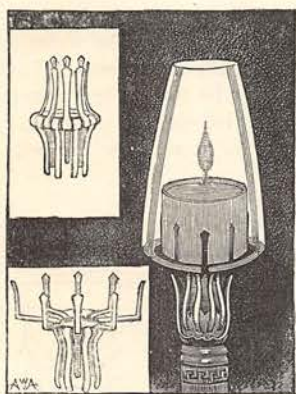


THE GATHERER: AN ILLUSTRATED RECORD OF INVENTION AND DISCOVERY.

Correspondents are requested, when applying to the Editor for the names and addresses of the persons from whom further particulars respecting the articles in the GATHERER may be obtained, to forward a stamped and addressed envelope for reply, and in the case of inventors submitting specimens for notice, to prepay the carriage. The Editor cannot in any case guarantee absolute certainty of information, nor can he pledge himself to notice every article submitted.

A Night-Light Holder.

The figure shows a little device which may be useful in households.



It is intended to be used with any kind of candlestick, and the curved springs on the under side enable it to fit into any socket, whilst the upper springs open out and hold a chimney and night-light as shown. The one with the double row of springs above is that specially designed for holding the glass.

Explosive Ice.

In Branchville, Connecticut, U.S., there is a kind of quartz which explodes, owing to minute cavities in it being filled with partly liquefied carbonic acid. A similar phenomenon has been observed by Mr. Mallet, of the University of Virginia, and occurred in connection with a French "gasogene," the domestic appliance used for preparing aerated water. The water in it, which had been charged with carbonic acid gas, had frozen into ice and burst the vessel containing it with considerable violence. Moreover, the ice itself, when taken into a warmer place, broke up with repeated explosions and threw off fragments to a distance.

The Graphophone.

On February 16th last, Professor G. Bell and others patented in this country an invention for reproducing, transmitting, and recording speech, the *modus operandi* of which is as yet a secret; but something of the matter has been revealed, and to the effect that the apparatus comprises an improved kind of phonograph, or graphophone, for recording and reproducing speech. The agency is said not to be electrical, but purely mechanical, and the impulses of the speech are registered on wax, from which the original sounds are capable of being resuscitated.

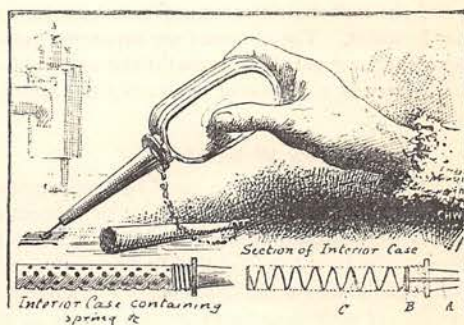
An Electric Travelling Crane.

In a former GATHERER we have referred to the electric hoist of Dr. Hopkinson, and we have now to mention a travelling crane worked by electricity at the warehouses of a well-known company at Roubaix, France. It is used for lifting and storing cotton bales coming from America, and owing to the risk of fire in

the premises steam power is not used. Electricity has therefore been adopted. The crane is placed on a trolley which runs on rails, and a rail fixed to the ceiling of the warehouse guides the top of the crane-post. A small Gramme dynamo machine of four horse-power is fixed on the trolley and kept running at 900 revolutions per minute, and by means of suitable gearing it is employed to hoist the bales, run the crane on the rails, and operate the jib, which has a derrick motion. The generating dynamo supplying the current to that which works the crane is a six horse-power Gramme dynamo. The current is 15 amperes, with an electromotive force of 250 volts. Some 60 per cent. of the original power is utilised by the crane. With the help of this crane it is said that four men can now do the work of ten men formerly employed, and in far less time.

Aluminium-Tin.

