

Nor had the gifted amateurs escaped, for he had taken advantage of their absence from the retiring-room, and while attention was directed to the platform, to abstract from the ladies' reticules, and the pockets of the gentlemen's overcoats, whatever he could lay his hands upon.

He was taken back to M——, and was no sooner confronted with my father than he was recognised as the man who had so long monopolised his dreams.

Eventually he was committed for trial, and his antecedents being arrayed against him, received a sentence that would deprive his adopted country of his presence for a period of ten years.

I have only to say, in conclusion, that if the murderous little German nearly lost me a father, his harmonica was the means of providing me with a wife, for in time I married Miss Emily G——, the youngest daughter of the worthy magistrate.

WHAT SHALL I SAY?

(See Frontispiece.)

WHAT shall I say? How answer this?
 O letter, little thing you seem
 To wake me up from girlhood's dream
 To thoughts of full life's woe and bliss,
 To make the laughing rill a stream!

Shall "No" be answer? Shall I fear
 The love so humbly offered me,
 Looking into the years to see
 A heart grown cold, life sad and drear,
 The glad sun set in misery?

Shall I say "No"? Shall I distrust
 My own heart's whisperings to day,
 And hear the world's hard logic say—
 "Marry for wealth and place you must,
 And surely this is not the way"?

Or shall I answer "Yes"? Put by
 All doubts, all fears of future woe?
 I will, I will, because I know
 My heart speaks best that makes me cry—
 I love him so! I love him so!

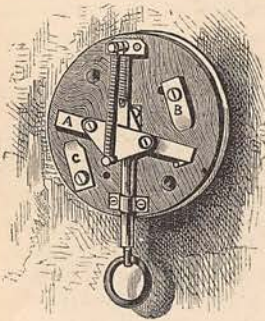
G. WEATHERLY.

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 Bell-pull Switch.

The figure illustrates a new form of switch for domestic electrical appliances, such as the electric light. It is worked like an ordinary bell-pull by means of a cord and tassel, or simply by the ring shown. The figure shows the spring arrangement behind, whereby, on pulling the ring, the electric current is made and broken. The figure shows it broken, the central switch arm, A, being apart from the two contacts, B and C. When the switch arm, A, connects these contacts, B and C, the current flows. The chief advantage claimed for the switch is that it can be fixed near the ceiling of a room, out of sight, while the dependent bell-pull brings its manipulation within reach.



Casting Iron on Brass.

Some novel experiments have recently been made on the casting of iron or steel on brass. The melted iron is prepared with a flux and run over the brass core, the union of the two metals being complete. The compound metal is expected to be useful for car-axles, pumps, and other mechanical parts. Patents have also been taken out in England recently, and put in operation, for a new method of platinising metals by electro-deposition. Platinum is the best metal for resisting corrosion, and as by the new process it can be deposited in thick layers if need be, it is likely to be useful in coating utensils, such as those of chemists, or metal work which is of itself apt to rust on exposure. In connection with this subject we may mention that brass may be tempered by mechanical compression just as a piece of steel may be tempered by heat. A small piece of polished steel placed on the brass object to be tempered will, when both are equally heated, show the temper of the brass; so that the latter can be tempered by hammering, rolling, or wire-drawing to any degree of hardness indicated by the steel.

A Frost Curio.

The engraving illustrates a curious effect of frost, which was produced last February in a New York house. A glass vase containing a carnation flower in



water was left in one of the bedroom windows over-night, and in the morning it was found that the flower had been raised out of the vase upon a pinnacle of ice about two inches high. The whole of the water was frozen clear and solid, with the exception of a pretty crystallisation in the centre.

A Mechanical Knot-tier.

An American has brought out a machine for tying a square knot with sufficient facility to make the apparatus useful in book-binding. His machine not only stitches with thread, but ties the knots and cuts off. It runs at the rate of forty-eight complete stitches per minute. Its operation is somewhat similar to that of a sewing machine, but the needles do not require to be threaded as in the latter.

