The Ames Monument.

To commemorate the services of Oliver and Oakes Ames in connection with the building of the first railway across the United States, connecting the Atlantic with the Pacific, the Union Pacific Company are erecting a granite pyramid on the highest point near its track. The monument is now nearly finished. It is 60 feet square at the base and 60 feet high, laid up in undressed red granite, in a style calculated to last for centuries. On the west side is a medallion bust of Oakes Ames, 9 feet high, with the date of his birth and death. On the north is the inscription: "In memory of Oakes Ames and Oliver Ames." On the east side the bust of Oliver Ames has yet to be placed. The top is rounded off, and does not make an acute angle. The cost is said to be nearly $90,000.

A Curious Tree.

Lieutenant Houghton, who has recently visited New Guinea and several other groups of islands in the Pacific, reports the existence of a prehensile tree. It appears to be a species of ficus, allied to the well-known banyan-tree, which throws out from its branches air roots, that eventually reach the ground, and take root there, and in their turn become new stems, which perform the same function; so that a single tree will eventually extend so far as to form a complete forest, in which the stems are united by the branches to each other. The prehensile tree in question similarly throws out from its branches long, flexible tendrils, which, touching the ground, do not take root there, but twine around any article that may lie within their reach. After a time these *quasi* branches contract, so that they fail to reach the ground; but the finger-like processes continue to closely gripe the article round which they have twined themselves, and which are consequently suspended in mid-air. In this way, articles of considerable weight may be literally picked up from the ground and held in suspension.

Aluminum.

At the recent meeting of the British Association, Mr. Barlow read a paper "On the Mechanical Properties of Aluminum." This metal is used chiefly as a substitute for silver, but the author had found it to be exceedingly strong in proportion to its weight. Experiments had been carefully made for him by Prof. Kennedy, from which its valuable properties of ductility, tensile strength, and elasticity were fully demonstrated. This was well illustrated by the comparative length of rods of uniform section, but of different metals, which could be suspended without rupture, the lengths in the case of steel and aluminum being equal and exceeding all others. Unfortunately it is an expensive metal, and the process by which it is at present extracted leaves little hope of its use being greatly extended. Sir H. Bessemer said he did not think any metal could be depended on like the one in question, from the small part its weight took in producing its rupture. He exhibited a key of the material (about the size of a large latch key), and it was stated that forty-five of these would only weigh one pound.

OBSERVATIONS upon Russian railways have resulted in showing that for the period of six months 77 per cent of the fractures of tires occurred when the temperature was below zero, 4 per cent at zero, and only 19 per cent at higher temperatures.

IMPROVED CIRCULAR SAW MILL.

We present an engraving of a circular saw mill lately introduced by the Taylor Manufacturing Company, of Westminster, Md. Circular saw mills have, to a certain extent, displaced the reciprocating mills, and are now chiefly used in the manufacture of lumber. The improvements made in saws in the last few years have done much toward bringing the circular mill into popular favor. To keep pace with these and other improvements, and to more perfectly meet the wants of saw mill men, the mill illustrated has been designed.

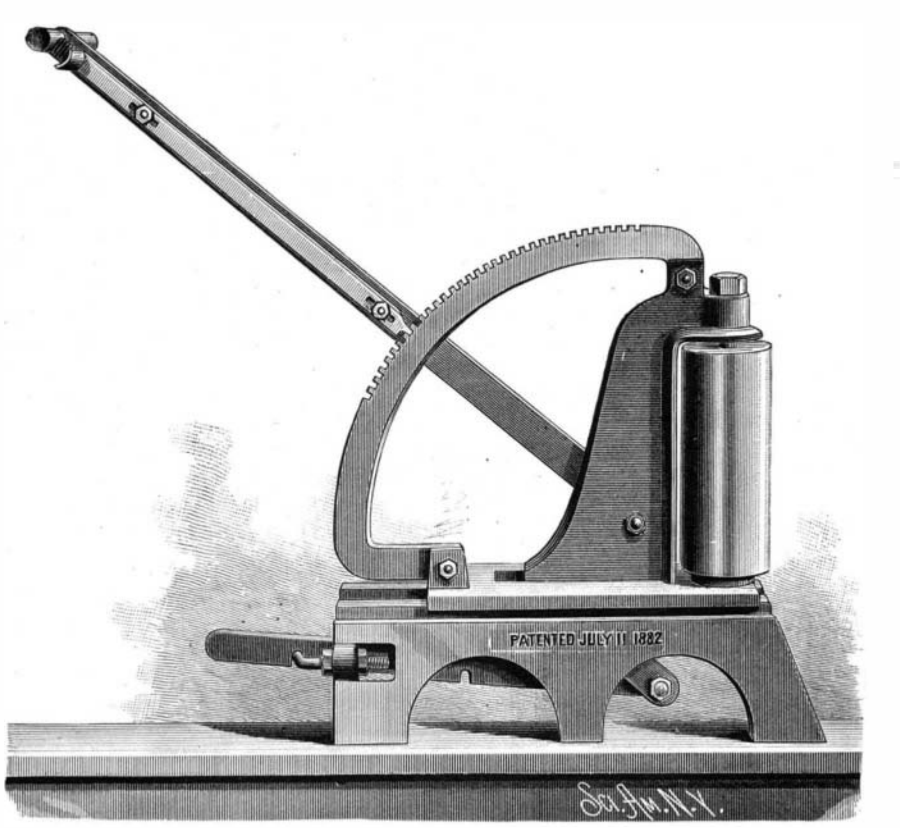

Fig. 1.—GAUGE ROLLER.

