MAGNETO STATIONS
FEDERAL SET

1. GENERAL

1.01 This section gives general information relating to the description, installation, connections and maintenance of magneto station telephone sets manufactured by the Federal Telephone and Radio Corporation.

1.02 These telephone sets are anti-sidetone sets and consist of a hand set and a telephone set mounting which houses a ringer, condensers, induction coil and a hand generator.

1.03 In connection with ordering information, reporting equipment installed on service orders, etc., these telephone sets are coded FTR 804BA and FTR 804CW, the former code being for sets equipped with B1AL ringer and the latter codes for sets equipped with Federal ringer. The code numbers referred to herein except those for the complete telephone sets and those parts listed under 6.01 are for apparatus of Western Electric manufacture.

1.04 These sets have housings made of metal with a black finish.

1.05 In general, the sets are installed in accordance with instructions included in the C30 Division covering the locating and mounting of hand telephone sets, subscriber sets (wall sets) and installation of connecting blocks.

2. DESCRIPTION

2.01 The set as furnished (shown in Fig. 1) is arranged for use as a wall set. Where the set is to be installed on a desk or table, two machine screws in the housing are removed and that portion of the housing on which the plunger and supporting surfaces for the hand set are located is lifted off and rotated 180° and then secured in place with the two screws. The upper housing is hinged to the right side of the base. On the left side a spring latch extends through the underside

of the base. To open the set this latch is moved approximately 1/8 inch to the left. This arrangement is shown in Fig. 2. A D4U, D5AA or equivalent cord is then added to the set to connect the mounting to the line and battery supply.

Note: If plunger sticks when housing is changed from one type to another, check to see if the operating spring roller is riding on the conical portion of the plunger. If not, shift contact spring assembly by loosening the two mounting screws for the assembly in the bracket provided with elongated holes and then retighten screws.

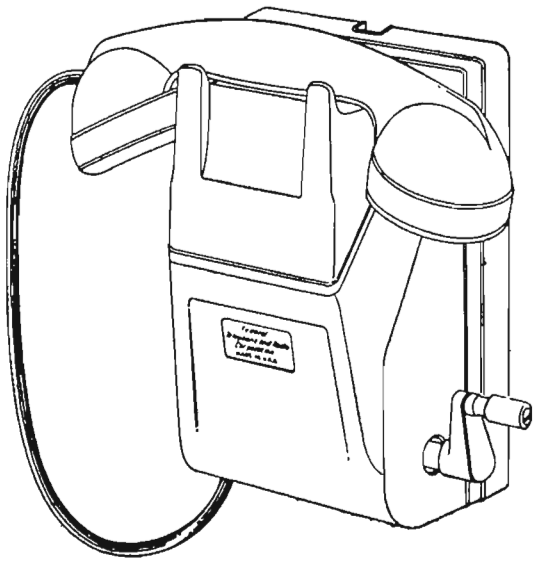


Fig. 1

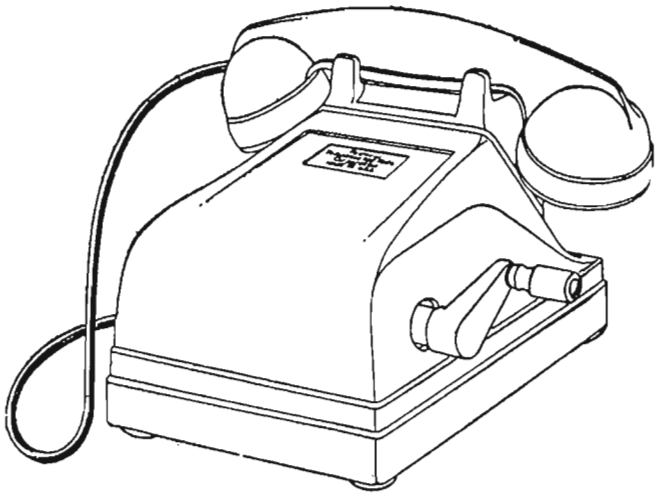


Fig. 2

2.02 The hand set consists of a Federal handle with Connecticut Telephone and Electric transmitter and receiver units. The hand set cord is of Federal manufacture, is four feet long and has rubber insulated conductors and a synthetic jacket covered with textile braid. The Federal hand set may be zoned the same as the F1A hand set. If for maintenance reasons it is desired to replace the hand set or hand set parts with an F1A hand set or its parts, certain replacements may be made as specified in Part 5.

2.03 The ringer in the set may be either a B1AL ringer or a Federal ringer. These ringers are interchangeable but the 1 mf. part of the 1147D condenser should be connected in series with the B1AL ringer in certain cases as indicated in 4.03.

