

MORE ABOUT FRICTION MATCHES.

As quite a number of fires in buildings have been caused by the ignition of friction matches, M. Lundstrom, of Jonkoping, in Sweden, in order to insure greater safety, has been manufacturing matches for the past year which can only be ignited by rubbing them upon a peculiarly prepared surface. The splints are tipped with a preparation of chlorate of potash, 6 parts; sulphide of antimony, 3 parts; glue, 1 part. The following is the preparation for the frictional surface on which these matches must be rubbed to ignite: First coat the surface (paper or wood) with a paste composed of glue and emery. When this is dry apply the following: amorphous phosphorus, 10 parts; sulphide of antimony or peroxyd of manganese, 8 parts; glue, 4 parts; made into a paste. This method of making friction matches divides the igniting and oxygenating substances, and renders them less dangerous, but not so convenient. We like the complete match in itself, independent of a frictional phosphorus surface to rub it upon, but in houses where there are children the new matches are certainly more desirable for safety. One pound of phosphorus is sufficient for tipping 1,000,000 matches.

The extent of the match manufacture appears almost fabulous. The total number of matches made in the United States, has been estimated at 7,000 gross of boxes daily. Mr. Partridge, of New York, is said to be the largest manufacturer. His match works, in order to obtain wood conveniently, are situated in the timber region of Lewis County, N. Y. In Herkimer, N. Y., there is also an extensive manufactory of matches and friction patent fire kindlers. There are also several other similar match establishments in various parts of the country.

In London there is one match establishment which makes 33,000,000 matches weekly, but vast quantities are also imported from the continent of Europe into England—Sweden alone furnishing to London 1,500 tons of them yearly. In Paris 990,000,000 boxes of matches are manufactured annually.

Austria, however, is the greatest country in the world for manufacturing matches. In 1849, 200 tons of them were exported from the port of Trieste alone.

The use of phosphorus in the match manufacture used to produce a terrible disease in those engaged in dipping the splints. Their teeth were first attacked, then the jaw bone, which rotted away gradually, and no antidote was ever found for it. Many operations have been performed in the New York Hospital for this disease. In some cases the entire jaw bone has been removed, in others part of the bone, the patients generally recovering.

Thorough ventilation of match manufactories, personal cleanliness and the use of amorphous phosphorus instead of common phosphorus, have been the means of decreasing the number of victims to this disease. The friction match is a humble but most convenient representative of modern civilization, applied to the useful rather than the ornamental arts. It is found in the palace and the wigwam, and is an indispensable servant of the prince and the peasant.

In the London *Chemical News*, August 30, which has come to hand since the above was penned, Dr. H. Dumbard, in a letter, states that the jaw disease produced by phosphorus is a cancerous ulceration. He recommends those who are exposed to the fumes of this substance to smoke cigarettes which have been dipped in a very weak arsenical solution. It is his opinion that this will prevent them from being attacked with the disease.

NATIONAL RIFLE CLUBS.

We have received a circular containing the rules and regulations of the "Central New York Rifle Club," an association which was formed in 1848, with John R. Chapman, C.E., of Oneida Lake (author of the "American Rifle"), as president; J. D. Owen, of Syracuse, as secretary; and Wm. Malcolm, as treasurer. It is formed upon the basis of the German and Swiss rifle clubs, and some knowledge of its rules and regulations may be of general interest to those who are now taking measures to form such clubs throughout our country.

The object of the Central New York Rifle Club is stated to be "the furtherance of the noble art and science of rifle shooting, both at rest and off-hand, by gathering together once every year the members of

said club, for the purpose of competing for such prizes and on such terms as the committee of management may deem prudent. Any person who is an inhabitant of New York State may become a member of this club upon the payment of \$5, which is applied to purchase suitable prizes for the annual shooting match, held on New Year's Day.

The rules for conducting the shooting matches permit every candidate for a prize to use a rifle of any construction and mode of sighting suitable to himself. They say "it is not just to cramp the invention and ability of our mechanics and marksmen by arbitrary rules and regulations on these points."

This is a just and enlightened rule. There are several rifle clubs in New York and its vicinity, principally composed of Germans and Swiss, who have annual matches for prizes, but their rules are arbitrary and absurd respecting the sights of rifles, none but "open sights" being permitted. The term "rifle practice at rest" means, by the rifleman's rules, that the muzzle end of the weapon be rested only, the butt plate being held against the shoulder or top arm muscle. The term "rifle practice off-hand" means that the marksman shall stand up, and use nothing except himself and his weapon; but having a perfect right to hip, or rib his elbow, or use off-hand clean, as he pleases.

All matches are decided by a string of shooting of no less than threeshots, and all strings are measured from the center of the target to the center of each shot, the aggregate distance being the length of the string. Each string shot is measured, counted and plugged in the target, and every marksman furnishes a target for himself.

The size of the targets are as follows: For twenty rods distant, 12 inches square; thirty rods, 18 inches square; forty rods, 24 inches square; fifty rods, 36 inches square; sixty rods, 48 inches square; and so on, in proportion to the distance.

As a general rule, all accidents and blunders which may befall a marksman in shooting a string, when caused by his own carelessness, are counted against himself; those which may be fairly attributed to his weapon are overlooked. A sufficient number of impartial judges are chosen to settle all questions of difference which may arise, and see that the rules are effectually carried out.

DISCUSSION ON THE PATENT LAWS IN ENGLAND.

