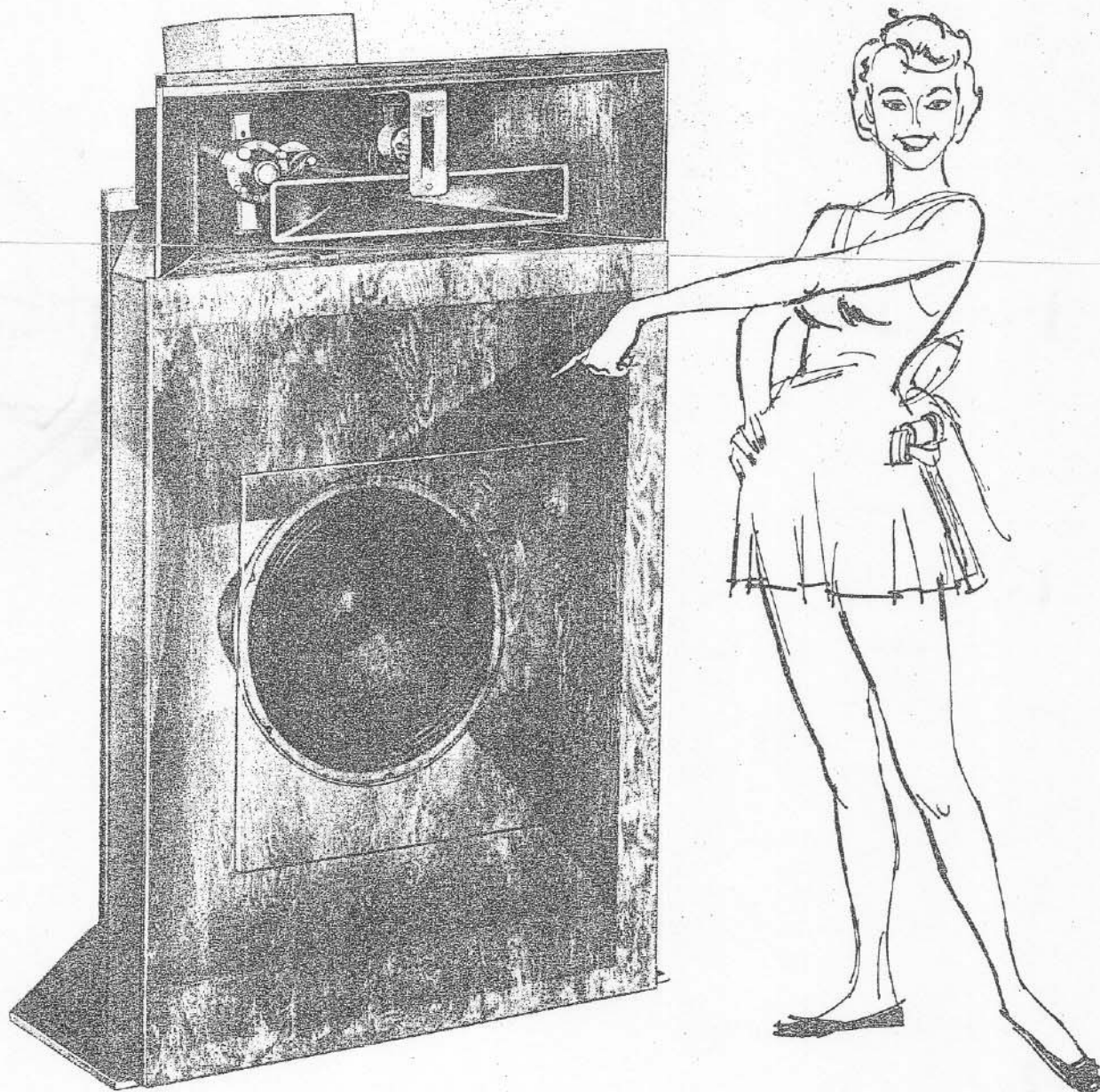


Do It Yourself!

build the

PATRICIAN IV

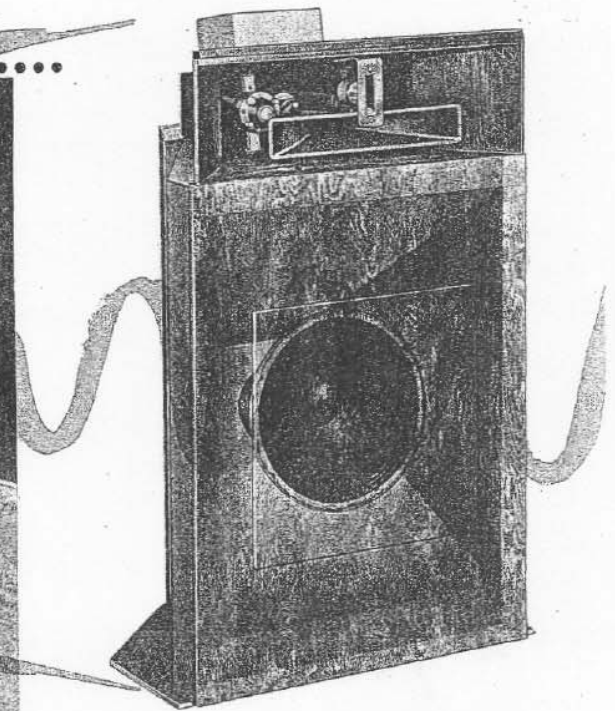
SPEAKER ENCLOSURE



Electro-Voice do-it-yourself project



K D



ROY R. CARLSON

designer of the PATRICIAN ENCLOSURE

A few short years ago, Hi-Fidelity started sweeping the world before it. Each extension of range demanded a new speaker. Before long the simple record player had become a Frankenstein monster, dominating the living room. One speaker was ugly enough, but three, or FIVE! "Take that junk down to the basement and keep it there."

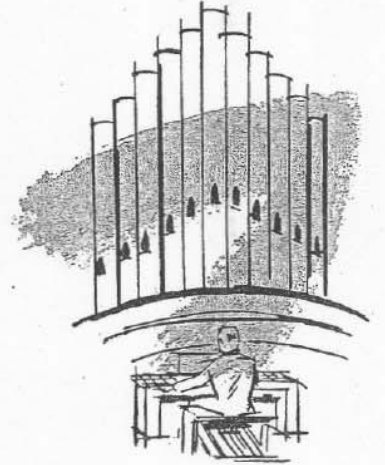
"Speakers can be beautiful," reasoned Roy, "and efficient as well". Condensing the complexity, mass and bulk of an efficient sound radiator into a functional piece of furniture was a task engineers avoided with surprising agility. Roy waded in, and four years later the end result was the PATRICIAN, the world's best and most highly condensed reproducer enclosure. Not only did it outperform all others, it had the external appearance of dignity and quality. It was designed to be a reproducer and made no attempt to be anything else, but somehow, now the Frankenstein monster had achieved respectability, and it was INVITED into the parlor.

The Patrician is now a part of the American Scene, but Roy kept right on working, drawing plans, designing kits, so now there is no reason why anyone who wants a Patrician cannot have it, if he is willing to make the effort. You can create a Patrician, from raw material, or by assembling pre-fab parts supplied as a package. While the idea is Roy's, the completed instrument is yours, as individual as your signature.



WHAT IS A PATRICIAN?

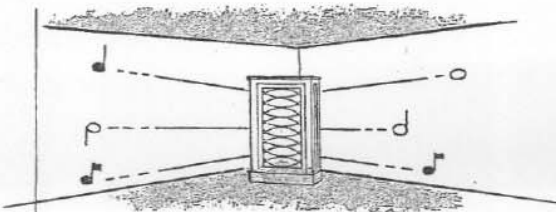
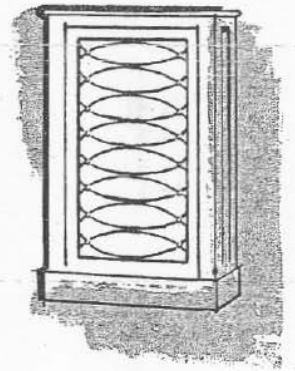
It is a new experience. It cannot be put into words. It is as subtle, as overwhelming, as awe inspiring as a burst of sunlight after a thunderstorm. It is as if the curtain of darkness has suddenly been drawn back and now you see for the first time what was there all along. Only with the Patrician, you don't see it, you hear it. It is the magic gift of the Gods which unlocks the treasure compressed into the grooves of a flat disc of vinylite. It is the Bagdad Carpet which whisks you out of the dreary work-a-day world right into a realm of make-believe. It takes you, and your comfortable armchair, right into the music hall, where you can have a front row seat at the best performances. By reaching out your hand, you can almost touch the artist. The Patrician brings the best of everything directly to you. The Patrician brings out the best of the best in the record, and the most of it. The Patrician is to music what Todd AO is to movies. There is nothing finer.



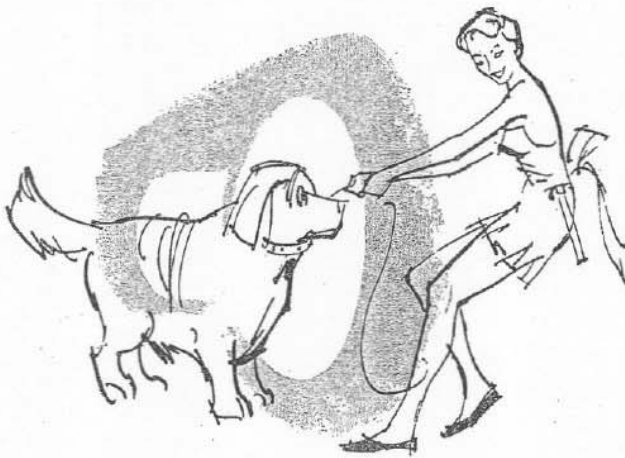
HOW DOES IT WORK?

Simple magic is inadequate. Compressed into the restricted dimensions of the Patrician is an electro-acoustical mechanism capable of reproducing the deep notes of an organ and the shrill chirp of a cricket with absolute fidelity, and everything between with equal ability. There is no magic here, just consummate care and a degree of engineering ability almost beyond belief. The engineering genius of Louis Hoodwin is responsible. Slowly and carefully, he designed suitable reproducing units, matched them, balanced them, equalized them, until a total of five speakers worked together as one. Between them, the entire audible spectrum was covered, and the result was so smooth, so unobtrusive, so realistic it was impossible to tell which speaker was delivering which note. Yes, it was difficult to tell whether the speakers were even working. The music filled the room and swelled about the listener. The obvious blare and directional effect of a single speaker was absent. Yes, the entire accepted concept of music appreciation had suddenly been rendered obsolete.

The deep bass resonating cavity There are not many devices capable of creating extremely deep notes. There are still fewer able to reproduce them. This is due to physical limitations. Make a drum or horn big enough and it will produce sounds so low the ear cannot hear them, only feel the air blast. Due to the difficulty of getting these deep notes, they are very desirable in musical compositions and are displayed like diamonds. The fact the average radio or phonograph won't pick them up only increases their intrinsic value. To reproduce a deep note with true fidelity requires a horn of extreme proportions. It won't go in the average living room.



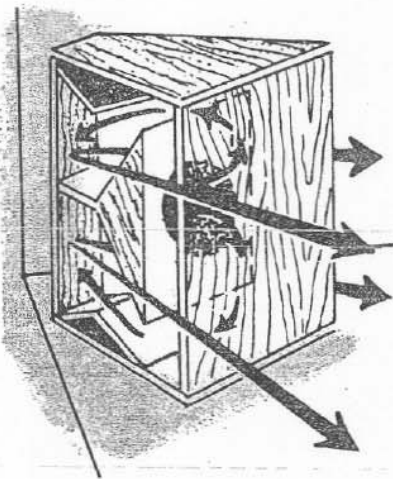
A gentleman named Klipsch hit upon the solution. Use the room as part of the horn. It worked. The horn was folded back on itself to save space, then coupled to the walls of the room. This idea was expanded by Louis Hoodwin and incorporated into the Patrician, with due credit to Klipsch, of course.



18WK WOOFER

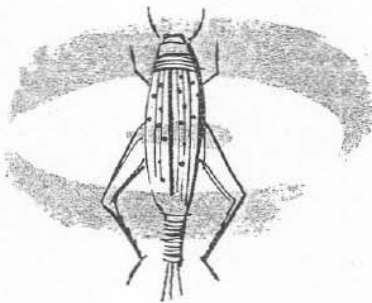
To get bass notes, you start with a speaker which has a growl like a grizzly bear. The cone is 18 inches in diameter. It moves a considerable distance, but with relatively slow speed, pushing a vast column of air ahead of it. This air column is directed into a cavity which is 7 x 14 inches to start, and expands according to the exponential curve to a pair of ports, size 10 x 48 inches each which are then coupled acoustically to the walls of the room.

Creating this cavity is the major portion of the work entailed in constructing the Patrician. According to outmoded standards, it is bulky; viewed by modern electro-acoustical concepts, it is compact to an amazing degree. Stretched out in the form of an exponential trumpet it would result in a horn 20 x 48 inches throat size and 6 feet long. The woofer handles only bass notes. The others are all filtered out and channeled to the proper speakers.



THE VITAL BACK CONE CAVITY

Every cone has two radiating surfaces, front and back. When one side is pushing, the other is creating a low pressure. The two must be isolated, or no sound in the bass range will be heard. A baffle will delay the back wave a half cycle so it can be piped around to reinforce the front wave, or it can be simply excluded. This is done by sealing off the cavity to the rear of the cone. This results in pure sound, but is obviously less efficient. In the Patrician the back cone cavity is tuned, and to bring the efficiency up to an acceptable level this pressurized column of air creates a spring effect on the diaphragm, snapping it back to normal with a greatly decreased time lag. This delay and return, or dashpot effect, is timed to the precise response which will augment and balance the bass, resulting in that unusual and seldom encountered timbre which identifies a Klipsch system and raises it above the level of all others.



THE VERY-HIGH-FREQUENCY SPECTRUM

The old style record player, and yes, even the old style records, stopped somewhere around 7,500 cycles. Like the deep bass, this borderline neighborhood of 7,500 to 20,000 cycles is but thinly populated with musical sounds. For years they were ignored because it proved too costly to reproduce them. Now, with Hi-Fi, the world has suddenly become aware there are such sounds waiting to be heard. Like the deep bass, they are not musical by themselves, but a fleeting passage or a haunting echo gives that certain something to an otherwise run of the mill musical selection. Current "extended range" records overdo it, but they will mellow down when popular fancy accepts very high frequency notes as essential. Best, and of most interest to you, is the fact the Patrician not only reproduces these formerly unheard notes, but gives them their proper emphasis. They are heard, but are not conspicuous.



