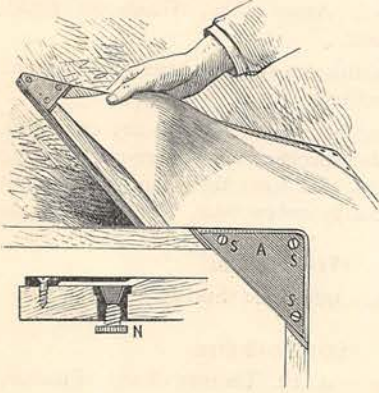


THE GATHERER: AN ILLUSTRATED RECORD OF INVENTION AND DISCOVERY.

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 Drawing-Paper Clip.

A new article for the drawing-office is shown in our illustration, and consists of a clip for fastening paper to the drawing-board. It is a triangular metal plate, A, about one-tenth inch thick, supported by three small washers of the same thickness, and secured to an ordinary drawing-board by three screws, S, S, S, the board being first cut away on its upper surface



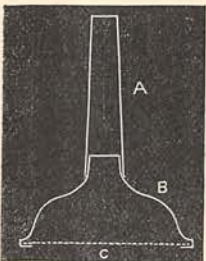
bring the plate, when fixed, flush with the board. The corner of the sheet of paper slips into the space under the clip, and it is held there by a screw-nut, N, under the corner of the board, as shown in the lower figure. This nut presses a small cone up against the paper from below, and holds it fast. A similar clip is fixed at each corner of the board; and, while not piercing the paper, they obviate the trouble of drawing-pins.

A New Cane-Sugar.

A new process of extracting sugar from the cane consists in cutting the latter into strips, and extracting the water by alcoholic vapour, thus leaving the saccharine matter to be dissolved into liquid. The alcohol and sugar are filtered out by means of lime and chalk. It is claimed that this process will produce more sugar from the same quantity of cane than that of crushing now in use.

A Platinum Filter.

A system of filtration, introduced by Dr. Carmichael, is well known to chemists, and consists in passing the liquid through a small paper disc held by the suction of a filter-pump against the flat, perforated surface of a small vessel called a filtering bulb. This bulb has recently been made of platinum by Mr. Casamajor, as shown in the figure, where A is a straight tube connected to the filter-pump, and made of platinum; B is the bulb turned out of platinum, and C is the perforated plate on which the filter-paper rests. The bulb and tube can be soldered together with gold.



A Triangular Nail.

Triangular tacks and nails are now made with flat chisel points and hatched or ribbed sides, so as to take a very firm hold of the wood they are driven into. Round but ribbed nails are also introduced with like effect. These nails are provided with good-sized heads, so that there is little chance of missing them with the hammer when driving them into the wood.

Edison's Railway Telegraph.

Mr. Thomas A. Edison has devised a method of telegraphing to and from railway trains in motion without employing a special line wire. He uses ordinary telegraph lines beside the railway, and communicates the message from the roof of a carriage to them through the air.

This is done according to a fact, perhaps first observed by Professor Hughes, namely, that rapidly intermittent currents traverse the air for some distance; whereas continuous currents are stopped. Fig. 1 shows the arrangement employed by Edison for the purpose. The roof of the telegraph car is covered with metal,

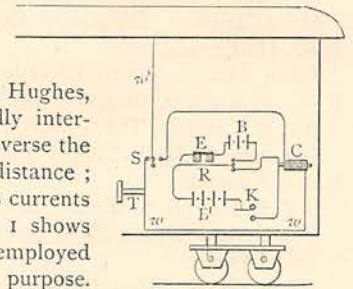


FIG. 1.

and this metal is connected by wire, w' , to the apparatus inside the car. All this apparatus is attached to a desk at which the telegraph operator sits. It consists of a telephone, T, by which he receives the message sent him from the fixed station on the line; and a "harmonic" telegraph by which he sends messages to the fixed station. The roof of the car is connected to either the telephone or harmonic telegraph by the switch, S, according as the operator means to receive or send a message. The telephone and harmonic telegraph are connected by wires, w , to an axle of the carriage wheels, as shown, and thus the circuit is completed to the "earth" through the rails. The harmonic telegraph consists of a steel reed, R, vibrating 500 times per second by means of an electro-magnet, E, excited by a small voltaic battery, B. This reed in vibrating interrupts the circuit of another battery, B', of ten Fuller bichromate cells. In this circuit is included a Morse signalling

