NOTES ON FOREIGN INVENTIONS.

Pneumatic Fire Detector.—Messrs. Taylor & Grimshaw, of London, have patented an ingenious fire-alarm and indicator. It consists of a small cylinder of thin metal, to contain atmospheric air. Within is a flexible diaphragm made perfectly air-tight. The expansion or contraction of the air in the cylinder causes the center of the diaphragm to rise or fall in a vertical line, and so give motion to a piston-rod transmitting motion through screw-gearing to a pointer which marks the temperature on a dial plate. By a simple arrangement, when the pointer reaches any arranged position, an alarm bell is rung. If placed in a ship's hold, and the temperature should be raised by spontaneous combustion, or otherwise, the excess of heat is shown on a dial on deck, and proper measures may be resorted to; or it will regulate any form of ventilator.

Railroad Conductors' Watches.—The conductors on the Swiss, French and Italian railroads carry a watch of ingenious construction, designed to lessen the danger of accidents. The aperture by which the watch is wound up is accessible to the conductor, but that by which the hands are regulated can be opened only by an official whose business it is to set all the watches by a common standard. Thus the time of running of the trains is rendered uniform, and no accident is excused on the ground of mistake. The aperture by which the dial is regulated is closed by an application of a system of permutations, such as is employed in some permutating locks.

Armstrong Guns and Iron Batteries.—Some experiments have lately been made at Shoeburyness with Armstrong rifled cannon, firing into a floating steam battery, called the *Trusty*, which is simply a steamer covered with thick iron plates. The result of the experiments are to the effect that iron plates, of no less than four inches in thickness, are no proof against the solid shot from such guns. Every shot that was fired shivered the plate to pieces, and entered the vessel. Some of the shots passed entirely through the vessel, going in at one side and out at the other. This class of vessels, it seems, are entirely useless for resisting shot from such guns.

A Steam Elephant.—A locomotive for common roads, called "Taylor's Patent Steam Elephant" has been lately brought out and tried in England, with some success. In appearance it resembles Fawkes' steam plow, recently illustrated in our columns, with the plow frame removed. It weighs seven tuns; and the driving-wheels make but 14 revolutions while the engines are making 280. It is therefore geared down in the same manner exactly as Fawkes', but instead of one large bearing-roller supporting the whole machinery, it has two large flat wheels, six feet in diameter each. It is chiefly intended for drawing heavy loads as a substitute for animal power, and for this purpose it has been quite successful—so it is stated.

Submarine Telegraph Cables.— M. Harder, the distinguished English electrician, has lately obtained a patent for a submarine cable constructed as follows:— The wire strand is about five times larger than that of the Atlantic cable; this is first coated with a number of strands of flax twine laid on a long spiral, the reverse of the twist of the wire. Over this a coat of gutta-percha is laid, then another layer of twine is laid in an opposite direction to the first, and the whole then covered with two layers of gutta-percha. No outside shield of iron wire, as in the Atlantic cable, is employed, but simply twine and gutta-percha as the coating of the conductor strands. Every strand of the twine possesses a breaking strength of 40 lbs., therefore great strength is combined with lightness, and this is certainly an advantage.

Triple Steam-engines.—J. Howden and A. Morton, of Glasgow, have obtained a patent for a peculiar combination and arrangement of high-pressure and expanding engine cylinders. Three cylinders are used; one receives the steam direct from the boiler, the other two receive the steam alternately from the first. These three cylinders are so connected to the crank-shaft that their respective strokes commence at periods about one third of the revolution. They may be placed in a line above, below, or at one side of the shaft, their pistons being connected to separate cranks, or they may be placed so that their pistons shall be connected to the common or to the Z-crank. The piston of the first high-pressure cylinder has an equal effective area on both sides, but the pistons of the low-pressure cylinders have unequal effective areas on opposite sides. The high-pressure cylinder receives steam direct from the boiler during a part of the stroke, and the steam then finds egress through a port and enters the end of one of the other cylinders and expands, then escapes into the condenser. The steam which has entered the other end of the high-pressure cylinder and performed the other stroke, now escapes into the third expanding-cylinder and actuates the piston in it, and so on alternately. The object of this arrangement is to obtain the benefits of high pressure and expansion of the steam to a more full extent than in common engines, and at the same time secure a more uniform rotative motion of the shaft.

Propelling Vessels.—A patent has been obtained by W. Middleship, of London, for propelling vessels by a rather singular device. The screw is made hollow and open at the center, so that the interior space may communicate with the interior of the hollow shaft upon which the screw is mounted. Water is admitted to the hollow shaft and allowed to flow to the end of the hollow screw blades where it is discharged obliquely through orifices, and the reactionary force of the effluent water rushing from these openings causes the screw to rotate upon the principle of the turbine wheel.

EXTRACTING SILVER FROM ITS ORES.

The processes now in use at the reduction works of the Sonora Exploring and Mining Company, for the extraction of silver from the ores, are essentially three, viz.: smelting, amalgamation in barrels, and amalgamation in the open air, or the *patio* process. They are briefly described by Mr. Frederick Brunckow, who has recently returned from Arizona, in a report to a committee of the stockholders, from which the following is in part extracted:—

The ores of the Heintzelman vein, as well as most of the Mexican ores, contain a considerable portion of quartz, which renders them difficult to smelt. The richest portions only are therefore selected for the smelt-process.

The lower part of the furnace is built of a fine-grained refractory quartzose sandstone found in the neighborhood. The upper part and the smelting-house are built of brick, dried in the sun and air, called *adobes*. The smelting-chamber inside the furnace is twelve inches square, and the blast is produced by a double bellows constructed at the place and worked by one man.

