Innovations

This collection of my "innovations" contains descriptions of the following items:

- Guiro Drumsticks
- Floor Tom Sound Booster
- Lazy Susan turntable for drum maintenance and cymbal cleaning
- Tennis ball drum riser for quiet practice

Guiro Drumsticks

In 2013 I came up with the idea of creating a "guiro" drumstick, allowing the player to drag the stick across an edge thereby creating a scraping sound similar to the Guiro.

I contacted my friend Bert E. who is a woodwork instructor in Richmond, Virginia and met him at his wood workshop in early September 2013. Having brought along two pairs of drumsticks of different sizes I watched as Bert machined them into the required shape (see photos below).

Notes for Construction:

- **Selecting the Wood:** Choose a dense hardwood, such as hickory, maple, or oak, for the drumsticks to ensure durability while also maintaining flexibility. Hickory is often preferred for drumsticks due to its balanced weight and shock absorption properties.

- **Initial Shaping:** Start by cutting your drumsticks to a standard length (around 16 inches). Use a lathe to round and smooth the stick to the desired diameter. For the "scraping surface," a slight taper can be introduced along one side, leaving a more pronounced edge.

- **Precision Cutting:** Pay attention to the symmetry of the stick. An uneven taper or inconsistent diameter will not only affect the playability but also compromise the aesthetic appeal of the final product.

Once completed, the sticks were treated in two ways: applying a "hardening oil" along the entire stick for protection and adding a rubberized end with liquid rubber paint. This created a rubber knob, similar to a xylophone mallet, giving the player a third sound option with these sticks (regular wood tip, scraping surface along the stick, rubberized end).

Instructions for Oil Treatment:

- **Preparation:** Before applying any oil, ensure the sticks are clean. Sand them down with fine-grit sandpaper (320-grit or higher) to smooth any imperfections. Wipe down with a damp cloth to remove any dust, allowing the sticks to dry completely.

- **Applying the Oil:**
    - Use a lint-free cloth to apply the oil, making sure to work it into the wood grain. Linseed oil, walnut oil, or a blend like Danish oil works well for this purpose.
    - Do not pour directly onto the sticks; instead, apply a small amount to the cloth and rub it in circular motions.
    - Ensure even coverage, focusing on any exposed end grain.
    - For a smoother finish, consider applying a heat source (hairdryer or heat gun on low) to slightly warm the oil as you apply it—this will help it penetrate deeper.

- **Curing:** After applying, let the sticks sit for 24 hours in a dry space. If using a thicker application, it may take a few days to fully cure. Remember to check for any excess oil pooling; wipe it off to avoid uneven curing.

Rubberized End for Extra Sound Option:

- **Rubber Coating:** For the rubberized end, you can use liquid rubber paint, which will create a cushioned knob at the end of each stick, similar to a mallet.
    - Apply the liquid rubber carefully, ensuring an even coat. Use a brush to prevent drips and to smooth the application.
    - Once dry, inspect for any rough patches and sand them gently to ensure a smooth finish.
    - If desired, you can add a second layer for added durability and sound isolation.

- **Test the Sound:** After the rubberized end is fully cured, try tapping the sticks on a surface. The rubber should dampen the sound while adding a distinct, soft tonal element when used.

Bert's suggestions for applying the hardening oil were as follows:

You should use hardening oil – one that cures. That would include linseed oil, Tung oil, walnut oil, teak oil, and other tree oils, or some combination of those oils with other chemicals to make them cure faster, such as Danish oil. Avoid furniture "oils" and polishes, cutting board oils (mineral oil), and most of those other furniture "treatments." If you have furniture oils around the house, see if the label mentions one of the hardening or curing oils I listed above. You need only a very small amount.

