

## **MECHANICAL REPAIRS.**

<b>BOTTOM MAIN AUGER BEARING INSPECTION, ADJUSTMENT OR REPLACEMENT.</b>	<b>4.02 - 4.05</b>
<b>REPLACING TOP MAIN AUGER BEARING.</b>	<b>4.05</b>
<b>REPLACING INTAKE AUGER FRONT BEARING.</b>	<b>4.06 - 4.07</b>
<b>REMOVING THE VAPOUR LINE.</b>	<b>4.07 – 4.09</b>
<b>CLEAN THE PRESSURE REGULATOR DAMPER.</b>	<b>4.10 – 4.11</b>
<b>DISMANTLE AND CLEAN SOLENOID VALVE.</b>	<b>4.12 – 4.13</b>
<b>MODULATING VALVE POWER ELEMENT REPLACEMENT.</b>	<b>4.14 – 4.15</b>
<b>PROBLEM SOLVING MECHANICAL.</b>	<b>4.16 – 4.21</b>

**!! IMPORTANT !!**

**BEFORE ATTEMPTING ANY MECHANICAL REPAIR ON A GT PORTABLE BATCH GRAIN DRYER DISCONNECT THE P.T.O SHAFT FROM THE TRACTOR.**

**IN THE CASE OF ELECTRIC MOTOR DRIVE ENSURE THAT THE MAIN POWER SWITCH IS IN THE OFF POSITION AND THE POWER SUPPLY IS DISCONNECTED.**

**ALSO MAKE SURE THAT THE DRYER IS SUPPORTED ON ALL IT'S JACKS TO AVOID ANY POSSIBILITY OF THE DRYER TIPPING.**

## **BOTTOM MAIN AUGER BEARING SEAL INSPECTION, ADJUSTMENT OR REPLACEMENT**

1. Open clean-out door in bin bottom well and check if at least 3/8" (9.5mm) clearance exists between inside bottom of well and lower end of vertical auger flight shaft – as illustration. **If less than minimum clearance – complete all following steps.** If clearance satisfactory - omit steps 5 and 6.
2. Slacken idler sheave adjuster and roll main auger drive belt off 18" auger sheave (No 4) underneath bin bottom well.
3. Loosen allen screws in 18" sheave and remove from lower auger stub shaft (No 10) – complete with key (No 22).
4. Loosen locking collar of lower auger bearing.
5. Place hydraulic jack under lower auger stub shaft and raise auger and housing assembly until at least 3/8" clearance exists between flight shafts and bottom well.

### ***However, before raising jack:***

- i) Check top bearing locking collar to upper stub shaft (No 3) on main auger is secure.
  - ii) Slacken auger tube support clamp (No 6) inside plenum assembly so that vertical auger tube (No 12) is free to slide up when auger is raised. Slacken tube clamp bolts (No 19) and not spider or auger will require centralizing.
  - iii) Loosen plenum chamber cone cap at top of plenum chamber (2 clamp bolts) so it will move to new position. On model 580, top auger brace clamp band also needs loosening.
6. Secure auger tube support clamp again to maintain 3/8" clearance when hydraulic jack is removed. Re-position plenum cone and auger brace clamp – tighten clamp bolts as necessary.
  7. Remove 2 5/8" x 3 1/2" cap screws (No 20) securing lower auger stub shaft (No 10) in flight shaft (No 14). Remove stub shaft from auger and bottom bearing.
  8. Remove bottom auger bearing.

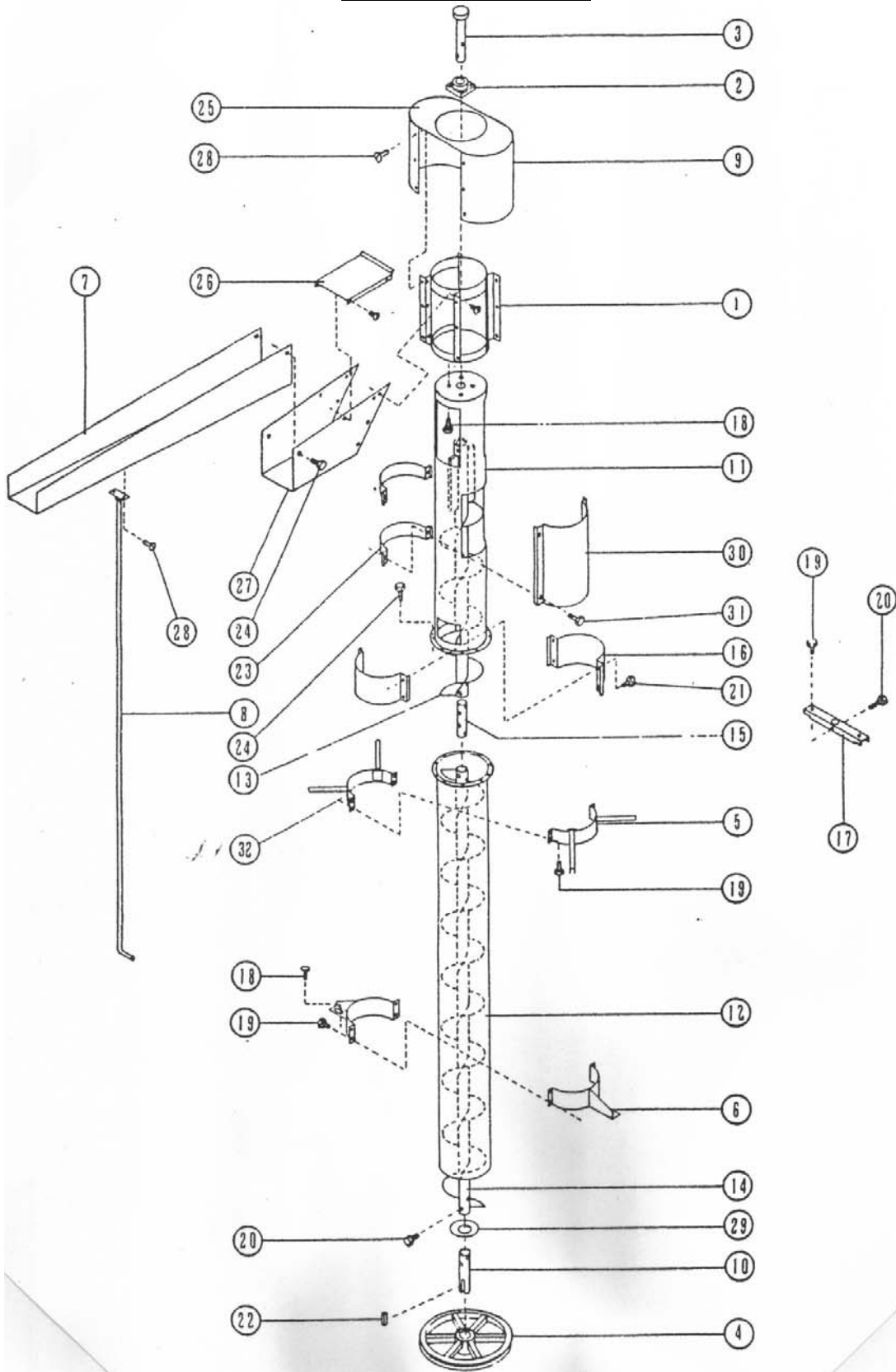
**NOTE:** Both shaft and bearing (step 7) may be removed together.

