



# MANCO MFG., INC.

2470 Ewald Ave. S.E.  
P.O. Box 13114  
Salem, Or 97302  
(503) 362-2241

## INSPECTION REPORT CHECK LIST

MFG: MANCO PRODUCTS, INC.  
NAME: PARATROOPER  
TYPE: NON-KIDDIE

RIM DRIVE PARATROOPER      DWG. NO. RD-513S      DATE \_\_\_\_\_  
RIDE SERIAL NO. \_\_\_\_\_      OWNER \_\_\_\_\_

1. Check blocking on front and rear landing gears and front and rear outriggers.
2. Check leveling.
3. Inspect condition of outrigger pins and snap keys.
4. Check condition of control stand and control cable.
5. Inspect condition of loading ramps and loading ramp lugs.
6. Inspect condition of main boom brace and boom brace pins, snap keys.
7. Inspect condition of boom brace turnbuckle rod and turnbuckle pins, snap keys.
8. Inspect condition and operation of brake switch.
9. Check stop and start switch for electric motor.
10. Check condition of car bows.
11. Check condition of car bow safety chain.
12. Inspect condition of car support bow safety turnbuckle, pins and snap keys.
13. See Dwg. No. RD-514S.

*Hurricane • Hydraulic Paratrooper • Rim Drive Paratrooper • Super Slide • Folding Tip Top • Super Round Up • Folding Round Up*

**Your thrill is ours - - We build excitement !**

14. Check car lock nut and lock washer.
15. Check condition of car hangers.
16. Inspect condition of car shock absorbers and pins and snap keys.
17. Inspect condition at lower car hanger suspension pins and snap keys.
18. Check condition at car suspension safety loop and bolts. (3/8 x 5 Grade 5)
19. Check condition of car suspension bumper.
20. Check dome retainer pins and snap keys.
21. Inspect condition of upper car hanger pin and lock nut.
22. Inspect condition of bow car hanger ears.
23. Inspect condition of safety cable and cable clamps. (Cable size 5/12 - 7 x 19 galvanized aircraft cable.)
24. Check outside condition of fiberglass dome.
25. Check outside condition of fiberglass car (inner and outer shell).
26. Inspect condition of lap bar and lap bar pins and bushings.
27. Check condition of lap bar plungers.
28. Inspect condition of lap bar plungers socket screws.
29. Check condition of latch links.
30. Check latch knobs and bolts.

31. See D.W.G. No. - R.D. 513S.
32. Inspect condition of hub pins and snap keys.
33. Inspect condition of electric brush and light collector ring.
34. Safety limiting ring. (See Drawing RD 35R)
35. Inspection condition of top bun plate.
36. Inspect condition of sweep retaining ring.
37. Inspect condition of rim drive track and track pins and snap keys.
38. Check condition of center panels and panel locks.
39. Check all lights, and light cords and plugs.
40. Check hydraulic pressure setting.
41. Check for hydraulic oil leaks.
42. Check condition and operation of drive wheel brakes.
43. Check ride rpm - 12-1/2 rpm maximum.
44. Check all assembly pins and snap keys.
45. Inspect condition of outside fence and fence jacks.
46. Inspect all electrical wire and main switch box and electrical plugs.
47. Check for correct power hookup (110 volt single phase for lights and 220 volt three phase for electric motor).

RIM DRIVE PARATROOPER INSPECTION REPORT

PAGE FOUR

48. Check out ride operator in proper use and function of the ride.
49. Inspect ride and operator for overall appearance.

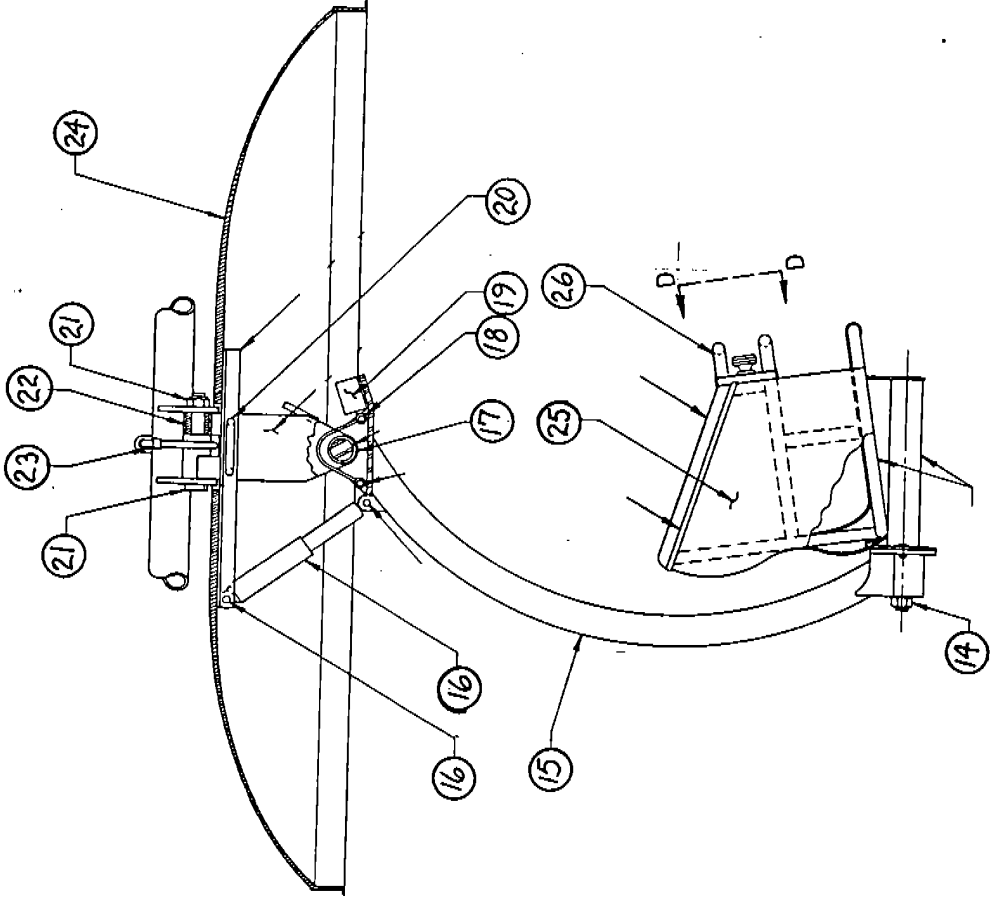
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Inspector

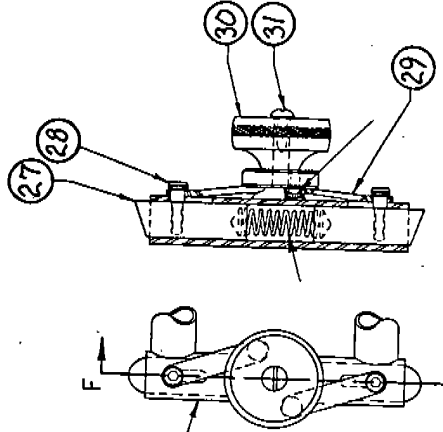
REMARKS:

MATERIAL SPECIFICATION

REV. QUANTITY



SECTION VIEW EE



SECTION FF

VIEW DD

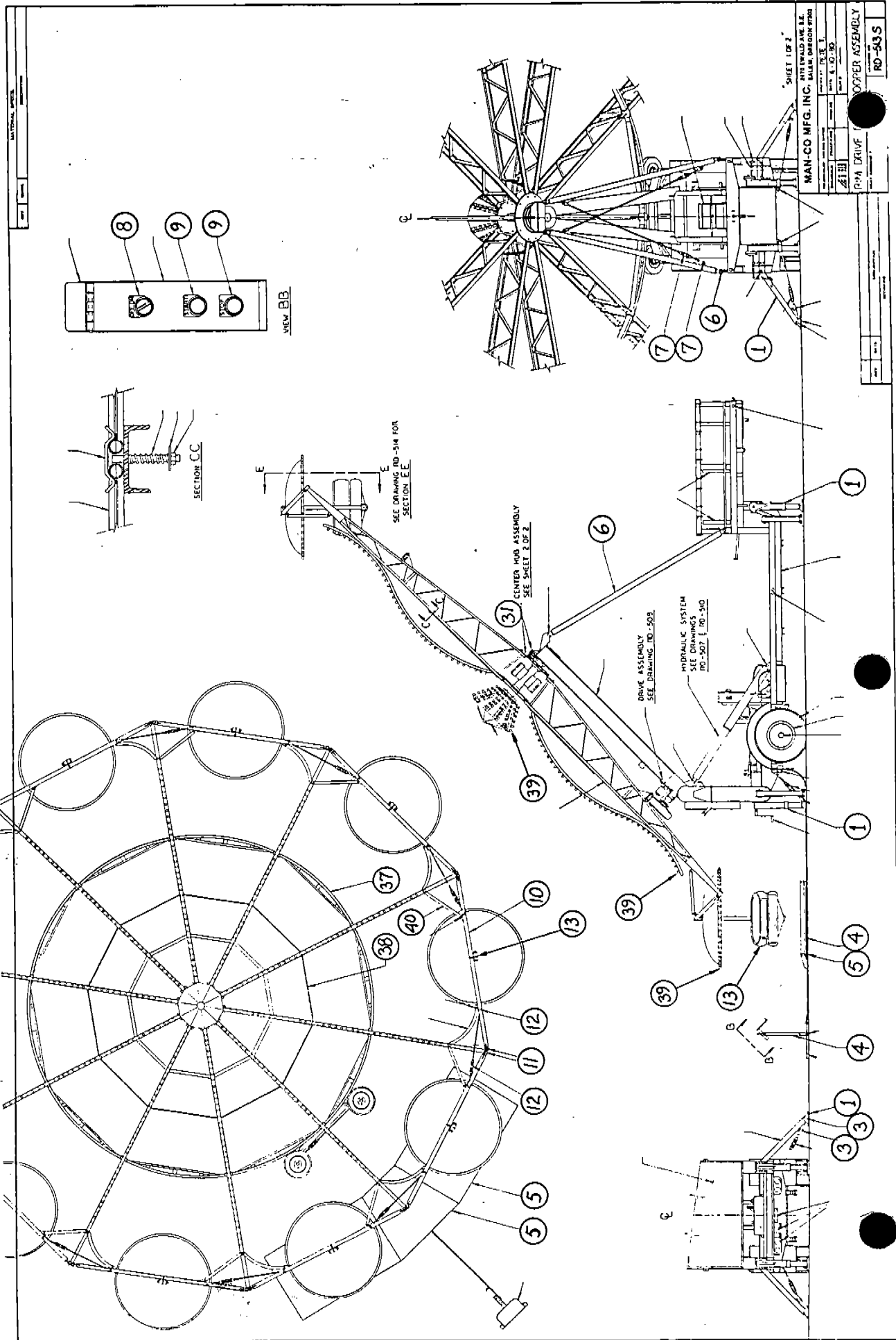
MAN-CO MFG. INC. 2470 ENWALD AVE. S.E. SALEM, OREGON 97302

