

Coin Collector Telephone Equipment for Trains

F. B. COMBS
*Transmission
Systems
Development*

Radio telephone service for trains has been available for the past six years. Originally, it was necessary for an attendant to set up the connection, but more recently unattended coin collector type telephone sets have begun to replace attended stations.

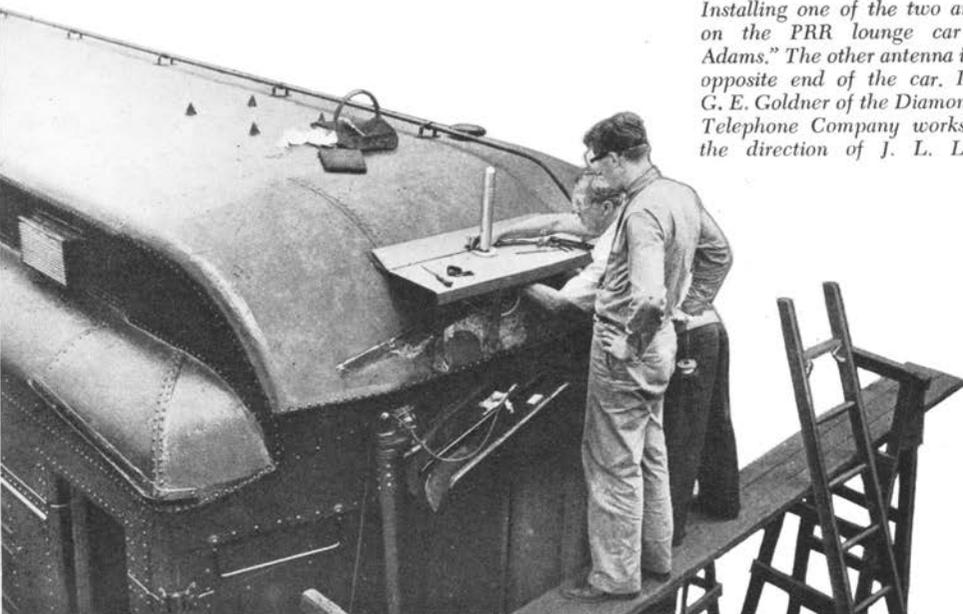
Vehicular mobile radio-telephone service was inaugurated in St. Louis June 17, 1946^o, and on August 15, 1947, Bell System mobile telephone service was extended to passengers on certain trains of the Baltimore and Ohio and Pennsylvania Railroads operating between New York and Washington. This extension of telephone service — on an experimental basis — had been made feasible by the installations of mobile radio systems

^o RECORD, July, 1946, page 267.

in and between these terminal cities. Using the same mobile receivers and transmitters, the calls passed through the mobile service operators in the area nearest the train when the call was made.

At the present time nineteen "name" trains on five railroads are equipped for this service. Six of these installations are presently attended stations, that is, calls are set up by a special attendant who is employed by the railroad. Nine have recently been converted from attended to unattended instal-

Installing one of the two antennas on the PRR lounge car "John Adams." The other antenna is at the opposite end of the car. Installer G. E. Goldner of the Diamond State Telephone Company works under the direction of J. L. Lindner.



lations, using coin collector type telephone sets. Four new installations of a similar type of equipment have been made.

This unattended type of service has been well accepted by the public and is most popular with the railroads. As a result, the Laboratories has recently designed a standardized unattended system. The Bell Telephone Company of Pennsylvania completed the first installations of this type in March, 1952 on the new "Senator" and "Congressional" trains of the Pennsylvania Railroad operating between Washington and New York.

A typical installation of such a system is shown in Figures 1 and 2, which picture the equipment as installed in the parlor-lounge-observation car on one of the new "Senator" trains. Calls may be completed between the trains and any Bell System or connecting telephone, through Bell System general mobile service base stations. These base stations are located in the principal cities through which the trains pass; a typical connection is illustrated in the block diagram of Figure 3. Basically, a single channel installation consists of a receiving antenna, a transmitting antenna, radio transmitter, radio receiver, coin collector type telephone, indicator panel, power distribution and control panel, and power source.

