FISHER'S TORPEDO GUARD.

We illustrate herewith a new system of guards for protecting the hulls of vessels against torpedoes. The apparatus is especially designed for application to men-of-war as a protection against submarine attacks; but it may be applied to other vessels to increase their buoyancy and carrying capacity Horizontal pipes of suitable dimensions are curved to conform to the hull and are attached to the latter and at a short distance from the sides of the vessel. The ends of the horizontal pipes are connected together by vertical pipes, A, to one of which, on each side of the vessel, a tube, B, is attached, which leads to a pump, C, by means of which air or water may be forced into the entire system. The inventor claims that when a submarine torpedo comes in contact with this protecting piping it will be caused to explode at such a distance from the vessel as not to injure the hull. By filling the pipes with air it is claimed that the carrying capacity of the vessel will be increased; or by allowing water to enter them, the ship will have greater draught and less of her surface will be exposed.

Patented through the Scientific American Patent Agency November 20, 1877. For further particulars address the inventor, Mr. J. Harmanus Fisher, P.O. Box 69, Baltimore, Md.

IMPROVED ORE CRUSHER AND PULVERIZER.

We recently witnessed some interesting operations in the reduction of ore by the Alden ore crusher and pulverizer, an engraving of which is presented herewith.

In order to exhibit the construction, part of the frame side of the machine in the illustration is removed. The dies and die faces and their mode of suspension, as well as of travel and action, are clearly shown. The dies are hung upon shafts, the ends of which project through the sides of the frame. On these ends are the connecting links, each secured by bolt and washer. At the lower ends of these links a rectangular yoke is attached in a similar manner. This yoke, one side of which only is shown, surrounds the free hanging ends of the dies and moves on a nearly horizontal plane, alternately pushing and pulling the dies within it the full distance of the stroke and imparting a rubbing effect, which is a peculiarity and one of the best features in the machine. The regulation of the set of the dies to different grades of production is effected by means of adjustable steel keys. The connection between the yoke and the crank is direct by means of a connecting rod or pitman. In the attainment of the required motion the usual appliances of crank shaft, flywheels, and pulleys are employed.

From the engraving the general construction and operation of the machine will be clearly comprehended, and no further description is required.

At the time of our examination galena and zinc ores were being crushed. The following results were obtained: Through No. 15 mesh, 12½ tons in 24 hours; No. 30 mesh, 10 tons in 24 hours; No. 60 mesh, 6 tons in 24 hours.

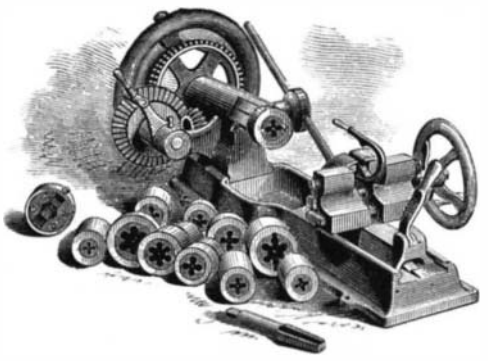
In the process of reducing ore this machine does the work of the preparatory breaker, and obviates the need of the intermediate machinery ordinarily employed between the preparatory and the final treatment. It works upon the principle of abrasion instead of direct compression. It breaks, crushes, and pulverizes by rasping and rubbing fragment upon fragment between the horizontally corrugated steel faces of the jaws. The motion of the rubbing surfaces is obtained by the oscillation of the dies, which both swing at the same time, in one and the same direction, and to an equal extent.

The following is a summary of the advantages claimed: It takes ore from the dump and breaks, crushes, and pulverizes it at one operation to any desired degree of fineness, ready for smelting, concentrating, or amalgamating; it is adjustable, and can be instantly regulated to yield coarse, broken, egg, nut, pea, powder, or dust; the heaviest piece of the largest machine (receiver, 14 inches by 7 inches) weighs 2,400 lbs; that of the smallest machine (receiver, 10 inches by 3 inches) weighs 587 lbs.

The machine is built in three sizes, and is adapted for crushing and pulverizing gold, silver, copper, zinc, and other ores; also for crushing quartz, flint, emery, corundum, felspar, manganese, phosphate rock, plaster, soapstone, firebrick, slag, etc. For further information address the manufacturers, Messrs. Copeland, Dodge & Co., 206 Broadway, New York city.

THE NO. 10 BOLT CUTTER AND NUT TAPPER.

