

## RECENT DEVELOPMENTS IN ELECTRIC LIGHTING.

*[Continued from first page.]*

nets of the large machine, and consequently controlling the current in the external circuit.

On the top of the magnets of the exciting machine there is a platform supporting a train of gearing, consisting of two ratchet wheels mounted on shafts carrying spur wheels which mesh into an intermediate wheel connected with the pivotal support of the commutator brushes by bevel gearing and a vertical shaft. The ratchet wheels are a short distance apart, and between them there is a double faced pawl, which is capable of engaging one or both of the ratchet wheels, or of moving between them without touching either. This pawl is reciprocated by an oscillating shaft at the rear of the magnet, which takes its motion from a small crank on a shaft above the armature and between the helixes of the magnets. The crank shaft receives a comparatively slow rotary motion from the shaft of the armature.

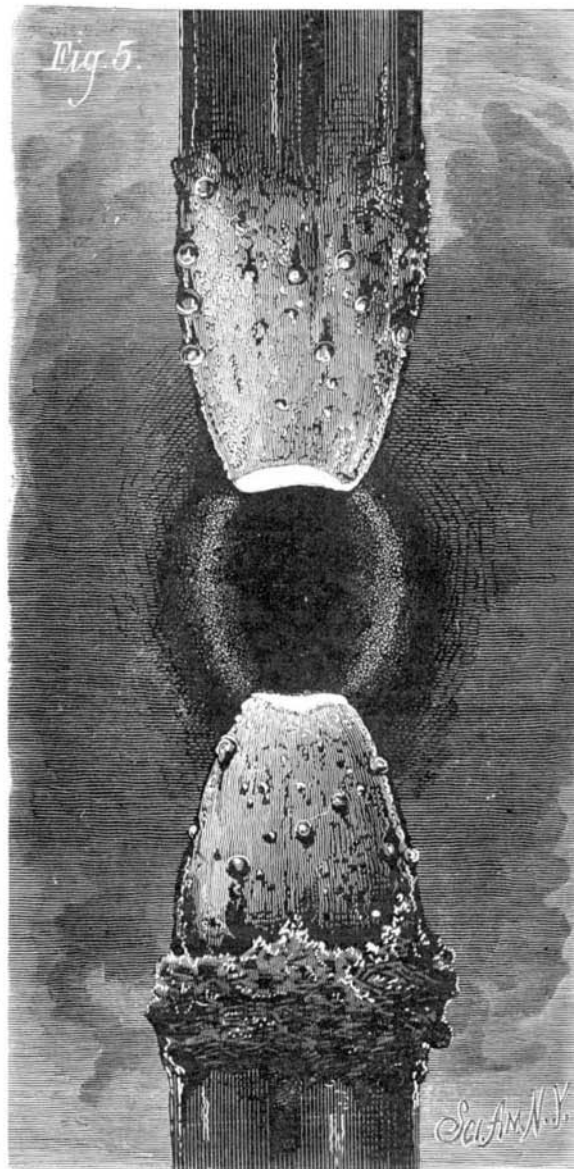
Above the ratchet gearing there is a table supported by pillars from the platform, and upon this table near one side there is an electro-magnet of high resistance, which is connected with the circuit wires, and is influenced by the current in the same manner as the incandescent lamps, which are connected in multiple arc. An armature is suspended above the electro-magnet by a nicely pivoted scale beam, and the downward movement of the armature is opposed by an adjustable spiral spring at the opposite end of the scale beam. The excursions of the scale beam are limited by stop screws in a vertical post near the electro-magnet. The end of the scale beam is prolonged beyond the armature to receive a rod, by which it is connected with the elongated end of the oscillating pawl playing between the ratchet wheels. The rod which connects the scale beam and the pawl is rendered elastic by the insertion of a short piece of spiral spring, to admit of the free action of the pawl in catching the teeth of the ratchet wheels. When the strength of the current is augmented by the removal of several lamps from the circuit, the armature of the regulator magnet is drawn down, permitting the pawl to engage with the lower ratchet wheel, which is turned one notch at a time until the commutator brushes are moved, so as to reduce the exciting current, and consequently diminish the current in the lamp circuit. Should the current diminish beyond the normal strength the armature is released, the spring moves the scale beam, bringing the pawl into engagement with the upper ratchet wheel, when the result will be opposite to that just described.

