SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter. Copyrighted, 1888, by Munn & Co.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LVIII.—No. 9. [NEW SERIES.] NEW YORK, MARCH 3, 1888. [$3.00 per Year.

THE ELECTRIC CLUB.

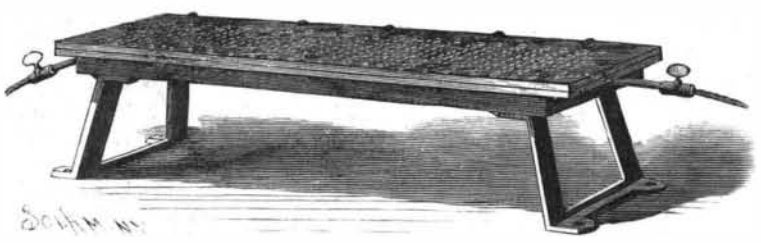
Electrical science may be said to have been established upon a new basis socially in this city when, on Tuesday, January 31st, the new headquarters of the Electric Club were formally opened. The proceedings were marked by the eminence of the invited guests, among whom were included the leading electricians of this country, as well as by the interesting address by Prof. Rowland, of the Johns Hopkins University, of Baltimore. In our present issue we illustrate some of the interior details of the club's new mansion, which throughout is fitted up with the utmost luxury. It is situated at No. 17 East 22d Street, where a building originally of great elegance, and which is now renovated throughout, is devoted to its uses.

We illustrate some of the most characteristic parts of the club house. Many of the rooms, while characterized by unusual taste in decoration, present nothing of specially distinctive interest, although much is omitted from the drawings that is well worth presentation.

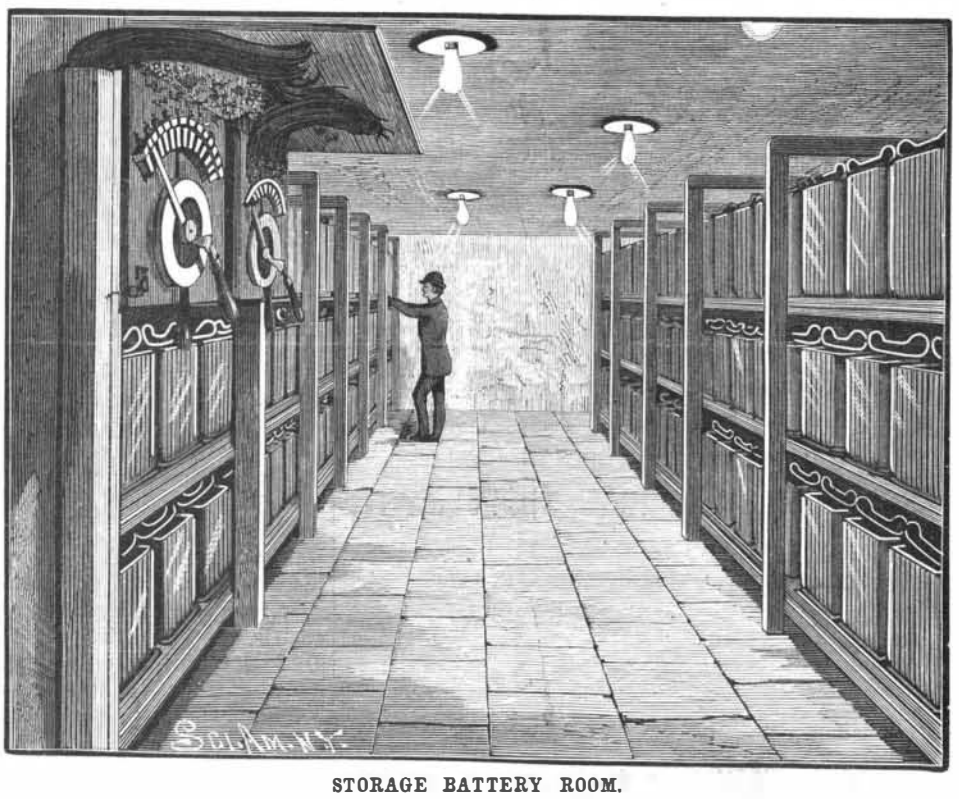
In the cellar are situated the steam boilers and the electric generating and storage plant. As is natural, this part of the installment is executed on the very best lines. It includes a high speed engine of the most advanced type, driven by independent boiler. The engine actuates two dynamos and in the cellar adjoining it a large storage battery is installed. In connection with these elements of the generating plant are ammeters and controlling apparatus, and a very elaborate switch board for directing the course of the currents. From this plant leads are carried throughout the house to all the

