e build to solve problems, to help friends and family, and to enjoy the satisfaction of creation. But even in a time of canceled plans and distancing, we still rely on each other for tips and direction. To strengthen the connection among builders, we reached out to the Pop Mech Pro community to share what they've made in the last year. You'll find inspiration in how they were able to make their lives a little tidier, more comfortable, and a lot more fun.

<u>լ՝ հետևօրին կախուն էն սերկուն էն որ հետևորն էր հարտան</u>

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Top Down View

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20" Dias

13" Diander

10"C veter

6/2

# A Cabinet for My **Fishing Tackle**

y son, Matthew, and I are avid outdoorsmen, and we fish year-round in the freshwater lakes and rivers near our home in eastern Washington State. Like most anglers, we've collected tons of rods and reels, tackle boxes and bags, and organizers for lures. And it's nearly impossible to keep it all neatly organized and safely stored away.

We saw a cabinet specifically designed for fishing tackle at our local outdoor-gear big-box store. We liked the idea, but I knew I could build a better, sturdier cabinet with more capacity for a lot less money, and I could customize it for our specific equipment.

After taking inventory of our gear, we finalized the design on paper, bought the necessary materials, and built the fishingtackle cabinet shown here. It features three storage shelves, and two fishing rod holders that each hold six rods and reels.

CUT THE PLYWOOD PARTS

Cut the cabinet sides, top,

and shelves from ½-in. plywood. Then cut the cabinet

base from <sup>3</sup>/<sub>4</sub>-in. plywood,

and the cabinet back from

Next, rout ¼ x ¼-in.

rabbets into each end of

the cabinet top and into

the upper ends of the side

pieces. Then cut 1/4 x 1/4-in.

base to accept the back.

on your workbench, and

rout the ¼-in.-deep dado

ioints that hold the shelves.

I installed three shelves and

spaced the top two 10 in.

apart, and the lower shelf

about 13 in. above the cab-

inet base, resulting in four

the dadoes using a router

storage compartments. Cut

rabbets into the rear edges

of the cabinet top, sides, and

Lay the two side pieces

1⁄4-in. plywood.

#### Part Qty Size/Description

Α	2	(sides) ½" plywood 16" x 48"
В	1	(top) ½" plywood, 16" x 24"
С	3	(shelves) ½" ply- wood, 15½" x 23½"
D	1	(base) ¾" plywood, 20" x 36"
E	1	(back) ¼" plywood,

- 23½" x 48" 2 F (upper rod racks) 3/4" stock, 23/4" x 191/2"
- G 4 (ends) 3/4" stock, 51/2" x 101/2" н 2 (guardrails) <sup>3</sup>/<sub>4</sub>"
- stock, 11/2" x 18" н. 2 (angled bases)
- 3/4" stock, 51/2" x 18" J 4 (casters) 2" wheels, 2 with locks

#### MATERIALS

- 1<sup>1</sup>/<sub>4</sub>" finishing nails • 1<sup>1</sup>/<sub>2</sub>" and 2" washer-head cabinet screws
- <sup>3</sup>⁄<sub>4</sub>" pan-head screws
- Carpenter's glue
- Paint or other finish Adhesive-backed felt
- 120-grit sandpaper



fitted with a ½-in.-dia. underedge. Draw lines along the sized plywood bit. Clamp a inside and outside of each straightedge guide in place side piece, marking their to ensure straight cuts. positions on the base. Mark the ends of the notches cut Prepare to cut two ¼-in.deep x <sup>1</sup>/<sub>2</sub>-in.-wide dadoes into the side pieces, too. into the 34-in. plywood base Now move the cabinet out to accept the cabinet side of the way and rout the two

pieces: First, notch the bot-

tom front corner of each side

piece so it'll conceal the ends

of the dadoes once the cabi-

net is assembled. Outline the

notch in pencil on each side

by measuring ½ in. back from

the front edge, and ¼ in. up

from the bottom edge. Then

use a jigsaw or handsaw to

Clamp the cabinet

together, with the top and

shelves in place. Then set

the assembled cabinet on

base, centered left to right

top of the ¾-in. plywood

and flush with the rear

cut out the notches.

