

Assembling the Seed Cleaner-Sorter

Note: if you are putting this machine together and you get stumped about how something goes together or what a piece is for, email or facebook-msg Steve Loveland steve@lovelandLLC.net Please do download and print out the scale drawings from the same site where you downloaded this document. These drawings may help clarify how things go together.

Step 1 Preparing your work space

Spread the tarp that was included in the crate on the ground to catch small hardware that escapes and falls down. There are little or no spares on a few of these items.

Step 2

Use the plywood that was fastened to the bottom of the crate as a floor under the bottom frame and level it by placing boards or blocks under it.

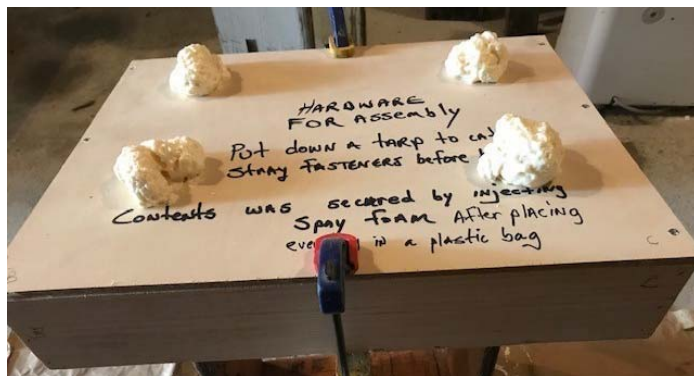
Position the bottom frame on the plywood with the leg sockets UP. The bottom frame is marked A' B' C' D' on the leg sockets.



Step 3 Unpacking the parts box

Take the six screws out of the parts-box top, and pry off the lid. The inside will be a mass of foam-in-place insulation. Fear NOT, All of the parts surrounded by the foam were placed in a plastic bag before the foam was injected. Carefully carve out the foam padding and put it in the trash. Be careful not to accidentally throw out something that was trapped in the foam.

Lay out the bags of fasteners that are in the box. There are spare fasteners, but not a lot of them. Keep control of these small fasteners and parts so they do not walk off – you won't be able to replace them very easily. A box with a lid would work well, maybe the one they came in.



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Step 4 Assembling the frame

Insert the four 1-1/4" X 1-1/4" black steel legs in their respective sockets – pay attention to the markings on each leg so you do not mix them up or put them upside down or inside out.

Step 5 Assembling the frame

Place the top frame on the top of the four legs, being careful to match the markings A – A, B-B C-C and D-D. Drive the frame down tight on the legs – use a soft faced hammer OR a block of wood to avoid denting the frame. Place eight 1/4" x 2-1/2" bolts, one each, in the holes where each leg is inserted into each socket. Do not put the nuts on yet so there is some wiggle room.



Step 6 Install the Chaff Blower housing.

Look inside of the body of the blower housing. If there are any sheet metal parts, or other parts, still inside you will need to get them out. You should not have to force or bend the parts.

Notice the markings on the plywood sides of the blower housing. Position the blower housing so that the A,B,C,D markings line up with those on the frame. Put an empty box about 12" tall on the floor inside the bottom frame to hold the blower housing in approximate position.

There is a plywood spacer block about 2" X 3" on each of the four corners- they are made to fit very tightly between the legs, you will have to use a bit of force to get the blower housing into place. You should NOT have to hammer forcefully! DO NOT dent the sheet metal!



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Step 6 continued

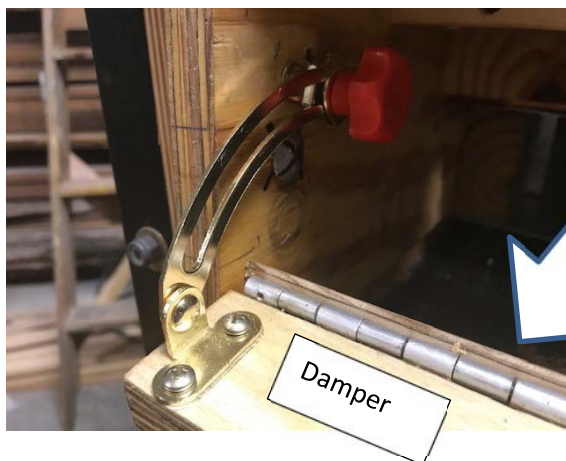
Install the four 5/16" X 3" carriage bolts, use a punch or a phillips screwdriver to line up each hole. Notice that each bolt has an X drawn on the head, please line up the X with the markings INSIDE the blower housing. The bolt heads go inside with the nut and washer on the outside of each leg. Before you can insert the bolt into the hole B-leg you may have to unscrew the brass mounting bracket for the air control damper.



Drive the bolts tightly into position on the inside the blower chamber by using a stick and a hammer.



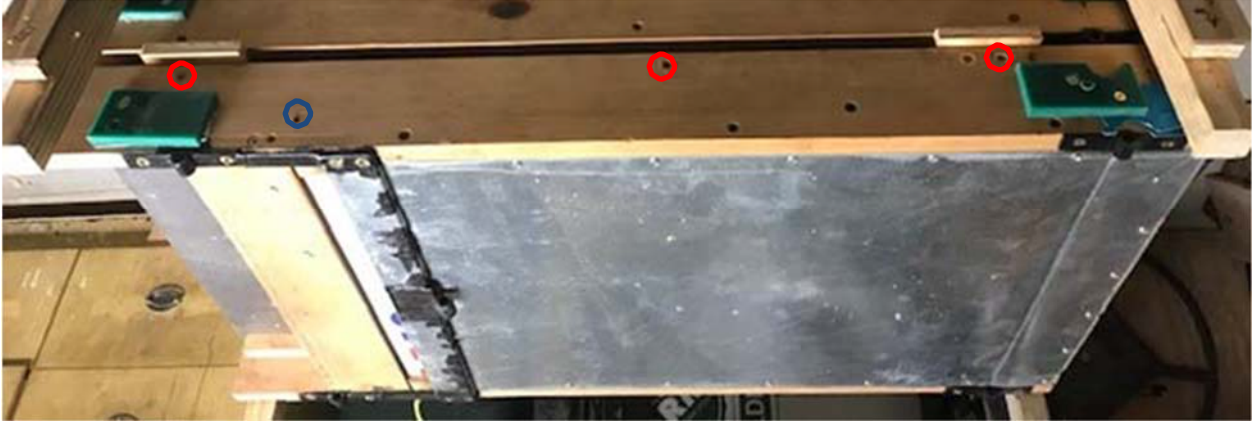
Put the damper control bracket back in its place AND rotate the fixed air-deflector into position. When the air-deflector is lined up with the pencil lines on the housing (45 degrees) install one screw, by hand, in the C-side of the blower housing to hold the air-deflector in position



