

LOSS CONTROL BULLETIN

MFG: MANCO PRODUCTS, INC.
 NAME: ROUND UP - *FOLD*
 TYPE: NON-KIDDIE

EMERGENCY ALERT ON THE RIDE, "ROUND-UP"
 (by Manco, Hrubutz Mfg, or Kilinski Mfg)

In early June 1993, a Round-Up ride experienced a failure of a weld located on the shrink collar on the main center spindle (two drawings are attached for reference). This is the first known occasion for this style of shaft to fail since the manufacturer's Bulletin requiring replacement of an earlier system.

The weld should be visually inspected immediately and periodically thereafter.

In doing so, the power for the ride needs to be turned off, and the brush holder located at the end of the main boom removed. Once this is completed, the weld that ties the (1) shrink collar to the (2) steel plate needs to be cleaned and inspected. See the first of the drawings for areas marked (1) and (2). Should a visual indication be found, the ride needs to be closed and the K&K Insurance Group, Loss Control Division, notified immediately (219-455-5709).

RECEIVED

JUN 10 1993

06/93/59

BUREAU OF
 FAIR RIDES INSPECTION

Presented in the interest of helping K&K clients improve their insurability

1712 Magnavox Way

P.O. Box 2338

K&K Insurance Group, Inc.

Fort Wayne, IN 46801

(219) 455-3000

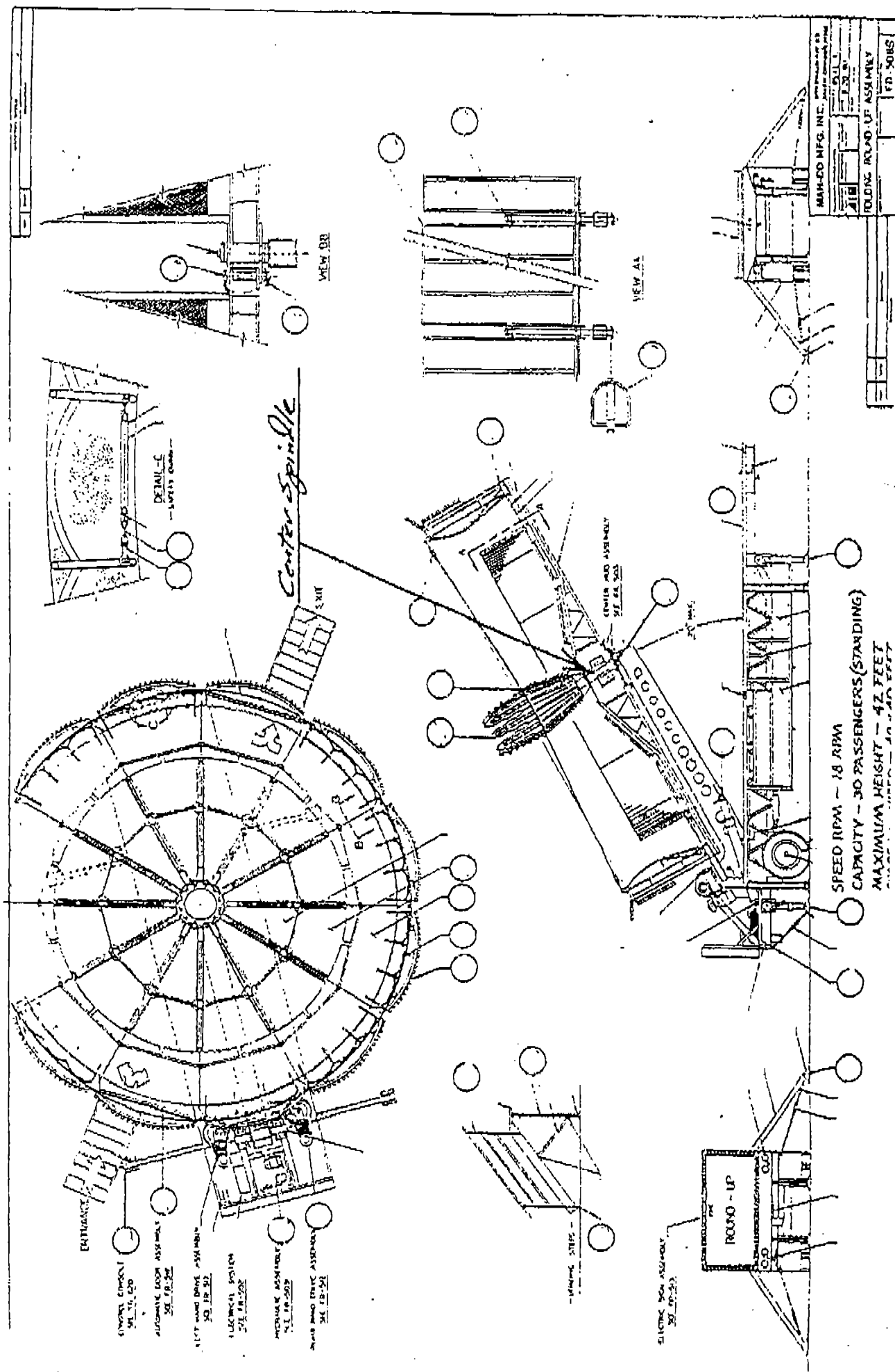
Fax: (219) 455-5866

QS-33 (1/92)

P O 2

GRP

OS. 10. 53 04:57PM K&K & K INSURANCE GRP



Sun., June 6, 1993 Rocky Mountain News 133

Elitch ties accident to bad

Round Up ride was inspected several times recently, but 'nothing's perfect,' official at amusement park says

By Hector Gutierrez

Rocky Mountain News Staff Writer

Elitch Gardens officials said Saturday that last week's screeching halt of the Round Up ride was triggered by a crack in a weld in the ride's center spindle.

Twenty-seven people aboard the ride were injured slightly. The amusement park's insurance carrier, K & K Insurance Group Inc. of Fort Wayne, Ind., said that neither the ride's operator nor maintenance shortcomings were responsible. Insurance company investigators said the crack forced a slight deflection at the axis

and a much larger curve at the ride's perimeter. When the ride made its sweep around, the Round Up made contact with the boom, which caused it to become dislodged.

Eventually, the ride became wedged between the boom, the outer rim of the table, and one of the drive wheels, which kept the platform from descending to a normal position.

Lori Lyons, vice president of administration of Elitch Gardens, said Saturday that safety inspections of the ride were conducted on April 2 and 13. Lyons said Intermountain Testing Co. of Englewood tested the Round Up and found no deficiencies.

In May, representatives of K & K Insurance made a visual inspection of all the rides, including the Round Up, and discovered no problems, Lyons said. The

Round Up had been manufactured for 1990, park officials said. "Nothing's perfect doesn't mean a defect afterward," Lyons said.

Lyons said the amusement park's consultants to conduct the park's safety inspections during the off-season. Elitch J.P. Hinde Enterprises conduct the park's safety procedures.

Other consultants named and surprised test safety conditions also make visual inspections of the rides daily.

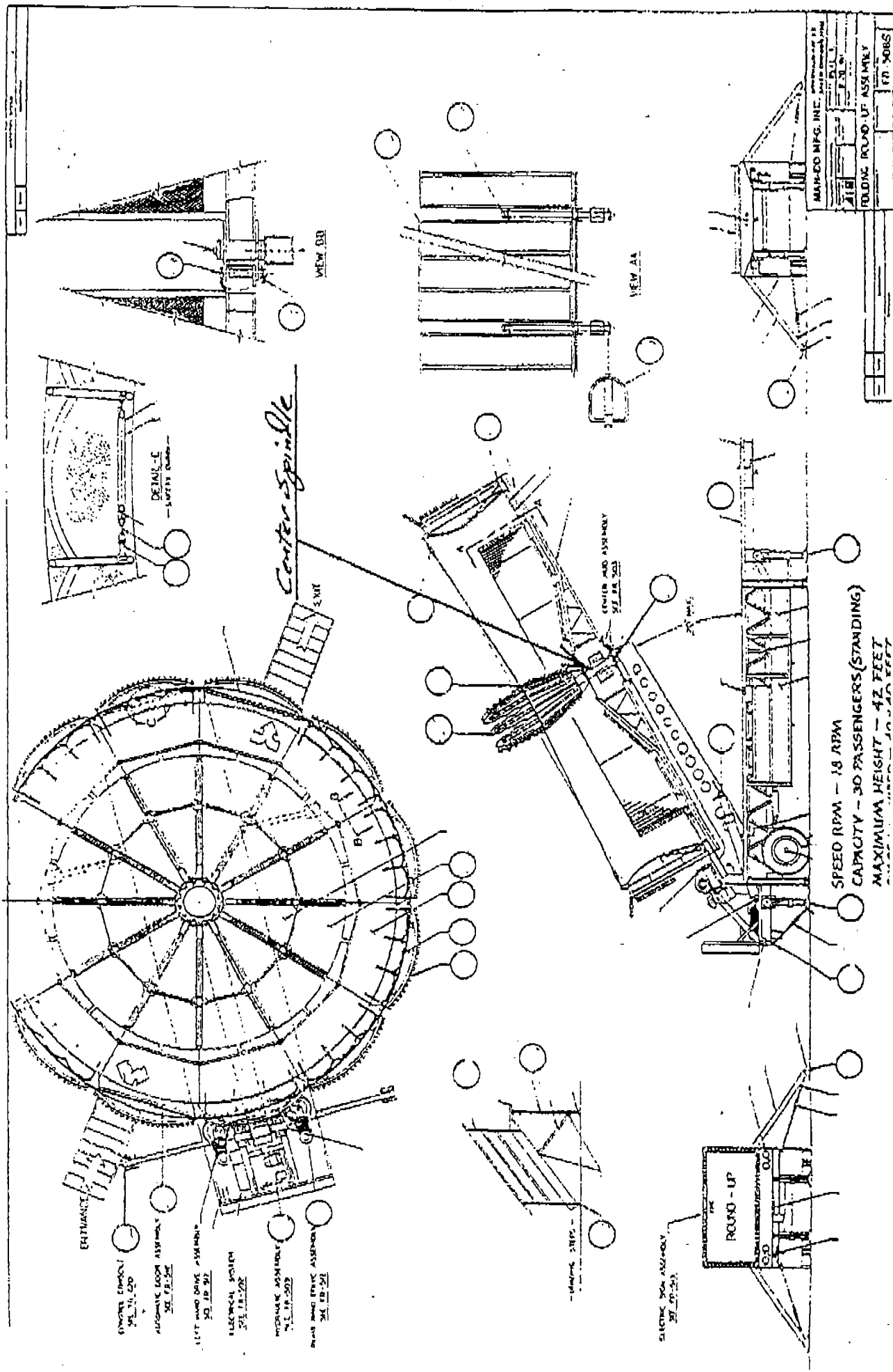
The Round Up ride's operator had another ride, Lyons said.

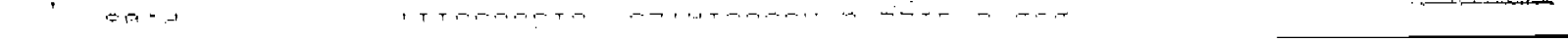


LTR



Duplex mode





Sun., June 6, 1993 Rocky Mountain News

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In May, representatives of K & K Insurance made a visual inspection of all the rides, including the Round Up, and discovered no problems, Lyons said. The

Round Up had been sent back to the manufacturer for a major overhaul in 1990, park officials said.

"Nothing's perfect by any means. That doesn't mean a deficiency cannot arise afterward," Lyons said.

Lyons said the amusement park hires consultants to conduct mechanical inspections during the park's operations and off-season. Elitch also contracts with J.P. Hinde Enterprises of Stuart, Fla., to conduct the park's safety and operational procedures.

Other consultants also make announced and surprise visits to Elitch to test safety conditions, and park employees also make visual inspections of all the rides daily.

The Round Up remains inactive and the ride's operator has been assigned to another ride, Lyons said.

26 hurt at Elitch's after popular ride screeches to halt

Attendant yanks brake on Round Up and riders jerk to a sudden stop; it sounded like gunshots'

By Kris Newcomer/
Rocky Mountain News Staff Writer

Twenty-six people were taken to hospitals after a circular ride at Elitch Gardens screeched to a halt Wednesday and jolted riders, suspending some in air.

"It was a nightmare," said Pat Neel, a parent with eight bus-loads of eighth-graders from Colorado Springs.

"I came away shaking," said Neel, who was on the ground at the base of the Round Up when the accident occurred at the popular park, 4620 W. 38th Ave.

Two of the students' school bus drivers were on the Round Up and were among six people taken by ambulance to St. Anthony Hospital Central.

All six were treated for injuries to their knees, necks and hips, according to the hospital. Two adults suffered whiplash. Another was treated for hyperventilation, and an 11-year-old suffered whiplash and a bump on the head.

By Benny Morron/
Rocky Mountain News Staff Writer

Arvada High School teams will be called the Reds, a vote by students, alumni and neighborhood residents has decided.

But what the name means

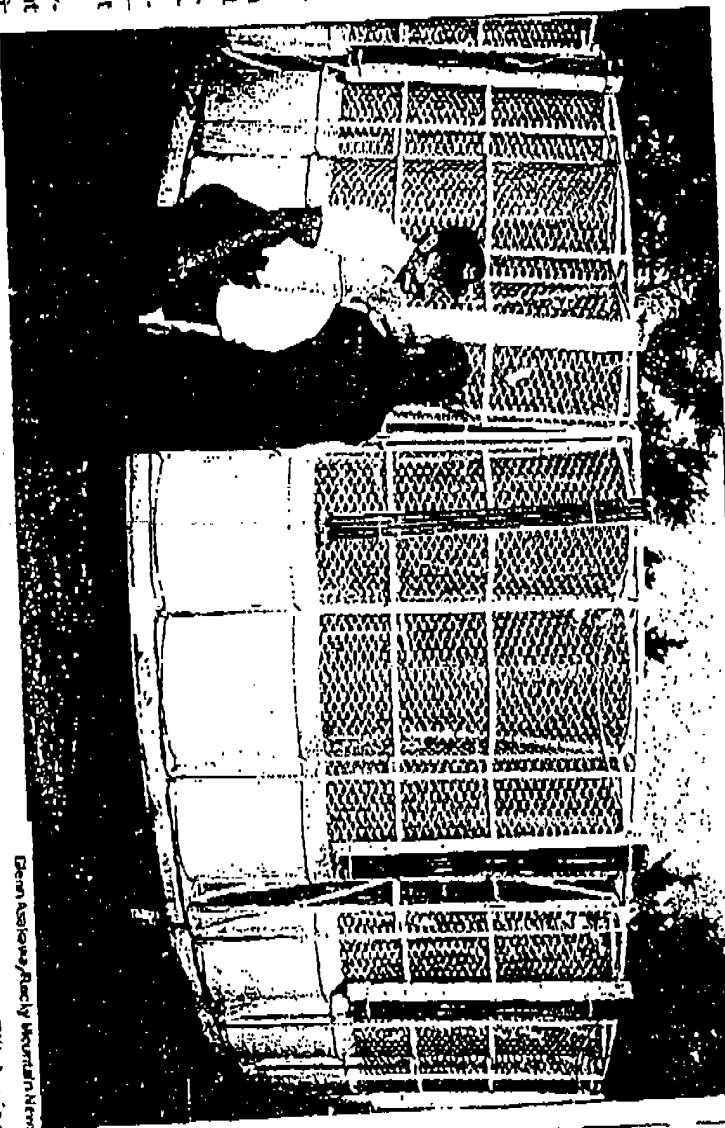
according to the hospital. Two adults suffered whiplash. Another was treated for hyperventilation, and an 11-year-old suffered whiplash and a bump on the head.

Thirteen children were taken to Denver General Hospital, but they were not seriously injured. No one was expected to be admitted, a nursing supervisor said. Seven more were taken to Lutheran Medical Center in Wheat Ridge.

Elitch's spokeswoman Lori Lyons said the cause of the accident would be determined in an investigation already under way Wednesday night.

Witnesses said the Round Up came to a screeching halt after the operator pulled the handle to stop it, as he had done with the previous set of riders because several of them were misbehaving.

