After I built my first coke can Stirling engine, I thought it was over complicated and could be made easier to build. This is a simpler version of the coke can Stirling engine.

**Important note:** It has been found that aluminium drinks cans need additional cooling around the top because the aluminium is so thermally conductive. Use steel cans if you can, such as Pepsi, Tango etc.

Thanks to David Williamson for the diaphragm design/construction method. Check out his website [here](#)!

**Materials**

- 1 Coke can
- Steel wire wool
- 1.6mm steel wire
- Spring paper clip
- Normal paper clip
- 0.4 – 0.6mm fishing line
- Super glue
- Thin cardboard from a cereal box
- A balloon
- 6.35mm electrical connector/spade connectors.
Step 1: Open the can with a can opener

Step 2: Bend a paper clip into this rough shape, this is so that you can tie the wire onto the displacer later on

Step 3: Roll the steel wire wool around a bic pen

Step 4: When it's a little bigger then the can opening, stop rolling the wool and cut it to size.

Step 5: Cut it down to about 2/3rds of the height of the can

Step 6: Thread the paper clip you formed earlier through the centre of the steel wire wool.
Step 7: Trim around the top of the displacer so that it will match the bevel around the top of the can.

Step 8: Tie on about a foot of fishing line to the hook in the paper clip.

Step 9: Squeeze the displacer into the can. It's a tight fit, but it can be done.

Step 10: Draw two circles on the cardboard about the same diameter as the opening in the top of the can.

Step 11: Inflate balloon

Step 12: Super glue the cardboard disc onto the balloon, there's usually a slightly deformed part of the balloon - this is roughly the centre. Glue it on here.
Step 13: Deflate the balloon and cut off the neck.

Step 14: Turn the balloon inside out.

Step 15: Cut off the balloon around the centre.

Step 16: Glue the other cardboard disc over

Step 17: Use a sewing needle to pierce a hole through the centre of the cardboard disc. Thread the fishing line through that hole. Stretch the balloon over the can. Check that the displacer can be moved up and down freely.

Step 18: Cut a piece of wire about a metre long. Mark the approximate length of the bearing supports by making a bend around 15cm from one end.
Step 19: Twist it around the can to secure it.

Step 20: Repeat steps 18 and 19 for the other side.

Step 21: Bend the two 15cm pieces upwards.

Step 22: The rest of the wire is bent downwards and formed into a big circle to support the coke can. I just twisted the wires together.

Step 23: Measure from the top of the can and cut the two bearing wires down to about 15cm.

Step 24: Crimp on two spade connectors for the bearing points.
Step 25: Cut a piece of the steel wire about a metre long. Bend the displacer crank, this part should be bent out around 25mm.

Step 26: About 5mm along from this, and rotated around by 90 degrees, start forming the two crank arms for the diaphragm.

Step 27: The diaphragm cranks arms should be a short a stroke as possible, 2 - 4mm is good.

Step 28: They'll look like this when they're finished.

Step 29: You should have about 80cm worth of wire left to form the flywheel. About 30mm from the diaphragm crank arm bend the wire in the opposite direction to the displacer crank arm. This is so you can counter balance it later on. Then about 12 cm along, start forming the circle for the flywheel.

Step 30: I just free formed this, but you could draw a template if you want.
Step 31: Make the displacer connecting rod as above. To get the rights, thread the cranks through the bearing holes, and line it up as you make it.

Step 32: The diaphragm connecting rods are made in the same way. Start by forming a half-circle curve on the wire the same as the cardboard disc. You need two of these the same, so repeat this and the next step.

Step 33: Form the zig zags and crimp on spade connectors.

Step 34: Fit all of the connecting rods on the crankshaft.

Step 35: Glue the ends of the diaphragm connecting rods to the cardboard discs using super glue.

Step 36: Tie the fishing line onto the displacer connecting rod. Make sure the displacer is moved all the way up and down by the cranks. When your happy, super-glue the knot so it can't come undone.
Step 37: Secure the end of the flywheel using a spring clip. This also counter balances the displacer. It's really important that you counterbalance the displacer - the engine won't work if you don't.

It's finished now! All you have to do is light a candle under the coke can and let it heat up. Once it's hot, turn the flywheel to start the engine.

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