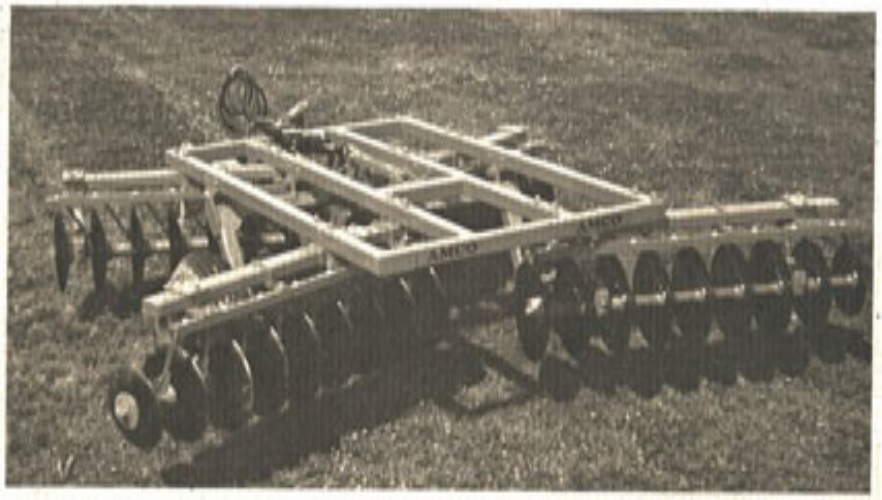
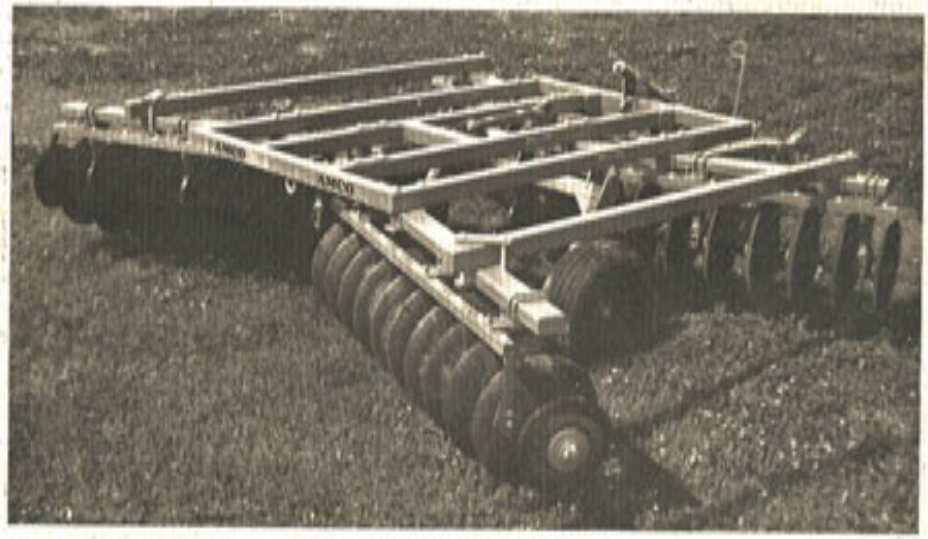
MODEL F-17
DOUBLE OFFSET TANDEM

PARTS CATALOG
OPERATION — MAINTENANCE — SET UP INSTRUCTIONS



9'3" TO 12'0"



13'6" TO 15'0"

AMCO

PRODUCTS

Portable Elevator Division, Dynamics Corporation of America
No. 1 AMCO Drive, Yazoo City, Mississippi 39194 / 601/746-4464

TO THE PURCHASER

The care you give your new AMCO F17 Double Offset Tandem Disk Harrow will greatly determine the satisfaction and service you will obtain from it. By observing the instructions and suggestions in this manual, your AMCO F17 Harrow will serve you well for many years.

As an Authorized AMCO Dealer, we stock Genuine AMCO Parts, which are manufactured with the same precision and skill as the original equipment. For best performance and longer life use only Genuine AMCO replacement parts. Our factory trained staff is kept fully informed of the most efficient methods of servicing AMCO equipment and is ready and able to assist you.

When you sell your F17 Harrow you should pass this manual to the new owner.

If you should require additional aid or information, contact us.

YOUR AUTHORIZED AMCO DEALER

OSHA requires that as a farm employer you meet certain safety requirements. Become familiar with and comply with those requirements. Be sure anyone who operates this equipment understands all safety related items. If this harrow is repainted, be certain new decals are ordered. Decals pertaining to personal safety must be replaced.

Look for this symbol to point out important safety precautions. It means — ATTENTION! Become alert! Your safety is involved.

To insure efficient and prompt service, please provide the model number and serial number of your AMCO Harrow in all correspondence or contacts. Remember, the right and left hand sides of the harrow are determined by standing at the rear of the harrow and facing the direction of travel.

MODEL NUMBER _____

SERIAL NUMBER _____

TABLE OF CONTENTS

PRINTED IN U.S.A.
AMCO PART NO. 11402

ISSUED AUGUST, 1977
AMCO PART NO. 11402

SAFETY SUGGESTIONS

THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY.

CAUTION *Never stand between tractor and disk harrow when hitching unless all controls are in neutral and the brakes are locked.*

CAUTION *Park or block the disk harrow so it will not roll when disconnected from the tractor drawbar.*

CAUTION *When working on disk harrows, care should be exercised in handling or tightening bolts near disk blades to avoid injury.*

CAUTION *Always secure for transport by using the lock pin*

CAUTION *Never clean, adjust or lubricate a disk harrow that is in motion.*

CAUTION *When transporting machinery over public roads, comply with your local and state laws regarding length, width and lighting.*

CAUTION *When trailing the harrow over public roads, the SMV Emblem must be used, for protection of tractor and motor vehicle operators.*

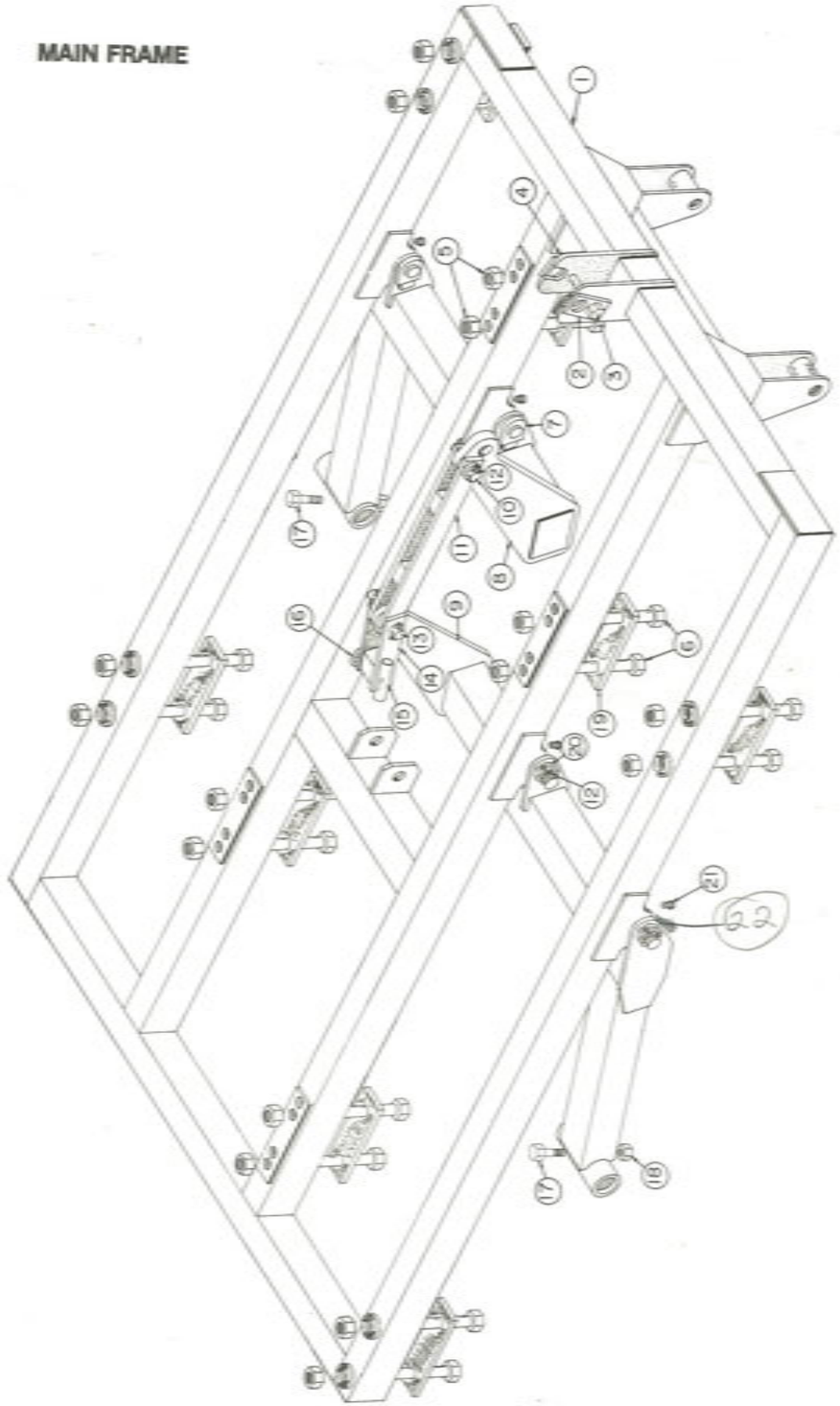
CAUTION *When transporting farm implements on public roads after dusk, it is the responsibility of the operator to provide lighting and reflectors on the rear of the implement in accordance with your state law.*