T35 TWEETER

This starts where the usual "treble" leaves off, responding to sounds well above the level of audibility. This brings the hearing threshold to midscale, giving full brilliance to the thin squeaks that are actually "high notes." It does not take much in the way of a horn to project high notes, so the treble is a mere handful. Like the bass, high notes also pass through a filter, which strains out all sounds below the acceptable level. A violin sounds clear, resonant and for the first time, beautiful, but the spoken voice is reduced to a high cackle, very grating on the nerves. A world composed only of high pitched sounds is so unnatural the human ear refuses to accept it. These same sounds, blended in true proportion with others, restore the feeling of natural hearing so long muted out of radio and phonograph music.

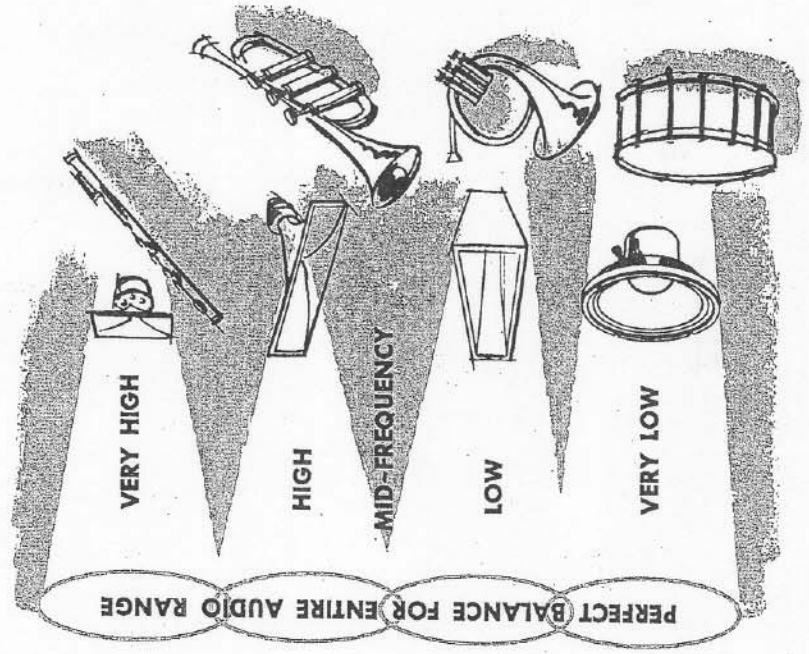
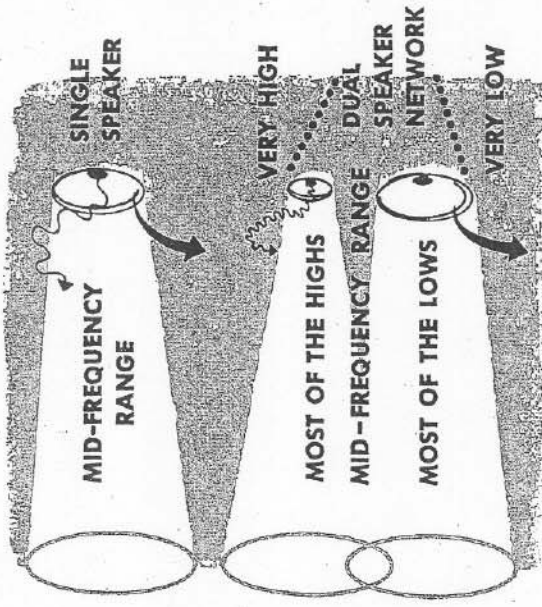
MID-FREQUENCY RANGE

Deprived of both highs and lows, the popular music spectrum as the world has known it through radio and phonograph, is composed entirely of mid-frequency sounds. This embraces the spoken voice and the melody notes of music. Until you hear the extended range of the Patrician, it seems quite satisfactory. Even in the mid-frequency range it is asking a lot to expect one speaker to handle the whole show. A low note will vibrate at 200 cycles a second and a medium high note will pull the cone in and out at 6,500 vibrations a second. How can one cone vibrate well at both speeds at once? It can't. The answer is to break the range down still further and let one speaker handle the low notes and the other the higher ones, with filters to regulate the traffic.

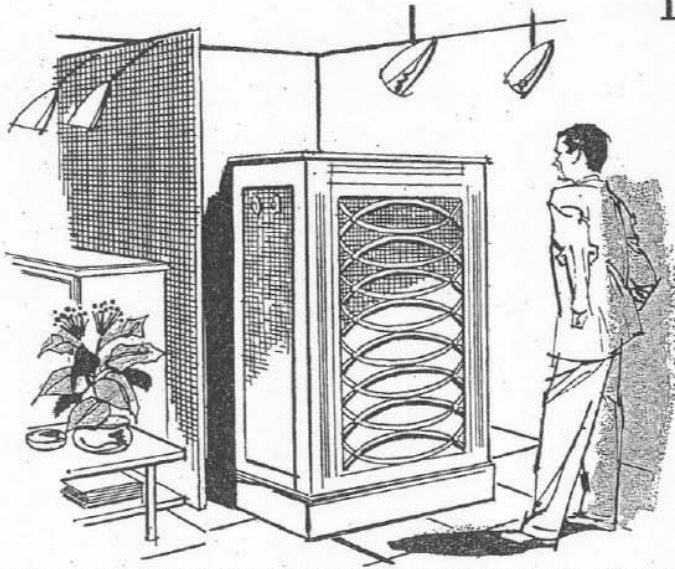
A 6HD and T25A driver and horn assembly does what the usual "tweeter" is expected to do, and does it in a big way. The upper mid-frequency range is where most of the common sounds lie. It does not take a large horn to handle these, so the speaker is nested inside the cavity used to direct the output of the two.

Two 828HF driver units handle the frequencies between deep bass and normal, which completes the mid-frequency range. This is approximately 200 to 600 cycles. Two units are coupled to a single air column to put more "soup" into the bracket which encompasses the heavy end of the musical range as well as the deeper singing and spoken voices.

An X2635 crossover network provides the filters to keep each of the five speakers in its own operating sphere. These include high pass and low pass circuits, properly blended. By using a combination of coils and condensers it is possible to arrive at any predetermined destination as far as electronics and electro-acoustics are concerned.



4 WAYS OF SELECTING YOUR PATRICIAN IV SPEAKER ENCLOSURE



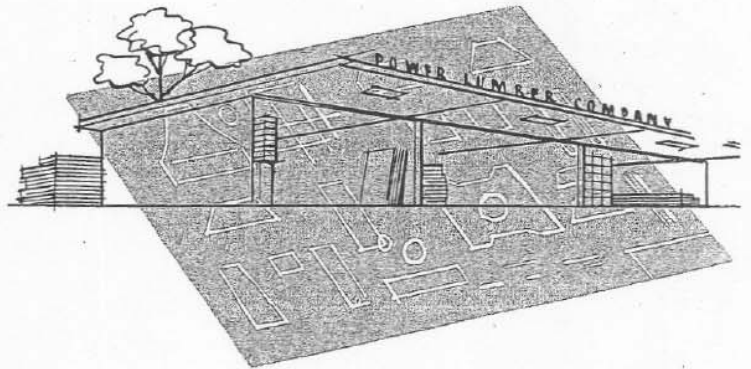
The established American idea of free enterprise and unlimited opportunity is no place more evident than right here. Also untrammelled is the fact that you can get what you want. All people do not want the same thing. One man wants the pleasure of creating something useful, complex and unusual. Another wants to keep himself busy evenings developing his skill at handicrafts. A third cares little about making essential complex interior structures, but is highly skilled at design and decorating. He would like to produce an end result without having to consume time on the fundamentals. A fourth wants results and would much rather pay cash and get them than consume his valuable time in a home workshop.

For each of those four men there is a Patrician. Each can get what he wants most, which for him is personal satisfaction, and each can get it in his own way.

first choice

Build a PATRICIAN from stock material

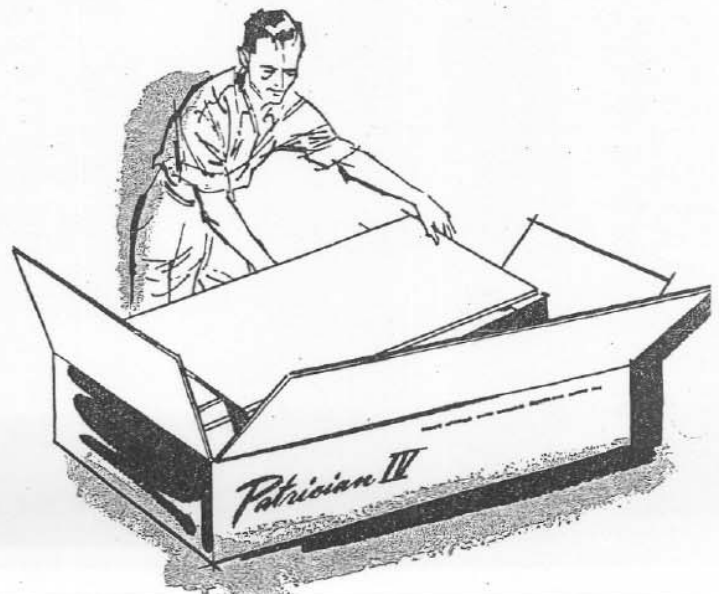
The plans are drawn. They are accurate. By following them implicitly you will achieve the end result, a Patrician. It is up to you to select the raw material, purchase it, cut it to size and assemble the components one by one, following instructions. This takes more than simple tools. You must have either power equipment or a degree of skill and ability which vanished with the old time cabinet maker and is practically extinct today. Building a Patrician with power tools is a matter of following instructions. Building a Patrician with hand tools puts you on the same plane as Chippendale and Duncan Phyffe. If you can do it, you are good.



second choice

Build a PATRICIAN by assembling a kit

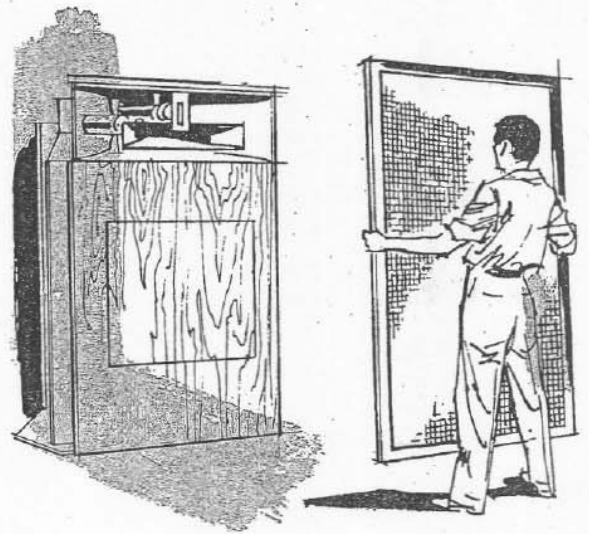
The same cabinet production line which makes Electro-Voice custom enclosures also makes pre-fab parts and packages them in kit form. These parts are cut on the same power machines, from the same material, and by the same men. The only difference is, the parts are not put together. Each part specified is inspected, packaged in a kit and shipped to you. This eliminates the cutting, machining and the detailing of parts, leaving you free to concentrate on fitting and assembly. Because the Patrician enclosure is heavy and must be airtight, assembly is no quick nail-up job. It takes time and skill. Each part must be carefully positioned, glued and drawn snug with fasteners. While it is drying you work on another section. There is enough hand work to keep you busy for many happy evenings.



third choice

Buy a PATRICIAN enclosure and build a cabinet around it

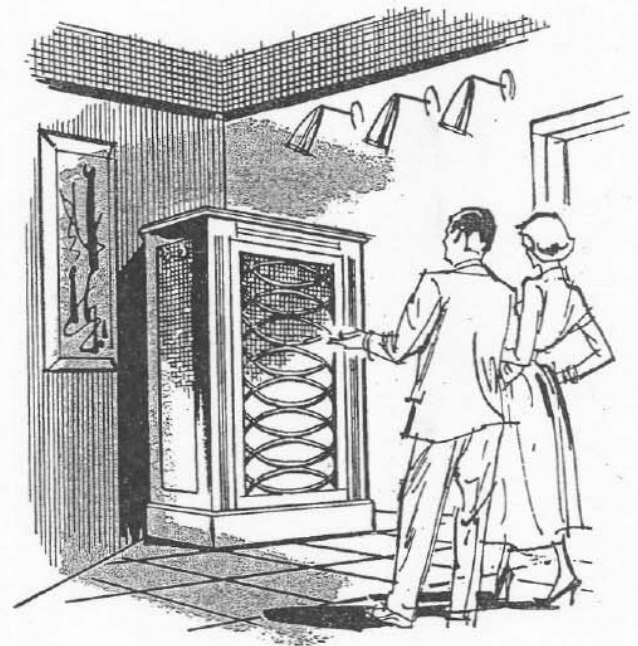
This is for the decorator, the custom installer or the man who has a "dream" to make come true. The enclosure is complete, glued and prime painted. All that is left is to install the speaker system and build it into the room, put a cabinet around it, or do what you had in mind. In this way, the purchaser can concentrate on the electrical and audio end as well as finished appearance without having to concern himself with the problem of creating the basic operating structure.



fourth choice

Purchase a PATRICIAN complete, ready to operate

This is doing it the easy way, and in an actuary sense, the cheapest way. All romance and glamor aside, it actually takes less time and energy to earn the money and buy the Patrician than it does to create it. Why? Because the Patrician is made on an assembly line with machines and power tools doing all the hard work. Assembly, securing and gluing is done with jigs and fixtures. There is still plenty of hand work, but it is highly skilled labor. This you pay for. Balance the total against the man hours it would require for you to do the job and you have your answer.



THE CHOICE IS YOURS

There is a rugged and strong willed strata of humanity which will not accept this answer. The answer will not be accepted by a man who rebels against buying what he can make, or feels he can make. A Patrician is something you or I can make. You won't save any money by making it, if your time is an asset, but you will have a lot of fun. You will learn first hand why electro-acoustics is a precise science. You will develop your skill and increase your self confidence. You will create something which is yours, and yours only. In conclusion, you will get what you want in the way you want it, and if that includes perspiration, bruised fingers, midnight mazdas and family apprehension—it is all part of the purchase price.





Building a *Patrician IV* FROM STOCK MATERIAL

It will not be easy. The bass horn portion is about as complicated as cabinet making projects come. Cutting and fitting the parts takes a high degree of personal skill. It can, however, be done, and it can be done very well by any person willing to follow instructions and make the effort. And these instructions have been made very concise. They have been made that way because a number of high school manual training instructors have requested plans for student projects. The once popular craft of jointing and fitting is almost extinct due to the use of machine tools and the encroaching of other materials on the field once held exclusively by wood. Because many of the younger men have never met a skilled cabinet maker, or had the opportunity to see how the work should be done, each step is explained in detail. Building a Patrician by hand is almost like stepping back to the gay 90s when the art of cabinet making reached an all time peak.