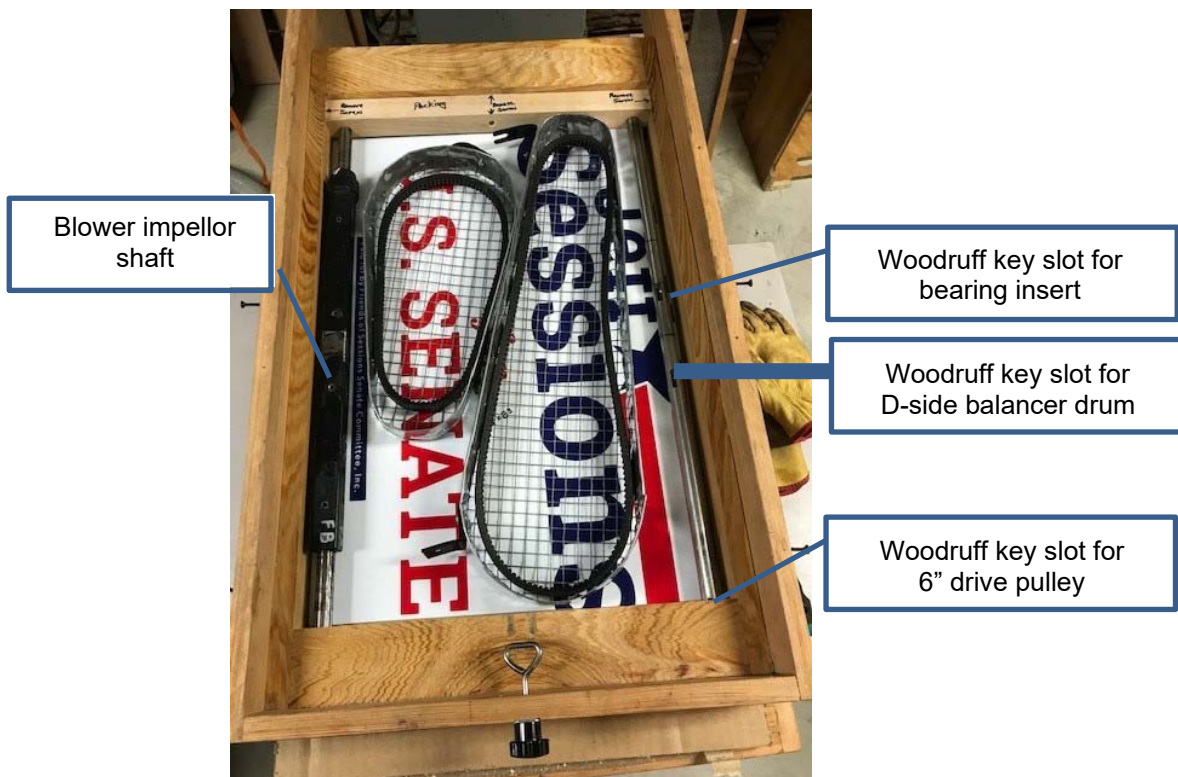
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Step 7 Assemble and install the blower impellor

1) First we have to find and unpack the shaft for the blower impellor:
Remove the spare screen from the upper shoe box by taking out the six packing screws that are so marked (red circles) on the sides of the upper shoe box.




2) When the spare (alternate grain type) scalp screen is removed, And the other scalp screen just below it is removed, you will find the drive belts and their respective belt guards; take those out of the box and then remove the two (one each side) packing screws marked above in blue – this will release the ends of the shaft retainer block that has secured the eccentric drive shaft and the blower impellor shaft during shipment

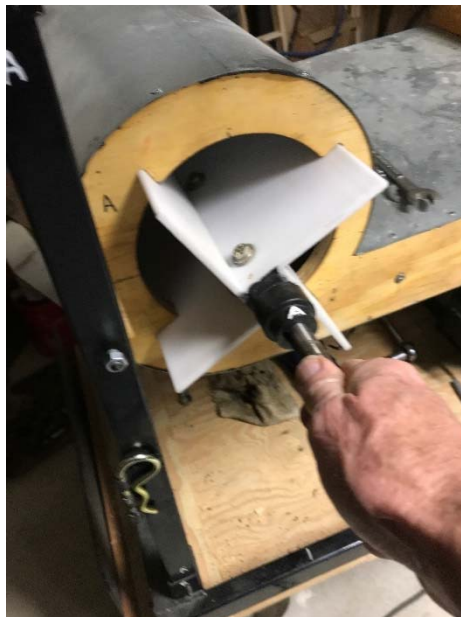


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- 3) Locate the four white plastic impellor blades that were packed into the blower housing. AND the (16) $\frac{1}{4}$ " X $\frac{1}{2}$ " cap screws, each with two washers, one golden and the other silver. These fasteners were all bagged together.



- 4) Position the blades on the shaft-armature so that the marking on the blade lays on top of (matches) the marking on the shaft armature. Put one drop of red thread-locker solution (packed in a bag in the blower housing) on the threads of each bolt before you thread it into the hole in the shaft BY HAND. It is important not to cross-thread these bolts!
- 5) Tighten the bolts firmly but not so hard that it presses the washer into the plastic blade.
- 6) Find the end of the shaft marked **A**, hold on to the A-end and push the impellor assembly into the blower housing, after making sure that you have gotten all of the parts stashed in the housing out 



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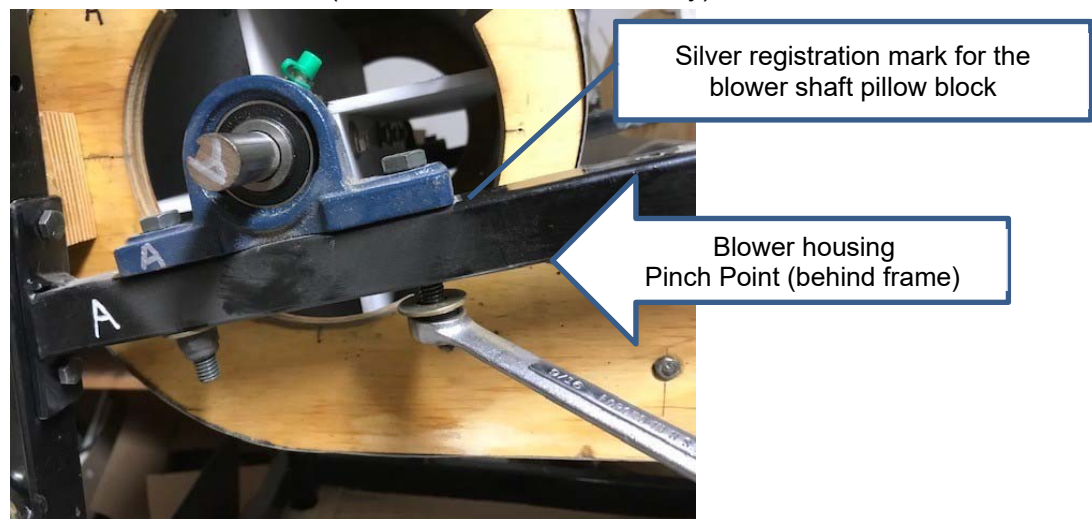
Step 8 Install the diagonal angle brace/pillow block supports

