

## H. M. S. BENBOW.

The Benbow, built at the Thames Ironworks, Blackwall, and recently launched, is a ship to which special interest naturally attaches at the present time, because she is perhaps the most remarkable vessel of the new citadel type representing the ships termed the Admiral class, being all named after celebrated admirals—that is, the Howe, the Anson, the Collingwood, the Camperdown, the Rodney, and the Benbow. The Benbow differs from the others in carrying in each of her barbette towers one 110 ton breech loading gun instead of two smaller pieces. It is this fact that constitutes her most notable feature. The 110 ton breech loading gun ordered from Elswick is 43 ft. 6 in. long; its caliber is 16.75 in. It fires a charge of 900 lb. and a projectile weighing 1,800 lb., with a muzzle velocity of 2,020 ft. per second, giving a muzzle energy of 61,200 foot tons, with a calculated perforation of 30.5 in. of wrought iron, and an energy per ton of gun of 513 tons. These figures will be found to imply that it will be the most powerful gun in the world at present, Krupp's 119 ton gun having only 46,061 foot tons calculated muzzle energy. The Benbow is also interesting as being built by contract, for at the present moment it is very important to learn the relative advantages and disadvantages of building by contract and in the royal shipyards. The Benbow is of the mastless type, having only a pole with a top for two machine guns. She has compound armor in a belt about 8 ft. wide and 18 in. maximum thickness along her water line amidships, with a 3 in. steel deck at the top of the armor, and a horizontal armored deck fore and aft of her citadel. She is 330 ft. long and 68.5 ft. wide. Her displacement will be over 10,000 tons, perhaps running up to 10,500 tons. She has 9,000 horse power, and her speed is hoped to be 16 knots. Her barbettes are protected by 14 in. of compound or steel faced armor built at an angle, as shown. Her armament is as follows:

On her hurricane deck she carries eight quick-firing Hotchkiss 6 pounder guns and four Nordenfolt machine guns, probably four barreled 1 in. Nordenfelts in small projecting towers. On her battery deck are ten broadside 6 in. new type guns, those at the fore and aft ends of the battery training round so as to fire if need be through ports made for firing directly fore or aft. There are also on this deck four quick-firing guns and six machine guns, four in towers and two carrying shields on their carriages. In her barbette towers are the two 110 ton guns. There are also four smaller five barreled Nordenfolt machine guns, 4.5 in bore. Her top is designed to carry two machine guns. Torpedoes can be discharged ahead, astern, and abeam.

The guns on the barbette towers are of course much exposed, but the gun detachment is down below a steel circular 3 in. revolving deck. The gun is loaded by running back and lowering the breech. The type to which this vessel belongs is one which we need hardly say has been the subject of long and bitter attack by Sir Edward Reed. At present this line of criticism meets with approval from some of the best

vessels may be capsized by destruction of unarmored parts, as has been shown at the Admiralty by model experiments. But the adversaries of the citadel type urge that water is liable to enter and interfere with speed. On the other hand, such a vessel as the Admiral Duperre has her men so entirely exposed that it may be questioned if she could keep a man at any of her guns under the fire of quick guns and machine guns

Some officers believe that the effect of quick fire is at present overrated. It appears probable that the construction of our ships may be so far affected by quick fire as to cause a thin belt of armor to be extended at the waterline to turn off the great mass of quick fire which may be assumed to fall on it more or less obliquely. As to ramming powers, the Benbow has a spur strengthened with a horizontal flange, and her bows are stiffened with her horizontal armor deck. With her twin screws she ought to be fairly handy.—*The Engineer.*

## SAIL RIGGED MERRY-GO-ROUND.

Our engraving shows a merry-go-round consisting of a braced standard upon the top of which is centrally pivoted a beam provided at either end with a mast and sails, and with a seat suspended by four ropes. The standard is a post six or eight inches square, and of the desired height, resting upon crossed timbers, the ends of which may be

