SPECIAL AMERICAN COMPETITION.

The Award in the American Domestic Service Competition will be published in our next number.

EIGHT-PART STORY COMPETITION AND LETTER COMPETITION.

The MSS. in these Competitions are still under consideration, but the Editor hopes to be able to publish the Awards in an early number of the Magazine.

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 Candle-Guard.

The woodcut illustrates a little device for shielding the flame of a candle against draughts, and for preventing the guttering of the flame and the dropping of grease. Moreover, it serves to extinguish the light when the candle has burnt low. The device consists of a double cylinder of metal or glass, which is fitted on the top of the candle as shown in the figure. The inner cone or cylinder acts as a wall or guard to the flame, and prevents the candle from wasting. For the flow of grease a receptacle is provided which prevents it from dropping on the furniture of a room, or the clothing of the person carrying the light.

Fluted Handles for Saucepans.

Who has not heard of accidents in the kitchen due to the slipping of a pan, because the handle was greasy and its unbroken round surface gave the cook no grip? Saucepans are now being made with fluted handles that will prevent such mishaps in future. The new handles enable the cook to take firm hold of the pan, and even to pour out its contents, without the slightest danger of slipping or of overturning. These new saucepans are also provided with improved lids, in which a simple little arrangement is fitted that allows the escape of steam, and so guards against boiling over.

Heating Cars by Gas.

Mr. W. Foulis, of Glasgow, has devised a system for heating railway carriages by the waste heat from the gas-lamps used to light the roofs of the carriages. This is done by means of water; a boiler being placed over the gas-flame, having two pipes descending from it, and connecting with two annular tubes under the carriage seats. The hot water circulates through these pipes and returns again to the boiler, after having heated the carriage. It is found that the ordinary size of gas-flame is quite sufficient to heat a compartment, though the consumption of gas is less than one cubic foot per hour. Congelation of the water when the carriage is not in use is prevented by mixing a little glycerine with it. The system has been tried successfully during the past winter on the trains of the Glasgow and South-Western Railway in Scotland, and the temperature of the carriage kept at from 52° to 60° Fahrenheit, even in the very cold weather.

A Screw-Lift.

The great height of the Eiffel tower proposed for the Paris Exhibition of 1889, has necessitated the invention of a new lift, by which the whole ascent can be safely made in one journey. This is a kind of spiral railway, the main idea of which is derived from the screw and nut. Below the cage of the lift is placed a truck, or trolley, with three or more wheels running on as many rails which ascend spirally like the threads of a screw. The trolley is to be revolved by an electric motor, or a water-engine, and will thus raise the cage above it. The cage, however, is kept from revolving by fixed guides. Passengers will not feel the spiral motion of the trolley beneath it, and precautions will be taken to guard against accidents or a too rapid descent.

Artificial Rubies.

MM. Fremy and Verneuil have made a most interesting discovery from a geological point of view. They have found that fluoride of calcium, when heated to a red heat in contact with moist air, gives off emanations which have the power of changing amorphous alumina into crystals; when a little colouring matter, such as chromic acid, is added these crystals become rubies of accurate form and rose-colour. Some years ago MM. Fremy and Feil made small rubies by a different process, but the new rubies are said to be of a good size.

A Use for the Radiometer.

The radiometer of Mr. Crookes has been applied by M. Frère, manager of the St. Quentin gas-works,

in France, to tell the proper time for putting "night pressure" on the gas. The vanes of the radiometer will keep turning so long as there is a sufficiently intense light falling on them, and by taking note each day of the time at which the radiometer exposed to daylight ceases to turn, the average time of lighting up, or putting on night pressure, can approximately be ascertained for each month of the year. M. Frère is of opinion that the averages obtained in this manner may be found useful to gas managers.

STONE BOWL FOUND AT BABYLON.

INSCRIPTION ON A STONE BOWL.

The Hittite Inscriptions.

The key to the mysterious "Hittite" inscriptions has at last been found by Captain Conder, who will shortly publish translations of them. The inscriptions were found in various parts of Asia Minor; for instance, at Hamath on the Orontes in Syria, and at Jerabis on the Euphrates. They have hitherto been an interesting puzzle to scholars. They are in relief, and may be seen in the accompanying illustrations of specimens found; but Captain Conder some time ago pointed out that they bear some resemblance to the well-known Egyptian hieroglyphics, although the latter are in intaglio, or cut below the surface. The full value of his discovery will not be known until his book is published; but it is supposed that the so-called "Hittite" inscriptions prove to belong to a pre-historic race, evidently of Turanian origin, who occupied Palestine before the Jews, and had affinities with the ancient Assyrians and Babylonians. The discovery, according to Captain Conder, throws an "astonishing" light on the ancient history of that portion of the East.

