

ENGR - 114a Term Project

Tandem Bicycle

Colin Hodge

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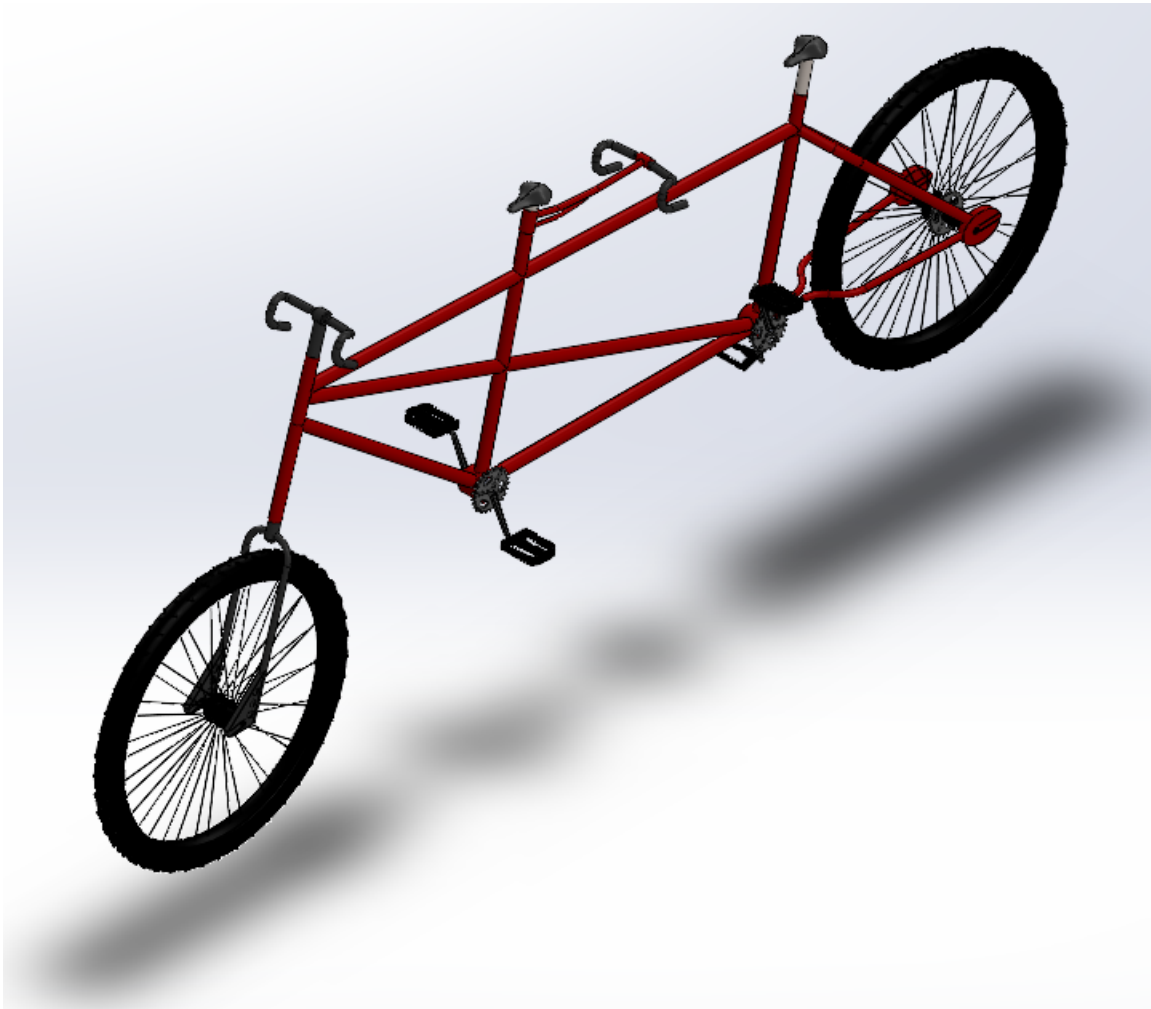
Contents

1	Project Description & Isometric Assembly View	3
2	Exploded View with Parts List	4
3	Orthographic Views	5
3.1	Orthographic of Entire Assembly	5
3.2	Orthographic View of Moving Part (Tandem - Fork)	6
4	Sub-Assemblies	7
4.1	Exploded and Orthographic View of Pedal Assembly	7
4.2	Exploded and Orthographic View of Front Wheel Assembly	9
5	Detailed Drawing of All Parts	11
5.1	Fork (Carbon Fiber)	11
5.2	Wheel (Rubber/Aluminum, used in the front and back)	12
5.3	Back Gear (Aluminum)	13
5.4	Front Wheel Caps (Plastic)	14
5.5	Back Wheel Caps (Plastic)	15
5.6	Frame (Carbon Fiber)	16
5.7	Back Handle Bar Holder (Aluminum)	17
5.8	Pedal Gear (Aluminum)	18
5.9	Seat (Plastic/Steel)	19
5.10	Pedal Insert (Silver)	20
5.11	Pedal (Plastic)	21
5.12	Handlebars (Carbon Fiber, used in the front and back)	22
5.13	Crank Arm (Carbon Fiber, pedal shafts)	23
6	Bill of Materials	24

1 Project Description & Isometric Assembly View

All units given in inches unless otherwise noted.

The tandem bicycle is identical to a normal bicycle in all ways but one, it only functions with two riders working together as opposed one working by themselves. Tandem, although thought of almost always as "The bicycle", refers to only the way that the seats are arranged and not the bike as a whole. Tandem bicycles have always had an interesting shape to them so drafting one in SolidWorks for the term project seemed like an interesting way to push the skills developed in this class to the next level.



2 Exploded View with Parts List

ITEM NO.	PART NUMBER	QTY.
1	Tandem-Frame	1
2	Tandem-Fork	1
3	Tandem-Handlebar	2
4	Tandem-Seat	2
5	Tandem-Wheel	1
6	Tandem-BackWheelCaps	2
7	Tandem-FrontWheel	1
8	Tandem-BackHandleBar	1
9	Tandem-BackGear	1
10	Tandem-FrontWheelCaps	2
11	Tandem-PedalInserts	2
12	Tandem-PedalGear	2
13	Tandem-PedalShafts	4
14	Tandem-Pedal	4

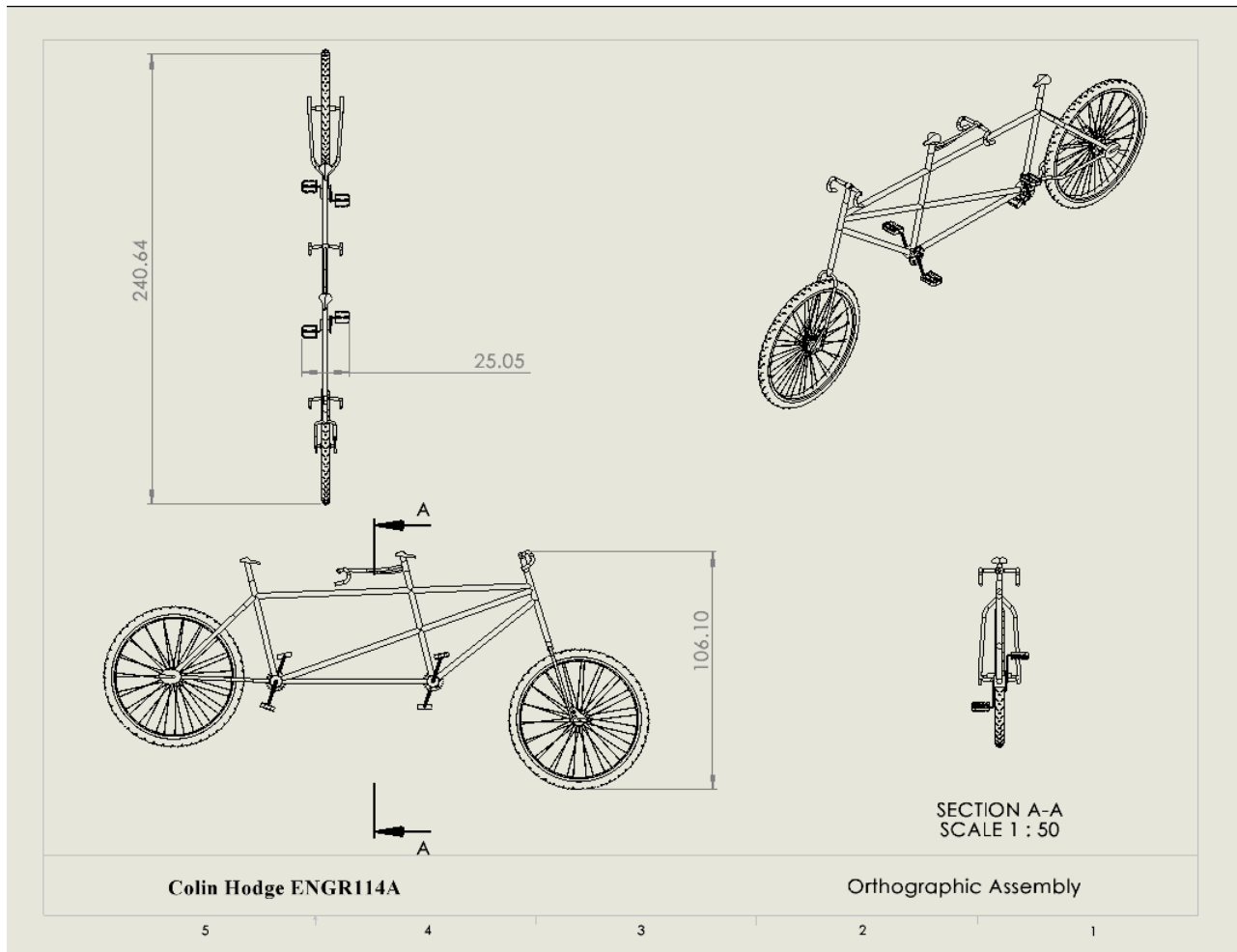
The diagram shows an exploded view of a tandem bicycle. The main frame (1) is the central structure. Two handlebars (3) are attached to the front. Two seats (4) are mounted on the frame. The rear wheel (5) is shown with its gear (9) and caps (6). The front wheel (7) is shown with its caps (10). The pedal assembly (11, 12, 13, 14) is shown in an exploded state, with two pedal shafts (13) and four pedals (14) connected to the frame via pedal gears (12) and inserts (11). The front fork (2) is also shown in an exploded state.

