

# MAG YOUR MULTIPLIER

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Classic Multiplier Design

Stainless steel and graphite  
construction -

# MAGNETIC CAST CONTROL UPGRADE TUTORIAL

**NB**

Follow instructional  
through to the end  
before attempting  
the upgrade.

Okuma Convector CV 45 CS



**YOU WILL NEED THE FOLLOWING TOOLS:**

Before MCC upgrade

**HANDHELD DRILL  
4MM DRILL BIT - MAG BOLT HOLE  
8MM DRILL BIT- SIDE PLATE HOLE  
7MM DRILL BIT - outer sleeve hole**

**Tap and dye set or  
5mm hardened steel bolt to cut thread , MANUALLY  
8mm hardened steel bolt to cut thread  
Large screw driver to turn 5mm bolt  
Spanner to turn 8mm bolt to cut thread**

**Cutting paste or oil helps alot when threading  
Hacksaw or grinder with thin blade to cut round BAR**

**40 GRIT SANDPAPER.  
GAFFER TAPE - OPTIONAL  
PRATLEY - GREY METAL TWO PART**

**PERMANENT MARKER**

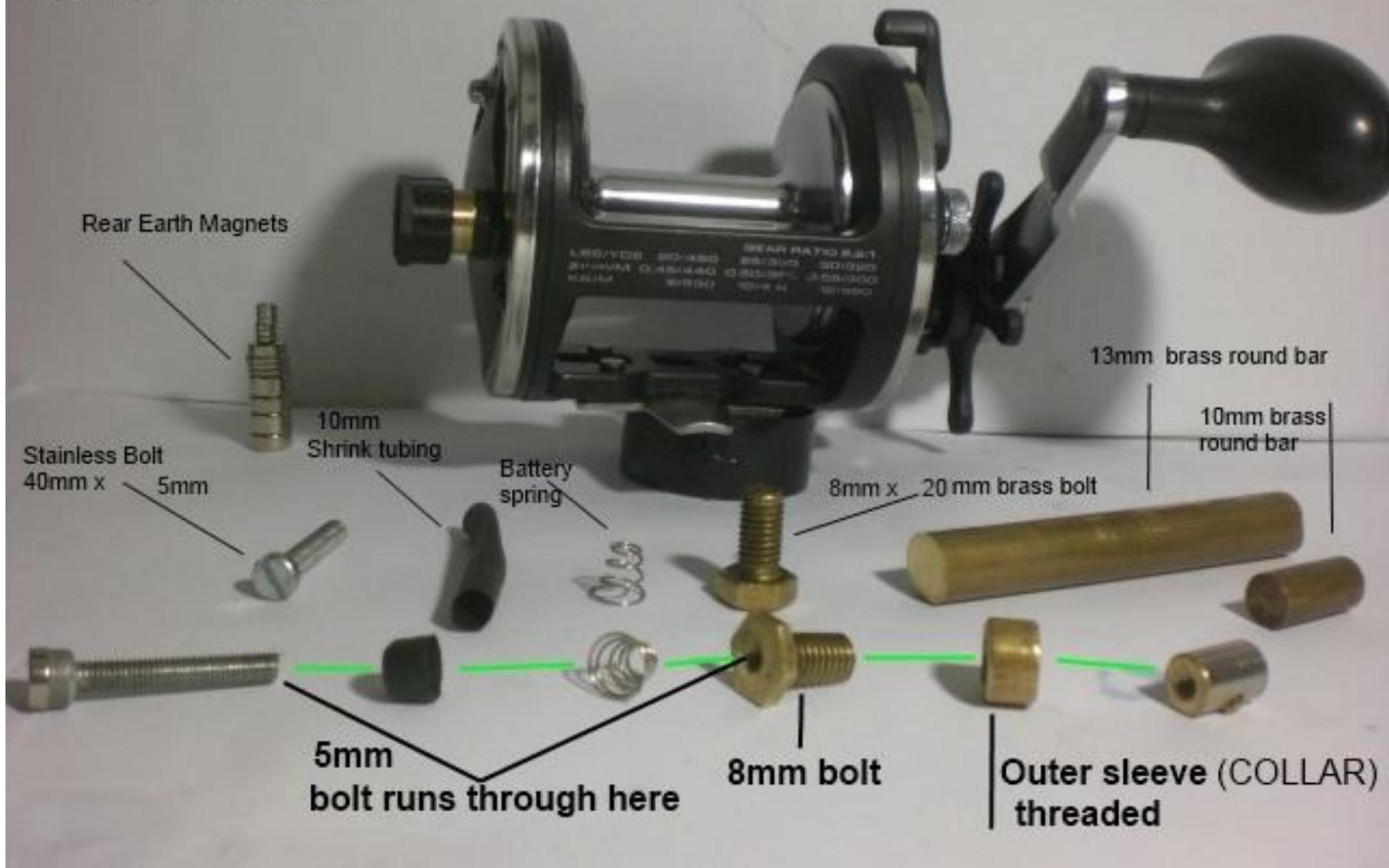


Sideplate View Prior to Upgrade



Magnetic cast control  
position.  
Close to thumb control.

Finished custom reel  
Raw Materials - centre row  
Exploded Magnetic Cast control - Bottom row  
Magnets - Back left



After Upgrade - Mags On full.  
Turned In.



- STEP BY STEP TUTORIAL
- FOR THE DIY ANGLER
- STANDARD TOOLS USED
- No Engineering experience needed.

Modifications will differ between models.  
This instructional should give you the basic idea about  
magnetic brake systems and how to  
manufacture them.  
Aswell as install them in the larger multipliers .



**Basic assembled  
MCC.**



After Magnetic cast control upgrade.



START

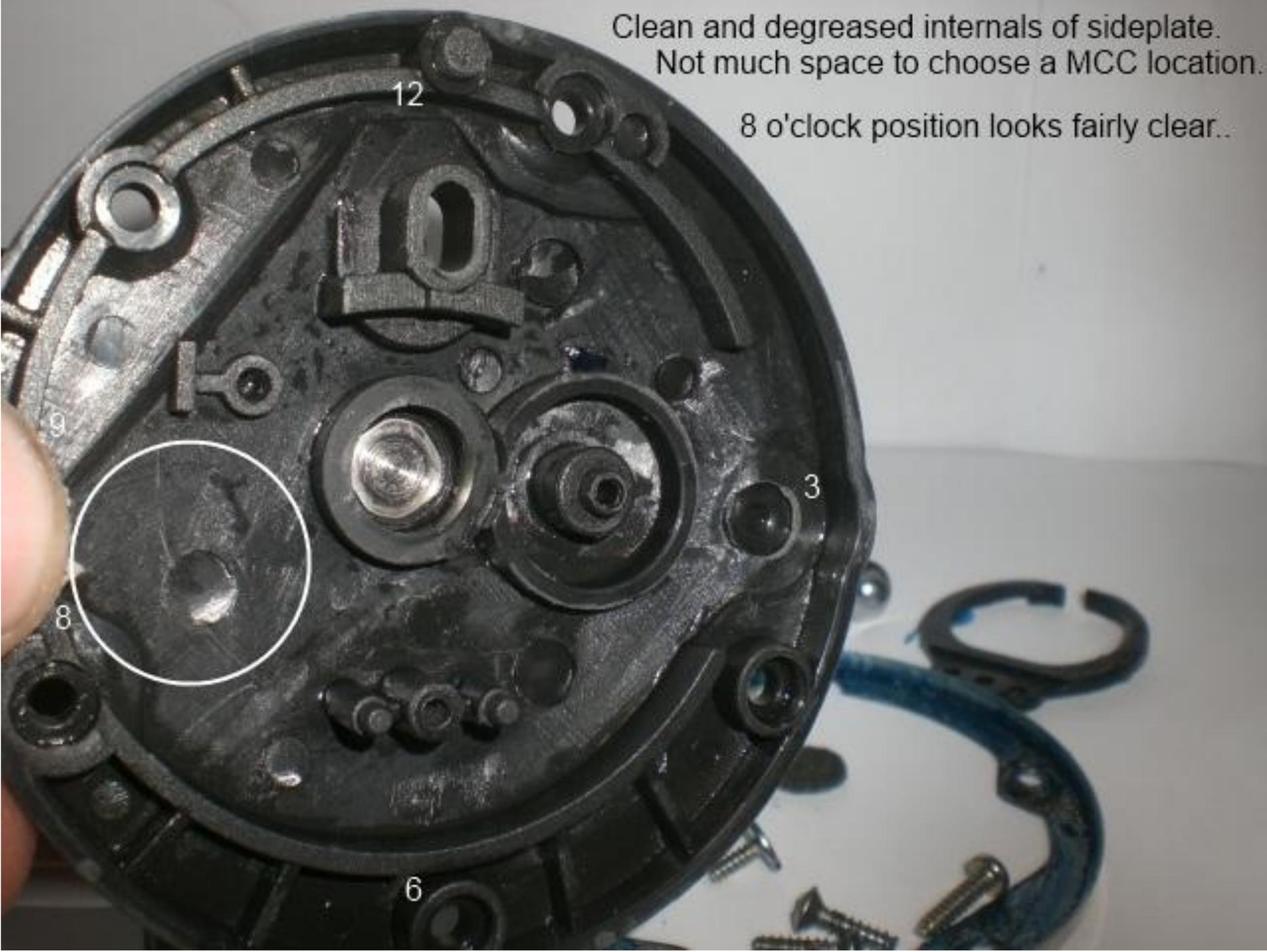
Remove left sideplate from multiplier intended for upgrade.

Remove grease from inside sideplate. Engine degreaser  
Plate must be dry and clean



Clean and degreased internals of sideplate.  
Not much space to choose a MCC location.

8 o'clock position looks fairly clear..





FOR MORE ACURATE MEASUREMENTS TAKE FURTHER READINGS AND OBSERVATIONS.

Confirm measurement against the spool, the magnet must be in the centred in the between the spool lips to avoid any abrasion when adjusting.

The more you measure and recheck the less likely you will be to make a mistake.

Make a permanent mark on spool to show position.



Mark the position you wish to drill with a permanent marker.  
Make sure that the outside of the sideplate is free from obstructions ie.

- Double check position.

Stainless Bumper  
Rings.



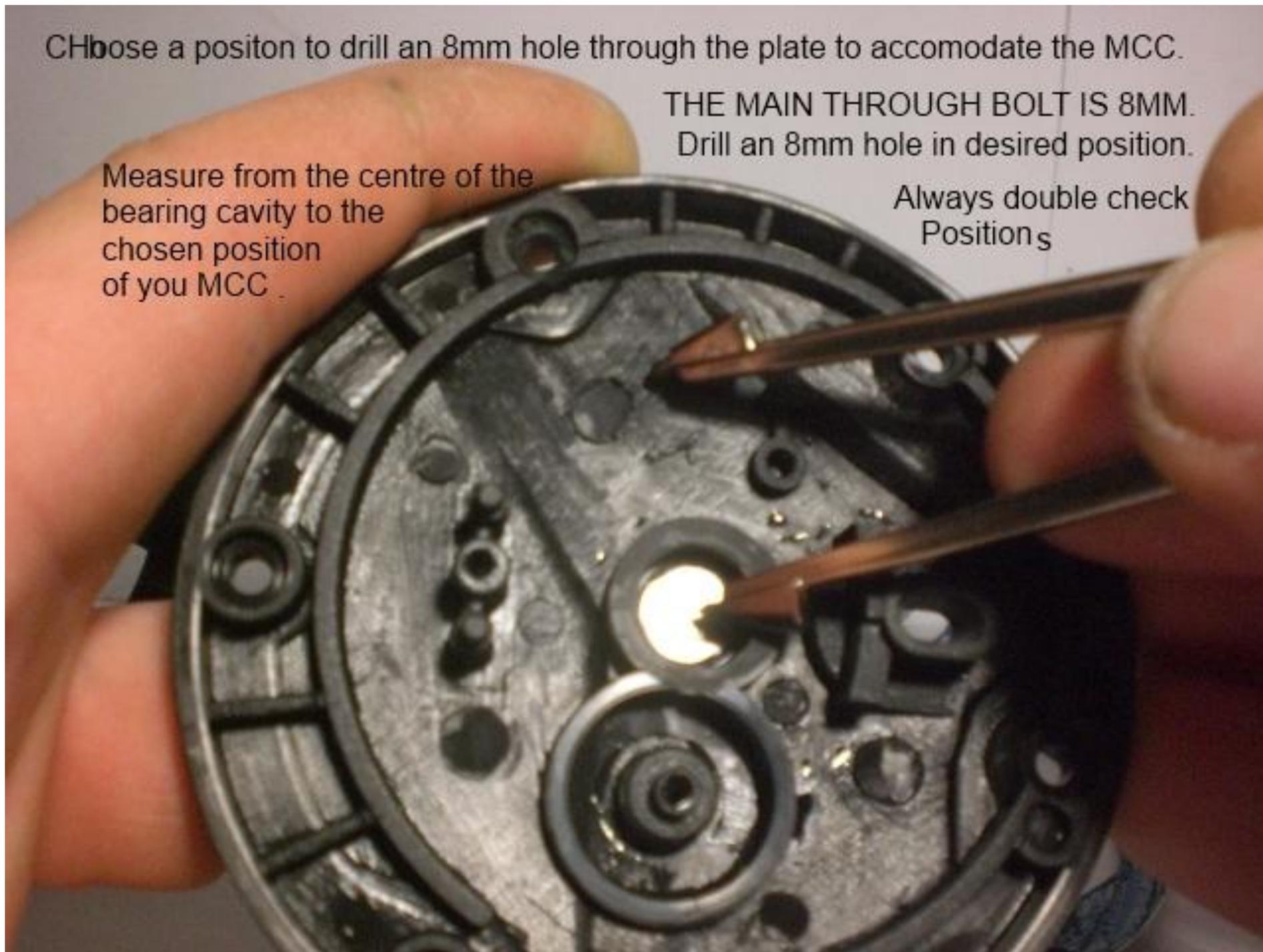
YOU DONT WANT TO  
DRILL THROUGH AND FIND YOU  
ARE UNDER THE BASH RING OR  
OUT OF POSITION.

Choose a position to drill an 8mm hole through the plate to accommodate the MCC.

THE MAIN THROUGH BOLT IS 8MM.  
Drill an 8mm hole in desired position.

Measure from the centre of the bearing cavity to the chosen position of your MCC.

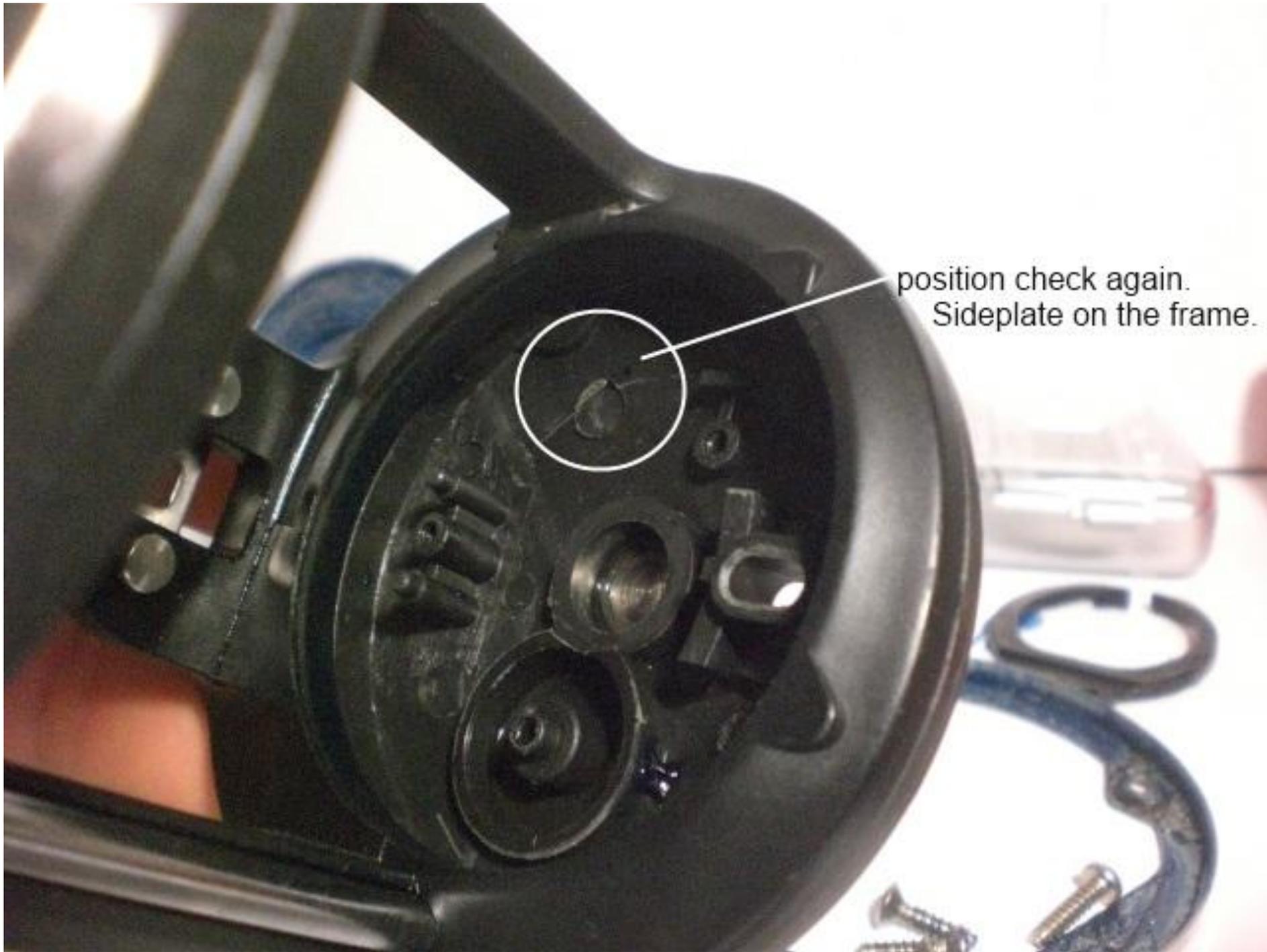
Always double check  
Positions



Take time to access reel semi assembled after the position has been marked. Visual checks crucial.

Permanent pen mark ed position looks good with spool in place.



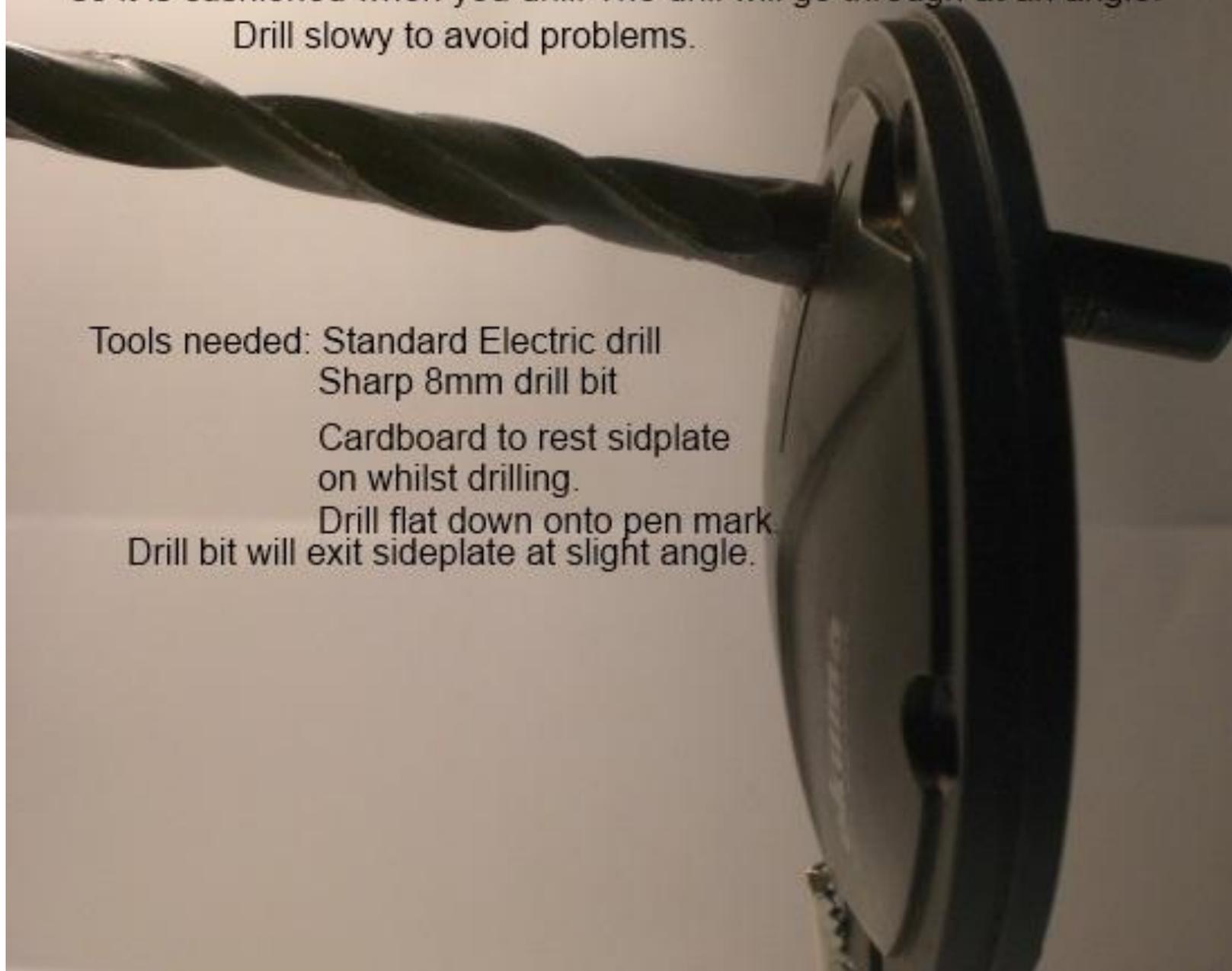


position check again.  
Sideplate on the frame.

Drilling from the inside of the sideplate , Rest the sideplate in some cardboard so it is cushioned when you drill. The drill will go through at an angle.