To each part of selected silver ore, three parts of lead ore from the Arenilla mines are added, and after complete fusion the contents of the chamber are allowed to run off into a basin on the outside. As it cools, a crust is formed on the surface, which contains to a large extent sulphurets of copper, lead, and the impurities. This is taken from the lead below and kept separate. The lead is run into castings in the form of cakes, ten inches in diameter, weighing 75 pounds. Six of these lead cakes are put on edge, one near the other, upon two inclined iron plates, which nearly touch each other. Charcoal is placed around and between the cakes, so that they are enveloped, and after kindling it the lead cakes must be protected from draughts of air. The heated cakes commence to melt and sink, and the lead runs down the iron plates to a basin, from which it is run into pigs. This lead is free from copper, and yields about 40 pounds of silver to the tun. A skeleton of each lead cake is left behind on the iron plates, and is rich in copper, and yields some silver. In order to separate this from the copper, the skeleton is broken into fragments and passed the furnace in company with the crusts taken from the lead in the first place, and with some other lead ore. By smelting the skeletons and crusts, which contain sulphurets, &c., lead will result, which is put in castings in the form of cakes; these cakes are put again upon the inclining plates, and pass through the process described before. The remaining skeletons this time contain very little silver; they are smelted in a copper refining reverberatory furnace and refined, and in the form of balls of metallic copper are delivered over to the amalgamation works, where they are required for the barrel process.

The argentiferous lead, free from copper, is put in a cupellation furnace, and passes the well-known exydating process; the silver remains, and is refined. The resulting oxyd of lead is added to the lead and silver ore, and again passes the blast furnace.

To prepare the ore for amalgamating in barrels, it is crushed by stamps, and passes three sieves. The siftings of the first sieve are put under the stamps again. The sifting of the second sieve is as fine as the grain of wheat, and the total sifting is delivered to the ore-mill, Arastra, where it is ground with water to a very fine powder; then it is dried and crushed. The sifting of the third sieve gives a powder fine as flour. This powder and the obtained fine-ore powder of the Arastra mill is mixed with 8 per cent common salt, put in a reverberatory roasting furnace, and roasted till all the metals are formed into chlorides; this process is completed in five hours. Eight hundred pounds of this powder are put into the amalgamation barrel, together with a certain quantity of water and 75 pounds of the copper balls from the smelting furnaces. The barrels are then made to revolve, so that the whole mass in the barrel will form, after a certain time, a paste so stiff that the 400 pounds of quicksilver now added will not remain in a separate mass at the bottom, but will be divided through the whole body of ground ore in minute globules, unseen by the naked eye. The barrels are now made to revolve for 22 hours. The formed chloride of silver will be precipitated into metallic silver by the presence of the metallic copper; chloride of copper will be formed, and this will be lost. The silver in the metallic state in contact with the quicksilver then forms the amalgam. The copper exists in the roasted mass as chloride of copper; it has no influence in the amalgamation process, and is lost in the residue. After 22 hours, more water is put in the barrels, in order to thin the paste, and to accumulate the minutest globules of quicksilver and the formed amalgam in a mass. This will be accomplished in two hours, by allowing the barrels to revolve slowly. The barrels are now opened, and the quicksilver and amalgam runs out in troughs, from whence it is put into strong canvas bags. The surplus quicksilver is pressed through the bags by its own weight; the remaining stiff amalgam is retorted; the silver, not being volatile, remains, and is melted, and cast into bars. The bars are marked with the company's stamps, numbered, their fineness according to the assay, and their value in dollars marked upon them.—*Mining Magazine.*

THE HAMMER."—GROSS PLAGIARISM.

In our last issue we presented an extract from a foreign periodical, in which it was stated that the whole of the "Pilgrim's Progress," the authorship of which is ascribed to the famous John Bunyan, was a gross plagiarism, having been copied entire from a rare old book, written by G. de Geideville, published by Caxton, in 1483. At present our opinion is against believing in the literary piracy of the sturdy converted tinker, but we have no means of proving or disproving the accusation. There is, however, a case of literary plagiarism which has just taken place nearer home, and which, although of minor importance, is as wrong in moral principle as if it were a thousand times of greater moment. The case to which we allude is an article entitled "The Hammer," published in the *North Western Prairie Farmer* (Chicago), of the 15th ult., with the signature of William H. Pearce, of Paw Paw, De Kalb county, Ill., attached to it. Excepting the first ten lines of the article in the columns of our cotemporary, the whole of it will be found on page 397, Vol. II., of the SCIENTIFIC AMERICAN, and was written by us more than 12 years ago. This article we have seen copied into other papers a hundred times since it was first published, some giving us credit, others not; some, again, giving credit to other parties. But never before has a single individual, so far as we know, but William H. Pearce, claimed its personal authorship. There is nothing more honorable than giving an author the credit which justly belongs to him; nothing more mean than to appropriate his productions, because this can be done with legal impunity. It is, however, a dangerous practice, as we have never known a case of this kind which was not ultimately found out, and the wrong exposed. We do not know Mr. Pearce, but have charity to believe that he has merely committed an oversight—that he sent the article to the *North Western Prairie Farmer* as suitable for its columns, and signed his name to it by mistake.

AMERICAN PLATINUM.—A new vein of platinum and gold has lately been found at Frederickstown, Mo., by Dr. Koch, of St. Louis. It is stated to be very rich.