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THE

BRITANNIA AND CONWAY

TUBULAR BRIDGES

BY

EDWIN CLARK

RESIDENT ENGINEER.

WITH THE SANCTION AND UNDER THE IMMEDIATE SUPERVISION OF

ROBERT STEPHENSON.

Plates

Königl. Ministerium der öffentlichen Arbeiten Bibliothek

LONDON:

PUBLISHED FOR THE AUTHOR,

BY

JOHN WEALE, 59 HIGH HOLBORN.

1850.

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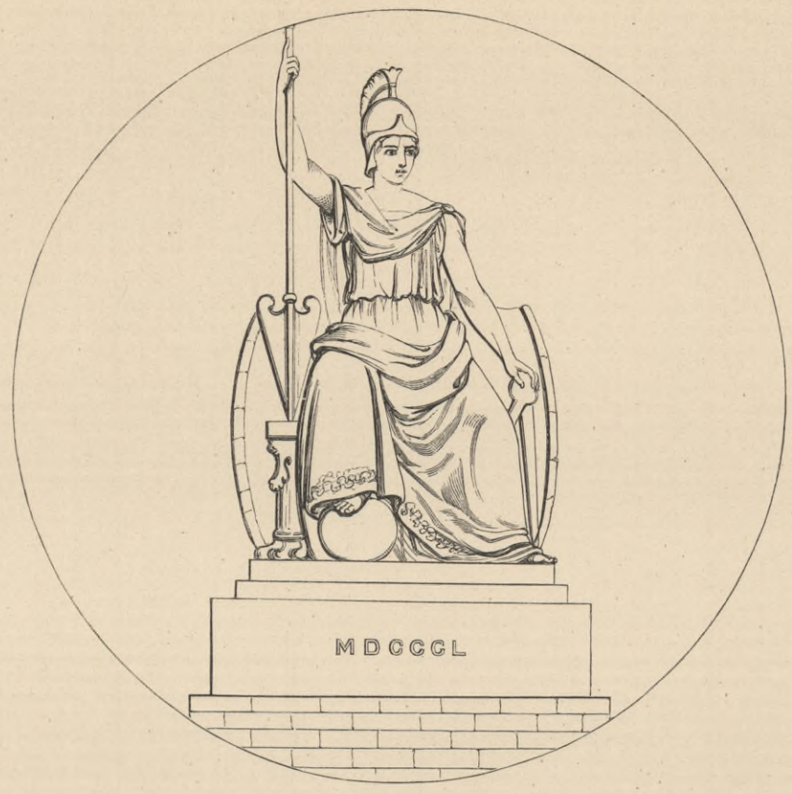

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BRITANNIA BRIDGE.

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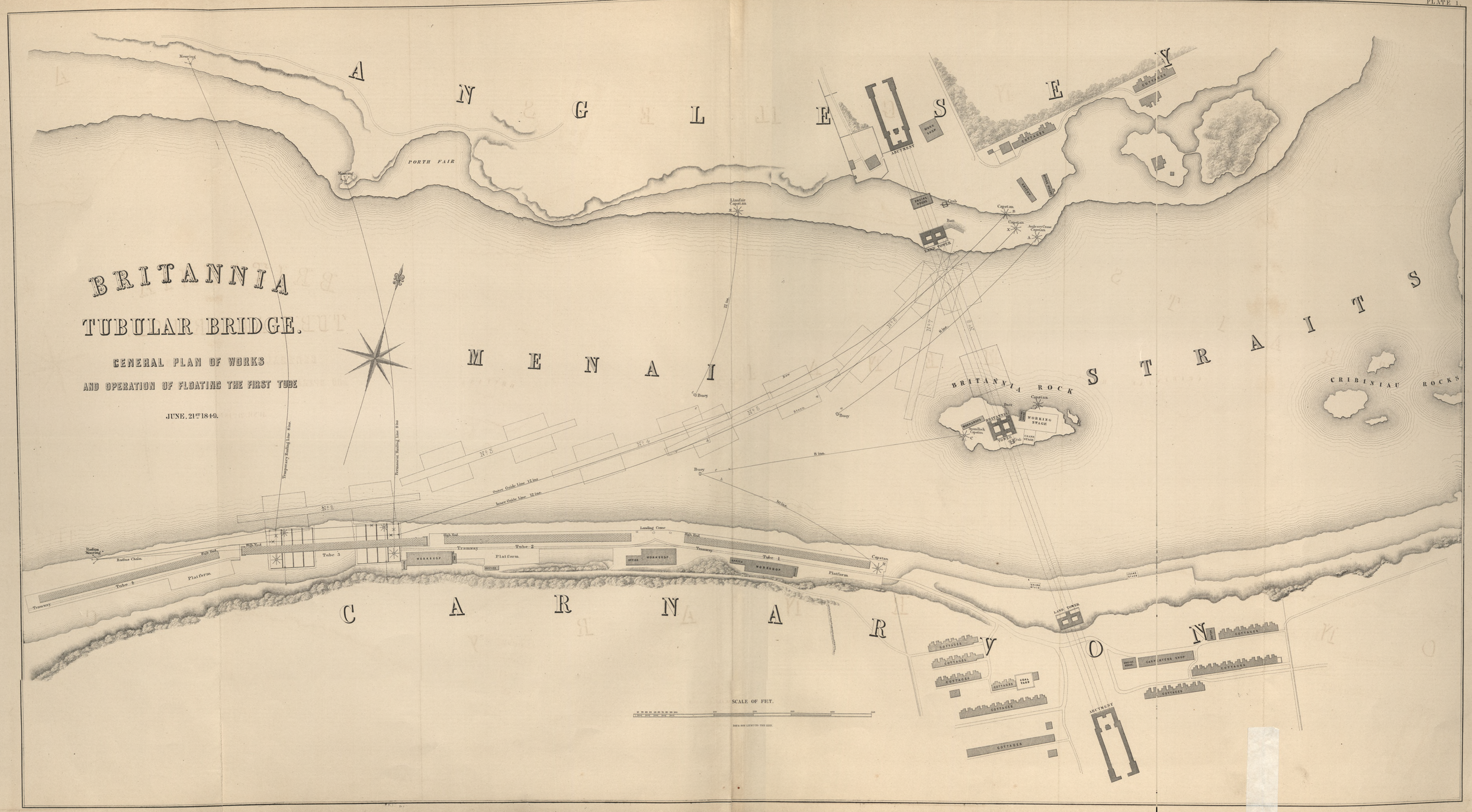
The Six Tinted Lithographs are Drawn on Stone by Mr. George Hawkins, from Sketches made by Himself, and are Printed by Messrs. Day and Son, Lithographers to the Queen.

The remaining Forty Plates are Engraved on Stone by Messrs. Day and Son, by whom they are also Printed.


BRITANNIA
TUBULAR BRIDGE.
GENERAL PLAN OF WORKS
AND OPERATION OF FLOATING THE FIRST TUBE
JUNE. 21st 1849.
ANGLESEY
MENAI STRAITS
CARNARVON
PORTH FAIR
BRITANNIA ROCK
CRIBINIAU ROCKS
Mooring
Temporary Building Line 8 ins.
Permanent Building Line 8 ins.
Outer Guide Line 12 ins.
Inner Guide Line 12 ins.
Tube 1
Tube 2
Tube 3
Tube 4
Platform
Tramway
High Rod
Radius Chain
Radius Mooring
Landing Crane
WORKSHOP
OFFICE
ABUTMENT
ENGINE HOUSE
LAND TOWER
COTTAGES
COAL YARD
CARPENTERS SHOP
WORKING STAGE
CRANE STAGE
Capstan
Buoy
Batt
Crab
SCALE OF FEET.

G. Hawkins, del. et lith.

ROBERT STEPHENSON, ESQ. M.P. ENGINEER.

Day & Son, lith.rs to the Queen.

BRITANNIA BRIDGE.

GENERAL VIEW OF WORKS, SEPTEMBER 1848.

London, Published for the Author, 1st Augt 1848.

G. Hawkins del et lith.

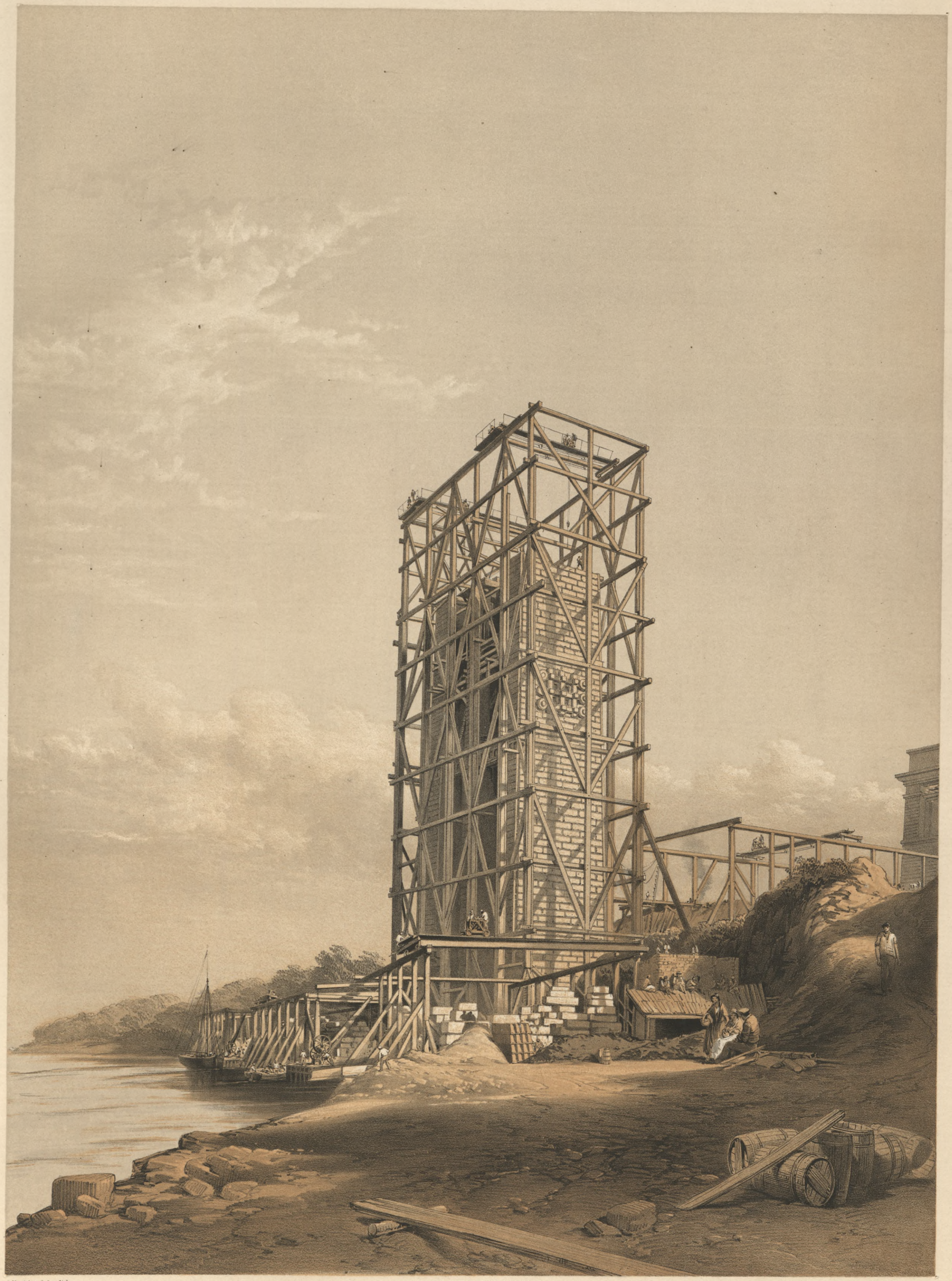
ROBERT STEPHENSON, ESQ. M.P. ENGINEER.

Day & Son lith.rs to the Queen

BRITANNIA BRIDGE.

PLATFORM AND CONSTRUCTION OF TUBES, SEPTEMBER 1848

London, Published for the Author 1st Aug.t 1849



C. Hawkins, del et lith. ROBERT STEPHENSON, ENGINEER. Day & Son Lith.rs to the Queen.

BRITANNIA BRIDGE, CARNARVON TOWER.

SEPTEMBER, 1848.

London, Published by John Weale 59 High Holborn, Aug.st 1st 1849

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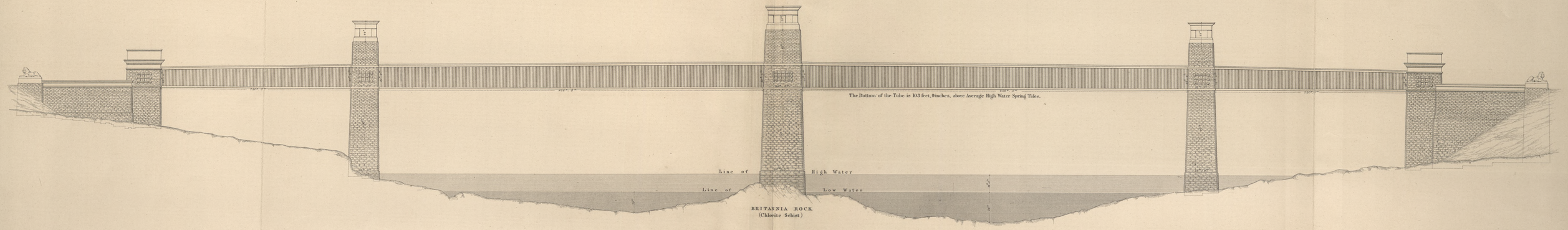
BRITANNIA TUBULAR BRIDGE.

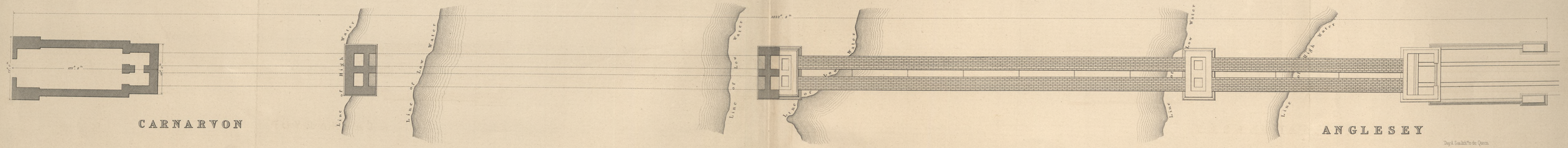
ELEVATION



FOUNDATIONS

PLAN

SUPERSTRUCTURE



SCALE

London, Published by John Weale, 59, High Holborn, 1st Aug.st 1849.

Day & Son lith.rs to the Queen.

Day & Son lith. to the Queen.

BRITANNIA TUBULAR BRIDGE

GENERAL VIEW.

London, Published for the Author, 1st August, 1849.

London, Published for the Author, 1st Augt 1849.

Dedd. on Liberty to the Queen.

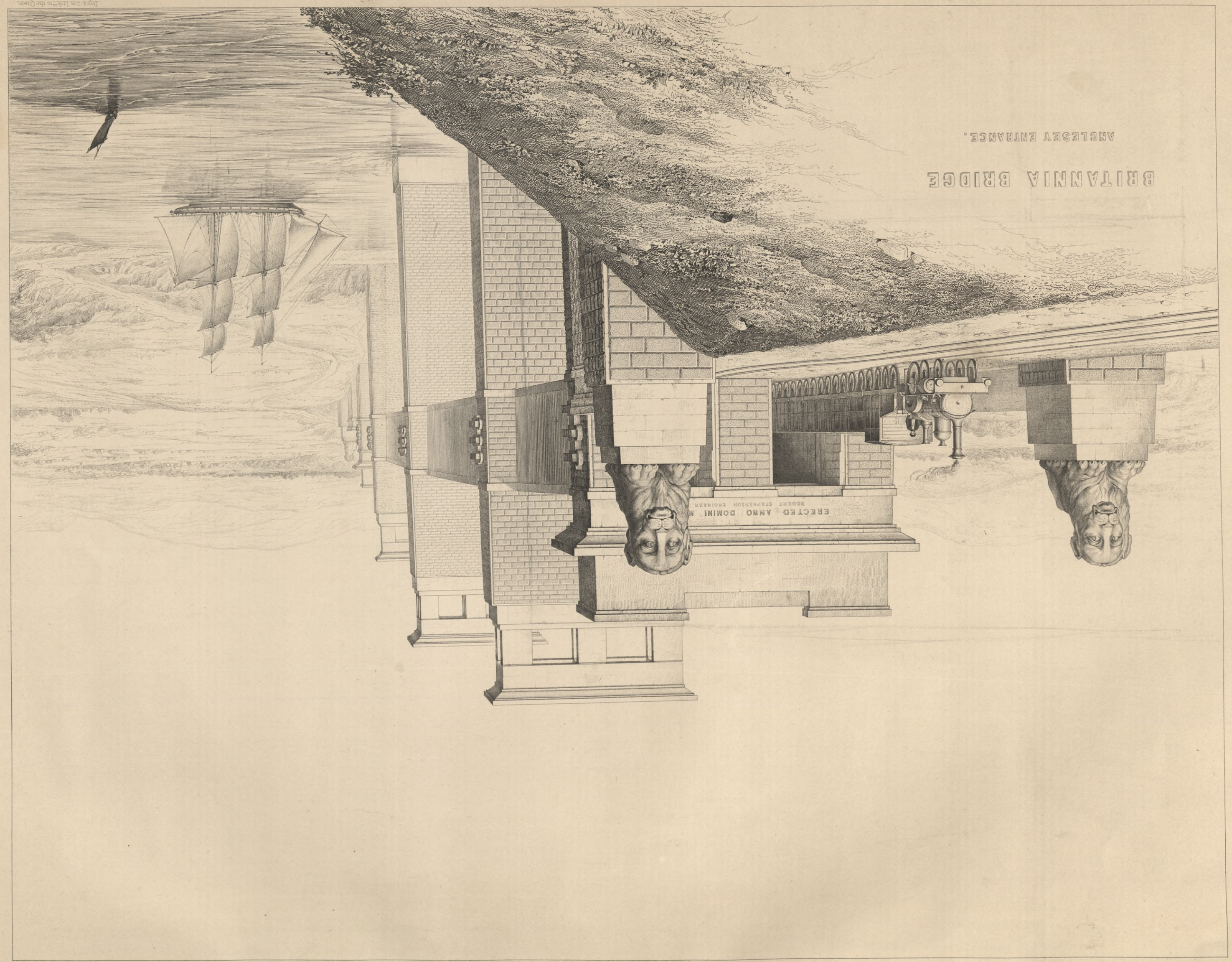
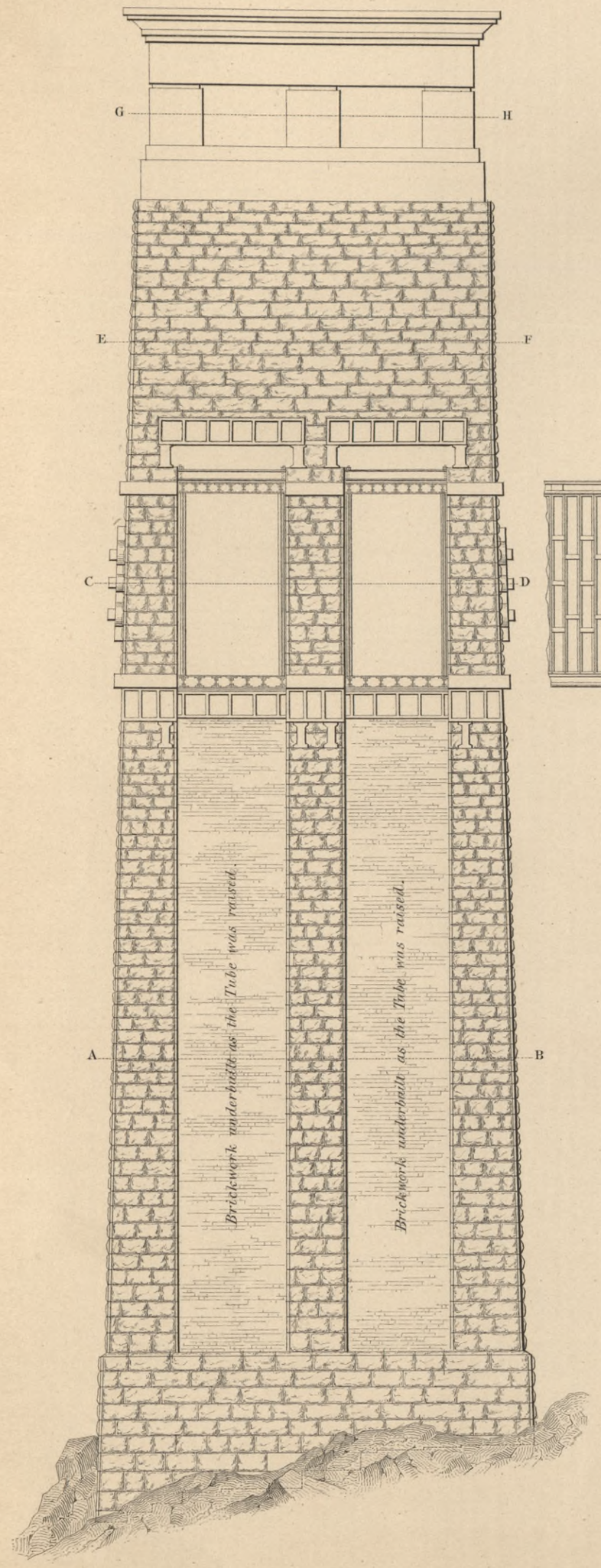


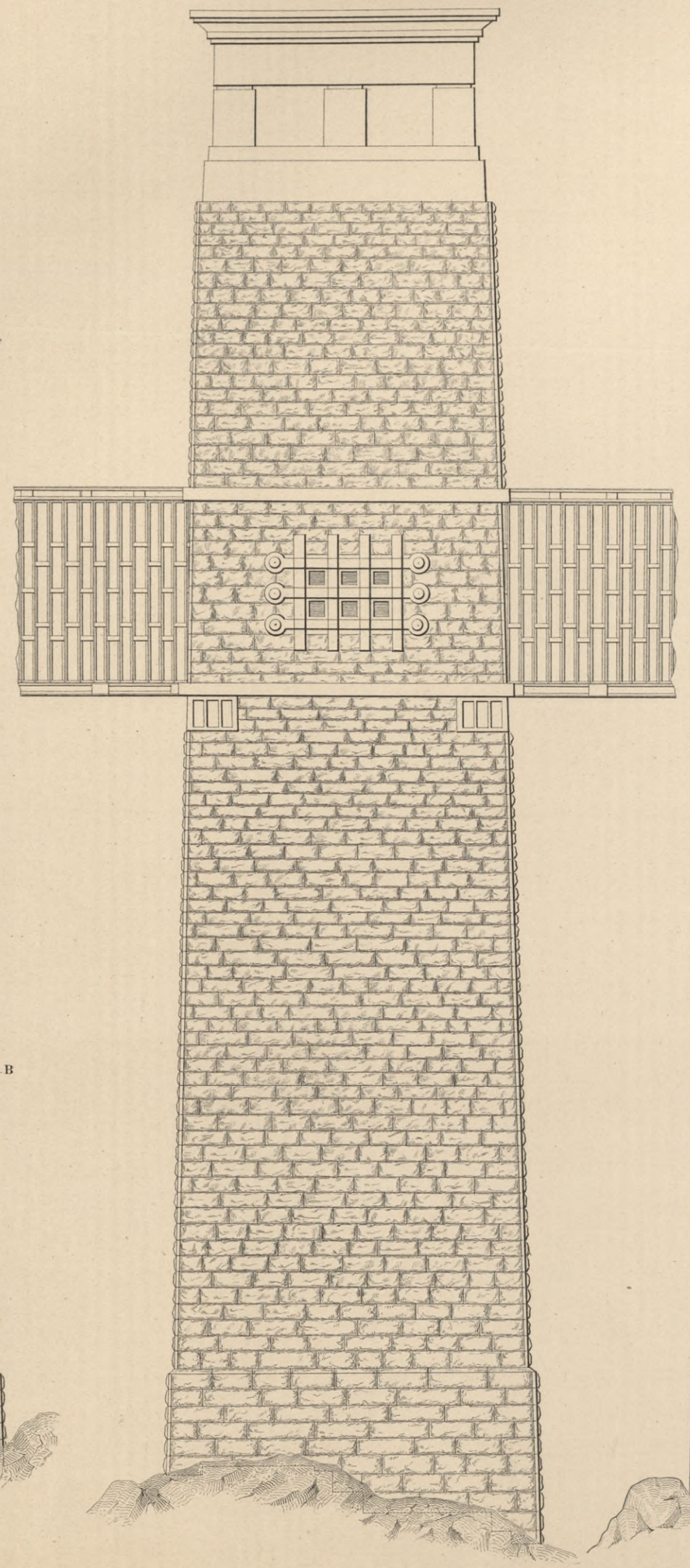
PLATE VII.

BRITANNIA TOWER.

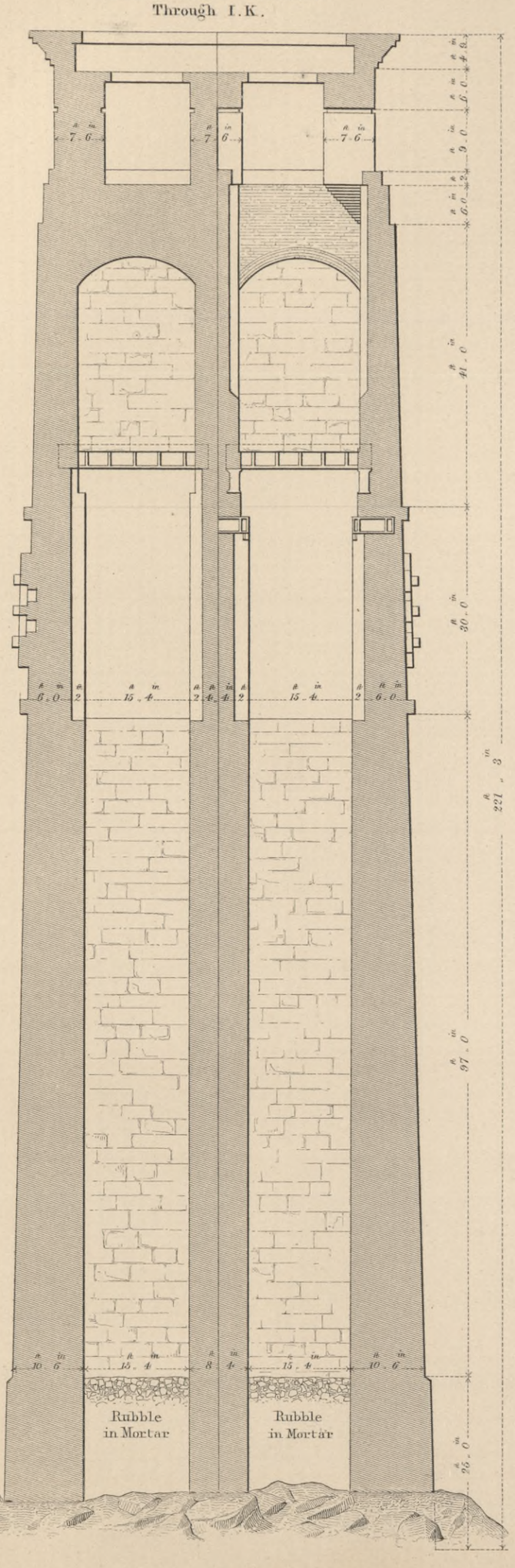
END ELEVATION



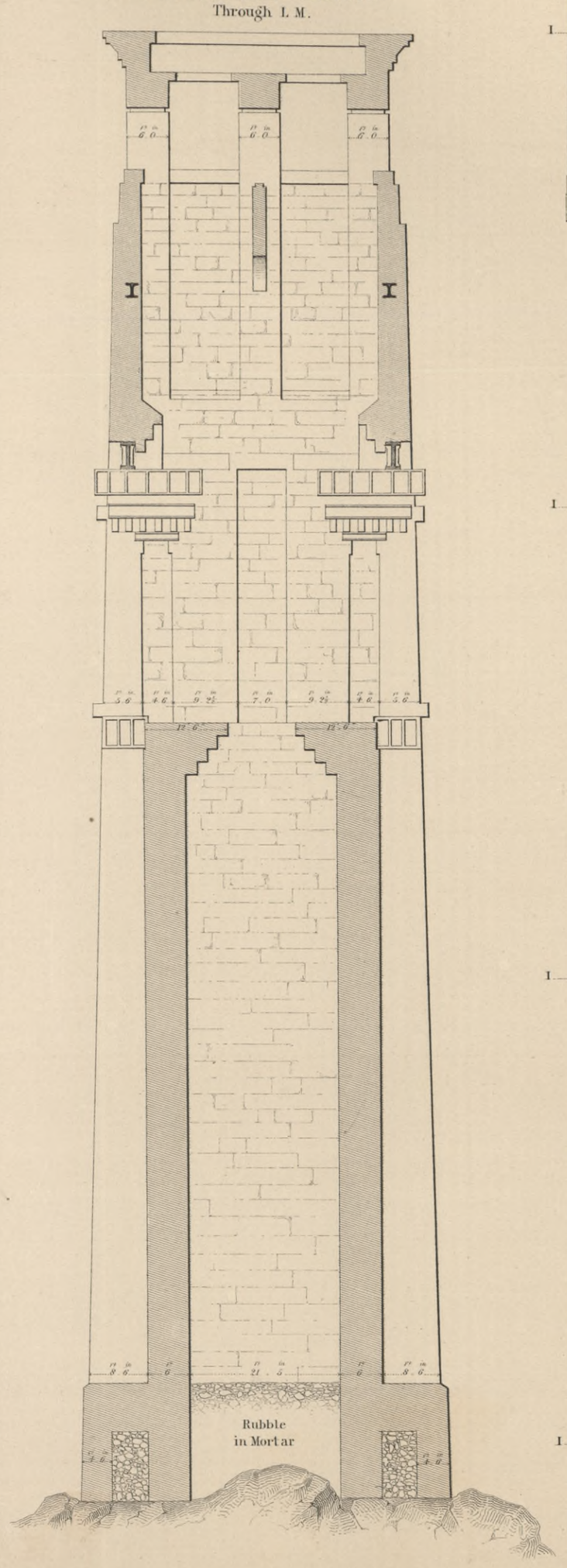
SIDE ELEVATION



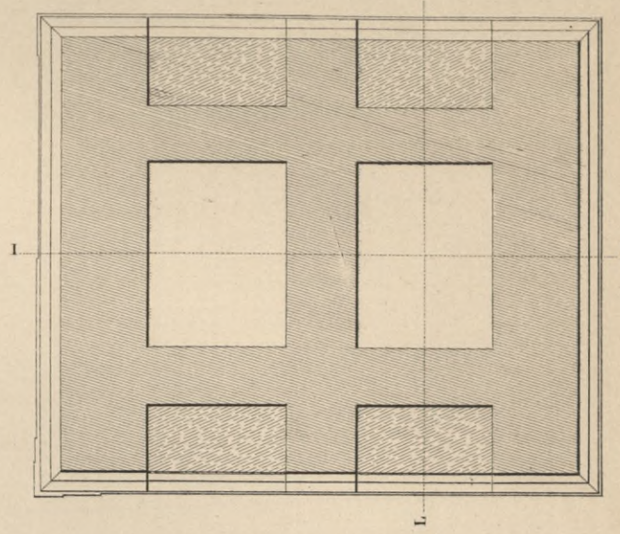
TRANSVERSE SECTION
Through I. K.



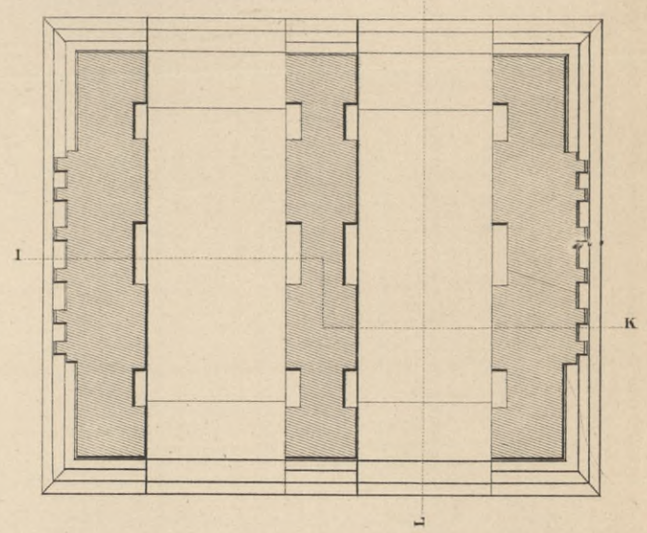
LONGITUDINAL SECTION
Through I. M.



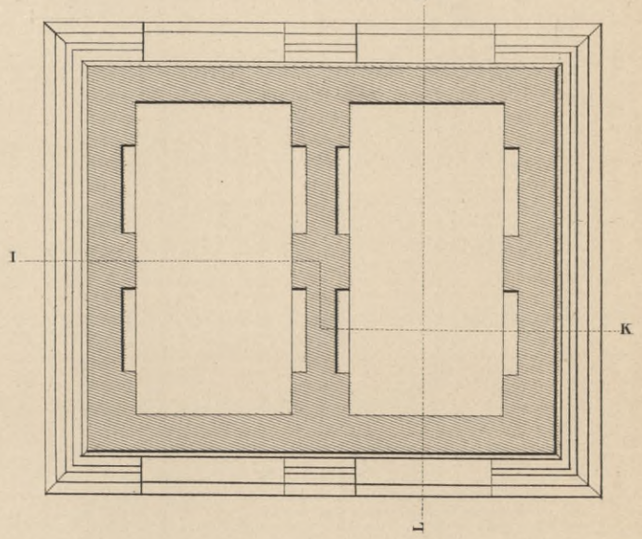
PLAN AT A B.



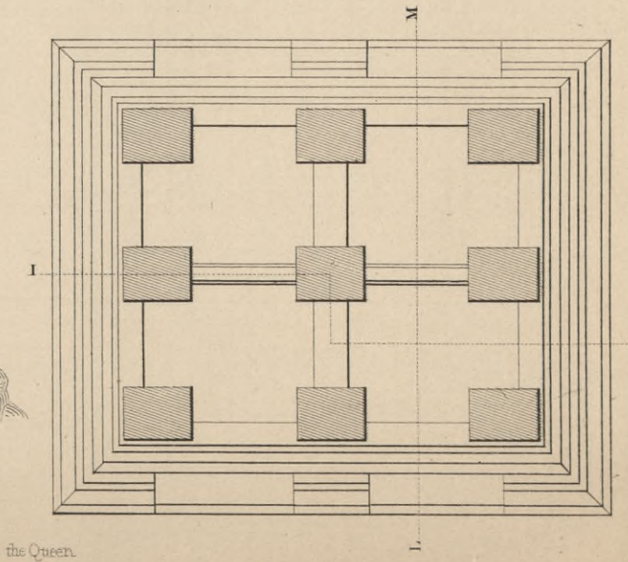
PLAN AT C D.



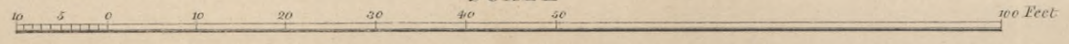
PLAN AT E F.



PLAN AT G H.



SCALE



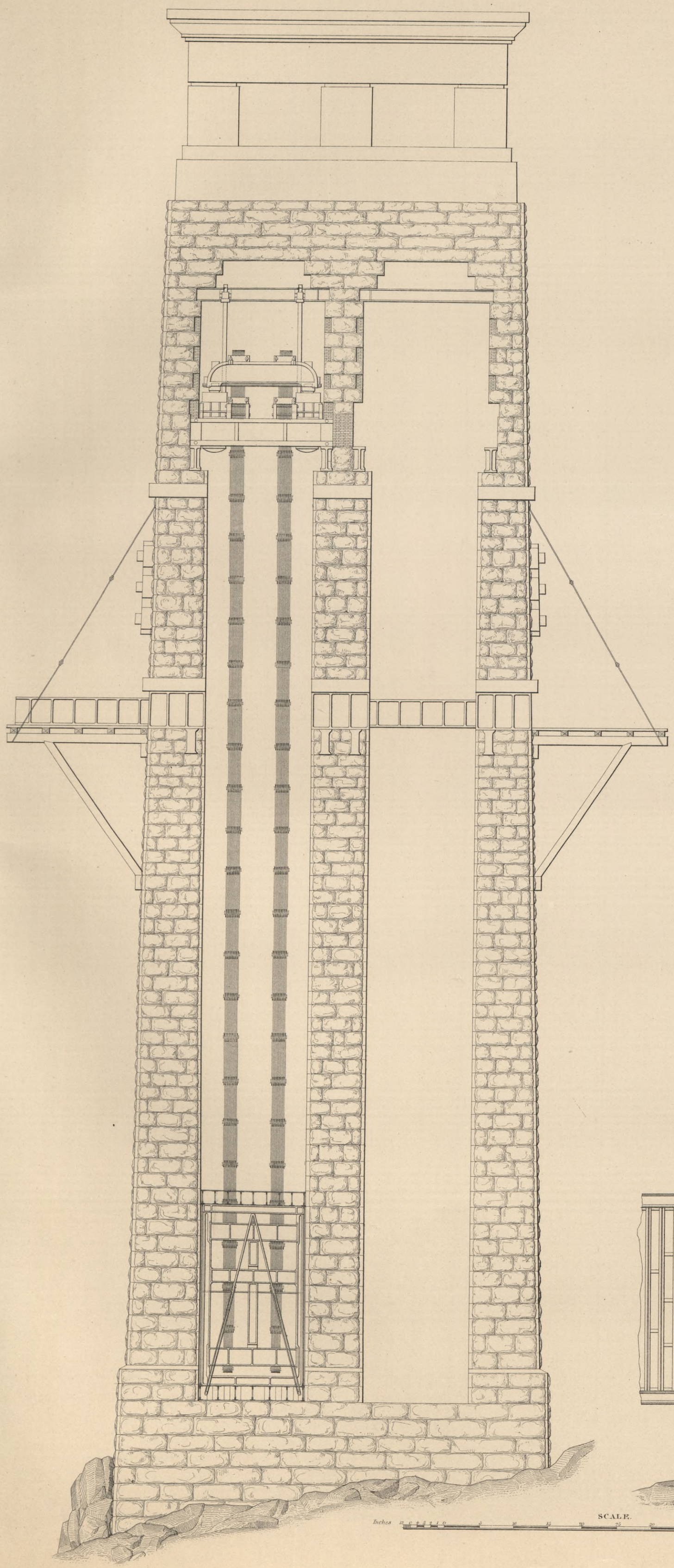
London, Published for the Author, 1st Aug.t 1849.

Day & Son lith.rs to the Queen.

