Improvement in the Process of Puddling Iron.

From the London *Mining Journal* we transfer the engraved plan and notice of a new puddling furnace now making considerable stir in England :-

" Mr. John Jones, the able secretary of the Iron Trade Association in the North or England, read a paper at the meeting of the British Association for the Advancement of Science, at Norwich, on the Economical Manufacture of Iron. He there states that, according to informatiou he has gathered, the furnace is being adopted in the Cleveland district, and that the saving of fuel is 20 to 25 per cent., that the consumption is 1,500,000 tuns of coals per annum in the production of our finished iron, and that the subject is one of national importance.—This paper was followed by one by Mr. Siemens, F.R.S., the well-known eminent inventor of the gas-furnace, in which he gives some very interesting details of the working of a puddling-furnace on his system, justly claiming extraordinary merit therefor, on account of it producing a larger quantity of iron than the ordinary system of furnace permits. Mr.Cowper stated that, in his opinion, one great cause of the superior yield, as also quality of the iron, was that the great heat of Mr.Siemens'furnace caused it to run more freely from the cinder than was possible inan ordinary furnace.

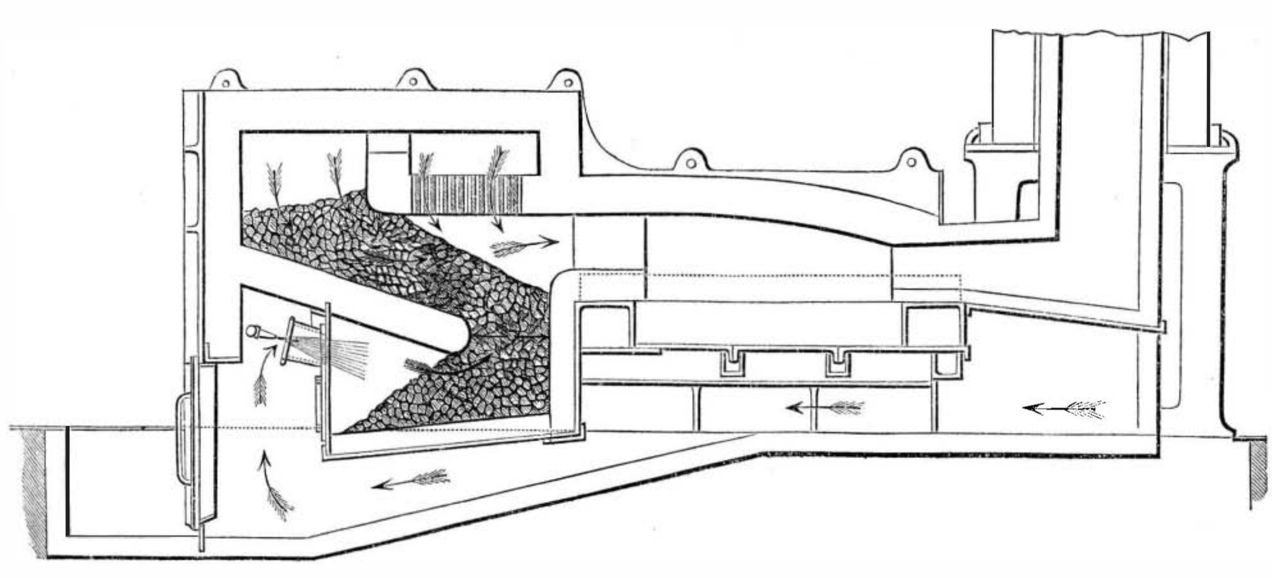
" With these preliminary remarks, we will now go into more detail. Messrs. W. Whitwell & Co., the Thornaby Iron Works, Stockton-on-Tees, so well known for their energy, enterprise, and determination to hold a first rank in the Cleveland iron trade, put up their first furnace in January this year ; it was very successful, but it had grate bars at the bottom, partly to meet the prejudices of the men, and to overcome them. In the month of March Mr. Wilson persuaded them to allow him to put up a furnace without bars, which he did. Forthwith the success was positive, all difficulties had completely vanished. For a little time minor points of construction had to be met ; but for some time every furnace was put up exactly like its neighbor, and at this moment nearly all the furnaces at the above works are on Mr. Wilson's system. Several of the woks in the district have trial furnaces at work, the results fully bearing out those of Messrs. Whitwell.