CAUTION *All hydraulically or mechanically elevated components must be blocked to prevent accidental lowering or must be lowered to the ground when making adjustments or when the equipment is idle.*

F17 PULL TONGUE
9'3" - 15'0"

REF. NO.	PART NO.	DESCRIPTION	NO. REQ'D.
1	0623	Assy. Clevis	1
2	0833	Assy. Pull Tongue	1
3	0650	Assy. Clevis Pin	1
4	10910	Roll Pin 5/16 x 2-1/4	6
5	11261	Tongue Jack	1
6	100061	Hose Holder	1
7	10872	Cut Washer 1-3/8" PL	6
8	10460	Spring	2
9	11114	Thrust Washer 3' O.D. x 1-1/2 x 1/8 Thick	2
10	9572 ~~9918A~~	Stabilizer Swivel	1
11	10053	Hex Jam Nut 1-3/8 - NC	1
12	9917A ~~9832~~	Swivel	1
13	11081	Grease Fitting 5/16 - Straight - Drive in	2
14	0635A	Assy. Stabilizer Rod	1
15	9628	Clamp Trunion 3/8 x 2-1/2 x 3-3/4 Long	2
16	100574	Pin 1-1/4 Dia. 6-7/8 Long	2
17	10075	Cotter Pin 1/4 x 1-1/2	1
18	100134	Nut Wrench	1
19	10299	Lock Nut 5/8 NC, PL	1
20	10067	Hex Head Machine Bolt 5/8 x 5-1/2 NC, PL	1

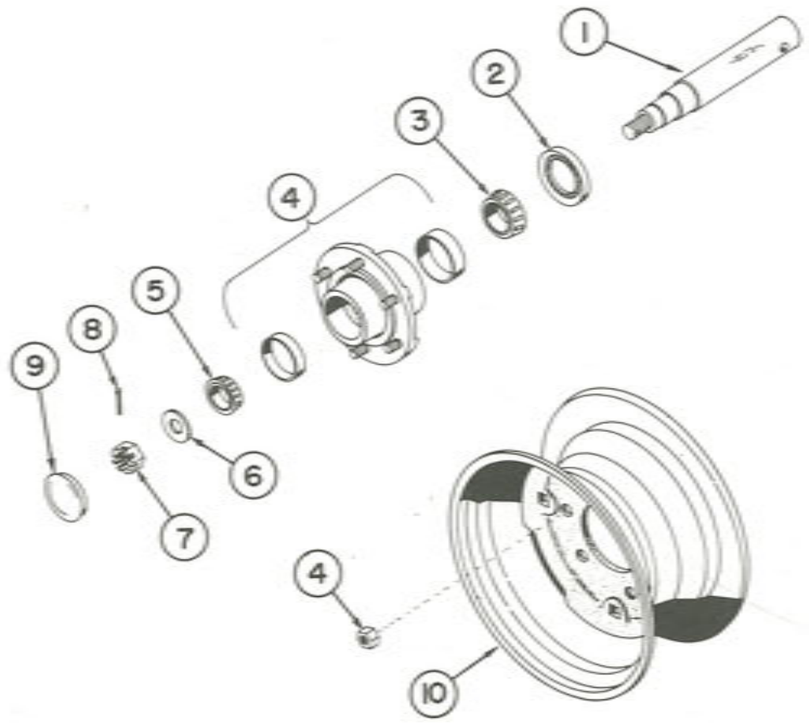
MAIN FRAME



F17 MAIN FRAME & ROCKSHAFT
9'3" - 15'0"

REF. NO.	PART NO.	DESCRIPTION	NO. REQ'D.
1	0848	Assy. Main Frame	1
2	9628	Clamp Trunion 3/8 x 2-1/2 - 3-3/4 Long	2
3	10043	Hex Head Machine Bolt 5/8 x 6-1/2 NC, PL, GR5	1
4	10299	Lock Nut 5/8 NC, PL	1
5	10396	Lock Nut 7/8 NC, PL	16
6	10945	Hex Head Machine Bolt 7/8 x 9 NC, PL	16
7	0866	Assy. Rockshaft Pivot Pin	4
8	0920	Assy. Rockshaft LH	1
9	0919	Assy. Rockshaft RH	1
10	7397	Pin 1" Dia. - 4-3/8 Long	1
11	0802	Assy. Rockshaft Tie Link	1
12	10910	Roll Pin	8
13	100578	Pin 1" Dia. - 5-1/2 Long	1
14	0912	Assy. Tranlsport Strap	1
15	0941	Assy. Transport Pin	1
16	10317	Klik Pin 1/4"	1
17	10773	Machine Bolt 3/8 x 3-1/2 NC, PL, GR5	2
18	10509	Lock Nut 3/8 - NC, PL	2
19	100583	Strap 3/4 x 3 x 9-1/8 Long ... 6" hole centers	8
20	10232	Hex Nut 1-1/2 - NC Slotted	4
21	11081	Grease Fitting	4
22	9270	Bronze bushing	8

WHEEL HUB



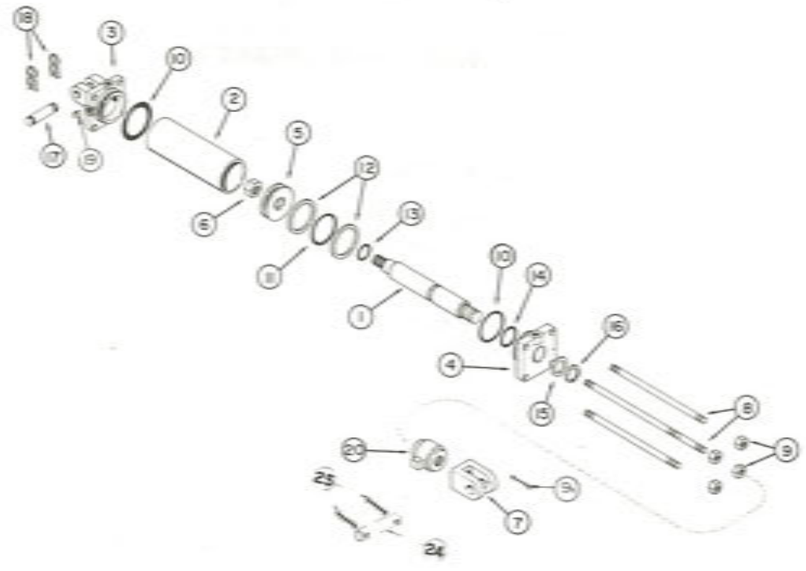
SPINDLE & HUB

REF. NO.	PART NO.	DESCRIPTION	NO. REQ'D.
1	10880	Spindle 50mm (1.969 in.) Dia. x 13 Long	2
2	10256	Seal (C/R 22870)	2
3	10258	Cone-Inner (Timkin 342A)	2
4	11297	Hub w/2 Cups, 6 Hub Bolts and 6 Hub Nuts	2
4	10257	Cup-Inner (Timken 332)	2
4	10261	Cup-Outer (Timken 14276)	2
4	11299	Bolt-Hub 1/2 x 1-7/8 - NF	12
4	11046	Nut-Hub 1/2 - NF	12
5	10262	Cone-Outer (Timken 14137A)	2
6	10263	Washer-Spindle 7/8	2
7	10264	Nut-Spindle 7/8 - NF Slotted	2
8	10291	Cotter Pin 5/32 x 1-1/4	2
9	10242	Hub Cap	2
10	10936	Wheel 15 x 8 - 6 Bolt	2
10	11236	Wheel 15 x 10 - 6 Bolt (Optional)	2

