

Choosing and Using Casters

What casters work best in which workshop applications, and how to build two versatile bases

BY JOHN WHITE

Small shop or large, most woodworkers find it makes sense to put some machines and fixtures on wheels. Whether it carries a benchtop planer, a worktable, or a wood rack, a rolling workstation not only frees up space; it helps you line up your tools—and your materials—more efficiently for specific jobs.

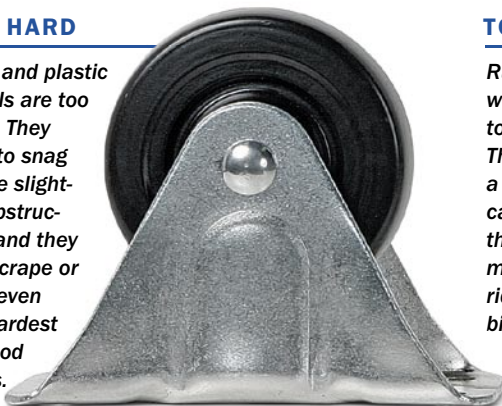
However, if you're like me, you know these little wheels can also cause big problems. They can leave a power tool restless, fidgeting when you want it to stand still. Poorly designed or poorly loaded, they can make their cargo tipsy. They can stop on a dime—or a sliver of wood—while you're gliding from A to B; and they can wreak havoc on your shop's new hardwood floor.

So how do you get the most out of a set of casters? Simple. Choose the right ones for the job at hand, and mount them properly on the base of the tool or fixture

WHAT TYPE OF WHEEL?

TOO HARD

Steel and plastic wheels are too hard. They tend to snag on the slightest obstruction, and they can scrape or dent even the hardest of wood floors.



TOO SOFT

Rubber wheels are too soft. They have a low load capacity and their "give" can make what's riding on them a bit tipsy.



JUST RIGHT

Urethane wheels are just right. They're soft enough to climb over small obstructions, yet hard enough to keep the load stable.



WHAT SIZE?

Use this chart to decide how big the casters should be for your specific job.



LOAD WEIGHT	TYPICAL USE	Smooth Floor		Rough Floor	
		WHEEL DIAMETER	RATING	WHEEL DIAMETER	RATING
Less than 200 lb.	Thickness planer, drill press, miter saw, sanding station, furniture dolly	4-5 in.	75 lb.	5 in.	75 lb.
200-400 lb.	Large cabinet, tool cart, small clamp rack, assembly table	5 in.	150 lb.	5-6 in.	150 lb.
More than 400 lb.	Large clamp rack, sheet goods rack	5-6 in.	250 lb.	6 in.	250 lb.

they support. Casters come in a wide variety of sizes and styles, but for most workshop applications you need only consider those most commonly offered in woodworking catalogs. Here's what you should know.

Key factors: rolling, steering, stopping

You'll find casters with a range of tire materials, from soft rubber to rock-hard steel or plastic wheels. My advice is to stick with Mr. In-Between: urethane. It's the same material used for skateboard wheels. Tires made of this synthetic material have enough "give" to climb over wood chips; they have a good load capacity for their size and cost; they're stable; and they hold up well.

Bigger is better—Although they are pricier, larger wheels roll easier and can handle more weight. I've found that any wheel under 4 in. dia. catches too easily on cracks or seams in a floor, or on the small wood chips and even sawdust that always seem to be underfoot. For most applications, a 4-in. or 5-in. wheel will work well, although you may need to go to a larger diameter to handle very heavy items, like a lumber rack. If your shop floor is plywood or hardwood, choose larger-diameter and wider wheels to prevent floor damage.

Casters have a rated capacity for the weight they can handle, but, like power-tool horsepower ratings, caster load ratings are suspect. To avoid problems, choose a set of casters that, combined, are rated to handle

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SWIVEL OR FIXED?

Swivel-based casters (left) offer the most mobility. They allow you to turn the load in any direction. Fixed-base casters (right) keep you on the straight and narrow. They eliminate side-to-side movement, allowing only front-to-back.



