

Insight:JBL

Imagine the sound of a superb loudspeaker system—one whose impact and excitement create the best music you've ever heard.

Have you ever given any thought to how that loudspeaker produces that sound? Many manufacturers will tell you that great sound is achieved by the proper application of a favorite acoustic approach such as "omni-directional," "acoustic suspension," or "ducted port." But, in the final analysis, regardless of acoustic principles (or any other kind of magic), great sound will only be achieved with loudspeakers of quality—designed, manufactured, and assembled like precision instruments to capture everything a fine recording

5. At JBL, we build every loudspeaker this way. Always have.

Today, JBL loudspeakers are the overwhelming choice of knowledgeable and discriminating listeners. The

most critical listeners in the world are professional musicians and recording engineers—and they use JBL's more than all other makes combined.

Studios like Warner Bros., Capitol, MGM, Columbia, Elektra, ABC-Dunhill, Motown, London/Decca, Angel and EMI rely on JBL monitor loudspeakers to mix down, master and record the music you listen to at home. And four out of five major rock concerts feature huge JBL systems that deliver a group's best sound to the audience.

Why such overwhelming professional preference for JBL? It could be our high efficiency. It could be our precision design and craftsmanship or dynamic range and transient response.

It could even be our unmatched product warranty. All are strong considerations, but the professionals

use JBL for a reason vitally important to their art and livelihood.

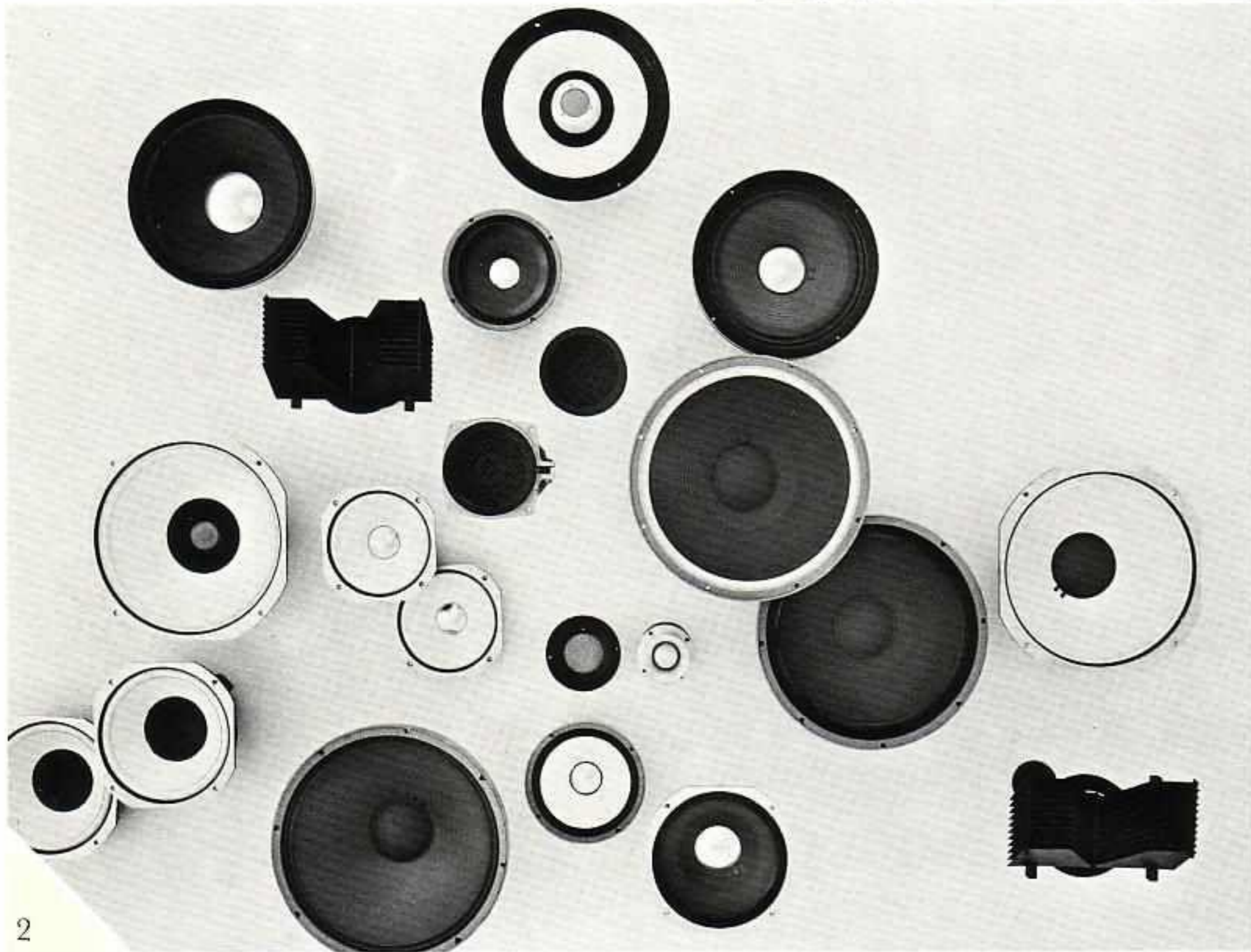
Professionals choose JBL for its distinctive sound. In this brochure you'll see many unique processes we perform to combine the special characteristics that result in that sound.



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In any well-stocked dealer's showroom, you will find yourself confronted with a wide variety of loudspeaker systems, ranging in price from \$50 to \$1500. How do you distinguish between them? What should you know about loudspeakers to help you make the proper choice for your particular listening needs?



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Let's assume for a moment that you don't have any strong feelings about the enclosure, as long as it satisfies the essential requirements of acoustic construction. You still want to know what goes on behind the grille cloth. You want to know how much of the price is for performance and how much for magic. JBL wants you to know. Because the best loudspeakers make the best sound. And we build the best.

The majority of high fidelity manufacturers buy their loudspeaker components from mass producers who make speakers to be used in everything from table radios to television sets. Not JBL.

We manufacture our own loudspeakers. More than 30 different component models, each carefully designed with a specific performance and function in mind.



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Competitor

JBL



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3.

Here's a look behind the grille of JBL's L26 Decade and a widely advertised competitor in the same price range. Our craftsmanship and attention to detail are obvious.

