Correspondence

Gilding on Glass and China and Enameling.

MESSRS. EDITORS:—The tools required for this business are as follows:—Gilder's cushon, gilding knife, camel hair g'lder's tip—cotton wool is best—camel hair pencils; also, a tin dipper, containing, water two parts, new rum one part, and two grains of isinglass dissolved by heat in the liquid. Use this solution cold.

Clean the glass both sides, make a design on the glass with soap sharpened to a point, place the design face downward, on clean paper, having cut the gold leaf to the design roughly and wet the glass over the design with camel hair pencil; lift the gold with the lip brush, and place it on the wetted gloss; over the design continue the process till the design is covered. Then place the glass aside to dry; in about two hours afterward, with the camel hair pencil, coat the gilding once over with the same liquid, and again dry it. When dry smooth the gilding gently with fine cotton wool, free from rough particles. Then regild as before, and finish in like manner. Transfer the design on the gold side by any mode that will be free from grease. Then remove the superfluous gold; with a boxwood point make the edges perfect, and keep the point sharp and clean. Take white paint in oil, or weak gilder's whiting, as described on page 230, present volume, and coat the design all over, one coating after another, until the surface is rendered opaque. Each coat should be dry before the other is applied. The reverse side will appear, by reason of the transparency of the glass, to have a high polish. If gilder's size or whiting is used it should be weak, as that will increase its whiteness; by using oil paint the work done will be water-proof.

Gilding on china is done as above (no paint or soap used) and is rendered water-proof by coating the surface with white shellac varnish. Two coats may be applied, but while it is moist the work must be subjected to about 90° of heat or the varnish will become milky, and the design obscure. This is pleasant work for ladies. THOMAS TAYLOR.

Washington, D. C., Oct. 29, 1864.

Osage Orange Hedges and Mulching Potatoes with Straw.

MESSRS. EDITORS:—Mr. Robinson's statement "that the Osage orange cannot stand 20 or 30 degrees of cold," reported in the proceedings of "The Farmer's Club," in your issue of Oct. 22, is not sustained by the facts in this portion of Illinois. Osage orange hedges, old enough to bear fruit, are all very full this year; the fruit being well grown, many of them being three inches in diameter; although the severe cold of last winter killed thousands of peach trees, and cut off the fruit from peaches, apples, pears, plums, and grapes, showing conclusively that the Osage orange is much hardier than our fruit trees. There are hundreds of miles of Osage orange hedge in the State of Illinois; and in ten years there will be thousands of miles of it. All the fruit made this year is being bought up for the purpose of starting-plants for next spring's sales. One individual engaged in this business thinks he will realize in this way $10,000 out of the seed he has secured up to this time. Since the war commenced it has been ascertained that the home-raised seed turns out to be a really better article than that brought from Texas; it not having gone through a scalding operation, and not being two years old before it gets to market. Our native seed will grow three feet the first season. Millions of pounds can be sold next season; our farmers showing decidedly that on the "Western prairies" they have no fear of extreme cold, and will exert themselves to plant miles of "Osage orange hedging."

South of this latitude, owing to dry summers, the potatoe is one of our most uncertain crops, almost as uncertain as the grape, which mildews everywhere in prairie soil. To meet the difficulty the use of straw mulching is coming generally into use; the potatoe raised in this way being uniform and of a large size, very clean and palatable. The most popular methods of mulching are to cover in the rows, as stated by Mr. Tucker, with straw only; to cover with straw from six to twelve inches, and cover straw with soil; to plant shallow and cover with straw; and to cover all the ground with straw, the deeper the better.

The "potatoe bug," a species of cantharides, but exciting so much irritation when used medicinally, as to be dangerous, is the great enemy of the potatoe in Southern Illinois. If he gets into your patch your potatoes are trimmed of their leaves, leaving a naked stalk above and below ground for you to exercise your philosophy on; he cares very little about applications of lime, snuff, grease, or turpentine, on the upper side of the leaf, he getting on the inside and eating nearly through. Turkeys, chickens, geese, birds, and pigs, avoid him as they would red hot nails. He marches victorious through your potatoe field, and makes you resolve "that you will never plant another potatoe." This year another species of potatoe fly has been ravaging the crop along the banks of the Mississippi, below St. Louis; but I am not familiar with it. The potatoe raised in Southern Illinois is entirely free from rot, yet I have seen cases of it; but the seed had been imported from Wisconsin or Northern Illinois. To my mind the potatoe rot is a disease produced by excessive moisture, like rust or smut in wheat. If this is the case, seed from Southern Illinois, properly selected and carefully packed, would be worth experimenting on in Great Britain. J. T. D.

