THE GATHERER.

AN ILLUSTRATED RECORD OF INVENTION AND DISCOVERY.*

Adjustable Desks.

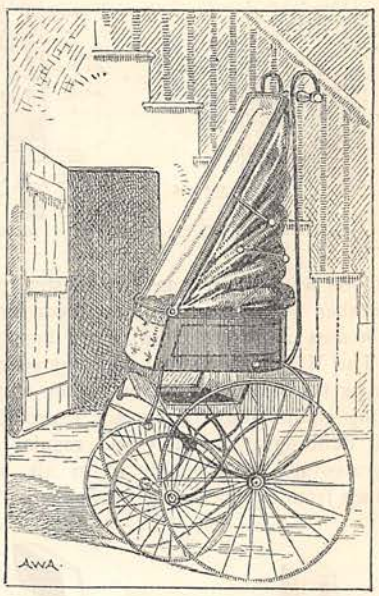
The use of rigid desks and forms in schools and offices sometimes tends to produce physical deformation; and hence the introduction of adjustable desks and chairs, which can be easily adapted to the requirements of the user. Such desks and chairs are here illustrated. They are so fitted and jointed that a person can readily enough raise or lower either the desk or the seat of the chair to suit himself.

Magnetic Shrinkage.

It has long been known that thin rods of iron and steel, when subjected to external magnetism by means of an electric current circulating in a hollow coil surrounding the rod, are elongated, and the elongation has been very accurately measured. Mr. Shellford Bidwell has, however, found from recent experiments that if the magnetisation be carried to a certain point the wire no longer lengthens, but begins to shorten again, and retracts beyond its original length. This curious discovery has not yet been satisfactorily explained. Nickel rods or wires are known to retract under the same kind of magnetisation; but so far as Mr. Bidwell's experiments went this retraction did not change into elongation. It is this elongation of iron under magnetism which is believed to be the cause of the sounds emitted by the iron wire inside a bobbin of wire when traversed by an interrupted current of electricity, an effect which takes the form of a musical note when the current is interrupted a great many times in a second—for example, 1,000 times.

A New Flower-Holder.

Men and women who like to wear a "button-hole"—as who does not?—may be interested in a new kind of flower-holder. The appliance consists of a neatly chased case of silver, and is to be attached brooch-wise by means of a pin to the coat or dress. The holder is in two pieces, the back portion hinging on to the front and being kept fastened securely to it by the knob arrangement common in some purses. In order to insert the flowers, the knob is pressed backwards and the holder opens. On the inner side of the back two tiny pins are soldered in, which serve the purpose of keeping the stalks of the flowers in suitable position. This seems to be the special feature of the holder, and it will be obvious that it possesses the advantage of enabling the wearer to artistically arrange the "button-hole," before putting it on to the coat or dress, without the slightest trouble. When the holder is not in use it may be kept, just like a piece of jewellery, in a case nicely lined with velvet.



A Contractible Perambulator.

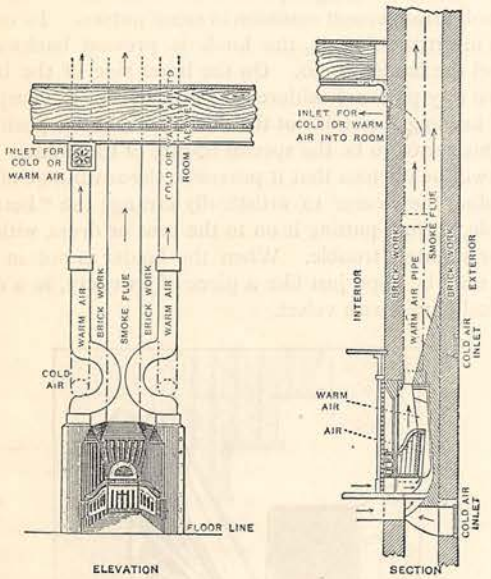
A perambulator which contracts, and is therefore capable of being driven in narrow passages or stored in small space, is shown in the figure. It is capable of holding two children in its ordinary position; but by turning a key from the rear the front section and wheels can be drawn under the back section and wheels, and the handle raised upright as shown, thus bringing the whole vehicle into a very small space.

