Jeux de Génie
EngGames 2027
Libère ton génie | Unleash your genius

MACHINE CONSTRUCTION BOOKLET

JANUARY 3RD TO 7TH 2027 | UNIVERSITÉ LAVAL

36TH EDITION OF THE ENGINEERING GAMES



SEPTEMBER 5TH, 2026 | ENGLISH VERSION

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1. INTRODUCTION

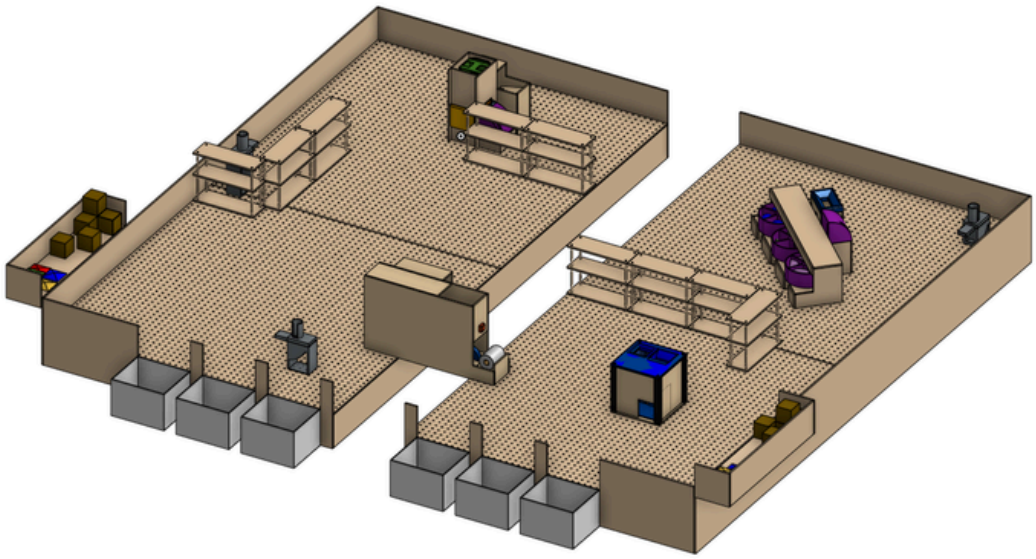
The purpose of this document is to present the teams with the various elements necessary to construct a course similar to that which will be used in the demonstration before the public.

CAUTION!!!

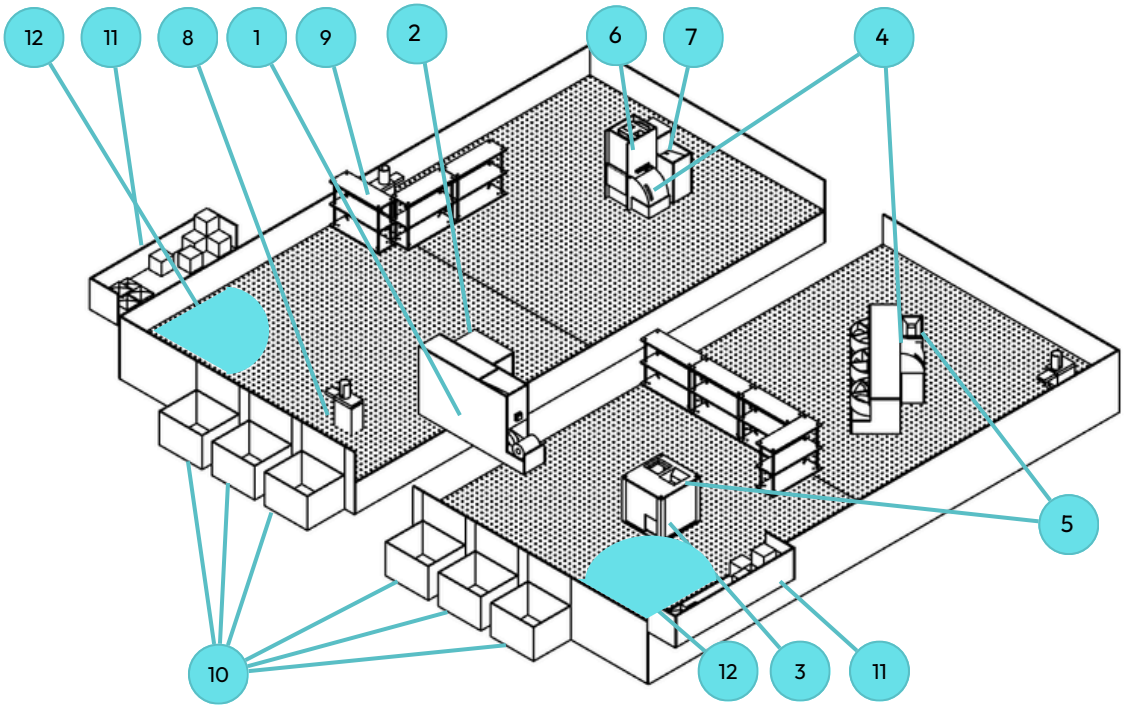
To construct our playing field, we have chosen to make hot glue our main means of assembly, not only for its efficiency, but also for its creative dimension. Hot glue “welding” allowed us to transform simple materials into a solid structure, while giving way to our imagination and manual know-how. Each line of glue becomes a kind of artistic stroke that connects, shapes and brings life to the terrain. This choice demonstrates that hot glue is not just a simple bonding tool: it is a true technique of creation, combining precision, resistance, and artistic expression.

IMPORTANT !

As with the machine rulebook, the organizing committee reserves the right to make changes to this booklet. In the case of modifications, a new booklet will be available on the Engineering Games website and delegations will be notified. In the event of a discrepancy between the French and English versions, the French version will prevail.



2. FIELD ELEMENTS



No.	FIELD ELEMENT
1	Roll dispenser
2	Cardboard recycler
3	Furnace
4	Cartridge receiver
5	Pouch receiver
6	Box tower
7	Roll receiver
8	Cartridge dispenser
9	Shelves
10	Shipping Zone
11	Resource Zone
12	Starting Zone

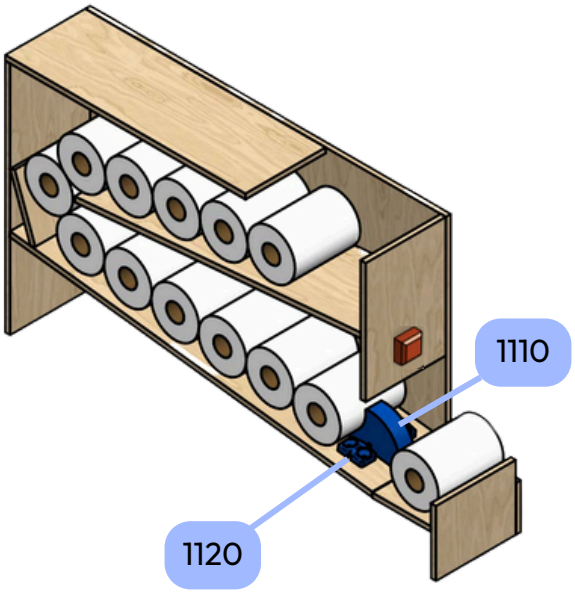
3. PAPER MACHINE

3.1. ELEMENT TREE

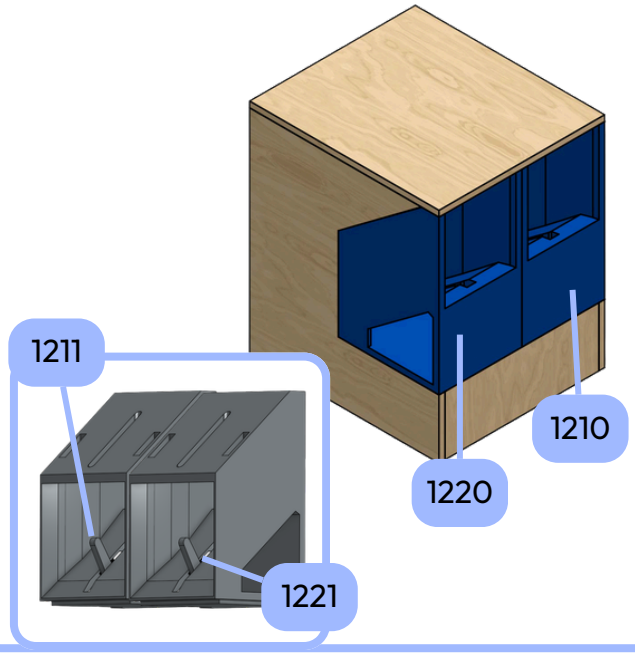
1000 - Paper Machine;

- 1100 - Roll dispenser
  - 1110. Dispenser wheel
  - 1120. Hinge (2x)
- 1200 - Cardboard Recycler
  - 1210. Left cardboard chute
  - 1211. Left servo arm
  - 1220. Right cardboard chute
  - 1221. Right servo arm

1100 - Roll dispenser



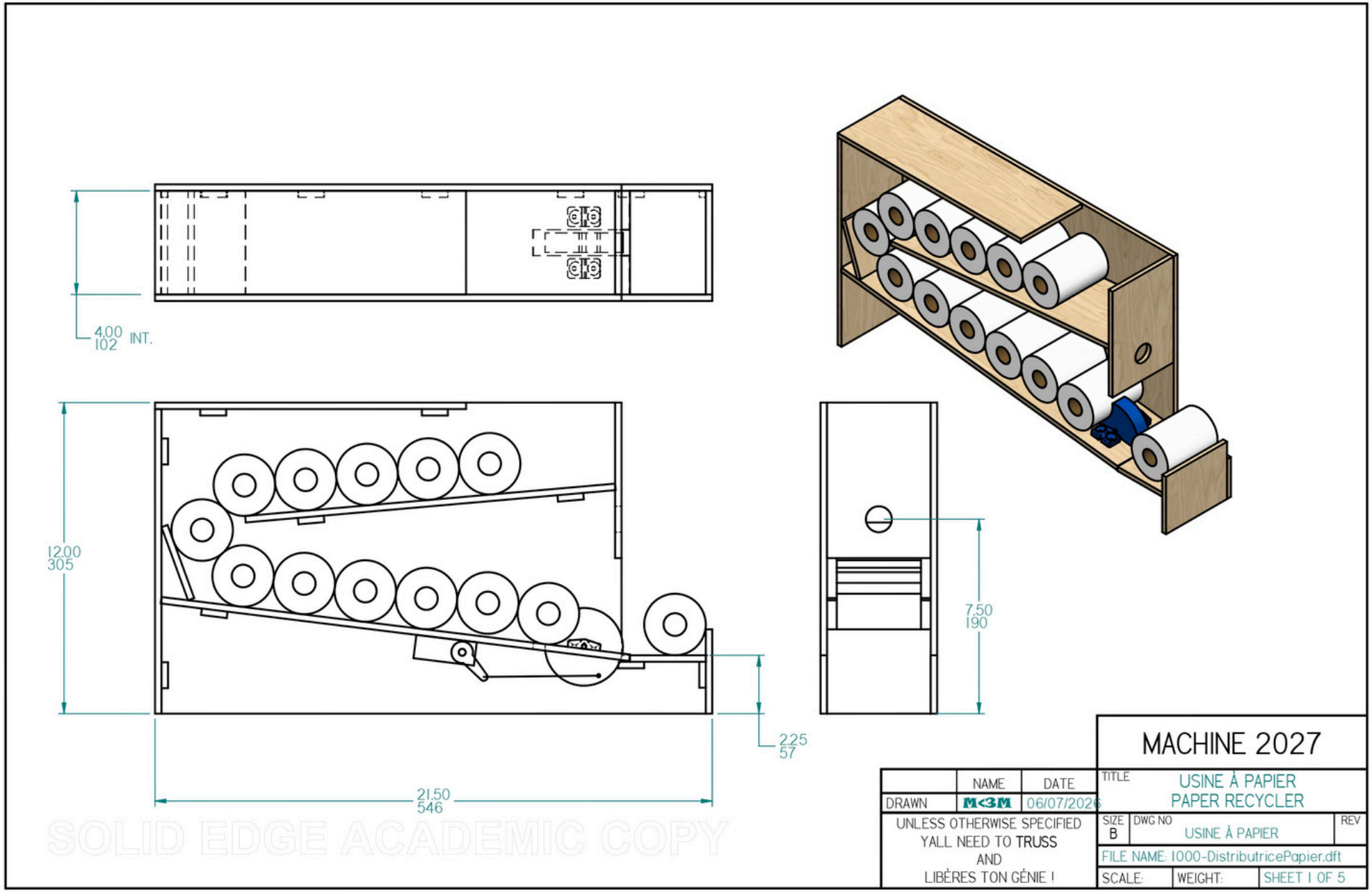
1200 - Cardboard Recycler



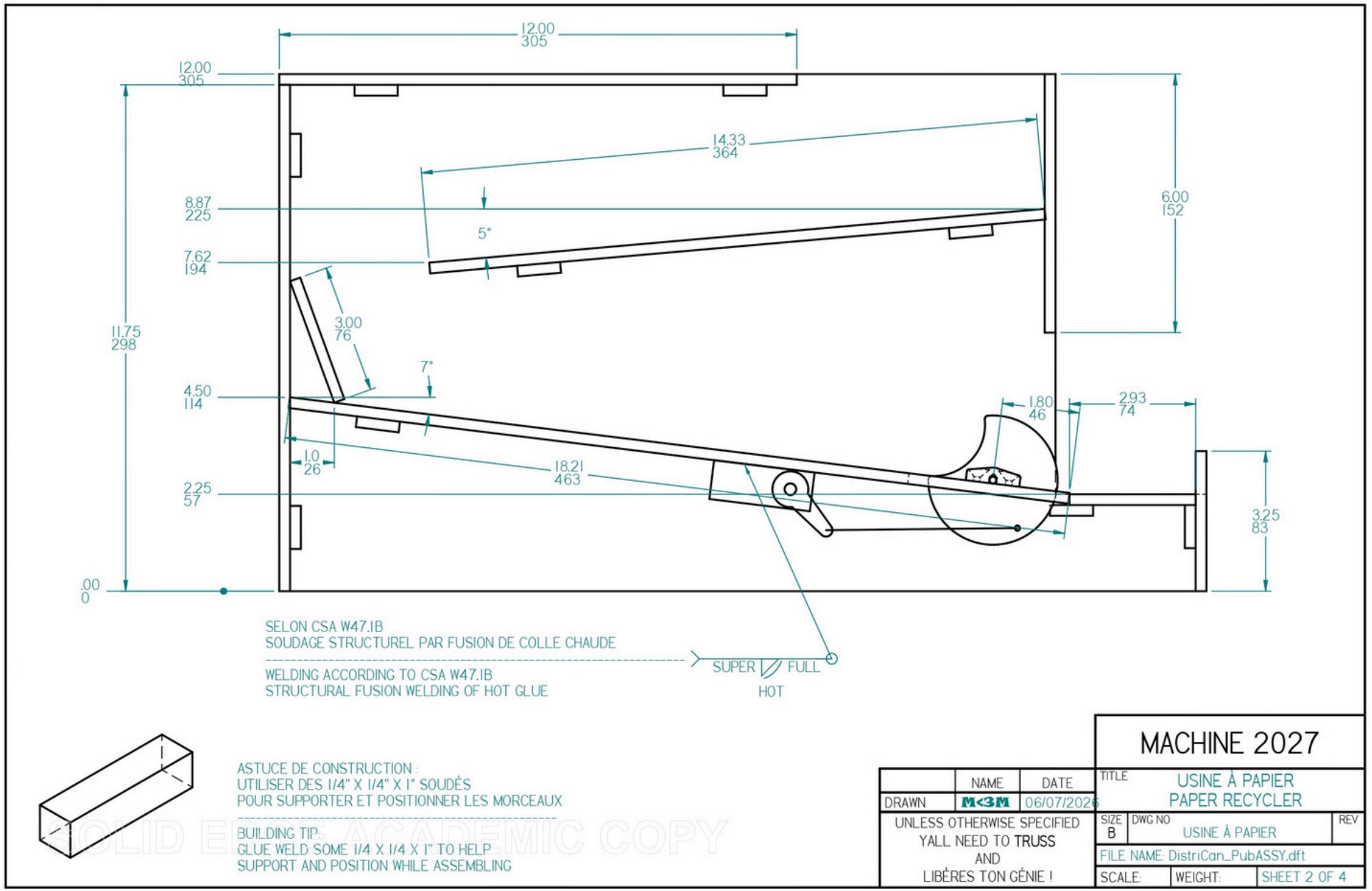
3.2. MATERIAL LIST

Item #	DESCRIPTION	QTY	SUPPLIED
1	Arduino Nano	1	Yes
2	Servo MG996R 9kg/cm + Servo mounting kit	1	Yes
3	Servo MG90S 9g/cm + Servo mounting kit	2	Yes
4	Infrared sensor HW870	2	Yes
5	Magnetic sensor HMC8883L	1	Yes
6	5V Relay Module	1	Yes
7	9V battery support	1	Yes
8	9V battery (replaceable by wired power supply)	1	No
9	Push-button with integrated LED	1	Yes
10	Buck converter LM2596	1	Yes
11	1/4" thick plywood board	n/a	No
12	Wheel axle (steel dia 1/8)	1	Yes
13	Servo rod	1	Yes
14	Hot glue	∞	No

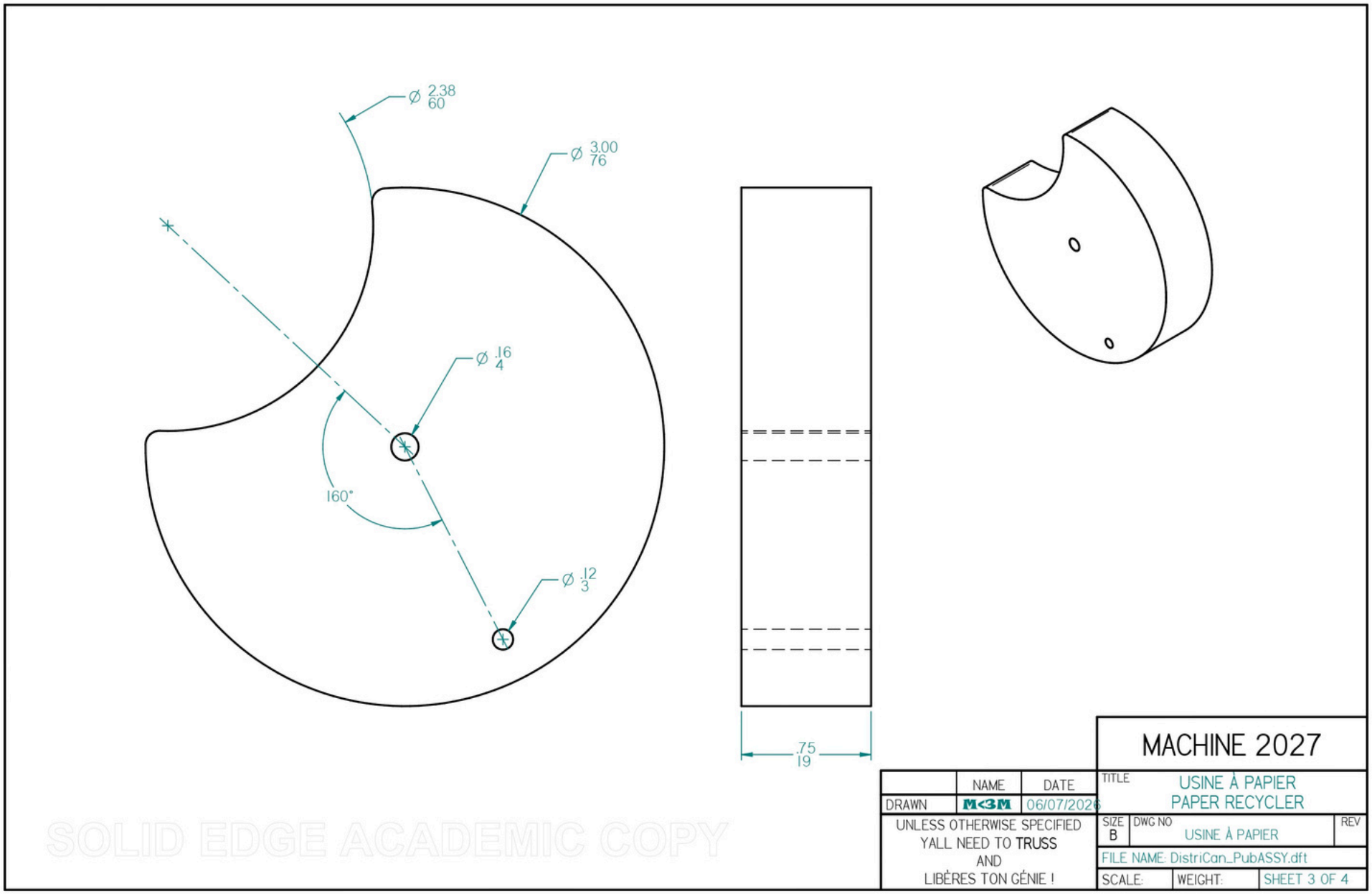
3.3. MECHANICAL ASSEMBLY



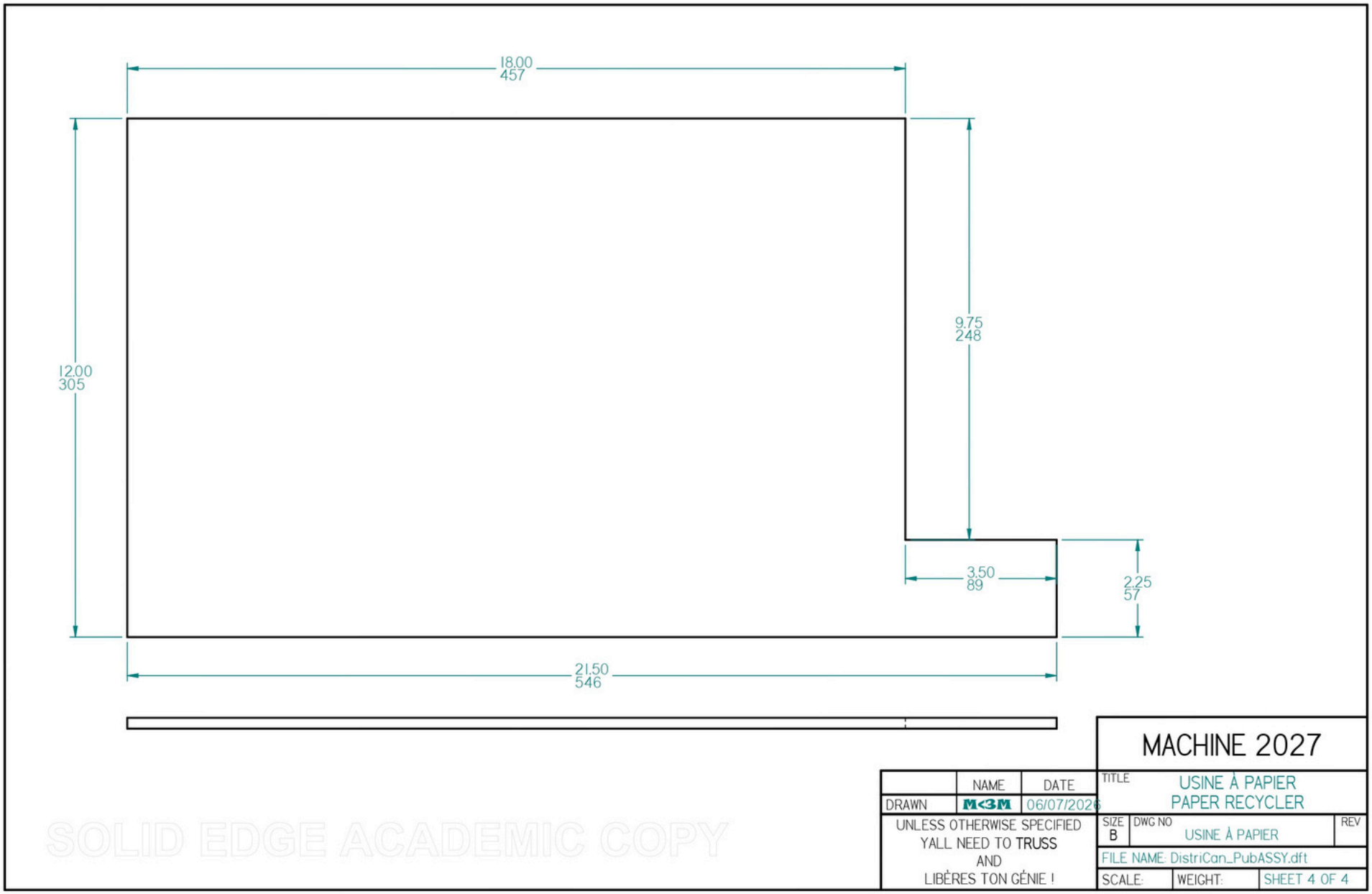
3.3. MECHANICAL ASSEMBLY



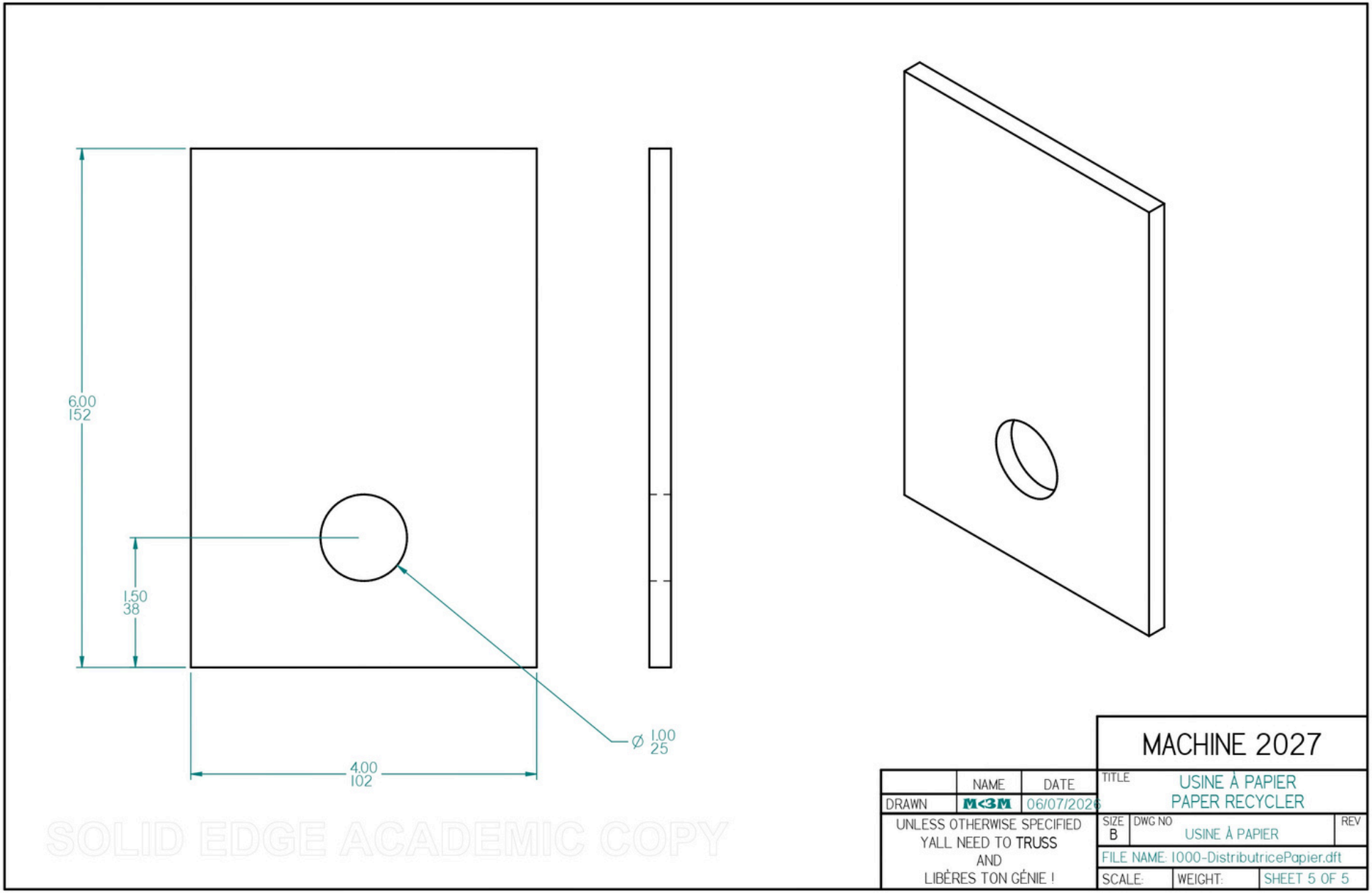
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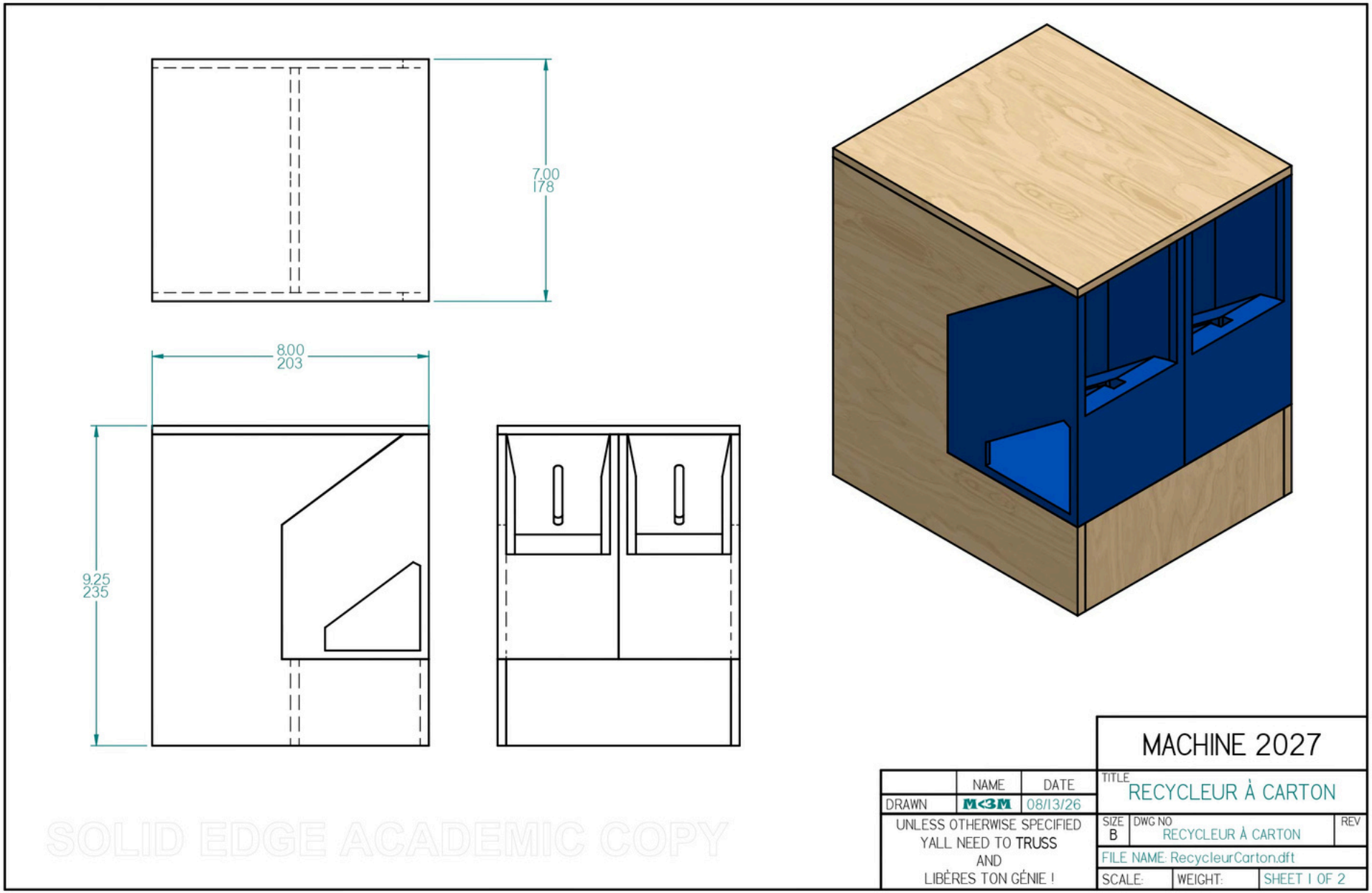
3.3. MECHANICAL ASSEMBLY



