



Inchworm Caterpillar Automaton



Axolotal_Kid_666

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updated 20. 10. 2026 | published 20. 10. 2026

Summary

A model from MakerWorld By Johan Karl Hugo

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Tags: [inchworm](#)

Updates

• 2024-05-21:

Version 2 of the drive gears, handle and caterpillar as well as an updated print profile has been uploaded.

- The drive gears now leave less play in the system, reducing the chance of jamming, even without lubrication.
- The handle should be less prone to break, but might need some more force to assemble.
- The caterpillar is still delicate depending on your material, but hopefully less so.
- All parts are compatible with the old versions of the other parts.

• 2424-05-22:

Version 3 of the drive gears has been uploaded. They should be even more reliable than version 2. These are also compatible with all other parts regardless of version.

- **2424-06-10:**

Version 3 of the crank handle has been uploaded. It's available as an **handle_v3.stl** under files for now, but I'll update the print profile when I get home.

The Model

I've always been fascinated by the movements of insects and other small animals, especially worms, larvae and caterpillars. I thought to combine this fascination with my more recent fascination for the conversion of constant mechanical movement into intermittent mechanical movement.

This is a simple, abstract automaton of a caterpillar crawling in circles on a leaf. It's based on, but not quite accurate to what is commonly known as an inchworm, the larval stage of the Geometer Moth.

Anyway! You simply turn the crank and watch as the caterpillar crawls its way around the leaf!

Here's a video of it in action: https://www.youtube.com/watch?v=e3_RjoHW6k0

Printing

I used mostly standard settings for all parts except the caterpillar itself, as the tolerances are quite forgiving for the mechanical parts. The covers could benefit from some ironing, though I haven't tried it myself at the time of writing.

No supports are needed if all items are orientated in the intended way. The raw model files have the crank and its handle oriented in a bad-for-printing way.

The caterpillar is a delicate part, and requires Arachne wall generation for best chance of a successful print, as well as making it more durable.

Assembly

There are no extra materials or tools needed for assembly, but for smooth operation, depending on the properties of your filaments, **some kind of lubrication is highly recommended**. Also, the outer lid, while being designed for press fitting, is intentionally not a very tight fit so as to facilitate easier disassembly. For a permanent solution, you could always glue it in place later.



1. Press the bottom and top driving gears (small, partially toothed gears) together, being mindful of the small pip keeping them correctly oriented to each other. They should hold together simply by friction.





2. Put the driving gear assembly on the driving axle pin, making sure the toothed side of the bottom gear is pointed downward as seen in the picture. Lubrication on the axle pin, teeth and smooth section of the gears is highly recommended.



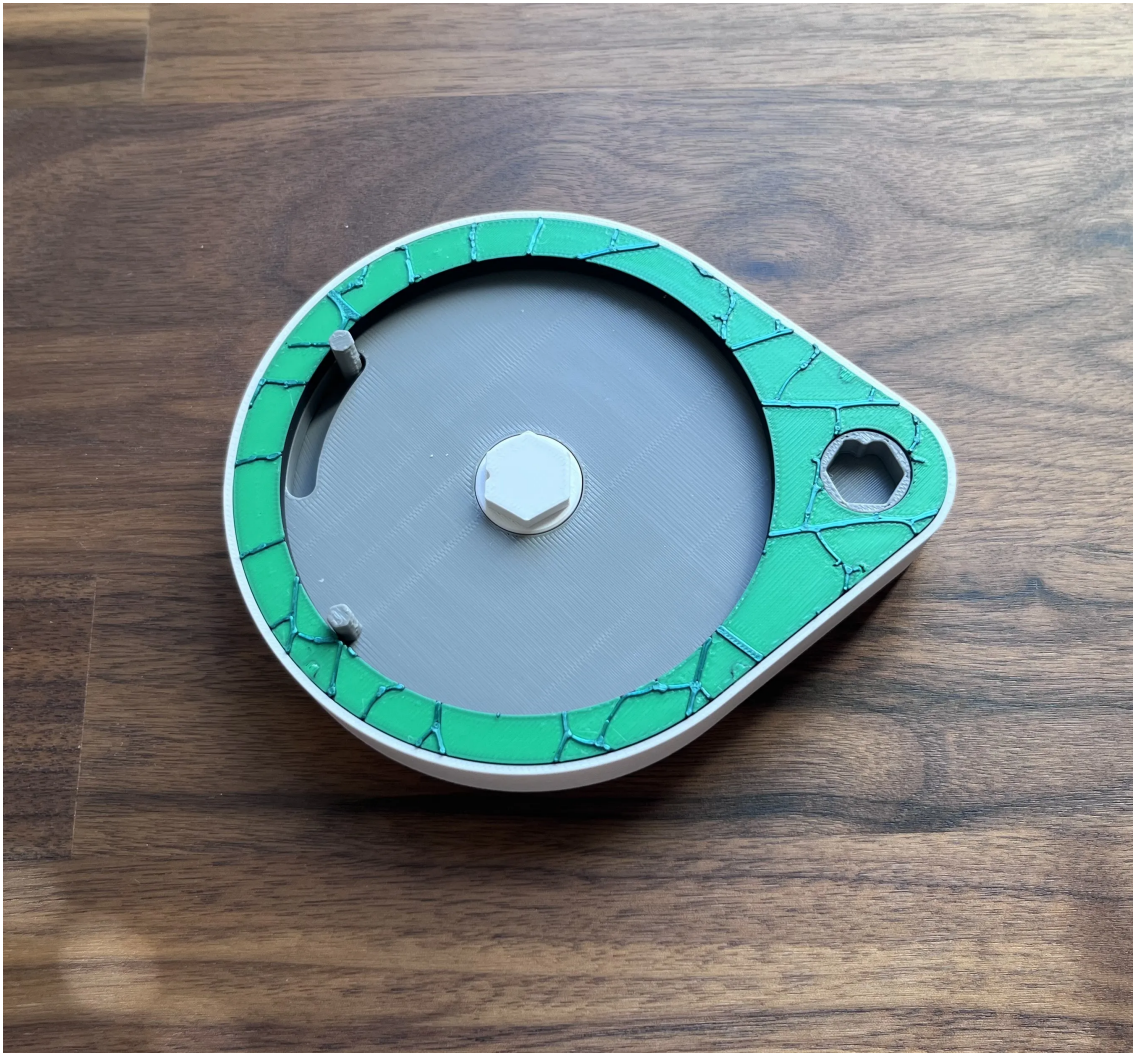
3. Put the big gear with the curved slot on top of the other big gear. Make sure that the bottom gear pin is positioned in the slot as far away from the top gear pin as possible. Hold the two gears together. The teeth of both gears should align.



