

The equipment, such as capstan and capstan engine, which is a 6-inch by 7-inch engine of the Marietta Manufacturing Company make, the water tanks, cable, anchor and lines, weighs 26,600 pounds, or 44.3 pounds per indicated horsepower.

OPERATION

On her trial trip the boat pushed a barge 200 feet by 36 feet, loaded to a draft of $3\frac{1}{2}$ feet, at a speed of 5 miles per hour against a current of 4 miles per hour, the wheel turning 22 revolutions per minute. On a consecutive trip she pushed a barge 156 feet by 30 feet, loaded to a draft of $3\frac{1}{2}$ feet, at a speed of $6\frac{1}{4}$ miles per hour against a current of 4 miles per hour, the wheel turning 24 revolutions per minute.

The World's Largest Ferry Steamer

Of unusual interest to the marine engineering world is the new train ferry *Contra Costa*, which is nearing completion at Oakland, Cal. This vessel will be the largest ferryboat ever built and represents the latest ideas in the design of ferry steamers, which incidentally have reached a remarkably high stage of development on San Francisco Bay.

The *Contra Costa* is being constructed by the Southern Pacific Railroad and will be used by them to carry passenger and freight trains across Carquinez Straits, between Port Costa and Benicia, Cal. She will supplement the ferryboat *Solano*, which for many years has held the reputation of being the world's largest ferry. The new vessel is built of Oregon pine throughout, 2,000,000 board feet of lumber being used in her construction. In order to insure against end or side collision fourteen watertight bulkheads have been provided. Any one of these bulkheads might be punctured without endangering the vessel. The design of the *Contra Costa* called for some exceedingly large timbers, and it is of interest to note that there are single timbers in the hull measuring 26 by 36 inches by 66 feet long, and others 116 feet in length by 18 inches square.

The principal dimensions of this vessel are as follows: Length overall, 433 feet; length over transoms, 420 feet;

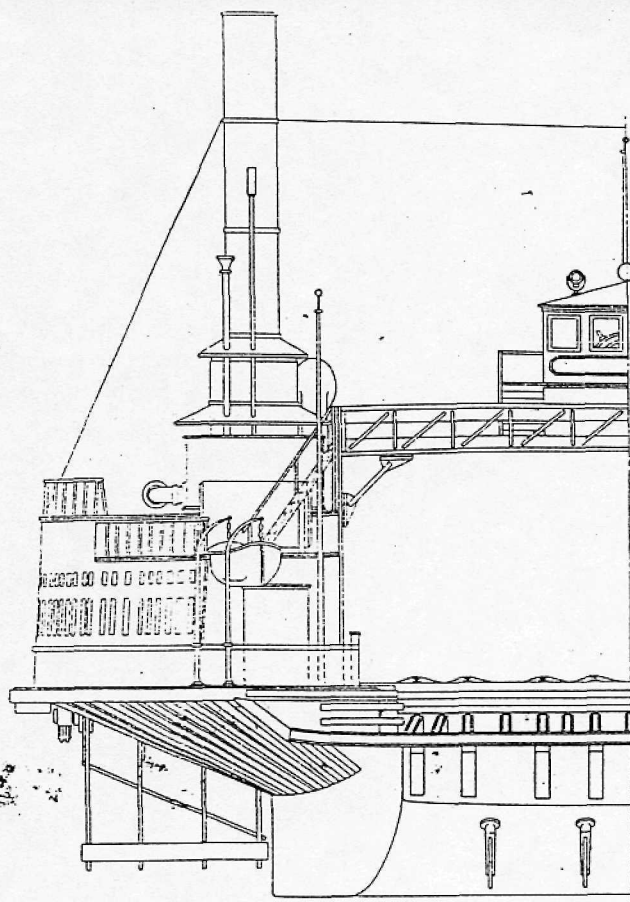


Fig. 2.—Half End View

width over guards, 116 feet; beam, molded, 66 feet; depth (amidships), $19\frac{3}{4}$ feet; draft, light, 5 feet; draft, loaded, 6 feet to 7 feet.

The four tracks on the main deck will accommodate thirty-six freight cars and two locomotives or twenty-four passenger cars and two locomotives.

