Trial of the Spanish Twin Screw Torpedo Cruiser Destructor.

The development of high-speed vessels is one of the features of naval architecture of the present day. This development is due to improvements in the system of construction of hull, improvements in forms of vessels, improvements in forms of propellers, and, more than these, in the development of the locomotive type of boiler for marine purposes and in the increased speed at which engines are now run. The most recent development of this combination has been made in the Destructor.

She was projected by Admiral Pezuela, who was then the Spanish Minister of Marine, who requested several British shipbuilders to submit a design of a sea-going vessel of about 350 tons displacement, with as high a speed as could be obtained. Messrs. Thomson's design was accepted, on account of the high speed promised. The vessel has since been built, and was put through her first official trial successfully. The conditions of trial proposed by the builders, and accepted by the Spanish Government, were that she was first to be run three times upon the measured mile, then to run at full speed for three consecutive hours; after this she was again to be run three times upon the measured mile. From the results of the mile runs the speeds upon the three hours' run were to be determined.

This severe trial was successfully carried out on Dec. 13, in the presence of a commission of Spanish naval officers appointed by the Minister of Marine. The following were the members of the commission: Commodore Casariego, Commodore Montojo, Captains Villaamil, Romero, Elduayen, and Goitia. The vessel was tried at the Admiralty knot, at Wemyss Bay, Firth of Clyde, and afterward ran out to sea about thirty-five knots. The results of the whole day's running show that the Destructor attained a mean speed of 22·65 knots (a little over 26 miles) per hour continuously for four hours, including the time occupied in running the mile. The weights carried on this trial were equivalent to having the vessel's armament of one 9 centimeter gun, four 6 pounder rapid firing, and two 47 millimeter Hotchkiss revolving cannon, with all ammunition complete, five torpedo tubes, and ten torpedoes; the crew and their provisions and effects, all spare gear, tools, and fresh water for machinery; the vessel complete in all respects for sea, and with sufficient coal on board to carry her at 11½ knots for 1,800 knots.

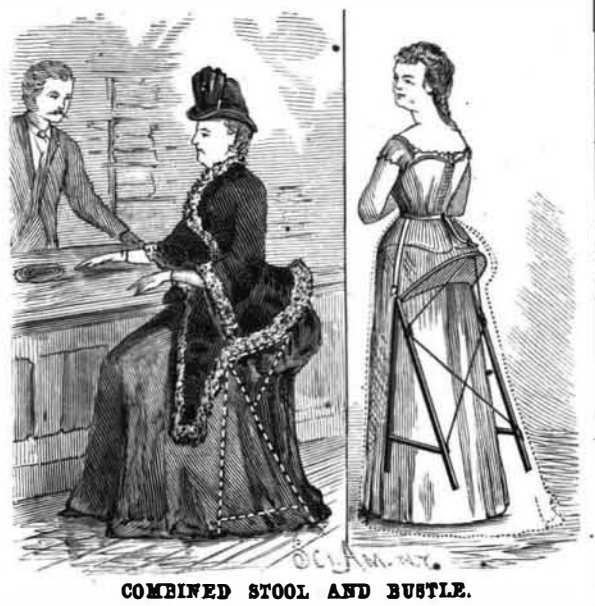
The machinery of this vessel is of the high-speed torpedo boat type, but is very much larger. There are two sets, each developing 2,000 indicated horse power. They are triple expansion, and have been designed to run at 350 revolutions per minute. The engine room is divided into two separate watertight compartments, each side being protected by a three-quarter inch bulkhead and coal bunkers. The boilers are of the locomotive type, but have several important improvements introduced by the builders. They are four in number, each in a separate watertight compartment. The advantage of this minute subdivision is obvious, not only for purposes of buoyancy, but for subdivision of effects of accident of any kind. These boilers are protected by coal bunkers in the same way as the engines. There is a transverse bunker before the boilers, and before this is a bulkhead 1¼ inches thick, which protects the machinery from raking fire. Abaft of the engines is a cross bunker, which affords similar protection from aft. The machinery worked very successfully, the boilers showing no sign of priming or leakage. The forced draught was very moderate, being only 2 inches. The results of these trials will be particularly interesting to war-ship engineers at the present time, as attempts have been made by the Admiralty to introduce this type of machinery more generally into war ships, but they have not yet been very successful. It is only by great care and fortunate experience that it is possible to avoid disaster in this type of boiler and engine when worked in groups in large ships.

