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 Removable Sash.

The woodcut shows a window-sash which can be removed for cleaning or re-glazing without taking out the frame. This property is intended to save the trouble and risk of servants getting outside the window to clean the sash. The sashes fit into hanging pieces which are fixed to the sash-cord, and they are kept in position by a small spring bolt at the upper part.

An Artificial Island.

It has been proposed to form an artificial island in Hobson's Bay, on a portion of the St. Kilda Bank, Melbourne. Such an island would, it is believed, give shelter to small boats and yachts, while providing the city with a new and easily-accessible recreation ground, and it would also be a good site for a fort.

Gauze Welding.

In order to overcome the difficulty of spreading borax and other fluxes over heated surfaces to be welded, a French engineer, M. Lafitte, has introduced a sheet of wire gauze containing the vitrified flux between the surfaces. This gauze is welded into the metal itself, and the operation can be performed at lower temperatures than formerly. Steel can be securely welded to iron by this method. We may also mention that electricity is now employed in welding wires, knife-blades, and other articles. The heat developed by a strong electric current, traversing the welding joint, is sufficient to fuse the metal and unite the surfaces.

A New Cartridge.

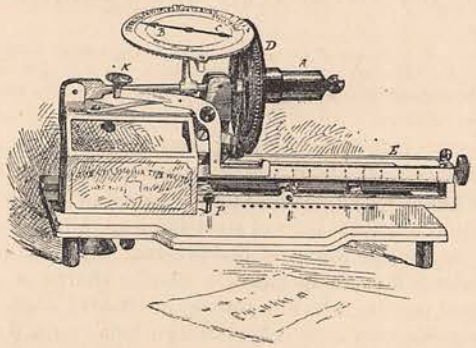
The Lorenz cartridge, which has been adopted in the German army, is about to be manufactured in England, at Millwall. This new ammunition has already met with much favour, the penetrative power of the ball being much superior to the older forms, and the cartridge having several important new properties. For example, it can be kept in stock for any length of time, without deterioration and without danger. It is protected by a steel case, and the cap to fire it need only be added immediately before use. The bullet, which has also been adopted in the French army, is a combination of steel and lead, which is said not to foul the rifling of the firearm. The charge of powder is fired by means of a smaller charge of condensed powder, which in turn ignites the larger charge. The new ammunition is applicable to small arms as well as cannon. While upon this subject we may mention that experiments have been made recently with the new Russian explosive, "silotvaar," invented by M. Rucktchell, an engineer. This substance gives out no report or smoke when it is fired. The experiments in question were made at the Krasnoe Selo camp of the Russian army, and are said to be of a successful character.

An Extending Handle for Brooms.

This is a useful little apparatus that should commend itself to housekeepers. Its object is to enable them to adapt their brooms and dusting brushes to the sweeping of ceilings and lofty walls. This is effected by means of an extension handle provided at one end with

a pair of clamping jaws in the form of two portions of a cylinder, one of which is secured by means of screws to the handle, and so fixed that rather more than half the jaw projects beyond the handle. The other jaw is loose and is connected with the fixed one by means of a bolt, secured by a square-ended shank in the fixed jaw, and by a nut bearing on the outside

of the loose jaw so as to cause the two jaws to grip the top of the broom-handle firmly when the nut is turned.



A Handy Type-Writer.

