Tools on Wheels

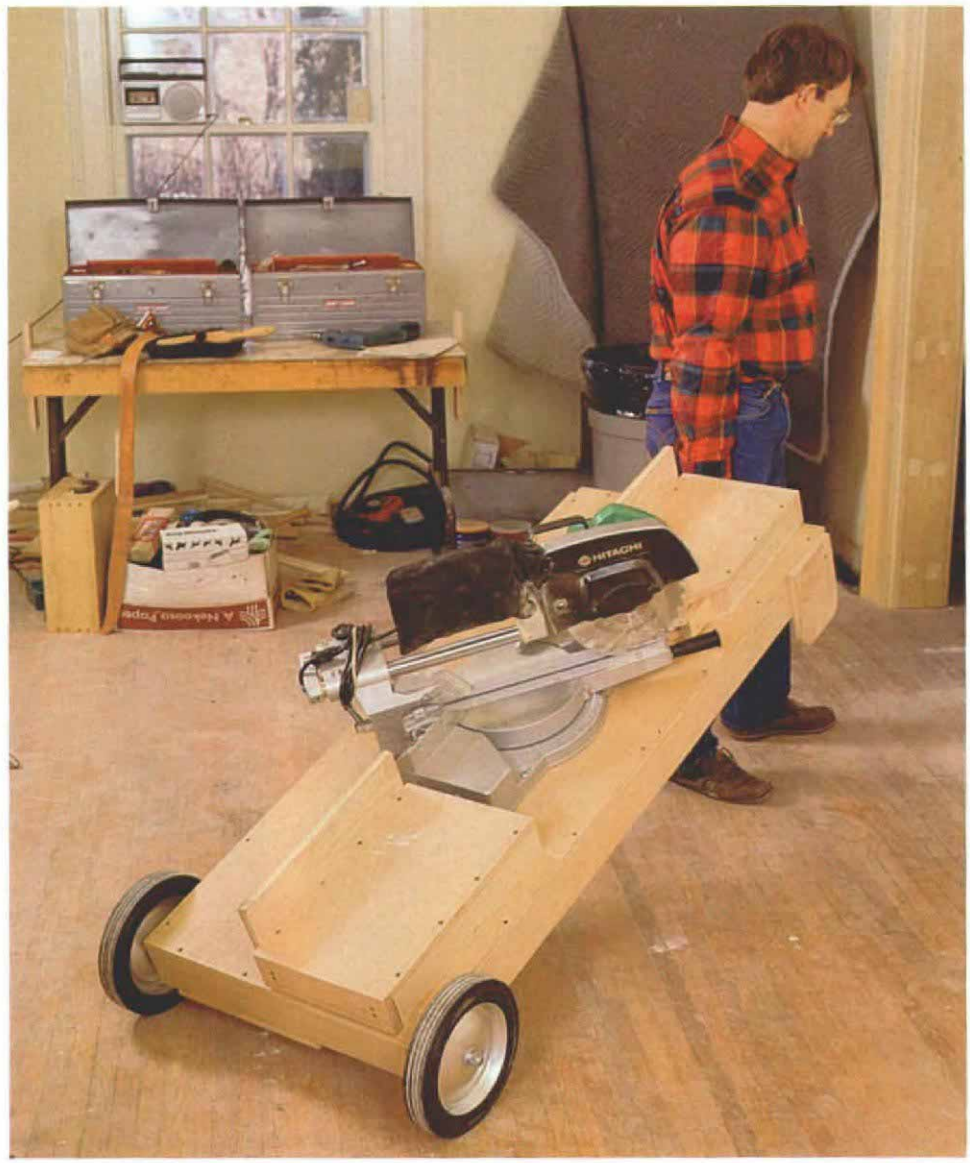
Four custom rigs for moving the tools of the trade

Miter-Saw Stand

by William Lego

As a professional woodworker, I divide my time between the workshop and the job site. Consequently, I set up my tools to serve in either place. The miter-saw stand featured here, for example, adds a level of convenience and utility not found in the tool alone. Moreover, its wheels and collapsible legs enable the tool to travel easily between jobs (photo right).

In devising stands and tables for totable power tools there is an ever-present danger of "T-Birdizing"—turning a once-lean-and-mean tool into a heavy, cumbersome lead sled that loses its original appeal. I always weigh utility against extra weight, complexity and safety when designing stands for my tools. That's why the exact dimensions of the saw stand you build are less important than its suitability for your needs.