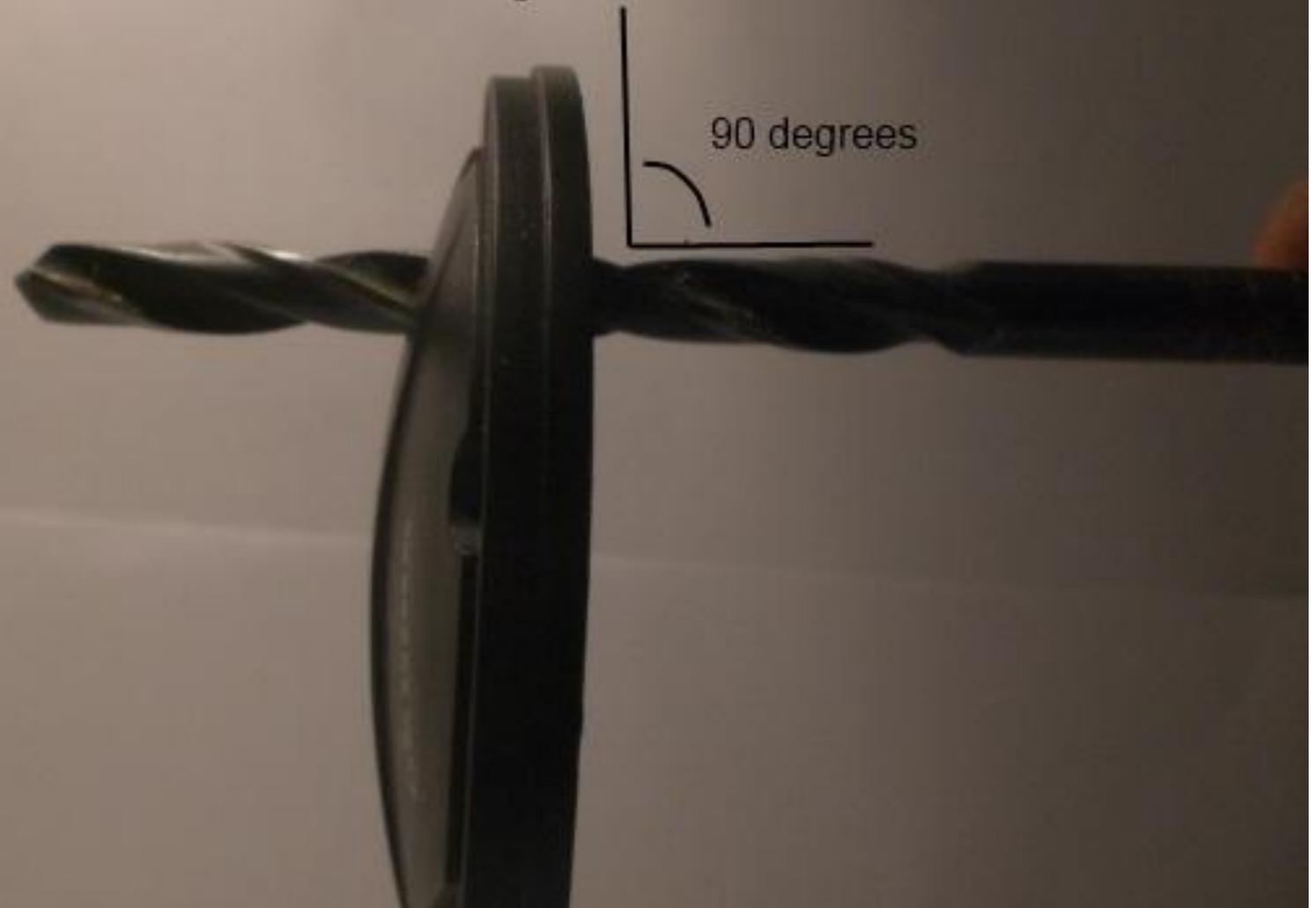
Drill slowly to avoid problems.

Tools needed: Standard Electric drill  
Sharp 8mm drill bit  
Cardboard to rest sideplate on whilst drilling.  
Drill flat down onto pen mark.  
Drill bit will exit sideplate at slight angle.



Drillthrough again slowly and carefully but directing the drill bit at 90 degrees to the inside of the sideplate. this is to ensure that the MCC once made will aligned correctly and not at an angle .

Be sure to keep the hole at 8mm and dont enlarge it too much.



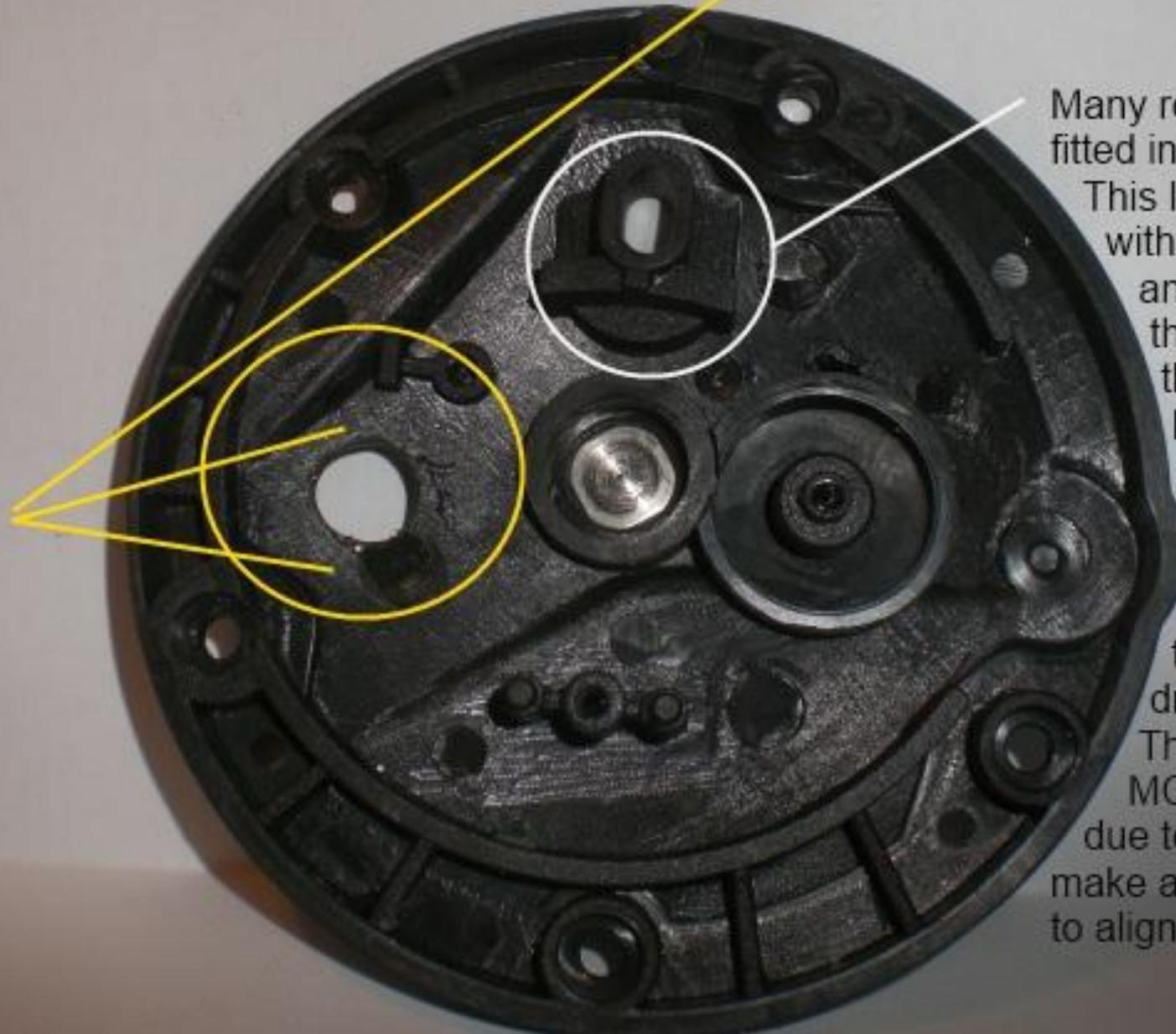
A slight gap is normal but the 8mm bit should still be fairly snug.



Good position - Away from stainless bash rings, well centred.



Internal position looks correct. Good space around hole.



Many reels get the Mcc fitted in this position. This leaves the reel without the clicker and it also leaves the reel without the option of ever having a clicker again.

The area is Flattened with special bit and the oval hole drilled out to 8mm. The fitting of the MCC is then easier due to not having to make angled spacers to align the MCC.



Find your marking on the spool. Align it with the hole and check to see if you are on target.



Many different reels will have many different positions. The principals are the same. Positons ,check and rechecks should keep you away from mistakes.

ALWAYS ENVISION THE FINAL RESULT.

MISTAKES THAT ARE IN THE WAY ARE EASIER TO SEE .



Mark well centred , away  
from spool lips and flanges.

**EXAMPLE**

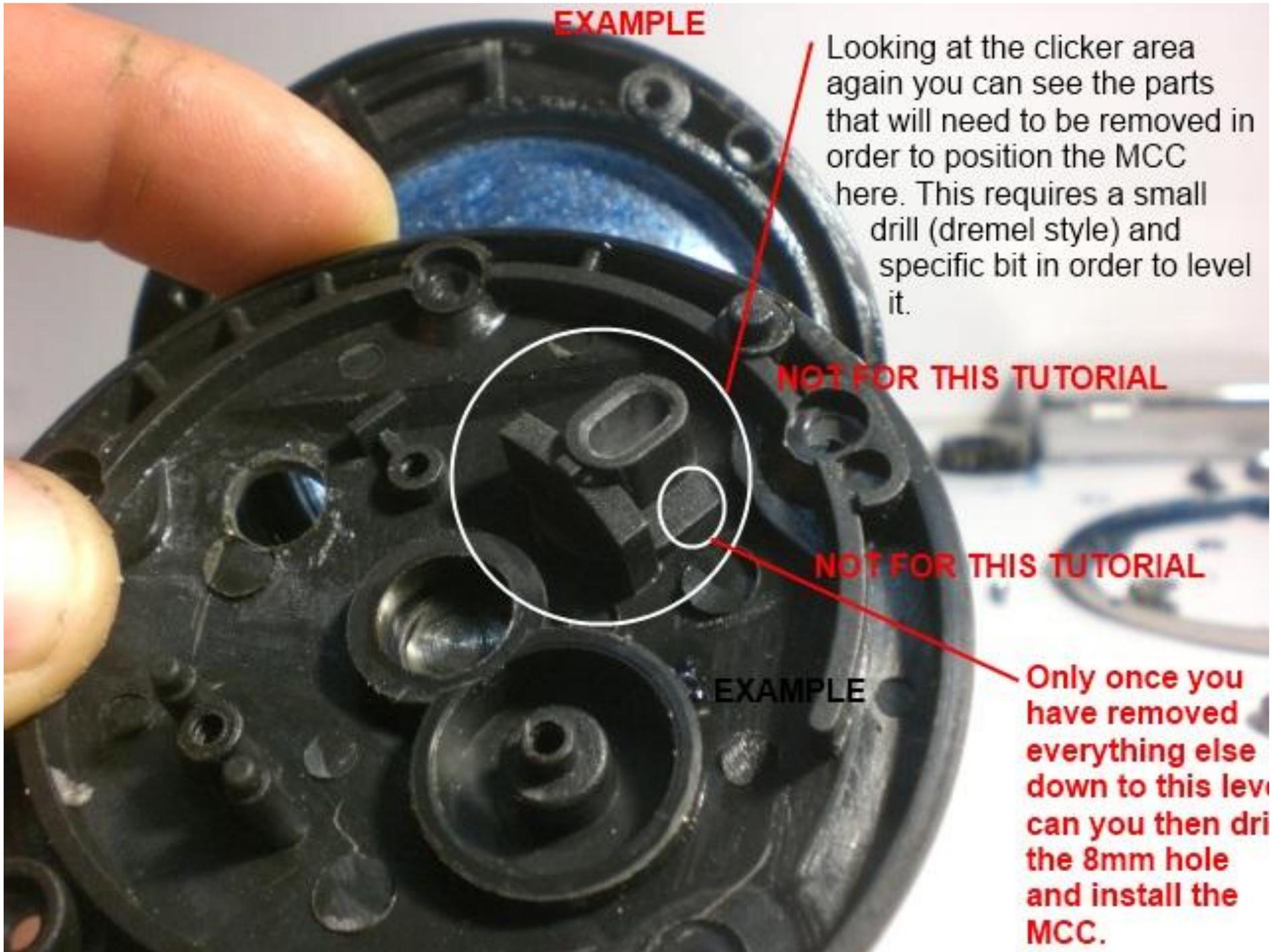
Looking at the clicker area again you can see the parts that will need to be removed in order to position the MCC here. This requires a small drill (dremel style) and specific bit in order to level it.

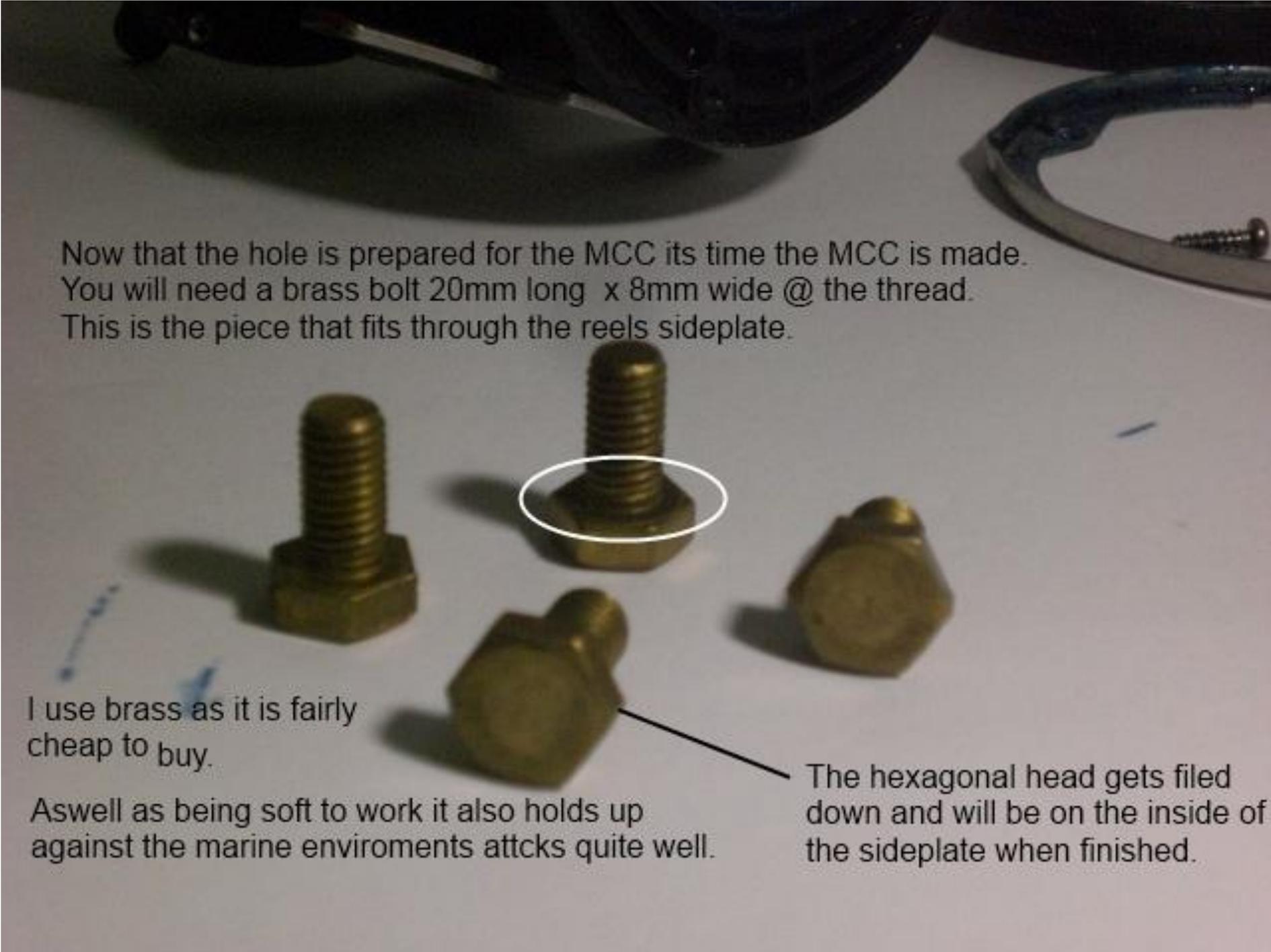
**NOT FOR THIS TUTORIAL**

**NOT FOR THIS TUTORIAL**

**EXAMPLE**

**Only once you have removed everything else down to this level can you then drill the 8mm hole and install the MCC.**



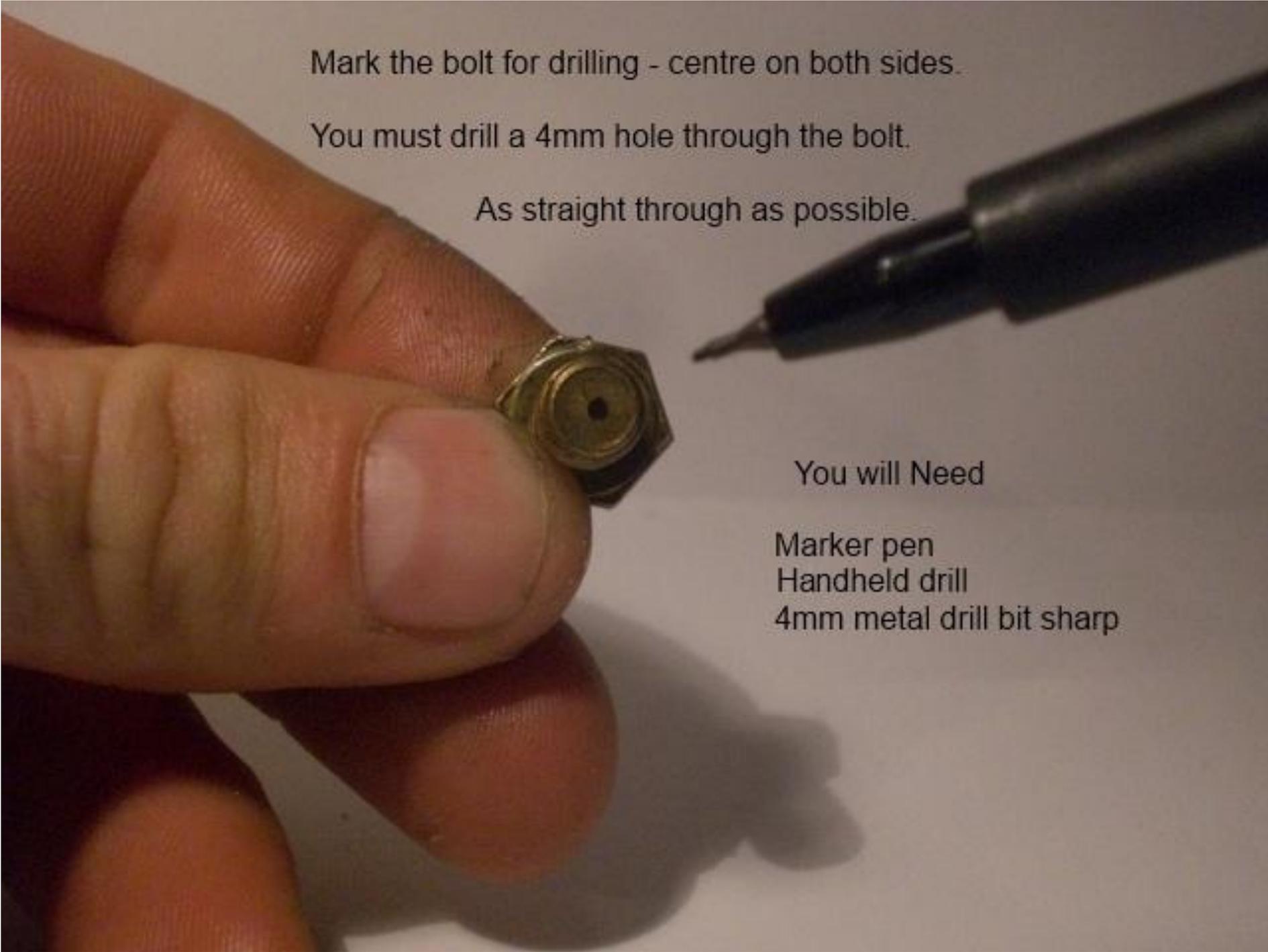


Now that the hole is prepared for the MCC its time the MCC is made.  
You will need a brass bolt 20mm long x 8mm wide @ the thread.  
This is the piece that fits through the reels sideplate.

I use brass as it is fairly  
cheap to buy.

Aswell as being soft to work it also holds up  
against the marine enviroments attcks quite well.

The hexagonal head gets filed  
down and will be on the inside of  
the sideplate when finished.

A close-up photograph of a person's hand holding a small metal bolt. The bolt is held between the thumb and index finger. A black marker pen is positioned to the right of the bolt, with its tip pointing towards the center of the bolt's hexagonal head. The background is a plain, light-colored surface.

Mark the bolt for drilling - centre on both sides.

You must drill a 4mm hole through the bolt.

As straight through as possible.