A type-writing machine which prints both capitals and small letters, and is yet easily portable, has recently been brought out, and is here illustrated. The form of the "Columbia" machine, as it is called, will readily be understood by a glance at our illustration. On turning the handle, A, the indicator, B C, is revolved on the dial-plate, across the top of which the letters and figures are arranged in the order found most convenient in practice. The letters are given only once—to avoid the multiplicity of signs caused by doubling the alphabet on the dial-plate—but the indicator is so arranged that when the point, B, of the indicator is directed to a letter, a capital is printed by the type wheel, D; and when the other point, C, is presented, a small letter is printed. In using the apparatus the required letter is found with the indicator by turning the handle, A, to right or left, and then depressing the handle, a process which automatically inks the letter and impresses it on the paper. Left to itself the handle will at once recover its position, and the process may be repeated till the word is completed. The spacing of the words is provided for by the spacing key, K, which is to be struck when a word is completed, and moves the paper the proper space. The paper is carried in a carriage, E, which moves automatically from right to left as the writing proceeds, and is provided with a knob by means of which the paper is moved vertically, and the proper space between the lines insured. By means of a little pin, P, the width of the line of writing is controlled; and, in order to secure a straight margin at each edge, an attachment is added which rings a little bell when the end of the line is reached. The apparatus is enclosed in a convenient polished case, which renders it available for travellers. In this, its more recent form, the "Columbia" is a great improvement on its predecessor, the double type wheel and other parts of which were too complicated for ordinary use.

Gilded Chrysalides.

Mr. E. B. Poulton has made some interesting experiments, which go to show that the colour of caterpillars can be modified in one generation by altering their surroundings. Mr. Poulton took some caterpillars of the peacock and the common tortoise-shell butterfly, and allowed them to turn to chrysalides on black and white screens, and the colour was found to vary with the screen. Those on the white were often of a bright golden colour, and gilded specimens were sometimes found.

Reindeer Life-Belts.

A Norwegian engineer, Herr W. C. Möller, finds that reindeer-hair and skin has a remarkable buoyancy. For instance, a reindeer-skin, weighing under two kilograms, and rolled up with the hair outwards, will support, for ten days, the same weight as an ordinary cork life-belt. When used in the form of a life-belt, it has the additional property of keeping the body warm. A suit of reindeer-skin will keep a man from drowning, and Herr Möller expects such a dress to supersede oilskin. Life-belts filled with reindeer-hair are substitutes for life-belts of cork. Collapsing boats and sledges may also be constructed of the hide. The life-saving establishment at Gothenburg has procured some of these reindeer articles.

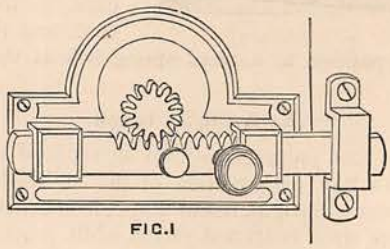


FIG. 1

An Indicating Door-Bolt.

The figures illustrate a door-bolt which, on being pushed home, shows the notice "Engaged," outside the door, as in Fig. 2. When the bolt is withdrawn, a metal-plated shield takes the place of this word. Fig. 1 shows the bolt on the inner side of the door, and the ratchet and wheel, by which the movement of the bolt works the indicator. The device will be useful to some people for securing themselves against interruption.

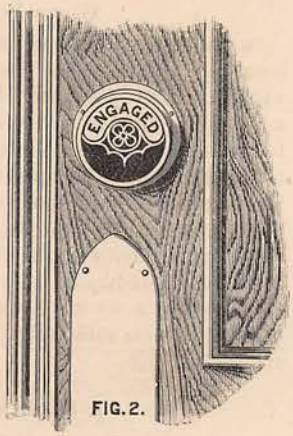


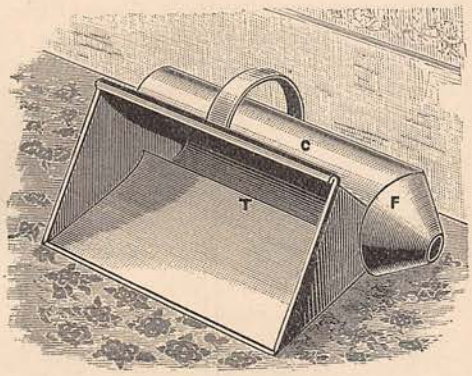
FIG. 2.

A Tiny Battery.

