

THE QUICK 'n DIRTY ON

HUBS



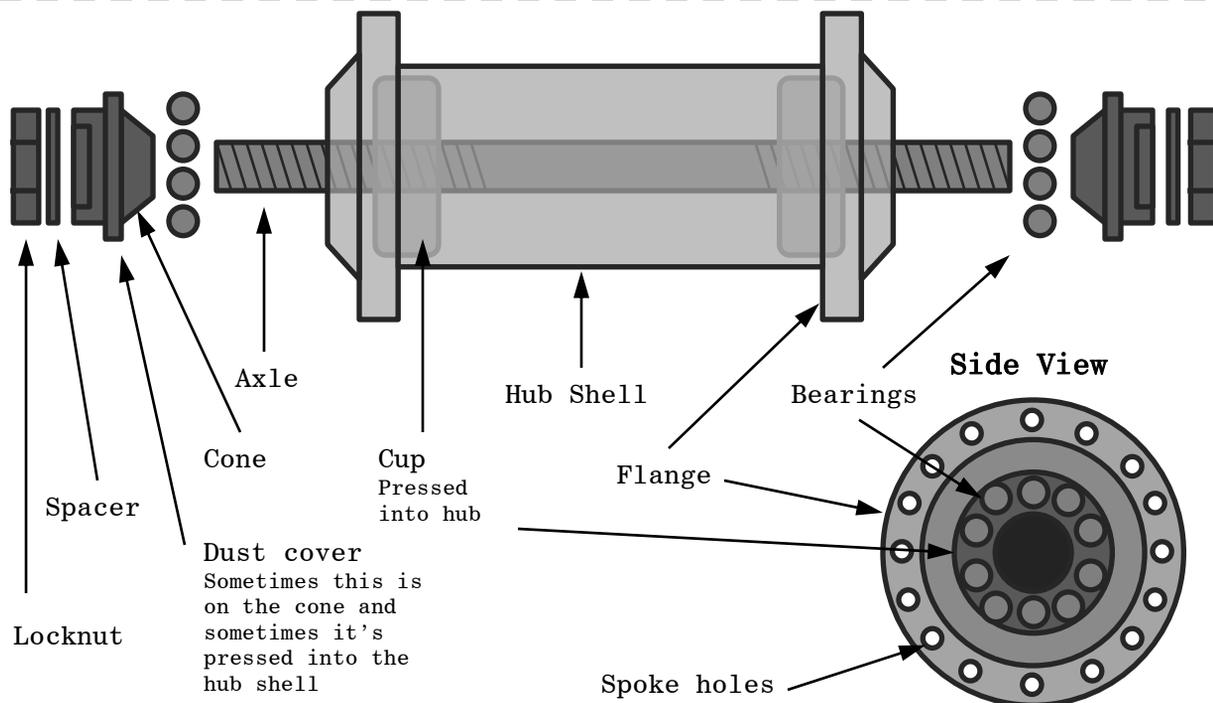
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Hubs – they make your wheels spin. Follow us as we journey inside the hub to explore it's inner workings.

Just like with the headset and the bottom bracket, the hub contains a bearing system that fits our common model. On each side of the hub, there is a cup, a race (here called a cone), and bearings.

THE FRONT HUB

The front hub is simple because there is no drivetrain component and it's typically symmetrical.



DROPOUT SPACING

Frame dropout spacing is important to know for picking the correct hub. The outer locknut dimension (X) should match the dropout spacing.



Standard Front

100mm width

9mm axle diameter

Exceptions: some older road bikes have 90mm spacing.

Newer MTBs may have 15 or 20mm thru axles.

Standard Road Rear

130mm width

10mm axle diameter

Exceptions: older road bikes can be 124 or 126mm and track bikes are 120mm

Standard MTB Rear

135mm width

10mm axle diameter

Exceptions: the newest MTBs may have 142mm thru axles.

Many older hubs will have 9.5mm diameter axles.

