

STEAM CATAMARAN.

The boat consists of two pontoons each 2' x 30' and 1' 8" deep placed 4' apart. Beams 2' from centers connect rigidly the pontoons; on these is laid a floor of $\frac{3}{4}$ " matched boards. These beams are secured by $\frac{3}{8}$ " bolts 25" long extending from bottom of boats to top of deck beams. The pontoons are covered water tight, and each divided into two tight compartments. The upper works are formed by stanchions with carline beams, on which is the upper deck of $\frac{5}{8}$ " timber. The pilot house is well up, so wheelsman can see fore and aft. An opportunity is also provided for steering in cabin, which is inclosed with canvas curtains secured to stanchions, as are carriage curtains, only stronger. In the cabin extra stanchions are set up when wanted to support folding cots, all of which takes but little room, by day, when not wanted.

The boats are nearly straight on inside lines, gathering enough water, as as I find on trial, so that, with the draught back, caused by the wheel, the water remains same height between the boats, when running, as outside. This is my second experiment in steam catamarans, and I am convinced it is the best plan for steam yachts up to 60' and perhaps longer, for the following reasons:

1. It is not cranky—"stiff as an island" they say—half a dozen men on one side scarcely change the level even of this small boat.

2. Safety from sinking—the four air tight compartments must all be filled before it will go down.

3. Cleanliness—all ashes and cinders go direct from the fire box to the water below.

4. Speed—nine miles an hour in still water. 5. Protection of boats from weather—the floor forming a sun shade.

6. Roomy—place for six to sleep in cabin; ice box, lockers, oil stove box, and coal bunker forward, and all accessible.

The power is a 4 x 6 engine and upright steel boiler with seventy $1\frac{1}{2}$ " flues 24" long submerged. I think that with 120 pounds boiler pressure I obtain about 260 revolutions, which gives about 5 horse power. The engine is faulty in construction in that the exhaust is but two $\frac{3}{4}$ " pipes from either side of steam chest, the area of both but little more than one 1" pipe. With 60' of heating surface more steam could be made, with poor wood, than the engine would use.

The boiler is all above the furnace. The grate is hung in center, and dumps into the water between the boats. My plan for feeding boiler I think is novel. From the deck pump the water is all forced through the feed pump, thus facilitating "starting" the feed pump, making it almost a certainty. When at dock with steam up, the waste of water is very easily supplied by hand, and more surely than with any small inspirator I have seen. By a simple device the leverage is changed when pumping by hand against a head of steam. The feed pipe coils around fire, and only hot water

thereby helping to keep wheel flange in place. The wheel shaft is hung in bearing secured by a steel plate bent around and riveted to lower end of a piece of oak $2\frac{1}{2}$ " by $4\frac{1}{2}$ ", tapered like a wedge at lower end, curved with length of wheel shaft as radius, and sliding vertically in a similarly curved casing securely bolted to deck beams. The wheel blades, when at highest point, just clear deck, and are not submerged entirely. Engine shaft is inclined so as to bring

having a pony truck at each end and the first and second drivers more widely separated. Instead of a blank tire on the main or second pair of drivers, the trailing drivers are used without a flange, making the rigid wheel-base the same as that of a Mogul.

This arrangement is possible because the trailing truck guides the back end of the machine. The rigid wheel-base is but 12 feet 1 inch, the total wheel-base 29 feet, or 6 feet more than that of the Consolidation engine, while its rigid wheel-base is 3 feet shorter.

