THRESHER–WINNOWER

FOR LOCALIZED FARMING AND TRANSITION TOWNS

Simultaneously thresh and winnow grains or dried beans on a small-plot scale. Improved model for 2014 includes optional, integral screen.

Hand-feed sheaves into the top hopper and rotating thresher. Clean seeds or beans, ready to grind and/or cook, come out the second-stage lower winnower.

Process rate: up to 20 pounds per hour (beans) and 12 pounds per hour (grains).

Can be solar-powered with a PV panel, battery, and inverter stand-alone system.

Comes complete with 12V winnower fan, but does not include typical 1/3 hp 120 volt ac motor for the thresher (ccw rotation and ½ inch shaft required).

Price complete (excluding shipping) in the U.S.: $785.00

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www.solarcarandtractor.com/new products  howe@megalink.net
ASSEMBLY: (Assuming you have the component kit and will be making the sheet metal and steel parts yourself). All holes are 11/32" unless noted. All hardware is 5/16-18 X 3/4" inch bolts and elastic stop nuts except the winnower motor rod which is 3/8-16 with appropriate nuts, lock washers and flat washers to position the rod between the sheet metal cylinder inside the two legs.

1. Fabricate the six 22-gage sheet metal parts per the sketches. Cut part 6, a standard stovepipe plug, to one inch long. Insert and rivet into the end of part 1. Drill a pilot hole first, then a 1/4" hole into the center of part 6. Layout, cut, and bend the upper and lower halves of the inlet chute, part 3 using the included patterns. Rivet or spot weld the two parts together as shown in the photo below:

2. Cut the two L-shaped holes into part 1 per the sketch and next photo. Drill three 11/32" holes first, then saw the L-shapes with a 36 tpi blade in a hand jig saw.
3. Drill the two opposite, horizontal 1/4 inch holes at 17 inches in part 2 per the sketch and third photo. Install a standard, 8" cast-iron, stove pipe damper inside with the handle out the side which will be under the thresher cylinder outlet.

4. Drill the two 3/8 holes at one inch from the end of part 2. Use the jig saw to cut slots to these two holes per the above photo. The threaded rod attached to the winnower motor will pass through plain nuts, flat washers and these two opposite slots before intersecting the 3/8" holes 11 inches from the bases of legs part 7 and part 8.

5. Cut and drill parts 7 through 15. Debur corners and paint. The layout and drilling are tedious for the numerous holes unless a drill jig is used. If you wish to go into production, drill jig information is available.

6. Bolt one of the two bearings on the underside of part 12 per assembly drawing. Bolt part 12 to the tops of legs, parts 8 and 10. Parts 12 and leg 10 are at right angles. Bolt cross bar part 14 to the two legs.

7. Slide the end (opposite the fan blade) of the thresher-rotor shaft with one 1/2" flat washer inside the part 1 cylinder, through the 1/2" hole in riveted part 6, add one 1/2" flat washer outside, then into the bearing attached to part 12. Push the thresher rotor into the thresher cylinder as far as it will go.

8. Slide the other horizontal angle part 11 through the opposite L-holes above the fan-blade end of the thresher shaft. Bolt part 11 to the tops of the other two legs, parts 7 and 9.

9. Working inside the thresher cylinder, slide the inside bearing onto the thresher shaft and bolt up against the bearing holes in top bar part 11. Fasten the large pulley on the protruding outside end of the thresher shaft to keep the rotor from sliding back out towards the fan end.

10. At this point, the lower ends of the four legs can be bolted to the two feet (parts 13) and the assembly will stand upright but the thresher cylinder can move allowing the fan blade to rub inside. Bolt two part 15 bars across legs 7&8, and legs 9&10.
11. Bolt the two threaded angle adjusters to part 11 on each side and outside the thresher cylinder so the bolts can be used to laterally space and prohibit movement of the thresher cylinder in a horizontal direction.

12. Rotate the thresher rotor and look for interference inside. The fan should be concentric and have clearance all around. If there is vertical interference, it will be necessary to shim the inside bearing downward from the top bar part 11.

13. In order to support the thresher cylinder which is temporarily resting on the ½" rotor shaft, drill an 11/32" hole into part 6 using the hole at 14 ½" in part 12 as a pilot hole.

14. Reach inside the inlet cylinder opening in part 1, and with the thresher shaft rotated to provide access in the inside, insert a 5/16"-18 bolt outwards through part 6 and the horizontal top bar part 12. Add nut on the outside and tighten.

15. Delete this step completely.

16. Install the 8" cast-iron damper inside the winnower cylinder with the damper handle protruding towards the left side of the cylinder facing the end without the flaps. Hold the lower winnower cylinder over the edge of a bench and bend the left of the two 8" flaps horizontal and slightly concave to fit under the thresher cylinder per the sketch.

