

The Lay Torpedo.

The most successful type of the movable torpedo is found in the invention of Mr. John L. Lay, of Buffalo, New York, who has heretofore been mentioned as associated with Chief Engineer Wood in the invention of the torpedo used by Cushing. As excellent as the Lay undoubtedly is, it still has the same defect as others, namely, want of sufficient speed; this, however, does not seem to be an insuperable obstacle, and with each successive construction a greater speed is obtained. The boat is always under the control of the operator, who can stop or start it, steer to either one side or the other, or fire the charge whenever he pleases. All these things are, of course, extremely advantageous, and greatly enhance the value of the weapon. The motive power is carbonic acid gas. This gas (as is well known) becomes liquefied under a pressure of forty atmospheres, and in this state it is stored in a flask in the boat. When the valve closing this flask is open, vaporization ensues, and the gas is taken to the engine, first passing an automatically acting reducing valve, so that the pressure will not be too great. As the liquid expands, great cold is produced, and trouble is experienced from its use as a motor; this, however, is not a serious difficulty, and remedy will doubtless be found. The explosive chamber, containing 500 pounds of material, is at the bow, and is so constructed that on contact with a vessel it is disengaged from its resting place, and drops several feet, the idea being that an explosion in that position will do more damage than at the water line. In one compartment of the boat is a drum, from which is paid out the cable through which the electric current passes. A suitable arrangement of magnets opens a valve which allows gas to enter a cylinder, the piston in which causes the helm to be put in the desired direction; and a similar arrangement causes the throttle of the engine to open or close. The explosion is caused on contact if it is desired, or it may always be kept under the operator's control. Some of these boats have but one wire in the cable, over which the various functions are caused to operate; others have a multiple cable, with a wire for each thing required to be done. Over a mile and a half of wire is carried, so that the effective range becomes very much greater than that of any of its rivals. Mr. Lay is constantly at work introducing improvements, all of which are protected by numerous patents. His system has been definitely adopted by Russia after a satisfactory trial of ten of the boats built for her. A factory has been established, and it is proposed to use them very extensively in any future war. —*Harper's Magazine.*

NEW BALING PRESS.

We give an engraving of a new press for baling hay, cotton, straw, tow, wool, and similar substances. It is compact, powerful, and quick acting, employing the toggle joint driven by suitable gearing to create the pressure; the mechanical arrangement being such as to insure the greatest pressure at a time when there is most resistance, that is, as the compression of the bale nears completion. The press is horizontal, and the toggle moves the followers that compress the bales in opposite directions at the same time, two bales being pressed and delivered simultaneously. The press boxes are on opposite ends of the press, and the plungers move on trucks or rolls in each of the boxes. These plungers are connected by heavy links with the toggle joint, which, together with the links, is supported by suspenders or swinging arms pivoted at the top of the press frame.

The toggle takes its motion from the crank driven by the gearing at the top of the frame, the gearing taking its power through a belt or otherwise as may be most convenient. The middle joint of the toggle is provided with rollers which are guided by the two uprights at the middle of the frame.

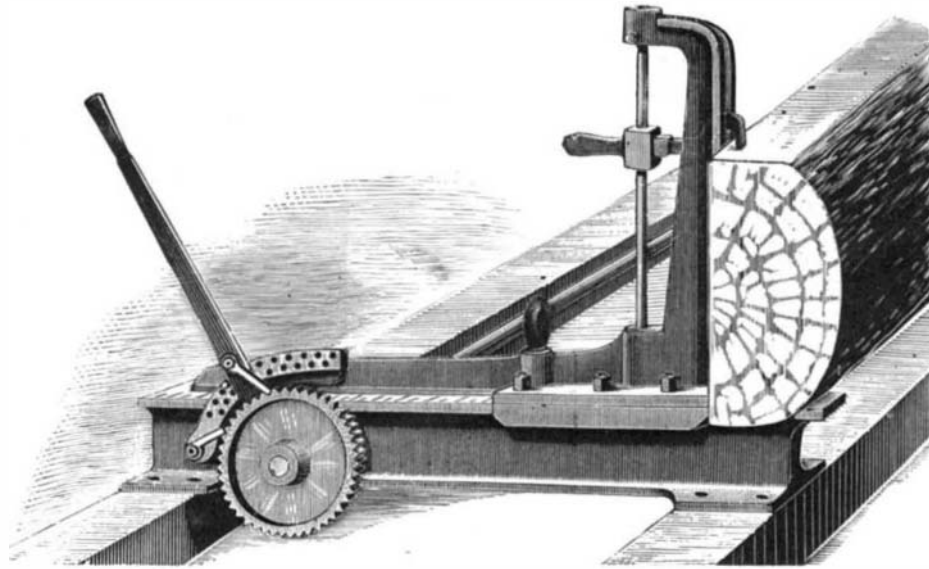
At each end of the machine and above the press boxes there is a pair of belts arranged triangularly around three or more sets of pulleys secured to the frame; the belts carry three or more gates which pass through the upper part of the press boxes. These gates move successively into position in the press boxes as they are needed by the forward movement of the material being pressed. They take their places at the right time, this result being secured by spacing the gates at the required intervals on their belts.

