

VALPARAISO UNIVERSITY
POST HOLE AUGER
FLOWER PETAL DROP APPARATUS

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Kyle Langreck

FACULTY ADVISOR: Andrew Gutshall

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2019 Midwest Stage Machine Design Competition

Petal Drop Device for a production of *Much Ado About Nothing*

We started out with the idea of having fabric on two rolls and a type of conveyor system which would have worked fine but was not feasible to reload under the restrictions. Then we thought of using a 5 gallon plastic water cooler jug which professor Gutshall had seen used on the touring Broadway show Cinderella. This again would have worked fine but would have been problematic to reload under the current restrictions. We finally settled on the auger setup to drop the petals.

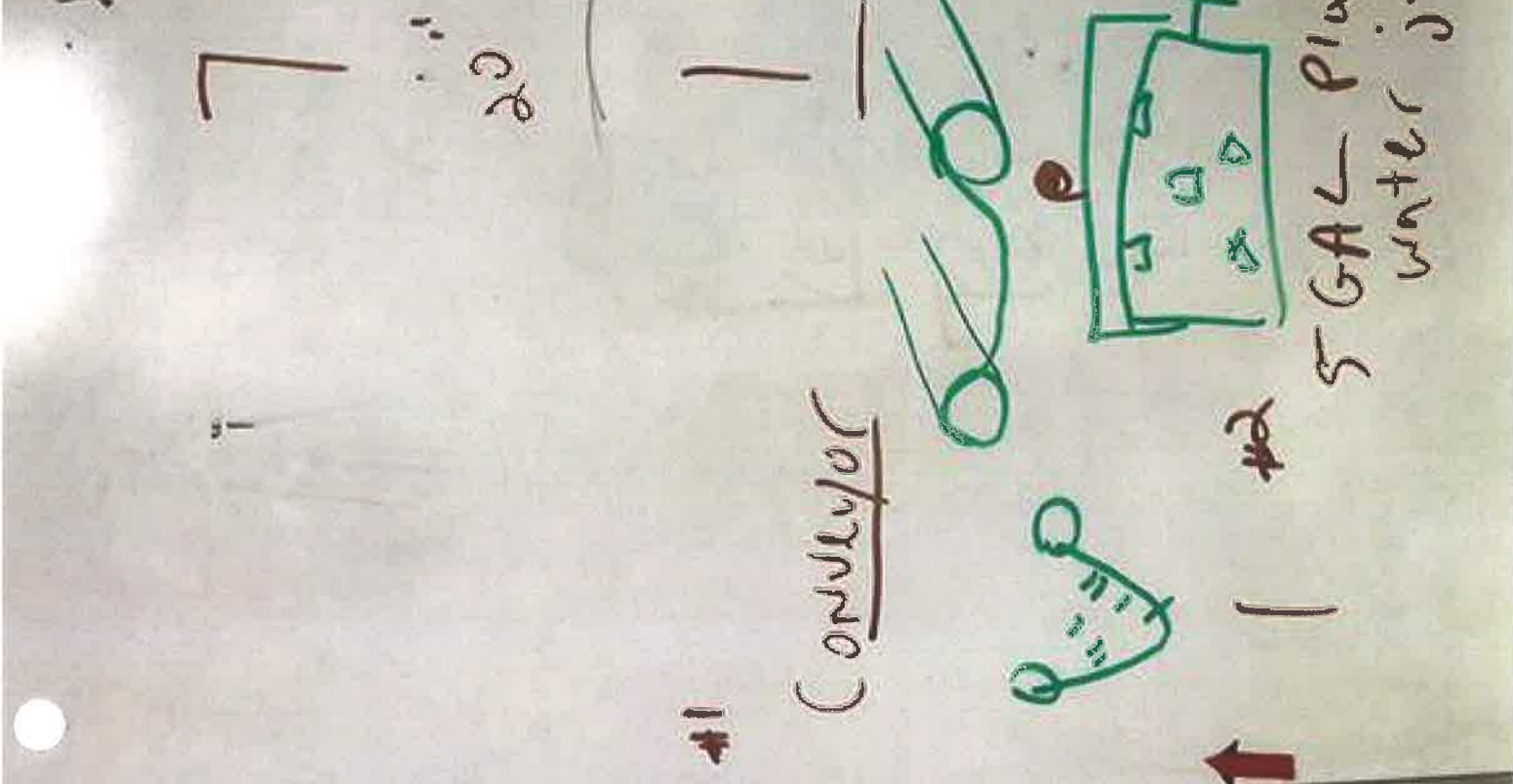
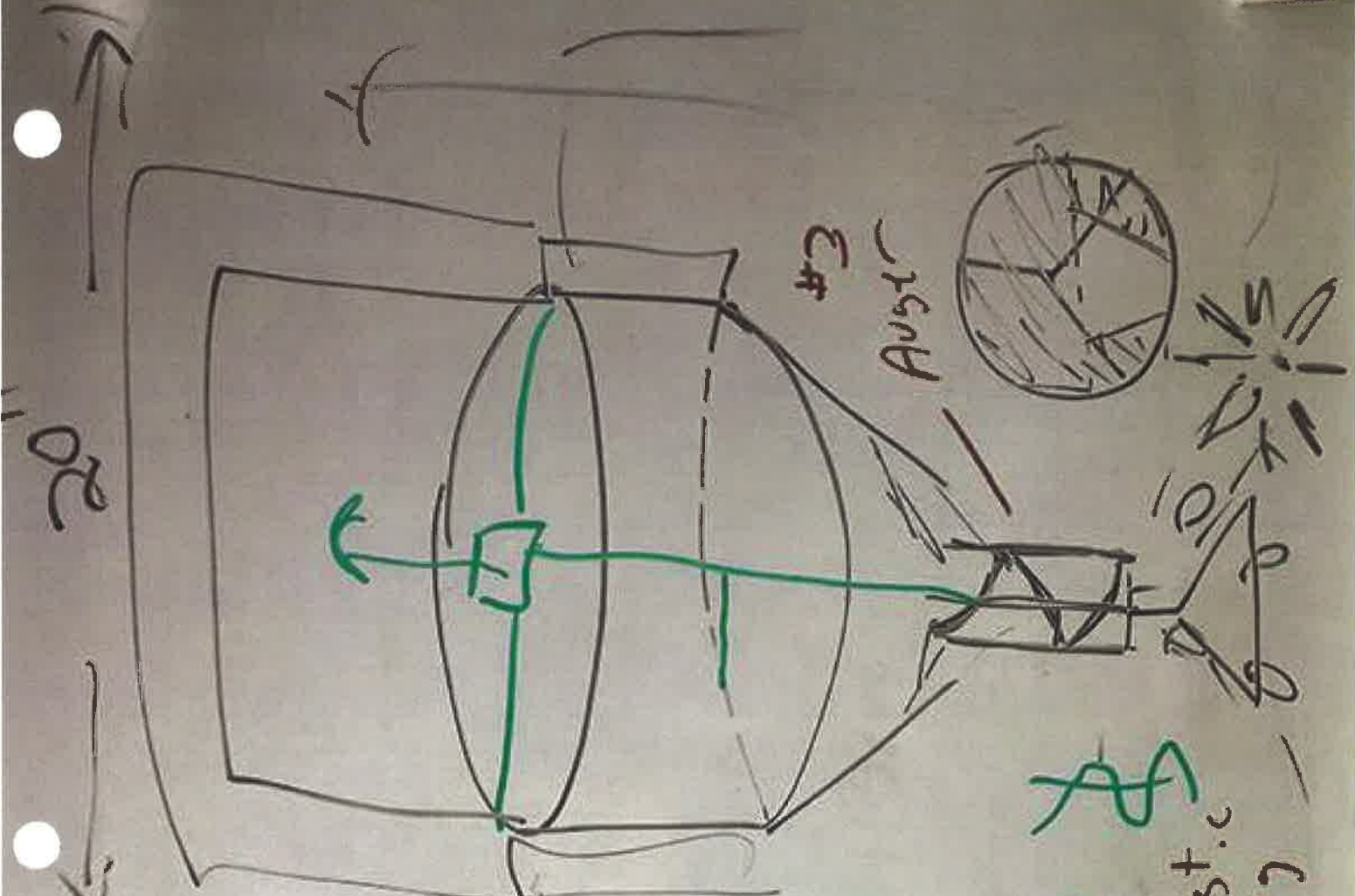
This design works by loading the petals into a container from above. The petals then work their way down by the spinning of the auger to an opening at the bottom where they are dispersed. The reload mechanism works by a quick release box on a 16-foot pole controlled by guide wires.