Colin Hodge ENGR114A

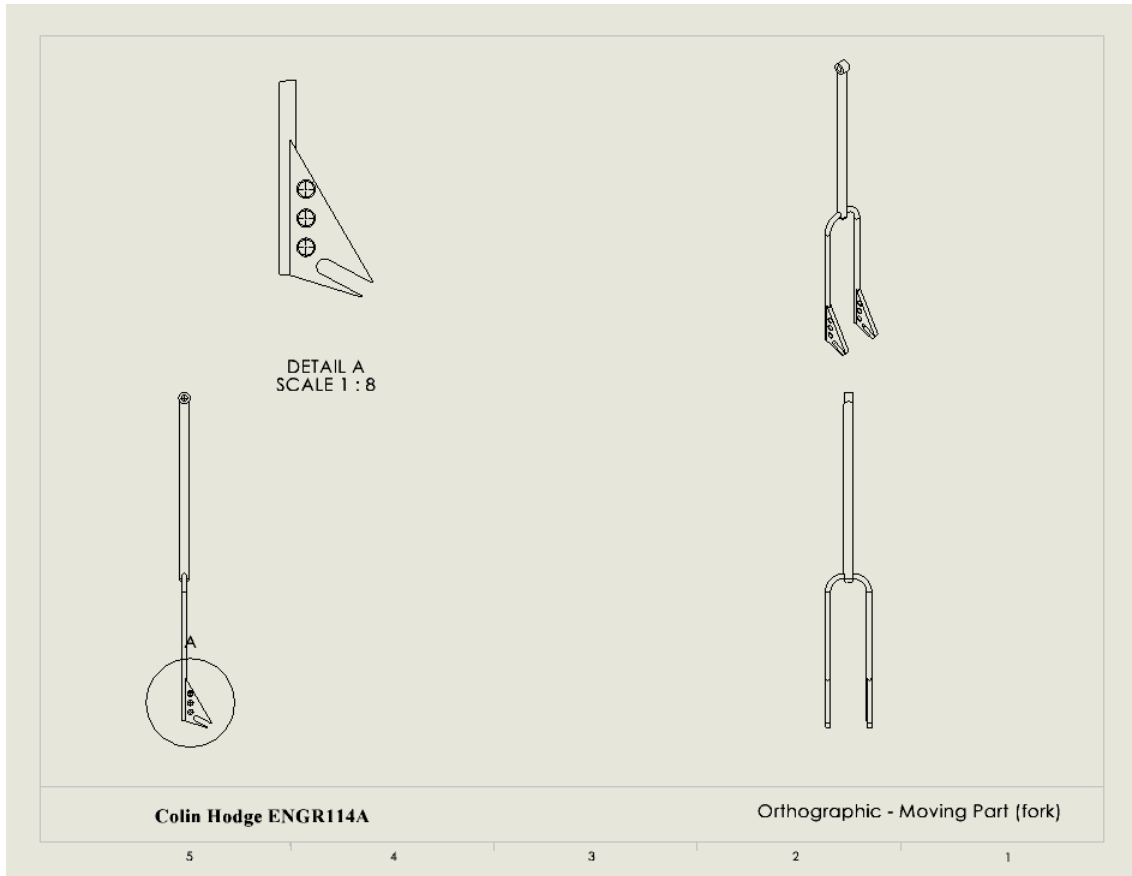
5 4 3 2 1

3 Orthographic Views

3.1 Orthographic of Entire Assembly

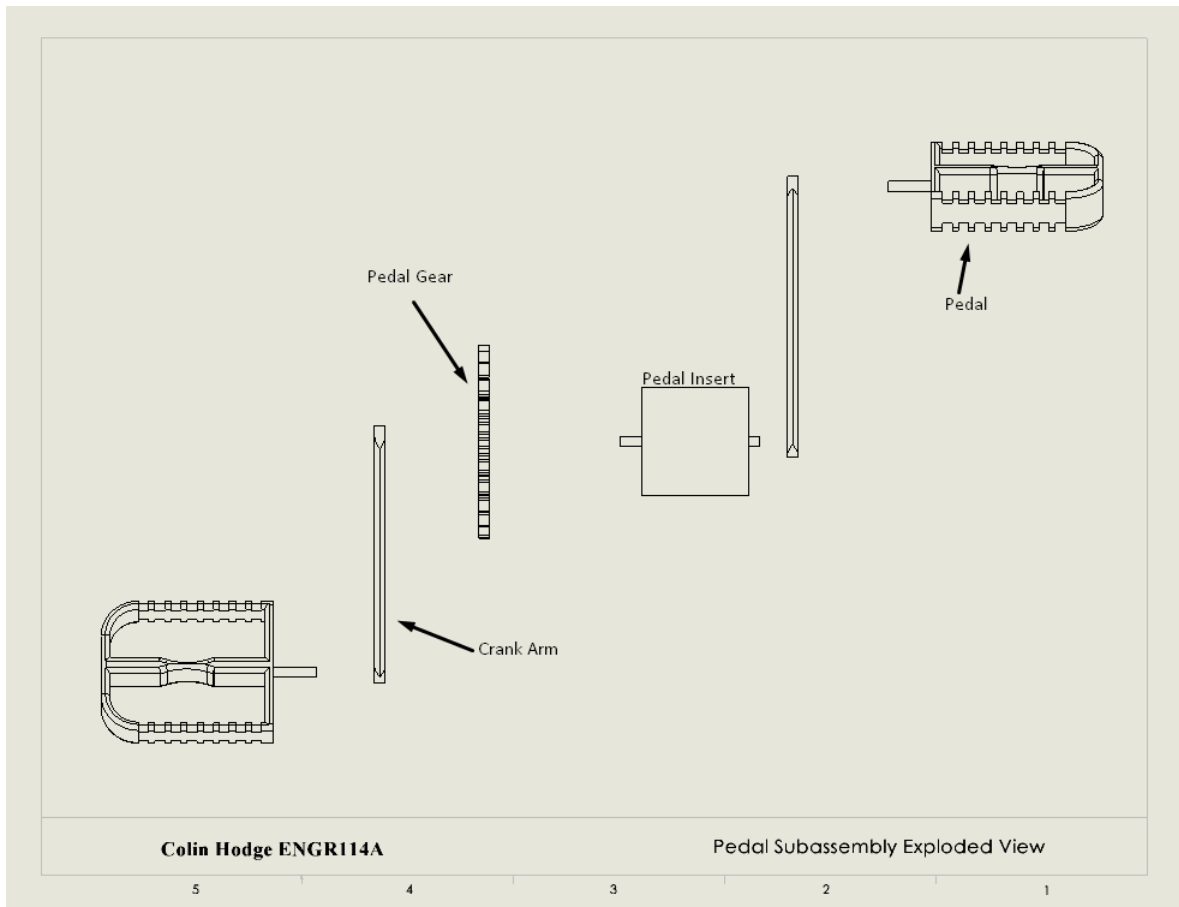


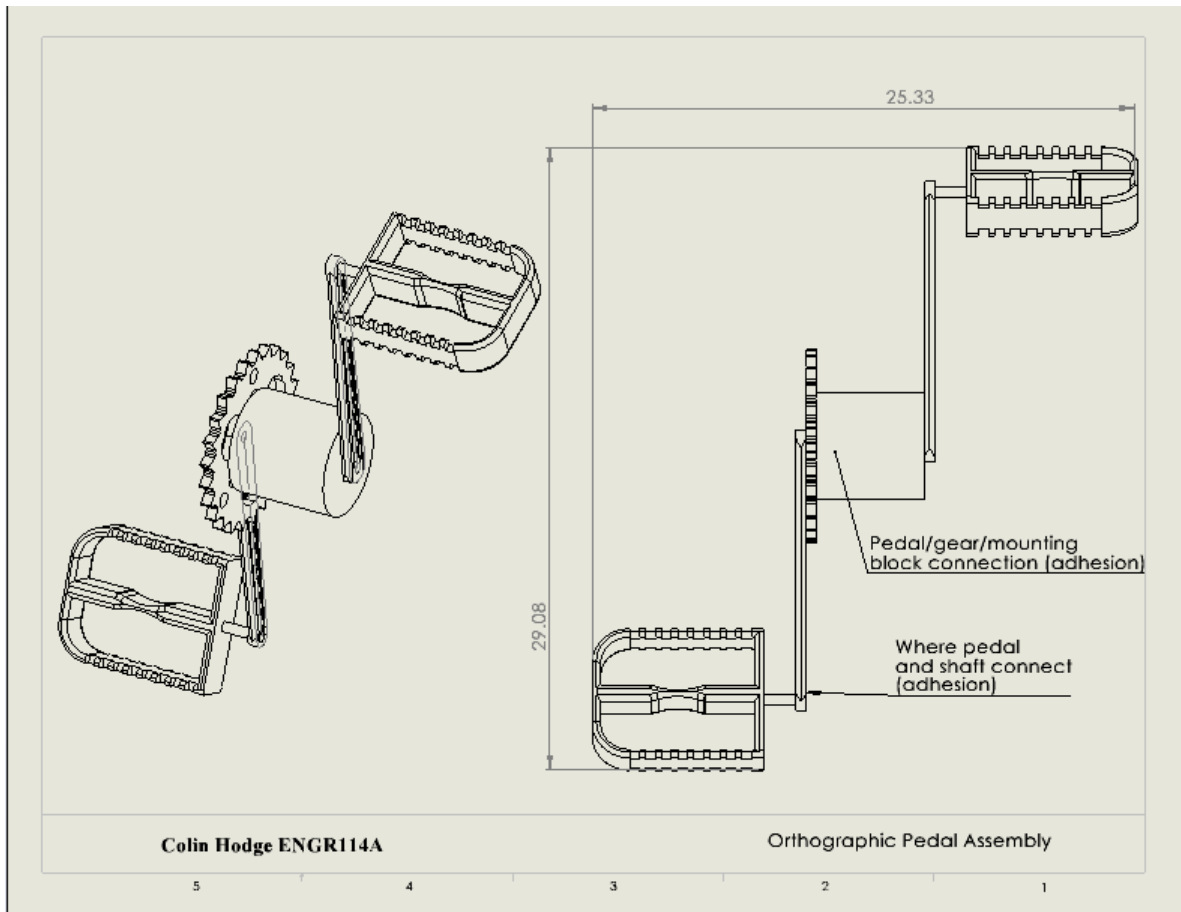