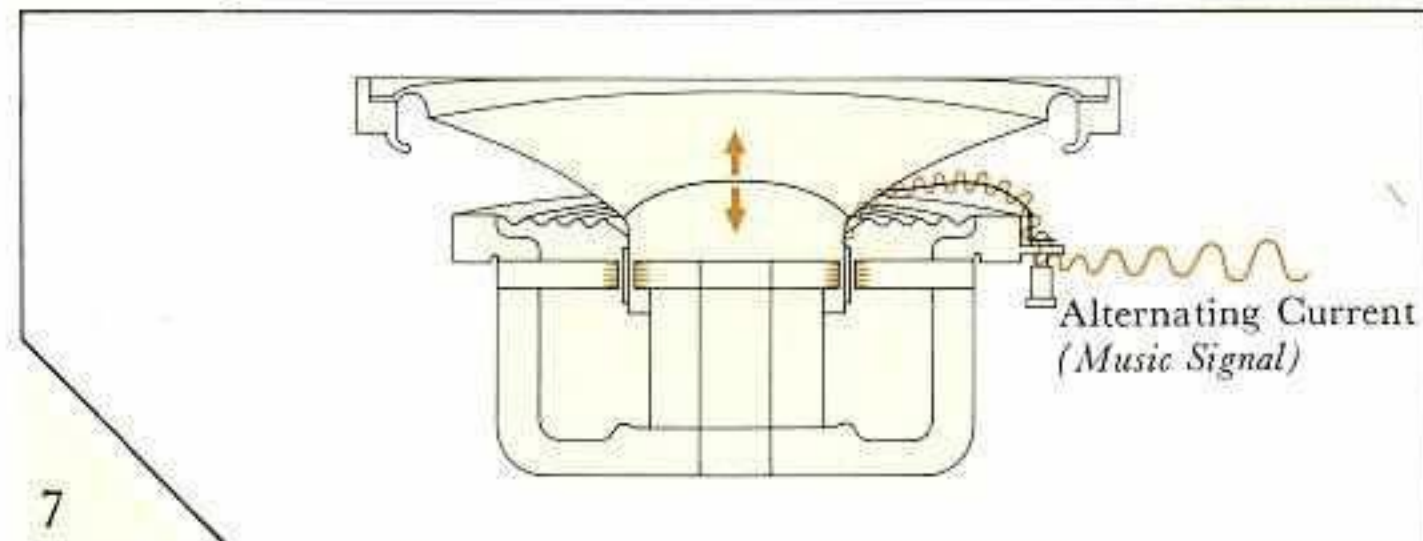
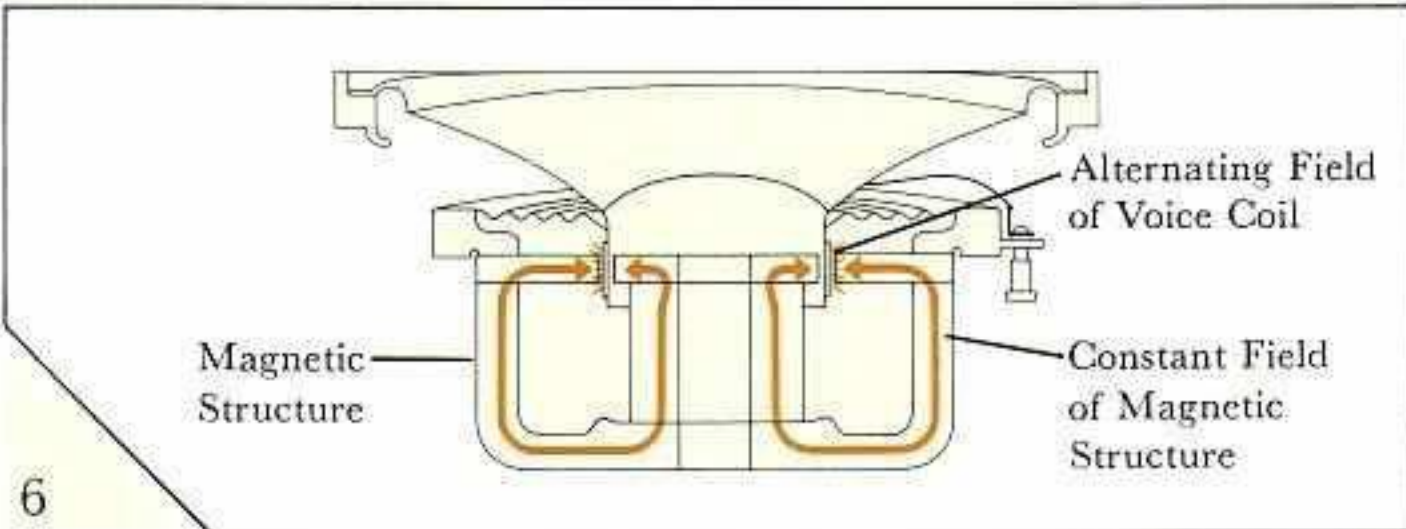
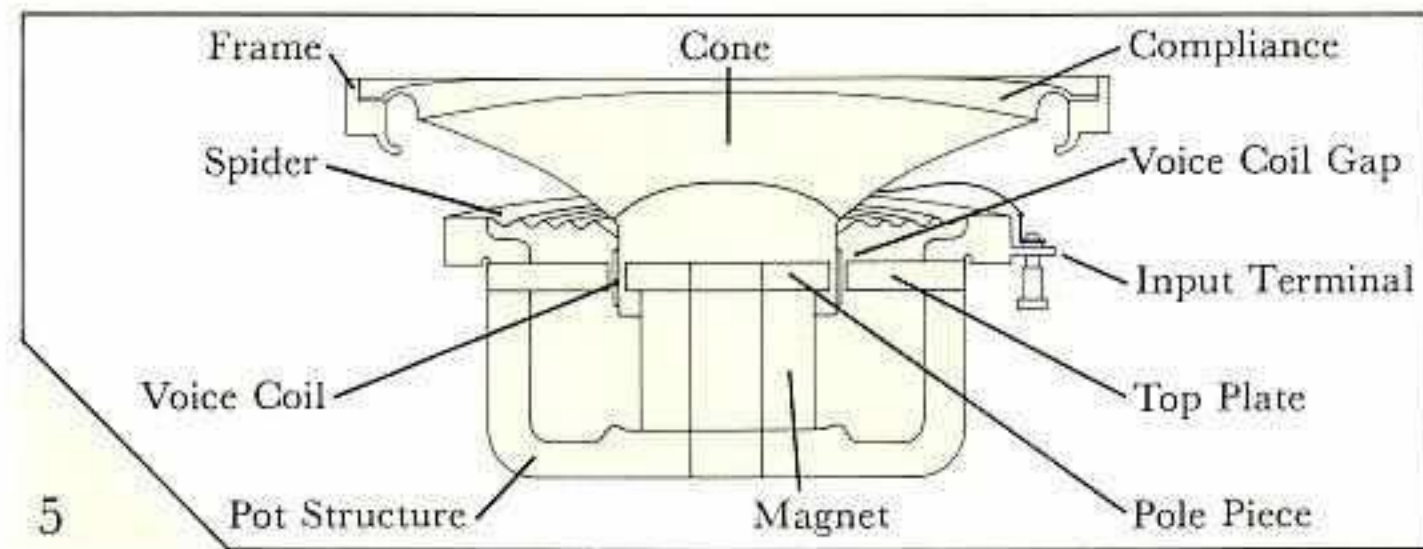
4.