A chloride of silver battery can now be had so small that a cell ready for use weighs only $\frac{3}{16}$ ounce. Yet this cell will, it is stated, cause an ordinary electric bell to ring. Such cells are useful for physiological purposes.

An Improved Dust-Pan.

Two Pennsylvanian ladies are responsible for the invention of a dust-pan which has much to recommend its adoption in place of the time-honoured tray in



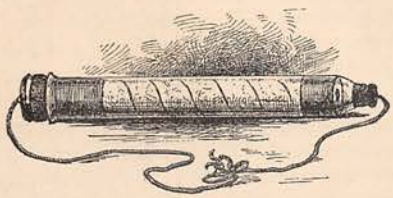
general use. Our illustration shows the principle of the new appliance. Along the back of the tray runs a large cylinder, C, into which the edge, T, of the scoop projects. The handle is fixed in a position found most convenient for holding the pan securely with the left hand while the right wields the brush. The dust and litter swept by the brush into the scoop pass into the cylinder behind it, and are prevented by the projecting edge, T, of the scoop, from being easily blown out again. A funnel, marked, F, in our illustration, allows the dust and other sweepings to be emptied.

A Mixture for Screws.

It has recently been discovered that by dipping screws in a mixture of oil and graphite (black-lead) before using them, they are effectually prevented from becoming too rigidly fixed, and, moreover, that they are protected for years against rust. This mixture is an excellent lubricant, facilitates tightening up, and largely reduces the friction of a screw in its nut.

A New Inhaler.

In order to facilitate the use of menthol in cases of headache or cold in the head, throat and lung ailments, hay fever, and other kindred complaints where it has



been found useful, the little inhaler illustrated in our engraving has been devised. As will be seen from our illustration, it consists of a small glass tube narrowed at one end, and provided at each extremity with a closely-fitting cork. The centre of the tube is filled with loose crystals of menthol secured by a perforated cork at each end. In use both stoppers are removed from the apparatus, and in cases of cold in the head, or other head troubles, the narrow end is placed in either nostril and the breathing confined for the time to that nostril only. The result is that the mentholised air is quickly carried to every part of the head, and relief is thus afforded. In other cases, where the trouble is in the throat or lungs, relief may speedily be obtained by placing the broad end of the apparatus between the lips and drawing the breath full and long through the inhaler.

An Extension Ladder.

A ladder which can be extended to nearly twice its length is shown in the accompanying figure. It will be seen that an iron hook prevents the upper part from slipping down. It promises to be useful in cleaning windows, or as a fire-escape, as well as for other purposes.

A Glass Cliff.

Another wonder of the Yellow Stone Park, recently described by Professor Iddings, is a cliff of obsidian or natural glass. It runs for half a mile, and varies in height from 150 to 200 feet. The quality of the glass is said to be as good as any artificially manufactured. It appears to be a relic of an ancient flow of obsidian from the eastward. At its southern end there are prismatic columns of shining black obsidian of the diameters of several feet. The cliff, as a rule, is of black glass, but it is mottled at places with red, yellow, purple, and olive-green glass. In some spots it shows a fine satin lustre, while in others it has a golden sheen. The rock is reported to form a beautiful object, with its varied tints and forms.

Kola Chocolate.

A new use of the kola nut is in the form of kola chocolate, in which the nut is made up into cakes like ordinary cocoa chocolate, and is used in the same way. In this form it is said to be very beneficial as an article of food for invalids and children, and for those needing a tonic.

Long Distance Photography.

