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SIGNAL CORPS
Technical Information Letter

JANUARY · 1945

ARMY SERVICE FORCES · OFFICE OF THE CHIEF SIGNAL OFFICER

SIGNAL CORPS

TECHNICAL INFORMATION LETTER

PURPOSE THE SIGNAL CORPS Technical Information Letter is a monthly publication designed to keep Signal Corps personnel and other military personnel using Signal Corps equipment informed on Signal Corps matters. It provides means for the dissemination and interchange of information of a widely-varied nature, both technical and tactical.

SOURCE THE LETTER is compiled mainly from information available in the divisions and branches of the Office of the Chief Signal Officer. Signal Corps and other communications personnel are invited to submit, through channels, material of general interest. Information on problems encountered and overcome by combat and service communications troops is desired. Such items should reach the Chief Signal Officer (SPSAY) not later than the 15th of each month for inclusion in the letter for the following month.

DISTRIBUTION DISTRIBUTION overseas is made by The Adjutant General on the following basis: Theaters of Operations (25); Armies, Corps, Departments, Island Commands, Air Forces and Base Commands (10); Divisions and AAF Commands (7); AAF Wings and Groups (4); AAF Squadrons (2); Signal Battalions (6); Signal Companies and separate Signal units (2).

Within the continental limits of the United States the Letter is distributed to Signal and other Ground and Service Forces units and installations by the Chief Signal Officer (SPSAY), Washington 25, D. C. Distribution to Army Air Forces units and installations in the continental United States is made by the Commanding General, Army Air Forces (AFMPB), Gravelly Point, Virginia.

Correspondence relative to distribution overseas and to all addresses, except AAF units, in the continental United States should be directed through channels to the Chief Signal Officer (SPSAY), Washington 25, D. C. Air Force units in the continental United States should write to the Commanding General, Army Air Forces (AFMPB). Gravelly Point, Virginia, on this subject.

WARNING THIS publication is issued solely to give proper and speedy dissemination to timely, useful information concerning pertinent trends and developments. Nothing herein is to be construed as necessarily coinciding with United States Army doctrine. Changes in official doctrine, as they become necessary, will be officially published as such by the War Department.

Publication approved by Bureau of the Budget, Executive Office of the President

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ENEMY SIGNAL DEMOLITIONS

German Instructions Covering the Disruption of Communications Are of Long Standing

The following paragraphs are quoted from a translation of a German directive dated 1938 prescribing practices to be followed in the disabling of communication installations. Photographs illustrating this article appear to indicate that much of the directive is still in force.

DAMAGE OR destruction to communication installations is carried out in order to restrict or prevent enemy use of them, or to stop undesirable traffic in a friendly area of operations.

Complete destruction of communication installations can be accomplished by destroying overhead or underground cables and wires and the specialized equipment of exchanges, telegraph offices, repeater stations, and radio stations along with their power supplies. Repair of an installation where proper demolition has been carried out will usually require considerable time and effort and it will generally be found preferable to install entire new equipment. Complete demolition will only be resorted to by order of the army staff, commander of an army (army group), or the commander of an army corps (cavalry corps) or a division.

When an installation is to be temporarily put out of action the operation must be carried out in such a way that it may be put back into service, by our own forces, within a relatively short time by installing replacement parts. Temporary disabling of communication installations may be carried out at the discretion of any troop commander unless orders to the contrary have been received from higher authority. Each commander is responsible for carrying out the instructions he receives and is required to issue definite written orders. Communication installations will be temporarily disabled where necessary for security reasons. During an advance, damage to communication installations must be avoided where possible. In a static situation the temporary disabling of communications is permissible. During a withdrawal it is required, and in enemy-controlled territory must be done wherever possible.

The disabling of communication installations is usually the duty of the signal troop. Where extensive demolitions are to be performed the assistance of personnel of army signal units and occasionally of pioneer troops may be required. Extensive demolition will preferably be performed by specially detailed units. Personnel of the DRP (Post Office Services) must be called in when public installations are to be disabled unless the disabling has been ordered by DRP authorities.

Disabling of communication equipment, even on a small scale, involves considerable time, labor, and material. To be effective it must be carried out at the right moment, which is possible only if the orders are issued sufficiently in advance. The commander issuing orders for the destruction or disabling of communications must notify his immediate superior of the time, place, and extent of the interruption, and if active circuits are to be interrupted the stations using them must also be notified.

Orders directing the disabling usually include the following:

1. Purpose, method, and extent of the interruption or demolition.
2. Labor and materials to be used in accomplishing the task.

JUST A FEW MOMENTS BEFORE THEY FLED THE CITY, JERRIES BLEW UP THIS LUXEMBOURG TELEPHONE CENTER EARLY IN SEPTEMBER.

THE MAIN FRAME ROOM OF THE LIEGE TELEPHONE EXCHANGE AFTER IT HAD BEEN BLASTED BY RETREATING NAZIS.

3. Time of initiation and completion of the work and where necessary a detailed plan.

4. The name or names of persons who will inspect the completed work.

5. Which channels are to remain undisturbed, if any, and the name of the person responsible for their eventual disposition.

6. Provisions for the transportation of items removed to the rear and designation of the point to which they will be taken.

Demolition of communication equipment requires a detailed prior reconnaissance. Lack of a detailed plan or incomplete information may cause more harm to our own side than to the enemy. The most complete demolition of a telegraph line is worthless if the enemy can replace it or make use of other circuits near at hand, for example: by using telegraph lines of railway systems or even the rails themselves if they are laid on wooden ties. Power lines particularly offer a good emergency means of passing signal traffic.

The extent and nature of a demolition depends on the general situation and the time, labor, and material available. The demolition will be much more effective if it is performed over a wide area and to a considerable depth, necessitating the employment of considerable labor and materials in order to reestablish communications. An effort must be made to destroy or disable the most essential part of an installation, that is, a part without which it cannot function. Additional unnecessary work is avoided by doing this. Details of the key points of an installation will be found in the technical specifications of the plant. Communication in a wide area is quickly disrupted if exchanges and switching points are disabled or destroyed. On the other hand, it must be remembered that undamaged cable and wire circuits, particularly over trunk routes, are more vital to the enemy than switching points. Where an area is to be abandoned to the enemy, demolitions will be more effective if, in addition to the immediate steps taken to disrupt communications, booby traps are set up to explode when the enemy commences to use the lines or to make tests on the circuits. If these are placed in such a way as to make their presence felt at an early stage of the enemy's restoring operations it will contribute to uncertainty and cause considerable delay in his efforts to reestablish the circuits.

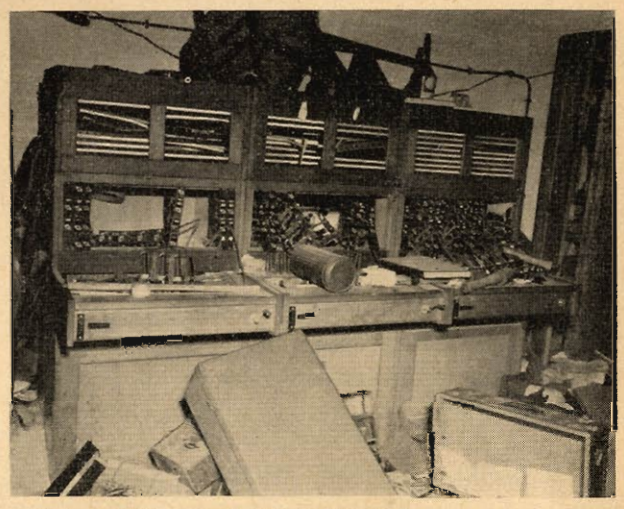
A detailed plan for the demolition of communication installations prepared well in advance will considerably reduce the time required when actually performing the work. The plan should include:

1. The location of points which can be profitably destroyed.

2. Details of measures to be carried out at each location, personnel allotted for the various tasks, and where practicable, the amount of time to be devoted to the demolition.

3. A list of the equipment required for the contemplated demolition, if possible, and where it is to be kept.

4. Provision for carrying out preliminary operations to such a point that only the final touches are necessary; for example: preparation of points



DAMAGED SWITCHBOARD FOUND BY ALLIES IN GERMAN UNDERGROUND DEFENSE CONTROL CENTER AT CHERBOURG.

on telegraph poles, cables, switchboards, etc., which are to be booby-trapped or destroyed by explosives, placing of braces or guys at points on a pole line where lines are to be cut and emplacing of short-circuiting and grounding wires, leaving only the final connections open.

5. Remove any parts which are not indispensable, cutting down traffic, if necessary, to do so.

6. Provide transportation for portable items and make arrangements for their disposal.

Detailed instructions for interrupting communications will be given in the following paragraphs. Other measures may be found more practicable depending on local conditions. Further steps not inconsistent with the spirit of this order are not only authorized but encouraged. The success of the demolition is the paramount consideration.

TEMPORARY DISRUPTION OF COMMUNICATIONS

General

The extent and nature of temporary interruption of communication depend on the end to be attained.

Simple measures are usually sufficient for security purposes in our own areas of operation. Frequently a simple disconnection will suffice. It is essential that places where such work has been carried out be guarded.

Temporary disabling of installations to be given up to the enemy are successful only if:

1. Many small troubles have been caused. They are more effective than a few large ones.

2. A large number of different types of faults are inserted. The greater their number and variety the greater the task of locating and correcting them.

3. Minor damage is effected at concealed and not easily accessible points. Their location then causes a great loss of time.

4. Concealed defects are introduced which are not readily recognizable and which do not advertise the fact that the installation is not in working order.

5. Specifications of the plant are carried away and kept in a safe place for possible future use by our forces. Due consideration must be given to the possibility of utilizing the equipment for interception of enemy traffic.

If it is anticipated that such installations may again be available for our own troops or authorities a record should be made of the damage done in order to facilitate the work of reestablishing communications.

TEMPORARY DISCONNECTION OF CIRCUITS

Open Wire—Routes of toll circuits are usually the most important. Local installations are important only when they are situated on the frontier or are in enemy operational areas (because of the danger of interception) or when they can be used as links in toll routes.

(Paragraphs omitted give detailed instructions and diagrams of techniques for introduction of opens, grounds, shorts, and crosses in open wire lines.)

Cable—A considerable number of circuits are inclosed in a cable, therefore, the number of cables for a particular installation is considerably smaller than the number of open wire circuits which would be required. For this reason, it is possible to disrupt large networks by a single cable disconnection. When such damage is attempted care must be taken that friendly traffic is not also affected. Interference with toll cables (especially international cables) may be performed only with specific permission of the High Command. It is always necessary to determine whether the disadvantages attendant on such damage may not in the long run outweigh the advantages.

Cables are very easily damaged. Partial disabling of cable circuits must therefore be carefully supervised to avoid complete destruction to the cable. Cable circuits which are expected to be used later may, therefore, be cut only by personnel with training in cable work.

(Paragraphs omitted give detailed instructions on partial disabling of buried and overhead cables.)

Temporary Disabling of Telephone Exchanges, Etc.

Permanent telephone installations are technically very complicated and sensitive. The mechanisms range from the simplest to the most complicated and from the newest to the oldest type of construction depending on the locality and the date of installation. The following paragraphs cover the types of installation usually encountered.

The removal of instructions, specifications, and diagrams to a safe place is always effective, as without them even experts must put in much time-consuming work to reestablish connections.

PREPARATION FOR RETREAT

THE DOCUMENT reprinted below was picked up on a battlefield near Caen during the early days of the invasion of the continent. It is a good example of the "written order" referred to in the High Command instructions for the disruption of communications.

REGIMENTAL COMMAND POST,
April 8, 1944.

Div. Art. Commander—716th Inf. Div.
Artillery Regiment 1716
Battalion Ia/Communication Br. B. No. 348/44
Secret

Subject: Preparation for disabling communication installations.

This unit will make all necessary preparation for the disabling of communication installations to include:

a. Determination of installations to be destroyed.
b. Assignment of personnel to perform the work.
c. Instruction of the designated personnel.
d. Preparation of schedules for carrying out the measures planned in accordance with the following:

Because of strained material resources dismantling and carrying away of communication installations must be undertaken in preference to demolition where possible. Therefore, the disabling of communications should be planned for in accordance with the following principles:

1. *Field wire lines.*—Removal of field wire lines and salvaging the wires must be attempted in any case. In exceptional circumstances where the situation does not permit this the disabling of lines may be accomplished by the introduction of numerous breaks.

2. *Pole lines.*—It is desirable to remove the wires from several spans. Before the wire is cut, the poles must be braced or guyed to prevent their toppling. Guys may be made of salvaged wire which has been cut out between previously guyed poles. Overhead wires left intact should be grounded to lightning rods or metal guys by means of fine wire as inconspicuously placed as possible. Grounding wires should be strung well in advance so that in case of evacuation it will be only necessary to make final connnection between the grounding wire and the line. At other points insulated splice connections will be made by cutting out a piece of the bare line wire and replacing it with a piece of well insulated field wire. Faults of this type should be inserted as near the middle of the span as possible to render visual detection more difficult.

3. *Telephone centrals.*—Telephone central office equipment belonging to the unit will be dismantled and taken along when the unit moves out. Where this is not possible, the switchboard and associated equipment will be destroyed. In the case of permanent switching centrals lead-in cables should be removed or cut off. Plug-in connections are to be removed and carried away. Connecting cords and plugs, ringers and power supplies are to be removed. All parts removed from the switchboard will be carried away or buried.

4. Underground cable is to be broken only on orders from Army, through "Feldschaltabteilung—2", and in accordance with specific instructions in each case. In order to achieve a maximum effect in a minimum of time troops to be employed in the duty of interrupting communications must be well trained and should be afforded frequent opportunities for practice.

Operations to achieve temporary disabling will, in general, be limited to removal of detachable parts and the opening of easily accessible connections. Parts which have been removed, as well as spare parts, should not be permitted to fall into enemy hands but should be taken away or hidden. Under no circumstances should they be destroyed, as replacement of these parts is usually difficult and sometimes impossible.

It is important to follow a definite plan. The key part of any installation must be disabled in most cases. This is easily accomplished by making simple disconnections which will affect the whole installation. If time is available other measures may be attempted since the greatest number and variety of faults introduced the longer time will be required to put the equipment in operating condition.

