

Zamperla Inc.

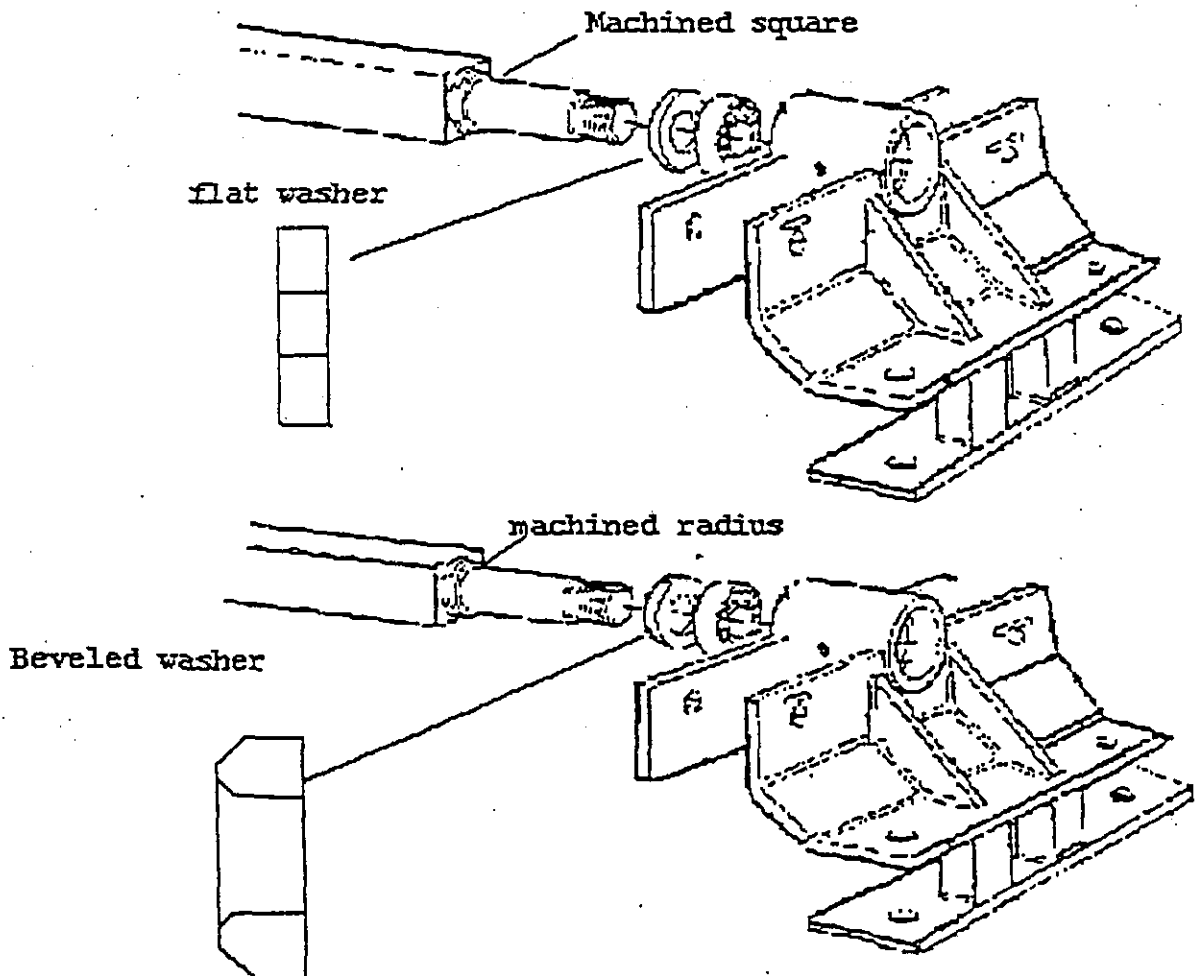
Maintenance Bulletin

February 1990

RE: Early Dragon coaster axles

The first Dragon coasters delivered in the U.S. experienced failures of the coach axles. This was remedied by a change involving replacement of the entire axle. This change was made by Zamperla personal on all rides in the country. This almost eliminates the possibility of finding any of the old style axles in operation. The following is provided as a safeguard in the event a used ride has entered the country that may have missed this modification. The easiest way to identify these two axles is the beveled washer used on the correct axle.

