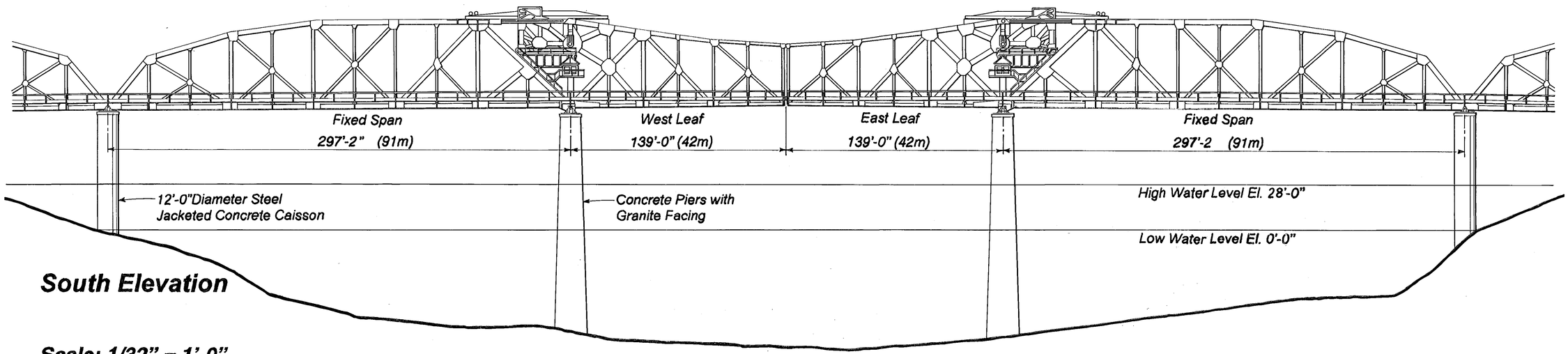
TRIM LINE

BROADWAY BRIDGE

PORTLAND - 1913 - OREGON



South Elevation

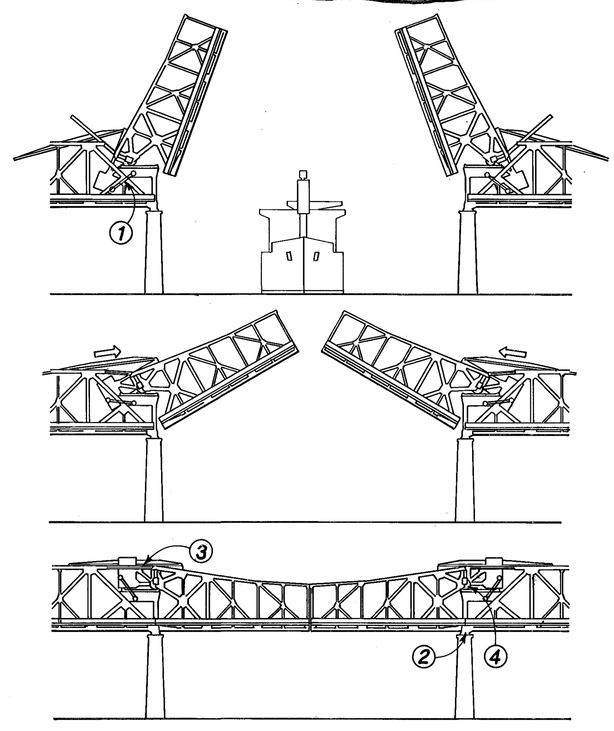
Scale: 1/32" = 1'-0"

0 25 50 100 feet

0 5 10 20 30 meters

Note: See overview information, HAER no. OR 21, Willamette River Bridges.

The Broadway Bridge emerged from debates among Portland business and political leaders, guided by consulting engineer, Ralph Modjeski, who brought diplomatic as well as technical expertise to the job. Shipping interests wanted a high bridge with substantial horizontal clearance. Teamsters and commuters hoped to avoid delays from bridge openings. But real estate costs made the long access ramps of a high fixed span expensive. Modjeski proposed, instead, a bascule sufficiently high that all but tall-masted vessels could clear it. Since the bascule would open infrequently, cost, rather than speed, won the debate over type. The contest between Rall and Strauss bascule interests was especially spirited because the Broadway would be the nation's longest bascule and patent holders anticipated great publicity. Ironically, over the next decades rolling lift mechanisms, such as the Rall, lost ground to fixed trunnion bascules, such as the Strauss. The Broadway remains the world's largest Rall, and one of the few surviving ones.