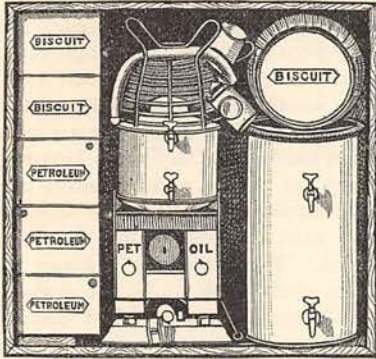
An alloy of 10 parts of aluminium to 100 parts of tin is stated by a French physicist to be capable of replacing brass in optical and other instruments. It is very little heavier than aluminium, and resists chemical action like the latter. It is well suited for some apparatus, and it can, moreover, be soldered like brass.



An Improved Oil-Can.

The holes for oiling locks and machine joints have a very awkward habit of becoming clogged with dust. This dust very often has the effect, when the nozzle of an oil-can is introduced, of blocking it up and rendering the oil-can useless. A new oil-can has lately been patented which is provided with a pin (shown at A in our illustration) that projects through the nozzle and can be used for clearing away any dirt that may be blocking the oiling hole. When this has been done pressure on the pin will force the valve, B, open and allow the oil to flow round the pin and through the nozzle. The valve and pin are generally kept in position by the coiled spring, C, which is enclosed in a

perforated tube. This tube is secured inside the reservoir by the screw that holds the nozzle in its place, and the escape of any oil that may be left in the nozzle round the pin is guarded against by a small close-fitting cap.

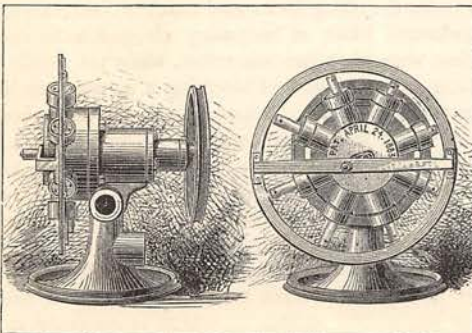


A Floating Locker.

A handy "locker" for small boats, especially those carried on ships for cases of emergency, is shown in the figure. It only occupies a space of three cubic feet, and can hold 200 small biscuits, 2 lbs. of oatmeal, 2 lbs. of beef, 2 lbs. of condensed milk, 2 lbs. of olive oil, and smaller quantities of tea, tobacco, meat extract, and so on. In addition there is a complete condensing apparatus, with sufficient petroleum to distil 120 lbs. of drinkable water from the sea; while provision is made for burning wood, coal, spirits, resin, or tar. A compass, chart, signal, lines and hooks, are also provided, and the locker with its contents is buoyant, and will float in water. The contents are separately put up in water-tight, buoyant tins, so that if the sea wash it overboard there is a chance of recovering the articles.

A New Water-Motor.

One of the most novel of the small hydraulic motors which have been designed for domestic or laboratory purposes is that shown in our engraving. It is the invention of Mr. David P. Todd, of Lawrence Observatory, Amherst, Mass., U.S., and consists of a series of radial cylinders with their bases at the centre of the motor, through which runs the driving shaft. The



pistons in these cylinders are single-acting, and the water is admitted to them in succession by the rotary valve, which forms part of the main shaft. The pistons in pressing outwards exert their force on a strong ring to which is bolted a cross-bar, which engages the crank of the main shaft. The ring is thus caused to turn the shaft, and it has the vibratory motion of an eccentric, returning the opposite pistons to their cylinders as it is distorted in shape by the extruding pistons. Several minor details need not be referred to. The supply pipe has a diameter of $1\frac{1}{2}$ inches, and the motor gives about two horse-power. The water is supplied from the city pipes under pressure. The motor has no fly-wheel, and can be started or stopped very soon. For continuous running at invariable speed a centrifugal governor is attached to the belt-wheel.

A New Castor.

A new form of ball castor recently brought out is shown in our woodcut, which represents a section through it. A steel ball enclosed in a ring or socket forms the rolling body, and a second smaller ball bears on it. The motion is smooth and free from friction. Another form has three smaller balls, two at the sides. Tests show that the ball continues to roll with loads up to 1,800 lbs. on a hard floor. The trouble given by ordinary swivel castors is greatly in favour of the new form in question.



Sugar and Boilers.

