Yurk's Custom Fabrication LLC

User Guide
Ted's Tumbler
Model 5.2

Applicable to Tumbler Number 7 and Thereafter
Portions of this tumbler may be covered by U.S. Patent Number 8,171,601

CAUTION:
READ ALL INSTRUCTIONS BEFORE USING TUMBLER.

www.gtyurkon.com/tumbler or www.glacialridgefarm.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. Pinch points of the tumbler drive belts have been covered to prevent incidental contact during operation, however, **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 7 for more information.

The tumbler is not deigned 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.

WARRANTY:

Great pride is taken in the quality of this product, however, the product is sold without warranty except as specifically noted below. Further, this warranty covers only replacement parts, and no labor costs are covered under this warranty. Still further, this warranty does not cover any item that has been subject to abuse or has been otherwise physically damaged.
The following items are warrantied to the original purchaser (purchaser) for a period of one year (12 months) from date of purchase, except as otherwise noted. To obtain warranty replacement of any of these items, the purchaser must perform the following steps:
1. Obtain a return approval from Yurk's Custom Fabrication, LLC (seller); and
2. Upon receiving said approval, return the defective item, if requested, to Yurk's Custom Fabrication, at purchaser's expense.

Upon receipt of the defective item, if requested, Yurk's Custom Fabrication LLC will ship, at seller's expense, a new, used or reconditioned replacement that is in good working order.

The above warranty applies to only the following items:
1. Drive motor;
2. Electronic Countdown Timer Switch, 5 year warranty;
3. Direction toggle switch;
4. Drive motor mount vibration dampers;
5. Pillow block bearing(s);
6. Drive motor V-belt;
7. Tumbler cage, multi-ribbed drive belt;
8. Tension arm assemblies;

9. Tension springs; and
10. Wire panels.

Except as expressed above, no warranty is provided. 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 purchaser. However, no guarantee is made in this regard. Further, if Yurk's Custom Fabrication, LLC agrees to perform repairs or replacement of any item not specifically listed above, said unit must be delivered for repair/replacement to Yurk's Custom Fabrication, LLC at purchaser's expense, and the repaired unit must be picked up and delivered from Yurk's Custom Fabrication, LLC to the purchaser at purchaser's expense. If the unit is located within a reasonably close distance to seller, at the seller's option, seller may agree to make repairs at the buyer's location.

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.

Improvements to Version 5.2 versus Version 5 include the following:

1. A stainless steel large pulley on tumbler cage.
2. Stainless steel tension arms.
3. Stainless steel fingers in cage, 3/16” dia.
4. Six finger bars in place of three.
5. Larger motor support plate.
6. Other minor improvements not listed herein.

Improvements to Version 5 versus Version 4 include the following:

1. A 10 mil JVCC UHMW-PE-10 UHMW Polyethylene Film Tape has been applied to various contact points to reduce paint scuffing and to ease installation of panels.
2. A padlock feature has been added to the motor enclosure for increased safety.
3. Other minor improvements not listed herein.

Improvements to Version 4 versus Version 3 include the following:

1. The drive assembly, including the motor and intermediate shaft bearings, is now fully floating. The motor and bearings are mounted on a thick plate which, in turn is mounted on four vibration dampers.
2. Steering locks have been added to the front casters enabling locking the casters into a straight-ahead position (for ramp loading, etc.) or into a brake orientation (one straight-ahead and one at 90 degrees).
3. The mechanical on-off switch has been replaced with an electronic countdown timer, enabling simple pushbutton operation for specific time intervals.
4. The tension springs have been replaced with more compliant springs, providing smoother starts, longer belt life, and safer operation.
5. A guard has been added to the top of the frame, between the cage and the frame, to reduce the possibility of injury.
6. Other minor improvements not listed herein.

Assembly Instructions

Depending on how the tumbler is shipped and delivered, and the options purchased, 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 Optional Wheels and Casters (if necessary)

Support the tumbler on wood blocks or similar under each of the four feet so the tumbler feet are at least 3-1/2 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.