3.2 Orthographic View of Moving Part (Tandem - Fork)



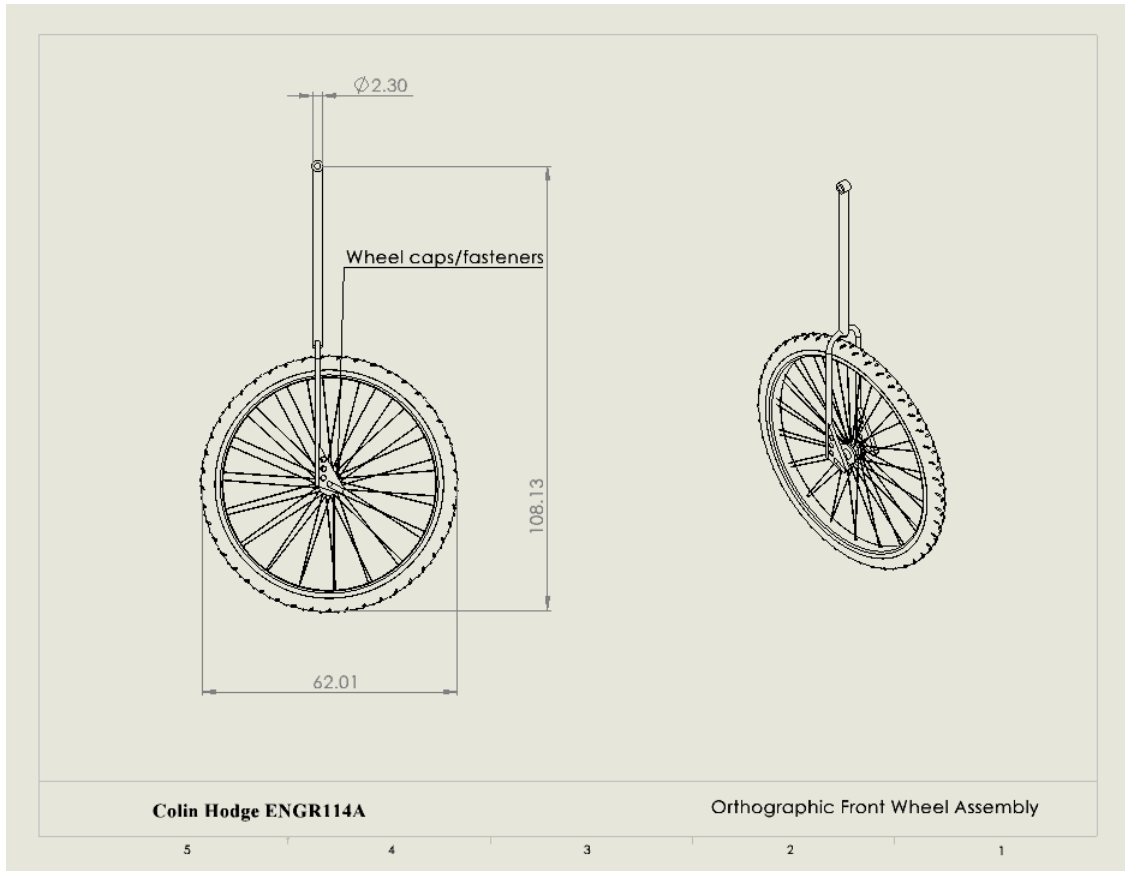
4 Sub-Assemblies

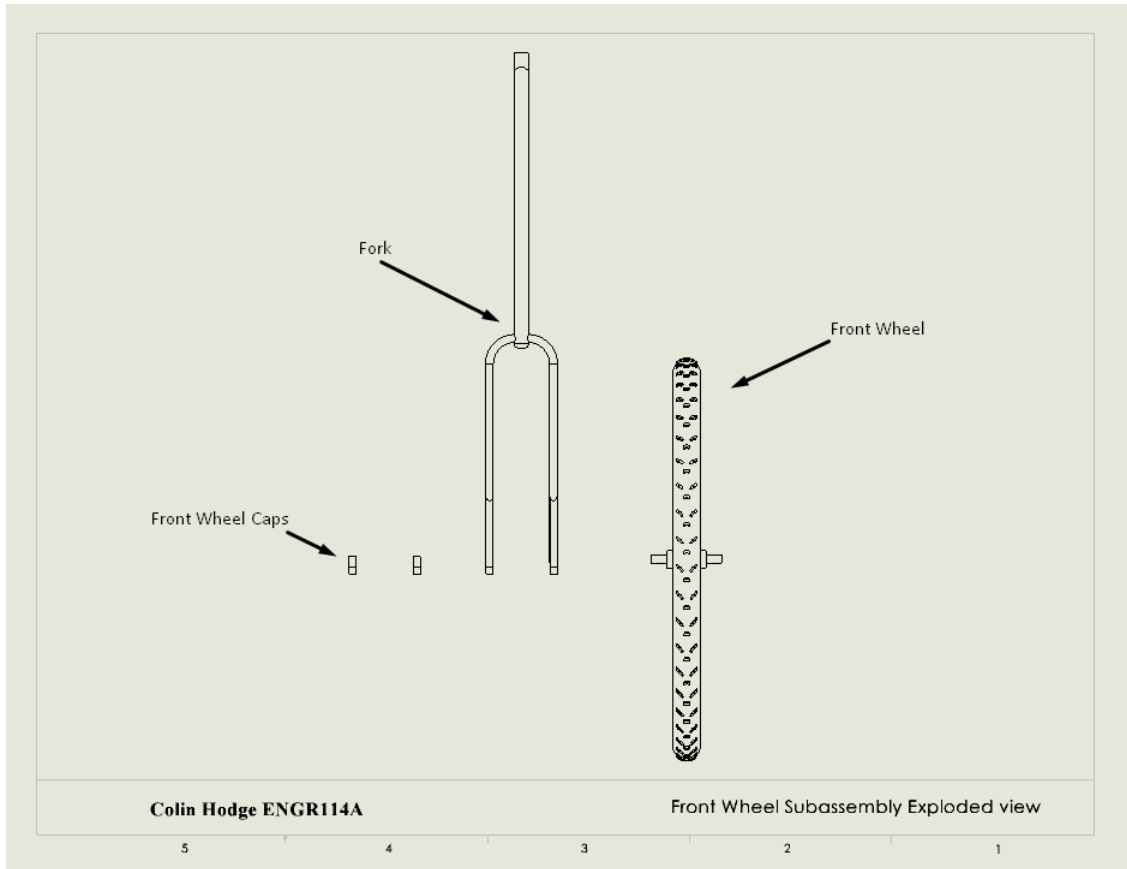
4.1 Exploded and Orthographic View of Pedal Assembly





