

Yurk's Custom Fabrication LLC

User Guide Ted's Tumbler Model 3 Patent Pending



CAUTION:
READ ALL INSTRUCTIONS BEFORE USING TUMBLER.

www.gtyurkon.com/tumbler or www.galcialridgefarm.com/tumbler

WARNING/WARRANTY/NOTE

WARNING:

While every attempt has been made to ensure that this product is safe and reliable, it is the owner's responsibility to ensure that all persons (especially children) and animals remain a safe distance from the tumbler when running. The tumbler drive belts have been covered to the extent practicable, however, it is impractical to cover the large rotating hexagon cage. Therefore, **never leave the tumbler operating unattended** unless access is restricted to responsible adults. Children should not be allowed to operate the tumbler without the direct supervision of a responsible adult. Further, the operating area should be kept clear of animals which may be injured by contact with the tumbler. Refer to the section Safety Enclosure on page 4 for more information.

The tumbler is not designed for operation in wet environments. The tumbler should only be plugged into an energy source in a dry location.

It is the owner's responsibility to use the product as described herein, and only for the intended purpose of tumbling animal fleeces.

It is not possible to predict and describe every danger associated with this product. It is the owner's responsibility to exercise care and common sense, and to observe all practicable safety precautions when using this product.

NO WARRANTY:

While pride is taken in the quality of this product, the product is sold without warranty. However, for at least the first year, a good-will attempt will be made to resolve any problems or defects with the product to the satisfaction of the customer. But no guarantee is made in this regard.

NOTE:

Changes and improvements are made to the fiber tumbler described herein on an ongoing basis. The photographs and figures contained herein are accurate representations of the fiber tumbler at the time of publication, however, future tumblers may vary in minor details.

Assembly Instructions

Depending on how the tumbler is shipped and delivered, some assembly may be required. Any assembly steps that may be necessary are described below and preferably should be performed in the order listed.

Installing Wheels (if necessary)

Support the frame of the tumbler on wood blocks or similar so the base rail is at least 6 inches above the ground.

Install the rear wheels (motor end) by first sliding the axle into the axle bushings at the motor end of the tumbler until it's centered. On each axle end, first install one 5/8" flat bushing, then a wheel, followed by a 2nd 5/8" flat bushing. Slide the 2nd bushing on far enough to expose the 1/8" hole in the axle, and then insert a cotter pin and expand the ends of the cotter pin to secure it and the wheel to the axle. When installing the wheel, slide the side having the extended hub on first. This provides the tumbler with a larger track, and a more stable footing. The rear wheels will then have a track similar to that of the front wheels. The installed rear wheel should be arranged as shown in Figures 1A-B below.

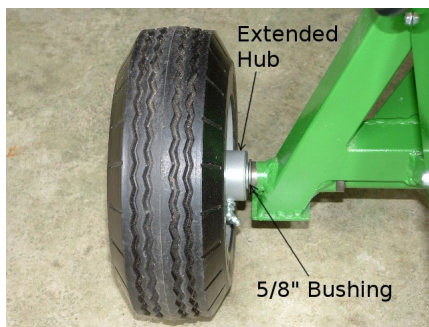


Figure 1A

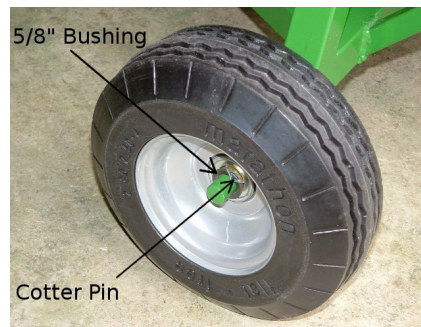


Figure 1B

Install each of the front casters by first positioning the caster under the support rails so the caster holes line up with the support rail holes. Then insert one 7/16" carriage bolt from underneath, up through the caster flange and support rail. Install one split-ring lock washer on the carriage bolt, followed by a 7/16" nut. Do not tighten any nuts until all 4 carriage bolts are installed on each caster. It may be necessary to turn the wheel when inserting the carriage bolt. Repeat this procedure for all 4 bolts on each caster, then tighten all nuts. Note that the carriage bolts and nuts are grade 5. They are not the normal hardware store bin bolts and nuts. Each installed caster should look like that shown in Figure 2 below.

