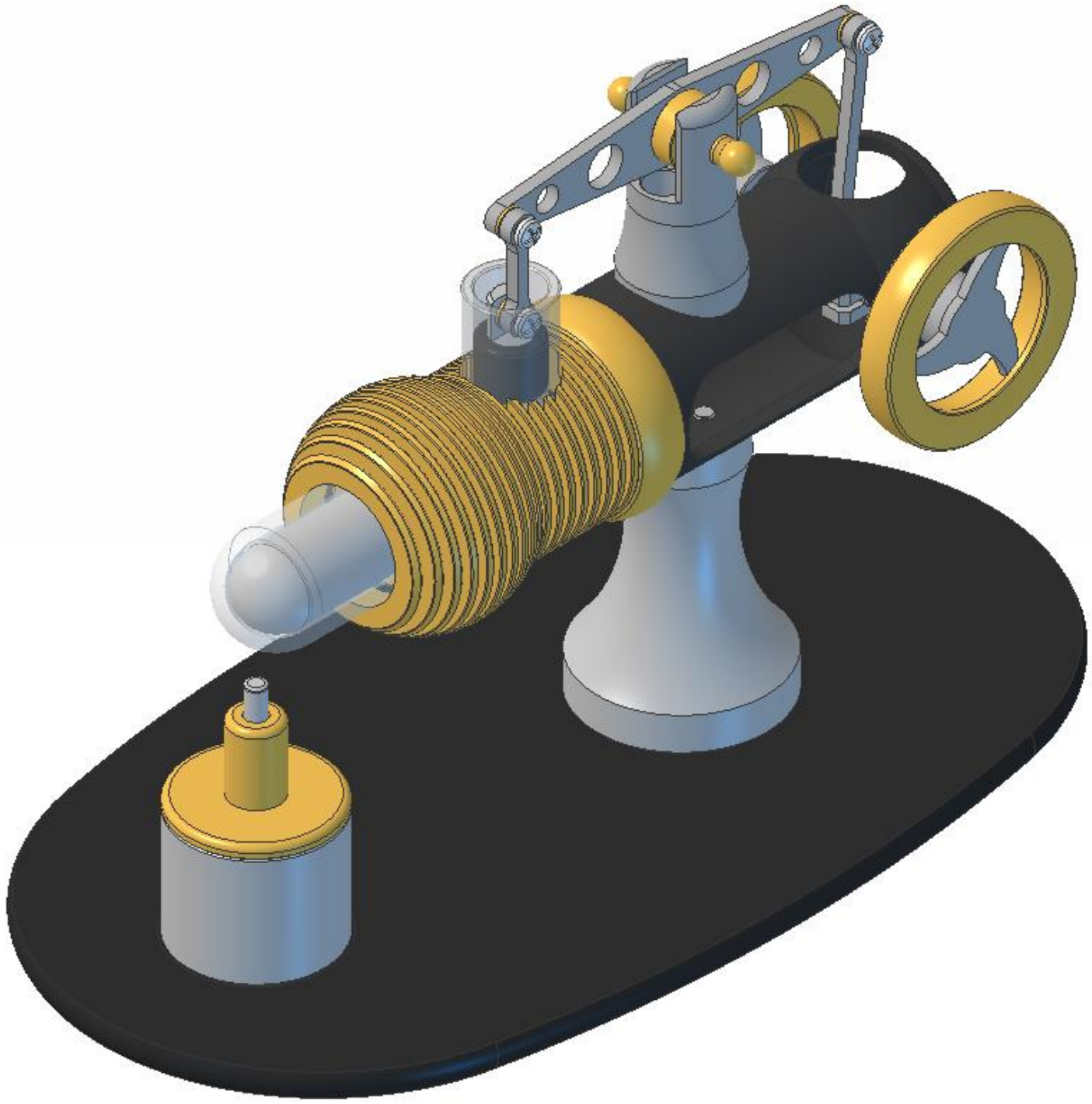
Kontax Stirling Engines KB09 instructions

This document covers the following:

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

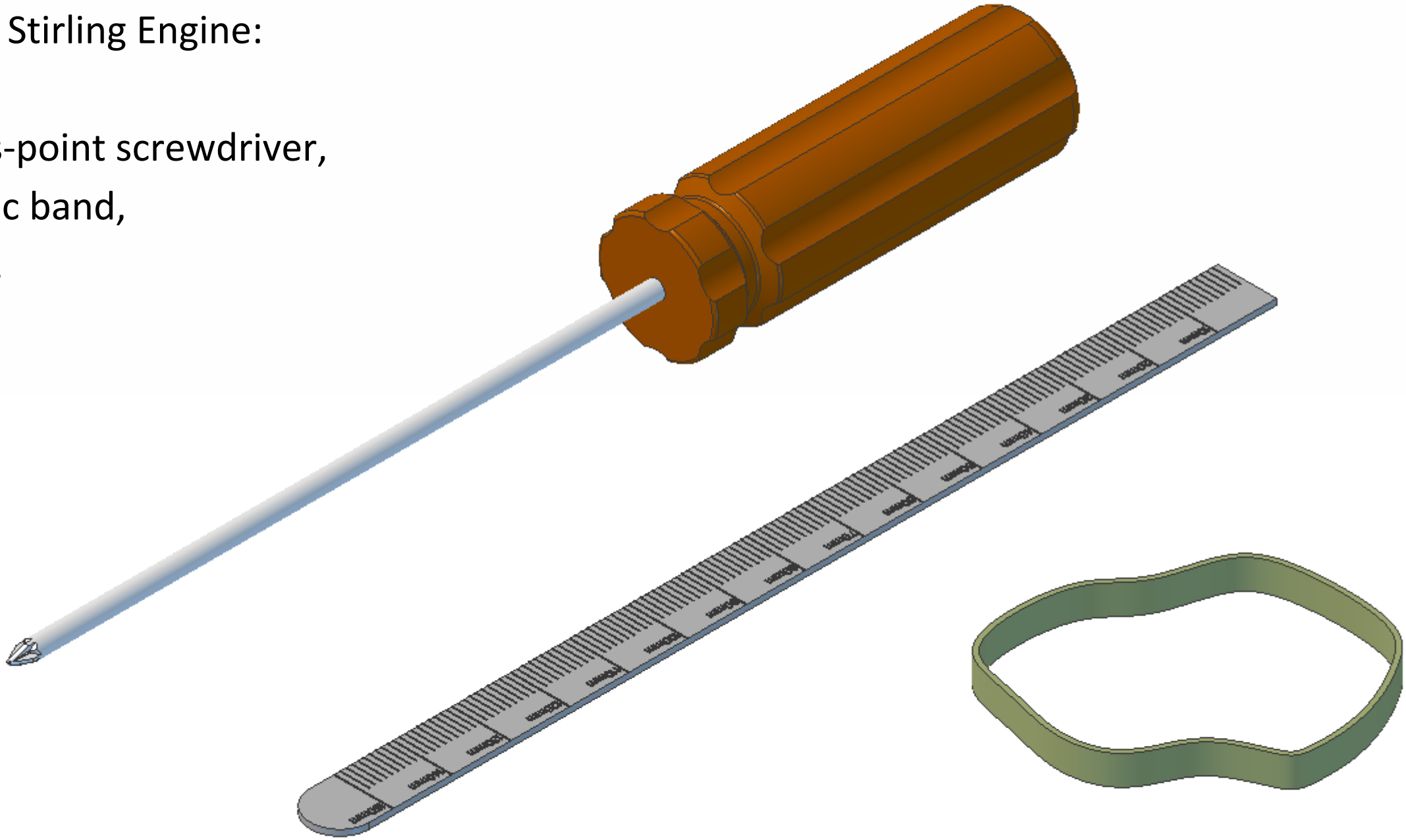


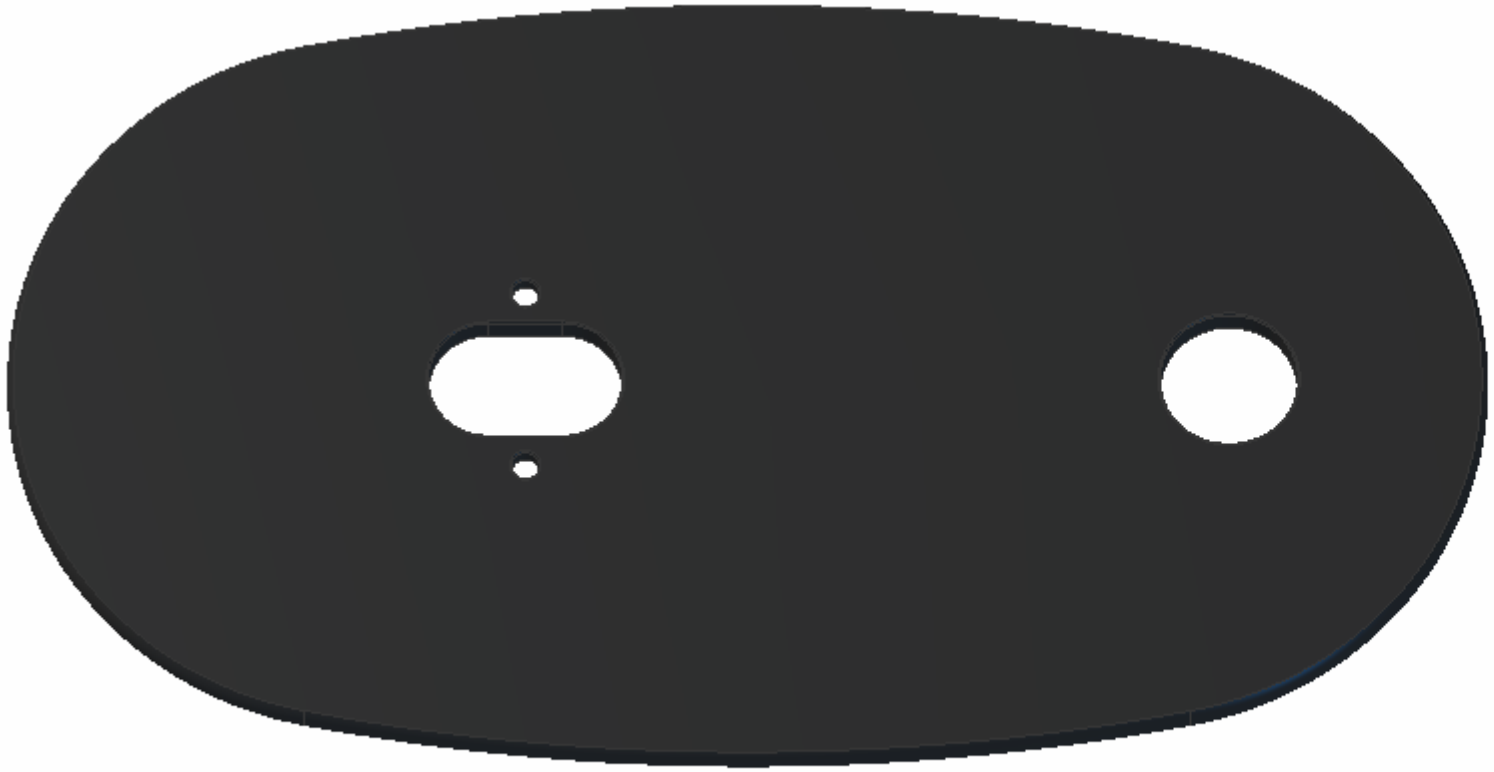
Contact details:

- www.stirlingengine.co.uk
- Kontax@btconnect.com
- Tel: 01452 905001(UK)

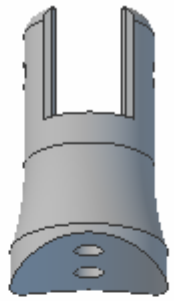
Tools you will need to assemble your KB09 Stirling Engine:

Cross-point screwdriver,
elastic band,
ruler.



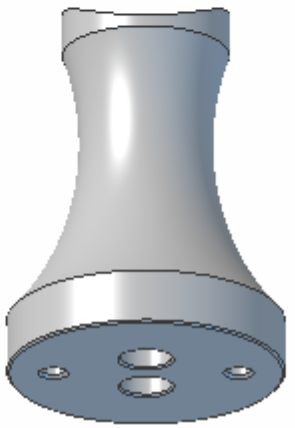


Base plate x1

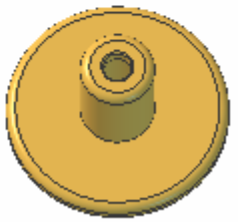


Top pillar x1

Wick x1



Bottom pillar x1



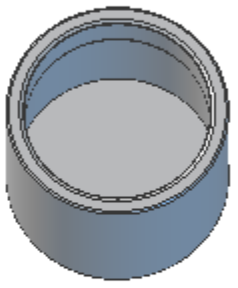
Burner cap x1

Fin block x1

Joint ring x1

Cradle x1

Flywheel x2

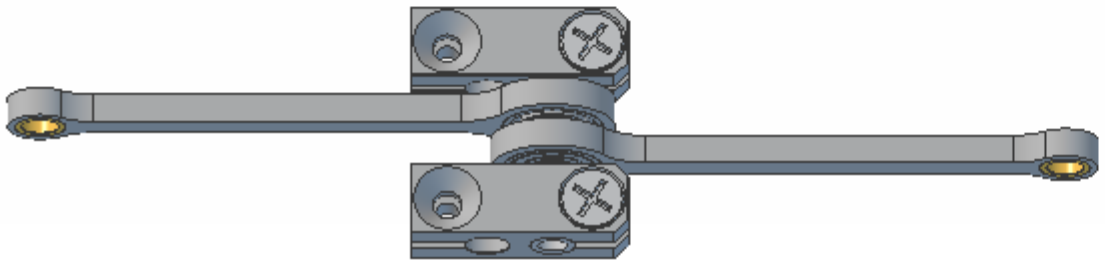


Burner body x1

Displacer stem x1

Displacer x1

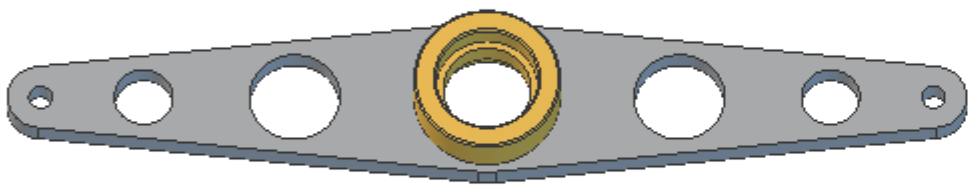
Glass dome x1



Crank & conrod assembly x1

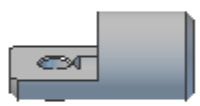
Piston x1

Cylinder x1

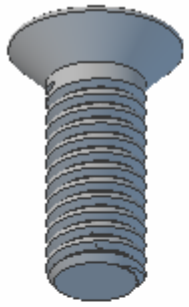


Beam x1

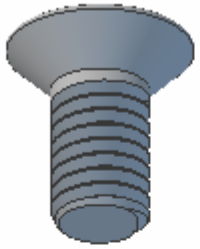
Piston conrod x1



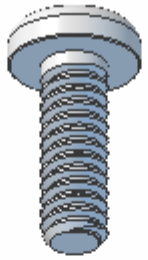
Displacer clevis x1



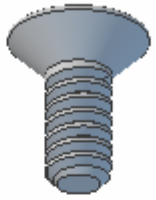
M3x8mm countersunk x6



M3x6mm countersunk x4



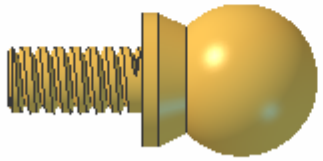
M2x6mm roundhead x4



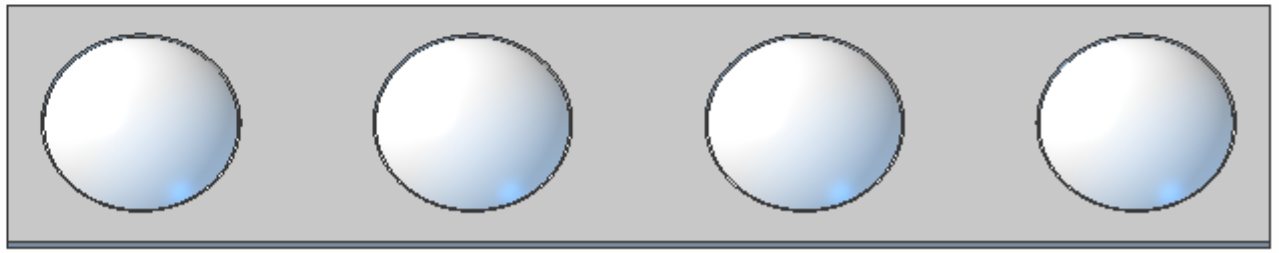
M2x5mm countersunk x2

Conrod bush x4

Beam axle x1



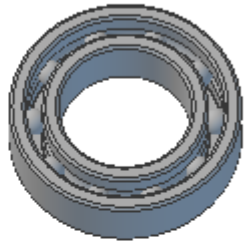
Ball-end screw x2



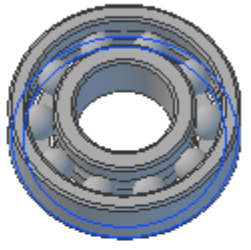
Feet x4 (1 strip)

17mm O ring x2

13mm O ring x2



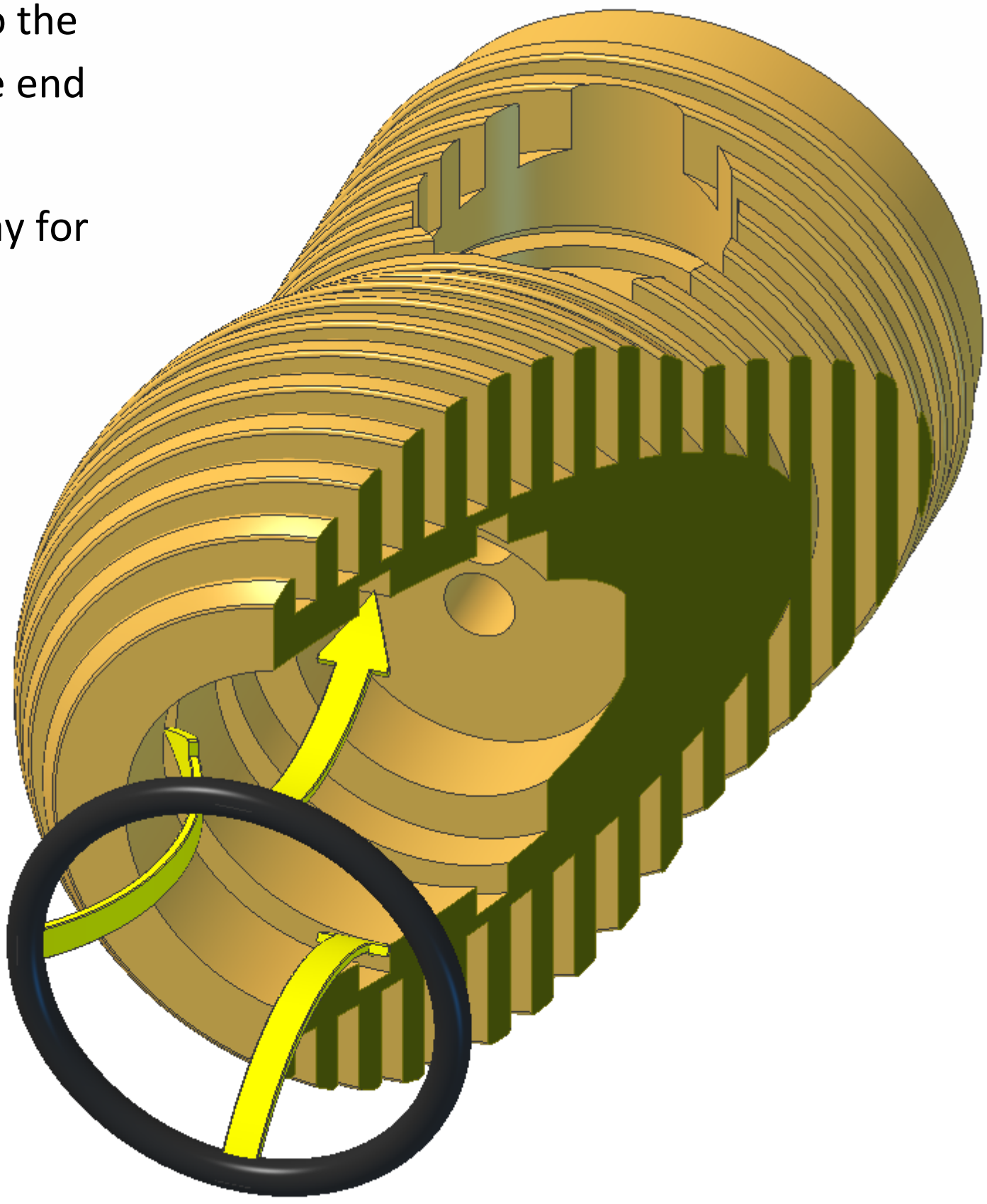
4mm Ball-race bearing x2



3mm Ball-race bearing x2

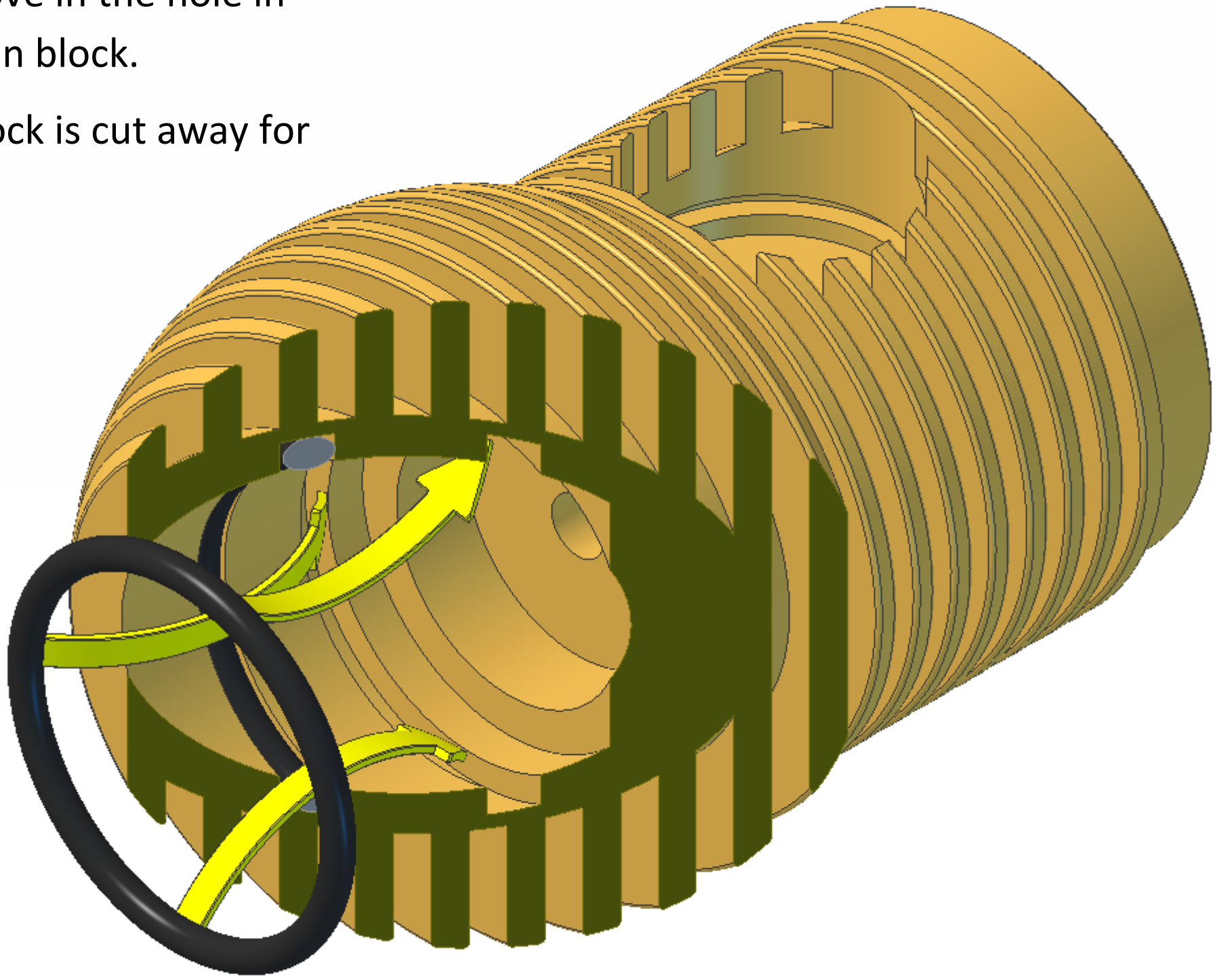
Fit the first 17mm O ring into the first groove in the hole in the end of the fin block.

Note, the fin block is cut away for clarity.

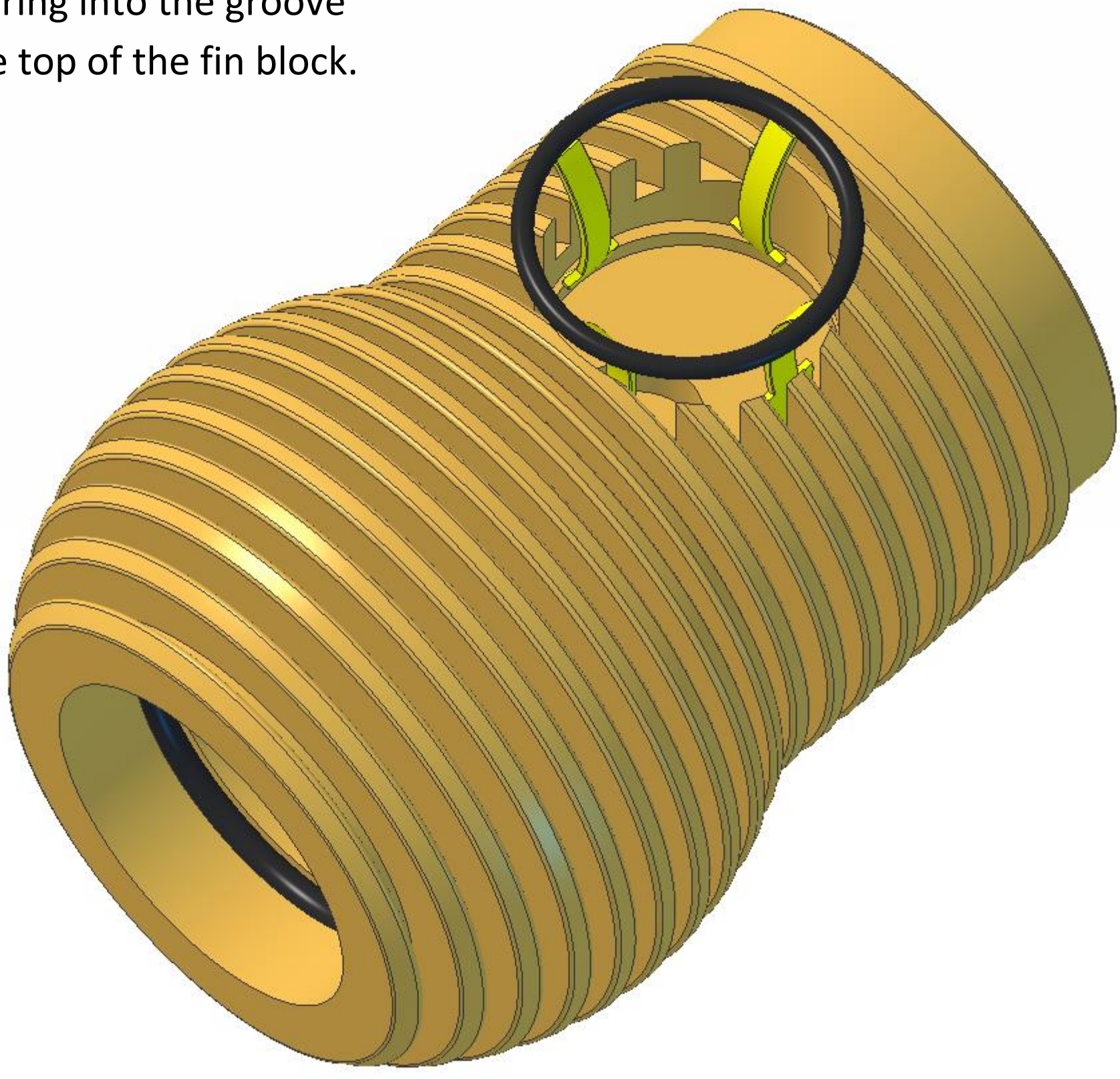


Fit the second 17mm O ring into the second groove in the hole in the end of the fin block.

