

**A NEW ROCK DRILL.**

The skill of a great many able mechanics and engineers, and a great deal of capital, have been employed in simplifying and perfecting machinery for drilling purposes, the principal object being to avoid breakages, which are far too common in the ordinary machines. It has been found by actual observation that where any great amount of work is being done it requires six drills to accomplish what should be done by four on account of the loss of time occupied in repairing broken parts.

In former machines the parts most liable to breakage were the valves, and as no modification of their construction has been sufficient to give them a durability which compares with that of other parts of the engine, the difficulty in many cases seems wholly irremediable, and the only recourse is to have a sufficient supply of duplicate parts on hand to be ready for emergencies.

Notwithstanding the many failures, mechanics and engineers, appreciating the immense benefits to be derived in case of success, have pluckily continued with their experiments. As valves could not be made sufficiently durable, the line of experiment naturally tended in the direction of valveless engines. These were known to be perfectly practicable in some respects, while in others, more particularly in the displacement of the compressed air or steam at the ends of the cylinder at the termination of the stroke, and giving a cushion for the piston to prevent severe concussion with the cylinder heads, the problem has remained unsolved until now.

Mr. S. G. Bryer, of Saugus, Mass., who has had an experience connected with rock drills of over ten years, after much experiment has devised the only thoroughly practicable valveless engine for a rock drill yet made. The piston of this drill is its own valve, thereby dispensing with the small valves and their consequent wear and breakage, together with many other small and weak parts common to other drills. As will be seen by reference to the engraving, it has fewer parts than any other rock drill in the market. Practically, there is nothing but the cylinder, the piston, and the rotating motion, which is perfectly simple and scarcely exposed to wear or breakage. The blow delivered is as positive and effectual as that from any other style of drill—a result which has never before been obtained with a valveless engine.

The advantages of this drill consists in such an arrangement of parts as to entirely obviate the use of tappets, valves, or other auxiliaries depending for their action upon percussion; while it is a perfectly effective and smoothly-working machine, free from liability to accident. It is sought to reduce it to the smallest number of unexposed parts, and so to simplify them that they can be easily repaired or duplicated and be interchangeable.

In the upper portion of the sectional cut, midway between the center and either end of the cylinder, are two annular grooves; these are connected on the back by a passage way, forming a steam chest, to which the supply pipe is attached. The exhaust port is located in the center of the cylinder. In the piston head are two grooves, which also pass entirely around, corresponding in width to those in the cylinder, distant from each other half the space of the latter from the exhaust port. In the right-hand portion of the piston, extending from the grooves in the same to either end, is shown a passage way for steam. In the lower part of the cut is what is termed the cushion valve, its lower end resting upon the lower head of the valve chamber. The valve is cylindrical, and reduced in size, between the ends and middle, to admit of free passage of steam to the exhaust ports of its chamber.

From this description, the operation of the drill can be easily understood. The steam forms a cushion at the end of each stroke, which prevents the piston from knocking. To the upper head of the cylinder is secured the usual device for rotating the piston and drill, consisting of a rod with spiral flutes, entering a socket in the piston head.

The improvements embodied in this drill secure a large percentage of useful effect, with the least supply of steam, the utmost expansive power of the same being utilized by its peculiar construction; and since no part strikes another to give it motion, the wear is insignificant. The inventor has displayed great skill in locating the control of the piston's action within itself, thus rendering the free and perfect operation of the drill wholly independent of auxiliary appliances. The drill may be operated equally well by the use of compressed air, and is absolutely non-freezing. In our opinion the claim of the manufacturer that this drill presents the greatest simplicity and efficiency is

well founded; and we think that wherever it may be introduced, it will give satisfaction. Mr. J. Allston Newhall, 67 High street, Boston, Mass., is the proprietor and manufacturer.

**NEW INVENTIONS.**

An improvement in whiffletrees has been patented by Mr. Ferdinand O. Fischer, of Aptos, Cal. The invention consists in combining a lever spring, shouldered bar, and slide bar having end disk, with the end of a whiffletree.

Mr. John Flanagan, of Newburg, N. Y., has patented a hydrant formed of a case with waste opening, shouldered valve rod, fluted screw plug valve, and a ring. The arrangement of the several parts cannot be described without an engraving.

Messrs. Carl P. Cullmann, of Idar, and Carl A. Lorenz, of Oberstein, Germany, have patented a process of manufacturing onyx stones from agate, by immersing one side in a bath of dilute nitric acid and iron, the other side in a bath of carbonate of potassa and water, then drying the stones on a stove, and burning them to fix the color.

