AN ALUMINUM TORPEDO BOAT.

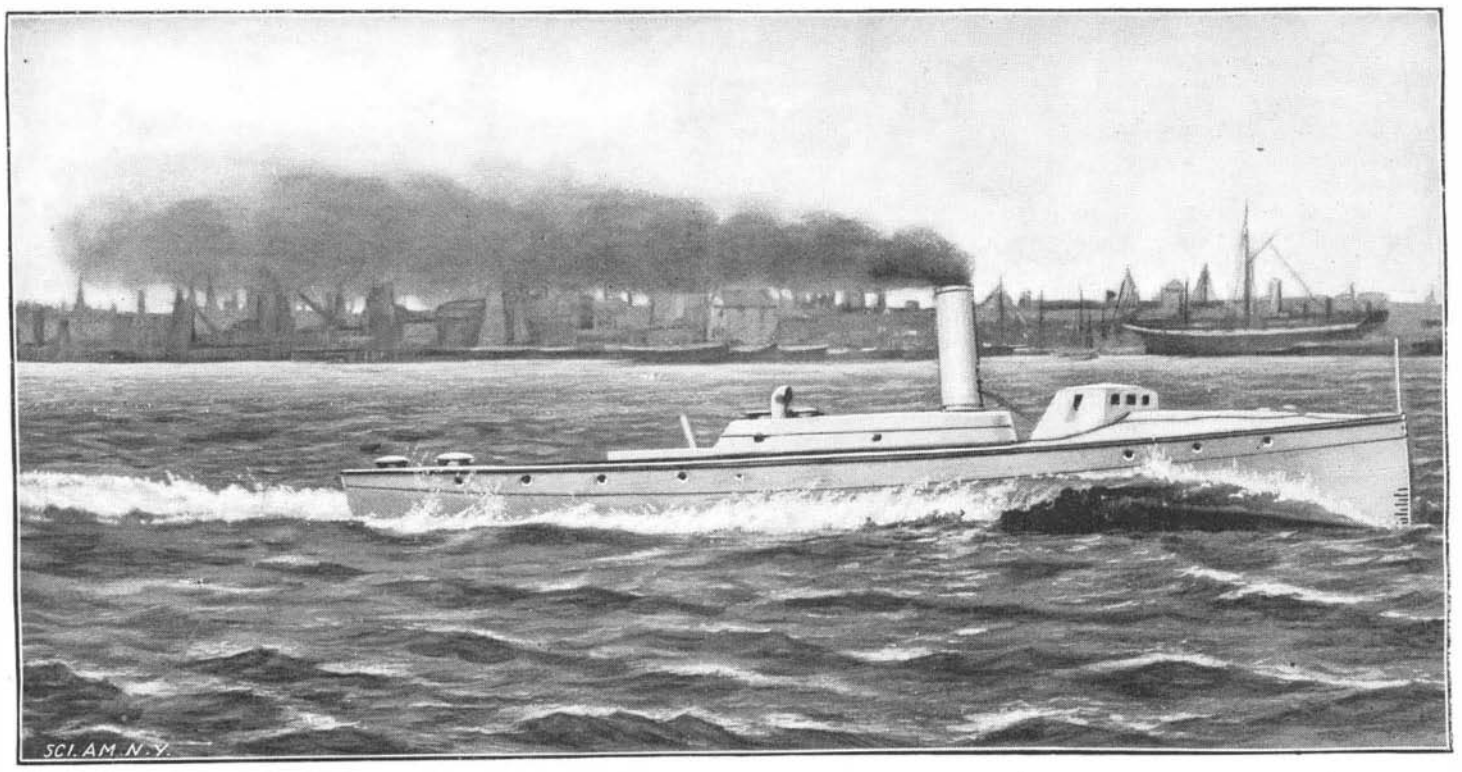
The aluminum torpedo boat which Messrs. Yarrow & Co. have constructed for the French government was recently subjected to trial, so certain engineers, naval officers, and others not officially connected with the vessel might have an opportunity of observing her performance.

