

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.

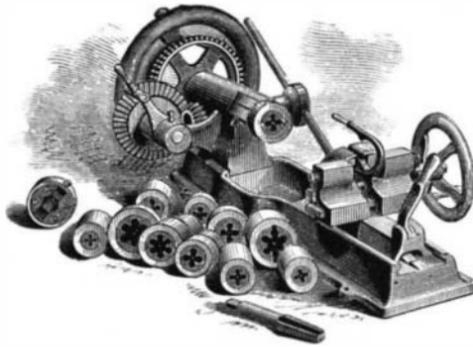
The following is a summary of the advantages claimed: It takes ore from the dump and breaks, crushes, and pulverizes it at one operation to any desired degree of fineness, ready for smelting, concentrating, or amalgamating; it is adjustable, and can be instantly regulated to yield coarse, broken, egg, 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

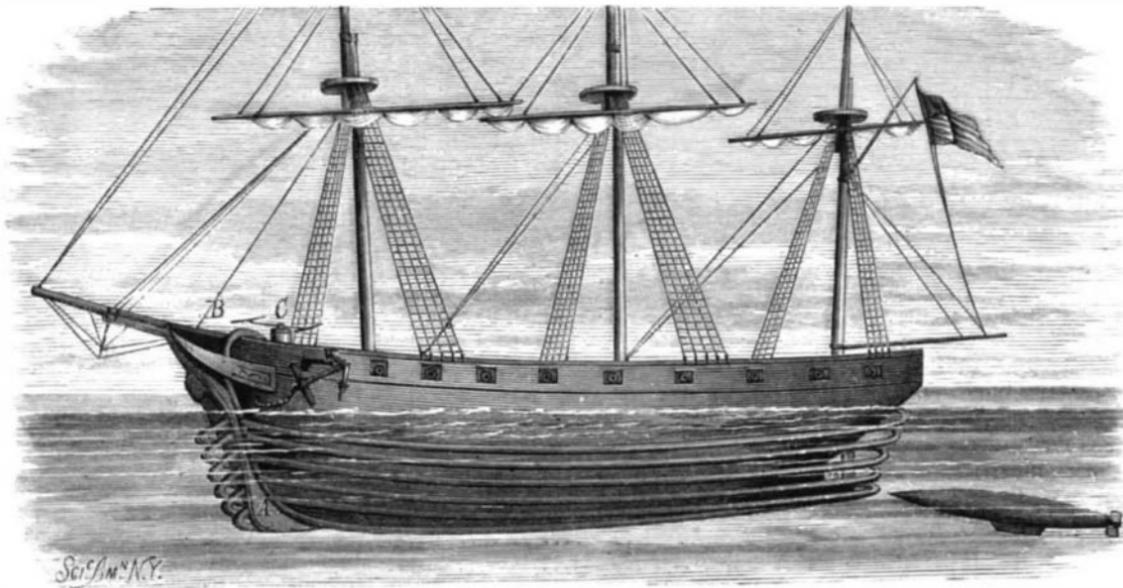
sizes, and is adapted for crushing and pulverizing gold, silver, copper, zinc, and other ores; also for crushing quartz, flint, emery, corundum, felspar, manganese, phosphate rock, plaster, soapstone, firebrick, slag, etc. For further information address the manufacturers, Messrs. Copeland, Dodge & Co.,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

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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.

