

TM5-265

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

BRIDGE FLOATING M4



***TM 5-265**

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BRIDGE, FLOATING, M4

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CHAPTER 1

INTRODUCTION

1. Purpose

This manual is for officers and noncommissioned officers and provides instruction in the assembly and maintenance of the floating bridge, M4. The manual is to be used for reference and training.

2. Scope

The manual presents a general description of the floating bridge, M4; describes the component parts; the methods of loading, transporting, and assembling the bridge. Since the components of the bridge can be assembled as either a fixed or floating bridge or as ferries, the manual describes in detail the methods, equipment, and men used in each case.

3. General Design

a. General. The M4 floating bridge equipment is used to assemble floating bridges, fixed bridges, and ferries. In general terms, the floating bridge consists of a deck built of hollow aluminum sections supported on aluminum pontons.

b. Floating Bridges. Floating bridges can be assembled entirely as floating spans or as a combination of fixed and floating spans. The deck of M4 floating bridges is supported on aluminum pontons (fig. 1), pneumatic floats, or combinations of both.

c. Fixed Bridges. Fixed bridges (fig. 2) can be assembled with or without intermediate supports, with single spans as great as 45 feet, depending on the class required.

d. Ferries. Ferries of various sizes and capacities are assembled with the same M4 bridge equipment as M4 floating bridges. Bridge erection boats are normally used for propulsion; outboard motors can be used in slow water. Figure 3 shows a four-ponton shortened ferry.

e. Deck. The deck (fig. 4) consists of hollow aluminum alloy deck balk which acts as stringers and floor. The deck of the M4 floating bridge is continuous between the abutments and is made up of individual deck balk, which are staggered and pinned at three points to give continuous beam action. At trestles and other fixed supports, hinge joints are normally used. These joints are made by using short and/or tapered balk and normal balk. The bridge deck is assembled 22 balk