Examine bearing – renewing if indicated.

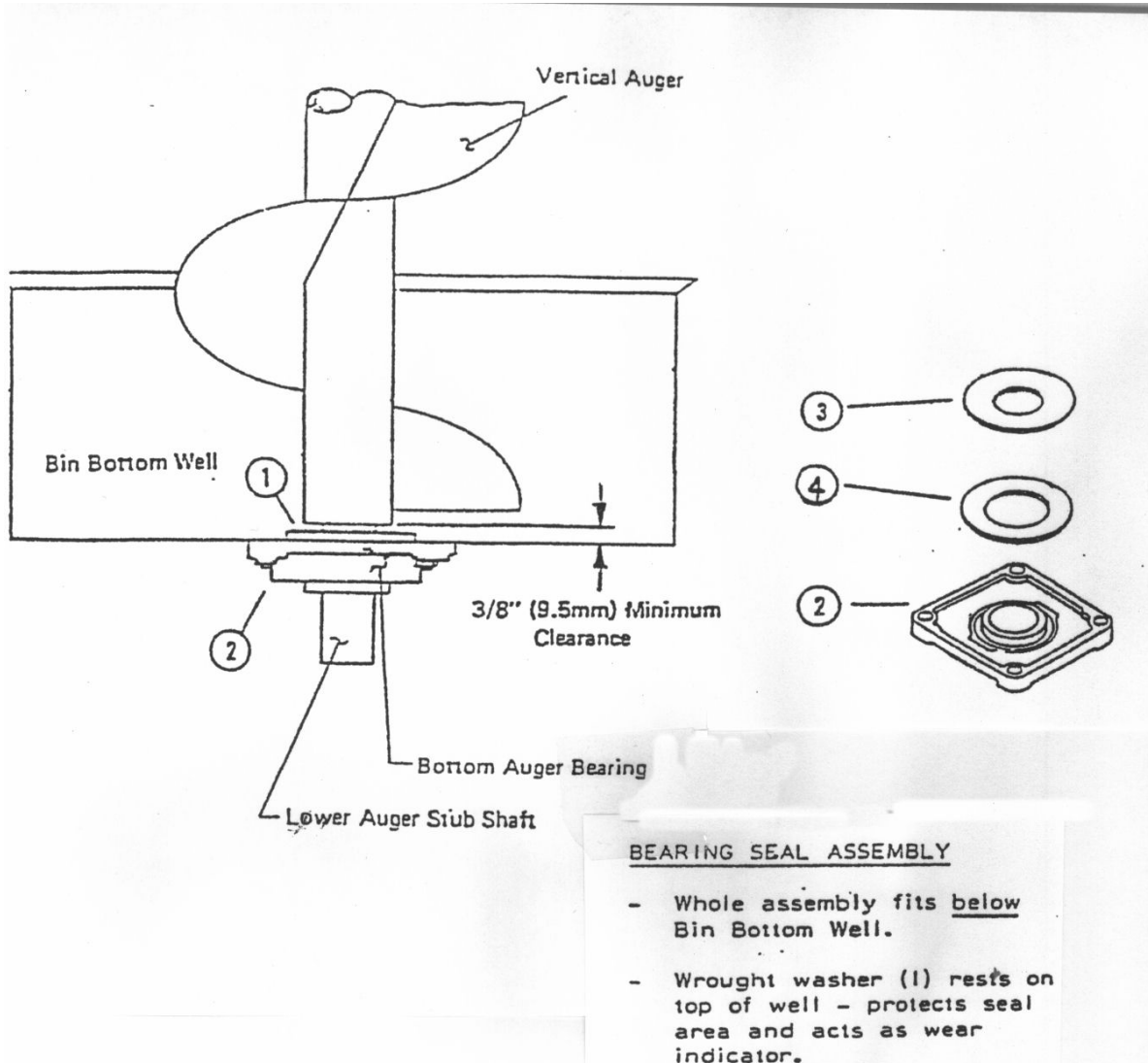
9. Refitting. Lubricate and fill upper cavity with grease. Place Neoprene bearing seal (Key 4) over bearing collar (refer illustration) and centralize neoprene shaft seal over bearing center. Re-fit bearing (carriage bolt heads inside well) using lock washers – but leave nuts slack at this stage.

# AUGER ASSEMBLY

4.03



## BOTTOM MAIN AUGER BEARING & SEAL ASSEMBLY



### COMPONENTS

KEY	PART NO.	QTY.	ITEM
1	72424	1	2" Washer - Wrought
2	D21161	1	2" Bearing - Bottom Auger
3	73289	1	2" Seal - Shaft Neoprene
4	73290	1	2 22/32" Seal - bearing Neoprene

10. Place 2" wrought washer key 1) over stub shaft hole inside well. Grease and re-fit stub shaft up through bearing, seals, well and washer into vertical auger. Re-fit cap screws (as stage 7) and tighten bearing nuts (stage 9).
11. Re-fit 18" auger sheave – important – with allen screws uppermost. Tighten carefully and re-fit belt.
12. Re-adjust idler sheave assembly to tension belt.