#### ASSEMBLE THE CABINET

plywood base.

1/4-in.-deep dadoes into the

► Apply carpenter's glue to the six shelf dadoes, and to the rabbet joints cut into the top of the side pieces. Clamp the parts together and then hammer 1¼-in. finishing nails down through the cabinet top, and through the sides and into the ends of each shelf. Space the nails about 3 in. apart.

Lay the cabinet face down, and squeeze glue into the rabbets routed into the

rear edges. Set the ¼-in. plywood back into the rabbets and secure with nails. Now apply glue to the dadoes cut into the base. Stand the cabinet on the base, fitting the side pieces into the dadoes. Secure the cabinet by nailing up through the underside of the base and into the bottom ends of the side pieces.

#### CUT THE FISHING ROD HOLDERS

▶ I mounted a fishing rod holder to each side of the cabinet: each holds six rods and reels and has an upper and lower rod rack.

Each upper rack is a 2¾-in.-wide board with six notches cut into it-one for each rod—fastened to the cabinet side 1 in. below the top of the cabinet. The lower rod racks are made up of four pine parts: two ends, a guardrail, and an angled base. Cut the upper rod racks to length from a pine 1x4, then rip them to 2 ¾ in. wide. Use a jigsaw to cut the notches.

To make the two lower rod racks, crosscut the four ends and two angled bases from a pine 1x6. Cut the two guardrails from a pine 1x2.

**BUILD THE FISHING ROD HOLDERS** Assemble each lower

#### upper rod rack

with glue and screws.

Spread glue along the

bottom ends of one of the

assembled lower rod racks.



Set it onto the cabinet base, rod rack by setting the guardrail and angled base and secure by driving 2-in. between the two end pieces. Position the guardrail about an inch below the upper front corner of the end pieces, and ¼ in. back from the front edge. Place the angled base 2 in. up from the bottom of the end pieces, and then tilt it back

Ø

screws up through the underside of the base and into the rack's end pieces. Repeat to install the second rack to the opposite side. Attach an upper rod

rack to each side of the cabinet, positioned 1 in. below the cabinet top. Drive four to 45 degrees. Secure the 1½-in. screws through the guardrail and angled base inside of the cabinet and into each rack.

Once the cabinet is assembled, ease all the sharp, square edges with a router equipped with a rounding-over bit.

Use a <sup>3</sup>⁄16-in.-rad. bit to ease the edges of the 1/2-in.thick cabinet parts, and a 1/4-in.-rad. bit to round-over the ¾-in.-thick parts. After routing, fill any cracks in the

plywood edges with wood filler if needed. Once the filler is dry, sand all edges and surfaces with 120-grit sandpaper. Wipe away the dust with a tack cloth

#### PAINT AND PRIME

Apply one coat of primer, followed by two topcoats of acrylic latex paint.

Allow the paint to dry overnight, then attach four 2-in.-dia. swiveling casters to the underside of the cabinet-locking casters in front, and nonlocking in the rear. Fasten each caster with four <sup>3</sup>/<sub>4</sub>-in. pan-head screws.

Last, line the notches in the upper rod racks with felt. Cut a 9x12-in. sheet of adhesive-backed felt into 34-in.-wide strips, and stick to the inside of each notch.

PERGOLA

Side Stinde Panel F prencord

# Sun Shades for My Pergola

ack in 2013 I built a 15x20-ft. deck off the back of our home, which sits on a windswept hilltop in rural Bucks County, Pennsylvania. The deck provided a quiet spot for us to enjoy the surrounding countryside. However, the summer sun made the deck unbearably hot, so I installed a canvas awning to create a shady oasis. Then one strong gust bent the awning's steel frame into a pretzel.

Eventually, I built a pergola around the deck with an overhead shade structure made of crisscrossing 2x10 beams, 2x8 rafters, 2x2 lattice strips, and an overhead screen. But in the late afternoon, the setting sun streamed in from the west with blinding ferocity.

