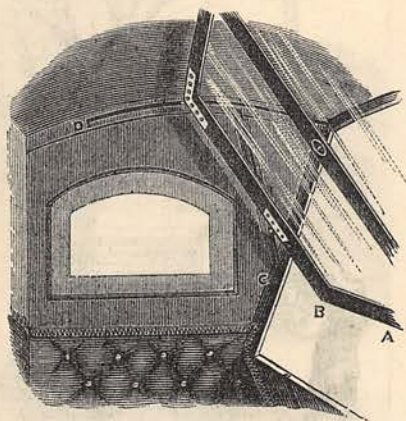


THE GATHERER.

A New Window for Hansom Cabs.

Travellers in hansom cabs are often annoyed by the difficulty in getting the front window raised or lowered by the driver, who alone can do this. It is, perhaps, the one disagreeable point about this comfortable vehicle; and it is satisfactory to learn that Mr. Spencer, of Euston Road, has overcome the defect by a very simple arrangement, which enables the fare to lift up or let down the window himself, if he chooses not to let the driver do so. The window is suspended by means of four studs or feet projecting from the edge of the sash, which run in grooves on the two sides of the hansom. There are two studs and two grooves on each side, one groove being nearly horizontal and the other nearly vertical, as shown in the illustration, where A B is the window, C is the vertical groove in which one stud travels, and D is the horizontal one near the roof in which the other moves. The window is raised by means of the handle on the middle bar; when fully up, the upper stud is at the end of its groove D; and when fully down, the lower one is at the end of its groove C. Mr. Spencer has further improved on the hansom by making the side windows to slide, and putting the doors under the control of the driver, who need not, therefore, leave his seat. Another desideratum in cab windows, pointed out to us by a correspondent, is some simple apparatus for keeping them fixed, so as to do away with the disagreeable rattle usually caused by the jolting of the streets.

**The Telephone Syren.**

The air syren of Cagniard de la Tour is familiar to all who have studied the elements of acoustic science, and most of our readers are probably aware that a steam syren is used as a powerful fog alarm for warning ships at sea of the proximity of the land. An ingenious little instrument, called the telephone syren, has just been brought out in Germany. It consists of a circular disc having small bar magnets arranged on its face radially, or from centre to circumference, like the spokes of a wheel. This disc is rapidly rotated in front of a Bell telephone deprived of its iron plate. When the same poles of the magnets, say N, are all directed outwards, a certain note can be heard in a second telephone connected to the dismantled one: if the poles alternate, N, S, the lower octave is heard. If the succession of poles at the border of the disc be, say N, N, S, there are heard three tones: one corresponding to the interval N N ;

one an octave lower, corresponding to N, S, N; and a third combination-tone of three times the time of vibration of the highest, corresponding to the return, each time, of the first N. The vibration-numbers are thus as 3 : 2 : 1. In this way, by arranging the magnets on the disc, a diversity of notes can be obtained. The sound heard in the telephone is, of course, produced by each magnet in its turn inducing a pulse of electricity in the telephone as it is rapidly whisked past it, and the electricity will be of a positive or negative kind according as the magnetism of the pole is N or S.

Self-Combustion of City Refuse.

How best to get rid of the refuse of markets, kitchens, and other places, is a problem for municipalities everywhere at the present time. At Paris the street rubbish is calcined and turned into *charbon de Paris*; and a somewhat similar process has been put in practice in America by Mr. R. Foote, of Stamford, Connecticut. This consists in burning the refuse by means of the large percentage of organic matter which it usually contains (94 per cent.) in a tall furnace fed by a hot-air blast, and consuming the foul gases given off, so that the decomposition is quite odourless. The gases which are allowed to escape are chiefly carbonic oxide and carburetted hydrogen, which last can be utilised for heating purposes. The residue is a scoria or slag, which can be converted into sand by allowing it to flow into cold water, or may be changed to those vitreous fibres known as "glass wool," by blowing steam upon it when it is in a molten state.