(*Continued on page* 132.)

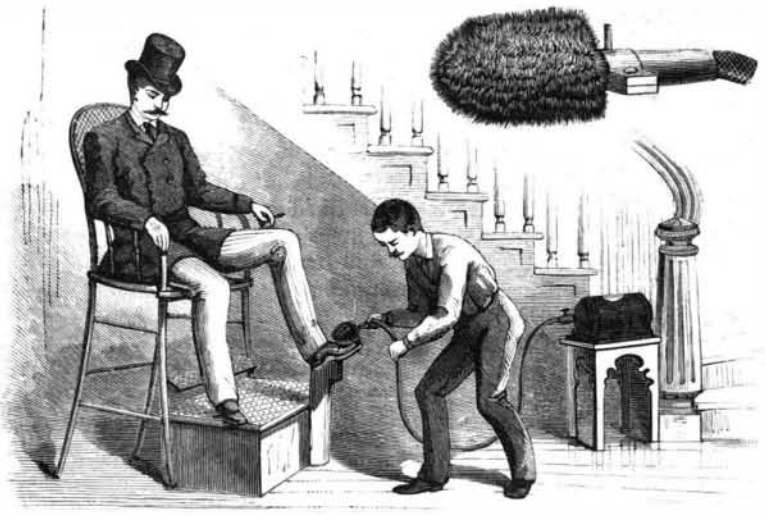
ELECTRIC DOOR OPENER.



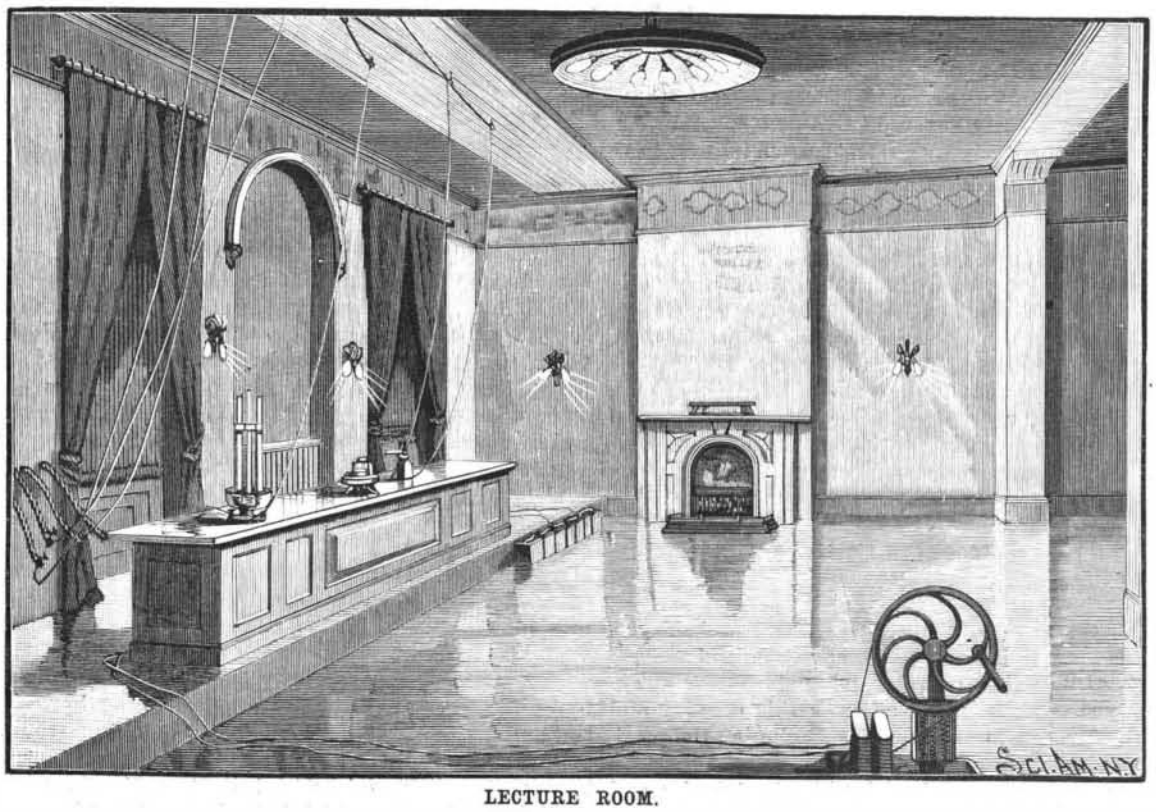
ELECTRIC STOVE.



