

**THE THOMPSON WOODEN SPRING FOR VEHICLES.**

We illustrate herewith a new wooden spring which may be adapted to any variety of vehicle, from children's carriages to railway cars. The advantages claimed for it are that it is light, strong, and durable; that it can be adjusted to carry with safety a greater or less weight; that frost has no effect upon it, and that its cost is about one fourth that of steel springs.

The ends of the wooden spring bars, A, are inserted in cast iron sockets, B, where they are separated by small central tongues. C is a tension rod, the extremities of which pass through the centers of the castings, B, and have nuts, D, screwed on the ends. The outer portions of the nuts are square, so that they may be readily grasped with a wrench, and their inner parts are cylindrical and fit against spiral springs, E, placed in the castings, B. Said springs assist the wooden bars, A, to recover their former position when the pressure is removed. By this construction, by simply adjusting the nuts, A, the strength of the spring may be increased or diminished as desired to suit the weight supported. The clasps, F, protect the bars, A, from wear, and all metal work is handsomely plated or bronzed.

We are informed that a pair of these springs, weighing 12 lbs., takes the place of a pair of 40-lb. steel springs, and that four such wooden springs, weighing 36 lbs., may be substituted for as many steel springs of 250 lbs. weight. The device can be applied in side bar as well as in elliptic form, and no change of fastening is required to insert it in place of a steel spring in case of the latter being broken or injured.

Patented through the Scientific American Patent Agency, December 18, 1877. For further particulars address the proprietors, Messrs. Thomas Ledwich & Co., Avoca, Iowa, or George H. Thompson, General Superintendent, Omaha, Neb.

**A Deaf-Mute Telegrapher.**

Considering the fact that in telegraphy, as now practiced, all messages are read from sound, and that on the quickness and good training of the ear depends, to a great extent, an operator's skill, one of the most remarkable cases (in fact, the only one) on record in this or any other country was that of the late Samuel J. Hoffman. Having lost his hearing entirely a short time after learning telegraphy, he nevertheless continued the practice and successively occupied prominent positions as long as he lived. He made use of a sounder of his own construction, and received by placing his hand over it in such a manner that he could feel distinctly every vibration of the armature. He would thus continue to receive by the hour without "breaking," and experienced no difficulty except when the wire worked hard or the circuit changed frequently; he obviated this by placing his fingers on the binding screws of the relay, distinguishing the characters by the variations of the current. He died in Florida, having gained the reputation of being a most thorough operator and electrician.

**THE INDIA RUBBER TREE.**

Caoutchouc, or India rubber (called by the South American Indians *cahuchin*), is the inspissated juice of a number of trees and plants found in Mexico and Central America, in Brazil, Guiana, Peru, and in the East Indies. The illustration represents a twig of the Mexican tree (*Castilloa elastica* Cerv.) in blossom. This tree is a genus of the order *Artocarpaceae*, and is very similar in appearance to its South American cousin, the *Siphonia elastica*, which is the most prominent source of supply of caoutchouc. The *Ficus elastica* of the Ganges, another congener, is described as one of the noblest of trees; while all the varieties of the India rubber tree may be classed among the most useful of Nature's products. The Mexican tree grows from 50 to 100 feet high and from 8 to 20 inches in diameter. It has male and female flowers alternating on the same branch. The male flowers have several stamens inserted into a hemispherical perianth, consisting of several united scales. The female flowers consist of numerous ovaries in a similar cup. The juice of the tree is tapped at several incisions in the trunk, and after various processes of manipulation appears in the form of the crude India rubber of commerce.