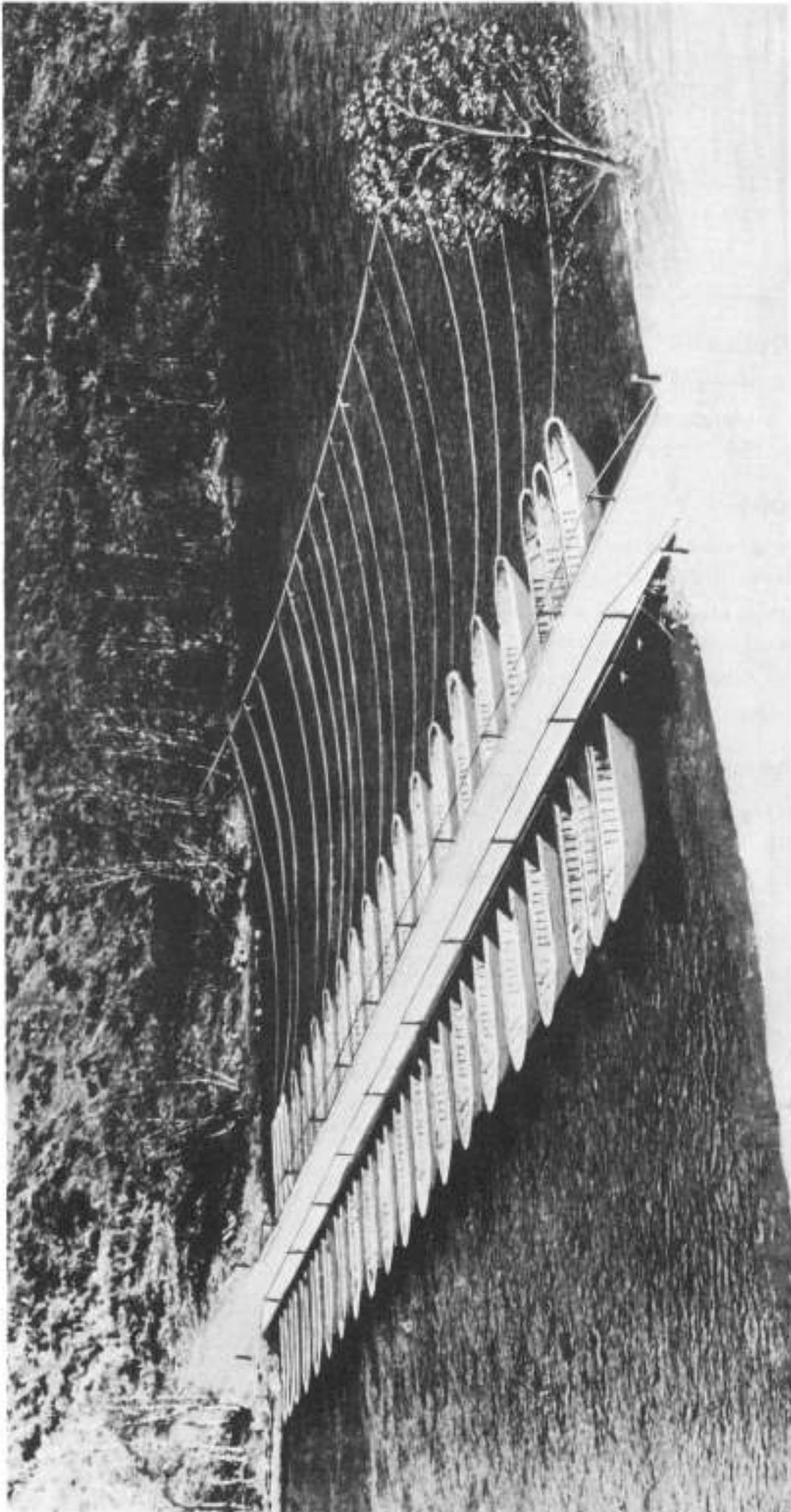


Figure 1. Partially completed M4 floating bridge.

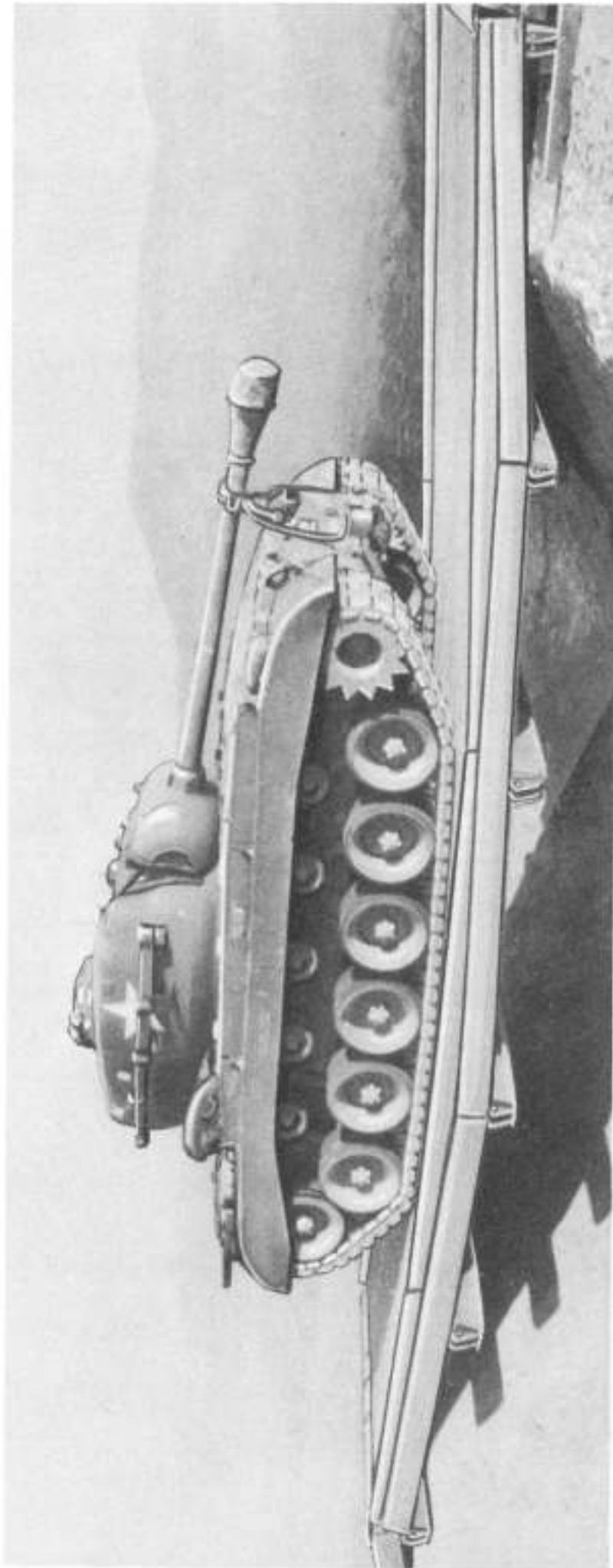


Figure 2. M26 medium tank crossing 38-foot span.