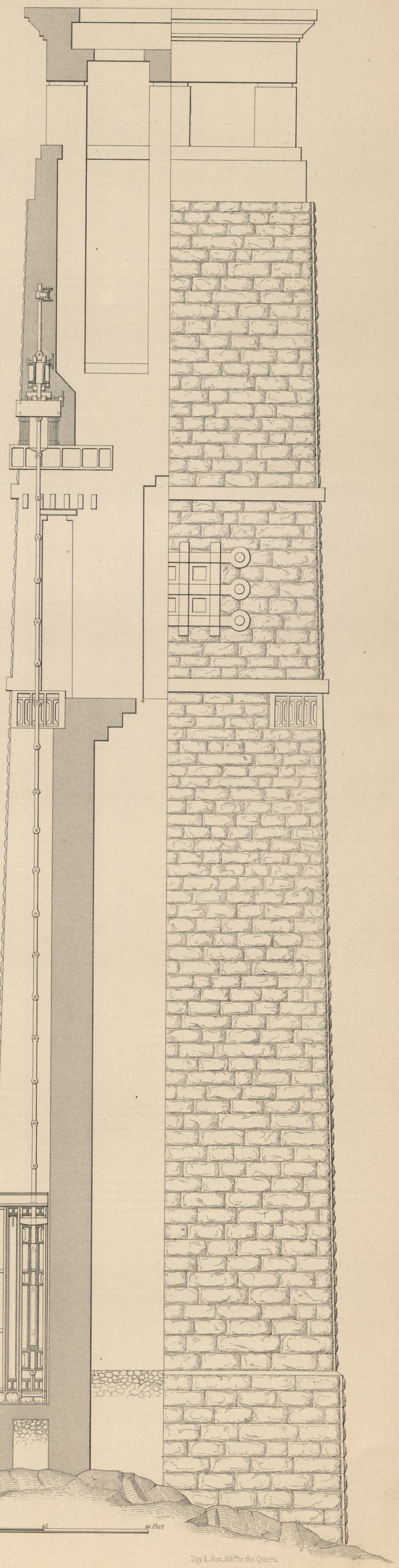
BRITANNIA TOWER

Shewing Double Press, Platforms for shifting A 2 Girders, and General Preparations for Raising Tube.

ELEVATION



SECTION
thro' Centre of Press



SCALE.

Inches 12 6 4 2 1 0 5 10 15 20 25 30 45 60 Feet

Day & Son, lith.rs to the Queen.

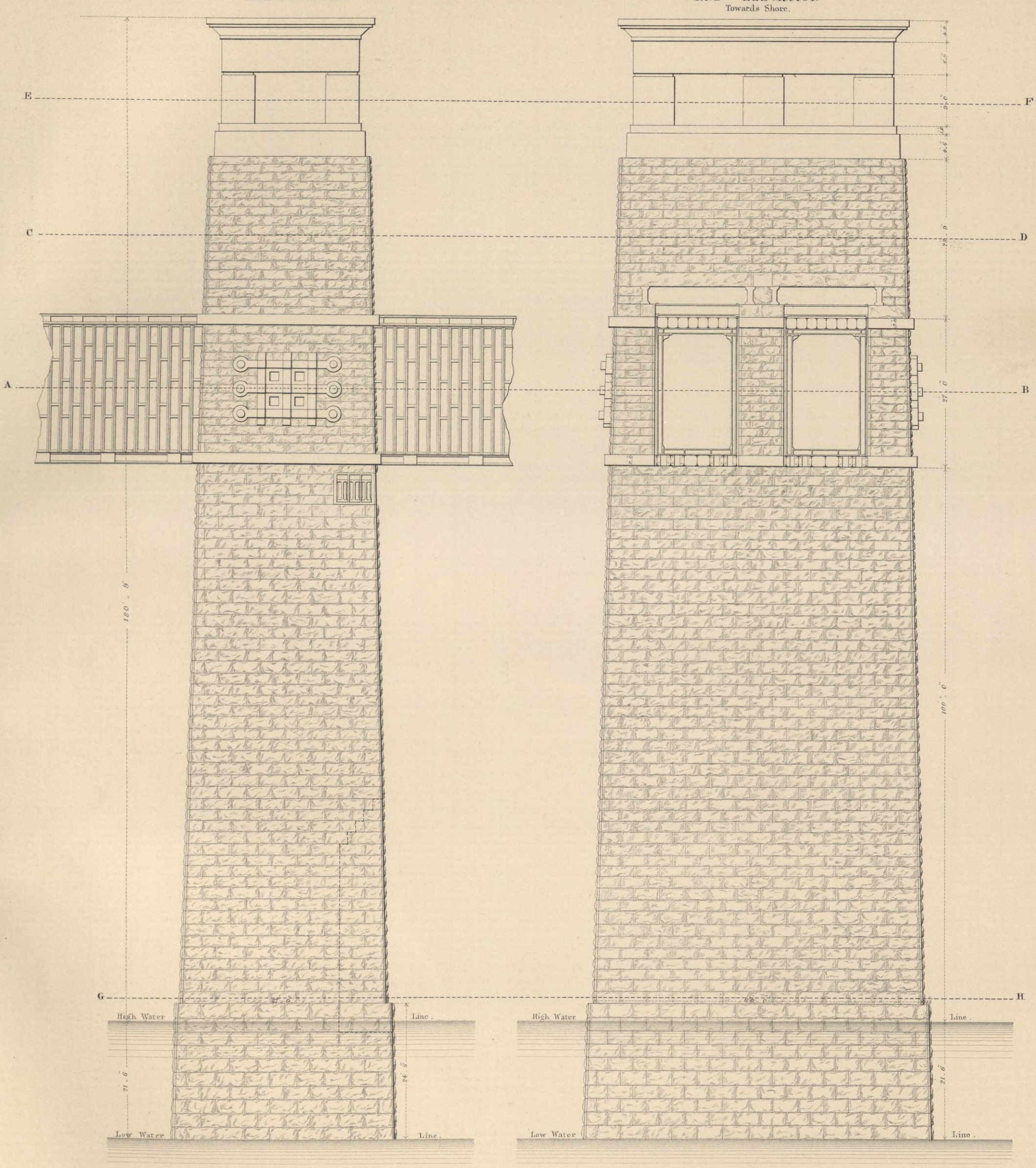
BRITANNIA BRIDGE

PLATE X

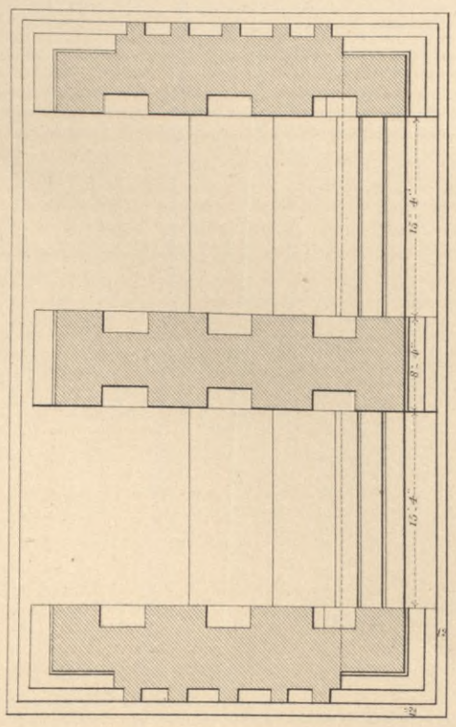
LAND TOWER.

SIDE ELEVATION

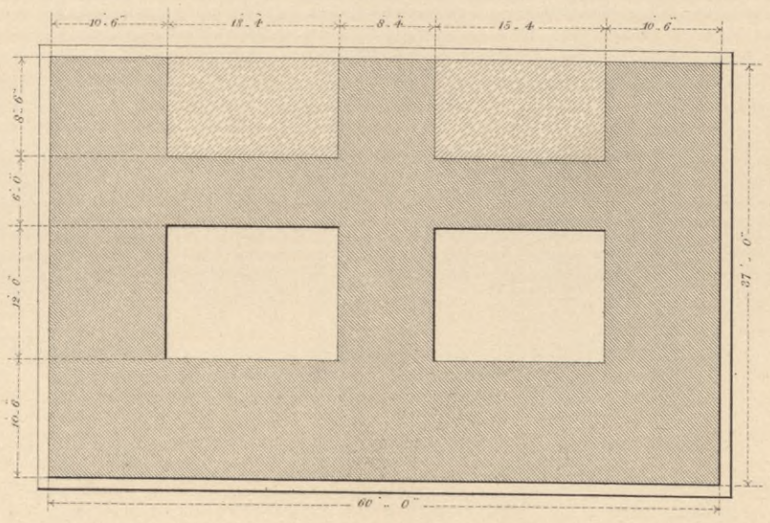
END ELEVATION
Towards Shore.



PLAN ON LINE A. B.



PLAN ON LINE G. H.



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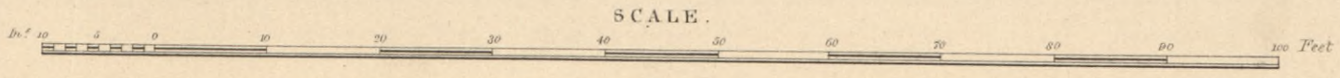


Day & Son lith.rs to the Queen.

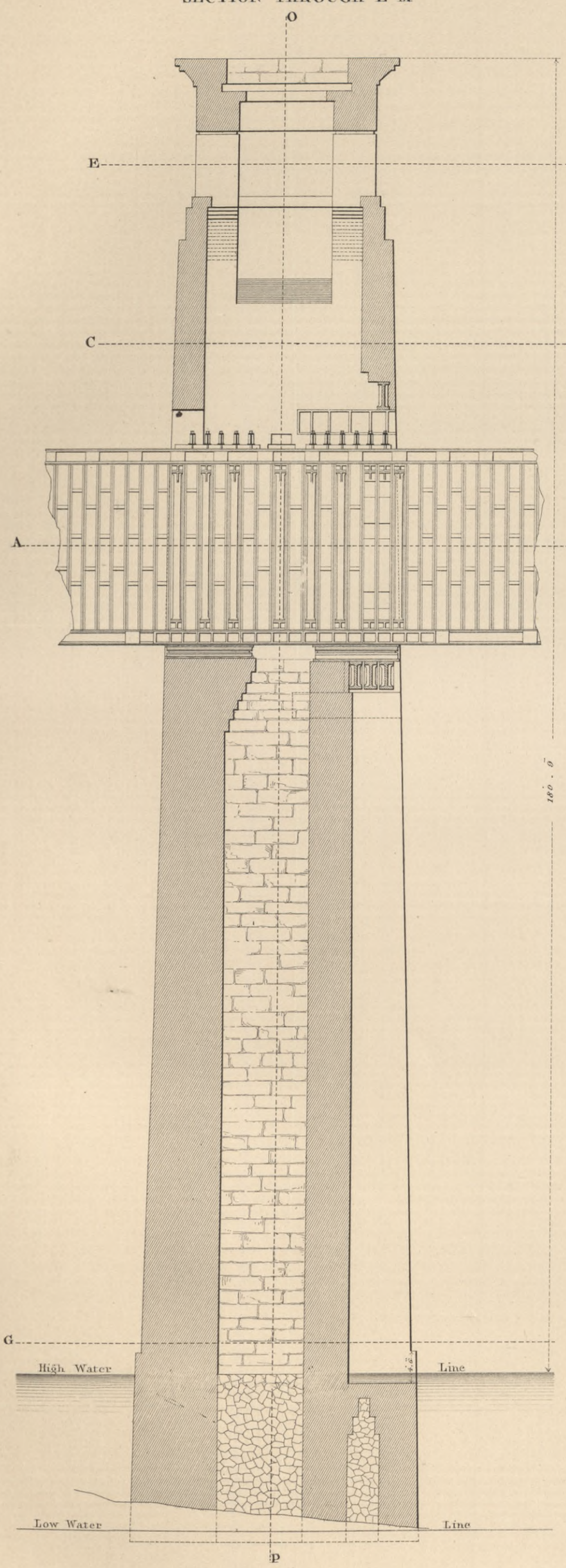
London, Published for the Author, 1st Aust 1850.

BRITANNIA BRIDGE

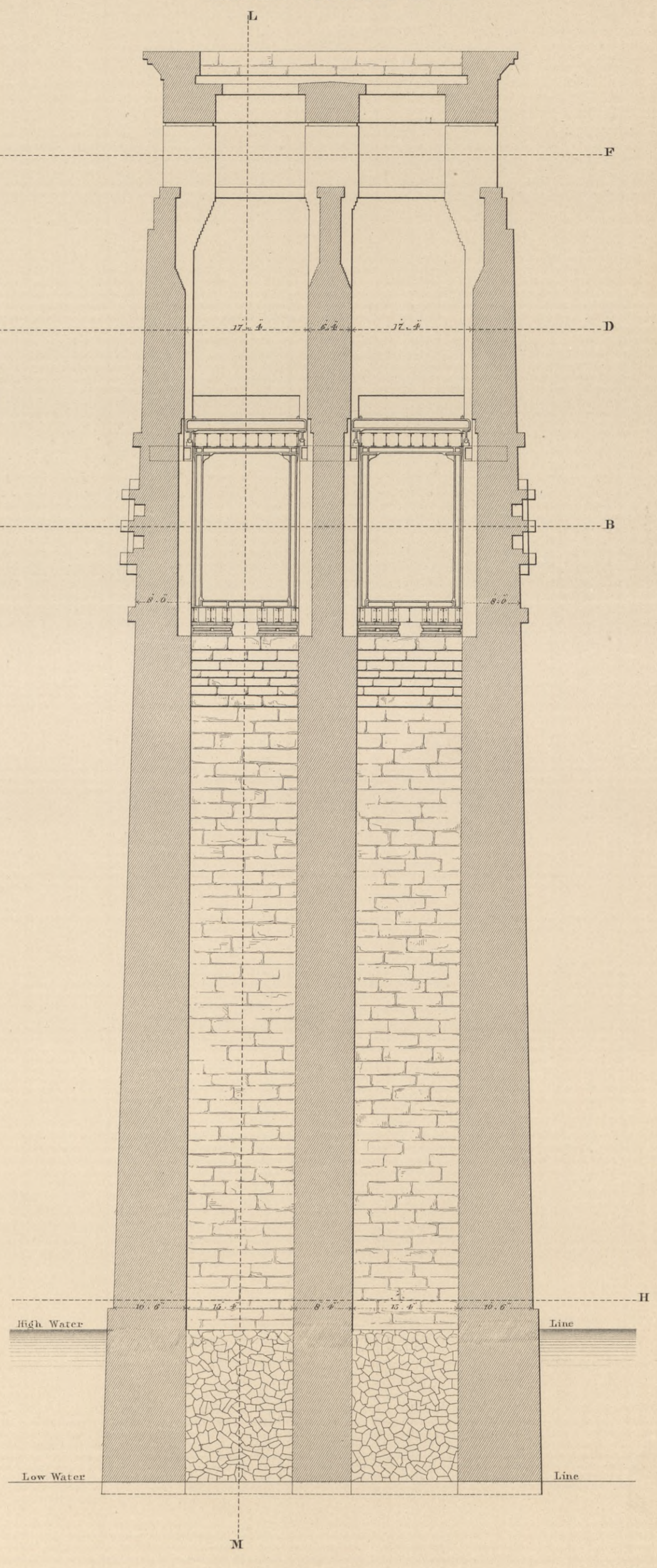
PLATE XI

LAND TOWERS

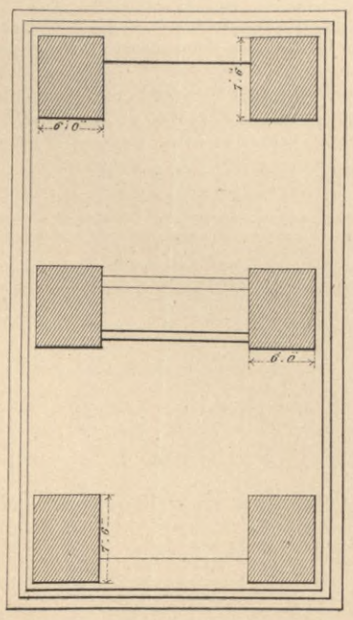
SECTION THROUGH L M



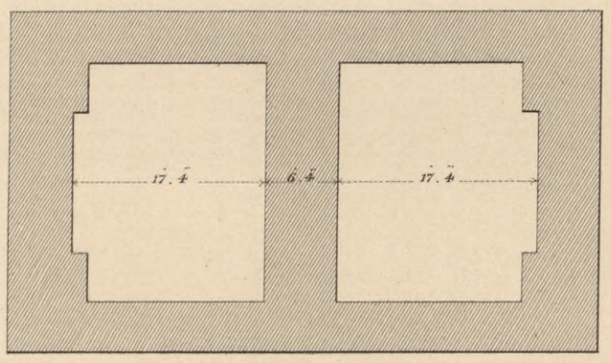
SECTION THROUGH O P



PLAN ON LINE E F



PLAN ON LINE C D



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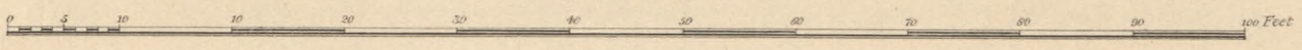

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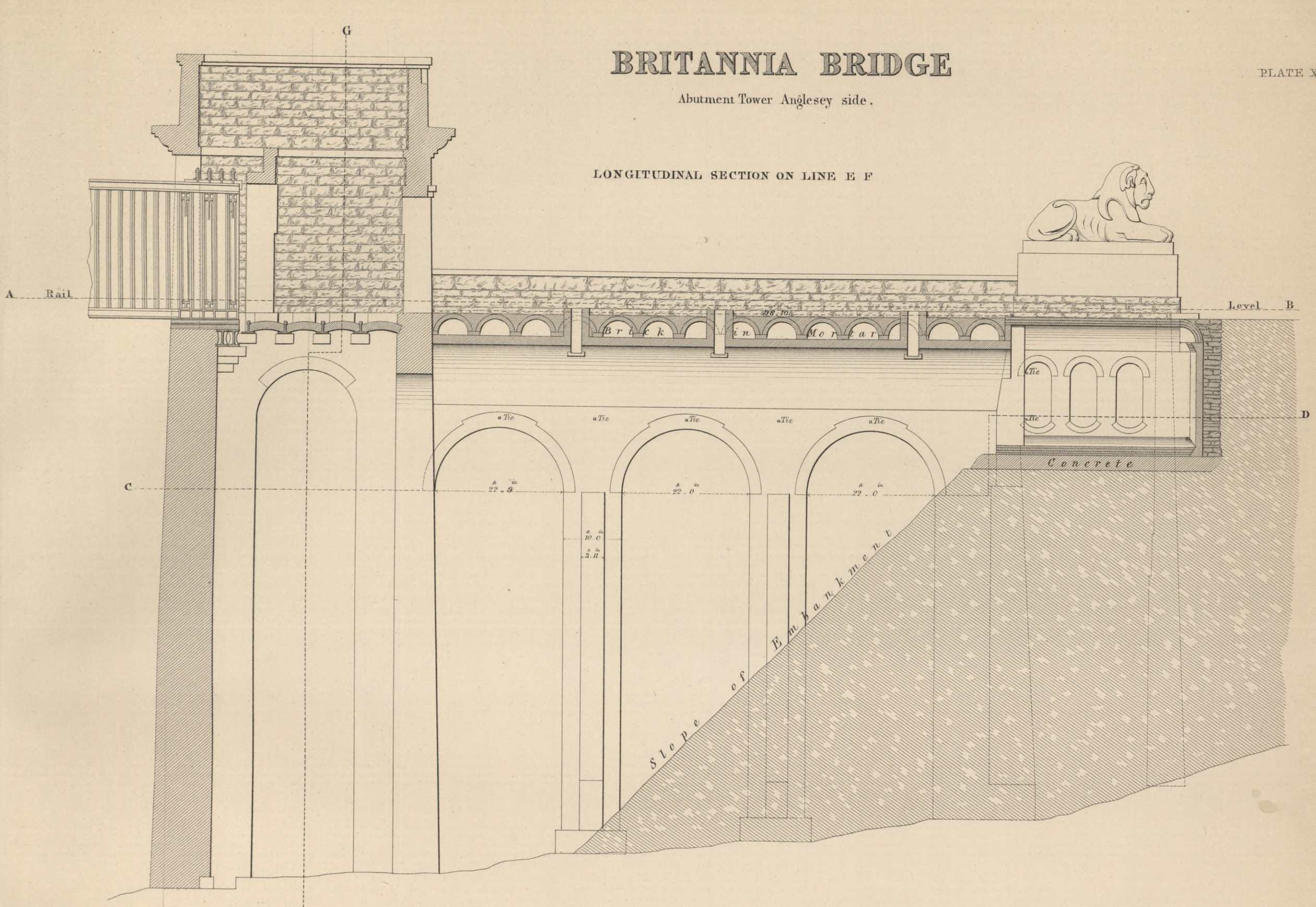
Engd. Lon. 20th To the Queen.

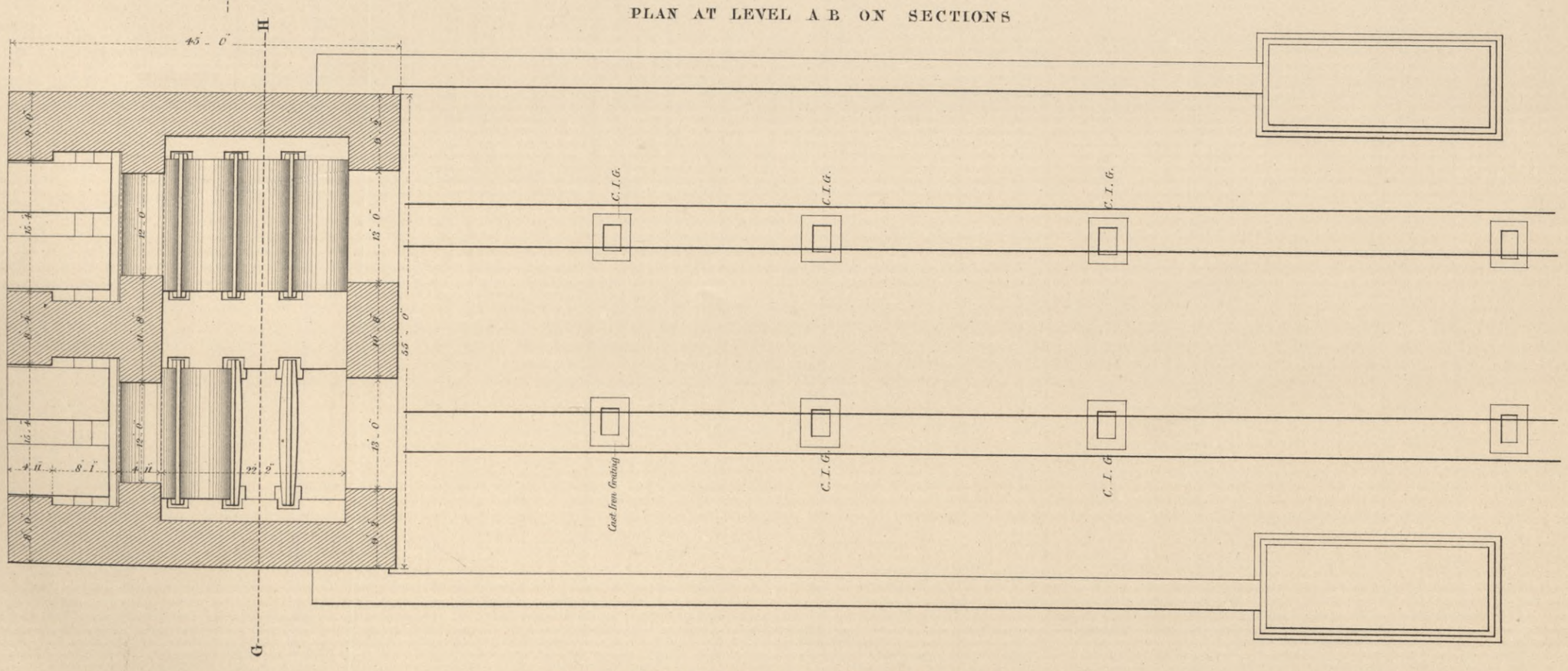
BRITANNIA BRIDGE

Abutment Tower Anglesey side.

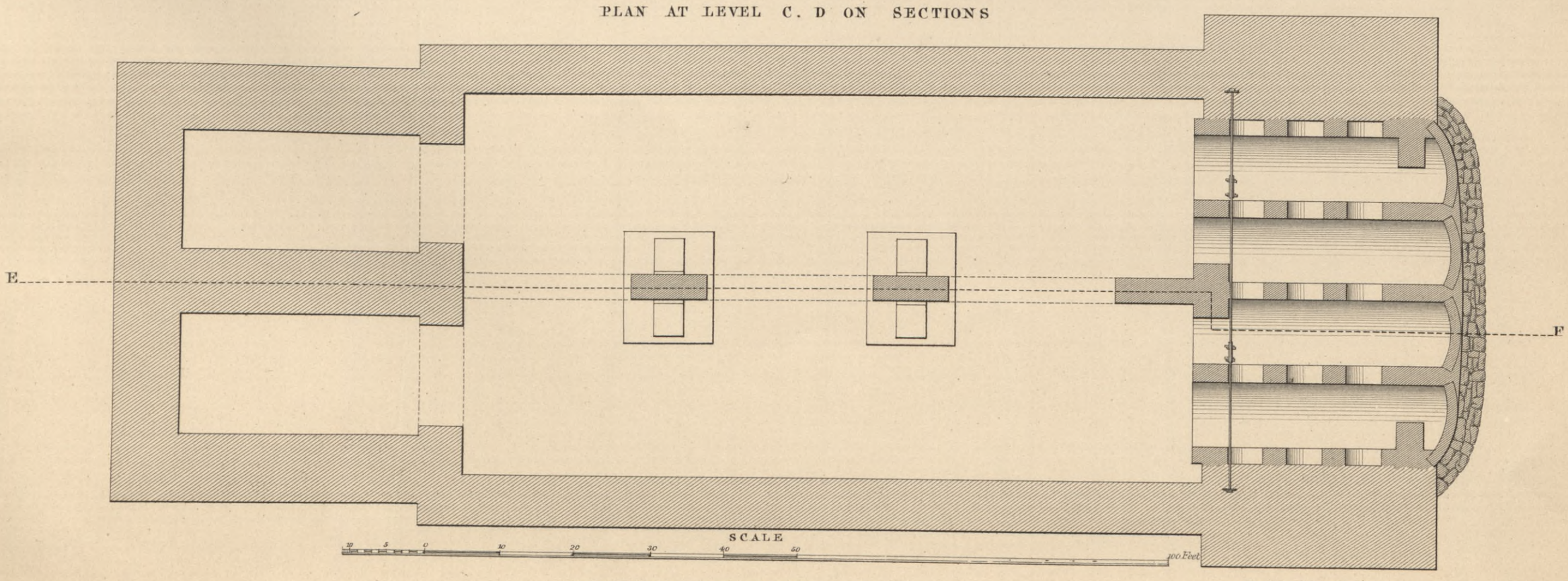
LONGITUDINAL SECTION ON LINE E F



PLAN AT LEVEL A B ON SECTIONS



PLAN AT LEVEL C. D ON SECTIONS



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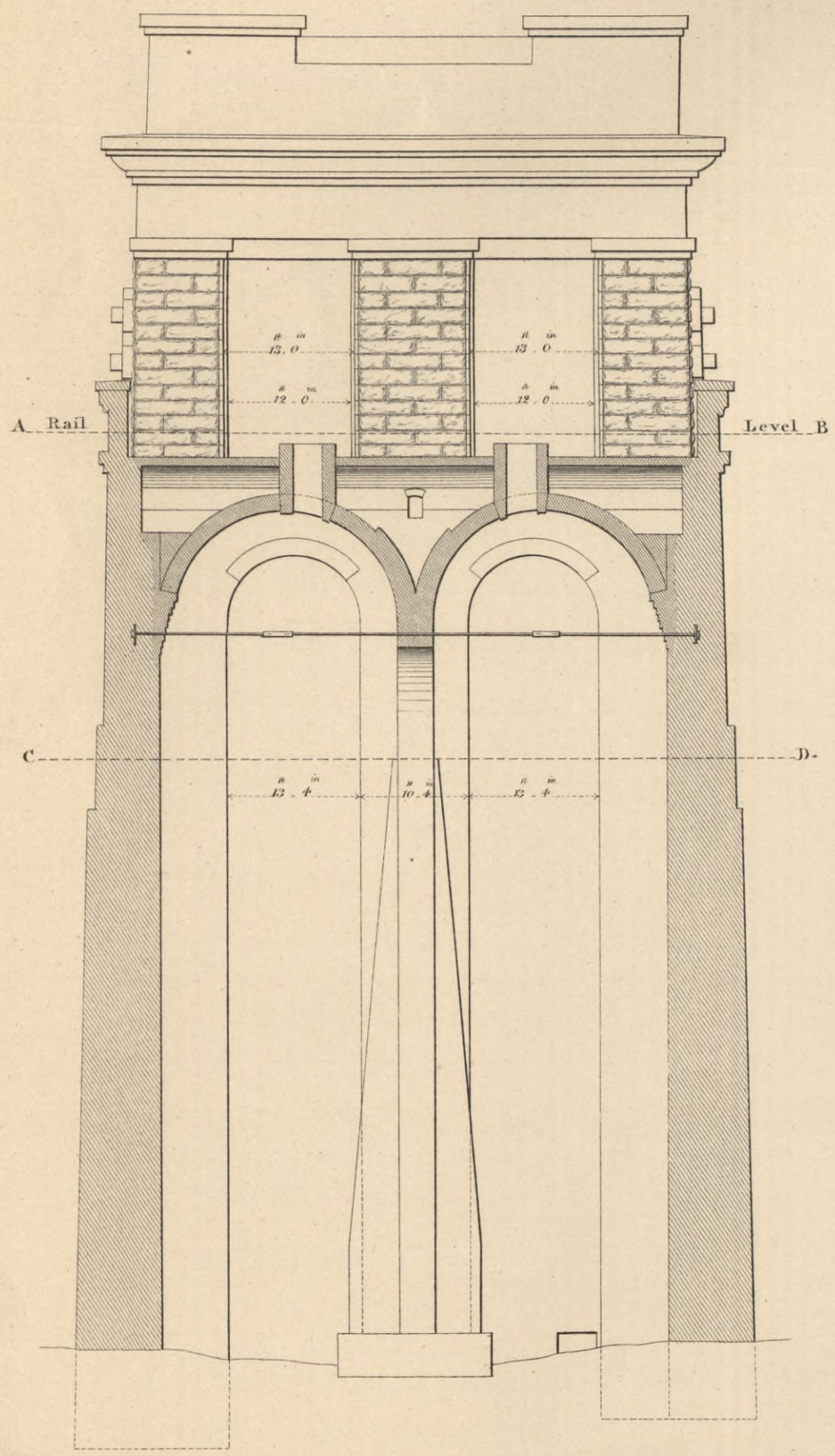
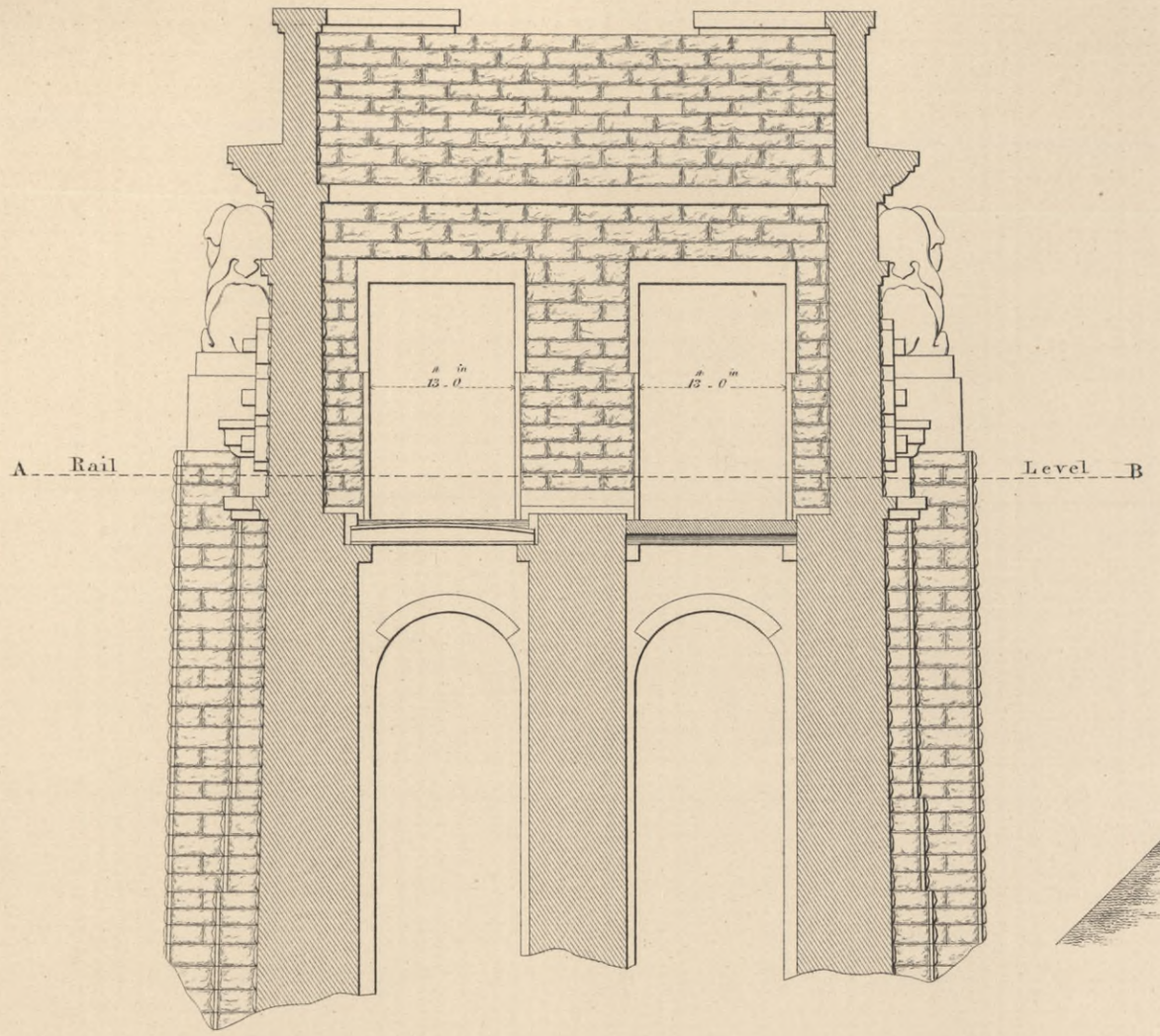
Day & Son lith.rs to the Queen.

ABUTMENT TOWER ANGLESEY SIDE

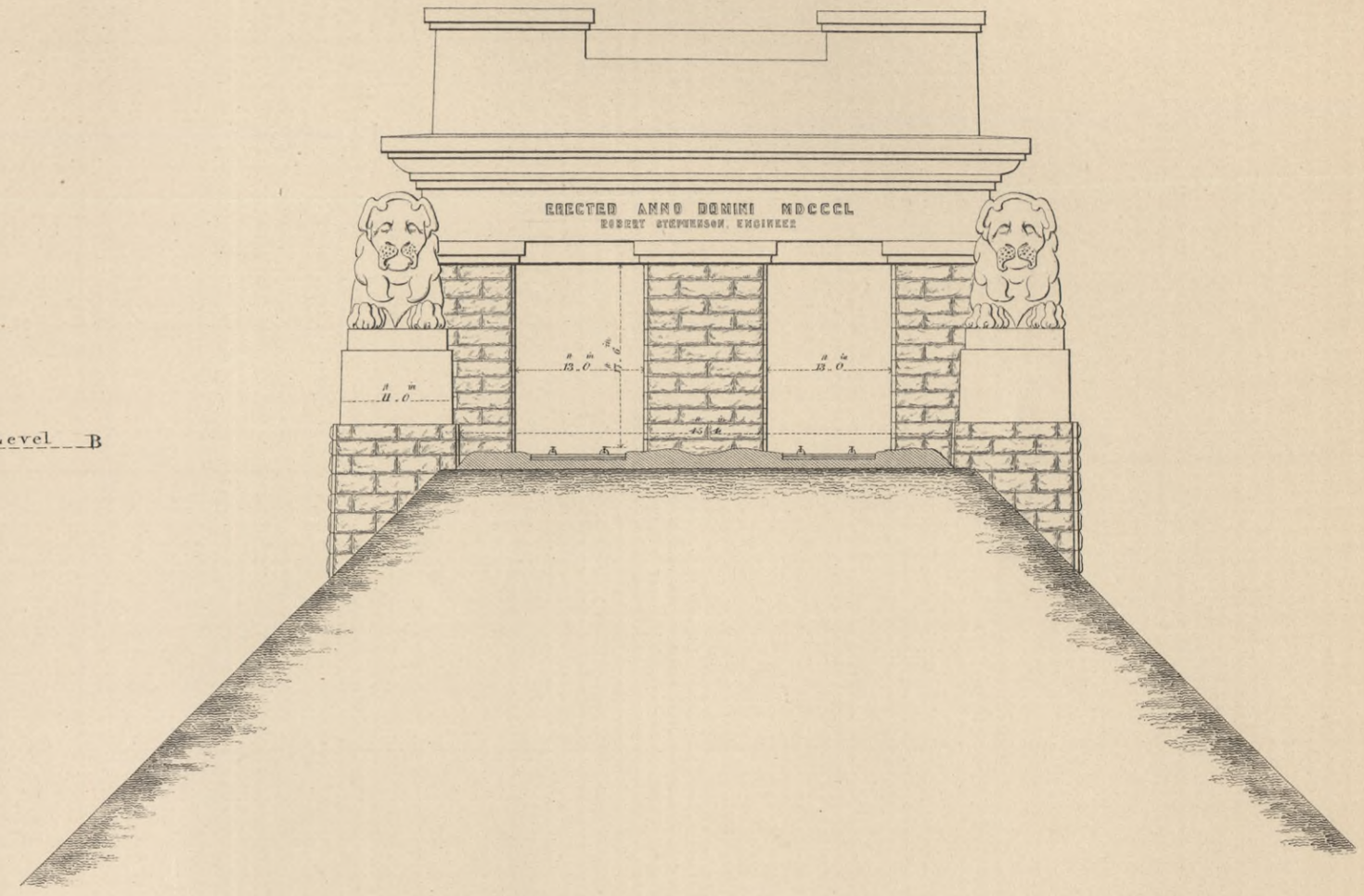
TRANSVERSE SECTION



SECTION ON LINE G H



ELEVATION OF ENTRANCE FRONT



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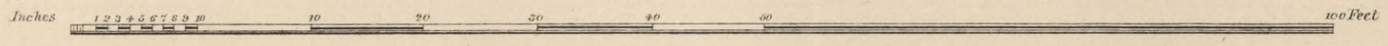

London Published by John Weale, 59, High Holborn, Aug.st 1.st 1849.