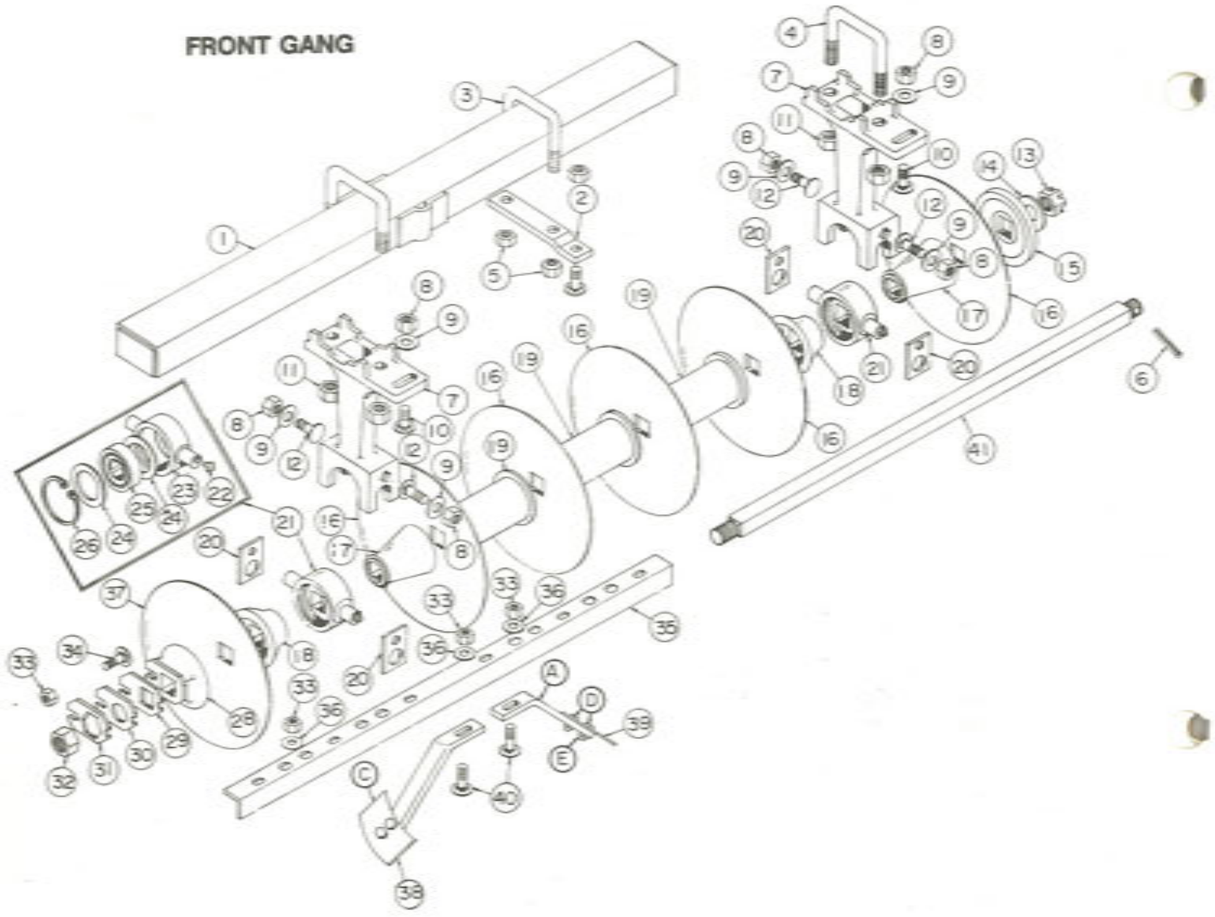
AMCO F17 HYDRAULIC CYLINDER (4 x 8)

REF. NO.	PART NO.	DESCRIPTION	NO. REQ'D.
1	10965	Rod-Piston	1
2	10966	Tube	1
3	10952	Butt	1
4	10967	Head-Piston	1
5	10968	Piston	1
6	11980	Nut-Lock 1" 14 NF	1
7	11296	Clevis for 1-1/4 Dia. Pin	1
8	10970	Rod-Tie	1
9	10139	Nut-Hex 5/8 NC, PL	4
17	10956	Pin-Clevis 1" x 4"	1
18	10957	Clip	2
19	10978	Plug-Pipe 1/2 NPT	1
20	10937	Control-Stroke	1
21	10976	Kit-Seal Repair (Prince #8600)	1
10	10958	"O" Ring	2
11	10959	"O" Ring	1
12	10960	Washer	2
13	10971	"O" Ring	1
14	10972	"O" Ring	1
15	10973	Washer	1
16	10974	Wiper	1
23	10975	"O" Ring (Used in Replacement Kit Only) (Not shown in illustration)	1
24	100570	Pin 1-1/4 Dia. x 5-3/8 Long	1
25	10910	Roll Pin 5/16 x 2-1/4	1
	BC-20-0004	4 x 8 Cylinder Complete (Prince #8608)	1

