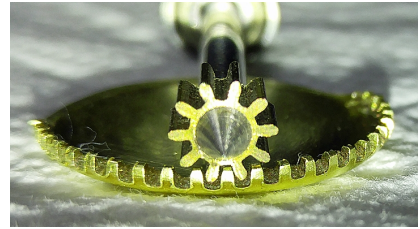


Making a Custom Low Profile Crown Gear

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I needed a custom crown gear for a new product that I will be marketing to magicians around the world. The closest item to what I require for my project is an old crown gear for the earlier style of slot cars.



This is an “upgrade” slot car crown gear from a few decades ago. It is impossible to run a manufacturing business relying on no longer made parts to use in my products – so I had to make my own crown gears.

This old gear is 1” in diameter, shallow, steel, 48 pitch, and has a tall mounting hub. The gear for my project needed to be brass, shallow, 48 pitch, and have a very low mounting hub.

Making such an item from scratch is a multi-step process. The first two steps are rather straight forward. A brass disc would be punched out and centered drilled with a .250” hole. The result would be a thin 1” diameter brass washer. This washer would need the rim to be turned up and tooling would need to be designed and made. For durability, tool steels O-1 and A2 would be used. This is the tooling that I made to turn up the rim of the brass washers.

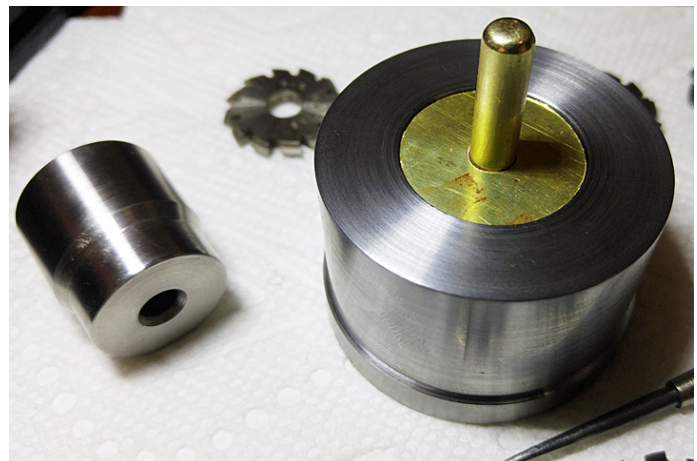
The base of the tooling has a 1/4” center hole. There is a center recess with a shallow ledge.

In addition, there is a steel plunger with a 1/4” center hole and a brass rod.

In use, the brass washer is placed onto the ledge of the central recess.



The brass guide rod is placed down through the washer and into the base.

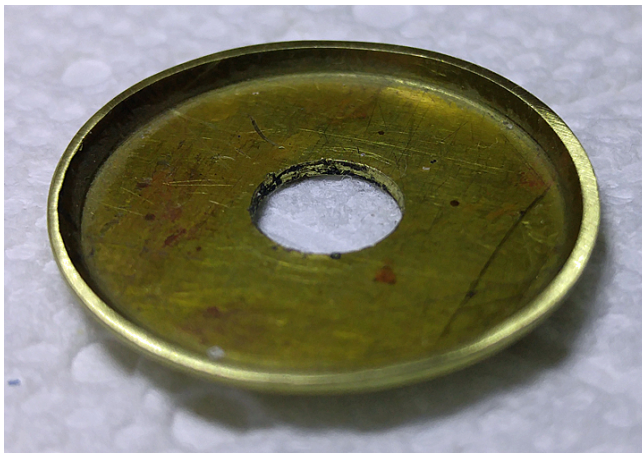




The plunger is slid over the guide rod and onto the brass washer.

This assembly is placed into my 20 ton shop press and pressed to curl up the rim of the washer.