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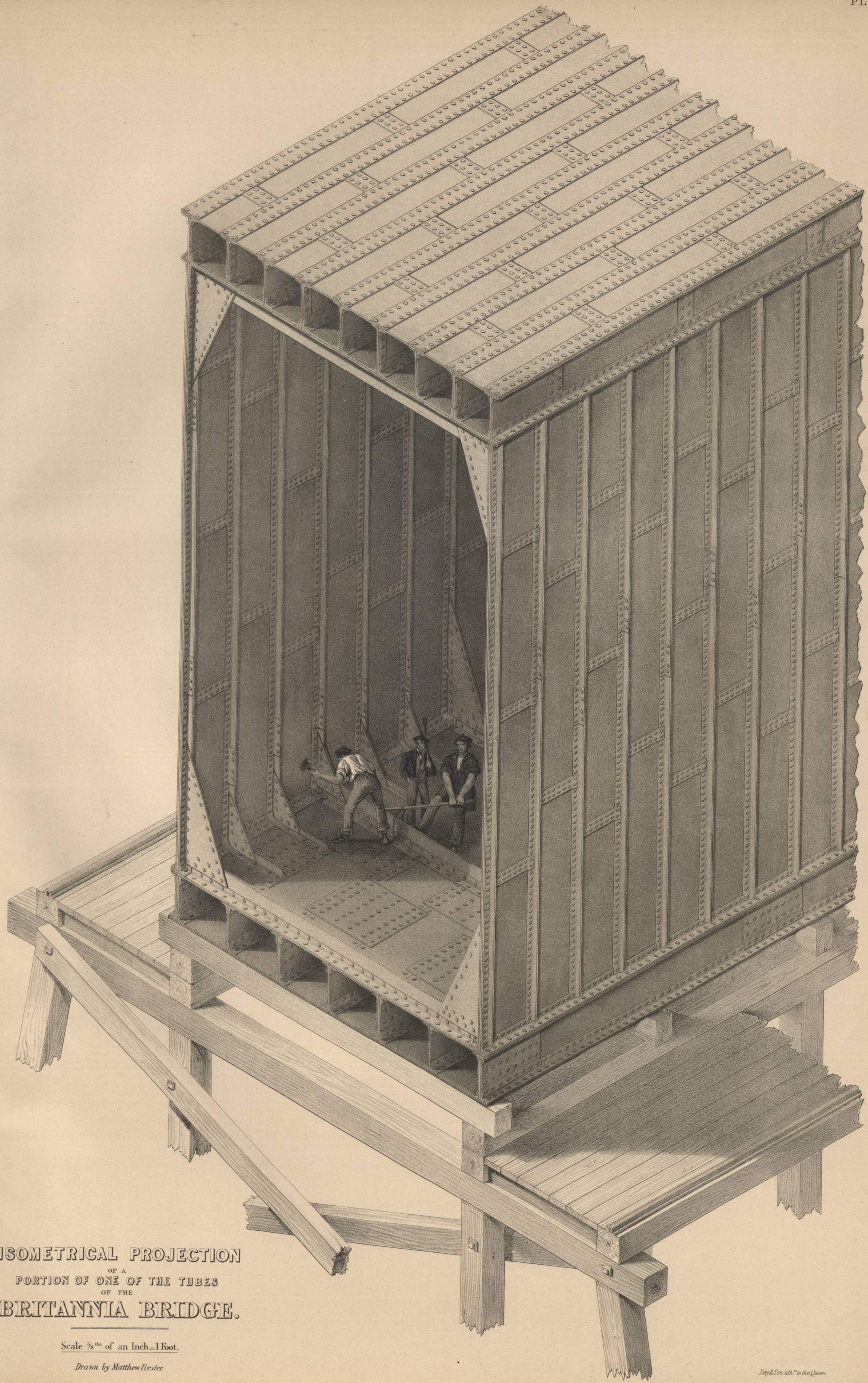


ISOMETRICAL PROJECTION
OF A
PORTION OF ONE OF THE TUBES
OF THE
BRITANNIA BRIDGE.

Scale 3/8ths of an Inch = 1 Foot.

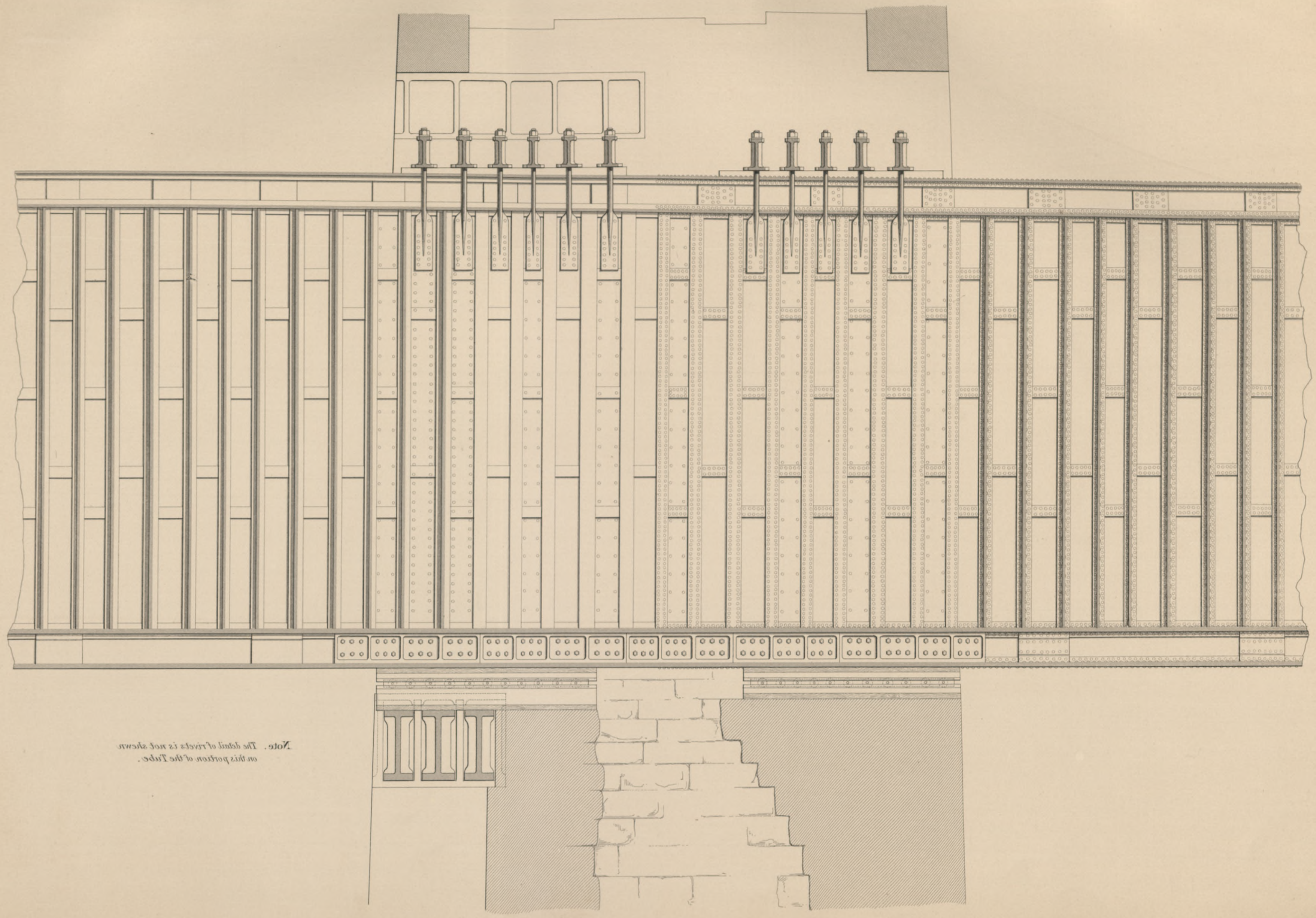
Drawn by Matthew Forster.

Day & Son lith.rs to the Queen.

BRITANNIA BRIDGE

ELEVATION OF TUBE

Through and Tower. Showing Spade Bolts, Bed Plates, Rollers &c.



Note. The detail of rivets is not shewn on this portion of the Tube.

SCALE

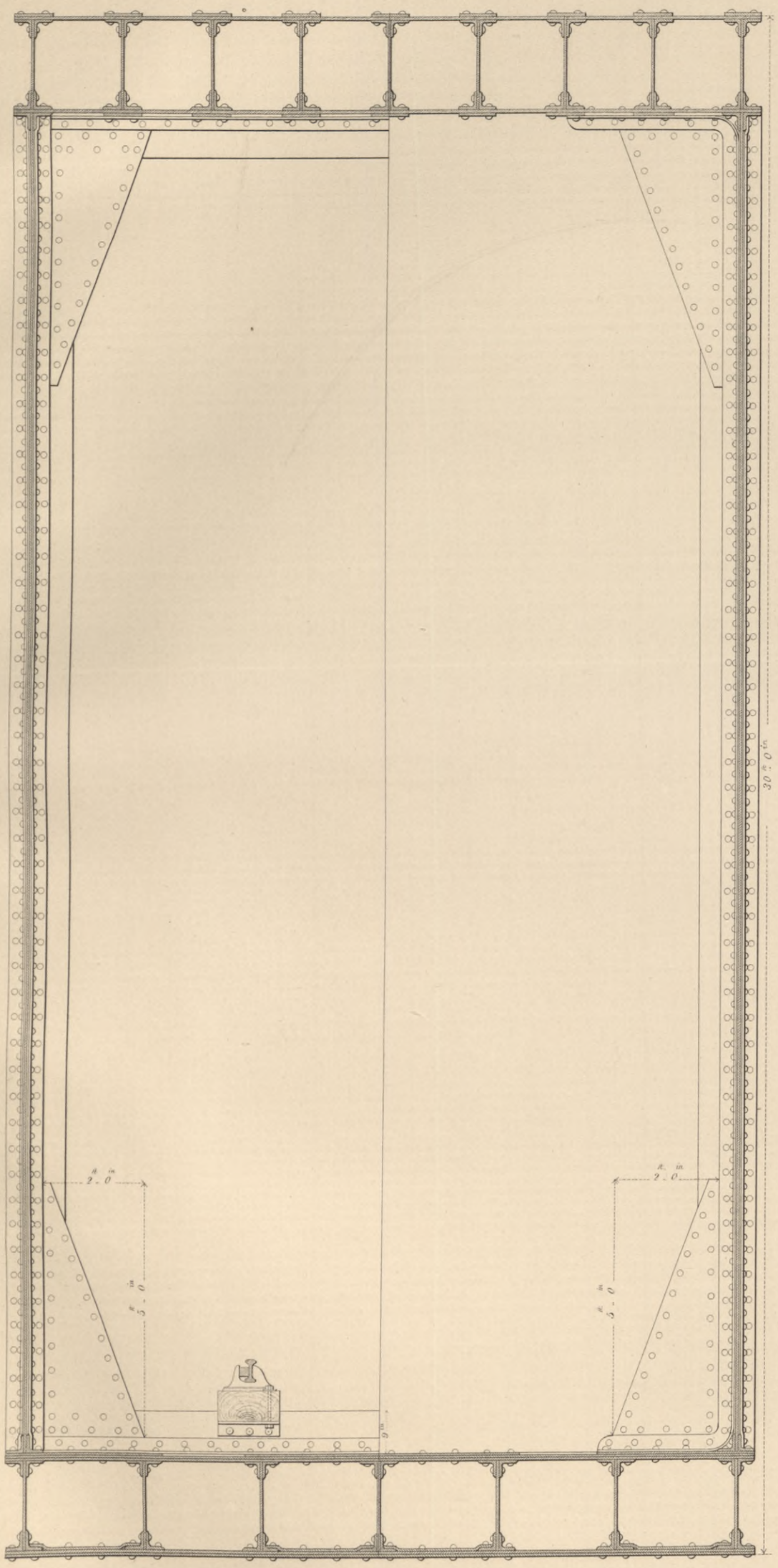
Inch 1 2 3 4 5 10 15 20 25 30 Feet

BRITANNIA TUBULAR BRIDGE

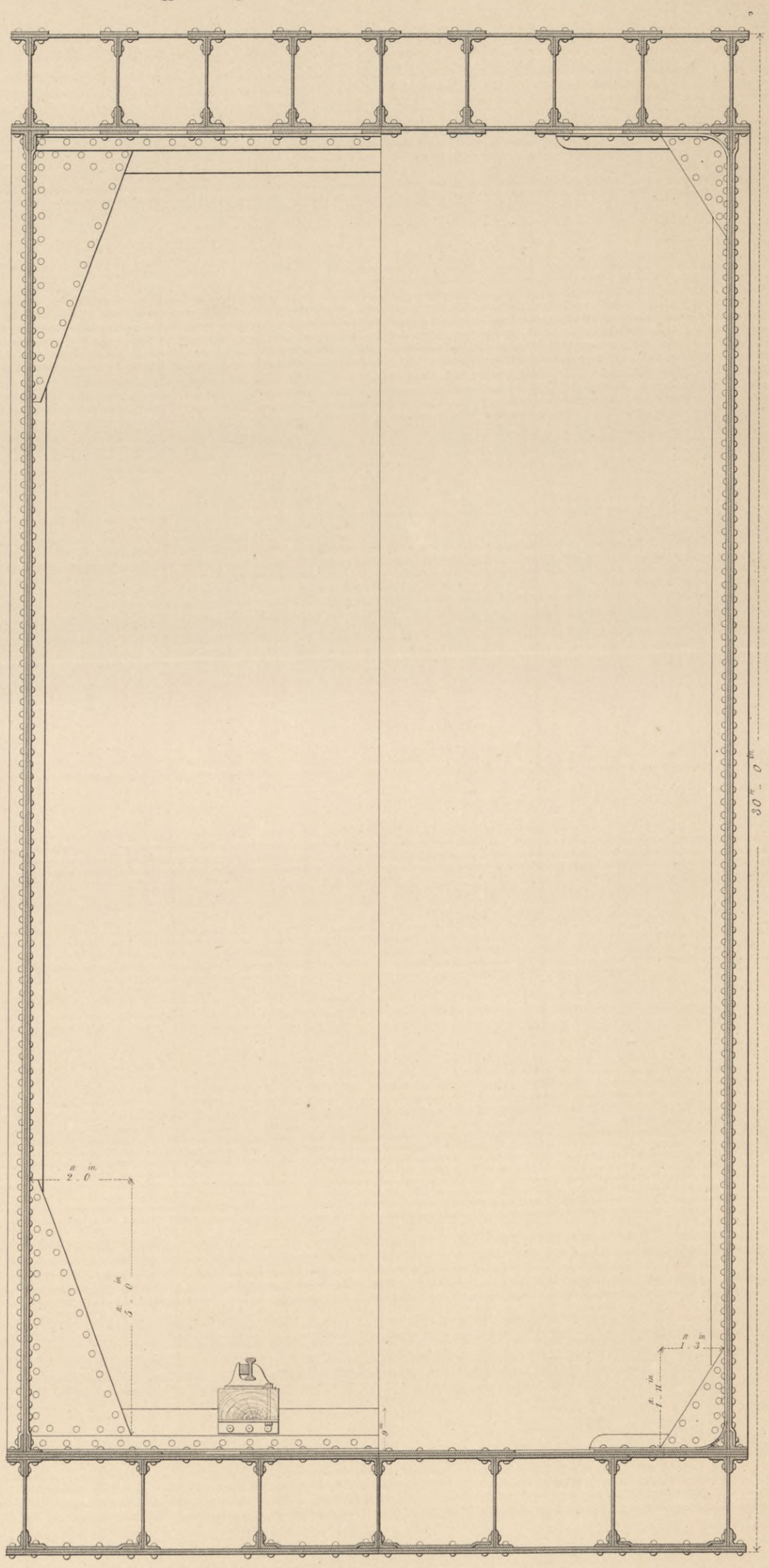
PLATE XV.

LARGE END OF ONE OF LARGE TUBES

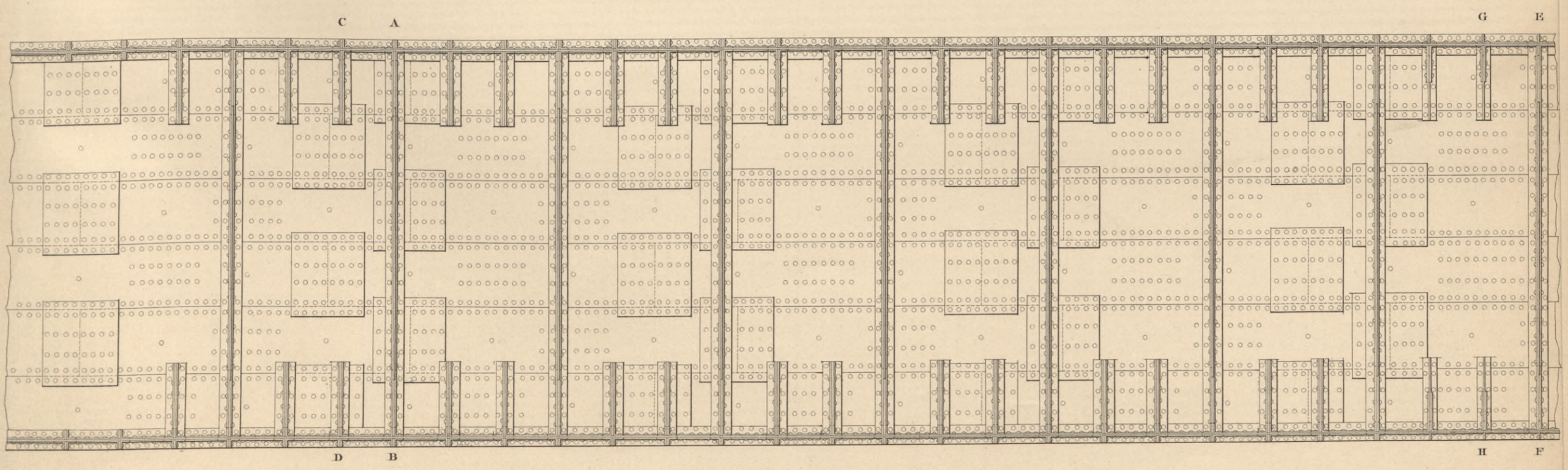
SECTIONS AT A B C D



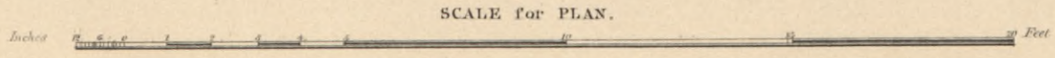
SECTIONS AT E F G H



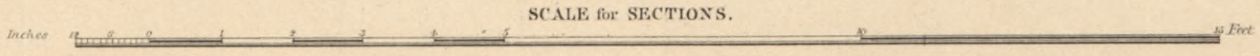
PLAN OF D PLATFORM.



SCALE for PLAN.



SCALE for SECTIONS.



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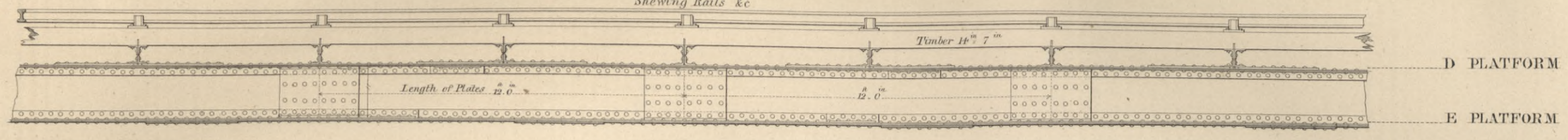
London Published for the Author 1st Aug.st 1849

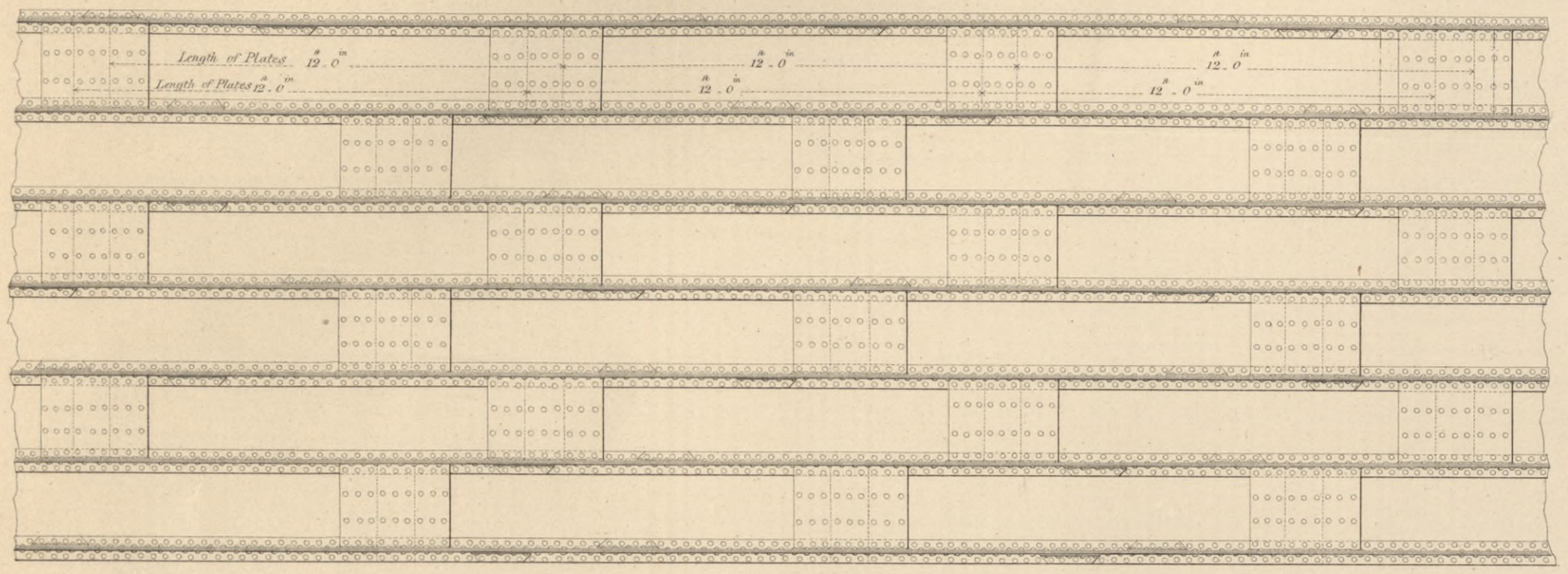
BRITANNIA TUBULAR BRIDGE

LAND TUBES

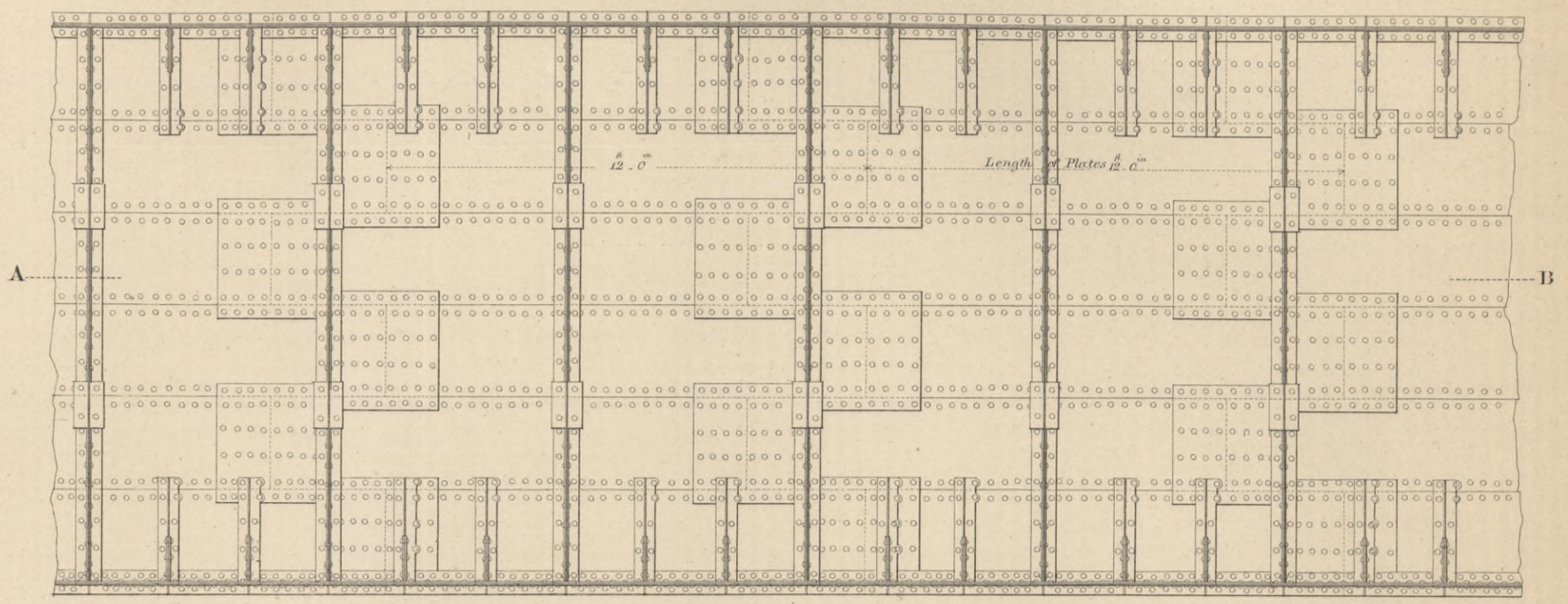
SECTION AT A B
Shewing Rails &c



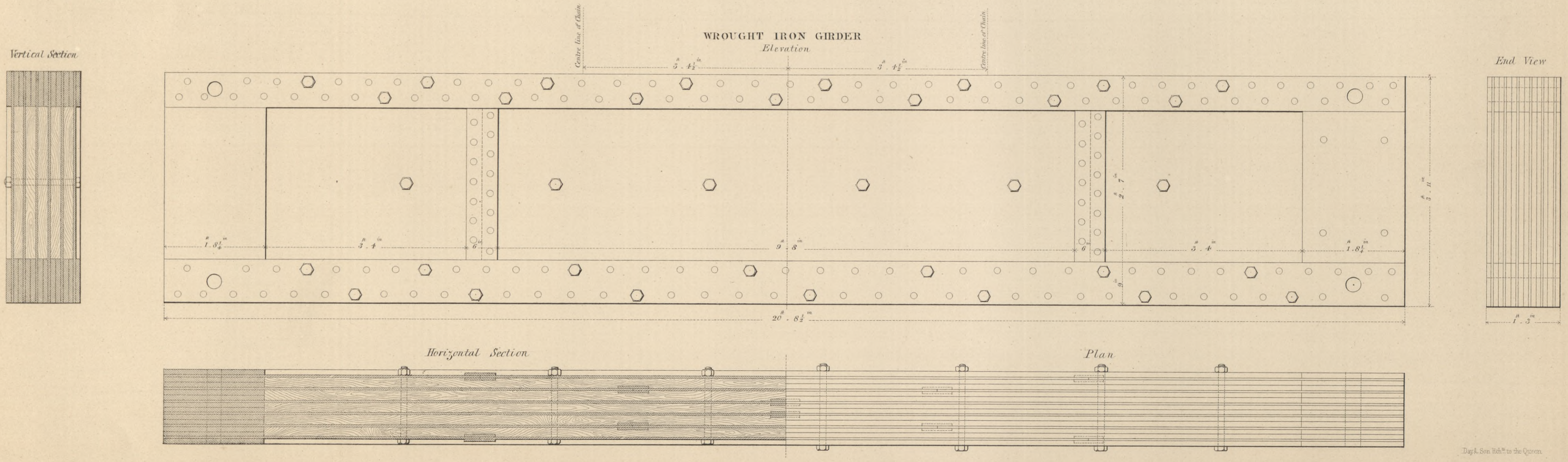
PLAN OF E PLATFORM



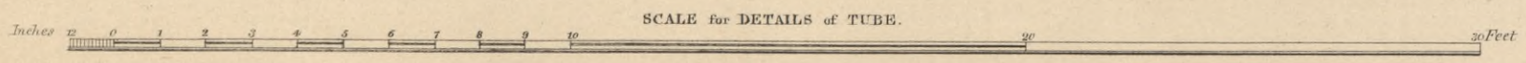
PLAN OF D PLATFORM



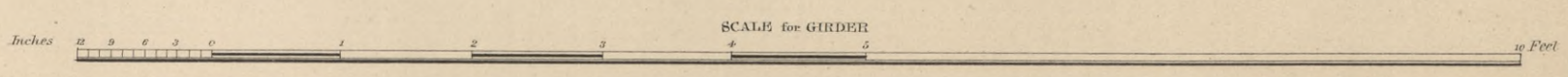
WROUGHT IRON GIRDER
Elevation



SCALE for DETAILS of TUBE.



SCALE for GIRDER



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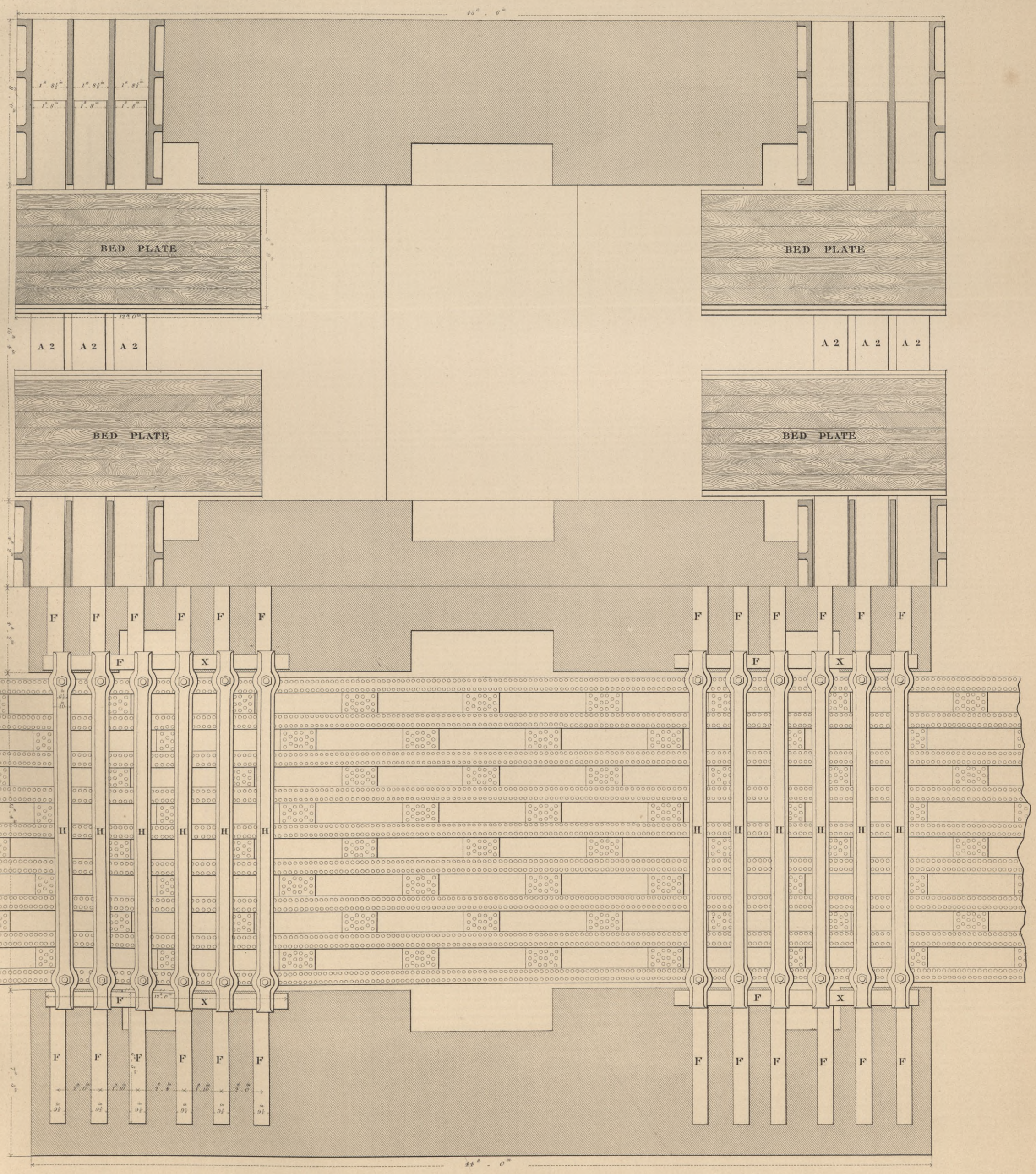
London, Published for the Author, 1st Aug.st 1849.

BRITANNIA TOWER

PLAN AT BOTTOM OF TUBE



PLAN AT TOP OF TUBE

SCALE

Inches 12 6 0 1 2 3 4 5 10 15 20 25 30 Feet

DRAWN BY THOMAS BIRDS.

Dey & Son lith. to the Queen.

London. Published by John Weale, 59 High Holborn, Aug.t 1st 1849.

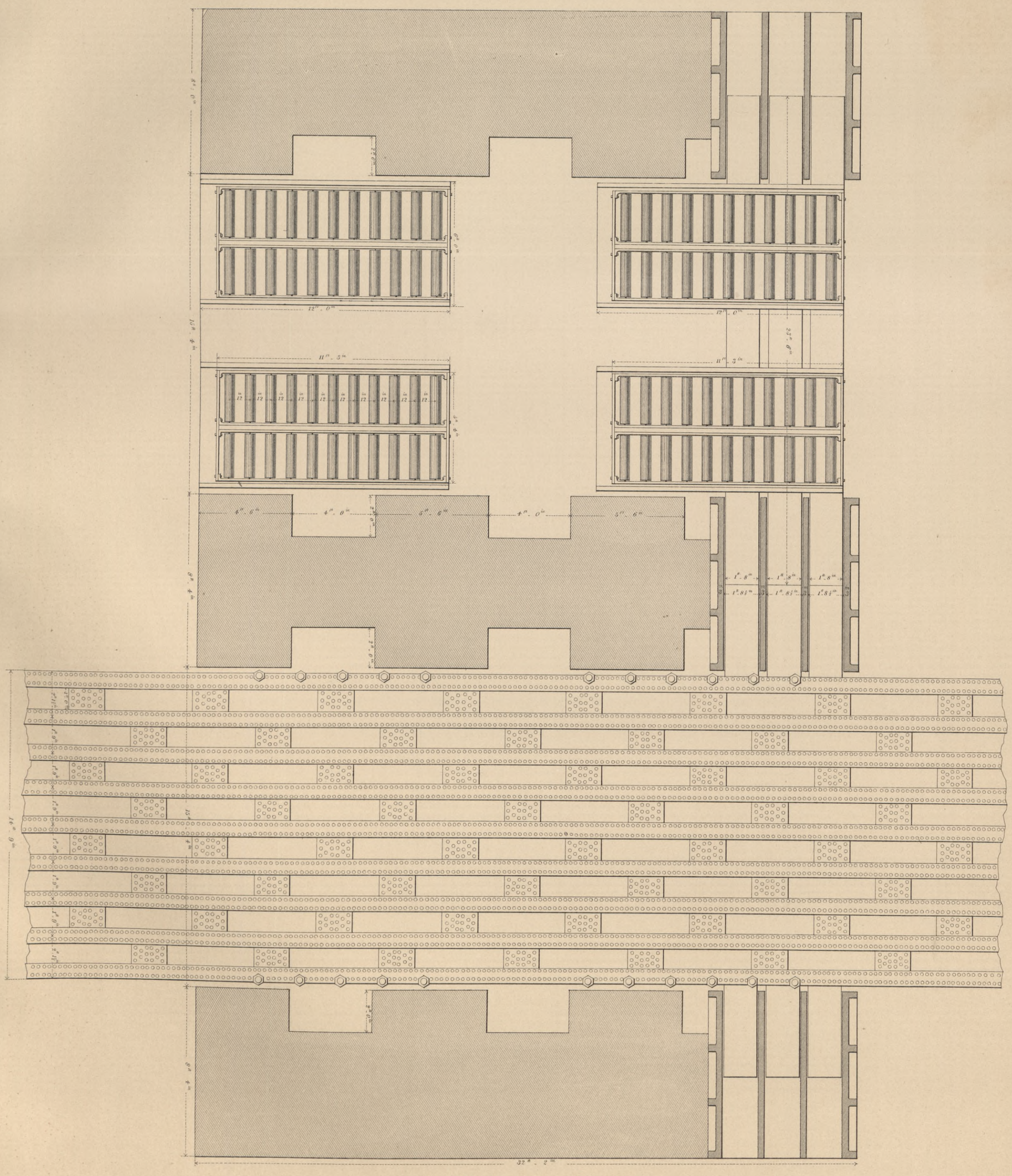
BRITANNIA BRIDGE

LAND TOWER

PLATE XVIII.

PLAN AT BOTTOM OF TUBE

Shewing Bed Plates, Rollers and Wall Boxes with tops removed



PLAN AT TOP OF TUBE

SCALE

Inches 12 8 6 1 2 3 4 5 10 15 20 25 30 Feet

DRAWN BY THOMAS HIBBS, 1849.

Day & Son Lith.to the Queen

London, Published by John Weale, 59, High Holborn, 1st Augt. 1849.

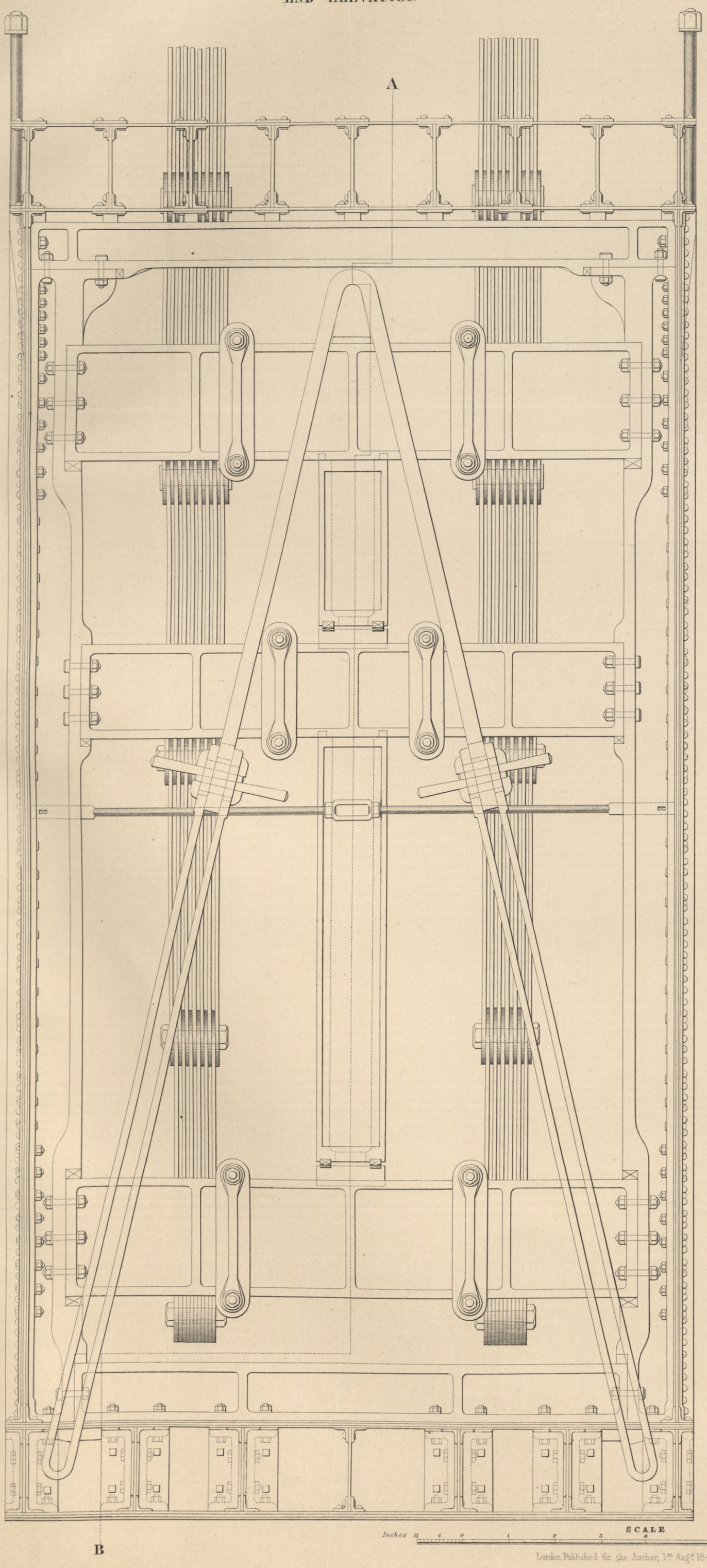
BRITANNIA BRIDGE

LARGE END OF ONE OF THE LARGE TUBES

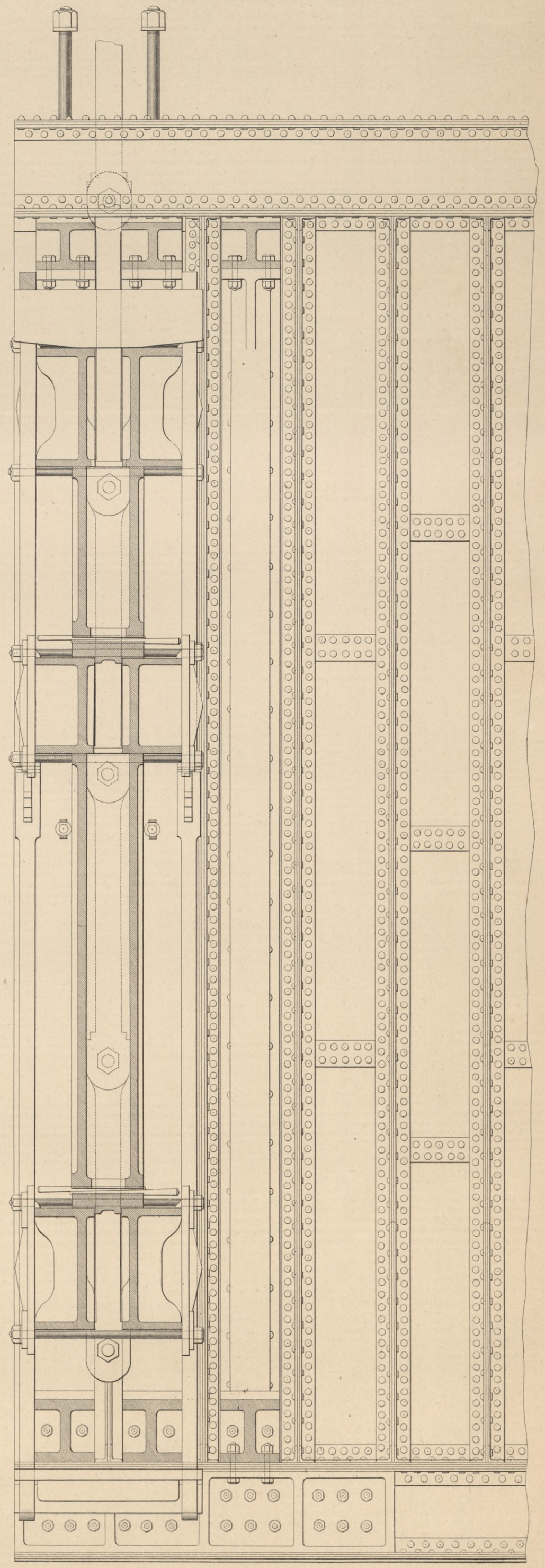
PLATE XIX

Shewing the Position of the Lifting Beams, Chains &c.

