THE ENGLEHARDT UNSINKABLE LIFEBOAT.

BY RANDOLPH I. GEARE.

About one hundred and twenty years ago the first patent was taken out for a lifeboat. Four years later (1789) Henry Greathead, of England, patented another kind which proved very successful, and continued to be almost the only one in use till 1851, when fifty models of improved lifeboats were exhibited at London in competition for a prize offered by the Duke of Northumberland. A boat designed by James Peake, of Woolwich Dockyard, then became the recognized model, and was universally adopted as the standard.

The principal essentials in a lifeboat are great lateral stability, speed against a heavy sea, facility for launching and taking the shore, immediate self-discharge of any water breaking in, the power of self-righting if upset, strength, and plenty of passenger space.

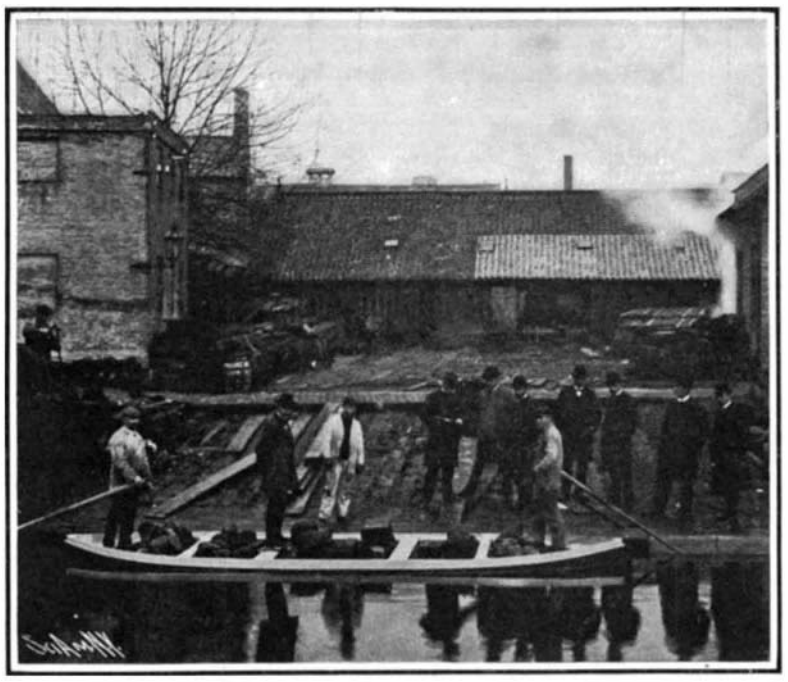
The latest lifeboat to aspire for first honors is the "Englehardt," recently invented in Copenhagen. It is about twenty feet long, and is said to combine the requirements of the smallest space with the utmost carrying capacity.

In case of shipwreck, if time should not allow the lowering of these boats, the lashings need only be cut, and when the ship has sunk, the boats will be found floating like rafts, and easily accessible for passengers who may be swimming or drifting about. Two persons can extend the sides in a few seconds by simply lifting in the cross-beams, and thus converting the boat-shaped raft into a lifeboat containing oars, bread, watertanks, etc.

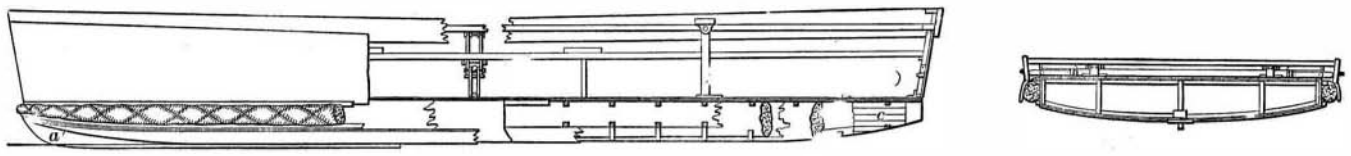
The principles of this boat are (1) a boat-shaped pontoon of wood or iron, filled with kapok (the product of plants growing in Java and Sumatra) carried in water-tight cushions, which again are placed in water-tight compartments. Kapok is said to combine the greatest floating capacity with the least weight, and will sustain from thirty to thirty-five times its own weight in water; and (2) a superstructure which can be folded down or erected, the whole surrounded by a fender also filled with kapok, in water-tight cushions.