" At a trial made by Messrs. Hopkins, Gilkes & Co. (week 6th to 11th July inclusive), the coals used were 17 cwts. 1 qr. 22 lbs. to the tun of puddled bar; the yield of iron in excess. Another experiment (week ending Aug. 22), the coals used were 16¾ cwts. to the tun ; 1½ tun of fettling saved—iron charged, 13 tuns 16 cwts. 3 qrs. 13 lbs. ; iron drawn, 12 tuns 18 cwts. 0 qr. 16 lbs. ; loss, 18 cwts. 2 qrs. 27 lbs. Messrs. Richardson, Johnson & Co., of the North Yorkshire Iron Works, Stockton, furnish a return (Aug. 31), coals, 18 cwts. to the tun of iron ; yield, 13 lbs. average per heat in excess of ordinary furnace. Messrs. Whitwell and Co. are charging all their patent furnaces 4¾ cwts. per heat, and they find very little loss of iron; the quality is in all cases superior. We think that these statements justify us in saying that the ironmasters have an opportunity of saving a large amount of money in the manufacture of iron, and we trust such an invention will not be allowed to languish and struggle into notoriety by slow degrees, as most of our inventions have to, no matter how great their benefit to the public.

" We will now point out the improvements in the furnace. Air is forced into the flue-bridge by a steam-jet ; it passes into a conduit at the back of the furnace, thence into the flame-bridge and up into a chamber, where it arrives red-hot ; it thence passes down into and on to the incandescent fuel.

" By this arrangement much fettling is saved, being the cause of a great economy. Mr. Siemens states that his furnace used an extra quantity of fettling, which reduced the benefit of his good yield of iron. But to obviate this, he adopted water-bridges (these are much used); they absorb much heat from the furnace—this gentleman states equal to 8 or 10 lbs. of coals per heat. We think this a low estimate, as the getting up has to be taken into account. However, it is obvious that, by the arrangement described above, the heat abstracted by the circulating current of air is restored to the furnace ; this forms an important feature in the improvement. The fuel is fed at the highest point of the furnace by a slide door on the standing, and there are proper arrangements for shoring up, when required, also on the standing. A current or currents of air are also forced in below into a closed chamber, by which the cinders are most completely burnt up. The steam being decomposed passing through the incandescent fuel, transfers the intense heat into the working chamber. The quantity of refuse produced is very small. The clinkers are readily removed with a light hook, and the men are never occupied more than a few minutes in the operation, generally one minute. Thus, we are justified in saying this is perfect combustion ; it appears to us there is no room for further improvement. But to restore the waste heat into the generator, furnaces are now being put up by Messrs. Hannah & Sons, under the superintendence of their manager, Mr. Badon, formerly of Jarrow, where pretty nearly all the heat will be regenerated. These furnaces can go to any intensity, and the flame is under perfect control to oxidize or not ; or the iron may be drenched with intensely hot air. The cost of alteration to existing furnaces is very small ; when erecting new ones about the same price. The advantages obtained are no smoke, no cinders, a large yield of iron, and better in quality. If we assume 25 cwts. of coals used as the Cleveland average for puddling, it appears to be about 8 cwts. to the tun saved. Much fettling is saved, there are less repairs, and no grate bars to replace. We think there is sufficient inducement to ask its adoption." The editor of the *Journal* adds :