The patent adjustable die, in the new machine herewith illustrated, is the same which has already been described in these



columns. To the apparatus is also added a variety of hand and power bolt cutters and nut tappers well known to the public. Threads are made by this machine in once going over, and crooked work is threaded without being straightened. The engraving shows a staple held in the chuck or vise ready to be operated upon. For large work the gearing provided multiplies the direct force of the crank seven-fold, and the arrangement is such that the die being run sufficiently far on the work the gears may be instantly thrown out, and the die whirled swiftly back off the thread by means of the balance wheel. Extra dogs are attached to the chuck to hold large smooth pipe which may slip in the vise.

Small work is rapidly done with the gears out, by handle on the balance wheel. The work represented in the illustration is half inch, and the gearing for large work need hardly be applied for any nuts or bolts under ¾ inch.

It will be observed that the merit of this machine is largely in the great range of sizes and variety of shapes that may be conveniently done on it. Its capacity for bolts and nuts ranges from three sixteenths to one and a half inch; for pipe from one eighth inch to two inches. It is especially useful for repair shops of mills and mines, wagon shops, boat builders, etc.

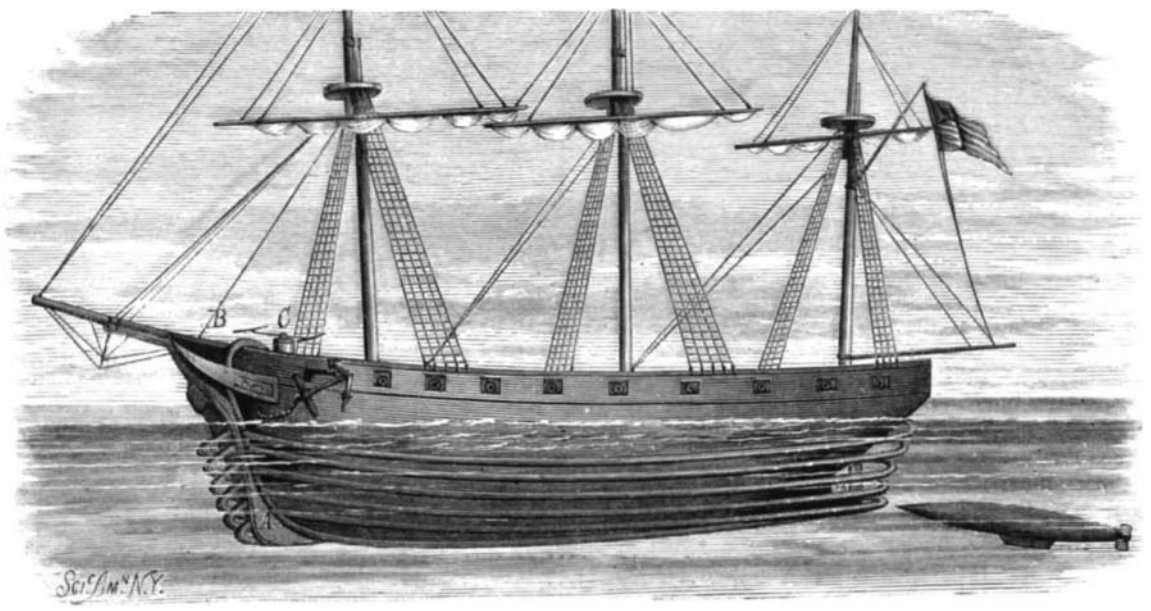
For further information address the manufacturers, the Wiley & Russell Manufacturing Company, Greenfield, Mass.

Craniology and Crime.

The British Medical Journal presents, at some length, the results arrived at by Professor Benedict, in his examination of the brains of sixteen criminals. These, on comparison with the healthy brain, proved to be abnormal. Not only, too, has he found that these brains deviate from the normal type, and approach that of lower animals, but he has been able to classify them in three categories. First, absence of symmetry in the two halves of the brain; second, an obliquity of the interior part of the brain or skull; third, a distinct lessening of the posterior cerebral lobes.

Rubber Bottoms for War Ships.

It has been found necessary to protect the submerged portions of war vessels against the results of plunging fire, more especially as, even in our armor-clad frigates and corvettes, few of them possess armored decks. An experiment in this direction is about to be tried at Portsmouth, England. It has been thought that if the bottom of a man-of-war were faced with India rubber of considerable thickness, the pressure of the water outside would effectually close the hole made in the hull by a plunging projectile which had forced its way through the decks. The suggestion is to be submitted to a practical test on board the Skylark, under the superintendence of Lieut. R. N. Custance, senior gunnery lieutenant of the Excellent. The head of an iron tube will be closed with rubber eight inches in thickness, and so made perfectly water-tight. The sealed end will be sunk in the water until the rubber occupies a position analogous to that which it would occupy if attached to the hull of a ship below the load-line. The bow gun of the Skylark will then be depressed until the rubber can be sighted down the tube, and a 64-pounder shot will be fired through it. Should the water fail to enter the tube, the rubber will be known to have performed its work by closing up the shot hole. The conditions, however, are only approximate, as the iron skin of a ship would, on penetration, be probably so jagged as to keep the aperture open for the inward rush of water.