In order to provide a maximum amount of track space the propelling machinery has been placed below the level

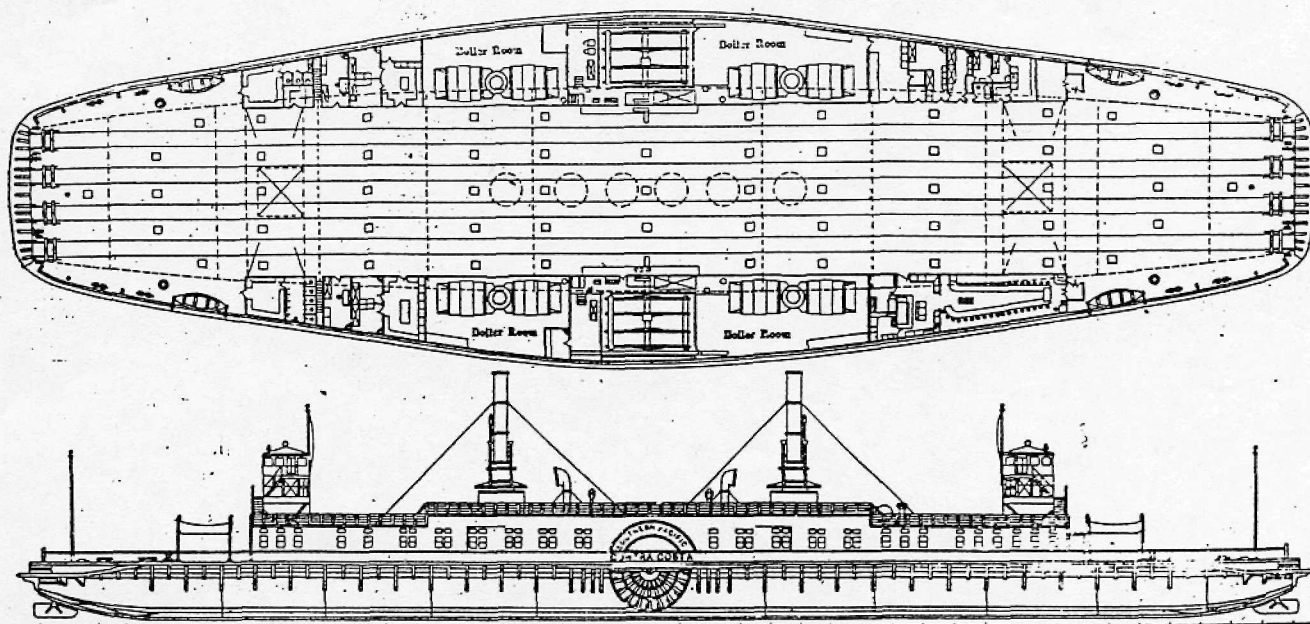
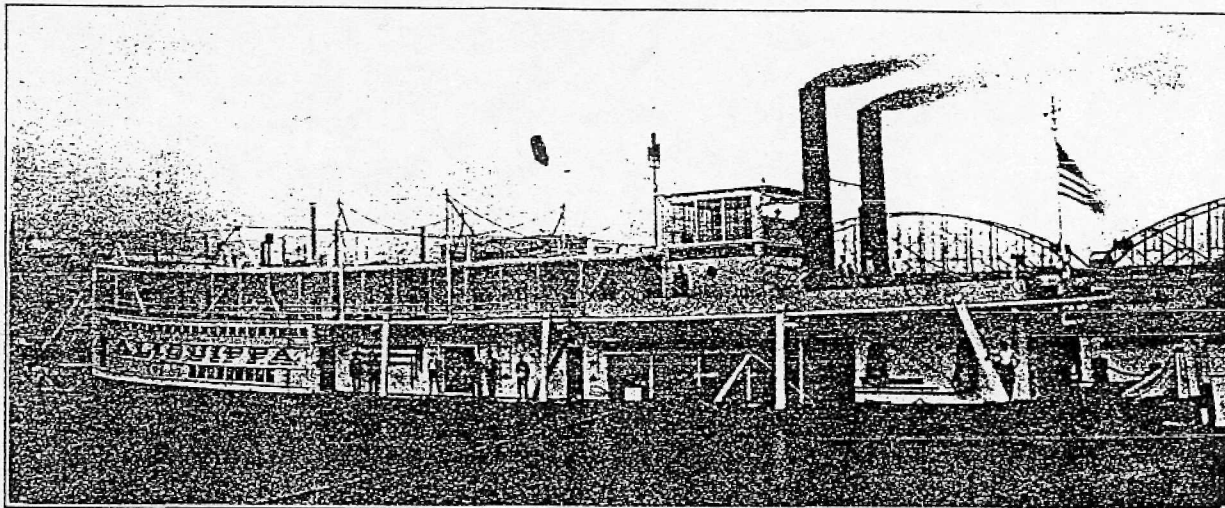