SILVER BOSS.

A Hand Fire-Extinctor.

The Lewis fire-extinctor which has been adopted by the Marquis of Salisbury at Hatfield, and is also to be used by the Birmingham Fire Brigade, is about the size of a policeman's truncheon. At the upper end is a wire loop by which it is hung from a nail or staple. A sudden pull (of about 10 lbs.) detaches the extinctor from the cap, opens the tube, and scatters the contents on the blazing fire. It contains a liquid which has the property of stifling a fire. Recent experiments with the device at the Crystal Palace on burning timbers soaked with petroleum were entirely successful. While upon this subject we may remind our readers that in a recent GATHERER we referred to the "automatic sprinklers," now in use for extinguishing fires in buildings. We have since been informed that a considerable reduction in the rate of insurance can be obtained where they are in use. We may also state that the temperatures given in our notice are not necessarily the lowest at which the sprinklers will operate, since this can be regulated by the fusible solder employed. The sprinklers can be made to act at lower temperatures than those given. For some works a temperature of 120° or 150° Fahr. will be sufficiently high.

A Steel Cab.

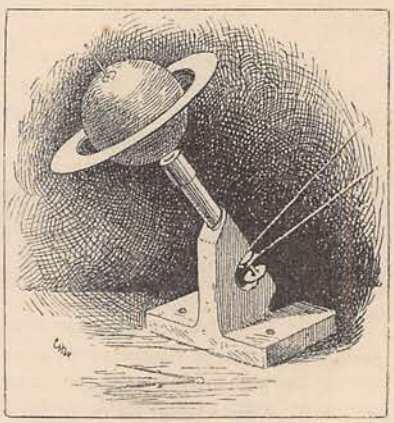
A gain in lightness is obtained by the use of steel for the frames of carriages. This material has recently been introduced for that purpose, and a steel-framed cab is now being constructed. The form is elegant, and the increased lightness of build is said to be accompanied by greater durability than if wood were used. The frame is covered where required with other materials.

Transparent Molten Iron.

Mr. W. Ramsay, a well-known chemist, has observed that molten iron, seen during a casting of several tons, is transparent. He could see bodies through the stream of molten metal, but they appeared to be of a yellowish colour.

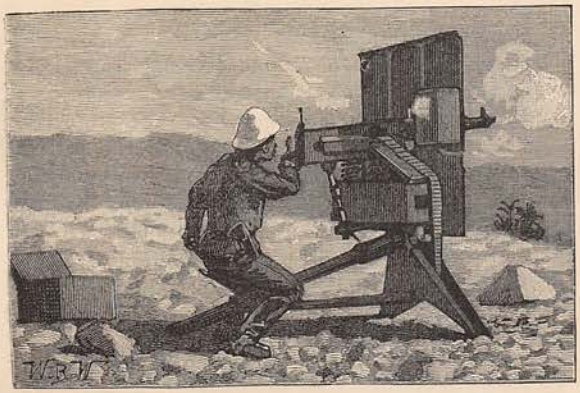
Imitating Saturn.

The figure illustrates a curious experiment recently made by M. Ch. Weyher in imitation of Saturn and his rings. The apparatus consists of a sphere on an inclined axle rapidly rotated by a driving belt. Round the equator of the sphere is placed a flat ring of paper as shown, and this ring, when the sphere is rapidly revolved, is caught in the whirl and forcibly keeps itself in the plane of the equator. Another experiment by the same gentleman is to attract a balloon by a similar arrangement, the rotating sphere having a wire guard round it to keep the balloon from striking it and bounding off.



The Maxim Gun.