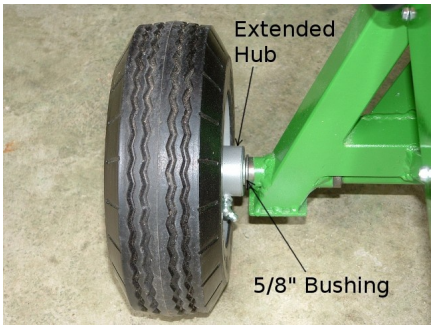


Figure 1A

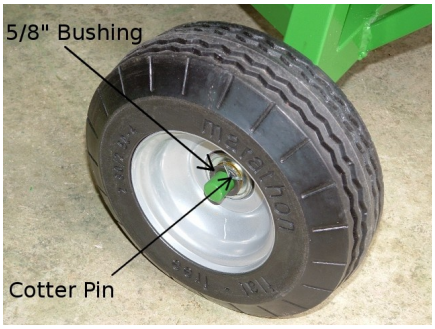


Figure 1B

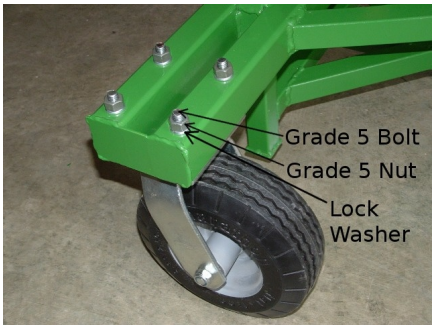


Figure 2

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. If the casters are provided with steering locks, please note that there is a left caster and a right caster. If the casters are not marked “L” and “R”, place the casters so the lock arm is on the inside when the caster is oriented in a forward direction as shown in Figure 4A on page 6. Insert one 7/16” carriage bolt from underneath, up through the caster flange and support rail. If the carriage bolt does not seat fully, rotate it 90 degrees. Install one 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. It is advisable to install the steering lock pin as shown in Figure 4A to ensure proper alignment. 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 similar to that shown in Figure 2 above or Figure 4A on page 6 if equipped with steering locks.

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 13.

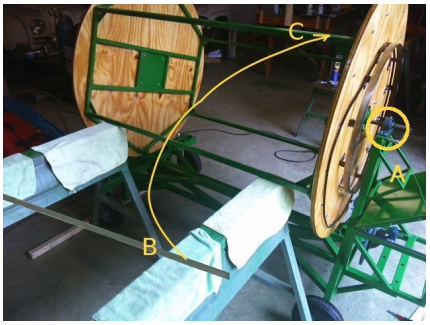


Figure 3

Miscellaneous Disassembly/Assembly Notes

It is not expected that any disassembly or assembly as described above will be necessary. However, in case the unit is disassembled. it should be noted that there are various alignment marks on the tumbler, and care should be observed during reassembly to align these marks properly to ensure correct fit and smooth operation thereafter. The metal-to-wood alignment marks consist of one or more large black dots on the wood and an equal number of small dimples stamped into the corresponding metal part as shown in Figures 3A-3C below for the large pulley and cage ends. The metal-to-metal marks consist of equal numbers of dimples to be placed adjacent each other as shown in Figures 3D-3F for the finger bars.