One Fire for Two Rooms.

By the Manchester grate it is easy to warm another room than that in which the grate is fixed. For example, a bed-room up-stairs can be supplied with warm air from a grate fixed on the ground-floor. This is done by means of warm-air chambers at the back and sides of the grate, and clay or iron pipes leading

* 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, however, cannot in any case guarantee absolute certainty of information, or to notice every article submitted.

from these either into the same room or another. The pipes are led up the chimney to the outlets for the particular room in question, as shown in the accompanying elevation and section of a fireplace. This arrangement, which is patented, can, moreover, be applied to other existing grates, thus adding to their warming and ventilating powers. Rooms containing 40,000 cubic feet of space can, it



is stated, be warmed by one Manchester grate. A large number of these grates have been erected in private homes and public buildings, hospitals, and so on. The Manchester stove, constructed on a like principle, is fitted with an ascending, or a concealed descending smoke-flue. They are especially applicable for buildings which have no regular fireplace. These grates not only supply warm air in winter, but cool air from outside in the summer months.

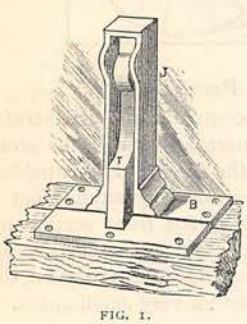


FIG. 1.

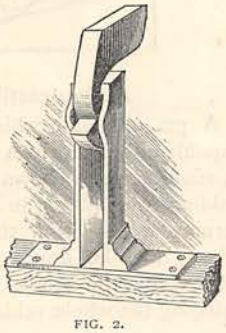


FIG. 2.

Another Safe Window Fastener.

There is a window fastener exhibited at the Inventions Exhibition, which we illustrate herewith. It is designed to keep out intruders, and consists of a base-plate, B (Fig. 1), which is screwed to the outer sash-bar, and supports two vertical jambs, J, from which a tongue, T, of the shape shown, is suspended on pivots. On the window being closed the tongue is placed in the position shown in Fig. 1, so that its base projects over the other sash and prevents its being raised. To open the window the tongue has to be lifted into the position shown in Fig. 2. It will be seen that a knife inserted from the outside between the sashes cannot drive back the tongue, which moves in a direction across the path of the knife.

A Rubber-Lined Thimble.

Thimbles lined with india-rubber are now employed, and are said not to fall off so easily as the ordinary unlined thimble. They are also warmer to the skin, and free from the metallic "rust," which sometimes takes the form of verdigris, a substance of a poisonous nature.

A Pocket Ambulance.

For the use of persons who, through the teaching of the St. John's Ambulance Association and classes, have learned to render early aid to the wounded, a little pocket-book has been prepared by a London firm, which contains a number of serviceable articles for an emergency, with practical instructions for their use.

A Camp Filter.

In the Soudan expedition, a number of Maignen's camp or bucket filters were employed, and favourably spoken of by correspondents. Figs. 1 and 2 represent one of these filters as used and carried. The two buckets, A A (Fig. 2), which form the outer casing of the filter when it is being transported, also serve to supply the foul and retain the filtered water when it has been drawn from the filter, which is one of Maignen's carbo-calcis filters referred to in a former GATHERER. The filter, F (Fig. 1), stands on the bucket, P, and the foul water is poured into it from the bucket, R, in the manner shown. Such a filter clarifies from five to ten gallons of water per hour. The filtering part is easily removed and cleansed for further use. Each of the 800 boats forming the Nile expedition is said to have been provided with one of this kind of filter, which is on view at the Inventions Exhibition.

