bottom plates completed the chassis assembly.

Once the chassis was finished, the components were mounted and fine-tuned. The result was a highly effective under-cutter bar spinner.

Expect to see Low Blow and Vile Ant continue climbing the Antweight ranking. SV

DRILL BABY, DRILL. Or, the Good, the Bad, and the Ugly

● by Pete Smith

For about a decade or more, it has been possible to get cheap cordless drills from Harbor Freight (**www.harborfreight.com**). These have steadily improved in power over that time, with the standard voltage climbing from 9.6V through 12V and 14.4V to 18V – all with essentially the same size gearbox and motor RPM.

The motors and gearboxes from these drills have powered many combat bots over the years in both the 12 lb and 30 lb weight classes.

However, this year Harbor Freight has changed its supplier and the old range is no longer available. My whole fleet of Bot Hockey bots and my 12 lb combat bot "Surgical Strike" used these motors, so I started a quest for a suitable replacement.

My requirements were:

- 14.4V–24V nominal voltage.
- 550–1,000 RPM at nominal voltage.
- Single speed (the two speed gearboxes tend to be larger and heavier).
- Standard gearbox (i.e., like the Harbor Freight models) form factor.
- 500 sized motor.
- Standard 3/8-24 NF output shaft.
- "Double D" nose on the gearbox.
- Less than $25 each.

Much "Googling" later, I found three possible candidates.

The first was a new drill by Harbor Freight (**Figure 1**) – their Drillmaster model 68239. The second was the 18V Power Smith model from Northern Tool (**Figure 2**). The last was one advertised as being by Boston Industrial (**Figure 3**) on Amazon.

I dismantled all three as per my article in the November '06 issue of *SERVO*, and they all came apart without major problems. I will cover the details of each drill in turn.

The Good

First, the Harbor Freight 68239. The case of this drill has one screw hidden behind a label (**Figure 4**), but you can easily pierce the label to get at it.

The pinion gear on the motor (**Figure 5**) is a press fit and smaller than that of the older Harbor

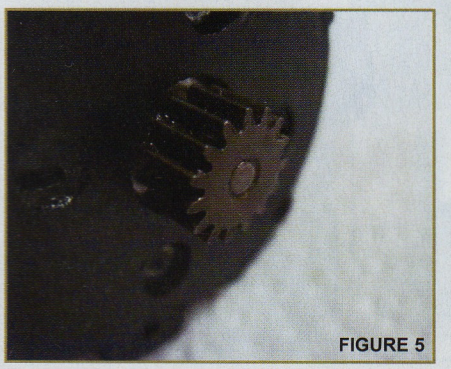


FIGURE 5

FIGURE 1

FIGURE 2

FIGURE 3

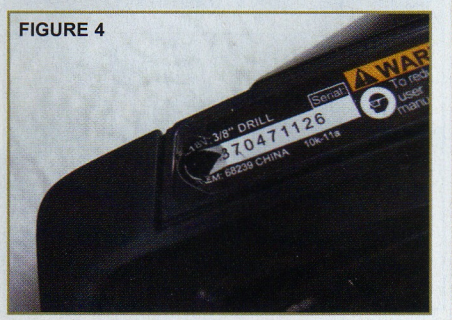


FIGURE 4

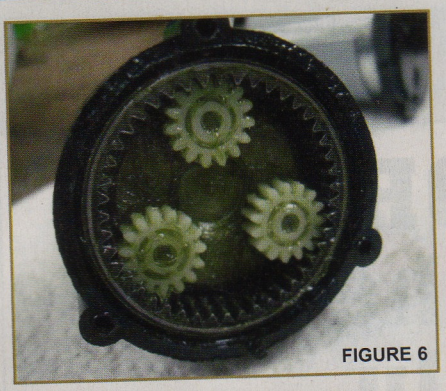


FIGURE 6

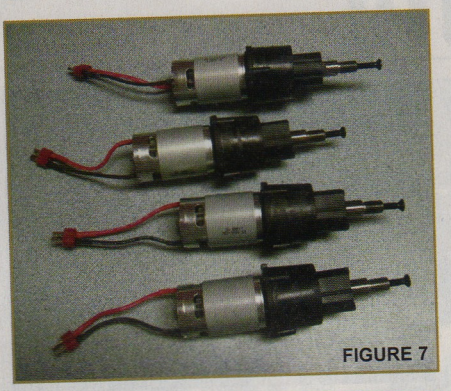


FIGURE 7

FIGURE 8

FIGURE 9

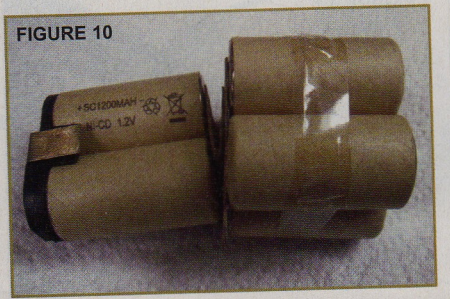


FIGURE 10

Freight models so it could not be used as a spare for them. The first stage gears are plastic (**Figure 6**) but the second stage are metal. The different motor and gears give a higher output speed of 900 RPM.

The casing is very similar to the old drills, but the Double D nose is just slightly larger so will require gearbox mountings to be modified. The output shaft is 0.3" longer (**Figure 7**).

To sum up, this drill should be good for combat use in a 12lber with 3" wheels.

The plastic first stage is a drawback, but most impacts will be on the second stage metal gears. The longer shaft, increased RPM, and slightly larger case means they are not a direct replacement but could be fitted to most existing bots with a little modification of the mounts and the wheel hubs.