The ride was closed and would remain so for the foreseeable future, she said. A preliminary inspection revealed that a horizontal strut became wedged into the bottom of



Don Meineke, Rocky Mountain News

Don Meineke, left, assistant ride foreman for Elitch Gardens, talks to Lori Lyons, Elitch vice president of administration, as he inspects the Round Up ride after it stranded riders.

the ride so that it became stuck in the air, Lyons said. Riders, who must be at least 43 inches tall, stand along the rim of the circular enclosure.

When started by an attendant, the apparatus spins, rises into the air and tips from one side to the other.

"There's a lot of G-force in that thing," said Bob Hughes,

who also was with the eighth-graders from Timberview Middle School in the Springs. Mayra Moore, 14, was among those on the Round Up before it broke down. She was planning to return to it — "but not any more."

She had been surprised how hard she was shaken when the operator brought the ride to a

sudden halt. When the ride broke, "it sounded like gunshots," said Hughes and Moore, who were nearby. "I could see how people were getting slammed around," Neel said.

Correspondent Randy Lyndia contributed to this story.

'Reds' new, if confusing, name for Arvada High teams

Lawrence said she voted for Reds. Glenn Morris, co-director of the American Indian Movement's Colorado chapter, found the new name perplexing.

"They're communists," he said. "What does it mean? If it doesn't mean it's all right with

fort against the Jefferson County Board of Education over the Red-skin controversy, also hailed the choice.

"All we have to do is add 'Kins' onto the end of it," Palma said.

Palma's group, Save Our Arvada Redskins, will begin circulating petitions today.

vote.

Palma said he can make common cause with others who disagree with school district policies, as those who oppose sex education.

Board member Kirk Brady said he doesn't know how seriously take the recall drive. He wishes the

said she was "appalled and disappointed" by the sexist "attraction" at last Friday's benefit tournament for Children's Hospital at the Park Hill Golf

though he promised Lawrence the nude photos — which he defended as "good clean fun" — would not continue. "We have done this tournament for six

business people and professionals" golfed in the event.

The president of Children's Hospital, Lus Blankenship, said he learned of the

Denver Post 10-3-93

27 HURT IN ELITCH RIDE ACCIDENT



An injured man is wheeled off after an accident on the Round-up ride at Elitch Gardens.

Strut on Round-up comes loose

By Bruce Finley
Denver Post Staff Writer

A ride collapsed at Elitch Gardens amusement park last night, sending 27 people to hospitals with minor injuries.

Danver firefighters were dispatched at 7:48 p.m. to rescue 30 stranded passengers on the Round-up ride after one of 16 horizontal metal struts came loose, park officials said. The spinning, tilting ride stopped abruptly.

Nobody was injured seriously, according to paramedics and hospital spokeswomen. Several riders suffered neck injuries, some had bruised knees and elbows, some had cuts requiring

stitches, one man was hyperventilating and an 11-year-old girl had a bump on her head.

Officials at St. Anthony Central, Denver General and Lutheran hospitals said all patients were expected to be released last night.

Most of the injured, like Ron Gentilli, 36, were able to limp away from the ride as park officials closed the area for an investigation.

"It gets you going vertical, extremely fast. It's actually kind of fun. I had closed my eyes. All I could feel was the Gs (gravitational forces)," said Gentilli. "I heard a heavy metal clank. Next thing I know, the ride came

abruptly to a stop. I didn't feel much. I just heard my fiancée screaming."

Paramedics moved Mary Jordan, who drove children from Colorado Springs School District 20 to the park, on a backboard. "It just whipped me when the things started flying," Jordan said, sucking on a cigarette despite the padded white brace around her neck.

A mixture of adults and children boarded the round, circular platform and strapped themselves to the padded edge for a ride that normally lasts three or four minutes, said Lori Lyons,

Please see RIDE on 19A

Arvada



MAN-CO MFG., INC.

2470 Ewald Ave. S.E.
P.O. Box 13114
Salem, Or 97302
(503) 362-2341

INSPECTION REPORT CHECK LIST

30 FT. ROUND UP (FOLDING) DWG. NO. FR-508S DATE

RIDE SERIAL NO. OWNER

1. Check blocking on front and rear outrigger and landing gears.
2. Check leveling.
3. Check condition of outrigger pins and snap keys.
4. See Dwg. No. FR-512S.
5. Inspect condition of drive belts and belt guards.
6. Check electric brakes.
7. Inspect condition of drive wheel tire.
8. Check drive wheel lug bolts.
9. Check taper locks (cracks and missing set screw).
10. Check flange bearing.
11. Inspect condition of drive mount pins and safety keys.
12. Check condition of rim section cages and screen.
13. Check condition of safety chain, snaps.
14. Check condition of rim section head cushions.

30 FOOT ROUND-UP INSPECTION REPORT

PAGE TWO

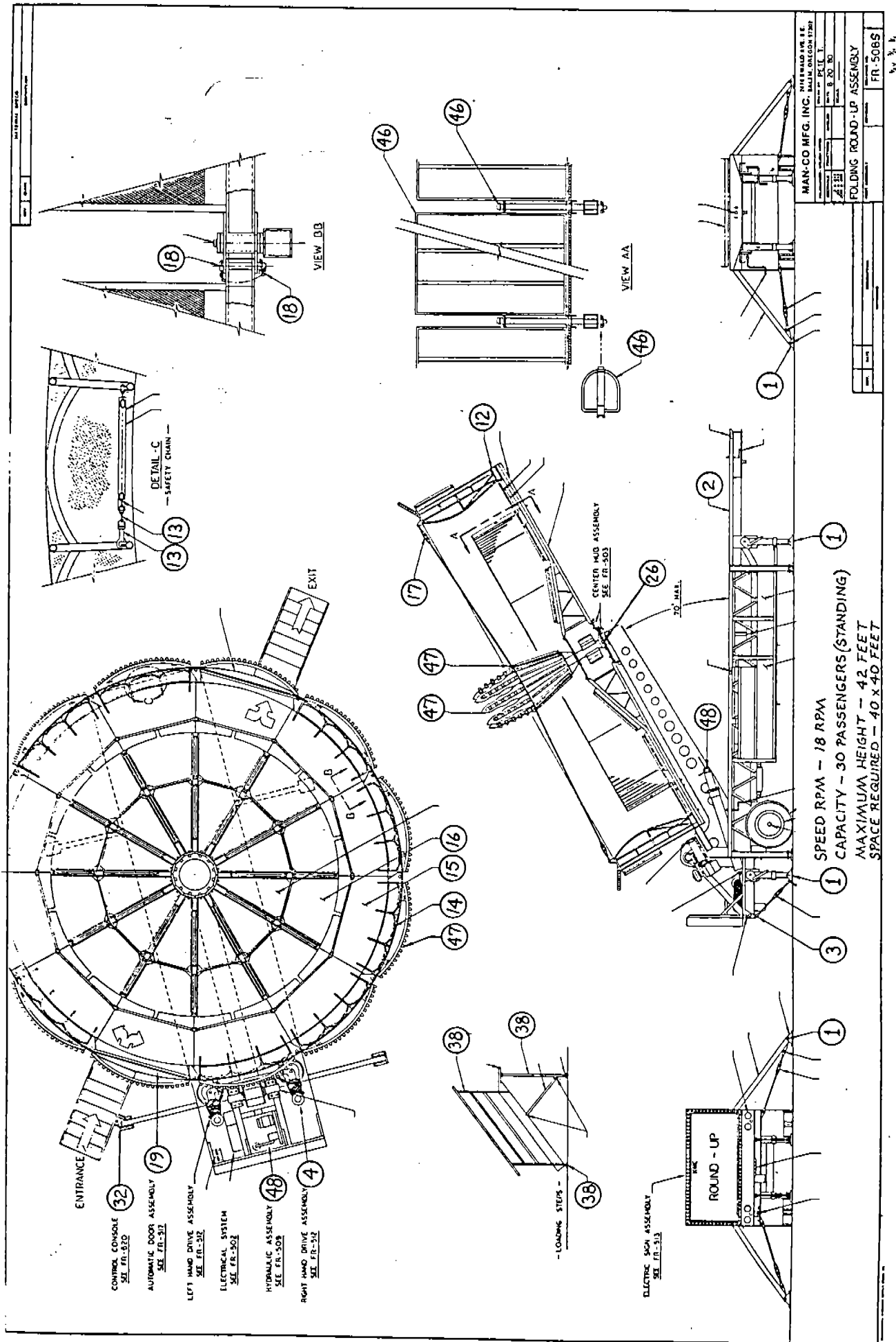
15. Inspect condition of walkway boards.
16. Check condition of center panel and for snap keys.
17. Inspect condition of top cage turnbuckle rods and safety keys.
18. Inspect condition of rim pins and linch pins.
19. See D.W.G. No. FR 517S.
20. Check door tapswitch.
21. Inspect condition and operation of door limit switch - (open and close).
22. Inspect door actuator motor and pins.
23. Check for door actuator motor safety cable.
24. Check all electrical wire on doors and plugs.
25. Inspect condition of wire screen on doors.
26. See D.W.G. No. FR 503S.
27. Inspect condition of hub pin and safety keys.
28. Safety limiting ring. (See Drawing FR 503S)
29. Inspect condition of electrical brushes and light collector ring.
30. Check condition of door limit switches.

31. Check condition of door actuator assembly.
32. See D.W.G. No. FR 520S.
33. Check door switch on control stand.
34. Check stop and start switch for drive motors. (Note: Do not turn switch off while ride is rotating.)
35. Check stop and start switch for hydraulic pump electric motor. (Note: do not turn switch off while ride is rotating.)
36. Check electric brake control.
37. Check elevation control joy stick. (Forward is up, back is down.)
38. Inspect condition of aluminum steps and hand rail, step support pipes.
39. Inspect condition of hydraulic dump valve. See Dwg. FR 509S.
40. Check cylinder flow control valve.
41. Check relief valve.
42. Check condition of emergency dump valve.
43. Check condition of emergency dump valve lever and actuating trigger and spring.
44. Check condition of safety chain. (Note: chain must be connected to main boom.)
45. Inspect condition of belt guard on hydraulic electric motor.

46. Inspect condition of fence post and platform fences, and linch pins.
47. Check all lights.
48. Check for hydraulic oil leaks.
49. Check ride for correct rotation. (Clockwise rotation only.)
50. Check ride for correct rpm's. (13 max.)
51. Inspect condition of all electrical wires, switch box and plugs.
52. Check for correct power hook-up (220 volts single phase for light and 220 volts three phase for electrical motors).
53. Check oil assembly pins for snap keys.
54. Inspect ride and ride operator for overall appearance.
55. Check out ride operator in proper use and function of the ride.

Inspector

REMARKS:





MAN-CO MFG. INC. 2470 LEWALD SE
SALEM OR 97302

2000年12月15日

Figure 1

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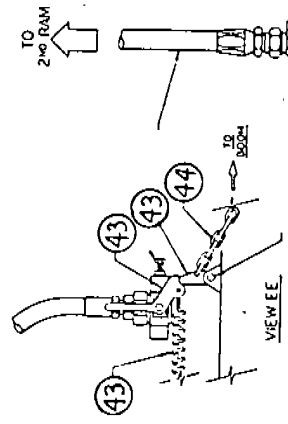
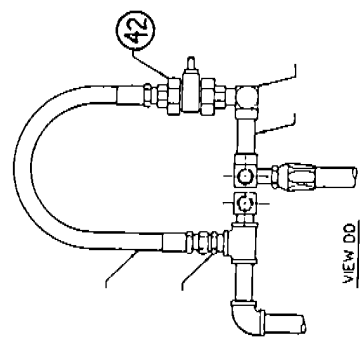
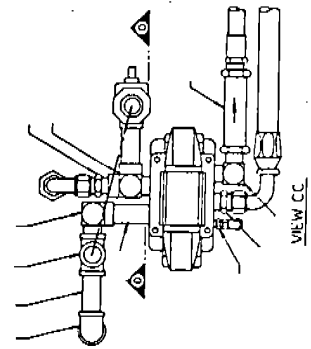
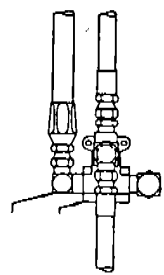
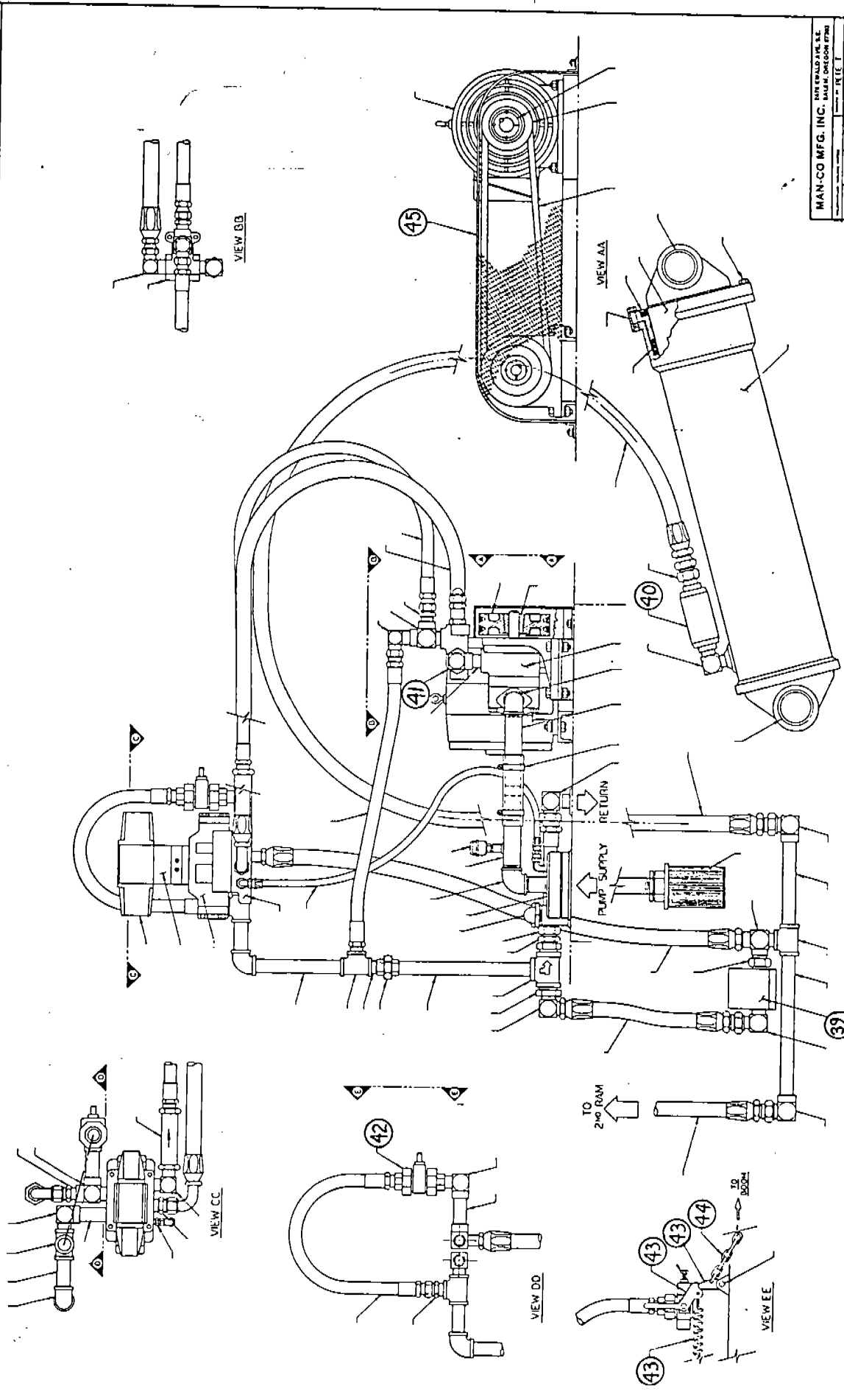
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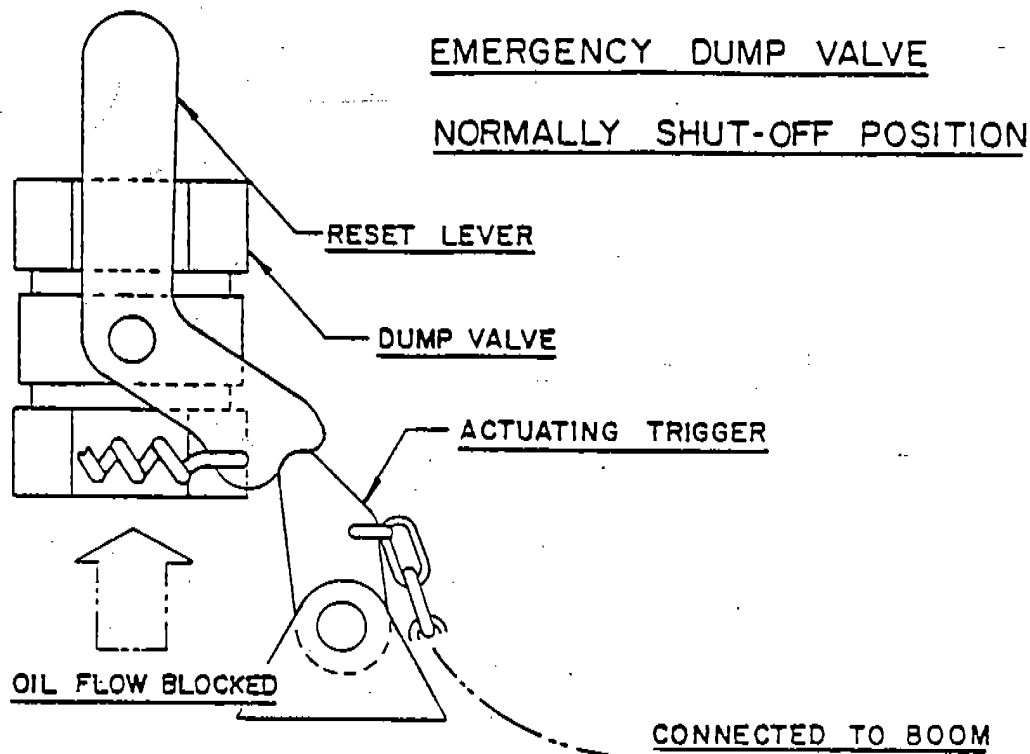
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MAN-CO MFG. INC. - PORTLAND, ORE. 97208