### **REPLACING TOP MAIN AUGER BEARING:**

Refer to diagram on page 4.04

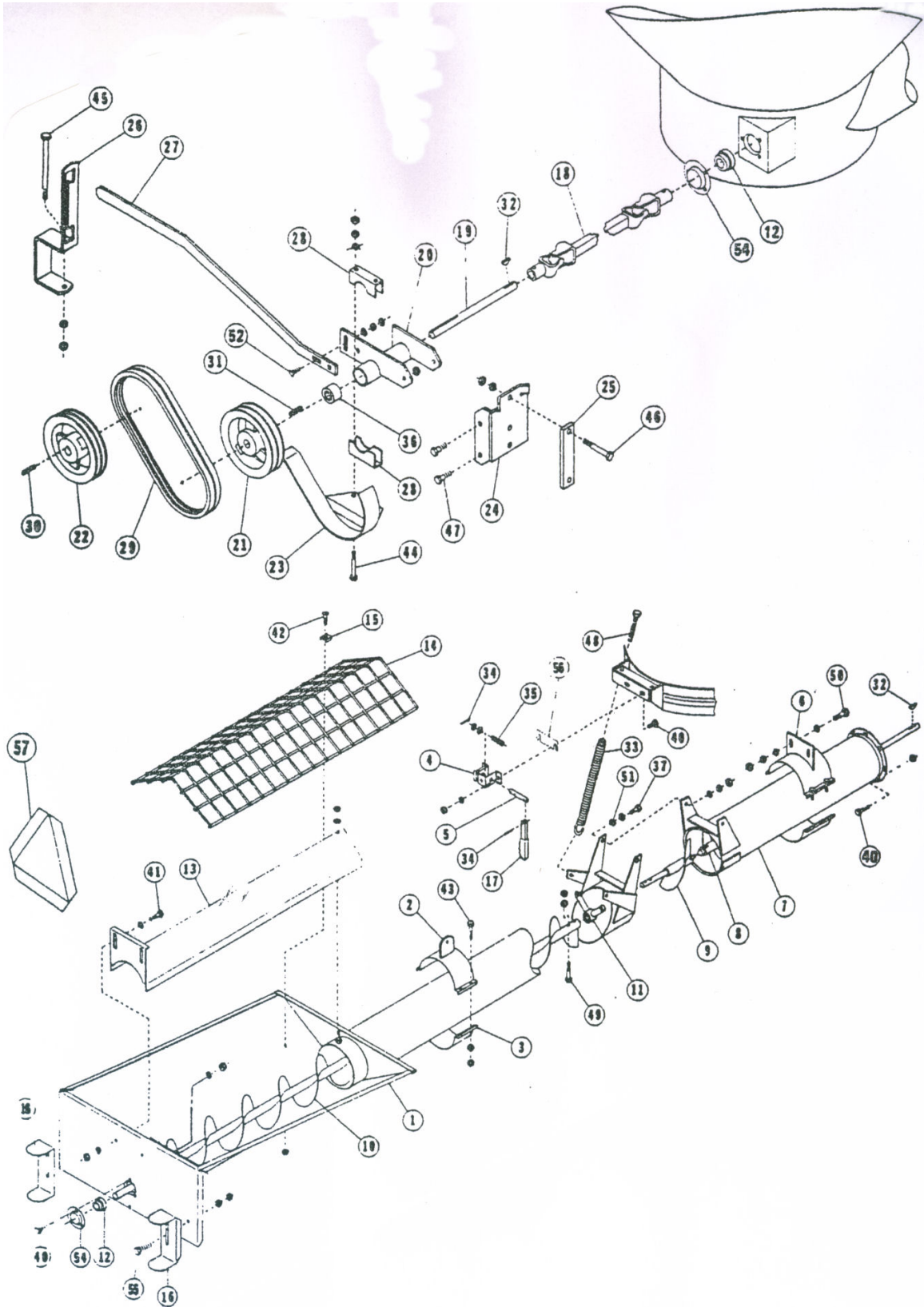
1. Place a jack or similar device under the bottom of the main auger to support the weight of the auger.
2. It is advisable to put a pallet and/or strong wooden boards across the top of the dryer to stand on.
3. Loosen the locking collar on the bearing (2).
4. Remove the two 5/8" diameter bolts which go through the top of the auger shaft (13) and secure the upper stub shaft (3).
5. Remove the upper stub shaft (3).
6. Remove the four cup headed bolts which secure the bearings (2) to the auger tube (11).
7. Fit new bearing using new bolts and nuts if necessary. Do not tighten the bolts at this stage!
8. Grease and re-fit upper stub shaft (3) through bearing (2) and re-fit bolts through auger (13) tighten bolts securely (It may be necessary to jack the auger slightly to get the bolt holes to line up).
9. Center the auger (13) in the tube (11) and then tighten the bolts securing the bearing (2) to the auger tube (11).
10. Release the jack under the main auger and allow the auger to settle down into position, and then secure the bearing locking collar onto the upper stub shaft.
11. Check the bottom auger clearance and adjust as required. See diagram on page 4.04

On dryers fitted with a horizontal hydraulic unloader, a similar procedure should be adopted but it will be necessary to remove the grain spreader from the upper stub shaft. Depending on the age of the dryer, it will be either be bolted to the upper stub shaft or clamped to it using large, square headed screws.

