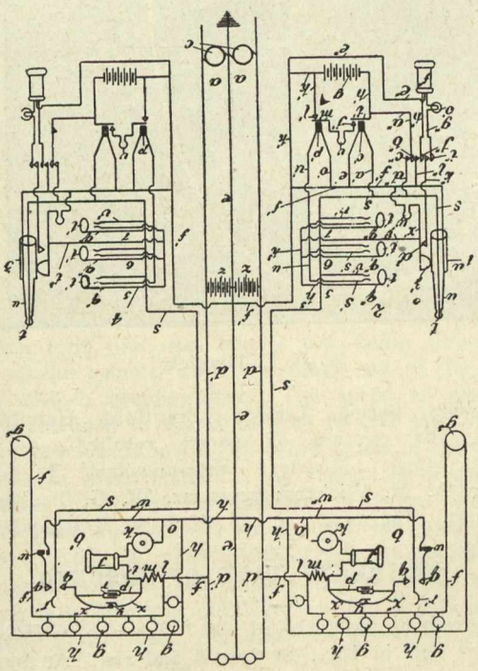
station to provide him with light and power also. As a result of continued experiments, he has succeeded in perfecting a system by which it is possible to use an ordinary electric light direct current of 110 volts, for the operation of telephone instruments, without possible danger thereto; hence, owing to this new development, every telephone subscriber is also supplied with a current which will light any number of lamps that he may require, in addition to driving motors, operating telegraph instruments, electric bells, fire and burglar alarms, etc.

As will be seen from the diagram of the circuits, the inventor proposes to adopt what is known as the three-wire system of generation and distribution. The current necessary for all services is distributed from the generator at the central station, where the telephone switchboard is also located, over the same main power circuit, from which service wires are taken to the subscriber's premises, in accordance with the present method adopted by electric light companies. In addition to this, one wire is carried from the central station to each subscriber's telephone, thereby effecting a saving of the second wire necessary with existing telephone systems.

The advantages claimed by the inventor for this system are as follows:

Economy and Simplicity of Construction.

One generating plant and central station instead of two. One wire of No. 22 B. & S. copper for each telephone circuit, instead of two wires of No. 19 B. & S. gauge. This would enable three times as many subscribers to be served as can be accommodated to-day by a cable of equal diameter over



five times the distance. As the same conduits would carry the mains for all services the number of underground ducts would be reduced to a minimum, and the amount of trenching would be lessened. The system of distributing could be so laid out as to avoid congestion, and the present chaotic web of underground and overhead electric light and telephone wires could be replaced by one well ordered and clearly defined system of conduits carrying the mains for every kind of electric service. These new conditions cannot fail to be a source of economy not yet reached in electric light and telephone construction.

Economy of Operation.

It is obvious that with the exception of the cost of the operation of the telephone switchboard, the combined systems could be maintained for the same expenditure as is now incurred by either one of the companies now supplying electric light or telephones. In other words, one managing and maintenance staff would be required, instead of two, as at present.

It may also be stated that the use of a direct current of 110 volts reduces all danger of personal injury from shock to the minimum. In fact, we believe no case has yet been recorded where death has resulted from receiving a shock from a current of this description and voltage; whereas the number of fatalities due to shocks received from alternating currents of high frequency is legion.

With regard to the general efficiency and economy of the three-wire system for electric lighting, the fact that the largest and most economical electric lighting plants in Great Britain, both company and municipal, including London, Liverpool and Glasgow, employ this system, is a sufficient demonstration of its merits.

The accompanying diagram and explanation will show the method of operation: A represents the central station and b b' the subscribers' stations. Connecting them is a three-wire circuit of two main wires d-d' and a return e. From the main wire d to station b is a wire f with a return h to the wire e. Connected in parallel with these two are the lamps g and a motor g5. Bridged across the wires f-h are the transmitter k and receiver j, with a resistance m. Hook r' is connected to a line wire s leading to the central office and there connected to the tip t of subscriber's individual plug u, and also to the signal relay c'. When the hook is down it rests on contact q' and cuts in the subscriber's signal w, connected on the other side to the main return wire e. The line wire s is connected to one spring v' in each of the multiple jacks of the line at central, of which the other springs s' are connected to the common return u', and thence through the relay p' by wires o' and f' to the common return e. The test rings t' are all connected together and to the plug seat switch x'. At the subscriber's station wires x and x" form a telegraph circuit, with any desired telegraph instrument y bridged by a condenser r, the purpose of which is to prevent the interrupted current of a telegraph instrument being transferred to the receiver of a telephone instrument. When the switch-hook r' is up it rests on a contact q, and the circuit from the central station is then from tip t of plug u, line wire s, hook r', contact point u, wire p, wire i, receiver j, and transmitter k to return wire o, and main wire e, and also from p over the telegraph circuit. Telegraph messages are sent and received over the telephone circuit when the hook is in this position. A storage battery z is bridged across the main power circuit to smooth out the current over the generators a-a. In calling central, the receiver is removed from the hook r' which engages the contact q and closes the line circuit to relay c', which attracts its armature i' and lights the lamp v, by current from battery g', the armature m' being normally back. When a plug is inserted in the jack, the tip t engages spring s' and closes the circuit of relay p', extinguishing the lamp v. It also engages the line spring v' and establishes a circuit to the signalling device w, which continues to operate until the receiver is removed from the hook. A clearing-out lamp w' is provided whose circuit is closed at the plug seat switch of the calling line when the plug is taken up for use. This lamp remains lighted until the subscribers have hung up, its extinction signalling for clearing out. The operator's telephone f2 is cut in by a listening key of the ordinary type whose contacts are shown at i2, j2, b2, and c2.

THE CANADIAN CASUALTY AND BOILER INSURANCE COMPANY.

The above company was recently organized with an authorized capital of $1,000,000, and a paid-up capital of $500,000 to carry on the business of boiler inspection and insurance sprinkler inspection and other classes of insurance and oversight appealing to owners of steam plants and manufacturing plants. The success which has already been attained by the company since it started business encourages the promoters to feel that they are filling an actual want. The business of boiler insurance had only been represented by one company in Canada, before the Canadian Casualty and Boiler Insurance Company entered the field, and the new law which was passed last year making it compulsory for companies to have their boilers inspected and insured, has no doubt