Temporary disabling of communication installations by inexperienced personnel may cause serious or irreparable damage to the installation. It is therefore necessary that experienced personnel from the responsible government agency be present, or if this is not possible, that the operations be carried out by trained personnel available locally. Expert handling is necessary to avoid accidents from high tension circuits.

The communication systems for public use are constructed by the DRP. Railways and certain other authorities and private concerns may have communication systems installed within their own plants or premises. These should be disabled to the same extent as the public systems.

(Paragraphs omitted give detailed instructions on disconnections to be effected, parts to be removed, etc., at subscriber stations, manual and automatic exchanges, teletypewriter exchanges, repeater stations, telegraph offices, and power plants.)

Temporary Disabling of Radio Stations

Construction of radio stations, transmitters, and receivers varies within such wide limits that only general instructions can be given here. Radio stations should be disabled only by radio personnel.

Wire diagrams, blueprints, etc., must be removed to a safe place.

(Paragraphs omitted give detailed instructions covering detuning, removal of parts, etc.)

Operating position, transmitters, and receivers are generally situated at some distance from each other. Expedients for temporary disabling of radio stations are:

1. At the operating position—remove all motors and keying apparatus and put in a safe place. Remove all coils and rectifier tubes from receivers and put in a safe place.
2. At the transmitter—remove tubes and relays from transmitting equipment.
3. At the receiver—remove tubes from the receiver and armature from the generator.

COMPLETE DEMOLITION OF COMMUNICATION INSTALLATIONS

General

Communication installations will be completely destroyed in an area to be evacuated when it appears unlikely that the area may be soon reoccupied. Post Office communication installations will be destroyed by local signal personnel with the assistance of personnel from the government agencies. Power installations will be destroyed by Engineers. The destruction of international cable lines will be governed by orders from the High Command only.

Trunk circuits, which are the most important part of a wire communication system, are given first priority in any demolition. Exchanges, repeater stations, etc., are easily demolished but may easily be replaced by portable equipment. Destroyed lines, however, must be entirely rebuilt.

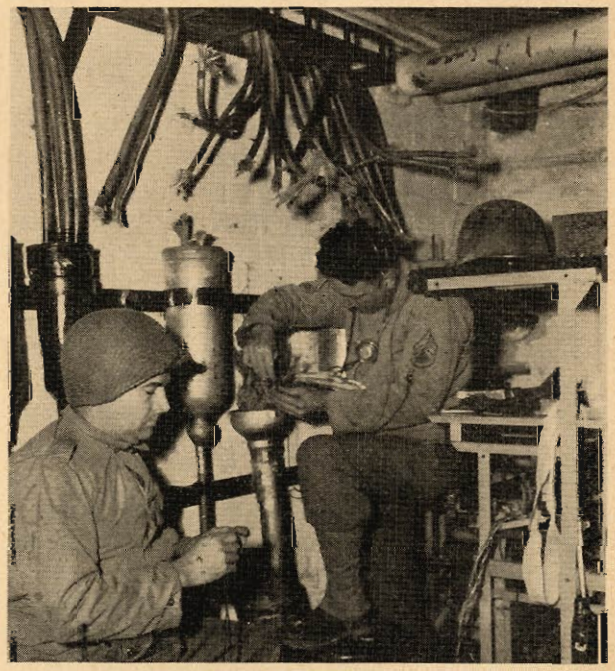
Communication systems should be destroyed by:

1. Dismantling the equipment and carrying it away. The dismantling should be complete as possible in order to retain as much of the equipment as possible for our own use. Such action should be anticipated allowing sufficient time for the dismantling but the time should be minimized in order not to interfere more than necessary with our own traffic.
2. Destroying the whole installation. Installations will be completely destroyed only when the individual parts are no longer useful. Where possible, parts of any value must be salvaged before the destruction.

Destruction of Wire and Cable Lines

The task of destroying lines should be entrusted to specially formed sections. Transportation must be provided for the salvaged material. A supply of special tools is required.

Wire lines are destroyed by breaking up the poles, cutting off the wires, smashing the insulators, and breaking up the crossarms. Parts which cannot be destroyed should be removed and buried, sunk in water courses, or carried away for future use. Before destroying the wire lines it should be ascertained whether Engineer troops are avail-



NEAR AACHEN, GERMANY, SIGNALMEN TRACE CABLE CIRCUITS CUT BY GERMANS AS THEY FELL BACK BEFORE THE ATTACKING ALLIED ARMIES.

able to handle the parts requiring demolition. If so, signal personnel have the duty of removing the wires and the Engineers are responsible for the disposal of the remaining parts.

Salvage of overhead cable must always be attempted. The cable and messenger wire should be taken down, the cable rings removed and the cable and wire coiled on a drum. This process usually damages the cable to such an extent that it is usable only as salvage. Underground cable in ducts is dealt with as described in the following paragraph. Recovering subterranean cable is usually impossible because of the time required.

Removal of single cable lengths will be done by cutting the cable at two consecutive manholes. One end of a winch line or tow rope should be attached to the cable, the other to a truck which will then be used to pull the cable from the duct.

Buried cable should be opened up and sawed through, then reburied in such a manner that the surface shows no sign of having been disturbed. The moisture of the earth will gradually ruin the cable. The process may be speeded up by pouring water over the severed ends of the cable. In an emergency, where the route of the cable is known, holes can be bored into the ground at intervals and the cable cut through with a crow-bar or blown up.

Complete Destruction of Telephone Exchanges and Other Installations

The most effective way is to blow up or burn the whole building. If destruction of the building is to be avoided individual demolitions by means of hand grenades, etc., should be satisfactory. If the rooms are not to be damaged and no demolition troops are available only the actual plant should be destroyed.

(A paragraph omitted lists the order in which components are to be destroyed if sufficient personnel for simultaneous demolitions are not available.)

Complete destruction of radio stations is carried out in the same manner as described above for telephone exchanges. Valuable parts which can be removed should be salvaged.

(Paragraphs omitted cover details in destruction of transmitters, receivers, associated equipment, and relay installations.)

(An appendix lists special tools to be provided to units to be employed in disabling or destroying communication installations.)

SCR-300 AWS NET

HOW AN engineer company used a Radio Set SCR–300–( ) net to warn a bridge construction party of the approach of hostile aircraft in France is contained in a recent report received in the Office of the Chief Signal Officer.

The engineer unit was given the job of constructing a bridge across a railroad cut in the vicinity of Viers, France, in the middle of August 1944. Temporary bridging had been effected by two emergency Bailey bridges, each of which was used for one-way traffic. While the construction work on the permanent bridge was being carried on, traffic continued across the Bailey bridges both day and night.

Since it was necessary for the engineers to work day and night, with most of the work being done in darkness as a protection against air attack, flashlights and electric lanterns were utilized extensively. In order to receive ample warning of the approach of aircraft in time to extinguish the lights used by the working party, the commander of the unit stationed men with Radio Set SCR–300–( ) at various positions near the bridge party as a "pick-up" aircraft warning service. One man with a SCR–300–( ) was stationed half a mile away from the bridge where he could listen for the approach of enemy planes undisturbed by the sound of heavy construction work. A man with a SCR–300–( ) was also stationed at each end of the two Bailey bridges.

Upon the detection of planes, the man with the SCR–300–( ) who acted as listening post relayed the information to the four men at the construction site. They in turn warned personnel at work of the approaching aircraft.

The SCR–300–( ) at each end of the Bailey bridges were also utilized to control traffic since it was possible for each man to contact his partner at the other end of the emergency bridge via the radio set.

It is believed that this is the first instance of a SCR–300–( ) net being used in this fashion.

FIG. 1

LIGHTWEIGHT SWITCHBOARD

SB–18/GT Facilitates Use of Adapter Plug and Provides Six-Line Switching Service

NUMEROUS REPORTS from theaters of operation have indicated the need for lightweight telephone switching equipment suitable for forward area use in amphibious, mountain, and jungle warfare. Several reports have included information on improvised methods of meeting this need.

As a solution to the problem of furnishing ultra lightweight switching equipment for emergency use, Adapter Plug U–4/GT was developed. This item was described in SCTIL No. 31, June 1944, wherein Laboratory models were illustrated.

Production models include improvements over the original Laboratory design, in that binding post functions are provided by the male contact pins which have knurled ends, and a luminescent-backed designation strip is provided on which identification numbers can be written in pencil or ink. Such numbers are visible in silhouette against the luminescent background under black-out conditions. The body design of the plug has been modified to include a recess which provides a means of gripping the plug firmly while making or taking down connections. The plugs are immersionproof and moistureproof.

As a means of facilitating the application of Adapter Plug U–4/GT and to supply this item in groups suitable for furnishing 6-line switching service, Emergency Switchboard SB–18/GT has been developed and is now in production. This item consists of seven Adapter Plug U–4/GT, normally housed in staggered compartments of Plug Holder MT–313/GT (see figure 1). The plug holder has a hinged cover with locking bars to hold the cover in a vertical position during operation. Seven pairs of holes are provided in the holder to serve as receptacles for the male contacts of the seven adapter plugs. The plug holder is equipped with a ⅝-inch web strap for lashing to a tree, post, or the case of Telephone EE–8.

In operation, six of the adapter plugs are connected to field lines while the seventh plug is connected to a Telephone EE–8 or other field telephone, which serves as an operator's set. Point-to-point connections and/or conference circuits

may be set up readily by proper grouping of the plugs (see figure 2). Operation is simple even under black-out conditions, and the equipment is weatherproof even in operating condition. Locked-in line and supervisory signals are not provided. Visual signals are furnished by the neon tube which is moulded in the clear plastic body of Adapter Plug U–4/GT.

Another application which has been suggested for Adapter Plug U–4/GT is its use as a "silent signal" for Telephone EE–8. For this purpose the adapter plug may be shunted across the line terminal of the telephone and the telephone ringer disconnected, the neon tube of the adapter plug providing a visible signal when ringing current is applied to the line, or two plugs may be used with one plug attached to the telephone and the other attached to the line, wherein the two plugs are connected together upon receiving a call. It is possible that the adapter plug may also prove useful in making continuity tests of lead-covered and field cable when used in conjunction with a telephone magneto generator or similar power source.

Emergency Switchboard SB–18/GT is furnished with Case CY–229/GT (canvas) suitable for attachment to a standard cartridge belt. Overall dimensions of the case when containing the switchboard are approximately 12 x 4 x 1½ inches; the total weight is approximately 1½ pounds.

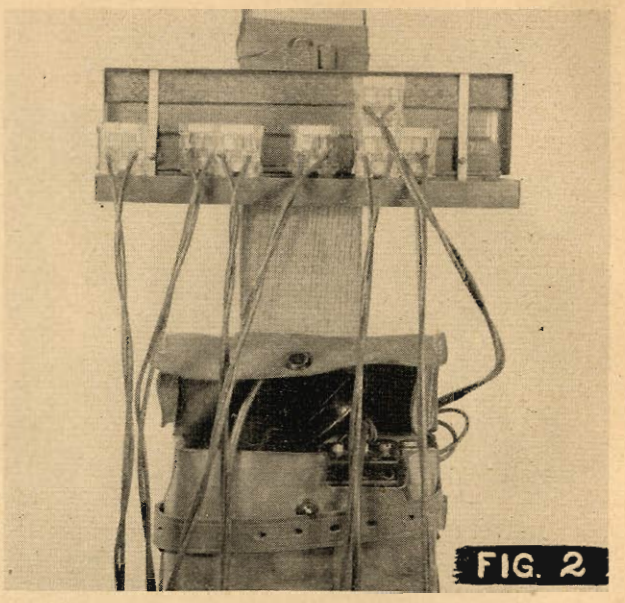


FIG. 2

The issue of SB–18/GT will be in accordance with revised T/O & E's. Information on SB–18/GT will be included in a technical bulletin now under preparation.

WIRE AT ANZIO

A MEMBER of a crew of a signal service company at the Anzio beachhead has reported how his outfit overcame the difficulty of identifying wire at night. Two means were used to accomplish this purpose. Since it was impossible to see the color of the tag due to blackout conditions, nicks were placed in the tags to indicate the number of the line in a cable. The second method was to place a loose knot in the wires to indicate that a particular wire belonged to a particular unit. Thus at night repairmen could merely run their hands along the wire and by contacting the knot, make sure that it was their wire.

Another improvement used by this unit was in painting one end of the tags which were attached to wires to indicate local and trunk lines. Red paint was used to indicate local lines and green to indicate trunk lines. By a glance at the tag a wireman could tell what the wires were and also distinguish his own unit's wire from those of other units using the same line route.

The problem of maintaining a seven-wire cable on the three-fourth mile-long jetty at Anzio was also overcome by placing test points at 150 feet intervals along the entire line. Cables were made up the length of the distance between each test point so that when there was a break in the line, replacement could be made. The break, of course, was determined by testing at each test point. This practice saved 2 or 3 hours for each replacement and eliminated all splices. The replacement cable was kept at the switchboard at the inland end of the jetty and was carried by hand as the wiremen moved along the communication line.

The cable ran to the guardship, at the end of the jetty, and it was essential that this communication line be kept open at all times. Enemy fire disrupted the cable lines on several occasions, and the difficulty of finding the break in the line at night led to the solution described above.

RIGHTING RADIO WRONGS

Security Infractions Must Be Corrected by Severe Punishment When Necessary

EVER SINCE chivalry disappeared, women have been discussed by many men, including radio operators. Although women are not usually considered a military secret, they cannot be discussed on army radio nets without incurring the penalty for "chatting." Operators are penalized not because a lady's honor is at stake, but because any unauthorized conversation, regardless of subject, is a violation of radio transmission security. To discourage "chatting" and other security violations or procedure discrepancies, radio discipline, including corrective action for breaches of discipline, must be strictly enforced in all nets. The message, "I go with a girl from Scotland," may indicate a commendable lack of nationalistic prejudice, but it also indicates a dangerous lack of respect for radio discipline.

Procedure and security rules have been devised to safeguard radio communication; without the means of enforcing these rules, however, it would be difficult to effect radio transmission security. Corrective action commensurate with the seriousness of violations committed by radio operators is the most practicable means of enforcing radio discipline. Analysis of army transmissions intercepted by monitoring stations uncovers violations of security and discrepancies in procedures for which delinquent operators must be reprimanded or penalized. Decision as to the severity of disciplinary action warranted in each case is made by the commander concerned. For a first minor offense the penalty is generally not so heavy as that for a recurring violation. If, however, an operator has endangered military operations by careless and unnecessary disclosure of classified information, the penalty imposed is usually extremely severe. Fortunately, major violations are progressively decreasing because of improvements in operator training and greater scope and efficiency of supervision and circuit discipline.