You will Need

Marker pen

Handheld drill

4mm metal drill bit sharp



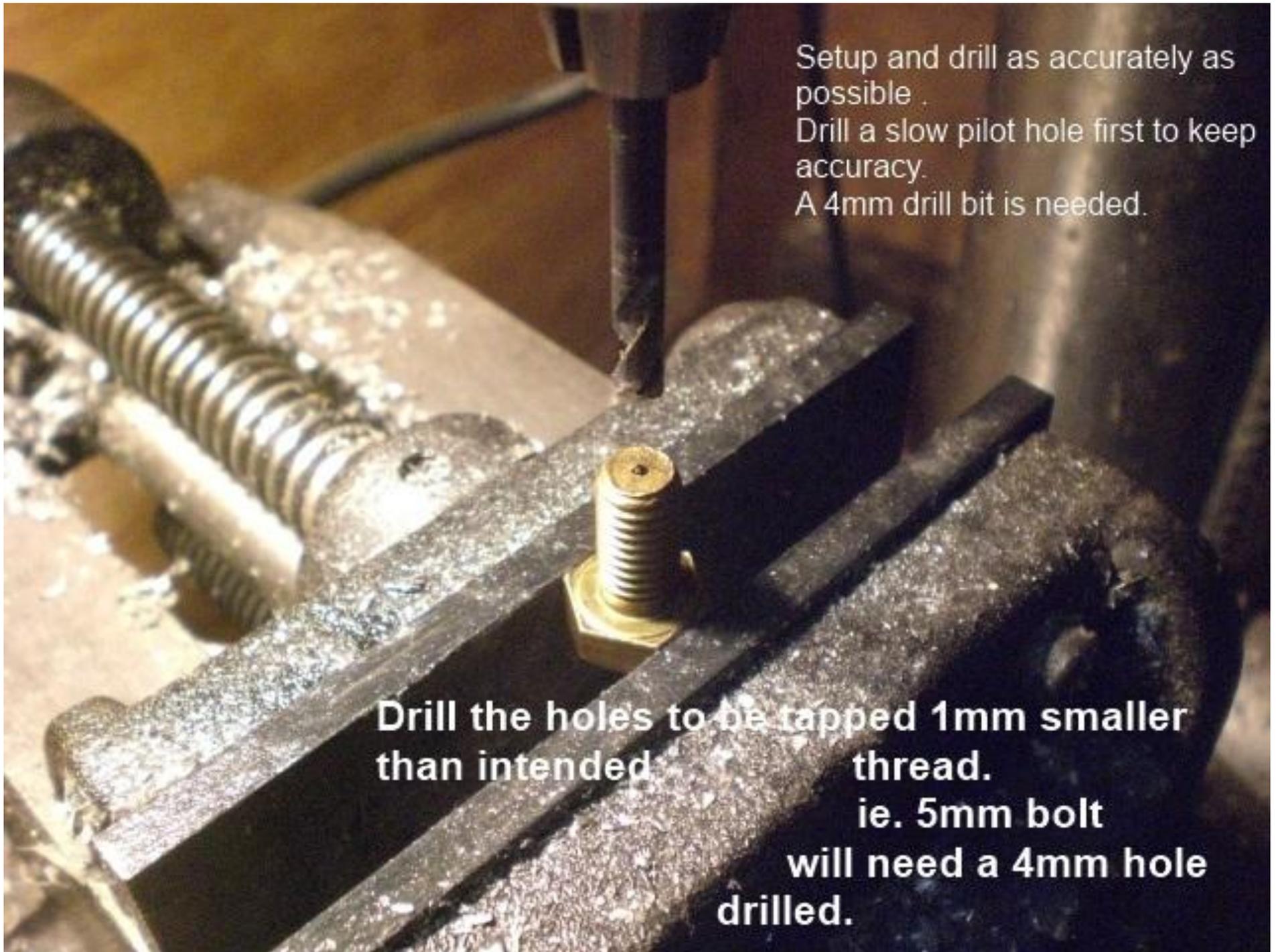
Marked - centre



Marked - centre



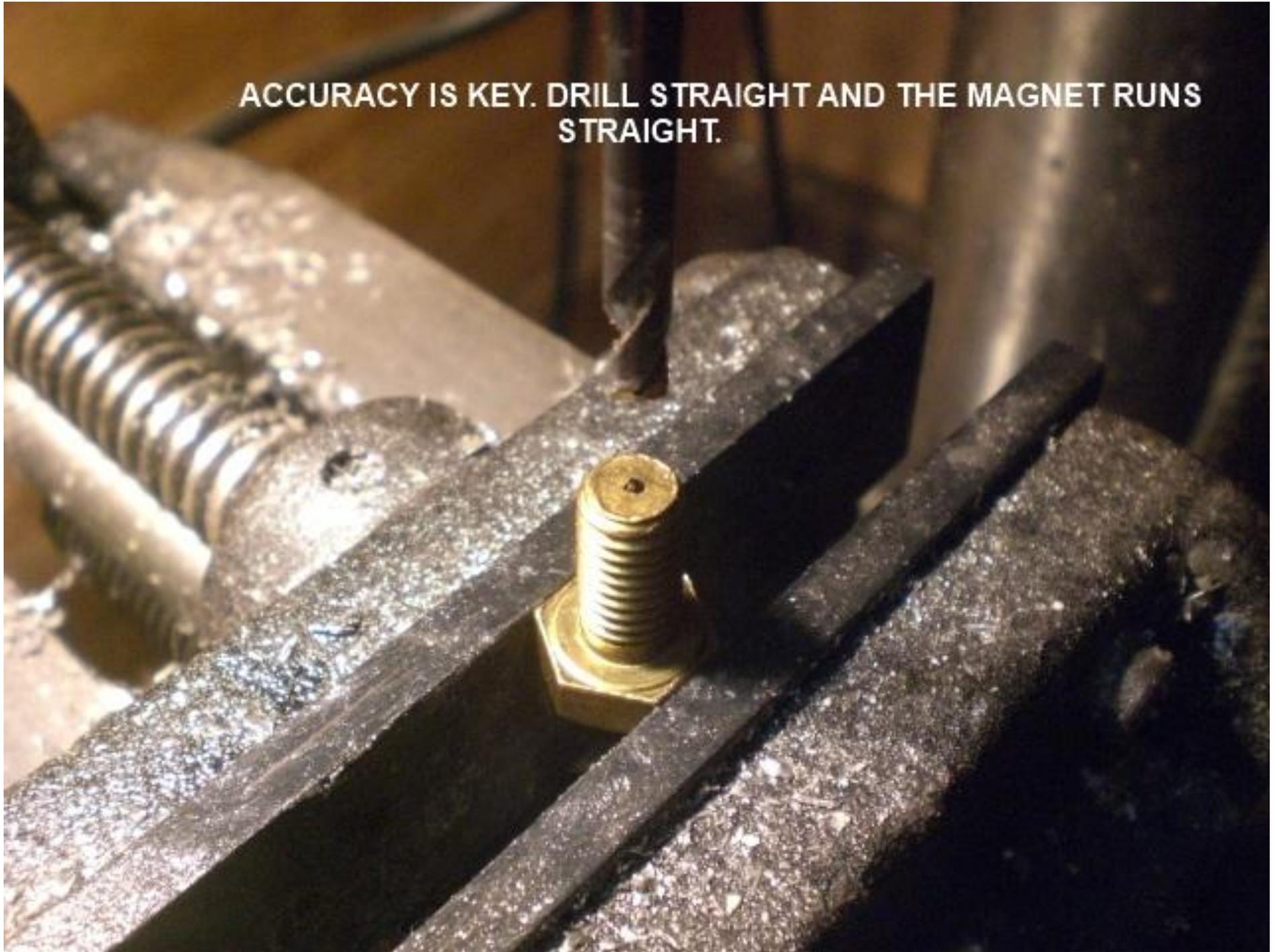
-marked centre-



Setup and drill as accurately as possible .  
Drill a slow pilot hole first to keep accuracy.  
A 4mm drill bit is needed.

**Drill the holes to be tapped 1mm smaller than intended thread.  
ie. 5mm bolt will need a 4mm hole drilled.**

ACCURACY IS KEY. DRILL STRAIGHT AND THE MAGNET RUNS STRAIGHT.



PILOT HOLE TO START. CHECK YOUR CENTRE.



DRILLED THROUGH -



DRILLED THROUGH  
4MM DRILL BIT - METAL



READY FOR CUTTING A THREAD.



TAP 4MM HOLE TO SUIT 5MM STAINLESS BOLT THREAD.

M5 X 0.8

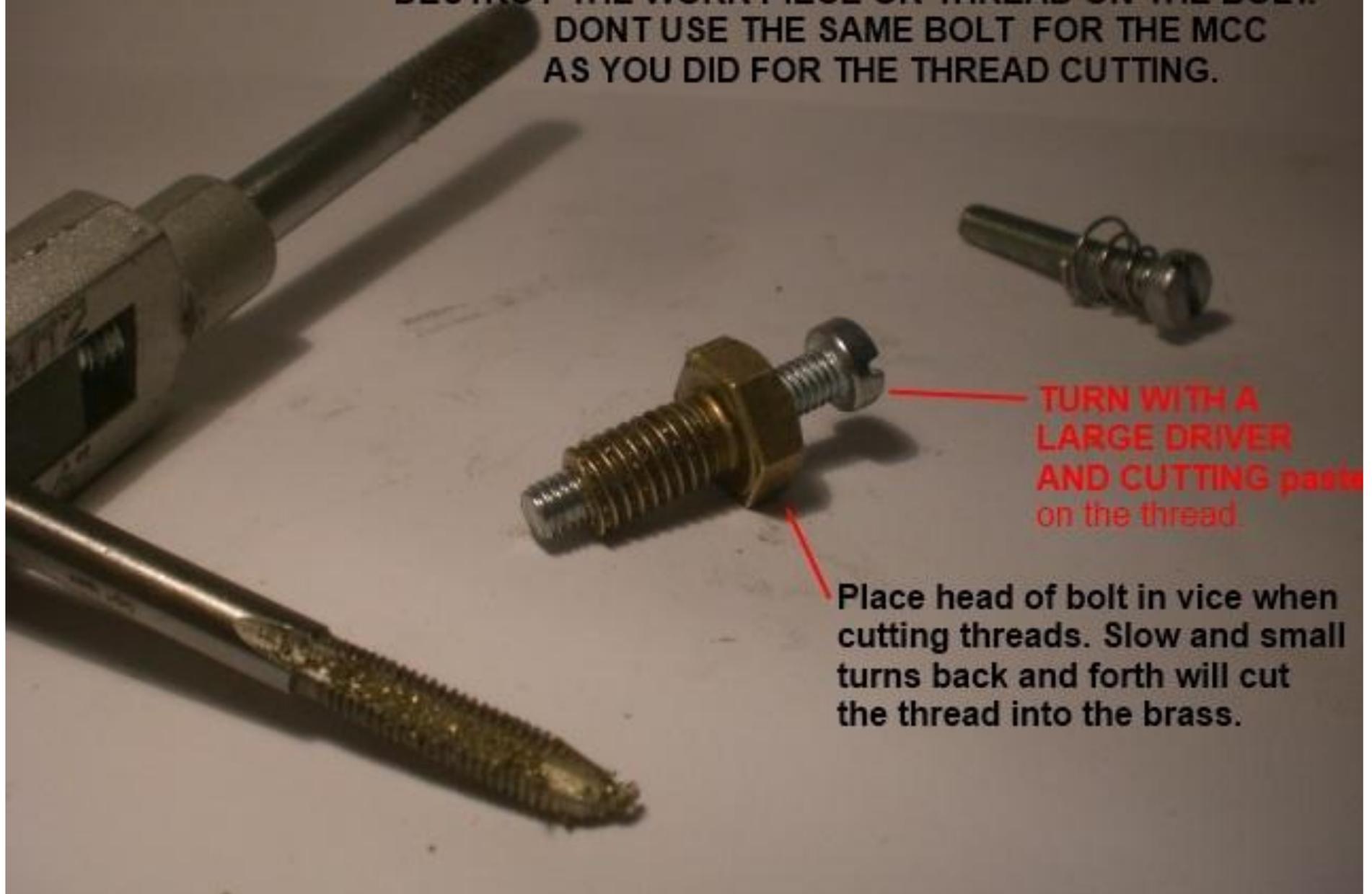
←  
ALTERNATIVELY USE A 5MM  
HARDENED STEEL BOLT AND  
DO A SLOW MANUAL CUT.  
SMALL INCREMENT TURNS AT A  
TIME.



**ALWAYS TRY TAP STRAIGHT DOWN THE CENTRE/HOLE.  
ANGLES CREATE PROBLEMS.**



A THREAD CAN BE MADE WITH A HARDENED STEEL 5MM BOLT . IT MUST BE CUT SLOWLY IN ORDER TO NOT DESTROY THE WORK PIECE OR THREAD ON THE BOLT. DONT USE THE SAME BOLT FOR THE MCC AS YOU DID FOR THE THREAD CUTTING.



TURN WITH A  
LARGE DRIVER  
AND CUTTING paste  
on the thread.

Place head of bolt in vice when  
cutting threads. Slow and small  
turns back and forth will cut  
the thread into the brass.

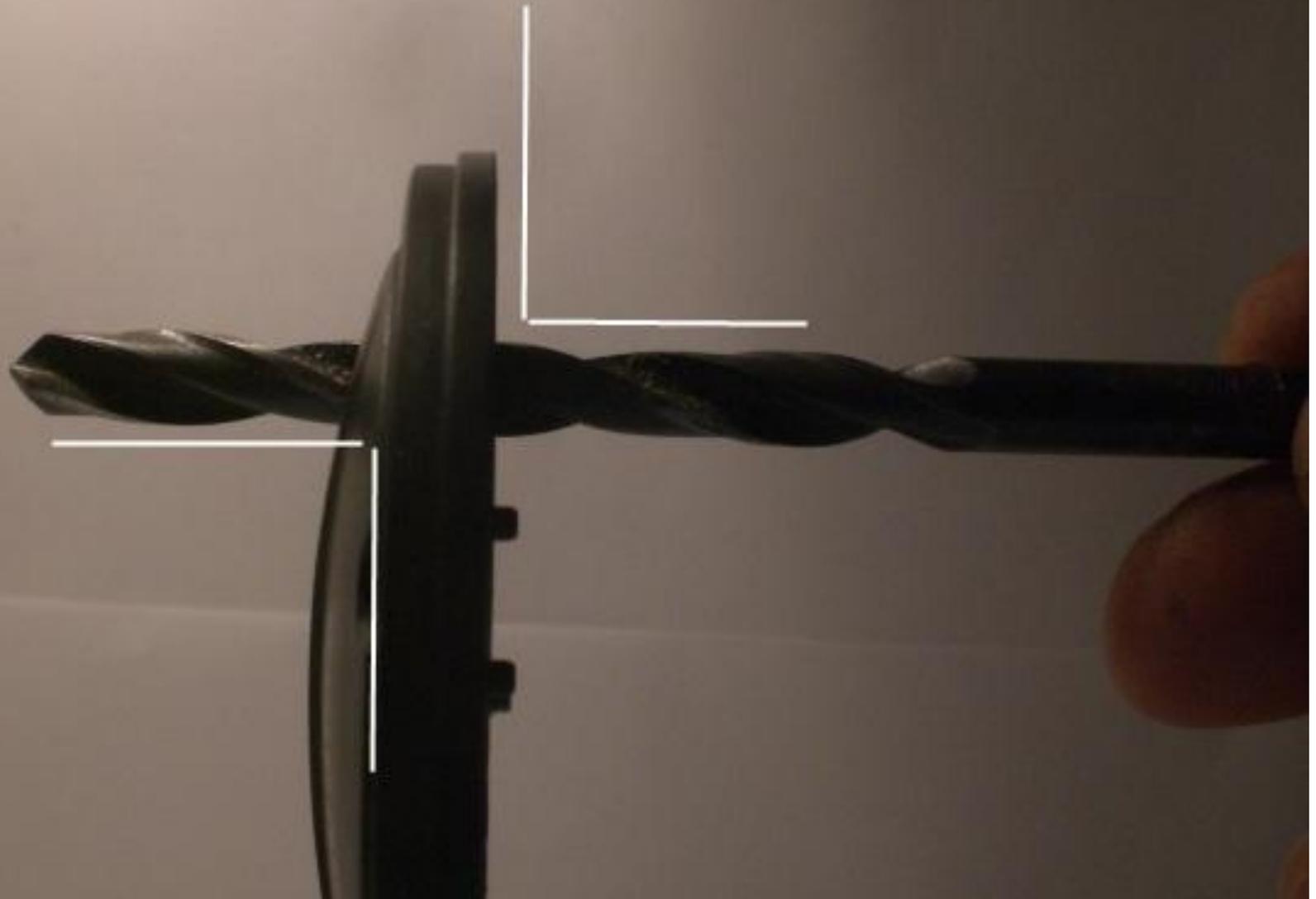


5mm bolt fairly straight through  
8mm brass bolt.

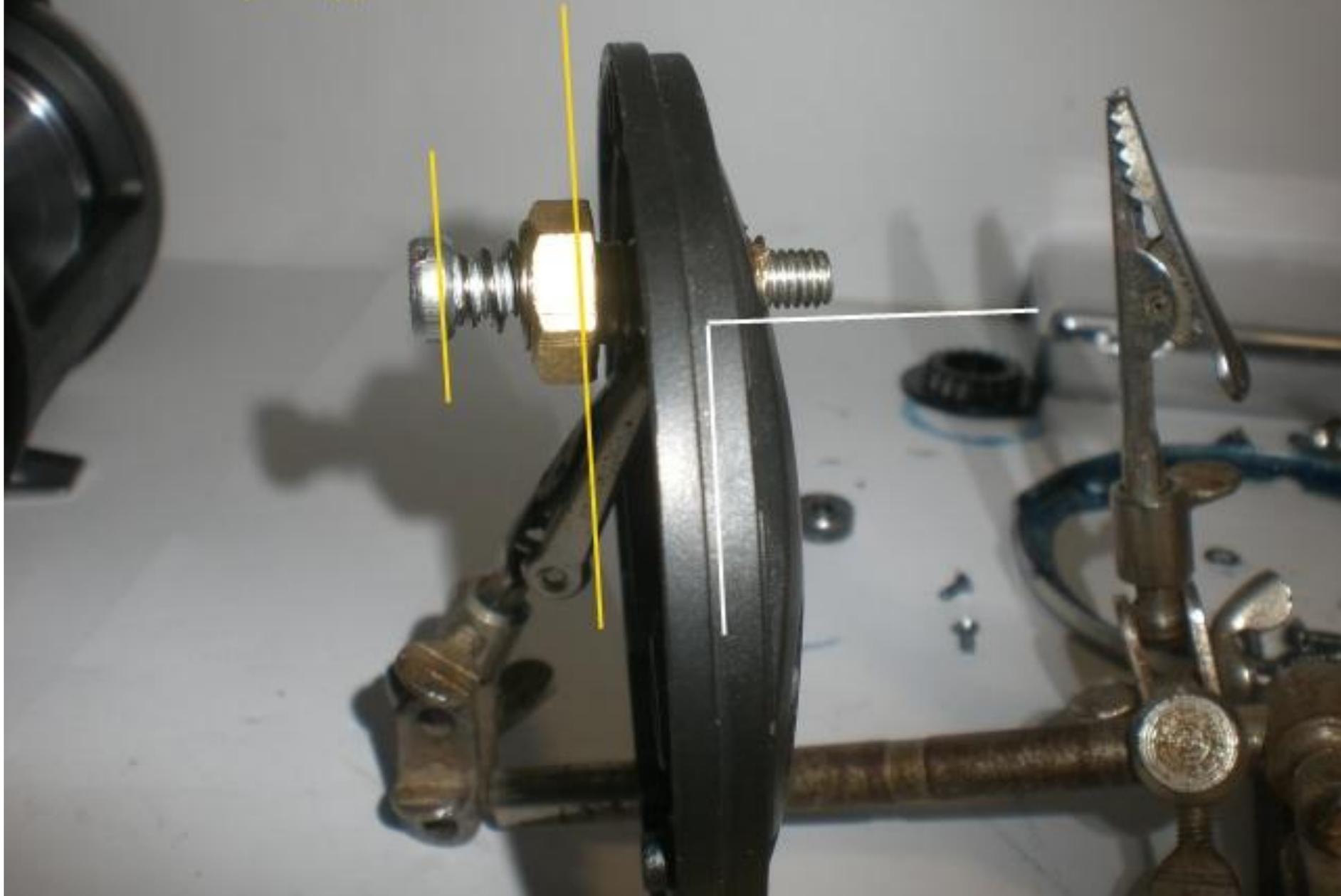
WORKS HALF THE  
BOLT HEAD OVER THE  
MAGNET'S A MORE  
COMPACT DESIGN

Magnet fits onto this  
platform secured with  
pratley two part.

**RECHECK YOUR SIDEPLATE HOLE IS ACCURATE AND STRAIGHT.**

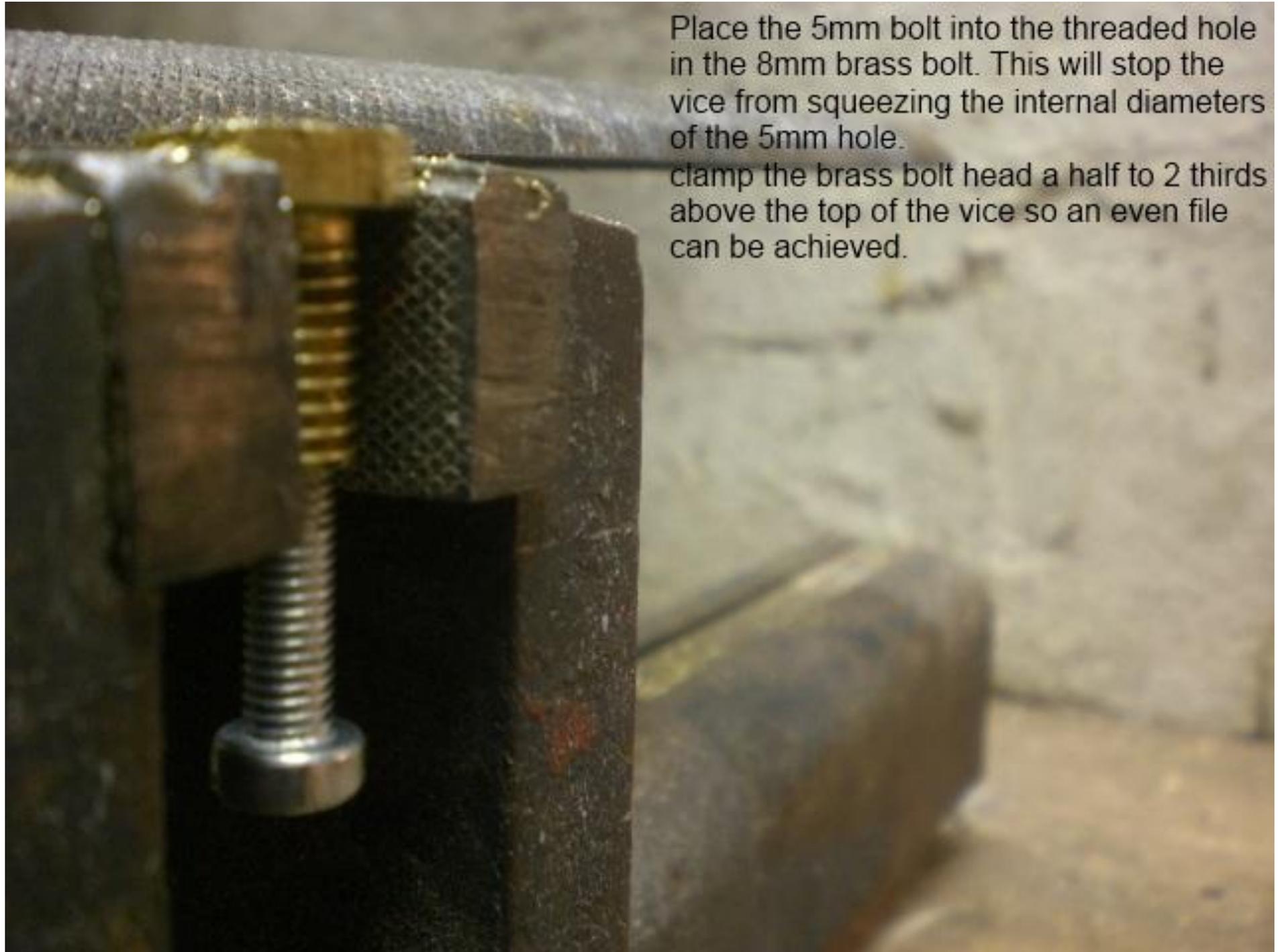


For future ref. these parts will be taken down to give the unit a more compact approach.



