

ASSEMBLY INDEX
MODEL 4590

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ASSEMBLY INSTRUCTIONS

1. See Fig. 20. Fasten L.H. center frame, arrow 1, and R.H. center frame half, arrow 2, together as shown. Center frame halves are fastened with four (4) 1" x 3-1/4" (25.4mm x 82.3mm) hex. bolts c/w nuts and lockwashers at each front, rear and inner connecting plates, arrow 3. **Do not tighten bolts until after rockshaft bearings have been installed.**
2. See Fig. 20. Raise frame assembly, arrow 1 and 2, approximately 36" (914.4mm) from ground and block securely.
3. See Fig. 20. Fasten center frame rockshaft assembly, arrow 4, to bottom of main frame, with three (3) sets of 5-1/2" (139.7mm) rockshaft bearing halves, arrow 5. Position rockshaft so that outside bearings are positioned between wheel legs. Fasten each rockshaft bearing assembly to bearing bracket, arrow 6, with two (2) 3/4" x 6-1/2" (19.1mm x 165.1mm) hex bolts c/w nuts and lockwashers.

NOTE: Position top half bearing so grease hole is on rear side of rockshaft and bottom half so grease hole is on front side of rockshaft.

4. See Fig. 20. Tighten bolts which fasten rockshaft bearing halves, arrow 5, to frame. Next, tighten bolts which fasten frame connecting plates, arrow 3. If there is a gap between the plates, arrow 3, at top or bottom, install a 1-1/2" x 5" (38.1mm x 125.5mm) shim, arrow 9, to take up this gap.

NOTE: If gap is closed by tightening bolts, a preload will be placed on rockshaft bearing. Frame must be level after frame connecting plate bolts have been tightened.

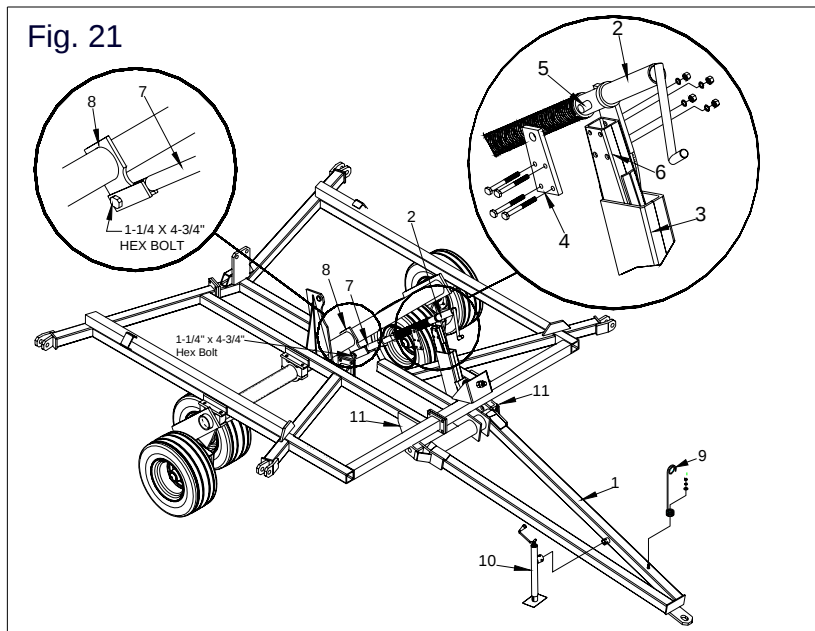
IMPORTANT: AFTER TIGHTENING ROCKSHAFT BEARING BOLTS, ROCKSHAFT SHOULD BE FREE TO PIVOT IN BEARINGS. IF BEARINGS ARE TOO TIGHT, PLACE TWO (2) 2" X 3" (50.8mm X 76.8mm) SHIM(S), ARROW 7, (AS REQUIRED) BETWEEN BEARING HALVES, ARROW 5.

NOTE: Before installing rockshaft bearings, place a coat of grease on bearing surface.



WARNING: SUPPORT CENTER FRAME SECURELY BEFORE ASSEMBLING COMPONENTS. INADEQUATE SUPPORT MAY RESULT IN THE HEAVY COMPONENTS FALLING AND CAUSING SERIOUS INJURY TO YOU OR PERSON(S) NEARBY

5. See Fig. 20. Install one (1) 1/4" x 28 (6.35mm x 28) grease fitting, arrow 8, in each top rockshaft bearing half. Install one (1) 1/4" x 28 (6.35mm x 28) grease fitting, arrow 9, in each bottom rockshaft bearing half.
6. See Fig. 20. Install one (1) eight bolt tire and wheel assembly, arrow 10, to hub assembly, arrow 11, on each side of each wheel leg. Center frame uses four (4) 12.5L x 15FI, range F tires. Secure with eight (8) 9/16" x 1-11/16" (14.3mm x 17.5mm) wheel bolts, arrow 12. Tighten wheel bolts to 130 ft. Lbs (176.3 N.m). Lock each wheel bolt by installing one (1) 9/16" (14.3mm) N.F. hex nut, arrow 13, on thread that extends past hub. Tighten nuts.



IMPORTANT: WHEEL BOLTS MUST BE KEPT TIGHT. IF BOLTS ARE NOT TIGHT, BOLTS WILL LOOSEN CAUSING SEVERE DAMAGE TO HUB, WHEEL AND TIRE.

CHECK WHEEL BOLTS PERIODICALLY, ESPECIALLY THE FIRST FEW HOURS OF EITHER TRANSPORT OR FIELD WORK.



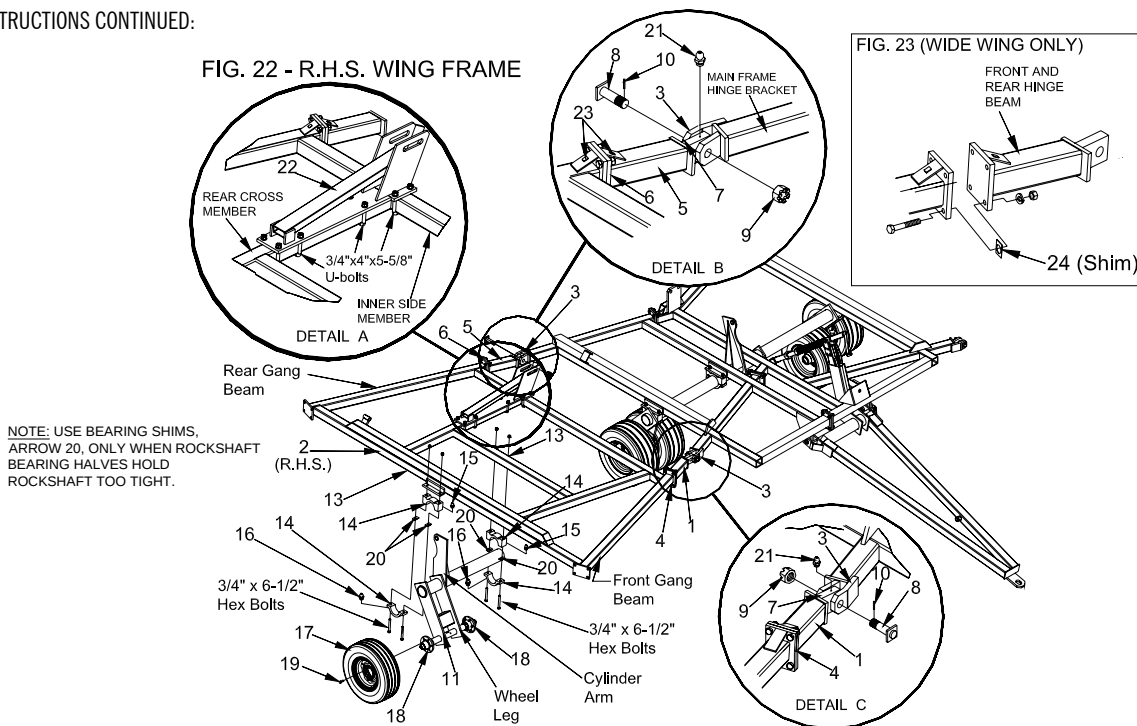
WARNING: USE ADEQUATE MANPOWER OR A HOIST TO LIFT HEAVY COMPONENTS IN PLACE. ATTEMPTING TO LIFT HEAVY COMPONENTS BY YOURSELF COULD CAUSE SERIOUS INJURY,

7. See Fig. 21. Attach hitch assembly, arrow 1, to hitch lugs, arrow 11, on center frame with two (2) 1-1/2" dia. x 5" (31.8mm x 127mm) pins. Secure each pin with one (1) 7/16" (11.1mm) lynch pin.
8. See Fig. 21. To attach levelling crank, arrow 2, to levelling arm, arrow 3, remove bolt-on lug, arrow 4, of hitch levelling arm. Next, install 1" (25.4mm) diameter pin of bearing tube, arrow 5, into weld-on lug, arrow 6, of levelling arm. Position bearing tube so grease fitting is facing up. Place bolt on lug, arrow 4, over outside of levelling arm. Install 1" diameter pin of bearing tube into bolt on lug. Fasten the bolt-on lug to the levelling arm with four (4) 1/2" x 5" (12.7mm x 127mm) N.C. hex bolts c/w nuts and lockwashers. Tighten bolts.
9. See Fig. 21. Attach clevis end of levelling link, arrow 7, to arm, arrow 8, on rockshaft. Fasten with one (1) 1-1/4" x 4-3/4" (31.8mm x 120.7mm) hex bolt c/w nut and lockwasher. Tighten bolt to 840 foot pounds (1139 N.m)

NOTE: The 1-1/4" x 4-3/4" (31.6mm x 120.7mm) bolt must be tightened so that the clevis is drawn up tight against the ball joint in arm, arrow 7. Tighten bolt to 840 foot pounds (1139 N.m). Ball must also be free to pivot in socket. Lubricate ball with oil and turn in socket to make sure ball is free to pivot.

10. See Fig. 21. Fasten hose support, arrow 9, to a bolt welded to top of hitch. Secure with one (1) 5/8" (15.9mm) nut, one (1) 11/16" (17.5mm) I.D. flatwasher, and one (1) 5/8" (15.9mm) lockwasher. Tighten nut.
11. See Fig 21. Mount hitch jack, arrow 10, on round tube welded to inside of hitch. Jack pivots on mounting tube can be placed in vertical position for supporting disc hitch or horizontal position while disc is in motion. Lock jack in desired position with pin.

IMPORTANT: JACK MUST BE IN HORIZONTAL POSITION WHEN DISC IS IN MOTION. IF JACK IS IN VERTICAL POSITION WHEN DISC IS IN MOTION, JACK MAY STRIKE GROUND OR OBSTRUCTION ON GROUND, CAUSING SEVERE DAMAGE TO JACK, BE SURE CRANK OF JACK IS NOT HANGING BELOW HITCH WHEN JACK IS IN HORIZONTAL POSITION. PLACE CRANK ON TOP OF HITCH TO AVOID DAMAGE.



NOTE: There are two types of wing frames, wide wing and narrow wing. Wide wing machines use bolt-on type hinge beams, arrows 5 and 6. Narrow wing machines have beams that are part of the frame. Refer to specifications on page 5 to determine type of wing your machine uses.

12. See Fig.22 and Detail C. **FOR WIDE WING DISCS ONLY.** Fasten rear hinge beam, arrow 5, to a four (4) hole attaching plate, arrow 6, at rear inside of R.H. wing frame, arrow 2. The rear hinge beams are made L.H. and R.H., be sure R.H. beam is used for R.H. wing. Rear hinge beam can be identified by locating a small plate, arrow 23, that is welded to top connecting plate brace. The same type of plate is welded to connecting plate brace on wing frame. Fasten hinge beam with four (4) 1" x 3-1/4" (25.4mm x 82.6mm) hex bolts c/w lockwasher. **IMPORTANT:** See Fig. 22. Before tightening bolts check rear hinge beam alignment. Hinge beam must be aligned and level with rear gang beam of wing frame. Install shim(s), arrow 24, as required between attaching plates to align hinge beams. Tighten bolts.
13. See Fig. 22 and Detail C. **FOR WIDE WING DISCS ONLY.** Fasten front hinge beam, arrow 1, to a four (4) hole attaching plate, arrow 4, at front inside of R.H. wing frame, arrow 2. The front hinge beams are made L.H. and R.H., be sure R.H. beam is used for R.H. wing. The front hinge beam does not have a small plate, arrow 23, welded to top connecting plate brace like rear beam. Fasten hinge beam with four (4) 3/4" x 2-1/2" (19.1mm x 63.5mm) hex bolts c/w nuts and lockwashers. **IMPORTANT:** See Fig. 22. Before tightening bolts check front hinge beam alignment. Hinge beams must be aligned and level with front gang beam of wing frame. Install shim(s), arrow 24, as required between attaching plates to align hinge beams. Tighten bolts.
14. See Fig. 22 and Detail B and C. Fasten R.H. wing assembly, arrow 2, to center frame by connecting wing hinge brackets to center frame hinge brackets, arrow 3. Insert hinge lug, arrow 7, of wing frame into clevis of center frame hinge brackets. Fasten each hinge assembly to center frame with one (1) 1-1/2" x 5" (38.1mm x 120.7mm) threaded pin, arrow 8, and slotted nut, arrow 9. Install front bolt from front side and install rear bolt from rear side. Secure slotted nuts with one (1) 5/16" x 2" (7.94mm x 50.8mm) cotter pin, arrow 10. See Details B and C.
15. See Fig. 22. Fasten R.H. wing rockshafts, arrow 11, to bottom of R.H. wing frame. Be sure correct rockshaft is used for each wing. Wheel leg must point forward with cylinder arm on top. Secure each rockshaft to two (2) bearing brackets, arrow 13, with two (2) sets of 5-1/2" (139.7mm) rockshaft bearing halves, arrow 14. Fasten each rockshaft bearing assembly with two (2) 3/4" x 6-1/2" (19mm x 165mm) hex bolts c/w nuts and lockwasher. Position top half of rockshaft bearing so grease hole is at front. Position bottom half of rockshaft bearing so grease hole is at rear. Tighten rockshaft bearing bolts.
AFTER TIGHTENING ROCKSHAFT BEARING BOLTS, ROCKSHAFT SHOULD BE FREE TO PIVOT IN BEARINGS. IF BEARINGS ARE TOO TIGHT, PLACE TWO (2) 2" x 3" (50.8mm x 76.2mm) SHIM(S), ARROW 20, (AS REQUIRED) BETWEEN BEARING HALVES.

NOTE: Before installing rockshaft bearings place a coat of grease on bearing surface.

