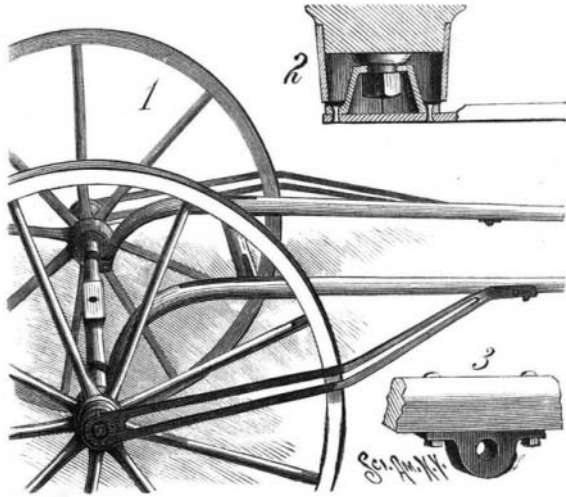


**A GUARD RAIL FOR VEHICLE WHEELS.**

A device to be attached to the thill and axle of a buggy or other vehicle, not to interfere with the free turning of the wheel, to prevent damage from collision with other vehicles by the wheels becoming interlocked, has been patented by Mr. John C. Tatman, of Mount Vernon, Dakota Ter., and is illustrated herewith, Fig. 2 showing a horizontal sectional view of a portion of

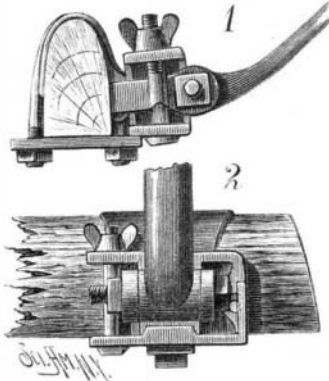


TATMAN'S GUARD RAIL FOR VEHICLE WHEELS.

the axle with the guard rail in place thereon, and Fig. 3 a view of the thill attachment. The guard rail has a circular opening in its rear end, behind which is a hollow or cup-shaped boss, adapted to fit upon the usual screw-threaded spindle of the axle. The guard rail thence extends forward and slightly inward, with a gradual sweep to a suitable point on the thill, where, through a transverse hole in its end, it is bolted by a pin to a drilled lug or web upon the under side of the thill. This guard rail not only precludes danger of the wheel becoming injured by collision or interlocking, but braces and strengthens the vehicle.

**AN IMPROVED THILL COUPLING.**

A simple and inexpensive thill coupling, designed to prevent rattling and be durable, is illustrated herewith, and has been patented by Messrs. Henry and John Knupp, of Warren, Pa. Fig. 1 shows a side view in section and Fig. 2 a front view, there being combined with the pivoted thill iron an elastic or compressible anti-rattler, placed next the thill iron eye. A clamp comprising opposite plates, hinged together at one side, bears upon the anti-rattler, and a screw passing through the opposite plates holds it in position. One of the clamp plates has a lug overlying the head of the thill iron pivot, and all the parts are cheaply and easily made, though forming a most efficient coupling.

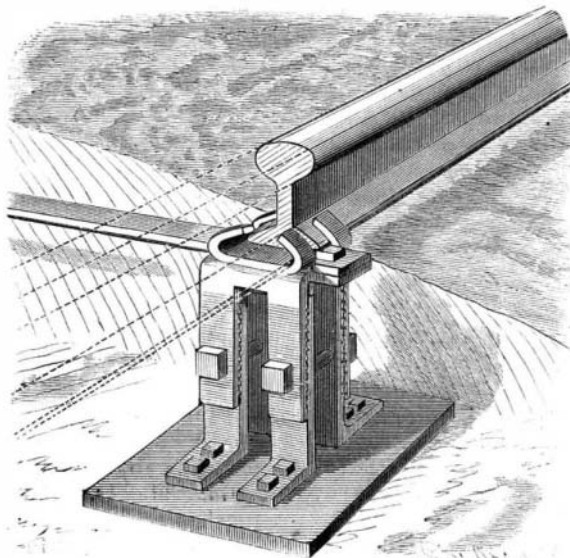


KNUPP'S THILL COUPLING.

rattler, and a screw passing through the opposite plates holds it in position. One of the clamp plates has a lug overlying the head of the thill iron pivot, and all the parts are cheaply and easily made, though forming a most efficient coupling.