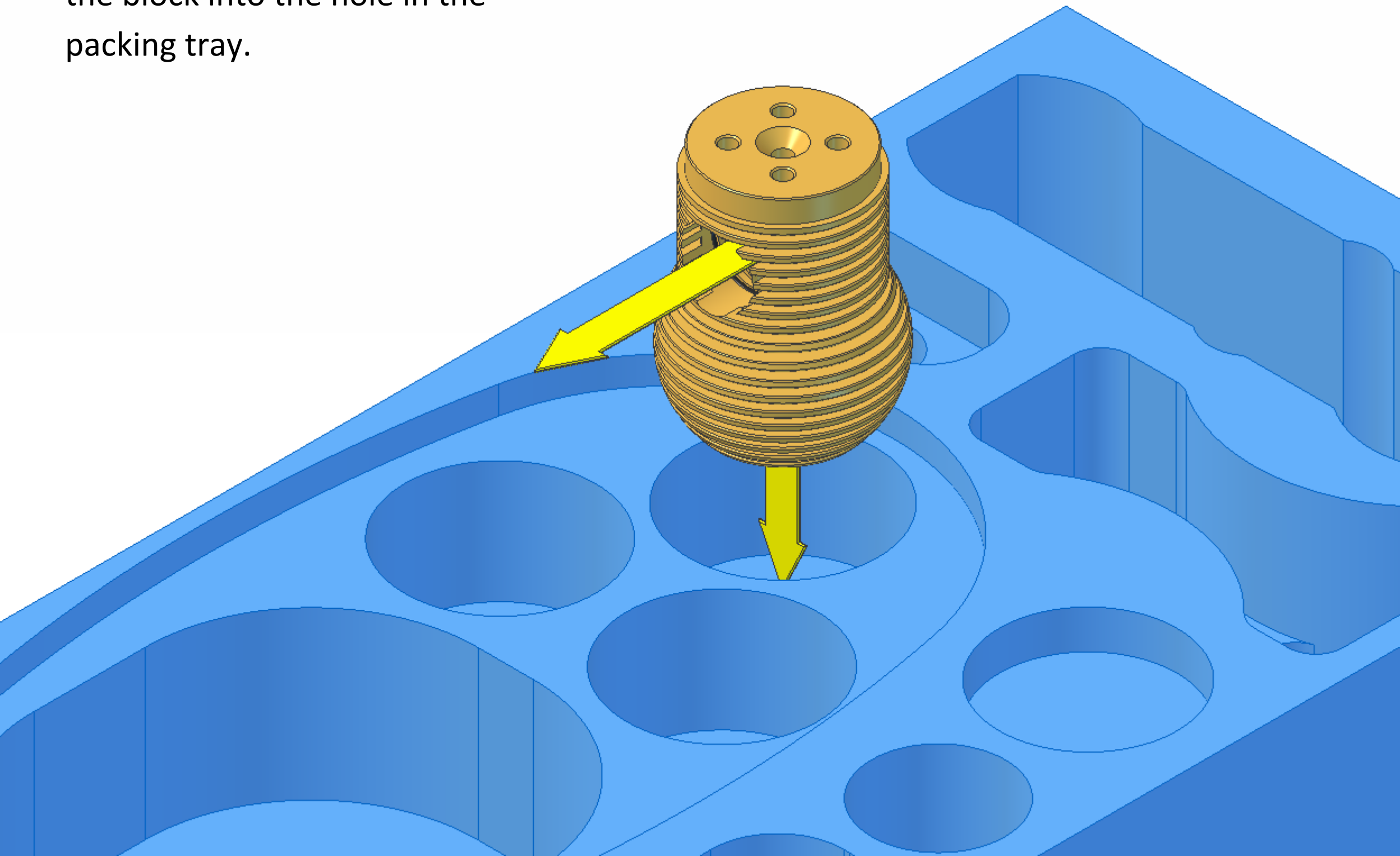
Note, the fin block is cut away for clarity.



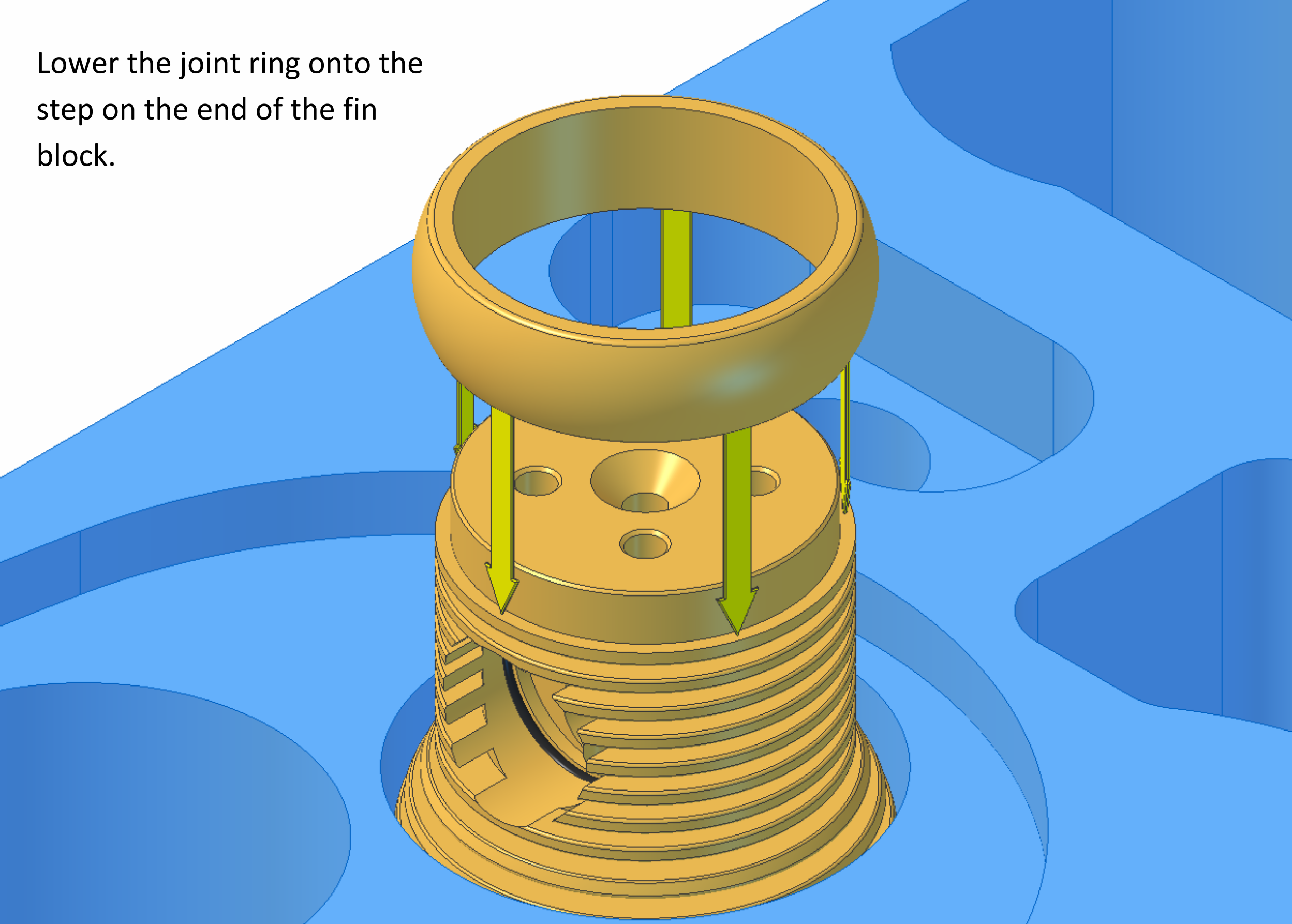
Fit one 13mm O ring into the groove
in the hole in the top of the fin block.



Align the hole in the fin block as shown in the diagram and push the block into the hole in the packing tray.

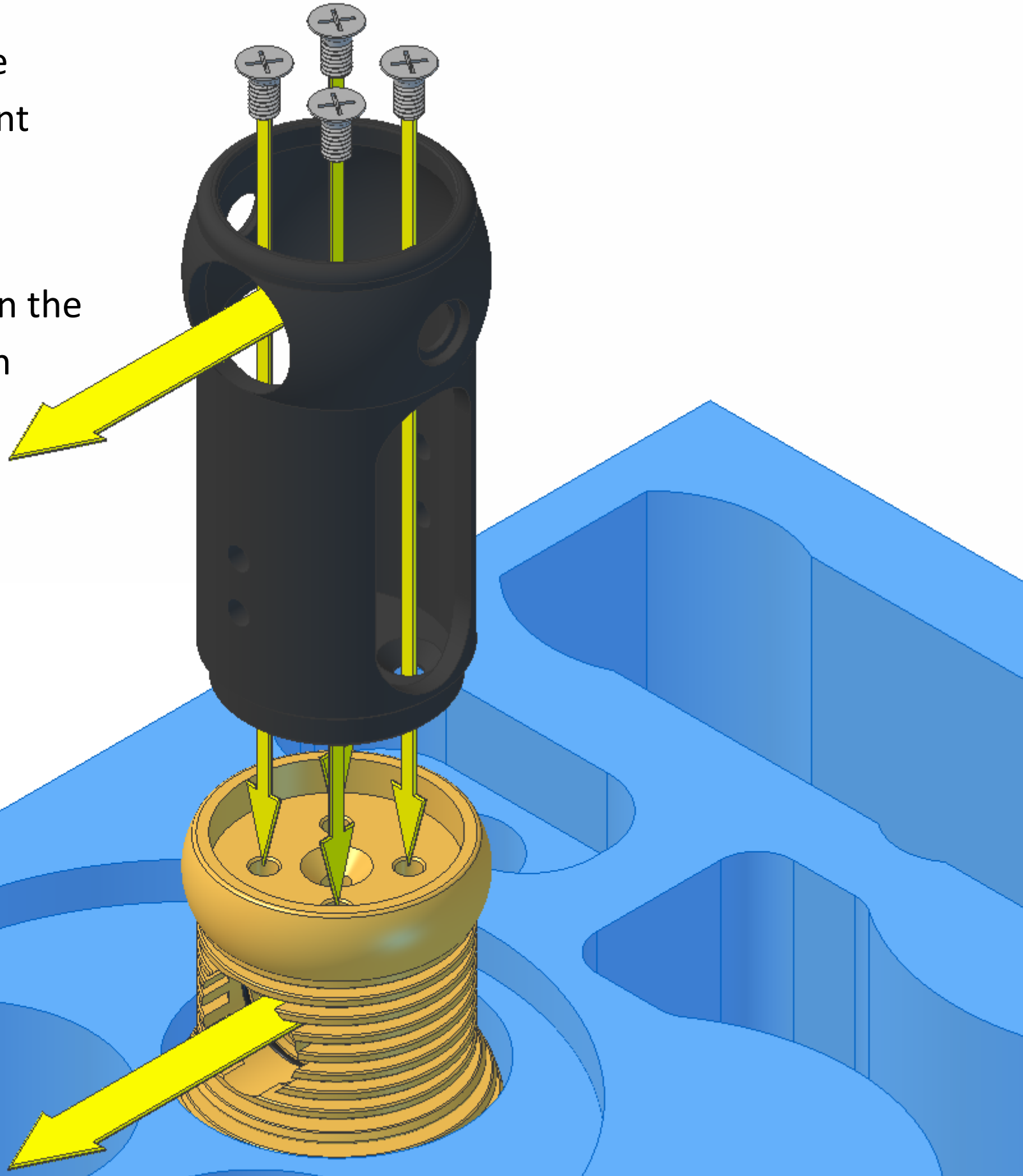


Lower the joint ring onto the step on the end of the fin block.



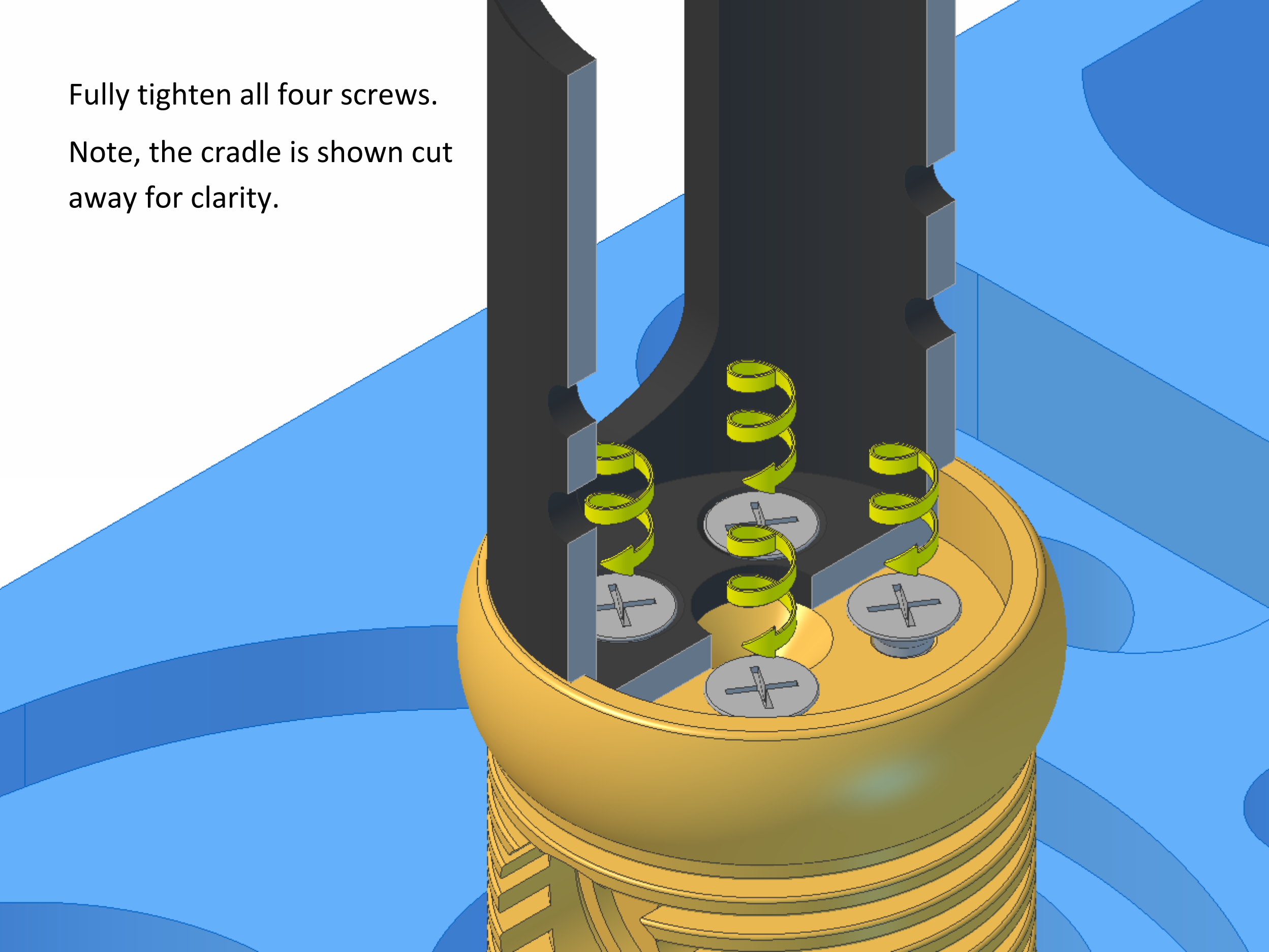
Align the cradle as shown in the diagram and lower onto the joint ring.

Fit four M3x6mm countersunk screws through the four holes in the cradle and into the four holes in the end of the fin block. Screw each screw nearly all the way in.



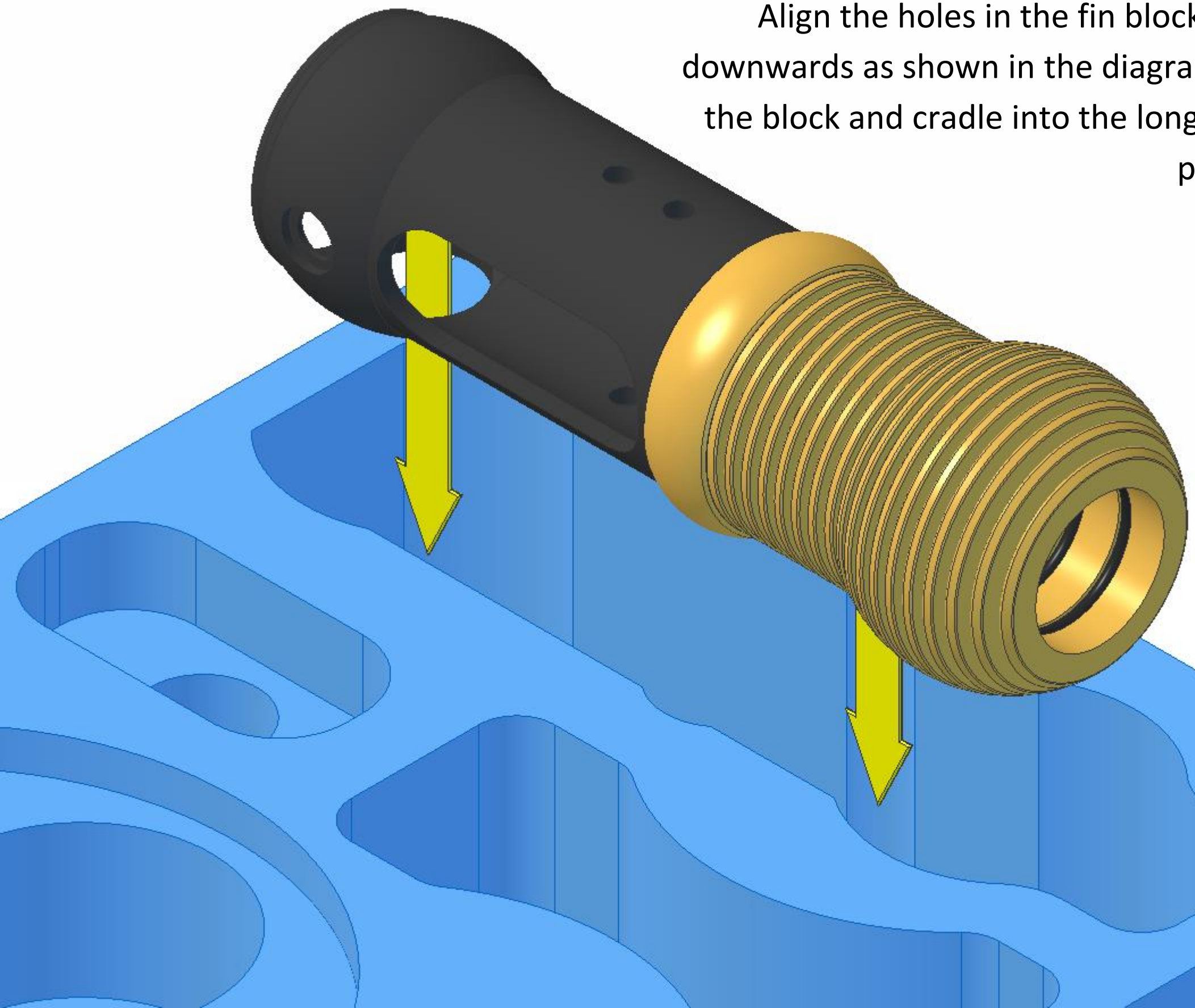
Fully tighten all four screws.

Note, the cradle is shown cut away for clarity.



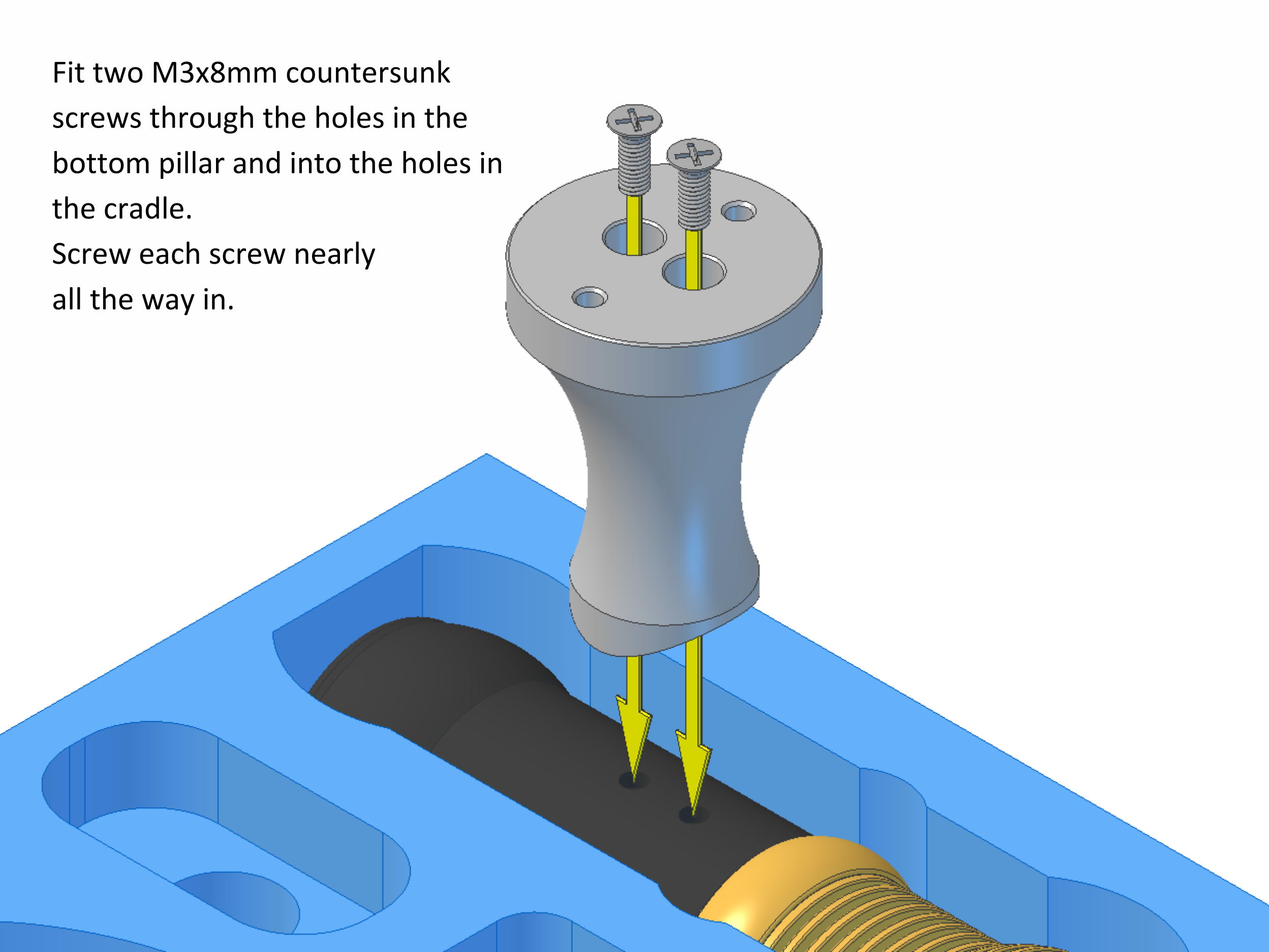
Remove from the packing tray.

Align the holes in the fin block and cradle downwards as shown in the diagram and push the block and cradle into the long hole in the packing tray.



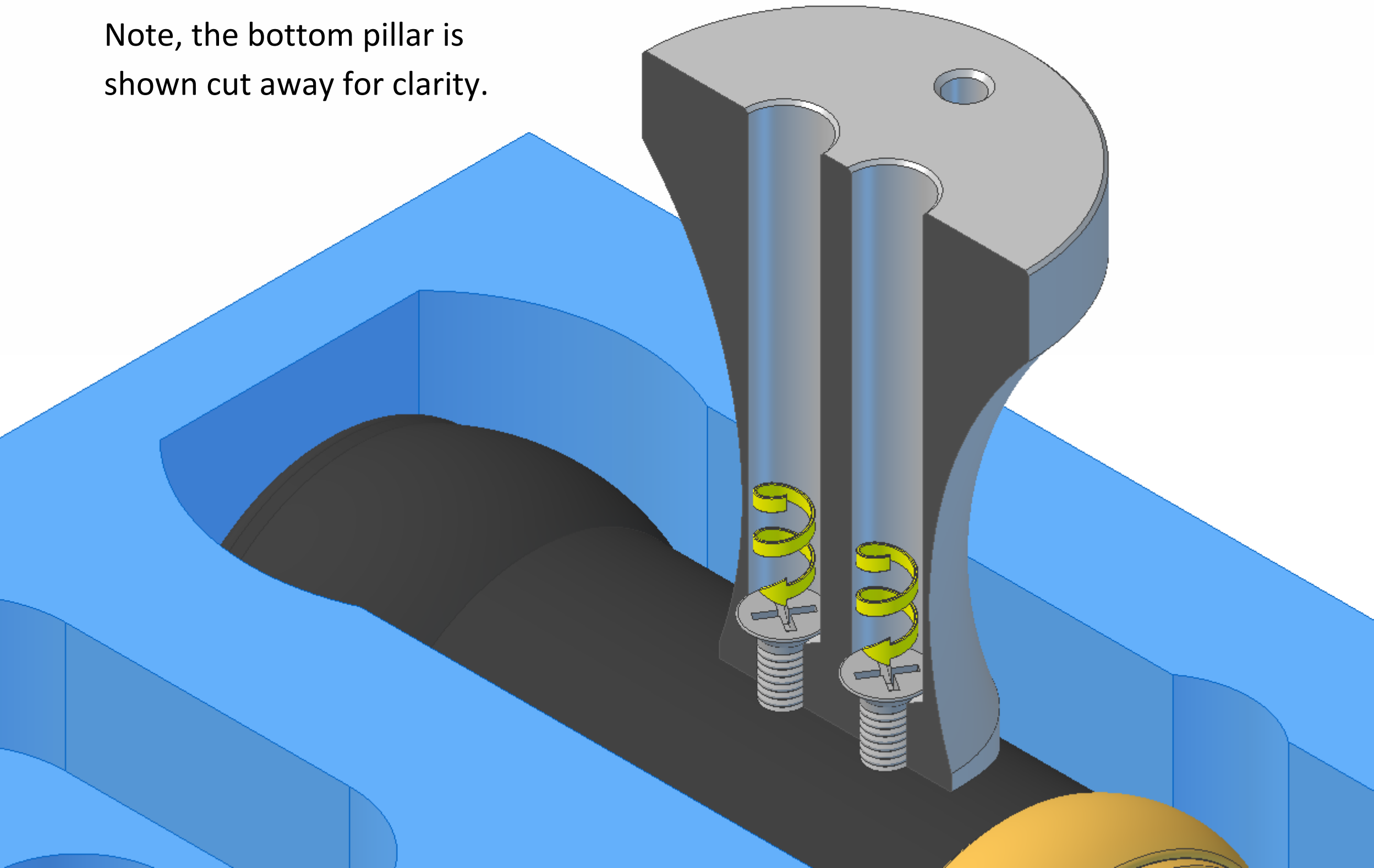
Fit two M3x8mm countersunk screws through the holes in the bottom pillar and into the holes in the cradle.

Screw each screw nearly all the way in.

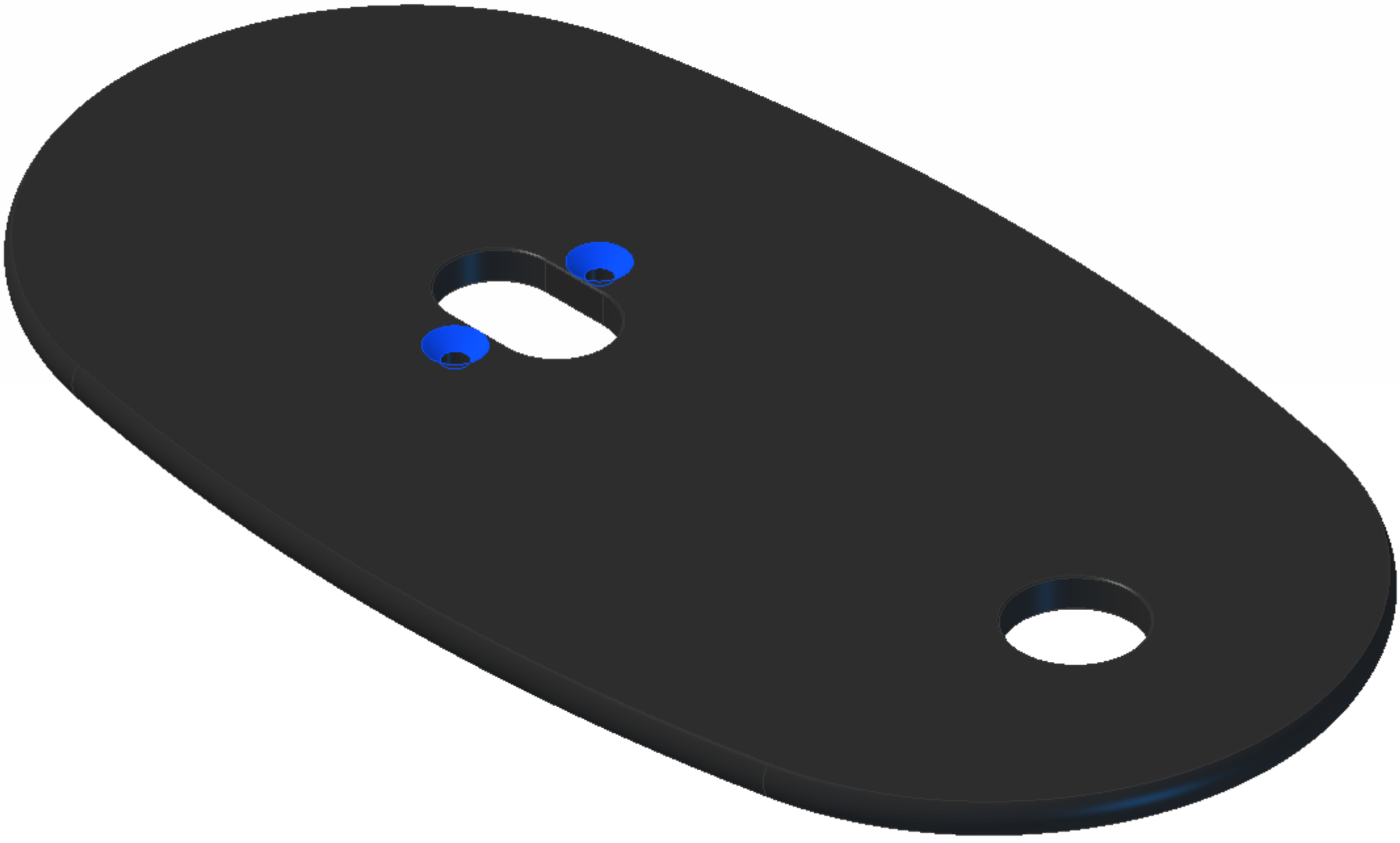


Fully tighten the screws.

Note, the bottom pillar is shown cut away for clarity.