DESIGNED BY: PETE T.  
DATE: 4-7-80  
SCALE: 1:1

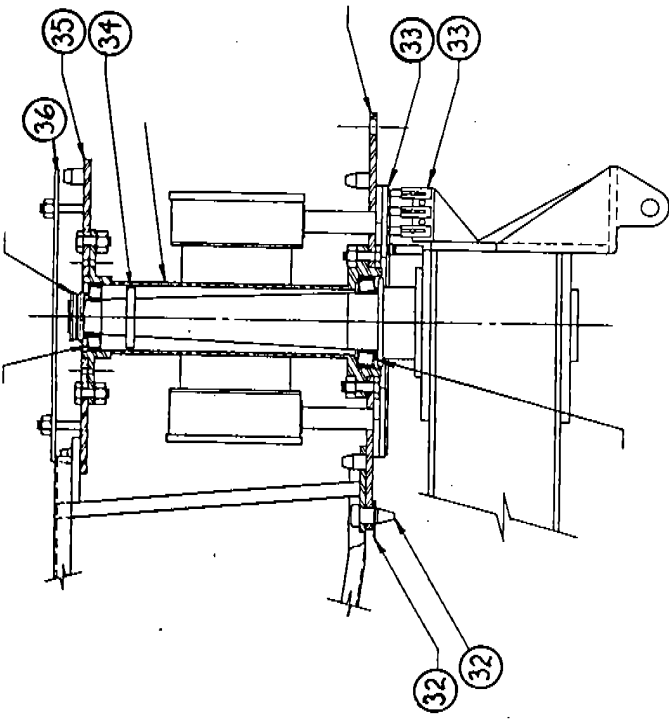
PARATROOPER CAR ASSEMBLY

RD-514S C

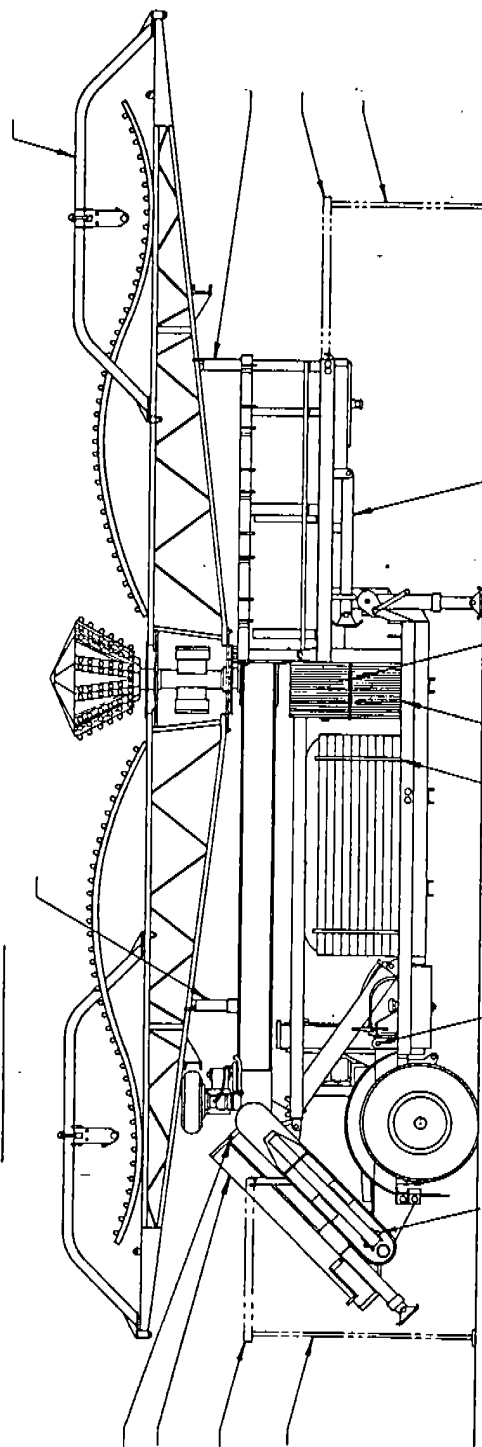
REV.	DATE	DESCRIPTION



REV	QUANTITY	MATERIAL SPECIES	DESCRIPTION
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CENTER HUB ASSEMBLY



SHEET 2 OF 2

SPEED RPM - 12 1/2 RPM (CLOCKWISE & COUNTER CLOCKWISE ROTATION)  
 CAPACITY - 30 CHILDREN (OR) 20 ADULTS  
 MAXIMUM HEIGHT - 40 FEET  
 SPACE REQUIRED - 50 X 60 FEET

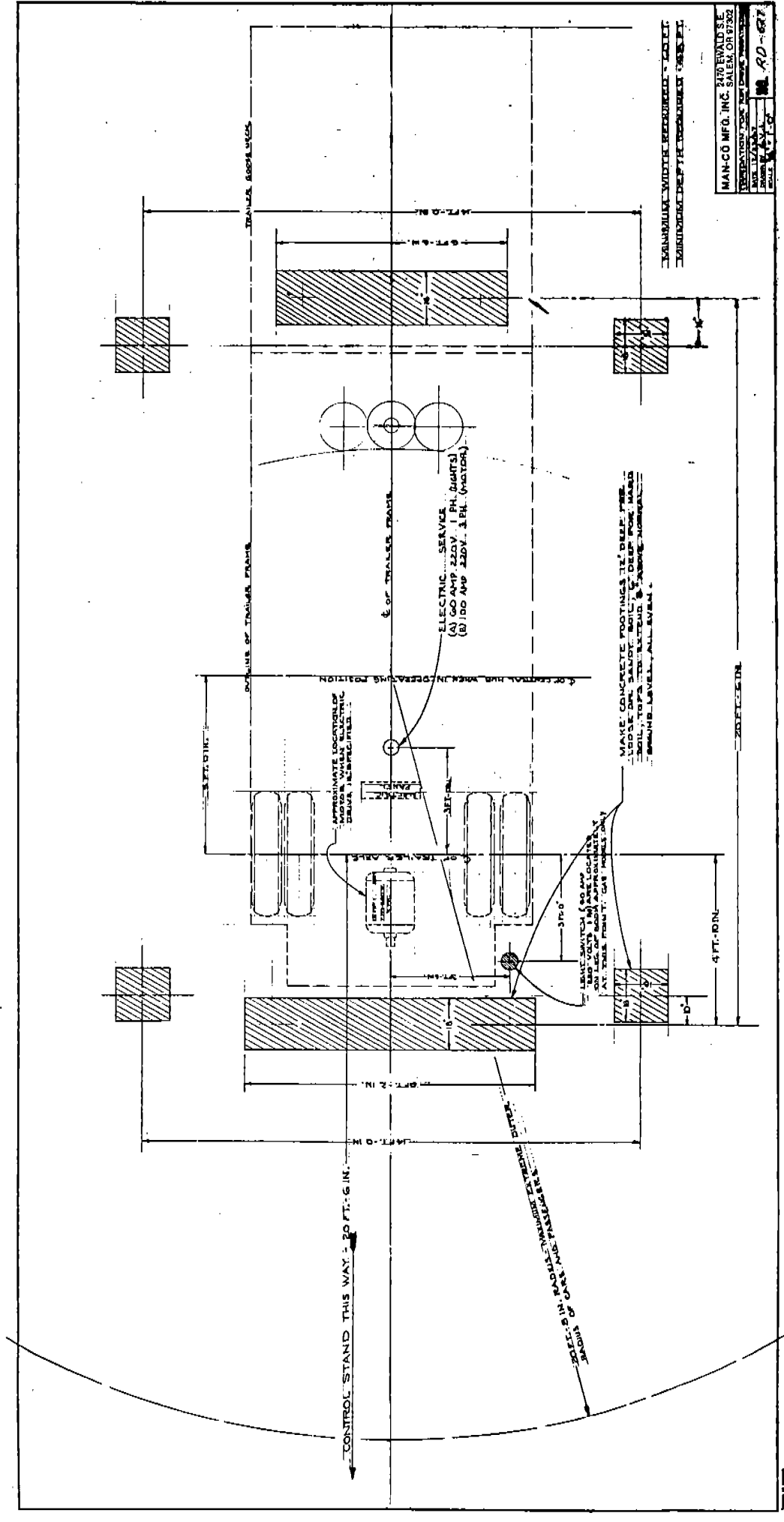
MAN-CO MFG. INC. 2470 ENALD AVE. S.E. SALEM, OREGON 97302			
DESIGNED BY	DATE	SCALE	REV.
PEPE T.	4-14-80		
RIM DRIVE PARATROOPER ASSEMBLY		RD-5135	

REV.	DATE	DESCRIPTION
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3

3

3



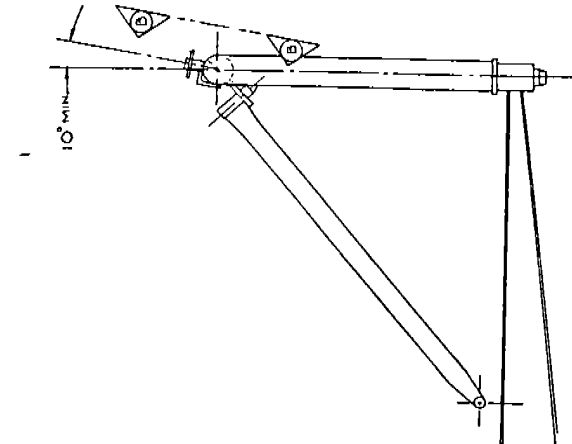
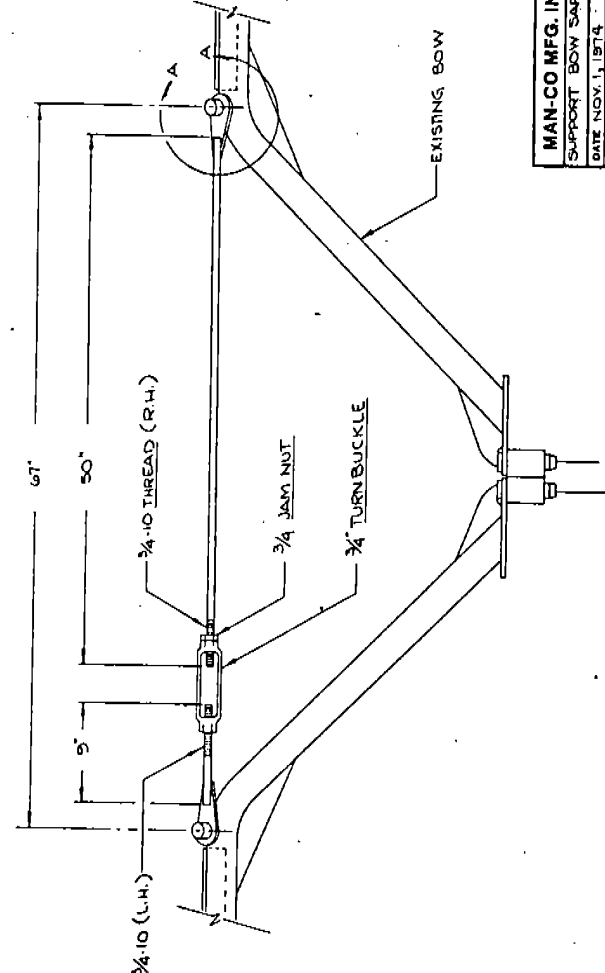
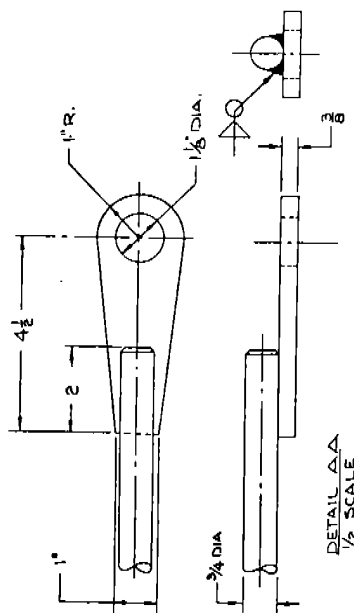
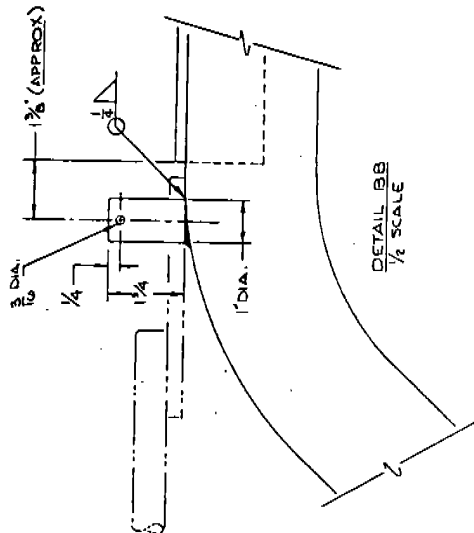


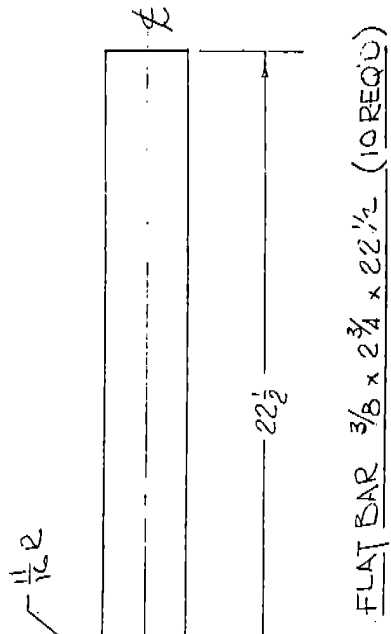




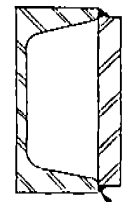
IN 1974 WE HAD REPORTS FROM TWO USERS OF THE PARATROOPER OF FAILURES OF THE SUPPORT BOW WHICH SUPPORTS THE CAR. THESE FAILURES MAY HAVE BEEN THE RESULT OF IMPROPER MAINTENANCE OR ABUSE. WHEN THE BOW FAILS IT ALLOWS THE CAR TO DROP SEVERAL INCHES AND IN SOME CASES THIS PRESENTS A VERY REAL DANGER TO THE PASSENGERS. WE HAVE FOUND THAT ADDITIONAL SUPPORT IN THE FORM OF TIES BETWEEN BOWS AS ILLUSTRATED WILL LEND ENOUGH SUPPORT TO A BROKEN BOW TO KEEP IT FROM DROPPING AND MINIMIZING DANGER TO PASSENGERS UNTIL THE RIDE CAN BE STOPPED AND REPAIRED.