NOTE: Seal Repair Kit Parts available in repair kits only



FRONT GANG



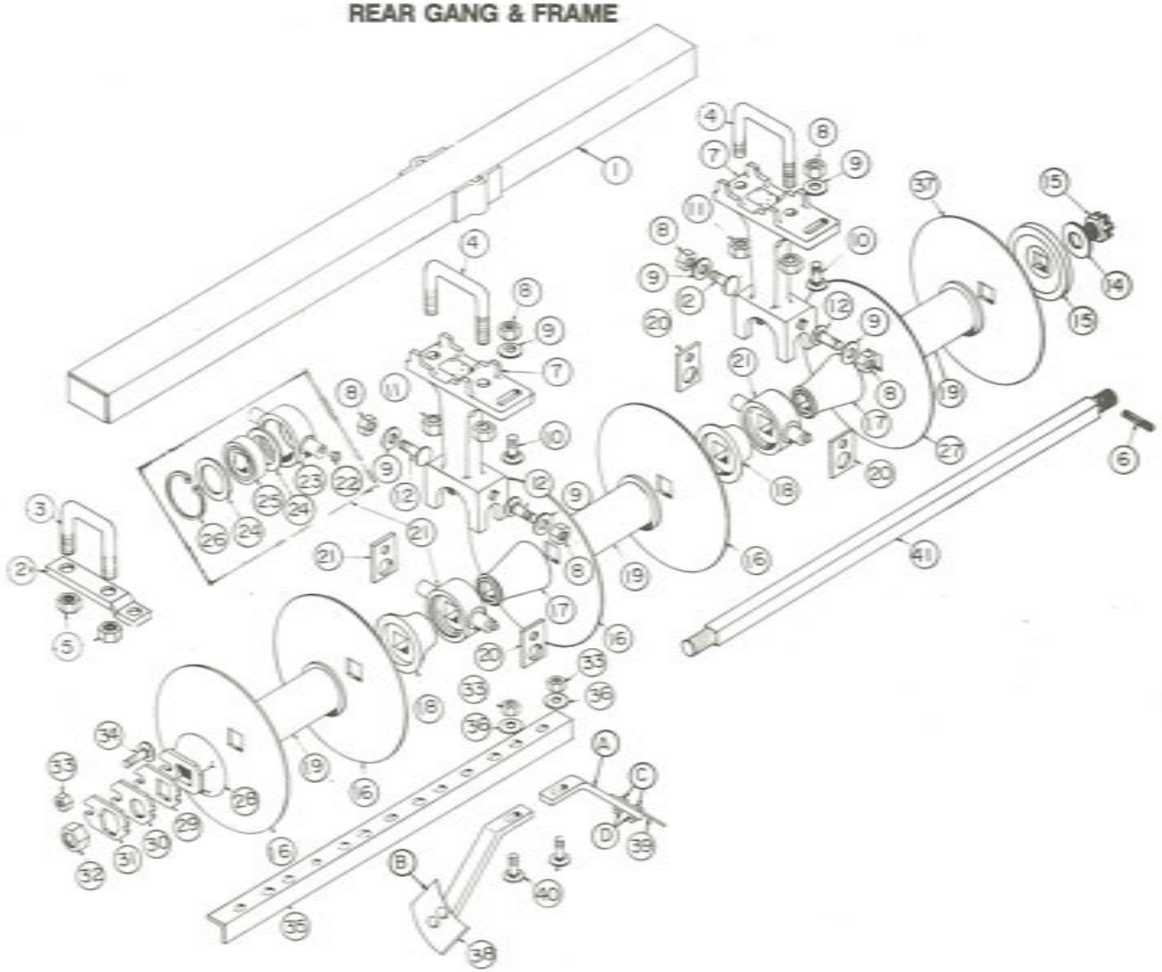
AMCO F17 FRONT GANG & FRAMES

REF. NO.	PART NO.	DESCRIPTION	9'3"	10'6"	12'0"	13'6"	15'
			NO. REQ'D.				
1	0933	Assy. Gang Frame (shown) 3 x 5 x 44	1	—	—	—	—
1	0921	Assy. Gang Frame 3 x 5 x 53	—	1	—	—	—
1	0923	Assy. Gang Frame 3 x 5 x 62-1/2	—	—	1	—	—
1	0925	Assy. Gang Frame 3 x 5 x 72	—	—	—	1	—
1	0927	Assy. Gahg Frame 3 x 5 x 81-1/2	—	—	—	—	1
2	100365	Scraper Bar Mount 5/8 x 2 x 11-1/16	1	1	1	—	—
3	6513	"U" Bolt 3/4 Dia.	1	1	1	—	—
4	11280	"U" Bolt 7/8 Dia.	2	2	2	3	3
5	10300	Lock Nut 3/4 NC, PL	—	2	2	—	—
6	10910	Roll Pin 5/16 x 2-1/4	1	1	1	1	1
7	16012	Bearing Riser	2	2	2	3	3
8	10299	Lock Nut 5/8 NC, PL	6	7	7	9	9
9	10059	Cut Washer 5/8 PL	6	7	7	9	9
10	10135	Carriage Bolt 5/8 x 1-3/4 NC, PL	2	3	3	3	3

FRONT GANG & FRAMES - Continued

REF. NO.	PART NO.	DESCRIPTION	9'3"	10'6"	12'0"	13'6"	15'
			NO. REQ'D.				
11	10396	Lock Nut 7/8 NC, PLT, G-B	4	4	4	6	6
12	10665	Carriage Bolt 5/8 x 2 NC, PLT, GR5	4	4	4	6	6
13	10226	Nut Gang Bolt 1-1/2" NF, Slotted	1	1	1	1	1
14	10872	Cut Washer 1-3/8 PLT	1	1	1	1	1
15	2404	Bumper Washer	1	1	1	1	1
16	9480	Blade 22" x 3/16 Plain	5	6	7	8	9
16	9484	Blade 22" x 3/16 C.O.	5	6	7	8	9
16	3276	Blade 22" x 1/4 Plain	5	6	7	8	9
16	3275	Blade 22" x 1/4 C.O.	5	6	7	8	9
16	11574	Blade 24" x 3/16 Plain	5	6	7	8	9
16	11573	Blade 24" x 3/16 C.O.	5	6	7	8	9
16	11571	Blade 24" x 1/4 C.O.	5	6	7	8	9
16	11572	Blade 24" x 1/4 Plain	5	6	7	8	9
17	17009	End Bell - Small	2	2	2	3	3
18	17010	End Bell - Large	2	2	2	3	3
19	0522	Spacer Spool	3	4	5	5	6
20	9628	Clamp Trunion 3/8 x 2-1/2 x 3-3/4 Long	4	4	4	6	6
21	FB-09-0013	Sub. Assy. Housing & Bearing	2	2	2	3	3
22	10606	Grease Fitting 1/8 NPT Straight	1	1	1	1	1
23	16003	Housing - Bearing	1	1	1	1	1
24	100104	Washer 100mm	2	2	2	2	2
25	G11071	Bearing GW211PP3	1	1	1	1	1
26	11064	Snap Ring	1	1	1	1	1
28	1222A	End Gang Washer	1	1	1	1	1
29	100099	Spacer Plate	1	1	1	1	1
30	100098	Bearing Plate	1	1	1	1	1
31	5622A	Lock Plate	1	1	1	1	1
32	10489	Nut Gang Bolt 1-1/2 NF	1	1	1	1	1
33	10395	Lock Nut 1/2 NC, PLT	6	7	8	9	10
34	10710	Carriage Bolt 1/2 x 2 NC, PLT	1	1	1	1	1
35	100677	Scraper Bar 2 x 2 x 3/8 - 44 9/16 RH	1	—	—	—	—
35	100678	Scraper Bar 2 x 2 x 3/8 - 44 9/16 LH	1	—	—	—	—
35	100681	Scraper Bar 2 x 2 x 3/8 - 53 3/4 RH	—	1	—	—	—
35	100682	Scraper Bar 2 x 2 x 3/8 - 53 3/4 LH	—	1	—	—	—
35	9921	Scraper Bar 2 x 2 x 3/8 - 62 15/16 RH	—	—	1	—	—
35	9922	Scraper Bar 2 x 2 x 3/8 - 62 15/16 LH	—	—	1	—	—
35	9923	Scraper Bar 2 x 2 x 3/8 - 72 1/8 RH	—	—	—	1	—
35	9924	Scraper Bar 2 x 2 x 3/8 - 72 1/8 LH	—	—	—	1	—
35	100679	Scraper Bar 2 x 2 x 3/8 - 81 5/16 RH	—	—	—	—	1
35	100680	Scraper Bar 2 x 2 x 3/8 - 81 5/16 LH	—	—	—	—	1
36	10832	Cut Washer 1/2 PLT	5	6	7	8	9
37	9481	Blade 20" x 3/16 Plain	1	1	1	1	1
37	9487	Blade 20" x 3/16 C.O.	1	1	1	1	1
38	0789	Assy. Scraper - LH	5	6	7	8	9
A.	100271	Scraper Shank	1	1	1	1	1
C.	100270	Scraper Blade 3/16 x 6 x 4	1	1	1	1	1
D.	10785	Hex Head Machine Bolt 1/2 x 1-1/2 NC, PL	2	2	2	2	2
E.	10395	Lock Nut 1/2 NC, PL	2	2	2	2	2
39	0788	Assy. Scraper - RH	5	6	7	8	9
40	10870	Carriage Bolt 1/2 x 1-1/2 NC, PLT, GR5	5	6	7	8	9
41	9442	Gang Bolt 1-1/2" Sq. x 52-1/8	1	—	—	—	—
41	9443	Gang Bolt 1-1/2" Sq. x 61-3/8	—	1	—	—	—
41	9444	Gang Bolt 1-1/2" Sq. x 70-5/8	—	—	1	—	—
41	9445	Gang Bolt 1-1/2" Sq. x 79-7/8	—	—	—	1	—
41	9446	Gang Bolt 1-1/2" Sq. x 89-1/8	—	—	—	—	1

REAR GANG & FRAME



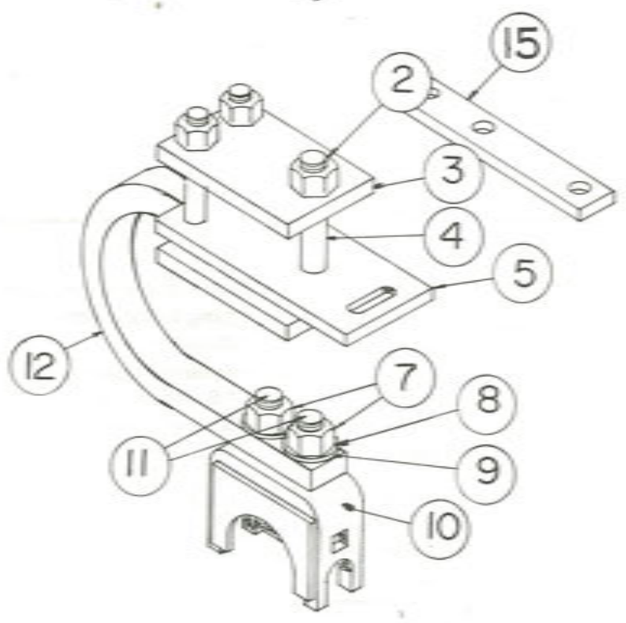
AMCO F17 REAR GANG & FRAME
9'3" - 15'0"