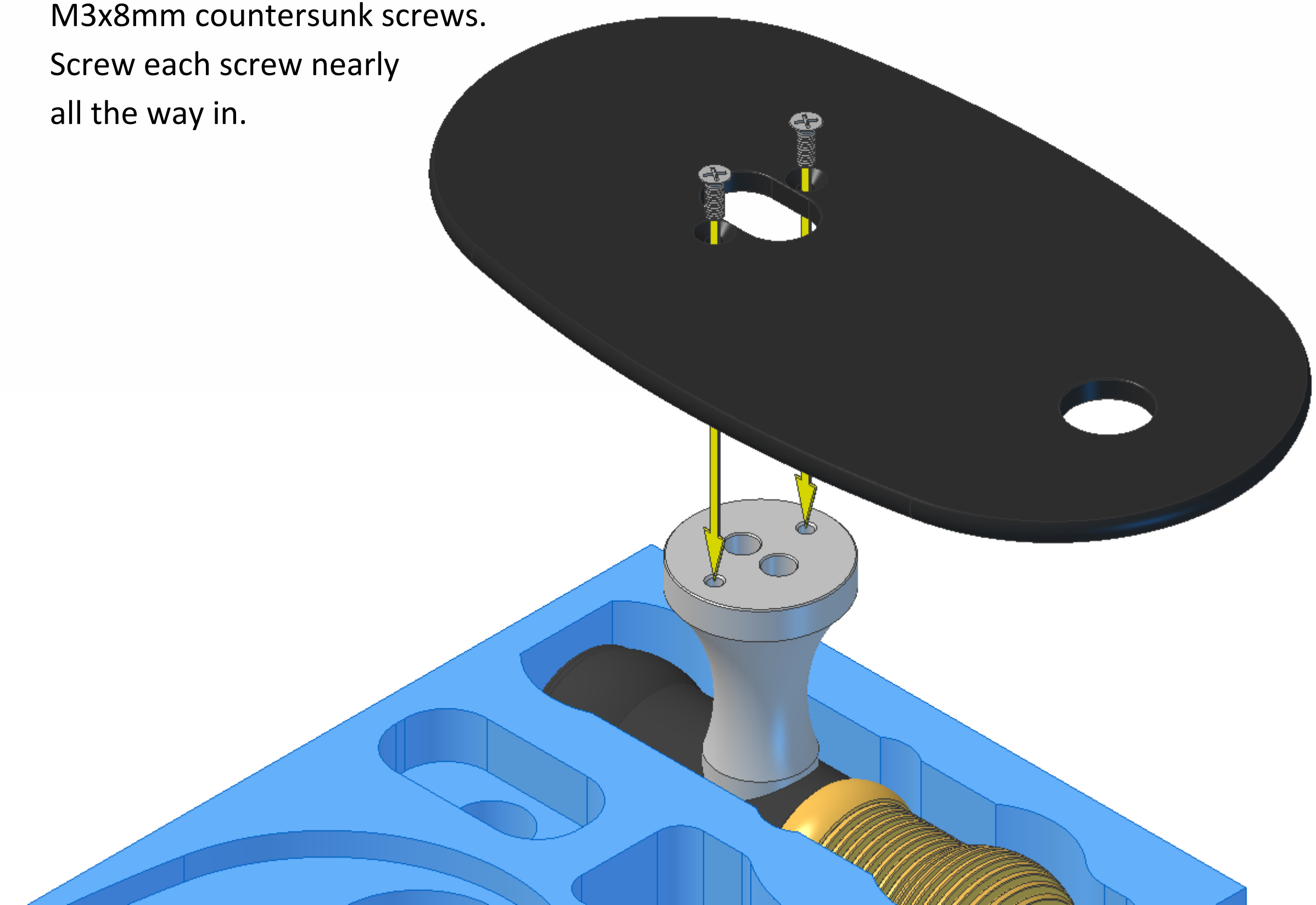


Locate the underside of the base plate. The underside is the side with the countersinks on the two holes as shown in the diagram.

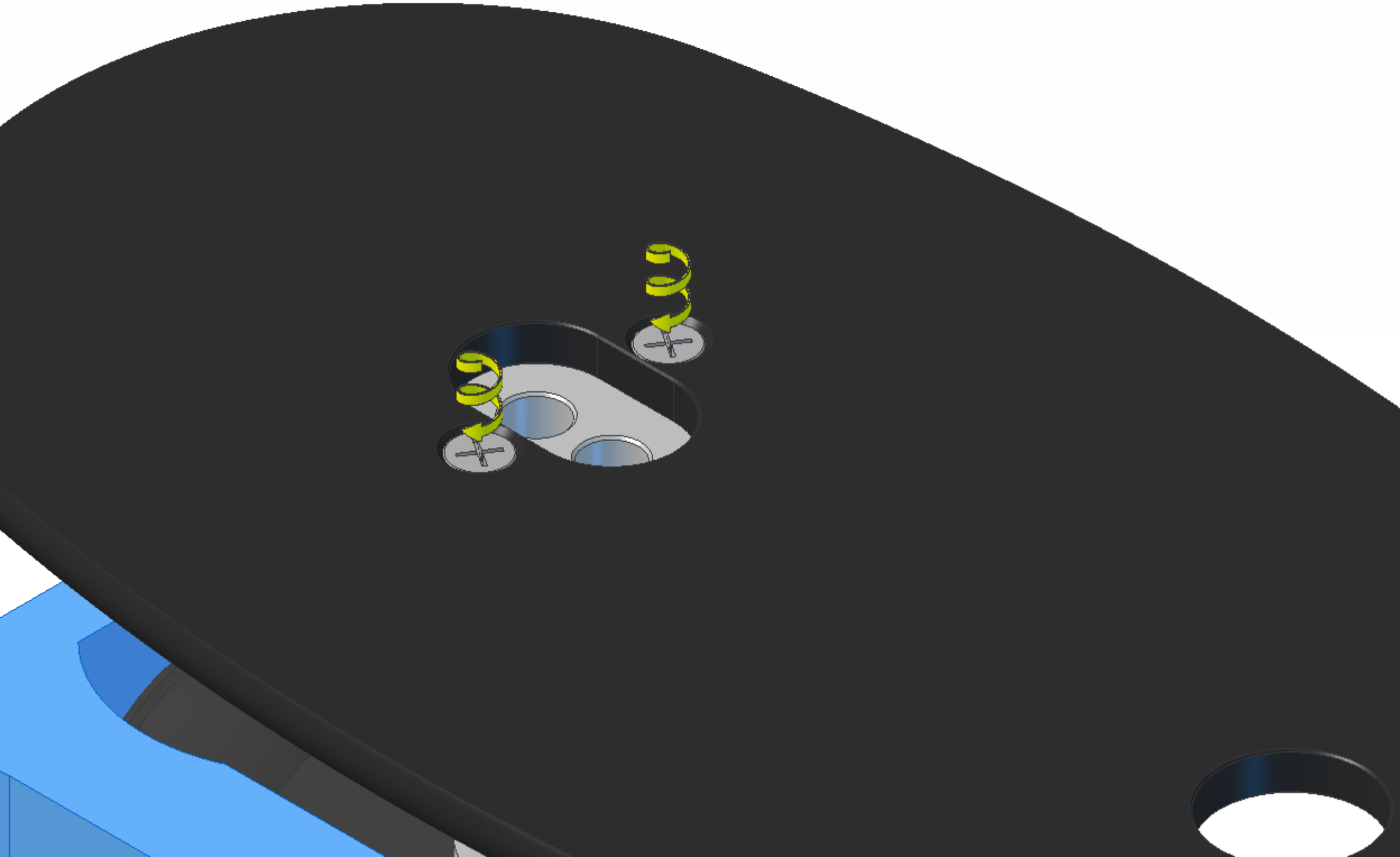


With the underside facing upwards, lower the base plate onto the bottom pillar. Align the two holes in the plate with the two holes in the pillar and start inserting two M3x8mm countersunk screws.

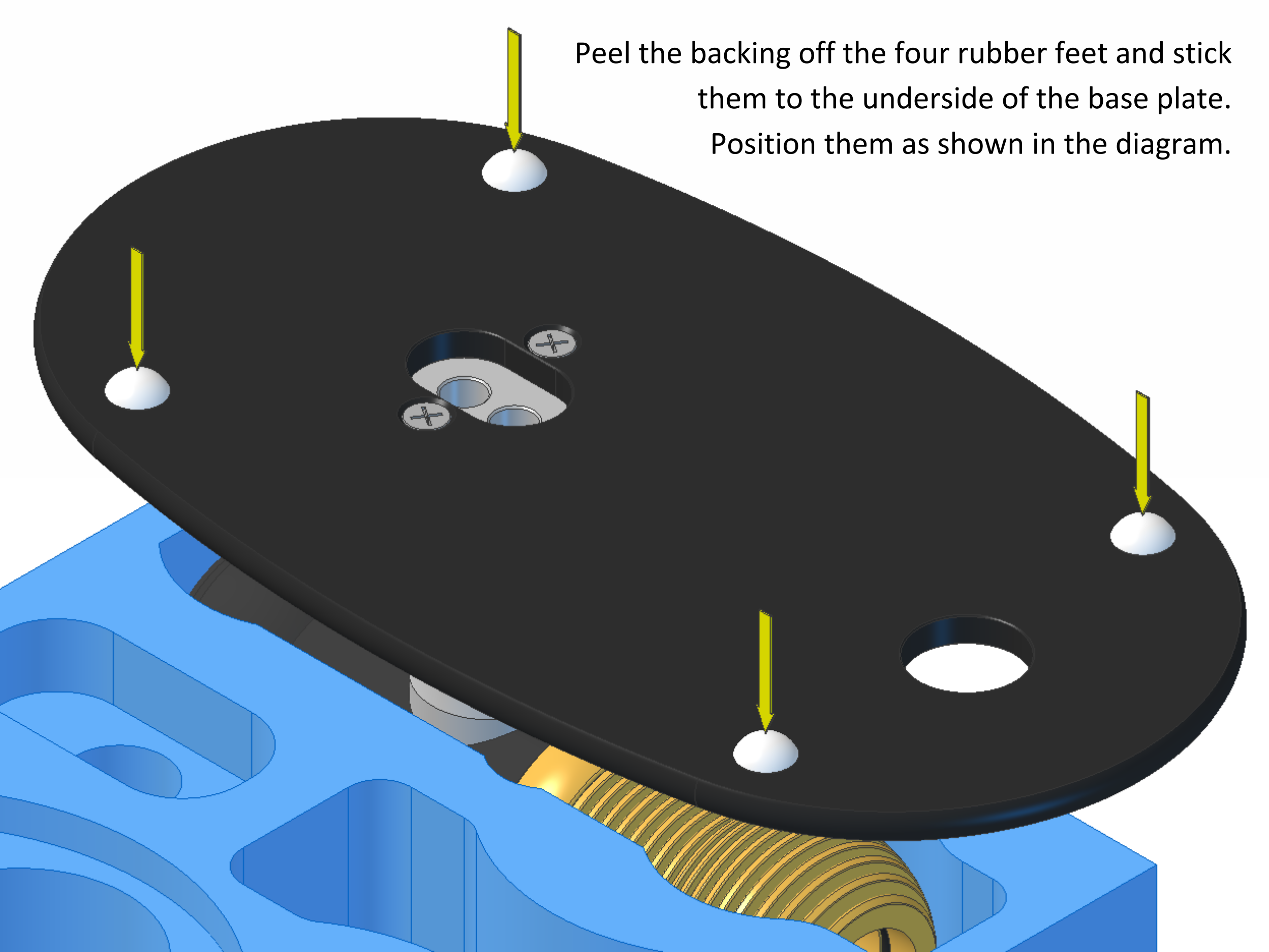
Screw each screw nearly all the way in.



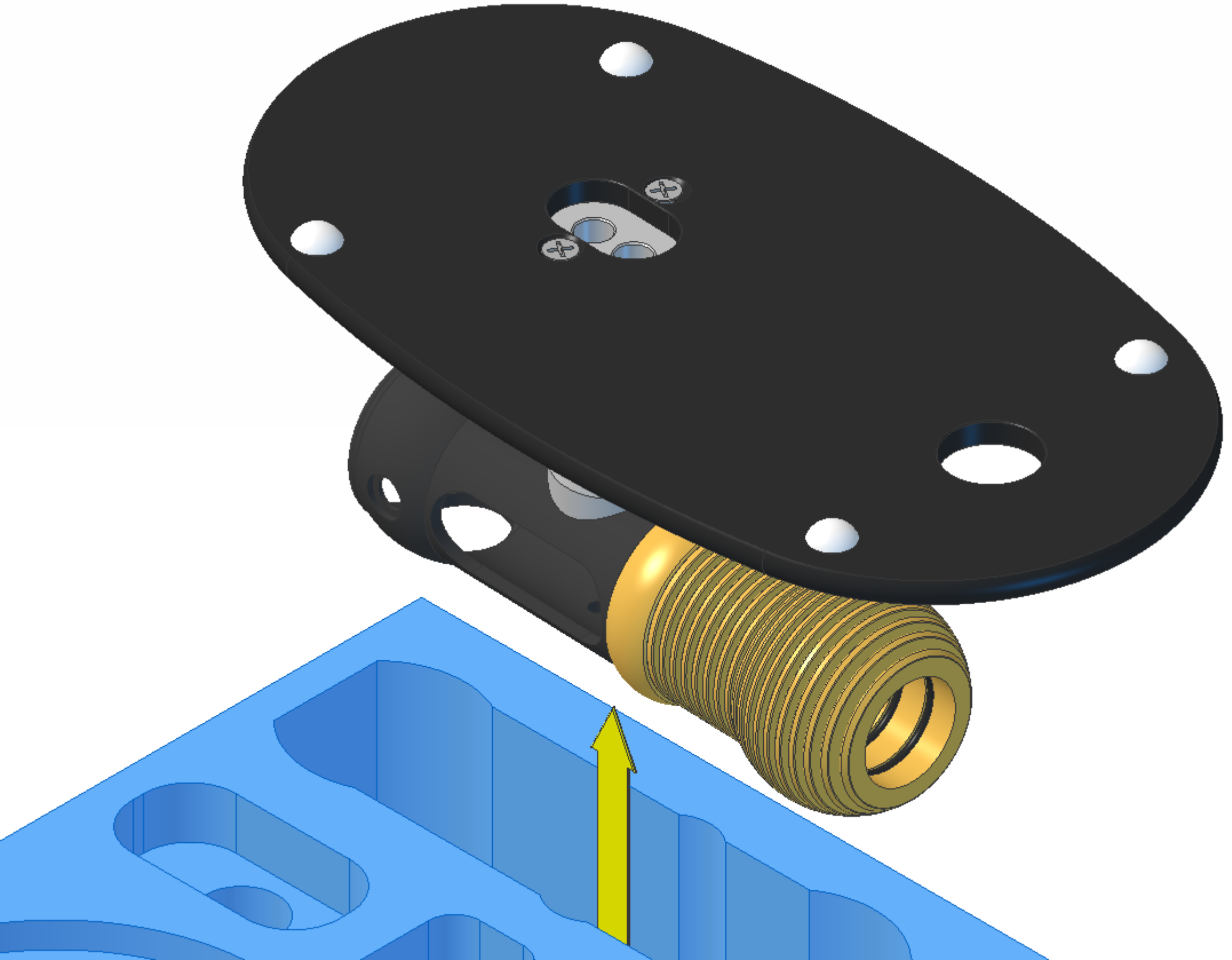
Fully tighten the screws.



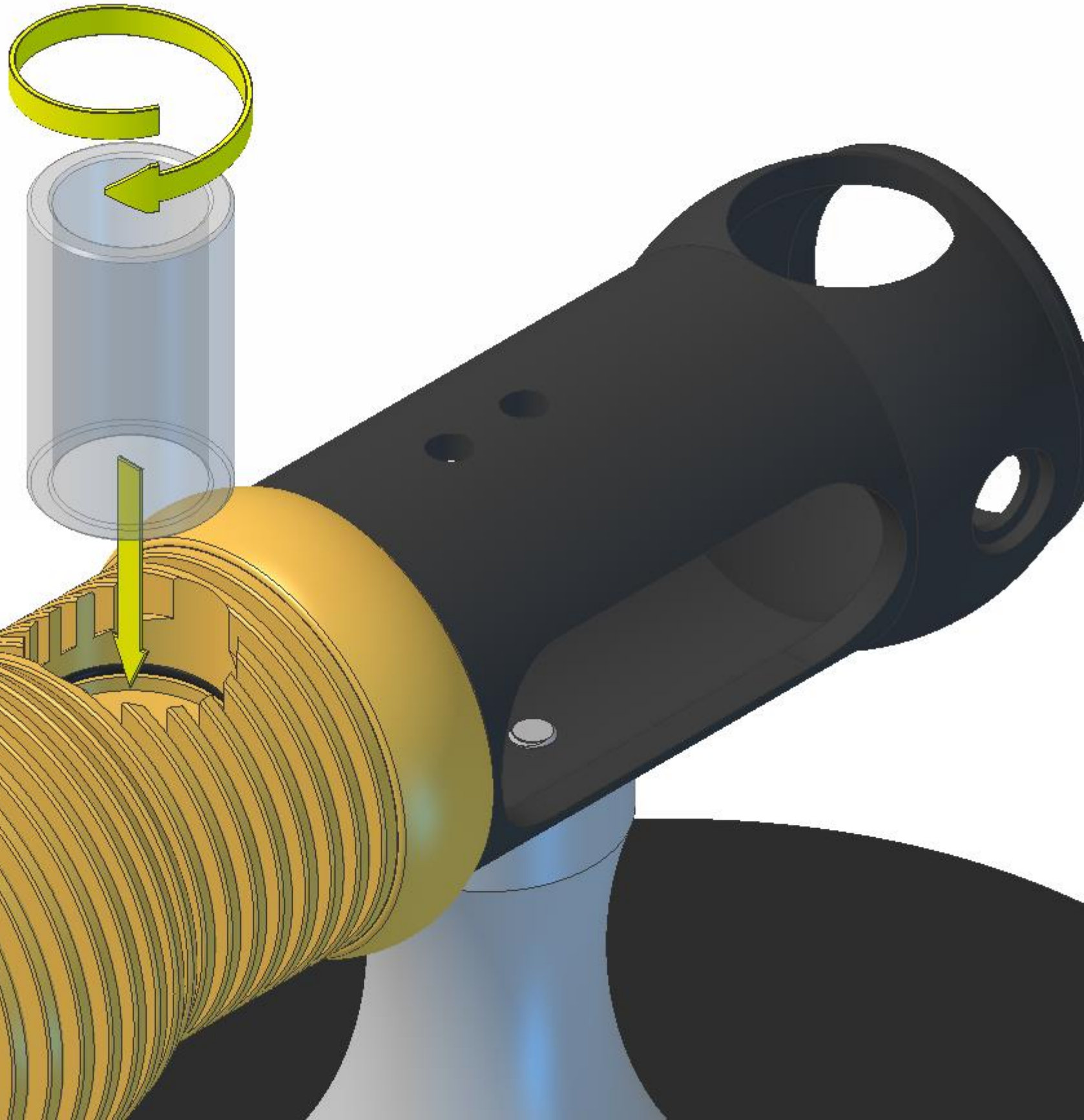
Peel the backing off the four rubber feet and stick them to the underside of the base plate. Position them as shown in the diagram.



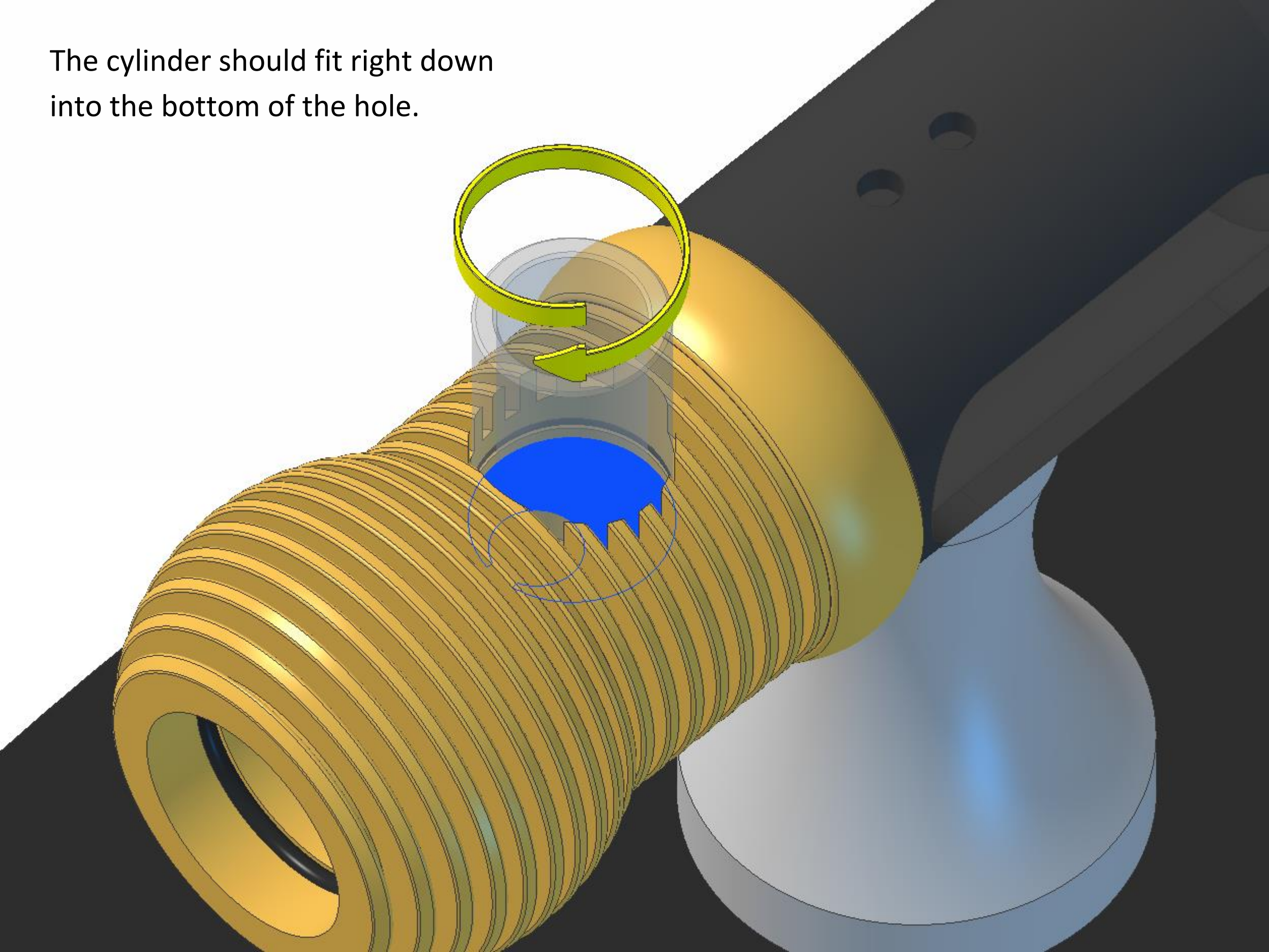
Remove from the packing tray.



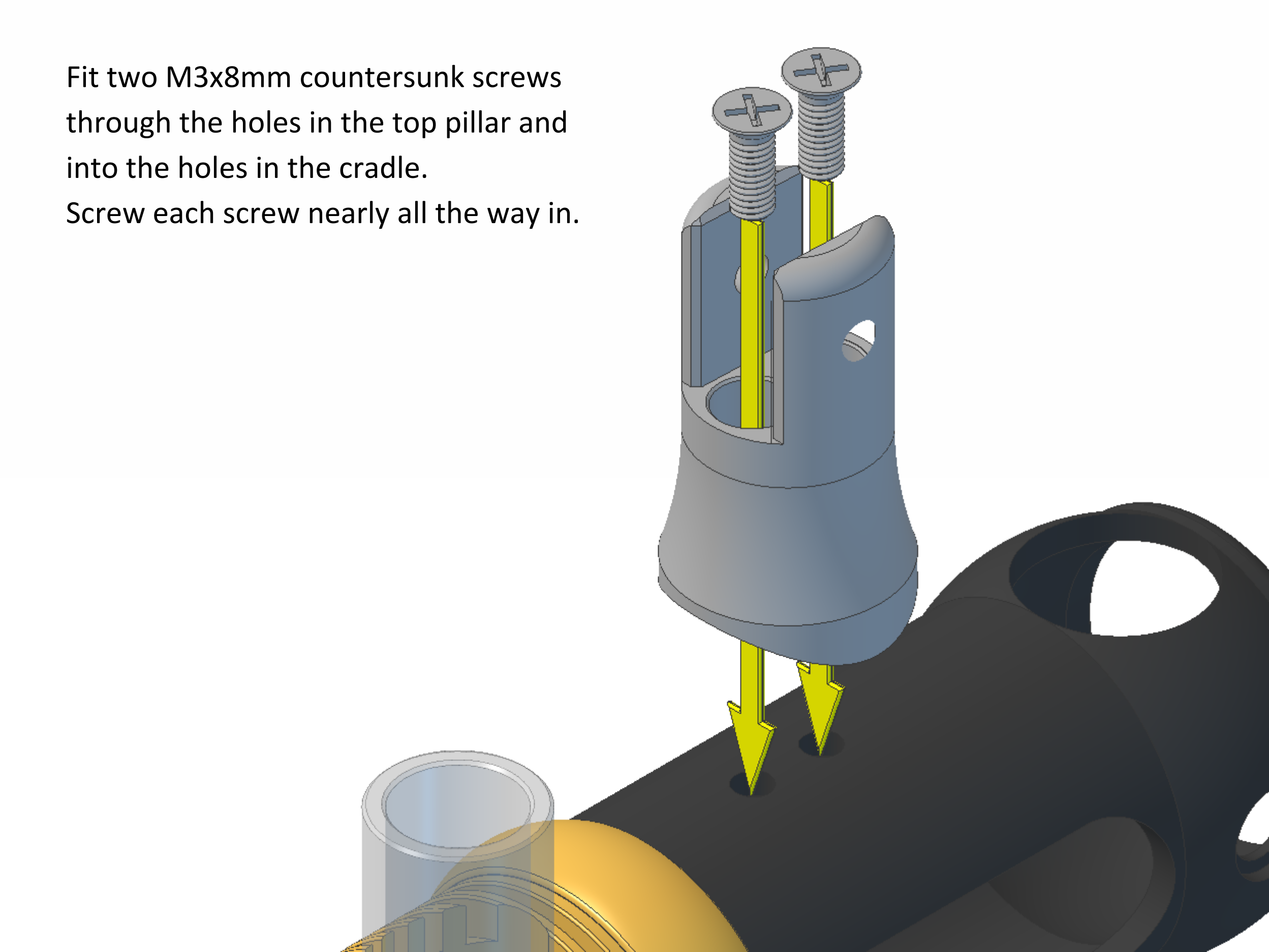
Moisten the end of the glass cylinder sparingly with slightly soapy tap water for lubrication and fit it into the hole in the fin block. A gentle pushing and twisting motion works best. Try not to allow the glass to come into contact with the sides of the hole.



The cylinder should fit right down into the bottom of the hole.

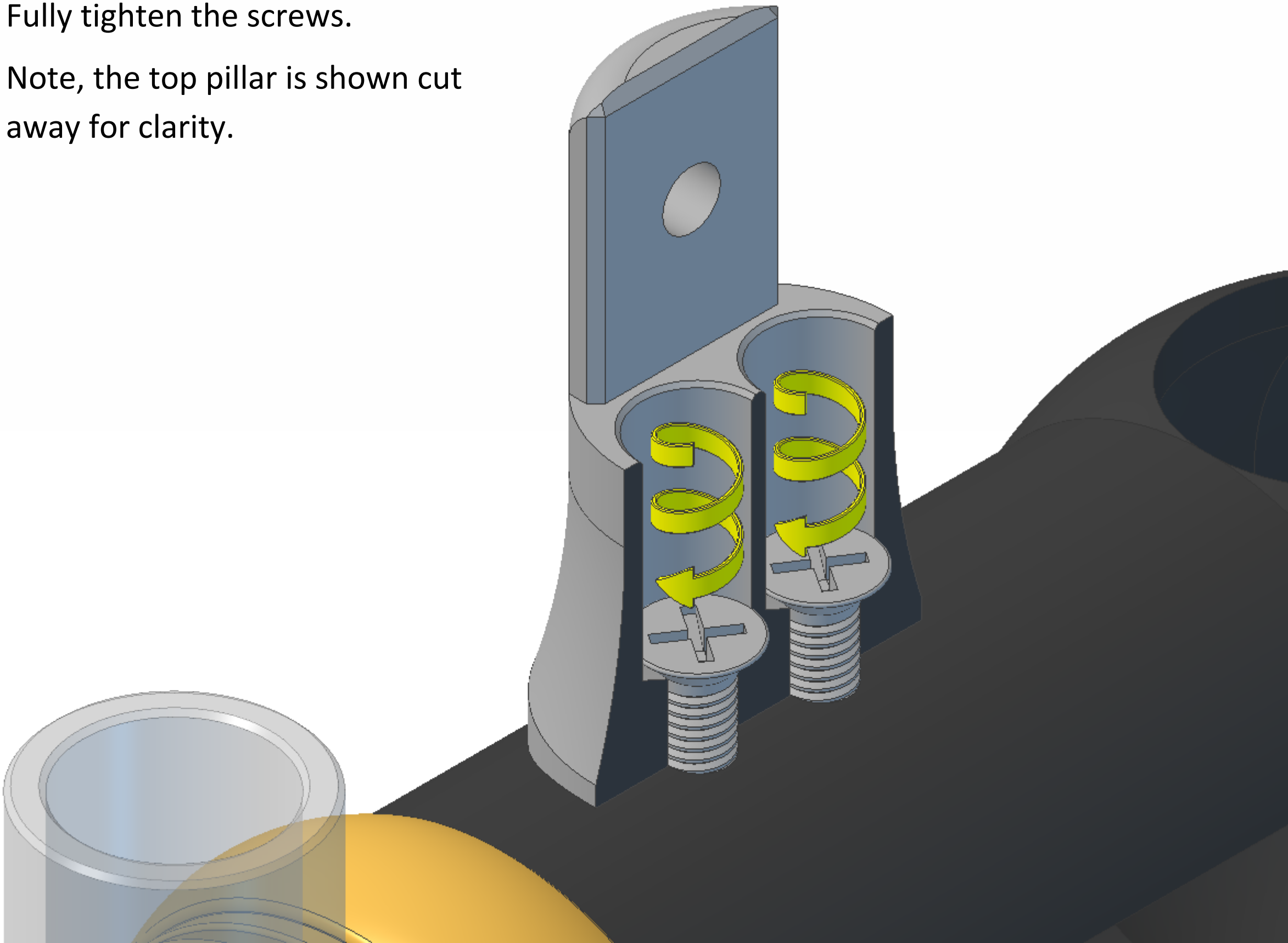


Fit two M3x8mm countersunk screws through the holes in the top pillar and into the holes in the cradle.
Screw each screw nearly all the way in.

