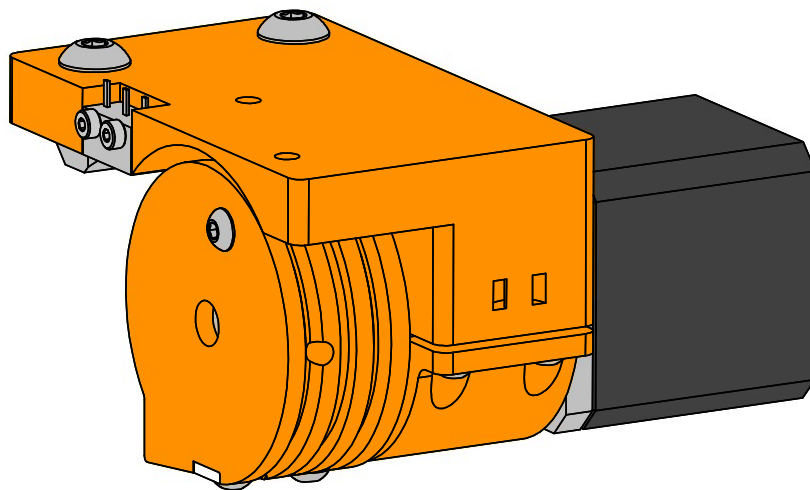


2

1

B

B



A

A

2

1

### Toolchanger Lock Actuator Assembly



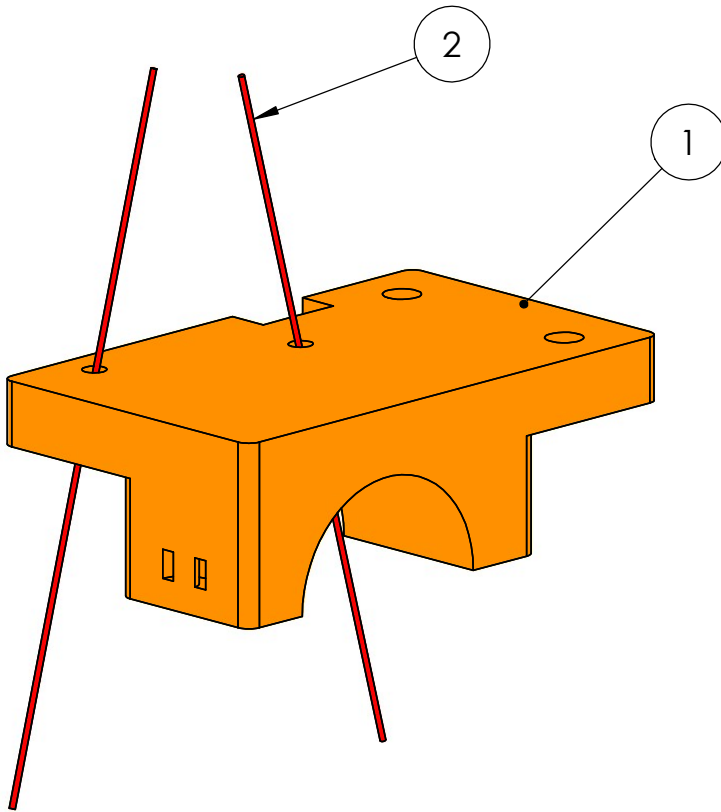
Created by:  
Joshua Vasquez

last edited:  
1/30/2020

SCALE: 1:1

SHEET 1 OF 15

B




Poke a loose end of wire rope through both holes shown above to ensure that they were printed correctly. If they don't fit, gently twist a Phillips screwdriver back-and-forth into the hole to widen it. Remove the wire rope when finished.

B

A

ITEM NO.	DESCRIPTION	QTY.
1	Top Lock Actuator Plate	1
2	full length of wire rope	1

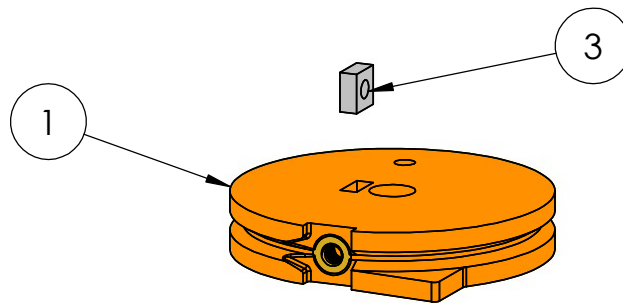
Part Inspection		
	Created by: Joshua Vasquez	last edited: 1/30/2020
	SCALE: 1:1	SHEET 2 OF 15

2

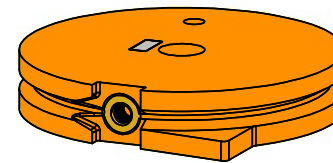
1

B

B




Press Fit the square nut such that it is flush with the top surface of the fixed half pulley.



