

# Telephone Apparatus for the Hard of Hearing

By A. N. HOLDEN

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**I**T is tantalizing for a person hard of hearing to feel that a voice which may have crossed the continent is stopped just as it reaches his ear. In contrast to the task of crossing such barriers of space, entering his ear seems a small thing to ask of a voice. From an early day, therefore, the Bell System has tried to provide means for opening to the hard of

hearing the field of conversation by telephone, with the great reach of contact it contains.

The effects upon acuity of hearing which different disorders produce can be grouped as those causing a general lowering of sensitivity over the entire range of audible frequencies, those causing distortion by affecting the sensitivity at certain frequencies more than at others, and those causing subjective disturbances in the ear itself which blur or obscure sounds of external origin by adding other sounds. So varied are these kinds of defective hearing that it might be supposed impracticable to design standard telephone equipment which would be serviceable to any great number of sufferers. That this is fortunately not the case is attested by the many telephone subscribers for whom the utility of their instruments, and of the millions of instruments that can be connected to theirs, has been preserved by a single device.

Experience has shown that a large proportion of those who are unable to understand ordinary speech suffer from a general lowering of sensitivity without excessive distortion. For these people general amplification will restore the intelligibility of speech sounds. Such is the transmission equivalent of the ordinary telephone connection that many who have difficulty in understanding speech face-to-face



*Fig. 1—In an installation of the No. 23-A Amplifier, only the control equipment need be mounted near the telephone*

have no difficulty in understanding over the telephone. But there are many others who can understand speech only when its loudness is considerably greater than the telephone ordinarily delivers. It is amplifying equipment to fill this function, therefore, which has been made available to telephone subscribers whose hearing is impaired.

The earliest device embodied a No. 1-A mechanical repeater, installed on the subscriber's premises, which raised the speech level about 10 db. But its cost and maintenance were high, and its transmission characteristic was none too good. The advent of the vacuum tube made it possible to develop apparatus having much-improved characteristics and offering greater and adjustable amplification. Known as the No. 23-A Amplifier, it consists of a single-stage vacuum-tube amplifier, of which the gain can be varied in steps. The vacuum tube and the equipment of its immediately associated circuits are mounted in a housing similar to that of a subscriber set.

The amplifier in its housing and the batteries in their battery box can be mounted anywhere in the room in which the telephone set is located, but the control equipment is mounted adjacent to the set, for ready availability. Here, by a key, the amplifier can be switched into or out of circuit, so that the telephone can be used by either one of impaired or one of normal hearing. By a potentiometer the gain of the amplifier can be increased



*Fig. 2—The 27-A Amplifier provides a convenient temporary installation of the equipment of the 23-A Amplifier*

in five steps from none to its maximum of 21 db, to suit the degree of the listener's deafness and the initial loudness of the speech.

When a subscriber requests this equipment from the telephone company operating in his territory, it is first necessary to find out whether his difficulty in hearing over the telephone is of the type that can be helped by the amplifier. Audiometer tests would be not only elaborate but on this point inconclusive; perfect assurance can be had only from a trial of the apparatus itself. Since an installation of the apparatus in its permanent form is unnecessarily expensive for a trial, it has been designed in a port-

able form, coded as the No. 27-A Amplifier, for temporary use. A single carrying case contains amplifier, batteries, desk stand, and control equipment. Weighing only about thirty-two pounds, it can be conveniently brought to the subscriber's premises, made ready for use by connecting its three-conductor cord in place of the standard desk-stand cord, and left for a trial of several days if desirable. A small hinged door in the top of the case gives the subscriber access to the control equipment without exposing the remainder of the apparatus.

The telephone system is necessarily

designed primarily to meet the needs of the average subscriber, and must not be made unsuitable for a large group in order to accommodate a smaller. When, however, both can be suited by such minor adjustments as the addition of these amplifiers, the modifications are more than justified. Typical testimony that they are appreciated comes from a subscriber in Ohio who experienced difficulty in hearing over the telephone. After the amplifying equipment had been installed in his home, he wrote, "For the first time in years, I have been able to hear my children talking to me from the Pacific Coast."



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