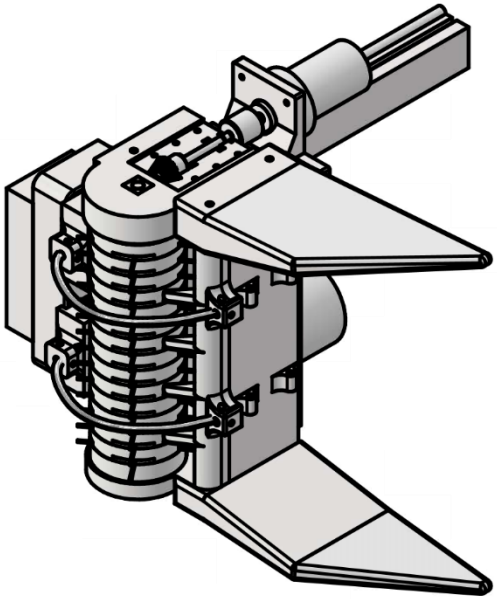
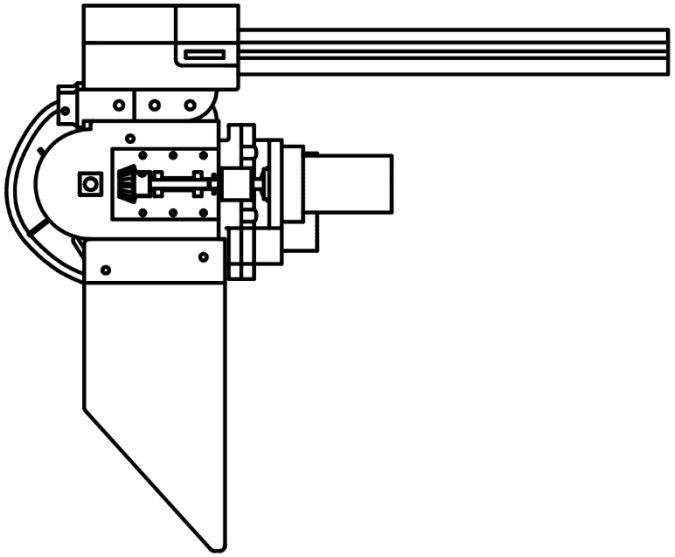
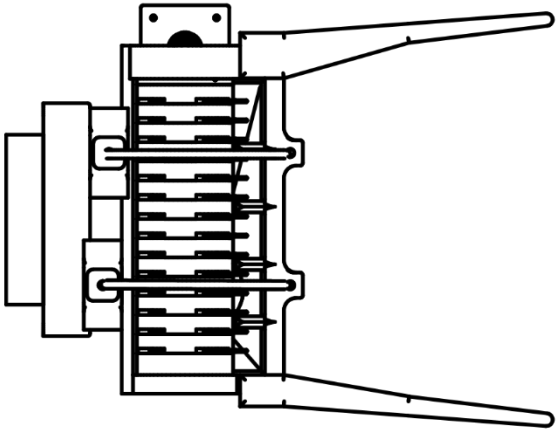
SUPPLEMENTARY MATERIAL

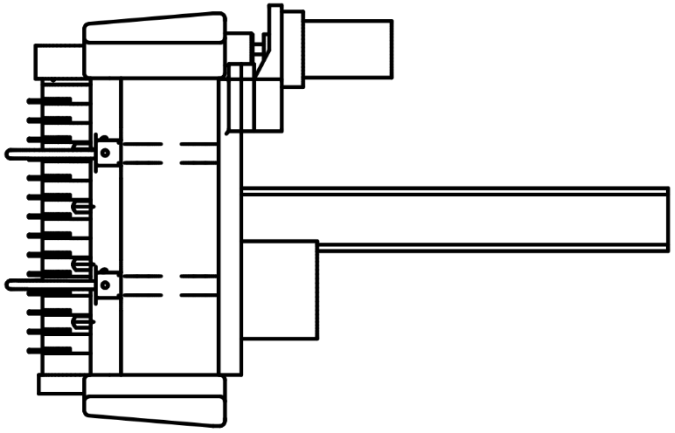
Figure S1. End-Effector detailed drawings (page 2-13).

End-Effector Assembly









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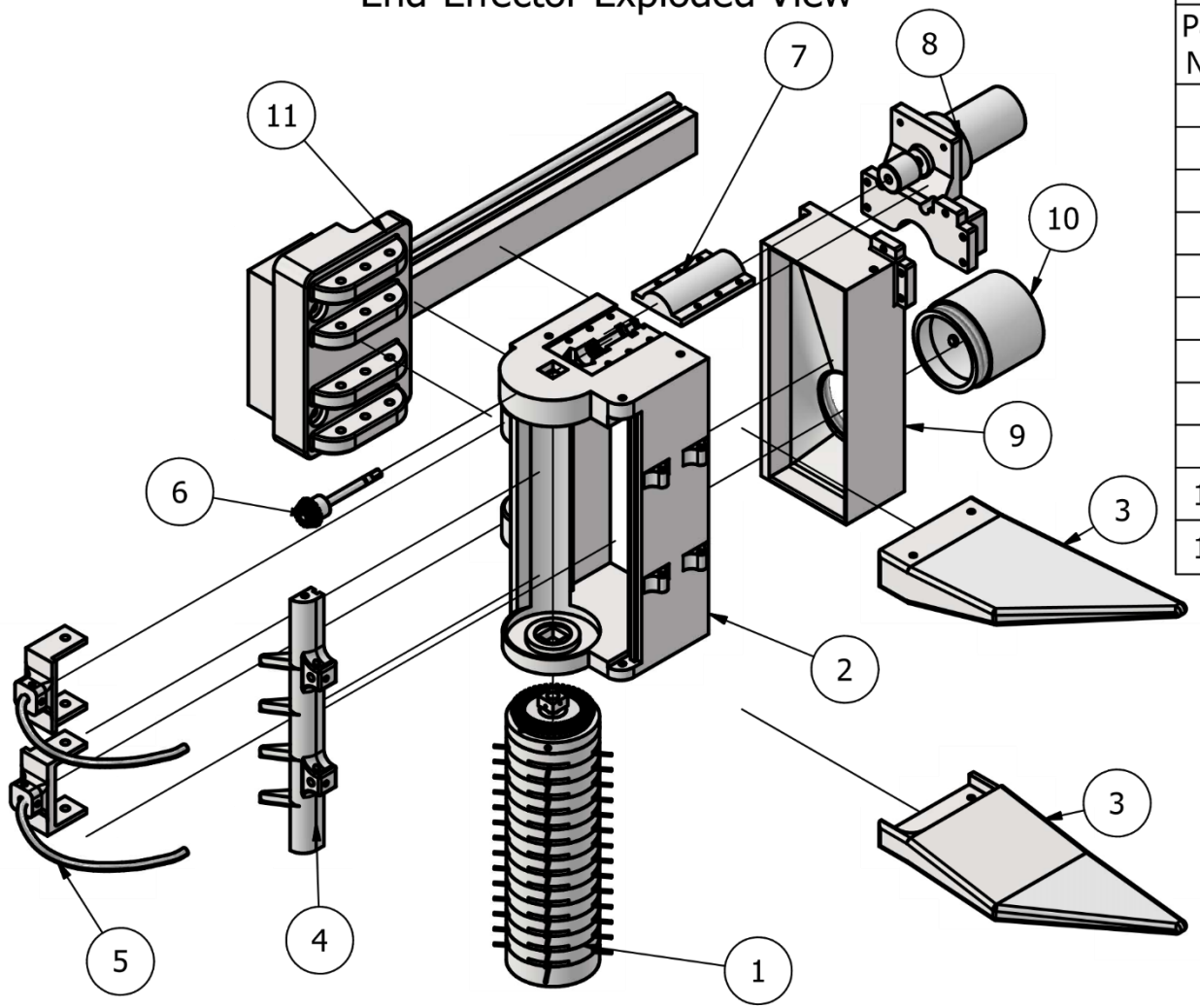
Thesis Title on:
"Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"