Springfield, Ill., Oct. 23, 1864.

The Atwater System of Rifling.

MESSRS. EDITORS:—Will you allow me the use of your columns for the purpose of correcting so far as lies in my power, an error which I have been the means to some extent of propagating. In my "Hints to Riflemen," published last spring by Messrs. Appleton & Co., I gave an account (pp. 82-89) of the Atwater system of rifling and the wonderful increase of penetration attained by it. Most of the details there given were from the statements of others, and I expressly stated that I had only once had an opportunity of witnessing the shooting of a gun rifled on that principle, in which case the results seemed to confirm the statements I had received. On that occasion I saved some half dozen or more of the bullets which I cut from the target, and put them away properly labelled.

Since the publication of my book I have received a great number of inquiries, verbal and written, in regard to the Atwater rifle, but have never been able to learn anything except in general terms that the experiments with the large piece of ordnance at Washington were entirely satisfactory. I am not prepared to deny that such may be the case, and I have some testimony from other quarters which tends to confirm the theory on which the whole system is based, but my present object is to expose a piece of deception which I have just discovered, and of which I was the victim. At the trial which I witnessed and which was conducted at a shooting range on my own premises, I was assured that the bullets were made of "the softest lead that could be procured," and I had such assurance of the character of the parties who had the matter in hand that I took their word for it without question. A few weeks since while conversing with a friend on the subject, I took the bullets from the paper and was instantly struck with their fresh white color, contrasting strongly with the dull leaden hue of others which had been preserved for more or less time, suggesting at once the idea that they must contain an alloy of hard metal. I therefore lost no time in placing them in the hands of our State Assayer, Dr. Charles T. Jackson, for analysis. I have just received his report, and learn by it that the metal contains 51 per cent of tin, which would harden the bullets sufficiently to produce all the effect attributed to the system of rifling.

I regret that I should have been the means however innocently, of deceiving others.

H. W. S. CLEVELAND.

Danvers, Mass., Oct. 29, 1864.

Words Fitly Spoken.

MESSRS. EDITORS:—Your favor of the 25th ult., enclosing official notice to allow "application for a patent for an improvement in sectional boat" was duly received. I have been a careful reader of your valuable paper for thirteen years, and am indebted to its columns for much useful information and very many new ideas. I have no work in my library to which I have more frequent occasion to refer than to the SCIENTIFIC AMERICAN. I shall omit no opportunity to recommend your Agency in connection with your paper as being the most reliable, complete, and effective method of procuring and introducing patents practised in this country. I shall avail myself of your valuable services again before long.

E. HEATH.

Rochester, Oct. 27, 1864.

Remarkable Plumb-line Deflection at Cowhythe, England.

