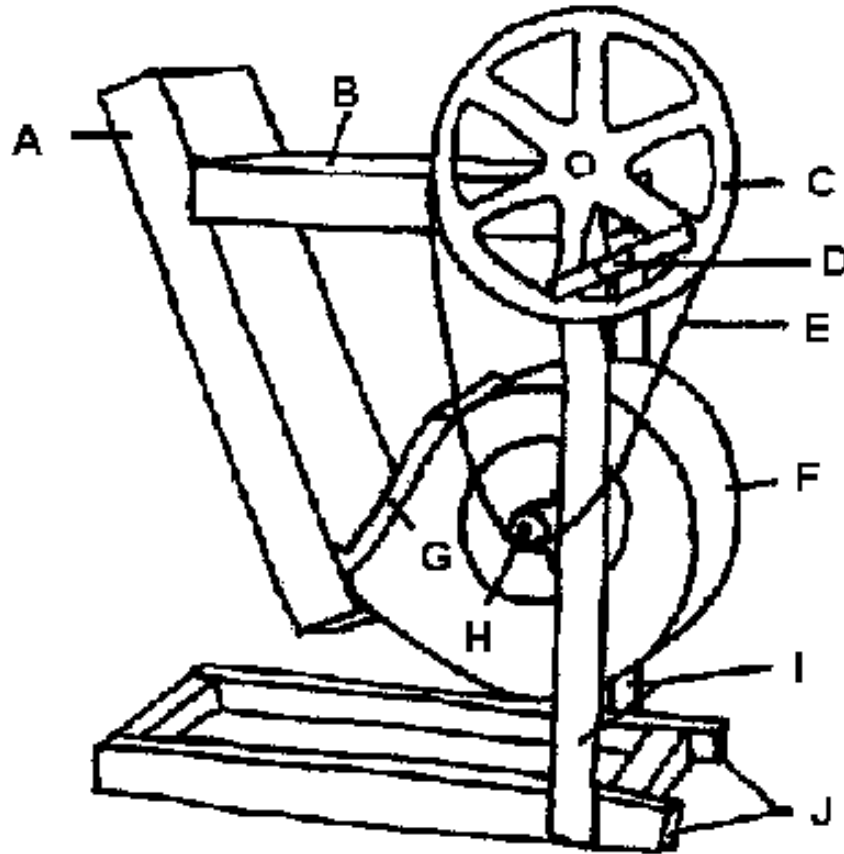


# Hand Operated Winnower

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0 5 10 15 20 Scale, inches

- A. Rectangular sheet metal air duct, 24"long x 10" wide x 3- $\frac{1}{2}$ "deep, available from heating and ventilation supply houses.
- B. Sheet metal tray, make your own.
- C. Sheave (V- belt pulley), 14" diameter, available from WW Grainger (3 x 943 or 3 x 942) (1-800-323-0620).
- D. Crank handle, make your own.
- E. V-belt.
- F. Blower with 9- $\frac{1}{2}$ " diameter wheel (4C589) or larger, available form WW Grainger.
- G. Sheet metal cover and adapter to merger blower (F) with air duct (A).
- H. Sheave,  $\frac{1}{2}$ " bore, 1  $\frac{1}{2}$ " diameter and a pillow block,  $\frac{1}{2}$ " diameter bore
- I. 1" x 2" steel channel or 2" x 4" wood upright support.
- J. 1" x 2" steel channel or 2" x 4" wood base for winnower.

**Operation:**

The winnower separates seeds from chaff by blowing the less dense chaff away as seeds fall down a column of air. Place the seed and chaff mixture on the tray (B). Turn the crank handle (D) and move the seed mixture into the air duct (A). Manually adjust the crank speed to provide enough airflow to lift the lighter chaff up and out the top of the air duct, while allowing the denser seeds fall through the bottom of the air duct.

**Construction (brief description):**

The air duct (A) is purchased from a hardware store. Cut a 2" x 9" slot across the air duct, 6" from the end. This slot receives the tray (B), and allows seed and chaff on the tray to be introduced into the air duct (A). The tray (B) is made from a 16" x 24", 20-gauge sheet metal. Fold the three sides up 3" and fold the fourth side down 1" to make a 10" x 20" tray. Trim the fourth side  $\frac{1}{2}$ " from both ends leaving a 9" lip that inserts and hooks on to the 2" x 9" slot in the air duct (A).

Attach the upright supports (I) to the blower (F) with the blower tilted up  $22\frac{1}{2}$  degrees, 6" off the ground and the axle of the blower wheel is centered on the pillow block/sheave (H). Make base (J). Attach supports (I) to base (J). If supports (I) and base (J) are made from 2" x 4" wood, add diagonal braces (not shown) to strengthen the join. No additional brace is needed if the upright supports (I) and base (J) are 2" steel channels and are welded together. A spacer is attached across the top of the two upright supports (I), (not visible in diagram). The spacer provides bottom support for the tray (B). The 14" sheave mounts on to the upright support using a rigid pillow block or two self-aligning pillow blocks, one on each side of the upright support.

Make a sheet metal cover and adapter (G) to merge blower (F) with air duct (A) at 45-degree angle between blower and air duct. A 45-degree air duct elbow can be used as part of the adapter. The sheet metal cover leaves a  $1\frac{1}{2}$ " gap at the bottom of the blower (F) for air to discharge into the air duct (A). Place a  $\frac{1}{4}$ " mesh screen (not visible in diagram) across the  $1\frac{1}{2}$ " gap to prevent debris from entering into the blower.