Storm Warnings by Carrier Pigeons.

The better to master the difficulties of weather forecasting, it has been proposed that outward-bound ships should take with them a number of carrier pigeons, to be sent home at predetermined points of the passage, bearing with them reports of weather observations likely to be useful at home. At a recent trial of carrier pigeons between Penzance and London, the birds flew the entire distance of 270 miles in less than six hours, or at the rate of from forty-five to fifty-six miles an hour. Therefore, as storms in these latitudes rarely attain a rate of thirty miles an hour, and sometimes do not exceed fifteen, a good carrier would easily outstrip any ordinary storm making for our coasts, and even in the case of the swiftest storm-centres would, if

the latter were still at a considerable distance from the land, herald their approach in ample time to forewarn the entire country.

A New Pruner.

The tree-pruner shown in the accompanying diagram will be found of the greatest service to agriculturists, for in pruning trees it supersedes the inconvenient ladder, shears, and saw, which are not only very awkward implements for this work, but also a continual source of expense. The man using the pruner has no cause to climb either tree or ladder, but can do his work readily and well from the ground. The knife being connected by a wire rod, the pole may be of any desired length—a decided improvement over pole-pruners worked by spring or cord. The peculiar construction of the hook which encircles the limb allows the blade to be made very thin, reduces the resistance of the wood, and insures an easy and smooth cut; and the small space required for working the knife allows it to be used among dense branches and a abundance of foliage, where it is very difficult to use the old-fashioned shears.

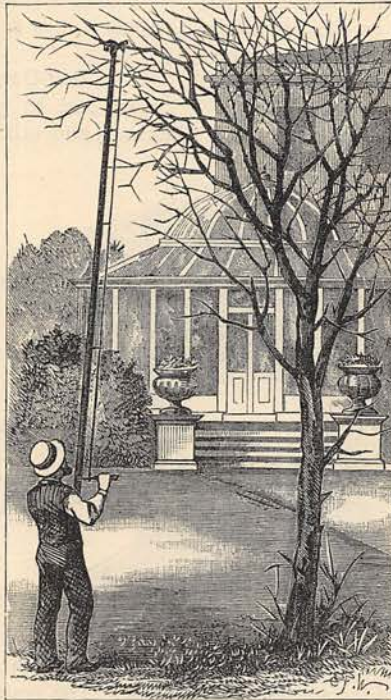
Green Pigment from Coffee.

A harmless green colouring matter, very well adapted for tingeing sweetmeats and preserves, has been extracted from the coffee berry by Herr Zech, a German chemist. The method of preparation is as follows:—The berries are first soaked in alcoholic ether to deprive them of their oil, after which they are dried and shaken up in white of egg for a time; then the mixture is exposed to the atmosphere for a few days, when the presence of the albumen of the egg elicits a brilliant emerald-green from the coffee. The pigment can also be prepared by simply bruising the berries, washing them in alcohol to free them from oil, and then steeping them in water.

Fishing for Torpedoes.

A new mode has been devised by Captain Arthur for clearing harbours of fixed torpedoes and sunken mines, instead of that at present in use, which consists in destroying the "infernal machines" by countermining, or by the dangerous process known as "creeping." This is generally done by boats being told off to sever the cable connections, when they have been found, by small charges of gun-cotton. As might be expected, this plan is very slow, involving

great waste of time. Captain Arthur's method is altogether more radical and expeditious. A couple of booms 30 feet long are run out from the bows of the vessel. Across the sunk ends is fastened a horizontal beam 38 feet long, having a zigzag arrangement of iron rods, shaped like a W, the intention being to make the open space of each V in the series, as it is driven through the water, imprison the torpedo connections and convey them to the point at the bottom, which is supplied with a scissor device, the blades of which are worked by levers attached to the capstan on board. The beam "fisher" has a range of 50 feet, and the cutting machinery can sever the stoutest electric cable. A net, supported from the bowsprit, catches the freed torpedo and prevents the engine from exploding. Captain Arthur's method has been tried at Portsmouth, on board the *Bloodhound* gun-boat, with successful results.