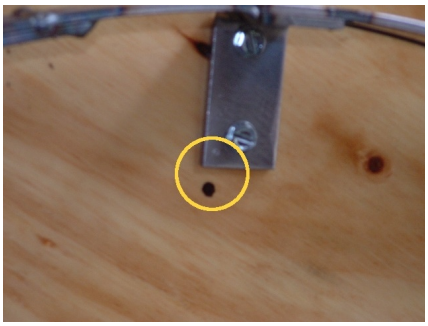


Figure 3A

Figure 3B

Figure 3C

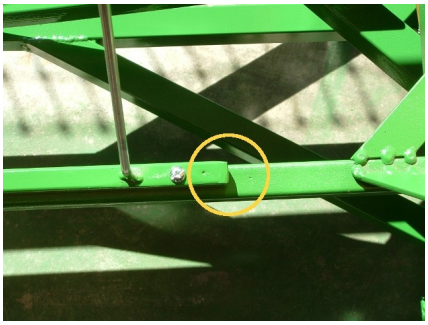


Figure 3D

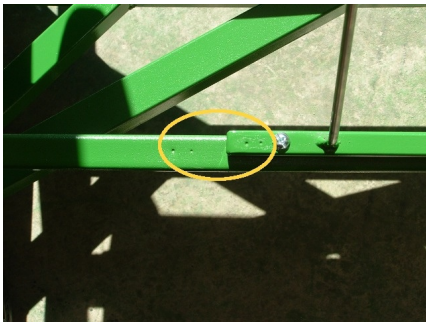


Figure 3E

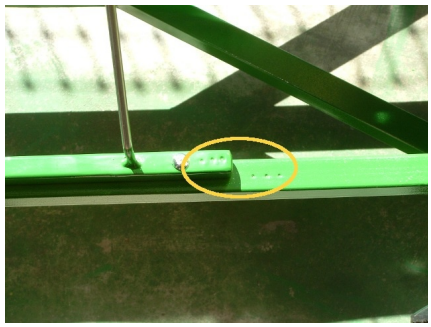


Figure 3F

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 positioned in their “brake” orientation to prevent wandering (see Caster Steering Locks below).

Figure 4

Caster Steering Locks Option

If the fiber tumbler was purchased with casters, the casters are now fitted with steering locks. It can be helpful when pushing the tumbler up a ramp to lock the casters in a straight-ahead position to prevent wandering to the side, and off the ramps. Each caster position is provided with a pin and 3 pin tubes. The pin is shown in the top, left tube in Figure 4A for the purpose of locking the wheel in a straight-ahead position. Both casters should be similarly locked for straight-ahead movement. A “brake” orientation is also provided for as shown in Figure 4B. If one caster is locked to the straight-ahead position, and the remaining caster is locked in a 90 degree position, the tumbler is effectively prevented from moving in any position. The pin tube shown in the lower, left position in Figure 4A is used for the 90 degree position, and the remaining pin tube is used for storing the pin when the caster is not locked. The brake orientation shown in Figure 4B is useful when operating the tumbler on a sloped surface. However, be careful to avoid steep slopes because the tumbler is fairly top heavy.

Figure 4A

Figure 4B

Optional Safety Enclosure

If the optional 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. 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.

Figure 6A

Figure 6B

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.

Motor Enclosure Padlock

For enhanced safety, the tumbler motor housing has been designed so that a padlock can be installed to prevent access to the motor and V-belt except by authorized persons. A combination padlock is provided with the tumbler and it is shown installed in Figure 7 below. The default combination has been set to “000”. However, the combination is user-changeable and can be changed as shown in the instructions to the right of Figure 7.

Figure 7

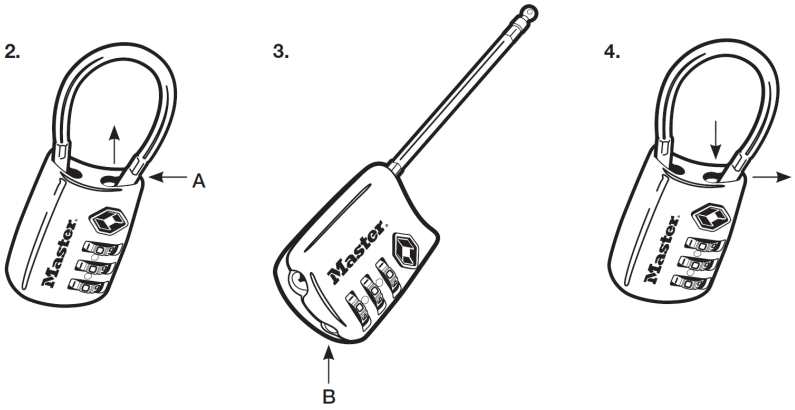
Master Lock

Transportation Security Administration (TSA) baggage screeners are trained to recognize the Travel Sentry® red diamond logo on TSA – accepted locks. They have access to a secured set of codes and tools which allow them to open, inspect and relock baggage which is locked with a TSA – accepted lock.