The incandescent lamps, in connection with which this regulator is more especially intended to be used, are connected in multiple arc; that is, they are connected across two parallel wires, so that the current is divided up between all of the lamps in the same circuit. Now, it is obvious that, when a number of the lamps are removed the current would, under ordinary circumstances, be much stronger in the lamps that are allowed to remain in the circuit, but when the regulator is applied there is no perceptible difference in the light given out by the lamps, whatever may be the number in circuit.

As many as sixty-four lamps have been brought up to over thirty candle power each in a single circuit by the machine shown in Fig. 3, and the lamps have been removed from the circuit until only one remained and then all replaced, the regulator meanwhile adapting the current perfectly to the widely varying conditions.

The incandescent lamp shown in Fig. 4 consists essentially of a glass globe containing an attenuated atmosphere of hydrocarbon vapor, in which is placed the carbon conductor, which is rendered incandescent by the electric current. The conducting wires, instead of being fused into the glass of the globe, are surrounded with a semi-elastic cement, which is capable of withstanding both heat and pressure. This cement insures a perfect and durable joint between the platinum elec-

trodes and the glass. It is estimated by Mr. Maxim that the large dynamo-machine will supply a current to 200 of these incandescent lamps. The machine certainly has great power, and generates what might be called



THE ARC ELECTRIC LIGHT.—CARBONS, NATURAL SIZE.

a giant current, which is capable of heating eighty feet of No. 9 iron wire to incandescence, and of maintaining a 10 inch arc between two 1 1/4 inch carbons, shown in Fig. 5. The light from these carbons when one inch apart is simply immense, and the heat is like that of a blast furnace.

Mr. Maxim's interests are identical with those of the United States Electric Light Company, of this city, whose offices are located at 120 Broadway. This company is doing a great deal toward the introduction of the electric light in all forms, and have recently established a central station in the vicinity of Madison square, from which several radiating wires extend to public buildings in that locality. We hope at an early day to be able to chronicle the introduction of the small electric lamp into offices, stores, hotels, and private dwellings.

## MISCELLANEOUS INVENTIONS.

Mr. George E. Eastman, of Muskegon, Mich., has patented a vehicle seat, whose ends and back are joined together with angle irons that enter corresponding vertical corner slots; the seat frame is mitered and secured in place by metallic plates, that are blind slotted into the corners.

Mr. Charles R. Kinehan, of Springfield, Ill., has patented a simple device for more readily and accurately circling and leveling the hair springs of watches. It consists of a sliding and rotating rod holding the spring, and fixed adjustably in a vertically adjustable stud or pillar that is connected with the top plate of the watch.

Mr. Enos G. Boughton, of Pittsford, N. Y., has patented an improved drying apparatus for drying substances such as fruits, vegetables, hops, meats, etc. The moisture is evaporated from such materials with dry air at ordinary temperature without the application or use of artificial heat, so that the natural flavor of the fruit is preserved.

An improved attachment for the key boards of musical instruments has been patented by Mr. Christopher C. Reynolds, of Kelseyville, Cal. The invention consists in a series of levers pivoted adjacent to each other in such a manner that they can be acted upon by a moving sheet which has the notes cut out or raised, and passes between two feed rollers, which draw it under the lower ends of the above-mentioned levers, having a cord or wire attached to the upper ends, the said cords or wires passing over or through suitable bridges, and being attached to the upper ends of a series of fingers resting on the keys of the instrument. By means of a crank the feed rollers are rotated, thus moving the music sheet as is necessary, and at the same time a roller arranged adjacent to and parallel with the row of fingers is rotated in such a manner as to assist in depressing the fingers, thereby relieving the music sheet from undue strain.

Mr. Philip B. Bicknell, of Lincoln, England, has patented an improved dark lantern for the use of policemen, watchmen, and others. It is an improvement on that general form of lantern which is constructed with a rounded front side and a flat or slightly concave rear side adapted to lie against the wearer, and in which the front portion is hinged to a back plate attached to the waist belt, so that the front portion may fold outwardly with the lamp to give access to the latter.

A closet or safe, which may be concealed in a wall and provided with secret devices for giving entrance thereto, has been patented by Mr. Nicholas Huetter, of Kenosha, Wis. The invention consists in a box fitted with a hinged cover that is held closed by sliding catches, and thrown open by a spring when released, and having combined with it a rockshaft and crank lever for operating the catches.