DESIGNED BY: SHEKHAR THAPA	Project Title: End-Effector Assembly	Scale:1 / 6	Unit: mm
2/24/2023	Filename: End-Effector- v2.iam	Sheet #: 2	

End-Effector Exploded View



PART LIST		
Part No.	Part Name	QTY
1	Roller & Tines	1
2	End-Effector Casing	1
3	Guide Plane	2
4	Vertical Screen	1
5	Aluminum Rings	2
6	Pinion Gear	1
7	Gear Box Cover	1
8	DC Motor	1
9	Funnel	1
10	Hose Attachment	1
11	Horizontal Robotic Arm	1

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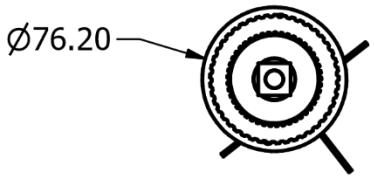
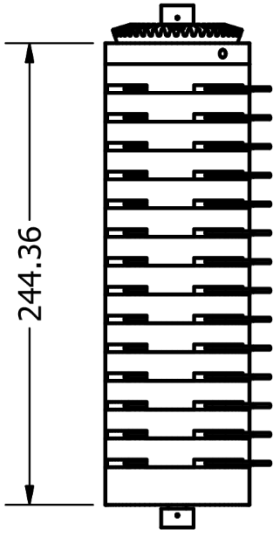
Thesis Title on:
"Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"

DESIGNED BY: SHEKHAR THAPA	Project Title: End-Effector Assembly Exploded View	Scale:1 / 6	Unit: mm
2/24/2023	Filename: End-Effector- v2.iam	Sheet #: 2	

Roller & Tines



TOP VIEW



FRONT VIEW

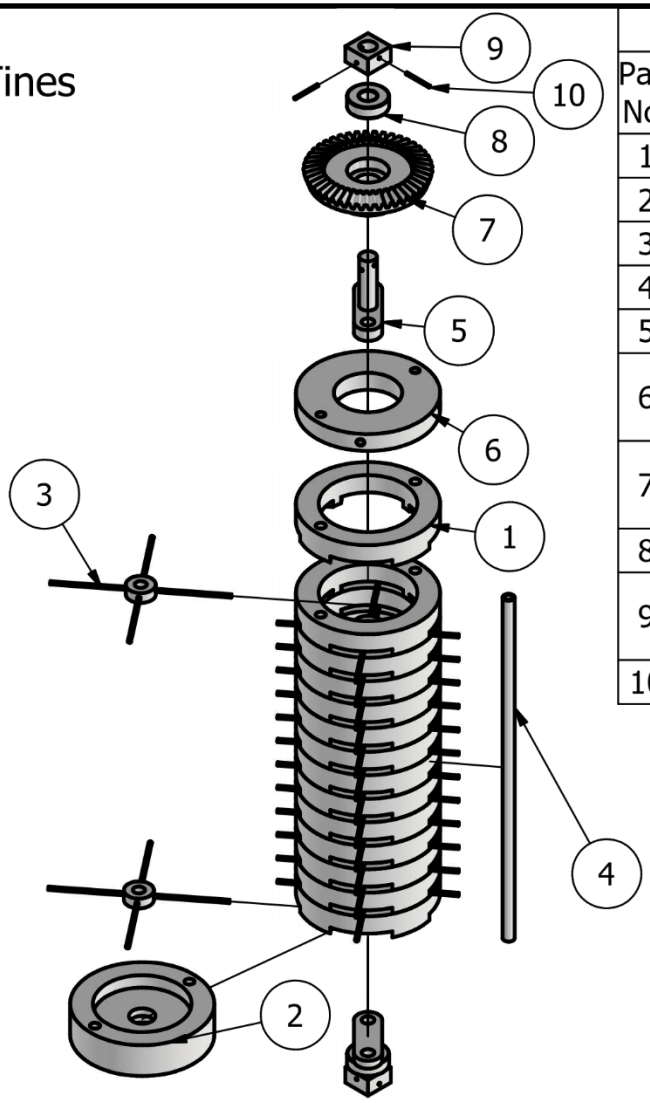


TABLE		
Part No.	Part Name	QTY
1	Roller Ring	14
2	Roller Cap	1
3	Tines-new	14
4	Cam Rod	1
5	Cam	2
6	Bevel Gear Holder	1
7	Metal Bevel Gear	1
8	Bearing	2
9	Cam Square	2
10	Pin	4

