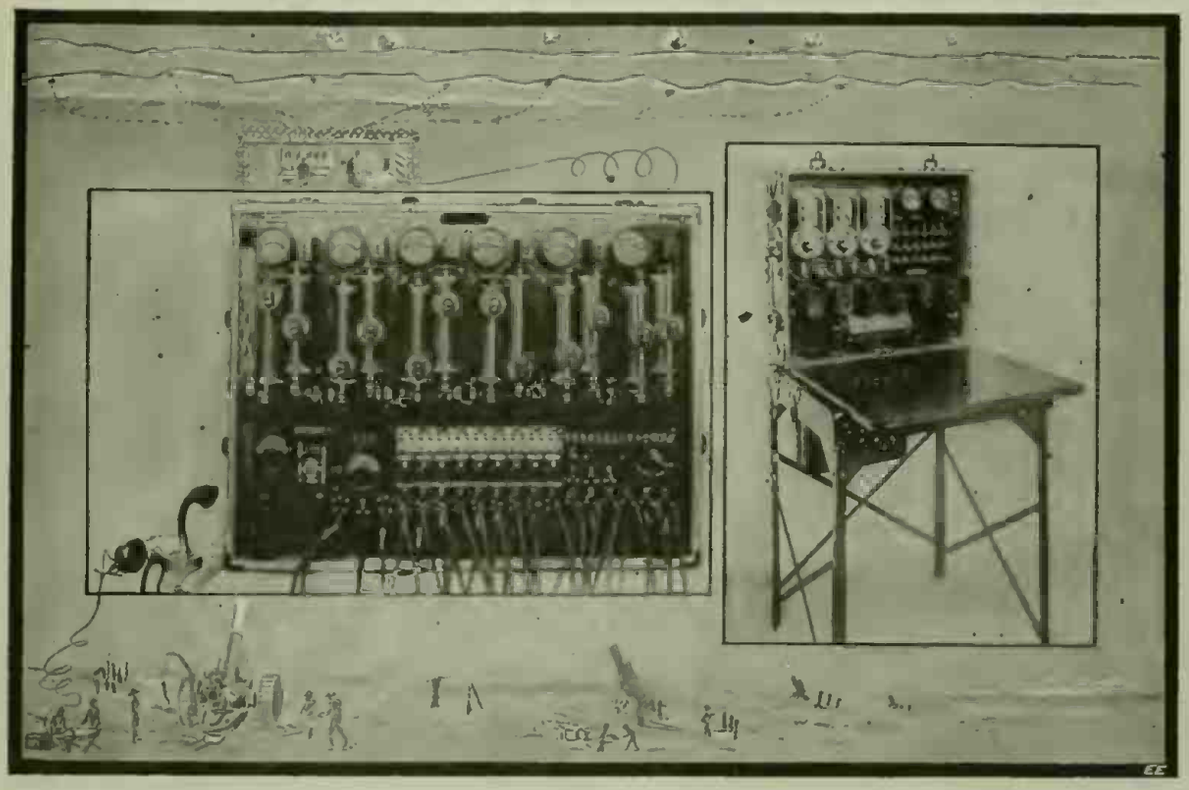
Locating Enemy Guns by Flash and Sound



Switchboards Used for Flash or Sound Spotting of Enemy Artillery. Photo at Left Shows a Type B-T Sound Ranging Set Such as Used By the United States Army Signal Corps During the War. Many of These Switchboards Were Successfully Used At the Front. It Is Slightly Larger Than the Smaller Model and Requires a Little More Time to Set Up, But On the Other Hand It Combines Many More Telephone Circuits. A Single Section Has Located as High as 117 Guns of Enemy Batteries In 24 Hours. The Right Hand Photo Shows a Small Portable Switchboard, Known as a Flash Ranging Set. This Signal Board Is Used in Conjunction With an Observation Telescope for Locating the Flash of Enemy Guns and General Activities At the Extreme Front, and is Suitable for Night or Day Service.

THE accompanying photographs show respectively two of the war's newer developments, which even the veterans of the Spanish-American War were not familiar with. For one thing, of course, "flash ranging" and "sound ranging," as they are called, are really two military developments which were brought about by the fact that vastly greater numbers of guns were used in the great world war than were ever even dreamed of before.

Let us first consider the "flash spotter." The flash spotter usually takes up his location in the vicinity of front line trenches, or in a shell hole from which he can effectively use an observation telescope for minutely observing and locating in what direction the flash of an enemy gun occurs. The electrical switchboard shown herewith forms a part of the communication link with the artillery and general intelligence headquarters, so that the position of the enemy guns can be quickly made known, and either shelled at once by counter-battery fire by the artillerists, or else the location is accurately plotted on large maps for future consideration, depending upon the activity of the enemy gun or guns at the moment.

The flash spotter, if he happens to be located in a listening post or shell hole, or in fact in any other forward location, invariably has with him his trusty portable telephone connected by wire to the nearest communicating depot, where we find one of the small portable switchboards here shown. These switchboards are fitted with the proper regulating instruments for creating the best working conditions on the various circuits, and make provision for connecting and disconnecting a large number of circuits, in some cases, about 30 or 40 lines running out to various flash ranging observation stations, or in other cases as many as 100 or more lines. The work of the flash spotter is finished for any particular case when his observations, as to the angle in which the flash was observed, and a similar or different angle measured by a co-observer somewhere down the line, have reached the engineers. These experts, by means of special slide rules and tables, quickly solve the distance of the enemy gun and its definite location geographically by the information afforded thru the observation data submitted by two or more flash ranging observers. In other words, it is *triangulation*, which mathematical quantity has been raised to the n'th power by Uncle Sam's artillery experts.

The work of the "sound ranging" experts in locating enemy guns, both large and small, is somewhat different from that of the flash ranging corps. One of the switchboards used in connection with the sound ranging of enemy guns is illustrated herewith. Hundreds of these switchboards were successfully used at the front during the progress of the war. A single section of sound-ranging equipment located as high as 117 guns of enemy batteries in 24 hours.

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World's Largest Generator

The accompanying illustration shows one of the largest water-wheel type generators ever built, and its gigantic dimensions may be judged by comparison with the figure of the man standing beside it. This is one of several water-wheel generators built for the Keokuk electric generating station of the Mississippi River Power Company. This mastodonic generator has 52 poles and delivers a current at 11,000 volts potential. This is a high voltage for a generator to produce, owing to the strains on the revolving windings, etc. Much higher voltages are frequently used for the transmission line, and voltages of 50,000 to 75,000 are common for such transmission, these extra high potentials being obtained by means of stationary transformers in the power station where the generators are located.

The large field or stator frame here shown forms the stationary part of the generator, and the rotating member which is also of gigantic size and mounted on a steel shaft several feet in diameter, is put in place and lined up with high accuracy when the stator frame of the generator is put in place and bolted to its foundation. These large machines are invariably built in sections which can be bolted together after they have reached the site of their installation.

The transformer comprises a laminated sheet iron core on which there are two windings or series of windings, one of which forms a low voltage primary which is connected with the generator, driven by a water-wheel or other source of primary power; while the second set of windings form a high voltage or secondary circuit, in which any desired potential current is induced by induction, the primary and secondary windings being linked magnetically by means of the iron core. Transmission lines are in use at the present day with potentials of 150,000 volts and higher.—*Photo Courtesy G. E. Co.*

Note the Relative Size of the Man Compared to the Huge Stator of the Largest Water-Wheel Type Generator Ever Built. It Develops a Current of 11,000 Volts.