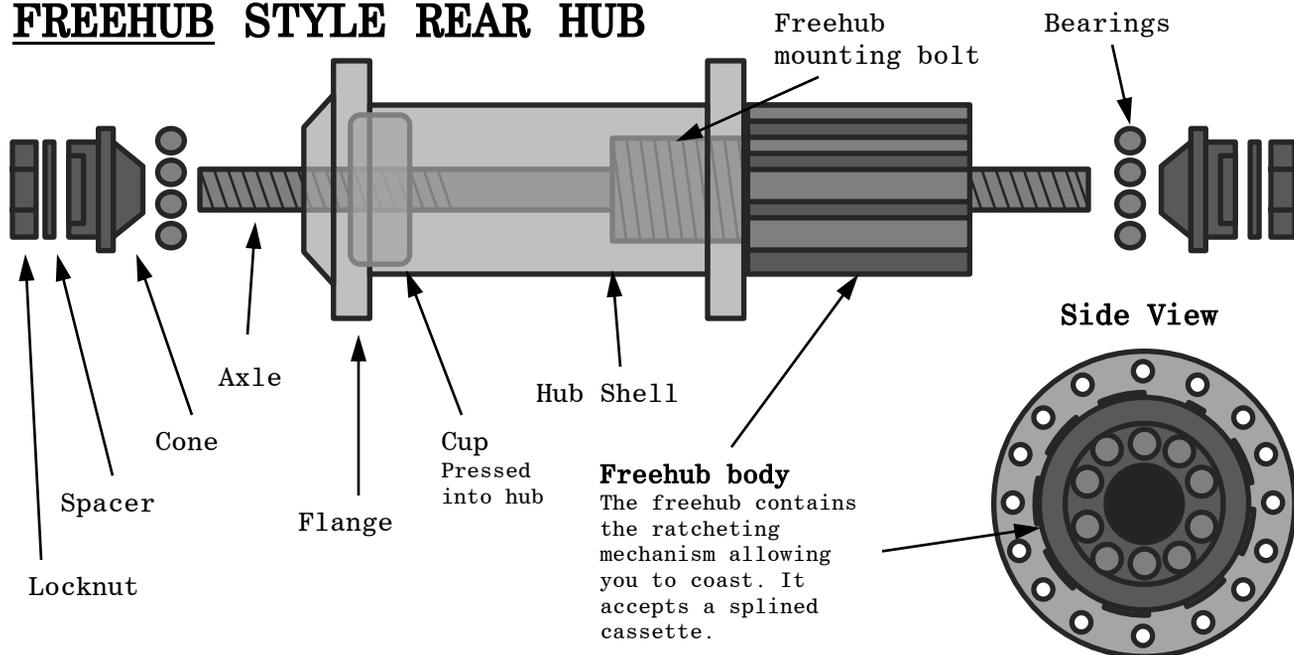


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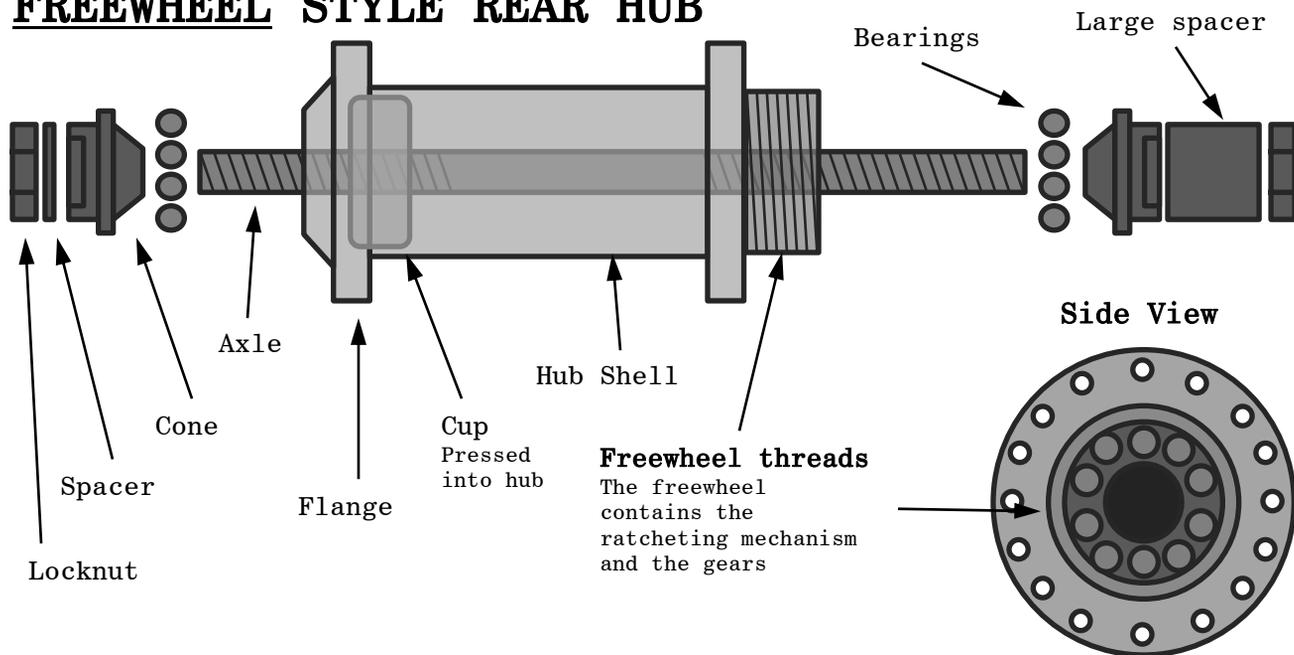
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The rear hub is basically the same as the front hub, but with different spacing to accommodate gears and with an interface to attach the gears. Here are the two main styles of rear hubs.

