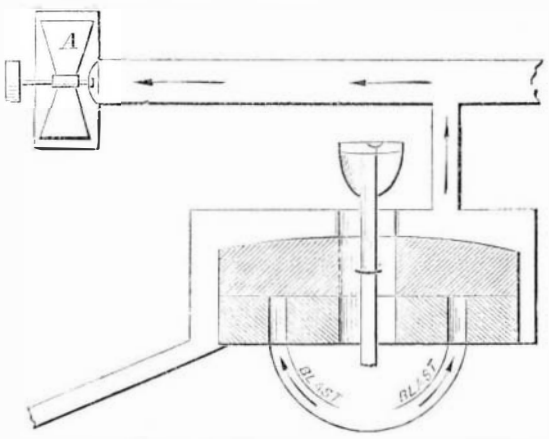
## WORKING MILLSTONES WITH AN AIR BLAST.

Extensive litigation, relating to the use of an air blast in running millstones, have, for some time, occupied a prominent position in English courts. These litigations possess little of interest to our readers, but the patented process which has given rise to the suits, has features of considerable value.

Mr. Bovill, the plaintiff in the action of Bovill *vs.* Smith, in his specification says:

"When working millstones with a blast of air I introduce a pipe to the millstone case, from a fan or other exhausting machine, so as to carry off all the warm dusty air blown through between the stones to a chamber, as hereafter described, by which the dust in the mill is avoided, and grinding improved, and this part of my invention relates only to sucking away the plenum of dusty air forced through the stones, and not to employing a sufficient exhausting power to induce a current of air between the millstones without a blast, this having been before practiced."




Mr. Bovill, in his English patent of 1846, published an arrangement for employing exhausting power to get the desired current of air through the grinding surfaces of the millstones, and at the same time avoid the inconvenience of passing the meal through the exhausting machine, and in 1846, a Mr. Debeaune registered under the Utility Designs Act, a plan of a set of millstoues arranged round a central receiver, from the top of which a fan was to carry away, by exhaustion, the stive. The inconvenience sought to be avoided by Mr. Bovill's English patent of 1846 was one supposed to attend the working of Newton's earlier patent of that year, whose drawing showed the exhausting apparatus attached to the meal spout itself, so as to draw both meal and air through the grinding surfaces, and discharge both from the pan into a receiver. Mr. Bovill proposed to draw air through the grinding surfaces by exhaustion, but to avoid passing the meal through the exhausting apparatus, while Debeaune proposed to use the exhaust only to draw away the stive from the receiver, without seeking to increase the currentof air between the grinding surfaces.

The defendant in Bovill *vs.* Smith used exhausting power only to draw away the stive from the millstone cases, and to blow it either into the open air, or into a non-porous stive room.

The general method in dispute is shown in the accompanying diagram, in which the stones are shown covered in, and made as near as possible air-tight, being supplied with air from the cold blast, which, when having passed through the stones, is drawn off by the extracting fan, A, thence into a small room, and into the open air.

The method has in various ways been modified and changed in its details; and so many have had a hand in its improvement that it is little wonder extensive litigation has grown out of it. In some instances both blast and exhaust fans have been employed. The air charged with flour dust is in some instances, passed through porous cloth to arrest the flour; and in other cases it is passed into a large room in which, the air emerging through ample screens with little force, the flour settles and is economized.

The advantages claimed are that the stones are kept much cooler, and thus a higher speed may be maintained, and a larger quantity of work performed; but so far as we can learn it has never been very popular in this country, although it has been tried in several large flouring establishments.

### How Dualin is Made.

Wood of soft texture (for instance, pine or poplar) is reduced to small grains, resembling sawdust, treated with diluted acids, and then boiled in a solution of soda. After having been thoroughly dried, by a quick drying process, the cellulose is mixed with—

"No. 1. Niter and nitro-glycerin; or,

"No. 2. Being first changed into nitro-cellulose, by being treated with nitric acid (48° B.) and sulphuric acid (66° B.), it is then mixed with nitro-glycerin.

