

**ENGINEERING INVENTIONS.**

Mr. Charles E. Macarthy, of Forsyth, Ga., has patented an improvement in horse powers of that type in which a king-wheel is arranged in horizontal position on a vertical post rotated by lever arms below, which wheel has a rope belt that passes around and drives a speed pulley, from which the power is utilized, while a tension pulley and idler pulley serve to give proper direction and tension to the rope.

An improved form of feathering paddlewheels for steam vessels, whereby the full power of the paddle against the water is utilized for the effective part of its movement, while the carrying of dead water is avoided by the paddles as they pass from their lowest position to the surface in the rear, has been patented by Mr. Joseph F. Breux, of Hardwick, Vt.

Mr. Charles E. Macarthy, of Forsyth, Ga., has patented an improvement in automatic car couplings, and it has reference to that class of such couplings in which a sliding block is arranged in the throat of the draw bar, and is pressed forward by a spring past the hole for the coupling pin, and which is made to hold up the coupling pin until the said block is forced back from under the coupling pin by the entering link of the opposite car, when the coupling drops through the link and couples the cars.

An improvement in slide valves has been patented by Mr. William S. Hughes, of Long Island City, N. Y. The main object of this invention is to reduce or prevent the noise made by exhaust steam of engines, which has heretofore been attempted by the use of muffles and similar devices. With the ordinary link motion and slide valve used on locomotives the exhaust edge of the valve must be moved the length of lap and lead before the piston receives steam from the direction in which it has been moving. In other words, the exhaust opening begins before the piston finishes its stroke, and before the steam has fully expanded. The exhaust being also opened suddenly by the quick movement of the eccentric, a wasteful and disagreeable explosion of steam from the cylinder takes place. To remove this difficulty the exhaust steam, instead of being allowed to explode, is gradually released, and without back pressure.

Mr. Abraham O. Frick, of Waynesborough, Pa., has patented an improvement in valve gears for changing the relation of the eccentric to the main crank. It is an improvement in that class of valve gear in which one or more cog wheels are arranged between a rigid gear wheel on the shaft and a loose gear wheel carrying the eccentric.

An improved elevator has been patented by Mr. Henry D. O. Kurrus, of Boston, Mass. The object of this invention is so to construct a passenger elevator that the cage cannot by any accident fall nor be elevated above a fixed point, and will automatically adjust itself to any inclination of the building occasioned by settling, warping, or shrinking.

**Liberian Coffee.**

The expectations awakened by the discovery of the species of coffee indigenous to Liberia, and its exemption from the blight which has ruined so many plantations of Arabian coffee, seem to have been well founded. Already it has furnished relief to the planters of Ceylon, and there is every promise that it will enable San Domingo to recover the standing it enjoyed fifty years ago as a coffee-growing island. Its productiveness is great, the tree is large and hardy, and the quality of the berry (certainly as represented by that sent to this market from Ceylon) is equal to the best.

In a recent pamphlet on the cultivation of Liberian coffee in the West Indies, Dr. H. A. A. Nichols says that its immunity from blight is of the utmost importance to the welfare of Dominica and the neighboring colonies, both English and French, for there is now nothing to prevent the islands of the Lesser Antilles from being once more large coffee-supplying countries. In Dominica the cultivation of coffee may be said to be re-established, although it is only yet in its infancy, and the productiveness of the Liberian trees is a matter of astonishment to those of the older residents who remember the coffee estates of forty years ago. The Liberian coffee plant is much larger than that of Arabia, being indeed in its native state a small tree. It has several other characteristics which render its cultivation different from that of its Arabian congener, and give it several advantages, all in favor of the planter. Its leaves are much larger; it flowers for several months, so that flowers and berries may be found on the same plant, and the berries are twice the size of the ordinary coffee bean. The ripe berries do not fall from the tree, like the ordinary coffee plant, but remain on the tree, without detriment to their quality, for weeks, an important feature, where it may be difficult to procure the labor necessary for speedy gathering.