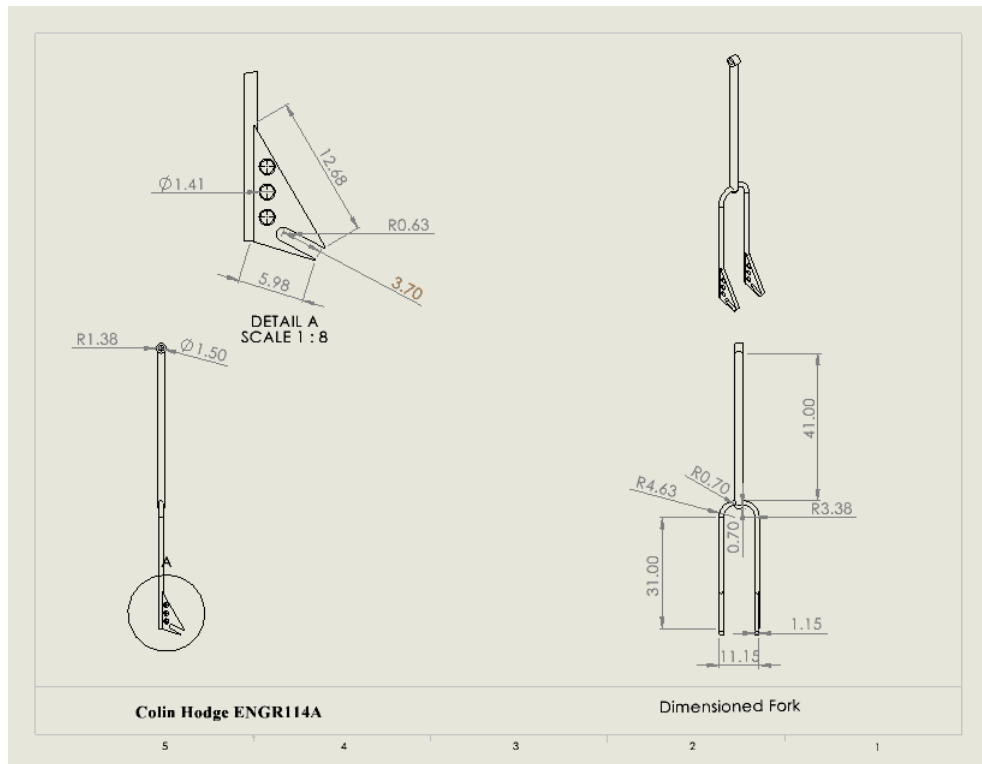
4.2 Exploded and Orthographic View of Front Wheel Assembly



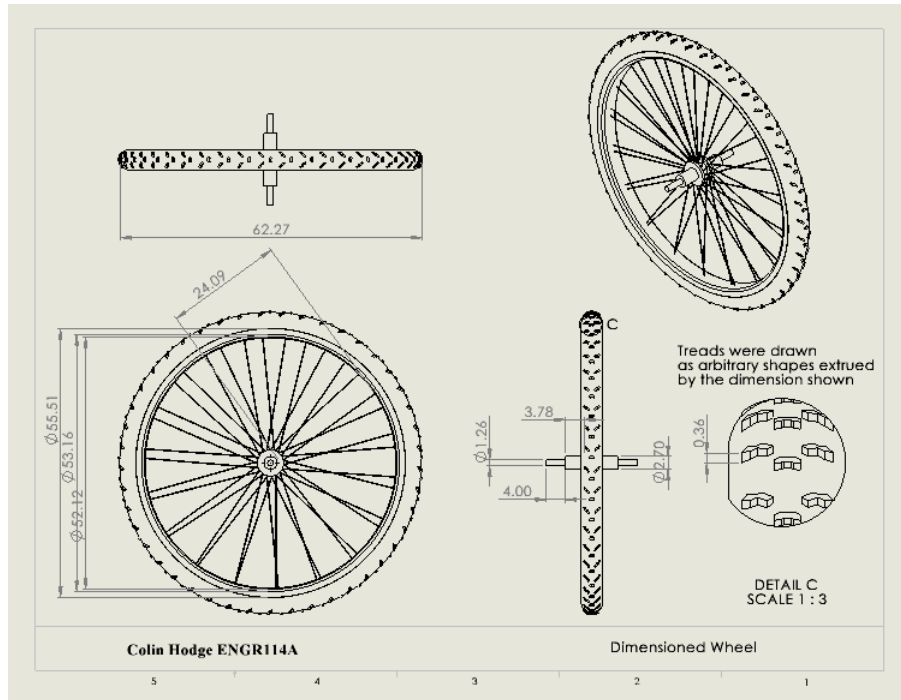


5 Detailed Drawing of All Parts

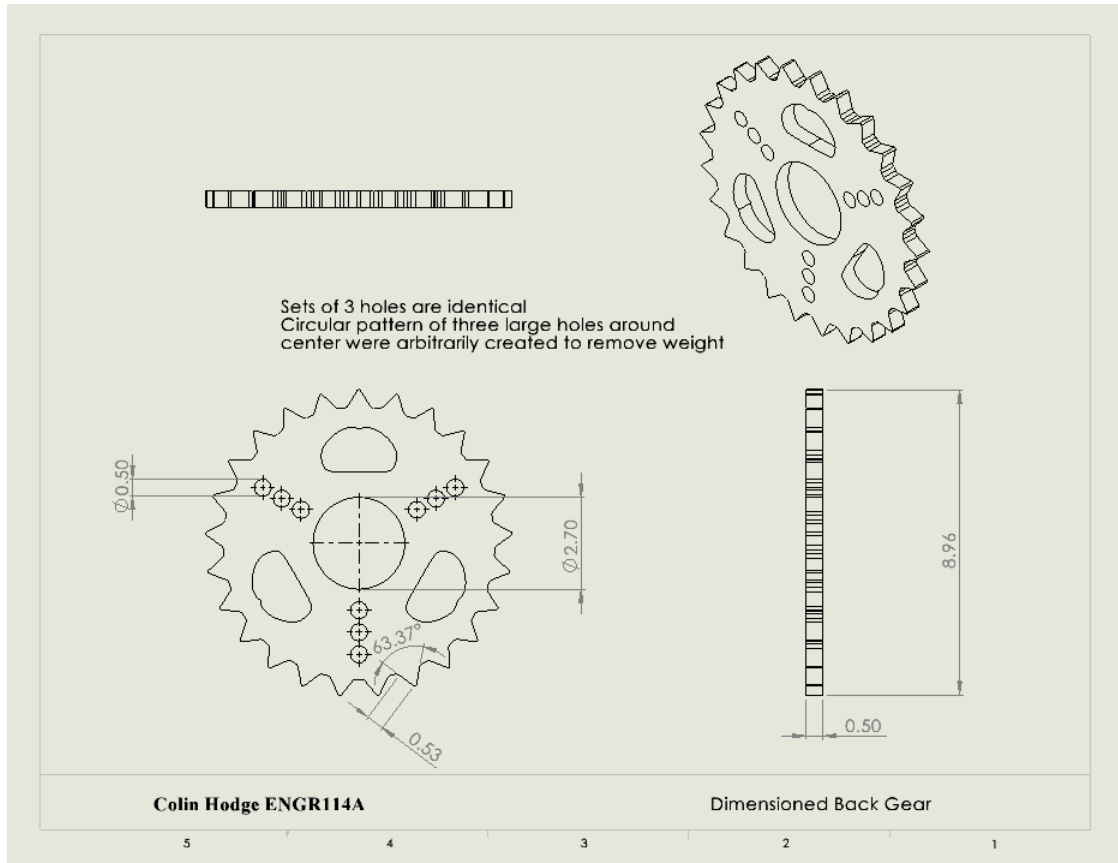
5.1 Fork (Carbon Fiber)