FREEHUB STYLE REAR HUB



FREEWHEEL STYLE REAR HUB



HUBS



There are relatively few tools needed to work on most hubs, but there are some brand-specific tools used for high-end products.

REMOVING THE FREEWHEEL OR CASSETTE

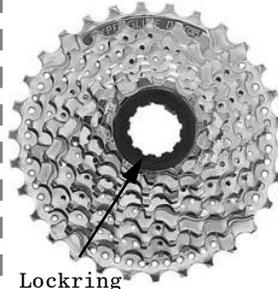


1) Find the appropriate freewheel removal tool



2) Clamp the freewheel removal tool in the vice

3) Place the freewheel on the tool and use the leverage of the wheel to unthread the freewheel



Lockring

1) Find the appropriate locking removal tool



2) Lock the cassette with a chain whip or hyperhandle

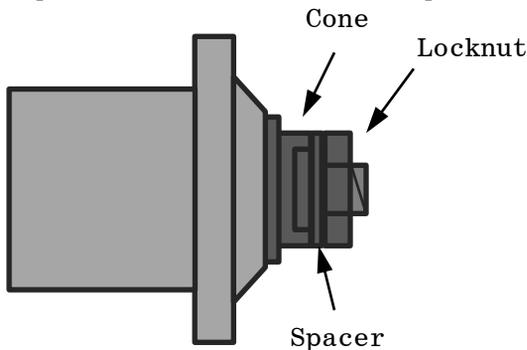


3) Use a large crescent wrench to turn the locking tool while holding the cassette in place



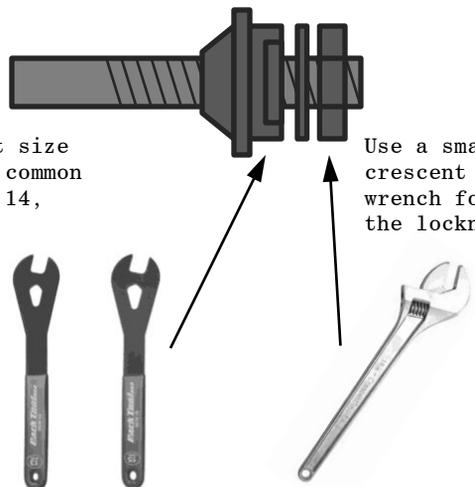
ADJUSTING THE AXLE HARDWARE

The cone and locknut on each side of the hub are tightened against each other to lock the hardware in place so that it does not tighten or loosen over time. A special thin wrench is required for the cone.



Find the right size cone wrench – common sizes are 13, 14, 15, and 16mm

Use a small crescent wrench for the locknut



NOTE: Sometimes the cone on the drive side is obscured by the freehub body or the freewheel. If you need to access the hardware, first loosen the non-drive hardware and the pull the axle out.



Hubs, like headsets and bottom brackets can wear out or fall out of adjustment. Here are a few pointers to diagnose problems.

TROUBLESHOOTING hub problems

1) The hub has play

The axle assembly is loose. The most likely culprits are loose hardware or worn bearings. Check for loose hardware – can you spin either locknut by hand? If so, readjust the cones to eliminate play and retighten the offending hardware. If the bearings are worn, broken, or missing, there's probably something else wrong – keep reading.

ALTERNATIVE: The axle is broken. You will be able to move either side of the axle independent of the other side.

