

PARTS IS PARTS: M[⊗]ounting Weapons Blades and Pulleys

● by Pete Smith

A lot of builders dream of creating a bot with an active weapon but are put off by the apparent complexity. How do you attach a blade to the axle? How do you know if the axle will be strong enough? How do you drive the axle, and finally, what kind of bearings should you use?

I faced all these questions when I developed my first Blade Spinner *Surgical Strike* (Figure 1). The design needed to be simple so that it would be something I could build and repair with my limited skills and budget. I also wanted to design something that could be the basis for a kit for more advanced builders.

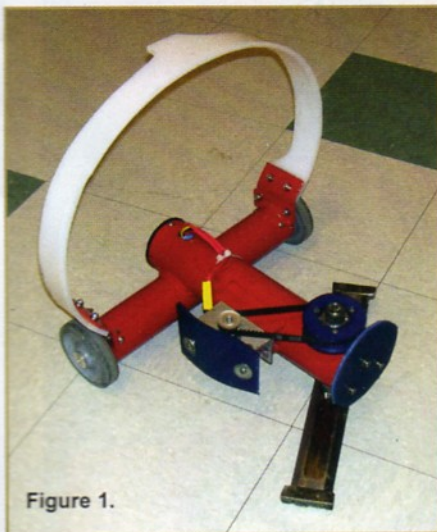


Figure 1.

The solution I came up with uses mostly off-the-shelf parts to make a tough, reliable, and very successful weapon system.

The main component is the axle (Figure 2). This is a precision



Figure 2.

ground, case hardened, steel shaft from www.mcmaster.com. These shafts have the very hard surface and smooth finish required for a bearing surface combined with a softer, tougher core to resist fracture. I made the mistake of using 0.5" fully hardened shafts on the first version of my robot but moved to 0.625" case hardened (McMaster part# 6061K111) after a couple of them failed during fights.

I grind the bottom end of the shaft into a dome shape (Figure 3) so that the spinning of the shaft has less effect on directional stability. A flat end on the shaft will tend to pull the bot to one side or the other. The dome also helps the axle ride over any irregularities in the floor.

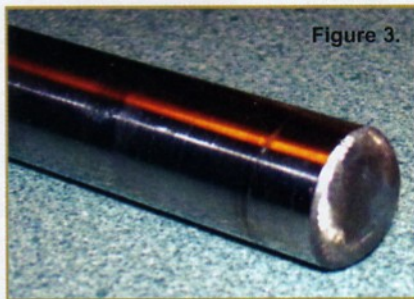


Figure 3.

I lighten the top half of the shafts by drilling out the first couple of inches with a 0.3" drill in my lathe (Figure 4). The soft core drills quite easily and the pulley end of the shaft does not have to be as strong as that required to attach the blade.

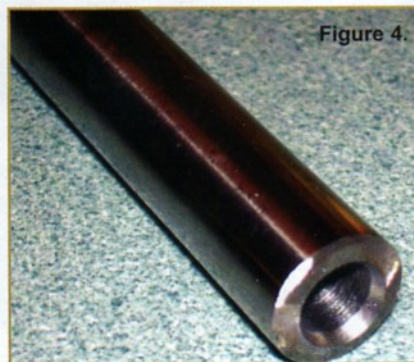


Figure 4.



Figure 5.

One of the best and certainly the easiest ways to attach the blade to the axle is to use a keyless bushing. There are two main types: Trantorques (Figure 5; McMaster part# 5926K18) manufactured by Fenner Drives at www.fennerdrives.com and Heavy Duty versions (Figure 6; McMaster part# 1058K13), also made by Fenner and some other suppliers.