END ELEVATION



SECTIONAL ELEVATION THROUGH A B



SCALE

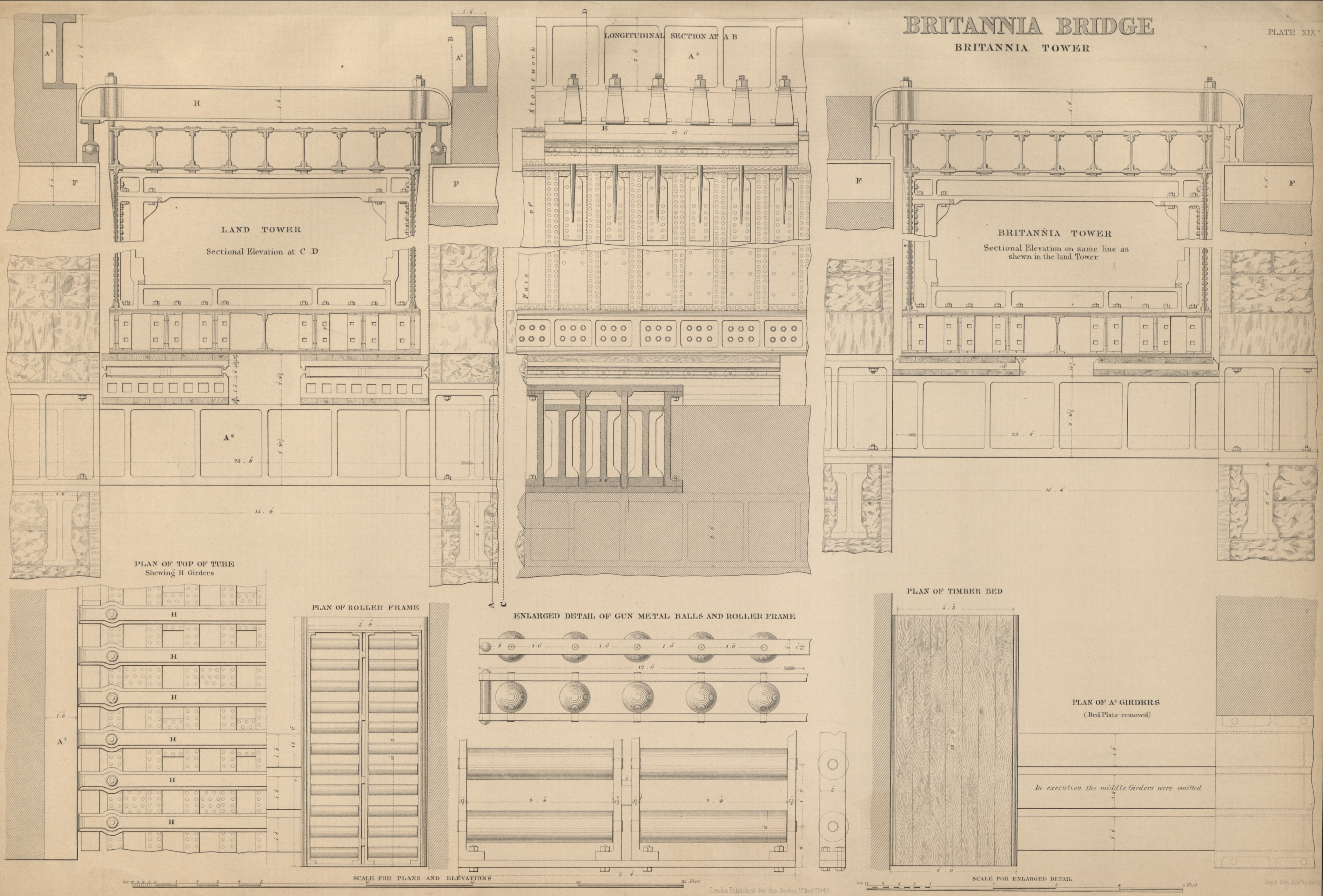
Inches 12 6 0 1 2 3 4 5 Feet

London, Published for the Author, 1st Aug.st 1849.

Day & Son lith.rs to the Queen

BRITANNIA BRIDGE

BRITANNIA TOWER

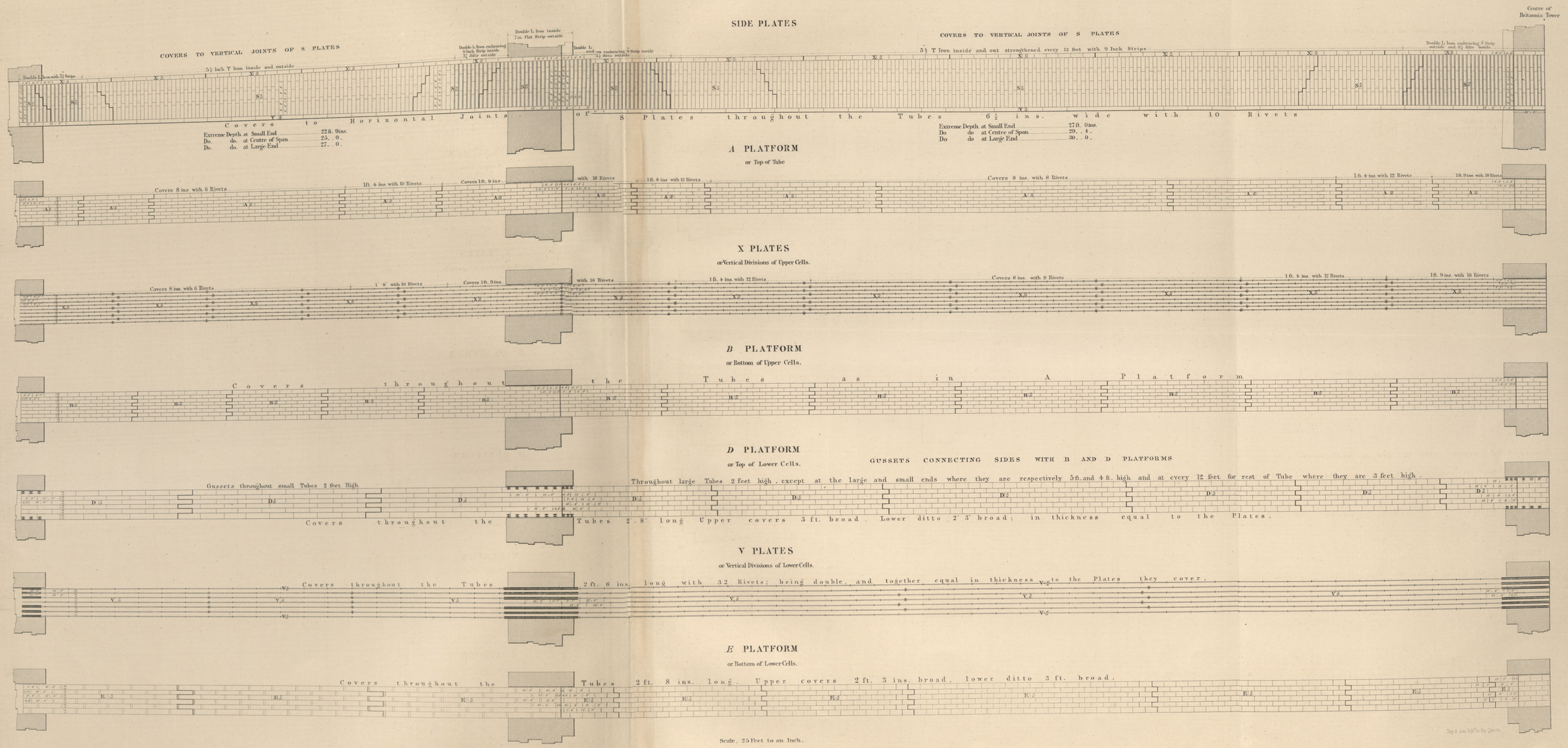


London Published for the Author, 1st Aug.st 1849

BRITANNIA BRIDGE

DETAIL OF PLATES IN ONE LARGE AND ONE SMALL TUBE

PLATE XX.



Scale, 25 Feet to an Inch.

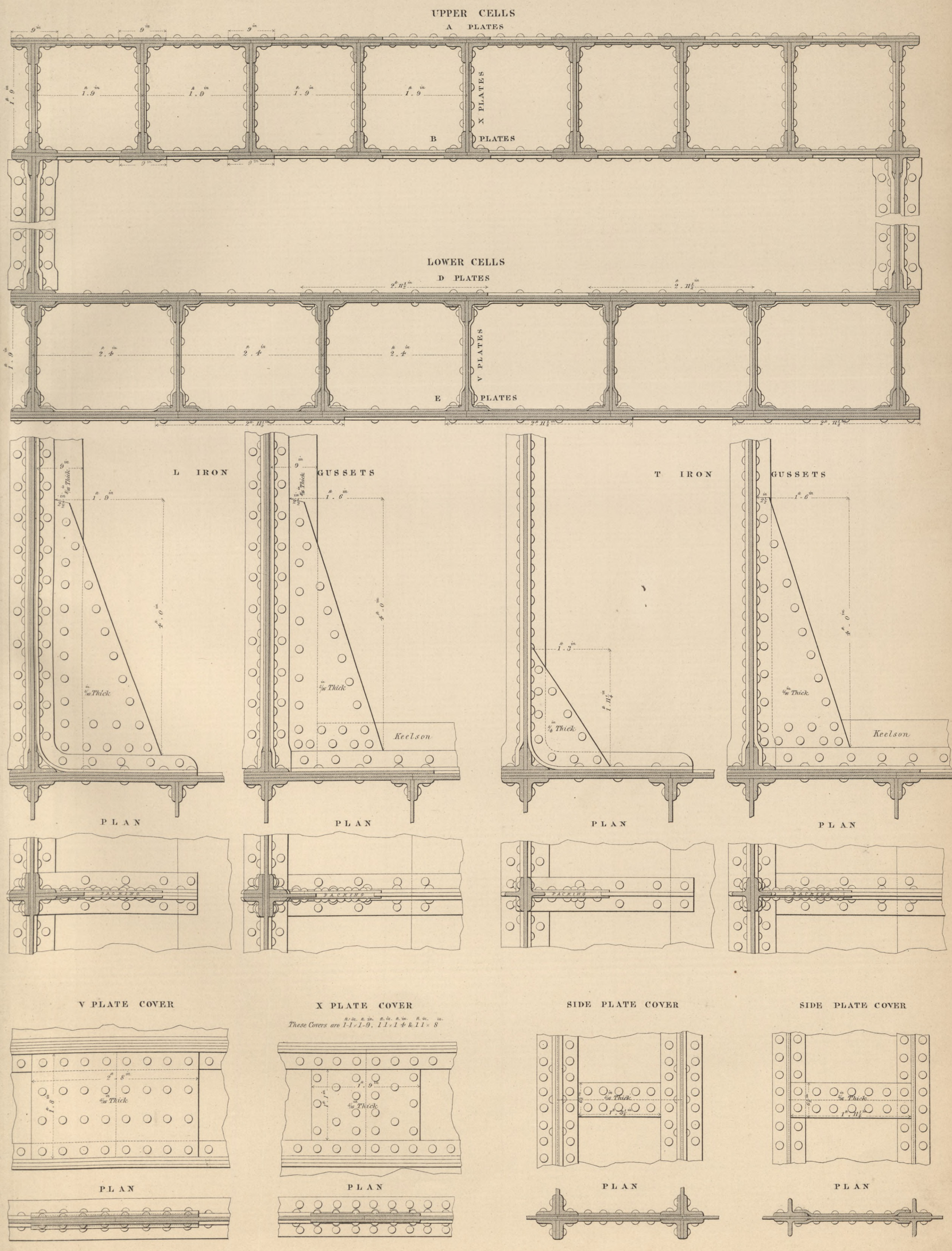
London, Published for the Author 1st Aug. 1849

Day & Son lith. to the Queen

BRITANNIA BRIDGE

PLATE XXI.

DETAILS OF WROUGHT IRON WORK.

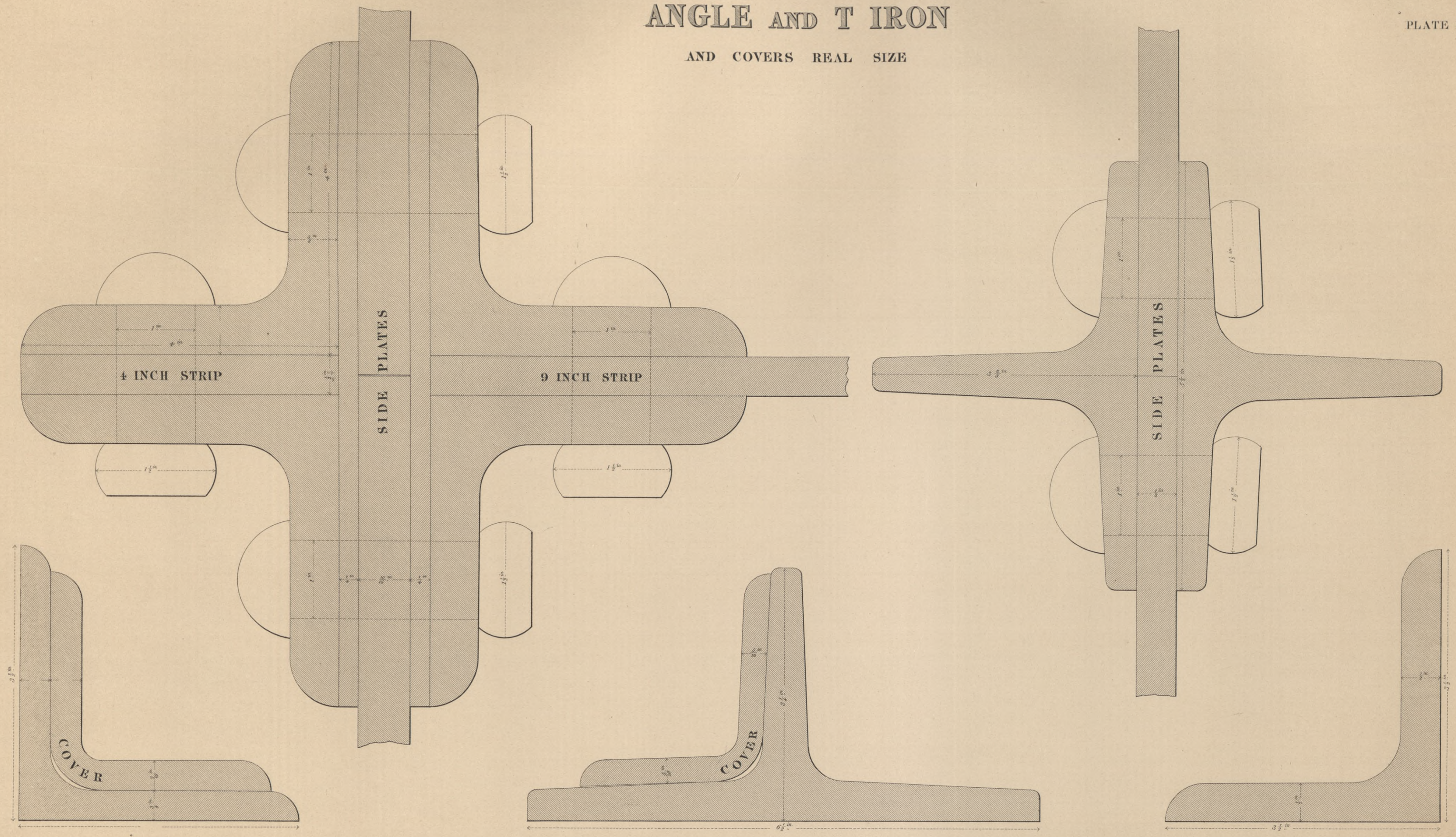


Day & Son lith.rs to the Queen.

London Published for the Author 1st Augt 1849.

ANGLE AND T IRON

AND COVERS REAL SIZE

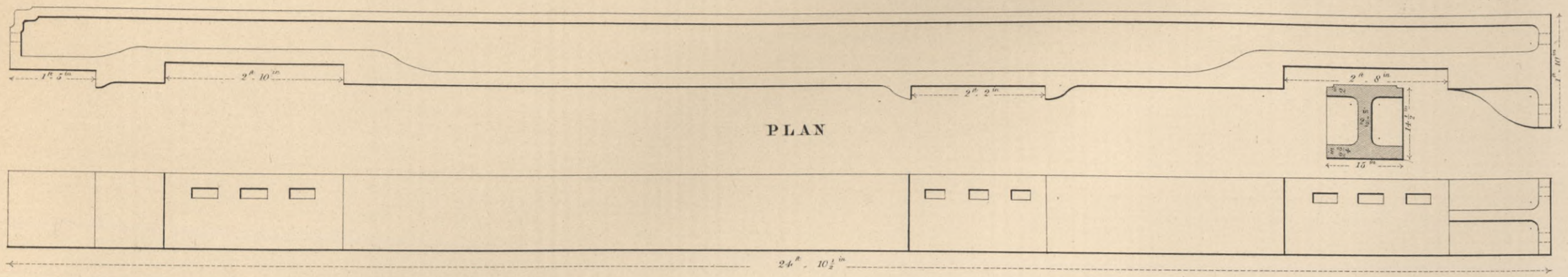


London Published by John Weale, 59, High Holborn, 1st Augt. 1849.

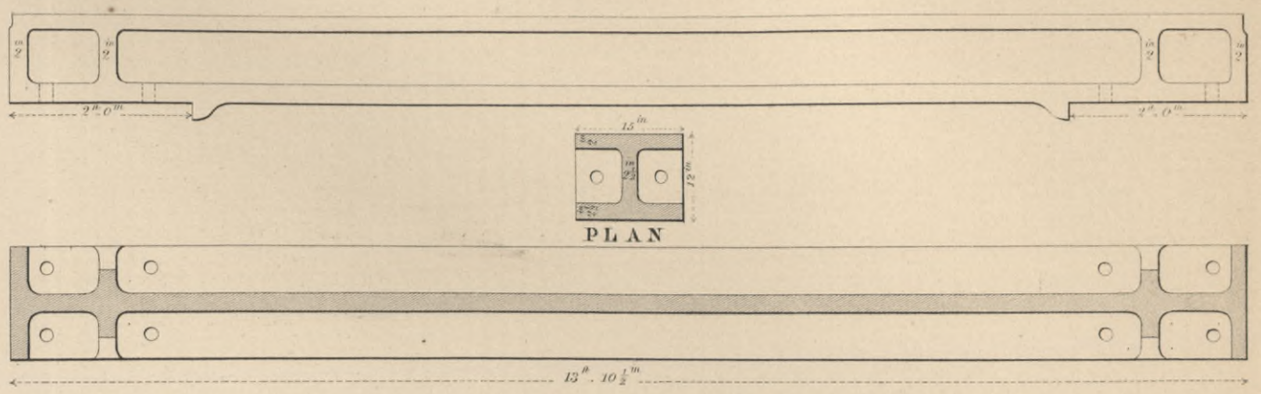
BRITANNIA BRIDGE

CAST IRON BEAMS AND GIRDERS

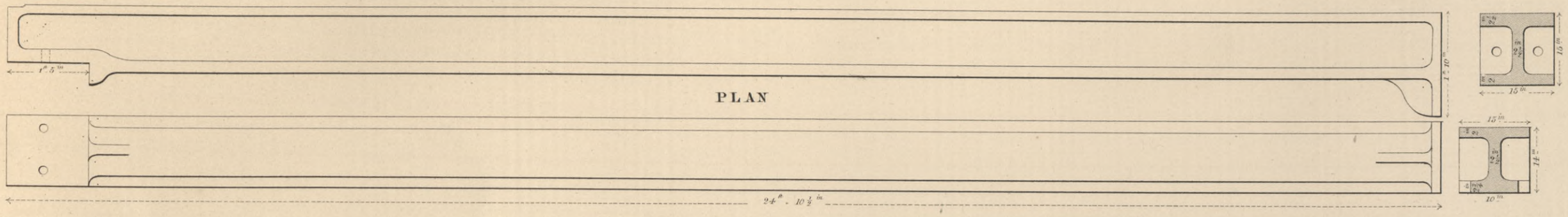
X CASTING



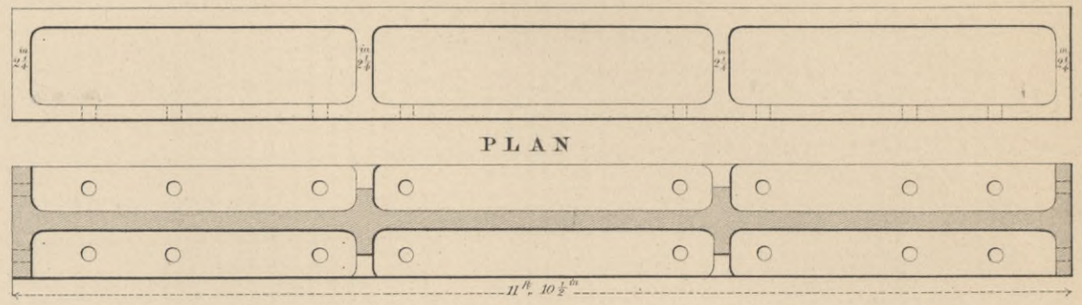
W CASTING



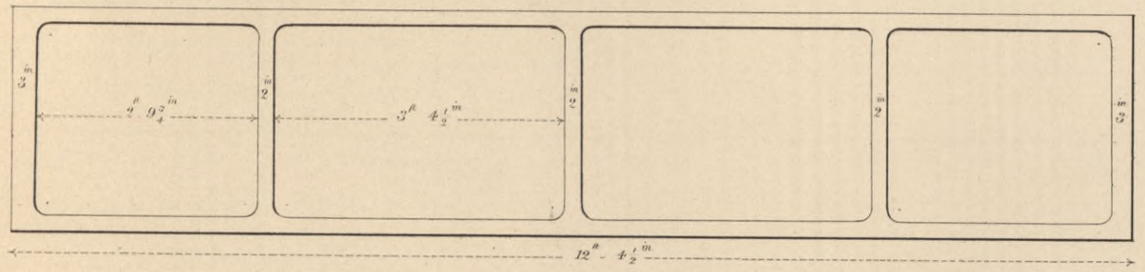
Y CASTING



Z CASTING

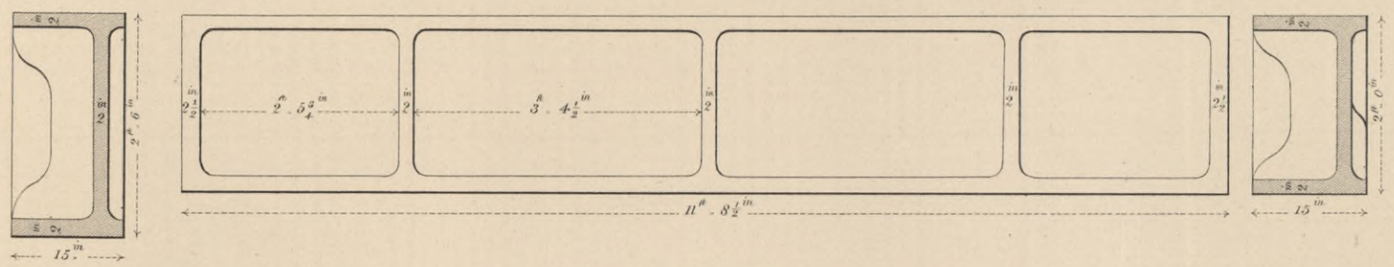


LIFTING BEAM



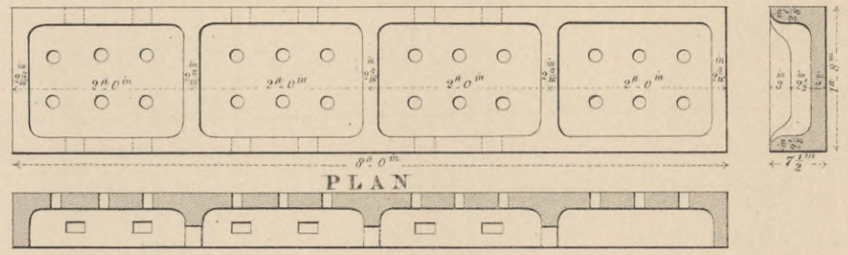
F GIRDER

LIFTING BEAM

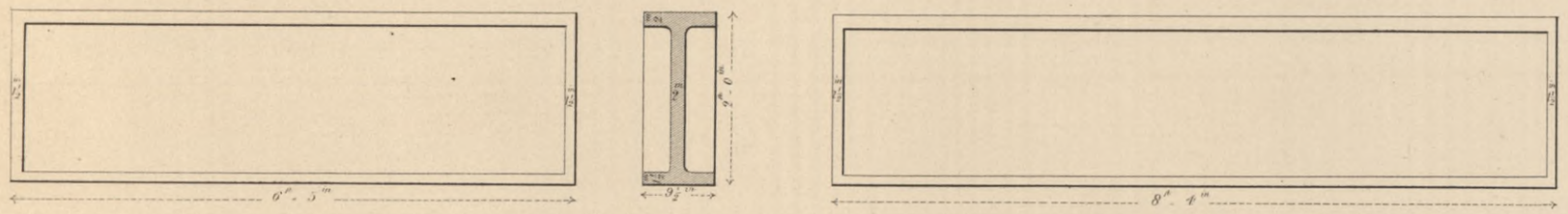


F GIRDER

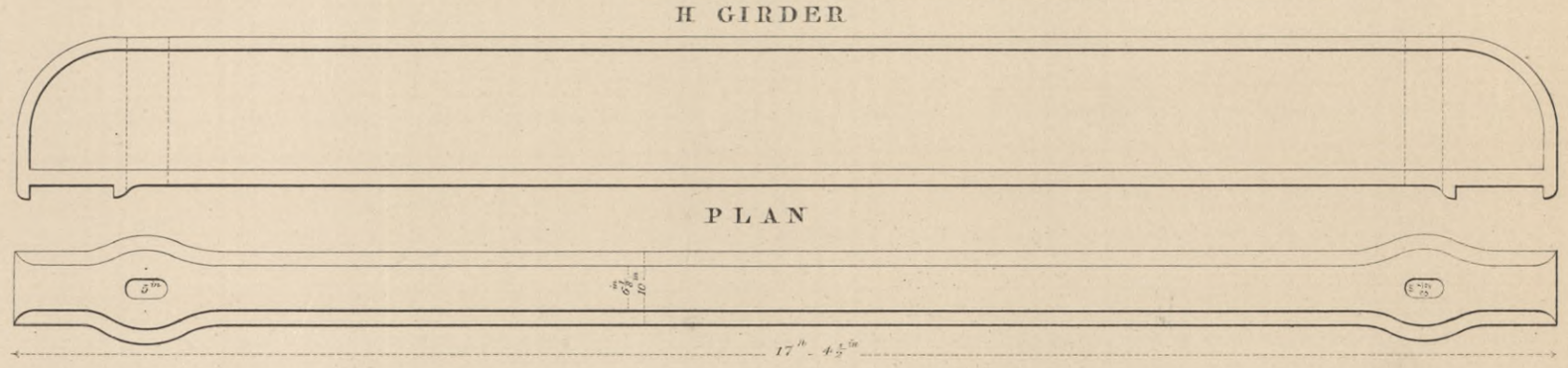
G CASTING



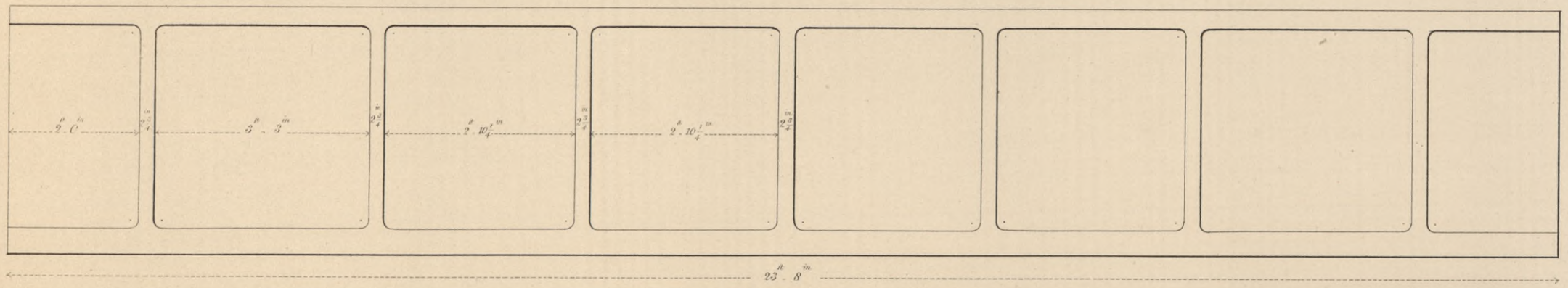
H GIRDER



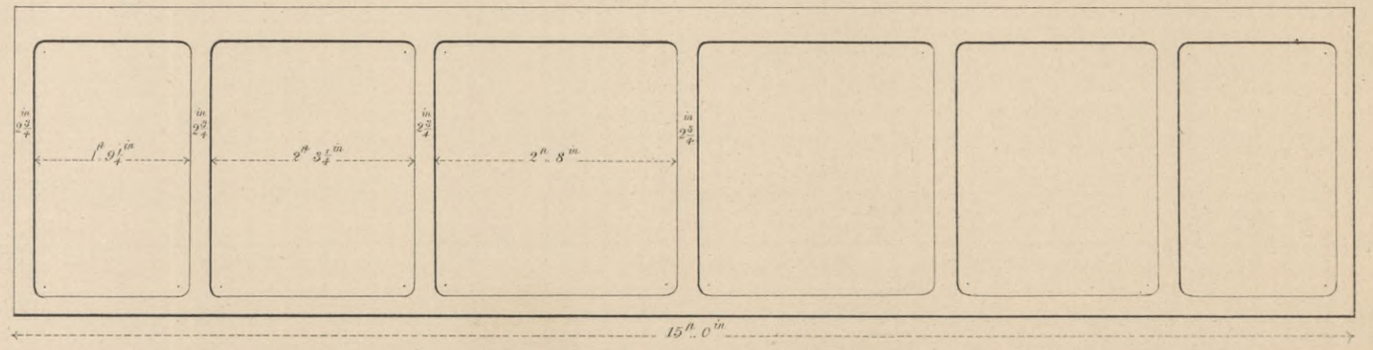
A² GIRDER



A³ GIRDER

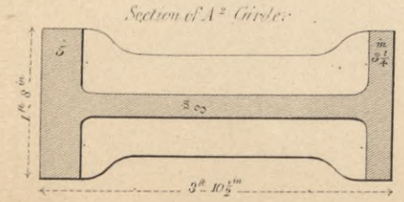


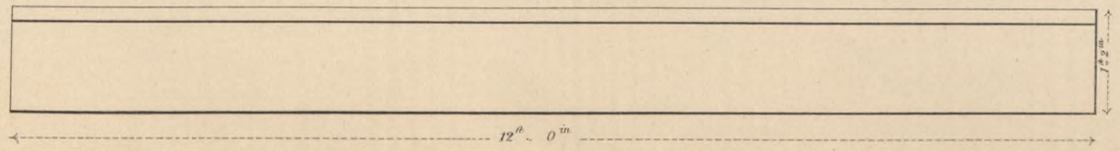
E GIRDER

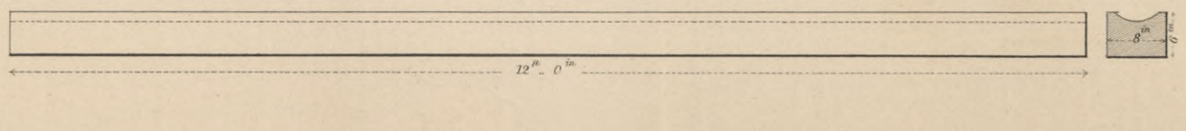


E GIRDER

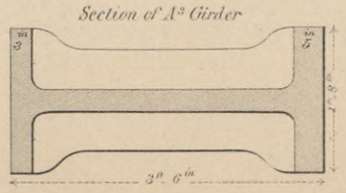
Section of A² Girder



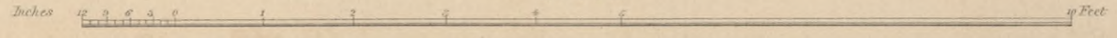




Section of A³ Girder



SCALE

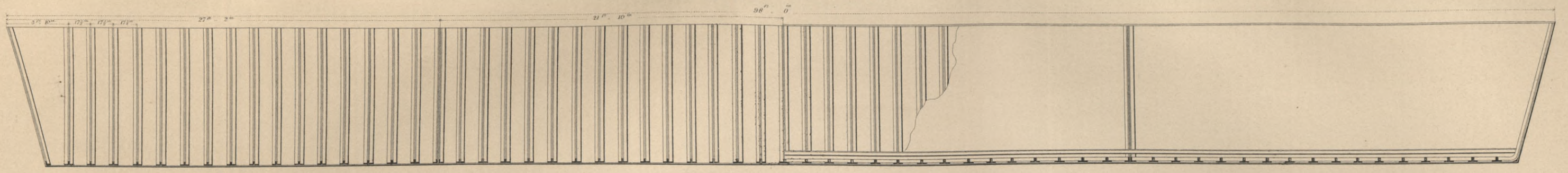


Day & Son, lith.rs to the Queen.

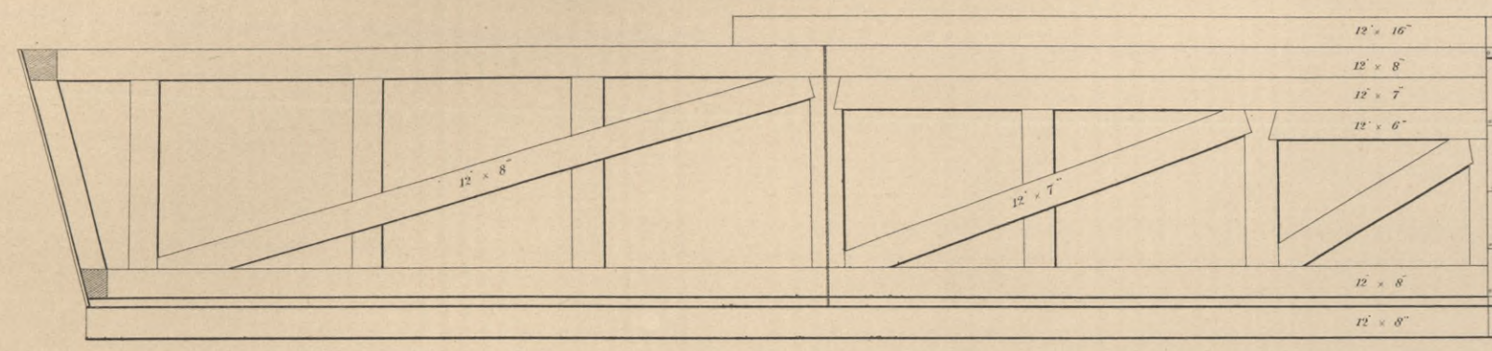
IRON PONTOON

Used in Floating the Britannia Tubes.

