

www.e-rara.ch

International Inventions Exhibition

Clowes, William

London, 1885

ETH-Bibliothek Zürich

Shelf Mark: Rar 45379

Persistent Link: <https://doi.org/10.3931/e-rara-77643>

VI. - The electric light - the gardens, and musical arrangements.

www.e-rara.ch

Die Plattform e-rara.ch macht die in Schweizer Bibliotheken vorhandenen Drucke online verfügbar. Das Spektrum reicht von Büchern über Karten bis zu illustrierten Materialien – von den Anfängen des Buchdrucks bis ins 20. Jahrhundert.

e-rara.ch provides online access to rare books available in Swiss libraries. The holdings extend from books and maps to illustrated material – from the beginnings of printing to the 20th century.

e-rara.ch met en ligne des reproductions numériques d'imprimés conservés dans les bibliothèques de Suisse. L'éventail va des livres aux documents iconographiques en passant par les cartes – des débuts de l'imprimerie jusqu'au 20e siècle.

e-rara.ch mette a disposizione in rete le edizioni antiche conservate nelle biblioteche svizzere. La collezione comprende libri, carte geografiche e materiale illustrato che risalgono agli inizi della tipografia fino ad arrivare al XX secolo.

Nutzungsbedingungen Dieses Digitalisat kann kostenfrei heruntergeladen werden. Die Lizenzierungsart und die Nutzungsbedingungen sind individuell zu jedem Dokument in den Titelinformationen angegeben. Für weitere Informationen siehe auch [Link]

Terms of Use This digital copy can be downloaded free of charge. The type of licensing and the terms of use are indicated in the title information for each document individually. For further information please refer to the terms of use on [Link]

Conditions d'utilisation Ce document numérique peut être téléchargé gratuitement. Son statut juridique et ses conditions d'utilisation sont précisés dans sa notice détaillée. Pour de plus amples informations, voir [Link]

Condizioni di utilizzo Questo documento può essere scaricato gratuitamente. Il tipo di licenza e le condizioni di utilizzo sono indicate nella notizia bibliografica del singolo documento. Per ulteriori informazioni vedi anche [Link]

VI.—THE ELECTRIC LIGHT—THE GARDENS, AND MUSICAL ARRANGEMENTS.

ELECTRIC LIGHTING OF BUILDINGS AND GROUNDS—MACHINERY FOR ELECTRIC LIGHTING—THE GARDENS—THE MUSICAL ARRANGEMENTS—TRAMWAYS.

ONE of the most remarkable features of this Exhibition is the thoroughness with which the electric lighting arrangements have been carried out. It may safely be stated that nothing on so large or so representative a scale has ever before been brought together. As a comparison it may be mentioned that whereas in 1883 there were 252 arc and 2629 incandescent lamps, this year there will be 464 arcs and 5530 incandescent lamps, used in and about the buildings, in addition to the 18,000 incandescent lamps used in the gardens as a substitute for the small oil lamps hitherto employed for the illuminations. The whole of the current required for the gardens is supplied by Messrs. Siemens Brothers, but the lighting in the buildings is distributed amongst several firms as set forth in the annexed list, taken from the Official Catalogue (see pages 59, 60). The whole of the power required to light the buildings is supplied by Messrs. Davey, Paxman, & Co., whose engine-house is situated between "Old London" and the South Gallery. This firm supplied the engine and boiler power necessary for working the whole of the vast system of electric lighting throughout the late Health and Fisheries Exhibitions. At the Fisheries Exhibition about 1000-HP. was employed, at the Health Exhibition about 1300-HP., and at the present Exhibition 2300-HP. in steam is provided for. The power is greater than that of any display which has yet taken place. The steam engines provided for this purpose are five in number. The two largest engines are capable of developing 750-HP. Nos. 1 and 2 engines are of the coupled horizontal type (same as fixed for driving the electric light at the South Kensington Museum), and provided with Paxman's Patent Automatic Cut-off Gear, worked direct from the governors, so as to ensure very steady and even running. The advantage of this system is that only just sufficient steam required for the duty is admitted to the cylinder at each stroke of the piston. This is one of the very few automatic arrangements which work with regularity and certainty. The cylinders are steam jacketed. It may be mentioned that one of the large driving bands on one of the engines suddenly broke when the engine was transmitting about 350-HP., but the excellence of the automatic gear—even in this extreme case—prevented the engine from over-running. No. 3 engine is of the compound receiver type, indicating 200-HP. It is fitted with Paxman's Automatic Gear as above described. The cranks are at right angles, and accurately balanced. With condensers and good generators, this engine will work with less than 2 lbs. of coal per indicated horse-power per hour, and run very smoothly and with great steadiness. No. 4 engine is of the semi-fixed compound type, of 140 indicated HP., and is precisely the

Electric Lighting of Buildings and Grounds.