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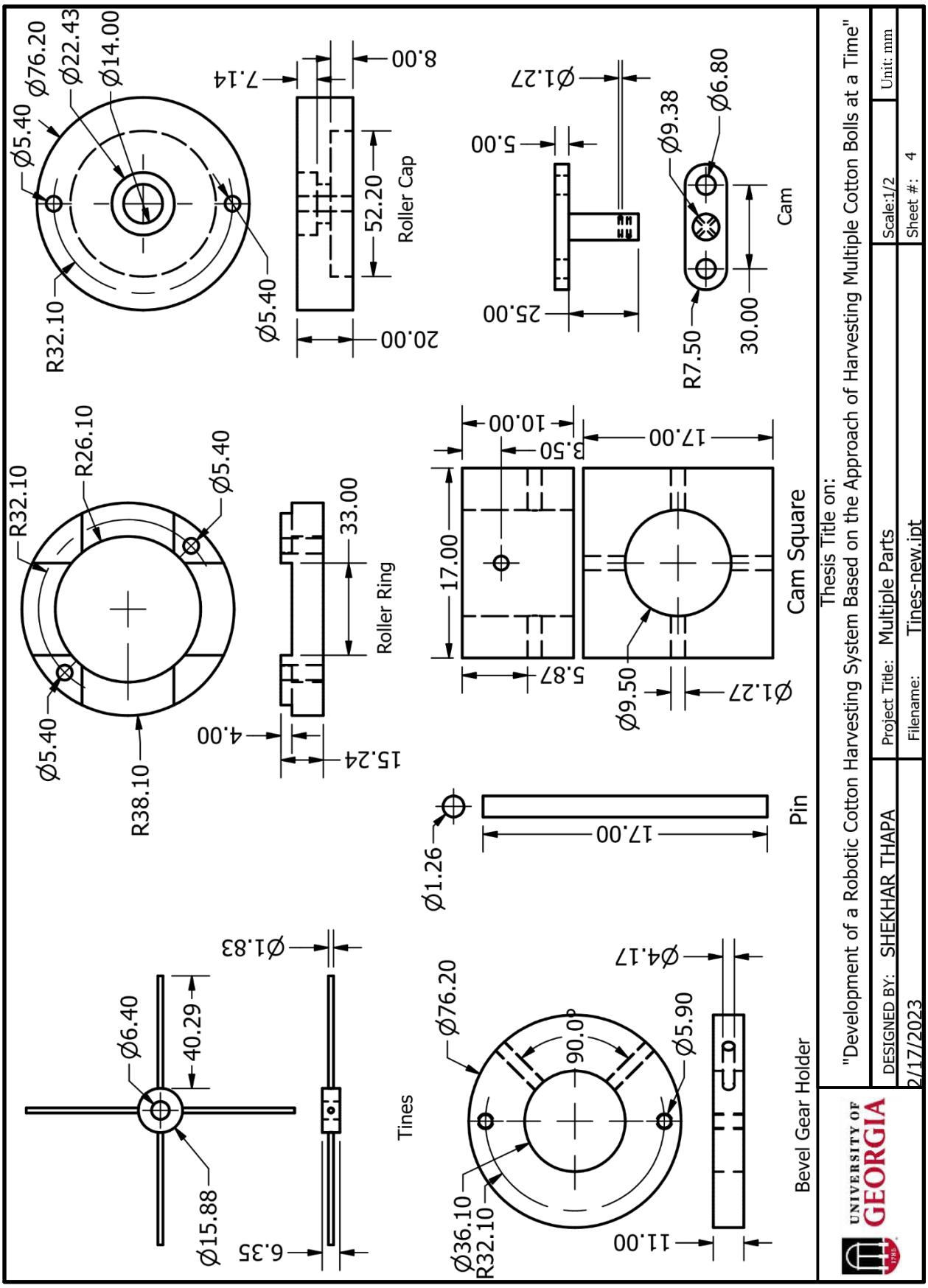
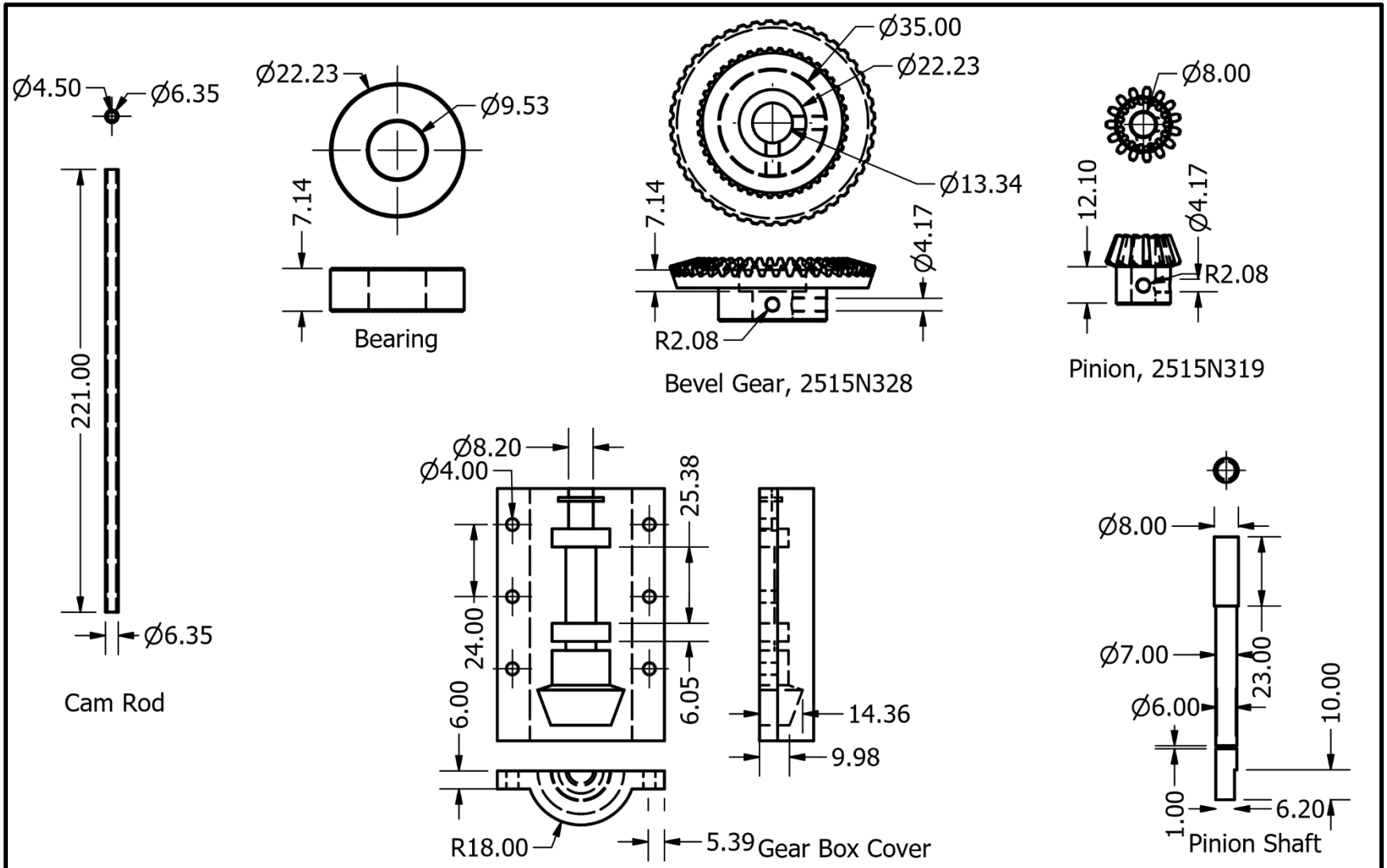
Thesis Title on:
"Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"

