The New Aluminum Outdoor Telephone Booth

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Because of the great popularity of outdoor booths, travelers and others away from home are now never very far from a telephone. The new aluminum booth has been engineered for resistance to weathering, for economy of manufacture, installation, and maintenance, and for attractiveness of appearance. It has the distinct advantage of being in a convenient location for use twenty-four hours per day.

Providing telephones at accessible and convenient outdoor locations is a step toward the Bell System goal of giving the broadest type of communication service so that people can converse with one another at any time from any place. The demand for outdoor booths has risen sharply, particularly because of the popularity of telephones along highways, parkways and turnpikes, where they are a great convenience and a necessity in time of emergency. Outdoor booths have the important advantage of being available for use twenty-four hours a day.

Wooden booths of the No. 9 Type° have been used for many years in outdoor locations and have required frequent repairs, regardless of special efforts made to protect the most suitable woods and other materials available against constant exposure to all kinds of weather. The desire to reduce maintenance expense, and to provide a more modern appearance, appropriate for a wide variety of installations, led to a review of outdoor booth design. As a result of extensive studies and discussions with representatives of the Operating Companies, a new metal and glass booth, shown above, has been developed. The new booth is durable and efficient. Particular effort was made to design it along functional lines that would harmonize with modern architectural trends.

Outdoor booths are not so restricted as indoor booths by limitations of space. For the greater comfort of the user, the new booth is wider and deeper and has more inside height than the indoor and older outdoor booths.

Experience has indicated that clear opening of approximately 22 inches is a satisfactory width for the entrance, and it has been found that the right rear corner of a booth is the most suitable position for the pay station type of telephone. These were controlling considerations in the design of the structure. For economical manufacture and ease of assembly, it was also desirable to have as much uniformity as possible in the various parts. Standardized sizes for panels and signs were obtained by

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having the necessary variations for other features designed into the corner posts. Figure 2, which is substantially a horizontal cross section, illustrates the different corner arrangements that permit the use of the same panels for the sides and back of the telephone booth.

Aluminum was decided upon as the most suitable material for the framework because of its durability, lightness, strength and ease of fabrication to the shapes desired. The aluminum extrusion process makes possible the economical production of structural shapes that otherwise would be too costly to manufacture. The extruded form is produced by subjecting hot-cast billets of aluminum alloys to sufficient hydraulic ram pressure to force the material plastically through a die orifice. A continuous length of material is thus formed which corresponds in cross section to the shape of the orifice in the die. Since the cross sectional area of the desired part is less than that of the billet, the extruded piece may run to 50 or 60 feet in length for an average sized die opening. Any distortion or twisting which may occur in these long pieces is corrected by a stretching or rolling operation.

To force the hot aluminum through the die, great pressure has to be exerted, depending, of course, on the size of the part. For example, the full width of the door frame, measuring about 12 inches, is extruded as one piece. Before this large extrusion was evolved, door frames were constructed from a number of separate pieces with the corners welded together. The press used to extrude the one-piece door frame has a maximum effort of 4,250 tons and can exert pressures up to 150,000 pounds per square inch.

The aluminum alloys selected for the extruded parts of the telephone booth have good forming qualities, resistance to corrosion, and have a light aluminum color after being given an electrochemical surface treatment. Because the anodic treatment for protection from corrosion gives a different color appearance to various aluminum alloys, care has been exercised to determine the proper alloys for the flat plates or panels so that they will match the color of the extruded parts with which they are associated.

The booth is so designed that practically all exterior screws are eliminated. The clean outside appearance is enhanced also by a minimum of junction lines. The interlocking joints within the corner posts and the extrusion flanges inside the booth serve to secure the parts. These joints also fasten the side assemblies together, so that only a wedge-type engagement of the corners is visible outside. This further permits engineering the booth so that five main sub-assemblies constitute a complete "knock-down" shipment.

The "knock-down" assembly facilitates merchandising the booth through numerous Western Electric Distributing Houses across the country, where booths are assembled with the varied panels and signs desired by the telephone companies to suit their specific needs. Moreover, if by accident the booth should become damaged, repairs can readily be made with the insertion of new panels at the point of installation.

In an outdoor telephone booth, lighting and color are primary considerations. Versatile arrangements are possible by the easy insertion of glass windows or solid panels of red, green or blue. In some areas, plain aluminum panels are used in place of either glass or colored panels. The aluminum and colored panels are laminates (sandwich

Fig. 1 — The new outdoor booth — a familiar sight along today's highways.

type construction) having a composition core with facings, on both sides, of anodized aluminum or thin sheet steel which has been given a colored porcelain finish. Any combination of panels can be initially installed to achieve the color scheme desired by the telephone company. For installations where the rear or side of the booth is near a wall or other similar surface, the transparent panels are unnecessary and solid panels are used from top to bottom.