REF. NO.	PART NO.	DESCRIPTION	NO. REQ'D. 9'3"	10'6"	12'0"	13'6"	15'0"
1	0934	Assy. Gang Frame 3 x 5 x 53	1	—	—	—	—
1	0922	Assy. Gang Frame 3 x 5 x 62-1/2	—	1	—	—	—
1	0924	Assy. Gang Frame 3 x 5 x 72	—	—	1	—	—
1	0926	Assy. Gang Frame 3 x 5 x 81-1/2	—	—	—	1	—
1	0928	Assy. Gang Frame 3 x 5 x 91	—	—	—	—	1
2	100365	Scraper Bar Mount 5/8 x 2 x 11-1/16	1	1	2	1	1
3	6513	"U" Bolt 3/4" Dia	1	1	2	1	1
4	11280	"U" Bolt 7/8" Dia	2	2	2	3	3
5	10300	Lock Nut 3/4 NC, PL	2	2	4	2	2
6	10910	Roll Pin 5/16 x 2-1/4	1	1	1	1	1
7	16012	Bearing Riser	2	2	2	3	3
8	10299	Lock Nut 5/8 NC, PL	7	7	8	10	10

F17 FLEX GANG BEARING RISER

REF. NO.	PART NO.	DESCRIPTION	NO. REQ'D.
2	10300	Lock Nut 3/4 NC, PLT	3
3	100715	Top Plate 3/4 x 5 x 8	2
4	10697	Machine Bolt 3/4 x 7-1/2 NC, PL	3
5	100716	Scraper Bar Mount 1/2 x 5 x 11-1/4	1
7	10585	Hex Nut 3/4 NF, CH	2
8	10002	Lock Washer 3/4	2
9	10078	Cut Washer 3/4	2
10	0944	Assy. Trunion Mount	1
11	10579	Carriage Bolt 3/4 x 3 NF, GR5	2
12	11521	Flex Gang Shank 1-1/4 x 2	1
15	100745	Scraper Bar Support 1/2 x 2-1/2 x 11-1/4	A.R.

NOTE: Parts 1-12 are required to replace bearing riser 16012 on a FLEX GANG HARROW.
Part 15 used to replace 100365 on a FLEX GANG HARROW.



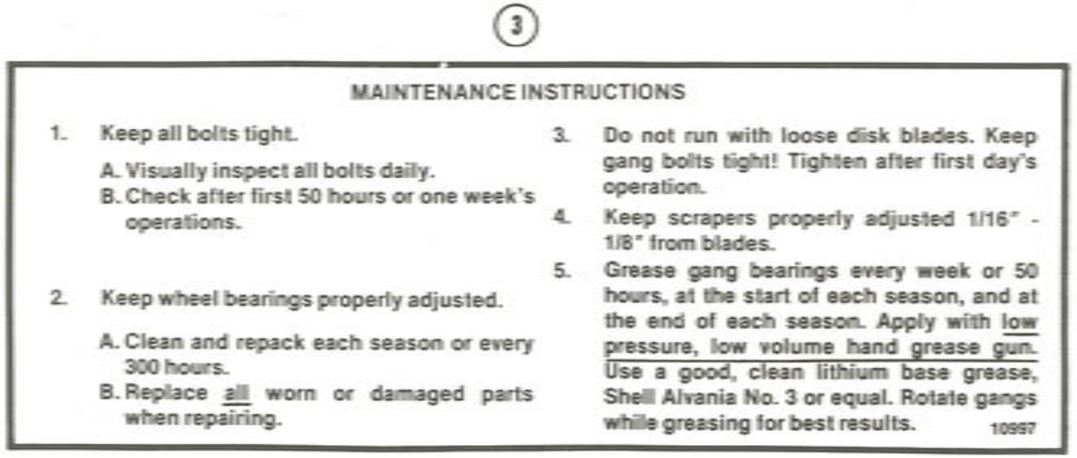
FLEX GANG BEARING RISER

DECALS

①

②

③



AMCO F17 SERIES DISK HARROW DECALS

Ref. No.	Part No.	Description	Req'd No.
1	10948	Decal-AMCO	2
2	11233	Decal—Warning	1
3	10997	Decal—Maintenance	1

GENERAL TORQUE SPECIFICATION TABLE

USE THE FOLLOWING TORQUES WHEN SPECIAL TORQUES ARE NOT GIVEN

Note: These values apply to fasteners as received from supplier, dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly-disulphide greases or other extreme pressure lubricants are used. This applies to both NF and NC threads.

SAE Grade No.	2		5		8 *	
Bolt head identification marks as per grade NOTE: Manufacturing Marks Will Vary						
Bolt Size	Torque Foot Pounds		Torque Foot Pounds		Torque Foot Pounds	
Inches	Millimeters	Min	Max	Min	Max	Min	Max
1/4	6.35	5	6	9	11	12	15
5/16	7.94	10	12	17	20.5	24	29
3/8	9.53	20	23	35	42	45	54
7/16	11.11	30	35	54	64	70	84
1/2	12.70	45	52	80	96	110	132
9/16	14.29	65	75	110	132	160	192
5/8	15.88	95	105	150	180	220	264
3/4	19.05	150	185	270	324	380	456
7/8	22.23	160	200	400	480	600	720
1	25.40	250	300	580	696	900	1080
1-1/8	25.58			800	880	1280	1440
1-1/4	31.75			1120	1240	1820	2000
1-3/8	34.93			1460	1680	2380	2720
1-1/2	38.10			1940	2200	3160	3560

* Thick nuts must be used with Grade 8 bolts

ALL BOLTS SHOULD BE TIGHTENED TO THE RECOMMENDED TORQUES SHOWN IN THE *"GENERAL TORQUE SPECIFICATION TABLE"*

ASSEMBLY INSTRUCTIONS - AMCO F17 HARROW

The AMCO F17 Harrow is shipped from the factory with maximum preassembly. The following bundles are required for a complete harrow.

A. Bundle Pull Tongue (with tongue jack)

B. Bundle Main Frame (with rockshafts)

C. Bundle Front Right Hand Gang and Gang Frame

D. Bundle Front Left Hand Gang and Gang Frame

E. Bundle Rear Right Hand Gang and Gang Frame

F. Bundle Rear Left Hand Gang and Gang Frame

G. Two 15" Six Bolt Wheels

STEP 1. Select a clear level area to assemble the harrow. Place all parts and bundles where they will be readily accessible during assembly.

STEP 2. Place the center main frame "right side up" on *sturdy stands* at least 33" high.

CAUTION *Use sturdy stands to prevent frame from falling.*

STEP 3. Attach the two front gangs and gang frames to the main frame. Clamp in place with the 7/8" bolts and straps. The gangs should be located to throw soil away from the center of the harrow. Tighten the 7/8" bolts to specified torque.

STEP 4. Attach the two rear gangs to the center main frame. Clamp in place with the 7/8" bolts and straps. The gangs should be located to throw soil toward the center of the harrow. Tighten the 7/8" bolts to the specified torque.

STEP 5. Mount two 9.5LX15 or 11Lx15 six or eight ply tires on the two wheels. Inflate to 40-50 PSI. Mount wheels on rockshafts. Tighten hub bolts tight.

CAUTION *When working on disk harrows, care should be exercised in handling or tightening bolts near disk blades to avoid injury.*

STEP 10. Final Grooming and check points.

A. Check inside front gangs. They should overlap in the center about 2-1/2" to 3-1/2". (Front tips of inside blades should be 1-1/2" to 2" over center line of harrow.) This can be adjusted by shifting the gangs on the gang frames. It is important that center blades clear by at least 3/4".