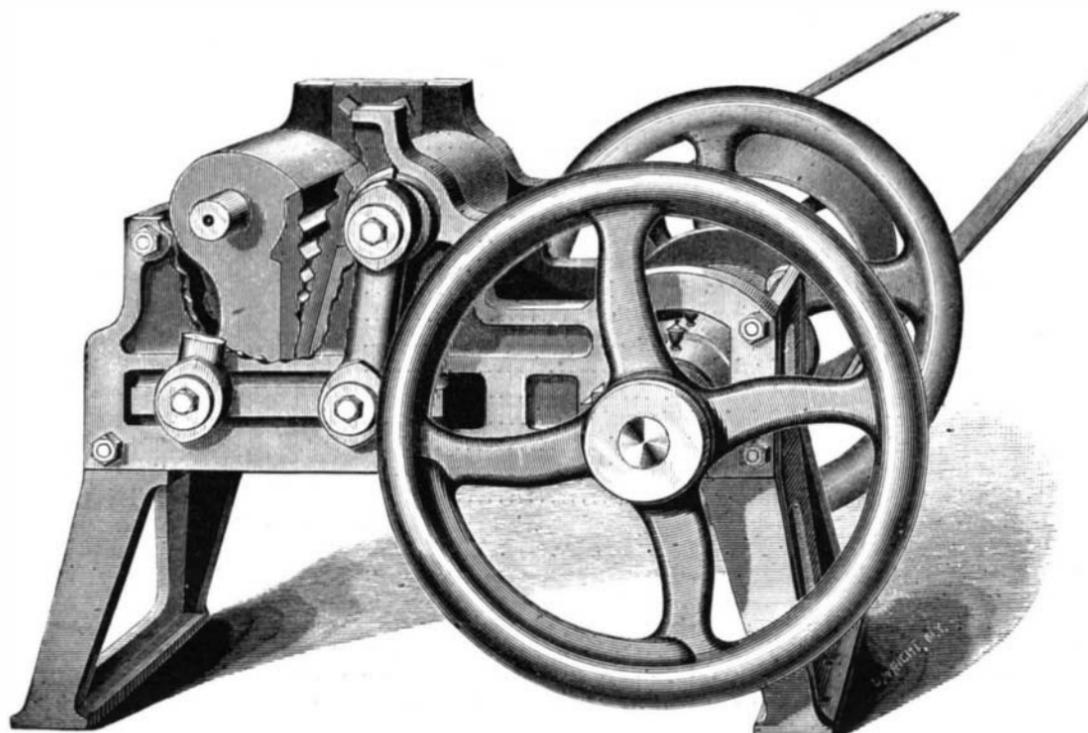
It has been found necessary to protect the submerged portions of war vessels against the results of plunging fire, more especially as, even in our armor-clad frigates and corvettes, few of them possess armored decks. An experiment in this direction is about to be tried at Portsmouth, England. It has 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.

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

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a fruit cellar under our stable, and it has proved so satisfactory that we venture to give a brief description of it. The division walls are constructed of brick, and the apartments are two in number, an outer and an inner room. The outer room is but partly underground, and is ten by twelve feet in area and eight feet high. The inner room is wholly underground, and frost-proof; it has four brick walls and a cemented floor. In this room the fruit is stored early in December, when the weather becomes cold. The outer room holds the fruit during the autumn months after it is gathered, and it is cool, well lighted, and dry. The windows are left open and a free circulation of air allowed so long as no danger from frost exists. When the fruit is taken to the inner room, the door is closed and no light admitted. Ventilation is secured in moderate weather by opening the inner door and throwing down a window in the outer room. In this cellar we kept apples of last season's growth until the present winter in perfect condition. Some of these apples, exhibited at the autumn agricultural fairs, were pronounced as fresh as those of the past season's growth.

Apples stored in this cellar which would bring only one dollar a barrel at the time of gathering we sold last spring and summer at three dollars, without picking over. The profits of a good fruit cellar are greater than anything connected with farm arrangements.—*Boston Journal of Chemistry.*

A CELEBRATED SHORT-HORNED COW.