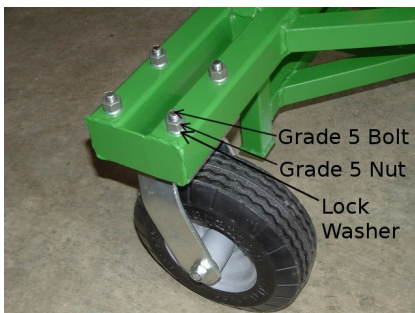


Figure 2

Installing Tumbler Cage on the Frame (if necessary)

Because the tumbler cage is heavy, it is strongly recommended that at least 2 persons perform this task. Further, to minimize weight, all panels should be removed from the cage prior to installing or uninstalling the tumbler cage. Still further, the tumbler should be sitting on a flat, level surface prior to attempting installation. The method shown is just one exemplary method. Some persons, especially if working alone, may wish to support the tumbler cage with an overhead hoist or other lifting device to eliminate manual lifting. Just be careful to attach the lifting means securely at each end, preferably at the base of each support shaft, so that the support means cannot shift and permit the cage to become unbalanced.

Place 2 sturdy sawhorses parallel to each other, approximately 36-42 inches apart. The tumbler cage can now be placed across the saw horses, supported by 2 of the cage cross members. If the cage is on the floor, it can be rolled up onto the saw horses by placing one cross member across the ends of the sawhorses and rolling the cage up onto the saw horses. Be careful to push just a little toward the sawhorses so the sawhorses don't tip back toward you.

Loosely lay the large belt on the large pulley as shown in Figure 3 so that it will be in place for routing over the drive pulley later on.

Place the tumbler frame adjacent to the ends of the sawhorses as shown in Figure 3. Position the frame so that the pillow block bearings on the cage shafts will align with the frame top supports as shown at A in Figure 3 when the cage is rolled down onto the frame. Standing on the side of the frame opposite the sawhorses, grab the topmost cross member and pull it toward yourself, but push just enough on the middle cross member so you don't pull the sawhorses over. Gently roll the cage down onto the frame to its final position as shown in the Figure. The farthest cross member previously resting on the sawhorses at B, will rotate to position C as shown in the Figure.

Align the pillow block mounting holes with the frame holes and insert the 1/2 inch carriage bolts. Secure each pillow block bolt with a 1/2" flat washer, 1/2" lock washer, and 1/2" bolt, in that order, on the underside of the frame support member.

The drive belt can now be routed as described under Cage Belt Replacement on page 9.

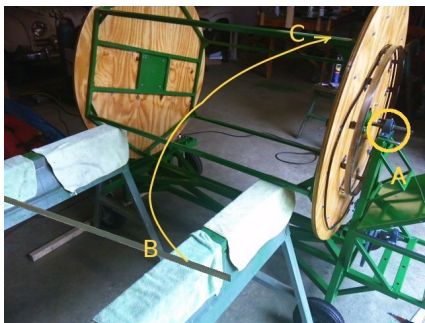


Figure 3

Basic Operating Instructions

Site Selection and Preparation

The fiber tumbler can be operated in any dry area where it can be leveled end-to-end as shown in Figure 4, and where it is stable. It is permissible for it to lean a small amount to either side so long as it remains stable. The front casters, however, may need to be blocked to prevent rolling sideways.



Figure 4

Safety Enclosure

A safety enclosure has been provided with the tumbler to assist in keeping small children and animals away from the tumbler. The safety enclosure should encircle the tumbler as shown in Figure 5 whenever children or animals can be present in the area. However, the safety enclosure should never be relied on as the sole means of keeping children and animals away from the tumbler. It is provided with the intent of facilitating a safer operating environment, however, it is the responsibility of the tumbler user to maintain a safe operating environment.



