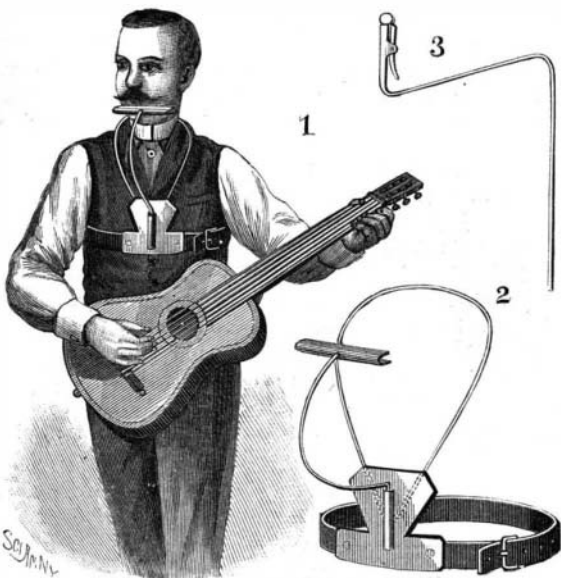


**The Congressional Vacuum Balloon.**

The committee of the House of Representatives on acoustics and ventilation has actually reported favorably a bill appropriating \$75,000 to subsidize a man who thinks he can construct a steel "vacuum" balloon of great power. He is to be allowed to use the facilities of one of the navy yards for the building of his machine, and is to have the money as soon as he has expended \$75,000 of private capital upon his air ship. One of the mathematical physicists of Washington was asked by a member of Congress whether such a balloon could be successfully floated. He set to work upon the problem, and here are some of his results, which are rather curious: A common balloon is filled with hydrogen gas, which, being lighter than air, causes the balloon to rise and take up a load with it. But, as the pressure of the gas within is equal to the pressure of the atmosphere without, no provision other than a moderately strong silk bag is required to prevent collapse. The inventor of the proposed steel balloon hopes to gain greater lifting power by using a vacuum instead of gas, the absence of substance of any kind being lighter than even hydrogen gas. But he has to contend with the tendency of the shell to collapse from the enormous pressure of the atmosphere on the outside, which would not be counterbalanced by anything inside of it. The first question which presented itself was, How thick could the metal of the shell be made, so that the buoyancy of the sphere, which would be the most economical and the strongest form in which it could be constructed, would just float it without lifting any load? The computations showed that the thickness of the metal might be 0.000055 of the radius of the shell. For example: if the spherical shell was 100 feet in diameter, the thickness of the metal composing it could not be more than one-thirtieth of an inch, provided it had no braces. If it was thicker, it would be too heavy to float. Now, if it had no tendency to buckle, which of course it would, the strength of the steel would have to be equivalent to a resistance of more than 130,000 pounds to the square inch to resist absolute crushing from the pressure of the air on a cross section of the metal. Steel of such high crushing strength is not ductile, and cannot be made into such a shell. If the balloon is to be braced inside, as the inventor suggests, just as much metal as would be used in constructing the braces would have to be subtracted from the thickness of that composing the shell. Of course, such a shell would buckle long before the thickness of the metal of which it was composed was reduced to 0.000055 of its radius. In other words, it is mathematically demonstrated that no steel vacuum balloon could be constructed which could raise even its own weight. This is an illustration of how intelligently Congress would be likely to legislate on scientific matters unguided by intelligent scientific advice.—*Science.*

**AN IMPROVED HARMONICA HOLDER.**

A holder in which a clamp or catch for a harmonica or similar instrument is mounted on a support, with means for attaching it to the body of the musician, is



MULHOLLAN'S HARMONICA HOLDER.

illustrated herewith, and has been patented by Mr. William E. Mulhollan, of Portland, Oregon. The body of the holder consists of a nearly flat plate, adapted to rest against the person, with a bottom cross strip to which is attached a strap or retaining band for holding the plate against the body. An attached pear-shaped loop, as more fully shown in Fig. 2, is also adapted to be placed around the neck to sustain the plate, which has a projecting socket in front for the reception of a detachable bent shank, carrying on its outer end a catch or clamp for removably holding a harmonica or

other mouth instrument, which is thus supported in convenient position for playing, leaving the hands free for another instrument. In Fig. 3 is shown another form of bent shank adapted to be placed in the socket for holding music in convenient position for reading when performing on a flute or similar instrument.

**AN EASEL WITH ADJUSTABLE SHELF.**

An easel having a detachable and adjustable shelf, adapted to receive colors, palette, etc., or articles of bric-a-brac or other ornaments when the easel is employed to display a picture, is illustrated herewith, and has been patented by Mr. William H. Van Wart, of Stonington, Conn. The front legs of the easel are provided



VAN WART'S EASEL.

with a series of apertures, in which are entered suitable pins for the support of a canvas or picture to be exhibited, or these pins may hold a suitable narrow table for such purpose. A shelf which is more or less rectangular, and of a size adapted to that of the easel near its base, is supported in front by a clamp-like cross-piece, attached to the shelf by screws or thumbscrews, the rear leg of the easel supporting the shelf at the other side by means of a bar attached to the under side of the shelf, passing through a slot in the rear leg of the easel, the shelf being held at any desired height by a pin passed through one of a series of apertures. Such a shelf, while useful for holding artists' materials or articles for display, acts also as a brace, imparting both strength and steadiness to the easel. The shelf may be made in sections hinged together to be folded, for convenience in transportation or out-of-door work, with a stud to engage an aperture in the rear leg of the easel, and the forward corners of the shelf recessed where they engage and are supported in position upon the forward legs, by pins placed in apertures provided therefor.