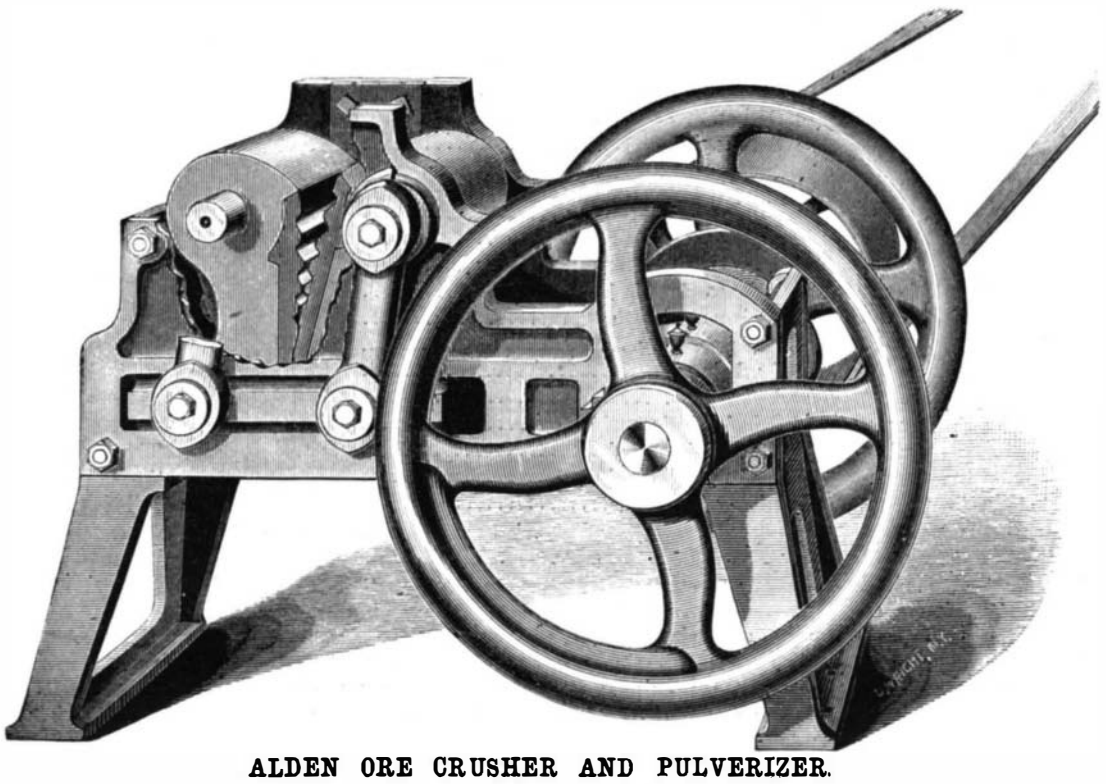


FISHER'S TORPEDO GUARD.

Fruit Cellars.

The importance to every fruit cultivator of a suitable place in which to store the products of his orchards late in the autumn and during the winter is strangely overlooked. No farmer's establishment can be satisfactory without a fruit cellar, and this is specially the case if large quantities of apples, pears, or grapes are among the products of the farm. The ordinary cellars under dwellings do not meet the want, as they are usually not adapted to preserve fruit, except for a month or two after harvest. They often do not protect from frost, or they are damp and without means of ventilation, and fruit soon decays. To keep fruit several conditions are important. First, the atmosphere of a fruit room should be dry; there should be no more dampness than ordinarily exists in the cold outside air. The room should be susceptible of ventilation in proper weather, not by direct currents of air, but by air modified before it reaches the fruit. A fruit room must be frost-proof; it must be cleanly and accessible. As regards location, it may be placed on a side hill, the excavation opening to the south; or it may be placed under a barn or stable, or other convenient outbuilding. It is not well to store large quantities of fruit in rooms under dwellings, even if they are adapted to the keeping of the fruit. The hygiene of families must not be jeopardized by the possibility of evil results arising from the decay or fermentation of vegetables in rooms under family apartments.

Ten years ago we constructed



ALDEN ORE CRUSHER AND PULVERIZER.