These two braces are marked A-B or C-D. Take care to line them up according to their markings. Install two 1/4" X 2-1/2" bolts in each end of each bracket so that the nuts will be on the outside of the legs [except as shown below]. If the legs and the brace pieces made it without being bent, they should fit nicely. Once again, Wait to put on the washers and nuts until you are further along on the assembly



Step 9 Install the blower impellor pillow block bearings

Slide the two pillow block bearings marked **FAN** onto the shaft according to their **A** or **D** markings. Drop four 3/8" X 2" bolts into the mounting holes and thread on a washer and neoprene insert lock nut. Line up the base of the pillow blocks with the silver markings on the black steel diagonal brace and tighten the bolts. Reach into the housing to feel the space between the edge of the blade and the pinch-point of the blower housing to verify that it is about the same on the **A** side and the **D** side. (this effects blower efficiency)



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Step 10 Install the pivot arms

Find the pivot arms in the parts box. They are fully assembled; each pivot arm has two white dots stamped into one end of the arm, these white dots are to be positioned UP.



Attach the pivot arm support brackets to the legs according to their letter markings **B** to **B** etc. Each end of each pivot arm has a brass bushing epoxy glued into the socket at the end of the arm.

Step 10 Install the pivot arms- continued

Place a small amount of the brake caliper grease inside the bore of the brass bushing at this time. (lubricants were stashed, in a bag, in the end of the blower housing)

Securely bolt the pivot arm brackets to their respective legs using a washer and a neoprene lock nut on each bolt.

There are shims supplied for the C pivot arm bracket to fine tune the alignment of the assembly so that you can position the pivot rod-ends more accurately when the pivot rods are inserted into the top shoe (the bottom shoe already being in position)



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STEP 11 Prepare the lower shoe

The lower shoe (the wooden box-frame that holds the screens) has several things packed into it. There are instructions written on masking tape attached to the sides of the shoe.

- 1) Unscrew the six screws (three each side- red circles) that are holding the upper-most spare sift screen. These screws are marked as such and are driven in from the sides of the shoe. Save the screws – you need them to hold the screen retainer rails. Pull out the upper-most spare sift screen and set it aside **on its edge** where it will not be bent.



- 2) Unscrew the two screws – one each side -blue circles to release the lower sift screen and pull it out of the shoe. If the screen is resisting being slid out, check for more retainer screws that have not been removed.
- 3) Now exposed, is the ball tray with each set of three or four cleaner-balls in thier own shipping packet (not pictured). These balls clean the sift screen while the machine is in use. They are critical to the screen's effectiveness. Please take care to place each set of cleaner-balls in the compartment in which they were packed. These balls are made of a specially formulated neoprene that is different from the average toy ball. They will take a lot of abuse before wearing out. The diameter of the balls is critical to their effectiveness.



Undersized-seed deflector already installed on the fines screen

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- 4) When the cleaner balls are in place, prepare either the rice sift-screen or the bean sift-screen depending on which grain will be the first to be run in the machine. Each sift-screen has a sheet metal deflector that must be installed with two screws on the exit end of the screen. The location is clearly marked with black lines and writing – be careful not to overtighten the attachment screws. These deflectors were packed in the blower housing.
- 5) Install the Y-shaped retainer bolt and knob when the sift screen is slid into place. The knob only needs to be thumb & finger tight.



- 6) Lower Shoe -Screen-Retainer rails – the screen retainer rails may be missing from the crate. These pieces are 7/8" X 3/4" X 30" +/- . Make replacements from any well-seasoned lumber and install them above the sift screen making sure that they are not so tight that the sift screen cannot be pulled out for changing the screens. I use old business cards, between the rail and the screen metal, for spacers when putting the retainer rails in place. Use the screws that were holding the spare sift screen in the shoe for shipment, to fasten in the screen-retainer rails.

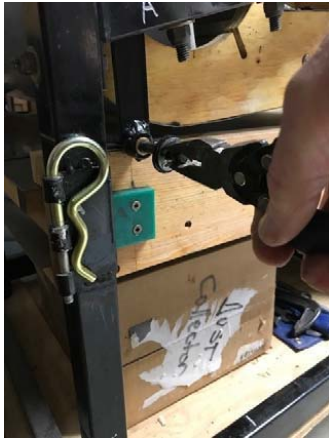
Step 12 Install the Lower Shoe

- 1) Place an empty cardboard box in between the bottom frame rails that has sufficient height to hold the lower shoe up close to the bottom of the blower housing. Pay attention to the A-B-C-D markings on the shoe's side boards, aligning them with the four corners of the frame to match. The green rubbing blocks will fit snugly inside the black steel frame legs. The blocks are shipped in their proper position.