Mr. Humphrey J. Williams, of New York Mills, N. Y., has patented a carpenter's bench hook that can be easily set in position, adjusted, and removed. The invention consists, essentially, of a tubular shell carrying a toothed plate on its top, set at right angles thereto, the shell being longitudinally divided into two sections that inclose an eccentric rod or screw, by means of which the sections are spread apart.

An improved vehicle spring brace has been patented by Mr. Charles A. E. Simpson, of Portsmouth, Ohio. The invention relates to means for preventing lateral

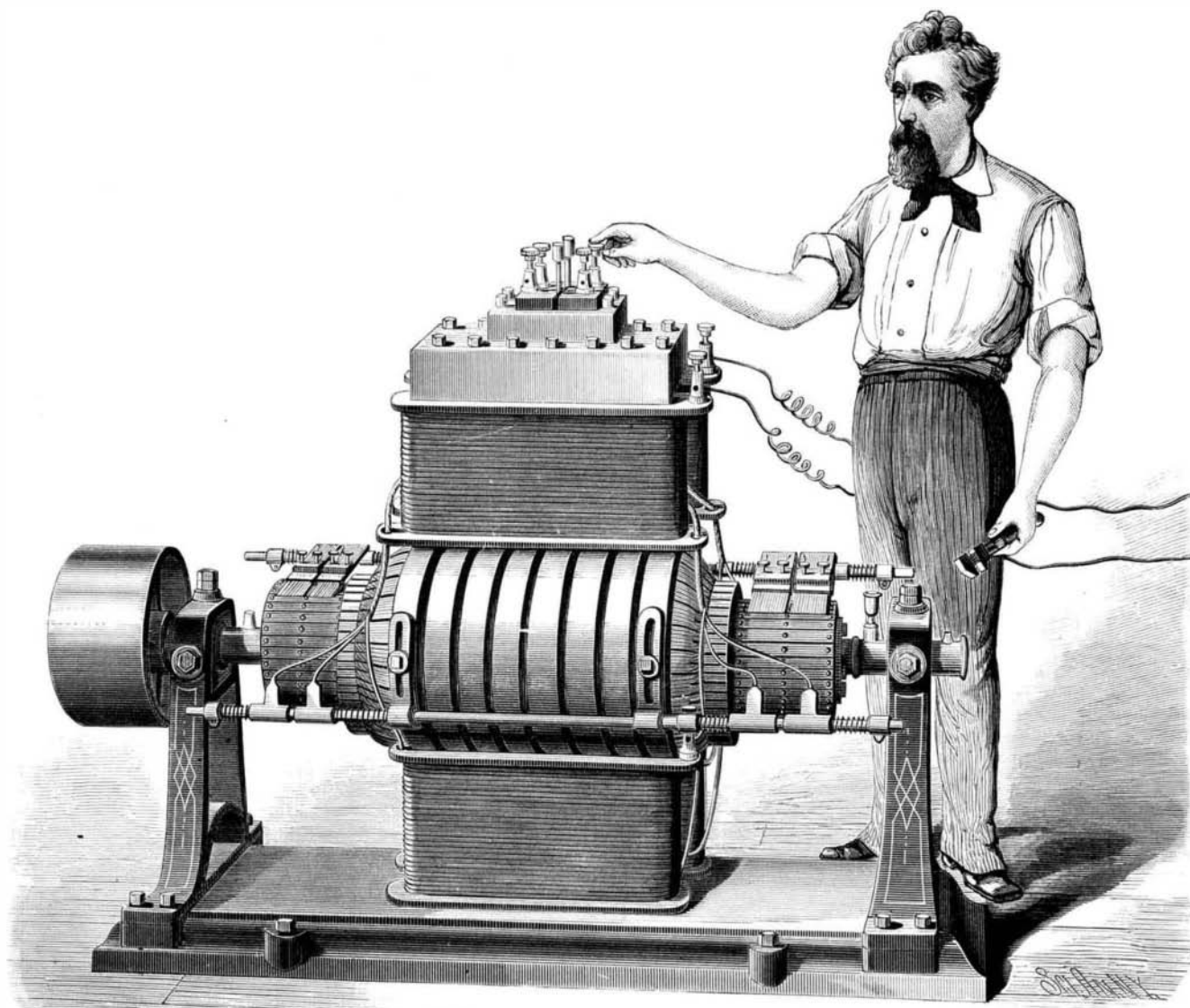


Fig. 3.—MAXIM'S DYNAMO-ELECTRIC MACHINE.

vibrations of the springs when they are depressed by the load or body of the vehicle in passing over rough surfaces or in ascending or descending a hill.