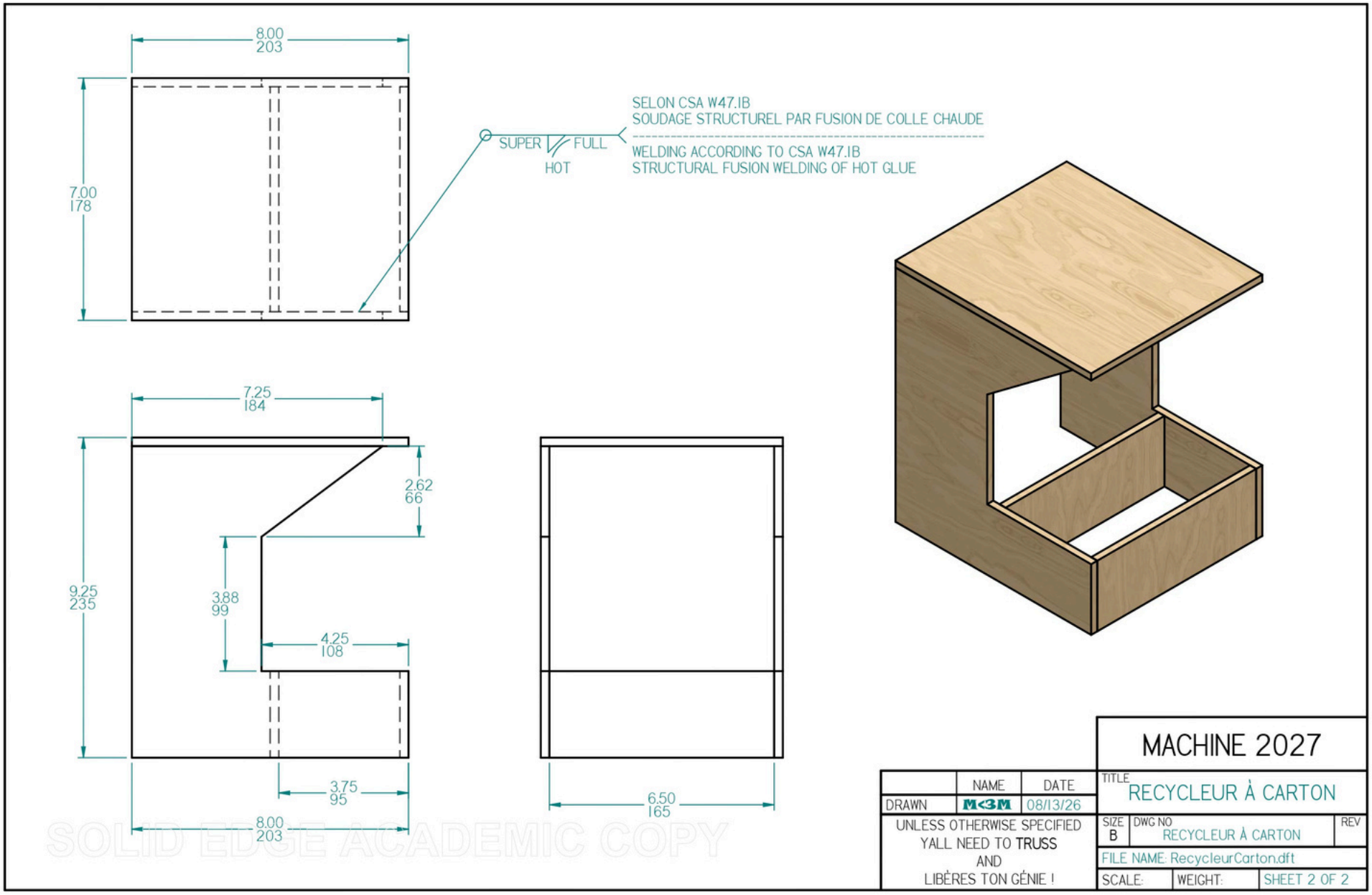
3.3. MECHANICAL ASSEMBLY



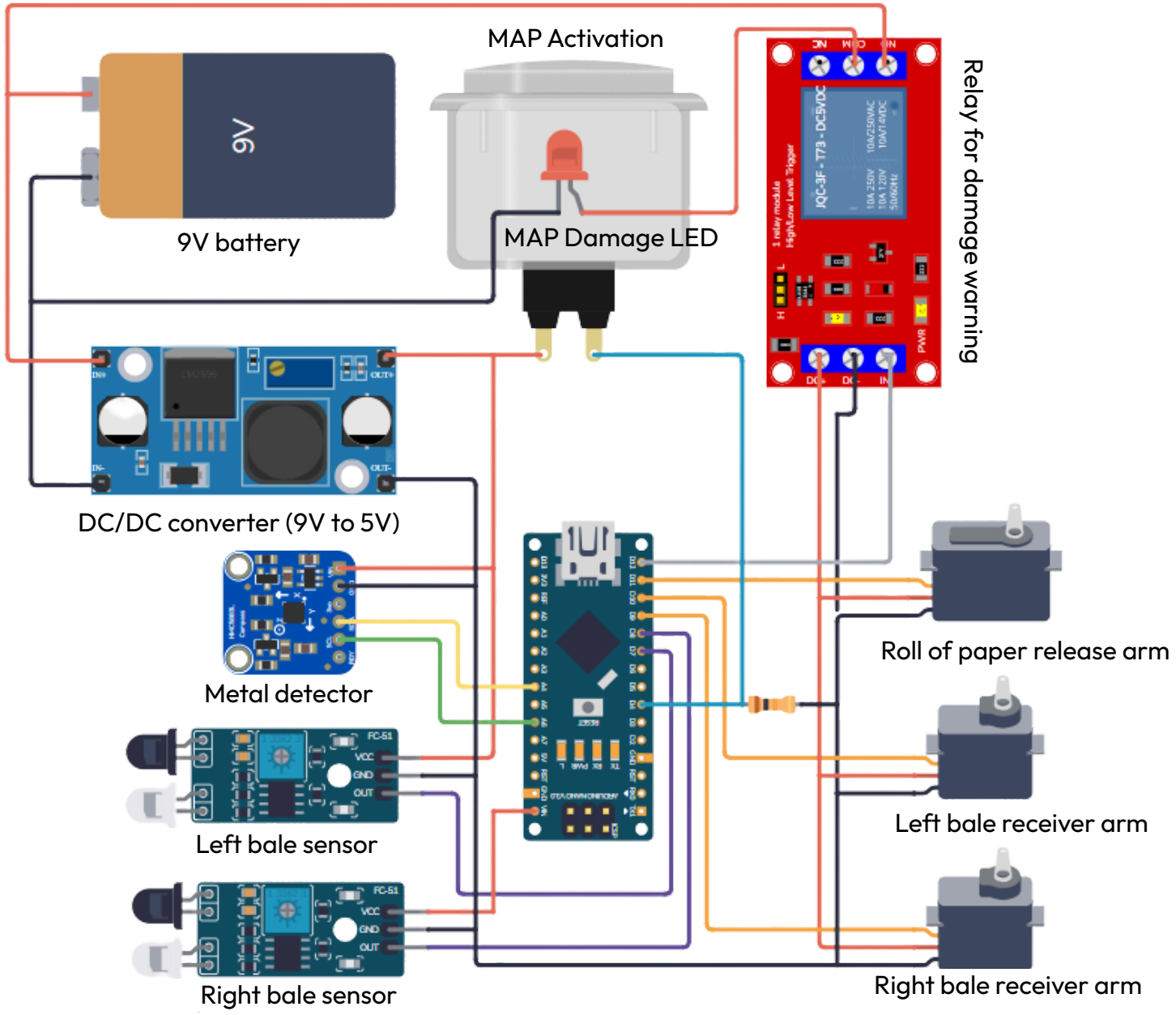
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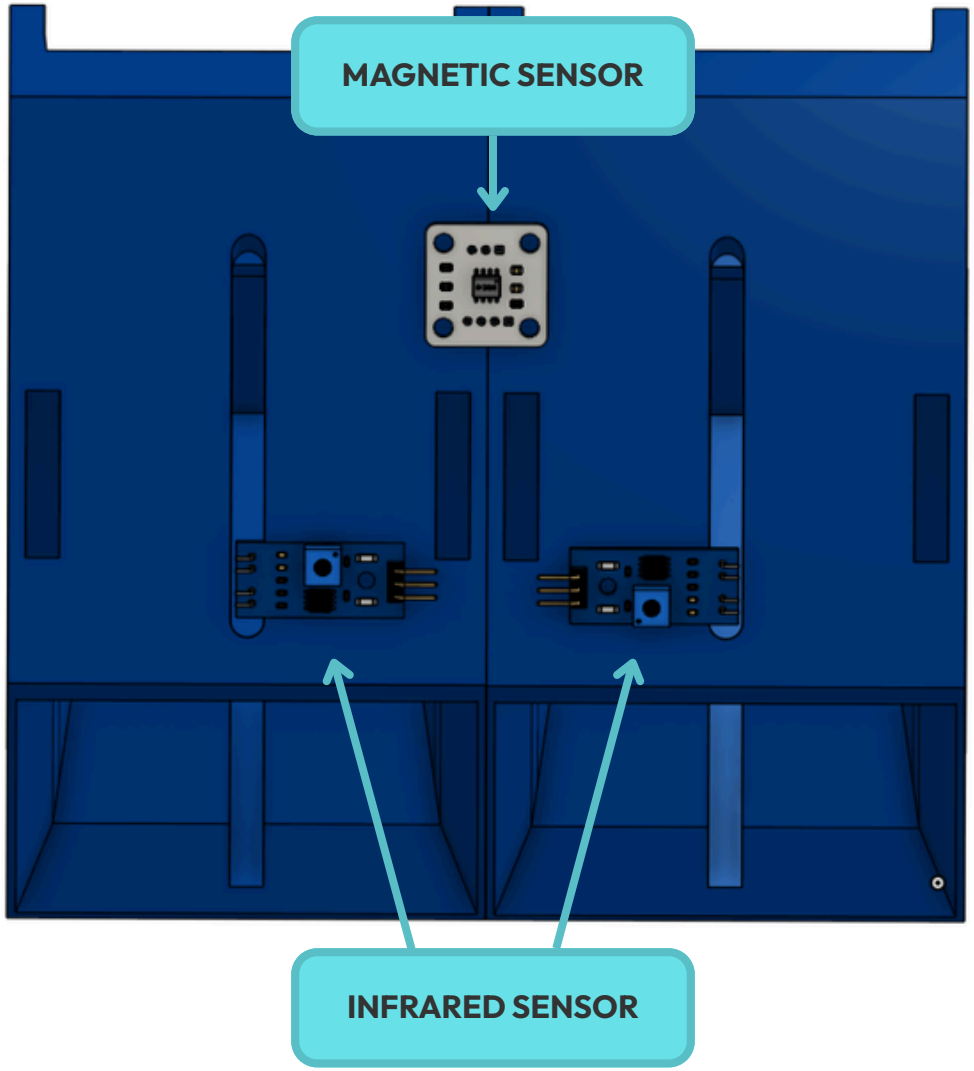


3.4. CIRCUIT DIAGRAM



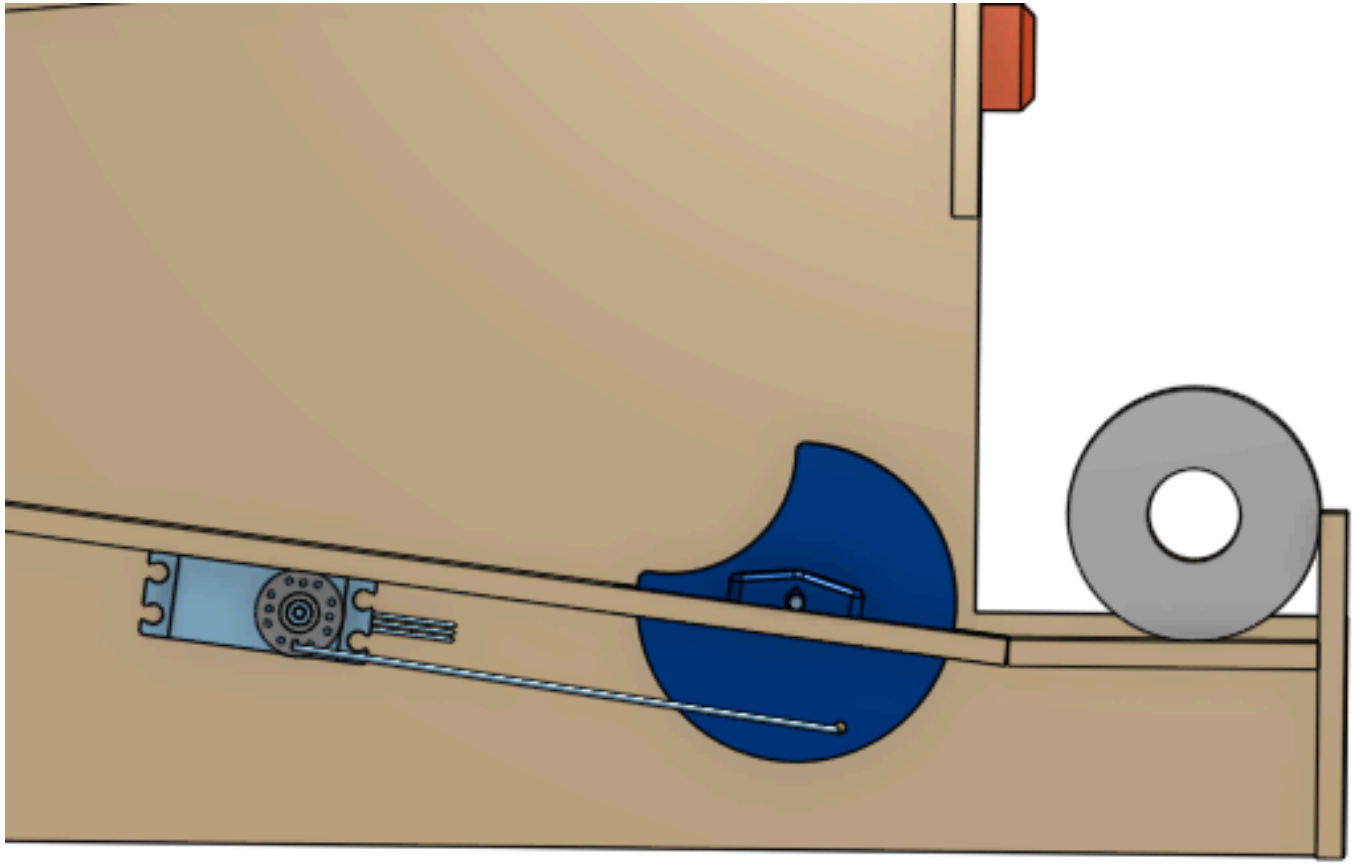
3.5. COMPONENT PLACEMENT

3.5.1. INFRARED SENSOR AND MAGNETIC SENSOR



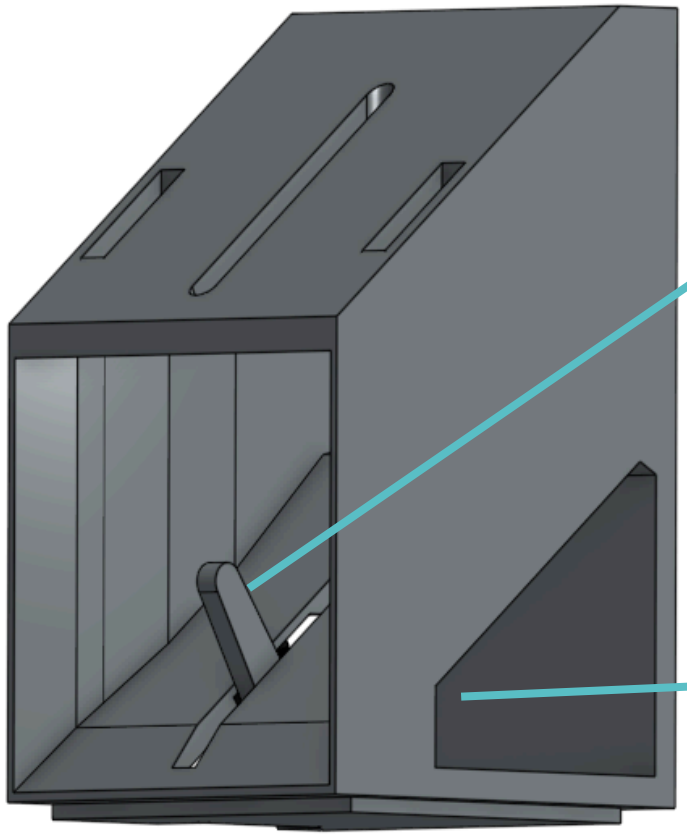
3.5. COMPONENT PLACEMENT

3.5.2. 9KG SERVO MOTOR



3.5. COMPONENT PLACEMENT

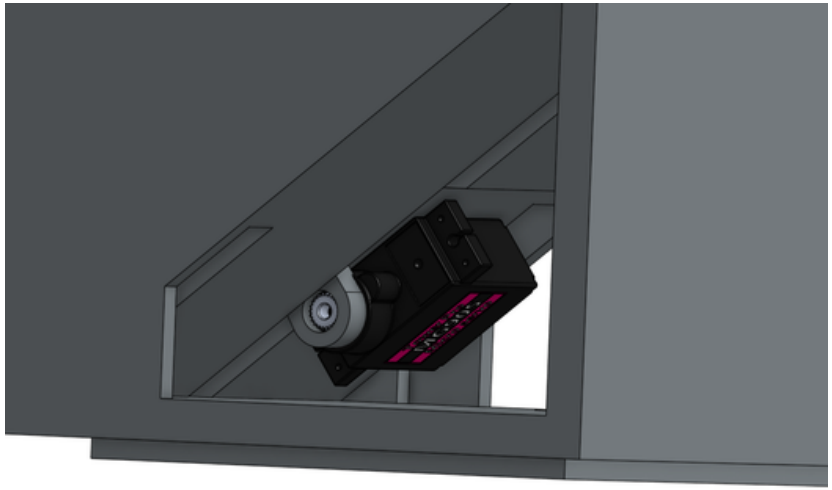
3.5.3. 9G SERVO MOTOR AND ARM



TO PRINT



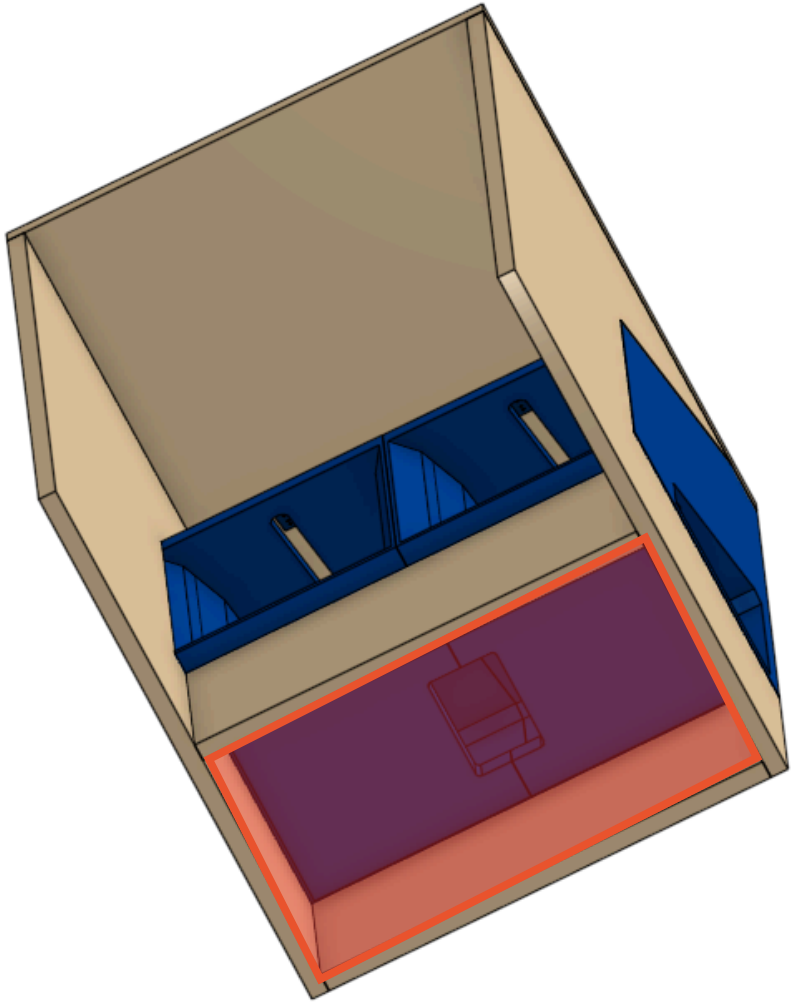
TO PRINT X2



3.5. COMPONENT PLACEMENT

3.5.4. OTHER COMPONENTS

The remaining components (Arduino, battery, relay, etc.) can be stored in the area beneath the cardboard recyclers of the paper machine. The space marked in red in the figure below shows the area where these components can be placed.



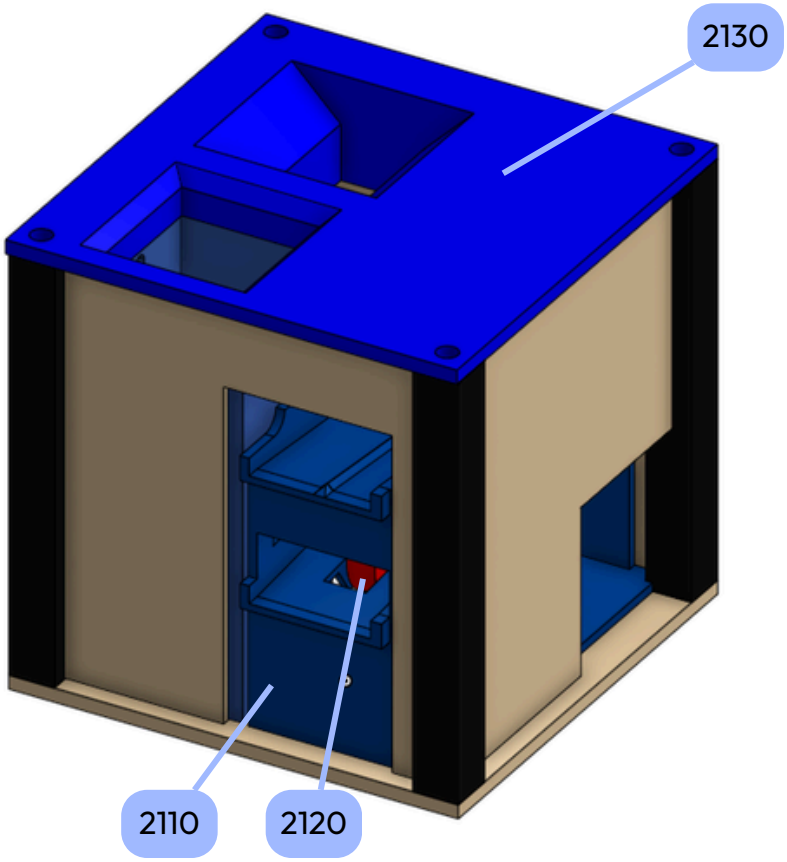
4. FURNACE

4.1. ELEMENT TREE

2000 - Furnace

- 2100 - Structure of the furnace
  - 2110. Bottle dispenser
  - 2111. Bottle selector
  - 2130. Receiver roof

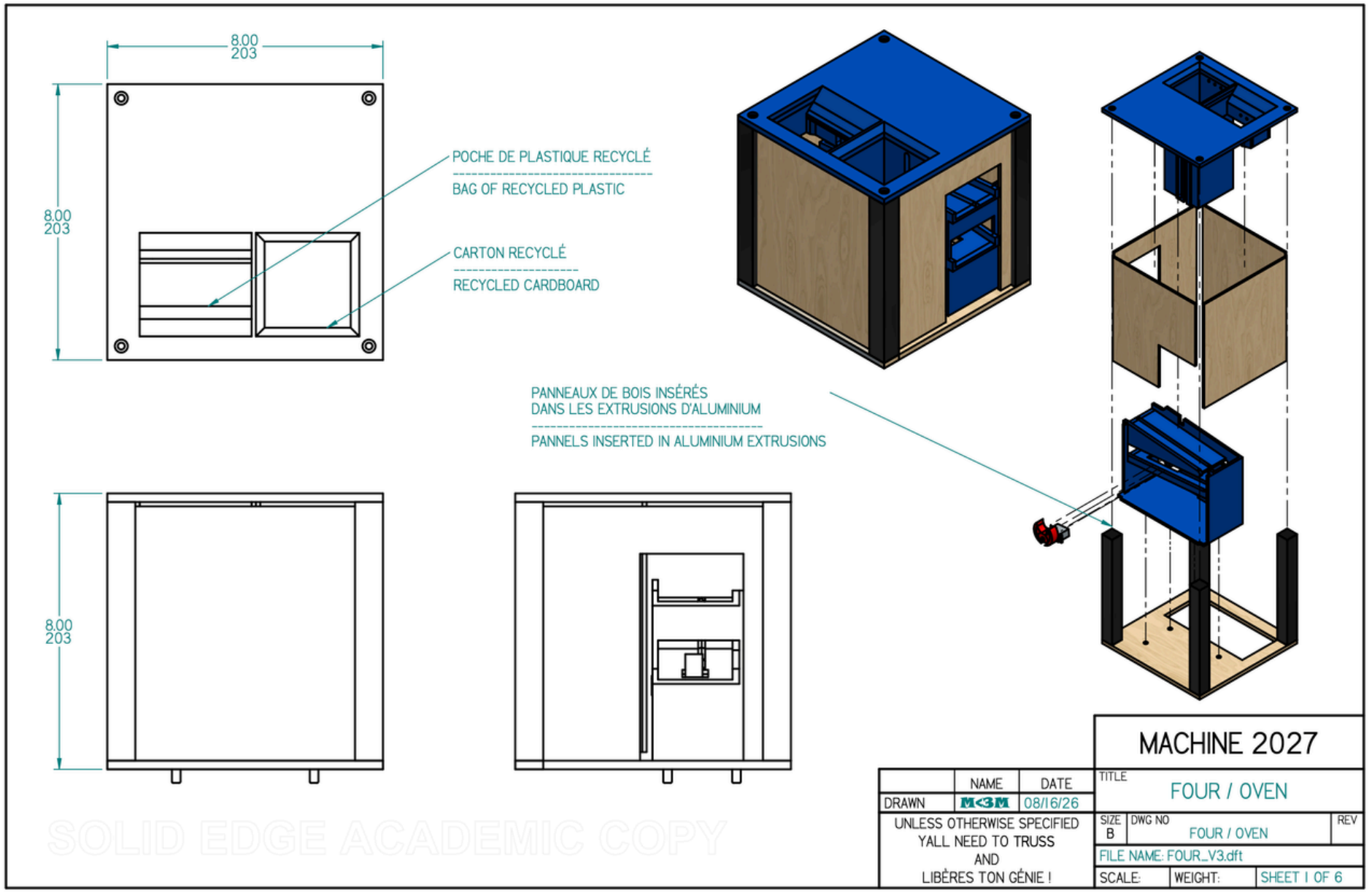
2000 -Structure of the furnace



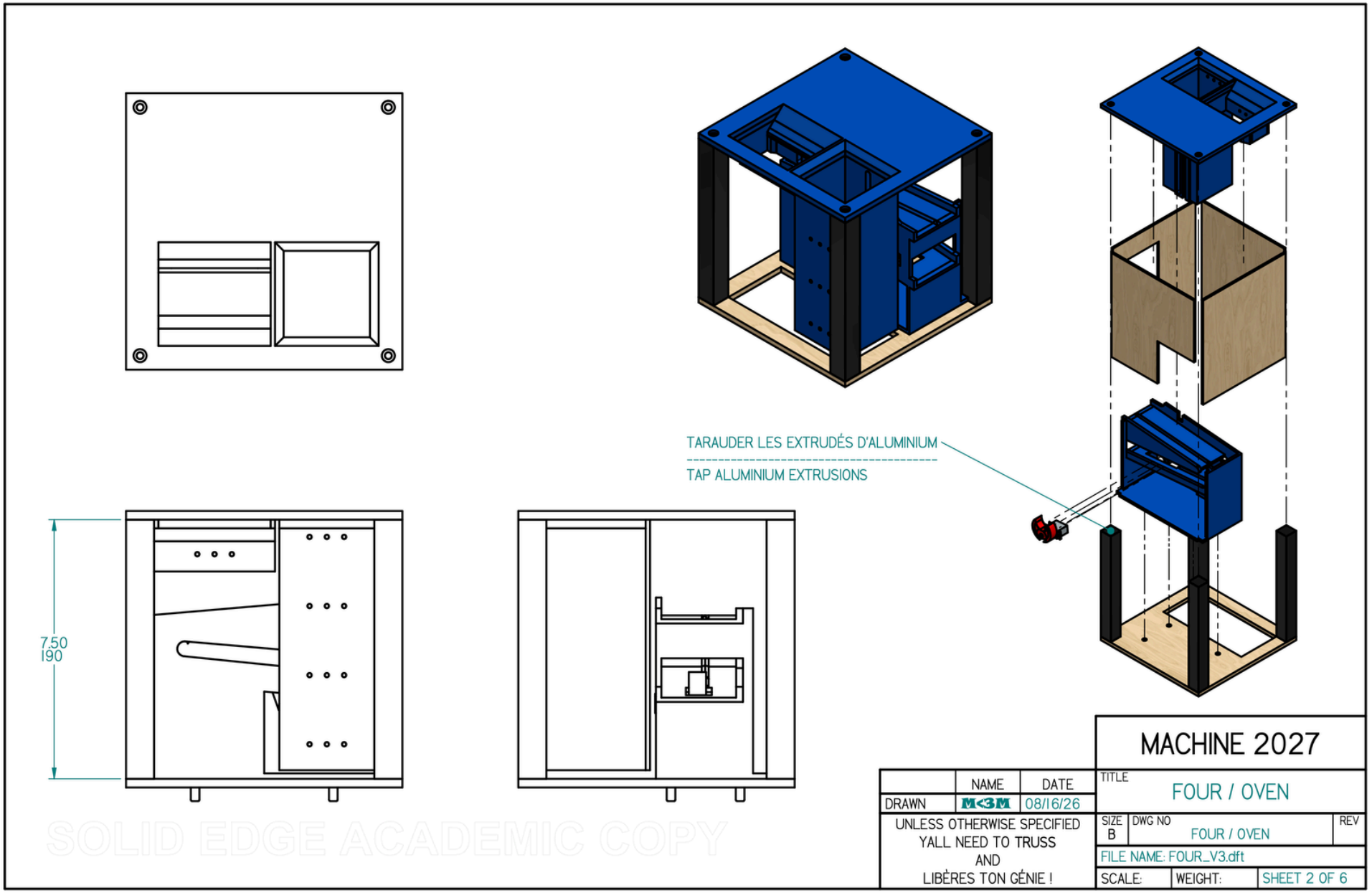
4.2. MATERIAL LIST

Item #	DESCRIPTION	QTY	SUPPLIED
1	Arduino Nano	1	Yes
2	Servo MG90S 9g/cm + Servo mounting kit	1	Yes
3	Infrared sensor HW870	5	Yes
4	Buck converter LM2596	1	Yes
5	9V battery support	1	Yes
6	1/4" thick plywood board	n/a	No
7	1/8'' x 12" x 12" MDF board	4	Yes
8	400mm profile 2020 aluminum extrusions	2	Yes
9	Hot glue	∞	No
10	9V battery (replaceable by wired power supply)	1	No