Wipe/wash generously with paint thinner and let that dry for a couple of days. A hair dryer will speed up the process and will also help the oil cure faster. After the oil soaks in but before it hardens, all excess oil must be removed by wiping thoroughly with an absorbent cloth or paper towel. Ideally, each coat should be allowed to dry completely, but that could take weeks in the humid air we've had recently. The compromise is to wait an extra-long time for the coats to cure if you apply several thin coats just days apart.

- **Oil Choices:** For durability and a rich, long-lasting finish, I recommend using **tung oil**. It penetrates deeply and forms a protective, waterproof layer. However, be mindful of applying too much. A thin, evenly applied coat is better than an excess.

- **Application Technique:** If using Danish oil, apply it generously with a soft cloth, let it soak for about 15 minutes, and then wipe off the excess. Multiple thin layers will create a better finish than one thick coat.

I have been using these sticks for 10 years now, the slightly thinner pair for lower dynamics and the thicker for louder playing situations. The sound best when dragged across a drum counter hoop but using them on cowbell edges is also an interesting sound experience.

- **Advice for Testing the Sound:** After finishing the sticks, test them on various drum surfaces, as you would in a real playing scenario. The scraping sound can vary greatly depending on the texture and the material of the drum edge, so try a few different types of drums to achieve the best scraping effect.

As an additional note, in case you're wondering about the white markings on the butt-end of two sticks, I often mark my sticks this way (I use white-out, a very useful product) to indicate sticks that are a little heavier. If I have a mismatched pair, I like to hold the heavier stick in my left hand, that's just my preference.

- **Master Carpenter’s Tip for Balancing Sticks:** To ensure even weight distribution, weigh the sticks on a small scale and match them as closely as possible. If you prefer one slightly heavier, mark it with a permanent marker or small strip of tape, just like you did with white-out. This way, your sticks will feel consistent when playing.

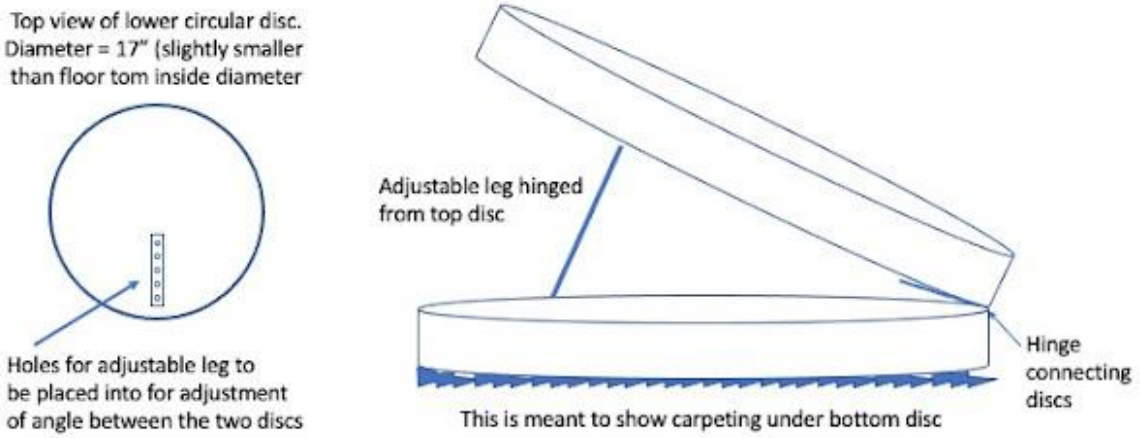
Floor Tom Sound Booster

Around 2015 I began toying with the idea of boosting the sound of my floor tom during live performances. The easiest way to do this was to place the lid of my floor tom case directly under the drum to provide a hard surface for the sound to bounce against. However, this would only reflect the bounced sound back upwards against the drum, whereas my wish was for the sound to be directed out and away, towards the listener/audience. The idea of creating an angled hard surface below the floor tom began to take shape.

