

with the 9in. cone used. Having reached this stage successfully, the constructor can "pat himself on the back," as the most difficult part has been passed.

The Paper Cone.

THE construction of the base, baffle board and cone comes next, and a glance at the various diagrams will be almost self-explaining. The material of which the cone is made takes some choosing. In the writer's case, a piece of Whatman's heavy drawing-paper was found suitable. This has the advantage of being readily obtainable in this country. There has been a great deal of controversy as to the best shape to make the cone of a dynamic speaker, but undoubtedly the strongest cone is one having an angle of 90 deg. at the apex. Details are given for cutting the material to shape so when bent a 90 deg. cone will be produced having a diameter of 9in. at the base. An extra 1/4in. is allowed round the rim for fastening to the kid or sheepskin on which the cone is floated.

Lay the heavy drawing-paper on a flat surface, and with a pair of compasses, draw a circle having a radius of 6.36 inches. Describe a second circle having the same centre of a radius of 6.6in. If a protractor is not available to measure an angle of 103 degrees from the centre, adjust a rule until a chord in the inner circle of 10 1/10in. is obtained. Allow a further 1/4in. on one side of this angle for the overlap when fastening the cone.

Use secotine for this purpose and stand a weight on the seam until quite dry. The 1/4-inch rim can now be bent, little by little, so that when the cone is stood upright, the rim lies flat.

At the apex of this cone a reinforcement has to be made, and the most convenient method is to make two copper cones, arranging one either side of the cone with a bolt running through the two to clamp the whole firm. These copper cones are made in the same way as the paper cone, only circles having a radius of 1 1/4in. are used. When shaped they can be soldered and trimmed with a fine file. An eighth-inch hole is drilled right in the apex of each of the cones through which the bolt passes. This bolt incidentally is the one arranged in the centre of the aluminium plate of the moving coil. Another method (that shown) is to use one copper cone with a wooden cone to fit into the apex of the speaker cone.

Quite a number of materials are suitable for suspending the paper cone. Thin kid, sliced sheepskin, flannelette, or thin rubber sheet, are quite O.K. Thin kid is perhaps the best, as it possesses a certain amount of elasticity and does not perish as does rubber.

A piece 12in. square will be needed. Lay on a flat surface and smooth all irregularities by stroking from the centre. Give the rim of the paper cone a coating of secotine and press down firmly on the square of kid. When this is firm, with a very sharp knife or razor blade cut out the centre circle of kid inside the cone, or trim off with a small pair of manicure scissors.

The Base and Baffle Board.

NOTHING more can be done until the base and baffle are constructed. A dynamic speaker is no better than any other unless a baffle board is used. To those who are puzzled by the term "baffle," it is a partition dividing the two sides of the moving cone, and upon its size depends the ability of the speaker to reproduce the low notes. The larger the baffle the better, but to quote in feet and inches, a baffle should be at least 3ft. across. This does not always mean a flat board 3ft. square, but can be in the form of a cabinet, the distance from the cone, along the front and sides, being at least 18 inches.

To build and adjust this speaker inside a cabinet would be decidedly awkward, so that the cone has been fastened to a small baffle, which is in turn fastened to the larger baffle after all adjustments have been made. For the baseboard, a piece of kauri or well-seasoned timber 12in. square and an inch thick is used. Two upright pieces of wood are screwed from underneath, and a cross-piece arranged so that the centre bolt in the aluminium end plate of the moving cone is exactly 5in. from the top of the baseboard. If the pot measurements have been exactly adhered to as given, then the bottom of the pot magnet will have to be 2 7/16in. from the baseboard. The reason for this will be apparent later.

A strip of brass or aluminium, bent to the shape of the outside of the pot, can clamp over the top of the magnet and screwed to the two upright pieces to hold the heavy pot magnet firmly. Two terminal strips, mounted on either side are used for connecting the leads from the magnet and moving coil to their respective places on the receiver.

For the small baffle, use a piece of hard wood 12in. square and 1/4in. thick. Drawing diagonals from each corner, mark the centre and describe a circle 10 1/4in. in diameter. With a keyhole saw cut this out. Drill three holes along one end and screw to the front of the baseboard. Take out the screws again and prepare to mount the cone in the hole just cut. For this purpose cut a ring out of guage 20 aluminium, having an inside diameter of 10 1/4in. (that is equal to the diameter of the hole in the baffle), and 1/4in. wide. Note.—In last week's issue a diagram was given

which made this 8in. This was a draughtsman's error. The outside diameter will be 11 1/4in. Equidistant round this ring drill 12 holes. Now lay the cone on a flat surface, with the kid lying flat, and lay the metal ring over the kid so as to mark, through the holes in the ring, where corresponding holes have to be cut in the kid. Perhaps the easiest way to cut these holes is to use a 1/4in. belt punch on a hard bench. Punch these 12 holes, each 1/4in. diameter, as this allows plenty of latitude for adjusting the cone when mounted. Next screw the ring to the baffle, between which is the kid, the cone being held centrally meanwhile. By

slightly loosening the screws in the ring, the kid can be pulled so that there is an even and very slight tension on the paper cone all round.

Final Assembly.

All is ready now to assemble. Slide the pot magnet well back away from the front when screwing the baffle to the baseboard. Now, gently pushing the pot magnet forward, see if the bolt on the moving coil will slide through the hole in the apex of the cone. If not, then adjust from the front of the baffle by slackening off the screws through the metal ring, and pulling the kid until the bolt is directly behind

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