Original (incorrect) axle



Rene Bernier
Customer Service Manager

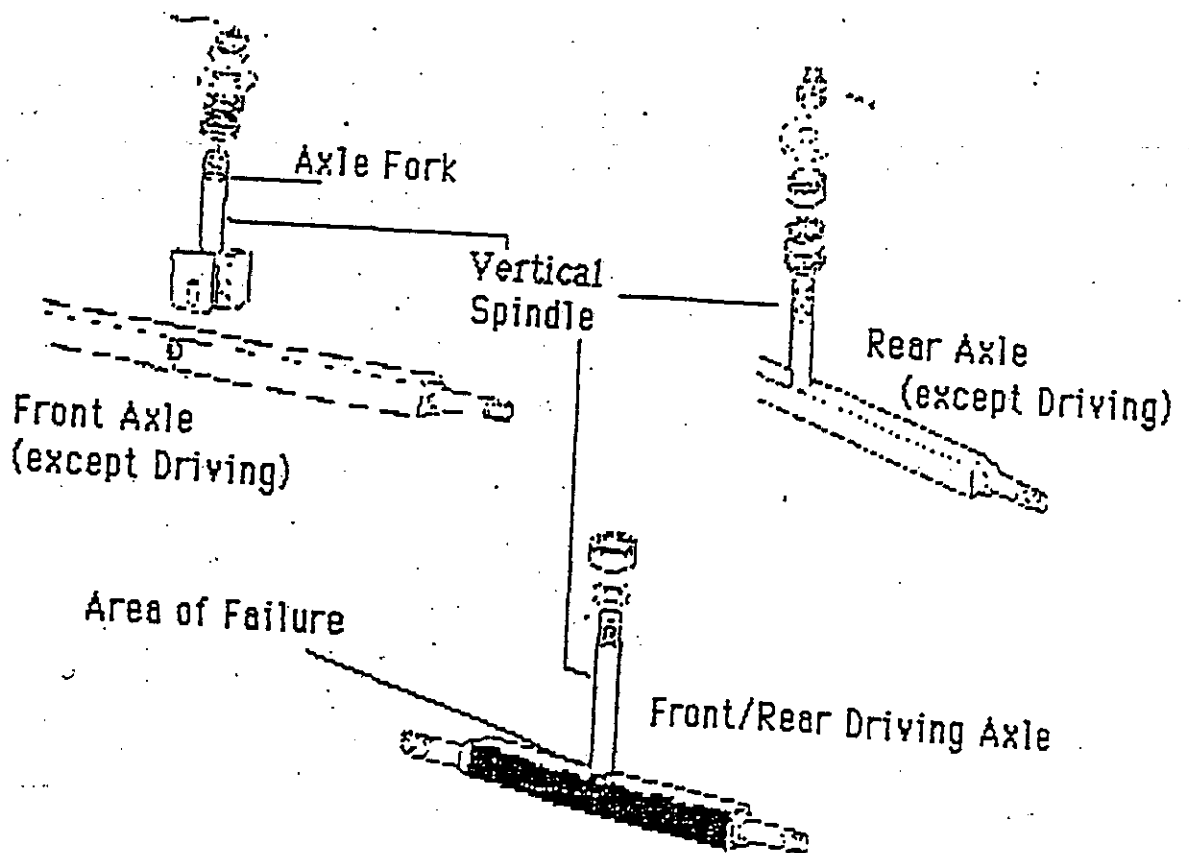
Zamperla Inc.

Maintenance Bulletin

January 1991

RE: Dragon/Tornado Coaster Axle Vertical Spindles

There has been a report of a failure of the vertical spindle on the rear drive axle of a Dragon Coaster. Zamperla has notified all Dragon/Tornado Coaster operators to perform ultrasonic testing on the vertical spindles on "ALL" the axles of their ride. To date this appears to be an isolated incident. The spindles may be tested without removing the axles. The only acceptable repair for indications of cracking is replacement of the axle or axle fork.