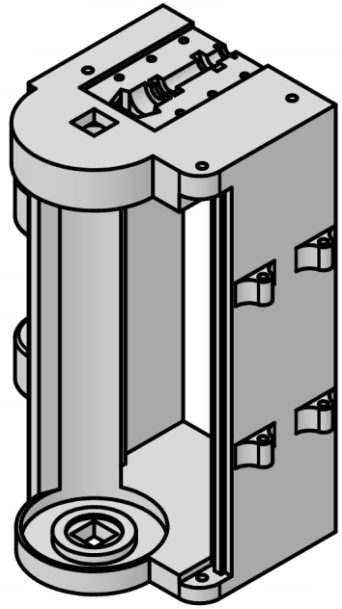
DESIGNED BY: SHEKHAR THAPA	Project Title: Roller & Tines	Scale:1 / 4	Unit: mm
2/24/2023	Filename: Roller and Tines.iam	Sheet #: 3	

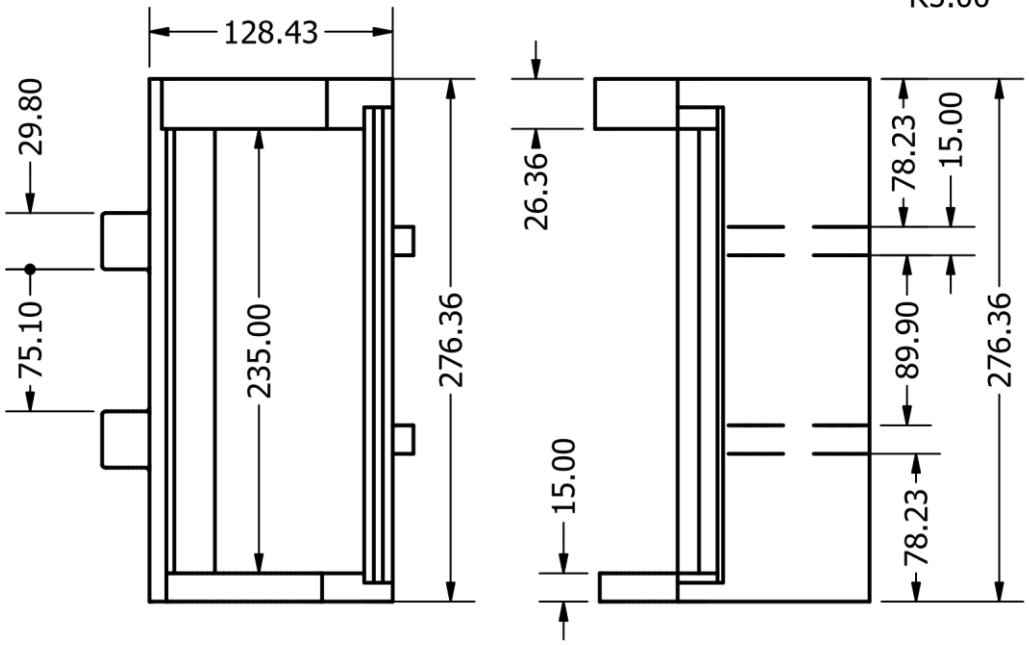

Ø76.20
Ø22.43
Ø14.00
Ø5.40
R32.10
7.14
8.00
Ø5.40
20.00
52.20
Roller Cap
Ø1.27
5.00
25.00
Ø9.38
Ø6.80
R7.50
30.00
Cam
R32.10
R26.10
Ø5.40
Ø5.40
R38.10
4.00
15.24
33.00
Roller Ring
10.00
3.50
17.00
17.00
5.87
Ø9.50
Ø1.27
Cam Square
Ø1.26
17.00
Pin
Ø1.83
Ø6.40
40.29
Ø15.88
6.35
Tines
Ø76.20
90.0°
Ø5.90
Ø4.17
Ø36.10
R32.10
11.00
Bevel Gear Holder
UNIVERSITY OF GEORGIA
Thesis Title on:
"Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"
DESIGNED BY: SHEKHAR THAPA
Project Title: Multiple Parts
Scale:1/2
Unit: mm
2/17/2023
Filename: Tines-new.ipt
Sheet #: 4



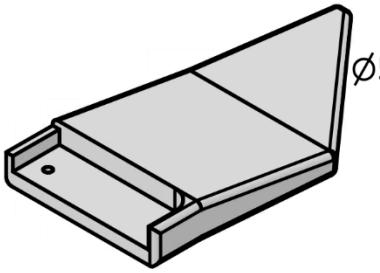
UNIVERSITY OF GEORGIA	Thesis Title on: "Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"			
DESIGNED BY: SHEKHAR THAPA	Project Title: Multiple parts		Scale:1 / 3	Unit: mm
2/21/2023	Filename: cam rod.ipt		Sheet #: 5	