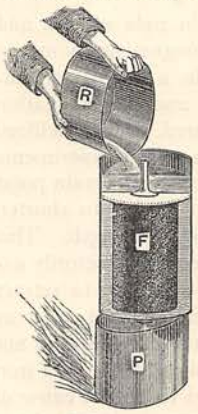


FIG. 1.

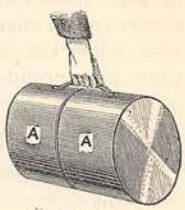
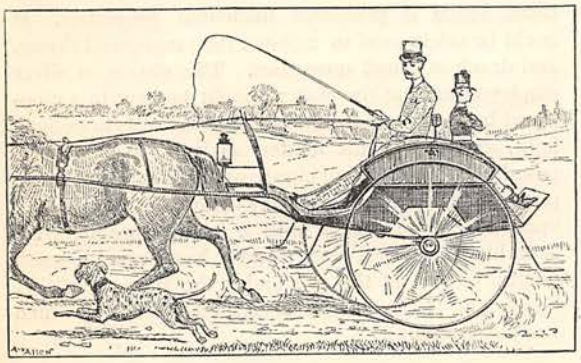


FIG. 2.

A New Gutta-Percha Tree.

Owing to the threatened dearth of the gutta-percha obtained from the *Isonandra gutta* (Hooker), it is satisfactory to learn that M. Heckel has announced a new rubber-bearing tree to the French Academy of Sciences. This is the *Butyrosphermum Parkii*

(Kotschy), which grows in the equatorial zone of Africa, between High Senegal and the Nile. It is called by the natives *karite*, and is regarded by them with superstitious feelings. The milk is contained in vessels under the bark, and on being drawn off and dried, much resembles gutta-percha in its properties.



A COMBINATION CARRIAGE.—FIG. 1.

Iron Flour-Grinders.

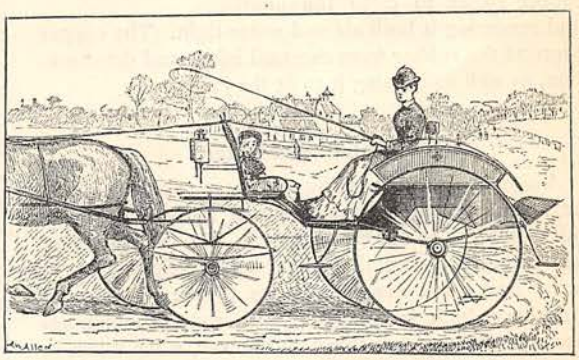
Millstones are being replaced by iron rollers in many flour-mills; the grain passing in succession through several pairs of rollers, each of which grinds it smaller than before. One roller is smooth, while the other is corrugated. They are made of chilled iron, and run at different speeds, to help the crushing effect. The process is stated to separate more of the gluten from the bran than was formerly the case, and to break fewer of the "flour-cells," seen under the microscope in flour. Along with this improvement, which is common in Canada and the United States, we may mention the growing practice of baking bread in ovens heated by gas, as exhibited last year at the Health Exhibition.

A Combination Carriage.

At the International Inventions Exhibition there is an ingenious new double carriage which can be arranged as a two or a four-wheeled carriage at will, and is only liable to a payment of duty for one vehicle, although it can be transformed into two vehicles on occasion. It forms, as will be seen from the accompanying figures, either an Alexandra car, a *vis-à-vis* phaeton, or a dog-cart phaeton; and it has also the advantage of going into a small coach-house, since the two carriages take up little more room than a single four-wheeled vehicle.

The Electric Light at the Inventions Exhibition.