2.04 A Federal induction coil is provided in the set.

3. INSTALLATION

3.01 Attach the set to walls of wood or wood lath and plaster with the fasteners regularly used for attaching subscriber sets. The fasteners are then placed through the holes in the base feet with one P-284151 and one P-284163 washer under the screw head.

3.02 On wall surfaces of other than wood or wood lath and plaster, use a backboard to mount the set. The 147A backboard may be used for this purpose. Attach backboard with fasteners regularly used to attach subscriber set backboards.

3.03 Where the set is installed on a desk or table, a 42A connecting block may be used to connect a four-conductor mounting cord to the line and battery supply. If a five-conductor cord is used, install a 44A connecting block.

3.04 Mount unit type batteries, battery bags or boxes in accordance with instructions in the section entitled "Dry Cell Batteries and Battery Boxes—Installation and Maintenance."

4. CONNECTIONS

Induction Coil Networks

4.01 The induction coil in the set is equivalent in electrical characteristics to the 104A induction coil used in other magneto station sets. To obtain satisfactory sidetone balance when used on the different types of subscriber loops employed in the Plant, induction coil networks similar to those used with the 104A induction coil are used with the Federal set. Table 1 indicates the connections to obtain the proper network for the transmission zone codes specified on the service order.

TABLE 1

Zone Code	Networks Connections
MA	Connect the BL condenser lead to A and 300^{w} resistance between A and C
MB	Connect a KS-8058 (700^{w}) resistance between A and C and strap A to L2
MC	Connect BL condenser lead to C
MD	Strap C to L2

Note: When making changes in connections at the terminal block in the set, take care to avoid excess pressure on screwdriver so as not to break block.

4.02 As furnished, the sets are connected for zone code MA and are provided with a 300 ohm resistance. Where required for zone code MB connections, the KS-8058 (700 ohm) resistance is provided locally. The 300 ohm resistance may be identified by the color of the stripes on the resistance, Orange-Black-Brown-Gold. The 700 ohm KS-8058 resistance may have

Violet-Black-Brown colors and possibly a fourth color Gold or Silver. For connections for zone codes MB and MD, a strap P-294521 or a piece of wire is installed.

Line and Ringer Connections

4.03 **(a) Low Impedance Ringers.** The B1AL ringer connected in series with the 1 mf. portion of the 1147D condenser (yellow and red condenser leads) or the Federal ringer not connected to the condenser constitute low impedance ringing bridges and may be used on non-polarized ringing magneto lines employing low impedance ringers as covered in Sections C64.141, C64.142 and C64.143.

(b) High Impedance Ringers. The B1AL ringer used without connection to a condenser may be used as a high impedance ringer on the same line with other high impedance ringers (3500 and 4300 ohm) as covered in the above Sections.

Ringer Connection Limitations

4.04 **(a) Bridged Ringing Lines.** Not more than 8 ringers per 4.03 (a) may be used on a line having a loop resistance of 800 ohms. Within reasonable limits the number of these ringers which may be connected to lines of greater or lesser resistance than 800 ohms is in inverse proportion to the loop resistance, e.g. 4 for a line of 1600 ohms or 16 for a line of 400 ohms.

(b) Grounded Ringing Lines. Follow the requirements given in the Sections mentioned in 4.03 (a) for both high impedance (3500 to 4300 ohms) and low impedance (1000, 1000-3000, 1400 and 1500) ringers.

Loud Ringing Bells

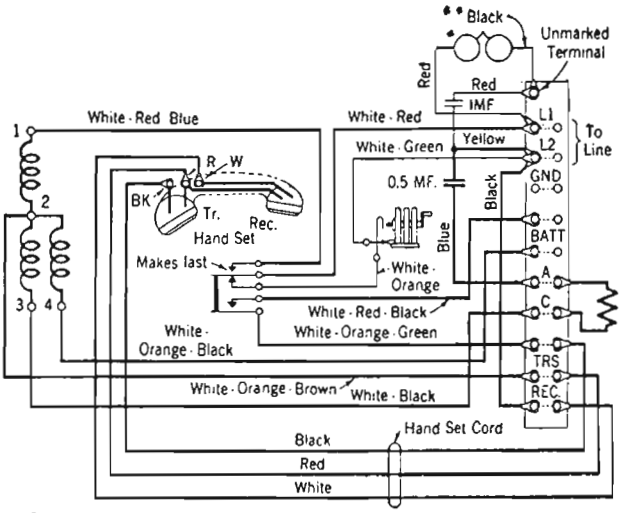
4.05 **(a) Bridged Ringing Lines.** Reduce permissible number of normal station ringers one for each 592B and two for each 392 type set employed on the line.