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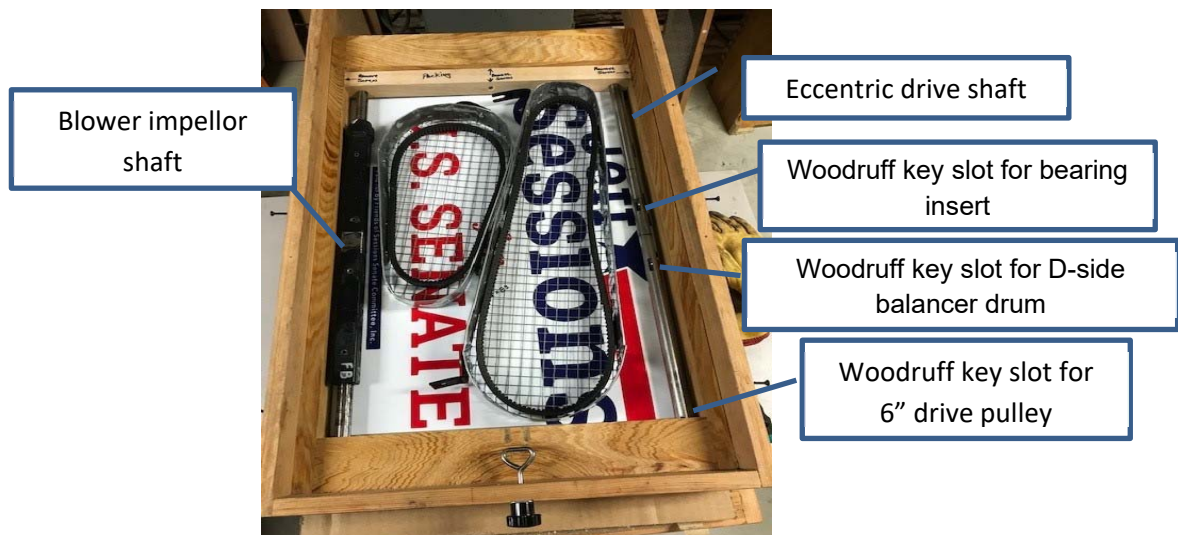
- 2) Wipe any dust or grit off two of the 5/16" X 22-1/2" pivot rods. Insert the first 5/16" pivot rod into the brass bushing on the lower end of the **C**-pivot arm. [all four pivot rods are interchangeable] Fit a plain flat-washer between the pivot arm and the bracket on the shoe.
- 3) Guide the rod through the brackets that are screwed to the bottom of the lower shoe on the **C**-side of the machine (DO NOT lubricate these brackets), push the rod through to the **B**-side pivot rod-bracket, fit another plain flat-washer between the shoe-bracket and the pivot arm, and then push the rod on through the brass bushing on the lower end of the **B**-pivot arm. Make sure that there is a washer, with felt attached to it, placed on each end of the pivot rod with the felt against the brass bushing. Lubricate the felt washer with the small bottle of gun lube provided; this bottle has a handy spout so that you can put one or two drops of oil on each felt washer. (when needed: refill the bottle with automatic transmission fluid) There are 12 felt washers to lubricate when that machine is fully assembled. Install cotter pins on each end of the pivot rod.
- 4) Use the cotter-pin-holes that will snugly hold the felt-coated washers to the brass bushings. There are two holes on each end of each rod to allow for adjustment to a snug fit.



After the **B-C** pivot rod is installed, raise the **A-D** end of the lower shoe to align the holes in the ends of the pivot arms with the holes in the shoe brackets. There should be about an 3/16" gap between the top of the shoe sideboards and the bottom of the blower housing. Install the **B-C** pivot rod the same way that the **A-D** pivot rod was installed. Remember to cotter pin and lubricate the felt coated washers after they are in place.

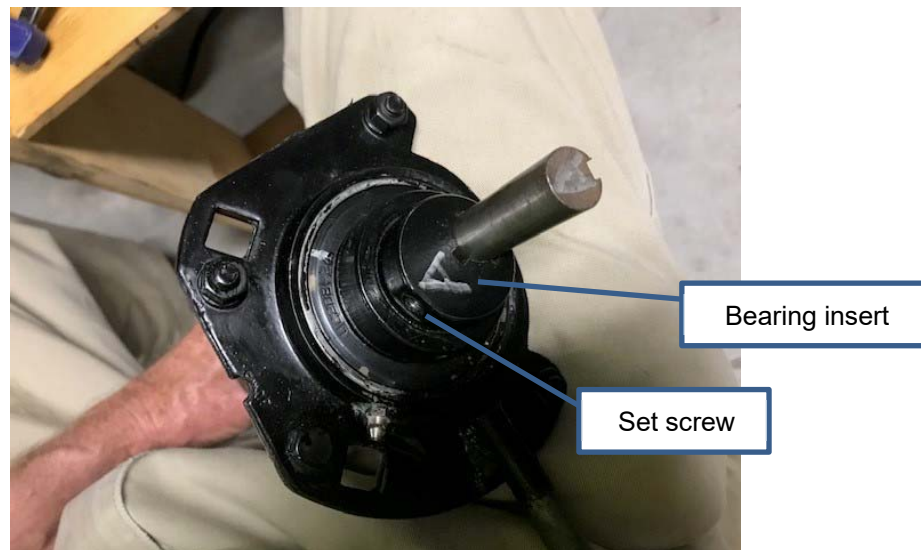
Step 13 Prepare the eccentric drive assembly

- 1) Find the shaft for the eccentric drive assembly that you unpacked in step 7-2



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- 2) The eccentric drive shaft has three half-moon shaped recesses machined into it for woodruff keys (see image above). The woodruff keys look like a metal half circle – they are taped to the parts that they are to be used with. They will be very difficult to replace locally, so don't lose them!
- 3) Locate the eccentric drive bearing with it's housing and pushrod in the parts box. Slide the lightly oiled shaft through the bored hole in the bearing insert as shown below. Slide the bearing and it's insert far enough onto the shaft to reveal the third woodruff key slot just outside the end of the eccentric bearing insert marked A.
- 4) Put the woodruff key in the slot and slide the shaft and key inside the bearing-insert so that the key is centered under the set screw in the bearing-insert. Firmly hand-tighten (thumb & finger) the set screw with an Allen wrench (provided), Be careful to firmly seat the Allen wrench so as not to strip the wrench-socket in the set screw



- 5) Find the two balancer drums in the parts box, being careful not to lose the keys.
- 6) One of the drums has a half-circle woodruff key taped to the hub, set that one aside, for now, and use the other one which has a slim key already in the slot of the hub. If for some reason the slim key is missing a small nail can be cut to length and used instead.