Result

ITEM NO.	DESCRIPTION	
1	Fixed Half-Pulley with Insert	1
3	M3 Square Nut	1

Fixed Half Pulley with Press Fits		
	Created by: Joshua Vasquez	last edited: 1/30/2020
	SCALE: 1:1	SHEET 3 OF 15

A

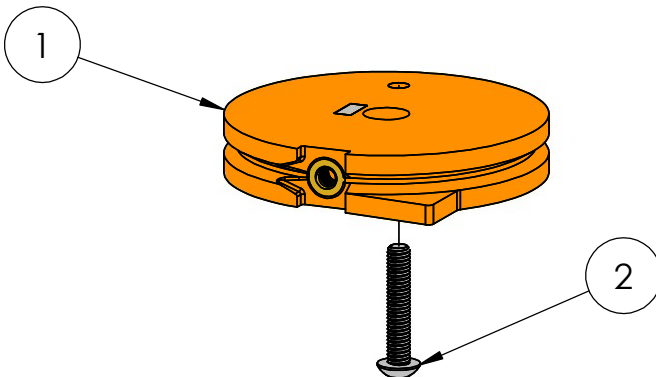
A

2

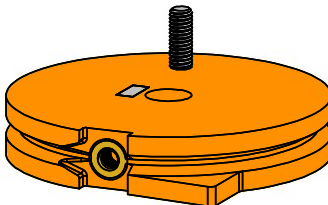
1

2

1




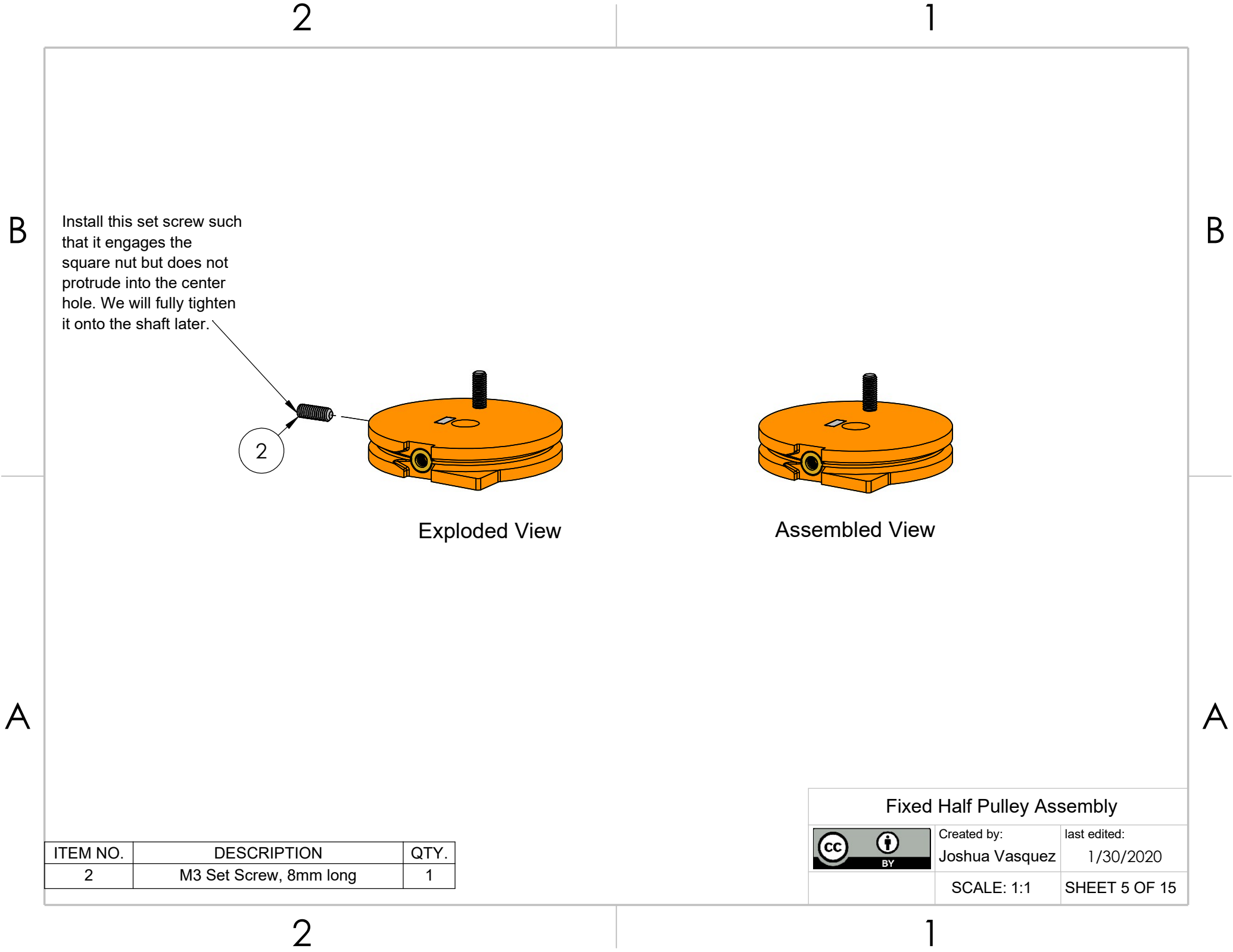
Fully screw in the butthionhead screw such that it pokes out from the top.



