PREVENTION OF DECAY IN WOODEN AND IRON SHIPS.

In our last issue—page 282—we presented some very useful information on the preservation of timber, and the prevention of iron from rusting, chiefly applicable to wooden and iron vessels. The following is a continuation of the same subject from the same source, being collected from patents issued in Europe.

In 1853, M. Romaine patented a process for treating wood to render it more durable and uninflammable. It was steeped in a tank containing water, and two bushels of hydraulic lime for every 500 cubic feet of wood, to render it uninflammable; and to render it more durable it was steeped in a tank containing three bushels of lime and one gallon of gas tar mixed with sufficient water to cover the wood. After steeping for a few days the timber was lifted and dried in the air. In the same year John Bethel patented the use of 1 pound sulphate of zinc to every 60 pounds of water, for charging wood to preserve it from decay; or 1 pound chloride of zinc to 60 pounds of water; or 1 pound sulphate of copper to 80 pounds of water. These quantities of metallic salts are standards for the strength of the solutions employed. T. E. Cook patented in the same year a composition of 2¼ pounds shellac, ½ pound seedlac, ½ pound gamboge, ½ pound gum arabic, ½ pound gum benzoin, and 1 pound of white lead, applied as a paint to preserve iron work, especially the hulls of iron vessels. At the same time, C. S. Jackson patented the use of two classes of salts in solution for preserving timber, consisting of the salts of zinc and the chlorides and sulphates of alumina. In 1854, three patents for such preparations were granted, namely to A. E. Le Gross, Paris, for a mixture of neutral magnesia and resinous oil in solution, for preserving timber; to H. K. Poole, for a mixture of the sulphate of copper in solution; and one to John McInnes for a preparation of yellow soap and blue vitriol, to be applied to ships' bottoms. During 1855, five patents were issued, as follows:—Leopold Oudry and Alphonse Oudry, of Paris, for covering metals and wood with copper, by electric depositions in the common manner that copper is deposited on plaster, or other molds, and also upon metals; one to M. M. Rey & Guilbert, of Marseilles, for a composition of sulphuret of copper and sulphuret of antimony, mixed with varnish and applied to iron vessels; one to Westwood & Baillie, iron shipbuilders, London, for applying first a coating of black varnish, then a coating of hot asphalte to the hulls of vessels; also one to H. Bencherie, for impregnating wood with creosote, solutions mixed with tannin, resin, and fats. In 1856, four patents were issued, one to C. S. Jackson, for a solution of the salts of zinc and iron combined, to preserve timber; one to P. M. Barlow for forcing air first through the pores of green timber to drive out the sap, then charging it with any preservative solution; another to R. M. Seiner, for saturating planks with a solution of gelatine and chloride salts, then pressing them between rollers to compress the cells of the timber; also one to C. A. Ferguson, of London, for charring the surfaces of ship timber, to prevent mildew and rot. The plan proposed to effect this object was by passing red hot iron rollers over the surfaces of the wood. Charring of the surface of ship-timber is now practised in the French navy yards. Six patents were issued in 1857. The first was to J. E. Cook, for a poisonous compound to be applied to ships, consisting of 8 ounces of dragon's blood and 1 ounce of strychnia, mixed with 4 pounds of shellac varnish. The object was to prevent the attack of marine animalculae. M. Closson obtained one for a paint made of plumbago in powder, and linseed oil applied to iron; M. Boboeuf of Paris one for the use of phenate of soda of 5° Beaume applied to wood; one to A. Prince, for the silicate of soda applied to wood, then treated with dilute muriate acid, to render the timber incombustible; one to A. Wall, fpr the applications of oxides of zinc and copper as paints for iron; and one to Green & Coppin for charging dried ship-timber with a solution of sulphur and arsenic. Two patents were granted in 1856, one to J. Scott Russell for first coating iron ships' bottoms with the size that gilders employ; then when this was dry applying a varnish mixed with copper reduced to powder. It was stated that this would answer the same purpose as copper sheathing with a non-conductor between it and the iron. The second was issued to F. Ransome, for impregnating wood first with a silicate of soda; then with a solution of the chloride of calcium for preserving and rendering it incombustible. Two patents were issued in 1859: one to H. P. Burt for creosoting timber under pressure in a tank; and the other to H. W. Hutton for subjecting timber first to the action of carbonic acid gas, then saturating it in a tank with a solution of silicate of soda; and afterwards by strong a solution of the chloride of calcium. In 1860, M. Mangles secured a patent for preserving timber by treating it with chlorine gas in a close chamber. Four patents were granted in 1861, namely, one to T. F. Williams for a mixture of gutta percha and the residue of distilled palm oil; one to C. Davis, for a mixture of soap, pitch, spirits of turpentine, and india-rubber applied to wood; another to M. Cullen for a composition of coal-tar lime and charcoal applied to wood; and one to T. Cobley for impregnating timber with solutions of potash, baryta, lime, magnesia, and fluo-silicic acid. Almost all the known substances under the sun have been secured by patents as applicable to the preservation of timber and iron from decay and rust.