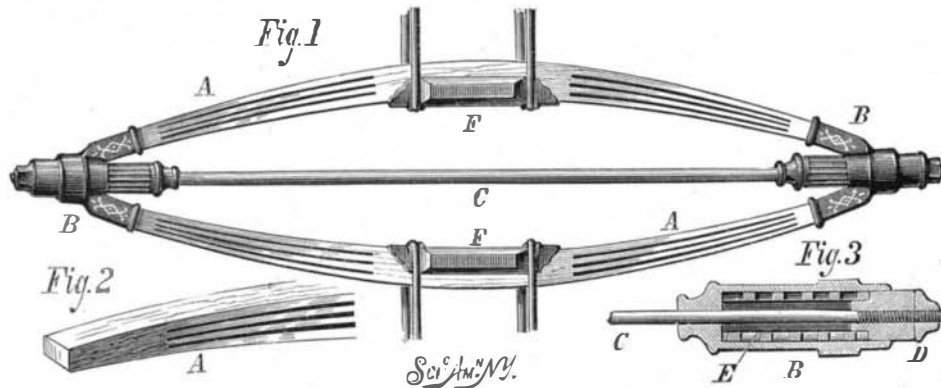
**The Orograph.**

At a meeting of the French Academy of Sciences, December 10, M. Schrader exhibited his orograph and a geographical map of Mont Perdu made with it. The instrument consists of a circular paper-covered plate with cen-

tral vertical axis carrying a sleeve which can turn round freely. On the top of the sleeve is a telescope, the movements of whose frame in the vertical direction are communicated to a pencil, and transformed by gearing into to and fro movements. If the telescope describes a circle round the horizon, the style describes a corresponding circle on the plate; if the

done in an hour—none appeared afterward to be the least injuriously affected by the operation. In those instances in which the cutting slightly damaged the calyx tube the wound soon healed over and became covered with a yellowish-green, cork-like substance, the latter eventually closing the tube, and thus creating an impassable barrier to the insect. As

regards the shape of the apple, this is somewhat altered by the above treatment, so as to render the variety less easily distinguishable, but the slight diminution in length, resulting from its adoption, is more than compensated for by increased thickness, total absence of grub, and, consequently, generally finer appearance. For the purposes of comparison, a considerable portion of the fruit on each of the trees selected for experiment had been left in its natural state, and the apples operated on were chosen quite at random, regardless of aspect or situation. The fallen fruit under the different trees was found to consist exclusively of such as had not been operated on.

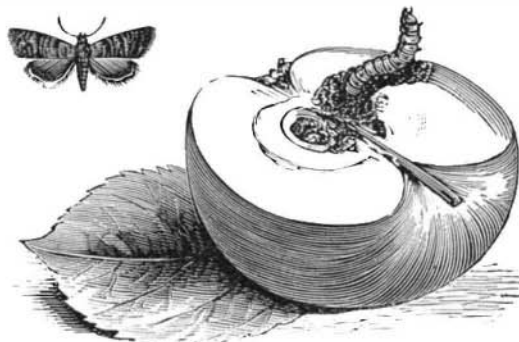


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telescope goes up or down, the trace produced is further from or nearer to the central axis. A spirit level being fixed to the telescope, the circle made when it is even gives a means of estimating the height and depressions.

**THE CODLING MOTH.**

The well known German pomologist, Dr. Edward Lucas, has recently called attention to a simple method of guarding against the ravages of that tiresome insect plague, the caterpillar of the apple or codling moth (*tortrix pomonae*). For an illustration of the moth and grub we are indebted to *The Gard-*



**GRUB OF THE CODLING MOTH (*Tortrix pomonae*).**

den. The plan is dependent for success on the fact that the moth most frequently deposits her eggs between the leaves of the calyx, whence the grub afterward commences its attack on the heart or pulpy portion of the apple, and finally escapes by a hole made in the circumference. Observing this, it occurred to Mr. Krausz, of Stuttgart, the discoverer of the remedy, to try the effect of cutting off the calyx, quite low down at its base, as soon as the apple should have attained the size of a hazel or walnut. The prominent situation of the calyx at that period of the fruit's growth greatly facilitates its removal, and in the case of some hundreds of apples Mr. Krausz experimented on—several hundreds can be

Cultivator Tongue, in which the advantage of the double tongue in separating the team, to prevent them from stepping upon the row of plants, is secured without the objection of cramping the team in turning. This is accomplished in an ingenious manner by combining with a single tongue a wheel, disk, reel, or other separating device, which is located upon the tongue in such manner as to secure the desired result in a simple and practical manner.

Messrs. Leonard L. and Daniel Lumbert, of Marston's Mills, Mass., have invented a new Apparatus for Gathering Cranberries, which is simple in construction and convenient in use, enabling the cranberries to be gathered much more rapidly than in the usual way. The raking apparatus may be floated upon the water or used upon dry ground, in either case gathering the berries quickly and effectively.

