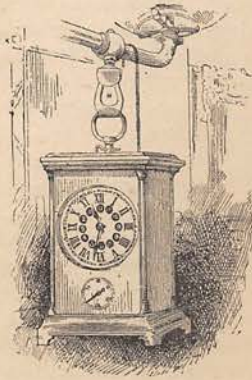


THE GATHERER: AN ILLUSTRATED RECORD OF INVENTION AND DISCOVERY.

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 Gas Extinguishing Clock.



An arrangement which can be applied to any clock to enable it to turn off gas, but which is specially adapted to that illustrated in our figure, has been devised by an American. A suspension hook, N, is attached above to the stop-cock of the gas-pipe, as shown, and below to a handle on a shaft. A notched disc is rigidly attached to the arbor of the hour-hand, and actuates the shaft which works

the stop-cock. The shaft only makes one-quarter turn. The device is easily set, and it enables a person to turn off the gas at a predetermined time. As gas is applied to many purposes now, this will be found a convenience sometimes.

A Lighting Calendar.

Mr. F. Lux, of Ludwigshafen on the Rhine, has compiled a diagram showing the natural illumination for every day of the present year, and indicating the times for artificial illuminations to begin. Curves show the time of sunrise and sunset; and the time the moon rises or sets below an angle of 20 degrees to the horizon. This angle is chosen because there is practically no illumination from the moon in the streets of a town until it reaches that altitude. The phases of the moon are also attended to. The diagram is worked out for Berlin, but corrections are given for all the large towns of Germany.

Hydrocarbon Paints.

A curious instance reported from America shows that care should be exercised in using paints giving off hydrocarbon vapours in enclosed spaces. Some workmen set to paint a large iron tube with a mixture of benzine and asphalt as a protection against rust, were found to become strangely exhilarated and wildly excited. Suspecting the cause the superintendent had the men removed, some being in a state of stupor. The open air revived them, but the reaction was felt afterwards.

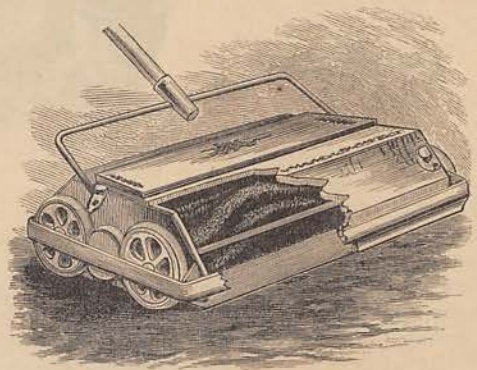
Bellit.

Bellit is a new Swedish explosive discovered by Herr Carl Lamm, of Stockholm. It consists of nitrate of ammonium and dinitrobenzol, which when melted are mixed with saltpetre, forming a compound

of which each molecule explodes. One litre of bellit weighs 800 to 875 grammes; and it is found most serviceable for military purposes in a granular state. Bellit can be struck without exploding. It will also withstand fire, friction, or vibration. Granulated bellit explodes with a small quantity of fulminating mercury. It is stated to be suitable for exploding mines as well as for military purposes.

A Telephone Siren.

Professor Karsten, a German electrician, has devised a telephone "siren" which consists of a disc capable of being rapidly revolved. On the face of the disc a number of bar magnets are fastened radially, and near them is fixed the magnet and coil of a telephone with the diaphragm or plate removed. When the disc is revolved the rapid passage of the magnets in front of the magnet coil of the telephone induces currents in the coil, and these are heard as a musical note in a second telephone connected in circuit with the coil. The note heard depends on the arrangement of the magnet-poles on the disc, the number of vibrations per revolution equalling the number of poles, if the latter are all of one name, that is to say, all north (N.) or all south (S.) poles. When the order is N.S., N.S., or north and south poles alternately, the number of vibrations per revolution is halved, and so on. By combining the siren with an anemometer it is possible to tell the strength of the wind by the note heard in the telephone.



A Carpet-Sweeping Machine.

