

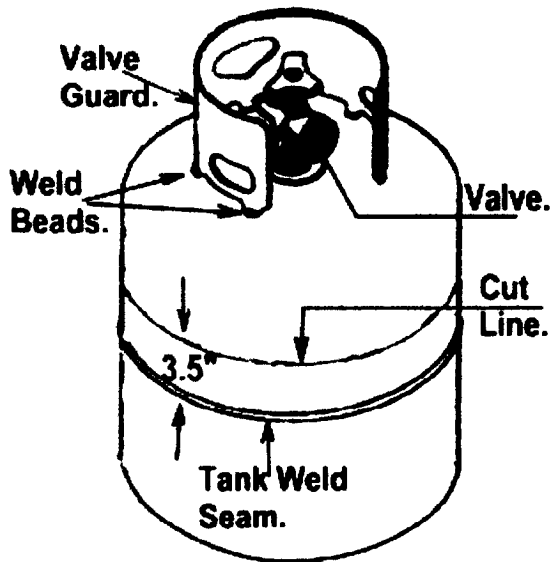
**This is an indispensable mulling machine for the
Home Hobby Foundry operator.**

This ebook provides instructions to
Build a machine for the mulling
Of:

Petro-Bond & Green Sand.

2006.

How To Build A Sand Muller.



20 Lb (9 Kg) LP-Propane Tank.

Caution.

In the interest of personal safety it is recommended that you use a brand NEW tank that has NEVER held any gas, or if using an old tank, make absolutely sure that the tank is thoroughly empty of all traces of LP or propane gas. The cutting of LP/propane gas tanks has the same, or greater danger than cutting or welding on old petrol tanks. **You could be dealing with a potential bomb.** If you have to use an old tank, make sure you fill the tank $\frac{3}{4}$ " full of water before using an Oxy/Acet cutting torch, or when cutting with a metal cut

off disc on an angle grinder. Water will reduce the amount of air space in the tank; hence lessen chance of a blow up.

Step One.

You need to remove the sheet metal valve guard surround. Which is the curved plate that wraps around the valve body on top of the tank, if you are using a new tank you can remove it by grinding or slitting the weld beads using a small 4" angle grinder. Wear eye goggles for your own protection.

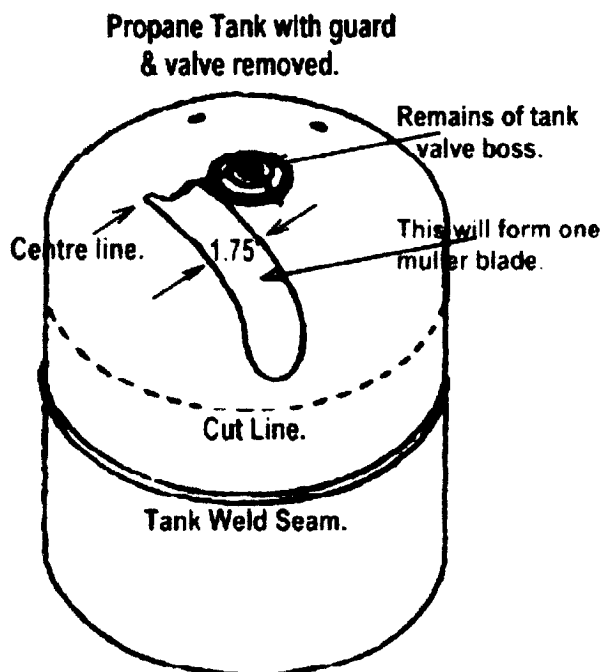
If you are using an old tank make sure the valve is closed, and ensure that you don't grind through the tank casing. Do not use an Oxy cutting torch on an old tank at this point.

With the guard removed you need to saw off the valve with a hacksaw. If you are dealing with an old tank, do not use a grinder or torch to remove the valve. Of course if the tank is new you can cut the valve body and boss off quite safely with a 9" angle grinder. Once the guard is removed, you may be able to unscrew & remove the tank valve.