A French physicist has been making researches recently into the action of cane-sugar and treacle on iron, and finds that they corrode or decompose iron, with the formation of an acetate of the metal. The fact is of practical utility in connection with boilers, because it sometimes happens that sugar gets into the water supplied to boilers in sugar refineries, and consequently tends to deteriorate the boilers. Other uses of the fact may suggest themselves to readers.

A Magnesium Torch.

A cylinder of magnesium ten inches long was recently exhibited at a meeting of the Pharmaceutical Society, and it was stated that in some German mines torches of this metal are now used to facilitate the work. When in a more massive form than the ordinary ribbon, it is thought that the combustion is less rapid and better for the purposes of illumination.

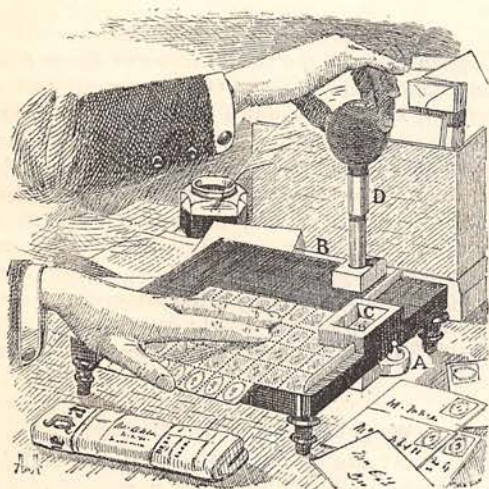
A Green Sun.

Some years ago, soon after the Krakatoa eruption, a blue sun was observed in different parts of the world, notably in India and the Soudan, where the ill-fated Hicks Pasha saw the phenomenon before the disaster which befell his army, and in a letter home asked the question, "What does this portend?" An appearance of a similar kind was more recently seen in the Lyonese

mountains, where on January 10th of this year, after a fall of snow crystals rather than flakes of snow, and about 2 p.m., Marie Lacharrière and some friends saw the sun like a yellowish-green disc in a grey sky. The luminary was also surrounded by a greenish aureole. This appearance was seen by them for three hours, until the sun hid himself behind the mountains.

A Stamp Affixer.

An apparatus for separating, damping, and affixing postage stamps or gummed labels to letters, circulars, newspaper wrappers, and so on, is shown in the accompanying illustration. In it B is a small table on dwarf legs, with a metal reservoir of water under-



neath. On the right of the figure a strip of cloth is in communication with the water. A is the tap of the reservoir; D is the affixer, consisting of two short brass tubes, the lower telescoping into the upper. The lower tube ends in a die with a small hole in the centre of the face. The upper tube ends in a hollow boxwood knob, with an india-rubber air-chamber, alternately exhausted or filled by the closing or extension of the telescopic tubes. The stamps are pushed under the enclosure, C, by hand; a small rail, shown, guiding them. The die is then stamped down on the stamp penned in the enclosure, and cutting edges within the latter detach it; whilst the wet moistens the gum; and the die, by suction of the rubber ball, lifts the stamp with it. The stamp can thus be transferred to the envelope or other paper.

Egyptian Petroleum.

That a copious supply of petroleum has been discovered at Jebel Zeit, in Egypt, is now beyond doubt; and the oil, though said to be a heavy petroleum, will find its uses, either as a lubricant, or as an illuminant in the new petroleum lamps, many of which are capable of burning heavy oil. It is claimed for these heavy oils that they are safe, and that therefore they are to be recommended for use in lamps.

A Handy Screw-Jack.

The figures show a useful little screw-jack which can be worked by one man, and has the advantage of not only raising articles in a vertical direction, but also of tilting them. Thus Fig. 1 shows the jack set for vertical raising, while Fig. 2 shows it set for tilting; the screw being inclined at any angle required by means of the screw and quadrant at its base. In using it a strip of iron is inserted between the blunt top of the jack and the object to be raised.

