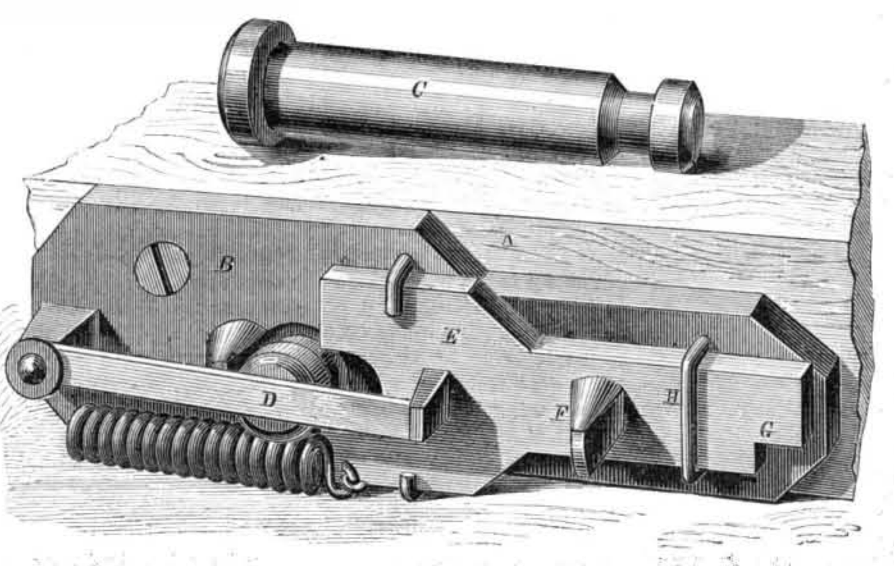
### Improved Bolt for Securing Window Shutters.

The ordinary method of locking the shutters of buildings is to pass the bolt through from the outside and then secure it on the inside by means of a strap or split key passed through a hole in the bolt near the end. Beside the annoyance of being compelled to pass into the building to lock the bolt, it is an unsafe contrivance, as sometimes by turning the bolt from the outside the key will drop out, and in any case the key is too slender to resist any considerable strain upon it from the outside before breaking. The device, however, shown in the accompanying illustration has none of these objections, and is in all respects a most admirable contrivance for the purpose intended.

A represents the wall or casement of a building, on the inside of which the lock is secured. It consists of a plate, B, through which the bolt passes. The bolt is shown detached at C, and the end is seen directly under the flat spring at D. As will be seen the bolt has an annular score near the end, into which the end of the slide, E, fits when the shutter is locked. When the bolt is to be released the slide, E, is moved back from the bolt by the thumb piece or knob, F, when the flat spring, D, throws the bolt partially out of the plate, and its end engages with the snug on the slide, E, and retains it in the position seen in the engraving. When the shutters are closed and ready to be locked, the bolt is passed through from from the outside in the ordinary manner, its end pressing against the flat spring, releasing the slide, when the spiral spring instantly brings the slide to engage with the bolt, and securely locks the slide by springing the notch, G, on the end of the slide on the staple, H. This is effected by the position of the spiral spring, which, being on one side the slide, tends to draw that side more than the other. The fastening may be used in any position, either vertical, horizontal, or at any angle, working with equal certainty and effect. It may be applied to any shutter, and the ordinary bolts may be altered to suit, simply by welding on them an end containing the annular nick. Except the springs, the fastening is made of malleable cast iron, and the inventor desires to correspond with manufacturers of malleable iron castings with a view to the sale of the patent or the production of the device.



FARRAR'S PATENT SHUTTER FASTENER.

Patented through the Scientific American Patent Agency, December 8, 1868, by W. B. Farrar, who may be addressed at Greensborough, N. C.

### Vienna White Bread.

Prof. Horsford gives the following recipe for making the celebrated Vienna white bread: In the first place, great care is taken in the preparation of the flour. Scrupulous neatness and cleanliness are observed in all the processes of preparing the yeast and dough. The dough is placed in an oven somewhat of the type of the aerotherme, that is surrounded by currents of heated air, maintaining a uniform temperature of about 380°. By an arrangement of steam pipes, jets of steam are introduced into the oven to maintain an atmosphere saturated with moisture, and so retard the evaporation of water from the loaf during all the early part of the baking. When the loaf has attained its fullest distension and is penetrated by myriads of minute pores, the steam is shut off, and a side door, communicating with a separate fire from that which heats the oven, is opened. From this the heat of an intense blaze is flashed into the oven to be reflected from the low, glazed, tile roof, and give that requisite delicate red tint to the surface, which at the same time charges a thin crust with an aroma which is the product of roasting—an essential oil—most grateful to the palate. This part of the operation is brief, and is watched through a glass door. When complete the loaves are taken from the tins and immediately varnished with warm milk or water, with which a little good melted butter has been incorporated. The water of the milk quickly evaporates, and leaves a fine glazed surface.

We can testify from considerable personal experience that the Vienna bread and beer are the best to be found anywhere.