Lay the tank on it's side, using a texta marker, draw a line around it 2.5" -3.5" inches above the centre weld seam of the tank. (See Illustration above) If you are using an old tank that has previously held gas, then you will need to wash it out with soap and water, fill the tank and slosh it around for a minute then empty the contents out

Do not start cutting the tank until you have studied all of the drawings and read the instructions from start to finish.

Marking out the carver blades.



Take your marker pen and draw a line radiating out from the centre of the old valve boss. Next, start nearest to the boss and using a straight edge or ruler draw a line at right angle (90Deg) to the centre line. Continue to draw along the top of the tank and down over the curved side of the tank to the cut line marked around the tank. This curved piece will form the trailing edge of your blade. Draw carefully to keep the line straight, looking at it from the top.

Now as you can see in the diagram, you need to measure out from the first line about 1.5" to 1.75". (The wider measurement probably will be the best.)

Then draw another line down over the edge parallel to the trailing edge. This will be the leading edge. Connect the two lines with a curved line as in the illustration by either hand drawing or by using a circle shaped template.

Do not cross the cut line that you previously marked around the tank

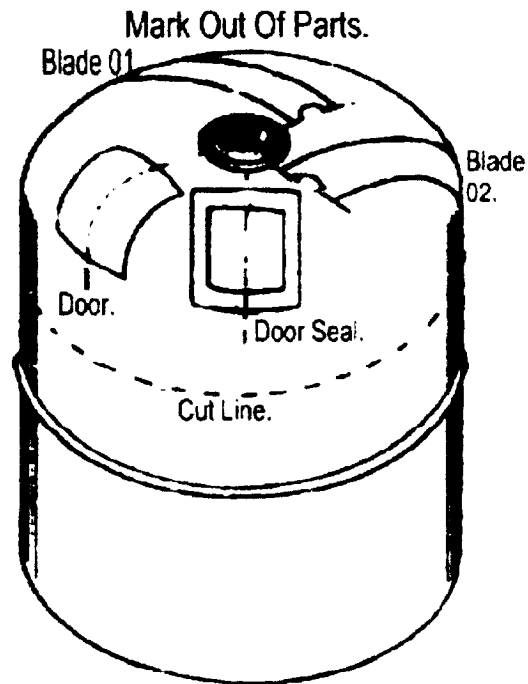
Rotate the tank 90 deg. And repeat the steps above on the other side. (See next illustration) You should now have both blades drawn.

Do Not Cut The Cylinder Yet.

As you may have noticed from the drawings the top of the cylinder is used to cut most of the parts for the muller. The top of the cylinder will be cut off and discarded. Please be careful as you mark out all of the items before you begin to do any cutting.

Tools For Cutting.

A small angle grinder should be able to handle the cutting job. Don't worry about trying to cut a half circle at the end of the carver blade, cut the blade as a rectangle and carefully form the radius afterwards with the angle grinder and a finishing belt. If you are skilled enough you could also use an Oxy/Acet gas torch to cut the parts out, but the angle grinder will make a neater job.



Now the fun begins.

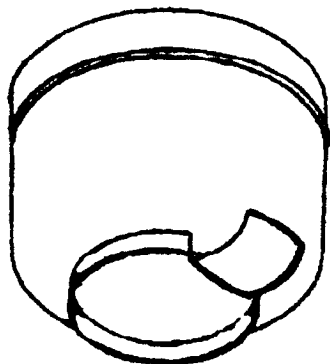
Now you need to draw the dump door and the door seal, to do this draw a line out from the valve boss like you did to start the blade drawing, this will be the centre line of the door. Move to the side of this line 1.75 inches and draw a line over the curved area seen in the illustration. Move to the other side of the centre line and repeat these three lines are to be parallel. Measure out 3" inches from the centre of the valve hole, make a mark, and go out another 4.5 inches and make another mark.

Draw a line perpendicular to the centre line and connect the two side Lines at the marks; you should now see a drawing of the door.