HAND TOOLS

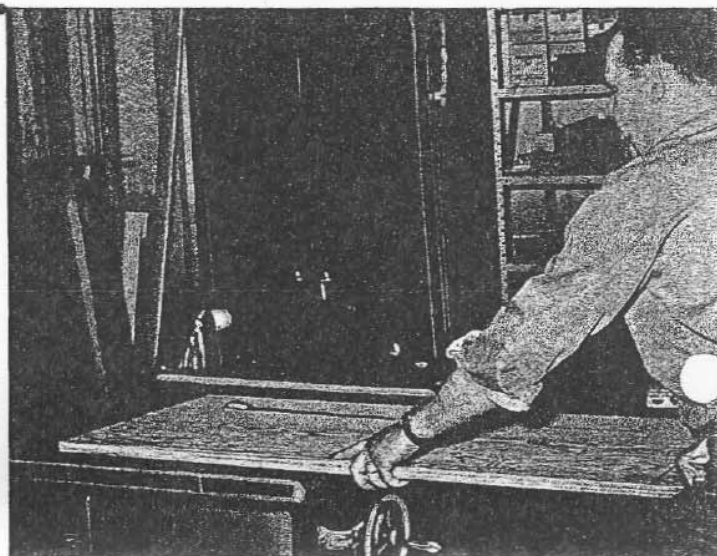
- ⊗ HAMMER
- ⊗ SAWS—CROSSCUT, KEYHOLE
- ⊗ SCREW DRIVER—PHILLIPS
- ⊗ PLANE
- ⊗ BEVEL GAGE—PROTRACTOR
- ⊗ RULER
- ⊗ PENCIL
- ⊗ SAW HORSES
- ⊗ PLASTIC GLUE
- ⊗ C-CLAMPS
- ⊗ SANDING BLOCK
- ⊗ CALKING IRON
- ⊗ DRILL
- ⊗ BITS
- ⊗ COUNTERSINK
- ⊗ SCREWS—NAILS
- ⊗ CALKING COMPOUND

TOOLS YOU WILL NEED

You can't buy many of the better cabinet tools because they have become obsolete and have been off the market for years. You won't need them, because construction has been beamed toward the "streamlined" modern conception of hand tools and popular power equipment. The man who has no tools but wants to get started, can purchase all the equipment needed at the better hardware stores. These tools are listed, and are all you will need. If you were lucky enough to "inherit" some genuine cabinet making equipment, their use will become obvious after reading the instructions, but we will say, sadly but truthfully, the quality of modern tools is vastly superior to that of the good old days. The blades are keener and stay sharp longer, the handles are easier to hold and adjustments are simple.

ELECTRIC POWER TOOLS

Best of all, electric power tools take away most of the hard work and let you concentrate on doing a good job. There is no bottom when you start dipping into the power tool situation, but a sturdy circular saw will do 90 per cent of the work required on the Patrician, and the other 10 percent can be divided among hand tools. There are power tools on the market which will do everything from drive screws to spread glue and bond the joints electronically, but after all—the man who choses to build himself a Patrician expects to do a little perspiring.

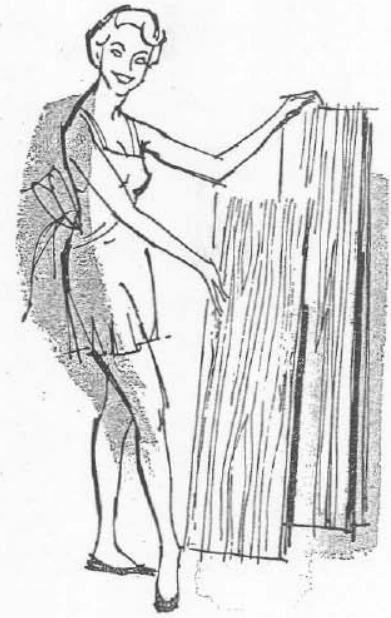


SELECTING YOUR LUMBER

Fir plywood is the best material for building everything from boats to airplanes to furniture to pre-fab homes, when cost, service and availability are concerned. The supply is virtually unlimited. Workability with power tools is fair. Cutting fir plywood with hand tools is one of those things we prefer not to discuss. It can be done, but it takes a severe toll on patience and muscle. The wood is hard, dense and tough. It grabs tools, it splinters. It is not a bit interested in how you feel as a creative individual.

If you intend to build your Patrician without the aid of a sharp and heavily powered circular saw, treat yourself to a supply of soft wood. The added cost will take much of the misery out of your sacro-iliac.

Pine "crating lumber" can be used for the detail parts, and the panel sections cut from sheets of five-ply poplar or basswood. These panels can be purchased in assorted sizes from "cabinet lumber" supply houses and shipped to you by express if you live beyond the limit of city delivery (see yellow pages of phone book for dealer listing).



LAYING OUT THE PARTS

Plywood panels, be they fir or soft wood, come in gigantic sizes. The question is whether you prefer to buy a large sheet and cut it up yourself or have the dealer size it for you. With the large sheet you can make paper templates of the part profiles in Fig. 1, lay them in position and do your cutting to avoid waste. By using small panels the handling is easier, but waste may prove excessive. It is your choice. The choice is further complicated by the availability of equipment.

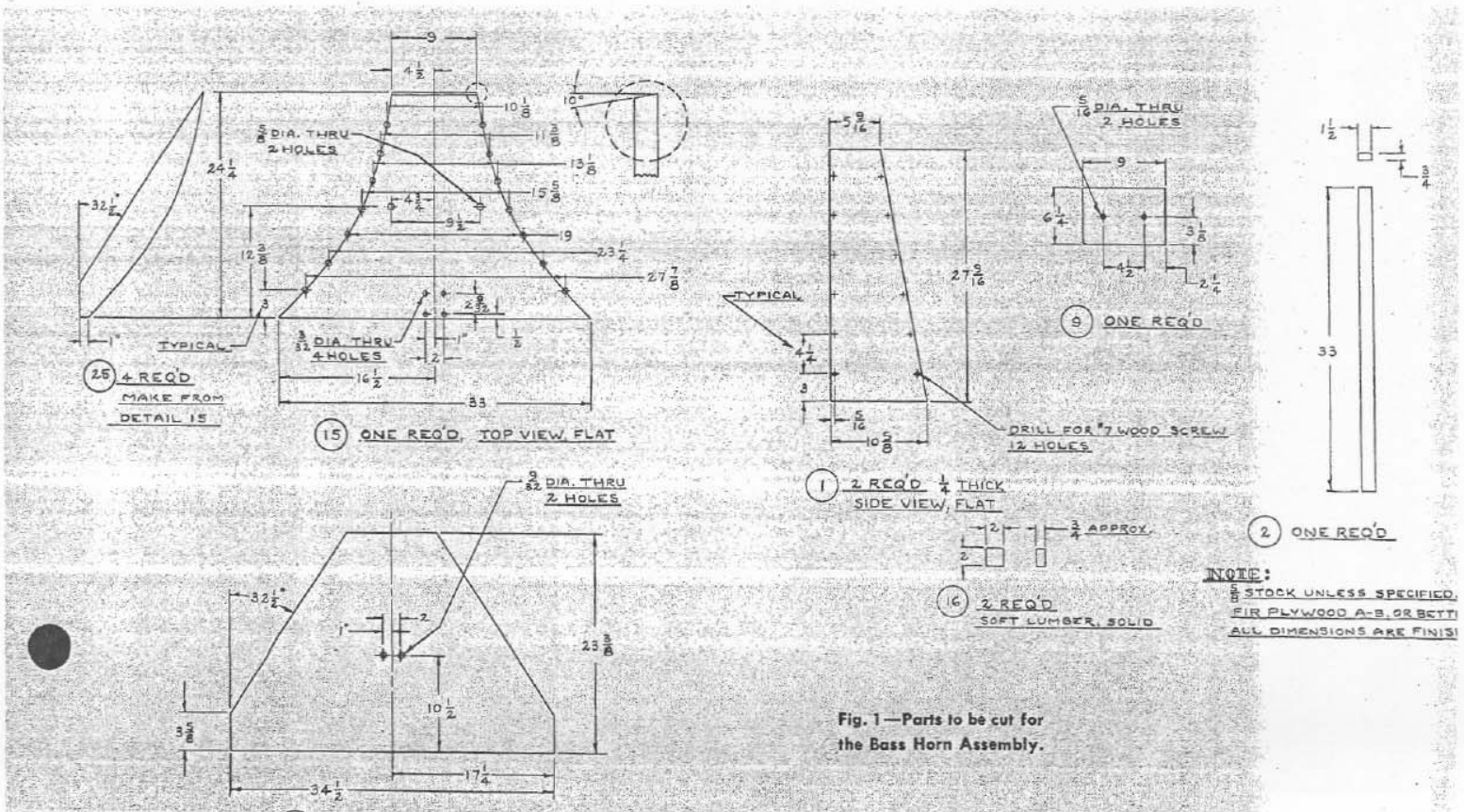
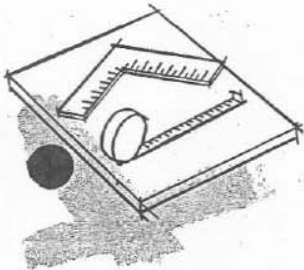


Fig. 1—Parts to be cut for the Bass Horn Assembly.



SMOOTH CUTTING PLYWOOD

Smooth cutting plywood is the answer to the home workmans prayer. It cuts as quickly and neatly as soft pine. Bass and poplar plywood were the accepted standard for furniture making before fir edged them out pricewise about twenty years ago.

These softer woods have a definite advantage in workability which, to an extent, offsets the higher cost. They saw, plane, drill and shape with practically no effort. Fir, on the other hand, does not respond to hand tools with any degree of enthusiasm. It does machine beautifully at high speed. As all factory equipment runs at breakneck velocity, fir has no disadvantages on production runs, and many advantages. The Patrician kit supplied by Electro-Voice is made of fir plywood.

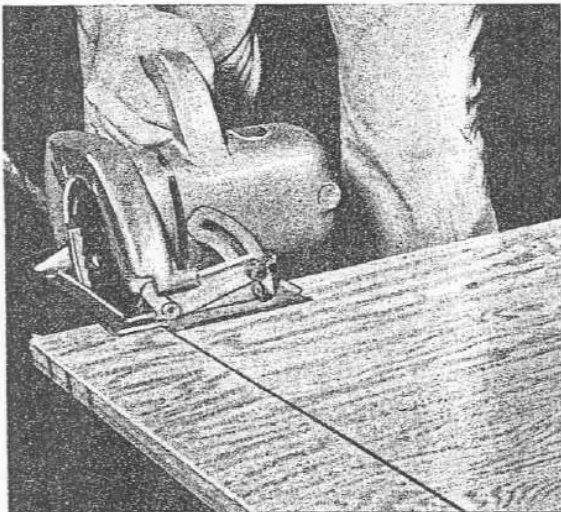


Fig. 2—A Power Saw is a handy and versatile power tool.

POWER SAWING

A power saw, Fig. 2, can be guided along the panel with the ease and accuracy of a dressmaker cutting material. Feeding a large panel into a circular saw may prove difficult. It can be done, but requires judgment and ability and one or more helpers to catch the sections as they cut free from the parent stock.

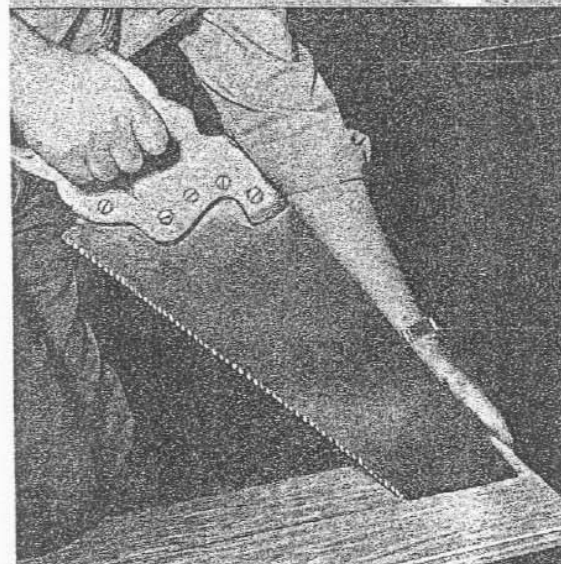
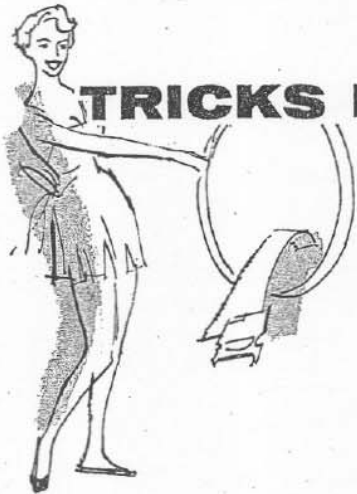


Fig. 3—Sawing right down the middle of the line.

SAWING PLYWOOD

Sawing plywood basically, consists of first laying down a guide line, then sawing right down the middle of it, Fig. 3. We say middle, because the practice of cutting to one side of the line breeds confusion. In the middle of a cut you may forget which side you are supposed to be working on, or how FAR to the side the cut should be. Stay in the middle.

This applies to both power and hand saws. On the larger pieces it may not be convenient to use guides on the power saw and the piece will have to be guided by eye. This is not as hard as it sounds, but you can go off the deep end fast if the situation gets away from you. To get that added margin of safety have the saw just high enough to clear the work. Then if the work grabs, lift up quick and the piece will free itself. Shut off the power and start over again. This procedure is relatively safe when ripping or crosscutting large panels, but *always* use a guide when working to close dimensions and on smaller members.



TRICKS IN HANDSAWING

Handsawing plywood requires a special technique quite different from sizing solid lumber. Draw your guide line with a pencil, then start the saw down the middle of the line, Fig. 4. A rip saw or a crosscut saw may be used. The preference depends upon the condition of the teeth and the set. Teeth must be freshly sharpened, and set held to close limits. Jagged or excessive set will re-

quire subsequent planing to obtain an airtight fit. Use gentle pressure, slow feed and take it easy. You will be sawing a long time, so there is no reason to rush. Watch the reflection in the blade, Fig. 5 and use it to hold the saw on even keel. The mitred joints had best be made by cutting square, then planing down to a protractor indication, Fig. 6.

Whether a panel saws best in a vertical or horizontal position is something only you can determine. If vertical, clamp to a post, Fig. 4 and work down from the top. If horizontal, lay across horses and have someone handy to hold the dangling end, Fig. 3.

SAWING A BEVEL

Planing need be done only when handsawing because the power saw is capable of producing an airtight joint in a single operation. Use a long smoothing plane, and take off a bare minimum of material. When an edge is to be mitred by plane, first square it, then set the bevel protractor and remove stock until you are cutting *almost* across the face, The skirt edge is your guide, and by holding it, the cut will be uniformly consistent.

