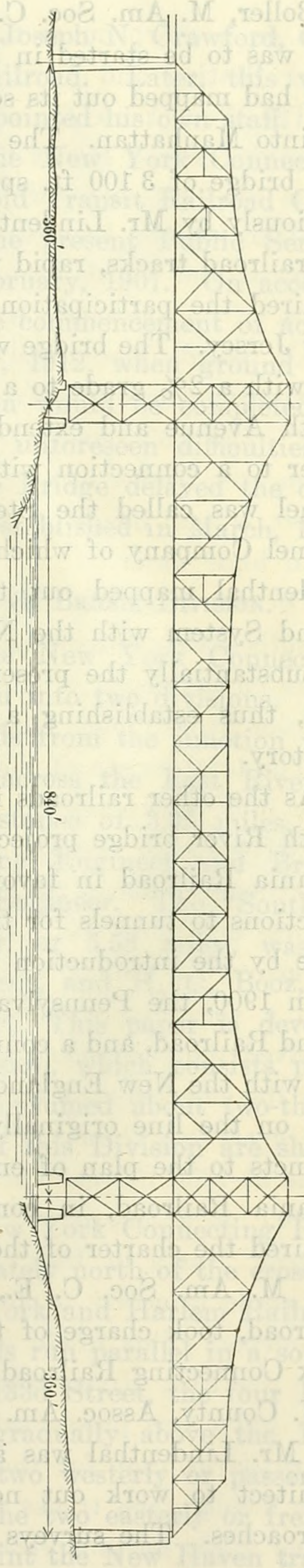


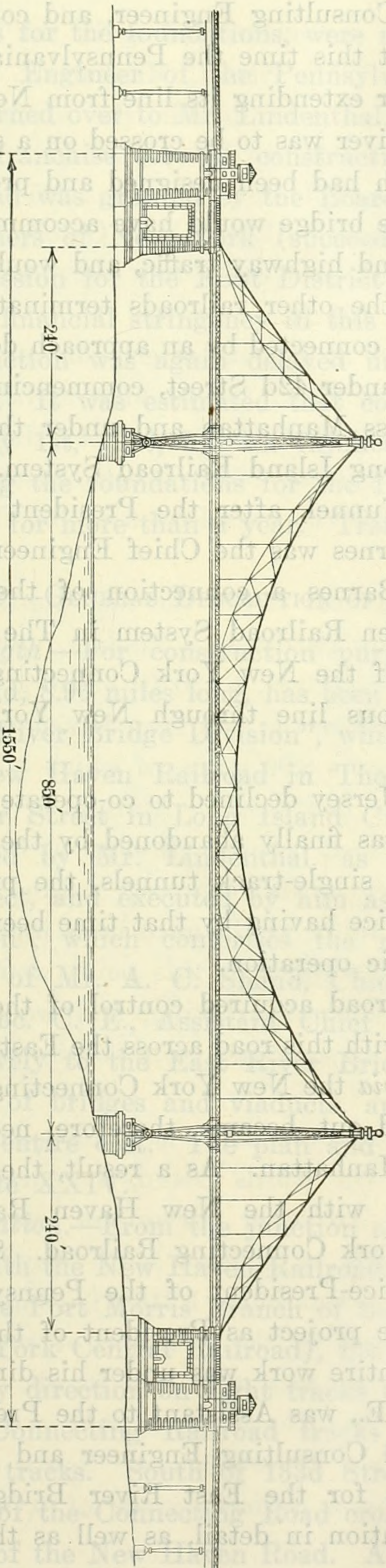
CANTILEVER DESIGN (1900)

FIG. 2.



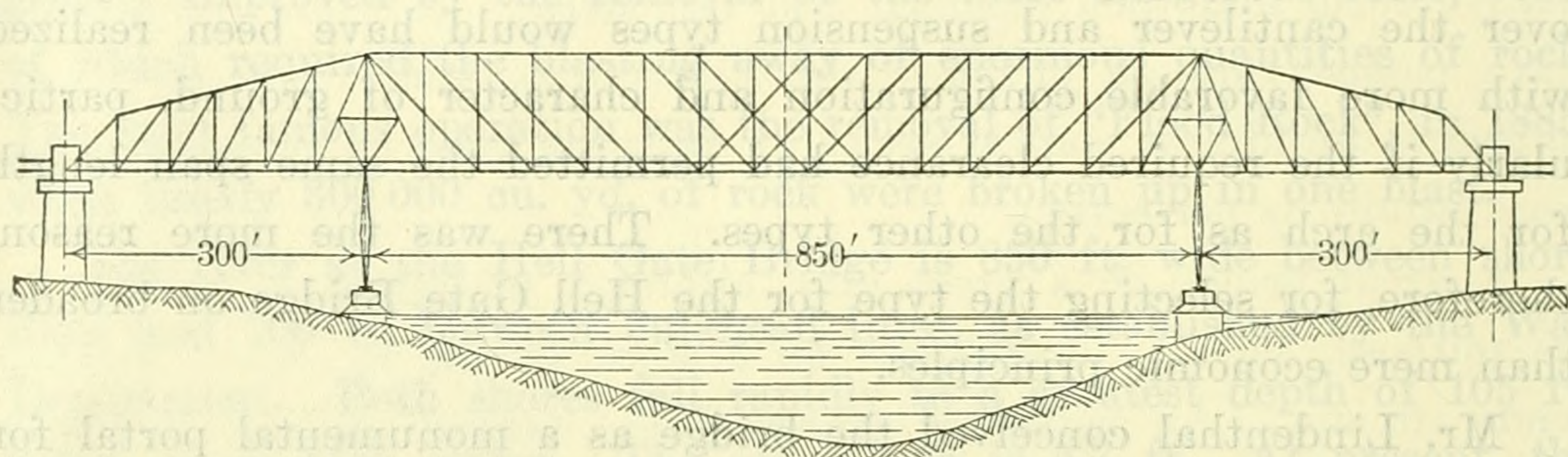
SUSPENSION BRIDGE DESIGN (1904)