Mr. Hiram Maxim, the well-known inventor, has designed a very ingenious gun of the mitrailleuse order, which has the property of loading and firing itself by means of the force derived from the recoil of the gun itself. The cartridges are put side by side in a belt which is fed into the gun by the recoil of the



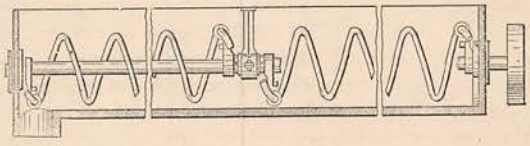
barrel. The barrel is also cooled automatically by means of cold water. We need not go into all the many mechanical details of the invention, but we may mention that it is also provided with a metal shield for the protection of the one operator who is necessary. The British Government ordered one of these guns capable of firing 400 rounds a minute, and 1,000 rounds in four minutes ; but the inventor submitted to them a gun which fired 1,000 rounds in one minute and a half, and no less than 2,115 rounds in three minutes forty-five seconds. This gun only weighed 42 lbs. Our illustration represents one of these guns planted in position. Its mounting was designed for Mr. Stanley, the African traveller, and its rate of firing is from 660 to 670 shots a minute. It weighs 42 lbs., and the tripod without the shield 50 lbs. The swivel connecting the gun and tripod weighs 16 lbs. This gun is of rifle calibre. The belt with its cartridges is shown in the figure.

A Fireproof Ship.

A splendid steamer is now being built at the Arrow Steamship Company's yard, at Alexandria, in Virginia, United States. She is designed to cross the Atlantic within six days. In addition to this high speed, she is intended to be unsinkable and fireproof. If the s.s. *Pocahontas* is as successful as her architect, Mr. Robert M. Fryer, holds out, twelve more vessels of the same type will be built, all carrying the American flag. It is expected that she will be launched next November. The length of her keel, which is practically a solid mass of iron, is 510 feet, and its weight is 710 tons. The walls and decks will be of steel, and she will be built in 1,060 air-tight compartments, of which 500 are below the water-line. These air-tight compartments are to be connected with an air-forcing apparatus, and filled with compressed air under a pressure greater than that of the water outside the vessel, so that if a hole is made the water may be kept out. The engines are expected to develop 28,000 indicated horse-power, and they are to be situated in the bottom of the vessel. The shaft will be 220 feet long, 24 inches in diameter, and weigh over 165 tons, its bearings resting directly on the keel. The diameter of the screw-propeller is to be 24 feet 2 inches. The total length of the ship is 540 feet, her breadth 40 feet, and her depth 46 feet, whilst her draught will be 25 feet 3 inches. With regard to the fireproof arrangements, carbon dioxide gas will be kept in tanks under pressure, and distributed in pipes throughout the ship, so that if a fire should break out, it can be stifled by the gas. Very little wood, however, will be used in her construction, and air-tight sliding doors and shutters of steel will be employed to isolate fires. The floors, of Georgia marble, will be covered with rugs, the steel walls with draperies, and the electric light will be employed. The beds of the state-rooms, of which there are to be 84 on the main deck, will be concealed by day like those of an American sleeping-car. A supply of pure air and water will be provided, and every care seems to have been manifested in the sanitary arrangements of the ship. There will be hot and cold baths in every room, and a buffet at which travellers can have food at any hour of the day. The grand saloon will be 400 feet long, and decorated with ornamental iron-work and mirrors. As the vessel will carry no freight, the return voyage can be made in a very short time. She will be manned by 128 officers and men, and is so built that she can be readily fitted with armour in case of war.

An Anti-Friction Conveyer.

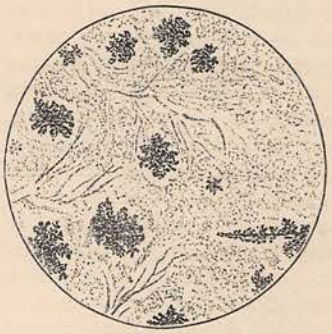
The figure shows a side view of a new "conveyer" for transporting flour and such-like materials on the old principle of the helix or worm. It consists of a tube containing a revolving shaft, which is encircled by a helical or screw rod connected at two or three points to the shaft. The material to be moved forward in the tube is urged onwards by the rotation of the helix, which is made slightly flexible.



There is exceedingly little power lost by friction of the helix as in the older "conveyers," in which the helical rod is replaced by a helical blade. This conveyer has, it is stated, been run at the high speed of 1,500 revolutions a minute.

Tabasheer.