B. Check the inside rear gangs. They should be 26" to 30" apart. (The front tip of the inside blades should be 13" to 15" from the harrow centerline.) Shift gangs as required to obtain this spacing.

C. Check scraper adjustment. Scrapers should be adjusted to run 1/8" to 1/4" from disk blades.

D. Tighten all bolts to proper torque.

E. Raise and lower harrow 4 or 5 times with heavy duty 3" x 8" or 4" x 8" hydraulic cylinders. Check transport lock to be sure it functions properly.

F. Raise harrow for transport as described above. Use a good grade of clean Lithium soap base chassis grease to lubricate the entire harrow. This is very important if the harrow will be kept in inventory for several weeks before being placed in service. Grease the harrow as follows:

(1) Grease the four rockshaft pivot pins until grease appears at the ends of the pivot journals.

(2) Grease the two fittings on the tongue adjusting rod. Remove tape from tongue adjusting rod.

(3) Grease the gang bearings with 4 or 5 shots of grease to purge any condensation that has accumulated during shipment and storage.

G. If the harrow is in storage for four to six months, the entire harrow should again be lubricated before placing in service. It should also be greased every 50 hours while in use, at the end of each season and at the start of each season.

H. Check decals to be certain they are in place and in good condition. Touch up paint as required before delivery. Place Operators Manual in the heavy plastic shipping bag. Tape bag to main frame so the Operators Manual will be delivered to your customer along with the harrow.

STEP 11. Review all steps of the assembly process to be certain the harrow is properly assembled. Check *all bolts* to be sure they are properly torqued. Visually inspect the harrow for any missing, damaged, or defective parts. Repaint any areas that need improvement.

Remember, a little extra attention to details at this time can prevent problems after the harrow is placed in service.

LUBRICATION

Careful and regular attention to lubrication will greatly increase the life of the harrow. For economical and efficient operation, the proper lubrication of frame fittings, gang bearings, and wheel bearings is essential.

Be sure fittings are free of dirt before greasing. If a fitting is lost or damaged, replace it immediately. Lubricate all parts thoroughly with a good grade No. 2 gun grease (Lithium Base).

Miscellaneous working parts not provided with lubrication fittings should be oiled occasionally with a good grade of lubrication oil.

ROCKSHAFT PIVOT PINS

A high carbon steel pin with a grease fitting joins each rockshaft to the main frame in two places. These 4 pins should be greased every 50 hours of operation. They should also be greased at the beginning and end of the disking season. A good grade of Lithium soap base grease is recommended.

WARNING *Lower or block elevated components before servicing or when leaving the machine. Elevated components can fall and cause serious injury.*

GANG BEARINGS

The AMCO F17 Harrow Gangs are equipped with regreasable Protect-O-Shield ball bearings. The grease fitting is located on the rear of each bearing housing. They should be greased every 50 hours of operation with a good grade of lithium soap base chassis grease, preferrably with a low volume-low pressure hand operated grease gun. All bearings should be greased at the beginning and end of each disking season. To protect the seals from the elements, raise the harrow on its wheels and slowly spin the gangs so the grease wraps around the seals.

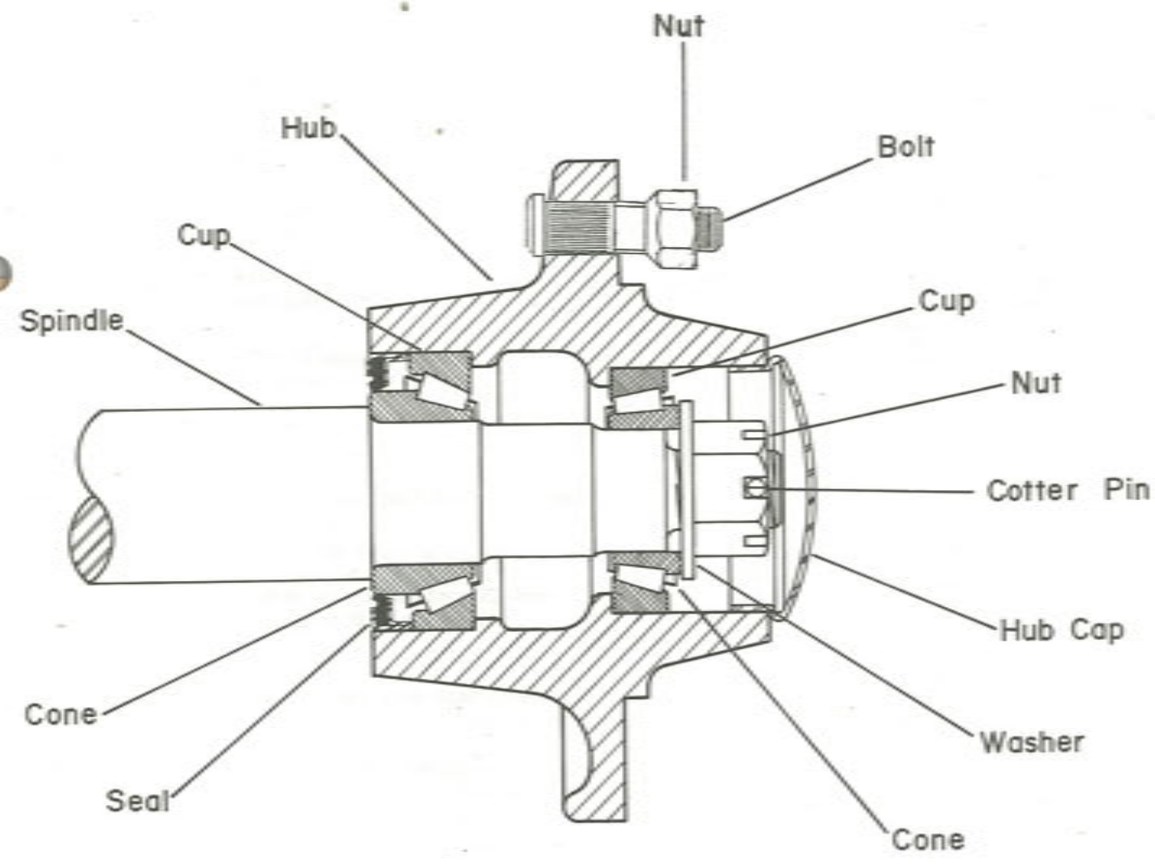
More frequent greasing is recommended when working in very sandy or wet conditions.

TONGUE ADJUSTING ROD:

The two swivels on the tongue adjusting rod should be greased every 50 hours of operation, also, at the beginning and end of each disking season. The threads on the rod should be cleaned and oiled occasionally for smooth operation.

WHEEL HUB BEARINGS

The wheel hubs are equipped with tapered roller bearings. These hubs are packed with grease and adjusted at the factory. They should be repacked and the spindle nut properly adjusted each disking season or every 300 hours of operation. Use a good grade of clean lithium soap base grease.

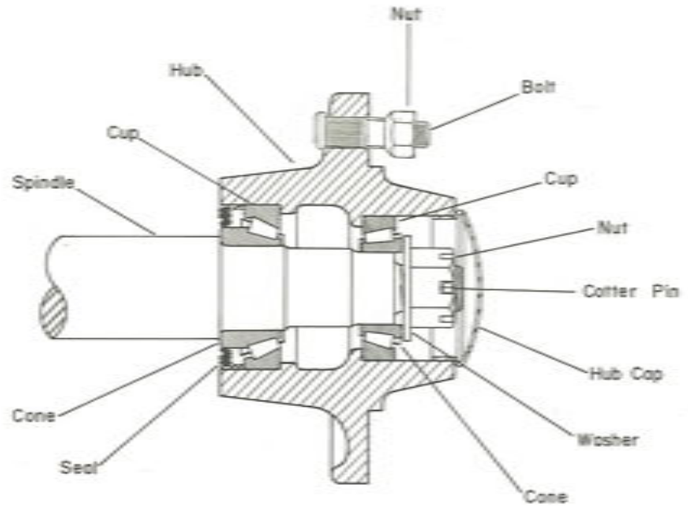


MAINTENANCE

WHEEL BEARING REPAIR

Wheel bearings should be repacked with grease and adjusted annually. Under extreme conditions, they should be serviced more frequently. Check occasionally for excessive end play. Adjust as required to eliminate excessive end play.