MAN-CO MFG. INC. - PORTLAND, ORE. 97208	
DATE: 1-15-77	BY: J.E.T.
REV: 2-09-80	BY: J.E.T.
HYDRAULIC SYSTEM	
FIG. NO. 1148	REV. B
FR-509 S	



OPERATION

IF THE BOOM SHOULD ELEVATE BEYOND THE FACTORY PRESET MAXIMUM HEIGHT, THE CHAIN CONNECTION WILL RELEASE THE TRIGGER AND THE SPRING WILL OPEN THE DUMP VALVE WHICH WILL ALLOW ALL THE HYDRAULIC OIL TO RETURN TO THE TANK. THE MAIN WHEEL WILL DESCEND AND IT WILL NOT BE POSSIBLE TO ELEVATE IT UNTIL THE DUMP VALVE IS RESET.

OPEN ACTIVATED POSITION

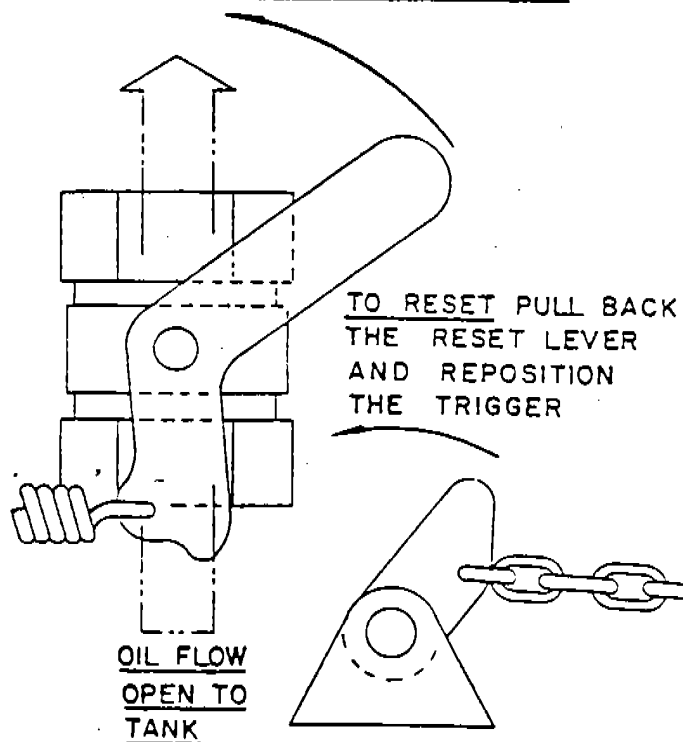
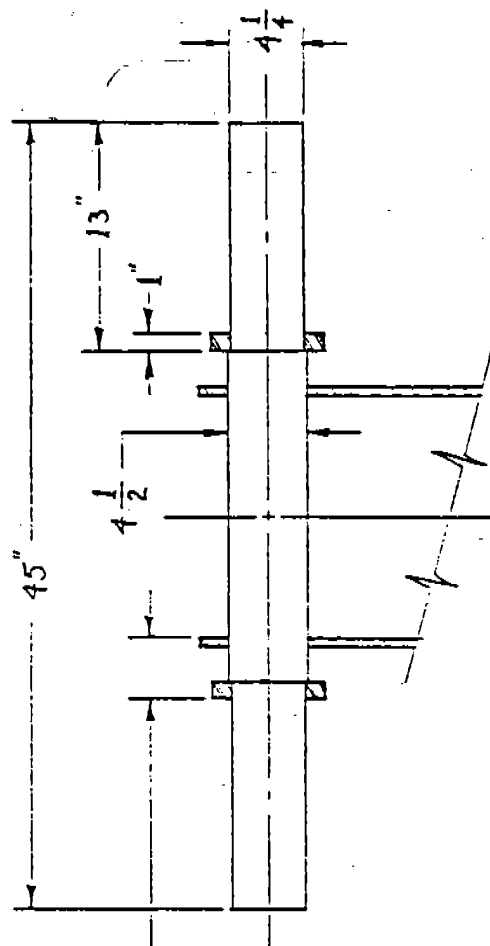
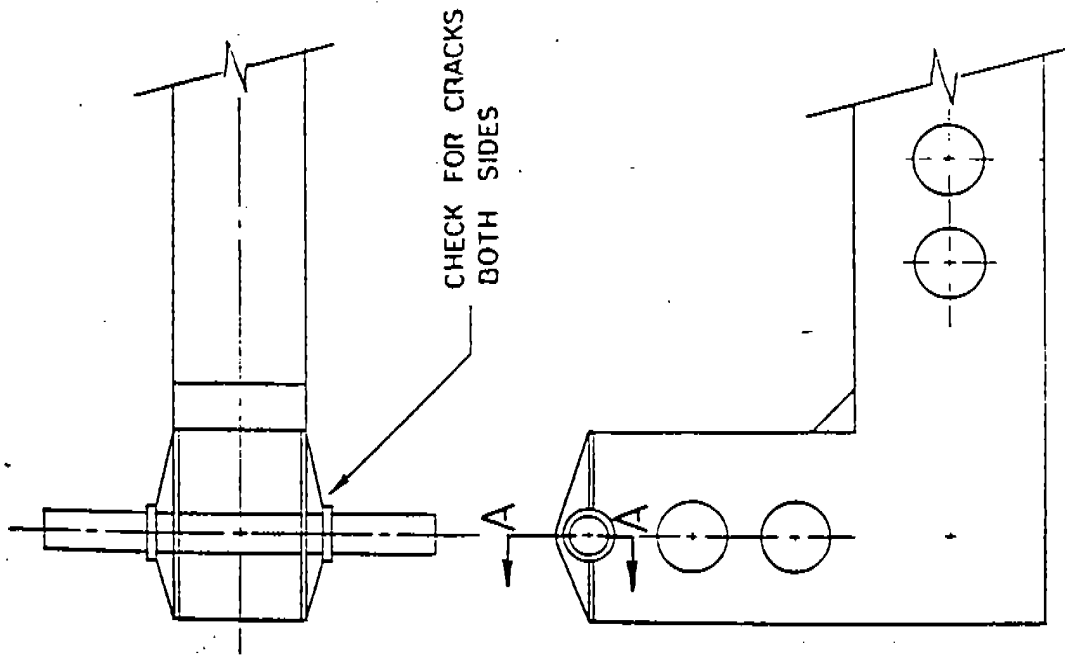


FIGURE 4



VIEW AA

BU-121 SHEET 2 OF 2

DISCLAIMER

This material has been provided to you by Man-Co Manufacturing, Inc. Man-Co does not warrant the accuracy or completeness of this information. The Frank Hrubetz Co., and the Kilinski Manufacturing Co., (KMC) are not predecessors of or related to Man-Co and Man-Co has absolutely no warranty responsibility (either express or implied) for any Hrubetz or KMC products or parts.

INSTRUCTIONS TO ASSEMBLE THE FOLDING ROUND-UP

The Model 30 Folding Round-Up requires a space 40' x 40'. Spot the ride in the center of the space with the back end of the trailer 4 to 5 feet from the Midway line. Lower the front dolly (1) onto blocks which should be at least 12" square. The blocks should be so adjusted that when the weight of the ride is on them the frame is level laterally. With the weight of the ride on the blocks remove the tractor.

Next, lower the rear dolly jacks (2) on similar blocks in such a manner that the ride is level. The rear jacks should take the weight off of the tires. The front turnbuckle braces (3) should then be installed from the jack shoes to the under side of the frame.

The side stabilizers (4) should now be installed. These are the 3-inch pipes with the hinged shoes at the outer end. Use 1½" turnbuckle braces (5) from the outer end of the pipe to the underside of the frame. The hinged shoes should rest on blocking at least 12" square.

Next, install the plastic petals (6) in the slots provided at the top of the center ornament. Plug in lights and tighten set screws. Then remove the loading steps from the sides of the load.

The adjustable spoke rests (7) at the ends of the spokes can now be lowered and the turnbuckle tie rods removed from the inner side of the folded cages. The spokes can now be swung outward and the cages moved into position with the adjacent spoke in such a manner that the two can be connected with the ¾" x 6" pins provided. Connect all cage elements and then install the entrance and exit sections which will be found in the front of the possum belly.

The risers (8) which support the floor boards should now be fitted to the top of the wheel spokes. Note that the two 1" round posts mate with two holes in the level part of the spokes. Install from the top down. Now install the floor boards (9) in such a manner that they rest between the angle clips on the inner side of the rim section. Then the inner guard rail (10) can be positioned. Note that a clip at the lower center of the rail supports the inner side of the floor board. Secure the inner guard rail with the 1½" pipe posts which will pass through the guard rail eyes and the wheel spoke.

The ½" turnbuckle rods (11) should now be installed from the upper sides of the rim sections to the top of the center ornament. With the turnbuckles outward, tighten only with the hand until the sag in the rods has been removed. Do not put extra tension in the rods since too much will bend the outer cages inward.

The outer spoke fluorescent strips (12) can now be mounted in slots provided on the level parts of the spokes and secured by tightening the set screw.

Instructions to Assemble the Folding Round-Up, continued

Next, the plastic panels can be installed. This is done by inserting the inner panel in the slots provided on the sides of the spokes and following with the outer panel which holds the inner panel in place and is secured with a safety pin in the outer slot.

The entrance and exit steps can now be assembled and located. Place the entrance step just to the left of the rear outrigger and in such a position that it provides easy access to the deck of the wheel assembly. In assembling the hand rails to the steps, note that they are in two pieces and slip together in the center. Also note that one rail is fitted with two pipe sockets which are designed to accept the push button and brake control. This rail is positioned on the right side of the entrance step. The exit step is placed opposite the entrance.

Next, assemble the valve control rod which fits over the 5/8" pin on top of the rear angle brace and connects to the valve control lever with the 1/2" rod which will be found on the valve control lever. This control rod can now be operated from the center of the entrance step.

Next, check to see that the 6-volt battery is in place in the socket provided on the left side of the rear deck plate and that the two spring connector clips are connected to the battery terminals. This provides current for the electric brakes.

Next, adjust the friction drive tires to the rim of the wheel by forcing the drive assemblies outward with the 3/4" turnbuckles which will be found between the drive wheel assembly and the main frame. Both tires should be adjusted equally so that about 80% of the tread bears against the rim of the wheel. Not enough pressure here will cause the tire to slip and too much pressure will cause the rim of the 12" wheel to cut the tire.

The ride can now be connected to the power supply. Since we provided both single-phase and three-phase installations according to the customer's requirements, be sure to check the motor nameplate to determine the type of power required. Both single and three-phase installations are all wired for 220 volts at the factory. Connect the power line to the main disconnect switch. Two-wire, 220 volt for single-phase and 3-wire, 220 volt for 3-phase. This one connection connects all motors. The ride is now ready for operation.

INSTRUCTIONS TO OPERATE THE FOLDING ROUND-UP

Press motor start buttons one at a time, one will start the pump motor and the other will start the two rotation drive motors. In three-phase installations, the direction of the rotation may be reversed. Check rotation to be sure that the ride rotates clockwise when looking down on it. If the ride runs opposite, the direction may be reversed by changing any two wires in the disconnect switch.

The valve control lever which elevates the ride can now be operated. Push the lever toward the center of the ride and the ride will elevate. Hold the lever in the extreme inward position until the automatic stop closes the valve. The automatic stop can be felt engaging on the hand lever, and you should allow this pressure to ease the handle into neutral position. The ride is now elevated to its maximum position and will stay there until the hand lever is moved past neutral to the outward position, which allows the ride to come down. A little practice will show that the valve can be eased into neutral position to prevent the motion from sudden stops.

The rotation is stopped by pressing the motor stop button and moving the electric brake control lever inward toward the ride. You will note that this control is rather sensitive and too much braking will cause the tires to slide. However, after a little practice you will learn to stop the ride smoothly and without sliding.

OPERATION OF RIDE

In operating the ride with passenger loads, it is recommended that the following procedure be followed.

Check passengers to see that all are in the cells with the safety chains fastened and that the ride is reasonably balanced. Do not unbalance the ride by more than 4 passengers. Start pump motor. Start rotation and allow wheel to come up to full speed (about 8 seconds). Move valve control to elevating position and hold until ride reaches maximum height. Allow ride to remain at maximum height for 4 to 6 revolutions, depending on size of crowd. Move valve control to down position and hold, allowing ride to come down. When ride is two-thirds down, press stop button on rotation motors. Ease the ride to full down position by slowly closing valve. Apply brake and bring ride to stop with exit and entrances in line with steps.

INSTRUCTIONS TO OPERATE FOLDING ROUND-UP

DO'S and DON'TS

DO

Always check passenger and safety chains before starting.
Be sure load is well-balanced.
Allow rotation to come to full speed before elevating.
Cut rotation motors when ride is two-thirds down.
Go easy on the brakes.
Ease the control valve on and off.
Always be alert.

DO NOT

Never raise loaded ride before it is up to speed.
Never stop rotation with ride in extreme up position.
Never close valve suddenly.
Never leave control stand while ride is running.
Never unbalance ride.

MAINTENANCE

Grease with zerk gun once a week:

Main spindlehub (top and bottom)
Both ends of hydraulic rams
Main rocker shaft bearings
Countershaft bearings on drive motor assemblies

Once per year:

Check drive wheel bearings
Check motor bearings

Drive wheel tire pressure - 30 pounds

Hydraulic oil - #9 ice machine oil for #10 SAE motor oil

TIPS

If ride fails to elevate - Check tension on V-belts, motor to pump. Check oil level (2" from top of tank). Check pump.

If motors fail to start, press reset buttons on magnetic switches, check main switch fuses, check power supply.

If ride fails to come up to speed in 10 seconds - check V-belt tension (two sets), check wheel pressure against rim of wheel.

If howl develops in hydraulic system - Cause: Increasing oil temperature causes increased packing pressure. Remedy - loosen each of three packing gland nuts equally one-half turn - when oil cools down reset packing gland nuts.

If in doubt, call us, and we will do everything possible to help you.



MAN-CO MFG., INC.

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

BULLETIN: BU-134 MC

DATE: 8/30/88

ROUND-UP/PARATROOPER MAIN SPINDLE SHAFT SAFETY LIMITING RING

ATTENTION ALL ROUND-UP AND PARATROOPER OWNERS

A Round-Up manufactured by Frank Hrubetz & Co., Inc. has experienced a failure in the upper bearing in place on the main spindle. When this happened, support at the top of the spindle was lost making it possible for the rotating platform to tilt and contact the main boom.