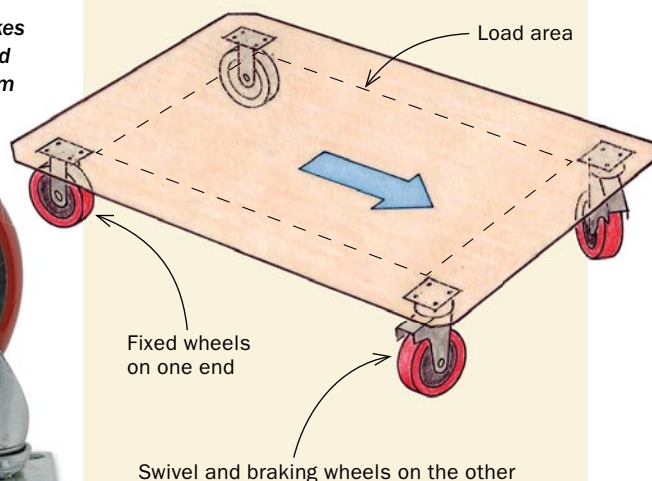
BRAKE OR NO BRAKE?

Brakes help stabilize the load. If you need a caster-mounted tool or assembly table to stay put, you need brakes on at least two of the casters. Single-lock brakes (below, left) keep the wheels from turning on their axles. Double-lock brakes (below, right) do that too, and also keep swivel casters from swiveling.