After some head scratching, I hung a pair of adjustable vertical sun shades along the west side of the pergola to block the setting sun and buffer the wind. The sun screen and vertical shades were made from Coolaroo shade fabric, which is a knitted, breathable high-density polyethylene (HDPE) material that blocks 90 percent of UV rays. Now our deck is comfortable on even the sunniest, breeziest days. Here's how I installed the overhead screen and shades.

### INSTALL THE OVERHEAD SCREEN

 Shade fabric—I bought a 12' x 50' roll of the fabric on Amazon for about \$200

MATERIALS

- Six 2x2s cut to the length of your pergola
  Two 1¼" x 6'
- dowel rods
  Six <sup>3</sup>/<sub>4</sub>" screw eyes
- ⁵⁄₃₂'' x 50'-long nylon paracord
- Two 1" screw eyes
- ¼-20 metal threaded insert and ¼-20 x 4" machine bolt
- 3" deck screws
- Four metal boat cleats

#### ► The pergola measures slightly less than 12 ft. wide x 13 ft. long, so I was

able to cover the underside of the structure with one large sheet of shade fabric. If your pergola is wider than 12 ft., use two pieces of fabric, overlapping by about

five 2x2s stained to match

4 inches.6x10-ft. pi4 inches.6x10-ft. pi1 cut the fabric to lengthric. Next, Iwith scissors and then sta-1¼-in.-dia.pled it to the bottom of theft. I wrappepergola's 2x6 rafters. Staplesfabric aroualone wouldn't hold for long,and then sso I reinforced the overheadto create tfabric by screwing in placethe top of

### the pergola. I positioned one 2x2 at each end of the pergola, and then evenly spaced three more in between. Each 2x2 was attached with 3-in. deck screws, one driven into each rafter.

#### ASSEMBLE THE VERTICAL SHADE

► For each shade, I cut a 6x10-ft. piece of fabric. Next, I cut a 2x2 and 1¼-in.-dia. dowel rod to 6 ft. I wrapped one end of the fabric around a 2x2 twice, and then stapled it in place to create the header at the top of the shade. And I wrapped the opposite fab-



## Now our deck is comfortable on even the sunniest, breeziest days.

screw eve

66

ric edge around the dowel rod twice and stapled it to form the weighted bottom end of the shade.

#### MAKE IT ADJUSTABLE

► At this point, I could just hang the shades to the pergola with a few hooks, but that didn't seem very convenient. So I made the shades adjustable, and now we can raise or lower them to block the sun or wind.

I started by drilling <sup>5</sup>/<sub>32</sub>-in.-dia. pilot holes and then twisting three <sup>3</sup>/<sub>4</sub>-in.dia. screw eyes into each shade's 2x2 header. The first screw eye is 1 in. from the end of the header, the second screw eye is 12 in. from the first one, and the third screw eye is positioned 18 in. from the second screw eye. Next, I cut two lengths of 5/32-in.-dia. nylon paracord, one about 14 ft. long, the other 18 ft. long. I tied the end of the shorter cord to the base of the second (middle) screw eye, and tied the longer cord to the base of the third screw. I looped the cords over the top and down the outside of the shade and up the inside, and then passed the shorter cord through the first and second screw eyes, and threaded the longer cord through all three screw eyes.

#### INSTALL THE SHADE

► To install the shades, I held them up against the

screw eye / short cord tie-off

inside surface of the pergola's 2x10 outer beam and then drove four 3-in. deck screws through the header and into the beam. Then I installed two cleats to a nearby post for tying off the two shade cords. I made wooden cleats to match the pergola, but you can also install metal boat cleats. To raise the shade, pull the two cords to the desired height. then wrap the two loose ends around the cleats. To lower the shade, just release the cord ends.