Fitting The final check of a dressed edge is whether or not it fits tight against the component member. Cut and try procedure is needed as the work goes along. Mistakes and reworking may result in pieces which are too small. It is much better to discard and make new ones than attempt to patch up the error. Check across the face with a straightedge, Fig. 7 as work progresses, and maintain uniform height on all supposedly identical pieces. Glue and clamping pressure will compensate for minor irregularities, but don't count on it.

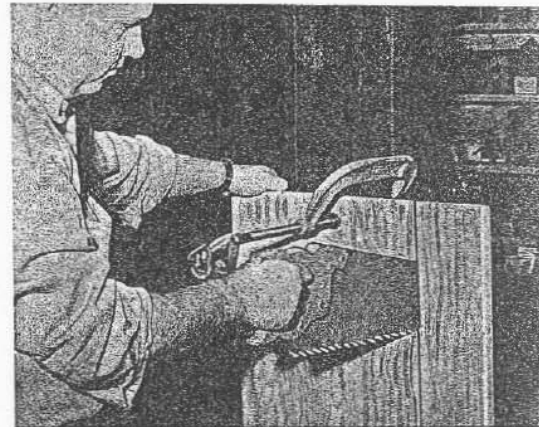


Fig. 4—Vertical sawing with panel clamped to post.

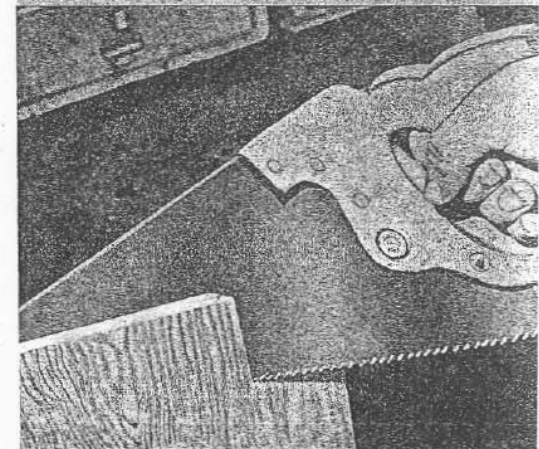


Fig. 5—Use the reflection in blade to hold cut to proper bevel.

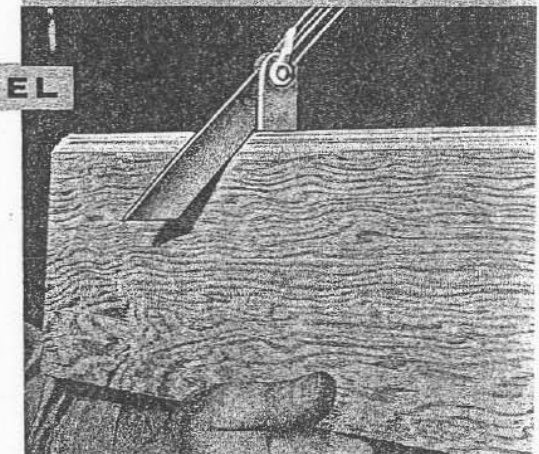
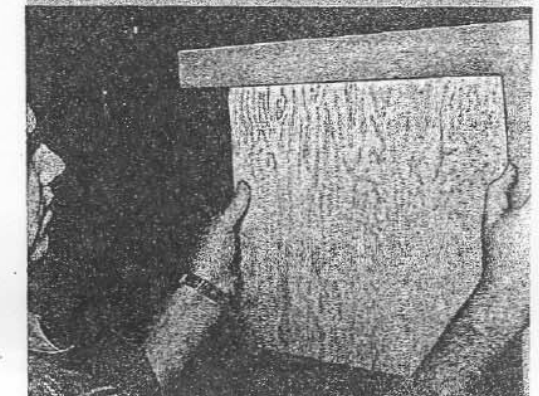


Fig. 6—Check your bevel angle with a protractor set bevel gage.

Fig. 7—Check and check again with your steel square.



ASSEMBLING THE ENCLOSURE

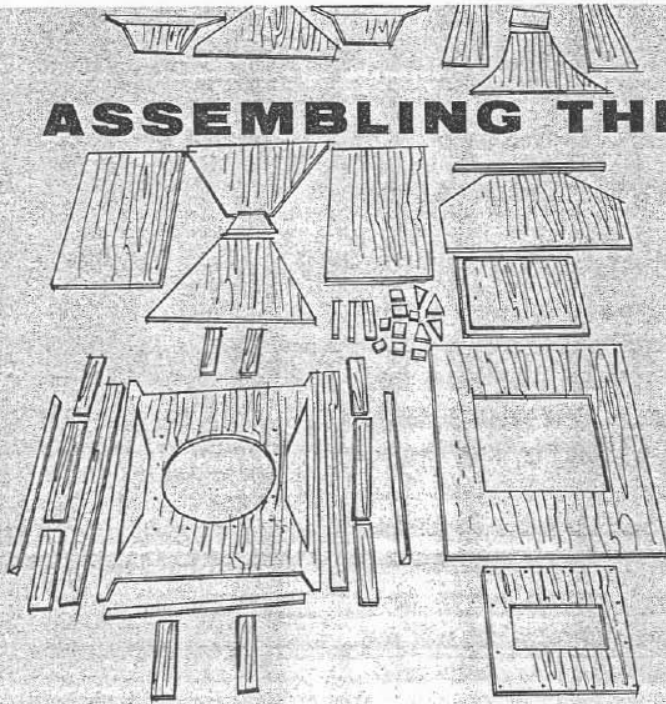


Fig. 8—Here are the parts ready to assemble.

This is where you start if you buy the pre-fab kit, or the next step if you have cut your own parts.

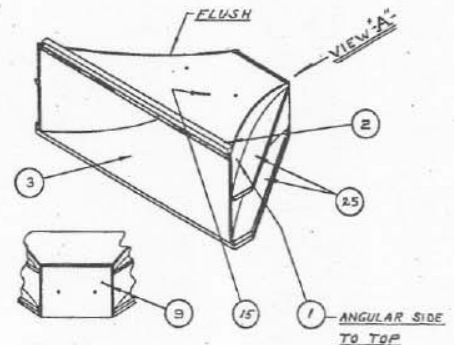


Fig. 9

IDENTIFYING THE PARTS

Identifying the parts is done by laying them all out on the floor, Fig. 8 and either coding each to the plan, if you made them yourself, or recognizing each part by the number, if you purchased the kit. Then the parts go together. There are as many ways of putting a kit together as there are people to do the job, and surprisingly, they all come out correctly in the end, or most do. It is possible, even easy, to "spoil the works", but if you *READ* first, and follow instructions, the kit will go together one piece at a time. Here at Electro-Voice we took a number of kits and a selection of men, and told each to put the kit together as he thought it should go, each man working alone and in the quiet of the evening. We took pictures of the work as it progressed. Each

man worked as he saw fit and all followed more or less the same procedure, and the difference in elapsed time could be counted in minutes. We are satisfied the Patrician kit can be assembled by anyone willing to make the effort. Allowing time for glue to set and granting a handicap for time out to study the prints, it should take five evenings to put the kit together. True, there will be men who can do it in one night, but it will be a long, hot night. Make the job fun. Take it easy and enjoy yourself; you will have lots of time to sit back and enjoy the music later on. Joy and the anticipation of more joy to come is really the only reason to embark on a project like this, so as they say in the Navy—shove off!

GETTING STARTED

The 200-cycle horn element, Fig. 9 is the most difficult part of the assembly, and most men felt it advisable to get it together first and out of the way. This is a good place to start, but is purely optional. The horn has to be non-resonant and airtight in the seams. Resonance is suppressed by installing dampers, Fig. 10. These are battens which are screwed and glued in place to stiffen the structure.

To start, take part 1, and drill for the mounting screws, Fig. 11 then wrap it around template 25 and secure. This is done by coating the mating surfaces with a generous application of plastic glue, and driving the screws home one by one. Seat each screw securely before starting the next one. There is no easy way of jiggging this operation, so do it freehand and work carefully. It takes plastic glue thirty minutes to set after exposure to air, so there is plenty of time to drive six screws.

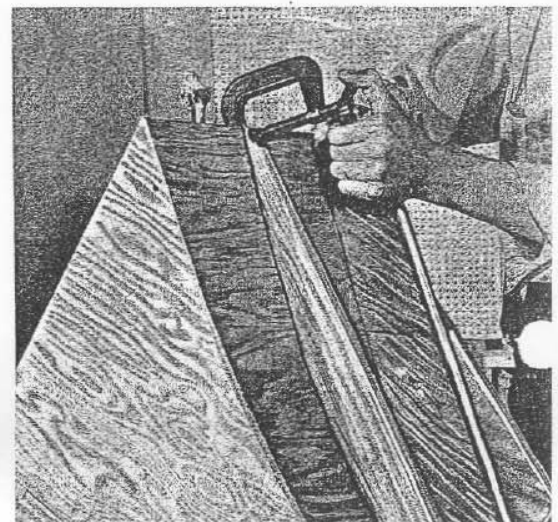
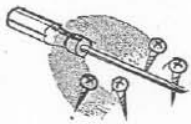


Fig. 10—Stiffening battens being clamped



GLUE

The old idea of hot glue and long setting intervals has vanished like most of the other traditional cabinetmaking procedures. Plastic glue comes ready mixed, is squirted out of a nozzle, is spread with your finger, dries slowly if spread thick, and is very patient in the hands of a bungling amateur. If the job goes together wrong, it can be taken apart at once, the glue scraped off with a putty knife, and the whole procedure started over from the beginning. There are a number of plastic glues, one of which is "Elmer's", available at most hardware stores and supermarkets. If you have a preference, use the glue of your choice and apply it according to directions, but remember, the quick setting types don't give you much leeway on pulling plywood panels into position with wood screws.



SCREWS

There is only one reason for using wood screws. The reason—most people don't own a set of cabinet clamps. The screws PULL the panels into position. The glue HOLDS them there. The screws can be taken out after the glue sets with no decrease in holding ability. Phillips head screws are easier to drive in awkward positions, Fig. 12.

The use of nails to draw panels into position is satisfactory if one is very sure of himself. Nails, however, are not easy to release and a rework job quickly takes on complications. The use of snake-tooth or cement coated nails produces a junction which cannot be taken apart. The heads will pull off these nails before they will release their grip. Ordinary, smooth nails do not hold plywood and had best be avoided. The use of nails to tack awkward panels in position while the screws are started is good practice and is advocated. The nails are pulled out when their mission is completed.



PLYWOOD WRAPPING

Side panel 1 will be under considerable tension by the time it is screwed securely to template 25. By the time it is wrapped around top, 15, there will be considerable twist introduced. Let the twist stay for the moment and install back board 9. This piece may have to be hand fitted as the curves of 1 introduce a flare of several degrees. Tap into place, Fig. 13, and when the mating edges have been planed down sufficiently to create a tight joint, secure with glue and screws. This will take away a good portion of the twist. The horn assembly is now positioned and secured to top panel 3. Line carefully and check angles with a square. Use lots of glue.

The battens 25, upper and 2 are now glued and screwed in place. If they do not appear to fit well at first, press into position and the spring in the plywood will fit the contour. Use clamps, Fig. 10 to secure the ends while the glue sets, as screws will not hold so close to the end.

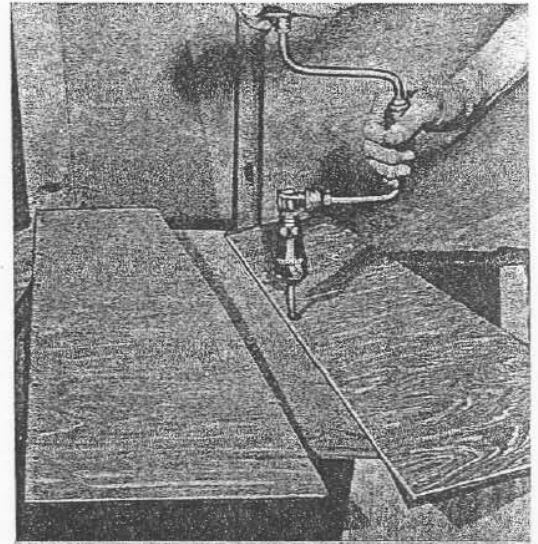


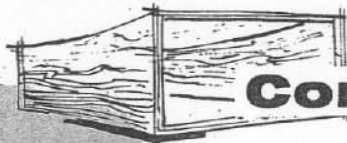
Fig. 11—Countersinking Screw Holes.



Fig. 12—Drawing the Joint Snug.



Fig. 13—Positioning Backboard.



Completing 200-cycle horn

The purpose of the battens is to stiffen the horn walls acoustically so they will not resonate and vibrate like a boat whistle. For this reason, use extreme care and as many screws as are required to pull the battens into positive contact their ENTIRE length. It is now that the merits of Phillips screws become apparent. By using a stubby screwdriver it is possible to seat the batten from the inside of the horn, using the left hand if more convenient. Now, and in all like instances, drill pilot holes for the screws first. If you cut your own parts and the screwholes are not indicated, line up the part between pencil marks and drill for screws as shown further on in Fig. 15, working from the outside. If assembling the kit, you will notice slight variations due to the use of machine fixtures in parts fabrication.

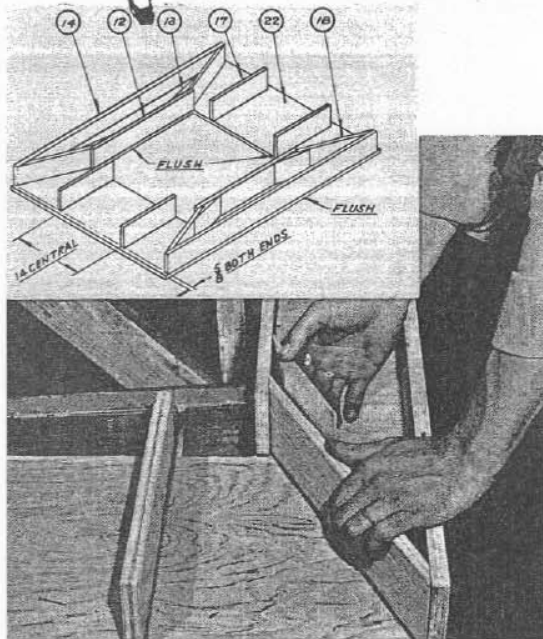


Fig. 14—Laying out parts for marking.

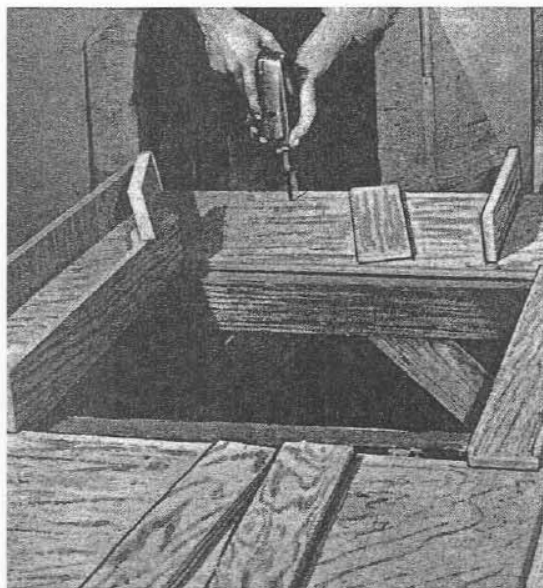


Fig. 15—Drilling for Assembly.