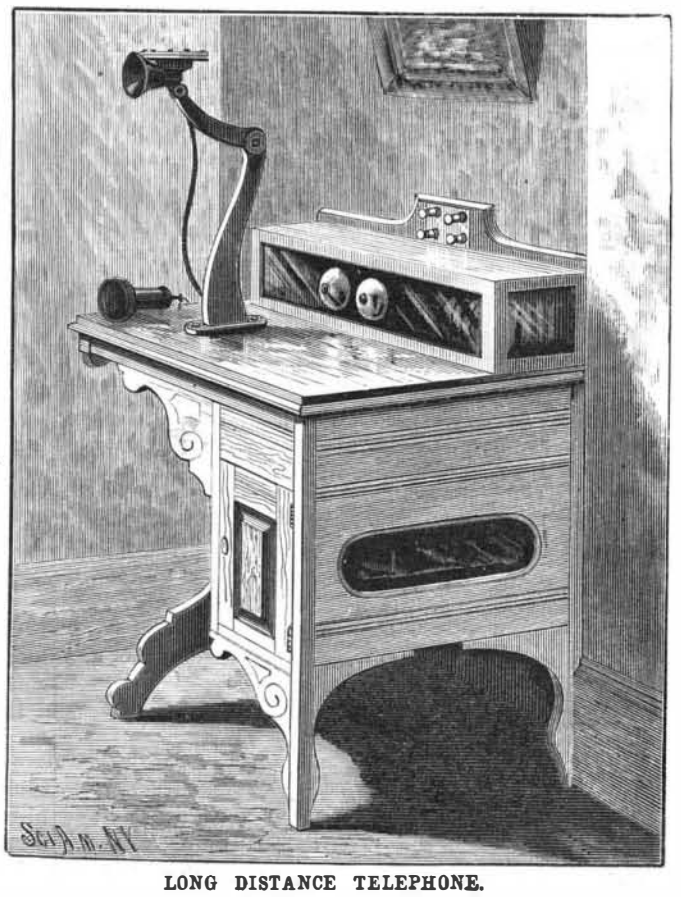
STORAGE BATTERY ROOM.



ELECTRIC SHOE BLACKING APPARATUS.



LECTURE ROOM.



LONG DISTANCE TELEPHONE.

THE NEW ELECTRIC CLUB HOUSE OF NEW YORK CITY.

© 1888 SCIENTIFIC AMERICAN, INC.

THE ELECTRIC CLUB.

