BUILD AND ASSEMBLY PROCEDURE FOR A MANUALLY OPERATED MIXING MACHINE FOR SHEA BUTTER

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**Procedure/Assembly**

**MATERIALS**

**Wood/Lumber**

*Length of wood is important but other dimensions are approximate*

<table>
<thead>
<tr>
<th>5cm x 30cm</th>
<th>8cm x 8cm</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="5cm x 30cm Diagram" /></td>
<td><img src="image2.png" alt="8cm x 8cm Diagram" /></td>
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</tbody>
</table>

1 – 5cm x 30cm x 100cm (length)

1 - 5cm x 30cm x 200cm (length)

4 – 8cm x 8cm x 30cm (length)

1 - 8cm x 8cm x 60cm (length)

2 - 8cm x 8cm x 100cm (length)

**Nuts/Washers/Screws/Threaded Rod**
Threaded rod

*The Diameter of Rod Determines Wing-Nut size, washer size, holes to drill

4 - 0.635cm diameter threaded rod 50cm (length)
1 – 0.635cm diameter threaded rod 30cm (length)

Wing Nuts

*Must thread on threaded rod
14 – Wing nuts

Washers

*Needs to slide over the threaded rod
14 – Washers outside Diameter 3cm
Screws

*Must be long enough secure pieces of wood together

20 – Screws 7cm (length)

Metal

*Diameter of Shaft DETERMINES bushings and pulleys to purchase!

Stainless steel

1 – Sheet approximately 35cm x 30cm square approximately 0.15cm thick
1 – Shaft approximately 1.5cm Diameter x 70cm (length)

Steel

1 – Shaft approximately 1cm Diameter x 50cm (length)
2 – Anchoring plates 8cm (length) by 12cm width and approximately .15cm thick
**Pulleys/Belt/Bushings**

**Pulleys**

*Must be able to find belt to fit pulleys. Also, shafts from above section must fit through hole in pulley and must be able to lock to shafts*

1 – Pulley approximately 10cm in Diameter with 1cm shaft able to slide through it

1 – Pulley approximately 5cm in Diameter (half the size of other pulley) with 1.5cm shaft able to slide through it

**Belt**

*Must fit on pulleys*

1 – Rubber Belt (Black in color) approximately 72cm (length)
Bushings or Bearing

*Shaft Diameter is important to match. Outside Diameter is not crucial but will need Drill Bit to match size

2 – Bushings with Shaft Diameter of 1.5cm
2 – Bushing with Shaft Diameter of 1cm

TOOLS

1 – Dill
1 – Screw driver
1 – Hammer
1 – Welder
Various Drill bit Sizes
STEPS

*Container purchased will minimally affect design. Slight modifications will need to be made with container obtained.

Blades

3 blades will need to be cut from the stainless steel sheet metal.

1) Measure container to determine radius at the bottom, middle, and top of container. These will determine how long your blades will be.

2) First blade will be 2cm shorter than radius at bottom of container by 8cm wide. (It will be 2cm shorter due to width of shaft attaching it to and human error)

3) Second blade will be again 2cm shorter than middle radius of the container by 8cm wide.

4) Third blade will be 2cm shorter than top radius of container by 8cm wide.
Next weld blades on shaft.

1) Take the shaft approximately 1.5cm Diameter x 70cm (length) and mark 6cm from one end, 12cm from same end, and 18cm from same end.

2) Weld first blade to shaft at 6cm mark on shaft on a 45degree angle.

3) Weld second blade to shaft at 12cm mark in opposite direction on 45degree angle.

4) Weld third blade to shaft at 18cm same direction as first at 45degree angle

Handle

1) Take shaft approximately 1cm Diameter x 50cm (length) and make marks at 15cm and 35cm. Bend shaft at 15cm mark 90degrees then 90degrees opposite direction at 35cm so it looks like:
Post Handle

1) Take 8cm x 8cm x 100cm (length) and measure 25cm from one end and 4cm in from side to find center of hole to drill

2) Drill a hole at mark using drill bit that is the same size as the outside diameter of the Bushing with Shaft Diameter of 1cm

3) Press the 2 Bushing with Shaft Diameter of 1cm into the wood.

4) Slide handle through
Top Table

1) Take the 5cm x 30cm x 100cm (length) draw a line down center of the board

2) Measure 4cm from each side of line and draw a line whole length of the board. Again measure from the centerline 4cm PLUS the diameter of the threaded rod to both sides of center line.

3) Find center of board and measure out the top radius of the container from the center. Measure 2cm in from this distance and 8cm out from this distance, creating an approximately 1cm x 10cm (length) slot. These will be your slots to make it adjustable to containers needs.
Container Post

1) Take the 8cm x 8cm x 100(length) and place it on top of your container. Cut it to size but allowing 15cm over hang on one end and about 20cm on other. Find center of container on 8cm x 8cm post and mark it.

2) Drill a hole at mark using drill bit that is the same size as the outside diameter of the Bushing with Shaft Diameter of 1.5cm

3) Press the 2 Bushing with Shaft Diameter of 1.5cm into the wood.

4) Slide blade shaft through bushings.

5) Cut out a section of the post 2cm deep by 25cm long from the end that over hangs the bucket by 20cm.

6) Next drill a hole 30cm deep (or as deep as you can) and the same diameter as the threaded rod in the end of 8cm x 8cm post on the end that over hangs on the bucket 20cm. This act as a belt tensioner later.
Anchoring Plate

1) Cut/grind slots 0.635cm wide (size of threaded rod) in anchoring plates as follows.

Assembly

1) Take the 5cm x 30cm x 100cm (length) board and attach with screws the four 8cm x 8cm x 30cm (length) posts to the corners.

2) Attach with screws the 5cm x 30cm x 200cm (length) board to step one as such.

3) Attach Handle post off center in front of top table with screws
4) Attach the other 8cm x 8cm x 100cm (length) with screws and cut to appropriate length and cut ends on angle accordingly.

5) Place container on top table centering it.

6) Take the 0.635cm diameter threaded rod 30cm (length) and put it in the hole of the container post drilled earlier. Slide washer over end and tighten with wing nut. (Note the tensioner will push against Handle Post. A steel plate made be needed so threaded rod does not push too far into handle post wood.) Slide blade shaft through bushings in post and put on top of container. Slide pulley approximately 5cm in Diameter on blade shaft and lock in place. (See CAD drawing).

7) Slide the four-threaded rods through slots on top table and around container post.
Slide anchoring plates across top of container post and through threaded rod to secure container in place. Use washers as seen in drawing. Secure with wing nuts to set in place. (See CAD drawing).

8) Slide pulley approximately 10cm in Diameter on 1cm handle shaft and attach belt. (See CAD drawing)

9) Use “tensioner” to tighten belt and tighten down wing nuts on top container post
Slide plastic pipe over handle for added comfort. (See CAD drawing).
Shea Butter Mixer Assembly

PART AND ASSEMBLY DATA

Dwg. No. DRW001 Rev. 1 Sheet 1 of 1
Shea Butter Mixer Blade

DRAWN: JAY S/2005
CHECKED: CM/6/2005

TOLERANCES: ± 0.05
COMMENTS: part and assembly data

DWG. NO. DRW009 REV. 1 SHEET OF 1
Shea Butter Mixer
Bottom Blade