Radio personnel are first trained to adhere strictly to prescribed radio operating procedure and the principles of radio transmission security. Before being assigned to tactical nets, operators should have been made fully aware that errors will be intercepted by monitoring, as well as enemy intercept, stations. If, in spite of thorough indoctrination in the proper methods for secure radio operation, radio operators occasionally become negligent and irresponsible, it is necessary to resort to corrective measures in order that security may be enforced.

Although such minor violations as the incorrect use of IMI and the use of less than eight E's in the error sign may not, in themselves, affect the outcome of the war, they are evidence of carelessness that might result in more dangerous violations. For this reason, any violation of security or discrepancy in procedure must be brought forcibly to the attention of the offending operator. Some units require operators to read their violation reports and learn the rules which have been disregarded. Others conduct classes in which the instructor demonstrates concrete examples of deviations from prescribed procedure, with emphasis on those most frequently detected. In conformance with a long-range plan for measuring improvement in radio security, some commands have increased monitoring of their nets by responsible officers and noncommissioned officers at the net control station. At one secondary station, when violations occur, the officer in charge posts a written order warning all operating personnel against further violations, with notice that disciplinary action for recurring errors will be severe. One field headquarters relieves violating operators from circuit duty for a specified period, during which they are assigned extra duty. Another reduced careless transmissions by publicizing reported errors where they will come to the notice of all radio personnel; at that headquarters, officers who violate security are assessed from one to five dollars for each delinquency and all assessments donated to an officers club fund. Such measures as these are mild, yet they are effective in promoting competition and alertness, and thus increase radio transmission security.

The purpose of corrective action is primarily to prevent repetition of operator errors. Personnel who are not amenable to discipline should be relieved from duty as operators. Because "chatting" frequently discloses names, places, and military organization, in addition to impairing the effi-

624814—45——2

ciency of radio operation, it is regarded as the most serious of all violations and incurs the heaviest penalties. Boredom is no excuse for unauthorized use of radio circuits. "Chatting" delays the transmission of official traffic, overburdens the circuits, increases the possibility of enemy detection by direction-finding facilities, and almost invariably leads to the disclosure of military information.

Discussing the fact that the women near some military installations do not object to dates with the GI's, the operators at four stations in a tactical net ran into difficulty. It was not their morals that were in question when disciplinary action was taken against all four. The remark of one operator, "The ones here don't speak English," received the answer, "They do here. That is, if you want to call it English." Another operator commented that "The ones here are too hard to understand," and was answered, "You should have come from Brooklyn. Then you could understand them." After Brooklyn was mentioned, the conversation naturally progressed to home states and eventually to identification of the operators' names and units. Although they previously had been warned to use the radio for nothing but official traffic, these operators had not grasped the fact that through their transmissions they could unintentionally divulge military information. Corrective action for this unauthorized conversation included severe reprimand and the maximum punishment authorized by the 104th Article of War for one of the guilty operators, reduction to the grade of private for another, and reduction to the grade of private with several days of hard labor for the two most serious offenders.

At a certain radio installation, several radicmen found it difficult to convey their meaning or adjust a transmitter without the use of obscene language too offensive to be printed. When, after warning, they persisted in this habit, they were penalized for incompetency by being reduced to the grade of private. Willful disobedience and repeated carelessness indicate disrespect for authority. Radio personnel who do not obey the rules for secure transmission should be relieved from duty that gives them an opportunity to endanger military operations.

Except in cases of defiance and repeated carelessness, corrective action should be designed to stimulate cooperation and a sense of responsibility among radio personnel. Refresher courses in procedure and security emphasize transmitting faults and impress operators with the importance of maintaining discipline. Some commands have adopted a rotation program which gives operators a chance to serve alternately as transmitting and monitoring operators. Others attach to every transmitter the admonition that "The Enemy is Listening!" and assign trained radio personnel to make "spot checks" of each radio installation within the command at least once a month.

Mention has been made of only a few of the measures employed to eliminate weaknesses and promote interest in maintaining radio transmission security. The success of these measures has been indicated by greater efficiency and security at the stations involved. If all units adopt corrective measures which are sufficiently effective to prevent recurrence of violations, discipline will be more efficiently enforced and the security of radio operation will be increased.

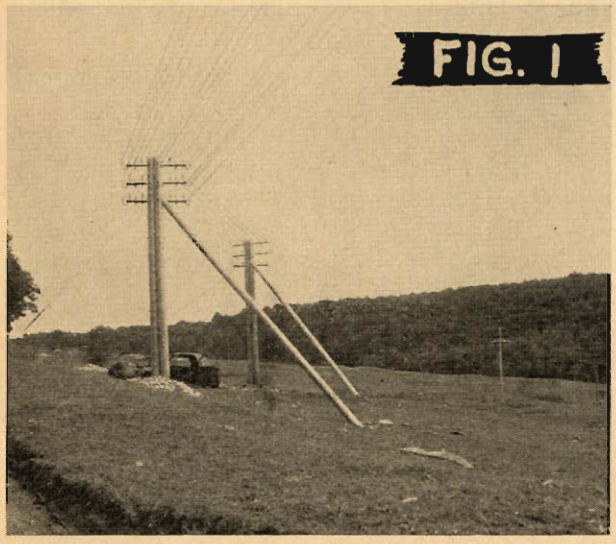
DRY BATTERIES

Revised issue of SB 11-6 "Dry Battery Supply Data," 4 October 1944, is now available. This issue gives "original supply," "suggested distribution," and "consumption rate for computing requirements" for each area of operation, in addition to zone of interior consumption rates for all equipments maintained by the Signal Corps.

Battery BA-38-R, constructed of "RM" cells, is being issued for use in tropical areas as it becomes available. This battery has a considerably longer service life than the conventional battery, and care should be taken that it is not thrown away at the end of normal use life of the BA-38. (See TB SIG 41, Battery BA-38-R, 16 May 1944.)

GERMAN MILITARY POLE LINE

Examination of Enemy Construction Reveals Differences in Methods and Materials



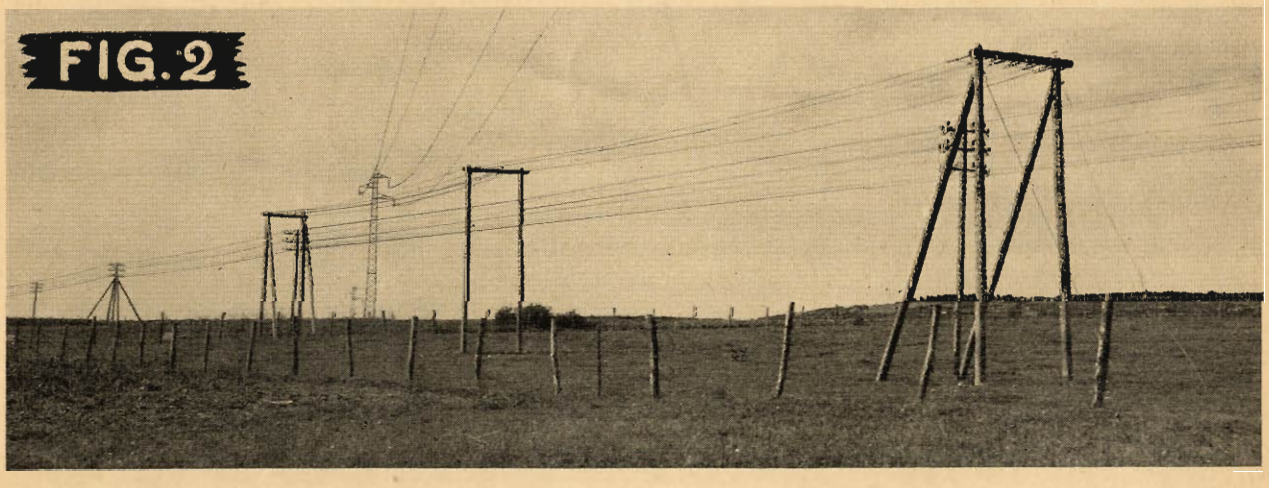
A SIGNAL heavy construction battalion has studied the many German military lines it has come across during the past several months in France. Without exception, it has been found that line wire was galvanized iron or steel somewhat larger than U. S. .109 iron wire. Construction was found to be uniform, rugged and neat. Span lengths and distances between transposition poles were erratic, indicating that inexperienced engineering personnel had been used while experienced construction men had built the lines.

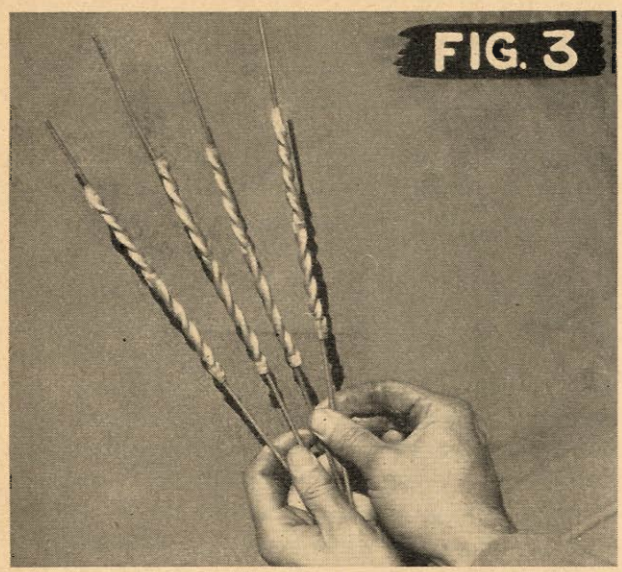
It was found that between Marseille and Avignon, a five arm lead (40 wires) had spans varying from 100 to 165 feet with no apparent reason for this lack of uniformity. Occasionally a section would be found with all spans at 131 feet (40 meters). In the section between Vesoul and Lure, which was a three arm lead (24 wires), spans varied from 100 feet to 175 feet, with average spacing of 142 feet. In this latter section, transposition poles occurred, roughly, each five-eighths of a mile for the first 10.6 miles then jumped to double that distance for the remaining 13 miles that were checked.

All wire was sagged evenly but with greater tension than U. S. standards call for, e. g., German span of 150 feet at 60 degrees F. was sagged at 7 inches. With like span and temperatures, U. S. wire would have 10½ inches of sag for light loading area or 13 inches of sag for heavy and medium loading area.

Storm fixtures using 4-way pushbraces were located at about every tenth pole. Single, side pushbraces were placed about every second pole. "Two pole" corners as shown in figure 1 were used in some places. All corner poles were double (two poles placed side by side) with a pushbrace as well as a 6M down guy. Corners with as much as 40 feet pull were made on a "one pole" corner of this type. No "dividing line" was observed as to when a "one pole" corner or "two pole" corner was used.

The line between Vesoul and Lure, which was studied closely, maintained even grade. Poles were normally 25 foot, class 6, set less than 4 feet deep. Each pole was numbered (stenciled with white paint), and all crossarms were placed on the forward side of the pole (side of pole to-





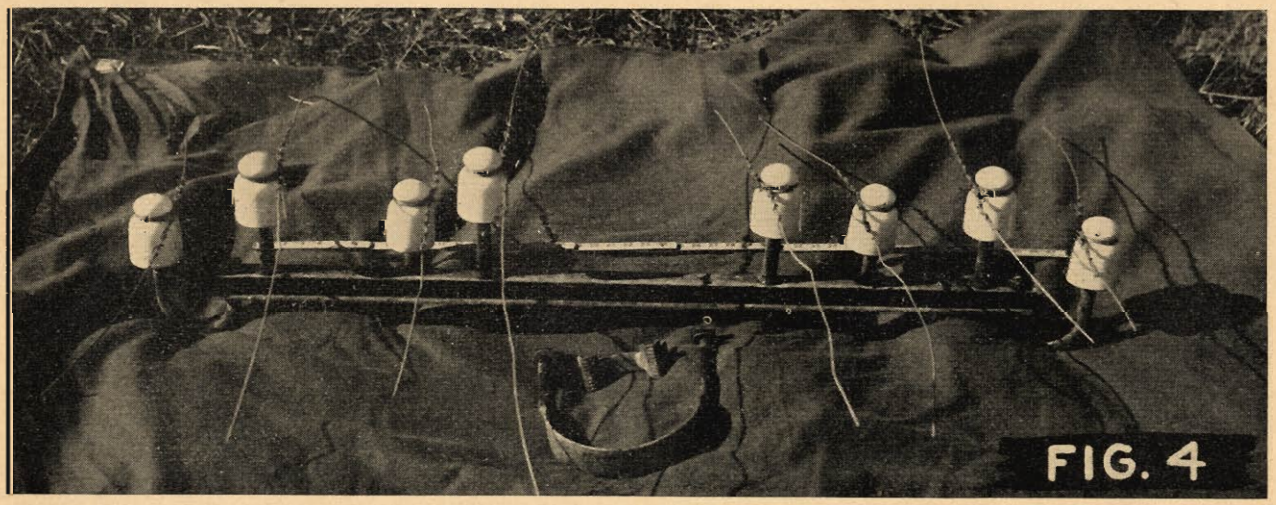
ward increasing numbers). The first arm was 8 to 10 inches from the top of the pole and the other arms were 17 to 19 inches apart. All wires were tied on the pole side of the insulators. All transpositions were of the point type, i. e., wires dead-ended both ways at the pole, either on a double groove insulator or on double crossarm and transposed by jumpering across to the other wires. Highway crossings were kept above 18 feet. The route of the line ranged from 100 yards to 200 yards from highways. At all points where power lines crossed over the telephone line, whether the power was 220 volts or 100,000 volts, the telephone line was protected as illustrated in figure 2. Test points were located at convenient points (roughly at 3-mile intervals) using wing nut bridging connectors. Test points and transpositions were all cut in after the line wire had been sagged and tied. Sleeves were of aluminum and nearly six inches in length (figure 3). They were apparently held in the center by a small tool and each end was then turned two complete turns (one end was given a right-hand twist and the other end, a left-hand twist). Center point was indicated on the German sleeves by a touch of blue paint.