But JBL is more than a pretty face. Let's look inside.

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Notice the JBL's heavy die cast frame and sealed magnetic structure. Aside from their rugged appearance, such differences bear an important relationship to loudspeaker performance. If they didn't, we'd eliminate them.

The advantages of construction details, such as cast frames become clear once you have an understanding of how a loudspeaker functions. This cutaway shows its basic parts.



A voice coil's changing field causes it to move back and forth relative to the constant field of the magnetic structure, resulting in sound.

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In a magnet structure, there is a constant flow of energy concentrated in the magnetic gap, indicated by arrows. Within this tiny gap lies the voice coil assembly which is attached to the cone and spider.

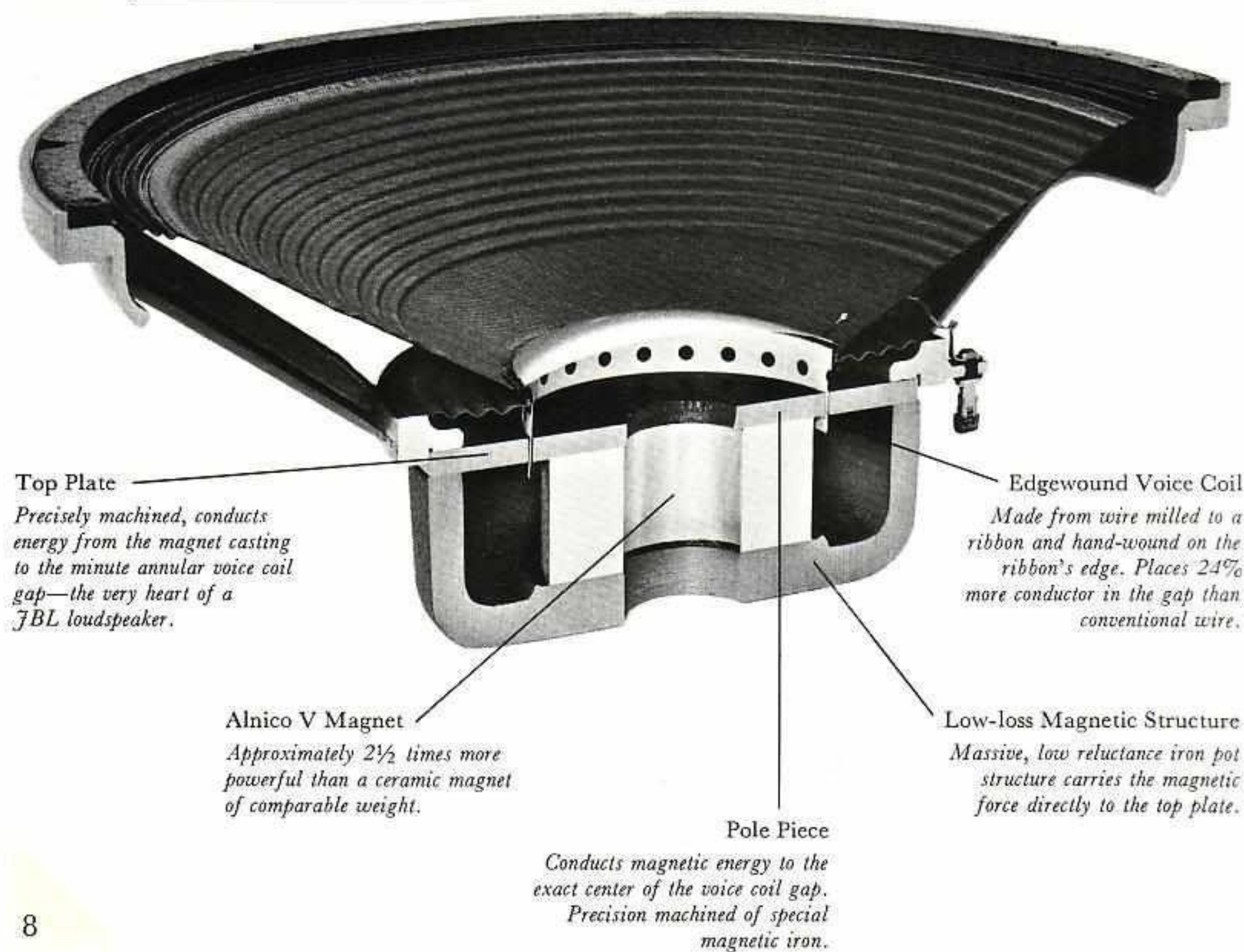
7.

Your amplifier or receiver sends music in the form of an alternating current to the voice coil, surrounding it with a temporary magnetic field of its own. Because an alternating current changes the polarity of this temporary magnetic field, it moves the voice coil back and forth in relation to the constant field in the magnet structure. This moves the cone too, which excites the air in front of it, resulting in sound.

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A deceptively simple process. Yet 99% of all loudspeakers function this way, whether they're called acoustic suspension, omnidirectional, ducted port or countless similar variations. So, regardless of acoustic principle, sound quality is a direct result of a loudspeaker's ability to convert the music signal from your amplifier into mechanical motion.

Because mechanical motion occurs when a voice coil's field interacts with the magnetic structure's field, these areas of a loudspeaker are vitally important to sound quality. The slightest compromise can easily hinder performance.