Second-generation stand—This stand is the second one I built, and I designed it specifically for my slide/compound saw. Previously, I made a narrower version for a 10-in. miter saw. You can easily adapt the design for whatever type saw you have.

The table is ¾-in. birch plywood, measuring 56 in. long and 22 in. wide. I used 5/4 oak for the legs and apron (4/4 would have been adequate, I just had the 5/4 handy). With the legs set up, the table stands 30½ in. off the ground. I used drywall screws to assemble everything—no glue.

After trying to navigate stairs and rough terrain with the 5-in. wheels on my first stand, I knew enough this time to use 10-in. wheels. A piece of ½-in. threaded rod, 27 in. long, serves as an axle.

Nesting legs—One leg assembly nests inside the other for compactness when the table is folded for transport. The inside legs have 2½-in. wide vertical members; the outside have 3¼-in. wide vertical members. Both leg assemblies have a plywood stretcher let in across the bottom and a hardwood stretcher let in across the top. The hardwood stretcher is tied to the underside of the plywood top with piano hinges.

When folded up, the legs are trapped by a 12-in. by 56-in. plywood retaining strip, hinged to the apron of the table with another piano hinge. To hold the plywood and legs in place, I insert two carriage bolts through holes in the plywood retaining strip and thread them into a set of T-nuts in the plywood stretchers. The carriage bolts each have a 3-in. dia. wooden disc mounted on them, making them "wrenchless" fasteners. The same piece of plywood that holds the legs in the folded-up position also swings down and ties the leg assemblies and top together when the legs are deployed.

To deploy the legs, two wrenchless fasteners are removed from the plywood, which is then swung up out of the way (top photos, facing page). The legs are folded out, and the wrenchless fasteners are reinserted through the retaining strip and into a second set of T-nuts in the leg assemblies (bottom left photo, facing page).

I added two short legs, screwed to the apron, to elevate the end of the table opposite the wheels so that the table sits level without deploying the legs. If I only need to make a few

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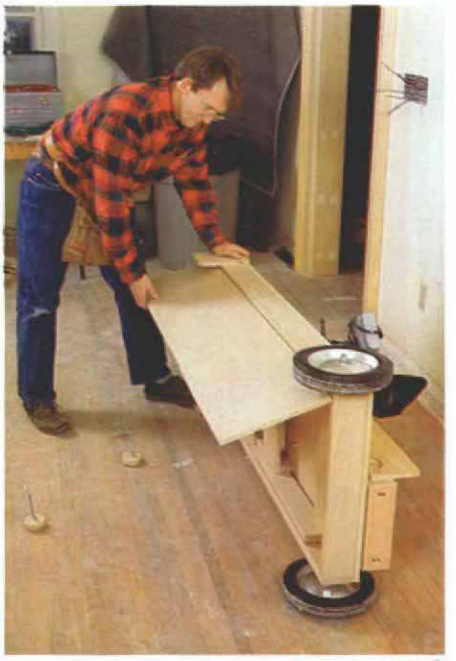

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Miter-saw stand. **Like a custom version of the Delta Sawbuck, the legs of this miter-saw stand fold under the table allowing the wheels to engage the ground. By grabbing the handle at the other end, the whole rig can be rolled around like a hand truck (photo facing page). To set up the miter-saw stand, the wrenchless fasteners—carriage bolts with wooden discs on them—are removed from the plywood retaining strip (photo 1). The retaining strip is then flipped up (photo 2), allowing the legs, which nest one inside the other, to swing out (photo 3). The wrenchless fasteners are then reinserted through the retaining strip into a set of T-nuts in the legs. The basic table is 56 in. long, but the slide-out stock support wings add another 12 in. on both ends (photo 4).**

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cuts on a job (and if nobody's watching), I'll squat in front of the saw and save having to set it up.

Stock-support wings—On each side of the saw base I built an extension table with a 3-in. high fence. The extra height in the fence lets me cut 3⅝-in. crown without employing the compound-cutting feature of this saw. I added slide-out stock-support wings that fit into the extension tables (photo above right). These lock in place—either fully retracted or fully extended—by means of ¼-in. carriage bolts inserted as pins through holes on the backside. The slide-out wings add 24 in. to the overall length of the table, giving me a total length of 80 in.—great for cutting long stock. □

William Lego is a cabinetmaker and carpenter in Rockford, Illinois. Photos by Kevin Ireton.