In drawing initial designs (see below) for this type of angled surface I ended up with the following:

- Two wooden circular plywood sheets with diameter slightly smaller than the floor tom. In my case, this would be just under 18" but the same concept applies to other floor tom sizes.
- One of the wooden round sheets will be covered with a soft textile covering.
    - The reason for the slightly smaller diameter sizing and textile covering is that the sheets can be transported inside the floor tom case, lying on top of the drum head without scratching it.
- The two wooden sheets are connected with a hinge at the edge, allowing one sheet to lie flat on the ground and the other angled upwards.
- One of the sheets has an angled "leg" attached which allows the sheet to be held at an angle against the other. This "leg" is nesting in a crevice during transport, allowing the two sheets to lie flat against each other.
- When the sheet is raised, the "leg" can be positioned in different slots carved into the opposite sheet, thus making it possible to lock the upper sheet at different angles.
- The raised sheet is coated with varnish, allowing sound to reflect outwards as much as possible.

Floor-Tom sound booster



Master Carpenter's Review and Suggestions for Construction:
This is a clever approach to addressing the issue of sound reflection. The design concept of using two wooden sheets with an adjustable angle to direct sound outward is solid. Here's a more detailed breakdown of the design and a few suggestions that might improve the functionality, durability, and ease of use:

Materials Selection and Design Considerations:

- **Wood Type:** The design suggests the use of plywood for the two wooden sheets. Opting for **birch plywood** is recommended due to its durability and resonant qualities. Birch has a high-quality sound resonance compared to cheaper, softer plywood varieties, and it will ensure the sound reflections are cleaner and more effective.

- **Size and Fit:** The slight reduction in diameter (just under 18") to accommodate transportation inside the floor tom case is practical. However, make sure to keep the design just snug enough to avoid rattling or shifting during transportation. The smaller diameter allows easier portability, but if the fit is too tight, it could affect how the sound is reflected when the surface is angled.

Master Carpenter's Suggestions:

- When cutting the two circular wooden sheets, use a **router** or **jigsaw** with a fine-toothed blade to ensure smooth edges. This will reduce any potential distortion in the sound.

- Consider using a **soundproofing fabric** for the textile covering on one of the sheets. A fabric with acoustic properties, like felt or dense wool, will absorb some of the reflected sound to prevent any unwanted echo or harshness.

Hinge and Leg Mechanism:

- **Hinge Design:** The concept of using a hinge to connect the two sheets is excellent, but it's important to use a **strong, durable hinge** that can hold the weight and angle of the upper sheet without warping or loosening over time. Brass or steel hinges with a tight locking mechanism are ideal for this application. Ensure the hinge allows smooth movement without creating any resistance that would make adjusting the angle difficult during setup.

Master Carpenter's Suggestions:

- Install a **continuous hinge (piano hinge)** along one side of the sheet for increased durability and stability. This type of hinge provides consistent support over the entire edge of the two pieces and will ensure they don't wobble or tilt unnecessarily when in use.

- For added safety, ensure the hinge is well-recessed into the edges of the plywood to prevent it from catching or damaging the drum shell when stored.

- **Angled "Leg" Mechanism:** The concept of the "leg" holding the upper sheet at various angles is solid. To ensure smooth functionality, **slot design** becomes key. The slots need to be precise to hold the leg in place securely at multiple angles.

Master Carpenter's Suggestions:

- **Slot Precision:** Consider cutting the slots with a **table saw** or **router** to ensure that they are consistently straight and even. The leg should fit snugly into the slots without too much wiggle to prevent instability.

- **Leg Material:** The leg itself should be made of **hardwood** (such as oak or maple) to withstand repeated use and maintain its integrity over time. Ensure the leg is sanded smooth to avoid scratching the surface of the plywood or floor tom.

- **Leg Mechanism Locking:** Add a simple **locking pin** or **screw-and-catch system** to secure the leg in place once it's inserted into the desired slot. This will prevent it from accidentally sliding out of place during use.