ASSEMBLY INSTRUCTIONS CONTINUED:

16. See Fig. 22. Install one (1) 1/4" X 28 (6.35mm X 28) grease fitting, arrow 21, in each hinge lug, arrow 7, of front and rear wing hinge brackets. See Details B and C.
17. See Fig. 22. Install one (1) 1/4" x 28 (6.35mm x 28) grease fitting, arrow 15, in each top rockshaft bearing half. Install one (1) 1/4" x 28 (6.35mm x 28) grease fitting, arrow 16, in each bottom rockshaft bearing half.
18. See Fig. 22. Install one (1) 6 bolt tire and wheel assembly, arrow 17, to hub assembly, arrow 18, on each side of wheel leg. Wing frames use 11L x 15 FI Range C Tires. Secure with six (6) 9/16" x 1-1/8" (14.9mm x 28.6mm) wheel bolts, arrow 19. Tighten wheel bolts to 130 ft. Lbs. (176.3 N.m).
19. See Fig. 22 and Detail A. Fasten wing lift bracket, arrow 22 to top of rear cross member of each wing frame, arrows 1 and 2. Position bracket as shown. Secure each bracket with five (5) 3/4" x 4" x 5-5/8" (19mm x 101.6mm x 142.9mm) U-Bolts c/w nuts and lockwashers. Three (3) U-Bolts are used to fasten bracket to rear cross member and two (2) U-Bolts are used to fasten bracket to inner side member. Tighten U-bolts.



WARNING: USE ADEQUATE MANPOWER OR A HOIST TO LIFT HEAVY COMPONENTS INTO PLACE. ATTEMPTING TO LIFT HEAVY COMPONENTS BY YOURSELF COULD CAUSE SERIOUS INJURY.



WARNING: SUPPORT MAIN FRAME SECURELY BEFORE ASSEMBLING COMPONENTS. HEAVY FRAME COULD CAUSE SERIOUS INJURY IF IT FELL.



CAUTION: WHEN ASSEMBLING DISC, USE ALIGNING PUNCH TO LINE UP HOLES. KEEP FINGERS OUT OF HOLES.

FIG. 24 - L.H.S. WING FRAME

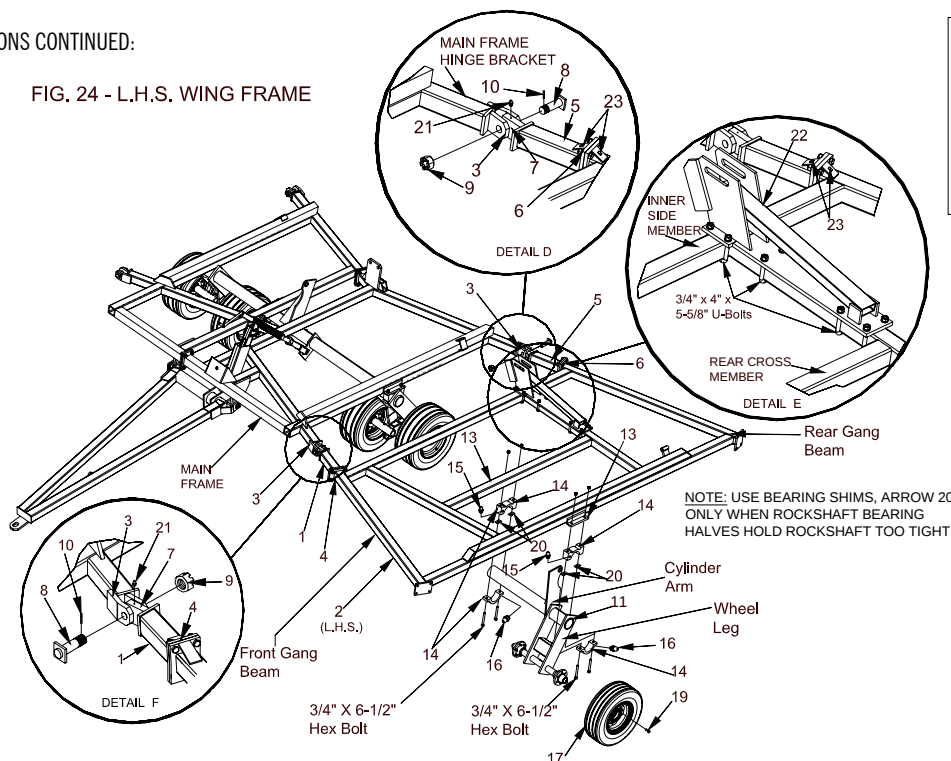
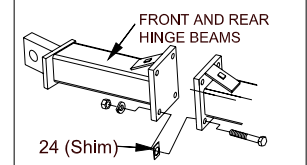


FIG. 25 (WIDE WING ONLY)



NOTE: There are two types of wing frames, wide wing and narrow wing. Wide wing machines use bolt-on type hinge beams, arrows 5 and 6. Narrow wing machines have beams that are part of the frame. Refer to specifications on page 5 to determine type of wing your machine uses.

20. See Fig.24 and Detail D. **FOR WIDE WING DISCS ONLY.** Fasten rear hinge beam, arrow 5, to a four (4) hole attaching plate, arrow 6, at rear inside of R.H. wing frame, arrow 2. The rear hinge beams are made L.H. and R.H., be sure R.H. beam is used for R.H. wing. Rear hinge beam can be identified by locating a small plate, arrow 23, that is welded to top connecting plate brace. The same type of plate is welded to connecting plate brace on wing frame. Fasten hinge beam with four (4) 1" x 3-1/4" (25.4mm x 82.6mm) hex bolts c/w lockwasher. **IMPORTANT:** See Fig. 22. Before tightening bolts check rear hinge beam alignment. Hinge beams must be aligned and level with rear gang beam of wing frame. Install shim(s), arrow 24, as required between attaching plates to align hinge beams. Tighten bolts.
21. See Fig.24 and Detail F. **FOR WIDE WING DISCS ONLY.** Fasten front hinge beam, arrow 1, to a four (4) hole attaching plate, arrow 4, at front inside of R.H. wing frame, arrow 2. The front hinge beams are made L.H. and R.H., be sure R.H. beam is used for R.H. wing. The front hinge beam does not have a small plate, arrow 23, welded to top of connecting plate brace like rear beam. Fasten hinge beam with four (4) 3/4" x 2-1/2" (19.1mm x 63.5mm) hex bolts c/w nuts and lockwashers. **IMPORTANT:** See Fig. 22. Before tightening bolts check front hinge beam alignment. Hinge beams must be aligned and level with front gang beam of wing frame. Install shim(s), arrow 24, as required between attaching plates to align hinge beams. Tighten bolts.
22. See Fig. 24 and Detail D and F. Fasten R.H. wing assembly, arrow 2, to center frame by connecting wing hinge brackets to center frame hinge brackets, arrow 3. Insert hinge lug, arrow 7, of wing frame into clevis of center frame hinge brackets. Fasten each hinge assembly to center frame with one (1) 1-1/2" x 5" (38.1mm x 120.7mm) threaded pin, arrow 8, and slotted nut, arrow 9. Install front bolt from front side and install rear bolt from rear side. Secure slotted nuts with one (1) 5/16" x 2" (7.94mm x 50.8mm) cotter pin, arrow 10. See Detail D and F.
23. See Fig. 24. Fasten R.H. wing rockshafts, arrow 11, to bottom of R.H. wing frame. Be sure correct rockshaft is used for each wing. Wheel leg must point forward with cylinder arm on top. Secure each rockshaft to two (2) bearing brackets, arrow 13, with two (2) sets of 5-1/2" (139.7mm) rockshaft bearing halves, arrow 14. Fasten each rockshaft bearing assembly with two (2) 3/4" x 6-1/2" (19mm x 165mm) hex bolts c/w nuts and lockwasher. Position top half of rockshaft bearing so grease hole is at front. Position bottom half of rockshaft bearing so grease hole is at rear. Tighten rockshaft bearing bolts.
AFTER TIGHTENING ROCKSHAFT BEARING BOLTS, ROCKSHAFT SHOULD BE FREE TO PIVOT IN BEARINGS. IF BEARINGS ARE TOO TIGHT, PLACE TWO (2) 2" X 3" (50.8mm X 76.2mm) SHIM(S), ARROW 19, (AS REQUIRED) BETWEEN BEARING HALVES.

NOTE: Before installing rockshaft bearings place a coat of grease on bearing surface.

ASSEMBLY INSTRUCTIONS CONTINUED:

24. See Fig. 24. Install one (1) 1/4" X 28 (6.35mm x 28) grease fitting, arrow 21, in each hinge lug, arrow 7, of front and rear wing hinge brackets. See Details D and F.
25. See Fig. 24. Install one (1) 1/4" x 28 (6.35mm x 28) grease fitting, arrow 15, in each top rockshaft bearing half. Install one (1) 1/4" x 28 (6.35mm x 28) grease fitting, arrow 16, in each bottom rockshaft bearing half.
26. See Fig. 24. Install one (1) 6 bolt tire and wheel assembly, arrow 17, to hub assembly, arrow 18, on each side of wheel leg. Wing frames use 11L x 15 FI Range C Tires. Secure with six (6) 9/16" x 1-1/8" (14.9mm x 28.6mm) wheel bolts, arrow 19. Tighten wheel bolts to 130 ft. Lbs. (176.3 N.m).
- 27 See Fig. 24 and Detail E. Fasten wing lift bracket, arrow 22, to top of rear cross member of each wing frame, arrows 1 and 2. Position bracket as shown. Secure each bracket with five (5) 3/4" x 4" x 5-5/8" (19mm x 101.6mm x 142.9mm) U-Bolts c/w nuts and lockwashers. Three (3) U-Bolts are used to fasten bracket to rear cross member and two (2) U-Bolts are used to fasten bracket to inner side member. Tighten U-bolts.



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28. See Fig. 26. Fasten one (1) 4" x 24" (101.6mm x 609.6mm) lift cylinder, arrow 1, to main frame and rockshaft arm. Attach barrel end of cylinder to lug, arrow 2, Position cylinder so ports face L.H.S. Attach shaft end of cylinder to rockshaft arm, arrow 3. Fasten each end of cylinder with one (1) 1-1/4" x 4-3/4" (31.8mm x 120.7mm) pin. Secure cylinder pins with two (2) 5/16" x 2" (7.94mm x 50.8mm) cotter pins.
29. See Fig. 26. Fasten one (1) 3-1/2" x 24" (88.9mm x 609.6mm) rockshaft cylinder, arrow 4, to L.H. wing frame and rockshaft arm. Attach barrel end of cylinder to 1-1/4" x 8" (31.8mm x 203.2mm) I-Bolt, arrow 5. Position cylinder so ports face up. Attach shaft end of cylinder to rockshaft arm, arrow 6. Fasten each end of cylinder with one (1) 1-1/4" x 4-3/4" (31.8mm x 120.7mm) pin. Secure cylinder with two (2) 5/16" x 2" (7.94mm x 50.8mm) cotter pins.
30. See Fig. 26. Fasten one 3" x 24" (76.2mm x 609.6mm) rockshaft cylinder, arrow 7, to R.H. wing frame and rockshaft arm. Attach barrel end of cylinder to 1-1/4" x 8" (31.8mm x 203.2mm) I-Bolt, arrow 8. Position cylinder so ports face up. Attach shaft end of cylinder to rockshaft arm, arrow 9. Fasten each end of cylinder with one (1) 1-1/4" x 4-3/4" (31.8mm x 120.7mm) pin. Secure cylinder pins with two (2) 5/16" x 2" (7.94mm x 50.8mm) cotter pins.
31. See Fig. 26. Fasten two (2) 5" x 36" (120.7mm x 914.4mm) wing lift cylinders, arrows 10 and 11, to each side of lug, arrow 12, at rear of main frame. Position each cylinder so ports face towards front of disc. Fasten barrel end to each cylinder with one (1) 1-1/4" x 4-3/4" (31.8mm x 120.7mm) pin. Secure each pin with two (2) 5/16" x 2" (7.94mm x 50.8mm) cotter pins. Do not attach shaft ends at this time.



WARNING: DO NOT STAND UNDER WING WHILE WING IS BEING RAISED OR LOWERED. IF ANY COMPONENT SHOULD FAIL, OR IF HYDRAULIC LEVER SHOULD ACCIDENTALLY BE OPERATED, WING COULD DROP.



CAUTION: WING WILL FREE FALL IF WING CYLINDERS ARE NOT FULL OF OIL, CAUSING SERIOUS DAMAGE.



CAUTION: WHEN TRANSPORTING DISC, ALWAYS PLACE HYDRAULIC LOCK UP VALVES IN "CLOSED" POSITION. IF HYDRAULIC LEVER WAS ACCIDENTALLY OPERATED, DISC COULD DROP OR WINGS COULD FALL.