\* It is important to note its position on the upper stub shaft and re-fit it in the same position.\* 4.05

# LOADING HOPPER & DRIVE ASSEMBLY

4.06



## **REPLACING THE INTAKE AUGER FRONT BEARING.**

Refer to diagram on page 4.06

1. Disconnect the PTO shaft from the tractor and lower the loading hopper into the working position.
2. Remove tumbler shaft from auger shaft end. Take care not to lose Woodruff key (32).
3. Loosen locking collar on bearing (12). Remove the three bolts securing the bearing to the bottom auger bin.
4. Remove the bearing flange (54) and slide the bearing off the shaft.
5. Remove remaining bearing flange and check both flanges for wear or damage. If in doubt, fit new.
6. Re-fit bearing flange (54) against bottom auger bin. Fit new bearing (12) and refit outer flange (54).
7. Bolts new bearing assembly to bottom auger bin. If bolt heads are worn, fit new bolts.
8. Set engagement of front auger (8) with rear auger (9) by pushing the front auger (8) rearwards as far as it will go, then pull forward  $\frac{1}{4}$ " (6mm). Once set, tighten the bearing locking collar onto the shaft.
9. Re-fit key (32) and tumbler shaft (18).

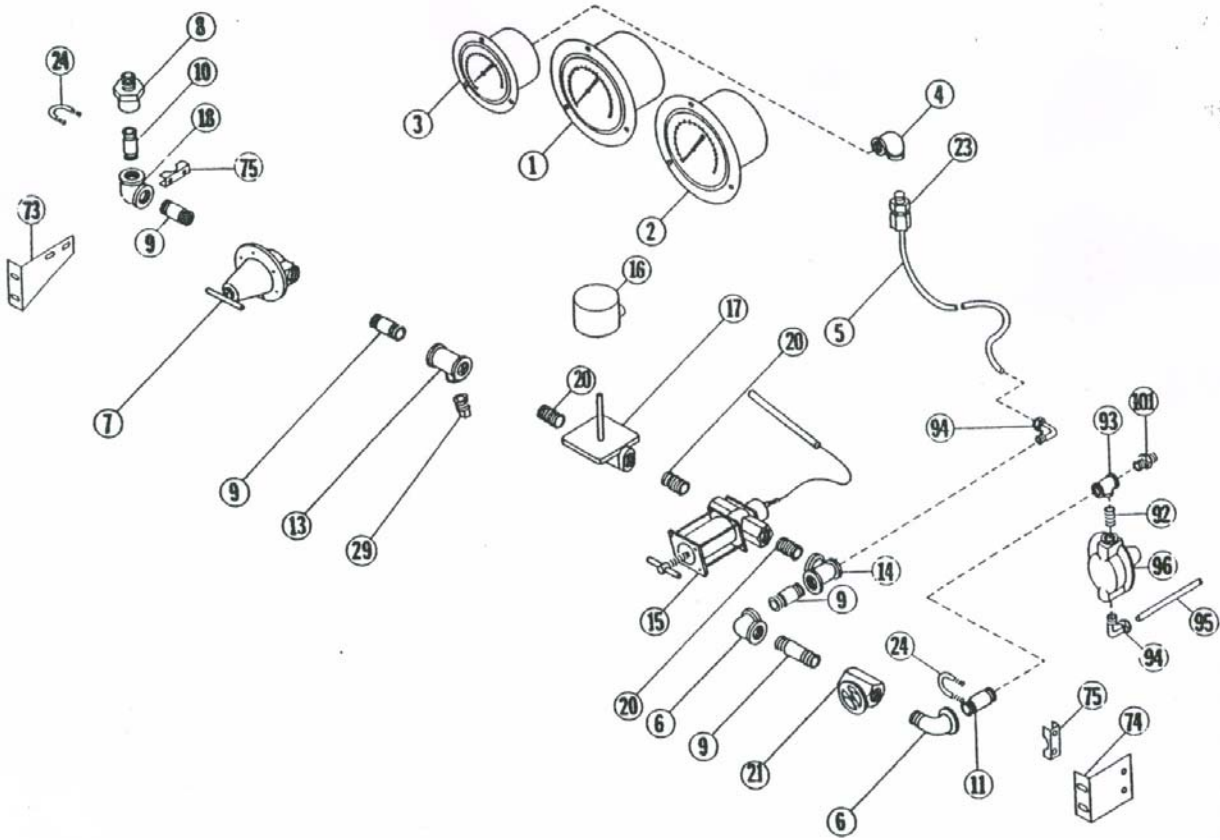
## **REMOVING THE VAPOUR LINE:**

See diagrams on page 4.08

The vapor line is the line between the vaporizer and the burner and contains the main gas controls. Access to it is through the large door on the left hand side of the burner unit. It needs to be removed for cleaning and/or dismantling.

1. Before starting to dismantle any part of the gas system on the dryer, disconnect the gas supply from the tank or cylinders. Start the burner and burn off any gas left in the system (allow the burner to go out through lack of gas). There may be small amount of gas still in the system, so carefully remove the plug from the bottom of the oil trap. Allow oil residue to drain out and refit plug. (Use a long thin screwdriver or stiff piece of wire to remove any solid residue that may be in the pipe).

**VAPOR LINE PLUMBING**



2. Starting at the rear end of the line (pressure regulator end), undo the brass nut and remove the copper tube fitted to the adaptor No 8.
3. Remove the screw from the top of the vapor solenoid coil (16) and lift off the coil. On dryers fitted with a Microprocessor and models 545XL and 345XL, there are two vapor solenoids. It is important to mark the solenoid coils so they are refitted in the correct place. There is no need to disconnect the wires.
4. Non Microprocessor Dryers: Disconnect the temperature sensor bellows from the modulating valve (15). Release all pressure on the adjusting screw and then remove the four screws securing the bellows to the valve body. Carefully withdraw the bellows taking care not to lose the bellows reinforcing plate. (For details of modulating valve see page).
5. Disconnect pressure gauge tube (5) from adaptor (94) situated just after the modulating valve.
6. Disconnect pilot orifice tube (95) from pilot regulator (96).
7. Disconnect copper tube to burner from adaptor (101).
8. Remove handle from ball valve (21).
9. Remove nuts for "U" bolts (24) situated at each end of the line and remove "U" bolts (24) and clamping plates (75). Remove the vapor line to a bench for further work. It may assist removal of the line if the adjusting screws are removed from the pressure regulator (and the modulating valve if fitted).