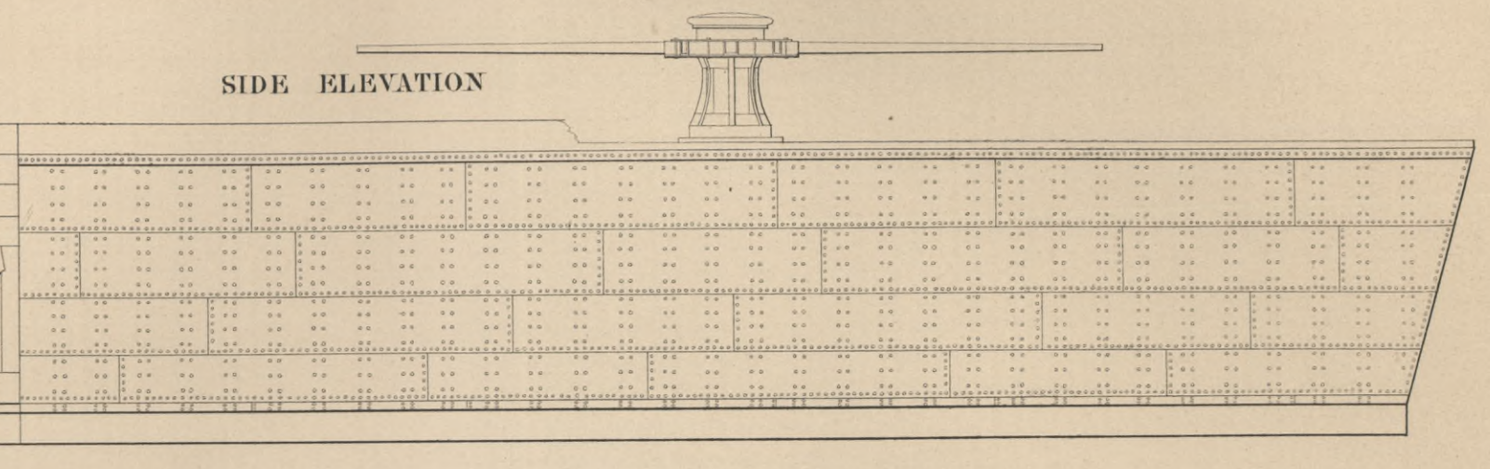
SECTIONAL ELEVATION



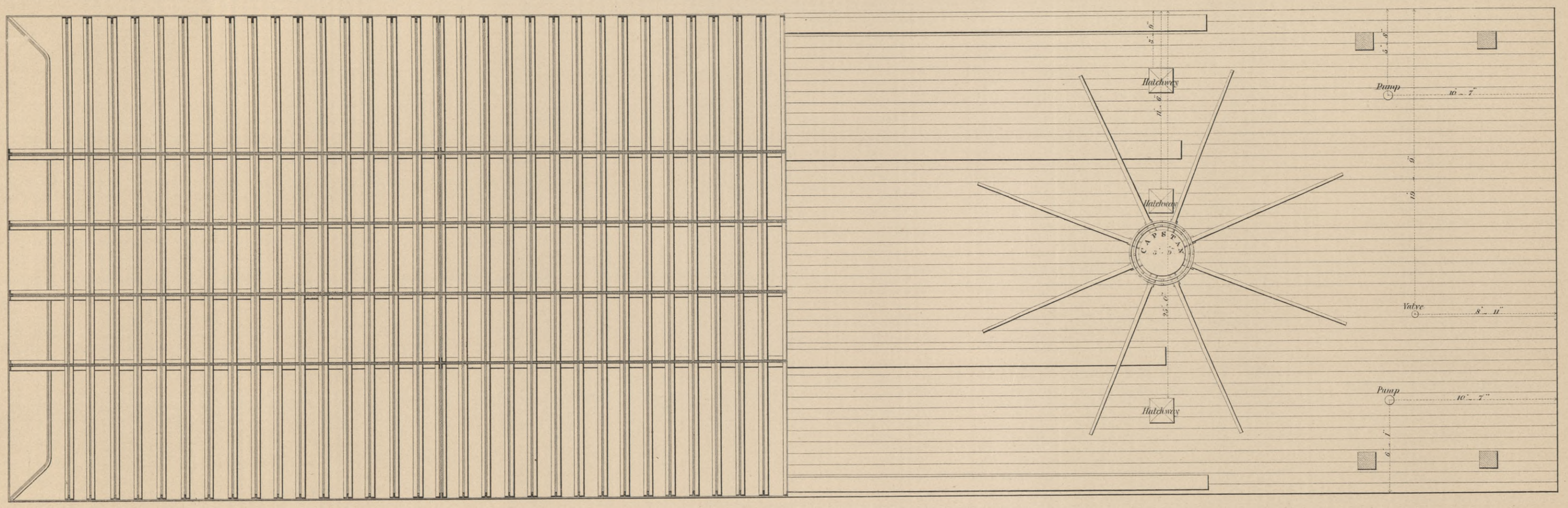
WOODEN FRAME WORK



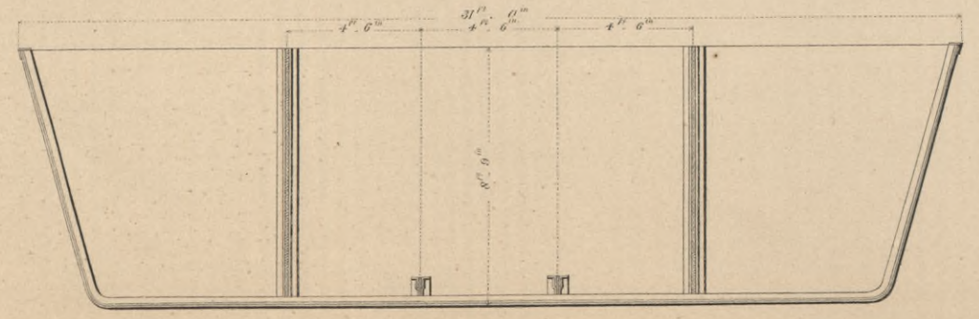
SIDE ELEVATION



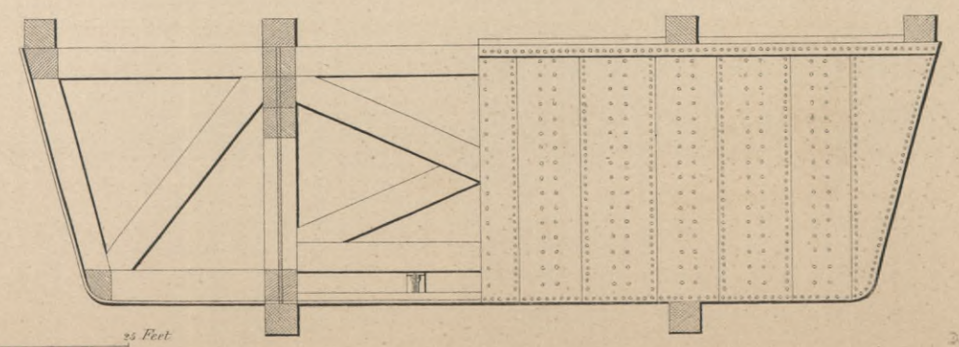
PLAN



SECTION



WOODEN FRAME WORK



END ELEVATION

SCALE.

Inches 12 6 0 4 3 2 1 0 5 10 15 20 25 Feet

DRAWN BY THOMAS BURNS.

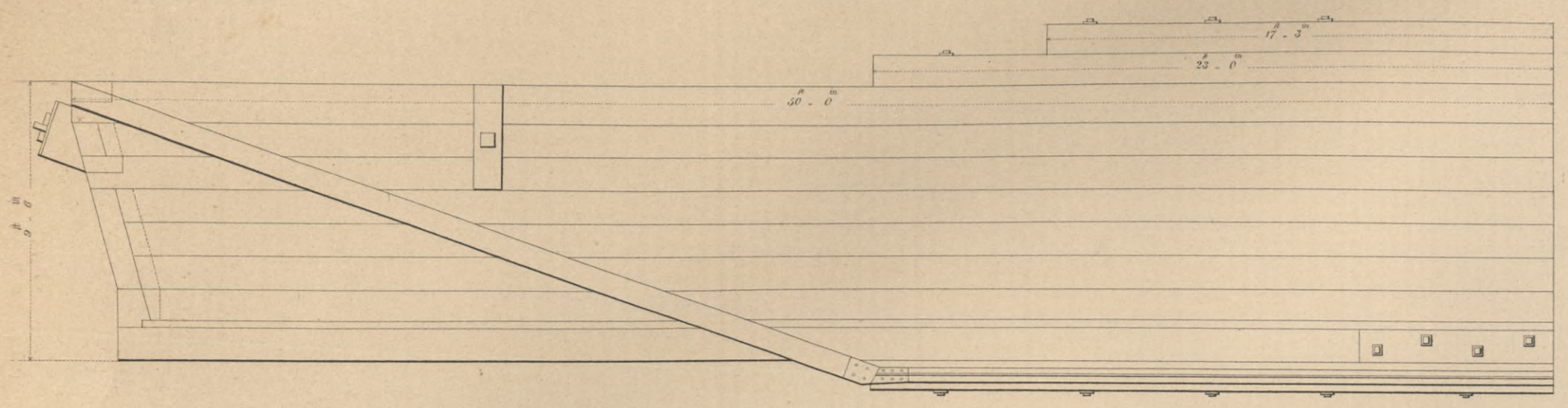
London Published by John Weale, 59 High Holborn, 1st Aug.st 1849.

Day & Son, lith. to the Queen.

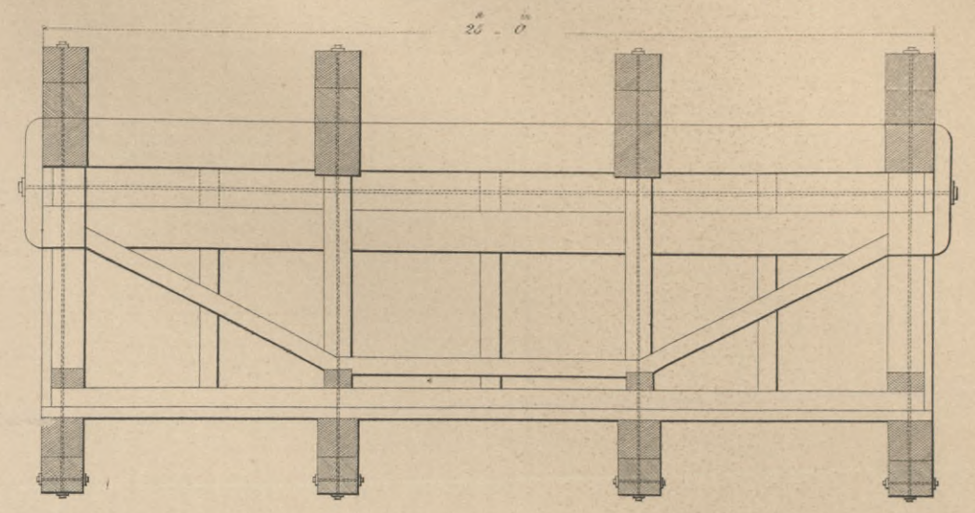
WOODEN PONTOONS

Used in Floating the Britannia and Conway Tubes

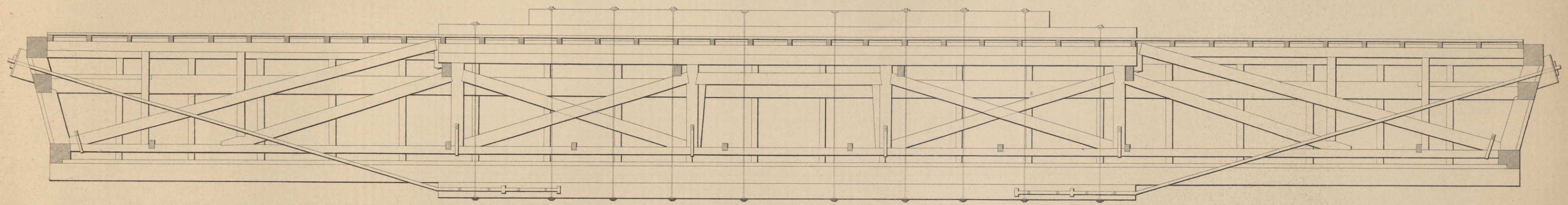
SIDE ELEVATION



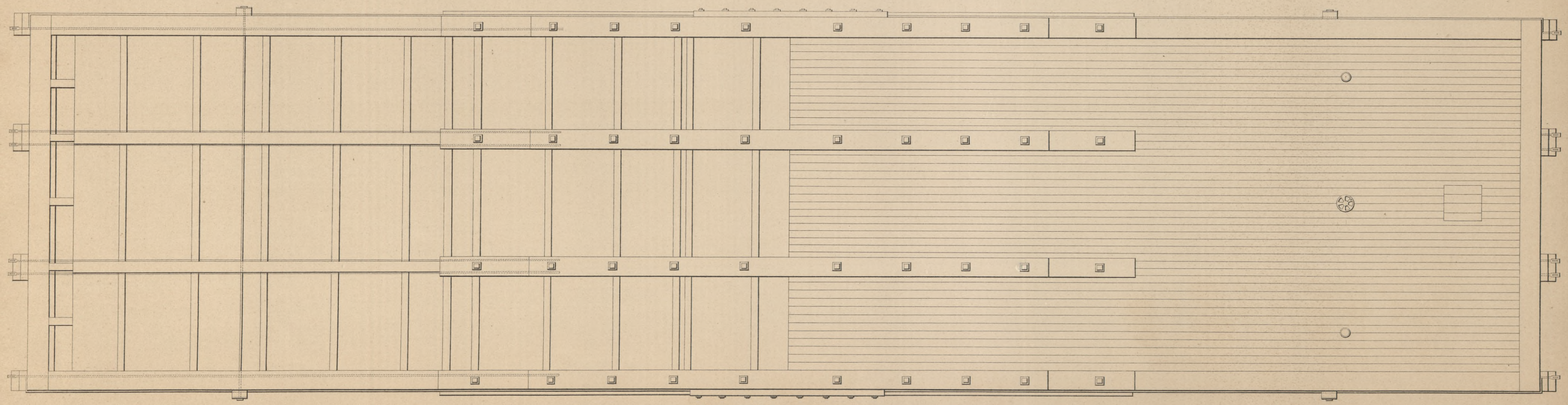
TRANSVERSE SECTION



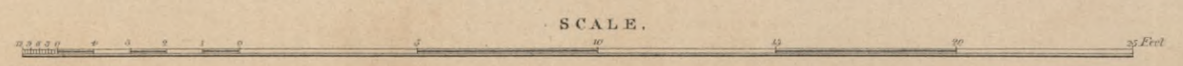
LONGITUDINAL SECTION



PLAN



SCALE.

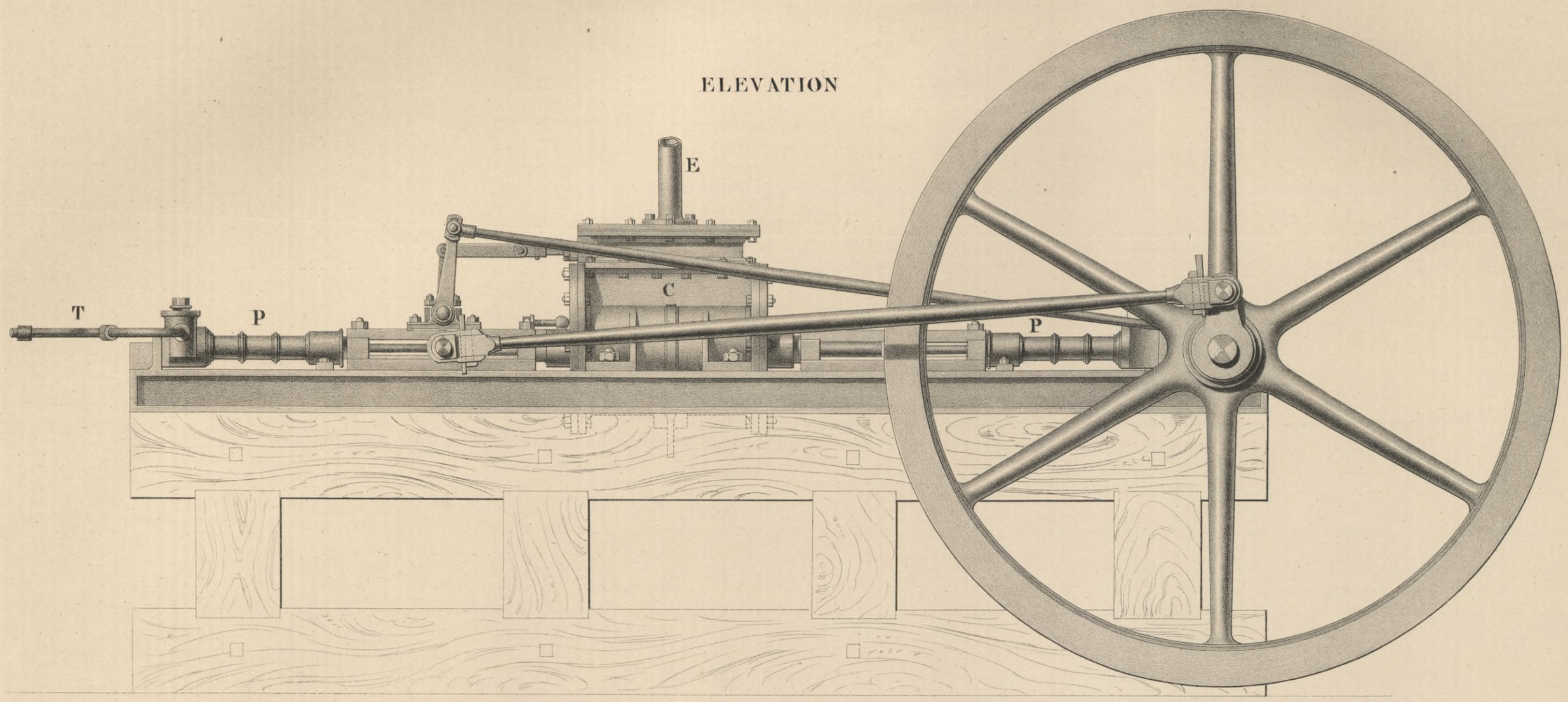


London Published for John Weale 59 High Holborn 1st April 1849

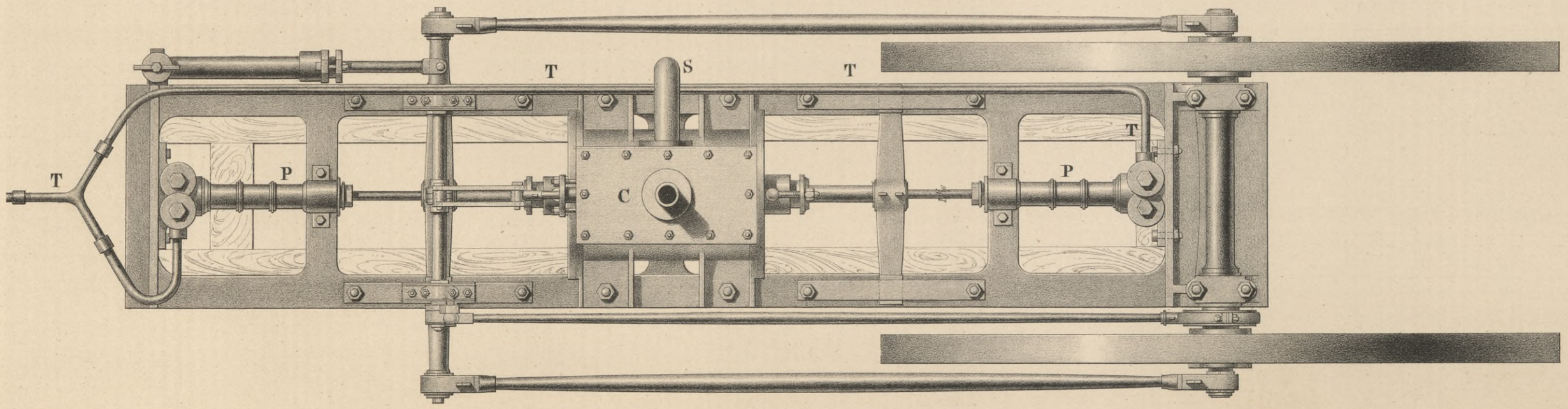
BRITANNIA AND CONWAY BRIDGES

Steam Engine working the Hydraulic Presses for raising the Tubes
by Messrs. Easton and Amos, London.

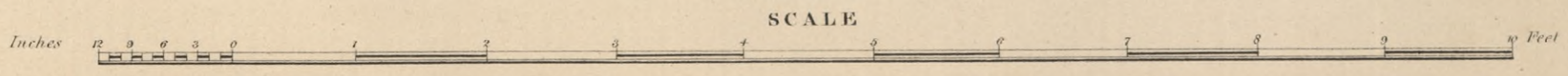
ELEVATION



PLAN



SCALE



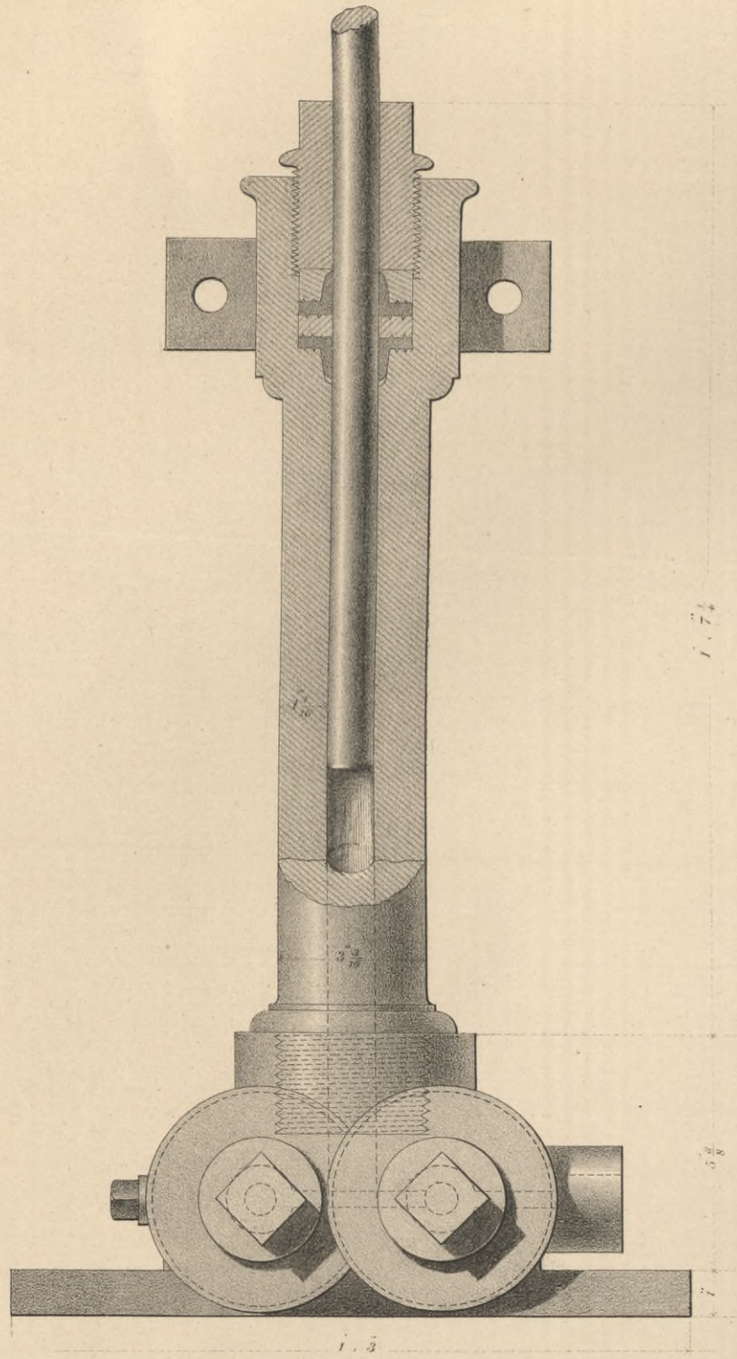
Day & Son, lith.rs to the Queen.

BRITANNIA BRIDGE

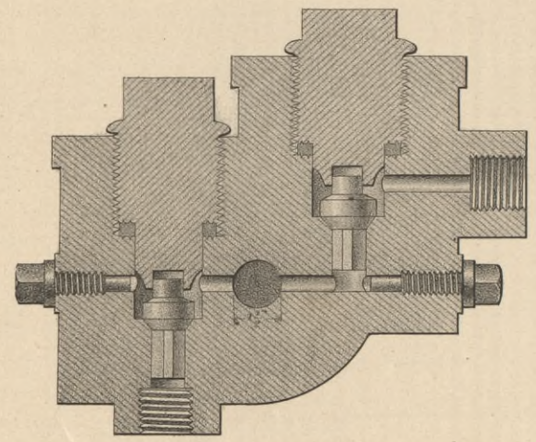
PLATE XXVII.

Single Hydraulic Press for Land Tower.

DETAIL OF FORCE PUMP
for Hydraulic Presses.

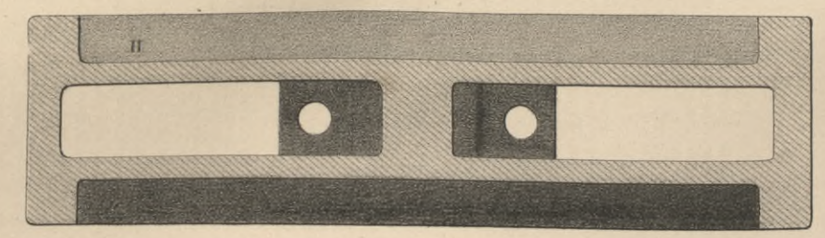


SECTION OF VALVE BOX

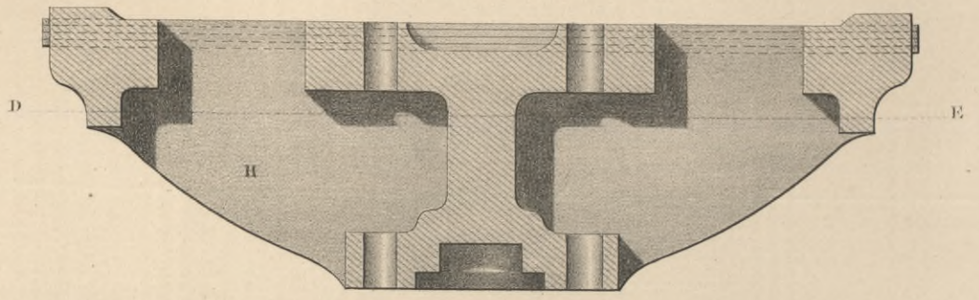


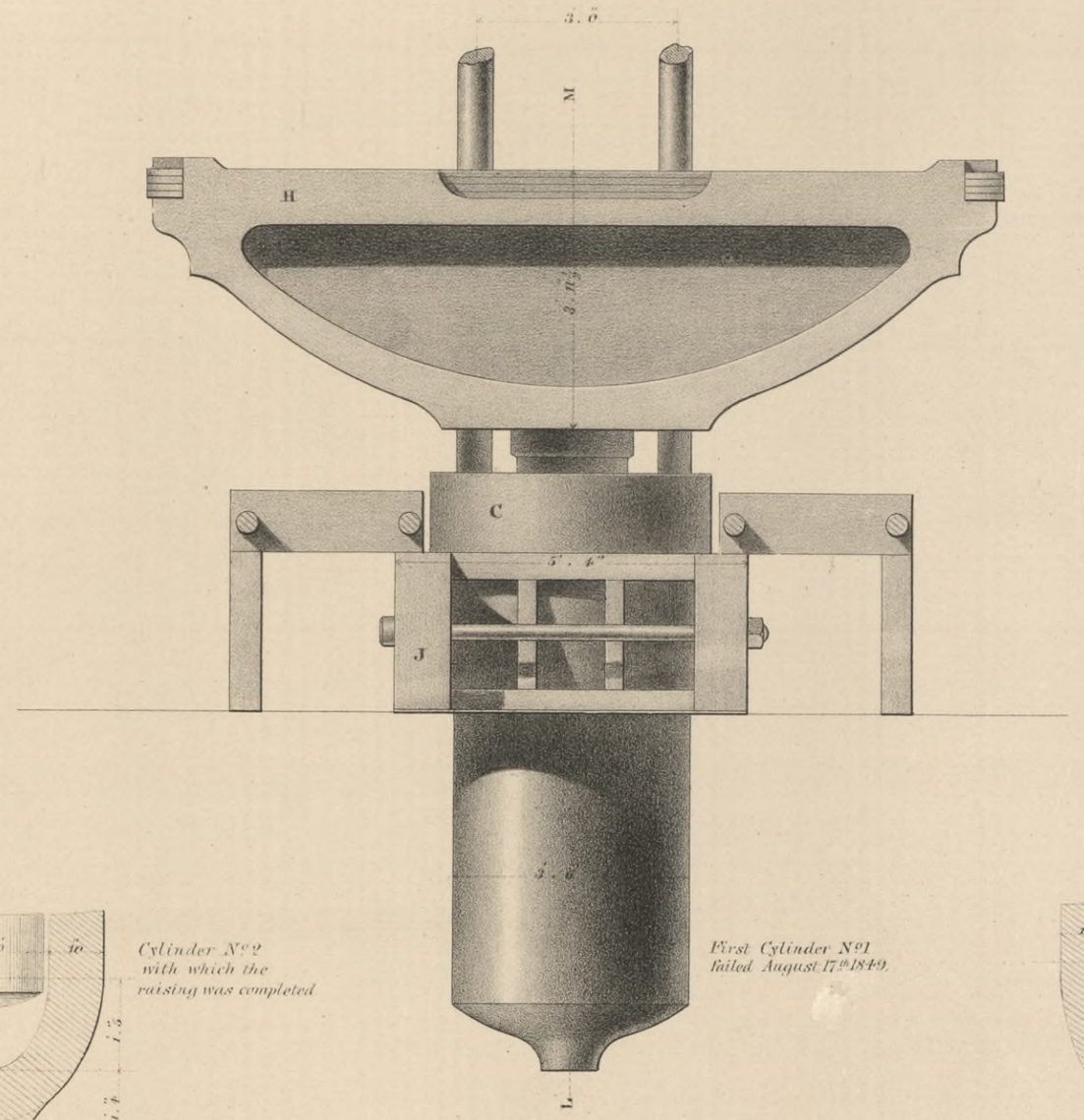
Easton and Amos, London.

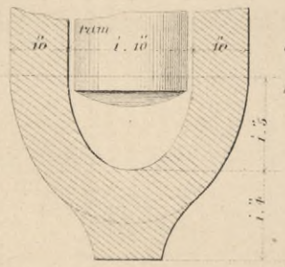
CROSS HEAD
Section at D. E.



Section at F. G.

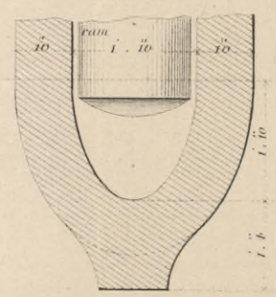






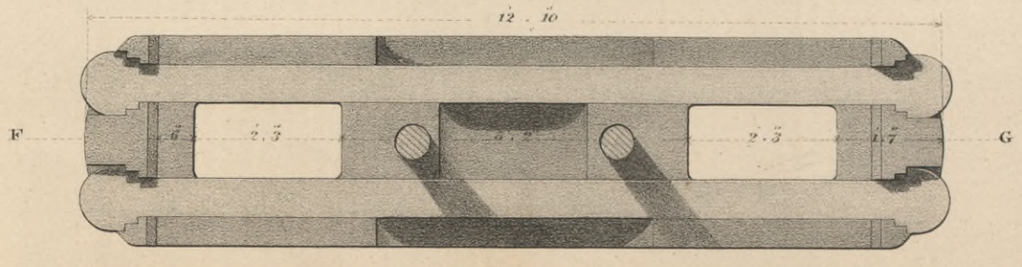
Cylinder No 2 with which the raising was completed

First Cylinder No 1 failed August 17th 1849.

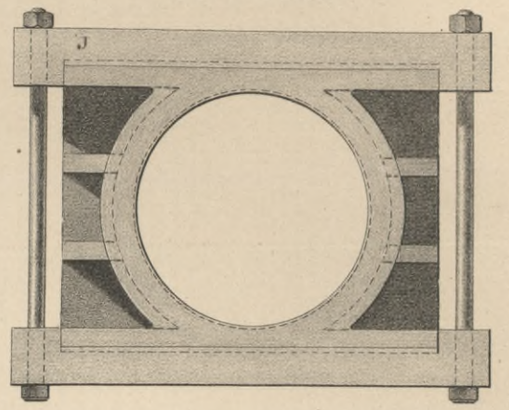


Cylinder No 3 reserved in case of accident

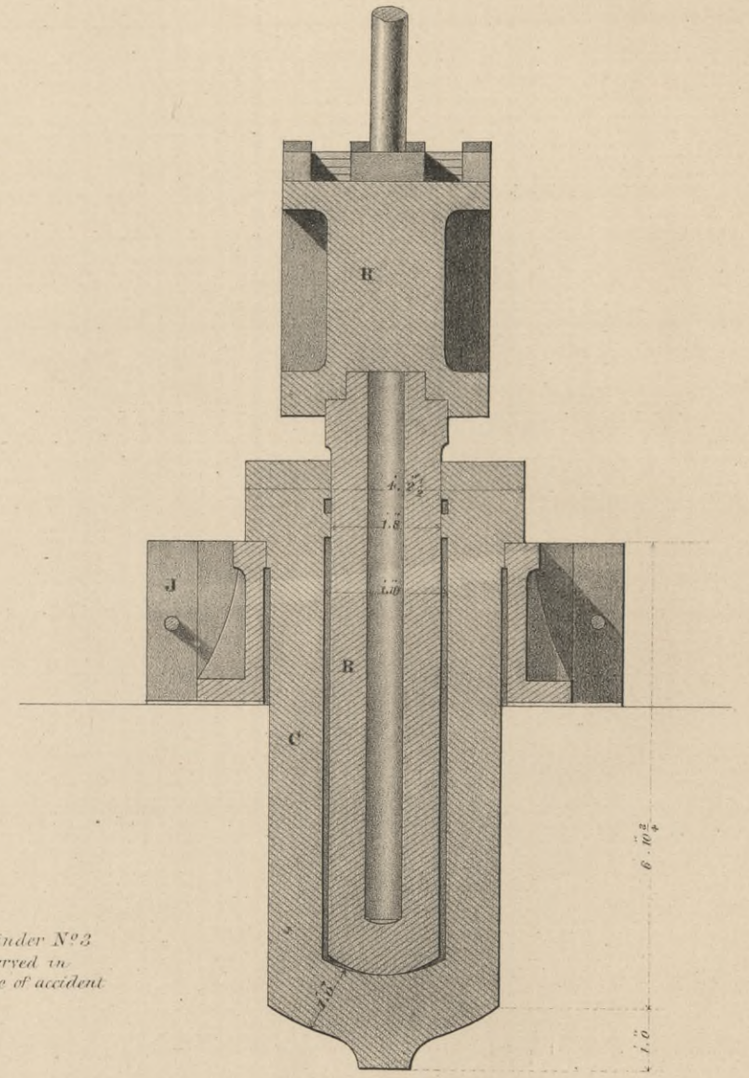
PLAN ON TOP



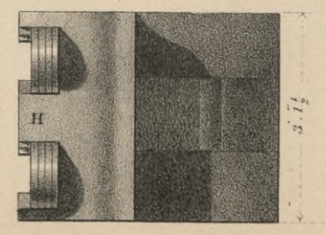
PLAN OF CASING



SECTION AT L. M.



END VIEW



Scale for details of Force Pump

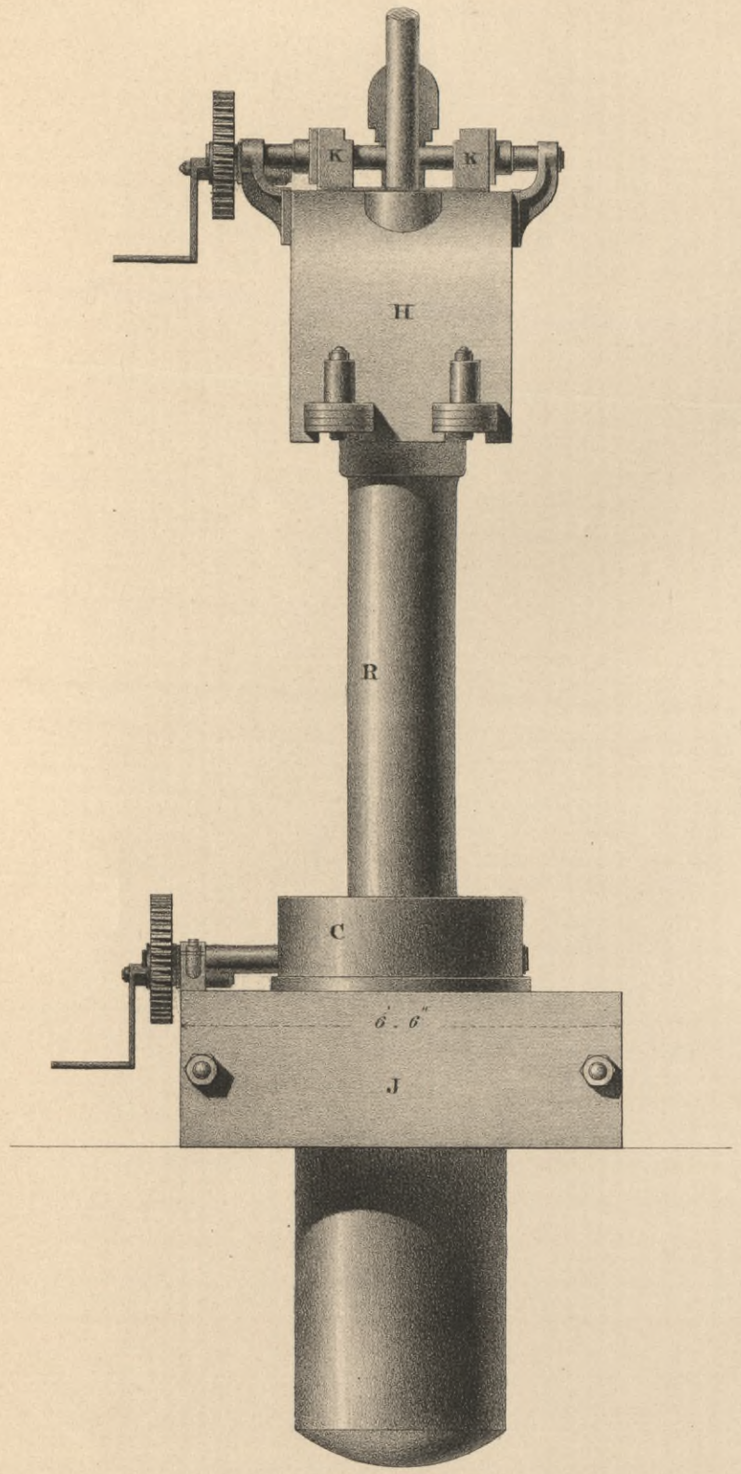
Scale for Press.