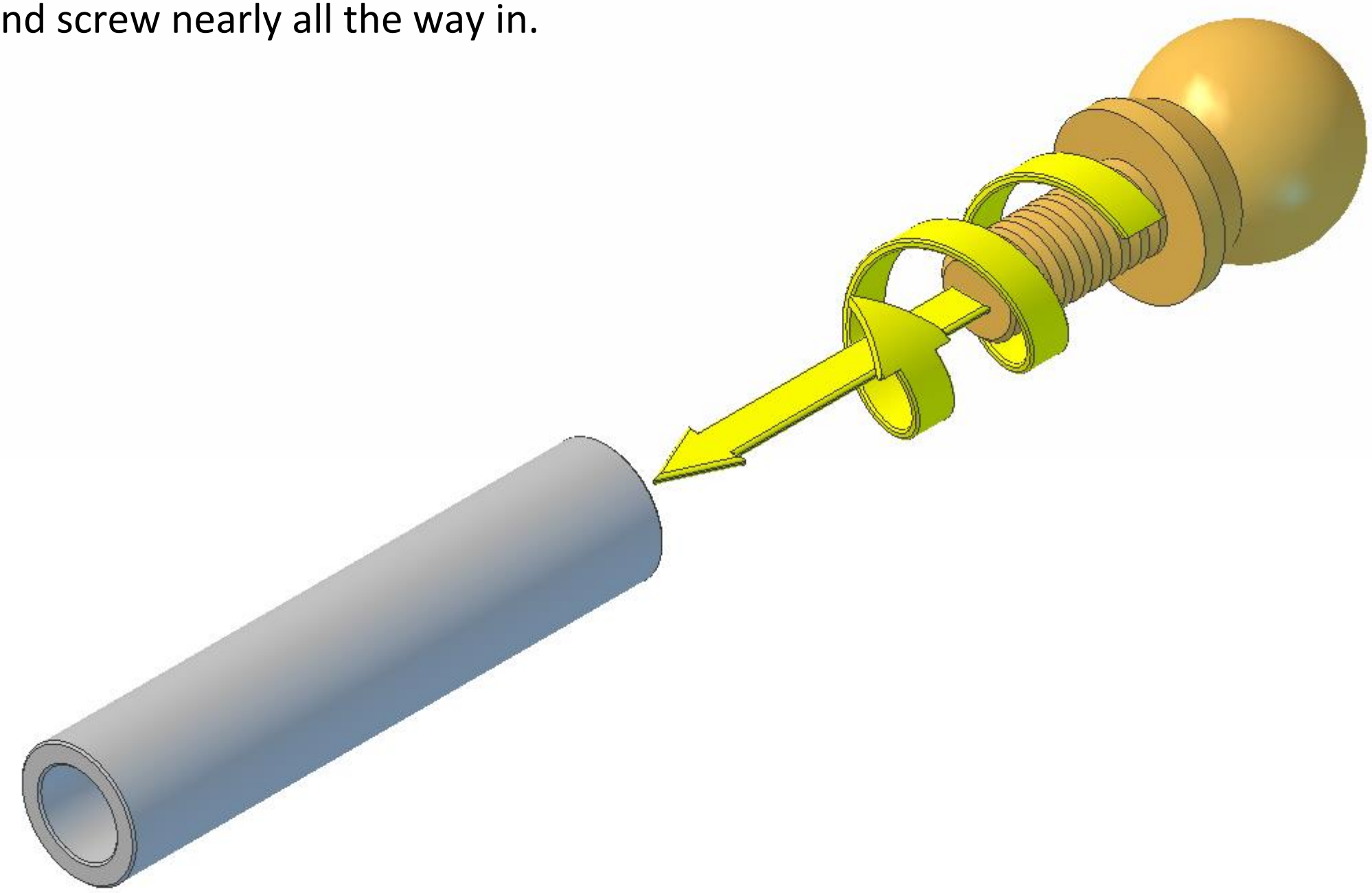


Fully tighten the screws.

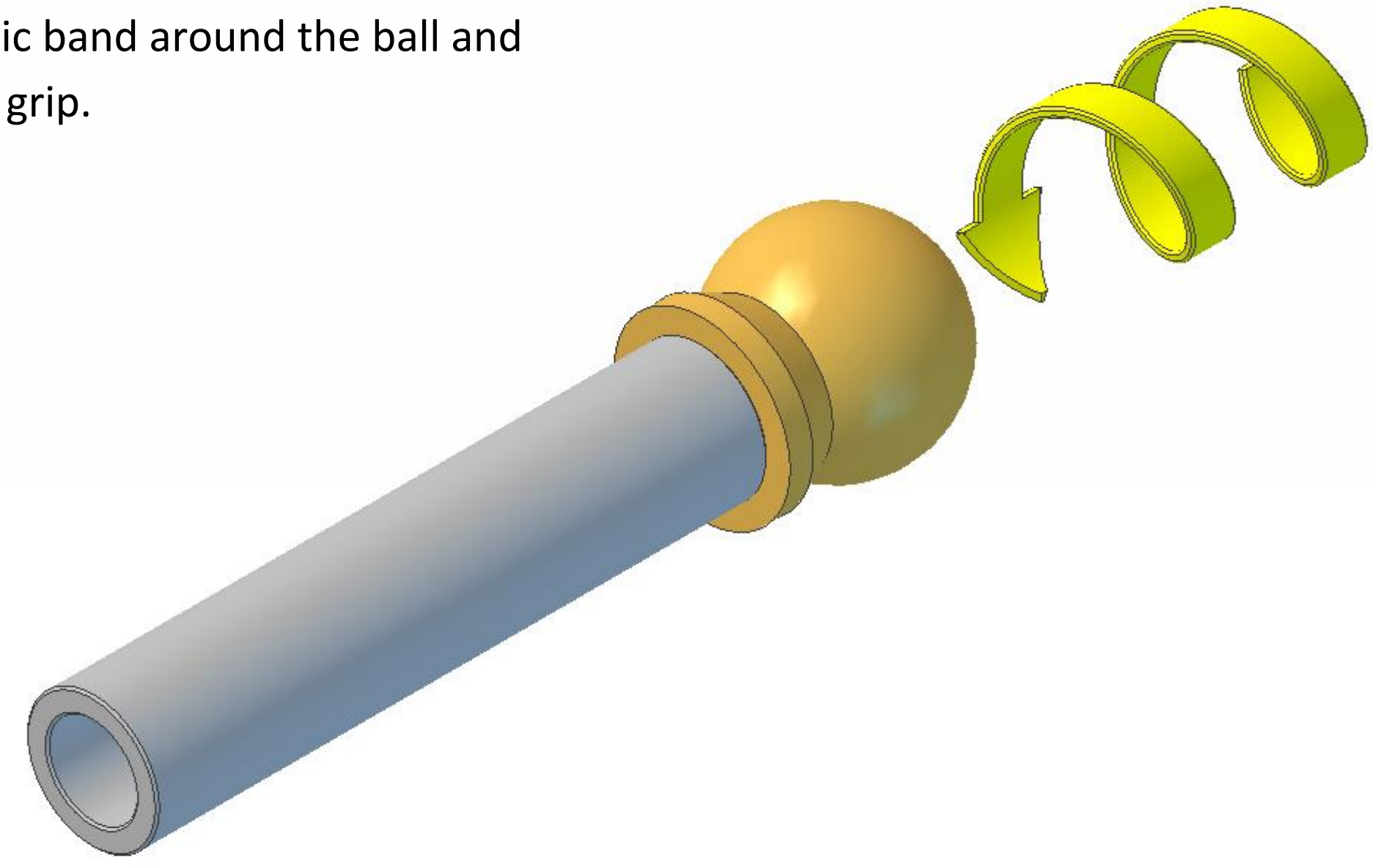
Note, the top pillar is shown cut away for clarity.



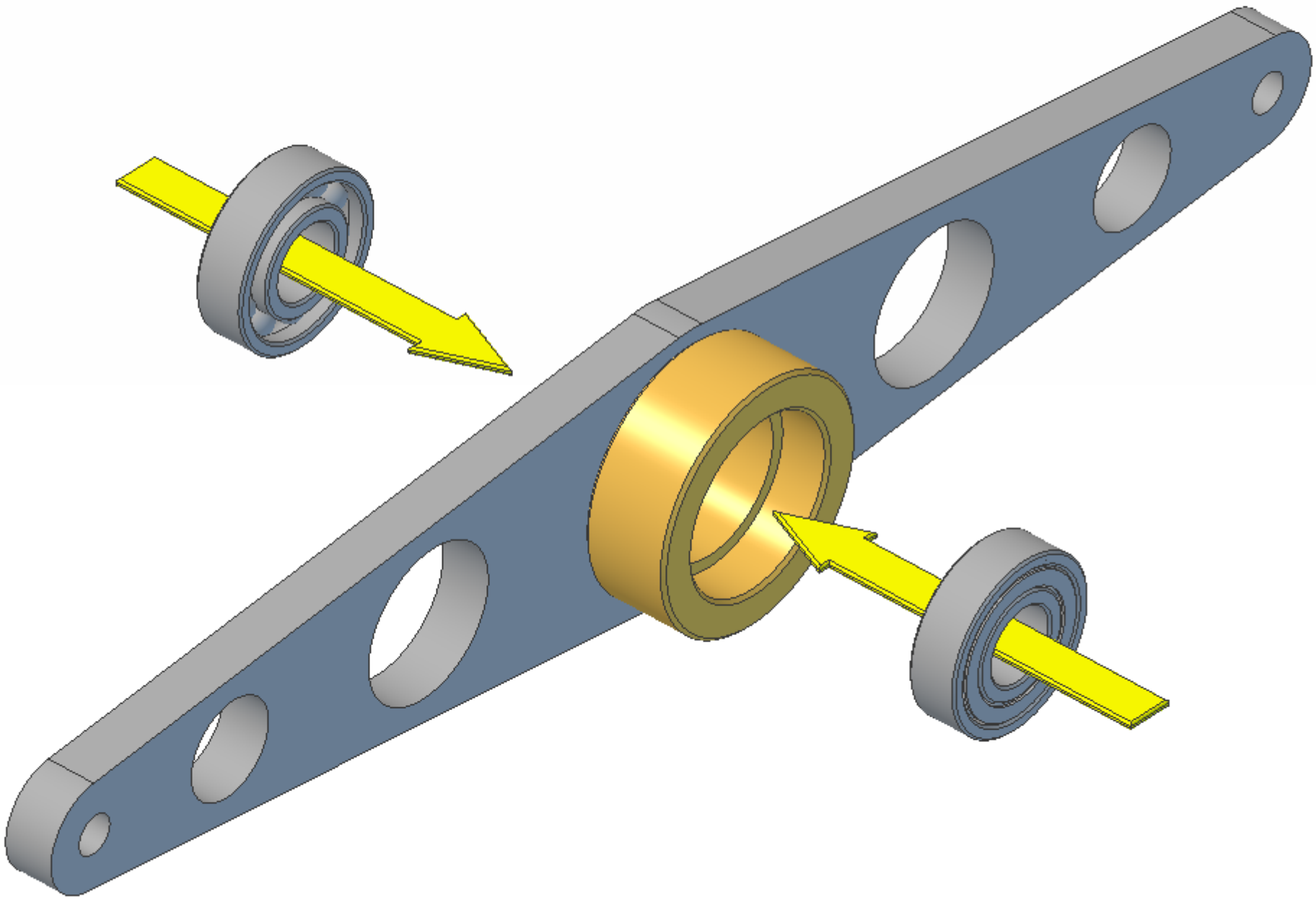
Fit the first ball-end screw into the beam axle
and screw nearly all the way in.



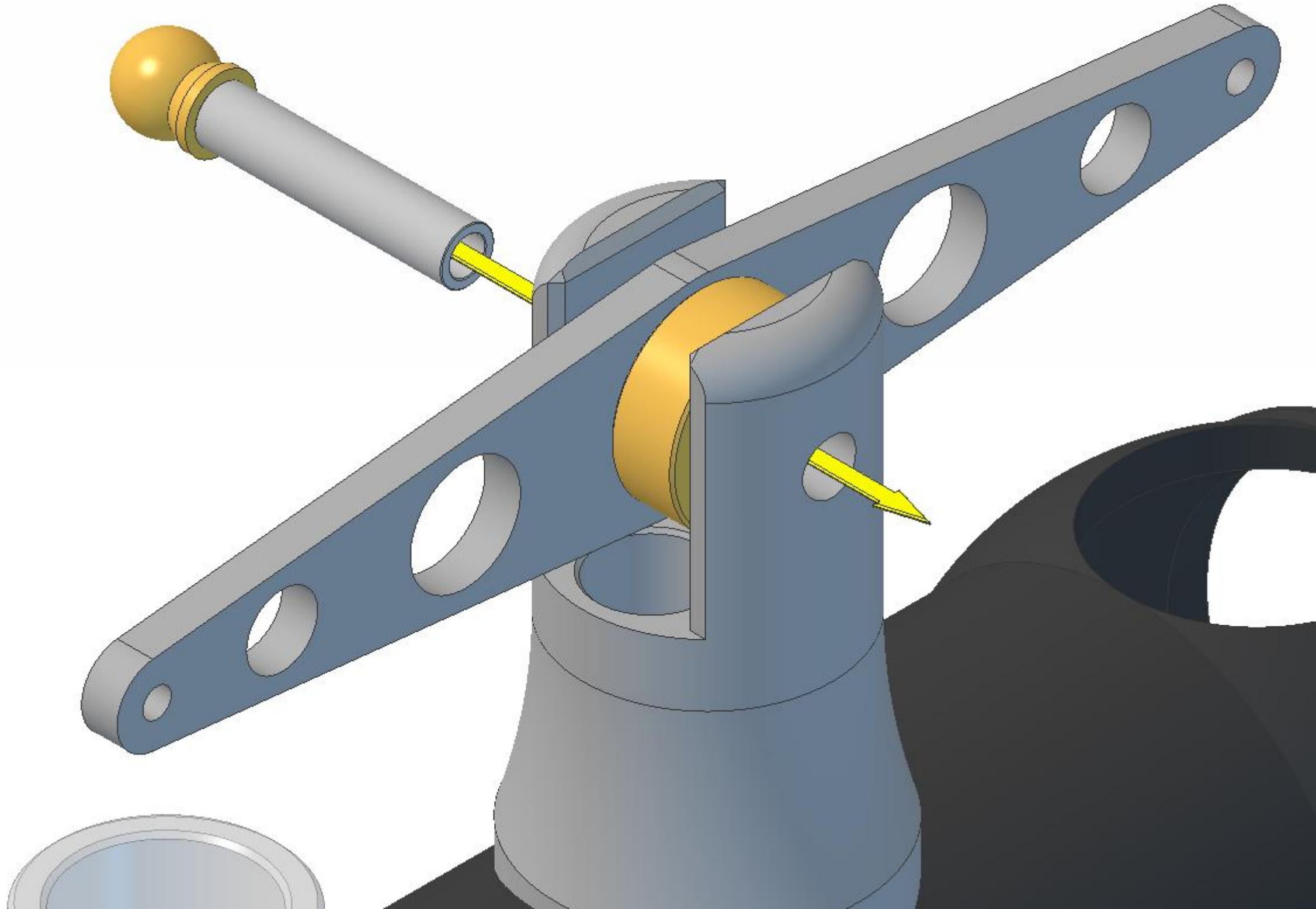
Fully tighten. You might need to wrap an elastic band around the ball and axle for grip.



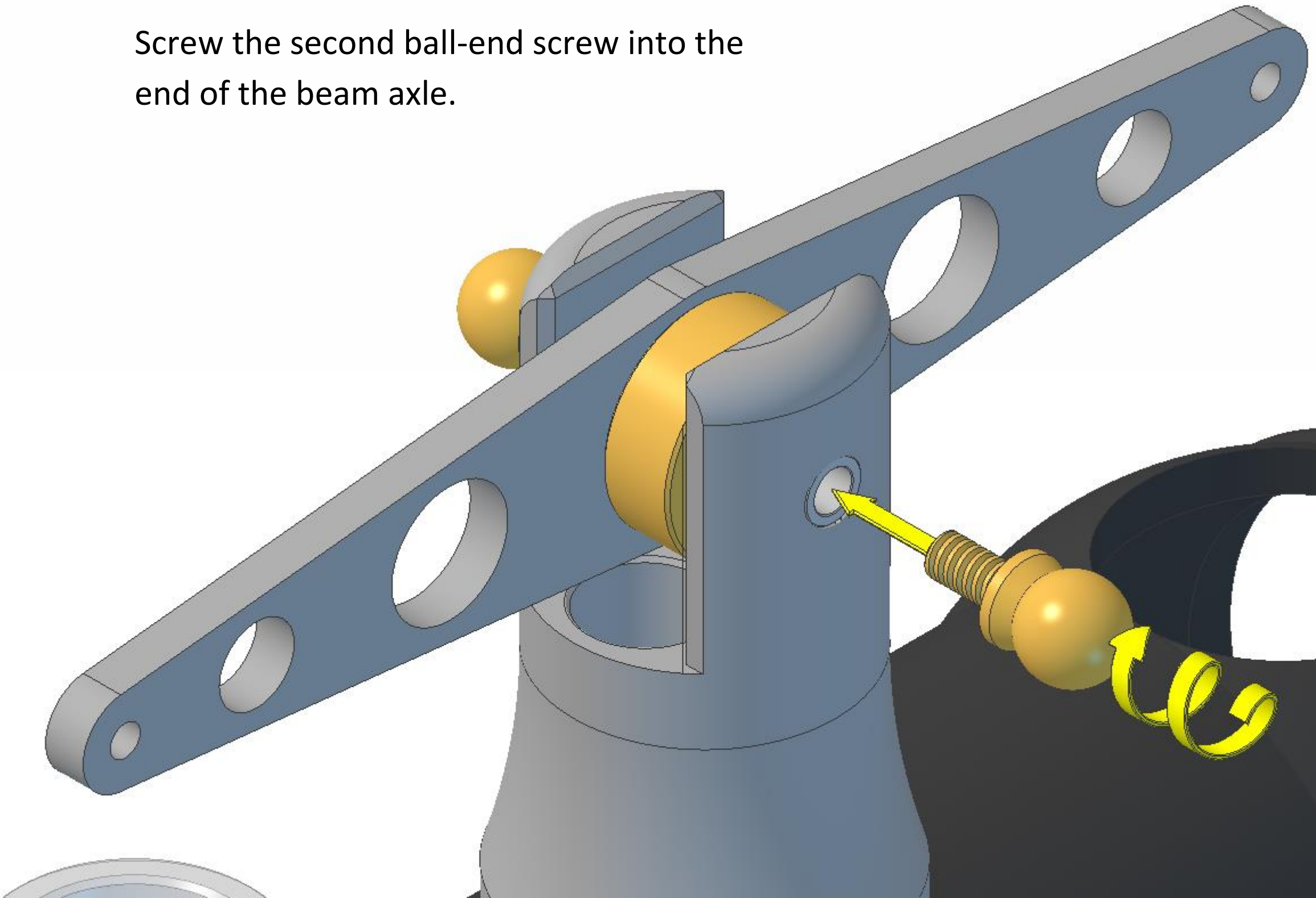
Fit two 3mm ball-race bearings into the holes in the middle of the beam.
The bearings have a dust shield on one side and are open on the other.
The open sides should face inwards after fitting.



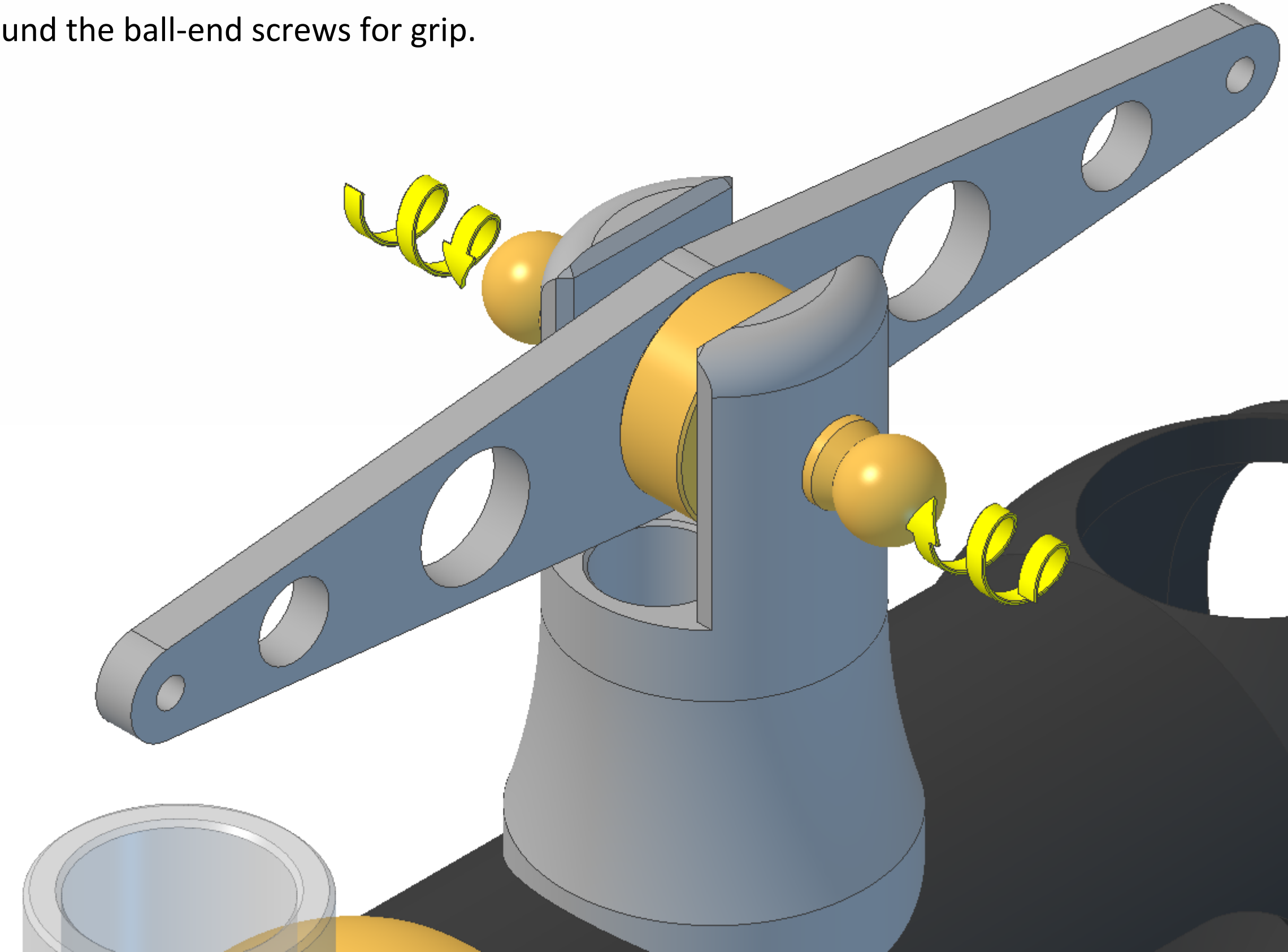
Lower the beam and bearings down between the forks on the top pillar. Fit the beam axle through the holes in the pillar and the two bearings in the beam.

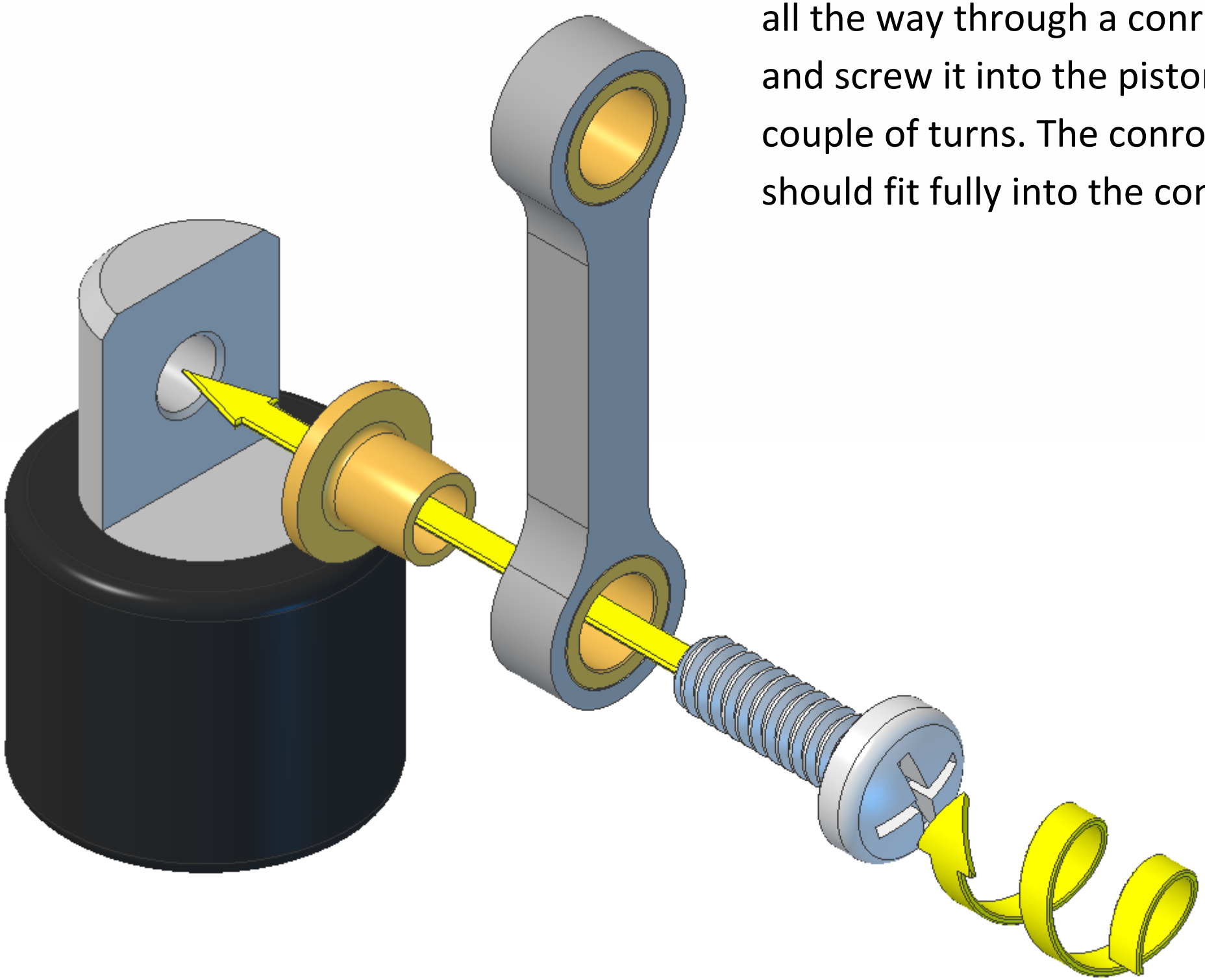


Screw the second ball-end screw into the end of the beam axle.



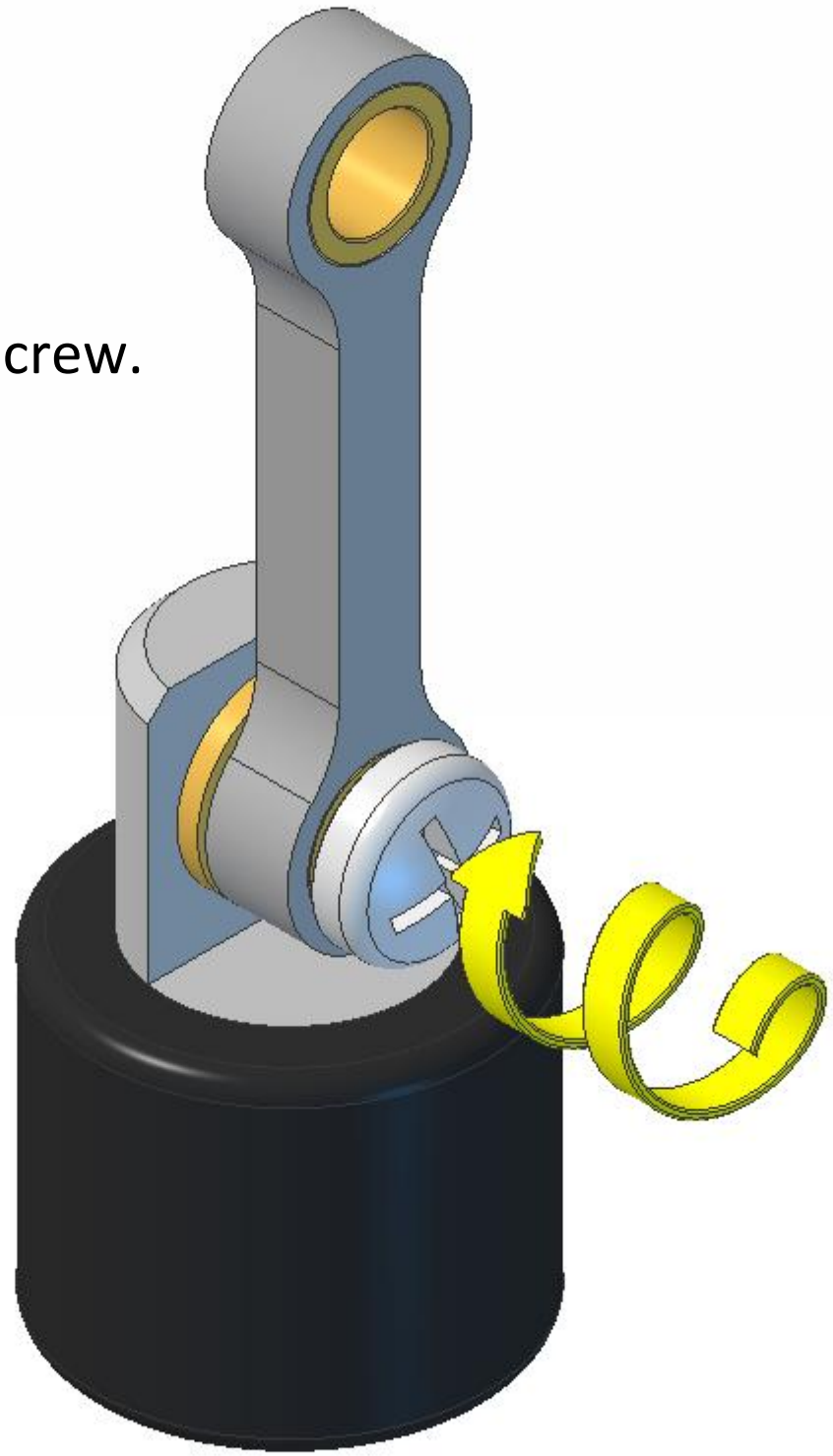
Fully tighten. You might need to wrap an elastic band around the ball-end screws for grip.