WE HIGHLY RECOMMEND THE INSTALLATION OF THE SAFETY RETAINER ARRANGEMENT ON ALL EXISTING PARATROOPERS CURRENTLY IN USE. INSTALLATION SHOULD BE DONE BY COMPETENT PERSONNEL AND WELDING BY A CERTIFIED WELDER. THIS MODIFICATION SHOULD BE MADE AT THE EARLIEST POSSIBLE DATE.



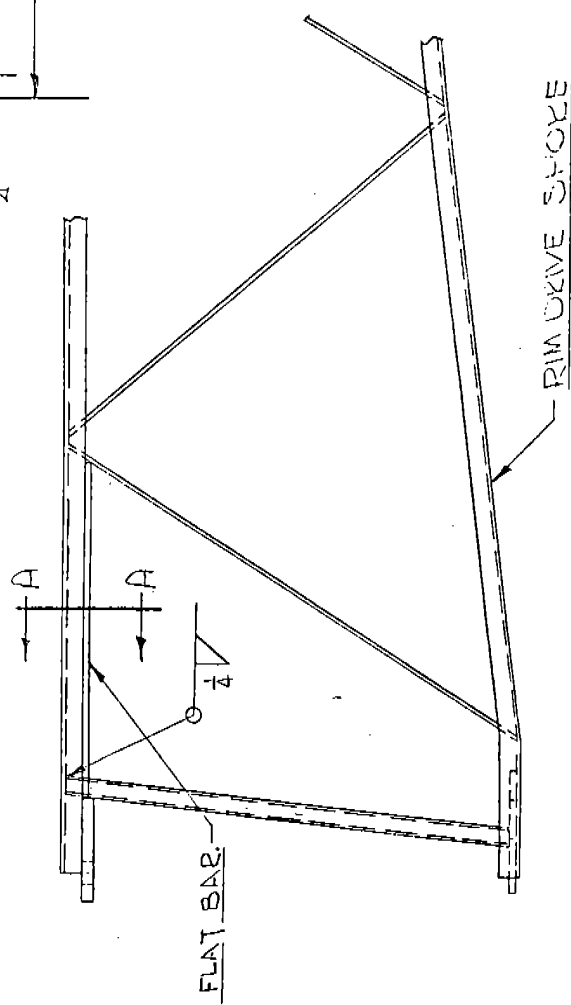


SCALE 3"=1'-0"



SECTION A-A

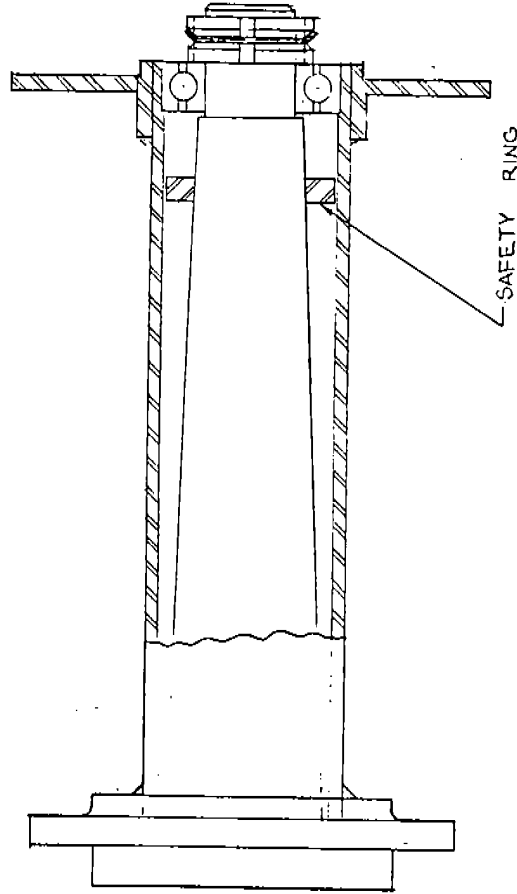
SCALE - 1/2 SIZE



NOTE:

A FEW OF THE RIM DRIVE PARTS PER RIGS HAVE SHOWN A WEAKNESS IN THE JOINTS. IT IS PROVIDED EXTRA STRENGTH BY THE INCOMING TO A FLAT BAR 3/8 x 2 3/4 x 22 1/2 TO BE WELDED AS SHOWN. MATERIAL AVAILABLE FROM THE WORKS.

MAN-CO MFG. INC. 3479 EWALD AVE. S.E. SALEM, OREGON 97302	
RIM DRIVE SPOKE MODIFICATION	
DATE 10-11-76	NO. SC-101176
DRAWN BY M.D.Z.	
SCALE 1/2" = 1'-0" UNLESS NOTED	



BEFORE INSTALLING A NEW BALL BEARING ON A RIM DRIVE PARATROOPER MAIN SPINDLE, PUT A SAFETY RING ON THE SHAFT WITH THE TAPER CONFORMING WITH THE TAPER ON THE SHAFT. THE RING IS TO PREVENT THE HUB FROM COCKING TO ONE SIDE IF THE BEARING FAILS.

MAN-CO MFG. INC. BALEK, OREGON 97102

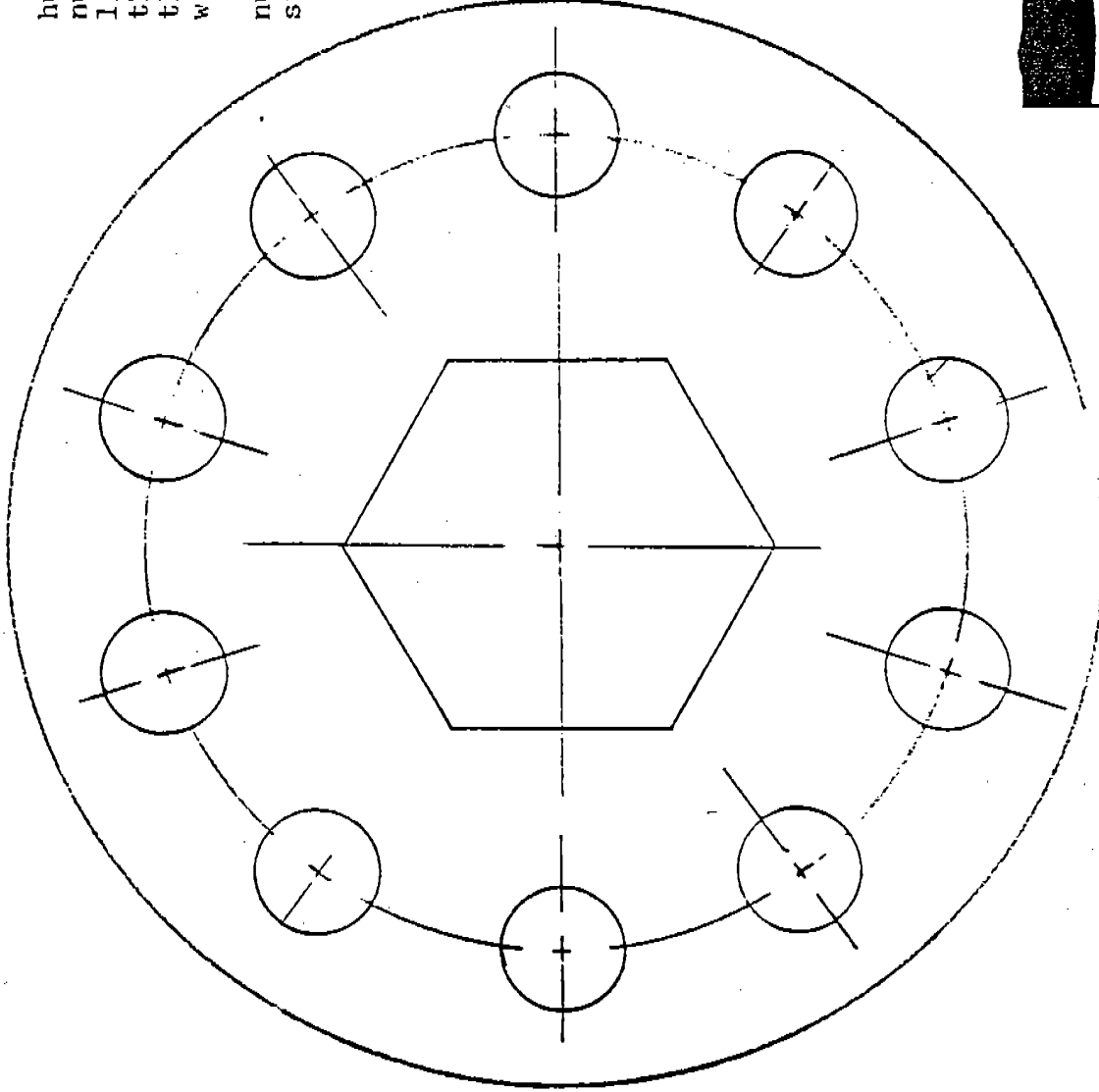
SAFETY RING INSTALLATION	
DATE	2-17-72
DRAWN BY	SME
SCALE	

NO. RD-35-R

### HUB NUT LOCK INSTALLATION

Remove the wheels from the hubs. After tightening the hub nut, install the lock plate. If the holes do not align with the studs, either loosen or tighten the nut slightly until the plate will slip on.

Replace the wheel and put nuts back on to complete the installation.



HUB NUT LOCK PLATE

DATE 6-14-74

DRAWN BY SME

SCALE FULL

NO. BU-106



## FLORIDA DEPARTMENT OF AGRICULTURE &amp; CONSUMER SERVICES

DOYLE CONNER, COMMISSIONER

★

THE CAPITOL / TALLAHASSEE 32399-0810

October 22, 1990

MEMORANDUM

TO: All Inspection Specialists

FROM: Lowell Parrish

SUBJECT: Shaft and Spindle Replacement on Round-Up, Paratrooper & Fireball

The Bureau has become aware of a letter to NAARSO from MAN-CO that seems to allow a year to replace shafts on Round-Ups and Paratroopers made in 1971 or later. A copy is enclosed. A cracked shaft was found at Pensacola on serial number 298, manufactured in 1972. An NDT certificate was presented at Pensacola.

Following discussion's with MAN-CO, the Bureau will adopt the most protective position of enforcing Bulletin BU-138-MC, dated September 1, 1989. The bulletin requires replacement of shafts and/or spindles which are welded in directly. The replacement is to be made within a period of one year from the date of issue. A copy of this bulletin is enclosed. All should now be replaced before operating in Florida.

The other memo, dated February 26, 1990, intended on allowing one year from the date of the initial bulletin. Tim Lake, of MAN-CO, confirmed that his memo was a letter of explanation and that none should run now with welded shafts and spindles.