IF YOU ARE SATISFIED ,remove and begin the bolt head filing.

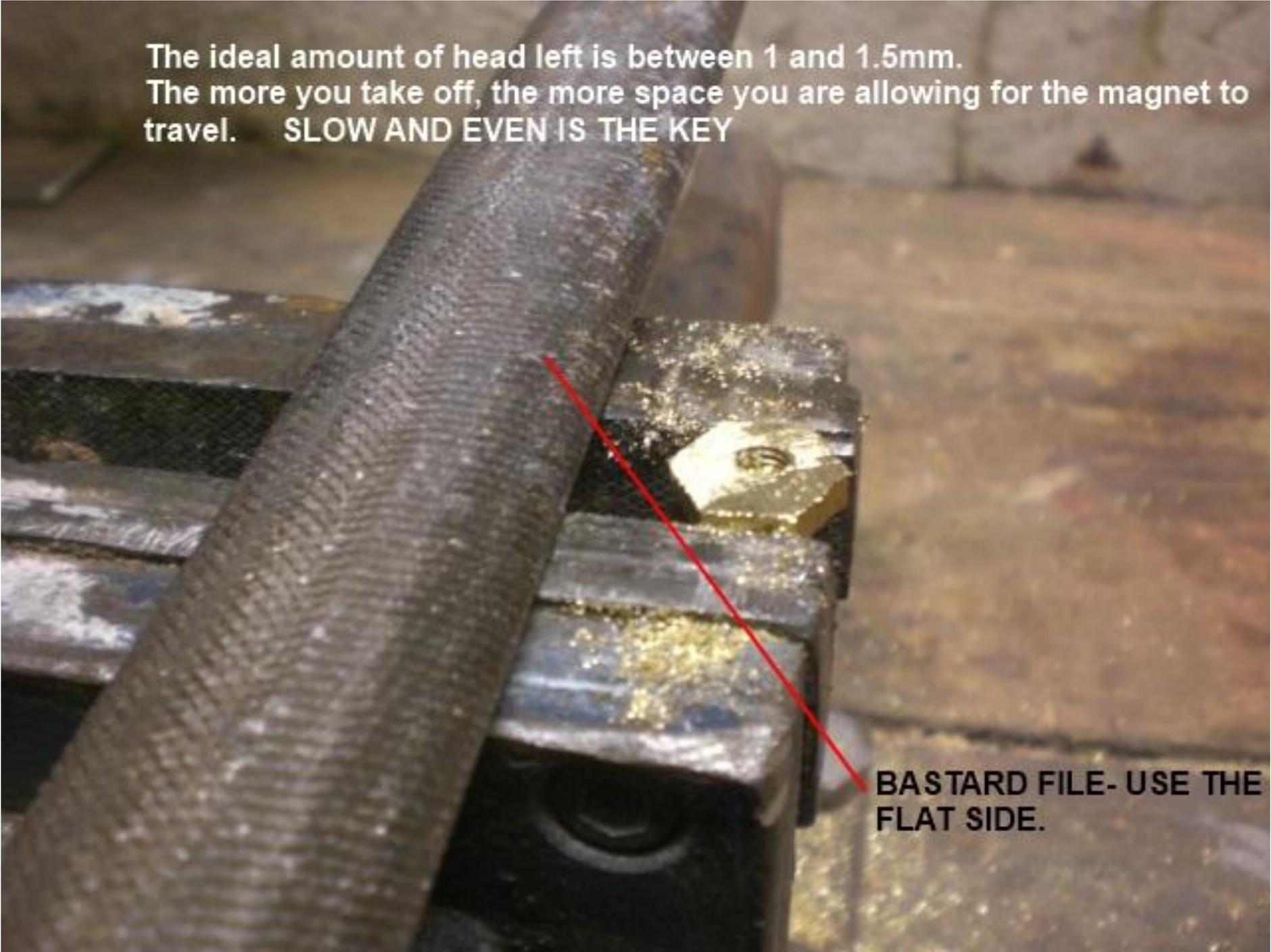




Place the 5mm bolt into the threaded hole in the 8mm brass bolt. This will stop the vice from squeezing the internal diameters of the 5mm hole.

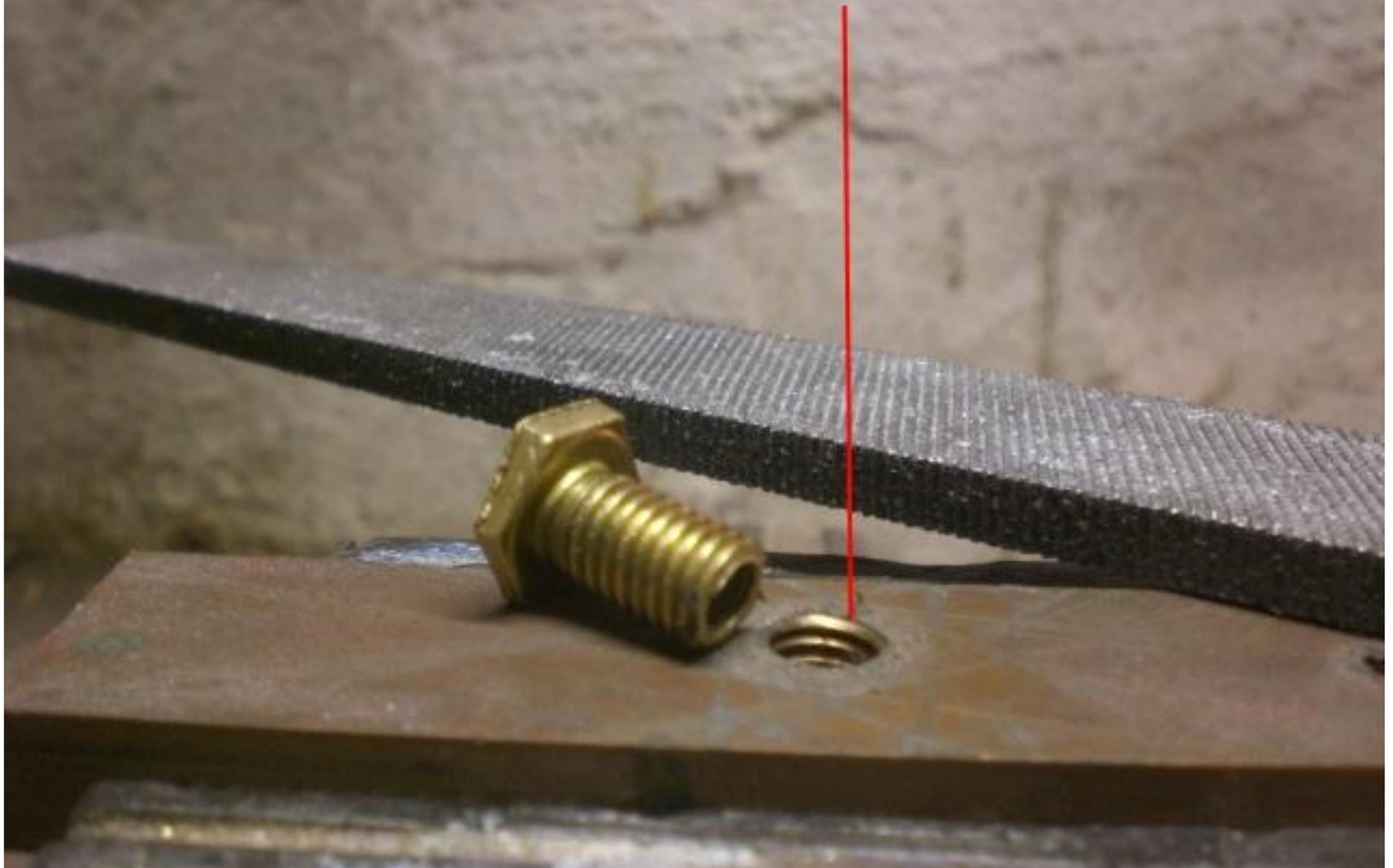
clamp the brass bolt head a half to 2 thirds above the top of the vice so an even file can be achieved.

The ideal amount of head left is between 1 and 1.5mm.  
The more you take off, the more space you are allowing for the magnet to travel. **SLOW AND EVEN IS THE KEY**

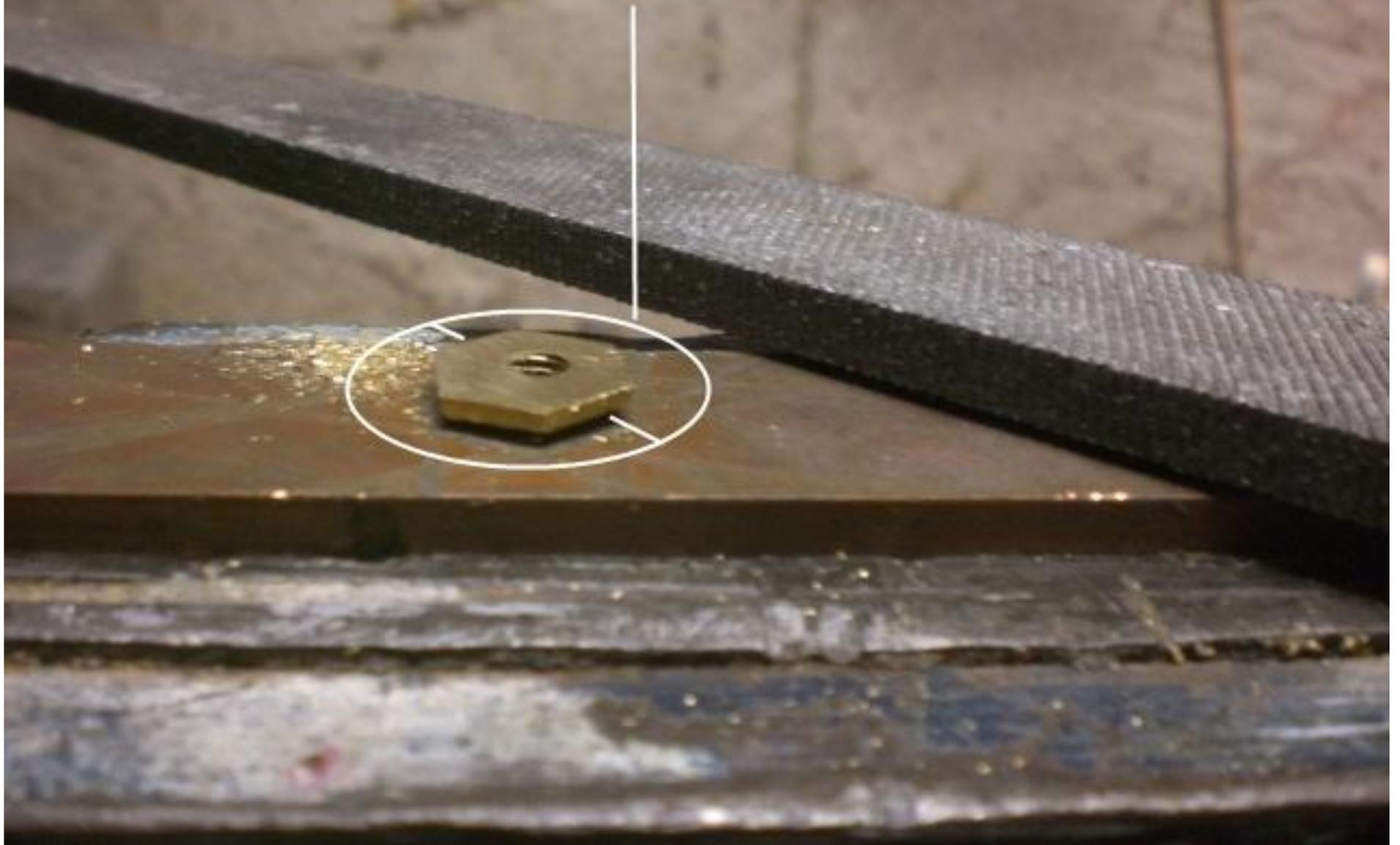


**BASTARD FILE- USE THE FLAT SIDE.**

Alternatively a hole can be prepared for the bolt in a separate bar in order to accommodate the bolt whilst it is being filed down.



Do not file too aggressively or the bolt head might get too hot and shear off when you get low down towards the shaft.



Turn the bolt out when the desired thickness has been reached.



This is a 10 toothed bolt . It has been trimmed down from its original 20mm length and has had the head filed down too



10 teeth. - Good length for your average sized multiplier.

Ready for the next step. -



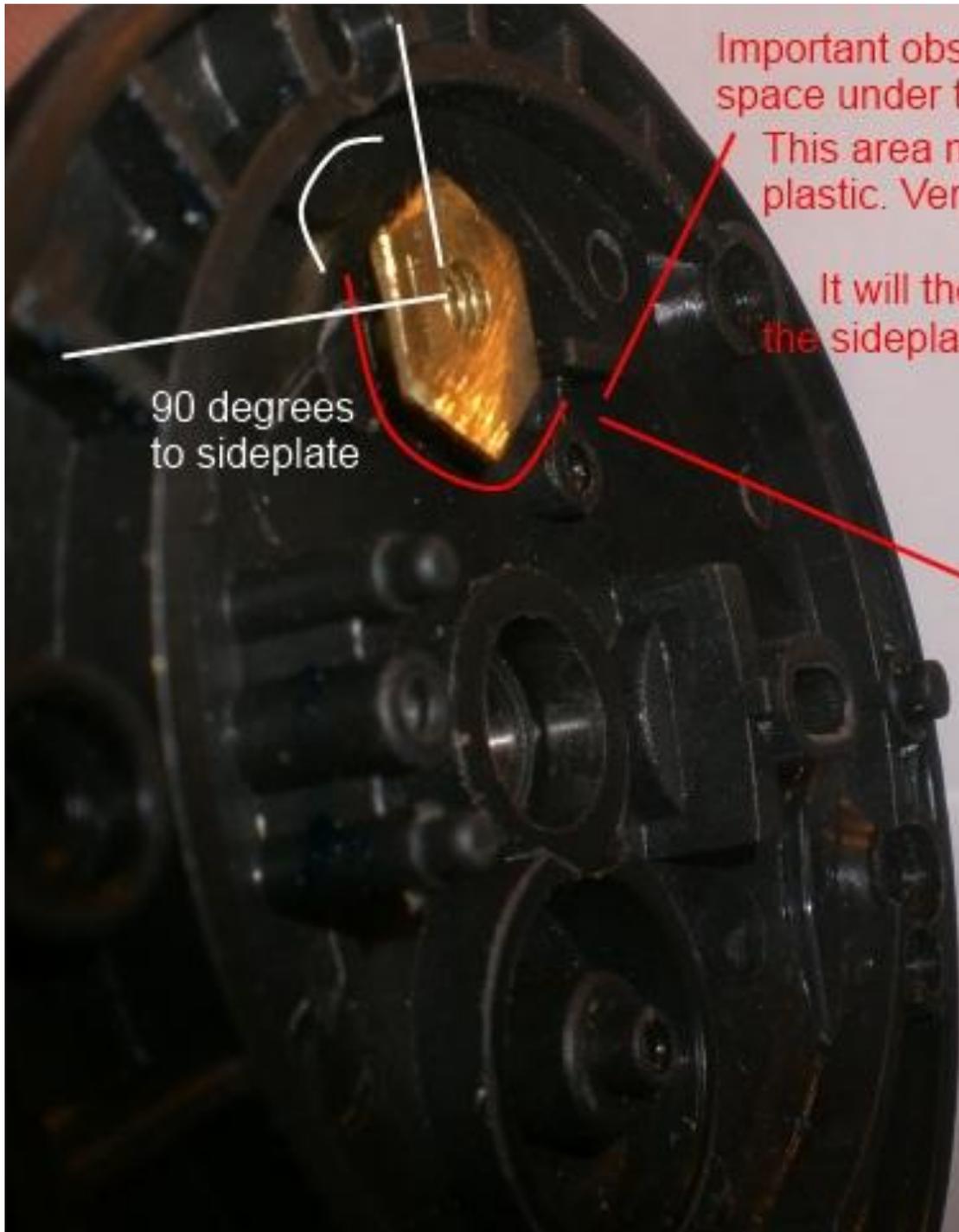
Fit the bolt into the 8mm hole.  
You should notice that when it is pushed  
in and is flush up against the sideplate  
that it will be at an angle. This is  
caused due to the angle of the  
sideplate that the hole is drilled in.

It needs an angled spacer on  
both sides of the side plate.



Flush to the sideplate, in a good space with no obstructions around the hexagonal bolt head.





Important observation - Note the size and shape of space under the bolt head.

This area must be filled with a spacer made from plastic. Very simple ,very easy.

It will then allow the bolt to sit straight through the sideplate and not at an angle.

90 degrees to sideplate

The space must be noted for the spacer shape when the bolt is held through the sideplate straight and not at angle

push bolt through and visually access  
for spacer angles

Visual note



Round plastic spacer prior to being shaped.  
Note the simple angles to follow when sanding  
down plastic.

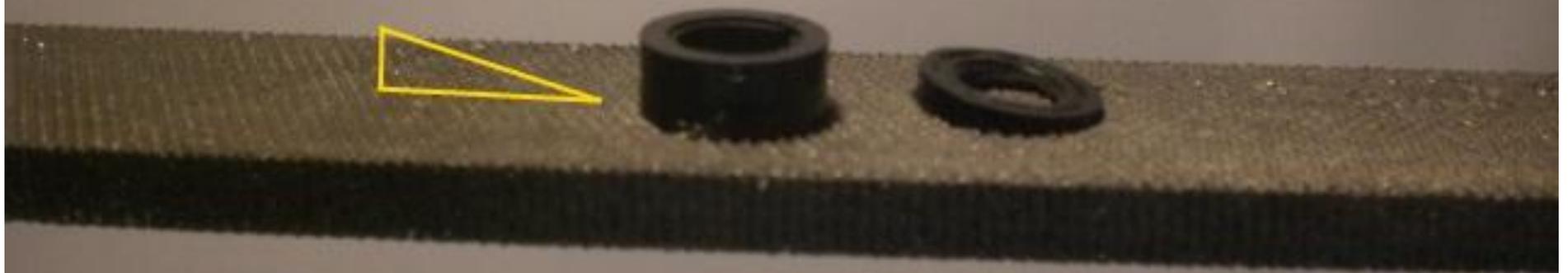
Use the white lines as a guide to  
create / .shape the spacer that  
will fill the triangular voids

The inside spacer should be  
thinner than the outer spacer.

If done correctly the spacers will  
allow the magnet to sit and run  
at 90 degrees to the sideplate.



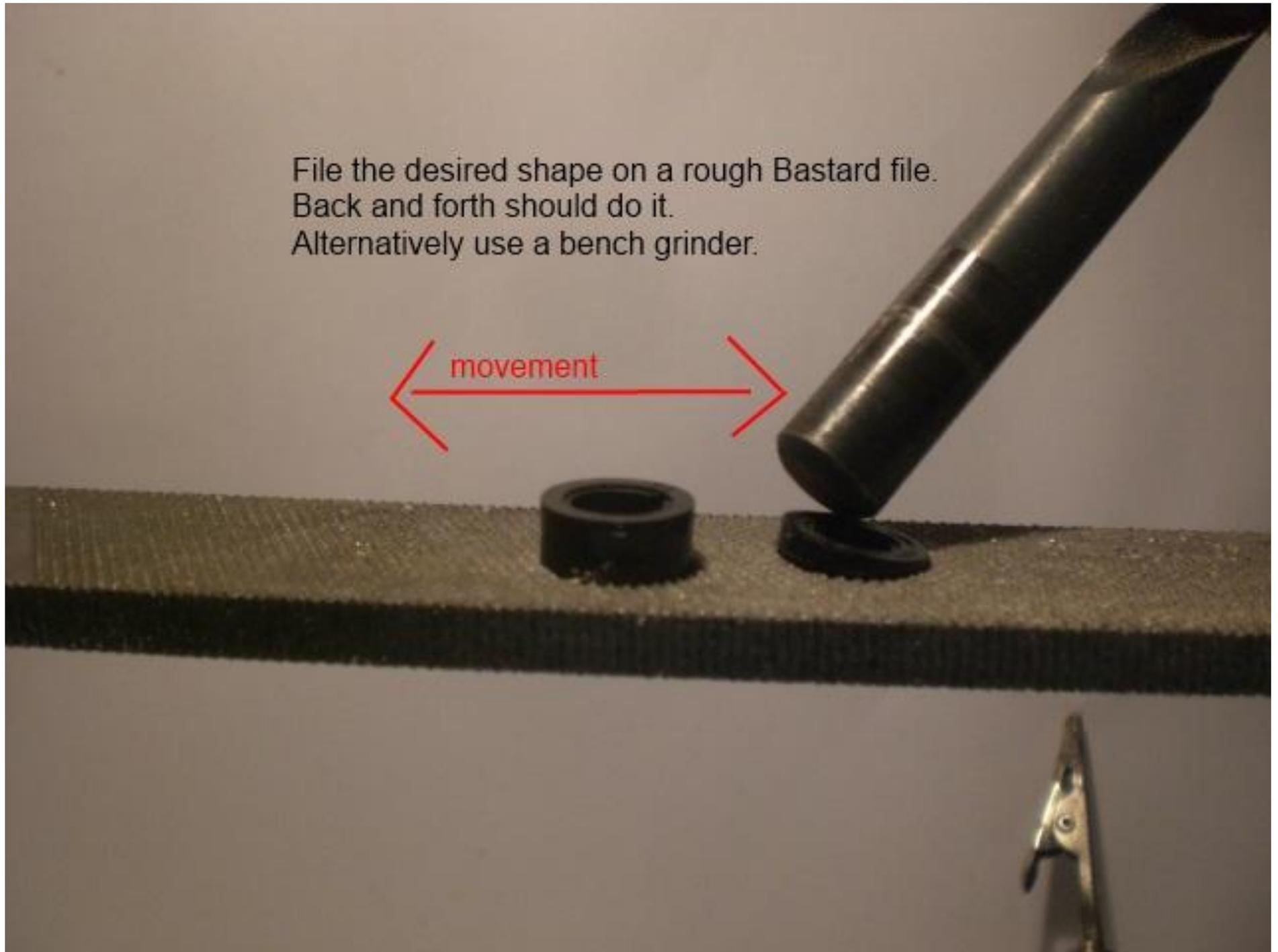
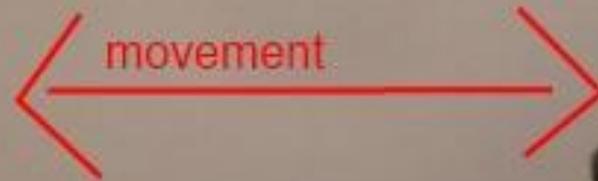
Here is how its done !