Fig. 1.—Car Ferry *Contra Costa*, Built by the Southern Pacific Railroad and Said to Be the Largest Car Ferry in the World

of the main deck. There are two separate engines of 2,500 horsepower, one located on either side of the vessel. This arrangement permits the independent operation of the two paddle wheels, so that in case of emergency the vessel may be maneuvered by reversing one wheel and sending the other ahead. The engines are of the low-pressure condensing type, equipped with Corliss valve gear, and set on an inclined engine frame. They were built at the railroad shops at Sacramento, Cal.

Steam will be supplied at a pressure of 60 pounds per square inch by eight Scotch dry back boilers, located on the main deck. Fuel oil is to be used under the boilers, the burners being supplied from two tanks of 7,800 gallons capacity, located below decks. Four water tanks of approximately 8,000 gallons capacity will supply water to

ments by three longitudinal bulkheads 3/16-inch thick, and five transverse bulkheads secured to the bottom and deck plating by flanged intercostals. The frames throughout are 2 1/2-inch by 3-inch by 3/8-inch angles spaced 18 inches apart, while the deck beams are 3-inch by 2-inch by 3/8-inch angles spaced on every frame. The deck is of 1/4-inch steel plate, while under the boiler and coal box the deck is covered with 2 inches of concrete. The side bulkheads and framing for the cabin on the main and boiler decks is built entirely of steel plate and angles. The pilot house is also of steel, the balance of the cabin being of wood construction with panels of "Nevasplit" furnished by the Keyes Products Company, of New York, which by treatment are rendered non-inflammable. The boiler deck forward is made of plates and angles, the side rail and



Stern-Wheel Towboat *Aliquippa*, Built by James Rees & Sons Company, Pittsburg, Pa., for the Jones & Laughlin Steel Company

the boilers and will also be utilized for filling locomotive tanks while crossing.

For the accommodation of local passengers a waiting-room, restaurant and bar have been provided in the superstructure. A small generating set will supply electric current for lighting purposes, and also for searchlights on either end of the boat.

stanchions of galvanized pipe, and the inside of the cabin overhead of steel plate in order to make the cabin as fireproof as possible without building it entirely of steel.

Besides being practically fireproof, the boat has proved a great success in steering, especially in a river with strong current and dangerous bends. In light condition the boat is practically on an even keel, a feature which is very desirable for river craft which have to cope with low water conditions.

Fireproof Towboat *Aliquippa*

James Rees & Sons Company, Pittsburg, Pa., has recently completed for the Jones & Laughlin Steel Company, Pittsburg, a fireproof stern-wheel towboat, 153 feet long on the deck and 29 feet beam, with a 5-foot depth of hold, driven by tandem compound engines, 14 inches and 28 inches diameter by 7 feet stroke, fitted with lever balance poppet valves, with the Rees inside cam motion taken from the connecting rod and the Rees adjustable cut-off motion taken from the crosshead. The engines drive a paddle wheel 21 feet diameter with buckets 20 feet long and 36 inches wide, the average number of revolutions in heavy tow being 18. A cylindrical surface condenser with Warren air pump and circulating pump is fitted. The boiler is fed by a "doctor" pump through a feed water heater equipped with a brass pipe worm, which delivers the water to the boiler at a temperature of 200 degrees Fahrenheit. The other auxiliaries include a steam power capstan driven by a double 6-inch by 9-inch engine and a General Electric turbo-generating set.