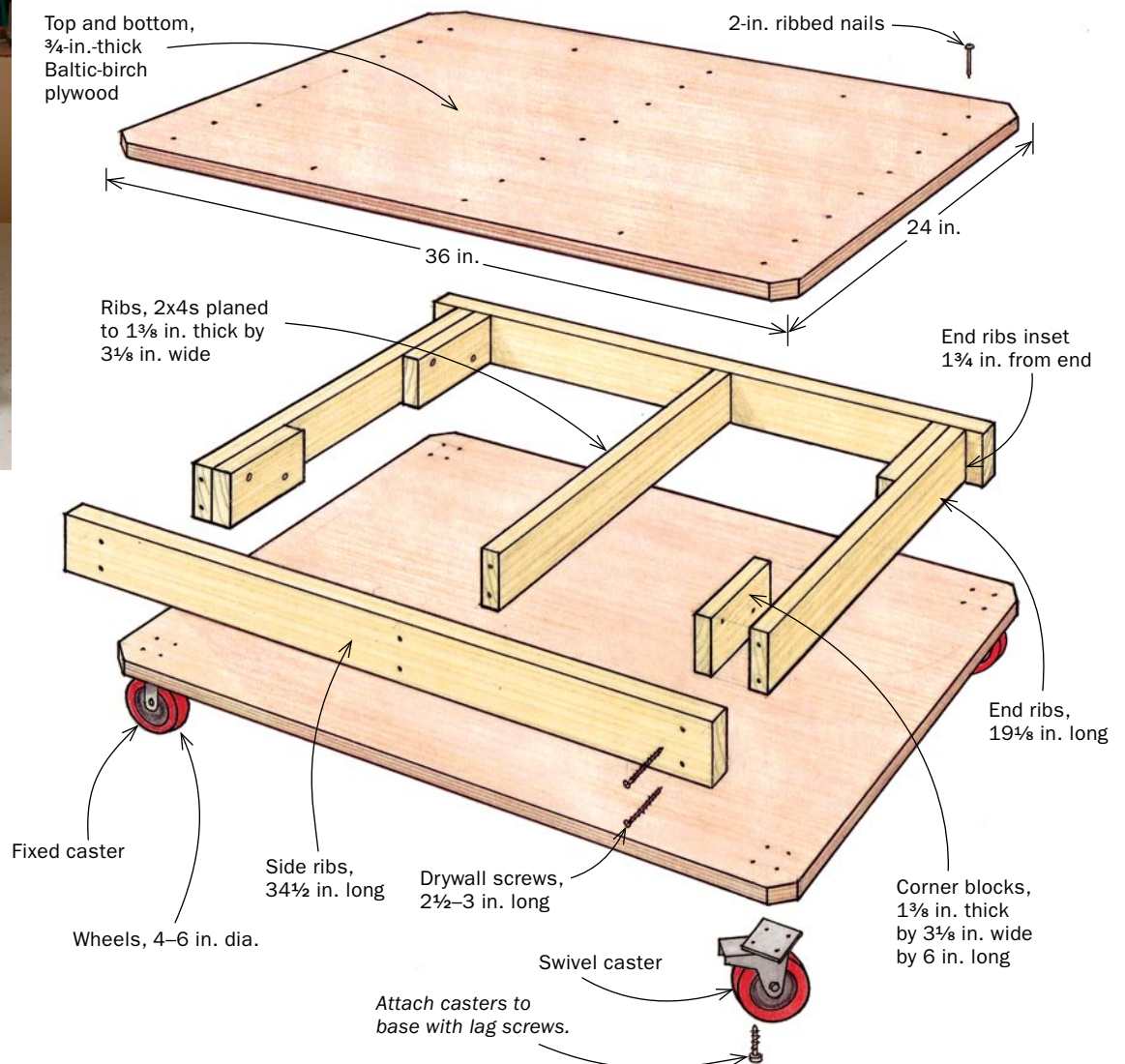
THE "SHOPPING CART" SETUP

By far the most common configuration is two fixed casters on one end or side and two swivel casters on the other. This gives the unit both movability and stability (think shopping cart). The platform base should be about 6 in. wider and longer than the base of the load it carries, so the footprint of the wheels, even at their innermost positions, is not narrower than the load base.





Platform base



Use a torsion-box base for furniture dollies, assembly tables, tool carts, floor-standing machines, and shop fixtures such as clamp and sheet-good racks. For stability, install the casters as close to the corners as possible. Here's a common 24-in. by 36-in. base, but yours should be sized to your needs.

MAKE A PLATFORM BASE

Attach corner blocks to support casters. Corner blocks on this basic torsion box provide a structure where the casters are attached. White attaches the blocks with countersunk 2-in. drywall screws.



Seal the "skin" with adhesive. Before attaching the base top and bottom, apply a thin bead of construction adhesive to the frame. Nail on the plywood "skins" with 2-in. ribbed nails, spacing them about 4 in. apart.



at least 50% more weight than they'll actually support. Overloading casters will make them hard to roll, even harder on your floor, and quick to wear out.

Combine fixed and swivel—Your next consideration is whether to use fixed or swiveling casters. In 99% of shop applications, you should use two fixed and two swivel casters, the same arrangement used on shopping carts. The pairing of the two types makes it easy to steer the unit around the shop. With swiveling casters on all four corners of a base, the table or machine they support will be difficult to steer and less stable when parked.

The opposite setup, fixed casters on all four corners, obviously can't be steered. But it is useful in situations where a machine or fixture would only have to be pulled straight out from a wall and then pushed back when it was no longer needed.

Double-lock is best—The final consideration is whether to use casters with brakes; and, if so, whether to use the single- or double-lock type. A single-lock brake only prevents the wheel from spinning on its axis, leaving a pivoting caster free to shift from side to side. A double-lock brake stops the wheel from spinning and from swiveling on its pivoting caster. For carts and racks, either no brake or a single-lock brake is all you need. For casters under worktables and machines, use double locks to create a more stable, shift-free surface.

The best double-lock models use a foot pedal that projects over the wheel and bears directly on the tire. The other type of brake, a small lever that pivots on the caster's axle bolt, is hard to set and usually fails to lock the wheel solidly.

Now attach them correctly

None of the above means anything, of course, unless the casters are attached to a base that can support them and the load they'll carry. The base must be strong and stable, while allowing access to the brake mechanism and leaving room for the swiveling casters to pivot 360°. All of these conditions are best met with a base whose casters are as close to the corners as possible. I've come up with two simple base designs, one for platforms and the other for cabinet-style units. The designs are easy to build, locate the



PLATFORM BASE IN ACTION

The platform base is sturdy enough to carry the largest of workshop loads. White uses 4-in. casters for medium-size loads such as this project rack (above). He uses 5-in. casters under the base supporting his sheet-goods rack (right).



When the load is large, use two bases. Moving a large piece of furniture or equipment might require two platforms. Use turnbuckles to link the sides with the fixed casters, leaving the swivel wheels on the ends for maneuverability.