Figure 5

The safety enclosure is provided in two separate sections which must be joined to provide an adequate working area. Please refer to separate instructions provided by the manufacturer of the safety enclosure for proper use of the enclosure. Each section is comprised of 6 joined panels and, for your convenience, a method of joining the sections is provided herein. As shown in Figure 6A, hold the panel having the hinges with one hand, the right hand as shown in the Figure. With the other hand, place the top part of the panel to be joined to the hinges under the top hinge as shown. As next shown in Figure 6B, press down on the hinged panel (with the right hand as shown) while simultaneously pulling the other panel up hard to compress the sprung part of the upper hinge far enough that the pin on the second panel can be swung over the pivot hole on the lower hinge of the first panel. The second panel can now be released so that the sprung upper hinge will force the pin into the hole of the lower hinge.

Completely join the two sections so that there are no openings. An adult can easily step over the safety enclosure. For storage, the sections can be separated by reversing the steps described above.



Figure 6A



Figure 6B

Selecting Panels

Panel selection will primarily be based on experience. The 1" grid size seems to be best for most fleeces, however, some fleeces such as silky smooth Suri alpaca fleeces will experience too much loss, and the 1/2" grid size may be best for those. The grid sizes can also be mixed in any ratio to obtain the best compromise for effective cleaning with minimal fleece loss.

Inserting/Removing Panels

To insert a panel, hold the panel by the handle at one end with one hand, and by the latch at the other end with the remaining hand. While holding the latch end of the panel above the cage, set the handle-end of the panel on the corner supports as shown in Figure 7A below, and then slide the panel handle end back tightly against the cage frame as shown in Figure 7B. Lower the latch end toward the tumbler frame, making sure the latch aligns with the catch as it is lowered. If it does not align, raise the latch end and reposition the panel and try again. Rotate the handle slightly to release the latch locking pin if necessary, and allow the latch to engage the catch on the cage as shown in Figure 7C.

Caution: Make sure the latch pin fully engages the catch so that the locking pin is against the latch frame with no gap as shown.



Figure 7A



Figure 7B



Figure 7C

To remove the panel, retract the panel latch pin, lock it open with the latch locking pin if desired, lift the latch end slightly, and remove the panel from the cage.

Tumbling the Fleece

Before starting the tumbler, always perform a safety inspection as described under Routine Maintenance. In particular, make sure no cracks are developing on the panel latches or catches to ensure that none detach during operation. Also check for accumulation of animal fiber on the drive pulley and tension pulleys that might cause interference with the free rotation of these parts. After loading the fleece into the tumbler, and inserting the last panel, make sure all panels are firmly latched. Select a direction for rotation with the direction toggle switch shown in Figure 8A, and press START as also shown in the Figure. Optimum tumbling times will vary based on the quality and cleanliness of the individual fleece. Typical tumbling times are usually from 15 to 30 minutes total. Press STOP to finish the tumbling.

Note: If the tumbler motor stops unexpectedly, or fails to run, the motor's thermal safety switch may need to be reset. **First, press the STOP button and unplug the tumbler.** Then, raise the motor cover by lifting one of the cover tabs until the cover is held suspended by a magnet on the underside of the control panel. As shown in Figure 8B, the motor has a reset button which should be depressed firmly to reset the motor. Close the cover, plug in the tumbler, and press START again.



Figure 8A

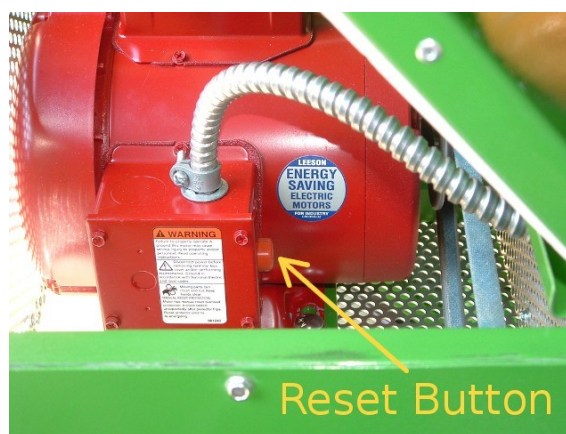


Figure 8B

Changing Direction

If you wish to tumble the fleece for some time in the opposite direction, first stop the tumbler by pressing STOP. The direction toggle can then be changed, and the tumbler can be restarted.

