

The Deliberator



Introduction:

The Deliberator is a .38 Special single-shot 3d printed pistol designed to be easy and fast to build. Combined with a self made .38 cartridge filled with powder from ground matchstick heads this gun is 100% clandestine. For an ammunition guide read “Expedient Homemade Handgun Ammo” from P.A.Luty.

You will only need a modest amount of tools beside the 3d printer, and the metal working is kept to a minimum. This should allow even city-dwellers to build themselves a gun out of their one room apartments.

Materials:

PLA Filament

1x seamless steel pipe 15mm x 3mm (S235) 100mm

1x seamless steel pipe 20mm x 2,5mm (S235) 65mm

2x M4 x 20mm bolts (ISO 1207)

2x M4 nuts

1x pressure spring 14mm OD, 1,5mm wire thickness, 40mm long
(quite unreliable, use longer spring if possible)

1x 2,5mm drill shank (or 2,5mm diameter high quality round steel)

2,5mm thick flat steel (S235)

Tools:

3d printer with at least 120mm x 100mm printing surface

power drill

3mm, 9,5mm and 10mm drill bits

cutting disk and grinding bit

a vice

hammer

handsaw with metal saw blade

small key files, flat and round

pincer

screwdriver

strong epoxy, JB-Weld or comparative strength

(9,7mm straight reamer instead of the 10mm drill bit for a tighter chamber)



Instructions

Printing the Grip, Hammer and Trigger

Make sure your printer is properly set up and working flawlessly. If it's your first time 3d printing, I highly advise you to first try some non-gun related objects. Familiarize yourself with the process and the finished product until you can differentiate a good print from a bad one.

We will use PLA filament. It's inexpensive, widely available and gets the job done. Other filaments may be stronger, but I didn't test them and can therefore not attest for their safety. The filament quality is not that important, my did only cost 13 bucks per kg and functions just fine.

I'm using 1,75mm filament with a standard 0,4mm Nozzle.

Open your slicing software (Cura) and load the grip.stl file. Rotate the part until it lays flat on the side with the barrel recess facing upward.

Now change the print settings to the following:

Material: PLA
Printer Setup: Custom
Profile: Low Quality 0,15mm
Layer Height: 0,15mm
Wall Thickness: 3mm
Top/Bottom Thickness: 3mm
Infill Density: 95%
Printing Temperature: 200°C
Build Plate Temperature: 50°C
Print Speed: 40 mm/s
Infill Speed: 40 mm/s
Travel Speed: 150 mm/s
Initial Layer Speed: 20 mm/s
Generate Support: checked
Support Placement: Everywhere
Build Plate Adhesion Type: Skirt

Basically, we want to print in full at low speed, while still retaining a more or less acceptable print time of under half a day. Hammer and trigger should be printed with the same settings.

Metalworking

Saw a 100mm(+25mm if you want easier reloading) long piece from the 15x3mm seamless pipe. Most likely you will not cut 100% straight, use your files to correct that. Only one side, the chamber end, will need to be in at a 90° angle. Then put the barrel in your vice and drill the chamber 28,5-30mm deep first with the 9,5mm bit, then with the 10mm bit. The exact chamber length is not that important, as long as your cartridges will fit to the rim in, it will work.

Saw a 65mm (+0,5mm for safety) long piece from the 20x2,5mm seamless pipe. You need to file both ends flat to a 90° angle. After filing both sides your pipe should be around 64,5mm long. Now test the fitting by pressing it in the grip recess. It shouldn't be too loose nor too tight. If it is too tight, file more material away. If it is slightly too loose, you can add epoxy in the next step to lengthen the pipe.

Clean both pipes inside and out with soap water, dry them, then test if they slide in another. File the outside of the 15mm pipe, if not. Put epoxy outside around the chamber end on the 15mm diameter pipe and push the other pipe from the chamber end until there is only a 1,5mm gap between them. A spend cartridge can help as spacer but consider the rim thickness is not always the same, so push the inner pipe slightly (0,1-0,2mm) more out. Remove any excess epoxy from the pipes with warm water. Slightly oil the barrel and let the epoxy at least 1 day to set.

The breech plate is a 16x16mm 2,5mm thick steel plate. The cut for the firing pin is 3mm offset from the center. Drill the middle hole with a 3mm drill, then saw a slit from one side to the hole. File away any burrs.

The firing pin is a 2,5mm drill bit shank. Cut it to 15mm with the cutting disk. Grind the top of on one side at a 45-60° angle until the tip is only 1mm in diameter. Glue or epoxy it in the hammer.



Work in Progress

If you read this, I decided to go out guns blazing and didn't find the time to complete this project. For your interest, I will post my test results.

I tested one shot with 9 grains of a 65/35 potassium chlorate/sugar mixture finely powdered behind a 158 grain lead bullet without gun failure/signs of breaking. This means that this gun can be used with 7 grain match-stick powder. Matches are made from potassium chlorate and antimony sulfide + glue/glass dust and burn slower/colder than the test mixture.

Alternative use black powder, up to 20grain.

An expedient wadcutter bullet mold can be made by drilling a 9mm hole through a 15mm-20mm steel plate. Then use fine sandpaper to smooth any burs.

Make a top plate from 2,5 steel by drilling a 4mm hole through it and use a 9mm bit to bevel it.

Put the improvised mold on a third steel plate, put the top plate over it so the holes match and fill it with molten lead or tin (solder can be used). Hammer the top plate off and push the bullet out with a wooden rod.

The 14x40x1,5mm spring is a bit too weak. I tested a 14x40x2 spring, which is too strong.

Currently trying to find a spring with wire thickness in between/ a longer one from 1,5mm strength.

Alternatively, a second spring 40x10x1mm inserted in the first could be enough, needs testing.

The trigger needs to be manually set when you cock the hammer. There is a protrusion on one side for that.

The screw holes are a little bit too large, so maybe change the .stl.