WARNING: Wear safety goggles at all times when the engine is running and cooling

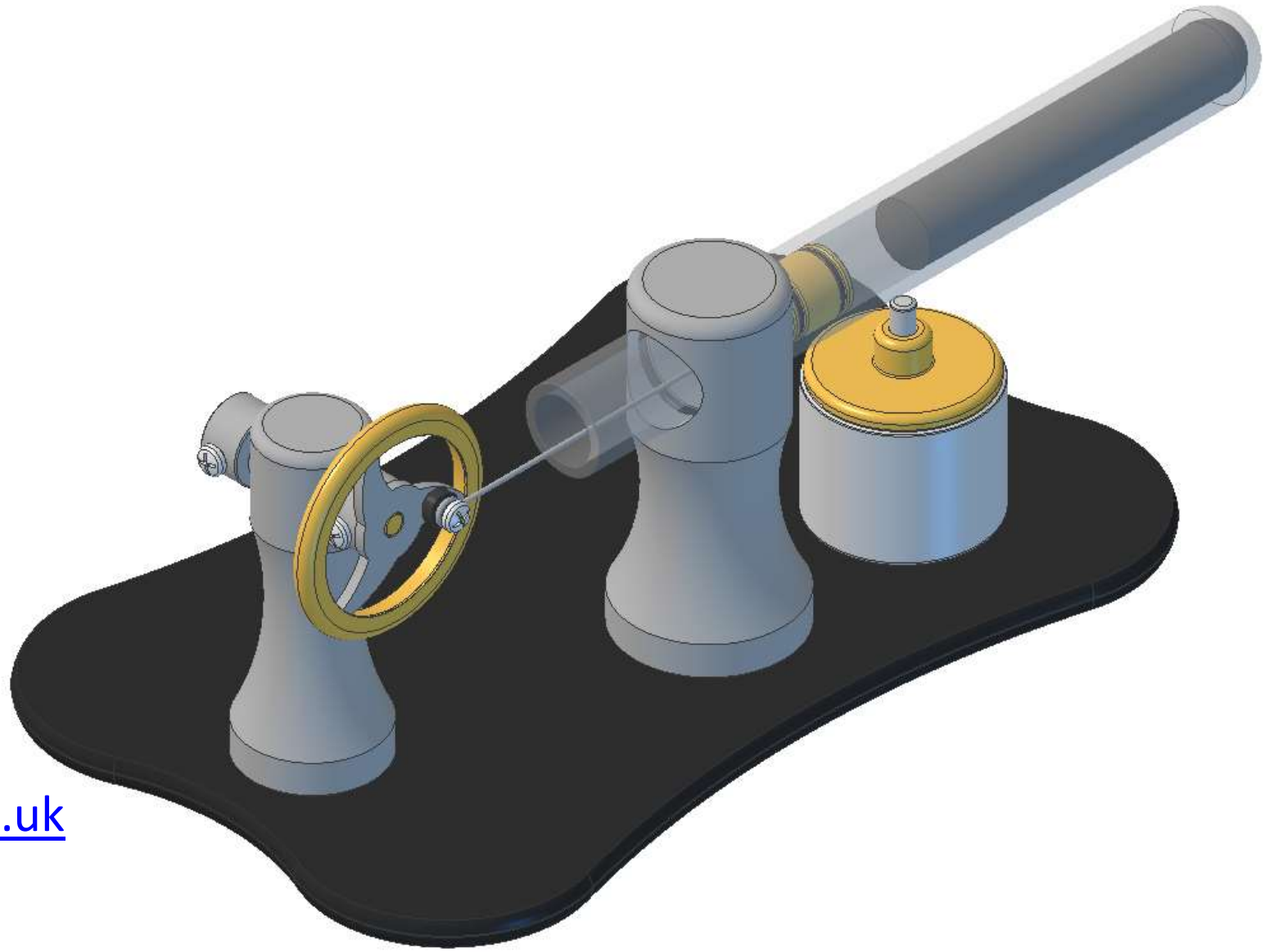
Please be safe and enjoy your engine. It is not a child's toy it is a precision machined working model.

- Never leave Children unattended with the engine
- Never leave the engine unattended while it is running
- Allow the engine to completely cool down before leaving it or storing it away
- Flammable liquid is required. Read the cautions of the flammable liquid
- Only use methylated spirits (also known as denatured alcohol or ethanol) as a source of fuel
- Only use the supplied burner as a heat source
- Never adjust the engine in any way while it is running or cooling
- The entire engine will get very hot when in use
- Never run on an easily ignitable surface. Always run on a surface that can withstand heat
- Product contains glass. Glass can crack, break or shatter.
- Never run an engine that has damaged glass. E.g. scratches, chips
- Never run an engine if the glass has visible defects. Contact customer services if defects found
- Although the glass is robust it can be damaged through miss-use
- Keep the fuel away from combustible materials
- Never overfill the burner. There is a step in the inside. This is the maximum.
- Always keep the wick trimmed to the length recommended
- While running keep hair and clothing away from the engine
- Never position the engine where the engine can topple or fall
- Keep your face and hands at a sensible distance while the engine is running

Kontax Stirling Engines KT09 instructions

This document covers the following:

- Tools required
- Parts list
- Assembly instructions
- Operating instructions
- Maintenance

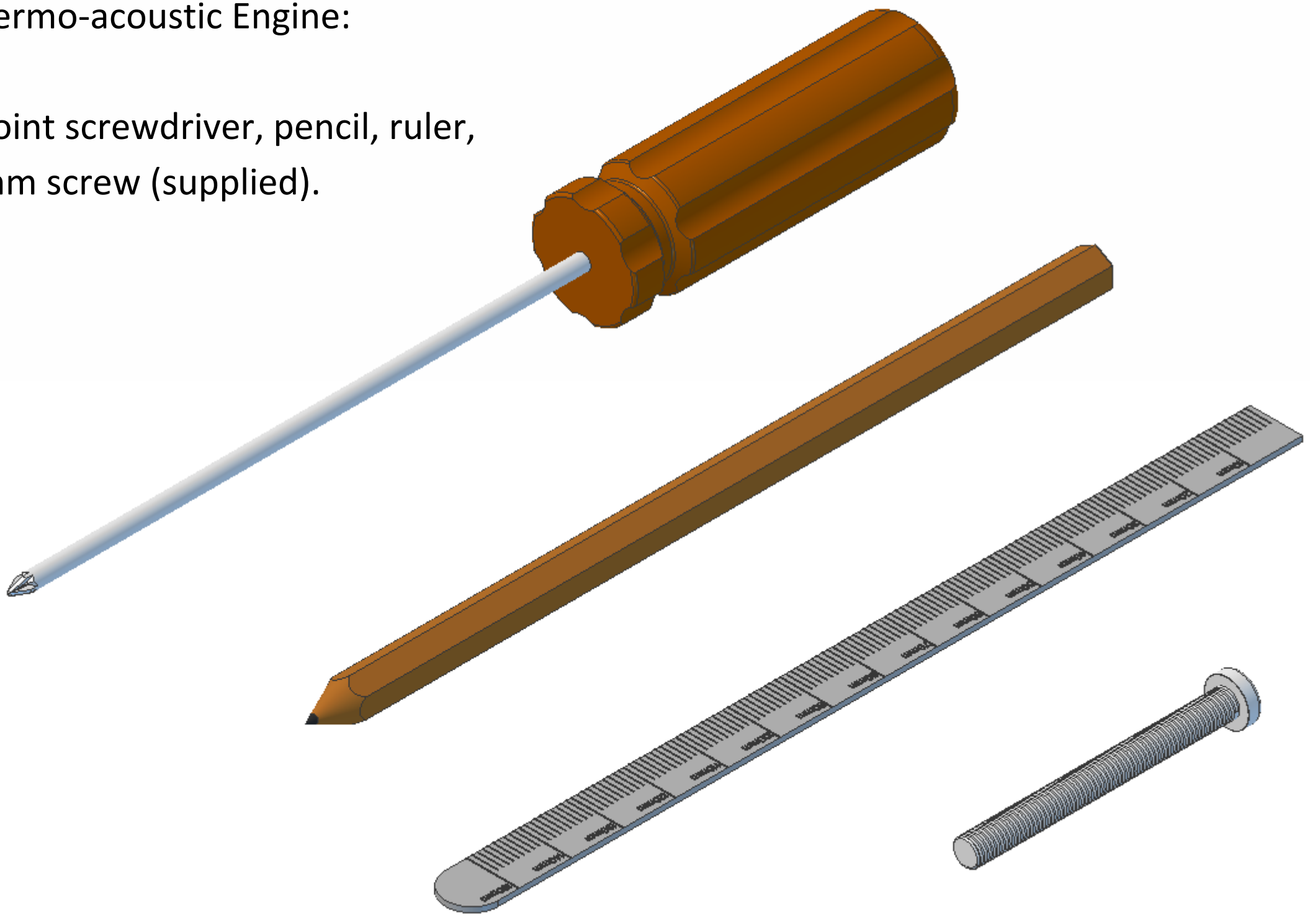


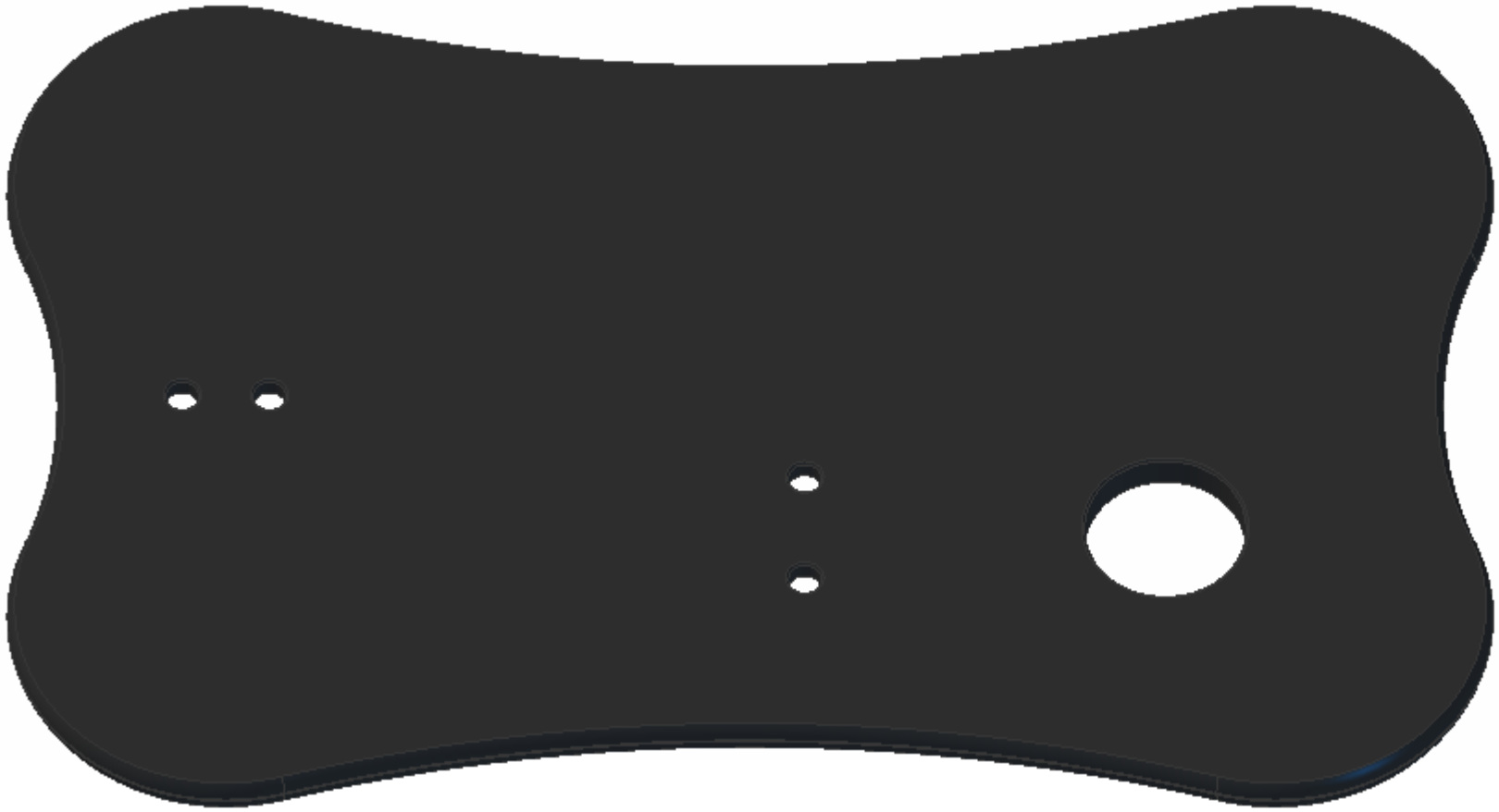
Contact details:

- www.stirlingengine.co.uk
- kontax@stirlingnengine.co.uk
- Tel: 01628 773212 (UK)

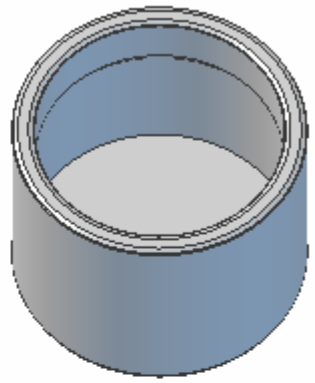
Tools you will need to assemble your KT09 Thermo-acoustic Engine:

Cross-point screwdriver, pencil, ruler, M5x50mm screw (supplied).

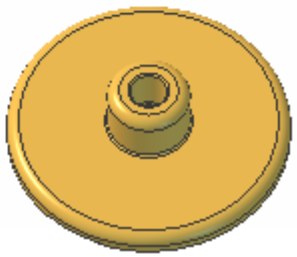




Base plate x1



Burner body x1

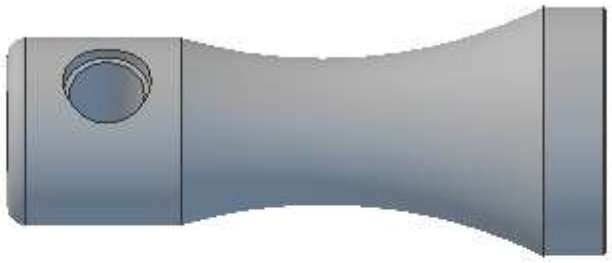


Burner cap x1

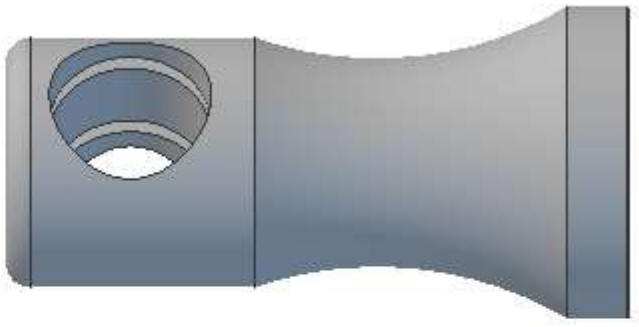
Tube x1

Wick x1

Conrod x1



Wheel pillar x1



Tube pillar x1

Axle retainer x1

Piston x1

Choke x1

Flywheel x1

M2x6mm roundhead x1

M2x4mm roundhead x2

12.5mm O ring x2

13mm O ring x1

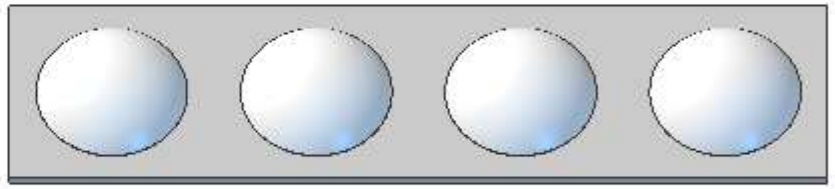
M3x8mm countersunk x4

Conrod bush x1

7mm O ring x2

Axle x1

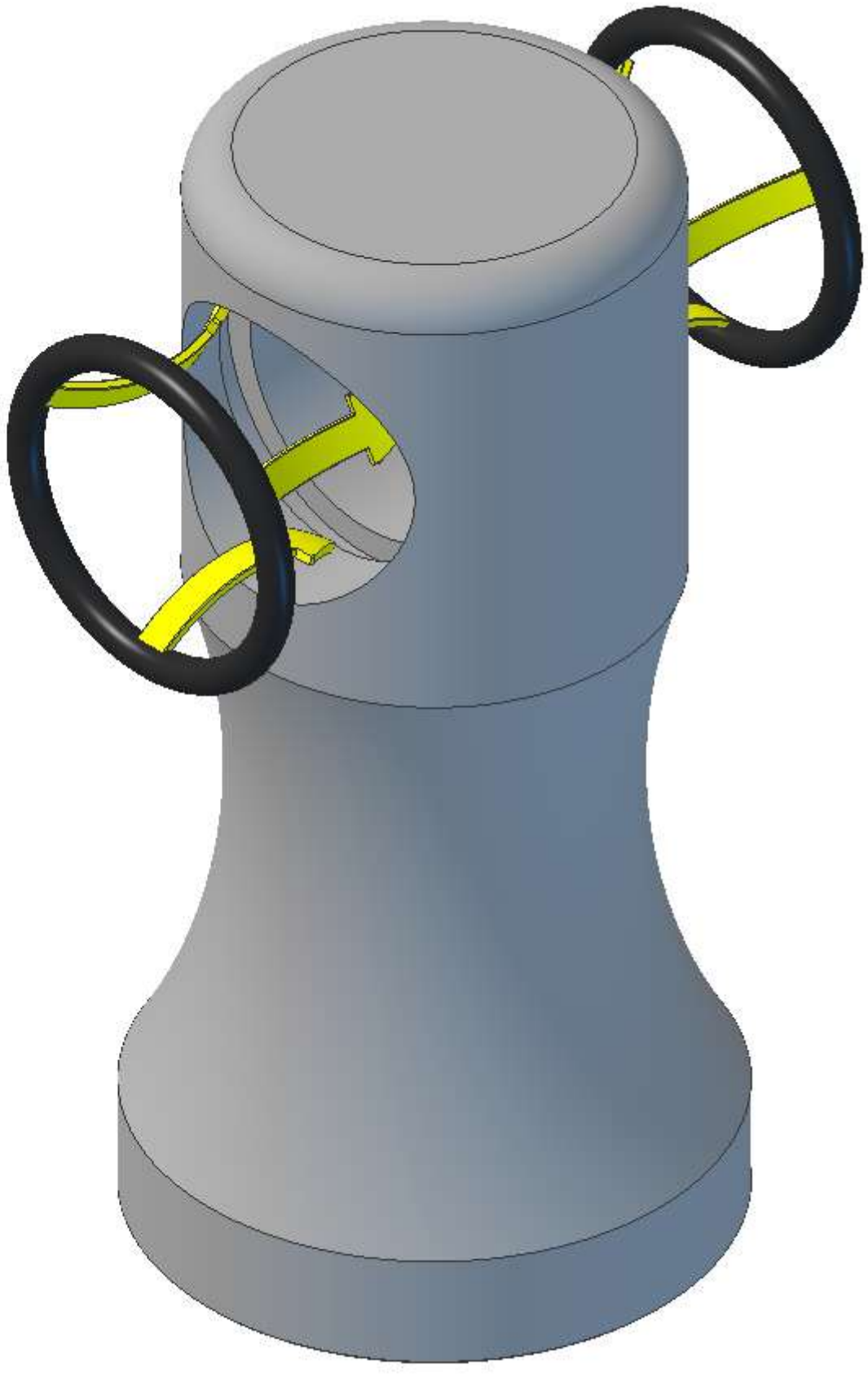
Ball-race bearing x2



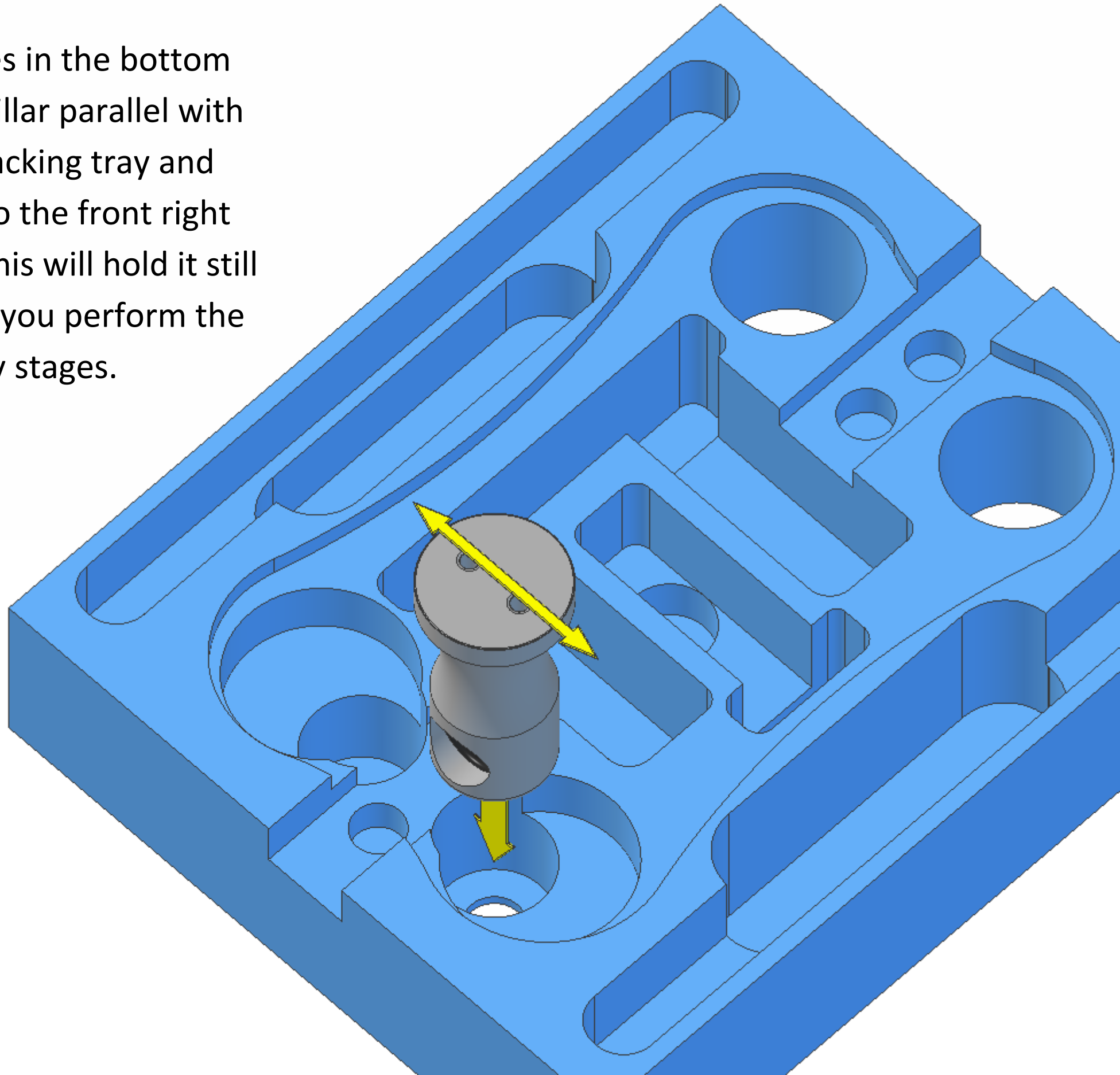
Feet x4 (1 strip)

Note, the 12.5mm and 13mm O rings are similar in size, but the 12.5mm O rings are slightly thicker than the 13mm ones. you will need the 12.5mm ones for this assembly stage.