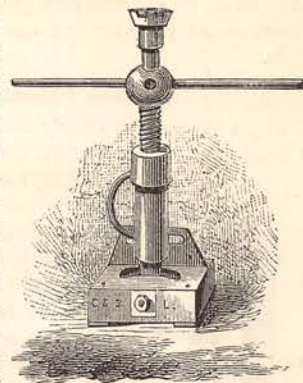


FIG. 1.

An Optical Illusion.

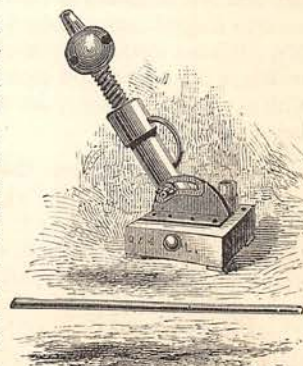
When, on a dark moonless night with a clear sky, the head is leaned against a wall, and the eye fixed on a particular star, the latter sometimes seems to swing or move about. The Germans call this *Sternschwanken*, and a French physicist finds that a similar illusion can be seen if in a very dark room the eye is fixed on a very small faintly luminous object. The effect is not to be confounded with the twinkling of a star, which is a different phenomenon.

The Speed of Swallows.

An interesting experiment was recently made to test the speed of the swallow's flight. Two hen birds were taken from their broods in Pavia and conveyed to Milan, where they were released at a given moment. Both of them made their way back to their nests in thirteen minutes, which gives the speed as $87\frac{1}{2}$ miles an hour.

A Steel Wire Gun.

An experimental cannon of steel wire, 33 feet long and weighing 25 tons, has been constructed and tested for the Government. The trials were so satisfactory that orders have been issued for several more guns of the same description. The gun consists of an inner tube on which the steel wire is coiled in 78 layers. Each length of wire is 2,400 yards long, and the lengths are joined by being brazed and riveted over a length of 15 inches. The form of the wire is flat, so as to fit close in winding. A steel jacket is shrunk over all. It is obvious that

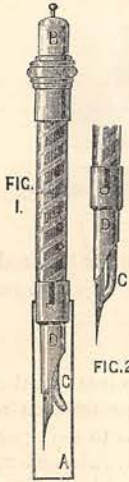


A NEW SCREW JACK.—FIG. 2.

this form of construction gives great strength: the Government pressure test was 65 tons to the square inch.

A New Fountain Pen.

Fig. 1 shows very clearly the nature of this new pen. A is an outer cap protecting the point, and is removed when writing has to be done. The end B is then turned ten times to the right, and the feeding tube, C, is dipped into the ink and kept there while the part B is pulled gradually out. The ink then rises into the holder by suction. The holder D is then taken off and replaced in such a way that the tube C points inwards to the pen, as in Fig. 2. The pen is then held well downwards, and a slight turn of B will feed it as often as required till the supply of ink is exhausted. Should too much ink be forced into the pen, it can be drawn back into the holder by pulling back spring B. When not in use remove the holder D, and replace it again with tube C pointing outwards, then put on the cap A. The pen can thus be carried in the pocket without any risk of spilling.



Water-Power from Niagara.

The water-power of the Niagara river is about to be utilised by the inhabitants of Lockport, who intend constructing a canal capable of transporting 50,000 horse-power to their town. It is expected that the canal will develop a large manufacturing industry in its vicinity.

A Lamp-Stove.

The Hon. Edward Atkinson, of Boston, has devised a cooking stove on the principle of accumulating the heat of a common hand oil lamp inside a chamber surrounded by thick walls of pine-wood, which retard radiation. Meats are cooked in this oven in their own juices. The heat is supplied to the chamber from the lamp by water circulating round it and heated by the flame of the lamp. The device is only an experimental one and Mr. Atkinson has not patented it, so that it is open to English stove-makers to try the same plan. Mr. Atkinson states that a cooking chamber $6 \times 4 \times 4\frac{1}{2}$ inches in dimensions will cook 3 lbs. of meat in an hour with a $\frac{1}{2}$ -inch wick lamp, the water being warmed to begin with.

A Cheap Concrete.

