

as to assist in regulating the flow of ink. Pens of this description are very convenient.

**Improved Parallel Ruler.**—By R. Eickemeyer, of Yonkers, N. Y.—This invention consists in a ruler with certain novel appliances whereby it can be moved to rule parallel lines at equal or otherwise graduated distances from each other, with the utmost convenience and accuracy. Diagrams would be required to show its construction.

**Improvement in Lime Kilns.**—By Job Sands, of Sand's Mills, N. Y.—The inventor says that in the ordinary kilns the air for supplying draught to the fire is admitted below the grates, which causes the heat to ascend and strike the arch of the fire-place, whereby a portion of the heat is absorbed, and another portion lost by reflection. The improvement consists in arranging the air draught on a line with the top of the fire, so that all the heat will be carried directly into the boiler. This plan is said to effect a considerable economy.

#### Recent Foreign Inventions.

**Dyeing Fast Black on Woolen Goods.**—On page 158 we presented an account of a new method of dyeing woolen cloth black by a mordant of the bichromate of potash and a topical application of logwood and the sulphate of indigo. At the time of publication, we stated that in all likelihood *cam wood* was employed with the logwood, although this was not mentioned in the magazine from which we obtained the information. In the last number of *Newton's London Journal*, received last week, a fuller account of this process is given, and it is stated that four pounds of *cam wood* are added to every 100 lbs. of logwood, thus confirming our opinions.

**A new Product of Castor Oil.**—A patent has been obtained by George F. Wilson and George Payne, of London, for an improvement in treating oils to obtain a new elastic product. Castor oil is placed in a still, and the temperature of it is raised to 600 or 650° Fah.—super-heated steam being used in heating. As the act of distillation goes on at this heat, it is found that when about one half of the contents of the still have passed over in the form of fat acids and glycerine, a few drops of a milky-white substance also comes over. The heat is then cut off, and the distillation stopped. On the interior of the still there is now found a peculiar spongy elastic matter, which has an offensive odor, which is removed by a current of low pressure steam and washing with a solution of the carbonate of soda. We understand that this elastic product possesses some of the qualities of india rubber.

**Preserving Vegetable Substances.**—F. J. Anger, of London, has taken out a patent for preserving potatoes and other like vegetable substances, by dipping them in a warm solution of diastase, or gum made from starch. Some of this gum is dissolved in water which is heated up to about 140° Fah., and the vegetable substances are then introduced into it, and kept at that heat until imbued with the solution. The vegetables are then taken out and placed in drying rooms until they are completely dried. Potatoes, when so treated, are stated by the patentee not to be susceptible of decomposition, by the influence of the atmosphere.

**Paper from Tan Bark.**—J. and T. Horton, of London, have obtained a patent for manufacturing a paper, suitable for pasteboard, from spent tan bark.

**Extracting Castor Oil.**—H. A. H. Durant, of London, has obtained a patent for extracting a very clear oil from the castor beans. The outer skin is first removed by rollers previous to the crushing and heating of them. This simple improvement produces a clear and fine oil, which it is proposed to call "castrine," the outer cuticle being then applicable for manure and other purposes. By this process, the thicker portion, or stearine, which is now lost (by being mixed and left with the outer skin or cuticle) is obtained, and the oleaginous or thin portion of the oil is not colored and deteriorated. The oil thus obtained can be purified by jets of gas, acids, and heat, at about 150° to 160°.

**Manufacturing Iron.**—J. Berch, of Birmingham, Eng., has obtained a patent for an im-

provement in processes for manufacturing iron—the improvements relates to the furnaces. In arranging furnaces, he builds a refinery furnace at the back tuyere, and employs reducing and oxidizing tuyeres to smelt and refine at one operation, so as to dispense with the fuel now required for the common refinery fire. He runs the metal from the blast furnace at once into the refinery furnace, so as to melt and refine the metal at one continued heat.