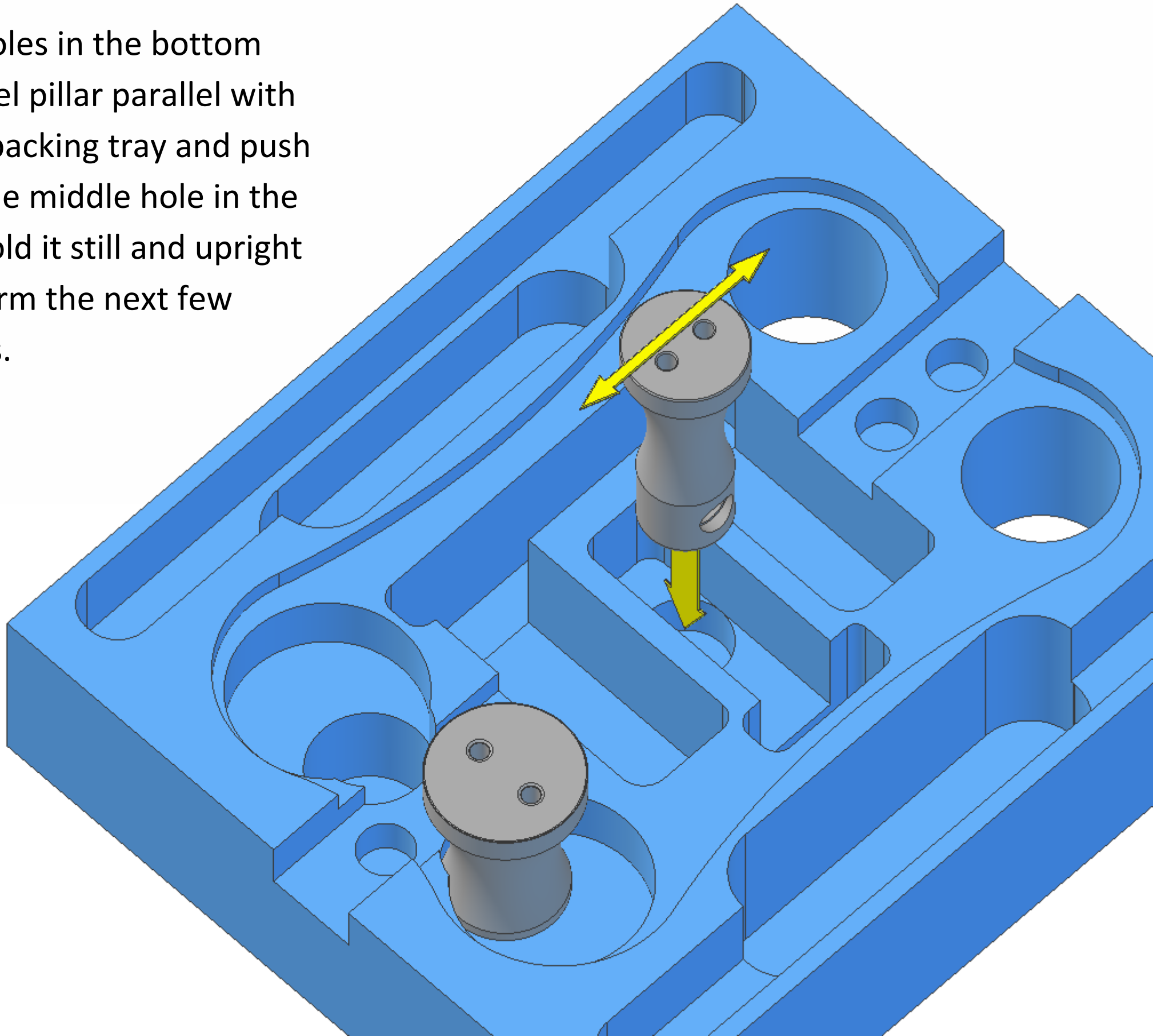
Fit two 12.5mm O rings into the two grooves in the hole in the top of the tube pillar.



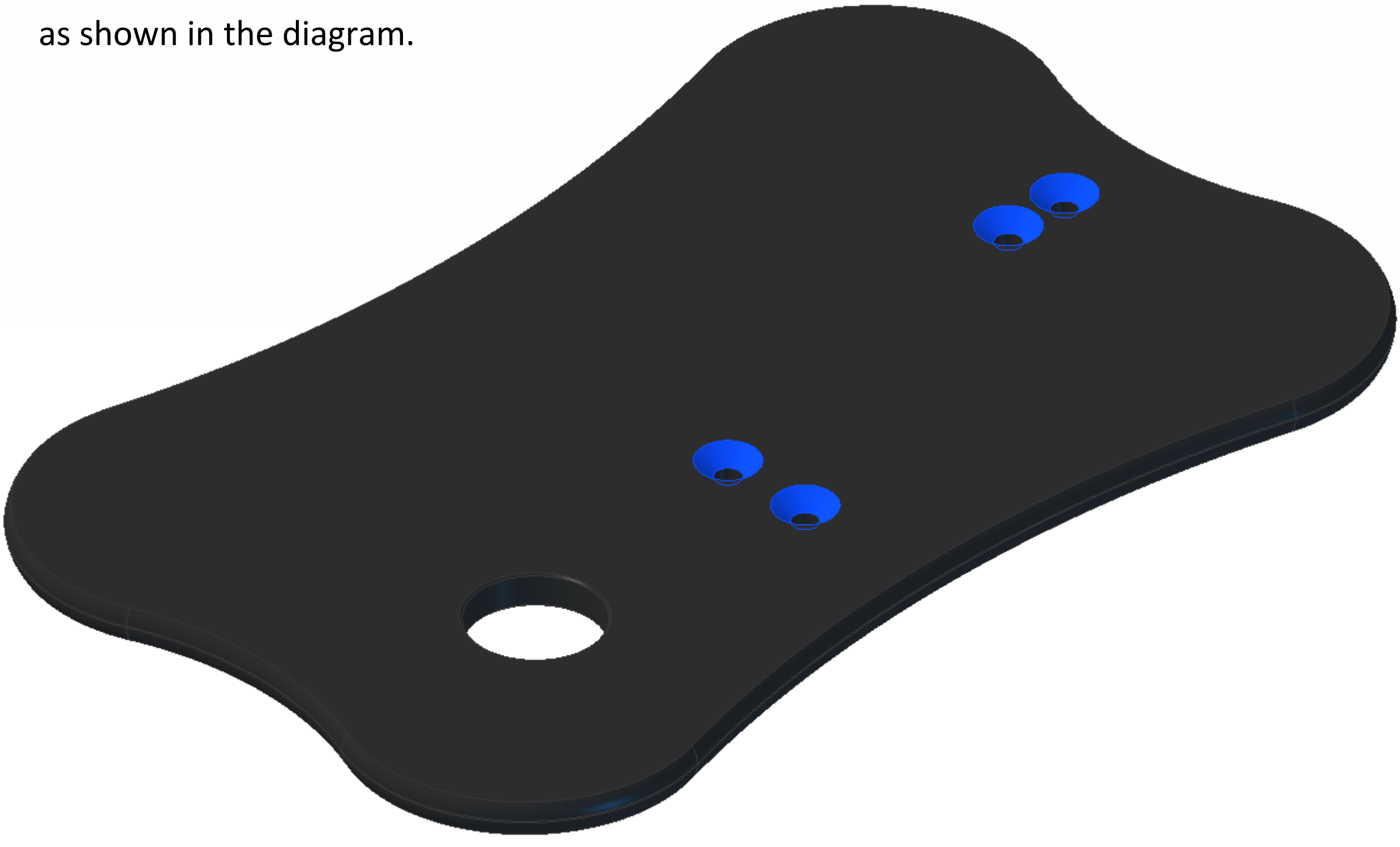
Align the two holes in the bottom face of the tube pillar parallel with the front of the packing tray and push the pillar into the front right hole in the tray. This will hold it still and upright while you perform the next few assembly stages.



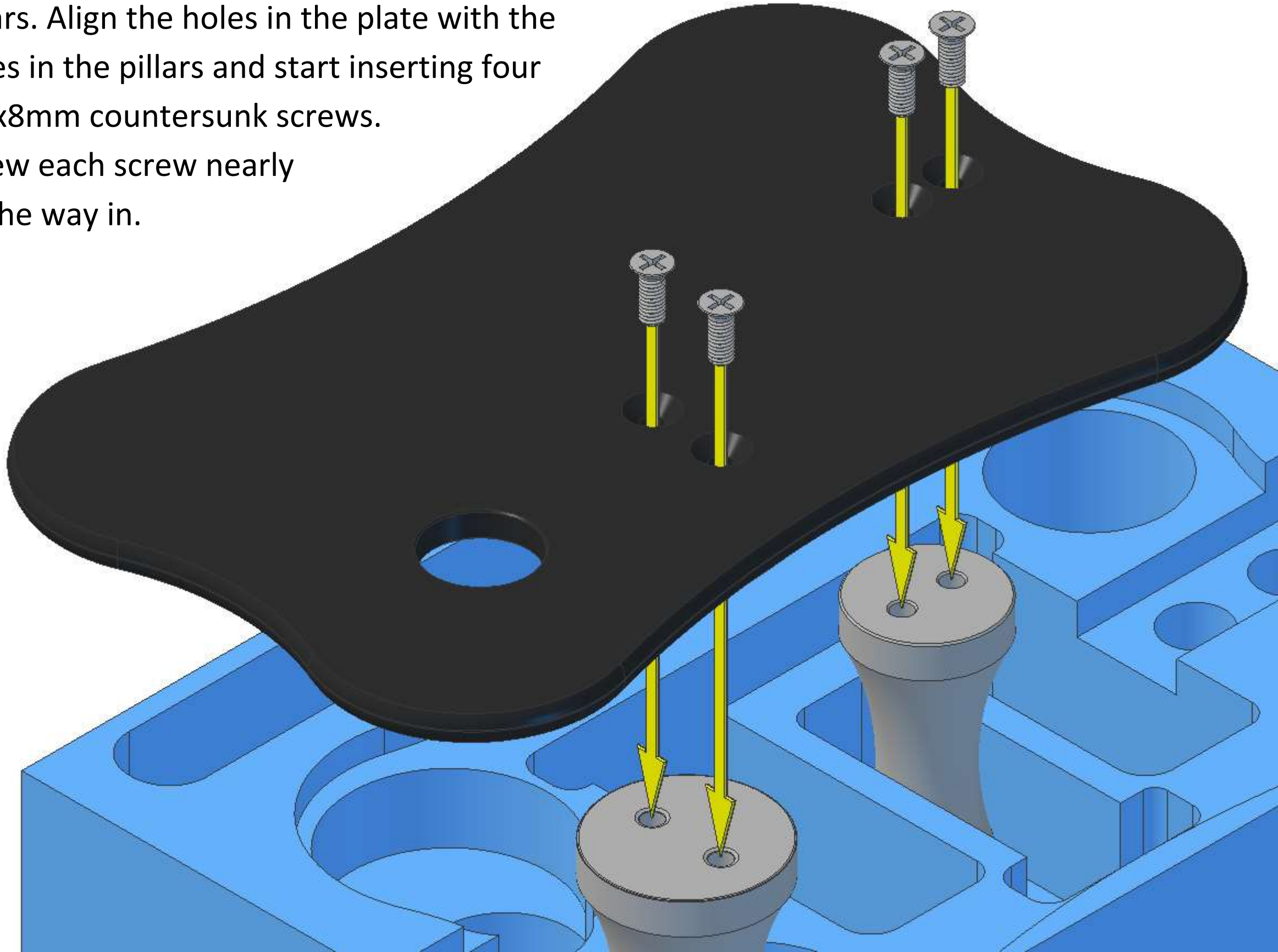
Align the two holes in the bottom face of the wheel pillar parallel with the side of the packing tray and push the pillar into the middle hole in the tray. This will hold it still and upright while you perform the next few assembly stages.



Locate the underside of the base plate. The underside is the side with the countersinks on the four holes as shown in the diagram.

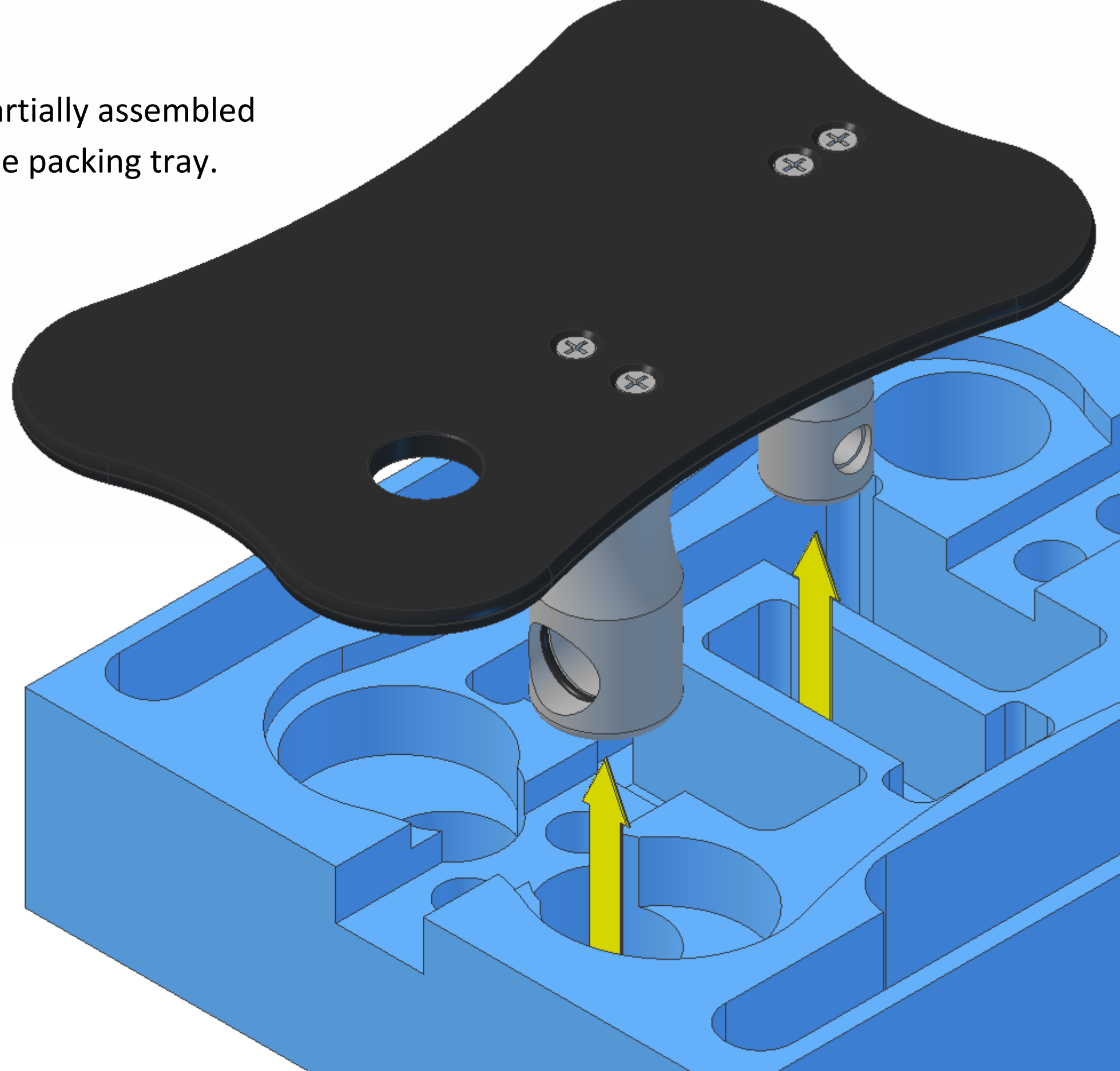


With the underside facing upwards, lower the base plate onto the pillars. Align the holes in the plate with the holes in the pillars and start inserting four M3x8mm countersunk screws.
Screw each screw nearly all the way in.

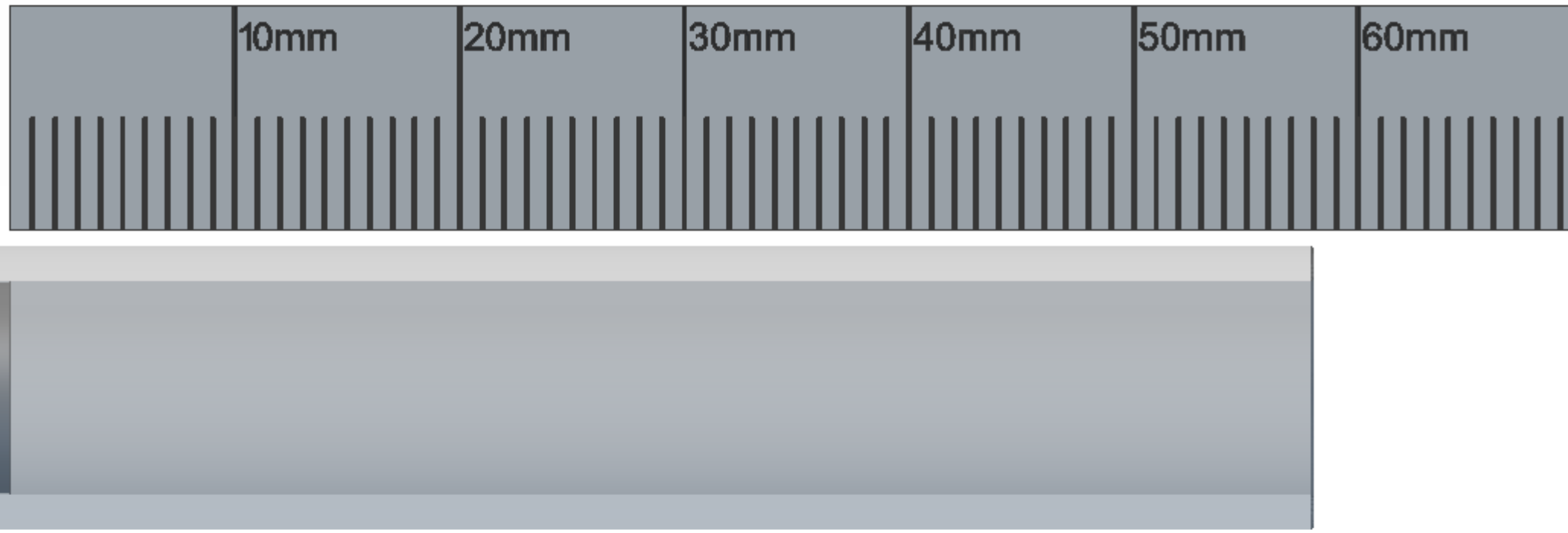


Fully tighten the screws.