"Tabasheer" is a peculiar stone or mineral found in the stems of certain bamboos. It is, according to Mr. Thistleton Dyer, an "opal," and seems to stand in



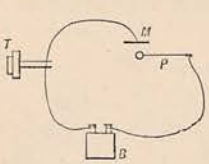
the same relation to the mineral kingdom as amber and pearls. From time immemorial it has enjoyed a high reputation in Eastern countries for medicinal virtues, like those of the fossil teeth of China and the belemnites ("thunderbolts") of this country. The bamboos which produce it contain a clear greenish liquid which, on standing, yields a whitish sediment. The stone is believed to be produced from this liquid, and is commonly found in bamboos which rattle on being shaken. When tabasheer is simply wetted it becomes opaque, but clear and transparent when soaked in water. It consists chiefly of silica, potash, and water, and thus resembles the opal in composition as well as in appearance. Mr. Dyer has recently examined specimens under the microscope, and the accompanying figure shows their peculiar structure. It represents a thin opalescent section of Indian tabasheer seen with a magnifying power of 250 diameters.

Iron Houses.

At the recent Liverpool Exhibition some pretty examples of iron houses, choicely furnished, were exhibited by an English firm of iron-workers, one being a tropical villa. The building itself was of wrought iron, and no masonry foundation was required for the column and main supports, which had self-fixing bases. The interior was of pine and red-wood. The house was so devised that it could be readily bolted together by unskilled natives or workmen.

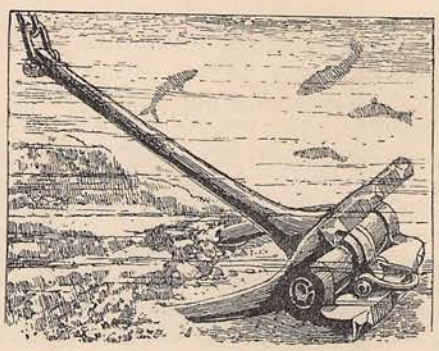
An Electrical Probe.

It will be remembered that Professor Graham Bell, the well-known inventor of the telephone, adapted the induction balance of Professor Hughes to localise the bullet which had lodged in the body of the late President Garfield. The induction balance so modified serves to determine the locality of the bullet to a certain degree of closeness, and it has now been supplemented by another electrical probe, which tells the exact place. This consists of a very fine steel probe, which is inserted into the body within the area indicated by the induction balance as containing the bullet. The probe is in circuit with a battery, a telephone, and a plate of metal, as shown in the figure, where P is the probe, B the battery, T the telephone, and M the metal plate, connected together by wire. With this arrangement, when the metal plate is laid over the surface of the body near which the bullet is hidden, and the probe thrust into the body, a sound is heard in the telephone when the probe touches the bullet. Such is the account furnished us from America of the device, and given by a doctor of that country. Its action is evidently due to the current between the surface of the bullet and the metal plate through the intervening flesh causing the telephone to respond.



Shale Illuminating Gas.

Shale is now being used to a considerable extent in the manufacture of illuminating gas in Scotland. The rich cannel coals of that country keep rising in price, owing to foreign export, and the gas-makers are taking to supplying oil-shales to the retorts. The Dundee Gas Works buy from 12,000 to 15,000 tons of shale yearly, a proportion equal to about one-fourth of the gas-coal consumed. There are large areas of shale and what is called "bastard" cannel in Scotland, and these are expected to supply the place of the richer cannels becoming used up. At Coatbridge nearly as much shale as coal is now used in the gas manufactory.



A New Anchor.

The accompanying illustration shows a new anchor made of cast steel, and so designed that the head compels the flukes to catch the ground when the cable is pulled upon. The flukes are fixed at an angle of 54° to the shank, and being part of the head, they are free to move on the trunnion of the shank. The trunnion and shank are made in one piece. The anchor is "stockless" as will be seen, and can readily be drawn in close to the ship, through the hawse-hole, without lifting it on deck.

Glue for Belts.

A new kind of glue for jointing leather belts has recently been introduced. Its tenacity may be gathered from the statement that a joint in a 4-inch single belt, recently tested, broke in the leather clear of the joint with a stress of 2,174 lbs., which is at the rate of 2,860 lbs. on the square inch of section of the belt.

A Letter-Box Annunciator.

Mr. Arthur Nahood has devised a simple and ingenious plan for substituting the ring of an electric bell for the well-known but sometimes startling

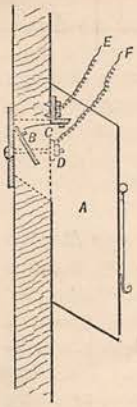


FIG. 1.