In addition to the illumination of the fountains by the light of electric arc lamps, projected from below through panes of coloured glass upon the waters of the fountains, which was a conspicuous effect at the Health Exhibition last year, Sir Francis Bolton has this year arranged for the illumination of the grounds and surrounding buildings by means of small five and ten candle power incandescent lamps in coloured glass bulbs, red, green, blue, and yellow. These trace out the lines of the buildings, and twinkle among the leaves of the foliage of the shrubs and trees. In fact, they take the place of the usual small oil and tallow lamps employed at fêtes for this species of illumination; but being electric, they can be mounted on the twigs of even high trees, and do not require daily renewal. Some of them are also arranged in the ponds to imitate the flowers of aquatic plants. By means of proper switches, controlled from the switch-room in the clock tower, it is also possible to light, extinguish, or graduate the light of these lamps, according to some pre-arranged system, so as to engage the attention of beholders, and produce a kind of colour play or harmony. There are no less than 9,020 of these incandescent lamps run on insulated wires throughout the grounds, and fed by the current from Siemens' dynamos, of which the armatures are wound with copper bands, instead of the usual round copper wire. These copper bands belong to the class of "ribbon wire" which has come into use of late for winding dynamos and other electric apparatus. Being of a rectangular section it fits closer into the space provided for it than round wire, so that on a bobbin of the same size there is rather more copper than when ordinary round wire is used. In other words, there is less resistance to the passage of the current, and consequently a somewhat greater efficiency of the armature, or bobbin, for the same size of bobbin and electromotive force. While upon this subject, we may mention some silvered lamp-bulbs exhibited at the Inventions Exhibition. These bulbs are silvered on one side so as to act as a reflector for the light of the filament, which is thus directed in any required direction, and moreover shows a bright sheet of light to the eye rather than the intense white line of the glowing filament. There is thus a saving of light by their use, and at the same time the eye is less likely to be injured than by the strong image of the incandescent filament.



A COMBINATION CARRIAGE.—FIG. 2.

A Balance Fire-Alarm.

A simple electric fire-alarm has been devised by Mr. Pritchel. It operates by the expansion of air in

a glass tube, due to the rise of temperature caused by the fire. The tube communicates at one end with another tube containing mercury, and the pressure of the expanding air forces the mercury up one limb of the latter tube, which being pivoted, has its balance thereby upset. The mercury tube is thus canted over, and in turning round its pivot it falls on two metal contacts, and closes an electric circuit. A bell is thereby rung, and the necessary alarm given.

Rubber-Jointed Pipes.

A simple, but useful, method of jointing earthenware pipes has recently been introduced, and is

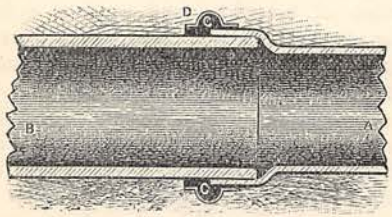


FIG. 1.

illustrated in Figs. 1 and 2, which represent a longitudinal and a cross section through the joint. The plan is especially applicable to the junction of earthenware and lead pipes in house-building. A rebated india-rubber ring, C, is slipped over the junction of the earthenware and the socketed lead pipes, B A; and a light copper band or collar, D, of hollow cross section, is passed over the rubber ring and tightly screwed together at the ends, thus pressing the rubber so as to close the joint, and rendering it both air and water-tight. The copper protects the rubber from external injury and deterioration, as well as causing it to fit the joint.

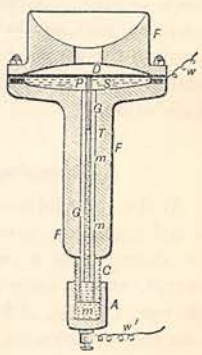
FIG. 2.

Drinkable Sea-Water.