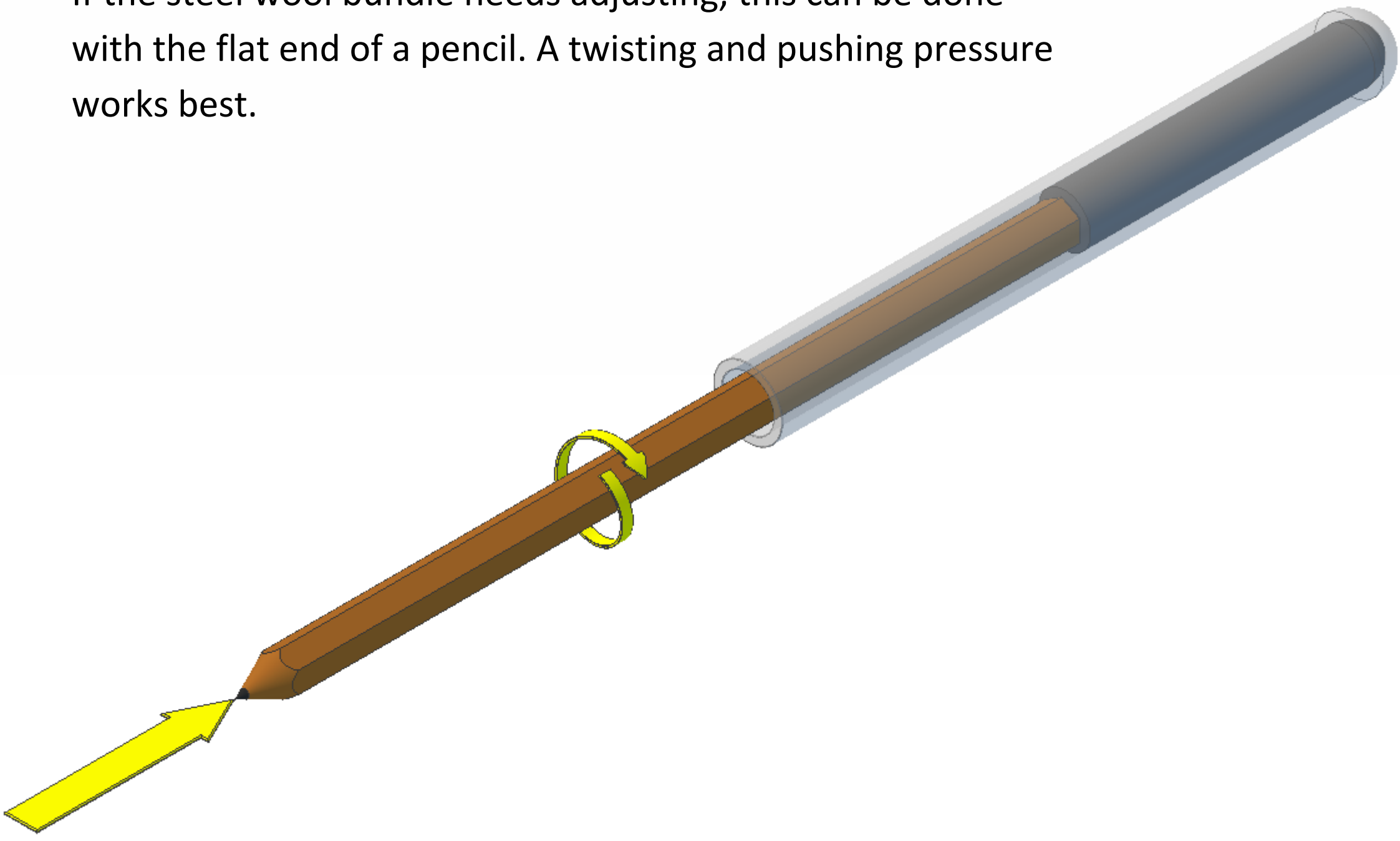
Remove the partially assembled engine from the packing tray.



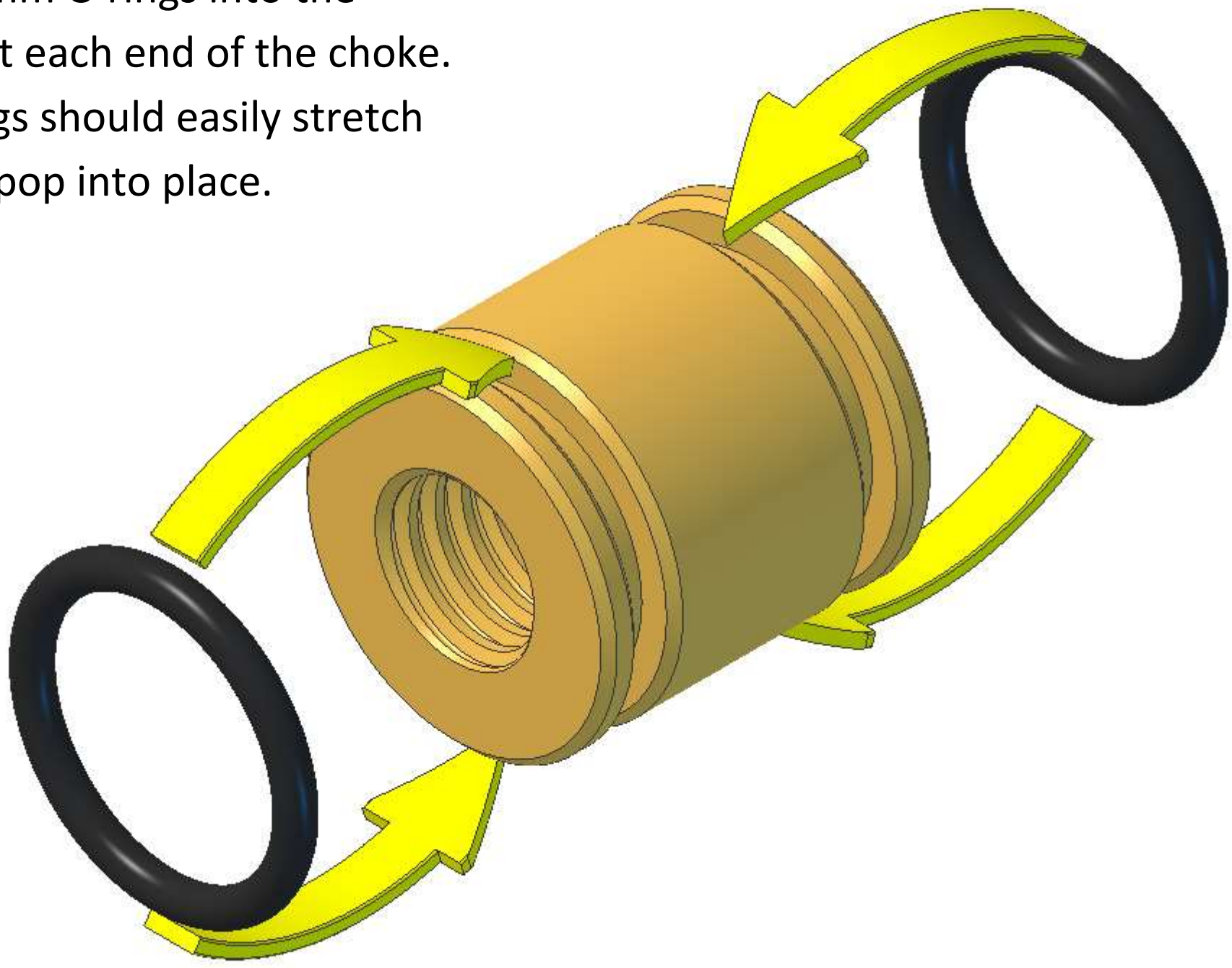
The glass tube is supplied with the steel wool bundle pre-fitted, but it may need some final adjustment. The front of the wire wool bundle should be 58mm from the front of the tube. Note, the front of the tube is to the right in the diagram.



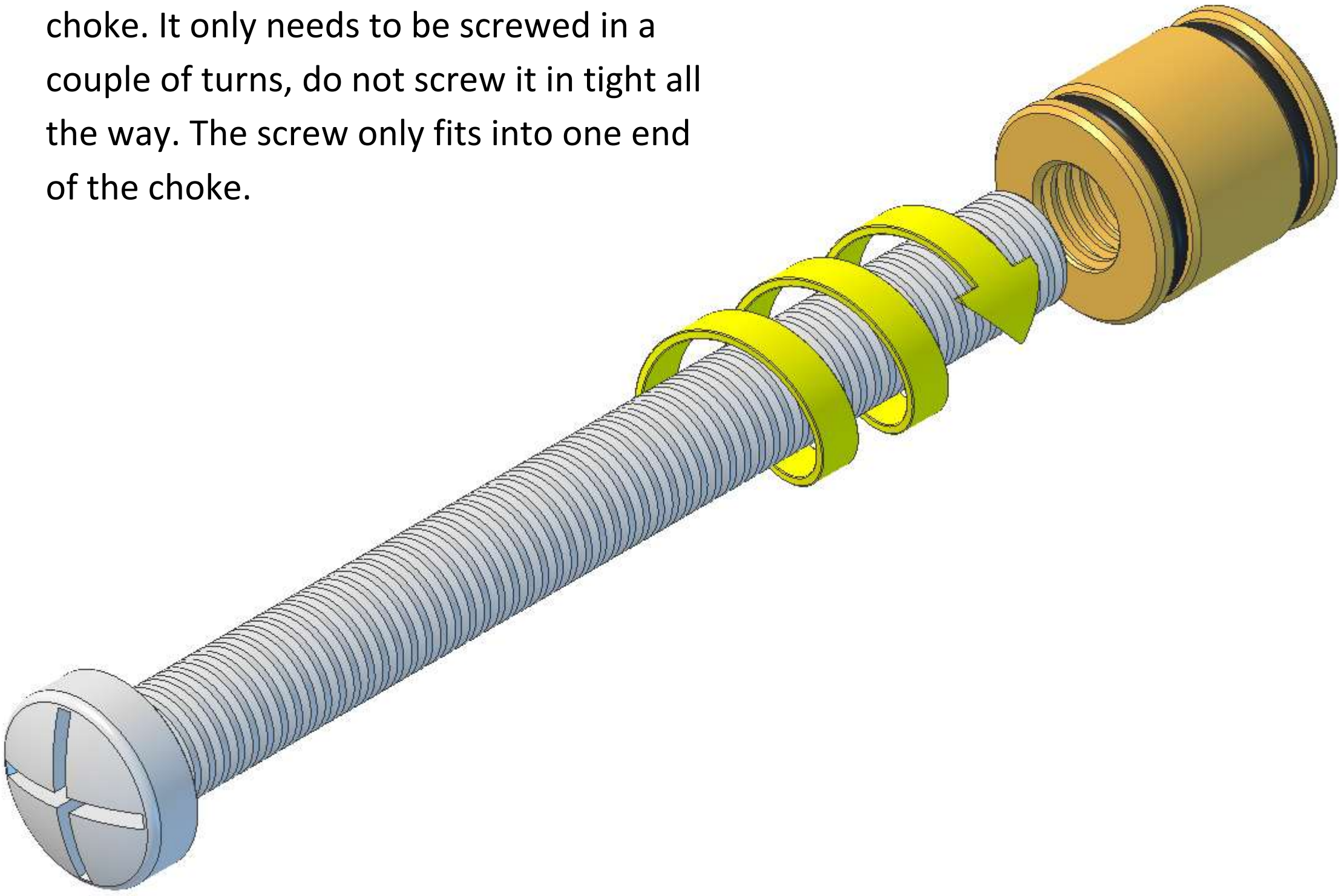
If the steel wool bundle needs adjusting, this can be done with the flat end of a pencil. A twisting and pushing pressure works best.



Fit two 7mm O rings into the grooves at each end of the choke. The O rings should easily stretch over and pop into place.

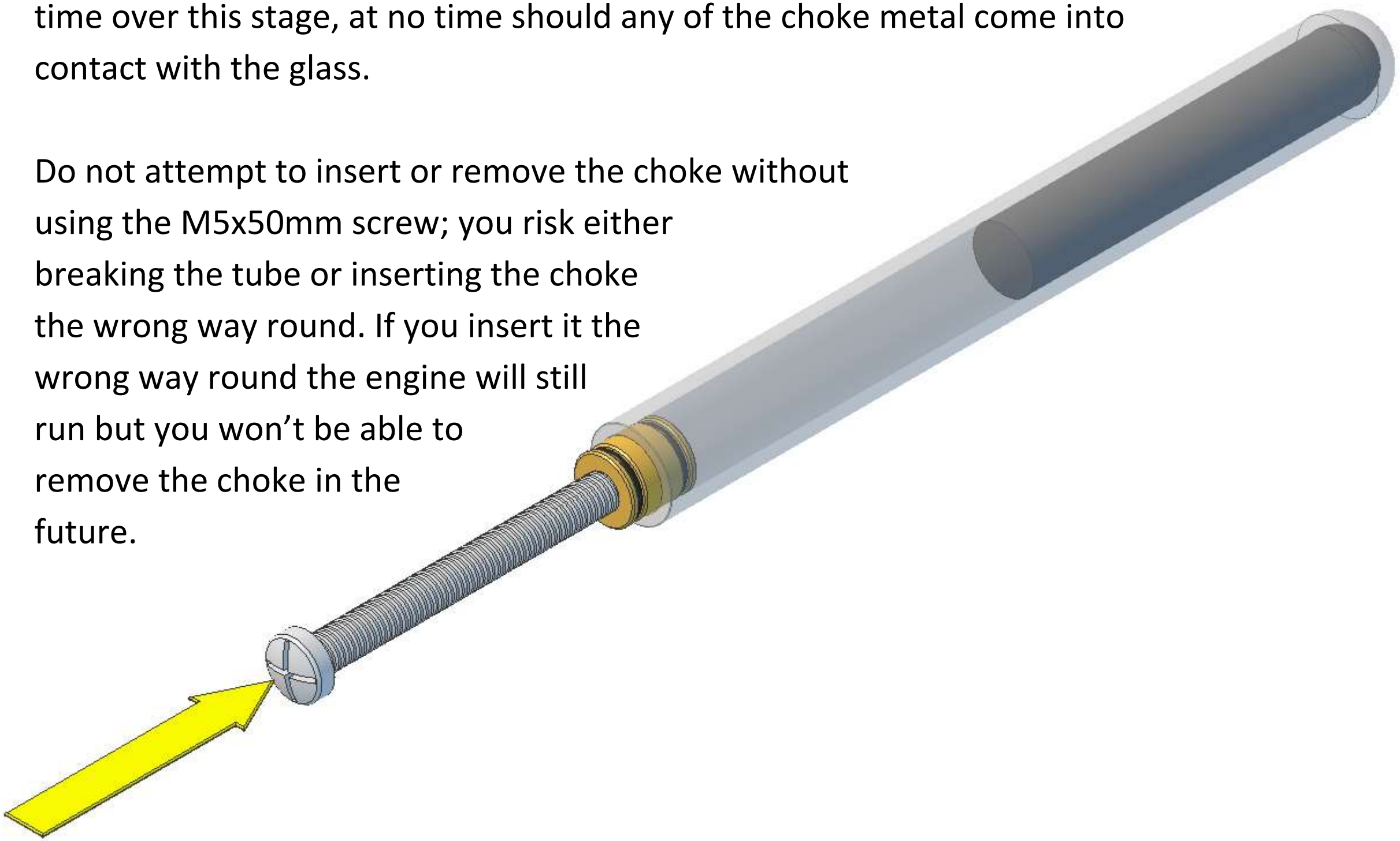


Screw the M5x50mm screw into the choke. It only needs to be screwed in a couple of turns, do not screw it in tight all the way. The screw only fits into one end of the choke.

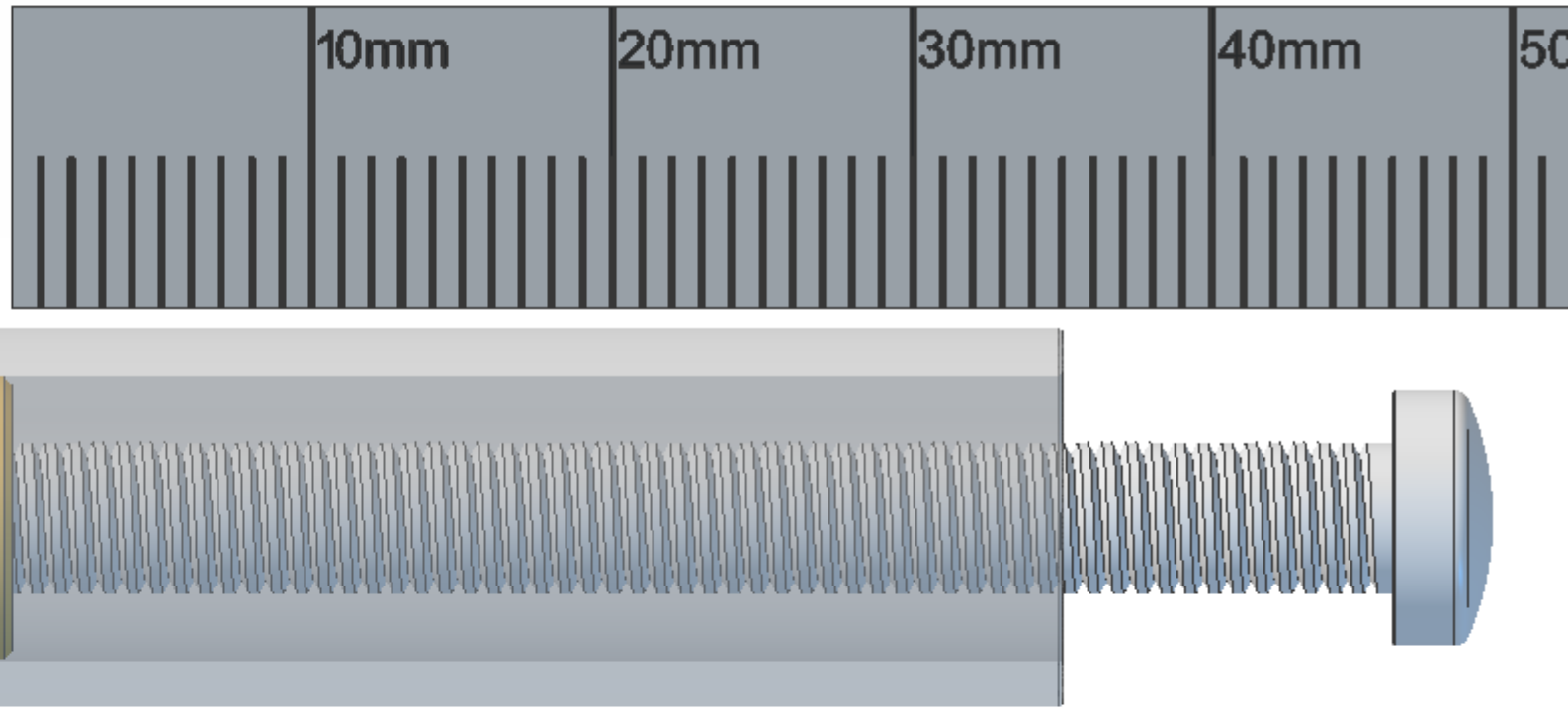


Moisten the two 7mm O rings sparingly with slightly soapy tap water to lubricate them and very carefully insert the gland into the tube. Take plenty of time over this stage, at no time should any of the choke metal come into contact with the glass.

