

**10" INTAKE DRIVE
TRANSPORT AUGER**

MODEL & LENGTH: _____
SERIAL NUMBER: _____
DATE PURCHASED: _____

MANUAL



Cardinal™ Brand Grain Handling Equipment One Year Limited Warranty

Novae Corp. warrants to the original owner that your Cardinal equipment will be free from defects in material and workmanship for the one (1) year period commencing with the date of purchase, except as herein limited. The obligation of this warranty is limited to repairing or replacing any part or parts which, in the opinion of Novae Corp. is/are defective in material or workmanship under normal use and service.

90 Day Limited Warranty

Excluded from this One Year Limited Warranty are driveline components such as gearboxes, PTO drive shafts, chain and belt drives, and universal joints, which are warranted for a 90 day period commencing with the date of purchase.

Warranty Validation

Your new equipment should be registered with Novae Corp within ten (10) days of the original purchase. Warranty registration forms are available on the web at www.cardinalgrain.com or by calling customer service at 888-400-3545 to have one mailed to you.

How to Obtain Service

1. All warranty claims must be presented to Novae Corp. and proper arrangements must be made and approved by Novae Corp. prior to any work being done.
2. All warranty repairs must be performed at Novae Corp. unless prior approval is obtained from Novae Corp. In certain cases, Novae Corp may, at its sole discretion, elect to have warranty work performed by a qualified repair facility.
3. Novae Corp. will not be obligated in any way to pay for: repairs made without specific advance approval, labor charges in excess of those deemed reasonable by Novae Corp., or for any part costs in excess of the cost if Novae Corp. had supplied the parts. The cost of any replacement items will be limited to the amount of the original cost of that item as installed and sold by Novae Corp.
4. Any charges for: overtime labor, service calls, towing charges, expediting, freight or transportation costs are the sole responsibility of the consumer and will not be paid by Novae Corp.

Items Not Covered In This Warranty

1. Wheels and Tires. Contact the tire manufacturer for warranty information
2. Running Gear including axle and suspension assemblies. Present all claims directly to the axle manufacturer or their authorized dealers.
3. Paint finish and durability are not covered under this warranty.
4. Damage or defects resulting from misuse (including, but not limited to, improper operation, negligence, alteration, accident or lack of maintenance.)
5. Maintenance items that are worn through normal use.
6. Damage caused by loose nuts, bolts or screws including improperly torqued wheel lug nuts.
7. Damage caused by improper hitching or improper installation of drive motors.
8. Loss of time, inconvenience, loss of equipment use, rental or substitute equipment, loss of revenues, or any other losses.
9. Damage or loss resulting from towing equipment that exceeds the tow vehicle manufacturer's specific towing limitations.
10. Any travel time or expenses, such as food, fuel, lodging, etc., incurred to obtain service.

Any express warranty not provided herein, and any remedy for breach of contract which, but for this provision, might arise by implication or operation of law, is hereby excluded and disclaimed. The implied warranties for merchantability and of fitness for a particular purpose are expressly limited to a term of one (1) year. Under no circumstances will Novae Corp. be liable to purchaser or any other person for any special, incidental, or consequential damages, whether arising out of a breach of warranty, breach of contract or otherwise. This warranty gives you specific legal rights and you may have other rights which vary from state to state.

Novae Corp. neither assumes nor authorizes any other person to give any other warranty on its behalf. This warranty is not transferable from the original owner.

Cardinal™ Equipment Warranty Registration Form

Model: _____ Date: _____

Serial Number: _____

Owners Name: _____ Phone Number: _____

Street: _____

City, State Zip: _____

Primary Use: _____

Store and Location where purchased: _____ Delivery Date: _____

Store Representative: _____ Owner Signature: _____

(Fold to conceal information, tape closed, affix postage and mail)

Name: _____

Address: _____

City, State Zip: _____

PLACE
POSTAGE
HERE

NOVAE CORP. / CARDINAL GRAIN
807 S CHAUNCEY ST
COLUMBIA CITY, IN 46725



Cardinal Grain Systems, Inc.

Post Office Box 992

Telephone (219) 244-4654

607 South Chauncey Street

Columbia City, IN. 46725

Fax (219) 244-7355

TABLE OF CONTENTS

SAFETY GUIDELINES & OPERATIONAL INFORMATION.....	PAGE 4-7
MAINTENANCE & LUBRICATION.....	PAGE 8
SPECIFICATIONS.....	PAGE 9
TUBE , SCREW & COMPONENTS DIAGRAM.....	PAGE 10
EACH INDIVIDUAL AUGER LAYOUT.....	PAGE 11-16
TUBE AND SCREW JOINING.....	PAGE 17
TOP END AND TRUSS DETAILS.....	PAGE 18
CHASSIS ASSEMBLY INSTRUCTION.....	PAGE 19
CHASSIS PARTS LIST & INSTRUCTIONS.....	PAGE 20
INTAKE ASSEMBLY INSTRUCTIONS.....	PAGE 21
PTO AND ELECTRIC DRIVE DETAILS.....	PAGE 22
PTO SHAFT AND GEAR BOX PARTS BREAKDOWN.....	PAGE 23



READ AND UNDERSTAND THIS MANUAL BEFORE OPERATING!



CAUTION! This symbol is used to call your attention to specific instructions relating to safety. It is recommended that you review the entire contents of this manual, paying particular attention to items preceded by this symbol.

FAILURE TO HEED THESE INSTRUCTIONS CAN RESULT IN PERSONAL INJURY!

OPERATOR QUALIFICATIONS



Operation of this farmstead equipment shall be limited to competent and experienced persons. In addition, anyone who will operate or work around power equipment must use good common sense. In order to be qualified, he must also know and meet all other requirements, such as:



1. Some regulations specify that no one under the age of 16 may operate power machinery. This includes farmstead equipment. It is your responsibility to know what these regulations are in your own area or situation.



2. Current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved."*



3. Unqualified persons are to stay out of the work area. The "Work Area" is defined as any area within 20 feet of storage bins or buildings or the loading or unloading system.



4. A person who has not read and understood all operating and safety instructions is not qualified to operate the machine.

*Federal Occupational Safety & Health Standards for Agriculture Subpart D, Section 1928.57 (a) (6)

MACHINE INSPECTION

After completion of assembly and before each use, inspection of the equipment is mandatory. This inspection should include but not be limited to:



1. Check to see that all guards listed in the assembly instructions are in place and secured, and functional. PTO shields must rotate easily.



2. Are all fasteners tight?
3. Are all belts and chains properly adjusted? (See Service Section.)
4. Check oil levels in drive boxes. (See Service Section.)

DRIVES AND LOCK OUT

It is essential to inspect your drive before adding power and know how to shut down in an emergency. Whenever you must service or adjust your equipment, make sure you shut down and lock out your power source.

A. PTO

PTO—Shaft



1. Never use a PTO shaft without a rotating shield in good working order. Also see that the power drive system safety shields are in place at the equipment gear box and the power source.



2. Be certain that the PTO shaft is securely attached to the gear box and the power source.
3. Do not exceed maximum recommended operating length or angularity of PTO shaft.
4. Before starting power source, be certain power to PTO is off.
5. Stay out of the hazard area of an operating PTO.



Lock Out



1. Remove ignition key or coil wire from power source. If this is impossible, remove the PTO shaft from the work area.

B. Electric

Power Source



1. Electric motors and controls shall be installed by a qualified electrician and must meet the standards set by the National Electrical Code and all local and state codes.



2. A magnetic starter should be used to protect your motor.



3. You must have a manual reset button.



4. You must disconnect power before resetting your motor.



5. Reset and motor starting controls must be located so that the operator has a full view of the entire operation.



6. Keep all guards and shields in place.

A main power disconnect switch capable of being locked only in the Off position shall be provided. This shall be locked whenever work is being done on the equipment.

C. Gasoline Engines

Power Source



1. Never attempt to adjust or service engine while it is in operation.

2. Shut down and allow engine to cool before filling with fuel.

3. Keep all guards and shields in place.



1. For engines with rope or crank start, remove spark plug wire or spark plug.

2. For engines with electric start, remove ignition key, spark plug wire or spark plug.

D. HYDRAULIC POWER

Power Source



1. Refer to the above rules and regulations applicable to the power source operating your hydraulic drive.

2. Do not disconnect hydraulic lines while system is under pressure. Consult your hydraulic systems operators manual for proper procedures.

3. Keep all hydraulic lines away from moving parts.



Refer to the above rules and regulations applicable to the lock out of the power source operating your hydraulic drive.

FULL LOAD OPERATING PROCEDURES

During the regular operation of your farmstead equipment, one person shall be in a position to monitor the operation.

It is also good practice to visually inspect the equipment periodically during the actual operation. You should be alert for unusual vibrations, noises, and the loosening of any fasteners.

Caution:



1. Observe work area restrictions.
2. Keep all safety shields and devices in place.
3. Make certain everyone is clear before operating or moving farmstead equipment.



4. Keep hands, feet, and clothing away from moving parts.
5. Shut off power to adjust, service, or clean.

SHUTDOWN

A. Normal Shutdown

Make certain that the equipment is empty before stopping the unit.

Before the operator leaves the work area, the power source shall be locked out.

B. Emergency Shutdown

1. Should the equipment be immediately shut down under a load—disconnect and lock out the power source. Clear as much grain from hopper and auger as you can. Never attempt to restart when full.
2. Reconnect power source and clear the equipment gradually.
3. Starting equipment under load may result in damage to equipment. Such damage is considered abuse of the equipment.

WORK AREA SAFETY AND DIAGRAMS



1. Designated work areas shall be marked off with colored nylon or plastic rope hung as portable barriers to define the designated work areas.



3. It shall be the duty of all operators to see that children and/or other persons stay out of the work area: Trespass into the work area by anyone not involved in the actual operation, or trespass into a hazard area by anyone, shall result in an immediate shut down by the operator.

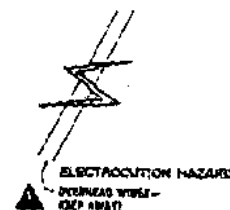
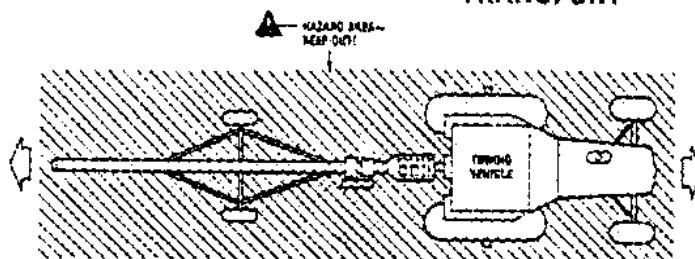


2. Under no circumstances should persons not involved in the operation be allowed to trespass into the work area.

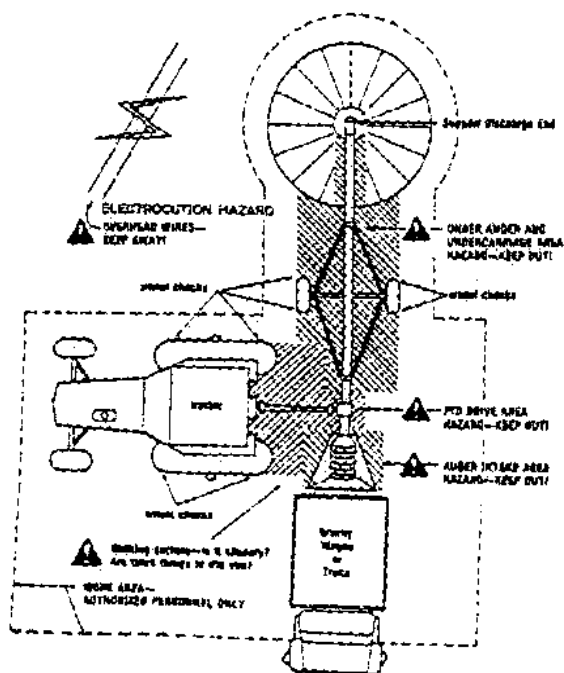


4. Prior to start up and during operation, it shall be the responsibility of all operators to see that the work area has secure footing, is clean and free of all debris and tools which might cause accidental tripping and/or falling.