If the vapor line is dismantled, a good quality sealing compound suitable for use with propane gas should be used on re-assembly.

Re-fitting the vapor line to the burner unit should be carried out in reverse order of removal. Once fitted, the gas supply should be re-connected and the vapor line checked for leaks.

*\*\*\*\* When checking for leaks, use either soapy water or other approved leak detector suitable for gas.*

**!! DO NOT USE NAKED FLAME!!**

**DO NOT RELIGHT THE BURNER UNTIL ALL  
LEAKS HAVE BEEN REPAIRED**

## PROCEDURE TO CLEAN THE PRESSURE REGULATOR DAMPER:

See diagram 4.11

1. Switch off the gas supply at the tank and the liquid intake tap on the dryer.
2. **Light the burner, exhaust all gas from the system:** Remember the vaporizer will contain quite a large amount of gas.
3. Unscrew the large hexagon nut (11) at the rear of the regulator, taking care not to lose the seal (12) or the spring (10).
4. The plunger (9) may be stuck in the hollow part of the nut (11), in which case it will be necessary to carefully remove it. (Take care not to lose the spring).
5. Clean all the parts thoroughly, not forgetting the small hole drilled in the threaded wall of the hollow nut.
6. Place the nut (11), hollow part uppermost on a solid surface. Place the spring (10), narrow end uppermost inside the nut. Place the plunger (9) with the small threaded hole uppermost on top of the spring (10) and press down until the plunger (9) is inside the nut (11). Once inside, release the pressure and allow the spring (10) to push the plunger (9) out. If the spring (10) cannot easily push the plunger (9) out of the nut (11), it will be necessary to take a sharp knife and trim the top off the "O" ring (13) that is fitted around the plunger. Repeat above until plunger (9) moves freely in and out of the nut. Do not apply oil to the "O" ring; if necessary apply a small amount of silicone lubricant.

### RE-ASSEMBLY:

7. Screw the plunger (9) back onto the threaded rod (8) in the rear of the regulator.
8. Make sure the seal (12) is properly fitted in its groove in the nut (11).
9. Fit the spring (10) into the nut (11) narrow end outwards and screw the nut back into the regulator.

### **IMPORTANT:**

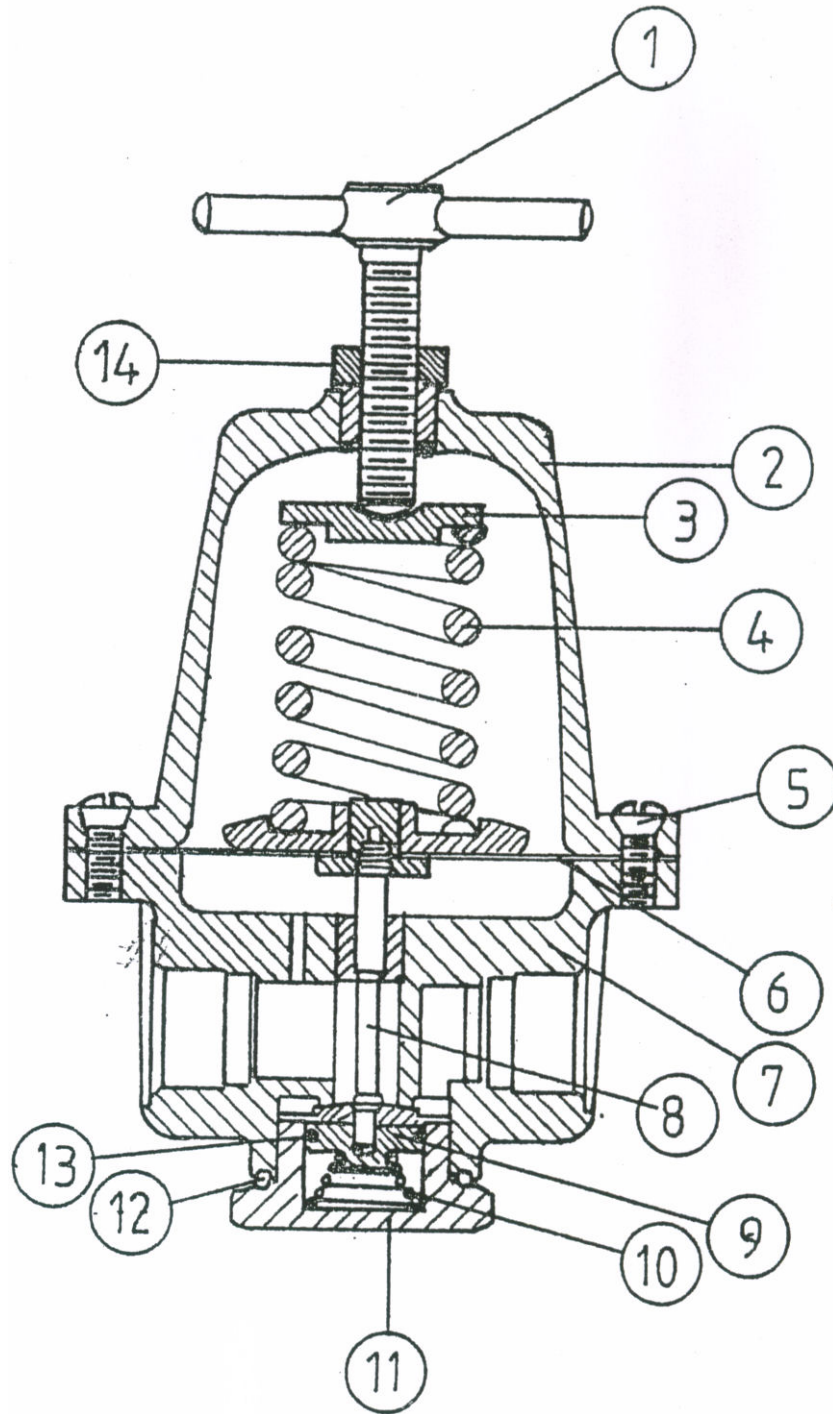
When cleaning the pressure regulator, always ensure that the oil trap is clean before turning on the gas.