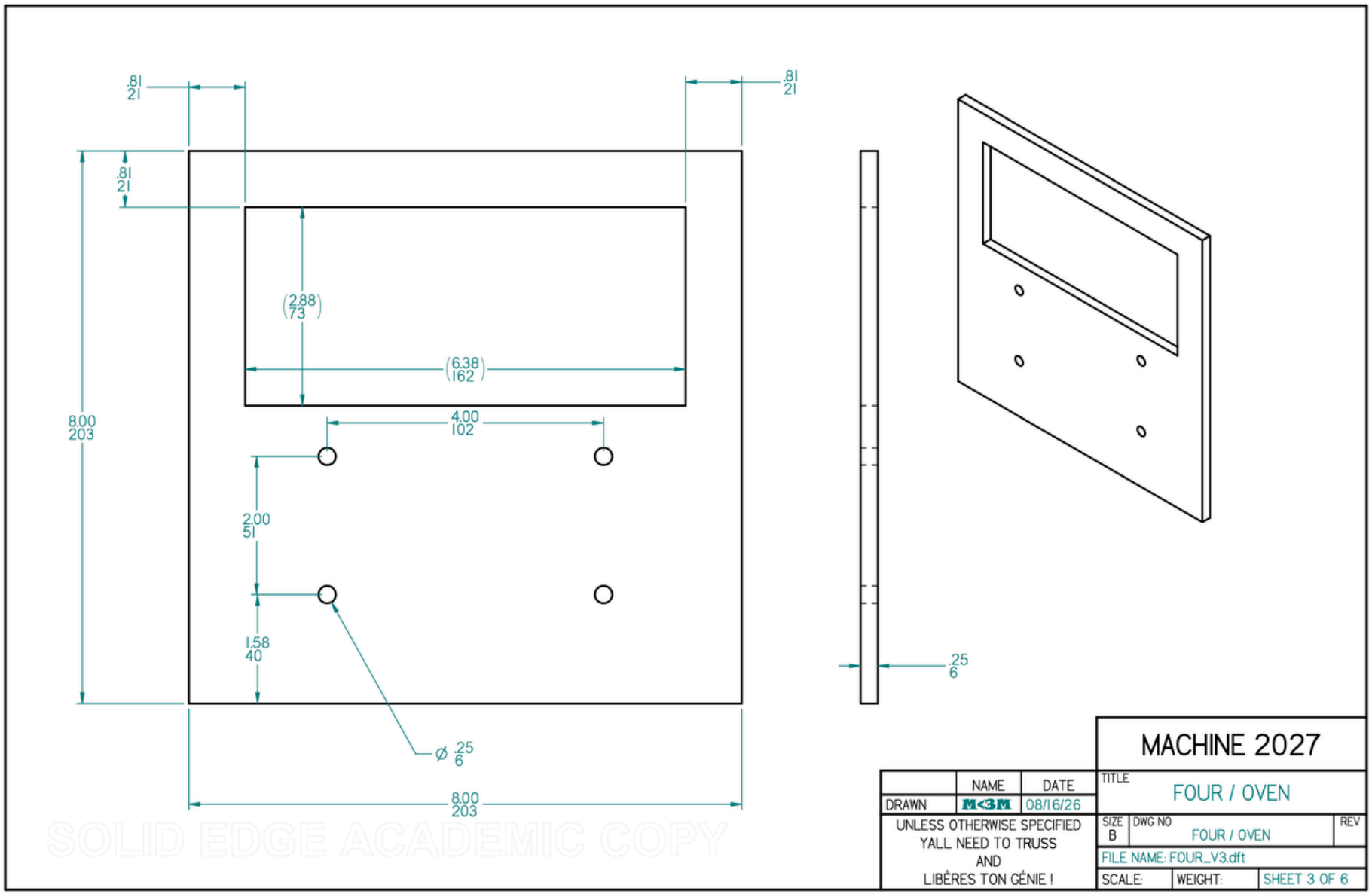
4.3. MECHANICAL ASSEMBLY



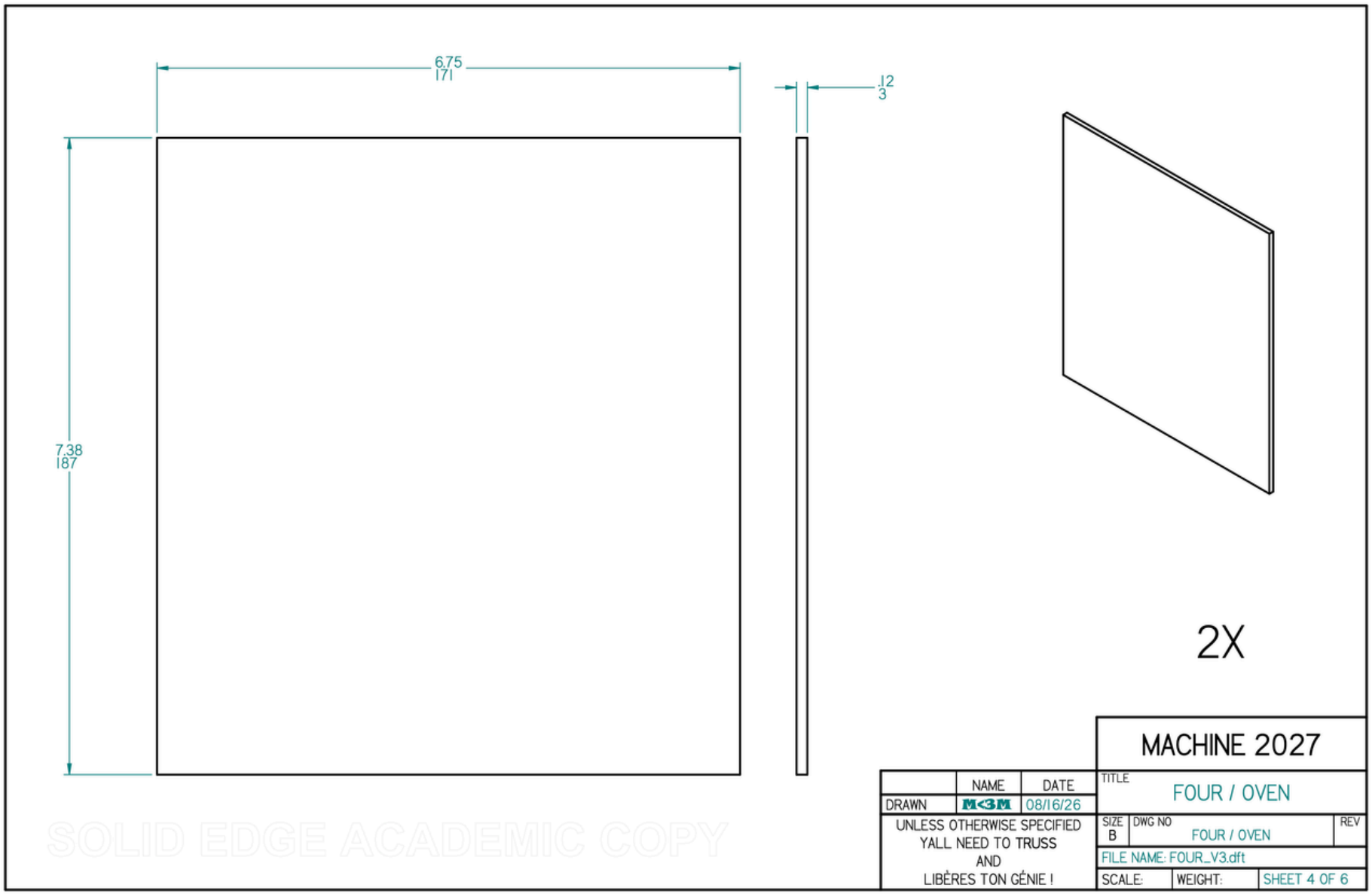
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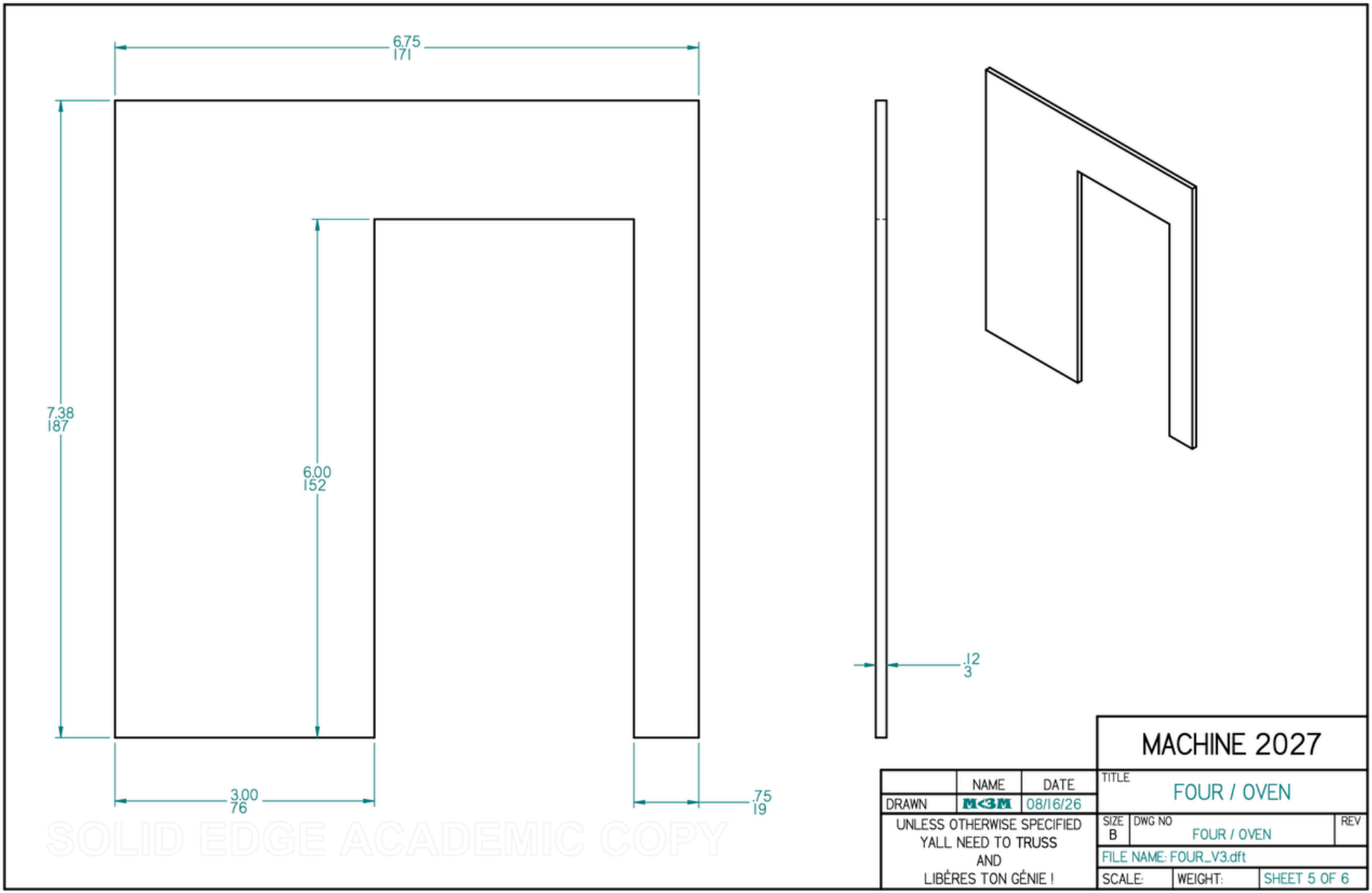
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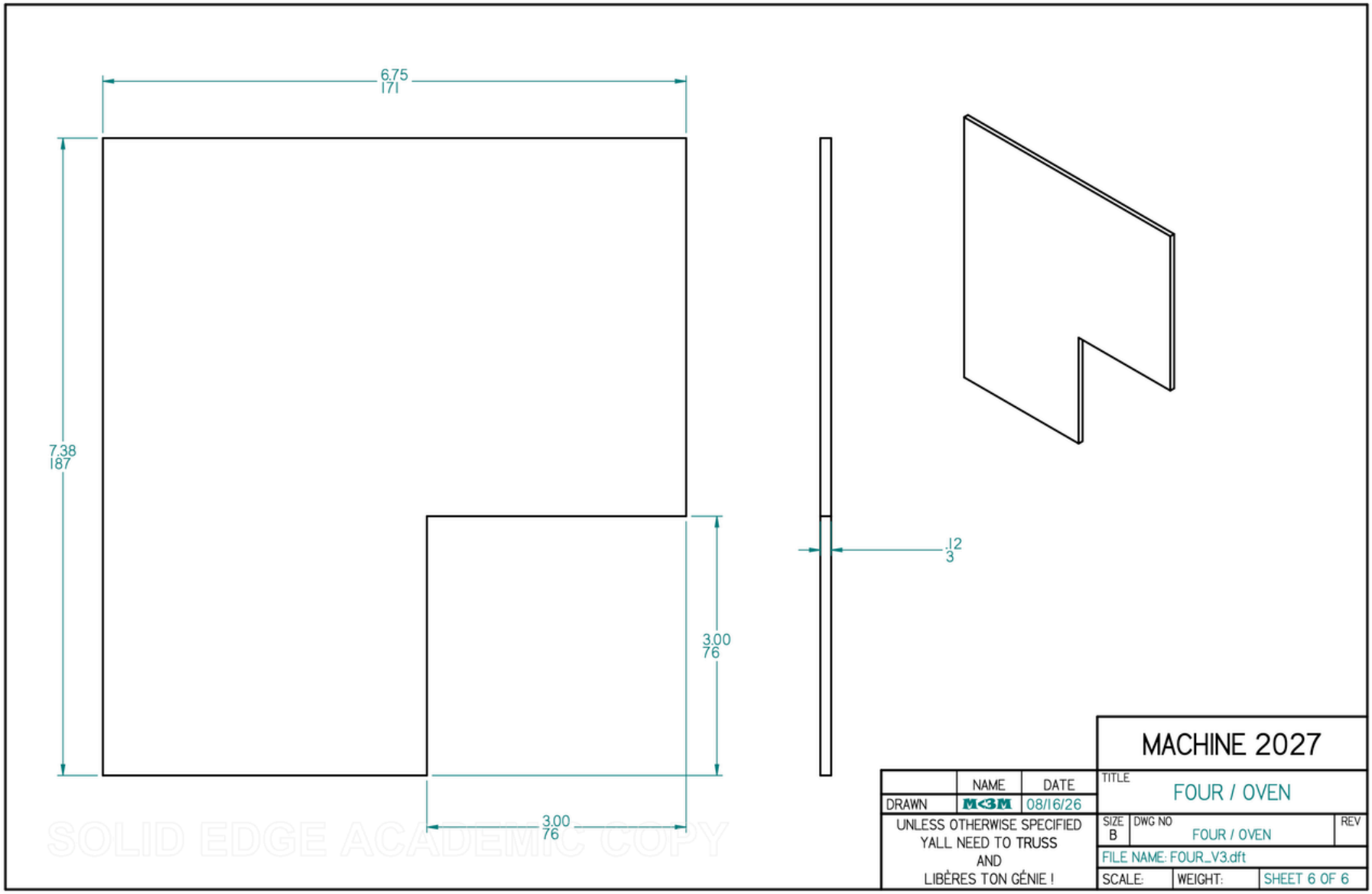
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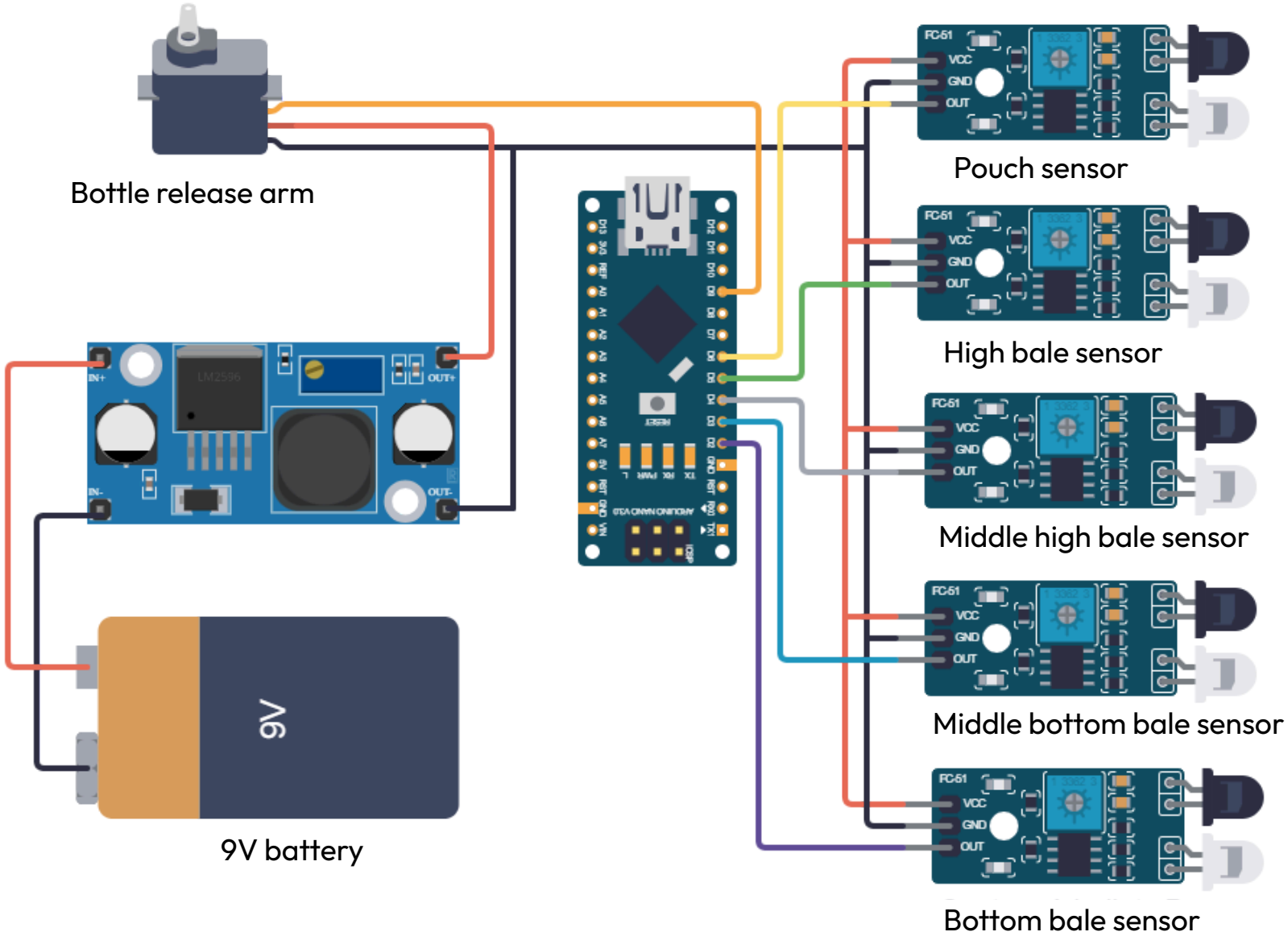
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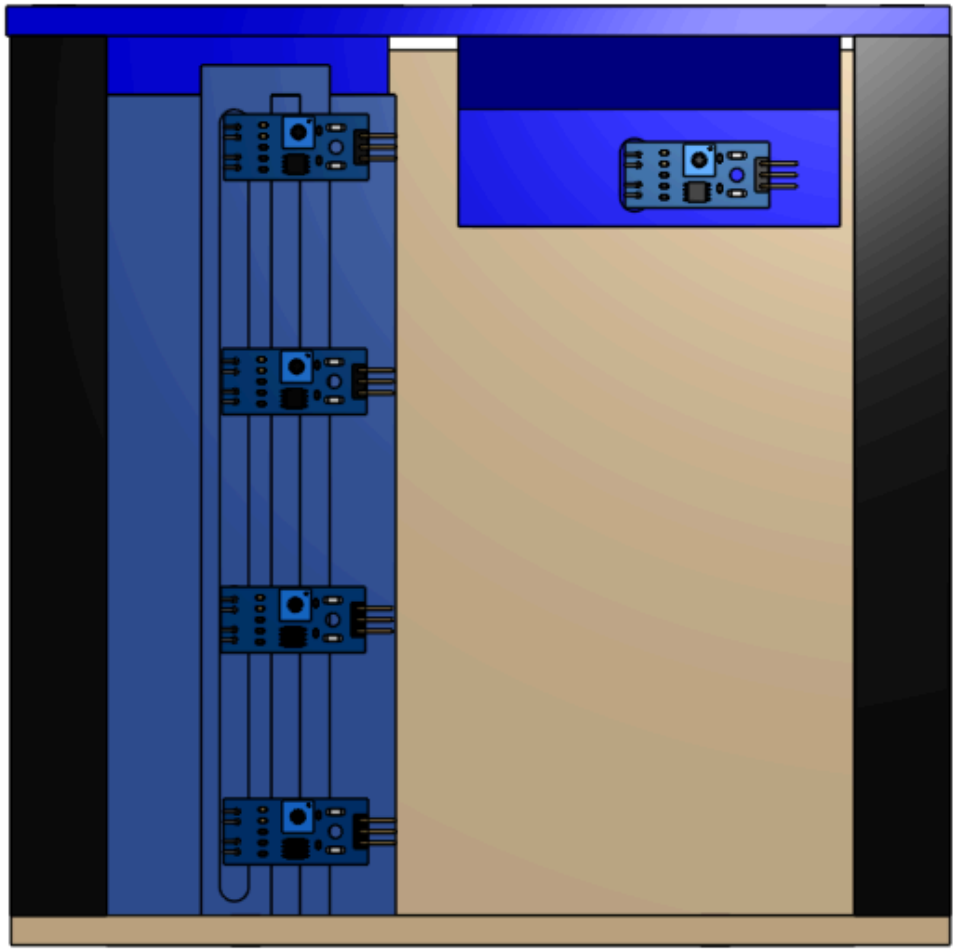


4.4. CIRCUIT DIAGRAM



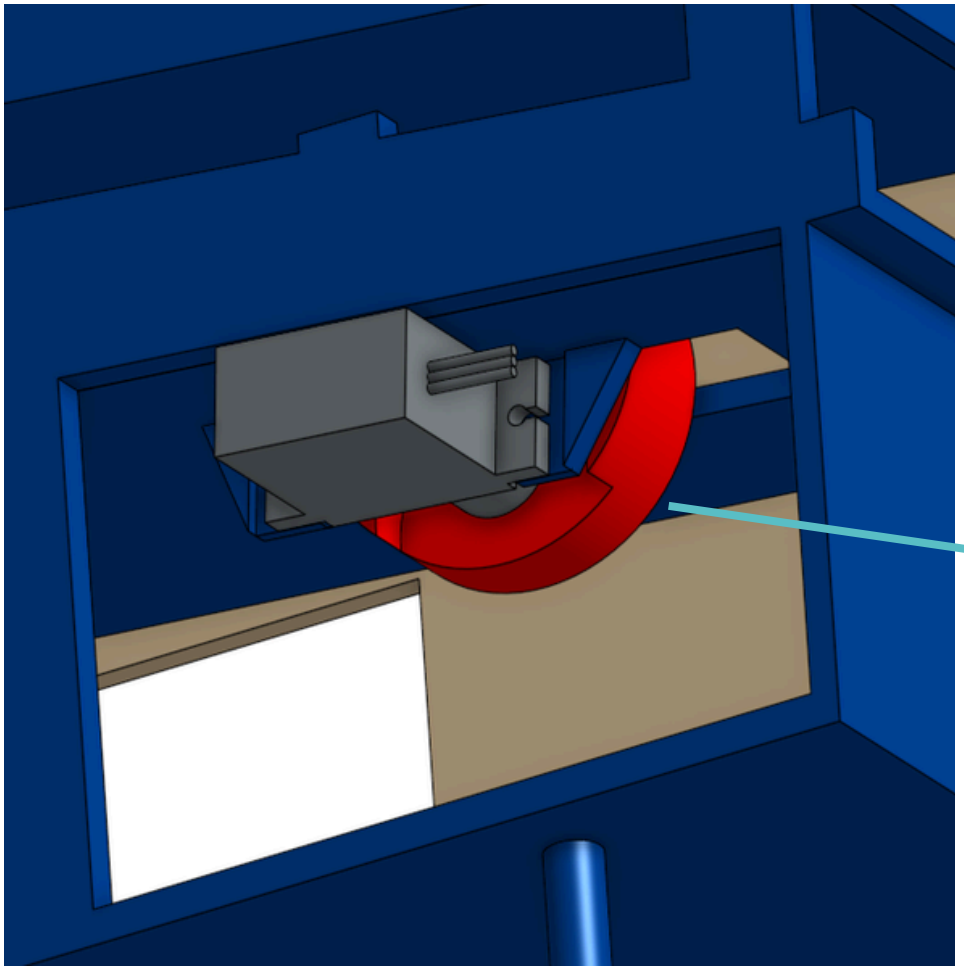
4.5. COMPONENT PLACEMENT

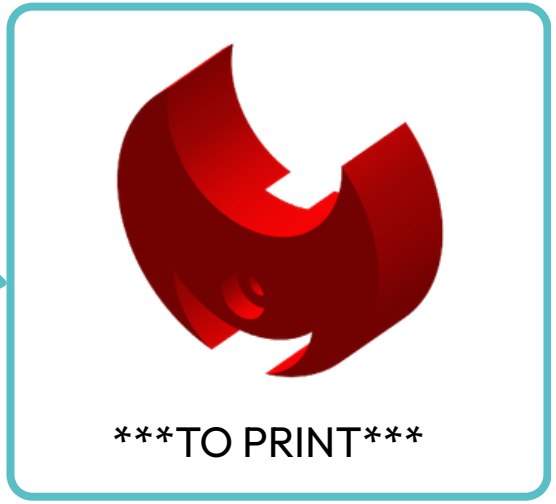
4.5.1. INFRARED SENSORS



4.5. COMPONENT PLACEMENT

4.5.2. SERVO AND BOTTLE SELECTOR

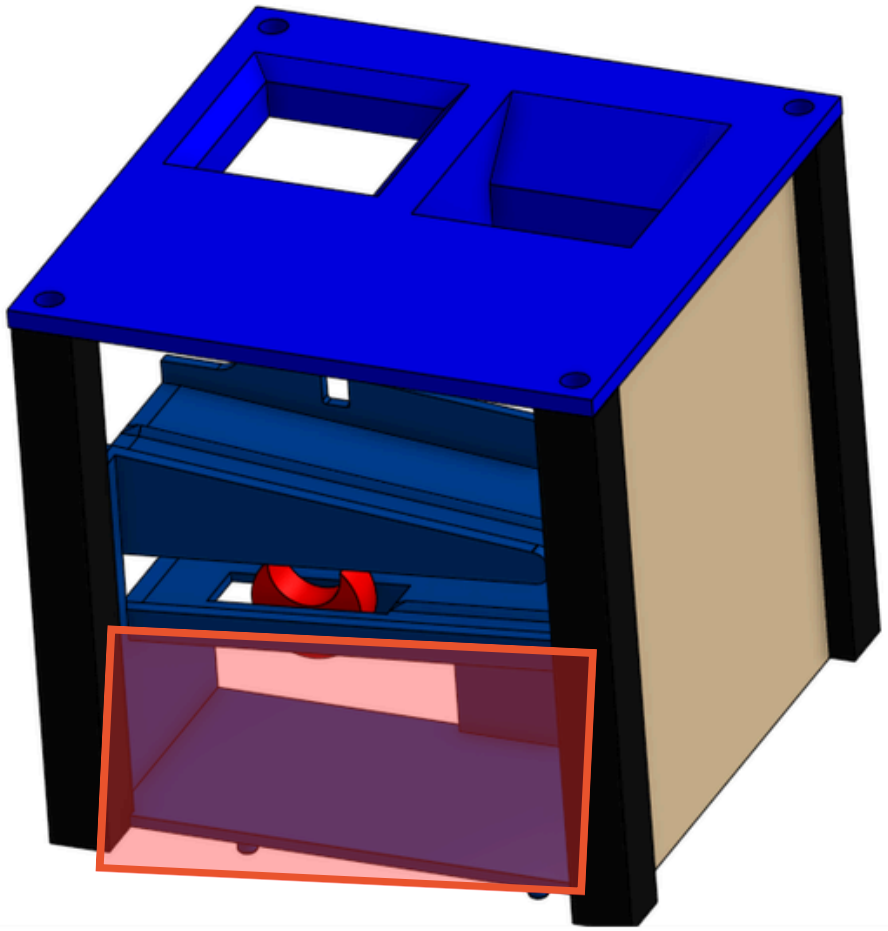




4.5. COMPONENT PLACEMENT

4.5.3. OTHER COMPONENTS

As with the paper machine, the remaining components can be placed in the area beneath the slide of the furnace bottle dispenser. The space marked in red in the figure below represents the area where these components can be placed.



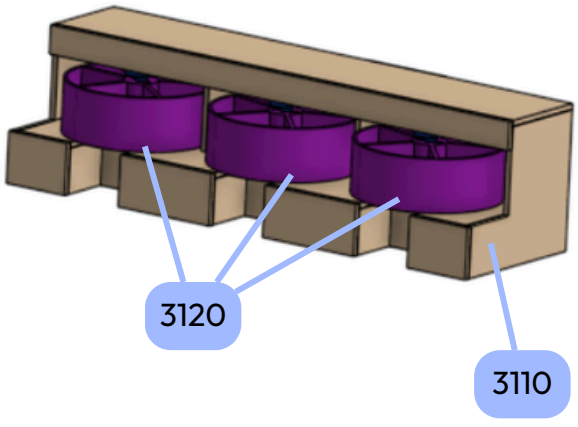
5. MIXER

5.1. ELEMENT TREE

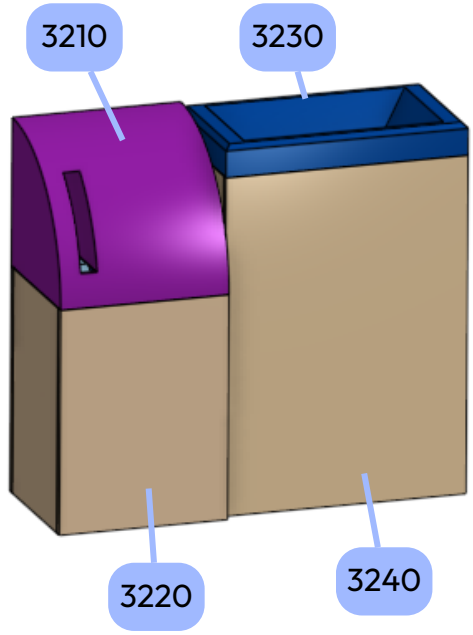
3000 - Mixer;

- 3100 - Carousel
  - 3110. Wood box
  - 3120. Resource turntable
- 3200 - Resource collector
  - 3210. Cent (Cartridge) collector
  - 3220. Cent collector box
  - 3230. Pouch collector
  - 3240. Pouch collector box

3100 - Mixer



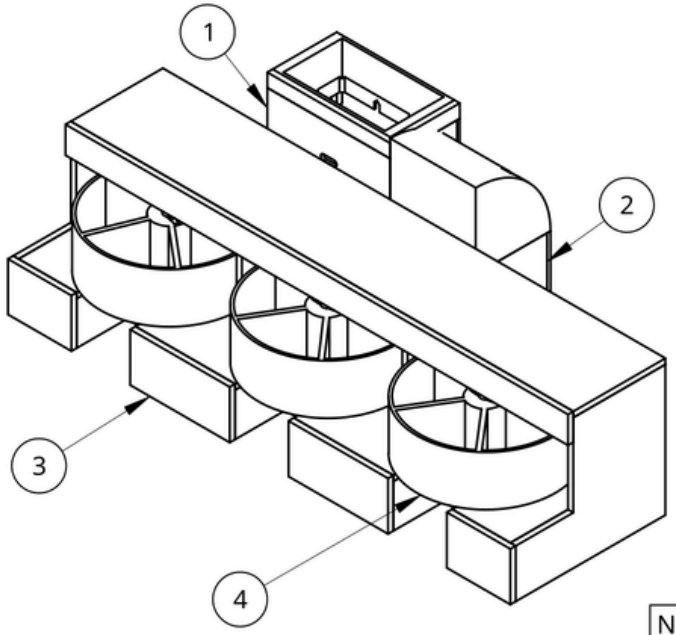
3200 - Resource collector



5.2. MATERIAL LIST

Item #	DESCRIPTION	QTY	SUPPLIED
1	Arduino Nano	1	Yes
2	Servo MG90D 9g/cm (360°) + Servo mounting kit	3	Yes
3	Servo MG90S 9g/cm (90°) + Servo mounting kit	1	Yes
4	Infrared sensor HW870	1	Yes
5	NFC Reader module 3 - chip #PN532	1	Yes
6	9V battery support	1	Yes
7	1/4" thick plywood board	n/a	No
8	1.5" x 1.5" x 2' wood plank	1	No
9	Very hot glue	∞	No

5.3. MECHANICAL ASSEMBLY



Numéro de pièce	Description	QTÉ
1	Poche collecteur	1
2	Coin collecteur assemblage	1
3	Boite distributeur de bloc, assemblage	1
4	Roulette de pièces	3

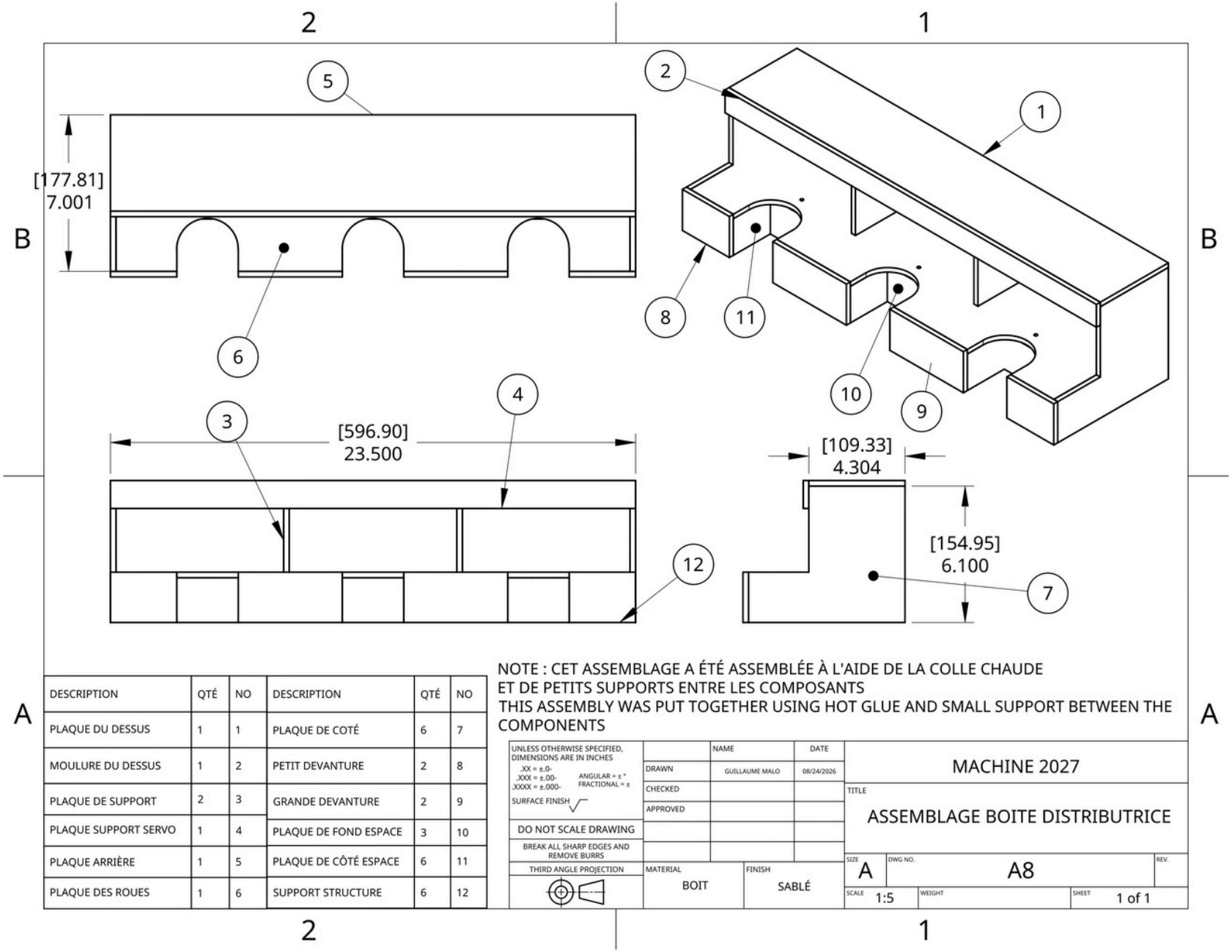
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES .XX = ±.0- .XXX = ±.00- .XXXX = ±.000- ANGULAR = ± ° FRACTIONAL = ± SURFACE FINISH		NAME	DATE
	DRAWN	GUILLAUME MALO	08/24/2026
	CHECKED		
	APPROVED		
DO NOT SCALE DRAWING			
BREAK ALL SHARP EDGES AND REMOVE BURRS			
THIRD ANGLE PROJECTION	MATERIAL: BOIS	FINISH: SABLE	

JEUX DE GÉNIE 2026

TITLE: ASSEMBLAGE, DISTRIBUTEUR DE BLOC

SIZE	DWG NO.	REV.
A	SILVERADO	
SCALE 1:5	WEIGHT	SHEET 1 of 1

5.3. MECHANICAL ASSEMBLY



DESCRIPTION	QTÉ	NO	DESCRIPTION	QTÉ	NO
PLAQUE DU DESSUS	1	1	PLAQUE DE COTÉ	6	7
MOULURE DU DESSUS	1	2	PETIT DEVANTURE	2	8
PLAQUE DE SUPPORT	2	3	GRANDE DEVANTURE	2	9
PLAQUE SUPPORT SERVO	1	4	PLAQUE DE FOND ESPACE	3	10
PLAQUE ARRIÈRE	1	5	PLAQUE DE CÔTÉ ESPACE	6	11
PLAQUE DES ROUES	1	6	SUPPORT STRUCTURE	6	12

NOTE : CET ASSEMBLAGE A ÉTÉ ASSEMBLÉE À L'AIDE DE LA COLLE CHAUDE ET DE PETITS SUPPORTS ENTRE LES COMPOSANTS
THIS ASSEMBLY WAS PUT TOGETHER USING HOT GLUE AND SMALL SUPPORT BETWEEN THE COMPONENTS