CALKING AIR LEAKS

Bass, or long Sound waves will go through a crack which is water-tight and almost air tight. Ordinarily this wouldn't be of much importance, but in the Patrician the special acoustic design requires good seals for perfection, and you will come mighty close to getting perfection by following instructions. The generous use of glue will take care of the smaller cracks. An additional calking with gummed tape, marine seam-compound or shellac filler will reduce leakage to an unmeasurable point. It is better to go too far than to stop too soon because the Patrician is VERY heavy. If lightly built, it may open up when moved in the usual ordeal of housecleaning. Once open, resealing is not easy. It practically means rebuilding the unit.

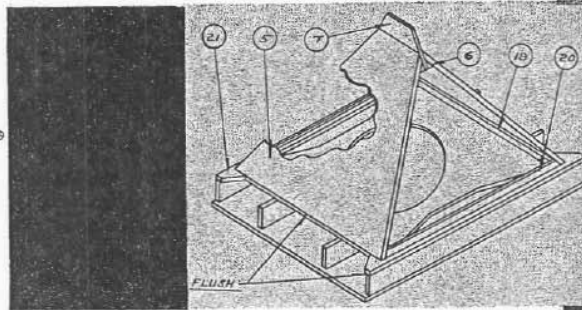
THE BASS HORN

While larger and heavier, work goes faster than on the 200-cycle horn, or at least appears to go faster because every piece installed adds considerably to the bulk of the assembly.

You start by laying piece 22, the front panel, across a pair of sawhorses and then position pieces 12, 13, 14, 17 and 18. You will notice there are two or four of most of these, so your stock pile goes down fast right from the start. If you cut them out yourself, position as shown in Fig. 14, mark the outlines with a pencil, Fig. 15 and drill screw holes. Pieces 14 are flush with the edges and can be screwed down first. Glue is smeared on the mating surfaces and the screws are driven up from the bottom. Pieces 12 are flush with the panel opening, and are glued and screwed on next. 13 and 18 are used to complete the assembly. Which goes on first depends upon how you work. 13 can be nailed in place after gluing as it supports no weight, only provides a bearing surface. These "boomerangs" are dead air cavities which increase the enclosed area behind the speaker cone and MUST be calked with extreme care. It is best to calk the lower surfaces from the inside, then finish the outside after speaker mounting panel 21 is in place. As usual, use plenty of glue, and don't be in a hurry.

Pieces 17 are positioned with the ends flush against the center opening and are each seven inches out from the centerline of the panel. That is, they are 14 inches apart from each other.

Fig. 16—Constructing the sealed cavity requires all the skill and ability you can muster. Work slowly—carefully and accurately.



DEAD AIR CAVITY

Now you start getting into the dynamics of sound propagation. Behind the speaker cone is a sealed cavity, Fig. 16 which acts exactly the same as the dashpot on a Corliss engine. It is tuned, balanced and regulated to give the exact response desired. Basically it takes the backwash of the speaker cone, stores the shockwave in the form of undissipated energy like a spring, and then uses it to push the cone back to zero position. This becomes an actual visible impulse, because a deep note of sufficient amplitude can pull the cone better than an inch. The return thrust snaps up the cycling and in terms of the hi-fi, puts "soup" into the speaker. Right now all you have to do is create that cavity, and it *HAS* to be AIR TIGHT.

YOU START by gluing and screwing part 21 in place, Fig. 17, making certain the two boomerang cavities are WELL calked. Part 17 requires no calking as it does not separate, only stiffens.

Parts 6, 7 and 5 go together in an unorthodox manner Fig. 18. They could be built up from the bottom, like pitching a roof, but it is easier to put them together from the top, Fig. 19 and lower the assembly in place as a unit. In the kit the edges all have the proper bevel and only need to be matched. If you cut the parts yourself, they may require hand fitting. Start with piece 7. Glue and screw pieces 6 to it, flush with the wide edge. Parts 5 must be matched air tight to the unit 6-7. Let the glue dry before handling the assembly. If in doubt, as you have good reason to be, screw parts 5 on dry, and position on part 21. Edges of 5 should be flush top and bottom. Parts 19 and 20 are sealing battens to which 5 are secured. Lay these in place and clamp; then position 5, tack lightly with casing nails and mark locations of 19 and 20. Remove 5 and clamps and glue and screw 19 and 20 into position. Now position 5, secure with the casing nails and screw down before the glue dries. Calk ALL of the seams, inside and out, as far as possible.

SEALING THE CAVITY is accomplished by installing panels 4. These must first be lightly nailed, Fig. 20 and the joints inside tested with a spatula or feeler gage for angle and tightness. If satisfied they can be drawn up snugly, go ahead and glue and screw, lining up top and bottom ends. Seal and calk to the best of your ability, Fig. 21.

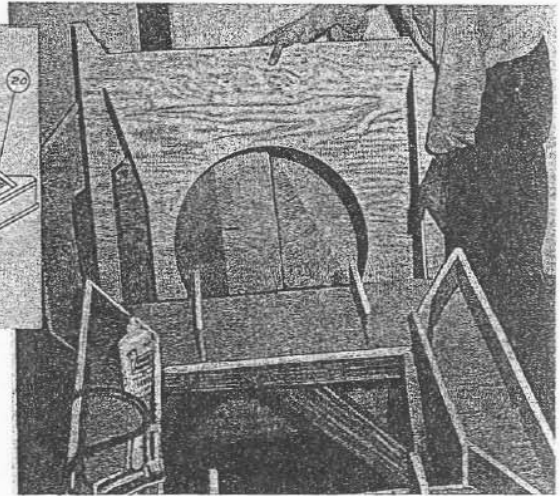


Fig. 17—Panel 21 goes in place first.

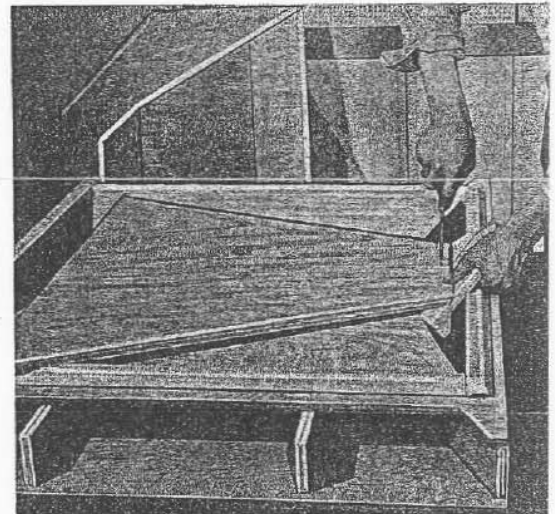


Fig. 18—Screw parts 5, 6, 7 together for a "Dry Fit" check before gluing.

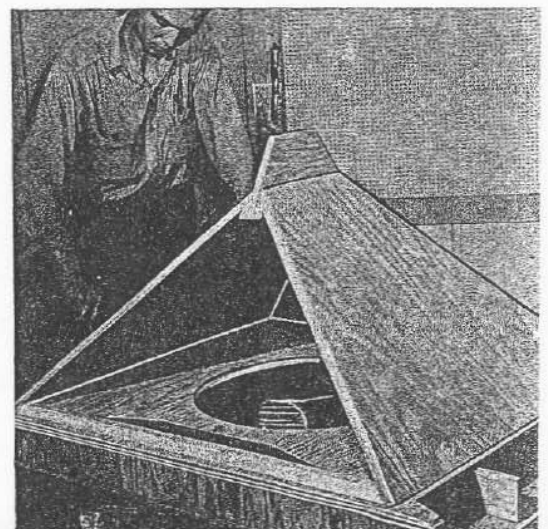
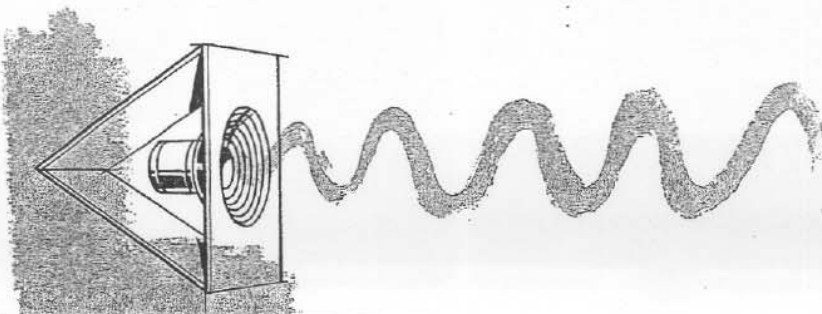


Fig. 19—The Glued Assembly is lowered in place like a Gable Roof.



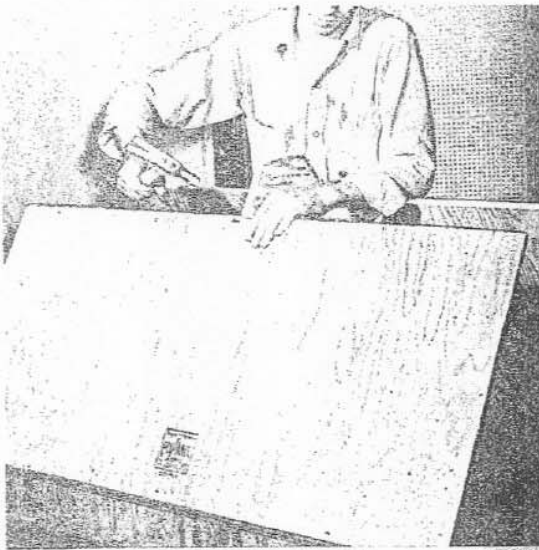


Fig. 20—Test Fitting Panel 4.

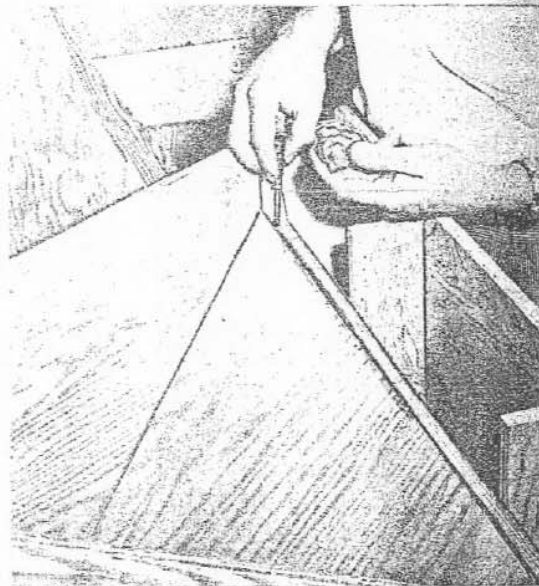


Fig. 21—Calking seams with Marine Glue.



Fig. 22—Checking Bottom Fit.



THE AIR COLUMN

There is six feet of exponential horn folded back on itself within the enclosure. Most of this horn has already developed without your realizing it. By placing pieces 10 and 11, the air column suddenly assumes a recognizable shape, Fig. 22. They are secured to parts 4, in such a way that top and bottom, 3 and 8 fit flush all the way around. This is asking a lot, because there is bound to be a slight warp in at least one of the panels, and it must be drawn snug. What you have to do, is position all the parts so there will be no hand fitting required before they can be secured.

You can't drive nails in unsecured panels 4 due to the spring and bounce, so drill pilot holes for the screws, Fig. 23, tack with nails first, then replace with screws when satisfied the fit is correct. Use lots of glue, Fig. 24 and keep drawing up on the screws, Fig. 25 until the joints are all snug. If two can work on this job, so much the better. It is awkward to hold parts and drive screws with only two hands when one or more panels insist on springing and pulling out the nails. If the spring proves excessive, resort to hand fitting rather

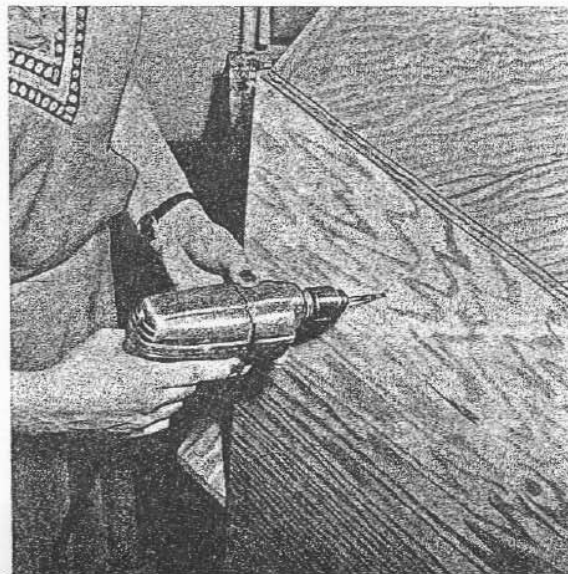
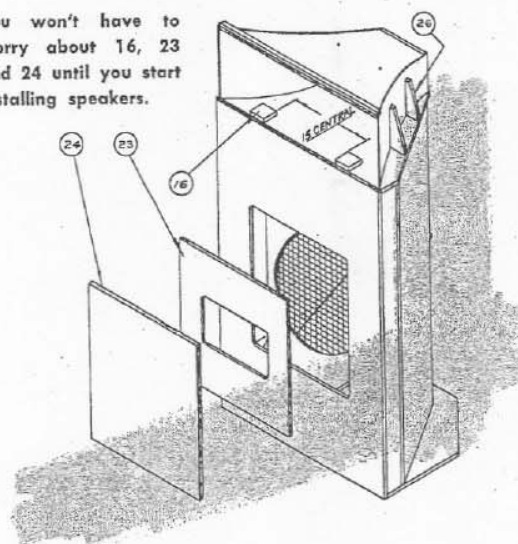


Fig. 23—Drilling for 10 and 11.

than forcing. In most cases the spring is in the panel, itself, not in faulty cutting or jointing. When the screws are once in place, the spring vanishes and the parts line up correctly, or they should, if no error was made in fitting.

When parts 10 and 11 are installed top and bottom, you are ready to seal off the horn and call it completed. Install the bottom, 8, first, Fig. 22. Drive in as many screws as are needed to secure it until the glue holds. Warpage is often bad in large panels, especially in humid weather and it is difficult to predict exactly HOW MANY screws may be needed. Keep inserting them until the bottom fits snug against parts 14, 17, 21, 4, 10 and 11. Calking is not important but do it anyway, just to play safe.

You won't have to worry about 16, 23 and 24 until you start installing speakers.