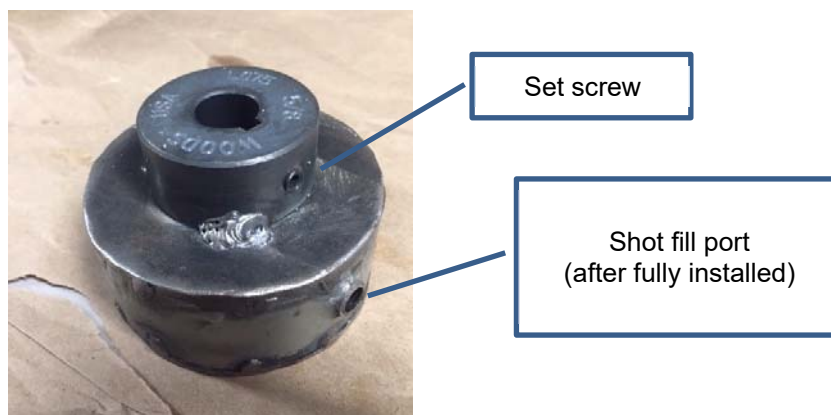


Figure 1 Balancer Drum

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- 7) Slide the balancer drum partway onto the lightly oiled shaft on the **A**-side of the eccentric drive with the hub and its set screw outermost. Fill the drum half full of copper coated shot – (about 9 oz.) use half of the shot that was supplied. Put three or four drops of oil into the drum along with the shot (either the gun oil OR automatic transmission fluid)



PLEASE NOTE:
RUNNING THIS MACHINE
WITHOUT BOTH SHOT-
LOADED BALANCER
DRUMS IN PLACE,
WILL CAUSE THE SHAFT TO
RAPIDLY FAIL

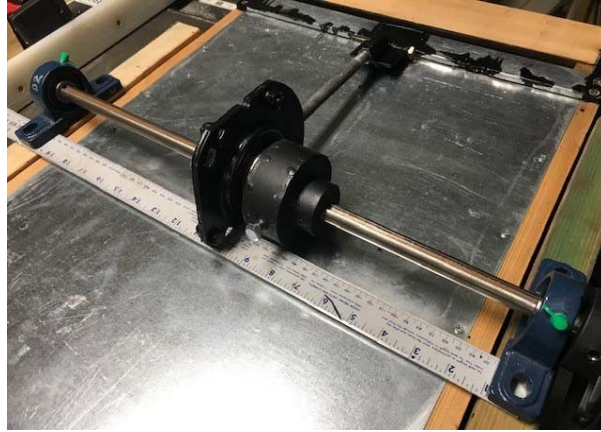
- 8) After loading in the shot, Install the bolt that plugs the fill-hole using the thread-locker solution on the bolt threads.
- 9) Slide the drum down the lightly oiled shaft to fit up against the eccentric bearing insert.
- 10) Tighten the set screw in the hub of the balancer drum.
- 11) Get the other balancer drum and repeat the process by sliding the drum halfway onto the other end (the **D**-side) of the shaft. Fill the drum with the rest of the copper coated shot and put in three or four drops of oil. Install the bolt that plugs the fill-hole using the thread-locker solution. Firmly insert the woodruff key that was taped to the hub of this balancer drum into the slot on the shaft that is about 2" away from the D-side of the eccentric bearing insert. Rotate the shaft so that the wood ruff key is UP. Rotate the balancer drum so that it's key slot it up. Carefully slide the drum (flat side first / hub outward) over the woodruff key until it fits up against the eccentric bearing insert and the end of the woodruff key is just visible in the key-slot of the drum's hub.
- 12) Tighten the set screw in the hub of the balancer drum.
- 13) Slide the two pillow block bearings onto the shaft one on each end paying attention to the markings on each bearing housing. **DO NOT** hammer on the ends of these shafts with a steel hammer – use a block of wood or a plastic headed hammer.



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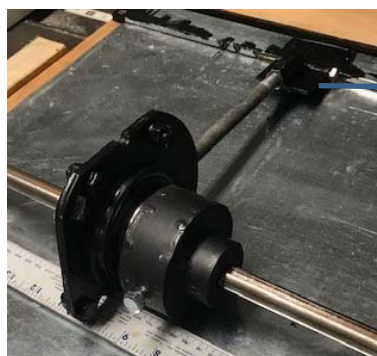
- 14) The image below is a mockup of the drive assembly with only one of the two balancer drums installed. The centerline of the eccentric bearing flange should be about 12" from the **D**-side end of the shaft, after installing the top shoe adjust the location to fit so that there is no side-to-side stress on the pushrod. This can be achieved by repositioning the eccentric bearing assembly OR by moving the shaft longitudinally in the pillow blocks.



- 15) Position the drive assembly onto the black steel diagonal braces. Drop 3/8" X 2" bolts into the mounting holes of the pillow blocks to hold them in position. Thread on a washer and neoprene insert lock nut on each of the four bolts. Do not tighten them yet.



- 16) Turn the connector on the end of the push rod 1/4-turn (ears up) so that the connector will mate with it's other half which is welded on the bottom of the upper shoe.



Push rod
connector

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Step 14 Install the drive pulleys and belts

Find one of the two black 6" pulleys and the gray 2" pulley. Install both pulleys on the D-side of the machine as shown in the image below. Use the woodruff key that was taped to the 6" pulley on the eccentric drive shaft. Use the square key taped to the gray 2" pulley on the blower shaft. Place the belt on the pulleys and install the black 6" pulley with the hub out and the gray 2" pulley with the hub in. (there is not enough room to put the belt on later) Check the pulley alignment with a straight edge as shown below. (right) When the pulleys are in good alignment tighten the set screw in the hub of each pulley using thread locking solution.



After checking to be sure that the bolts in the blower shaft pillow block are tight, use a wood block to wedge the pillow blocks apart to tighten the belt. When the belt is tight enough to only deflect about $\frac{1}{2}$ " when pressed down halfway between the shafts, tighten the pillow block bolts on the **D**-side. Compare the distance between the centers of the blower shaft and the eccentric drive shaft on the **D**-side to the **A**-side, if they are within $\frac{1}{4}$ ", Then tighten the **A**-side eccentric shaft pillow block bolts. If there is more than a $\frac{1}{4}$ " variance, something is out of line and needs to be adjusted – take your time.



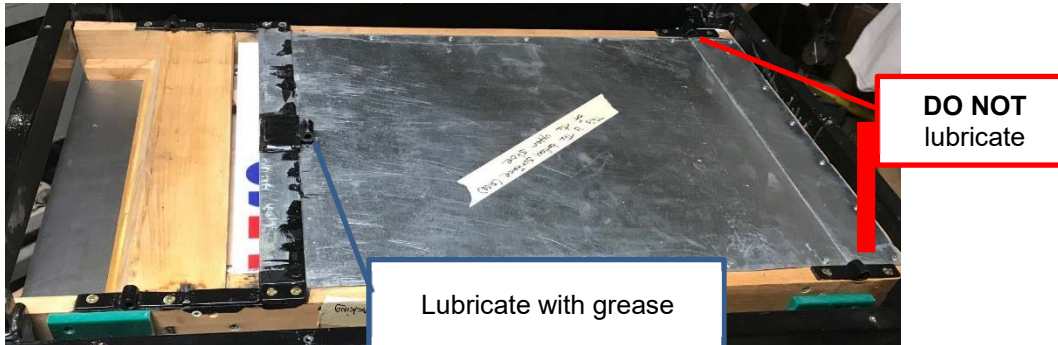
Tighten the shaft-locking set screws in the two blower-shaft pillow block bearings with the provided Allen-wrench.