The London Times says: The boat is of the second class, being 60 feet long and 9 feet 3 inches wide, a beam 1 foot 9 inches in excess of the older type of second class boat. The chief interest naturally centers in the hull, the machinery consisting of an ordinary set of three stage compound torpedo boat engines and a Yarrow water tube boiler. In design the vessel is on the same general lines as the second class boats recently built by this firm, but the adoption of a lighter material has enabled important alterations to be made in the structure. As compared to a steel boat of the same type, the scantling has been thickened about 25 per cent, in spite of which the total weight of the hull has been reduced about 50 per cent. The builders had the boat weighed when slung on a crane in the docks, the total weight with water in the boiler being 9 tons 8 cwt. Toward this total the hull itself contributed two tons; so it may be taken that an ordinary steel second class torpedo boat's hull weighs four tons. The material of which the hull is constructed is, of course, not pure aluminum, but an alloy consisting of 94 per cent of aluminum and 6 per cent of copper. A large number of experiments have been made by Messrs. Yarrow and by the French government, the results of which point to the proportions adopted being found best for the purpose.

The chief result of using the lighter metal has been that a speed of over 20½ knots was obtained on the official trial, carried out on September 20 under the supervision of a French naval commission, of which Captain Le Clerc, of the French navy, was president. The maximum speed of torpedo boats of this class in the British navy is about 17 knots.

It will be seen that by using aluminum in place of steel in the hull construction—for in other respects the boat is on known lines—an increase of speed of 3½ knots has been obtained, in addition to which there are other subsidiary but by no means unimportant advantages dependent upon the decrease in weight of hull structure. Among these are ease in lifting, additional buoyancy, and freedom from vibration. The latter feature is really remarkable in the new boat, which steams at her highest speed with a degree of vibration, to quote the report of the official trial, "not appreciable;" in fact, when running at her best speed the boat was so steady that one could make notes in the after cabin with facility. Those who are acquainted with the performance of the average torpedo boat when running at speed will appreciate the great advance that has been made in this essential feature, for excessive vibration does much to reduce the efficiency of these high speed craft as engines of war. No doubt the greater steadiness is largely due to the improvements in engine balancing introduced of late, but Messrs. Yarrow & Co. attribute it chiefly to the increased scantling and the non-resilience of the alloy used when it is manufactured in the manner requisite for producing ship plates and angles—for aluminum is among the most resilient of metals when treated in some ways.

Mr. Yarrow states that the price of the material for the hull and fittings varied from 3s. to 5s. per lb., and the metal used in this little boat cost over £1,000.