A Robe of Glass.

In San Francisco, Professor Grenier, a known artist in fine glass-work, is now, we are told, engaged in weaving the material for a lady's dress with coloured strands of glass, spun by himself. He heats a piece of glass and then spins a spider-like thread, which is caught on the disc of a slowly-revolving wooden wheel, about nineteen feet in circumference. After a certain number of turns the wheel is stopped, and the strand, consisting of an immense number of glistening floss-silk-like threads, is washed in a solution of water and beet-sugar. This renders the threads tough. The spinning has already been accomplished, and nothing now remains to be done but the weaving. Ten inches a day is the extreme length possible to be woven; and the dress, when complete, will be a veritable curiosity.

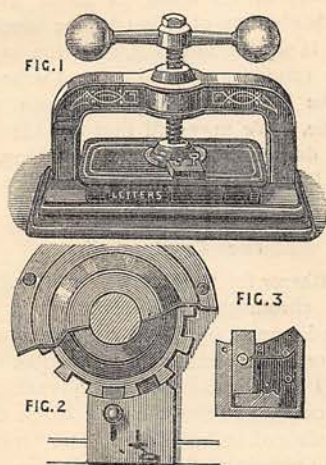
Luminous Flowers.

One of the elegant novelties of the hour now offered for sale on the Paris boulevards is phosphorescent flowers which glow with a lambent light in the dark, and reveal their natural tints. They are rendered luminous by coating the petals with transparent size, and then dusting them with a phosphorescent substance such as Canton phosphorus (sulphide of calcium), or Bologna phosphorus (sulphide of barium). Canton phosphorus is the best, and yields a soft yellow light. According to M. Becquerel, a good quality can be made by mixing 48 parts of flowers

of sulphur with 52 parts of calcined oyster-shells, and raising them to a temperature between 800 and 900 degrees centigrade in a crucible. After exposure to sunlight during day, or to the electric or magnesium light, the flowers thus coated become brightly luminous in the dark.

Locking the Letter-Press.

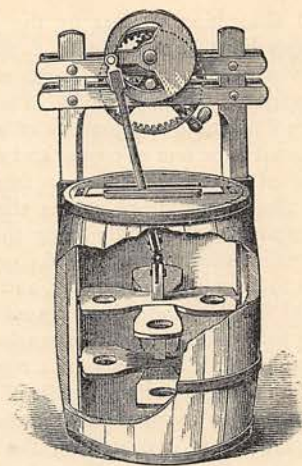
The engraving below represents an ingenious device for preventing letter-books from being removed or stolen or lost. It will be found to offer complete security against the curious folk and hangers-on who frequent business offices. To the lower end of the screw there is attached a toothed wheel, while the platten is fastened a lock, the bolt of which enters when required between the wheel's teeth. The platten having been screwed down upon the book in the usual



process of copying a letter, the bolt of the lock is projected into the wheel on the screw. It will now be impossible to turn the screw so as to withdraw the book. The lock is so designed that by pushing a knob the press will be securely locked without the help of a key, but that useful article will be needed to unlock the press. The general appearance of the instrument is indicated in Fig. 1, and in Figs. 2 and 3 are shown the details of the lock.

A Mechanical Churn.

One reason *inter alia* why the American, Dutch, and other dairy farmers are able to hold their own in most markets, is that they never hesitate to adopt the best mechanical and scientific appliances for the turn-out of produce. The churn we have illustrated hails from the United States, but we cannot say whether it is yet in use there or not. The dasher consists of two pairs of cross-arms attached horizontally to a short rod, and adjusted so as to work in the side of the churn. It is actuated by gearing carried in a frame fitted to the churn. The rod by which the dasher is attached to the crank passes through the cover. When the churn is driven by hand a pinion is