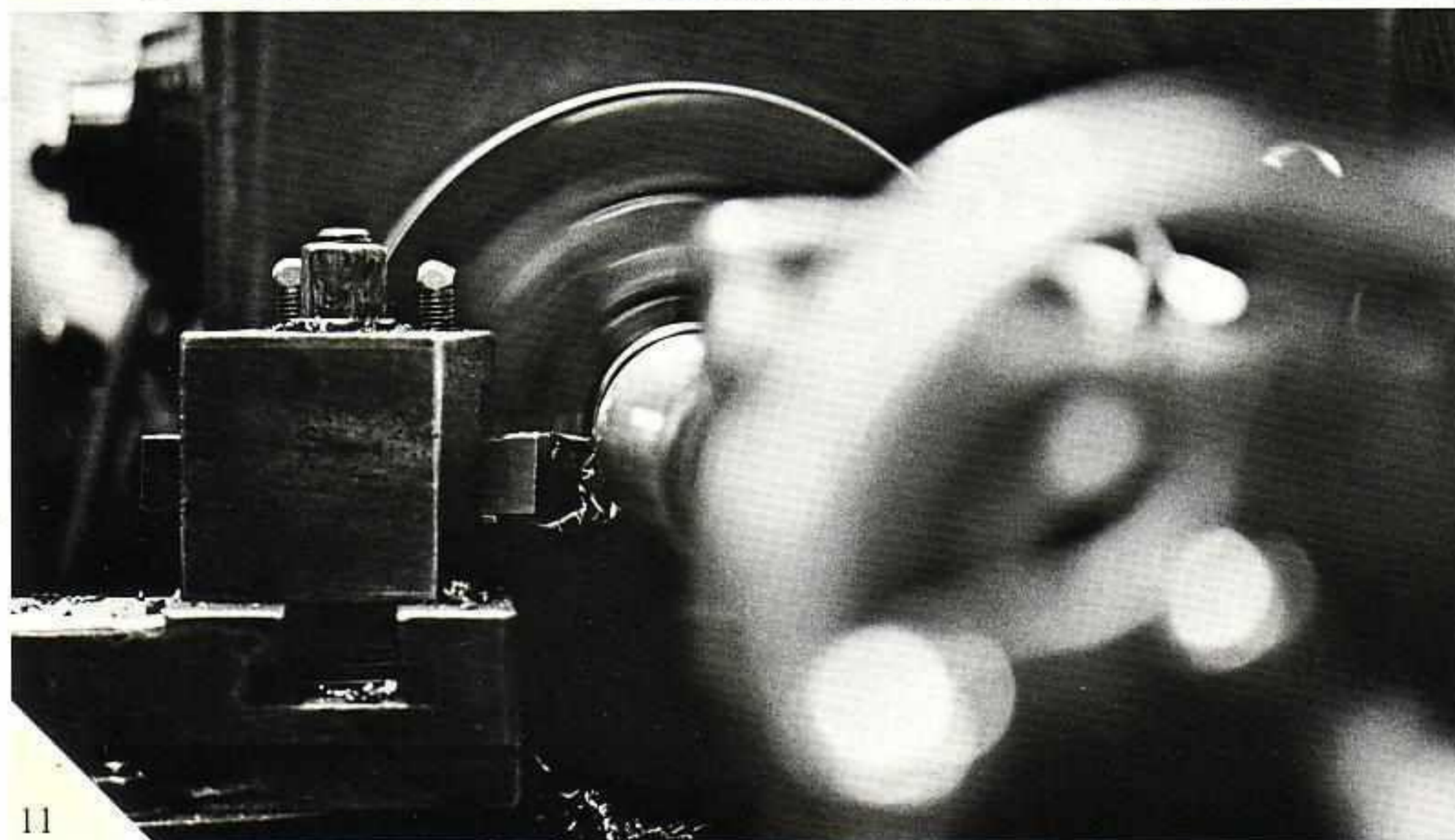
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The magnetic structure must be powerful and capable of concentrating all its energy in the magnetic gap. In almost every instance we use large Alnico V magnets (2½ times stronger per pound than conventionally used ceramic types). The Alnico magnets are housed in massive iron pot structures which direct all energy to the magnet gap. Precision machining of mating parts (top plate, pole piece, magnet, pot structure) avoids additional energy losses so common in mass produced loudspeakers. A JBL magnetic structure yields an intense field to interact with the voice coil, providing unmatched efficiency, dynamic range and transient response.

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Here are several important processes we perform to optimize magnetic strength:

The surface of our magnets is finished to tolerances within 32 millionths of an inch.

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JBL pot structures begin as rough castings and are machined within two thousandths of an inch on parallel surfaces.

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Machining the pole piece and top plate is an extremely critical operation. By using special tooling, roundness is held within five ten-thousandths of an inch.

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The top plate and pole piece are concentrically mounted on the pot structure and magnet, forming the smallest possible voice coil gap. Optimum concentricity is maintained within two thousandths of an inch.

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The mass produced loudspeaker uses a backplate-pole piece combination with a high-loss open magnetic field.

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Valuable magnetic strength, needed in the voice coil gap, is dissipated all around the loudspeaker as shown by this screwdriver attached to its magnetic structure. When you relate this to sound quality, you become aware that more than just magnetic strength has been sacrificed. Under the same conditions, JBL's magnetic structure completely ignores the screwdriver.

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Equally important to a powerful magnetic structure is the voice coil. When it receives a signal from an amplifier, it must move with verbatim accuracy. To accomplish this, a voice coil's "field" must also be very strong to interact perfectly with the constant field of a magnetic structure.

Very intense fields are achieved by using large diameter voice coils and placing as much voice coil wire in the magnetic gap as possible. Most manufacturers wind round wire by machine to form their small voice coils; JBL voice coils are always tightly wound by hand.

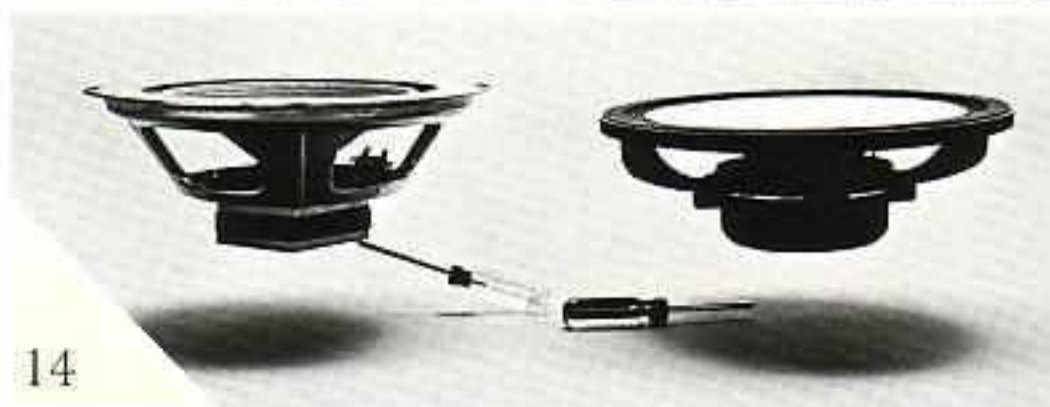
In most cases we actually form wire to a thin ribbon, which is then wound on its narrow edge. Compared to standard coils, this places 24% more wire in the magnetic gap.