INSTALLING 200-CYCLE HORN

With the horn already in position on the top, 3, it proves a bit awkward to insert screws in some of the prescribed locations. Counterbore through battons 25, Fig. 26 to enable the screws to sink deep enough to grab. It may be necessary to reach up between parts 17 and 18 to mark the underside of 3 so pilot holes can be drilled in location. You can't reach part 11 at all, and there is really no need to, so smear on lots of glue and let nature takes its course. Part 10 can be screwed up from the bottom.

Before the horn is mounted permanently, remove and install the mechanical fittings as detailed on page 31, Fig. 20. You will use these to secure the speaker units when the time comes.

Now install the top panel, 3, permanently, and once it is in place you have reached the point of no return, your unit is sealed and ready for the installation of the electrical equipment.

There is one optional feature. If the enclosure is to be operated without a cabinet, even for testing, screw a 1 by 10-inch board between 3, 7 and 8, so it acts as a deflector plate for the air column. This board is removed when the enclosure is placed in a cabinet.



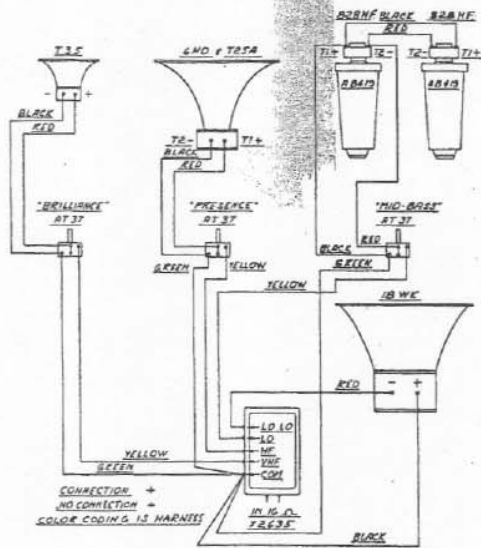
Fig. 24—Prime the joint surface with a thin coating, then put on a thick layer and assemble at once. Plastic glue will set in about thirty minutes.

Fig. 25—Draw up screws till glue squirts out of joint top and bottom.

Fig. 26—Drill holes in 25 large enough to admit screw driver.

Installing the Components...

This is where you start if you purchase the enclosure completely assembled.



WIRING DIAGRAM

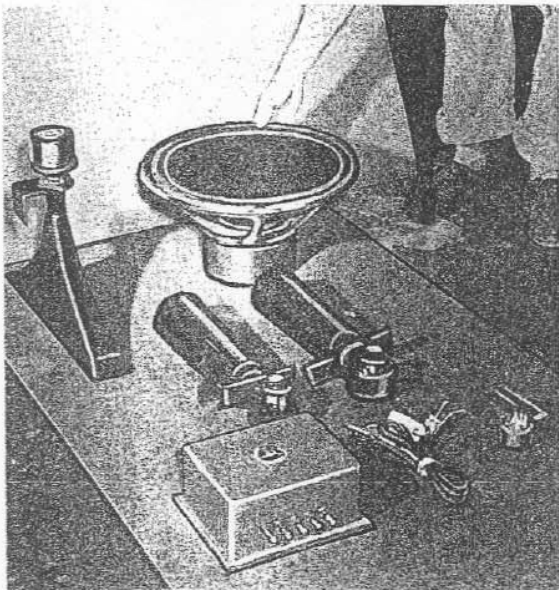
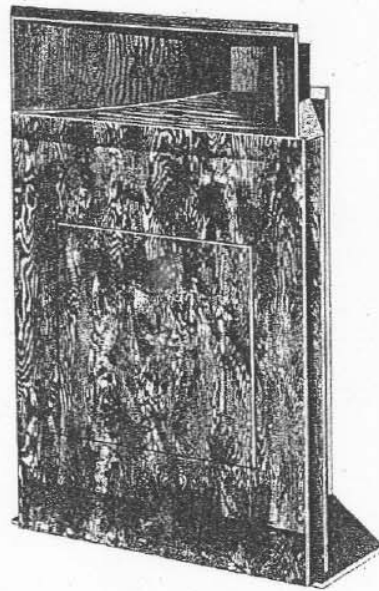
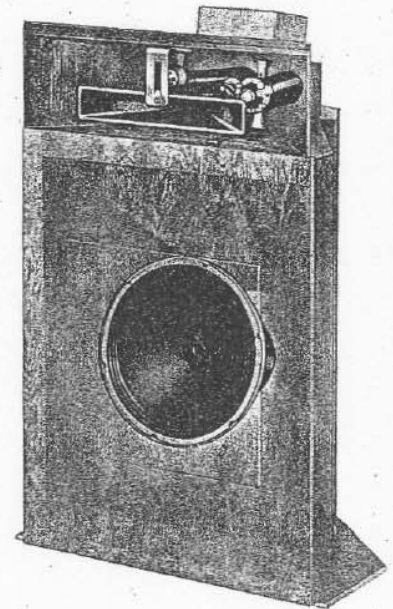


Fig. 27—Left, units unpacked, ready to install. Above, wiring diagram.



COMPLETED ENCLOSURE



PHANTOM VIEW OF SPEAKERS IN POSITION

THE DRIVER UNITS come packed in a wooden box, Fig. 27, and the kit is complete, ready to install. The units match, and will work together as a system. Substitutions of other makes will introduce possibilities of error. Unless you have a very good reason to do otherwise, it is to your advantage to obtain the **COMPLETE ELECTRO-VOICE 103C** package and install it as instructed. We say "good reason to do otherwise" because the enclosure you have built or purchased is an excellent foundation unit for testing, developing and comparing speakers of all sizes and makes, and even creating a new approach to the problem. This unit, the **PATRICIAN** is the **BEST** you can buy or make. If your inclination is to delve into the unexplored in sound propagation, the **Patrician** is the logical place to start. By doing so, you will not be duplicating what has already been done.

Included in the 103C package are—

- 1 18WK very-low-frequency driver
- 2 A8419 low-frequency phenolic horn sections
- 2 828HF drivers
- 1 T25A treble driver
- 1 6HD 600-cycle diffraction horn
- 1 T35 very-high-frequency driver
- 1 X2635 4-way crossover network
- 1 8675 cable harness including three AT37 level controls.

The outer shell of the **Patrician**, as supplied on factory built instruments, is not available as a separate item because it is jig assembled about the enclosure and has no foundation of its own. It would cost more to build the holding fixtures than buy the complete unit. If you want the **Patrician** in furniture ready to play, make choice **FOUR** as outlined on page 5.

ASSEMBLY PROCEDURE

Installing the units in YOUR Patrician is identical to the procedure advocated for the assembly line. Therefore we will simply lift the basic work sheet instructions supplied the assembly line workers. The photos taken are of actual factory workers making an installation. Each man is highly skilled and the system goes together quickly and smoothly. This is the factory built Model 115, and is a prime painted and fixture assembled unit; otherwise it is exactly the same as the enclosure you or I have made. Yes, I made one too, and am personally satisfied anybody who really wants a PATRICIAN badly enough can put the kit together, only mine was done the hard way. I sawed out pieces by hand, just to prove to myself it could be done. Now here are the factory work sheets, with a few ad-libs tossed in to clear up points of possible doubt.

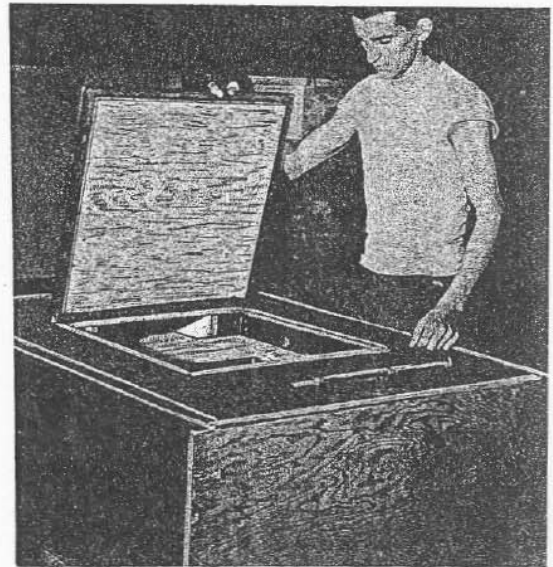
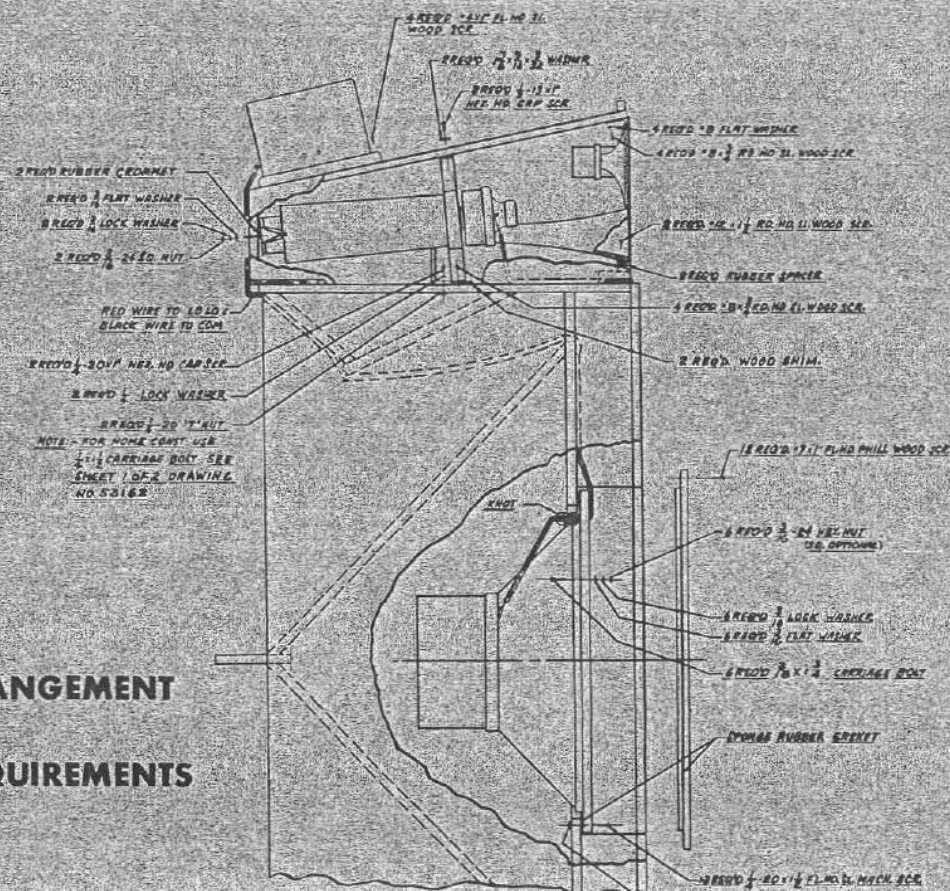


Fig. 28—Removing front cover, 24, to gain access to speaker compartment.

step 1 Lay the Model 115 on its back. Remove the front cover and speaker mounting board (yours has not yet been installed), see Fig. 28. Note or mark the tops of these boards. The factory unit is pre-drilled for speaker mounting but the home constructed unit must be drilled.

step 2 (Omit in factory built unit). Lay the 18WK LF driver on the center of the mounting board, with two opposite rim holes on a vertical center line and with the speaker terminals oriented on either side of the top hole. Mark the 18WK mounting board through the rim mounting holes. Drill six $\frac{1}{4}$ -inch holes through the mounting board and one $\frac{3}{16}$ -inch hole near the terminals on a $9\frac{1}{4}$ -inch radius, or, in other words, far enough out to just clear the rim of the 18-inch speaker.

GENERAL ARRANGEMENT AND HARDWARE REQUIREMENTS



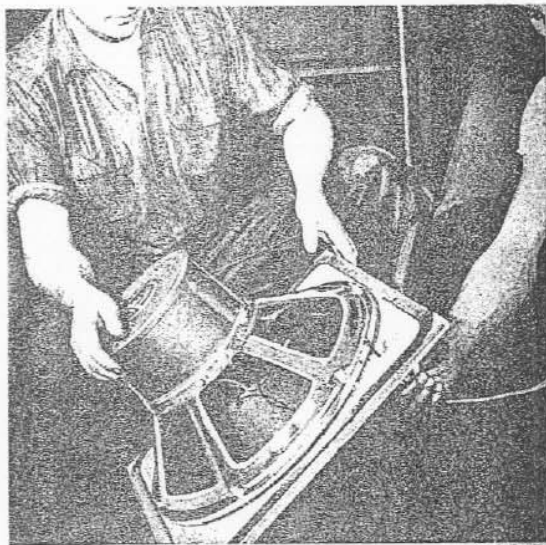


Fig. 29—Snubbing the Cable.

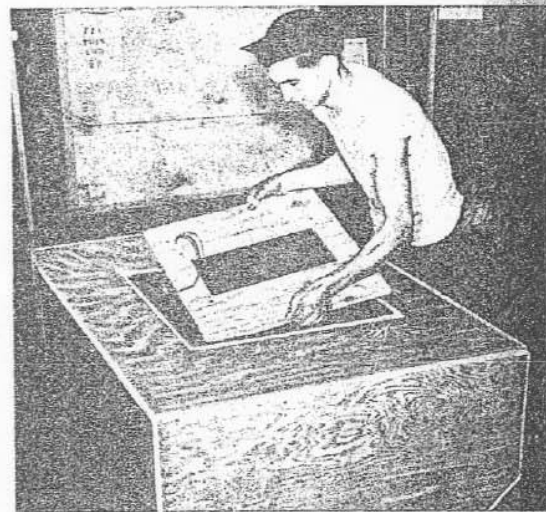


Fig. 30—Lowering Speaker in Place.

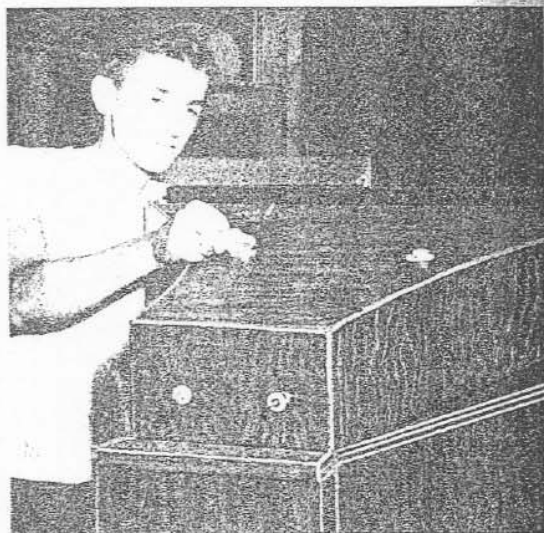


Fig. 31—Positioning A8419 Horns.

step 3

Bolt the 18WK in place with $\frac{3}{16}$ by $1\frac{1}{4}$ -inch carriage bolts, using both flat and lock washers. Tighten the carriage bolts only snugly enough to assure firm positioning of the loudspeaker. Excessive tightening may warp the speaker frame and cause the voice coil to rub. Run the long single red and black wire supplied in the wiring harness kit through the $\frac{3}{16}$ -inch hole and form a square knot as shown, Fig. 29 on the speaker side, to prevent the cable from being pulled out. Attach the wires to the terminals on the 18WK, *RED* wire to the *BLACK* terminal and *BLACK* wire to the *RED* terminal. This insures proper phasing in operation.