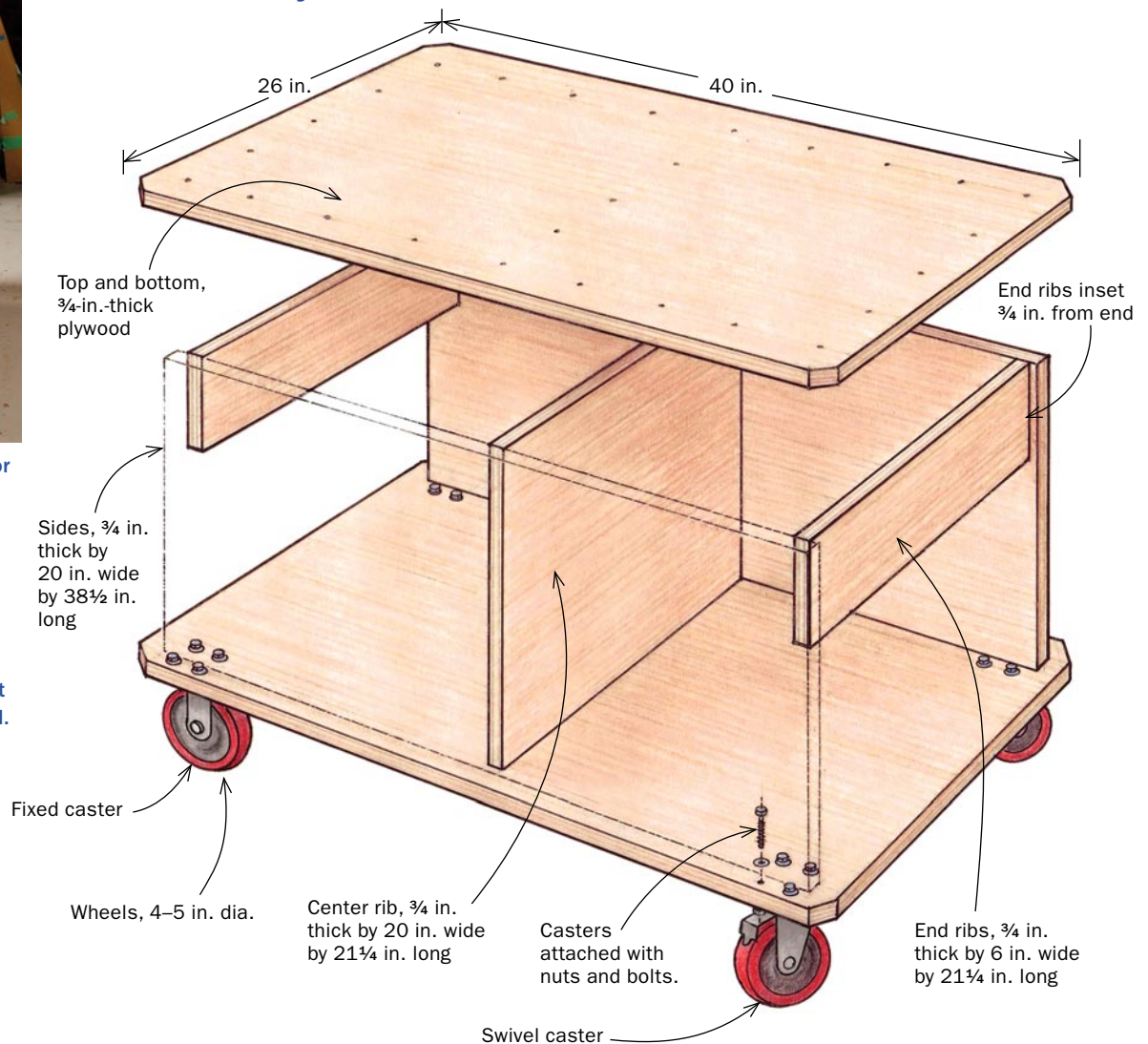


Attach the casters. White uses 1½-in. lag screws to attach the casters securely to the base. Typically, the corner blocks will support lag screws for only three of each caster's mounting holes, but that's enough.





Cabinet-style base



MAKE A CABINET-STYLE BASE

Simple butt joints suffice.

There's no need to put the cabinet base together with dadoes, rabbets, or even glue. Just make sure the edges are square, mark the screw locations carefully, predrill and countersink the holes, and attach with 2-in. deck screws for a better grip in the plywood end grain. (Note: To prevent splitting, predrill the holes all the way into the plywood end grain. Use a tapered bit, or start with a bit narrower than the screw diameter, then widen the hole in the surface piece only.)



casters properly, and are adapted easily to almost any workshop application.

Building a platform base—The platform-style base is basically a torsion box in which the thickness of the plywood skins requires only a few cross-braces to create a very stiff assembly (see photos, pp. 78-79). The plywood top and bottom faces overhang the 2x4 frame slightly to simplify the construction and to allow beveling of the corners. The frames are assembled with drywall screws or nails and the plywood is attached with construction adhesive and nails. The casters are attached with lag screws drawn into the frame and corner blocks. This base can serve as built as a platform for furniture or tools, or it can have racks for clamps or lumber attached.