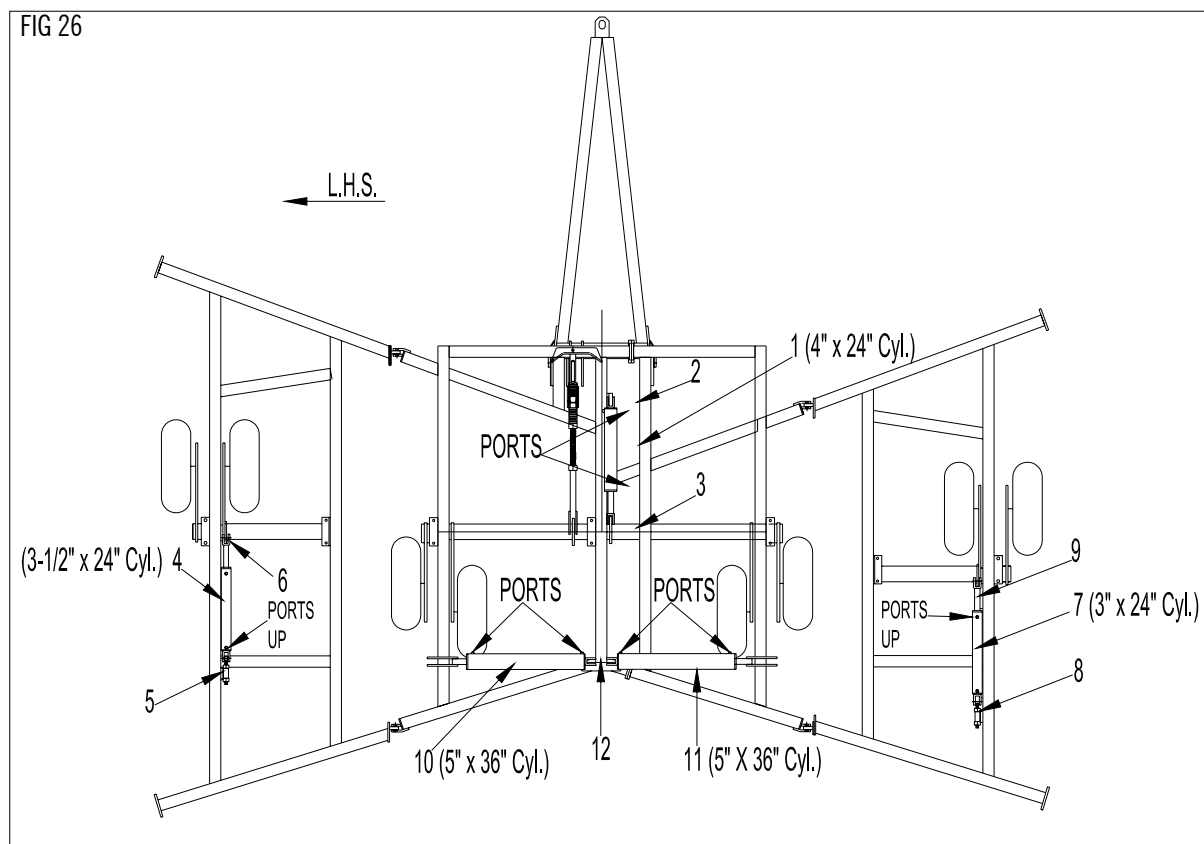
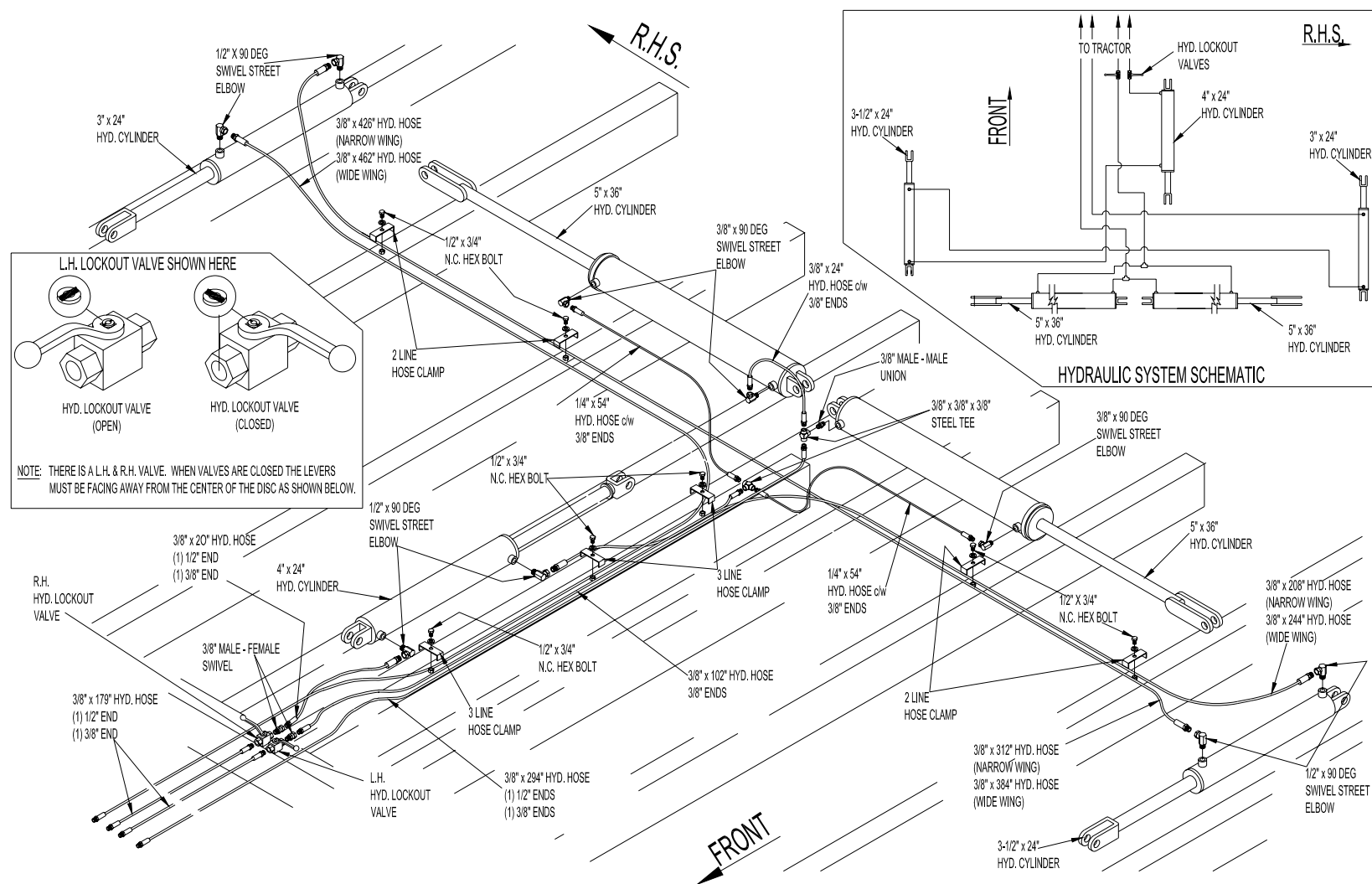
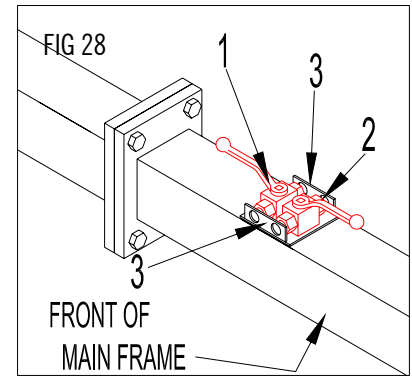


FIG. 27.



32. See Fig. 28. Place two (2) hydraulic lockup valves, arrows 1 and 2, between brackets, arrow 3, welded to front center of main frame. Each valve is held in place with incoming hoses.



33. ATTACHING HYDRAULIC HOSES TO ROCKSHAFT CYLINDERS AND WING CYLINDERS - See Fig. 19.

IMPORTANT: Do not use teflon tape to seal hydraulic hoses and fittings. If pieces of tape get into the hydraulic system they may plug small orifices.

NOTE: To determine if your machine has a narrow or wide wing frame see Specifications Chart on Page 5.

NOTE: To ensure that the hydraulic system does not leak, seal fittings and hoses with sealing liquid.

- a) See Fig. 27. Install one (1) 1/2" (12.7mm) x 90 degree swivel street elbow, into the shaft end port of the 3" x 24" (76.2mm x 609.6mm) cylinder on R.H. wing. Connect one (1) 3/8" x 426" (9.53mm x 10820mm) hydraulic hose to the 1/2" (12.7mm) x 90 degree swivel street elbow. Narrow wing machines use a 3/8" x 426" (9.53mm x 10820mm) hose and wide wing machines use 3/8" x 462" (9.53mm x 11735mm) hose. Then run the hose across the wing frame to the center of the main frame, and to front of hitch.
- b) See Fig. 27. Install one (1) 1/2" (12.7mm) x 90 degree swivel street elbow in shaft end port of the 3-1/2" x 24" (88.9mm x 609.6mm) cylinder on L.H. wing. Install one (1) 1/2" (12.7mm) x 90 degree swivel street elbow, in the barrel end port of the 3" x 24" (76.2mm x 609.6mm) cylinder on L.H. wing. Connect one (1) hydraulic hose, to swivel elbow, on R.H. cylinder. Narrow wing machines use a 3/8" x 312" (9.53mm x 7925mm) hose and wide wing machines use 3/8" x 384" (9.53mm x 9754mm) hose. Next, run hose across frame to the 1/2" (12.7mm) x 90 degree swivel elbow on L.H. cylinder.
- c) See Fig. 27. Install one (1) 1/2" (12.7mm) x 90 degree swivel street elbow to barrel end port of the 3-1/2" x 24" (88.9mm x 609.6mm) cylinder on L.H. wing. Install one (1) 1/2" (12.7mm) x 90 degree swivel street elbow to shaft end port of 4" x 24" (101.6mm x 609.6mm) cylinder on main frame. Connect one (1) hydraulic hose, to swivel elbow, on main frame cylinder. Narrow wing machines use a 3/8" x 208" (9.53mm x 5283mm) hose and wide wing machines use 3/8" x 294" (9.53mm x 7468mm) hose. Next run same hose across frame to the 1/2" (12.7mm) x 90 degree swivel elbow on the 3-1/2" x 24" (88.9mm x 609.6mm) wing rockshaft cylinder.
- d) See Fig. 27. Install one (1) 1/2" (12.7mm) x 90 degree swivel street elbow to barrel end port of 4" x 24" (101.6mm x 609.6mm) cylinder on main frame. Connect one (1) 3/8" x 20" (9.53mm x 508mm) hydraulic hose, to rear port of R.H. lock-up, with one (1) 3/8" (9.53mm) male-female swivel. Next connect same hose to 1/2" (12.7mm) x 90 degree swivel elbow on front port of main frame cylinder.
- e) See Fig. 27. Install one (1) 3/8" (9.53mm) male x 3/8" (9.53mm) male union, in the barrel end port of the 5" x 36" (127mm x 914.4mm) L.H. wing lift cylinder. Then install one (1) 3/8" x 3/8" x 3/8" (9.53mm) tee, to the 3/8" (9.53mm) union. Install one (1) 3/8" (9.53mm) x 90 degree street elbow into the shaft end of the 5" x 36" (127mm x 914.4mm) L.H. wing lift cylinder.
- f) See Fig. 27. Install one (1) 3/8" (9.53mm) x 90 degree swivel street elbow into barrel end port of the 5" x 36" (127mm x 914.4mm) R.H. wing lift cylinder. Install one (1) 3/8" (9.53mm) x 90 degree street elbow into the shaft end port of same cylinder.
- g) See Fig. 27. Install one (1) 1/4" x 54" (6.35mm x 1372mm) hydraulic hose to the shaft end port of the 5" x 36" (127mm x 914.4mm) L.H. wing lift cylinder and fasten opposite end to one (1) 3/8" x 3/8" x 3/8" (9.53mm) tee. Fasten one (1) 1/4" x 54" (6.35mm x 1372mm) hydraulic hose to the shaft end port of the 5" x 36" (127mm x 914.4mm) R.H. wing lift cylinder and fasten opposite end to same 3/8" x 3/8" x 3/8" (9.53mm) tee.
- h) See Fig. 27. Install one (1) 3/8" x 24" (9.53mm x 609.6mm) hydraulic hose, to the barrel end port of the L.H. 5" x 36" (127mm x 914.4mm) wing lift cylinder and fasten opposite end to the barrel end port of the R.H. 5" x 36" (127mm x 914.4mm) wing lift cylinder.

- i) See Fig. 27. Install one (1) 3/8" male x 3/8" (9.53mm) female swivel adapter, in to the L.H. lockup valve. Fasten one (1) 3/8" x 102" (9.53mm x 2591mm) hydraulic hose in 3/8" (9.53mm) tee. Fasten opposite end of same hose to the 3/8" male x 3/8" (9.53mm) female swivel adapter in lockup valve.
- j) See Fig. 27. Install two (2) 3/8" x 179" (9.53mm x 4547mm) hydraulic hoses to the front port of hydraulic lockup valves, and run hoses to front of hitch.
- k) See Fig. 27. Install one (1) 3/8" x 294" (9.53mm x 7468mm) hydraulic hose, from the 3/8" tee, to front of disc.

34. **SECURING HYDRAULIC HOSES TO FRAME** - See Fig. 27

Fasten hoses to frame with one U-shaped hose clamp at each hose hold down point. Each hold down point has a 1/2" (12.7mm) hex. nut welded to the top of frame. The hold down clips are supplied in two widths, one for two hoses and the other for three hoses. Place hose clamp over hoses and fasten clamp to weld-on nut with one 1/2" x 3/4" (12.7mm x 19.1mm) bolt.

35. **HOW MAIN LIFT HYDRAULIC SYSTEM WORKS** - See Fig. 27

When raising the disc, oil is pumped into the barrel end port of center frame cylinder causing the cylinder to extend. Oil is then forced from the shaft end port of same cylinder into the barrel end port of the 3-1/2" x 24" (88.9mm x 610mm) cylinder on L.H. side causing wing cylinder to extend. Oil is then forced from the shaft end port of the 3-1/2" x 24" (88.9mm x 610mm) cylinder into the piston end port of the 3" x 24" (76.2mm x 610mm) wing cylinder on R.H.S. causing wing cylinders to extend. The oil from shaft end port of the 3" x 24" (76.2mm x 610mm) cylinder on R.H. S. is returned to the tractor.

When lowering the disc, oil flows from tractor to shaft end port of the 3" x 24" (76.2mm x 610mm) wing cylinder, causing wing cylinder to contract. Oil forced from piston end port of the 3" x 24" (76.2mm x 610mm) wing cylinder flows to shaft end port of L.H. 3-1/2" x 24" (88.9mm x 610mm) cylinder, causing cylinder to contract. The oil forced from the piston end port of the L.H. 3-1/2" x 24" (88.9mm x 610mm) wing cylinder flows to shaft end port of main frame 4" x 24" (101.6mm x 610mm) cylinder causing cylinder to contract. The oil from piston end port of the 4" x 24" (101.6mm x 610mm) cylinder is returned to the tractor.

NOTE: Lockup valve must be open to allow oil flow to and from lift cylinders.

All cylinders extend and contract at the same rate because the amount of oil flowing between the shaft end ports and the piston end ports is equal in volume. For example, the 4" x 24" (101.6mm x 610mm) main frame cylinder has a 2" (50.8mm) diameter piston shaft which displaces enough oil from the shaft side to fully extend the 3-1/2" x 24" (88.9mm x 610mm) L.H. wing cylinder. The same method is used between the 3-1/2" x 24" (88.9mm x 610mm) L.H. wing cylinder and the 3" x 24" (76.2mm x 610mm) R.H. wing cylinder.

Each lift (rockshaft) cylinder contains a by-pass to allow oil to flow past piston when each cylinder is fully extended. If all cylinders are not fully extended when disc is raised, continue to pump oil into lift cylinders until all cylinders are fully extended.

36. **FILLING HYDRAULIC CYLINDERS WITH OIL** - See Fig. 27

NOTE: Before filling cylinders with oil, remove clevis pins from shaft end of each lift cylinder so that the cylinders may be extended and contracted **WITHOUT ACTUATING** rockshaft. Also place blocks under each hydraulic cylinder so shafts do not strike disc component when cylinders are extended.