The antennas are a specialized type designed by the Laboratories^o to meet the requirements of vertical polarization, close roof top clearance, grounded elements, and rugged construction. They are mounted at opposite ends of the car to provide maximum separation between the transmitting and receiving circuits. Two antennas are employed to permit full duplex operation; that is, the telephone is used in the customary manner rather than on a push-to-talk basis as is done in most mobile systems.

Standard Western Electric phase modulated radio transmitters[†] and receivers[‡] for mobile service are used, and are operated from a 12-volt dc source provided by the railroad. The cabinet shown under the directory shelf in Figure 1 houses the motor generator for supplying the dc power for

^o RECORD, May, 1949, page 172.

[†] RECORD, October, 1947, page 376.

[‡] RECORD, September, 1947, page 330.

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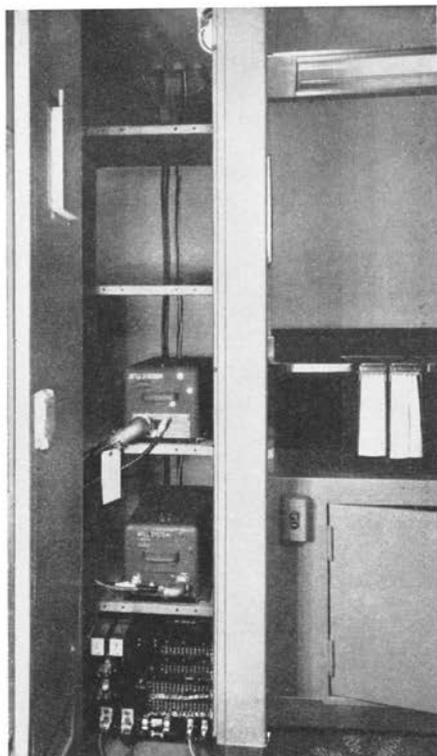
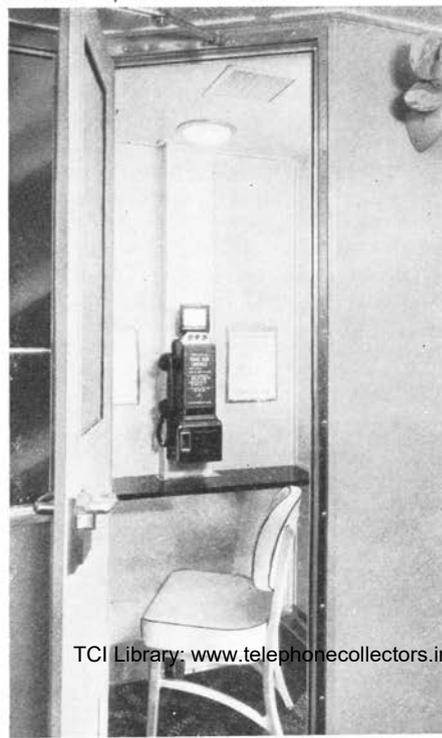


Fig. 1 — Radio equipment and cabinet on one of the Pennsylvania Railroad "Senator" trains.

Fig. 2 — The telephone booth associated with the radio equipment of Figure 1.



