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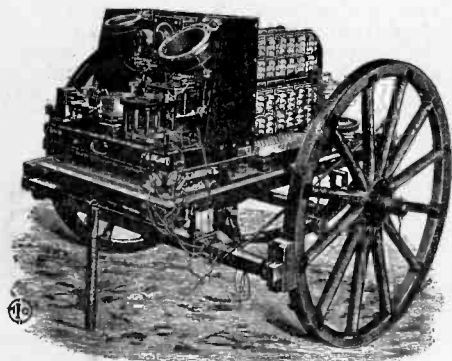
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Electricity in Modern Warfare

By H. Winfield Secor

ELECTRICITY plays a more important part in the modern war game than some people believe. Probably the most spectacular and modern application of electrical energy to war problems is that of wireless telegraphy. Truly, it has surely worked a wonderful change in the plans



Military Radio Wagon Set.

of the military or naval strategist of today. In years gone by it was no uncommon occurrence for countries or parts of countries to be entirely cut off from communication with the rest of the world during the reign of war. Take the case of Germany in the present titanic struggle; it is nearly isolated from the rest of the world, as regards the communication of intelligence in the ordinary way. Thanks, however, to the wonderful radio towers rising majestically 800 feet into the air at Nauen and Hanover in Germany, and at Sayville and Tuckerton in the United States, direct news communication is effected between the Kaiser's Empire and ourselves, as well as with other countries and ships at sea.

The applications of radio-telegraphy have been probably much more widespread for military requirements in Europe than in America. The Germans particularly at an early date realized the great possibilities of this wonderful messenger which could travel over the heads of their enemies at the speed of 185,000 miles per second.

One type of radio trunk set, mounted on a two-wheel cart, to be hauled by mules or horses, is illustrated here. The cart set shown was developed by the

Telefunken Co., and has an average communicating range of 150 to 200 miles.

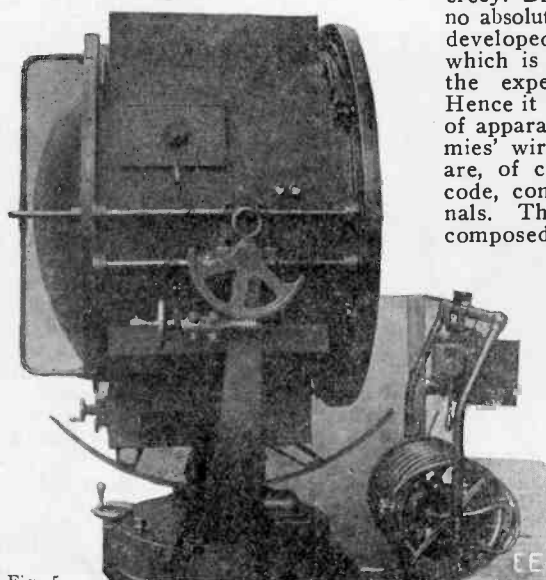


Fig. 5

Powerful Search-Light with 36 inch Lense.

The range, of course, depends upon the height of the elevated aerial wires employed, weather conditions, etc. Portable steel masts are carried by the Signal Squad for use with these portable radio sets. They are so cleverly designed and built that a couple of soldiers can erect an 80 ft. mast in a few minutes anywhere desired. By this means various divisions of an army can keep

in constant touch with headquarters.

A question in the popular mind regarding the use of radio in war is that of secrecy. Briefly, it may be said that, so far, no absolutely secret tuning means has been developed and applied in one country which is not pretty well understood by the experts of every other country. Hence it is always possible to make a set of apparatus which will pick up the enemies' wireless message. Such messages are, of course, sent by the telegraphic code, consisting of long and short signals. The letter A, for instance, being composed of a short and long signal successively, etc., a French operator would send his message in that language and supposing a German operator to have intercepted it, it is an easy matter for one of the staff to translate the received message word for word. In mili-



The German Crown Prince, an interesting onlooker at manoeuvres. Note Boy Scout with portable field telephone.