A simple plan of making sea-water palatable would be a great boon to mariners cast away in boats or rafts, and also to our naval forces. Mr. Thomas Kay has recently shown that the baneful effects of sea-water as a drink are chiefly due to the presence of chlorine, which is combined with sodium and magnesium. It produces thirst and scurvy, when taken in excess. In order to remove the chlorine, he mixes sea-water with a certain proportion of citric acid, or silver citrate, and thus produces what may be called a mild mineral water, which is drinkable, and being nearly free of precipitated chlorine, is not injurious to health when taken in moderate quantities. At a recent meeting in Manchester he treated a pint of sea-water brought from beyond the Eddystone with 960 grains of citrate of silver, and four grains of free citric acid. Silver chloride was precipitated and the overlying liquid decanted and filtered. Each fluid ounce of it contained about eighteen grains of citrate of soda, one and a half grains of citrate of magnesia, half a grain of citrate of potash, one grain of sulphate of magnesia, half a grain of sulphate of lime, one-fifth grain of citric acid, and less than half a grain of undecomposed chlorides. The salts of soda in this liquid are diuretic, the salts of magnesia aperient, hence it possesses medicinal properties. It could be safely used to moisten the tongue and throat, and drunk in small quantities. The citrate of silver employed to treat the water should be kept in a stoppered bottle, covered with india-rubber, so as to exclude light, air, and organic matter, as it is easily decomposed. As an ounce of citrate of silver converts half a pint of sea-water, a man may keep alive for a day upon it. Seven ounces will, it is therefore inferred, keep him alive for a week; and it has been proposed to stow bottles of the salt under the thwarts of life-boats, and in the lockers of certain life-buoys, which carry restoratives.

A Mercury Telephone.

The telephone which we illustrate is the invention of Mr. Charles Lever, and is based on the fact that the surface of a mercury globule in dilute sulphuric acid is deformed when a current of electricity is passed through the dilute acid and mercury. It is therefore a variety of the telephone invented by the late M. Breguet, the well-known French mechanician. It consists of a glass capillary tube, G, nearly filled with mercury, M M, which is contained below in a reservoir, A, adjustable by a screw, C, so as to raise or lower the level of mercury in the tube. A light piston of ebonite rests on the mercury at T, as a kind of float. The upper end of the piston is in contact with the centre of a diaphragm, or drum-head, D. A quantity of dilute sulphuric acid, S, fills up the space between the mercury and the diaphragm. The whole is enclosed in an outer case, F, preferably made of glass so as to reveal the interior, and aid in adjusting the level of the mercury in the tube so as to make the piston bear slightly against the centre of the diaphragm. Wires, W W, lead the electric current through the mercury and acid. The passage of the current causes the mercury column to rise and fall slightly at its upper point, T, thereby raising and lowering the piston, and setting the diaphragm into vibration. The ear, placed at the mouth of the case above the diaphragm, interprets these vibrations as sound.



Danger from Oil-Lamps.

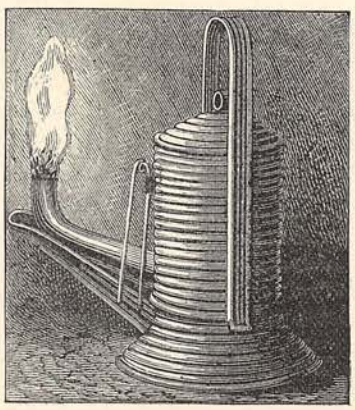
In a recent lecture at the Royal Institution, Sir Frederick Abel, C.B., has shown that accidents are very apt sometimes to occur from mineral oil-lamps exploding while being agitated or removed from one

part of a room to another, or in the act of blowing them out. These explosions are due to the mixture of air and petroleum gas, which collects above the oil in the reservoir, and finding its way round the wick, is set fire to by the flame. Hence it is necessary that care should be used in moving lighted non-explosive oil-lamps, and also in blowing them out. Sir Frederick Abel recommends that the light should first be carefully screwed down low, in blowing it out, and then finally extinguished by a puff of breath blown *across* the mouth of the chimney, not down into it, as is often done. He also points out that it is advantageous to have a fine wire-gauze cover separating the reservoir from the supply pipe of the wick. This pipe should have a very fine bore. In the course of his lecture he referred to the lamps of Mr. Defries as embodying the features which exhaustive scientific inquiry has proved necessary for the safe use of mineral oils. In this lamp neither ignition of the petroleum vapour, nor outflow of the oil in the event of the lamp being overturned, can occur. The light it gives is also stated to be very white, odourless, and steady. While upon this subject, we may mention the recent trials made with Mr. Shallis's new oil-lamps for lighting railway carriages. These lamps are constructed to yield a light by which any passenger in the carriage can see to read small type without over-taxing his eyes. They are already in use on the Great Northern, and one or two other railways.

