Electrical Effects—Luminous and Vibratory.

M. D. Negreans, of Paris, has made an interesting series of experiments relating to the vibrations and luminous effects produced in metallic wires by a Wimshurst machine. If one pole of the machine is connected to a wire stretched, insulated and contained in a tube, the other pole of the machine being connected to earth, the wire is seen to make transverse vibrations. If the vibrating wire is observed in the dark, alternately luminous and obscure portions are seen. When the wire is attached to the positive pole of the machine the phenomenon takes the form of brilliant and equidistant lines, which are wider at the middle of the wire and thinner at the ends. In the case of the negative pole, a series of equidistant luminous points is seen all along the wire. The experiment was made with a glass tube 8 feet long and 2.4 inches diameter, and a wire gaging 0.1 inch. If two wires of the same length are stretched parallel and connected with the two poles of the machine (the outer ends being electrically free), the wires enter into vibration. In the dark, a series of equidistant luminous points are seen on the negative wire, while on the positive is a series of luminous lines whose centers correspond to the luminous points of the first wire. The experiment is very brilliant if the two wires are fused in the ends of a glass tube, and the luminous lines and points appear very regular. If the wires are close enough together, only one of them need be attached to the machine, the second being connected to earth, thus giving a condenser effect.

IN THE TERMINAL STATION AT BUFFALO.

BY ARTHUR B. WEEKS.

As has been heretofore stated in a recent article in these columns, a third transmission line, of aluminium, has been finished and is now in operation between the cities of Niagara Falls and Buffalo, carrying electric current from the Niagara Falls Power Company's plant to the Pan-American Exposition. In the terminal station, just within the city limits of Buffalo, is found a fine example of modern insulating construction and protective devices, the experiences of years having brought to bear in producing marked changes and wonderful developments in the handling of high voltages.

The cables, on entering the terminal station, are connected to the time limit relay circuit-breakers and switches shown in one of the accompanying illustrations. At the rear of these specially built panels are the lightning arresters, consisting of spark gaps and choke coils. From these panels the cables are continued to six Westinghouse static interrupters, 100 amperes at 22,000 volts, one on each pole, a common ground wire being used for the interrupters, between each of which and the ground an inclosed fuse is in circuit.

From these interrupters, located in the rear of the transformers shown in our second engraving, the two three-phase circuits are continued and next connected to the six 2,250-kilowatt Westinghouse transformers, which, like others of that make, are oil-insulated and water-cooled.

The pressure is here reduced to 11,000 volts, and the three-phase cables continued to the distributing board, as will be seen in our third engraving. Here they are connected to two sets of bus-bars run through vitrified tiles, to prevent short circuits. From the bus-bars a number of circuits run.

The cables coming from the transformers extend upward through the floor, through porcelain insulators, at the rear of the distributing board. The circuits have single element switches which may be connected to either set of bus-bars. Each circuit on the distributing board has its circuit-breaker and switch. Some lesser parts of the wiring are as yet incomplete, as well as a railing which will take the place of ropes now stretched before the open, unprotected switches. In our illustration is shown a platform where circuit-breakers are opened or closed by means of a hand lever.

RELATIVE SPEED INDICATOR.

Kilroy's relative speed indicator, which is manufactured by Messrs. Evershed & Vignoles, Limited, Woodfield Works, Harrow Road, London, has been devised in order that those in charge of the engines

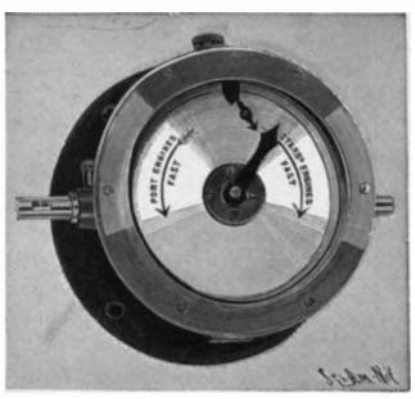


Fig. 1.

in twin-screw ships may be able to know at a glance whether the port and starboard engines are running at equal speeds, and, if not, which is going the faster. The indications given by this indicator are such as to enable the engineers quickly and easily to bring the engines to equal speeds, and maintain them so. The advantages gained in the engine-room by the use of this indicator are self-evident to those used to the management of marine engines. Deck officers will appreciate the benefits derived, as the equal running of the two engines, besides insuring a slightly better

