



Now a major new coin telephone improvement program, featuring "dial-tone-first," offers more convenient calling and a new way to get help in an emergency. With this service, no dime is needed to reach the operator or to dial certain service calls from coin telephones.

No Dime Needed

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THE BELL SYSTEM'S first coin telephone was installed in Hartford, Connecticut, in 1889. Since then coin telephone service in the Bell System has grown to more than 1,200,000 coin telephones. During this time, the Bell System has made substantial progress in improving coin telephone service by modernizing equipment and establishing better operating procedures.

A thorough review of the Bell System's coin telephone service has recently been completed. As a result of this review, a coin service improvement program has been defined which represents another package of features intended to provide many service advantages both to coin telephone customers and to operating telephone companies.

A major feature of the coin service improvement program is "dial-tone-first" operation, which permits coin telephone customers to reach the operator and to dial certain service calls without depositing a coin. Since the 1920's when the Bell System converted to dial operation, a coin deposit has been necessary to initiate a call (pre-pay operation). Thus, the customer would receive a dial tone only after the appropriate coins were deposited. An exception to this is post-pay operation used in some outlying community dial offices. In post-pay operation, the calling customer deposits the required money after the called station answers. This mode of operation lacks the automatic

coin-control features and has no provision for returning coin deposits.

As the name implies, with dial-tone-first operation dial tone is connected to the customer when he removes the handset from the switchhook and before he deposits a coin. Because of this feature, the customer can be reasonably confident that the telephone is working before he risks the loss of his money. Currently, a person using a coin telephone doesn't know if the phone is working until after he inserts money and receives dial tone.

With dial-tone-first operation, a customer can also dial certain calls without depositing money. These include calls to the operator, directory assistance and telephone company service calls, as well as calls to 911—the new universal emergency service number. Collect, credit card, and other charge calls can also be made without depositing money. Person-to-person and other calls requiring operator assistance can be initiated without money. For a regular local call, the customer deposits the money after he hears the dial tone and then dials the call. If he dials his call without putting in an appropriate coin, he is connected to a recorded announcement which reminds him to start over and deposit the correct change. If he deposits money before dialing the operator or one of the other "no dime" numbers, the coin is returned automatically.



From 1889, when the Bell System introduced its first coin telephone, to the present has been quite a contrast. Time has

brought about many changes in the Bell System's coin telephone service. The latest of these is dial-tone-first operation.

The coin service improvement program offers another benefit to the customer in improved voice transmission. This is achieved by isolating or removing a "coin-present" ground at the coin telephone during a conversation. As a result noise is reduced.

Ideally, the coin service improvement program should be applicable to every type of switching system, any switchboard, and both the older multi-slot and the newer single-slot coin telephones. The coin service improvement program requires changes in switching systems and coin stations that are individually modest but collectively sub-

stantial. As a result, technical and economic compromises have been made in the selection of package features and by not applying the program to older equipment, which is due for replacement in the near future.

Equipment designs are now available for modifying the No. 1 and No. 5 crossbar offices and No. 1 Electronic Switching System (ESS) offices. Equipment designs for converting step-by-step offices will be available in 1970. Coin telephones served by panel offices can be transferred to near-by ESS or crossbar offices to benefit from the coin service improvement program.

In general, modifications to the crossbar switching equipment involve four key components:

- Line Circuits—the circuits that detect the start of a call without a coin present.
- Originating registers and subscriber senders—these are the devices that receive and store dial pulses and test for presence of coins, then use this information in conjunction with markers to control the operation of the switching mechanisms.
- Completing and originating markers—the circuits that translate the code dialed, determine the proper routing for the calling customer, and select the channel or path for a telephone call.
- Trunk and coin-control circuits—the equipment that provides transmission, supervision, and coin-control functions.

Essentially, ESS can be converted to dial-tone-first operation by making changes in the program.

Making modifications to existing equipment is not the only problem. Some additional equipment must also be provided in the central office to convert to dial-tone-first operation. For example, holding time of crossbar originating registers and subscriber senders can increase up to 60 percent for each completed coin call with the new service. This is due to the time taken by customers to deposit coins after the register or sender is attached and furnishing dial tone. Moreover, some calls—those without the correct initial deposit—will not be completed and will have to be redialed. Registers and senders must therefore be added to compensate for the increased holding time as the offices are converted. Similarly, coin calls handled by ESS offices are subject to a 5 to 15 percent increase in processing time. This increase plus longer equipment holding time will result in a decrease in call-handling capacity and require more coin-control circuits.

Some cord switchboards have been arranged for coin-retention operation (the initial deposit is retained and the operator requests only the additional deposit for the initial rate). In this case, the switchboard must be converted so that the customer's initial deposit will be returned before dial-tone-first operation can be added.

The plan to convert to dial-tone-first operation assumes that an office currently operates on a pre-pay basis. However, any office which operates on a post-pay basis can also be converted to dial-tone-first operation.

Compromises have been made to minimize cost and reduce complexity at the coin telephone. Only minor modifications are made in multislot coin telephones to change from coin first to dial-tone-first operation. A new universal type single-

slot coin telephone will serve either type service.