Turn on the gas supply and check for gas leaks using soapy water or other approved leak detector suitable for gas.

**DO NOT RELIGHT THE BURNER UNTIL ALL LEAKS HAVE BEEN REPAIRED.**

**!! DO NOT USE NAKED FLAME !!**

PRESSURE REGULATOR



## DISMANTLE AND CLEAN SOLENOID VALVE:

Propane Gas Dryers – Refer to diagram 4.13:

The dryer will be equipped with either 2 or 3 solenoid valves depending on the model and age. One solenoid is used to control the liquid gas flow and one or two are used to control the vapor flow. Where two solenoids are used to control the vapor flow, one controls the low heat, and one the high heat. The low heat solenoid is fitted with a control orifice and care should be taken to ensure that the orifice plug is clean and secure.

**BEFORE ATTEMPTING TO REPAIR A SOLENOID, TURN OFF THE GAS SUPPLY AT THE TANK OR CYLINDERS. LIGHT THE BURNER AND EXHAUST ALL GAS FROM THE SYSTEM.**

To dismantle the solenoid, first remove the screw from the top and lift off the electrical coil (1). If two solenoids are to be cleaned, mark each coil to ensure they are re-fitted in the same position.

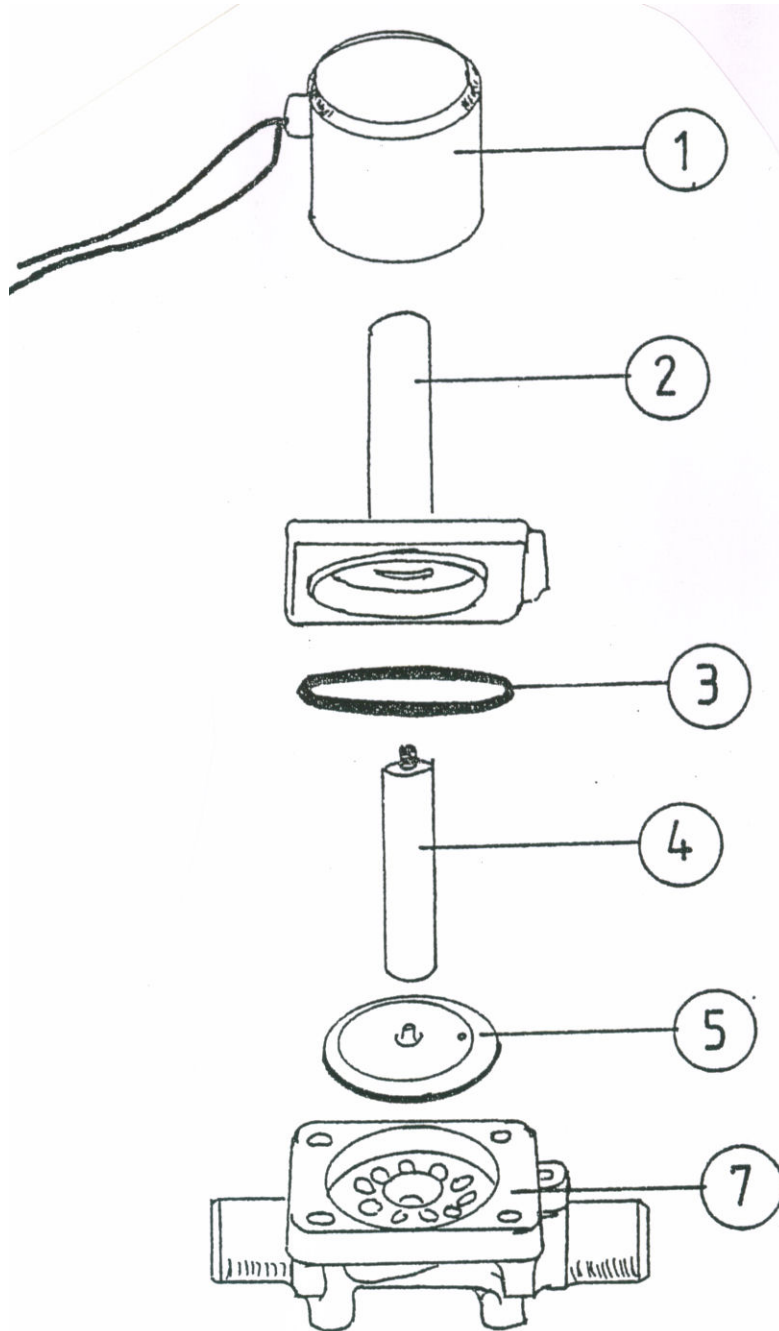
Next remove the four socket head screws from the base of the solenoid body (the top (2) will be pushed up by pressure from the plunger spring), then carefully lift off the top (2) taking care not to lose the “O” ring (3) or the plunger (4). Next lift off the diaphragm (5) noting which way it is fitted. (The diaphragm is usually marked to show which way it should be but it is not always easy to read).

Clean all parts thoroughly, inspect “O” ring (3) and diaphragm for signs of wear or damage, if at all suspect fit new parts. When re-assembling, place diaphragm on solenoid body (7) ensuring it is the correct way up. Hold the solenoid top section (2) upside down and put the plunger (4) back into the center. Before fitting plunger (4) make sure the spring is still fixed in the top. This end should go in first. Next fit “O” ring (3) to the top section (2) and re-fit to the base (7) using the four socket head screws. Tighten the screws fully but first ensure that the diaphragm (5) and “O” ring (3) are not likely to get damaged.

Refit the electrical coil and secure with the screw. If two solenoids have been cleaned, ensure that the coils are fitted in the correct position.

Once assembly is complete turn on the liquid gas supply tap and allow the vaporizer to fill. Leave the vapor tap switched OFF. Operate both solenoids to ensure they are full of gas and check for leaks using SOAPY WATER. If a leak is detected it must be repaired before the burner is lit.