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES
.XX = ±.0-
.XXX = ±.00-
.XXXX = ±.000-
ANGULAR = ± °
FRACTIONAL = ±
SURFACE FINISH
DO NOT SCALE DRAWING
BREAK ALL SHARP EDGES AND REMOVE BURRS
THIRD ANGLE PROJECTION

	NAME	DATE
DRAWN	GUILLAUME MALO	08/24/2026
CHECKED		
APPROVED		

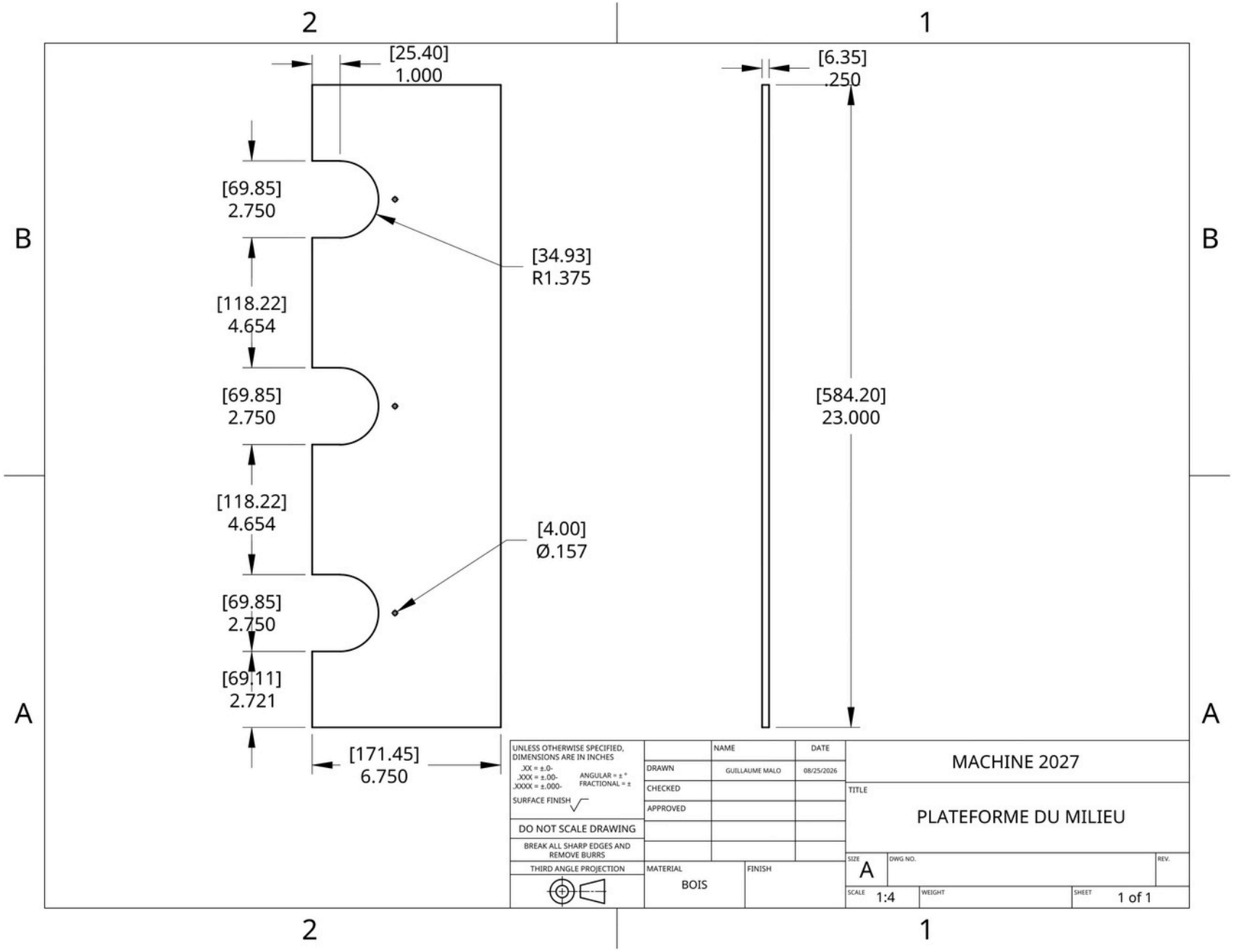
MATERIAL: BOIT
FINISH: SABLÉ

MACHINE 2027

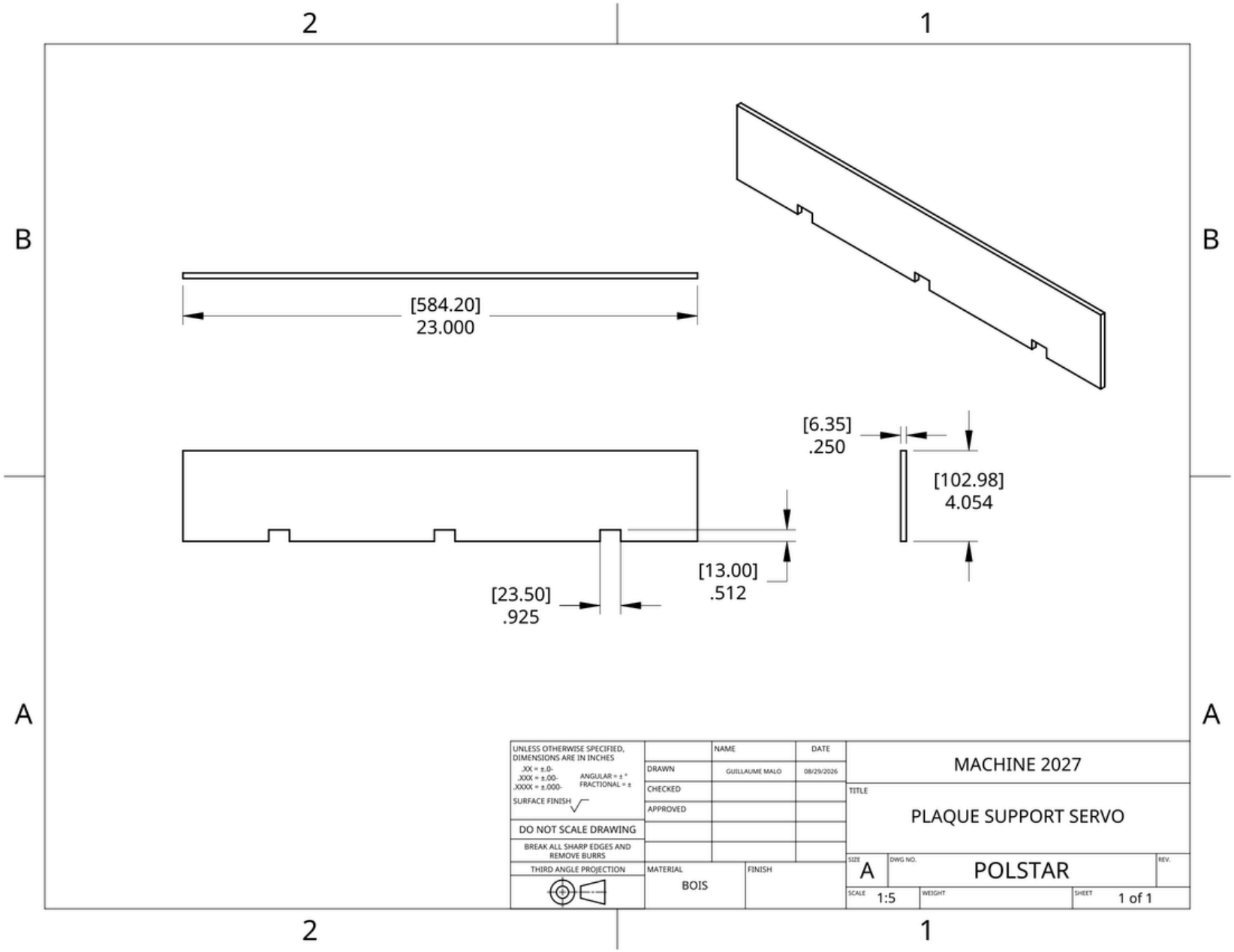
TITLE: ASSEMBLAGE BOITE DISTRIBUTRICE

SIZE: A | DWG NO.: A8 | REV.:
SCALE: 1:5 | WEIGHT: | SHEET: 1 of 1

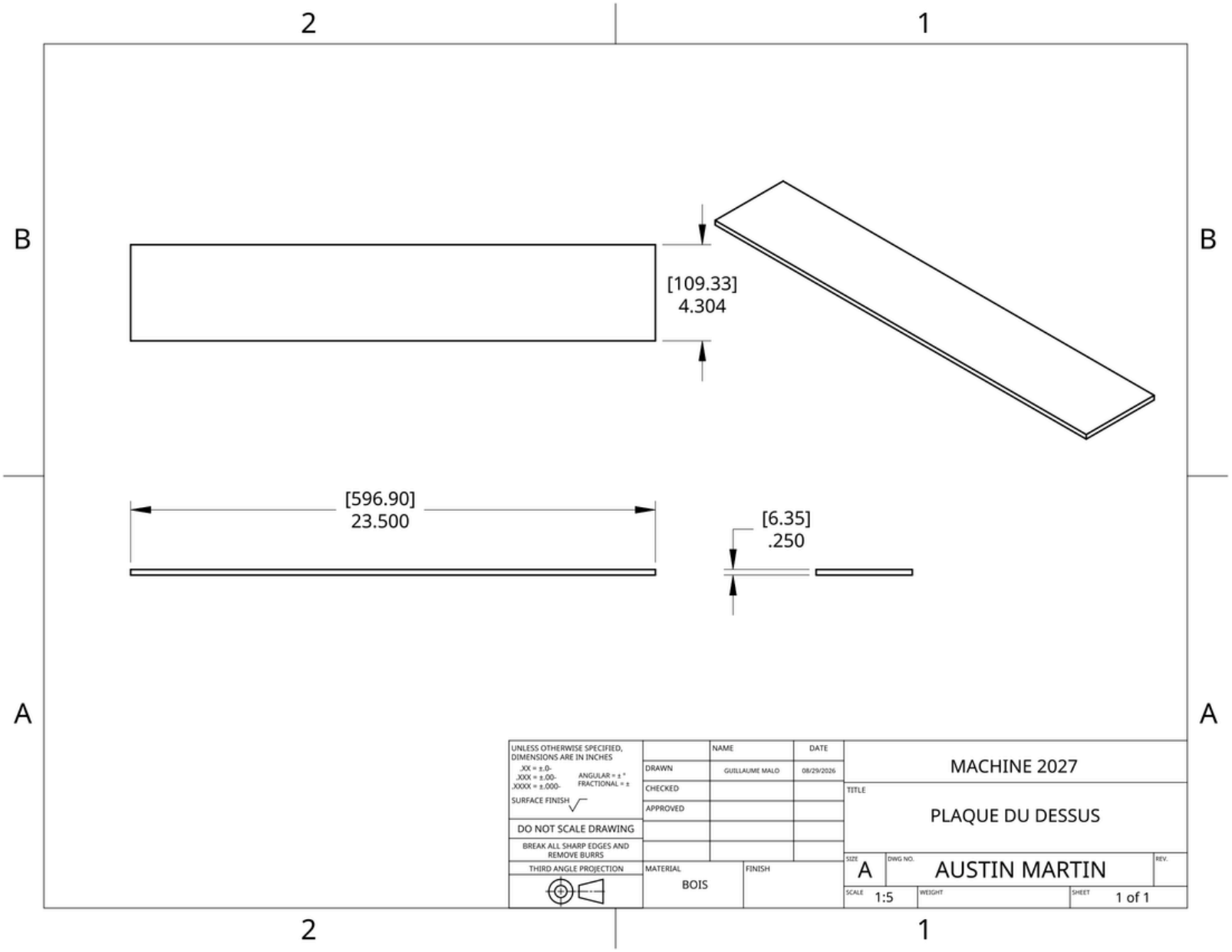
5.3. MECHANICAL ASSEMBLY



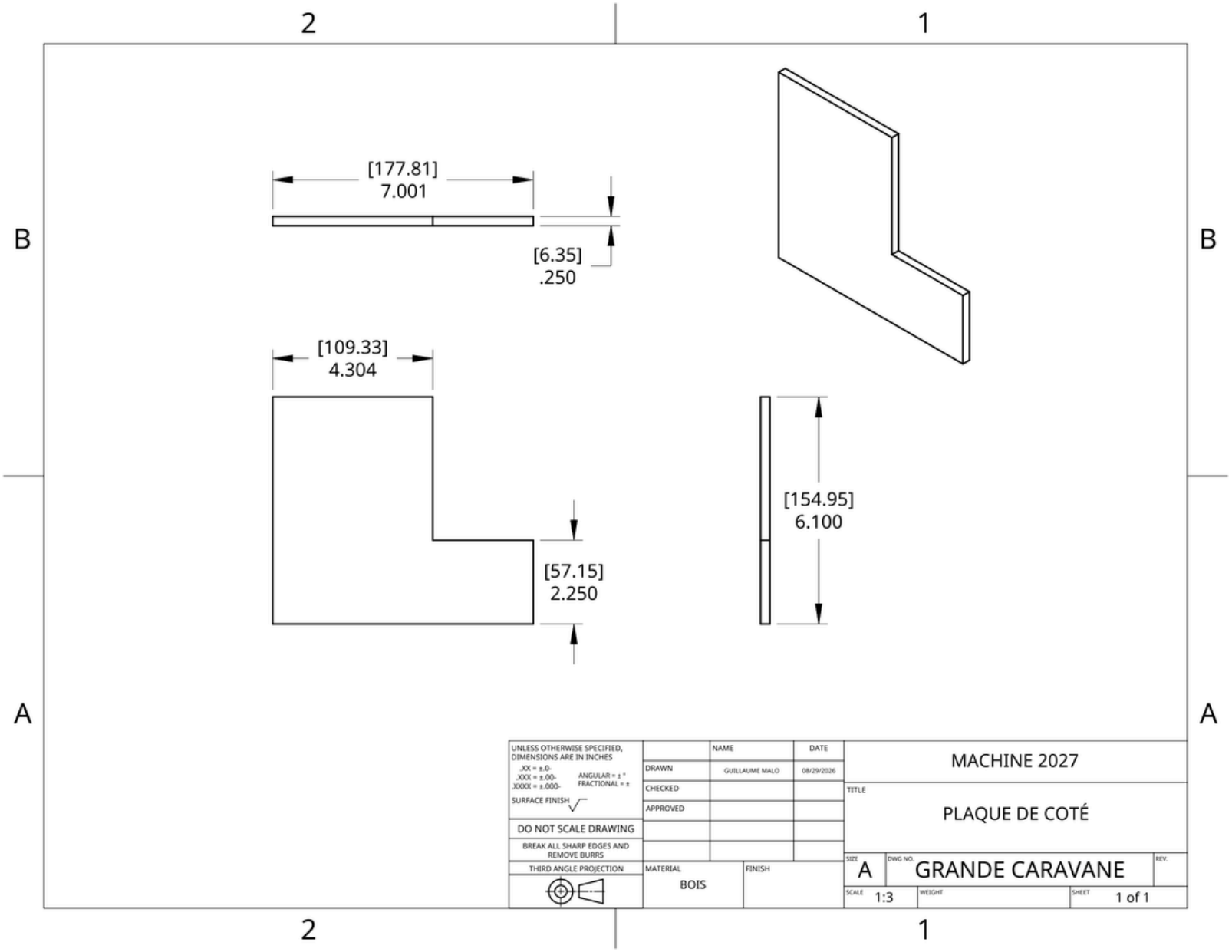
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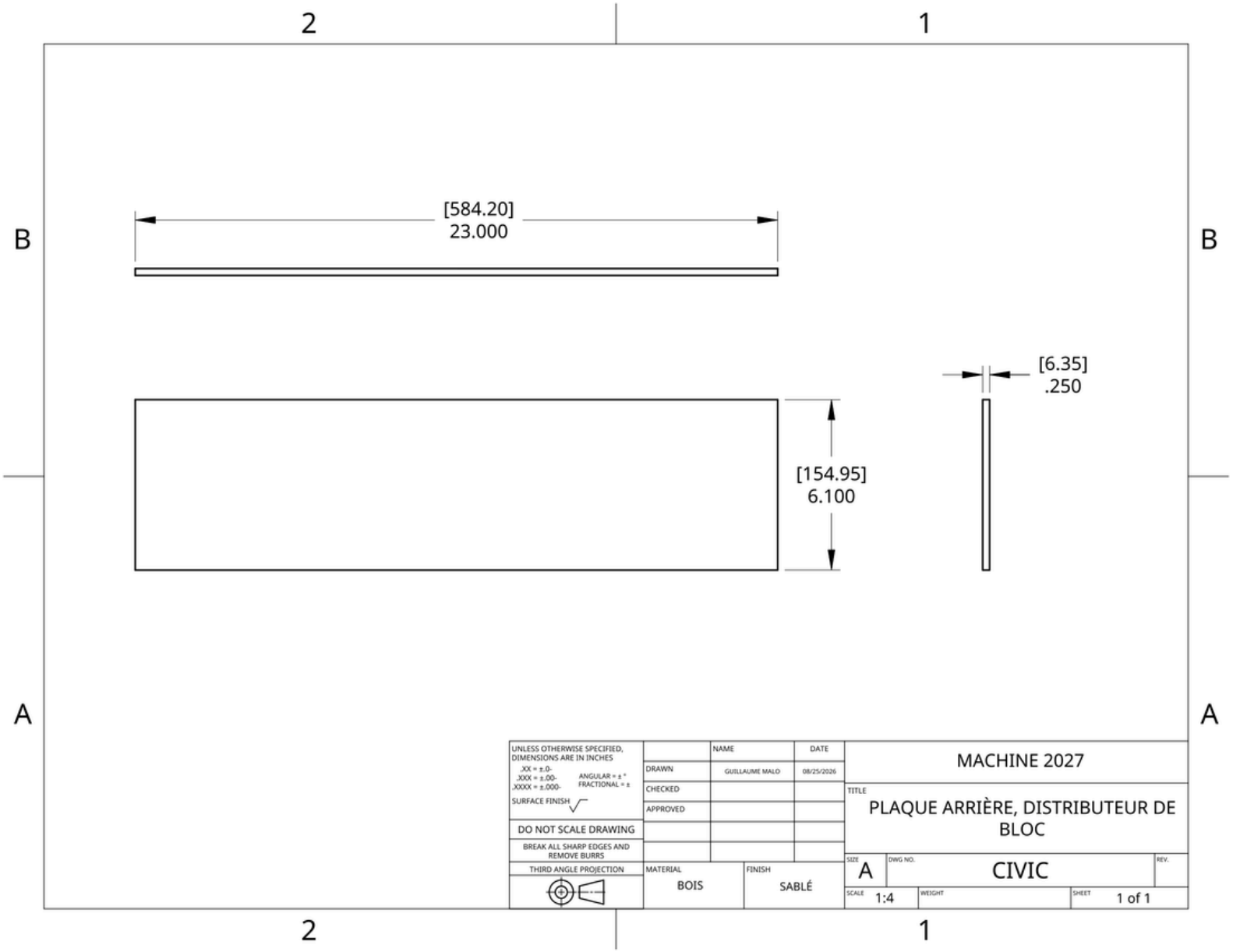
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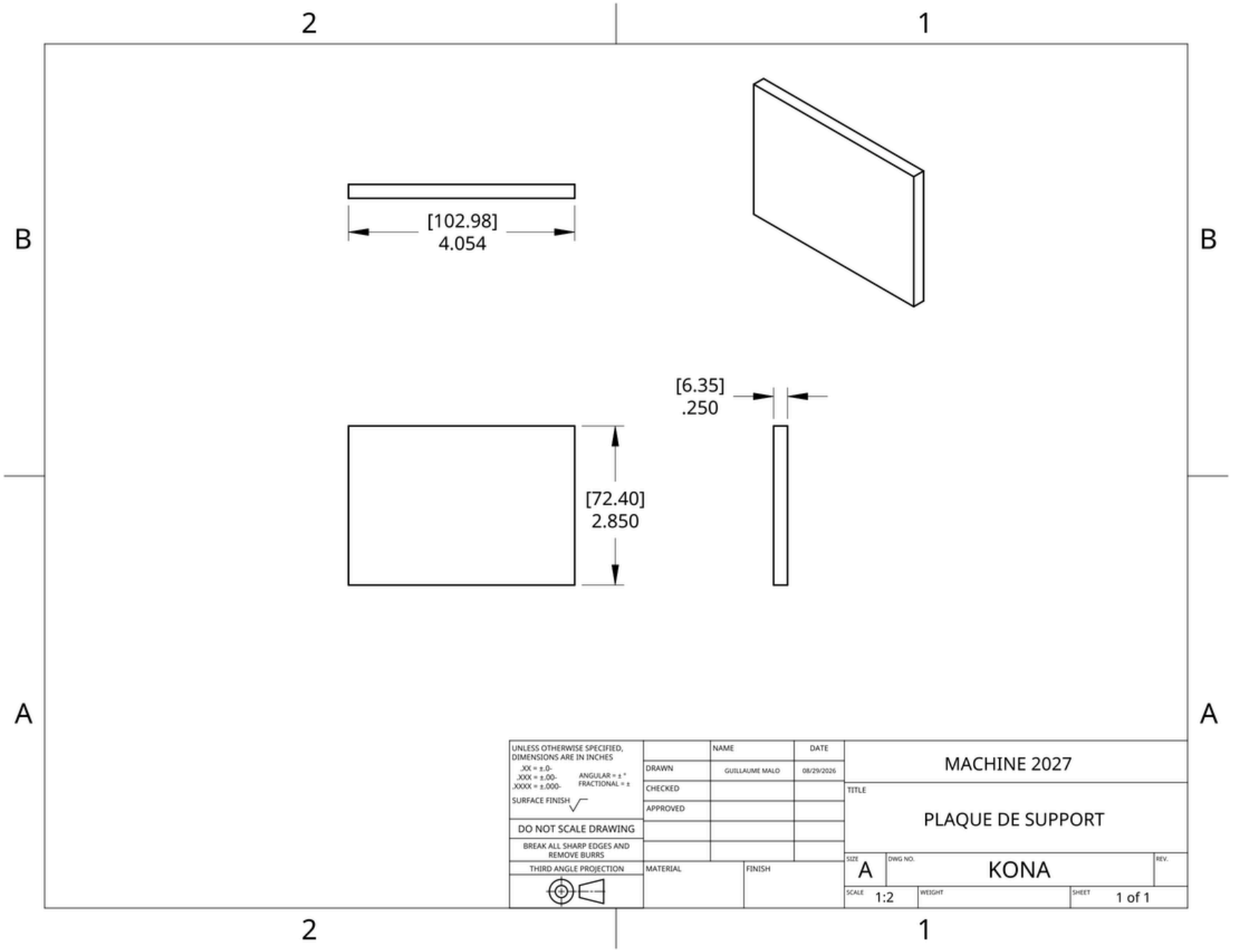
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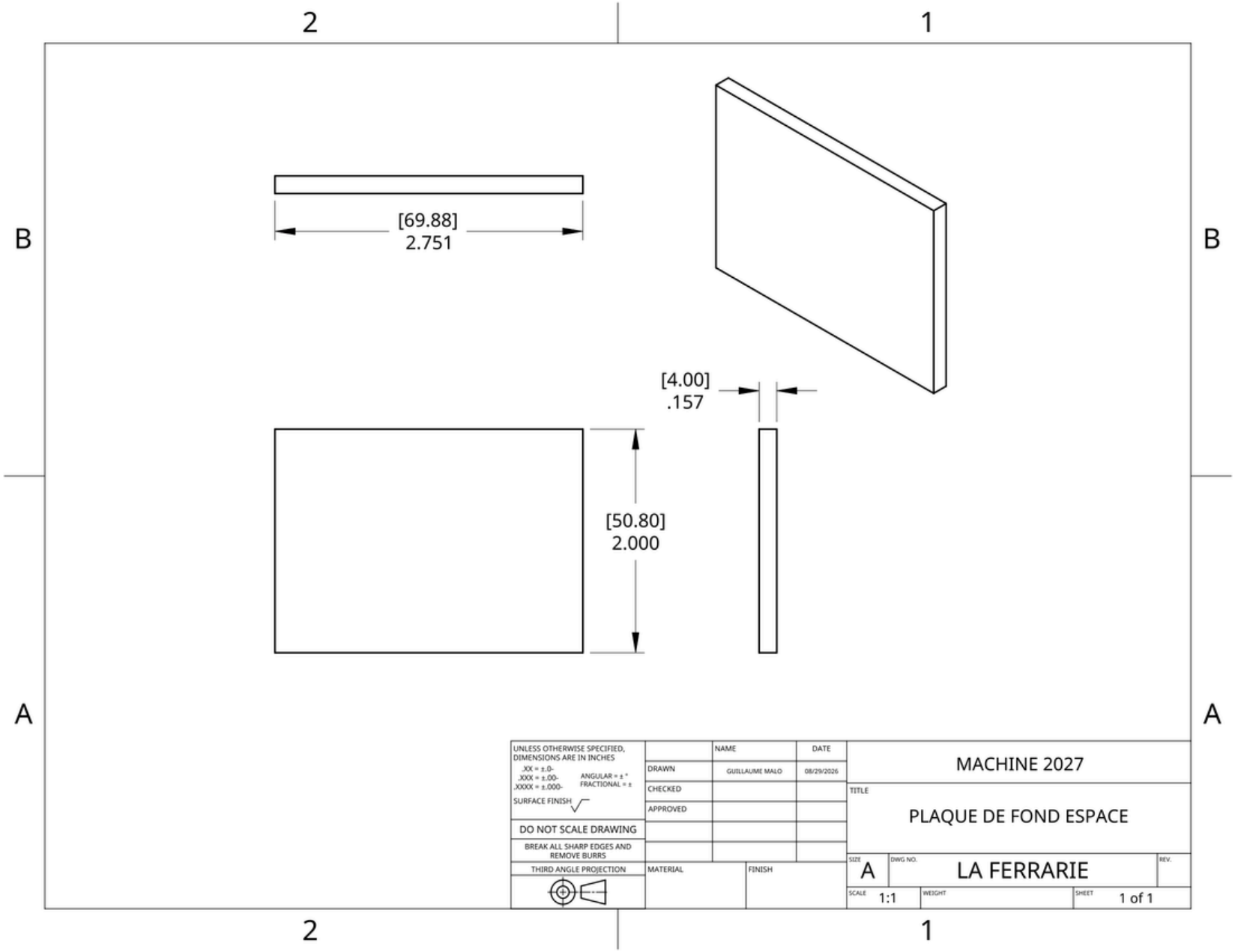
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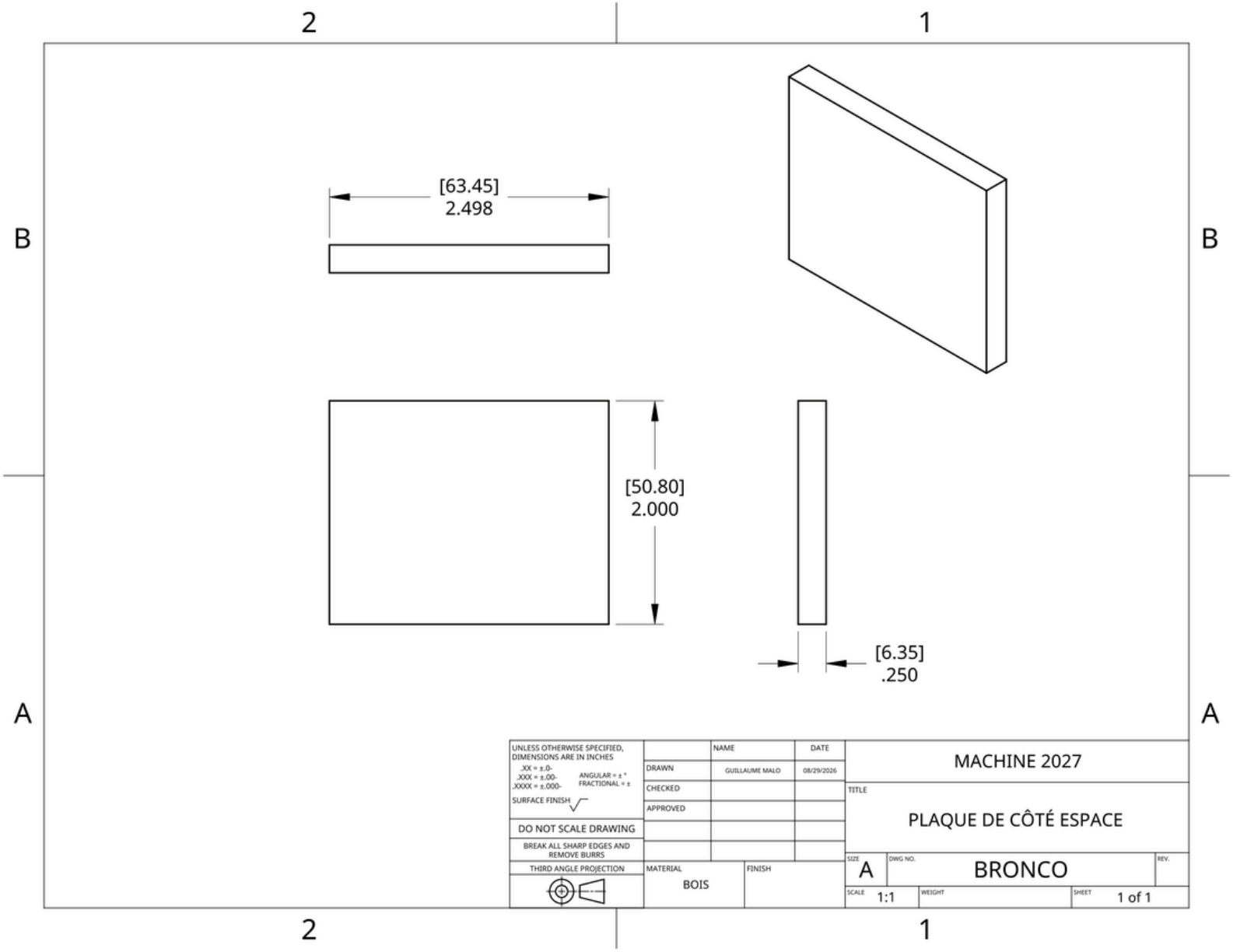
5.3. MECHANICAL ASSEMBLY