Our illustration shows a new carpet-sweeping machine which has recently been introduced to this country from the United States. It consists, as will be seen at a glance, of a light frame running on four india-rubber-tired wheels and surrounded by a rubber furniture guard. Between the two wheels at each end, and geared so as to be driven by their motion, is a

revolving brush which gathers up the dust and dirt as the machine is pushed over the carpet by means of the long driving-handle. The sweepings are collected in two dustpans in the frame of the machine, and, on pressing the triggers, one of which is shown on the top of the case, these pans are automatically emptied, without any need of tilting, or of removing any portion of the machine. The rubber furniture guard provides a satisfactory protection against accidents to the legs of chairs and tables, which might otherwise result from the use of the machine by a careless servant.

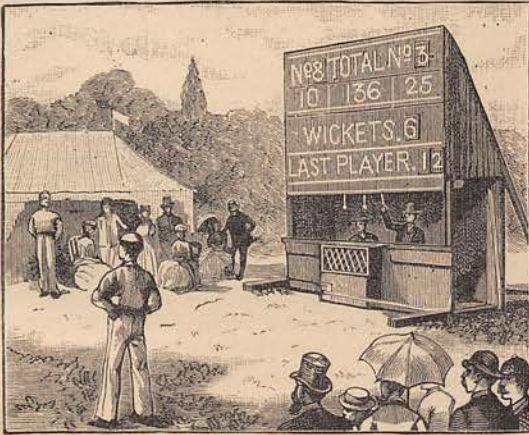


FIG. 1.

A Cricket Scorer.

The cricket scorer which we illustrate is an ingenious piece of mechanism working by means of endless belts and pulleys. The three handles, pulled in the manner shown, work the machine and adjust the score. Each run, as it is made, is added to the score of the man who made it, and also to the total score, and all extras are added to the total score without affecting the score of each batsman. We need not enter into the details of its construction; but we may mention that all the numerals are on endless belts or bands, each belt carrying a complete set from 0 to 9, and free to move over suitable drums on

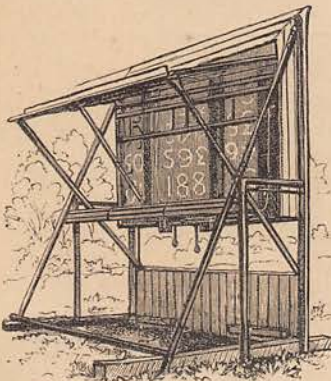


FIG. 2.

axles running from end to end of the scorer. Fig. 1 shows the front, and Fig. 2 the back of the scorer.

The Southern Cross Pearl.

The remarkable cluster of pearls known as the "Southern Cross Pearl" was found at Roeburn,

Western Australia. It is a group of nine pearls in the shape of a Latin cross; seven composing the shaft, which is one and a half inches long, and one composing each of the arms, which spring from the second pearl, reckoning from the top of the shaft. The pearls are mutually compressed and of fine quality, though somewhat out of shape. The pearl has been carefully examined to detect any artificial means of joining the pearls; but none has been discovered, and its formation is a subject for speculation. It is known that the Chinese produce pearl deposits on wire artificially, but in this case no such thread could be found. It has been suggested that a fragment of serrated sea-weed may be the framework of the pearl.

Natural Gas and Insects.

Natural gas has been used in Philadelphia for ridding fruit-trees of insects. The fact, as stated, was discovered by a jet of natural gas burning near some peach-trees; but whether it is that the flame attracts and consumes them, or that the vapours kill them, is apparently not well established. Natural gas has also been employed recently in America for melting iron in a cupola. The iron is stated to be of purer quality than coke gives, and the waste is less. Colonel Sweeney at Wheeling, in West Virginia, cast 1,200 lbs. of engine plate in this way without difficulty.

Dispersing Smoke.

In a recent GATHERER we described the method of dispersing and laying smoke or other fumes by electric discharges in the air; and we may further add that it has recently been found that if the containing vessel is coated inside with glycerine the process is hastened. It has also been proposed to clear away the smoke from heavy guns in firing by electric discharges through it. We are not aware, however, that this proposal, though patented, has ever been satisfactorily tried.



A New Diver's Helmet.