COMBINATION RESETTING INSTRUCTIONS

Your new lock is preset at the factory to unlock at 0-0-0. Make sure you are able to open and close the lock prior to setting your own combination. Carefully follow each step to ensure proper setting procedures.

1. Adjust dials so the preset factory combination of 0-0-0 aligns with the markers.
2. Hold cable tip (A) and move toward left to remove from the lock.
3. While pushing in button (B) turn the dials to any combination you choose.
4. Release button (B), insert cable tip (A) back into the hole, push down and move all the the way to the right.
5. The lock is now ready to be used with your combination. To change the combination again, repeat steps 2-4.



Selecting Panels

Panel selection will primarily be based on experience. The 1” grid size works well 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 8A below, and then slide the panel handle end back tightly against the cage frame as shown in Figure 8B, keeping the panel parallel to the opening as much as possible. 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. Release the latch locking pin and allow the latch to engage the catch on the cage as shown in Figure 8C. It is advisable to push the locking pin toward the latch to ensure full engagement. **Caution:** Make sure the latch pin fully engages the catch so that the locking pin is against the latch stop with no gap as shown.

Figure 8A

Figure 8B

Figure 8C

To remove the panel, retract the panel latch pin, 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 9A. The tumbler is equipped with an electronic pushbutton countdown timer and a safety cover as shown in Figures 9A-9B. To start the tumbler, lift the safety cover and momentarily press one of the 4 upper buttons to immediately start rotation. The buttons are labeled and correspond to 5, 10, 15 and 30 minutes respectively. The lower, unlabeled button is a stop button and will stop the tumbler if necessary. If the uppermost button is pressed and held for more than 2 seconds, the tumbler will run indefinitely until stopped, however, it will stop after 24 hours if not stopped before that time. Optimum tumbling times will vary based on the quality and cleanliness of the individual fleece. Typical tumbling times are usually from 10 to 30 minutes total.

Note: Because safety is considered of paramount importance, the safety cover has been configured so that it depresses the stop button when pressed. To stop the tumbler before an expired time, simply press the safety cover momentarily and the tumbler will stop. In this way, the safety cover performs two important functions. Firstly, it prevents accidental activation of the tumbler, and secondly, it provides a readily visible and accessible means of stopping the tumbler when necessary.

Note: If the tumbler motor stops unexpectedly, or fails to run, the motor's thermal safety switch may need to be reset. **First, unplug the tumbler**. Then, raise the motor cover by lifting the cover tab, and then lift the prop rod and insert it into a pocket provided in the motor cover. As shown in Figure 9C, the motor has a reset button which can be depressed firmly to reset the motor. Lower the prop rod, close the cover, plug in the tumbler, and try starting the tumbler again.

Figure 9A

Figure 9B

Figure 9C

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. In this regard, bungee cords are provided on each side of the tumbler so that one of the bungee cords can be used to prevent the tumbler from rotating after removing a panel. Spring clips may be useful to temporarily attach a fleece bag to the cage when unloading. Figure 10 shows such an attached bag, with a bungee cord engaged to the cage.

Figure 10

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 17) 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.

Figure 11A

Release the belt from the large upper pulley as follows:
As shown in Figure 11A, while facing the pulley, pull the free portion of the belt at the lower left (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 11B.

Figure 11B

Step 2: The now-loosened belt can be removed from the lower drive pulley as shown in Figure 12 (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.

