

**TORPEDO BOAT FOR THE ITALIAN GOVERNMENT.**

We annex engravings of a torpedo boat recently constructed for the Italian Government by Messrs. Yarrow & Co., of London. It is 100 feet in length by 12 feet 6 inches beam, dimensions which have been found by actual experience to give thoroughly sea-going qualities. As evidence of this it may be mentioned that two similar boats were navigated across the Atlantic last year as well as ten to the Mediterranean, all of which reached their destination in perfect safety.

It may be observed that the stability of these boats has on several occasions been carefully tested with a view to a reduction of beam so as to obtain finer lines and better speed, and it has been found the breadth of 12½ feet must be maintained to secure a range of stability necessary to make them thoroughly safe in any weather, which is clearly a primary consideration in a sea-going torpedo boat. The official trial of the above boat was made last December in the presence of the Italian authorities, when a mean speed, with torpedo apparatus all completely fitted on board, was obtained of 22.48 knots, which we believe is the highest speed hitherto officially recorded. The forward part of the boat is protected, as will be seen, by a turtle back terminating at its after end with the conning tower, an arrangement always adopted by the builder since they constructed the Batoum, which was the first boat of this class built. This turtle back is found of great value when encountering rough weather, at the same time giving very ample room for the working of the torpedo gear below.

Messrs. Yarrow & Co. attach very considerable importance to the curvature of all the plates in the hull which may have to bear compression, a thin flat plate possessing but little strength to resist that strain; for this reason they invariably adopt a curved form of deck, the platform for walking on being along the central portion. The curved deck has the additional advantage of causing the water which may come over the boat to freely flow off.

There are two ejecting tubes, which are snugly housed under the turtle back, and the bow of the boat is so arranged that the forward ends of the tubes are completely inclosed within the vessel's lines, it having been found from experience that if the tubes project when the vessel is pitching the waves striking them cause a serious shock, as well as offering a greatly augmented resistance. This arrangement enables a man to get down in the fore peak and examine the tube ends, which otherwise it would be impossible to obtain access to.

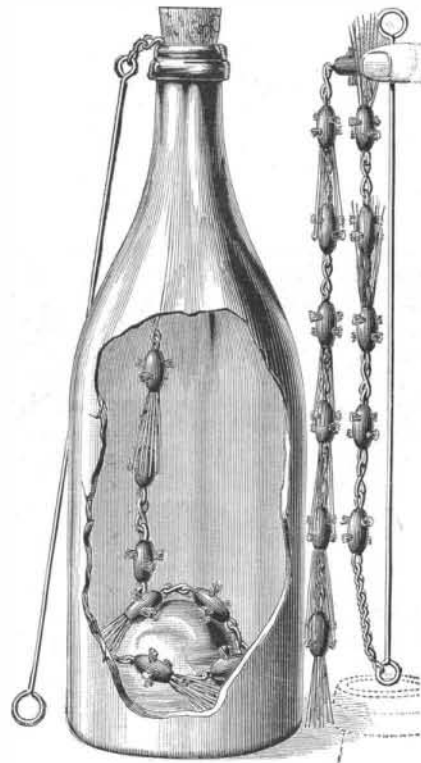
The steering of all these boats is effected by means of two rudders, one aft as usual, and one drop rudder forward, as originally introduced by Messrs. Yarrow & Co.; these are worked by steam, and under the control of the steersman in the conning tower. The upper part of the funnels are bent slightly aft, as shown, for it has been found that in very rough weather, when everything is screwed down tight, the only way the water can obtain access to the hull is down the funnels. This fact alone will give some idea of the boisterous weather which they have at times encountered. The engines, which are of 16 inches stroke, during the trial made 430 revolutions per minute, *i. e.*, 1,230 feet per minute, which our readers will be aware is an exceptionally high piston speed; nevertheless no sign of abrasion has ever been visible, which is the more remarkable considering that no oil under any circumstances is allowed into the interior of the engines, because even a very small quantity of lubricant finding its way into the boiler causes rapid deterioration and increases to a remarkable degree the amount of steam space necessary to avoid priming. The effect of even the smallest quantity of grease or oil as tending to cause priming was formerly exemplified to a remarkable degree in torpedo boats when it was the custom to use lubricants to the pistons and slide valves. It was found that the boiler when new and supplied with only fresh water, or, still better, distilled water, at first not showing the slightest indication of priming, would, after a few hours' continuous steaming (by which time a little grease could find its way through the condenser and feed pumps), commence priming to such an extent as frequently to bring a trial to a premature end.