The figure illustrates a new diver's helmet, which is fitted above with an electric incandescent lamp, capable of directing a beam of fifty candle-power. A telephone is also fixed to the inside of the helmet, and enables

the diver to speak with his assistant. A modification of this helmet has been devised for the use of men entering gas-holders, or for distillery men and firemen. The heavy gear is dispensed with, and replaced by a mouthpiece and eye-guard. The mouthpiece has a valve and tube by which the exhaled air is liberated and the pure air admitted for inhalation. The muscular power of the wearer is sufficient to draw the fresh air through the tube, and no pump is required. Of course the outer end of the tube is in a pure atmosphere.

Casting Metals on Lace.

Mr. A. E. Outerbridge has introduced a method of casting iron and other molten metals on lace or other textile fabrics, leaves, grasses, and so on. The lace is carbonised, then spread smoothly on a mould of



green-sand, and the molten metal poured on. The lace forms its pattern on the under-surface of the metal. In this way dies can be formed like those of electrotypes. The fabric or vegetable tissue to be carbonised is placed in a cast-iron box, the bottom of which is covered with a layer of powdered charcoal or other form of carbon, then another layer of carbon-dust is sprinkled over them, and the box is covered with a close-fitting lid. The box is next heated



gradually in an oven to drive off moisture, and the temperature slowly raised until the escape of blue smoke from under the lid ceases. The heat is then increased till the box becomes white-hot; it is kept in this glowing condition for at least two hours, then removed from the fire, allowed to cool, and the contents tested in a gas-flame. If they have been thoroughly

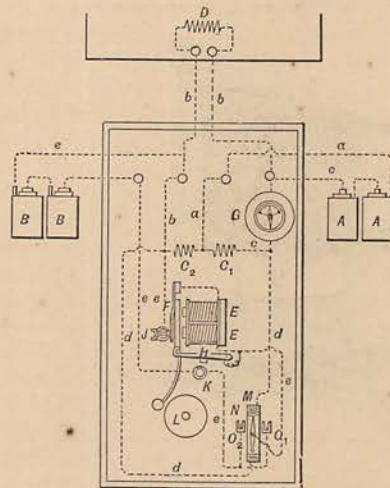
carbonised they will not glow when removed from the flame, and the fibres may even be heated white-hot before consuming. Of course the method employed to carbonise the materials is susceptible of variation. The figures represent samples of castings as they were made.

Pulp Pails.

Light and durable pails are now made from wood pulp by the papier-maché process. The pulp is made as if for paper, then filled into an outer mould of sheet brass perforated with minute holes all over the surface. This mould has the form of the pail, and an india-rubber bag which is distended by hydraulic pressure is placed in the pulp, thus driving out the water from the latter and forming the skin of the pail, which is dried at a temperature of 100° Fahr., then trimmed, and dipped in raw linseed oil. After this the pails are baked at a temperature of 180° Fahr., the oil being oxidised and the pulp transformed into a leathery material capable of resisting corrosion. The pails are finally varnished and ornamented.

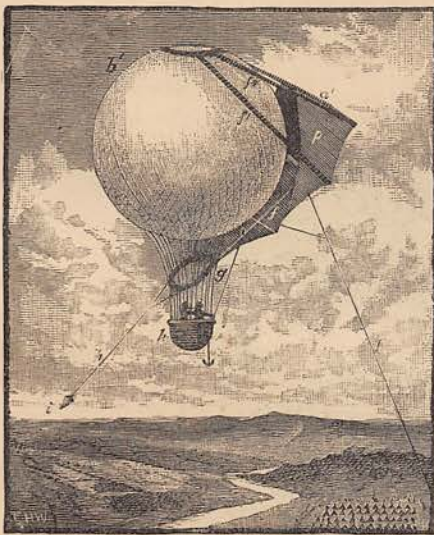
An Electrical Safe Alarm.