LP/nd

enclosures

*Lowell*

cc: Ronnie Greenman  
Chuck Schwenk  
Jerry Compton



# MAN-CO MFG., INC.

2725 19th Street S.E. • P.O. Box 13114 • Salem, Oregon 97309 U.S.A.  
Office (503) 362-2341 • FAX (503) 362-2536

February 26, 1990

To: Narso

RE: Serial Numbers and years of manufacturing for Round-ups and  
Paratroopers

Rides recommended for immediate shaft change. (those manufactured in 1970  
or before)

Standard Round-up-Serial # 401 to 499  
4401 to 4499

Folding Round-up - Serial # 201 to 269

Standard Paratrooper - Serial # 501 to 599

Rim Drive Paratrooper - Serial # 301 to 348

Hydraulic Paratrooper - Serial # 801 to 840

Spitfires -All

Rides recommended for shaft change within the next year (those manufactured  
in 1971 and after)

Folding Round-up - Serial # 270 to 299  
#2201 to 2250

Rim Drive Paratrooper - Serial # 349 to 399

Hydraulic Paratrooper - Serial # 841 to 875

Fireball - Serial # F-701 to F-710

Hurricane • Paratrooper • Super Slide • Tip Top • Round Up • Riptide

MAN-CO Builds Thrills!

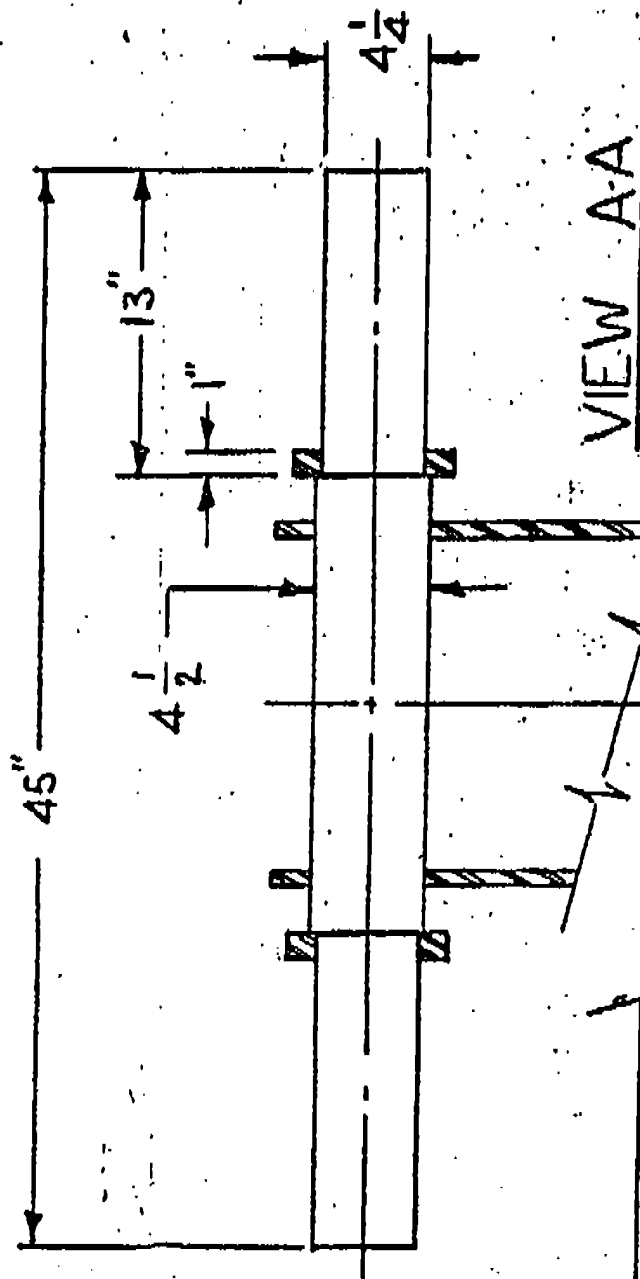
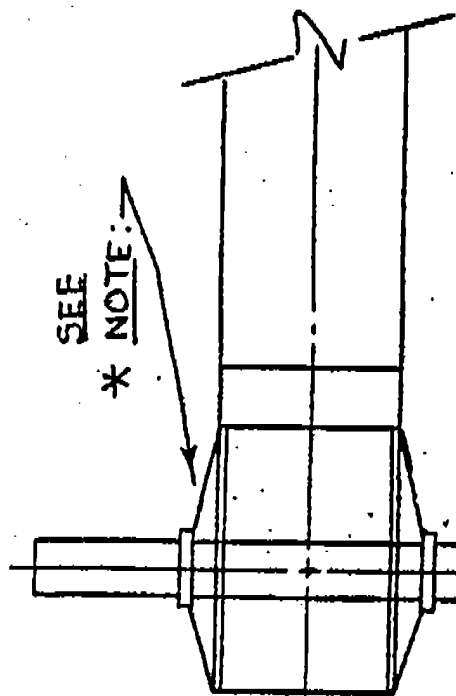


SEE

\* NOTE:

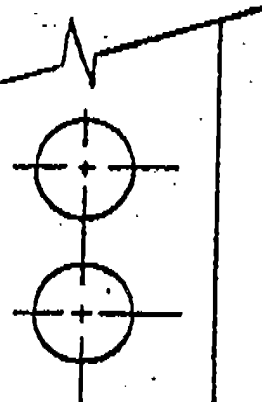
\* NOTE: IF ROCKER

SHAFT HAS THIS APPEARANCE  
THEN REPLACEMENT OF SHAFT  
IS NEEDED.



VIEW A-A

SHAFT DIM. SHOWN PREVIOUS TO SHRINK COLLAR



MAN-CO. MFG. CO.

P.O. BOX 12112  
SALEM, OR 97309

MAIN BOOM ROCKER SHAFT

DATE 8-31-89

DRAWN BY S.W.J.

SCALE

NO. BU 1138-C



# MAN-CO MFG., INC.

2725 19th Street S.E. • P.O. Box 13114 • Salem, OR 97309 U.S.A. • (503) 362-2341

BULLETIN: BU-138-MC

DATE: 9/1/89

ATTENTION: ALL ROUND-UP, PARATROOPER, AND FIREBALL OWNERS

## SHAFTS AND SPINDLE REPLACEMENT

It has been brought to our attention that there have been recent failures of the shafts and spindles of the above mentioned rides that were manufactured by Frank Hrubetz Co. and Kilinski Manufacturing Company (KMC). For various reasons, these failures have only occurred in those rides that have the shafts and spindles welded directly into the boom. Newer rides and replacement shafts and spindles that have used shrink collars for installation (therefore no direct welding to the shaft) have not experienced these failures and with proper maintenance and regular testing should provide years of safe operation.

However, due to these failures, Man-Co Manufacturing, Inc. recommends that the following steps should be taken.

- 1) Inspect your ride and determine if the shafts and/or spindles are welded in directly, or if shrink collars are used. (See Drawings BU-138-A through F for information on how to determine the installation method used on your ride.)
- 2) If shrink collars are used on your ride, there is no need for replacement. Please note: All shafts and spindles still need to be tested annually according to the procedures outlined in BU-135-MC (QC-UI-1 - Rev. 3).
- 3) If the shafts and/or spindles on your ride are welded directly to the boom, then replacement is needed.

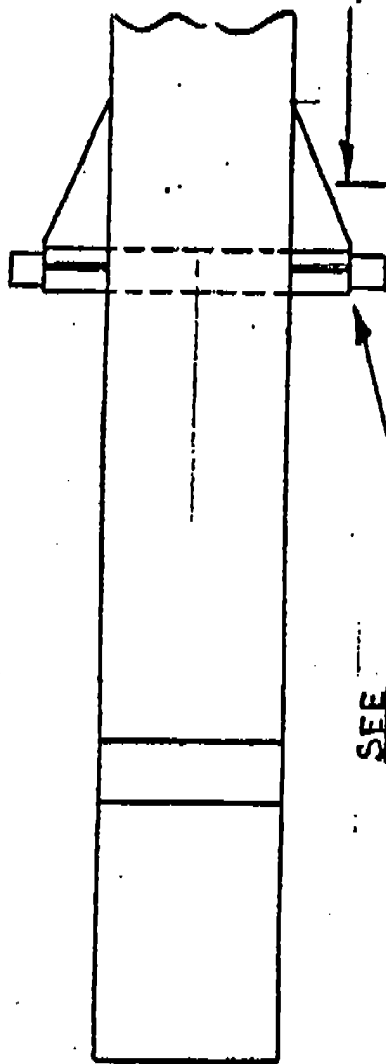
Due to the time element involved to manufacture and install these shafts and spindles, we recommend that a time period of one year be allowed to make these replacements. However, if your ride is a 1970 model or older, we recommend the replacements be installed as soon as feasibly possible.

Man-Co Manufacturing, Inc. is not related to or a successor of Frank Hrubetz Co., or Kilinski Manufacturing, Inc. and can recommend but not mandate that these procedures be adhered to. However, we feel that this is a most important step for the protection of the ride owners and the safety of their customers.

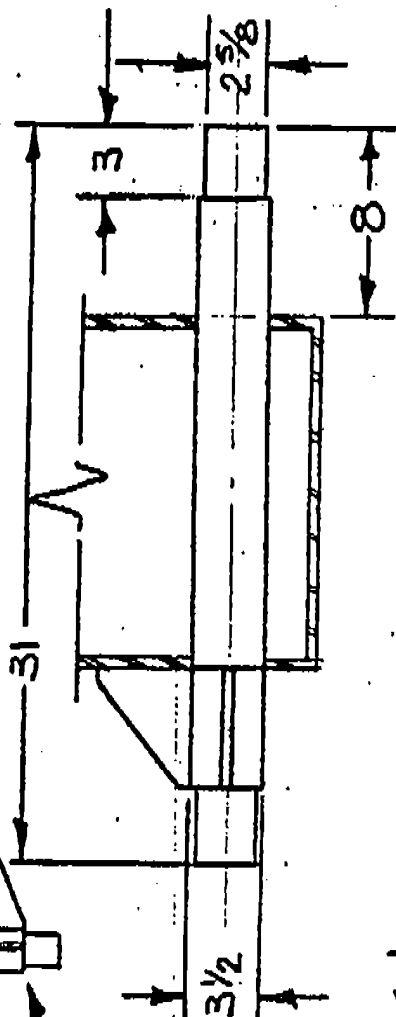
Hurricane • Paratrooper • Super Slide • Tip Top • Round Up • Rip-Tide

**MAN-CO Builds Thrills!**

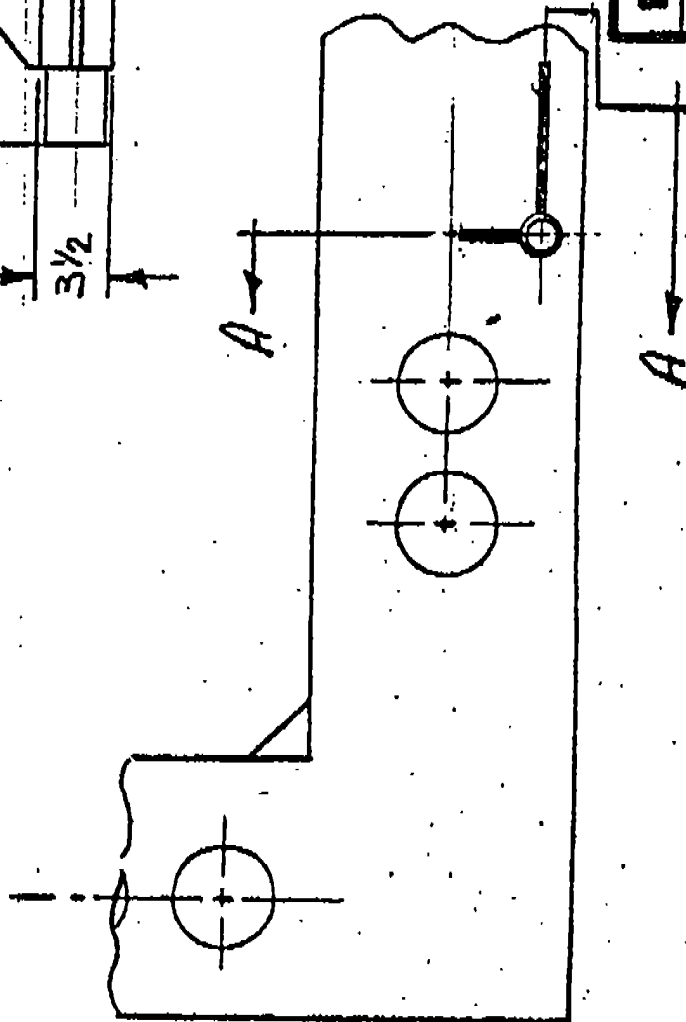
\* NOTE: IF CYLINDER ANCHOR SHAFT HAS THIS APPEARANCE, THEN SHAFT REPLACEMENT IS NEEDED.