Move to a new area and draw a new centre line for the door seal, measure out 2.75 inches from the valve hole centre and make a mark, measure 7.5 inches from the centre of the hole and make another mark. To the side of the centre line move over 2 inches and draw a line parallel to the centre line, repeat this on the other side of centre line. Draw lines perpendicular to the centre line and you see a square shape larger than the door. Now inside of this door seal square draw a smaller square (see Illustration) sides should be about $\frac{1}{2}$ " wide.

Now that you have all the drawings done. You can now cut the tank in two halves along the cut line that you marked out earlier. Cut out the blades and the door parts. When you have the door cut out, place it on the bottom part of the tank. The part corresponding to where you cut out on the top. Draw around it, cut this area out, but stay inside the lines. You want the door to fit closely with a slight gap, of no more the $\frac{1}{16}$ " inch

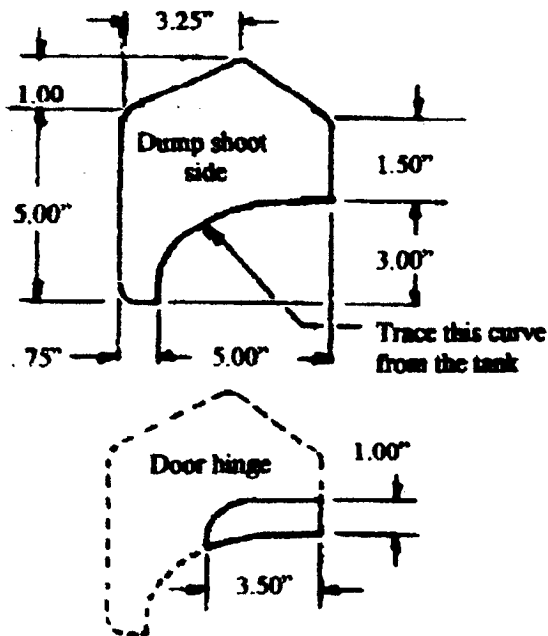
The George Vontome Hobby Foundry Muller.



This view is from the bottom of the tank which shows the floor stand ring on the base of the tank, part of which has been cut away to allow room for the location of the dump door, the sketch at left shows the door opening already cut out.

Note: There are two parts that make up the dump door. The inner or smaller part of the door is the cutout. When the door seal is overlaid and welded to the inner section it will fill the void left when you make the cut-out in the bottom of the tank (See pic at left) For efficient mulling action the inside

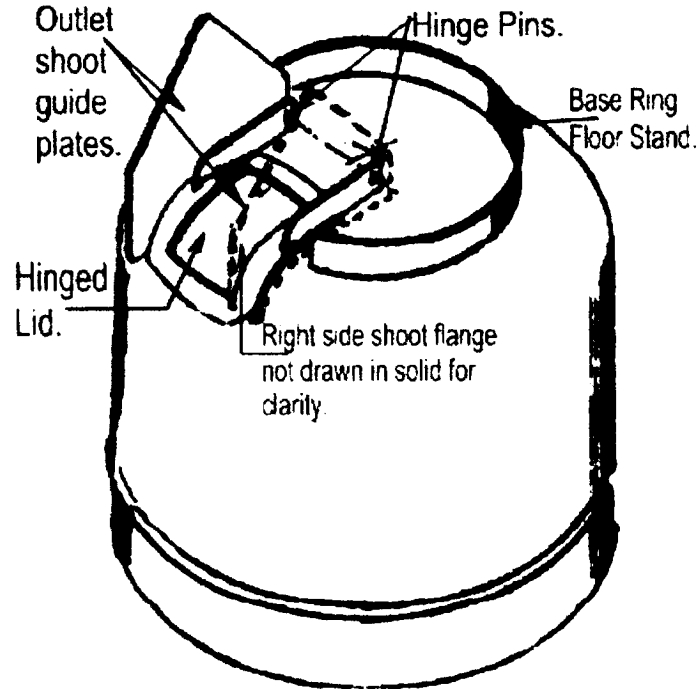
surface of the tank must remain smooth, the filler piece will ensure smoothness. Tack weld seal and inner door piece on the outside only otherwise the door may not seal correctly.