There are two of these set screws in each bearing hub. Be careful not to over-tighten and strip the sockets in the screws.

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Step 15 Install the upper shoe

- 1) Turn the upper shoe bottom-side-up, place a small amount of brake caliper grease into the pushrod connector bolt hole.



- 2) Turn the upper shoe top-side-up. Take the screws out that are holding the green rubbing blocks. These blocks had to be moved inboard about 2" to clear the temporary frame-legs.

Notice that there are two or three business card shims under one of the blocks – keep those with that block. (I think it is the **D** block)

- 3) Turn the **B** and **C** green rubbing blocks so that the letter written on them matches what is written on the side of the shoe. The outboard end of the block should closely line up with the end of the shoe. Match the screw holes and install the blocks using the same screws that were holding them in the shipping position.
Wait to install the **A** and the **D** blocks until the shoe is installed onto the pivot arms.
- 4) Place a piece of the corrugated plastic on top of the blower housing to protect it
- 5) Install the shoe between the frame rails feeding it in from the **B-C** end (blower exhaust)
- 6) Wipe one of the remaining pivot rods clean and insert it through the brass bushing at the top of the B pivot-arm, place a flat washer between the pivot art and the pivot bracket on the bottom of the shoe.
- 7) Push the rod on across the bottom of the shoe and feed the end through the C-pivot rod bracket, place a flat washer between the shoe's pivot bracket and the top end of the C pivot arm. (you may need to grab the pivot rod free end with pliers and twist it back and forth to get it to feed through the brackets)
- 8) Place felt-faced washers on each end on the pivot rod with the felt against the brass bushing. Lubricate the felt with one or two drops of gun oil (supplied in the bottle with a spout) or automatic transmission fluid. Repeat at the start of each seed processing session.
- 9) Raise the **A-D** end of the shoe to position the center of the **D** pivot arm bushing with the center of the **D** pivot rod bracket.
- 10) Wipe the remaining pivot rod clean and insert the end into the brass bushing at the top of the D pivot arm. Repeat 6-8 above for installing the A-D pivot rod
- 11) Install the A and D green rubbing blocks positioned according to their screw hole locations. Use the business card-shims to bring the D-side rubbing block out far enough to just touch the black steel leg. You do not want it to be tight enough to cause friction that builds up heat.

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- 12) Install the eccentric pushrod connector bolt at the underside of the **B-C** end of upper shoe. Use the 5/16" X 4-1/2" gold colored bolt (this is a tougher Grade 8 bolt) and a 5/16" neoprene lock washer. Do not try to move the shoe from side to side to line up the connector. RATHER, move the eccentric drive by repositioning the drive bearing assembly or moving the shaft in the pillow blocks.



- 13) Install the appropriate scalping screen in the upper shoe to match the grain type of the sifting screen that you installed in the lower shoe. Use the other Y-shaped eyebolt and knob (from the parts box) to hold the screen in place.



There are no deflectors to install on the scalping screens in the upper shoe

- 14) Install the scalp-screen-retainer bars – (these were strapped to the **A-B** angle brace in the crate. Orient each bar so that the **B / C** registration marks line up with those on the shoe sides. Shim the bars up off the screen deck with business cards or thin cardboard before driving in the screws. The screws that secured the spare screen into the upper shoe can be used to install the retainer bars.



Each retainer bar has a steel sleeve pressed into the side. These sleeves form the sockets that the seed agitator rod fits into



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Step 16 Check for Freedom of motion

Rotate the black 6" eccentric drive shaft pulley several times to ensure that there is not anything blocking the shoes from their $\frac{3}{4}$ " back and forth motion as the machine operates. You will hear the balancer drum shot falling down as you rotate the pulley – not a problem.

If there is something catching, or pinching, you must diagnose it and remedy the problem before proceeding.



AFTER PROPER ALIGNMENT IS ACHIEVED

Tighten the shaft-locking set screws in the two eccentric shaft pillow block bearings with the provided Allen-wrench.

There are two of these set screws in each bearing hub. Be careful not to over-tighten so as to strip the sockets in the screws.

Step 17 – Install the motor

- 1) The motor was shipped in the transport position and must be re-positioned to its operational position on the motor mount. Markings on the motor-mount will show you where to position the motor on the motor mount frame. The plywood shim that is provided raises the motor enough to be able to fit the belt on without unbolting the motor from the motor-mount frame. (design flaw)



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- 2) If you have not already done it, install the capacitor. Peel the black duct tape off of the motor housing to reveal the rubber seal and the wires for the capacitor. The wires are color-coded, blue and yellow, plug them into the tabs on the capacitor.



- 3) After you have plugged in the two wires, snap the capacitor into its housing, flip it over onto its rubber seal and install it with the two screws that are stored in their respective mounting holes. Be careful not to lose a screw down inside the motor case!
- 4) Install the dust shield on the end of the motor opposite the shaft. The dust shield was shipped inside of the blower housing.



- 5) Place the motor, with its frame, into position under the Lower Shoe at the **D-A** end of the machine with the motor shaft on the **A**-side of the machine. Mount the adjustable pulley on the motor shaft using the square key that was taped to the pulley. The motor pulley is pre-set for the correct operating diameter.



DO NOT enlarge the pulley operating diameter so as to speed up the machine. This will not improve cleaning or sorting effectiveness. Target speed is 300 cycles per minute for maximum screening effectiveness.

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- 6) Install the black 6" pulley and belt onto the blower impeller shaft on the **A**-side using the square key taped to the hub. Check, and adjust the alignment of the 6" black pulley on the blower shaft and the silver adjustable pulley on the motor shaft to be sure they are on the same plane.
- 7) Lock both of the pulleys to their respective shafts with the set screws using the provided allen wrench .



- 8) Slide the motor mount down the length of the machine (from A to B) until the belt is tight enough to have only about ½" to 1" of movement when pressed at the midpoint with one finger. Lock the motor mount in place with a clamp (not provided) or by wedging a fitted board between the motor mount and the A-D frame rail.

Step 18 Check the machine for operating clearances

Cycle the machine on and off by plugging it into the 110 volt house current for about two seconds and letting it start and shut right back down. If something is hammering OR binding – it must be figured out and fixed.

The machine should run without much vibration and it certainly should not “walk” across the floor.

Step 19 Install the belt guards

- 1) Install the **A**-side belt guard to cover the belt connecting the motor to the blower shaft.