Result

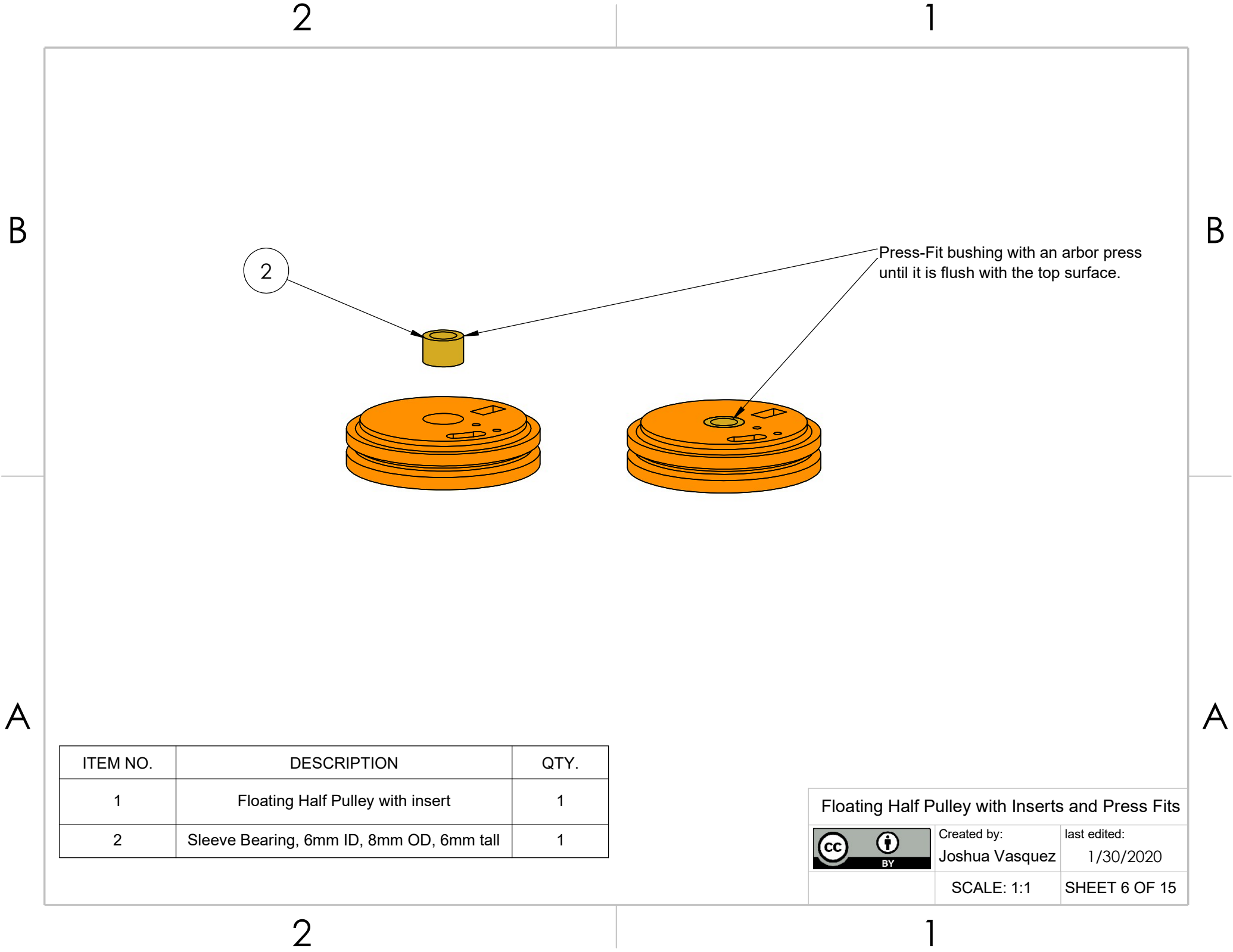
ITEM NO.	DESCRIPTION	
2	M3 Buttonhead Screw, 16mm long	1

Fixed Half Pulley with Inserts		
	Created by: Joshua Vasquez	last edited: 1/30/2020
	SCALE: 1:1	SHEET 4 OF 15



ITEM NO.	DESCRIPTION	QTY.
2	M3 Set Screw, 8mm long	1

Fixed Half Pulley Assembly		
	Created by: Joshua Vasquez	last edited: 1/30/2020
	SCALE: 1:1	SHEET 5 OF 15



ITEM NO.	DESCRIPTION	QTY.
1	Floating Half Pulley with insert	1
2	Sleeve Bearing, 6mm ID, 8mm OD, 6mm tall	1

Floating Half Pulley with Inserts and Press Fits		
	Created by: Joshua Vasquez	last edited: 1/30/2020
	SCALE: 1:1	SHEET 6 OF 15

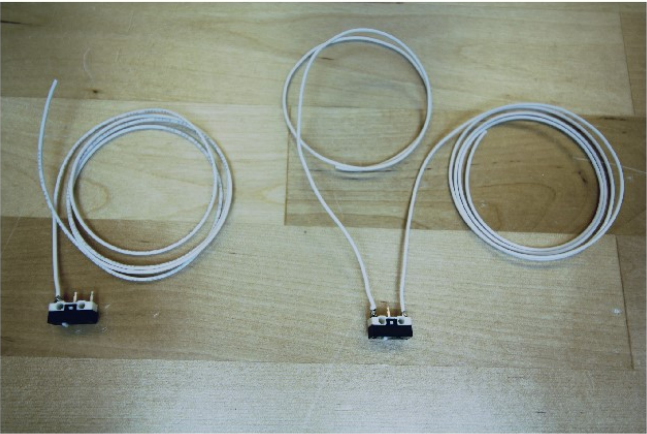
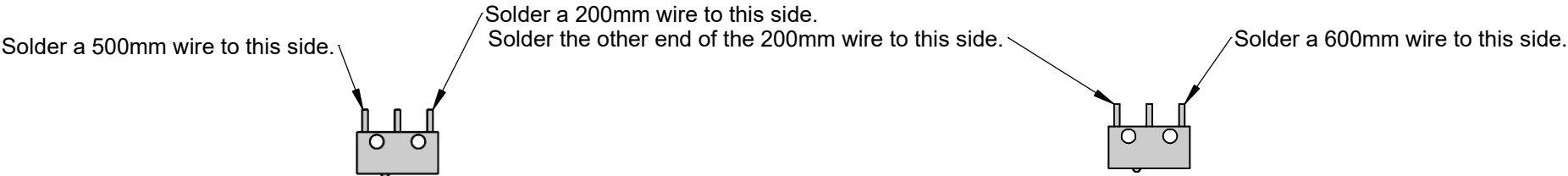
The lock actuator assembly requires two limit switches wired in series.