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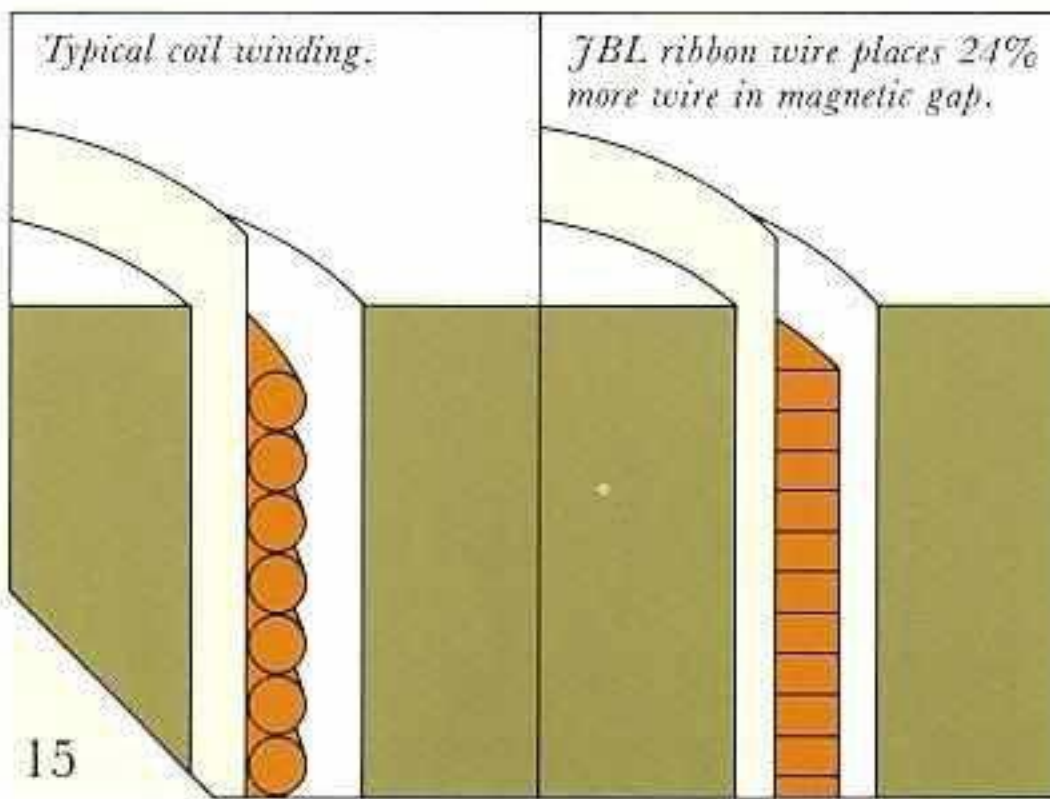
JBL voice coils are also unusually large; many up to 4-inches in diameter. By immersing edgewound ribbon wire voice coils into a powerful magnetic field, we achieve an assembly that responds accurately to music signals from your amplifier. Because the voice coil and cone work together as a single unit, a loudspeaker's cone must be an optimum combination of stiffness, density and weight to balance with magnetic strength.



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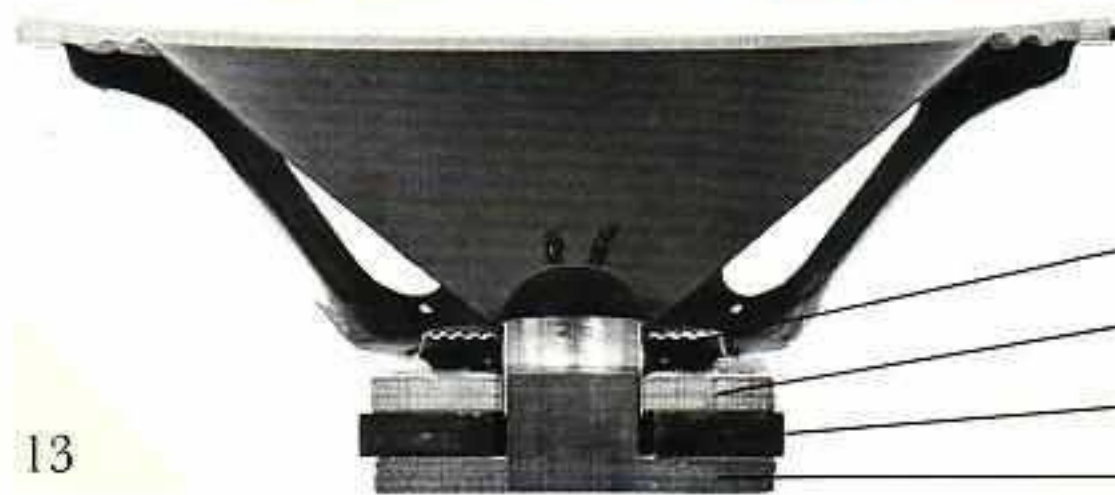
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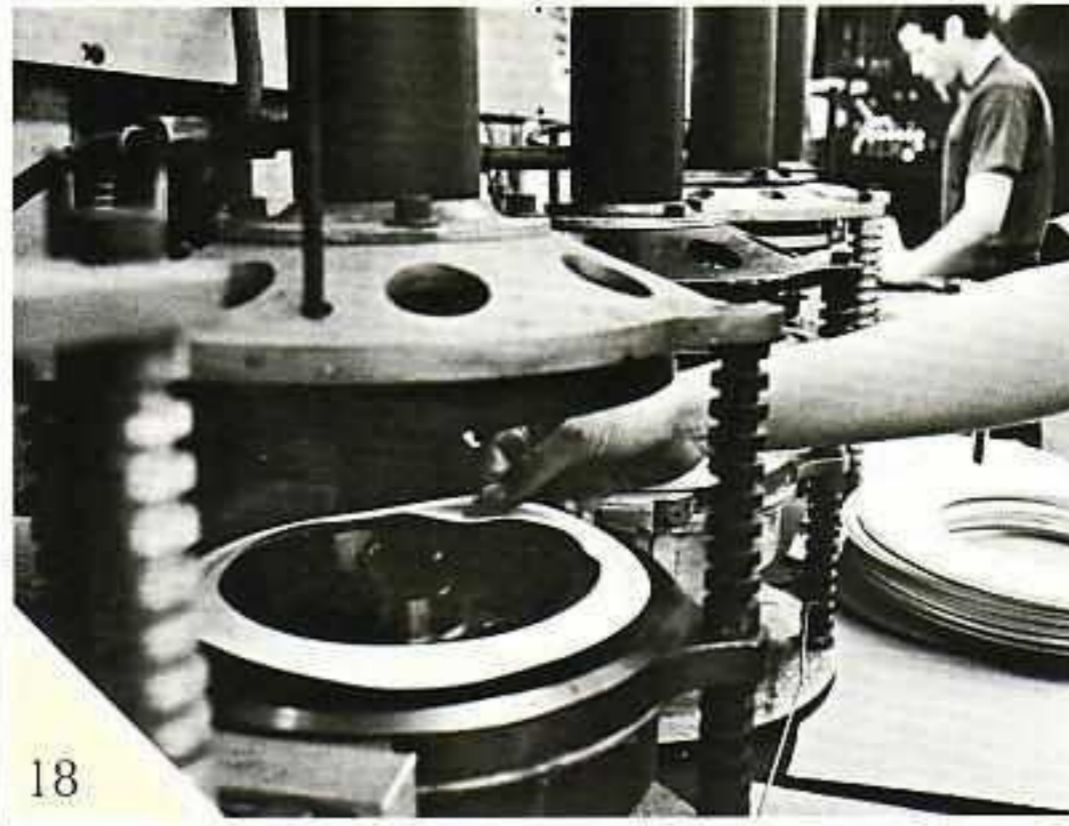
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Typical mass produced loudspeaker loses vital magnetic strength in the form of stray fields surrounding its magnetic structure.