A practical improvement in Bale Ties for cotton bales and other purposes has been devised by Mr. Wm. M. Seaman, of Bullitt's Bayou, La., which consists in the combination of a U-shaped buckle, corrugated lengthwise on the inside, and a metallic strap or band, the ends of which are corrugated crosswise, for the purpose of being held from slipping when placed to overlap each other, and inserted to fit in the opening between the corrugated inner sides of the buckle. Lateral motion is guarded against by notches in the buckle, forming a shoulder against which the band presses.

An improved Poke, or device for preventing horned cattle from throwing fences or goring, is made of an outer plate and an inner plate formed to suit the angles of the animal's head and horns, kept apart a short distance by springs and held together and in place by flexible stays; and also having the outer plate armed with hinged points, conducted through the lower plate to come in contact with the head when any attempt is made to use the horns. This is the invention of Messrs. David S. Ludlum, of New Hampton, N. Y., and Louis W. Ludlum, of Orange, N. J.

Mr. Isaac O. Sailor, of Montgomery City, Mo., has invented a Stump Extractor, the novelty of which consists in a combination of straps with the cross bars and posts of the apparatus against the downward pressure of the lever. The latter is operated by a rope and pulleys in connection with a horse windlass.

An improved Machine for Measuring and Packing Tobacco has been invented by Mr. C. C. Clawson, of Raleigh, N. C. It has a revolving table which carries the filling apparatus, containing the empty bags in forms, under a chute, after which the bags are filled by a plunger and follower.

Mr. D. P. Ferguson, of Janesborough, Ga., has devised a light Plow, suitable for furrowing, cultivating, etc., in which the standard is pivoted near its middle to an inclined brace, whose upper end is pivoted to the rear end of the beam. The standard may be adjusted at various inclinations to vary the depth at which the shovel or plow proper shall enter the soil, and is clamped and held in any adjustment by friction with a slotted wedge which is placed on the upper side of the beam and under a cross bar or rod passing through the forked end of the standard.

Mr. A. H. Ballagh, of Macon City, Mo., has patented an improved Harrow, which may be readily adjusted to hold the teeth in any desired position from vertical to horizontal when at work, the machine in the latter case being used as a clod crusher, thus combining two implements in one.



**TWIG OF THE MEXICAN INDIA RUBBER TREE ("CASTILLOA ELASTICA") IN BLOSSOM.**

**New Mechanical Inventions.**

A Safety Car Wheel and Lubricating Device have been invented by Mr. Benjamin F. Shelabarger, of Hannibal, Mo. The wheel is cast with a conical or converging flange, which projects a short distance over the axle box. The under surface of the axle box is convex and of the same curve as the inner edge of the flange on the wheel, so that should the axle break the car will be supported by the engagement of the under surface of the box with the projecting flange of the wheel. This flange serves another purpose, that of catching the oil which is thrown out by the jarring of the truck, and conveys the oil so gathered back into the box from the top of the chamber in the wheel formed by the flange, the oil being thrown outward by centrifugal force and led to the box. An inclined flange on the inner face of the box conveys the oil which may fall on the outside of the box to the annular chamber in the wheel formed by the first mentioned flange.

Mr. Theodore J. Palmer, of New York city, has made an improvement in Rocking Chairs, in which the rocking frame acts upon a base part to which it is secured by a spiral spring, and in motion is rendered reliable and uniform by an arrangement of overlapping side pieces, stop pins, and outer swell portions, which secure the position of the rockers upon the base frame, preventing lateral motion, and also tipping beyond a fixed point. The spring holds the chair in its normal upright position when not rocked.

An improved Tunneling and Excavating Machine has recently been patented, which is constructed with a cylindrical case or shield having a concave socket to which the convex portion of an interior case is fitted. The latter carries the excavating mechanism. Within it there are two concentric drums, the outer one of which rotates in contact with longitudinal rollers carried by the case, and the inner one rotates with the outer one and is capable of sliding longitudinally in it, being guided and supported by friction rollers. To the rear end of this drum a chain wheel is secured for receiving the driving chain, and to its front end a series of cutters are attached. A shaft carrying an earth auger is journaled in the center of the inner drum, and there are suitable devices for operating and adjusting the various parts. This machine is the invention of Mr. Hawley N. Cargill, of Grand Rapids, Mich.