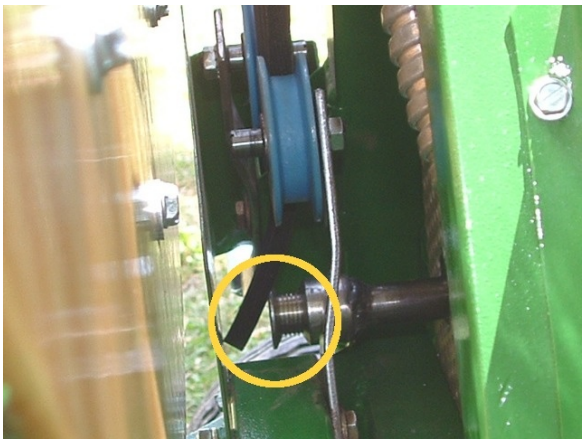


Figure 12

Step 3: Using an 11/16 inch open-end wrench, remove the nuts and washers from the two pillow block bearing carriage bolts as shown in Figure 13. 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.

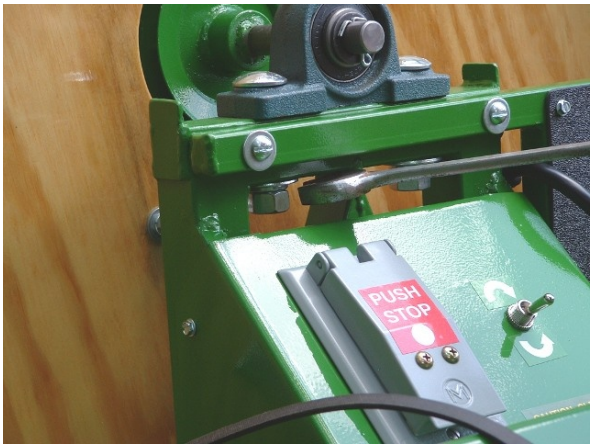


Figure 13

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 as shown in Figure 14. Lower the pillow-block bearing back onto the frame.

Figure 14

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 14 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 15. 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.

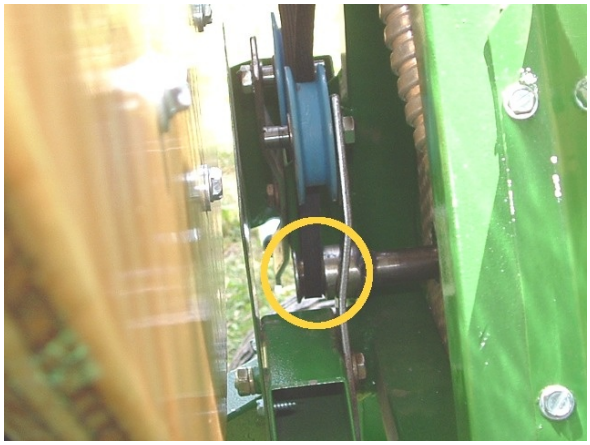


Figure 15

Step 7: Working from above again. loop the belt over the large pulley as far as it will freely go as shown in Figure 16A. While holding the belt on the pulley with the right hand, use your left hand to rotate the tumbler counterclockwise as shown in Figure 16B until the belt is fully engaged to the large pulley. Don't worry too much about centering the belt; it will automatically center itself. Rotate the tumbler manually a few rotations to make sure the belt centers and works smoothly.

Figure 16A

Figure16B

Step 8: Inspect the drive pulley from the left side to make sure everything appears aligned as shown in Figure 17. 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.

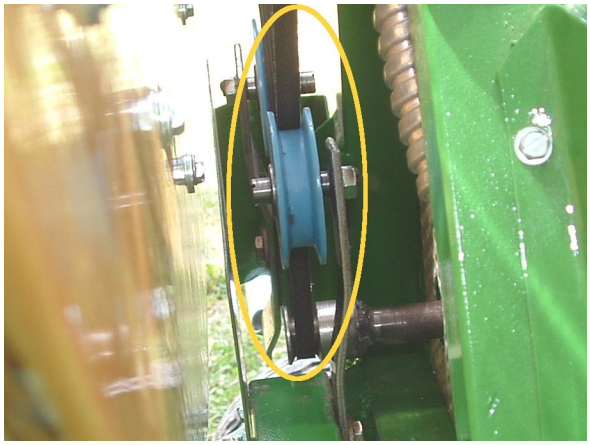


Figure 17

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 (5/8” 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 26” 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 26”+(1.57*.5)=26.785. Belts generally come in 1” increments, so the closest belt size is 27”, although the original 26” 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 in the same section show reengaging the long drive belt which is done after replacing the V-belt