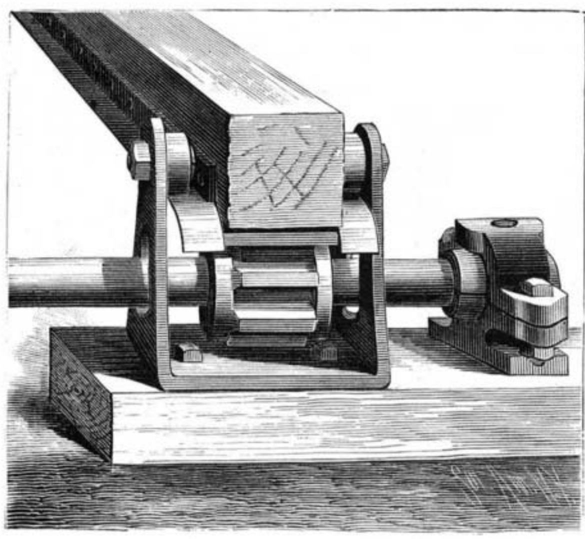

Fig. 3.—EXTENSION GUIDE.

There is probably no machine made by which purchasers are in so great danger of being misled by appearances as in circular saw mills. The chances for deception are numerous; circular saw mills cut so much faster than old fashioned sash or muley mills, that they seem to be doing wonders, and are liable to deceive those who are not familiar enough with the subject to know how much a mill should do. They work very fast, and when the stuff is badly sawed, as is invariably the case when a mill is built regardless of quality, so that it can be sold at a low price, the loss is very great.

The object of the manufacturers in designing this mill is to furnish the machine at a fair price, and at the same time present entirely new valuable features in construction and design. The main frame is of cast iron, of girder shape; it is well proportioned for strength, and being cast in one piece cannot spring out of line. The mandrel is made of steel, and of large diameter so as not to spring. The mandrel boxes are self-oiling, and have large bearing surfaces; they are provided with an ingenious device for giving lead to the saw. The feed and the backward motion of the carriage are operated by friction, thus doing away with belts and complicated gearing. There are three fixed changes of feed operated by one lever, and the feed can be varied or stopped instantly by a slight movement of the lever. The gigging back is controlled by the same lever, and can be speeded slow or as fast as seven hundred feet per minute. This rapid gigging back saves much time, and is secured without any injurious jar on the machinery, as the movement of the carriage is gradual to its fastest speed. A rapid movement for setting up the log to the saw is secured by the combined gear for moving up the head block, and a novel quick-acting accurate gauge roller. This gauge roller, shown in Fig. 1, is placed on the end of the frame in front of the saw and at the feed lever where the sawyer stands, thus being convenient to his hand. The roller is operated by one lever to set it in position, and the lever is held in place by a latch in notches cut in an arc, as shown in the engraving. These notches are marked in one-quarter inches, and serve as a rule to saw by, so that the sawyer only has to set the roller, and an attendant who rides on the carriage brings the log up to the gauge-roller, while the carriage is moving toward the saw, and the result is the lumber is sure to be straight, and of whatever thickness the roller is set for. The connections of the lever to the gauge roller are provided with an adjustable link, by means of which all lost motion of parts connecting the roller and the lever can be corrected and the roller always kept true to the saw and the figures on the notched arc. This adjustment can also be used for setting the roller to any fraction less than a quarter inch; for instance, for lumber that is one inch full, or one inch and an eighth, and so on, it is only the work of a few minutes to set the roller for it. This gauge roller is an entirely new feature, and has been patented. It is very important on any saw mill, and is applicable to all mills.