Rene Bernier
Technical Service Manager

C. Non-Destructive Testing

1. INTAMIN as the manufacturer of this Roller coaster is recommending non destructive testing as an additional safety measure to be conducted by a qualified NDT inspector, in accordance with local practice.
2. NDT is the development and application of technical methods to examine materials or components in ways that do not impair the future use and serviceability in order to detect, locate, measure and evaluate discontinuities, defects or other discrepancies or imperfections. The recommended methods to be applied for testing Roller Coaster components is first of all careful and extended visual inspection and the "Liquid Penetrant Method".
3. NDT shall be used to verify the integrity of components which due to their design, location, or installation, or combination thereof, cannot be adequately evaluated by other means.
4. INTAMIN is recommending that such NDT shall be performed on an annual basis. First such testing shall be initiated one year after opening of ride to public. It is anticipated that this NDT will be executed during a yearly major overhaul of this ride.
5. Listed hereafter are those components which are considered to be of major importance as far as safety considerations of the Roller Coaster are concerned and which are recommended to be tested along with appropriate acceptance criteria. The most critical areas on the components are believed to be welded connections and certain bolted connections.
6. The following components are proposed for scheduled NDT:
 - a) Main Structure of Track 50%
 - b) Rail Connections 20%
 - c) Steel frame of Vehicle Body 50%
 - d) Undercarriage 80%
 - Main beam structure
 - Main Axle/Bogie system
 - Tow Bar system
 - e) Lap bar system 50%
 - f) Base plate for friction wheels and brakes 20%

It is recommended that welded connections are tested on a percentage basis, i.e. the indicated percentage represents the runs of welds to be checked, measured against the total amount of welding runs on a particular component. Exact locations will not be indicated, they shall be selected by the inspector responsible for the NDT. As far as the bolted connections on these items are concerned it is recommended to test 50% of the total amount of typical and/or identical fasteners.

7. The criteria for acceptance of the inspected welding runs shall be that the total of inspected run per component must be of accepted quality and DIN welding standard.

In case certain components indicate that they do not meet the acceptance criteria these shall undergo a second NDT according to the ULTRASONIC method. If this second test again shows negative results the said component shall be tested on a larger scale i.e. a checking of all welds shall be executed.

Corresponding to the results of above NDT the component in question must be reconditioned and/or repaired. Bolted connections which do not meet standard are to be replaced.

8. Components found free of relevant indications, that meet the acceptance criteria of have been reconditioned, shall be further tested at the regular schedule in accordance with Non-Destructive Testing specification number 4.
9. As part of the recommended maintenance inspections other than daily pre-opening inspections INTAMIN is recommending to conduct the following additional inspections.
10. Load, guide and counter (upstop) wheel diameters shall be checked and measured every three months:

If the diameter of the load or guide wheels is less than 184 mm, they must be replaced.

If the diameter of the counter (upstop) wheels is less than 88 mm, they must be replaced.

11. As further described in chapter Non-Destructive Testing INTAMIN is recommending to perform NDT for safety reasons on a number of selected components.



ILLINOIS DEPARTMENT OF LABOR

Shinae Chun
Director

January 24, 1992

Mr. Rene Bernier
Technical Service Manager
P.O. Box 5545
49 Fanny Road
Parsippany, NJ 07054

RE: Nondestructive Testing

Dear Mr. Bernier:

I just obtained the January, 1991, Zamperla Maintenance Bulletins on the Mini-Enterprise Tension Rod Attachment and the Dragon/Tornado Coaster Axle Vertical Spindles. If the Illinois Department of Labor is not on your mailing list for bulletins, please add it so that we will get the information promptly, not a year after the fact.

I have two questions regarding these bulletins, they are: Is the ultrasonic testing of the Dragon/Tornado vertical spindles intended to be a one-time test or an annual test: Is the magnetic particle testing of the Mini-Enterprise Tension Rod to be performed only if a crack is observed during the visual inspection?

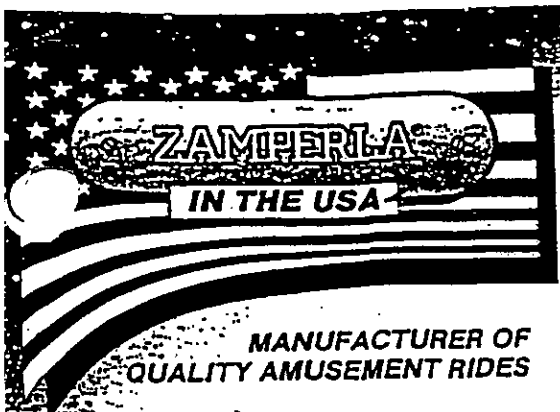
A prompt reply will be appreciated.