Radial-Arm Saw Cabinet

by J. Azevedo

Like most builders, Jerry Clevenger liked what his radial-arm saw could do, but he grouched at wrestling it around the job site in an awkward dance that often threw the saw out of adjustment. Even after the saw was in place, there was the rummaging for clamp-on lights, an extra extension cord and shims to level the wobbly legs. And whatever became of that blade wrench? Clevenger, a reasonably patient man, got tired of fighting his saw and made an elegant black box to serve as a base cabinet.

Basically, Clevenger's box is a laminate-skinned carcase, mounted on wheels, with built-in leveling screws and an electrical power center (top photo, next page). The radial-arm saw table, which sits on the cabinet, has a custom light standard and a set of handles, allowing it to be carried like a stretcher.

The basic box—Clevenger built the box of ½-in. plywood for the back and sides and ¾-in. plywood for the top and bottom, and then covered it with black plastic laminate. He divided the box into two compartments. On the left are four drawers for storing extra blades, small tools and that elusive blade wrench (bottom photo, next page). On the right is a cupboard where he stores his portable power tools. Both sections have laminate-covered plywood doors with locks.

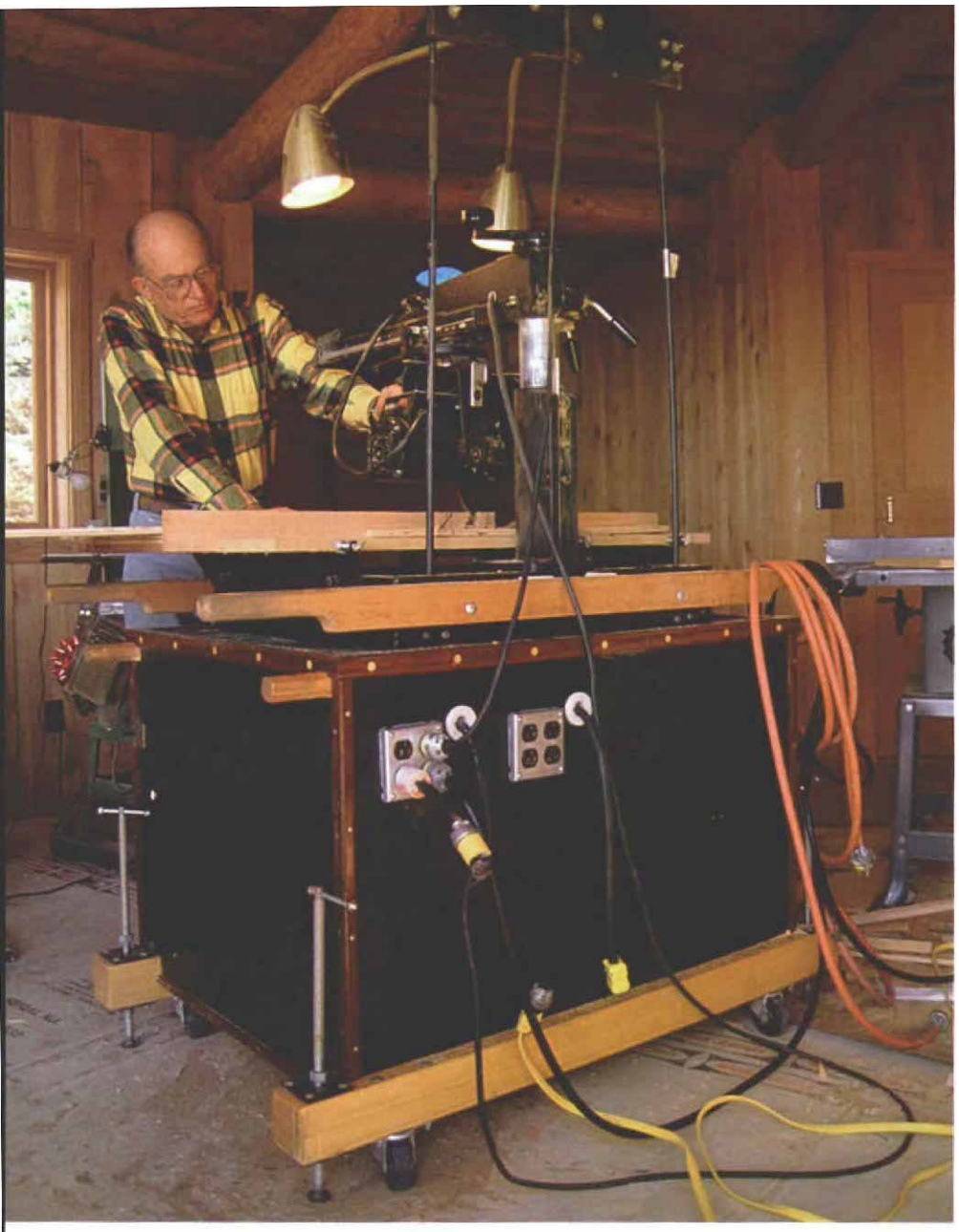
To protect the box's edges, he screwed strips of ironbark, L-shaped in cross section, to the comers. Ironbark, a variety of eucalyptus, is tough—bulletproof, according to Clevenger—but expensive.