Wire Fenders for Ships.

A plan for lessening the blow of collisions between ships has been patented recently. It differs both from the ordinary rope-work fender and the wire netting used to catch torpedoes; and consists essentially of steel wire ropes suspended from brackets round the sides of the ship in such a manner that the vessel approaching has to break through these before she reaches the hull. A projecting framework of iron fitted with a powerful spring fender is also part of the plan, and applicable as a protection to the bows of the ships.

A Tricycle Cab.

A three-wheeled cab has been introduced into London. Its chief advantage, combined with the stability of a three or four-wheeled vehicle, is the ease with which it can be entered, especially by ladies, who can keep their dresses clear of the wheels—a feat not always accomplishable with the ordinary “four-wheeler.”

Surveying by Electric Light.

A Professor of Schemnitz, in Hungary, has applied the electric incandescent lamp to surveying by the level and theodolite in mines. Two lamps are employed, each fed by its own portable accumulator. One lamp is larger than the other, and is used for

illuminating the angle of sight; the other, a miniature lamp, is used to light the vernier of the instrument in taking readings. The lamps are connected to the accumulators by flexible conductors, and the whole so designed as to be light and serviceable.

A Novel Lacing Stud.

A new lacing stud for boots and shoes has recently been patented in England by an American firm, and bids fair to supersede entirely the old arrangement which is so liable to break, double up, and wear out the laces. This new stud is made of solid metal, with a shank which, under pressure, forms a rivet on the under side of the leather. The indentation for the laces is perfectly round, so that there are no sharp edges to produce friction. The head of the stud being solid cannot be bent up and down, while it is very neat in appearance, resembling a small button. On the same principle as the lacing stud, some tubular rivets have been patented, which are intended to save all stitching in the manufacture of mill-bands, harness, straps, and leather work generally. By the use of a special machine these rivets punch their own hole in the material, and form their own cinch, and can be set at the rate of one a second.

**An Office Lamp.**

The figure illustrates a combined lamp and inkstand for libraries and offices. A call-bell is also fitted to the base of the lamp along with the ink-bottle and pen-holder. The height of the lamp is 26 inches, and it is fitted up with the “Empire” or “Duplex” burner as desired.

While upon this subject, we may refer to a new automatic extinguishing lamp called the “Shaftesbury Lamp.” The light of the lamp is put out whenever the lamp is tilted or upset. It is, therefore, calculated to do away with some of the dangers of petroleum lamps.

A Steel Steamer.

Three fast new steamers, built of Siemens-Martin mild steel, have been built for the mail service between Dover and Ostend. They are intended to make $17\frac{1}{2}$ to 18 knots an hour, and to enter the Dover and Ostend harbours at all states of the tide. Each of these vessels is 255 feet long, by 29 feet broad; and the draught of water is 8 feet 6 inches. They are paddle steamers, and every accommodation is provided on them for passengers. They will be lighted by electricity, and provided with both steam and hand steering apparatus.

A New Mechanical Device.

A mechanical device has been introduced for the purpose of imparting or recording variable velocities to rotating parts of instruments and machines. It consists essentially of a hollow cone, mounted concentrically but ex-axially on a spindle with which it revolves; the axis of the cone being inclined from that of the spindle, and the direction of the inclination and the plane of the two axes remaining the same while the cone and spindle revolve. It is obvious that this device involves a continuous change between any point in the periphery of the cone and the axis of the spindle. Hence the cone can be used for driving belts from, whose velocity can be readily varied.

A Yucca Arch.

The above illustration is taken from a photograph of a remarkable yucca-tree in the Mojave desert, near southern California. The trunk has bent over and taken root again, thereby forming a complete arch, under which four or five horses could pass abreast; its height being from 12 to 15 feet at its crown. From the top springs a similar limb like a plume. These yucca-trees yield a pulp which is now manufactured into paper.

An Electric-Store Launch.