Master Carpenter's Suggestions for Surface Coating for Sound Reflection:

- **Varnish Type:** Use a **high-gloss polyurethane varnish** for the best reflective quality. The glossy finish will enhance the reflection of sound waves. However, make sure to apply **thin coats** and allow sufficient drying time in between to prevent any uneven finish.

- **Sand Between Coats:** After each coat of varnish has dried, lightly sand the surface with **400-grit sandpaper** to ensure an even, smooth finish. This will help the varnish build up to a durable and reflective layer.

- **Testing Reflection:** Once complete, test the effectiveness of the angled surface by placing it under the floor tom and playing at different volumes. Ensure that the sound is clearly directed outward and not simply bouncing back upwards, as intended.

Master Carpenter's Suggestions for Ease of Transportation and Storage:

- **Protective Liner:** Consider adding a **soft, padded liner** (such as felt or foam) on the bottom of the sheets, especially on the underside of the textile-covered sheet, to prevent any accidental scratching or damage to the drum head during transport. You can use velcro straps to secure the sheets in place within the case, ensuring they don't shift.

- **Weight Consideration:** The two plywood sheets, even though they are slightly smaller than the floor tom, might still add extra weight when transporting your drum kit. Ensure the weight is manageable and consider lightweight **composite plywood** options, which are durable but lighter in weight than traditional plywood.

Additional Functionality and Innovation:

- **Sound Directional Modifications:** Depending on the environment and the specific performance space, you might want to add **adjustable louvers** (like small angled slats) along the raised sheet's surface to further direct the sound. This would allow you to experiment with different directional sound projection techniques, giving the performer more control.

- **Portability Enhancements:** If your design remains relatively successful, consider **customizing the height** of the leg for added flexibility. A telescoping or foldable leg could allow different angles of sound projection based on venue size or acoustics.

This design is a great step towards creating a more dynamic sound experience for floor toms. With the adjustments to hinge stability, leg precision, and surface finish, the **Floor Tom Sound Booster** can become a highly functional and innovative tool for live performances, directing sound outward and providing a richer, more resonant auditory experience for the audience.

Lazy Susan turntable for drum maintenance and cymbal cleaning

A "Lazy Susan" is often used at a dinner table to maximise table space and allow people seated around a table to easily access dishes. They are common in formal Chinese restaurants.
It features a larger circular tray set upon a smaller base and can be rotated 360° due to ballbearings between the two trays.

See below for examples of a wooden Lazy Susan with side view and a view from below..

The idea with the turntable for drum and cymbal maintenance is to have a top circular tray sized at approximately 24" with a base (which could be round or square) large enough to hold the top tray securely while it is being rotated. Some form of locking mechanism, such as suction cups or similar, could be used to hold the entire Lazy Susan in place while it is being turned.

The top tray will be covered by a thin carpet, on which drums and cymbals can be placed for changing heads, general maintenance, and cleaning.

Master Carpenter's Review and Suggestions for Construction:

This Lazy Susan turntable design is a smart and practical solution for drum maintenance and cymbal cleaning, allowing easy access to all sides of the instrument while keeping the workspace organized. Below are suggestions and improvements that will enhance functionality, stability, and ease of use:

Materials and Build Quality

- **Tray Material:**
  The circular tray should be made from durable **plywood** or **MDF (Medium-Density Fiberboard)** for a balance of strength and weight. For the most aesthetic option, **hardwood** (like maple or oak) can be used to enhance both durability and appearance. Choose a wood with a smooth, even surface to prevent any scratches on the drums or cymbals while rotating.

- **Carpet Covering:**
  A thin carpet or felt is a good choice for the top tray, as it will provide grip for the drum and cymbal while preventing any scuffing. However, ensure that the material is **non-abrasive** and **easy to clean**. Opt for a **dense felt** or **low-pile carpet** that resists wear and tear. Consider using a **removable felt layer** for easy cleaning and replacement over time.