Sincerely,

Carl Kimble, P.E.
Chief Inspector
Carnival & Amusement Rides
Telephone: 217-782-9347

CK:rh

cc: NAARSO



1-28-92

Carl.

Regarding your questions for inspection of Mini-Enterprise rod attachment area and Dragon/Tornado coaster vertical spindles the NDT of the spindles is a yearly inspection. The magnetic testing on the Mini-Enterprise is to be performed if there are any visual indications that create the suspicion of a crack. I am also including this years edition of our Field Reference guide. and have added your office to our bulletin mailing list. If you have any other questions please contact me.

sincerely.

Rene Bernier

Technical Service Manager

RECEIVED
FEB 03 1992
DEPARTMENT OF LABOR
CARNIVAL & AMUSEMENT RIDE
INSPECTION DIVISION

ZAMPERLA INC.
49 Fanny Road
Parsippany, New Jersey 07054-6545
USA
Phone: 973 334 8133 Fax: 973 334 6880

Bulletin No: 2000 DR1
Release Date: 10/09/2000
Effective Date: 10/09/2000
Supersedes:
Completion Date: As soon as possible
Page: 1 of 11

SERVICE BULLETIN

Ride Manufacturer: Zamperla Inc.	Affected Production Dates: All
Ride Name: Dragon Coaster	Affected Serial Nos.: All
Model Number: Dragon Coaster	

Abstract Of Issue:

Certain maintenance procedures have been modified.

Reason For Release:

Same.

Action To Be Taken:

Insert this modified maintenance procedure in your instruction manual.

Detail Of Issue:

Attached.

Future Action To Be Taken:

Follow this maintenance procedure in the instruction manual.

	daily	weekly	monthly	6months	yearly
REAR DRIVING UNIT DR05-APP.2					
Visual check point 31		x			
Disassembly and check point 31				x	
Visual check of welded seams of the boogie				x	
Wheel smoothness check (by hand)			x		
Wheel wear visual check	x				
Check the tire pressure		x			
Check the tensioning of the belts		x			
Check the wear of the brushes			x		
Check the oil level in the gearbox				x	
Check the tightening of the motor support bracket bolts				x	
Grease all lubricating points				x	
Check lateral roller support nuts are safety locked			x		
TRACK					
Visual check point marked * DR06-APP.2			x		
Running pipes condition visual check			x		
Visual check of all columns welded seams			x		
Check bolted connections and anchor bolts tightening				x	
Check of the bolts pretension					x
REAR CAR AXLE					
Check points are referred to DR01-APP.2					
Bearing lubrication					
Points 4-6-10			x		
Wheels					
Smoothness check (by hand)			x		
Wear visual check	x				
Check the vertical and horizontal clearance					
Boogie					
Visual check of welded seams		x			
Bolts					
Check of the bolts tightening			x		
Check of the bolts pretension					x
Axle					
Visual check of welded seams (specially points 8-9)		x			
Axle disassembly visual and/or Magnetic Particle test					x

A. ZAMPERLA spa	DRAGON COASTER Ride OPERATORS AND MAINTENANCE MANUAL	29 September, 2000 Chapter 2
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	daily	weekly	monthly	6months	yearly
FRONT CAR AXLE					
For this axle it is necessary to carry out all the checks listed for the rear axle plus the following The points are referred to DR02-APP.2					
Visual check points 21-22			x		
CHASSIS					
Visual check of welded seams		x			

Welded connection

Visual inspection are sufficient until formation of rust and/or cracks in the paint coat have been detected. Where paint coats near the welded seams are damaged it would be possible to find out a crack. So magnetic examination must be carried out. Before repairing welded seams consult ZAMPERLA in order to receive prescriptions.