"No. 3. The dried cellulose is mixed with anhydrous glycerin, until the mass becomes of the consistency of thick broth. This is gradually treated to a bath composed of a mixture of sulphuric acid (66° B.) and nitric acid (48° B.) of eight to ten times its quantity, during which process the greatest care must be taken to stir the heated mixture, and cool it. The stirring is continued for at least half an hour, after which the mixture is placed in a water bath of ten times its quantity. The acid-water being repeatedly drawn off, and replaced by pure water, the mixture is now placed in a bath of diluted soda-lye. In this, it is stirred from one to two hours, again washed in pure water, and then rendered anhydrous by means of hot water heating, and treating it with concentrated sulphuric acid and chloride of calcium. After having been rendered anhydrous, it is mixed with cellulose, prepared by process described under No. 1, 2, or 4, until a dry and not very greasy powder is obtained. The dust is sifted out, and this, if packed into cartridges, is serviceable.

"No. 4. The cellulose is charred, finely pulverized, boiled in concentrated niter-lye, and after soda has been added, is rapidly dried, and mixed with nitro-glycerin or dualin, prepared by process No. 1, 2, or 3.

"No. 5. The process of preparing nitro-starch, another ingredient of dualin, is also new. It will prevent the formation of lumps after the starch has been subjected to the acids, and also render the dried preparation less sensitive to dampness.

"*a.* Starch is thoroughly dried until it assumes a yellowish-brown color. It is then finely pulverized, and mixed with anhydrous glycerin. The mass is slowly placed in a mixture of nitric acid (48° B.) and sulphuric acid (66° B.) of ten times its quantity, during which process the greatest care must again be taken to stir the mixture, and cool it. The stirring is continued for half an hour, when the mixture is placed in a water bath. The acid-water being repeatedly drawn off, and replaced by pure water, the mixture is now placed in a bath of soda-lye, then placed in another water bath, and finally rendered anhydrous by means of hot water heating, and treating it with concentrated sulphuric acid and the chloride of calcium. It is now pressed through a fine sieve, and mixed with either dried pulverized starch that has been treated with niter-lye, or it is mixed with cellulose, prepared as above described, until a dry and not very greasy powder is obtained.

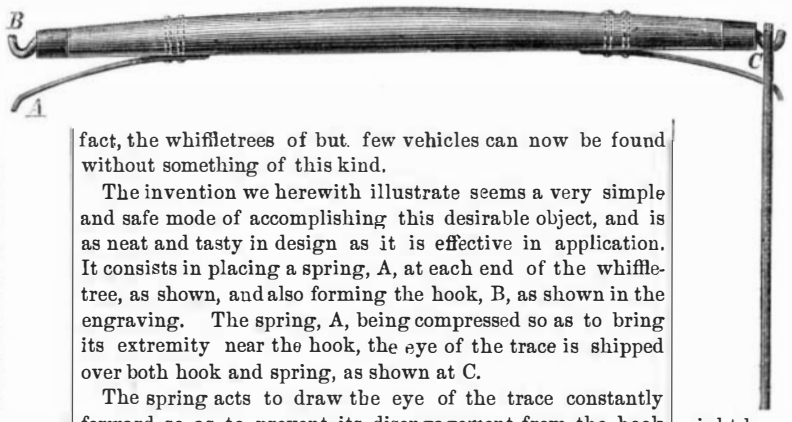
"*b.* After the starch has been dried, it is mixed with pulverized cellulose, or with the dualin-dust prepared by process No. 3. This mass is then placed in a mixture of nitric acid (48° B.) and sulphuric acid (66° B.), and for the rest, treated as described by process No. 5.

"No. 6. In an entirely analogous manner, mannite is mixed with anhydrous glycerin, and compounded with the other ingredients of dualin."

## WILLIAM'S IMPROVED TRACELOCK.

The detachment of a trace from the whiffletrees of carriages is an accident which has often endangered, and not unfrequently sacrificed the lives of their occupants. When the occupants have escaped without injury, many a young and promising horse has taken fright and has been ruined for life.

Many devices designed to lock traces so that they cannot become detached, unless by design, have been made, and many of them have justly attained a wide popularity. In fact, the whiffletrees of but few vehicles can now be found without something of this kind.