Step 3: Open the motor housing by lifting firmly on the cover tab. Lift the prop rod and insert it into the pocket on the underside of the cover as shown in Figure 18. 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 18

Step 2: The V-belt can now be slipped off the pulleys and removed. If necessary, the belt guard under the motor housing can be removed to provide additional clearance, however, this should not be necessary.

Step 3: If the motor pulley and/or intermediate pulley is being changed, replace it at this time.

Step 4: The mew V-belt can now be slipped over the motor and intermediate shaft pulleys.

Step 5: 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. It is neither necessary nor advisable to have too much belt tension. Even a loosely fitted belt is not likely to slip much in this machine. Finally, double check that the motor pulley and the intermediate shaft pulley are in line with each other so the belt is not distorted.

Tension and Belt Centering Adjustments

Unplug the tumbler from the power source before, and while making any adjustments.

Centering the Ribbed Drive Belt

The large ribbed drive belt is centered on the large stainless pulley during assembly. However, because the tumbler cage is large and heavy, it is possible that rough handling during shipping or other harsh impacts on the tumbler may cause the cage support shafts to shift position within the supporting pillow block bearings. If the drive belt appears to be more than ±1/16" off center, an adjustment would be advisable.

Step 1: With reference to Figure 17 on Page 15, make sure that the idler pulleys (blue in the figure) are approximately centered on their respective pins. If not centered correctly, perform the following steps before continuing to Step 2.

Step 1.1: Examine the tension arms for damage or bending. They can be straightened with pliers and/or vise-grips and a little forceful bending. Make sure, however, that both pins remain parallel to each other. Proceed to Step 2 if this corrects the problem.

Step 1.2: Raise the motor box cover and loosen all set screws on the intermediate drive shaft pillow block bearings (**2 on each bearing**). Also loosen the screws on the collar clamps situated against each bearing just enough that the intermediate shaft can be repositioned. Reposition the intermediate shaft just enough to center the idler pulleys. This can be checked by tightening one bearing set screw and manually rotating the cage through several revolutions and observing if the idler pulleys remain centered. When satisfied, firmly tighten the set screws (**4 in total**). Reposition each collar clamp up against its respective bearing and tighten the screws. Tighten the screws in such a manner that the gaps on each side of the collar clamp are approximately equal in size.

Step 1.3: As a result of repositioning the intermediate shaft, the large (5 inch) V-belt pulley may need to be repositioned slightly so that it remains parallel to the motor V-belt pulley. Simply loosen its set screw, reposition, and re-tighten the set screw. The V-belt should not show any visible distortion.

Step 2: When the drive belt appears to be more than ±1/16" off center on the large 24" diameter cage pulley, perform the following steps.

Step 2.1: There is a pillow block bearing on each end of the cage, and each bearing is sandwiched between a pair of collar clamps. Each pillow block bearing is secured by two set screws, and each collar clamp is secured by two screws (in total, 4 bearing set screws and 8 collar clamp screws). Loosen all 12 screws. It is not necessary to remove any screws.

Step 2.2: When the screws are sufficiently loosened, the cage can be shifted fore or aft. Rather than sliding the cage by hand, it is better to tap the appropriate shaft end with a dead-blow hammer or rubber hammer. You may also hold a piece of wood on the shaft end and strike the wood with a hammer. Give each end a final tap to ensure there is no "set" causing stress.