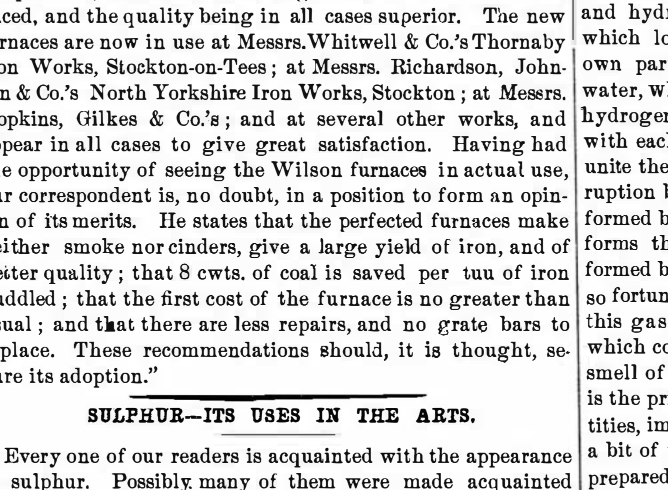
" In the supplement to this week's *Mining Journal* will be found an interesting communication from a correspondent who has had considerable experience in iron making, describing the recent improvements introduced by Mr. E. B. Wilson in the construction of his patent furnaces, and which are considered to make the furnace absolutely perfect. We are glad to learn that the increased yield of the Wilson furnace, as compared with that of ordinary construction, averages 13 lbs. per heat, the loss of iron being at the same time much reduced, and the quality being in all cases superior. The new furnaces are now in use at Messrs.Whitwell & Co.'s Thornaby Iron Works, Stockton-on-Tees ; at Messrs. Richardson, Johnson & Co.'s North Yorkshire Iron Works, Stockton ; at Messrs. Hopkins, Gilkes & Co.'s ; and at several other works, and appear in all cases to give great satisfaction. Having had the opportunity of seeing the Wilson furnaces in actual use, our correspondent is, no doubt, in a position to form an opinion of its merits. He states that the perfected furnaces make neither smoke nor cinders, give a large yield of iron, and of better quality ; that 8 cwts. of coal is saved per tuu of iron puddled ; that the first cost of the furnace is no greater than usual ; and that there are less repairs, and no grate bars to replace. These recommendations should, it is thought, secure its adoption."



WILSON'S PUDDLING FURNACE.

SULPHUR—ITS USES IN THE ARTS.

Every one of our readers is acquainted with the appearance of sulphur. Possibly many of them were made acquainted with its medical properties early in life, like Squeer's schoolboys, to whom it was regularly administered, as a measure of economy, in molasses, always before breakfast. It is quite possible that many are not so familiar with its chemical properties and its extended use in the arts. It is kept for sale everywhere in two forms ; roll sulphur, popularly known as brimstone, formed by concretion after fusion, and in a powdered state, obtained by pulverizing the roll sulphur, by sublimation, or precipitation from its solution iu limewater by muriatic acid. Sublimation is the heating of any solid substance until it becomes vaporized, and collecting it again when cooled by passing the vapor into a refrigerating chamber. Sulphur thus sublimed can be obtained in a very fine and impalpable state, called flowers of sulphur. When obtained from the solution as described above, it is called lac-sulphur, or milk of sulphur.



SULPHURIC ACID CHAMBER.

Sulphur is an element, that is, it has never been found to be resolvable into other substances. Its affinities or tendencies to unite with other substances are numerous and strong, and under favorable circumstances it will combine with a vast number of simple and complex bodies. Its combinations with simple substances or elements are called sulphurets or sulphides. Such compounds form a large proportion of the ores of different metals, as they are found in nature. A simple experiment will illustrate the formation of these ores. Mix 21 parts by weight of flowers of sulphur with 30 parts of iron, and put it gradually into a red-hot crucible, waiting until each portion becomes incandescent before adding more. After the whole is put in, cover the crucible and raise the heat until the entire mass is fused. The compound is called the proto-sulphide of iron. There are also other sulphides of iron, which contain more sulphur in proportion to the weight of the mass than the proto-sulphide. Of these the bisulphide may be mentioned. It has a pale yellow metallic luster, and has often been mistaken for gold by the inexpert. In the early settlement of this country an enterprising adventurer shipped a whole cargo of this substance to England, supposing it to be gold, and that he had, to use a quite modern phrase, "struck oil." His chagrin was great upon finding the value of his venture less than an equal bulk of good garden soil. So many similar mistakes have been made that the substance has been called "fools' gold." The mineralogical name for it is iron pyrites. These sulphides are types of the sulphides of other metals, as found native or artificially produced. The proto-sulphide of iron is used in the laboratory for making hydro sulphuric acid gas, to which the names sulphydric acid and sulphureted hydrogen are also given. Hydrosulphuric acid is a most valuable reagent in analytical chemistry, and therefore deserves some mention here. When fragments of proto-sulphide of iron are thrown into dilute sulphuric acid, a series of reactions take place, which may be described as follows:

Sulphuric acid is a combination of sulphur and oxygen ; the proto-sulphide of iron is a combination of sulphur and iron ; the water used to dilute the acid is a combination of oxygen and hydrogen. When these couples come together, iron, which loves not sulphur less but oxygen more, deserts its own partner and unites with the faithless oxygen of the water, which leaves fond hydrogen desolate. Sulphur and hydrogen, under these circumstances, mutually sympathizing with each others wrongs, strike up a bargain, and agree to unite their fortunes. The sulphuric acid aids and abets the disruption by providing for the protoxide of iron as fast as it is formed by the union of iron and oxygen, and uniting with it, forms the sulphate of iron. The sulphureted hydrogen formed by the union of the sulphur and hydrogen not being so fortunate, goes off in exceedingly bad odor. The smell of this gas is discernable in the decay of all organic substances which contain sulphur, as turnips, cabbages, eggs, etc. The smell of rotten eggs is its most prominent characteristic, and is the principal test for its presence. The most minute quantities, imperceptible to smell, may be detected by moistening a bit of paper with a solution of acetate of lead. Paper so prepared is turned black by the action of the gas. The reason for this change of color will give the clue to the value of this reagent in chemical analysis. Metallic salts are formed by the union of their oxides with acids. When sulphydric acid comes in contact with solutions of these salts, a mutual decomposition takes place, the hydrogen of the sulphydric acid unites with the oxygen in the metallic base, and forms water, while the sulphur combines with the metal itself, to form a sulphide which generally falls to the bottom as a bulky precipitate. The conditions under which these reactions take place vary for different metals. Thus, the metals capable of being precipitated may be classed into groups. The alkalies are not precipitated by it under any circumstances, neither are the alkaline earths. A third group, comprising the salts of alumina and the sesquioxide of chromium, and a number of others of very rare occurrence, are not precipitated by sulphydric acid but by sulphide of ammonium. The metals of the third group and the remaining metals are precipitated under certain conditions, either by sulphide of ammonium or by sulphureted hydrogen, the precipitate being in the third group a hydrated oxide, that is, an oxide combined with water, and in all other cases a sulphide, or the mixed sulphides of all the metals precipitable by these reagents. Suppose now a chemist wishes to determine whether sodium is a constituent of a very complex solution under examination. By passing a sufficient quantity of sulphureted hydrogen through the solution under the proper conditions, he can eliminate all the metals, except the groups above specified not precipitable by this reagent. The field of research is thus greatly narrowed, and a very long step is taken toward the complete isolation of the substance sought. This brief description will give a correct idea of the great value of this reagent in chemical analysis.

Sulphur forms acids by combination with oxygen, the most important of which is sulphuric acid, more popularly known as oil of vitriol. This substance may be called the Goliath of chemistry. No other substance known has such extended and diversified applications. There is scarcely a department of the arts that does not directly or indirectly involve its use.