This condition makes it possible for the pins and sweeps to hit the boom and bring the rotating platform to a sudden stop.

Since the same shaft and hub assemblies are used in both the Round-Up and the Paratrooper, we feel that the problem exists in both types of rides.

We feel it is necessary for you to take the following preventive measures immediately: (See enclosed drawings RD-35R and FR-503S.)

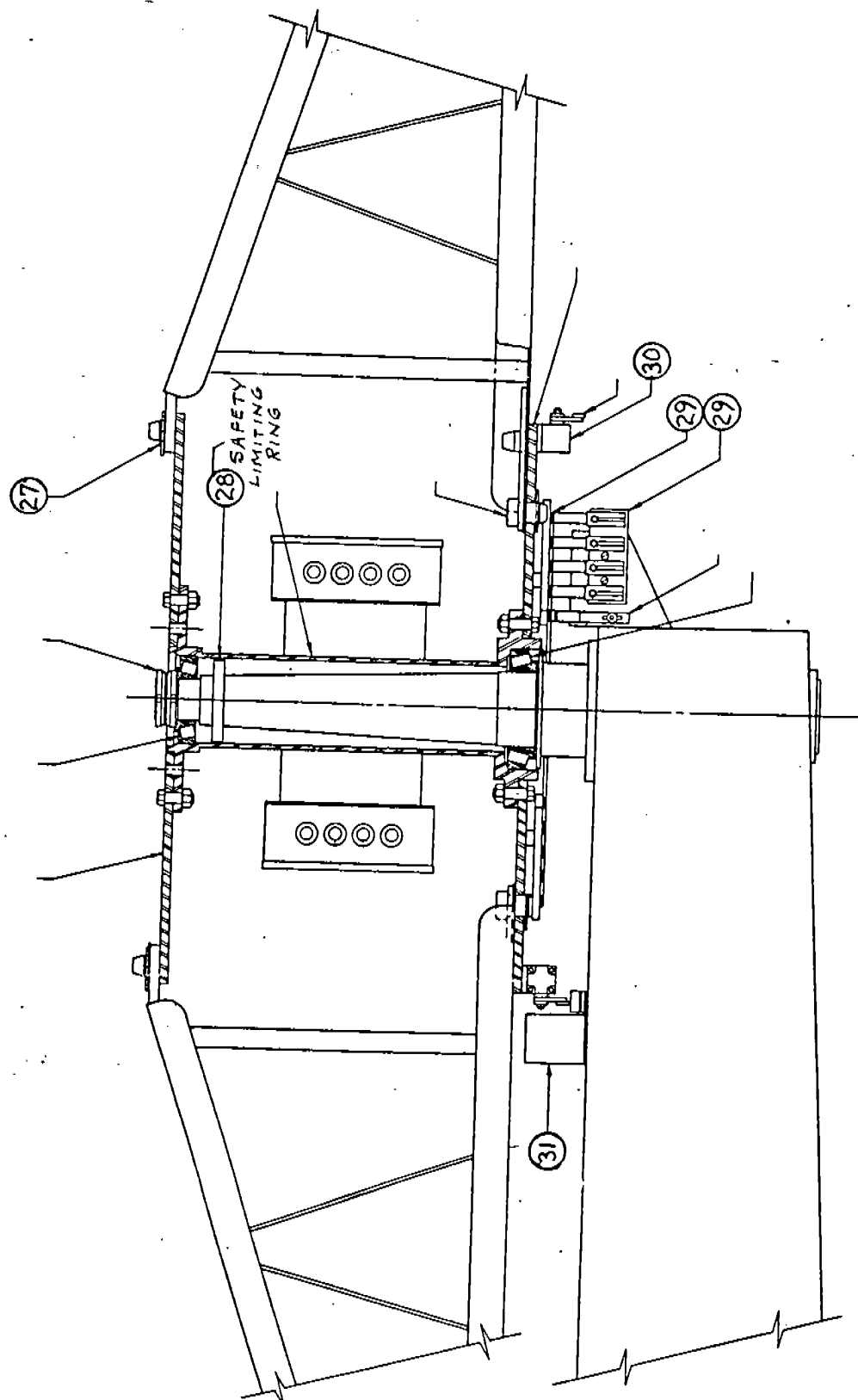
1. Remove the center ornament and inspect the weld on the hub (shown in drawings RD-35R and FR-503S) for cracks. If there are cracks, ship the hub to Man-Co Mfg.. We will repair, using the design presently being used.
2. Remove the top bearing and visually inspect the bearing and make sure there is a safety limiting ring in place. If there is a limiting ring on your ride, it will be plainly visible on the upper portion of your main spindle shaft. If it is not present, we highly recommend that you add this part immediately. (Part #STD 353)

Although Man-Co is not responsible for the manufacturing of these rides, we are the exclusive manufacturer of replacement parts. We feel that it is in the best safety and interest of your customers that this preventive measure is adhered to.

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

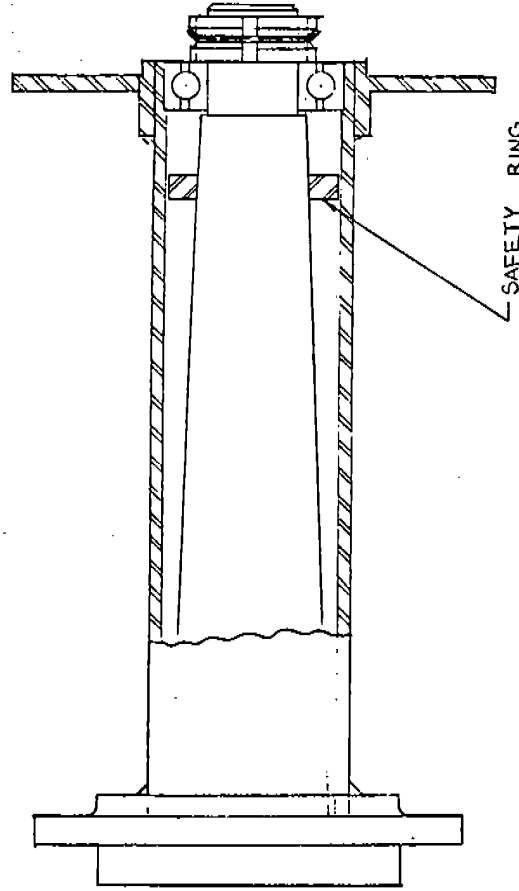
Your thrill is ours - - We build excitement!

MATERIAL SPEC.



MAN-CO MFG. INC. 8170 JFWALD AVE. S.E. SALEM, OREGON 97302	
DESIGNED BY: PETE T.	DATE: 8-26-80
CHECKED BY: [Signature]	DATE: [Blank]
CENTER HUB ASSEMBLY	
REVISED AND REDRAWN	FR-503 S C

REVISED AND REDRAWN	DATE: [Blank]
BY: [Blank]	DATE: [Blank]



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. 8175 EVELAND AVE. S.E.
BAINBRIDGE, OREGON 97106

SAFETY RING INSTALLATION

DATE 2-17-72

DRAWN BY SME

SCALE

NO. PD-35-R



MAN-CO MFG., INC.

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

BULLETIN: BU-136 MC

NOTICE: THIS BULLETIN SUPERCEDES BU-131 MC DATED 1/5/82

DATE: 9/8/88

ROUND-UP/PARATROOPER HUB INSPECTION

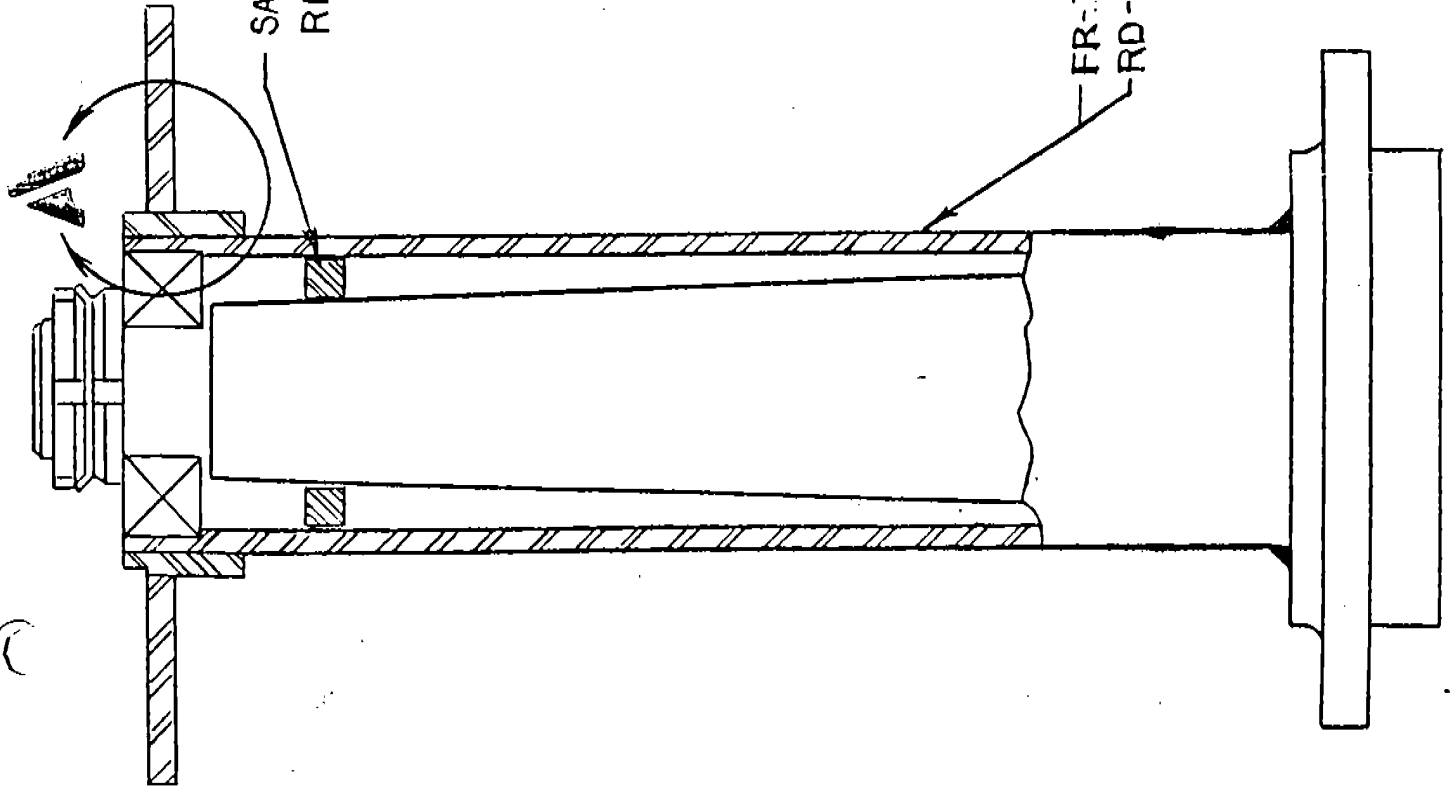
The main spindle shaft hub housing on the Round-Up and Paratrooper amusement rides that were manufactured by Frank Hrubetz Co., and Kilinski Mfg. Co. (KMC) have shown some sign of fatigue cracks in the weld areas of the hub assemblies.

We at Man-Co feel that this is something that should be inspected on a more regular basis and so we are recommending that the welds shown in the attached drawing (BU-136-MC) be inspected annually. If any sign of stress or cracks are noted, then we recommend that the entire hub assembly be replaced for the safety of the ride owners and customers.

Although Man-Co Mfg., Inc. is not responsible for the manufacturing of Hrubetz or KMC rides, we are the exclusive manufacturer of replacement parts. We feel that it is in the best safety of your customers that this preventive inspection is adhered to.

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

Your thrill is ours - - We build excitement!



DETAIL

NOTE:

IF CRACK IS
NOTED IN THIS
AREA, CENTER HUB
SHOULD BE REPLACED

FR-713 CENTER HUB (REF)-ROUND-UP
RD-35 CENTER HUB - PARATROOPER

MAN-00. 0000-0000

P.O. BOX 13114
SALE, DE 0720

DRAWN BY: SWJ

DATE: 9-1-88

SCALE: NONE

CENTER HUB - INSPECTION OF WELDS
ROUND-UPS & PARATROOPERS

BO-136

MAN-CO MANUFACTURING, INC.

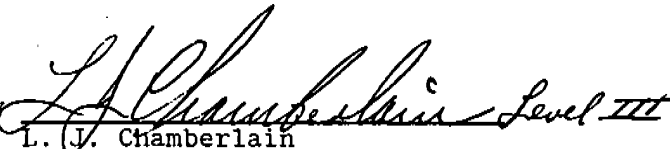
QUALITY CONTROL PROCEDURE

ULTRASONIC INSPECTION OF STEEL


MAIN SPINDLE SHAFTS

QC-UI-I-Rev. 3
September 29, 1988

Initiated by


L. J. Chamberlain
WESTPRO LABORATORY

Approved by


J. Timothy Lake
President
MAN-CO MANUFACTURING, INC.

ULTRASONIC INSPECTION OF STEEL

MAIN SPINDLE SHAFTS

1. METHOD

1.1 Scope

This procedure establishes the minimum requirements for the pulse echo ultrasonic inspection of steel main spindle shafts by the contact longitudinal beam techniques for the detection of inservice stress cracking.

1.2 Principle

High frequency sound waves are induced into the material under test with the reflected sound wave forms being displayed on a cathode-ray tube. The soundness of the material is determined by analyzing the reflection patterns on the cathode ray tube.

2. APPARATUS

2.1 Electronic Apparatus

An ultrasonic, pulsed, reflection type of instrument shall be used for this inspection. The system shall have a range capability for testing at frequencies of 1 to 5 MHz.

2.2 Search Units

Contact type search units shall be used for the inspection. Search units shall be utilized at their rated frequencies. The maximum search unit dimension shall not exceed 1 inch, with a minimum frequency of 2.25 MHz.

2.3 Couplant

A couplant, liquid or paste, having sufficient wetting properties to transmit sound waves from the transducer to the test surface such as, oil, glycerin, water, grease, or equivalent, shall be used.

2.4 Reference Standards

Reference standards made from acoustically similar material shall be used to establish a suitable base for determining the adjustment of the instrument used.

3.4 Scanning Surfaces

- 3.4.1 Longitudinal beam examination shall be performed on the test material as described in Figure 2.
- 3.4.2 The instrument calibration shall be checked using a reference standard prior to and after each piece is tested or at intervals not exceeding 1 hour.

3.5 Interpretation of Results

Test part is unacceptable if longitudinal examination results show one or more reflections greater in amplitude than the indication from the calibration defect or reference line and are not associated with the geometric configuration.

3.6 Test Report

Test records shall be maintained by the testing organization for a minimum of three years following completion of order. The following data shall be recorded on the test report.

- 3.6.1 Specific written test procedure and revision utilized for performing the test.
- 3.6.2 Transducer description, instrument and ultrasonic frequency employed.
- 3.6.3 Reference standard description.
- 3.6.4 Location and identification of rejectable indication in material. (Sketch to be included)
- 3.6.5. Customer identification and location of material and equipment serial number.
- 3.6.6 Name and location of testing organization.
- 3.6.7 Date of Test
- 3.6.8 Signature of operator and level of certification.
- 3.6.9 Signature of interpreter and level of certification.

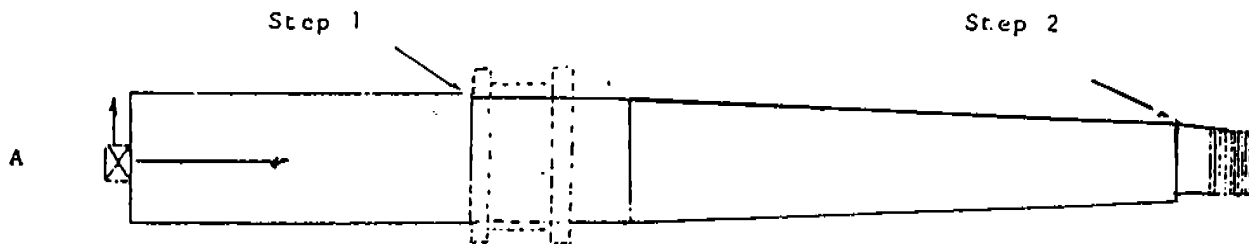


Figure 1

Calibration on test piece for Longitudinal Beam examination

Notes for Figure 1:

1. A 3/4" Diameter - 5 MHz Transducer is recommended.
2. The search unit shall be placed on center of shaft area (A) and adjust second back reflection to 100%.
3. Move transducer towards edge of shaft (A)
 - 3.1 Step 1 should appear to be approximately 25%.
 - 3.2 If not, scan the perimeter and adjust to the average.