You will need 2x round 13mm x 5mm plasticwashers.  
You can cut and shape from metal or plastic.



File the desired shape on a rough Bastard file.  
Back and forth should do it.  
Alternatively use a bench grinder.















Your end result will look like this .  
There is a hole in the middle of this wedge already from it  
being a plastic washer/spacer.

If you Dont have a hole through them you will need to drill  
an 8mm hole through both.



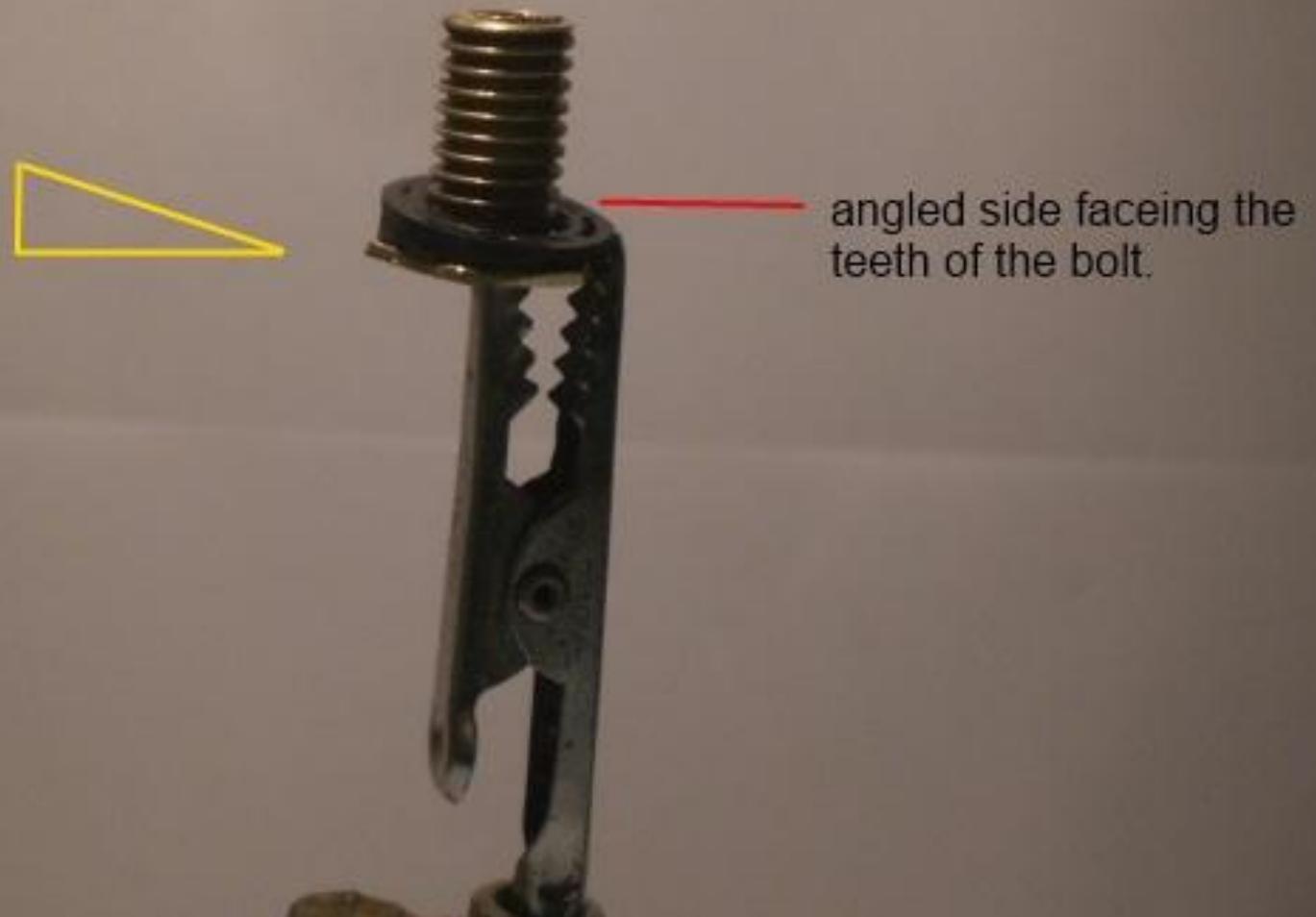
Internal spacer

external spacer

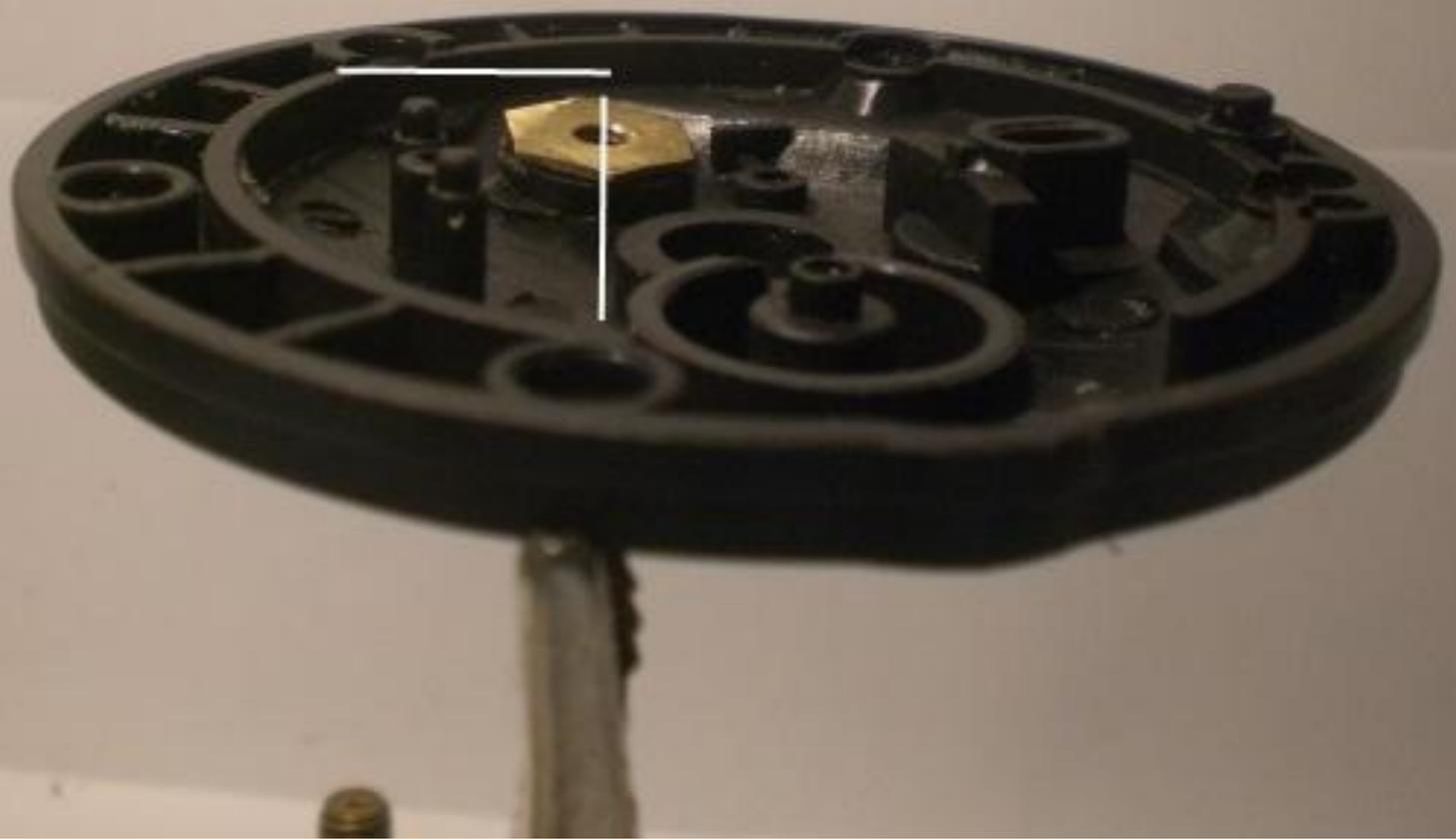


This is the brass bolt that fits through the 8mm hole.

Its been fitted with the internal spacer . It can now be pushed through the 8mm hole in the sideplate and accessed on its levelness.

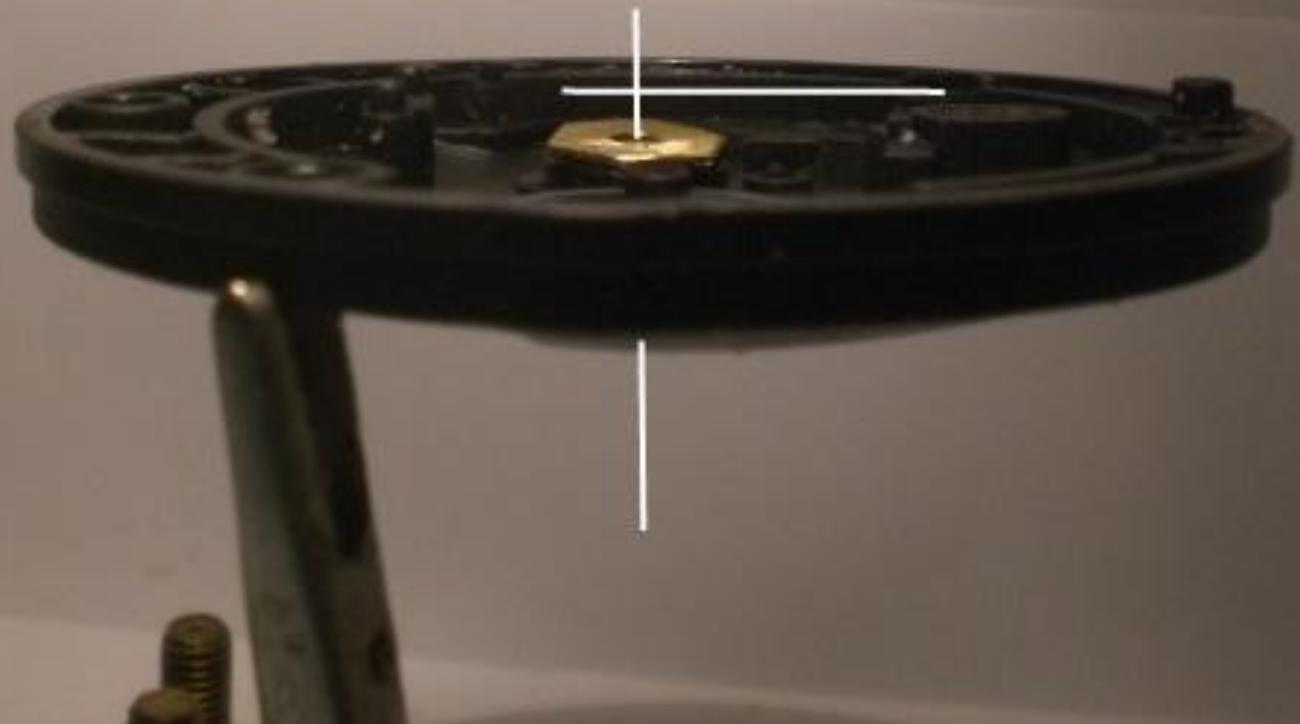


Fitted .flush and level



Spacers can be shape with brass ,alloy or plastic.  
Plastic is easy and quick.

No more angle to deal with.  
Spacers have worked well.



Outer spacer makes all the difference in appearance. Note the angles.

Now its getting somewhere.

Note in this pic the length of the bolt, (10 tooth) ready for the final piece to turn on

The 4 teeth showing will be more than enough for the final assembly.



Take a measurement of the brass teeth exposed .  
Add 1.5mm on this and that will be the length of the 13mm brass round bar section you will need to cut.  
It will cover the teeth and tighten the entire MCC together.





13mm round bar

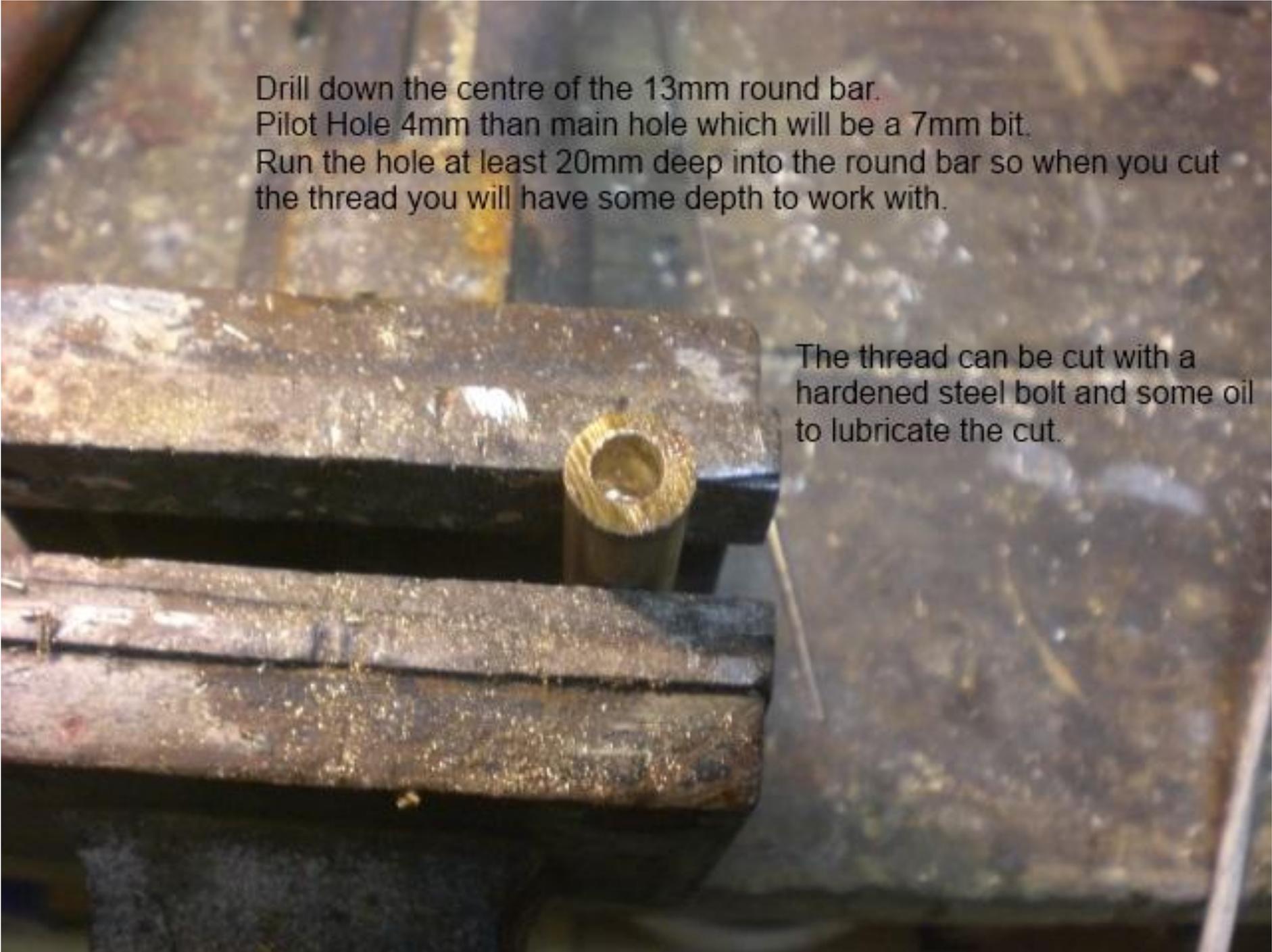


It is better to first cut the 13mm round bar off longer than you need .

When youve cut the thread into the 13mm and have finished that process , then cut the piece to the size you require.

differs according to reel

approx. cut length



Drill down the centre of the 13mm round bar.  
Pilot Hole 4mm than main hole which will be a 7mm bit.  
Run the hole at least 20mm deep into the round bar so when you cut  
the thread you will have some depth to work with.

The thread can be cut with a  
hardened steel bolt and some oil  
to lubricate the cut.

Position the bolt straight into the 7mm hole that's in the 13mm round bar.  
OIL to lubricate the cut. Take the appropriate size spanner and turn  
the cutting bolt precisely and incrementally.  
Back and forth, Divide a full turn into 8ths or 16ths.  
Small cuts will leave you with a better finish.

Every now and again turn the  
bolt out and clear the debris  
accumulated from cutting.



When cutting a thread manually ,little precise movements are key.

-Turn forward to cut 2mm

-Turn back 4mm to release

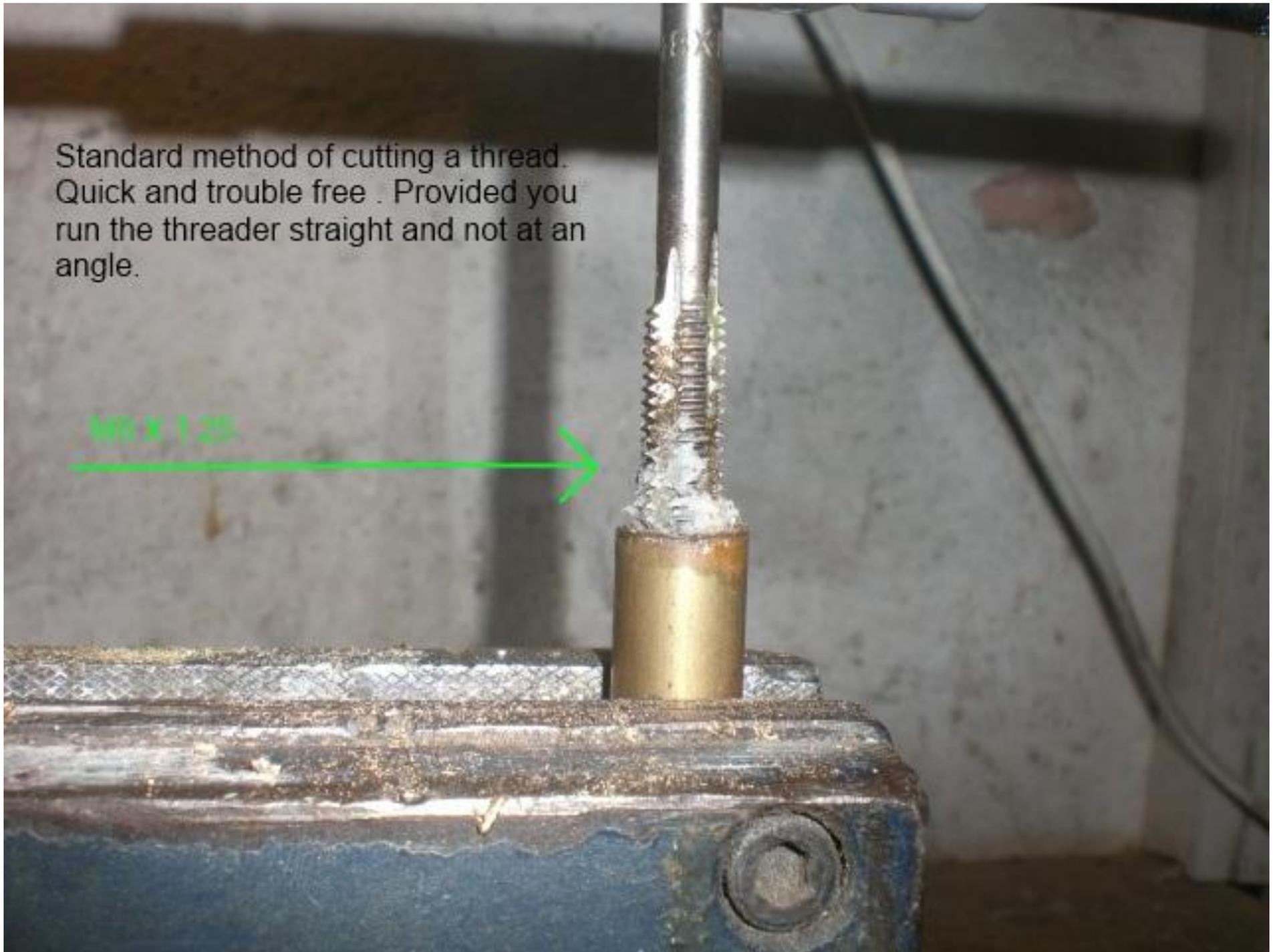
Then repeat and re-oil if you feel its getting tight.