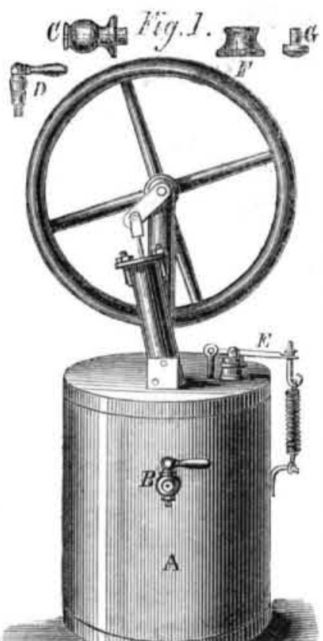
### The Growth and Prosperity of Michigan.

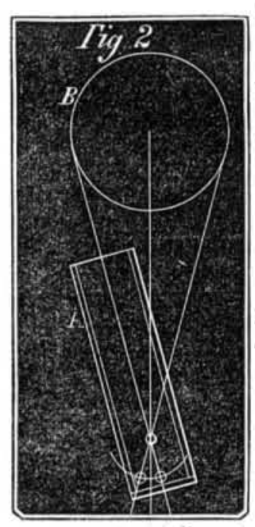
Many of our readers can remember when Michigan was in the far West, only to be reached by tedious journeyings through wide regions of unsettled country. But to-day Michigan has a population of more than a million; six incorporated colleges, one of them a University, with law, medical, literary, and scientific departments, and with more than twelve hundred students; an Asylum for the Blind and the Deaf; two Asylums for the Insane; a Normal School; high schools in every considerable town, and a system of public instruction as thorough, as wisely adjusted, and as efficient as in any State of the Union, so good indeed, that private schools are hardly known. Pupils come from all the States of the West, not only to the University, but to the Union Schools of Michigan. The finest and largest buildings, the most beautiful for situation, and most convenient in their appliances, are those which are set apart for public instruction. No interest is so jealously guarded as this. Every city and every county has its superintendent of schools. There is the same zeal for education in the newer as in the older settlements, in Saginaw and Muskegon, as in Monroe and Detroit. The market for school books in these forest cities is not less sure and regular than the market for boards and shingles.

Classic and foreign learning flourishes on what were but yesterday Indian hunting grounds; and the youths and maidens know more of Goethe and Virgil and Xenophon than of the legends of the red men. This strange mingling of ancient lore with the traditions of savage life is presented to us in the names of Michigan towns and cities. Pontiac borders upon Troy; just beyond Owasso is Ovid; Metamora joins Attica; Adrian is the next town to Tecumseh; Athens is but half an hour's ride from Wakeshma; and in Lenawee county we find Rome and Palmyra close to Madison and Franklin. Enough of the Indian appellations are retained to preserve a native flavor amid the classic and romantic names by which the famous sites of Europe and Asia, ancient and modern, from Caledonia to China, are represented in this favored Peninsula.

### HOW TO CONSTRUCT A TOY STEAM-ENGINE.

A communication from T. D. Quincy, Jr., a high school pupil, of Dorchester, Mass., gives directions for the construction of a toy steam engine, most of the parts of which may be made by any boy of ordinary intelligence, possessing




a slight knowledge of the use of tools, at a very slight cost. It is a single acting, oscillating engine of which A, Fig. 1, is the boiler, which consists of a fruit can about 4 inches in diameter by 4¾ inches in hight, with a new end soldered on where it was opened. B, C, D, represents the gage cock, which is made by turning a piece of brass to the form indicated at C, and drilling a hole through it in the globular part, which is then reamed out tapering. The plug, D, of the cock is turned to fit the hole in C, and seated by grinding it in with grindstone grit and oil at first, and afterward with oil alone. A piece of wire will do for the handle. Cut a thread on D, and fit a nut on it to hold the plug D in C; then put the two together and drill a hole longitudinally through C and across D. The cock is then complete. It may be cheaper to purchase the cocks already made at any gas fixture or hardware establishment, but these directions are intended for those who cannot readily avail themselves of this accommodation. E is the safety valve with its parts. F shows the form of the seat of the valve which has a hole drilled through it, as seen by the dotted lines, and beveled at the top to receive the piece marked G. Place these together and seat them by grinding, as in the case of the gage cock. Make a score in the small portion of G to receive the edge of the safety valve lever. This lever is merely a light bar with a hole in each end, one end to be attached to a stud, or fulcrum secured to the top of the boiler by soldering, and the other to a light spring on the side of the boiler with an adjusting nut at the top, or it supports a hook on which weights may be suspended. These described, two of the most important points relating to the boiler may be understood—the gage for ascertaining the hight of the water; and the safety valve, the means of regulating the steam pressure.

The cylinder of the engine is a piece of brass tubing, 2¼ inches long and ½-inch internal diameter, ground out true. The piston is a disk of brass, ¼ inch thick, with a wire soldered to its center as the piston rod. On opposite sides of the cylinder, near the top, are soldered two screwed pieces of wire designed to hold the cylinder end and stuffing box combined, in place.