- A) **LIFT CYLINDERS-** To fill rockshaft cylinders with oil remove depth control stops to allow cylinders to work full length of stroke. Next, pump oil into the cylinders, extending cylinders. Hold hydraulic lever for (3) minutes allowing all cylinders to fully extend. Next, fully retract all cylinders then fully extend them and hold hydraulic level another (3) minutes. This procedure will purge air from all cylinders and fully synchronize them. Attach shaft end of each cylinder to rockshaft arm with one (1) 1-1/4" x 4-3/4" (31.7 mm x 121 mm) pin. Secure each pin with two (2) 5/16" x 1-3/4" (7.57 mm x 44.4 mm) cotter pins.
- B) **WING LIFT CYLINDER-** Pump oil in each direction into wing lift cylinders. After cylinders are **completely filled** with oil, fully extend them and fasten shaft end of each cylinder to wing lift bracket bolted to wings. Place clevis of cylinder shaft between two lugs which have slotted holes. Secure each cylinder shaft to slotted holes with one (1) 1-1/4" x 6" (31.8mm x 152.4mm) pin. Place one (1) 1-5/16" (33.3mm) I.D. flatwasher over pin on outside of cylinder lug. Secure each pin with one (1) 5/16" x 2" (7.94mm x 50.8mm) cotter pins.



CAUTION: DO NOT DISCONNECT HYDRAULICALLY OPERATING COMPONENTS WHEN THERE IS PRESSURE WITHIN THOSE COMPONENTS. HYDRAULIC COMPONENTS UNDER PRESSURE MAY CAUSE PARTS AND HYDRAULIC FLUID TO FLY OUT AT A HIGH VELOCITY WHICH COULD CAUSE SERIOUS INJURY.



CAUTION: HYDRAULIC OIL ESCAPING UNDER PRESSURE HAS SUFFICIENT FORCE TO CAUSE SERIOUS INJURY. IF INJURED BY ESCAPING FLUID, OBTAIN MEDICAL TREATMENT IMMEDIATELY.

CHECK HYDRAULIC HOSES PERIODICALLY FOR SIGNS OF RUPTURE AND LEAKS. USE A CARDBOARD BACKSTOP TO CHECK FOR ESCAPING HIGH PRESSURE OR HOT FLUID.



CAUTION: WINGS WILL FREE FALL IF WING LIFT CYLINDERS ARE NOT FULL OF OIL, CAUSING SERIOUS DAMAGE.



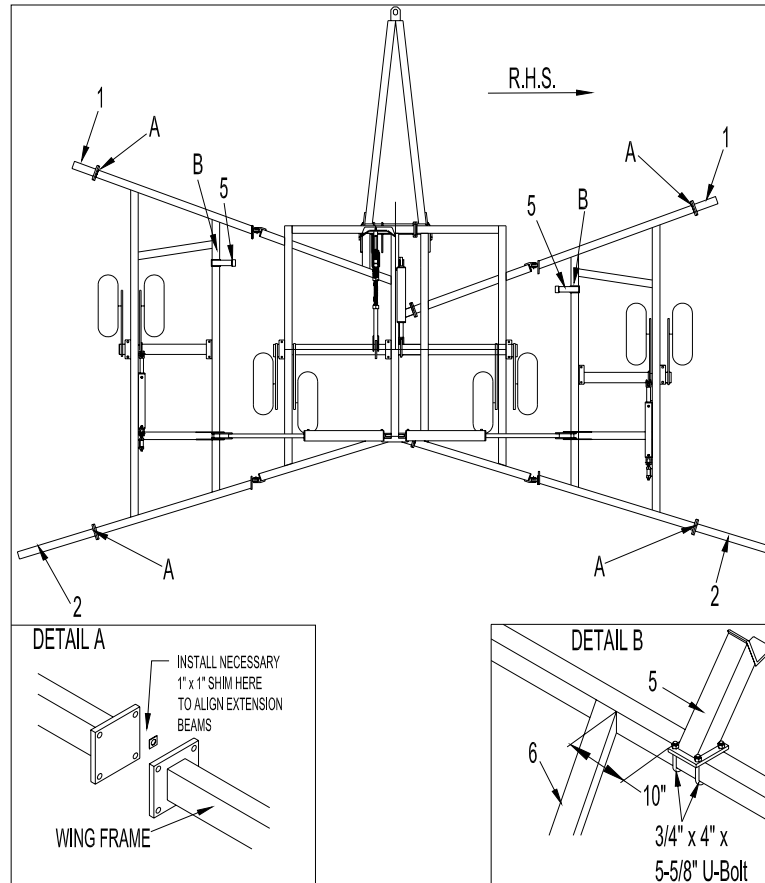
WARNING: TO ASSEMBLE BALANCE OF DISC, EXTEND MAIN LIFT CYLINDERS RAISING FRAME. BE SURE MAIN LIFT CYLINDERS ARE COMPLETELY FILLED WITH OIL. NEXT PLACE ADEQUATE SUPPORT UNDER CENTER FRAME AND EACH WING FRAME.

DO NOT USE LOCK OUT VALVE AS SAFETY DEVICE TO PREVENT FRAME FROM FALLING. IF ANY HYDRAULIC COMPONENT FAILED DISC COULD DROP CAUSING SERIOUS INJURY OR DEATH TO PERSON(S) NEARBY.



WARNING: DO NOT STAND UNDER WINGS WHILE WINGS ARE BEING RAISED OR LOWERED. IF ANY COMPONENTS OF HYDRAULIC SYSTEM SHOULD FAIL OR IF HYDRAULIC LEVER SHOULD ACCIDENTALLY BE OPERATED, WINGS COULD DROP.

FIG 28



37. **ATTACHING GANG BEAM EXTENSIONS** - See Fig. 28.

NOTE: See gang beam chart on Page 38 to determine length of gang beam extensions for the size of your disc.

- A) FRONT WING: Attach front gang beam extension, arrow 1, to attaching plates that are welded to each wing frame. Fasten with four (4) 3/4" x 2-1/2" (19mm x 254mm) hex bolts c/w nuts and lockwashers. Tighten bolts.
- B) REAR WING: Attach rear gang beam extension, arrow 2, to attaching plates that are welded to each wing frame. Fasten with four (4) 3/4" x 2-1/2" (19mm x 254mm) hex bolts c/w nuts and lockwashers. Tighten bolts.

NOTE: Use necessary 1" x 1" (25.4mm x 25.4mm) shim plates to align and level each beam extension. See Fig. 20, Detail A.



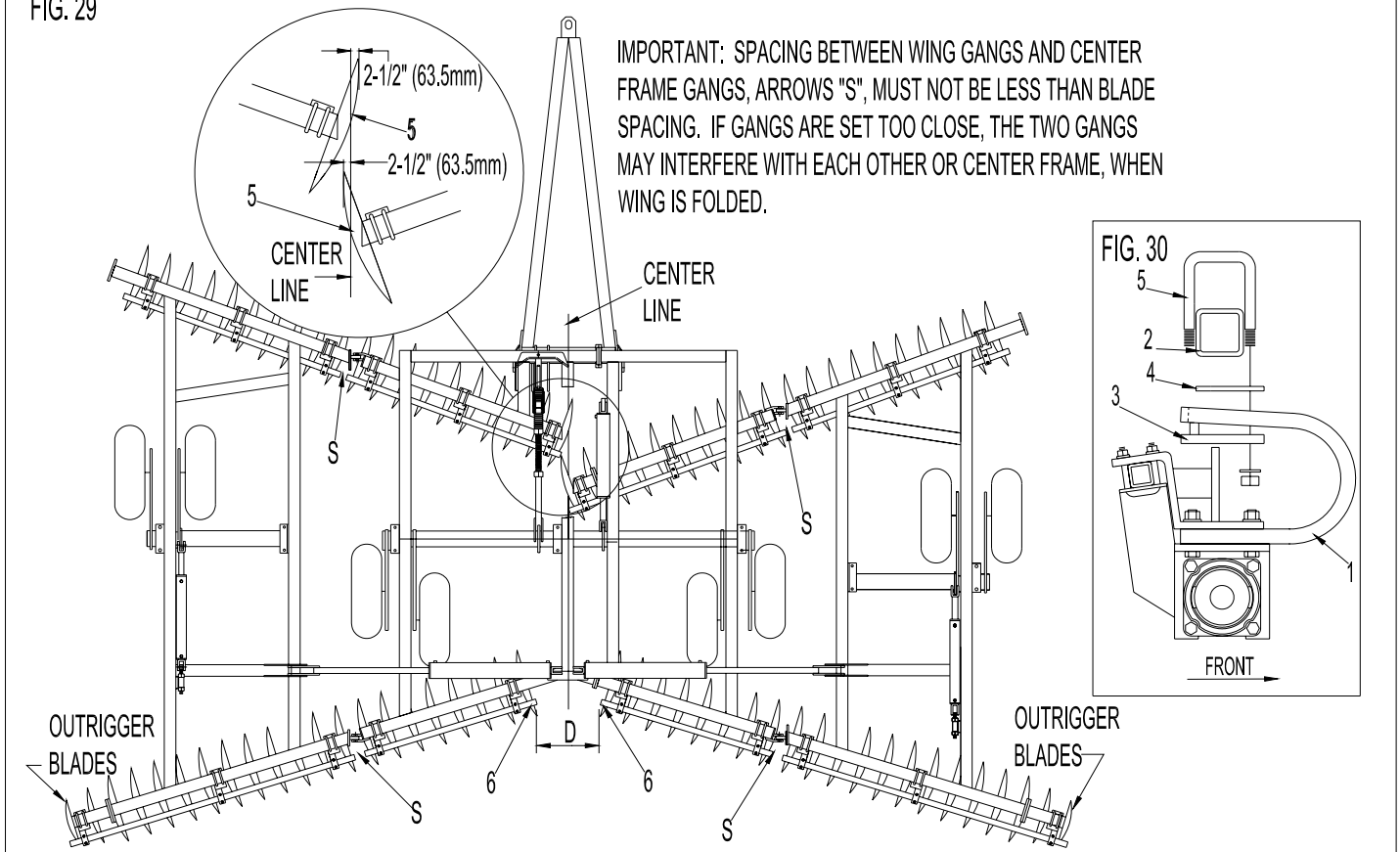
CAUTION: TO PREVENT SERIOUS INJURY OR DEATH FROM FALLING FRAMES, ALWAYS PLACE ADEQUATE SUPPORTS UNDER ALL THREE FRAMES.

38. **INSTALLING FRONT WING SUPPORTS - WIDE WING DISCS ONLY**- See Fig.28

NOTE: See Specifications on Page 5 to determine if your disc uses a wide wing frame.

Attach one (1) front wing support, arrow 5, to each wing frame with two (2) 3/4" x 4" x 5-5/8" (19.1mm x 101.6mm x 142.9mm) U-bolts c/w nuts and lockwashers. Locate attaching plate approximately 10" (254mm) from inside of front cross tube, arrow 6. Tighten U-bolts.

FIG. 29



39. ATTACHING GANG ASSEMBLIES - See Fig. 29

NOTE: See gang patterns on pages 39 to 45 to determine gang position for your disc.

- a) **REAR GANGS** - Roll rear gang assemblies in place under rear gang beams of main and wing frames. Position rear gangs so that the scrapers are at the rear. The gang assemblies with outrigger blades (small diameter blades) must be positioned at the outside. See Fig. 29 for the direction rear gangs face.

Attach bearing hangers to gang beams with two (2) U-bolts per bearing hanger. Leave U-bolts loose. If disc is equipped with optional stone flex bearing hangers, see Step "C" below to attach hangers.

- b) **FRONT GANGS** - Roll front gang assemblies in place under front gang beams of main and wing frames. Position gang assemblies so that the scrapers are at the rear. See Fig. 29 for the direction the front gangs face.

Attach bearing hangers to the gang beams with two (2) U-bolts per bearing hanger. Leave U-bolts loose. If disc is equipped with optional stone flex bearing hangers, see Step "C" below to attach hangers.

- c) See Fig. 30. **OPTIONAL STONE FLEX BEARING HANGER** - Fasten each stone flex hanger assembly, arrow 1, to bottom of gang beam, arrow 2, with one (1) backing plate, arrow 3, two (2) 3/4" x 4" x 7" (19 x 102 x 178mm) U-bolts and one (1) bearing plate, arrow 4. The bearing plate is placed between bottom of gang beam and top of spring shank. When installing U-bolts, be sure rear leg of each U-bolt is installed through a hole in bearing plate. Be sure the pin on backing plate, arrow 3, is inserted in slot of shank.

IMPORTANT: KEEP BEARING HANGER U-BOLTS TIGHT.

- d) See Fig. 29. Set front center frame gangs, so that the leading edge of inside blade, arrow 5, on rear gang is 2-1/2" (63.5mm) past center of disc frame (center line of center frame is shown in Fig. 29).

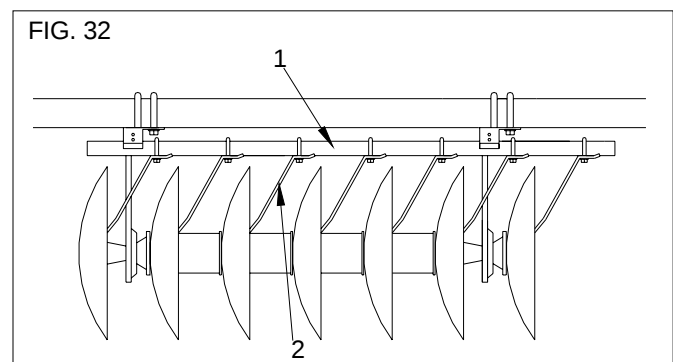
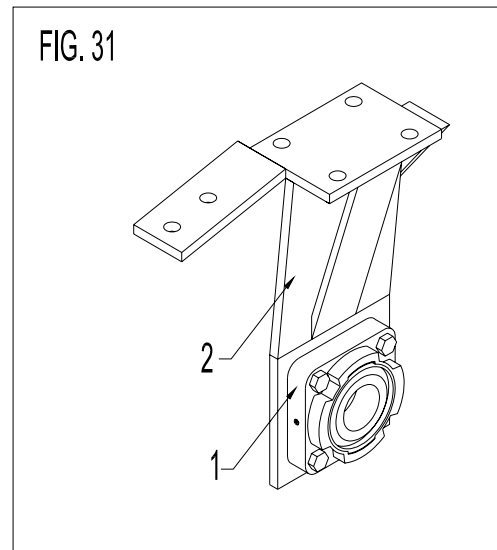
- e) See Fig. 29. Set rear center frame gangs, arrow 6, so that the distance between the rear edge of the two inside blades, dimension "D", is equal to 2" less than diameter of blade. For example, if your disc is equipped with 24" diameter blades, dimension "D" would be set at 22". Be sure rear gangs are centered on frame.
- f) See Fig. 29. Adjust spacing between each individual gang assembly. This spacing should be the same as the blade spacing of the gang assemblies.