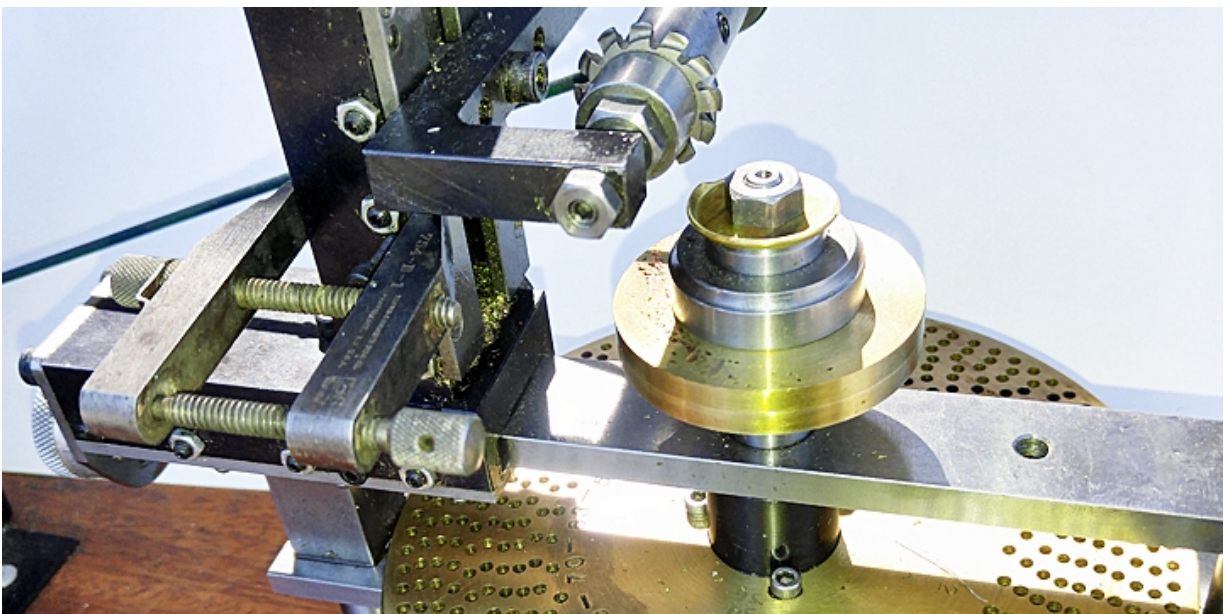
The tooling is disassembled to reveal the modified brass washer.

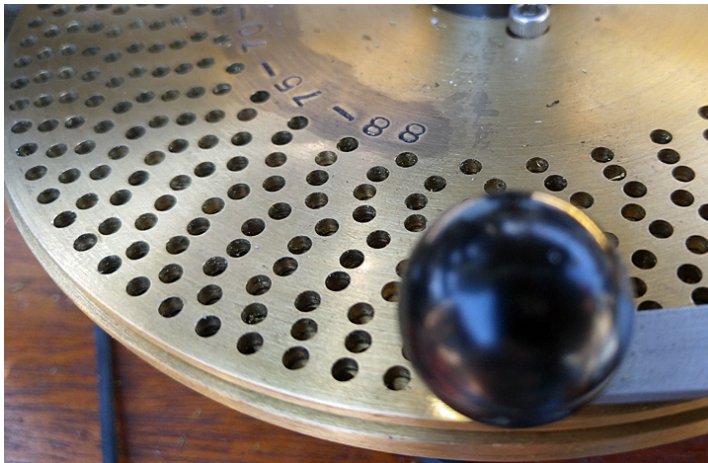


This turned up rim will have the small gear teeth cut into it to resemble the slot car gear.



The teeth are cut using my Chronus clock wheel engine – one tiny tooth at a time. The small machinist's clamp is used to limit the depth of cut when cutting the gear teeth.





The low profile 48 pitch crown gear needs to have 44 teeth on a 1" diameter blank so I set up the wheel engine index disc for the 88 hole pattern and would use every other hole.



Since the custom crown gear that I require for my product will provide intermittent movement, I require only half of the crown gear to have teeth. The other half of the crown rim is ground off to provide a pause in the motion of the device. The stages of the crown gear production are shown below along with the slot car gear.

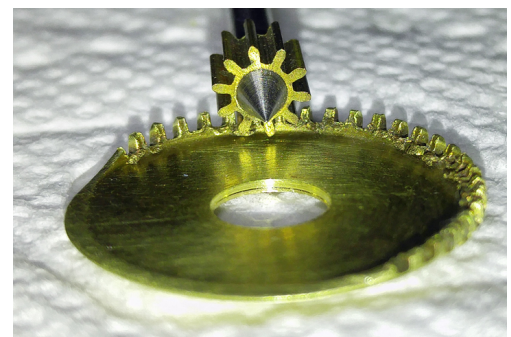


In use, this new shallow crown gear will have a very short mounting hub. All of this stubby construction is required as the completed spring powered device must be mounted into very cramped quarters. Space is at a premium.

The crown gear will be driving a 10 leaf brass pinion, as well as, changing the direction of motion. The relationship between the crown gear and pinion are shown below.



The missing tooth section of the crown gear is clearly visible in these pictures. This crown gear drives the pinion.



The 10 leaf brass pinions to work with the new brass crown gears will be made on my Chronos pinion mill. This will be described in another document – if I find the time.