Fig. 2 is a diagram of the cylinder, and its connections, A, is the cylinder, and B the path of the crank pin. Three holes are seen near the bottom of the cylinder, with an arc describing the oscillation of the cylinder, the upper hole being the center of the circle of which the arc is a segment. On the side of the bottom of the cylinder is soldered a piece of brass, about $\frac{1}{16}$ of an inch thick and ⅝ by $\frac{9}{16}$ in area. The lower hole is drilled through a plate into a cylinder near its bottom; the upper hole ⅜ of an inch above it and through the plate only, a small hole slightly indenting the cylinder being made exactly opposite without piercing the shell. Another piece of brass, ⅛ inch thick, ⅝ wide, and ¾ long, has a hole drilled through it $\frac{9}{16}$ of an inch from the bottom, and that receives a bit of wire soldered in and projecting $\frac{1}{16}$ of an inch. On a ⅜-inch radius from this point, $\frac{3}{32}$ of an inch from the center line, drill two holes, that on the right hand entirely through the piece and that on the left about half way through, meeting one drilled from the bottom. The inner faces of this plate and that on the cylinder must be fitted smoothly together. These constitute the valve faces, or valve and seat of the engine.

The pillars or supports of the wheel, shaft, and crank, are rods of brass or iron, 3⅞ inches high, with holes near the top for the shaft. At the hight of $\frac{9}{16}$ of an inch from the bottom a hole is drilled and tapped, through which a pointed screw is passed, the point of which enters the hole in the side of the cylinder opposite that on which the plate is soldered. The thicker and separate plate is soldered to the top of the boiler, the side having both holes being placed inward or next the cylinder, and the left hand hole meeting that through the bottom being directly over one through the top of the boiler. Place the faced side of the cylinder against the fixed plate, the projecting pin of which enters the hole in the cylinder plate and the pointed screw through the pillar engaging with the opposite hole in the side of the cylinder. The pillar is soldered in this position to the top of the boiler, and the other is similarly secured at the distance of about one inch. The cylinder bottom is a thin plate of brass soldered on. When the crank and piston are at their lowest points, the latter should not quite reach the lower hole in the cylinder. The wheel may be of iron, about 4½ inches diameter, to be obtained at any iron foundery, or be cast of lead, or lead and tin. The gage cock may be attached 3¼ inches from the bottom, and if filled to this hight the boiler will furnish steam for half an hour's safe running. The boiler may be filled by the safety valve. To start the engine set the boiler on a stove or range, or place it over a lamp. The first is the preferable mode as being more cleanly.

An engine of this fashion need not cost much, and its construction would afford useful employment to boys in town or country, and be a source of pleasant and profitable amusement during winter evenings.

## Correspondence.

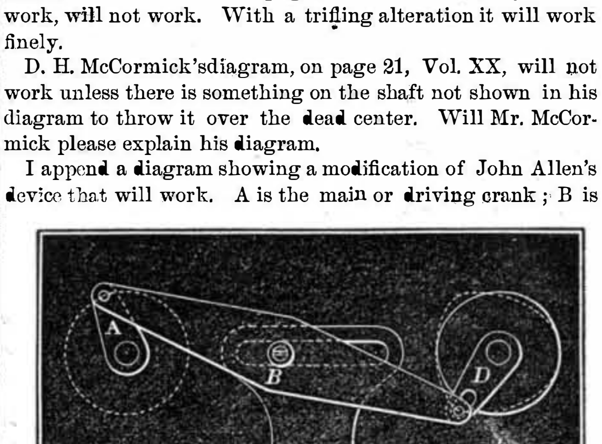
*The Editors are not responsible for the Opinions expressed by their Correspondents.*

### Connecting Shafts by Pitmans.

MESSRS. EDITORS:—John Allen's plan for connecting shafts by pitmans, a diagram of which is given on page 20, Vol. XIX, and which "Aberdeen," on page 69, same volume, says won't work, will not work. With a trifling alteration it will work finely.

D. H. McCormick's diagram, on page 21, Vol. XX, will not work unless there is something on the shaft not shown in his diagram to throw it over the dead center. Will Mr. McCormick please explain his diagram.

I append a diagram showing a modification of John Allen's device that will work. A is the main or driving crank; B is




the fulcrum which is made permanent in the center of the connecting bar and slides in its bearing, B, slotted for the purpose. The crank, D, is slotted at the end to allow the crank-pin to slide to and from the center. The crank pin will describe a curve shown by the dotted line E. In this way the movement will be perfectly free and smooth, though with slightly varying velocity in the revolution of the crank D.

C. H. PALMER.

### Periodic Oscillations of the Earth.

MESSRS. EDITORS:—An article in your paper indicates a theory of earthquakes and volcanoes originating from gaseous explosions as opposed to the general belief in a molten sea beneath the earth's crust, and basing the improbability of such