An electric boat called the *Spark* has been built for use at the Royal Gunpowder Works, Waltham. The object of the vessel is to carry a supply of electric power from powder-house to powder-house, so as to enable these to be lighted by electricity when work of a dangerous character has to be done in them after dark. The vessel is fitted with thirty accumulators, which propel the screw by means of an electric motor, and at the same time carry the store of electricity to light the incandescent lamps in the magazines. We

may add that the Channel from Dover to Calais and back was crossed in September last by another electric launch, the *Volta*.

A Magnetic Probe.

During the British Association meeting at Birmingham, Mr. W. H. Preece, F.R.S., read a note on the use of a magnetic needle in localising a fragment of steel in the hand. One of his daughters had the misfortune to have her hand penetrated by a needle, which broke into three pieces. Two of these were extracted, but the third piece defied localisation even by the induction balance of Professor Hughes. A delicate magnetised needle was then suspended on a light paper stirrup or hook from a single fibre of cocoon silk, and when the injured hand was brought near it, invariably pointed to one spot. An incision was made here by a surgeon, and the missing fragment found.

Lightning Holes in the Alps.

Professor Brun has been investigating the "lightning holes" found on the high Alps at heights from 11,000 to 13,000 feet above the sea. The holes are hollow passages in the rock, sometimes only a few millimetres in diameter, sometimes larger, quite vitrified by the heat, and of colours—black or brown—depending on the nature of the rocks. Sometimes the passage branches out, and in other instances it is as if a

cannon-ball had bored right through the stone. When examined under the microscope the holes or passages show many internal cavities.

A Tell-tale Paint.

A red paint, which grows darker in tint as its temperature rises, until at 180° Fahr. it is quite brown, has been brought out recently, and is proposed for use as a heat tell-tale. For example, if the bearings of an engine are painted with it, the man in charge can tell if they are running cool or hot. The heating of electric wires could also be told. It seems as if a scale of tints for comparison, with the corresponding temperatures marked upon it, would be useful with the paint, which, it is said, regains its original colour on cooling.

A Cab Communicator.

An electrical device for enabling a fare to communicate with the driver of his cab has been brought out. On an indicator are the words "Stop," "Right,"



A YUCCA ARCH.

"Left," "Turn Round," and on pressing the corresponding button an index flies round to the word in question, thereby signalling the driver. A small bell rings to call the attention of the latter, and it only rings when the index points to the proper word.

A New Food for Invalids.

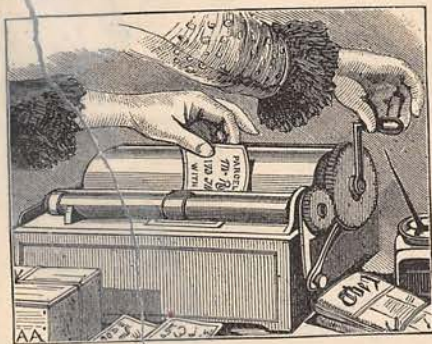
Essences of meat for the use of invalids are now being made up in glass jars. The essence is forced under great pressure into the jars, and these are then hermetically sealed. The advantage of this process is that all danger of contamination from contact with metallic surfaces is done away with.

A Mercury Train Signaller.

A well-known firm of Berlin engineers is now making a device for signalling the passage of a train by means of mercury. The deflection of one rail of the line caused by the passing of a train is caused to press upon the elastic diaphragm of a vessel fixed under the rail, and containing mercury. The mercury is forced up a side tube so as to complete an electrical circuit and ring a bell, or work some other indicator.

Steel Wire Matting.

Matting of steel wire is now used in the United States for railway carriages and street car floors, as well as for door-mats. The steel wire is woven in a series of spirals, strengthened by a rectangular system of steel bars, and bound at the edges by a steel band. The wires, being open, allow the mat to be cleaned by shaking.



A Gumming Mill.

The gumming machine which is shown in our engraving is worked by the handle at the side, the label being put on as shown and passed through the mill. It can gum either the edges or the back of a label, and is likely to be useful in large establishments, railway stations, and so forth.