The invention we herewith illustrate seems a very simple and safe mode of accomplishing this desirable object, and is as neat and tasty in design as it is effective in application. It consists in placing a spring, A, at each end of the whiffletree, as shown, and also forming the hook, B, as shown in the engraving. The spring, A, being compressed so as to bring its extremity near the hook, the eye of the trace is shipped over both hook and spring, as shown at C.

The spring acts to draw the eye of the trace constantly forward so as to prevent its disengagement from the hook except when it is compressed in the manner above described.

The device is exceedingly simple, and it will be seen is very easy to manipulate in the attachment or detachment of the traces. It deserves to become popular.

The inventor will sell either the entire patent or State rights.

Patented, through the Scientific American Patent Agency, Dec. 7, 1869, by Samuel P. Williams, of Rutland, Vt., who may be addressed for further particulars.

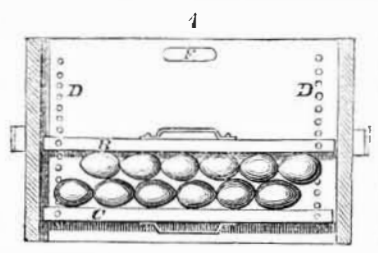
## J. D. MICHAEL'S PATENT EGG BOX.

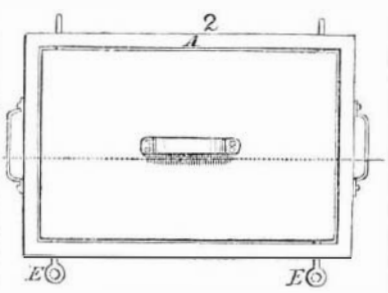
It is generally known that eggs keep much better and longer if frequently turned over, for if left lying on one side any length of time, the yolk will settle or sink until it reaches the shell; the egg is then too stale for use, and will soon be rotten. If turned over every few days, the yolk will not reach the shell so soon, and consequently the egg will keep a great deal longer.

It is a well known fact to persons conversant with natural history and the breeding of fowls, that the fowl when setting is known to turn her eggs over every day. She is taught by instinct that this is necessary. If the eggs were allowed to lie on one side during the three weeks required for hatching, the yolks would settle so that the eggs would spoil or not hatch. The heat from the fowl's body would hasten the spoiling of the eggs if they were allowed to remain in one position.

The design of this box is to provide a package for eggs, in which they can readily be turned over all together, whether the box be full or partially filled. This box would be very useful to parties who buy eggs and ship to market, also to persons who have a great many fowls, and especially useful to retailers of eggs, and in large families. An improvement has been made in the manufacture of these boxes, which will do away with the use of the rods, and make the box simpler and cheaper. For shipping purposes they can be provided with locks to prevent pilfering, while in transit.

Fig. 1 is a side view. Fig. 2 a surface or plan view of the same. The invention consists of a case or box, A, open at top and bottom, provided with boards, B C, arranged to be moved up and down and secured at any point within by running the rods, E, through the holes, D, and through holes bored in the ends of the boards, B C. Four iron eyes may be attached to each board, B C, to run the rods, E, through, and thus dispense with boring holes in the boards, B C. An additional board like B C, and two additional rods, E E, may be provided to be placed in the middle of large boxes to prevent breakage of eggs by accumulation of weight. Eggs for shipment should be packed with chaff or other packing to prevent breakage. Small boxes for local use need no packing.




These boxes would be useful for packing and shipping choice varieties of fruit in, by providing several boards to separate them into thin layers, and by making proper openings for ventilation. They may be also used for packing fruit and other articles.

This invention was patented through the Scientific American Patent Agency, Jan. 4, 1870, by J. D. Michael, No. 125 McElderry's Wharf, Baltimore, Md., who can be addressed for further information, rates of territory, etc.

### The Moon as a Terrestrial Motor.

The *Railroad and Travelers' Journal* thus discourses:

"An ingenious civil engineer of Marseilles has discovered a mode of using the force of rising and falling tides as a motive power, and he thinks that this new motor can be made serviceable at a great distance from the sea. The name of the discoverer is Ferdinand Tommasi.