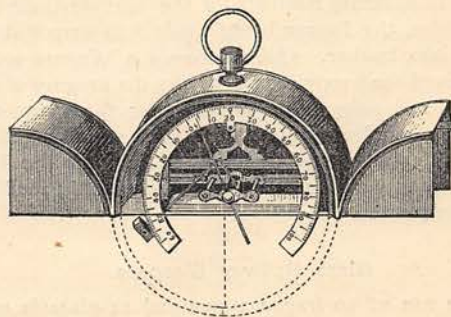
placed on the crank shaft, and worked by an internal gear wheel connected with the lower cross-bar of the frame. Driving power can readily be obtained by placing a pulley on the crank shaft. The churn-cover may be easily removed without interfering with the frame by which it is supported.

Electric Jewellery.

M. Trouvé, an ingenious optician of Paris, has applied the electric current in an amusing manner to articles of personal jewellery. For example, he forms scarf-pins of tiny gold or silver creatures, such as hares, dogs, and dormice, and arms them with drumsticks, wherewith they are made to beat a rapid tattoo on miniature drums at the will of the wearer, who carries a small battery about the size of a cigar in his vest-pocket, and can cause the electric current to actuate the automaton by shifting the battery from a vertical to a horizontal position without attracting any notice. Jewelled birds can also be made to flutter their wings on ladies' hats by the same means. Of course the surprise of the thing is only possible with persons who are innocent of the trick.

A Metallic Thermometer.

It is well known that thermometers in which glass tubes are used are more or less unreliable, owing to



radiation and absorption of heat by the glass; and several attempts have been made to construct these useful articles wholly of metal. Perhaps the most successful apparatus is that of M. Tremechini—which we have illustrated. It consists of a system of two parallel metal bars, one of copper and the other of iron, so connected together that they are free to expand according to their temperature at the time, and the difference of expansion is adroitly made the means of pressing a sensitive sheet of corrugated copper, coated with platinum to keep it from oxidising, and about $\frac{1}{10}$ of a millimetre thick. The sheet thus pressed to a degree corresponding to the difference of expansion—that is, to the temperature of the air—operates a counterpoised lever, which in turn actuates the needle of the instrument and causes it to move round the dial. In this way the temperature is indicated on the scale with great exactitude, and a promptness which spirit or mercury thermometers do not show.

An Electrified Pine-Forest.

St. Elmo's Fire is the name given by mariners to a weird glow and lightning-like flame sometimes seen hovering round the spars and rigging of ships at sea. It is in reality a species of lightning, in the form of a silent discharge of electricity from the loftiest points of the ship into the atmosphere; and it is produced by a mass of electrified cloud or air over the ship *inducing* a charge of opposite electricity on the sea underneath and drawing it off by the masts of the vessel, which in this case act as lightning-rods. A splendid instance of the same phenomenon was lately witnessed in the Jura at St. Cergues, where a whole forest of pine-trees was seen to be aglow with light like a phosphorescent sea in the tropics. A thunderstorm was raging at the time, and at every flash of lightning the illumination suddenly disappeared, but soon shone forth again, until the next flash came. Before the appearance of this St. Elmo's Fire, heavy rains had fallen and soaked the forest so as to render it conductive of electricity, and the thunder-cloud overhead heavily charged with electricity had induced an opposite charge on the ground below, which discharged itself into the air by the pointed boughs and needles of the pine-trees.

Kangaroo-Tongues.

Australian kangaroos have for many years been killed in immense numbers for the sake of their tails and hides, the former being made into soup and the latter into leather. Quite recently a Warroo settler conceived the happy idea of drying the tongues of the slaughtered animals in smoke, after the manner of Russian reindeer-tongues, and then exporting them. A new delicacy has thus found its way into the London market, and a great waste of nourishing food has been prevented.

Glass Railway Sleepers.