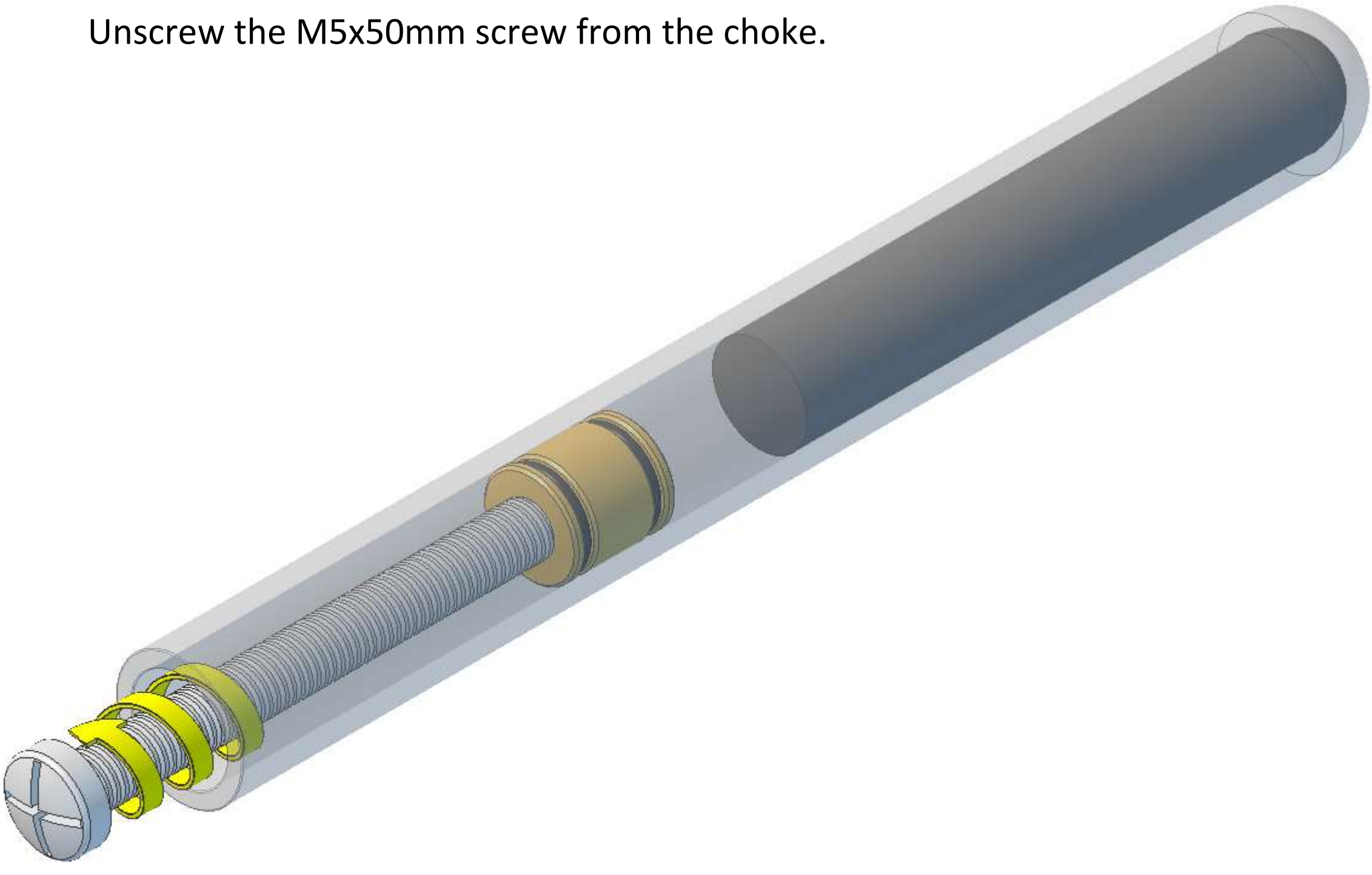
Do not attempt to insert or remove the choke without using the M5x50mm screw; you risk either breaking the tube or inserting the choke the wrong way round. If you insert it the wrong way round the engine will still run but you won't be able to remove the choke in the future.



Push the choke in with the M5x50mm screw until the front of the choke is 35mm from the front of the tube.

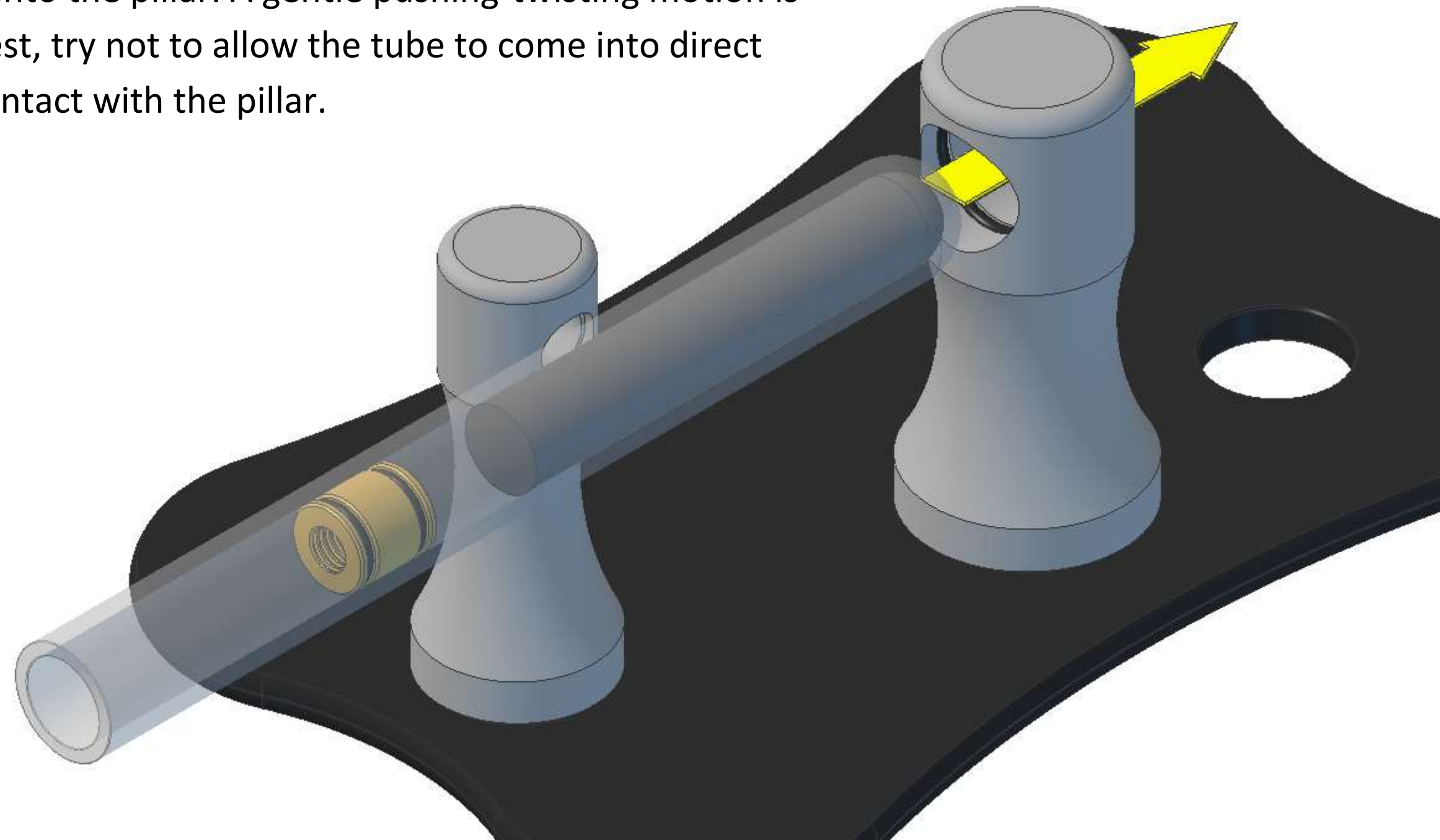


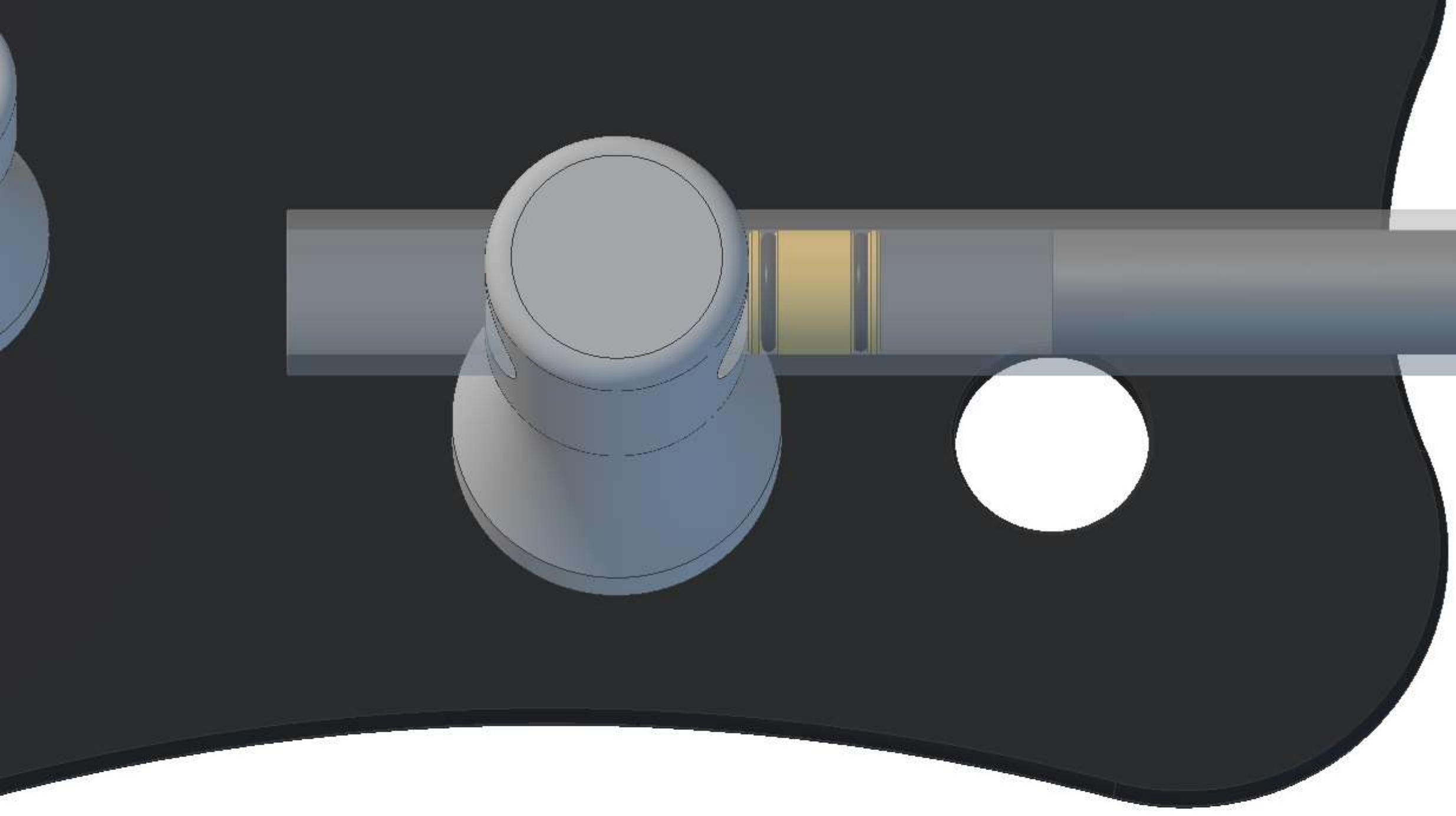
Unscrew the M5x50mm screw from the choke.



Moisten the two 13mm O rings in the tube pillar sparingly with slightly soapy tap water for lubrication and push the tube into the hole in the pillar.

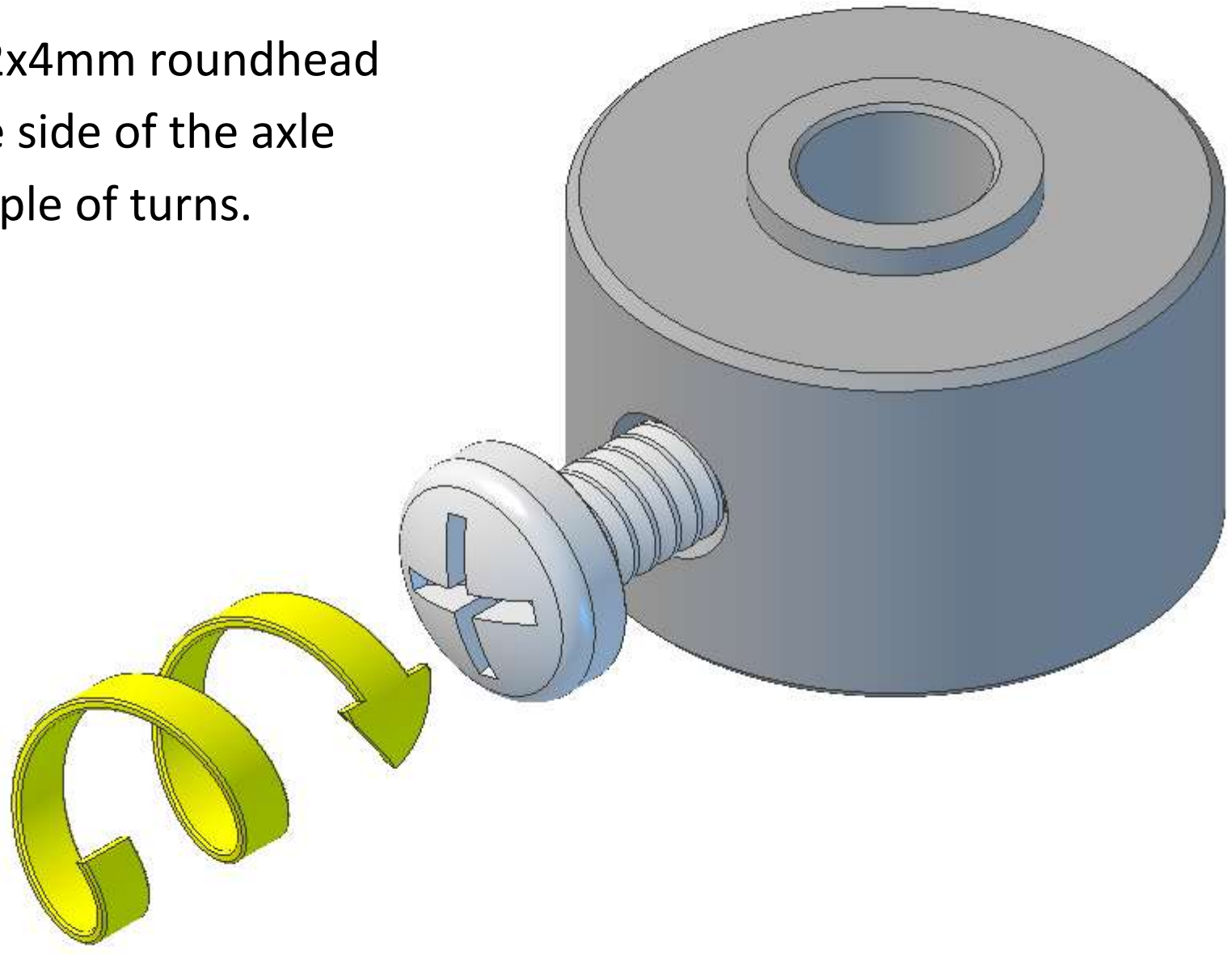
FOR SAFETY, wrap a cloth around the square end of the glass tube when pushing it into the pillar. A gentle pushing-twisting motion is best, try not to allow the tube to come into direct contact with the pillar.



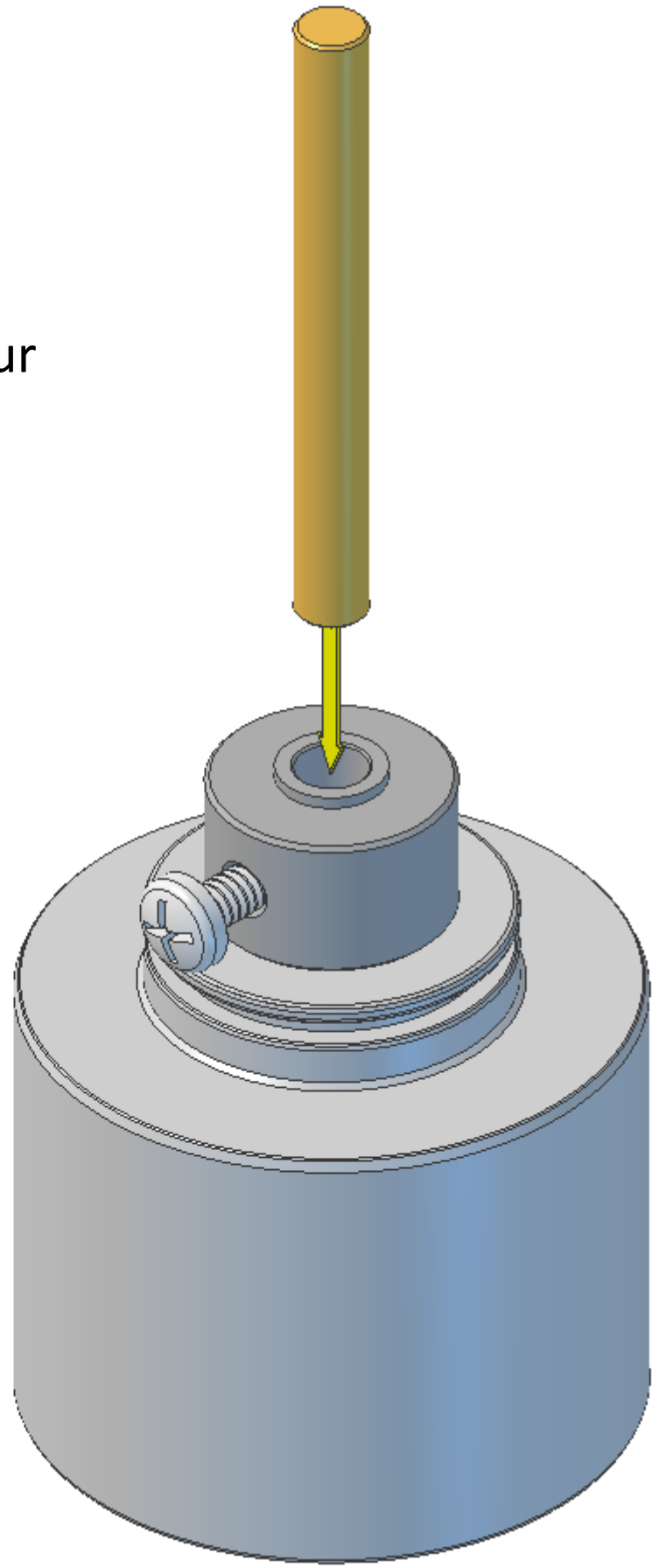


Push the glass tube in until the front face of the choke lines up with the back edge of the tube pillar. If you have difficulty inserting the glass tube into the pillar with the pillar attached to the base plate you can temporarily remove the pillar from the plate, fit the tube and then re-fit the pillar to the plate.

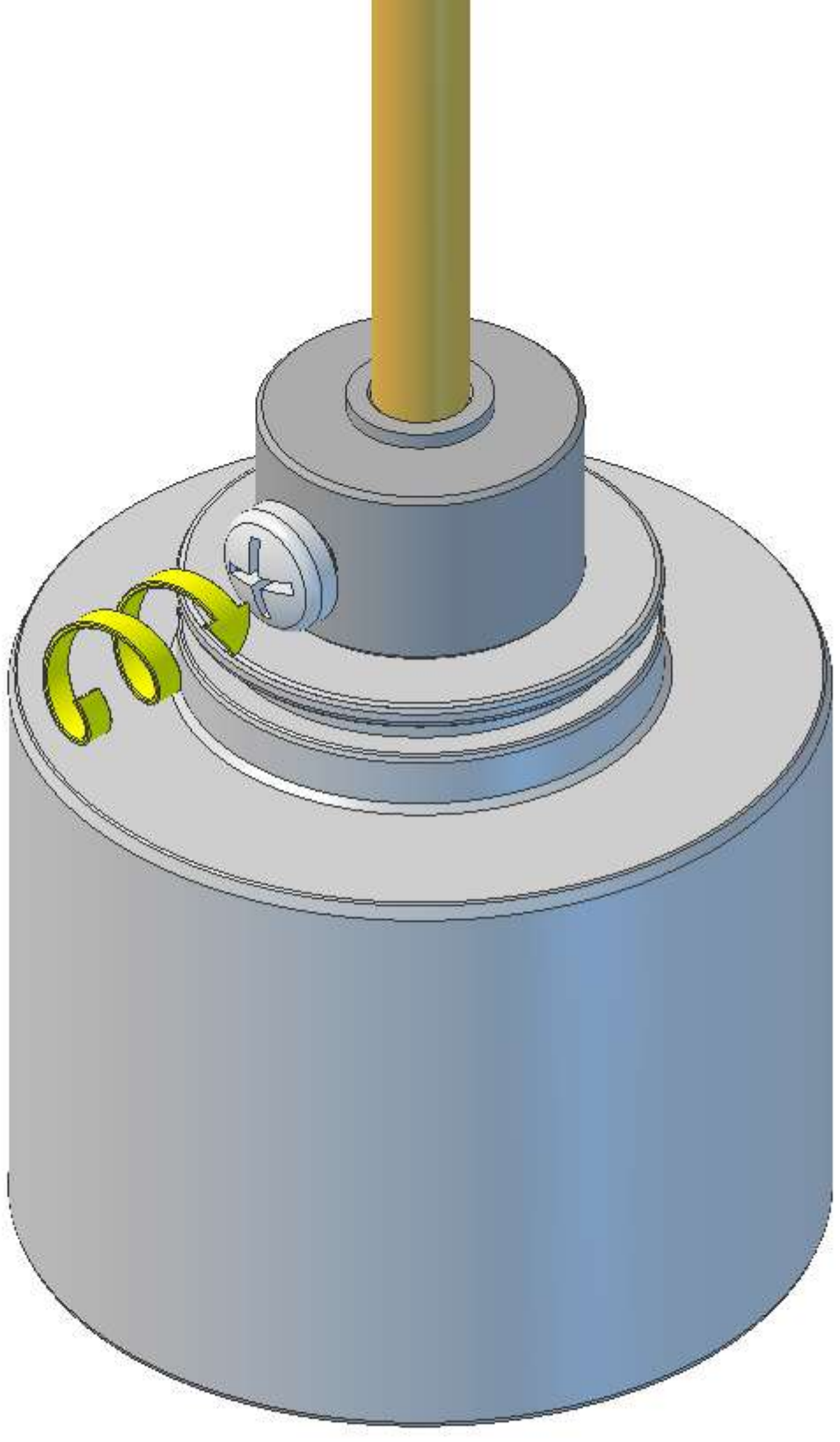
Screw one M2x4mm roundhead screw into the side of the axle retainer a couple of turns.