IMPORTANT: Space between wing gangs and center frame gangs must not be less than blade spacing. If gangs are set too close the two gangs may interfere with each other when wings are folded.

- g) Before tightening bearing hanger U-bolts, loosen U-bolts which fasten scraper bar bearing hanger. Then check each bearing hanger to make sure hanger is sitting square under gang beam. Also, be sure hanger is not turned to one side. Tighten U-bolts. If your disc is equipped with solid bearing hanger, tighten U-bolts to 150 ft. Lbs (203.25 N.m). If your disc is equipped with stone flex hangers, tighten U-bolts to 260 ft. Lbs (352.3 N.m).

IMPORTANT: If bearing hangers are not sitting square before tightening U-Bolts, thrust will be built into the bearings and the life of the bearing will be shortened.

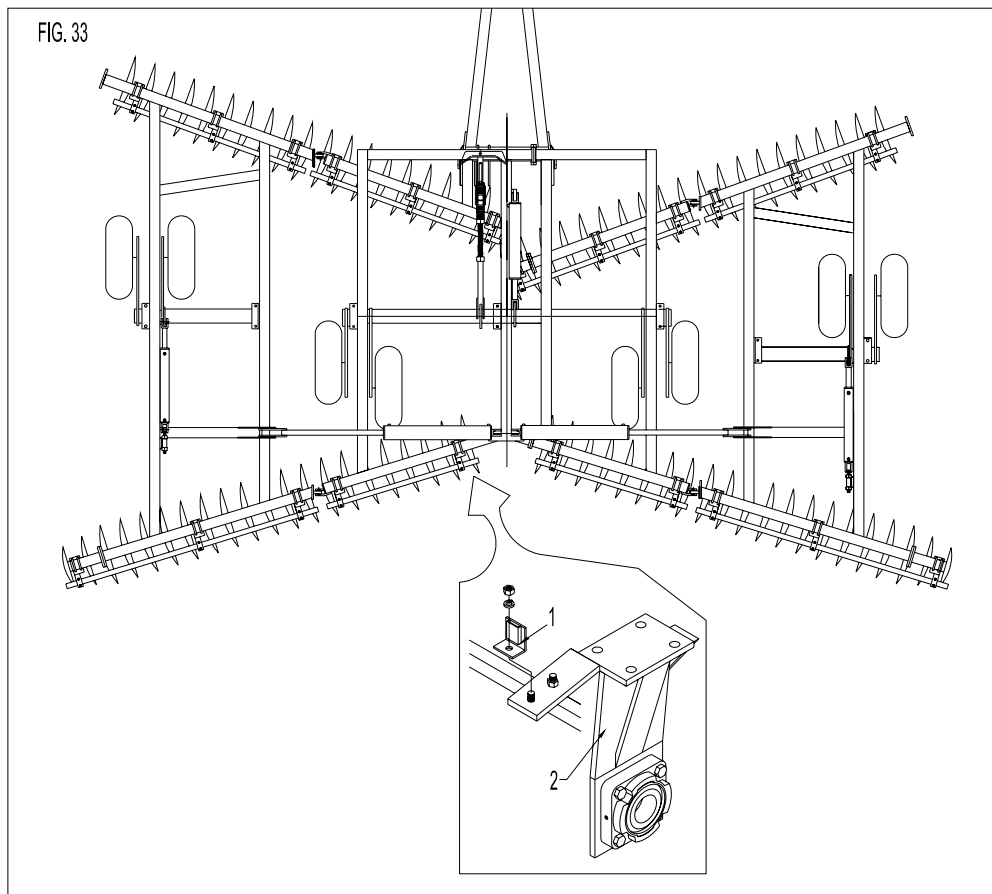
- 40. See Fig. 31. Loosen all the bolts, arrow 1, which fastens the bearings to the hangers, arrow 2. Then turn the disc blades to allow the bearings to align themselves. Next, tighten all the bolts. This will ensure proper bearing alignment, increasing bearing life.
- 41. **IMPORTANT:** WHEN RAISING WINGS FOR TRANSPORT FOR FIRST TIME AFTER ADJUSTING GANGS, RAISE WINGS SLOWLY MAKING SURE WING GANGS CLEAR CENTER FRAME GANGS.
- 42. See Fig. 32. Adjust scraper bar, arrow 1, and scrapers, arrow 2, of each gang so that each scraper blade is in contact with disc blade. Tighten U-bolts.



IMPORTANT: Disc will require less horse power to pull if scrapers are adjusted properly.



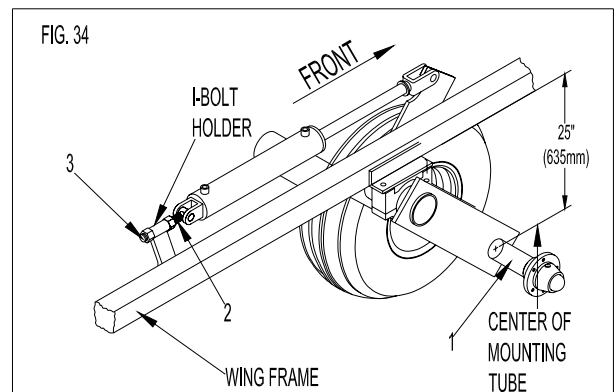
CAUTION: WHEN ATTACHING GANG ASSEMBLIES, WEAR PROTECTIVE GLOVES TO HELP PREVENT INJURY FROM CUTTING EDGES OF BLADES.



43. See Fig.33. Mount the SMV bracket, arrow 1, to the main frame's rear inside bearing hanger on the L.H. rear gang. Secure to the top of the scraper bar support with the same U-bolt used to fasten The scraper bar to the bearing hanger. Tighten nut.

44. See Fig. 34. Level wing frame with main frame as follows:

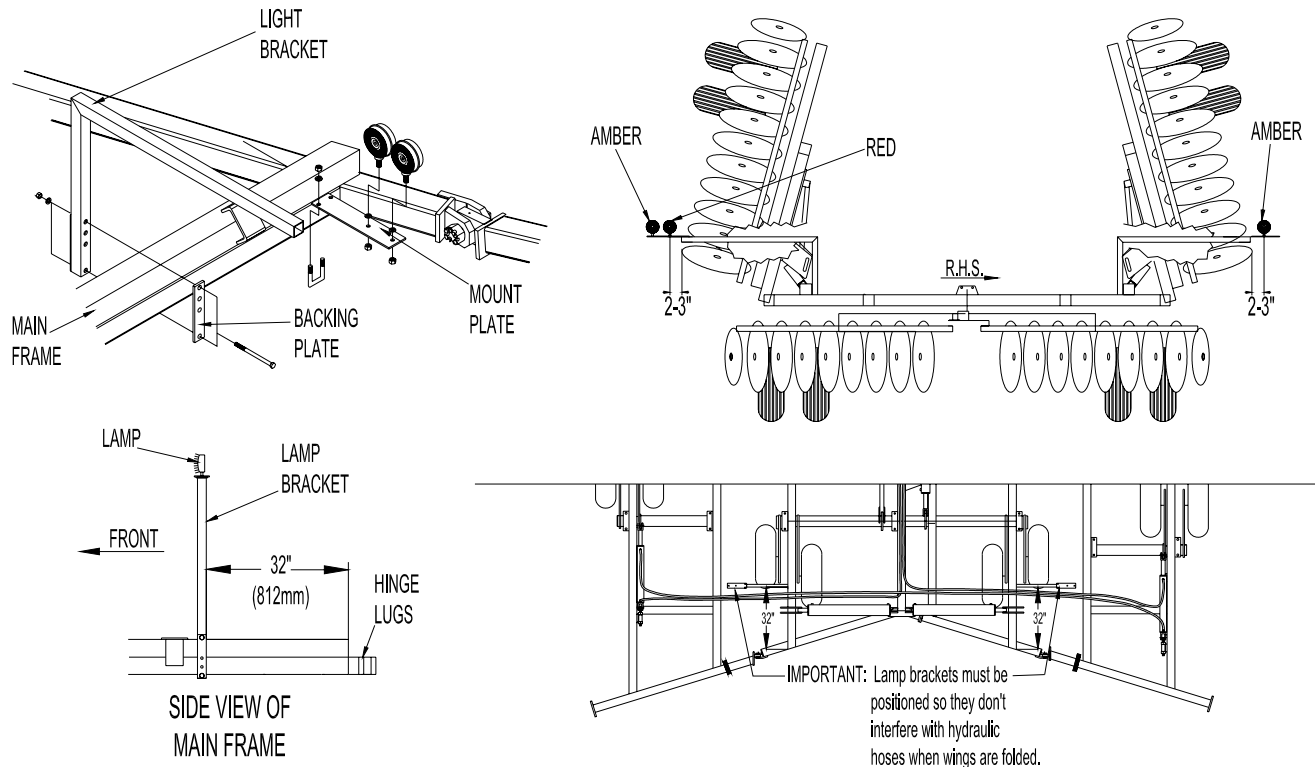
- 1) Raise disc by extending rockshaft cylinder. Be sure wing rockshaft cylinders are fully extended.
- 2) Check the distance the spindle mounting tube, arrow 1, (welded to bottom of rockshaft wheel leg) is from the bottom of each wing frame. This distance should be 25" (635mm).
- 3) If spindle mounting tube location is not correct, adjust length of wing cylinder, I-bolt, arrow 2.
- 4) After adjustment is complete, lock I-bolt by tightening front nut, arrow 3, against I-bolt holder.



NOTE: The above wheel leg setting is an initial setting only. If wing gangs do not cut at same depth as the main frame gangs, further wing cylinder adjustment will be required.

IMPORTANT: Be sure axis of barrel end pin is horizontal and cylinder points are facing up. If cylinder and I-bolt are not positioned properly, cylinder will not be free to pivot when activated causing serious damage.

FIG. 35



45. WARNING LIGHT KIT (OPTIONAL) - MOUNT INSTRUCTIONS - See FIG. 35.



WARNING: DO NOT STAND UNDER WINGS WHEN WORKING ON DISC. IF HYDRAULIC SYSTEM FAILED OR IF HYDRAULIC LEVER WAS ACCIDENTALLY OPERATED, WINGS MAY FALL RESULTING IN SERIOUS INJURY OR DEATH TO PERSON(S) NEAR DISC.

- A) With disc folded, install one lamp support bracket on each side of main frame. Locate each bracket on inside of double 4" x 4" (101.6mm x 101.6mm) tubes 32" (812mm) from rear of main frame. Fasten each support with two (2) 1/2" X 7-1/2" (12.7mm x 190.5mm) hex bolts c/w nuts and lockwashers and one (1) backing plate. **IMPORTANT:** Lamp brackets must be positioned as shown in ILL. 35 so they don't interfere with the hydraulic hoses when wings are folded.
- B) Fasten one (1) mount plate to top of each lamp support bracket with one (1) 1/2" x 2" x 3" (12.7mm x 50.8mm x 76.2mm) U-bolt c/w nuts and lockwasher. Do not tighten U-bolt at this time.
- C) Fasten one (1) amber lamp and one (1) red lamp to the L.H. mount plate. Position amber and red lamps so they face the rear with the amber lamp on the outside. Install lamps through 3/4" (19.1mm) holes in mount plate. Secure with nuts. Leave nuts loose on amber lamp so ring connector on wiring can be installed later.
- D) Fasten one (1) amber lamp to R.H. mount plate. Position so amber lamp faces rear. Install lamp through 3/4" (19.1mm) hole in mount plate. Secure with nuts.

IMPORTANT: Paragraphs "C" and "D" and Fig. 35 describe and show lamp positions for North American public roads. For other countries such as Australia, check local laws and regulations for required warning light mounting positions.

- E) Loosen U-bolt of each mount plate, then with disc folded for transport, position L.H. lamps so center of red lamp is 2 to 3" (50.8mm to 76.2mm) outside widest point of machine. Position R.H. amber lamp so it is 2 to 3" (50.8mm to 76.2mm) outside widest point of machine. Warning lamps must be visible from the front and the rear of the machine. Tighten mount plate U-bolts.

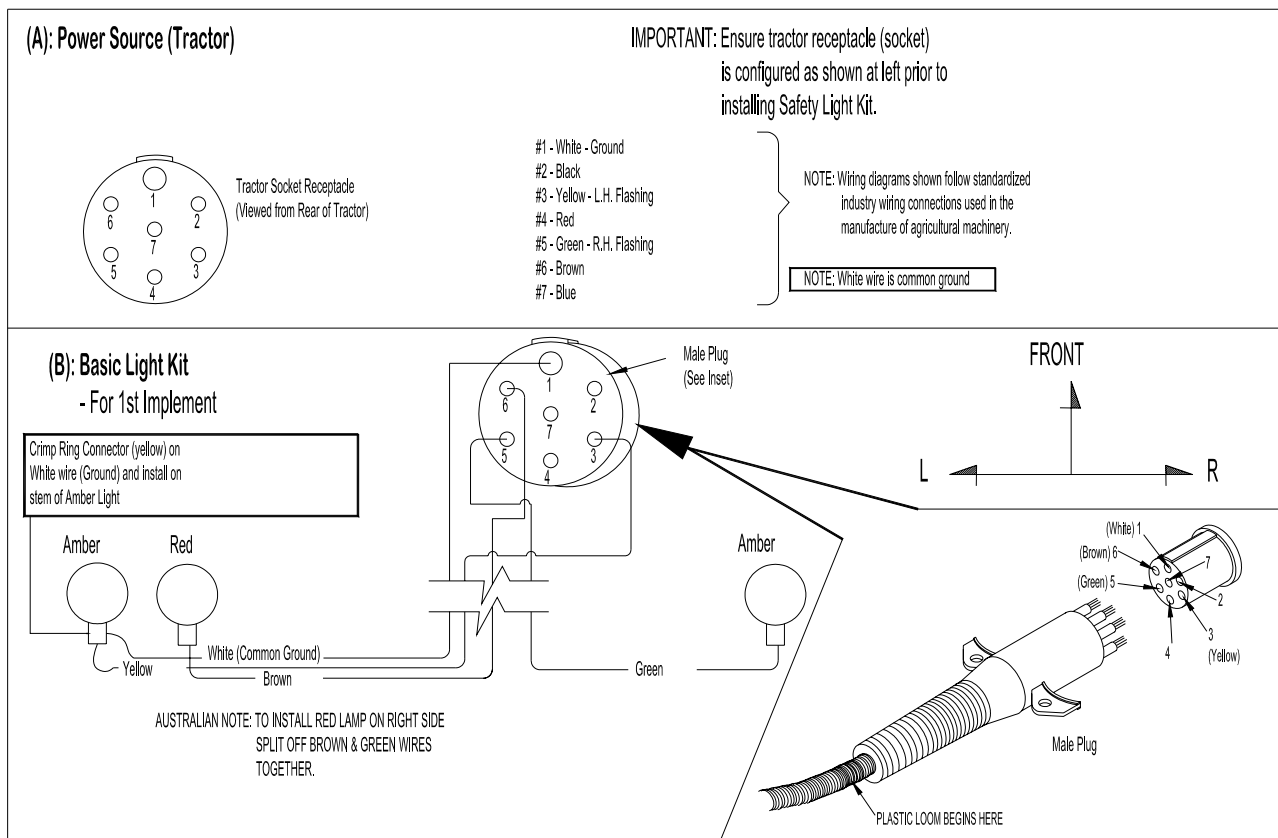


CAUTION: WHEN TRANSPORTING DISC OVER PUBLIC ROADS, USE THE SMV EMBLEM AND WARNING LIGHT FOR PROTECTION OF TRACTOR AND OTHER MOTOR VEHICLE OPERATORS. CHECK LOCAL LAWS FOR WIDTH AND HEIGHT MAXIMUMS.