# SOLENOID VALVE



## REPLACING THE POWER ELEMENT ON A MODULATING VALVE:

The power element (10) usually needs to be replacing when it is not possible to control the heat of the dryer with the modulating valve.

To change the power element you will need the dryer empty of grain. Disconnect the PTO shaft from the tractor before entering the dryer. With electric drive models, ensure electrical power is switched off at the main switch or fuse box. Exhaust all gas from the lines.

Remove the power element sensor from the plenum chamber and tube. (Take care not to damage the other capillary tubes). Enter the plenum chamber through the access hole and locate the power element (it should be on the right hand side of the burner tube). It is easily identifiable, being the biggest of the three sensors in the bracket.

Release the pressure on the adjusting screw.

Remove the four screws which secure the power element bellows (8) and carefully withdraw the bellows from the main body of the valve. Take care not to lose the reinforcing plate (9).

Carefully inspect the new power element and uncoil the copper capillary tube between the bellows and the sensor. Take care not to kink the tube as this will render the power element useless.

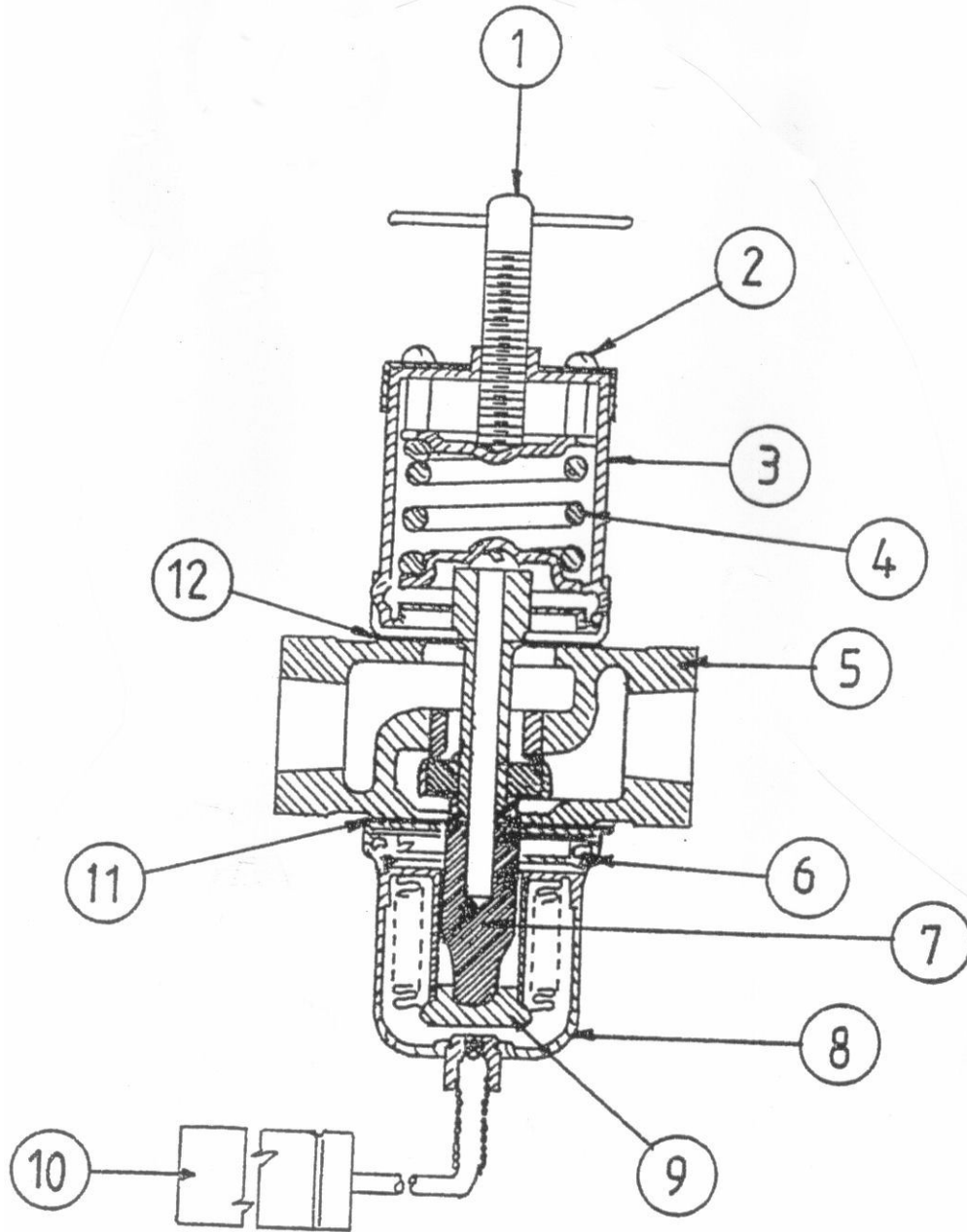
Fit the bellows (8) of the new power element to the main body of the valve, ensuring that the reinforcing plate (9) is in position. Carefully thread the power element sensor and tube through the tube into the plenum chamber and fit the new sensor into the bracket and secure it to the frame. Carefully coil up and/or secure any excess capillary tube so it cannot get accidentally damaged.

To reset the valve, screw in the adjusting screw (1) until pressure is felt the screw in a further 4 full turns. Make the final adjustment with the burner running.

Reconnect the PTO shaft and turn on the gas. Energize the liquid gas solenoid and allow the vaporizer to fill. Turn off the vapor tap and energize the vapor solenoid once there is a pressure reading on the gauge, then check for gas leaks using SOAPY WATER. Repair as required.

Start the dryer and ignite the burner in the usual way, once the plenum temperature has started to raise the pressure gauge reading should start to drop. Once the temperature and pressure gauge readings appear to have stabilized, it is possible to check the operation of the valve by making a sudden adjustment of  $\frac{1}{4}$  to  $\frac{1}{2}$  a turn on the adjusting screw (1) either way. This should cause a fall or rise in the pressure gauge reading.