17. Assemble the two winnower motor brackets (already attached to the motor) and all but the outermost nuts and spring washers onto the 3/8-16 12" long threaded rod per the included sketch. Slide the threaded rod assembly with attached motor and fan into the 3/8" holes in parts 7 and 8. Slide the winnower cylinder slotted holes onto the threaded rod from under the thresher assemble which is now standing securely on four legs. Tighten the two nuts and flat washers outwards against the legs 7 and 8. Tighten all nuts and bolts with the motor and fan concentric inside the cylinder.

18. Rotate the winnower cylinder up against the thresher cylinder so the vertical flap reaches up to the thresher shaft pulley. The winnower cylinder can be held up against the thresher cylinder with a 24" bungee cord. The thresher motor and fan axis should be parallel with, and not interfering with the surrounding cylinder.

19. Insert the outlet chutes parts 4 and 5, inside the ends of the thresher and winnower cylinders so they can be tipped up to further restrict beans or berries from being blown out the ends of the cylinders along with the chaff. When they are properly positioned about 30 degrees upward, clamp with C-clamps and drill a 1/4" hole in each side and fasten with 1/4-20 X 3/4" bolts and wing nuts (outside).

20. Lower the inlet chute part 3 between the top bars until it rests on the tops of the two vertical legs. The small end of the chute should just fit into the upper open rectangular hole in the thresher cylinder and rest on the upper three-inch flap, but without interfering with thresher rotor-rod rotation. When the chute is perfectly in place, drill a 1/4" hole from underneath through the approximate center of the flap and up into the chute. Use another 1/4-20 X 3/4" bolt and flat washer downward from the inside of the chute to secure the chute against the flap.

21. Cut a piece of 10" X 10" X 5/8" plywood and paint. This plate will be bolted to legs parts 9 and 10 to support the base of a standard 1/4 or 1/3 hp, 1725 rpm induction motor with ½" shaft and connected for CCW rotation.
22. Secure the small pulley to the motor and position the motor with the V-belt between the pulleys. The plywood can be marked and drilled in the center of the slotted holes on the base of the motor. Bolt the motor to the plywood. The entire machine should be ready to go if both motors rotate freely when energized. Different size pulleys can be used to find the best rotational speed to blow most of the chaff out the threshing cylinder without shattering beans or wheat berries. The best pulley combination is 2" to 5" to give a thresher speed about 800 RPM.

23. Attach the WARNING sticker to the top of the thresher to remind the operator to keep hands or clothing out of rotating parts. Always turn off the thresher motor for any adjustments or cleaning. Leave the winnower motor running to keep chaff from sliding down into the pan.

OPERATION:
1. Lay a sheet under the entire machine to catch all the seeds that might fly out. They can be winnowed when the process is finished.

2. Place the plastic pan between the two legs and slide it up as far as possible against the bottom of the winnower cylinder. Put a 4" block under the pan to hold it up. Cut and stretch the fly screen around the pan and the inlet of the winnower chute so air can pass through but seeds cannot fly out. Secure the fly screen in place with duct tape. Use duct tape to seal most of the gaps between the cylinders and the cylinders and chutes.

3. The principle is the same for dry beans or grain. The thoroughly dry plants are held by hand by the bundle of stems (sheaves) or root structure (in the case of a hand-pulled bean bush). The head of the grains with the berries or bean pods are inserted through the chute into the rotating thresher (with the winnower running). This step should take only one or two seconds. If there are extra bean pods already removed from the bush, they can be hand fed directly into the thresher.

4. Adjust the stove-pipe damper inside the winnower so the bottom gap is open toward the upper, outlet end. This will be your primary adjustment to control the balance between seeds going down the bottom of the cylinder into the pan, and the lighter chaff blowing up and out of the top.

5. Tip up and duct tape the outlet chutes at the proper angle for your product. Nearly all the seeds should drop down into the winnower cylinder and slide below the adjustable damper down into the plastic pan. If too much chaff is going down into the pan, open the damper more.

6. Periodically, it may be necessary, with the thresher motor turned off, to reach into the end of the thresher cylinder and the winnower cylinder to pull-out excess chaff that has not blown out. With a stick or long brush and with the winnower motor still running, push accumulated seeds in thresher cylinder past the stationary thresher fan into the opening to the winnower cylinder. When through, pour the accumulated chaff and seeds on the sheet into the inlet chute.

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SHEET-METAL SKETCHES For Home THRESHER
All parts 22g GALVANIZED (except Pt 6)
REVISED 6/3/11

Pt 1
(10" Dia x 20" Long)

Pt 2
(8" Dia x 28" Long)

Pt 2
Outlet Flap (6" x 6")

Pt 1
Inlet Flap

Pt 2
Outlet Flap (3" x 4 3/4"

Pt 1
Inlet Chute

Pt 2
Outlet Chute

Pt 4 & 5
Outlet Chutes
Pt 4 10" Dia Circle
Pt 5 8" Dia Circle

Pt 6
Std 10" Steam Pipe Plug

1/4" Hole
For Thresher Shaft

Cut to 1"