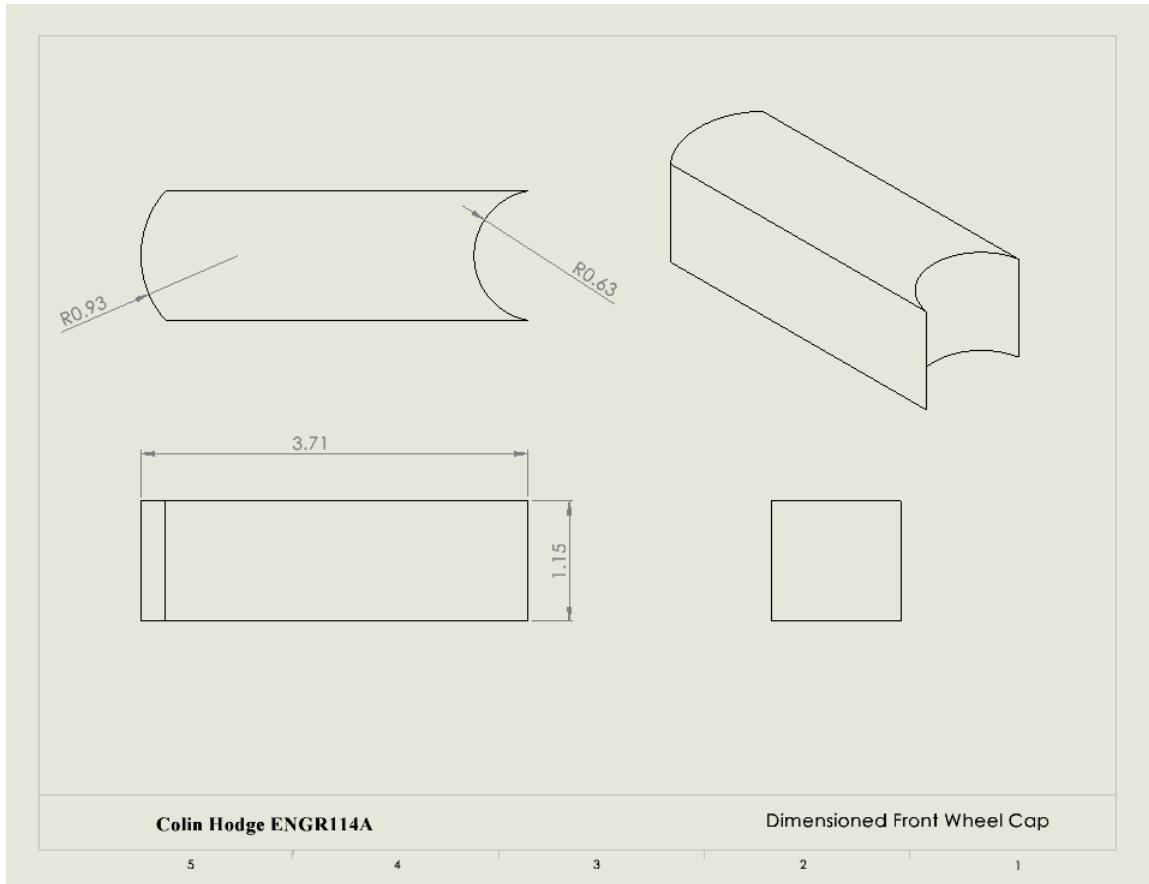
5.2 Wheel (Rubber/Aluminum, used in the front and back)



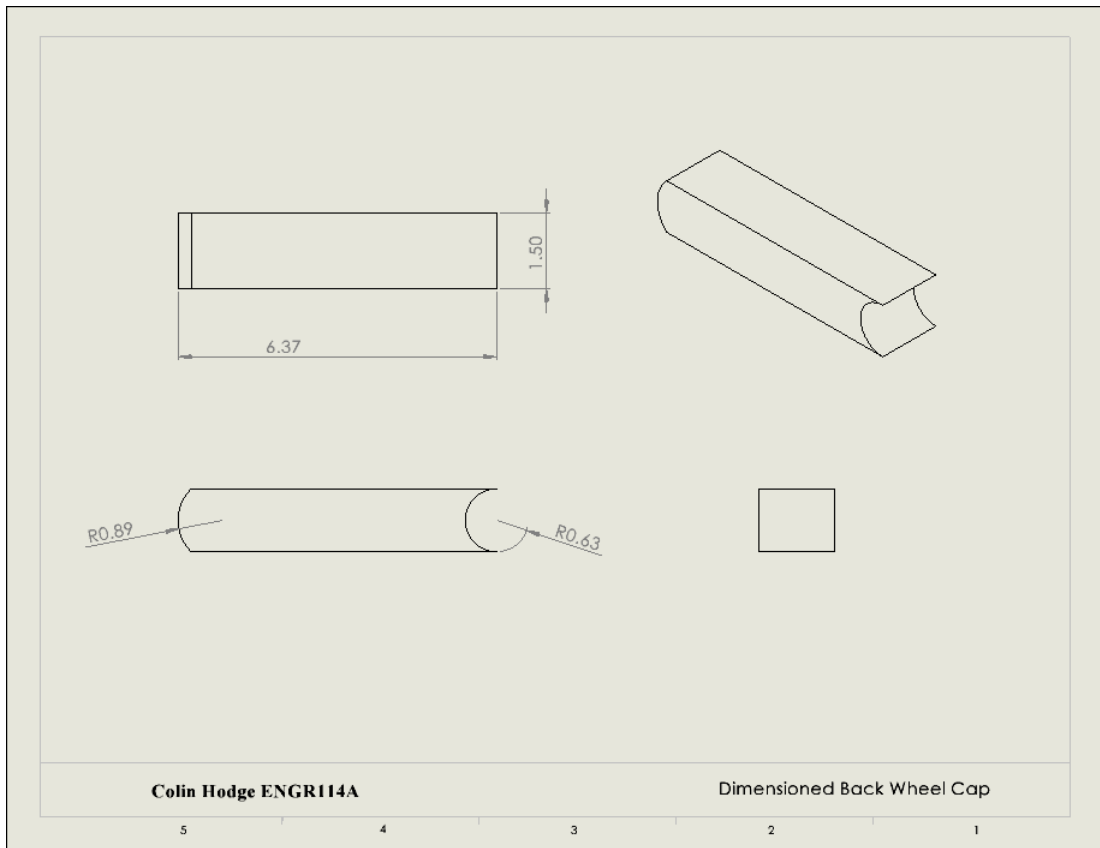
5.3 Back Gear (Aluminum)