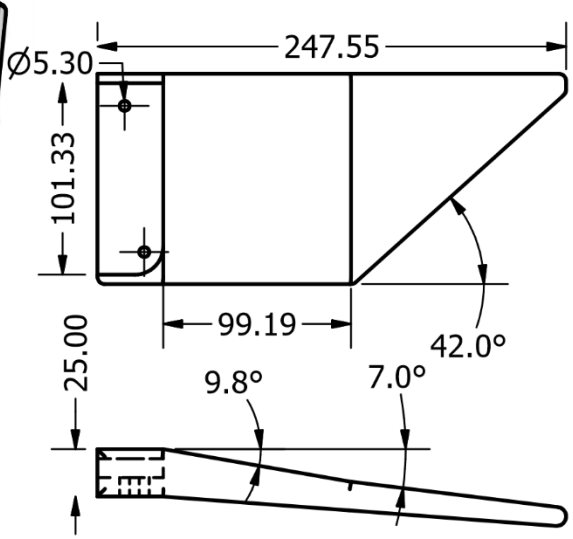
End-Effector Casing

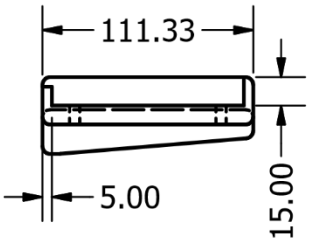




UNIVERSITY OF GEORGIA	Thesis Title on: "Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"			
	DESIGNEDBY: SHEKHARTHAPA	ProjectTitle: End-EffectorCasing	Scale:1 / 4	Unit: mm
	7/23/2023	Filename: shaftcover(case).ipt	Sheet#: 6	