From iron founding to the manufacture of gingerbread; in agriculture, in dyeing, in painting; indeed it would be very difficult to suggest a trade, occupation, or profession that does not depend more or less upon this most important substance. A friend asks over our shoulder, "Do you include lawyers and clergymen?" Most certainly we do. The paper upon which, and the ink with which lawyers and clergymen write, involve in their manufacture the use of sulphuric acid. Try something else. Hesitatingly—"boot-blacks." Out again. No blacking without the immediate or remote use of sulphuric acid. Once more. "No, I give it up if the two extremes are not exempt. I'll none of the means."

The processes of manufacturing sulphuric acid are various. The fuming *Nordhausen* acid is distilled from the sulphate of iron, popularly known as green vitriol. The acid as thus obtained is in a state of the highest concentration it can attain in a fluid form. A proper redistillation of this acid produces a white fibrous mass of a silky appearance—solid sulphuric acid. This is called anhydrous sulphuric acid, the term *anhydrous* meaning without water. This is a most remarkable substance. Notwithstanding it is the most concentrated form in which the acid can be obtained, it has no acid properties. It is tough, waxy in consistence, and may be molded in the hands without danger. The concentrated liquid acid would soon reduce them to a state resembling pounded raw beefsteak. Anhydrous sulphuric acid, or concentrated liquid sulphuric acid is a very thirsty substance. Its fondness for water is only equaled by the disgust which that fluid seems to excite in some individuals of the human species. If it cannot get water elsewhere the acid will absorb it from the air. The anhydrous acid thus becomes liquid after a time, and the liquid gradually becomes weaker by exposure. It is therefore necessary to keep it from the air. Advantage is taken of this property to dry certain substances from which it is difficult to extract water. An open vessel containing acid is placed under a bell-glass, together with the substance to be dried. Being thus imprisoned together, the acid appropriates to itself all the moisture which the bell-glass incloses, and so without artificial heat a substance may be perfectly dried. Its attraction for water is so great that when poured into the latter it hisses like a red hot iron. Strong acid exposed to the air will absorb water enough to double its weight. Mix four pints of this acid with one pint of water, and there will be considerably less than five pints of the mixture. This shows that the attraction of sulphuric acid for water is very strong indeed, sufficient to compress it more than a pressure of hundreds of tuns to each square inch of surface would do if applied to that fluid separately. Were we not right in calling it a Goliath?

We have already said that very large quantities of this substance are used. In England alone over one hundred thousand tuns are used annually, and its manufacture is conducted on a large scale in quite a different manner from the method above described for making the Nordhausen acid. That method is only practiced at Nordhausen, in Saxony, from which the acid takes its name. In order to understand the manufacture of sulphuric acid as it is conducted on a large scale, we must first know something of nitric acid. Nitric acid is composed of nitrogen and oxygen. These two gases mixed constitute the bulk of the atmosphere which we breathe, but when chemically combined in the proper proportions they form the nitric acid of chemistry—the aquafortis of the shops—an acid ranking next in strength and importance to sulphuric acid. The salt known as nitrate of soda is composed of nitric acid and soda. When sulphuric acid is poured upon nitrate of soda, the salt is decomposed, the sulphuric acid unites with the soda to form sulphate of soda, and the nitric acid becomes free. It is liberated in the form of a gas, and in this state it is used in making sulphuric acid. Remember its components—oxygen and nitrogen. When sulphur is burned in air the oxygen of the air combines with it, and forms sulphurous acid. This is also a gas, but like most other acid gases it is freely absorbed by water. One half more oxygen than it already contains would, if combined with it, change it to sulphuric acid. The process of making sulphuric acid can now be understood. First, sulphur is burned to form sulphurous acid; second, nitric acid is made to give a portion of its oxygen to transform the sulphurous acid into sulphuric acid; then the compound of nitrogen and oxygen which remains (deutoxide of nitrogen) seizes oxygen from the air (though not as much as was absorbed at first by the sulphurous fumes), becoming peroxide of nitrogen, only to be again robbed of its oxygen by the sulphurous acid, and so on *ad libitum*, the sulphuric acid, as fast as it is formed, combines with steam which is generated for that purpose, and is further absorbed by water. The engraving illustrates the apparatus by which this process is effected. A A are furnaces in which the sulphur is burned; in the current of heated gas is suspended an iron pot, B, containing nitrate of soda and oil of vitriol. The nitric acid vapors are thus intimately mingled with the sulphurous fumes, and pass through flues into the chamber, F F. This chamber is of lead, and is supported on strong timber framework. Water two or three inches in depth is placed upon the floor of the chamber, D D, to absorb the acid. Jets of steam are admitted from the boiler, E, through the pipes, C C C. An exit flue, G, permits the escape of nitrogen and nitric oxide, the only gases which can escape in a properly managed chamber. Some modifications of this process have been invented by Gay Lussac and others, by which saving is made in the amount of the salt used, but the general principle remains unchanged. The leaden chambers are frequently of enormous size, some of them being three hundred feet in length by twenty in width and twelve to fifteen feet in hight. The acid as drawn off from the chambers is too dilute for use in the arts. It is therefore concentrated in lead, glass, or platinum vessels, lead being used only for acids whose specific gravity is not required to be more than 1·720. This is the brown acid of commerce, and it usually contains many impurities. The concentrated acid of commerce is much stronger, having a specific gravity of 1·842, according to Bineau.