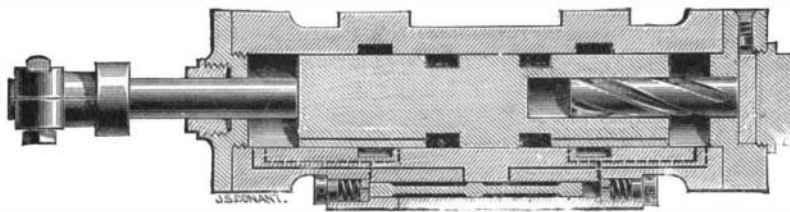


Fig. 2.—LONGITUDINAL SECTION OF ROCK DRILL.

Mr. Carl J. Renz, of Hudson, N. Y., has patented an improved process of preserving fruits, and more particularly grapes, pears, strawberries, and other fresh whole fruits without the use of a mother liquor. It is an improvement in that general process of preserving in which the air is first exhausted from the receptacle in which the fruit is placed, and in which the gases subsequently evolved by the fruit are taken up by an absorbent. The improvement consists in deodorizing and absorbing the condensable gases by a block of quassia wood or other material impregnated with quassia.

A simple and efficient apparatus for obtaining a vacuum has been patented by Mr. Lyman H. Ward, of St. Mary's, Texas. The vacuum is formed in this apparatus by the displacement of water or other liquid.

**Origin of Fires.**

Theories of fire "origins" run in fashions, and at times, the *American Exchange and Review* thinks, the favorite presumptions become much overdone. Defective flue is the actual source of a great many ignitions, and it is not apt to be exaggerated, like newspaper "incendiarism," but occa-

sionally we may go too much on "defective flue." A clothes press adjoining a flue in a Pittsburg dwelling lately took fire; defective flue was, of course, named as the flame maker. but, on further examination, it was found that the closet was a receptacle for soiled clothes and rags, and some of the latter were saturated with an oleaginous lotion for "rheumatiz." The combined oil and cotton, in a confined atmosphere, at a temperature produced by the heat radiations from the flue, were together inflammable. The "mis-hap" will perhaps go by the name of spontaneous combustion, yet this is solely due to the fact that the substance required a comparatively low temperature in order to ignite: flue was the inciting cause, so far as relates to the merely physical condition of the fire-making. Fires are generally of mixed origins.

**American Manufactures by a Colonial Editor.**

The last issue of the *Victoria Review*, the leading magazine published in Australia, pays the following tribute to American manufactures and to our series of illustrated articles on American industries. American manufactures, says the editor, are a perpetual source of wonder and of instruction to the foreign observer. In perfection of machinery, scientific division of labor, and completeness of execution, there is nothing in the world besides to be compared with them. To visit the great continent and inspect the leading manufactories must be equal to a good education for any man possessing a mechanical turn of mind. But, failing time and means to go forth on such an expedition, a foreign reader can make himself as well acquainted with the subject as if he were on the spot, simply by taking in the *SCIENTIFIC AMERICAN* and

regularly perusing it. In the current numbers there are full descriptions, illustrated by excellent woodcuts, of the manufacture of printer's types by Messrs. Farmer, Little & Co., of New York; the manufacture of Mège oleomargarine and oleomargarine butter by a New York company; the brass manufacture of the Benedict and Burnham Company at Waterbury, Conn.; and of the great tunnel under the Hudson River, between New York and New Jersey, which is of a similar character to the London underground railway, and is in the hands of a company holding a capital of \$10,000,000. The tunnel will be 5,000 feet long, or more than three times the length of the Thames tunnel. There seems to be but little doubt of its being carried through to completion.