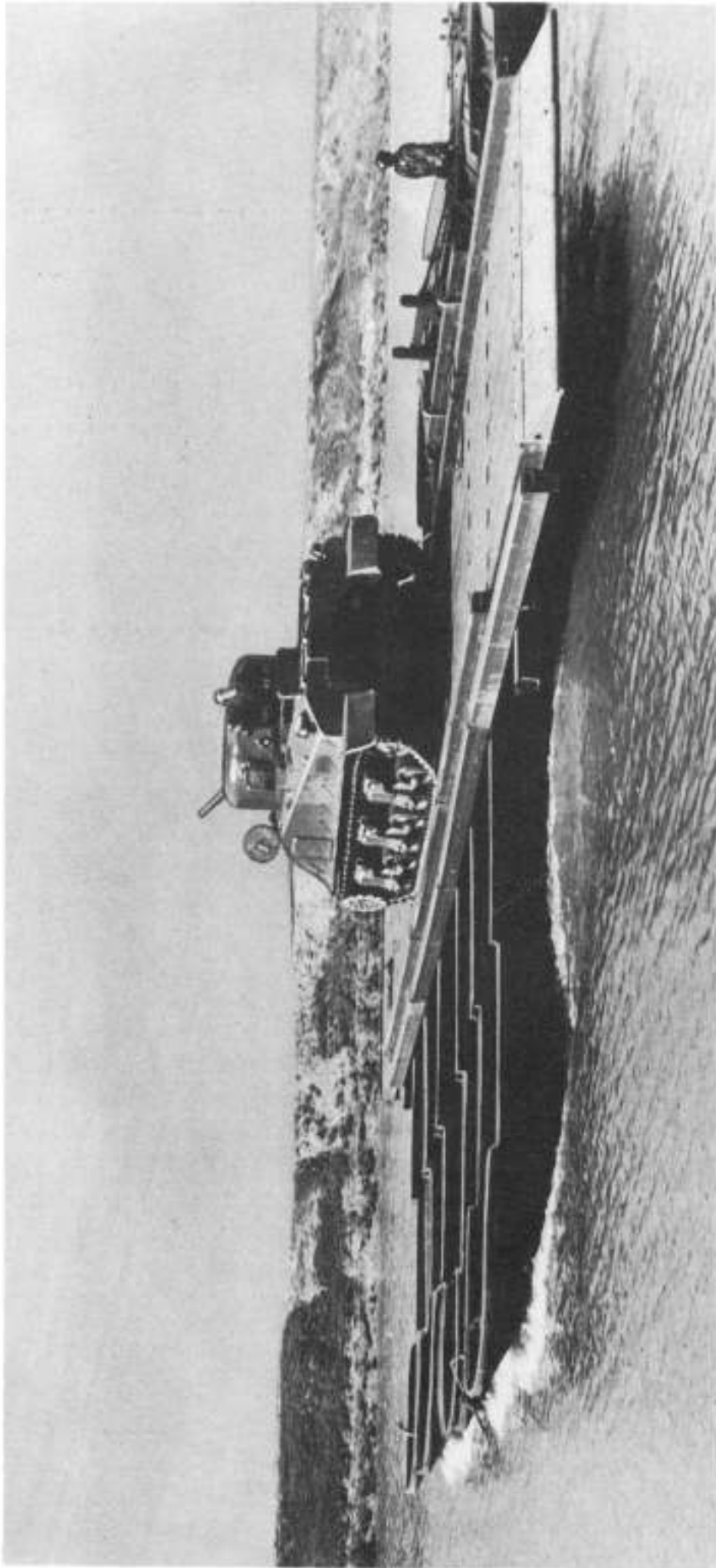


Figure 3. Four-ponton M4 ferry, shortened.