The Bad

The "Boston Industrial" drill purchased through Amazon looked at first glance to be nearly identical to the old Harbor Freight models, and I had hoped that they would be simply the same drill repackaged for a different vendor (none of the drills here are actually made by the companies selling them). However, this quickly seemed to not be the case since the batteries were not interchangeable.

Closer examination of the drill revealed all was not as it should be. The drill packaging and casing is labeled 18V (**Figure 8**) but curiously the charger was only rated at 9V (**Figure 9**).

The final answer came when opening up the battery pack to find only six cells, i.e., 7.2V (**Figure 10**) and the motor on the drill had a 7.2V sticker on it (**Figure 11**). Yes, it was a 7.2V drill, mislabelled and being sold as a 18V model! They say you only get what you pay for but it seems sometimes you don't even get that.

Amazon and the vendor have been contacted, and the drill had been removed from sale at the time of this writing.

The Ugly

The Power Smith isn't really ugly. It's as good a drill as the Harbor Freight model and it has the same 550 RPM. It also has plastic – but chunky – first stage gears (**Figure 12**) and a press fit gear. What makes it ugly for our purposes is that the gearbox case is quite different, with a rounded triangular nose (**Figure 13**). It would not fit any existing bot designed to fit the old designs. I've seen this triangular nose before, but its not a common design, so future replacements may be even harder to locate.

Conclusion

The new Harbor Freight 68239 drill is usable as a drive train for 12 lb bots. Its first stage plastic gears are not as good as the metal ones we are used to, but these are not particularly likely to fail. The higher RPM should give

FIGURE 11

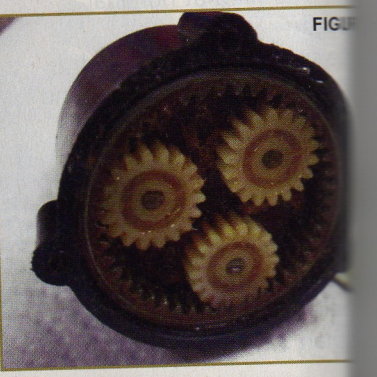


FIGURE 12

useful extra speed in bots with 3" or smaller wheels, but it comes with the cost of lower torque and a higher risk of stalling the motor. The slightly larger case is easily fixed with a file. The higher gearing might make them impracticable in a 30 lb bot.

The other two drills are a useful lesson in never assuming that a drill will be a suitable replacement until you have bought one and checked it out. The Power Smith could have been used in a new bot or even put back together, and it would have served as a reasonable light-duty drill and driver. The 7.2V fake serves as a good reminder of that wise advise, "Caveat Emptor."

The search for the perfect replacement cheap drill will apparently continue ... SV

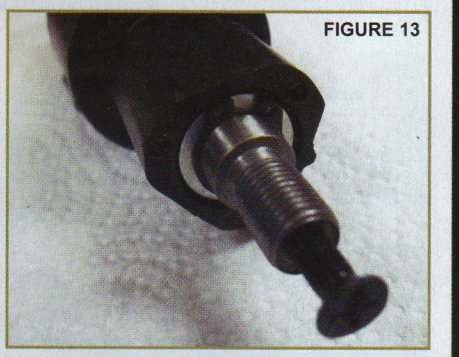


FIGURE 13

EVENTS

Completed Events for September 2011

Seattle Bot Brawl 2011 was presented by Western Allied Robotics in Seattle, WA on September 11, 2011.

HORD 2011 was presented by the Ohio Robot Club in Brunswick, OH on September 24, 2011. SV

EVENT REPORT:

ORC Storms "The Gate"

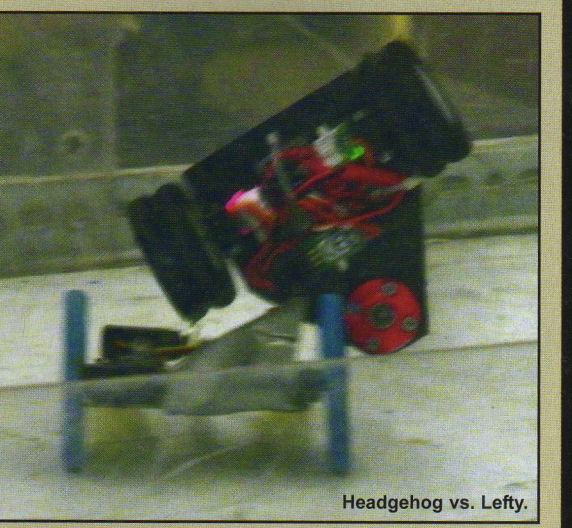
● by Chris Olin

2011 was a difficult year for the Ohio Robotics Club (ORC). First, their spring event at Cuyahoga Valley Career Center was canceled due to lack of support from the school and several personal schedule conflicts. Then, in early August, it was learned that the venue for their September event – Classic RC Raceways – had gone out of business. With no venue for an event scheduled to be held in little over a month, the ORC team scrambled to find a new venue.

Through this adversity came a new opportunity. The Northern Ohio Radio Control Auto Racers (NORCAR) graciously offered ORC the use of their facility "The Gate" located in downtown Brunswick. The Gate features a large carpeted racing surface and spacious pits in a well-maintained storefront located in the Laurel Square Shopping Center. However, there was a catch. The Gate was not available for use on the originally scheduled date, (September 17th) so the event would have to be postponed one week. The issue was put to a vote and all registered teams agreed to the new place and time.

"House of Robotic Destruction 2011: Storming The Gate" was held on September 24th. Nine teams brought 20 robots to ORC's first (of hopefully many) event at this new location.

A field of five Fleaweights (150 grams) fought a round robin



Headgehog vs. Lefty.