**SEVRES VASE.**

The Imperial Manufactory at Sevres has unquestionably taken the lead in pottery art work, not only in the designs in general, but in the unique and artistic ornamentation.

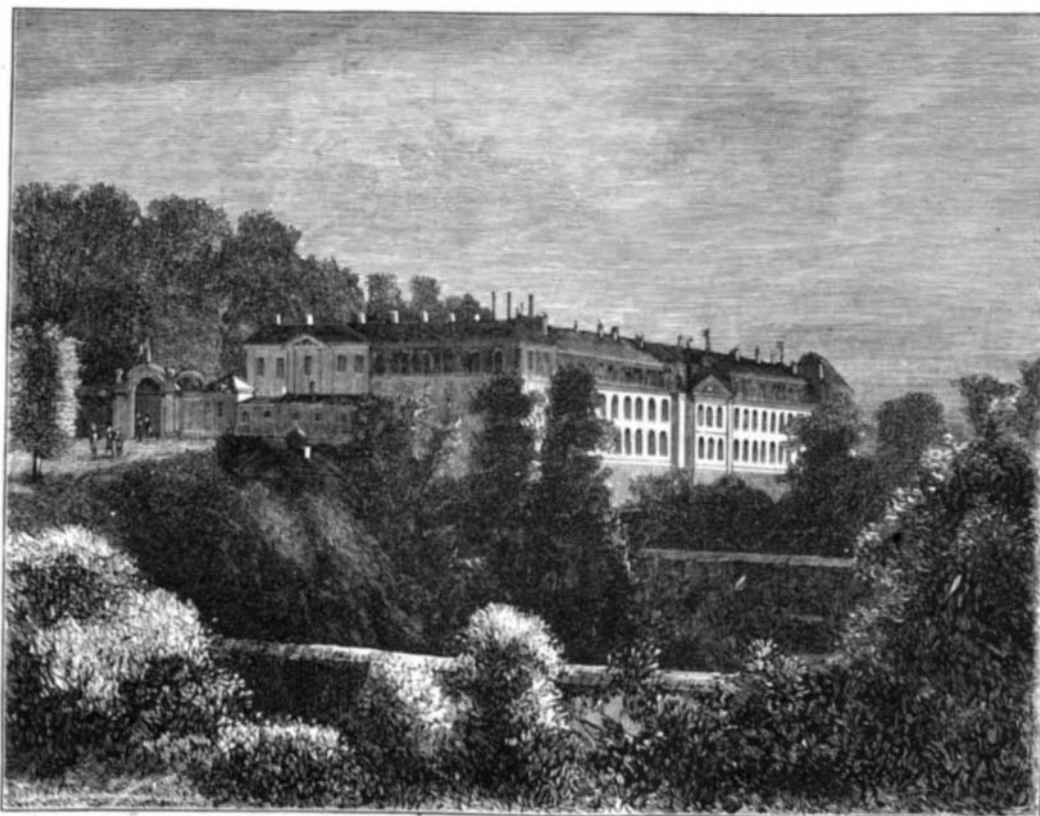


**SEVRES VASE.**

The engraving presents an example of this work which differs from other vases illustrated in these pages, both in respect to its configuration and its decoration.

**THE SEVRES PORCELAIN FACTORY.**

We give an engraving of the celebrated porcelain factory at Sevres. We have frequently given illustrations of the beautiful wares from these works, and have outlined the history of the porcelain industry, giving some of the leading facts. This porcelain factory was removed from Vincennes, in 1756, to its present picturesque site in Sevres, on the left bank of the Seine, six miles from Paris. It stands between the hills of Meudon and St. Cloud.



**THE PORCELAIN FACTORY AT SEVRES.**

The great reputation of the Sevres factory is due to the employment of the highest artistic skill, both in form and decoration. A very large number of artists are employed, and the work has no equal.