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tary radio work, owing to the state of affairs as just mentioned regarding tun-

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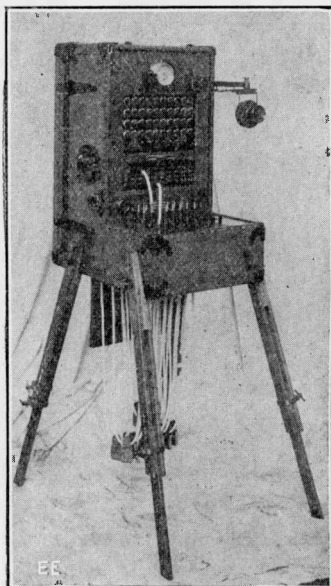
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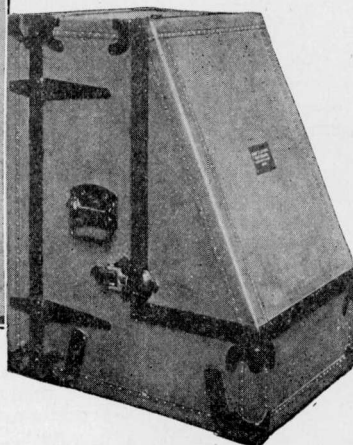
ing, the "cipher code" system is always employed invariably. As an illustration, suppose the enemy picks out of the ether the message: "The cat is in the well." Now, unless the recipient of such a "code message" has a copy of the code system governing the transmission of such a statement, he has no idea whatsoever as to the meaning of it. It might be a command from headquarters to the effect that a certain regiment was in need of assistance, etc., ad lib.

Our old friends the telegraph and telephone must not be forgotten, for they



Signal Corps style of telephone switchboard in folding case. (Left Photo)

The same switchboard closed for transportation. (Right Photo)



play a very important part in the handling of troops, etc. Our illustration herewith shows a proud German Boy Scout (now in active army service) carrying a field telephone set on his back. An officer is observed using the instrument at manoeuvres, while the German Crown Prince is seen standing at the right.

Of course, these telephone and telegraph instruments require a complete metallic or semi-metallic circuit for their operation. Usually a single wire is laid along the ground or insulated on fence posts in some instances, the apparatus being joined to the ends of same, and the return circuit being completed by a connection to earth at either station. The telephones are designed for hard duty for army use.

The telegraph sets usually operate on the buzzer principle, the received signals consisting of short and long buzzes in a pair of telephone receivers strapped to the operator's head. It is simply wonderful what these buzzer telegraph sets

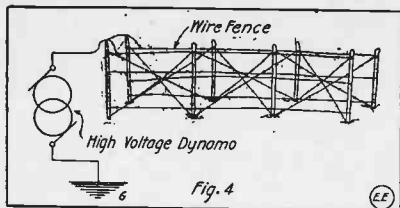


Fig. 4

can accomplish in transmitting messages under unfavorable conditions. It has occurred that, using a ground return, the wire line lying on the ground has become severed, several yards separating the two ends, but the signals were re-

ceived just the same. Connected to the two rails of a standard steam railroad, these signals will carry for several miles, notwithstanding the fact that several trains may lie in between the stations, which, of course, short-circuit the two telegraph lines or rails.

The arrangement of such buzzer telegraph sets is indicated plainly in Fig. 1. An extra inductance or kicking coil is used in series at I to boost the strength of the current taken from across the buzzer vibrator V. A battery and telegraph key complete the outfit.

The electric detonating of high explosive mines is widely used in land and harbor defenses. The principle of their application will be grasped by referring to Fig. 2, where the loaded land mines are placed at an opportune moment under some earth, etc., to hide them, so that when the enemy makes a dash onto the land so mined or part of it, all or any part of it can be blown heaven-ward in an instant by pressing the corresponding

push button at the officer's position S. A battery is generally utilized to melt a fine piece of wire in each mine, the make-up in detail of the fuse being observed from Fig. 3. The current enters the wires C C, and melts the fusible wire E, which ignites the powder B. A similar method is used in firing heavy dynamite charges used to blow up bridges, railways or buildings.