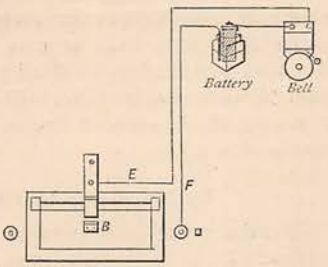


FIG. 2.

postman's knock. Its operation will be understood by a reference to Figs. 1 and 2, which represent a section through the letter-box and door, and a back view of the letter-box with the electric circuit shown. In Fig. 1, A is the letter-box with its metal flap, B, which is pressed open by the postman in dropping a letter into the box. In doing so a metal contact on the back of B touches a steel spring, C, in connection with a wire, E, leading to one pole of the battery through the electric bell. The flap, B, is permanently connected to the other pole of the battery by the wire F, through the bolt D, which fastens the letter-box plate to the door. When the flap, B, touches the spring C, the electric circuit is completed, and the bell rings announcing "letters." When the flap falls back the circuit is broken, and the bell stops. The bell may be at any distance from the letter-box, which can be on the garden-gate.

A Red-Hot Telephone.

Experiments were recently made by Professor George Forbes and Mr. J. Munro, in which a red-hot wire was used as a transmitter of speech by telephone. The wire employed was platinum of very small diameter—namely, from $\frac{1}{1000}$ to $\frac{5}{1000}$ of an inch. The finer of these wires was that known as Wollaston wire, after the maker, who succeeded in drawing platinum wire of great fineness, by enclosing it in a silver tube and drawing out both metals. The silver coating, being dissolved away by acid, leaves the central filament of platinum. A short length of such wire, W (Fig. 1), was joined up in circuit with a charged accumulator or battery, A, and the primary wire, P, of an induction coil, IC; the current being sufficient to heat the wire red-hot. The secondary wire, S, of the induction coil was connected in circuit with an ordinary receiving telephone, T, at a convenient distance. On speaking to the glowing wire through a suitable mouthpiece, M, the words were audible in the telephone. The explanation given of the result is that the sound-waves in the air, passing in quick succession by the heated wire, cooled it in a sympathetic manner, and altered its resistance to the current according to the known change of resistance with temperature. The varying resistance caused variations in the current of the primary circuit, which in turn produced variations of the induced current in the secondary circuit of the induction coil and receiving telephone. These latter variations caused the telephone to respond to the voice. Watch-springs of steel and platinum-iridium were also tried in place of the wire, and a diaphragm was interposed between the voice and the heated filament. While upon this subject, we may mention that a new domestic telephone has been brought out in France by Dr. C. Herz. It is intended, primarily, to take the place of electric bells in houses, so that orders can be given to servants, or other talk carried on, without those engaged having to leave the room in which they happen to be. The apparatus comprises an electric call-bell similar to the ordinary electric bell, a telephone transmitter of the microphonic kind, and a receiving telephone such as was introduced by Mr. Graham Bell. Fig. 2 is a view of

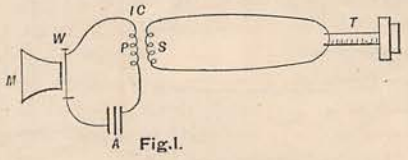


Fig.1.

the new apparatus, which has been called the "microtelephone push-button." It is fixed to the wall at a convenient spot or to any suitable support; and it consists of the push-button, A, for ringing the electric call-bell, the magneto-telephone, B, for hearing with, and the microphone transmitter, C, for speaking to. After ringing the bell by pressing in the push-button, the operator unhitches the telephone, B (Fig. 3), and places it to his ear to get the response of the person called. He (or she) then speaks to the diaphragm, D (Fig. 4), of the microphone transmitter. When the conversation is ended, the telephone, B, is replaced as in Fig. 2, and the apparatus left until it is again required. The telephone, B, serves as a cover to close it up. We need not enter into the details of the apparatus, since they are merely different forms of the well-known Bell telephone, microphone transmitter, induction coil, electric bell, and the necessary connecting wires and switches.

Fig.2.

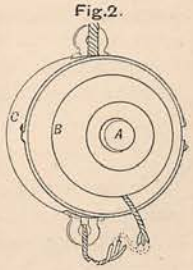


Fig.4.

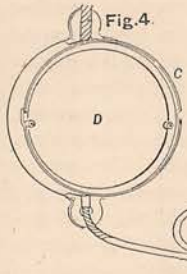
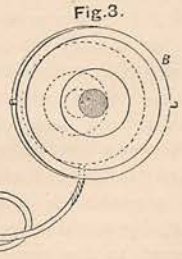


Fig.3.