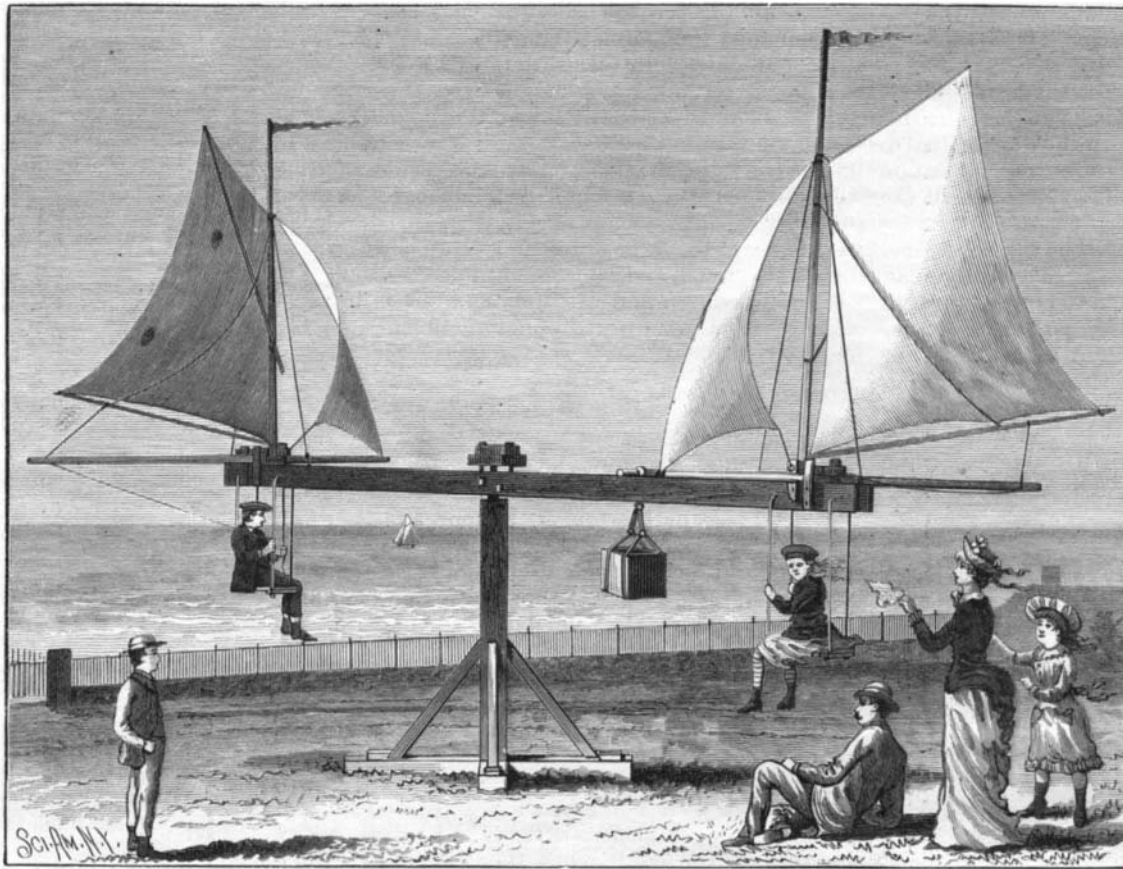
known naval officers. On the other hand, others think it has been pushed to unreasonable lengths. Citadel ships leave their ends exposed at the water line. The French barbette class, represented by the Admiral Duperre, have armor along their water line from end to end at the expense of exposing the ship in other places.

At Alexandria no shell that passed into the unarmored part of any of our vessels did serious damage, and until the introduction of quick-firing guns, few officers would, we think, believe that ships could be destroyed by such fire. It is now urged that quick fire may very quickly riddle a vessel along her water line, and so cripple her that she may be rammed. Both classes of