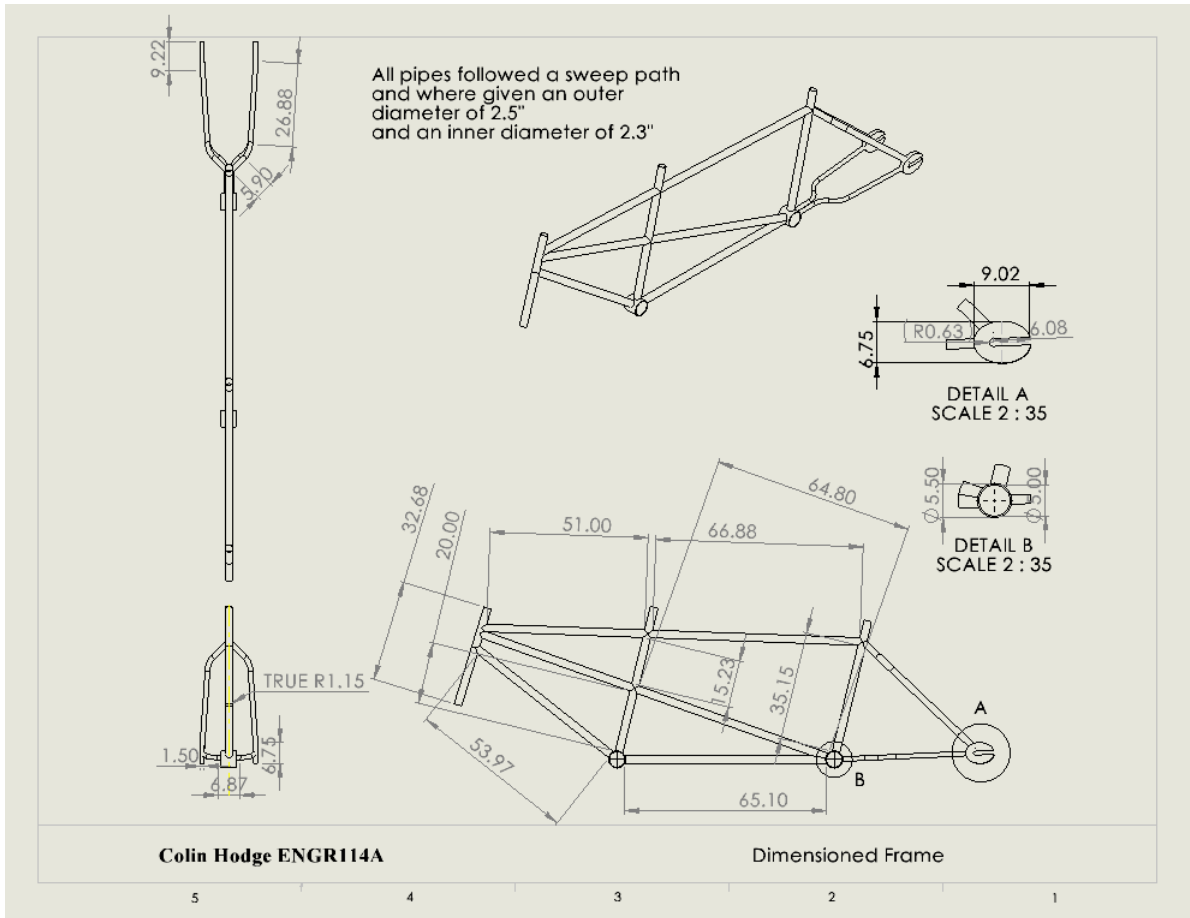
5.4 Front Wheel Caps (Plastic)



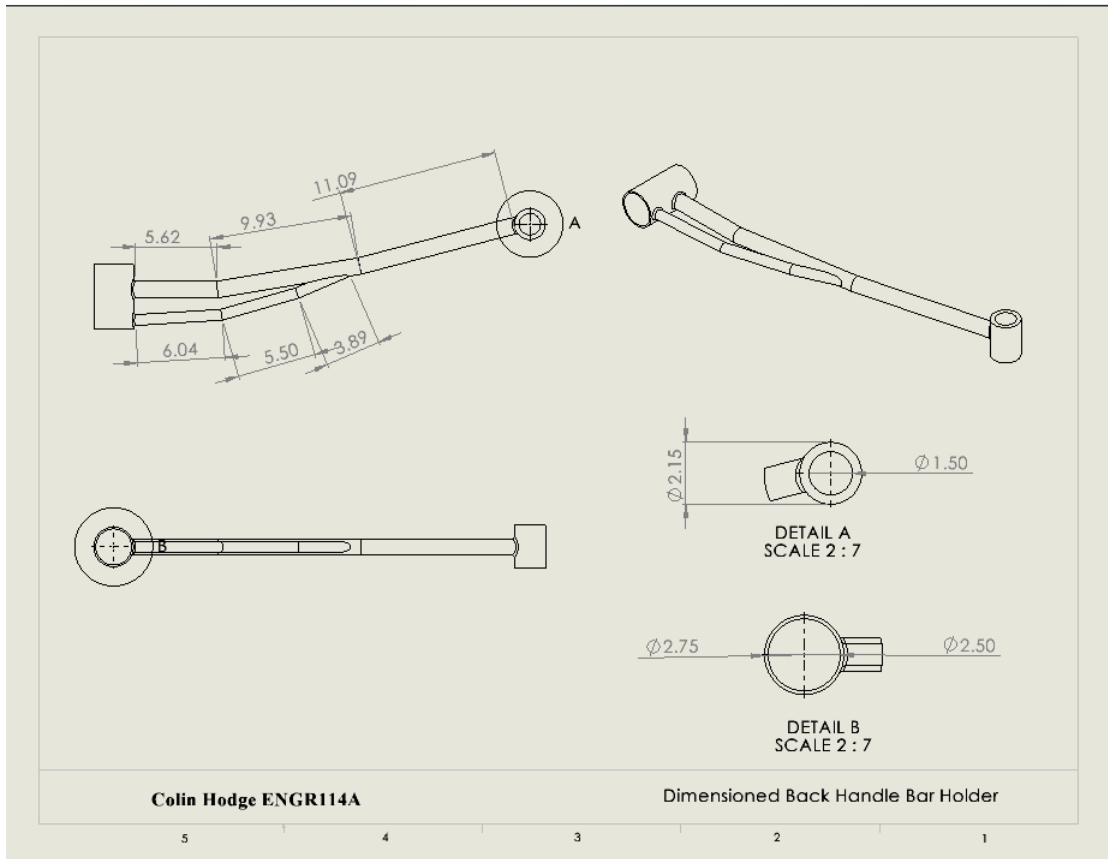
5.5 Back Wheel Caps (Plastic)



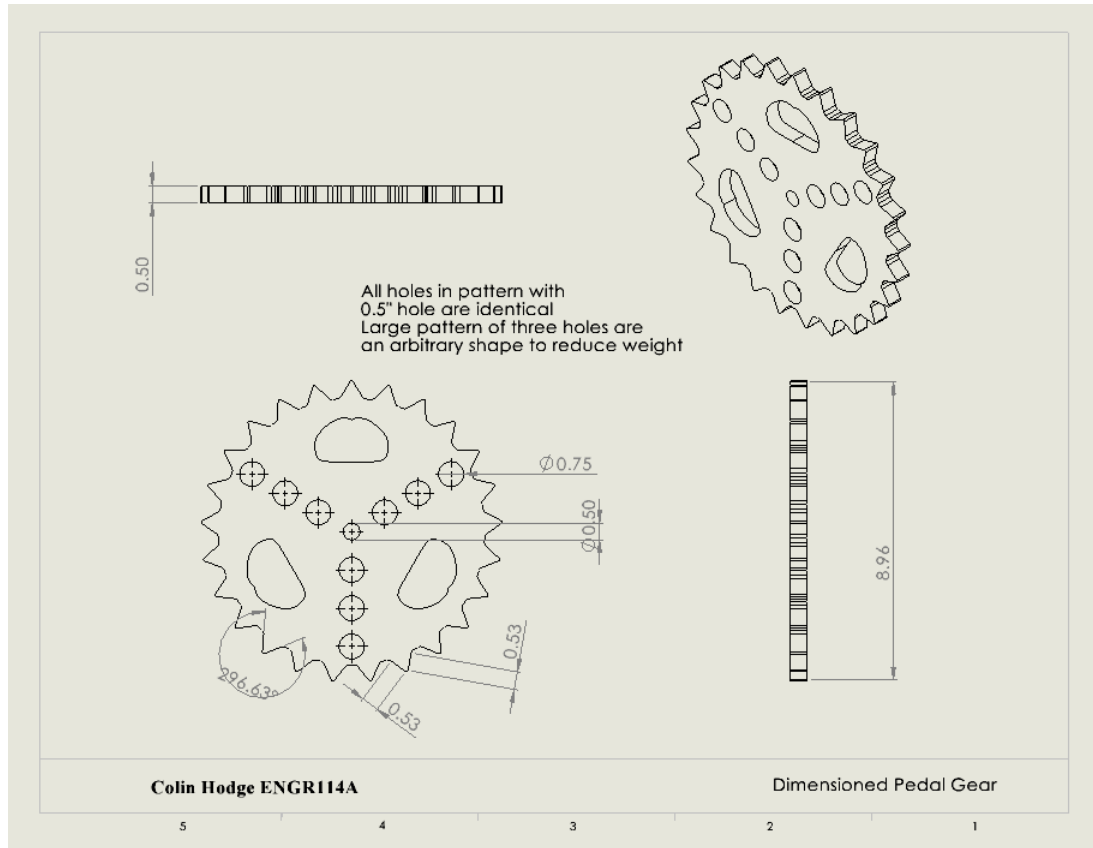
5.6 Frame (Carbon Fiber)