The oleomargarine butter is a product extracted from beef fat, according to a principle discovered by M. Mège, a French chemist, about twelve years ago. The butter produced is pure, perfectly wholesome, and suitable for all domestic purposes. The company work up an average of 100,000 lb. of fresh caul fat daily, producing from 40,000 to 50,000 lb. of butter, selling at from 15 to 20 cents a pound. This invention of the French chemist has added many millions of dollars annually to the value of the staple products

of the country. In addition to the foregoing articles, there is, in the numbers before us, a vast variety of illustrated descriptions of new inventions and improvements in many branches of mechanical construction. It was shrewdly observed by the English Consul at New Orleans, in a report he lately sent to the British Government, that the superiority of American over British manufactures is due, among other things, to the fact that the Americans never raise the objection to any novel "notion" or suggestion that it is "new-fangled." In fact, they rather prefer it on that account. The newer, the more likely to be an improvement on the old method, is the principle they go by. English manufacturers, on the other hand, proceed on the most rigid lines of custom and precedent, and are very jealous of anything in the shape of an innovation on the established methods. The result of this difference between the two nations is that the Americans are beating the British completely out of the field in many branches of manufacturing industry. Edison's "new-fangled" inventions are not alone revolutionizing the world of practical ideas, but are making their inventor rich beyond the dreams of avarice. It is to the Americans, rather than to their home friends, that Australian manufacturers should turn their eyes for precedents and examples. The *SCIENTIFIC AMERICAN* ought to secure a wide circulation in this part of the world. To manufacturers of every description it is simply invaluable.

**MECHANICAL INVENTIONS.**

Mr. Perry A. Peer, of Comstock, Mich., has patented a hinge peculiarly adapted to a V-shaped harrow. When it is desired to uncouple the two sections of the harrow, one of the sections is allowed to

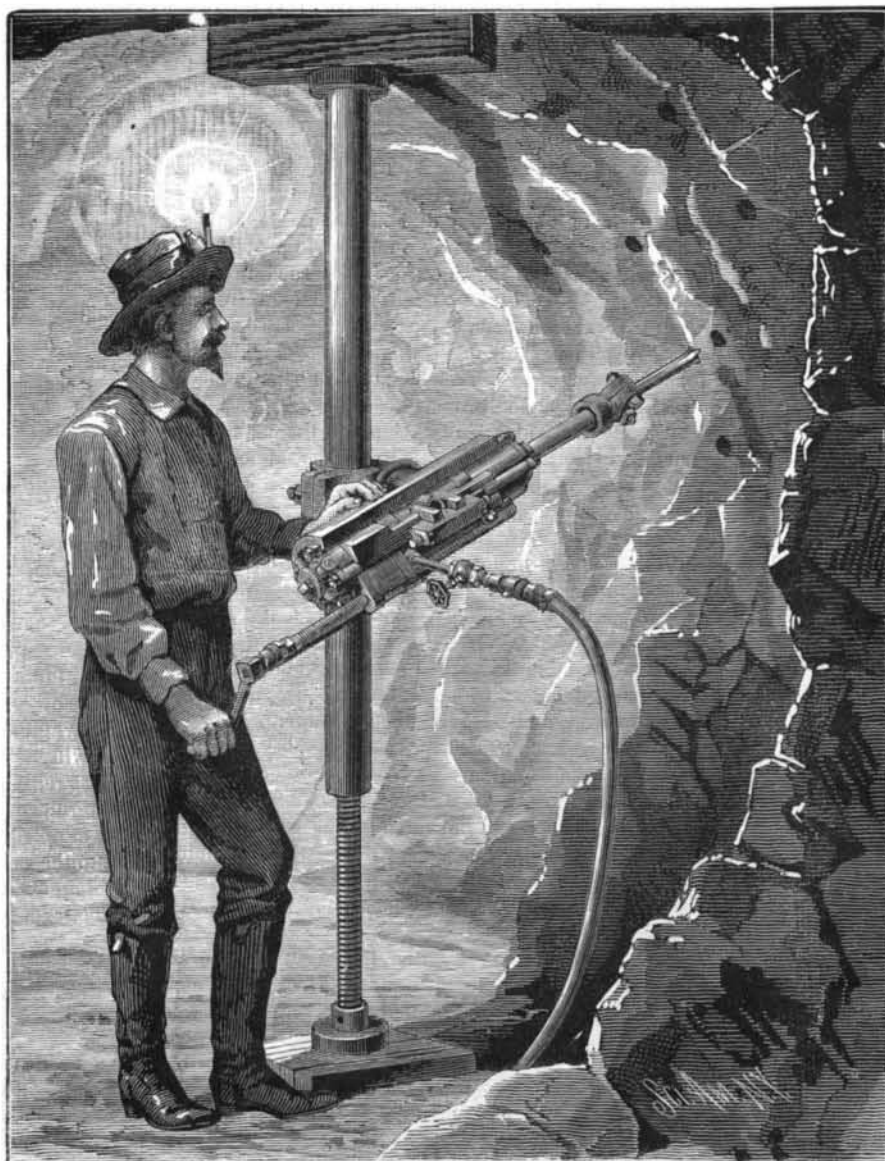


Fig. 1.—THE BRYER ROCK DRILL.

lie flat on the ground, and the other is raised to about a vertical position, and it may then be readily detached.