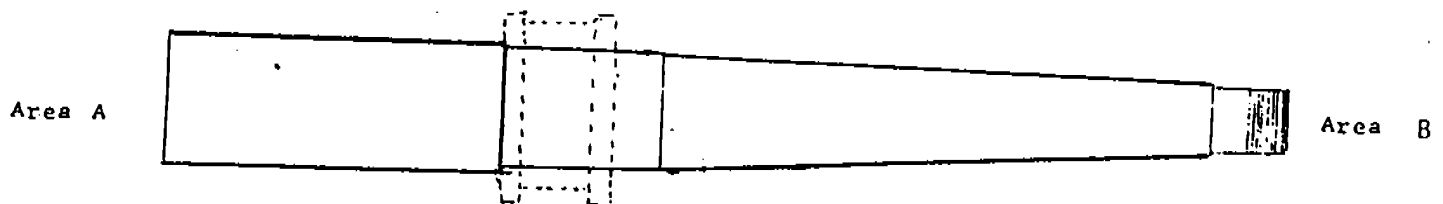
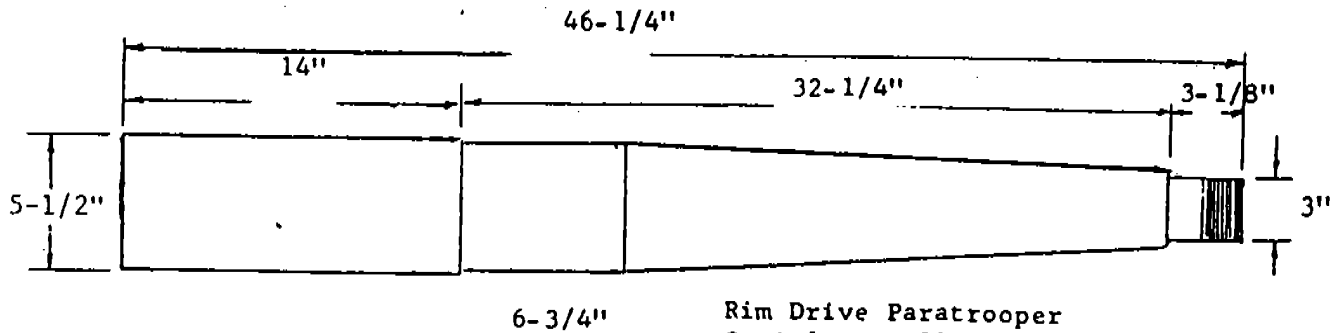


Figure 2

1. Longitudinal Beam Examination

- A. After calibration per Figure 1, areas (A) and (B) shall be scanned 100%.

Useful Information :Basic Shaft Configuration

Rim Drive Paratrooper
Serial No. 300 & on.

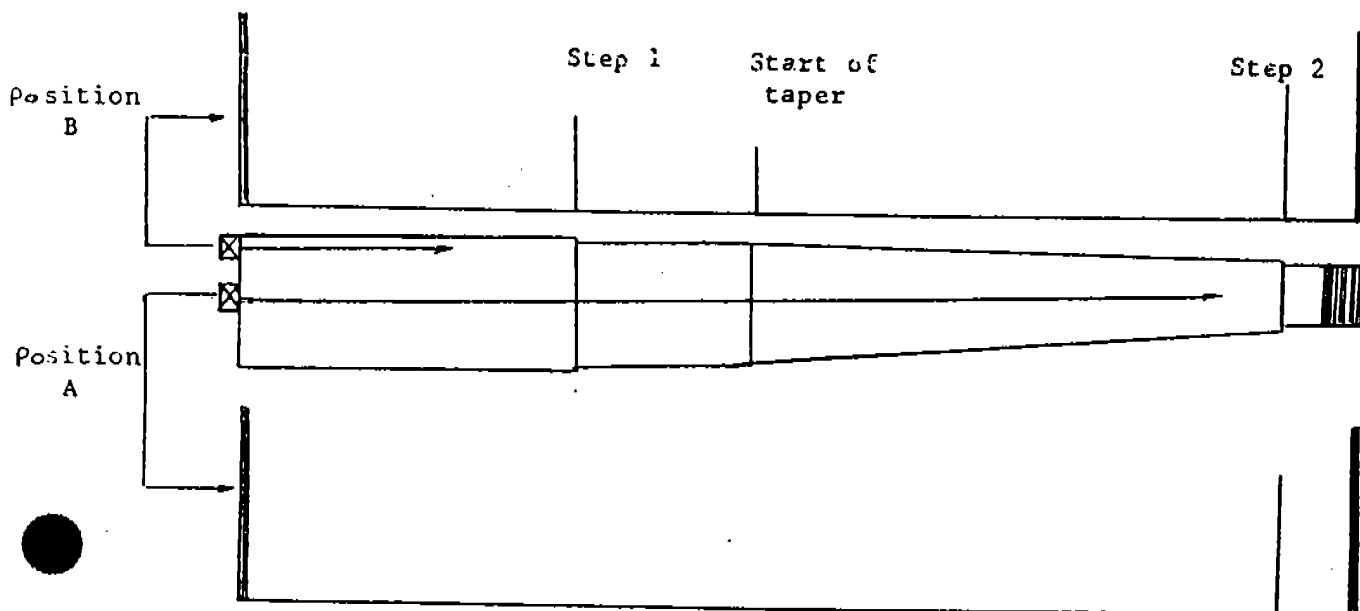
I. Material: Carralloy Steel
Longitudinal Velocity: $2.31'' \text{ per second} \times 10^5$

II. Transducer Beam Divergence in Steel:

1" Dia. Transducer @ 1	MHZ = 30° or 3" per ft.
1" Dia. " @ 2.25	MHZ = 14° or 1-1/2" per ft.
1" Dia. " @ 5.0	MHZ = 6° or 5/8" per ft.
.750" Dia. " @ 1	MHZ = 45° or 4-1/2" per ft.
.750" Dia. " @ 2.25	MHZ = 20° or 2-1/8" per ft.
.750" Dia. " @ 5.0	MHZ = 9° or 7/8" per ft.

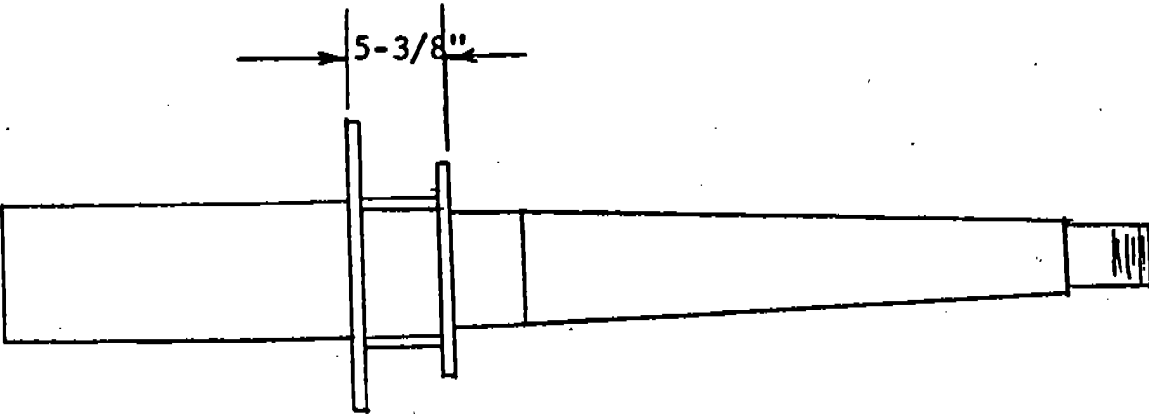
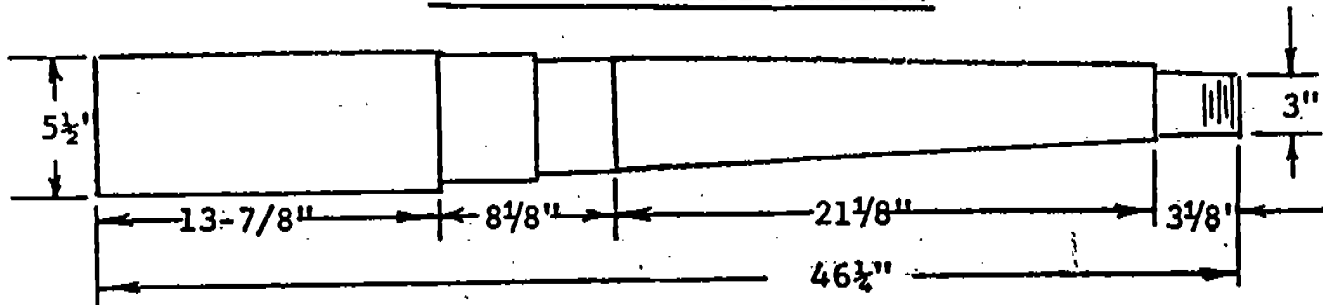
Front Face

Back
Reflection

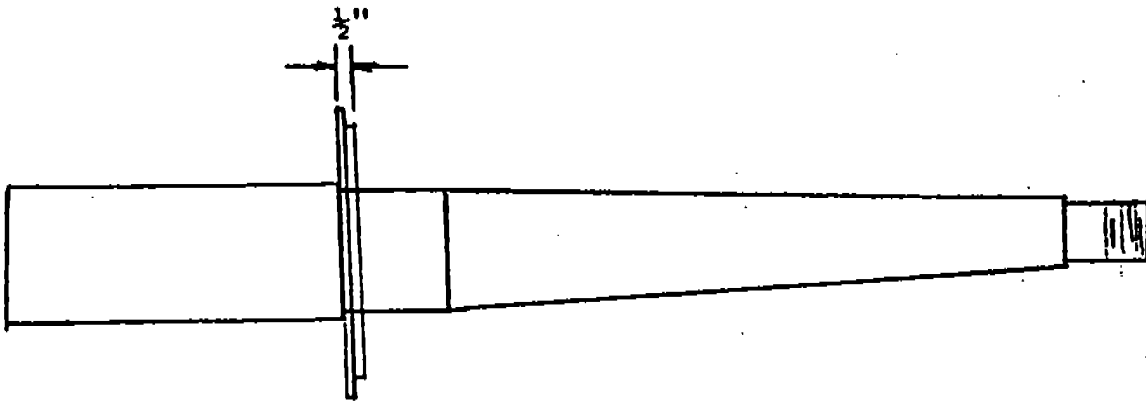
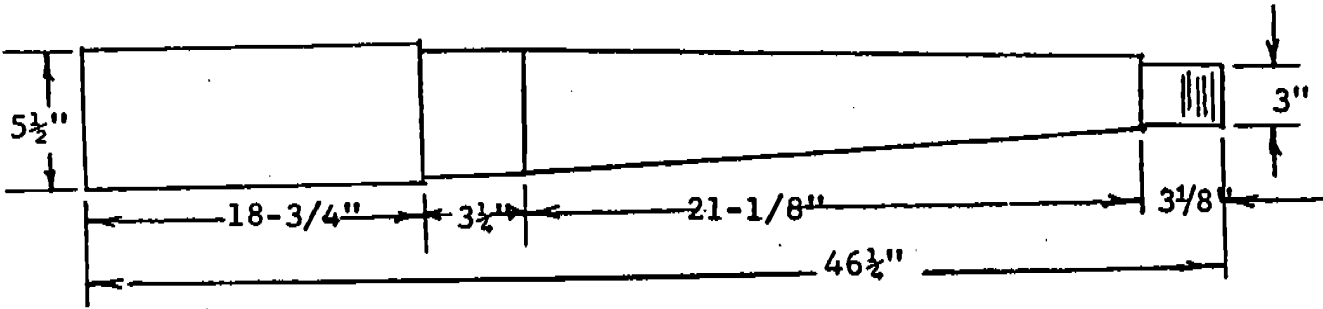


A - Scan Presentation

BASIC SHAFT CONFIGURATIONS

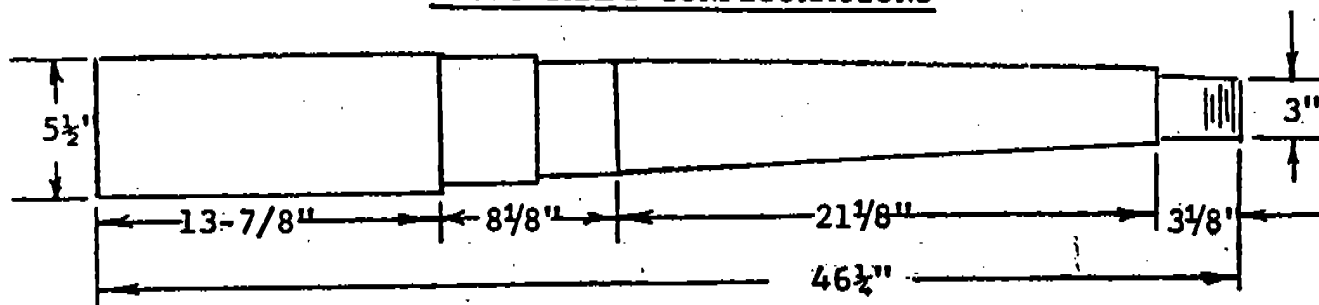


STANDARD PARATROOPERS
SERIAL NO. 500 and on

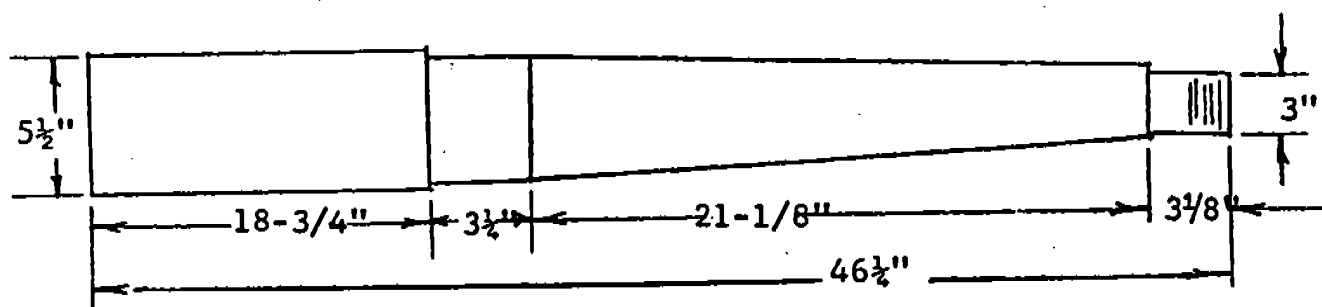


SPITFIRE AND
STANDARD PARATROOPERS
PRIOR TO 1960

BASIC SHAFT CONFIGURATIONS

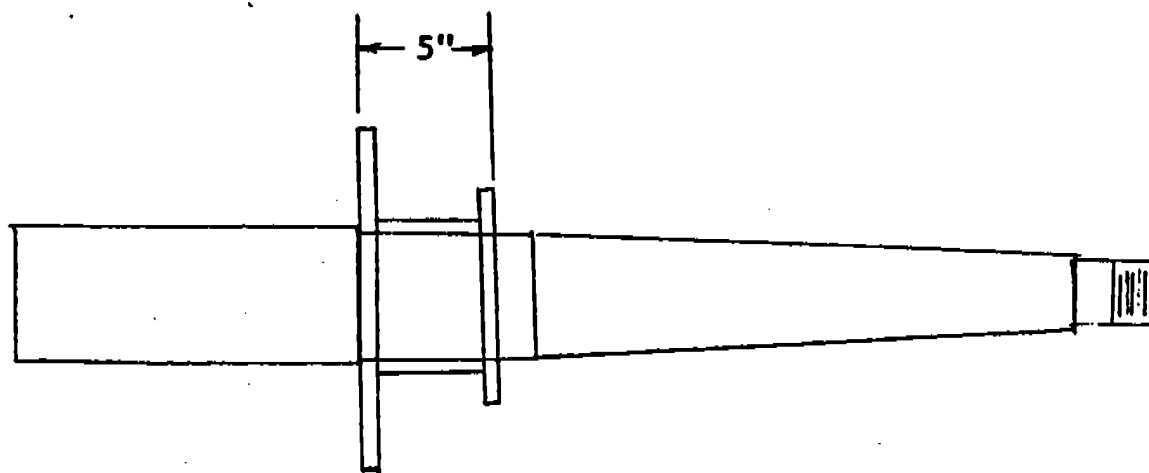
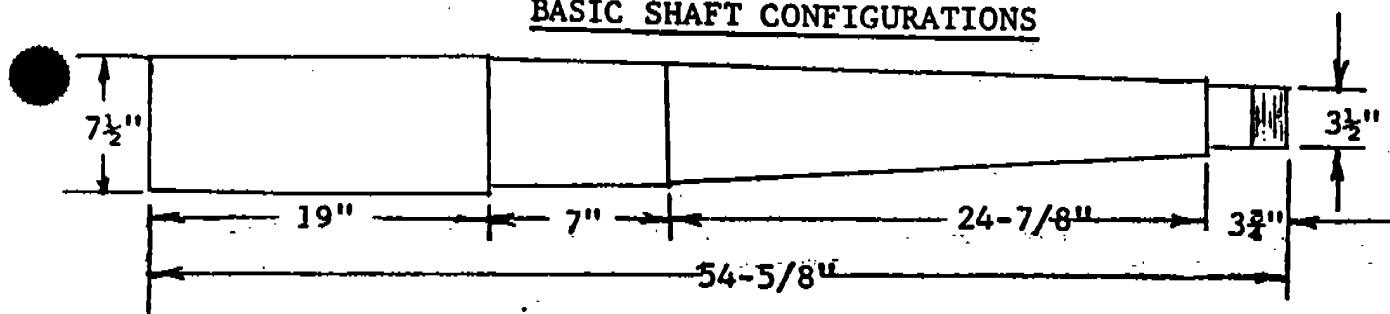