These are the parts for the dump shoot and the dump door hinges. The curve where they meet the tank can be traced by inserting a card-board pattern or template in the slot made from cutting out the blades, trace the hinges using the dump shoot side as a pattern, see illustration.

The plate thickness of the material for the parts at left are .125" or 1/8" ms plate.

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When the trap door on the bottom of the Muller is opened it will form the third side of the shoot to direct the mulled sand into a bucket or container.

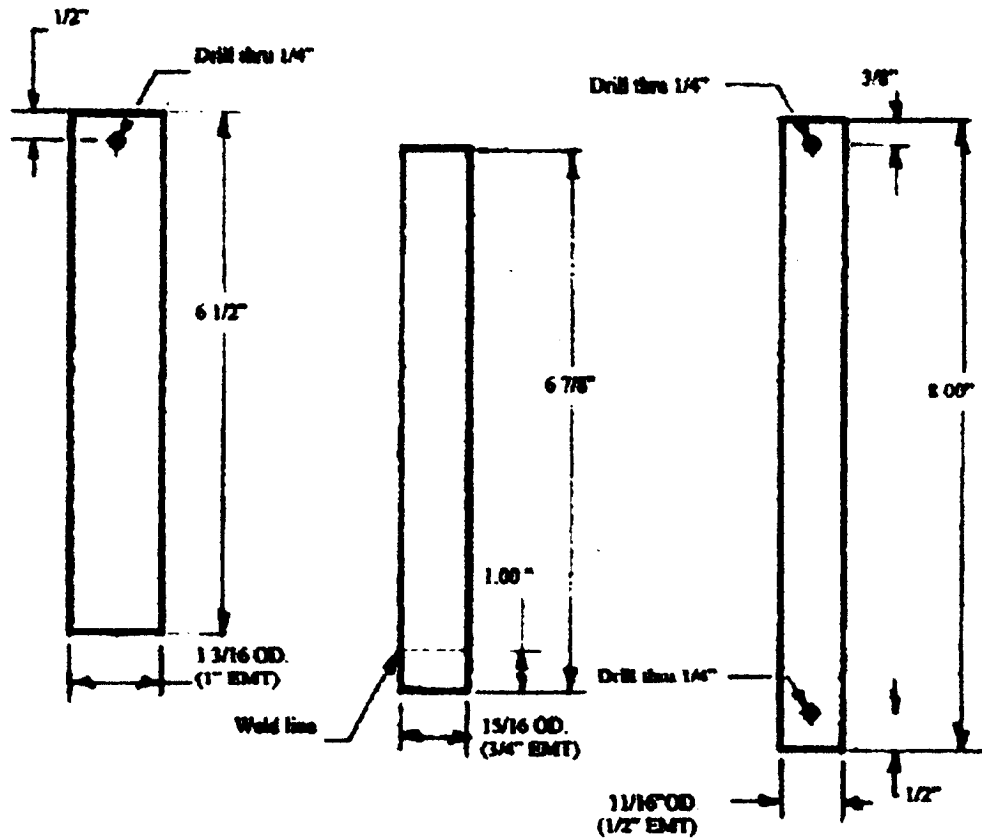
The door is to be centred in the door seal piece so the door will fill the hole cut for it which make the inside smooth, if you have been careful when marking out and cutting the parts outlined on page one these parts should all line up accurately ready to weld.

The seal will lay over the gap on the outside of the tank. Weld the shoot sides on the tank leaving about 1/16" between the seal and the shoot side.

After you have welded the shoot sides in place, you can weld the hinge pieces to the door, leave a gap between the chute sides and the hinges of 1/16" an easy way to get the door to align correctly is to pre-drill the short hinge flats before welding and the sides of the chutes. (It can be done with careful set-up and marking out. Then the parts can be assembled and placed on the tank and tack welded, then you can check the operation of everything before doing the final welding.