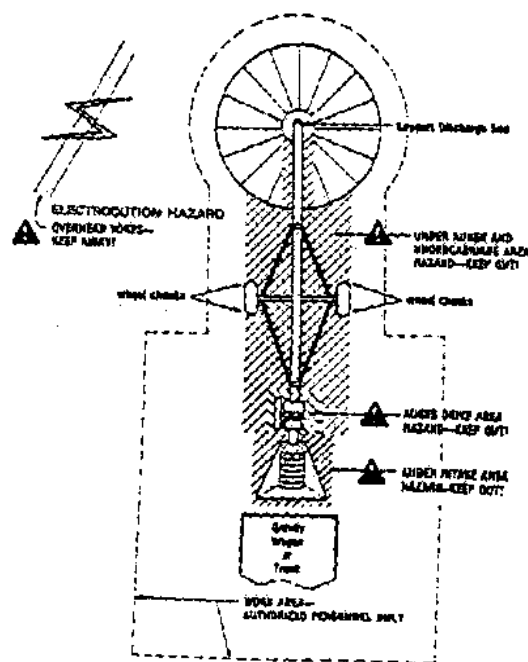
TRANSPORT



PTO DRIVE



GAS, ELECTRIC AND HYDRAULIC



MANUAL WINCH OPERATION



**READ BEFORE EACH USE!
SEE WINCH**

1. This winch is equipped with a brake that is actuated by turning the handle. Turn the handle clockwise to raise the auger, and counterclockwise to lower the auger. The brake is designed to hold the auger in position.
2. **CAUTION:** The brake is not fully locked until the handle is turned clockwise far enough to hear two clicks.
3. **CAUTION:** The brake disc will get HOT when lowering auger. If brake is smoking, or squeals, stop lowering and let the brake cool for 15 minutes. **DO NOT TOUCH BRAKE!**
4. **NEVER CONTINUE TURNING THE HANDLE COUNTERCLOCKWISE IF THE AUGER DOES NOT LOWER; THIS WILL DISENGAGE THE BRAKE MECHANISM.**
5. Brake disc inspection (items 9). To physically check the wear on these parts, they must be removed from the winch. Measure the discs for wear and if they are worn to 1:16 of an inch, replace both discs.



READ MANUAL SHIPPED IN WINCH CARTON.

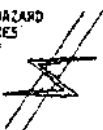
TRANSPORTING AND POSITIONING



Your auger is designed for maximum balance when empty and in down position. Auger must be empty and in lowest position before moving. Partially filled augers can be dangerous and difficult to handle. Before transporting on county or state highways, contact your local sheriff's department or State Highway Patrol office for laws governing the transportation of the equipment in question. Care should be exercised when traveling on rough and uneven terrain and in turning and cornering to avoid upsetting. Auger is designed for transport at tractor speeds. Be alert to overhead obstructions and electrical wires and devices.



**ELECTROCUTION HAZARD
OVERHEAD WIRES
KEEP AWAY**



**ELECTROCUTION HAZARD!
THIS MACHINE IS NOT INSULATED. KEEP AWAY FROM OVERHEAD WIRES AND DEVICES. ELECTROCUTION CAN OCCUR WITHOUT DIRECT CONTACT. FAILURE TO KEEP AWAY WILL RESULT IN SERIOUS INJURY OR DEATH!**

Leave auger in the full down position while moving. Raise auger to necessary height and back into position at bin or building making sure all persons are clear of the hazard area. Auger must be hooked up to the tractor for transport, raising and placement. **DO NOT push or pull in any other manner.** Operation site should be firm and level. When in place, unhook from tractor, lower to final position, remove hitch and install the proper hopper. Install the necessary wheel chocks, supports and anchors needed to secure auger. When operation is complete, move auger slowly out of the working position with towing vehicle--not by hand. If not in transport position, lower auger to the full down position immediately upon clearance of any obstruction. Transport to the new work area or storage area. We recommend that the auger be stored in the full down position with the intake end anchored.

BEFORE OPERATING AUGER



Make certain everyone is clear of the auger before starting or moving it.



Electric drives should have manual resets on auger. Wiring must be done by a qualified electrician making certain it meets all safety laws and ordinances.



Make certain all guards and shields are in place before starting.

CAUTION: Auger should be securely fastened to bin or building during operation or when raised and unattended.

BREAK-IN INSTRUCTIONS

Augers should be broken in properly and never run empty. Do not try out new auger prior to season by running it empty. This will result in serious damage to your auger.

Idle engine and be sure a supply of grain is available. Slowly engage clutch lever and increase R.P.M. to handle grain supply. New augers should always be run at reduced capacity until tube and screw become polished, therefore auger should be broken in at reduced RPM's. This would also be true of an auger which has not been used for some time.

ANGLE OF OPERATION

Your auger is designed to operate between 15° and 45°. Capacity decreases and power requirements increase as the angle of operation increases, therefore the lower the angle of operation the greater the efficiency of the auger.

RAISING AND LOWERING



FAILURE TO HEED THESE INSTRUCTIONS CAN RESULT IN PERSONAL INJURY.

1. Never fully extend the cable. Always keep three (3) complete turns of the cable around the drum.
2. Always inspect the cable for damage prior to each use. Replace frayed or kinked cable.
3. The operator must keep all persons clear of the auger when it is being raised or lowered.
4. Never operate winch with wet or oily hands and always use a firm grip on the handle.
5. Auger should be in the down position or secured to bin or building when unattended.
6. Always keep the winch lubricated per lubrication instructions. Remember that worn parts cause unsafe conditions.
7. Whenever raising auger with a manual winch, listen for a "clicking sound" of the ratchet. If the clicking sound stops, keep a firm grip on the handle and return the auger to the full down position by turning the handle counterclockwise. Repair the ratchet. There will not be a clicking sound when the auger is being lowered.
8. The winch is designed for raising the auger weight only! **DO NOT LIFT OTHER ITEMS WITH THE AUGER!**

-MAINTENANCE AND LUBRICATION-

-Periodic Inspection-

The auger is subject to some vibration. Even though all the nuts are locking types, the auger should be checked at least once a week during operation for loose bolts and nuts. Especially check in critical areas; such as the tube joiners, chassis hook-up, drive shafts, PTO shafts, trailer hitches, ect. This is especially true with a new auger. One mistightened bolt could cause a lot of down time. Check your new auger closely.

-Lubrication-

Lubrication and care of this auger will determine its useful life. The more care, the greater its life.

PTO SHAFTS-Grease the fittings on each yoke each eight hours of operation and right before storage. Pull the sliding members apart and grease the surface of the solid square shaft at least twice a year.

GEARBOX-Fill with EP80 or EP90 Gear Oil. Check level through plug in the side of gearbox housing. Be sure vent plug is in the top of the gearbox.

INTAKE DRIVE HOUSING-This unit has a fixed center distance (no adjustment) roller chain drive. Fill this housing with approximately one (1) pint of SAE # 10 or #20 motor oil. There is a level check plug on the lower part of the housing. Be sure the vent plug is in the top of the housing.

WHEELS-Repack each wheel hub at least once a year and check before transporting long distance. Lubricate each wheel right before storage. Periodically check the wheel bearings for excessive wear.

WINCH-All gears should have a film of grease on them at all times. The bushings should be wet with oil. Do not lubricate any part of the friction brake. (See instructions included in the winch carton.)



Shut off power to adjust, service or clean.

-SPECIFICATIONS-

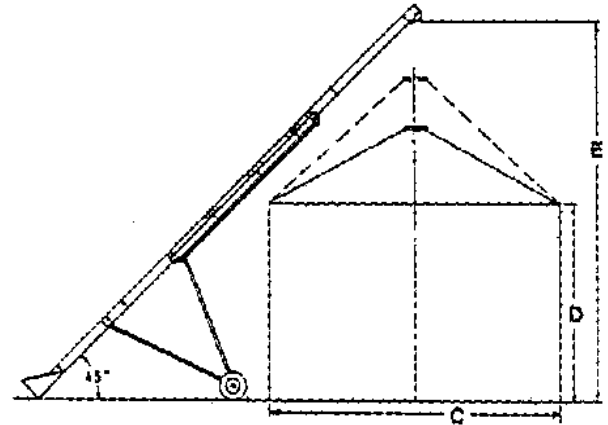
WHEEL TREAD WIDTH ----- 75" ON 32' MODEL
 93" ON 47'-62' MODELS
 104.5" ON 72' MODEL

WHEEL BEARINGS ----- TAPERED ROLLER BEARING

AUGER RPM ----- 400

APPLICATION CHART

Lengths	32'	47'	52'	57'	62'	72'
Bin Dia. (Max) C	16'	24'	32'	31'	34'	44'
Base (Max) D	14'	21'	20'	25'	26'	28'
Discharge Hgt. (Max) E	21'6"	33'	35'	39'	43'	48'



CAPACITY CHART
(In Bushels Per Hour)

Materials	Elevation	
	20°	45°
Dry Corn (14%)	3600	2900
Hi-Moisture Corn (25%)	2100	1680
Soybeans	2900	2300
Wheat	3280	2600
Oats	2800	2100
Cornmeal	2800	2240

NOTE: Due to such variables as the cleanliness and the moisture content of the material, the method of feeding into the auger, and other variables, the actual capacities may vary from the figures at left.

Recommended Electric Motor Horsepower

32'		47'		52'		57'		62'		72'	
DRY	WET	DRY	WET	DRY	WET	DRY	WET	DRY	WET	DRY	WET
10	13	15	20	20	25	20	25	25	30	30	35

TRANSPORT HEIGHTS

LENGTH	32'	47'	52'	57'	62'	72'
10"	8'9"	10'9"	11'9"	13'0"	14'0"	16'0"

32'

A28794 30'-9" Tube

USE FOR SCREW DIAGRAMS
10" I.D. AUGERS

A28569 12' Discharge Tube



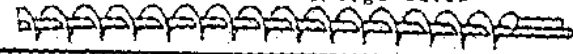
47'

A28654 14'-9" Tube

A28798 31' Tube

A28571 18' Intake Screw

A28570 31' Discharge Screw



52'

A28800 19'-9" Tube

A28796 31' Tube

A27944 21' Intake Screw

A28570 31' Discharge Screw



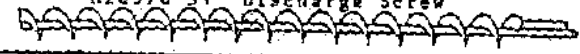
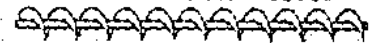
57'

A28801 24'-9" Tube

A28797 31' Tube

A28572 26' Intake Screw

A28570 31' Discharge Screw



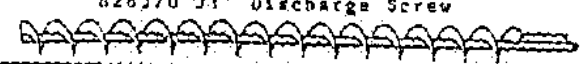
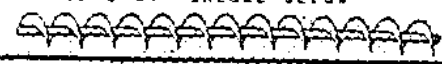
62'

A28802 29'-9" Tube

A28798 31' Tube

A28573 31' Intake Screw

A28570 31' Discharge Screw



72'

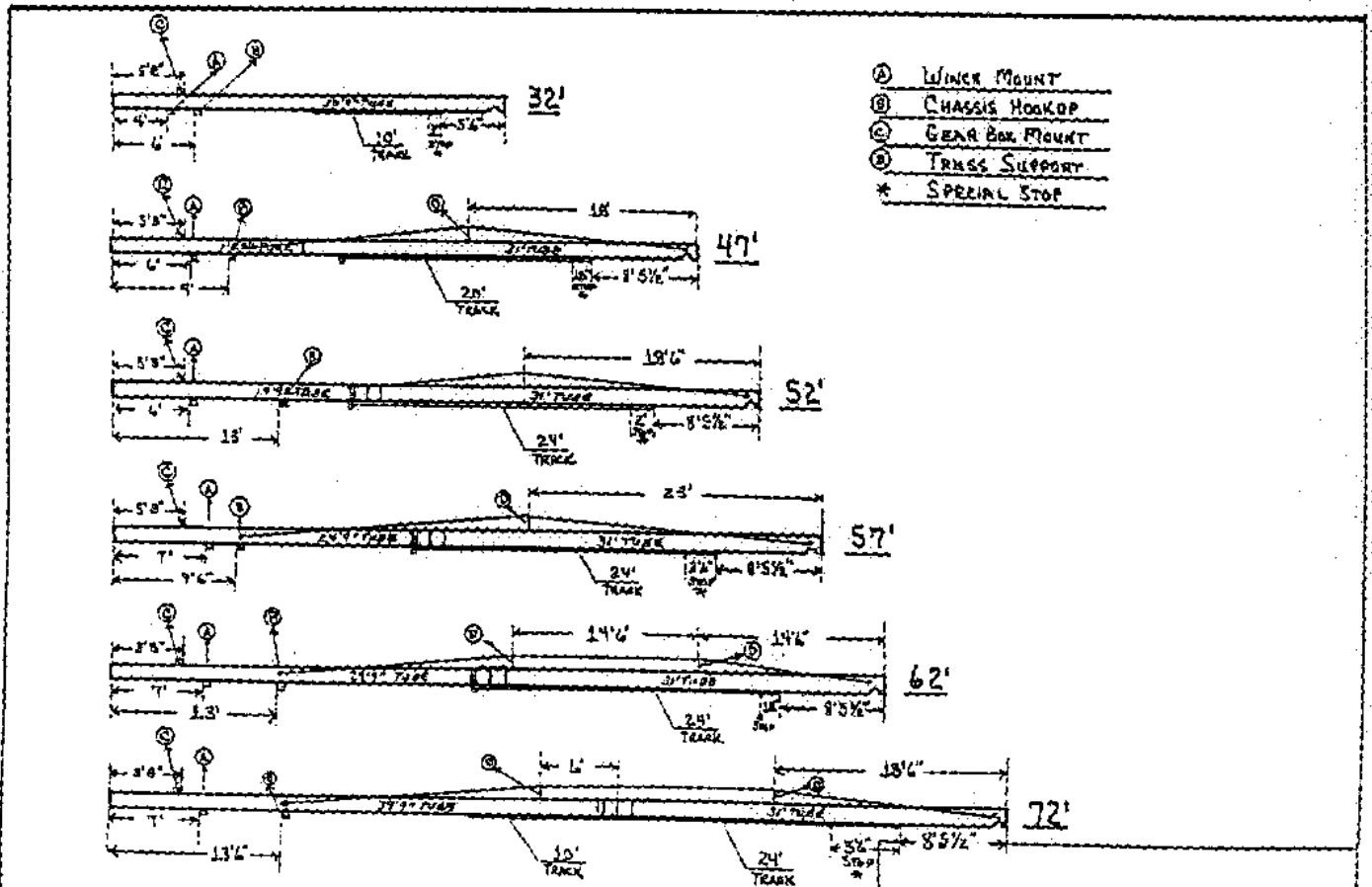
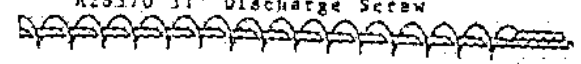
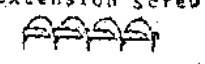
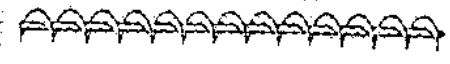
A28803 39'-9" Tube

