SIMPLE LAMP SOCKET AND RHEOSTAT.

BY GEO. M. HOPKINS.

In the annexed engravings, Fig. 1 represents a simple and efficient electric lamp socket, designed for use in experimental work and in places where an ornamental socket is not required. It consists simply of a small wooden cylinder in which is inserted the end of a brass wire, the projecting portion of which is bent to form a helical coil which fits the thread of the base of an Edison incandescent lamp. In the wooden cylinder is inserted another brass wire of the same size, which is annealed, flattened, and bent over the end of the block as shown, to form the second connection of the lamp.

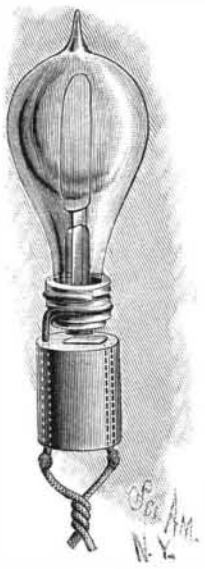


Fig. 1.—SIMPLE LAMP SOCKET.

To the ends of the wires projecting below the wooden cylinder are soldered the ends of the flexible cord which conveys the current to the lamp. By screwing the lamp down in the socket, the button at the bottom is brought into contact with the flattened wire and the circuit is completed. By unscrewing the lamp, the circuit is broken.

A convenient rheostat for experimental purposes is shown in Fig. 2. A number of coiled wire sockets are attached to a board and connected with a wire leading to one of the binding posts at the end of the board. A corresponding number of flat copper strips are secured to the board and soldered to a wire leading to the other binding post. Any one or all of the lamps may be screwed down in their sockets so as to throw them into the circuit. Lamps of any resistance may be used, so that the rheostat can be adapted to the current to be controlled.

With one lamp in the circuit, the resistance thrown in will of course be that of the lamp; with two lamps of the same resistance, half that amount; with three lamps, one-third, and so on, *i. e.*, each lamp thrown in in parallel will increase the conductivity and diminish the resistance of the rheostat.

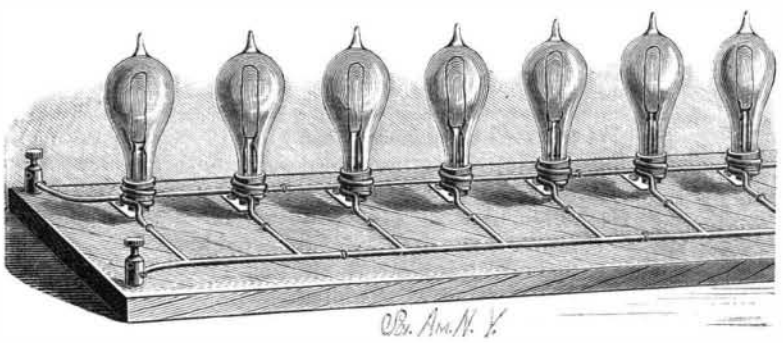


Fig. 2.—RHEOSTAT FORMED OF LAMPS.

It is not essential that all of the lamps should be of the same resistance. When lamps of different resistances are used, their joint conductivity is ascertained by adding the reciprocals of their resistances together. The reciprocal of this equals the joint resistance in ohms. For example take three lamps or combinations of lamps having resistances of 50, 150, and 200 ohms respectively. The reciprocals of these numbers are 1-50, 1-150, and 1-200, the sum of which is 19-600. The reciprocal of this is 600-19; joint resistance of the three lamps in parallel will therefore be 31.6 ohms. Where resistance greater than that of one lamp is required, two or more lamps may be connected in series.

Boiler Plates.

The methods employed by Messrs. Cramp in the building of large modern boilers, with thick plates for high pressures, are thus described:

The plates are, in the first place, pickled in a wooden bath containing a 5 per cent solution of sulphuric or hydrochloric acid. After remaining in the bath for about six hours, they are removed and thoroughly scrubbed with hickory brooms, while a strong stream of fresh water is played upon them. They are then immersed in a bath of lime water to neutralize any remaining acid, and again washed with clean water. All holes are drilled, and the edges of the plates are planed and beveled for calking. The shell plating is bent cold to the proper curvature in the rolls. The flanging is done by a Tweddle hydraulic flanger, the plate being heated to a bright cherry-red. A length of about 8 ft. can be flanged at each heat. Furnace mouth plates are flanged in cast iron dies at a single heat.