M. Lacombe, a Frenchman, has succeeded in taking long distance photographs by simply fixing a telescope in front of the objective of the camera. It is kept in position by means of a screw-cap, A, in Fig. 1, which screws into the mounting of the objective at B. A diaphragm

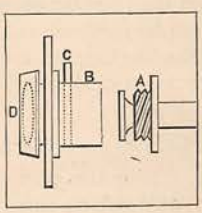


FIG 1.

with a large aperture, placed at C, keeps it from abutting on the objective lens at D. With this device M. Lacombe has taken photographs of houses about a mile off, and also distant views of scenery. The apparatus appears likely to be useful to travellers

FIG. 2.

and tourists. A very small camera has been brought out in Paris. It weighs only about 700 grammes. As illustrated in Figs. 2 and 3, it resembles a flat round box. It is simply held in the hand and manipulated —the likeness being taken instantaneously. Several plates may be impressed before replenishing the camera. We may also mention here the curious impressions of objects obtained by M. Boudet, of Paris, with the aid of the electric spark. He takes a plate of glass and lays it on a sheet of tinfoil. On the glass he lays a coin, having its under face coated with plumbago. The coin is then connected to one pole of an electric machine, and the tinfoil to the other. After the machine has been worked, the coin is connected direct to the tinfoil and a spark passes between them. On lifting off the coin its impression will be found on the glass in detail. If a sheet of white paper is laid on the glass between the coin and glass, the impression can be received on that in place of the glass. Other powders can be used instead of plumbago, and other metal objects than a coin—for example, a medal.

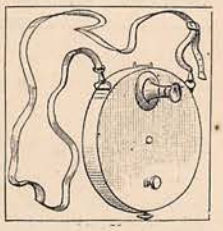


FIG. 3.

Manufactured Rubies.

During the past summer rubies have been in the market which are believed to be of artificial origin, though purporting to come from a new locality. The "syndicate of diamonds and precious stones" of Paris has caused a microscopic investigation of some of these stones to be made. It has been found that they contain certain small spherical bubbles which are similar to those present in glass or other fused mixtures. They can be seen, according to Mr. George Kunz, by a pocket-lens. In natural rubies the cavities are always angular or crystalline, and usually filled with a liquid. Genuine rubies have also a silky texture sometimes which is in fact called "silk" by jewellers, due to a series of cuneiform or acicular crystals, as may be seen by the microscope; but the new rubies do not appear to show this structure. It has been concluded that these stones are artificial, and probably manufactured by the Fremy and Feil process, formerly described in the GATHERER.

Fluor.

An important discovery was recently made by the French chemist, M. Moissan. This is the preparation of fluor by the electrical decomposition of fluorhydric acid. At the positive pole appears a gaseous body, believed to be fluor, and at the negative pole hydrogen. The properties of fluor are of a very virulent character. For instance, it decomposes cold water, producing ozonised oxygen. Sulphur and iodine burn in it. Cold crystalline silicium burns in it with a bright flame, and forms fluoride of silicium. Iron slightly heated burns in it; and organic bodies are strongly attacked and charred; while alcohol, ether, turpentine, benzine, and petroleum burn on coming into contact with it.

Steel Water-Pipes.

The Dundee Water Commission recently instituted experiments on the use of mild steel pipes for conveying water, and they were found to withstand great pressure. They are recommended for railway bridges, where the traffic sets up great oscillation, and for crossing mosses where cast iron would require to be laid on a bed of stone or timber. According to experiments, they will stand the flow of soft water almost as well as iron.

Colouring Phosphorescence.

According to M. Verneuil, a French *savant*, the most beautifully phosphorescent material known is prepared as follows:—Take twenty grammes of lime of the *Hypopus vulgaris* shell, calcined and pulverised; mix it with six grammes of sulphur, and two grammes of starch. To the mixture add, drop by drop, a solution containing half a gramme of subnitrate of bismuth, 100 cubic centimetres of absolute alcohol, and some drops of chlorhydric acid. When most of the alcohol is evaporated by exposure to the air for half an hour, the mixture is to be heated in a covered crucible for twenty minutes, to a clear cherry heat, by means of wood charcoal or a Perrot gas furnace. After pulverising the mass calcine it again at the same temperature for a quarter of an hour. It should not be too strongly heated. And the colour of its phos-

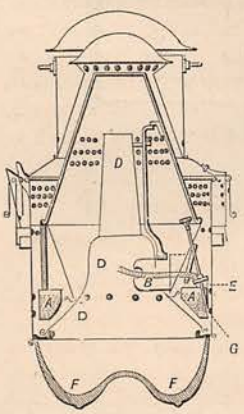
phorescence can be changed by the addition of other chemicals. Manganese, for example, produces an orange tinge. Sulphides of antimony, cadmium, mercury, tin, copper, platinum, zinc, and molybdenum produce colours varying from yellow-green to blue-green. The material is rendered phosphorescent by exposure to light.