We have already noticed two acids, namely, sulphuric and sulphurous, formed by the union of sulphur and oxygen, as well as one formed by the union of sulphur and hydrogen—sulphureted hydrogen. There is still another oxacid, containing a small proportion of oxygen, called hyposulphurous acid. All of the oxacids combine with numerous bases to form salts extensively used in the arts. It would extend this article too much to specify these applications and describe them; they would fill volumes. But there is one class of these salts we must say something about, namely, the alums. There are several kinds of alums, of which the common alum of the shops is a type in its composition and its qualities. If you examine a crystal of alum you will see a white, partially transparent substance, which has a sweetish astringent characteristic taste. From such an examination you would hardly guess that it is composed of five different elements, yet such is the case. Two of these components are gases, oxygen and hydrogen; two of them are metals, aluminum and potassium; and the other is sulphur, which forms nearly one seventh of its entire weight. Throw your crystal upon a hot stove, and it will melt and froth and bubble, and finally become a dry, hard, white, and opaque mass. You have partly decomposed the salt by the process; it has lost $\frac{216}{474}$ of its former weight. What passed off was only water, which is composed of hydrogen and oxygen; what remains is composed of four elements, and sulphur now composes nearly one fourth the entire weight. In this state it is called anhydrous alum. The alums are in large demand in the art of dyeing, and the manufacture of the common alum is a large and growing industry. At some other time we may describe the process of making alum in full.

Take a lump of charcoal and a roll of brimstone and place them side by side. Nothing, to one unacquainted with the wonders of chemistry, would seem more improbable than that these hard and opaque substances could unite to form one of the clearest, most limpid and colorless fluids known. That is so, however. Charcoal is nearly pure carbon. Sulphur and carbon unite to form the bisulphide of carbon, a fluid so clear and of so high a refracting power that it has been used, inclosed in a triangular glass box, for the prism of that most wonderful instrument, the spectroscope, of which you have heard and read much, and will probably hear a great deal more ere another decade passes.

Take a piece of the ordinary rubber sold at the present time in the shops; put it on a fire shovel and hold it over the coals; in a short time it will soften and fry, and presently it will commence burning with a blue flame. It is sulphur which burns with the blue flame, a very large proportion of the substance called india-rubber being sulphur. By a peculiar process this rubber can be rendered hard as horn, and in this state it is now used for combs, brush and knife handles, and even for the plates upon which dentists fix artificial teeth.

Sulphur is also largely used for bleaching, its fumes while burning producing that effect. Straw goods are thus whitened.