A Knot-stitch Sewing Machine.

A new lock-stitch sewing machine has been brought out recently in which the two threads make a *knot* after every stitch, instead of the usual twist of ordinary lock-stitch machines. It follows that the seam of the new machine will be stronger against wear and tear than mere twisted sewing.

A Self-Acting Music-Holder.

The accompanying figure shows a music-holder which replaces the old-fashioned desk hooks. It consists, as shown, of a rod, on which two upright arms slide. These arms hold the music leaves down,



and, being movable, can be shifted to suit music of any size. The arms are self-righting, and on being subjected to the slightest touch give way, so as to allow the leaf to turn over, but immediately after resume their position as shown. The new holder can be fitted to any piano, organ, and so on, in a few minutes. It is usually made of polished brass, but other metals can be had according to taste.

Marine Wool.

A raw material called *bisso*, or golden wool, obtained from the *Pinna nobilis*, a mollusca or shell-fish which attaches itself to the sea-bottom by a tuft of fibrous hair, is utilised on the coast of Sardinia and especially the island of Madalena for making cravats, shawls, and so on. The fibre is of a yellow-brown colour and is collected by a kind of iron rake. The tuft is washed, dried, combed, and spun, then woven into cloth. The dark rich "old gold" variety is most prized and, besides being pretty, is said to be durable.

A Sheep-Shearing Machine.

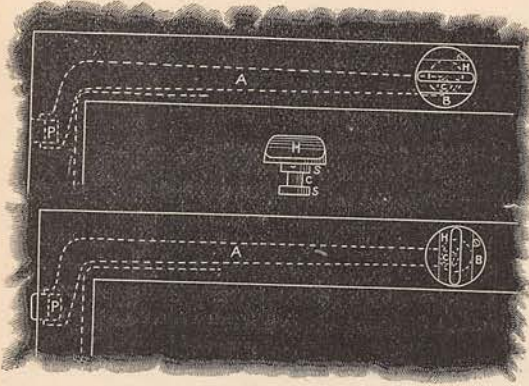
In Victoria, Australia, there is a machine for sheep-shearing in use, which is said to be successful. It is of brass and shaped somewhat like a small trowel. In front is a comb which serves to guard against cutting the skin. The machine is used like shears, but is said to cut both cleaner and quicker. It is actuated by a small turbine wheel geared into another wheel fixed on the cutter. The steam to work it is conveyed from the boiler in a double pipe of india-rubber.

Vibration and Taste.

In a recent paper to the Royal Society of Edinburgh, Mr. J. B. Haycraft shows that just as certain compounds containing elements of the same chemical groups have similar colours, so they have similar tastes. This phenomenon he considers to be due to the vibration of the "radical" common to the group. For example, the carbon compounds mannite, grape-sugar, glycerine, and glycol are all sweet, and they

possess a common radical (CH_2OH) with which the taste called "sweet" is associated. In connection with this fact is the current hypothesis that the sensation of taste is caused by vibrations transmitted to the brain by the nerves.

A Carriage Sash Fixer.



A fastener for the window-sashes of carriages is shown in our engraving. It is intended to prevent the rattling of the sash and hold it in position. It consists, as shown, of two pieces of metal, one of which, H S C, forms the handle, spindle, and crank-pin. The other, A, forms the arm. The piece H S C is fixed through the top bar of the sash, and forms an eccentric, which, when the handle is turned a quarter round, throws out the arm A, which lurks in a recess of the bar. The arm A has at its end a pad P, of india-rubber, which forces the sash against the opposite groove, and holds it tight. The handle is similar in shape to those of the windows of the Metropolitan District Railway carriages, and turns upon a small metal bearing-plate B.

Preventing Panics in Halls.

M. Leon Lenaerts, of Brussels, has devised a system of electrical appliances, whereby on the outbreak of fire in a hall or theatre any of the audience can turn the gas off at the meter, at the same time lighting up electric lamps, which show the exits. It is expected that the assurance of this arrangement will give confidence to an audience, and prevent panics.