- Round Wire Voice Coil
- Stamped Top Plate
- Conventional Ceramic Magnet
- High Loss Magnetic Structure



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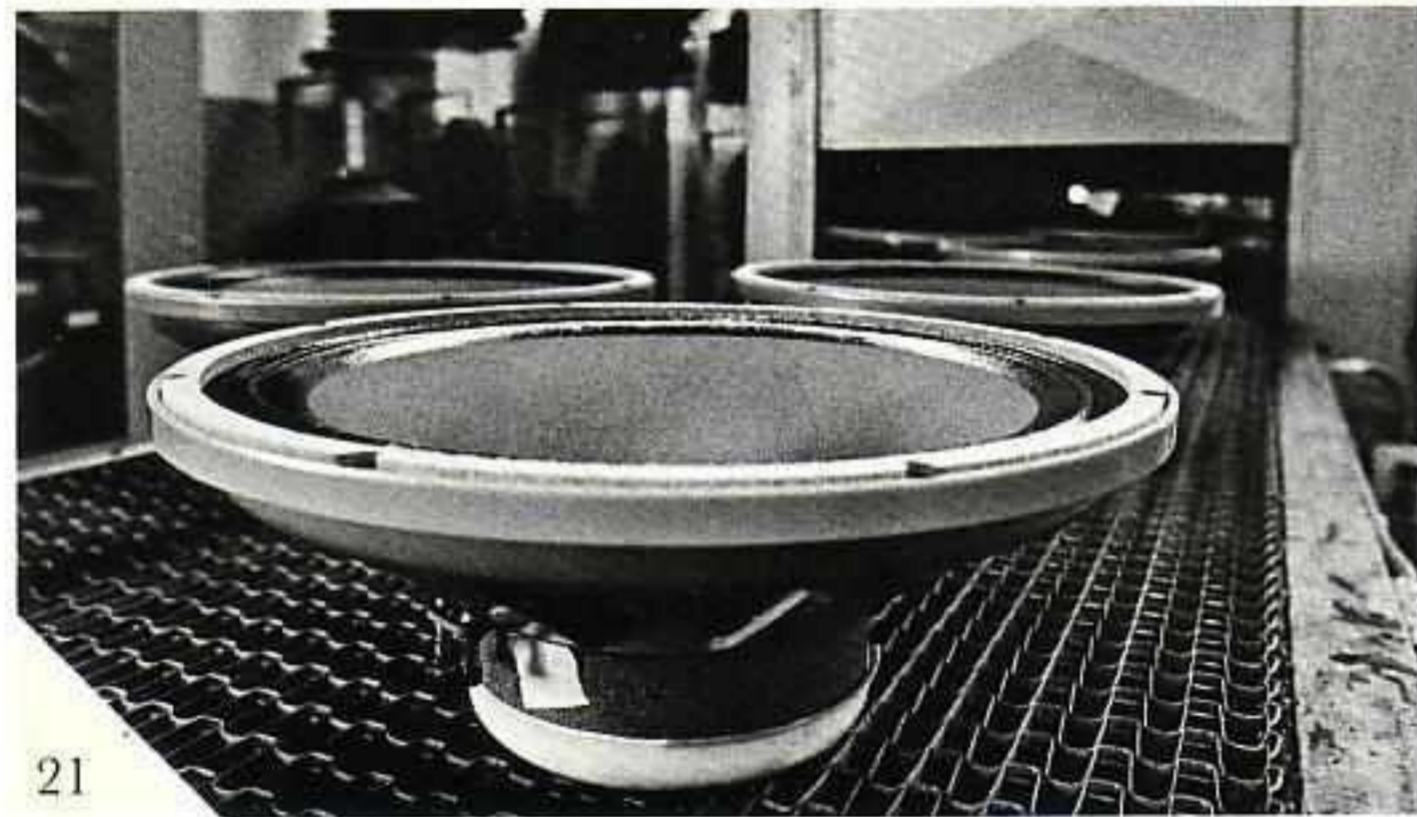


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Stamped Frame



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JBL cones are designed to provide the exact performance characteristics determined by our transducer engineers. They are made in many shapes and sizes from a complex blend of paper and fiber.

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A loudspeaker's compliance and spider must suspend the cone/voice coil assembly and allow it to travel back and forth smoothly and linearly. Compliances which are not engineered for specific application may actually alter cone movement which can affect sound quality. For critical applications, we form our own compliances using special machines developed at JBL.

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These machines mold the material into an exact contour which allows the cone to undergo long, linear excursions.

The cone, voice coil and spider are assembled on fixtures that assure precise positioning. Each part is bonded together with special adhesives, then heat cured for optimum reliability.

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The cone, voice coil, compliance and spider are centered by the loudspeaker frame. Every JBL loudspeaker uses a heavy die cast frame, not stamped sheet metal types that can warp, causing misalignment of the voice coil in the magnetic gap.

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After a final check of voice coil roundness and magnetic gap concentricity, the cones are installed in the frame, adhesives are applied to

mating surfaces and the speakers move through a conveyerized oven for curing. Time and temperature are electronically monitored to give each loudspeaker uniform performance and reliability.

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After curing, every loudspeaker is checked for possible voice coil misalignment by feeding to it a high power low frequency signal. The cone undergoes excursions that would rarely be encountered in actual use, even under the most intense listening conditions.



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After frequency response curves have been run, those units which pass inspection receive an identification tag and serial number.



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Those that do not meet JBL's stringent standards are rejected and sent back to production.

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Those that pass will find themselves in a recording studio or someone's living room. Or any application where only the best will do.



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If another manufacturer attempted to build the kind of loudspeakers we do, he would have to start from scratch, as we did over 30 years ago. The loudspeakers made by JBL today require equipment and tools so specialized, that they are designed and built in our own facilities.