Wheel pins

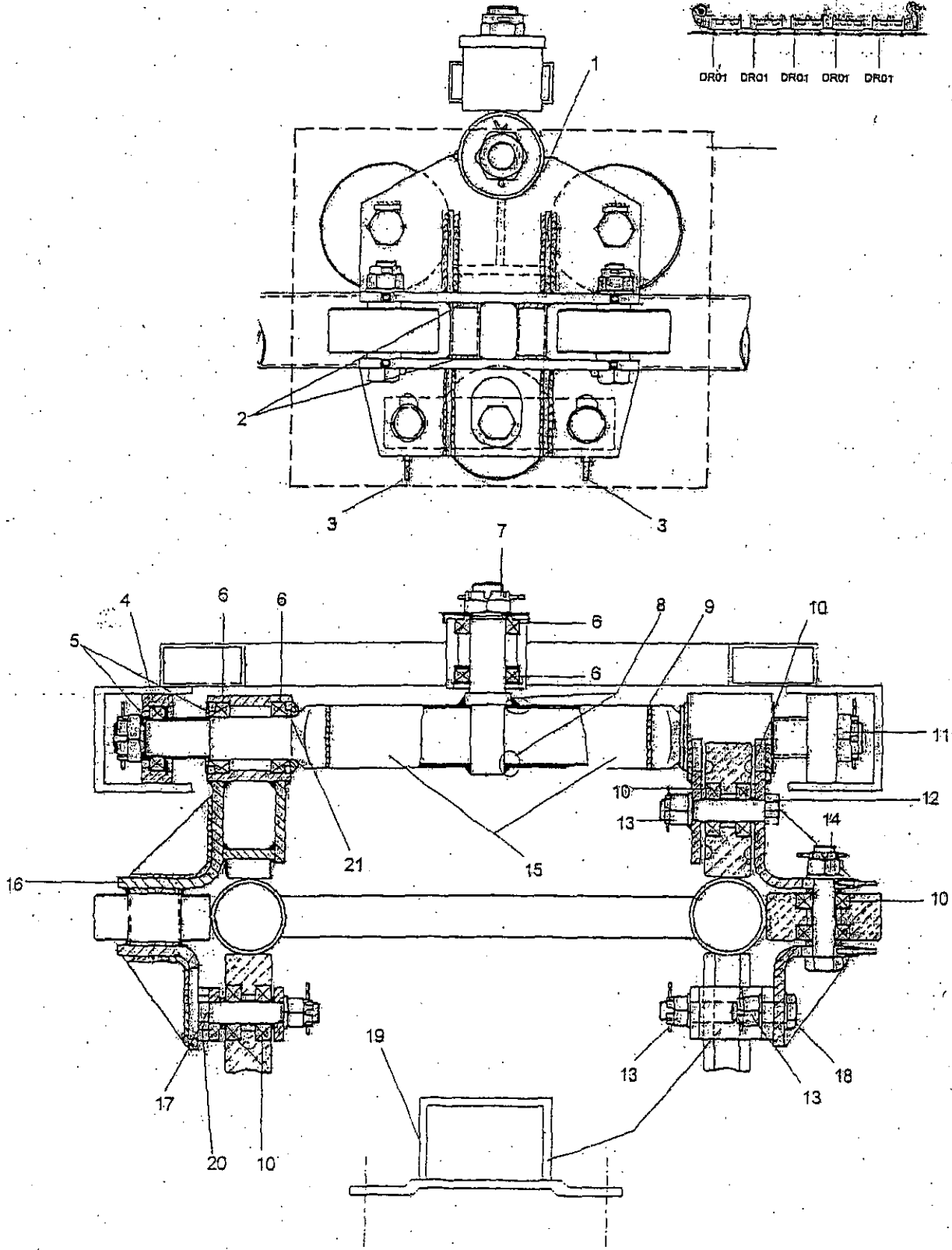
Look for formation of cracks by means of yearly liquid penetrant or magnetic particle testing .

