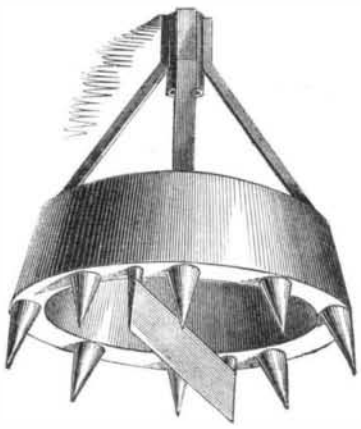
ARTESIAN WELL-BORING IN QUICKSANDS AND ROCKS.

MESSRS. EDITORS:—I send you two items for publication on the subject of artesian well-boring (descriptions of inventions of mine), which, I think, are valuable, and worthy a place in the SCIENTIFIC AMERICAN. The one is how to bore any size of hole for a well through solid rock, and the other relates to the sinking of a well through great beds of sand. Your readers in the different parts of the country can appreciate my communication, as they know the difficulties attending the drilling through hard rock when the bore is larger than three or four inches, and also the almost impossibilty of sinking the necessary tube in extensive beds of quicksands. These are difficulties that have never been overcome; and hence the sterility of many countries otherwise blessed, but destitute of water. In such places, an artesian well is the only method by which it can be got; and the professional borer will do well to digest the methods here pointed out to him. With these preliminaries, I will proceed to describe, first, the instrument for the rock a drawing of which (in perspective) I here present



for the better illustration of my subject. It is what the profession would call a "built tool;" that is, one constructed of different pieces. In its simplest form, it is merely an iron cup, with pieces of tempered steel, as teeth, fixed in it by means of fusible metal, the points projecting and spreading a little wider than the edge of the cup. But for larger borings, which is the subject of my communication, the cup has no bottom, but the sides are very thick, allowing a hollow ring or groove being scooped out to nearly the depth of the cup, and in this groove the teeth are placed; the points of the teeth projecting a couple of inches or so, and extending a little over the edge This bottomless cup allows a perfect free passage for the water, &c., to pass and repass through; while, in the act of working, a single chisel crosses the center of the cup, as seen in my figure. The metal embraces firmly all these pieces in the groove, and two or three of these tools, and a few sets of teeth, may be conveyed to any distance where a well is required, and the boring accomplished independent of the services of any blacksmith; for when the teeth become blunted, or worn so as to reduce the size of the bore-hole, they may be taken out of the cup in a couple of minutes by simply melting the fusible metal that binds them together, and re-set with an iron ring under them as a lifter. When cool, the tool will be as perfect as at first; and this may be repeated till the teeth be worn down. This fusible metal holds the teeth as firm as if they were run in with melted lead; and a small stove, oven or boiling water is sufficient to fuse it.

The original temper of the teeth is never impaired by this operation of re-setting, the heat required to melt the metal being so moderate as not in the least to affect their nature. Its composition is 8 ounces bismuth, 5 ounces lead, and 3 ounces tin, melt the lead first, and then add the other metals. The teeth may be either round or square, but all must be of equal length, and, of course, pointed or tapered according to the nature of the rock to be bored; and the bore-hole will always be circular and never angular.

My other item, regarding the sinking of artesian wells through great depths of sand where tubing is absolutely necessary at all times, is to have it smooth both outside and inside, and a sufficient length secured before commencing operations. A small pump must be provided (such a one as Gwinne's centrifugal pump) which operates no valve, and lifts water and sand combined without choking. The pipe of this pump, for my purpose, must be flexible, such as india-rubber, gutta-percha or leather, and pretty stiff, to withstand a collapse; let it be of a length equal to the well tube, but in short sections. Water will be required, but a limited quantity may be sufficient. Let each piece of tubing be fitted together and numbered before commencing; likewise measure and mark the pipe of the pump so as to correspond with the figures on the tube. Dig a few feet under the surface of the ground where the well is to be, and erect a scaffold above. To insure the tube fitting close upon the rock when it reaches the bottom, fix a small piece of rubber tubing to the lower end outside, and let it project about an inch; this will exclude all sand from ever getting into the tube when the well is finished—a precaution rendered necessary on account of the unknown dip or declivity of the rock. All things being ready, screw two lengths of tubing together, and commence by inserting the end in the ground, having guides to insure a perfect perpendicular. All that is necessary, for the accomplishment of the undertaking is to remove the sand from the end of the tube, and it will sink of itself by its own weight; and for this purpose the pump is provided. The end of the pump pipe may now be put into the well tube; and to insure its sinking at all times, there should be three or four feet of lead pipe attached to the extreme end. Water is now introduced into the tube from a reservoir fixed up for the purpose, and the pumping commences, sand and water are extracted and the tube sinks; this, then, is the whole operation. Keep the tube full of water and the pump agoing, and if the water be scarce, that which is drawn from the tube may be carried back to the reservoir and saved. While the pump is going, see that water is supplied to the tube, and as a caution, never stop the pump as long as any sand is flowing, for the sand will settle in the pipe and cause much trouble to clear it out. If a recess is to be taken, or when the tube is down far enough, then raise the pipe in the tube so as to draw nothing but water. We have now got a fair beginning, two lengths of tubing are down, which marks one stage of progress; the pump and feed water being stopped and the pipe lifted out of the tube, two other lengths of tubing are to be screwed on, the pump pipe let into the well tube again as in the former instance, keeping their lengths as nearly equal as possible, that is, to have their lower ends about the same level; now introduce the water as formerly into the tube and resume the pump, the tube will sink as the sand and water is withdrawn, and thus the work will progress quite rapidly if properly managed. Care must be exercised that the tube does not go down out of reach by letting the pipe remain too long in the tube, before raising. It will be understood that a tube furnished with an india-rubber point is to be used only when it is intended to drill the underlying rock; a simple tube being sufficient at other times

It will be unnecessary for me to enlarge upon the benefit of artesian wells, whether the object sought be water or minerals, it is sufficient that I have done my duty in this communication, which I hope will be appreciated.