This boat is the first which has been fitted with a patent arrangement for preventing the fire from being extinguished should water gain access to the stokehole or boiler compartment, which in face of the present machine guns is a contingency to be looked for.

The arrangement is exceedingly simple but effective. The fact is the ash-pan is simply continued up round the sides of the firebox to above the sea outside, and secured water-tight to the barrel of the boiler, the fire-door at the same time being tolerably water-tight.

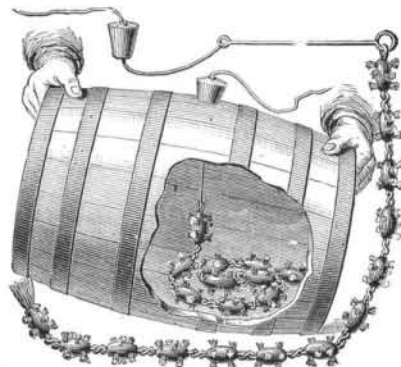
It will be easily seen that if the water gain access under

speed, it naturally follows that the steaming powers of the boat would enable it to run from forty to fifty knots under the conditions assumed; while, on the other hand, had this new arrangement not been provided, immediately the fire is extinguished the boat would be quite helpless, and the pumping power, which so long as there is a supply of steam is very considerable, would be stopped.—*Engineering.*



**NEW BOTTLE CLEANER.**

ordinary circumstances to the stokehole or boiler compartment, it would not have many inches to rise before it would reach the level of the bars, which are kept as near to the bottom of the boat as possible, so as to avoid raising the center of gravity. It will be clearly understood with this new arrangement the water could rise up in the stokehole to the



**BARREL CLEANER.**

level of the sea outside, and still the fire would be untouched and the supply of air would likewise not be interfered with. The steaming power of the boat will therefore continue so long as the fire lasts, and as these boats when running have about 12 cwt. of fuel on their bars, and as it is found by experiment that 2 cwt. is sufficient to run an hour at a ten knot

**NEW BOTTLE CLEANER.**

We give an engraving of a bottle and cask cleaner, which is very simple and effectual. It has proved itself in actual practice to be capable of quickly and thoroughly cleaning bottles of all shapes and sizes, also jugs and casks. For very small vials the inventors have produced a special size of cleaner, which will economically clean vials from one-half ounce upward.

The cut represents the "rapid bottle cleaner" in use. This device is simple in its construction, and can be operated by any one. It fills a want long felt, and is valuable in family use as well as by the trade. It does away with the old and dangerous method of cleaning with lead shot, in which operation several shot will often fasten in the bottom of the bottle, and through neglect or trouble in getting them out be allowed to remain there.

The barrel cleaner is operated mainly in the same manner as the bottle cleaner described above. The balls are introduced through the bung without reversing, the bung closed with the stopper, and the barrel shaken as in operating with a chain. It is obvious that these balls, weighing a quarter of a pound each, and furnished with stiff brushes on all sides, will do the work thoroughly and effectively.

The bristles are forced by the weight of the balls into the smallest crevice of a barrel or the narrowest corner in the bottom of a bottle. No lead deposits need be feared from the device; the balls are made from a composition metal which will not corrode. The machines are especially useful in bar-rooms, apothecaries' stores, wholesale stores, and in all establishments where liquids or liquors are barreled or bottled.

The invention, as will be seen by reference to the engraving, consists of a series of metal balls or blocks connected together by links and provided with a series of bristle or wire brushes. One end of the chain of balls is connected with a rod, by which it is introduced and withdrawn from the bottle or barrel. The cleaning is effected by shaking the chain about in the bottle or barrel with water or some suitable cleaning fluid.

For further particulars in regard to this useful invention address Rapid Barrel and Bottle Cleaning Co., Rhinebeck, Dutchess Co., N. Y.