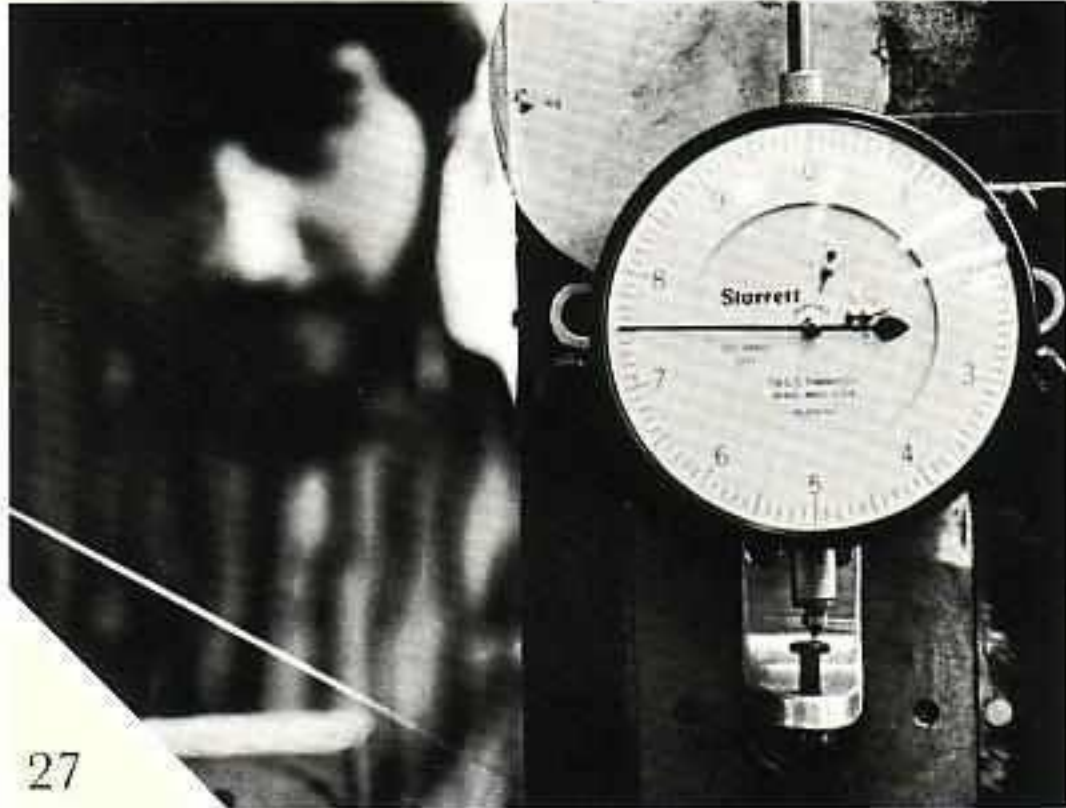
For example, we needed an extremely high power machine to completely saturate magnetic assemblies with energy. None existed. JBL engineers designed and built this one.

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To form ribbon wire, we created a milling device that holds tolerances of 1/10,000 of an inch.

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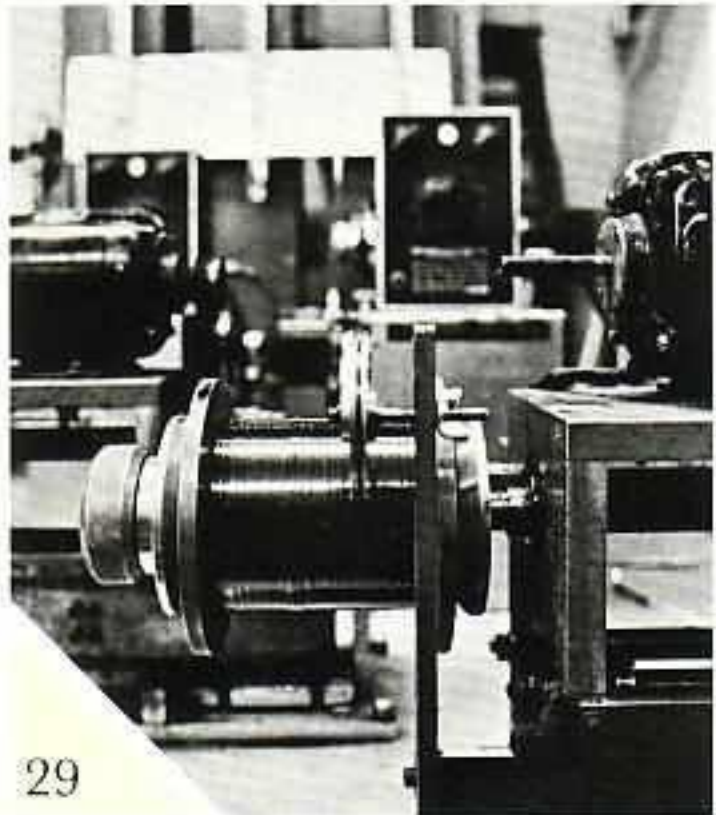
To fit precisely into our tiny magnetic gap, voice coils are expanded for perfect roundness on this tooling.



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Insulation is applied to ribbon wire on this complex apparatus.

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Diaphragms for compression drivers and aluminum center domes are pneumatically formed on these highly polished dies.

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Now for JBL cabinetry. It's the finest, uniquely styled and solidly constructed to last a lifetime. Only the very best compressed woods and hardwood veneers are used, hand-rubbed to a rich, lustrous finish.

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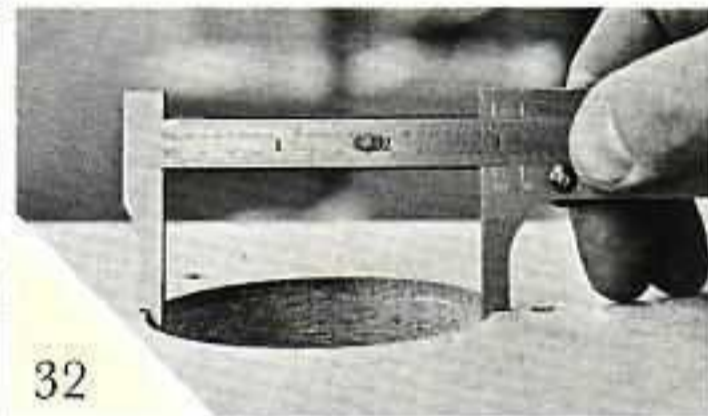
Cabinet tolerances are typically held to 1/64 of an inch.



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and feature hand-fitted, lock-mitered joints.

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Each cabinet is electronically wood welded, to force glue into the wood's pores, assuring rigid, air-tight construction.



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Every phase of assembly and finishing is done by hand. Each cabinet receives the personal attention fine furniture deserves.

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For oiled walnut finishes, we use a special formula of oil and wax to create the characteristic luster seen on JBL cabinets and enclosures. Two coats are applied and after penetrating the wood grain, each surface is painstakingly burnished to reveal grain structure and detail.