Mr. John O. Grisham, of State Line, Miss., has patented a corn cutting and grinding mill, which is an improvement upon the form of corn crusher in which the ears of corn in the husk are fed through throats, sliced into sections by revolving knives, and these sections then rendered fine by passage between grinding surfaces. The invention consists in combining with the feeding throats and knives, a set of spring seated tables, which hold the ends of the ears of corn while being cut, and which allow the sections being cut off to press down to accommodate the thickness of the knife, thus preventing the knife from hanging in the ear, and rendering the cutting action easier.

Mr. Isaac S. Schuyler, of Brooklyn, N. Y., has patented a machine for cutting screw threads. The improvements relate to machines for cutting screw threads on pipes and couplings, internally and externally, and are designed to accomplish such work more rapidly and perfectly than has heretofore been done. Rotary cutters formed with serrated edges are employed. The arbors of the cutters are fitted in a revolving head that has an endwise motion proportioned to the pitch of the screw, so that while the cutters rapidly revolve with their arbors they also travel in a spiral path upon the surface being operated upon.

Mr. Charles G. Trafton, of Slatersville, R. I., has patented a thread guide for spooling machines that is self-adjusting to the yarn as the latter runs from the bobbin to the larger spool, so as to avoid friction. It consists in a guide plate provided at one end with a curved friction surface and at the other with a slotted flange and a plate, in combination with a rod having projections at its top to limit the movements of the plate sidewise and a screw which serves as a pivot for the plate.

An improved gin saw sharpener has been patented by Mr. Robert S. Mudford, of Texarkana, Ark. The object of this invention is to improve the construction of the gin saw sharpeners for which Letters Patent No. 20,933 were granted to A. H. Burdin, July 20, 1858, in such a manner that they will bring the teeth to a better condition.

Mr. James H. H. Taylor, of Lawrence, Mass., has patented a mechanism for stopping and starting street cars, so constructed that the momentum of the car can be used for stopping the car, stored up, and again used for starting the car.

Mr. William W. Rochelle, of Star Landing, Miss., has patented a tool for sharpening the teeth of cotton gin saws. It is made in three pieces—the sharpening bit proper, which is shaped at its outer end to enter between the teeth, the head or shank, which is formed to receive and support the bit, and a sliding collar, which clamps the bit in the head by a wedging action.

#### DECISIONS RELATING TO PATENTS. By the Commissioner of Patents.

STEVENS vs. PUTNAM.—INTERFERENCE.—WIRE BARBING MACHINE.

Marble, Commissioner:

1. The earliest date at which an invention can be said to exist is that time when there was in the mind of the inventor a well defined idea of something which might rightfully constitute the subject of a patent.

2. The law is well settled that a mere unembodied principle or discovery is not a subject of a patent, and it must follow that the mere mental apprehension of the same is not the conception of an invention. When, however, the principle or discovery is rendered of practical service by its embodiment in material form, there exists something for which a patent can be allowed, and the union in the mind of the inventor of the principle or discovery with the means of its embodiment is conception of the invention.

3. A combination, as distinguished from a mere aggregation, may be defined as a union of elemental parts co-operating dependently to produce a desired result, and a conception of such combination must include not only the idea of associating the parts, but also that of so uniting them that there will be a dependent co-operation.

4. The fact of the conception of an invention is one which public policy demands shall have been so evidenced as to be capable of other proof than the mere allegation of the inventor that such invention was at a certain time in his mind before it can avail him anything, and so long, therefore, as he keeps his invention unembodied and undisclosed it cannot serve to antedate and thus defeat the invention of a contestant.

United States Circuit Court.—Southern District of New York.

BRICKILL et al. vs. THE CITY OF NEW YORK.—FEED-WATER HEATERS FOR STEAM FIRE ENGINES.

Wheeler, J.:

1. Letters patent No. 81,132, granted August 18, 1868, to William A. Brickill, for an improvement in feed-water heaters for steam fire engines construed and sustained.

2. Section 7 of the act of 1839, which provides that every person or corporation may use and vend to others to be used any specific machine, manufacture, or composition of matter which they have purchased or constructed prior to the application for a patent, applies in cases of patents for substantive things to the particular things so purchased or constructed only, and does not include the right to practice the invention without liability.