An electrical alarm for safes has been adopted by a large firm of well-known safe-makers. By it two ordinary electric bell wires can be led from the safe to an electric bell, and, though the wires are exposed outside the safe, they cannot be tampered with without ringing the bell. Also, if the safe be opened or removed, the bell is set ringing. As seen from the figure of the electrical connections there are two voltaic batteries, AA and BB; and also two equal resistances, C₁ C₂; while G is a galvanometer having a resistance approximating to that shown at D in the safe. The galvanometer shows that all the circuit is correct. Ordinary bell magnets, EE, actuate the armature, F, and support or release, as the case may be, the contact arm, H; J and K are contact pillars, and L is a bell-gong. Another galvanometer, M, has a vertically-balanced needle, N, with contact points dipping into mercury cups, O₁ O₂. Prior to any disturbance, the current from the battery, AA, passes by the wire, aa,



through the resistances, C₁ C₂, and by the wires, bb, through the resistance, D, the wires, cc, and galvanometer, G, back to the cells. The galvanometer, M, being in a balance, no current passes through it. If,

however, the circuit, *bb*, leading to the safe be cut, the galvanometer, *M*, will be thrown out of balance, and a current set up through the circuit, *dd*, deflecting the contact needle, *N*, and establishing a momentary circuit by *eKeJe* on the bell battery; consequently the armature, *F*, is pulled towards the magnets, *E F*, and releases the contact arm, *H*, which short-circuits the galvanometer, *M*, and establishes the circuit of the bell. The bell then rings till the arm, *H*, is again varied; the galvanometer needle having returned to its vertical position by reason of its weight. If, however, the circuit, *bb*, leading to the safe is joined across by wires outside the safe, or anywhere, the galvanometer, *M*, is again deflected, and the same results follow, by reason of a current passing in the opposite direction through the circuit, *dd*.



A Captive Kite Balloon.

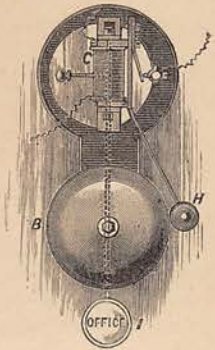
The fault of ordinary captive balloons used for military reconnoissance is that they are unsteady in wind, and cause a disagreeable jerking. Mr. E. D. Archibald has designed the kite balloon illustrated to remedy these defects. In the figure *a*¹ is an octagonal kite, with a frame made of four pieces of bamboo; *b*¹ is the spherical balloon; *f* is the silk covering of the kite; *p* is an extra or top hood; *f*¹*f*² are bands connecting the kite and hood with the top of the balloon; *g* is a ring connecting the lower end of the kite with the converging net cords of the balloon; *h* is a tail of cones; *l*¹ is an earth-line connected with the kite, one branch passing through a pulley to the car, *k*. The kite shields the balloon from the action of the wind. Wire is used for the earth-line, with a gain of strength and loss of weight. The addition of the kite also increases the lifting power of the balloon.

We may also mention that Mr. Eric Bruce has designed a signalling balloon for the Belgian Government, that has some points of novelty over his former ones. It may be remembered that these balloons, of varnished cambric, are translucent, and contain a set of electric incandescent lamps on a wooden frame

inside. The light of these lamps is put out or in by cutting off or letting on the electric current supplying them, so that when the balloon is high in air the luminous signals can be seen afar, and interpreted like those of a flashing signal lamp. This invention is expected to be useful in military and such-like operations. Mr. Bruce has now added a projector to the balloon, for use in thick weather. The projector is fixed outside the balloon, and the lamps with it, in such a manner that it projects the light free and unimpeded through the atmosphere. In this case the balloon serves to buoy up the projector. The current is supplied by an accumulator, and conducted to the lamps by insulated wires. The incandescent lamps used are those of Edison and Swan, and are of eight to ten candle-power each, but a number are used so as to equally illuminate the balloon inside. Those who witnessed the illumination of the Fleet at Spithead, will have an idea of the power of electric projector lamps when the arc light is used.

An Indicating Electric Bell.

A new electric bell, invented by Mr. Lloyd, which indicates the position of the call-push, is shown in our engraving. It consists of the usual bell-gong, *B*; the hammer, *H*; and the electro-magnet, *C*, which actuates the hammer to strike the bell. But it contains also an indicating disc, *I*, which by its vibrations tells the bell-push, or, in other words, the position of the person who has rung up. This is done by making the electro-magnet coil, *C*, hollow, and passing through it a stem, *S*, of iron, carrying the indicator, *I*, at the other end. The stem vibrates under the magnetic influence of the coil, when the bell is rung and the electric current passes, and the vibrating disc at its end indicates the position of the caller, in this case in the "Office."