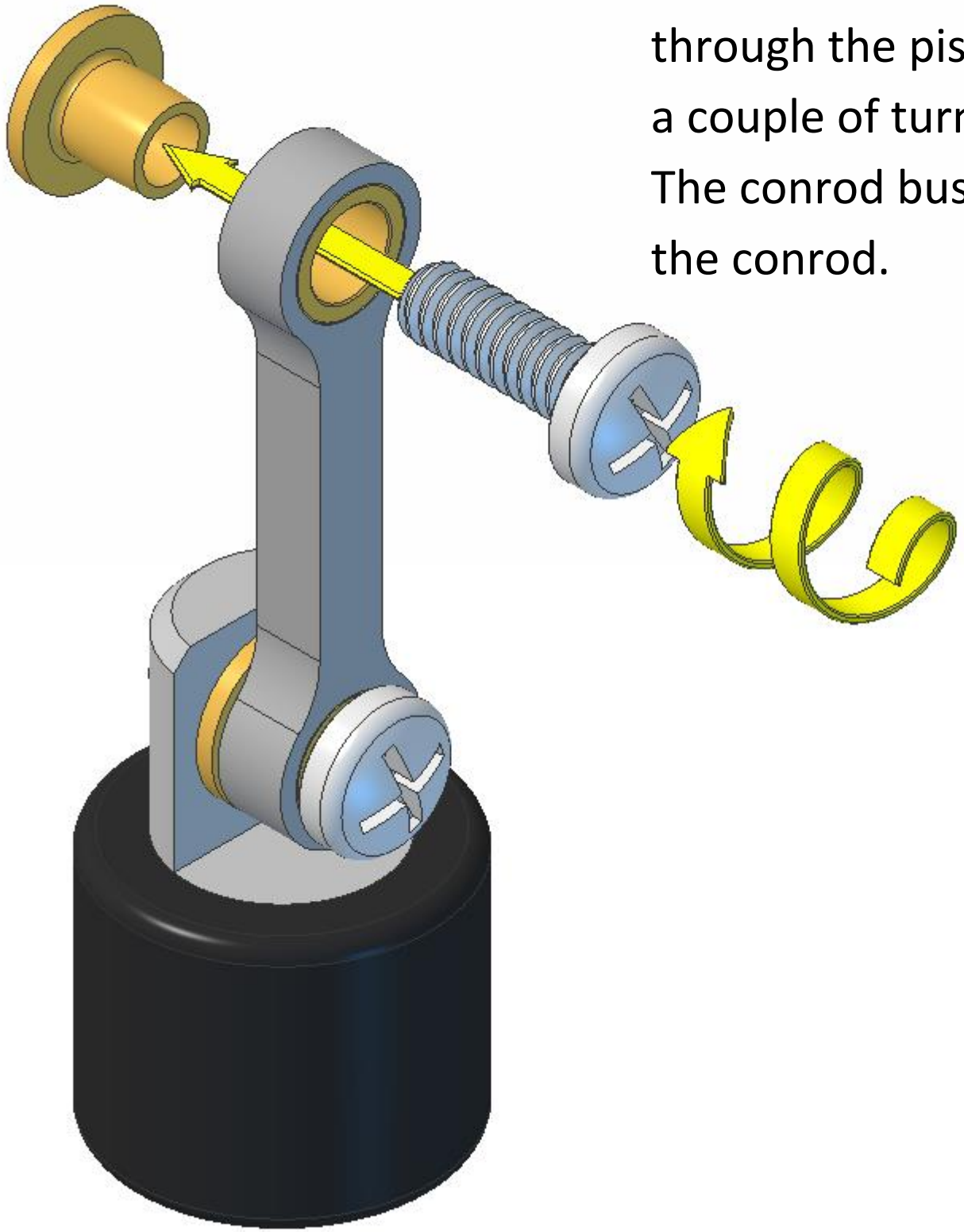




Fit one M2x6mm roundhead screw through the piston conrod, screw it all the way through a conrod bush, and screw it into the piston a couple of turns. The conrod bush should fit fully into the conrod.

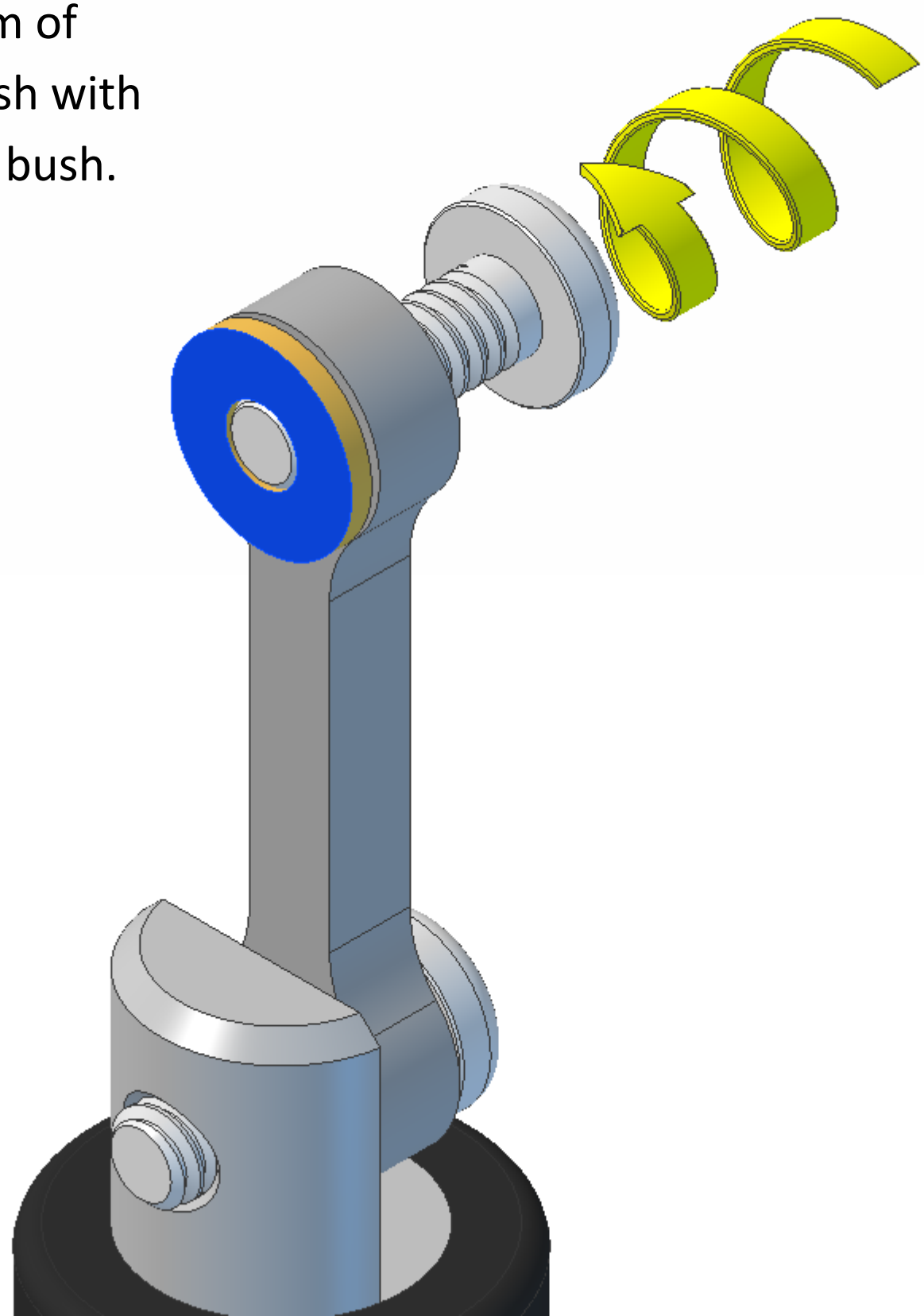
Fully tighten the screw.



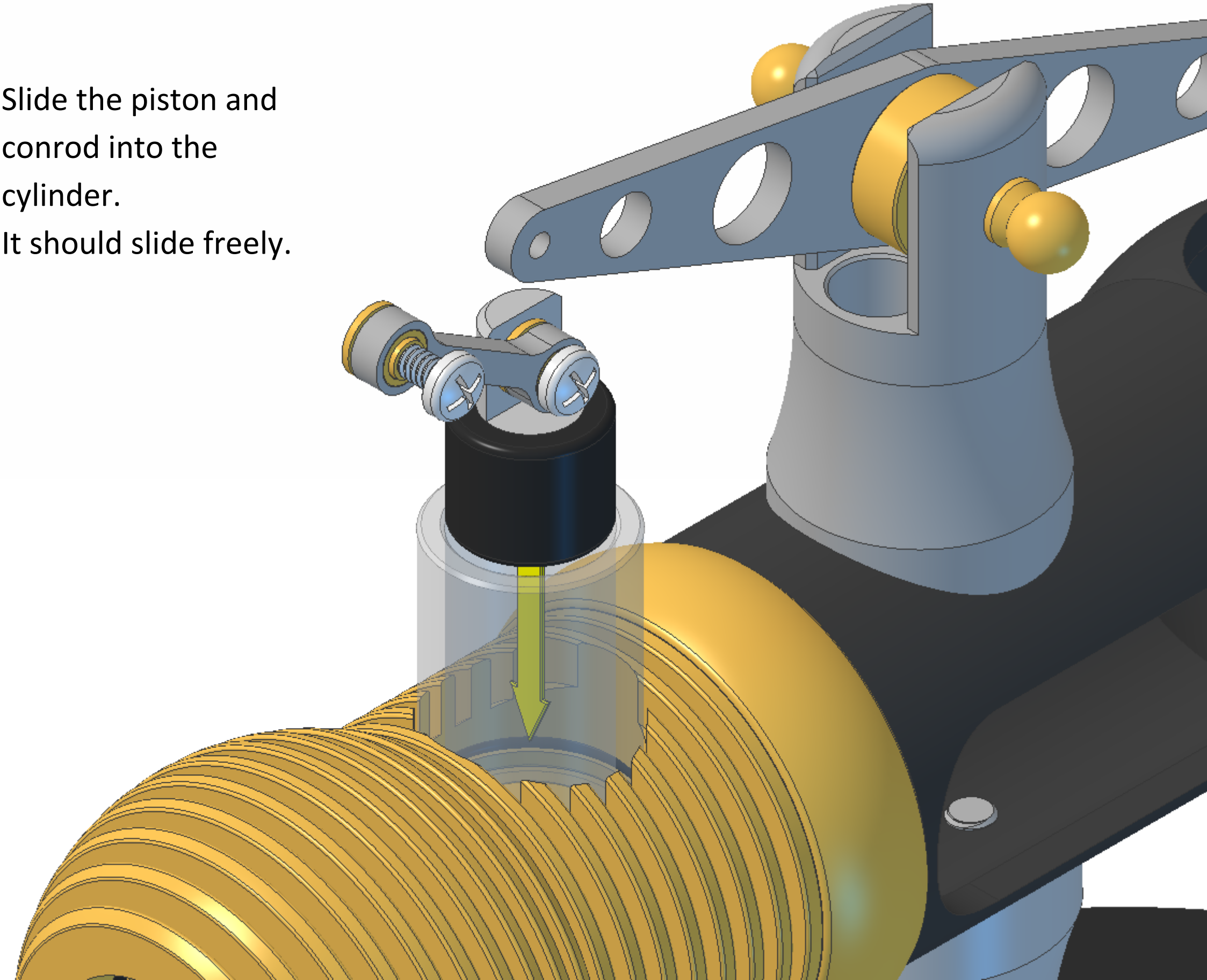


Fit one M2x6mm roundhead screw through the piston conrod and screw a couple of turns into a conrod bush. The conrod bush should fit fully into the conrod.

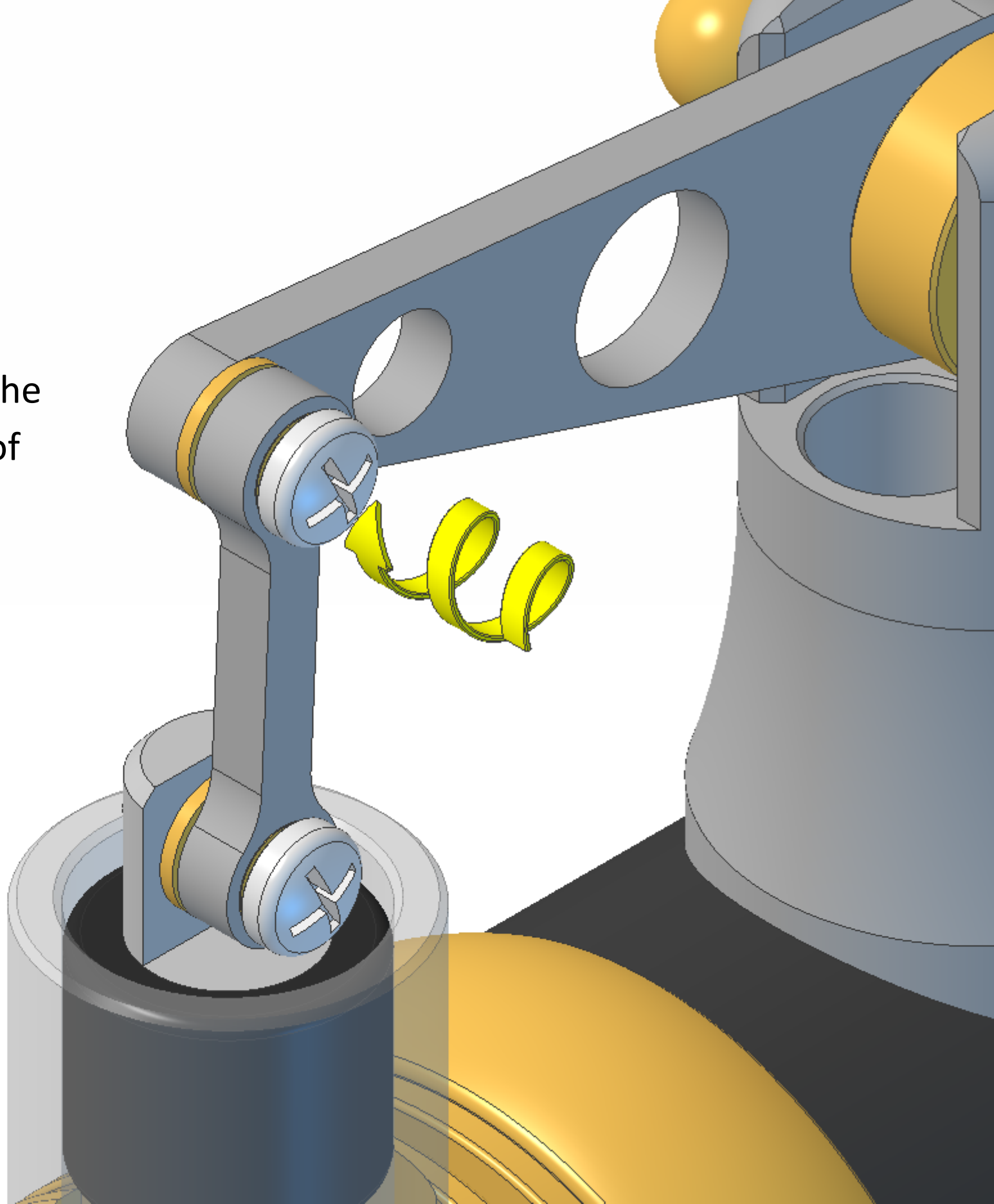
Screw the screw in until the bottom of the screw is flush with the back of the bush.



Slide the piston and conrod into the cylinder.
It should slide freely.



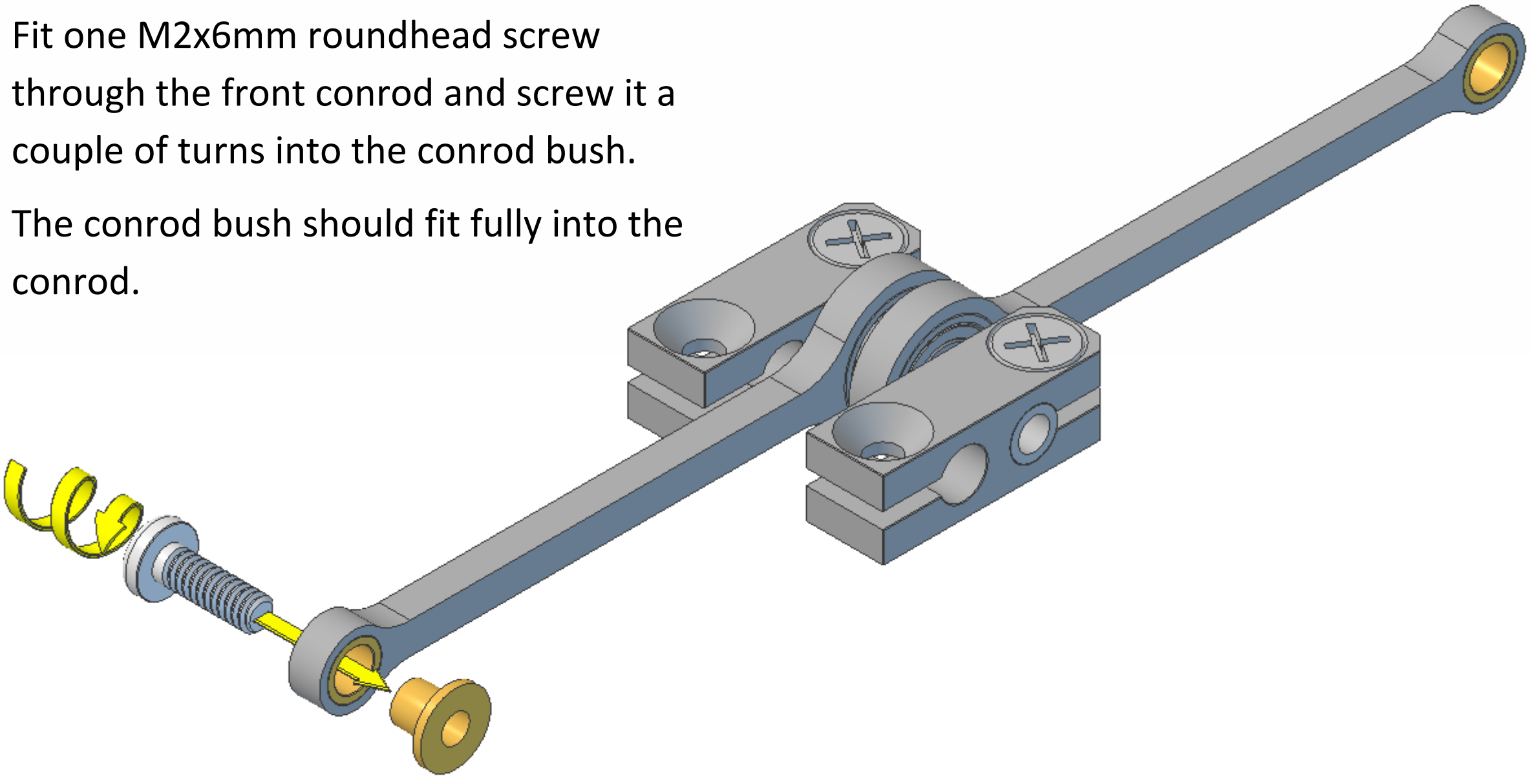
Screw the screw into the small hole in the end of the beam and fully tighten.



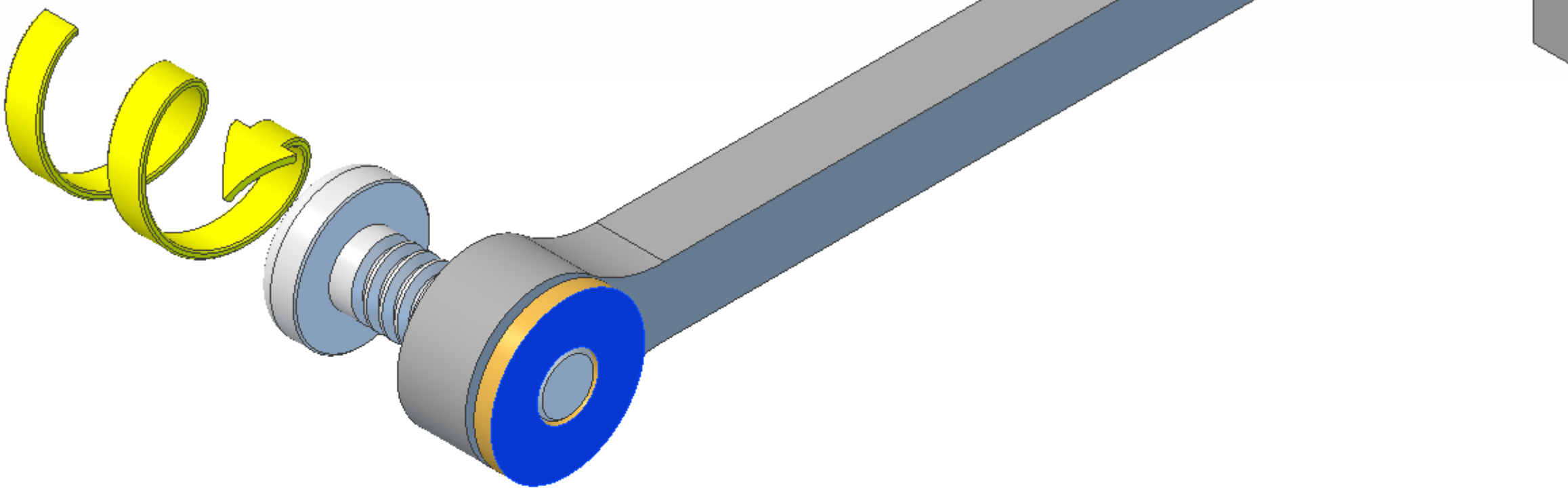
Lay the crank and conrod out as shown.

Fit one M2x6mm roundhead screw through the front conrod and screw it a couple of turns into the conrod bush.

The conrod bush should fit fully into the conrod.

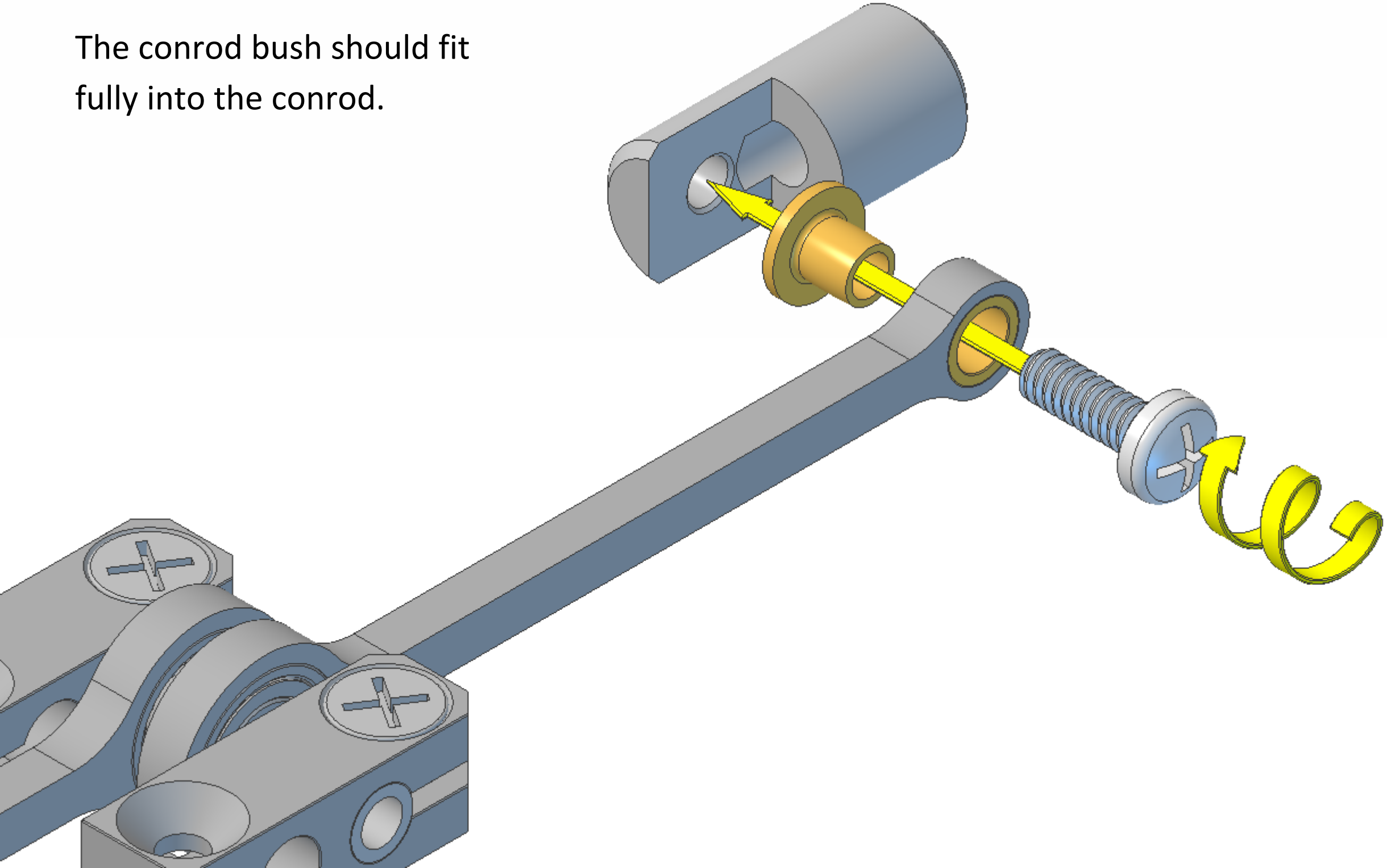


Screw the screw in until the bottom of the screw is flush with the back of the bush.

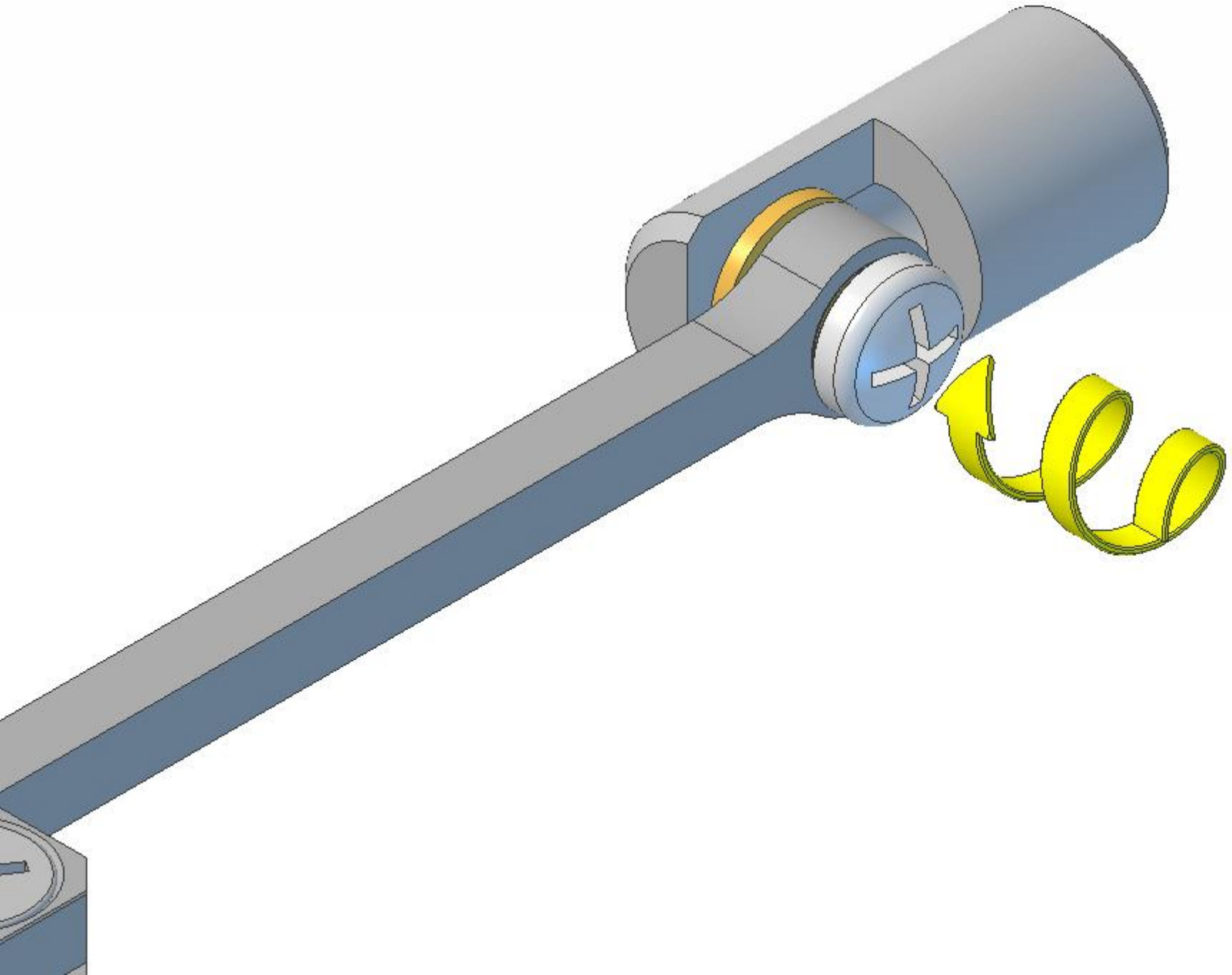


Fit one M2x6mm roundhead screw through the back conrod, screw it through the conrod bush and into the displacer clevis a couple of turns.

The conrod bush should fit fully into the conrod.