After the flanging of tube plates, etc., is completed, they are reheated, and the plates are straightened on a cast iron surface plate, and finally they are annealed by cooling in the open air from a cherry-red heat.

The riveting is performed by a Tweddle hydraulic riveter, using a pressure of 1,500 lb. per square inch on the flange, which gives a stress of about 90 tons on the rivet. The stay tubes are screwed into both tube plates and expanded, the ends in the combustion chamber being beaded over.

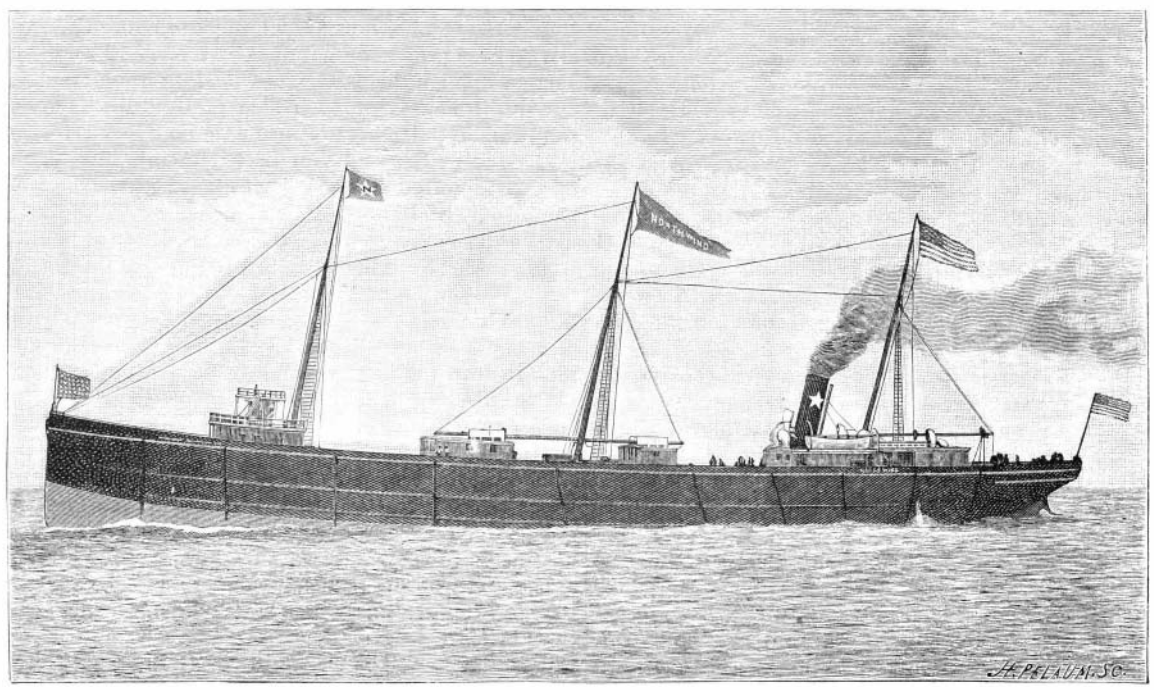
A Warning to Dog Owners.

Possessors of canine pets will do well to take warning from certain recently reported observations of Professor Nothnagel. These go to prove that the development of cysticerci in the human subject is in some cases to be attributed to contact with the saliva of lapdogs which have been allowed to lick the faces and mouths of their owners. The explanation is a feasible one, and adds a noteworthy contribution to our knowledge of morbid etiology. The tænia echinococcus, as is well known, inhabits the small intestine of the dog, and it is highly probable that the ova occasionally find their way into the animal's mouth; for example, in vomiting. There are various æsthetic reasons why the kiss of even the most cleanly and most friendly pug or terrier should be dispensed with. We have now, thanks to the Viennese observer, a still stronger argument to urge against this practice. It may, indeed, like the others, fail to daunt the too-devoted master or mistress, but we cannot do less than avail ourselves of this opportunity to forestall if possible, by a timely warning, the sharper teaching of experience.—*Lancet.*

THE STEAMSHIP NORTH WIND—THE BUSINESS BOAT OF THE LAKES.