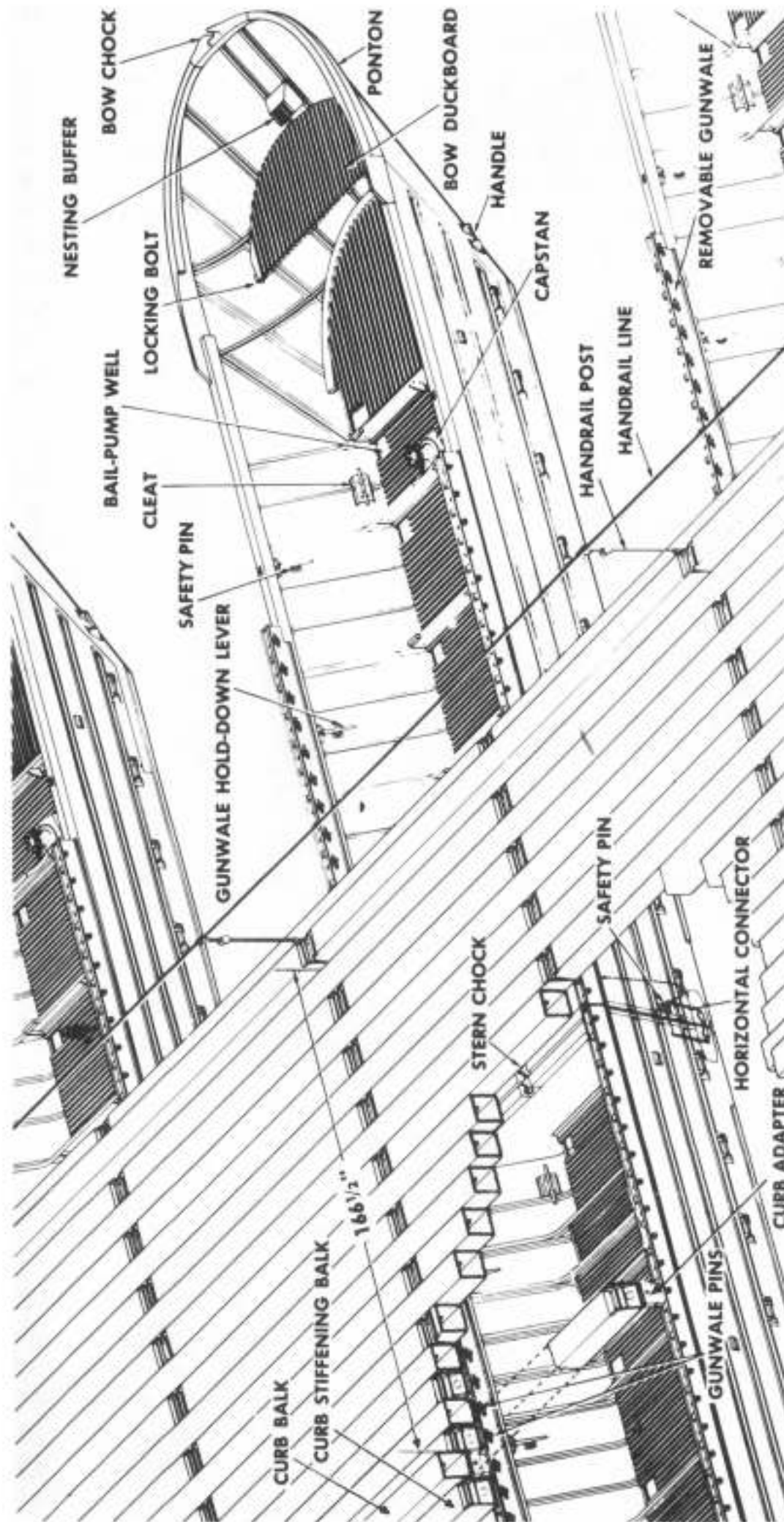


Figure 4. Nomenclature of deck and pontons, floating bridge, M4.

wide which provides a roadway 166½ inches wide inside-to-inside of curb balk.

f. Floating Spans. Floating spans of the normal bridge are supported on whole pontons which are formed by fastening half-pontons together stern-to-stern. Normally whole pontons are spaced 15 feet apart center-to-center, except at each end of the bridge where three pontons are 7 feet 6 inches center-to-center as shown in figure 5. In the fully reinforced bridge, reinforcing whole pontons are placed between all whole pontons of the normal bridge, thus producing a spacing of 7 feet 6 inches between centers of floating supports. The bridge may also be only partially reinforced, as shown in chapter 5. The end span is reinforced by a superimposed span in order to utilize the capacity of the reinforced floating bridge (fig. 6).

g. Shore Connections.

- (1) The type of assembly used between the ends of floating spans and the shore connection depends primarily upon the variation in river stages to be provided for, steepness and length of bank at point of landing, and characteristics of stream bed along the shore at place of crossing.
- (2) Continuous-deck connections must always be used between shoreward floating supports and fixed supports at the shore (figs. 5 and 7).
- (3) Aluminum pontons cannot be grounded safely under load because of the probability of being punctured. However, pneumatic floats may replace aluminum pontons (fig. 8), because they can be grounded under load without damage, provided sharp objects are not present or are removed from the stream bed. When pneumatic floats are used, the stillwater classes given in table I are reduced by 10. The bottoms of grounded pneumatic floats wear through after long continuous use and require replacement. The use of floating type supports in shallow water areas of shoreward ends of floating bridges frequently may be eliminated in bridges being used for extended periods by placing a shallow fill or by using a standard or improvised trestle.
- (4) Trestles are used where the shore connection is made to a high bank, where moderate variations in water level are anticipated, or where long shallow-water approaches must be crossed. The number of trestles required for grade adjustment is determined by the range of water-level fluctuation and maximum permissible slope of the deck. If trestles are used, every precaution must be taken to provide adequate bearing under trestle shoes. A minimum of two trestle-bracing struts is used at each trestle column. Cross-bracing (fig. 7) is the most satisfactory trestle bracing. When long spans requiring trestles are used, additional trestle-bracing struts