SEE  
\* NOTE:



VIEW A-A



SHAFT SHOWN PRIOR TO SHRINK COLLAR

MAN-CO. INFO. INC. PD. BOX 13115 SALEM, OR 97309

CYL. ANCHOR SHAFT

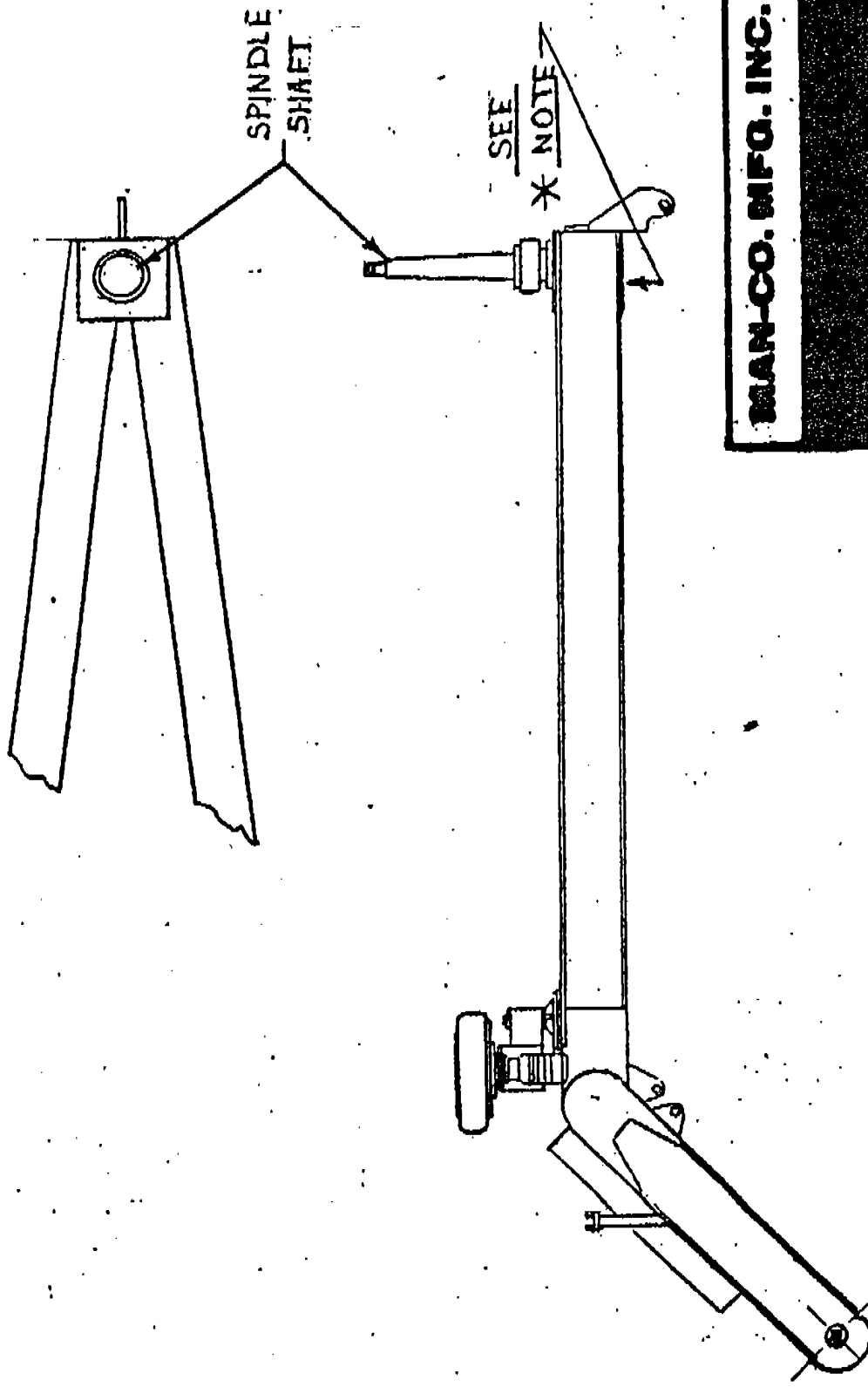
DATE 8-31-89

DRAWN BY SWJ

SCALE

NO. BU 138-B

\* NOTE: IF NO SHRINK COLLAR  
IS VISIBLE AT BOTTOM  
OF BOOM, THEN REPLACEMENT  
OF SPINDLE SHAFT IS NEEDED.



MAN-CO. MFG. INC.

P.O. BOX 18118  
SALEM, OR 97308

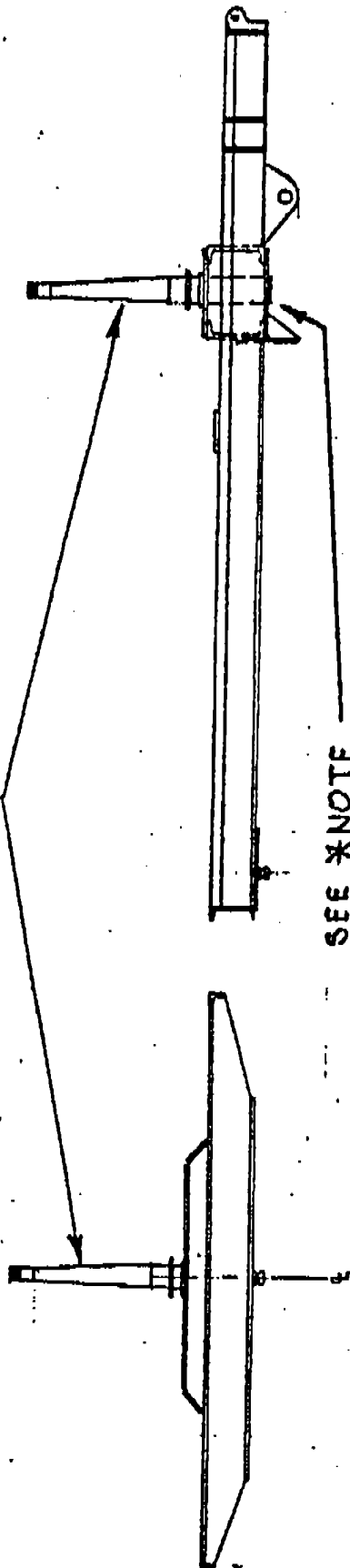
SCALE:	DATE:	DRAWN BY:
NONE	8-31-89	SWJ

RIM DRIVE PARA BOOM

BU-138-D

\*NOTE: IF NO SHRINK  
COLLAR IS VISIBLE AT  
THIS POINT THEN SPINDLE  
SHAFT REPLACEMENT IS NEEDED.

SPINDLE  
SHAFT



**MAN-CO. MFG. INC.**

P.O. BOX 13116  
SALEM, OR 97306

DRAWN BY: SWJ

DATE: 8-31-89

SCALE: NONE

TOLERANCES: UNLESS NOTED

DIMENSIONS: UNLESS NOTED

FRACTIONS: UNLESS NOTED

DECIMALS: UNLESS NOTED

ANGLES: UNLESS NOTED

FIREBALL SPINDLE SHAFT

NEXT ASSEMBLY

REVISION

DRAWING NO.

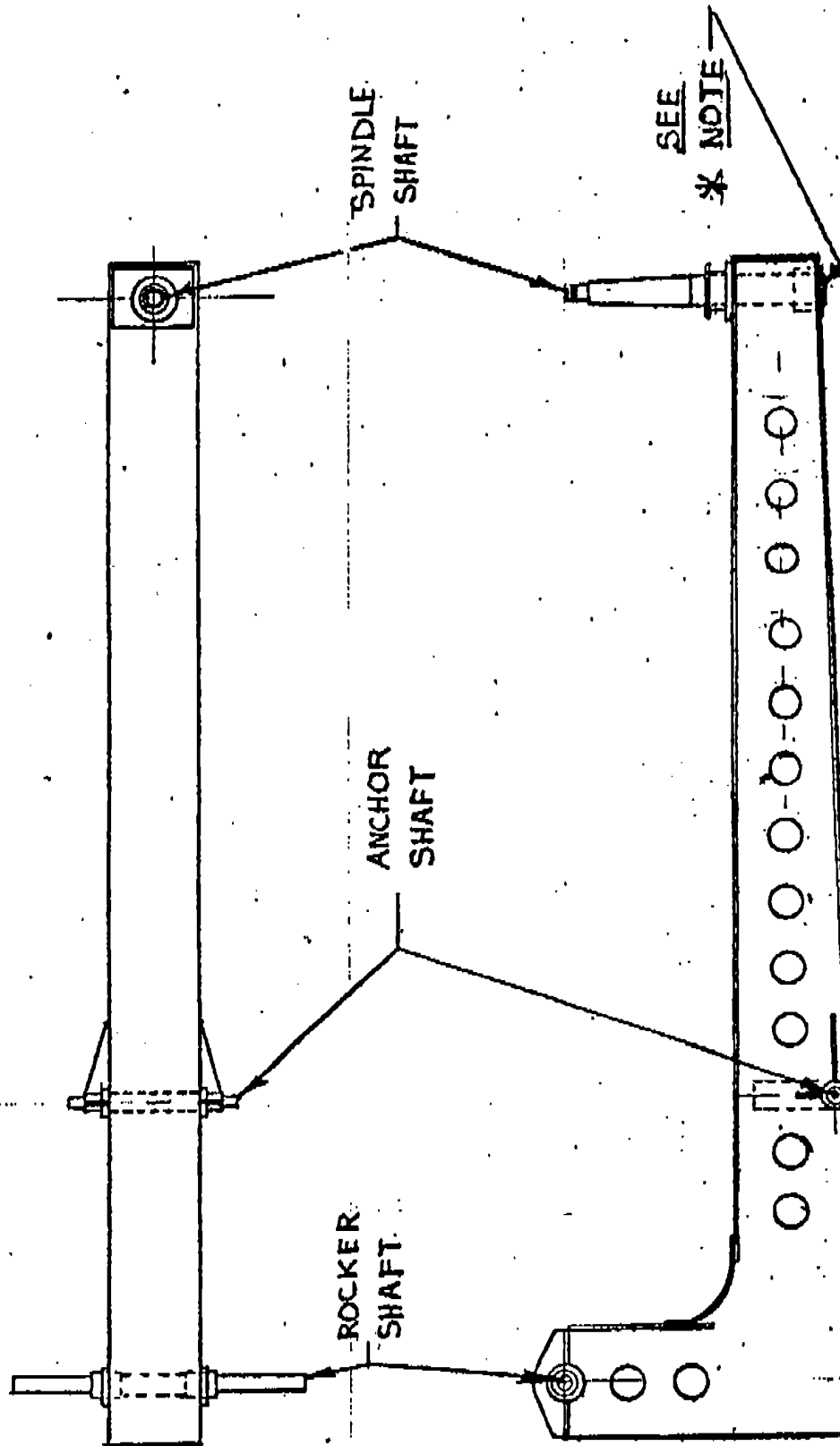
BU 138-F

DESCRIPTION

REV. DATE

REVISIONS

\*NOTE: IF NO SHRINK COLLAR IS VISIBLE AT BOTTOM OF BOOM, THEN REPLACEMENT OF SPINDLE SHAFT IS NEEDED.



MAN-CO. MFG. INC.

92.00X13114  
GALLEN, OR 97260

SCALE: NONE

DATE: 8-31-89

DRAWN BY: SWJ

30' FOLDING ROUND-UP

ANCHOR SHAFT

13R-A



# MAN-CO MFG., INC.

2725 19th Street S.E. • P.O. Box 13114 • Salem, OR 97309 U.S.A. • (503) 362-2341

March 24, 1988

## WE'VE MOVED!

Man-Co Manufacturing, Inc. has two new owners and a new home. January 15, 1988 Man-Co Manufacturing was purchased by J. Timothy Lake, of Houston, Texas, and Peter A. Blum, of Salem, Oregon. We are happy to add that three of the original owners of Man-Co; Al Stevens, Mike Zagya and Norm Oakes, have remained on our staff to serve you.