Wheels and legs—To make the box mobile and stable, Clevenger added wheels and leveling legs. The cabinet sits on a pair of yellow cedar 4x4s that project 4 in. past it on either side. To the bottom of these rails, he bolted a set of four heavy-duty wheels, and where the rails extend beyond the cabinet, Clevenger mounted four leveling screws.

The leveling screws are made from ⅝-in. threaded rods that pass through holes in steel plates bolted to the top and bottom of the rails. A nut welded to the bottom plate captures the threaded rod, so the leg can be screwed up and down, and a loose nut on the top can lock the leg in position. Clevenger welded a washer to the bottom of the leveling leg to serve as the foot.

The handle for adjusting the leveling screws up or down is a small bolt that slips through a hole drilled in the threaded rod, working like the handle on a C-clamp. Unfortunately, when the small bolts slip to one side, they hang up on the ironbark edging. Short, fixed T-handles that clear the edges might be an improvement.

Lights—Suspended above the saw, two gooseneck lamps light up the worktable on both sides of the blade. The light fixture, which Clevenger inherited from a previous remodel-



ing job, is fastened to a piece of ¾-in. plywood supported by two ½-in. rods. At the base, the rods pass through holes drilled in the steel frame of the saw table and fit into sockets made of steel channel. The light standard pulls out of the base to make moving the saw less awkward.

Power center–Clevenger wired his black box, as he does all of his major power tools, to serve as a small-load power center set up to handle the seemingly endless demand for outlets around a job site. The induction motor on Clevenger's saw was built to run on either 110v or 220v, so Clevenger made a power center for each voltage.

On the back of the box are two four-square junction boxes, each with four outlets and two dangling male plugs. The cords on the dangling plugs disappear into the cabinet through a cord grommet (modified from a through-hull boat fitting) and each feeds one of the boxes. The 110v plug on the left feeds the four 110v outlets in the left-hand box. The 220v plug on the right feeds the other box, which has two 220v outlets and two 110v outlets.

Now, let's say that only 110v power is available on the job. Clevenger plugs the 110v plug into that source, and he gets power at the four 110v outlets. To run the saw, he plugs the motor into one of the 110v outlets. Even after plugging in the light, he still has two extra outlets for small tools.

If 220v power is available, Clevenger plugs in the 220v plug, giving him a 220v outlet for the saw, a spare 220v outlet, and two 110v outlets. Further, if he plugs the 110v plug from the other box into one of those 110v outlets, he gets four more hot outlets.

Of course, this clever wiring does not revoke the basic laws of electricity—a circuit breaker will still pop if too many tools are run at once. The advantages of Clevenger's arrangement are that it saves a lot of plugging and unplugging.

In the two years Clevenger has been using his black box, he's never regretted the time spent building it. I visited him on an early spring day as he was getting ready to move on to his next job. He pulled out the light standard, and with his partner's help, lifted the saw off the box and loaded it in the pickup. Then they made a second trip for the black box, rolling it where they could and carrying it over the rough ground.