BRITANNIA BRIDGE

PLATE XXVIII

THE DOUBLE PRESS

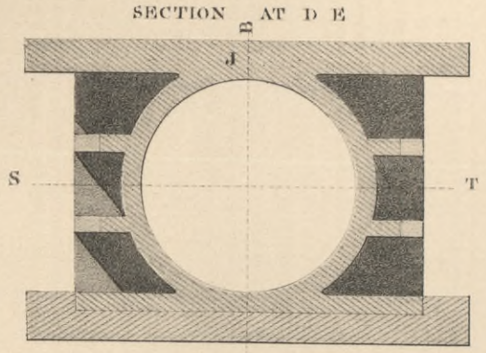
SIDE ELEVATION



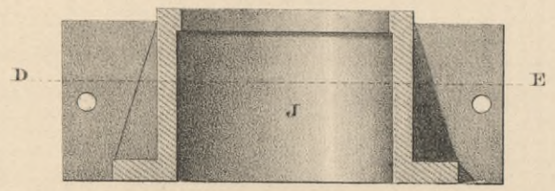
CASING

SECTION AT A B

SECTION AT D E

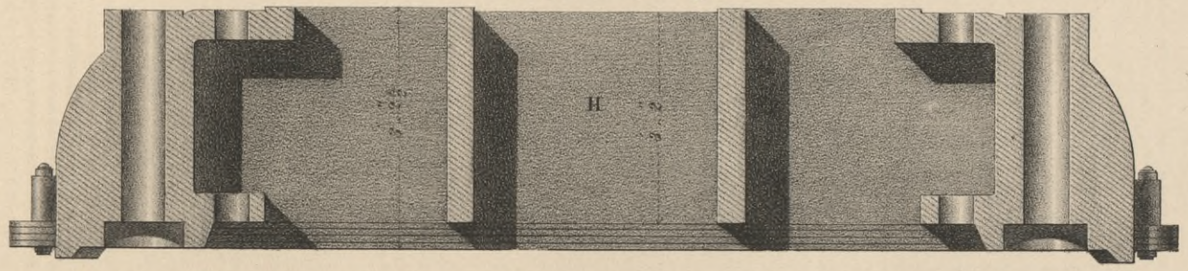


SECTION AT S T

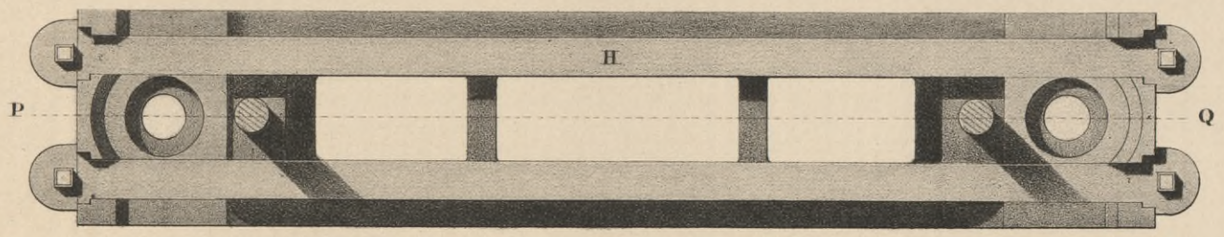


CROSS HEAD

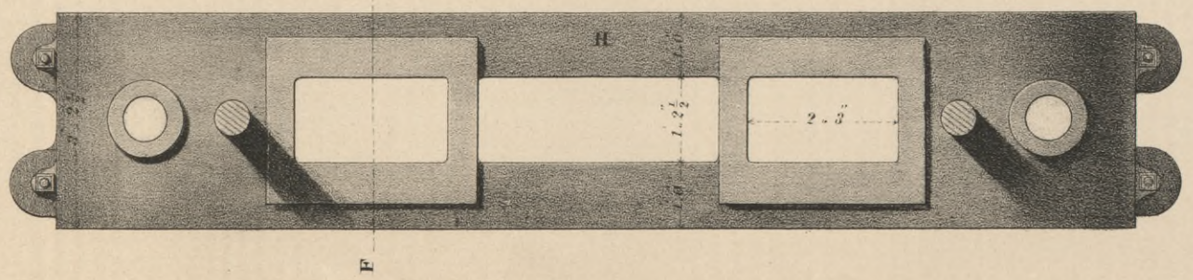
SECTION AT P Q



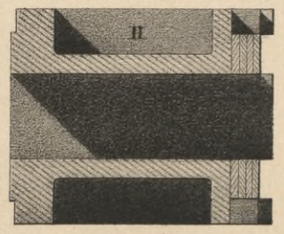
PLAN OF UNDERSIDE



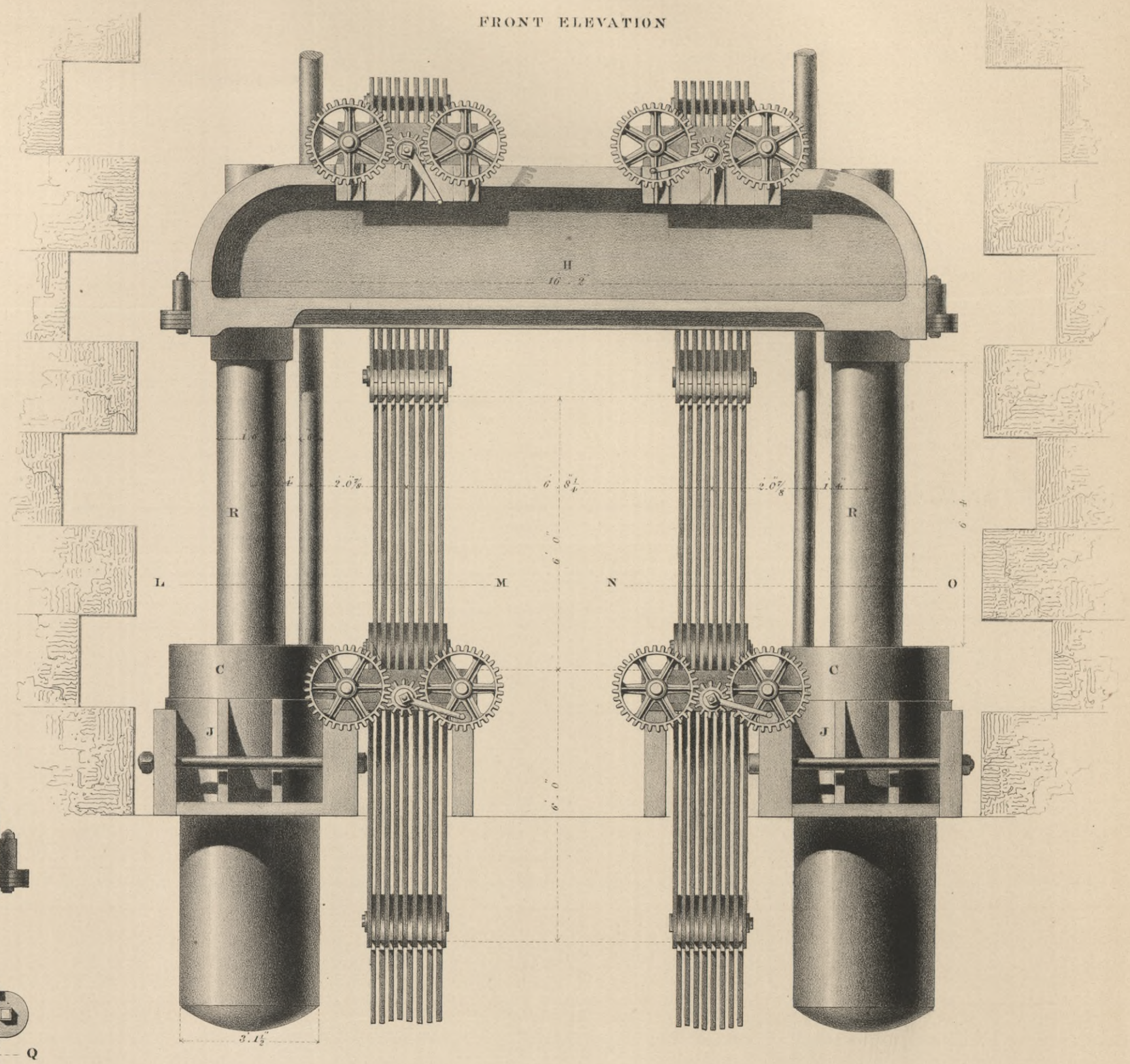
PLAN OF UPPERSIDE



SECTION AT F G

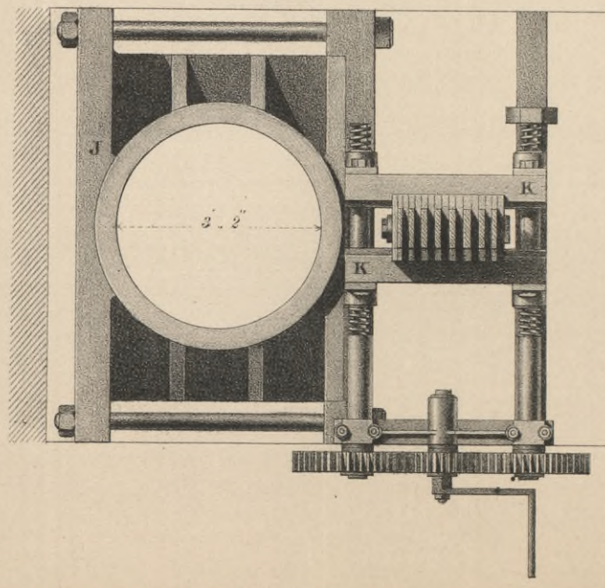


FRONT ELEVATION

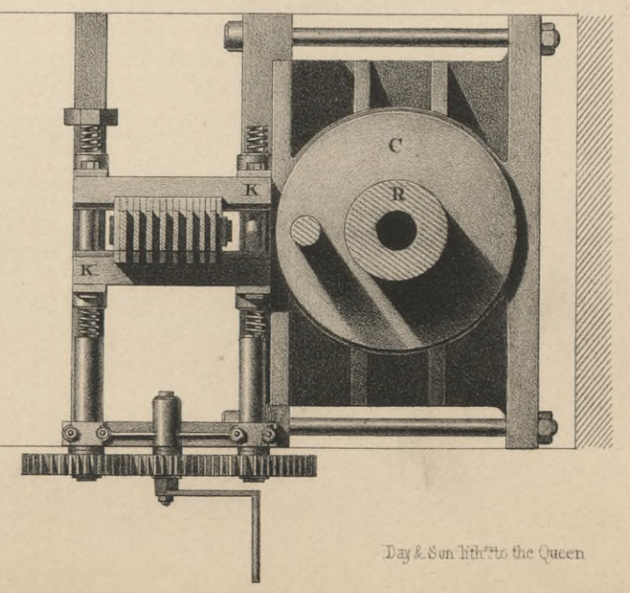


SECTION AT L M

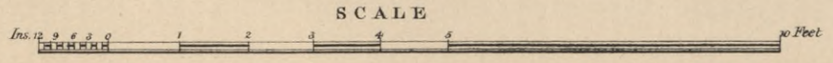
WITH CYLINDER REMOVED



SECTION AT N O



SCALE



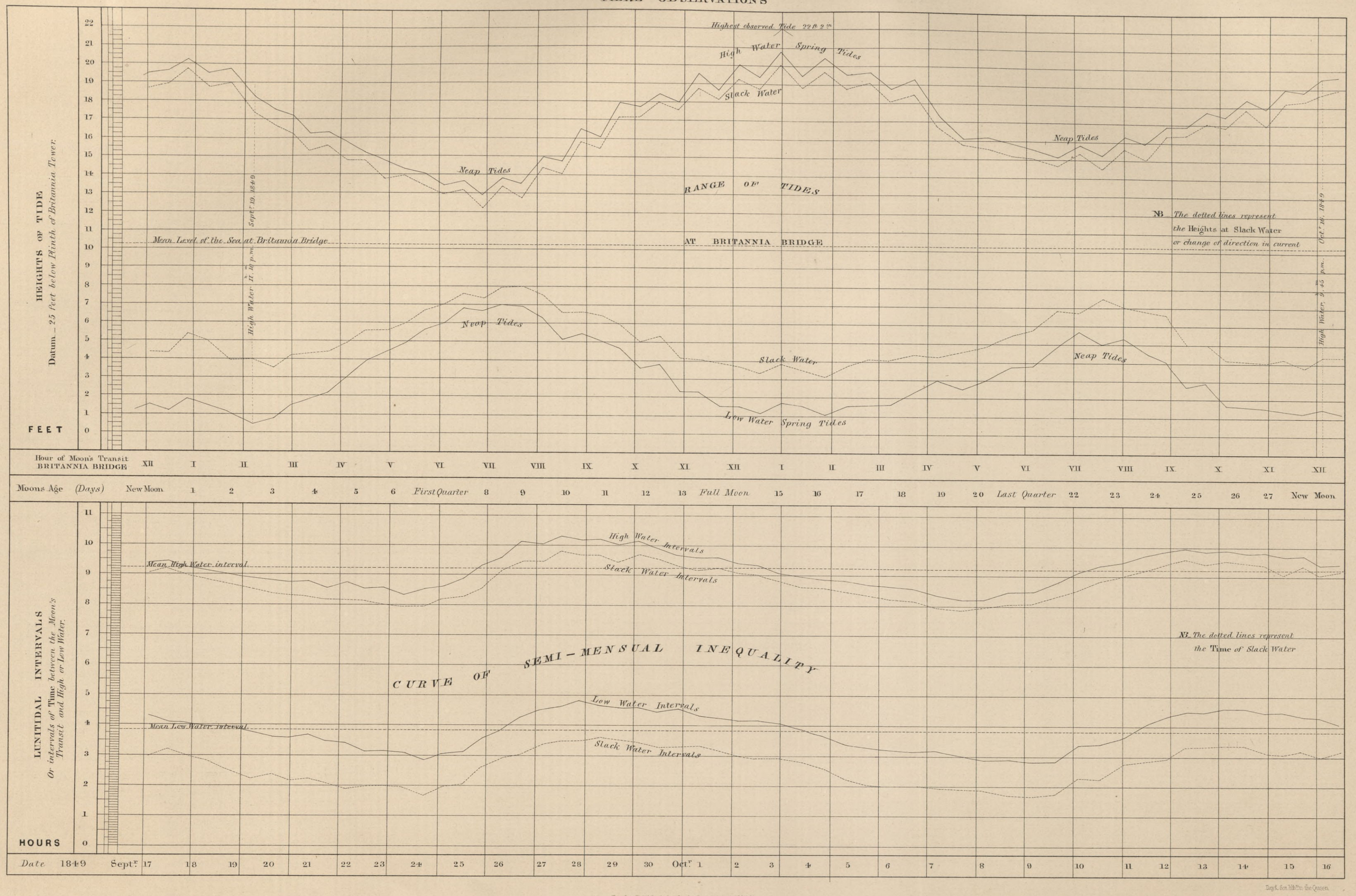
Easton & Amos, London.

London, Published by John Weale, 59 High Holborn, Aug.st 1.st 1849.

Day & Son lith.rs to the Queen

BRITANNIA BRIDGE

TIDAL OBSERVATIONS

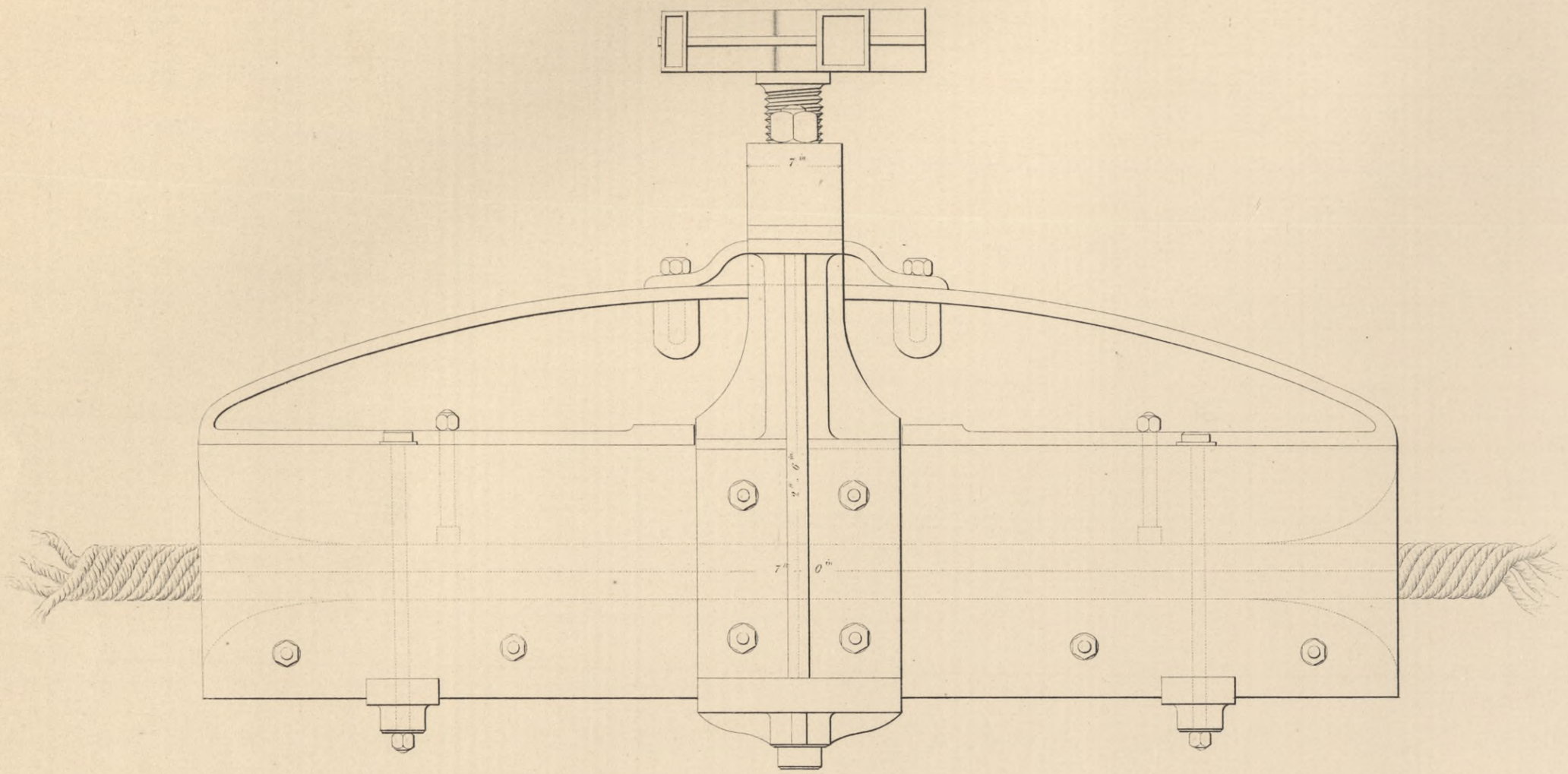


London, Published for the Author 1st Aug.st 1849

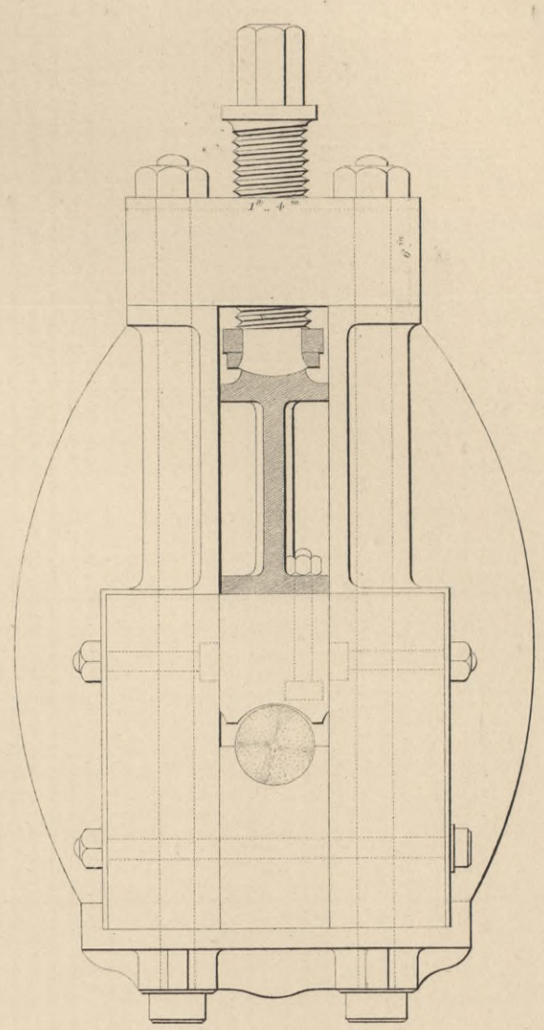
Day & Son lith.rs to the Queen.

CABLE STOPPER

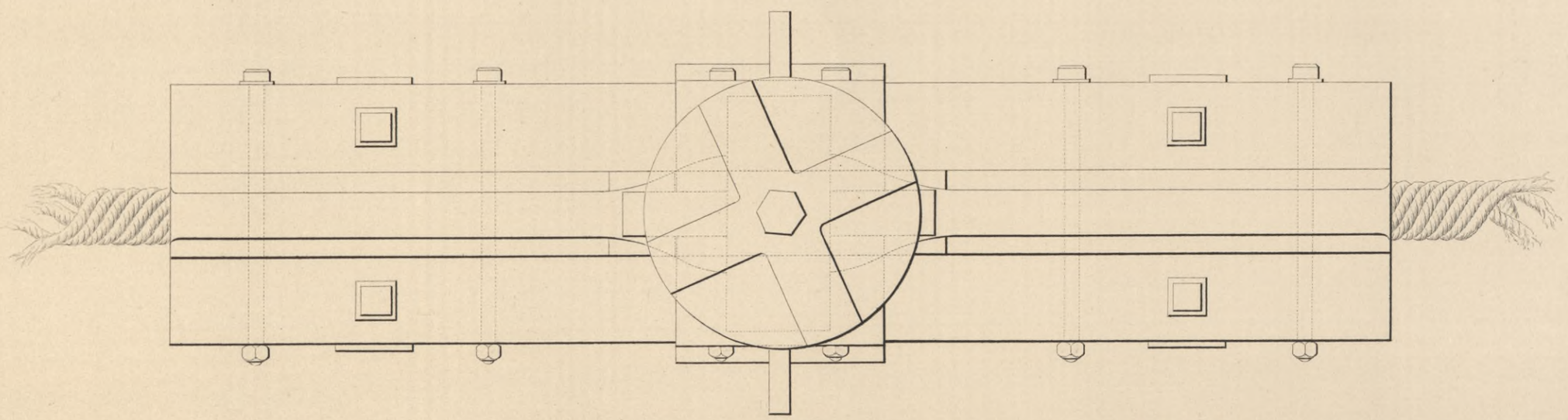
ELEVATION



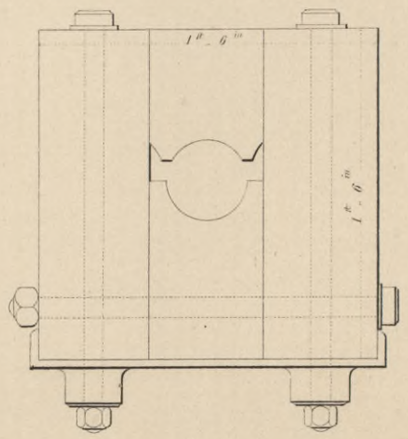
SECTION



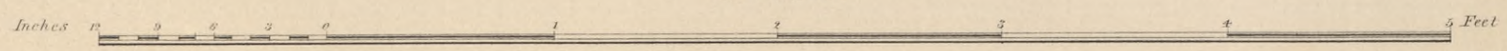
PLAN



END VIEW



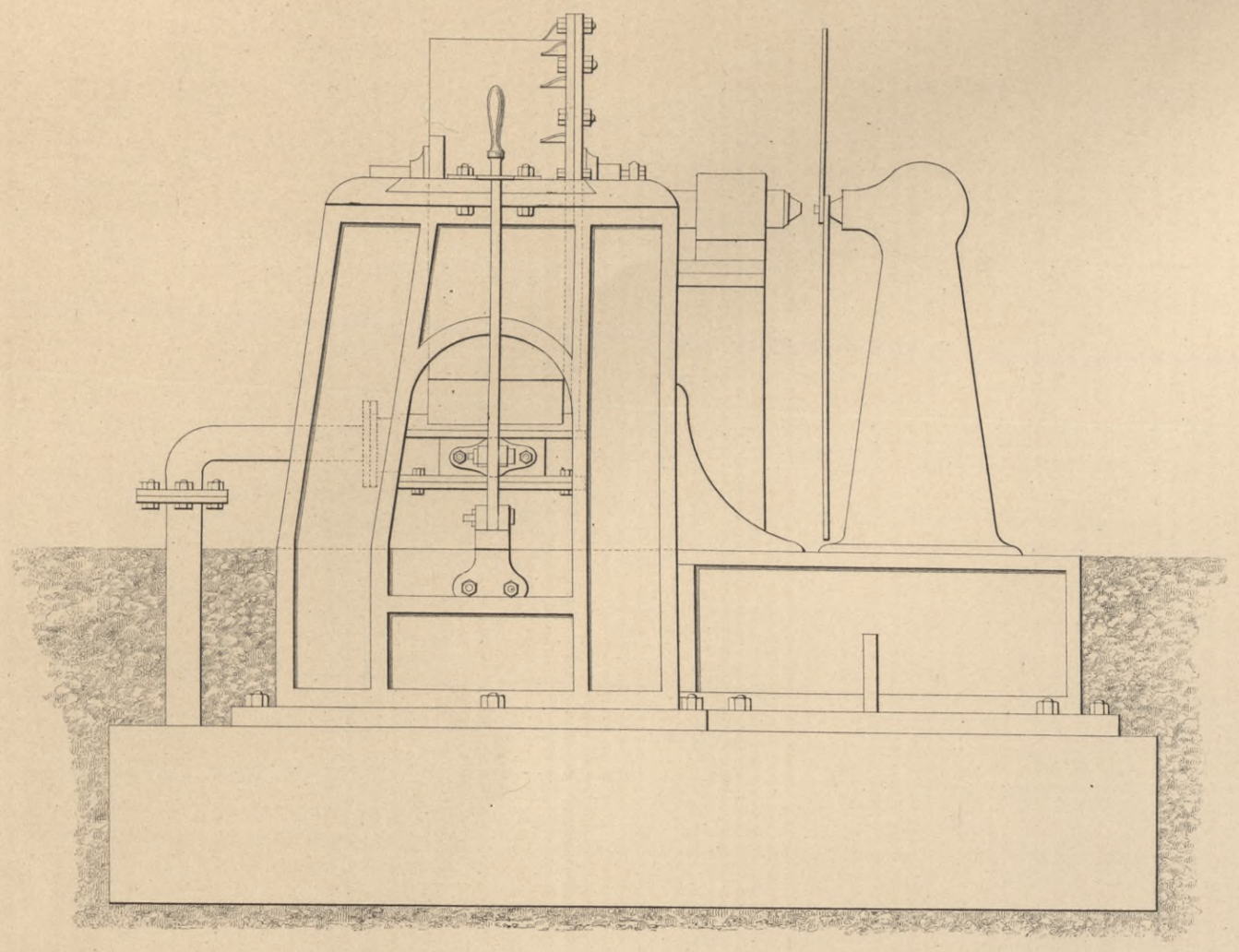
SCALE.

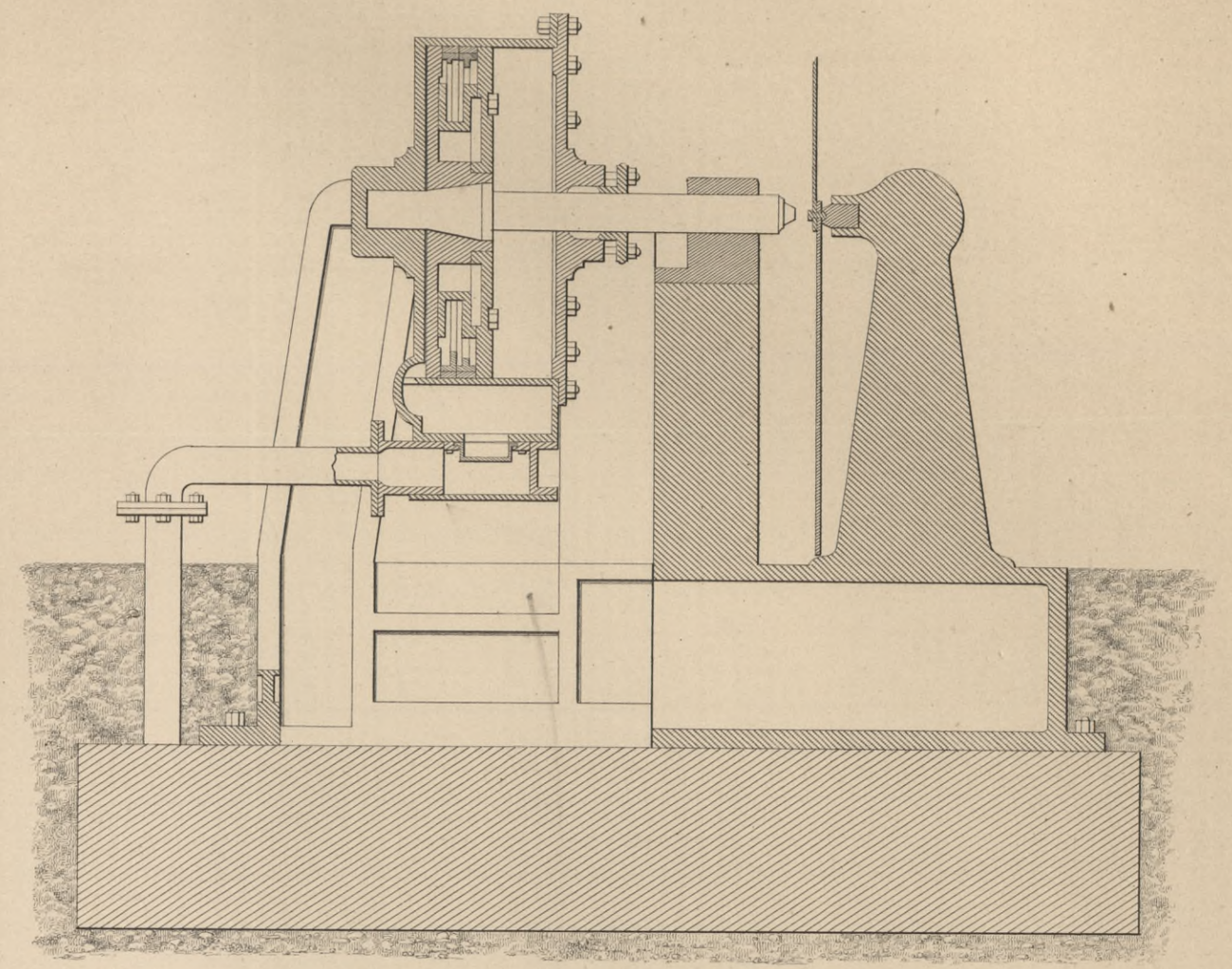


DRAWN BY THOMAS BIBBS.
London, Published by John Weale, 59, High Holborn, August 1st 1849.

BRITANNIA AND CONWAY TUBULAR BRIDGES

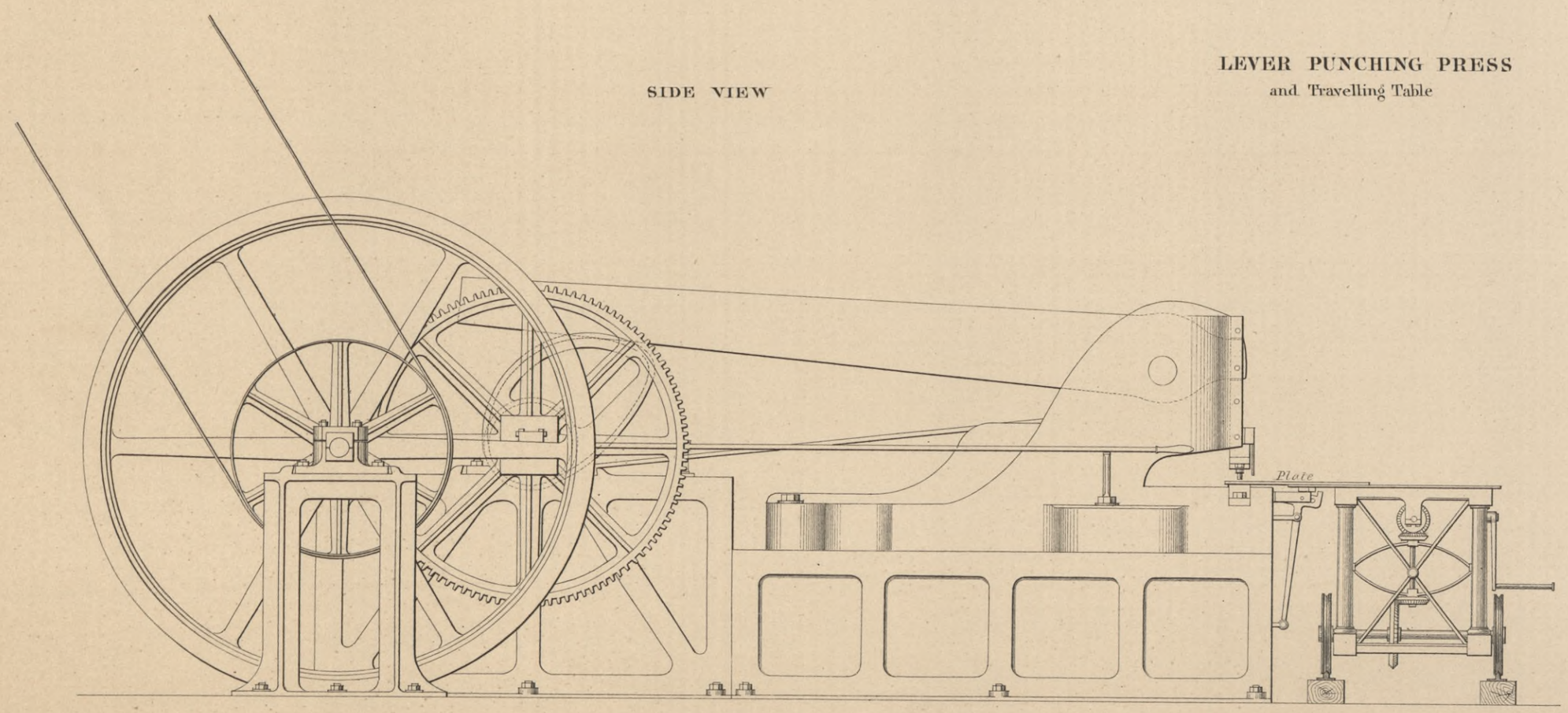
THE STEAM RIVETING MACHINE



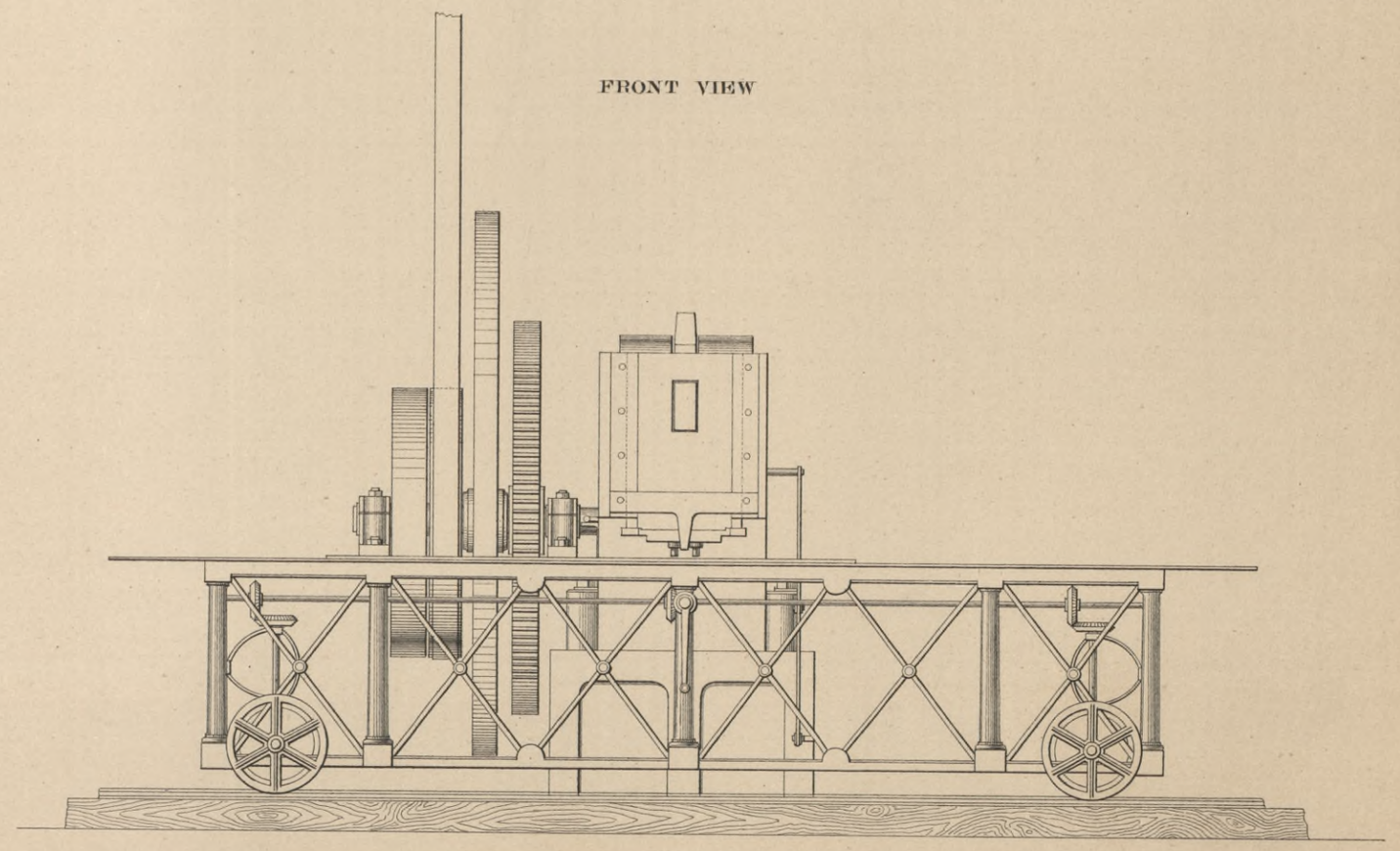


LEVER PUNCHING PRESS
and Travelling Table

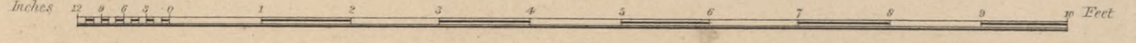
SIDE VIEW



FRONT VIEW

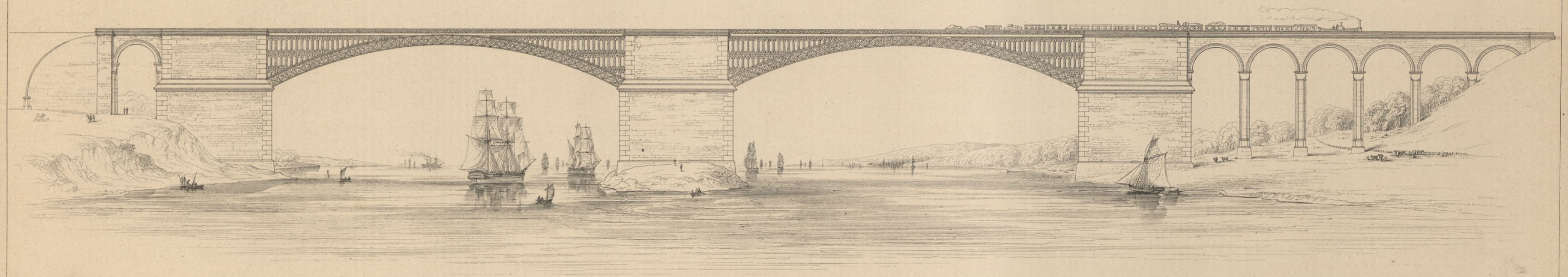


SCALE



Day & Son lith.rs to the Queen.

London, Published for the Author, 1st August 1849.



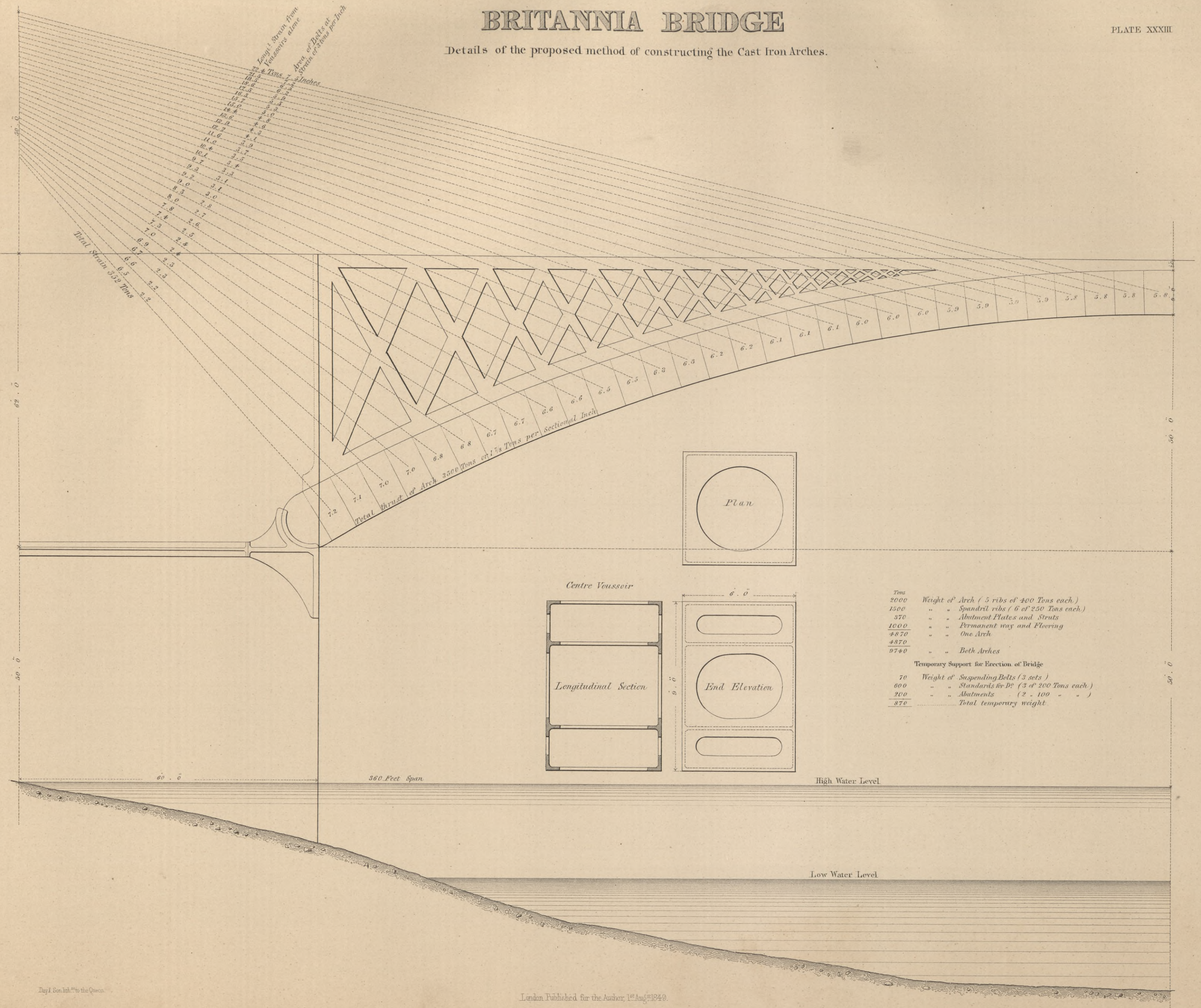
Day & Son lith.rs to the Queen.