(*Continued from first page.*)

rooms. These wires are used for the most varied and different purposes. The introduction of so extensive a system of wires involved a complete overhauling of the building, and this work, in connection with the decorative and other operations, involved an expenditure, it is said, of some $40,000. In the basement are the billiard rooms and kitchen, and on the main floor are situated the parlors and restaurant. These, like the rest of the building, are lighted by electricity; for the principal apartments electroliers in brass and silver bronze, and thickly hung with strings of glass prisms and pendants, are used. Cut glass shades cover the incandescent burners. The effect of this work is extremely rich, although, of course, obtained at the sacrifice of some light, which again is made up for by the large number of lamps used. The perfection of the system of lighting was very perceptible on the occasion of the evening of opening. The parlors were then crowded with the assemblage of guests listening to Prof. Rowland's paper. Had the room been lighted with gas as brilliantly, the heat thereby produced would have made it very uncomfortable for all. As it was, the air of the room was perfectly pleasant, although it was flooded with light.

On the next floor are situated the library, lecture room, and committee room. In the committee room is the long distance telephone, with which communication can be had with all connected cities. In the library is an embryonic collection of patent reports and other works, destined ultimately to acquire much value. A set of the French *brevets d'invention* is a very valuable portion of this collection. The lecture room is situated on the rear of this floor. It has at its end a large stage for the accommodation of the speaker, and in a corner back of the stage the electric leads are introduced. Immediately above the lecture table a large wooden panel is attached to the ceiling. This is for the purpose of serving as a place of attachment for wires and any special apparatus that may be in use during the lecture. The wooden surface offers every facility for the attachment of hooks, staples and insulators. In the upper floors some rooms are reserved for sleeping apartments and other purposes.

Scattered throughout the building will be found various objects of intertest, as illustrating the progress of the science. The electric stove, in which a current of electricity is used to heat a long platinum wire, carried zigzag across a surface of asbestos, and above which wire is arranged the heating plate, is illustrated among our cuts. A machine for blacking boots, consisting of a motor that rotates a flexible shaft, to the end of which shaft is attached a rotating brush, is kept ready for use in the basement. The brush is provided with a clutch, so that it may be thrown in and out of gear with the rotating shaft, and thus stopped or started without interfering with the motor. A switch is also provided for stopping the motor. A safe with electric lock is used to hold the valuables of the club. An electric door opener for the main entrance is employed. The initiated member who wishes to enter the building presses with his foot a block, upon which the door immediately flies open. In this way electricity is made to contribute its fullest part to the conveniences of the building.

All the appurtenances of a social club are of course provided, including billiard and pool tables and other features. The walls are hung with paintings and photographs, among which are included many very interesting portraits of electricians.

The objects of the club are not purely social. President Davis, in his address at the opening, summarized them briefly and concisely. The hope is that the club will have a true work to do in furthering the progress of electrical science and its rapidly increasing application to the commercial interest of the world. It is designed to have the club supply the useful functions at once of a museum, a laboratory, a lecture room, and a library. For the use of lecturers, apparatus is to be supplied which, in connection with the large generating and storage plant, will give unusual facilities for work on a large scale. It is proposed to have lectures given by the most distinguished scientists periodically during the season. This idea was happily carried out at the opening in the selection of so eminent a physicist as Prof. H. A. Rowland. The laboratory project remains to be carried out. In Philadelphia, the Franklin Institute performs for all mechanical subjects a most useful work in conducting investigations into the machinery and technical processes. It also has an annual course of lectures on technology. The work of the Electric Club, it is hoped, will be of an analogous nature. President Davis summarized the ambition of the club's founders in his aspirations that the Electric Club might be to electrical matters what the Cooper Institute and the American Institute, of this city, and the Franklin Institute, of Philadelphia, are to mechanics.

Its constitution and by-laws are conceived in a spirit of simplicity and liberality. The institution is incorporated under the laws of the State of New York. It admits any duly elected person to membership, either as resident, non-resident, or life member. Provisions are made for change of class of membership. The president of the club is Mr. Henry C. Davis. Its vice-presidents include Messrs. Geo. W. Hebard, Thomas A. Edison, John B. Powell, Geo. L. Beetle. Secretary, Chas. W. Price. Treasurer, A. J. Dam. The committee on membership consists of Messrs. Henry Hine, Geo. T. Manson, Geo. Worthington, Henry D. Lyman, Lieutenant, F. W. Toppan, U.S.N.