Blower/Fan

To further enhance debris removal, it can be helpful to place a low fan near the tumbler so that it is blowing diagonally upward toward the rotating cage. However, take care to place the fan a safe distance from the cage to avoid inadvertent contact. You can experiment and decide from the results the best location for the fan.

Removing the Tumbled Fleece

After stopping the tumbler, before removing a panel, it may help to manually rotate the tumbler so that the fleece is on the side of the tumbler where you are standing. Otherwise, when you remove a panel, the weight of the fleece may rotate the cage slightly, placing the opening in an inconvenient position.

It may also be convenient to rotate the cage until the wire fingers are at the base of the panel you plan to remove. The fingers make convenient prongs to attach a plastic bag to while unloading as shown in

Figure 9 below.



Figure 9

Routine Maintenance

Very little maintenance is needed. Before each use, however, make a thorough visual inspection to make sure no nuts, bolts or screws are loosening. Tighten as necessary.

Pillow block bearings:

There are 2 pillow-block bearings supporting the tumbler cage, and 2 pillow-block bearings supporting the intermediate shaft in the motor housing. These bearings can be greased lightly on an annual basis.

Wheels and Casters:

Each wheel hub has a grease fitting which can be greased as necessary. Each caster has a pivot bearing which should be greased at least annually.

Tension Pulleys:

The tension pulleys (see blue pulleys in Figure 16) could use a drop of light machine oil on the shaft occasionally. Avoid excessive oiling which might contaminate the belt, causing slippage.

Tension springs:

A drop of heavy oil, e.g. bar chain oil, on the end of each of the 2 tension springs will help avoid wear and failure of the spring.

Safety Inspection:

Periodically inspect the wire mesh panels to make sure no cracks are developing on the panel latches or catches to ensure that none detach during operation. Also check the catches on the tumbler cage to ensure that no cracks are developing. Any cracks must be repaired before further operation of the tumbler. Also check for accumulation of animal fiber on the drive pulley and tension pulleys that might cause interference with the free rotation of these parts. Remove accumulated fiber as necessary.

Servicing Normal Wear Parts

Cage Belt Replacement

Step 1: Turn off and unplug the tumbler.

Caution: Because the tumbler cage is very heavy, it would be advisable to remove all 6 panels from the cage to reduce weight prior to performing the following steps. The tumbler should be placed on a level, or near level surface so the pillow-block bearing does not slide off the frame after the carriage bolts are removed.

Release the belt from the large upper pulley as follows:

As shown in Figure 10A, grip the large pulley firmly with the right hand while simultaneously pulling the free portion of the belt (i.e., the part not contacting the pulley) toward you.

Rotate the tumbler clockwise with the right hand as you continue to pull the belt free from the pulley with the left hand until the belt drops free as shown in Figure 10B.



Figure 10A



Figure 10B

Step 2: The now-loose belt can be removed from the lower drive pulley as shown in Figure 11 (viewed from the left hand side of the tumbler). Reaching in from the left, slip the belt off of the drive pulley as shown in the circled area in the Figure. The belt can now be pulled up, from above, through the blue idler pulleys.

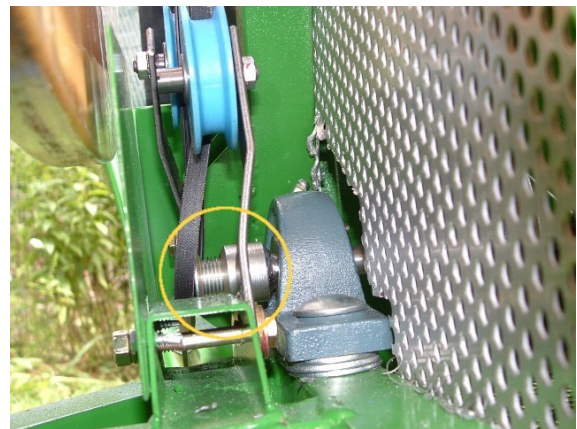


Figure 11

Step 3: Using a 3/4 inch open-end wrench (a 19 mm will also suffice), remove the nuts and washers from the two pillow block bearing carriage bolts as shown in Figure 12. A standard box wrench will also fit with a little practice. Insert the box wrench into the open space between the nut and the center A-frame, then rotate it onto the nut --- easy once you get the technique right.