Step 2.3: Manually rotate the cage several revolutions in each direction while observing the belt

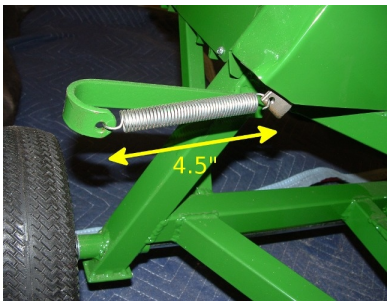
location. When satisfied, re-tighten the pillow block bearing set screws (**4 in total**). Position each collar clamp up against its respective pillow block bearing and tighten the 2 screws. Tighten the screws evenly so the gaps on each side of the collar are approximately equal.

Step 2.4: Double check your work and make sure all screws are tight, and make sure all collar clamps are snugly fit against their respective pillow block bearing.

Adjusting Ribbed Belt Tension

The ribbed drive belt tension is set correctly on the tumbler when assembled. However, a number of factors such as belt stretching or wear can cause the tension to change over time. Sometimes, new belts, even original factory replacement belts can vary somewhat in length, thereby necessitating tension adjustments.

Step 1: The easiest way to check belt tension is to measure the tension spring length. It should be approximately 4-1/2”±1/4” as shown below. Jiggle the tension arm a few times, back-and-forth a little, to make sure there is no set, and the springs are of equal length. If this measurement is within spec, no further action is necessary unless you are experiencing slippage or too much “snap” on startup. If you decide to proceed with adjustment, go to Step 2 below to increase tension (spring length is less than 4-1/2”), or go to Step 3 if the length is greater than 4-1/2” to reduce tension (spring length is greater than 4-1/2”).



Step 2: Tension can be increased by adding 7/16” flat washers under the pillow block bearings supporting the cage. The washers are to be inserted at the locations shown below. Only one bearing is shown, however, bearings at each end should have an equal number of washers.

Step 2.1: Pull the ribbed drive belt off of the large pulley, leaving the lower end of the belt intact. This will ease lifting of the pillow block bearing.

Step 2.2: Remove the nuts and washers from the two bolts securing the drive-end pillow block bearing and remove the bolts. See Step 3 on Page 14 for additional information.

Step 2.3: Raise the pillow block bearing just far enough to slip a 7/16” flat washer under each side. **Caution:** Do not raise the bearing more than an inch or so because the plywood end may impact the lower drive pulley shield. An assistant may be necessary to help with lifting.

Step 2.4: Re-install the two bolts in the pillow block bearing, and re-install the ribbed belt onto the large pulley as described in Step 7 on Page 15.

Step 2.5: Measure the tension spring length again. Repeat Step 2.3 if necessary to further increase tension, or remove one washer if there is now too much tension.

Step 2.6: Re-install the washers and nuts on the two bolts, and tighten securely.

Step 2.7: Repeat Steps 2.2-2.4 and 2.6 on the non-drive end, placing an equal number of washers under the non-drive end pillow block bearing.

Step 2.8: Go to Step 4.

Step 3: If washers have been previously installed under the cage pillow block bearings, try to reduce the tension by repeating Step 2 above, but removing washers rather than installing them. Otherwise, continue with the steps below.

Step 3.1: Raise the motor housing cover to gain access to the intermediate shaft pillow block bearings. See Figure 18 on Page 16.

Step 3.2: Pull the ribbed drive belt off of the large pulley, leaving the lower end of the belt intact. This will eliminate lifting force on the intermediate shaft.

Step 3.3: Remove the nuts and washers from the two bolts securing both intermediate shaft pillow block bearings and remove the bolts.

Step 3.4: Raise each pillow block bearing just far enough to slip a 7/16” flat washer under each side. Make sure both pillow block bearings have an equal number of washers.

Step 3.5: Re-install the two bolts, washers and nuts in each pillow block bearing, and re-install the ribbed belt onto the large pulley as described in Step 7 on Page 15. Tighten all nuts securely.

Step 3.6: Measure the tension spring length again. Repeat Steps 3.2-3.5 if necessary to further reduce tension.

