Groundnut Huller

constructed from scrap motor vehicle parts

PETER KRUSCH

(a vita publication)

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This plan for a simple groundnut huller was supplied by VISTA Volunteer Peter A. Kruch. He designed, constructed and operated the huller in Sierra Leone where he was Associate Director of the Peace Corps.

Automobile and truck tire rims (wheels) come in a variety of shapes and sizes. You must find a combination of wheels and a spindle that will fit together in a simple manner, as in this plan. You will need a welder.

Materials

Dimensions and amounts are given in English measurements.

1 wheel
1 20" (diameter) truck tire rim
1 truck front wheel steering knuckle and spindle assembly with backing plate, bearings, and brake drum
1 17" truck tire rim (holes must be able to fit studs on brake drum)
1 16" automobile tire rim
1 17" automobile tire rim
1 headpan
4 2" heavy flat washers
6 1/2" x 6" machine bolts
6 pieces of pipe, 1/2" inside diameter x 17" long
12 1/2" nuts
50 lb clean coarse hard sand (approximate amount)
20 lb Portland cement (approximate amount)
Construction

WHEEL D is a 12" auto tire rim

WHEEL C is a 16" auto tire rim

WHEEL B is a 17" truck tire rim

WHEEL A is a 20" truck tire rim

The section shown in dark outline rotates on the spindle, which, along with all other parts shown in light outline, remains stationary.

Place front wheel steering bracket and spindle with backing plate onto WHEEL A, which serves as a base, and weld in place. Bolt on WHEEL D.

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Pack bearings with grease.

Replace hub, washer, hub nut, and collet key.

Allen WHEEL C on top of WHEEL B and weld in place.

Weld here
Decide which side of WIFE P will be facing upwards when it is built onto the top of the bollor.

Find a pan to fit comfortably into the hollow of this face. Cut a hole in the bottom of the pan the same size as the hole in the center of the wheel.

Hold six 2" washers equally spaced around the upper lip of WIFE P.
Prepare to pour concrete into WHEELS C & D.

Thoroughly clean inside of the wheels where concrete is to be poured so that the concrete will bond with the metal.

Place WHEEL D upside down on the ground. Into its hole place an object that will serve as a form, for example, a tin can with top and bottom removed, glass jar, etc.

Place something like a stiff piece of tin across the hole in WHEEL C, to hold in the concrete mixture.

Plug any small holes in either of the 2 wheels with pieces of wet rags.

Take a concrete mixture of 1 part cement, 3 parts coarse clean sand, and enough water to make the mixture workable but not soupy.

Pour the mixture into each of the wheels. Strike the pourings off absolutely level, but leave a somewhat rough surface. These will be grinding surfaces.

When concrete has set up, cover exposed surfaces with wet rags and keep in shade. Keep rags moist for a minimum of one week to insure proper curing.
Cut the heads off each of the 1/2" x 6" bolts.

Insert one inch of the cut-off ends of these bolts into one end of each of the six 1/2" pieces of pipe, and weld tight.

Flatten the other end of each pipe.

After the concrete in HOLE A is dry: Screw one nut onto each of the bolt ends. Insert bolts through washers welded onto the upper lip of HOLE A. Secure each bolt/pipe assembly with a second nut on top.
Center Milled D over Milled C (which has been fixed on top of the other two wheels).

Bend the 6 pipe/bolt assemblies approximately as shown. A sufficient length of each bolt must remain unstretched and be positioned vertically to allow adjustment of Milled B to particular grinding conditions.

The lower (flattened) ends of the pipes must make contact with the upper edge of Milled A. Weld them there.

Leave about enough space for a shelled groundnut between the two faceted concrete surfaces in Milled C and D. You will be able to adjust this amount of space later by moving the nuts on the bolts going through the 6 washers.

**Operation**

Power to turn the lower wheel may be transmitted from a waterwheel, small petrol engine, or wheel powered by animals. Use a belt made from 4 to 1/2" rope or belting. Operating speed is 30 - 50 rpm.

As the groundnuts are fed on top, the hulls are torn open and nuts and broken hulls forced outward toward the edge by centrifugal force.

Since groundnuts vary greatly in size and diameter, it will be necessary to adjust the hutters for maximum efficiency. Initial adjustment should be made slightly larger than the thickness of a shelled groundnut.

With well sun-dried nuts and a well adjusted hutter, the amount of splits and cracks should not exceed 6%.
About the hollow on a large smooth concrete platform, or other smooth hard surface, so that the hulled nuts and broken hulls may be swept up and winnowed.

If you wish, construct a circular catching pan and chute to catch the material that comes out from between the concrete surfaces and direct it into a pan. (See front cover sketch.)

From time to time the grinding surface will have to be resurfaced. Remove the top wheel, chip away a minimum of 1/2" of concrete, and reface with fresh concrete of the same proportions used in construction (one part cement to three parts sand, plus water).