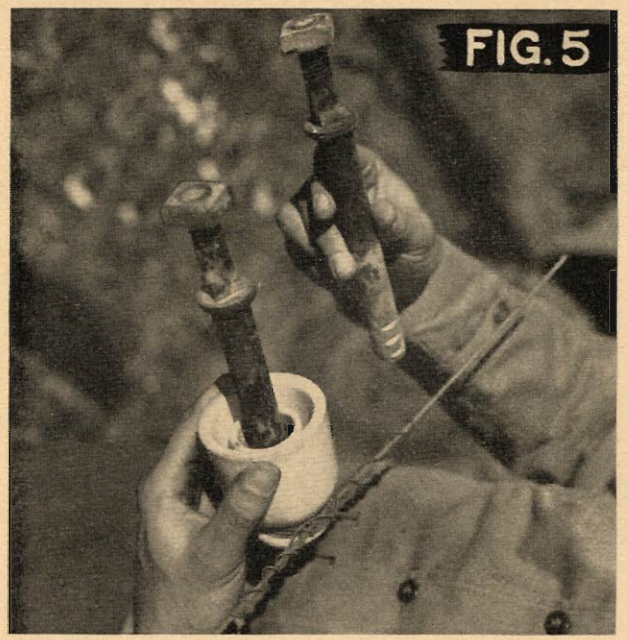
Crossarms on all German military lines were 8 pin arms as illustrated in figure 4. The crossarm was of channel iron. The pins were centered about 6 inches apart alternating "J" pins with straight pins. Pairs and phantom groups were obtained in the same manner as in American lines rather than from the diagonal as the French use.

Insulators were attached to the steel pins with gray-black, non-porous substance. Pins were larger than U. S. ⅝-inch steel pins. The crossarm was attached to a single pole with the U bolt strap and "adapter" as shown in figure 4. The crossarm was attached to double poles by using two machine bolts, one for each pole. The bolt holes in the side of the crossarm were elongated to compensate for variations in the diameter of poles.

Line wire was tied to insulators with soft iron wire, smaller than U. S. .083 iron wire. (See figure 5 for close-up of tie, insulator, and steel pin with insulator removed.) Tie wires were from 36 to 40 inches in length.

At one point, two 4-arm pole lines dead-ended at a 4-pole fixture. Guys were about equal to U. S. 6M strand (W-115). No guy rod was used, the strand itself being buried instead. The guy strand was "served" at the top of the pole rather than fastened with clamps. A turnbuckle was used





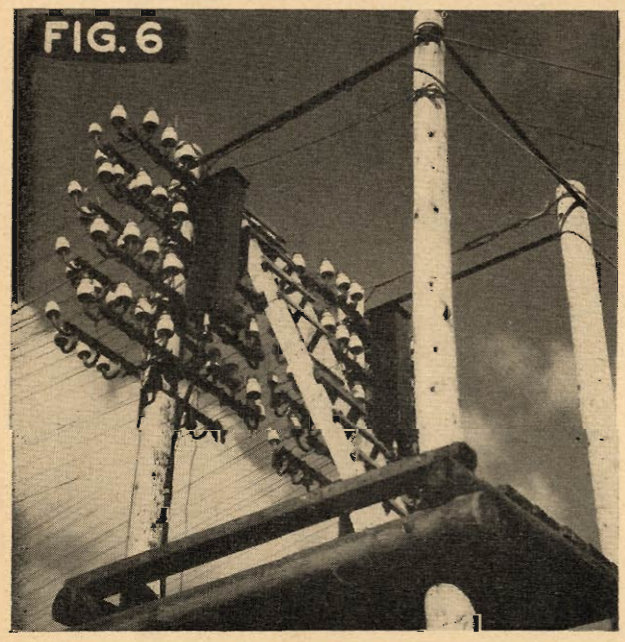
to adjust strain on the strand at the ground end and a regular two-bolt cable clamp was used to secure the ends of the strand.

Figure 6 shows a close-up of platform and cable terminals of the 4-pole fixture. Each terminal contained sufficient termination posts for ten groups of four wires complete with glass inclosed lightning arrestors, and fuses. Bridle wires were soldered to posts in the fuse chamber which was on the right hand side of terminal, facing the pole and was covered with a hinged door (hinges toward the pole). The ladder was a homemade affair used to facilitate work on top crossarms. Fuses were arranged in horizontal groups of four.

The buried cables terminated in a PTT repeater station a hundred yards away where they could be crossconnected to the PTT cable connecting Dijon, Dole, and Besancon. All equipment in the repeater station had been destroyed by burning before the Germans left.

Line wire was wrapped once around the front insulator then twice around the rear insulator, the end then making three loose wraps around the line wire toward the front insulator then three loose wraps back with the remaining end turned up. The insulated bridle wire exited from the rear of the fuse chamber and was taped to the crossarm and to the pin it fed. It entered the space in the upper portion of the insulator (see figure 7) through a hole in the bottom of the insulator. Sufficient insulation was stripped from the bridle wire to allow it to exit from the insulator near the line wire groove, and to connect to the tail of the line wire. The end of the stripped bridle wire was placed alongside of the line wire tail, and an aluminum sleeve was slipped over the two wires and twisted. A fiber cap covered the space in the insulator. A small amount of slack in the bridle wire was stored in this space which

(*Continued on page 16*)



OFFICE OF THE CHIEF SIGNAL OFFICER, ENGINEERING AND TECHNICAL SERVICE GROUND SIGNAL EQUIPMENT BRANCH

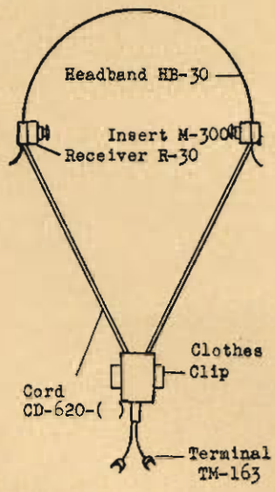
HEADSETS, MICROPHONES AND CHEST SETS MOST COMMONLY USED BY GROUND FORCES

15 SEPTEMBER 1944

(REVISED 15 NOV. 1944)

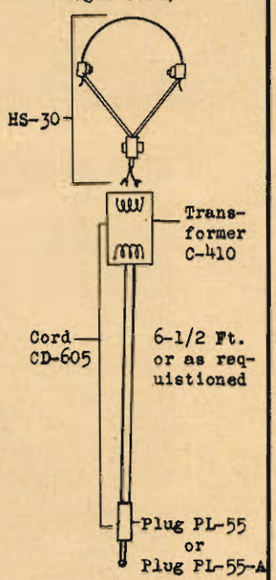
Headset HS-30-( )

You get this only

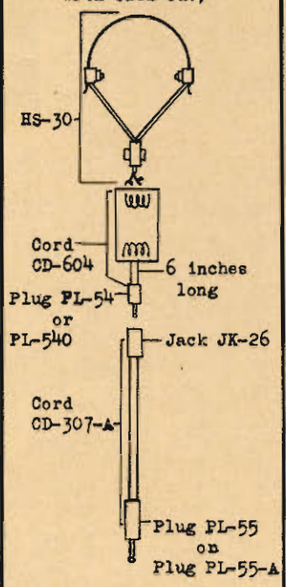


"Impedance 256 ohms"

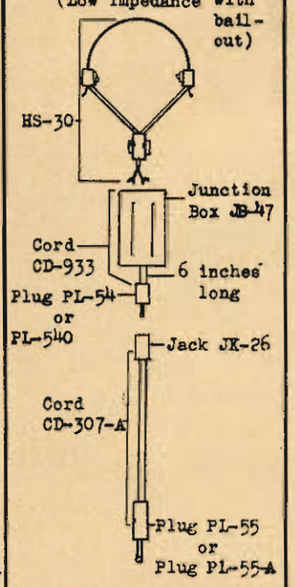
HS-30 + CD-605 (High impedance single cord)



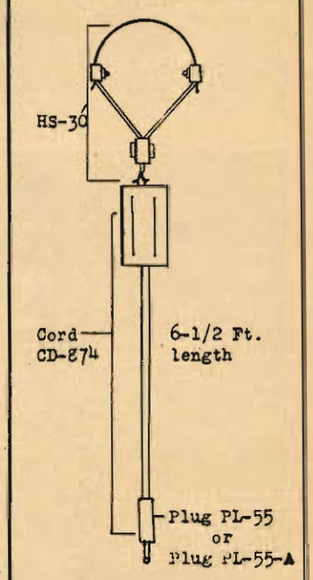
HS-30 + CD-604 + CD-307-A (High impedance with bail-out)



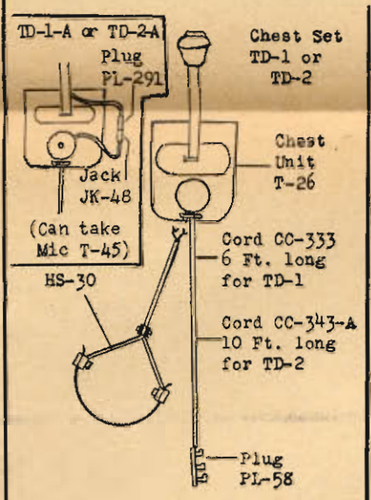
HS-30 + CD-933 + CD-307-A (Low impedance with bail-out)



HS-30 + CD-874 (Low impedance)

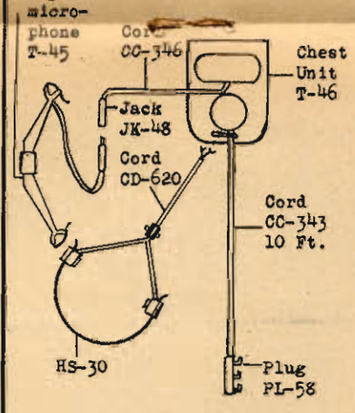


HS-30 + Chest Sets TD-1, 2 and 3 for operation with line equipment



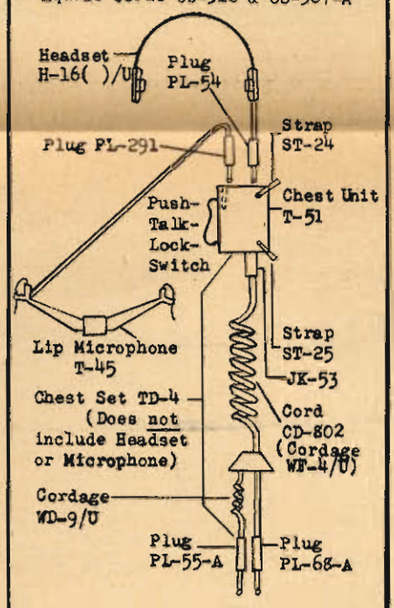
Chest Set TD-1 and 2 does not include Headset HS-30

Chest Set TD-3

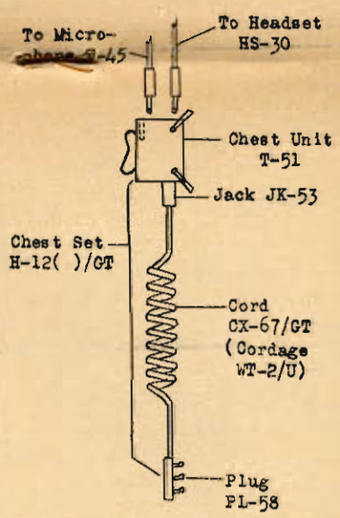


Chest Set TD-3 does not include Headset HS-30 or Microphone T-45

Chest Sets TD-4 (250 ohms) Equals Cords CD-318 & CD-307-A

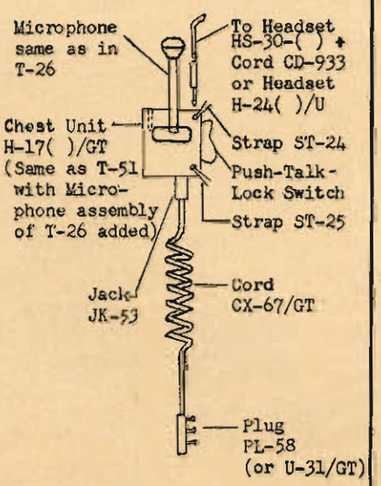


Chest Set H-12( )/GT (250 ohms) Equals Chest Set TD-3

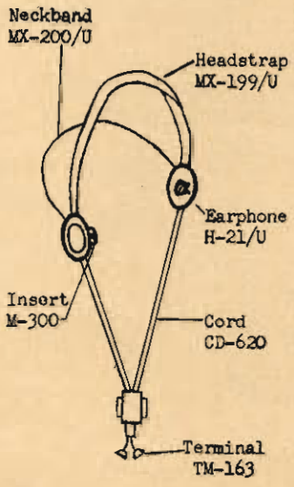


Chest Set H-18( )/GT

Equals Chest Sets TD-1 & TD-2

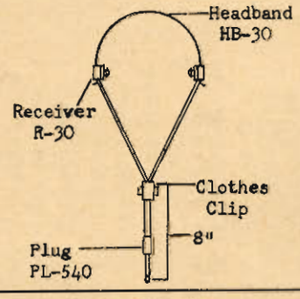


Headset H-20/U



Headset H-20/U (Modified HS-30)

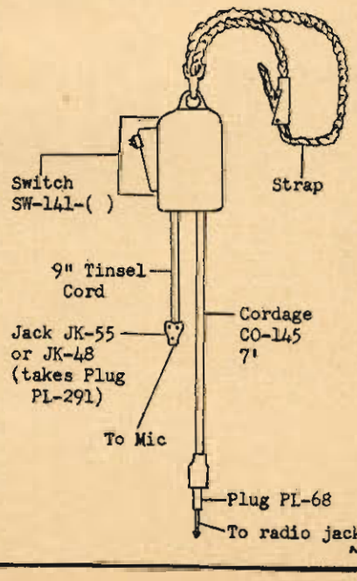
Headset H-24/U



PLUGS & JACKS (for plugs shown)

Plug PL-54 & 540 fits Jack JK-26
Plug PL-55 & 55-A " Jack JK-24, 31, 34, 34-A, 38 and 39
Plug PL-58 fits Jack JK-37 on Telephone EE-8, Switchboard BD-70, 71 and 72
Plug PL-68 fits Jack JK-23, 33 and 33-A

Cord CD-318-( )



(*Continued from page 13*)

was about 1¾ inches in diameter by ¾ inch deep.