2) The hub rotation is stiff

The axle assembly is too tight. Check for loose hardware – I know, this sounds counterintuitive, but sometimes cones can tighten if not locked in place. Loosen a cone to provide proper bearing pre-load. Retighten the locknut to fix the cone in place.

3) Hub movement is rough

Something on the hub is either worn out, damaged, or incorrectly assembled.

- a) Disassemble the hub enough so that the bearings and cones can be inspected. Are any bearings missing or out of place? Are the surfaces of the cones in good condition (**pitting is the most likely culprit**)? Are the cups cracked?
- b) If either the cones or cups are pitted, the bearing are also damaged. Do not re-use the bearings.
- c) If the roughness is periodic – tight only during part of the rotation – the axle is probably bent. Watch the axle as it rotates. Sometimes the bend is subtle enough that you can't see it until you remove the axle from the hub and roll it across a flat surface.
- d) Is the grease clean or dirty? Hubs need regular service. If caught early enough, a dirty hub may be cleaned, re-greased, and reassembled.

4) The hub is not coasting properly

If the freehub or freewheel action is rough, the chain may jump forward when initiating a coast. If you hear a grinding or whirring sound (when coasting) the bearings in the freehub or freewheel may be worn or lacking grease. Grab the largest cog and flex from side to side to check for play. If the freehub or freewheel has excessive play, remove and replace. Freehub bodies can be removed and replaced if the rest of the hub is in good shape.

5) A popping sound while pedaling hard and the wheel goes out of true

Look for a loose or dangling spoke. Huge forces are applied to the flanges of the hub while pedaling and braking. Check the flanges for cracks around the spoke holes. If you find any damage to the hub body the hub must be replaced.

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Finding replacement parts...there's a lot to look out for.

REPLACING HARDWARE

Axles

Size matters. Make sure the replacement is the correct length, diameter, and thread pitch.



Gauge to check diameter and thread pitch of axles and hardware

Spacers

There are many different widths. Swapping to a different width will change the overall hub spacing and the position of the rim relative to the frame or fork.

Cones

There are so many different shapes and sizes. Make sure they match.

**Bearings**

Bearings should be replaced with the same size and number.

Check bearing size with ruler



NOTE: We save plenty of hardware for re-use in the shop, but it's often easier to get a *complete hub*. Check out the wall of hubs to see if you can find the same model you're working on.

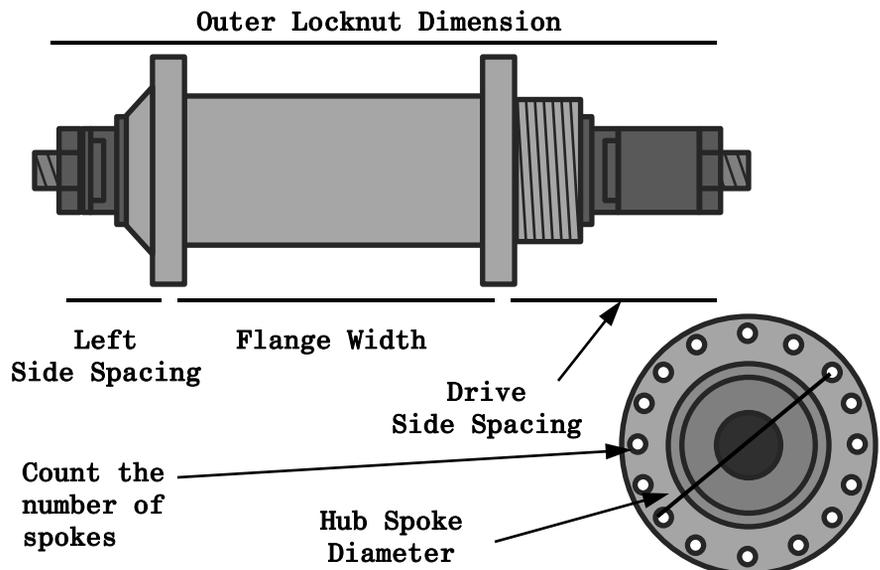
REPLACING HUBS

This is a VERY advanced task and it's a ton of work. A hub swap is not always worth it...

1) You start by removing all the spokes from both the rim and the hub. Yep, that's a lot of work.

2) If you want to use all the same spokes and the same rim you need to find a hub with the same dimensions. The easiest solution is to find the same model hub.

3) Rebuild the wheel. Again, easier to say than to do.



For information on wheel building check out <http://sheldonbrown.com/wheelbuild.html>