Tunnelling the Rocky Mountains.

The "Great Divide," familiar to English travellers, is a celebrated watershed in the Rocky Mountains, sometimes spoken of as the Crown of the Continent. Rivers which flow into the Atlantic and Pacific Oceans take their rise here. Owing to the scarcity of suitable passes through the Rocky Mountains, the railways crossing them have been obliged to swerve for hundreds of miles out of the direct route, in order to cross them; but engineers now propose, and have indeed begun, to tunnel through the Great Divide under Gray's Peak, so as to open up direct communication between the Atlantic and Pacific slopes. This will lessen the railway journey to San Francisco by nearly 300 miles; and it is expected to cut through silver veins. We may also add that a new railway in Kentucky will pass through a natural tunnel bored in the rocks by the waters of Stock Creek, an arm of the Clinch River. The tunnel is 275 metres long, and the rock is of a compact nature. The utilisation of the passage will, it is estimated, save the company about £100,000.

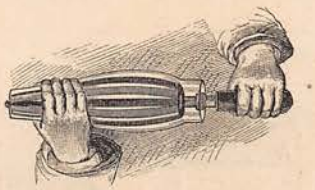
A Carriage Roof-Lamp.

A carriage roof-lamp of a new kind which burns mineral oil has been introduced with success on the Great Northern, Midland, and other railways. The lamps are lighted at six a.m. and burn till one the next morning without attention; the light being from ten to twelve candle-power. In the accompanying figure, which represents a section through the lamp, the oil reservoir, A, is annular, and is entirely below the wick, B, which projects horizontally as shown, into a combustion chamber, D D, terminating in a funnel. The wick issues from a metal dome or cap, B, as in ordinary oil lamps. The combustion chamber is lined with white enamel, to reflect the light down through the bottom of the lantern, F, F. No oil can get into the lantern F, and so obscure the light. Air to feed the flame passes through perforations in the case of the lamp, some of which are shown in the figure. It circulates round the combustion chamber, by which it is warmed before it enters the dome to feed the flame. A device for operating the wick is seen at E G. Heavy mineral oil is burned at a great saving of cost over the rape-oil, formerly used by the railway companies mentioned. A roof-lamp requires twenty gallons of oil per annum, and the new lamp is said to effect an economy of twenty per cent. per year, while giving three times the illumination. An oil having a flashing point of 250°, which is practically as safe as colza, is recommended for the lamp.



A Lamp-Chimney Cleaner.

That lamp-chimneys require frequent cleaning if they are to be of any service, is a fact of which all users of lamps are painfully aware. A device has recently been patented by a Canadian inventor, which renders this



necessary operation a safe and easy one. Running on a square steel rod of about the length of an ordinary chimney are a couple of sliding collars, not unlike the collars of an umbrella frame. A series of steel strips connects these two collars, and is attached to them by means of an annular flange on each of the collars. A glance at our illustration will show the construction of the apparatus. In use it is covered with the cleaning cloth and inserted into the chimney. One of the collars is then pressed towards the other, the result being an outward springing of the steel slips, which presses the cloth against the inner surface of the glass in such a way that the chimney may be readily cleaned by twisting the apparatus about.

A Gas Hammer.