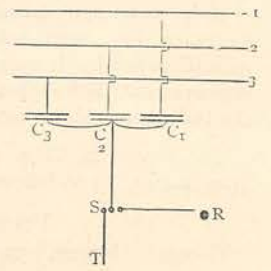
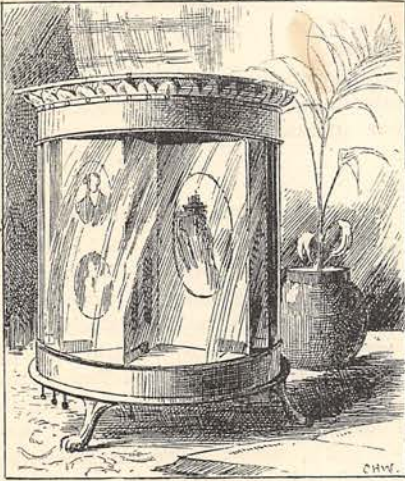


FIG. 2.

key, *K*, and the primary wire of an induction coil, *C*. The intermittent currents produced by the interruptions of the reed excite corresponding currents in the secondary circuit of the coil, and these go to the metal roof of the car, and thence through the air to the neighbouring telegraph wires. A musical note is heard in the receiving telephone, but interrupted into distinct signals. A similar apparatus is connected to the telegraph wire at the fixed station through condensers, as shown in Fig. 2, where *C*₁ *C*₂ *C*₃ are the condensers, and *S*, *T*, and *R* as in Fig. 1.



A Revolving Album-Case.

An ornamental revolving album-case is shown in the figure, where the album is seen inside with all its pages open to view. The leaves are opened from below by means of clips on the leaves, having arms which project through a circular groove in the bottom of the case.

An Armour-Plated Thimble.

Ladies sometimes complain that the ordinary silver thimbles are soon worn away by the cotton constantly passing over the same place. Stone ends to silver thimbles, and thimbles made entirely of steel, have been tried, but found in turn unsuitable. Now an armour-plated thimble has been invented and patented, which bids fair to solve the problem of providing a thimble at once light, cleanly, and durable. This new thimble is made of three plates of metal—the outer and inner coats of silver, and the middle one of steel—the advantages of the silver thimble being thus combined with the strength of the steel one.

A New Food-Preserver.

Boracic acid has hitherto been used for preserving food, and especially milk; but Messrs. Sulman and Berry have recently pointed out to the Chemical and Physical Society of University College that free boracic acid is injurious, especially when given to children in milk. They state, however, that benzoate

of soda is more effective than boracic acid, and is, when pure, both tasteless and innocuous, even when taken for prolonged periods. It may be added that these gentlemen remark that salicylic acid and the salicylates used as preservatives in some so-called "temperance drinks" cannot be administered frequently with impunity.

Saccharin.

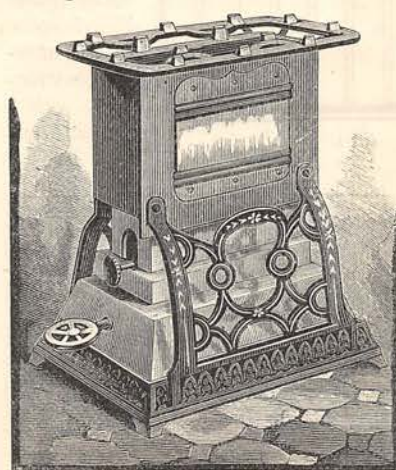
A new substance termed "saccharin" has been discovered in that wonderful material, coal-tar, by a German chemist named Fahlberg, resident in the United States. It is stated to be 230 times sweeter than the best cane-sugar, and hence it must be very sweet indeed. For some months past it has been used to sweeten and render palatable the food of persons suffering from diabetes at a Berlin hospital. In appearance it resembles flour, but is denser, and it dissolves easily in hot water. It appears from experiments by Professor Emmerson Reynolds, F.R.S., that it is harmless; and it is expected that, when its cost of production is reduced, saccharin will be a rival to cane-sugar, because one part is enough to sweeten 10,000 parts of water. Ether, alcohol, glucose, and glycerine dissolve it readily. At present the price is, however, about forty shillings per pound.

The Ear and the Earth's Magnetism.

An audible demonstration of the earth's magnetism can be obtained (according to Dr. Schäfer) by arranging a series of telephones in a circuit which is rapidly made and broken, and turning one telephone end for end in such a way that its north and south poles are alternately the uppermost. At each reversal a crack is heard in all the telephones. This results from the induction of the earth's magnetism on the telephone which is reversed. The latter may be replaced by a simple bar magnet wound with a length of insulated wire.