An improved Churn is the invention of Messrs. John A. McConnell and Wm. V. McConnell, of Houston, Texas. By suitable gearing the motion from a crank operates a vertical dasher shaft having a head on the lower end secured in a box, and the whole so arranged that the cover and its attachments may be removed without disconnecting the dasher shaft.

Mr. Thomas Percival, of Napanock, N. Y., has invented a Door Latch which is operated by a spring thumb piece projecting over a handle. This latch is also made in reversible form, and may be locked by a key which fits in a key hole in the handle.

Mr. Joseph B. Stone, of Jersey City, N. J., has invented an improved Lock Hinge for shutters, gates, doors, etc., by which they may be securely locked into open position, the novelty consisting of a combination, with a second guide sleeve of the swinging hinge section, of a vertically sliding gravity catch with wedge-shaped ends, that passes over and locks to the fixed pintle bracket of the hinge.

Mr. Wm. Birch, of Salford, Eng., has invented a Machine for Opening, Smoothing, Spreading, and Guiding Fabrics, for the use of bleachers, dyers, calico printers, and others. In it the fabric, after passing through heaters, is led under and over rollers having ribs spirally radiating from the center, and through a governor, which, by springs, regulates the motion.

David P. Sularff, of Mifflintown, Pa., has invented a Mill Feeding Apparatus, by which the grain or grain product is agitated in the hopper and fed downward into the eye of the runner through a tube, by means of a spirally flanged shaft, and then discharged laterally at the bottom of said tube by a ribbed revolving cone. A sleeve is applied to the lower end of the feed tube to regulate the rapidity of discharge of the grain or grain product into the eye of the runner.

**Using the Telephone.**

The Bell telephone people in this city have adopted the system of renting instruments at \$50 per double pair per year for use on local lines, and decline to sell them to users. In order to prevent infringement of their patents they maintain agents whose duty it is to watch for attempts at private

manufacture of the invention over certain districts, and on detecting such to require the unauthorized maker to pay the same rent as if he had regularly hired his instrument. This method of managing a patent is rarely successful. The apparatus may be constructed very easily, and at the cost of only a few cents; it is so much a novelty that hundreds will make it, if only to gratify their curiosity, while others having found uses for it will go on and employ it as freely as they would the telegraph. No system of espionage can take account of all such cases, and therefore it probably would be found much more remunerative if the invention were manufactured and sold at a fair profit. This is already done in Germany, a correspondent writes us, where Professor Bell has no patents, and where a pair of instruments can be pur-

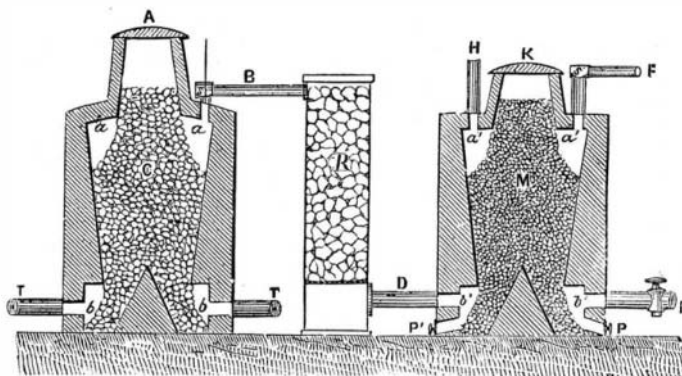


Fig. 1.—M. HENRI GIFFARD'S APPARATUS FOR THE MANUFACTURE OF HYDROGEN IN THE DRY WAY.

chased for six dollars. In England the price demanded is \$150, which is obviously excessive. Patentees and patent proprietors make a mistake in endeavoring to gain larger profits by guarding their devices thus closely. There is more to be gained by allowing them to come into the widest possible usage, and by the exercise of reasonable liberality.