Another very important feature of this mill is a continuous log beam in combination with a main head block for dogging the log. This log beam extends the whole length of the carriage, and is arranged every eighteen inches of its length with fending blocks that are dovetailed into the beam as shown. The blocks virtually serve as head block knees in keeping the lumber to the saw and prevent its springing, and the face of these blocks can be trued in perfect line with the saw by taking a cut-off of them after the mill and carriage has been set in position, and it may be kept true by same means, and when worn out can be replaced. It can readily be seen that the lumber, by having to pass between these blocks, and the gauge roller and the

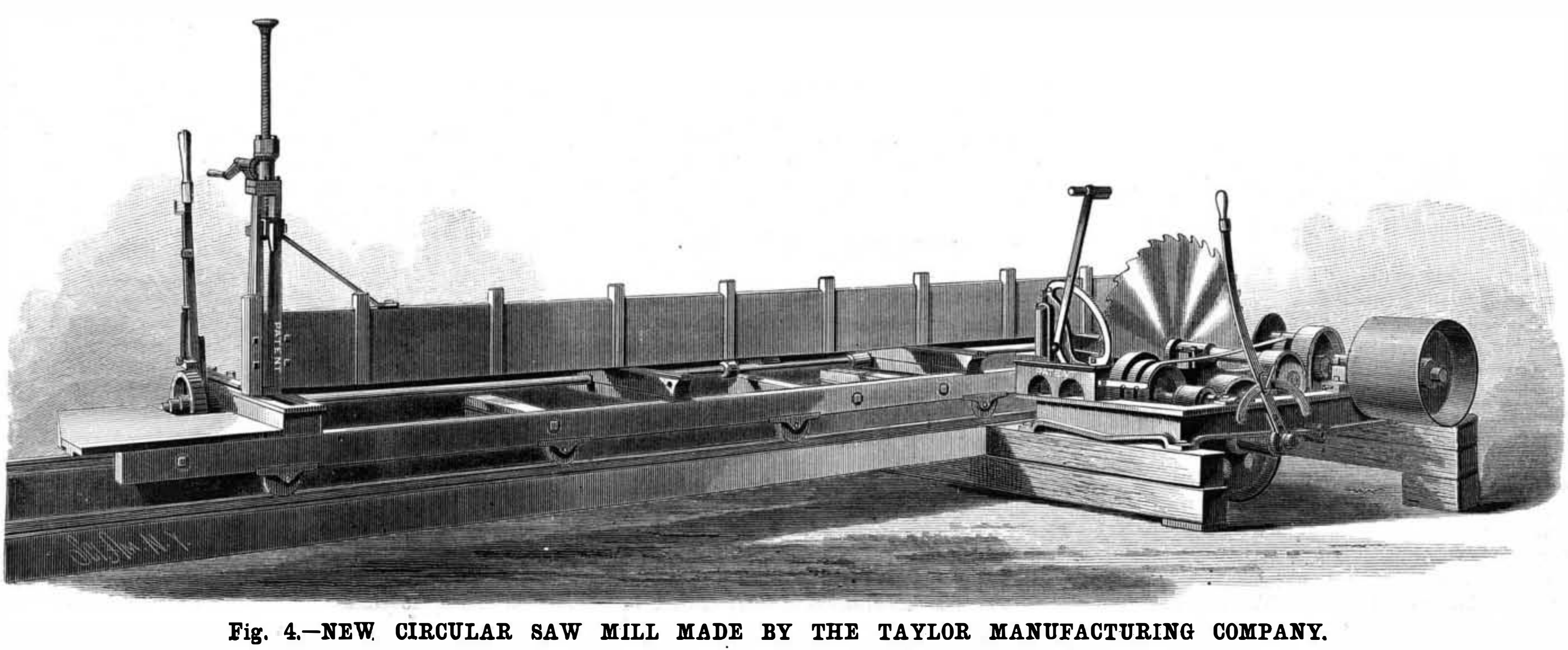

Fig. 4.—NEW CIRCULAR SAW MILL MADE BY THE TAYLOR MANUFACTURING COMPANY.

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face of the blocks being true to the saw, straight and even lumber only can be produced, it being impossible, if the saw is in proper order, to saw bad lumber. This is a novel and important feature.

The log beam is made of three pieces, in box form, and is very rigid. It is secured to the elbows of the head blocks, three of which go with twenty-four feet of carriage, and two short elbows that fit into back of log beam, and one main dogging block at end of beam, as shown in cut. Combined in the elbow of this main block is an ingenious device for dogging or holding the log in place on the carriage. This dog is the only one needed on the carriage, it is very complete, and being part of the head block proper is very rigid and strong. The dog is arranged in a cross-head that slides up or down in the elbow; through this cross-head the dog can be made to project so as to fasten well out on a rough log while it is being slabbed, or it may be set for holding the last board one inch thick. It is held securely in place by means of a clamping device, and cannot come in contact with the saw. The cross-head and dog are operated by a long screw that is threaded its entire length, and engages two half nuts that may be opened and closed, and by which the screw and dog are held suspended at any point, or released, and when dog is lifted to the top of elbow out of the way of log as it is rolled into the head blocks by releasing the two nuts the cross-head dog and long screw will drop down, and the weight of all together will force the dog into the log sufficient to hold, and if it does not the nuts can be engaged into the screw, and by turning the handle shown at top of elbow, the dog can be forced into the log as far as desired, and by the turning of the same crank the dog can be pulled out of the log, and when out of the log can be drawn quickly to top of elbow by releasing the nuts and lifting by the end of the screw that projects out of the top of elbow. This whole movement is very rapid, and is accomplished by a man riding on the carriage. The dogging and setting up of the log can be done while the carriage is in motion, and according to directions given by the sawyer. It is evident that by such arrangements the saw can be kept in the log a greater proportion of the time than with other mills where the sawyer sets up the logs and must stop the carriage to do so. A detail view of the main dogging block is given in Fig. 2.