A Lamp-Stove.

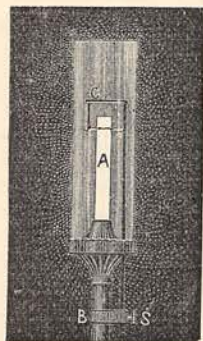
A lamp which gives out heat as a stove is shown in the figure, where the flames are visible through the glass in front.



The oil vessel is separate from the stove and can be removed at will. The stove is ten inches high, eight and a half inches broad, and weighs six pounds. It serves to cook, as well as to heat a room.

A New Gas-Burner.

The figure represents the new gas incandescent burner of Dr. Auer, to which we referred in a recent GATHERER. The apparatus consists simply of an ordinary Bunsen burner, above which is suspended a



conical cylinder, A, formed of specially-prepared cotton or woollen fabric, about 2½ inches high. This cylinder is supported by a thread of platinum which runs through its upper part, and is attached to two iron rods connected at the top to a ring, C. The longer of these rods is mounted on a metal ring or collar, B, encircling the stem of the burner, and adjustable by means of a screw, s. When the burner is lighted there is considerable development of

heat within the cylinder, which in a few seconds is raised to incandescence, producing a steady, white light. Nothing is said, however, as to the actual illuminating power of this burner. The cylinder is composed of oxide of lanthanum and zirconium, or oxide of yttrium and zirconium. The zirconium may be replaced by magnesium. The cotton or woollen material is plaited into shape, and impregnated with a solution of nitrate or acetate of the above-mentioned substances; and, the tissue having been carbonised, leaves behind an earthy skeleton of the original web. We may add that electric incandescent lamp filaments are now made of earthy matter to work in the open air, and not in vacuum bulbs.

A Collapsible Life-Raft.

An inflated air-raft with a frame of iron or steel bars made in the form of lattice-work has been introduced

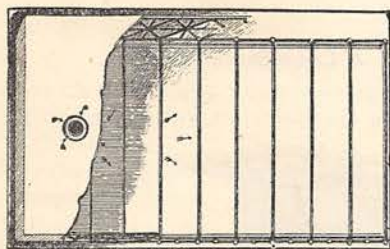


FIG. 1.

lately. The raft is collapsible and can thus be packed in a small space. Fig. 1 is a plan of the internal construction, with a shaded portion on the

left side showing part of the cover and air-valve. Fig. 2 shows in detail part of the lattice side of the vessel; and Fig. 3 exhibits the latter as

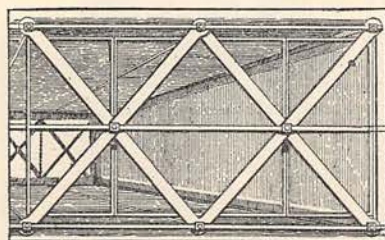


FIG. 2.

packed up. As soon as the air-valve is opened the raft can be drawn out and extended to its full dimensions, the air inflating it at the same time. When full of air the valve is closed and the raft is rigidly tightened up by the cross and longitudinal steel bars. Considering how difficult boats

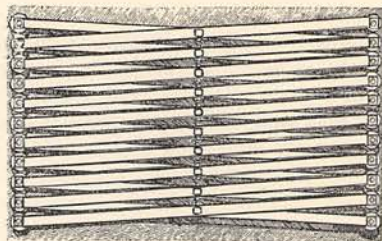


FIG. 3.

are to launch sometimes in a heavy sea, and how precarious their accommodation may be, it is to be hoped that more attention will be given to such appliances as this.

A New Magnesium Light.

An American photographer has devised a plan of burning magnesium wire in a continuous supply of oxygen, thereby obtaining a highly actinic light for photographic purposes. The magnesium ribbon hangs vertically in a box, its end coming over a sponge saturated with alcohol. A fine platinum wire is heated red-hot by an electric current, and sets the alcohol in flame, thereby igniting the magnesium when the light is desired. The whole is enclosed in a box with a glass front, and oxygen gas is supplied to it by a pipe, as in the case of the lime-light. When the gas is shut off the light will go out. Another plan is to mix magnesium powder with fine sand, and allow the mixture to fall through an alcohol flame in a steady stream.

A Cement for Ironwork.