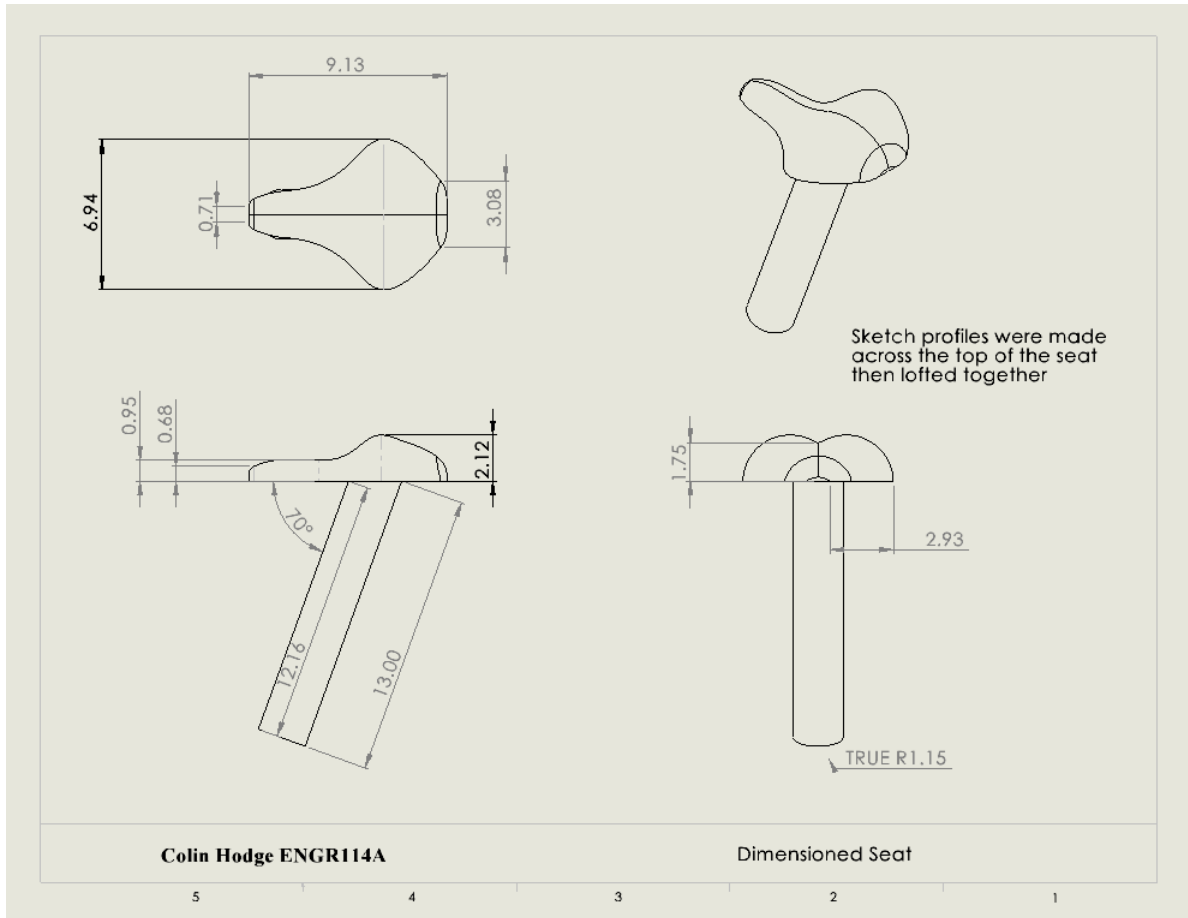
5.7 Back Handle Bar Holder (Aluminum)



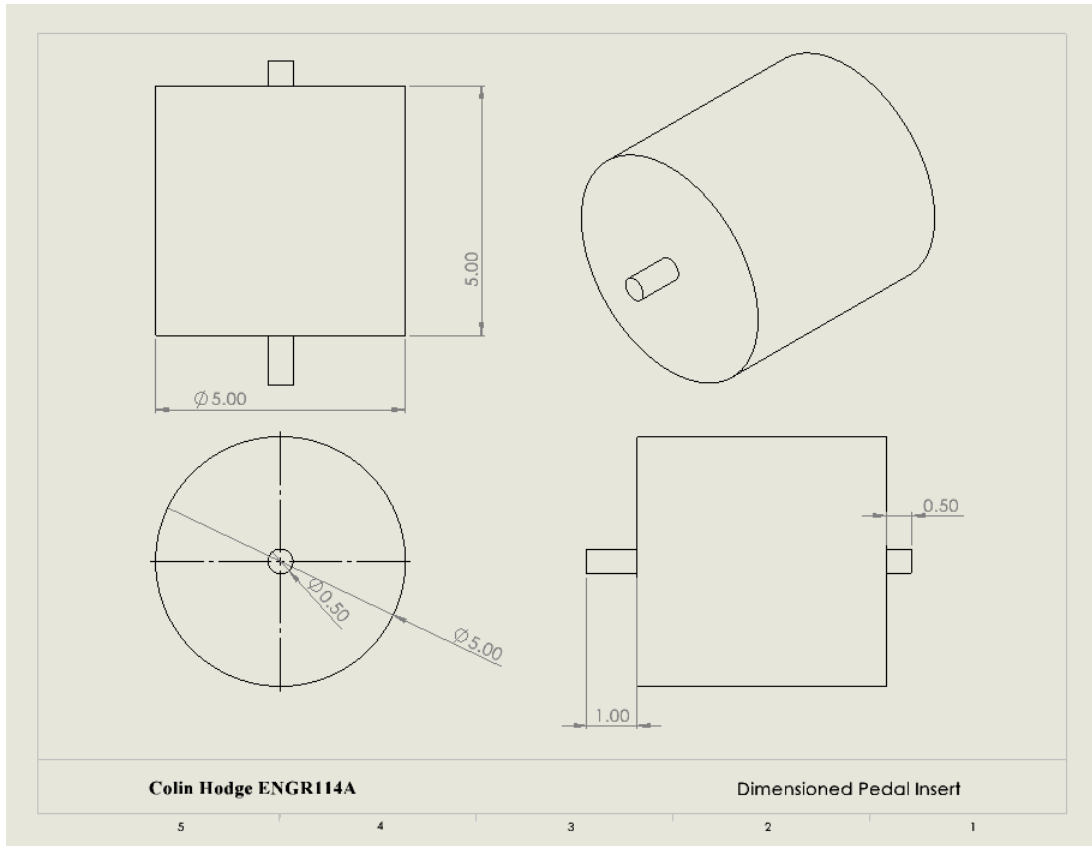
5.8 Pedal Gear (Aluminum)



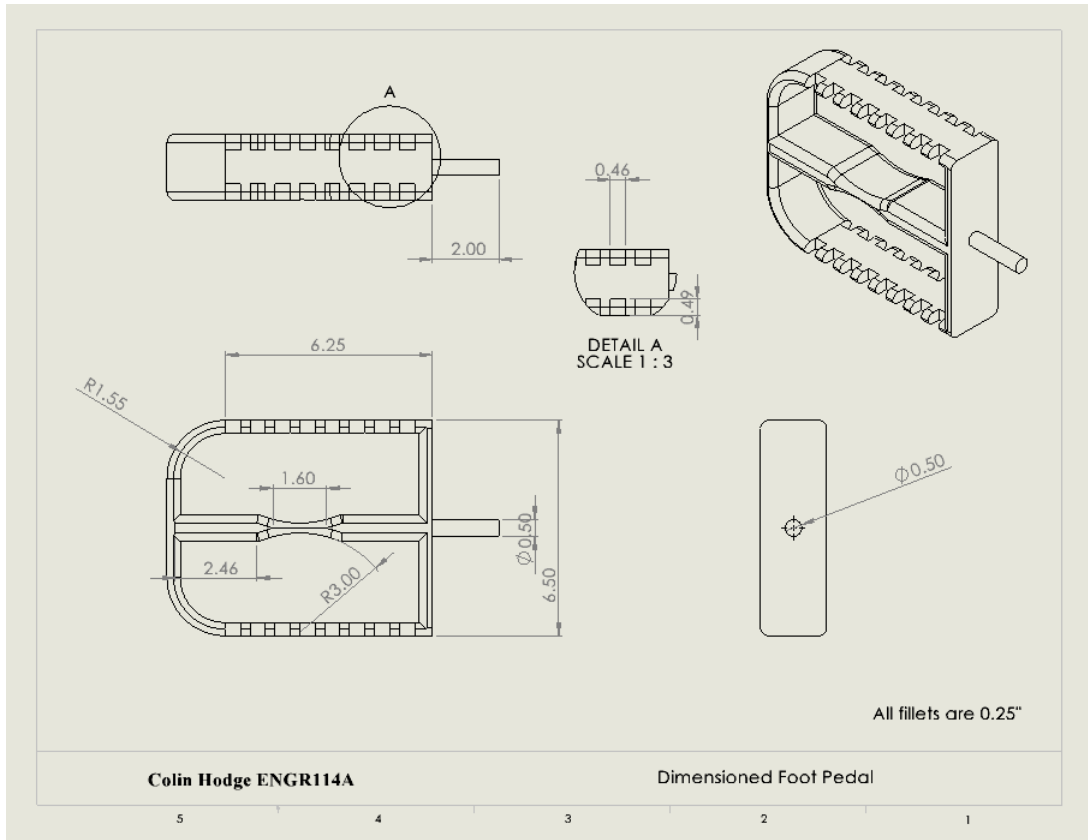
5.9 Seat (Plastic/Steel)