A24714 10' Extension Screw

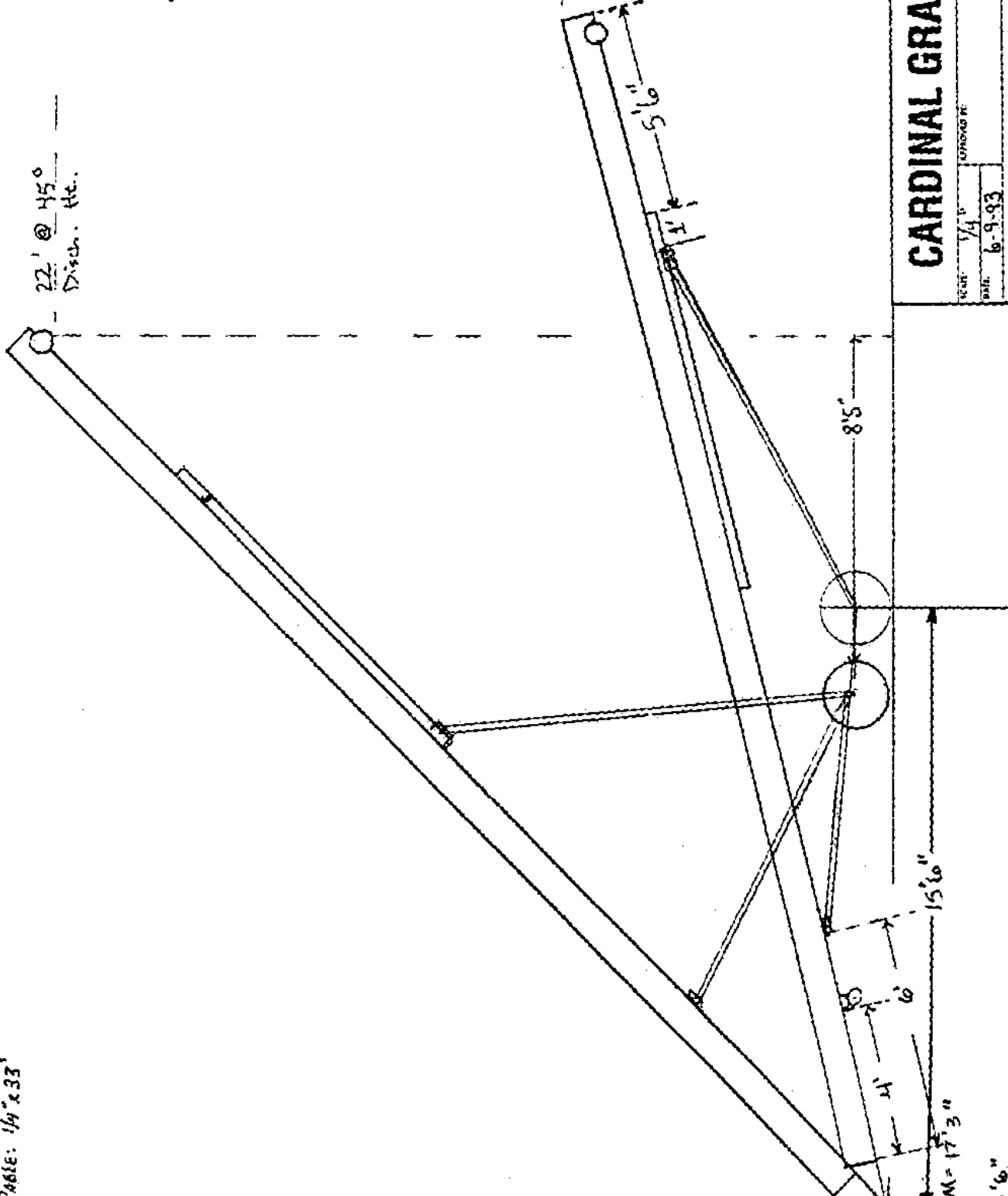
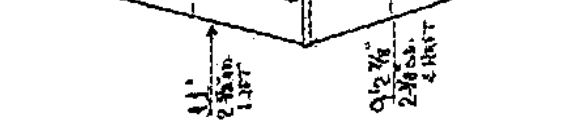
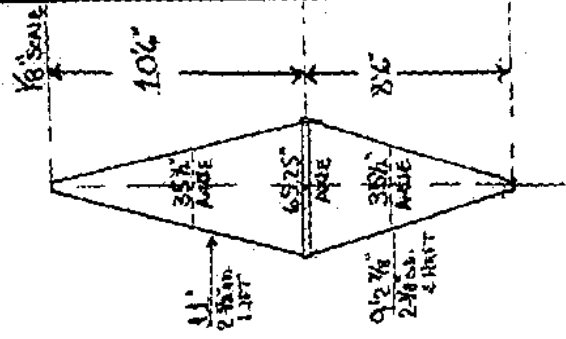
A28799 31' Tube

A28573 31' Intake Screw

A28570 31' Discharge Screw



Wire Rope: 1/4" x 33'



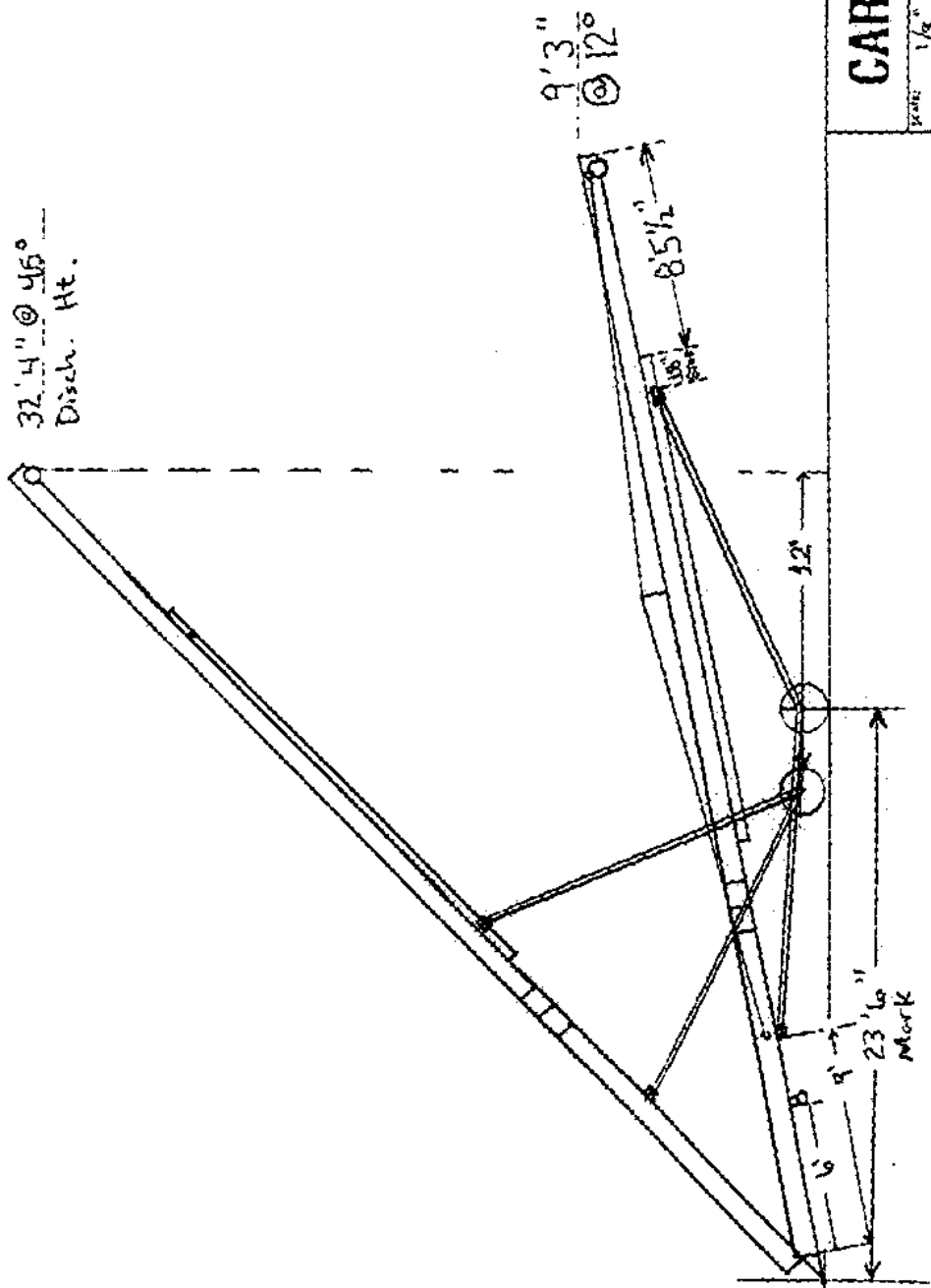
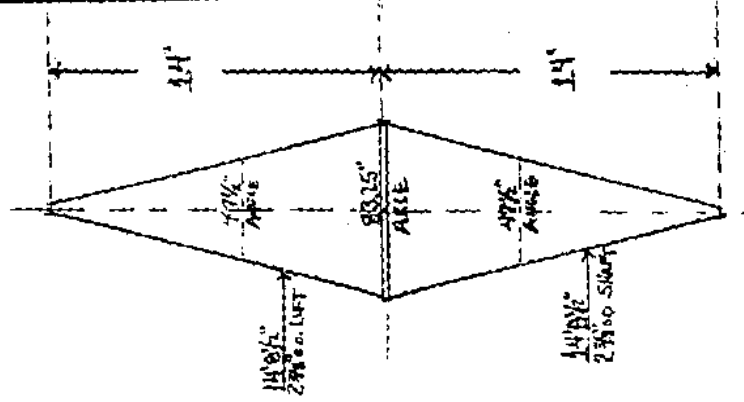
CARDINAL GRAIN SYSTEMS

DATE: 6-9-93	DRAWN BY: JJE	CHECKED BY: JJE	
SCALE: 1/4" = 1'-0"		PROJECT NO: 10" x 32" INTAKE DRIVE	
		DRAWING NUMBER:	

- A = 11' 6"
- B = 13' 7"
- C = 9' 1"
- D = 7' 6"

WINDING CABLE: 1/4" x 53' (SINGLE STRUNG)

TOWERS CABLE: 3/8" x 38'