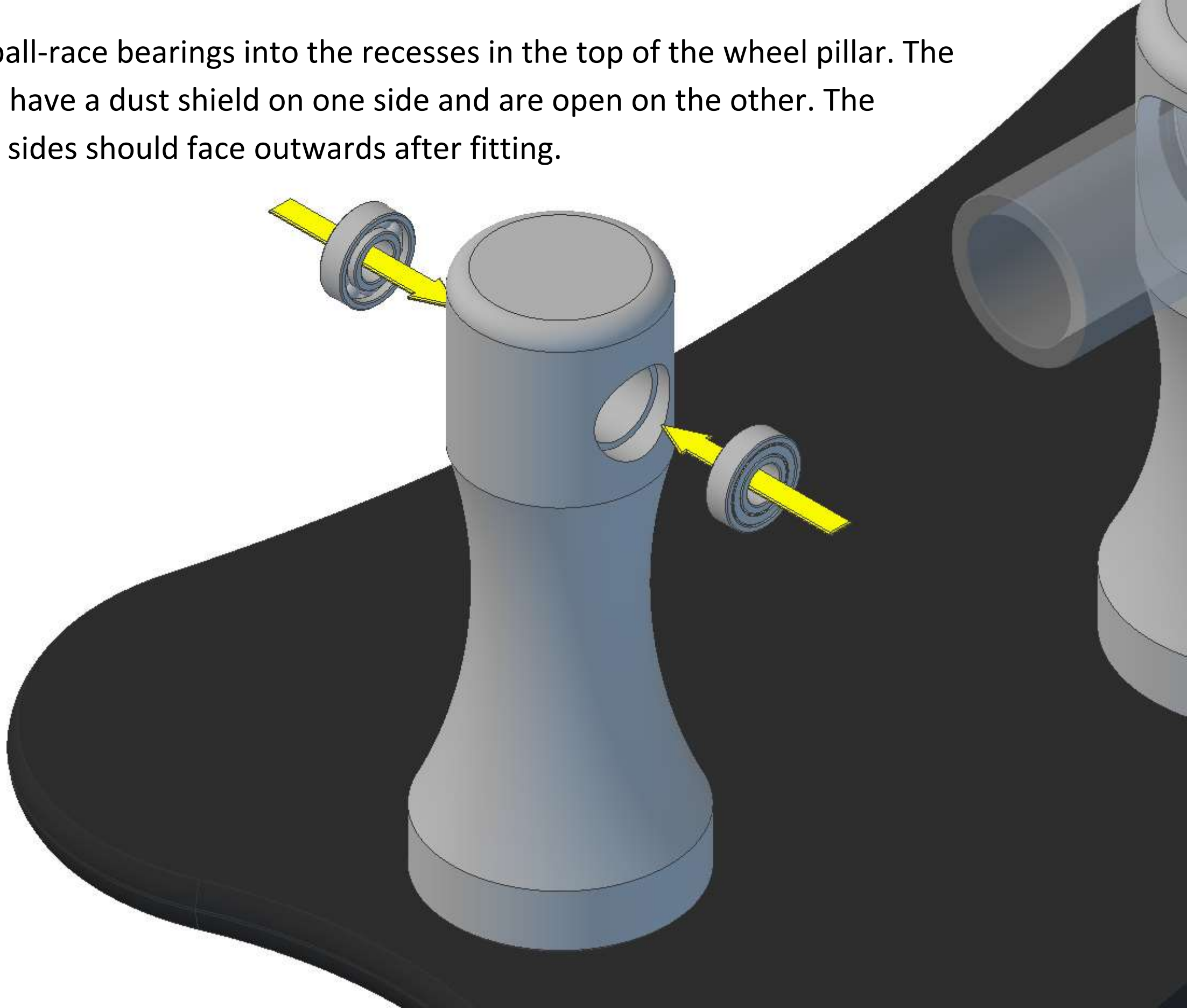
Put the burner body upside down on your work surface and place the axle retainer flat side down on it. Fit the axle into the retainer and push it down flat onto the burner body.



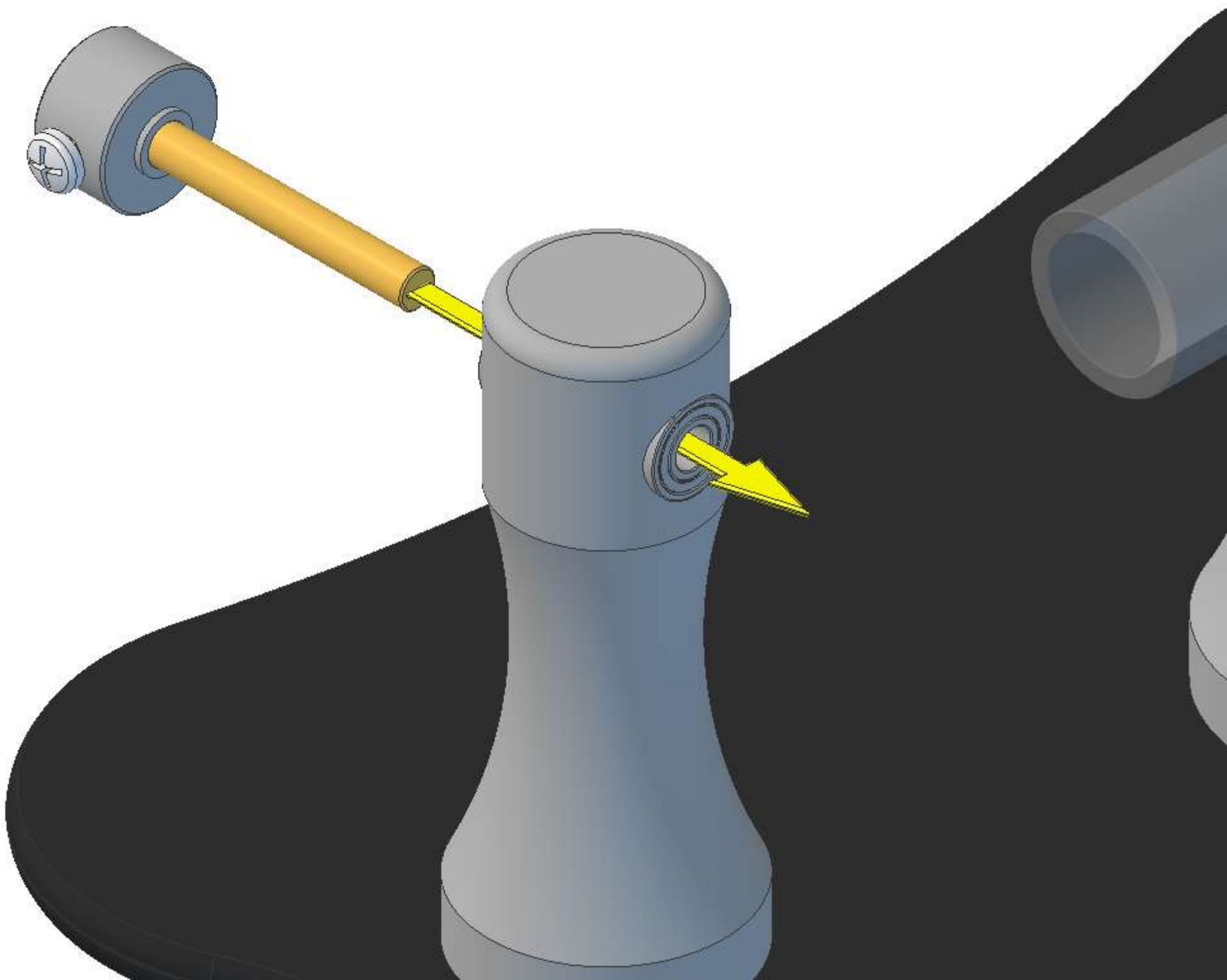
Fully tighten the screw.



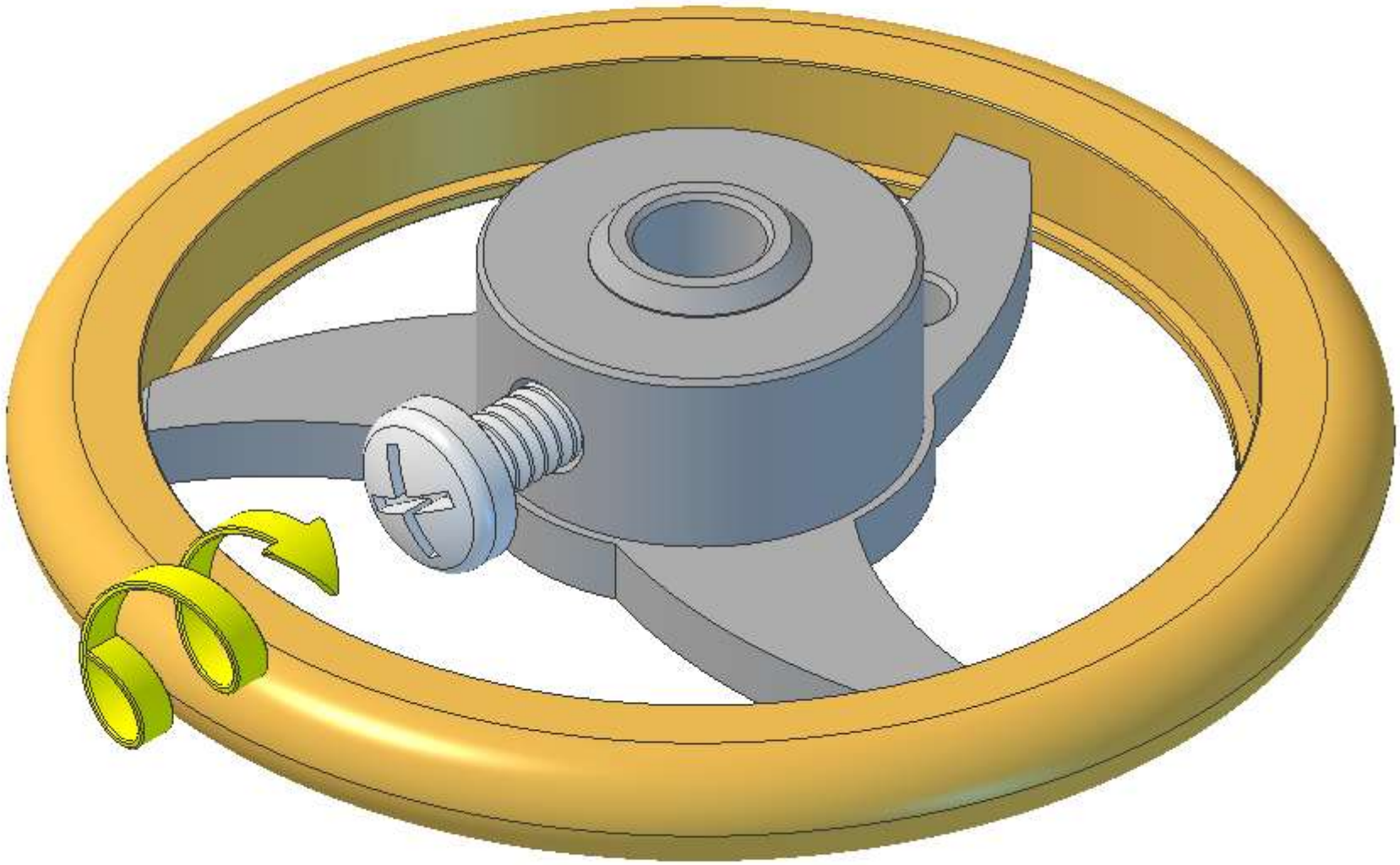
Fit two ball-race bearings into the recesses in the top of the wheel pillar. The bearings have a dust shield on one side and are open on the other. The shielded sides should face outwards after fitting.



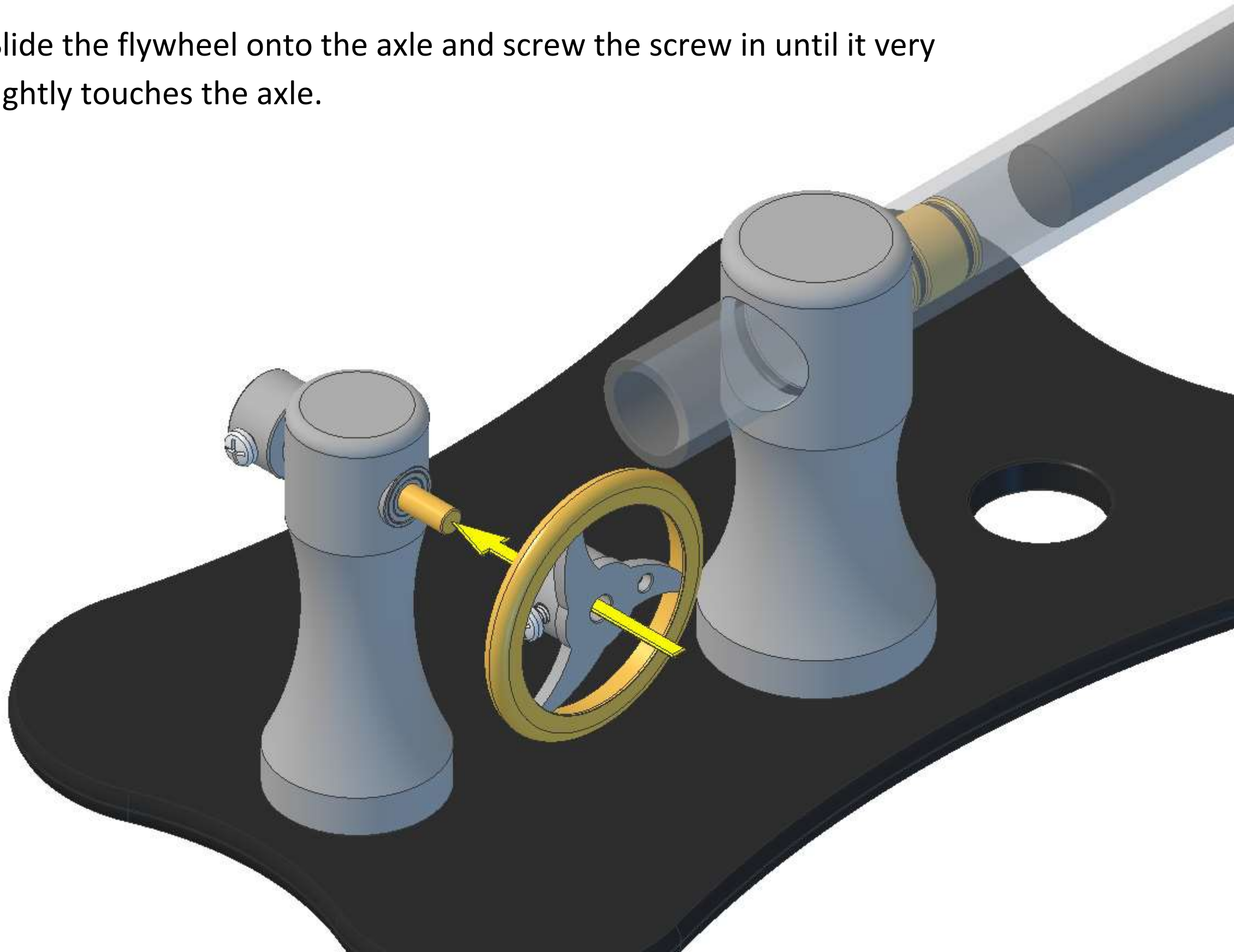
Slide the axle through the bearings. The axle should be a good fit but not tight in the bearings.



Screw one M2x4mm roundhead screw into the side of the flywheel a couple of turns.

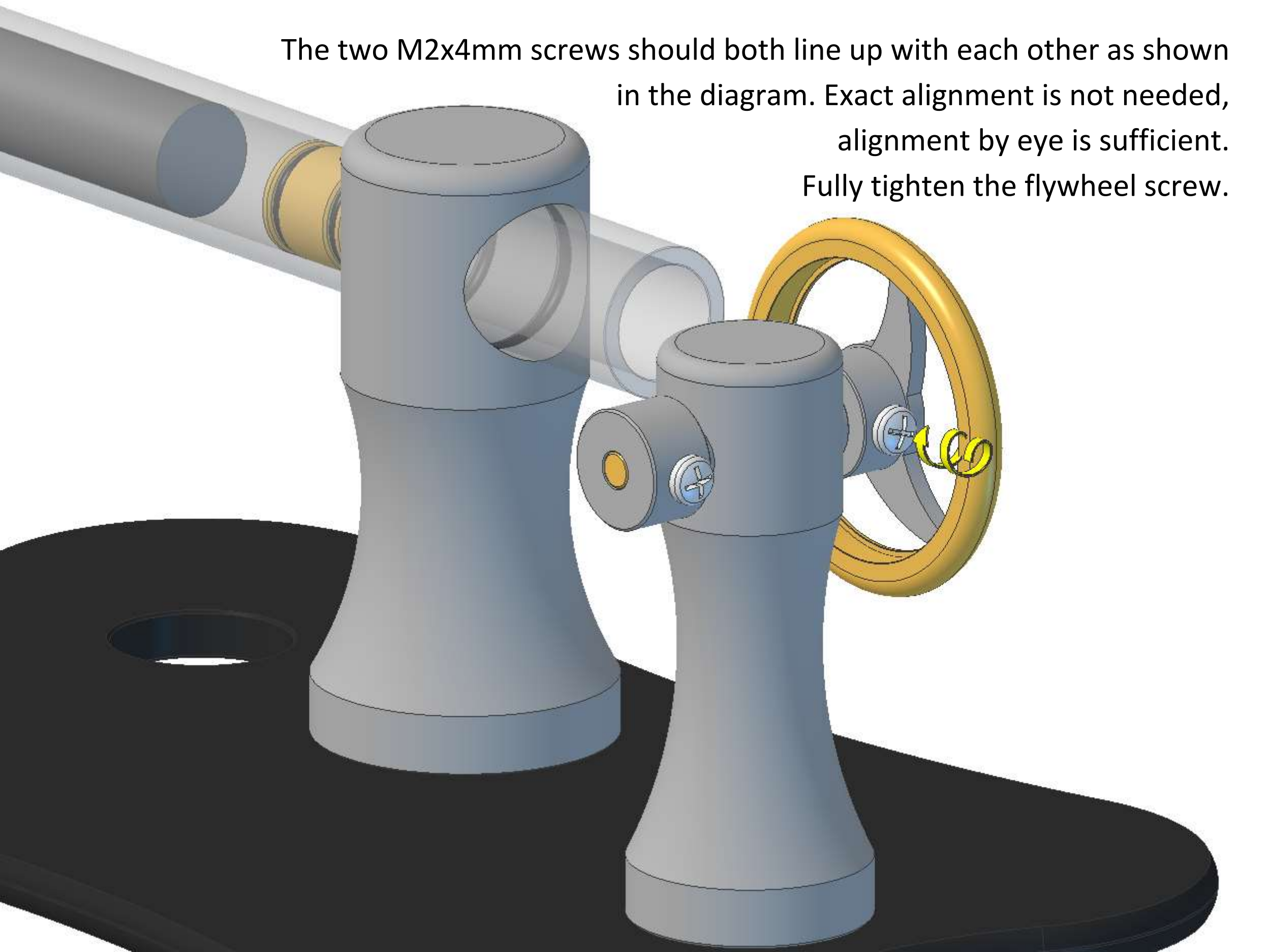


Slide the flywheel onto the axle and screw the screw in until it very lightly touches the axle.