#### Smoking Tobacco and Cigars.

A French chemist has recently been trying some experiments on the smoking of tobacco and cigars, to discover the reason why a cigar, when partially smoked, extinguished for a short time and ignited again, has such an unpleasant flavor in comparison, with what it had when first smoked. His intention also was to ascertain the quantity of nicotine absorbed by tobacco smokers. The apparatus used consisted of a stone jar, in which the tobacco was made to burn, connected with a series of bottles communicating by tubes. The bottles were either empty, or contained some water and water mixed with a little sulphuric acid. From a few experiments it was found that, in the smoke of tobacco extracted by inspiration, there is ten per cent. nicotine. Thus a man who smokes a cigar of the weight of seventy grains, receives in his mouth seven grains of nicotine, mixed with a little watery vapor, tar, empyreumatic oil, &c. Although a large portion of this nicotine is rejected, both by the smoke puffed from the mouth, and by the saliva, a portion of it is, nevertheless, taken up by the vessels of the buccal and laryngeal mucous membrane, circulated with the blood, and acts upon the brain. With those unaccustomed to the use of tobacco, the nicotine, when in contact with the latter organ, produces vertigo, nausea, headache and somnolence. From further investigation it was found that the drier the tobacco the less nicotine reaches the mouth. A very dry cigar while burning yields a very small amount of watery vapor, the smoke of it therefore cools rapidly in the cigar, while passing from the point of ignition to the mouth; hence it is that the first half of a cigar smokes more mildly than the second, in which a certain amount of watery vapor and nicotine, freed by the first half, are deposited. The same remark applies to smoking in pipes. Smoking through water, or with long tubes and small bowls, prevents in a great measure the nicotine from reaching the mouth and being absorbed.

#### The new Frigate Merrimac.

This steamer, which lately sailed from Boston on an experimental trip seaward, has returned, and her performances are said, in the papers, to have been "perfectly satisfactory." She is paraded as the most complete and effective steamer in the American navy, and has been ordered to Annapolis, Md., near Washington, so as to afford an opportunity for Members of Congress to examine and admire her wonderful qualities, and then vote a few millions more for another crop of similar boats.

We have been informed, in a private manner, for the correctness of which we will not vouch, that the machinery of the *Merrimac* proved, on the late trial, to be a miserable failure; that the highest speed obtained was nine miles per hour, and forty-five revolutions of the propeller per minute, while the average speed was only seven miles per hour. If this is so, she is a disgrace rather than a credit to the country, and the treasury has been robbed for her construction more than it ever ought to be again for such a purpose.

It is a singular fact that no public statement of the speed of the *Merrimac* has heretofore been given. What does it all mean?

#### Cotton Seed and its Uses.

A recent number of the *Railroad Record*, Cincinnati, contains an excellent article on the above subject. It states that cotton seed yields 30 per cent. of oil, and that the total product of oil that could be obtained from the seed raised in the United States would amount to 671,940,000 lbs.—the residue being oil-cake, amounting to 1,567,860,000 lbs. Edgar Conkling, of Cincinnati, has invented a process for

making soap from the seeds without expressing the oil from them.

#### Earthquakes.

Recent accounts from Japan describe a terrific earthquake which took place at Jeddo, the capital city of that island, on the 11th of November last, by which 100,000 houses were thrown down, and 30,000 of the inhabitants killed. As the houses in that city are very small and numerous, and as the inhabitants, no doubt, rushed out from them when the first shock was felt, this will account for the great number of buildings destroyed in proportion to the number of persons. Still, the destruction of 30,000 lives by one earthquake proves it to have been one of the most terrible that has ever taken place.

On the 15th of last month, at night, several severe shocks of an earthquake were felt in San Francisco. The vibrations of the earth lasted about thirty seconds, and waked every person in the city. Bedsteads placed on casters were rolled across the floors, doors were wrenched from their hinges, large iron safes were moved out of their places, walls of buildings were cracked, clocks stopped, and other damage done, but no lives were lost, although every house in the city was swayed to and fro. The shocks were felt throughout the most part of the State.

There are two theories respecting the cause of earthquakes. 1st. The igneous theory; which maintains that this earth was once a molten fiery ball, and that its interior is still a fiery mass, and is sometimes caused to generate waves, which produces oscillations on the earth's surface. 2d. The electric theory; which attributes the shocks to disturbed magnetic action in the crust of the globe—that the shocks are nothing more than powerful electric shocks.

As earthquakes are local, those who dispute the igneous theory assert that if the interior of the earth were a molten mass, and earthquakes were caused by waves of this fluid, then the oscillations would be felt equally strong on every part of the earth's crust.

#### Explosions of Boilers.

On Wednesday, last week, a boiler exploded in a small factory belonging to Erhardt Beck, in Alder st., Phila., by which a number of persons were killed, and the building shattered to pieces. The boiler was an upright one, and the head was blown out. The Coroner's investigation established the fact that the explosion was caused by over-pressure of steam. It was a poor boiler, and was purchased second-hand two years ago, from another person who also had purchased it second-hand.