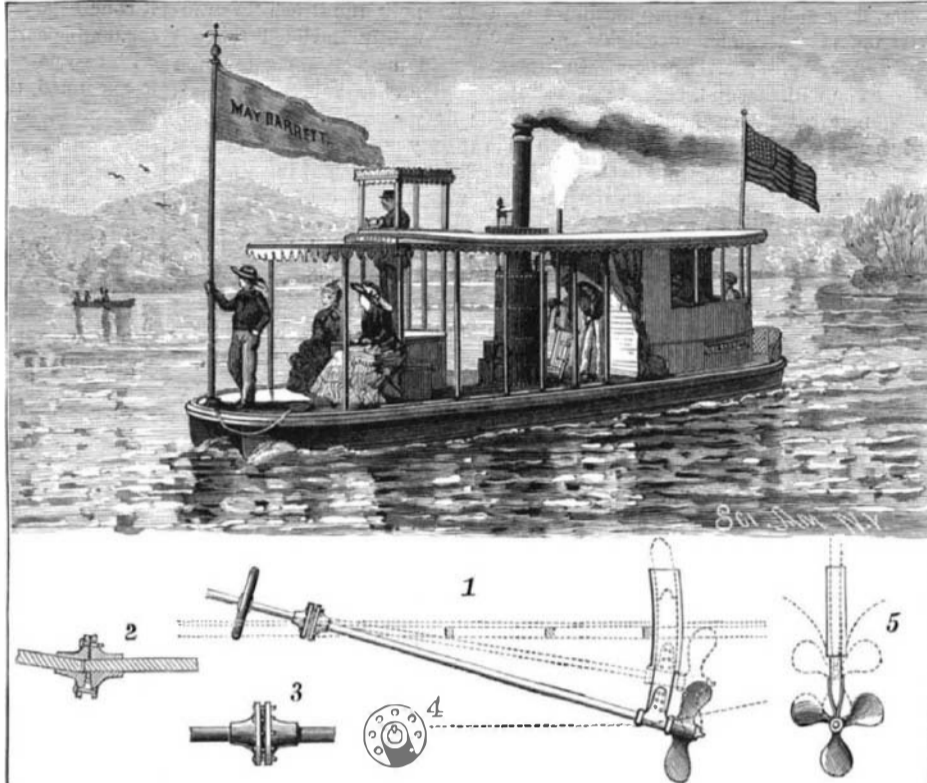
As would be expected, the engine is much easier on the curves, and at the same time runs with much less danger of getting off the rails. The forward truck is of the usual pony pattern, with half elliptic springs. The trailing truck has volutes under the side bearings and spirals in deep pockets in the center.

The frame of the engine differs from the ordinary type in having jaws and braces in separate forgings, which are bolted together. The main bar is straight to the back end, where it is slightly turned up. The first and second pair of drivers are equalized with each other, and can be equalized with the pony truck if necessary. The third and fourth pairs are also equalized together. The latter pair have seven-inch plain tires. The driving wheels are 60 inches in diameter, and have 88,000 pounds upon them, or but little more than that which is placed with safety on an ordinary car journal. The leading truck has 11,000 pounds, and the trailing truck 6,000. The cylinders are of an unusual size, at least for this part of the country, being 20 inches in diameter by 26 inch stroke. They have De Laney balanced valves, and two

relief valves on the steam-chest cover. The boiler to supply steam to the cylinders is of Otis steel, is 54 inches in diameter at the smallest ring, and has 288 2-inch flues 12 feet long. It is fed by pumps driven in the usual way from the cross-head, but there is a small injector in the cab for use in case of emergencies or when the engine is standing. The fire-box is 11 feet long on the bottom and 33 inches wide inside at the grate. The Bee, as the engine is called, has gained for itself a very enviable reputation on the road, and has demonstrated that the principles involved in its construction are correct.

Nuremberg Metal Exhibition of 1885.

This international display of precious metals and alloys, organized by the Bavarian Industrial Museum, promises to be of remarkable interest. The Government has decided upon giving medals of gold and silver. Free entry will be granted to all works which are again exported, and a lottery will take place in which the prizes will consist of objects which have been exhibited. A guarantee fund of £5,000 has already been arranged, and the various German consulates in other countries will assist in the work. It is stated in

**THE STEAM CATAMARAN MAY BARRETT.**

wheel shaft in line when in ordinary use, *i. e.*, down. This pitching wheel shaft has not proved objectionable, thus corroborating the views of that party who urged the inclined shaft so strongly before one of your New York societies two or three years since. By the way, does this universal joint coupling happen to be new? I never saw it. I know it is good.