CARDINAL GRAIN SYSTEMS

DATE: 1/8" PROJECT: 10" x 47' INTAKE DRIVE

SCALE: 1/8" = 1'-0" DRAWN BY: JLR

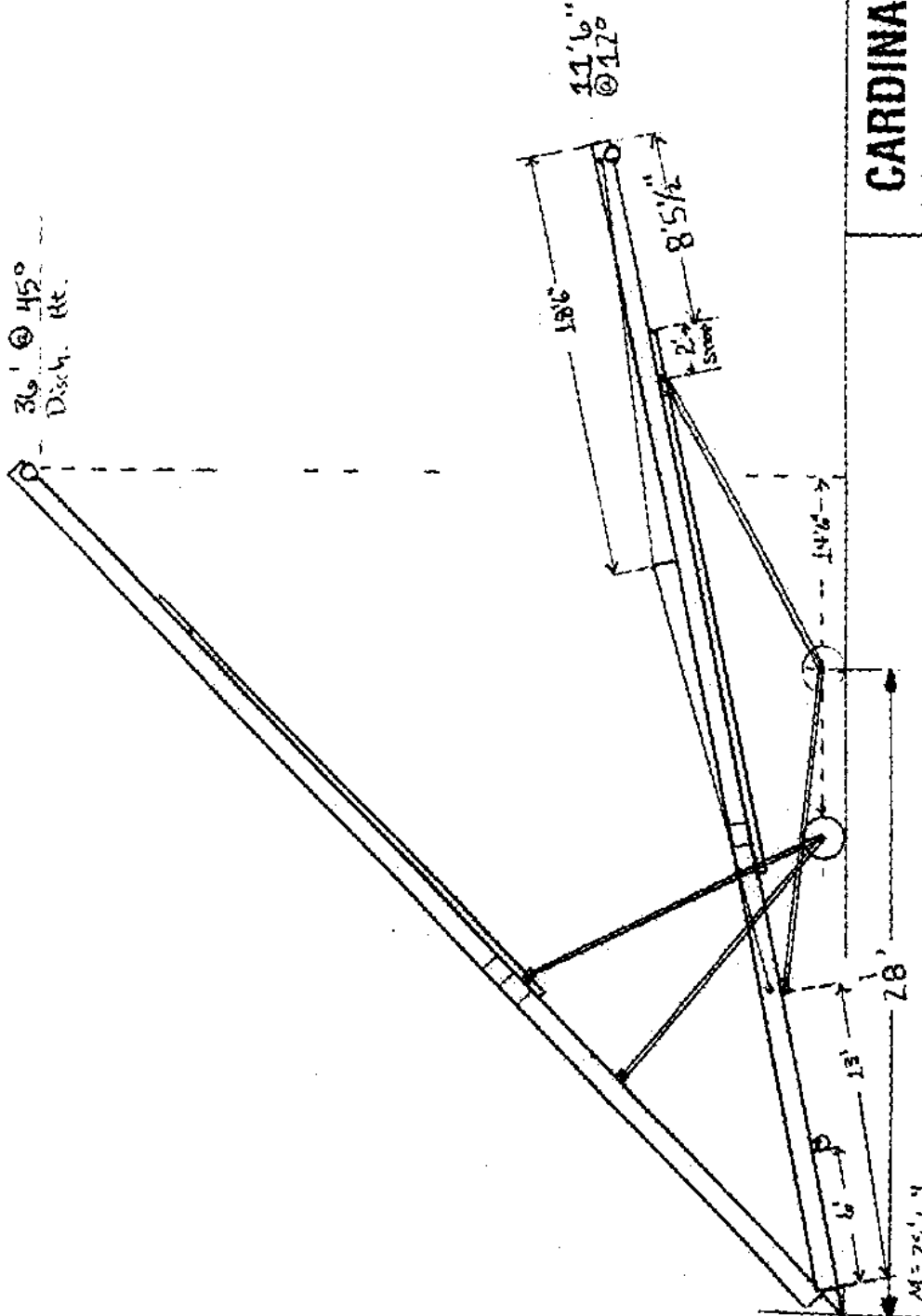
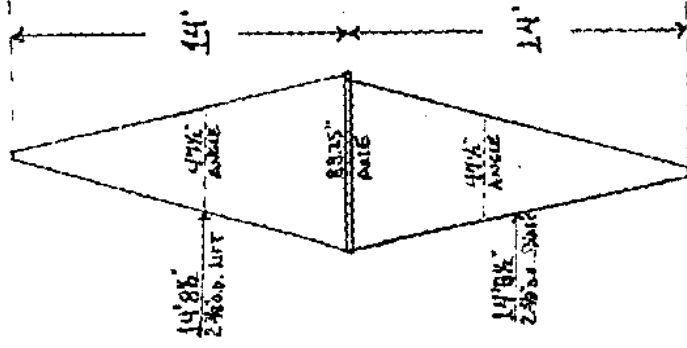
NO. 6-9-93

DESIGNED BY: JLR

- A- (O) NA
- (O) NA
- (O) NA
- (O) NA
- (O) NA

WADH CABLE: 1/8" x 80' (DOUBLE STRUNG)

TWINE CABLE: 3/4" x 39'



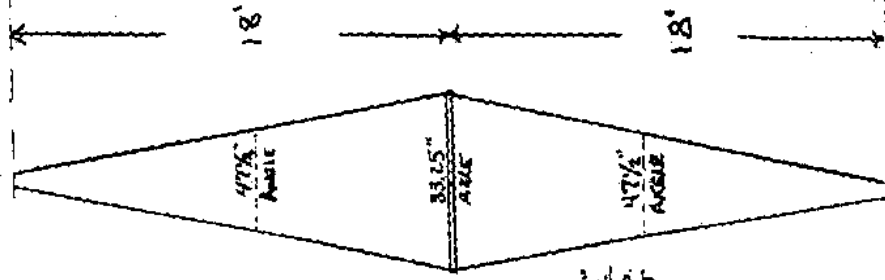
CARDINAL GRAIN SYSTEMS

DATE: 1/8	DESIGNED BY: JAG
NO: 6-9-93	PROJECT:
10' x 52' TAKE DRIVE	
DRAWING NUMBER:	

- A =
- (1) 13' 9"
 - (2) 23' 9"
 - (3) 14'
 - (4) 10' 7"

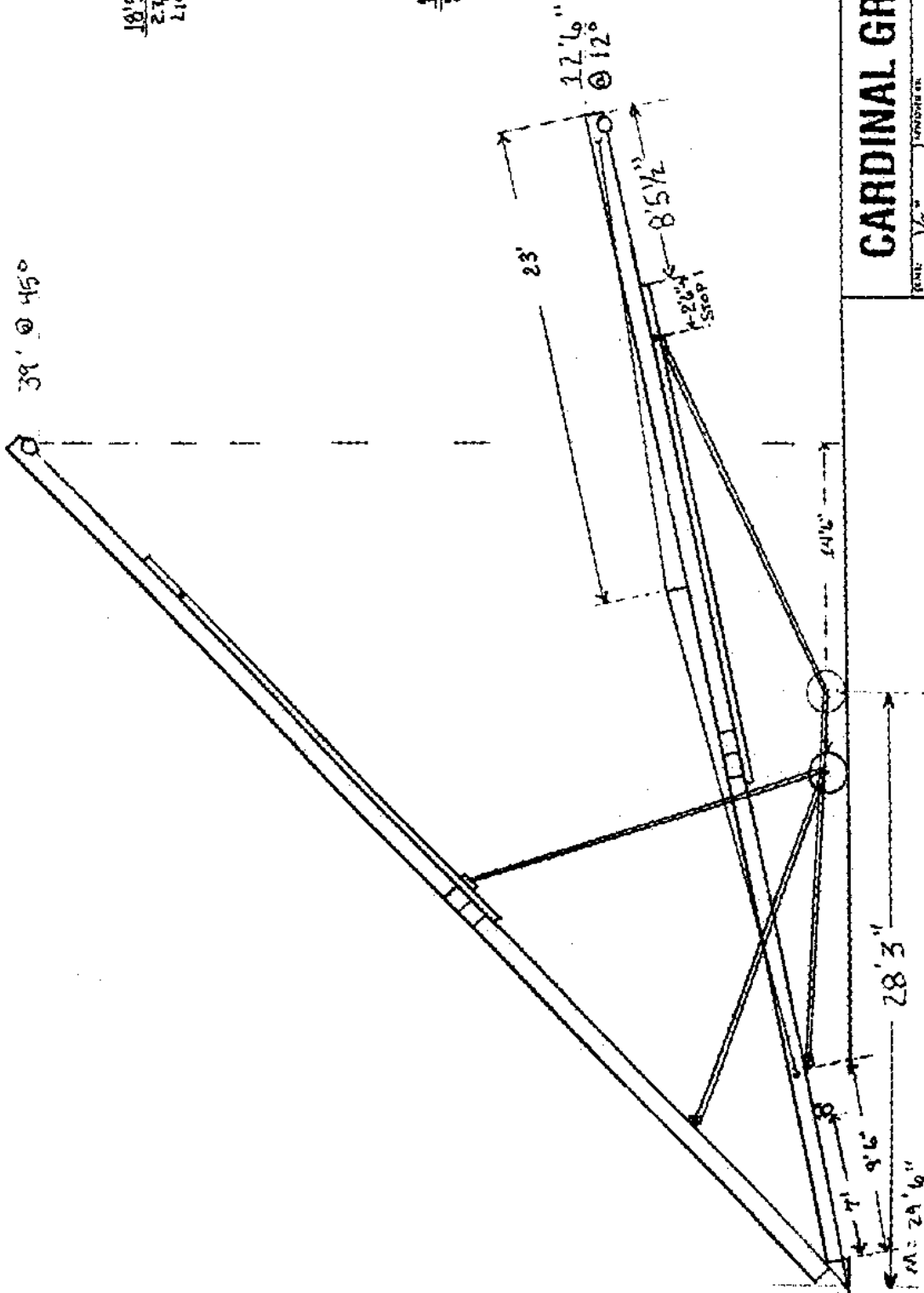
CHAIN FABRIC - 5/16" X 33' (DOUBLE STRUNG)

TRUSS CHAIN: 1/4" X 48'