External Limit Switch

This switch will be installed on the mounting plate.

Internal Limit Switch

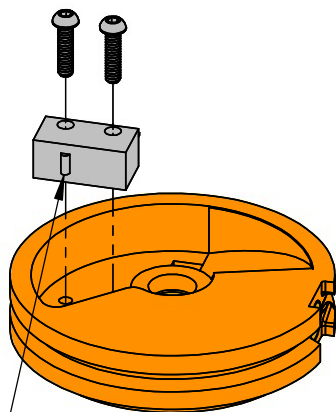
This switch will be installed inside the pulley assembly.



Result. TODO: retake this picture with the completely soldered wire harness.

ITEM NO.	DESCRIPTION	QTY.
1	Mechanical Limit Switch	2
2	26AWG stranded wire, 500mm long	1
3	26 AWG stranded wire, 200mm long	1
4	26 AWG stranded wire, 600mm long	1

Internal Switch Wiring		
	Created by: Joshua Vasquez	last edited: 1/30/2020
	SCALE: 1:1	SHEET 7 OF 15

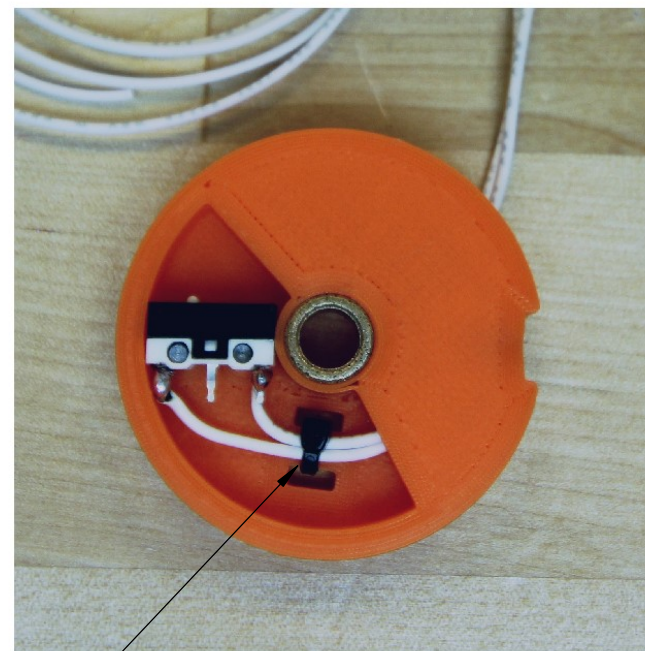


Exploded View



TODO: retake both pictures because the old version is mirrored!

The limit switch button should be closer to the outside.



Zip-tie the wires down such that the head of the zip tie is inside the cavity and does not protrude out the bottom of the printed part.

ITEM NO.	DESCRIPTION	QTY.
1	Mechanical Limit Switch	1
2	Floating Half-Pulley Assembly	1
3	Small Zip Tie	1
4	M2 Buttonhead Screw, 8mm long	2

### Internal Switch Installation



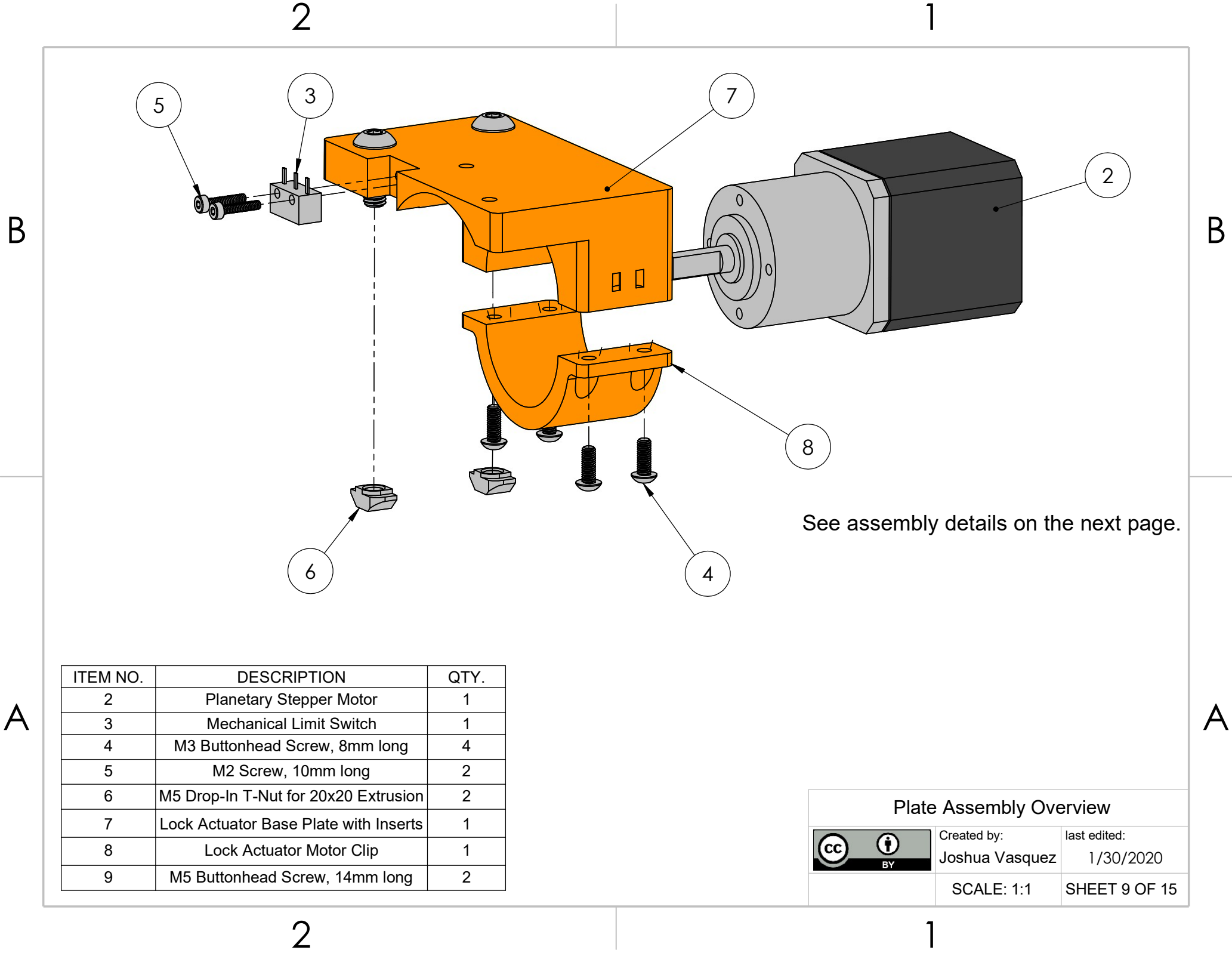
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SCALE: 1:1