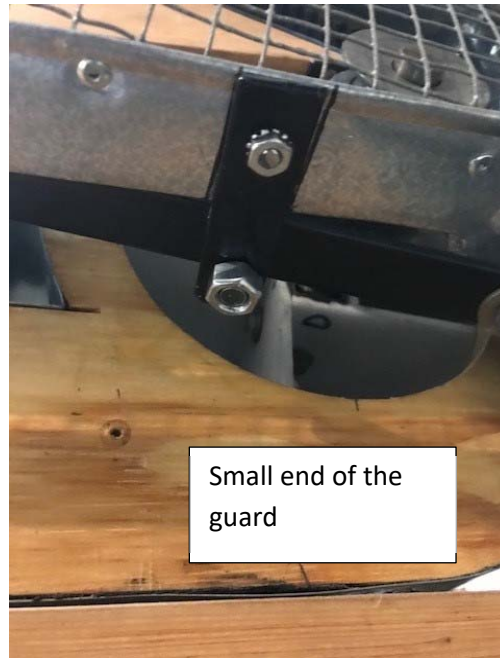
The lower bracket bolt for the belt guard is welded to the motor mount.

The upper belt guard bracket is held in place by the A-side blower housing bolt&nut



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2) Install the **D**-side blower to eccentric drive belt guard as shown below:
The angled bracket on the large end is held in place by the uphill eccentric-drive shaft pillow block bolt.
The bracket on the small end of the guard is held in place by the inboard blower shaft pillow block bolt



Step 20 Assemble the Seed Hopper

The seed hopper assembly should still be wrapped up in tape sandwiched between some corrugated plastic sign material (I didn't vote for any of those people 😊)



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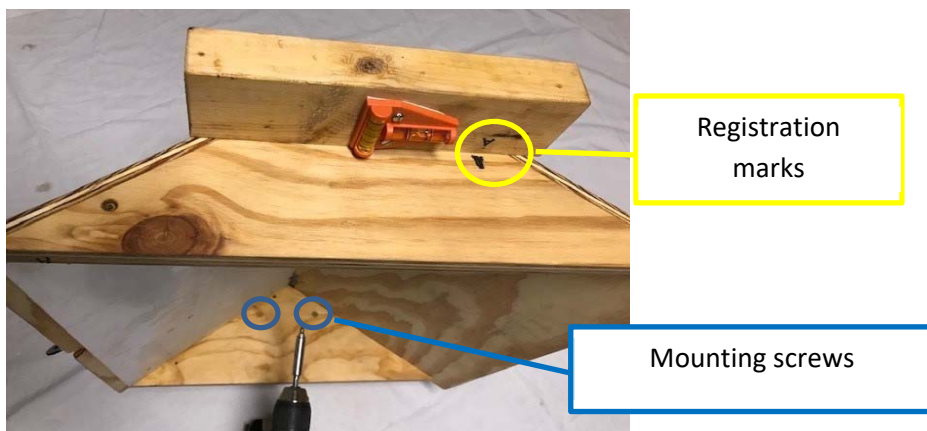
- 1) Fasten the triangular $\frac{3}{4}$ "-plywood ends to the $\frac{3}{8}$ " plywood panel that has the black metal flow adjuster mechanism attached to it. (see below) Use the $\frac{3}{4}$ " brass screws provided in a bag with the hopper package to attach the $\frac{3}{8}$ " plywood panels. The parts are marked so you can position them correctly.



- 2) Install the white aluminum gate plate into the seed hopper, fitting the black metal flow adjuster tab into the slot in the gate. Secure the flow adjuster to the gate by installing a cotter pin in the hole in the tab.

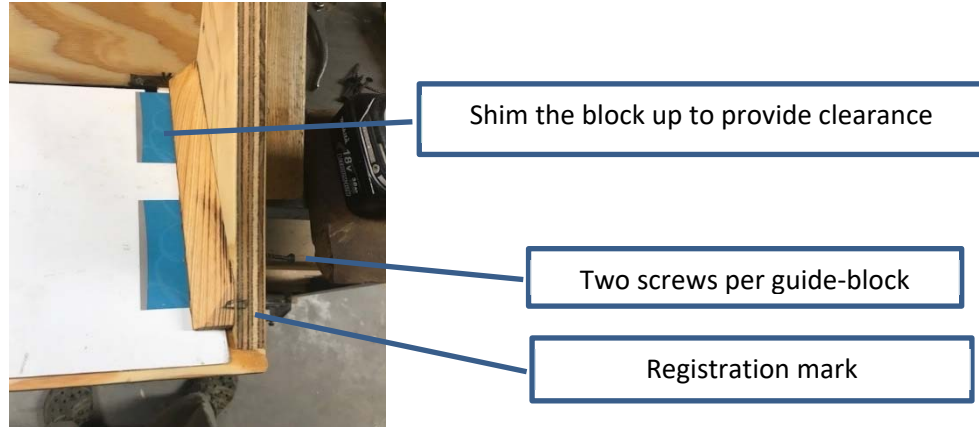


- 3) Install the frame-support blocks on the outside of the ends. Use the A / D registration marks to get the blocks oriented correctly.

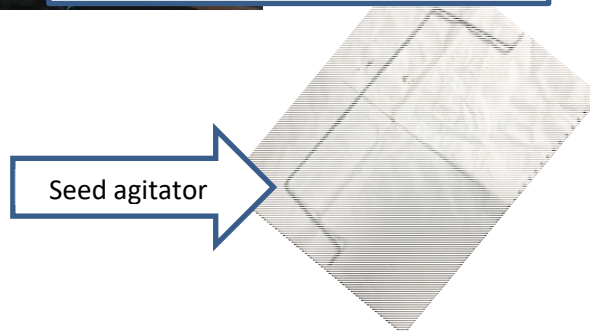
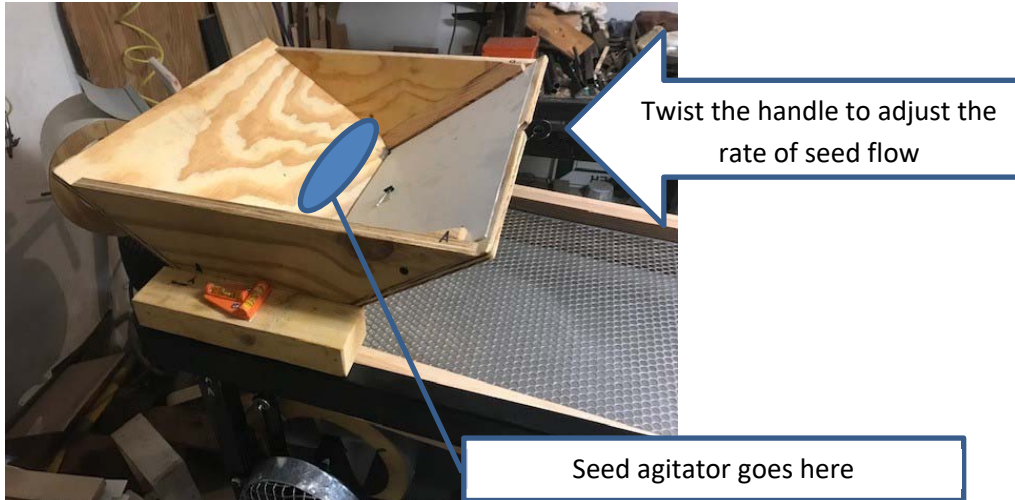