The Metallic Cartridge System of Breech-loaders.

George W. Morse, the inventor, says: I invented the modern metallic cartridge system of breech-loading firearms, now in use in all parts of the world in the form of infantry rifles, repeating firearms, and in all machine guns, in 1855; patented it in 1856 and 1858, introduced it into the service of the U. S. army, by manufacturing the Springfield rifle musket and other arms at the Springfield Armory in 1858 to 1860. I then reduced the caliber of new carbines from 0·58 to 0·45 caliber. I sent my new arms all over Europe, readily firing twelve shots per minute—no misfires—and the cartridges always automatically extracted by opening the gun, substantially as it is now done in all the military arms in the world.

A West Point ordnance board, convened in 1858, required by an order of the Secretary of War to select from twenty-three or four models then on trial "at that place on the 12th instant, and report on the adaptability of the principle of each in the alteration of the muzzle-loading to breech-loading arms," say in conclusion:

"The board selects Morse's model, inasmuch as it differs from the others by including the new and untried principle of a primed metallic cartridge, which may on actual trial be found of advantage."

My own were the only military arms in the world at that time which used the primed, flanged, expansive metallic cartridge loaded as a whole, and leaving a clean cartridge chamber in the gun when opened to receive a new load.

My agent in England was met by the following report of a committee, dated Hythe, September 23, 1858:

"The cartridge, which is metallic, is a self-primer. . . . The introduction of fulminating powders into cartridges is a dangerous element in their construction, and for military service an insuperable objection. The manufacture, the packing and carriage, become alike dangerous, and these alone the committee consider are sufficient reasons for condemning the employment of cartridges with caps attached." This report positively knocked the whole system out, for it was useless without the primed cartridge. The objections of our own army officials to breech-loaders were so invincible that it seemed absolutely impossible to make headway against them.

Fearing the success of my plans, they procured the passage of a clause in the army appropriation bill of 1860 forbidding the purchase of patents and patented articles.

But in 1866 the civilian Secretary of War, Stanton, appreciating the advantages of breech-loaders, ordered the alteration of 25,000 "Springfield muskets to breech-loaders of the best pattern."

Then it was that Master Armorer Allin, to whom I had devoted the years from 1858 to 1861, at the Springfield Armory, teaching how to make my guns, began the work, and made the Allin alteration of the Springfield musket, retaining every one of the essential elements of my inventions patented in 1858 and 1859.

These essential elements, as disclosed in my patents in combination, are as follows, and I defy the world to show its existence previous to 1856, or to produce a military arm of any kind, except revolvers, now in use in any army in the world, in which the combination is not used:

First.—A barrel rigidly attached to the stock or frame open at the breech, having a tapering cartridge chamber to admit a cartridge case whose interior diameter is equal to the diameter of a projectile large enough to fill the rifle grooves in the barrel, the rear end of the barrel cut away for the hook or bill of a cartridge extractor to come in front of the flange of an inserted cartridge, and fill the cut thus made to receive it, when the gun is fired.

Second.—A breech block movable in relation to the stock and barrel, which is locked in place before the charge is fired, and which carries an easily retreating firing pin, so that the cartridge can be forced in without pressure on the priming, or makes other provision for igniting the fulminate priming in the cartridge.

Third.—An open space non-contact, all around between the front face of the breech block and the rear end of the side walls of the cartridge chamber, leaving room between the face of the breech block and the rear end of the barrel for the head on any cartridge case made for use in the gun.

Fourth.—A loosely fitting, primed, flanged, expansive metallic case cartridge, capable of use any side up, which seals the breech joint, both as to powder and priming, and is made of sufficient substance not to burst and leak at the breech joint.