The carriage bolts may now be lifted out of the pillow-block bearing.



Figure 12

Step 4: Caution: Make sure the pillow-block bearing remains directly above the frame surface when lifting it so that it will fall onto the frame if it slips from your grasp. It is advisable to have a second person remove the belt while the first person raises the pillow-block bearing slightly.

Raise the pillow-block bearing no more than necessary (approximately 1/2"), and slip the belt out. Lower the pillow-block bearing back onto the frame.



Figure 13

Step 5: To install the new belt, lift the pillow block bearing again and slip the belt underneath the bearing so that it can be looped around the shaft as shown in Figure 13 above.

Re-install the carriage bolts, washers and nuts before continuing.

Step 6: Reaching in from the left, as in Step 2, push the belt down between the blue idler pulleys and loop it around the drive pulley as shown in the circled portion of Figure 14. Make sure the ribbed side of the belt is facing inwards. If you find it difficult to push the belt down between the idler pulleys, try retracting one of the pulleys and slipping the belt in between. Don't worry that the idler pulleys are offset as shown, they will realign automatically when the belt is under tension again.

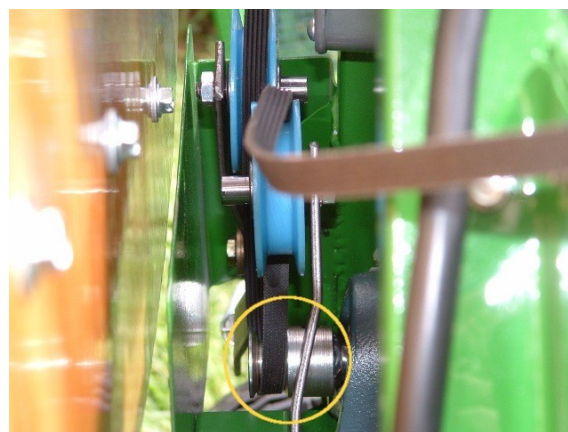


Figure 14

Step 7: Working from above again. loop the belt over the large pulley as far as it will freely go as shown in Figure 15A. While holding the belt on the pulley with the right hand, use your left hand to rotate the tumbler clockwise as shown in Figure 15B until the belt is fully engaged to the large pulley. Don't worry too much about centering the belt; it will automatically center itself. If you wish, rotate the tumbler manually a few rotations to make sure the belt centers and works smoothly.

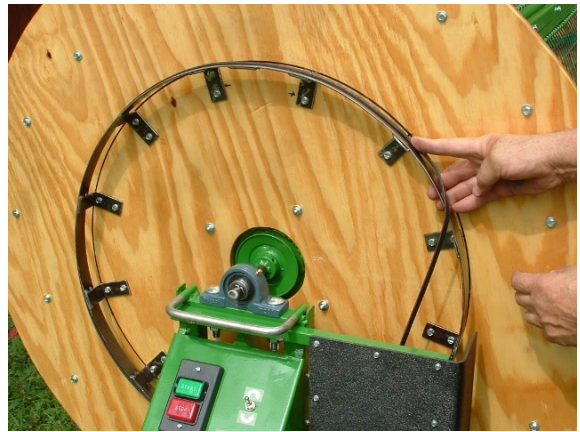


Figure 15A



Figure 15B

Step 8: Inspect the drive pulley from the left side to make sure everything appears aligned as shown in Figure 16. Make sure the belt is installed with the ribbed side facing inwards so that the ribs face both the drive pulley and the large pulley. The back, flat side of the belt should be facing the idler pulleys. And, be sure that the belt correctly engages the ribs in the lower drive pulley. Also, double check to make sure there are no twists in the belt.

If everything appears correct, the tumbler can be plugged in and operated again.