18' 5/16"
2.188" O.D.
LIFT

18' 5/16"
2.188" O.D.
SHAFT



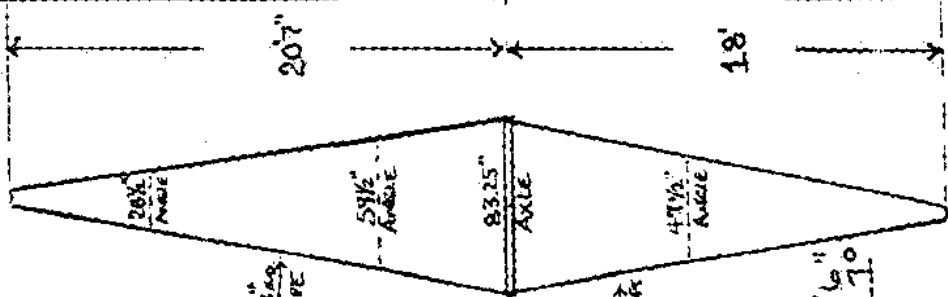
CARDINAL GRAIN SYSTEMS

SCALE: 1/8"
DATE: 6-9-93

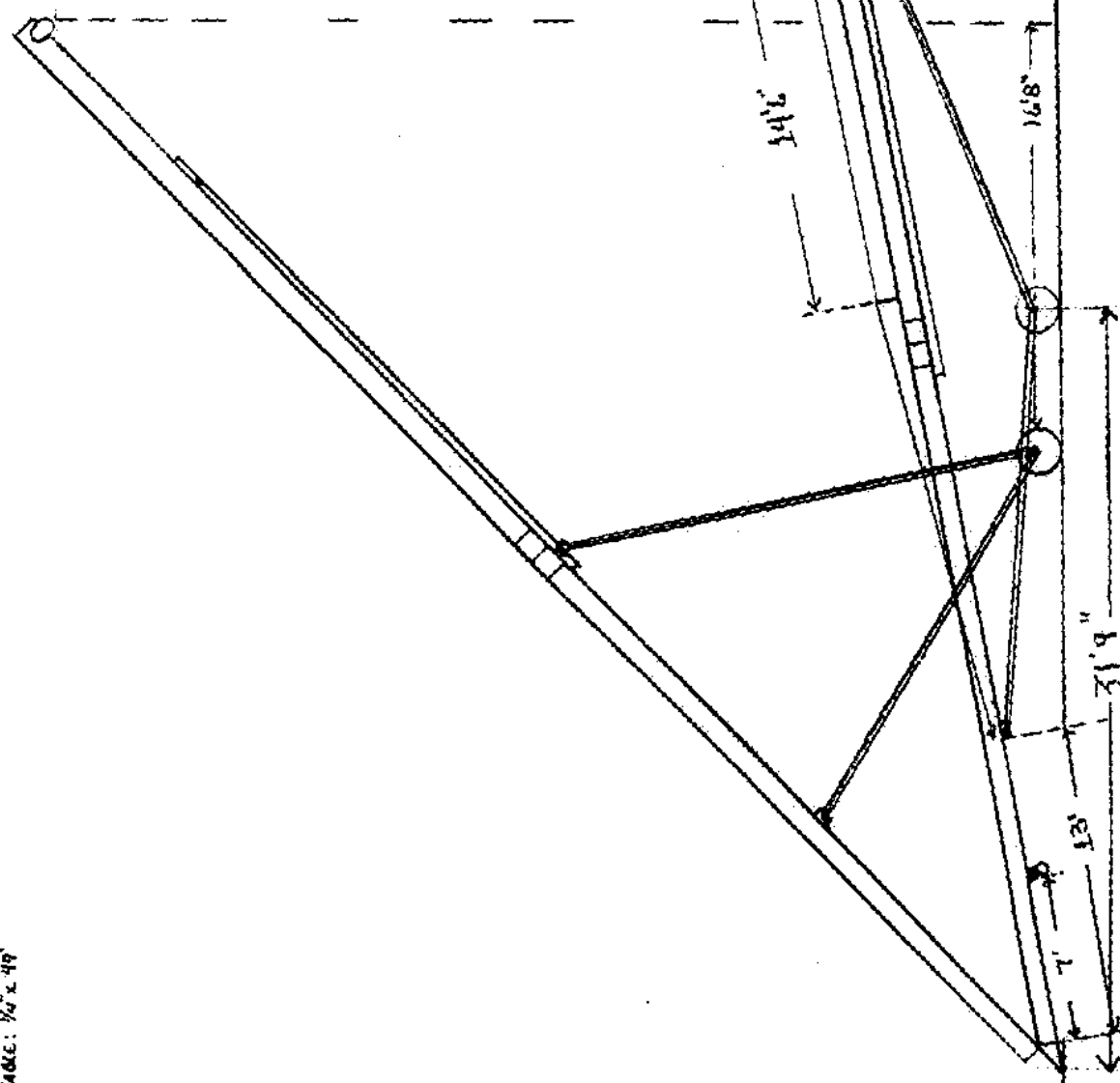
DESIGNED BY: J.R.

10' X 57' INTAKE DRIVE

- A-1
- A-2
- A-3
- A-4
- A-5



42' 10" @ 45°
Disch. Ht.



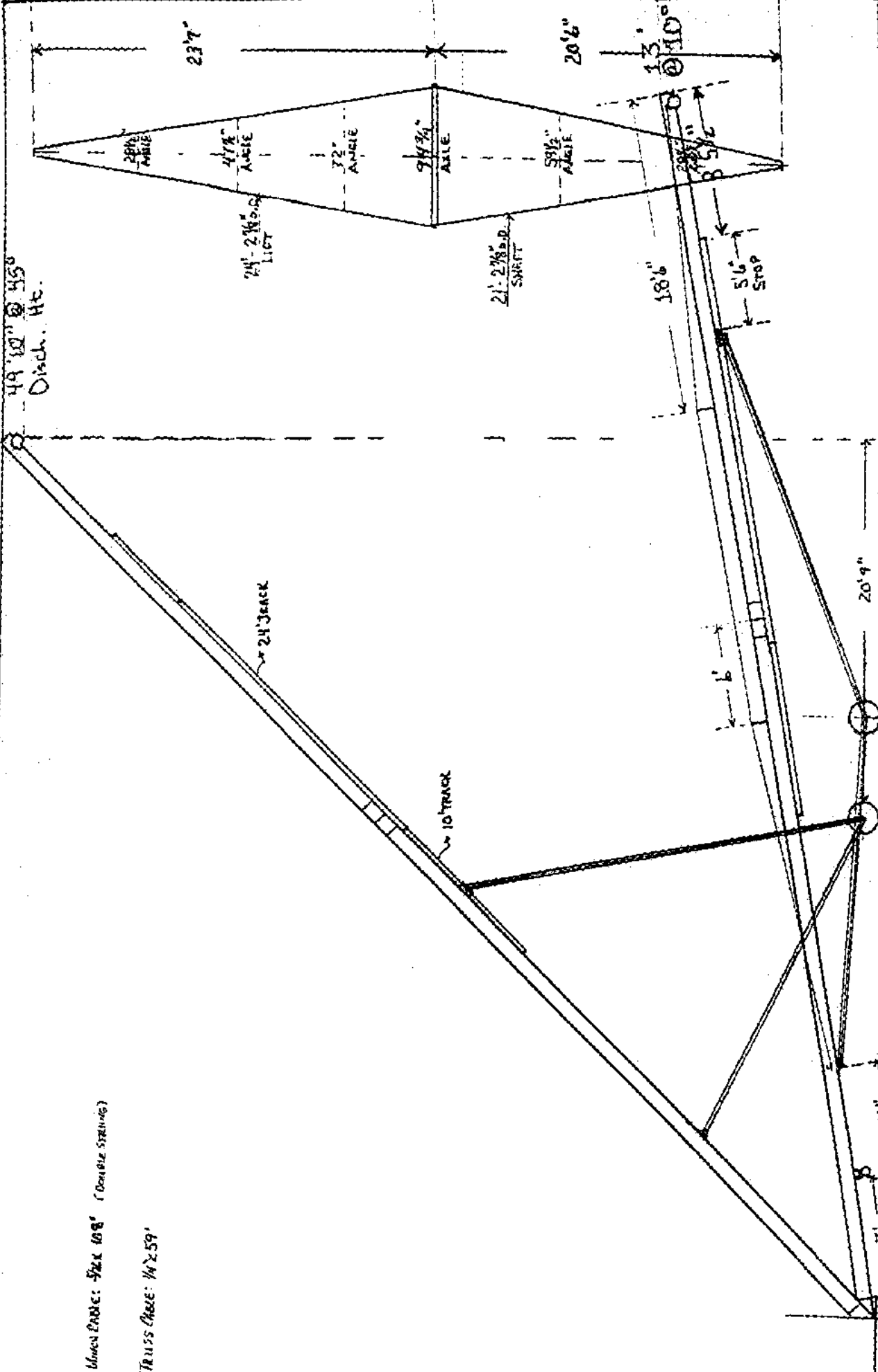
STEEL CHAIR: 3/4" x 92' (Double Braced)

TRUSS CHAIR: 1/2" x 44'

CARDINAL GRAIN SYSTEMS

DATE: 1/2	PROJECT: 10" x 62' INTAKE DRIVE	DRAWN BY: JJP
DATE: 4-9-93		CHECKED BY:
		ESTIMATOR:

- A- (0) 41' 10"
- (1) 27' 10"
- (2) 20'
- (3) 13' 2"



WOODEN TRACKS: 5/2x 10x8' (DOUBLE SPRING)

TRUSS CHORDS: 1/4" x 5 1/2"

CARDINAL GRAIN SYSTEMS

NO. 157	DATE: 6-9-93	DRAWN BY: JLR	CHECKED BY: JLR
PROJECT: 10' x 72' INTAKE DRIVE			

- A = 10' 15"
- (5) 22"
- (4) 23"
- (2) 18' 9"
- (1) 17' 5"

-ASSEMBLY INSTRUCTIONS-

The auger should be assembled in an area that is level. A mechanical lifting device, of at least a 2-ton capacity, should be available to lift the partially assembled auger during the assembly procedure.

This auger is shipped broken down. The tubes and screws are shipped according to the length of auger ordered. Each auger length has one 31 foot long discharge tube with the proper screw inside.

With the tubes and screw arranged in the proper order, place a joiner band (see Figure 1) over one tube at joint of two tubes. No tube joiners are required at either end of the auger. Now, with the joiner on one tube, couple the two screws together with the coupler shaft and attached coupler bolts (see Figure 1). Go to the next joint and repeat the process until all screws are coupled. Butt the tubes together and center the joiner over the joint. Use 3/8-16NC x 1 1/2 bolts starting at the center bolt hole in the joiner flange and work your way to each end of the joiner (see Figure 2). Watch the overall alignment of the auger as the tubes are joined to be sure of maintaining a straight auger. Note: Tighten the bolts (Key No. 2 in Figure 2) in the joiner band to a reading of 35-40 foot-pounds to obtain good clamping pressure.

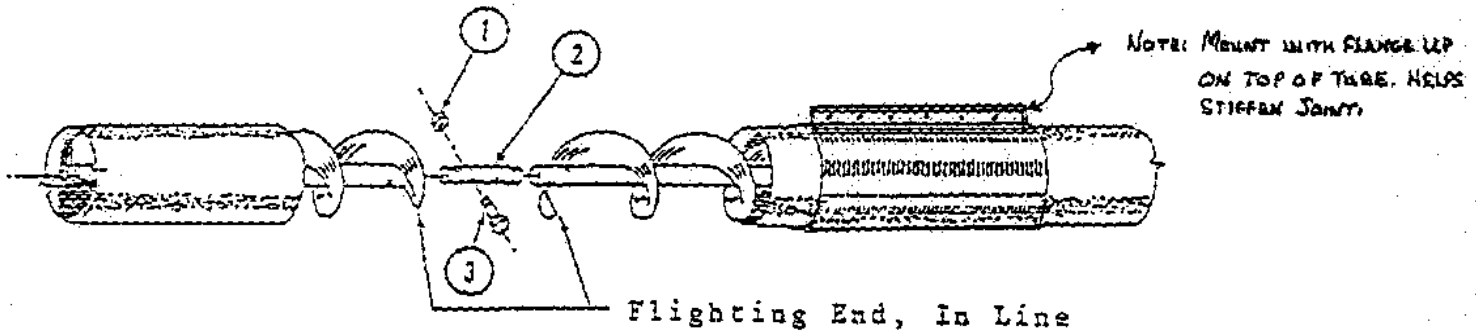


Figure #1

<u>Figure #1 Key Nos.</u>	<u>Part No.</u>	<u>Description</u>
1.	1274	3/8-16 LOCKNUT
2.	24644	Coupler Shaft
3.	24770	COUPLER BOLT

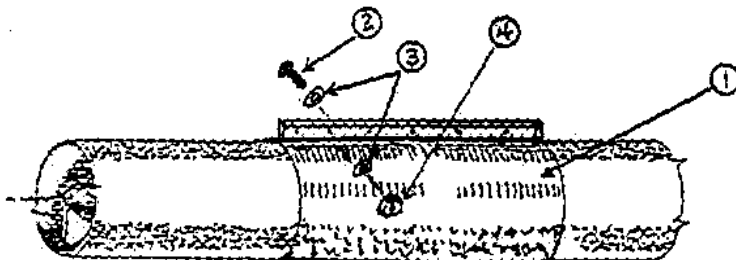


Figure #2

<u>Figure #2 Key Nos.</u>	<u>Part No.</u>	<u>Description</u>
1.	A28447	Tube Joiner W/Hdw
2.	1404	HHCS 3/8-16 x 1 1/2 GRD5
3.	28453	Clamp Washer 7/16 I.D.
4.	1274	3/8-16NC LOCKNUT

Assemble the discharge shaft, Key No. 10 (Figure No. 3) to the discharge screw with 3/8-16x2 5/16 bolts. Slide the discharge shaft through the bearing collar. Pin the thrust collar (Key No. 5) to the discharge shaft making sure it is up against the bearing collar. Tighten the eccentric locking bearing collar by turning it in the same direction (clockwise looking at the end of the shaft) as the shaft will be rotating in operation.