To disassemble the hub, remove the dust cap by prying around it. Remove the cotter pin, slotted nut and spindle washer. Carefully remove the hub and bearings from the spindle. Inspect all parts for wear and replace if necessary.



Use the following procedure when repairing or servicing wheel hubs:

1. Clean all parts that are to be re-used.

2. Carefully inspect the metal case on the grease seal. Discard seal if case is bent or damaged. Check seal lips for cuts, tears or excessive wear. Seal must fit snugly on extended inner race of bearing.

3. Carefully inspect both sets of bearing cones. Bearing bore and rollers must be smooth and free of nicks and scratches. Replace cones if damaged.

4. Inspect hub to make sure that hub bolts have a good thread. Bearing cups must be smooth and free of surface blemishes. Cups must be removed from the hub and replaced if damaged. Cups should be fully pressed into the hub and rest squarely against the shoulder inside the hub. Hub cap and grease seal should fit snugly inside the hub. Severely damaged hubs should be replaced.

5. Threads on spindle must be in good condition. Bearing cone seats must be smooth and free of blemishes. Bearing cones must fit squarely on spindle.

6. Spindle washer, slotted nut, cotter pin and hub cap must be in good condition. Replace if worn or damaged.

To reassemble the hub, repack each bearing cone with grease and fill the hub cavity 1/3 full of grease. Place inner bearing in hub, press grease seal into hub and carefully install the hub on the spindle. Install the outer bearing assembly into the hub, and replace the spindle washer and slotted nut. Tighten the slotted nut until the hub binds when rotated.

Back the slotted nut off to the nearest slot. Rotate the hub five or six revolutions in each direction to seat all parts. Re-tighten the slotted nut while rotating the hub. When the hub binds, back the slotted nut off to the nearest slot and secure with a cotter pin. Install dust cap and mount wheel on hub.

GANG REPAIR

1. With the harrow in its "down" or working position, loosen the gang bolt nut. It is helpful to clean the threads of all bolts with a wire brush and apply penetrating oil before removing the nuts.

2. Remove the nuts that secure the gang to the bearing riser.

3. Remove the trunion clamps.

4. Raise the harrow on its wheels. The entire gang can then be rolled away from the harrow. In most cases time can be saved by removing the scraper bars and scrapers.

5. Remove the gang bolt nut and end washer.

6. Remove the blades, spacer spools and bearings being careful not to damage the threads on the gang bolt.

7. Tear the entire gang down and clean all parts. Check disk axle for straightness. Bowed, bent or worn axles must be replaced.

8. Check spacer spools for damage caused by running disk with loose gangs or hitting underground obstructions. Replace spools if they are damaged.

9. Carefully check all end bells. The large end must contact the disk blade around the entire circumference of the end bell. The small end must be smooth and perpendicular to the axle. The end bells *must be replaced* if they are cracked or worn on the surface adjacent to the bearing.

10. Check all the bearings on the gang. Running a harrow for one hour or more after a bearing failure will seriously damage other bearings on the gang. These damaged bearings will then fail within a few hours after the failed bearing has been replaced. Continued operation with this failed bearing will damage the new bearing thus it will fail after a few hours use. In most cases it will be best to replace all bearings on a gang when it is torn down for repairs. A triple lip sealed regreasable bearing should always be used for bearing replacement.

11. To replace a bearing, the snap ring must be removed. The old bearing and "Protect-O-Shield Washers" should then be pressed out of the housing. Clean and wash out old grease and carefully check the housing. Replace the housing if it is damaged. Check the Protect-O-Shield washers. They should fit snug in the bearing housing requiring a few light taps with a hammer to remove or install them. If they are loose, bent, or show signs wear near the inner race of the bearing, they should be replaced. Do not use the harrow without the washers being installed. Press the new bearing straight into the housing. Always press against the outer race of the bearing. Check the location of the grease holes in the bearing. These holes must align with the grease groove in the bearing housing. Rotate the bearing in the housing after it is pressed in to be sure it turns freely. Install the snap ring in the housing.

12. Check all disk blades for cracks, breaks, wear and other damage. Replace worn or damaged disk blades.

13. After cleaning, checking and replacing all damaged parts, the gang should be assembled. Be sure the grease fittings in the bearing housings face to the rear. Be sure the snap ring in the bearing housing is turned toward the convex (back) side of the disk blades. The 1-1/2" square gang bolt nut should be torqued to 1200 FT./LBS. The axle nut should be locked in place with the lock strap.

14. After the gang is assembled it should be attached to the harrow. The bearing risers should be carefully spaced to match the bearing housing. Poorly spaced bearing risers will overload the bearings and cause premature failure. The gang should be rotated 4 or 5 complete revolutions to be sure that all parts are aligned and the gang turns freely. Replace the scraper bar and scrapers.

15. The bearings should be greased each week or every 50 hours of use with a good grade of clean, lithium soap base grease. Use of dirty grease or a grease with metallic additives will reduce bearing life.

16. It is essential that gang bolts be kept tight to prevent axle bending, blade breakage, spacer spool breakage and damage to other gang parts. Gang parts tend to wear on a bevel when the harrow is operated with a loose gang bolt. This reduces the area of contact between mating gang parts. Therefore it is often difficult to keep a gang bolt tight if it has been operated in a loose condition. After such a gang bolt has been properly torqued it should be retorqued after about 30 minutes of operation, again after 4 or 5 hours of operation and again after 8 to 10 hours of use. This will assure that proper gang bolt tension is maintained while the mating components are reseating. If the gang bolt will not stay tight, the gang should be completely disassembled and all parts carefully inspected. All damaged parts should be replaced before reassembling the gangs.

CAUTION: When working on disk harrows care should be exercised in handling or tightening bolts near disk blades to avoid injury. All hydraulically or mechanically elevated components must be blocked or lowered to prevent accidents when servicing the harrow.

SCRAPER REPAIR

Bent scraper bars or shanks should be replaced or straightened if possible. The blades can be replaced when they wear to the extent they are not performing properly. Keep the blades adjusted from 1/8" to 1/4" from the disk blades. The scrapers can be adjusted by loosening the mount bolt and sliding the scraper to the proper position then tightening the mount bolt. Additional adjustment can be obtained by loosening the scraper bar mount bolts and shifting the entire scraper bar. Do not allow the scraper blades to run on the spacer spools as immediate damage to the spool will occur.

ROCKSHAFT PIVOT PIN REPAIR

The rockshafts are equipped with replaceable, regreasable bronze bushings. If properly lubricated they should last for several seasons. The bushings should be checked each disking season for excessive pivot pin or bushing wear. Worn bushings and pivot pins should be replaced. Failure to replace worn or damaged parts will damage other parts.

GENERAL

Keep all bolts tight. Check all bolts after 50 hours operation and each season thereafter. Visually inspect all bolts daily. Do not run with loose gang bolts. Keep the gang bolts torqued to 1200 ft. lbs.

STORAGE

Proper storage will add to the life of your disk harrow, and assure its being in good condition for the next season. The following procedure is recommended.

Clean off all foreign matter, and *thoroughly lubricate* the harrow. (See lubrication instructions)

Tighten loose bolts and replace any damaged or missing parts.

Repaint the harrow where the original paint has worn off.

Coat the disk blades and hydraulic cylinder rod with a good rust preventative.

Store in a dry place, with the gangs resting on boards to remove weight from the tires.

Carefully rotate each gang and check for worn or damaged blades, bent gang shafts, worn scrapers, damaged bearings and other parts which may need replacing.

Whenever disk blades or bearings are replaced, the gang shaft nuts must be torqued to 1200 foot pounds.

CAUTION *All hydraulically or mechanically elevated operating components must be blocked to prevent accidental lowering or must be lowered to the ground when making adjustments or when the equipment is idle.*

CAUTION *Hydraulic systems are highly pressurized. Escaping hydraulic oil, even an invisible pinhole leak, can penetrate body tissues causing serious injury. Use a piece of wood or cardboard when looking for leaks - never use the hands or other parts of the body.*

Relieve hydraulic pressure before disconnecting circuits. When reassembling, make absolutely certain that all connections are tight.