SHEET 8 OF 15

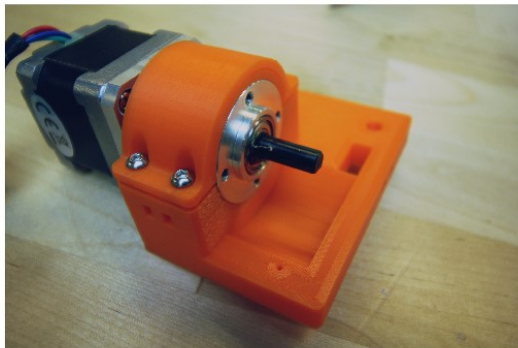
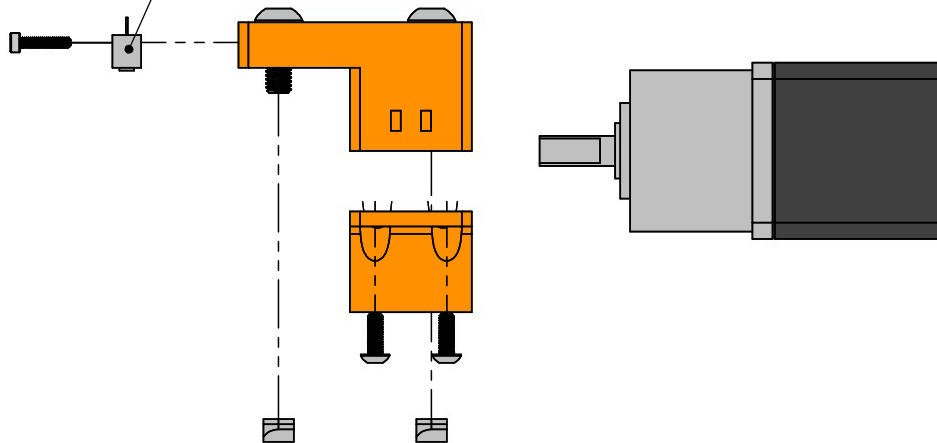




2

B

Install the dangling switch in the wire harness from the prior step first;  
then install the screws.



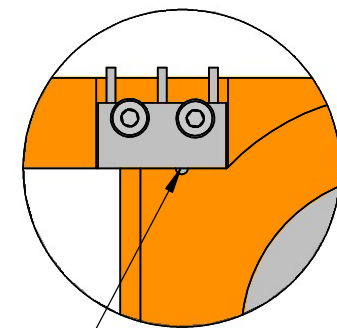
Note: the face of planetary stepper should be flush with the face of the locking plates. The limit switch wire should curl out of this gap.

2

1

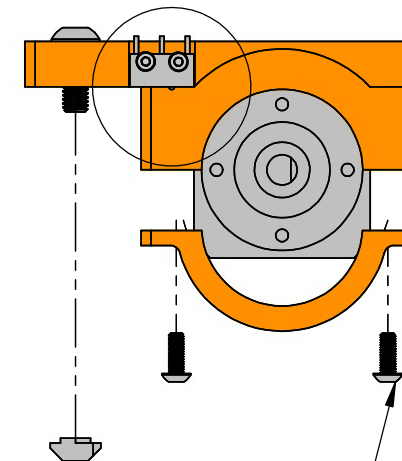
B

Note the orientation of the switch  
from this view.



DETAIL D

D



Tighten the four M3 screws  
until you can no longer twist  
the stepper motor by hand  
relative to the plate.