Pine Tannin.

Dr. Laudin, a chemist who has studied the tanning matter of the American hemlock fir, has at length succeeded in producing tannic matter from the Swedish pine, by a chemical process. Leather tanned by it is said to be equal to the American, though more yellow in colour. It is hoped that a new tanning industry will be developed in Sweden from this discovery.

A Giant Wire Rope.

A wire rope for hauling purposes, no less than 5,490 yards long, and weighing 16 tons, is being made at the North-Eastern Wire Rope Works, Tyne Dock. The

rope is made of wires so shaped as to build up in geometrical sections, which lock into each other, so that if a wire breaks, it remains in place and cannot spring out. There is also a smooth wearing surface for friction.

Treacle in Fuel.

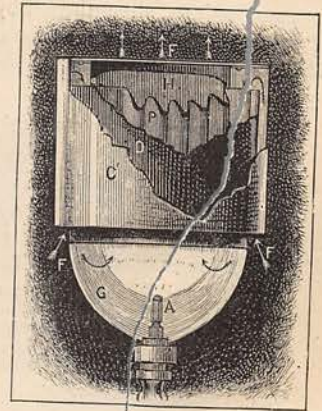
A German chemist, Dr. Kosmann, recommends the use of treacle for forming small coal and fine ore into solid briquettes of fuel. A mixture of 1 to $1\frac{1}{2}$ per cent. of treacle is sufficient to make coal-dust of lean Silesian coal into good solid blocks, giving a strong coke. Such blocks are good for gas-making. In the same way such blocks can be made of some powdery iron ores, for example the magnetic ores, and pyrite residues, before being reduced.

A Hot-Air Gas-Burner.

The figure illustrates a French gas-burner, devised by M. Delmas, and manufactured in Paris. It consists of a cleft steatite jet, enclosed in an oval globe G, so that the air cannot enter beneath. The globe is the height of the flame, and supports the heating apparatus, which is a flat chimney H, surrounded by a corrugated tube P, designed to multiply the heating surface, and ending at half an inch from the top of the chimney. The tube itself is enclosed in a jacket D, into the lower part of which the globe is so fitted as to prevent the air entering.

Loss of heat by radiation is prevented by enclosing the apparatus in a third flat tube C, which projects one-third of an inch beyond the globe. This supports a reflector. The air indicated by the arrow, F, rises through the annular space between the tubes C and D to the top of the apparatus, then descends through the corrugated tube P, where it is heated by the waste products F, escaping through the chimney H. The result is a flame of steadiness and brilliancy.

While upon this subject, we may again mention the Welsbach system of incandescent gas-lighting, which was recently brought before the British Association. It is produced by a thin network cap of fibre, impregnated with an incombustible substance, and placed over the top of a Bunsen burner. The heat of the burner destroys the fibre, but leaves a mineral shape or cage which glows with light. The solution in which the fibre is steeped is a mixed solution of zirconium and oxide of lanthanum. The light is similar to that of a twenty-candle electric incandescent lamp. A yellowish light can also be obtained by tincturing the solution used. The illuminating power is ten candles per cubic foot of gas burned.



Stopping Chanticleer.

A writer in a magazine gives the following simple device for silencing the crowing of cocks in the early morning. A small lath is loosely suspended about eighteen inches above the bird's perch, so that when he stretches his neck up to crow, the swinging lath comes gently into contact with his comb. This effectually stops him, according to the writer, who states that he owns a dozen birds which never presume to crow until he lets them out.

A Steam Balloon.

A colossal balloon is now being constructed in Berlin. It will be propelled and directed by two steam-engines of 50 horse-power each. The balloon itself is of a cigar shape, and 500 feet in length by 50 feet in diameter. The total weight is estimated at 43,000 lbs. the envelope and netting alone representing 10,000 lbs. of this. It is expected that a speed of 46 to 48 feet per second will be obtained, which it is stated exceeds the ordinary velocity of the wind near the earth's surface.