APPENDIX 2

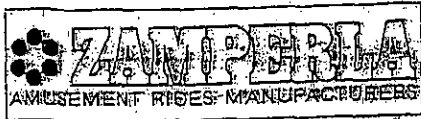
APPENDIX 2

TAB. DR 01
TAV. DR 01

ASSALE POSTERIORE VETTURE
REAR CAR AXLE

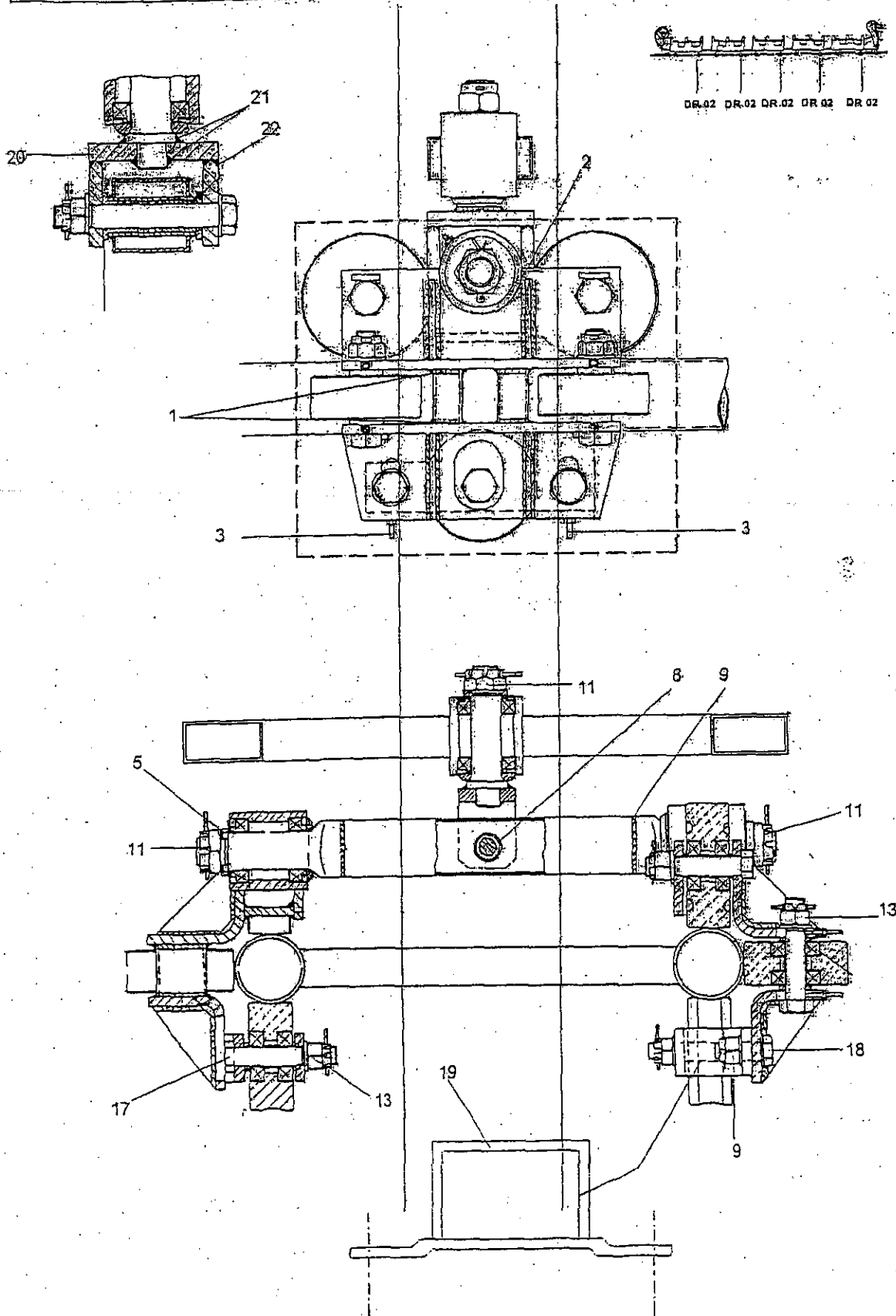


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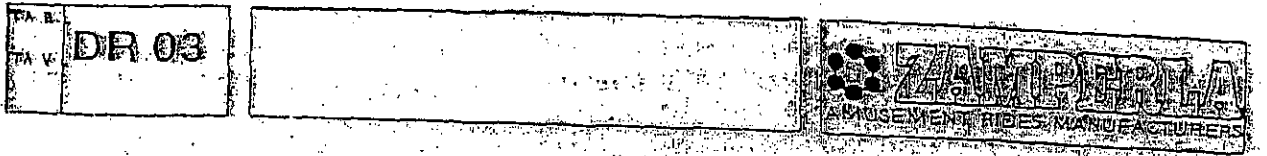