The three top crossarms were bridled with heavy stranded insulated wire, while the fourth arm on each pole was bridled with small stranded insulated wire.

The large bridle wire was nearly one-quarter of an inch in diameter and was made up of 7 strands of copper wire of approximately 20 gauge. It was covered with thin layers as follows: white rubber, black rubber, white rubber, white cloth, and finally tar-treated braid. The small bridle wire, nearly one-eighth of an inch in diameter, was made up of 6 strands of 24-gauge steel, 2 strands of 26-gauge copper, and 1 strand of 22-gauge copper, and was covered as follows: a thin layer of rubber which is white on the inside and black on the outside which is covered with a wax-treated white cotton braid.

"J" type pins were used on all dead-ends to relieve "top strain" on crossarms.

Although the line was built over a year ago it was in excellent condition. Despite last winter's heavy storms the line was as good as when first built. The poles were straight, the right-of-way, clear; the sag, well equalized, and consistent high quality of workmanship prevailed throughout. One point that clearly stood out was the quality of workmanship and materials used. Nothing was stinted. Materials were sufficiently used to make the line more than just a temporary military line; this line was built for a permanent line of communication.

SPARE PARTS CATALOG INDEX

THE FOLLOWING table lists the equipments for which pamphlets have been issued under Army Service Forces, Signal Supply Catalog, Sections SIG 7 and 8. These items have been issued between 1 November 1944 and 1 December 1944, and are supplemental to the list published in SCTIL No. 36, November 1944.

SIG 7

AN/GMQ-1
AN/PPN-2
AN/TPS-2
AN/VRC-1
AS-81/GR

BC-314
BC-344
BD-70
BD-71
BD-72

CF-1
CF-2
CF-3
DV-2

EE-81
EE-91
EE-94
EE-95
EE-96
EE-97
EE-98
EE-102

GR-4

IE-10
IE-17

LC-40

M-209
MG-37
ML-24
ML-80
ML-277

PA-1-A, B
PA-1-C
PA-1-F
PA-2-C
PA-3-A
PA-4
PA-5
PE-43
PE-74
PE-75
PE-84-C
PE-95
PE-108
PE-128
PE-137
PE-162
PE-173
PE-194
PE-197
PH-13-B
PH-14-A
PH-77-C
PH-81
PH-92
PH-97-A
PH-110-A
PH-114
PH-115
PH-129
PH-132-B
PH-176
PH-193
PH-206
PH-222
PH-239-A
PH-240-A
PH-253-C
PH-321
PH-326
PH-330
PH-398
PH-424
PH-431

RC-58
RC-99
RC-120
RC-148-C
RC-192-A
RC-282
RC-350
RL-31
RL-106

S-20-R
SCR-211
SCR-288
SCR-298
SCR-511
SCR-555
SCR-582
SCR-584-A
SCR-614
SCR-625
SCR-636
SCR-694
SCR-808

TC-4
TC-5
TC-10
TC-12
TC-16
TC-19
TC-21
TC-22
TC-23
TC-24
TG-5
TG-23
TG-24

SIG 8

AN/GMQ-1 (SCM-20)
AN/PRC-1
AN/TPS-2
AS-81/GR

BC-325
BC-787
BC-791-B
BC-794
BC-908
BC-918
BC-1005

EE-81
EE-94

GN-42

I-208
IE-53

ML-47
ML-62
ML-80
ML-313

PA-1; PA-2; PA-3
PE-43
PE-84
PE-99
PE-151 (Rev)
PE-173
PE-197
PH-13-B
PH-14-A
PH-91
PH-91-A
PH-115
PH-121
PH-129
PH-206
PH-210
PH-222-A
PH-240-A
PH-244
PH-321
PH-326
PH-358
PH-358-A
PH-416-A
PH-424
PH-502/PF
PH-513/GF
PH-515/MF
PP-49
PP-50
PP-78
PU-6/TPS-1

R-19/TRC-1
RA-54
RA-84
RA-91 (Rev)

RC-127
RC-145
RC-192-A
RC-282

RL-81
RM-7
RM-38

RT-12/TRC-2

S-20-R
SCR-270/271
SA-24
SCR-510
SCR-582
SCR-584-B
SCR-636

TC-19
TG-34

CHEST SET TD-4, H-12 ( )/GT AND H-18 ( )/GT

CHEST SET TD-4-( ), H-12( )/GT and H-18( )/GT are a related group of chest sets, recently standardized, and intended ultimately to replace substantially all other similar equipment now in use by the ground forces. The group is based on Chest Unit T-51-( ), used in TD—4-( ) and H-12( )/GT. A swivel-mounted microphone, identical with the microphone now used with Chest Set TD-1 and TD-2 is added to the T-51-( ) to form Chest Unit H-17/GT of Chest Set H-18( )/GT.

The chart of "Headsets, Microphones and Chest Sets" published on the preceding pages shows the components of these new chest sets, and their relation to the equipment which they will ultimately replace.

Chest Set TD-4-( ) will replace the present combination of Cord CD-318 and Cord CD-307-A by a single retractile cord and a chest unit hardly larger than Switch SW-141-( ) of Cord CD-318. The size of the switch on the T-51-( ) was dictated by requirements of ruggedness and operability by a gloved hand for winter use.

Chest Set H-12( )/GT will replace present Chest Set TD-3 for connecting lip Microphone T-45 or throat Microphone T-30-( ) to field telephones or switchboards.

Chest Set H-18( )/GT will replace Chest Set TD-1 and TD-2 for use by switchboard operators, and for other uses. This chest set can also accommodate the lip or throat microphone for use with the gas mask, thus obviating the need for Chest Set TD-3 as auxiliary equipment for this purpose.

Chest Set TD-1, TD-2 and TD-3, which will ultimately be replaced by the new equipment, have been reclassified as limited standard. No more will be procured, but those now on hand will be issued and used.

Production of the new chest sets has not begun, and it is not expected that substantial quantities will be available for some time.

If the new equipment is not available when requisitioned, the old equipment will be furnished, as the two are functionally interchangeable.

CABLE IDENTIFICATION

ON ONE of the projects completed by the — Signal Heavy Construction Battalion in France, 107 miles of spiral-four cable was placed to provide circuits in an area which required the placing of four cables parallel to one another and on the same route.

Two or more cables paralleling each other creates an identification problem when troubles arise. Time is wasted and communications interrupted by linemen opening cable connections to locate faulty circuits. Markings on cardboard tags prove illegible because of rain, sun, and wind.

The method of marking cable as illustrated in figure 1 has been found to be most satisfactory, and was used in the four-cable, 107-mile route mentioned above. Positions of Reel Unit RL-26, used to reel out the cable, were marked numerically in chalk. As each Reel DR-15 of cable was placed on the RL-26, a piece of 0.109 or 0.134 GI wire was placed completely around the cable, forming a ring. The number of rings corresponded with the number on the RL-26 paying out the cable.

Completion reports and circuit diagrams were to give them definite information on the routes of the cables. Recommendation was made that, if the plan outlined above is followed, further identification can be made by using the following wire-ring code: Army troops, 0.109 or 0.134 GI wire; Air Force, 0.128 or 0.104 Cu.; Corps, W-71.
submitted to signal sections and maintenance crews

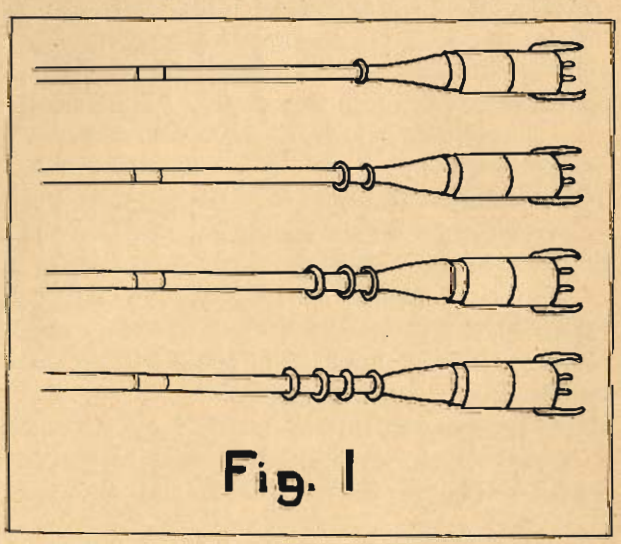


Fig. 1

TACTICAL AIR COMMUNICATIONS

Striking Power of the Air Forces is Aided by Radio Channels and Wire Installations

The following is based on a study of the adequacy of tactical air communications made by the AAF Evaluation Board, Mediterranean Theater of Operations. It is based on conclusions derived from operational experience gained in Southern France, Italy, Sicily, Pantelleria, and North Africa.

A TACTICAL air force in joint operation with an army on the move requires highly mobile and flexible items of signal equipment for radio and wire communications. In addition, a tactical air force must have enough signal supplies and personnel to be able to leapfrog headquarters without closing down signal facilities to make the move. Finally, the integration of wire and radio communications is important.

RADIO EQUIPMENT

Radio Set SCR–299–( ) is by far the most widely used ground h-f radio set in a tactical air force. The tactical air force also uses such other h-f sets as Radio Set SCR–188–( ), SCR–193–( ), SCR–399–( ) and SCR–499–( ).

The number of radio channels normally employed at — Air Force, (forward echelon) in the last year averaged 20. During displacements it was found necessary to have 30 transmitters available. During the move, existing channels were temporarily reduced to 15. The average traffic handled per day was 100,000 groups by forward echelon, and 40,000 groups by rear echelon. This volume of traffic has made the use of radio teletype links between an air force headquarters and its major subordinates most desirable and has resulted in considerable saving in personnel and radio equipment as well as in relieving the overcrowded frequency spectrum.

Radio Set SCR–522–( ) is the primary v-h-f radio set used for air-ground communications. The SCR–522 has four channels, but due to the necessity of using two channels (one for World Guard and the other for Air-Sea Rescue) two control channels only have been available. The need for extra channels is deemed imperative.

The necessity for additional v-h-f and h-f channels can be seen from the following list of frequencies used by the — Tactical Air Force; 1 fighter control frequency, 2 fighter bomber frequencies, 1 tactical air command common frequency, 1 bomber escort frequency, 1 bomb group control, 1 tactical reconnaissance frequency, and 7 artillery spotting frequencies.

The above breakdown for tactical frequencies necessary to aircraft of this type shows how badly the spectrum is congested. Several unfortunate instances have occurred when planes of different operational types were unable to communicate with each other. One method used to overcome this lack of channels has been by allocating certain radio crystals to the aircraft radio sets for duration of a special mission.

(Radio Set AN/ARC–3, delivery of which is due early this year, appears to answer the objection raised above. It has 8 channels.)

The performance of the SCR–522 aircraft radio has been satisfactory, the only major difficulty being interference from certain Radio Set SCR–270–( ) radars. The fitting of aircraft radios with suppressors has improved this situation.

Very high frequency ground sets used by the tactical air force are Radio Set SCR–573–( ) and SCR–574–( ) for air-ground communications, radio teletype and radio point-to-point communications; Radio Set SCR–624–( ), for air-ground communications airdrome control, forward fighter control, and radio teletype; and Radio Set SCR–542–( ) used for forward fighter control.

The use of v-h-f ground equipment for point-to-point and radio teletype communications has become more and more important in the — Air Force. On many occasions units of the — Air Force moved so rapidly that wire communications could not be constructed in time to meet communication requirements. The v-h-f teleprinters used by the — Air Force included the standard SCR–573 and SCR–574 radio sets, with Telephone Terminal CF–1–( ) and Telegraph Terminal CF–2–( ) carrier systems.

When the Mediterranean Area Tactical Air Force moved to Corsica, one station of the equipment was set up on a mountain on that island and worked to the mainland of Italy, near Rome. In the landing in Southern France — Tactical Air

Command took one end of this system with them into France. It was used extensively with the Corsica terminus. The distance between the terminal at Corsica and the one in France is roughly 140 miles. No relay stations were used. The system used three teleprinter channels and was so constructed that the signal received could be placed on wire and transmitted to other headquarters at varying distances from the radio receiving station.

Considerable use was also made of the same type of equipment by echelons of the — Tactical Air Command. On other occasions the system operated between Forward Echelon — TAC at Orbetello — TAC liaison party with Fifth Army at Tuscania, and — TAC operational party at Rocca di Papa, south of Rome. One relay station was used in this circuit by locating on a hill near Tolfa, east of Civitavecchia. Transmissions of any station on this system were received simultaneously by the other two stations.

WIRE SYSTEMS

There are two distinct phases which have characterized all tactical air force operations in the Mediterranean Theater as far as wire communications are concerned. The first is the build up of the wire system at bases from which operations are to be launched. In the landing in Southern France, this included parts of the mainland of Italy, Corsica, and Sardinia. The second is the build up of the wire system from the beaches after D-Day and following subsequent advances of the army inland.

As an example of the magnitude of the problem of providing wire communications in preparation for an operation, the following is a summary of the items of signal communications equipment used in the build up of fixed wire communications on Corsica and Sardinia for the invasion of Southern France: Carrier systems—twenty-four Telephone Terminal CF-1-( ), two Carrier Hybrid CF-7-( ), fourteen Telegraph Terminal CF-2-( ); sixteen Teletype Switchboard BD-100; Telephone Central Office Sets (exclusive of Headquarters — TAC and — Fighter Wing)—one TC-1, two TC-2, twenty-three TC-4, five TC-12, twenty Switchboard BD-72.

The fixed wire system in Corsica and Sardinia consisted of approximately 2,000 miles of spiral-four cable and 3,000 circuit miles of open wire pole line covering approximately 1,400 route miles. This system served — Tactical Air Force headquarters, four fighter wings (operating from fourteen airfields) and also served the Northern Base Section. It is estimated that tactical air force units used 50 percent of the total communication facilities available.