Swan's Electric Safety Lamp.

At the British Association meeting at Birmingham, Mr. J. W. Swan stated that he had improved his safety lamp, an account of which appeared in a recent



GATHERER. The battery now consists of four cells instead of seven, and the weight 6 lbs., for a lamp giving a light of from 1 to 1½ candles for ten hours. The box is of teak and liquid-tight, so that the lamp can be placed in any position. The lamp also serves to indicate the presence of fire-damp. By turning a switch the current from the battery is sent through a fine platinum wire in a glass tube. When fire-damp is present, the wire becomes abnormally bright (as in Living's indicator); and also in another form the rise of a liquid in a gauge tube, produced by combustion of the gas, making a partial vacuum, indicates the presence of the gas. The figure illustrates the lamp as now made, the "bull's-eye" being the light, and the tube below the fire-damp indicator. We may add that Mr. Pitkin's hand-lamp, which is also used as a miner's lamp, was introduced to the British Association by Mr. Preece, who stated that it is now fitted with a white opaque reflector, which appears to soften the light better than a silvered reflector. Mr. Preece uses the lamp for reading in railway carriages. The battery can be placed in the travelling-bag, and the light can be hung to the coat; flexible conductors being used to connect them.

A Boiler Dredge.

The figure illustrates a little device which, when dropped into a "rusty" domestic boiler or kettle, will clean it. If, after some use, the water grows red again, the dredge is to be removed, and scrubbed clean with sand and a brush, then put back into the boiler. The device is a metal disc cut into three sectors or vanes, which allow of a circulation of the water between them. The cleaner is stated to be quite innocuous.

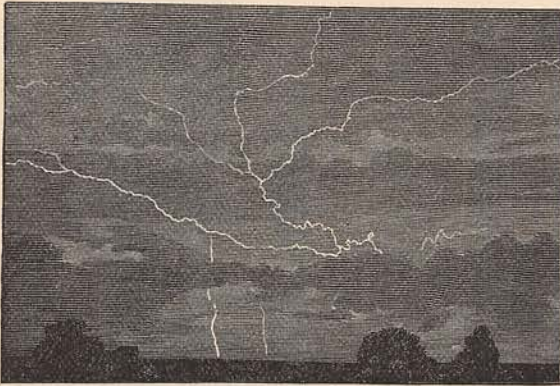


Some Seasonable Novelties.

Christmas and New Year's cards have now become established features in our English life, and each season sees them apparently more popular and in greater variety than before. Messrs. Marcus Ward and Co. have won a name in past years for the careful printing of their cards; and this year's novelties are in no way behind their predecessors in colouring or execution. Sprays of leaves, rich in autumn tints, on grounds of gold crossed by a tiny view in colours, or crossing a band of gold on a plain ground, form a pretty and striking novelty. Some folding cards represent hampers, that on being opened disclose kittens and other pets, or flowers. Another novelty is a circular card, in the margin of which are cut two tiny apertures, so placed that on the corners of a visiting card being inserted in them the card is held securely in its place, and thus identifies the sender. With their cards Messrs. Marcus Ward and Co. have issued three Christmas books very suitable for presents at this time of year. "At Home Again" is the title of the first of these, which is charmingly illustrated in colours by Messrs. J. G. Sowerby and Thomas Crane. "Pets and Playmates" is a book suitable for young children, and consists of verses by Eliza Keary, prettily illustrated by Edith Scannell. The third, and last, of these little books illustrates that favourite old nursery story, "Three Blind Mice," and the pictures in this case are by Mr. E. Caldwell. From Messrs. T. Nelson and Sons we have received a set of views of the English lakes, tastefully mounted in floral borders, which should serve to remind many readers of pleasant summer holidays. Messrs. Hildesheimer and Faulkner's parcel of cards is quite up to the high average of their work in former years. In delicate flower painting and in pictures of children they especially excel. Miss Havers, whom our readers will remember as illustrating "A Wilful Young Woman," contributes a series of charming little sketches of children. Some mechanical cards are provided with a clever attachment which, on being pulled, turns over the pages of a little book of views affixed to the card. The shapes of the cards are, as a rule, not unlike last year's, except for autograph cards, and in this class fans have been introduced.