Master Carpenter's Suggestion:

- For increased durability and ease of use, consider covering the top tray with **vinyl or rubberized fabric**, which is easy to wipe clean and won't catch dust and dirt as quickly as carpet. Rubber also provides better grip for instruments.

Base Design and Stability

- **Base Size and Material:**
  The base must be large enough to support the weight and rotation of the top tray. A **round or square base** is an excellent choice, and **plywood** or **MDF** is adequate for this purpose. However, if you're looking for a more polished finish, you could use **hardwood** for both the base and the tray for a cohesive, professional look.

- **Support for Rotation:**
  The key to a smooth turning mechanism lies in the ball bearings. The ball bearing system is crucial for ensuring the Lazy Susan rotates smoothly and without resistance. For heavier objects like drums and cymbals, ensure that the ball bearings are **heavy-duty** and capable of supporting more weight. Opt for **steel ball bearings** with **sealed precision** for longevity and smoother operation.

Master Carpenter's Suggestion:

- Consider using **double ball bearing assemblies** for extra strength, especially if heavier items like large drum kits are going to be placed on the tray.

Rotation and Locking Mechanism

- **Suction Cups or Locking Mechanism:**
  The idea of using suction cups to lock the Lazy Susan in place is practical but needs some refinement. Suction cups are often effective, but they can lose grip over time, especially on surfaces like polished wood or fabric. Instead, consider **locking pins** or **twist-lock mechanisms** that can secure the base and prevent unwanted movement during maintenance or cleaning. Alternatively, a **clamping system** could be used to secure the base to a workbench or table surface.

Master Carpenter's Suggestion:

- Use **locking swivel casters** with a brake function. The casters can be placed under the base, allowing you to move the Lazy Susan easily and then lock it in place during use. This system is more durable than suction cups and offers easier maneuverability.

- **Rubberized Feet:** If you stick with the suction cup idea, ensure the feet of the base are **rubberized** to avoid surface damage or slipping. Rubber feet would also improve grip, even if the suction cups don't fully adhere.

Ease of Transport and Assembly

- **Transportability:** Given the size and weight of the Lazy Susan, it's important to make it easy to move around. Ensure that the base has **ergonomically placed handles** or **cutouts** that allow you to lift it without putting strain on your hands or wrists. For a larger base, consider adding a **foldable stand** or **wheeled base** for

additional mobility when moving it between different areas of your studio or workspace.

Master Carpenter's Suggestion:

- You could incorporate a **removable or collapsible base** for easy storage when the Lazy Susan is not in use. This can be achieved by designing a **modular base** that clicks or locks together and disassembles easily.

Surface Protection for Maintenance

- **Protection Against Scratching and Damage:** To further protect your drumheads and cymbals, make sure the **edges of the top tray** are **smooth and rounded**. This will prevent any accidental scratching during rotation. **Edge banding** with a soft material like **felt or foam** around the circumference of the tray will ensure that your instruments stay free of nicks and scrapes.

Master Carpenter's Suggestion:

- Consider installing **edge protectors** on the tray's perimeter made from soft **silicone or rubber**. These protectors will help to maintain the integrity of your drumheads and cymbals while also reducing noise caused by direct contact between the instruments and the edges of the tray.

Versatility and Maintenance Use

- **General Maintenance Functionality:**
  The Lazy Susan concept works well for changing heads and cleaning cymbals but also consider adding **dividers or trays** along the perimeter of the top tray for organizing small parts (drumheads, cymbal cleaning supplies, tuning keys, etc.). This can improve workflow efficiency and make the maintenance process more organized.

Master Carpenter's Suggestion:

- Install a **modular storage compartment** in one corner of the base or underneath the Lazy Susan. This could hold cleaning supplies, drum keys, or other tools and would keep them within easy reach while performing maintenance.

Customization and Aesthetic Touches

- **Aesthetic Customization:**
  This is a functional and utilitarian piece, but you can also make it visually appealing. Consider offering the Lazy Susan in various finishes, such as **stained wood**,

painted wood, or even a **matte metal base**. Custom engraving or logos on the tray can also personalize the unit.