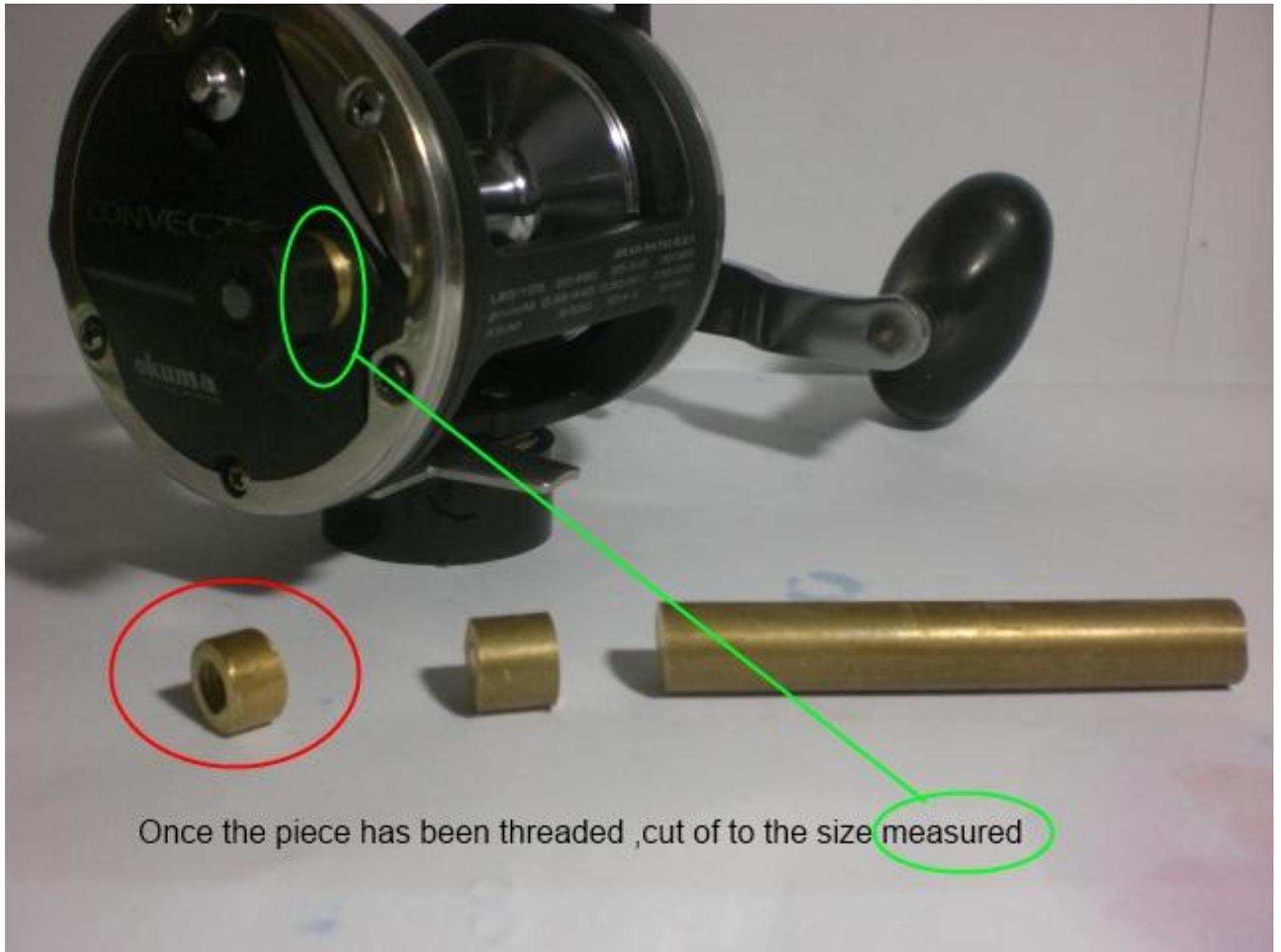
Going further  
each time you cut.



Standard method of cutting a thread.  
Quick and trouble free . Provided you  
run the threader straight and not at an  
angle.

M16 x 1.25

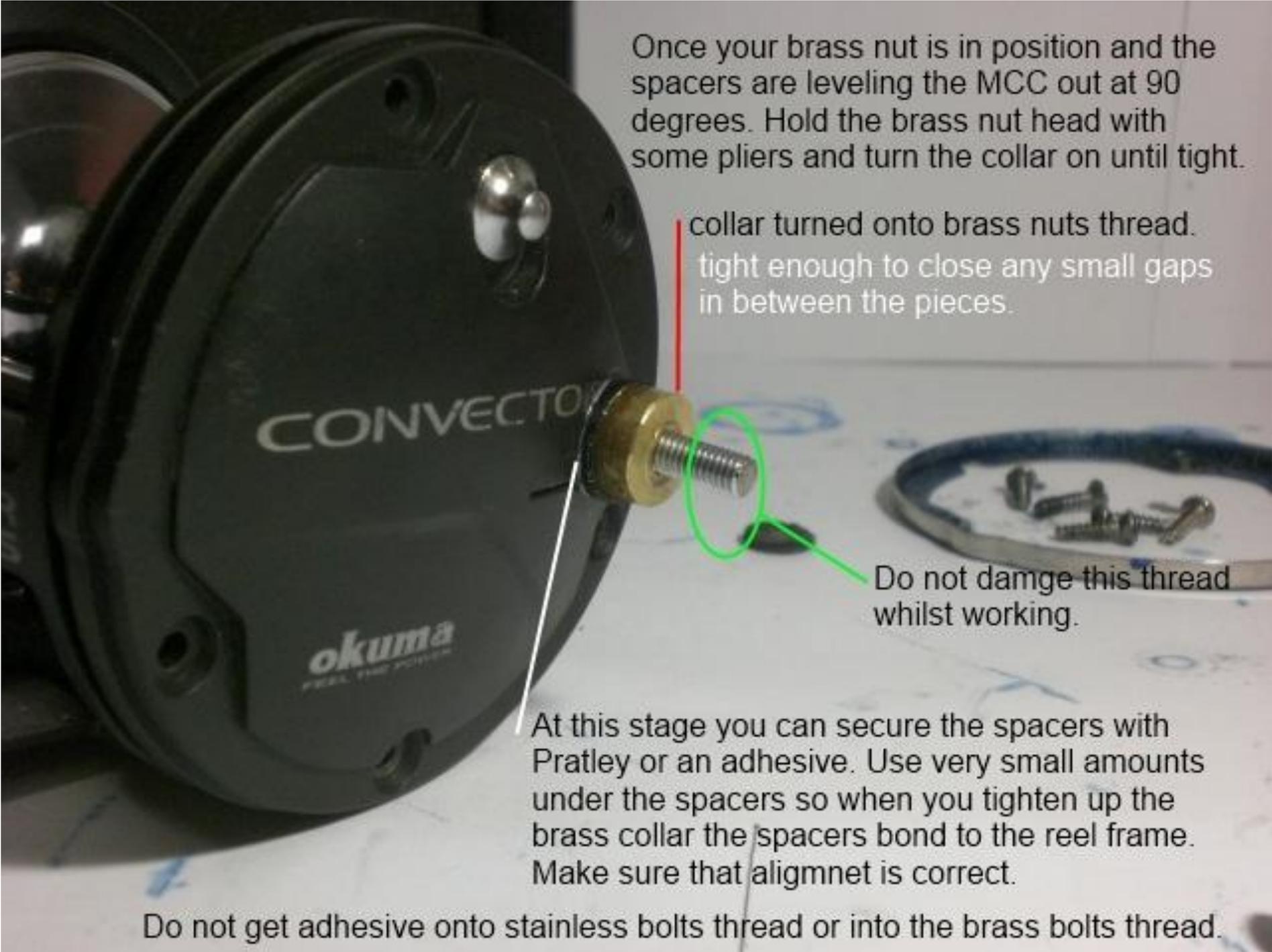




Once the piece has been threaded ,cut of to the size measured



Clean the piece and ready it for assembly onto the MCC unit.



Once your brass nut is in position and the spacers are leveling the MCC out at 90 degrees. Hold the brass nut head with some pliers and turn the collar on until tight.

collar turned onto brass nuts thread.  
tight enough to close any small gaps  
in between the pieces.

Do not damage this thread  
whilst working.

At this stage you can secure the spacers with Pratley or an adhesive. Use very small amounts under the spacers so when you tighten up the brass collar the spacers bond to the reel frame. Make sure that alignment is correct.

Do not get adhesive onto stainless bolts thread or into the brass bolts thread.

Remove the bolt from the unit completely. Select a magnet that is 5mm wide x1mm or 2mm thick.

Place the magnet onto the top of the bolt head. It will stay in place due to magnetism but securing it in this position must be done with a small amount of prattley adhesive.



Some reels have very little space to operate a mag break. Grinding this bolt head down to a platform of 1mm thick will help the issue.



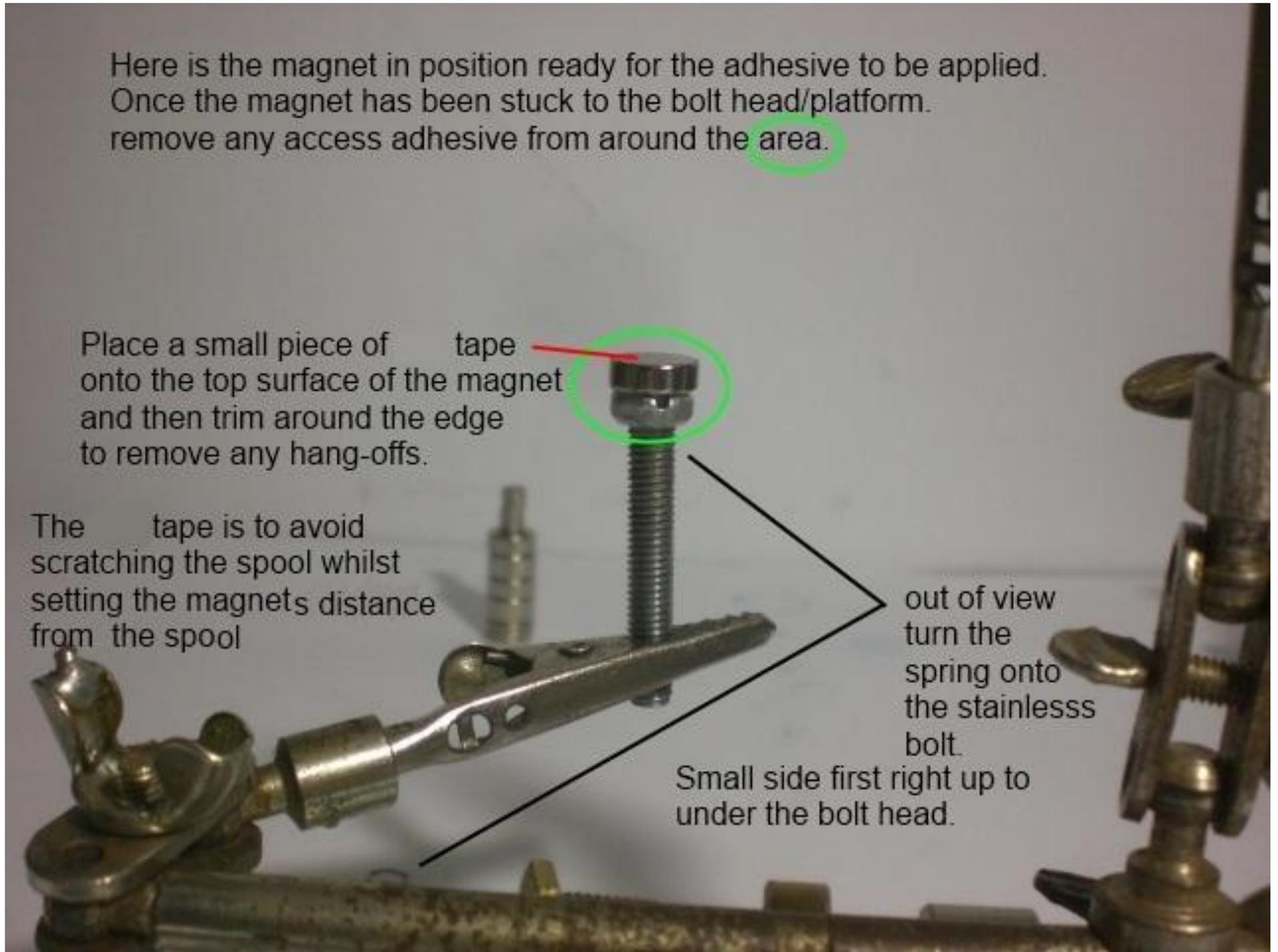
Here is the magnet in position ready for the adhesive to be applied. Once the magnet has been stuck to the bolt head/platform. remove any access adhesive from around the area.

Place a small piece of tape onto the top surface of the magnet and then trim around the edge to remove any hang-offs.

The tape is to avoid scratching the spool whilst setting the magnets distance from the spool

out of view turn the spring onto the stainless bolt.

Small side first right up to under the bolt head.



Spring is compressing against bolt head  
when the mags are turned out

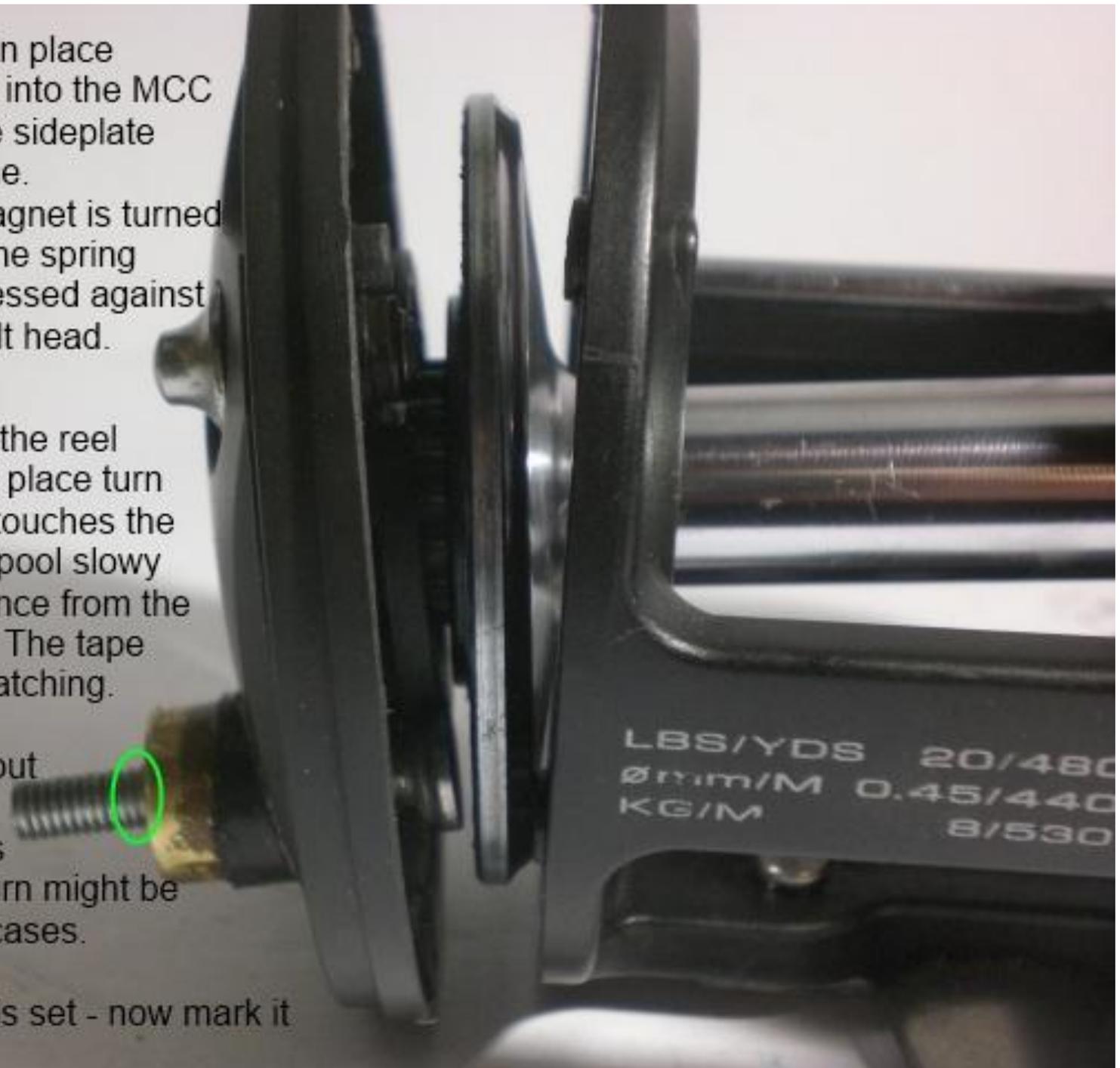


With the magnet in place run the bolt back into the MCC unit and place the sideplate onto the reel frame. Make sure the magnet is turned all the way out. The spring should be compressed against the hexagonal bolt head.

With the plate on the reel frame and held in place turn magnet in until it touches the spool. Turn the spool slowly to feel the resistance from the magnet touching. The tape will avoid any scratching.

Make a half turn out so the magnet no longer touches the spool. A full turn might be needed in some cases.

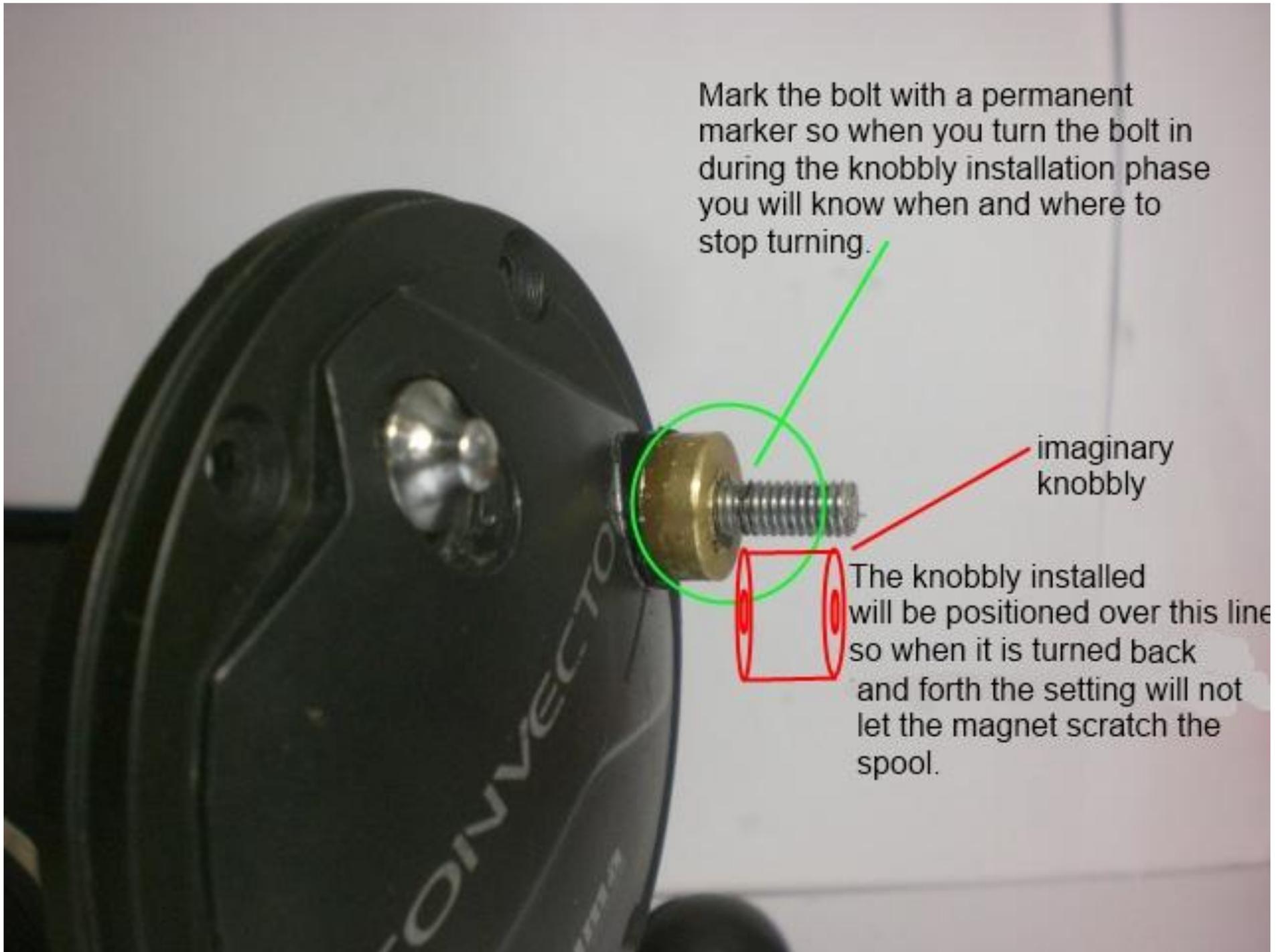
Magnet distance is set - now mark it on the bolt.



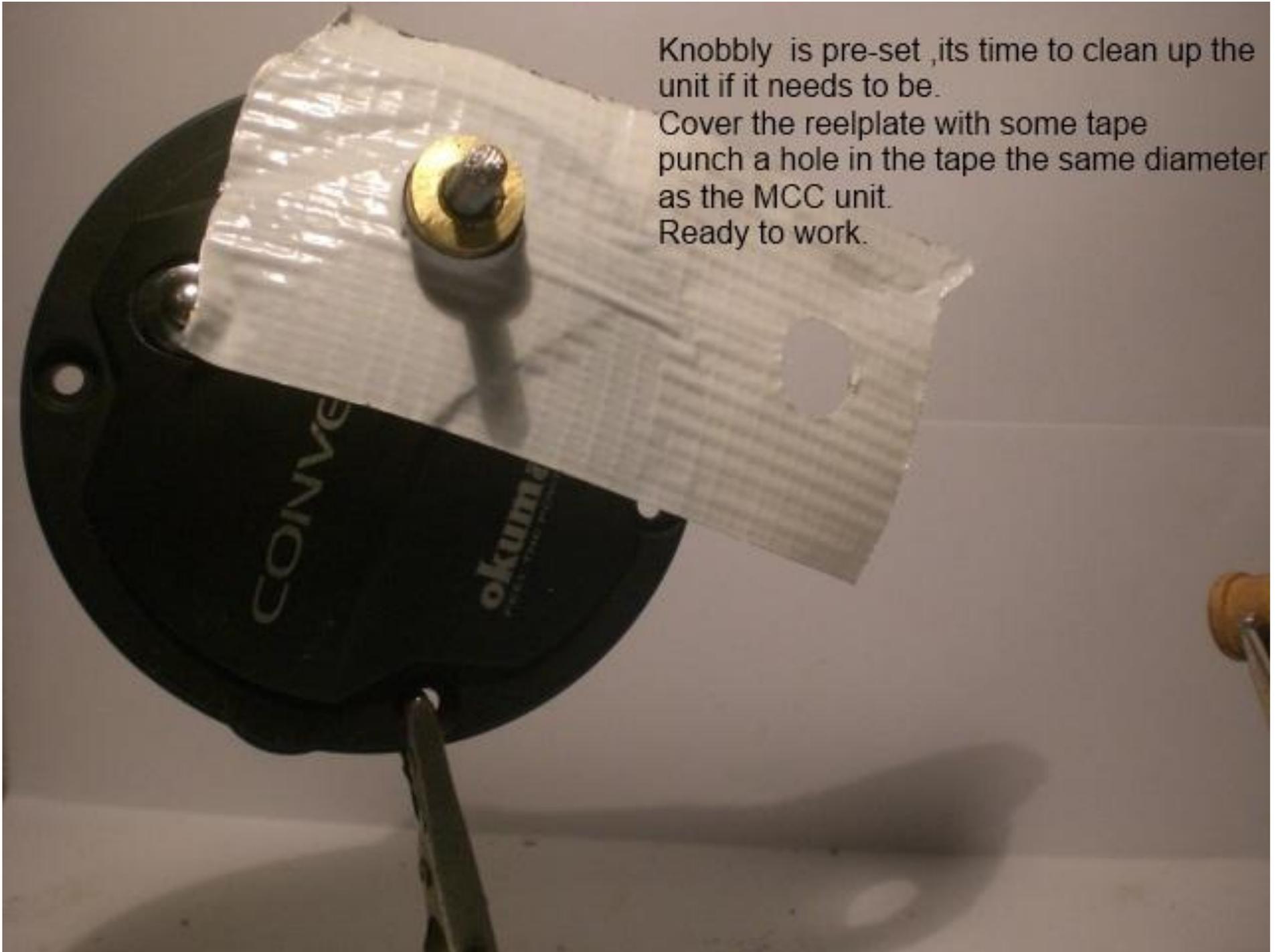
Mark the bolt with a permanent marker so when you turn the bolt in during the knobbly installation phase you will know when and where to stop turning.

imaginary knobbly

The knobbly installed will be positioned over this line so when it is turned back and forth the setting will not let the magnet scratch the spool.



