

# DIY COFFEE



## CHASING THE GODSHOT



Pack perfect grounds every time with this hydraulic espresso tamper. By John Edgar Park

*Godshot.* That's the elusive goal of espresso fanatics everywhere. Thick with micro-bubble crema and a velvety mouth-feel, and packing explosive flavor, the godshot is pulled too infrequently for my liking. A perfect shot of espresso is the product of many variables, so anything I can do to lock in one of those variables is a good thing. Think scientific method as applied to espresso.

As a home barista, the five factors I worry about most are: beans, water, grind, dosing, and tamping. Here's a quick overview:

**Beans:** Use high-quality beans that have been roasted within the past 3 days to 2 weeks.

**Water:** Fresh water needs to be brought up to proper temperature and pressure by the espresso machine.

**Grind:** Dial in your burr grinder to fine-tune the coarseness of the ground beans.

**Dosing:** There's a prescribed amount of grounds to measure into a standard portafilter basket, but people tinker with this all the time.

**Tamping:** Once the grounds have been measured into the portafilter and distributed evenly, they should be compressed with 30 pounds of pressure using a tamper. This is difficult to do by hand.

Once these steps have been taken, the portafilter is locked into the group head of the espresso machine and the shot is pulled. This is sometimes accompanied by breath holding, finger crossing, and the like.

The variable I chose to attack was the problem of tamping. I'd heard about automated tamping systems, which remove the guesswork of manually pressing grounds into the portafilter with a hand-held tamper, and instead consistently provide 30 pounds of uniform pressure. This is great, but automatic tamping machines cost hundreds of dollars. One clever member of the [home-barista.com](http://home-barista.com) forums scoffed at the price tag and built his own, using a manual lever juicer as the platform. I decided to give it a try.

I considered a few requirements for my auto tamper: a way to know when I've hit the magic 30lbs, a way to secure a commercial tamper base to the down-shaft of the juicer, and a method of resting different portafilters with their oddly shaped undersides on a load-bearing surface.

Through some informal research, I determined that the most common method of indicating correct pressure in a commercial auto tamper is with a "clicker" system. This is a calibrated spring and ball bearing mounted at a right angle to the shaft. One great feature of these systems is that they stop all downward pressure after the threshold has been met.

Home baristas have more commonly opted for a heavy spring mounted over the juicer shaft, kind of like a car's coil-over suspension. Enlisting the aid of a bathroom scale, they test for the 30lb depth and then mark a calibration line on the shaft. This is an elegant, simple design, and they've reported excellent results. Another simple method, suggested by a gearhead friend of mine, would be to replace the lever handle on the juicer with a torque wrench adjusted to pop when 30lbs are measured at the tamper.

While the torque wrench would have functioned well, I was also concerned with aesthetics. I wanted to maintain the quasi-steampunk look of my espresso machine, with its beautiful pressure gauges front-and-center. I wondered how I could use an analog dial to read out my tamping force. After another brainstorming session with my friend, we had it: a pressure gauge connected to a hydraulic piston coupled between the juicer's down-shaft and the tamper base.

To set these plans into motion, I began sourcing parts. The foundation for the project is the juicer. It can be had for about \$20 at T.J. Maxx or Marshalls, and I also found many on eBay — just search for "manual juicer."

The piston, gauge, and fittings proved a bit harder

## MATERIALS

**Manual lever juicer around \$20 from department store clearance sales or [ebay.com](http://ebay.com)**

**Espresso tamper base** You may be able to unscrew the handle of your current tamper, or buy one at [coffeetamper.com](http://coffeetamper.com).

**Actuator piston** See what you can find at the salvage yard, or search eBay for a 1" Parker actuator.

**100psi pressure gauge**

**Aluminum 1" round stock, 1½" length** Try a local metal supply or order from Small Parts ([smallparts.com](http://smallparts.com)).