The view above shows the tank with the door assembled along with the door seal and hinges welded in place. Only one side of the shoot is shown as a solid, the other is left out for clarity. Note the hinge pin line, some people may wish to drill the holes after the chute sides are welded to the tank and the door is in position.

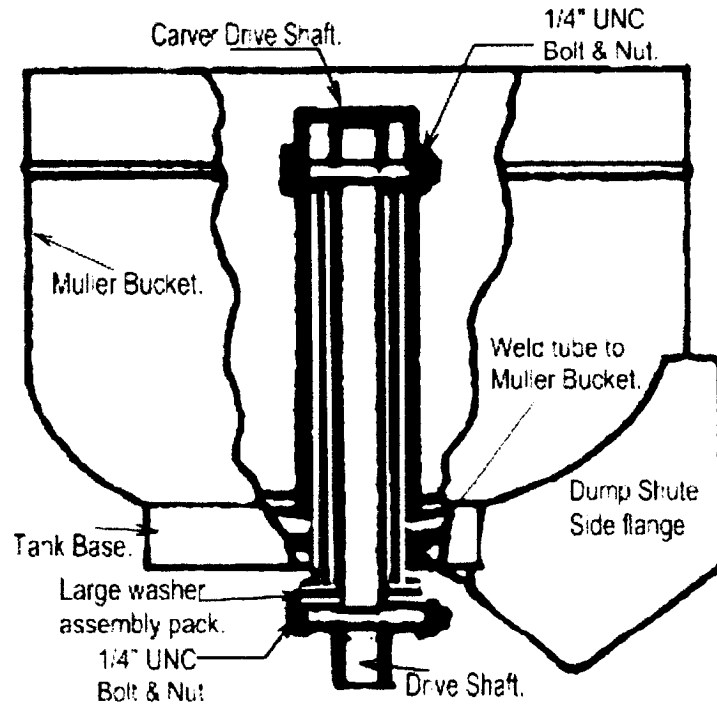
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Now, a 1" Diameter hole will need drilled or bored dead centre in the middle of the tank bottom to install the centre stand tube, Insert the tube up to the weld line shown in the illustration and weld it in place. Make sure that it's straight because it forms the axle for your carver blades.

The various tube parts shown above can be made from electrician's metal tubing - Which can be bought from your Lowe's or Home Depot, or your local electrical contractor. A good metal supply shop should also stock a heavier gauge ERW tubing if you wish to use this. Contact your local electrical man first, as he may have some short ends left over from a job that he will give you. You will use one complete length of the 1" tube if you use it for the support legs of your Muller.

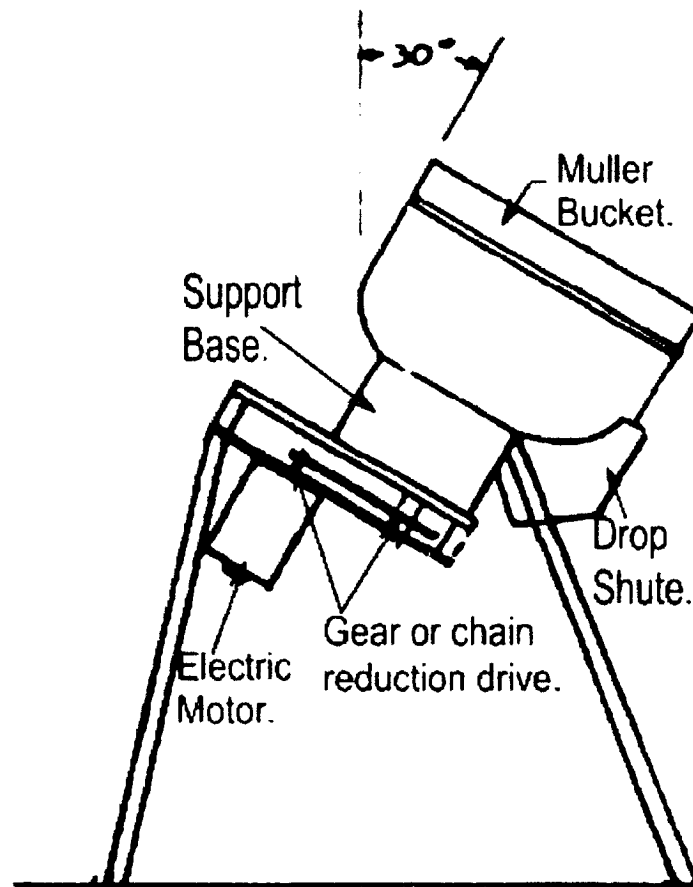
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Cutaway Drawing Of Muller Assembly.