Knobbly is pre-set ,its time to clean up the unit if it needs to be.  
Cover the reelplate with some tape  
punch a hole in the tape the same diameter  
as the MCC unit.  
Ready to work.



Taking some 40 grit sandpaper sand around the MCC in circular movements in order to clean and shine the material . removing any rough edges left from the previous processes











Once it has been sanded and cleaned properly remove the tape. The unit should be looking almost complete at this stage..

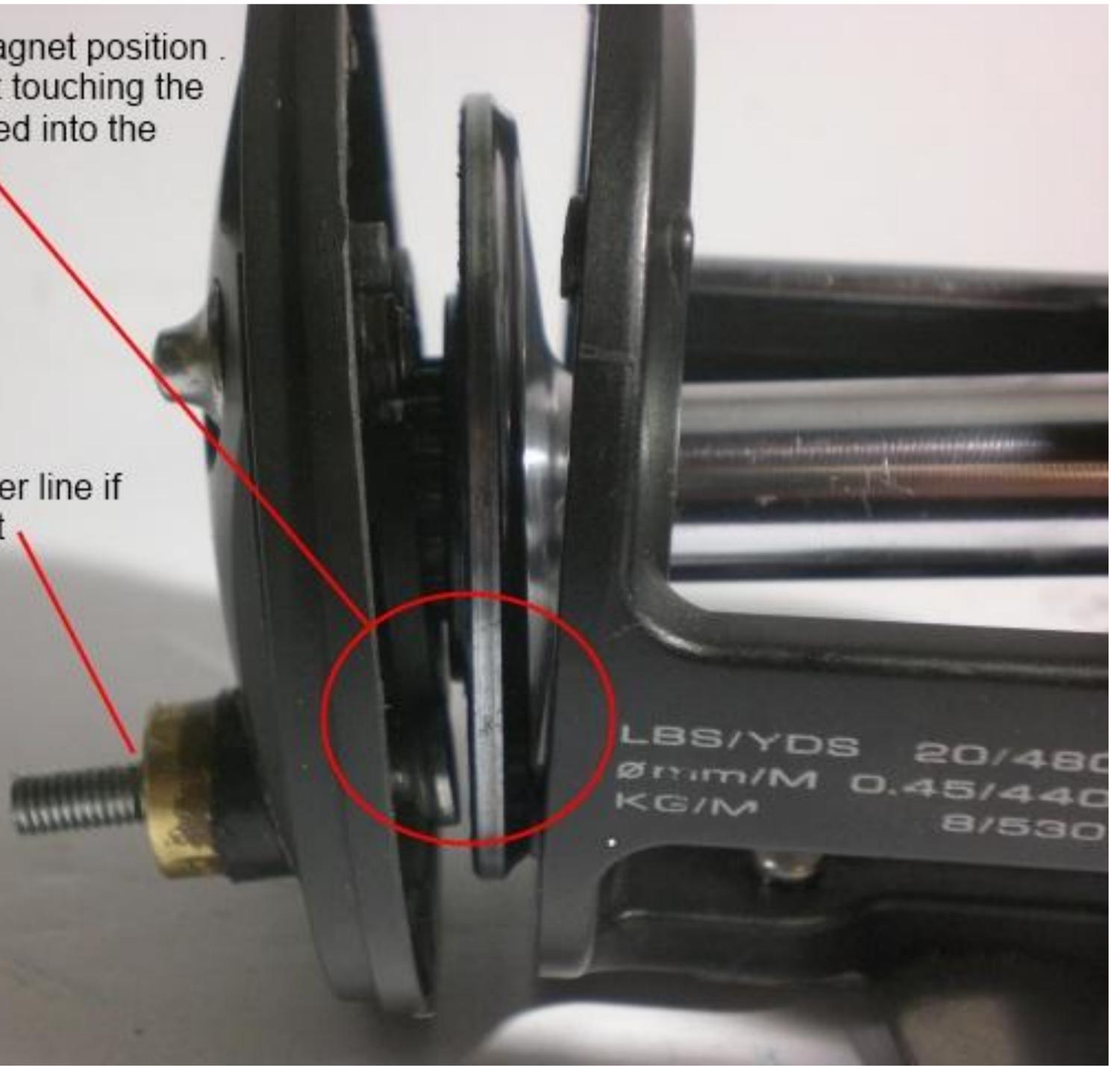




Ready for the knobbly

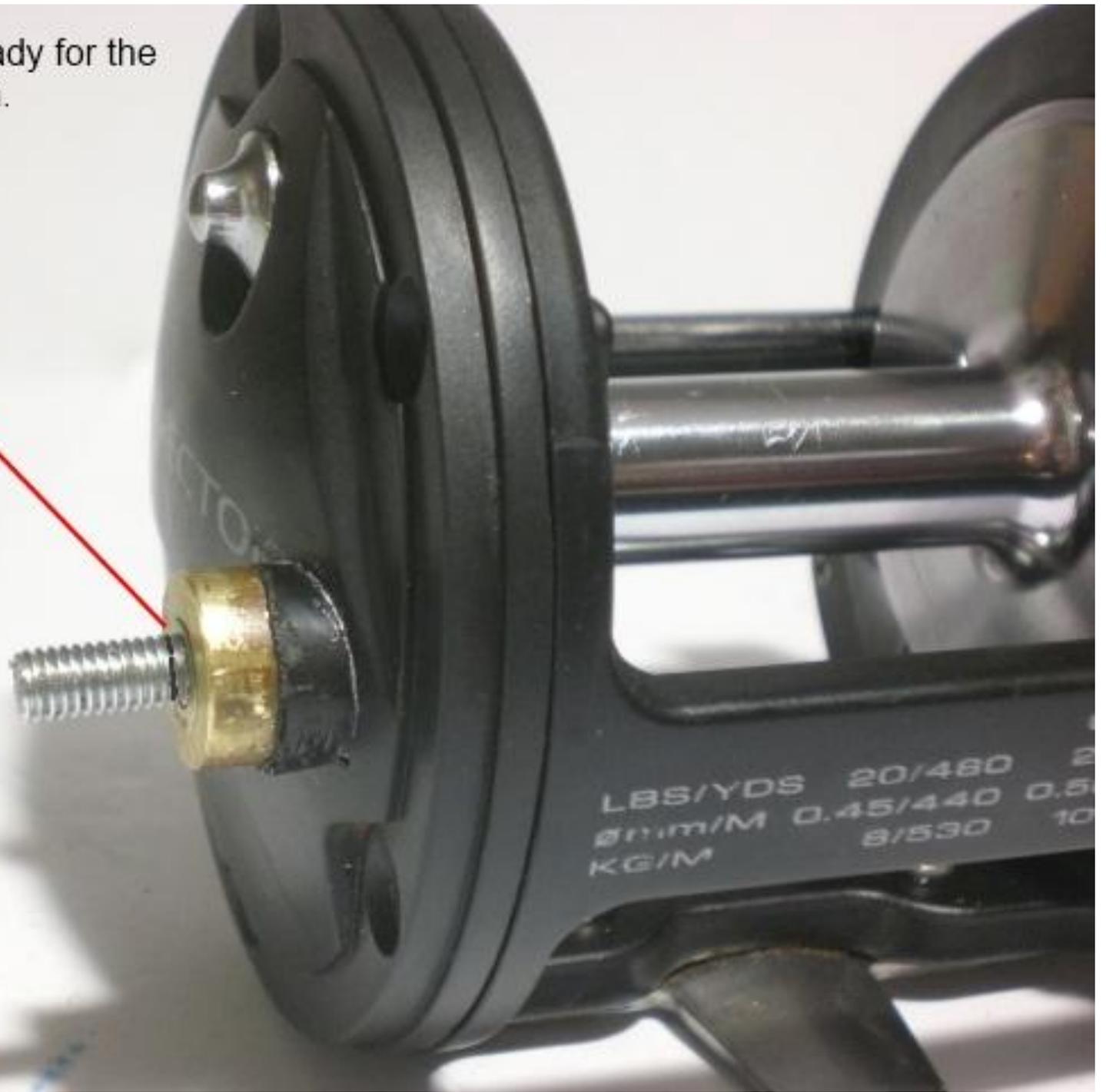
Recheck your magnet position .  
Make sure its not touching the  
spool when turned into the  
full ON position.

Redraw your marker line if  
it has become faint



In POsition and ready for the  
knobbly installation.

Line mark



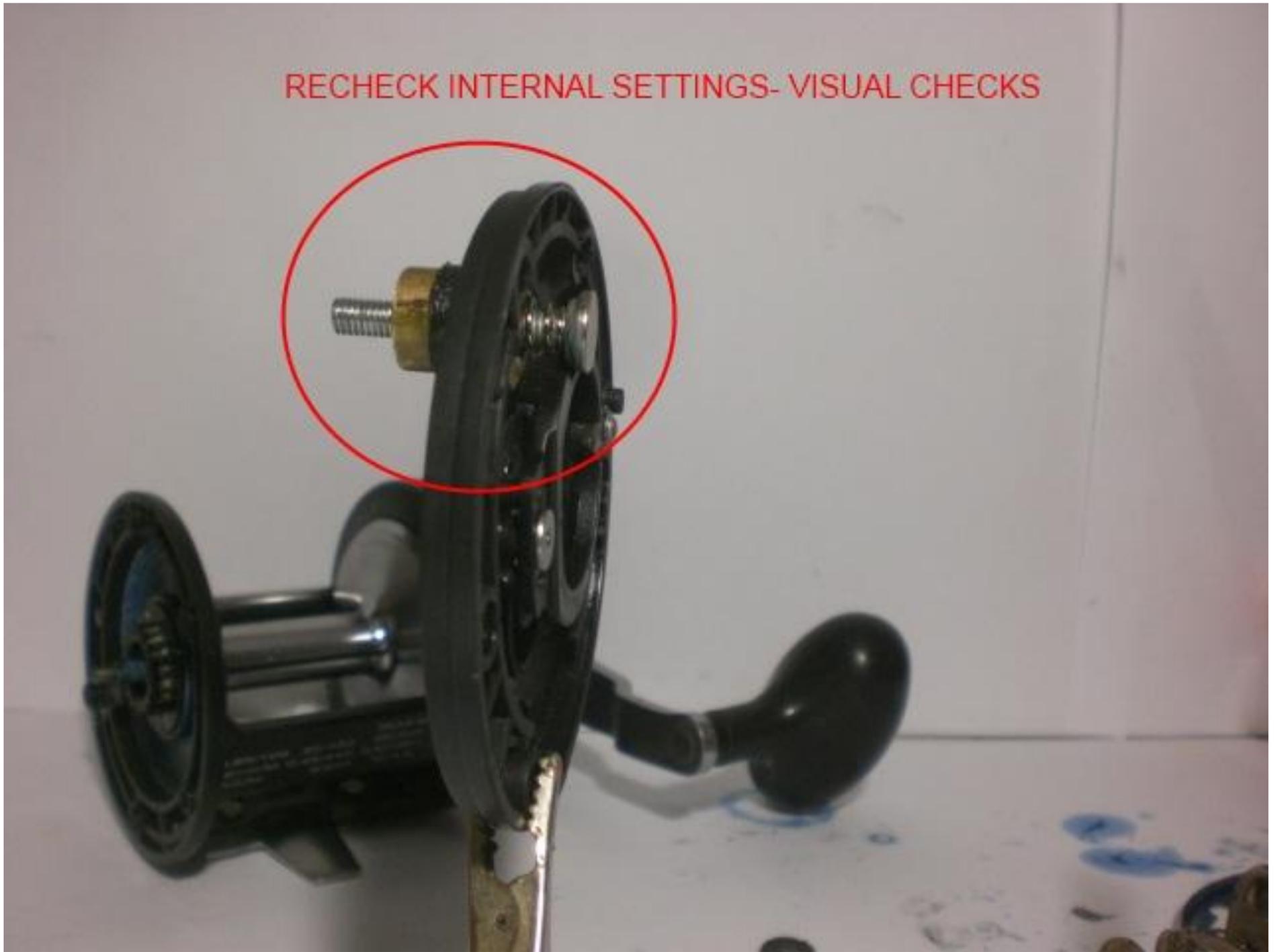
LBS/YDS 20/480 2  
g/mm/M 0.45/440 0.5  
KG/M 8/530 10

RECHECK YOUR POSITION  
AND SETTINGS.



LBS/YDS 20/480  
Ømm/M 0.45/440  
KG/M 8/530

RECHECK INTERNAL SETTINGS- VISUAL CHECKS



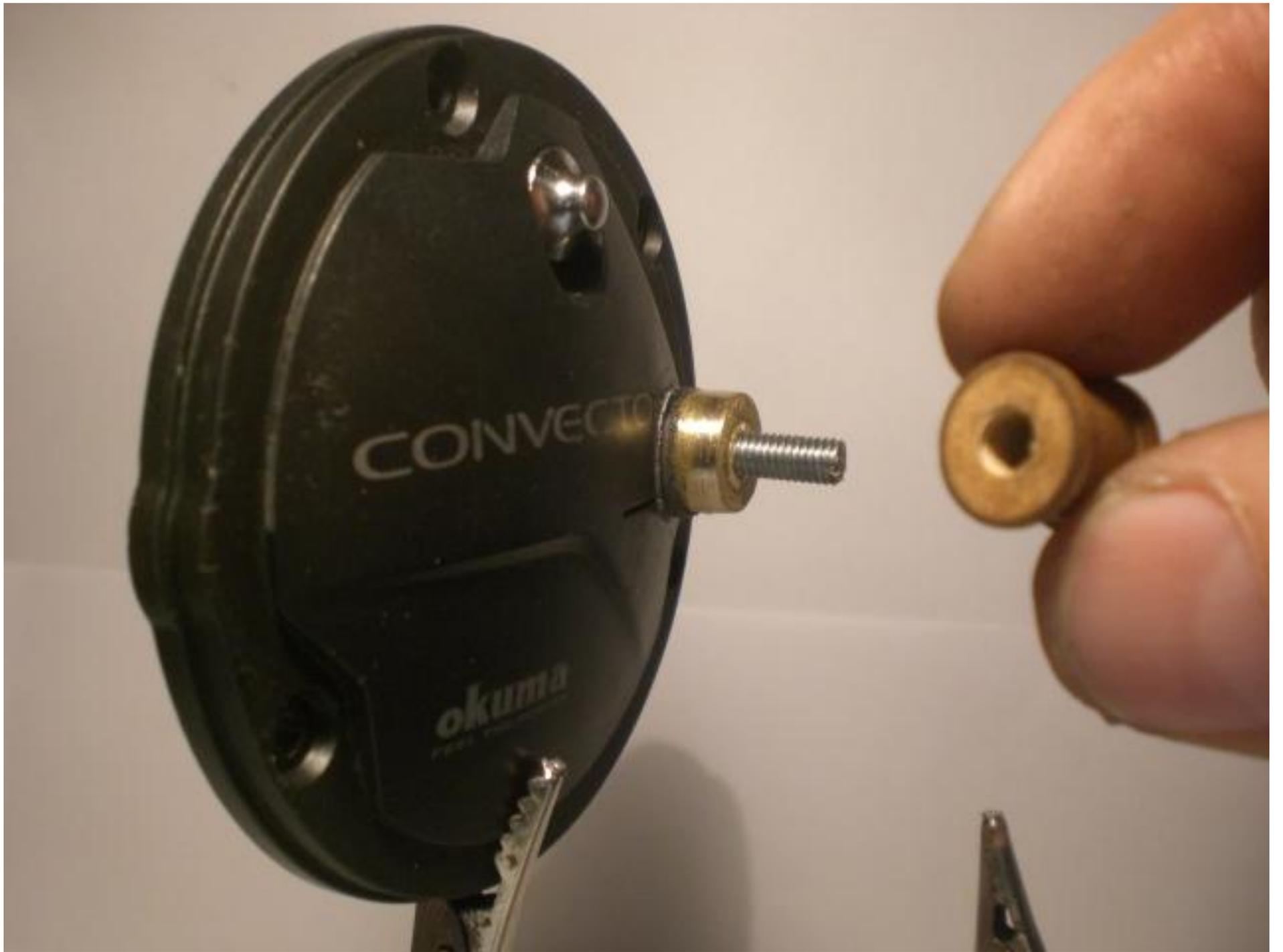


TWO different style knobs for the MCC.  
A wooden bead and or  
a plastic valve cap with  
spacer.

the wooden bead is the basic fitting knobly.  
Simply have the stainless bolt marked and turn the wooden bead  
down until you cover your marker line.

If your bead is loose on the bolt then you will have to  
secure it with adhesive. If it is to tight Turn another  
bolt into the bead as if you are cutting a thread  
into it. It should then turn on quite snugly.











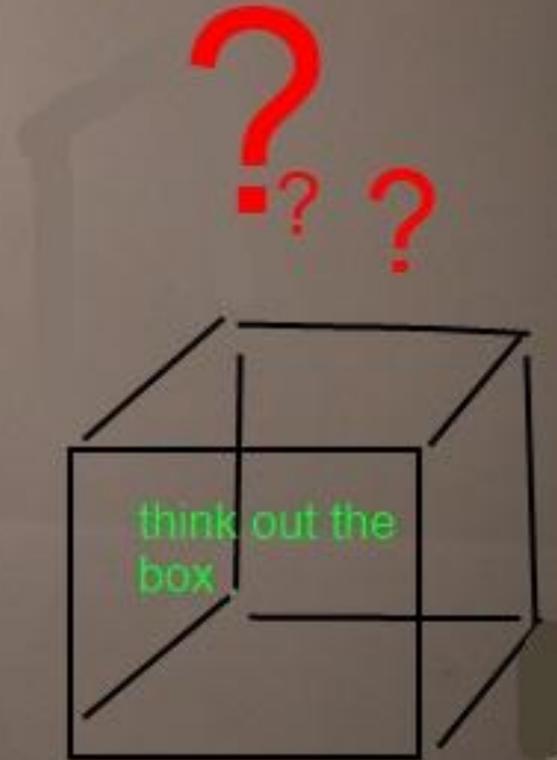


straight forward and simple. Ready to fit onto the reel and go test cast.

The wooden bead can be secured with a half drop of superglue and it will still turn the magnet in and out quite well.

Shrink tubing can be used around the wooden bead in order to cover the wood and or change the colour of the knobby.

Almost anything can be used as a knob at this point. It all depend on you design and imagination capabilities.





Two parts to be used in this knobby installation process..



eventual  
position

will be fitted into the  
cap. The spacer  
encircled then turns  
onto the stainless bolt.

This part will turn onto the stainless thread of the bolt that holds the magnet on its platform. It will eventually be secured with adhesive

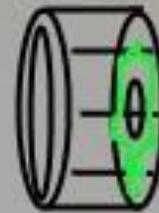
Another explanatory angle..



This cap will fit over the T- shaped spacer to form the knobby adjuster.



Turn the T-shaped spacer onto the stainless bolt end that holds the magnet on its platform. This is preparation for the knobby cap. Take note of your magnet settings as they might need to be adjusted whilst fitting this knob/cap.



Adhesive

Basic fitting idea

Enlarged



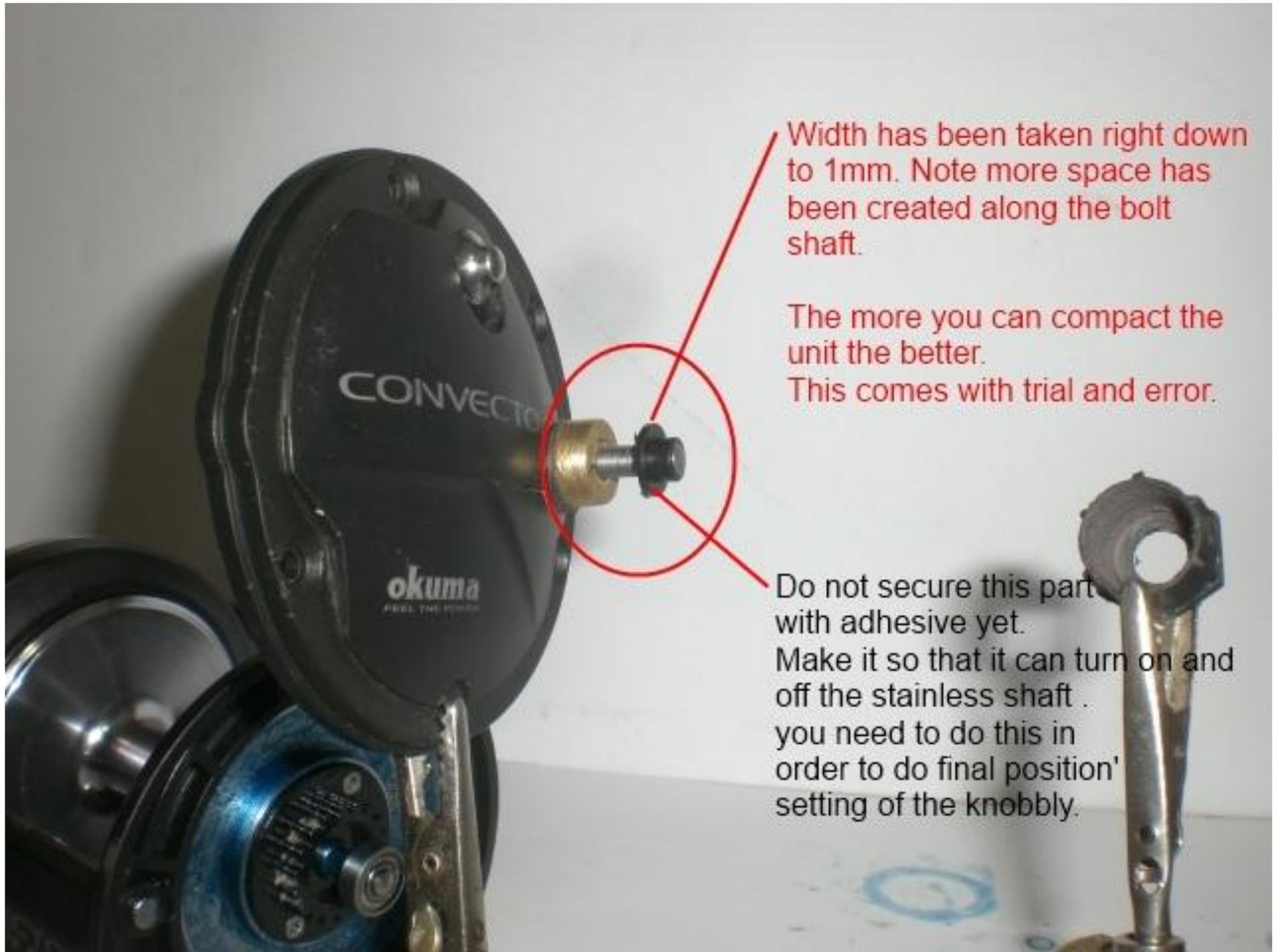
This area can be taken right down to 1mm as it is not needed to be so wide. Taking it down will allow more travel of the bolt /magnet thus giving the cap a better coverage of the brass collar.