An economical concrete, which is said to be coming into favour among Parisian builders, is made of 8 parts of sand, gravel, and pebbles, 1 part of burnt and powdered common earth, 1 part of pulverised clinkers and cinders, and $1\frac{1}{2}$ parts of unslaked hydraulic lime. These materials are thoroughly blended while dry, and the mixture is then wetted and beaten up. The result is a solid mass which becomes very hard in a few days. It can be made still stronger by the addition of 1 part

of cement. A three-storey house, 65 ft. by 45 ft., has, it appears, been built of it without iron bonds in the walls, or wooden lintels, beams and posts. The new concrete is stated to be free from cracking or scaling, while it can be made of materials which are very common.

Thermometers for White Heat.

Thermometers have recently been constructed for high temperatures, similar to the ordinary sort, except that the bulbs are of platinum or porcelain, and they are filled with air, which by its expansion acts directly in moving a column of mercury along the scale indicating the temperature.

A Submarine Oil Spring.

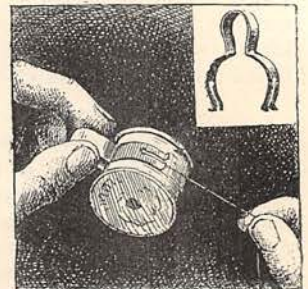
Captain Eden, of the British schooner *Storm King*, bound from Utilla to New Orleans, reports that on Thursday, March 11th of this year, he passed over a submarine mineral oil spring. The oil bubbled and rippled all round the ship and extended to a considerable distance beyond. The latitude of this phenomenon was $25^{\circ} 48' N.$, and the longitude $86^{\circ} 20' W.$ At 11 a.m. they were over the spring proper, and at 11.30 a.m. they were outside the ring of oil. Some suppose the so-called spring is the outburst of a cargo of oil from a foundered vessel; but it may be what Captain Eden has supposed, namely, a submarine oil well.

Weighing an Electric Current.

At a recent meeting of the Royal Society of Edinburgh, Professor Blythe described a method of finding the strength of an electric current by weighing its attractive force. Two parallel circles of copper wire, of a certain radius and a certain distance apart, are traversed by the current in such a manner that they attract one another. These circles of wire take the place of the scale-pans of a delicate chemical balance, the wires being carefully insulated between discs of glass. The apparatus is said to give a very constant result.

A Thread Tidy.

Ladies sometimes complain that their cotton or silk breaks away from the nick made in the reel to receive it, and makes the work-basket untidy. To obviate this, an Accrington firm has patented a "Cotton Tidy," which consists of a small steel spring so bent as to grip the reel rather more than half-way round. As will be seen from our illustration, in each side of this spring is a long slit through which, when the clip is in its place, the thread passes. The middle part of the spring forms a convenient handle, and on holding



this the thread can be readily drawn through the slits and cut off as required, while the action of the spring precludes all possibility of loose ends.

Luminous Cement.

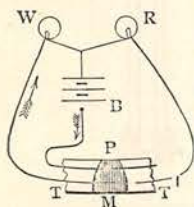
A process has been brought out for mixing Parian cement with sulphide of calcium, the luminous material in luminous paint, so as to render the cement light-emitting. From 2 to 5 lbs. of the cement are mixed with 1 lb. of the sulphide of calcium; and this mixed with water gives a plastic substance which can be moulded into any form, or laid on ceilings and other surfaces by a trowel. The moulded articles as soon as they are dried are placed in a bath of melted paraffin wax, or benzoline, to make them waterproof. It is proposed to use the luminous cement for outlining paths, buildings, docks, notices, and so on, thereby preventing accidents in the dark.

A Dead-Black Paint.

A dead-black paint for optical instruments is made by taking two grains of lamp-black and mixing it with a very little gold size in a saucer. The size may be added a drop at a time. When thoroughly incorporated add about twenty-four drops of turpentine, and again mix all together. The paint should be applied with a camel-hair pencil, and allowed to dry.

An Electric Light Fire-Damp Alarm.