Notes:

When building projects such as the Muller a lathe will allow you to machine many of the various parts for greater accuracy rather than rely on hand finishing with a file or hand held grinder. In fact when you come to the point of building and fabricating the reduction gear drive, a lathe will come in handy for machining the shafts, bosses, & collars, and any other parts that may require machining.



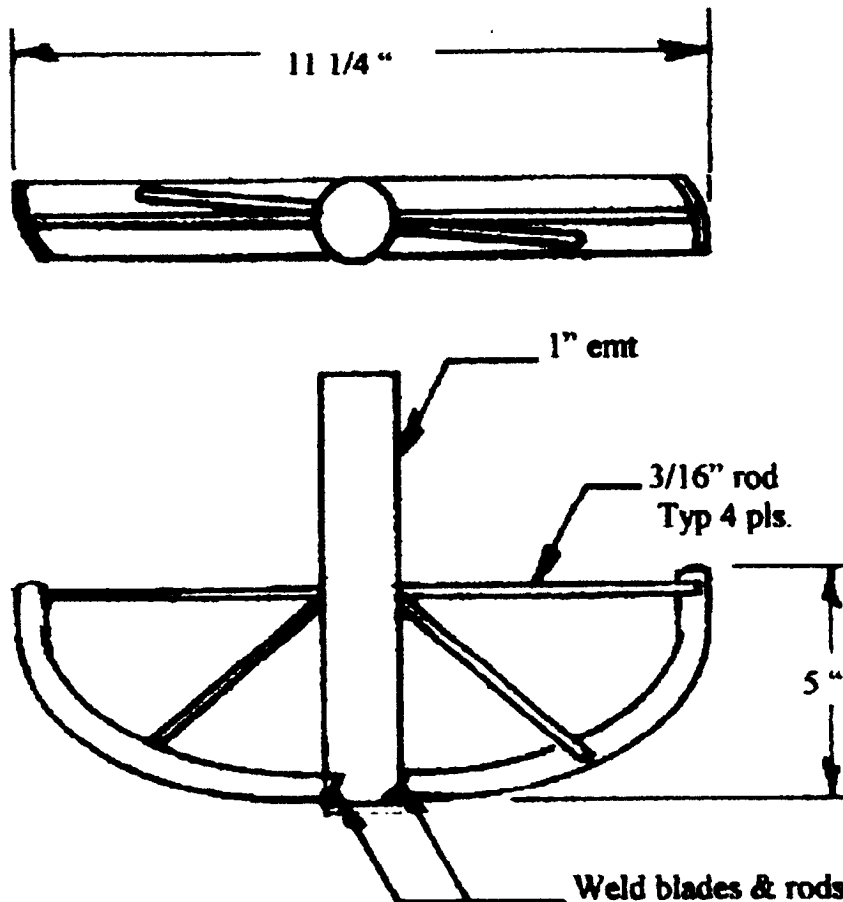
Sand Muller Gear Reduction Drive Layout.

Because there are different ways to build a gear reduction unit, eg chain & sprocket or gearbox, we are only showing you the set up angle of the Muller, this is the optimum angle to tumble and mull the sand.