I asked Clevenger whether he would change anything were he to build another. "I *am* building another, for my drill press," and then he surprised me. "But this one is totally different. This time I'm using orange laminate." □

J. Azevedo writes about building and lives in Friday Harbor, Wash. Photos by the author.

Radial-arm saw cabinet. **This tool cabinet serves also as a radial-arm saw stand and a job-site power center. To move the parts, the saw is carried off like a stretcher, and the cabinet is wheeled to its next destination.**

Rolling Tool Bench

by Paul Pieper

The carpentry business in a large metropolitan area is far more competitive than I ever imagined. Increasing wages bring demands for increased production. In order to comply and still do professional-quality work, the organization and efficient care of tools is essential.

I do a lot of work in high-rise construction, such as trimming offices and condominiums, installing complex millwork in lobbies and penthouses around Philadelphia. And I can only do my best if I've got all the tools I need with me. I don't want to be 20 stories up and realize I left my block plane in the truck. For finish work I use a rolling tool bench—a combination toolbox and workbench (photo below).

Trapezoidal bench—The bench design is a stable trapezoid, measuring 13 in. wide by 32 in. long at the bottom (long enough for handsaws) and 28 in. at the top (not counting the vise extension). I built it 11 years ago out of long-fiber pin oak. I dovetailed the top to the legs and strengthened the joint with dowels through the pins, which lock the joint both ways. Taking a lesson from the Japanese who use thick softwood benchtops, I laminated a piece of ¾-in. pine to the top to increase top thickness and friction. I haven't had to clamp material as much, as tight or as often since.

The ¾-in. thick legs are strengthened under the bottom shelf by a piece of ¾-in. by 4-in. wide curly beech that is glued and screwed cross-grained to them on the inside. This also gives the legs mass for attaching the wheels and suports the lower plywood shelf.

For part of the bottom rail, I used a piece of walnut that had a carpenter ant's nest in it. Materials such as this rail and the square plugs that I used to cover screw heads give my bench some style. Perhaps I get this from my father, who's always saying, "Anybody can do it that way." Sometimes in trying to be different, I've discovered a better way. Other times, I've just learned what works and what doesn't.

At 23 in. tall, the bench might seem a little low for working on, but it allows me to work over my material, enabling me to exert greater pressure on my hand tools with less effort. I also kept the bench low so that it can double as a step stool.

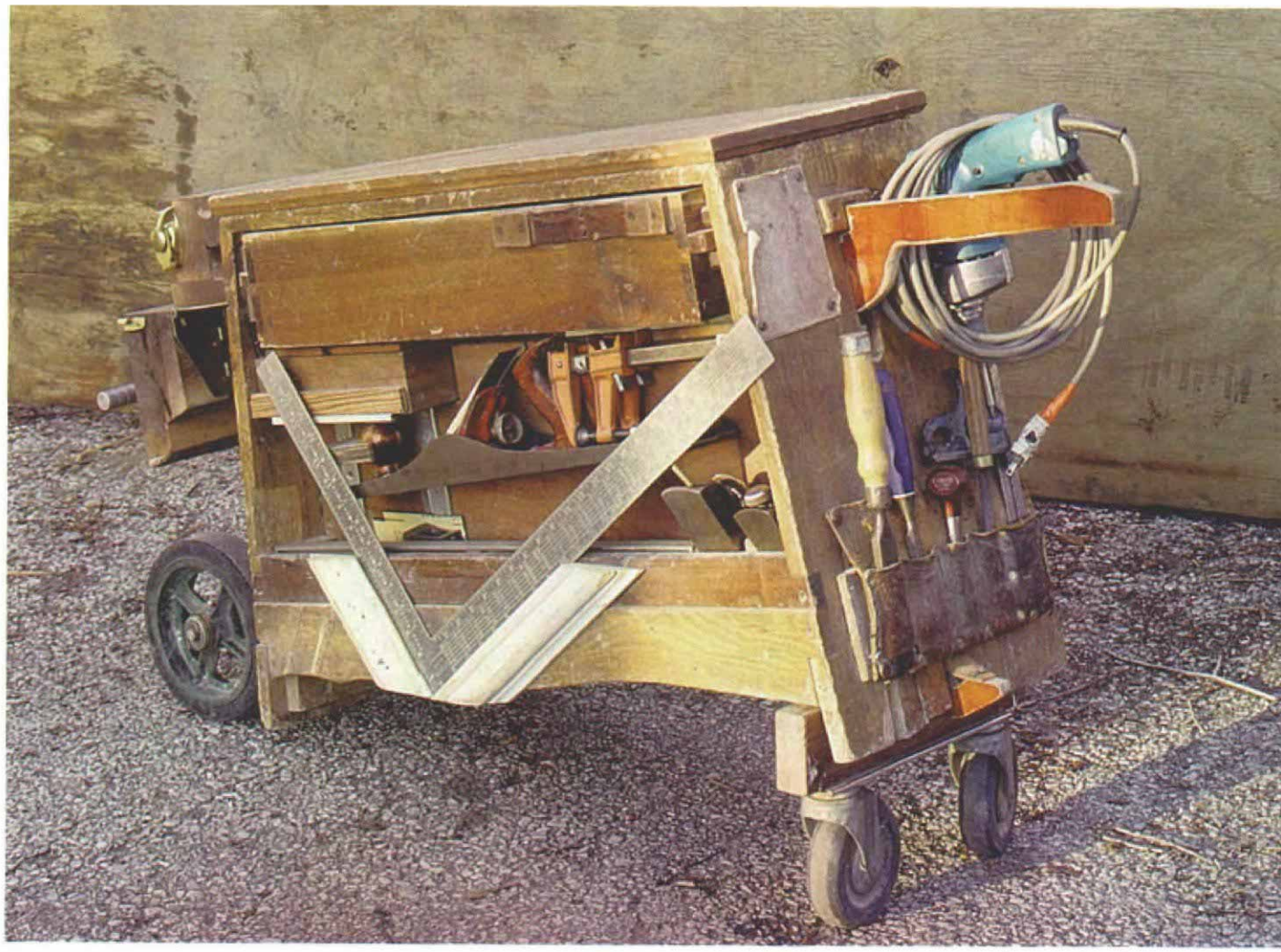
Fitting it out—I added a piece of applewood as a divider down the length of the plywood shelf. It stiffens the bench and gives me wall space for mounting tools. It's installed off center, making it easier to get at the tools mounted on it. Also I've found that, in general, two different size compartments are more versatile than compartments of the same size.