We copy from the London *Graphic* a fine portrait of a celebrated shorthorn cow, Tenth Duchess of Geneva, whose personal and family history is somewhat remarkable. Tradition ascribes the origin of the family to a breed of cattle possessed for centuries by the family of the Duke of Northumberland, but the actual records commence in the last century, when an ancestress of this cow passed into the possession of Mr. C. Colling, of Ketton, Durham, who was one of the founders of the shorthorn as a distinct and highly improved breed. In 1804 Mr. T. Bates, of Kirkclevington, Yorkshire, purchased one of the Duchess cows, and recognizing in her excellence and that of her male offspring the superiority of the family over the shorthorns he had previously owned, he determined to secure more of the sort; and at Mr. Colling's great sale, in 1810, when forty-seven animals of both sexes and all ages, from eleven years downward, made the then unprecedented average of \$732.84, he gave \$929.64 for the two year old heifer Young Duchess, afterward called First Duchess, a daughter of Comet (sold on the same occasion for \$5,080), and granddaughter of the cow he had first purchased. From that heifer, in the female line direct, sprang those Duchesses which have at different periods won the chief honors of the Royal Agricultural Society of England, and for many years past have commanded the highest prices at public and private sales. Mr. Bates, while practicing to a considerable extent the system of in-and-in-breeding, crossed his Duchesses at different times with other approved shorthorn families, notably with those of Mr. Colling's Red Rose and Princess, thus combining what he considered three of the oldest and best shorthorn families in the kingdom. In 1853, at the Tortworth sale (after the death of Earl Ducie), Sixty-sixth Duchess was bought by Messrs. Becar and Morris, of New York, for \$3,557.40.

Her descendants, having changed owners in America, were finally dispersed by auction in 1873, when Tenth Duchess of Geneva was bought by Mr. Berwick for the Earl of Bective at \$35,000. She had bred in America the bulls Third Duke of Oneida, Sixth Duke of Oneida, and the heifer Eighth Duchess of Oneida, bought also for Lord Bective, at the same sale, for \$15,000. In this country she has produced the bull Duke of Underley and the heifers Duchess of Underley and Duchess of Lancaster, all of which, with Eighth Duchess of Oneida, are now in the herd at Underley Hall, Westmoreland. The Tenth Duchess of Geneva died in January last, and in the same month the Earl of Bective had the misfortune to lose his old bull Second Duke of Tregunter.

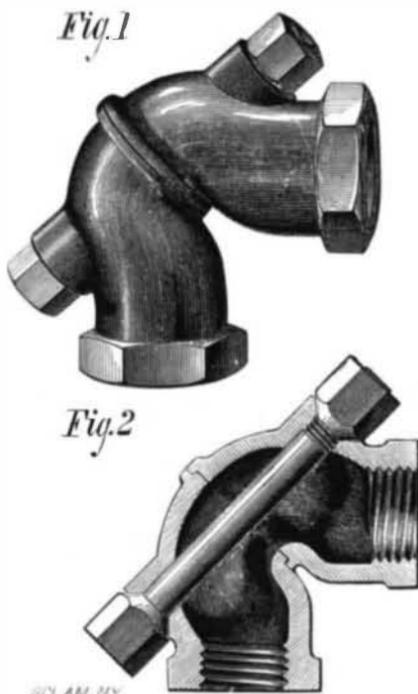
Two Flowers from One Stalk.

Mrs. Lucy A. Millington, of South Haven, Mich., writing to the *Gardener's Monthly*, says:—"Perhaps some of

the many lady readers of your *Monthly* would like to know how to get two flowers instead of one from every flowering sheath of their Calla lilies. As soon as the joint flower is cut, or begins to wither, pull the stalk down through the open sheath clear to the bottom. At the bottom will be found standing, close to the stalk, another bud, inclosed in a delicate covering. Cut the old stalk away as close as possible without injuring the bud, and if it has not been kept back too long it will grow up very quick. I have never failed to get both buds to flower. I never tie up the leaves close, but leave them free."

CHAPELL'S PIPE COUPLING.