On March 1, 1988 we moved into a 27,000 square foot fabrication facility. This move has allowed us to increase our staff and will enable us to produce more rides to better serve you, our valued customers. Note that our P. O. Box number and phone number have remained the same, but please update your records with our new street address.

When you are in our area, please stop by (see map), have a cup of coffee and tour our new home. We look forward to welcoming you to the "new" Man-Co.

Best Regards,

MAN-CO MFG., INC.

J. Timothy Lake  
President

/pz

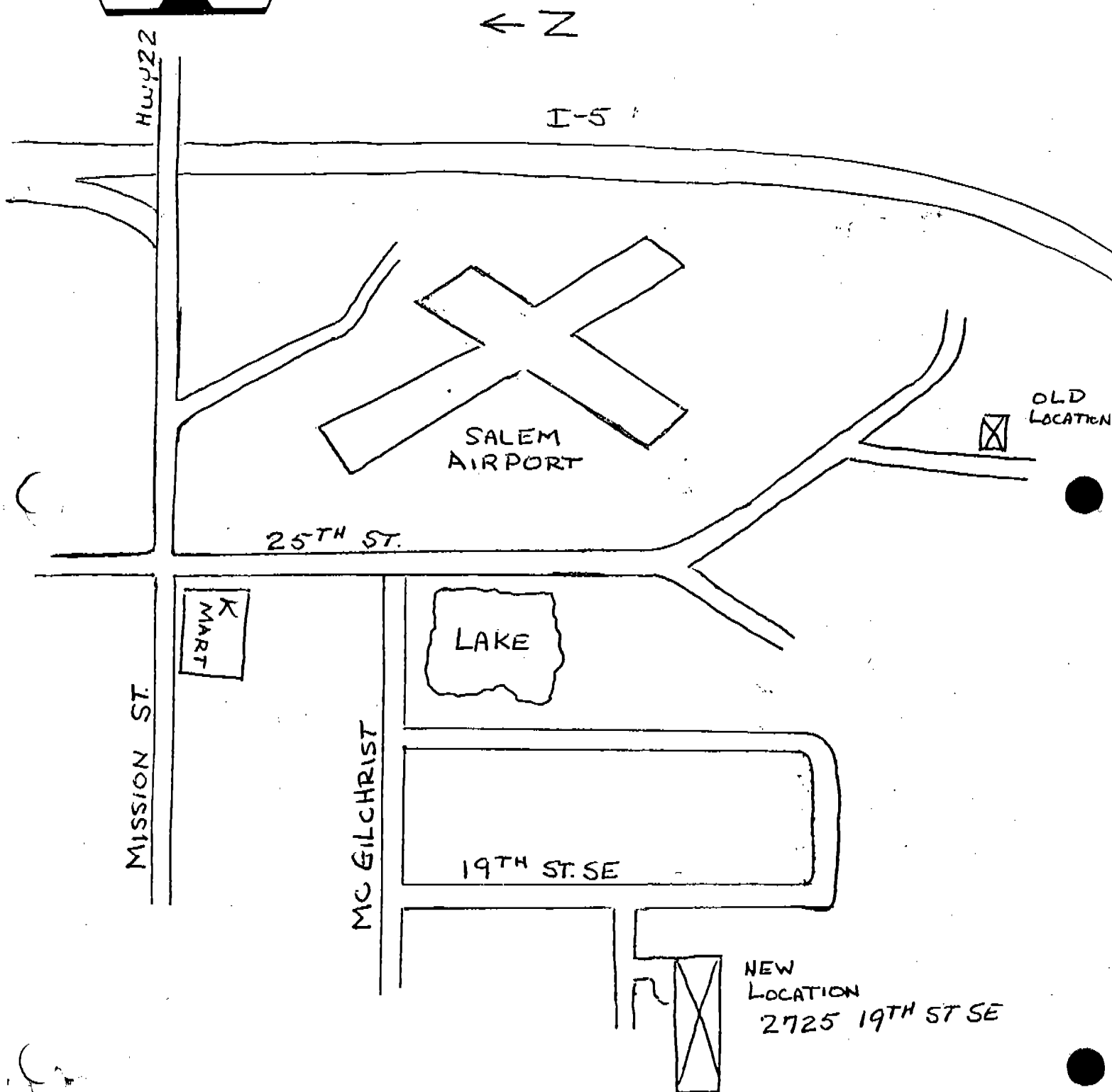
Hurricane • Hydraulic Paratrooper • Rim Drive Paratrooper • Super Slide • Folding Tip Top • Super Round Up • Folding Round Up

**Your thrill is ours - - We build excitement!**



# MAN-CO MFG., INC.

2725 19th Street S.E. • P.O. Box 13114 • Salem, OR 97309 U.S.A. • (503) 362-2341



Hurricane • Hydraulic Paratrooper • Rim Drive Paratrooper • Super Slide • Folding Tip Top • Super Round Up • Folding Round Up

Your thrill is ours - - We build excitement!





# MAN-CO MFG., INC.

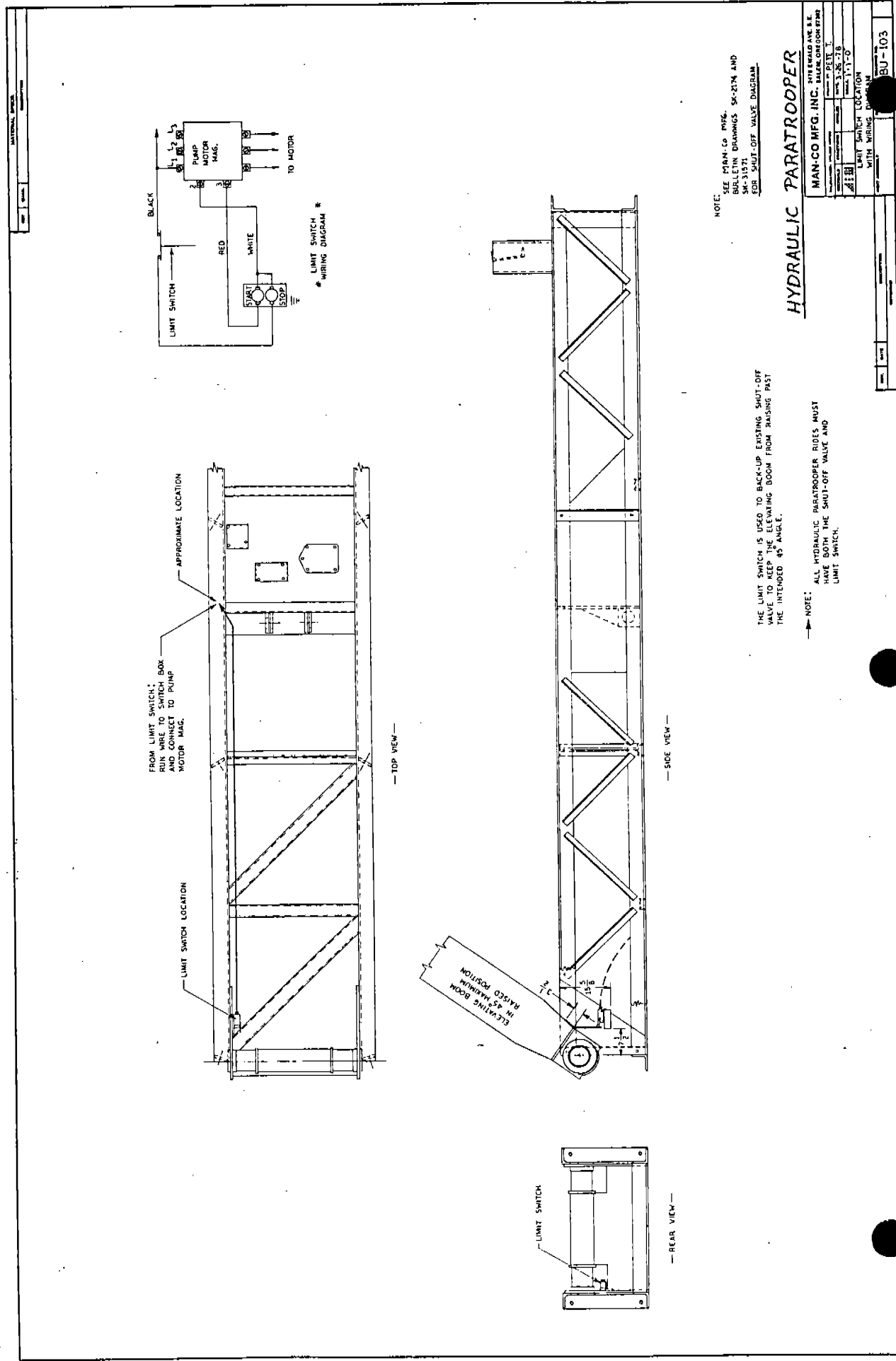
2725 19th Street S.E. • P.O. Box 13114 • Salem, Oregon 97309 U.S.A.  
Office (503) 362-2341 • FAX (503) 362-2536

## DAILY INSPECTION CHECKLIST - PARATROOPER

1. Check blocking, outriggers, and landing gears
2. Check leveling
3. Inspect loading platforms and jacks
4. Inspect boom braces and turnbuckles (Rim Drive models)
5. Check snap keys on a.) dome retainers; b.) bows and bow braces;  
c.) hanger blocks; d.) shock absorbers; e.) drive rim (Rim Drive models)  
f.) cotter key on Park models
6. Inspect bow safety turnbuckles
7. Check electrical connections and plugs
8. Check car lock nut and lock washer
9. Inspect lap bars and check operation
10. Inspect center panels and panel locks (some Rim Drive models)
11. Check hydraulic oil tank level
12. Inspect hydraulic hoses for leaks
13. Check brake operation
14. Inspect fence and fence jacks
15. Check car suspension safety loop bolts
16. Inspect safety valve linkage and limit switch. (Ride should not exceed 45°)  
(Hydraulic model)
17. Operate Paratrooper through one complete ride cycle of proper functioning.  
Ride should run at 12½ RPM maximum

Hurricane • Paratrooper • Super Slide • Tip Top • Round Up • Riptide

*MAN-CO Builds Thrills!*



NOTE:  
SEE MAN-TO MFG.  
BULLETIN DRAWINGS SK-21M AND  
SK-31M FOR  
FOR SHUT-OFF VALVE DIAGRAM

THE LIMIT SWITCH IS USED TO BACK-UP EXISTING SHUT-OFF  
VALVE TO KEEP THE ELEVATING BOOM FROM RAISING PAST  
THE INTENDED 45° ANGLE.

NOTE:  
ALL HYDRAULIC PARATROOPER RIDES MUST  
HAVE BOTH THE SHUT-OFF VALVE AND  
LIMIT SWITCH.