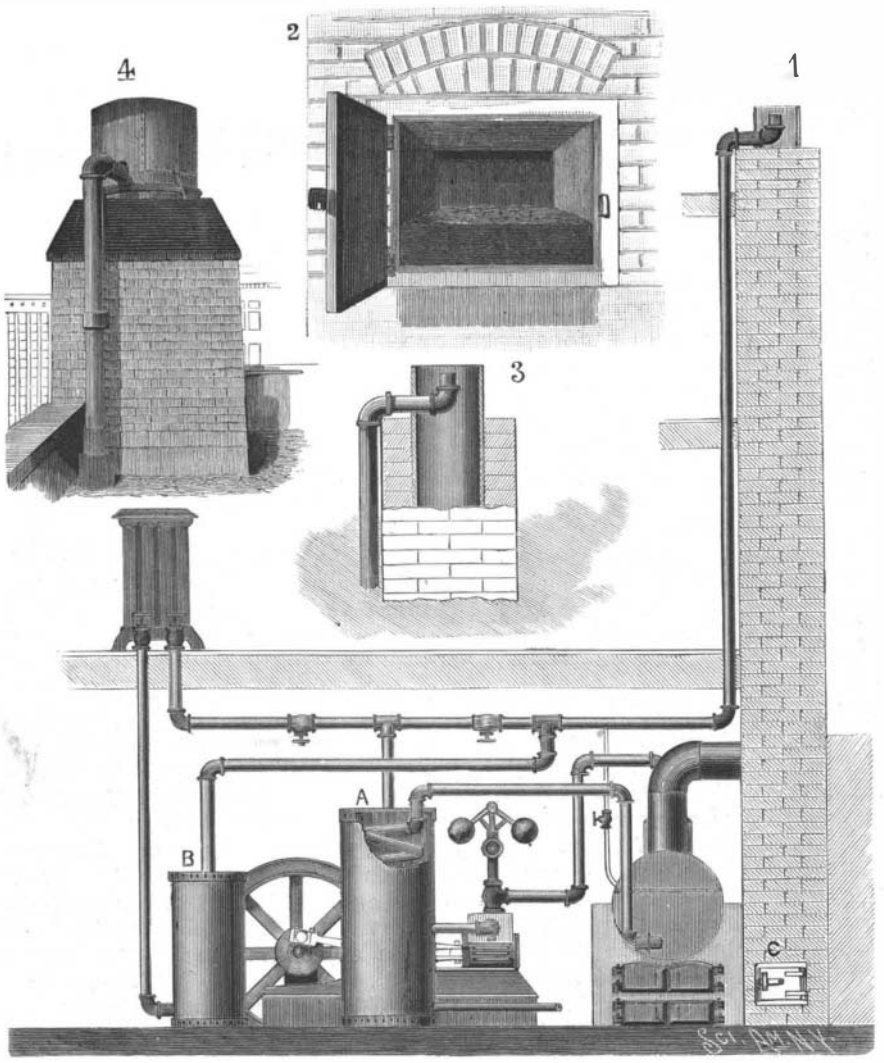


YARROW TORPEDO BOAT MADE OF ALUMINUM.

THE "EUREKA" SMOKE BLEACHER.

The illustration represents a very simple, inexpensive, and automatic device for extracting the coloring matter from smoke, thus enabling steam users to readily comply with the smoke ordinances of cities. It also, by regulating the draught of chimneys, is designed to cause perfect combustion most of the time, thus saving materially in the fuel consumed. The improvement is the invention of Mr. James T. Sands, 510 Pine Street, St. Louis, Mo., and consists in extending the exhaust steam pipe either outside or inside the chimney to within about four feet from the top. Live steam is also connected to the exhaust, to be used in case of emergency. A vacuum is produced by the velocity of the steam entering the air, and a slight down draught is also caused, carrying the carbon saturated with moisture of the steam to a soot box at the bottom of the chimney. The gases in the chimney receive an extra impetus in filling the vacuum, thus drawing an additional amount of oxygen into the furnace, and the draught in the chimney is uniform, because governed by the velocity of the steam at 212 degrees Fah., the point of condensation. Ninety-six per cent of the carbon entering the chimney is said to be precipitated, and can be sold for lampblack for making inks, etc. The other four per cent is either precipitated on the roof or chemically changed, as no color is visible from four to ten feet from the chimney.

In the illustration Fig. 1 shows the bleacher connected with the steam exhaust, A being the water heater connected with the engine exhaust, B a vapor tank, and C a carbon or soot box at the bottom of the chimney; Fig. 2 shows the carbon box open and the way the carbon is deposited, as represented by a photograph, the size of the box being 18 inches by 24 inches by 24 inches; while Fig. 4 is an exterior view of the chimney top and Fig. 3 is a sectional representation, showing one form of the exhaust steam discharge near the top of the chimney. The distance from the top of the chimney at which the discharge is made, as also the form of the discharge pipe and its nozzle, may be considerably varied, according to the height and draught of the chimney.



SANDS' APPARATUS FOR BLEACHING SMOKE.

This device has been in successful operation for the past eight months on the chimney of the Roe building, a large office structure in the city of St. Louis, Mo., and by actual test ninety-six per cent of the carbon entering the chimney was found to be precipitated, analyzing: 2·06 per cent moisture; 34·26 per cent volatile matter, mostly carbon, with some salts of ammonia; 63·68 per cent ash, metallic, mostly ferrous oxide; total, 100; which shows much less volatile matter than either London or Glasgow soot. A close observation, covering the past eight months, presents some peculiar phenomena. Most of the time nothing is visible coming from the chimney, and although it is three and a half feet in diameter and has a six inch steam pipe within four feet of the top pouring in its vapor, still the chimney looks as though no work was going on, while buildings close by are puffing steam twenty-five feet in the air from exhaust pipes. In this condition a paper placed in the soot box will show only a few drops of clear liquid per minute, shovel in a bushel of coal into the furnace, and in another moment the paper will be covered with small black pellets of carbon, quite moist. During the dry, hot months the carbon was deposited in the center of the soot box at the bottom and had to be hoed out; but in cooler, and particularly damp, weather it was quite moist, extending to the door of the soot box and formed in layers each day. The average