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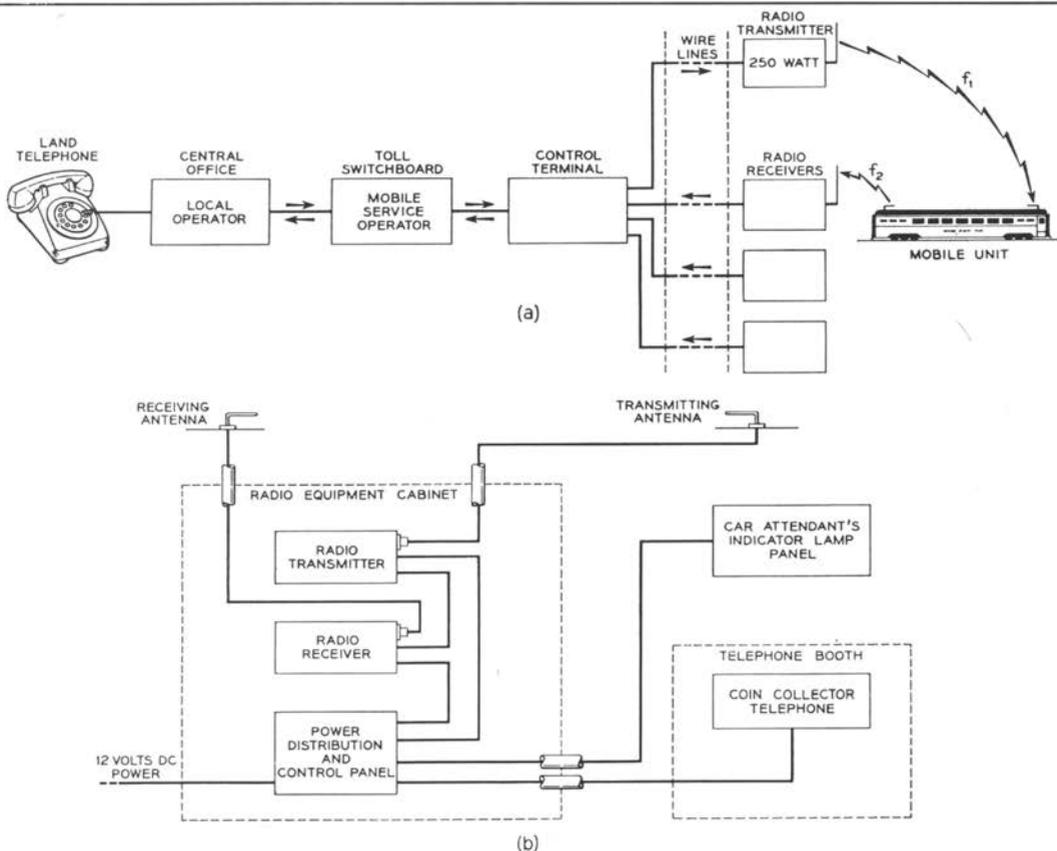


Fig. 3 — Block diagram of a typical radio telephone connection to a railroad train.

the radio equipment on the "Senator".

As shown in Figure 4, the telephone instrument is similar in general appearance to other Bell System coin-operated telephone sets, except that it has an enlarged instruction card and is provided with a transmitter-start push button. This button is used to put the radio transmitter "on the air" at the time the call is originated. The telephone set is also equipped with a dc calling bell, and the handset is a four-wire type.

The power distribution and control panel, shown in Figure 5, contains the power terminations, fuses for both power and control circuits, control circuit relays, and terminal strips. The latter serve as the junction points for the cabling between the various units of the train installation.

In order to be prepared for any incoming call, the radio receiver on the train is in constant operation while the train is in service and is within communication range. Each car is assigned a mobile telephone number, and the incoming calls are dialed by the mobile service operator at the central office. At the control terminal, the dialing pulses are converted into two-tone signals suitable for modulating the base station radio transmitter. Receipt of the properly coded call signal by the train receiver operates the bell at the coin collector telephone set for about four seconds. If the car porter is not within hearing distance of the telephone bell, a signal lamp on an indicator panel, usually located in the far end of the car, notifies him of an incoming call. The



Fig. 4 - The coin collector telephone used in the train booth by E. J. Butler of Bell of Pennsylvania.

lamp remains lighted until the call is answered. This panel also provides visible indication of "12-volt power-on" and "transmitter-on-the-air" conditions inasmuch as the porter is generally the employee designated to turn the equipment on and off as the car is placed in and out of service.

Operating instructions are provided in the booth to enable the user to understand the method of placing a call. These instructions point out any areas where transmission and

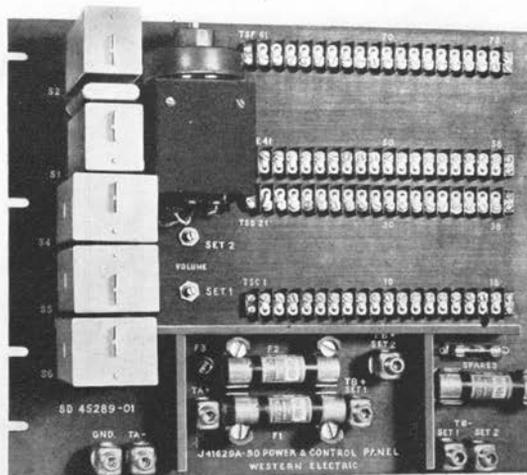


Fig. 5 - Power distribution and control panel for the equipment on trains.