A Photograph of Lightning.

The figure is a reproduction of a very fine photograph taken at the Château Rougemont, at Tours, in France, by M. Schleusner, at 10.30 p.m., May 26th last. The streaks at the bottom of the picture belong to a flash which preceded the principal one by a frac-



tion of a second. The divergence from the conventional representation of lightning, namely, a zig-zag line, is worthy of notice, so is the point near the root of the flash where the line of light appears to turn on itself.

Driving Piles by Dynamite.

An engineer of Pesth has recently employed dynamite for driving piles. A circular plate of cast iron, 15 inches in diameter and $3\frac{3}{4}$ inches thick, is fixed on the head of the pile in a horizontal position, and a dynamite cartridge the shape of a disc, 6 inches in diameter and three-quarters of an inch thick, containing $17\frac{1}{2}$ ounces of dynamite, is placed upon it and exploded by electricity. The depth the pile is driven is stated to be equal to that from five blows of an ordi-

nary pile engine weighing $14\frac{1}{2}$ Vienna cwt. falling 9 feet 10 inches. A plate resists some twenty-five explosions.

An Electrical Foot-Warmer.

In a former GATHERER we have given an account of a foot-warmer for railway carriages entirely heated by electricity, and also of the foot-warmer heated by acetate of soda, which was introduced upon some Scandinavian railways. M. Tommasi, a French electrician, has combined these methods in employing the electrical current to make up for the heat lost by radiation from the acetate, or, it may be, from hot water. The current develops heat in passing through coils of wire of high resistance, and this heat supplies the place of that given out by the heated material in the warmer, thus keeping the latter warm for a long time, and preventing the necessity of changing the warmers.

A Needle File.

An ingenious little arrangement has lately been devised which should prove very useful to business men. It consists of a needle of peculiar construction, which, together with a ring and a piece of cord, serves as a letter-file. The eye of the needle is a little more than half an inch from the top, and is merely a fine hole, through which the doubled cord may pass, and which is so shaped as to retain the knob at the end of the cord and prevent its slipping through. From the eye to the top of the needle is a groove in which the cord lies when the needle is threaded, so that the bend of the cord offers no resistance to the passage of the needle through a pile of papers. A ring at the other end of the cord completes the apparatus, which is very simple and efficient.

PRIZE COMPETITIONS.

DRESS ALLOWANCE COMPETITION.

The Editor is at length able to make public the Award of the Prize in this Competition. Ninety-five papers were received in response to the offer made in our June (1886) Number, and after careful consideration of all these, the Judges have advised the Editor to divide the Prize of Three Guineas between

(MRS.) THOMASINE HOPE-JOHNSTONE,
20, Great Smith Street, Westminster, S.W.,

and

(MISS) EMILY DIBDIN,
62, Torrington Square, W.C.,

whose papers are of equal merit.

Honourable Mention is awarded to the work of the following competitors:—

E. Braine, Oxford.

Blanche McCroben, Bradford, Yorks.
Annie Georgina Banks, Tettenhall, near Wolverhampton.
Maude Jones, Wrexham.
Beatrice E. Barker, Bromley, Kent.
Florence Cuthbertson, Birmingham.

The Editor hopes to be able to publish the Prize Papers in a future Number of the Magazine.

PRIZE STORY COMPETITIONS.

The MSS. in the Thirty-five Pound Prize Story Competition are now in the Judges' hands, and the Award will be published as soon as possible.—The Seventy-five Pound Prize Story Competition closes, in accordance with the Regulations published in our June (1886) Number, on February 1st, 1887.