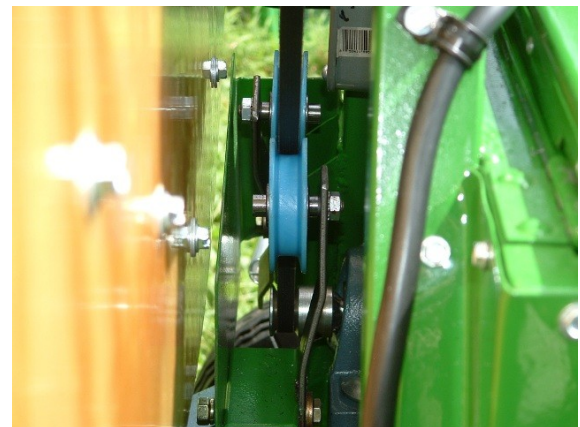


Figure 16

Drive Belt or V-Belt Pulley Replacement

Some comments: The tumbler motor is equipped with a 3" diameter V-belt pulley (5/8" bore), and the intermediate shaft is equipped with a 5" V-belt pulley (1/2" bore). This combination produces a tumbler rotation speed of approximately 32 RPM. The large tumbler cage pulley is approximately a 24.25" diameter, and the ribbed drive pulley on the intermediate shaft is approximately .75" diameter, with the motor being a 1725 RPM motor. The V-belt pulleys can be changed to produce other RPMs as desired. The belt provided is a 30" belt. However, if a pulley is changed, the belt size may have to be increased or decreased accordingly. The new belt size can be computed as follows. The change in length is simply 1.57 times the change in diameter. For example, if the 3" pulley is replaced with a 3.5" pulley, the new belt size is $30" + (1.57 * .5) = 30.785$. Belts generally come in 1" increments, so the closest belt size is 31", although the original 30" belt may still work, provided there is enough adjustment available at the motor mounts. The approximate cage RPM can be calculated as follows: $RPM = 53.35 * D_M / D_I$, where D_M is the motor pulley diameter, and D_I is the intermediate shaft pulley diameter.

Step 1: Turn off and unplug the tumbler.

Step 2: While not absolutely necessary, it is best to perform Step 1 under **Long Drive Belt Replacement** to eliminate tension forces on the intermediate shaft. Steps 7 and 8 show reengaging the long drive belt which is done after replacing the V-belt

Step 3: Open the motor housing by lifting firmly on either of the cover tabs. Lift the cover until it is supported by a magnet on the underside of the control panel as shown in Figure 17. From underneath the motor housing, loosen the nuts on the four motor mounting bolts just enough that the motor can be slid closer to the intermediate shaft. Carriage bolts have been used so it is not necessary to put a wrench on the bolts which are difficult to access inside the housing.

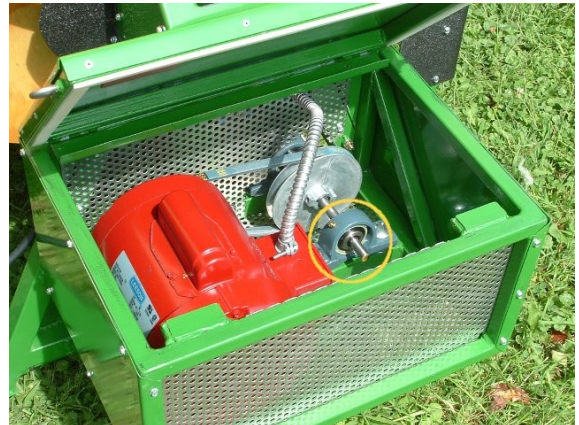


Figure 17

Step 4: Remove the two carriage bolts (3/4" wrench) holding the rearmost pillow-block bearing in place (see the circled area in Figure 17). Retain the spacer washers mounted under the pillow-block bearing. The spacer washers are important as they control the amount of belt wrap on the drive pulley.

Step 5: The V-belt can now be slipped off the pulleys and removed. Because the pillow block bearings are self aligning, the rear pillow block bearing can be raised slightly if necessary.

Step 6: If the motor pulley is being changed, replace it at this time. It may be necessary to completely remove the motor mounting bolts to make clearance for removing the pulley.