A

### Plate Assembly Details



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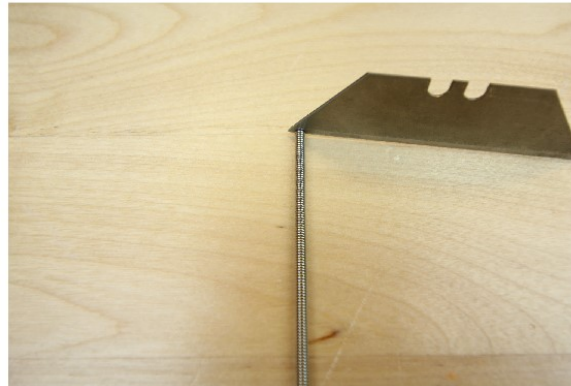
SCALE: 1:1.5

SHEET 10 OF 15

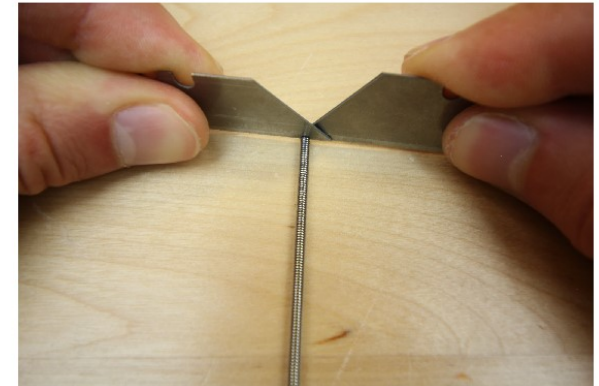
1

With calipers and hard wire cutters, measure and cut a length of Spring Guide to 106.5mm.

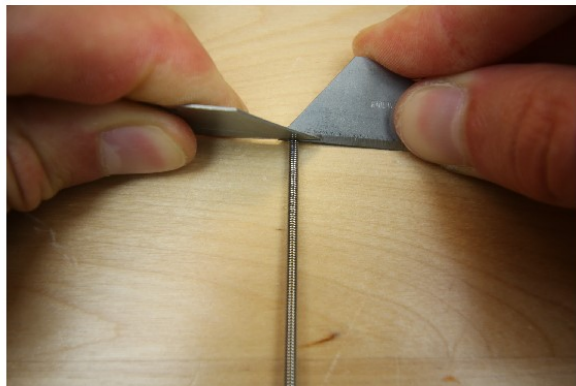
Follow the remaining instructions to create loops in both ends of the cut spring guide.



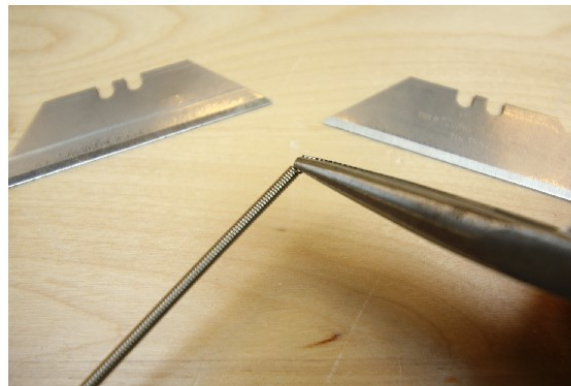
Wedge a knife blade into the last full loop on the spring guide.



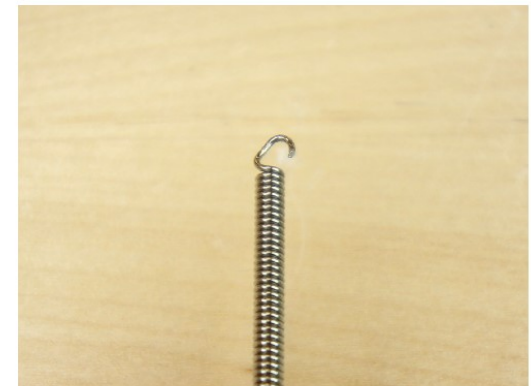
Wedge a second knife blade into the same location as the prior knife blade.



With the blade that is farthest towards the end of the spring guide, bend it outwards to bend the last loop away from the spring guide.



Use pliers to open the loop.



Create a loop like this one on both ends of the spring. It need not be aesthetically perfect as we will crush it into another piece in the next step.

ITEM NO.	DESCRIPTION	QTY.
1	106.5mm Spring Guide (0.088-in outer diameter)	1

### Locking Spring Fabrication



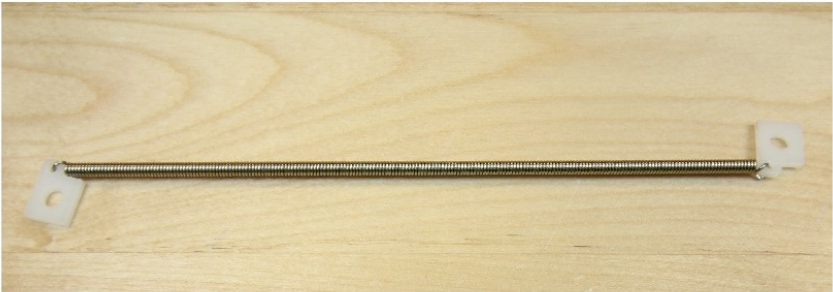
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SCALE: 1:1

SHEET 11 OF 15

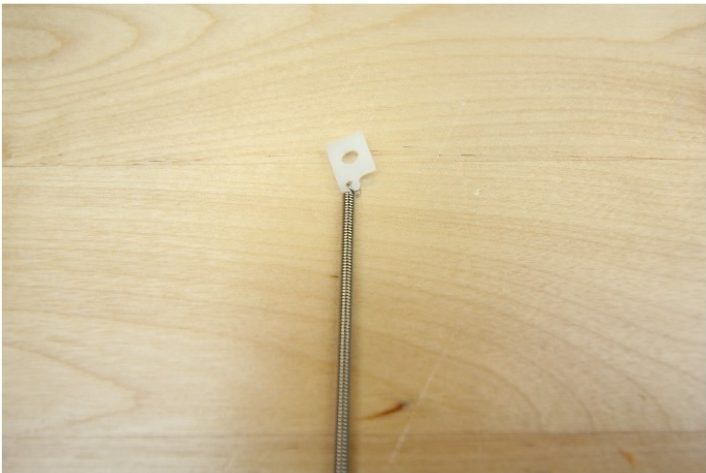
B



Note the orientations of both cinch plates on the ends of the spring guide.