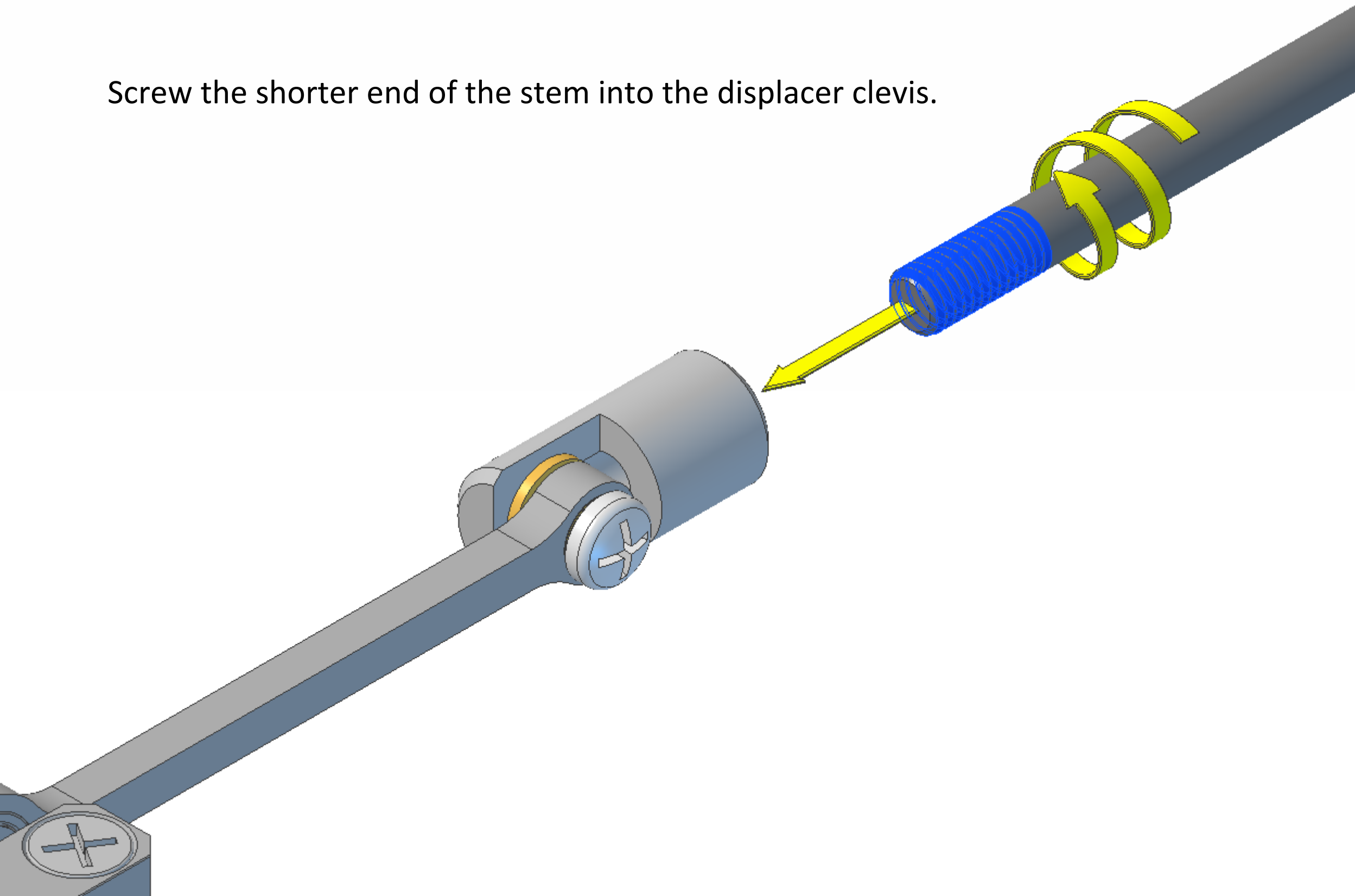


Fully tighten the screw.

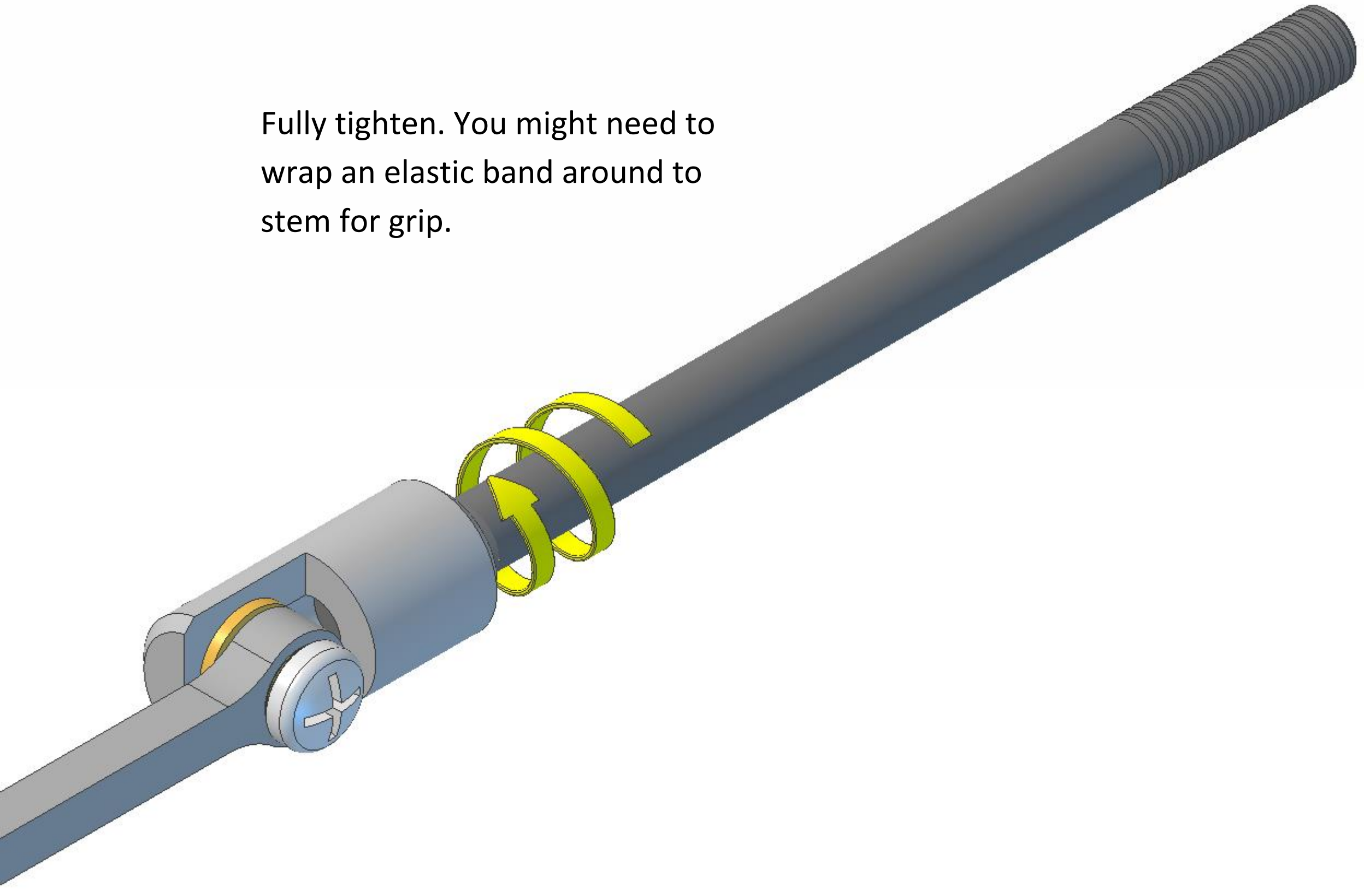


Both ends of the displacer stem are threaded, one end is threaded shorter than the other.

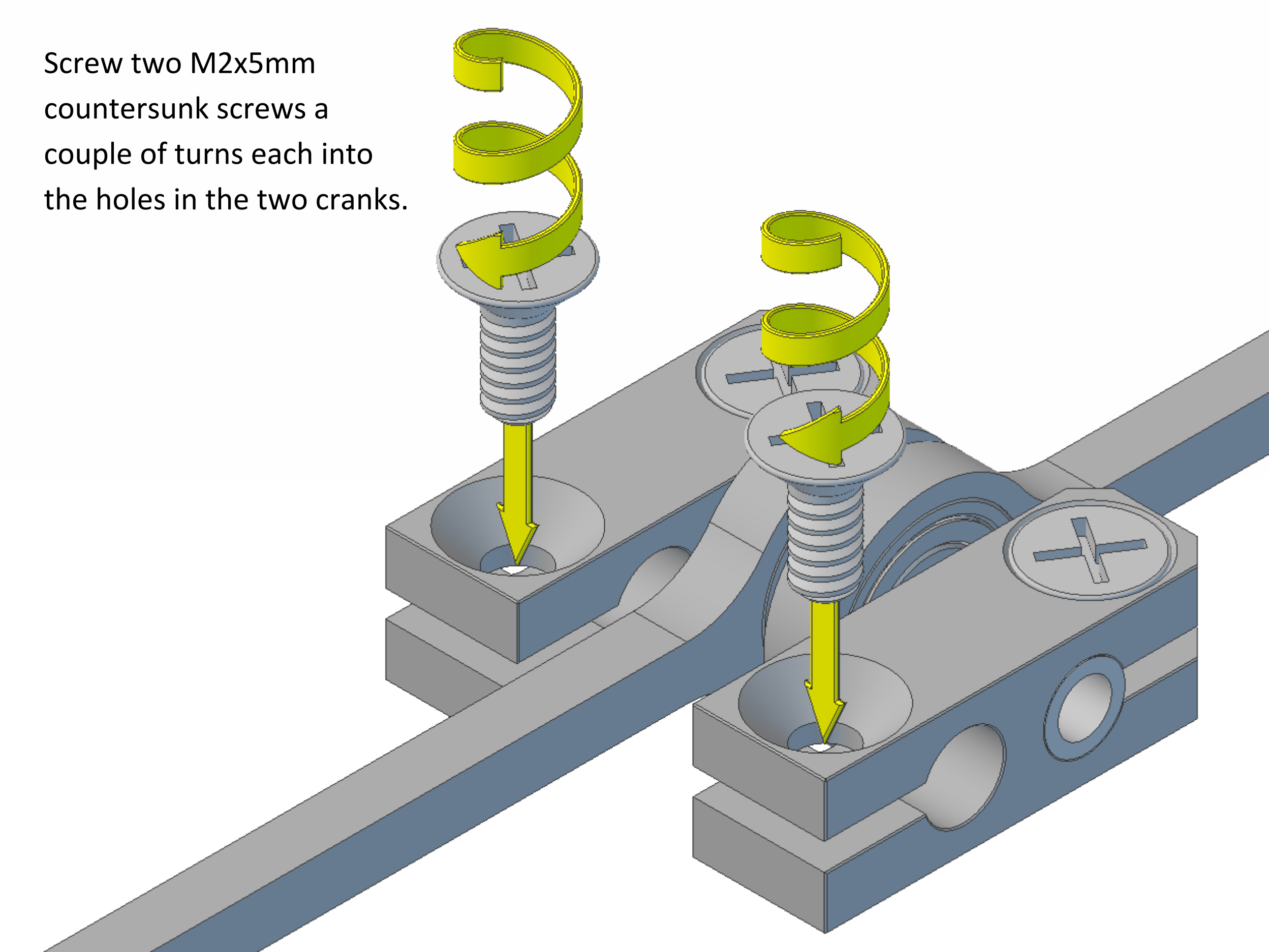
Screw the shorter end of the stem into the displacer clevis.



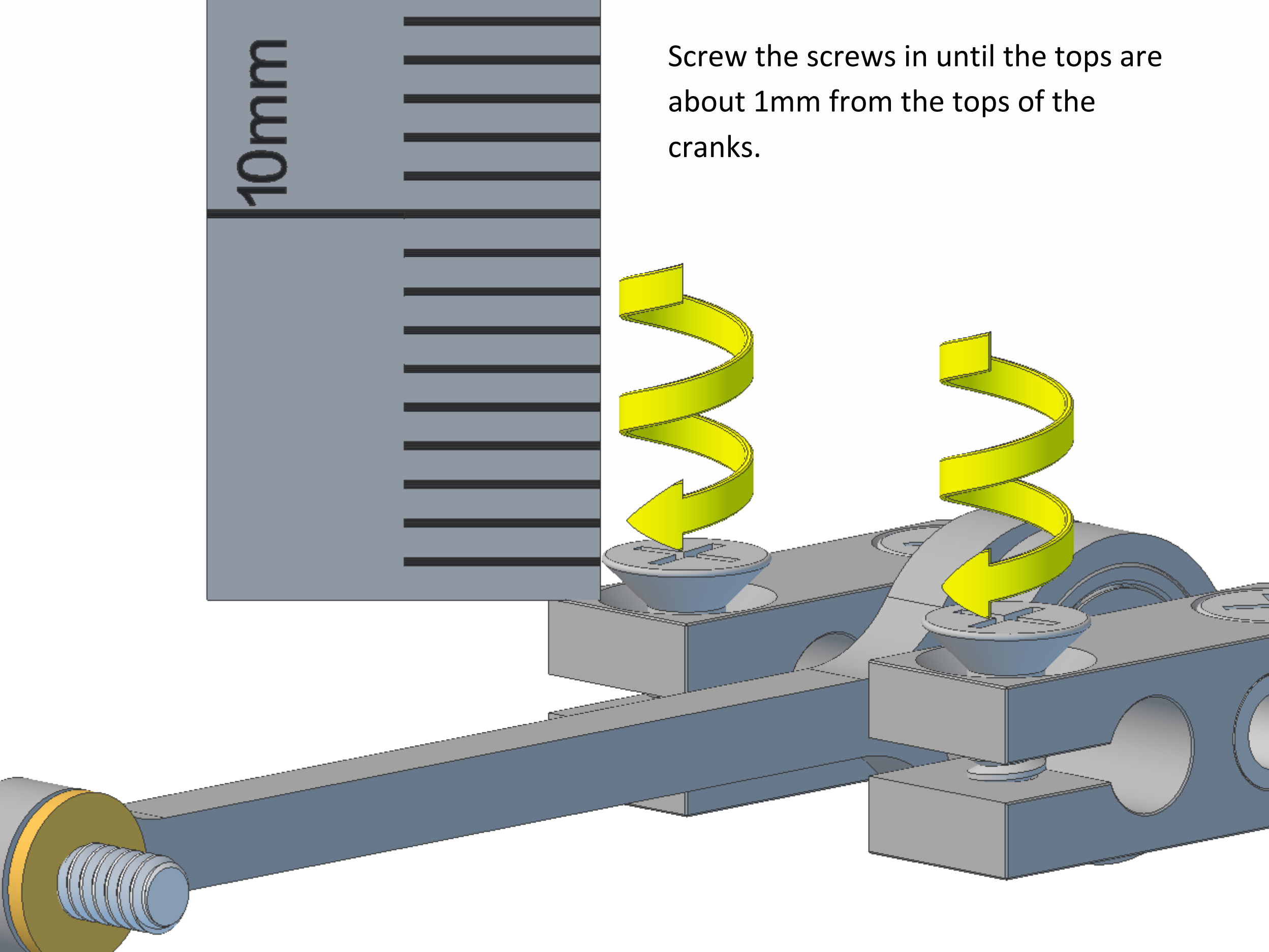
Fully tighten. You might need to wrap an elastic band around to stem for grip.

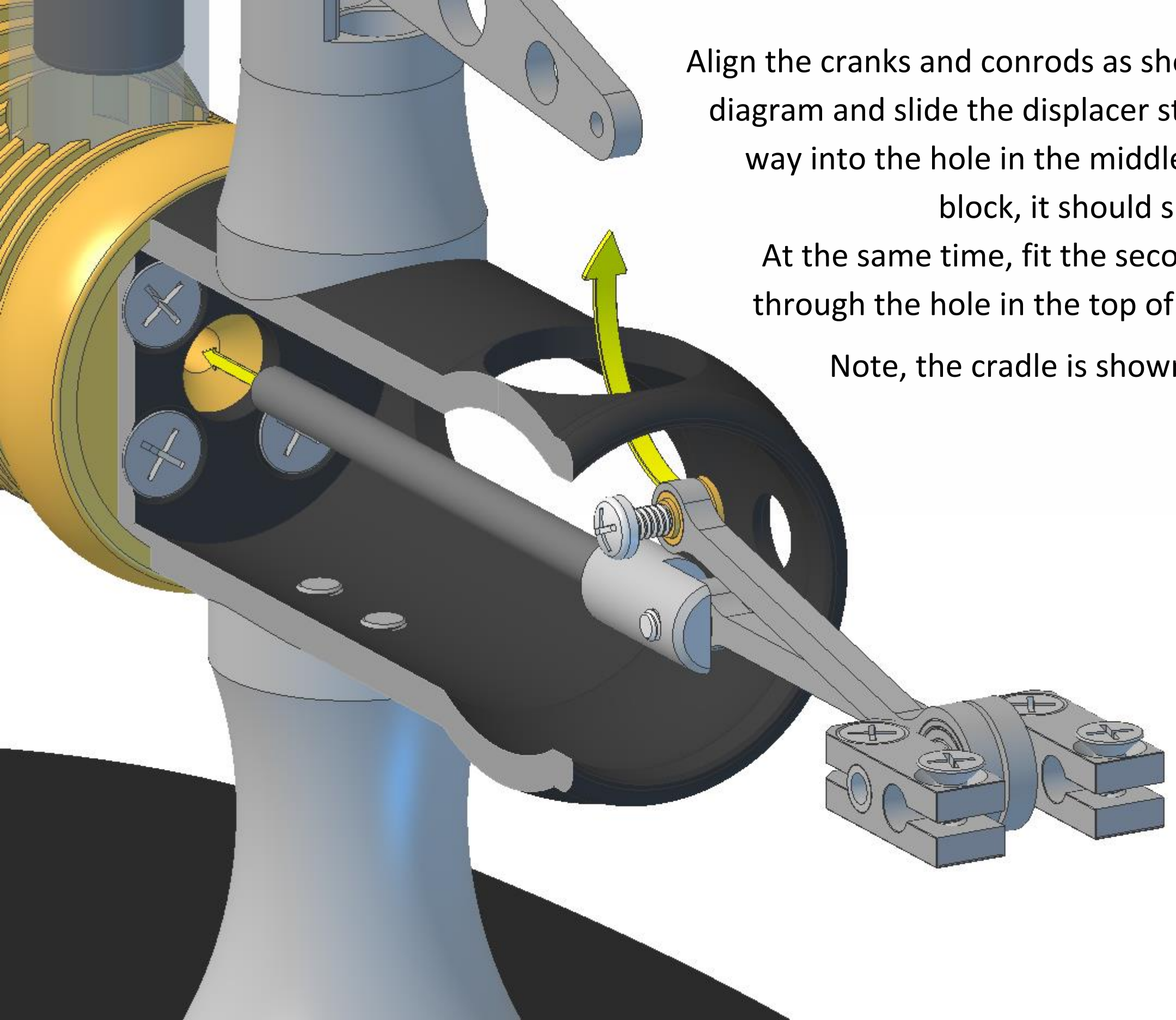


Screw two M2x5mm countersunk screws a couple of turns each into the holes in the two cranks.



Screw the screws in until the tops are about 1mm from the tops of the cranks.



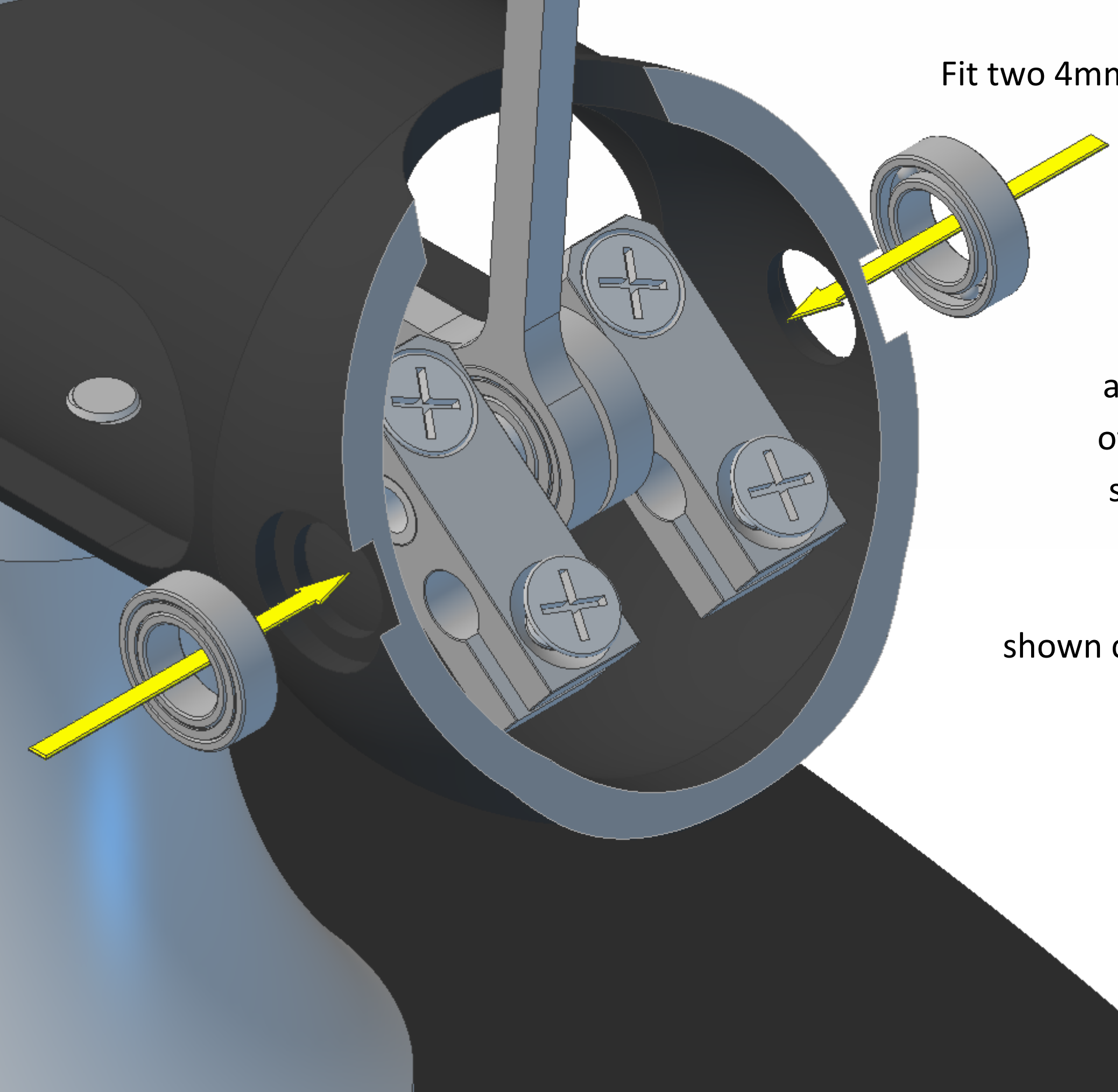


Align the cranks and conrods as shown in the diagram and slide the displacer stem all the way into the hole in the middle of the fin block, it should slide freely.

At the same time, fit the second conrod through the hole in the top of the crank.

Note, the cradle is shown cut away for clarity.

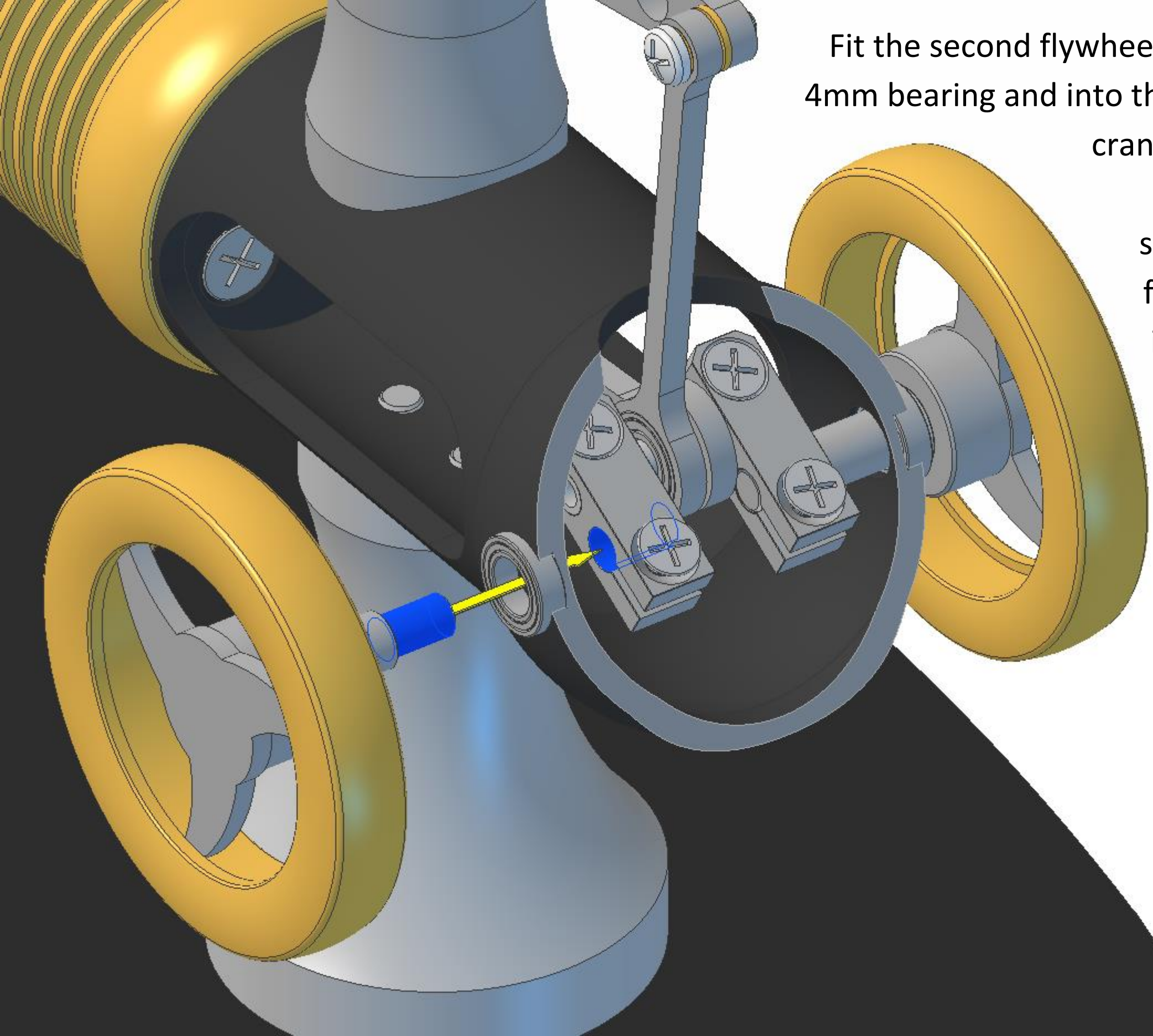
Screw the top conrod screw into the small hole in the end of the beam and fully tighten.



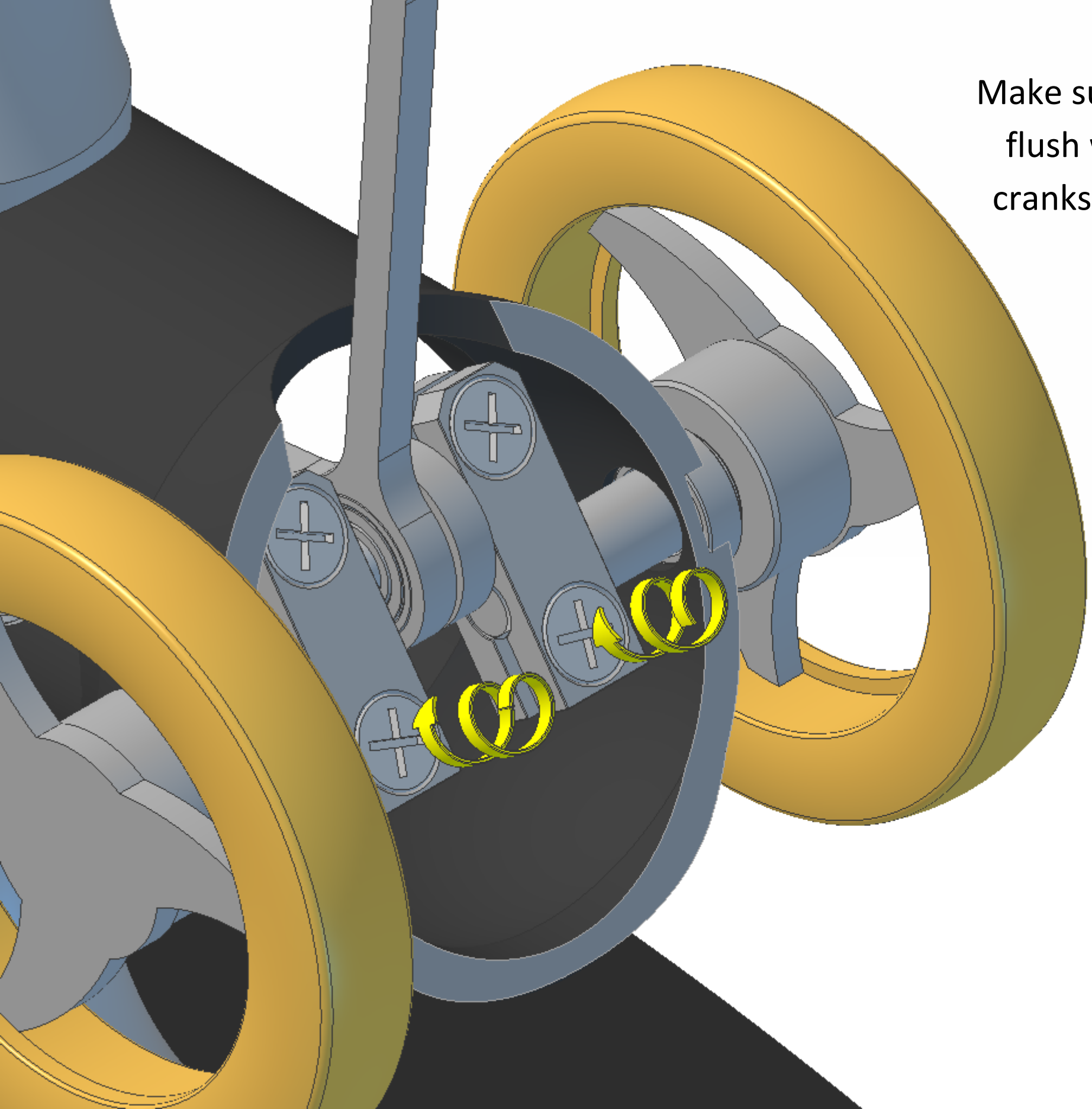
Fit two 4mm ball-race bearings into the holes in the cradle. The bearings have a dust shield on one side and are open on the other. The open side should face inwards after fitting.

Note, the cradle is shown cut away for clarity.

Fit the first flywheel through the 4mm bearing and into the hole in the crank. The end of the flywheel should line up flush with the inside face of the crank. Note, the cradle is shown cut away for clarity.