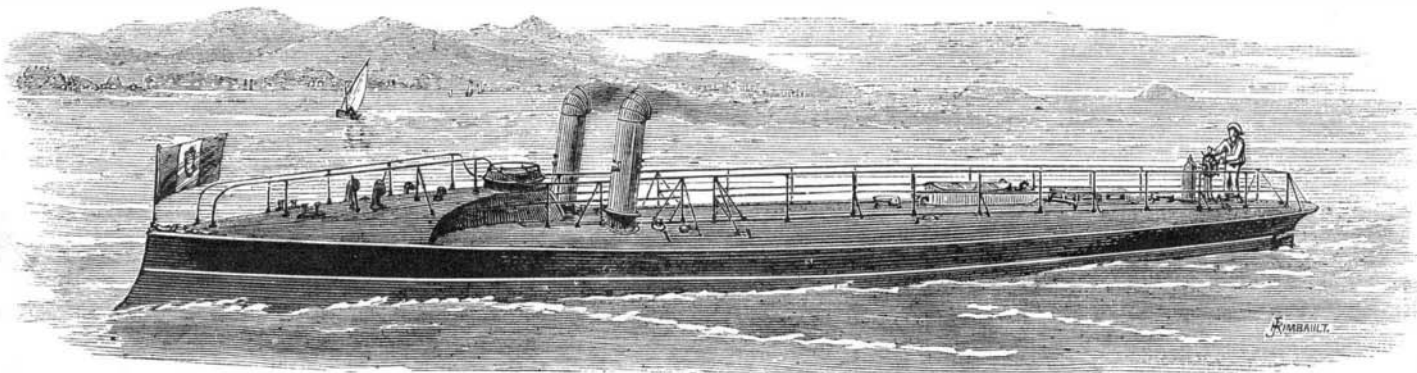
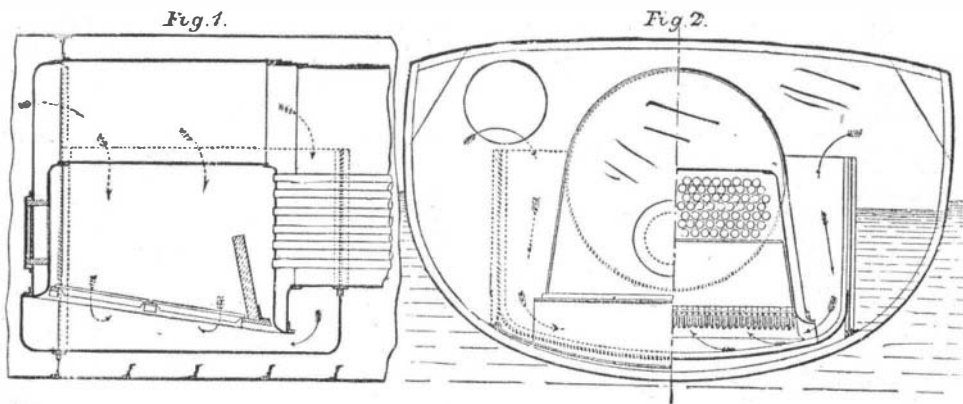
**Process for Photo Printing Plates.**

Mr. J. Traill Taylor, in a letter from New York to the *British Journal of Photography*, describes the following mode of making photo printing plates, practiced by Rev. H. Goodwin, of Newark, N. J.:

The leading feature in Mr. Goodwin's engraving process consists in a reversal of the methods hitherto employed, as will be seen from my description. Let us suppose that a metal plate—zinc, for example—is to be prepared for typographic printing; the surface having been polished is coated with sensitized albumen or gelatin and dried. It is next exposed to light under a transparency, not a negative. An engraving, a piece of music, or any drawing or pen and ink writing on a sheet of paper having nothing on the back may be reproduced by this method. This is then pressed into close contact with the plate, which is now exposed to light.

It need scarcely be remarked that this operation will be greatly aided by first rendering the paper as transparent as possible, by some of the known means of doing so, in such a manner as not to affect it permanently—*e. g.*, sponging over with benzole or any of the volatile oils. Having been exposed, the plate is next inked and developed by water in the manner well known to workers in similar processes. The parts corresponding to the blacks of the writing are now seen to have been laid bare, all the whites being coated with the insoluble albumen and ink, which layer is strengthened and made acid-resisting by dusting powdered rosin upon the

plate, the rosin adhering only to the inked portion. The surplus having been dusted off a sufficient degree of heat to just fuse the rosin is then applied. The plate is next dipped for about a minute in a dilute solution of perchlor-



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