A plain lever with simple ratchet arrangement is used for moving the elbows of head blocks. A figured rule is also arranged on the main head block, so that the man at the head block can keep tally with the gauge roller and also use it for slabbing. The shaft connecting the head blocks is of large diameter, so as not to spring nor twist in bringing up the log. The carriage is strong and well braced and held together by iron rods and extensions at each end, eight feet long, which allows a log to be sawed full length of the carriage; on each side of extensions there are guides, Fig. 3, that run in rollers and prevent the rack on the extensions from springing out of the pinion and tearing off the cogs. This allows of the sawing of pieces 10 feet longer than the carriage. It is an improvement peculiar to this mill, and any one familiar with mills will understand the importance of it. The rack is wide on the face, and cogs are large and strong. The rollers under the carriage are of large diameter and strong, one being flat and the other being flanged on both sides so as to run over a regular T rail, same as used on railroads, which runs easier and less wear than the V-shaped track used by other builders, and the track being high is comparatively free from being covered with sawdust.

The company build five sizes of circular saw mills; the mill shown in Fig. 4 being their No. 3 mill, or medium size. No. 5 mill, called the plantation mill, is the smallest size. No. 1 is their largest mill, suitable for heavy engines, and built to stand the heaviest kind of work; feed belt is six inches wide, and feed of carriage to saw three and four inches.

For further particulars address Taylor Manufacturing Company, Westminster, Md.

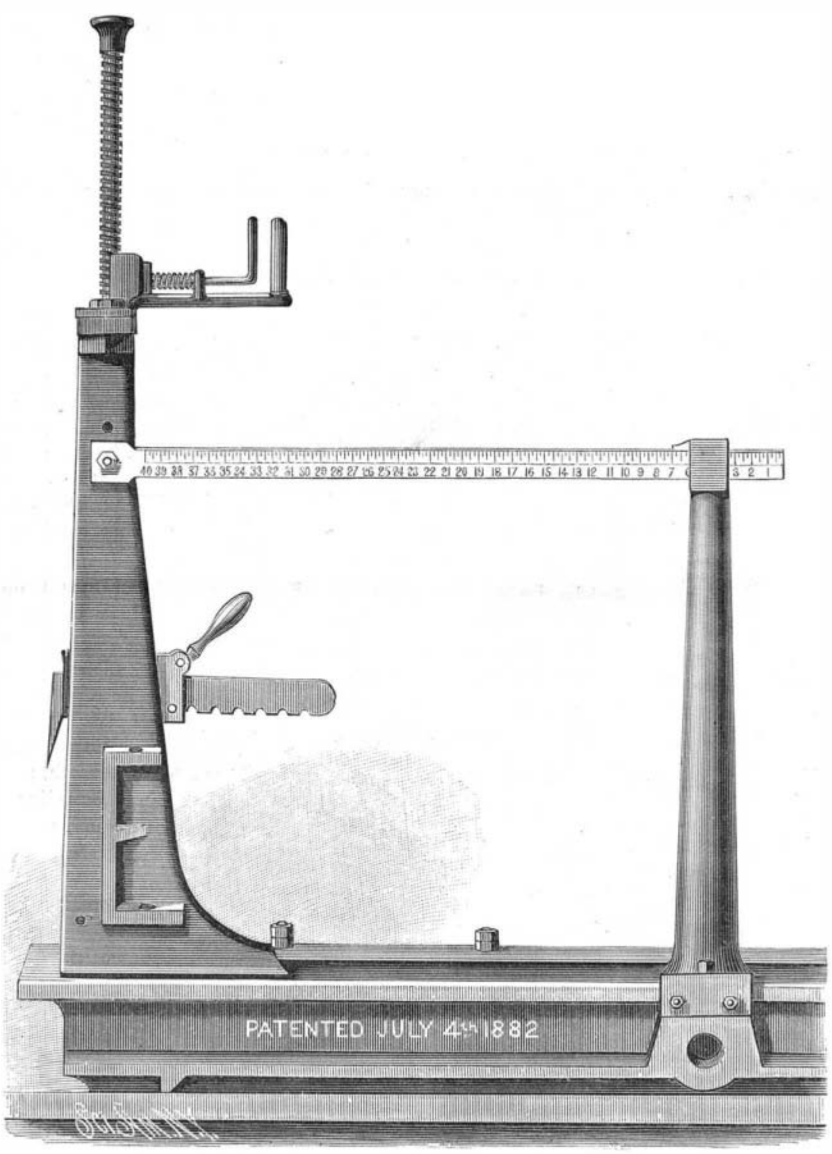

Fig. 2.—HEAD BLOCK.