A strong and useful cement for joining ironwork is said to be as follows:—Six parts of sulphur, six of white-lead, and one of borax, thoroughly well mixed. In applying it the cement is wetted with strong sulphuric acid. A thin layer pressed between two broken surfaces of iron is said to join them if it is left to dry for a few days.

The Meldometer.

The meldometer is a new adjunct to the microscope, by which the melting point of minerals can be determined, and their behaviour in contact with re-agents watched. It consists of a narrow ribbon of platinum, two millimètres wide, arranged to traverse the field of the microscope. It is raised to incandescence by the passage of an electric current from three Grove cells. The objective of the microscope is protected from its heat by a glass strip, and the observer is sheltered from the heat by a wedge of tinted glass, which is also used to estimate the brightness of the field. The temperature of the platinum is found from its electrical resistance in a well-known manner, first introduced practically by the late Sir William Siemens. The

mineral is placed in fragments on the centre of the platinum strip, and watched while the electric current is increased, the temperature of the platinum raised, and the melting point of the mineral reached. In this way the inventor of the apparatus has melted beryl, orthoclase, and quartz. They become like clear glass; topaz whitens to a milky glass, throwing out filmy threads of clear glass, and glass bubbles, that break, liberating a gas (perhaps fluorine), which, attacking the white-hot platinum, causes rings of colour to appear round the specimen. A form of the apparatus is also made which allows the melting to be projected on a screen by means of a lantern.

Fresh Fruit from Australia.

The *John Elder*, of the Orient Line, has recently brought home a consignment of fruit from South Australia to the market of the Colonial Exhibition. It was not frozen, but simply packed in cork dust or sawdust, and placed in a cold chamber fitted with insulators, and kept at 40° F. of temperature. Apples, pears, grapes, oranges, quinces, lemons, melons, pomegranates, and so on, are included in the consignment, which came home sound; and it is hoped to establish a fruit trade along with the existing meat trade. As the fruit season in Australia begins when ours ends, there is a prospect of our having fresh fruit all the year.

Bark-Bread.

The "fladbröd," or flatbread, of Norway is in some places, notably Hardanger, made principally of tree-bark. The bark of young pine or elm branches is the ingredient used. The inner layers of pine-bark, ground to a fine meal, are mixed with a small quantity of rye-flour, to give it consistency, before being baked. This bread is also largely used in Kajana and the forest regions of Oester-botten and Tavastland.



A Straining Milk-Pail.

The figure shows a new milk-pail which strains the milk as the latter is poured out. The strainer fits into the lip of the pail in the manner shown, and is removable so that it can be easily cleaned. These pails are used in the Royal dairy at Sandringham.

Sifting Coal by Air.

The air blast is now used in Pennsylvania to blow away the dust from fine anthracite coal before it is moved from the coal-breaker to the pile. In this way the coal is rendered clean, and much waste of small coal is prevented. In fact, it is believed that the refuse or "culm" coal left by the old method can be profitably worked by the new blast-sorter, and merchantable coal obtained from it.

A Long Conduit.

A scheme for laying a line of pipe from Baku on the Caspian to Batoum on the Black Sea, a distance of 560 miles, for conveying petroleum, has been approved in Russia. The scheme favoured is that of M. Nobel, and passes by the Suram Pass through the Caucasus.

A New Drawing-Board and Slate.

A combined drawing-board and slate which has recently been brought out is shown in Fig. 1. In each

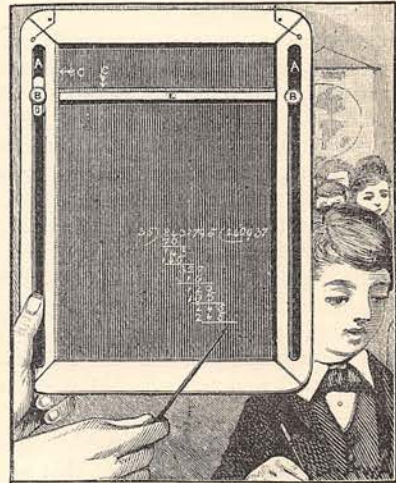


FIG. 1.

side frame there are slots A A, in which work screws B B, with a sliding block D, which are attached to a sliding bar E, and serve to slide and fix the latter on the front of the slate. The edge of the frame at C is graduated as a scale, as is also the edge of the sliding bar E. Fig. 1 shows the slate in use, with the bar E as a parallel ruler for ruling lines across. But it also serves as a square to guide a triangular square set upon it; or it can be used to hold a copy to write from at the head of the slate. It can also be unscrewed and fixed at one side of the frame out of the way: and the top of the slate being removable enables the slate to