**Novel Method of Indicating Perspiration.**

M. Aubert, the author, has studied the effects of cutaneous disease in modifying the perspiratory secretion. He made use of the following simple procedure: A piece of white paper is applied to the skin, and maintained in contact a few

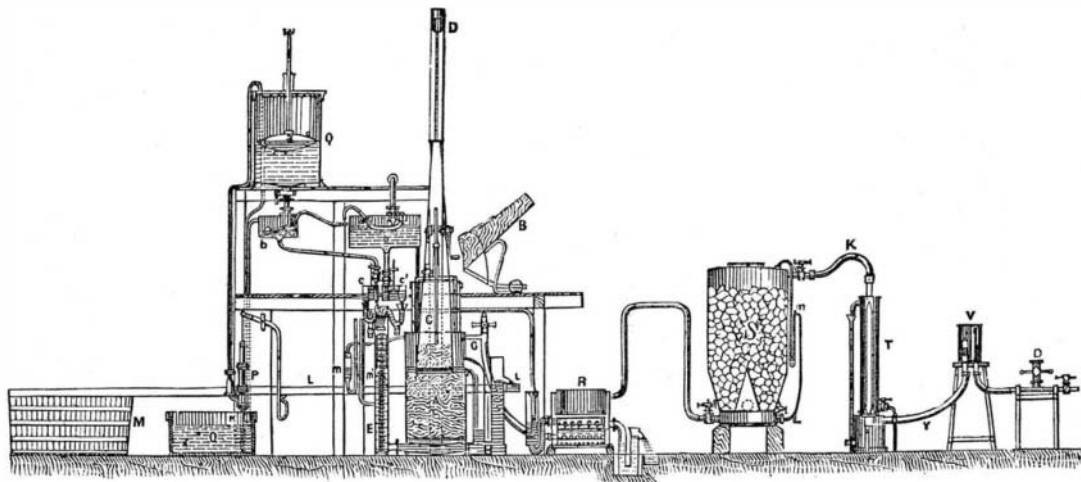


Fig. 2.—APPARATUS FOR THE MANUFACTURE OF HYDROGEN IN THE MOIST WAY.

minutes. The sweat, as it issues from the follicles, slightly moistens the paper at points corresponding to their orifices.

A dilute solution of nitrate of silver is then brushed over the paper, and the nitrate becomes converted into a chloride from the chloride of sodium in the perspiration. The chloride of silver blackens upon exposure to light, in this way mapping out the distribution, etc., of the sweat glands. With the aid of this test paper he has studied the secretions in nævus, ichthyosis, pelade, erysipelas, scabies, lupus, favus, herpes, psoriasis, etc.

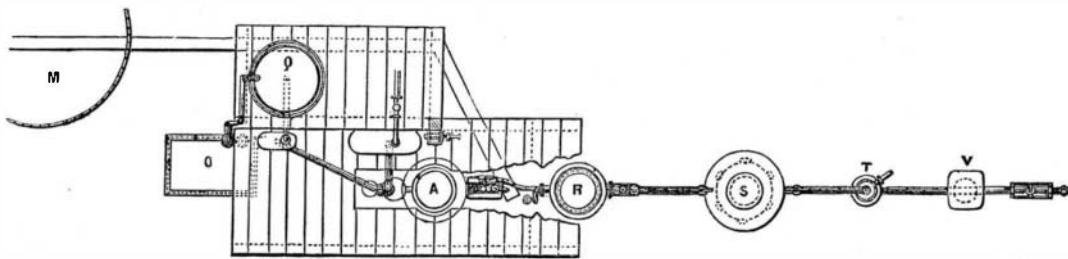


Fig. 3.—PLAN OF APPARATUS, FIG. 2.

Aubert's observations enable him to state that, as a rule, irritations of the skin completely suppress the perspiratory secretion, and that after their disappearance some time elapses before the secretion reappears. In cicatrices many of the glands disappear, but those which remain secrete more profusely than before.—*Le Progrès Medical.*

It is announced that Mr. J. W. Ward, of Belfast, has accomplished the feat of observing the satellite of Neptune with a 4 1/2 inch achromatic.