4. Drop the big gears into the base, making sure that a non-toothed section (any one will do) of the big gear assembly mates with the non-toothed section of the driving gear pair. Also mind the small protrusions on the inside of the base where the lid will sit.



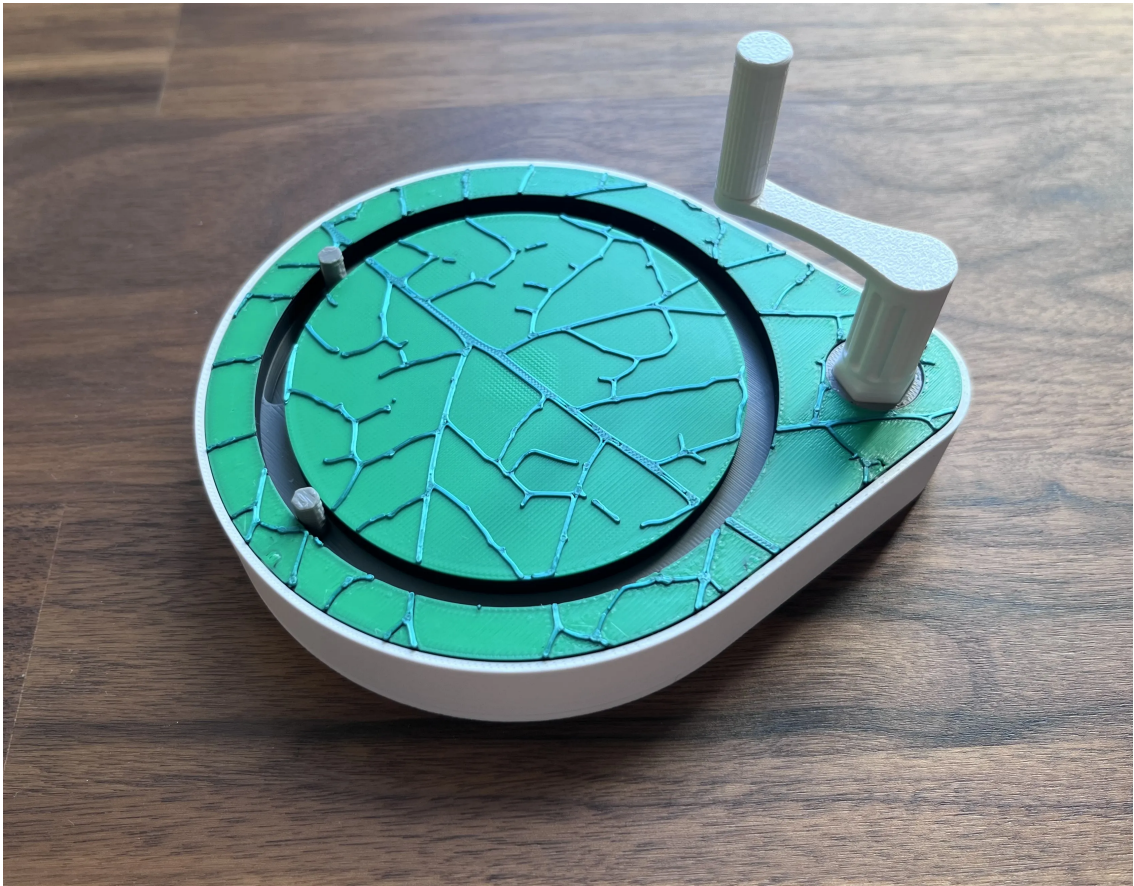
5. Place the outer lid inside the base. The crank hole on the tapered side of the lid really benefits from some lubrication.