A Railway Pedometer.

Herr Stork, the Director of Swedish Railway Telegraphs, has invented an electrical apparatus which promises to become valuable for preventing railway collision. The apparatus indicates at stations the place of the train on the line. This is done by a contact device set at intervals along the rails, and the train in passing it closes an electric circuit and works a needle indicator at the station which points out the locality of the train. The details of Herr Stork's invention are not yet made public; but it is being tried on the Liljeholmen Railway, near Stockholm, and is found to work satisfactorily.

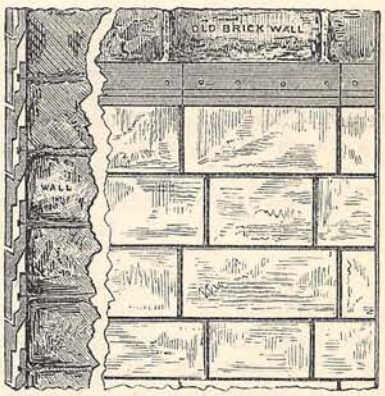
A Corrugated Hand-Lamp.



Lamps, oil-cans, and oil-jars are now made of thin corrugated iron, a form which combines strength with lightness. The figure illustrates a torch lamp of this construction exhibited at the Inventions Exhibition. It has the advantage of allowing no oil to escape when the lamp is tilted; moreover, the top comes off and serves as a cup, with which the oil may be emptied from the waste-oil compartment into the reservoir which feeds the cotton wick.

The Electric Light and Moths.

The introduction of the electric arc light into New Orleans, and some other parts of North America infested with moths and other night insects, has led to their destruction in large numbers, owing to the fact that the brilliant light allures them in the same way as a candle-flame. A New Orleans paper states that the ground below a lamp-post is frequently quite black with the dead bodies of moths killed in this manner, and it is proposed to try the light in the cotton-fields in order to kill the cotton moth.



Hanging Tiles.

An ornamental tile for facing old walls, corridors requiring light, shops, dairies, and so on, has been introduced, and is exhibited at the Inventions Exhibition. The method of fixing the tiles to a wall by nails driven into the layers of mortar will be better understood from Figs. 1 and 2, which represent a section, and the front of a wall protected by them. The tiles are made of various patterns, and can be glazed white or any other colour.

Photographing the Larynx.

Dr. Steine, a French electrician, has devised a very handsome little apparatus for enabling surgeons to photograph the larynx, and thus obtain a record of the progress of certain throat disorders from day to day. The apparatus consists of a very small electric incandescent lamp, which illuminates the throat, and is kept cool by circulating water, and a small camera with gelatine-bromide plates. The combined apparatus is neatly mounted in a portable form, and provided with a battery to supply the necessary current.

A Selenium Actinometer.

M. Morize, of Rio de Janeiro, has devised an apparatus for measuring the relative intensities of the solar rays at different altitudes of the sun above the horizon. It consists of a "selenium cell" of the kind used by Professor Graham Bell in his "photophone,"

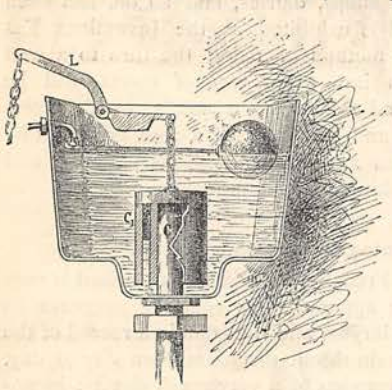
and previously described in the GATHERER. This is made of thirty-eight small discs of copper built up like a pile of coin, with smaller discs of mica plate between each pair, and the edges between each pair filled in with selenium. This cell, when connected in circuit with a battery and galvanometer, indicates the strength of the sun's rays falling on its edges by a fall of electric resistance in the selenium, which causes a stronger current to circulate through the galvanometer and deflect its needle. The cell is exposed to the sunlight in a glass vacuum vessel insulated from the ground on glass supports.