The vessel had a run of 135 knots, in order to determine her consumption at about 11 knots; and it was determined that with the amount of coal she can carry in her bunkers, she can steam 5,100 knots at 11½ knots per hour. This same quantity of coal will carry her 700 knots at full speed. In addition to the members of the Spanish commission, there were present at the trials Mr. Bakewell and Mr. Bennett, of the Admiralty, Mr. J. R. Thomson, Mr. G. P. Thomson, Mr. Parker, Mr. C. D. Haynes, Mr. Biles, Captain Celies.

This vessel is interesting in many respects. She is not the first high-speed twin-screw vessel built in this country, but she is the second, the first being the Russian torpedo boat Wiborg, of 168 tons displacement, which also was built by Messrs. Thomson. The Destructor's value consists not only in her high speed, but in the fact that she is able to maintain this speed in a seaway. Recently she was taken to sea with the Spanish commission on board, and in a heavy sea she maintained a speed of 22 knots for four hours. The duplication of her machinery is an enormous advantage to her, compared with a single-screw ship. Her turning powers are good, as she has a very large after-rudder, and also an auxiliary bow rudder. She turns a complete circle in about 1¼ minutes and of less than three times her length. The protection by thick plates of the vital parts will be of value to her if she is ever attacked by machine guns. As it seems to be almost certain that high speed cannot be maintained in a seaway in a vessel of smaller size than this, we may confidently look to the Destructor as the forerunner of a large number of other similar vessels, whose chief characteristic will be their speed at sea. It is to be regretted that this vessel is not the property of our own Admiralty, but we have no doubt that the Grasshopper type, though slower, will, if their machinery is successful, be useful ships of the same type.—*The Engineer*.

COMFORT AND STYLE TOO.

So long as it is the fashion for ladies to wear bustles of the pronounced amplitude now favored by so many of the fair sex, we do not see why the fact may not be taken advantage of to introduce an invention calculated to make it convenient for them frequently to rest

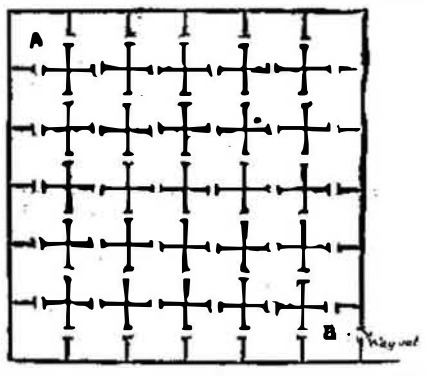


COMBINED STOOL AND BUSTLE.

from the fatigue of long standing or walking. Such, at least, we presume to be the idea of the inventor of the device shown in the accompanying illustration, for which a patent has recently been issued. The transformation the style has effected in the appearance of a lady properly fitted out in walking costume is something really wonderful, and we are not surprised, therefore, that several other inventors have rushed into the same field, with devices which would not otherwise have been thought of.

A PUZZLE.

The following I *believe* has a solution, but what that solution may be I by no means promise to tell—for a most excellent reason.



The figure represents the plan of a prison with intercommunicating cells (bless the Latin); a prisoner in A is offered his freedom if he can make his way to B after passing once, and once only, through all the 36 cells. How is he to do it?—*Knowledge*.

What About Duluth

Duluth is a side hill city. There is nothing gentle about the slope. The hill commences at the edge of the lake. Ten minutes' climbing from the docks takes one through the railroad yards, the business section, and into the suburbs. Still there is plenty of hill ahead. You are not much more than half way up when you reach the outer fringe of the handsome residences. But there is no need of going higher just now, for an "about face" presents a view of all Duluth, and at your feet lies the finest harbor in the world. On the left as you stand facing the lake there stretches out that singular formation, Minnesota Point. Seven miles long, slightly curved, averaging about 700 feet in width, with a covering of pine trees, the point looks like a gigantic green needle. It is a natural breakwater. Outside the point is a great lake. Inside, with the ragged shore line of Wisconsin for the other boundary, is a harbor. At your feet on the right, Rice's Point juts out and curves toward the Minnesota Point, making an inner harbor. Away in the distance a headland from the Wisconsin shore extends into the lake toward the extremity of Minnesota Point. That is Wisconsin Point; and between the two points was formerly the entrance to this harbor, seven miles long and from two to three miles wide.