Machinery for Electric Lighting.

For Contents, see p. 3; View of Gardens, p. 41; Ground Plan, p. 48; View of Old London, p. 56; Index, p. 67; Method of reaching the Exhibition, pp. 72-77.

**Machinery
for Elec-
tric Light-
ing.**

same as No. 3 above described, but with locomotive boiler placed above the engine. At the Health Exhibition this engine, although without condenser, ran constantly with $2\frac{1}{2}$ lbs. of fuel per indicated horse-power per hour. No. 5 engine is a double cylinder semi-fixed steam boiler. A battery of eight large boilers, of the locomotive type, is fixed between the two large coupled engines for supplying them, as also some high speed engines, with steam. There is also a second battery of six boilers on the west side. The whole of these are made to work at 100-lbs. steam pressure. The fire-boxes are of mild steel. Altogether nearly 2300-HP. in boilers are provided for. Receivers, 16-in. diameter, have been placed along the top of the two batteries of boilers.

**The
Gardens.**

The Gardens, with their innumerable electric lights, are a spectacle which has never yet been rivalled, and will undoubtedly prove to be the great popular attraction to the Exhibition.

The principal lines of the Conservatory, band-stands, Albert Statue quadrants, and the buildings on the east and west sides of the gardens are picked out with lines of light, as also are the chief features of the garden, such as the balustrading, terrace lines and flower beds, while the trees and shrubs are profusely sprinkled with richly-coloured lamps. The whole of this work has been undertaken by Messrs. Siemens Brothers, under the direction of Sir Francis Bolton. The number of incandescent lamps used is about 10,000, and the necessary current is derived from three Siemens' dynamos coupled parallel, each of which is capable of producing a current of 450 ampères at a potential of 250 volts. This being the largest output ever obtained from a single machine. The dynamos are each directly driven by a Goodfellow and Matthews 6 cylinder compound engine of 200 indicated horse-power.

In addition to the Upper Gardens, many other portions of the grounds are well worthy of a visit. The Central Avenue is beautifully planted with rhododendrons. The garden adjoining the North Court of the South Gallery is well laid out, and contains two out-door cafés, which are much frequented. In the bit of ground to the north of Old London, Mr. Lockhart has a very popular cocoa and coffee house. To the south of the Great Southern Gallery is a long stretch of ground occupied by many interesting exhibits. Towards the eastern end Mr. Williamson has an oyster bar. Close by are many samples of green-houses, conservatories, and methods of glazing without putty. A full-sized model in wood of a cast-steel stern-post with brackets for twin screws, all in one piece, is a splendid sample of the work which can now be executed by Messrs. Jessop. (See also p. 33.)

**South
Parade.**

In this part of the grounds are also to be seen two very interesting tramways, in one of which the car is driven by compressed air, and in the other by electricity. The former is exhibited by the British Mékarski Improved Air Engines Co., Limited. A short description of the method of working the car may be found interesting.

**Tram-
ways.**

**Mékarski's Air
Engine.**

By means of engines and pumps atmospheric air is compressed into reservoirs to 450 lbs. on the square inch. From these the air is, when the car is coupled up to the charging-pipes, allowed to pass into smaller reservoirs, which are carried underneath the car-body. When these are charged with atmospheric air to the necessary pressure, the charging-pipes are disconnected, and the car is ready to commence its

journey. To the driving-wheels of the car ordinary working cylinders of $5\frac{1}{4}$ inches diameter by 10 inches stroke are connected, and through these cylinders the compressed air from the reservoirs is used. The principal feature of the system is that the air in passing from the reservoirs to the cylinders bubbles through boiling water, and steam of 60 lbs. pressure on the square inch, contained in a vessel called a "hot-pot"—this vessel being charged at the pumping station during the time occupied in filling the car reservoirs with compressed air. The advantages claimed in thus using the air are that the heat which the air takes up in passing through the hot water, not only causes the air to expand, but prevents the formation of snow in the cylinders and at the exhaust. The moisture also picked up by the air in its passage through the water acts as a lubricant for the slide valves and pistons.