If injured by hydraulic oil escaping under pressure, see a doctor immediately. Serious infection or reaction may occur if medical attention is not given at once.

OPERATING INSTRUCTIONS AND PROCEDURES

Disk as deep as necessary to do a thorough job, but do not try to disk to an exeecssive depth. In most conditions the AMCO harrow has sufficient weight for good penetration. In other conditions you have a little more weight than you really need. For these conditions, your harrow should be equipped with flotation tires. 11L x 15 tires will be adequate for most conditions. You also need a good heavy duty 3 x 8 or 4 x 8 hydraulic cylinder with depth control. This will allow you to control cutting depth.

Never allow soil to "bulldoze" ahead or flow over the spacer spools. Cutting depth should be controlled to avoid this situation. Maintaining proper cutting depth will have the following advantages.

1. Increased gang bearing life.
2. Reduced strain on harrow frame and related parts.
3. Reduced load on tractor engine and drive train.
4. Lower fuel consumption due to less load on tractor engine.
5. Reduced wheel slippage and rear tractor tire wear due to lower load.
6. Increased travel speeds due to less wheel slippage.

By properly controlling cutting depth, gang bearing life will be increased with more acres covered per day at a lower cost.

CAUTION *Never clean, adjust or lubricate a disk that is in motion. Disk blades could cause severe injury.*

ADJUSTMENTS FOR LEVEL DISKING

Six factors must be considered when level disking is required. They are (1) depth of cut, (2) tractor speed, (3) tongue adjusting rod length, (4) gang angle adjustments, (5) lateral gang adjustments, and (6) soil conditions.

CENTER RIDGE

If a ridge of soil is left behind the center of the harrow, decrease the weight on the rear gangs by shortening the tongue adjusting rod, decrease the angle of the rear gangs, increase the angle of the front gangs, or move the rear gangs farther apart, or do a combination of all four.

CENTER FURROW

If a furrow is left behind the center of the harrow, increase the weight on the rear gangs by lengthening the tongue adjusting rod, increase the angle of the rear gangs, decrease the angle of the front gangs, or move the rear gangs closer together, or do a combination of all four.

OUTER RIDGES OR FURROWS

If ridges or furrows are left behind the outer ends of the harrow, change the weight on the rear gangs by adjusting the length of the tongue adjusting rod, or change the front or rear gang cutting angle. You may have to change tractor speeds.

MOST OFTEN ENCOUNTERED DISC BLADE FAILURES

Most disk blade failures can be prevented by selecting the correct blade size and thickness for individual conditions when buying a disk. Reduction of gang cutting angle and speed in areas containing rocks and stumps will greatly lengthen the blade life. Keeping gang bolts properly torqued and raising the harrow while turning will also reduce disk blade breakage.

FIGURE 1 - Laminated Disc-defective steel. Eligible for warranty consideration

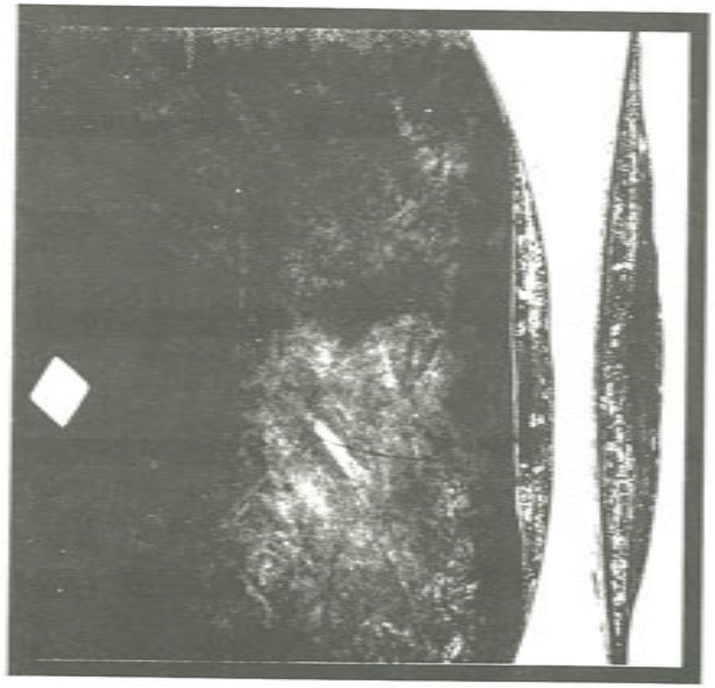
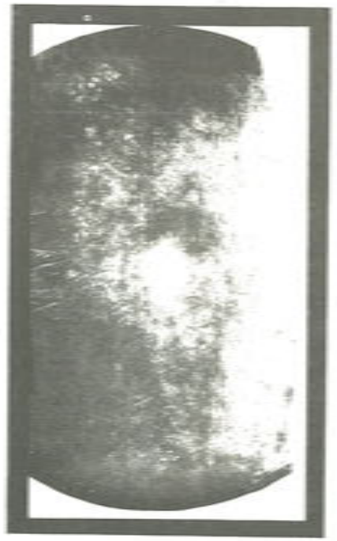


FIGURE 2 - Straight directional break caused by defective steel. Eligible for warranty consideration



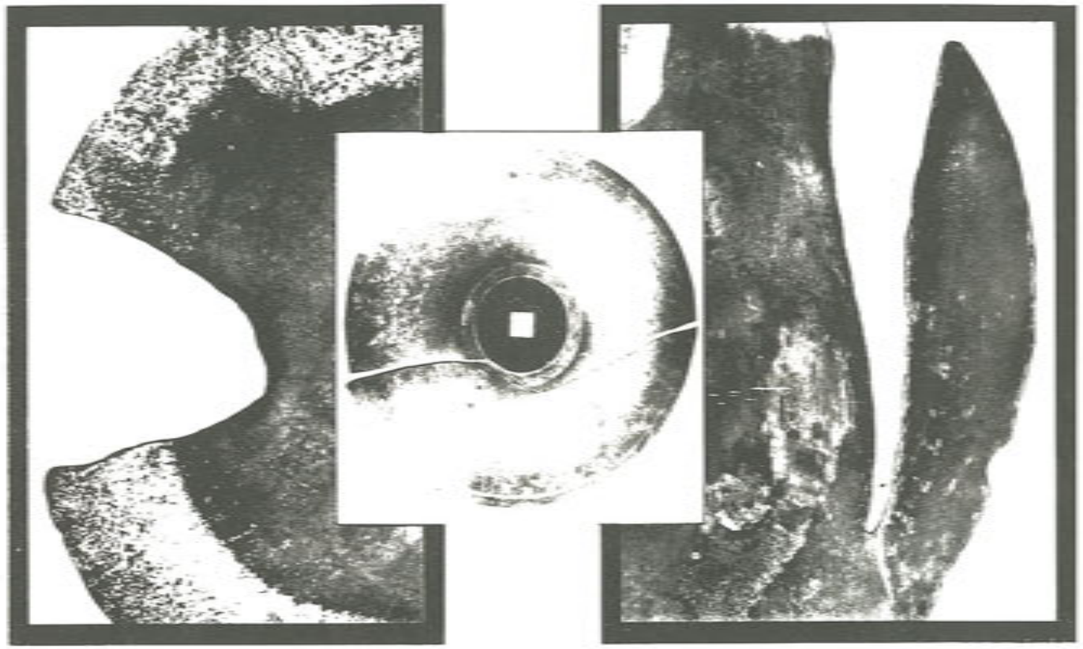


FIGURE 3,4,5 - Irregular breaks caused by contact against rocks or stumps. Not covered by warranty.

FIGURE 6 - Chipped or dented edges resulting from use in areas containing rocks or stumps. Not covered by warranty.

FIGURE 7 - Center broken out. Experience has shown that this is usually caused by loose bolts, excessive flexing, or by contact with rocks and stumps. Not covered by warranty.

SHEET 1 OF

MACO NUMBER: BC-05-0175

MODEL: F15 16'6" to 24'0"

NO. REQ.	IDENTIFICATION NUMBER	
	BC-05-0175	SUB ASSY.
1	20041	ASSY. YOKE -
1	20042	ASSY. YOKE -
1	20046	ASSY. CONNECTOR
2	0598	ASSY. PIN RETAINER
1	10606	GREASE FITTING
2	10910	
1	10053	