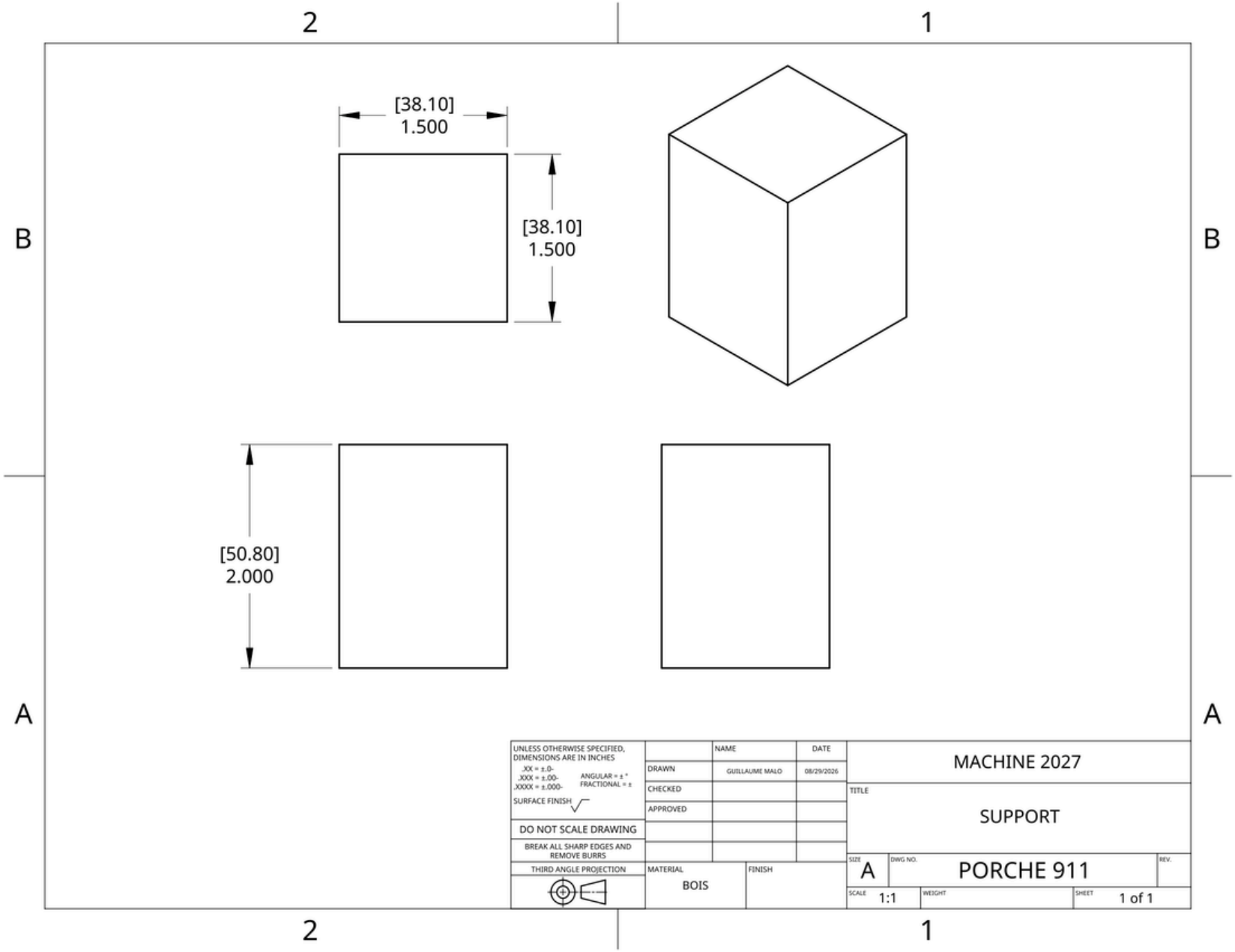
5.3. MECHANICAL ASSEMBLY



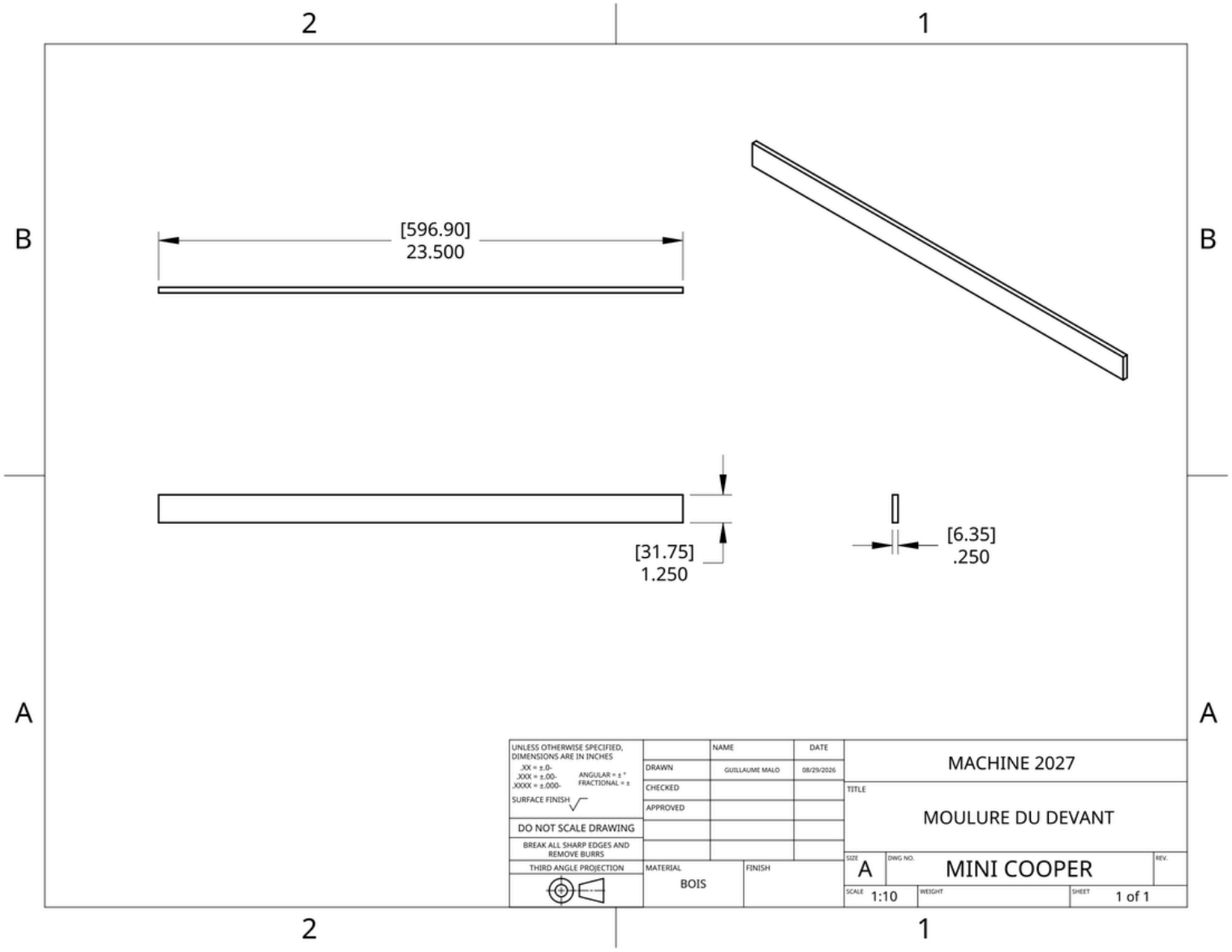
5.3. MECHANICAL ASSEMBLY



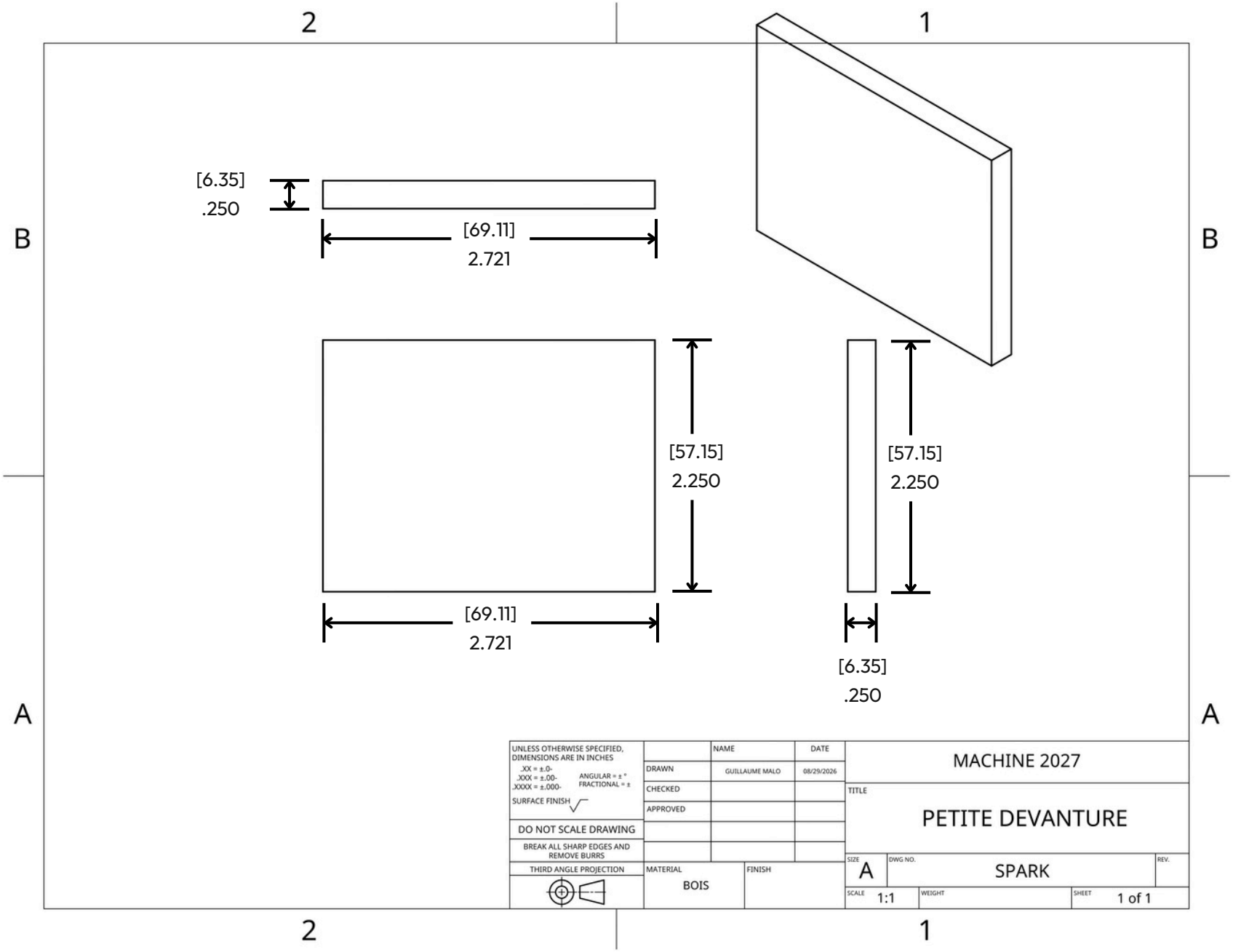
5.3. MECHANICAL ASSEMBLY



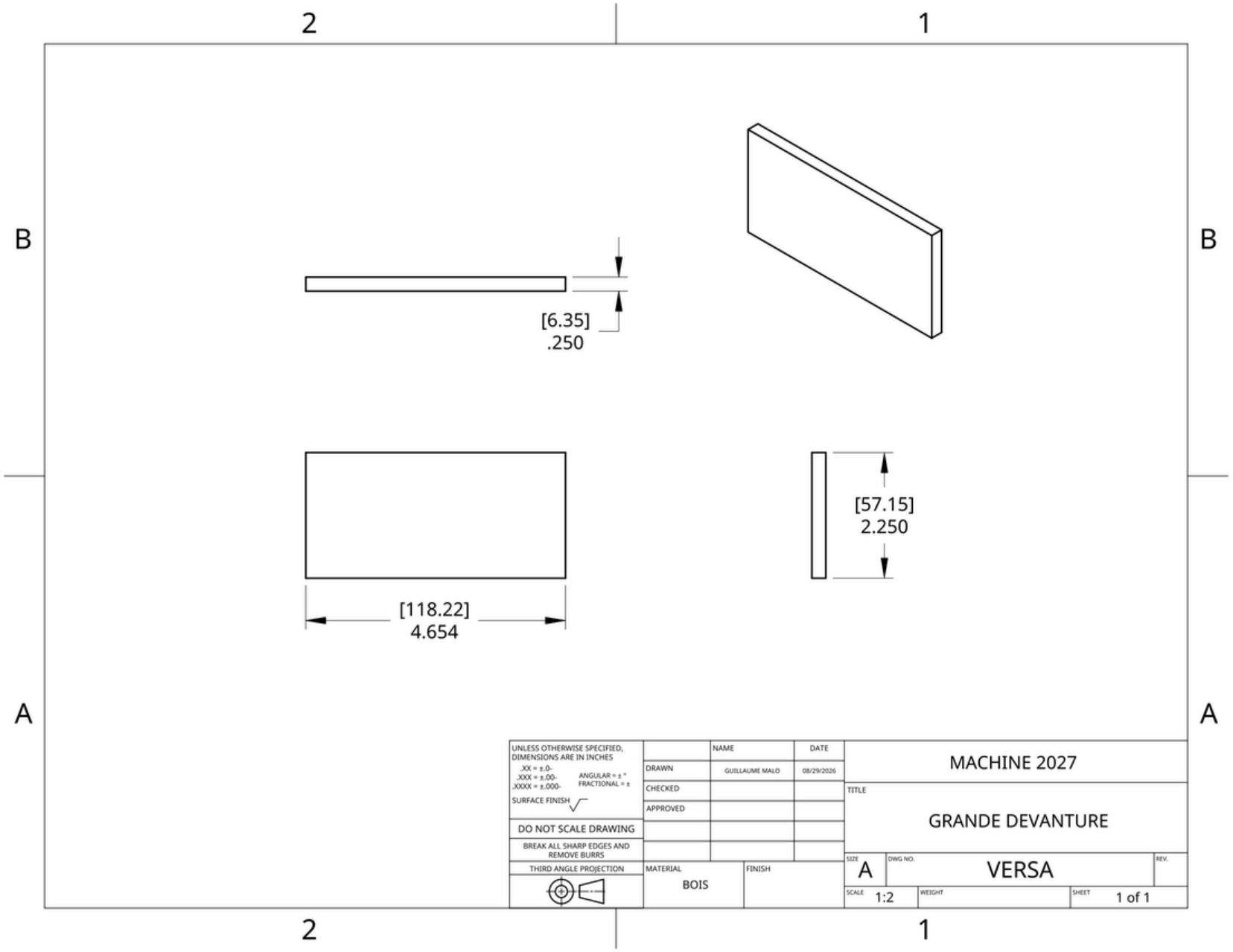
5.3. MECHANICAL ASSEMBLY



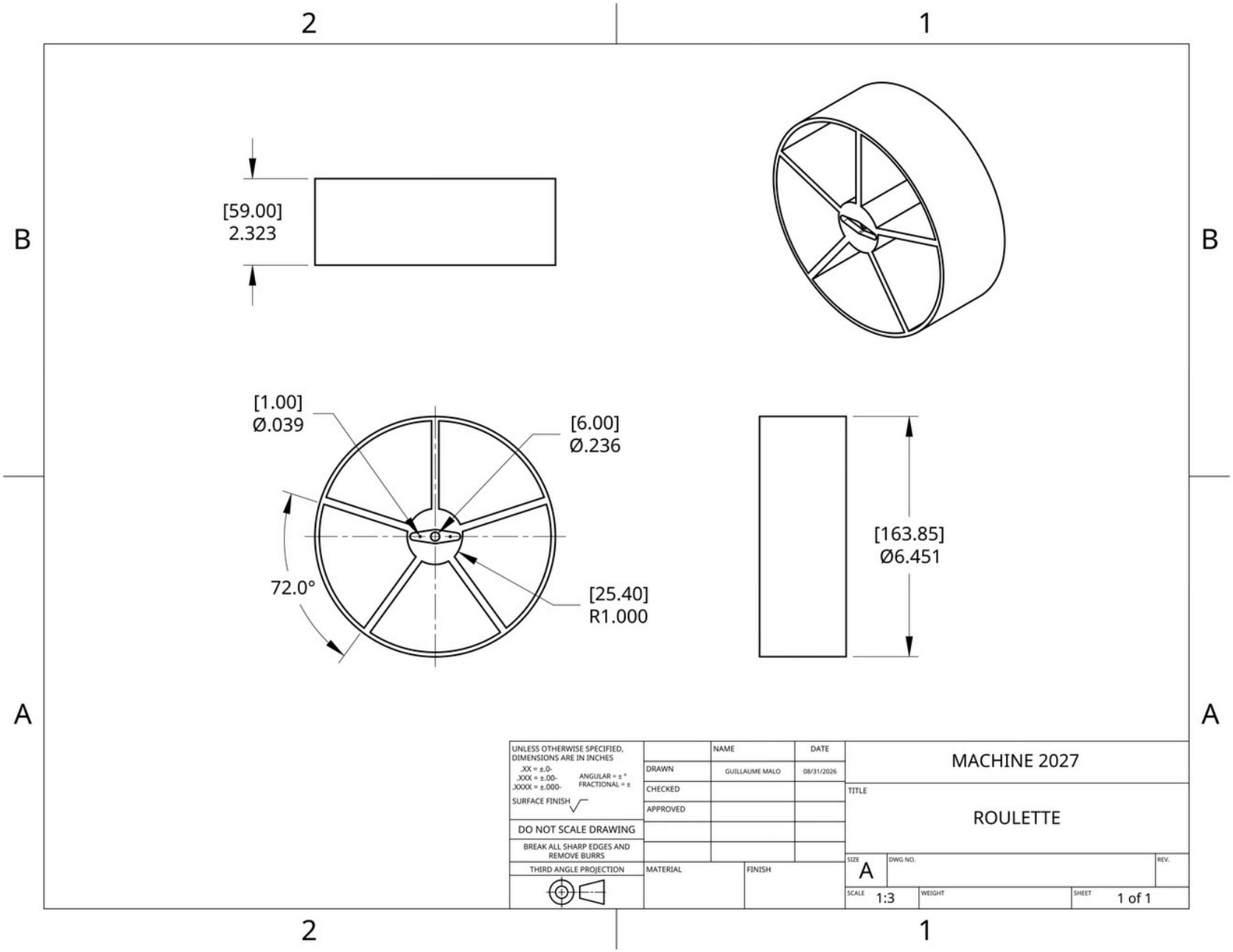
5.3. MECHANICAL ASSEMBLY



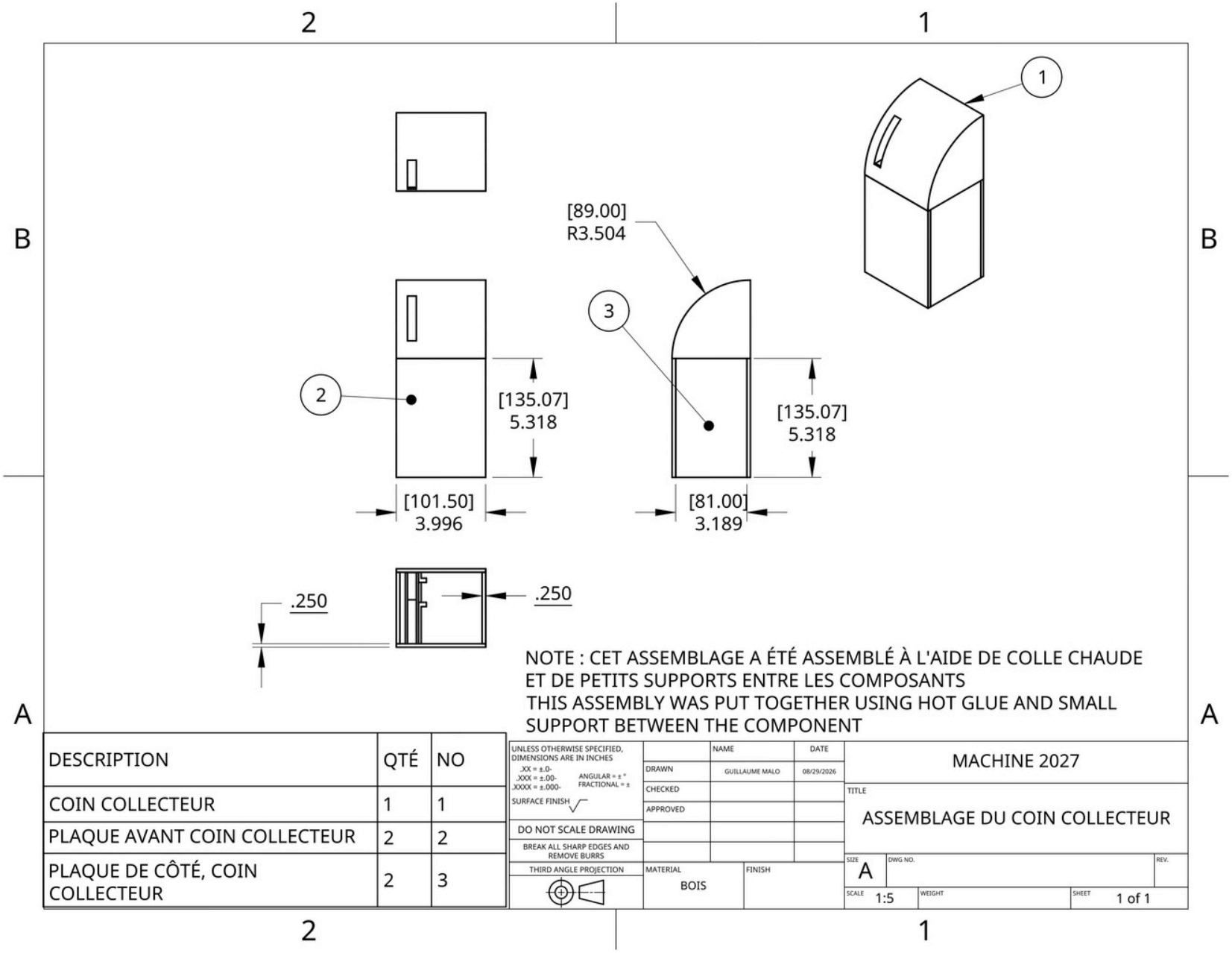
5.3. MECHANICAL ASSEMBLY



5.3. MECHANICAL ASSEMBLY



5.3. MECHANICAL ASSEMBLY



DESCRIPTION	QTÉ	NO
COIN COLLECTEUR	1	1
PLAQUE AVANT COIN COLLECTEUR	2	2
PLAQUE DE CÔTÉ, COIN COLLECTEUR	2	3

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES
.XX = ±.0- .XXX = ±.00- .XXXX = ±.000-
ANGULAR = ± °
FRACTIONAL = ±
SURFACE FINISH
DO NOT SCALE DRAWING
BREAK ALL SHARP EDGES AND REMOVE BURRS
THIRD ANGLE PROJECTION

	NAME	DATE
DRAWN	GUILLAUME MALO	08/29/2026
CHECKED		
APPROVED		

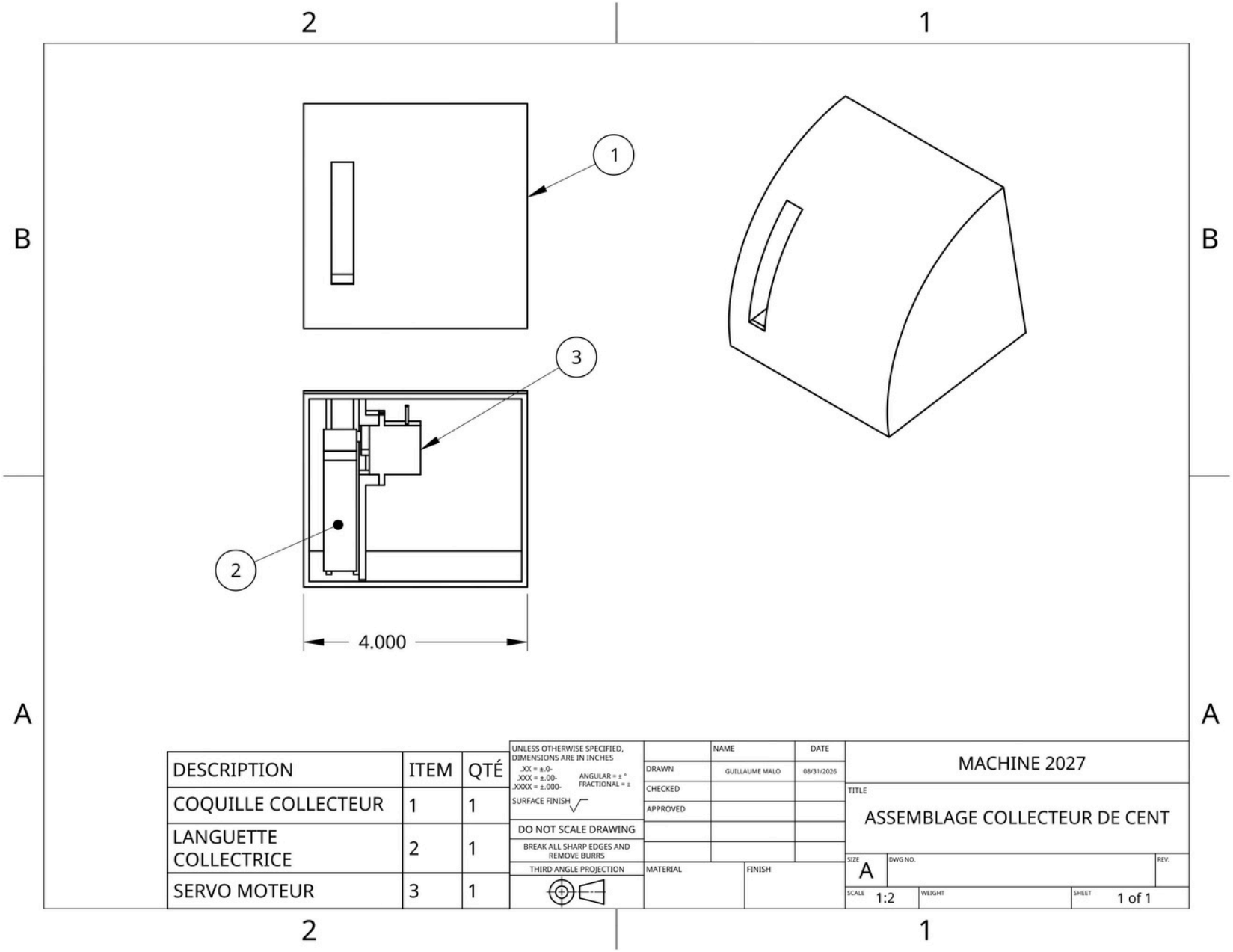
MATERIAL: BOIS
FINISH:

MACHINE 2027

TITLE: ASSEMBLAGE DU COIN COLLECTEUR

SIZE A | DWG NO. | REV.
SCALE 1:5 | WEIGHT | SHEET 1 of 1

5.3. MECHANICAL ASSEMBLY



DESCRIPTION	ITEM	QTÉ
COQUILLE COLLECTEUR	1	1
LANGUETTE COLLECTRICE	2	1
SERVO MOTEUR	3	1

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES
.XX = ±.0-
.XXX = ±.00-
.XXXX = ±.000-
ANGULAR = ± °
FRACTIONAL = ±
SURFACE FINISH
DO NOT SCALE DRAWING
BREAK ALL SHARP EDGES AND REMOVE BURRS
THIRD ANGLE PROJECTION
MATERIAL
FINISH

	NAME	DATE
DRAWN	GUILLAUME MALO	08/31/2026
CHECKED		
APPROVED		

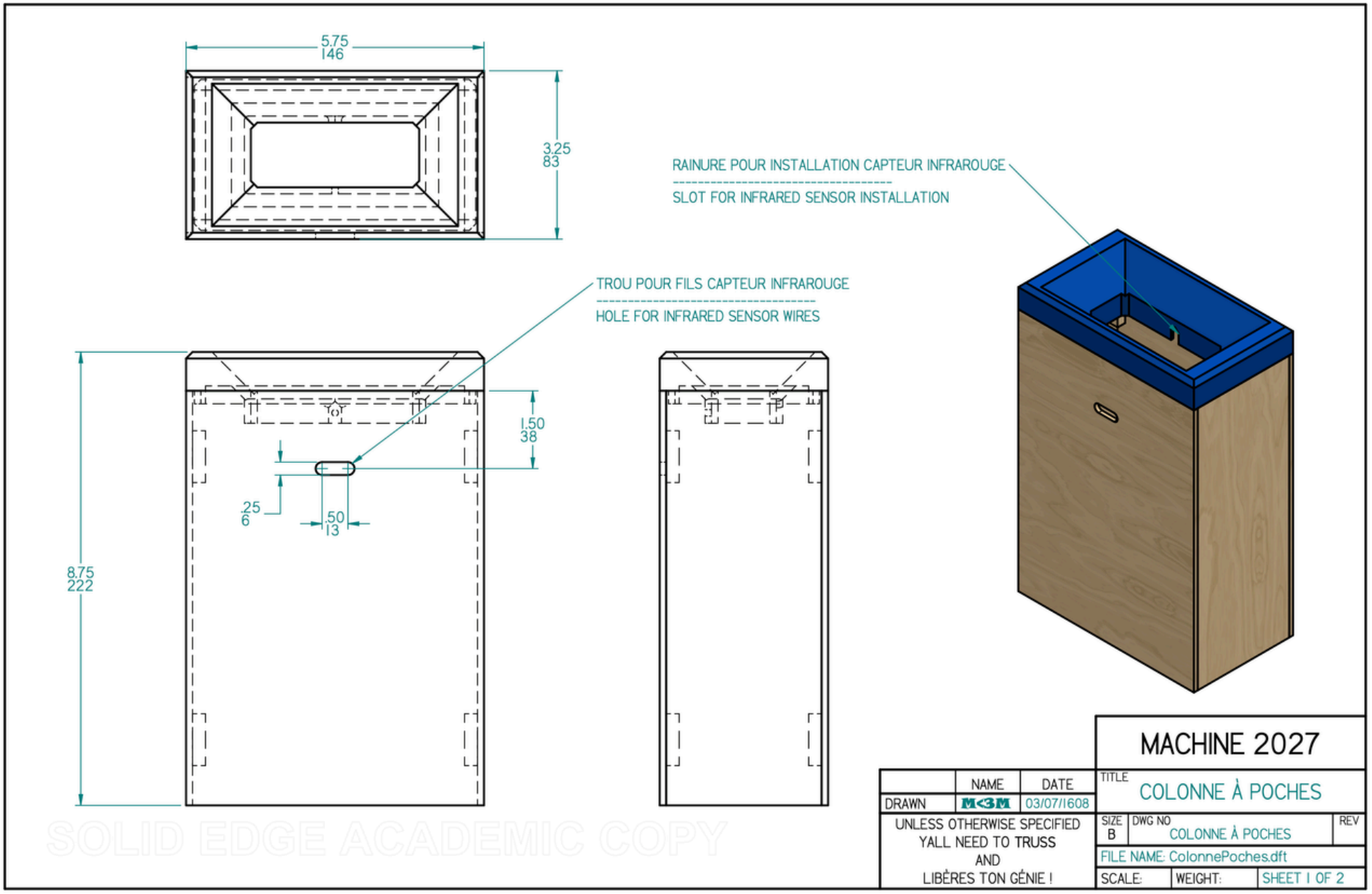
MACHINE 2027

TITLE: ASSEMBLAGE COLLECTEUR DE CENT

SIZE A | DWG NO. | REV.