Photographic Printing and Engraving.

The following useful and deeply interesting extracts are from a paper by W. Crooks, F. R. S, in the *Popular Science Review* (London, England):—

"A process has been brought to considerable perfection, by Sir Henry James, in the Ordnance Office, Southampton, where it is used for producing copies of maps. A mixture of gelatine and bichromate of potash is in this case also the foundation. A surface prepared with this mixture is exposed to the action of light behind a transparent picture of the map, or other object to be copied, which is tightly pressed against it. The change which has been already described takes place, and now a roller charged with lithographic ink is passed over its surface. This blackens the whole, but when it is soaked in warm water, those portions of the sensitive surface which remain unchanged by the action of the light are dissolved out, and the lithographic ink is thereby removed from those parts of the picture. A prepared flat surface of zinc is then placed in contact with the inked picture, and the two are submitted to heavy pressure, when a complete transfer of the picture will be found on the zinc. After suitable preparation any number of copies can be printed from this zinc plate in the ordinary printing ink. This process is capable of giving very perfect results, and when applied to the reproduction of manuscripts, prints, or similar matter, it is impossible to conceive a more perfect reproduction. Indeed, it is no easy matter, when the original and the photozincographic copy are placed side by side, to distinguish one from the other; and if the copy has been reduced in size by the photographic means, most persons would prefer it to the original both in point of delicacy and sharpness.

"By the photogalvanographic process of Pretsch, a plate of glass, or any other smooth surface, is coated with bichromate of potash and gelatine, and then exposed to the light under a photograph or an engraving; it is then moistened with water, but not thoroughly washed. The first action of moisture is to cause those portions of the surface which have not been exposed to the light to swell and rise up, more or less, in ridges from the surface of the plate. A mold is then taken from the plate so raised; from that an electrotyped copper plate is procured, which is used as a matrix, from which other plates may be produced suitable for printing purposes. The gelatine, in swelling, is found to split up into ridges, giving to the whole surface a granular effect, which holds the printing ink equally well in the fine lines and the broad masses of shadow. This process gives very effective prints when they are large, and viewed from a distance; but for fine, delicate work it is not so successful.

"An art like this is still in its infancy. As soon as a method of photographic engraving comes into general use for book-illustration, improvements will follow one another rapidly. The general adoption of a process of this kind would be invaluable; an engraving of any object or scene, however good the artist might be, is not, and cannot be, an exact representation; at the best it is but a mere approximation to that, and there is always a tendency for the artist to idealise the subject and render it difficult to recognise at first glance, or he will not descend to those minutiæ of detail which give such a charm to the photograph. The great value of photography is that it produces absolute *fac-similes*; but this value is lessened by the tedious rate of reproduction, and the great probability that in twenty years' time upwards of ninety per cent. of the photographic prints now in existence will have faded out. By wedding engraving to photography, and making the same physical agencies which impress the sensitive tablet produce the engraved plate, the mathematical accuracy of form and detail possessed by the photograph is secured, united to the permanence of a printed book. For the illustration of objects of natural history, flowers, plants, and animals, even to the most minute microscopic objects this invention is invaluable. By it *fac-similies* of rare engravings or manuscripts can be multiplied to any extent."

Impressions on the Retina after Death.