The greatest difficulty encountered in connection with the first phase of the operation was the lack of sufficient personnel to maintain the system while releasing enough men for the build-up in the second phase. In operations of this nature the construction and maintenance of wire communications on the main axis of communications has been the responsibility of the army signal officer. Circuits along the main axis, however, constituted only a small percentage of the number of circuits required by the tactical air force. Circuits to airfields, radar routing circuits, lateral circuits to adjacent air force units, circuits between adjacent sector operations rooms and between sector operations rooms and adjacent gun operations rooms, frequently did not follow the main axis, and even if they did, army signal personnel were in no position to furnish the number of circuits required. Furthermore, airfield areas were sometimes well off the main army axis, necessitating an entirely different axis. If a tactical air force is to have adequate wire communications when required, it must have adequate construction troops to take care of its own needs. For all of these reasons the release of such troops from the base area for the second phase of the operation was of paramount importance.

In the second phase of tactical air operations, the build-up of wire communications from the beaches after the landing, again necessitates sufficient construction personnel. The problem is complicated in the initial stages by the restricted availability of shipping. In latter stages the difficulties are proportional to the rapidity of advance.

The difficulties of maintaining wire communications during rapid advance can be illustrated by the problems in Italy following the offensive in May. Although in most cases 95 percent of the poles on existing lines could be used, it was necessary to replace the wire for main circuits since most Italian construction used iron wire which did not have the range of U. S. copper wire. North of Rome, the problem was further complicated by the fact that the airfield areas were along the coast—well off the main army axis. Two choices

presented themselves; constructing laterals or building an air force axis. The latter course was adopted and circuits were constructed from Rome to Civitavecchia and from there up the coast. In France groups of airfields 50 to 100 miles apart were often well off the main army axis. Normally, in the early stages of an advance three of these groups of airfields were occupied at the same time, the movement forward being progressive (i. e. the last group being abandoned as the next forward group was occupied). If movement is rapid, wire communications lag.

The extensive use of carrier equipment is made necessary by the number of circuits required and the distance involved. Both CF–1 and CF–2 are considered indispensable in providing satisfactory service under conditions normally encountered. CF–7 has been used to some extent but its use has been considerably restricted by the type of circuit required for satisfactory operation. As an example of the need for carrier equipment, the — Tactical Air Command with its Air Defense Wing normally required fourteen CF–1 terminals while operating in Italy. There were occasions when additional equipment of this nature were needed.

In the — Air Force, teletype service is normally provided to all headquarters down to and including groups and separate squadrons. Flexibility is obtained by the use of Telegraph Central Office Set TC–3. Extensive use has been made of spiral-four cable, particularly in a rapidly moving situation. It has been used both with and without carrier.

Mobility of signal equipment is of the greatest importance. During operations in Italy, the equipment of both the — TAC and its Air Defense Wing was, as far as possible, mounted in trailers. At forward echelon, six such communications trailers were used. They provided two mobile radio receiving stations, two telephone carrier and switchboard stations, and a cryptographic room.

MAINTENANCE OF CABLES

A ZONE system for cable maintenance has worked very successfully in the Peninsula Base Sector, Naples, according to information reaching the Chief Signal Officer. The system is similar to that used by commercial telephone companies in the United States. In fact it was put into effect by U. S. telephone men serving with a signal service company at Naples.

Zone gangs are assigned to various areas of the sector, responsibility being placed on individual gangs assigned to specific towns. A zone gang is responsible for testing, repairing, and keeping records of defective cable pairs. These records facilitate trouble shooting when cable failures occur. In the city of Naples several zone gangs are employed; single gangs are assigned to individual neighboring towns. The sole purpose of designating gangs to separate zones is so that men in each of the individual units become thoroughly acquainted with all maintenance problems arising in their particular zone. In addition to frequent spot checks, the men contact the signal office in Naples at least three times daily to learn if any trouble had been reported in their particular zones.

A zone gang consists of a cable splicer and two helpers. Principal duty is maintaining cables and keeping up the communication systems by continually testing. Each gang inspects about 30 boxes, each box containing approximately 200 pairs of trunk cable and from 200 to 300 pairs of secondary cable. If no trouble is experienced in a particular zone over a period of 2 weeks or more the gang is moved into another zone which requires assistance.

Duplicate records of all repairs made to defective pairs of cable are maintained. One set of records is kept by the man in charge in the zone and the other by an NCO at headquarters in Naples. The records permit individual gang members to familiarize themselves with cable records in their particular zones. This helps in expeditiously locating troubles. At headquarters in Naples the NCO keeps a record showing the type of defect (as short, cross, or open), the number of the pair, when the trouble occurred, when it was cleared, and by whom it was cleared.

At the main office in Naples a tester receives all reports of trouble and acts as dispatcher, sending repairmen to the scenes of trouble. If the repairman discovers trouble in the instrument, he clears it himself. However, if the cable is found to be defective the matter is reported to the Naples headquarters where the NCO advises the zone gang concerned. In addition, the tester keeps the non-commissioned officer at Naples informed of all cable changes of conductors.

PRODUCTION IMPROVEMENTS

IN ACCORDANCE with the Signal Corps' policy of providing the American soldier with the best possible communications equipment, new ground signal equipment is continually being developed, while existing equipments undergo continuous improvement.

Reports of unsatisfactory equipment performance, when such reports are sufficiently definite and detailed, enable the Signal Corps Ground Signal Agency to determine means of overcoming defects in design or construction, or to suggest ways of making good apparatus still better. This information is used to revise specifications, and is communicated to the manufacturers of the equipment, who then make changes in production.

The accompanying table shows the major improvements made in production on Radio Set SCR–300–( ) and Radio Set SCR–536–( ). Information included in the table shows nameplate data (manufacturer, order number, and serial number) to enable using arms to identify the equipments incorporating the improvements.

Production changes made in other Signal Corps equipments will be presented in future issues of the Signal Corps Technical Information Letter.

Equipment (component)	Change	Reason	Producer	Order No.	From Serial No.
SCR–300–A (BC–1000–A)	Rear bearing changed from a single ball-bearing to a cluster ball-bearing. Coupling between the antibacklash gear shaft and the gang capacitor shaft eliminated. Bearings in the antibacklash drive gear-shaft eliminated. Antibacklash drive gear shaft eliminated and gang capacitor shaft extended to carry the antibacklash drive gear. End plate and end plate mounting studs of the antibacklash drive gear housing eliminated.	The improvement and simplification of construction, as an aid to production, and to minimize backlash misalignment and binding of shaft.	Galvin Mfg. Corp.	32870–Phila–43–01	2203
Do	do	do	Philco Corp.	10185–Phila–44–01	1
Do	Bias of the third i-f amplifier reduced to minus 1.5 volts and plate and screen resistor R–41 reduced from 22,000 ohms to 15,000 ohms.	To increase i-f sensitivity and over-all sensitivity and to permit use of most tubes that are within JAN specification without tube selection.	do	10185–Phila–44	4625 to 4935 incl. and 5801
Do	do	do	do	8558–Phila–44	6500
SCR–300–A (BC–1000–A and CS–128).	Catch, hold down clip, Ref. No. 305 and 401, Galvin Part No. 55A41977 replaced by catch, hold down clip, Part No. 358–4602 as made by American Cabinet Co., and clip, hold down, Ref. No. 112 and 306, Galvin Part No. 55K34338 replaced by clip hold down Part No. 258–5480 as made by American Cabinet Co.	To prevent damage to equipment resulting from failure of wire loops on original clip, hold down catches.	do	10185–Phila–44	3000 approx.
Do	Catch, hold down clip, Ref. No. 305 and 401, Galvin Part No. 55A41977 replaced by catch, hold down clip, Part No. WX–6956 as made by American Cabinet Co., and clip, hold down, Ref. No. 112 and 306, Galvin Part No. 55K34338 replaced by clip hold down Part No. WX–6252 as made by American Cabinet Co.	To prevent damage to equipment resulting from failure of wire loops on original clip, hold down catches.	Galvin Mfg. Corp.	8558–Phila–44	9075
SCR–536–C (BC–611–C)	Inductance of primary of second i-f transformer, circuit symbol T–2, changed from 1.1 mh to 1.8 mh.	To increase i-f gain, thus improving over-all sensitivity.	Electrical Research Labs.	31391–Phila–43	All sets
Do	Two holes and clinch nut added to top of case.	To permit mounting antenna support.	do	31391–Phila–43	3706
Do	Antenna support, ERLA Part No. G15560, added inside case near top cover.	To prevent breakage of phenolic antenna guide.	do	31391–Phila–43	5457
Do	Bakelite cones substituted for paper cones in microphone, Ref. No. M–4, and earphone, Ref. No. M–5.	To improve waterproof characteristics of this set.	do	31391–Phila–43	5441
Do	Top cover assembly, Stock No. 2C5351C/A2 and bottom cover assembly Stock No. 2S536A/A3 modified as follows: material of gaskets changed from sponge rubber to sponge neoprene, type FR, and gaskets increased in thickness.	To improve the seal of the case against the entrance of moisture.	do	31391–Phila–43	985
Do	Bottom cover assembly, Stock No. 2S536A/A3, modified to change material of battery contactor springs from spring brass to phosphro bronze.	To improve contact to battery.	do	31391–Phila–43	1

Equipment (component)	Change	Reason	Producer	Order No.	From Serial No.
SCR-536-C (BC-611-C)	Material of cover for push-to-talk switch, Stock No. 2C5351C/C7, changed from rubber to neoprene, type FR, of reduced thickness (ERLA Part No. G15522-A).	To improve flexibility of switch cover.	Electrical Research Labs.	31391-Phila-43	1
Do	Material of microphone and earphone caps, Stock No. 2B475/1, changed from molded phenolic to aluminum alloy. New part has Stock No. 2B475/1.1.	To increase strength of cap and provide better fit to case.	do	31391-Phila-43	1
Do	Material of microphone and earphone caps, Stock No. 2B475/1, changed from molded phenolic to aluminum alloy. New part has Stock No. 2B475/1.1.	To increase strength of cap and provide better fit to case.	Galvin Mfg. Corp	31391-Phila-43	1 and up
Do	"On-off" switch, Stock No. 3Z9853, modified to change molded phenolic throwarm to a canvas bakelite type with brass insert.	To prevent breakage of switch throwarm.	Electrical Research Labs.	31391-Phila-43	2429
Do	Battery filler strip assembly, Stock No. 2C5351A/J2/7, impregnated with wax.	To prevent warpage due to moinsture.	do	31391-Phila-43	5500
Do	All varnished cambric tubing used for insulation changed to extruded vinylite.	To make moistureproofing more effective.	do	31391-Phila-43	1200
Do	Phenolic cones substituted for paper cones in microphone and earphone units.	To improve waterproof-characteristics.	Galvin Mfg. Corp	31393-Phila-43	8450
Do	Set sprayed with moisture and fungus proofing lacquer.	To moisture and ungus proof.	Electrical Research Labs.	31391-Phila-43	4394
Do	Existing ceramic type antenna insulator removed and a polystirene antenna insulator (ERLA Part No. G15651) installed. This new insulator has integral metal top bushing, with a vinylite moisture seal around the antenna entrance hole.	To reduce breakage of the ceramic antenna insulator and to prevent the entrance of moisture around the antenna at the point of its entrance.	do	10757-Phila-44	7344
Do	Color of wiring from pin No. 1 of VT-174 socket to open lug on "receive" switch contact K changed from brown and white to white and blue.	Brown and white coded wire not available.	Galvin Mfg. Corp	31393-Phila-43	11435
Do	Press-to-talk switching assembly replaced by new design made of steel (ERLA, Part No. G-15882).	To prevent breakage of die-cast parts previously used.	Electrical Research Labs.	17057-Phila-44	9788
Do	Resistor, fixed carbon 4,700 ohms added in screen circuit of tube VT-171 (V2).	To reduce the possibility of oscillator failure when using a tube VT-171 with low cathode emission.	Galvin Mfg. Corp	29056-Phila-43	1
Do	do	do	Electrical Research Labs.	31391-Phila-43	1
SCR-536-E (BC-611-E)	Ground lead of Capacitors C2 and C5 relocated to remove these leads from proximity to plate lead of tube VT-174 and length of spaghetti added on plate lead of Tube VT-174.	To prevent grounding of plate lead of tube VT-174.	Galvin Mfg. Corp	10756-Phila-44	1
SCR-536-C (BC-611-C)	do	do	Electrical Research Labs.	10757-Phila-44-01	8344
Do	Right angle bracket on chassis replaced with a solid block in accordance with Drawing SC-D-14303.	Bracket pulls out of the chassis when the set is dropped by parachute.	do	20412-Phila 44	31287
Do	do	do	do	26827-Phila-44	1
SCR-536-( ) (BC-611-( ))	Right angle bracket on chassis replaced with a solid block in accordance with Drawing SC-D-14303.	Bracket pulls out of the chassis when the set is dropped by parachute.	Galvin Mfg. Corp	26828-Phila-44	10816
SCR-536-C (BC-611-C)	Leather washer replaced with composition gasket washer under top cover of hold-down screw.	To improve moistureproofing and fungus resistance.	Electrical Research Labs.	20412-Phila-44-01	31330
Do	do	do	do	26827-Phila-44-01	1

SLOGAN

United States Army telephone men in France have adopted the following slogan, quoted in the ETO Current Information Letter for November:

"Congress makes a General, but he's not a *Commanding* General until we put a telephone in his hand."

EQUIPMENT NOTES

SIGNAL CORPS BOARD

CASE APPROVED BY THE CHIEF SIGNAL OFFICER

Case No. 572—Modified Trailer K–36–A

The Signal Corps Board was directed to service test a modified pole-hauling and cargo Trailer K–36–A developed by Fort Monmouth Signal Laboratory. This development was initiated as the result of War Department Circular No. 312, 30 November 1943, which in Section I states that special purpose vehicles will utilize standard parts and assemblies unless it is clearly shown that these will not perform the functions required. Trailer K–36 and K–36–A are commercial types of vehicles and the modified trailer incorporates standard Ordnance components in its assembly.

The trailer tested by the Board has a gross weight of 9,400 pounds when loaded to its rated capacity of 7,000 pounds payload. It is equipped with dual tires 7.50 x 20 which are interchangeable with those of the 1½-ton 4 x 4 and 2½-ton 6 x 6 trucks.