The following is the verdict of the jury:—"That Charles Eckhardt and Herman Eckhardt, came to their death by an explosion of a steam boiler in the manufactory of Erhardt Beck, Alder street, above Master, said explosion having been caused by gross neglect and carelessness, the said boiler being in an unsafe condition, and therefore the jury hold the said Erhardt Beck censurable."

There should be inspectors for boilers in every city, and no steam boiler should be allowed to be used without an Inspector's certificate. It is just as culpable to use such a boiler as the above in a factory, as to shoot a loaded cannon into a crowd.

#### Brittle Annealed Iron.

We have received another sample of brittle annealed iron from A. Hotchkiss, of Schnevus, Otsego Co. N. Y., which possesses the same characteristics as that described on page 184. The piece we then received was part of a plate; the piece we have now received is the fragment of a small tube. Where it was struck with a hammer it has broken off with an edge as clean as if it were cut with a chisel, and the appearance of it is like that of the cleavage plane of a crystal; the metal has evidently become peculiarly crystalline. It is easily operated upon with a file, but from its nature it is totally unfit for use in a machine.

#### Cast-Iron Connecting Links.

G. W. Hildreth, of Lockport, N. Y., suggests the use of cast-iron connecting links on railroad trains, as a substitute for the wrought-iron links in use. After mentioning some cases where connecting links broke when locomotives run off the track, thus saving the lives

of the passengers, he states that it would be well to make a certain provision for breaking the links when a locomotive or any of the cars run off the rails. He says, "the great difference between wrought and cast-iron links, is, the former will only bend by transverse strain, while the cast-iron will instantly break, and thus disconnect the cars. Should it be urged that cast-iron links will be subject to break readily by a sudden starting of the engine, the engineer will always get notice of this by means of the bell rope, which runs through the train, and a spare link can then easily be substituted."

#### The Missing Steamer Pacific.

At the time of going to press no intelligence of the steamship *Pacific* had been obtained. She left Liverpool on the 23d of January, and has, therefore, been out more than fifty days. The *City of Edinburgh*, a Scotch steamer, saw the cabin furniture belonging to some vessel on a field of ice, when on her last voyage to Europe; but there is no positive evidence that such furniture belonged to the *Pacific*. The current opinion respecting the fate of this steamer is, that she is lost. It is supposed that she came in collision with an iceberg during the night, while running at a high speed, making efforts to accomplish a short voyage, in competition with the *Persia*. This may, and may not have been the case. We have but faint hopes now of her safety; but we believe that some evidence of her fate will yet be gathered. But when we remember the fate of the *President* and the *City of Glasgow* steamships, not a relic of which has yet been found, so it may be the case with the *Pacific*, but we hope not.

#### Colored Flames.

Hydrogen gas burns with a blue flame; strontium with a red flame; copper oxyd with a green flame, and many substances with a yellow flame, such as the common gas used in our streets. The cause of this must be owing to the forms of the particles or atoms undergoing combustion. They must be of such forms as to reflect their peculiar colors, like a prism.

When boracic acid is present in minerals it is well known that they burn with a beautiful green flame; and Prof. Forbes, of Edinburgh, has recently discovered that chlorine produces the same result. A jet of chlorine directed upon the flame of a spirit lamp or coal gas, produces a jet of green flame. When burning alcohol is injected into a globe filled with chlorine gas the alcohol burns at the mouth of it with a flickering green flame. When hydrochloric acid is dropped cautiously on the flame of burning alcohol a greenish tinge is observable.

Hitherto a green colored flame has been considered by mineralogists and chemists as affording positive evidence of the presence of boron; but since it has been discovered that chlorine produces the same effect this test is valueless, especially when, as it often happens, chlorine and boron occur together.

#### Body Braces.

One of the London tailors has taken out a patent for a waistcoat which combines the two-fold convenience of being a waistcoat and a pair of braces at the same time. One of the English papers says: "It is a very happy thought, and very well rendered into a comfortable and most convenient garment."—[Exchange.]

Button eyelets may be sewed on the inside of a vest to answer the purpose of braces; but these should be made of some elastic substance. We, however, like the braces best. They are superior to any other means for upholding pantaloons, such as waist belts or back straps and buckles. Braces support the weight of the pantaloons from the shoulders, and is the most healthy method.

#### A Large Cargo of Cotton.

The ship *Morning Light* recently sailed from Mobile, Ala., with a cargo of 5869 bales of cotton, valued at \$251,217.

#### Natural Rights of Inventors.

We will publish, next week, an able article by the Commissioner of Patents on the above subject.