We are enabled to furnish our readers with the following particulars respecting this curious local disturbance of the plumb-line in our neighborhood, which is now the subject of research, with a view to its being traced to its limit, by a party of the Royal Engineers, under Colonel Sir Henry James, R.E., F.R.S., etc., Superintendent of the Ordnance Surveys. Early during the present century the headland eastward of Portsoy on Cowhythe was visited by an officer of the Royal Engineers with the zenith sector, constructed for the Ordnance survey of this country by the celebrated Ramsden, and from the observations made with that instrument to determine the latitude of the trigonometrical station there, it was found that the plumb-line, instead of being vertical, was deflected northward of the zenith and southward of the earth's center fully nine seconds of angular measure. This extraordinary and unexpected result was viewed with great interest by the scientific world, especially by such as were employed by their respective governments in connection with the determination of the figure of the earth; and, by way of verification, a party of the same corps, some sixteen years back, furnished with a new zenith sector, designed by the present Astronomer Royal, and constructed by Troughton and Sims, visited the same spot. More observations, and to a greater number of stars, resulted in confirming the first or earlier determination; and here the matter rested, merely as a subject of occasional wonder to those concerned, till recently the Russian Engineers, in prosecution of their national survey, came upon a similar anomaly in the neighborhood of their ancient capital, Moscow. On tracing it to its limit, which they have done in a public-spirited and most creditable manner, they concluded that there is a vacuum, or a comparative vacuum, of a great many square miles in extent, under the earth's surface in that country. To give some idea of the reasoning which leads to so startling a conclusion, the reader may conceive a wide, deep pit with a plummet suspended from its mouth at the earth's surface. The plumb-line will be vertical only when in the center of the pit (or shaft, it is called in connection with mines), because it will there be equally attracted in every direction. If carried round the side of the pit, the line will be so deflected from the vertical as to cause all the lines, if produced upwards, to meet in a point above the earth's surface: and such are the phenomena discovered by the geodetical engineers of Russia. The pit, it is true, is closed at its mouth, and no plumb-line can be let down into it, but the spirit level, being always at right angles to the plumb-line, discloses the fact as clearly to the mind as the open pit would to the eye. Now, whether the Cowhythe deflection is to be accounted for by a comparative vacuum on the north under the Moray Firth, or by some unknown mass of extraordinary density on the south, or partly by both, is the problem to be solved, and, doubtless, it will ultimately be solved by the thoroughly trained staff of astronomical observers and computers under their talented chief, Sir Henry James. Their present operations with zenith telescopes, transits, chronometers, theodolites, etc., were commenced at Cowhythe in August, and are now extended southward to the Fourman Hill, near Rothiemay and Westerfield (formerly known as the Haggs) near Inverkelthny, all in Banffshire, where our Highland tourists may see the parties regularly encamped with their portable observatories and instruments all in working order. The general result can be but briefly stated to be a diminution of the deflection as the observers proceed southwards, but how far it may extend is of course at present unknown.—*Banffshire Journal.*

[Perhaps there is a great deposite of gold south of

the Cow hythe headland instead of a cavern at the north. In that case we should have the charlatan's divining rod succeeded by the astronomer's zenith sector in the search for precious metals.—EDS.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week ; the claims may be found in the official list:—

Tobacco Pipe.—This invention consists in a pipe for smoking tobacco cartridges, the novelty being found chiefly in a radiating plate which protects the chamber and tube of the pipe from the destructive effects of the great heat of the burning tobacco, and also prevents them from becoming foul and offensive so soon as in other forms of smoking pipes and tubes. H. J. Hall, of New York city, is the inventor.

Knitting Machine.—This invention consists in the employment in knitting machines of a grooved needle in combination with a sliding eye-closer or casting-off needle, operated by a suitable cam, in such a manner that the first or old loop is allowed to slip back over the point of the casting-off needle unto the shank of the main needle, and when said needle has received the yarn from the guide and is drawn back, the cam holds the casting-off needle forward until its point meets the hook of the main needle and the eye thus formed retains the yarn and permits the old stitch to slip off over the end of the needle forming a new stitch or course; the invention consists, also, in a shoe applied in relation to the needles and needle bed, in such a manner that when the needle bed has become worn and the needles get loose they will be held down to their places and prevented from rising and interfering with the guide or other parts. S. L. Otis, of Manchester, Conn., is the inventor.

Power for Sewing Machines.—The manifold attempts heretofore made to drive sewing machines by spring or weight power have all been failures, principally for the want of a suitable device to regulate the speed of the machine. If a spring or weight is applied powerful enough to overcome the inertia of all the working parts and to start the machine, it, the machine, soon begins to race and to assume a speed quite incompatible with the successful operation of sewing, and if the spring or weight has not sufficient power to start the machine the whole device is useless. These difficulties are overcome by the power which forms the subject matter of this invention. It consists in the application of an adjustable friction device or regulator acting upon the fly-wheel, or any other part of the sewing machine and used in combination with a series of gear wheels to which motion is imparted by a spring or weight, and from which motion is transmitted to the main driving shaft of the sewing machine and through it to all the working parts of the same, in such a manner that the motion or speed of the sewing machine can be regulated independent of the power of the weight or spring, and a weight or spring can be employed of sufficient power to work the machine for a long time without winding up. J. Zuckermann, San Francisco, Cal., is the inventor.