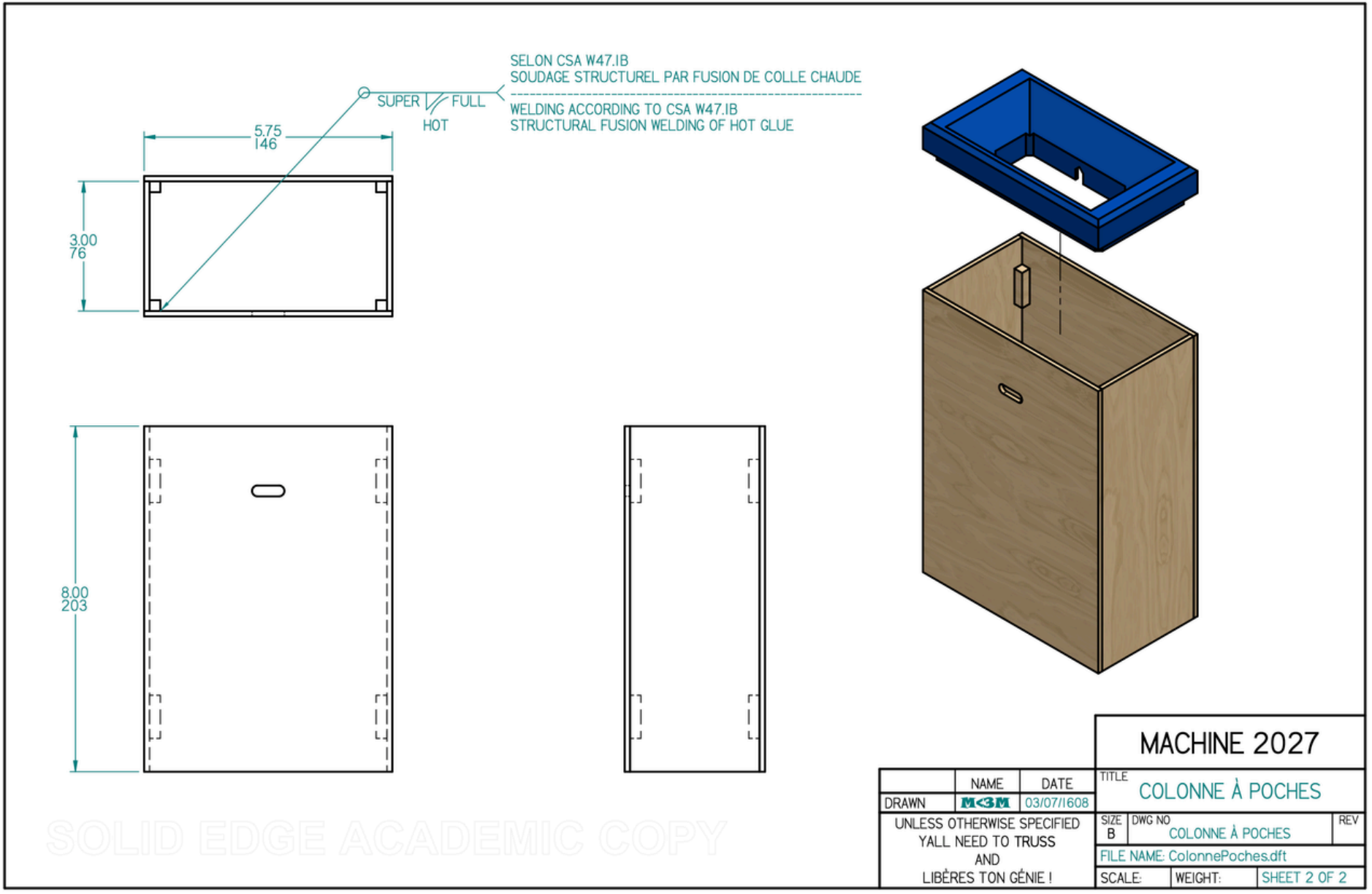
SCALE 1:2 | WEIGHT | SHEET 1 of 1

5.3. MECHANICAL ASSEMBLY

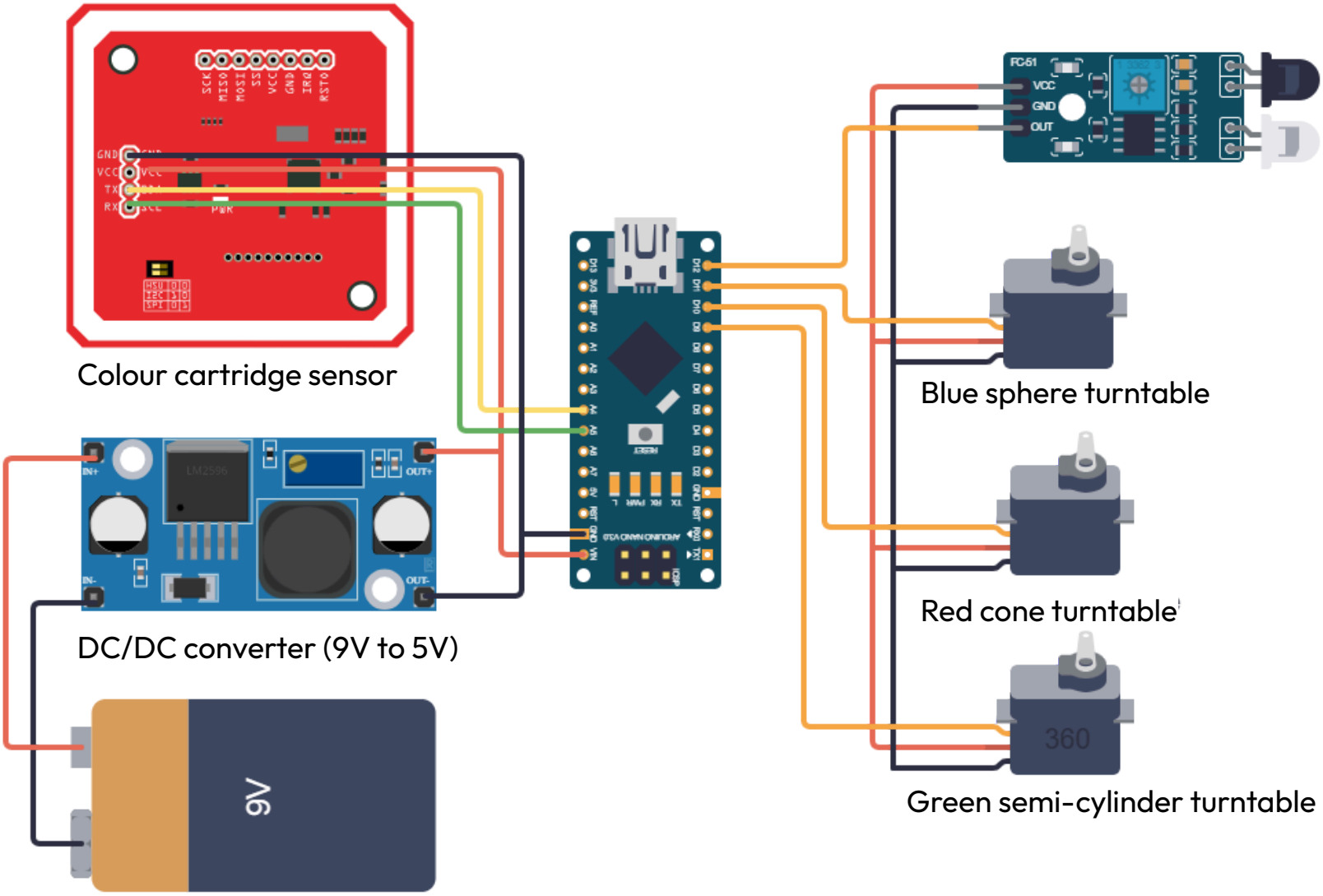


SOLID EDGE ACADEMIC COPY

5.3. MECHANICAL ASSEMBLY

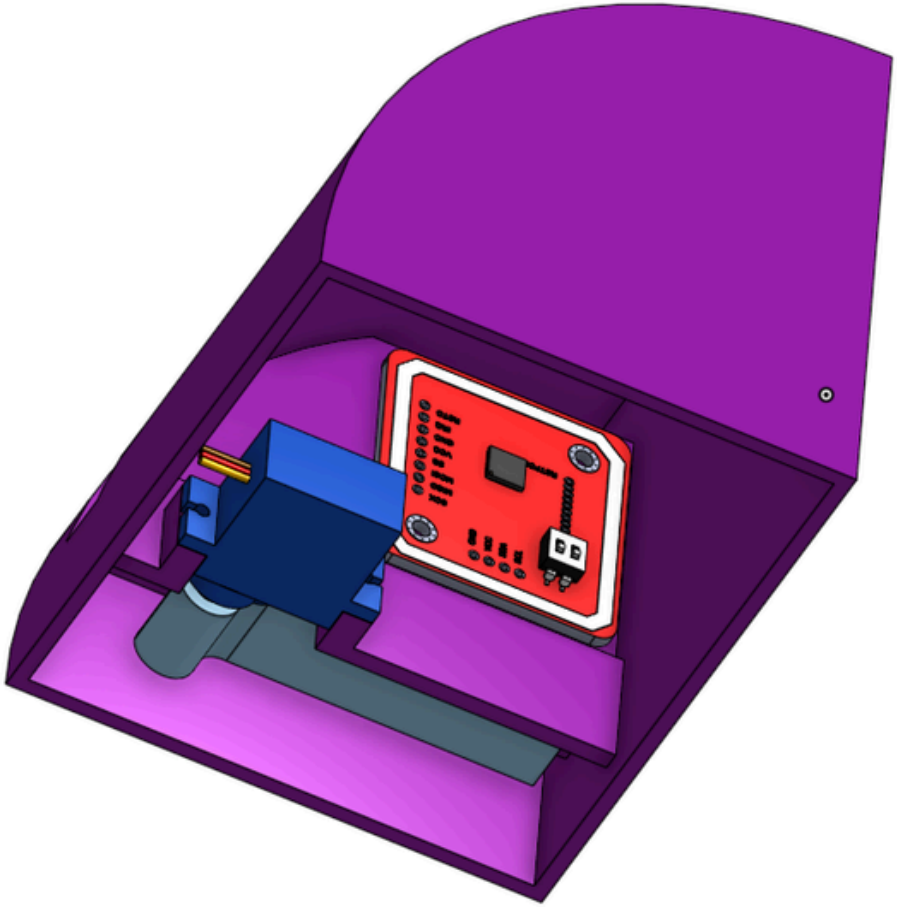


5.4. CIRCUIT DIAGRAM



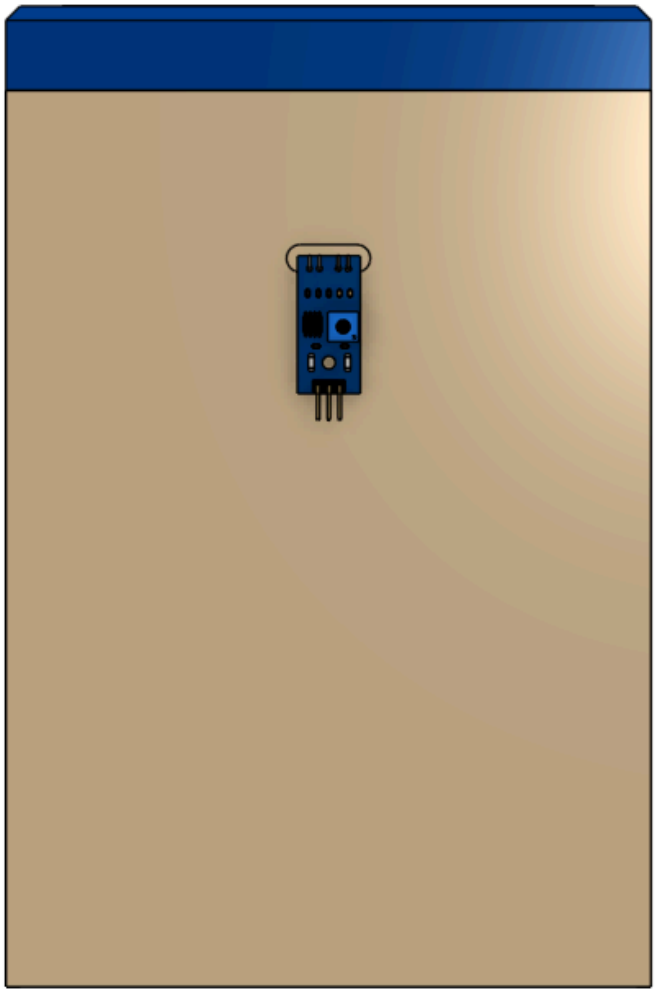
5.5. COMPONENT PLACEMENT

5.5.1. CARTRIDGE COLLECTOR SERVO AND NFC READER



5.5. COMPONENT PLACEMENT

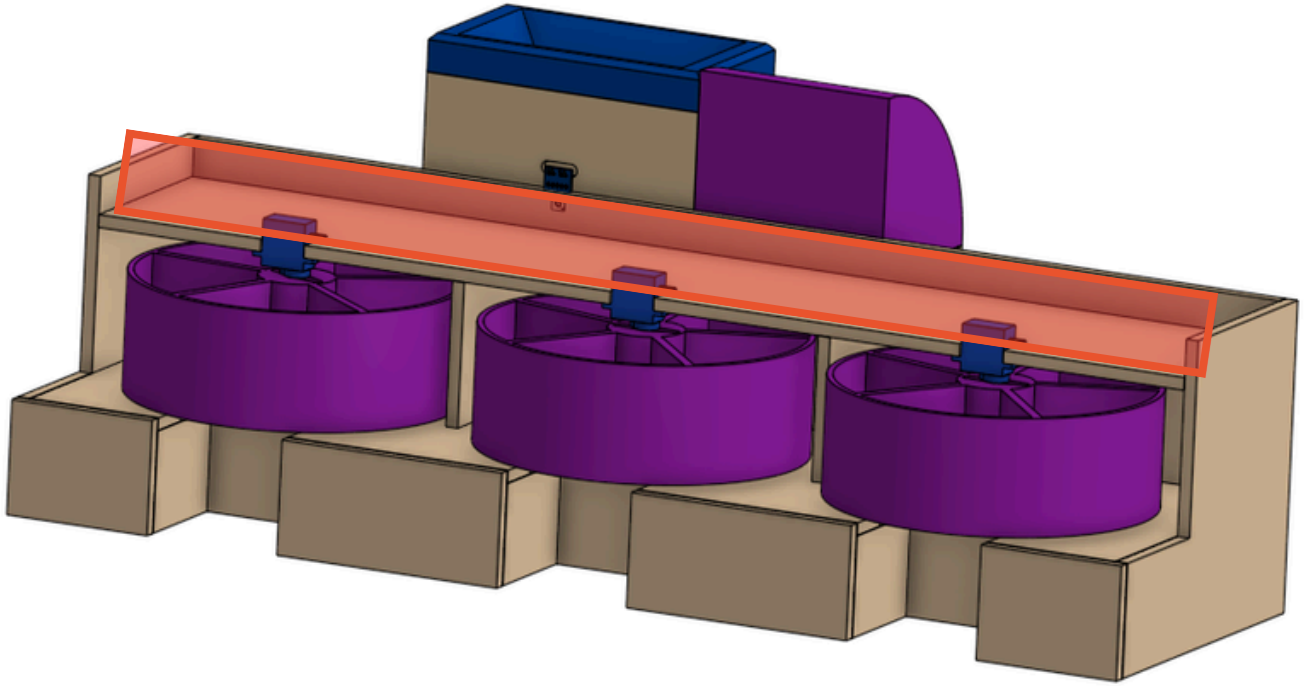
5.5.2. INFRARED SENSOR OF THE POUCH COLLECTOR



5.5. COMPONENT PLACEMENT

5.5.3. 360 SERVO AND REST OF THE COMPONENTS

For this station, servo motors will be positioned as shown in the figure below. The servos, along with the rest of the station's power and control components, will be placed on top of the station and covered by the board located at the very top of the station. The area marked in red in the figure below represents the space where these components can be placed.



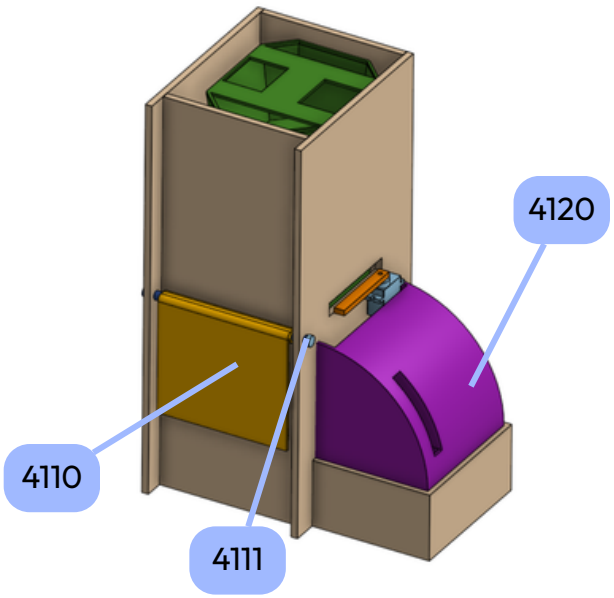
6. PACKAGING PRINTER

6.1. ELEMENT TREE

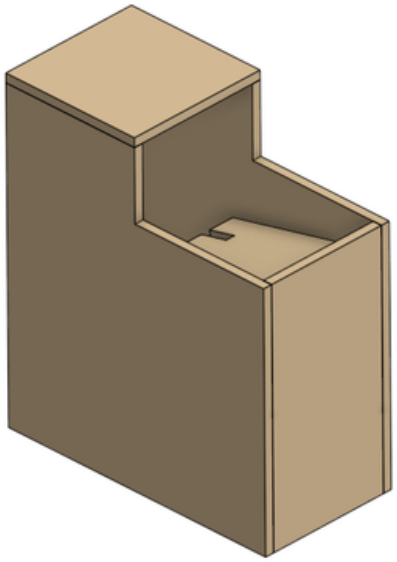
4000 - Packaging printer;

- 4100 - Structure of the printer
  - 4110. Door
  - 4111. Pivot cap
  - 4120. Token receiver
- 4200 - Roll receiver

4100 - Structure of the printer



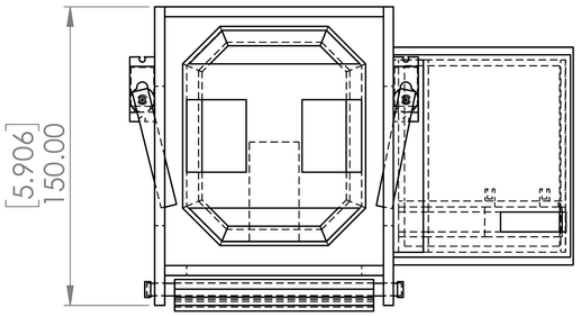
4200 - Roll receiver

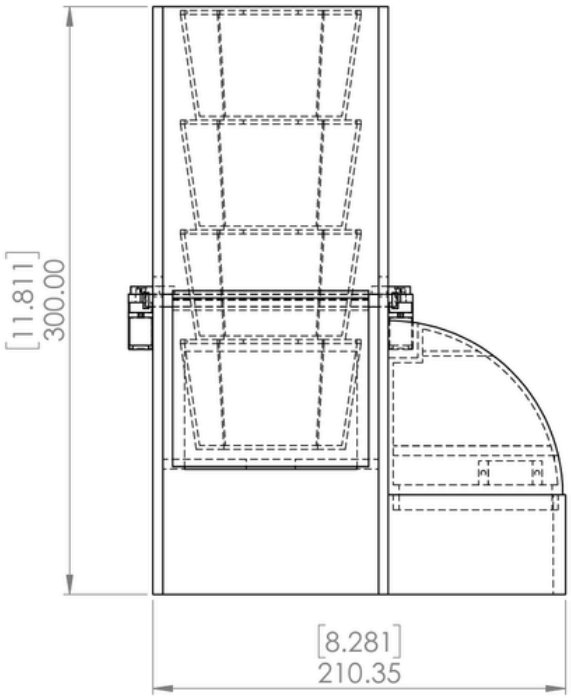


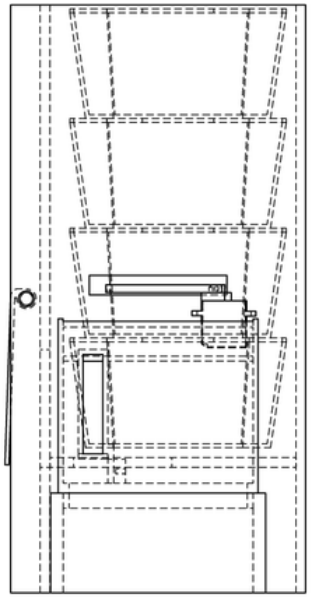
6.2. MATERIAL LIST

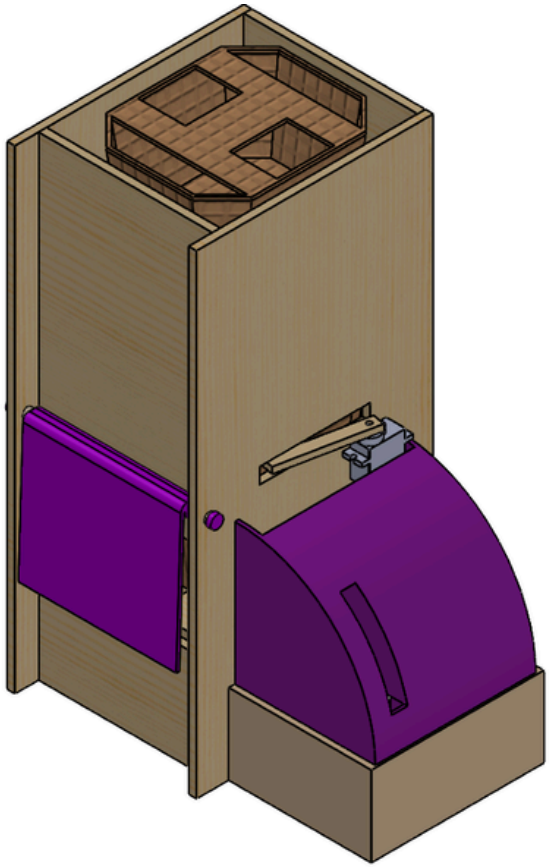
Item #	DESCRIPTION	QTY	SUPPLIED
1	Arduino Nano	1	Yes
2	Servo MG90S 9g/cm (90°) + Servo mounting kit	3	Yes
3	NFC Reader module 3 - chip #PN532	1	Yes
4	9V battery support	1	Yes
5	Relay module 5V	1	Yes
6	Limit switch	1	Yes
7	DC motor with wheel	1	Yes
8	1/4" thick plywood board	n/a	No
9	1/4'' wooden dowel	n/a	No
10	Heat-activated welding glue cartridge	∞	No