Loop a cinch plate into each loop and use pliers to squeeze the loop such that the cinch plate can freely rotate but cannot fall off.



A

ITEM NO.	DESCRIPTION	QTY.
1	Spring Guide with formed loops	1
2	cinch plate	2

Locking Spring Assembly



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SCALE: 1:1.5

SHEET 12 OF 15

B

A

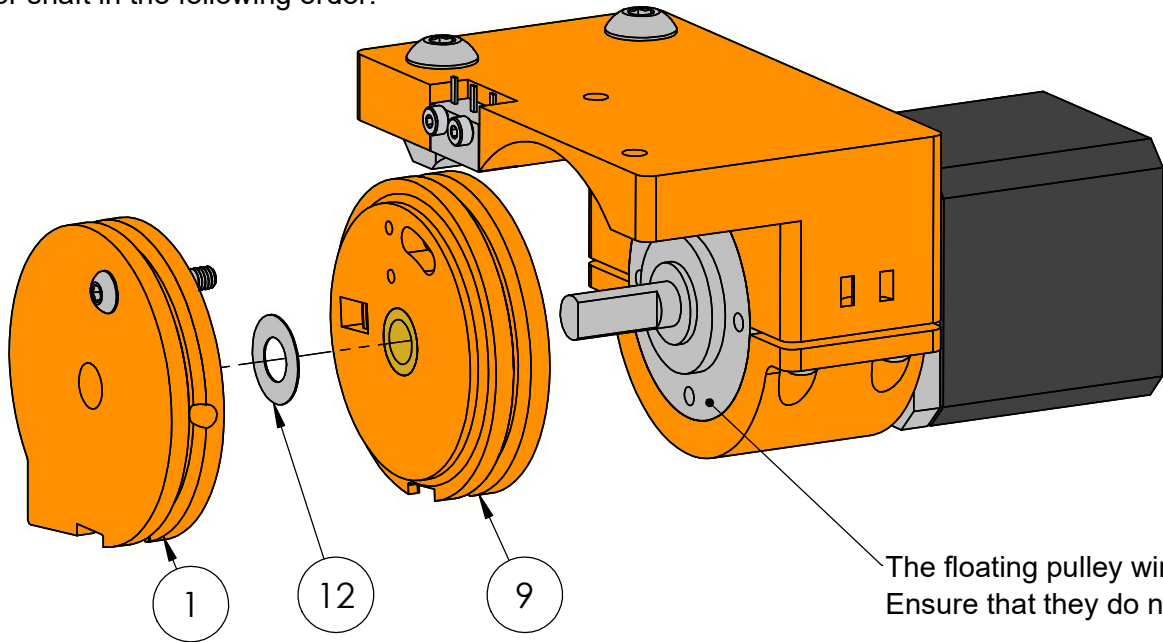
2

1

Compress the 3 components onto the motor shaft in the following order.

B

B

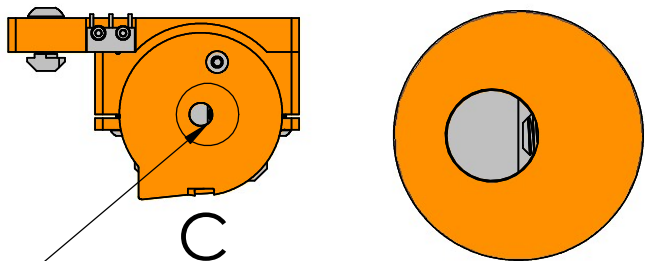


The floating pulley wires will need to ride smoothly in this location. Ensure that they do not snag when installed.

A

A

DETAIL C  
SCALE 2 : 1



Note how the set screw must line up with the flat part of the shaft in the final assembly. Before installing the fixed pulley assembly, twist the motor shaft by hand such that the flat section properly engages the set screw.

Apply threadlock to this setscrew. Then fully-tighten it.

ITEM NO.	DESCRIPTION	QTY.
1	Fixed Half-Pulley Assembly	1
9	Floating Half Pulley Assembly	1
12	M6 Shim, 0.2mm thick	1