The use of so fragile a material as glass is ordinarily conceived to be for the purpose of supporting

the rails of railroads and tramways is a somewhat surprising innovation. Nevertheless, glass sleepers are actually in use on the line of the North Metropolitan Tramways at High Street, Stratford. They are made of common glass, toughened by a new process discovered by Mr. Frederick Siemens, of Dresden, and they have been introduced into this country by Mr. H. S. Bucknall. The sleepers at Stratford are of exactly the same section as the wooden longitudinal sleepers they have replaced, and the upper side is moulded so as to accurately fit the rails. To avoid the danger of settlement at the joints, bearing-plates of iron are placed at these points, and the rails are fastened to them in such a way as to obviate the necessity of moulding any hole in the glass. Samples of the sleepers have been tested by Mr. Kirkaldy, who finds that their average breaking weight when resting on supports thirty inches apart is about five tons, or about two-thirds that of a good pine sleeper of the same size. It should, however, be borne in mind that whereas the timber one would rot and wear with time and use, the glass one would remain practically indestructible. We may add that this kind of toughened glass does not splinter on breaking, like that of M. de la Bastie, but merely fractures like cast iron.

The Tryptograph.

In the Gatherer for October we described the working of the chromograph in multiplying copies of drawings and manuscripts, and we have now to record another process of a similar kind, invented by Messrs. Zuccato and Wolf. One of the advantages of the latter plan consists in the use of a black carbon ink instead of coloured aniline fluids. The "tryptograph" combines the principle of Edison's electric pen, or the horograph, with the papyrograph of the Messrs. Zuccato and Wolf; a stencil being first prepared and copies made by means of it. A sheet of special paper is placed upon a perforating tablet, and the clerk then writes on this paper with a steel-pointed stylus the words to be copied. The track of his stylus is traced on the paper by a train of small holes made by the perforating tablet, and the paper is transformed into a stencil, which, when laid upon a clean sheet of paper, and rubbed over with carbon ink in a suitable apparatus, prints a copy of the writing on the clean sheet underneath. A very great number of copies can in this way be thrown off by aid of a single stencil, as many as 5,000 having been obtained.

Chinese Smoke-Rods.

For some time past, Chinese aromatic smoke-rods have been used for perfuming rooms. They are greyish-brown sticks, which are easily kindled, and burn slowly with a bright glow, leaving a ruddy ash behind, and diffusing a pleasant aroma on the air. They are formed of powdered cascarilla bark, from which the bitter principle has been boiled out, leaving the aromatic resin. These grounds are kneaded into a soft mass with tragacanth gum, and then moulded into rods.

A New Variety of Silk.

The persistent epidemics which have assailed the silk-worm of late years in France, have led French silk growers to turn their attention to a new silk-producing animal, namely, the caterpillar of the *Altacus cynthia*, or ailanthus silk-worm, introduced into that country from India by the Acclimatisation Society some twelve years ago, and now domesticated there. Visitors to Paris may have observed a large moth with striped wings fluttering round the ailanthus trees in the gardens and squares; that is the imported moth in question. In winter their long pearl-grey cocoons may also be noticed hanging from the leafless boughs of this tree. The cocoon is not very rich in silk, and it is also thickly encrusted with gum, so that hitherto it has been regarded as fit only for producing floss silk, a material of little value. But, by a simple and inexpensive process, M. le Doux has succeeded in relieving the silk from the gum and spinning it into threads for weaving. The silks which he produces are of a pretty blonde colour, and make charming stuffs of *le cru* tint, but they are of course susceptible of all sorts of dyes.

Electricity and Bee-hiving.

Keepers of bees are well aware of the difficulties and dangers involved in hiving a swarm. Often the swarm is perched on the topmost branches of a tree or some other inaccessible place, and despite all his care the bee-master may get painfully and even seriously stung in approaching it. Plans for rendering this task both safe and easy are therefore to be sought out, and a very novel one has lately been put in practice by a German, Herr Freiwith. The Herr's original idea was to stupefy the bees by the application of electricity; and experimental trials on single bees and clusters resulted in his being able to shock the insects into a state of insensibility lasting for periods varying from minutes to hours, according to the strength of the current employed. Encouraged by his success, he applied the method to bees actually in the hive. With this aim, he inserted the ends of two conducting wires into a fully occupied honey-comb, and turned on the current for a moment: the bees soon strewed the floor of the hive, and did not recover their activity till half an hour after. Herr Freiwith then constructed a small portable apparatus, consisting of the battery and induction coil for generating the electricity, a key to turn it on or off, and wires attached to rods whereby it can be directed on a swarm so as to shock the bees into a harmless insensibility.