The following modifications were made on standard Trailer K–36–A in order to incorporate standard Ordnance components and increase the payload from 4,600 to 7,000 pounds:

1. Side members change from 3/16″ steel to ¼″ steel.
2. Heavier floor and floor braces (12 gauge USS).
3. Short lunette connection frame changed from angles to channels.
4. Addition of helper springs.
5. Addition of larger axle (15,000-pound tubular, 4½″ diameter).
6. Elimination of automatic push-button connection of electric brakes, tail light, stop light, and safety switch.
7. Addition of dual wheels and elimination of fenders.
8. Addition of reflectors and blackout lights.
9. Replacement of safety rope with safety chains.
10. Wiring changed to conform to Ordnance standards.
11. Lunettes changed to standard dimensions (3″ diameter hole and 1⅝″ diameter eye stock).
12. Elimination of intermediate position on telescoping tongue.

The Signal Corps Board tested the trailer by loading it with 35-foot poles weighing approximately 8,100 pounds and towing it behind a 4-ton 6 x 6 truck for a distance of 160 miles over roads and rough cross-country routes. The test was made in wet weather in the vicinity of Fort Monmouth.

The Board found that the modified trailer possesses decided advantages over Trailer K–36–A. It is much more rugged in design, tracks well behind the towing vehicle, loaded or empty, and is capable of carrying a pay load of 7,000 pounds of poles at speeds up to 45 miles per hour. The

TRAILER K–36–A, INCORPORATING STANDARD ORDNANCE PARTS, IS SHOWN HERE WITH AN 8,100 POUND POLE LOAD.

advantage of standard Ordnance components for maintenance and repairs was, of course, one of the primary objectives of the development.

As a result of the field tests the Signal Corps Board concluded that the trailer submitted for test, with slight modifications, is a satisfactory and desirable replacement for Trailer K–36–A. It was recommended that the proposed military characteristics for Pole Hauling and Cargo Trailer submitted by the Board be presented to the Signal Corps Technical Committee with the recommendation that they be adopted; that the modified trailer be classified as a standard article; and that Trailer K–36–A be reclassified as a limited standard article.

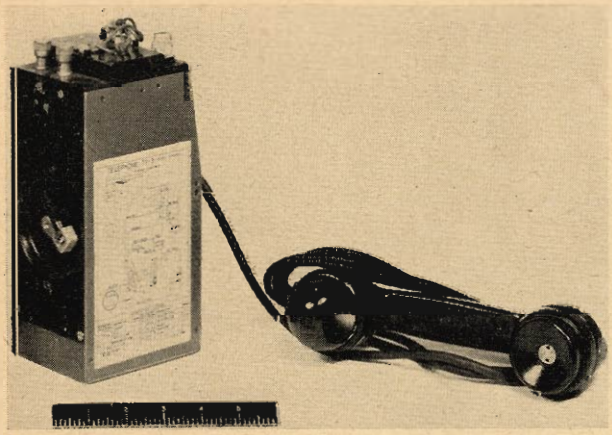
GROUND SIGNAL

SOUND POWERED TELEPHONE TP–3

Sound powered Telephone TP–3 is voice powered, requiring no dry cells for operation. A neon lamp and key switch are included in this telephone for alternate receipt of a visual signal when the sound of the ringer would be objectionable. Telephone TP–3 is identical to Telephone EE–8 with respect to case, chassis, generator and ringer. However, EE–8 has a holding coil and capacitors not required in TP–3. Sound powered Handset TS–10–( ), is included in TP–3 as compared with battery operated Handset TS–9–( ) included in EE–8.

Telephone TP-3 provides two-way signaling and voice communication over approximately six miles of Wire W–110–B (dry) or three and one-half miles of wire W–110–B (wet).

Handset TS–10–( ) has magnetic balanced armature type transmitter and receiver units. The power output of the transmitter is approximately 30 db below that of a battery operated transmitter; however, the sensitivity of the receiver unit is approximately 10 db better than that of the receiver unit part of the battery operated handset.



CHASSIS AND HANDSET OF SOUND POWERED FIELD TELEPHONE TP–3. CASE IS SIMILAR TO THAT USED IN TELEPHONE EE–8.

Telephone TP–3 is in production and deliveries are being made. Detailed information on this item is included in Technical Manual TM 11–2043. Issue will be in accordance with T/O & E's.

TOWL HARDWARE KITS

Reports from theaters of operations early in 1943 indicated that some difficulty was being encountered in the control and distribution of small components of tactical open wire pole line equipment. In September 1943 some relief was provided by furnishing the smaller hardware and accessory items in kits.

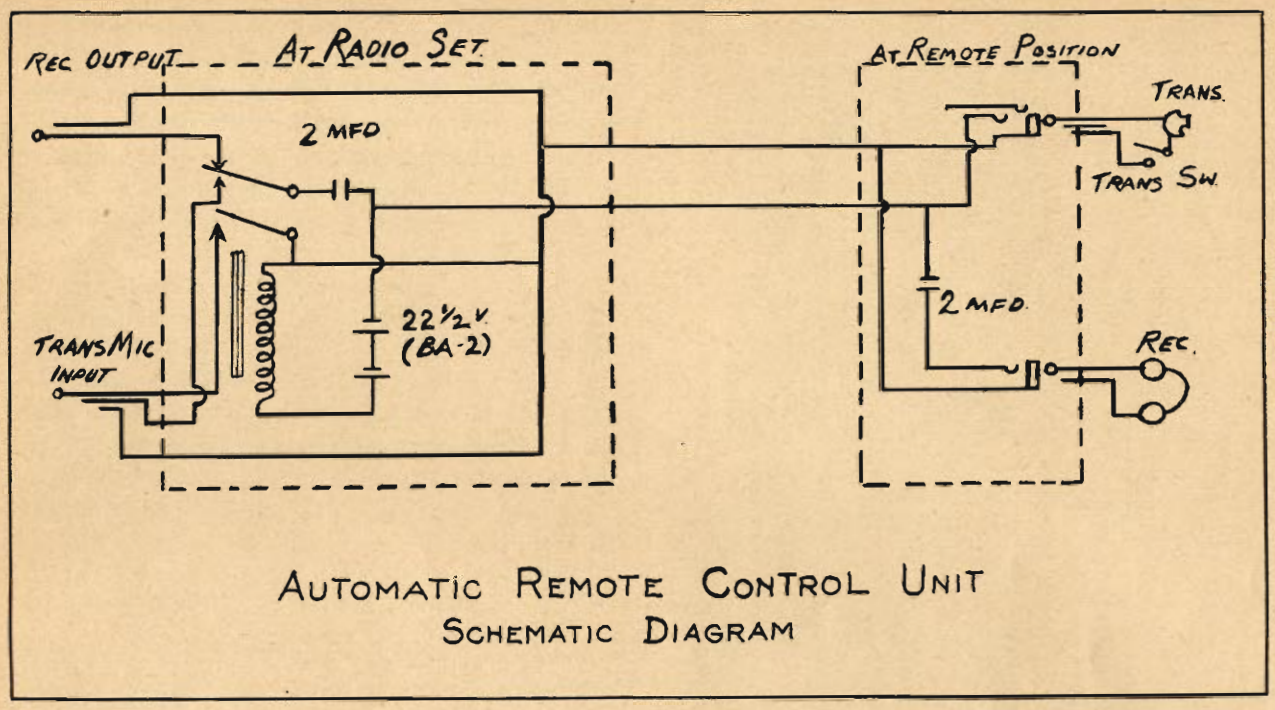
So successful did this procedure prove that at the present time two hardware accessory kits are being furnished for tactical open wire pole line use. Kit A (Stock No. 5B–5703) is furnished for the light loading type of TOWL. Each kit contains items sufficient for two miles of construction, including wire ties, connectors, bolts, braces, clamps, ring bridles, screws, washers, nails and sleeves. Kit A weights approximately 220 pounds and measures about two cubic feet in volume.

In June of 1944 when the medium and heavy type of tactical open wire pole line became available Kit C (Stock No. 5B–4675) was provided containing sufficient items for a one mile of construction. These items include wire ties, connectors, bolts, braces, clamps, bridle rings, screws, washers, nails, sleeves, and thimble-eyes. Kit C weighs approximately 230 pounds and measures about two cubic feet in volume.

Recent reports from the field indicate that these kits have been popularly received and have aided greatly in eliminating previous difficulties.

REMOTE CONTROL UNIT FOR SCR–609

A report received by the Chief Signal Officer from an Engineer special brigade operating in France which found that Remote Control Unit RM–29–( ) did not prove entirely satisfactory for certain specific situations in which the brigade was engaged, has been received. The report described an improvised light-weight automatic control unit designed and built by communications



AUTOMATIC REMOTE CONTROL UNIT
SCHEMATIC DIAGRAM

men of the brigade, used for shore fire control communications.

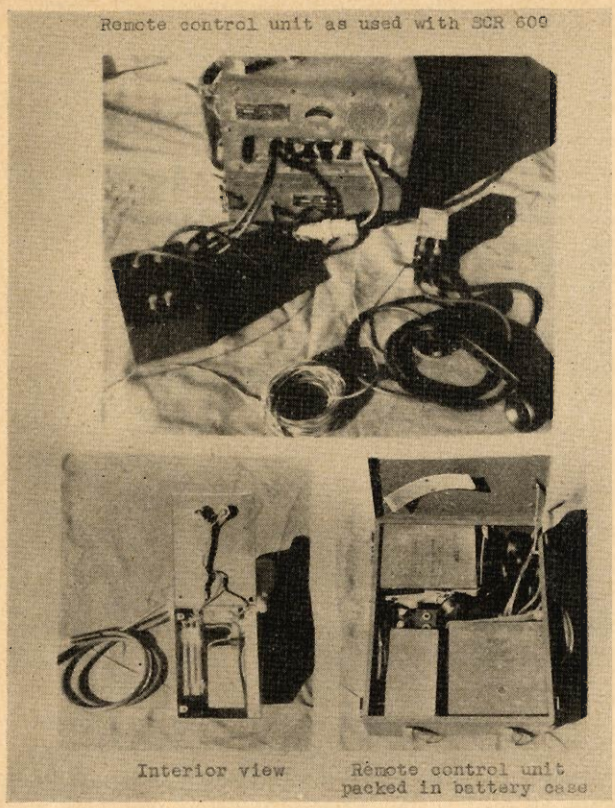
The trouble with the RM–29 was the lack of accurate coordination of operation of the "anti-howl" switch of the RM–29 unit corresponding to rapid changes in transmitting and receiving at outlying Telephone EE–8 stations. This necessitated the relay of all messages from the gun fire spotter to the supporting naval vessel which made possible errors in repetition. In addition, the RM–29–( ) unit was too heavy to be handled over the rough and hilly terrain and spotters felt that the telephone was too bulky.

The improvised remote control unit consisted of a small 22½-volt battery, one relay, and a 2-microfarad condenser. The three components were contained in a case with two and three conductor cords for plugging into the radio set. The entire unit weighed slightly more than one pound and was transported in the battery compartment of Radio Set SCR–609–( ).

A two-wire line was run to the remote position either to the radio handset or, more often, to a chest transmitter and Headset HS–30–( ) receiver. The receiver was bridged across the line wires in series with a 2-microfarad condenser. The transmitter was bridged in parallel with the receiver plus condenser by the operation of the transmitter switch. Sidetone was obtained at the remote station, by leaving the receiver and condenser bridged across the transmitter during transmissions. This proved to be satisfactory and produced no noticeable impairment to transmission. The relay in the remote control unit followed the operation of the transmitter switch to disconnect the radio receiver circuit, light transmitting tube filaments, and connect the remote line wires to the transmitter input circuit. When working with a 500-ohm remote control line no appreciable differences in transmitting and receiving efficiency was noted.

Although no monitoring was necessary at the radio set for shore fire control work, if it had, it was planned to make provisions for a second handset at this location. If this had been done, by removing the transmitter plug from the radio set, the two handsets could be used as a combination private wire and listening circuit on the radio channel. The transmitter plug would be inserted in the radio set during transmission only.

Another use was found for this remote control unit with voice radio sets temporarily installed in LCI's during an amphibious operation. Several of the LCI's required two or three radio sets for Army communications afloat. Radio sets with attached remote control units were mounted in an out-of-the-way location on the quarter-deck. Radio operators worked in compartments below deck,



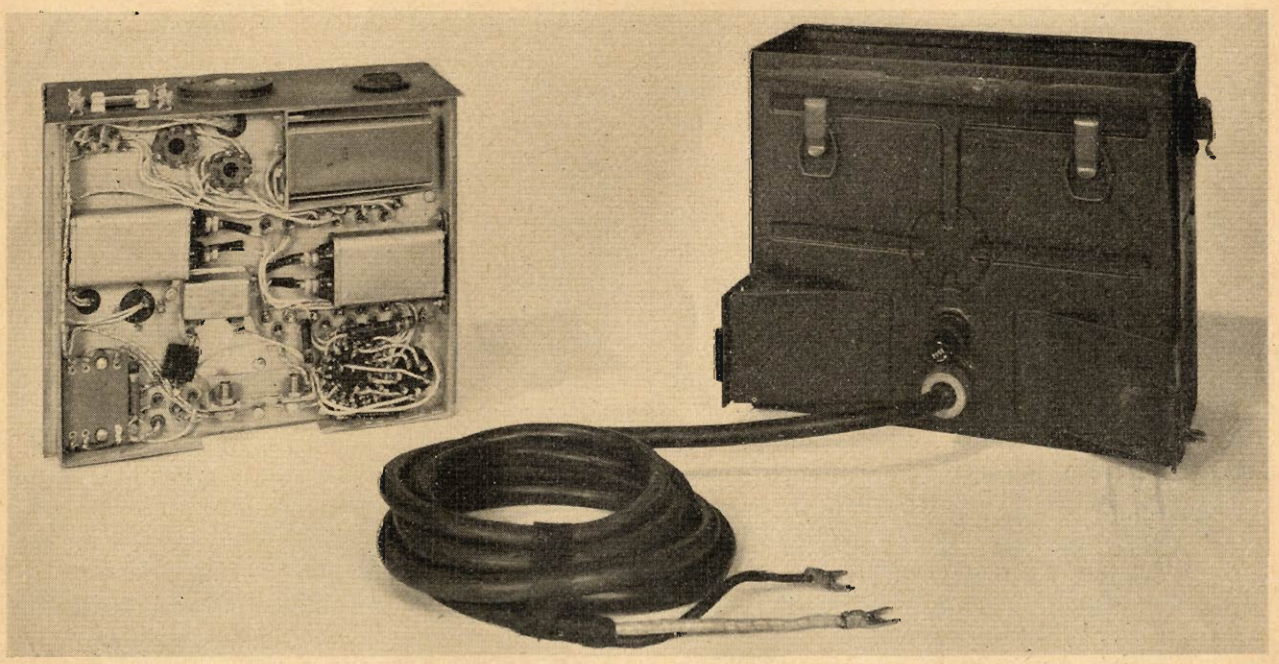
adjacent to the message center, out of the weather and rough sea. This set-up permitted message logging to be carried out efficiently and provided the radio operators with plenty of illumination at all times. When the landings were made the sets were readily unlashed, brought ashore and installed in a suitable transmitting locality several hundred yards from the brigade command post. Again using the remote control unit the operators worked under optimum conditions with respect to weather, lighting, and proximity to the message center.