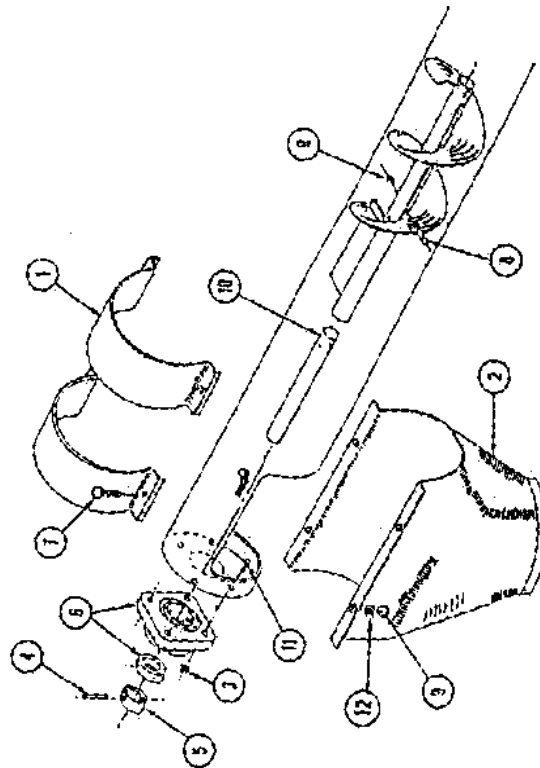


Figure #3
Discharge Details

Figure #3 Key Nos.	Part No.	Description
1.	28386	Clamp Band 10"
2.	A27026	Discharge Spout 10"
3.	1276	Locknut 1-13
4.	26649	Spring Pin
5.	27191	Thrust Collar
6.	A23660	Flange Bearing
7.	1177	HBS 3/8-16x1 1/2
8.	24790	Coupler Bolt 3/8-16
9.	1274	Locknut 3/8-16
10.	27190	Discharge Shaft
11.	1190	HBS 1/2-13x1 1/2
12.	1294	Flapwasher 3/8

Assemble the truss supports (crussed models only), Key No. Figure No. 4, to the tub placing it as shown on the component placement diagram on pages

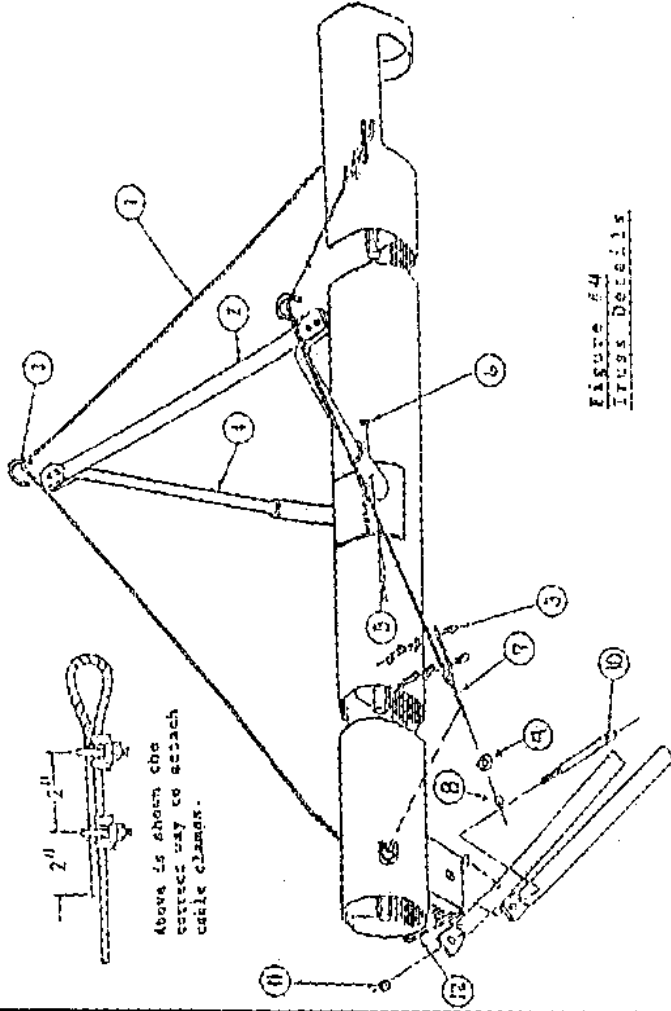
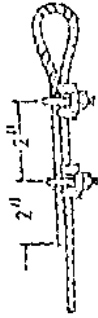


Figure #4
Truss Details

Figure #4 Key Nos.	Part No.	Description
1. A.		1/2 DIA. X 'CABLE (47')
1. B.		1/2 DIA. X 'CABLE (52')
1. C.		1/2 DIA. X 'CABLE (57')
1. D.		1/2 DIA. X 'CABLE (62')
1. E.		1/2 DIA. X 'CABLE (72')
2.	28111	TRUSS CROSS PIPE
3.	15188	1" CABLE CLAMP
4.	28100	TRUSS SUPPORT PIPE
5.	1176	HRS 3/8-16x1 3/4"
6.	1276	HEX LOCKNUT 3/8-16
7.	A28415	EYE BOLT 1/2-13x8"
8.	1295	1/2-13 REG. NUT
9.	1508	FLAT WASHER 1/2" (2 \times 6.6mm)
10.	1508	HCS 3/4-18x7"
11.	1278	3/4-10 LOCKNUT
12.		CHASSIS BOOKUP



Above is shown the correct way to attach cable clamps.

CHASSIS ASSEMBLY

6 Assemble the chassis pipes and axle together as shown in Figure 6. With a cable or chain sling fastened securely around the auger tube just ahead of the chassis track, lift the discharge end of the assembled auger three or four feet off the ground. Roll the assembled chassis underneath the auger. Attach the chassis hook-up band Key No. 5 and 9, in Figure No. 6 to the auger tube in the correct position as shown on the component placement diagrams. Attach the anchor bracket, Key No. 12 in Figure No. 4 to the chassis hook-up band as shown.

Bolt the winch mount to the auger tube in position as shown on the component placement diagrams. Attach the winch mount as shown.

String the winch cable as shown by starting at the end opposite the winch. Attach the cable to the winch drum as noted on the winch instruction sheet.

The cable winch is equipped with a brake which is activated by turning the handle. Turn the handle clockwise to raise the auger and counterclockwise to lower the auger. A clicking sound will be heard when raising the auger. When lowering the unit, no clicking will be heard. When the auger is lowered to the desired height, turn the handle clockwise until two clicks are heard to lock the winch. There is no pawl or clutch to release to lower the auger.

Always be sure there are at least three wraps of cable on the winch drum.

Read winch operating instructions included in the winch carton.

Carefully lift the auger with the cable or chain sling, and at the same time manually raise the chassis lift until the roller frame Key No. 12 (Figure No. 6) engages the end of the chassis track. With the roller frame in position on the chassis track, continue to raise the auger until the lift roller frame passes the four sets of holes in the track. Refer to the component placement diagrams and find where to place the chassis stop, Key No. 2 (Figure No. 5).

Attach the chassis stop with four 1/2-13NC1 bolts and nuts. Lac the auger down until the lift roller frame rests against the stop.

Do not remove the lifting sling at this time as the auger may be top end heavy and tip.

String the truss cables as shown in Figure No. 4. Note: Only one truss support is shown for simplicity. Tighten cables only enough to maintain a straight auger.

Assemble the rest stop, Key No. 2, in Figure No. 5 onto the chassis track as shown on the component placement diagrams.

CAUTION: Check the assembled auger balance. If it is heavy on the discharge end, then add weight to the intake or hitch end in the form of an optional gravity hopper, electric motor, or if necessary, tie down the intake end to prevent a "tip-over" condition. Never lift the intake end any higher than necessary to attach the hitch to the towing vehicle as a weight shift toward the top of the discharge end will take place rapidly.

Assemble the chassis track to the auger tube at 90 degrees to the track bands as shown in Figure No. 5. The chassis tracks come in 4', 8', 14', & 20' lengths. Check the component placement diagrams for the correct placement on your auger. The basic 20 foot chassis track has four sets of holes in one end. This end of the track should be placed toward the discharge end of the auger. Be sure the track is directly on the bottom of the tube opposite the truss supports and at 90 degrees to the tube joiner flanges.

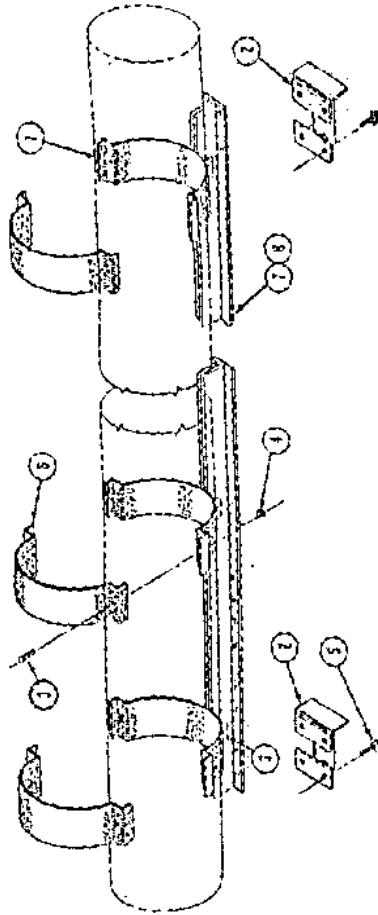
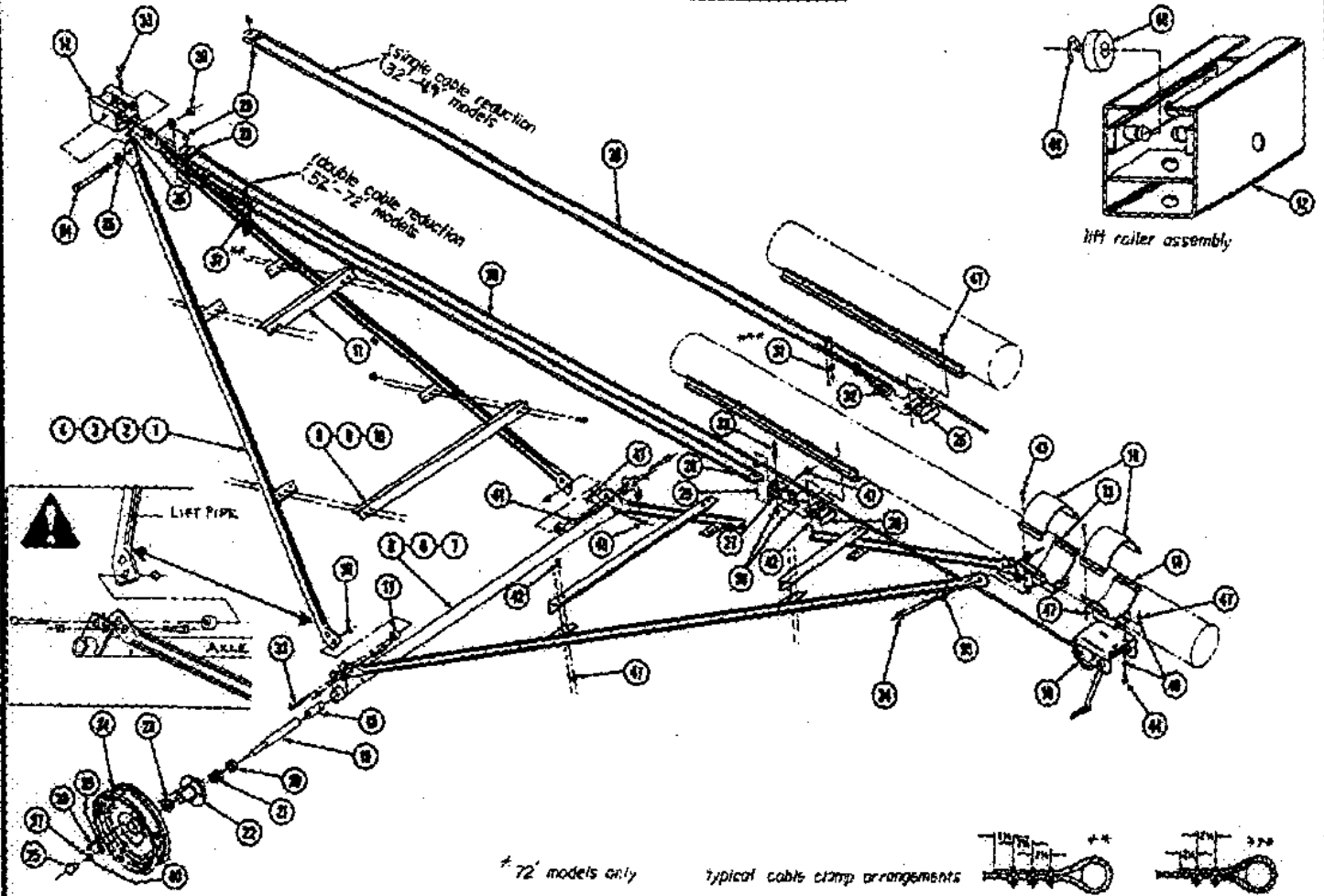


Figure #5
Chassis Track Details

Figure # & Key Nos.	Part No.	Description
1	A18394	Track Band
2	828395	Stop
3	1404	3/8-16 Hex Locknut
4	1274	HACS 4-13x1
5	1187	Track Clamp Band Half
6	28366	Chassis Track Angle
7	28375	Chassis Track Angle
8	28374	Chassis Track Angle