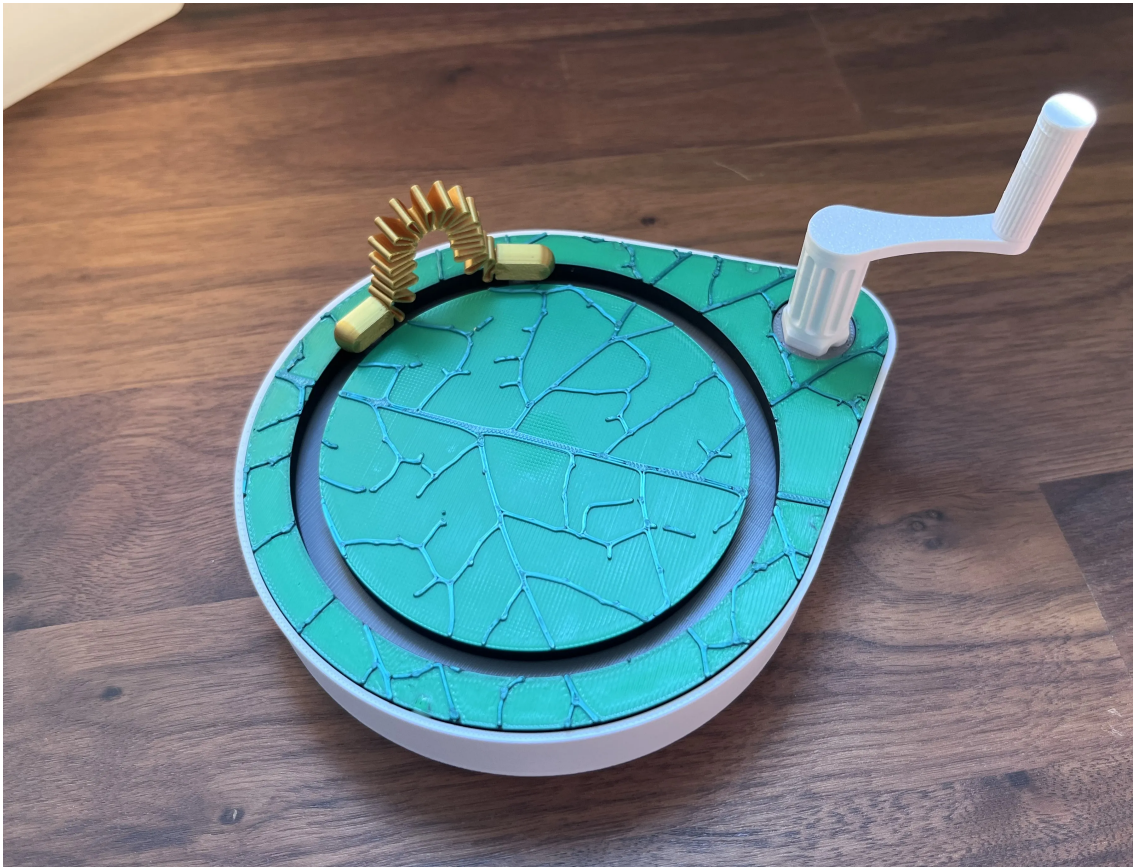
6. Press the crank into the hole by the driving gears and and click the crank handle into place at the end of the crank arm. The crank should stay in the hole with friction. Now is a good time to make sure that the mechanism works and feels smooth before the next step.



7. Press the center lid into place, minding the small pip that dictates the orientation. Observing the leaf pattern can help as well.

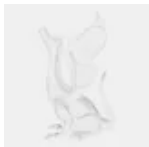


8. Fit the caterpillar on the moving pins. I found this to be easier in the minimally extended position. The worm may require some bending to make it conform to a nice shape, but I found that after initial tinkering it holds its shape very well.



Good luck, and let me know if you run into any issues!

This remix is based on



None

Model files



caterpillar_v2.stl



caterpillar_automaton_v2.3mf



big_gear_bottom.stl



crank.stl



center_lid.stl



base.stl



handle_v3.stl



drive_gear_top_v3.stl



drive_gear_bottom_v3.stl



handle_v2.stl



big_gear_top.stl



outer_lid.stl

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