6.3. MECHANICAL ASSEMBLY

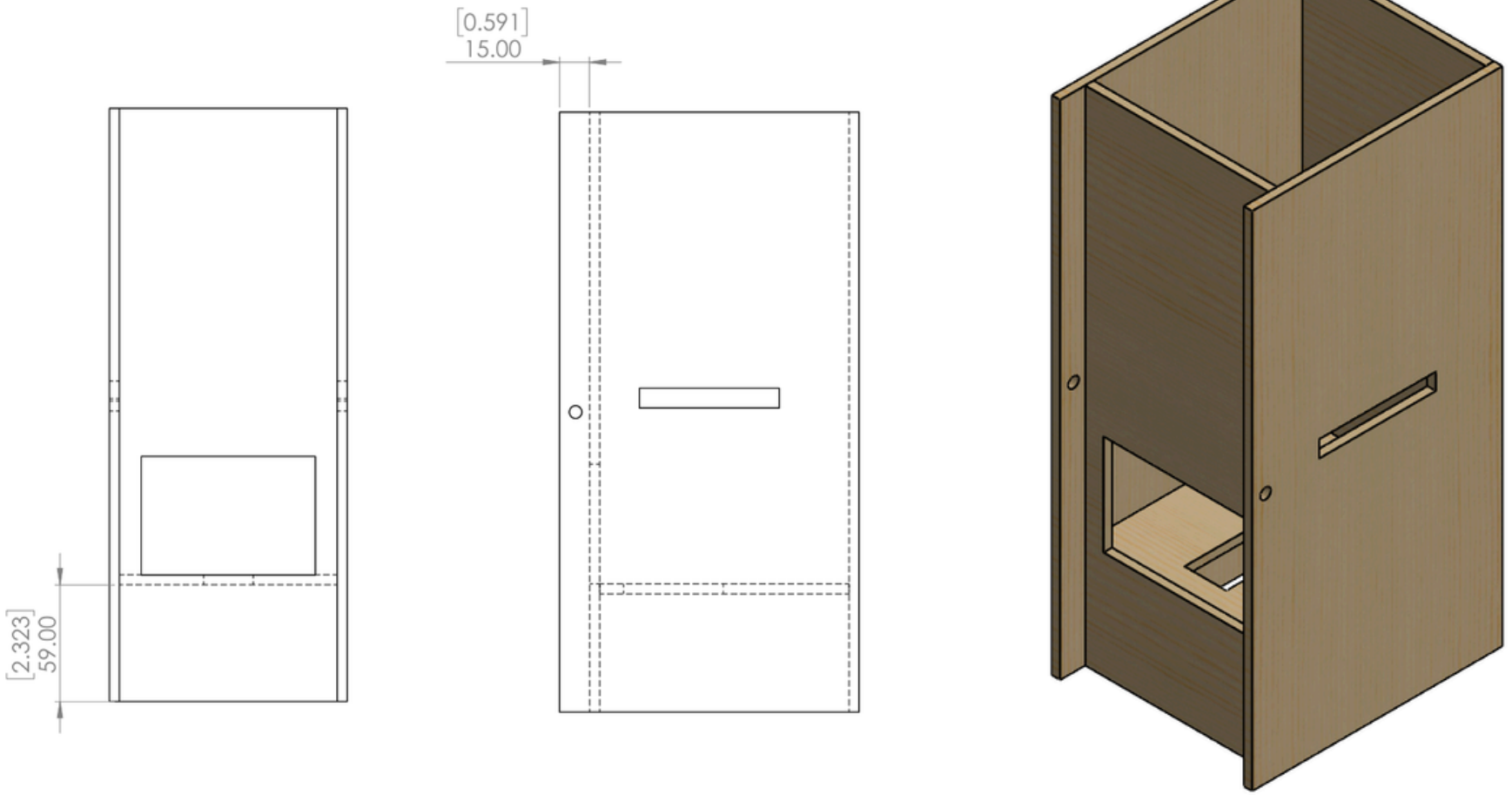




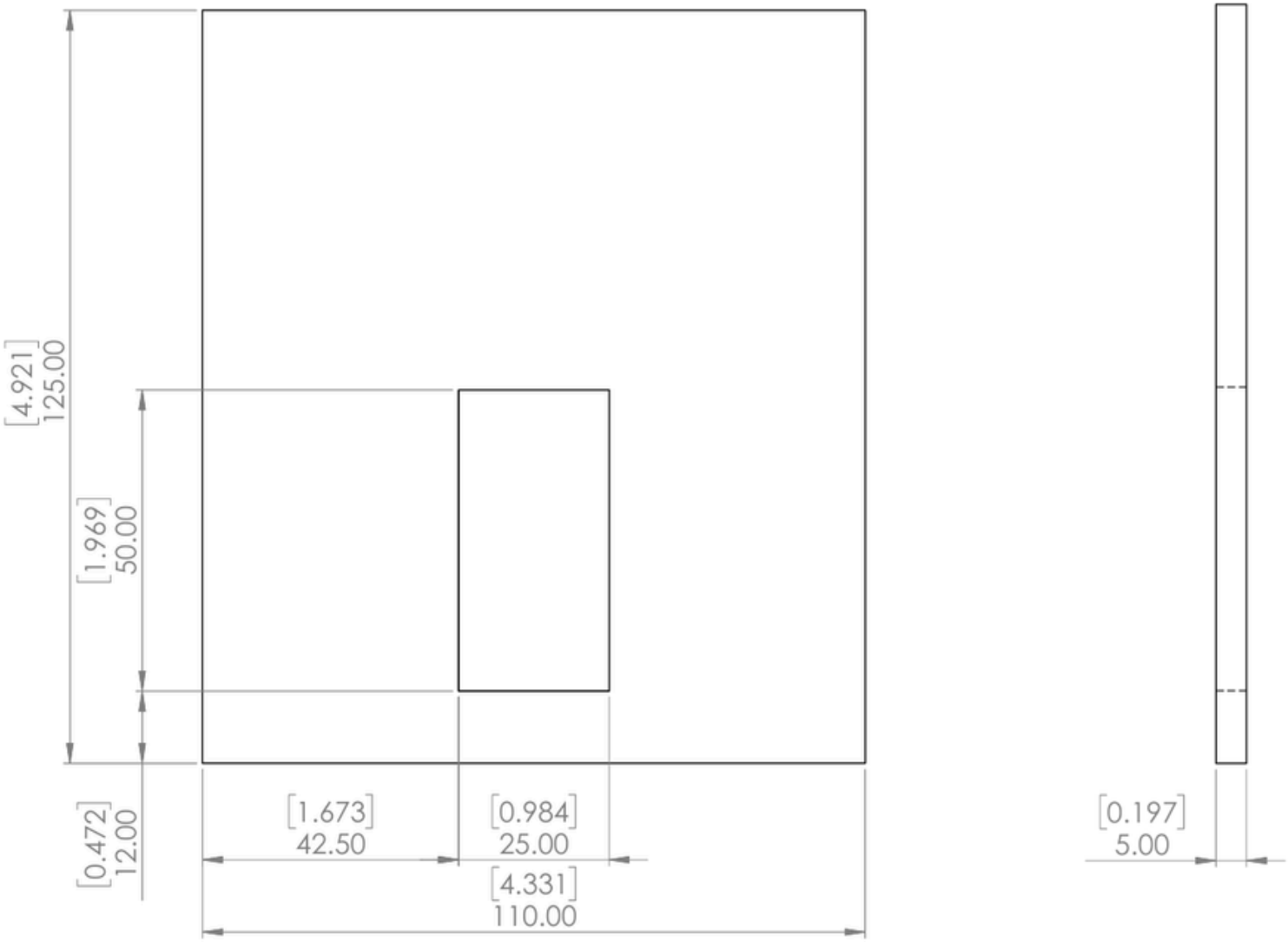




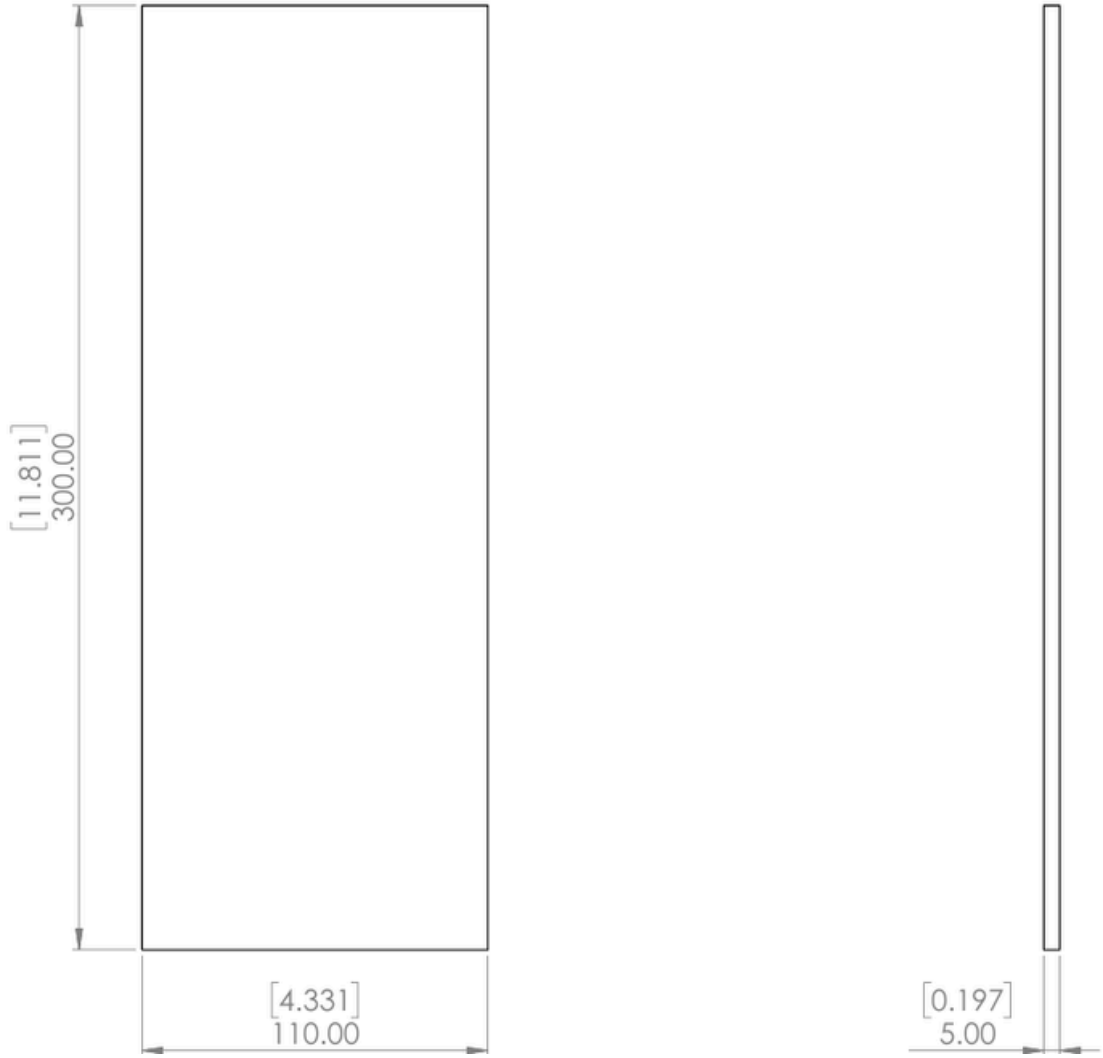
6.3. MECHANICAL ASSEMBLY



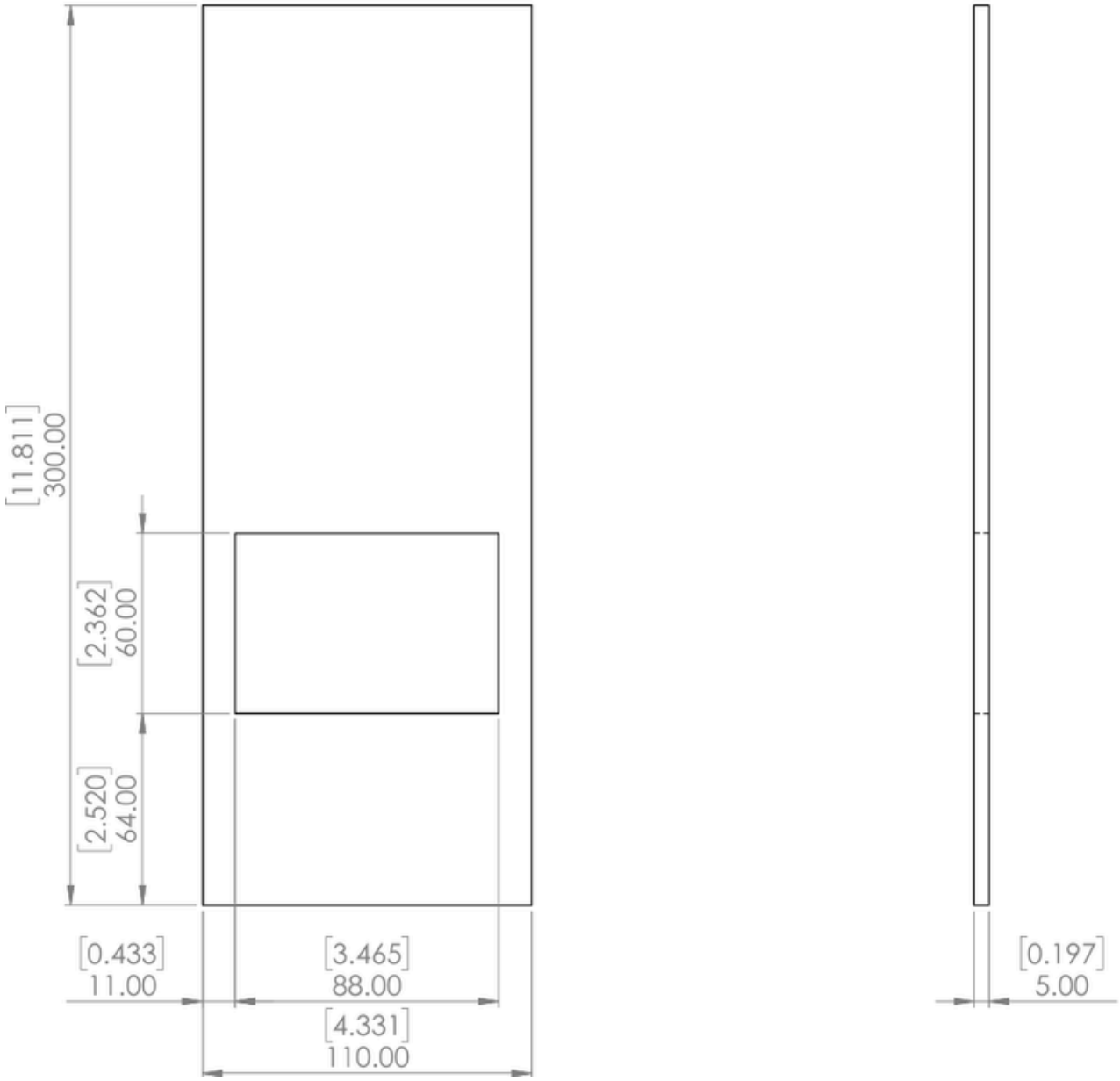
6.3. MECHANICAL ASSEMBLY



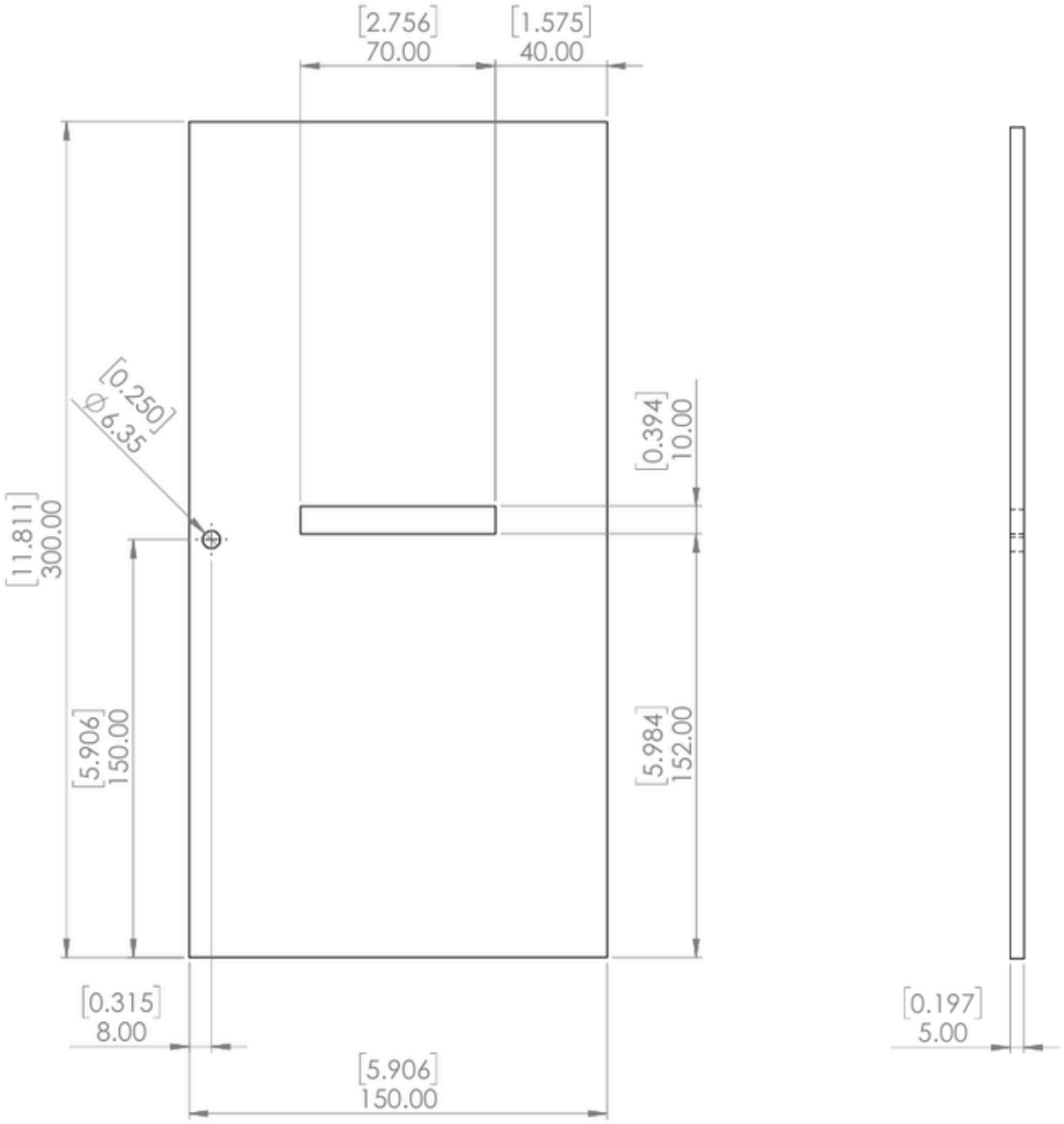
6.3. MECHANICAL ASSEMBLY



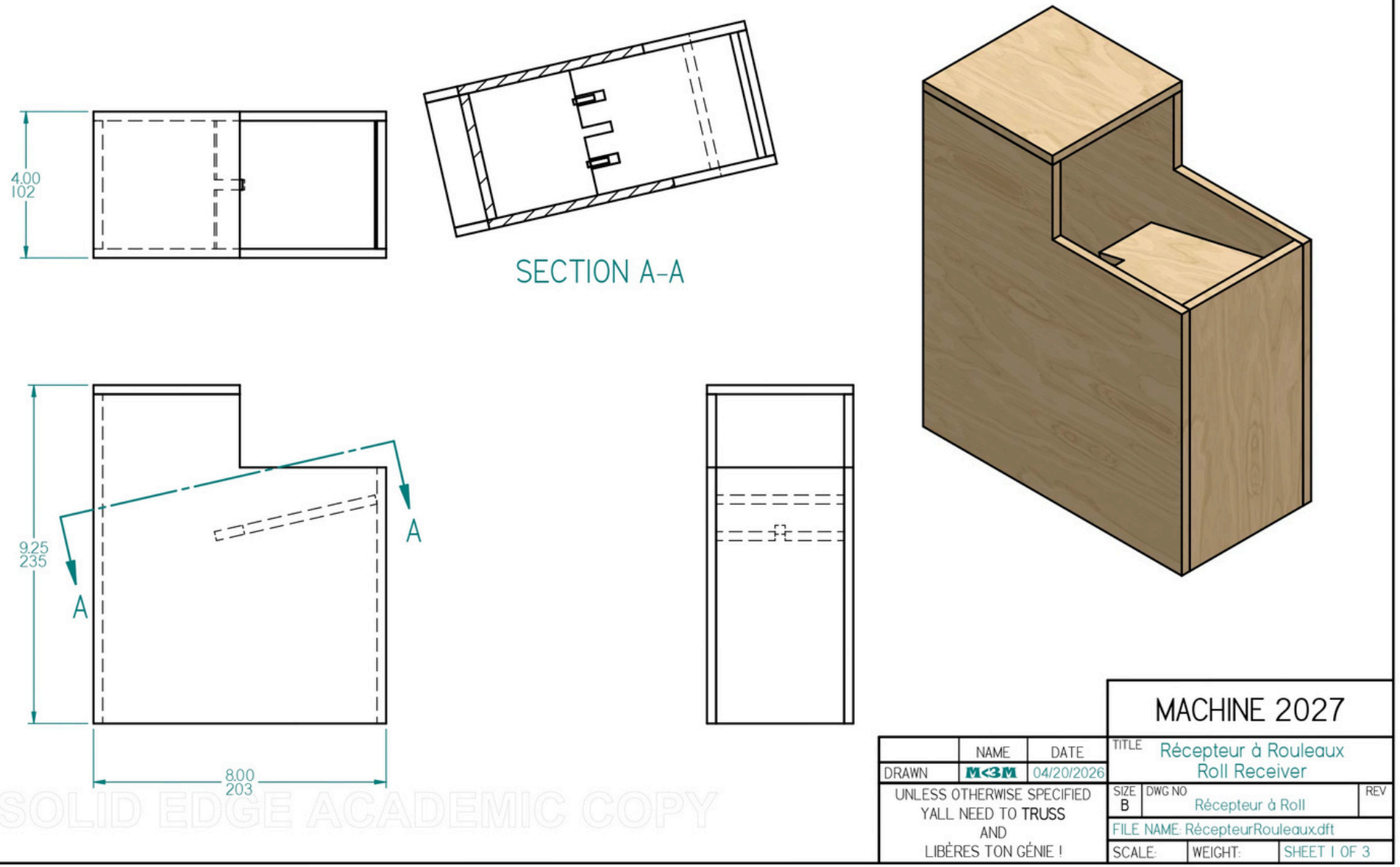
6.3. MECHANICAL ASSEMBLY



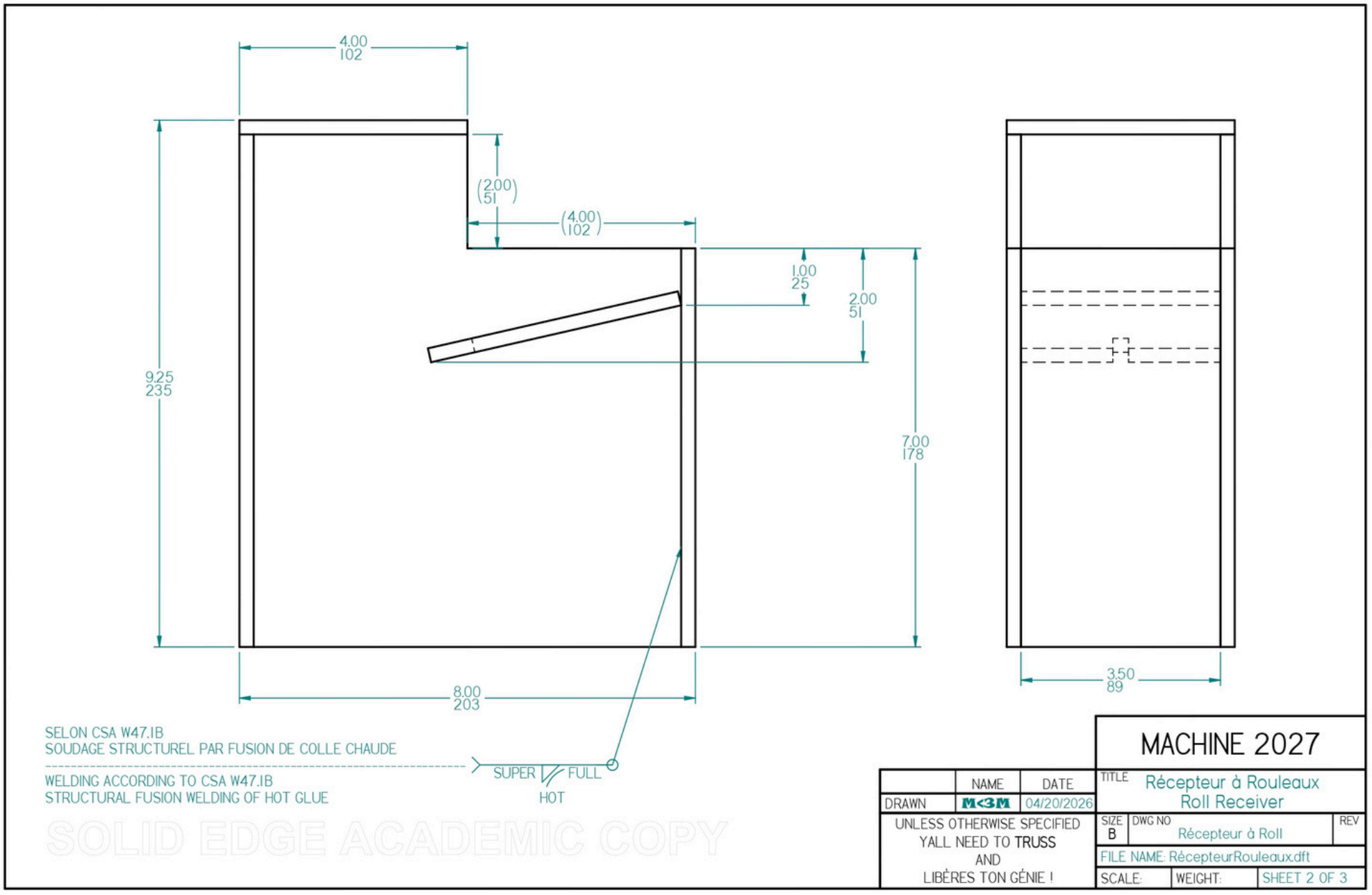
6.3. MECHANICAL ASSEMBLY



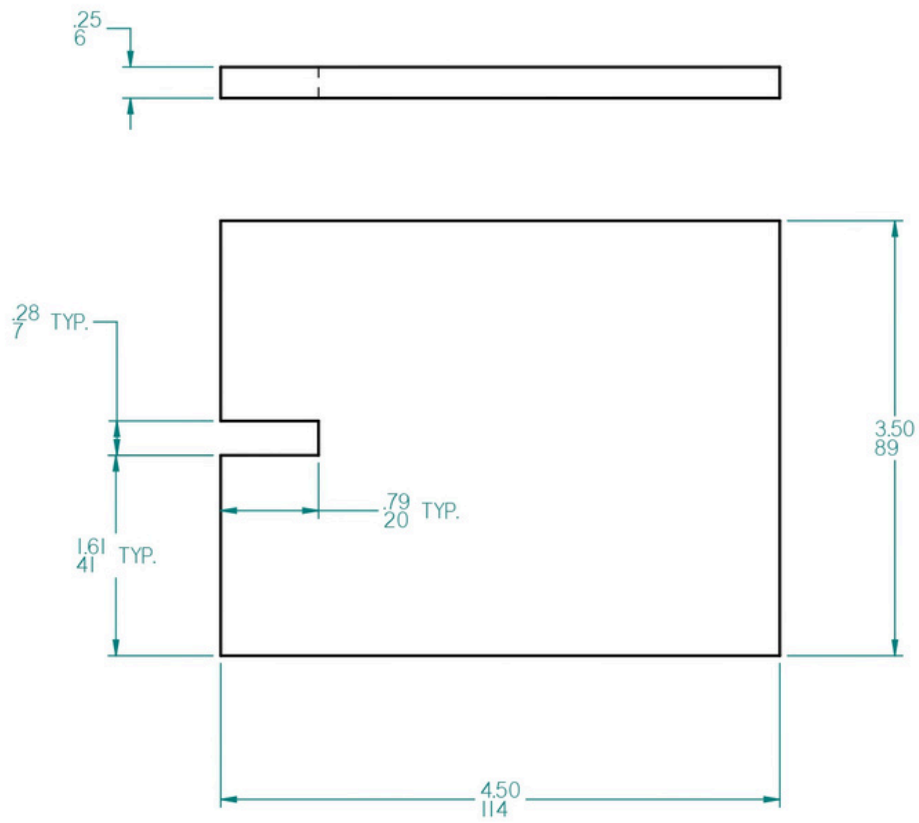
6.3. MECHANICAL ASSEMBLY

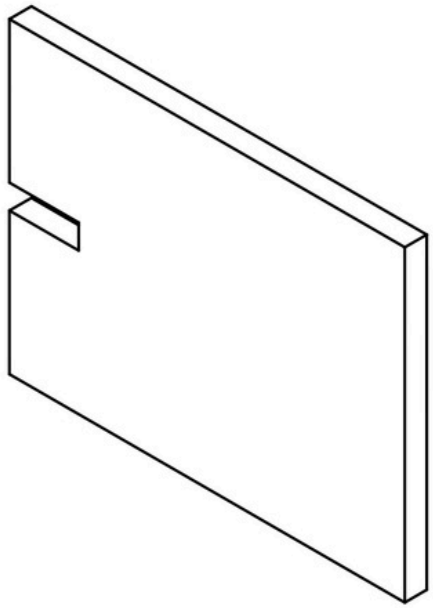


6.3. MECHANICAL ASSEMBLY



6.3. MECHANICAL ASSEMBLY





	NAME	DATE
DRAWN	M<3M	04/20/2026

UNLESS OTHERWISE SPECIFIED
YALL NEED TO TRUSS
AND
LIBÈRES TON GÉNIE !

MACHINE 2027

TITLE: Récepteur à Rouleaux
Roll Receiver

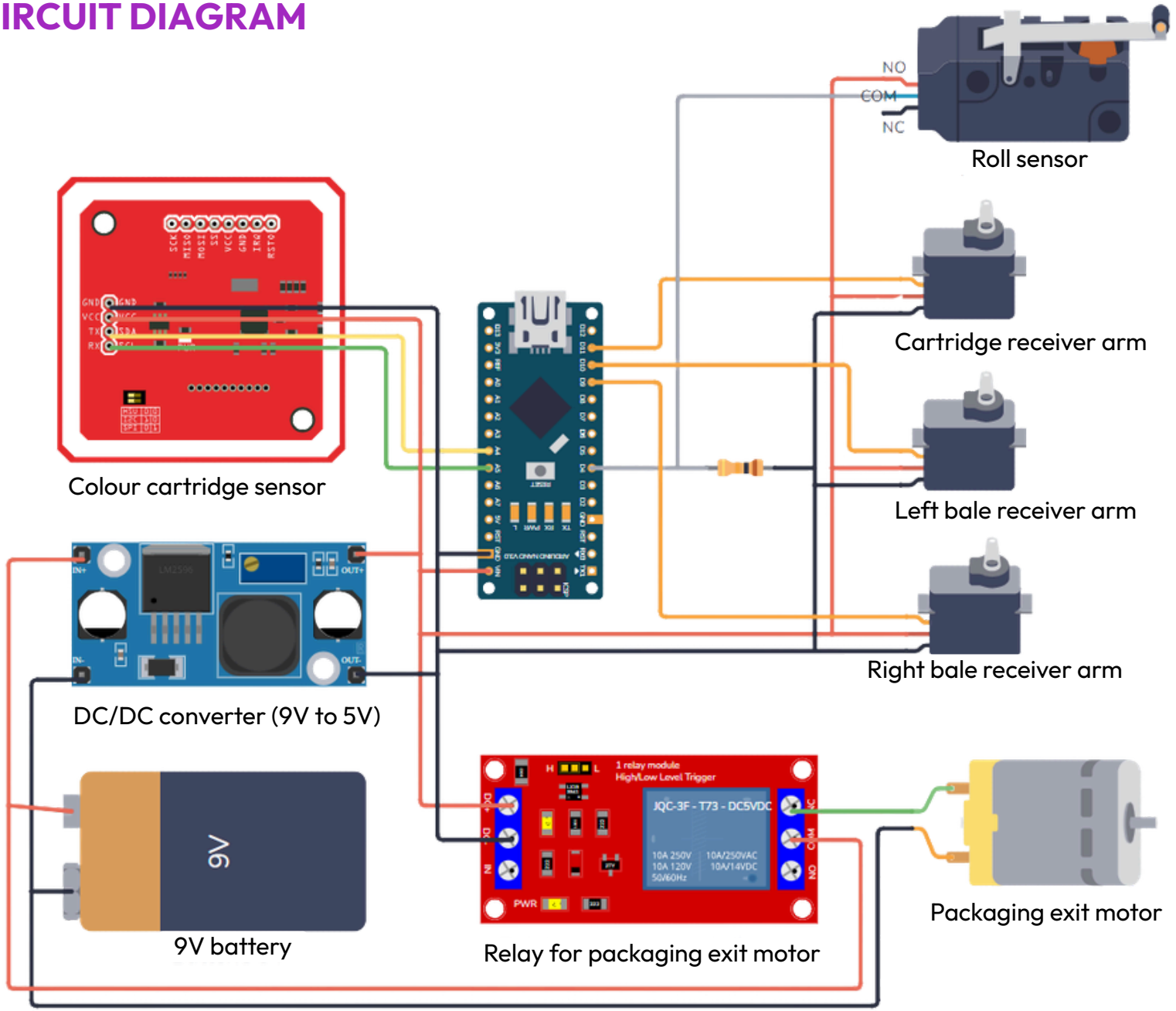
SIZE	DWG NO	REV
B	Récepteur à Roll	

FILE NAME: RécepteurRouleaux.dft

SCALE:	WEIGHT:	SHEET 3 OF 3

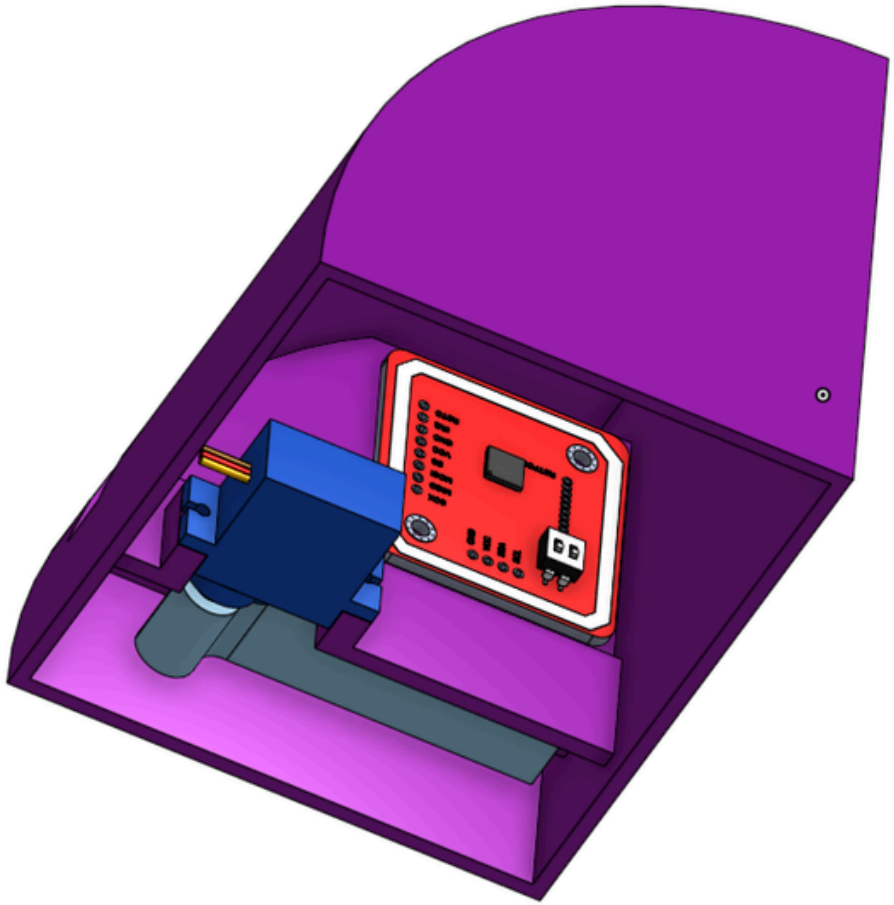
SOLID EDGE ACADEMIC COPY

6.4. CIRCUIT DIAGRAM



6.5. COMPONENT PLACEMENT

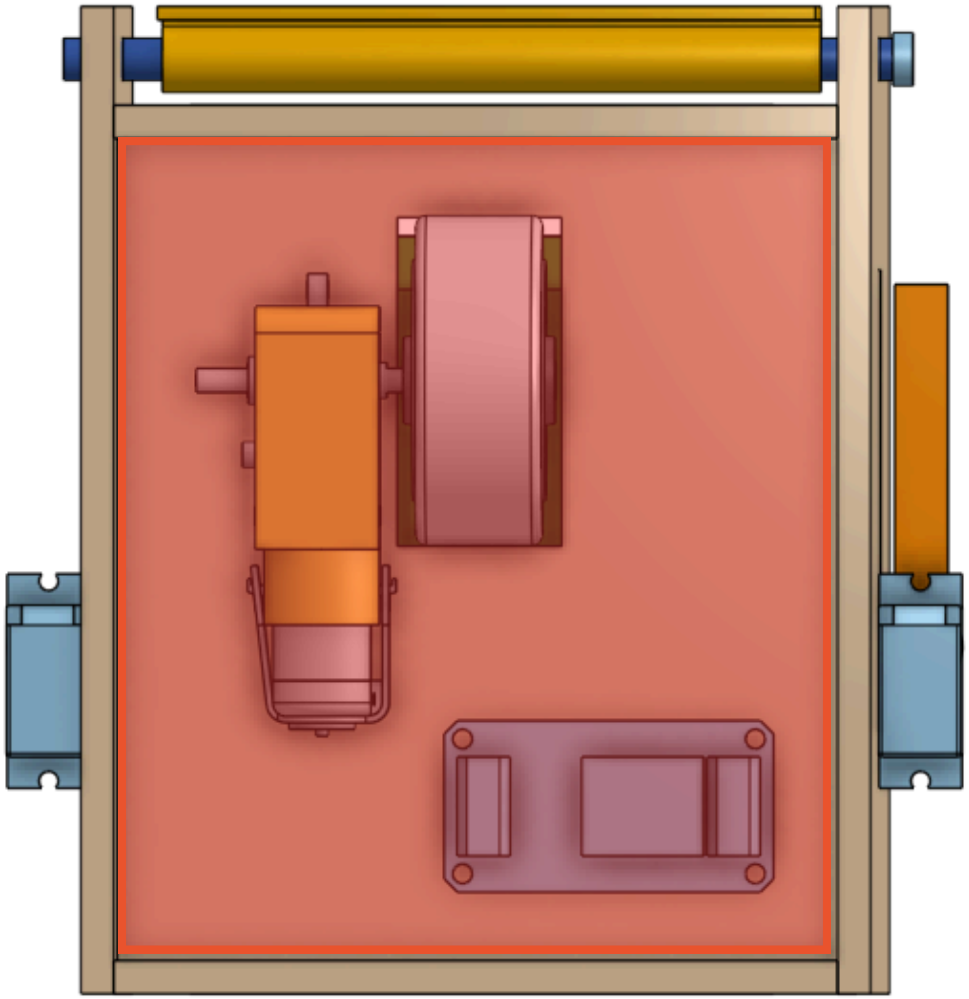
6.5.1. CARTRIDGE COLLECTOR SERVO AND NFC READER



6.5. COMPONENT PLACEMENT

6.5.2. REST OF COMPONENTS

For this final station, the motor, Arduino, relay, and power supply must be placed under the box tower. The area marked in red in the figure below shows where these components can be placed.



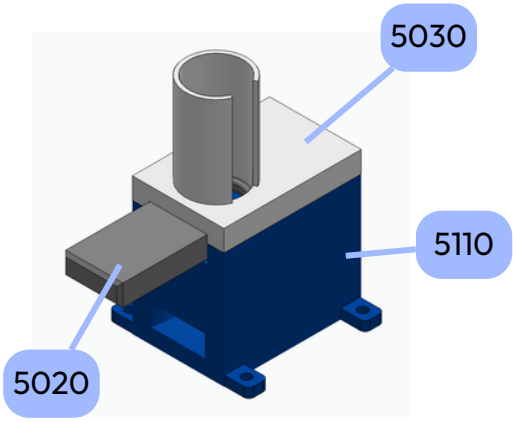
7. TOKEN DISPENSER

7.1. ELEMENT TREE

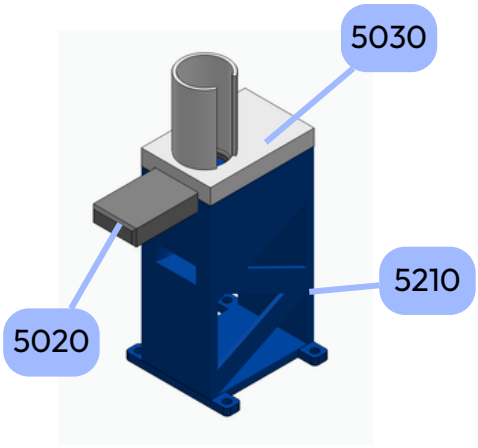
5000 - Token dispenser;

- 5100 - Small dispenser
  - 5110. Small base
  - 5020. Reservoir stopper
  - 5030. Slide button
- 5200 - Big dispenser
  - 5210. Big base

5100 - SMALL CARTRIDGE DISPENSER



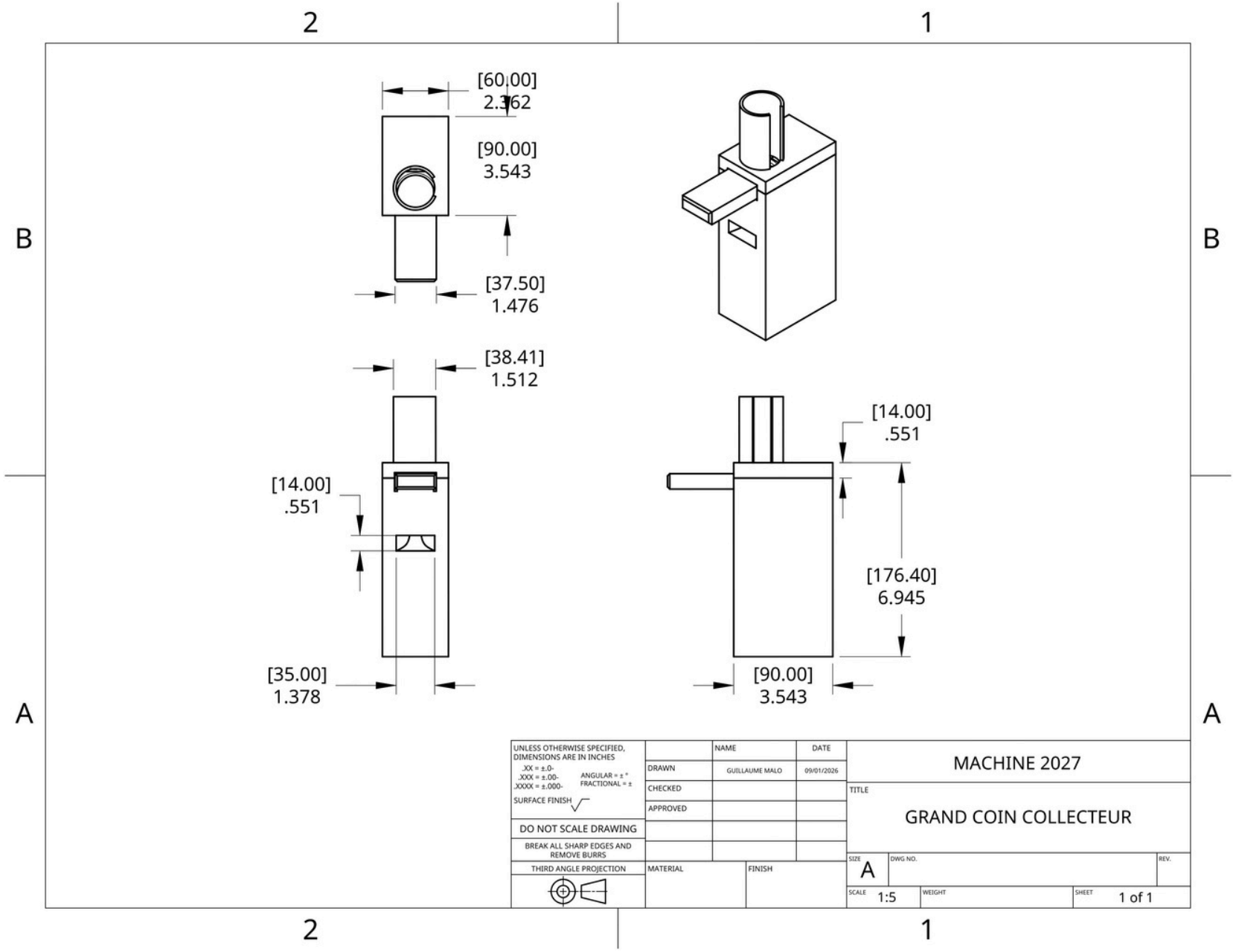
5200 - BIG CARTRIDGE DISPENSER



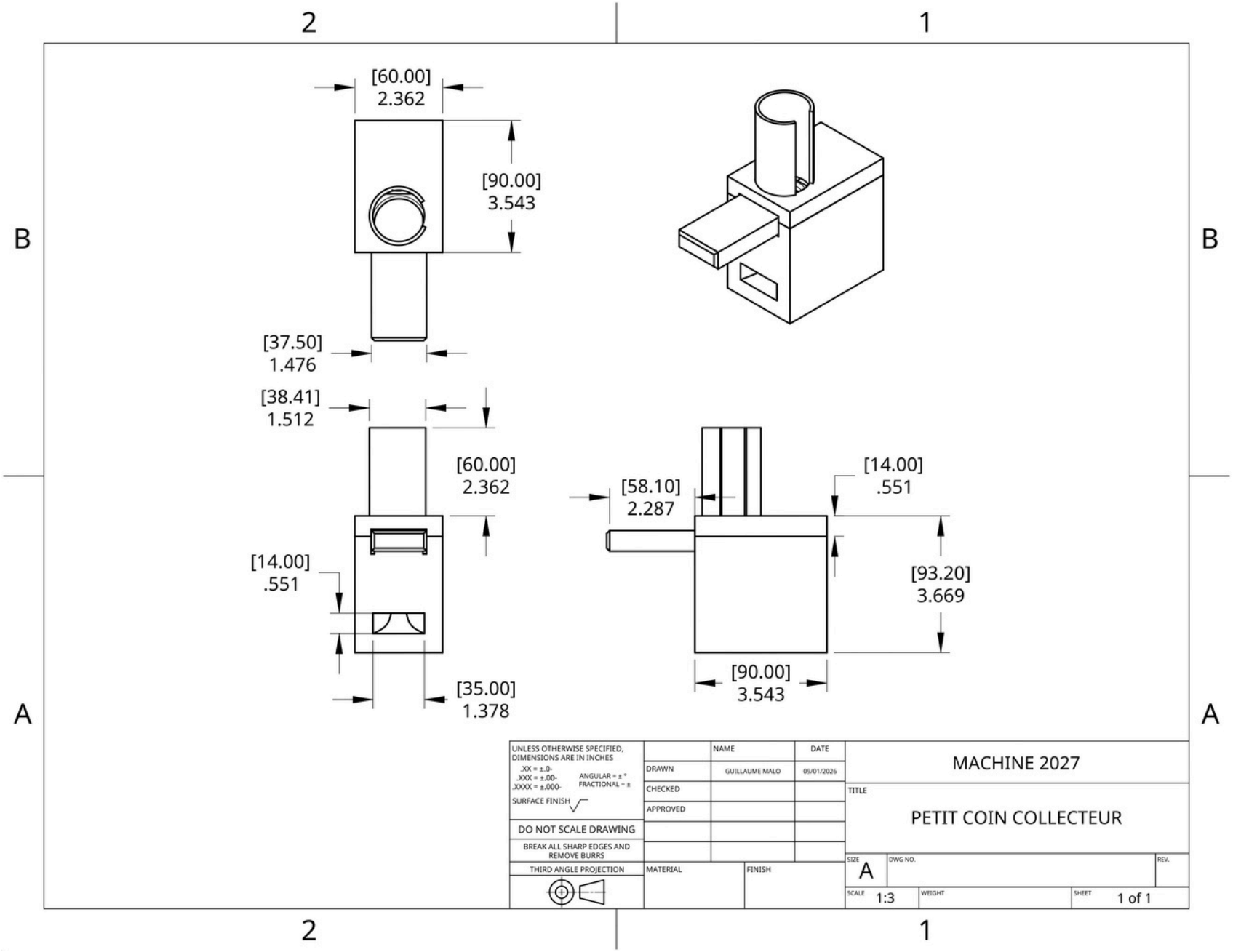
7.2. MATERIAL LIST

Item #	DESCRIPTION	QTY	SUPPLIED
1	Tension spring	1	Yes

7.3. MECHANICAL ASSEMBLY

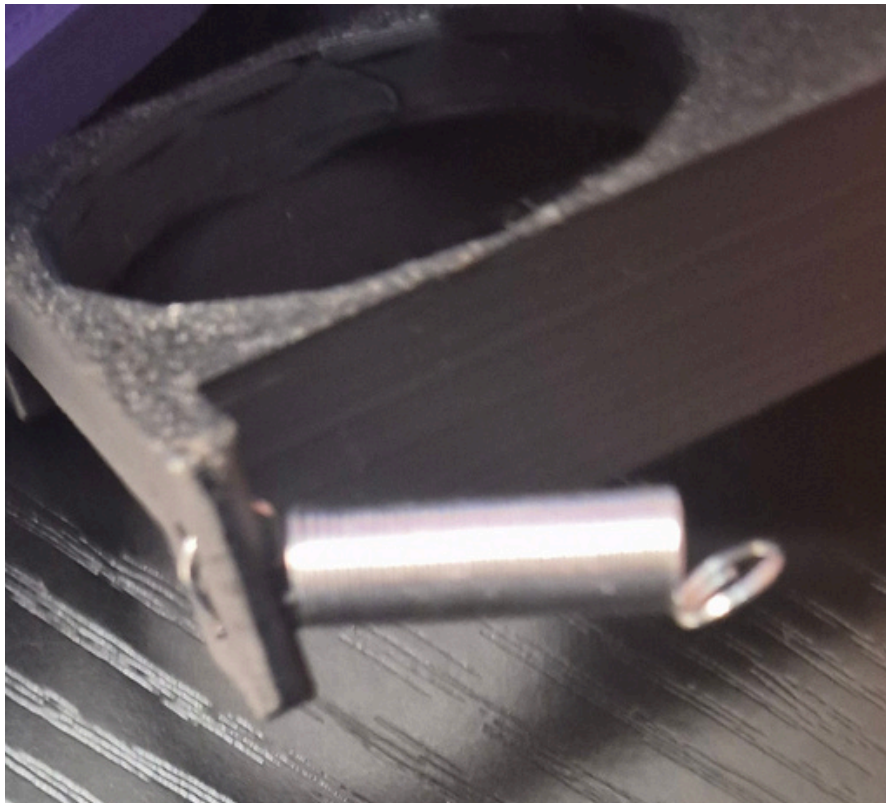


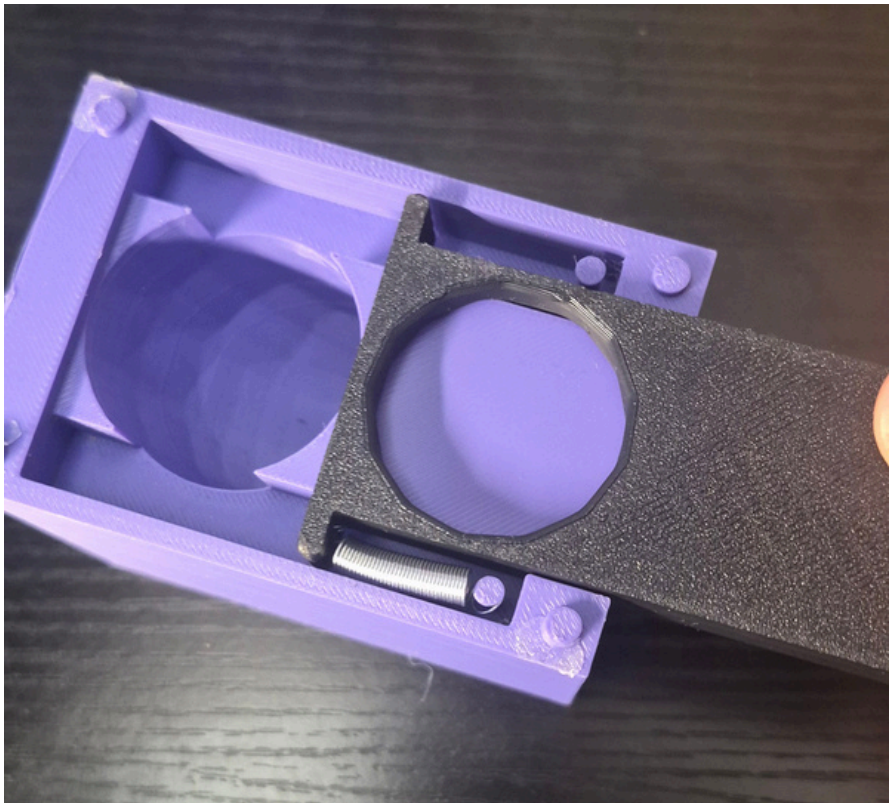
7.3. MECHANICAL ASSEMBLY



7.3. MECHANICAL ASSEMBLY

7.3.1 PLACEMENT OF THE TENSION SPRING IN THE DISPENSER





8. RESOURCES

8.1. ELEMENT TREE

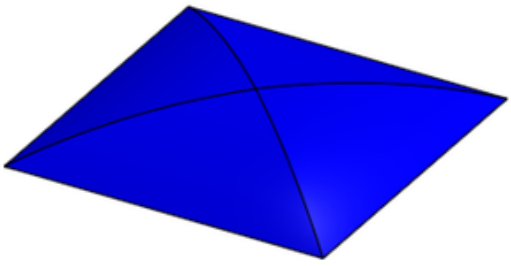
8000 - Resources

- 8100 - Cubes or recycled cardboard
- 8200 - Rolls of paper
- 8300 - Pouches of plastic pellets
- 8400 - Recycled plastic bottles
- 8500 - Printed cardboard packaging
- 8600 - Ink token
- 8700 - Printed solids
    - 8710 - Cones
    - 8720 - Spheres
    - 8730 - Semi-cyclinders