Messrs. Walter Emmott and W. Ackroyd have applied the electric glow lamp in use as a miner's lamp to signal fire-damp. In their apparatus (see illustration) there are two glow lamps W, R, one of white and the other of red glass. They are fed by the current from a battery B, as the arrows show; W, or the white glass, being that which is lighted when the air is good. P is a part of a glass tube which has a mercury plug or seal, M, filling



up its diameter inside and making electric contact between the wire T and the wire from the battery, thus sending the current through the white lamp and giving a white light. When, however, fire-damp accumulates in the air to about five per cent., it diffuses so much into a porous reservoir joined to the pipe P, as to alter the air pressure on the mercury and drive it up the pipe to the right, thereby breaking contact with T, and making contact with T¹. The current is thus shunted to the red lamp R, which shows the miner the presence of the gas.

Slag Manure.

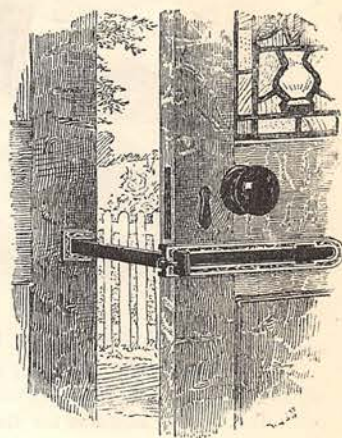
Experiments have recently been made with the furnace slag made by the Thomas process, used as a fertiliser. The slag is ground before applying it to the land. When mixed with nitrate of soda it gives good results, but is said to give better when also mixed with kainite. The mixture should be used as early as possible in the manuring season.

Dagame.

"Dagame" is a Cuban wood, of great strength and elasticity, which is now coming into use in place of lance-wood for the manufacture of such articles as fishing-rods. The dagame tree (*Colycophyllum candidissimum*) grows to a height of forty to fifty feet; the wood is yellowish and close in texture, resembling box-wood, but differing from the latter in its great flexibility.

A New Door-Bolt.

The combined door-bolt and chain shown in our illustration has the merit of holding a door open or closed without damaging the door, as is often the case with ordinary door-chains. The contrivance has a steel bolt sliding in a guide fixed to the door, and a catch fixed to the door-jamb, into which the bolt slides. When the bolt is pushed quite home into the catch it allows the door to be opened some four inches, and will hold it open to that extent, if required for ventilation. When the bolt is pushed partly into the catch it will securely close the door.



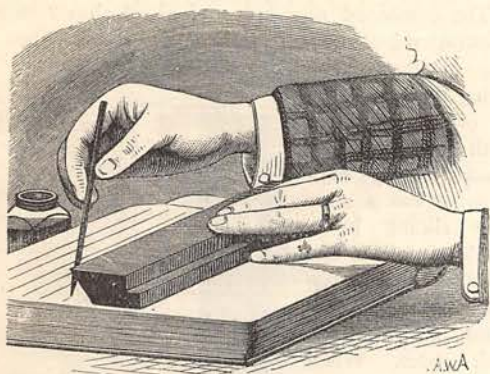
Pine-Tree Gas.

Experiments have been made at the Bordeaux Municipal Gas Works in order to distil illuminating gas from the pine-oil which is burnt in the district. The experiments are said to be successful, and the inventor claims for the new illuminant that it is cheaper than coal-gas.

A Quickly-Boiling Kettle.

Our old-fashioned kettles have a provokingly bad habit of bringing their contents to boiling point very slowly. This fault, at any rate, cannot be alleged against a new kettle, by name "Victoria," recently patented. In outward appearance it is not unlike its predecessors save that the spout is of wider bore and is not so long, and that behind the handle is an aperture whose use is not at first very apparent. But on inverting the utensil its peculiarity is seen at once. Instead of the old flat bottom, a cone-shaped flue runs through the interior of the kettle, sloping to the opening behind the handle. Although this plan of construction materially decreases the holding power of the vessel, its advantages are obvious. Not only is the water heated by the fire round the sides of the vessel, but the flue through its centre secures a quick draught, which does its work so rapidly that in little more than four minutes the water is boiling.