"The power of the moon's attraction has been used practically for a long time. The inhabitants of Long Island, while still colonists of Great Britain, ground their wheat and sawed their lumber by moon power. The ocean tide was suffered to fill mill ponds at flood, and the water so gathered was confined and used to drive undershot wheels after the tide had nearly ebbed. By this process, however, only an insignificant part of the tide power was employed. On every mile of ocean coast the power of the tide is sufficient to raise ten million tuns a distance of ten feet twice every day. The tidal power exerted in Delaware Bay alone would more than suffice to drive all the machinery now in use in the world. The chief difficulty in applying tide water as a mechanical motor is the want of strength in metals. If a cheap substance could be had of ten times the strength of steel this tide power could be gathered up and utilized. With such a metal a spiral spring, weighing a few hundred lbs. and wound up by the power of the tide, might be made to propel a railway car a hundred miles by means of a system of wheels like those which are driven by the main spring of a watch. While tidal power is in amount scarcely conceivable for its vastness, it is very slow in its vertical motion, the machinery by which it can be made directly available must therefore be of great strength and dimensions. The utilizing of the tidal motor has long been a subject of study among mechanicians and inventors, but the insufficiency of the strength of metals has been constantly in the way of a successful result. The same want is experienced in almost every branch of mechanical invention or improvement. The discovery of some chemical means by which the strength of steel could, without additional cost, be doubled, would realize the dreams even of those who seek the means of useful aerial navigation, and it would result in the application of steam-water and electro-magnetic power to very many new uses."

TO PREVENT THE ESCAPE OF GAS FROM INDIA-RUBBER TUBING.—India-rubber tubing is slightly permeable to gas. The amount which escapes through the walls of the tube is, however, very small; it may be advisable sometimes to render any escape impossible. This can be done by giving the tubing a thin coating of a varnish made by dissolving one part and a half of treacle and two parts of gum arabic in seven parts of white wine and three and a half parts of strong alcohol. The treacle and gum must first be dissolved in the beer or wine, and the alcohol must be added very slowly, constantly stirring the mixture, or the gum will be thrown down.

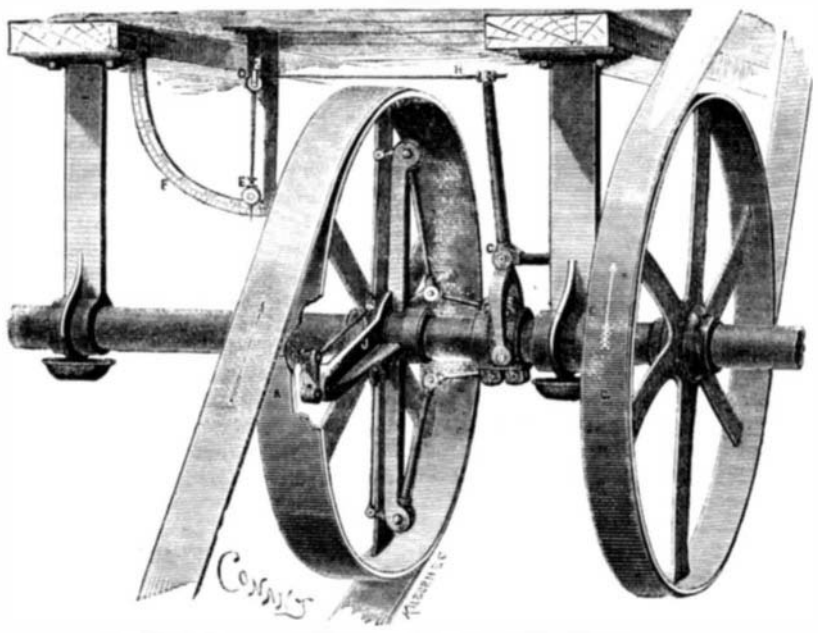
A PATENTEE, whose business had been conducted through this office, says: "I believe I have made enough from the few lines notice of my invention, printed in the SCIENTIFIC AMERICAN, to pay the cost of my patent."