But Duluth saw an opportunity to improve upon nature. She cut a canal 200 feet wide and 30 feet deep across Minnesota Point a few furlongs out, and now the largest steamships move into the improved harbor between Minnesota and Rice's Points, and take their places at elevator or warehouse or dock, as business requires, while the sailing vessels furl their canvas at the mouth of the canal and in five minutes are towed to their destination. This was a natural harbor, but it was susceptible of considerable improvement. Dredges have worked out slips and basins, piling the gravel within the shore line until the harbor is deep water, and the docks are to a considerable extent of solid earth. The largest lake vessels lie alongside the warehouses and elevators, and all around is a network of railroad tracks. It matters little to Duluth, commercially speaking, if the bill is steep. Her gigantic trade is handled on the water fronts, and such facilities never were surpassed. When the full advantage is taken of what nature has here provided, Duluth will have fifty miles of dock line.—*Coal Trade Journal*.

How Gold is Exported.

The process of shipping gold across the ocean is thus described by the Boston *Commercial Bulletin*:

Each keg contains $50,000 in clear gold. It is from the Bank of America, at New York, that most of the gold is shipped from that city. The foreign steamships sailing from Boston now carry little or no gold, although the reverse was the case years ago.

The shipments of gold are not generally on the bank's account. At a first glance, persons might well suppose that when the demand arises for gold to send abroad, the shipper would only have to send in his order for his hundreds of thousands to the sub-treasury, where millions of specie are on deposit. But there are sufficient reasons why this plan will not work. The sub-treasury can pay out its coin only to creditors of the government. With the Bank of America the associated banks keep on deposit constantly an enormous sum of gold, sometimes amounting to $40,000,000. To the members of the bank association the Bank of America issues its own certificates against these deposits, redeemable on demand. So, when there is occasion for making a gold shipment, the coin is prepared for that purpose in the rear office of that bank; here it is bagged and kegged and made ready for shipment.

Kegs in which gold is packed—"specie kegs" as they are called—are made of extra hard wood. They must have an extra iron hoop. Specie is not thrown loosely into a keg, nor, upon the other hand, is it carefully wrapped in tissue paper and piled up one coin upon another. The keg serves only as a protection for canvas bags, into which the gold is placed in the ordinary hit and miss fashion of pennies in a man's pocket. Into each bag go $5,000, and ten bags fill a keg.

In the interests of security, each keg is treated to what is technically known among the shippers as the "red taping" process. At each end of the keg, in the projecting rim of the staves above the head, are bored four holes at equidistant intervals. A piece of red tape is run through these holes, crossing on the head of the keg, and the ends finally meet in the center. At the point of meeting, the tape is sealed to the keg's head by wax bearing the stamp of the shipper.

Gold crosses the ocean very much as does every other kind of freight, without any special looking after. The average rate of insurance is about $2,000 on a shipment of $1,000,000. There are shippers who do not insure. Having to ship $1,000,000, they give it in equal parts to half a dozen different vessels. It is a strict rule with some firms never to trust more than $250,000 at a time on any one ship.

A certain party furnishes all the kegs for gold, and packs them. The man who does this is a monopolist in his way. Shippers of large amounts always lose a few dollars by abrasion, but not exceeding sixteen ounces on a million dollar shipment. The only protection to be found against abrasion lies in the shipment of gold in bars instead of coin. Gold bars are not readily obtained.

Culture of Asparagus.

Mr. Joseph Harris argues, in the *American Agriculturist*, that "the plants which contain comparatively little nitrogen require a 'sap of the soil,' rich, rather than poor, in nitrogen. Turnips contain comparatively little phosphates, and yet soluble phosphates are found of special value as a manure for turnips. Wheat and barley contain comparatively little nitrogen, while clover, peas, and beans contain a high proportion of nitrogen; and yet it is a well known fact that to produce a good crop of wheat or barley, the sap of the soil must be richer in nitrogen than for clover, peas, and beans."