A Perforated Propelling Screw.

A new type of propeller screw has lately been invented, which offers certain features of improvement upon the more familiar blade. This advantage mainly lies in the propeller being perforated with numerous holes, the diameters of which become larger as they approach the centre of the wheel, the holes being countersunk on the driving face of the blade. The

number of blades that is found to work most satisfactorily is four, but Mr. Deane contends that the leading principle of his invention—namely, the perforations—improves any and every kind of blade. Among the benefits resulting from a use of this screw may be mentioned increased facility in backing, less liability to corrosion and fracture, greater buoyancy at the stern of the ship, complete absence of vibratory movements, and—last but not least—greater speed. All these advantages, it is stated, are to be simply accounted for by the circumstance that the vacuum behind the blade being in this new form of screw destroyed, the entire force of the power applied to the wheel is made amply and directly available.

The Penograph.

Devices for facilitating the work of writers continue to occupy the attention of inventors. Here for instance is a little instrument—called somewhat tautologically the "penograph"—which has for its object the retaining of as much ink taken at one dip as will suffice for the writing of a letter, or the filling of a page of foolscap. To the end of the penholder there is jointed at the inner side a small metallic tongue of a rather pointed shape and bent into a scoop. This is called the retainer, and acts in the following manner:—Before dipping the pen into the ink, the retainer is pressed against the inner surface of the nib, so that when ink has been taken up a little reservoir has been formed, which will hold enough fluid for a letter of ordinary dimensions.

An Alarm-Clock Lamp.

An ingenious little alarm-clock is now much in vogue in New York. It consists of a small time-piece, or alarm-clock, supporting a petroleum lamp, and its object is not only to sound an alarm-bell at the pre-determined hour the sleeper is required to awake, but also to light the lamp, and thus assail both his ears and his eyes with the announcement that his time of rest is at an end. For this purpose the lamp is provided with a small burner, which is kept alight all night, and at the appointed hour a hand of the clock frees a detent and allows a vertical stem to be raised by a spring, so as to screw up the wick of the lamp till it comes into contact with the lighted burner and catches flame.

A Steam Rammer.

Probably before long our paviers will have the assistance of a steam rammer in laying down the wood blocks and granite paving of our streets. A successful experiment has been tried in Philadelphia, and if the idea be carried out it is to be expected that our paving will be vastly improved both in durability and smoothness. The steam rammer is worked on the principle of the steam hammer. It can deliver a blow at any given weight and force from 1 lb. up to 1,500 lbs., and work done by it is estimated to last till the pavement itself is worn out. This is a satisfactory conclusion, if an unthinking opposition does not succeed in crushing its utility.

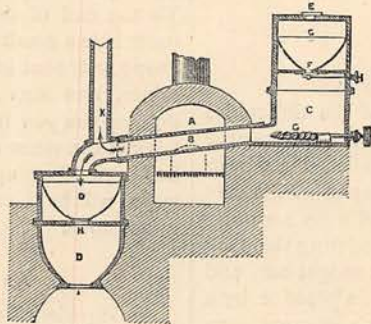
Gas and Fuel from Rice-Husks.