A great deal of unprofitable discussion has been spent on this subject, and we think the fallacy of it well set forth in the following paragraph cut from the *Medical and Surgical Reporter*. If the story of the ox is "true," then we may look at a fish's eye and see a hook therein, or at a chicken's and discover the fatal axe that chopped off its head, and so on through an unending list of absurdities:—"An English photographer, Mr. Warner, lately took a photograph of the eye of an ox a few hours after death, and on examining the impression through the microscope, distinctly perceived on the retina the exact delineation of the stone with which the slaughter house was paved, being the last object which affected the vision of the animal on bending down its head to receive the fatal blow. The consequence deduced from this very apocryphal story is, that if the eyes of a murdered man be photographed a few hours after death, the likeness of the murderer will be found on the retina, that being the last object he could have seen during the death struggle. Without entering upon the judicial value of evidence thus obtained, we will simply state the reasons which we consider sufficient to cast a doubt upon the whole thing. If, a few hours after death, the retina retain the picture of the object from which it receives its last impression, we must suppose the retina to possess the property, not only of receiving photographs like sensitised collodion, but also of fixing them, which in photography requires a liquid different from that which renders the surface sensitive. Now, hitherto, the retina has not been found to possess any such properties, one of which, it must be kept in mind, is the direct contrary of the other. If in the living subject the retina only receives a momentary impression, how and by what physiological process can it, in the dead subject, retain an impression for several hours after death? In the present state of our knowledge there is nothing to warrant such a supposition."

Grist Mills.

In a recent work on "Mills and Millwork, by William Fairbairn, F. R. S.," a description is given of a mill erected by him for the Russian Government at Taganrog. There are 36 pairs of 4 feet stones in it; these are driven at the rate of 140 revolutions per minute, and each pair grinds from 5 to 5½ bushels per hour. With respect to shafting, a peculiar case is related:—In a range of shafting of 220 feet, the diameter being 3 inches at one end and 2 inches at the other, the work was done uniform throughout; but it was soon found that the shaft made considerably more than one complete revolution at the driven end before it began to move at the other. This caused a constant succession of jerks, or accelerated and retarded motions, injurious to the machinery and destructive to the work it had to perform. At the middle of the length of the line of shafting the resulting twist was very severe, and the line had to be supplied with a stronger and heavier shaft. With respect to gearing and belts in driving machinery, Mr. Fairbairn gives the preference to gear wheels. He asserts that belts strain the journals, that they are liable to slip, and are very objectionable in the manufacture of fine cotton. Belts are more noiseless, and their first cost with pulleys less, but accurately cast gearing is more enduring.

Improved Railway Pilot.

Many lives are annually lost and much property destroyed by railway accidents, and of these not a few are directly the result of obstructions on the track. The remedy for trouble of this sort has always been found in the old-fashioned pilot, or, as it is popularly called, the "cow-catcher." This has been found a very useful appliance, but anything less than a cow, or, more properly speaking, comparatively small obstructions, such as stones, trees, sleepers, &c., run under the cow-catcher and virtually destroy all the protection it ought to afford.

In the accompanying engraving we have illustrated a new pilot, which is intended to overcome these troubles. It consists of two revolving cylinders, A, of a conical shape, running on bearings in the frames, B and C; these cones have peculiarly-shaped teeth, D, which engage with corresponding teeth on the inner side of the forward truck wheel. By these teeth the cylinders are rotated; when thrown out of gear by the lever, E, they do not revolve but remain idle at the pleasure of the engineer. The cylinders are also furnished with wings, F, which traverse their circumference at regular distances; these wings act on any obstruction lying between the track, and from the nature of their position and form, throw said obstacle upward and outward entirely clear of the rails.

A peculiar and ingenious feature of this invention is the shape of the teeth which drive the cylinders. It will be seen that they are not cogs, but that they consist of a series of gradually inclined curves, and that they can be thrown into connection with the truck wheels at any time, even when running at the highest speed, without danger of breakage. A small spring, G, is fitted to the ends of the cylinder shaft, so as to keep the cylinders in position and avoid end play. The apertures between the top of the pilot and the foot board are closed by the ordinary arrangement of bars. This pilot can be attached to any engine, involving no other alteration than placing the rack on the inside of the forward wheels. This duty involves merely the drilling and tapping of a few small holes, easily done in a few minutes by any mechanic; when put on to special order, the rack may be cast with the wheel.