We may mention, however, that the microphone consists of a plate of carbon, D (Fig. 4), which also serves as the diaphragm to speak to, and a set of carbon pencils lightly pressing against it from behind. The telephone cover, B (Fig. 3), is attached to the rest of the instrument by a bayonet joint, and the whole is of small size and neat appearance.

A Handy Ewer.

The woodcut illustrates a handy form of ewer which has recently been introduced. As will be seen, the handles are flush with the sides, so that they are very

unlikely to be broken off by a blow, as projecting arms are. Moreover, they are on every side of the ewer, which can therefore be grasped in any position. The mouth of the ewer is adapted to the four handles, and the shape of the vessel is artistic and pretty.

An Electric Bellows.

At the works of Messrs. Latimer Clark, Muirhead, and Co., the well-known electrical engineers, there is a homely application of the transmission of power by electricity, in the shape of some blacksmiths' furnaces, of which the fires are blown by electricity. The electric power from the generator rotates a small Gramme machine which works an air propeller, and thereby creates a steady current of air which is directed through the furnace-fire.

A Line-Throwing Gun.

A gun for throwing a line to vessels, or other objects at a distance, has recently been brought out. It is made in two types, one for firing from the shoulder, which we illustrate in the figure, and one in cannon form mounted on a gun-carriage, and for firing from shore or the deck of a ship. Both types are alike in principle. The gun is loaded from the muzzle with powder, and the line is wound on a sort of bobbin which is projected by the discharge. One end of the line is fastened to the gun, so that when the bobbin of coiled line is fired into the air, the line is unwound and paid out behind the projectile. Care is taken to protect the line from getting burnt by the powder. In some recent experiments a line 160 yards long was projected to its full extent from a shoulder-gun of the kind illustrated, and then hauled in again, without damaging the case. The charge of sporting powder used weighed 1¾ drams. A line 460 yards long, or over a quarter of a mile, was also projected to its full length from a ship-gun with 7½ ounces of powder. The gun may be useful in saving life in cases of fire in buildings, as well as wrecks at sea.

Beating Time by Electricity.

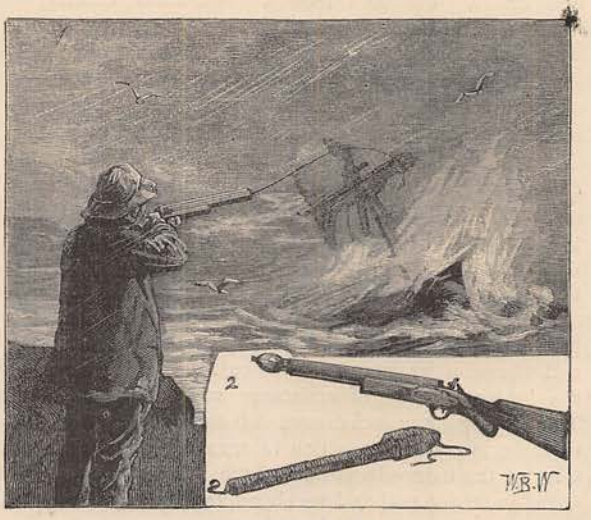
After the recent manœuvres of the German Army, a serenade by 1,200 performers was given by night in honour of the Emperor. It was pitch-dark, but the movements of the conductor's bâton were rendered visible to the performers by fixing a tiny electric incandescent lamp to the top of the bâton. The lamp was fed by means of insulated wires running along the bâton.

For House and Home.

A London laundryman has invented a new gloss for linen, which he calls Ivorine. The linen is to be ironed in the usual way, after which the Ivorine is applied by means of a pad of linen, and, upon passing the point of a hot iron again over the linen, a good polish is produced.—Some inexhaustible smelling-salts have lately been patented. When the stopper of the bottle is replaced, after the salts have been used, chemical action is at once set up and restores their power to the salts.—From an Oban chemist we have received a handy little medicine-chest, adapted for use either in a family or by any one making a long voyage.—"Musical Dominoes" is the name of a new round game that ought to be popular with lovers and students of music.

An Iron File-Handle.

An iron handle for files, which is claimed to be unbreakable, is now made in Manchester. These new handles are made of thin annealed iron. A short wooden plug is driven into the handle to serve as a bed for the file; and a hole at the butt allows the file and plug to be easily removed.



A LINE-THROWING GUN.