two ends parallel to each other. The stack can then be compressed to assure good electrical contact between stampings. Good electrical contact can also be insured by soldering the stack, forming a solid unit which does not require continuous compression.

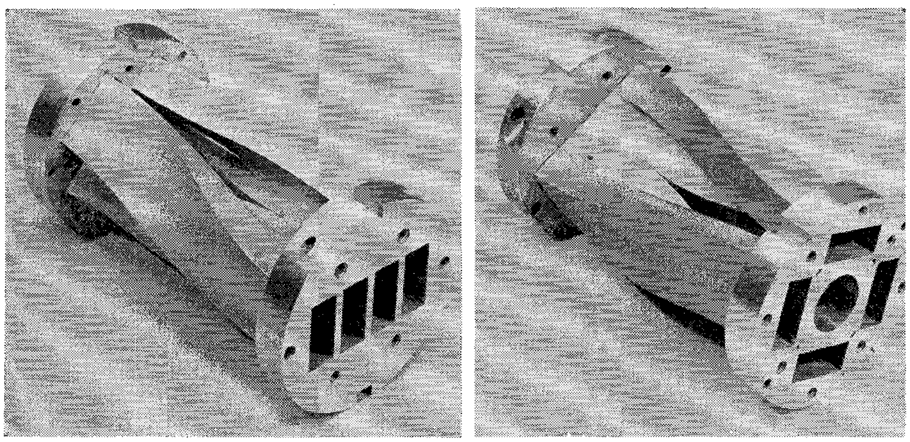

Fig. 2—Two views of a multiple waveguide twist section.

Fig. 2 shows two views of a very complex multiple waveguide twist section that was easily constructed of 0.005-inch thick brass stampings in the manner described above. In this case the assembly was soldered together in an electric oven. For the application in which this twist section was used, it was necessary that all the waveguides have the same electrical lengths to a high degree of precision. Initial measurements showed that over the 1.5 to 1 waveguide frequency range the electrical lengths of the four guides differed by as much as eight degrees due to their slightly different physical lengths. Therefore the widths of the appropriate individual guides were increased, by honing with an abrasive piston until all guides had electrical lengths within one degree of each other over this frequency range. The vswr of each guide was less than 1.02 over the full waveguide frequency range.

E. M. T. Jones and R. C. Honey
Stanford Res. Inst.
Menlo Park, Calif.

On Symmetrical Matching

It is sometimes desirable to use symmetrical matching for a symmetrical lossless discontinuity in a transmission line or waveguide. A convenient form of such matching is two equal shunt susceptances placed across the transmission line, or waveguide, at positions which are symmetrical with respect to the discontinuity. The following procedure can be used to determine the positions and value of the shunt susceptances. 1) The position P and the value B of the shunt susceptance for one-sided matching is determined. (The susceptance may be inductive or capacitive; therefore, there are two possible pairs of P and B. Either of these pairs may be used.) 2) A shunt susceptance whose value is $B/2$ is placed at the position P. 3) The second shunt susceptance is placed on the other side of the discontinuity so that symmetry is restored.

It can be shown that no other positions or values of shunt susceptance can be used for this type of matching. When symmetry is not required, two unequal shunt susceptances may be used at the positions indicated by the above procedure if their sum is B.

The above procedure is not strictly valid unless it is assumed that the discontinuity, transmission line or waveguide, and shunt susceptances are lossless. However, this procedure can often be used to obtain satisfactory matching when the losses are small.

H. F. Mathis
Goodyear Aircraft Corp.
Akron, Ohio