**A COMBINED RAILWAY RAIL CHAIR AND TIE.**

A railway rail support that is designed to be durable, stable, adjustable, elastic, and economical is illustrated herewith, and has been patented by Mr. Nicholas M. Marks, of Quana, Texas. The base plate has its edges turned down to form flanges, and to the upper face of this foundation seat are secured four upwardly extending standards, in the form of angle irons, the outer faces of the standards being ribbed, the upper faces of the ribs extending outward from the standards at



MARKS' RAILWAY CHAIR AND TIE.

about right angles. To these standards are connected a rail support, formed from a blank having a central section with apertures, with arms bent down to extend at right angles from the central section, the space between the arms being such as to freely admit the standards, the arrangement being such that the rail support may be adjusted toward or from the base to such position as may be required to bring the rail to a proper level. Two such supports are connected by a cross bar, the ends of which are wider than its main portion, in such way as to make an exceedingly firm connection between the parts, but so that a proper adjustment of the supports and the parts by which they are carried may be readily made. The construction is such that the foundation, once in place, need not afterward be disturbed, but vertical and lateral adjustments can be easily effected.

**Magnesium in Electric Batteries.**

M. Heim, of Hanover, has lately made a series of observations on the increased electromotive force obtained by substituting magnesium for zinc in various well known cells. As anticipated, from the known fact that the heat of combination of magnesium with oxygen is greater than that liberated on the oxidation of zinc, the electromotive force of the cells in which the substitution was made experienced in every case a notable increase. Thus the electromotive force of a Daniell cell, the positive electrode of which was a copper plate immersed in a solution of sulphate of copper, was measured, first, when the negative electrode was a zinc rod plunged in dilute sulphuric acid; secondly, when a magnesium plate was substituted for the zinc, the solution remaining unchanged; and, thirdly, with a magnesium electrode in a solution of magnesium sulphate, and under these conditions the following figures were obtained: 1.185 volts, 2.033 volts, and 1.93 volts—results which were very favorable to magnesium. Nearly as striking figures were obtained in making the charge in a Bunsen cell, the positive electrode of which was a rod of arc lamp carbon. In this case, using both metals under similar conditions, the electromotive force was 22 per cent greater with the magnesium than with the zinc plate. With a Leclanche cell the electromotive force was raised by the charge from 1.5 volts to 2.3 volts, or upward of 53 per cent. These facts seem to show that considerable advantages would follow the use of magnesium in primary cells generally, if the metal could at any time be produced at a cost approximating to that of zinc.

**Preserving Telegraph Poles.**

Telegraph poles are preserved in Norway by making an auger hole, about an inch in diameter, in each post, about two feet from the ground, and pointing down at a small angle till the center of the stick is reached. From four to five ounces of sulphate of copper, in coarsely powdered crystals, is inserted, and the opening is stopped with a plug, which projects so that it can be pulled out to admit of replacing the charge every three or four months. The chemical is gradually absorbed by the wood, which, it is said, permeates to the very top of the pole, the whole outside surface assuming a greenish tint, due to the presence of copper in the pores. This simple means of preservation suggests the application of the same material to other purposes than telegraph poles.

**The New Gas, Hydride of Nitrogen.**

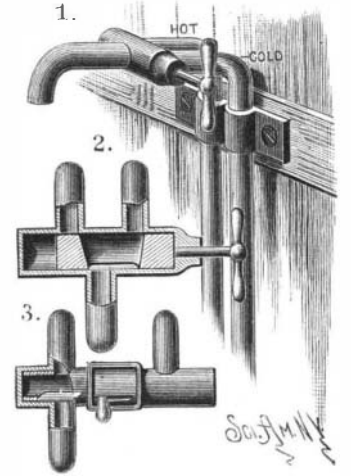
The discovery of a new gas is reported in Germany by Dr. Theodore Curtius, who has succeeded in preparing the long sought hydride of nitrogen, amidogen, diamide, or hydrazine, as it is variously called. This remarkable body, which has hitherto baffled all attempts at isolation, is now shown to be a gas perfectly stable up to a very high temperature, of a peculiar odor—differing from that of ammonia—exceedingly soluble in water, and of basic properties. In composition it is nearly identical with ammonia, both being compounds of nitrogen and hydrogen.