A Land Yacht.

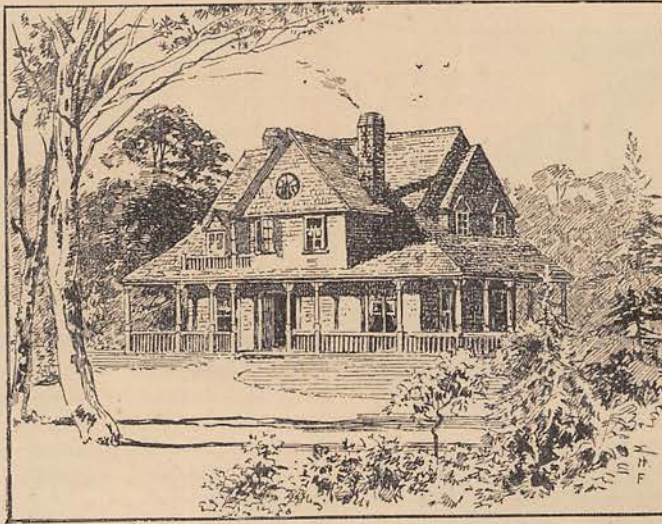
A travelling van, or "land yacht," has been constructed by a Newcastle-on-Tyne firm of carriage-

builders. It is useful for small parties travelling for pleasure round the country in the way which has become fashionable of late years. The yacht illustrated was exhibited at the Newcastle Exhibition, and has carried four companions some 300 miles over the country in about a fortnight.

A New Submarine Boat.

The new submarine boat of Dr. De Laval has recently been tried at Stockholm. It consists of two boats, one sixty feet long and nine feet broad, which is entirely submerged, and another and smaller one entirely above water, and looking like a steam-launch.

the space of $\frac{1}{72}$ second. As each of these photographs gives a different posture of the moving body, it follows that by causing them to succeed each other rapidly on a screen the image will appear to perform the same movement as the object; the persistence of images on the retina bridging the intervals. The photographs are very small, but are enlarged afterwards and transferred to thin glass plates. The twenty-four transparent views thus obtained are mounted on an iron disc containing twenty-four apertures near the rim for their reception. The disc is rapidly revolved before a Geissler vacuum tube lighted by an induction coil, which sends a spark through the tube as each picture is in the line of projection. Thus a succession of bright



SHINGLE HOUSE.

The two boats are joined by pillars. In the lower boat are a condensing steam-engine and naphtha cisterns; naphtha being the fuel employed. The engines are worked from the upper boat, so that no one need be in the lower boat when it is in motion. Another peculiarity of the new craft is what is termed "air lubrication." A water-tight frame surrounds the lower boat, and when it is still, is filled with water, which, however, is driven out and air supplied in its place when the vessel moves. This air is forced out under the water, and produces air lubrication on the after part of the vessel.

Moving Photographs.

Herr Ottomar Anschütz, of Lissa, has devised a new photographic apparatus for reproducing on a screen photographs of objects in movement. He takes first a series of rapid photographs of the object in motion by means of very sensitive plates. Some of these plates are sensitive to an exposure of $\frac{1}{5000}$ second. The camera has twenty-four lenses, and that number of pictures of the moving object, say a horse leaping, or a body of troops marching, can be taken successively in

images are thrown on the screen one after another, and as the eye unites them into one, the image reproduces the original movements of the object. The apparatus has been constructed for the Prussian War Minister.

A Shingle House.

At the American Exhibition there is a house built of shingles, which, as will be seen from our engraving, has a picturesque appearance. They are used in America at seaside places, and are stated to be warm in winter and cool in summer. The shingles, or wooden "tiles," used are of Canadian white pine.

A New Fruit.

A new fruit, similar in colour and size to the apricot, and which has been introduced into France, is that of the Gomme-Gutte tree of the Moluccas. There are several kinds of the *Clusiaceæ*, to which it belongs; but the *Zanthochymus pictorius* is that now grown under glass in Europe. The fruit is sweet but slightly acidulated, and has a faint perfume. It is grown in a greenhouse kept at a comparatively gentle warmth.