Building a cabinet base—The second design is for a cabinet-type base that could be used as a stand for a benchtop power tool or as an assembly or outfeed table, with storage underneath. The heart of the design is the inset sides that place the weight of the sides and top directly over the centerline of the casters and allow the casters to be right out at the edge of the bottom panel for the widest and most stable base. Built from cabinet-grade plywood, the base is sturdy and very simple to construct; all of the elements are just simple rectangles joined by drywall screws. To prevent the box from racking, each of the open ends of the cabinet will need either a face frame or a rib supporting the top. Once the basic box is built, any combination of drawers, open compartments, and doors can be added to suit the unit's function.

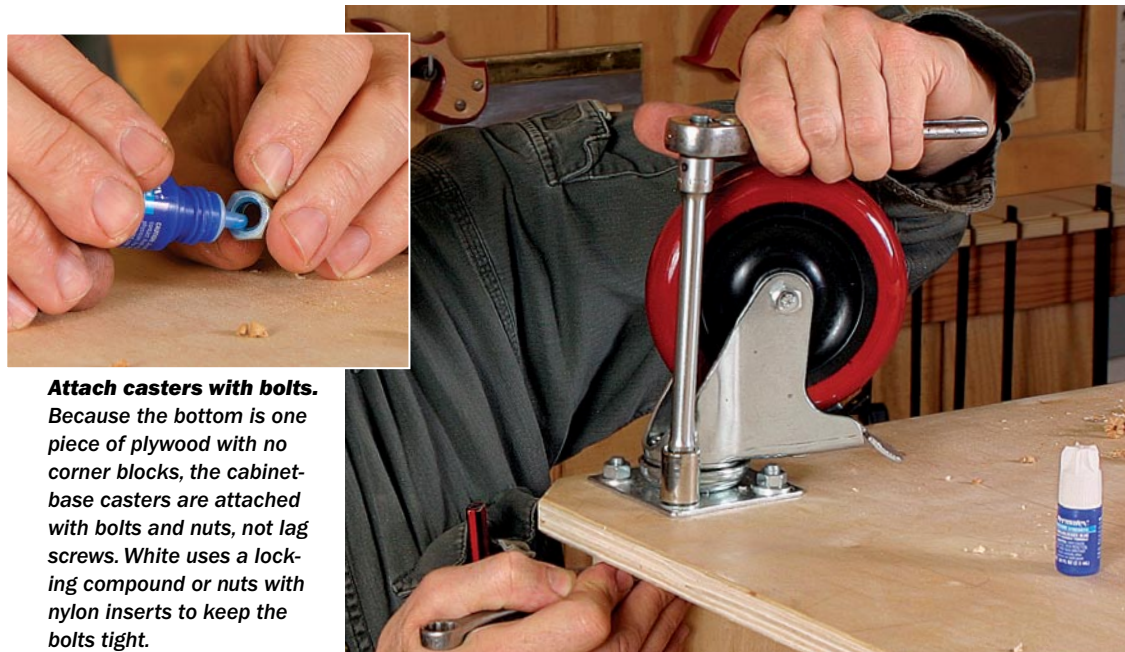
When choosing the dimensions for either style of base, keep in mind that the actual footprint of the casters will be narrower than the platform. This can make the unit tippy unless you add a few extra inches to the width of the base to compensate. For instance, if a tool stand resting directly on the floor would be stable at 18 in. wide, the equivalent unit on casters will need to be around 24 in. wide to be as stable. □

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CABINET BASE IS VERSATILE

White dedicates one cabinet base to his downdraft table (above), which carries its own shop vacuum. Another serves as a platform for several machines. In addition to the thickness planer, White uses this type of cabinet base to support both a router table (right) and a drill press.



Attach casters with bolts. Because the bottom is one piece of plywood with no corner blocks, the cabinet-base casters are attached with bolts and nuts, not lag screws. White uses a locking compound or nuts with nylon inserts to keep the bolts tight.

SOURCES OF SUPPLY

Grizzly Industrial Inc.
800-523-4777
www.grizzly.com

Hartville Tool
800-345-2396
www.hartvilletool.com

Rockler
800-279-4441
www.rockler.com

Woodcraft
800-225-1153
www.woodcraft.com

Woodworker's Supply
800-645-9292
www.woodworker.com