Fifth.—An automatic cartridge extractor, made movable in relation to the breech block and other parts of the gun.

The first one of these elements is often modified in machine guns to bring up different barrels, to prevent the overheating of one, but the principle always remains the same.

Some inventors move the breech block in one direction to open the gun, while others move it in other directions, but it is always the same breech block that gives the finishing thrust to insert the cartridge, never itself making contact with the barrel, always leaving an open space for a cartridge head, and always locked in place before firing, and always providing for firing the charge through itself, as described in my patents of 1856 and 1858, operated by me in two different directions.

All use a loosely fitting metallic case cartridge having the esential elements first described in combination in my cartridge patent of 1856, and claimed in my gun patent of the same date, to seal a breech joint purposely made open, between a movable breech block and the rear end of the gun barrel, but not essential to the sealing of a close joint necessary in tipping barreled guns. This combination in the cartridge made the breech-loading system possible, and not a military gun in the world is fired without its use.

All provide for the certain withdrawal of the cartridge case, whether fired or not fired, by the use of either the hook extractor patented by me in 1856, or the crank lever extractor described in my patent of 1858, operating upon an unchangeable flanged head on the rear end of the case.

My movable base cartridge is a perfecting up of my old system to the long-range small-bored rifles now in use. It provides for the inaccurate workmanship of both gun and cartridge, and also for the wear of parts of the gun in use by relieving the cartridge case from all longitudinal strain.

Its general adoption may be delayed for a time by ill-considered reports from the army, where my instructions for its use were not followed; but its final adoption is certain, because when properly handled it never clogs the gun, and becauses it reduces the cost of practice to learn the use of the gun substantially to the cost of powder, balls, and priming—a saving in our little army of about $30,000 yearly.

Canals or Ship Railways.

The system of carrying burdens on ship wagons is receiving attention, and, it is argued, if a vessel can safely carry a heavy freight over stormy seas, where half her hull is sometimes out of water, pounded by the waves that break upon her decks or drive upon her abeam, tossing her in their fury from crest to crest, and dropping her suddenly into great "troughs of the sea," it is idle to suppose that she cannot safely carry her burden when lifted gently into a "cradle," and borne smoothly and steadily along over solid rails of steel. It is customary to speak of the sea as a ship's "native element," but no ship was ever yet built in the water. Ship railways, however, have now passed beyond the stage of mere scientific speculation. The air is full of ship railway projects for all parts of the globe. The ship railway over the Chignecto isthmus is already under contract. A ship railway has also been surveyed across the Florida peninsula to save the 600 miles of distance around and through the straits. This, we are assured, is a most practicable route, and the railway can be built for about one-half the estimated cost of a ship canal. But the great work in all this programme, both as to the magnitude of its construction and its results, is the Tehuantepec ship railway of Captain Eads, now in the hands of Captain E. L. Corthell as chief engineer. This is a scheme which is regarded by competent judges as sound and well planned, though it is one of remarkable originality and boldness.

Perhaps it is too much as yet to say that the age of ship canals is giving way to that of ship railways, but M. De Lesseps can hardly be expected to feel quite at his ease in the presence of this new and vigorous movement.—*The Iron and Steel Trades Journal, London.*

Triple Expansion.

An interesting example of the value of triple expansion engines as compared with compound was exhibited on the Clyde, on the trial of the Orient liner Cuzco, which has recently been thoroughly renovated, and furnished with new boilers working to a pressure of 150 pounds to the square inch, and with triple expansion engines of the most approved type. The Cuzco is seventeen years old, and has hitherto been regarded as a 12½ knot boat. Recently she was tried on the measured mile for a six hours' run, when she attained a speed of 16 knots, and made upward of 75 revolutions per minute. This increase in speed was, a daily newspaper correspondent says, accompanied with the usual economy in coal consumption, and the incident is remarkable on account of the success with which the power of the new engines has developed a high speed in a vessel, the model of which is comparatively obsolete.

© 1888 SCIENTIFIC AMERICAN, INC.