**AN IMPROVED MASON'S FLOAT HANDLE.**

A handle which may be detached from one float and attached to another in a short space of time, but one tool being required to make the transfer, has been patented by Mr. Edward M. Van Duzer, of No. 98 Thomas Street, Newark, N. J., and is illustrated herewith, in perspective and transverse sections. The handle has the usual grip and standards, with ears integral with the ends extending outward at right angles, the ears being apertured between the ends and the standards. A screw passes loosely through the aperture in each ear, and is provided with a winged lock nut having a centrally rectangular recess to receive the rectangular head of the screw, the nut to act as a wrench or lever to turn the screw. The other end of the screw is flattened and beveled upon opposite sides to form a wide cutting edge, wider than the diameter of the aperture in the ear. This handle can be readily and expeditiously detached from a mason's float that is unfit for use and attached to a new one, or with such handle a new float can be quickly and efficiently made from a rectangular board of suitable size.

**AN IMPROVED FAUCET.**

A faucet especially adapted for use with stationary basins, whereby either hot or cold water, or both, may be made to flow from one spout and be controlled by one handle, has been patented by Mr. William B. Rodman, of Norfolk, Va., and is illustrated herewith, Fig. 2 showing a partial vertical and longitudinal section and Fig. 3 a front elevation, partly broken away, of a modified form of faucet. Separate inlets are provided for cold and hot water, with a single outlet upon the opposite side, there being an interior pin near the forward end, and a plug having a reciprocating and rotary motion, provided with an elongated diametrical aperture having tapering ends adapted to register with the inlets, singly or collectively, and with the outlet, there being a segmental peripheral recess adapted to receive the pin. By this device the flow may be increased or diminished as desired, or any wished for proportion of hot or cold water be obtained.

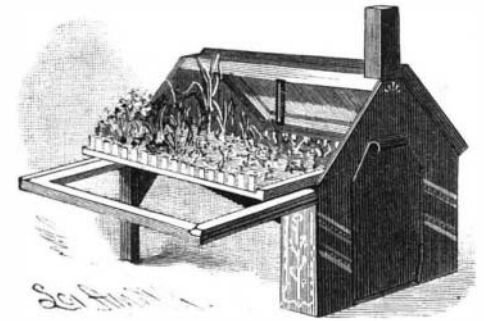


RODMAN'S FAUCET.

there being a segmental peripheral recess adapted to receive the pin. By this device the flow may be increased or diminished as desired, or any wished for proportion of hot or cold water be obtained.

**AN APPARATUS FOR TESTING SEEDS.**

An apparatus for determining the vitality or germinative qualities of seeds, to enable both the dealer and the purchaser to judge more accurately than is ordinarily possible, has been patented by Mr. Henry A. Goetz, of New Albany, Ind., and is illustrated herewith. It has a lamp chamber at one end, and a flue leading therefrom in such way as to diffuse an equable warmth through the compartment in which is located the seed pan. The seeds are placed in the pan on a bedding of cotton or other fibrous material, in rows which are properly labeled, and then water is poured in the pan at one edge of the cotton, so as to float the cotton and the seed placed thereon, the compartment

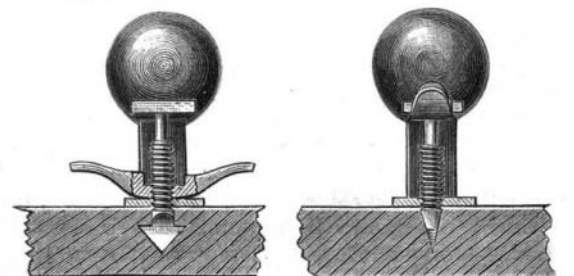
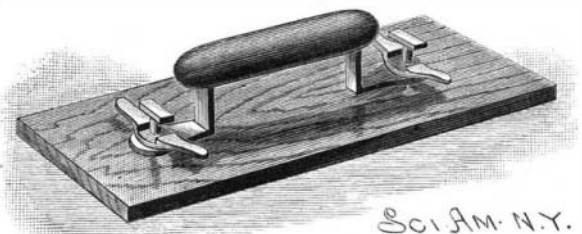


GOETZ'S SEED TESTER.

being closed by glazed doors to allow of raising the temperature as desired. The moisture supplied to the seeds at the same time assists the heated air in the chamber in causing the good seeds to sprout, while the operation has little or no effect on poor and worthless seeds.

**Total Eclipse of the Moon.**

Our readers must not forget the eclipse of the moon which will occur on January 28, beginning at 5:30 P. M. The full data will be found in our issue of January 7, 1888, page 2, of the present volume, to which we refer for particulars of the different phases. The interest of the phenomenon will be enhanced by the fact that it occurs at so convenient an hour.



VAN DUZER'S MASON'S FLOAT HANDLE.