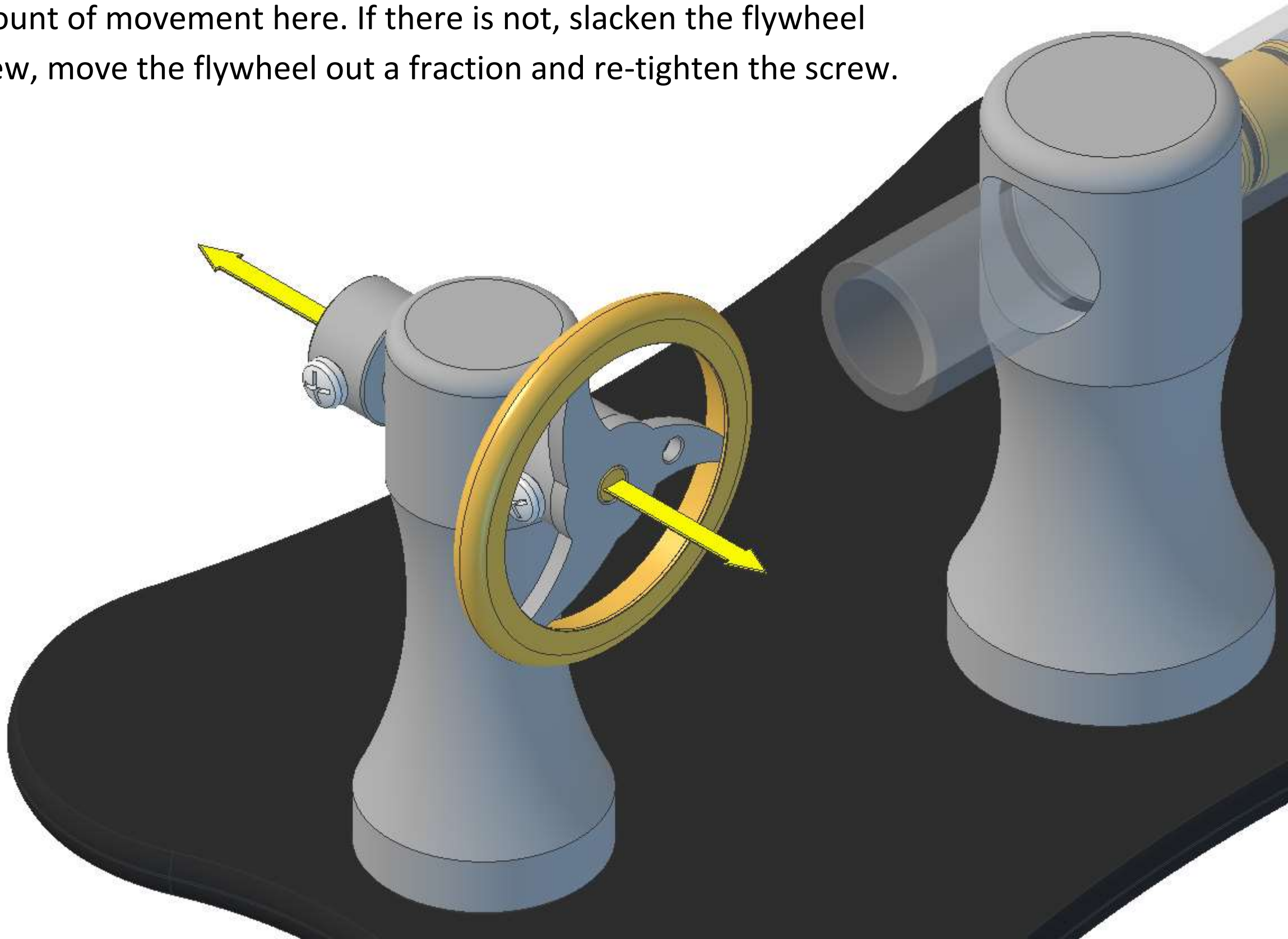


The two M2x4mm screws should both line up with each other as shown in the diagram. Exact alignment is not needed, alignment by eye is sufficient.

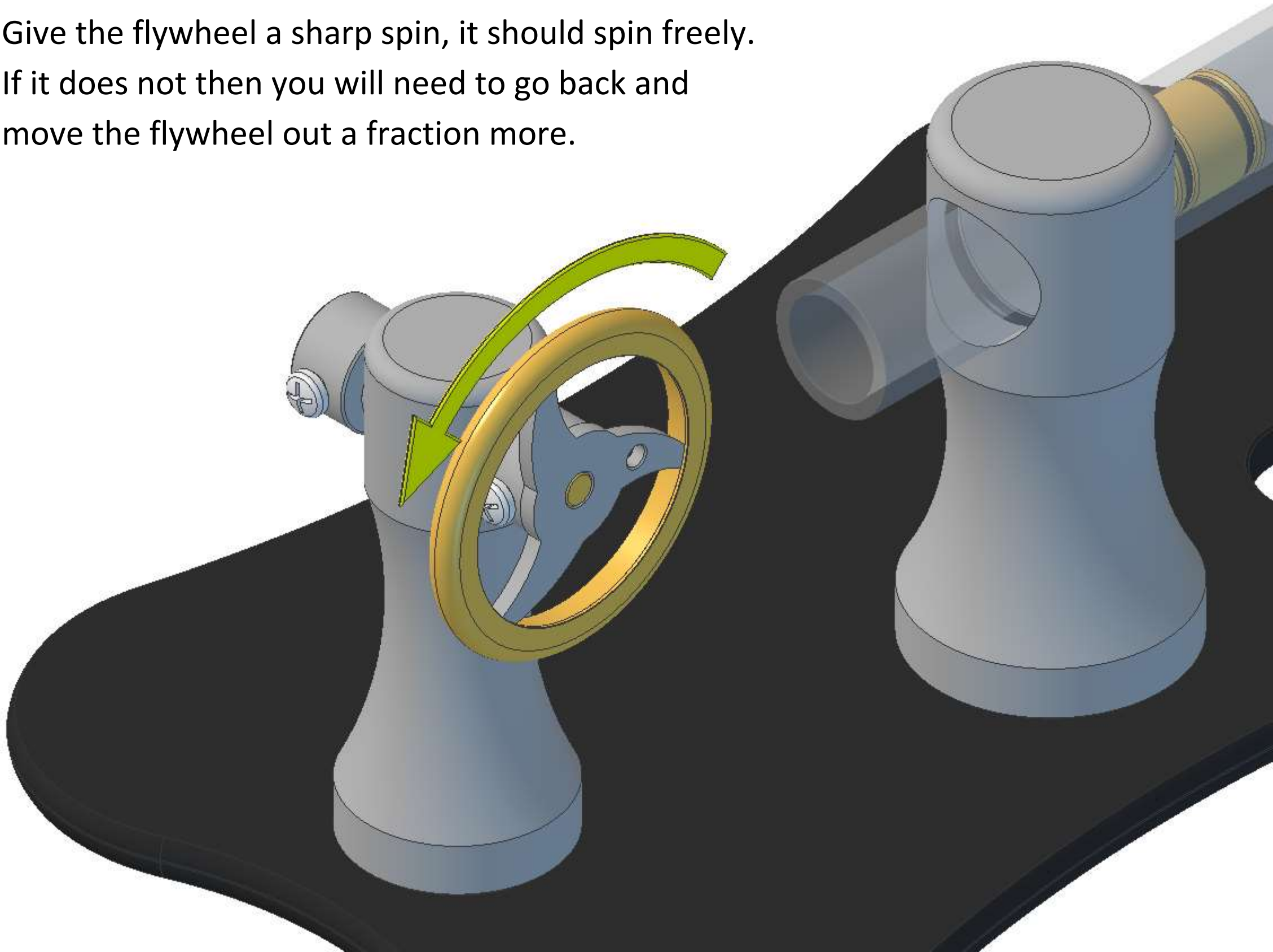
Fully tighten the flywheel screw.



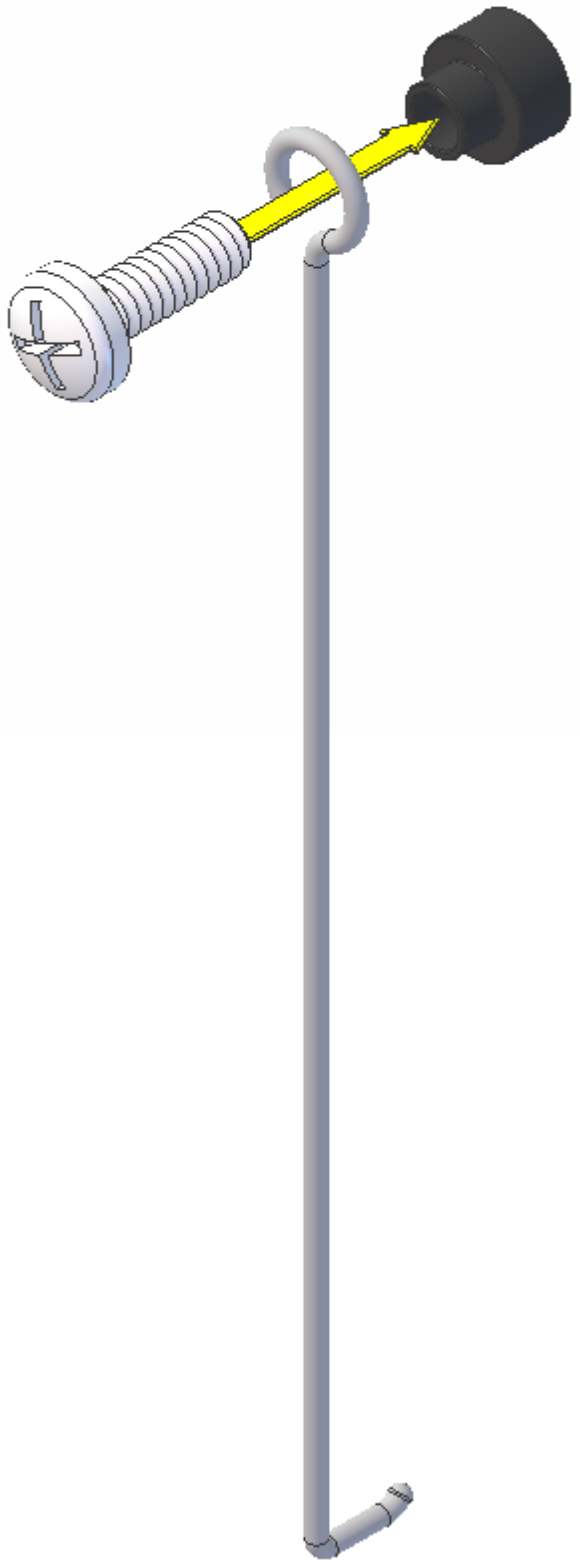
Gently push the flywheel back and forward, there should be a small amount of movement here. If there is not, slacken the flywheel screw, move the flywheel out a fraction and re-tighten the screw.



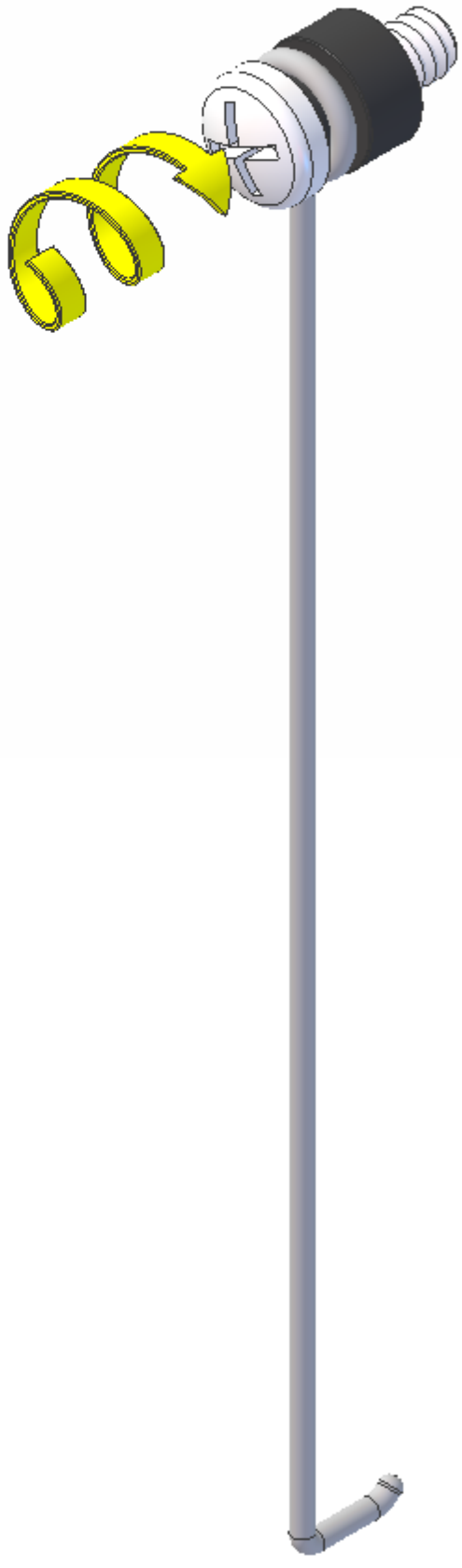
Give the flywheel a sharp spin, it should spin freely.
If it does not then you will need to go back and
move the flywheel out a fraction more.



Fit one conrod onto one conrod bush and secure with one M2x6mm roundhead screw. The screw only needs screwing in a couple of turns at this stage. Note, the hook on the bottom of the conrod should be aligned as shown in the diagram.

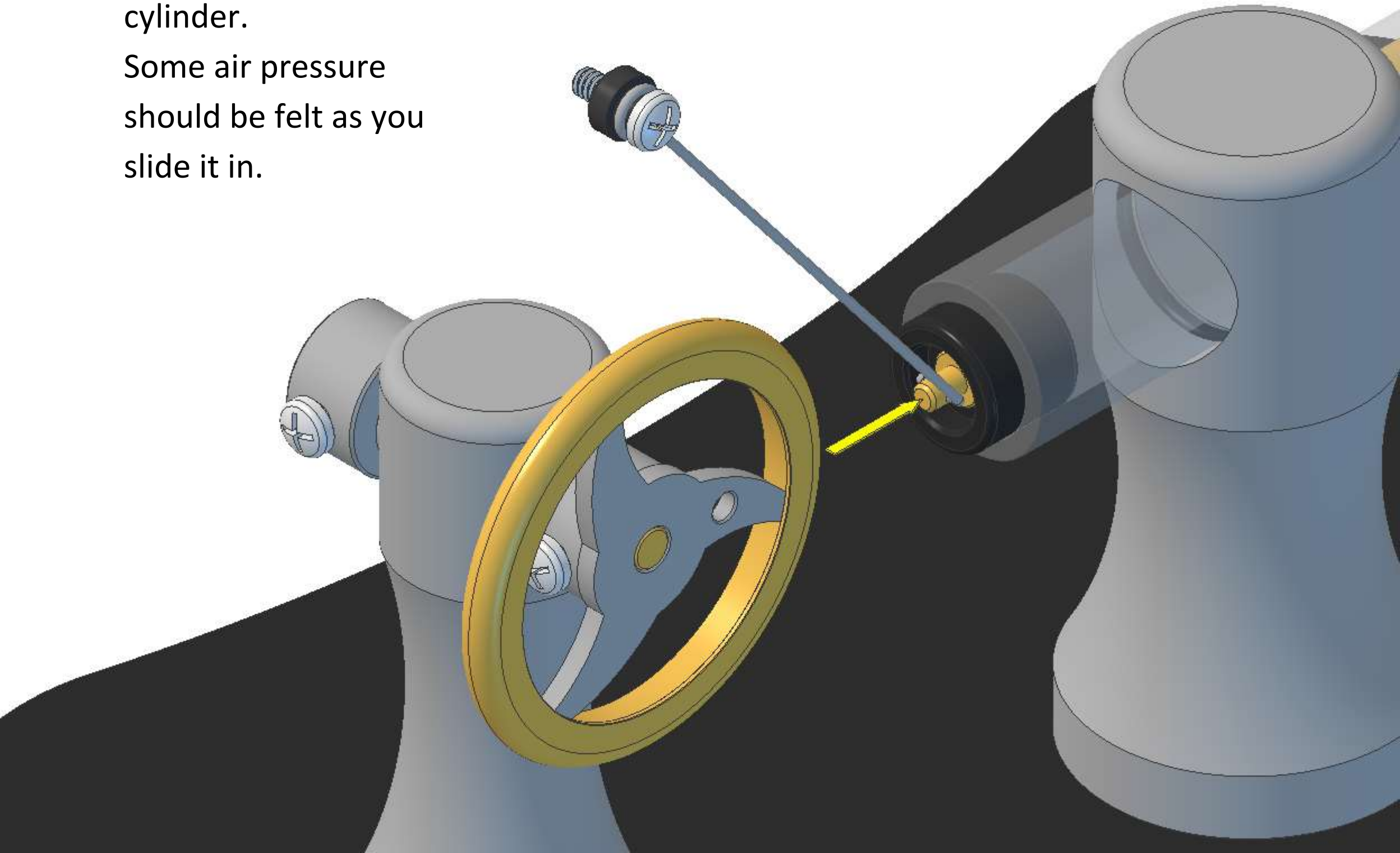


Screw the screw in until it *just* touches the bush. Do not over-tighten or you could cause the bush to expand and pinch the conrod eye, which could prevent your engine from running.

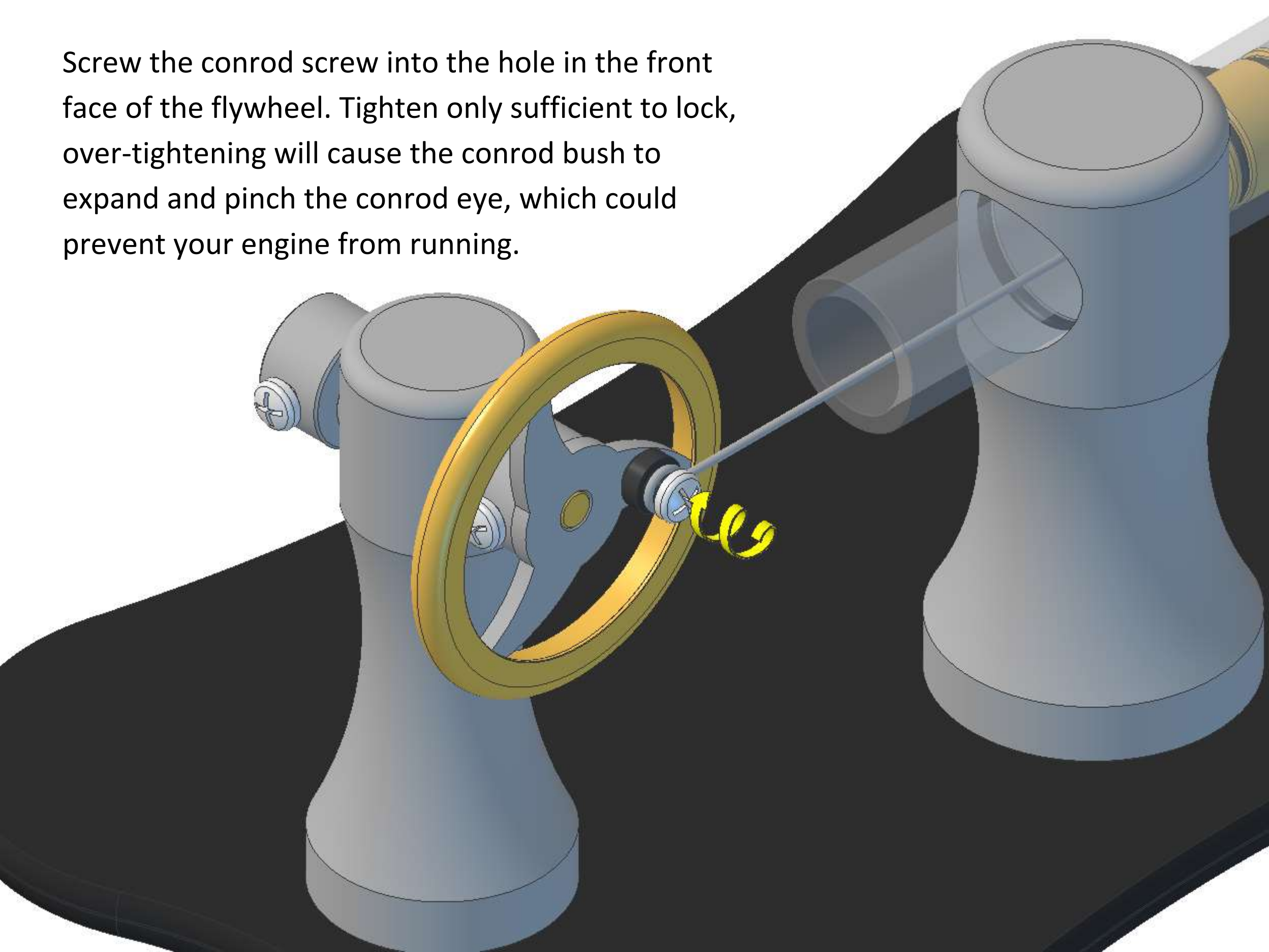


Fit the hook on the conrod through the hole in the top of the piston.