Again note the unnecessary width of the spacer. Take it down to 1mm. The highlighted area is all that is needed for the adhesive.



Measure and remove spacer to take down with file or bench grinder.



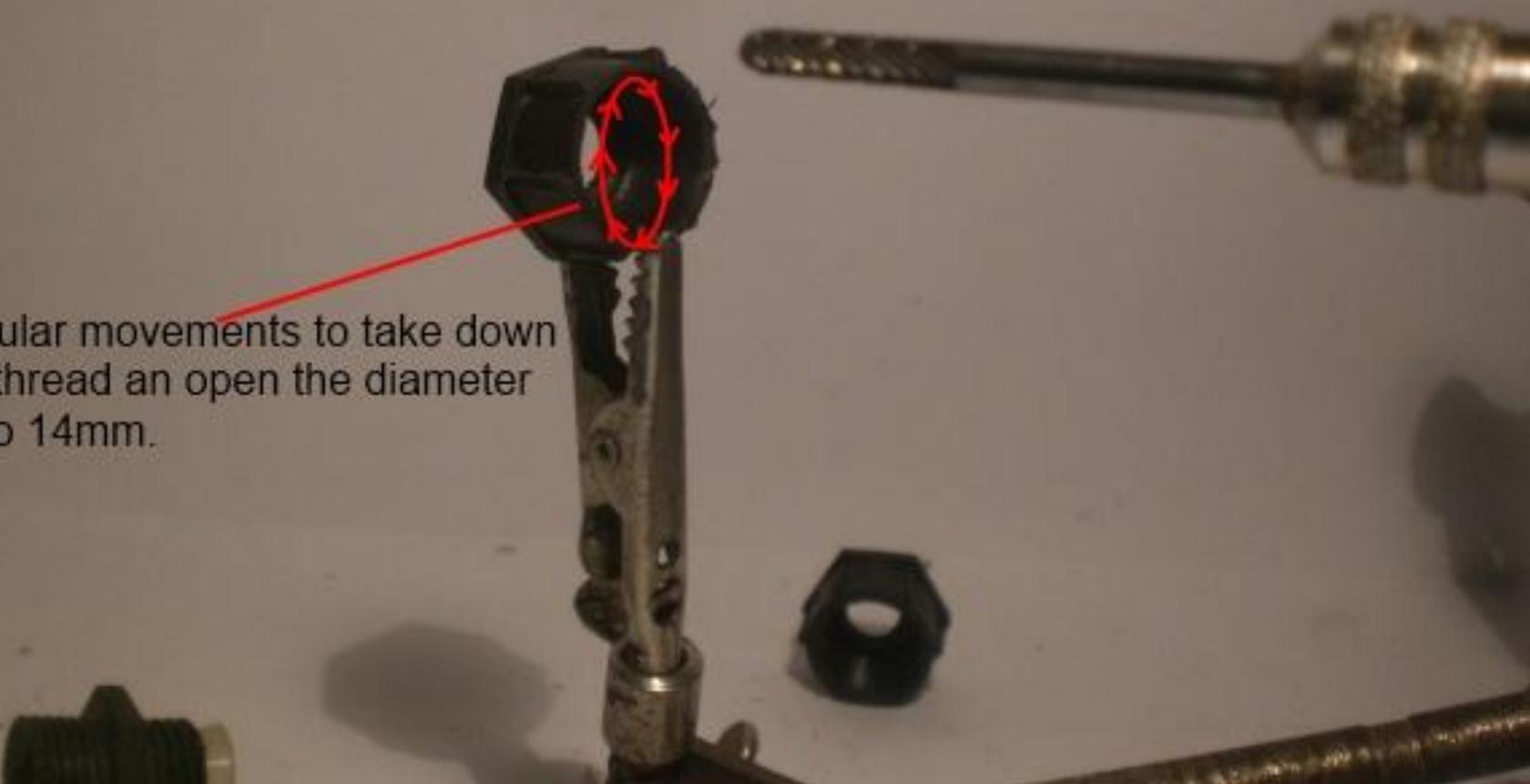
Width has been taken right down to 1mm. Note more space has been created along the bolt shaft.

The more you can compact the unit the better.  
This comes with trial and error.

Do not secure this part with adhesive yet. Make it so that it can turn on and off the stainless shaft. you need to do this in order to do final position' setting of the knobly.

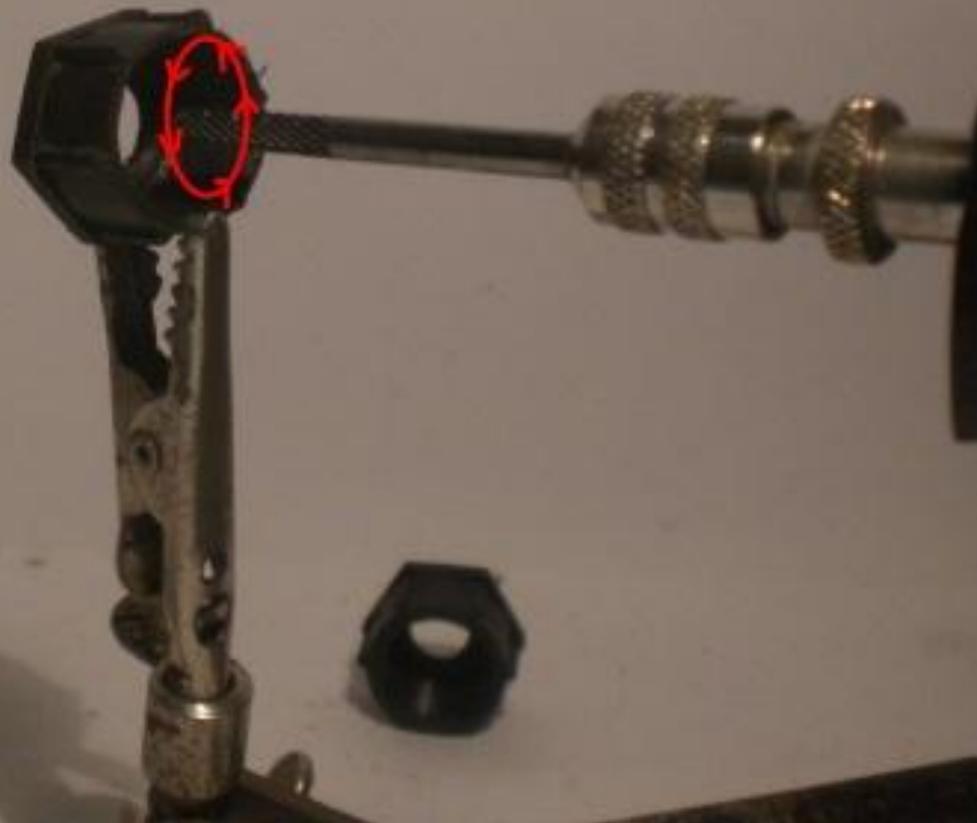
Open the internal diameter up with a dremal or a piece of rounded 40grit sand paper to 14mm. This will allow free movement over the brass collar when turning the magnets on to the full on position.

It also aids in making the unit very compact when magnets are on Hard.



Circular movements to take down the thread and open the diameter up to 14mm.

Opening the cap up to 14mm -



will  
Sanding work just as well. turn the cap in both direction over the 40 grit  
to remove the internal diameter to 14mm.



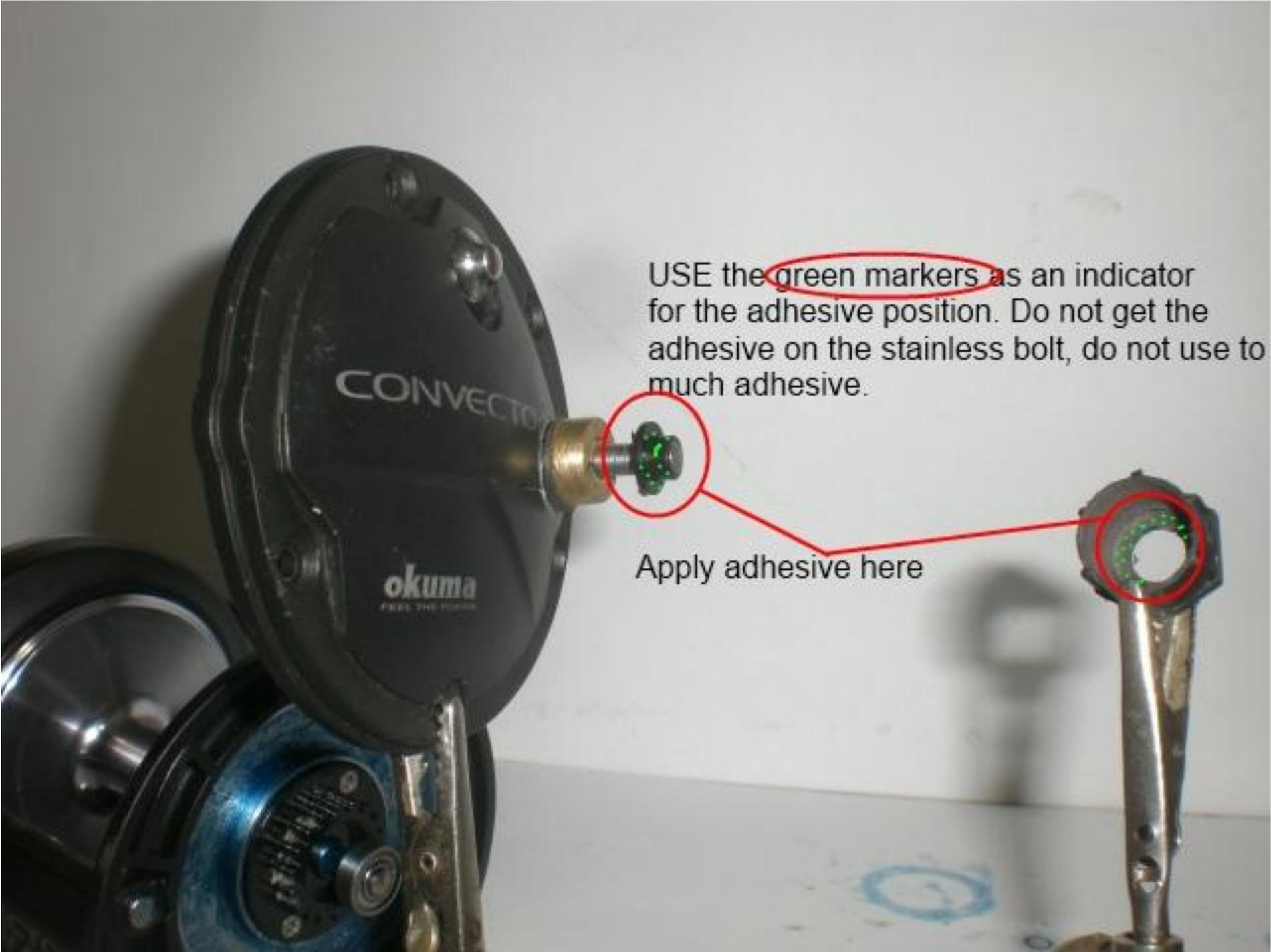
Twist and turn the cap over  
the 40 grit sand paper.  
Removing internal diameter  
to 14mm.

Cap can be placed over the spacer that is positioned on the stainless shaft. Lie the sideplate down horizontally so the cap is level when you apply the strong two part adhesive/epoxy. onto the inside of the cap.

SEE NEXT TWO PICS FOR ADHESIVE POSITION BEFORE APPLYING ADHESIVE..

This spacer must not be secured to the bolt with adhesive yet





USE the green markers as an indicator for the adhesive position. Do not get the adhesive on the stainless bolt, do not use too much adhesive.

Apply adhesive here

Place cap over the spacer when you have applied the adhesive to the given positions. Adhesive can be seen bulging slightly out of this **area.**

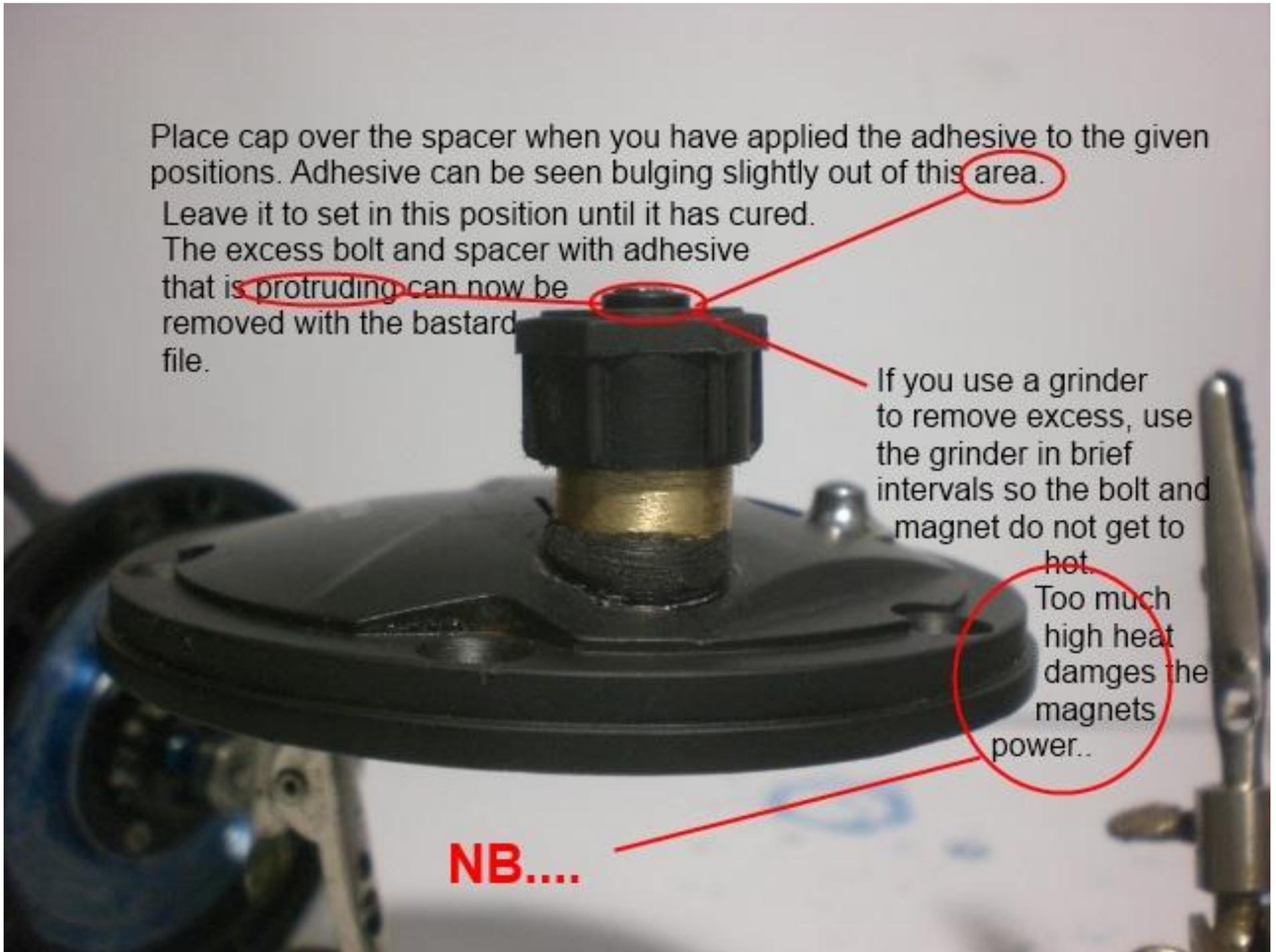
Leave it to set in this position until it has cured.

The excess bolt and spacer with adhesive that is **protruding** can now be removed with the bastard file.

If you use a grinder to remove excess, use the grinder in brief intervals so the bolt and magnet do not get to **hot.**

Too much high heat damages the magnets power..

**NB....**



HOMESTRETCH - At this point the knobby should be secure ,but when turned out to its max off position itwill lock at the spring point inside the reel allowing the unsecured spacer thread on the stainless bolt shaft to turn off.



Take the sideplate off. Screw on the knobby and find your desired position for the magnet setting. At this point you can secure the assembled knobby onto the stainless shaft with adhesive.

Make sure it is not rubbing on the spool.

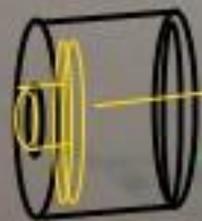


~~REMOVE~~ EXCESS SPACER AND BOLT.

Recheck your magnet position .  
Make sure its not touching the  
spool when turned into the  
full ON position.

The yellow internal  
spacer is secured into  
the outer cap with  
adhesive. The yellow  
spacer threads onto  
the stainless bolt.

Redraw your marker line if  
it has become faint  
before applying your adhesive



remove the tape  
from the magnet

LBS/YDS 20/480  
Ømm/M 0.45/440  
KG/M 8/530

Mags set in the max ON position. Note that that cap runs over the brass bush.



Mags set in the Off position exposes the brass bush





GEAR RATIO 6.2:1

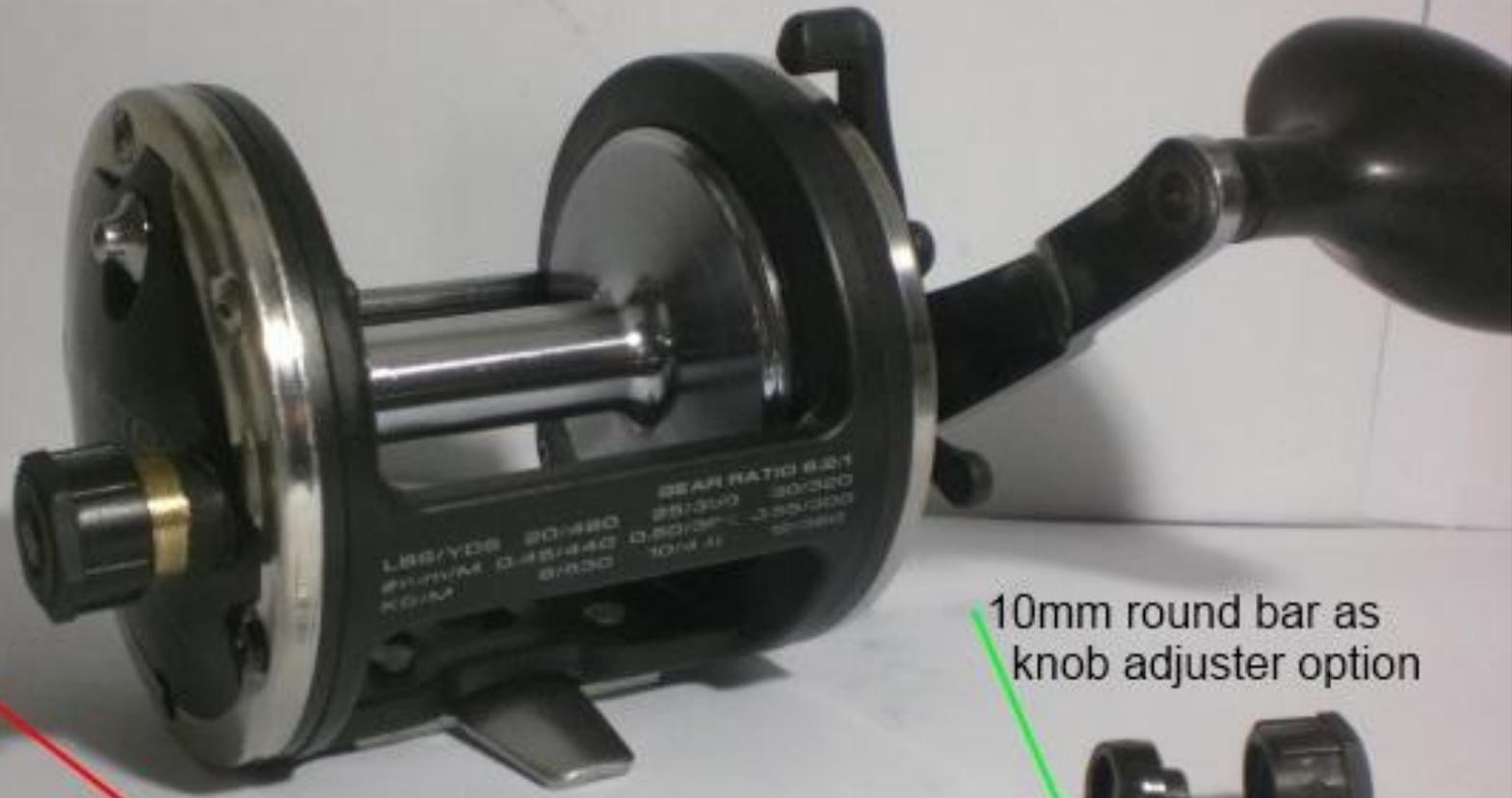
LBS/YDS	20/480	25/360	30/320
g/mm/M	0.45/440	0.50/370	0.55/300
KG/M	9/830	10/410	12/300

Magnetic Cast Control upgrade



# EXPLODED PARTS VIEW- Magnetic Cast Control COMPLETED

Heat over mag and platform then trim excess away. Leave magnet face exposed.



10mm round bar as knob adjuster option



optional - shrink tubing over magnet once stuck to platform.