**M. HENRI GIFFARD'S NEW APPARATUS FOR THE PRODUCTION OF HYDROGEN IN LARGE QUANTITIES.**

Hydrogen is the lightest of known gases. Air outweighs it fourteen and a half times. Hence it is the most favorable gas that can be employed for the inflation of balloons. Illuminating gas is commonly substituted for hydrogen for this purpose, but simply on the score of convenience, due to the readiness with which it may be obtained. The ascensional force of hydrogen is in the proportion of 1,100 to 700 as compared with that of illuminating gas, hence the economical production of the former for aeronautical purposes as well as for industrial uses is greatly to be desired.

A novel apparatus which, according to *La Nature*, solves this problem has lately been devised by M. Henri Giffard, the well known inventor of the Giffard injector. Two devices are proposed, the first working in the dry and the second in the wet way.

The first apparatus is based on two well known chemical reactions, namely, (1) the reduction by carbonic oxide of natural oxide of iron, and (2) the decomposition of vapor of water by metallic iron reduced in the preceding reaction. The system is composed essentially (Fig. 1) of two cylindrical furnaces, C and M. The first is filled with coke, and the second with fragments of natural iron oxide (ore). These furnaces are built of fire brick. Inside are formed recessed portions, so disposed that the coke or ore may be surrounded above and below by annular spaces, *a a*, *b b*, *a' a'*, and *b' b'*, which are always clear, and never choked by the material introduced at A and K. The ore furnace has doors at P P', through which the lower portion of the ore is agitated in case of obstruction.

The coke in chamber, C, is ignited from beneath, and air is blown in through the tweezers, T T', causing energetic combustion. The carbonic oxide formed escapes at the annular space, *a a*, passes into the tube, B, and traverses the cylinder, R, which is filled with broken refractory material and wherein the cinders are deposited. The gas is then led by the conduit, D, to the lower part of the ore furnace, M, which it enters by the annular space, *b' b'*, and leaves by the space, *a' a'*. The oxide of iron is reduced and its surface transformed into metallic iron. The gas itself is converted into carbonic acid and escapes by the tube, F, communicating with a chimney. No grate or fire is necessary in the second furnace, as the carbonic oxide is itself hot enough to raise the temperature of the ore to the desired degree.

When the reduction of the ore is effected a current of steam is sent through the mass. The reduced metallic iron combines with the oxygen of the water and the hydrogen is disengaged. To this end the valves, *s'* and *s*, are closed and the steam is introduced by the tube, E. The hydrogen escapes by the tube, H, traverses a powerful refrigerant, and is finally dried in a lime purifier. After this decomposition of the water the iron is oxidized anew. Carbonic oxide is again passed through it, the ore is again reduced, steam is admitted, and thus the operation goes on indefinitely.

The following details of actual experimenting with the apparatus are given: In order to produce 32.7 cubic feet of hydrogen there is required theoretically 12,320 grains of water, or say, in practice, allowing for loss 2.2 lbs. The formation of the last amount of steam costs, in Paris, one tenth of a cent's worth of combustible, counting coal at \$6 or coke at \$8 per ton. This steam, before use, is employed to drive the blower, so that it yields free a certain amount of motive power which should be credited. In order, moreover, to produce 32.7 feet of hydrogen, 8,878 grains of pure carbon are needed to generate (theoretically) the necessary carbonic oxide, or practically about 9,240 grains. To allow for loss, let these figures be increased to 12,320 grains. This amount of coke costing 0.62 of a cent, 32.7 cubic feet of hydrogen costs, in Paris, 0.67 of a cent. Add to this the insignificant cost of ore reduced to powder, etc., and the total maximum cost may reach 1 cent per same amount, or, say, 30 cents per 1,000 feet.

M. Giffard's second or wet-way apparatus is no less ingenious than the foregoing. In Fig. 2 the generator, A, is the essential portion in which the hydrogen is made. Iron turnings are introduced by the swinging inclined plane, B. They fall into the large conduit, C, which is disposed like the mouth of a blast furnace and which is hermetically closed by a hydraulic arrangement lifted at the moment of filling by a cord passing over the pulley, D, Fig. 4. The iron turnings fill the interior of the vessel, A, as far as a lower perforated plate forming a false bottom. Water mixed with sulphuric acid enters the lower