Assembling the Seed Cleaner-Sorter

- 4) Install the angle guide-blocks that retain the white aluminum gate plate by putting a cardboard shim (like a business card or piece of cereal box) between the plate and the angle guide-blocks. Drive the 1-1/2" screws in from the outside ends. Test the flow control mechanism to be sure that the gate will slide up and down when the black washer-handle is twisted in or out.



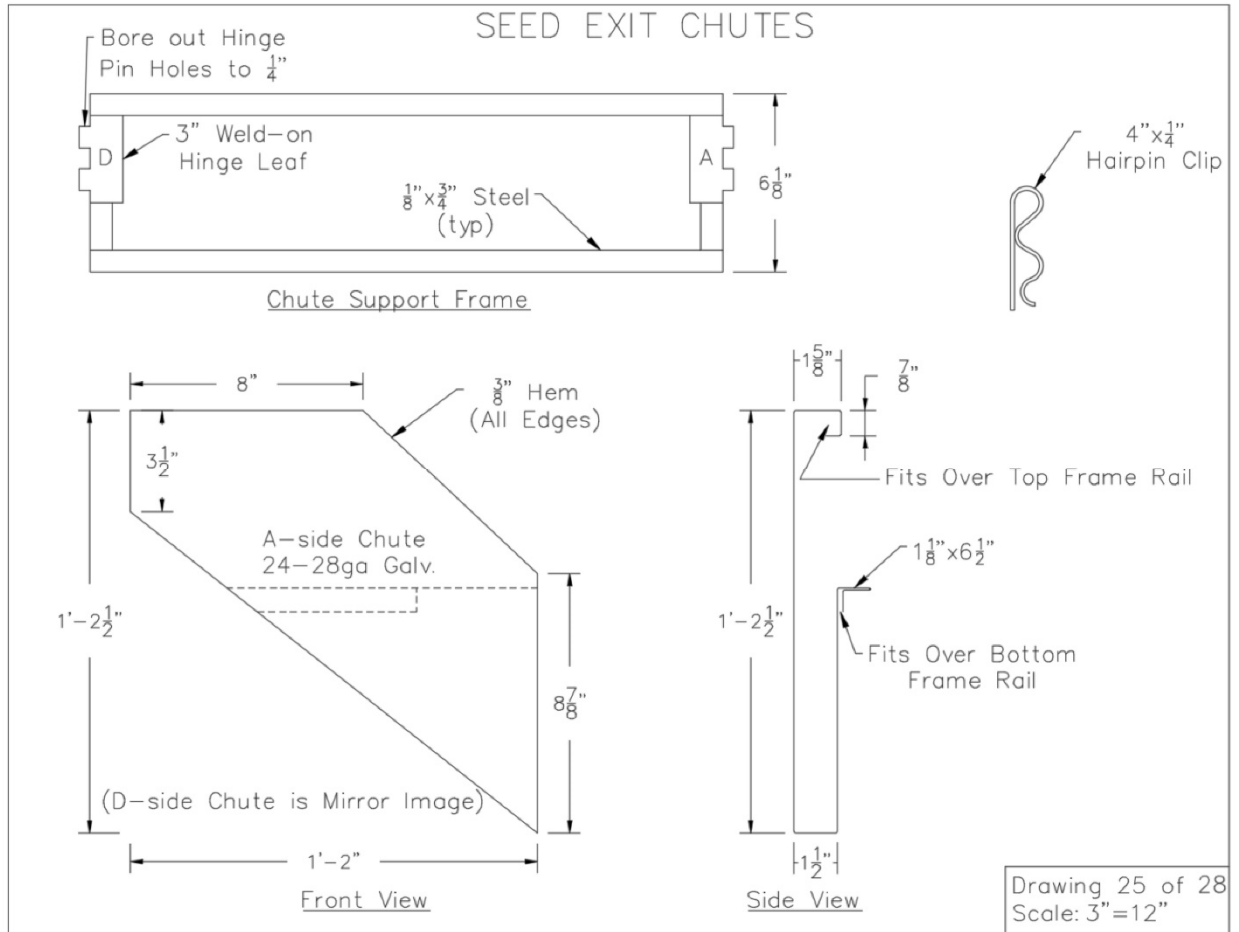
- 5) When ready to process seed, place the seed hopper on top of the frame, fitting the support blocks over the short square knobs that are on top of the frame at the **A-D** end of the machine. Find the seed-agitator [1/8" wire bent into a square U] and install it by placing the ends of the wire into the steel sockets located in the insides of the scalp screen retainer bars. Open the slide gate a bit. Lift the seed hopper up and fit the seed agitator up through the slide gate gap at the bottom of the hopper.



Assembling the Seed Cleaner-Sorter

Step 21 – Mounting the seed chutes

- 1) Locate the seed chute support frame and mount it onto the **A-D** end of the machine according to the markings on the frame. Use the hairpin clips, provided to fasten one end of the support frame to the leg. Let the other end swing free.



- 2) If you pinned the **A**-side of the support frame, mount the **A**-side chute. The chute is designed to clip onto the lower and the upper horizontal bars of the support frame. (see drawing above). After you have clipped the chute on, swing the frame closed to check that the chute is fully seated on the frame. The lip formed into the bottom frame grip will fit fairly snugly under the bottom of the exit end of the lower shoe. Slide the chute left or right a bit so that the inner edge of the chute lines up with the center of the support frame.
- 3) Next, open the **D**-side of the support frame (swing it out) and then mount the **D**-side chute onto the frame following the guidance in (2). Swing the support frame shut and push in the **D**-side hairpin clip

You have completed the assembly: Test Run the machine for 15 minutes, without putting any seed in the hopper to make sure that it is running freely. Shut off the machine and feel each of the bearing housings and the pivot arms to be sure there is no heat build-up. If there is heat, add lubrication. **Please download and read the operating instructions.**