(b) Grounded Ringing Lines. Reduce permissible number of normal station ringers one for each 592 type and two for each 392 type set employed on the line. If the 592A set is used on the same line with high impedance ringers (such as the 66JA ringer in the 417CD set) the condenser in the 592A set **shall not** be connected in the ringing circuit. If, however, the 592A set is used on the same line with low impedance ringers the condenser **shall be** connected in the ringing circuit.

Federal Set Connections

4.06 The connections for the Federal magneto set are shown in Fig. 3. When a mounting cord is used to connect the telephone set to the line and battery supply a D4U-9

or equivalent cord may be used on bridged ringing lines and terminated at a 42A connecting block. On grounded ringing lines, a D5AA-9 or equivalent cord should be used and terminated at a 44A connecting block.



* W.E. Co. B1AL in FTR 804 BA sets. Fed. Tel. ringer in FTR 804 CW sets.
** Connect black ringer lead to L2 terminal in the FTR 804 CW sets. Connection shown above is for FTR 804 BA set.

Fig. 3

5. NUMBER CARD

5.01 A Federal station number card holder is provided for attachment to the front of the set. By removing the small screws securing this card holder, the standard printed or make-up type can be inserted in the recess in the card holder, The number card is held in place in the holder by the P-172045 card retainer spring furnished as part of the holder. When the card holder is in place, attach card holder to front of the set with the three mounting screws.

6. MAINTENANCE

6.01 Code or piece part numbers of Federal apparatus parts which may be required for replacement purposes are listed below:

Item	Description
Assemblies:	**Generator Pinion UP-368.** Pinion assembly for hand generator.
	Plunger Spring TA-20-1. Mounting switch contact spring assembly.
Clamp:	**Cord UP-10582.**
Coil:	**Induction FTR 801C.**
Generator:	**FTR 801A.** 3 Bar hand generator.
Grommet:	**UP-22013.** Rubber foot on base of telephone set.
Handle:	**Generator Crank UA-10483.**
Screws:	**UP-140.** 3/16" x 5-32 Fillister Head Screw used as connecting block terminal screw.
	UP-3784. 3/16" x 6-32 R.H. Machine Screw used with cord clamp.
	UP-2439. Ringer mounting screw.
Snap:	**Cover UP-21993.** Mounting latch.
Strip:	**Terminal Designation UP-32555.**
Telephones:	**FTR 804CW.** Telephone set equipped with Federal ringer.
	FTR 804BA. Telephone set equipped with B1AL ringer.
Washers:	**UP-432.** Pinion thrust washer.
	UP-1025. Rubber washer used with UP-2439 screw.
	UP-1913. Metal washer used with UP-2439 screw.

Hand Generator

6.02 The automatic cut-out should positively open and close contacts when the collar on the gear shaft is moved back and forth to a point where the armature just begins to turn. If the cut-out fails to operate properly, correct this condition when possible by adjustment of the contact springs or by lubrication of the moving parts with a small amount of oil per KS-6232 or KS-6470. The oil may be applied with a toothpick. Do not oil contact springs. If contact springs require adjust-

ment, adjust these as necessary with a No. 466A tool or equivalent without making a visible kink in the springs. Follow between front and transfer springs should be approximately 1/32 inch. Gauge by eye. The tension on the transfer spring should be sufficient to assure that the back contact will be made in the normal position.

6.03 When operating the hand generator if there is a tendency of the shaft to stick or turn hard due to lack of lubrication, apply a small amount of KS-6232 or KS-6470 oil with a toothpick to the gear and shaft bearings. If generator still turns hard it may be due to poor insulation of the bushings in the spring pile-up or partial short circuit in the armature. If the generator turns freely but no ringing current is applied to the line terminals, spring adjustment may be faulty or armature winding open. Replace generator if armature is defective.

B1AL Ringer

6.04 **The B1AL ringer** should be adjusted as outlined in the section in the C30 Division covering tests and adjustments for B type ringers except that the biasing spring should be placed in the low tension notch when used on bridged ringing lines and in the medium tension notch on divided ringing lines. If cross ringing is experienced during ringing tests, place spring in the high tension notch and repeat ringing tests.

Federal Ringer

6.05 Gongs may be adjusted by loosening the gong mounting screws just enough to permit rotating the gongs with some friction. Retighten screws after gongs are in desired position.

6.06 Clean the points of contact between the armature and pole faces on this ringer by inserting a strip of Bell Seal bond or approved equivalent cleaning paper between the contact and each pole face in turn while pressing the armature against the respective pole face. Repeat until a clean paper shows no dirt.

