Portable telephone outfit. The wire carried on the back.

A field telephone station of the German Army of the West connecting it with the commander of the corps.

Lighter portable outfit. The wire carried on a hand reel.

The German Military Telephone System

By H. Marchand

AMONG the apparatus which the German army has specially studied we may note the various appliances of telephony for communication between patrols and the main body, between troops in charge of the railway service, and between the signal corps of the army.

The properties of telephony which make it of great importance for military use, are its simplicity and the high speed of communication it affords. The growing number of soldiers engaged in battles and the wide dispersion of the various corps on areas more and more extended, make it absolutely necessary that the signal corps possess means of prompt and sure communication. While radio-telegraphy, as well as wire telegraphy, may be of value for long distance communication, the telephone is essential for short distance communication with a minimum of delay and a maximum of clearness.

The German army uses four principal types of apparatus. The first is a light equipment with a high-frequency vibratory device used for the calling signals and for communication by Morse signals. This apparatus is used by patrols, the signal corps, and the field artillery. The second type of apparatus employs a magneto coil, and this is used for railway troops.

The third type is a combination of the first two, and is used for communication between corps; while the fourth is a loud-speaking telephone apparatus. The high-frequency vibrator is arranged to be connected with telegraph lines without interfering with the telegraph signals. Each post is fitted with the necessary source of power and a length of flexible cable. In the lighter, portable apparatus the line of insulated wire is carried on light reels which may readily be transported by the men in the manner shown in the photographs. The heavier apparatus with its coil of cable used for the signal corps is carried on light trucks. The lines are laid on the ground or on poles, trees, etc., or in dry trenches. Field stations are connected with the existing telegraph or telephone circuits. When desired, as, for instance, for the military railway troops, special permanent lines of bronze wire are installed.

Bending Bows for Vehicle Tops

A MACHINE for bending the bows of automobile, carriage, and wagon tops is here illustrated. It will take bows varying from 36 to 72 inches between bends.

Cast iron forms are used, and they are galvanized to prevent corrosion of the stock. The forms are adjustable by means of a right and left hand screw for bending the different widths of bows which come within the limits of the machine. They

are raised and lowered by power and rest firmly on top of the material.

The bending arms, which occupy a horizontal position before the bending begins, are fitted with a steel band or master strap over the entire upper surface, forming a table to support the minor strap which receives the material to be bent.

Models illustrating the action of geysers and hot springs.

At the left is shown Wiedemann's artificial geyser. On the right is the improved Merrill apparatus that shows what takes place in the Yellowstone Park region.

A machine for bending the bows of vehicle tops.

The minor straps are fitted with malleable iron end castings with screw adjustment for placing the end pressure on the stock. The arms are operated by means of link cable chain, in connection with a cast iron drum driven by a suitable gearing.

A convenient hand lever is used for starting and stopping the machine at the beginning and the end of the bending operation. After the arms are returned to their original position, the drum is automatically stopped. Four large steel springs are employed for holding the material firmly against the forms during the course of bending, to insure perfectly true circles, and special provision is made for taking care of the stretch of the master strap.

After the bend is completed, a malleable iron shackle is used to connect the ends of the minor strap, so as to hold the bent stock in its true shape after being removed from the machine. By one full turn of the right and left hand screw, the forms are moved inward to release the stock for easy removal. The stock remains in the minor strap until thoroughly cooled and set.

Artificial Geysers

D. L. MERRILL of Battle Creek, Mich., sends the accompanying sketch of apparatus that he has constructed to illustrate the action of the geysers and hot springs of Yellowstone Park.

A galvanized iron tank of water, X, 18 by 24 inches and 4 inches deep, represents the Yellowstone Lake. It is supported by a wooden cabinet with doors, and a shelf holding a gas stove (11), representing the hot rock underlying the valley. No. 10 is a copper vessel that represents a reservoir deep down in the earth, near the source of heat. The rubber and copper tubing are $\frac{1}{8}$ inch in diameter. Nos. 8 and 9 are drain pipes for draining the lake to the heated subterranean reservoir. No. 7 is the fissure leading down from the lake to the heated subterranean reservoir. No. 6 is a pipe which gives Old Faithful. This explodes every seven minutes, throwing water and steam over four feet high. (The original Old Faithful is in eruption every 60 to 75 minutes, and throws the water 125 to 150 feet high.) No. 5 is the Bee Hive, irregular in its action. (The eruptions of the original occur at intervals of from seven to nine days.) No. 4 is the Riverside Geyser, while Nos. 2 and 3 are just hot springs, though all three are branches of a single tube. Mr. Merrill says: "I found that lengthening and shortening any one of my tubes changed its action."

This is but one of the many pieces of apparatus which have been made by various people to illustrate and help explain the action of geysers, but it differs from all others of which we have any knowledge in showing several different forms of

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