Just under the top is a 4-in. deep tool drawer made of walnut. The drawer, which opens from either side of the bench, is divided in half. One half is then divided in half again and fitted with two lift-out trays (photo next page). The drawer has pinned dovetails and can be removed completely to lighten the bench. There are leather straps on one drawer face where I can hang my drill and screw guns. The straps also mark the drawer for me; at a glance they distinguish the book-matched drawer fronts.

Saws are kept sharp and ready in their own box. My gent's saw under the vise even has its own canvas scabbard, which can be unsnapped and kept with the saw when it's necessary to work away from the bench. The level also has its own box.

At one end of the bench top I mounted a vise (The Disston Co., 7345G W. Friendly Ave., Greensboro, N. C. 27410; 919-852-9220) on spring-loaded drop-leaf-table hinges. In the vertical (folded down) position, the vise serves as a door buck. The vise can also be swung up

Rolling tool bench. **Built 11 years ago, this rolling tool bench is still serving in the field today. With the plywood handle flipped up and the rear casters flipped down, the bench can be pushed around like a shopping cart.**



to a horizontal position where window sash locks hold it firmly in place.

A leather pouch at one end of the bench keeps edge tools sharp and off the work surface, yet still handy. This pouch unsnaps so I can clean out the sawdust. I screw pieces of sandpaper to the leg of the bench above the pouch. This gives me a flat, stationary sanding block and is more efficient than a hand-held sanding block for dressing small pieces. When the top piece of sandpaper is used up, I tear it off to expose a fresh piece.

Additional features include a pencil sharpener, a framing-square holder made with some scrap molding and drill or screw-gun hangers front and back.

Wheel system—I made the wheel system so that the bench sits firmly on its legs for working and standing on, yet rolls and turns easily. Two 8-in. wheels are mounted just above the ground in the front, allowing the bench to rest on its legs until the back is raised and the fold-up 4-in. casters are locked in the down position. This changes the angle of the bench to the floor, raising the front legs 1 in. and causing the front wheels to engage the floor.

The rear wheels, which fold down and serve as the steering wheels, were salvaged from a discarded shopping cart. I cut the wheel mounting strap from the cart and screwed this to a piece of bubinga, which is hinged to the bench with two 4½-in. by 4½-in. ball-bearing butt hinges. This allows the wheels to fold up and down. I chose bubinga for the wheel mount because it's very hard and dense, but for maximum strength my screw selection also had to be right.