The working pressure varies from 120 lbs. down to 50 lbs. on the square inch, the variation being regulated by a valve of peculiar construction. One of the "hot-pots," with its regulating valve upon it, has been placed at each end of the car, and means for ingress and egress of passengers has been provided; so that when the end of the journey is reached, the driver takes his reversing handle, and the wheel of the regulating valve, to the opposite end of the car with him, and the conductor changes ends as in the ordinary horse-car.

Among the many requirements of the Board of Trade is one that there shall be provided upon the car a governor, which shall, when the car exceeds a speed of 10 miles an hour, not only cut off the steam, or rather the air, from the engines working it, but shall put on the brakes. An apparatus fulfilling these requirements has been fitted, and it works most satisfactorily.

The electric tramcar is one of ten now being constructed for the Electric Tramway Company of Blackpool. It is worked in the following manner. An underground channel is constructed in the centre of the track, having a narrow slit or opening in its surface, so that communication can be made between the electric motor on the car and electric conductors within the channel. Two conductors are employed; first, that they may be hidden under either side of the surface, and so be protected from injury by any substance falling through the slit in the surface of the channel; and secondly, to make it possible to deal with points, loops, and crossings. The current returns by means of the rails, which are electrically connected one with the other. Communication is made with the cars by means of a collector, which runs upon the copper conductors within the channel. Insulated copper bands, protected by steel plates, pass through the slit and are attached by a flexible metallic cord to an electrical terminal underneath the car, so that when the car moves the collector is drawn along with sufficient force to clear away any ordinary obstruction; but, should an absolute block occur, then a special clip releases the collector and a breakage is avoided. From the terminal underneath the car the current passes to the switch-box, when the quantity and direction of the electricity passing to the motor is regulated, and thereby the speed and direction of the car is controlled. From the motor the current passes by way of adjustable clips to the axles and by them through the wheels to the rails and back to the station where the electricity is generated.

**Musical
Arrange-
ments.**

The musical arrangements have been very carefully thought out, and a great treat has been provided for Londoners in Strauss' famous orchestra of 45 performers, which has been specially engaged to come from Vienna and to remain in London for two months, from June 3rd. The full band and trumpet corps of the Pomeranian (Blücher) Hussars will also, by special permission of the Emperor of Germany, visit the Exhibition during the month of June. In addition to the above, the bands of the three Guards' Regiments, of the two Life Guards and Royal Horse Guards,—the Royal Artillery,—the Horse Artillery,—the Engineers—Marines, and the Royal Irish Constabulary will give concerts during the season. The bands will perform twice daily, viz. in the afternoon and evening; during fine weather in the grounds, and when wet in the Albert Hall.

The electrically illuminated fountains this year have been considerably augmented and improved. The effects produced by the various coloured beams of powerful arc lamps, thrown upon the jets and sprays of the fountain are produced by an elaborate combination of appliances, which are well worth a short description. The whole arrangement is controlled from a small room in the clock-tower, commanding a bird's eye view of the grounds. On a small bench beneath the window is an instrument resembling the key-board of an harmonium, having 3 tiers of keys for giving by means of electrical connections the necessary directions to the men stationed in a chamber constructed in the basin immediately under the principal fountain jets. A second key-board furnishes the means of automatically controlling the lights in the various parts of the grounds, which can be put on or off, raised or lowered, at the will of the operator. Several improvements have been made since last year in the fountain basin. A second wall has been built round the centre island above the outer water level; this produces a cascade, the water from the centre fountain jets flowing over it from the higher to the lower level. Seven small islands have also been constructed in the basin, each surmounted by ornamental rockwork and a fountain jet. These islands each contain a powerful arc lamp, and various glass slides, so arranged as to throw their beams upon the centre fountains; the whole being worked by an ingenious arrangement from the centre island. On the west side of the fountain is a small rustic house, from which access to the centre island is obtained by means of a subway. The interior of the island contains a perfect labyrinth of water mains with their various valves and five large arc lamps, so arranged as to throw their beams vertically through glasses let into the roof immediately under the five principal jets, each lamp being provided with five glass slides of various colours, which can be instantly interposed between the lamp and the glass in the roof. Ranged along one side are the various indicators worked from the clock-tower; a man seated in front of these reads off the various signals and passes the word to the men operating the valves, lamps and coloured glasses. Eight men are necessary in order to read the signals, attend to the valves, and the five lamps, to shift the colours, to work the communications with the seven small island lamps, and to reply to the telephone.