CAST IRON ARCHES

ORIGINALLY PROPOSED FOR THE BRITANNIA BRIDGE.

BRITANNIA BRIDGE

Details of the proposed method of constructing the Cast Iron Arches.



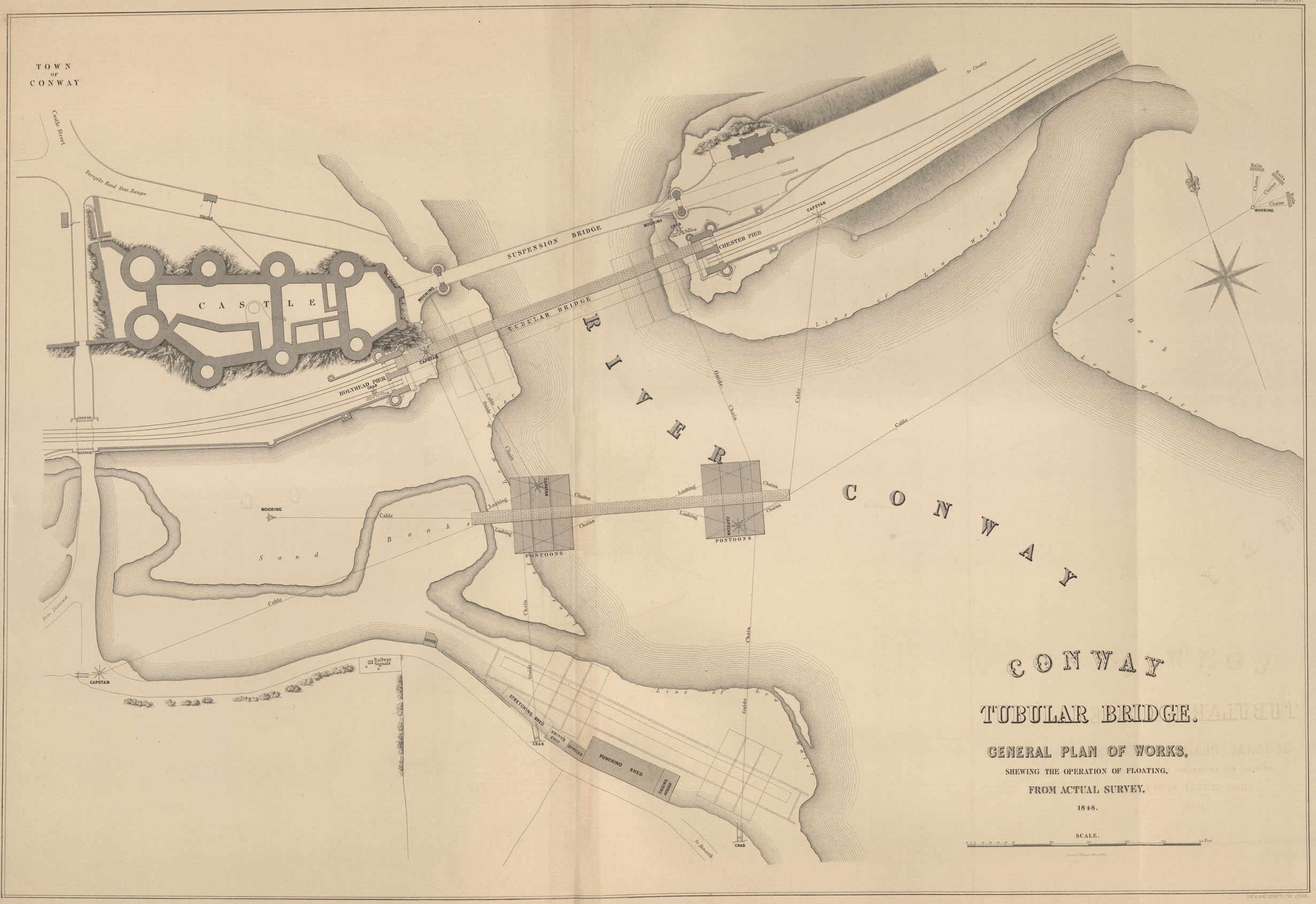
Tons	
2000	Weight of Arch (5 ribs of 400 Tons each)
1500	" " Spandril ribs (6 of 250 Tons each)
370	" " Abutment Plates and Struts
1000	" " Permanent way and Flooring
4870	" " One Arch
4870	
9740	" " Both Arches

Temporary Support for Erection of Bridge

70	Weight of Suspending Belts (3 sets)
600	" " Standards for Do (3 of 200 Tons each)
200	" " Abutments (2 " 100 " ")
870	Total temporary weight

Day & Son lith.rs to the Queen.

London Published for the Author, 1st Augst 1849.



CONWAY TUBULAR BRIDGE.

GENERAL PLAN OF WORKS,

SHEWING THE OPERATION OF FLOATING,

FROM ACTUAL SURVEY,

1848.

SCALE.

DAY & SON, LITHO TO THE QUEEN.

G. Hawkins, del. et lith.

Day & Son, Lith^rs to the Queen.

CONWAY BRIDGE.

CONSTRUCTION OF SECOND TUBE, SEPTEMBER, 1848.

G. Hawkins, del. et lith. ROBT. STEPHENSON ESQRE M. P. ENGINEER. Day & Son, Lith.rs to the Queen.

CONWAY TUBULAR BRIDGE.

WITH THE PREPARATIONS FOR RAISING THE SECOND TUBE.

G. Hawkins, del. et lith.

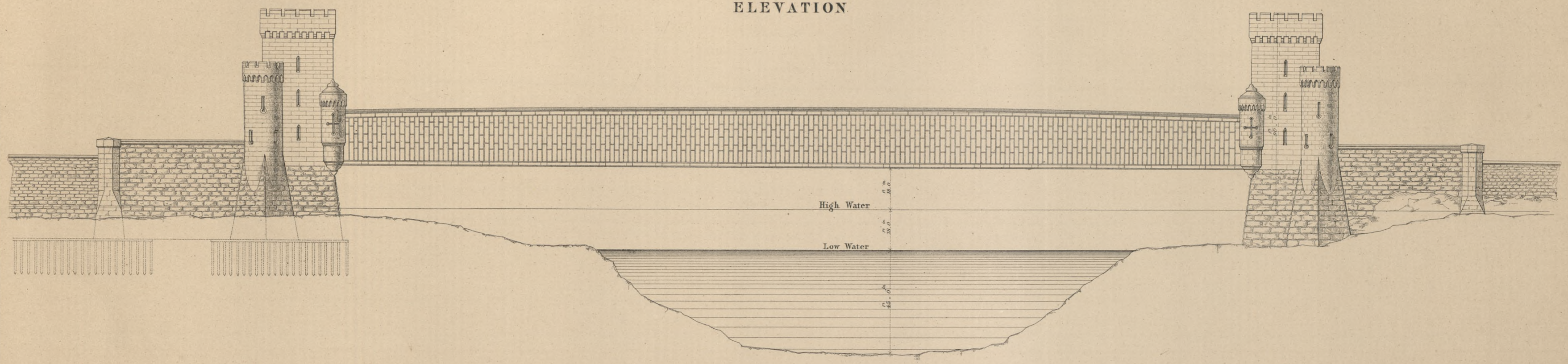
Day & Son, lith.rs to the Queen.

CONWAY BRIDGE.

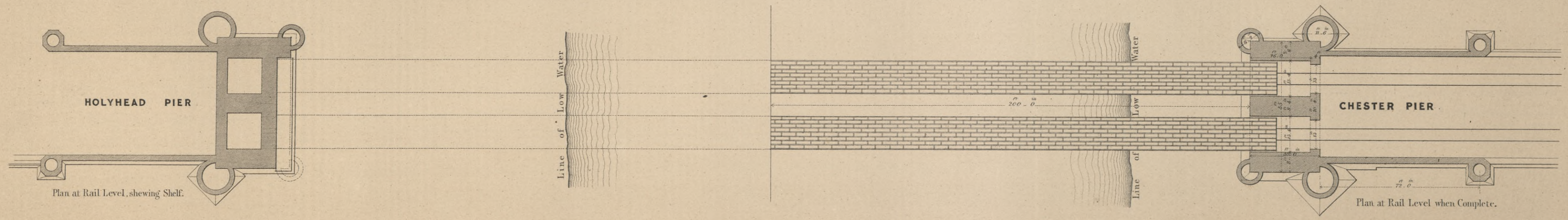
FLOATING OF SECOND TUBE, SEPTEMBER, 1848.

CONWAY TUBULAR BRIDGE

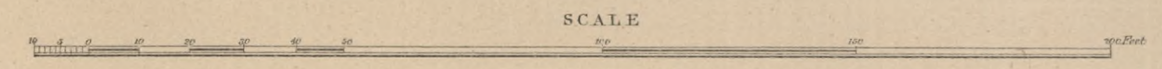
ELEVATION



PLAN



SCALE

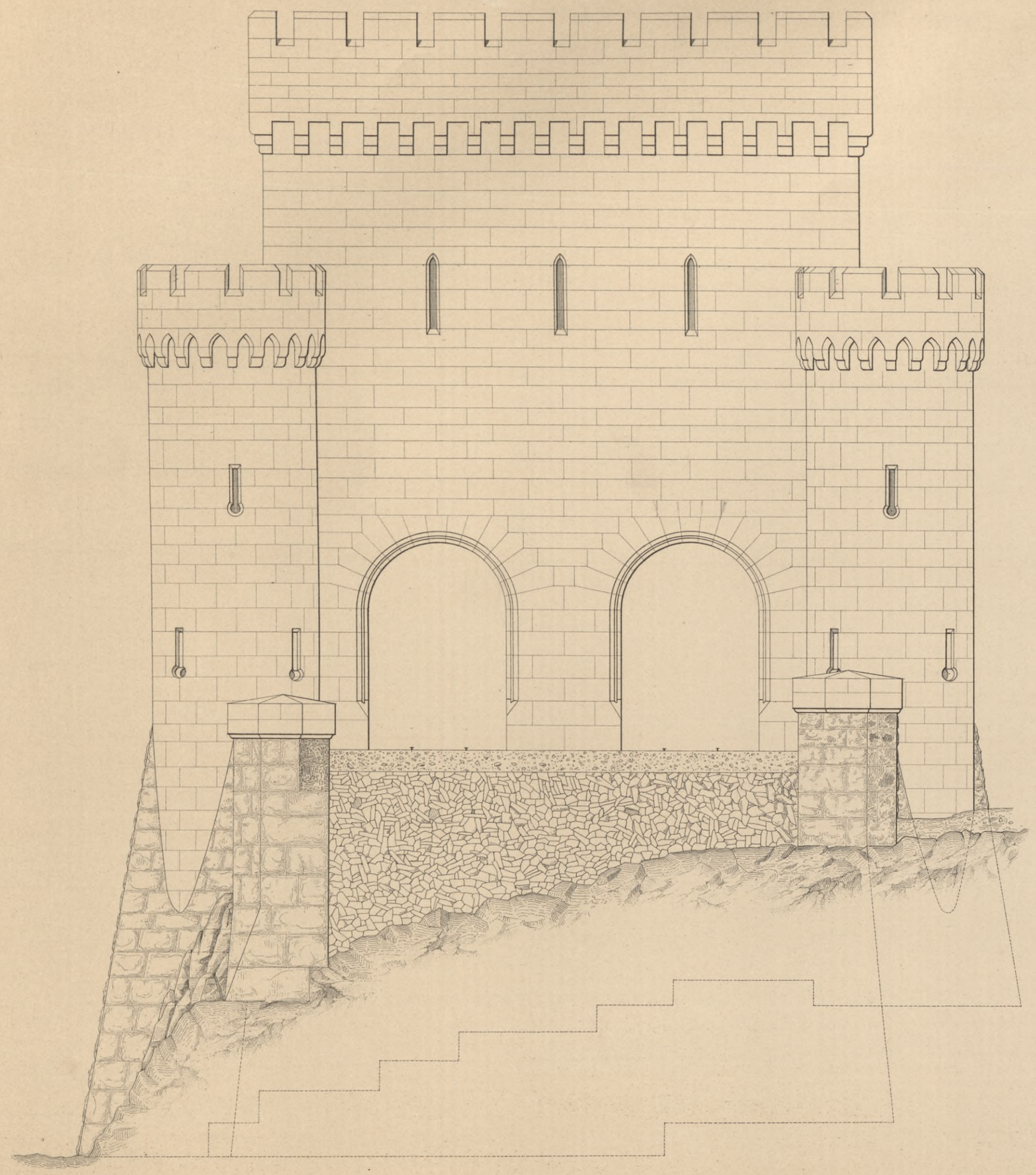


DRAWN BY THOMAS REES

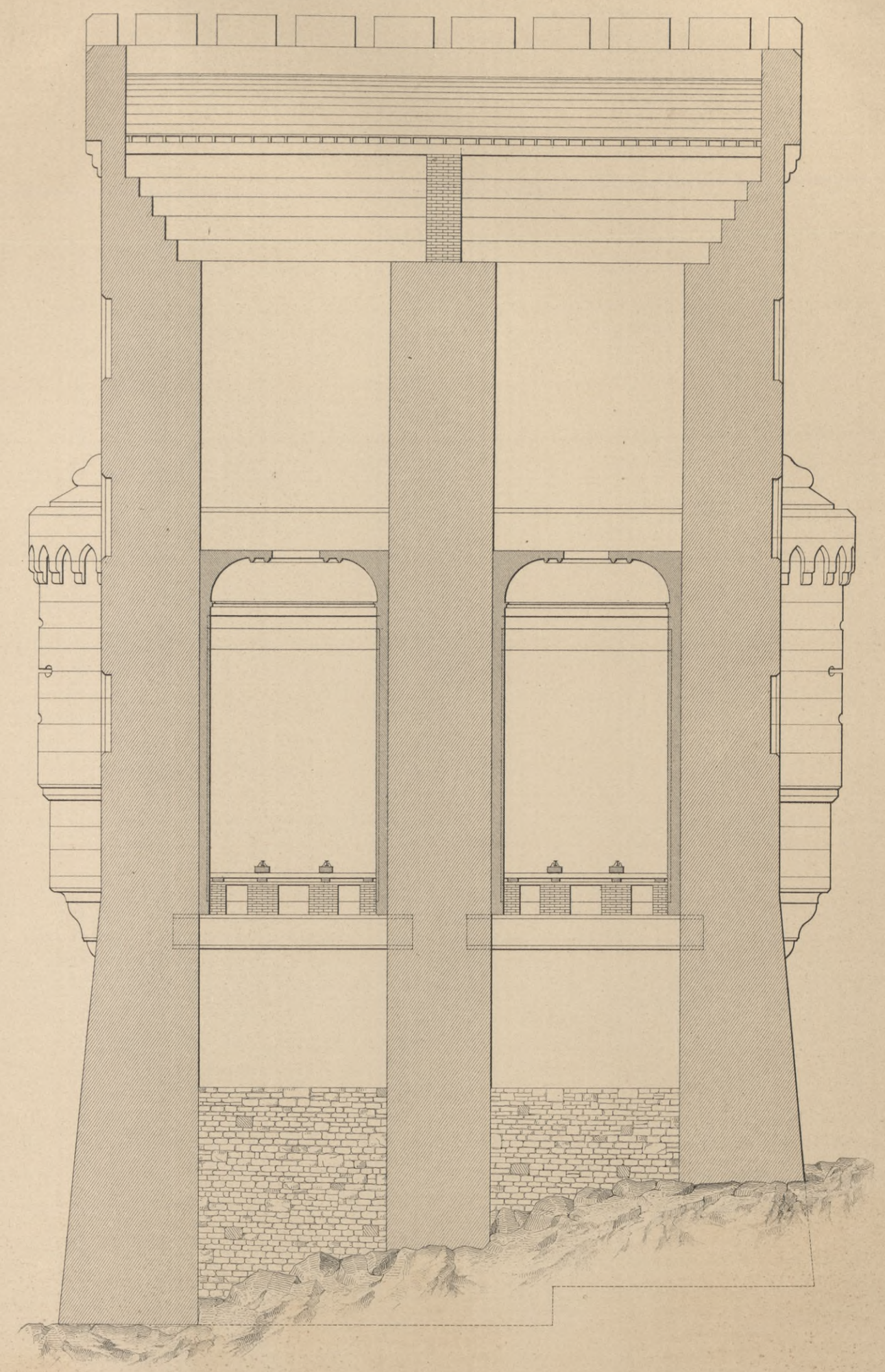
London, Published by John Weale, 59 High Holborn, 1st Augt. 1849.

CONWAY TUBULAR BRIDGE

END ELEVATION



SECTIONAL ELEVATION



SCALE

0 5 10 20 30 40 50 Feet

London, Published by John Weale, 59, High Holborn, Aug.st 1st 1848

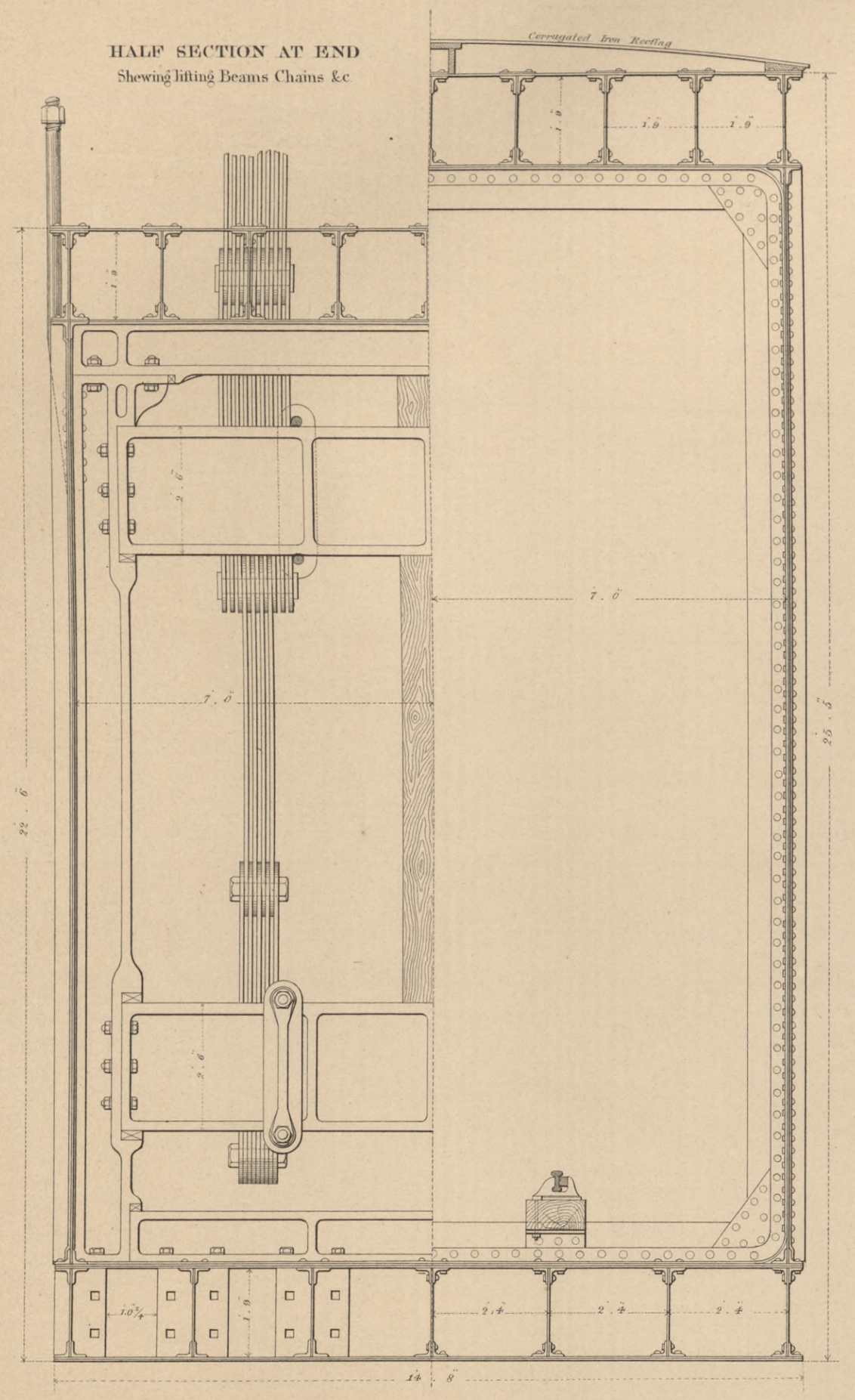
CONWAY TUBULAR BRIDGE

Sections of Tube and detail of Plates

HALF SECTION AT END

Shewing lifting Beams Chains &c

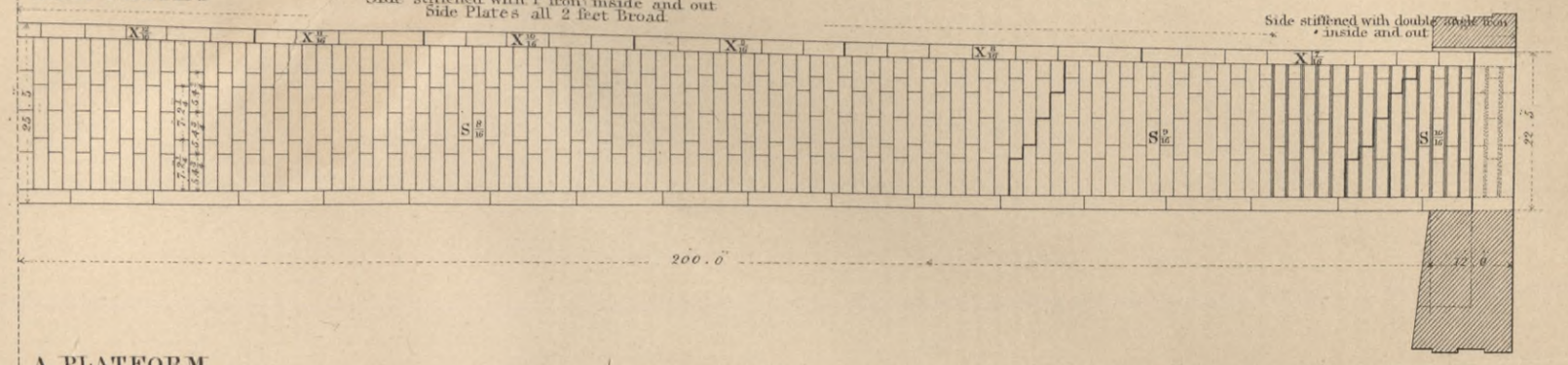
HALF SECTION AT CENTRE



SIDE PLATES

Side stiffened with T Iron inside and out
Side Plates all 2 feet Broad

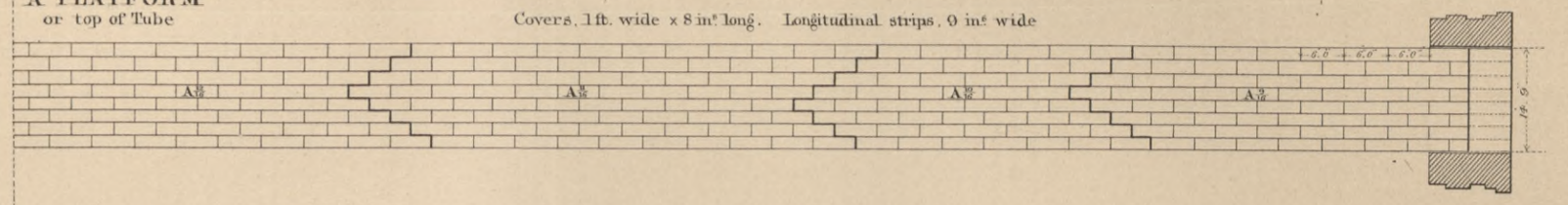
Side stiffened with double angle Iron inside and out



A PLATFORM

or top of Tube

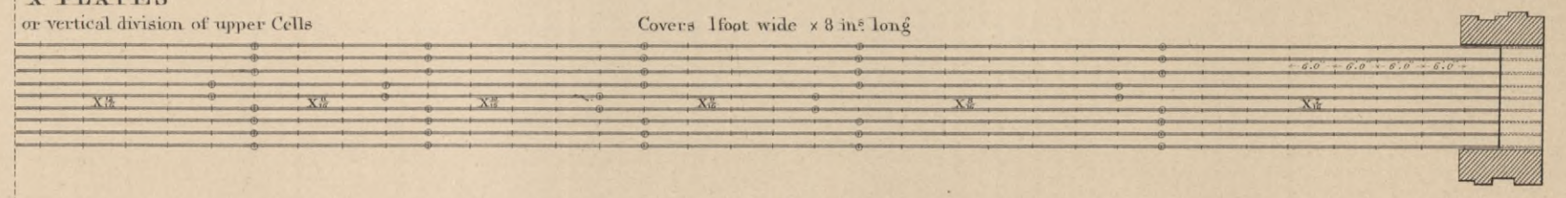
Covers 1 ft. wide x 8 in.s long. Longitudinal strips, 9 in.s wide



X PLATES

or vertical division of upper Cells

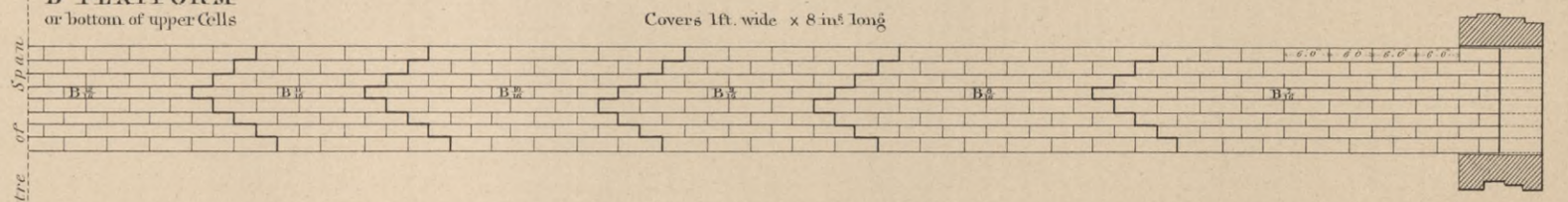
Covers 1 foot wide x 8 in.s long



B PLATFORM

or bottom of upper Cells

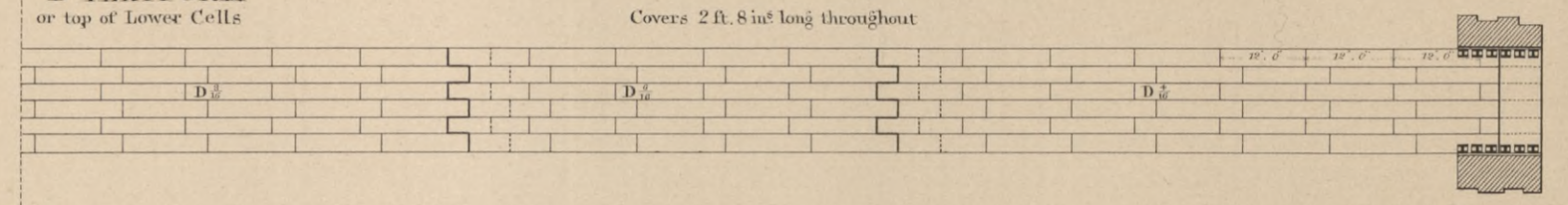
Covers 1 ft. wide x 8 in.s long



D PLATFORM

or top of Lower Cells

Covers 2 ft. 8 in.s long throughout

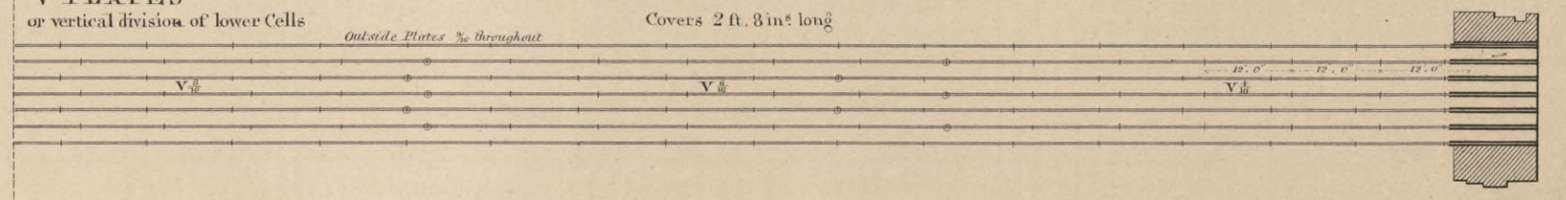


V PLATES

or vertical division of lower Cells

Covers 2 ft. 8 in.s long

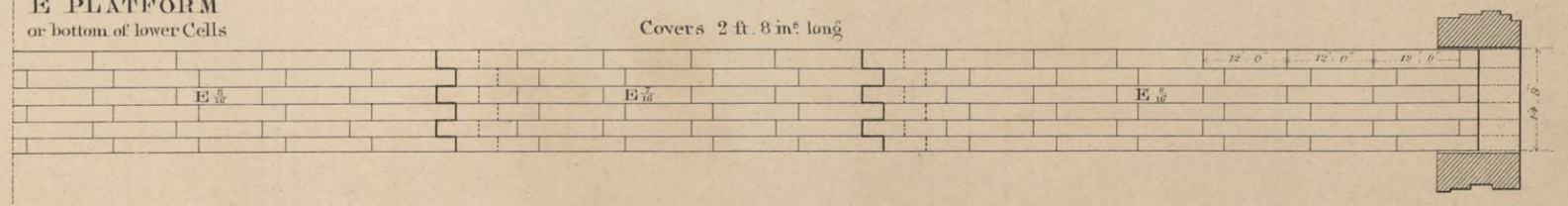
Outside Plates ⅞ throughout



E PLATFORM

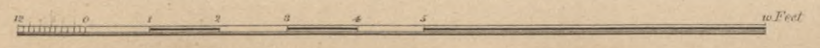
or bottom of lower Cells

Covers 2 ft. 8 in.s long

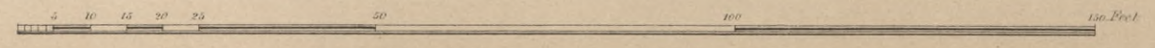


Drawn by William Dempsey

Day & Son lith.rs to the Queen

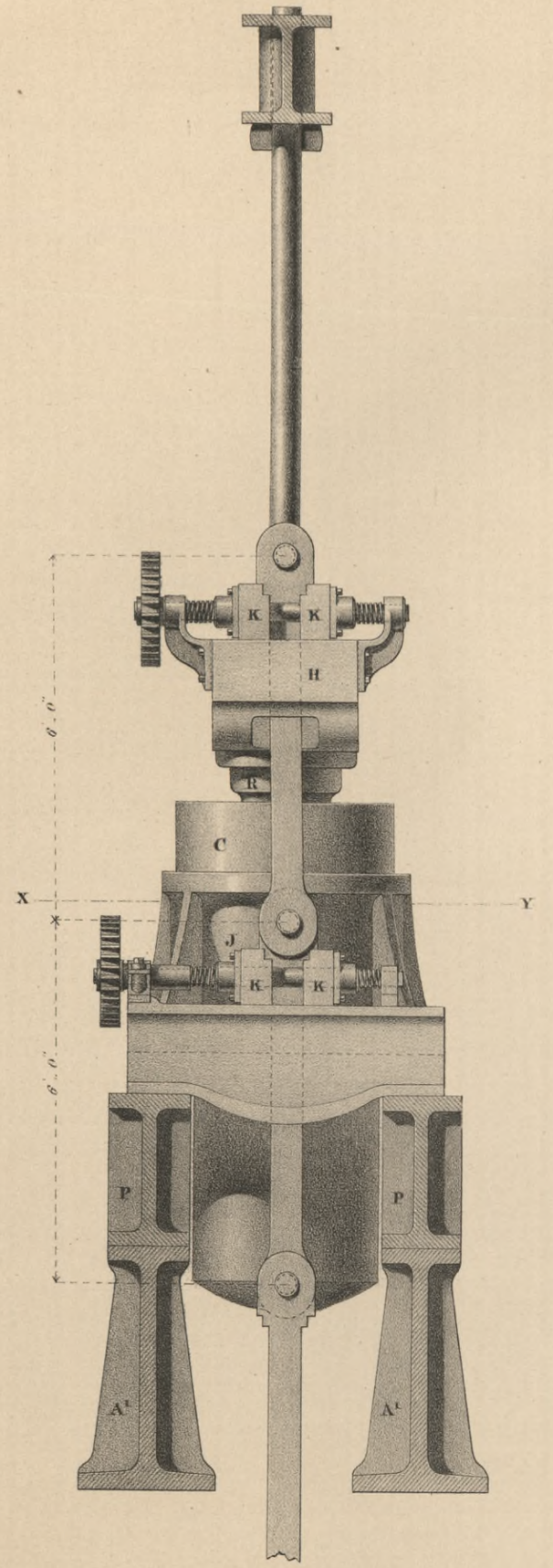


London, Published for the Author, 1st Augst 1849.

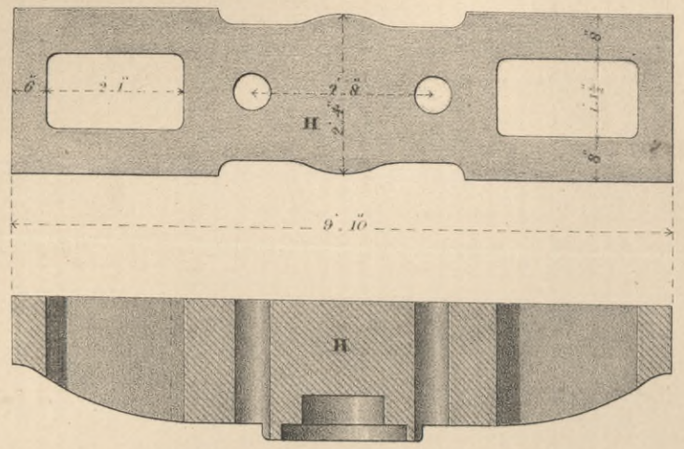


CONWAY TUBULAR BRIDGE

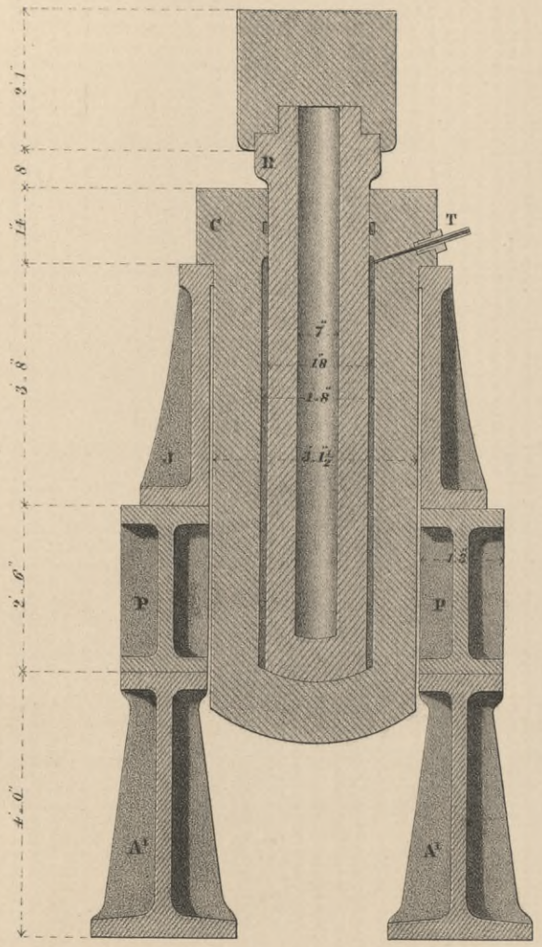
Hydraulic Press for raising the Tubes.