STANDARD PARATROOPERS
SERIAL NO. 500 and on

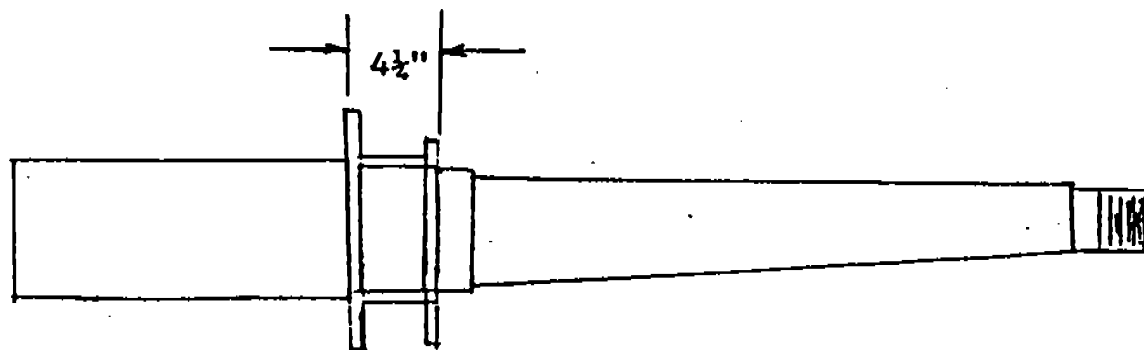
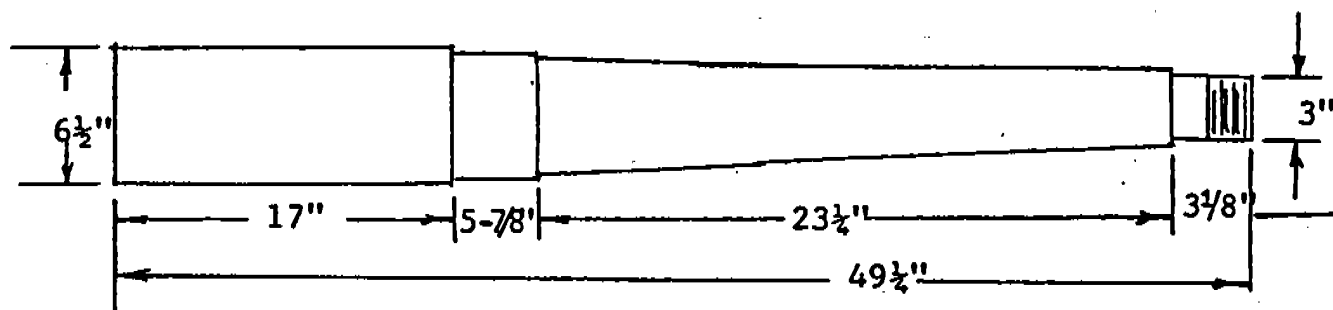


SPITFIRE AND
STANDARD PARATROOPERS
PRIOR TO 1960

BASIC SHAFT CONFIGURATIONS



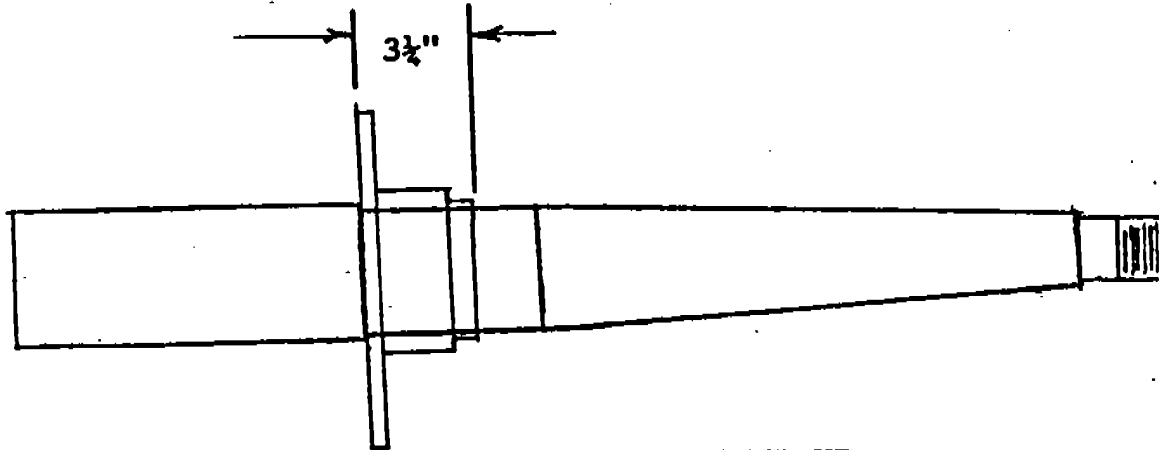
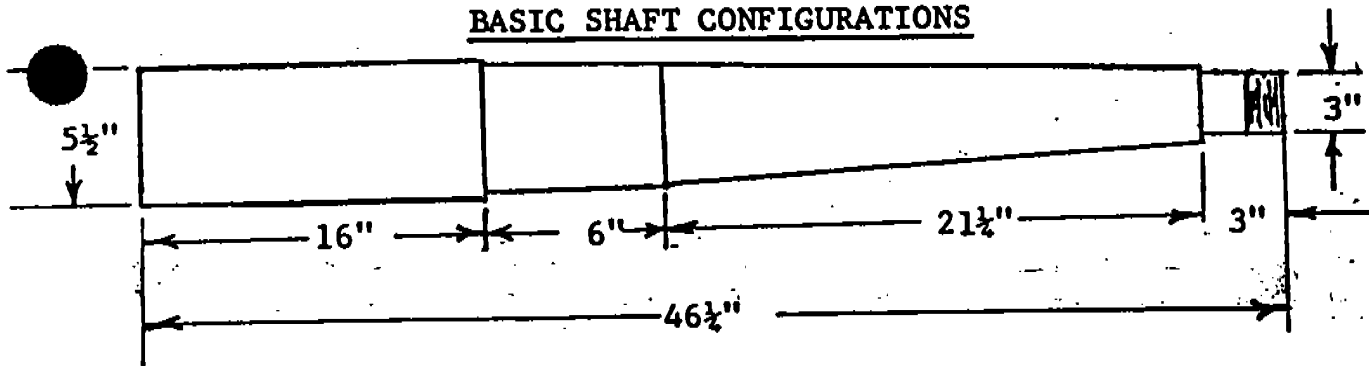
SUPER ROUND-UP
SERIAL NO. 200S & UP



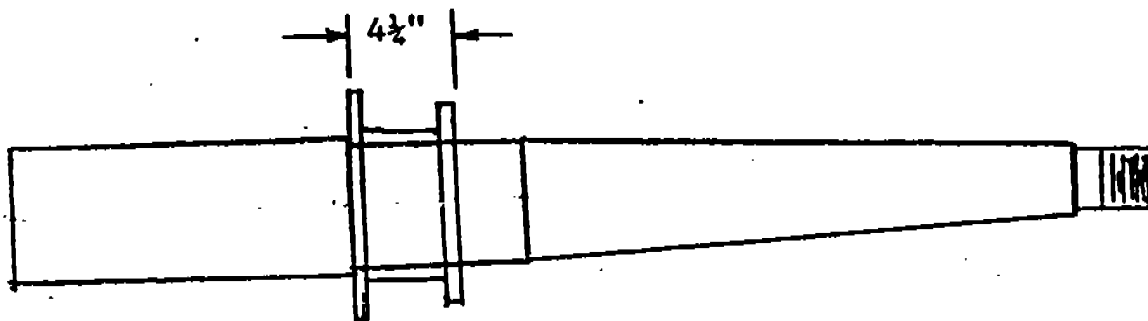
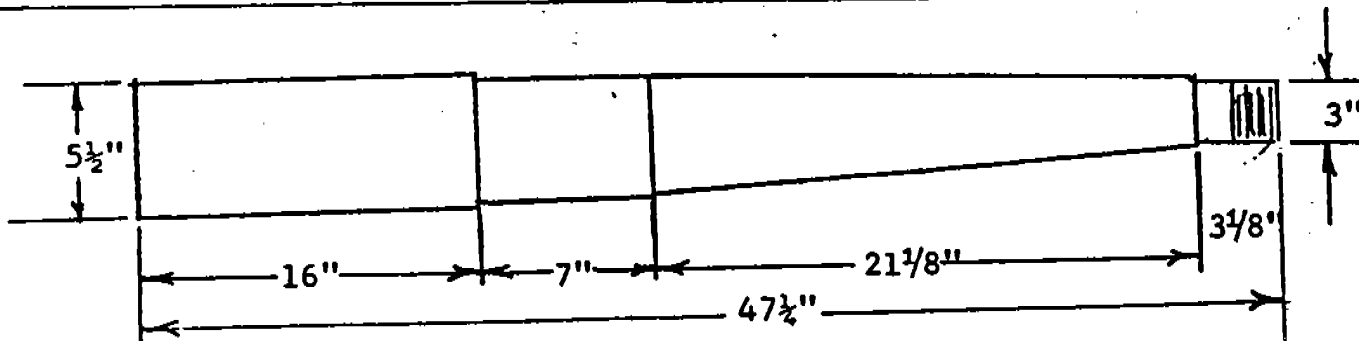
FIREBALL - SERIAL NO. F701
AND UP

HYDRAULIC PARATROOPER
SERIAL NO. 800 & UP

BASIC SHAFT CONFIGURATIONS

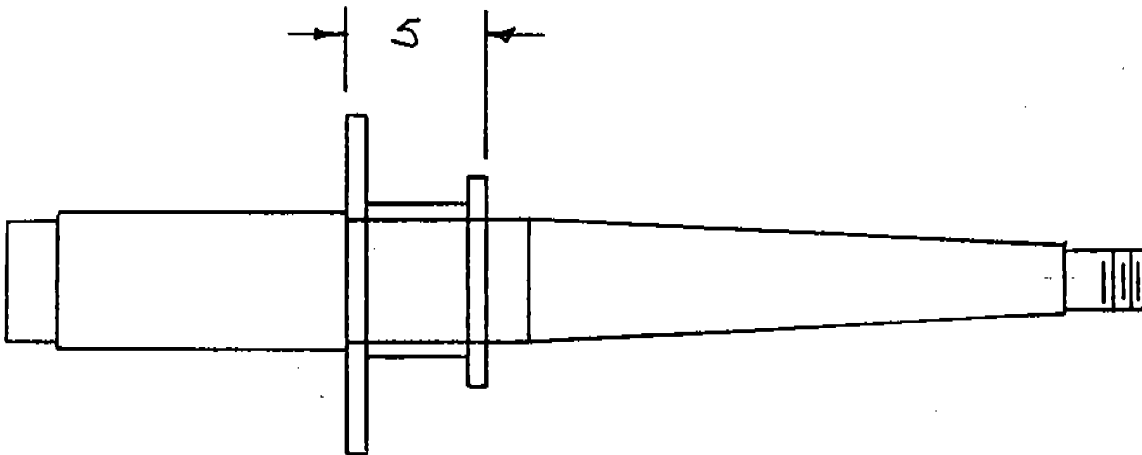
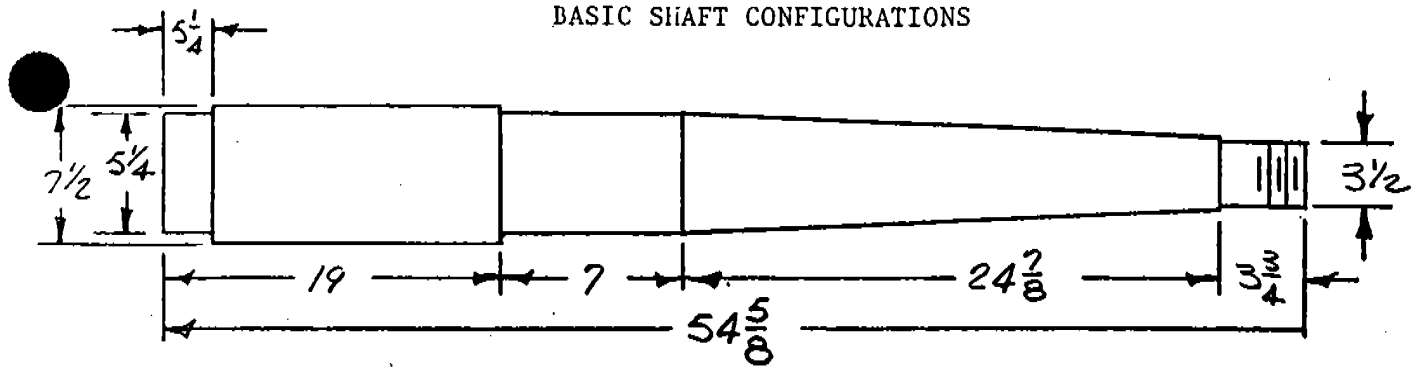