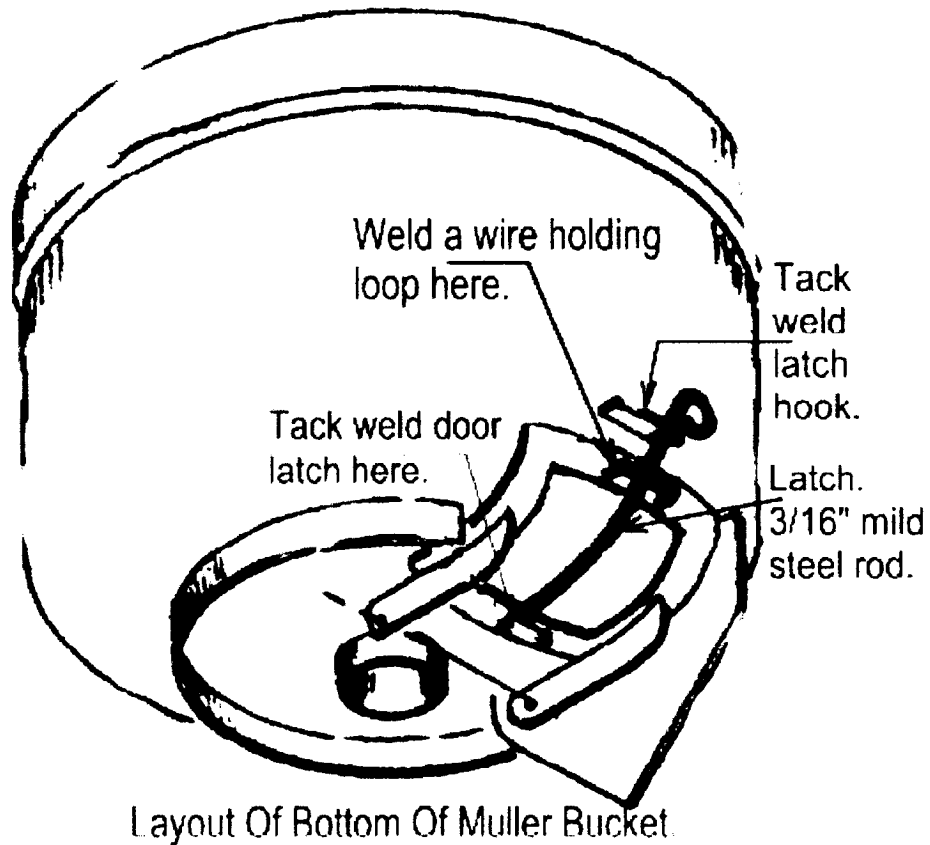
The carver blades should rotate between 25 - 35 RPM. So whatever reduction method you use, you will have to do the math to figure your reduction to these speeds. With a 1750 rpm motor the reduction will be about 60:1. Electric Motors in other countries may operate at 1350 RPM, so a different reduction gear set will be required.

This mulling machine has three support legs; two at the front and one at the rear, make sure the legs extend forward to the front of the bucket and calculate the length to make the legs long enough so you can dump the mulled sand into a 5 Gallon pale or a normal domestic garbage bin. Give the legs plenty of spread to make sure the Muller is stable while operating.

Carver Blade Layout Details.



The blades should be about 1/4" above the bottom of the tank when the carver is installed, if not, you make the required adjustments as needed. There could be quite a bit of trial and error of fitting involved before you arrive at the optimum 1/4" clearance between the blades and the bottom of the Muller bucket.



Notes:

The wire latch.

Fashion the latch from a short piece of 3/16" mild steel rod, or even a piece of welding rod, it is designed to be spring loaded so that it snaps into the latch hook.

The Latch Hook.

Make this from a small piece of flat plate, cut a small section from one side to form a groove for the wire to locate in between the tank wall and the latch. File a small "V" or circle radius to help locate the wire when it is closed.

The wire holding Loop.

This item can be made from the same material as the latch wire.

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Muller design and original drawings supplied by: George Vontorne USA.