3. The patent involved in the case of *McClurg vs. Kingsland* was for a method of casting iron rollers, and it is not probable that the decision rendered in that case would be followed beyond cases of the same statutory class.

4. By the act of 1870 the right of a person constructing or purchasing a patentable article before the application for a patent is limited to the right to use or vend the specific thing, and this, whether it be regarded as a legislative construction of the former acts or not, may properly govern the right of recovery in actions brought since its passage.

5. For an infringement of a patent by its fire department a city is liable.

U. S. Circuit Court—Northern District of Illinois.  
WASHBURN & MOEN MANUFACTURING COMPANY vs. HAISH.  
—BARBED FENCE WIRE.

Blodgett, J.:

1. A person has no right to mark his goods with any words or terms indicating that they are manufactured under a patent which he does not own and has no right to use.

2. A defendant, having so marked his goods, will not be allowed to defend himself by denying the validity of such patent.

#### Complaints about the Patent Laws.

There is a growing disposition in some branches of industry in this country to find fault with our patent laws and the manner in which they are enforced. There is hardly a trade that has not at frequent periods its crop of harassing patent suits, which perplex the manufacturer, the dealer, and the consumer. It is not surprising, therefore, that the dissatisfaction thus created finds expression in complaints. Naturally, the subject comes up before the associations formed among those belonging to the various trades for their mutual protection and the advancement of common interests. A committee is appointed, and, if its members are in earnest, a report is drawn up suggesting possible measures of reform. Such has been the course pursued by the millers, and we learn that the brewers have taken the first steps in that direction. All this is very well in its way, but it does not seem as though the agitation of the subject is conducted in the manner best calculated to secure the reforms desired. The reports of such committees are so evidently biased by the interests of the members, as defendants in patent suits, as to have, as the rule, little or no value. The one great and sole object of their efforts seems to be to beat the particular patent or patents which menace them, and the fact is lost sight of that it is to the interest of every enterprising manufacturer to aid in sustaining patents. In many cases where complaint against the patent system is loudest, known rights have been infringed, and the protests of patentees disregarded, in the belief that it was cheaper to take the chances of infringing than to recognize the demands of those whose claims were disregarded. Patents thus ignored almost always acquire an unexpected value before they expire, and it is quite usual for them to be made the basis of expensive suits. Often they are sustained by the courts and become very valuable, for the simple reason that they have been infringed without regard to consequences. Manufacturers who find themselves figuring as defendants in suits of this character commonly have a great deal to say about the injustice of our patent laws. Perhaps they are unjust in their requirements in some instances, but to modify them in any essential particular in points touching the value of valid patents would be to destroy an immense property right, and to make it extremely difficult for an inventor or the owner of a patent acquired by purchase to protect himself in the enjoyment of the rights it is designed to secure to him. It may be vexatious to settle or defend frequent demands for royalties and damages; but it is still more so to know that you have valuable rights in patents which you are unable to enforce, and that which should belong to you alone has become common property.

The only safe and honorable position for the manufacturer is one of justice and fair dealing. He should act advisedly with regard to the payment of royalties and the infringement of patents. If he manifests a fair and liberal disposition in this matter, and a willingness to recognize the rights of others as beginning where his own rights cease, he is not likely to have serious trouble. As the rule, it is cheaper to purchase a right under a patent than to defend an infringement; but when a manufacturer persistently disregards notices and warnings, and takes his chances as an infringer, he should stand by the consequences like a man, and not whine nor complain if called upon to pay for what he has taken without leave. He may, at least, have the satisfaction of knowing, under such circumstances, that every decision of the courts affirming the validity of patents increases the value of those he owns and controls, and that he has thus a direct interest in sustaining all good patents. But then we must make some allowance for human nature, and it certainly does make a great difference in a man's feelings whether he appears as plaintiff or defendant in a patent suit. He often does and says a great many things when he is defending an infringement suit which he would be very sorry to have quoted against him should he ever find it necessary to move for the protection of his own rights and interests. Our patent laws may be susceptible of improvement, but the men to improve them are not found on committees representing cliques of defendants interested in suits brought to recover damages for the wholesale infringement of valid patents. What they have to say may always be taken with some allowance.—*Iron Age.*

#### Apples for Foreign Markets.

Speaking of the magnificent apples shipped from the United States, the *London Magazine of Pharmacy* says that there is no reason why this splendid fruit should not be received in London as fresh and blooming as when first gathered from the tree. To secure this most desirable result each apple should be wrapped in soft tissue paper, previously soaked in a solution of salicylic acid and dried.

