

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.

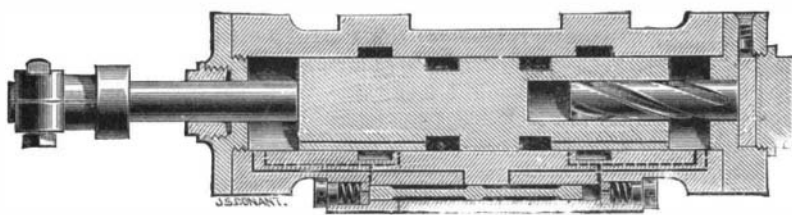


Fig. 2.—LONGITUDINAL SECTION OF ROCK DRILL.

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

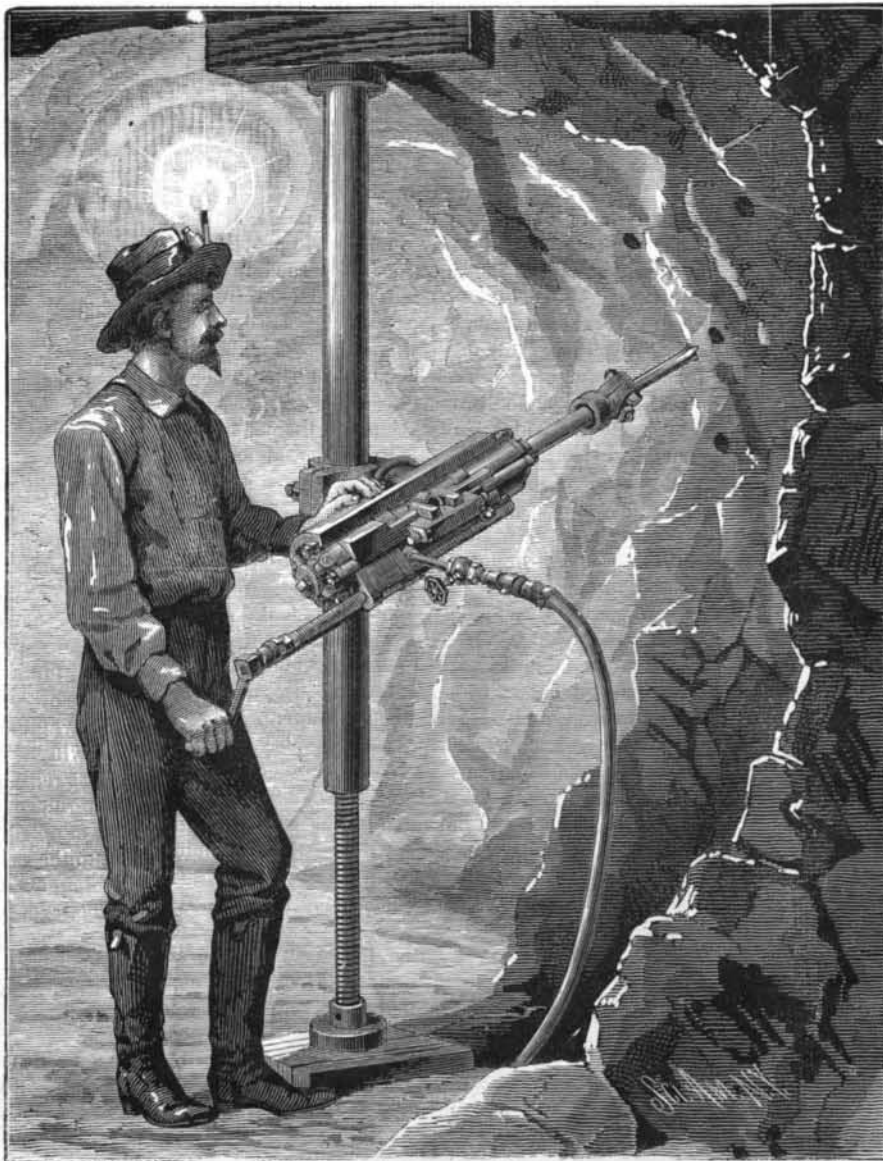


Fig. 1.—THE BRYER ROCK DRILL.