6.07 Four notches are provided in this spool head for the biasing spring setting. Insert the biasing spring in the notch which furnishes the most satisfactory ring. Make several tests to ensure that the spring will not hop out of the selected notch during ringings. If there is any doubt that the spring will not remain securely in the notch selected, replace ringer with B1AL ringer.

6.08 The armature travel should be minimum .024 inch, maximum .032 inch. The 126B and 126C gauges may be used to check this adjustment. If the ringer fails to meet these

limits and does not ring satisfactorily, replace ringer with B1AL ringer.

Hand Set

6.09 If required, the complete Federal hand set may be replaced with the F1A-3 hand set.

6.10 The Federal hand set cord may be replaced with H3C or equivalent cord and the excess length of free conductors at the connecting block end should be dressed to avoid pinching when the set is closed.

6.11 The F1 transmitter unit may be used to replace the Connecticut transmitter unit, but it may be necessary to adjust height of contact springs to engage the F1 unit. Likewise the HA1 receiver unit may be used to replace the Connecticut receiver unit provided that the contact springs are adjusted, if necessary, as to height and lateral position.

6.12 Either the Federal cap or the transmitter cap of the F1A hand set may be used to clamp the F1 unit in the Federal handle and either the Federal cap or the receiver cap of the F1A hand set may be used to clamp the HA1 receiver in the Federal handle. However, the transmitter and receiver caps of the F1A hand set are not satisfactory for clamping the Connecticut transmitter and receiver units in the respective places in the Federal handle; so if it is necessary to replace one of the Federal caps, both the cap and the associated Connecticut unit should be replaced by like parts of the F1A hand set.

Note: Transmitter and receiver caps of the F1A hand set cannot be used with some Federal handles of earlier manufacture. If any difficulty is experienced in making cap replacements, the complete hand set should be replaced.

Plunger and Switch Contact Assembly

6.13 **Cleaning:** Clean contacts with a clean 265B tool.

6.14 **Contact Alignment:** Contacts shall line up so that the full width of the contacting surface falls wholly within the length of the other mating contacts. If the contact springs do not meet this requirement, loosen the spring assembly with a 3-1/2 inch cabinet screwdriver and shift the springs until the opposing contacts are approximately centered. Take precautions to see that the bushings go through the holes and then tighten screws securely.

6.15 **Contact Follow:** Both contacts on the same spring shall make with their respective opposing contacts at approximately the same time and the contacts shall have a perceptible follow.

6.16 **Contact Separation:** There shall be a separation of approximately .010 inch between the contacts when the plunger is depressed to the level of the hand set supporting surfaces.

6.17 **Contact Sequence:** The contact sequence shall be such that when the contacts to which the white-red-black and white-orange-green conductors first make there will still be a separation of minimum .004 inch between the contacts to which the white-red-blue and white-red conductors are connected.

6.18 **Spring Clearance:** There shall be a clearance between springs which are not intended to make contact of approximately 1/32 inch.

6.19 **Contact Margins:** To insure proper contact margins, all contacts shall make before the plunger reaches a point approximately 1/16 inch from its extreme upper position and break before the plunger reaches a point 1/16 inch from the lowest position it takes with the hand set in place on the housing.

6.20 If the requirements in Paragraphs 6.15 to 6.19 inclusive are not met, adjust the contact springs close to a point where they leave the clamping plate and insulators with a 466A tool or approved equivalent. When adjusting contact springs take care not to kink them.

6.21 **Plunger:** The plunger shall move freely without binding or squeaking throughout the entire travel. To clean the plunger, remove the 5/16 inch 8-32 R.H. Machine Screws on either side of the plunger which attach the hand set supporting surfaces and plunger to the housing. Remove plunger mounting and grip hard rubber wedge at the bottom of plunger shaft with the fingers or long nose pliers. Turn wedge counterclockwise and remove plunger shaft. Clean plunger shaft and hole in plunger mounting in a manner similar to that described in the section in the C30 Division entitled "Telephone Set Mountings—H Type—Maintenance." Reassemble plunger shaft in mounting and reassemble plunger mounting on telephone set housing, being careful to see that shakeproof washers are reassembled under the heads of the two machine screws before the screws are retightened in place.

6.22 When the hand set is slowly lifted from the housing, the plunger shall move upward and come to a positive stop.

6.23 When the hand set is slowly lowered into place on the housing, the plunger shall move downward until the hand set rests on the supporting surfaces.

6.24 If the plunger fails to operate properly, replace the set.