Step 3.7: Go to Step 4.

Step 4: Double check your work and make sure all nuts have been tightened securely.

Troubleshooting

The fiber tumbler is a fairly simple device, and simple troubleshooting techniques should suffice. However, a few topics are discussed here.

1. Motor fails to run: First, make sure the motor's thermal interrupt hasn't tripped. Refer to Figure 9C on page 10 for location of the motor's thermal reset button. If this fails to remedy the problem, refer to the following procedure for resetting the electronic countdown timer.

2. Electronic countdown timer malfunctions: If the electronic countdown timer is suspected of a malfunction (e.g. noise, improper times, failure to start), try resetting it by performing the following steps, after first ensuring the power cord is plugged in:

1. Press and hold the 1st (top) and 3rd timer buttons to enter Select Timer Mode. **Note:** Motor will run, but continue holding both buttons until a green LED starts flashing, then release.
2. The current active Timer LED will flash green to indicate the device is in Select Timer Mode.
3. Press the 3rd timer button (corresponding to “5, 10, 15 30” programming).
4. The new Timer button will briefly flash to demonstrate the timer mode chosen.
5. Pressing the OFF button (bottom) will save programming and exit programming mode. The timer will also exit programming mode automatically if no buttons are pressed for 3 minutes.

Programming Alternate Electronic Countdown Timer Settings

The electronic countdown timer can be programmed for alternate times if so desired. Press the button (from the table above) corresponding with the time outs you desire. To do this, perform the following steps:

1. Press and hold the 1st (top) and 3rd timer buttons to enter Select Timer Mode. **Note:** Motor will run, but continue holding both buttons until a green LED starts flashing, then release.
2. The current active Timer LED will flash green to indicate the device is in Select Timer Mode.
3. Press the button (from the table below) corresponding with the time outs you desire.
4. The new Timer button will briefly flash to demonstrate the timer mode chosen.
5. Pressing the OFF button (bottom) will save programming and exit programming mode. The timer will also exit programming mode automatically if no buttons are pressed for 3 minutes.

Button	Time Outs, Buttons 4-1	Leviton Model No.
1 (top)	2, 4, 8, 12 hours	LTB12
2	10, 20, 30, 60 minutes	LTB60
3	5, 10, 15, 30 minutes	LTB30
4 (2nd from bottom)	2, 5, 10, 15 minutes	LTB15
5 (bottom, OFF)	N/A	N/A

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 at much less than MSRP prices.

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 26", Kevlar, Tractor Supply SKU 4460668 available at www.tractorsupply.com
Note: Kevlar is highly recommended for long life and quiet operation. The few extra dollars are worth it.

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
Note: This pulley is now welded onto the intermediate shaft. If replacement is necessary, please contact Yurk's Custom Fabrication, LLC.

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:
5/8" x 5", for 1/2" belt, Tractor Supply SKU 3240219 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 as provided by Repair Clinic. However, it is not recommended to use the arm. Yurk's Custom Fabrication, LLC now replaces the arm with a stronger custom made arm. Therefore, please contact Yurk's Custom Fabrication, LLC if replacement is necessary.

Tension Arm Spring:
Century Spring Corp., Stock No. 5563, OD 0.562, length 3.630, rate (lbs/in) 3.900, initial tension (lbs) 2.000, wire dia. 0.062, hard drawn, zinc finish at www.centuryspring.com
Note: Because Century Spring has minimum order size requirements, it may be best to contact Yurk's Custom Fabrication, LLC for replacement.

Electronic Countdown Timer Switch:
Leviton, model LTB30
Available from www.smarthome.com/4254/Leviton-LTB30-1LZ-30-Minute-Countdown-Timer/p.aspx.
Also available from www.amazon.com and many electrical suppliers.

Direction Toggle Switch:
20A, 120V, DPDT on-on (DPDT on-off-on SHOULD NOT be used), 1/2” hole size, spade 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, zinc plated rod, 7-1/4” length, 3/16” 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