F) INSTALL ELECTRICAL WIRING AS FOLLOWS:

- F1) See Fig. 36- Run four (4) wire cables (brown, white, yellow, and green) from tractor socket receptacle to rear of disc. Split off green wire and run it to the R.H. amber lamp. Next run white wire to amber lamp on L.H. side, then run yellow wire to L.H. amber lamp and run brown wire to red lamp on L.H. side. Strip wires and fasten ring connector to each wire. Install ring connector of each wire to threaded stem of each lamp.
- F2) Next, disassemble male plug, then insert all wires through spring end of male plug. Strip wires and insert each wire into specific terminal of outer half of male plug. Use Fig.36. to match wire color to proper terminal number. Reassemble both halves of male plug.
- F3) Insert male plug into tractor's socket receptacle. Activate warning light switch and check if all lamps are flashing.
- F4) **IMPORTANT:** Run wires along frame member. Do not run wires across open spaces. Wires that are run across open space will be damaged during discing operations by people working on the disc.
- F5) Install a 1/2" I.D. x 8' (12.7mm x 2.4m) long plastic loom over wires that run from male plug shown in Fig. 36. The plastic loom is installed by pushing the wires into the opening that runs the length of the loom.

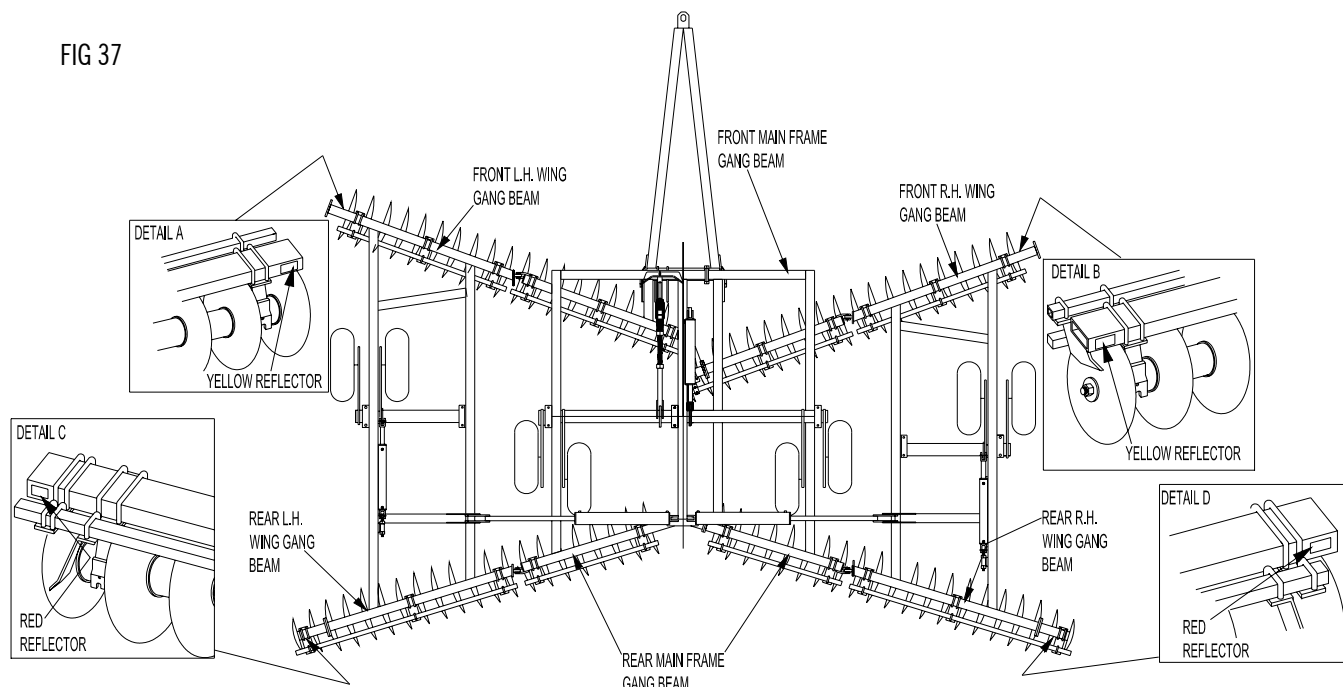
FIG 36



COMPONENTS: BASIC LIGHT KIT

- | | |
|--|---|
| 1 - 7 pin male plug c/w 55ft. (13.7m) 14/4" rib wire | 1- 8' (24.4m) 1/2" (12.7mm) plastic loom |
| 3 - Nylon connectors (closed end) | 1 - Ground Connector - ring type (7/16" - 1/2") (11.1mm - 12.7mm) |
| 2 - Lamps - amber both sides | 1 - Lamp - red one side |
| 10 - Cable ties | |

FIG 37



46. REFLECTOR DECAL INSTALLATION - See Fig 37.

Note: Before installing decals, clean the area they will be placed on.

- A) Place one (1) 2" x 9" (50.8mm x 228.6mm) red reflector decal on rear side of each rear gang beam. Locate decals approximately 1" (25.4mm) from end of gang beam. See detail "C" and "D".
- B) Place one 2" x 9" (50.8mm x 228.6mm) yellow reflector decal on front side of each front gang beam. Locate decals approximately 1" (25.4mm) from end of gang beam. See detail "A" and "B".

4590 GANG BEAM EXTENSION CHART

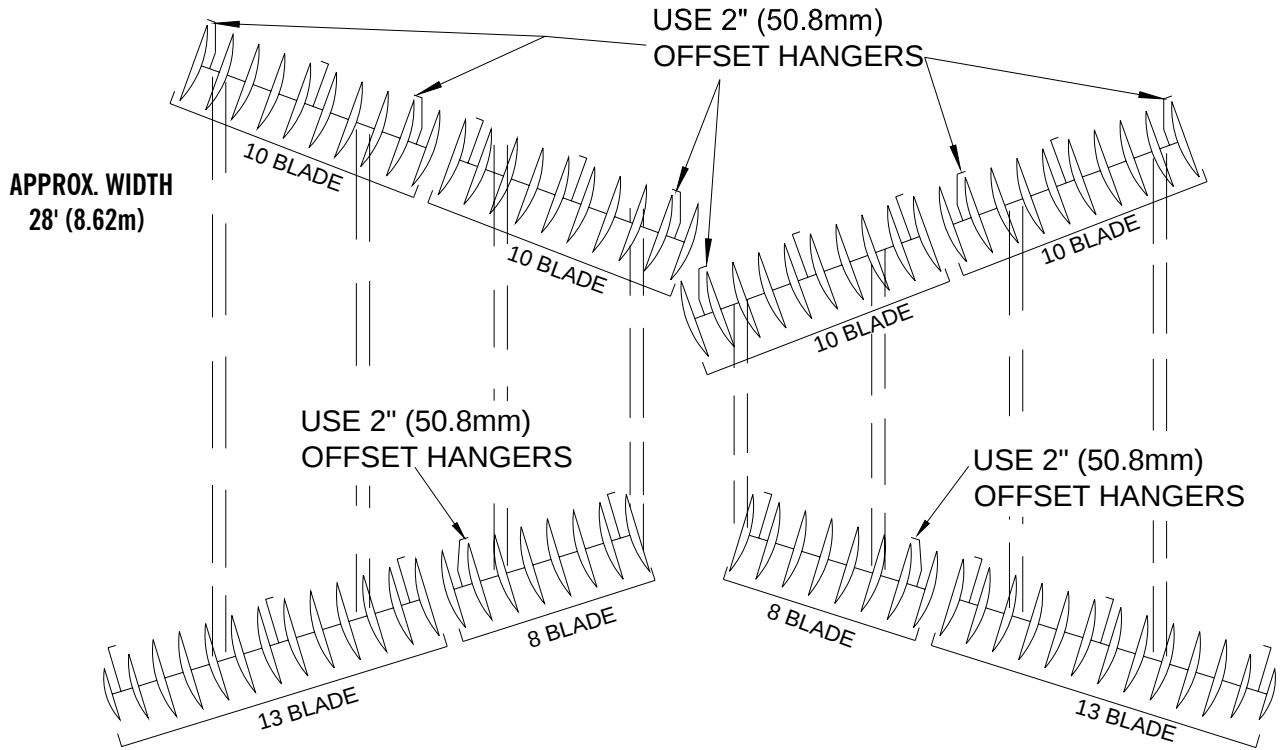
8" SPACING

DISC	FRONT EXTENSION	REAR EXTENSION
82B (Narrow Wing)	--	12" (304.8mm)
94B (Narrow Wing)	12" (304.8mm)	42" (1066.8mm)
106B (Wide Wing)	18" (457.2mm)	42" (1066.8mm)
114B (Wide Wing)	36" (914.4mm)	60" (1524mm)
122B (Wide Wing)	50" (1270mm)	78" (1981.2mm)

9" SPACING

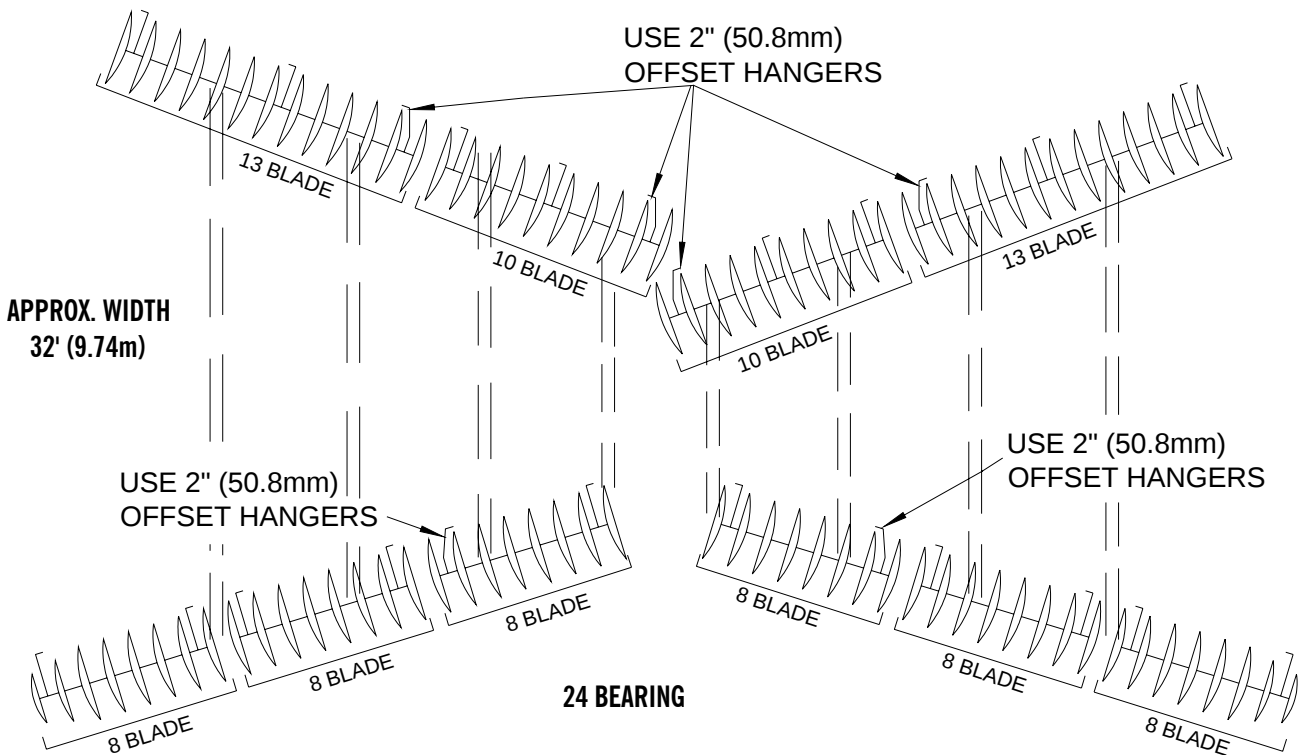
DISC	FRONT EXTENSION	REAR EXTENSION
74B (Narrow Wing)	--	16" (406.4mm)
86B (Narrow Wing)	16" (406.4mm)	42" (1066.8mm)
94B (Wide Wing)	16" (406.4mm)	42" (1066.8mm)
102B (Wide Wing)	36" (914.4mm)	60" (1524mm)
106B (Wide Wing)	42" (1066.8mm)	72" (1828.8mm)

