cate. The twelve cells supply all the battery current for the operators' instruments, line, supervisory and pilot lamps, and all the subscribers' instruments. The battery rack is constructed of architectural iron, and is strong and well braced. The shelves are heavy slate slabs. The power tables are



## Fig. 8.

made from angle iron and arc strong and rigid. The top is of a thick maple slab supported on soft rubber balls, set in a maple frame, mounted on the top of the iron rack.

Fig. 8 is a business wall telephone with shelf. It is equipped with a strictly long distance transmitter, mounted upon an adjustable arm. The receiver is a double-pole, horseshoe magnet type. It is adjustable, and has all parts self-contained and completely enclosed. The switch is of the long lever gravity type, and is so constructed that it has no scraping or rubbing of parts excepting at the contact points, which form a sliding and positive connection at all times. This instrument has all its apparatus mounted in a quartersawed oak or walnut backboard of a neat design.

Fig. 9 is a long distance central energy instrument, largely used for residence use. It has all its parts compactly mounted in a small case, without shelf. A portable desk telephone is also in use. Its pedestal is a neatly designed, strongly constructed cast brass stand. The switch is mounted in its head, and has a large and strong restoring spring. It is constructed on the same principal as the wall set switch and has no rubbing of parts excepting the platinum contact points. All exposed parts are of brass, heavily nickel-plated and highly polished.

On all telephones there are no exposed metal parts that form any part of the circuit at any time. All terminal

scribers signal the central office automatically when taking the receiver from the hook. This lights a lamp on the switchboard in front of the operator, indicating that a connection is desired. The attendant inserts connecting plug in the spring jack immediately below the signal showing, which connects the operator's telephone, when the number of the party wanted is ascertained. When the number desired has been given, the operator inserts the mate plug into the spring jack of the line desired, and presses the ringing key, which throws the power generator in circuit and rings the bell of the subscriber's instrument. The ringing key is automatically restored to its normal position from the ringing side, and is manually restored from the listening side. When conversation is completed, and subscribers replace the receivers on the hook, lamps corresponding with the connecting cords are lighted on the face of the plug-board. These are automatically extinguished when the lines are disconnected. Each position on the board is provided with three pilot lamps which are placed at the bottom of the face of the board, one indicating when a subscriber signals, one when a subscriber is being called, and one when the subscribers have replaced the receivers and until the disconnection is made. This means gives a double signal to avoid any mistake, and in case of any defect at any time in any one part of the equipment.

## A NEW TELEPHONE HOOK-SWITCH.

In Figs. I and 2 are shown two perspective views of a new hook-switch, recently placed on the market by the Stromberg-Carlson Telephone Manufacturing Company, of Chicago. The hook is one of the long lever type and mounted on a heavy brass frame fastened with bolt and nut. The hook lever forms no part of the circuit, but all con-



Fig. I.

tacts are made by the springs mounted upon the lug at the side of the frame, as shown. The downward movement of the hook causes a hard rubber insulated pin, attached to the lever, to be drawn in between the springs, thus disengaging the springs and breaking contact, as shown in Fig. 2, and making contact when the hook is released, as in Fig. 1. A



Fig. 9

screws, binding posts and connecting wires are fully concealed. In this system there are no batteries at the local subscribers' instruments, all battery power of the system being obtained from the storage battery plant at the central office. Sub-

## Fig. 2.

stop is provided at the lower edge of the frame to prevent the downward movement of the lever, below the proper point. The springs are made of German silver of good length, and all contacts are pure platinum; pure hard rubber strips are used to insulate the springs from each other and the frame. At the top of the lug, upon which the springs are mounted, is fastened a strip of hard fibre with the front edge slotted, through which the wires are brought down to the springs, thus keeping them separated and reducing the chances of short-circuiting to a minimum.

The Index to the Canadian Engineer for 1902 is now ready and will be mailed to subscribers on application.