**Sugar Machinery.**

The British Vice-Consul at St. Iago de Cuba, in a Foreign Office report, states that the sugar estate machinery in use in Cuba is obtained from England, the United States, and France. He says the English sugar mills are found to be the strongest and best, but the French evaporating apparatus is preferred to and found to work better than the English. The general class of machinery made in the United States for export is, in his opinion, unreliable, being simply made to sell, though that used in the American refineries is unrivaled. Small machinery is often ordered from the United States instead of from Europe, on account of the greater promptness with which delivery can be obtained. At present there are two appliances for use on sugar estates for which there should be a good future, viz., cane shredders and furnaces for burning green bagasse. Though there are several in the market, none has so far given universal satisfaction, and the report states that there is a field for really good articles of this kind.

**A Great Globe.**

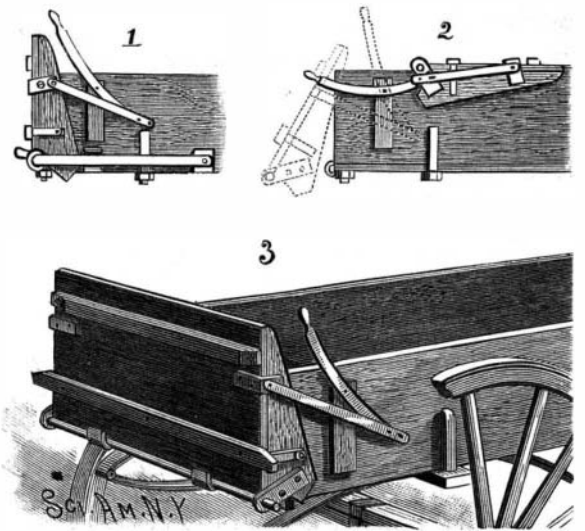
According to *La Nature*, an immense terrestrial globe, constructed on the scale of one millionth, will be shown at the Paris exhibition of 1889. A place will be set apart for it at the center of the Champ de Mars. The globe will measure nearly 13 meters in diameter, and will give some idea of real dimensions, since the conception of the meaning of a million is not beyond the powers of the human mind. Visitors to the exhibition will see for the first time on this globe the place really occupied by certain known spaces, such as those of great towns. Paris, for instance, will barely cover a square centimeter. The globe will turn on its axis, and thus represent the movement of rotation of the earth. The scheme was originated by MM. T. Villard and C. Cotard, and *La Nature* says that it has been placed under the patronage of several eminent French men of science.

**Buckthorn in Toothache.**

Dr. Gretchinsky has called attention to a practice which obtains among the peasantry in some parts of Southern Russia of treating toothache with a gargle of decoction of buckthorn—*Rhamnus catharticus* (*Lond. Medical Recorder*, June 20, p. 241). He states that, in order to test the ground of this practice, he made a series of control experiments upon a number of inmates of the local prison who were suffering from toothache. The patients were ordered to gargle their mouths with the cooled decoction every three or five minutes until the pain disappeared, and in every case the suffering ceased in about half an hour, though there still remained a vague aching or kind of itching about the teeth. A prolonged anodyne effect was produced by inserting a cotton wool plug steeped in the decoction in the cavity of a hollow tooth. Dr. Gretchinsky considers his experiments proved decoction of buckthorn to be a reliable means for mitigating such dental pain as depends upon inflammation of the pulp. He recommends the decoction to be made by boiling 100 parts of the bark in water sufficient to yield 200 parts of the strained liquid and adding 10 parts of brandy. Another writer attributes the anodyne action to the powerfully astringent properties of the decoction.

**AN IMPROVED END GATE FOR WAGONS.**

An end gate removably pivoted at its lower edge to a wagon body, and provided with levers, whereby it is moved in and out of position by a person in the wagon, has been patented by Mr. Emil L. Burklund, of Wahoo, Neb., and is illustrated herewith. It is formed with side parts braced by metallic strips, and overlapping the body, and is pivoted at the bottom by means of a rod passing through sleeves or loops on the wagon body, the lower ends of the side parts being curved, and resting upon strips secured to the rear edge of the body, whereby the gate may rock on its lower edge independent of the pivotal connection. The gate is operated and held in closed position by means of handled levers, each pivoted to a strip secured on the wagon body, the outer ends of these levers being each pivoted to one end of a bar, which at its other end is pivoted to a bracket projecting from the side edges of the end gate. The joint between the outer end of the handled lever and the bar is made adjustable, there being different holes in which the pivot pin may be placed, to secure greater range of movement of the end gate. When it is desired to use the end gate for dumping or unloading, the pivotal rod at the bottom is slipped out of the sleeves, when the gate may be thrown out at its lower end, as shown in dotted lines in Fig. 2, or it may be moved entirely out of the way, by means of the levers, and brought down upon the top of the wagon body, in position to serve as a seat, as also shown in the same figure. In Fig. 1 is shown another form of pivotal connection at the bottom of the end gate, for use where the location of the wheels would interfere with the ready removal of the pivotal rod. In the latter case, the end gate has a tubular rod secured by metallic eyes or bent strips to its lower edge, the ends of this rod being held by a catch block on the end of a metallic strip, secured along the



BURKLUND'S WAGON END GATE.

lower edge of the wagon body, there being a handle whereby, with this hinge connection, the lower edge of the end gate may be easily detached or engaged in hinged position.

A MAN who has tried it says that wooden posts treated as follows, at a cost of two cents apiece, will last so long that the party adopting it will not live to see his posts decay. Take boiled linseed oil, and stir in pulverized charcoal to the consistency of paint, and put a coat over the timber.