8400 - Recycled plastic bottle



8300 - Pouch of plastic pellets



8.1. ELEMENT TREE

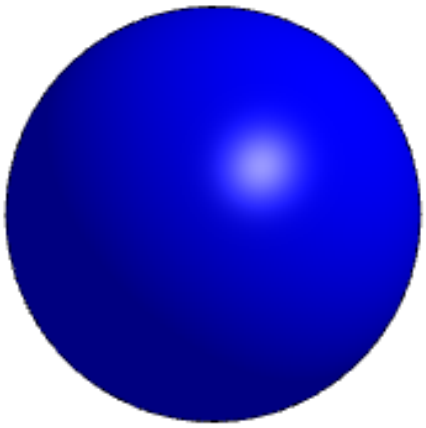
8600 - Ink cartridge



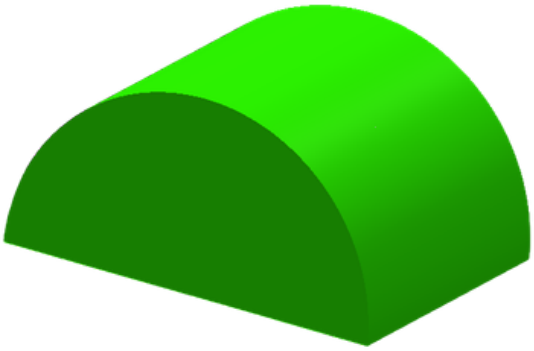
8710 - Cone



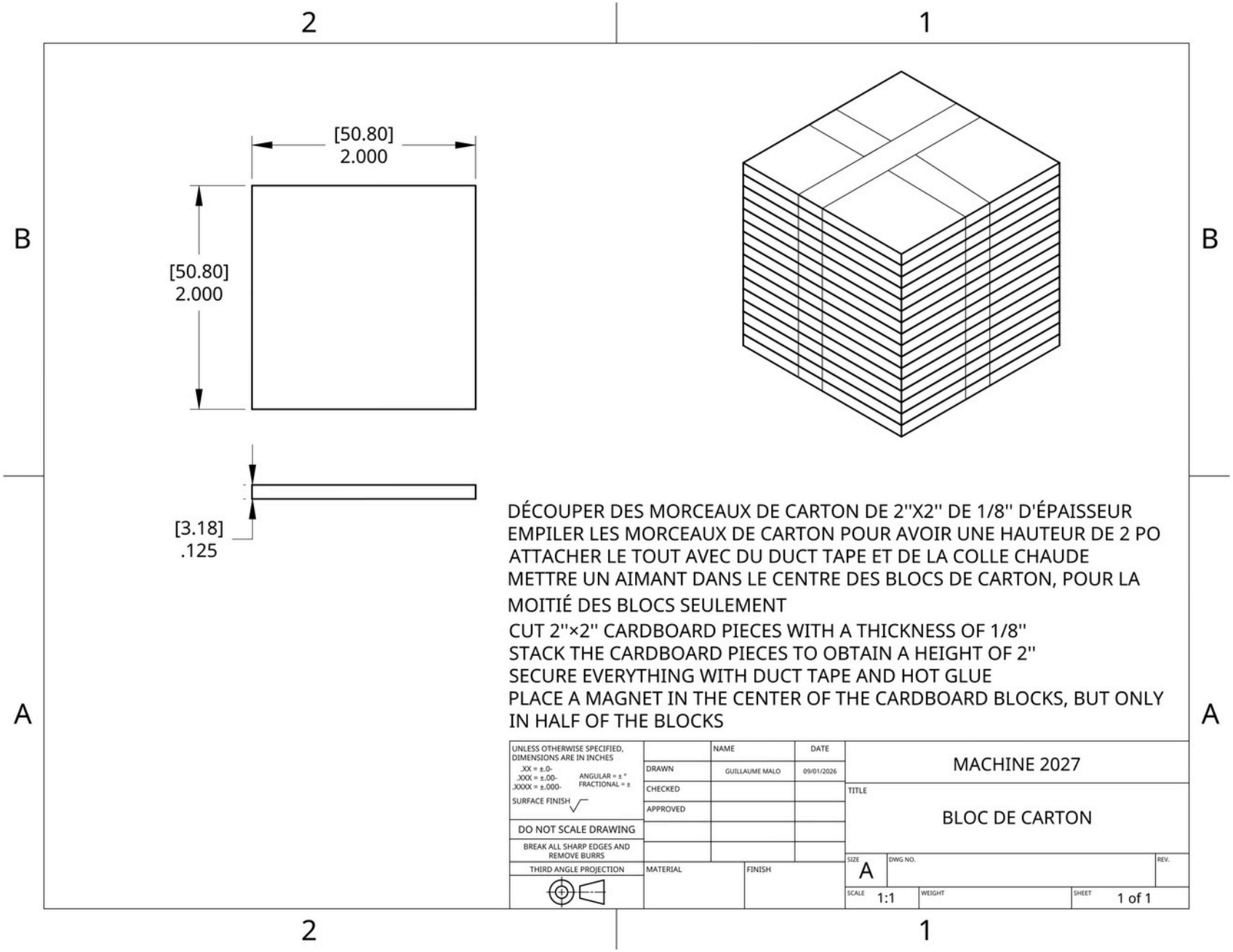
8720 - Sphere



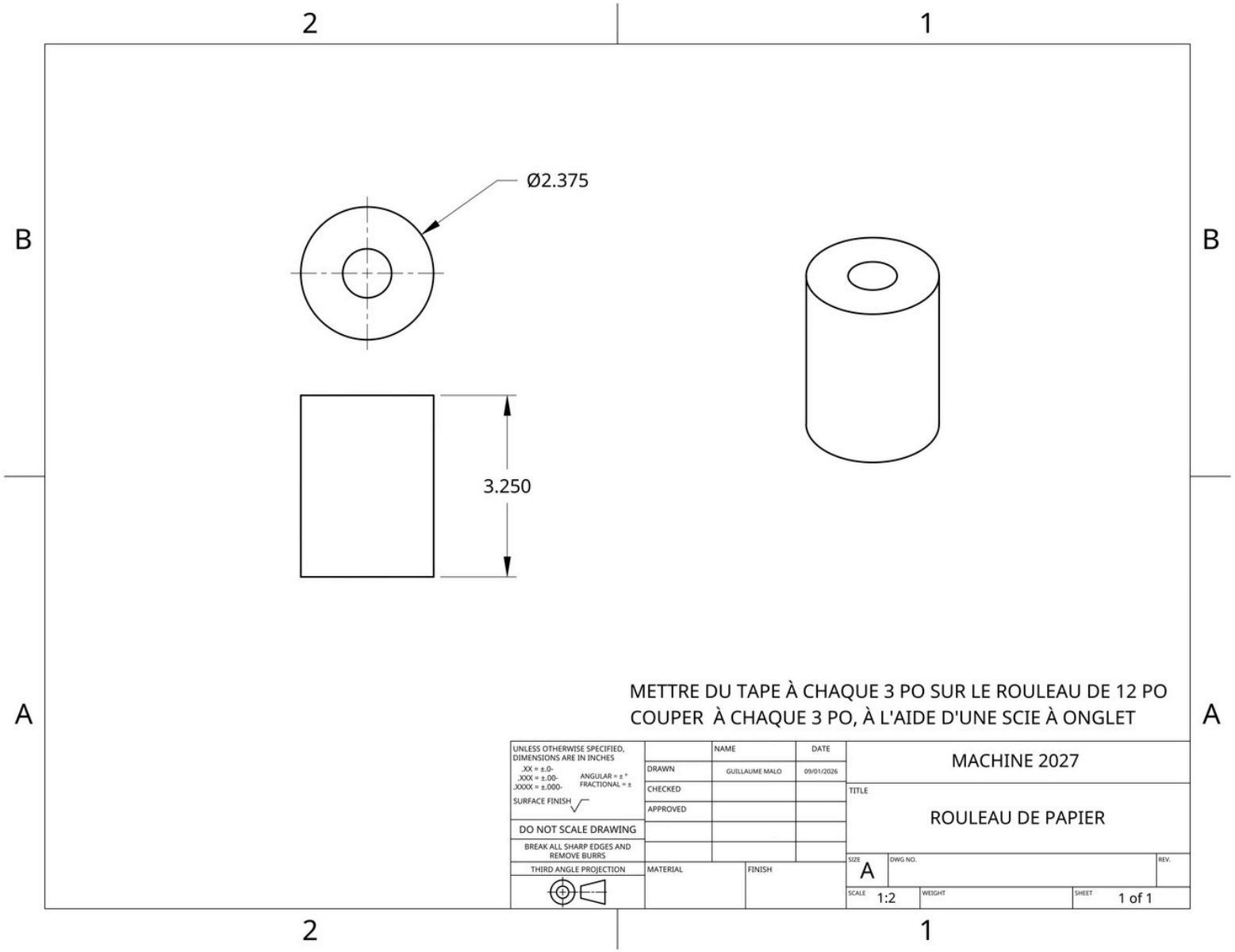
8730 - Semi-cyclinder



8.2. MECHANICAL ASSEMBLY



8.2. MECHANICAL ASSEMBLY



9. FIELD

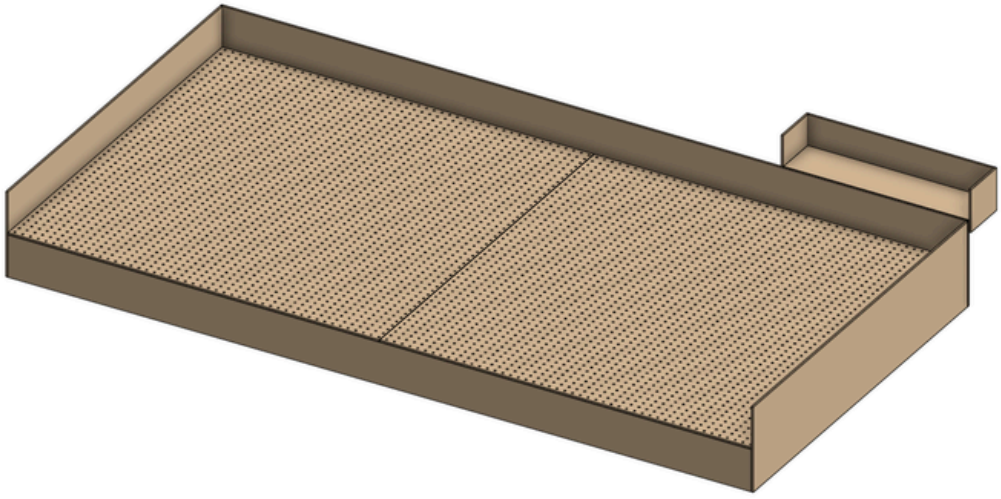
9.1. ELEMENTS

The structure of the field is built using 2x4" wood planks and perforated plywood. The features are secured with printed angle brackets and screwed into the features and then into the holes. Pallet racks (shelves) are assembled using ¼" plywood and ¼" wood dowels.

CAUTION!!!

During the competition, we will have a complete 4x8 pegboard sheet (perforated plywood). Some hardware stores sell half-sheets measuring 4x4; if you use these, align them as best you can.

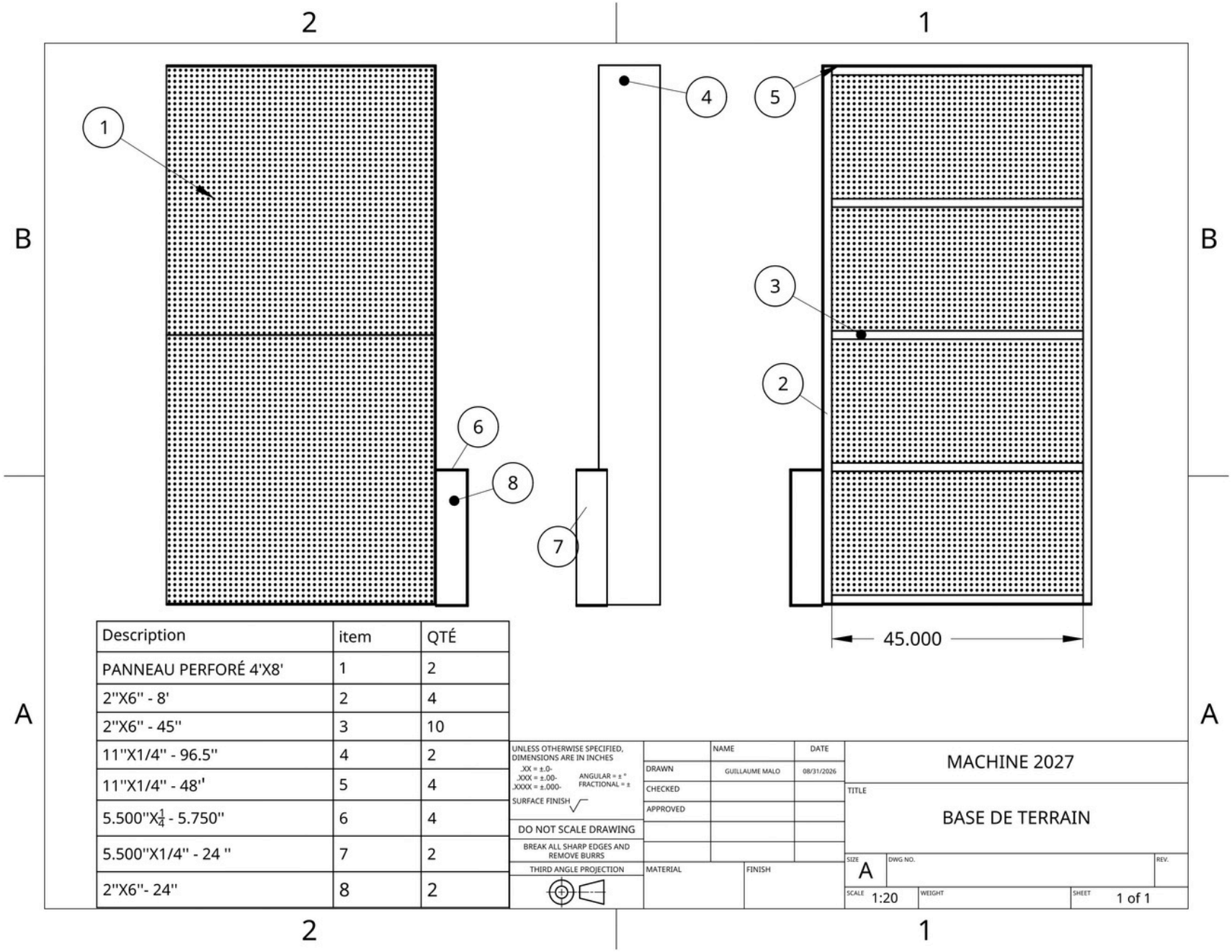
9000 - FIELD BASE



9.2. MATERIAL LIST

Item #	DESCRIPTION	QTY	SUPPLIED
1	2" x 6" x 8' wood planks	8	No
2	1/4'' MDF pegboard	N/A	No
3	Plywood 1/4''	N/A	No
4	Printed angle brackets	6+7	No
5	#4-8 x 1'' wall anchors	A lot	No
6	Plastic bins for order shipping	6	No

9.3. MECHANICAL ASSEMBLY



Description	item	QTÉ
PANNEAU PERFORÉ 4'X8'	1	2
2"X6" - 8'	2	4
2"X6" - 45"	3	10
11"X1/4" - 96.5"	4	2
11"X1/4" - 48"	5	4
5.500"X$\frac{1}{4}$ - 5.750"	6	4
5.500"X1/4" - 24 "	7	2
2"X6"- 24"	8	2

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES
.XX = ±.0- .XXX = ±.00- .XXXX = ±.000-
ANGULAR = ± ° FRACTIONAL = ±
SURFACE FINISH
DO NOT SCALE DRAWING
BREAK ALL SHARP EDGES AND REMOVE BURRS
THIRD ANGLE PROJECTION

	NAME	DATE
DRAWN	GUILLAUME MALO	08/31/2026
CHECKED		
APPROVED		

MATERIAL | FINISH

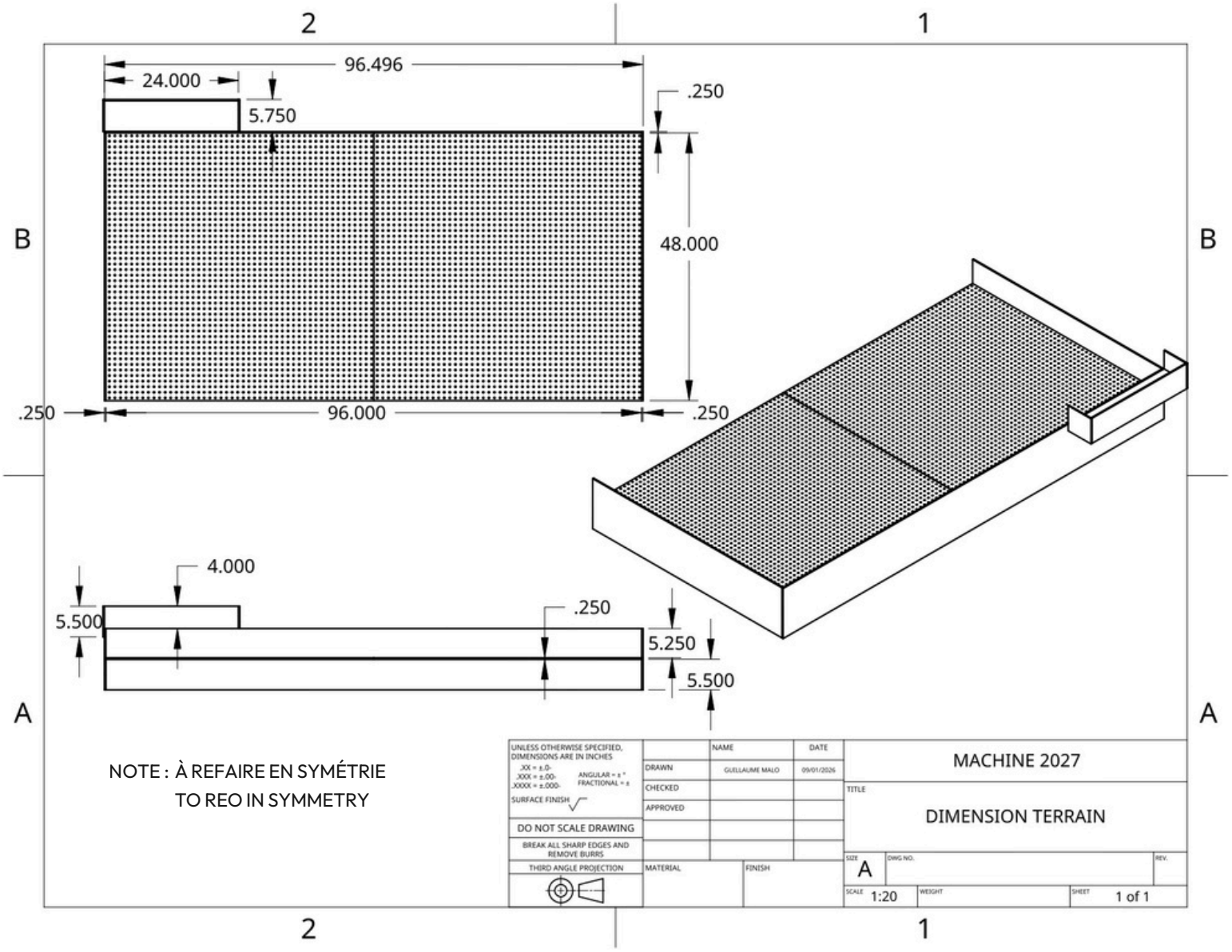
MACHINE 2027

TITLE: BASE DE TERRAIN

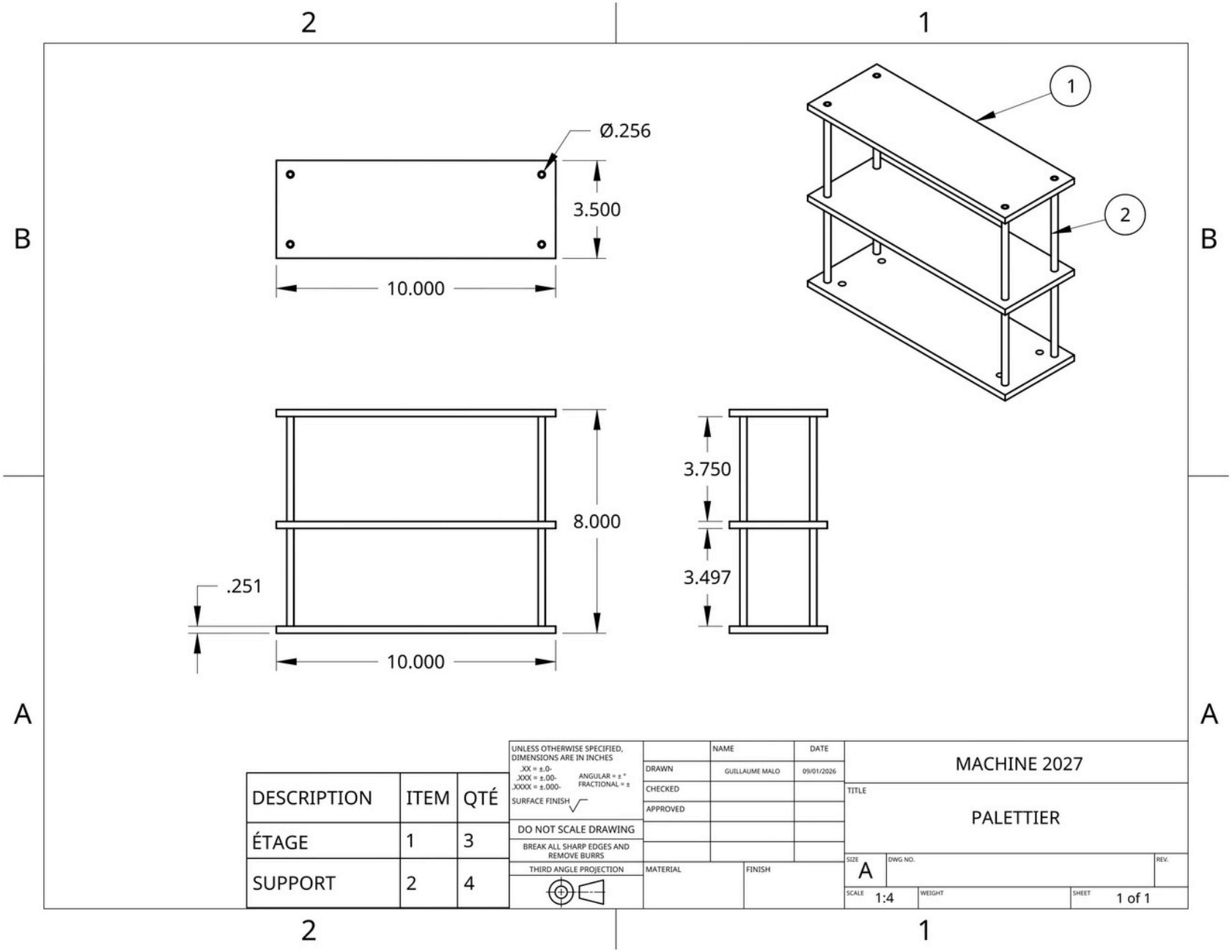
SIZE A | DWG NO. | REV.

SCALE 1:20 | WEIGHT | SHEET 1 of 1

9.3. MECHANICAL ASSEMBLY

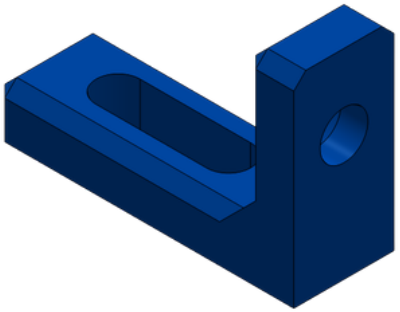


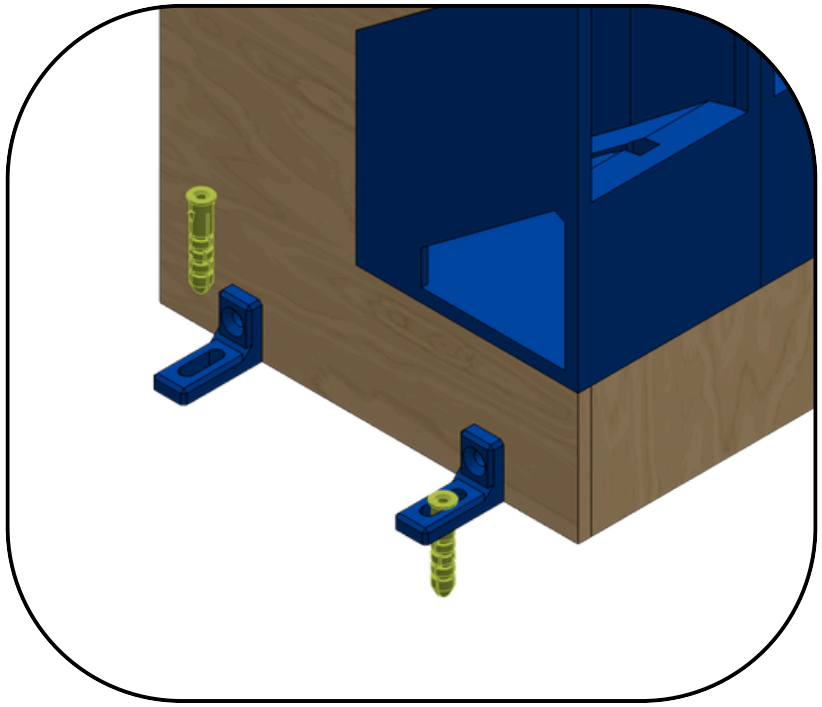
9.3. MECHANICAL ASSEMBLY

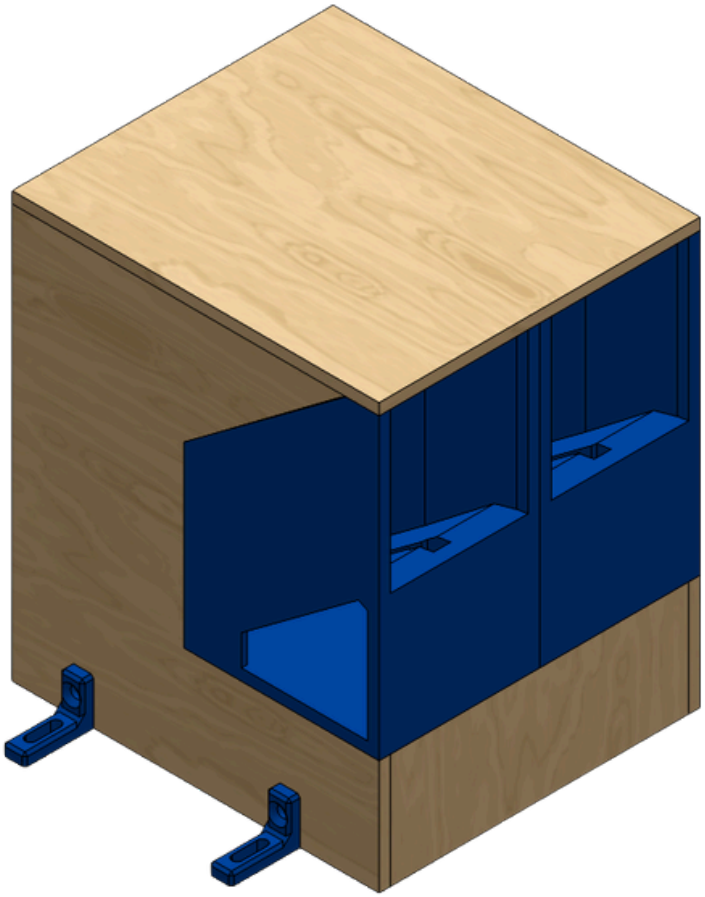


9.4. ANCHORING OF STATIONS

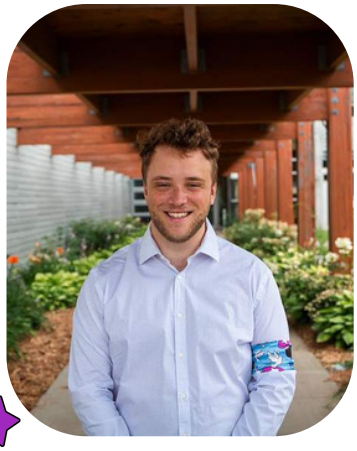
These anchors are used to hold all the stations in place. You can adjust the screw within the slot to achieve the proper fit. Use No. 4–8 x 1" yellow plastic wall anchors and a small wood screw, and screw them into the holes in the perforated floor.







10. ORGANIZING COMMITEE



Étienne Charbonneau
VP-Machine



Vincent Levesque
VP-Machine

Guillaume Malo
Machine Director

Julien Laurence-Brook
Machine Director

Leo Bertin
Machine Director

Dan Levy
Machine Director

If you have any questions or comments about the challenge, you can contact the Machine Team at the following address:

machine@jeuxdegenie.qc.ca

APPENDIX A

COMPLETE PARTS LIST

Item #	DESCRIPTION	QTY	SUPPLIED
1	Arduino Nano	4	Yes
2	Servo MG996R 9kg/cm + Servo mounting kit	1	Yes
3	Servo MG90S 9g/cm (90°) + Servo mounting kit	7	Yes
4	Servo MG90D 9g/cm (360°) + Servo mounting kit	3	Yes
5	Infrared sensor HW870	8	Yes
6	Magnetic sensor HMC8883L	1	Yes
7	Relay module 5V	2	Yes
8	9V battery support	4	Yes
9	9V battery (replaceable by wired power supply)	1	No
10	Push-button with integrated LED	1	Yes
11	Buck converter LM2596	2	Yes
12	NFC Reader module 3 - chip #PN532	2	Yes
13	Limit switch	1	Yes
14	DC motor with wheel	1	Yes
15	1/4" thick plywood board 4' x 8'	3	No
16	1/4'' MDF pegboard 4' x 8'	2	No
17	1/8'' x 12" x 12" MDF board	4	Yes
18	1.5" x 1.5" x 2' wood plank	1	No
19	2"x 6"x 8' wood planks	8	No
20	1/4'' wooden dowel	1	No
21	Wheel axle (steel dia 1/8)	2	No
22	Servo rod	1	Yes
23	Tension spring	1	Yes
24	400mm profile 2020 aluminum extrusions	2	Yes
25	#4-8 x 1'' wall anchors	20 +	No
26	Plastic bins for order shipping	6	No
27	Hot glue sticks	100	No