### The Measurement of Power---Emerson's Dynamometer.

The time when people were content to estimate the power of motors by guess is passed. If there is any one thing more than another that indicates the advance of mechanical science at the present day, it is the perfection of appliances whereby accurate knowledge of the relative performance of boilers, engines, water wheels, and motive power of all kinds can be accurately measured and determined.

We this week give illustrations of the dynamometer invented by Mr. James Emerson, formerly of Worcester, now of Lowell, Mass. The stationary form of this instrument was illustrated and described on page 1, Vol. XX of the SCIENTIFIC AMERICAN, but the parts were not as fully shown as is desirable, and we herewith present another engraving, with a portion broken away to more fully exhibit its construction.

FIG. 1



EMERSON'S STATIONARY DYNAMOMETER.

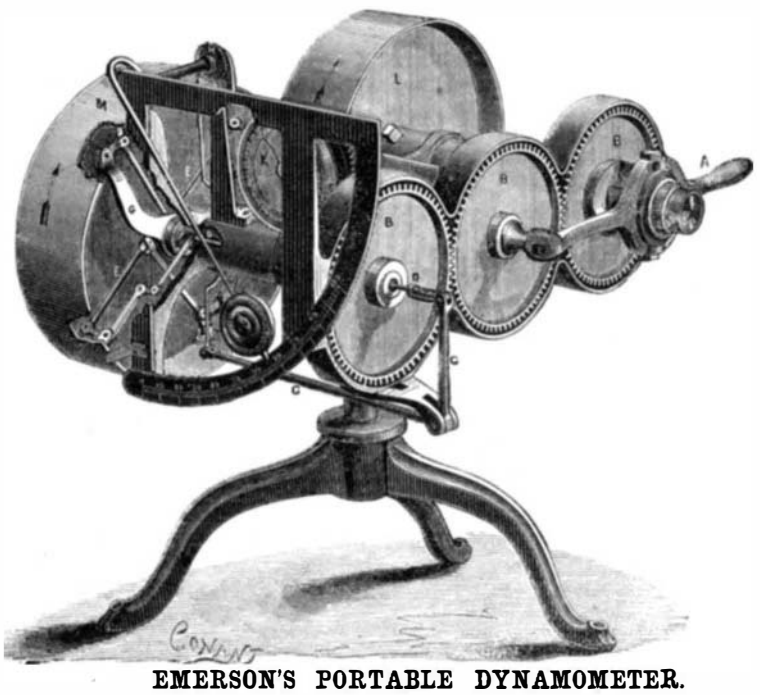
The pulley, A, is loose upon the shaft, but is made to revolve with it by the levers connected to its rim from the spider, J, which is keyed to the shaft. These levers are connected to the pendulum E. The arrangement is that of the platform scales, made rotary. The index is graduated and the whole tested by sealed weights, the same as any other scales. It is placed permanently upon the shaft, so that the power used may be known at any time. Its introduction demonstrates what we have often stated; namely, that little reliance can be placed in the common methods of estimating the amount of power used. We are informed that in one place, where it was claimed that but four-horse power was used, the dynamometer gave sixteen. Examination proved that one half was wasted by bad arrangements. In another case, 231-horse power was claimed; the dynamometer gave 145, and it was found upon examination that the head of water had been estimated from the bottom of the "pit" to the surface of water in the flume, and that the wheel was clogged with sticks and leaves, which were removed; then the dynamometer gave 190-horse power. Engines have been found that used abundance of fuel without giving out much power. A large dynamometer, measuring 250-horse power, in use at the Wamesit Power Company's works, at Lowell, Mass., for nearly two years, is seemingly as perfect and sensitive now, as the day it was put on.

The portable form of the dynamometer is shown in Fig. 2. The power to be measured is received from the motor shaft by the pulley lettered L, transmitted through the wheels, B, and the weighing apparatus to the pulley, M, which imparts it to the machinery to be driven.

This form of instrument is made of different sizes for testing pickers, looms, spinning frames, or any kind of mchinery.

It may be used where power is rented, but the stationary kind is far the best for that purpose. A tenant can always favor his power where the dynamometer is applied temporarily.