After installing the shades I noticed they flapped around on windy days, so I made a simple tie-down device to stabilize them. First, I cut pieces of 2x8 stock, to attach to the bottom of the pergola posts facing the shade. I drilled out a  $1^{1/4}$ -in hole with a hole saw, and fastened the blocks with



dowel ends fit into these holes. To secure the shades in the middle of the pergola, I drilled <sup>5</sup>/<sub>32</sub>-in.-dia. pilot holes into the inside ends of the dowels and then twisted in 1-in.-dia. screw eyes. Next, I drilled <sup>3</sup>/<sub>8</sub>-in.-dia. holes into the deck directly below the screw eyes, and then tapped in 1/4-20 threaded metal inserts. Now, when the wind kicks up, I pass a 1/4-20 x 4-in. machine bolt through the screw eyes and into the insert, which with the blocks, holds the shades steady.

the deck screws. With the

shade lowered, the outside

screw eye /
long cord tie-off

BY DEVIN STEWART, AS TOLD TO TAYLOR ROJEK

## **A Grill-Top** Pizza Oven



ere in Singapore, we went into full-on lockdown back

in March. We were allowed to go to the grocery store, but otherwise we could not go anywhere.

And I just got a hankering for some pizza. But the ovens here are pretty small, like the size of a microwave. I tried to make a pizza on my gas grill by sliding it directly onto the grill grates, but it was just all right. I wanted that leopard-spotted bottom, and the charred bubbles on the crust. I saw there were some pizza ovens

that sell in the U.S. that go on top of a gas grill. And I thought, Maybe I can make something like that. My design uses a baking

steel as the base, covered by much practice. I'm always a stainless steel dome with trying to perfect it by studya pizza stone attached at ing types of dough and how the top. The baking steel is to get the heat right (for tips, a better heat conductor than see "How to Make the Perthe stone, which lets it run fect Pizza" sidebar). about 40 degrees hotter. It works great—it gets super hot on the bottom to give

the crust that pizza crunch, while also trapping heat and reflecting it downward to melt the cheese and make the top crust pillowy. I'm originally from

way for me to escape men-

- **B** Stainless steel serving tray or dish **C** 6" stainless steel handle
  - D Pizza stone—mine is 13"dia., but use what fits.

big. It's the simplest food,

hard. Pizza's like that too-

tray

Texas, where barbecue is tally and creatively during lockdown. It's also helped but to get it perfect is so me reconnect with friends. These days, lockdowns to get it just right, it takes so have eased up and we can have five people over at a time. And people are pretty amazed. Like, "Oh my God, you're making this on your grill." Even in the middle of a pandemic, there's nothing Creating the oven was a better than good homemade piz

#### MATERIA

- A Baking steel to fit your grill
- E Stainless steel 10" dumpling

zza to share with friends
S
• 35 washers
• 23 5mm stainless steel

- screws • 23 stainless steel
- acorn nuts • 23 splitlock washers
- 2 stainless steel elbows

### Even in the middle of a pandemic, there's nothing better than good homemade pizza to share with friends.



#### FIT THE TRAY TO YOUR GRILL

▶ My serving tray was too big to fit on my grill grate, so I cut off four inches on one side. That way, I was able to close the lid of the grill while the tray was on it without obstructing anything.



#### ATTACH THE PIZZA STONE

▶ Install the stone toward the back as far as you canit'll be warmer back there, because the opening at the front allows hot air to escape. Use a mortar bit to drill holes to attach the stone and tray. Use all stainless steel hardware because



with the heat and the expansion, it may get a little bit loose. I used 11 screws, with a dumpling steamer tray as one big retaining dish for all of them. Individual washers per screw would be fine; I just used what was available to me, and dumpling steamer trays are common here. It worked out great because it's thin stainless steel.

With the dumpling tray, I needed an inch-long washer for the 5mm screw in the center, but I didn't have one handy. I know in Japan and China, some of their coins are minted with holes in them. So I got a Japanese yen coin and it fit right in the middle, and the hole that it's minted with fits a 5mm screw perfectly.

#### ATTACH A HANDLE

▶ The opening on the side of the pizza oven isn't big enough to slide the pizza peel in with the pizza on it. So I attached a stainless steel cupboard handle to the top of the oven with stainless steel screws and

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### A Grill-Top Pizza Oven cont.

washers. That way, I can just pick the oven up as one piece, get the pizza on the pizza steel quickly, close it down real quick, and then shut the grill lid. The handle I used is  $3\sqrt{2}$  in. long, but should have gone with a bigger handle (around 6 in.) so that it could fit a gloved hand easier.