Master Carpenter's Suggestion:

- If you want to elevate the design further, opt for **handcrafted details** like decorative inlays around the edge of the tray or **stamped logos** on the base. A sleek and professional appearance can also be created by polishing and finishing the wood with a clear protective layer, giving it a high-end look.

This Lazy Susan turntable for drum and cymbal maintenance is a fantastic idea, streamlining the maintenance process and making it easier to clean and adjust your instruments. With some tweaks to stability, ease of use, and aesthetic design, this can become an indispensable tool for any drummer's workshop or studio space.

Tennis ball drum riser for quiet practice

The purpose of this type of drum riser platform is to isolate vibrations travelling downward from striking the drums.

Description:

- Two boards, typically MDB, are placed one on top of the other, with holes cut symmetrically in both boards.
- The size of the holes are small enough that a part of a tennis ball can protrude through the whole but not the entire tennis ball.
- The holes are spaced about 6"-8" apart, allowing for many tennis balls to stabilize the platform.
- Smaller holes are drilled around the perimeter of the boards to allow for zip-ties to hold the boards together securely.
- The top of the board is covered by carpet material.
- The bottom will have short rubber legs (not shown in the above picture) in several places around the perimeter for stability.
- For a larger platform, for example 3m x 4m, smaller platforms (2-4) can be made and held together with latches similar to the one shown below.

- For ease of transportation, both boards of the platform(s) can be outfitted with rollers/casters on one side. By tilting the platform onto the rollers/casters, it can be easily rolled away.

- For additional sound reduction it is proposed that an upright square post be screwed on to each corner of the platform. The posts could be approximately 100-125 cm high. A thick cloth material is then placed between the posts and screwed/tacked on to the post, thus creating a three-sided absorbent 'wall' on the sides and in front of the drummer. For extra stability, the upright posts could be connected at the top horizontally by additional lengths of wood.

Master Carpenter's Review and Suggestions for Construction:

This is an interesting and creative approach to reducing vibrations and sound transfer during drum practice. By isolating the vibrations, you can significantly minimize sound bleed and make for a more quiet and controlled practice environment. Below are some suggestions to refine this design, enhance its stability, ease of use, and overall functionality:

Material Selection for the Platform

- **Board Type:**
    - **MDF (Medium-Density Fiberboard)** is commonly used for such platforms due to its flatness, stability, and ease of cutting. However, for a more durable and slightly lighter option, consider **plywood**. **Birch plywood** or **poplar plywood** would be good alternatives, as they are durable yet lighter compared to MDF.

    - If a higher-end finish is desired or if weight is a concern, using **plywood** may be preferable due to its natural finish and lighter weight.

Master Carpenter's Suggestion:

- When selecting your boards, ensure they are **high-density**, as this will help maintain the platform's structural integrity over time without warping, particularly if the platform is large or subjected to significant weight.

Hole Design for Tennis Balls

- **Hole Sizing:**
    - The holes that are drilled to allow the tennis balls to protrude should be precisely sized. Since the balls are not meant to go through completely, the hole must allow for a snug fit that will hold the tennis ball firmly without allowing it to fall out or move too much.

    - **Hole Tolerances:** The holes should be slightly smaller than the diameter of the tennis balls, ideally allowing just enough clearance for a portion of the ball to protrude. This provides stability while ensuring the ball doesn't slip out of the hole.

Master Carpenter's Suggestion:

- Use a **hole saw** with a **diameter slightly smaller** than the tennis ball to make the cuts. This will ensure the holes are perfectly round, minimizing any unwanted movement of the tennis balls. A **drill press** would help achieve precise hole placement and depth.

Securing the Boards

- **Zip-Ties for Stability:**
    - Zip ties are an affordable and functional choice for securing the boards together. However, if you anticipate heavy use, the zip-ties could wear out over time. For a more permanent and stable connection, **metal brackets** or **wood screws** can be used at the corners where the boards meet. This will provide long-term stability and prevent any shifting of the two layers.