# HYDRAULIC PARATROOPER

MAN-TO MFG. INC.	211 EMMETT AVE. S.E.
ALBANY, OREGON 97321	
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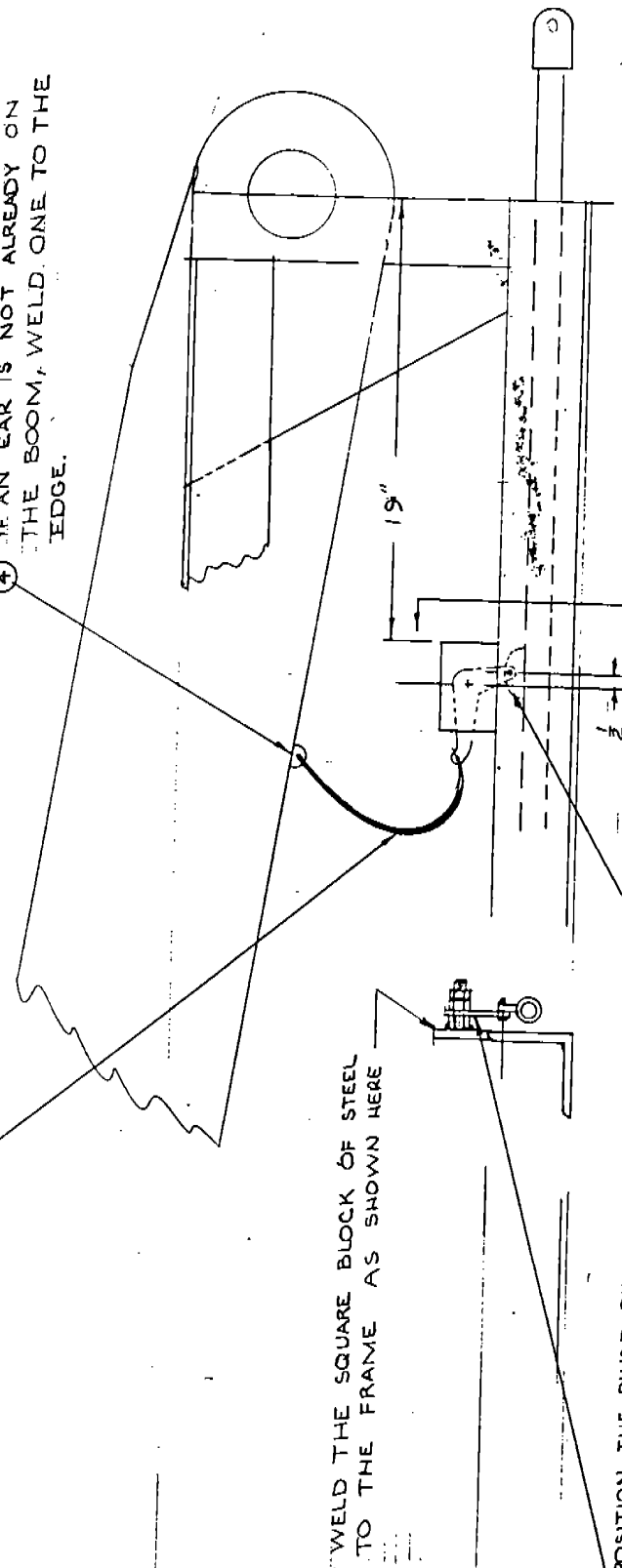
⑤ RAISE THE BOOM UNTIL WHEEL IS AT 45°. LOOP THE CABLE THROUGH EAR ④ SO THAT IT IS STRETCHED TIGHTLY. CLAMP THE CABLE SO THE IT WITH ALWAYS STOP AT THIS ANGLE

④ IF AN 'EAR' IS NOT ALREADY ON THE BOOM, WELD ONE TO THE EDGE.

① WELD THE SQUARE BLOCK OF STEEL TO THE FRAME AS SHOWN HERE

③ POSITION THE PIVOT ON THE STEEL BLOCK SO THAT THE HOLE IN THE PIVOT LEVER ALIGNS WITH THE HOLE VALVE ROD EAR. THEN WELD IT TO THE PLATE

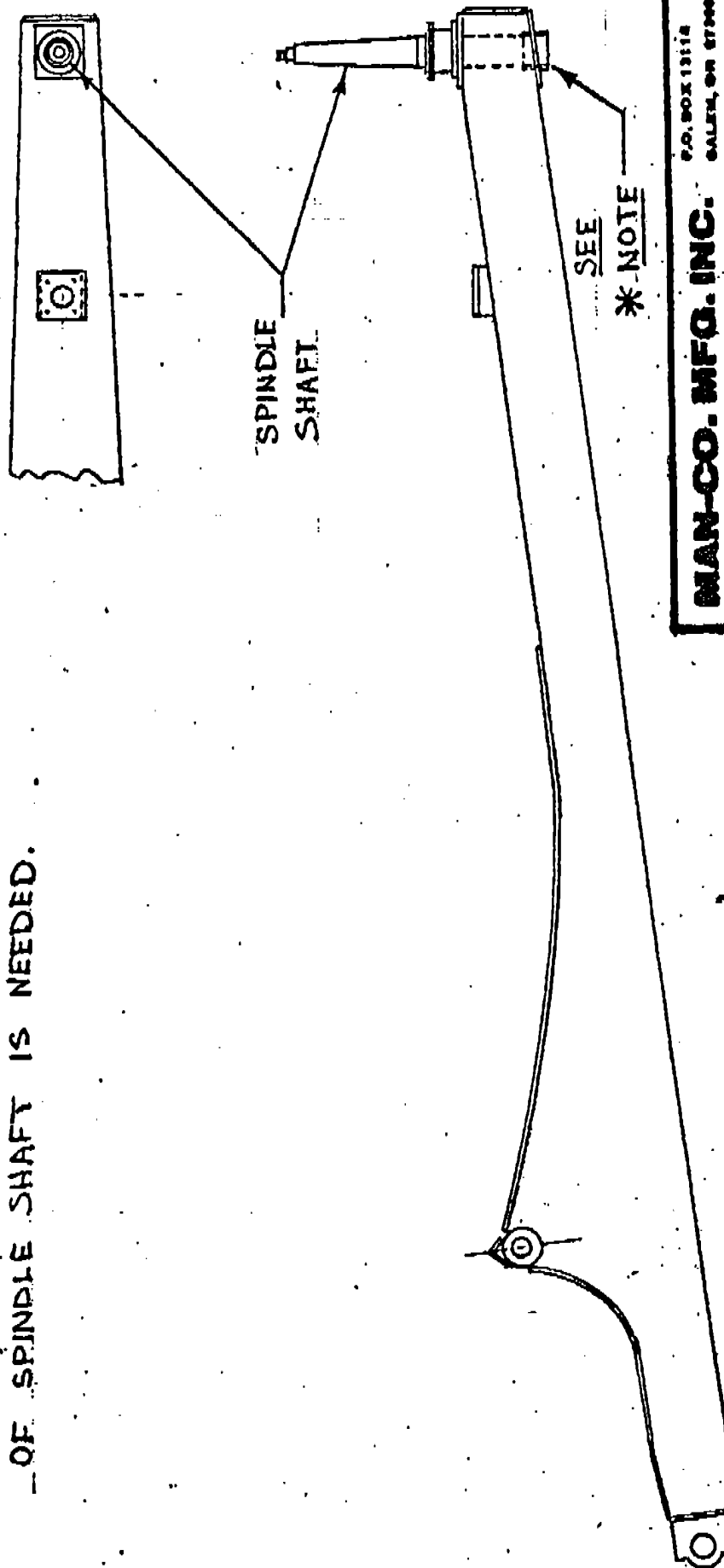
② WELD THIS EAR TO THE VALVE ROD ABOUT 1/2" OFF CENTER



# HYDRAULIC PARATROOPER

MAN-CO MFG. INC. 2475 EWING AVE. SE.	DATE	2-1-74	SCALE	NONE
VALVE SHUT-OFF CABLE	DRAWN BY	SNL		
				No. SK-2174

\* NOTE: IF NO SHRINK COLLAR  
IS VISIBLE AT BOTTOM OF  
BOOM, THEN REPLACEMENT  
OF SPINDLE SHAFT IS NEEDED.



SEE  
\* NOTE

MAN-CO. MFG. INC. P.O. BOX 13114  
SALEM, OR 97300

SCALE: NONE	DATE: 8-31-89	DRAWN BY: SWJ
SPINDLE SHAFT ON BOOM		HYD. PARA.
BU 130-E		

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FRANK HRUBETZ & CO., INC.

RIM DRIVE PARATROOPER

Assembly, operation and  
service instructions with  
parts list.

## INSTRUCTIONS TO ASSEMBLE THE RIM DRIVE PARATROOPER

The Rim Drive Paratrooper is the result of years of design and development to produce a machine of mechanical excellence, maximum portability and esthetic beauty. We believe that all of these objectives have been accomplished and that with proper care and maintenance this ride will take its place as a leader and will give many years of trouble-free and profitable service.

Please refer to the accompanying drawing, titled Assembly Arrangement, Hydraulic Rim Drive Paratrooper.

The first step to assemble the Paratrooper is to select a location. The ride requires a space 55 feet wide by 45 feet deep, and the trailer should be positioned in the center of the space laterally, with the back end of the trailer 16 feet from the Midway front.

Before disconnecting the tractor from the trailer, lower the front dollies (1) until they accept a large percentage of the weight. Solid blocking at least 12 inches square should be placed under each dolly shoe. The trailer should then be checked for level, crosswise. If it proves to be unlevel, the dollies can be lifted and the proper shims inserted to bring the ride to level laterally.

Remove the ticket booth from the rear of the trailer and assemble.

Remove the two loading platforms from the side of the trailer. One of these (2) is used to form a working platform at the rear of the trailer. Two brackets will be found on the sides of the sign which will accept the 2 x 4 on one side of the platform and two pipe standards (3) about six feet long will be found to support the opposite side of the platform.

The board (4) on the front of the trailer is hinged and can be let down to approximate level and supported by two pipe standards (5) of about five feet in length. This provides a working platform at the front of the trailer.

The ten cars must be removed from their hangers and set aside.

The folded wheel assembly (6) should then be unlocked by loosening the four turnbuckle hooks which secure it to the spoke support frames. This will permit the spokes to be snifted off of the support frames after which the frames should be removed. Since two opposite spokes are not hinged it will be necessary to shift them off of the supports in unison with one man working the front and one the rear platform.

The wheel is now ready to be unfolded. Working from the rear platform, lift the inner end of the car support bow (7) from its socket on the side of the right hand spoke and bring it outward until it can be inserted in the end socket of the next spoke. Continue this successively until the circle has been completed. As the support bows are assembled the safety chains should also be assembled by inserting the bolt through the end link of the opposite chain and then through the hole in end of the spoke. No nuts are required on these safety bolts.

Instructions to Assemble the Rim Drive Paratrooper, continued - Page 2

As the support bows are assembled, the support bow braces (8) can also be installed. These are the  $1\frac{1}{2}$ " pipes about three feet long with 1-inch stubs welded at either end. Note that these are left and right hand and connect the fitting at the bend of the bow to the fitting on the top of the spoke. Insert safeties as you go.

The driving rim (9) can now be assembled to the wheel spokes. It will be found stored on the front of the trailer and can be assembled from that position. Pin the rim sections to the 'C' shaped mountings on the spokes using the  $\frac{3}{4}$ " x 7" pins. The sections can be assembled in any order. No further adjustment is needed after the rim sections are in place.

Beginning with the 1970 models the tie rods (10) are no longer used since spokes have been modified to eliminate the need for them. However, for models with tie rods, they can now be swung from their carrying supports to the adjacent spoke where the ends of the rods fit over the pin in the center of the spoke channel. All of the rods should be assembled loosely and then tightened evenly. Do not subject the rods to excessive tension. It is recommended that they all first be snugged up by hand alone and then tightened with a lever not over six inches in length.

The plastic panels (11) can now be installed. You will note that they fit on top of the spokes at the center with the inner and under a socket and the outer ends secured with a safety pin key.

Inflate the friction drive tires (12) to 24 P.S.I. Loosen the two bolts on the underside of the drive wheel support. When tightening the drive unit, position a spoke between the tires (12). Turn the cranks (13) until both tires are just touching the rim. Turn each crank six more turns to get the proper tire contact with the rim. Retighten the support bolts.

The control stand should now be connected. Note that for gasoline engine drives, the stand is equipped with a control lever, a throttle control, ignition switch, start button and brake switch. All of the electric controls are contained in a single cable and connection to the ride is made by a six-way connector plug. The long lever is the hydraulic pump control lever, which is used to start and stop the ride. Through the flexible control cable it should be connected to the hydraulic pump control at (14). This control is the small lever (about 2"), which will be found on the right side of the pump, near the bottom. On Continental engines the control cable attaches directly under the valve control and works vertically. On Allis-Chalmers engines it connects to the 'U' shaped fitting on the same side as the valve control lever and works horizontally. An inspection will show where the throttle controls are connected.

Instructions to Assemble the Rim Drive Paratrooper, continued - Page 3

On electric-powered units the control stand is equipped with the valve-operating control lever, a push button for starting and stopping the motor, and a brake control switch. All electrical connections are made through a single cable with disconnect plug. The Valve Control Cable connects on the right side of the pump to a "U"-shaped fitting and works horizontally.

The ride is now ready to elevate to its operating position. On the right side of the trailer will be found a hydraulic valve (15) which, when opened, operates the two elevating cylinders (16). First, start the engine, or the electric motor, then push the valve lever away from you and the ride should begin to elevate. Elevate the ride until the rear sign is vertical, then unpin the support struts (17) from their carrying position at the rear and swing them forward until they can be attached to the fittings (18) at the rear end of the gooseneck. If you find that you are unable to align these holes, it is because the frame is in a twist. This can be corrected by adjusting the front and rear jacks, to bring the holes into alignment. After the struts are in place the two tie rods should be detached from their carrying position and swung across to form an "X" brace. Insert the pins and tighten the rods snugly.