Some features of this device are; 3D printed couplers, electronic variable speed controls and plasma cut agitators to avoid build up or clogging of petals inside the device

This version of the design cost us just about \$200.00 to build. In the future, we would use a larger motor to run the auger we would also install a vacuum system to refill the petal hopper, in order to maximize efficiency and minimize reloading complications. This vacuum system would also allow for continuous petal flow despite the size of the hopper.

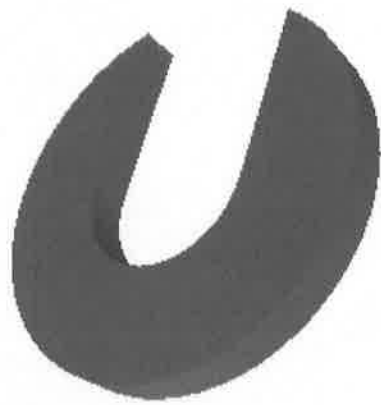
2019 Design Competition Parts list

STORE	DATE	AMOUNT	DESCRIPTION
Amazon	4/11/2019	\$11.99	DC Motor Speed Controller Universal DC 12V/24V Speed Controller Switch For Car Truck Motor
Amazon	4/11/2019	\$35.58	Driver Heater Control
Amazon	4/11/2019	\$8.99	East Penn 03206 100' 14-2 Gauge Jacketed Wire
Amazon	4/11/2019	\$15.49	CODE FLORIST 2200 PCS Dark-Red Silk Rose Petals Wedding Flower Decoration
Amazon	4/11/2019	\$15.49	Greartisan DC 12V 50RPM Gear Motor High Torque Electric Micro Speed Reduction Geared Motor
Amazon	4/11/2019	\$12.99	Centric Output Shaft 37mm Diameter Gearbox
Amazon	4/11/2019	\$25.99	JUL Listed Chanzon 12V 3A 36W AC DC Switching Power Supply Adapter (Input 100-240V, Output 12
Menards	in stock	\$24.23	Volt 3 Amp) Wall Wart Transformer Charger for DC12V LED Strip Lights CCTV Cameras (6Ft Cord, 36
Menards	in stock	\$16.05	Watt Max)
Home Depot	4/18/2019	\$18.25	Earth Auger Drill Bit Fence Post Hole Digger Drill Garden Planting Non-Slip Hole Drill 4 1/2" 5" 6" 8" 5"
Home Depot	4/12/2019	\$10.22	1 1/4" metal pipe
Menards	in stock	\$3.48	1/2" Plywood
Norcostco	in stock	\$31.90	Machine screws, washers, hex nuts, bolts, flange, nipple and cap
Global	in stock	\$8.34	junction box, machine screws, tubing
			Black spray paint
			lighting C Clamps 15.95each x 2
			scrap piece of fabric
			kee clamp 2 x 4.17
			Reloading device
Menards	4/29/2019	\$39.99	extendable paint pole
Menards	4/30/2019	\$6.98	u bolts, strap hinges, 10-32x1/2" bolts
Menards	in stock	\$11.78	scrap 1/4" Masonite
Menards	in stock	\$3.48	green Spray paint
			Tie Line 30 feet 34.95 for 600' spool .06 per foot
Total		\$292.52	
		\$205.48	Cost excluding stock materials



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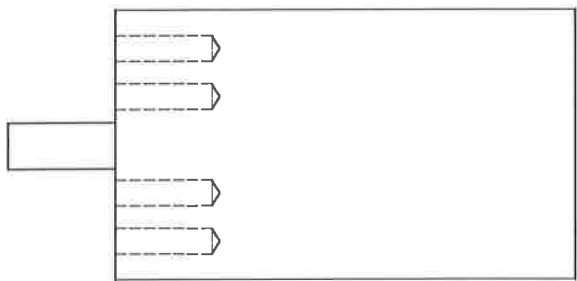
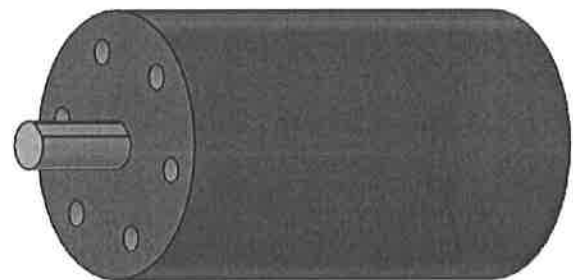