The hull is divided into twenty-one watertight compart-

Hydraulic Suction Dredge No. 103

The hull of a wooden 18-inch hydraulic suction dredge, 100 feet long, 40 feet beam and 8 feet depth, having two decks and an operating room on top, contracted for by the Jennings Pump & Dredge Company, Chicago, Ill., is now at the docks of the Marine Iron Works, Chicago, for the installation of her boilers and machinery, which were built by this company. There are four boilers, each 90 inches diameter by 144 inches long, with single furnaces 44 inches diameter, built according to the Hartford Inspection Rules, for a steam pressure of 175 pounds per square inch. The battery of four boilers, which is installed on the main deck, is supplied with feed water by two Worthington ram pattern pumps, each 7 1/2 inches by 5 inches by 6 inches.

The machinery consists of a triple expansion engine with cylinders 13 1/2 inches, 19 inches and 33 inches diameter by 16 inches stroke, connected with an 18-inch Jennings hydraulic suction pump supplied by the Jennings Pump & Dredge Company. Both the engine and pump

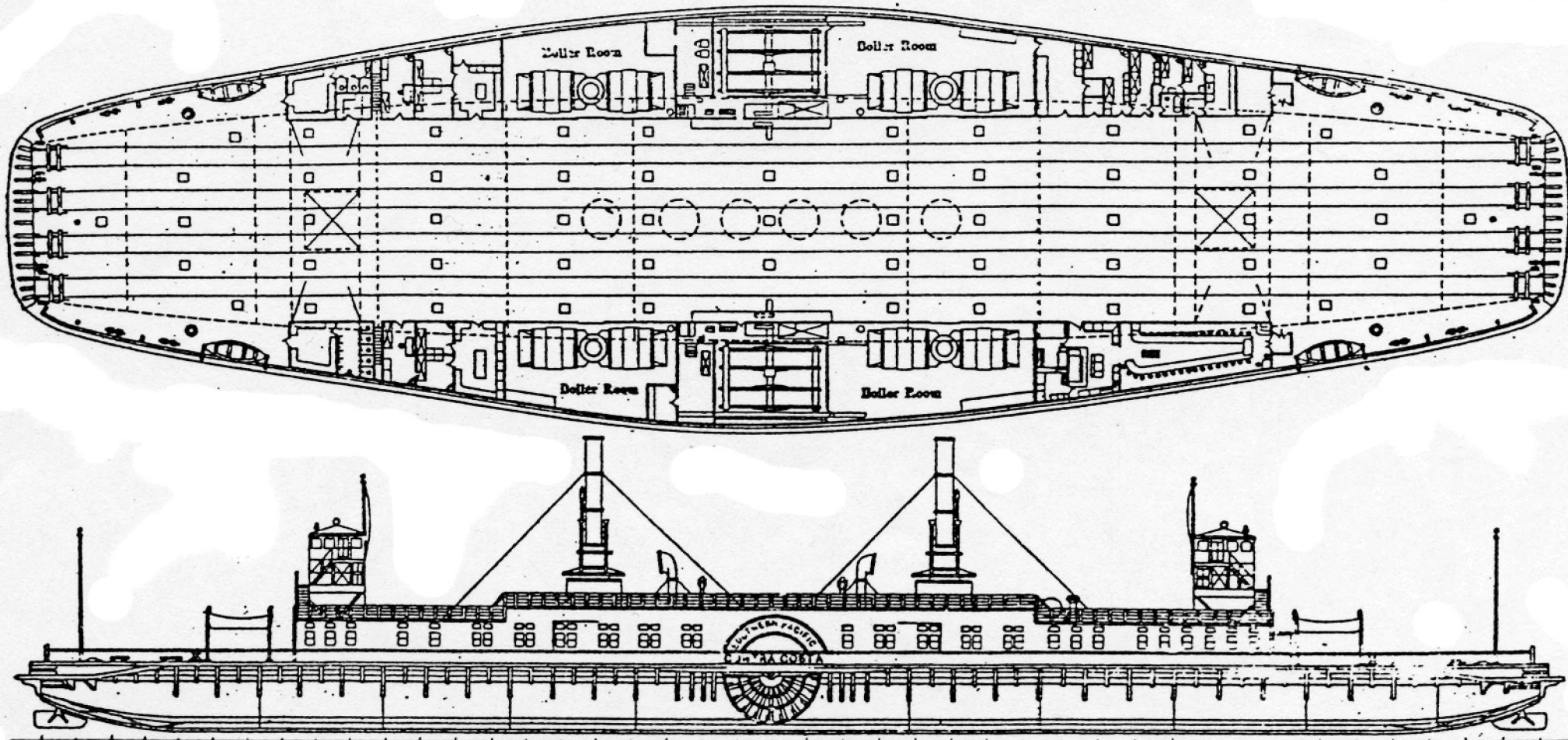


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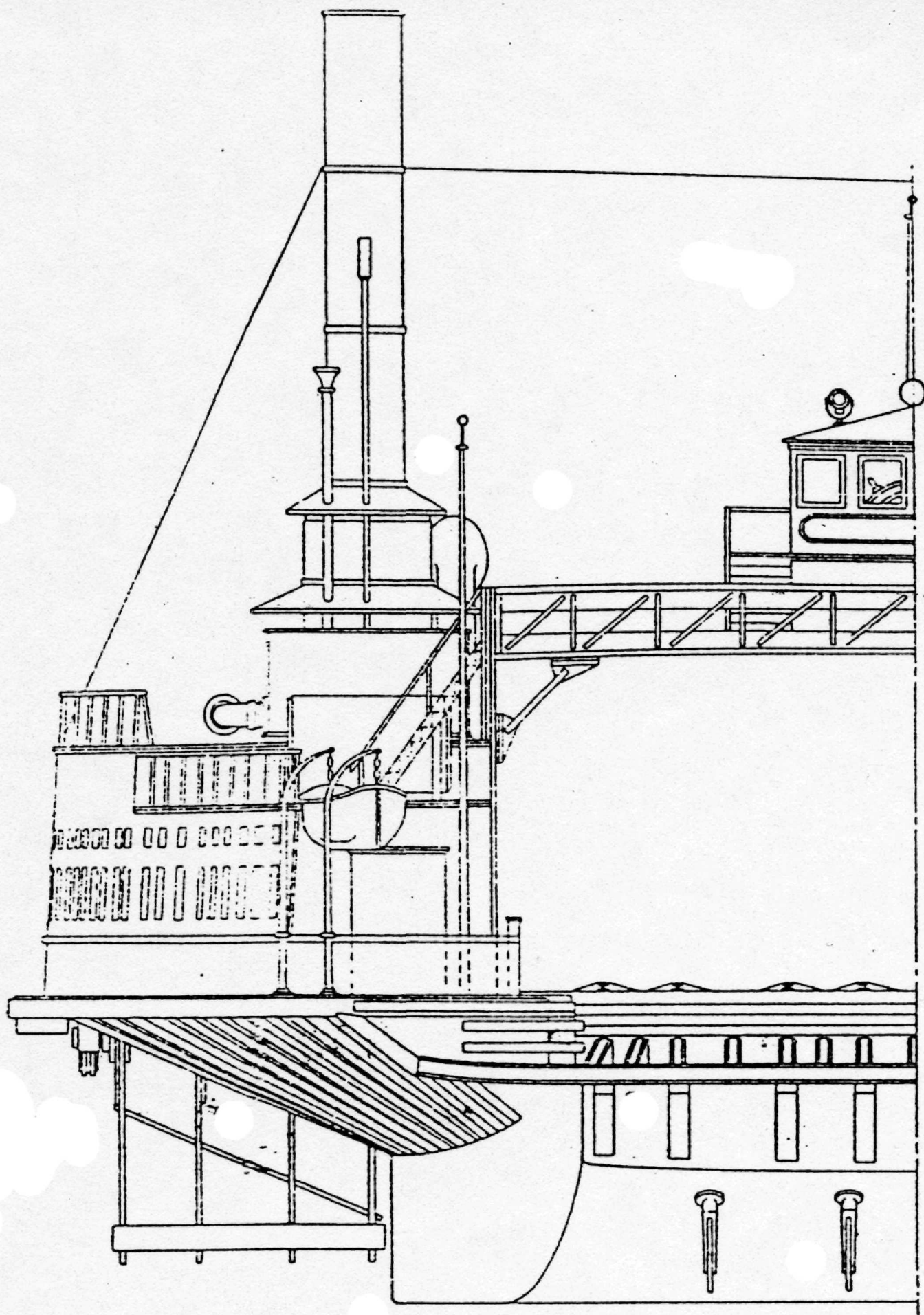


Fig. 2.—Half End View