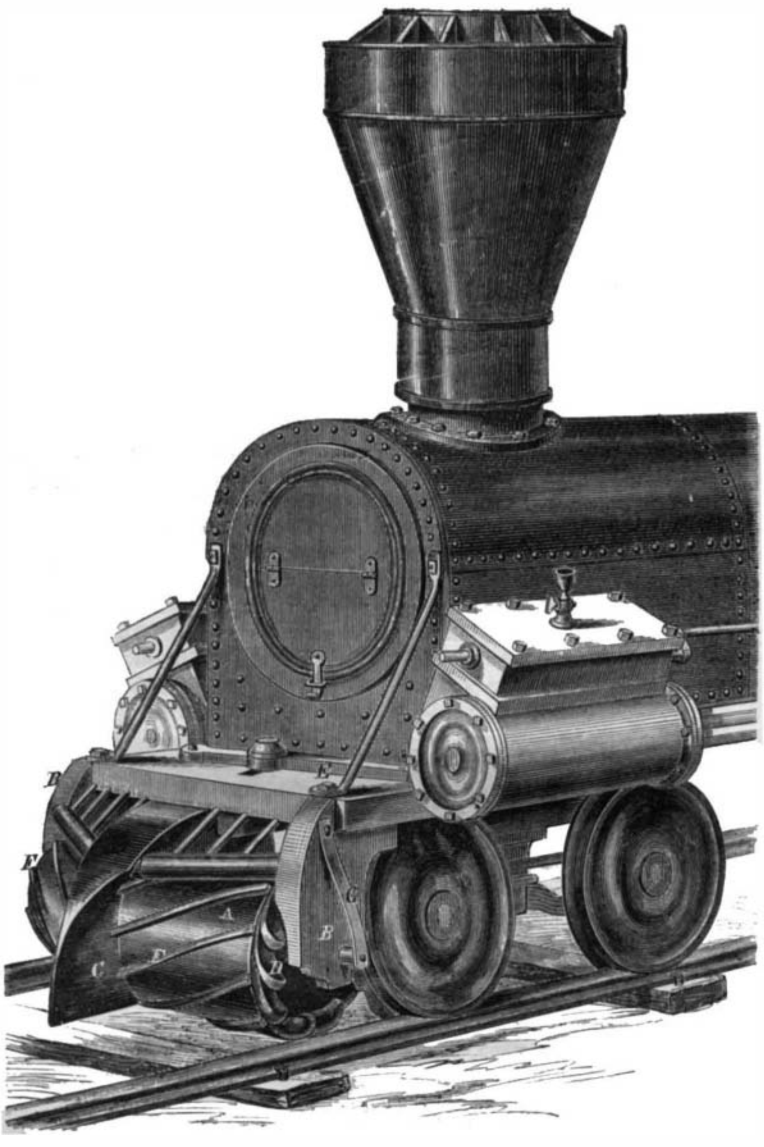
The invention was patented on May 3, 1863, by E, & A. Wyckoff, of Elmira, N. Y. For further information address them at that place.

DEATH OF LORD LYNDHURST.

Recent English papers announce the death of this venerable statesman, at the advanced age of ninety-two years. In many respects he was a remarkable man, and being an American by birth, he is also a subject of somewhat greater interest to us on this account. His father—John S. Copley—was a painter of some distinction in his day, and resided for some years in Massachusetts, where the future peer was born, May 21, 1772, and which he left at three years of age with his mother and the entire family. In early youth he exhibited superior abilities, and his parents were enabled to give him a collegiate education at Cambridge, where he graduated with high distinction, having the object in view of following the profession of law. Previous, however, to being called to the bar in 1804, he visited his native country, and was introduced to Washington.

Soon after his entrance into public life, his powers of logic and oratory attracted the attention of leading English politicians, and he entered political life under the patronage of the tory party then in power. His promotion was rapid. He was made Sergeant-at-Law in 1813, became Chief Justice of Chester in 1818; was Solicitor-General from 1819 to 1823; Attorney-General, 1823 to 1826; and Master of the Rolls from 1826 to 1827. On the retirement of Lord Eldon in 1827 he was constituted Lord Chancellor of the Empire, when he attained his peerage by patent (under the title of Baron Lyndhurst) dated April 27, 1827. He resigned the chancellorship in 1830 to resume it in December, 1834, for a short period. For the third time he was appointed to this post in September, 1841, from which he finally retired in July 1846. He has since, until very lately, been a constant attendant in the House of Lords.