Many of the English papers are discussing Sir William Armstrong's remarks in opposition to the protection by law of a man's property in inventions. The London *Engineer* quotes from "an old American tract, written by one Professor Daniel Treadwell," to prove that Armstrong's mode of constructing his cannon was tried on an extensive scale 20 years ago in this country, and the fact was generally known among the gunmakers of England! Professor Treadwell says:—

My observations upon the lodgment have been made upon wrought-iron cannon. Between the years 1841 and 1845 I made upward of twenty cannon of this material. They were all made up of rings or short hollow cylinders, welded together endwise. Each ring was made of bars, wound upon an arbor spirally, like winding a ribbon upon a block, and, being welded and shaped in dies, were joined endwise, when in the furnace and at a welding heat, and afterwards pressed together in a mold by a hydrostatic press of 1,000 tons force. Finding in the early stages of the manufacture that the softness of the wrought-iron was a serious defect, I formed those made afterwards of a lining of steel, the wrought-iron bars being wound upon a previously formed steel ring. Eight of these guns were 6-pounders of the common United States bronze pattern, and eleven were 32-pounders of about 80-inch length of bore, and 1,800 lbs. weight. Six of the 6-pounders and four of the 32-pounders were made for the United States. They have all been subjected to the most severe tests. One of the 6-pounders has borne 1,500 discharges, beginning with service charges and ending with ten charges of 6 lbs. of powder and seven shot, without essential injury. It required to destroy one of the 32-pounders, a succession of charges ending with 14 lbs. of powder and five shot, although the weight of the gun was but sixty times the weight of the proper shot.

The *Engineer* asks:—

What is the substantial difference of structure between the gun described in Professor Treadwell's pamphlet (a copy of which has been deposited in the library of the Institution of Civil Engineers) and the guns patented in 1855 by Captain Blakely and in 1857 (?) by the then Mr. W. G. Armstrong? Professor Treadwell's description would answer, almost exactly, for that of gun-making at Woolwich; except that, in the Woolwich and Elswick guns, the "steel ring"—at first used for the chase—has been abandoned for wrought iron, apparently for no other reason than to evade, if possible, Captain Blakely's patent.

It seems that Mr. Armstrong, having picked up

these old inventions and patented them, and sold the patent to the English government for \$100,000, having been knighted for the inventions, and having made immense profits in manufacturing ten millions of dollars worth of his guns for the British army and navy, now that all which is original in his patent is proved by experience to be impracticable and useless, and all that is of any value is the invention of others, suddenly comes to the conclusion that the patent laws ought to be all swept away!

In the discussion which this proposition has drawn forth it is gratifying to see how clearly the English writers perceive that the opposition comes from a few masters of industry who wish to keep their workmen down, while those beneficent laws protect all thinking men, rich and poor, in the fruits of their original ideas, which, more clearly than any other possessions, are their own rightful property.

If our friends over the water attach any importance to our experience in the matter, we can tell them that the propriety of patent laws is thoroughly established in our convictions. We regard them and our common schools as the two great corner stones of our prosperity.

SUBSTANCES THAT WILL CRYSTALLIZE AND THOSE THAT WILL NOT—A NEW SEPARATION.

The eminent chemist T. Graham, Esq., F. R. S., Master of the Mint, recently read a paper before the Royal Society in London, on a new mode of separating substances like sugar and salt, which will crystallize, from those such as gum, which will not. Mr. Graham calls the class that will crystallize *crystalloids*, and those that will not, *colloids*.

The *crystalloids* in solution are free from gumminess or viscosity, and are always sapid or have a positive taste.

The solution of *colloids* has always a certain degree of viscosity, and they are insipid or wholly tasteless. Starch, the vegetable gums, tannin, albumen and vegetable and animal extractive matters belong to the class of colloids.

Mr. Graham finds that these two classes of substances may be separated from each other by the mysterious operation of osmose. He constructs a vessel in the form of a sieve with a flat hoop of gutta perch and a bottom of animal membrane, like bladder, or of the paper called "vegetable parchment," and pours the solution containing the mixture of the crystalloid and colloid into the vessel to the depth of half an inch, and then floats the vessel on the surface of water. The crystalloid passes down through the membrane by osmose, and the colloid remains. Mr. Graham gives to this mode of separation the very appropriate name of *dialysis*.

Great Rifle Guns.

In the Elswick Ordnance Works of Sir William Armstrong & Co., near Newcastle, England, no less than 3,000 men and boys are continually employed. A great 300-pounder battery gun is about to be constructed there for the British government. Its bore will be 10½ inches; length, 14 feet; weight 12 tons; and is to be a muzzle-loader. A 200-pounder breech-loader is now being manufactured at these works, and from six to eight rifled guns, of various calibers, are turned out weekly.

On the recent occasion of a large invited party visiting these works, Mr. R. Lambert, one of the proprietors, stated that they had fired bolts of 700 lbs. weight from one of their 100-pounder guns without the least appearance of bursting it. He also said:—"A question of great interest had to be solved, viz - whether artillery could be made to break the strongest and heaviest iron plates with which ships could be protected. If he might venture on a prediction as to the solution of this question, it would be that they would manufacture Armstrong guns which no plates that any vessel could carry and float, could have any chance of resisting."

A TERRIBLE steambot disaster occurred on the 25th ult. on the Sacramento river above the city. The J. A. McClelland, an independent steamer, running to Red Bluff exploded, killing fifteen certainly and probably many more of the passengers. Twelve were scalded, some of whom have since died. Among the victims are Capt. Webster, Z. Gardner, C. S. Howell, Jos. Aceja and Jas. Morrow, of Sacramento.