Mr. Aaron D. Cheney, of Three Oaks, Mich., has patented an improved apparatus for hatcheling or straightening and removing the gummy matter and roots from hair combs or other snarled and tangled hair. The invention consists in a bed or table fitted with hatcheling and combing teeth arranged in a peculiar manner. These teeth are carried by blocks fitted to slide in the bed to allow change or removal of the teeth and the substitution of fine and coarse teeth one for the other, as required.

**LONG-BILLED PARROT AND BANKSIAN COCKATOO.**

A very singular form of cockatoo is that which is known as the Philip's Island, or the long-billed parrot. This bird is only found in the little island from which it derives its name. It may probably become extinct at no distant period, as its singularly shaped beak renders it an object of attraction to those who get their living by supplying the dealers with skins and various objects of natural history; and its disposition is so gentle and docile, that it readily accommodates itself to captivity. Philip's Island is only five miles in extent; and it is a very remarkable fact that this long-billed parrot is never found even in Norfolk Island, though hardly four miles distant.

Its favorite resorts are among rocky ground interspersed with tall trees, and its food consists mostly of long and succulent vegetable substances. The blossoms of the white hibiscus afford it a plentiful supply of food, and in order to enable it to obtain the sweet juices of the flowers the tongue is furnished with a long, narrow, horny scoop at the under side of the extremity, not very unlike the human nail. As earth has often been found upon the long upper mandible, the bird is believed to seek some portion of its food in the ground, and to dig up with its pickaxe of a bill the ground nuts and other subterranean vegetation. This opinion is strengthened by the fact that another species of parrot belonging to the same country is known to seek its food by digging.

One species of this genus has been known to imitate the human voice with much accuracy. This is the southern Nestor, or the kaka of the natives (*Nestor hypopolius*.)

The birds which belong to the genus Nestor may at once be known by their extraordinarily long upper mandibles, which curve far over the lower, and remind the observer of the overgrown tooth so common in the rat, rabbit, and other rodent animals. Some persons suppose the long-billed parrots to form a link between the parrots and the cockatoos.

The Philip's Island parrot is dark brown on the upper surface of the body, but takes a grayish hue on the head and back of the neck. Each feather of the upper surface is edged with a deeper tinge, so that the otherwise uniform gray and brown is agreeably mottled. The cheeks, throat, and breast are yellow, warming into orange on the face. The inner surface of the shoulders is olive-yellow, and the abdomen and both tail coverts are deep orange-red. The tail is moderately long, and squared at the extremity.

The banksian cockatoo is a good representative of a very curious genus of cockatoos resident in Australia. The plumage of these birds, instead of being white or roseate, as in some other cockatoos, is always of a dark color, and frequently dyed with the richest hues. About six species belong to this genus, and they all seem to be wild and fierce birds, capable of using their tremendously powerful beaks with great effect. Their crests are not formed like those of the common cockatoo, and the tails are larger and more rounded.

The Banksian cockatoo is only found in New South Wales, inhabiting the vast brush district of that land. Its food is mostly of a vegetable nature, consisting chiefly of the seeds of the banksia; but the bird will also eat the large and fat grubs of different insects, mostly of a coleopterous nature, which it digs out of the trunks of trees with its strong bill.

The flight of this handsome bird is rather heavy, the wings flapping laboriously, and the progress being rather

slow. It seldom mounts to any great height, and as a general fact only flies from the top of one tree to another. The eggs are generally two and sometimes three in number, and are laid in the hollow "spout" of a green tree, without any particular nest.

The chin of the adult male is deep rich black with a green gloss. A broad vermilion band crosses the whole of the tail, with the exception of the two central feathers, and the external webs of the outside feathers. The female is also greenish black, but her plumage is variegated with numerous spots and bars of pale yellow.