Fully Open *– The Bascule Spans are at 89 degrees from horizontal and bears most of its weight upon the Rall Wheel that has rolled to the other end of the Track Girder. The control strut ① has traveled through its full range of movement. The process is reversed for closing the bridge.*

Closing *– The Operating Struts (Shown with arrows) begin to push the bridge closed. The bascule spans pivot at the trunnions in the Rall Wheels that roll back along the Track Girder. The overall movement of the bridge opening is governed by the Control Struts which have pinned connections at the Counterweight and Track Girders*

Closed Position *– The Bascule spans behave as ordinary cantilevers with compression forces bearing on the Bridge Seat ② while the anchor strut ③ takes up tensile forces. Little or no weight bears upon the Rall Wheel ④ The bascule spans are held in place by the Latch mechanism located in the West Leaf.*

HISTORIC AMERICAN ENGINEERING RECORD OR - 22

SHEET 1 OF 3

BROADWAY BRIDGE - 1913
SPANNING WILLAMETTE RIVER ON BROADWAY AVENUE
MULTNOMAH COUNTY
PORTLAND OREGON

DELINEATED BY: JOSEPH A. BOQUIREN, MANUEL HERNANDEZ, 1999

WILLAMETTE RIVER BRIDGES RECORDING PROJECT
HISTORIC AMERICAN ENGINEERING RECORD
UNITED STATES DEPARTMENT OF THE INTERIOR

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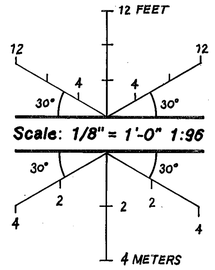
TRIM LINE

WEST LEAF BASCULE SPAN



Legend

A. Operating Strut
B. Rail Wheel
C. Track Girder
D. Control Strut
E. Operating Machinery
F. Sway Bracing
G. Wood roadway decking (original)
H. Counterweight (approx. 1000 tons)

Anchor Strut (SW Strut not shown)

Top Chord Bascule Span

Top Chord Fixed Span

Latch Mechanism (See Detail)

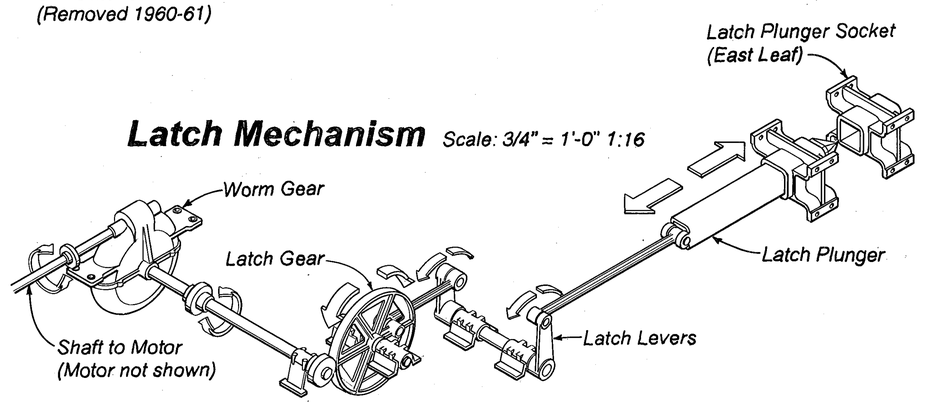
Bottom Chord Bascule Span

SW Gatehouse (Removed 1960-61)

Pier

Bottom Chord Fixed Span

Latch Mechanism Scale: 3/4" = 1'-0" 1:16



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WILLAMETTE RIVER BRIDGES RECORDING PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

BROADWAY BRIDGE - 1913
SPANNING WILLAMETTE RIVER ON BROADWAY AVENUE
MULTNOMAH COUNTY
PORTLAND OREGON

SHEET 2 OF 3

HISTORIC AMERICAN ENGINEERING RECORD
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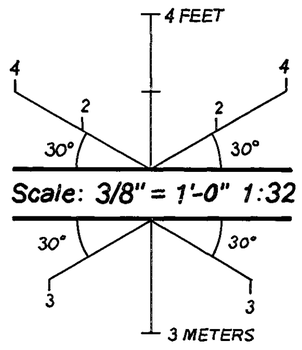

Operating Strut

This component opens and closes the span through a pin connection located at the top of the sway bracing.

Rack

Pin

Top Chord Bascule Span

Sway Bracing

75 hp Motor

Reduction Gears

Operating Machinery

These elements move the operating strut back and forth through a series of reduction gears that engage a rack along the bottom edge of the strut.

Anchor Strut

Box Girder

Trunnion

Pin

Counterweight Box

Track

Rall Wheel

The centerpiece of the Rall Mechanism, this wheel rolls back and forth along its track while the span pivots along the trunnion located within the wheel.

Control Strut

Acting as a movement limiter, the arc of the span motion centers on the control strut's pin connection at the track girder.

Pin

Main Post

Bottom Chord Bascule Span

Bearing Shoe

A seat forming a part of the shoe receives the end of the bascule span bottom chord.

Bottom Chord Fixed Span

MECHANICAL COMPONENTS

DELINEATED BY: *JOSEPH A. BOQUIREN, 1999*

WILLAMETTE RIVER BRIDGES RECORDING PROJECT NATIONAL PARK SERVICE UNITED STATES DEPARTMENT OF THE INTERIOR	BROADWAY BRIDGE - 1913 SPANNING WILLAMETTE RIVER ON BROADWAY AVENUE PORTLAND — MULTNOMAH COUNTY — OREGON	SHEET 3 OF 3	HISTORIC AMERICAN ENGINEERING RECORD OR - 22	LIBRARY OF CONGRESS INDEX NUMBER

TRIM LINE

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