The best preparation of salicylic acid for this purpose is the alcoholic solution, made with the strongest spirit, and then diluted with as much water as it will bear without precipitating the acid, so as to make the solution go as far as possible. Each apple should be enveloped in at least three or four folds of salicylated paper, and every possible precaution should be taken to prevent bruising when loading into the casks or cases. Well-packed apples should not move at all during the voyage, and the shaking of a railroad train should have little effect upon them. Nevertheless, a certain amount of contusion is inevitable, and to avoid the ulterior results of this, the salicylated paper is indispensable. As to the cost, it would be a mere trifle when we consider the result gained, and the splendid condition of the fruit when it would enter the London market. Besides, it is very probable that the salicylic acid paper used for packing the apples in America might be used over again, or applied in England to some similar antiseptic purpose, and an allowance made for it accordingly.

#### Prehistoric Mexico.

Very interesting discoveries have been made by M. Desire Charnay in ancient cemeteries high up on the slopes of the volcanoes Popocatepetl and Itzacacuatl. The burial place on the latter mountain is high above the line of vegetation. Just below it is a small valley almost concealed on three sides by a natural bulwark of stupendous rocks.

Access to this singular dell seemed at first impossible; in fact, was so difficult as to lead M. Charnay to doubt the tradition of a Chichimecan village having existed in such a place. Excavations have led to the supposition that this narrow valley had been a temporary refuge of the Toltecs, perhaps as early as the year 600. It bore evidence too of having been inhabited by the Chichimeca Indians. Idols and household utensils similar to those found in ruined Chichimecan villages were dug up from a depth of from three to four feet. Singularly, too, there were found near the surface Aztec relics, which proved that at a comparatively recent date this natural stronghold had served as a place of concealment for a third tribe. Tradition says that after the Spanish conquest in 1520 a few spirited Aztecs and Tlaxcaltecos, rather than submit to slavery or accept the doctrines of the invaders, fled with their "lares and penates" to this mountain fastness and subsisted on corn, frijoles, and other vegetables, burying their dead as near the "snow line" as possible. Many Aztec idols, vases, and jars were unearthed there.

#### Pacific Coast Fishes.

The United States Fish Commission have obtained on the Pacific coast 270 species of fish. Among these are nineteen species of sharks. Two large toothed man-eater sharks, caught in Monterey Bay, measured from 23 to 24 feet in length, and weighed fully two tons each. Another variety of shark found on the coast averages 32 to 33 feet in length, and weighs three tons. Their teeth are small, and they are not dangerous. Monterey is a middle ground where the fishes from north and south meet, and no locality on the Atlantic coast is so rich in species. It has about 130 species; San Francisco about the same; Santa Barbara, 95; San Diego, 80; and Puget Sound, 90. The so-called perch, found on the California coast, are not true perch. A million and a half of salmon, averaging from 25 to 30 pounds each, are taken from the Columbia River, and from seven to eight millions of pounds of fish are taken from San Francisco Bay and marketed.

#### Monument to the Original Promoters of the Union Pacific Railway.

Norcross Bros., of Chicago, have contracted with the Union Pacific Railway Company for a monument to the memory of Oliver and Oakes Ames. The monument is to be located at Shannon, Wyoming Territory, at a point about 400 miles west of Omaha. It is at the highest point in the Rocky Mountains which is crossed by the railroad. The monument is to be 50 feet square at the base, and 60 feet high, pyramidal in outline, with three slopes. The material will be Black Hills granite. There are to be two medallions representing the heads of Oliver and Oakes Ames in alto-relievo. One will face the east and the other the west, at a height of 40 feet from the ground. On the side next to the railroad will be an inscription, "In Memory of Oliver and Oakes Ames." The medallions are to be cut out of McGregory quarry brown stone. There is also to be a bronze tablet, which will more particularly show why the monument was erected. The contractors are to complete the work in about two years. The cost is to be about \$80,000.

An accidental dropping of a cipher in our recent description of the heavy Worthington oil pumping engines leads to an obvious understatement of their efficiency. The work actually done by some of these pumps is the pumping of 15,000 barrels of oil through 100 miles of pipe, against the enormous pressure of 1,500 pounds per square inch.