J. T.

Wayne Center, Ill, Jan. 21, 1860.

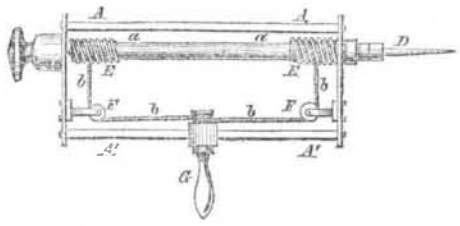
MOUNTAINS OF THE SEA.—There can be no doubt that a portion of California at some period, was an immense inland sea, the water of which sought an outlet either through the Pajaro, at Monterey Bay, to the Pacific or through the Tejon Pass to the southern portion of the State. The more general belief is that the Golden Gate was the outlet, and that it was forced through the Coast Range at a comparatively recent period. Traditions are extant among the Indians, that their ancestors walked across from one side of the famous Golden Gate to the other, while there was a tunnel communication between the waters of the Pacific and San Francisco Bay. In the Tulare Valley and at the Tejon Pass there are indications that a powerful current has at some period passed over the ground. The most learned geologists of the East are quite at a loss when required to give an opinion in regard to our State geology.—*Stockton Republican.*

IT has been ascertained that a work like the Great Pyramid could not be constructed at the present day, with all the aids of modern science, for less than a hundred and thirty-five millions of dollars.

PRESS' QUICK ACTION DRILL STOCK.

The last-received number of the *Mechanics' Magazine* contains an illustration and description of a novel drill stock recently patented in England, and thinking it may interest many of our readers, we republish the same. This improved drill stock will drill holes in metals and other substances with greater ease and rapidity than is attainable by the use of any description of drill stock hitherto made; so, at least, says the inventor, Mr. Press.

In the drawing, A A, A′ A′, is the frame of the drill



stock; *a a*, is the spindle carrying the drill, D. Each end of the spindle, *a a*, has a spiral external thread, as shown at, E E. On the frame are fixed two small pulleys, F, a handle, G, is attached to that part of the frame marked, A′ A′, so that it may slide from end to end upon it. To the inner side of the handle is fastened a gut or string marked, *b*, which passes over the pulleys, and from thence around the spiral threads, where its ends are fastened. By working the handle, G, from end to end on that part of the frame marked, A′ A′, a very quick motion is imparted to the spindle and drill by means of the gut or string passing over the pulleys and in the grooves or spiral guides, which may be large or small in diameter according to the kind of work for which they may be required.

ADULTERATED LIQUORS.—Dr. Hiram Cox, the Cincinnati inspector, has published many deeply interesting facts of his experience in testing liquors sold in that city. In 700 inspections of stores and lots of liquors of every variety, he found that 90 per cent were impregnated with the most pernicious and poisonous ingredients. Nineteen young men, all sons of respectable citizens, were killed outright by only three months' drinking of these poisoned liquors. Many older men, who were only moderate drinkers, died within the same period of delirium tremens, brought on in one quarter the time usual, even with confirmed drunkards, by drinking this same poison. Of 400 insane patients, he found that two-thirds had lost their reason from that cause. Many of them were boys under age. One boy of 17 was made insane by the poison from being drunk only once. Seeing two men drinking in a grog shop, and that the whisky was so strong that it actually caused tears to flow from the eyes of one of them, the doctor obtained some of it and applied his tests. He found it to contain only 17 per cent of alcohol, when it should have contained 40, and that the difference was supplied by sulphuric acid, red pepper, caustic, potassa and strychnine. A pint of this liquor contained enough poison to kill the strongest man. The man who had manufactured it had grown wealthy by producing it.

MOVING PIANOS IN WINTER.—A piano if transported in very cold weather is liable to acquire so low a temperature that on being introduced into a warm room it condenses moisture from the atmosphere; and to the astonishment of the owner, the case, strings and other parts suddenly become bathed with perspiration. The instrument is thus exposed to injury The difficulty may be avoided by throwing open the windows of the apartment in which the piano is received, so that the temperature of the air and of the instrument will be equal. After thus remaining for a short time the room may be very gradually warmed, and no condensation will take place.

PHOTOGRAPHS OF THE PEMBERTON MILL.—We are indebted to John A. Whipple the skillful photographist of Boston, for a fine photograph of the above mill at Lawrence, Mass. It was taken in a rain storm, the day after the disaster. Any one who may desire to see the picture can do so by calling at our office.

ON another page of our present issue will be found an important statistical article on the subject of railroads, which has just appeared in the columns of our cotemporary, the *American Railroad Journal.*