Pulley Installation



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SCALE: 1:1

SHEET 13 OF 15

2

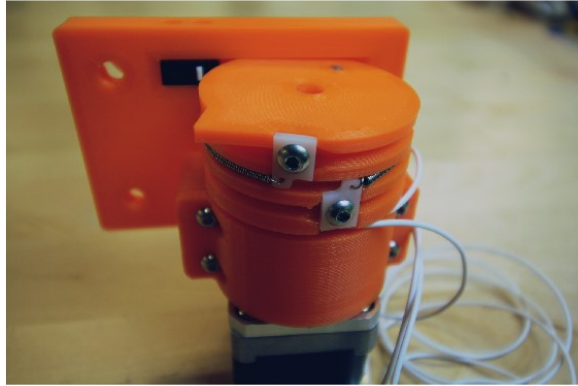
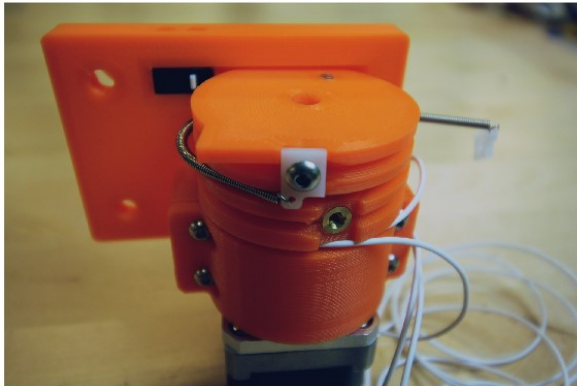
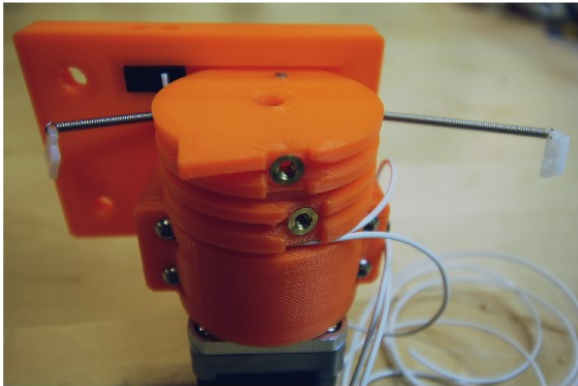
1



2

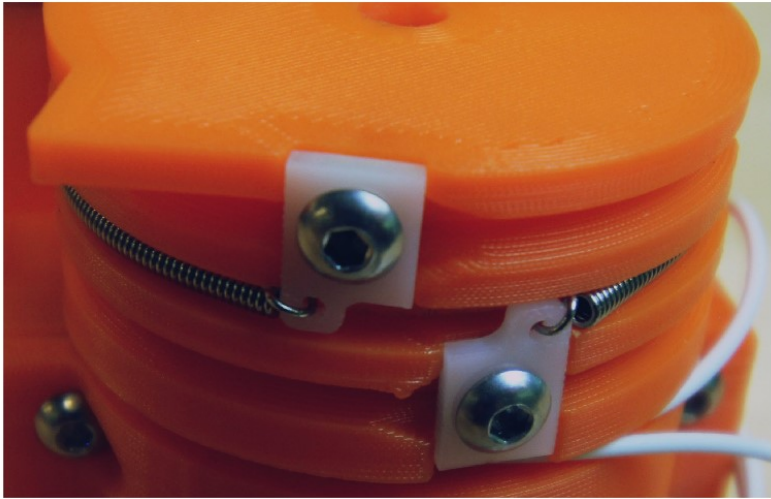
1

B



B

A



A

ITEM NO.	DESCRIPTION	QTY.
1	M3 Buttonhead Screw, 8mm long	2
2	Locking Spring Assembly	1

2

1

Spring Installation

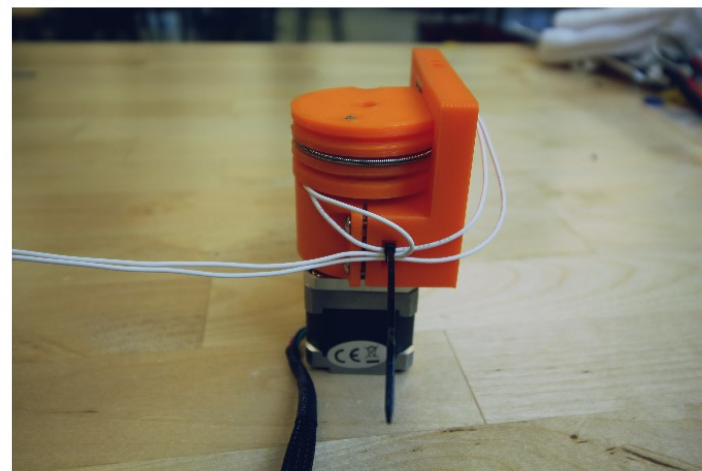
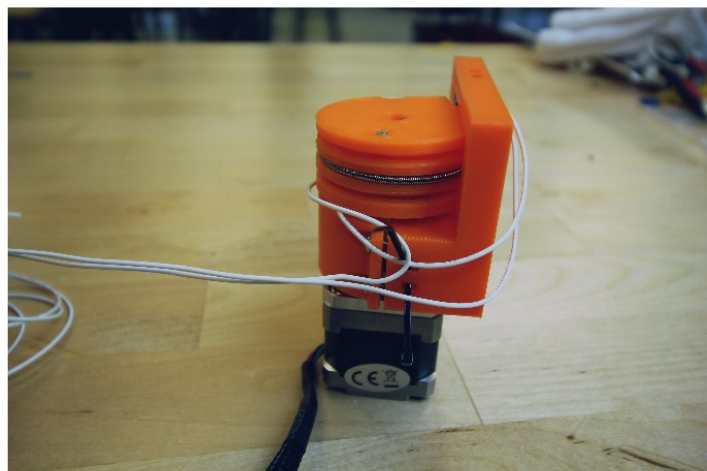


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SHEET 14 OF 15



Gather the loose wires and zip tie them such that the long leads extend as show in the picture. Ensure that the pulley can freely rotate to the limit without being snagged. If it does snag, tighten up slack on the two wires that extend from the pulley and re-zip-tie.



Optional: sleeve the two loose wires for easy management.



From the connector bag that came with the Duet, install the 3-wire connector as shown. Polarity does not matter, but the wires must be installed on the outermost connector sockets.

## Lock Detect Wiring



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SHEET 15 OF 15