Enameled Cloth.

As a substitute for leather, enameled cloth is now largely used where lightness and pliableness are desirable. Having the appearance of leather, and nearly, if not quite, its durability, it is used where strength is not so important as a good appearance. In the covering of carriage tops, the upholstering of furniture, the covering of trunks and traveling bags, a great quantity is used, and it is also employed in garments, coverings, etc., as a protection from water. Enameled cloth originated in America, and was first made at Newark, N. J., in 1849. The details of its manufacture are very simple, and can soon be told. The foundation of the article is cotton cloth of the best quality, and generally made expressly for this purpose. The cloth is taken from a bale and wound upon a large cylinder preparatory to receiving its first coat. It is then passed between heavy iron rollers, from the top one of which it receives its first coating of composition. In many places the covering is spread by a knife under which the web passes. The composition is made of linseed oil, lampblack, resin, and a few other ingredients, which are boiled together till they reach the consistency of melted tar. From between the cylinders it is carried to a drying frame made in the shape of a reel, and subjected to a high temperature in the drying-room, which is heated generally by steam pipes. After the drying process it is given to workmen who make all the rough places smooth by rubbing with pumice-stone and water. The cloth is then passed through the same operation as before, rolling, drying, and rubbing, and this is repeated from three to five times, or until the required thickness has been laid on. After the last scrubbing down, the fabric is taken to another department, thoroughly varnished, and again passed through the heater. It now appears as a piece of cotton cloth, with one black side looking very much like patent leather. One step yet remains to be taken. The cloth is passed between heavy rollers, which cover its surface with regular indentations resembling the grain of leather. It is now ready for the market. We venture to say that as many frauds are perpetrated in this article as in any other article that can be mentioned. Manufacturers who desire to turn out a heavy material first fill the cloth with clay, and the result is an enamel that will crack during the cold weather of winter, or, in their endeavor to turn out a cloth that will stand a low temperature without cracking, they fill the merchant's shelves with material that will be sticky in summer. The poor quality is used in the cheap trunk and bag trade, but none but the best will do for the outside wear that comes upon carriage tops. Taunton turns out the best line of goods of this description that comes to the market.—*Manufacturers' Gazette.*

Baked Angle Worms.

The *Pall Mall Gazette* (London) gravely reports that a group of French gourmets have tested the edible qualities of the common earth worm, whose agricultural services have been so recently demonstrated.

"Fifty guests were present at the experiment. The worms, apparently lob-worms, were first put into vinegar, by which process they were made to disgorge the famous vegetable mould about which we have recently heard so much. They were then rolled in batter and put into an oven, where they acquired a delightful golden tint, and, we are assured, a most appetizing smell. After the first plateful the fifty guests rose like one man and asked for more. Could anything be more convincing? Those who love snails, they add, will abandon them forever in favor of worms."

Explosives from Tar, Pitch, Coal Dust, and Peat.

Two years ago, Hellhoff, of Berlin, patented a process for making explosives from crude coal tar oils by direct nitration with strong nitric acid. The mixture of various nitro-substances thus obtained was washed and dried, then mixed with oxygenated substances. The alkaline nitrates, chlorate of potash, and the strongest nitric acid served for this purpose.

Experience gained by the long-continued manufacture with aid of steam proved that the separate fractions of the crude tar oils, even those of the highest boiling point, were capable of nitration, and gave a satisfactory yield of nitro-derivatives.

The question naturally arose whether the tar itself could not be nitrated and utilized for making explosives. Experiments made in this direction soon proved that the treatment of coal tar with strong nitric acid was a very dangerous operation, that its employment on a large scale would be attended with great difficulties, and the greater part seemed to be burned up and lost. In subsequent experiments, therefore, an acid of 1·53 to 1·45 specific gravity was employed. The liquid tar is gradually stirred into the acid, the surface of the acid becoming covered with it. After a while this layer of tar contracts on stirring and settles slowly to the bottom. After about ten minutes the mass at the bottom puffs up, and gradually changes from a liquid to a solid or pasty state. The completion of the operation can be recognized by the mass rising from the bottom and spreading itself evenly over the surface. When the acid has been all used up the tar which is added no longer contracts and settles to the bottom. The chemical changes does not produce an excessive amount of heat, so that cooling is unnecessary.

The product thus obtained is well washed with excess of water, and the sour wash water that remains in its pores is expressed out. The purified product is then mixed with the oxygenated bodies above mentioned. One part by weight of the product dissolves very slowly with the evolution of but little heat, in three parts of nitric acid, specific gravity 1·52.

All these mixtures gave new explosive compounds of different degrees of violence. The power possessed by a solution of these new nitro-derivatives in concentrated nitric acid is evident from the fact that a small quantity of it, when exploded by a double dynamite exploder, was able to shatter an iron shell.