Step 7: If the intermediate shaft V-belt pulley is being replaced, loosen the two set screws (1/8" Allen wrench) on the pillow-block bearing, and remove the pillow-block bearing. The V-belt pulley can now be replaced. Make sure the new V-belt pulley aligns with the motor pulley after installation so the belt has no unnecessary bends in it.

Step 8: The new V-belt can now be slipped over the motor and intermediate shaft pulleys.

Step 9: Reinstall the two carriage bolts to secure the rearmost pillow-block bearing in place (circled area in Figure 17). Make sure to reinstall the retained spacer washers under the pillow-block bearing. Again, the spacer washers are important as they control the amount of belt wrap on the drive pulley.

Step 10: While pushing the motor firmly to the left, re-tighten the nuts on the four motor mounting bolts underneath the motor housing. Double check the V-belt tension and readjust the motor position if necessary. Finally, double check that the motor pulley and the intermediate shaft pulley are in line with each other so the belt is not distorted.

Direct Sources for Replacement Parts

While Yurk's Custom Fabrication LLC can provide replacement parts, it may be more convenient and economical to obtain some commodity parts directly. Some sources are listed below, but a search for more economical sources is advised because prices and sources are always changing. A Google search is always a good idea.

Motor:

Leeson Catalog No. 113256.00, 1/3 HP, 1725 RPM, TEFC, CW or CCW rotation

Further details may be obtained at www.leeson.com

This motor is available on many online sources.

Cage Drive Belt:

Maytag Dryer Belt, length 91-5/8", width 5/16", 5 ridges, flat , manufacturer part no. 33002535

RepairClinic item number 791135, www.repairclinic.com

V-Belt:

1/2" X 30", Kevlar, Tractor Supply SKU 4460707 at www.tractorsupply.com

Ribbed Drive Pulley:

Whirlpool Dryer Motor Pulley, Appliance Parts Pros Part No. AP2996680, SKU 685011

www.appliancepartspros.com/Appliance-Parts/WHIRLPOOL-Pulley-motor-item-number-AP2996680.aspx

Motor V-Belt Pulley:

5/8" x 3", for 1/2" belt, Tractor Supply SKU 3240120 at www.tractorsupply.com

Intermediate Shaft V-Belt Pulley:

1/2" x 5", for 1/2" belt, Tractor Supply SKU 3240201 at www.tractorsupply.com

Tension Arm with Idler Pulley:

Electrolux/Frigidaire dryer idler arm and pulley, manufacturer part no. 131863100

RepairClinic item number 823099 at www.repairclinic.com

Note: Pulley shaft may need to be removed and reinstalled on opposite side of arm.

Tension Arm Spring:

Home Depot Bar Code 0 30699 16089 1, SKU 685447, 5/8" x 3-1/4" x .072" at www.homedepot.com

Start/Stop Switch:

Grizzly H8238, 110/220V On/Off Switch , 35A @ 110V, lockable

www.grizzly.com/products/110-220V-On-Off-Switch/H8238

Direction Toggle Switch:

20A, 120V, DPDT on-on (DPDT on-off-on SHOULD NOT be used), 1/2" hole size, screw terminals

Wheels and Casters:

Flat-free, 8" diameter, 5/8" Bore at www.marathonind.com

Specifications

Overall dimensions (approximate): length 71.5", width 41", height 55.5".

Approximate weight: 242 lbs without panels, plus 49.2 lbs for 1/2" panels or 52.4 lbs for 1" panels.

Cage dimensions (not including plywood ends): Hexagonal cage, each face 47" long by 19-7/8" high, with a maximum width of 39-3/4", and a minimum width of 34.42".

Panels: 6 panels with 1/2" grid size (optional), and 6 panels with 1" grid size (optional).

Panel dimensions: 45-1/4" x 18-3/8" x 1/2" (excluding latch and handle).

Tumbler Fingers/Pins: 3 sets of 5 pins each, music wire, 7-1/4" length, 0.122" dia., removable.

Wheels: 8", flat-free wheels, casters at non-powered end.

Motor: Leeson 113256.00, 1/3 HP, 1725 RPM, reversible, TEFC.

Wiring Diagram