reception may not be satisfactory. They also explain that the mobile radio channel is shared by other users, and the passenger is instructed first to listen in on the circuit to learn if it is in use. If there is no evidence that the channel is busy, he then pushes the transmitter-start button which places the train transmitter "on the air". When this transmission from the train reaches one of the base station receivers, a signal is carried over the receiver output trunk through the



THE AUTHOR: F. B. COMBS joined the Laboratories in 1935 as a member of the Commercial Products Development Department. Until World War I, he was engaged in the mechanical design of aircraft and marine radio equipment, and the emergency radio telephone. In 1941 he transferred, on loan, to the Manufacturing Relations Department as the Bayonne and Jersey City representative of the Commercial Products Department. He was also concerned with the establishment of a manufacturing relations group at the Burlington, N. C., plant. Mr. Combs spent three years with the mobile radio group at Whippany, and since 1950 has been a member of Transmission Systems Development at Murray Hill. He attended Pratt Institute, receiving a certificate of mechanical engineering in 1925, and a certificate of industrial electrical engineering in 1936.

control terminal to the mobile service operator. After answering the signal, the operator sets up the call and collects the charges before connecting the two parties. The operator identifies the amount deposited by the usual coin actuated gong tones.

The normal procedure in obtaining a train installation is for the railroad to apply for this service to the Bell Telephone Company serving the area in which the railroad headquarters are located. Telephone Company engineers then make a survey to determine the type of service best suited for the requirements and the frequencies available in the area through which the train operates. Various types of equipment arrangements that can be made available in the standardized design are:

(a) Operation on a single channel in the 30-44 mc band.

(b) Operation on any one of four channels in the 30-44 mc band.

(c) Operation on any one of eight channels in the 30-44 mc band.

(d) Operation on a single channel in the 152-162 mc band.

(e) Operation on either one of two channels in the 152-162 mc band.

(f) Operation on any one of four channels in the 152-162 mc band.

Multi-channel systems are ordinarily required only on long runs where the train passes through areas having different channels available for this type of service.

Additions to TV Network

Four TV stations were connected to the Bell System's nationwide network facilities over the first weekend in August. They were WGVL, Greenville, S. C.; KBES-TV, Medford, Ore.; and WHB-TV and KMBC-TV, Kansas City, Mo.

The interconnection of the Greenville and Medford stations makes it possible for residents in these cities to view live network programs for the first time. The Kansas City stations represent additions to areas already receiving network programs. Network programs for Greenville's new station are being carried from a microwave tower on the Washington-Atlanta route direct to WGVL's transmitter location.

The new TV station at Medford is being fed network service from a point on the intercity facilities between Sacramento, Calif. and Seattle, Wash. Network programs for the two Kansas City stations are tapped off of the transcontinental radio relay route at Omaha, Neb. and routed over intercity facilities to Kansas City.

Thanks to a new 35-mile microwave link recently placed in service by Long Lines, nationwide network television programs have been made available to KTVH, Hutch-

inson, Kan., the first TV station to be constructed in that state. Network programs are beamed over the new video link to KTVH from a southbound Omaha-Dallas TV channel. This channel interconnects with the Bell System's transcontinental TV facilities at Omaha and feeds programs to Kansas City, Tulsa, Oklahoma City, Dallas, and five Texas cities south of Dallas.

Network service is now available to 146 stations in 97 cities in the United States.

Plane Tickets by Mobile Telephone

The Pacific Telephone and Telegraph Company is providing mobile telephone service for mobile ticket offices of Trans-World Airlines in the Los Angeles and San Francisco areas. The basic equipment is a one-ton truck, one side of which opens to provide an outside counter, while rear doors admit customers to a small office inside the vehicle. The mobile telephone will be used to reach main reservation centers in the areas served. The airline expects this plan to be useful in reaching potential customers at the gates of large industrial installations in outlying areas or at special events such as football games.