Each press box is provided with a feeding trough or chutes projecting from it at right angles, and having working plungers that feed the hay or straw into the press boxes in front of the plungers. The proper movement of these feeding plungers is secured by cams connected with the reciprocating plungers of the press. The press boxes are arranged to contract the bale laterally as it is moved forward, and there are spring catches to hold the gates in their

places in the boxes when the hay is pressed. When the press is in operation a platform is to be built between the feed boxes and on a level with their tops.

It is claimed for this press that it will press two bales while an ordinary press completes only one, without anything like a corresponding amount of labor. The pressure is applied gradually, and therefore does not break up or thrash the hay. The material to be pressed is introduced low at the side of the machine, thus saving a great amount of handling. The gates being carried by the belts saves the labor of placing them by hand, and insures a greater uniformity in the size of the bales, as they are of necessity uniformly spaced.

Further information may be obtained by addressing the manufacturers, Messrs. Elliott & Torraine, Brookfield, Missouri.



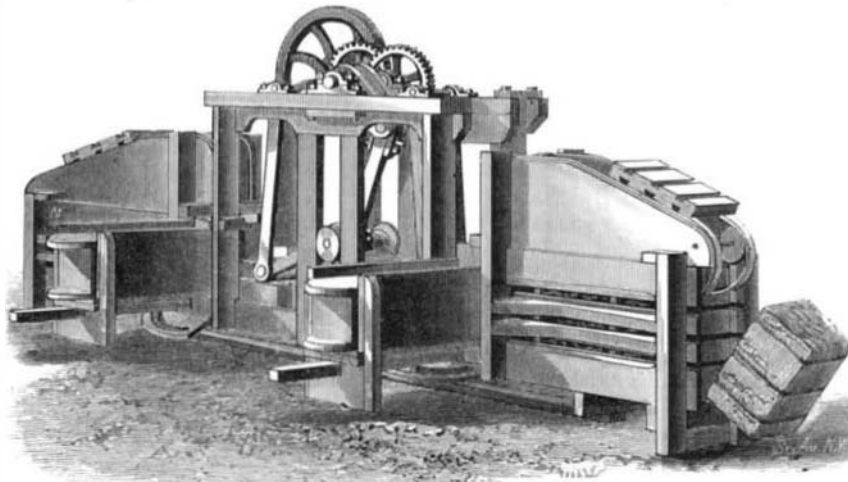
CARLEY'S MILL DOG.

NEW MILL DOG.

The engraving shows a new saw mill dog manufactured by Messrs. Alexander, Bradley & Dunning, of Syracuse, N. Y. This dog is entirely automatic, requiring no driving or forcing to make it enter the log, it being only necessary to raise it, and let it fall, to insure its firm fastening in the edge of the board or cant. It holds entirely from the top, drawing the cant or board toward the stake, instead of pushing it from the stake. It works equally well in hard and frozen timber and soft wood.

The dog is made of steel, and is placed on a steel rod attached to the stake, and projecting through a slot in the center of the stake. This arrangement of the slotted stake and dog prevents the board or cant from sliding endwise.

This dog is always in place ready to be used when required, and it holds with all the firmness of the more complicated and expensive machinery. It is readily disengaged by raising the handle; and when it is not in use it falls back out of the way, and cannot by any chance come into contact with the saw.



RICE'S IMPROVED BALING PRESS.

Messrs. Alexander, Bradley & Dunning put this improvement on all their saw mills without extra charge.

Influence of Early Feeding upon Vitality.