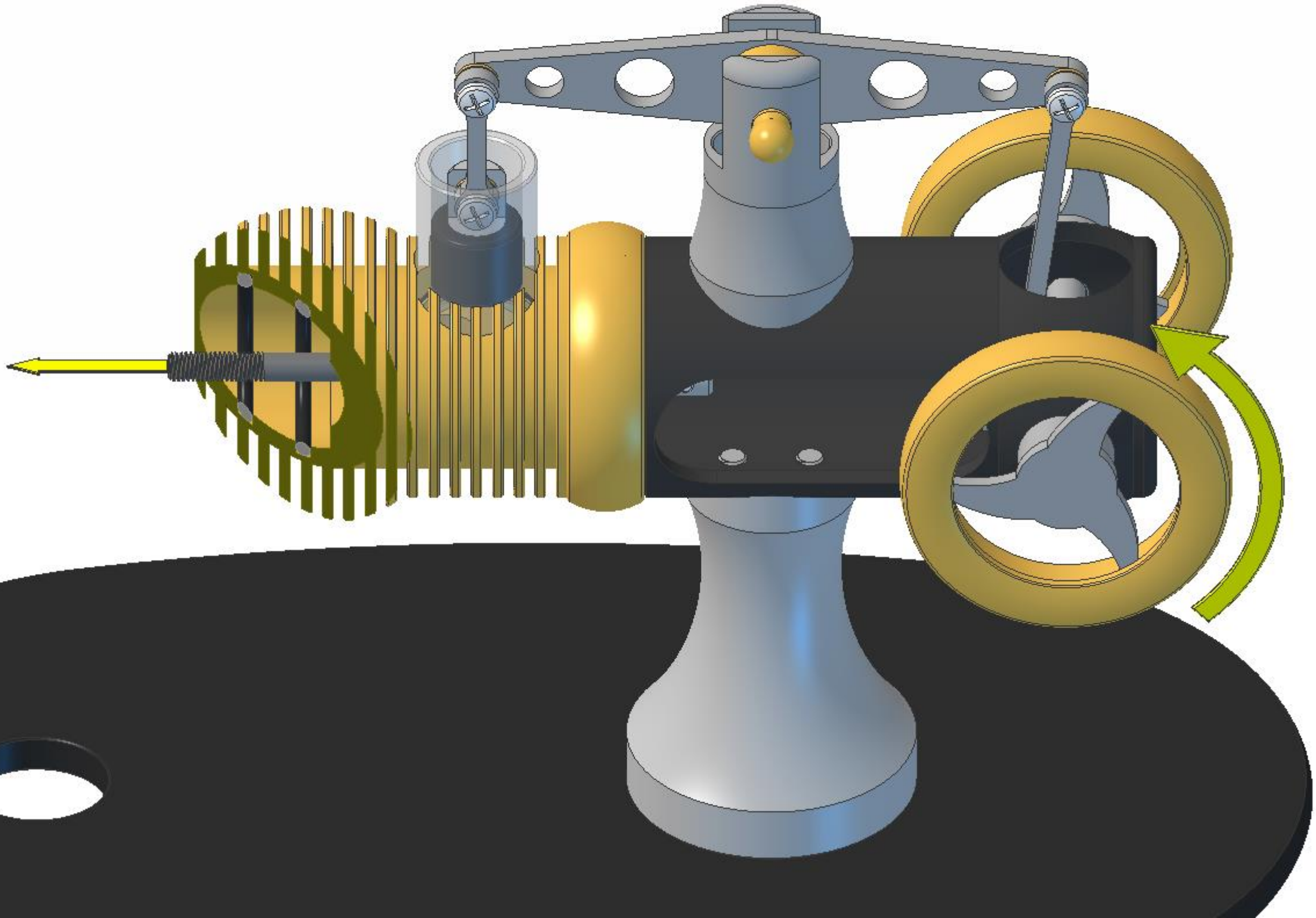
Fit the second flywheel through the 4mm bearing and into the hole in the crank. The end of the flywheel should line up flush with the inside face of the crank. Note, the cradle is shown cut away for clarity.



Make sure both flywheels are flush with the insides of the cranks and then fully tighten the two crank screws.

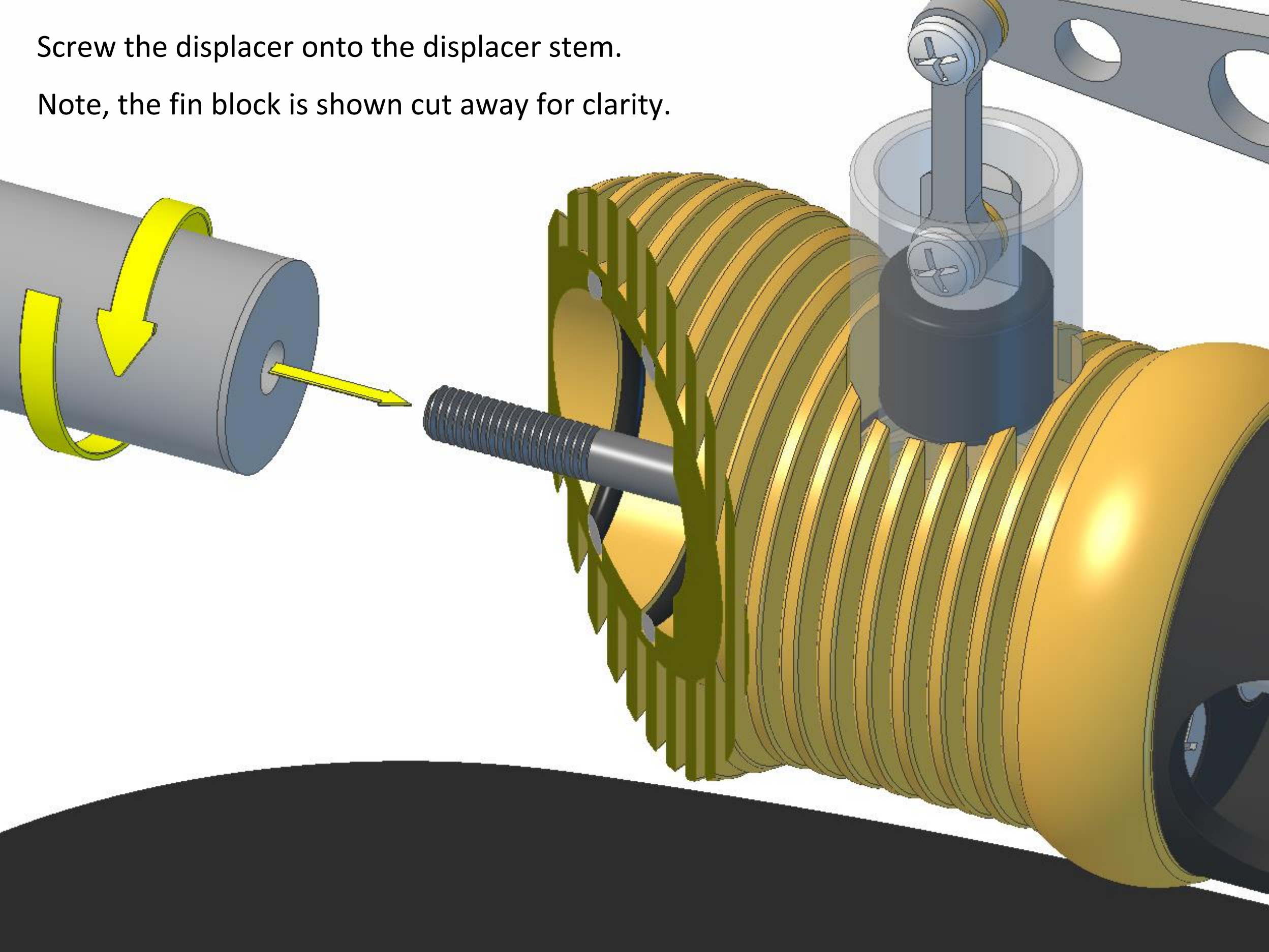
Rotate the flywheel until the displacer stem protrudes from the end of the fin block.

Note, the fin block is shown cut away for clarity.



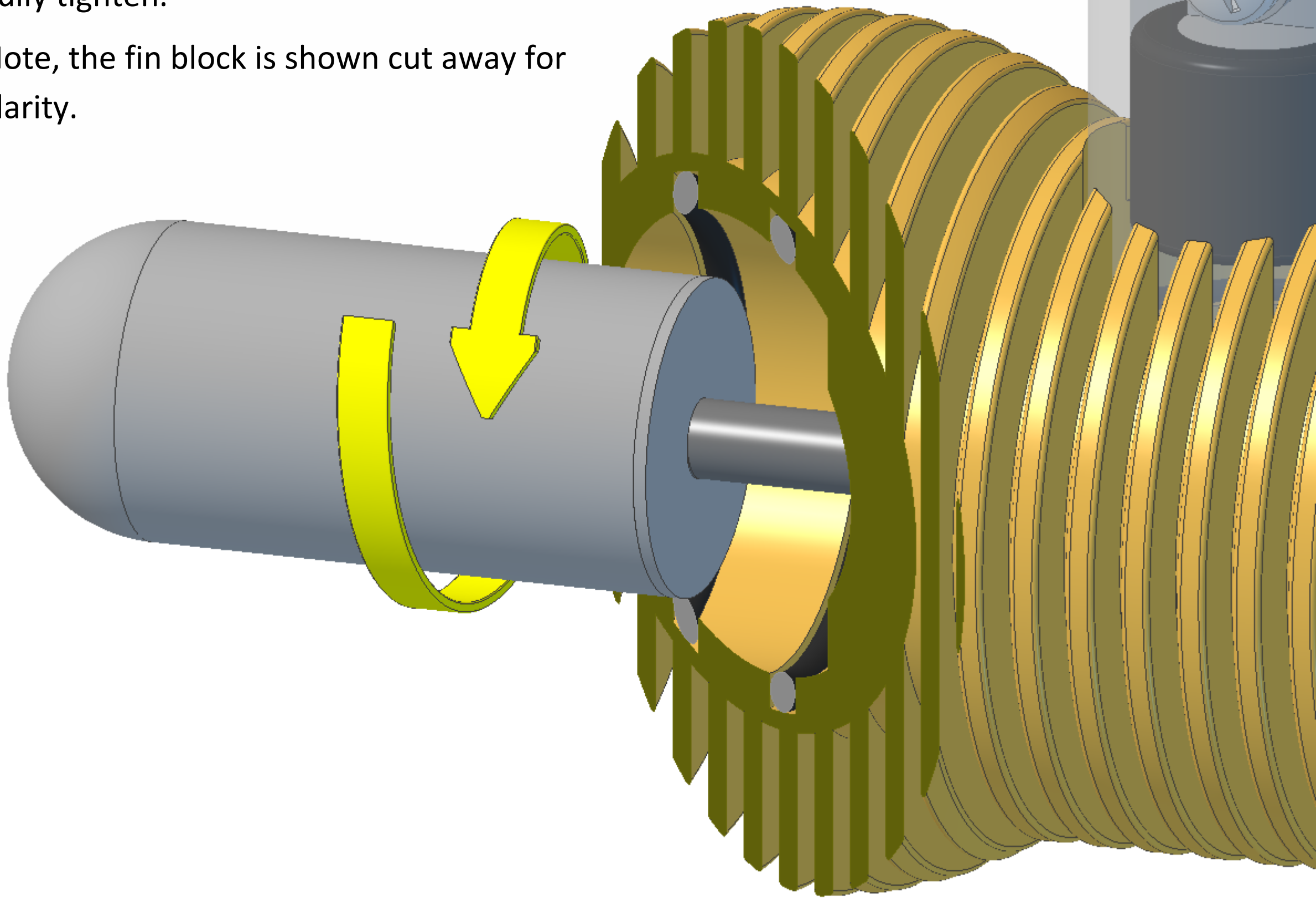
Screw the displacer onto the displacer stem.

Note, the fin block is shown cut away for clarity.

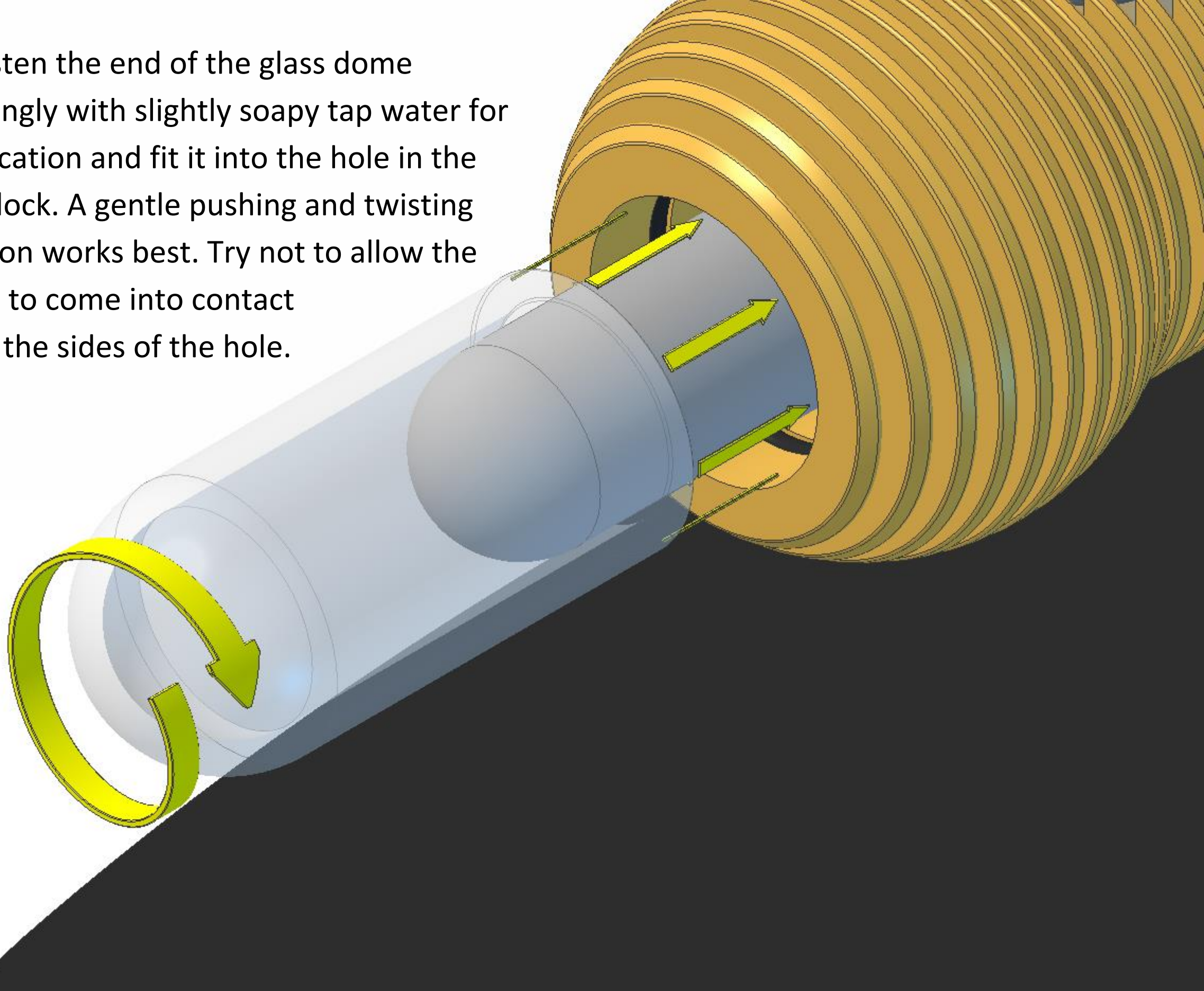


Fully tighten.

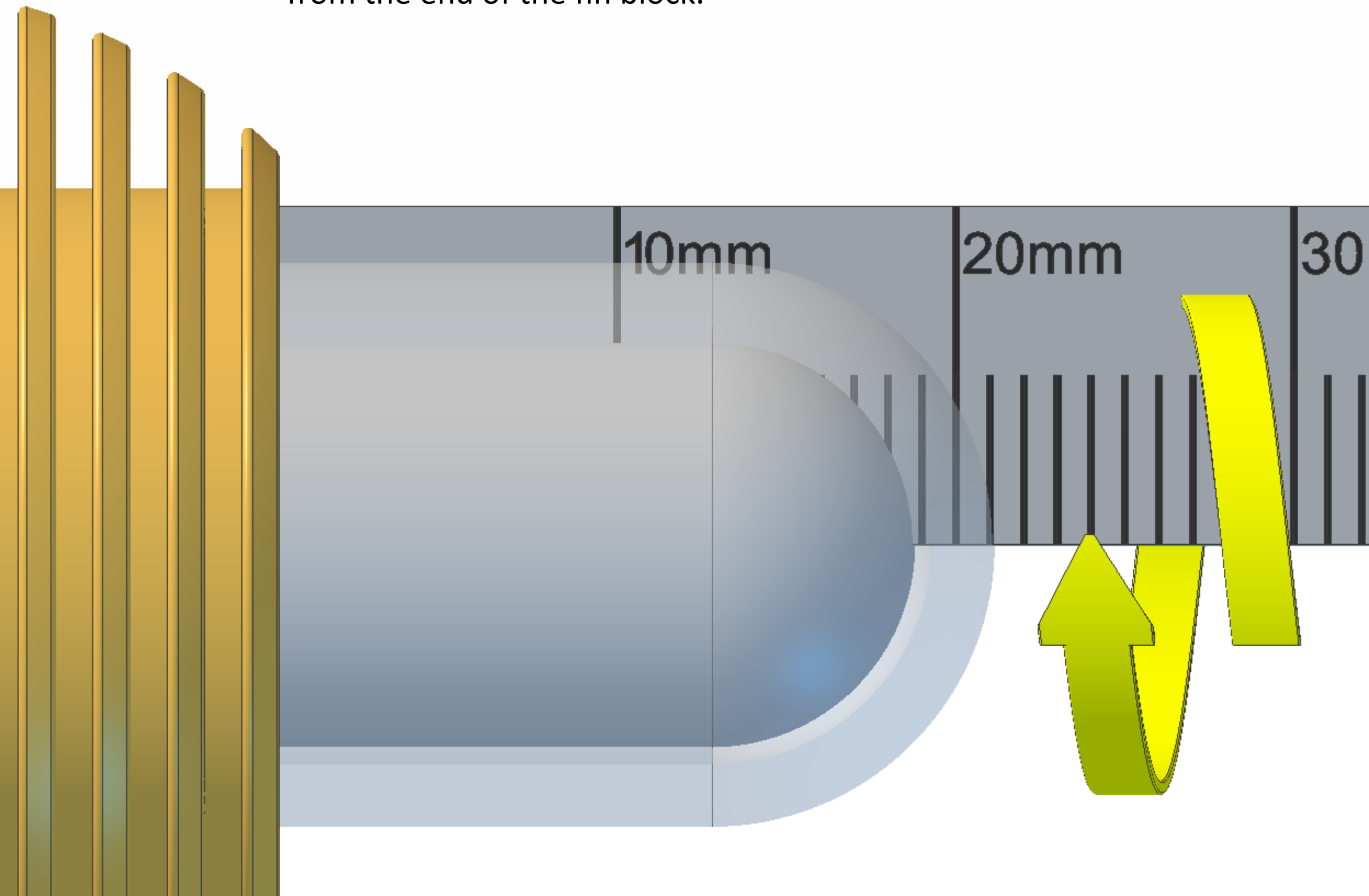
Note, the fin block is shown cut away for clarity.



Moisten the end of the glass dome sparingly with slightly soapy tap water for lubrication and fit it into the hole in the fin block. A gentle pushing and twisting motion works best. Try not to allow the glass to come into contact with the sides of the hole.



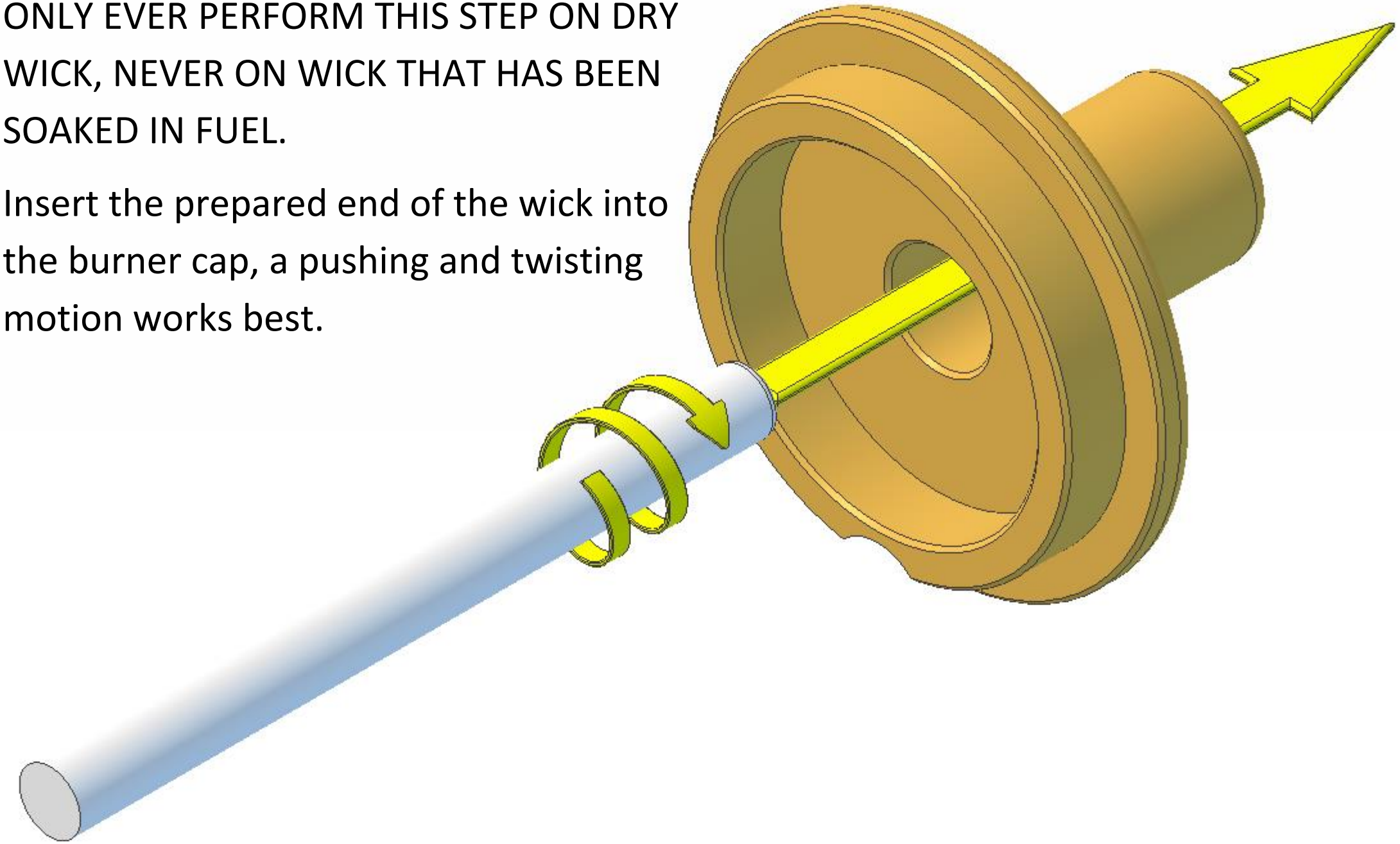
The end of the dome should be 21mm from the end of the fin block.



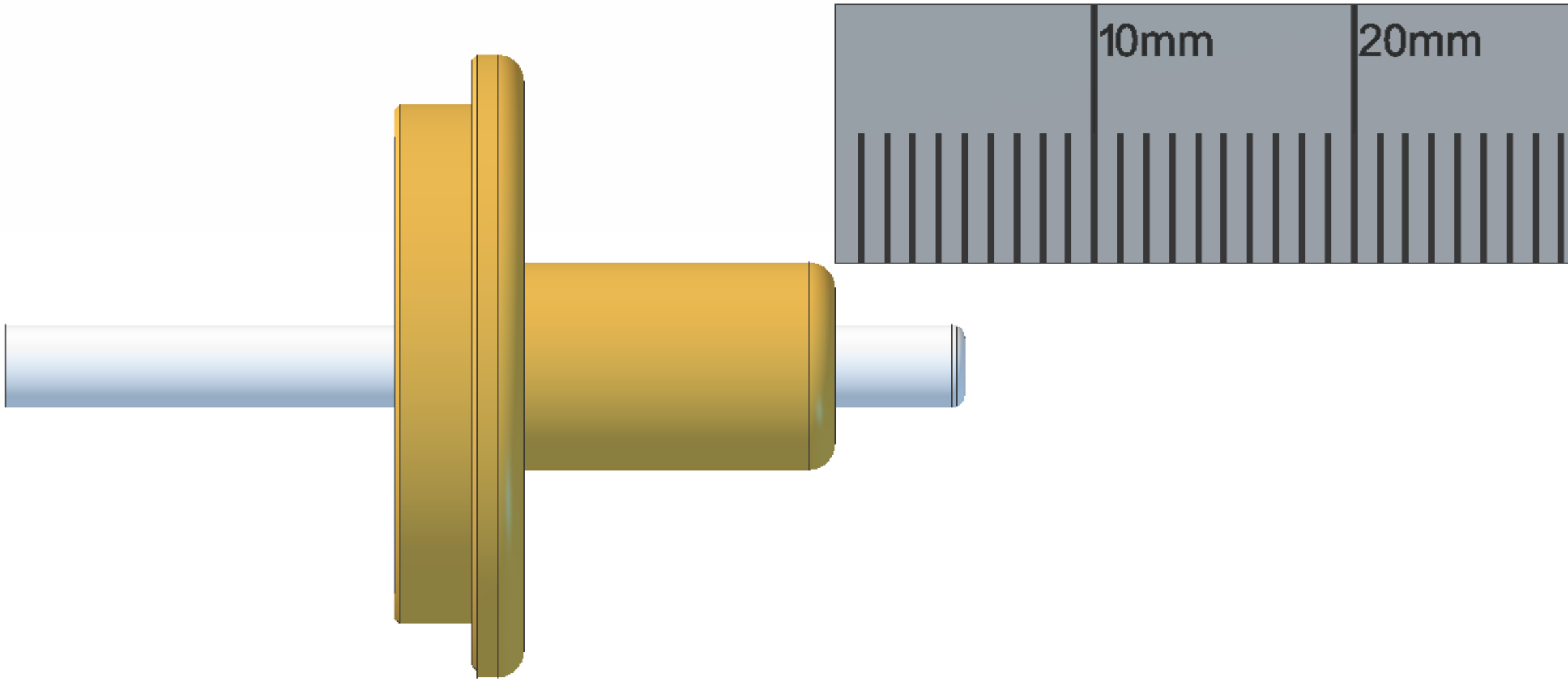
If the top end of the wick is frayed you will need to burn off the loose fibres, allow to cool, and then roll the end into a blunt point.

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

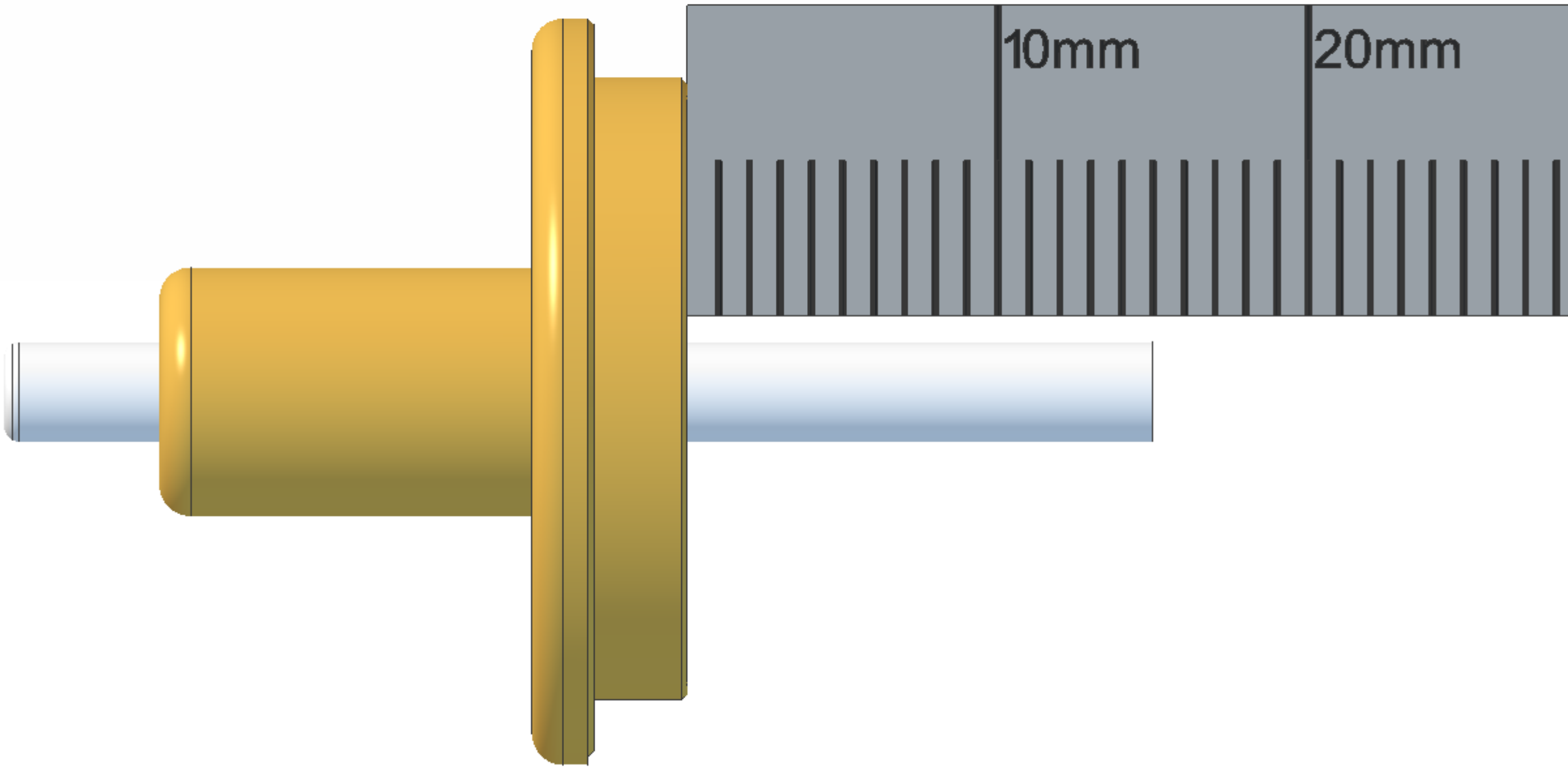
Insert the prepared end of the wick into the burner cap, a pushing and twisting motion works best.