FIG. 3.



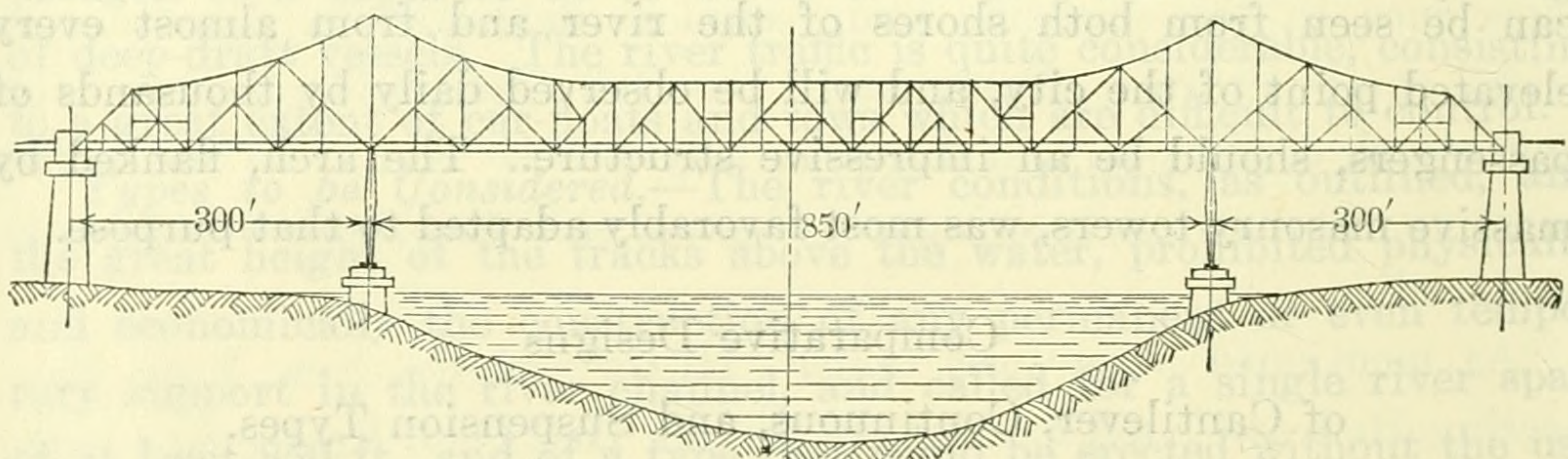
in the four-track designs and throughout for the two-track designs. The estimated weights of steelwork varied from 7 000 to 8 500 tons for double-track and from 11 200 to 14 200 tons for four tracks (if carbon steel had been assumed these weights would have been 14 000 and 17 000 tons, respectively), being least for the suspension bridge and greatest for the cantilever.

The saving in steelwork in the suspension design was partly offset by the greater cost of the anchorage piers, but, under assumed favorable soil conditions, the estimates showed a saving in cost in favor of the latter design. Under the more unfavorable soil conditions actually found on the Wards Island side, the total cost would be more nearly alike for the different designs.



CONTINUOUS TRUSS DESIGN (1904)

FIG. 4.



CANTILEVER DESIGN (1904)

FIG. 5.

Suspension Design.—The system of trusses adopted for the suspension design (Fig. 3) is that of an inverted three-hinged spandrel-braced arch suspended from hinged towers. The upper chord or chain of eye-bars follows very nearly the equilibrium polygon for dead load. The web members and lower chord form, with the main chain, the stiffening trusses.