Lord Lyndhurst was accounted one of the most



E. & A. WYCKOFF'S RAILWAY PILOT.

eloquent men in the British Parliament. When he spoke he always drew a crowd. In his prime he was considered one of the handsomest men in either house, and to the last he had a fine presence. His voice was clear and musical, and his style of speaking interesting. He was a master of wit and sarcasm, but he knew especially well how to state a case in such a way as to convince almost all who heard him. During the latter years of his political career he witnessed a happy change in the conduct of political parties. The virulence and animosity which characterized the old Whigs and Tories had departed and given place to kindliness and almost uniformity of sentiment in both Houses of Parliament.

Coal and Steam Power.—In a paper read before the British Association on the Coal and Coke Trade of the North of England, Mr. Nicholas Wood said it had been calculated that an acre of coal four feet in thickness produced as much carbon as 115 acres of full-grown forest, and that a bushel (84 lbs.) of coal consumed carefully, was capable of raising 70,000,000 lbs. one foot high, and that the combustion of 21 lbs. of coal gave out power sufficient to raise a man to the summit of Mont Blanc. The aggregate steam power of Great Britain he sets down at 83,635,214 horse-power, or equal to 400,000,000 of men.

A Huge "Pouring"—Seventy Tuns of Iron Run at One Heat.

We are indebted to the *Pittsburgh Dispatch* for the following account of an experiment to determine the feasibility of running the quantity of metal required for a twenty-inch gun, which weapon, it seems, is actually under way:—

"We have already noticed the fact that preparations were progressing at the Fort Pitt Works, in this city, for the manufacture of twenty-inch guns, the lathe, patterns, &c., being in an advanced condition. As the experiment of manufacturing a gun of such a caliber, however, is one of great risk, it was determined to settle at least one point practically before attempting to mold the great gun, by melting, at a single heat, nearly the same quantity of metal as would be required for the twenty-inch. For this purpose two guns were molded of the fifteen-inch navy pattern, and each furnished with a twelve-inch instead of a fifteen-inch, hollow core, making the rough weight of each of the guns nearly as great as that of the columbiad fifteen-inch. These molds were placed side by side in the pits of the new foundery, and on Saturday morning five of the furnaces in the foundery were charged, three for the special purpose of casting the great guns, and two for the ordinary work of the shop. The respective weights of these charges will give some idea of the capacity of these enormous furnaces, being thirty-four, nineteen, nineteen, thirteen, and eighteen and a half tuns—an aggregate of nearly *ninety four* tuns, with a far greater amount of metal, we believe, than was ever reduced in furnaces in a single establishment in one day. Seventy-two tuns of this metal, being the charge of the three large furnaces, were designed for the casting of the experimental guns. The metal was led from each of these furnaces to a large pool, equidistant from each of the molds, and communicating by two "runners" with the two "gates" of each.

"About one o'clock the three furnaces were tapped in quick succession, and in a moment three streams of molten iron were pouring into the pool, from which, as the metal rose to the level of the openings, two fiery lines shot into each of the molds. The intense heat of the iron pouring along these seven streams, with the molten mass in the reservoir, seemed to have no extraordinary effect on the workmen, who performed their accustomed duties of skimming and clearing the molds with as much indifference as if the glowing metal surrounding them and filling the air with showers of sparks were harmless streams of water. Familiarity with such situations is apt to breed contempt of danger, but we believe that no accident has ever yet occurred at the works during the operation of casting. Notwithstanding the unusually risky character of the experiment on Saturday, everything passed off successfully, and the streams of hot metal and cold water, crossing and interlacing on their way, poured into the molds without accident."

Great Demand for Iron.—The furnace of Chapinville (Litchfield) is turning out six tuns of iron a day. The *Enquirer* says:—"Seeing a teamster waiting by the furnace for the iron to cool that he might get a load, we said to the weigher, 'Is iron in such demand that you are obliged to send it off hot?' 'Yes,' said he, 'and sometimes we run it directly into the carts instead of the sand-beds.'"

The total enrolled strength of the British volunteer force is 1,300 cavalry, 23,000 artillery, 2,500 engineers, and 132,000 riflemen—total 159,000.