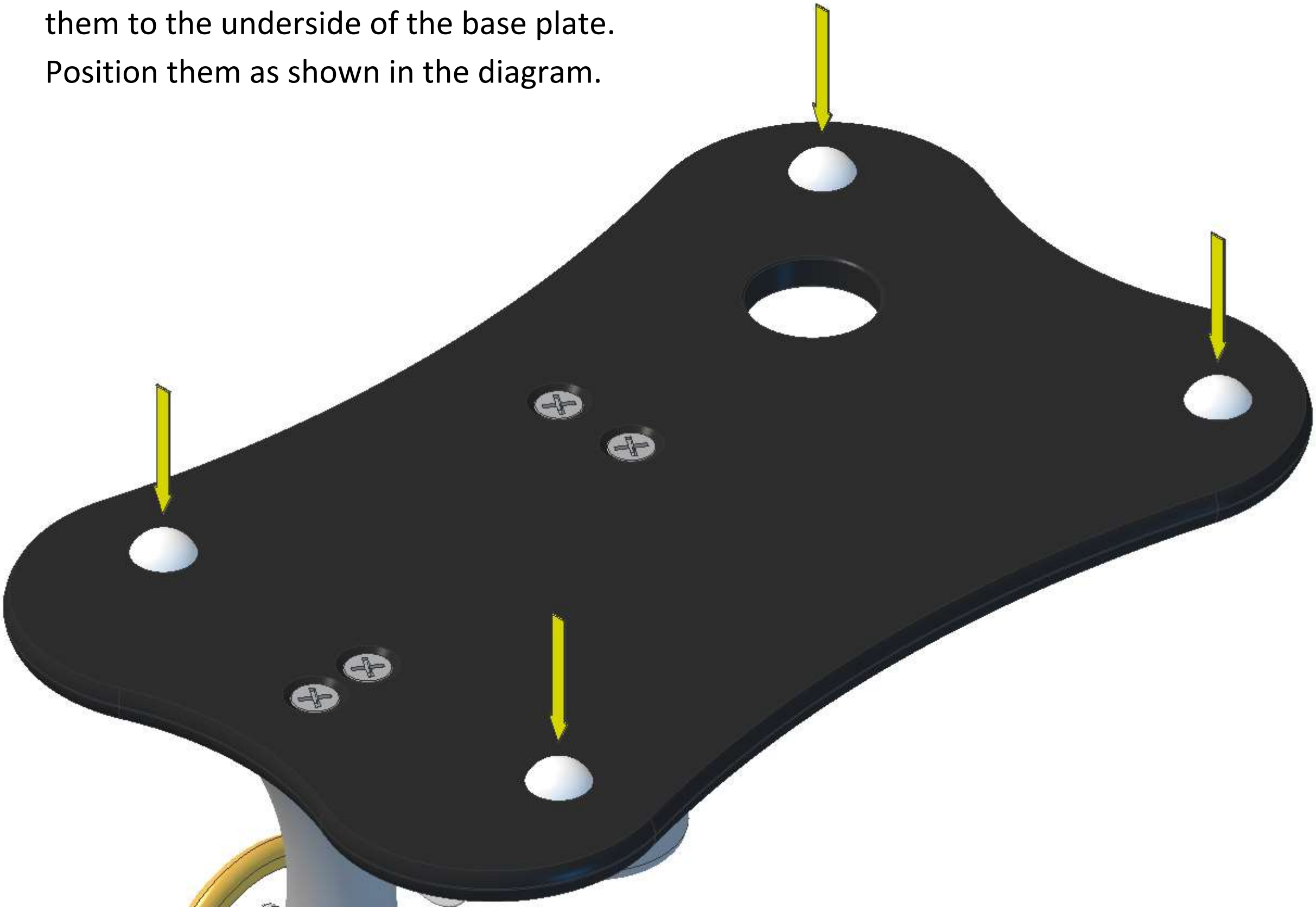
Slide the piston and conrod into the cylinder.
Some air pressure should be felt as you slide it in.



Screw the conrod screw into the hole in the front face of the flywheel. Tighten only sufficient to lock, over-tightening will cause the conrod bush to expand and pinch the conrod eye, which could prevent your engine from running.



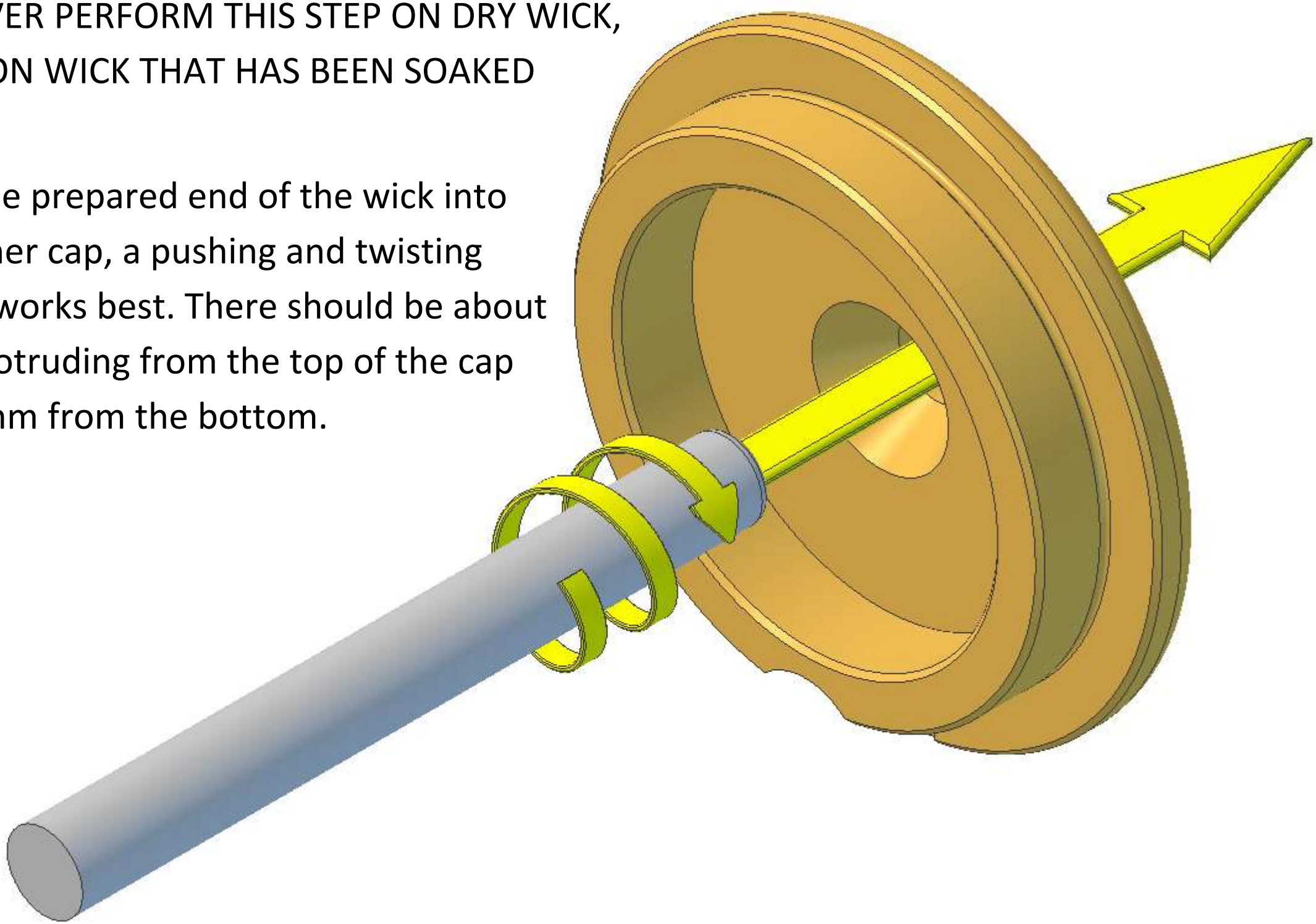
Peel the backing off the four rubber feet and stick them to the underside of the base plate.
Position them as shown in the diagram.



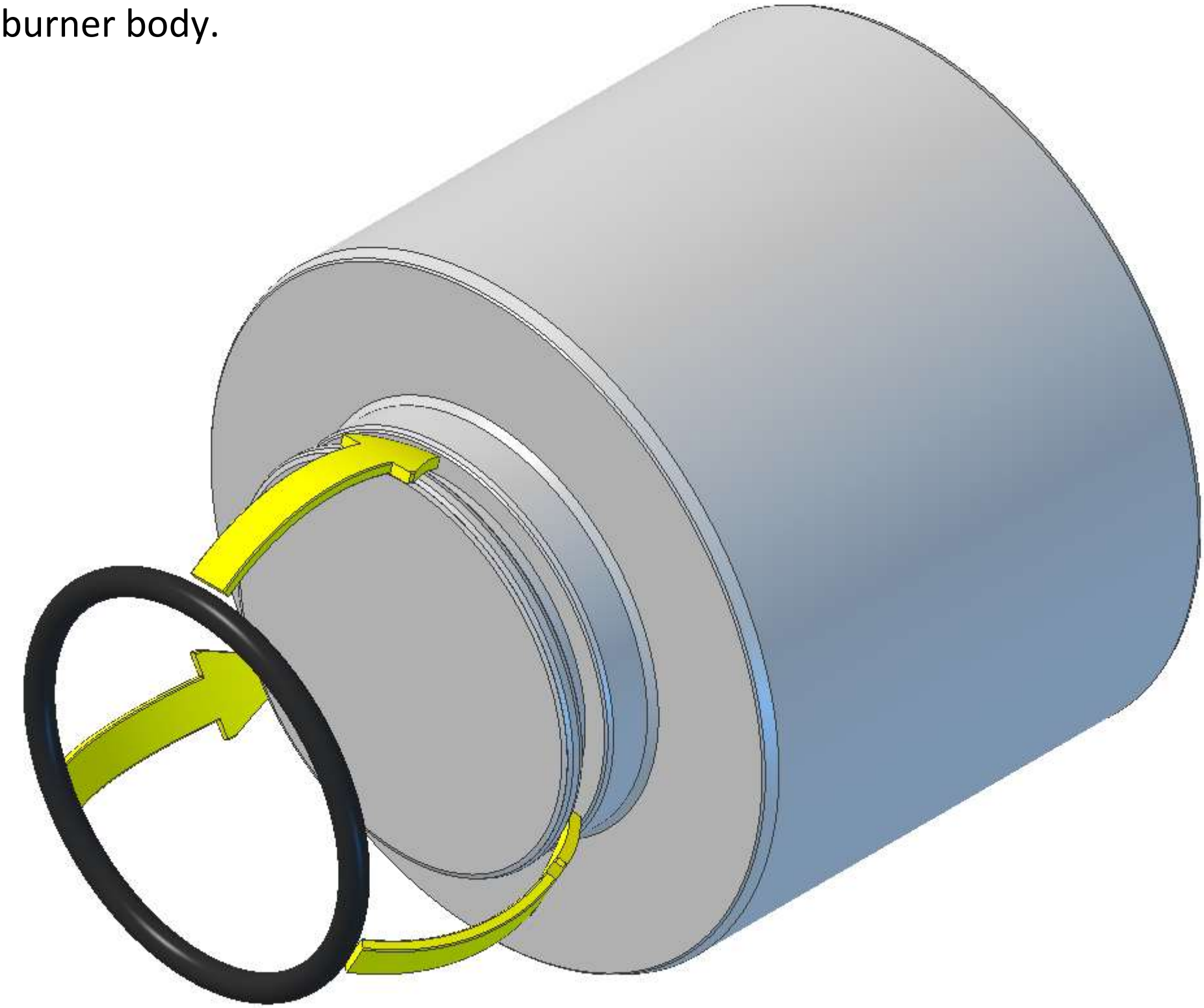
If the top end of the wick is frayed you will need to burn off the loose fibres, allow to cool, and then roll the end into a blunt point.

ONLY EVER PERFORM THIS STEP ON DRY WICK, NEVER ON WICK THAT HAS BEEN SOAKED IN FUEL.

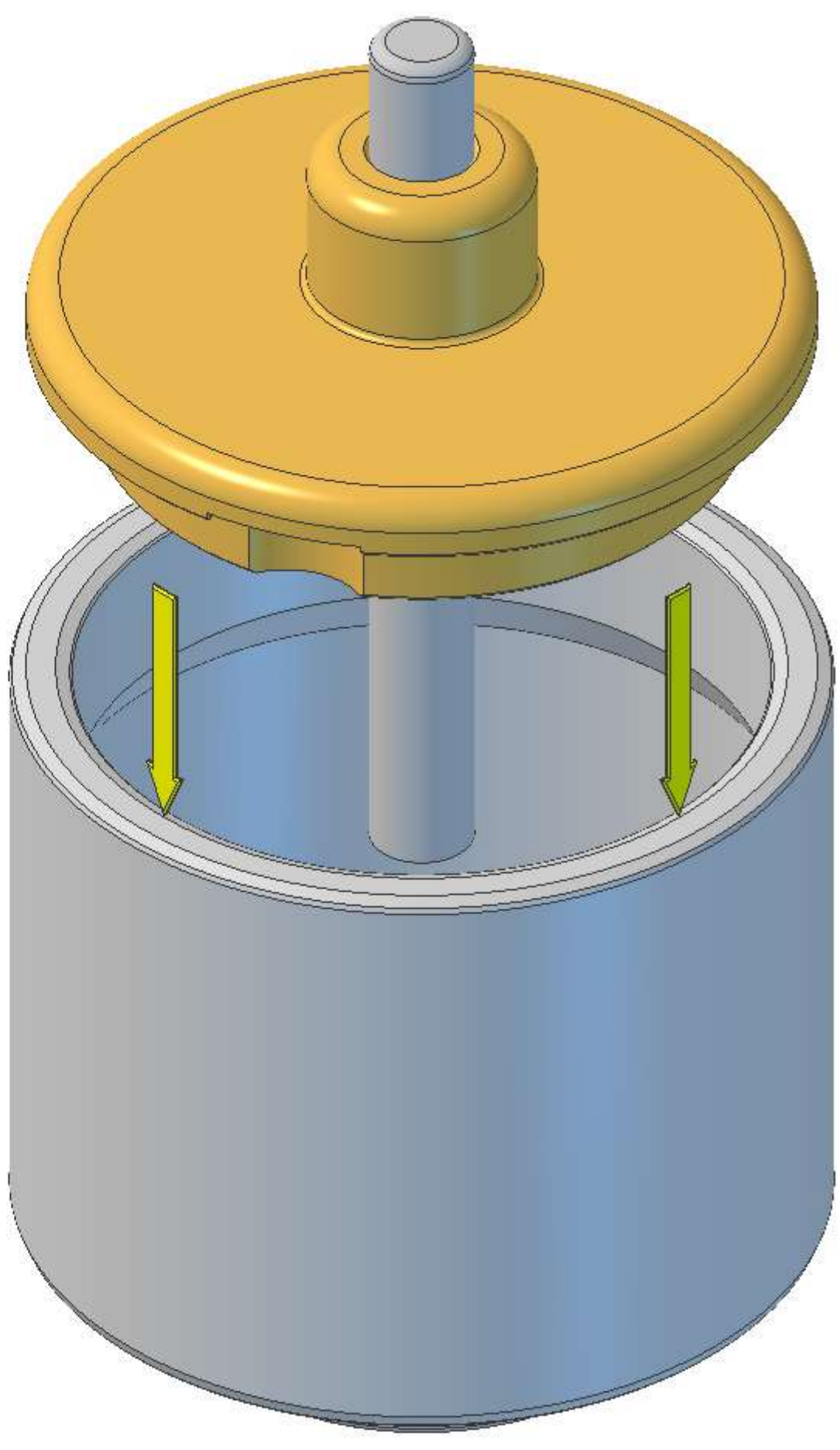
Insert the prepared end of the wick into the burner cap, a pushing and twisting motion works best. There should be about 4mm protruding from the top of the cap and 15mm from the bottom.

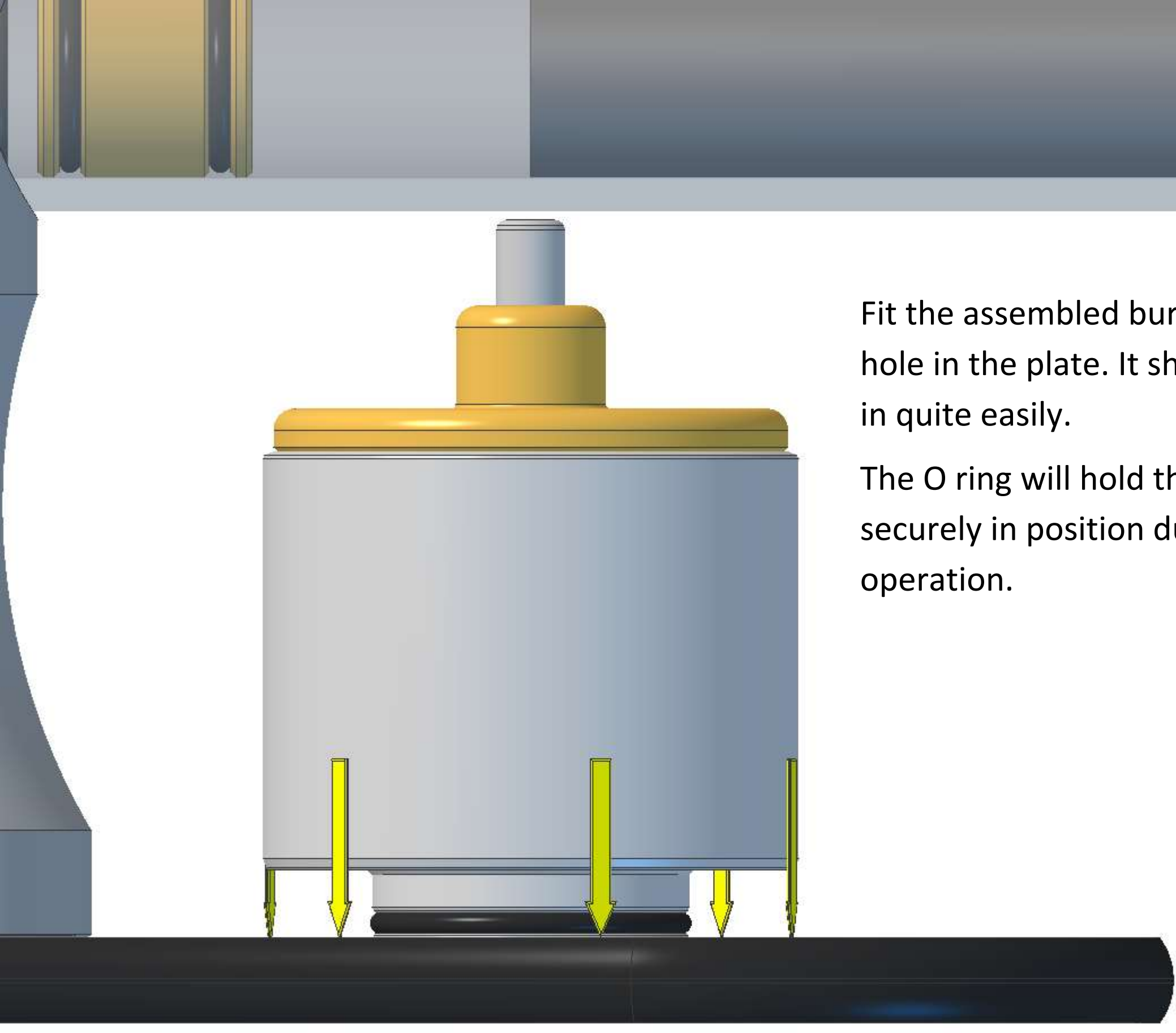


Fit one 13mm O ring into the groove on the bottom of the burner body.



Fit the burner cap into the burner body.