Owing to the varying composition of the tar, it is impossible to give the exact proportions in all cases of the oxygenated substances which must be added, but in the experiments it was found that two to five parts of concentrated nitric acid (chloric acid), or four to six parts of the salts, were sufficient for one part of the nitro-derivative. The great advantages offered by this process are: cheapness of the material to be acted upon, the cheapness of the lighter acid used (the difference is about 60 per cent), and finally in the quiet and regular manner in which the operation takes place, permitting of the use of more simple and less expensive apparatus, etc.

These favorable results led to further experiments upon the pitch, the paraffines, etc., as well as the mineral oils. The possibility of nitrating the latter seemed probable from their great similarity to the crude tar oils. Experiment, in fact, proved that they reacted exactly alike. But the strongest nitrating agents are required to act upon the purified mineral oils used for illumination. A mixture of equal weights of the strongest nitric and sulphuric acids, or a mixture of an alkaline nitrate with sulphuric acid, was employed.

On paraffines and similar products the weaker acids are as ineffective as on purified mineral oils. By the action of the nitrating agents mentioned upon purified mineral oils, nitro-compounds were precipitated of a light yellow or light brown color having the external appearance of rancid fat. These products are difficultly soluble even in the strongest nitric acid. Pitch treated with nitric acid of 1·45 to 1·52 specific gravity gave a yellow-brown solution, and from this light yellow to brown scales separated on washing with water. The oil and pitch from wood tar were treated with the weaker acid (1·45), and those from brown coal and stone coal with the stronger acid (1·52). The products thus obtained are easily soluble in strong nitric acid with slight evolution of heat. These nitro-compounds when mixed with oxygenated bodies also form powerful explosives, but the quantity of the latter used must be two to four times greater than that added to nitro-derivatives of tar. There is no special advantage in working these materials as compared with tar or even the tar oils, for a high grade of acid must be used, while the increased quantity of oxygenated salts raises the price still higher. Still, this process is of some importance in so far as pitch is concerned, since the price of tar is likely to increase as more uses are found for it.

All the special products of the distillation of coal having

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been found capable of being converted into explosives by nitration, it only remained to try an experiment on the original materials, coal and peat. Wood was excluded from the list for its conversion into an explosive (pyroxyleine) had already been accomplished by Trauzl. It was found that the direct conversion of coal into an explosive by extracting the nitro-products, would involve very expensive and tedious manipulations. After numerous unsuccessful experiments, in which the product was either completely burned up, or the coal was but slightly acted on, we were induced to try a gradual nitration. The coal, in form of a fine dust, was first treated with weak nitric acid, specific gravity 1·40 to 1·48; the weight of acid required was ten times that of the coal used. When stone coal was introduced slowly into the acid the rise in temperature was inconsiderable, and some hyponitric acid was formed. The action was much more violent in the case of brown coal, and least so with wood coal. After the operation with any coal, a large portion of the material to be nitrated remained apparently unaffected, and formed a thick sediment on the bottom of the vessel, while the nitro product was dissolved in the acid layer above and imparted to it a light brown color—with brown coal nearly a black color. When this fluid layer was well washed with water, the nitro product was thrown down as a fine brown powder. This precipitate was filtered out, and washed repeatedly until the wash water was no longer acid. The sediment was also washed several times to remove the exhausted acid, then dried and finally treated with the most concentrated acid. It separated into two layers, the liquid one was treated just as before described, to obtain the nitro product suspended in it. Again the precipitate was brown, either light or dark. The solid residue was again washed and dried, then treated with the most powerful nitrating agents. In this way we succeeded in converting nearly all the brown coal and stone coal into nitro bodies, as well as the larger portion of the wood coal.

The yield was scarcely sufficient to compensate for the large consumption of acid, especially with the wood charcoal and coke. All the nitro products obtained are nearly alike in color, state of aggregation, and other properties. They are insoluble in water, soluble in alcohol, and the most concentrated in nitric acid, and burn with strong aromatic odor. They are heavier than water.

The results of experiments made on peat were considerably more encouraging, different kinds being tried. A firm, solid kind called "bog peat" (*Moortorf*), from Lüneburg, was tried after a small test had shown that the reaction would not be too violent. It was first subjected to the action of equal parts by weight of the strongest nitric and sulphuric acids for several hours. The substance changed color from dark brown to dark red. Ignited in the air it burned with a lively flame and strong, aromatic odor. When soaked in a solution of chlorate of potash and dried, it formed a powerful explosive. If the same peat was well pounded before the nitration so that the humus substance was separated from vegetable fibers, and a larger surface was exposed to the powerful action of the acids, the earthy humus constituents were converted into a dark brown liquid, sticky nitro-body, have the external characters of that obtained by nitrating the heaviest tar oils. Its action when mixed with oxygenated bodies is also just like the latter. The other nitro substance, formed from the finely divided fibers left in the dry distillation that attends the formation of peat, yields an explosive without any admixture of an oxygen-bearing salt. In the open air it burns very rapidly, leaving a slight carbonaceous residue.

