The Telephone In Modern Warfare

THE signal corps in a modern army is, perhaps, the most important unit of men in the organization. Every shot made by the gun, and every move made by each soldier is practically controlled by the signal corps, that is to say, the staff officers transfer all communications from headquarters to the various posts on the fighting line by employing various kinds of signaling instruments. Some of these are familiar to our readers, as the heliograph apparatus used with the aid of the sun as a source of light, flags, lamps, telegraph and the telephone.

Fig. 4. U. S. Artillery Officer Giving Orders for Aiming and Firing of Cannon Shown in Center View, Fig. 5. Note the Compact, Loud-Speaking Telephone in Use in Both Photos. These Outfits Will Serve Also as Field Type, Buzzer Telegraph Sets. Fig. 6, At Right Shows One of the Latest Telephone Head-Sets for Aviators.

The telephone has been especially exploited for military work of late. In the past, this instrument was used very little, because it was not sufficiently perfected, but to-day there are several military type field telephones employed by different nations.

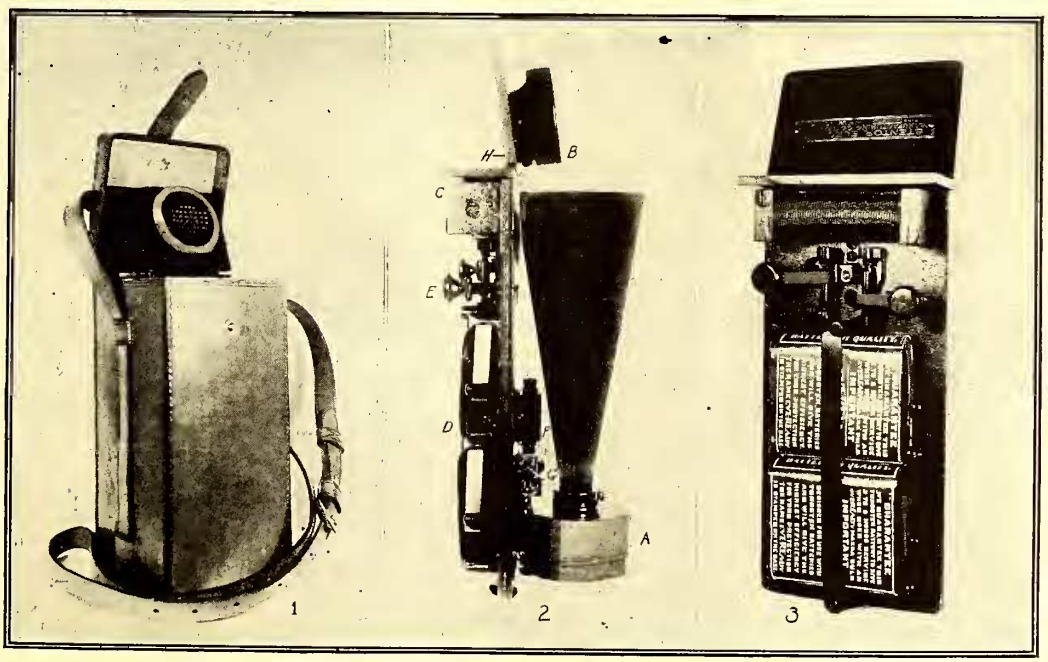
A number of concerns in this country have been developing military style telephone sets, none of which have proven superior to the portable telephone recently brought out by a New York house. The complete outfit is shown in Fig. 1. Not only is the instrument adapted for telephone service, but it also contains a military hytone, buzzer telegraph set.

This instrument consists virtually of a special loud-speaking receiver, A, enclosed in the lower compartment, Fig. 2. The horn is constructed of heavy sheet metal, substantially fastened to the receiver cap. The sound collecting instrument, or transmitter, B, is also specially built and is fastened to the case cover as the reader will perceive. The induction coil, C, is of the standard telephone type, and is supported below the cover. The power for the complete instrument is obtained from two ordinary flashlight batteries, D. These are carefully braced to the rubber support by means of a leather strap encircling both batteries. A set of four instruments comprises the complete telephone unit. The buzzer telegraph set is enclosed in the same case and supported on the same board. The buzzer, F, is of the standard high-frequency type, and is connected in series with a small telegraph key, E. This consists of two levers, one on the opposite side as can be seen in Fig. 3, which is a back view of the complete unit. The power for the buzzer telegraph is obtained from the same two flashlight batteries which supply current to the telephone. The main line consists of a rubber-covered wire, fitted at the ends with special jack plugs, similar to the ones used on a modern telephone switchboard. These plugs are fitted in a socket, Fig. 2-G, which connects the instrument with the distant party with whom communication is desired.

The cover upon which the transmitter is fastened contains two springs, H, so arranged that when it is raised to the position shown it will perform three functions: first to disconnect the telegraph key, E, from the main circuit—second, to put the telephone transmitter into the circuit so that telephonic conversation may be carried on—and third, to hold the cover in place, so that the officer using the outfit can speak into the transmitter without the inconvenience of holding the instrument in a certain position.

When telegraphic conversation is desired, the operator in charge of the apparatus plugs in with the party to whom he wants to talk, and leaves the transmitter cover down. The key circuit is thus put in operation. The telephone receiver is also connected with the buzzer circuit so that a loud sound is produced when the messages are being sent. With such an arrangement the outside noises, such as those produced by the firing of cannon, are thus overcome by the large volume of sound produced by the receiver. It has been shown by actual test that signals can be plainly read at a distance of 30 feet from the instrument during gun fire. Fig. 4 shows a United States officer of the

(*Ct'd on p. 360*)



Figs. 1, 2 and 3, Illustrating the Latest Military Loud-Speaking Telephone and Buzzer Telegraph Outfit. Rugged and Simple in Design and Construction. Works on Flashlight Batteries. Rising Lid Makes Connections.