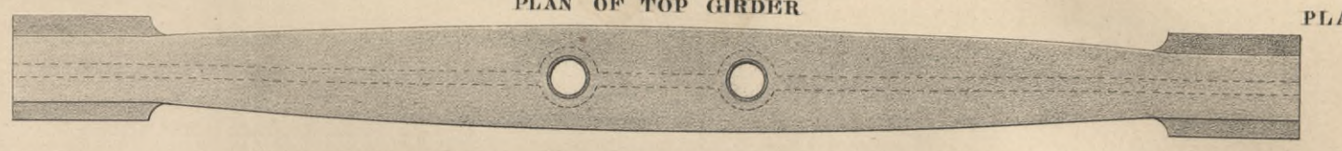
CROSS HEAD

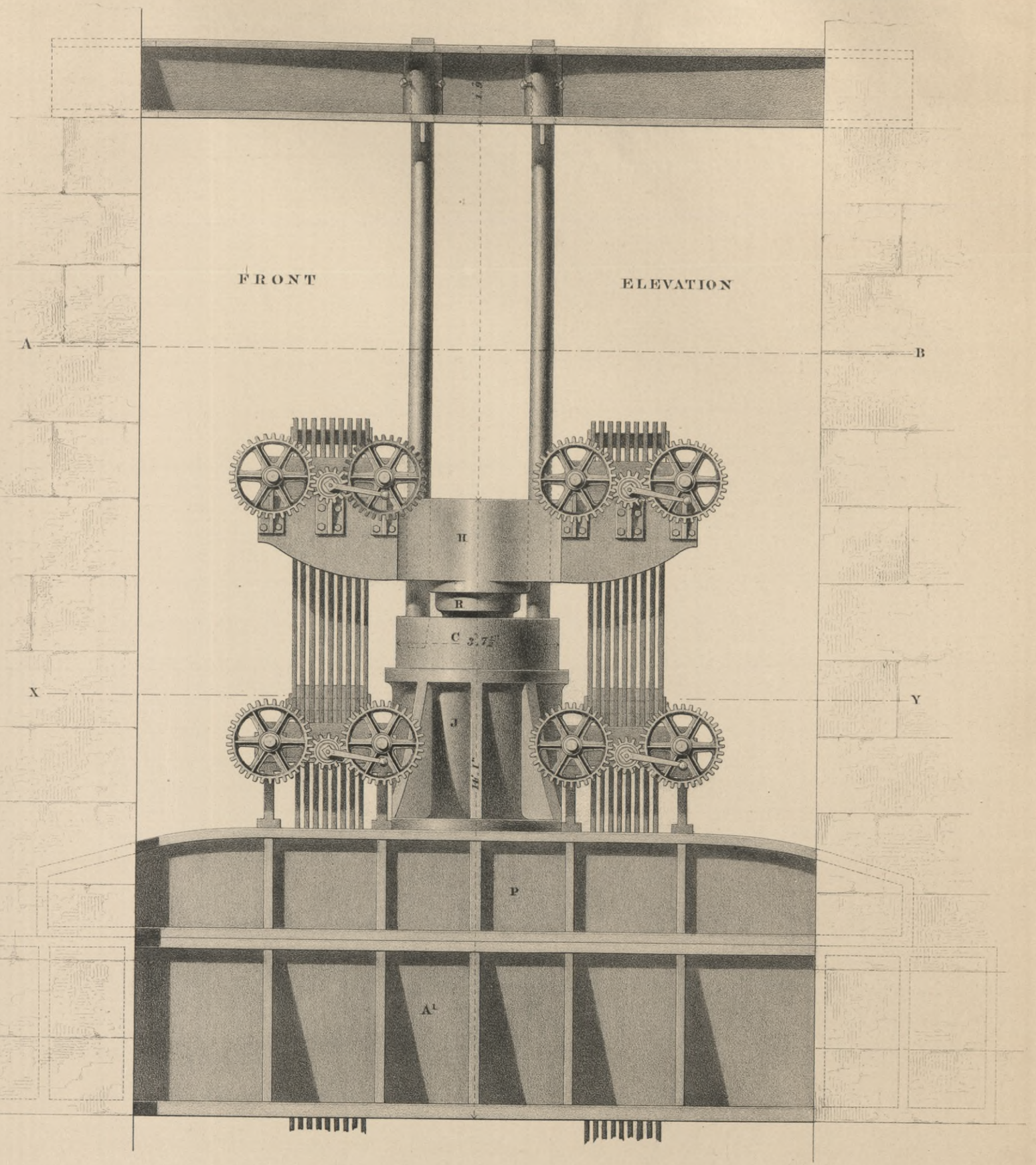


SECTION AT E F

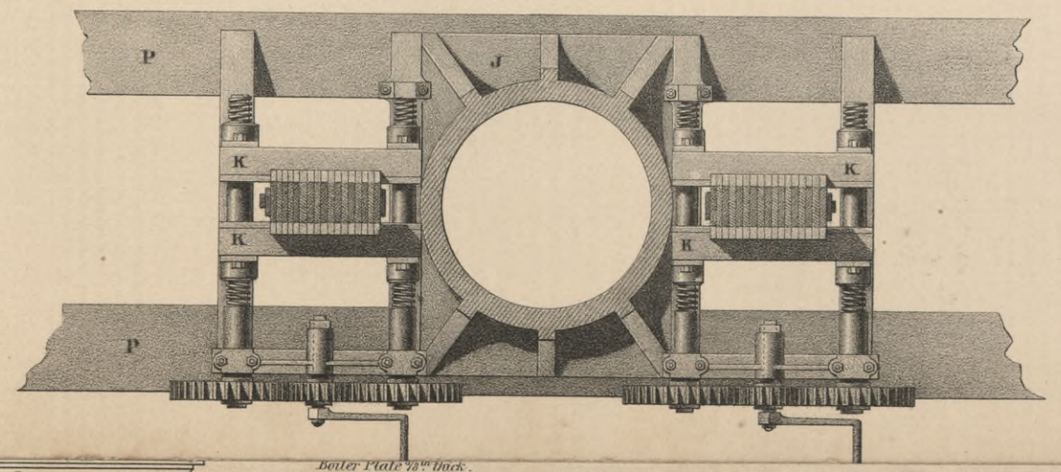


PLAN OF TOP GIRDER

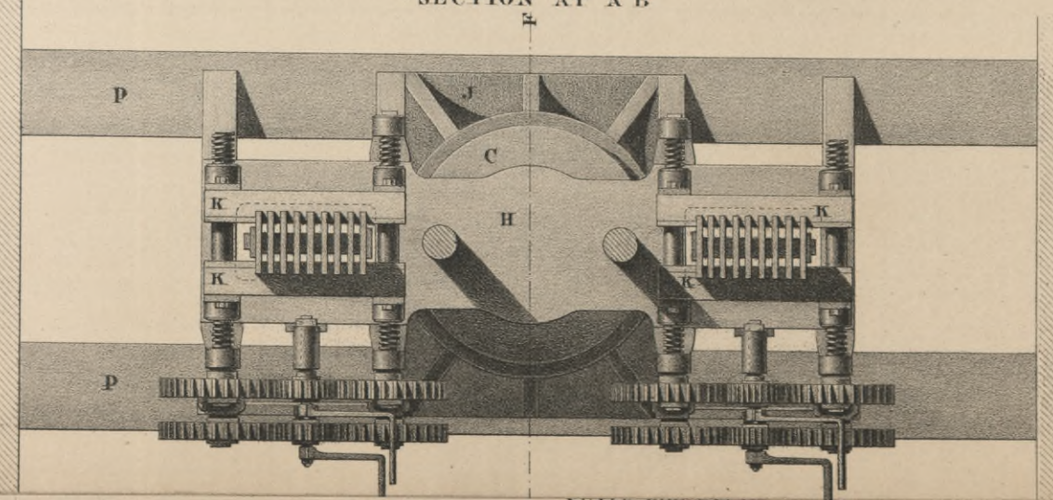




SECTION AT X Y

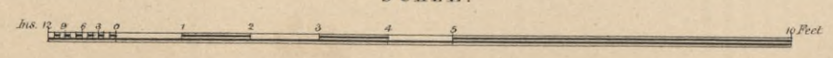


SECTION AT A B



Easton & Amos, London.

SCALE.



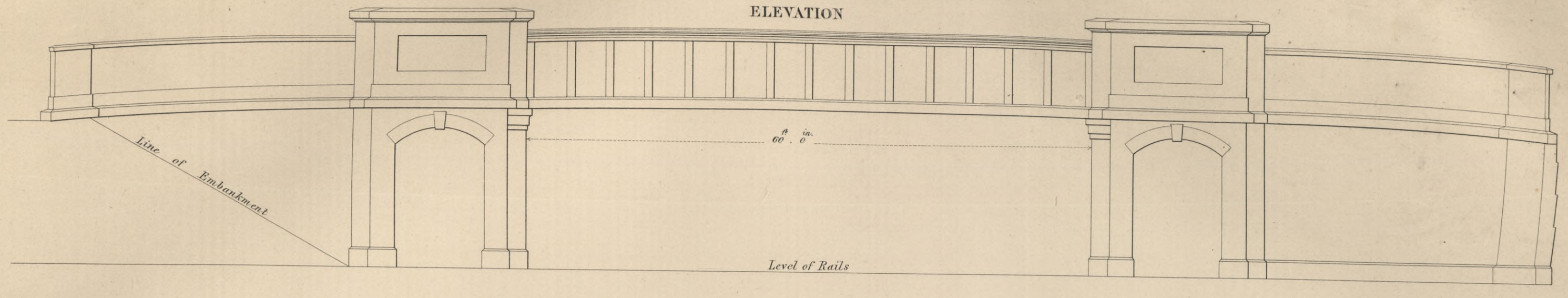
Day & Son, lith.rs to the Queen.

Boiler Plate 75 to Back.

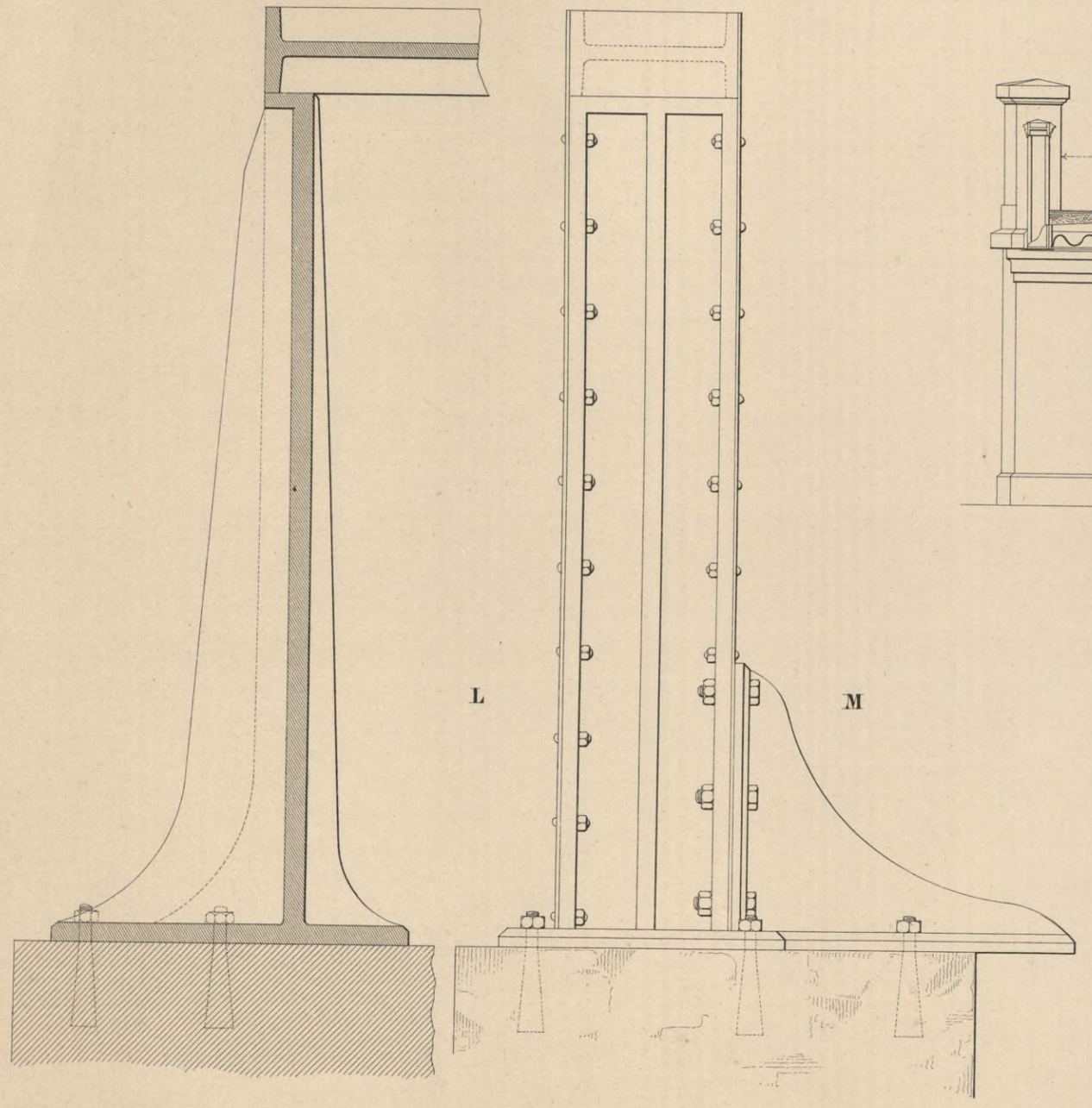
BOX GIRDER BRIDGE

Over Chalk Farm Lane London & North Western Railway

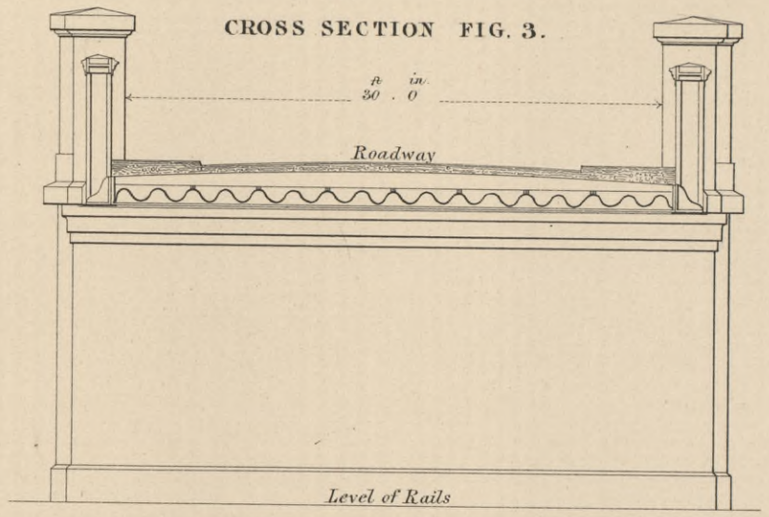
ELEVATION



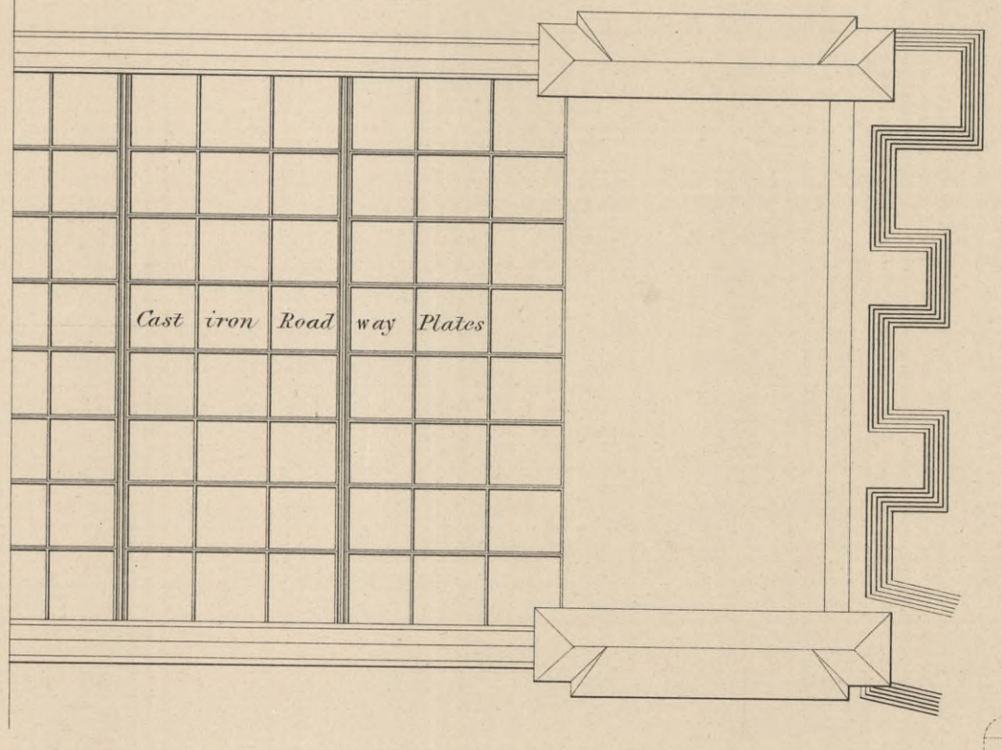
CAST IRON SHOE FOR END OF BOILER PLATE GIRDER



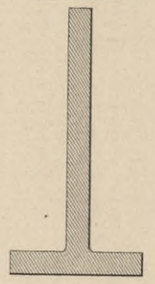
CROSS SECTION FIG. 3.



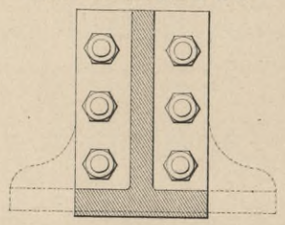
PLAN FIG. 2

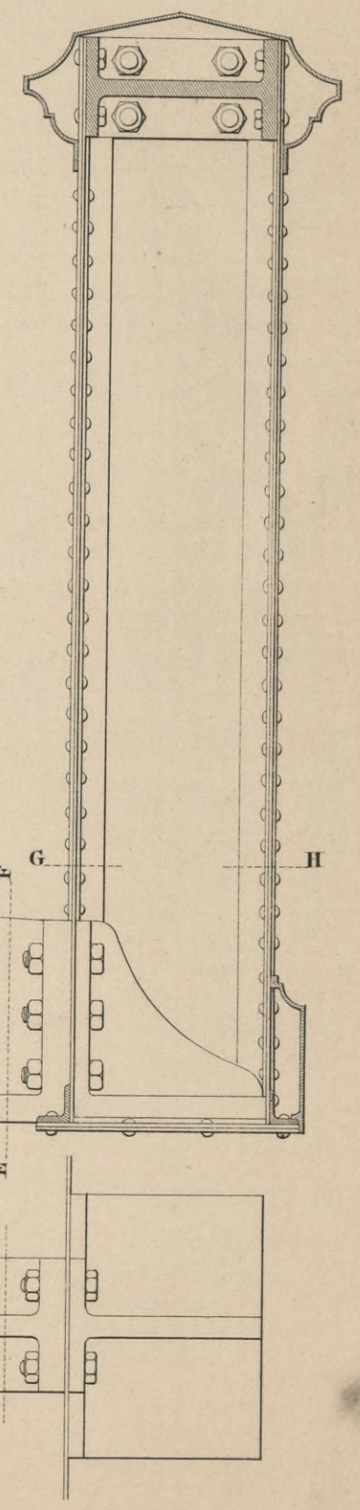


SECTION OF Cast Iron Girder at centre

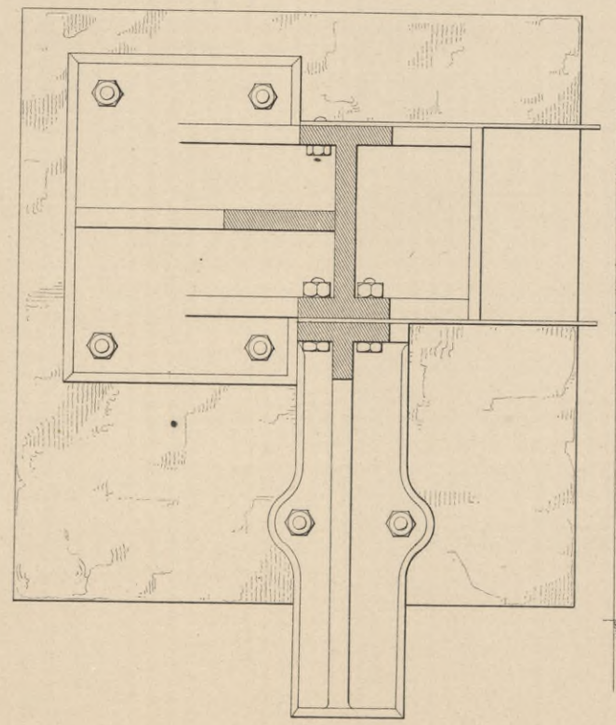


SECTION ON LINE E F

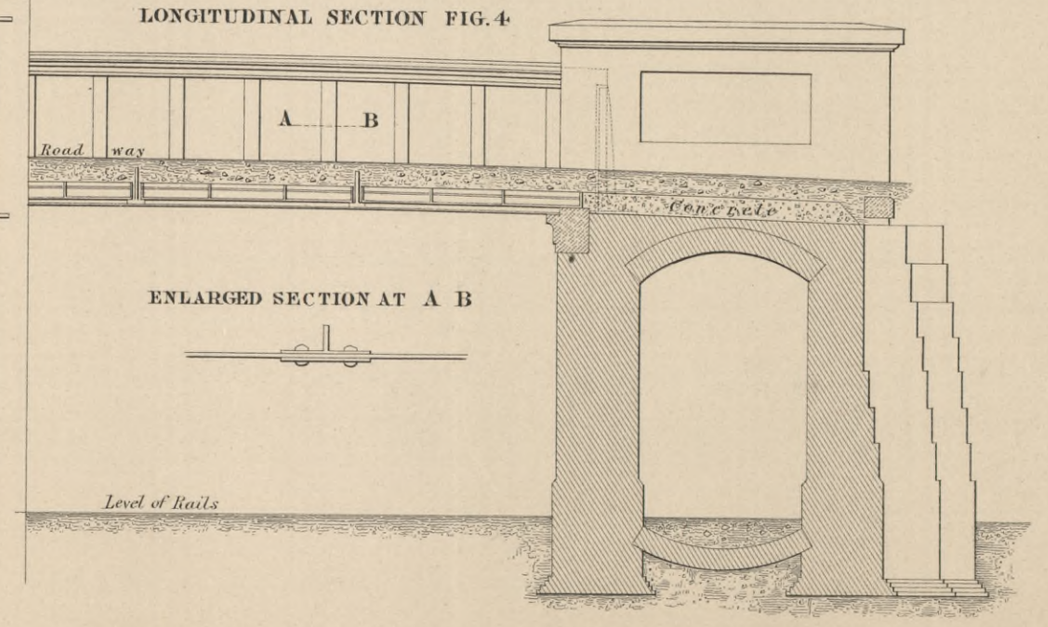




SECTION ON LINE L M

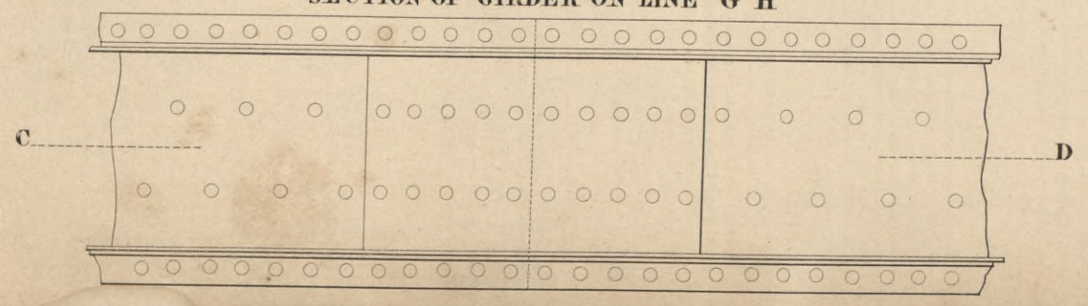


LONGITUDINAL SECTION FIG. 4

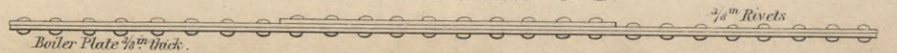


ENLARGED SECTION AT A B

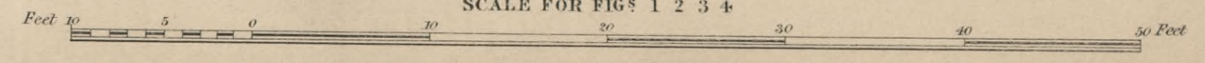
SECTION OF GIRDER ON LINE G H



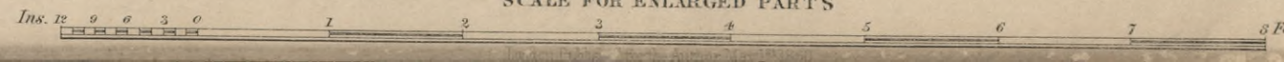
SECTION ON LINE C D



SCALE FOR FIGS 1 2 3 4



SCALE FOR ENLARGED PARTS



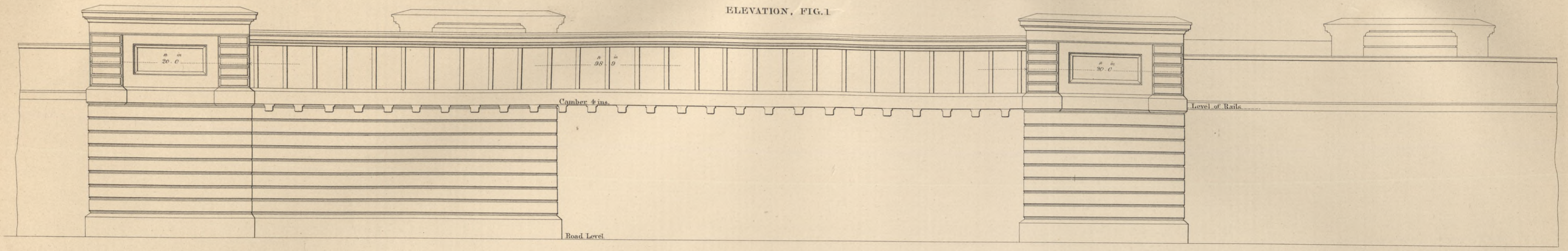
Day & Son, lith.rs to the Queen.

CAST IRON GIRDER BRIDGE

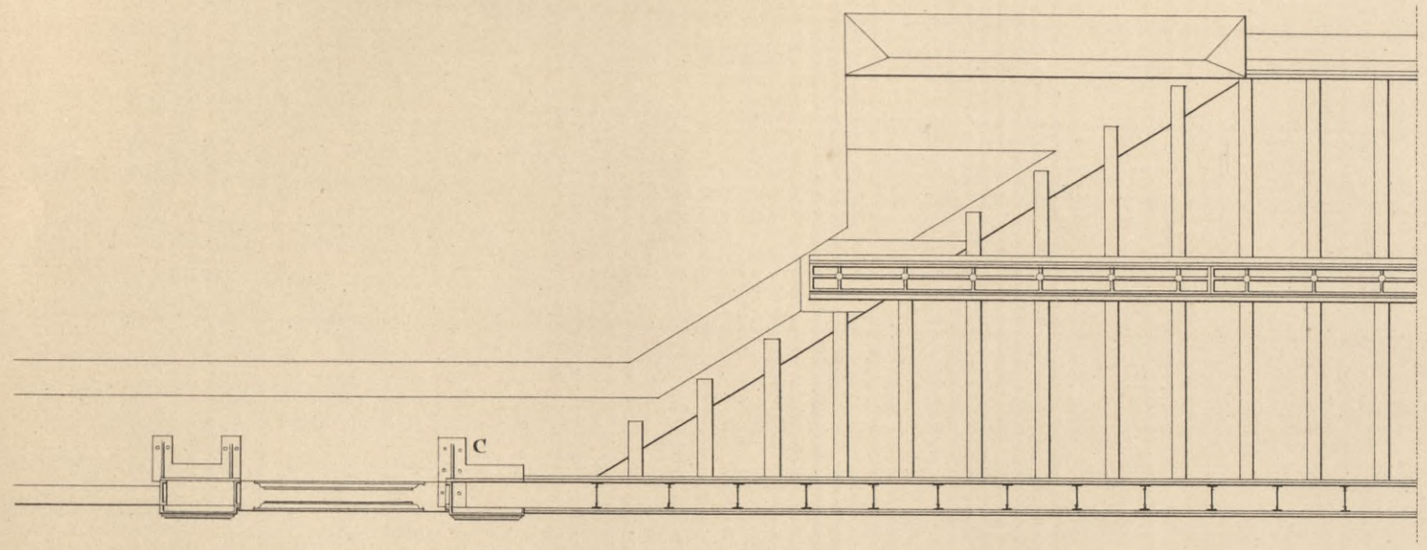
INTENDED FOR CROSSING THE RIVER NENE NEAR WISBEACH.

BOX GIRDER BRIDGE OVER WEST STREET, GATESHEAD.

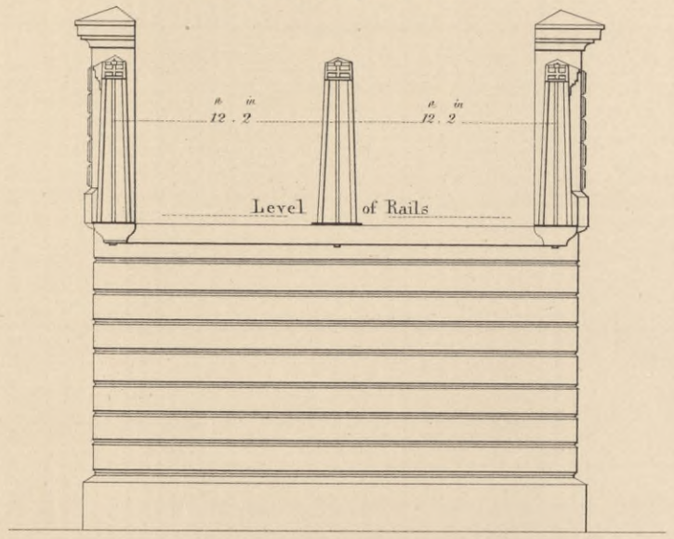
ELEVATION, FIG. 1



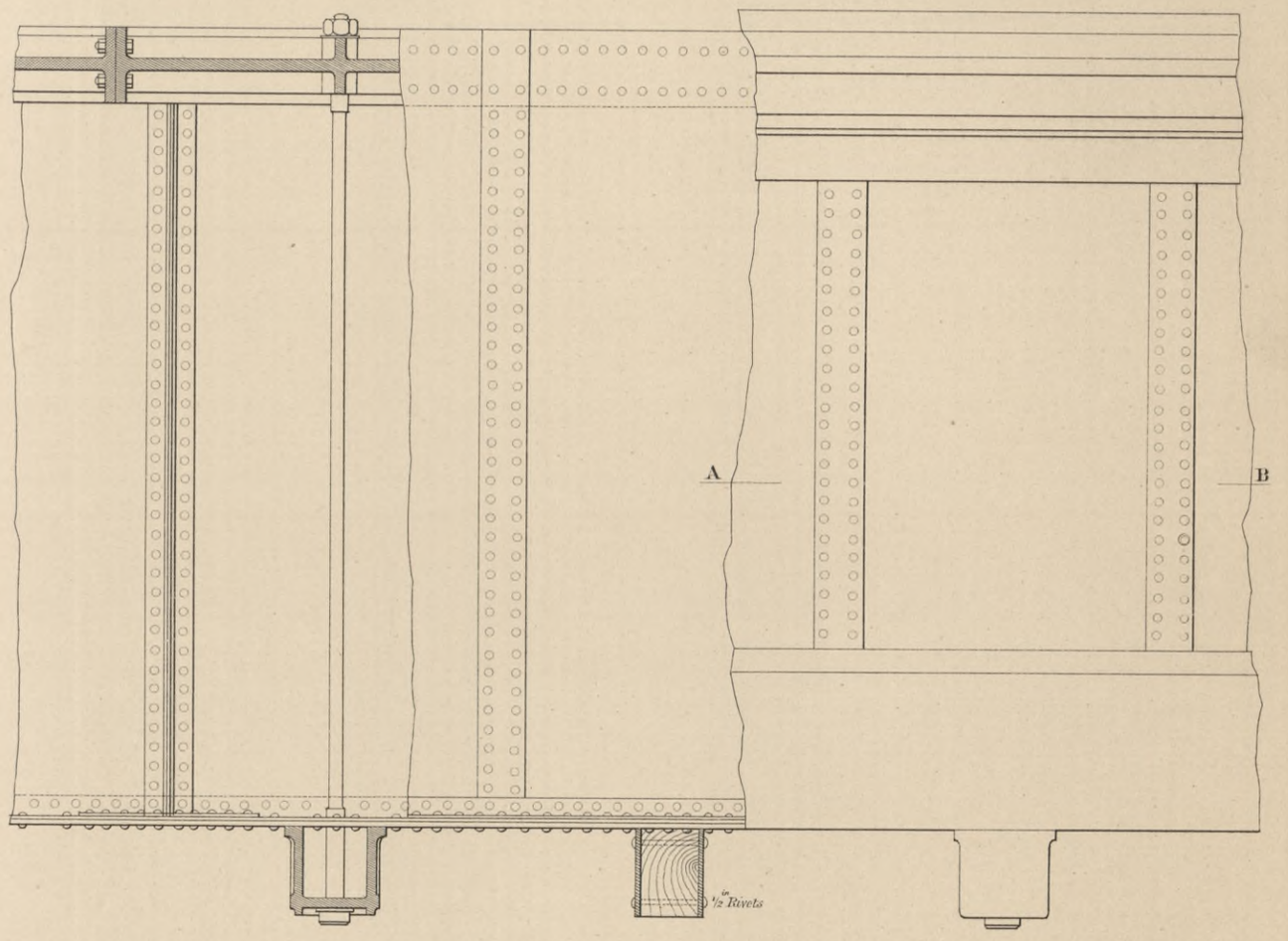
PLAN, FIG. 2



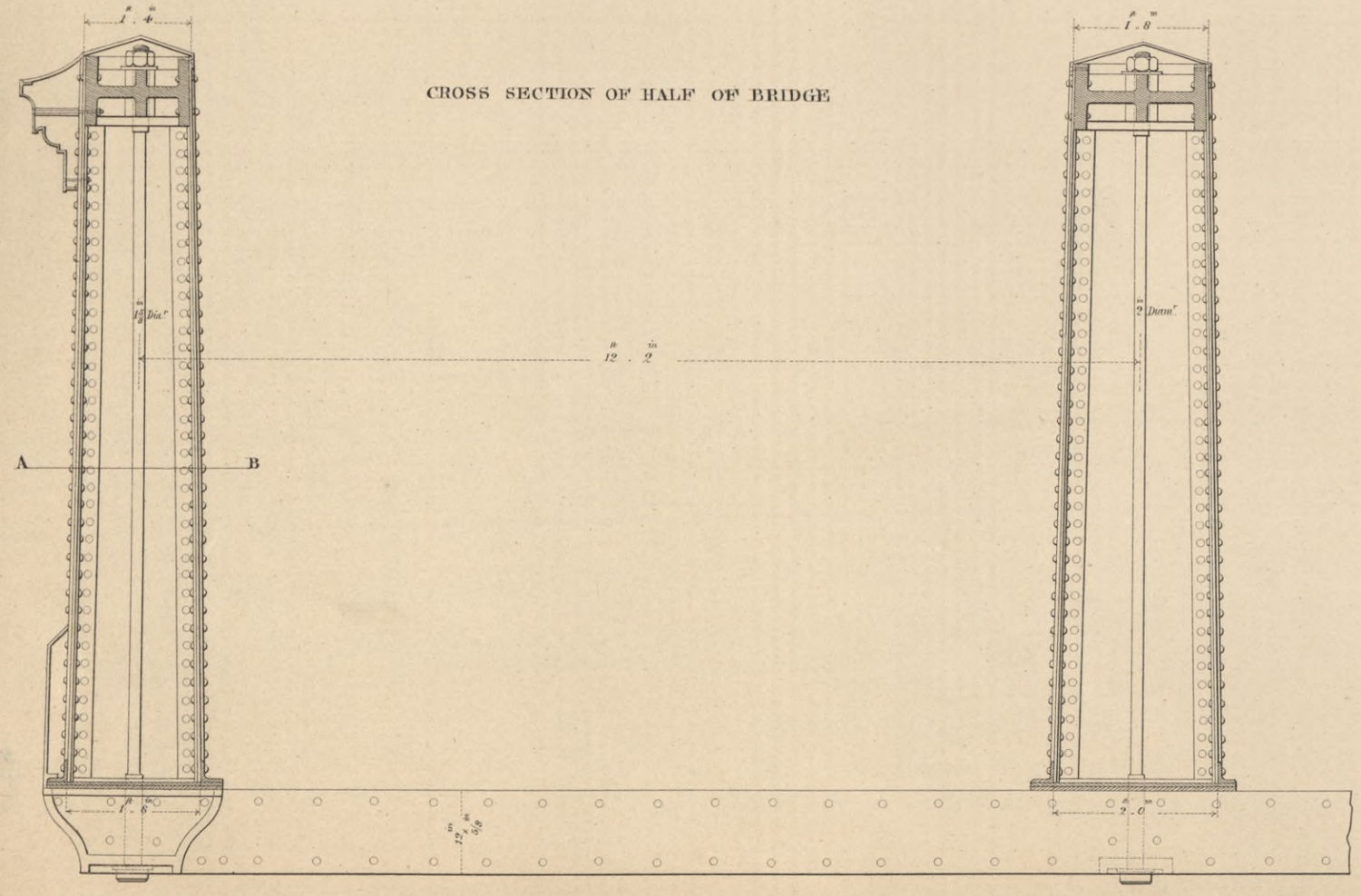
CROSS SECTION, FIG. 3



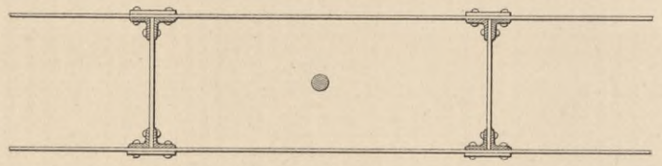
LONGITUDINAL SECTION AND ELEVATION OF PART OF GIRDER



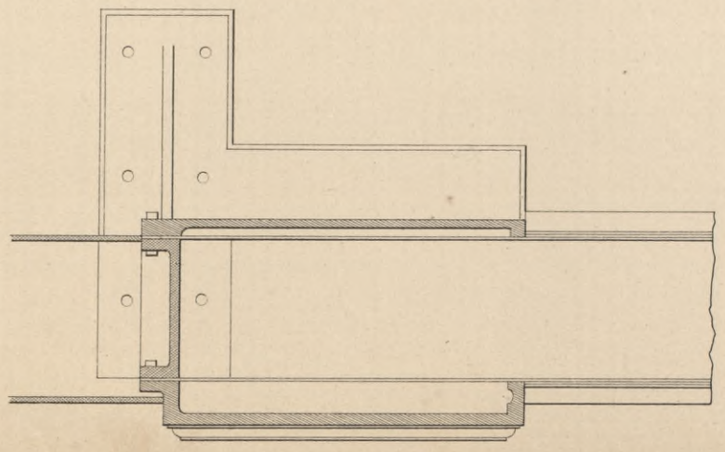
CROSS SECTION OF HALF OF BRIDGE



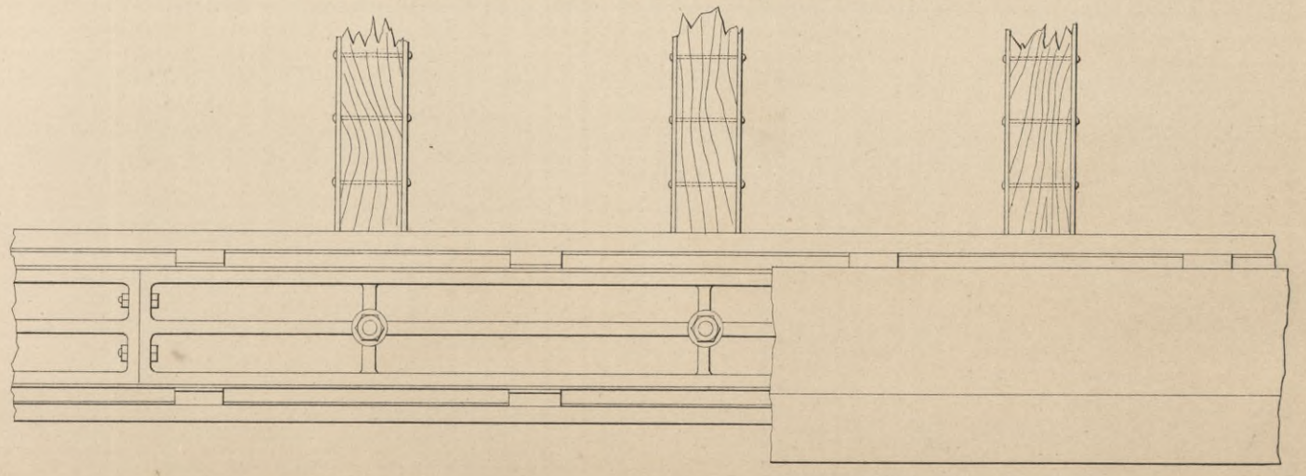
SECTION ON A.B



ENLARGED DETAIL OF PART AT C



PLAN SHEWING CAST IRON TOP PLATE, CAPPING &c



Drawn by William Dampney

Scale for Figs. 1.2.3.

Scale for Enlarged Details

Day & Son Lith.rs to the Queen.

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