The North Wind is one of a fleet of six steel steamships, owned by the Northern Steamship Company, the lake line of the Great Northern Railway Company, between the head of Lake Superior and seaboard connections at Buffalo. As this fleet carried between the opening and close of navigation 500,000 tons of freight, including 1,300,000 barrels of floor, they may well be classed among the money makers, and the immense tonnage credited to them shows the extent of the lake trade outside of the millions of tons in the coal and ore business. But they are unable to meet requirements even in connection with the railway, and preparations are being made for increasing the fleet in the near future by an addition of four steamers, two of which will, in all probability, be passenger steamers, elegantly equipped and so arranged that they can be used for freight traffic when the passenger season is over, carrying 3,500 tons of freight through the Sault canal.

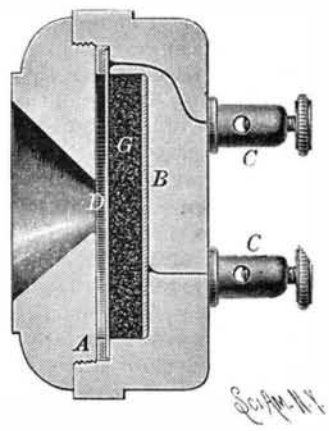
The North Wind, alike to the other boats of this fleet—they are duplicates in every respect and were built by the Globe Iron Works Company—cost her owners $223,000. She is 292 feet keel, 312 feet over all, 40 feet beam and 24½ feet moulded depth. Her triple expansion engines are 24, 38 and 61 by 42, and she has two boilers 14×12½ feet. She has four gangways on either side and six hatches for the handling of freight. A line shaft with two drums to each hatch enables the boat to handle ninety-six barrels of flour at one time, as each of the drums handles eight barrels. The boats are capable of carrying about 2,500 net tons on 15 feet of water through the Sault canal. The boats are thoroughly equipped in every way, the Northern Wave being fitted with an Edison electric light plant, and the entire fleet have Providence windlasses. Electric plants will be placed on all of the other boats of the line during the winter.—*Marine Review.*



NEW LAKE STEAMSHIP THE NORTH WIND.

LONG DISTANCE TELEPHONY.

The difference between the ordinary and the long distance telephone systems lies not so much in the instruments used for transmitting and receiving speech as in the lines. The fundamental thing in the long distance telephone is a metallic circuit, *i. e.*, a line in which the current returns through a wire instead of the ground. Another important difference is that the wire used in the construction of the line is of very high conductivity. By the employment of the metallic circuit the effects of induction are *nil;* the induction in both wires being equal and in opposite directions in the receiving instrument, exactly neutralize each other.



Where the long distance line is in a cable containing other lines, the two wires are usually twisted, to subject them both to exactly the same inductive influence.

These are important points, and it is of course necessary to employ an efficient transmitter. The one commonly used on long distance telephone circuits is known as the "Hunning transmitter," shown in section in annexed engraving, for which we are indebted to Prescott's "Electric Telephone." The diaphragm cell is made of insulating material, and arranged to clamp a diaphragm, D, of thin platinum foil or ferrotype plate, the diaphragm being held in place in the cell by a ring, A. In the cell is arranged a back plate, B, of brass, the space intervening between the back plate, B, and the diaphragm, D, being filled with a body, G, of loose, finely divided conducting material, preferably finely granulated coke, sifted so as to remove all fine dust. Oven-made engine coke is recommended for this purpose. The binding screws, C, C, are placed in connection with the diaphragm, D, and back plate, B.

This transmitter may be used in a circuit with a battery and Bell receiver, or the transmitter and battery may be arranged in circuit with the primary wire of an induction coil, the secondary wire being connected with the line wires extending to a distant point, and there provided with a Bell receiver. This transmitter has been tested by Prof. Cross along with the Edison and Blake transmitters, with the following results: The average strength of the current flowing with the Edison transmitter was 0·100 milliampere; with the Blake transmitter, 0·138 milliampere; and with the Hunning transmitter, 0·560 milliampere.

Fat in Milk.

The Dairy Association of Kiel offers a prize of £150 (3000 marks), for an improved method for determining the fatty matter in new milk, skimmed milk, and butter milk, without the use of a chemical balance as accurately as by the gravimetric process. It must be free from danger, cheap, and so simple in execution as to allow of comparative determinations of the fat in the milk of individual cows; and it must be distinctly preferable to all the methods now in use. Applications marked with a motto and accompanied with a sealed envelope containing the name and address of the sender, and with the apparatus required, may be addressed to Herr C. Boysen, Kiel, up to October 1, 1891.