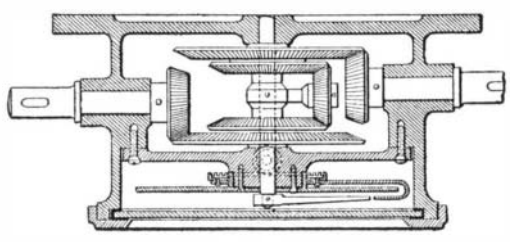


Fig. 2.

efficiency of propulsion, facilitates the steering of a ship under all steaming conditions.

The engraving shows an indicator. One of these would be fitted in each engine-room, suitably near the starting platforms.

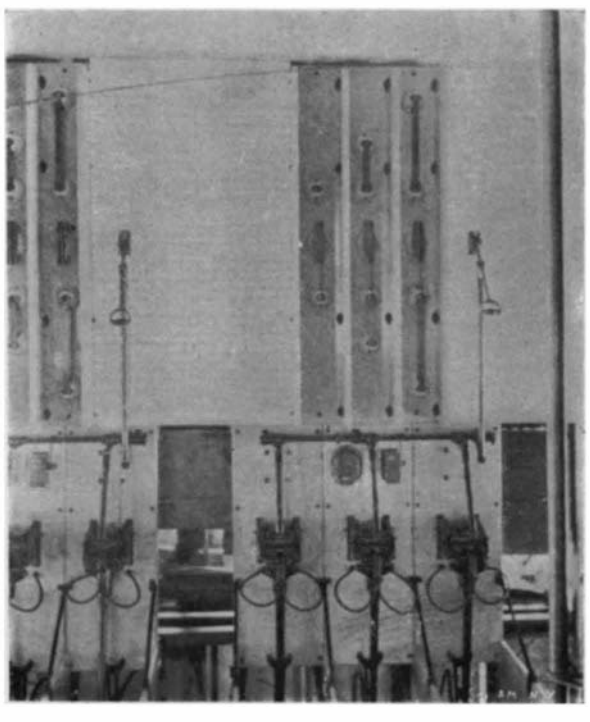
When the two engine-rooms are separated by a water-tight bulkhead, the two indicators could conveniently be coupled together, one on either side of the bulkhead; as, in this case, connection by shafting to the port and starboard engines need only be made to one of the two indicators. The direction of rotation of the pointer indicates the faster engine. The right-hand shaft is joined by shafting to the starboard engines; the left-hand shaft is joined by shafting to the port engines. When both engines are running at equal speeds, the pointer will remain stationary opposite the indicator mark. If the starboard engines are running faster, the pointer will move round in the direction indicated on the dial shown in the photograph. If the port engines are running faster, the pointer will move round in the opposite direction, as indicated on the dial. The small arrow pivoted under the indicating mark is always pointing in the direction in which the pointer has moved away from the indicating mark. Lubrication is provided for all the moving parts, an oil syphon being fitted in the usual way.

It will be seen from Fig. 2 that the shafts to be connected respectively to the port and starboard engines each engage, by means of bevel gearing, with a differential bevel gear, whose bevel pinion is mounted on an arm which is pinned to a spindle, to the end of which is fixed the pointer. An auxiliary pointer acts as the "indicating mark," and is fixed, behind the dial, to a crown wheel gearing with a pinion on a spindle, which is actuated by a knob on the outside of the instrument. This arrangement enables the "indicating mark" to be moved round the dial opposite to the pointer when necessary. The small auxiliary arrow pointer, which can be seen in Fig. 1, but which is not shown in Fig. 2, is pivoted under the "indicating mark," and has a cam attached to it behind the dial worked by a spring lever. At the back of the pointer is a spring pin or tooth, which engages in a hollow in the back of the arrow pointer in such a way as to leave it pointing in the direction in which the pointer has moved away from the "indicating mark."—We are indebted to London Engineering for the above description.