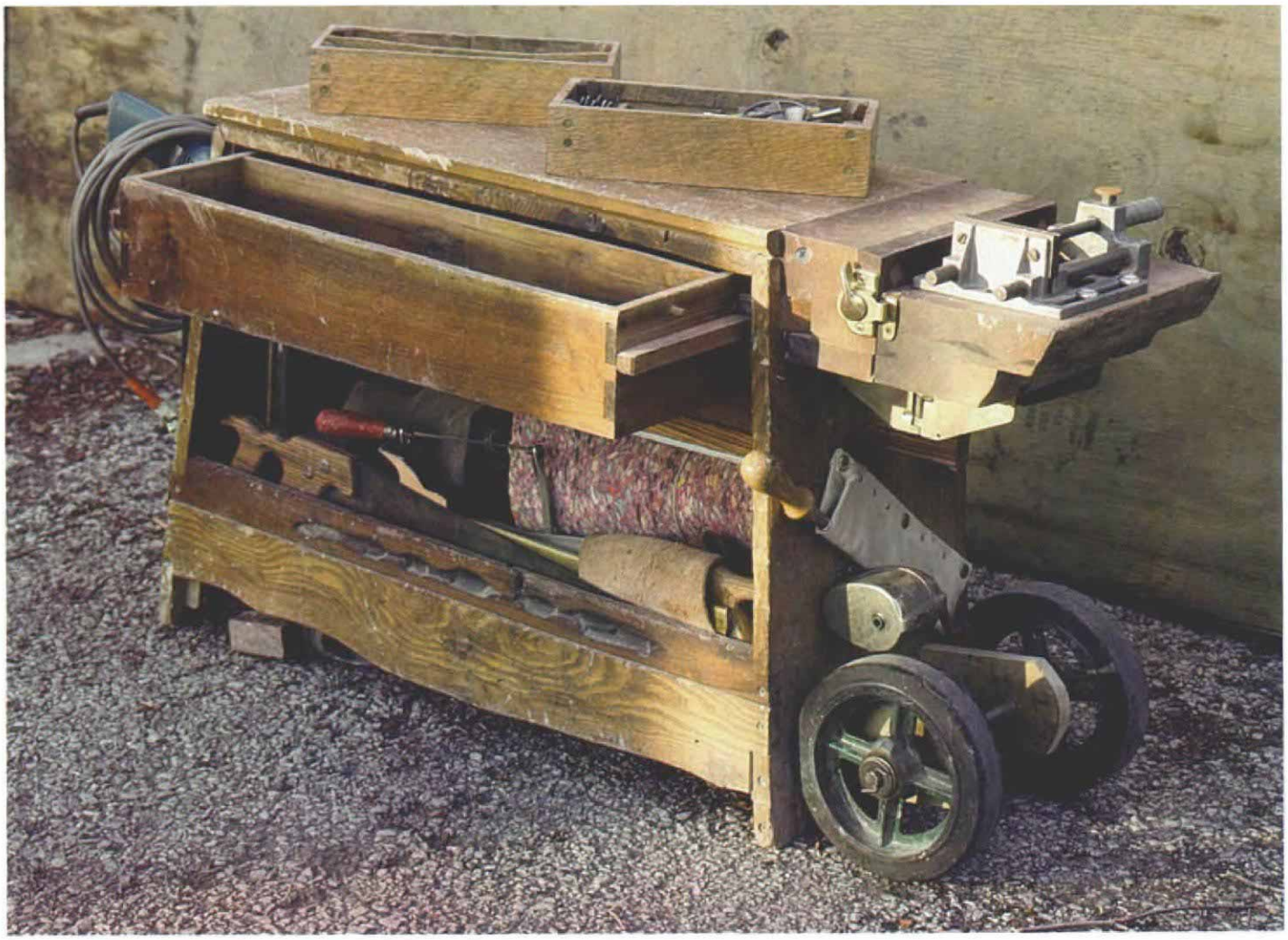
Tapered screws in such a dense material can loosen in their tapered holes. Case hardened screws, such as drywall screws, are not tapered, but can snap when stressed. A vocational school teacher once told me that a standard coarse-thread machine screw will grip hardwood better than a wood screw if it's accurately drilled to the root size of the screw. Machine screws aren't tapered so there is always friction on the threads, and there's much more thread surface to generate friction. So I used 1½-in. by ¼-20 machine screws for mounting the hinges and wheel straps. They haven't loosened one bit in 11 years of pounding.