FIG. 2.

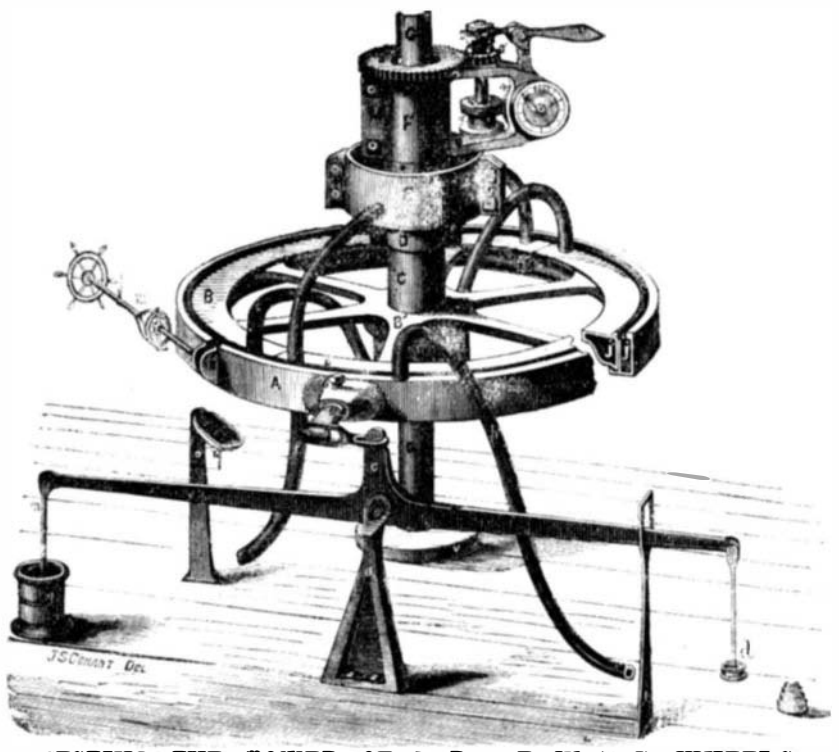


EMERSON'S PORTABLE DYNAMOMETER.

We are informed that in each case where two wheels, of the same kind, were tested the past season, a difference of two or more per cent was found, thus proving the necessity for each builder to have a place where his wheels can be readily tested and worked up to their best points.

The effect of the test, the past season, upon the water wheel trade, renders the fact patent that hereafter mill owners will require facts from actual test before purchasing wheels, and without doubt there will be plenty of testing the coming season; Mr. Emerson, with his dynamometer, will make arrangements by which it can be done at much less expense than heretofore; any one may have a private test, but henceforth, if a wheel is entered as a competitive wheel, the result will be published without fear or favor. Further information relating to these dynamometers, or in regard to test of water wheels, engines, or power, may be obtained of the patentee, by addressing James Emerson, Box 502, Lowell, Mass.

FIG. 3.



TESTING THE POWER OF TURBINE WATER WHEELS.

Fig. 3 is an engraving of Mr. Emerson's turbine dynamometer. The wheel, B, is secured to the shaft of the water wheel, and its speed controlled by the friction band, A, which is connected to the scale beam, as shown, the point of connection describing a circle of 13 feet. The rim of the wheel and the friction band are hollow, and are kept cool by a stream of cold water passing through them.

We are informed that in some tests made at Beloit, Mich., the scale beam was found to be readily balanced with an ounce weight, and the whole apparatus was so delicately constructed that a two-ounce weight added to the beam at *d*, equaling 2½ pounds at the point of connection with the friction band, would cause a decrease of two revolutions when the wheel was running at 130 revolutions per minute. Substantially the same instrument was used at the Lowell tests during the last summer and fall.