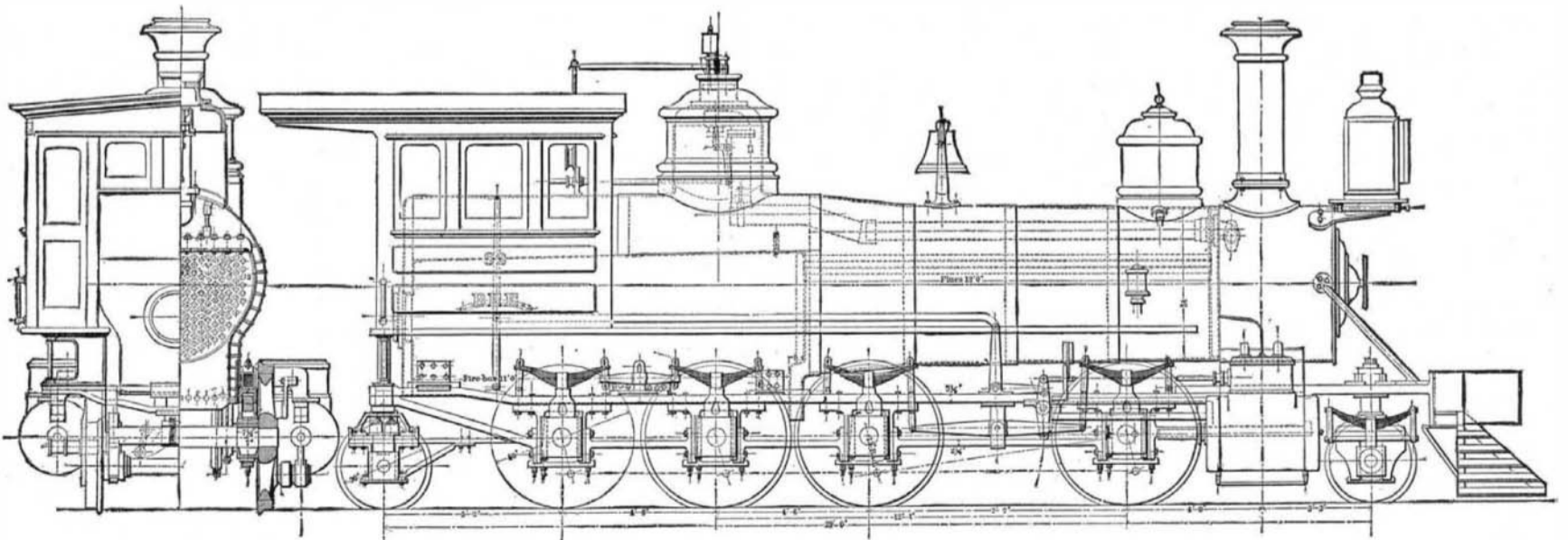
For cruising I have never seen a more comfortable rig. A party of seven last summer were out weeks with it, and were certainly very comfortable. With a mosquito net around the cabin, and when hot with the curtains down a little, the nights were delightful.

WM. B. REED.

Hastings, Minnesota, June 24, 1884.

TWELVE-WHEEL FREIGHT LOCOMOTIVE.

At the Long Branch meeting of the Master Mechanics' Association, the Committee on Improvements of the Locomotive exhibited, among other things, a photograph and some sketches of an engine built by Mr. Alex. Mitchell, of the Lehigh Valley Railroad, but which by no means attracted the attention which the novelty of the design and the performance of the engine deserved.

**TWELVE WHEEL FREIGHT LOCOMOTIVE—LEHIGH VALLEY RAILROAD.**

enters boiler. The inlet is in center of lowest point in boiler, taking place of one tube. An outside vertical circulating pipe secures good circulation.

The wheel is 3 bladed, 24", and is arranged to be raised in shallow water, being attached to main shaft by universal joint which is shown in Figs. 1, 2, 3, 4, and 5. The flange faces are 7", turned to segment of sphere with length of propeller shaft as radius. Eight steel pins, $\frac{5}{8}$ " diameter, 3" long, are riveted into the flange attached to engine shaft and work in holes reamed tapering in flange attached to wheel shaft. Wheel shaft extends into flange on engine shaft, about $\frac{3}{4}$,

It made its first appearance upon the track, says *The National Car-Builder*, as a ten coupled fourteen-wheeler, having a pony truck at both ends. The weight of the engine, however, was but 108,000 pounds, and experiments showed that while the design was satisfactory, so great a number of drivers was not necessary for an engine of this weight. One pair of wheels was therefore removed, and the positions of the others arranged so as to make the rigid wheel-base of the engine similar to that of an ordinary Mogul. As will be seen from the engraving, the engine now has two trucks and eight driving wheels, differing from the Consolidation in

the *Metallarbeiter* that Indian metal work, as well as Persian and Kabyle specimens, will be exhibited. In America, Spain, and Portugal the idea has been warmly taken up, and the participation of Japan is considered certain. France, Italy, Belgium, and Austria have been applying for space in an encouraging manner. As to Germany itself, it would seem that the old metal working towns, Hanau, Pforzheim, Stuttgart, Gmund, etc., will be represented in a special manner. The historical department will be of great interest. The light will partially be obtained from above, the objects shown being thus exhibited under favorable circumstances.