**MODULATING VALVE**



## PROBLEM SOLVING: MECHANICAL

### PROBLEM:

1. Main auger stopped

#### POSSIBLE CAUSE:

a.) Belt slipping

#### REMEDY:

Check belt for signs of burning. IF burnt, fit new belt, otherwise adjust tension.

#### POSSIBLE CAUSE:

b.) Foreign body stuck in auger

#### REMEDY:

Empty dryer and remove obstruction.

#### POSSIBLE CAUSE:

c.) Wet grain left in dryer overnight

#### REMEDY:

Empty dryer, start auger and refill. Grain should not be left in the dryer overnight as it will settle around the bottom of the auger making it difficult to turn.

#### POSSIBLE CAUSE:

d.) Auger bearing seized

#### REMEDY:

Check bearings, renew as required.

**PROBLEM:**

2. Agitator drive chain comes off

**POSSIBLE CAUSE:**

- a.) Agitator roller bearing seized

**REMEDY:**

Check rollers and repair as required

**POSSIBLE CAUSE:**

- b.) Excessive horizontal play between agitator race and rollers

**REMEDY:**

Check and adjust rollers.

**POSSIBLE CAUSE:**

- c.) Agitator drive sprocket out of line

**REMEDY:**

Check alignment of sprockets and adjust as required.

**POSSIBLE CAUSE:**

- d.) Loading rate too fast

**REMEDY:**

If grain is fed into the dryer too quickly it cannot be moved by the main auger and it builds up around the agitators sometimes getting into the race and causing the chain to come off. Close the grain flow regulator in the loading hopper slightly to reduce the grain flow.

**PROBLEM:**

3. Excessive Drying Time

**POSSIBLE CAUSE:**

- a.) Inaccurate plenum temperature gauge/low plenum temperature

**REMEDY:**

Check accuracy of the plenum gauge/re-adjust plenum temperature

**POSSIBLE CAUSE:**

- b.) Poor grain circulation

**REMEDY:**

Check operation of agitator. Adjust position of agitator arms if required.

Check for build of foreign material, chaff etc... In bottom auger bin. Clean as required.

Check condition of main auger especially the first pitch of flight at the bottom. Repair if badly worn.

If fitted with horizontal unloader, short top section of auger flight may be worn and need replacing. Obstruction such as a piece of wood or a bag stuck in auger.

If top section has recently been removed, check alignment of flight at the joint. Flight should be continuous.

**POSSIBLE CAUSE:**

- c.) Dirty or trashy grain

**REMEDY:**

Leave fan operating whilst filling the dryer, this will blow some trash out of the grain.

Ensure grain cleaner is working.

**POSSIBLE CAUSE:**

- d.) Difficult to dry crop

**REMEDY:**

Sometimes a problem crop can be more efficiently dried using a lower plenum temperature. Very wet, high gluten wheat is usually better dried using a lower than normal plenum temperature.

**PROBLEM:**

3. Excessive Drying Time - Continued

**POSSIBLE CAUSE:**

e.) Incorrect fan speed

**REMEDY:**

Check PTO speed and adjust as required.

Check fan belt tension, adjust as required

**POSSIBLE CAUSE:**

f.) Re-circulation of exhaust air from dryer back into fan

**REMEDY:**

Re-position dryer so exhaust air is blown away from fan.

If dryer is under cover improve ventilation. If possible position fan in doorway or other opening to the outside.

**POSSIBLE CAUSE:**

g.) Adverse weather conditions

**REMEDY:**

Damp, high humidity atmosphere will affect the drying performance.

**PROBLEM:**

4. Slow filling rate

**POSSIBLE CAUSE:**

a.) Incorrect PTO/auger speed

**REMEDY:**

Check PTO speed, adjust as required.

Check drive belt tension and adjust as required.

**POSSIBLE CAUSE:**

b.) Foreign material in auger

**REMEDY:**

Clean out auger, check for foreign material also clean out bottom auger bin.

**PROBLEM:**

4. Slow filling rate - Continued

**POSSIBLE CAUSE:**

c.) Worn auger flight

**REMEDY:**

Check auger flight for wear. Repair as required.

Check auger flight drive coupling for wear. Repair as required.

**PROBLEM:**

5. Slow Discharge Rate Horizontal Unloader

**POSSIBLE CAUSE:**

a.) Incorrect auger speed

**REMEDY:**

Check hydraulic supply flow rate (required 6-7 rpm). (Auger speed should be 450-480 rpm).

**POSSIBLE CAUSE:**

b.) Worn auger flight

**REMEDY:**

Check top section of main auger for wear. Repair as required.

Check horizontal auger flight for wear or damage. Repair as required.

**PROBLEM:**

6. Main Auger Belt turns over and twists

**POSSIBLE CAUSE:**

a.) Incorrect belt and or tension

**REMEDY:**

Use only genuine GT belt, proprietary brand belts are not usually strong enough.

Check belt tension, adjust as required.

Incorrect positioning of idler pulleys. When adjusting belt tension, the idler pulleys should be kept level where possible.

**PROBLEM:**

7. Trash or Grain Fire

**POSSIBLE CAUSE:**

- a. Excessive plenum temperature

**REMEDY:**

Reduce plenum temperature

**POSSIBLE CAUSE:**

- b.) Trash build up in plenum

**REMEDY:**

Clean plenum chamber regularly, especially with dirty or trashy crops.

**POSSIBLE CAUSE:**

- c.) Poor circulation of grain

**REMEDY:**

See notes above.

**POSSIBLE CAUSE:**

- d.) Ruptured gas line or vaporizer

**REMEDY:**

Check condition of flame for signs of leakage. Repair as required.

**SHOULD A FIRE OCCUR IN THE GRAIN, THE FOLLOWING ACTION SHOULD BE TAKEN:**

1. Shut off the fuel supply.
2. Disengage the fan clutch and continue to circulate the grain. If the fire persists empty the dryer and dose with water.
3. Do not attempt to disconnect the gas supply as escaping gas may ignite.
4. If fire is close to cylinders, tanks or supply line, keep cool by dosing with water.
5. If the fire department needs to be called, advise them of the proximity of propane cylinders or tank.