NON-FOLDING ROUND-UP
SERIAL NO. 400 & 4400

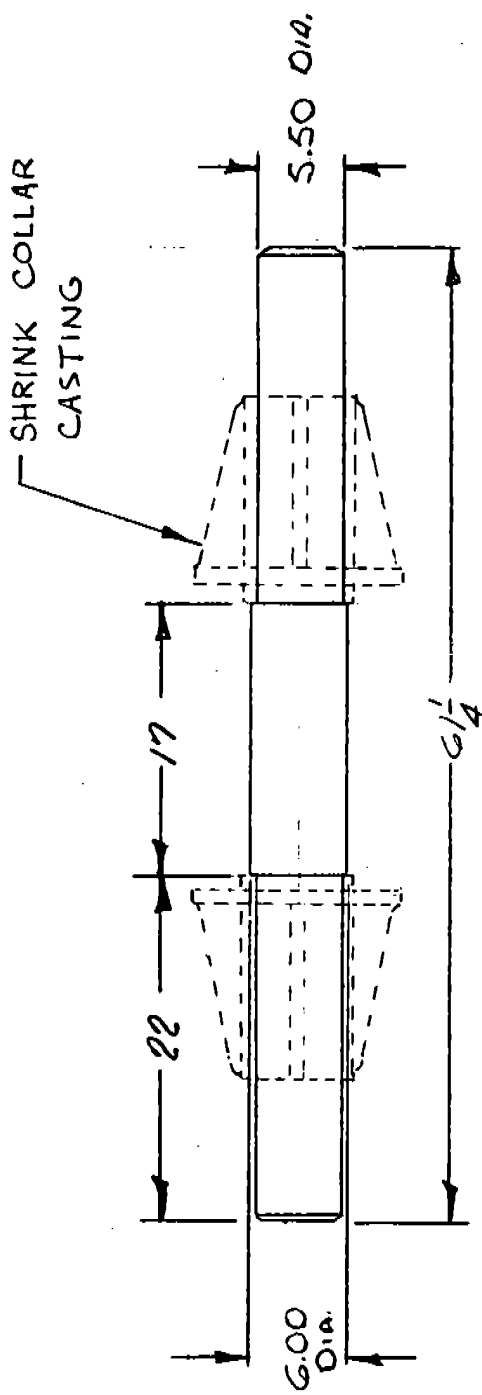


FOLDING ROUND-UP
SERIAL NO. 200 & 2200

BASIC SHAFT CONFIGURATIONS



SUPER ROUND-UP
SERIAL NO. 220 & UP



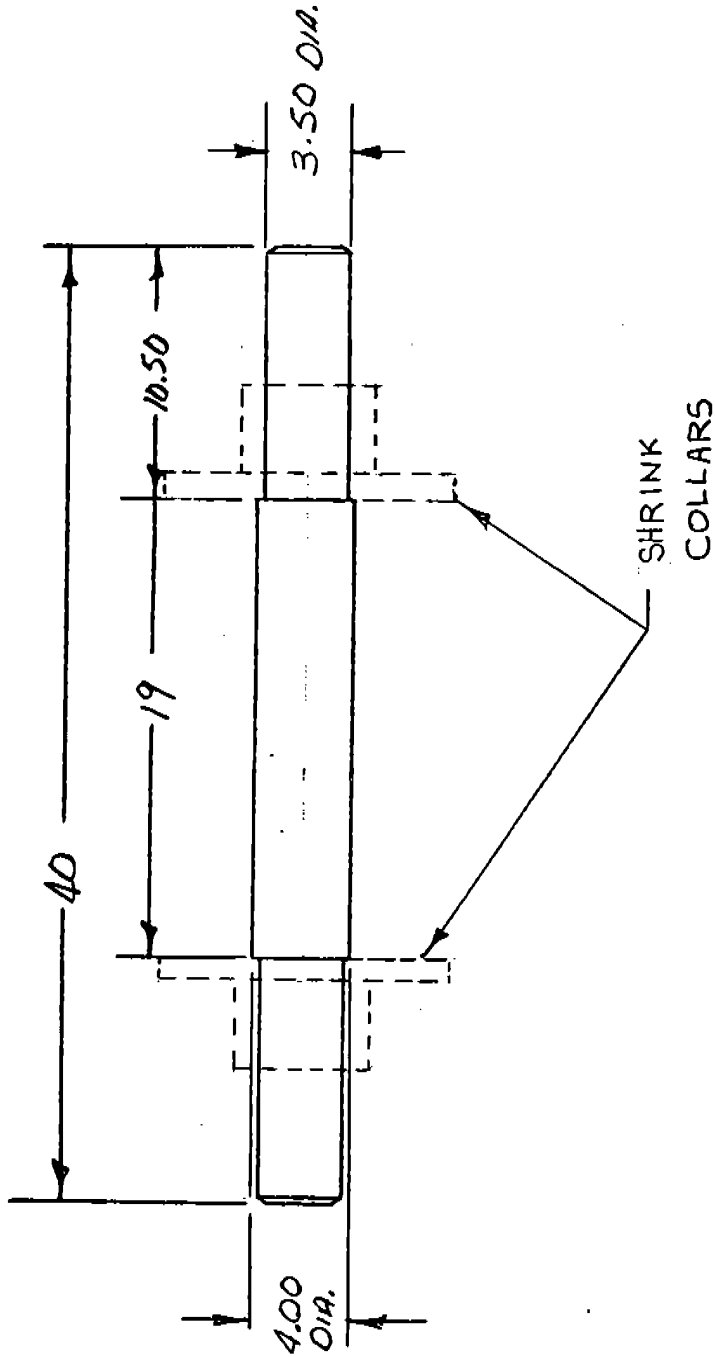
MAN-CO. MFG. INC.

P.O. BOX 13114
SALEM, OR 97308

PIVOT SHAFT - 40FT. Round-Up

DATE 4-12-89
DRAWN BY M.D.Z.
SCALE
NO. SK-41285

REV	DATE	DESCRIPTION
A	3-17-89	SHOW SHRINK COLLARS



MAN-CO. MFG. INC.

P.O. BOX 13114
SALEM, OR 97309

ANCHOR-SHAFT 40 FT. ROUND-UP

DATE 4-12-85

DRAWN BY M.D.Z.

SCALE

NO. 52-4385

REV	DATE	DESCRIPTION
A	3-17-84	SHOW SHRINK COLLAR

ULTRASONIC TEST REQUIREMENTS

Ultrasonic testing shall be performed once every year on the following rides built by Frank Hrubetz & Co., Kilinski Mfg. Co., and Man-Co Manufacturing, Inc.

Non-Folding Round-Up

1. Rocker shaft - see dwg. BU-133MC sht. 2 of 3
2. Cylinder anchor shaft - see Dwg. BU-133 sht. 3 of 3
3. Spindle shaft

Folding Round-Up

1. Rocker shaft - see Dwg. BU-133MC sht. 2 of 3
2. Cylinder anchor shaft - see Dwg. BU-133MC sht. 3 of 3
3. Spindle shaft

Super Round-Up

1. Rocker shaft
2. Cylinder anchor shaft
3. Spindle shaft

Hydraulic Paratrooper - park and portable

1. Spindle shaft

Rim Drive Paratrooper - park and portable

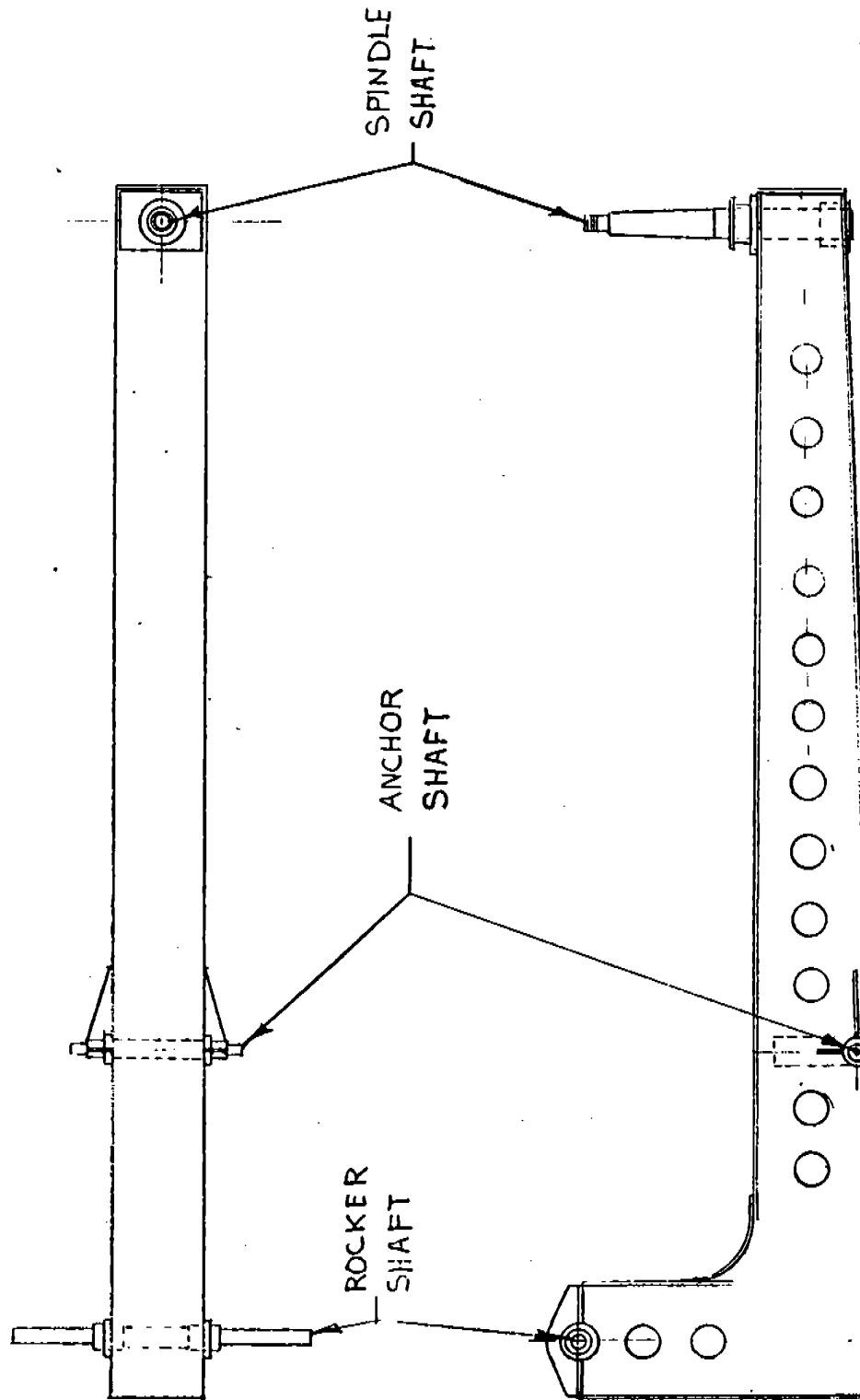
1. Spindle shaft

Standard Paratrooper - park and portable

1. Spindle shaft

Fireball - portable

1. Spindle shaft



MAN-CO. MFG. INC.

P.O. BOX 13114
SALEM, OR 97309

SCALE:
NONE

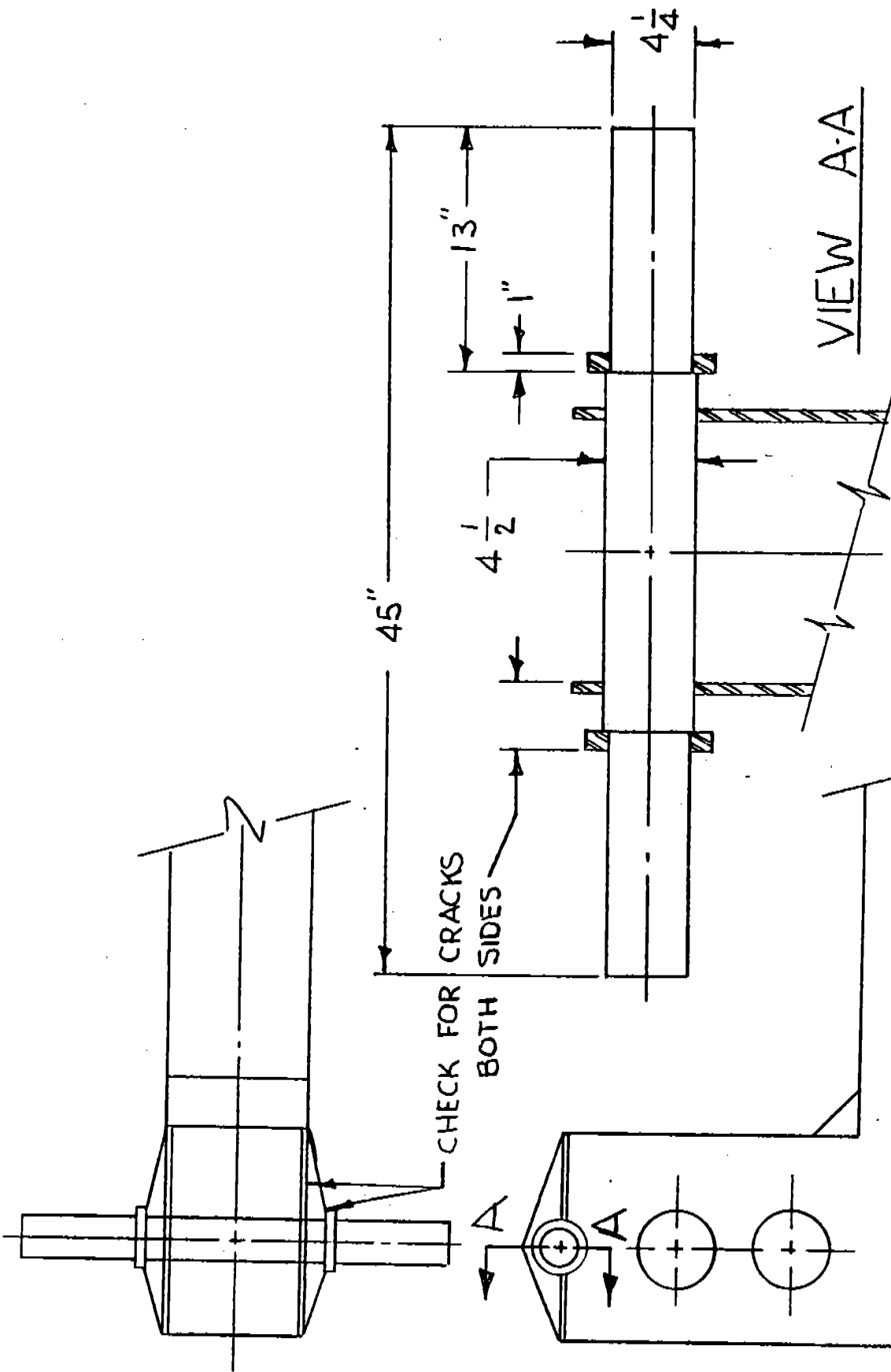
DATE:
3-14-89

DRAWN BY:
SWJ

30' FOLDING ROUND-UP

ANCHOR
SHAFT

SK 314990



MAN-CO. MFG. INC.

P.O. BOX 13114
SALEM, OR 97309

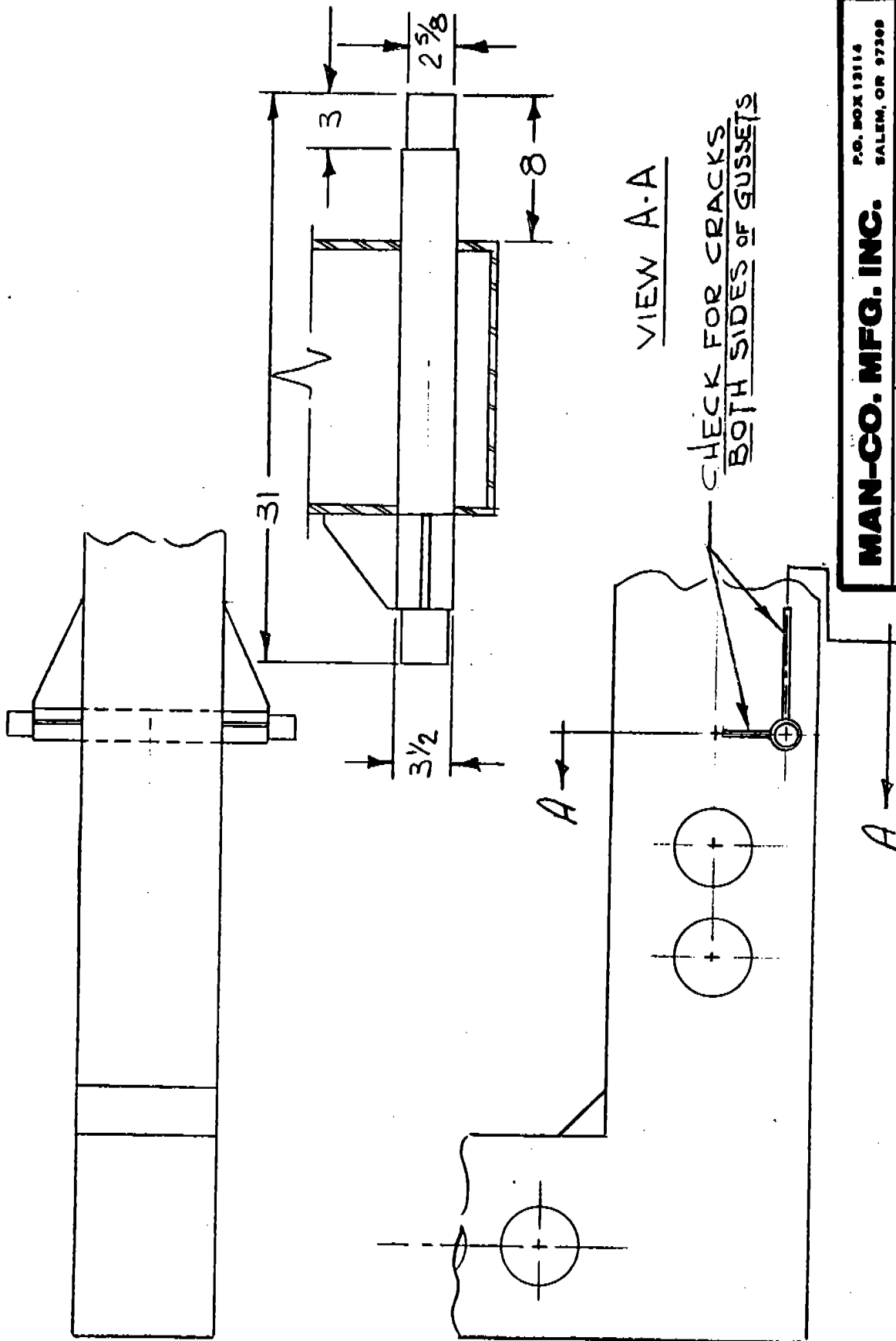
MAIN BOOM ROCKER SHAFT

DATE 8-14-84

DRAWN BY M.O.Z

SCALE —

SHAFT DIMENSIONS
PREVIOUS TO
NO. SHRINK COLLARS



MAN-<u>CO.</u> MFG. INC.		P.O. BOX 13114 SALEM, OR 97309	
CYL. ANCHOR SHAFT		SHAFT DIMENSIONS PREVIOUS TO SHAFTS WITH SHRINK COLLARS	
DATE	8-14-84	NO.	
DRAWN BY	M.D.Z		
SCALE			



MAN-CO MFG., INC.