MODEL 4590
DISC GANG PATTERN 8" SPACING
82 BLADE
FRONT



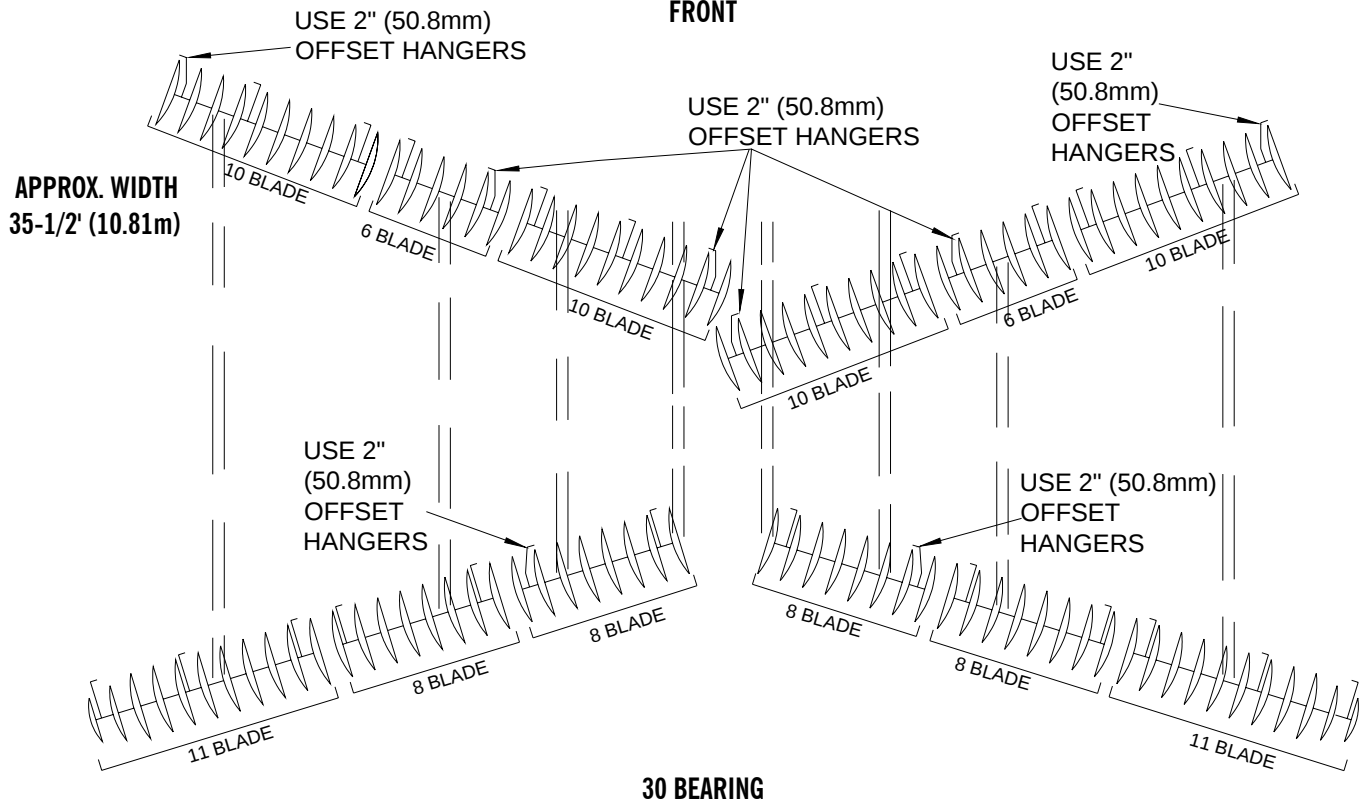
22 BEARING

MODEL 4590
DISC GANG PATTERN 8" SPACING
94 BLADE
FRONT

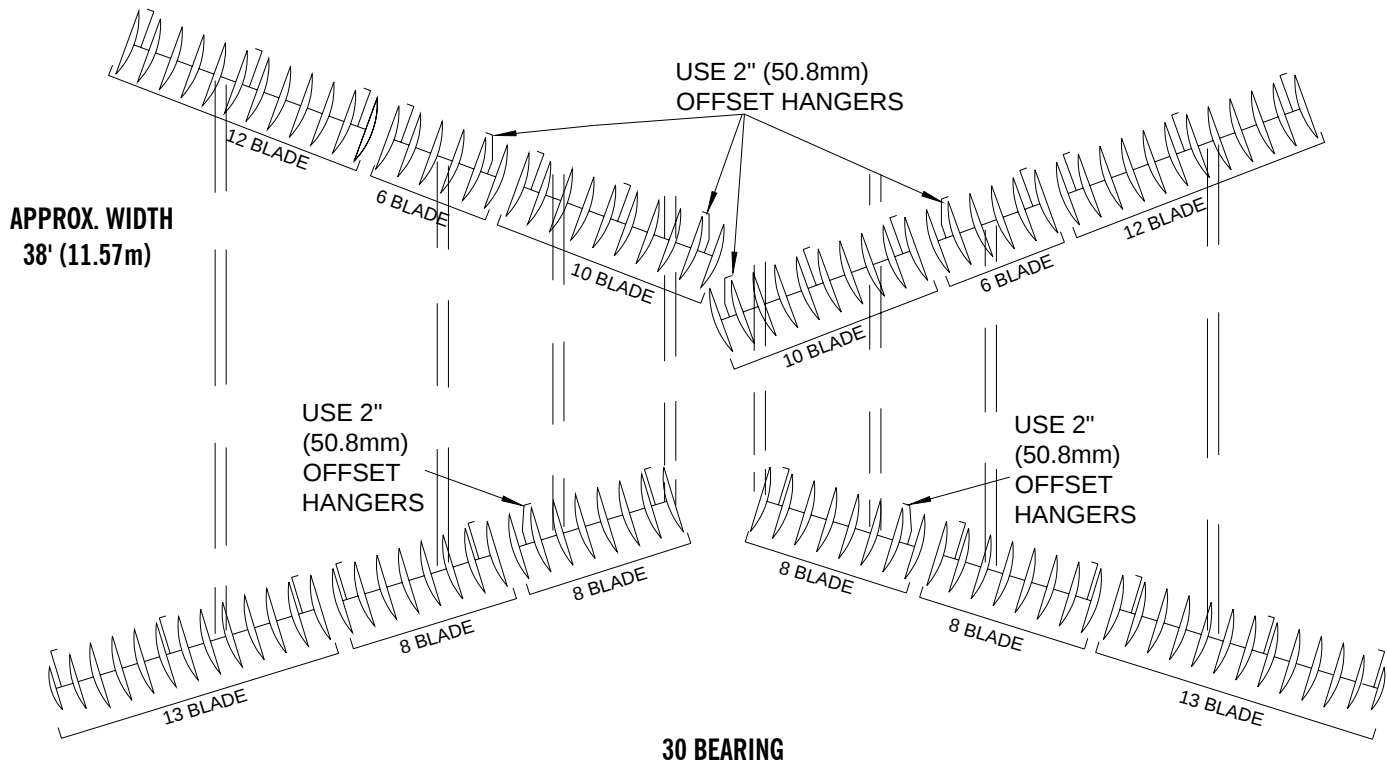


24 BEARING

**MODEL 4590
DISC GANG PATTERN 8" SPACING
106 BLADE
FRONT**

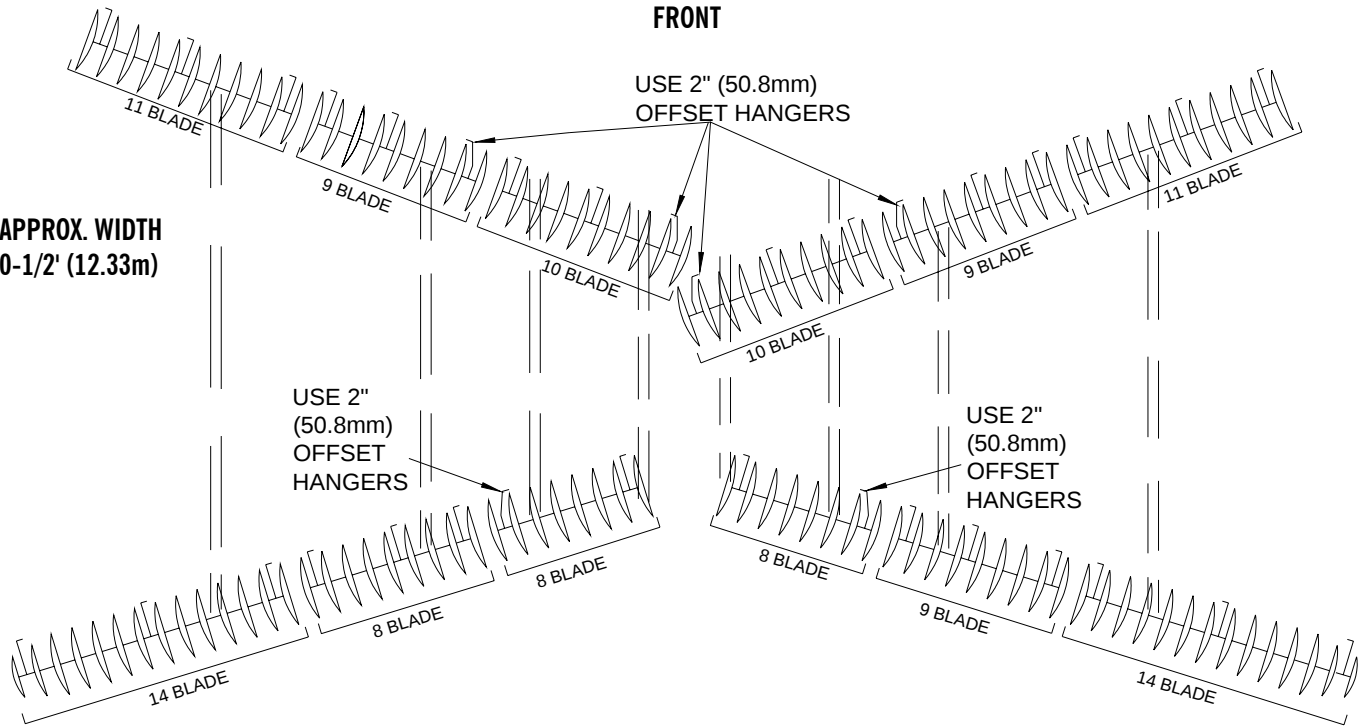


**MODEL 4590
DISC GANG PATTERN 8" SPACING
114 BLADE
FRONT**



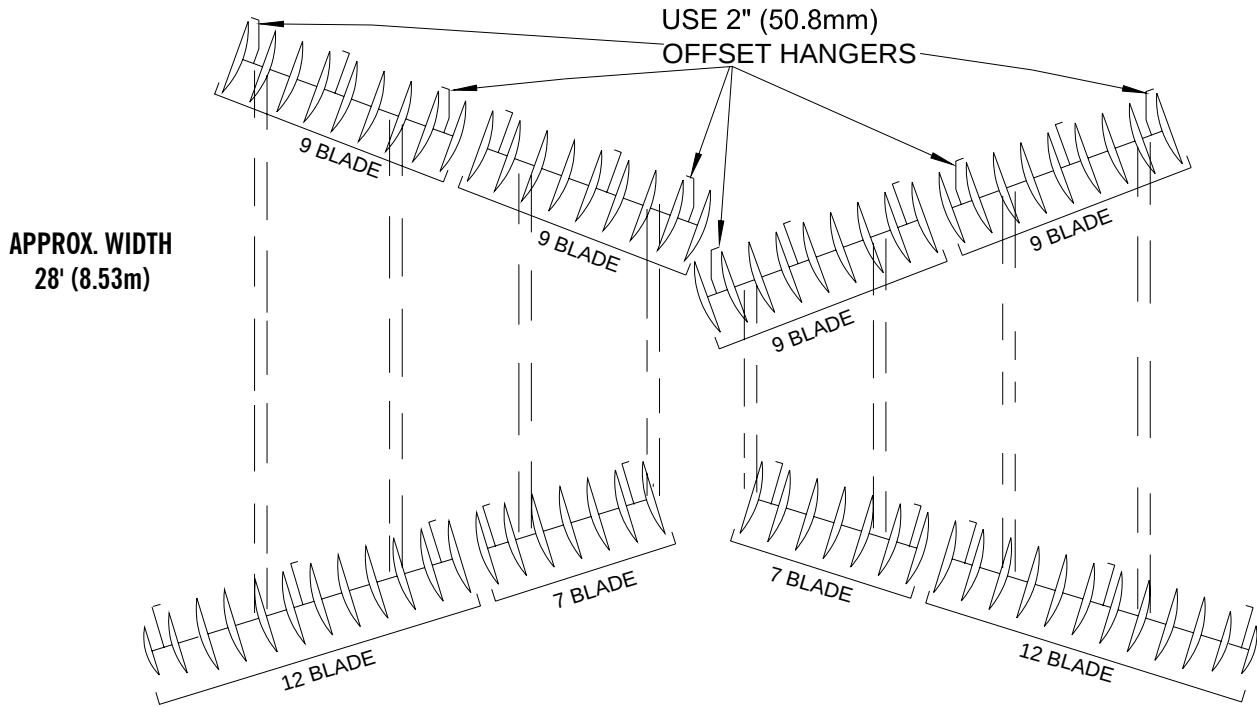
MODEL 4590
DISC GANG PATTERN 8" SPACING
122 BLADE
FRONT

APPROX. WIDTH
40-1/2' (12.33m)