The procurement and issue of Remote Control Equipment RC–261 should provide the necessary equipment for remote control of Radio Set SCR–609–( ) without the need for field improvisations. It should be available to the field within a short time. However, until such time, it is possible that the improvised unit described above may be of some help. The RC–261 was described in SCTIL No. 31, June 1944.

VIBRATOR POWER SUPPLY

Vibrator Power Supply PP–114–( )/VRC–3 provides all power required for vehicular operation of Radio Set AN/VRC–3–( ), replacing dry Battery BA–70.

This new power supply consists of a single unit providing a vibrator, transformer, rectifier, and controls, making possible the operation of Radio Receiver and Transmitter BC–1000–( ) directly from a 6, 12 or 24-volt vehicle storage battery. The unit is about 11″ x 10″ x 5″, and can be



VIBRATOR POWER SUPPLY PP–114 ( )/VRC–3 REPLACES DRY BATTERY BA–70 FOR RADIO SET AN/VRC–3–( ). PICTURED ABOVE IS THE BOTTOM VIEW OF THE CHASSIS AND A REAR VIEW OF THE CASE.

attached to the radio receiver and transmitter chassis interchangeably with Case CS–128–( ) heretofore employed to house the dry battery for powering this set. The drain on the vehicular battery is about 36 watts at any of the three operating voltages. The power output is regulated to provide proper operating voltages for AN/VRC–3 over the entire input-voltage range encountered in vehicular installations.

Control of Vibrator Power Supply PP–114( )/VRC–3 is automatic; a self-contained relay turns the unit on and off under control of the on-off switch already present on the radio chassis. A screwdriver adjustment permits selection of the proper input voltage corresponding to the system voltage of the vehicle.

In the design of this power supply, special attention was paid to minimizing maintenance. The two rectifier tubes (type VT–195) and the vibrator unit itself have expected service lives of over 500 hours of operation. All other major components are hermetically sealed in metal cans and should give long service under any climatic conditions.

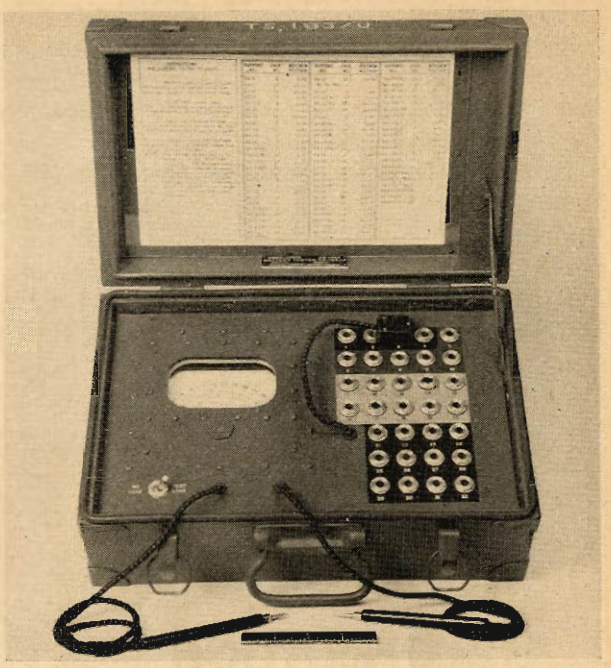
Advance production of a substantial quantity of Power Supply PP–114( )/VRC–3 has already been initiated, and the item is to be issued as a component of Radio Set AN/VRC–3–( ) in accordance with the recommendation of the Armored Board, which conducted the service test.

MAINTENANCE

BATTERY TESTER TS–183/U

Battery Tester TS–183/U provides 4th and 5th echelon units and supply organizations with a simple, rugged, lightweight, portable instrument for reliable and accurate testing under load of dry batteries before their issue. Use of this tester will result in a saving in batteries since these will now be discarded only if they fail the test and not merely because they have reached the limit of shelf life indicated in tables. It will also greatly reduce the number of unserviceable batteries which are issued.

The instrument consists of a pair of test leads and prods, 32 jacks, 26 load resistors, and 1000-ohm per volt multiscale voltmeter, all of which are mounted on a metal panel. Four of the jacks have been included incorporating odd size load resistors in anticipation of future battery developments. The entire assembly is housed in a



BATTERY TESTER TS–183/U IS TO BE USED BY HIGHER ECHELONS IN THE TESTING OF BATTERIES PRIOR TO ISSUE. NOTE THAT THE TOGGLE SWITCH NORMALLY IS IN "LOAD" POSITION WHICH OBVIATES THE POSSIBILITY OF CHECKING BATTERIES UNDER "NO LOAD" CONDITION.

10″ x 13″ x 4″ waterproof plywood carrying case and weighs 8 pounds.

Jack JK–34 has been used in place of smaller more special jacks because of the facility of replacement. The instrument contains a "load"-"no load" toggle switch. This switch has a spring return and is normally in a "load" position. Through the use of this switch, personnel using the tester can determine whether or not the load circuit in the load resistor arrangement is functioning properly or is open-circuited. The switch also allows the tester to be used as a voltmeter and may also be set in the "no load" position when it is desired to check the accuracy of the meter in the tester. The spring return feature eliminates the possibility of accidentally checking batteries in the "no load" position.

The meter is contained in a hermetically sealed compartment and is thus protected against humid conditions. Should it become necessary to disassemble the battery tester it is, of course, necessary to reseal this compartment and great care must be taken to insure that the instrument is clean and dry and that the air in the seal compartments is also dry before resealing.

The battery tester has been designed for ease and rapidity of operation by the use of colored

meter scales and corresponding jacks identification coloring. Proper scale selection is facilitated for the user by noting the background color of the jacks selected and then reading the corresponding colored scale on the meter.

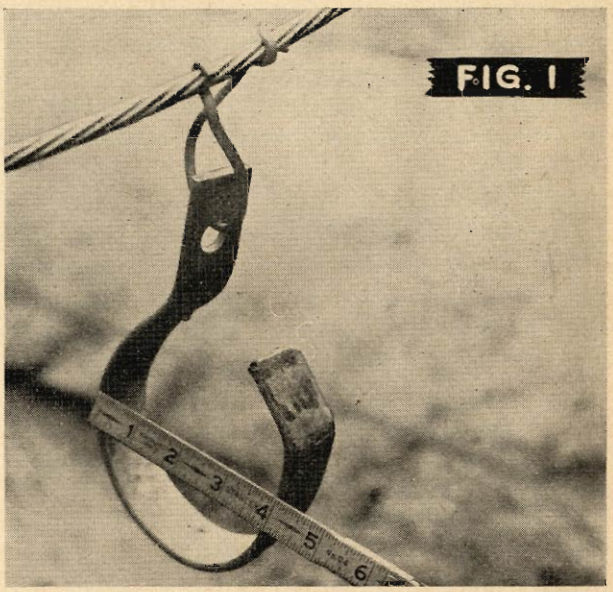
Battery Tester TS–183/U has been classified standard. Basis of issue provides for one such equipment for S & I sections, signal depot companies, (T/O & E 11–107); storage sections, signal base depot companies, (T/O & E 11–587); and S & I platoons, signal companies, depot (aviation), (T/O & E 11–287).

NOTES ON RADIO OPERATION

The following comments are drawn from a report of interrogation of a signal company radio operator who recently returned to the United States from France.

There were four men for each radio and they were sometimes forced to operate 24 hours a day. They worked in shifts normally, but many times for long periods four men would have to work at once, two men operating remote control telephones, one man operating the radio, and another man encoding and decoding. Remote control telephones were used frequently and successfully by staff officers. An attempt was always made to locate the radios away from roads and at least one mile from the command post.

SPIRAL-FOUR CABLE SPAN



HOW A signal heavy construction battalion put a number of spiral-four cables in one long span across the Moselle River in France several months ago is told in a report recently received by the Chief Signal Officer.

It was SOP with this signal organization to use 0.109 GI wire as messenger for one or two spiral-four cables, and to use 0.134 GI wire as messenger for three or four spiral-four cables. When confronted with the problem of putting more than a dozen spiral-four cables across the 320-foot wide river, it had the choice of putting a series of individual cables on iron wire or of improvising something for a long span construction in this heavy loading (storm) area. It was decided to improvise.

A 30-inch crossarm brace was cut to 13-inch length and bent as shown in figure 1. The over-all length was 8 inches from messenger to the bottom of the hook. This provided a 4-inch ring with a 2-inch opening for the placement of the cables.

The hook was firmly secured to the strand (6M was used in this case) with standard cable rings (preferably one-half inch) spaced at intervals of five feet. The hook was easily capable of carrying 25 spiral-four cables.

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- Rectifier Industry 27 Facilities
- Electron Tube Industry 27 Facilities
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- Bearing Industry 21 Facilities
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- Radio Grade Insulation Ind. 25 Facilities
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1-4-45

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Materials illustrative only; by no means show total required for Signal Corps materiel.

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Precious Metals
Tantalum, Tungsten, Moly
Plastics

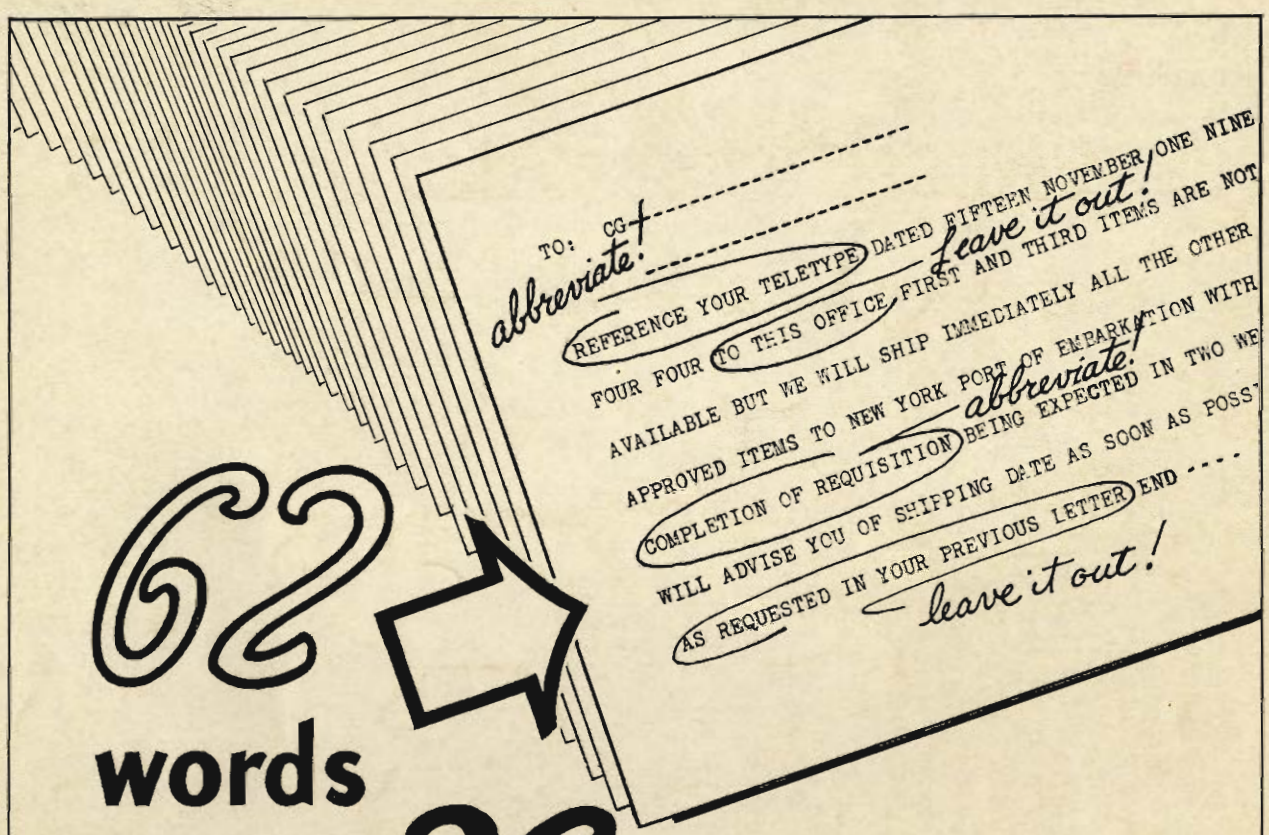
Paints and Finishes
Waxes, Gums and Asphalt
Textiles
Felts
Upholstery and Padding
Chemicals

Rubber and Substitutes
Fibers and Cordage
Paper and Pulp
Ceramics and Glass
Insulating Materials
Tin

Wood - Lumber
Quartz and Raw Minerals
Brass
Adhesives
Oils and Lubricants
Animal Products

AMERICAN INGENUITY, RESOURCES AND PRODUCTION TECHNIQUES

THE SIGNAL CORPS MUSEUM
FORT MONMOUTH, NEW JERSEY
PROPERTY OF SIGNAL CORPS, U. S. ARMY



62 words when 26 words would do!

TO: CG

REURTT FIFTEEN NOV FIRST AND THIRD ITEMS NOAVAL
WILL SHIPIM ALL OTHER APD ITEMS TO NYPE COMPL
REQ EXPECTED IN TWO WKS WILL ADSHPDAT SAP END ---

ARMY COMMUNICATIONS SERVICE

Read AR 850-150 and *use it!*

KEEP *Your* MESSAGES SHORT!