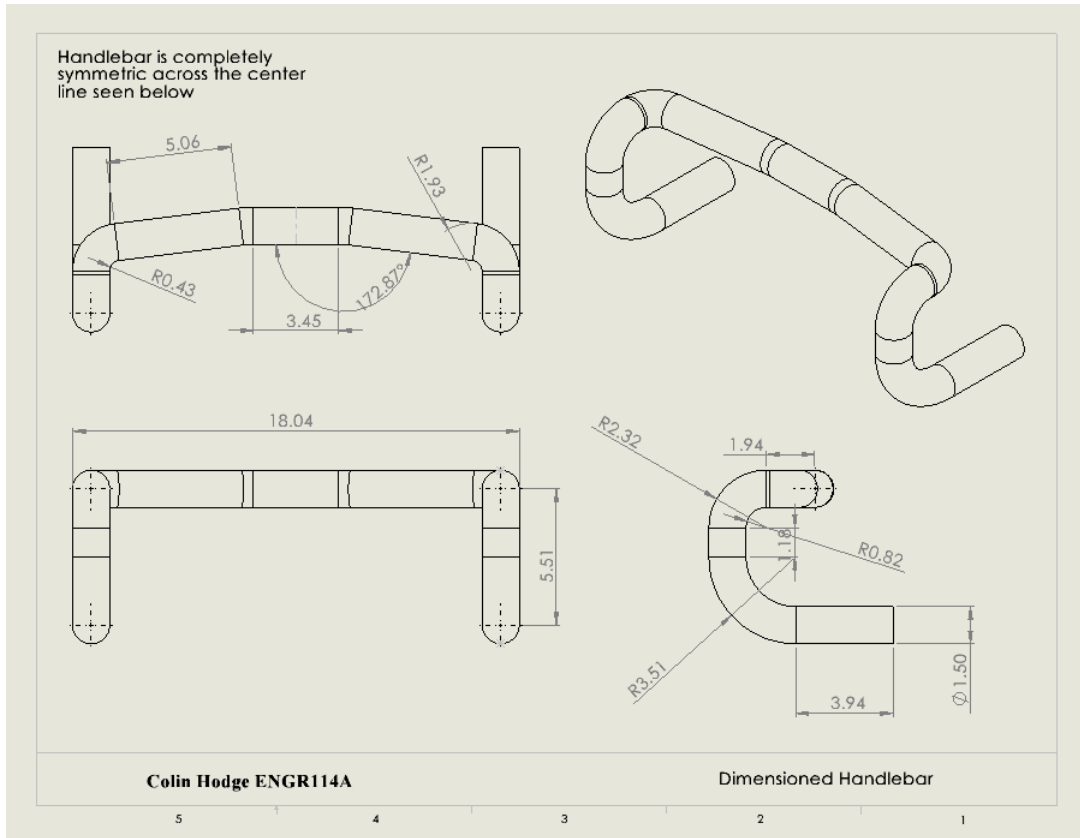
5.10 Pedal Insert (Silver)



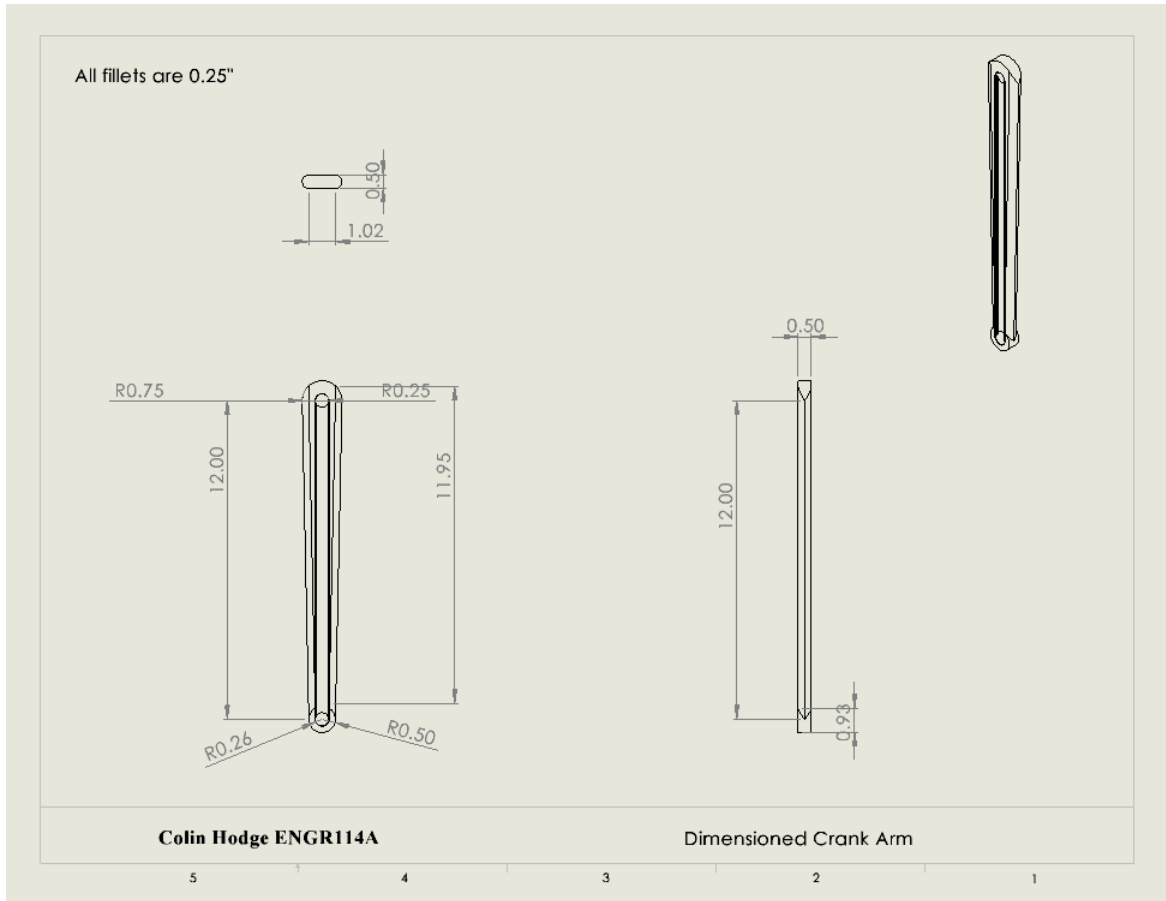
5.11 Pedal (Plastic)



5.12 Handlebars (Carbon Fiber, used in the front and back)



5.13 Crank Arm (Carbon Fiber, pedal shafts)



6 Bill of Materials

ITEM NO.	PART NAME	MATERIAL	SUPPLIER	PRICE	QTY.
1	Tandem-Frame	Carbon Fiber	Upzy.com	\$3,100	1
2	Tandem-Fork	Carbon Fiber	Pro Bike Supply	\$170	1
3	Tandem-Handlebar	Carbon Fiber	State Bicycle Co.	\$27	2
4	Tandem-Seat	Plastic/Steel	LightInTheBox	\$11	2
5	Tandem-Wheel	Rubber/Aluminum	Competative Cyclist	\$60	1
6	Tandem-BackWheelCaps	Plastic	Specialized 3D Printed Part	\$0.5	2
7	Tandem-FrontWheel	Rubber/Aluminum	Competative Cyclist	\$60	1
8	Tandem-BackHandleBar	Aluminum	Mike's Bikes	\$70	1
9	Tandem-BackGear	Aluminum	BikeSomeWhere.com	\$7	1
10	Tandem-FrontWheelCaps	Plastic	Specialized 3D Printed Part	\$0.5	2
11	Tandem-PedalInserts	Silver	Cambria Bike	\$10	2
12	Tandem-PedalGear	Aluminum	BikeSomeWhere.com	\$7	2
13	Tandem-PedalShafts	Carbon Fiber	Worldwide Cytery	\$100	4
14	Tandem-Pedal	Plastic	Dick's Sporting Goods	\$23	4

The grand total cost to construct this tandem bicycle is \$4,070. Which at first seems like a great deal of money for what is being built, but when you consider a few things it is not unreasonable. High end performance bikes go for upwards to \$10,000, and they only seat 1 person. Where as this bike goes for half that and seats two.