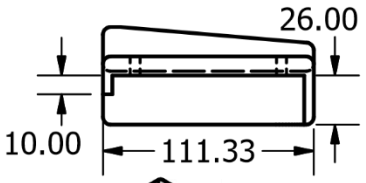


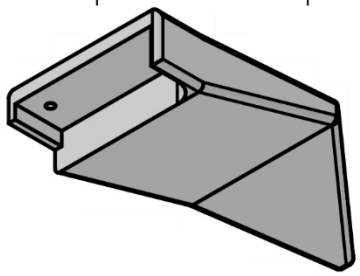


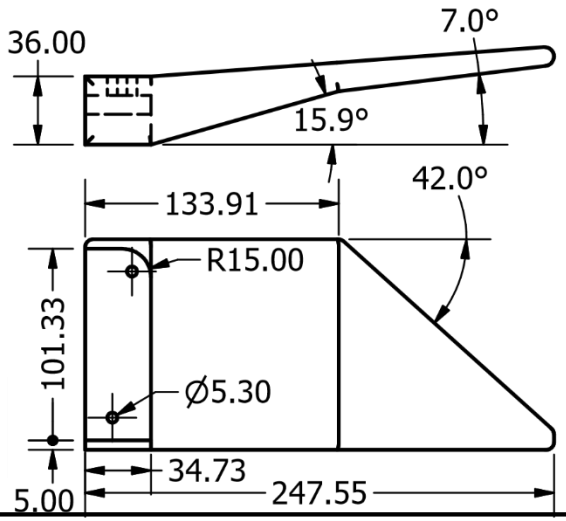


Lower Guide Plane

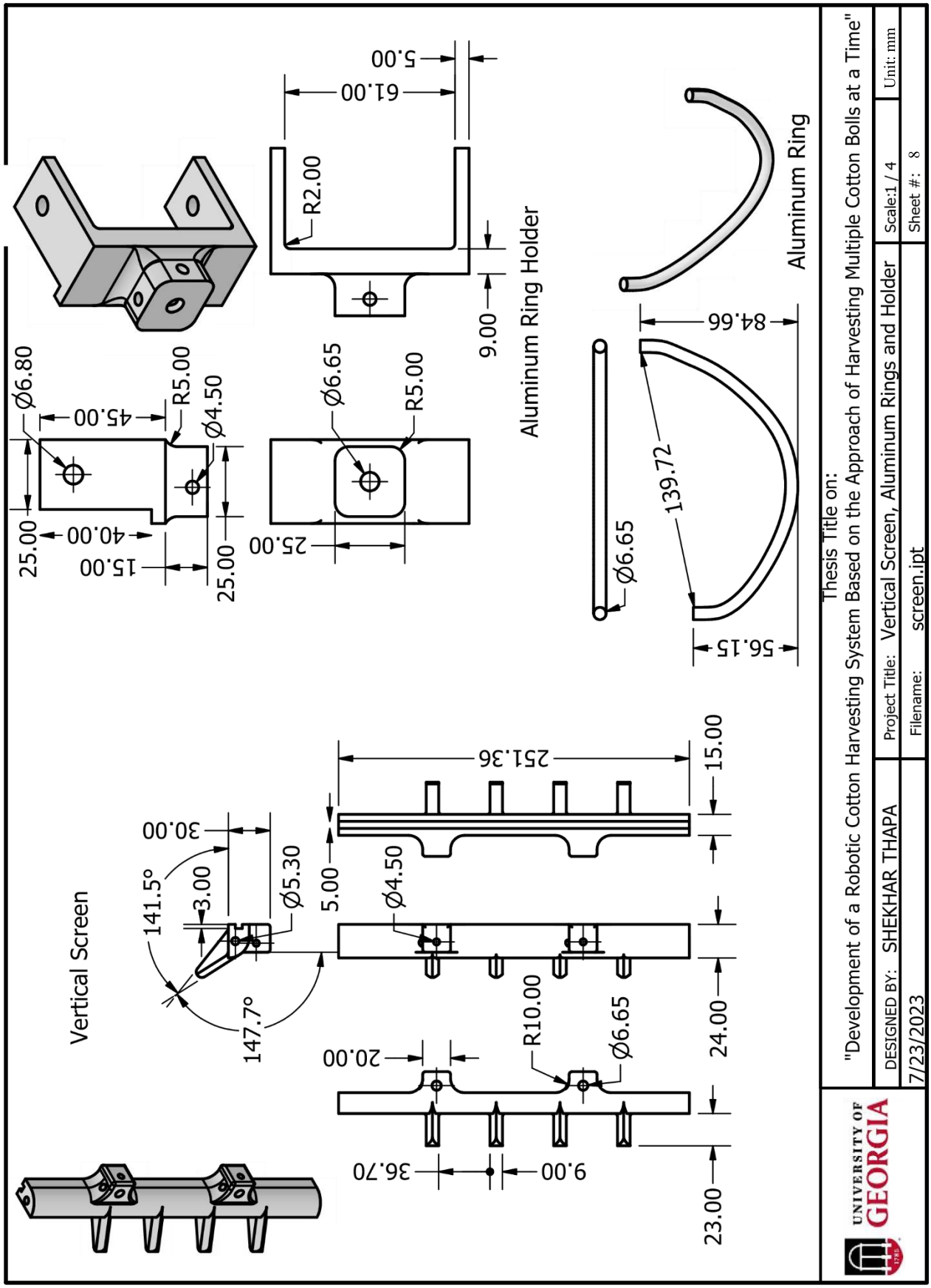
Upper Guide Plane

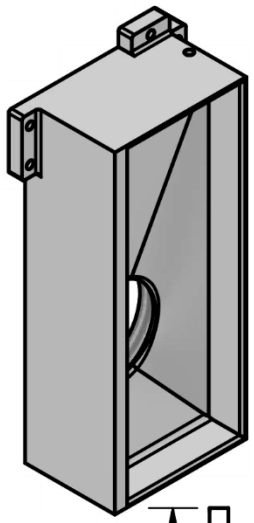


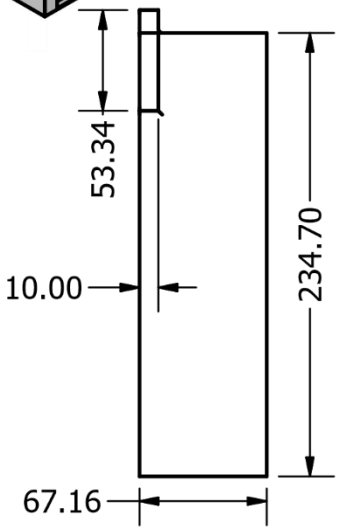


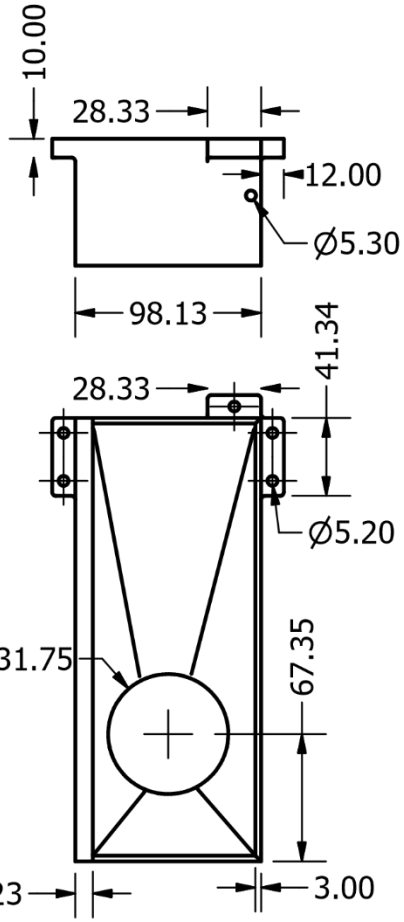


UNIVERSITY OF GEORGIA	Thesis Title on: "Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"		
DESIGNED BY: SHEKHAR THAPA	Project Title: Lower and Upper Guide Planes	Scale:1 / 4	Unit: mm
10/8/2023	Filename: lower guide.ipt	Sheet #: 7	

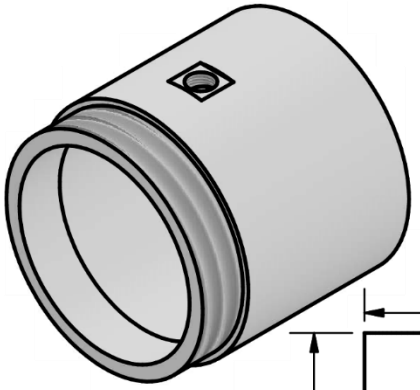

Vertical Screen
Aluminum Ring Holder
Aluminum Ring
Thesis Title on:
"Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"
UNIVERSITY OF GEORGIA
DESIGNED BY: SHEKHAR THAPA
Project Title: Vertical Screen, Aluminum Rings and Holder
Scale:1 / 4
Unit: mm
7/23/2023
Filename: screen.ipt
Sheet #: 8