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JBL could easily get 90 percent of the performance at reduced cost if we were willing to compromise: our powerful magnetic structures,

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our large edgewound voice coils,

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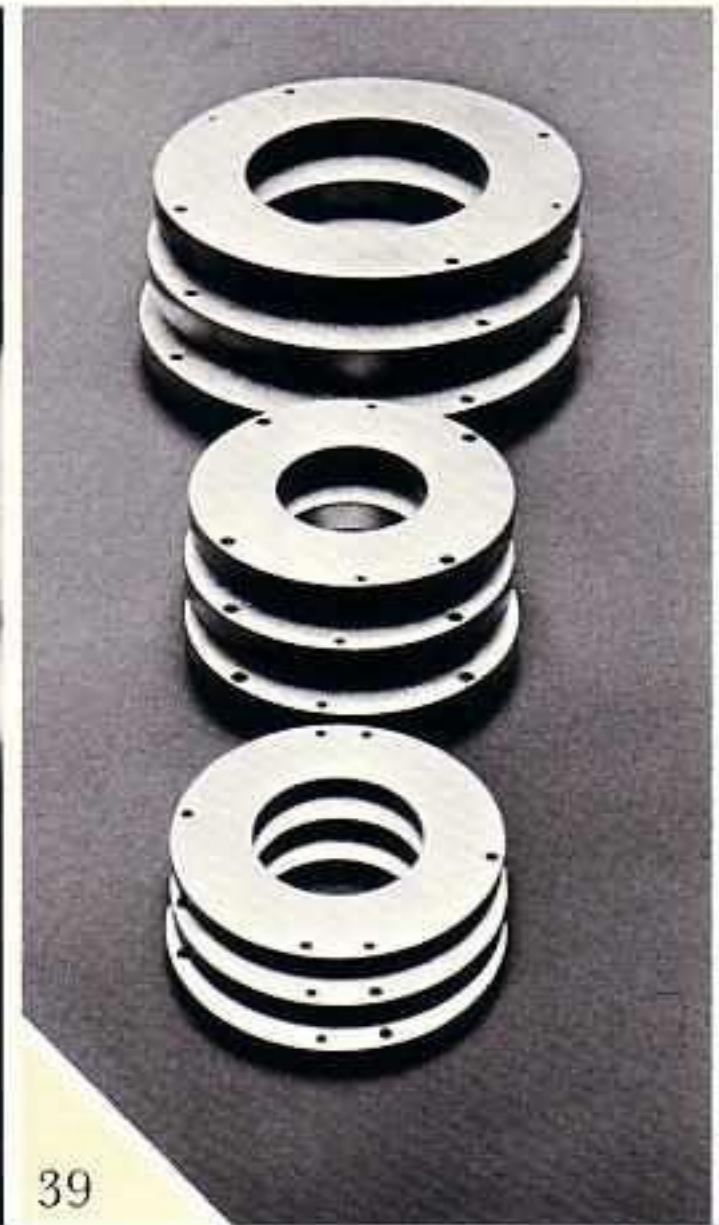
our critically machined components,



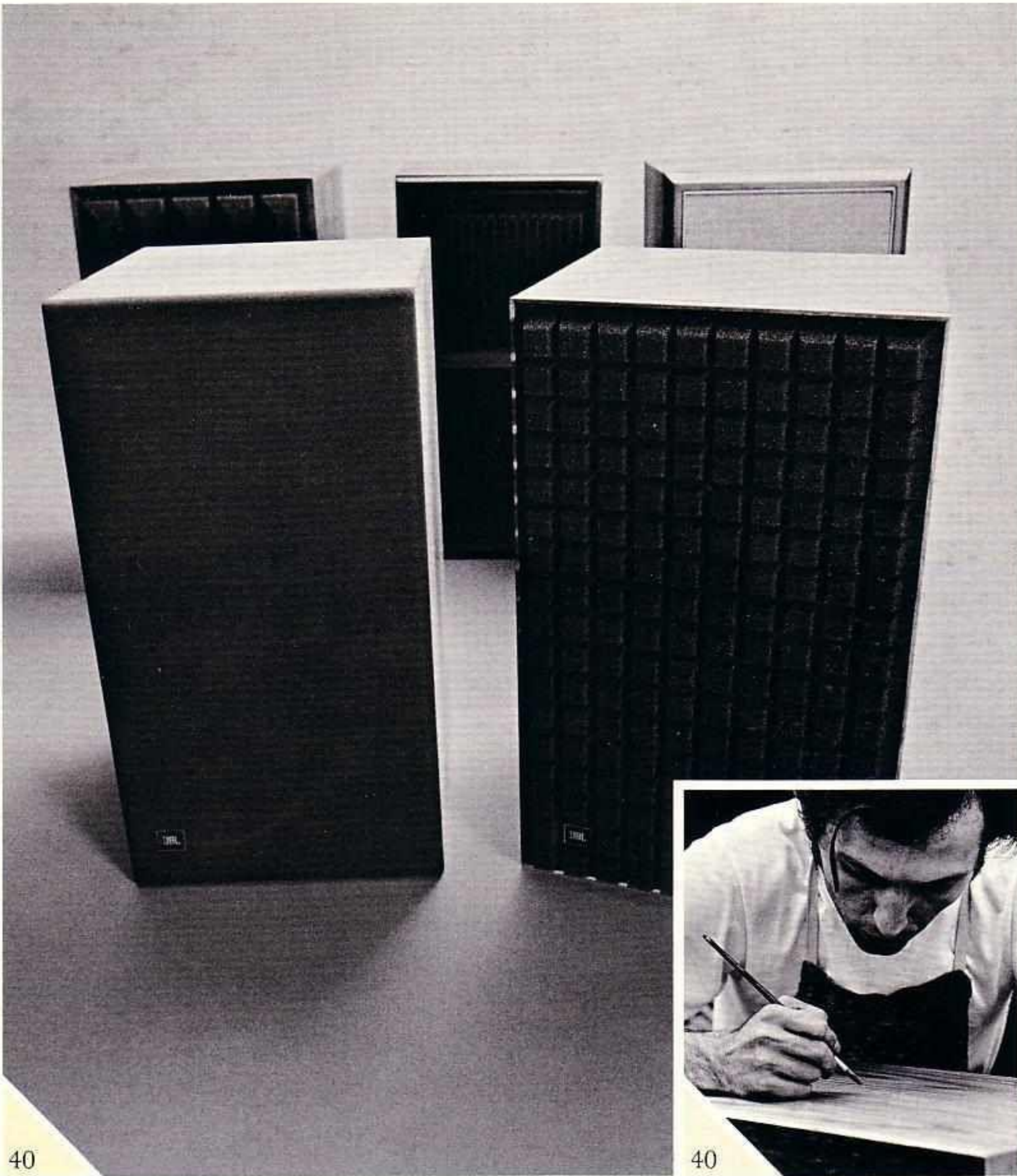
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and our attention to detail.

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Things that set JBL apart from the average loudspeaker manufacturer. Listen to a JBL loudspeaker. Find out what the best of everything can do.

