Product Decomposition

Design Organization: ME 40 | **Date:3/07**

Product Decomposed: HandHeld Sewing Machine

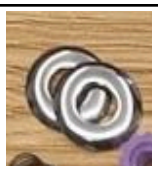
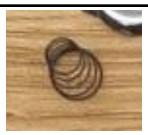
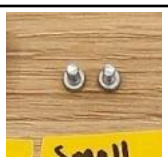
Description

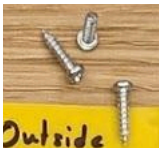
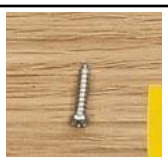
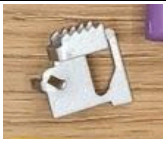
This is a Handheld sewing machine meant for sewing things on a smaller scale. It is portable and small so you can carry it in your purse or backpack with no issue.

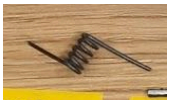
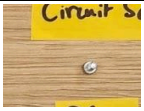
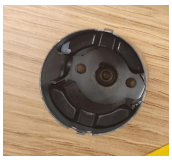
How it works:

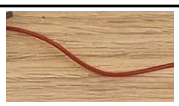
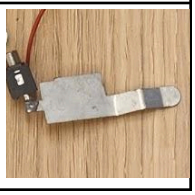
First, the product uses 4 AA batteries that are plugged into the back of the machine that is equivalent to 6 Volts of power, this machine also has a DC ring in the back as well, the machine come assembled already as the sewing machine needle is in the front, and the power button is then pressed down to activate the rotary wheel which starts the oscillation of the needle to move up and down at a constant speed.
speed

Parts:

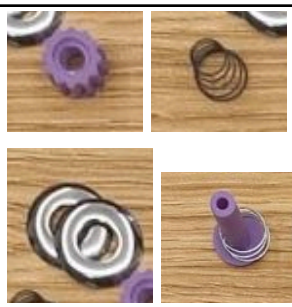
Part #	Part Name	# Req'd	Material	Mfg Process	Image
1	Tension control	1,1	Polymer, Metal Spring	Injection Molded, Wound Wire	
2	Washers	2	Sheet metal	Stamped sheet metal	
3	Spring	1	Metal Spring	Wound Wire	
4	Tension Control knob	1	Polymer	Injection Molded,	
5	Rotary Wheel	1	Polymer	Injection Molded	
6	Small screws	2	steel	Thread Rolling	

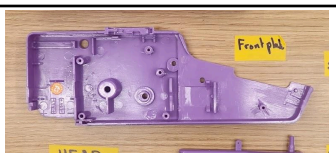
7	Outside screws	3	steel	Thread Rolling	
8	Gear case screw	1	steel	Thread rolling	
9	Power switch and safety control	1	Polymer	Injection Molding	
10	Battery Case	1	Polymer, Metal (Some sort of Conductor), Some sort of Adhesive	Injection molded, Stamped sheet metal, Adhesive	
11	Battery Springs	1	Polymer, Metal Spring	Injection Molded, Wound wire	
12	Gear Case	1	Polymer	Injection Molding	
13	Back Casing	1	polymer	Injection Molded	
14	Front Casing	1	Polymer	Injection Molded	
15	Movement control	1	Polymer, Spring, Screw	Injection Molding, Wound Wire, Thread Rolling	
16	Tension Spring	1	Steel	Wound wire	
17	Base Plate	1	steel	Metal Bending	
18	Head Plate	1	Polymer	Injection Molded	

19	Torsion Spring	1	Metal Spring	Wound wire torsion	
20	Spring Bar	1	Steel	Extruded and cut	
21	Movement Translator	1	steel	Metal bending	
22	Fastening Plate	1	steel	Metal bending	
23	Cloth Plate	1	steel	Metal bending	
24	Needle Arm	1	steel	Metal bending	
25	Circuit Screw	1	steel	Thread rolling	
26	Oscillation conversion gear	1	polymer	Injection Molding	
27	Rotary wheel to Transition gear	1	polymer	Injection moulding	
28	DC Brushed Motor North and South pole magnetic field ring	1	Copper, steel, polymer	Powdered Metallurgy	
29	Brushed DC motor	1	Copper, Steel	Shaft: CNC Turning Rotor Core: Die Casting Wire: Wire Turning Commutator: Copper molding	

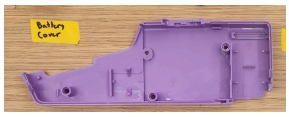
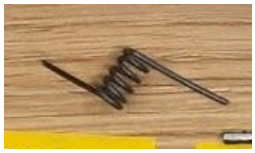
30	Brushed DC motor power translation	1	Copper, Polymer	Injection molding + wire turning	
31	Bobbin Assembly	1	Plastic, String	Thread, injection molded	
32	Needle Assembly	1	Metal	Extruded and cut	
33	DC in Ring	1	Metal	Thread rolling	
34	Circuit Wires	1	Copper wire, wire coating	Wire pulling and coating extrusion	
35	Switch	1	Sheet Metal	Metal rolling	

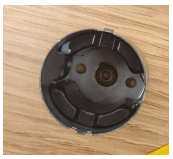
Disassembly:

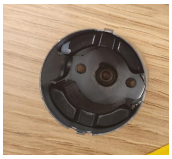
Step #	Procedure	Part #s removed	Image
1	Take apart Bobbin Assembly	31	
2	Unscrew tension Assembly	1, 2, 3, 4	
3	Take out needle assembly	32	
4	Unscrew Rotary wheel	5	
5	Unscrew Small screws	6	

6	Unscrew 3 Outside screws	7	
7	Take off Battery Case	10	
8	Pull apart front plate leaving everything in tact on the back plate	14	

9	Take apart power switch and safety	9	
10	Unscrew gear case screw	8	
11	Pull apart gear box crate	12	
12	Take apart top oscillating gear	26	
13	Then take apart bottom transition gear	27	
14	Unscrew Head plate	18	

15	Pull fastening plate off of cloth plate and pull off tension spring	22, 23, 16	  
16	Take needled arm out from the back plate	24, 13	 
17	Flip needle arm over and start taking apart the internal components starting with torsion spring	19	
18	Pull apart spring bar from torsion spring	20	
19	Retrieve movement translator	21	
20	Retrieve movement control	15	
21	Pull apart base plate	17	

22	Take motor out of back plate	28, 29, 30	  

23	Take off DC ring from the side of the back plate	33 from 13	
24	Detach circuit wires from motor by cutting it off	34	
25	Take motor out of little steel cylindrical case	Parts (28, 29, 30)	
26	Take cooper inside of motor from the North South Magnetic fields	29 from 28, 30	
27	Set all aside and label	1-35	All

Team member: Tej Chhabra

Team member: Matthew Maiava

Team member: Chris Pisinski