In extending the boat, the oars are released, an oval-shaped-thwart supplied with cross-thwarts slides into position, and stanchions and other parts drop into their places automatically.

The lower part of this boat is a buoyant layer, consisting of a keel, one amidships keelson, two side keelsons, two double side-strakes, all of which are connected by cross-timbers and carlins and are fastened to the stem and stern posts. The bottom as well as the deck in this layer is planked with boards laid lengthwise under the bottom, and diagonally on deck. The deck canvas reaches two or three inches down on the side-strake, the bottom canvas the same distance up on the deck. Both layers of canvas are then covered on deck by a second layer of boards crossing the first at a right angle. The bottom canvas is further covered below a layer of boards and on the sides by the second side-strake. On each side of this buoyant layer, two narrow battens are fastened to the side-strakes for lashing the fender, which consists of short cushions made of prepared water-tight canvas stuffed with kapok and surrounded by a strong canvas cover. Between the three keelsons are placed cushions, likewise water-tight and stuffed with kapok, while the peaks "fore and aft" are filled with cork. The top stanchion consists of a rail, to which is bolted a gunwale or sheer strake, and which is connected to the lower structure by toggle joints or hinged uprights. Two cross-beams are likewise bolted to the rail, each furnished with stanchions.



TWENTY-ONE-FOOT ENGLEHARDT COLLAPSIBLE LIFEBOAT UNEXPANDED.
Load 4,500 pounds.



Longitudinal and Cross Sections of the Englehardt Boat.

TWENTY-ONE-FOOT COLLAPSIBLE LIFEBOAT EXPANDED.
Twenty-two men are trying to list her over.

Launch of a New Japanese Battleship.

The latest addition to the Japanese navy is to be launched from the shipyard of Messrs. Vickers, Sons & Maxim, Ltd., Barrow (England) on July 4, by Princess Arisugawa. This is the "Katori," which is practically identical with the "Lord Nelson" class now in course of construction for the British navy, being of 16,000 tons displacement. The vessel has a length of 420 feet; beam, 78 feet; coal supply, normal, 750 tons, full, 1,800 tons; mean draft, 27 feet; indicated horse-power, 16,000; speed, 18½ knots. The fighting armament comprises: Four 12-inch (45-caliber) guns in barbettes of armor 10 inches thick; four 10-inch (45-caliber) in barbettes of 6-inch armor; twelve 6-inch, all protected (ten will be in a 6-inch armored battery); ten 12-pounders and two 12-pounders for landing purposes; three 3-pounders; six Maxims; five 18-inch submerged torpedo tubes, four on the broadside and one aft. The main features of the armor protection are a complete waterline belt 9 inches thick, tapering aft to 2½ inches thick, and an intermediate belt forming the base of the armored main deck battery varying from 6 inches to 4 inches. The conning tower and the communication tube are 9 inches thick, and there is also to be an observation station of 5-inch thickness.

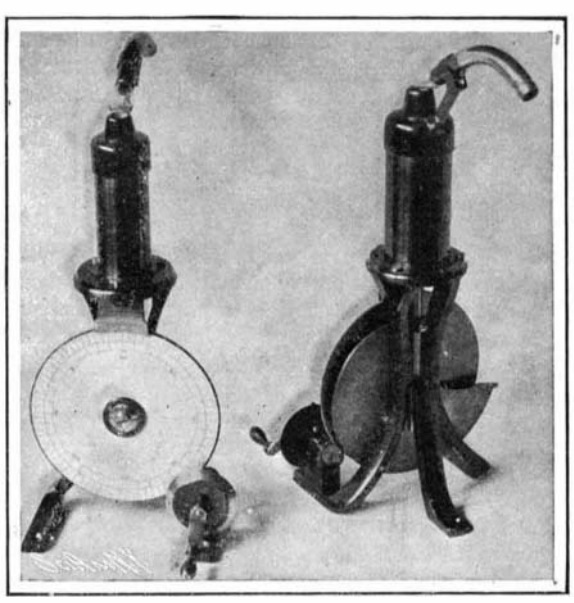


Fig. 1.—FRONT AND REAR VIEWS OF NEW FORM OF VIBRATION-INDICATING SIREN.

