

# Building instructions for Mini Oilcan

This is not a Beginners Project. You should have some practice in building and dealing with very small parts. Be patient. Not everything will work at the first shot.

## Bill of Material:

All parts are made from bar stock Brass or Steel. All dimensions and threads are metric. The Valve balls are 2.5mm stainless steel balls. You can find them on Ebay. The Plunger is made of Chrome/Vanadium steel rod (115CrV3) precision ground and polished. One of the springs is from a Ballpoint pen, cut to length. The other one is wound on a 2mm mandrel from 0.2mm wire. This wire is used by anglers for offshore fishing as leader wire for all those toothy predators.

1. **Main Body:** Cut off a piece of 24mm Brass pipe and turn to length. Drill both 3mm holes.
2. **Bottom:** Turn the bottom from Brass bar stock. The shape of the bottom can be according to your taste. The 1.5mm recess should have a snug fit in the Main body. Now stick the body and the bottom together and silver solder from the inside.
3. **Lid:** Turn the Lid from Brass bar stock. Give the recess a snug fit in the Main body. Drill an 8 mm through hole in the middle. Drill two 5mm through holes. If you are using the shape and pitch from the plan, then drill the 5mm holes perpendicular.
4. **Nozzle:** The Nozzle is made from a 50mm long, 3mm dia. brass bar stock. First drill about 25mm length with 1.5mm. Then turn the piece around and drill the other 25mm with 1.3mm. Now give this side on a length of about 35mm a conical shape. I did this on the lathe with a small file. Leave the other 15mm straight. Polish the nozzle. Now comes the tricky part! Bending the nozzle. Anneal the nozzle in a small propane flame ONLY where you want to bend it. Not the whole nozzle! Stick two pieces of wire in both ends to hold the nozzle and SLOWLY bend it while the "pipe" is hot. When the brass cools down bending gets harder. Then anneal again. Repeat this until the desired angle is reached. I used about 100°.
5. **Fittings:** The fittings are made from 6mm spanner size hex Mild steel. Simple turning parts, both the same size. Drill one of the fittings with 3mm and the other one with 2.5mm. Cut a M4x0.5 fine thread on them. I blackened the fittings for optical reasons.
6. **Filling Lid:** The filling Lid is just a simple turning part made from brass. You can turn the shape according to your taste.
7. **Handle:** The handle is made from 3mm brass bar stock. Just anneal and bend it to your like. Make the ends fit into the two holes of the Main body. Then soft solder the handle into the Body.
8. **Pump Intake side:** This part is made from 5mm brass bar stock. Use the dimensions from the plan. Drill and Ream the inside carefully in the lathe. Drilling, reaming and Thread cutting is all done in one setting. Now put a 2.5 mm valve ball inside and give the ball a LIGHT tap with a 2mm steel rod and a small hammer to form the valve seat on the bottom.
9. **Pump pressure side:** The same is done with this part. But watch the different designs! The pressure side has no through hole on the bottom. Later when assembling the pump, use new

valve balls. The ones you took for forming the seat may have been deformed and don't seal good anymore.

10. **Spring:** Wind the pressure side Spring on a 1.5 - 2mm mandrel with about 15 windings and an overall height of about 12mm. This is not critical. It only has to fit into the bore. Just make sure the spring can slide in the bore. The necessary length is adjusted later. This spring keeps the valve ball in its seat and prevents the oil from flowing back.
11. **Plunger and Nipple:** Use the dimensions from the Plan. Be careful by turning the plunger and cutting the M 2.5 thread. Any scratches on the surface will prevent the sealing of the plunger in the bore. It should slide easy in the bore and nevertheless seal like a piston in an engine. The Push Nipple is a simple turning part. Turn to your taste.
12. **Assembly:** Slide one of the fittings on the nozzle. Turn a small stop ring (see plans) and glue it on the end of the nozzle to prevent the fitting from falling off. Use Loctite 648. Now stick the parts through the holes in the Lid. Make sure the whole assembly fits into the Main body. The intake side should be as close as possible to the bottom. Both holes for the connection must be on the same side. Measure the distance between them. Now we have to make a connection between the intake and the pressure side. I used a 2mm brass pipe with a 1.3mm bore. Depending on the distance that you measured you must now anneal the brass pipe and bend a half circle i.e. over a drillrod. In my case I had to use a 10 mm drillrod. Cut off the half circle, deburr and adapt it to the holes in the pump until it fits. Make sure the whole assembly fits inside the Body! When satisfied you can soft solder the connection to the pump. Use flux and very small amounts of solder to not cloak the holes inside. When finished you can glue the Pump in the lid with some Cyanacrylate or Loctite. Now flush the whole pump with some solvent to get any chips and dirt out. Next, assemble the Intake and pressure side of the Pump. Now adjust the length of the pressure side spring. When you screw in the nozzle, the spring should just hold the ball in its seat. Fill the Oilcan with thin Machine oil and start pumping. Once the air is out it should work.
13. **Hope you were succesful and your Oilcan works!**