The speaker baffle board with the 18WK mounted on it, Fig. 30, may now be put in place. Care should be exercised to insure a tight seal on this board against the sponge rubber gasket material. Feed the 18WK leads through the top opening of the horn and out to the back. The front cover, may now be screwed in place, closing the throat of the large horn. Be sure the gasket makes a perfect seal.

step 4

Return the Model 115 assembly to an upright position. Guide the bolts projecting from the ends of the A8419 horns through the holes in back plate of the smaller wood horn, using the rubber spacers provided to insure an airtight fit. Run large cap screws and washers through the top of the horn and into the brackets of the phenolic tubes, and tighten *by hand only*. Fig. 31. Now push the two wood shim blocks under the bottom of the brackets, but *do not force*. Start the wood screws through the brackets and into the shims, but not into the top of the large "K" horn board. With one hand on the back of the tube and one hand on the shim, float the shim until the back bolt is free through the back board hole. Now drive a brad through the wood shims into the top "K" horn board and complete running the wood screws into the top board of the large horn. Tighten the cap screws just snugly enough so that the tube bolt is free through the back hole. Now add the washers and nuts on the bolts through the back, bringing the nut and washer up just snugly enough to avoid strain on the phenolic horn tube.

step 5

The 828HF drivers, with the terminals facing toward the front, may now be screwed in place on the reentrant horns Fig. 32. The drivers are wired in parallel; T1 or the black wire connects to T1 on the other driver, and T2 or the red wire terminals connect together. The wires are stapled in position and brought out on the front left side of the 200-cycle horn assembly.

Mount the X2635 crossover network with output terminals toward the back of the cabinet, and centrally with the cap screws and the back of the horn as shown.

step 6

The T35 VHF driver now may be mounted in place. Mount the T35 bracket inside on the top section of the 200-cycle diffraction horn, using the predrilled holes. A slight bend must be made in the bracket after it is in place to allow the T35 to be aligned vertically.

Wire the T35 as shown in the schematic diagram, the black wire connecting to the black terminal, and the red wire to the red terminal. The AT37 level controls may be mounted, optionally, on a board as shown on the phantom view of the exterior as shown in the home construction drawings, or in any other convenient position. Extensions up to 20 feet in length may be added to the #8675 cable harness.



step 7

Now mount the 6HD and T25A in place. This is accomplished by following the assembly instructions packed with the T25A driver. Note that the T25A mounting bracket foot faces forward in the components assembly drawing. Attach the threaded adapter plate furnished with the T25A to the bracket and horn and bolt it in place using the flat gasket supplied with the driver. Now screw the T25A onto the horn. The complete subassembly now may be placed in position.

On the factory-built Model 115 unit, use the cap screws and washers furnished with the "K" horn. On the home constructed unit, mount horn foot brackets over the preinstalled carriage bolts and nuts and then lock washers and nuts. Do not tighten until the 6HD horn is lined up parallel with the front of the "K" horn structure. Now install the rubber spacers and screws, drawing them down just enough to compress the rubber slightly. Complete the tightening of the foot bracket. Wire the T25A driver as shown in the schematic diagram, below, the T2 terminal to the black wire, and the T1 terminal to the red wire. Run the wires parallel to those from the 828HF drivers and staple in place.

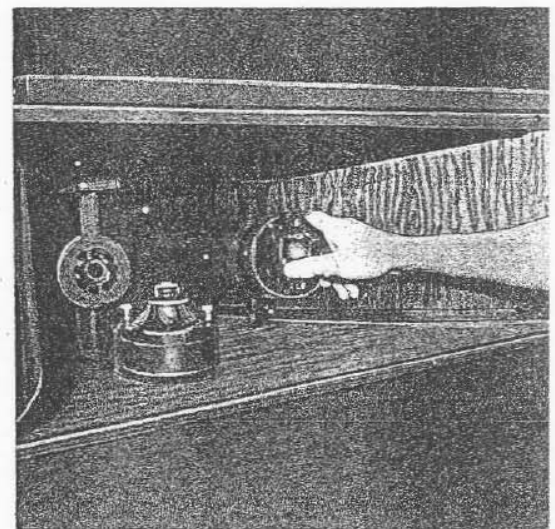
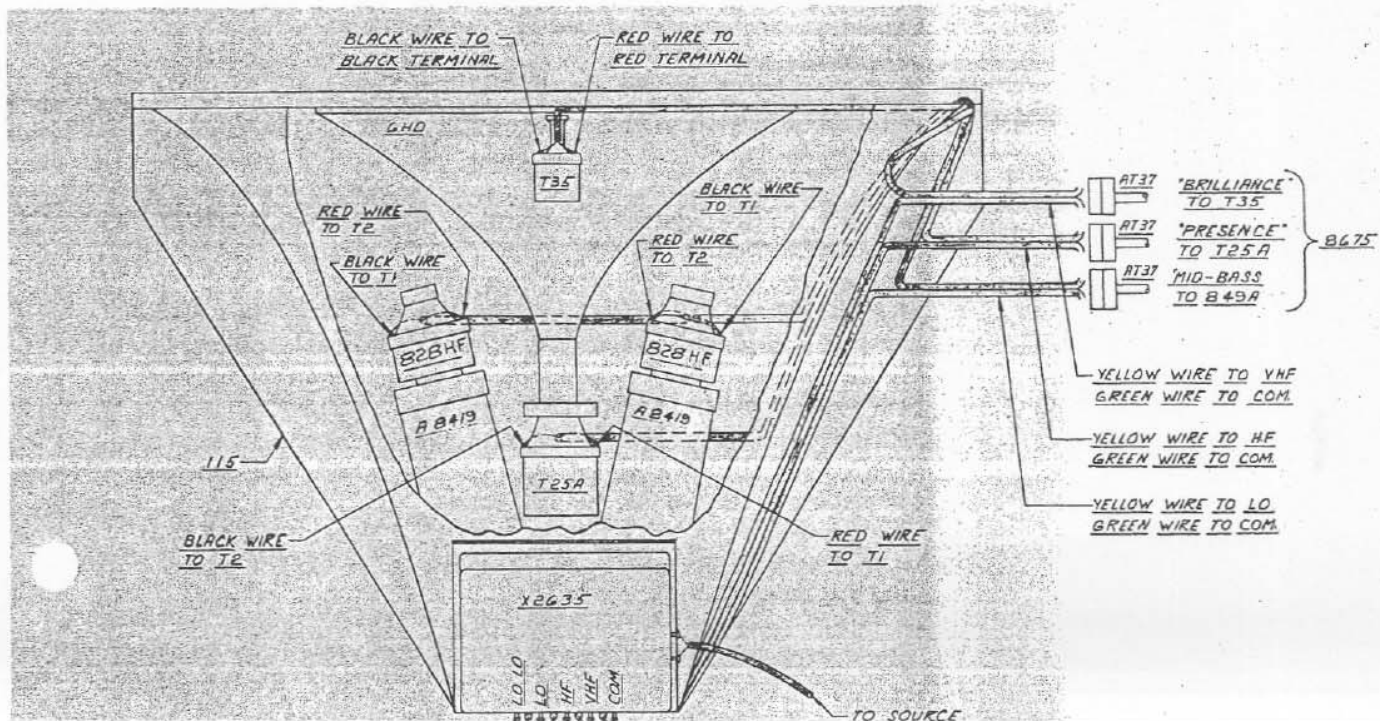


Fig. 32 — Four speakers nest compactly inside the 200 cycle horn.



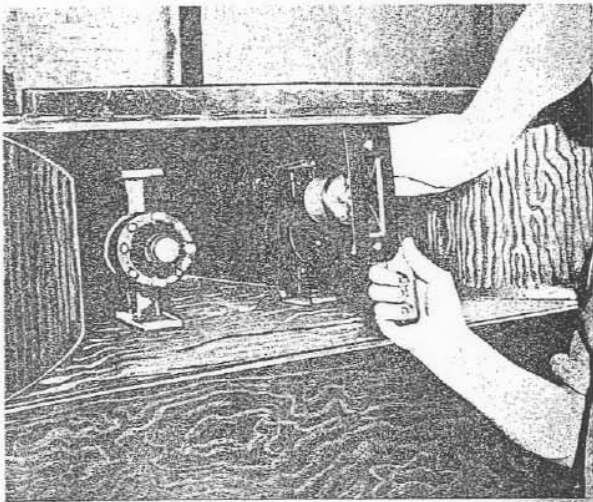


Fig. 33 — Installing T35.

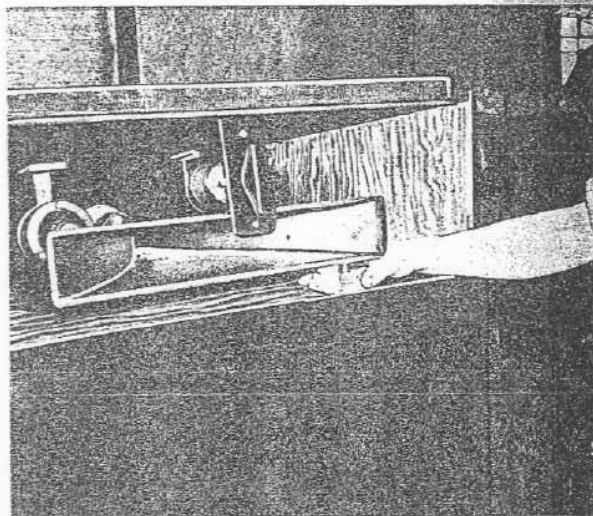


Fig. 34 — Installing T25A Treble Driver and 6HD Horn.

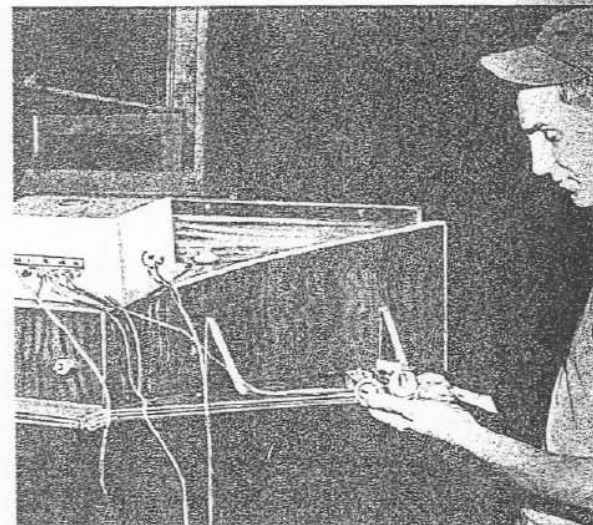


Fig. 35 — Checking controls.

step 8

If the drivers have been connected as described, all units will be phased properly. Connect the output terminals on the X2635 crossover network as follows:

1. Splice the black wire from the 18WK with the three green wires from the high frequency drivers and connect them to the terminal marked "COM" or "Common".
2. Connect the yellow wire from the T35 *Brilliance* control (AT37) to the terminal marked "VHF".
3. Connect the yellow wire from the T25A *Presence* control (AT37) to the terminal marked "HF".
4. Connect the yellow wire from the 828HF *Mid-Bass* control (AT37) to the terminal marked "LO".
5. Connect the red wire from the 18WK to the terminal marked "LO-LO".
6. The terminals marked "IN" should be connected to the 16-ohm output of the amplifier.

preparation for operation

The lead wires to the amplifier should be #18 fixture wire up to 20 or 30 feet; for longer lead lengths, use #16 two-conductor cable. If the unit is connected to a Williamson-type amplifier, capacity between long leads may induce oscillation, resulting in instability and distortion. The remedy is to separate the two wires by an inch or so, or to use television twin-lead.

A high-quality amplifier with damping factor of 10 or more should be employed. If the amplifier has a variable damping factor, it should be set at maximum, although no qualitative difference will be observed past a setting of 10.

testing

If the unit has been wired according to the instructions provided, it is ready for operation. If an audio oscillator is available, the following confirming check may be performed:

Feed the test oscillator into an unequalized, high-impedance amplifier input. Do not use a magnetic preamp connection. With the signal at a comfortable level, select the frequency of 200 cps. If the 828HF drivers are properly connected and in phase with the 18WK VLF driver, the level will just barely diminish at this frequency (down 3 db) as the MID-BASS control is turned counter-clockwise. If they are not connected in phase, the level will *increase* appreciably.

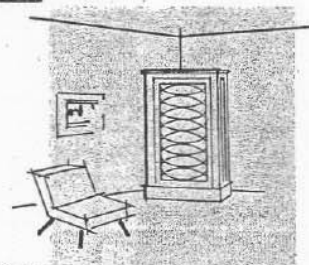
Select 600 cps as the next point on the oscillator and repeat this test for proper connection of the T25A-6HD assembly. The same effect will be observed as in the previous test, and show proper phasing of the T25A to the 828HF drivers as the *PRESENCE* control is raised or lowered.

Because of the short wavelength of sounds radiated, phasing is of little importance for the T35 driver.

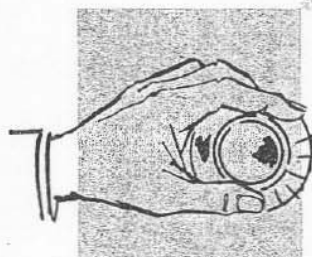
If the sound radiated by the driver in question does not decrease as its attenuator is turned down, a reversal of connections will bring the unit into phase.

OPERATING INSTRUCTIONS

PLACEMENT—The 103C-115 assembly will function in an optimum manner only when operated in a corner. Closely situated chairs and objects affect the operation of the bass section only if their size is very large, so that they form an appreciable portion of the wavelength of the low-frequency tones being emitted. For instance, the wavelength of a 30 cps tone is 111 inches, and an object 3 or 4 feet square must be actually blocking the side ports to affect radiation at this frequency. If furniture is kept 2 or 3 feet away from the sides of the unit, perfect radiation of all tones will be insured. An open window or door, several feet away, will cause little degradation of response.



placement



controls



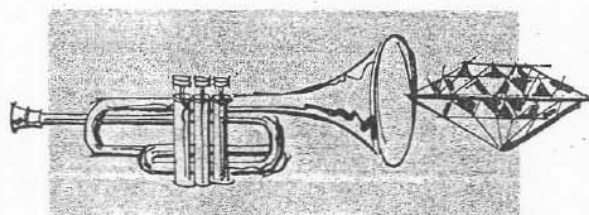
mid-bass



presence

SETTING THE CONTROLS—The three level controls allow complete balancing to any acoustical environment. The controls are continuously variable, insuring optimum adjustment to all tastes. While playing a comprehensive orchestral selection, set the MID-BASS control to maximum, and the PRESENCE and BRILLIANCE to $\frac{1}{2}$ rotation. This will be a pleasing setting for a large living room with hard walls and few drapes and rugs. If the room is average in size (about 14 by 20 feet), advance the PRESENCE control to about $\frac{3}{4}$ rotation. This will require a readjustment of the BRILLIANCE control for good musical balance, so advance this control slightly while listening to various passages in the music. If the source material is clean and wide range, the point of balance will be definite, the higher tones will suddenly fall into place, and there will be little doubt that the proper setting has been achieved. In heavily draped rooms the setting may be as high as 9 or 0, but only in extreme cases.