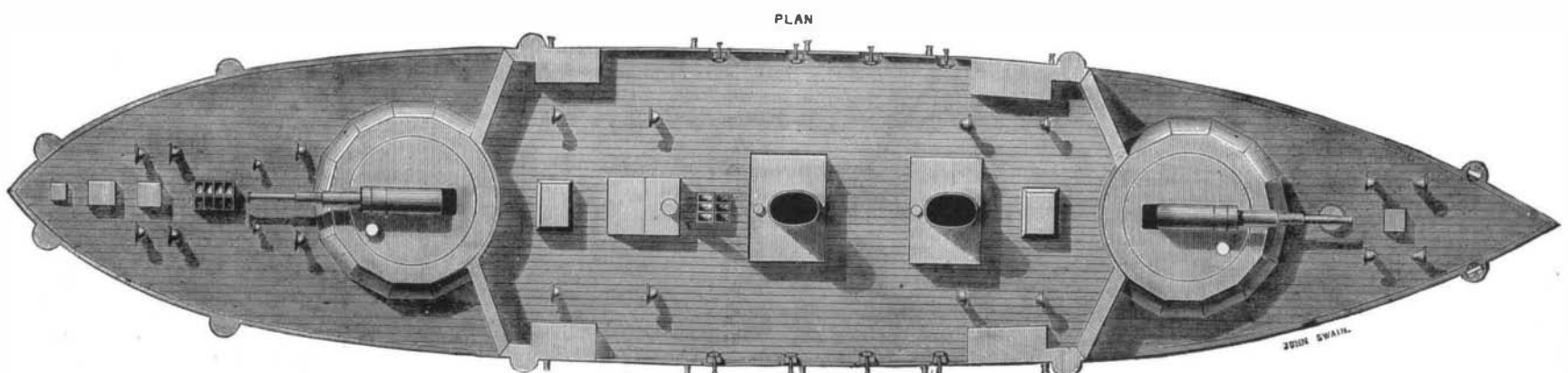
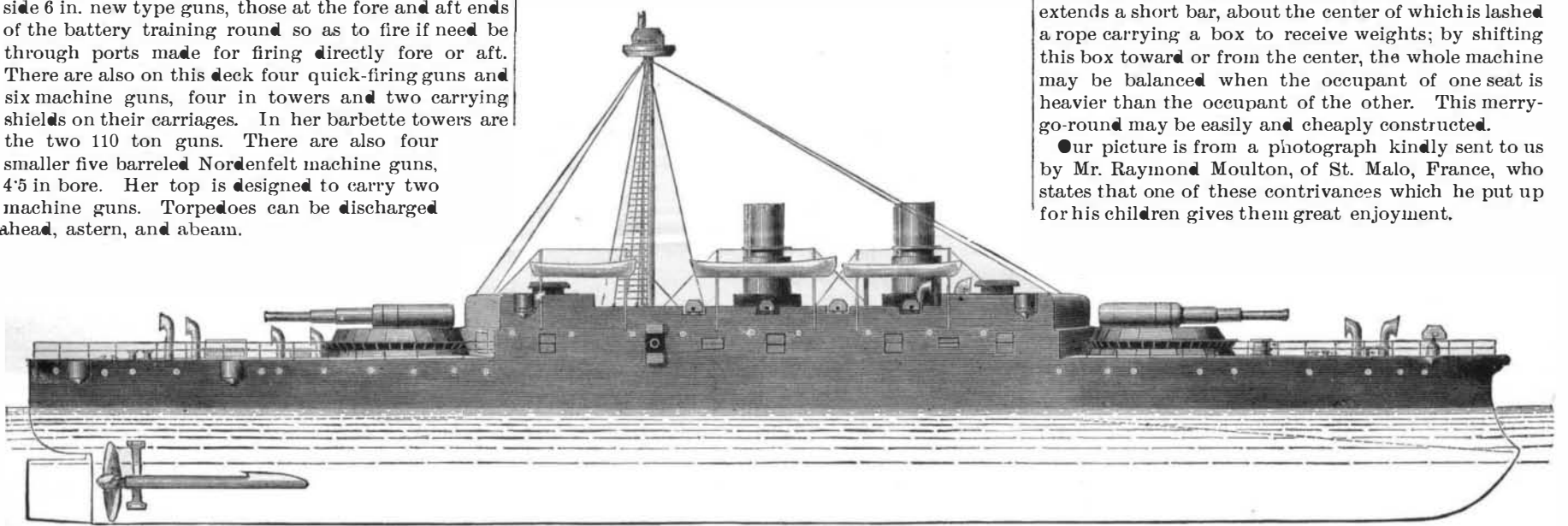
pegged to the ground or which may be made of a length sufficient to prevent tipping over; four braces support the standard. The main beam is composed of two timbers about eight inches wide and one and a half or two inches thick and of any desired length—twenty or twenty-five feet would answer admirably.

These two pieces are separated by blocks at the ends and center and bolted together, so as to form a square box without top or bottom. Upon the upper side of the center of the beam are two blocks of wood held by two bolts; the under block carries a socket which rests upon the end of a long pivot bar projecting from the top of the standard; of course this bar is long enough to permit the beam to swing clear of the standard. Across the slot formed by the timbers of the main beam extends a short bar, about the center of which is lashed a rope carrying a box to receive weights; by shifting this box toward or from the center, the whole machine may be balanced when the occupant of one seat is heavier than the occupant of the other. This merry-go-round may be easily and cheaply constructed.

Our picture is from a photograph kindly sent to us by Mr. Raymond Moulton, of St. Malo, France, who states that one of these contrivances which he put up for his children gives them great enjoyment.



SAIL RIGGED MERRY-GO-ROUND.



THE NEW BRITISH WAR STEAMER BENBOW.