Master Carpenter's Suggestion:

- Consider using **heavy-duty wood screws** for the perimeter of the platform to ensure that the boards remain secured and stable even with prolonged use. If zip-ties are preferred for ease of adjustment, make sure to **double them up** at each connection point for added strength.

Rubber Legs and Stability

- **Rubber Legs:**
    - The addition of rubber legs around the perimeter will help stabilize the platform, particularly by preventing direct contact with the floor and further isolating vibrations. The placement of the legs is critical to prevent wobbling.

    - **Rubber Type:** Opt for **high-density rubber** for the legs to ensure they provide sufficient grip and stability. The legs should have a relatively **wide surface area** to distribute the platform's weight evenly.

Master Carpenter's Suggestion:

- Instead of just rubber legs, consider using **small, wide rubber feet** or **cushioned rubber pads** to further absorb any vibrations while providing better grip. These feet should be **spaced evenly** around the perimeter for optimal stability.

Platform Size and Mobility

- **Large Platform Option:**
    - For a larger platform (e.g., 3m x 4m), dividing the platform into smaller, manageable sections is a great idea. This allows for easier transport and customization based on space requirements.

    - **Latching System:** For attaching multiple smaller sections, **heavy-duty latches** or **quick-release fasteners** can be used. These should be strong enough to hold the sections securely while in use, but easy to unclip when transportation is needed.

Master Carpenter's Suggestion:

- Use **reinforced metal latches** with a simple **clip system** for securing the smaller platforms together. Ensure that the latches can withstand repeated use without loosening over time.

- For a **sleek aesthetic**, consider **concealing the latch system** underneath the platform's edge or using flush latches that don't protrude from the sides.

Upright Posts for Additional Soundproofing

- **Post and Cloth System:**
    - The inclusion of vertical posts with cloth stretched between them is a clever addition to further dampen sound. This creates a barrier to absorb noise and reduce reverberation.

    - **Post Material:** Use **lightweight hardwood** (such as pine or poplar) for the posts, as they need to be sturdy enough to hold the cloth without buckling, but not too heavy. For extra durability, you could use **metal posts** if weight is less of a concern.

Master Carpenter's Suggestion:

- Ensure that the posts are **firmly anchored** into the platform. Use **wood screws** or **metal brackets** to secure the posts to the platform. Consider attaching them to the **corners** for maximum sound isolation.

- For the cloth, opt for **dense acoustic fabric** (such as thick felt or soundproofing cloth). This will provide better sound absorption. Stretch it tightly between the posts to prevent sagging or loose fabric, which could reduce its effectiveness.

Transportation and Mobility

- **Rollers/Casters:**
    - The inclusion of rollers or casters on one side for easy transportation is a practical feature. For large platforms, using **casters with brakes** will allow the riser to be moved easily but also securely locked in place during use.

Master Carpenter's Suggestion:

- Use **heavy-duty casters** that are rated for the platform's weight and can handle the load without compromising on mobility. Ensure that the casters are **lockable** so the platform stays securely in place during practice.

Overall Design and Functionality

- **Weight Considerations:** The tennis ball-based isolation system is effective for damping vibrations, but keep in mind that larger platforms may require additional structural support to avoid sagging in the middle. You may need to add **reinforced cross supports** underneath the platform to ensure it remains flat and stable when in use.

Master Carpenter's Suggestion:

- Consider adding **center supports** in the middle of the platform, especially if it's large. These can be simple **wooden beams** that run across the width or length of the platform, attached securely to the underside.

This tennis ball drum riser for quiet practice has a solid foundation and innovative features that will help reduce vibration and noise transfer during practice. With enhancements to the structural integrity, mobility, and overall durability, this design can become a highly effective and practical tool for drummers looking for quieter practice solutions.