Investigations made in Germany concerning the comparative vitality of children under various methods of feeding exhibit some peculiar results. Thus, of 100 children nursed by their mothers only 18.2 died during the first year; of those nursed by wet nurses, 29.33 died; of those artificially fed, 60 died; and of those brought up in institutions, 80 died to the 100. Again, taking 1,000 well-to-do persons and 1,000 poor persons, there remained of the prosperous, after five years, 943, while of the poor only 655 remained alive; after fifty years there remained of the prosperous 557, and only 233 of the poor; at seventy years of age there remained of the prosperous 235, and but 65 of the poor. The total average length of life among the well-off class was found to be fifty years, as against thirty-two among the poor.

The Great Vienna Telescope.

The largest equatorial refracting telescope at present in existence is now *en route* from Dublin to its final destination—the great Vienna observatory. This telescope, says the *British Journal of Photography*, the *magnus opus* of our esteemed contributor, Mr. Howard Grubb, adds another laurel to the scientific workers of Ireland, who, hitherto unrivaled in reflectors, are now equally foremost in refractors. The mechanical parts of this telescope were completed so long ago as the year 1878; but, owing to the difficulty in obtaining perfect disks of glass, great delay occurred in finishing it, and it was not till about twelve months ago that the commission appointed by the Austro-Hungarian government to report upon it transmitted to headquarters their report, which stated their full approval of the manner in which the work was carried out. The value of this report

will be seen when our readers know that the commission was composed of such distinguished men as Professor Ball, the Earl of Crawford and Balcarres, Mr. Huggins, Professor J. Emerson Reynolds, the Earl of Rosse, Professor Stokes, Dr. G. Stoney, and Mr. Walsh, the Austro-Hungarian consul at Dublin. The object glass is twenty-seven inches in diameter, and the telescope tube thirty-three and a half feet in length—just over a yard in diameter in the middle—tapered to the width of the object glass at one end and to twelve inches at the other. It is composed of steel plate about an eighth of an inch thick in the center and a twelfth at the ends. The weight of the whole of the moving parts is between six and seven tons; and yet, so marvelously and cleverly arranged are all the adjustments, that the whole can be moved and set to position by one man's unaided arm. The immensity of the instrument constitutes it a marvelous production, but even this is secondary to the nicety of precision, the ease of the movements, and the excellence of the great lens. Additional luster is conferred on the eminent constructor by the fact that he was specially chosen to construct the telescope upon the recommendation of the General Director of the works, who had made a tour of inspection, and examined all the great observatories and astronomical workshops of Europe and America before making his recommendation. [The object glass of the above telescope is one inch larger than that of the great instrument at Washington.]

A Large Establishment.

One of the largest manufacturing establishments in Europe is the Cockerill Iron and Steel Works, at Seraing, near Liege, in Belgium. The works, on the right bank of the Meuse, cover an area of 267 acres.

The number of workmen and employes is 8,770, having been 9,100 in 1875. The capital of the company is \$3,000,000. The amount paid yearly in wages and salaries varies between \$1,600,000 and \$2,000,000. The total horse power of the 280 engines is 11,660; and the daily consumption of coal exceeds 1,000 tons. When the works are in full swing, the products reach a value of \$8,000,000. The twelve divisions under which the various departments are classified are capable of turning out yearly 100 locomotives, 70 steam engines, 1,500 pieces of mechanism, 10,000 tons of roofs, bridges, turntables, and boilers, and 14 steam vessels in iron or steel, besides hydraulic presses, cranes, and travelers. The yearly production of coal from collieries owned and worked by the company is 400,000 tons, and of coke 110,000. The mines owned by the company, situated in Belgium, produce 150,000 tons of iron ore; and those in foreign countries 170,000 tons. The blast furnaces turn out 10,000 tons of common, and 700,000 tons of Bessemer pig a year. Castings to the amount of 6,000 tons; bars, plates, and joists to the tune of 26,000 tons; steel rails, tires, cannons, etc., weighing 70,000 tons; 28,000 tons of engines and machinery, and 80,000 tons of vessels, leave the works annually.

Diving for Black Pearls.

Diving for black pearls employs a large number of men and boats off the coast of Lower California. Traders supply the vessels and diving apparatus upon the stipulation that the pearls that are found are to be sold to them at specified rates. These jewels are of much beauty and highly prized. A year's production is worth on an average from \$500,000 to \$1,000,000.

NARCISSE LECOMTE, one of the most eminent French engravers of the first half of the present century, has just died in Paris, at the advanced age of 88. Lecomte, who was a pupil of the Ecole des Beaux-Arts, and several times decorated, is perhaps best known by his engraving of Dante and Beatrice, after Ary Scheffer.