
Subject: Geared D6

Posted by [Magic](#) on Fri, 20 May 2011 20:06:47 GMT

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The Geared D6 did finally arrive! It is in Frosted Ultra Detail.

Even if it is not fully functional, I am very happy with the result: none of the gears get fused although the very small clearances.

Nevertheless the gears of the number 6 are not turning at all. But except 6, all the gears of the other faces are turning a little bit when you turn the big gear of face number 1.

Unfortunately I don't know really what to do. I have the feeling that this is due to too much clearance on the axes, but it is perhaps just that the movement cannot be transmitted through so many gears: from 1 to 3 and from 3 to 6.

I will probably try to reduce some clearances and to have less teeth in the internal gears (compared to the external) and hope this will be enough to fix the issue.

I will post a video soon.

Subject: Re: Geared D6

Posted by [stop4stuff](#) on Fri, 20 May 2011 21:00:18 GMT

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Wow, that's amazing!

Is all of the wax support material out? - it will bind things up a bit. And a spray of silicone/ptfe oil might help things too.

Subject: Re: Geared D6
Posted by [Magic](#) on Fri, 20 May 2011 21:19:28 GMT
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Thanks Stop4stuff. When you see how close the teeth of the different gears are, you just cannot believe it!

Yes, I think there was no more wax inside (I put it in hot water with soap to try to remove any wax, but according to me, this had no effect, it was already clean).

I should try to lubricate it, you are right. I did not even think about that...

Subject: Re: Geared D6
Posted by [dizingof](#) on Fri, 20 May 2011 22:16:31 GMT
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Very cool !!

Is FUD strong?

Subject: Re: Geared D6
Posted by [WillLaPuerta](#) on Fri, 20 May 2011 22:57:24 GMT
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Awesome! This really is the die I've always wanted to make . . . now what do I have to look forward to?

Subject: Re: Geared D6
Posted by [Magic](#) on Sat, 21 May 2011 07:46:40 GMT
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@Dizingof: Yes, I would say it is quite strong. The gears have a thickness of 1 mm but the teeth are quite small. And although I tried to force to make them turn, none of the teeth broke.

@WillLaPuerta: Thanks. This opens a lot of new possibilities... I am sure you will find something

Subject: Re: Geared D6
Posted by [Magic](#) on Tue, 24 May 2011 20:21:30 GMT
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The video of this first prototype is now available.
As you can see all the gears can move (I mean: none is fused), but the gears of the face number six cannot turn by moving the gear of face number one.
It seems that the axes of the middle gears of face number 3 and 5 are moving a lot: probably to much clearance there...

Subject: Re: Geared D6
Posted by [KBscale](#) on Tue, 24 May 2011 20:47:11 GMT
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Can you post a drawing to show how the gears are arranged on the inside?

Subject: Re: Geared D6
Posted by [stop4stuff](#) on Tue, 24 May 2011 20:51:50 GMT
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That's awfully good Magic.

From the video, it looks like there's quite a bit of slop in the gears & axles, what kind of clearances did you use?

Subject: Re: Geared D6
Posted by [dizingof](#) on Tue, 24 May 2011 21:26:12 GMT
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Sweet !

I think i'm going to like this cool material - thanks Magic

Subject: Re: Geared D6

Posted by [Magic](#) on Tue, 24 May 2011 21:47:42 GMT

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Thank you all.

@KBscale: Have a look at this post. Number three is transmitting the movement from one to six. It should answer your questions. If not, let me know...

@Stop4stuff: The clearances between the teeth are very small (0.1 or 0.05mm). Instead, for the axle, the clearances are +/-0.25mm in all directions that is 0.5 mm in x, y and z direction (the be clearer: 0.25 mm for the radius = 0.5 mm for the diameter). That's far too much. But I was so afraid to have the different parts fused... I think I will try +/-0.1 mm in all directions.

@Dizingof: Yes, this material is not perfect, but very very promising... The main advantages are the small wall thickness and the ridiculously small minimal clearances...