In the annexed engraving is illustrated a new and improved pipe coupling which is claimed by its inventor to obviate the difficulty in starting union joints which have become rusted fast, in hunting out the left hand thread where right and left elbows are used, also in bending pipes for steam and gas fitting to the exact angle required. It consists of two parts, both of the same pattern and threaded with right hand threads, but faced on a diagonal line to fit each other, and secured together by a bolt passing through both parts, having a conical head and a conical nut covering the point of the bolt, both fitting into conical seats in each part. The two parts are curved in such a way that when one part is turned around the bolt one half a revolution it will assume



positions equivalent to those of a union joint. In the position shown it is equivalent to an elbow and union joint, and it may also be secured in any intermediate position. If this fitting was in general use, the inventor claims, there would be no need of left hand threads, taps, and dies, thereby avoiding a large outlay of capital. Patented April 17, 1877. For further information address the inventor, E. S. Chapell, Pembroke, Maine.

New Agricultural Inventions.

A Collar Pad has been invented by Martin F. Sauer of Somonauk, Ill. Two elliptical pads fit on the upper part of the horse's neck, while a strap rises slightly above the neck, leaving the upper portion unpressed and out of contact. The neck is thus prevented from being made sore by the collar.

In a Windmill invented by William A. Guzman of Washington, Iowa, the face side of the wheel is nearest the vertical axis of the mill, the wind striking it on that side when in operation. It is provided with a rigid vane shaft placed parallel with and in front of the wheel. It combines many other useful improvements and will at once commend itself to the favorable attention of millers.

A Churn invented by Eliza Brough of Greenville, Mich., is kept erect by spring rods and elastic springs and is oscillated on gudgeons at the sides. A tube runs down through the center through which water can be poured to temper the milk. The machine can also be used as a clothes washer. The butter comes quickly.

In a Churn patented by George H. Bradshaw of Fayetteville, Tenn., the dasher is formed of a hollow truncated cone, provided with flanges and connected with the shaft by rods. A band fitted into the interior of the cup is provided with flanges. Great agitation is secured with little heat.

Between the lugs of a Thill Coupling invented by Carlton E. Pickering of Hornellsville, N. Y., is pivoted a block, the upper part rounded off and notched forward. A double hook thill iron fits over this and is secured by a spring catch. At the bases of the lugs is placed rubber packing. It is noiseless in use and easily detached and attached.

Senator T. F. Randolph, of Morristown, N. J., has patented a Ditching Machine, which is an improvement upon his previous invention, which has obtained a considerable reputation. The previous machine could cut a ditch when running in one direction only. The present or improved machine is so constructed as to work equally well in either direction, so that the cutting wheel and lifting spade do not require to be raised out of the ditch and the entire machine turned about and reset for the return cut, at end of the ditch. The saving of time effected by this improvement is above 50 per cent, so that the cost and labor of cutting a ditch is reduced more than half.

John P. Moore, of DeMossville, Ky., has patented a Millstone Balancing Device, which provides an improved means of balancing millstones to make them run true and grind

uniformly, and which permits an easy and accurate adjustment, and dispenses with weights. The improvements consist, first, in using in the place of the block a headed bolt whose head carries the weight of the millstone by resting against the under surface of the opening in the balancer and is itself supported upon the spindle; and employing in connection with the threaded end of said bolt a nut and washer which not only holds the bolt firmly in the balance rind, but also rests against the flattened heads of the horizontal adjusting screws and acts as a nut lock to the same. The invention also consists in forming such nut directly upon the bottom part of the distributing cup.

A Grain Toller, patented by Adolphus H. Vitt, of Union, Mo., consists of a stationary conductor tube, that conveys the grain from the hopper or elevator to a revolving and vertically movable spring disk. The disk is lowered by the pressure of the grain, and the grain allowed to escape over the edge of the disk into an encircling casing with two exit spouts. Vertical partitions of the encircling casing, of which one is stationary, the other adjustable, conduct a certain proportion of grain to the toll spout, while the remaining grain is conducted to the grindstones of the mill.

A Ventilator patented by R. S. Grigsby, of Fayetteville,



THE SHORT-HORNED COW TENTH DUCHESS OF GENEVA.