**Tip:** I use a welder's glove rather than an oven mitt. The leather lasts and protects my hand better. Depending on how good you are with sliding the pizza off the peel, sometimes you have to hold onto the handle for a while.

#### ATTACH ELBOW BRACES FOR STRENGTH.

► I had a problem with the stainless steel bowing with the weight of the stone and the heat. So I put elbow braces in the opening to keep it from flexing. The elbows were at 90 degrees, so I just opened them each up by banging on the corner with a hammer until it conformed to the tray—about 120 degrees or so.



HOW TO

MAKE The Perfect Pizza



**PLACE THE BAKING** steel and oven top on the grill grate. Turn the grill on high, and let it heat up for 45 minutes. Check the temperature of the baking steel with a laser temperature gun—it should be about 500 degrees F.

Use semolina flour to prepare your pizza peel. Lift the grill and oven lids, and slide the pizza onto the steel. Close everything, and let it cook for four and a half to six minutes, checking for doneness as you approach the end of the cooking time. Look for leopard spotting on the bottom, melted cheese, char-bubbles on the top crust, and slightly charred tips on a piece of onion or pepperoni.

## A 1934 Ford Coupe

stripped it to the frame, then built my dream car.

uilding cars is a family thing for us. After World War II, my dad built race cars—midgets, hot rods, that sort of stuff. He actually raced himself for a while in the Bay Area and was the first to hit 100 miles per hour on the Oakland Speedway. When I was a kid, I always hung around the shop with Dad, helping him out, and kind of got the knack of it.

After I got out of the Navy in the late '60s, I started building aluminum bodies on race cars: midgets, dragsters, funny cars, and sporty cars. I also started building motorcycle gas tanks for the Harley-Davidson XR-750 flat-trackers in the early '70s.

I've been a fabricator, building cars and parts for other people, almost my whole life. But a little over a decade ago, I bought this '34 Ford. That's the year that Fords started having nicer lines—a more flowing look. I looked for a five-window '34 coupe for a long time and paid way too much money when I finally found one, but it's what I wanted.

It was a running car, but it needed help. It was just in primer when I bought it. It had a Chevy 350 in it, which I'm not particularly fond of—I'm a little

bit of a purist. To me, a Ford's a Ford, and a Chevy's a Chevy. It sat with me for years, then I finally I decided I'd just take the car apart and do a restoration on the thing reassemble it, paint it, and everything.

I stripped it down to the bare frame, but the further I got, the more problems I found. This is where the car really became a project.

I took the body to Myers Sandblasting in Oakland, who took off the paint down to fresh metal. Well, the only thing holding that steel body together was Bondo. The bottom had rotted out and it was terrible.

From the way the body was beat up in all four corners, I'm almost positive the car was raced. I pulled the running boards off and one was a much different shape than the other, and both were an inch shorter than they should have been. Nothing on this car really matched up as far as the stock size. It's up there around 500 horsepower and instant RPMs. It's kind of fun to nail it on the highway once in a while, though.

The chassis was twisted, too, so I had to straighten and box the frame up quite a bit to make it roadworthy. Luckily, I saved a lot of money by fabricating and replacing basically everything myself: the deck lid in the back, the trunk lid, the cowl to accommodate a modern air conditioning system, and the side panels from the firewall back.

I used an English wheel to stretch the metal in the shapes I needed, and finished by hand using mallets, sand bags, and steel dollies. The basic shape was all there, though. One thing about the rounded shape of a '34 is that it's more forgiving than the flatter door skins, where it's easier to stretch the metal out too much.

ary Allen, who builds drag motors, built a Ford 351 Windsor engine with a bit too much horsepower for the car. It's up there around 500 horsepower and instant RPMs. It's kind of fun to nail it on the highway once in a while, though.