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 Q.A.
 COMMENTS:

DIMENSIONS ARE IN MILLIMETERS
 TOLERANCES:
 ANGULAR: MACH ±0° 30'
 ONE PLACE DECIMAL +0.5
 TWO PLACE DECIMAL ±0.15

INTERPRET GEOMETRIC
 TOLERANCING PER: ASME Y14.5
 MATERIAL
 FINISH
 USED ON
 NEXT ASSY

DO NOT SCALE DRAWING

APPLICATION

TITLE:

MOTOR WITH
50:1 GEAR RATIO

SIZE DWG. NO. REV

A MOTOR

SCALE: 1:1 WEIGHT: SHEET 1 OF 1

A

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2

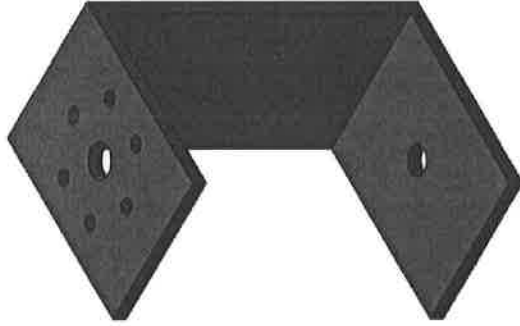
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TITLE:

MOTOR
BRACKET

SIZE DWG. NO. REV

A BRACKET

SCALE: 1:2 WEIGHT: SHEET 1 OF 1

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DIMENSIONS ARE IN MILLIMETERS	DRAWN	
TOLERANCES:	CHECKED	
ANGULAR: MACH±0° 30'	ENG APPR.	
ONE PLACE DECIMAL ±0.5	MFG APPR.	
TWO PLACE DECIMAL ±0.15	Q.A.	
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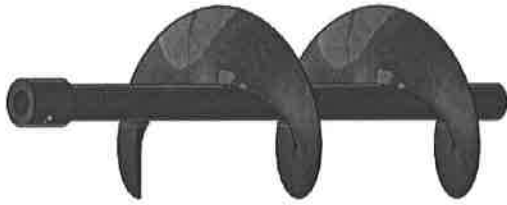
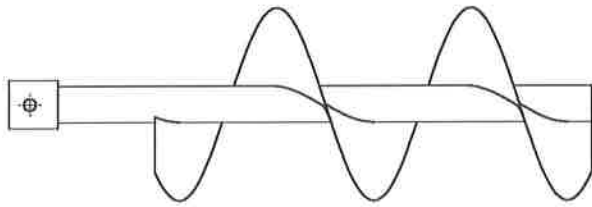
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TITLE:

AUGER

NAME

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UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS

TOLERANCES:
ANGULAR: MACH ±0° 30

ONE PLACE DECIMAL ±0.5

TWO PLACE DECIMAL ±0.15

CHECKED

ENG APPR.

MFG APPR.

Q.A.

COMMENTS:

INTERPRET GEOMETRIC
TOLERANCING PER: ASME Y14.5

MATERIAL

FINISH

DO NOT SCALE DRAWING

NEXT ASSY

USED ON

APPLICATION

SIZE DWG. NO.

A AUGER

REV

SCALE: 1:4 WEIGHT:

SHEET 1 OF 1

2

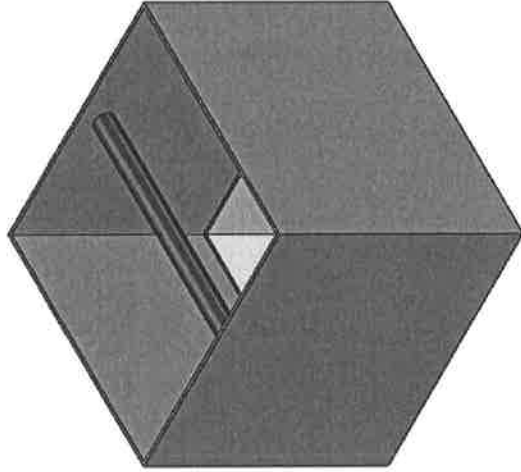
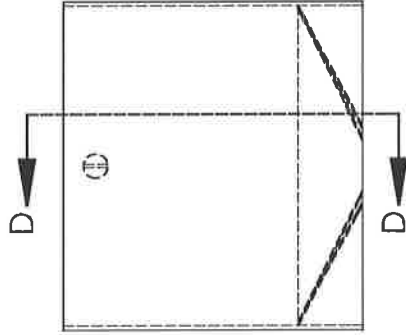
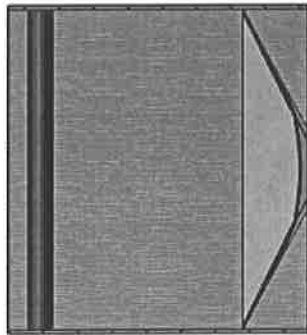
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SECTION D-D

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TITLE:
HOLDING BOX

SIZE DWG. NO. REV
A **BOX**

SCALE: 1:12 WEIGHT: SHEET 1 OF 1

NAME	DATE	UNLESS OTHERWISE SPECIFIED:	DRAWN	DATE
		DIMENSIONS ARE IN MILLIMETERS	CHECKED	
		TOLERANCES:	ENG APPR.	
		ANGULAR: MACH±0° 30'	MFG APPR.	
		ONE PLACE DECIMAL ±0.5	Q.A.	
		TWO PLACE DECIMAL ±0.15	COMMENTS:	
		INTERPRET GEOMETRIC		
		TOLERANCING PER: ASME Y14.5		
		MATERIAL		
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		NEXT ASSY		
		APPLICATION		
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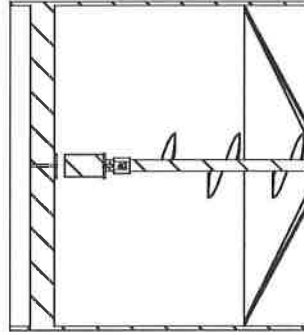
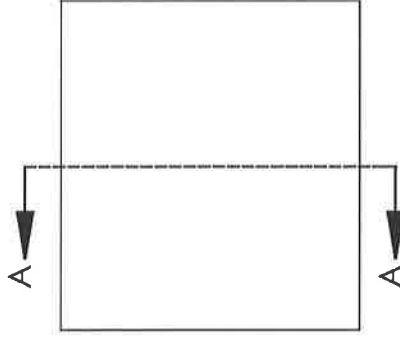
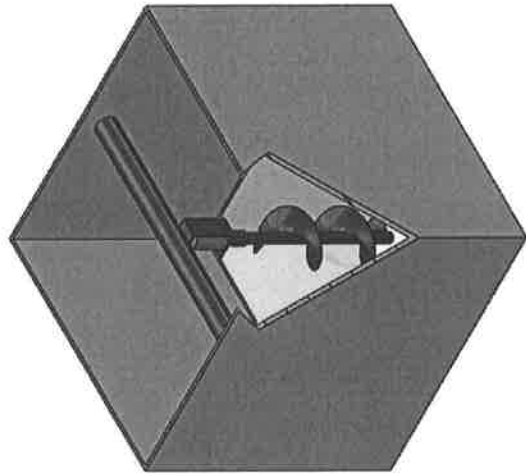
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SECTION A-A



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NAME

DRAWN

UNLESS OTHERWISE SPECIFIED:

DATE

DATE

DATE

DATE

DATE

TITLE:
FULL ASSEMBLY

CHECKED

ANGULAR: MACH $\pm 0^{\circ} 30'$
 ONE PLACE DECIMAL $+0.5$
 TWO PLACE DECIMAL ± 0.15

ENG APPR.

MFG APPR.

Q.A.

COMMENTS:

COMMENTS:

SIZE DWG. NO. REV
FULL ASSEMBLY

INTERPRET GEOMETRIC TOLERANCING PER: ASME Y14.5

MATERIAL

FINISH

USED ON

APPLICATION

DO NOT SCALE DRAWING

DO NOT SCALE DRAWING

SCALE: 1:12 | WEIGHT:

SHEET 1 OF 1

SHEET 1 OF 1

SHEET 1 OF 1

SHEET 1 OF 1

SHEET 1 OF 1

SHEET 1 OF 1

SHEET 1 OF 1

1

2