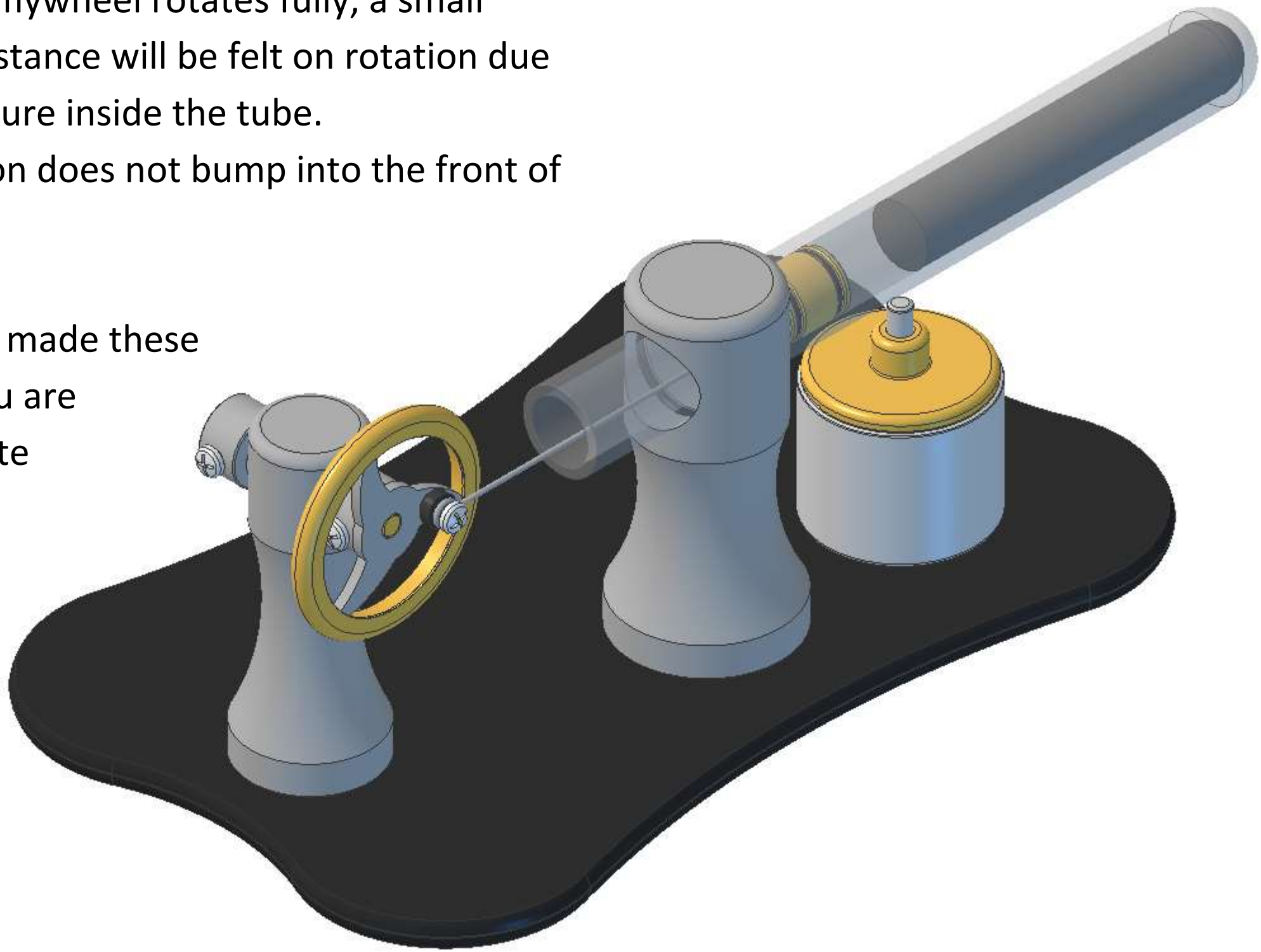
Fit the assembled burner into the hole in the plate. It should slide in quite easily.

The O ring will hold the burner securely in position during operation.

Your engine is now fully assembled.

Check that the flywheel rotates fully, a small amount of resistance will be felt on rotation due to the air pressure inside the tube.
Check the piston does not bump into the front of the choke.

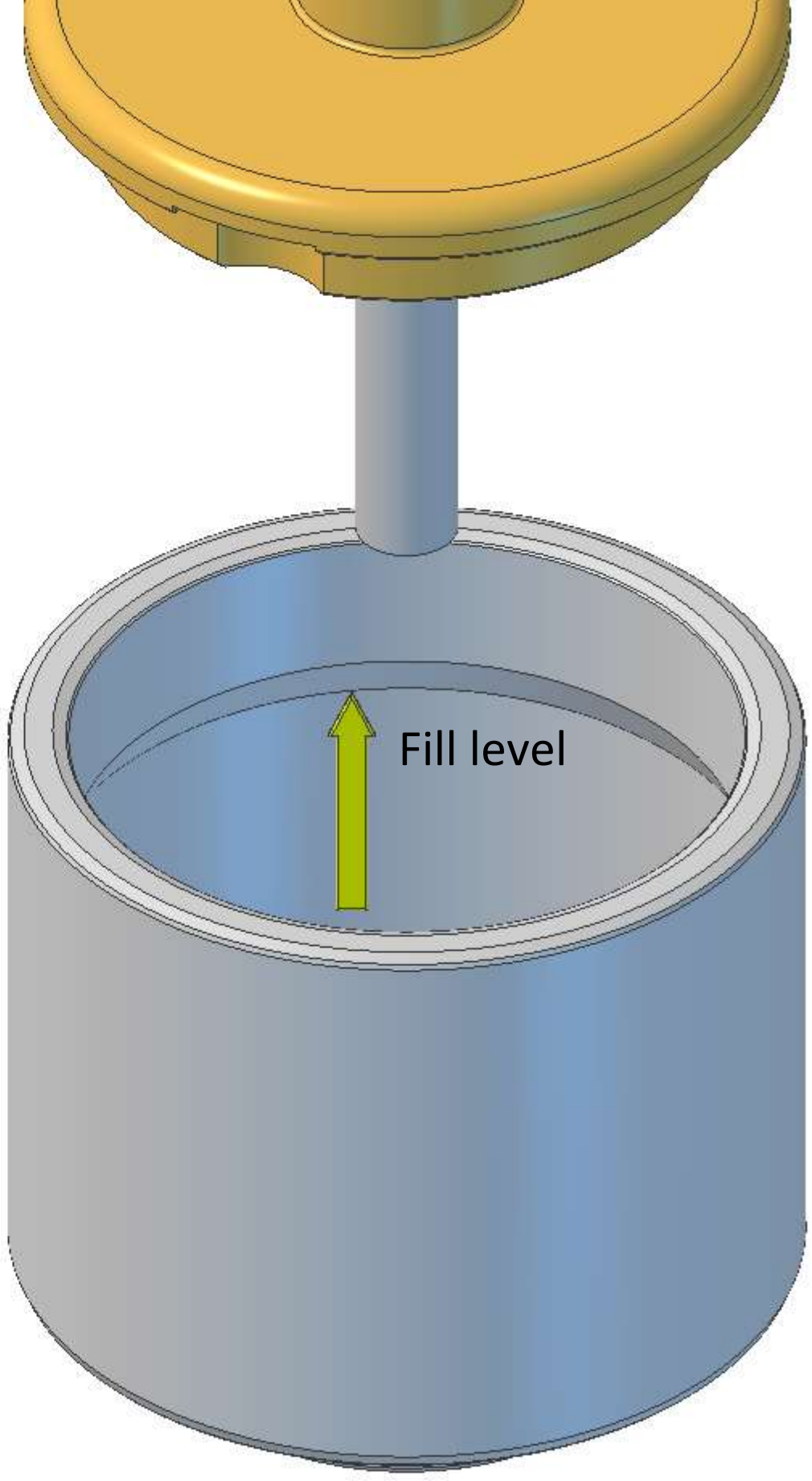
Once you have made these final checks you are ready to operate your engine.



The engine uses Methylated Spirits or Denatured Alcohol as fuel.

Remove the burner from the engine base plate and remove the cap from the body. There is a small step about a quarter of the way down inside, fill with fuel to this level AND NO MORE. Trim the wick to 4mm protruding from the top and 15mm from the bottom. Fit the cap back in the body.

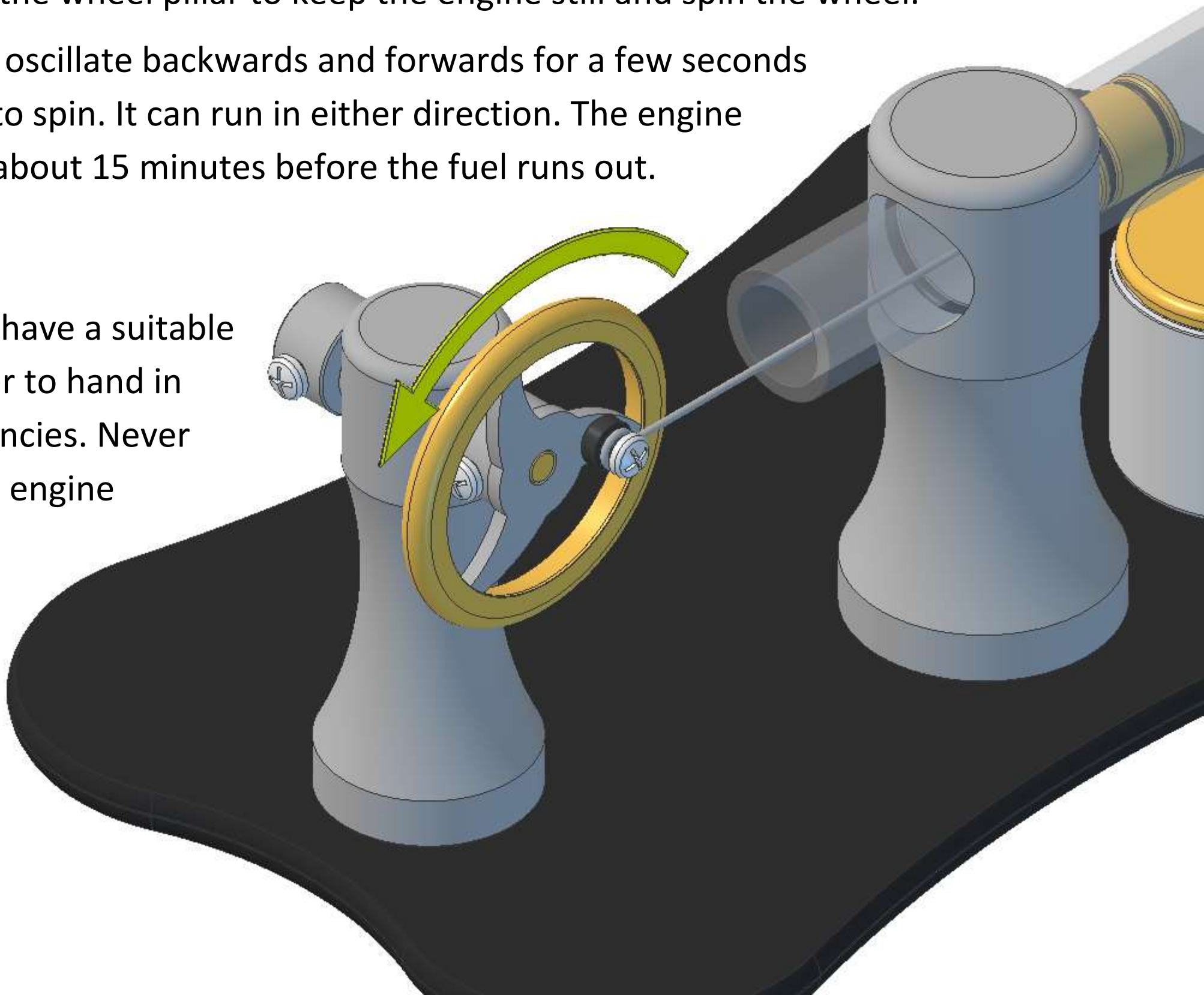
The cap has a small vent slot on its underside. This must always be kept clear or the burner cap might pop off during operation and spill burning fuel on the base plate.



Fit the burner into the base. Light the wick and allow a minute or so to warm up. Press down on the wheel pillar to keep the engine still and spin the wheel.

The engine will oscillate backwards and forwards for a few seconds and then start to spin. It can run in either direction. The engine should run for about 15 minutes before the fuel runs out.

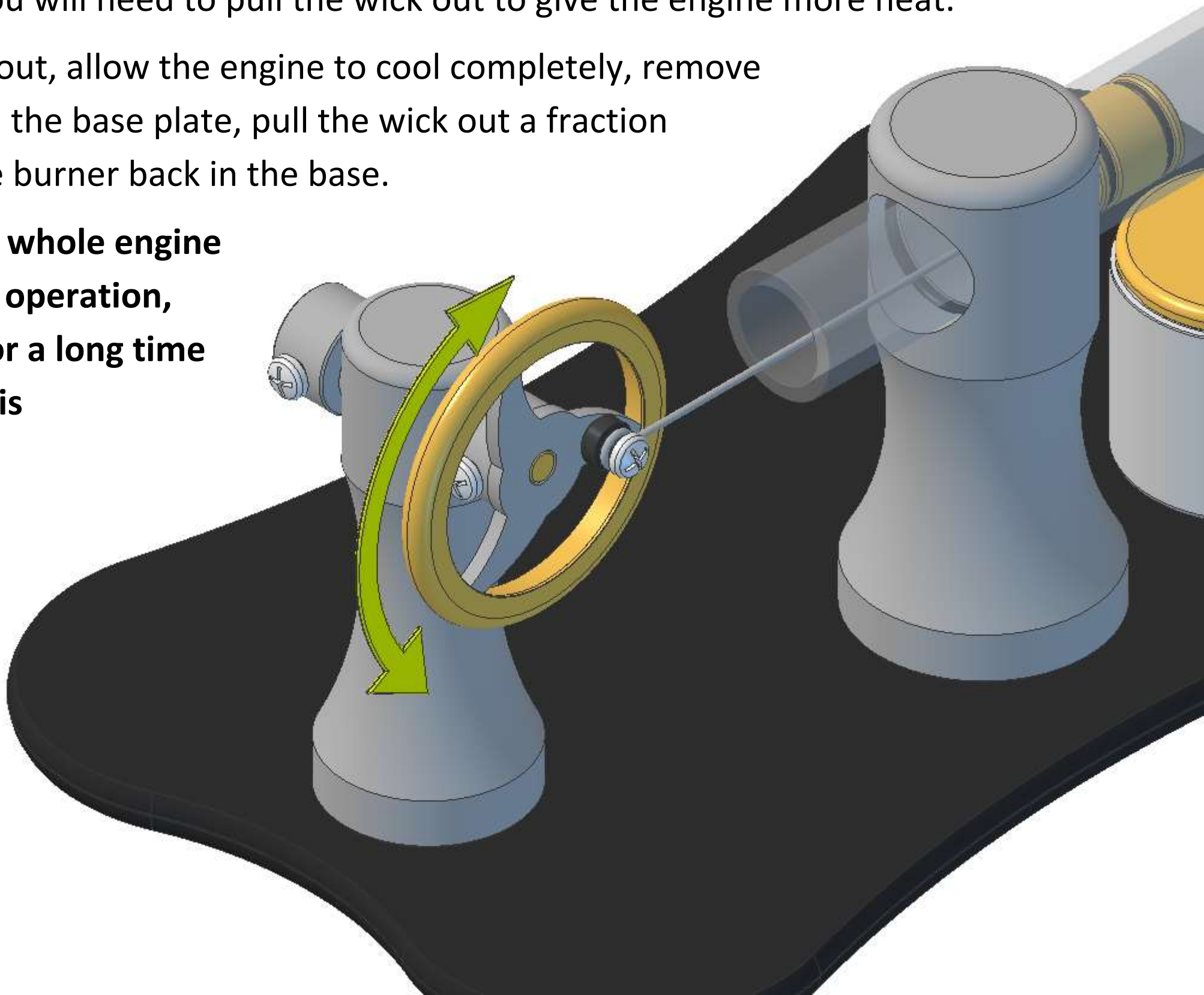
Make sure you have a suitable fire extinguisher to hand in case of emergencies. Never leave a running engine or naked flame unattended.



If you find that your engine oscillates back and forwards instead of spinning in one direction you will need to pull the wick out to give the engine more heat.

Blow the flame out, allow the engine to cool completely, remove the burner from the base plate, pull the wick out a fraction more and fit the burner back in the base.

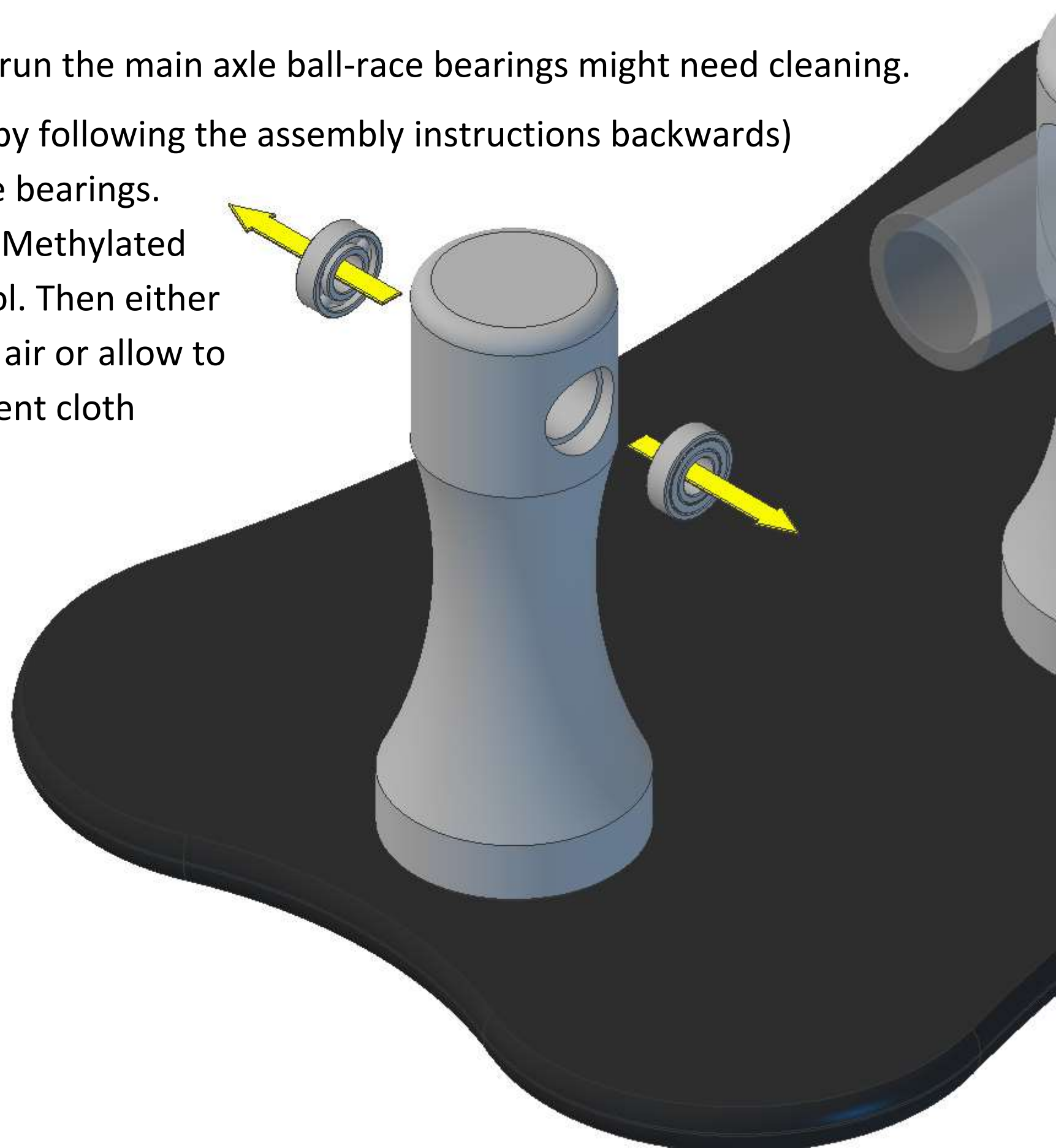
Remember, the whole engine gets very hot in operation, and stays hot for a long time after the flame is extinguished.



If your engine struggles to run the main axle ball-race bearings might need cleaning.

Disassemble your engine (by following the assembly instructions backwards) until you gain access to the bearings. Remove them and rinse in Methylated spirits or Denatured alcohol. Then either blow dry with compressed air or allow to dry naturally on an absorbent cloth or paper towel.

Follow the assembly instructions to reassemble your engine.



If your engine struggles to run you might need to clean the piston and tube.

Unscrew the conrod screw from the flywheel and slide the conrod and piston out of the tube.

Wipe the piston with a paper towel and clean the inside of the tube with a rolled up paper towel or cotton bud.

Make sure there are no stray fibres on the piston or in the tube and re-fit by sliding the piston into the tube (some air pressure will be felt, this is normal) and screwing the conrod screw into the hole in the face of the flywheel.