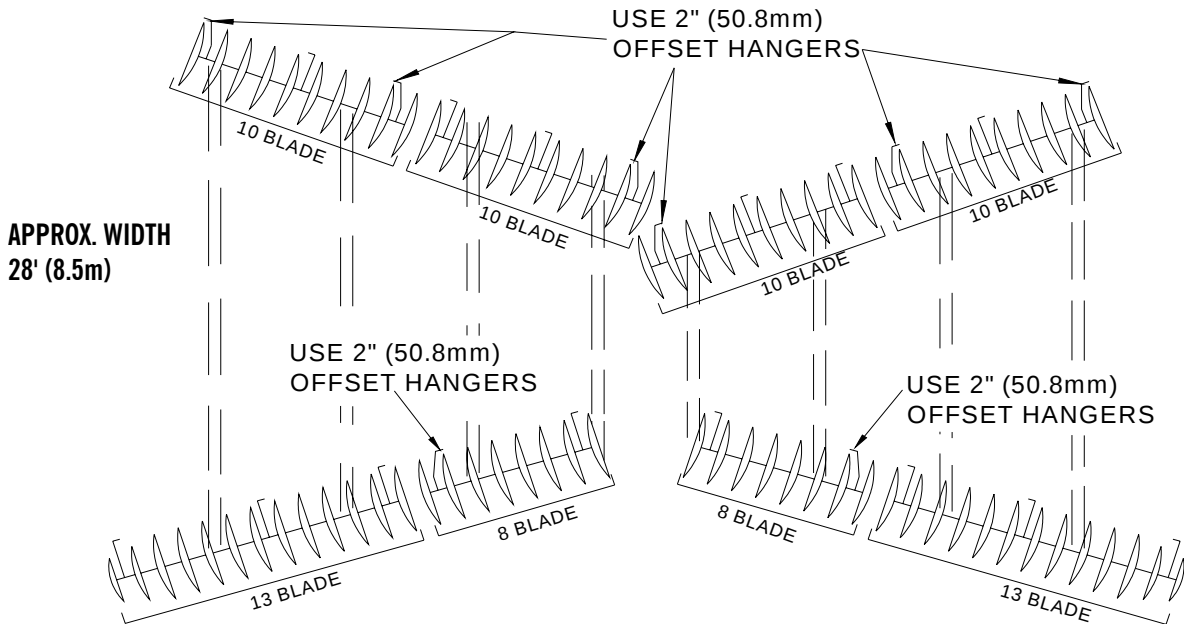
34 BEARING

MODEL 4590
DISC GANG PATTERN 9" SPACING
74 BLADE
FRONT



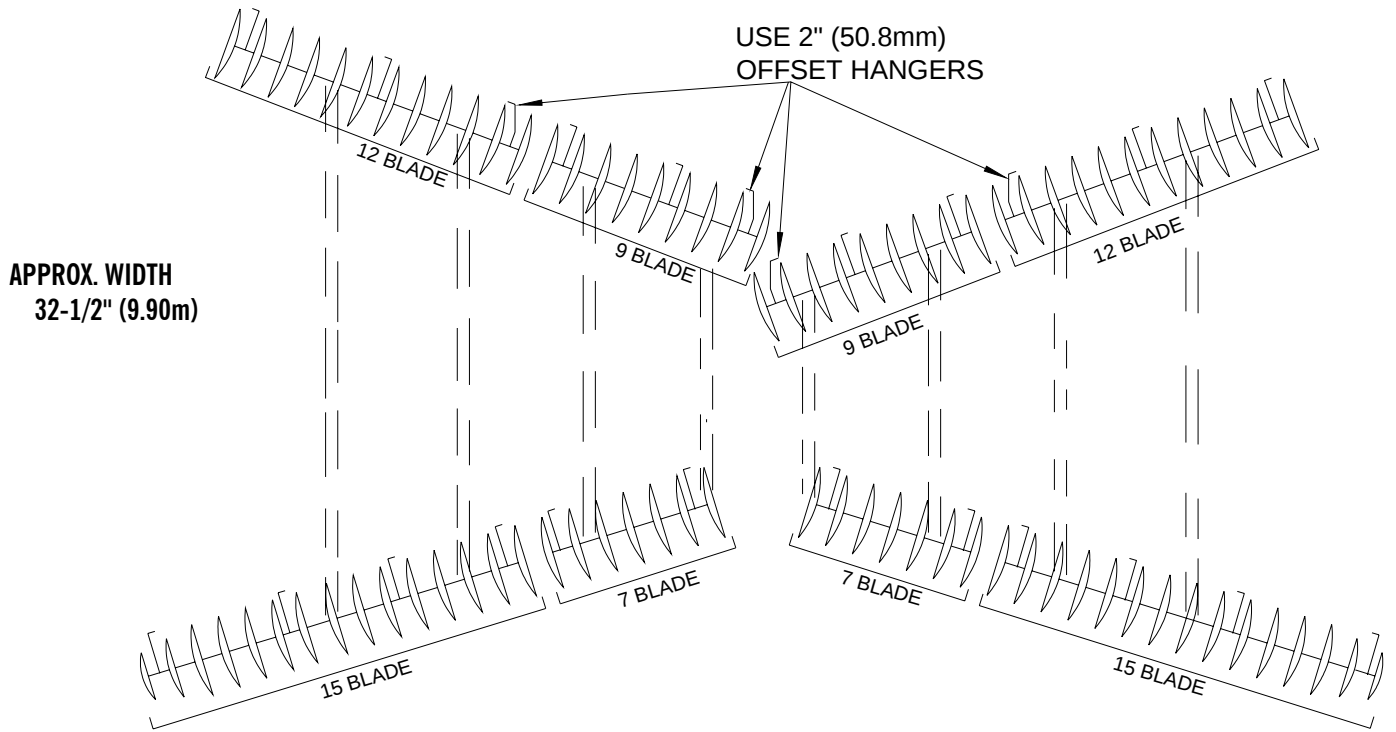
22 BEARING

MODEL 4590
DISC GANG PATTERN 9" SPACING
82 BLADE
FRONT



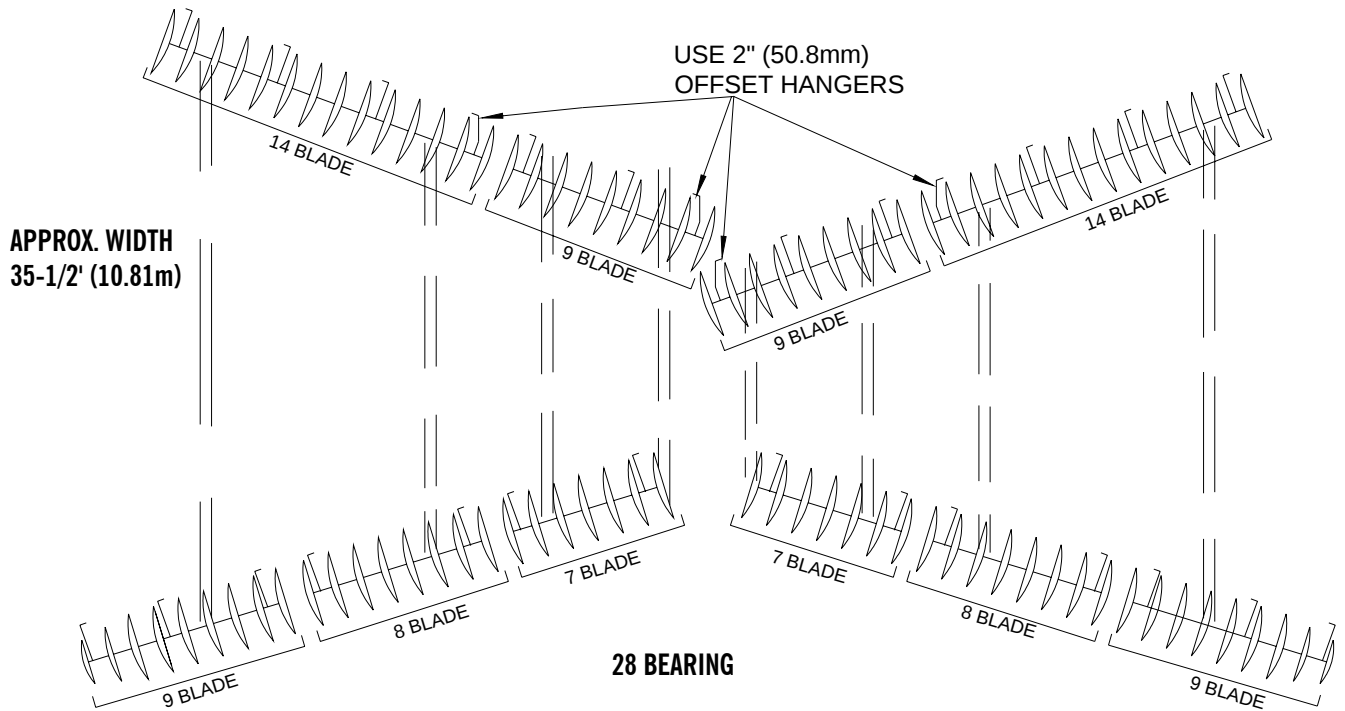
22 BEARING

MODEL 4590
DISC GANG PATTERN 9" SPACING
86 BLADE
FRONT



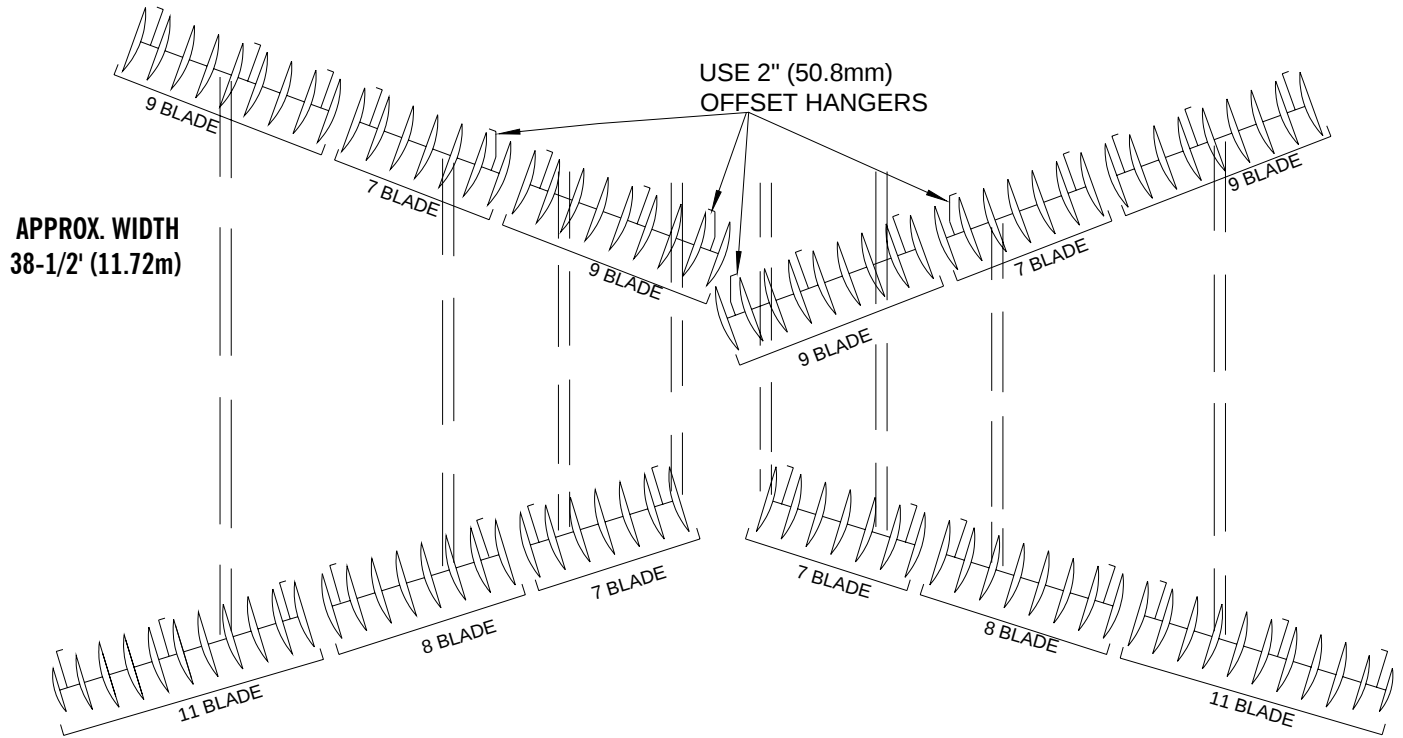
24 BEARING

MODEL 4590
DISC GANG PATTERN 9" SPACING
94 BLADE
FRONT



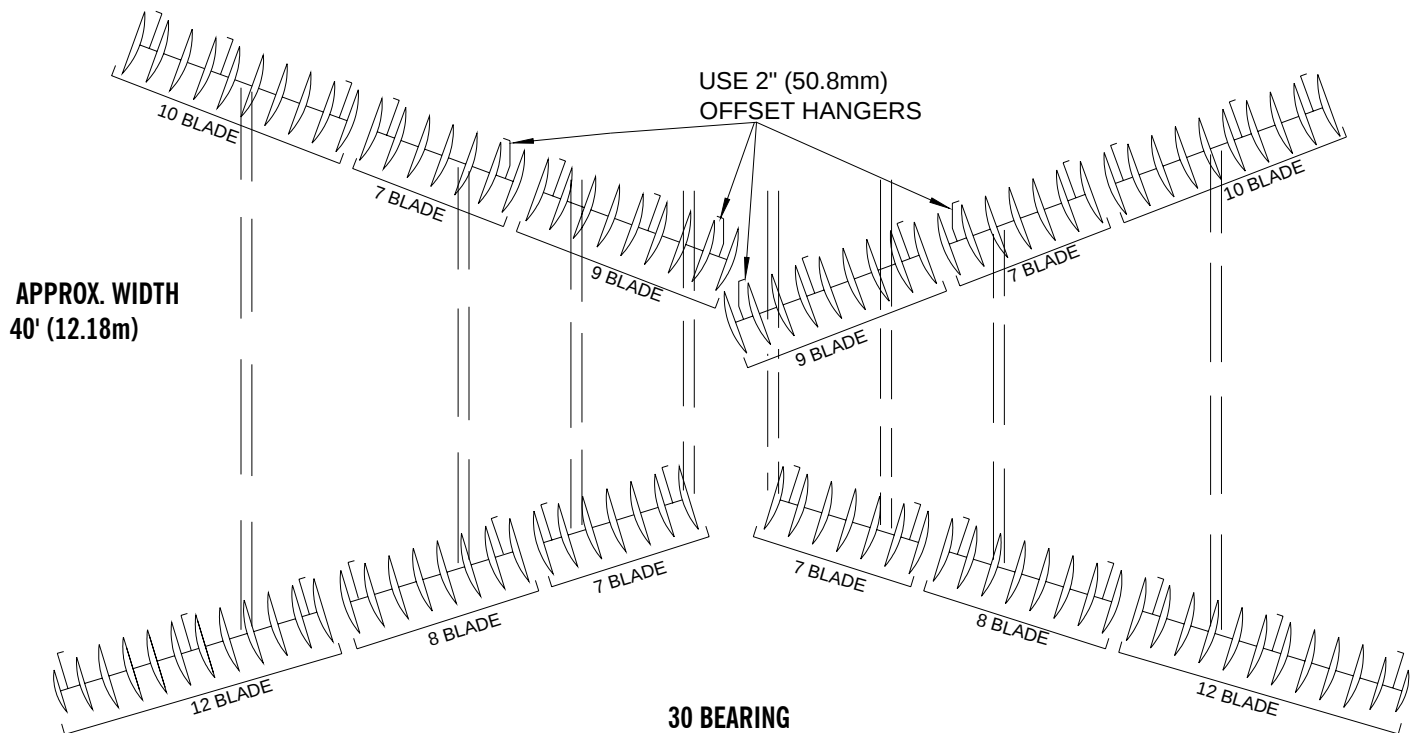
28 BEARING

MODEL 4590
DISC GANG PATTERN 9" SPACING
102 BLADE
FRONT



30 BEARING

MODEL 4590
DISC GANG PATTERN 9" SPACING
106 BLADE
FRONT



30 BEARING