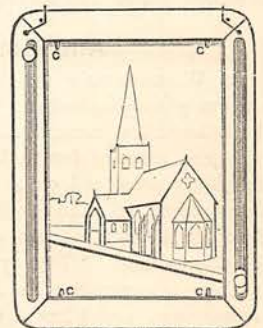
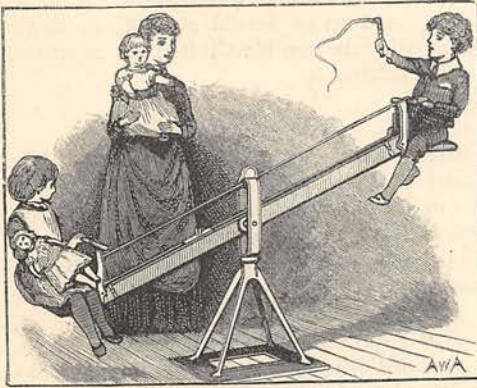


FIG. 2.

be drawn out and reversed when one side has been filled. Fig. 2 shows the use of the slate as a drawing-board; the slate being removed, and its place supplied by a board having a sheet of paper fixed on it by clips at C C C C.



NEW SWINGS,—FIG. 1.

New Swings.

Fig. 1 represents a new and improved form of the old see-saw swing, constructed of iron and wood, with seats at the ends which remain horizontal whatever the position of the swing, and handles to hold on by. Four sizes of the machine are made, ranging from nine to sixteen feet long. In France the hobby-horse is now mounted on two pairs of spiral springs, representing the legs of the animal; and the rider, by his own exertion, imitates the galloping of the horse. These articles are useful for gymnastic exercises; and we may also illustrate another new swing in Fig. 2, which is portable, and can be fixed up on any ground by means of the legs and pins shown. This is a swing of the ordinary kind, and needs no further description.

Fire-Risks of Nitric Acid.

A French chemist has pointed out that many fire accidents occur from the straw used to wrap carboys of nitric acid becoming burned by spontaneous generation of heat, especially if the sun's rays reach the carboy. He concludes that all straw, or other organic matters, should be removed from the vicinity of concentrated nitric acid during its transport and storage.

A New Stereoscope.

In Wheatstone's stereoscope the images of the objects photographed are very often seen on a scale far below their natural size; and a new stereoscope has been devised for making the magnified image of an object projected on a screen by a magic lantern stereoscopic, so as to resemble the original still more. Two optical lanterns are placed side by side as if for dissolving views. Two transparencies, photographed in the same manner as if intended for an ordinary stereoscope, are placed one in each lantern, and projected on a screen in such a position that they overlap each other as nearly as possible. The picture which is intended to be seen by the right eye may be placed in the right-hand lantern, and the other in the

left. Supported by suitable framework, and in the front of the two lenses of the lanterns, is a revolving disc, portions of which are cut away, so that during its revolutions it obscures the light of each lantern alternately; or, in other words, so that only one picture at a time is thrown on the screen. A continuous change from one picture to the other is thus obtained. In the same framework, and in convenient positions for the observers, two pairs of eye-holes are provided, one pair on either side of the apparatus. Behind each pair is also a rotating disc, and these discs are connected by suitable wheel-work or driving-bands with the one previously mentioned, in such a way that the three discs rotate together and at the same rate. The two last-named discs are also so cut that they will obstruct the view through the right and left eye-holes alternately. Finally, the connection between the three discs has to be so arranged that the time of obscuring the view of the observers' right eyes or left eyes shall coincide with the time when the light is shut off from the right or left lens of the lanterns respectively. It is obvious that by this arrangement the left eyes can only see the picture projected from the left-hand lantern, and the right eyes can only see that from the right-hand lantern. The flashes follow each other from thirty to forty times per second, so that a continuous effect is produced on the eyes. The discs giving two flashes per turn, they must rotate from fifteen to twenty times per second. They



NEW SWINGS,—FIG. 2.

are rotated by a driving-wheel, band, and handle. The perspective effect given is very good. The apparatus described is only suitable for two persons, but it can be adapted for more by making the side discs larger, and increasing their number.

PRIZE COMPETITIONS.

Intending competitors are reminded that the latest dates for receiving M.S.S. in Competitions 3 and 4 are July 1st and August 3rd respectively. For full particulars of these and other Competitions, readers are referred to page 448 of last month's issue.