We might fill this paper with the enumeration of the uses of sulphur and its compounds. Any chemist will tell you that we have only skimmed over the surface of the subject. We have omitted to mention many of the properties of sulphur, some of which have given rise to much speculation. Sulphur is found plentifully distributed in the crust of the earth, but is most abundant in volcanic regions, one of the principal sources being the Island of Sicily, where it is found in an uncombined state. There is perhaps no other substance, unless it be iron, upon which the arts and refinements of civilization are more dependent. The world could infinitely better afford to lose all of the precious metals and precious stones, rather than be deprived of its sulphur deposits. The thought may serve to render the substance more palatable, when your physician prescribes it in the future.

Who Ate Roger Williams?

Steele's "Fourteen Weeks in Chemistry," says:

"The truth that animal matter passes from the animal back to the vegetable, and from the vegetable to the animal kingdom again, received a curious illustration not long since.

"For the purpose of erecting a suitable monument in memory of Roger Williams, the founder of Rhode Island, his private burying ground was searched for the graves of himself and wife. It was found that everything had passed into oblivion. The shape of the coffins could only be traced by a black line of carbonaceous matter. The rusting hinges and nails, and a round wooden knot, alone remained in one grave; while a single lock of braided hair was found in the other. Near the grave stood an apple tree. This had sent down two main roots into the very presence of the confined dead. The larger root, pushing its way to the precise spot occupied by the skull of Roger Williams, had made a turn as if passing around it, and followed the direction of the backbone to the hips. Here it divided into two branches, sending one along each leg to the heels, when both turned upward to the toes. One of these roots formed a slight crook at the knee, which made the whole bear a striking resemblance to the human form. There were the graves, but their occupants had disappeared; the bones even had vanished. There stood the thief—the guilty apple tree—caught in the very act of robbery. The spoliation was complete. The organic matter, the flesh, the bones of Roger Williams had passed into an apple tree. The elements had been absorbed by the roots, transmuted into woody fiber, which could now be burned as fuel, or carved into ornaments, and bloomed into fragrant blossoms, which delighted the eye of the passer-by, and scattered the sweetest perfume of spring; more than that—has been converted into luscious fruit, which, from year to year, had been gathered and eaten. How pertinent, then, is the question, 'Who ate Roger Williams?'"

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Agawam Nail Works, Mass., resumed operations on the 12th inst.

The expense for labor upon the Holyoke dam, in Massachusetts, is $800 per day.

The consumption of flour in the city of Boston is said to be one million barrels per annum.

Europe is said to own $983,400,000 of American Railroad, State, and Government bonds.

A firm at East Boston use six tuns of iron per day in the manufacture of telegraph wire.

It is stated that preparations are on foot to re-open the Schenectady and Athens route of the N. Y. Central Railroad.

Middletown, Conn., has voted $60,000 more stock in the Air Line Railroad. This brings its entire subscription up to $260,000.

There are sixty thousand people engaged in watchmaking in Switzerland They turn out over a million of watches each year.

The refinery of Messrs. Rockefeller, Andrews & Flagler, at Cleveland, Ohio, produces 1,100 barrels of refined petroleum per day.

It is estimated that by 1870 there will be 50 000 miles of railway completed in the United States, enough to twice girdle the earth.

The iron bridge over the Housatonic river at Great Barrington, Mass., is completed. It is an elegant and expensive structure.

There are at present 557 woolen mills in Ohio, Michigan, Illinois, Indiana Wisconsin, Iowa, and Minnesota, with a capital of $5,500 000.

The Directors of the Chicago and Northwestern Railroad have fully determined to resume construction upon the Winona and St. Peter line.

The Chicago, Burlington, and Quincy Railroad Company is building a new freight depot at Quincy, to accommodate its increasing business.

A single manufactory in Maine has this season packed 1,600,000 cans of green corn, and during the spring and fall has canned nearly 600,000 lobsters.

The Bay City Iron Company have begun to build works at Bay City, Mich., in which they will carry on the foundery and machine business on an extensive scale.

The town of Farmington having refused to loan its credit to the Connecticut Western Railroad the Company have changed their route and left Farmington out in the cold.