Modifications to the single-slot and the older multislot coin telephones have one change in common—the removal of a contact that disables dialing until the correct initial deposit is made. Other modifications are required because of differences in operation of the two types of coin telephones; that is, the methods of transmitting coin deposit signals to the central office.

Because of the change in the way coin phones function with dial-tone-first operation, some changes in signaling between the telephones and the central office are necessary. Currently, an initial coin deposit resting in the hopper closes a contact which not only starts the bid to supply dial tone to the customer, but tells the central office that the deposit has been made. The money resting on the hopper trigger also removes the dial-disabling contact. With dial-tone-first operation, however, the dial must be permitted to be operative before a deposit is made, and the presence of a deposit, when required, must be verified at another point in the call setup process. This means that an additional test for the presence of the correct initial deposit between the central office and the coin telephone is required—a difficult thing to do considering the number of signals already on two-wire coin loops.

Operation in the central office is further complicated by the fact that although all pre-pay calls currently require an initial deposit, with dial-tone-first operation some calls require a deposit and others do not. At some point in the course of the call the central office must verify the presence of an initial deposit if it is required for the particular call. Different central offices check for an initial deposit at different times and reach the logical decisions to complete or deny a call in different ways. But the method of checking for the presence of a coin deposit at the coin telephone is the same for all central offices. Thus, a universal coin telephone may be used with any type central office.

Positive 48-volt battery has been added to central offices to implement the plan. This voltage source is used for two purposes: it disables the TOUCH-TONE® dial while an operator is on the line, and it permits the operator to recognize five-cent deposits.

Calls via cord switchboards will have positive battery connected during the entire time the call is in progress. This precludes the use of



Touch-Tone dialing for end-to-end signaling on coin lines. In the future, with growth of Traffic Service Position (TSP) operation, cord switchboards will handle a diminishing portion of coin traffic. Thus, this limitation will affect fewer and fewer calls.

To test dial-tone-first operation, three trials were conducted in 1966-67. The first trial was held in Hartford, Connecticut, where the first coin telephone was introduced seventy-seven years earlier. For this trial, 325 outdoor coin telephones were served from a modified No. 5 crossbar office and converted to limited dial-tone-first operation. Dial tone was supplied without a coin deposit, but only calls to the operator could be completed without a coin. The Hartford trial was designed to measure:

- Public reaction to the concept.
- Customer acceptance and ease of use.
- The value of the service based on the nature of calls placed.
- Experience with possible nuisance calling.
- The feasibility of the service in a TSP area.
- Overall administration of the service.
- The effect of the service on revenue.

The feasibility of the service was confirmed in the Hartford trial, and personal interviews showed that customers were enthusiastic about the service (ninety-six percent of those interviewed felt the service was an improvement). Customers had little difficulty learning to use the new service, and the number of mistakes diminished as the service became more familiar. A negative aspect of the trial was an increase of nuisance calls to operators.

The Hartford trial was followed four months later by another trial conducted by the New York Telephone Company in the Greenwich Village area of New York City. This trial involved 288 outdoor and subway coin stations served by two No. 1 crossbar offices. Again, customers could only reach the operator without a coin. The trial was conducted before a standard method of operation and circuit configuration had been set. Nevertheless, customer reaction to the trial was good.

Primarily as a result of the Hartford trial, a standard method of operation was established. To evaluate critical items of the proposed standards and additional changes in the system, a third trial was held in Danville, Illinois in

1967. The Danville trial provided a broader test of the plan because every coin station in the exchange area (327 telephones) was modified for dial-tone-first operation. These coin phones, served by a No. 5 crossbar office, terminated on a regular cord-type switchboard for assistance and toll calls and required different traffic operating procedures from the first two trials, which involved TSP operation. For this trial, only local calls could be dialed directly by the customer, and only access to the operator on a coinless basis was provided.

The Danville trial also verified the feasibility of the overall plan and the more nearly standard method of operation. The transition from coin first to dial-tone-first operation was effected as smoothly in the switchboard office as it was in the TSP offices. Each trial confirmed that once an initial transitory period of unfamiliarity was overcome, customers preferred the dial-tone-first operation. Another result common to all the trials indicated that reports of trouble with coin phones sharply increased, but actual troubles did not. This indicates, perhaps, that customers are more willing to report difficulties when they don't have to risk their money. Regardless of the reason, a continuation of this "habit" can assist the operating telephone companies in providing better coin service.

Based on the trial results and the favorable customer reaction, the decision was made to introduce dial-tone-first operation nationwide. The first standard equipment installations were made in 1968 in the Washington, D. C. metropolitan area, and the borough of Manhattan in New York City. The New York Telephone Company is in the process of converting outdoor and subway coin telephones in all five boroughs of New York City to dial-tone-first operation. All of the locations are served by No. 1 or No. 5 crossbar offices.

The cost of converting all of the more than 1,200,000 Bell System coin telephones to dial-tone-first operation is estimated to be over \$200 million (about 80 percent of the cost is for central office modifications and additions). Because of the size of the job, it will be necessary to schedule the conversion over a number of years. Although this will result in a mixture of types of coin service for a while, dial-tone-first operation will eventually be a reality throughout the Bell System, bringing with it more convenient calling and a new key to help in an emergency.