Owing to the hinge at the center, the system is statically determinate and immune to settlements of the foundations. A similar system,

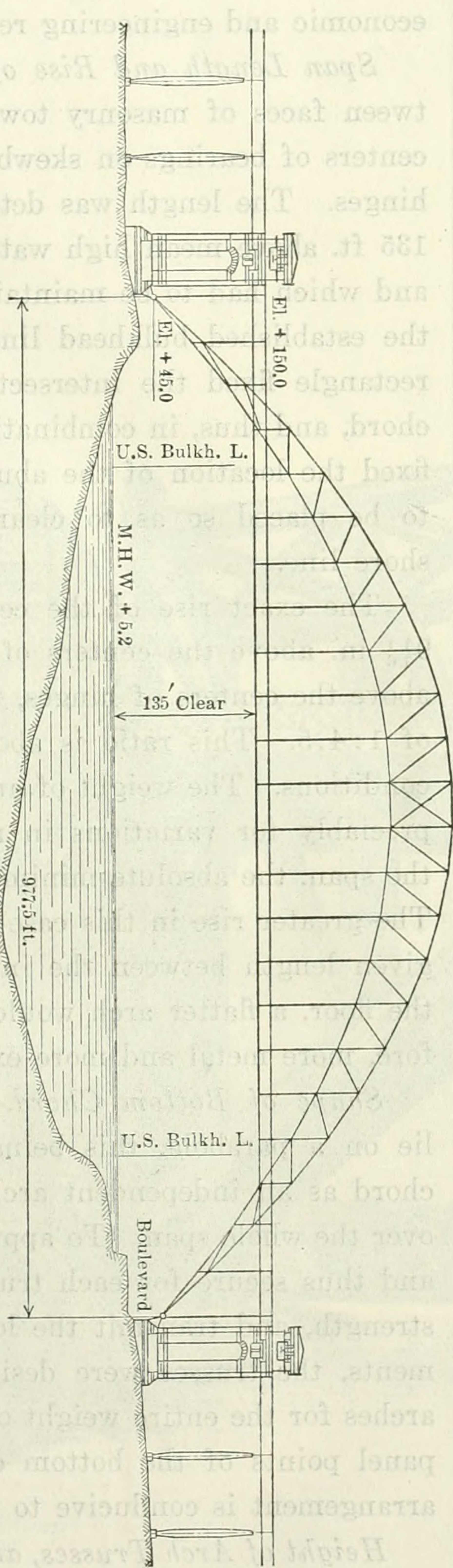


FIG. 6.

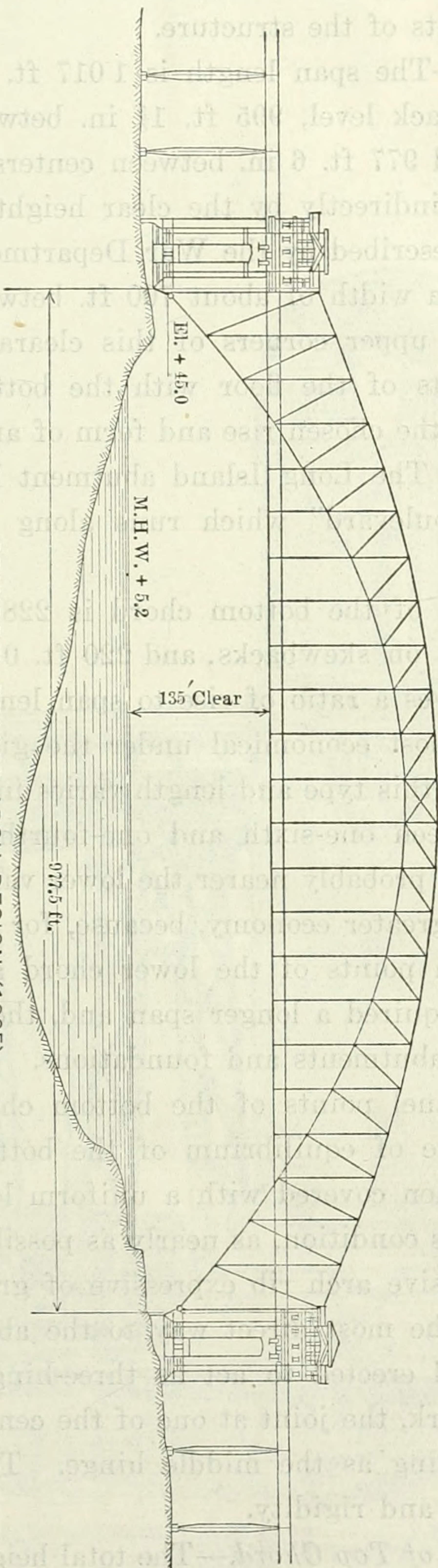


FIG. 7.

GENERAL PLAN
OF
HELL GATE BRIDGE
AND
PORTIONS OF
WARDS AND LONG ISLAND VIADUCTS