The highest mine in the world is the Potosi silver mine, 11,375 feet above the level of the sea. The deepest is a salt mine in Westphalia, 2,050 feet below the surface of the ocean.

A beet root sugar manufactory is about to be established in Buena Vista County, Iowa. The machinery is to come from France at a cost of $100,000. Five thousand acres have been purchased upon which to grow the beets.

A. M. Wheeler, of Halifax, has cut a hemlock tree from which was made twelve thousand shingles, all clear, first rate shingles, leaving timber enough for five or six hundred feet of boards, and lots of good wood for fire, beside three-fourths of a cord of bark.

A watchman at the car shop in St. Albans, went to a drawer in search of a pipe the other night. Not finding it he lighted a match and fire from it dropped into the drawer which contained about a quarter of a pound of gunpowder. The consequence was an explosion, and the man's face, hands, and arms were badly burned.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

VARNISH.—Isaac Ranney, Delaware, Ohio.—This invention has for its object the production of a very lustrous, durable, and economical varnish for general use.

CARRIAGE STEP.—George Panchot, Hastings, Minn.—The object of this invention is to provide a neat, simple, and cheap attachable and removable step for wagons and other carriages.

BUGGY-TOP FASTENING.—D. S. Early, Hummelstown, Pa.—The object of this invention is to provide a simple and cheap device for securely fastening the top of a buggy to the seat, which, by simply throwing down or up a hinge joint in the fastening rod, will instantaneously lock the top to the seat or loose it therefrom.

CAR COUPLING.—J. P. Freeman, Dalton, Whitfield, Ga.—This invention has for its object the construction of a simple and efficient coupling for railroad cars, which shall combine with the old-fashioned method of coupling by hand, an automatic coupling of new and greatly improved construction and operation.

HARVESTER.—Isaac H. Palmer, Lodi, Wis.—In this invention, the platform, upon which the grain is delivered by the reel, is placed directly behind the cutter, and is tilted at every revolution of the reel or of one of the draft wheels, so as to deliver the sheaf upon the ground and set the platform again to receive another sheaf.

FENCE.—Obadiah Love, Saxenburgh, Pa.—The object of this invention is to obtain a neat, light, cheap, and portable wooden fence, which is capable of being easily converted into a temporary shelter for sheep and other animals. Simply doubling the panels and interlocking their ends is all that is required to hold them together.

MANUFACTURE OF SHOT.—Wm. Glasgow, Jr., and John G. Wood, St. Louis, Mo.—The object of this invention is to do away with the high lofty towers now used in the manufacture of shot, which is accomplished by dropping the lead through a denser medium than air, such as mercury, glycerin, sirup, oils, etc., the temperature and density of which will be regulated according to the size of shot to be made.

MACHINE FOR DRESSING MILLSTONES.—Wm. Bold, Sheboygan Falls, Wis.—The object of this invention is to accomplish the cutting or dressing of the "lands," so called, of millstones, in an easy and expeditious manner.

CORN HARVESTER.—John D. Hampshire, Paper Mills Post Office, Md.—This invention relates to a new and improved machine for harvesting maize or Indian corn.

RAILROAD SWITCH.—Hiram Beckwith, Grass Lake, Mich.—This invention relates to an improvement in the method of operating railroad switches, and it consists in the method of securing the switch lever and holding it in place.

KING-BOLT AND WHIFFLETREE PLATE FOR WHEELED VEHICLES.—Levi Adams, Amherst, Mass.—This invention relates to a new and improved king-bolt and whiffletree plate for wheel vehicles, whereby several advantages are obtained.

PUMP VALVE.—J. A. Nichols, Paterson, N. J.—This invention relates to an improvement in the method of constructing pump valves, being more particularly designed for steam fire engines, but which may be applied to other pumping engines.

LUBRICATING DEVICE FOR STEAM CYLINDERS.—George Girty, Rainier, Oregon.—This invention relates to a new and improved device for lubricating steam cylinders, and it consists of a novel arrangement of valves, oil chamber, and lever.