There's a Book You Need on Page 378. LOOK FOR IT

QUESTION BOX.

(*Continued from page 356*)

ture or alternating current arc lamps and not on direct current ones?

A. 2. With alternating current there is a tendency for the action of the armature to be jerky or unsteady, and cause the light to flicker. By the insertion of these springs, the vibration of the armature is absorbed, so to speak, instead of being transmitted to the upper carbon, causing both the action of the lamp and the light to be more steady. This jerky feature is absent in the direct current lamps, in which no springs are necessary.

CONDUIT WIRING.

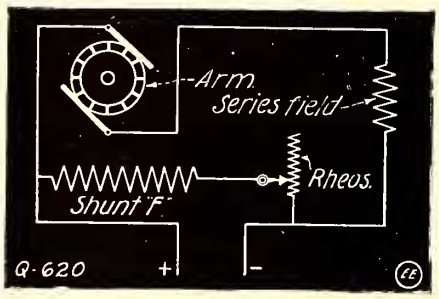
(620.) O. Blassland, Newark, N.J., writes:

Q. 1. How is a flexible conduit installed by "fishing?"

A. 1. It is pulled or fished under floors in partitions, between the floor and the ceiling, by making pockets in the floors, walls, and ceilings, say every 15 or 20 feet, and fishing through with a stiff steel wire called a snake. Thus the conduit is pulled in place from pocket to pocket.

Q. 2. How should armored cable be installed?

A. 2. It should be continuous from outlet to outlet without being spliced, and installed on the loop system. Outlet boxes should be installed at all outlets, but where this is impossible, outlet plates may be used under certain conditions. Clamps should be provided at all outlets and switch boxes to hold the cable in place, and also to serve as a means of grounding the steel sheathing.



A Rheostat to Control the Speed of a Compound Dynamo is Connected According to This Diagram

Q. 3. Give diagram of connection of a compound dynamo with a rheostat for regulating the current through the shunt winding.

A. 3. The diagram gives the proper connections.

COST OF EXPERIMENTAL LABORATORY.

(621.) Nick Smucyn, Chicago, Ill., wants:

Q. 1. An idea of the cost of an experimental laboratory for chemical and electrical research?

A. 1. You will find some good ideas given relative to a chemical laboratory and the cost of it in the *Experimental Chemistry Course* which started in the June, 1916, issue of THE ELECTRICAL EXPERIMENTER. The cost of an electrical laboratory ranges from a few dollars up to thousands of dollars. It all depends, of course, on what kind of work and its magnitude which you wish to perform in the laboratory.

Usually, if you purchase a fairly accurate voltmeter and ammeter, together with a few ordinary incidentals, you can undertake some worthwhile experiments. A Wheatstone bridge or Ohmmeter will be found very useful in any electrical measurements and tests. A small electric furnace is useful for some work as well as several rheostats, inductances, or impedance coils.

RADIO INTERFERENCE TROUBLE.

(622.) A. B. Rowland, Stuttgart, Ark., asks several antenna queries:

A. In the first place we do not know just exactly the location and arrangement of your antenna. In general, it has been our experience that a simple antenna consisting of but two wires, elevated 40 to 50 feet above the ground, having a length of 250 to 300 feet or more, will do excellent work, especially in receiving.

Again, the antenna should, in all cases, be placed at right angles to all transmission lines carrying commercial light and power currents. If this is not watched carefully there will be observed considerable induction from the antenna with severe interference created by the low frequency alternating currents on the transmission lines. In some cases this effect is so marked that it will entirely drown the signals in the receivers, unless the signals are particularly strong.

A method which has been used successfully to reduce such interference from nearby commercial light and power circuits consists of shunting a very small condenser across the antenna and ground connections before they enter the loose coupler or tuning coil. This condenser is composed of a few small sheets of tin foil, separated by paraffined leaves, the size of the foil sheet being about ¾x1 in. About 10 leaves may be tried, and a greater or less number used, as experience with this arrangement dictates. The size of the condensers will vary of course for different conditions.

With respect to your antenna and the wire for it, we would suggest that all the joints be well made and soldered, for any corrosion on the joint will tend to yield poor results. We advise that you look over some of the complex interference preventer diagrams given in the excellent 25c. book entitled "Wireless Hook-ups" obtainable from our Book Department. Undoubtedly the Marconi or Fessenden arrangement for this purpose will help you. The book mentioned explains both of these connections. Usually the proper arrangement of variable condensers and tuning inductances will eliminate, to a large extent, the sort of interference which seems to trouble you.

BRAUN TUBE REPAIRS.

(623.) Mr. Ralph Batcher, Ames, Iowa, wants to know:

Q. 1. Where he can have a Braun tube repaired?

A. 1. We are glad to know that you appreciated the articles published in a recent issue of THE ELECTRICAL EXPERIMENTER on the Braun cathode-ray tube by Prof. Dr. Ferdinand Braun. The Electro Importing Co. of New York will undoubtedly be able to have the repair made for you if the tube can be repaired at all.

NEW ALUMINUM SOLDER.

A new form of aluminum solder to be applied with a flux has been invented by Mr. Frederick W. Beitz of Peoria, Ill. This solder may be used with a soldering copper and the solder itself contains no aluminum, the inventor claims. Such solders have extensive applications nowadays and prove particularly effective for experimenters' requirements, as it is not always desirable to rivet or otherwise join aluminum parts making up tanks, cylinders and other parts.