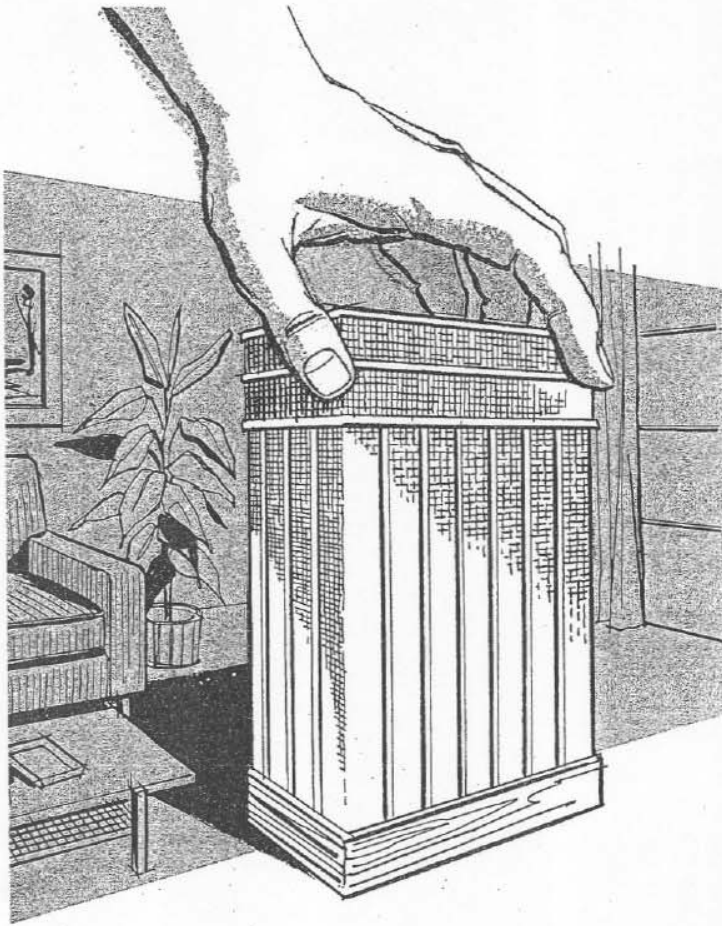
Ordinarily, the MID-BASS control is operated fully clockwise, at a setting of 0. But over long periods of listening, engineers and others engaged in recording and music monitoring, have found that a decrease in the energy in this part of the spectrum vastly lessens listener fatigue. The user should set this control to conform to his own listening habits, but probably never lower than a setting of 5.



brilliance

Once set, the controls need never be touched except for an unusual record with poor musical balance, or a badly worn record which requires lowering of the BRILLIANCE setting to subdue scratch.

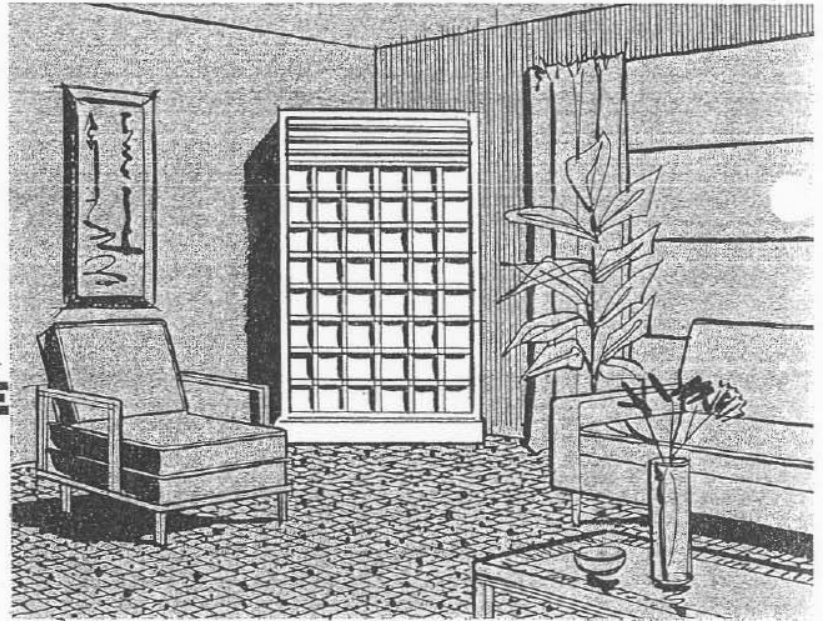




To you and me, the Patrician enclosure is beautiful, a work of art, a means to an end. But to friends, neighbors and even members of the family the reaction may be 'Now that you have it waddaya gonna do with it?' That is highly unimaginative thinking, but alas, very close at hand.

As it stands, the enclosure has all the radiant appeal of a piano crate, but dressed up, it can surpass the piano for elegance. Ideas for cabinets are yours, all yours, because if they were not, you would have made selection Four. Because they are all your ideas, and confidential brain children at that, we will not trespass. If, on the other hand, the Patrician is to be blended into the landscape here are a few suggestions.

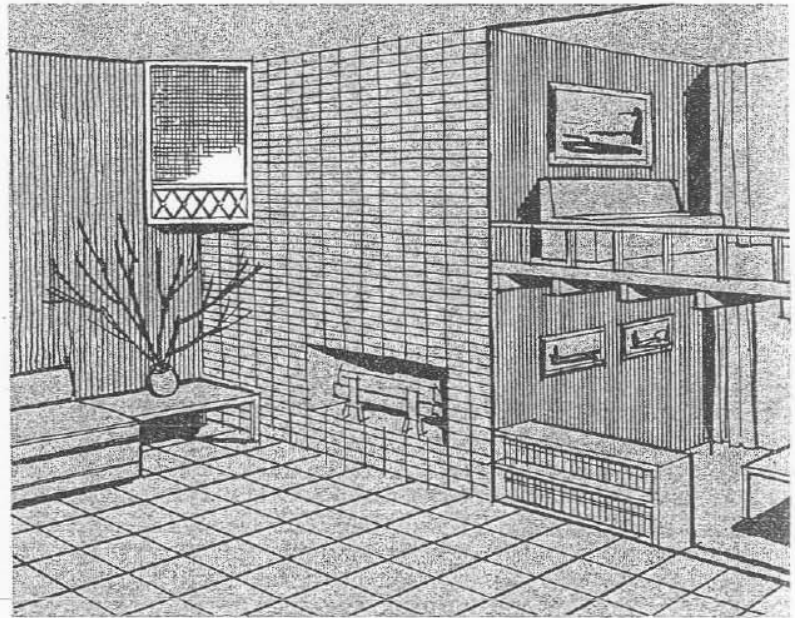
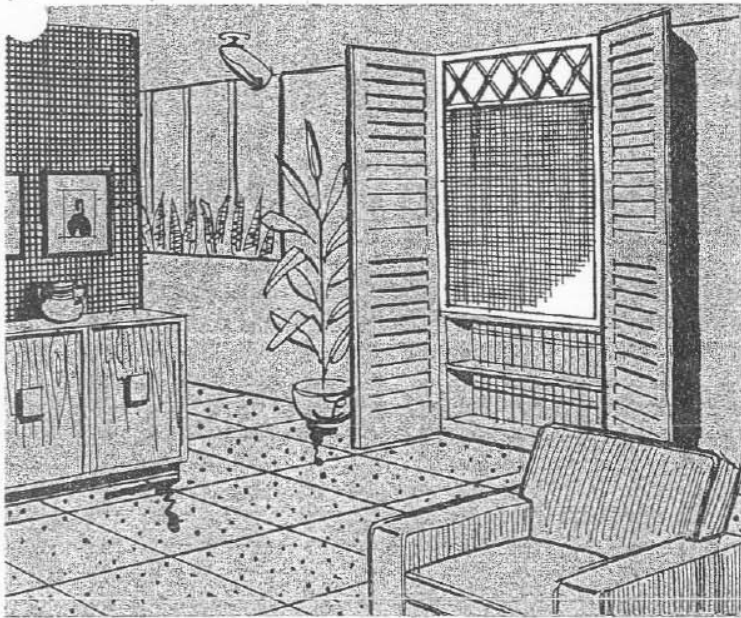
FITTING THE PATRICIAN IV INTO THE PICTURE



CORNER PLACEMENT

In the good old days when men carried rifles, axes and blanket packs as items of wearing apparel, the corner was the logical place to dispose of such garments when entering a room. To discourage this practice, the good wife made certain each and every corner was well graced with a cupboard, what-not or at least a spinning wheel, so the idea grew and hung on. Today people instinctively expect to find the room corners occupied, and nobody questions the presence of a built-in Patrician. If it blends into the scheme of things it can be modern, colonial, Georgian, Gothic or Grand Rapids. The only point being that it must look as if it belonged there.





EXIT BLOCK

Up till recently it was customary to build houses with three or more entrances into each room, including the bath. Modern taste frowns upon such a traffic pattern and road blocks in the form of partitions became popular. A Patrician can be built into one of these otherwise non-useful barriers. The front side couples into the hi-fi room, the back becomes a storage wall with most of the space already spoken for. If you have an abundance of closets the same idea applies. Additional horn area can be obtained by mounting swinging doors which open into horn extensions, and are folded flat on silent night. The efficiency of the Patrician is so high anyway, you will lose only the effect of the lowest of the deeper notes by abridging the room section entirely.

BALCONY SCENE

This is not practical in low ceilinged living rooms, but for clubs, restaurants, auditoriums and the larger houses where there is plenty of overhead area going to waste, the Patrician enclosure can be mounted UPSIDE DOWN in the corner *and at the ceiling* so the 200 cycle horn comes at ear level. This leaves the floor area free and actually gives better tone quality because wall area near the ceiling is usually unoccupied.

BOILER ROOM COUPLING

Many of the newer homes do not have room in the parlor for a Patrician so the sound can be 'piped' in from below. The use of gas and oil for fuel has liberated the old coal bin and today basements are the roomiest areas in the house. The two units are separated, and the bass horn laid on its side in the basement, or hung close under the parlor floor, depending upon home construction and dampness. Only one side of the horn is coupled, but by doubling the trumpet area it can be fed through into the 'window seat' with ample volume and excellent quality. The 200 cycle horn is built into the window seat.

SECOND STORY MANIPULATING

The same deal applies to basementless homes which have sealed off attics or unfinished upstairs rooms. Here the bass horn feeds down through a grill at the edge of the ceiling. There is no bottom to a deal like this as the entire house can be brought into the act or even designed around the bass horn.

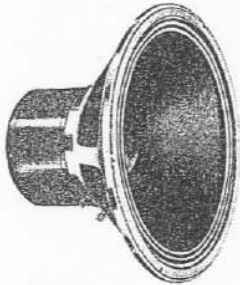
All of which boils down to what was said at the beginning of the book. When you build a Patrician, you start something. When it is all dressed up and looking pretty it becomes a cherished item in the household. An evening of listening to their favorite music will overcome the resistance of friends and family, and they will thank you for bringing them the means to so much enjoyment. Now—through the years to come—just sit back and LISTEN!



FOR THE

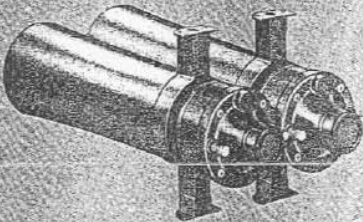
DRIVER COMPONENTS

PATRICIAN IV HIGH-FIDELITY ENCLOSURE



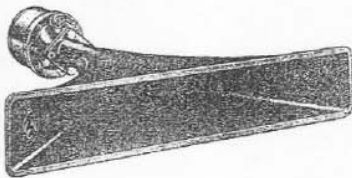
MODEL 18WK
LF DRIVER

LOW-BASS SECTION Employing the Klipsch principle of folder corner-horn loading, the new Patrician IV utilizes an 18-in. low-frequency driver, Model 18WK, housed in a "K" type reproducer scaled up 16 2/3 percent. The taper rate has been extended to 35 cps. The first three octaves, to the first crossover point at 200 cps, are reproduced by a tremendous bass driving section . . . the largest, most highly developed ever designed for a home audio system. When the Patrician is placed in a corner, the folded throat of the bass horn becomes part of the entire room, allowing the large wave lengths of the second and the upper part of the first audible octave to be formed properly.



MODEL 828HF
DRIVERS WITH
A8419 HORNS

MID-BASS SECTION A separate horn employed as an indirect radiator with its two complementary Model 828HF driver units takes over for only the next 1 1/2-octave range to 600 cps. Because no metal horn presently developed satisfactorily reproduces down to 200 cps, the horn load for the intermediate bass drivers is fabricated of wood and phenolic tubes. These are a part of the overall interior assembly.



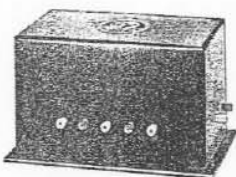
MODEL T25A
HF DRIVER
WITH MODEL
6HD HORN

TREBLE SECTION From 600 to 3,500 cps or the next 2 1/2 octaves, the Electro-Voice Model T25A treble driver exhausts into a 600-cycle Model 6HD diffraction horn. This diffraction horn is the latest design and employs the principles of optical diffraction to disperse high frequencies uniformly, without the losses typical of cellular and lens type horns. Thus, the important "presence" range is assured of complete and proper transmission by this specialized driving unit. Other frequencies, not a part of this range, are completely excluded.



MODEL T35
VHF DRIVER

VERY-HIGH SECTION The range above 3,500 cps, extending beyond the range of hearing, is reproduced by the Model T35 Super-Sonax very-high-frequency driver. This driver, a recent Electro-Voice development, utilizes an integral diffraction horn. Through the Model T35, the remaining octaves of the upper audible register are completely accomplished with practically no measurable distortion.



MODEL X2635
CROSSOVER

CROSSOVER NETWORK To allocate the various portions of the spectral energy to the respective driver units, the Model X2635 crossover network divides the amplifier power into four separate portions, and eliminates upper harmonic and intermodulation distortion from one driver in the region covered by the next.

Electro-Voice

ELECTRO-VOICE, INC.
BUCHANAN, MICHIGAN

MODEL HOME CONSTRUCTION PART IV