2725 19th Street S.E. • P.O. Box 13114 • Salem, Oregon 97308 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 with 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!



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.

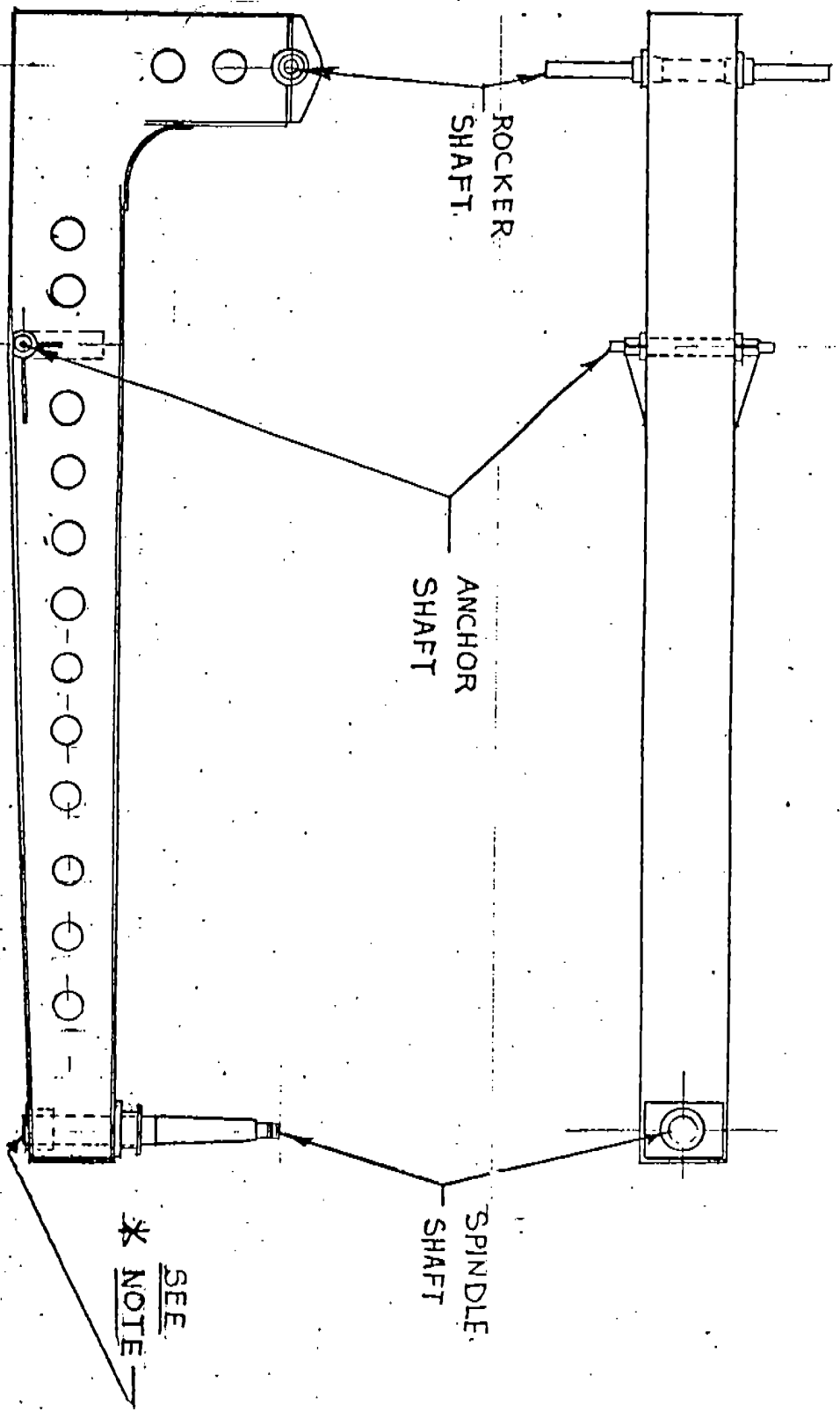
Due to the time element involved to manufacture and install these shafts and spindles, we recommend that a time period of one year be allowed to make these replacements. However, if your ride is a 1970 model or older, we recommend the replacements be installed as soon as feasibly possible.

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 NO SHRINK COLLAR IS VISIBLE AT BOTTOM OF BOOM, THEN REPLACEMENT OF SPINDLE SHAFT IS NEEDED.



MAN-CO. MFG. INC.

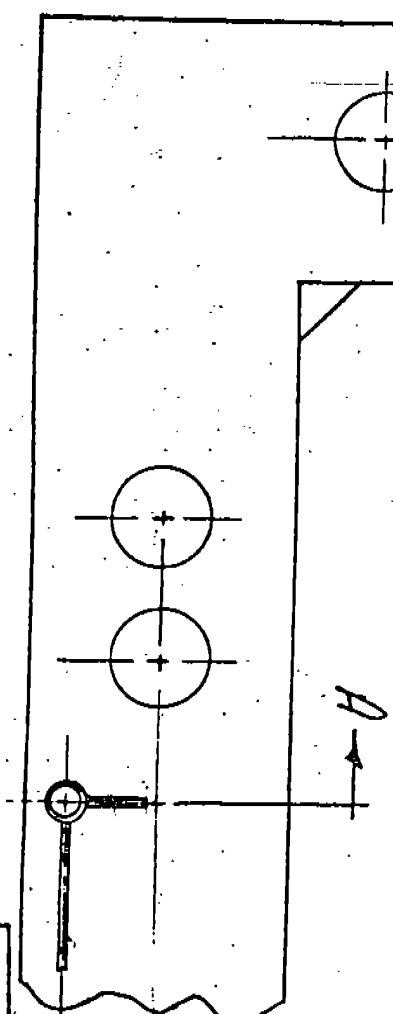
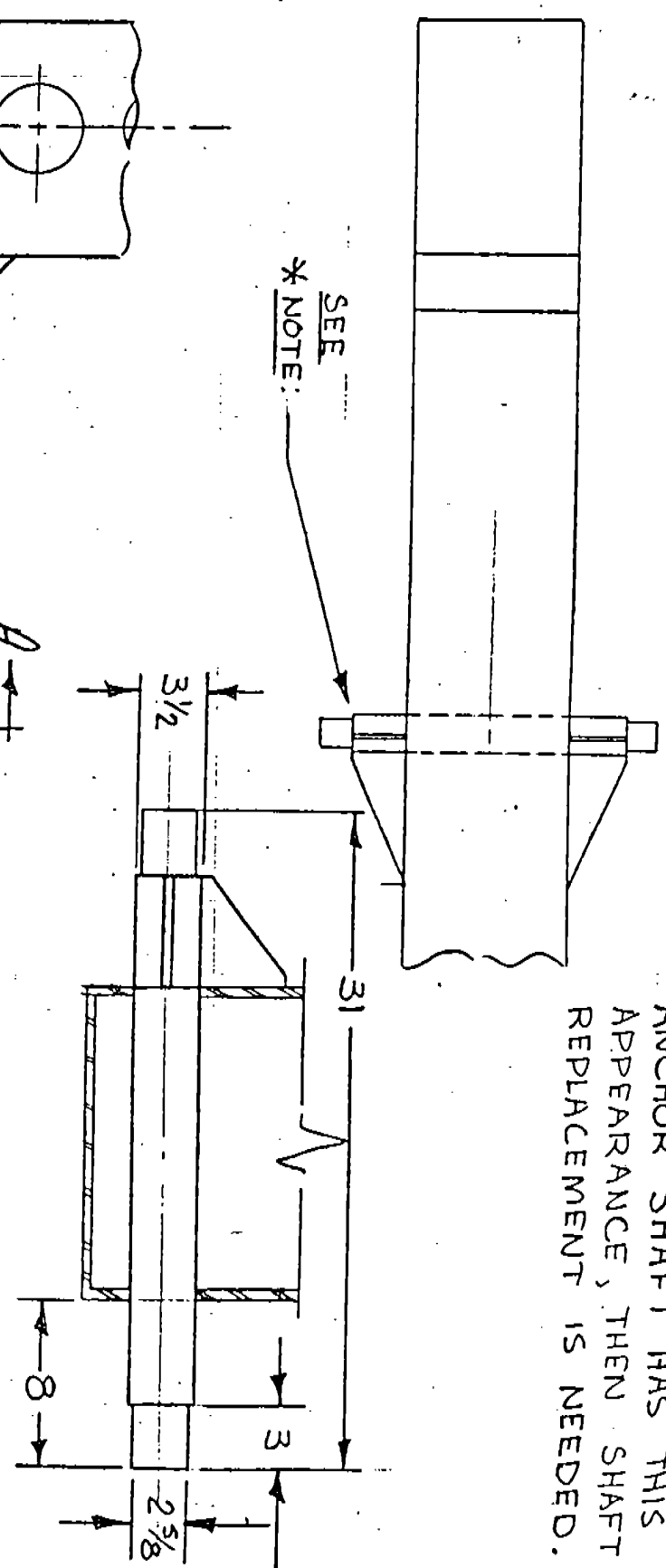
P.O. BOX 13116
SALEM, OR 97309

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

30' FOLDING ROUND-UP	ANCHOR SHAFT
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BU 138-A

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



VIEW A-A

SHAFT SHOWN PRIOR TO SHRINK COLLAR

MAN-CO. MFG. INC. P.O. BOX 13114 SALEM, OR 97309

CYL. ANCHOR SHAFT

DATE 8-31-89

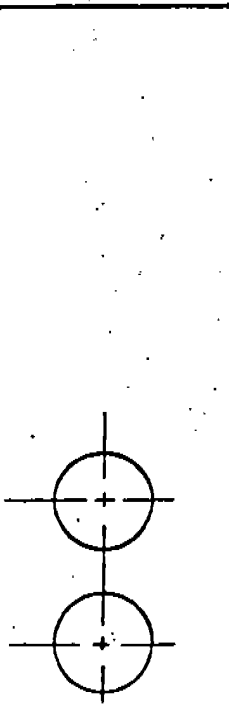
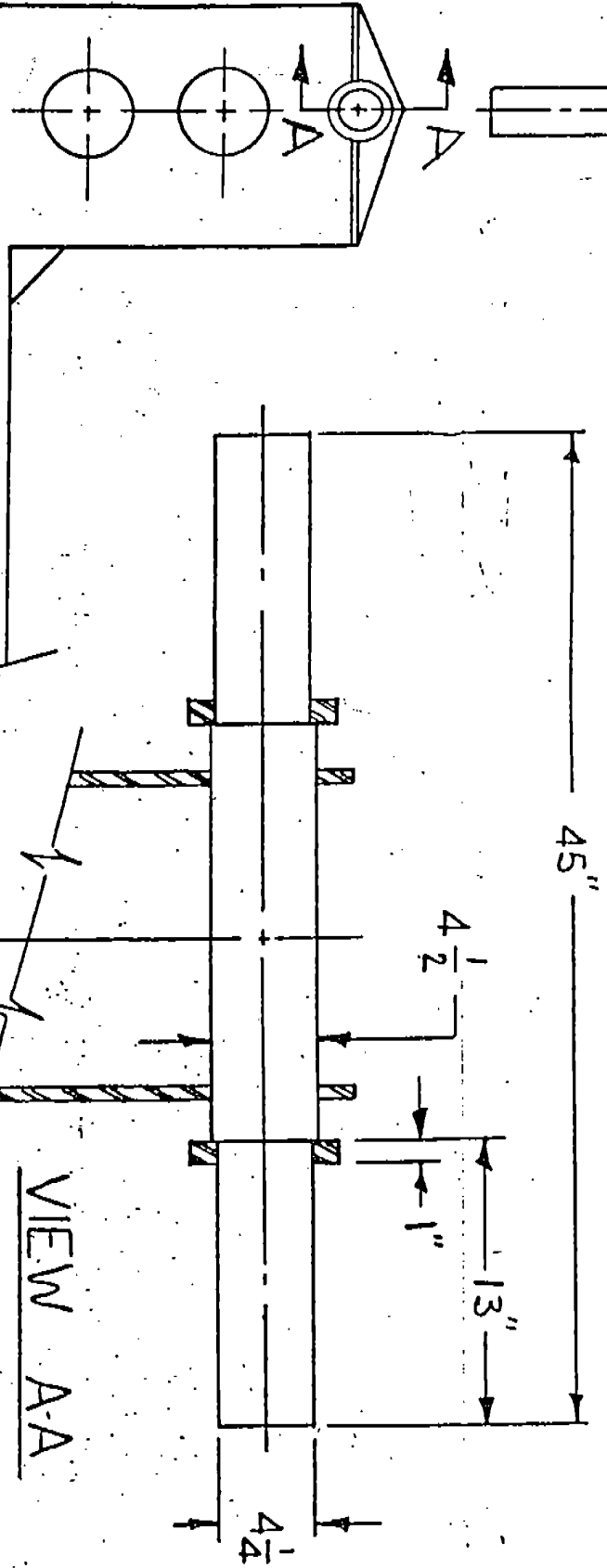
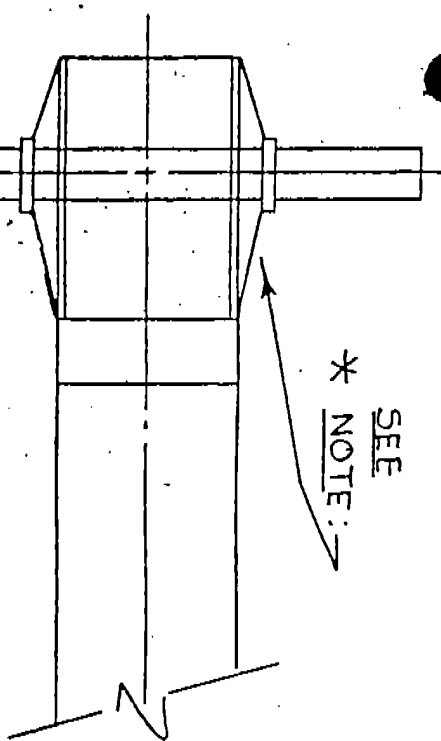
DRAWN BY SWJ

SCALE

NO. BU 138-B

SEE
* NOTE:-

* NOTE: IF ROCKER
SHAFT HAS THIS APPEARANCE
THEN REPLACEMENT OF SHAFT
IS NEEDED.



SHAFT DIM. SHOWN PREVIOUS TO SHRINK COLLAR

VIEW A-A

MAN-CO. MFG. INC. P.O. BOX 13114 SALEM, OR 97309

MAIL BOOM ROCKER SHAFT

DATE 8-31-89

DRAWN BY SWS

SCALE —

NO. BU 1138-C