All of the glass panels, including the signs, are of safety (shatterproof) type and are composed of three parts – that is, two pieces of glass with a

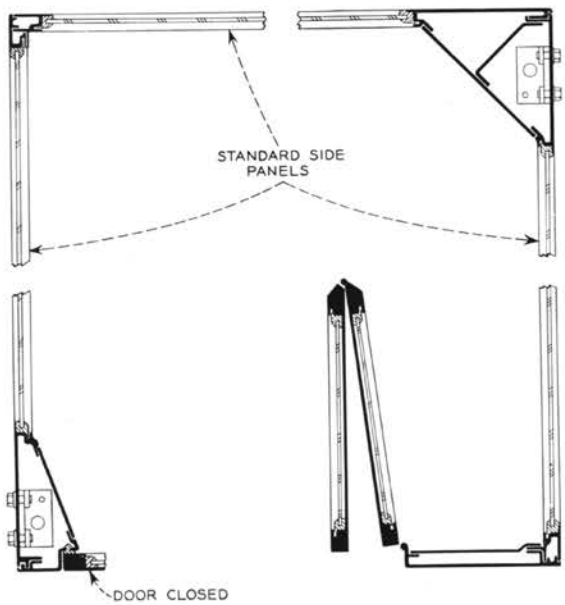


Fig. 2 — Different corner arrangements for the outdoor booth permit use of standard-sized panels.

vinylite center sheet. This is the standard method of making laminated safety glass, but to protect the lettering and background of the signs from abrasion or scratching, the painted portion is on the inside surface of the glass adjacent to the vinylite. Adherence of the glass pieces with the vinylite takes place when the three parts of the assembly are processed in a vacuum oven, where heat and vacuum act to bond the parts without an adhesive.

A specially designed light fixture is located in the ceiling. Two large fluorescent lamps, which give approximately three times the lumen output of equivalent wattage incandescent lamps, illuminate the inside of the booth as well as the telephone sign panels. Also, a large area around the outside of the booth is illuminated at night by the light transmitted through the windows. The advantage of a well lighted booth beside a highway is illustrated by Figure 3. Fluorescent lamps are normally intended for indoor use, since they operate more favorably in warm temperatures (optimum 80° F.). To give satisfactory starting and operation of the lamps outdoors at below freezing temperatures, thermal starters and preheat type of ballast coils are used in the lamp circuit. The safety factor of having two lamps in the booths, which may be at remote locations, and the long life of fluorescent lamps (approximately 10,000 hours compared to about 1,000 hours for ordinary incandescent lamps) assure illumination without the necessity of frequent examination for replacement.

Fluorescent lamp life is greatly affected by the number of times the lamps are started. The emissive coating on the filaments in each end of the lamp is gradually used up, especially during starting before fluorescence takes place inside the lamp. Once the lamp is lit, the starter could actually be removed from the circuit without extinguishing the lamp. However, the starter used in the telephone booth light fixture is essentially a thermal relay which performs other functions in addition to starting the lamp. A recycling mechanism operates to restart the lamp if there is a temporary interruption in the power supply. Also, after several recycles occur with a defective or deactivated aging lamp, a bimetal mechanism in the starter serves to cut off the power. When the power has been removed at the source, the starter cools sufficiently to restore its bimetal mechanism to the initial starting condition. Besides preventing excessive blinking of the lamp, this automatic cut-off and reset feature protects the ballast coils in the lamp circuit and avoids the necessity for costly replacements.

Incorporated in the telephone booth is a folding door with equal-sized extruded frames, mentioned before. They are so designed that although only three hinges are used to join the two frames, a bead on one of the extrusions gives the appearance of a continuous hinge. This bead not only improves the appearance but retards the entrance of driving rain. The handle of the door is shaped to be suitable for production by the extrusion process and to provide an assuring grip for opening the door from the inside. A spring-operated, self-closing device is built in the upper door hinge. It keeps the door partially closed to protect the interior of the booth and the

telephone apparatus from much of the rain or snow that otherwise would enter if the door were left fully open. The hinges and other hardware items of the booth are made of corrosion-resistant steel to assure long life with good appearance.

The booth is ventilated by louvered panels at the bottoms of the sides and rear. Space around the four sides of the ceiling, and long openings behind the overhang of the roof, permit passage of air to the outside of the booth. To augment the natural flow of air, a fan or blower is being made available for warm southern areas or installations that are particularly sunny.

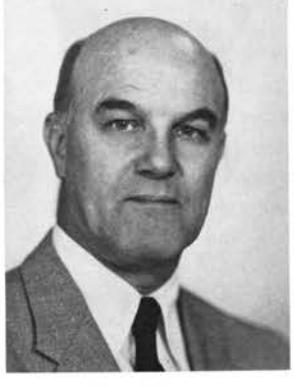
An important accessory for the outdoor telephone is the directory rack, which is combined with a large shelf area. Various sizes of directory books can be accommodated, or a small auxiliary shelf can be attached over part of the rack. This extends the shelf when only half of the directory space is required. The directory binders are supported by one hinge at the back. To consult the telephone listings, the user raises the directory and opens it on the shelf. It will normally stay open or can be held easily while reference is being made. When the user closes the directory, it automatically falls back into its compartment by its own weight.

The absence of combustible materials and the elimination of possible fire or electrical hazards have resulted in approval of the booth by Underwriters' Laboratories, Inc.

Fig. 3 — The lighting of the new booth illuminates interior, the signs, and an area outside.

The improvements in appearance, lighting, and other convenience features are attracting an ever increasing number of telephone users as evidenced by the growing volume of calls from outdoor telephone pay stations. Furthermore, the additional advantages of easily obtainable variety of color in the panels and signs, greater resistance to deterioration from the effects of weather, and the reduced cost of maintenance and repair have met with widespread approval of the operating companies.

THE AUTHOR



J. M. Hayward graduated from Pratt Institute in 1916. After service as a pilot in Europe during World War I, he joined the Laboratories in 1920 where he has been concerned mostly with the development of various types of station apparatus. As a Colonel during World War II, he was in charge of one of the Air Force engineering laboratories at Wright Field. Later he was in command of technical intelligence activities, investigating the products of German and Japanese research and design. In recent years Mr. Hayward has been engaged in development work on the 500-type telephone set and the outdoor telephone booth.