A forging hammer worked by gas instead of steam has recently been introduced. The hammer is operated by a piston which is forced downwards by an explosion of mixed gas and air in the cylinder. The force of the blow is regulated by varying the volume of explosive. A second piston in the cylinder effects the charging. The firing is accomplished by a jet of flame which explodes the gas between the two pistons. For smiths, coach-builders, and others who require a powerful hammer, without having recourse to steam, the machine is likely to be useful, especially as it can be always ready.

Cocaine in Horse-Firing.

The operation of firing horses is well known to be a very painful one; and it is satisfactory to know that Dr. Clarke has succeeded in rendering it painless by means of a hypodermic injection of cocaine. A ten per cent. solution of cocaine was used, and although the horse winced slightly under the injection needle, it bore the subsequent firing without signs of pain. Owing to recent advances in the manufacture of the alkaloid in England from the *Erythroxylon coca*,

we are informed that the price of the quantity required for the operation in question would not be more than two shillings at an ordinary chemist's.

The Golden Orfe.

An attempt has been made to acclimatise the golden "orfe," or chub, of Bavaria, in ponds near Liverpool; and, so far, the attempt has been successful. The fish is almost as beautiful as the well-known gold-fish, but is far more hardy. It attains a length of about a foot, and a weight of six pounds. The orfe breeds freely in England, and the offspring retains the colour of the parent. It rises to the fly in enclosed waters, and it is also suitable for aquaria.

An Ironing Machine.

The figure illustrates a machine which has been devised for ironing cloth. It consists of a table as shown, with an "iron" above it; means being provided for working the appliance by foot and hand. Gas can be utilised in keeping the iron hot, and the pressure on the cloth can be properly regulated.

Pianoforte Silencing.

A useful device for enabling a beginner at the pianoforte to practise freely, without disturbing the neighbours, has been introduced by Mr. Dimoline. The stop operates to a greater degree than the "soft pedal," and reduces the sound of the instrument to a minimum. Moreover, it can be fixed to any piano for a small sum.

An Electric Gong.

A large electric gong has been erected on one of the lantern towers at the Holloway Sanatorium, Virginia Water. It is beaten by the electric power, the operator simply working a key like an electric bell press-button. The boom of the gong can be heard for about half a mile.

The Electric Light and Lilies.

A gentleman of Davenport, Iowa, U.S., whose garden runs within 100 feet of an electric light tower, has remarked that some of his lilies, which usually close their petals before sunset, now unfold them a few minutes after the electric lights begin to blaze. It has also been observed that the foliage of trees in the streets of Detroit, Michigan, were, during the past summer, more luxuriant where the electric light fell upon them.

The Brachionigraph.

This instrument is intended to enable persons to write who have lost the use of their hand, or indeed the hand itself. It is, therefore, adapted for sufferers from writers' cramp. Simple in construction, it consists of a light metal strip, curved so as to fit the side of the forearm, and supported by a kind of gauntlet which is attached round the arm. The splint carries a pen at its extremity on a universal joint; and the person can move the pen in writing by the muscles of his arm and shoulder alone.

A Use for Sodium.

The metal sodium has recently been used to find the height of water in borings. The sodium, which, as is well known, kindles and flames on touching water, was lowered in shallow pans containing naphtha, a substance in which sodium can be kept, and which protects it from the dampness of the air. When the pans reached the water the naphtha floated away, and the sodium blazed up in a manner visible at the top of the bore-hole.

A Label Clip.

An iron clip for holding address labels, which can be readily attached to waggons, and so on, is illustrated in our figure. The clip is fastened by screws to the woodwork underneath, and the label is firmly held in place by studs on the under side of the clip, which perforate the card.

"Life's Fitful Fever."

SPECIAL NOTICE.

Since the first two instalments of this story have left his hands, the Editor has learned, and with much regret, that the title is identical with that of a story which has been appearing for nine months past in the columns of a provincial newspaper called *The Southport Visiter*. The title thus inadvertently reproduced has, therefore, been changed for one in which the name of the heroine of the story is a prominent feature, viz., "Vere Thornleigh's Inheritance."