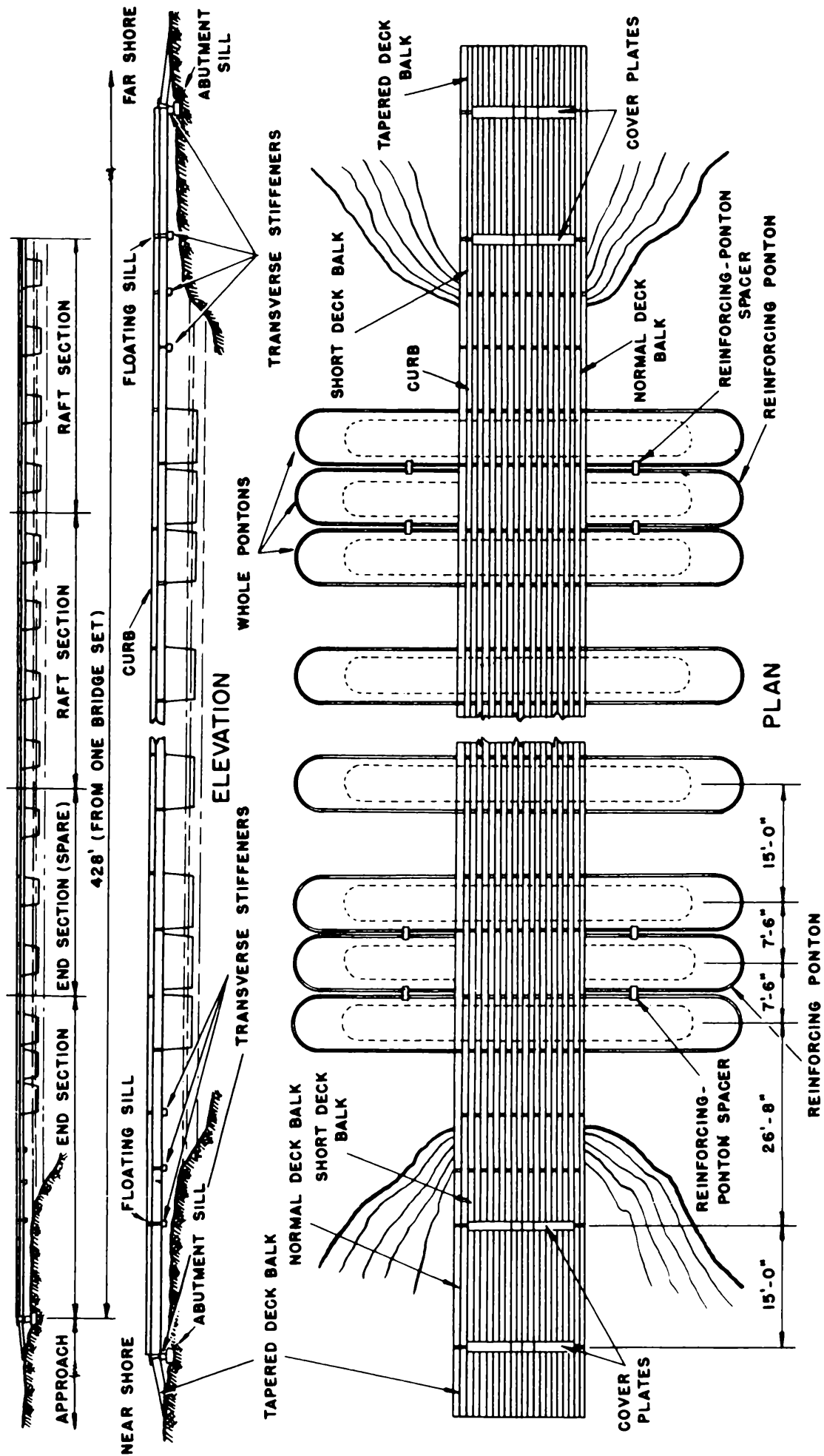


Figure 5. Floating bridge, M4.