When the bench is resting on its legs, the rear wheels are not secure. They just lie on the floor until I raise the back sharply and gravity swings the wheels down, plumb and in place. In this position, the butt hinges are closed securely against each other. A small steel catch holds the wheels in place so when I raise the bench over obstacles, the wheels will not collapse. Pushing the bench maintains the closed position of the hinges, and the catch is stressed only when the bench is pulled. A spring-loaded lever, which I trip with my foot, releases the catch and the wheels simply fold under as the bench is lowered onto its legs.

At the back is a swing-up handle by which I can push the bench around. It's made from a scrap of Finn-Form plywood (Baltic birch plywood coated with a phenolic film and used for concrete forms). The front wheels, which are scaffolding casters, take most of the weight and are large enough to roll over obstacles as high as 1 in. This is important when you consider how much debris and how many extension cords can be on the floor of any construction site. By lifting up on the handle, I can raise the smaller casters over obstacles and reduce the turning radius when necessary. □

Paul Pieper is a union carpenter who lives outside of Philadelphia, Pennsylvania. Photos by Kevin Ireton.

Folding up the casters changes the angle of the bench, lifting the rear wheels off the ground and allowing the bench to sit level and stable. A vise, hinged on the end, can be swung up and secured in place with window sash locks. In the down position, it serves as a door buck.



The Tool-Barrow

by Linden Frederick

I built my "tool-barrow," as I call it, while working in the Hartford, Connecticut, area building decks. The decks we built were multi-leveled and quite complex, and we often stayed on the same job site for two weeks or more. Most decks are in the backyard, which made access with my van impossible, so I would lug all my tools from the driveway to the backyard in the morning and in the other direction at day's end. This usually meant several trips. One day I had the idea of building a toolbox on wheels to carry most everything I needed in one trip (top photo, right).

Dovetailed box—The main body is basically a dovetailed pine box. I used dovetails for strength and durability because I knew the toolbox would take quite a bit of abuse. As it turned out, I was right. I backed over the toolbox one day with my van, inflicting only minor damage to it (the van was unhurt). I also reasoned that being outside, it would be rained on occasionally, and the dovetails would hold together better than screws and glue.

Inside the box I partitioned places for power tools and for my nail belt, as well as compartments for an assortment of hardware. This proved to be very handy for quick repairs or minor wiring jobs. I also made the box wide enough to accommodate a framing square laid diagonally (bottom photo, right). I find the inside of the box serves best for such things as bottles of glue and safety glasses, as well as for things I absolutely want to keep dry in case of a surprise rain shower—I can simply slam down the lid.

Saw scabbards and pipe clamps—Mounted to the sides are two handsaw scabbards—one for a fine-tooth saw and one for a coarse saw. This works well because it keeps handy an otherwise difficult tool to transport. Above the saws I screwed on plywood handles.

The wheels are simple lawnmower wheels with a bolt as an axle. If I were to make another box, though, I'd spend more time on the wheels. Pneumatic tires would work best with a solid axle, or even a single wheel like a real wheelbarrow, though this might be unstable.

On top of the closed lid, I placed two compartmentalized portable tool boxes, with blocks mounted on the lid itself to keep them from sliding in transit. In these, I carry hand tools and other small items. The handles were simply made using two 48-in. pipe clamps. When I needed to use them, they were at my elbow, not clanging around somewhere in my van.

The finished toolbox is surprisingly easy to transport. It even goes upstairs when pulled like a handtruck. I suppose I never fit *all* the tools I need for a job in the box, but the essentials are there, and it sure impresses the clients when I come rolling into their backyard, fully equipped and ready to go. □

Linden Frederick now lives in Belfast, Maine. Photos by Chuck Lockhart.

Tool-barrow. **A dovetailed pine box is a traditional approach to a carpenter's tool chest, but wheels on one end and handles on the other are an innovation. Riding piggyback on the tool-barrow are a pair of smaller toolboxes, variants on the traditional carpenter's shoulder box, that sport 4-ft. pipe clamps for handles. Handsaws ride in plywood scabbards flanking the tool-barrow handles.**