Peat containing animal admixtures acts just like this bog peat. Peat that seemed to be of later formation would not bear the action of concentrated acids. There was a violent evolution of hyponitric acid, and in spite of the most careful cooling the heat became so great that there was danger of its reaching the ignition temperature of the nitro-derivative, so that the process had to be interrupted. The same peat was then mixed with ordinary commercial nitric acid, specific gravity 1·35, and as the action of this acid was scarcely perceptible, concentrated acid was gradually added until the process began to be quite violent. The acid had then been brought up to a gravity of 1·45. After the reaction had gone on for several hours with careful cooling, the product was washed and dried. This is also an explosive without the admixture of the oxygenated body, but not so strong as that made from bog peat with the stronger acids.

Others of the newly prepared nitro derivatives, especially those from the crude tar oils by repeated nitrations, form explosives alone; but they are always weaker than when mixed with oxygenated bodies.

The manufacture of explosives from peat, owing to the cheapness of the material and its wide dissemination, as well as the simplicity of the process, is doubtless an important step in advance.

The chief characteristics of the newly-prepared nitro-substances are the following: The specific gravity of all is very nearly that of water. They all possess a powerful aromatic odor, resembling the fruit ethers, which is particularly noticeable on burning them. All solutions of these substances have a strong refractive power. The greater part of them are soluble in the strongest nitric acid, as well as in alcohol; they are all insoluble in water. In the open air they all burn with a bright, but more or less smoky flame. Their molecules are so slightly united that they can be exploded alone or mixed with oxygenated substances, by simple ignition.—*Deutsche Industrie Zeitung, No.* 36.

The Microphone and Fire Damp.

A new application of the microphone to the determination of the position of nodes and ventral segments in columns of vibrating air has been communicated to the Academy of Sciences by M. Lerra-Carpi. The microphone is mounted on an elastic membrane stretched over a little drum, and then lowered into the sounding pipe. When the apparatus came to a node, the telephone in circuit with the microphone gave out a rumbling sound, similar to that caused by an induced current. On the other hand, when the microphone passed a belly the sounds become very faint and rare, while at intermediate points they increased or diminished according as the microphonic sounder was brought nearer to a node or a belly. It is believed that the microphone may thus be made useful as a detecter of fire damp in mines. According to some observers such explosives are always preceded by undulations too feeble to be detected by the human ear, but these latter would be revealed by a system of microphones placed at intervals through the mine.

APPARATUS FOR CHANGING CAR TRUCKS.

The engraving shows a novel device for facilitating the changing of the trucks of railroad cars when the cars are to pass upon a track of different gauge. The invention consists of a platform or frame raised and lowered by means of eccentrics, and provided with rails corresponding with stationary rails placed at a lower level than the rails of the main line and sliding tracks, and at right angles therewith, and carrying a transfer-truck to receive and carry the car trucks. In combination with the eccentrics carrying the

ATKINSON'S APPARATUS FOR CHANGING CAR TRUCKS.

platform or frame there are chain-wheels, chains, and a capstan, by which the eccentrics can be readily operated to raise and lower the truck receiving the platform or frame.

By means of this apparatus a train of cars can be transferred, or all of the trucks changed, without disconnecting the train. All that is necessary to do is to back the train over the apparatus and transfer the trucks in the manner illustrated by the engraving.

This invention has been patented by Mr. Geo. W. Atkinson, of Petersburg, Tenn.

Cotton Manufacturing in the South.

The development of cotton manufacturing in the South is one of the most notable and promising industrial occurrences of the day. Not merely because of the rapid growth of the business, but more because of its appropriateness and apparent profitableness. The conditions would seem to be altogether in favor of the Southern mills, so far as the supplying of their home market is concerned at least, and it remains to be determined whether they have not also marked advantages in the competition for control of the markets of the West. The larger part of the charges for freight, jobbers' commissions, storage, insurance, etc., which the Eastern mill owner has to pay, the Southern mill is exempt from; and the difference from $2 to $3 a bale in freight alone is clear saving.

The Baltimore *Journal of Commerce* estimates the actual capital now invested in Southern cotton mills at $50,000,000, of which nearly one-third has been invested within two years.