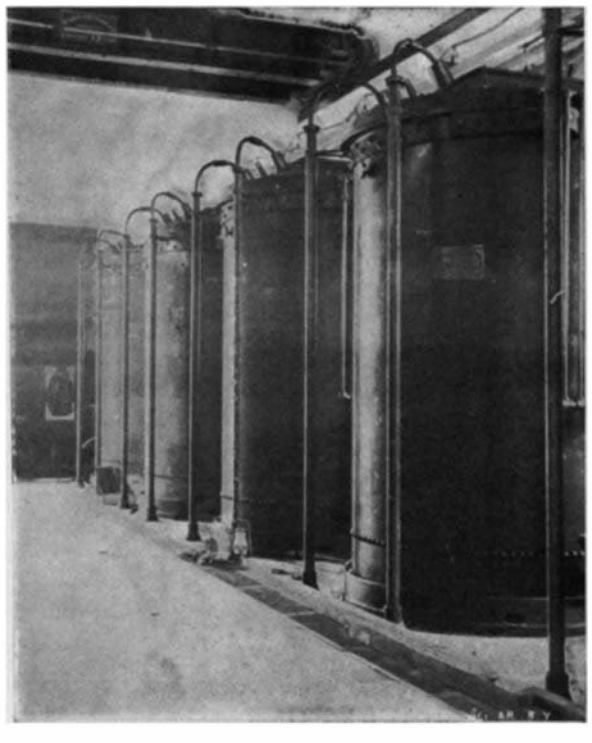
Restriction of Penny-Ice Trade.

The London Lancet sounds a note of warning concerning penny-ices, the number of peddlers of this delicacy being about as numerous in the British metropolis as in this country. The penny-ice man is usually an Italian who is anxious to return to his own country after ten or twenty years' hard work, and become a land owner. In order to do this he is compelled to live in unsanitary surroundings where there is every risk of contamination. The Public Health Committee of the London County Council recently brought out a report, which was adopted by the Council, recommending legislation forbidding the manufacture, sale or storage of ices in any cellar or room in which there was an inlet or opening to a drain, or in any other place where there is any risk of contamination or infection. A failure to notify in case of infectious or contagious disease occurring among persons employed in this place would lead to summary conviction and the infliction of a fine. Finally, every vendor must exhibit on his barrow a notice giving the name and address of the persons from whom the ices have been obtained. Many ices are made in small backyards of overcrowded tenement houses, and the conditions are as unsanitary as when the ices are made in an unhygienic room. From the public health point of view, it would be a great advantage if the ices were made in large and properly arranged establishments. Aniline colors are freely used in tinting the ices.

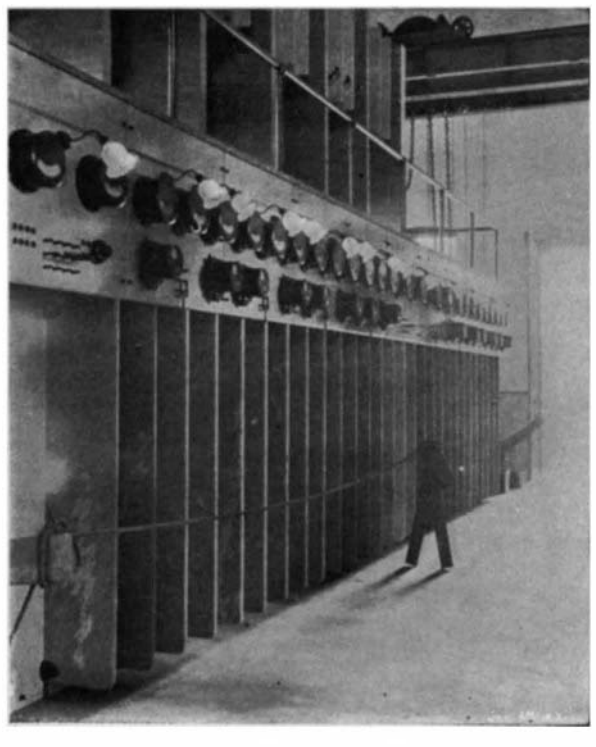
The chimney of the Oxford copper works at New Brighton, Staten Island, is 365 feet above the ground.



Time Limit Relay, Circuit-Breakers and Switches.



Transformers.



Distributing Board.

TERMINAL STATION AT BUFFALO.