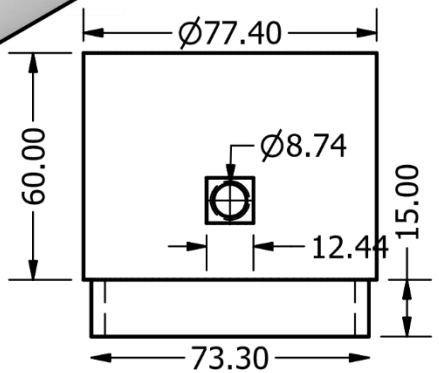


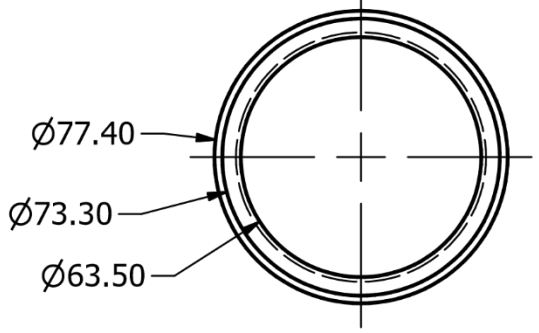




Funnel







3 in Hose Attachment

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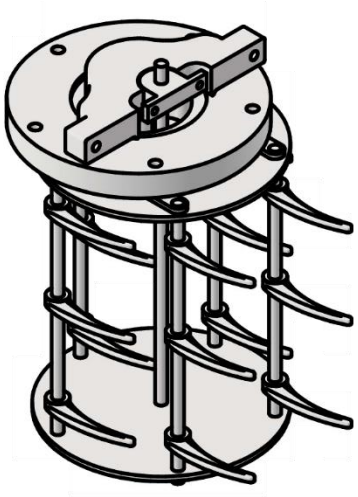
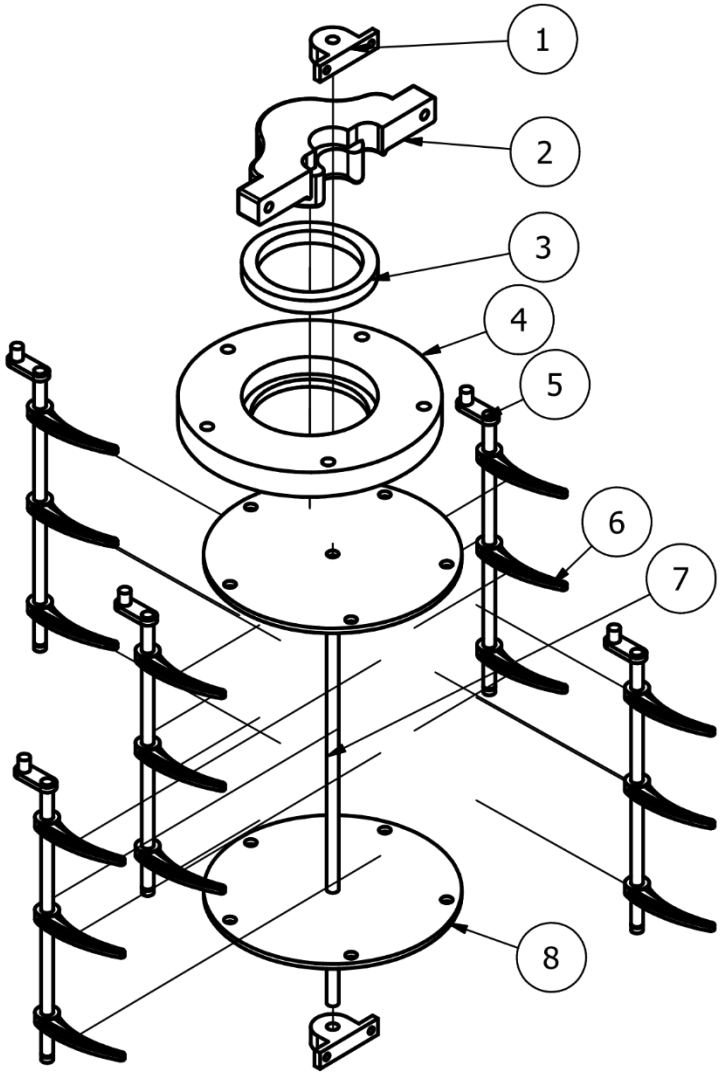
Thesis Title on:
"Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"

DESIGNED BY:	Project Title: Funnel and Hose Attachment	Scale:1 : 2	Unit: mm
8/7/2023	Filename: 3 inch vac and endeffector attachement.ipt	Sheet #: 9	



Pullback Reel



PART LIST		
Part No.	Part Name	QTY
1	Shaft Mount	2
2	Bearing Mount	1
3	Bearing	1
4	Offset Disk	1
5	Peripheral Rod	5
6	Finger	15
7	Shaft	1
8	Disk	2

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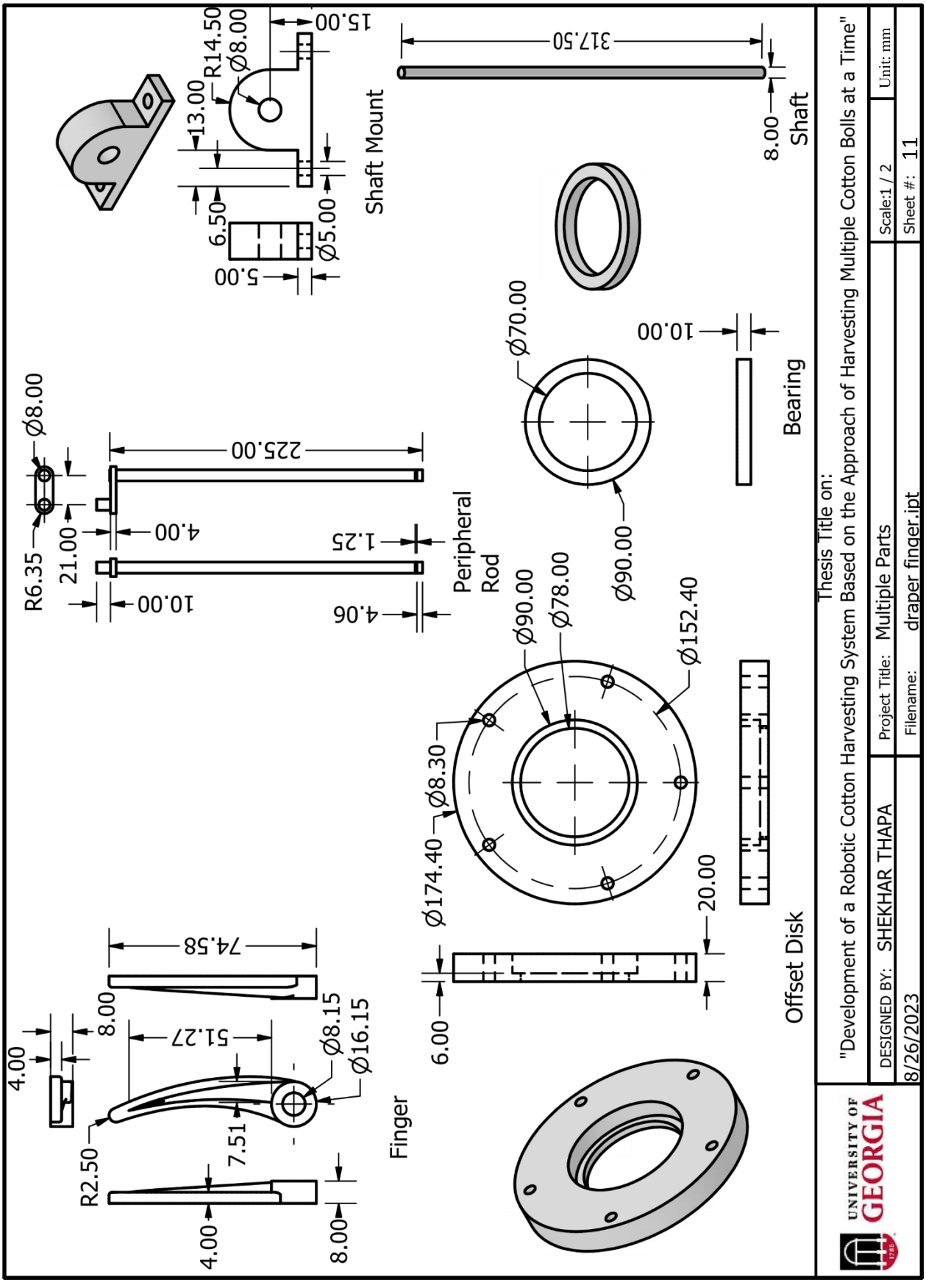
Thesis Title on:
"Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"