**Eastport Sardines.**

Eastport, Maine, depends for its prosperity almost entirely upon its fishing interests, large quantities of cod and other fish being caught within a few miles of the town. The putting up of small herrings sardine fashion has latterly become a prominent industry, giving employment to many fishermen and cannery men. The fish are very abundant at certain seasons, sometimes a hundred hogsheads being taken at one time. Large weirs are constructed along the shores and

**The Daddy Long-legs in England.**

For some four years past Miss E. A. Ormerod—a lady living at Dunster-lodge, Isleworth, who takes a great interest in meteorological and agricultural matters—has been collecting observations on injurious insects and plant life from all parts of the United Kingdom, and the success of her work may be imagined from the fact that this year some 400 observers—some as far north as Caithness—have sent in reports. These reports will not be published in the usual annual form until the observations of the entire year are completed. Enough is, however, now known of the great damage done this year, and of the experience gained in the destruction of these pests, to enable farmers and gardeners to protect themselves to a very great extent from their ravages in the future.

The reports from all parts of the country show that great damage has been done by the grubs of the *Tipula oleracea*—known better by the popular name of "daddy long-legs." Previous observations have shown wet weather to be favorable to the development of this fly, and the experience of the present year is quite in harmony with them. The eggs deposited in the clover stubbles last autumn produced myriads of grubs—as many as 150 to 200 sometimes in a square yard—which have been destructive to crops generally, but especially to corn. The grub works by gnawing the plant through, or partly through, beneath the surface of the ground, thus wasting far more than it needs for food, and as it can bear being thoroughly immersed for more than three days and nights, and can (at least, exceptionally) support a temperature of  $-10^{\circ}$ —that is,  $10^{\circ}$  below zero, or  $42^{\circ}$  of frost—winter influences are not to be looked to for any very efficient help against it. The experiences of the present year also show that when the grub is fairly established in a field, special applications or dressings on the grub itself do but little towards killing it, and that the best remedies in a "grub run" field are dressings of guano, or of any quick acting manure that will stimulate and encourage a healthy and vigorous plant growth. The great lesson of the year is, that greater attention should be given in the autumn to the thorough cleaning of the ground.

The clover stubbles are the headquarters of the *Tipula oleracea* for egg-laying, and the legless grubs lie just below the surface, and, except when torpid, require to eat. What is needed is either to kill them at once, which can be done, to a great extent, by paring and burning, or to starve them out before the new crop is put in by thorough cultivation. The grub is very active and feeds on many plants, so that mere common cultivation does but little towards getting rid of it; but if the ground is thoroughly worked, and the rubbish collected and burnt at once, the attack in the coming season has been found to be very much lessened. The soil is thus put in a good state to run the next crop on, many grubs are destroyed by being either thrown up to the birds, burnt, or buried too deep to come up again, and if a sufficient time has been allowed to elapse before putting the new crop in, a very large number will have been starved out. All the reports of careful observers show that farmers have good cause to be thankful for the work done by birds in the destruction of insect pests. Starlings, rooks, and lapwings—all

of which are scarcer now than a few years ago, the cold and wet destroying large numbers—are powerful helpers in keeping down these injurious ravagers of our crops. Another pest, which has appeared in unusual numbers during the past two months, is the mangel-wurzel fly (*Anthomyia beta*), which does harm by its small, legless maggot gnawing away the inside pulp of the leaves between the upper and lower sides. This has, however, but rarely caused any serious mischief in this country, and as the reports of the past week all show that the rains are fast recovering the injured crop, the loss from its ravages will not probably be large this year. Among the other more prominent pests this year is the celery fly and the wheat midge (*Cecidomyia triticea*), the latter being very prevalent in some of the southern and midland counties. Miss E. A. Ormerod will be always pleased to receive from any persons specimens of insects or maggots doing injury to plant life, together with an account of their ravages, whether in the garden or in the field. Suc-



**LONG-BILLED PARROT AND BANKSIAN COCKATOO.**

around the islands of Passamaquoddy Bay, and the fish, swimming in with the tide, are caught behind them. When the tide falls and the fish are crowded into narrow spaces, they are dipped out in great quantities. When taken to the extensive factories along the shores the fish are cured by boiling in oil, like sardines, and put up in small boxes in imitation of genuine sardines. The business is said to be controlled by New York firms. The fish are also potted and put up in various other ways. The large herrings taken during the winter are frozen and shipped to market in barrels.

**England's 100-ton Gun.**

A successful trial of England's new 100-ton gun was made September 22. Loaded with 441 pounds of pebble powder (in cubes of  $1\frac{1}{4}$  inch) it drove a 2,000 pound projectile 45 feet into a sand butt. The velocity of the projectile was 1,556 feet a second.