Circular-saw Mill.—This invention relates to a means for driving circular saws and controlling the feed movement of the carriage on which the stuff to be sawed is placed and dogged. The invention consists in the employment of a belt-tightener arranged with two belts, whereby either belt may be rendered operative or inoperative as desired, and the driving belt made, when required, to operate as a brake for the feed mechanism of the carriage. P. D. Shaw, of Carson city, Nevada Ter., is the inventor.

Fruit-preserving Jar.—This invention consists in the employment of a glass stopper of conical form and provided with an annular india-rubber packing and a central opening in which a cork is fitted, all being arranged in such a manner that the fruit, after being placed in the jar and the latter sealed with the large stopper and packing, may be covered and the jar entirely filled with the liquid or sirup as well as the opening within the glass stopper, said opening serving as a reservoir to admit of the jar being supplied with liquid or sirup, as the contents of the jar become cool and contract or decrease in bulk, thereby keeping the fruit covered, which prevents it from molding. G. F. S. Colburn, Newark, N. J., is the nventor.

Burglar-proof Safe Lock.—This invention relates to a new and improved burglar-proof lock of that class in which a key is not employed for operating the bolt and in which circular tumblers are used. The object of the invention is to obtain a lock of the class specified, which will not admit of the tumblers being tampered with so that a knowledge of their position can be attained in order to pick or illegitimately unlock the lock; and also to have a ready and convenient means for effecting the "changes" of the tumblers, so that they may be adjusted to different marks, figures or letters, in order that the lock may be unlocked; and, further, to have the dog and bolt so arranged that the latter may, in connection with a slotted disk, be acted upon by the former in a perfect manner. P. S. Felter, Cincinnatus, N. Y., is the inventor.

INTERESTING ENGLISH PATENTS.

Plans and specifications for the following subjects have recently been published in England. They are interesting, and will repay perusal. Doubtless some of our readers may obtain hints from them. Utilizing the power of sea waves, although not new, can be made to do service in some situations:—

Applying and transmitting Motive Power Obtained from the Sea.—It is, according to this invention, proposed to employ the ascentional power of the wave by transmitting it to the pistons of a pneumatic engine in the following manner:—At any point of a beach, or of any construction built on the sea shore, it is proposed to place an arrangement of two or more pulleys on which will roll a cable having at one end a buoy and at the other a counter weight, which may rise and fall in a well made for such purpose. The pulleys, by the constant come-and-go motion of the wave, which will at one lift and at another lower the buoy, may be guided by connecting rods, which act upon the pistons of air compressing machines, which will store this compressed air in reservoirs provided for this purpose, and placed even several miles inland at the places where the power is required. The distribution of this power will be effected through pipes, by which it will be dispensed to blast furnaces, spinning factories, or other places where it may be required.

Pontoons or Caissons Applicable to building Structures in Water.—In carrying out this invention the patentee proposes to construct the pontoon or caisson of iron of any required dimensions. The proportions which he considers efficient would be about 100 feet long, 50 feet wide, 30 feet deep. The bottom or floor consists of a horizontal division or partition placed about 20 feet from the top of the caisson, so as to divide it into two chambers, the upper chamber being 20 feet deep, and the lower chamber 10 feet deep, without a floor or bottom. A large circular or square hatchway is made in the partition, and is provided with vertical walls rising to the top level of the caisson, whereby communication is established between the upper and lower chambers. The hatchway is furnished with a valve closing or opening the division as required. The valve being closed, the pontoon or caisson is floated over the spot where a foundation or other work in water is required to be performed. The valve is then opened, and the water let into the upper chamber, which sinks the pontoon to the bottom, say to a depth of 20 feet, and when the water in the upper chamber is on a level with the water outside, the valve is shut and water is pumped into the upper chamber until it is filled up 10 feet above the level of the river or other water (and the upper chamber must always be left so filled up 10 feet above the level of the water), so that the 10 feet of water will cause a downward pressure equal to counteract the upward tendency of the pontoon caused by the withdrawal of water from the lower chamber. The extra weight of the upper chamber (which can be constructed larger in area than the lower chamber) will drive or force the lower edge of the pontoon down into the clay, and stanch the lower chamber, which is then to be pumped out dry, when the workmen may descend therein through the hatchway. The work being finished, water is let into the lower chamber and pumped out of the upper chamber, when the pontoon will rise.