Touching the prosperity of these Southern mills the *Journal* says that ten per cent annual dividends are the lowest reported, and this after a large amount has been taken from the earnings for increasing the size and capacity of the mills. Under more favorable conditions the dividends have been much larger, as in the following instances:

The Augusta, Ga., factory, the oldest mill in that city, has a capital of $600,000, and runs 26,200 spindles and 790 looms; from 1865 to 1882, 17 years, it has paid out in cash dividends $1,467,000, or about 2¼ times its capital, or an average of 14½ per cent per annum; besides this it has laid aside a surplus of between $340,000 and $350,000, or over 50 per cent of its entire capital; its stock is worth from 160 to 170. The Langley mill of the same city has a capital of $400,000, with 10,000 spindles and 329 looms; it has paid in the past 3½ years 47½ per cent dividends, or an average of about 15 per cent per annum; last year it paid a dividend of 20 per cent; its present surplus is $200.000, and its stock is worth from 160 to 170. The Graniteville mill, also of Augusta, with a capital of $600,000, has 34,600 spindles and 900 looms; this company pays 10 per cent dividends, and then puts its surplus into new spindles; out of its surplus earnings, that is, its earnings above its dividends, it has built, without a dollar's expense to the stockholders, the Vaucluse mills, with 10,000 spindles for making fine fabric, at a cost of $340,000; it has also laid aside an additional surplus of $125,640. The Enterprise was started in 1877, with a capital of $900,000; it has also paid 10 per cent dividends, and laid aside the rest of its earnings as a surplus. The Wesson mills of Mississippi have paid a dividend of 26 per cent, and the Troup factory of the same State 24 per cent, while from time to time we have noted dividends of from 30 to 50 per cent, the latter having been earned by a Pulaski, Tenn., mill last year.

Against this, by way of comparing the relative profitableness of Northern and Southern mills, is set the assertion of Mr. Russell, Member of Congress from Massachusetts, who said in the House of Representatives that he had from official sources a statement showing that fifty of the leading corporations in Lowell, Lawrence, Chicopee, and Salem, Massachusetts; Manchester, Nashua, and Newmarket, New Hampshire; Lewiston, and other points in Maine, representing a capital of $50,000,000 engaged in manufacturing the various grades of cotton and woolen fabrics, have paid to their stockholders in the last five years an average dividend of a little less than 7 per cent per annum only.

The cotton mills of the South already give employment to something like 40,000 operatives.

Georges Leclanche.

On the 14th of September, 1882, at 7 P.M., Georges Leclanché died at Paris, at the age of 43 years, a man universally well known and esteemed, the inventor of the peroxide of manganese battery. After leaving the Ecole Centrale des Arts et Manufactures de Paris, in 1860, Leclanché entered, as chemical engineer, the laboratory of the Compagnie des Chemins de Fer de l'Est, where he remained until 1867.

The year 1867 was the time of his first patent for peroxide of manganese batteries with a porous cell. He left the Compagnie to devote himself almost entirely to the industrial development of his idea, which he completed by a series of subsequent patents. Two of these new patents are especially important: that of 1873, relative to cylindrical agglomerate surrounding the carbon, and that of 1876, relative to movable agglomerate plates maintained against the carbon by India-rubber bands. Very limited at its commencement, the manufacture of Leclanché batteries is now almost monopolized at Paris by M. Barbier, employing 50 workmen, who manufacture at least 2,000 plates per day, and have turned out during the year 1881 about 280,000 elements.

At the present day complete elements or simply agglomerated plates manufactured at Paris are exported to all parts of the world. Leclanché batteries have penetrated everywhere; the recent invention of the telephone has given them a fresh impetus, and opened up an immense trade, of which the importance can scarcely at present be predicted; their increasing employment for domestic purposes, bells, calls, electric lamp-lighters, telephones, etc., has familiarized the public with electricity, and, to some extent, made way for more important applications. The capital invention of M. Leclanché will have been, therefore, at once a service and a benefit. His premature death in the full maturity of his intellectual power and of his chemical and electrical knowledge will be deeply regretted by all those who are interested in the progress and future of the applications of electricity.

Outside of his researches on batteries, which, to reduce them to a practical form, absorbed a large portion of his time, M. Leclanché was occupied with electric horology, and devised, to distribute the time to recording chronometers, a sure and ingenious system of simple contact, very little known, and applicable to a number of electrical instruments.—*The Telegraphic Journal and Electrical Review.*

The Atlantic Ocean Cable of 1869.

It is stated by the Anglo-American Telegraph Company that the Telegraph Construction and Maintenance Company, with their S.S. Scotia, have succeeded in picking up the Anglo-American Company's cable laid in 1869, between Brest and St. Pierre, in mid-ocean, in depths varying from 1,600 to 1,930 fathoms of water, and repairing the fault which occurred on the 18th March last. They have also repaired a minor fault at a distance of 335 miles from Brest, in a depth of 1,269 fathoms. The whole of the company's system of cables and land lines is now in perfect working order and condition.

Novel Fire Escapes.

The last invention for the protection of theater audiences is a "penetrable safety wall," which has just been patented by an engineer at Kottbus, Germany. The plan is to make the interior wall in all parts of the theater of papier mache, made after a certain method. Such a wall will have the appearance of massive stone, but, by pressure upon certain parts where the words are to be painted in luminous letters, "To be broken open in case of fire," access to the exterior corridors is to be obtained, whence escape to the outer air can be made.

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