**The Selenium Cell.**

At a recent meeting of the Physical Society, Dr. James Moser, read a paper expressing his opinion that the well known action of the selenium cell in Professor Graham Bell's

photophone is not so much a mechanical, physical, or chemical one as it is a microphonic action. The cell is usually composed of metal plates cemented together by annealed selenium, and having wire electrodes. Dr. Moser, therefore, argues that the junction between the metal and the selenium is what electricians term "a bad joint," or in other words a microphonic contact. The varying beam of light from the photophone transmitter, falling upon the cell, expands and contracts the metal plates or the electrodes by virtue of the heat rays, and thereby tightens and slackens the microphonic joint. This has the effect of undulating the current of electricity which flows through the cell, and causing the modulations of the voice to be audible in the telephone. Dr. Moser showed that with copper plates the selenium cell was really a pile of copper, selenite of copper, and selenium, built up in order, and he compared it to the thermocouple of Professor Hughes and Mr. Edison, in which a number of little cakes of carbon are arranged end to end in a glass tube with brass filings between. When a current is sent through this combination it becomes very sensitive to heat rays falling on it, owing to the expansion of the carbons by heating and the consequent closing of the microphonic joints between them.

**An Ancient Mat.**

At a late meeting of the San Francisco Academy of Sciences, Mr. B. B. Redding presented, from Captain Mellon, an interesting fragment of a prehistoric mat or garment with a piece of wood attached, found in a deposit of salt, seven feet below the cap rock of the Belding ledge, on Virgin River, six miles above its junction with the Colorado, in Lincoln County, Nevada. Mr. Redding said it was probably very old indeed, and was knit by hand from the inner fiber of some tree. He believed only one similar case had been found in Louisiana, where, like this one, it was directly over a bed of salt; and that was among bones of the mastodon and fossil elephant, thus clearly establishing its great antiquity.

He has written to learn if the cap rock was formed by accretion, or if a land slide could possibly have occurred in the vicinity. If it came where found by the ordinary sedimentary process, and not by any cataclysm, it is a most valuable proof of the vast period of time during which man has existed on this continent. It may be thousands of years since this work was woven, and it has only been preserved to come down to our day by the immediate presence of extensive salt beds. This will add to the rapidly accumulating evidence of the great antiquity of man on the American continent. It will be interesting also to know whether the mat is a specimen of weaving, matting, or knitting.

**Quebracho Wood.**

Mons. F. Rhem has lately communicated a paper on the "Quebracho Wood" to the *Société Industrielle du Rouen*, from which the following particulars are extracted:

This wood belongs to the family of the Asclépiades, and comes from America. Being very hard, and composed of a great quantity of interlaced fibers, the tannin it contains is different from that of chestnut or of oak. Gelatine precipitates this tannin out of a water solution with a flesh color, while salts of protoxide of iron give an ash-gray precipitate, and the peroxide salts a dirty greenish coloration. When boiled with weak sulphuric acid, the tannin is not converted into gallic acid. According to a German chemist, quebracho wood contains 18 per cent of tannic acid. The bark of this wood contains an alkaloid analogous to quinine. Extract of quebracho, now much used in wool dyeing, giving a yellow shade with a tin solution. It gives even shades, resembling those of cutch, if used with bichromate of potash, but its principal use is for obtaining blacks, for which the wool is given first a bottom of the extract, then passed through iron, and dyed with the quebracho; this, in these conditions, can replace cutch. Solutions of quebracho wood, or extract, will only keep limpid if heated to a certain temperature, but get turbid on cooling. Dyeing experiments, with the dry quebracho extract, as manufactured by a French firm, in comparison with cutch, have proved the

former of more value, since, with a lower price, it possesses a greater richness of coloring matter. Three series of trials were made, one by passing the cotton prepared in a quebracho or cachou bath through bichromate of potash, the second through iron, and in the third the patterns were passed through iron and then chromed. In all cases the same results were obtained, showing the advantage of the quebracho over cutch, in spite of a slightly more grayish shade of the colors obtained with the former. The same