Gary built the Windsor like a race engine with Trick Flow cylinder heads and an MSD distributor. Everything's all balanced. It runs a simple 650 four-barrel carburetor atop an air gap intake manifold. The intake chambers sit above the manifold





Left: The Ford's first drive since the rebuild started. Above: Hagemann refabricated the doors, rear quarter panels, rear apron, and deck lid. Below: Hagemann straightened the frame by hand, and strengthened it by boxing in (reinforcing) the existing frame rails. base itself so there's air in between them. It stays cooler, so you get better flow and performance.

The first transmission I got—a C4 automatic that didn't come with the car—was a mess. The C4 was very common in '60s and '70s Fords and popular with hot-rodders for being light and compact but still able to handle lots of horsepower. But as near as we can tell, the guy who built mine used mismatched parts. There's three C4 transmissions and they are all different. You cannot take parts from a C4 number one and put it in a C4 number two or three. So, Bob's Almaden Transmission in San Jose ended up just chucking the transmission, buying another C4, and rebuilding it up to their standards. It's now good for 600 horsepower.

I replumbed the brakes and rewired the car with an off-the-shelf wiring harness with hookups for its new heating and air conditioning system. The car used to have a gas tank in the very back, but I built a fuel tank to go farther up in the trunk. In case anybody ever smacks me in the rear end, it's not going to blow. The doors, the deck lid, side panels, fenders, and everything else that could come off of the body came back wrapped in shop blankets for me to assemble.





Above: Hagemann chromed the grill shell and windshield frame to contrast with the paint. Left: Hagemann modified the stock dashboard, upgraded the glove box, and installed a backup camera and radio combo. The new center console serves as a transmission cover and has cup holders.

The front is still a straight solid axle, which is typical for the '30s. All four shocks are more modern now. Instead of having the leaf spring in the back, I put coil-over shocks. They're a little simpler, and you can adjust the ride.

I ended up putting in rack-and-pinion power steering, which is a little simpler than the Vega steering box it came with. When you're trying to park a car like this, it gets a little tough. I put a tilt steering column in, too, so my wife could drive it and tilt it back a little bit if she wants to.

here's plenty of '33s and '34s around, and they're all a little too hotroddy for me—fenders off, fat tires, \$50,000 paint jobs. I wanted more of a stock look, though I kept the wheels that came with it because they're original one-piece American mags that go way back, probably made in the '60s.

I kept as much as I could on the car around the upgrades, like the vent window that cranks out. I put power windows in the doors, though. It's just a little thing that makes it convenient. I even installed a backup camera. Mods Hot Rods in Fountain Hill, Arizona, painted the car piece by piece. The doors, the deck lid, side panels, fenders, and everything else that could come off of the body came back wrapped in shop blankets for me to assemble.

I didn't want a pricey show paint job I wouldn't want to take anywhere, and I didn't really want to go hog wild with scallops or flames. I just wanted something nice and clean. I went for a tannish-colored body with dark chocolate fenders for a nostalgic look, but with a bit of modern flair. When I went to get a custom license plate for this thing, my wife, Jan, said, "How about Milk Duds? It looks just like a Milk Dud to me!" Milk Duds are caramel with chocolate on the outside, and the car kind of resembles that. So the license plate says "MLK DUDS."

After building a car like this where everything is fresh, you've got to shake it down-drive it around, put miles on it. You always have little issues here and there. When I first started driving it, I had to readjust the power steering to correct some pretty serious oversteer. The first pair of shocks and springs on the back were too loose and could bottom out, so I got some that were an inch longer with more adjustment. A couple of my exhaust hangers were too short and the heat from the exhaust melted the mount's little rubber pucks. And my emergency brake assembly was also hitting the inner wheel, so I had to massage that a little bit to move it out.

Gary's going to come down one of these days to do the final tune-up on the engine, but right now, it's pretty snappy just the way it is.

I'm going to keep building my own cars from now on. After this car, I'm building a '27 Ford for myself. I've always wanted one because I had an original '27 pink slip that I believe came from my grandfather. I've got my shop here and I still like doing what I'm doing. There's no pressure. I take my time. Life is what you make it, and you've got to keep going.