An Electrical Rainbow.

Mr. R. S. Newall, F.R.S., the electrician, has observed the singular phenomenon of a rainbow caused by a powerful electric light in lieu of the sun. While visiting the South Foreland, where the experiments are now being made to determine whether gas, oil, or electricity is best for lighthouse illumination, he was traversing a field towards one of the observing-huts, when, in a shower of rain, he saw a faint lunar-like bow in the rain every time the electric lighting tower revolved. Only the largest electric light in use produced the effect; the carbons being 1½ inch in diameter.

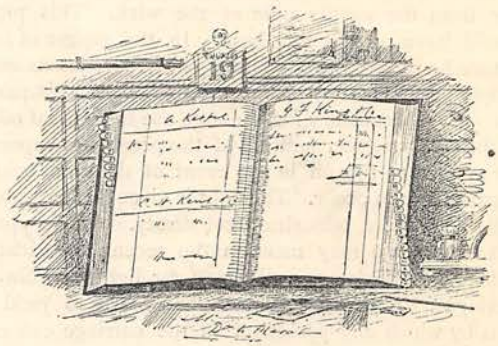
A Siphon Cistern.

In order to prevent waste of water in cisterns, the arrangement shown in the engraving has been introduced, and is exhibited at the International Inventions Exhibition. It consists of a cistern of ordinary construction, with a "well" or outlet pipe at the bottom. A short cylinder, C, with open mouth, projects from the well into the cistern. Over this is placed a double copper cylinder, C_1, which rests on three blocks, to allow the water to pass under it, and is connected by a chain to the lever, L, by which the water is let on. In the action of the apparatus the air between the two cylinders prevents the water flowing out until by the lever the copper cylinder is raised, and a partial vacuum formed. The water then overflows out by a siphon action into the well.



Belt Conductors.

The introduction of electric lighting has led to many devices for running the insulated wires underground. One of these is the belt conductor, which consists of two flat bands of gutta-percha or other insulator capable of being so treated, pressed together into one "belt," and having a number of parallel copper wires between. These wires convey the electric current, and are insulated by the superposed bands. Several of these belt conductors can be over-laid one upon another, and enclosed in an underground trough or conduit. Mr. Sellars, the inventor, has also introduced a porcelain insulator, with eyes in the sides, whereby several bare wires can be held, and at the same time insulated from each other. These porcelain pieces, placed at intervals, support the wires and keep them apart, while the surrounding air may be employed to insulate them between the pieces.



A New Index for Books.

Our illustration shows a new plan for indexing books, the index tags being used to turn over the leaves, which are thus preserved intact. The plan of cutting down the page now in vogue is objectionable, and the new plan renders it unnecessary. It will be seen that each tag represents a letter and projects from the leaf. A brass eyelet enables the fingers to hold the tag, which is of vellum or leather, and connected to the binding of the book by a sheet of calico pasted between two pages. The tags are numbered on both sides.

CASSELL'S MAGAZINE
AMATEUR SHORTHAND CHAMPIONSHIP.

The Editor has pleasure in announcing the result of this Competition, in connection with which an Examination was held simultaneously in all centres on June 1st last. After careful consideration of all the papers submitted by the Candidates, the appointed Judge, Mr. F. Pitman, has declared the best papers to be those of

DANIEL CHARLES DEVINE, Tubbercurry, Co. Sligo, Ireland.

We therefore proclaim him our AMATEUR SHORTHAND CHAMPION, *and award him the Prize of Five Guineas.*

The Judge also HIGHLY COMMENDS *the work of*

EDWARD LATHAM, 16, Mildmay Park, London, N.,

to whom an Extra Prize in Books to the value of Two Guineas has been awarded.