Floating mines, properly anchored, are used in harbor defense, each mine

having an insulated wire running from it to the shore. By means of range-finding telescopes and the application of mathematics, the exact position of a warship over the mined area is quickly determined. It then remains but to push an electric button corresponding to the spot where the ship lies and the mine does its work.

In land defenses, considerable use has been made of electrically charged barbed wire structures, as shown at Fig. 4. Usually the wire fence is connected to one pole of a high voltage dynamo (say, 2,000 volts or more) and the other pole of the dynamo is connected to earth. If a soldier attacks the barbed wire with nippers or wire cutters, he is killed instantly in most cases, the current passing thru his body to earth and so back to the dynamo. Wherever Central Stations are near the battle-field they provide the electric energy for this hellish purpose, or isolated portable type dynamo and petrol engine outfits are impressed for the work.

So that the enemy may not get too much time to sleep, monster searchlights sweep their dazzling beams over the battlefield, showing the gunners their prey.

A typical searchlight of this class built by the Carlisle-Finch Co. and having a lens 36 inches in diameter, is illustrated in Fig. 5. This massive arc light is fitted with electric motion controlling devices so that it can be placed in a field by itself and controlled by an electric wire from a distance. Its powerful beam can be seen for several miles. The projector is here illustrated just before being mounted on an automobile truck, which can transport it rapidly to any

point desired. Imagine a battery of these mammoth searchlights throwing their weird white beams back and forth over the battlefield, with a perfect rain of bullets and exploding shells all about, and some idea of the 20th century night battle is gained.

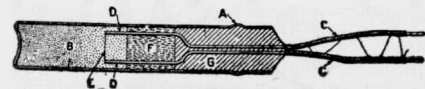


Fig. 3. Mine Detonating fuse.

Finally, we should not overlook the merciful work the field and hospital X-Ray apparatus is performing for thousands of injured men. The Hughes electrical induction balance is also in use for locating bullets and shell splinters in the body. Beyond a doubt, electricity has made decided changes in modern military strategy and warfare; changes that our forefathers wouldn't even have dreamed of, much less believed to be a possibility.

Few people know the important and varied use of electricity in this great war of the nations. The great navies of the warring countries could hardly be operated without electricity. It carries the wireless signal from ship to ship, from station to station. It revolves the gun turrets, manipulates the guns, carries the ammunition and controls the gun fire. Every part of the ship is connected by telephone and signal systems. It lights the searchlights, drives

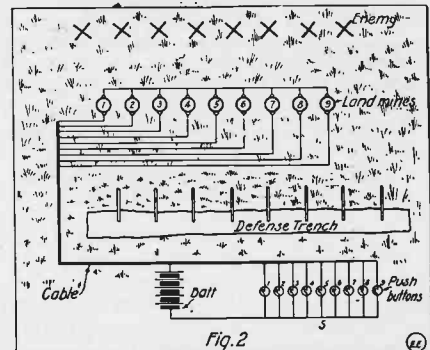
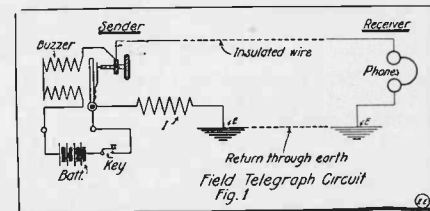


Fig. 2

the submarines beneath the waves, and sparks the motors for the air craft. It is even used for cooking the food on a modern battleship.

In the field with the great armies electricity is no less useful and important. Here it is extensively used for portable wireless stations to establish lines of communication between army corps and division, between the firing lines and the supply bases. Buzzer signal systems, telephones and telegraphs are also used for this purpose. Portable search lights are carried by the infantry. Thousands and thousands of horses are still used by the armies of Europe, but huge auto trucks and high-speed automobiles are



Field Telegraph Circuit Fig. 1

employed whenever possible. Of course, these cars could not be operated without electricity to ignite the gas. This is equally true of the huge air craft and flying machines. Electricity is used to fire mines and dynamite charges when there are railroads, bridges, etc., to destroy.