AN APPARATUS FOR INDICATING THE VIBRATIONS OF SOUND WAVES.

BY EMILE GUARINI.

The object of this apparatus, recently invented by Mr. William Stern, of Breslau, and constructed by the Max Kohl establishment, of Chemnitz, is, through an absolutely continuous variation of the pitch of the sound, to embrace, in a large measure, the series of sounds in such a way that any number whatever of vibrations may be immediately produced and read upon the apparatus as soon as obtained. As long as it resounds, the sound has a constant intensity, and does not continue to decrease as in the tuning fork. The apparatus consists of a series of vessels of different sizes, each embracing an octave, and each consisting of a brass cylinder surmounted by a zinc cap provided with a short pipe and soldered to the cylinder. The bottom of the latter is hermetically closed by a piston, the upward and downward motions of which produce the variations of the sound. For the production of the sound the cylinder is placed in the path of a current of air directed obliquely upon the short pipe end by means of a flattened nozzle. The air may be driven into the latter by means of an ordinary bellows arrangement, for which may be substituted the apparatus shown in Fig. 2. A substitution of this sort is advantageous in the first place because it dispenses with the necessity of continually actuating pedals, and, in the second, because it does away with the production of slight vibrations isochronous with pedaling. The new apparatus is based upon the principle of gasometers. It consists of a large iron plate cylinder open at the bottom and descending by its weight into a tank filled with water. This motion drives out the air imprisoned above the water, with a pressure of about 15 millimeters of mercury. This compressed air passes into the tube and enters the regulating one of the diversifier. Now, since as the cylinder enters the water it loses its weight, and the pressure of the air must therefore diminish, a very interesting arrangement has been devised to prevent such diminution. Upon the descending holder there is an annular receptacle which communicates, through another, with a glass tube filled with water and placed upon the side of the table. This is seen at the left in Fig. 2. When the holder, and consequently the annular receptacle, descends, a certain quantity of water passes from the glass tube into the receiver. It is a question, therefore, merely of giving the two communicating vessels dimensions such that the weight of the water introduced shall balance the loss of weight by immersion. When the holder is completely submerged, it suffices to pull a cord in order to raise it to its former level. The pulling of the cord opens at the same time a valve which allows air to enter the holder in measure as it ascends. After the ascent of the holder, it is possible to pursue for several minutes the study of the sounds produced by the apparatus with an always equal intensity. The cylinder resounds as long as the current of air lasts. The pitch of the sound is modified during this time by raising or lowering the piston.

It would evidently be possible, by the use of one or more transmissions, to actuate the piston very slow-

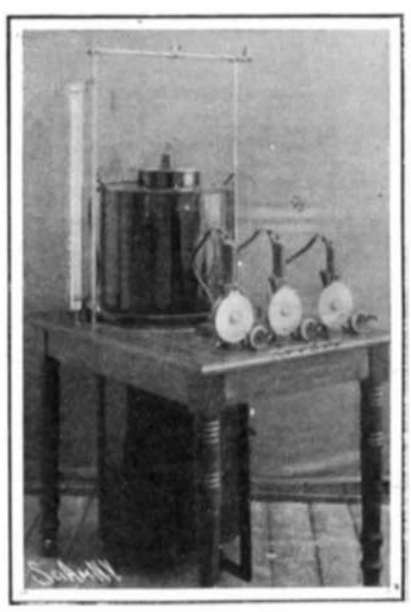


Fig. 2.—CONNECTED SIRENS AND AIR PRESSURE APPARATUS.