### Metallic Spectra.

M. Robert Thalén has communicated to the Royal Society of Upsala, a memoir on the characteristic metallic lines of the spectrum, especially with reference to their wave-lengths. As ordinary spectroscopes do not give entirely accordant readings, varying as they do with temperature and other incidental circumstances, it is necessary in all cases to make the solar spectrum the basis of reference. Augström's "normal solar spectrum" was accordingly the normal starting-point of the author's researches; and, with this as his guide, he has succeeded in constructing a chart, which gives, in millimeters, the wave-lengths of metallic lines within about 0·0000001 of their true value. Forty-five metals have been thus investigated, and their spectra mapped. Of these, the following give lines coinciding with those in the solar spectrum: Sodium, calcium, magnesium, iron, manganese, chromium, nickel, cobalt, and titanium. The discovery of the last-named coincidence is due to M. Thalén himself.

### The Japs in California---An Interesting Sketch of the Colony near Gold Hill.

Up to this time the Japanese have accommodated themselves in their household matters at considerable inconvenience; but this will soon be at an end, and in a few weeks they will be settled down as comfortably as you please, with houses of their own, each family reposing "under its own vine and fig-tree." Among their number are four carpenters, and these men are now engaged in erecting buildings for the use of the party. The houses are to be twelve in number, dimensions thirty-six by thirty, each containing four rooms, and built after the real Japanese fashion, with low, pitched roofs, the eaves extending far over the sills, and forming a balcony or awning around the entire house. The outer walls and partitions are all of sliding pannels, that can be shut together at the corners and folded into boxes, leaving nothing but the roof and its supports during the hot summer days, affording a luxury that can only be exceeded by "taking off your flesh and sitting in your bones." The partition walls are of paper, the outer walls of wood; one room is to be used as a sleeping room, another as a kitchen, and the two others—in each house—for silk raising, where the worms will be kept and nursed, and the silk woven and otherwise manipulated. I had omitted to mention that silk culture will form an important branch of this enterprise, fifty thousand mulberry plants having already been set out for a beginning. The Japanese carpenters are ingenious workmen, and their work is done with marvelous neatness. A curious feature of their houses is that they do not contain a nail, all of the joints and timbers being dovetailed together by many ingenious devices, and the whole work, even to the rafters, is as smooth as if it had been polished down with sand-paper. And the Japanese are a neat people, for they use no paint to hide any blemishes of construction or ornamentation, no filigree work or plaster of Paris gewgaws, but every stick in the building is exposed. Every morning, as regularly as she cooks the breakfast or sweeps the floor, the Japanese housewife takes a wet cloth and scours the whole interior of the dwelling, leaving no part untouched, and no stain or dirt spot to mar its cleanly appearance. Then the Japanese do not come into the house with muddy boots after the style of the American "sovereign;" but having covered the floor with a neat matting, always removes the dirty sandals before stepping upon it.

I stood and watched the Japanese carpenters at their work for some minutes, and noticed the peculiarity of their movements. The Japanese works "toward him"—that is, instead of shoving a plane from him, he reaches out, sets the plane upon the board at arm's length, and pulls it toward him; and he cuts, saws, and chops in the same way. His saws are fixed in handles, like a butcher's cleaver, and the teeth slant or "rake" toward the handle. The planes are constructed like ours, but the wooden portion is very thin and wide. The adze is fastened to the end of a hooped stick like the handle of one of the crooked canes that are worn on the arm on Montgomery street, and altogether their tools are different from ours, yet I cannot observe that they are awkward in appearance or awkwardly handled. The men are bright, intelligent, and polite, lifting their hats and bowing gracefully to strangers; and the women stay at home, do their cooking, take care of the babies, keep the house in order, and manage pretty much as American housewives, even to the wearing of the Grecian bend. Take them all in all, they are in every respect a superior race to the Chinese, and resemble them in no manner except in their physical appearance.—*San Francisco Paper.*

KEEPING IRON AND STEEL GOODS FROM RUST.—Iron and steel goods of all descriptions are kept free from rust in the following manner: Dissolve ½ oz. of camphor in 1 lb. of hog's lard, take off the scum, and mix as much black-lead as will give the mixture an iron color. Iron and steel goods, as well as machinery of all kinds, rubbed over with this mixture, and left with it on for twenty-four hours, and then rubbed with a linen cloth, will keep clean for months. If the machinery is for exportation it should be kept thickly coated with this during the voyage.