Steam Engines.—This invention relates first to the application of certain apparatus between two cylinders, whereby motion may be communicated to an intermediate crank, while, at the same time, a parallel motion is secured for the rods of the two pistons. This apparatus consists of a fixed wheel with internal teeth, in gear with which is a pinion carried by the crank. To this pinion the piston rod is connected, and as the said pinion rolls round the internal teeth, the required parallel motion will be obtained. The cylinders above-named may both be steam cylinders, or one of them may be an air pump, or a force or lifting pump. Secondly, the invention consists in certain methods of constructing the above described parallel motion.

Apparatus for heating the Feed-water of Steam Boilers.—This invention consists in the application to a steam cylinder of two or more heater exhaust valves in addition to the ordinary condenser exhaust, and arranged in relation to the same and to the ordinary steam piston in such a manner that the heater exhaust will open with the usual lead of the exhaust valve into the condenser, the condenser exhaust waiting upon it such a period of time as in practice the greatest economy in the working of the engine will direct. By this arrangement a portion of the exhaust steam passes into the heater and raises the temperatnre of the feed water to nearly 212 degrees, or from 100 to 120 degrees above the usual temperature in the hot well, without obstructing in the least the motion of the pistion or the correct operation of any part of the engine, and by connecting the lower part of the steam chamber in the heater with the feed pump the heater is kept clear of water, and the boilers are supplied to the extent of condensation in the heater with fresh water.

Quicksilver--How to Test it and Detect Adulteration.

Quicksilver, after being extracted by the plain process of retorting, is seldom quite pure, and generally contains a small proportion of other metals. The eminent naturalist Priestly suggests a very simple method to purify mercury, by merely shaking it strongly in an iron flask, and renewing the air in the same repeatedly with a pair of bellows. By this manipulation a black powder will be formed on the surface, which can easily be separated. If no more of this dust is formed the quicksilver may be considered pure. In this state it will always give a clear sound when agitated in the flask, while an admixture of lead will make it sound dull, as if the vessel were made of potter's clay. It is often found in the market wilfully adulterated with lead, tin, and bismuth. Of lead, it can absorb or dissolve almost one-half of its weight, without losing much of its limpidity. This adulteration can easily be discovered by rubbing some of the metal on the open palm; if it soils the skin it is adultered—if pure it leaves no trace. Besides, if dosed with lead, it will leave a tail behind—"*il fait la queue*," to use a French expression—that is, the drops, instead of being globular, will assume an elongated form, and a more or less flattened surface. Some of these observations may be, perhaps, useful to the gold miner, as many complaints have latterly been heard about the impurity of the quicksilver sold in the mines, which fact is also proved by the frequent occurrence and admixture of base metal in the amalgam gold, probably, in most cases, by artificial means.

THE COFFEE BEAN.—Efforts are soon to be made to introduce the culture of the coffee bean into the Connecticut valley—a product that is said to be the best substitute for coffee yet discovered. Marsh Stiles, of New Ashford, in Berkshire county, Mass., has the seed, and it is believed that the article can be as profitably produced as tobacco.

[There is no question but that coffee will grow in that latitude, but the point is the flavor. Tea grows in Pennsylvania but it is very poor tea; tobacco grows in Connecticut and it is Connecticut tobacco not Havanna. Coffee grown in Massachusetts will doubtless be a substitute for the genuine article.—EDS.

THEY manufacture matches in San Francisco, which can be trodden upon or rolled under foot without igniting; and which after having been manufactured a month, may be immersed in water for ten or fifteen minutes, and when taken out will not only ignite but hold a flame. The wood used is "Port Orford cedar." They sell at wholesale for $1 70 per gross