The next step is to stabilize the back end of the trailer. This is done by lowering the individually-controlled jacks (19) to foundation blocks which should be at least 12 inches square. Take the load off of the tires and at the same time level the frame horizontally. The frame should also be leveled lengthwise. However, it is not necessary to be perfect in this direction. The side stabilizers (20) should now be swung down from their carrying position at the side of the frame. Connect the bottom fitting on the pipe stabilizer to the fitting under the main frame with  $1\frac{1}{2}$ " turnbuckles and tighten snugly with a bar. The ground pads should rest on wood blocks about 12 inches square. Next there is provided two  $7/8$ " turnbuckles (22) which are used to connect from the jack shoes to the bottom of the frame in a lengthwise direction. Similar side stabilizers (20) will be found to attach to the front end of the trailer just behind the gooseneck.

Next assemble and position the loading platform. This consists of three parts: a center board in the shape of a truncated triangle, and two rectangular side boards fitted with adjustable jacks at the outer ends. These two boards attach to the center section with  $\frac{1}{2}$ " hinge pins. The center of the center section should be directly under the center of a car when it is in its lowest position. The ends of the side sections should be about 10 to 12 inches higher than the center section.

The domes (21) may now be assembled to the car hangers with the horseshoe clips provided. Note that the angles inside the domes are drilled on one end. This end must be to the left to fit the shock link.

Next the curved car hangers are attached under the domes and the shock links connected to the dome angles. Be sure the safety loop on top of the hanger is secured with the  $3/8$ " bolt provided.

The cars then can be attached to the hanger and secured with the 1" nut provided. This completes the assembly.



### OPERATION OF RIM DRIVE PARATROOPER

As the name suggests, the final drive of the Rim Drive Paratrooper consists of two pneumatic tires running against the driving ring of the wheel. Thus there is no solid connection between the driving mechanism and the wheel itself. The friction wheels are driven by a hydraulic motor which, in turn, is driven by a variable delivery hydraulic pump directly connected to the engine or electric motor. The principle involved is to circulate oil from the pump through the motor and back. The amount of oil circulated determines the speed of the motor and since the pump can be varied from zero to maximum volume, the speed of the motor can be varied from zero to maximum.

The pump is so constructed that the oil flow may be reversed and thus reverse the motor and the rotation of the ride.

The operation of the ride is simplicity in itself. Release the brake, start the motor or engine; if an engine, accelerate with the hand throttle on the control lever and slowly move the lever toward you. This will cause the ride to rotate counterclockwise, which is the normal direction of operation. Continue to move the lever to its limit at which point the ride will be up to speed. (12.5 R.P.M.) To stop the ride, move the lever away from you and the ride will decelerate, since the hydraulic system acts as its own brake. When the lever has been returned to neutral the ride will stop. To reverse the ride, move the lever away from you and the same sequence will be reversed. When the ride is brought to a stop for loading, the brake switch should be moved to "on". This will lock the wheel and prevent drifting from unbalanced loads. Never start the ride with the brake on or apply the brake when the ride is in motion.

In loading the ride, care should be taken to keep it as nearly balanced as possible. This will prevent unnecessary unbalanced loads and will maintain smooth operation.

Care should be taken by the operator to start and stop the ride gently since rough operation will cause excessive swinging of the cars which is hard on the bearings, sockets, etc., and also is unpleasant to the riders. Our years of experience indicates that more repeat business will be gained by smooth operation than from a rough ride.

The ride cycle we recommend lasts from one to one and one-half minutes, depending on the crowd. First rotate the ride forward (counterclockwise) for about two-thirds of the cycle, then reverse the direction for the balance of the ride. We do not recommend excessively long rides even in slack times.

## MAINTENANCE OF RIM DRIVE PARATROOPER

The Paratrooper has been designed to operate with a minimum of care and maintenance. However, some care is required.

### Hydraulic Drive System

The hydraulic drive system is a sealed system and requires no maintenance. Under normal conditions the oil should never have to be changed and there should be no reason to open the system to the atmosphere. If, however, this becomes necessary and oil must be added, use automatic transmission oil which can be found at any service station.

TYPE "A"

USE ONLY FOR CONTINENTAL PUMP & MOTOR ONLY! FOR CHAC-LYNN PUMP & MOTOR USE 10W-40 MOTOR OIL ONLY!

The system works under a normal pressure of about 1800 pounds per square inch. However, during the braking cycle surges may develop to substantially increase this. If, for any reason, a pressure hose must be replaced, it should be at least 4-braid, with a pressure rating of 5,000 pounds per square inch.

The hydraulic elevating system also should require no attention. It is filled with the same oil and operates at about 2,000 pounds per square inch.

### Main Spindle

The main spindle hub is fitted with a large Timken thrust bearing at the bottom and a single row ball bearing at the top. These should be greased with an alemite or zerk gun about once monthly. Fittings will be found at the bottom and at the top.

### Car Hanger Pins

These pins are drilled and grooved to carry the grease directly to the wearing surface. Grease daily with alemite gun (2 pins per car).

### Elevating Boom Hinge

Use alemite gun once monthly.

### Shock Links

Do not let shock links deteriorate or operate when they become ineffective. Replace when they fail to function.

### Trailer

Use normal highway trailer maintenance procedure.

### Engine

Manufacturer's specifications for maintenance should be followed.

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## FRANK HRUBETZ & CO., INC. STANDARD PARATROOPER RIDE

Assembly, operation and  
service instructions with  
parts list.

FRANK HRUBETZ & CO., INC.

Salem, Oregon

INSTRUCTIONS TO ASSEMBLE THE PARATROOPER PARK MODEL

The first step to assemble the Paratrooper is to lay out the center in the space available. This can be done by referring to the space diagram, which is enclosed with these instructions. Note that the size of the space should not be less than 55 feet in width and 50 feet in depth. Spot the center of the column 30 feet from the front line-up.

Next, back the trailer into the space in such a manner that when the lower section of the column is hinged down it is over the center spot. The mud sills can then be assembled as shown in diagram No. 1. Care should be taken to locate the sill with the extra fitting A opposite the trailer. This provides an anchor for the rope tackle. The mud sill tie rods (P-101) can now be assembled and tightened evenly to keep the sills in line on opposite sides of the column. Next level the lower section of the column by blocking and stake the sills down through the holes provided near the outer end. The gin pole, gin pole tie rod and the rope tackle can now be assembled as shown in Diagram No. 1. To elevate the column pull the trailer out from under the ride. Secure the column by installing the column flange bolts. Then the side sway braces. (P-97)

Next, install the engine mount (P-91) and (P-93), the engine and the V-belts. The V-belts should be adjusted so that they can be moved up and down one inch with two fingers. Now install the control column and connect the clutch control linkage, and the brake cable. Adjustments are provided in these to cause the levers to work within the quadrants.

To provide a working platform, the trailer may now be backed toward the ride in such a position that the wheel spokes are accessible from the trailer bed.

The next step is to assemble the wheel spokes. To accomplish this, attach the small rope tackle set to the central hub extension, as shown in the diagram. Assemble two 96" slimline strips, less globes, to the spoke by engaging the attachment clips. Connect the two with the cord connector and insert safety pin at inner end of spoke. With one man on the column platform, one man on the rope tackle, and one man on the outer end of the spoke, elevate the spoke to position and drive the wheel spoke pin.

The procedure to follow is to install one spoke, then with the engine, rotate it to the uppermost position and install opposite spoke. Proceed in this manner until all spokes are assembled. Next, install inter-spoke angle struts, one flange down, as shown in the diagram. These can be installed successively,

The car support bows should now be assembled to the end of the wheel spokes. First, engage the balls in the spoke sockets with the bow upside down and tighten the screwed ball sockets until they are snug. Assemble the bow braces to the bow fittings, noting that the braces come in right and left.

Now, swing the bow upward until the bow braces can be engaged to the spoke fittings as shown in the diagram. Because the bows are rather heavy, the first bow should be rotated to its uppermost position and the opposite bow then installed. Proceed in this manner until all bows are assembled.

INSTRUCTIONS TO ASSEMBLE THE PARATROOPER PARK MODEL

Note that on one end of one bow, the ball is adjustable. This bow should be assembled last and, if necessary, the ball adjusted to fit the space.

The spoke tie rods can now be assembled successively, as shown with the turn-buckles to the outside. Assemble all rods without tension at first and then tighten evenly, until all are snug. This completes the assembly of the wheel with the exception of the light globes, which should now be installed, after which the working platforms can be removed.

The domes, car hangers, and cars can now be assembled in that order. An examination of these parts will clearly indicate the procedure.

Now place the loading platforms in position. Note that the center section or small section rests over the control column on the ground and directly under the hanging car. The left-hand section of the platform is equipped with a frame and foot lever, which raises and lowers the outer end. The right-hand section is equipped with adjustable jacks. This permits the loading of two cars at a time and the left-hand adjustable platform provides a safety factor of additional foot clearance.

### OPERATION

The operation of the Paratrooper is not complicated, and only a few basic rules should be followed. The control stand consists of a left-hand lever which is the brake, a right-hand lever for the engine clutch, a throttle control at the top of the stand and switches for the ignition and the engine starter.

To start the ride, disengage the engine clutch, by pulling the right-hand lever to you. Release the brake by pulling the left-hand lever to you. Start the engine and apply about one-fourth throttle, then slowly engage the engine clutch by moving the lever forward until it is completely engaged. Bring ride up to speed with the throttle. To stop the ride, disengage the engine clutch and apply the brake.

To operate the ride in service, we recommend that the engine clutch be disengaged for each stop, to prevent excessive heating of the fluid drive.

In using the brake, care should be exercised to slow the ride down evenly and at not too rapid a rate. Slowing the ride too rapidly causes excessive swinging of the cars, which is undesirable to the passengers.

Try to slow the ride at such a rate as not to cause the cars to swing against the rubber bumpers.

In loading, the ride should be as nearly balanced as possible. The same principles apply to the Paratrooper as to a wheel. By keeping the ride as nearly in balance as possible, the operation is smoother and more pleasant to the passengers and, of course, does not subject the structure to heavy strains.

We find that the best operating speed is 12 to 13 RPM for the older age groups, and 9 to 10 RPM for the moppets, and it has been our experience that excessive use of the throttle and the brake to create a wild ride is extremely undesirable for the reason that it frightens too many passengers and reduces the amount of re-rides. The ride should always be accelerated and decelerated slowly and evenly.

### MAINTENANCE

The Paratrooper has been designed to require a minimum of attention and with reasonable care, should give trouble-free service for many years.

**Brake** - The 44-inch diameter brake, which operates directly on the wheel hub, is designed with an excess of surface, to give extra long life. However, in service, the surface may become glazed, causing the brake to squeak. To prevent this, the braking surface should be treated with powdered graphite.

**Bull Gear** - The Bull Gear and pinion should be greased with a heavy grease, such as Marfak No. 3 or any grease that will adhere to the gear teeth. Inspect and grease weekly.

**Main Spindle Hub** - This hub is equipped with two alemite fittings, as shown on the diagram. To grease both upper and lower bearings, use alemite gun weekly.

**Pinion Bearings** - At the top of the column, an alemite fitting and a pipe carries the grease to these bearings. Use alemite gun weekly.

**Gear Case** - In the bottom of the column, the gear case is fitted with a grease filler pipe. The case requires 7 pounds of differential compound and has been filled at the factory. Unless a leak develops, this should require no attention for one year. After this time, it should be changed. Where the ride is moved weekly, the upper bearing of the gear case gets oiled when the column is lowered and requires no further attention. For park service, however, this bearing should be greased weekly with an alemite gun, through a fitting, in the case, just under the lower chain coupler.

**Outboard Bearing** - This is the bearing that supports the 24-inch diameter V-belt pulley. This is a sealed bearing and should be greased lightly once a week. Do not exert excessive pressure with the grease gun, since this will destroy the grease seals. When greasing remove the lower pipe plug and allow the grease to flow through the bearing.

**Car Hanger Pins** - These pins are drilled and grooved to carry the grease directly to the wearing surface. Grease daily with alemite gun.

**Engine** - Manufacturer's specifications for maintenance should be followed.