FIGURE-6



- | | | | |
|------------|---|------------|---|
| 1. A28542 | 2 3/8" O.D. x 9' 2 7/8" CHASSIS PIPE | 26. A28395 | STOP W/A |
| 2. A28543 | 2 3/8" O.D. x 14' 8 1/2" CHASSIS PIPE | 27. A26033 | PULLEY BRACKET |
| 3. A28547 | 2 7/8" O.D. x 18' 5 1/2" CHASSIS PIPE | 28. 15144 | CABLE SHEAVE |
| 4. A28544 | 2 7/8" O.D. x 21' CHASSIS PIPE | 29. 20660 | SPACER |
| 5. A28476 | 65.25" AXLE PIPE (32' AUGER) | 30. A28627 | 1/4" x 36' WINCH CABLE (32' AUGER) |
| 6. A28477 | 83.25" AXLE PIPE (47' thru 62' AUGERS) | | 1/4" x 53' WINCH CABLE (47' AUGER) |
| 7. A28478 | 94.75" AXLE PIPE (72' AUGER) | | 1/4" x 80' WINCH CABLE (52' AUGER) |
| 8. 28540 | 35 1/2" CHASSIS ANGLE (32' AUGER) | | 5/16" x 92' WINCH CABLE (57' & 62' AUGER) |
| 9. 28541 | 47 1/2" CHASSIS ANGLE (47' thru 62' AUGERS) | | 5/16" x 108' WINCH CABLE (72' AUGER) |
| 10. 28539 | 59 1/2" CHASSIS ANGLE (72' AUGER) | 31. 15188 | 1/4" CABLE CLAMP |
| 11. 28538 | 28 1/8" CHASSIS ANGLE (72' AUGER) | 15266 | 5/16" CABLE CLAMP |
| 12. A28589 | LIFT ROLLER FRAME -W/A | 32. 19480 | 5/16" CABLE THIMBLE |
| 13. A28370 | CHASSIS HOOKUP -W/A | 33. 1192 | HHCS 3/4"-10x3" |
| 14. A28030 | WINCH MOUNT -W/A | 34. 1508 | HHCS 3/4"-10x7" |
| 15. 28185 | 3 BOLT - HALF BAND | 35. 1297 | 3/4" FLATWASHER |
| 16. A20385 | 1500 # WINCH - (32', 47' & 52' AUGERS) | 36. 1278 | 3/4" LOCKNUT |
| A28057 | 2500 # WINCH - (57' thru 72' AUGERS) | 37. 28307 | SPINDLE NUT |
| 17. 28484 | FRAME SPACER | 38. 28510 | WHEEL BOLT |
| 18. 28483 | AXLE TUBE SLEEVE | 39. 28506 | SPINDLE WASHER |
| 19. 28513 | AXLE SPINDLE | 40. 28508 | SPINDLE COITER PIN |
| 20. 28511 | SEAL | 41. 1191 | HHCS 3/4"-10x2" |
| 21. 15128 | WHEEL BEARING - INNER CONE | 42. 1187 | HHCS 1/2"-13x1" |
| 22. 15184 | WHEEL HUB | 43. 1404 | HHCS 3/8"-16x1 1/2" GR.5 |
| 23. 15127 | WHEEL BEARING - OUTER CONE | 44. 1175 | HHCS 3/8"-16x1" |
| 24. 15124 | 15" 4 BOLT RIM | 45. 1514 | HHCS 3/8"-16x2 3/4" GR.5 |
| 25. 28309 | CAP | 46. 1294 | 3/8" FLATWASHER |
| | | 47. 1274 | 3/8"-16 LOCKNUT |
| | | 48. 27689 | PLASTIC ROLLER |
| | | 49. 27690 | RETAINING RING |

- Intake Section -

(Refer to Figure No. 7)

Assemble the intake shaft, Key No. 18, to the auger screw with two 3/8-16x2 5/16 bolts, Key No. 23.

Assemble the intake housing, Key No. 12, to the auger tube leaving 17" of exposed flighting, see figure tooth sprocket, Key No. 7, to the intake shaft leaving 3/4" between the plate and the sprocket, as shown on diagram on page 30. Use a 3/8"x2" square key, Key No. 25. Place the drive shaft, Key No. 13, through the top bearing. Attach the 13-tooth sprocket, Key No. 8, to the drive shaft using the 1/2"x1 3/4" square key, Key No. 24. Be sure to align the two sprockets. Assemble the drive shaft shield mounting bracket, Key No. 6, to the intake housing.

Before assembling any more of the intake section, next assemble the gear box and couple it to the drive shaft as shown for PTO drive or for electric motor drive as shown

Assemble the gearbox, Key No. 11 (Figure No. 8) or Key No. 20 (Figure No. 9) to the mount. Assemble the shear half coupling, Key No. 8 (Figure No. 8) or Key No. 14 (Figure No. 9) to the gearbox using a 3/8-2 1/2 spring pin. Insert the drive shaft, Key No. 7 (Figure No. 9) into the counting hub. Adjust the gearbox clamp band up or down the tube to maintain alignment of the upper sprocket with the lower sprocket. Attach the chain, Key No. 6 (Figure No. 7).

For electric drive, assemble the motor mount details as per Figure No. 9. Be sure to maintain the 13" dimension between the gearbox mount and the motor mount as shown.

Assemble the drive shaft shield, Key No. 5 (Figure No. 8) or Key No. 12 (Figure No. 9) to the shield mounting bracket, Key No. 13 (Figure No. 8) or Key No. 19 (Figure 9) on the gearbox. Attach the other end of the drive shaft cover to the mounting bracket, Key No. 16 (Figure No. 7) on the intake housing.

Attach the brackets to the drive shaft shield, Key No. 15 (Figure No. 7) using 1/2" self tapping screws, Key No. 26.

Attach the driveshaft guard, Key No. 14 (Figure No. 7) to the drive shaft shield, Key No. 15 using 1/2" self tapping screws, Key No. 26.

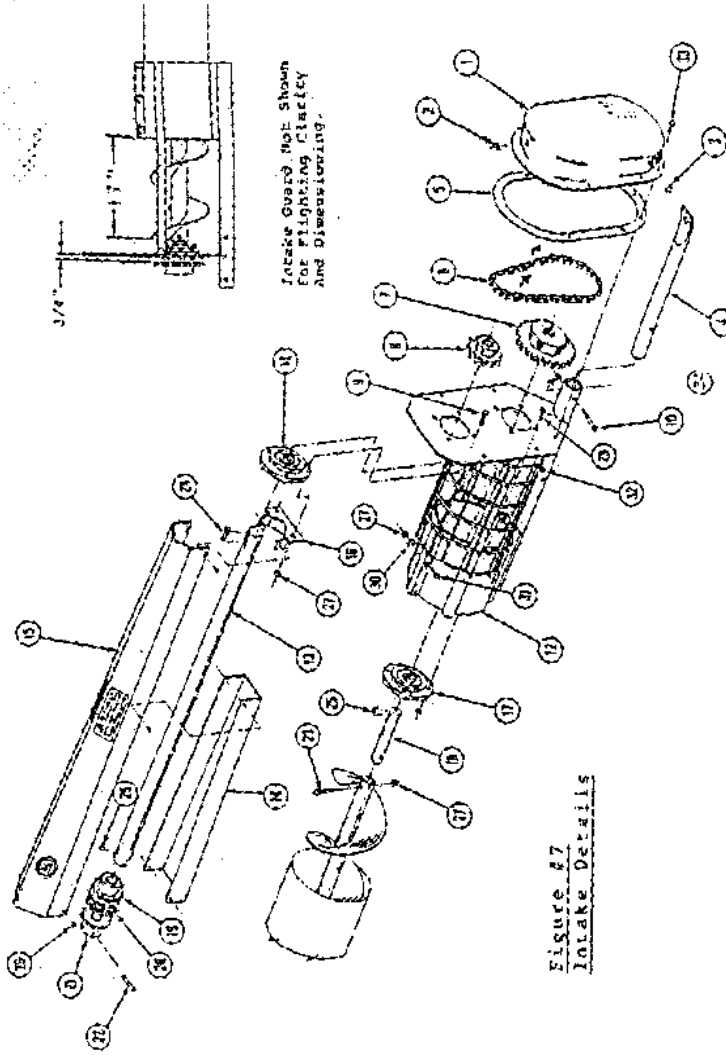


Figure 27
Intake Details

Figure 27 Key Nos.

Figure 27 Key Nos.	Part No.	Description
1.	25020	Drive Housing
2.	25145	1/2" Vented Pipe Plug
3.	25166	1/2" Pipe Plug
4.	26481	Nut
5.	25091	Gasket
6.	A25940	Roller Chain
7.	A26072	Sprocket 24T
8.	A26071	Sprocket 13T
9.	1177	HMCS 3/8-16x1 1/2
10.	1427	HMCS 1/2-13x3 G85
11.	A25143	Flange Bearing 1 1/2
12.	A28073	Intake Housing W/A
13.	25891	Driveshaft
14.	27194	Driveshaft Guard
15.	A26078	Driveshaft Shield W/Bolts
16.	A26076	Bracket
17.	A25805	Flange Bearing 1 1/2
18.	25940	Intake Shaft
19.	25892	Half Coupling
20.	A27180	Coupling Chain
21.	A27182	Shear Half Coupling
22.	A27191	Spring Pin 3/8x2 1/2
23.	27143	Shield Pin 3/8x1 1/2
24.	24790	Coupler Bolt
25.	25825	Square Key 3/4x1 3/4
26.	24727	Square Key 3/8x2
27.	1319	Self Tapping Screw 1/2x1 1/2
28.	1278	Hex Locknut 3/8-16
29.	1179	HMCS 3/8-16x2
30.	15278	Woodruff Key
31.	1294	Flacwasher 3/8
32.	1484	HMCS 1/8-16x1 1/4 G85
33.	1271	Hex Locknut 1/2-20
34.	1154	HMCS 1/2-20x1 1/2
35.	1276	Hex Locknut 1/2-20

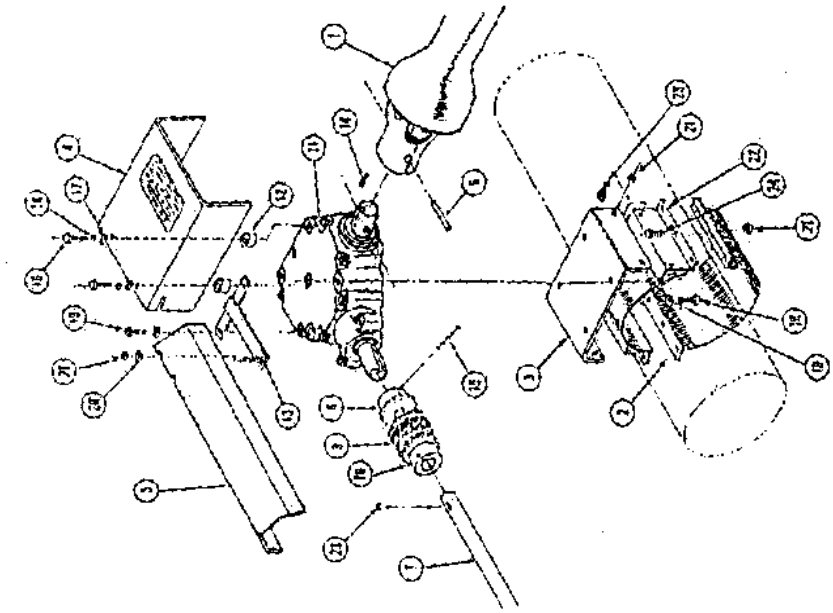
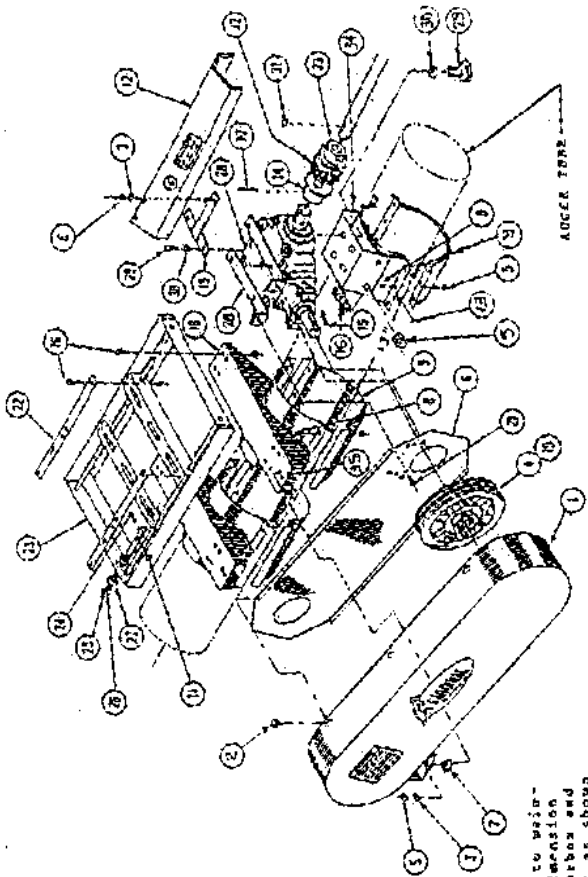