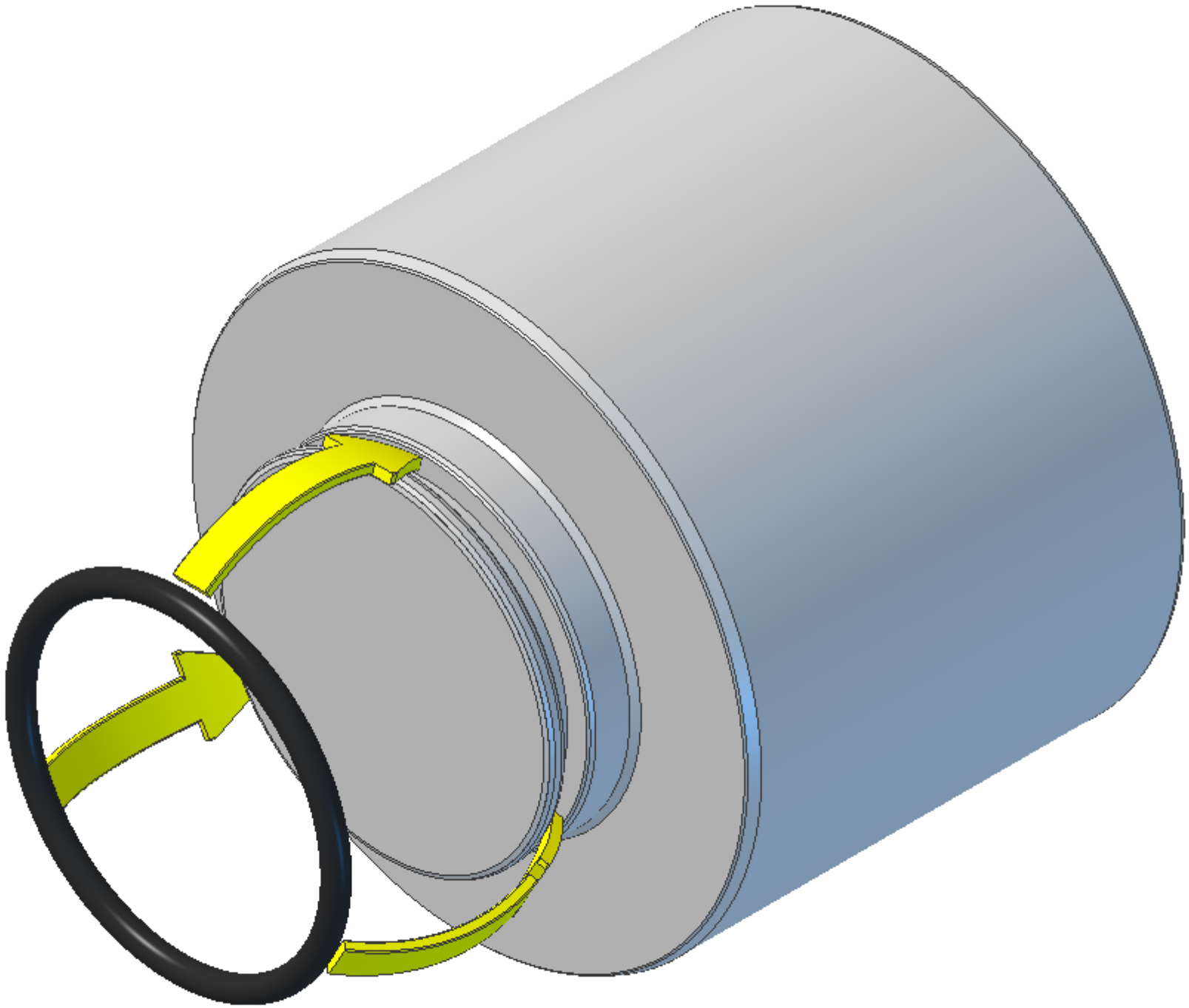
Trim the top of the wick to 5mm long.



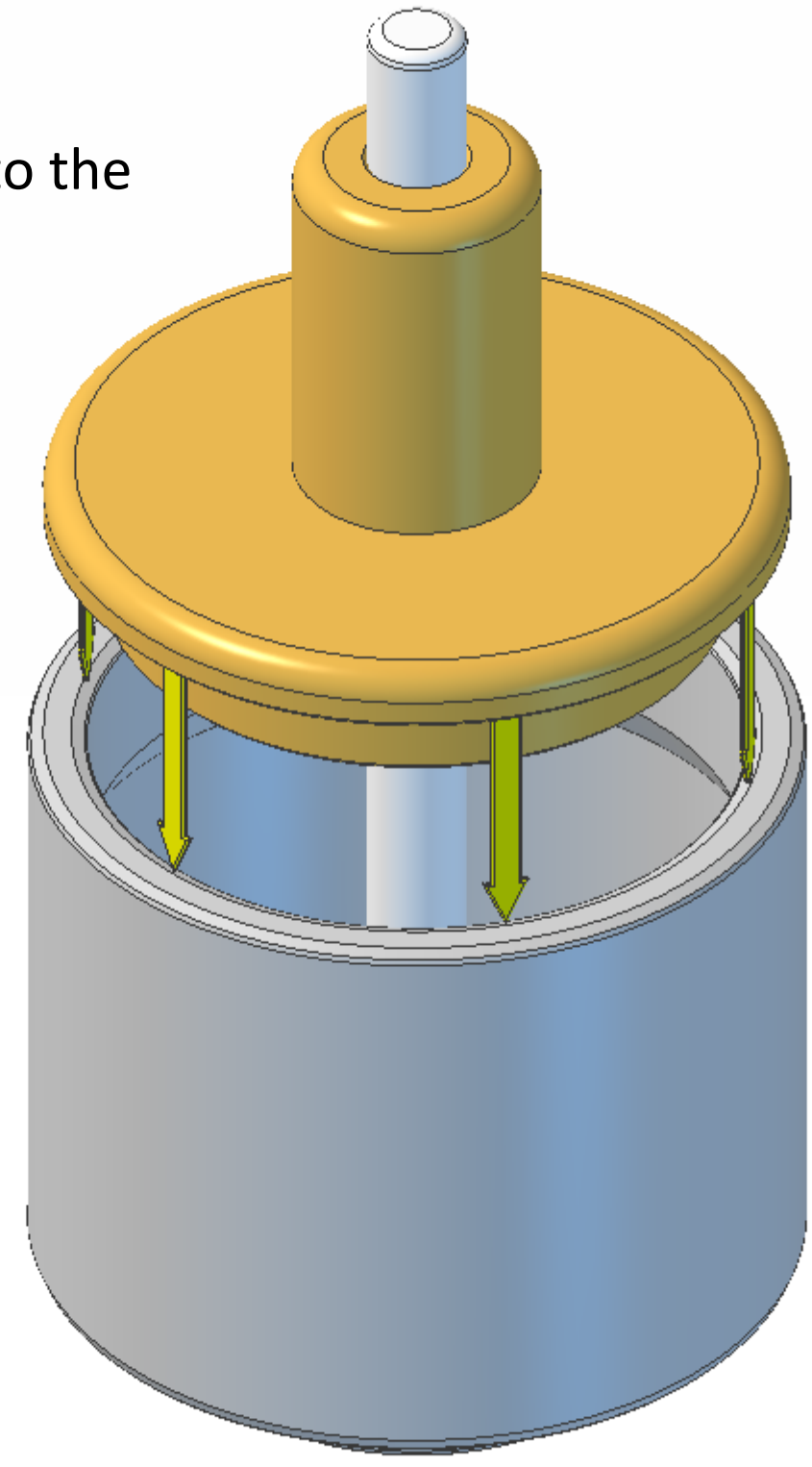
Trim the bottom of the wick to 15mm long.



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

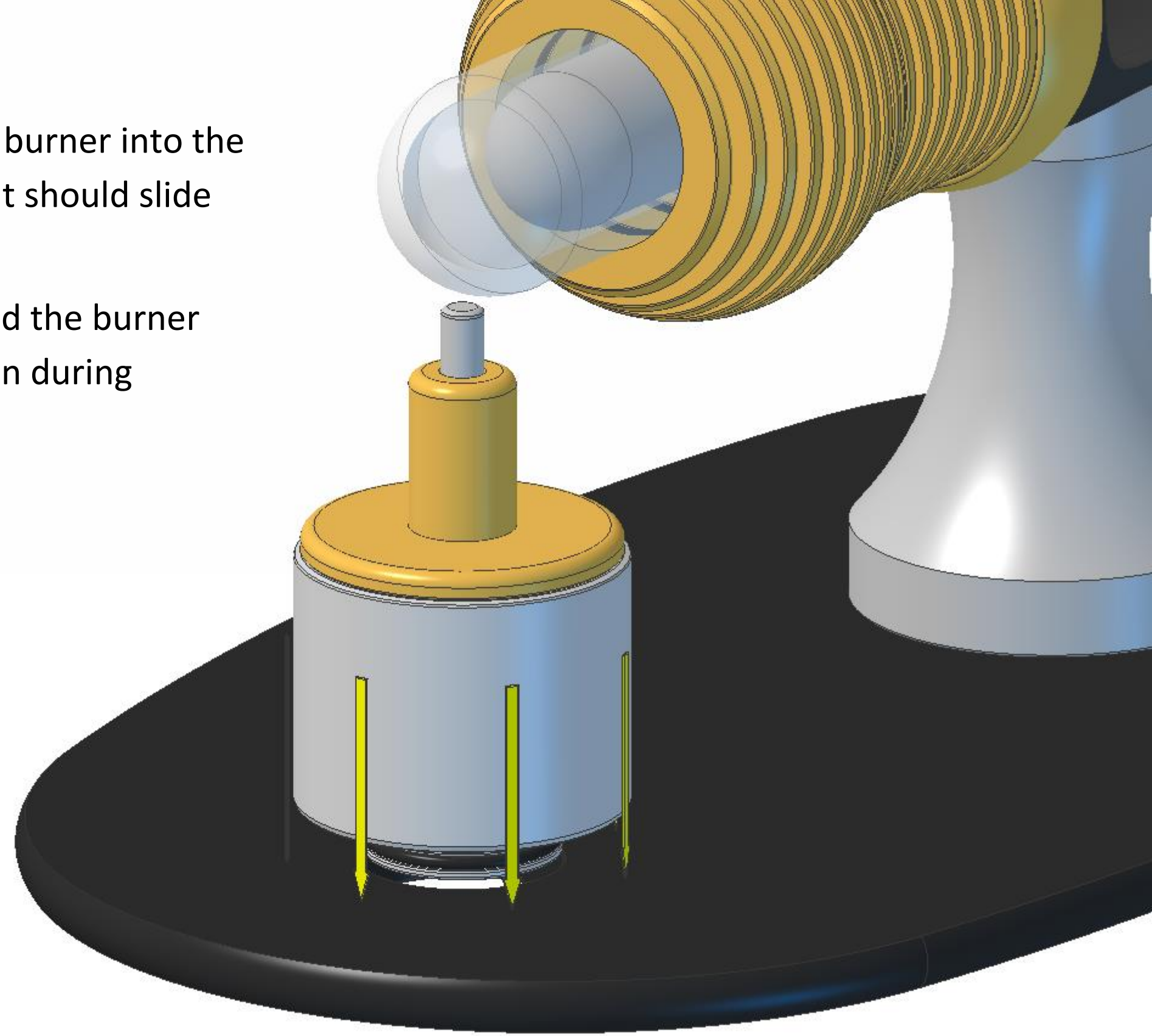


Fit the burner cap into the burner body.



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

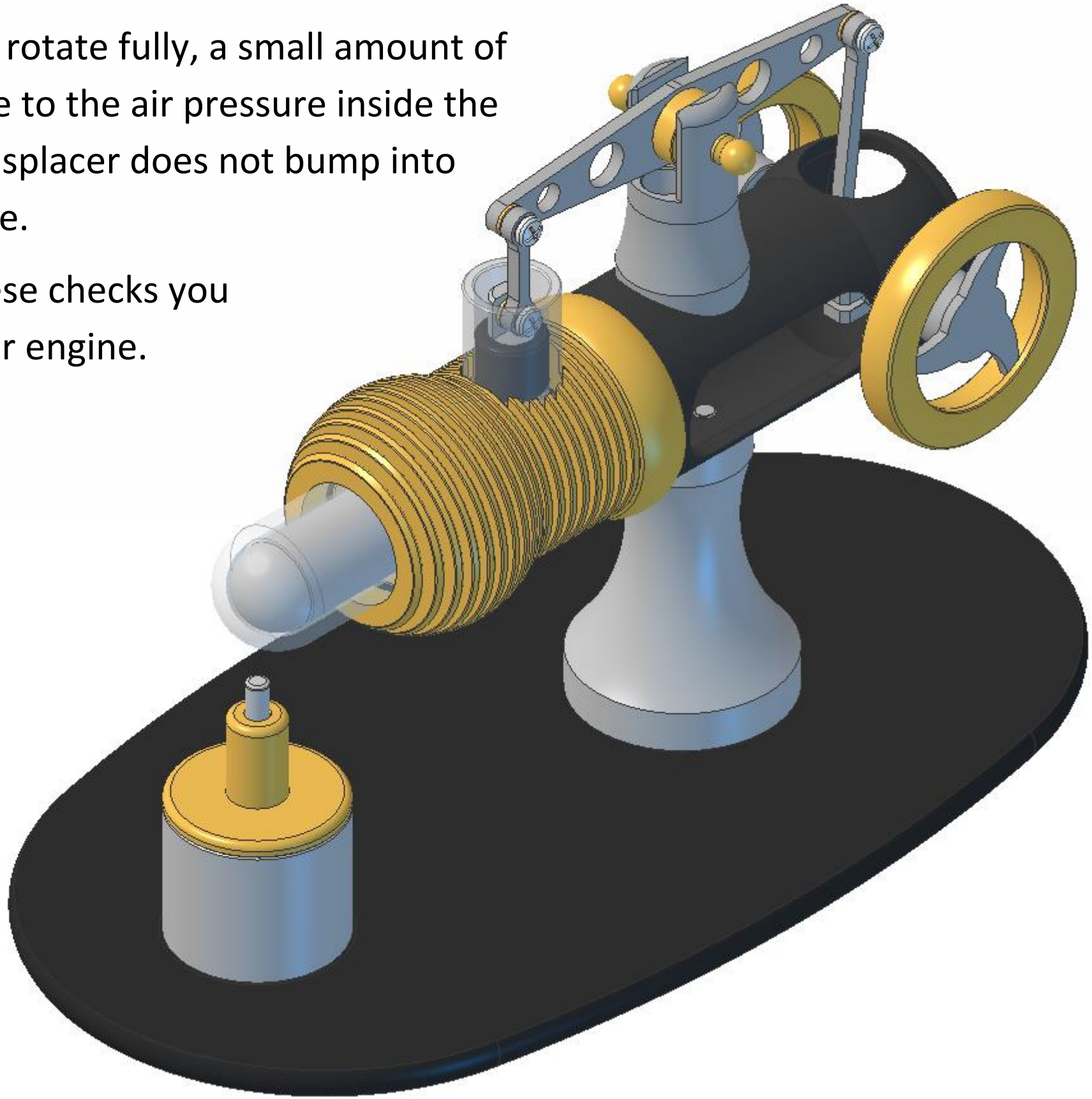
The O ring will hold the burner securely in position during operation.



Your engine is now fully assembled.

Check that the flywheels rotate fully, a small amount of resistance will be felt due to the air pressure inside the engine. Check that the displacer does not bump into the end of the glass dome.

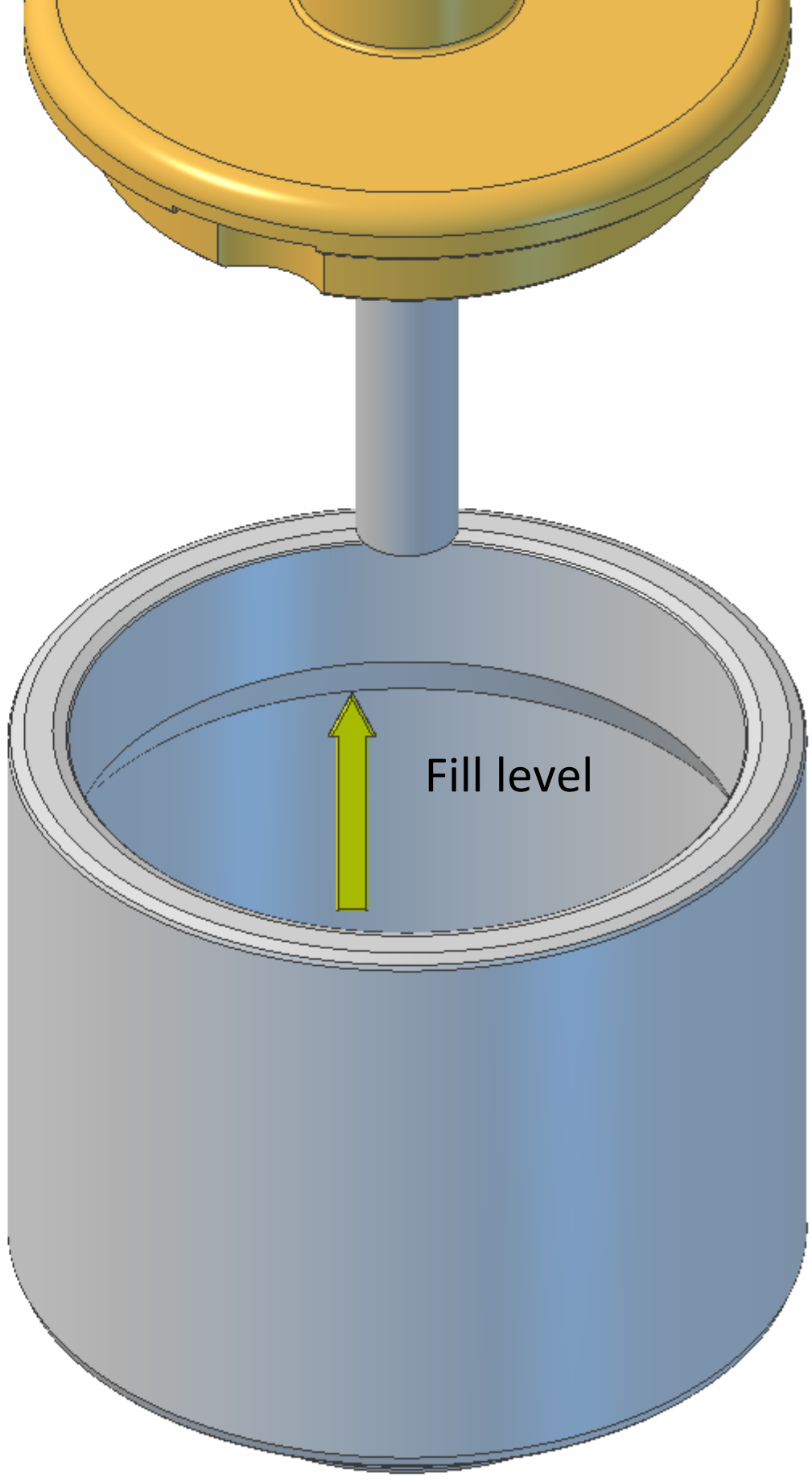
Once you have made these checks you are ready to operate your engine.



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 5mm protruding from the top and 15mm from the bottom. Fit the cap back in the body.

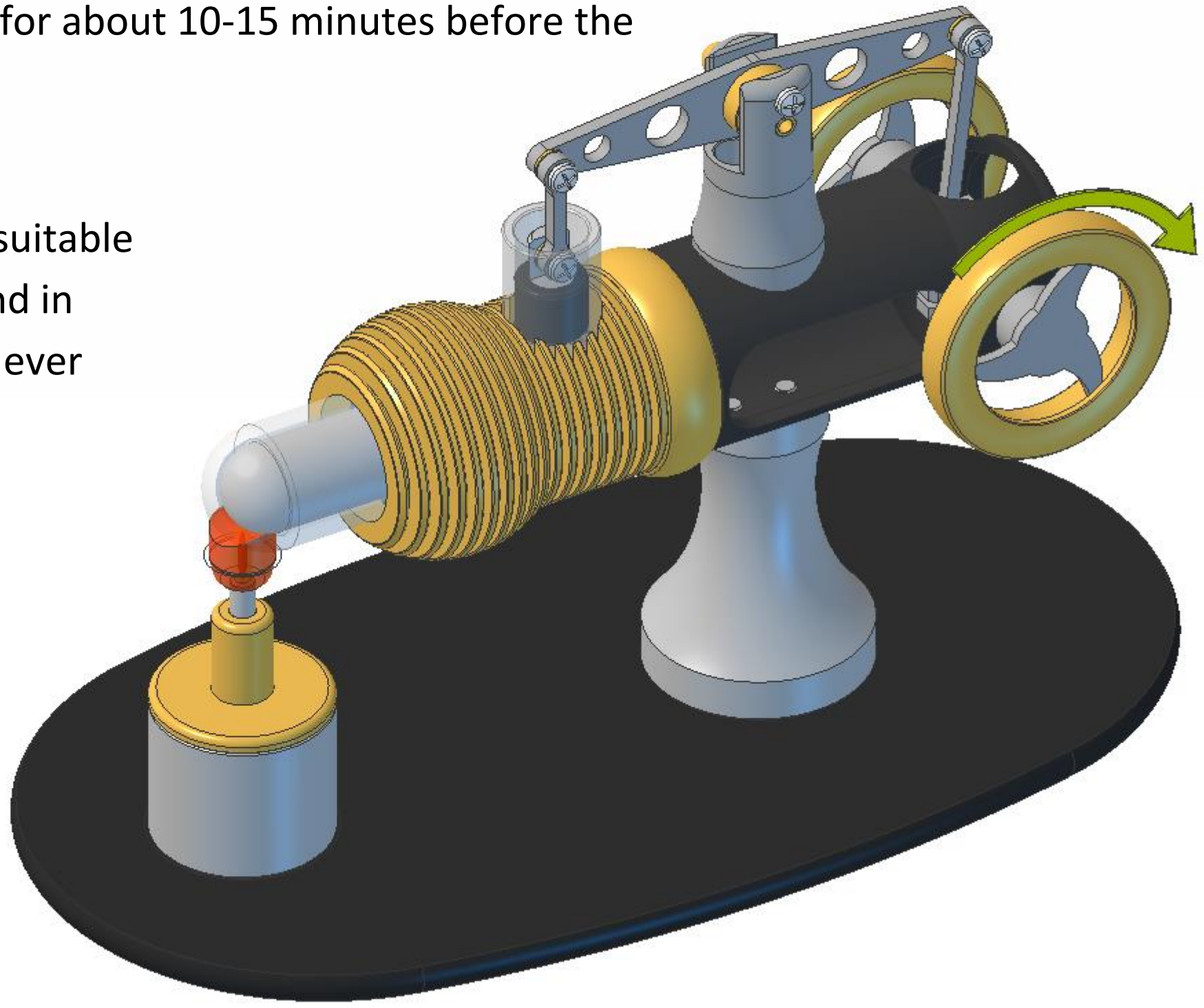
The cap has a small vent slot on its underside. This must always be kept clear or the burner cap might pop off during operation and spill burning fuel on the base plate.



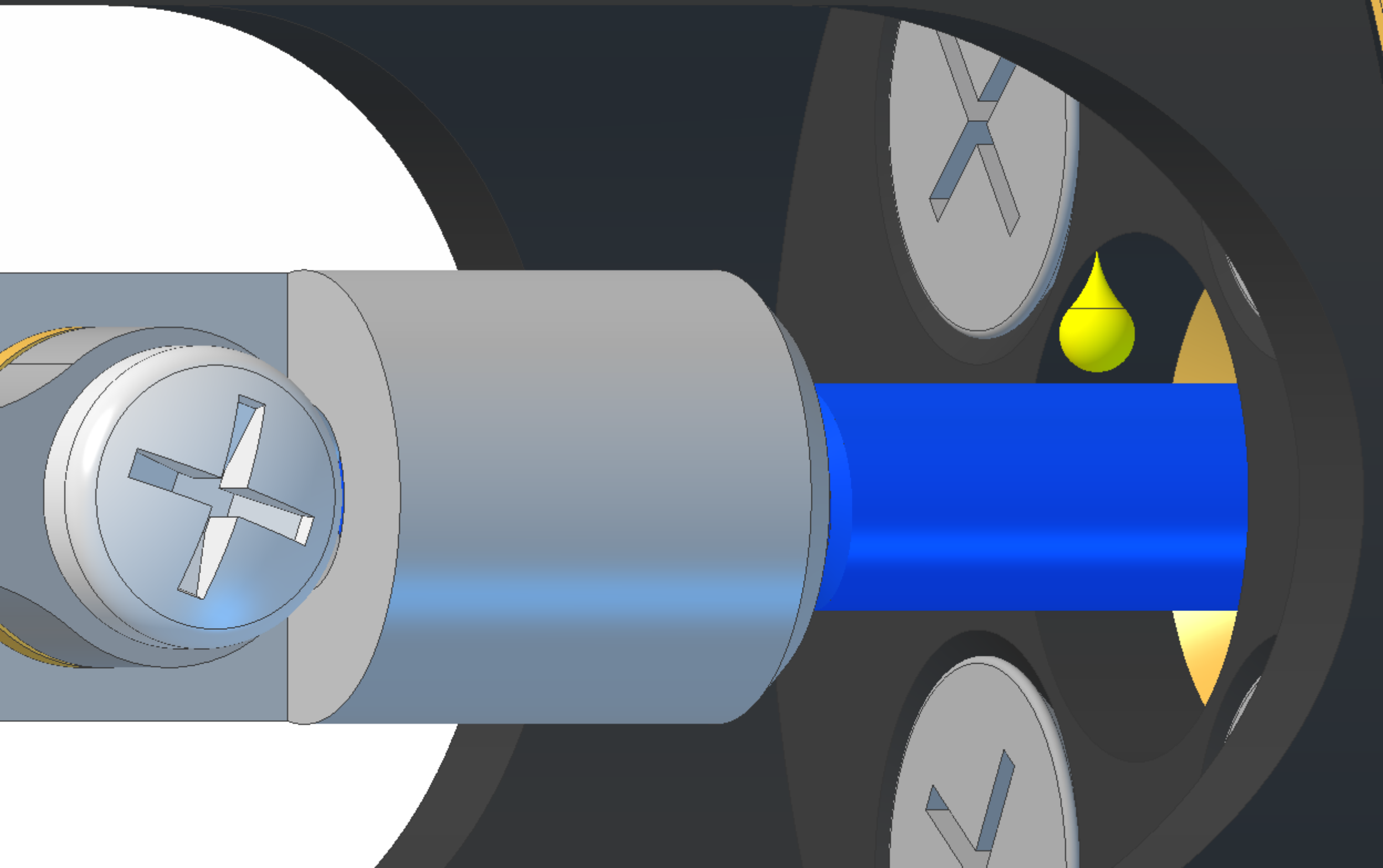
Light the wick and allow a minute or so for the engine to warm up, then spin the flywheels in the direction shown in the diagram.

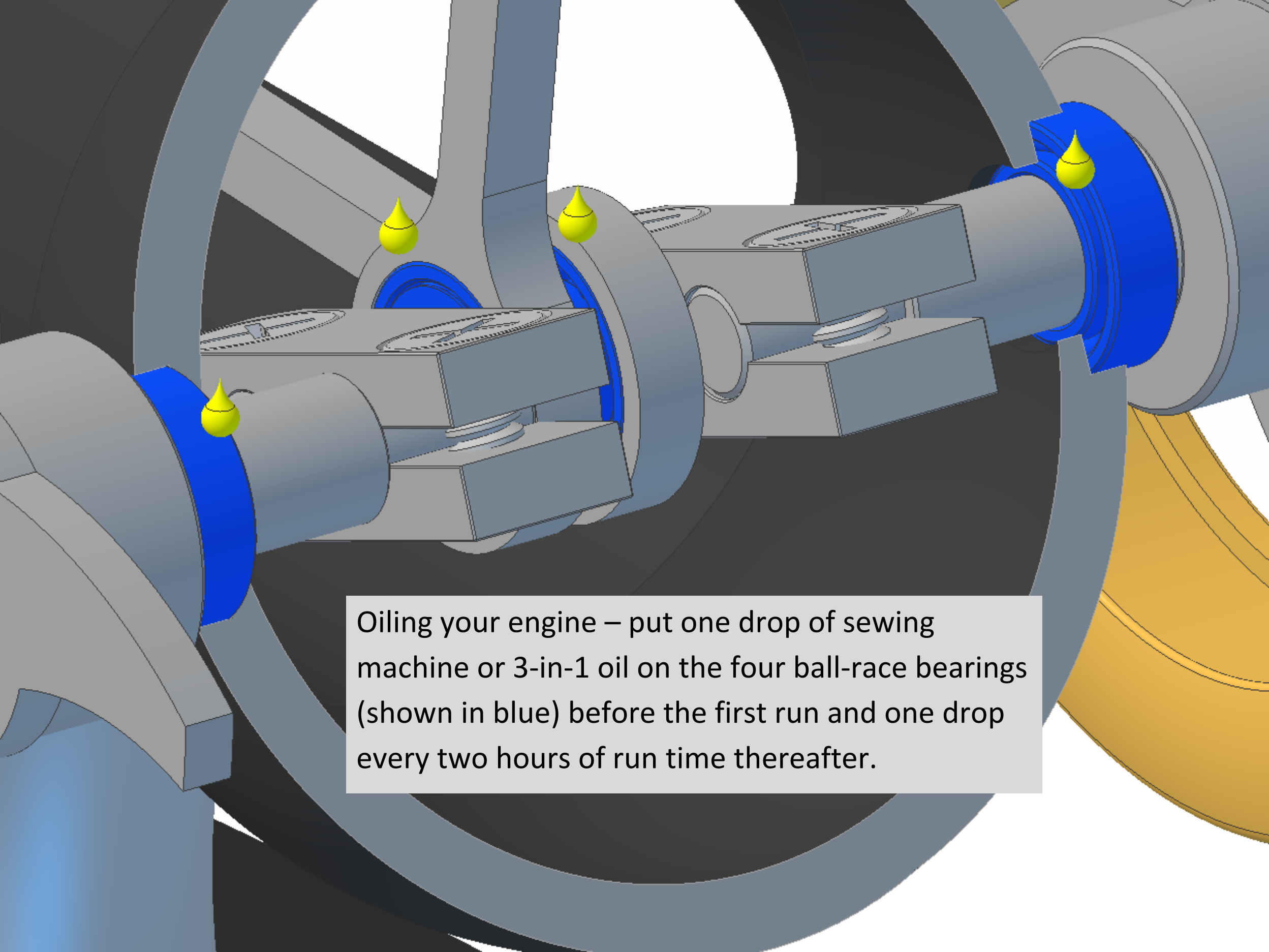
The engine should run for about 10-15 minutes before the fuel runs out.

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



Oiling your engine – put one drop of sewing machine or 3-in-1 oil on the displacer stem (shown in blue) before the first run and one drop every two hours of run time thereafter.





Oiling your engine – put one drop of sewing machine or 3-in-1 oil on the four ball-race bearings (shown in blue) before the first run and one drop every two hours of run time thereafter.