Subject: Re: Geared D6

Posted by [stop4stuff](#) on Tue, 24 May 2011 22:14:09 GMT

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With a solid 0.1mm clearance, you may get wax left in, seizing things up like with my little rubiks cubes... as yet, I've not found a workable solution to free them up without damaging them (#9 & #8 I used hot water & detergent, both broke, #7 spent 4 days in mineral/white spirits - one part was still siezed and the central spindle had gone soft, #6 is soaking in a thin penetrating oil right now, still 5 more to go)

Maybe your option could be like one of the examples here somewhere for WSF where there are nodules sticking out of the main shaft with very small clearance (I'll post the link to the page when I can find it)

Subject: Re: Geared D6

Posted by [dizingof](#) on Tue, 24 May 2011 22:18:02 GMT

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stop4stuff wrote on Tue, 24 May 2011 22:14 With a solid 0.1mm clearance, you may get wax left in, seizing things up like with my little rubiks cubes... as yet, I've not found a workable solution to free them up without damaging them (#9 & #8 I used hot water & detergent, both broke, #7 spent 4 days in mineral/white spirits - one part was still siezed and the central spindle had gone soft, #6 is soaking in a thin penetrating oil right now, still 5 more to go)

Maybe your option could be like one of the examples here somewhere for WSF where there are nodules sticking out of the main shaft with very small clearance (I'll post the link to the page when I can find it)

Would an air pressure nozzle that you can find in any gas station do the trick? to clear the tiniest wax residue

Subject: Re: Geared D6

Posted by [stop4stuff](#) on Tue, 24 May 2011 22:26:33 GMT

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It might do, but with 2mm parts stuck together with 0.1mm of wax making up a 6.2mm cube, I've got a fair to middling chance of watching the cube disintigrate into itty bitty bits of plastic shrapnel with the one in the filling station... I have a LEGO air compressor I built that may do the job and is certainly worth a try... thanks for the idea

Subject: Re: Geared D6

Posted by [stannum](#) on Wed, 25 May 2011 02:24:44 GMT

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stop4stuff wrote on Tue, 24 May 2011 22:14 Maybe your option could be like one of the examples here somewhere for WSF where there are nodules sticking out of the main shaft with very small clearance (I'll post the link to the page when I can find it) Do you mean the Woosh machine article?

Subject: Re: Geared D6

Posted by [KBscale](#) on Wed, 25 May 2011 04:30:02 GMT

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stop4stuff wrote on Tue, 24 May 2011 22:14 With a solid 0.1mm clearance, you may get wax left in, seizing things up like with my little rubiks cubes... as yet, I've not found a workable solution to free them up without damaging them

You could try an ultrasonic cleaner. Sometimes you can find small low-cost units designed for cleaning jewellery etc.

Subject: Re: Geared D6

Posted by [Magic](#) on Wed, 25 May 2011 06:14:26 GMT

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@Stop4stuff: There are some interesting techniques to have small clearances without the need of large areas facing with small void space between them.

Like this: http://www.shapeways.com/forum/index.php?t=msg&&th=5145&goto=26920#msg_26920

I could not find the one you are mentioning, but I remember it. It is basically the same idea: not having the same diameter on all the length of the axle.

I am unsure this can apply to such small parts. Perhaps just adding some holes where the wax could get trapped (under the gears for example)...

Subject: Re: Geared D6

Posted by [stop4stuff](#) on Wed, 25 May 2011 06:31:38 GMT

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stannum wrote on Wed, 25 May 2011 02:24 stop4stuff wrote on Tue, 24 May 2011 22:14 Maybe your option could be like one of the examples here somewhere for WSF where there are nodules sticking out of the main shaft with very small clearance (I'll post the link to the page when I can find it) Do you mean the Woosh machine article?

Yep, that's the one, and @Magic, yep same idea there too.

@KBscale, thanks for the idea, I know one or two people that might just have one

Subject: Re: Geared D6
Posted by [Magic](#) on Sun, 29 May 2011 07:55:45 GMT
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I found a flaw in the design that probably explains why the gears are not turning properly.
So... back to the drawing board...

Subject: Re: Geared D6
Posted by [maximus123](#) on Mon, 30 Jan 2012 11:39:55 GMT
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nahicee.....