Figure 48
PTO Drive Details

Figure 48 Key Nos.	Part No.	Description
1	A27856	PTO Shaft
2	A25963	Clamp Band Half
3	25843	Gear Box Mounting Place
4	A27855	PTO Shield W/Decal
5	A28078	Shield W/Decal
6	26649	Spring Pin 5/16x2
7	A25891	Drive Shaft
8	A27181	Shear Half Coupling
9	A27182	Coupling Chelo
10	A27180	Coupling Half
11	A25015	Gearbox
12	28087	Spacer
13	A27184	Bracket
14	19180	Square Key 1x2 1/4
15	27163	Spring Pin 3/8x2 1/2
16	1190	MRC5 1/8-18x1 1/2
17	1295	Flatwasher 1/2"
18	1203	Lockwasher 1/2"
19	1187	MRC5 1/8-18x1 1/2
20	1294	Flatwasher 3/8"
21	1274	Hex Locknut 3/8-16
22	A25841	Gear Box Mount 2/A
23	15278	Woodruff Key
24	1177	MRC5 3/8-16x1 1/2
25	1175	MRC5 3/8-18x1 1/2

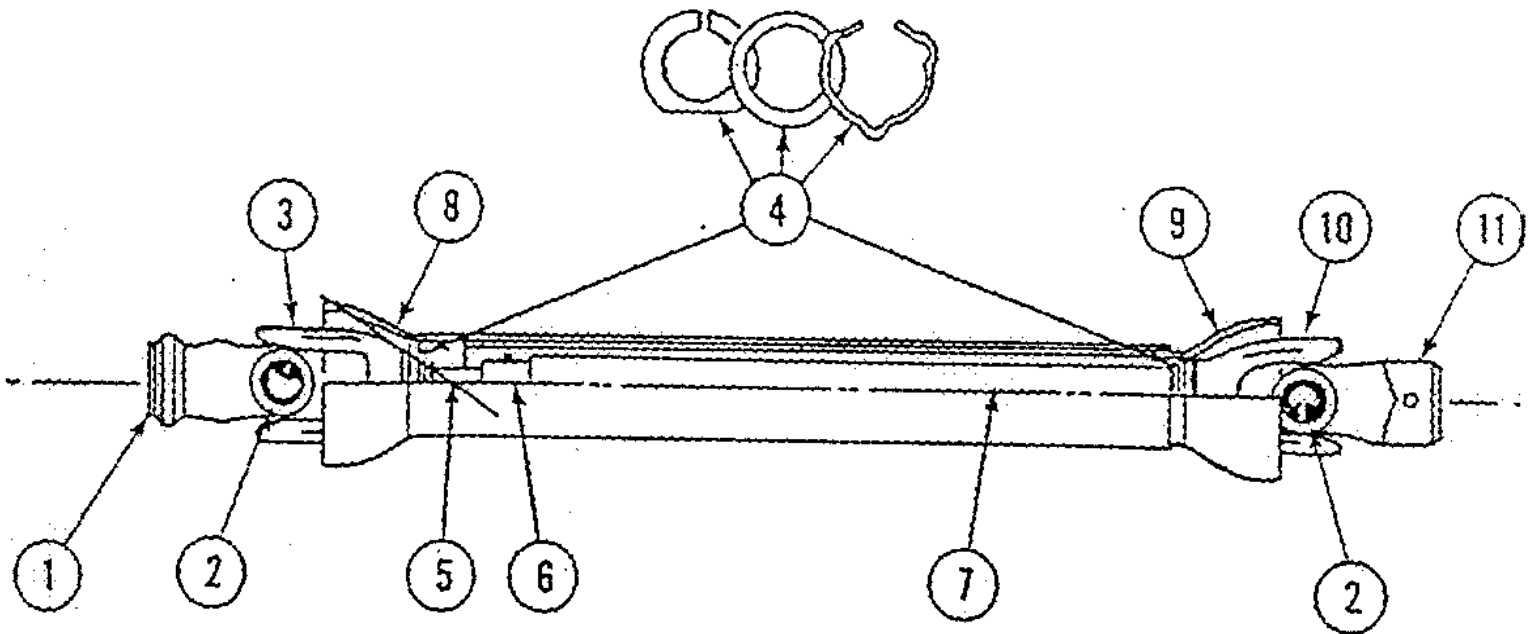


NOTE: Be sure to maintain the 1/2" dimension between the gearbox and the motor mount as shown above

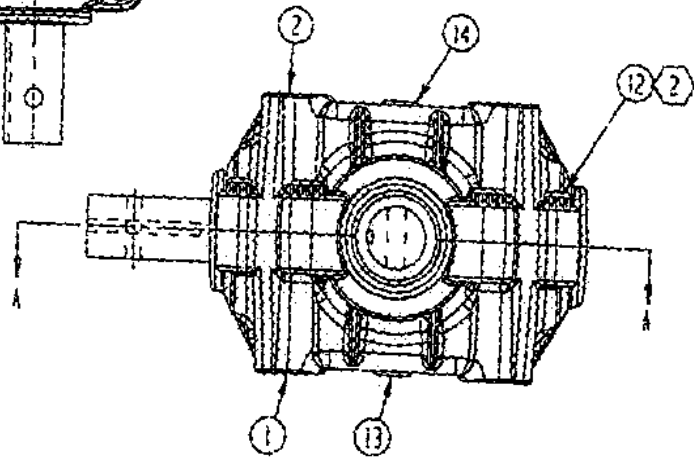
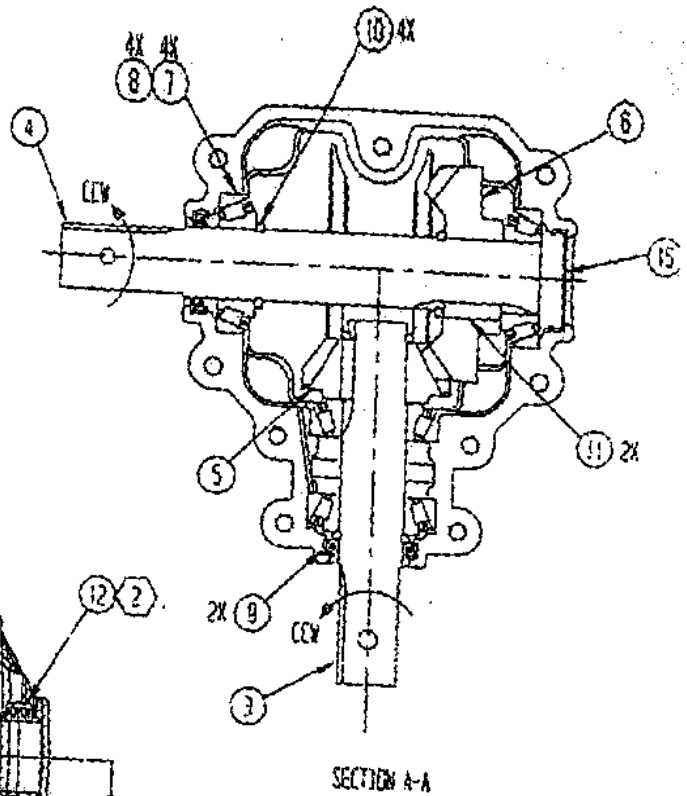
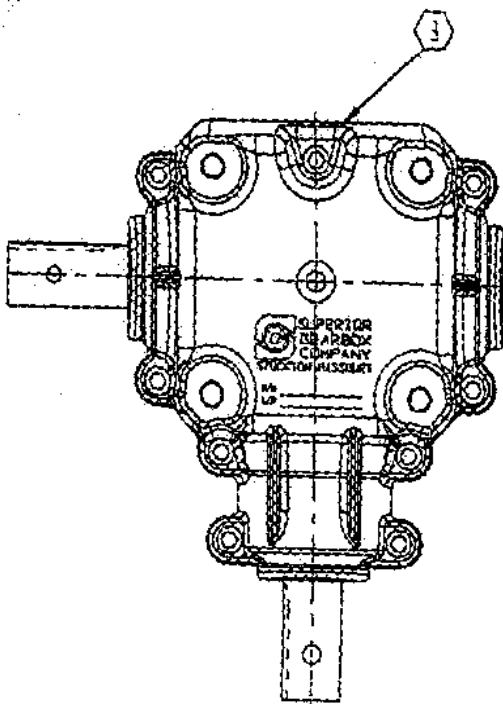
Figure 49
Motor Mount Details

Figure 49 Key Nos.	Part No.	Description
1	A25133	Guard Cover W/Decal's
2	1451	Self Drill Screw #10x1/2
3	1294	Flatwasher 3/8"
4	A25954	V-Belt Pulley
5	1274	Hex Locknut 3/8-16
6	25125	Guard Backplate
7	19852	Spacer
8	1177	MRC5 3/8-16x 1/2
9	A25949	Clamp Band
10	A25953	Hub
11	1273	Hex Locknut 5/16-18
12	A28078	Drive Shaft Shield W/Decals
13	A25841	Gear Box Mount
14	A27181	Shear Half Coupling
15	19179	Square Key 1x1 1/4
16	1175	MRC5 3/8-16x1 1/2
17	27163	Spring Pin 3/8x2 1/2
18	A26027	Support
19	A27166	Bracket
20	25127	Guard Support
21	1129	5/16-18x1 MRC5
22	20786	Spacer
23	A20158	Motor Base W/A
24	1202	MRC5 5/16-18x1 3/4
25	20771	Adjusting Rod
26	1278	Hex Locknut 3/4-10
27	1297	Flatwasher 3/4"
28	A20013	Gearbox
29	1187	MRC5 3/8-18x1 1/2
30	1703	Lockwasher 1/2"
31	15278	Woodruff Key
32	A27182	Coupling Chelo
33	A27180	Coupling Half
34	A25841	Gear Box Mounting Place
35	1175	MRC5 3/8-18x1 1/2

REPAIR PARTS LIST
CARDINAL MODEL 310-32 (A27856) (G&G)



<u>KEY NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	27858	Ball Snap Hitch Yoke (540 RPM)
2	A26194	Repair Kit
3	26195	Rectangular Yoke 1" x 1 1/8"
4	A25298	Bearing, Thrust Washer, Snap Ring
5	25294	1" x 1 1/8" Rectangular Shaft
6	26196	Slip Sleeve
7	26197	Torque Tubing
8	26198	Outer Shield (Metal)
9	26199	Inner Shield (Metal)
10	26200	Torque Tube Yoke
11	27870	Implement Yoke (1 1/2" Bore)
	A27857	Tractor Half Assembly
	A27010	Implement Half Assembly (1 1/2" Round)



Run-Date: Fri 01/10/2003



SUPERIOR GEARBOX COMPANY BILL of MATERIAL

Customer-Name: **CARDINAL GRAIN**

Superior Gearbox P/N: **R400-9DXA-B0455**

Customer P/N: **A29013 (ID-10)**

Seq	Component-Item	Description	Qty-Per	PART#
1	R500-003M-A0536	HSG, R500 MACH TAP-STD	1	30423
2	R500-004M-A0535	HSG, R500 MACH THRU-STD	1	30424
3	400100-14	SHAFT, R400 STUB KW 25KW Ø.39 (PINION)	1	26228
4	400110-07	SHAFT, R400 CROSS-O KW 25KW Ø	1	26229
5	451020	GEAR, R400 1.50 20T KW Ø1.2505	1	30071
6	451030	GEAR, R400 1.50 30T KW Ø1.2505	1	30072
7	414124	BEARING, CONE TMRN# 14124	4	26232
8	414276	BEARING, CUP TMRN# 14276	4	26233
9	412458	SEAL, 1.250-2.000-.312 (R) TC	2	26234
10	403373	RETAINING RING, EXT 1.250 SHFT	4	27031
11	400200	KEY, 1/4 X 1/4, 1.200	2	27032
12	203815	BOLT, 3/8-16 X 1.50 SHCS	9	27710
13	400300	PLUG, 1/2-14 NPT SCHD W/3M	2	27717
14	40030V	PLUG, VENT 1/2 NPT SCHD PLN	1	27718
15	400301	END CAP, CP-2.000-.312 D.#0689	1	30428
16	X000-48A0-A0163	LUBE/EP 80W90		