DESIGNED BY: SHEKHAR THAPA	Project Title: Pullback Reel Exploded View	Scale:1 / 5	Unit: mm
8/22/2023	Filename: Pullback Reel.iam	Sheet #: 10	


Thesis Title on:
"Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"
UNIVERSITY OF GEORGIA
DESIGNED BY: SHEKHAR THAPA
Project Title: Multiple Parts
Scale:1 / 2
Unit: mm
8/26/2023
Filename: draper finger.ipt
Sheet #: 11
Finger
Peripheral Rod
Offset Disk
Shaft Mount
Shaft
Bearing
R2.50
7.51
51.27
74.58
Ø8.15
Ø16.15
4.00
8.00
R6.35
21.00
225.00
Ø8.00
4.06
1.25
Ø174.40
Ø8.30
Ø90.00
Ø78.00
Ø152.40
Ø90.00
Ø70.00
6.00
20.00
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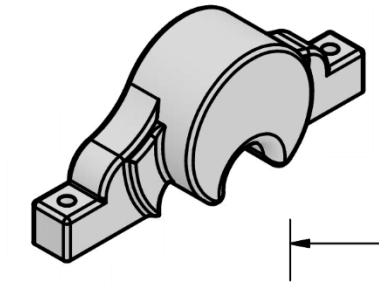
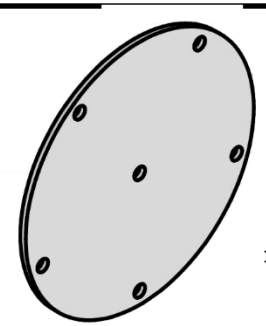
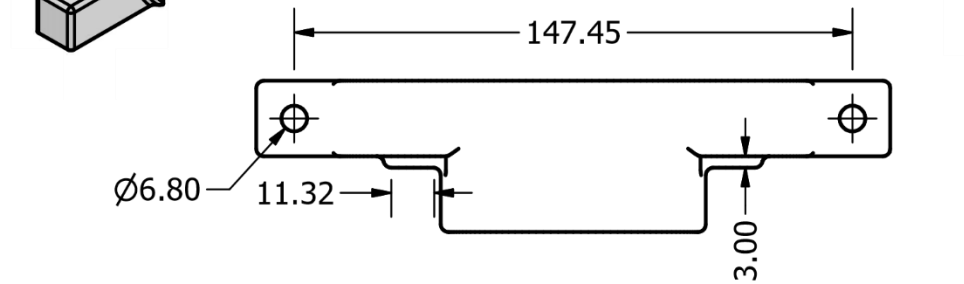
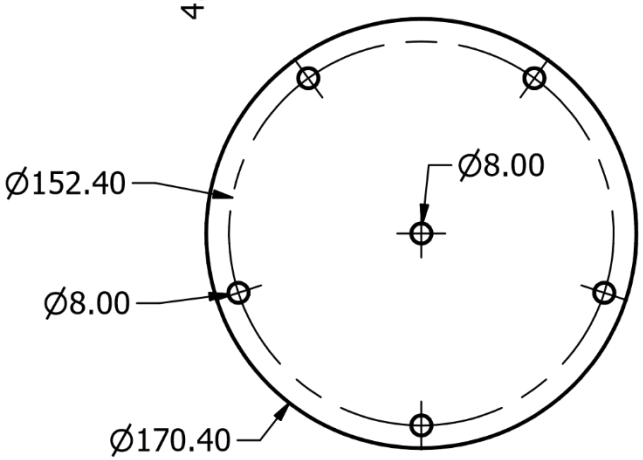
6.50
5.00
Ø5.00
317.50
8.00

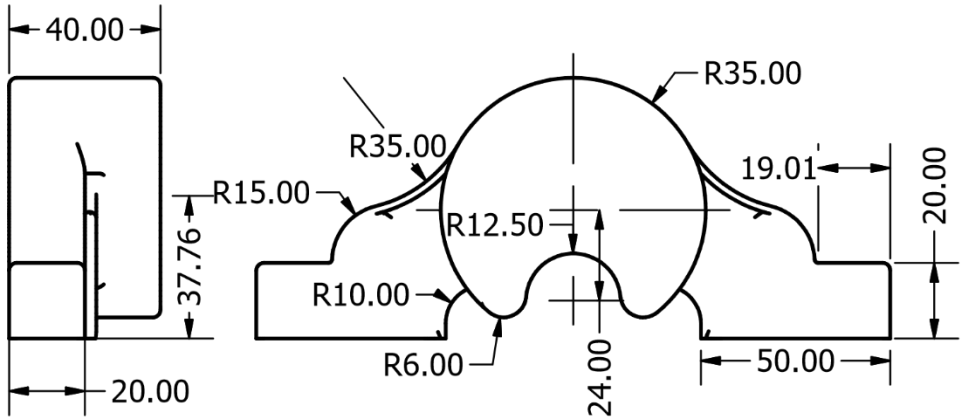








Disk



Bearing Mount

UNIVERSITY OF GEORGIA	Thesis Title on: "Development of a Robotic Cotton Harvesting System Based on the Approach of Harvesting Multiple Cotton Bolls at a Time"		
DESIGNED BY: SHEKHAR THAPA	Project Title: Bearing Mound and Disk	Scale:1 /2	Unit: mm
8/22/2023	Filename: big shaft.ipt	Sheet #: 13	