front of the board, showing back and front plugs and flexible connections and counterweights, are shown in diagram (Fig. 6).

In Fig. 4, a general view of the front of the board is given; in Fig. 2, the arrangement of spring jack apertures in groups of 100 is shown. It is evident that the operator can very quickly find any desired number of the 6,000. The upper part of the board is unoccupied. When this portion is filled, the capacity of the board will be nearly doubled. It now, as has been stated, is wired for 6,000 subscribers.

The subscriber's bell is rung by depressing a button. This turns on a current from a dynamo driven by an electric motor. At night a current is taken directly from the storage batteries, and by means of a pole changer is made to vary in direction so as to ring any bell it is connected with.

Some idea of the magnitude of the work may be reached from the number of soldered connections. Of these there are 810,000 back of the board. After it was erected and in place, over a year was consumed in making these joints and connecting the wires with the switchboard.

In Fig. 3 a view is given of the rear of the board showing the general arrangement of cables. The division into sections can here be traced, one section and part of another occupying the foreground of the cut. At the top the induction coils are seen, which form part of the operator's talking and listening apparatus. Hanging from pulleys the counterweights can be seen which support the weight of the swinging transmitting microphones.

On the floor of the room are three desks with spring jack connections, telephones, etc. At each of these sits a monitor, who can connect at will with any of the operators or with her group of subscribers, so as to hear all communications between operators and subscribers. Thus he watches their work, receives from them any notices of faults, and can be asked by the operators for information. The three monitors can also communicate with each other.

Lightning arresters are placed in each circuit back of the board. They are seen in Fig. 4 on the left hand side, arranged in rows against the wall. They consist of a thin strip of easily fusible metal held within a protecting tube. This foil will be melted by the lightning before it can do any injury. Very few are thus destroyed, and can be instantly replaced by new ones.

Starting with front of the keyboard, the following is the succession of keys, etc. (See Fig. 2.) Nearest its front edge is the row of buttons for ringing the calling-up subscriber's bell; second, a row of cam lever switches for the operator's listening connection; third, one set of plugs and flexible connections. There are 48 of each of these in one section. Fourth comes the row of 6,000 answering spring jacks, with, fifth, a correspondingly numbered set of 6,000 calling-up annunciators, 150 to a section. Sixth comes the row of clearing-out annunciators one for each pair of plugs, or 48 to a section; and seventh, the second set of plugs, completing the pair. This completes the contents of the keyboard. Back of it rises the main board, with its quarter million spring jacks, 6000 in a section. The general arrangement may be seen in the diagram of keyboard connections already referred to.

In the rear of the cellar is the lighting plant for supplying current for nearly eight hundred lamps contained in the building, as well as for ringing subscribers' bells. It comprises two Edison and two Electro-Dynamic Co's. dynamos, driven by Buckeye engines. The generators are so arranged that they work in connection with a storage battery, charging it and also supplying lamps with current. At night the battery is relied on for lighting. It comprises 580 cells (Fig. 5) arranged in ten series, giving an output of 300 amperes at about 125 volts potential.

The cells are continually tested with the hydrometer to determine when they are exhausted and when charged, the acid being kept within the limits of 1,160 and 1,200 specific gravity. The voltage of a single cell is never allowed to fall below 1·9. The plant is provided with ammeters and all appliances of the most advanced order.

In a subsequent issue the subject of underground distribution of electric currents for light, telephonic and telegraphic communication, power, etc., will be treated in detail, with full illustrations. The subject of local connections with the through lines and the means of making connections with them will be included, thus fully explaining the solution of underground transmission of electric energy.—*Scientific American.*

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"Stone" makes mention of a device for cutting stone by means of steel bands or wire rope made to run around pulleys like a band-saw. Since that time we have been investigating the matter more fully, and are now in possession of full detail drawings and specifications of all that pertains to the apparatus. As soon as translations can be made from matter in hand and cuts prepared, we will give all information extant upon this subject. Primarily, it is well to say that the results contemplated are much more extensive than was suggested in the original articles published by us. Not only stone-cutting but stone-quarrying in all its branches, where cutting is of use, is contemplated. It is intended for horizontal, vertical, or angular cutting. By cutting a channel through the bed of a quarry, horizontal cuttings of any length may be made, subsequent to which the machine may be adjusted for vertical cutting. These may be regulated to any angle. In such cases it is entirely possible to cut vertically any direction into the rock and then horizontally and, if desired, through the top again. While it might not be necessary to do such work at any time, the somewhat fantistic illustrations show us quarry with a central source of power and cords running in all directions, some of which are making vertical, others horizontal cuttings; again, others were transmitting power for the purpose of elevating and conveying stone blocks. Again, there are those which are cutting the quarries into various finished forms. All of the details appear to have been worked out in a thorough and practical way. The means of transmission of power when under cover is by hemp rope, otherwise wire rope. The details of the carriers and tightners are worked out in the most complete manner. Hemp rope as a means of transmitting power under cover is now very generally employed in this country, and has long since been very generally employed in other sections. One of the interesting illustrations of the use of wire rope in cutting is the gangs where large blocks are cut into many parts. The details, while most carefully worked out, are of the simplest character. In the cutting from the quarry the waste is only about one-half of one per cent., and as by its use it is possible to almost entirely do away with blasting or drilling, the general saving is apparent. It is said that the work accomplished is fifteen times greater than possible by old methods.—*Builder and Wood Worker.*

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To Remove Finger Rings.—The removal of rings is practiced by jewelers in the following manner:—The swollen finger is wrapped very tightly with a flat rubber braid, commencing at the end; the finger is then held upright for a few minutes, the braid quickly removed, and again wound around it. The operation being repeated three times, leaves the finger so shrunken that the ring may easily be taken off without further inconvenience.