" N  
long. 76° 49' 31" W

07°30'  
76°52'30"

840 000 FEET