**Aluminum ½"×2½" flat bar stock, 5" length** Fittings and pipe to connect piston to gauge

**Glycerin or castor oil** Either makes good hydraulic fluid, and neither should accidentally poison you!

**Threaded insert**

**Thumbscrew or bolt**

**Total cost should be \$60–\$100, depending on where you find your parts.**

## TOOLS

**Needlenose pliers** to remove lever handle retention clip

**Crescent wrench**

**Drill press and various bits**

**Tap wrench and taps**

**Hex wrenches** for juicer disassembly

**Angle grinder** to cut and smooth aluminum



to track down. I found many sources online, but they were all too expensive. I finally hit the jackpot at Norton Sales ([nortonsalesinc.com](http://nortonsalesinc.com)), an aerospace scrap yard in North Hollywood, Calif. There, I picked up a stainless steel actuator piston for \$5, a 100psi gauge for \$7, and the pipe and fittings for a few bucks.

I went to Industrial Metal Supply ([imsmetals.com](http://imsmetals.com)) for scrap aluminum stock. A neat little store in



A



B



C



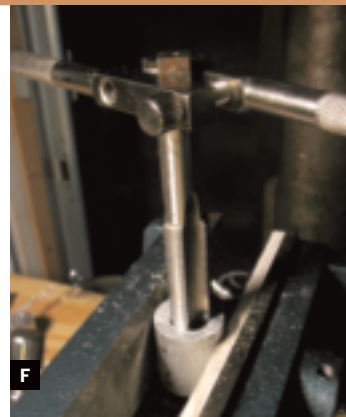
D

Disassembling the juicer. First, remove the cone-shaped cup from the juicer shaft (save it — it may come in handy for a future project). Figs. A and B: Remove the lever assembly.

Fig. C: Use pliers to remove the retention clip on the lever handle. Fig. D: Place the down-shaft at its highest point, and reinsert the lever handle at the starting angle, as shown here.



E



F



G



H

Connecting the juicer shaft to the actuator piston. Fig. E: Cut a 1 1/2" length of 1" aluminum rod. Fig. F: Drill and tap the rod to couple the juicer shaft

and the piston mounting thread. Figs. G and H: Juicer shaft, coupler, and piston shown separately and joined together.

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I



J



K



L



M

Final steps. Fig. I: Thread insert into tamper base to join it to the actuator piston. Fig. J: Make base plate from rectangular aluminum stock. Cut a U-shaped notch to hold the portafilter and add a bolt to tighten

the base onto the support column. Figs. K–M: Pull the lever to tamp your grounds, while keeping an eye on the pressure gauge. Perfect tamping!

Burbank, Calif., called Luky's Hardware yielded various bolts, inserts, taps, and cheap, resharpened drill bits.

To begin construction, I disassembled the juicer and its down-shaft. I then removed the lever handle, placed the down-shaft at its highest point, and re-inserted the lever handle at a better starting angle.

Next, I drilled and tapped a 1½" length of 1" aluminum rod to couple together the juicer's shaft and the piston's mounting thread. If you don't want to drill and tap solid bar stock, you could consider using a tube with some cross-drilled tightening bolts instead.

I couldn't find an insert of the correct dimensions to mate the piston rod to my commercial tamper base. I found one that was very close, and cut it with a die to fit the coarse threading of my tamper. A bit of a hack, but it seems to work well enough. If you're willing to re-tap your tamper base, you'll have a wider variety of inserts to choose from.

I filled the piston with glycerin, my food-safe hydraulic fluid of choice, and then screwed in all the fittings for the pipe, gauge, and piston (including a plug for the upstroke inlet). I left a bit of air in the line to provide a little compression. I found that it feels better to have some give as you pull down on

the lever. If this were a car, you'd call it mushy brakes.

Since I use both regular and bottomless portafilters (see *MAKE*, Volume 04, page 117, "The Bottomless Portafilter" to build your own), I needed a versatile enough base plate to support either of them during tamping. I cut a 5" length of my rectangular aluminum stock with a grinder, and then cut a U-shaped section out of it. I made this wide enough to clear the underside of a regular portafilter but still support the bottomless one.

I drilled a ¾" hole at one end of the plate so I could slide it over the juicer's support column. Finally, I drilled and tapped a ⅜" hole at the back of the plate. This allows me to tighten it in place with a small bolt.

With everything assembled, I've now got my own auto tamper for about \$50 — far less than a commercial unit. It functions flawlessly, gives me an exact tamp every time, and looks stylish. But most importantly, it's removed tamping from my list of espresso worries in the continued quest for the godshot.

John Edgar Park rigs CG characters at Walt Disney Animation Studios. His home base is [jpixl.net](http://jpixl.net).