These kettles can be used over coal fires, or on gas or oil stoves, and are peculiarly well adapted for camping-out. For this latter use a little perforated metal attachment, to contain enough tea-leaves to convert the water in the kettle into tea, is made, and can be placed inside the kettle, or removed, at pleasure. The danger, according to our own experience, with these new kettles is not lest they should be too slow in doing their work, but lest they should "boil over" before they are expected to be ready.



A Reversible Ruler.

The engraving shows a ruler which can be reversed, and which by the form of its edges prevents smearing with ink. It is suitable for the use of young people especially, as it does not roll or easily shift. One end of the ruler is bevelled, so as to rule close up to the edge of the thickest book. The figure shows the peculiar shape of the appliance better than any verbal description.

Amalgam Relief.

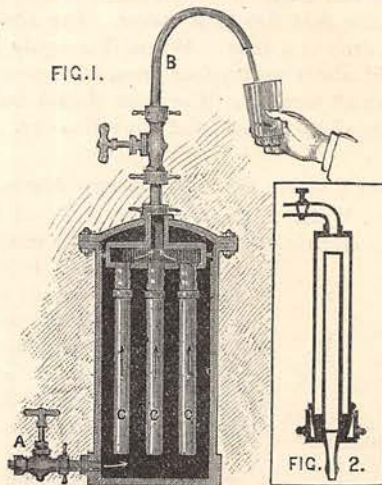
Professors Ayrton and Perry have observed that when mercury is amalgamated with other metals, such as gold, silver, and so on, there is a certain swelling of bulk which would produce a kind of "relief" on the surface of the solid metal; and they attribute to this the phenomenon of the Japanese magic mirror, that presents a plain highly polished surface in which, however, a design can be seen by proper inspection. These gentlemen thought a few years ago that this effect was produced by hammering the back of the mirror and altering the density of the metal; but they are now inclined to the view that amalgamation has caused the change in the metal which makes it exhibit a picture in the light reflected from its surface.

Paper Shingles.

Tiles are now made of paper for roofing purposes in the United States. The pulp is moulded into the form required, then partially dried, impregnated with a waterproof solution, and baked. The tiles are then enamelled and sanded, which process renders them fire-resisting, while giving them a pretty appearance. The paper tiles have the advantage of being lighter than slates, and they can be readily nailed in their places.

The Pasteur Filter.

The celebrated M. Pasteur, whose experimental treatment for hydrophobia has given him a world-wide reputation, has, in conjunction with Mr. Chamberland, devised a filter which is said to filter water of germs as well as other impurities. The filter is shown in section in our engraving, and though we have before referred to the invention in the GATHERER, we deem it desirable to give the latest particulars of the contrivance, which is now introduced into England. In Fig. 1, A is the inlet pipe, fitted with a stop-cock, by which the water is allowed to enter the filter. B is the exit pipe by which the filtered water leaves; and C C C are three hollow porcelain cylinders through the pores of which the water is pressed and purified. The filter is made in other forms suitable for requirements. A single tube or cylinder form when attached to the water-supply pipe of a house will filter from 6 to 12 gallons per day, according to the pressure of the water. The filter illustrated will supply a large establishment with from 200 to 10,000 gallons of water per day. Wine may also be filtered by the same means,



on a large scale. Fig. 2 is a filter for use without pressure, the water being merely supplied by hand. It gives from 1 to 10 gallons per day according to its size.

Kettles Made by Electricity.

An American has recently patented in this country a method of making copper vessels, such as pans and kettles, as well as reflectors, by electro-deposition. A "form" or pattern of the vessel is made, and coated by dipping with a thin layer of pure wax, which in turn is coated with a conducting surface of blacklead, or some equivalent substance. The copper is then deposited on this in a sulphate of copper bath with a dynamo current. The vessel "grows" by electro-deposition on the mould, and can be made of the required thickness. One electric light company, we may add, are building a dynamo for quantity electrotyping, giving a current of 122,500 amperes, which is capable of depositing 315 pounds of copper per hour. Tin is also about to be deposited on iron from scrap tin by electrolysis.