A mode of producing illuminating gas likely to be of great use in rice-growing countries has recently been patented in this country by Mr. J. A. Müller, of Amsterdam, now resident in London. It consists in distilling a gas for lighting and heating purposes out of the husks of the rice-grain, and converting the refuse into fuel for burning. For this purpose it is necessary to expose the husks direct to a certain high temperature which decomposes them into lighting gas, for if they be allowed to heat gradually in a retort, as is the case with coals, they are apt to give off gases which do not possess much illuminating power. The apparatus for making the gas is illustrated by the figure, where A is the furnace, with its funnel L, and B is a fire-clay pipe or retort traversing the fire. At one end, B opens into a supply-box C, for receiving the husks, which is closed by a lid E, and divided into an upper and lower compartment, which communicate by a valve F. An Archimedean screw, G, is fitted inside at the bottom for the purpose of feeding the rice-chaff into the retort. The receptacle D on the other side of the retort is for the refuse, and is also divided into two compartments, communicating by a valve H. The delivery-pipe K conducts the gas to the coolers and gasometer. The process of making the gas is as follows:—After heating the retort to a white heat, the valve F is opened, and the two compartments of the receiver, C, are charged with husks; the valve F is then closed, and the Archimedean screw is set in motion, so as to push the husks at a settled rate into the retort, where they are decomposed by the heat into illuminating gas, which escapes by the pipe K to the coolers, while the refuse is forced into the receiver D. By opening the valve H, while the bottom door I is closed, the refuse falls into the lower compartment of D, from which, by closing H and opening I, it can be removed with very little or no loss of gas. In the same way the receiver C can be charged without interrupting the process of gas-making. The refuse, mixed with tar or other inflammable liquid, and pressed into cakes, makes an excellent fuel. Mr. Müller informs us that a ton of rice will by this method of distillation produce from 15,000 to 20,000 cubic feet of gas, having a high illuminating power, and about a quarter of a ton of residuum fit for fuel. The production of gas is instantaneous, and the first cost of apparatus is considerably less than that required for making gas from coal.

Warming Railway Carriages.

With regard to the methods of warming railway carriages, "The cry is, 'Still they come;'" for a new process, to which we shall presently call attention, was lately tested, with satisfactory results, by the New

York Elevated Railroad Company. As will be seen from our description, the *modus operandi* is very simple, appears to be well adapted for its purpose, and ought to be comparatively inexpensive. Running through the carriages on each side is a set of pipes connected with the engine by means of elastic hose, which is wound to prevent condensation, and has couplings like those used in car-brakes. It is then brought into communication with the dome, or some other available steam main on the locomotive, by a small pipe in which is a valve that enables the driver or stoker to efficiently control the heat. Under the body of the carriage are two expansion valves, to allow vent for the air when steam is first turned on, and also to permit the cold water resulting from condensation to be liberated, and to prevent freezing. The pipes inside the carriages are enclosed in thinner pipes, and the space between the two is filled with fine dry sand. The hot steam-pipes impart their heat to the sand, which in turn gives it off, by radiation, through the inner pipe. An amount of heat equivalent to 350° can be conducted to the inner pipe, where it is given off so gradually as to keep the carriage comfortably warm for nearly three hours. By this method stoves are rendered quite superfluous—all danger from fire being thus entirely removed. In the matter of ventilation, we are assured that under the new plan of warming it can easily be made perfect.



The Rataphone.

This is the name given to a new genus of telephone, invented by Professor Dolbear, of the United States. It is a kind of hybrid between the electro-magnetic telephone of Professor Bell, and the "motograph" type of Mr. Edison. In the former it will be remembered that the electric current flowing through an electro-magnet attracts and repels an iron disc, thereby setting it into audible vibration. In the latter, the current agitates the vibrating disc by modifying the friction on a small arm or brake connected to the disc. Now, in the "rataphone," there is a similar arrangement of disc and arm connected to it, but instead of changing the friction by electro-chemical means, as Edison does, Professor Dolbear effects it by the attraction of an electro-magnet, through which the current is made to pass. The arm connected to the centre of the disc is of iron, and it impinges on the poles of the electro-magnet, which is gently rotated so as to cause a kind of magnetic drag or friction between the poles and the arm. This drag is, however, increased or diminished by the vocal currents passing through the coil of the electro-magnet, and as a consequence the arm is pulled out or let go, so that the disc with which it is connected is put in vibration.