ASSALE ANTERIORE VETTURA
FRONT CAR AXLE

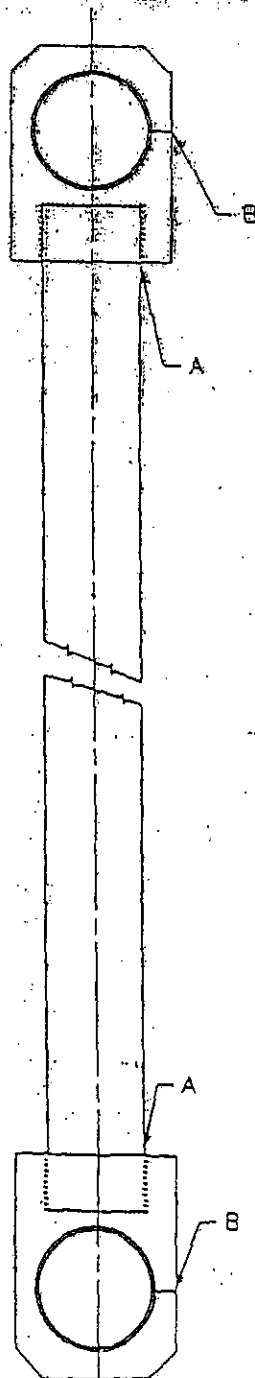
TAB.	DR 02
NAV.	



APPENDIX 2



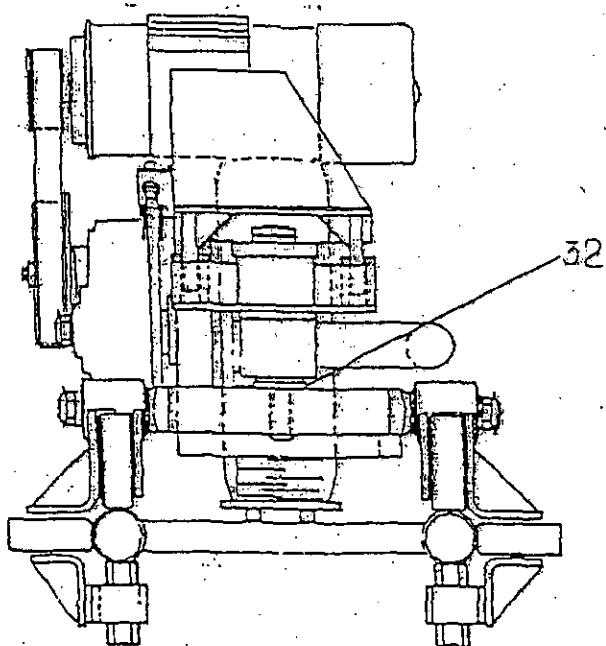
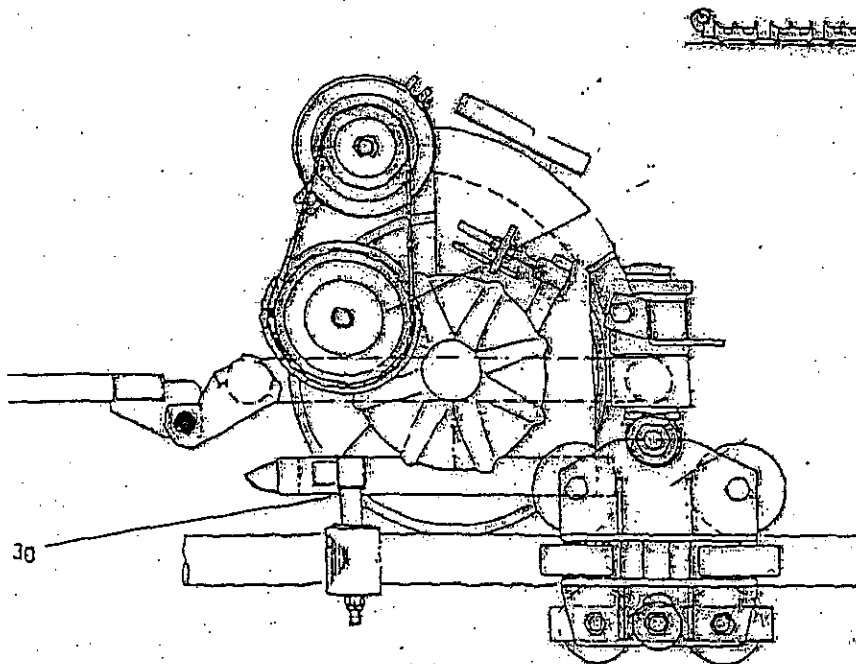
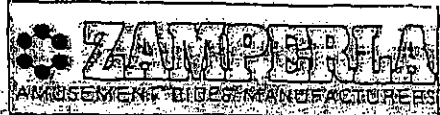
VEHICLE COUPLING



APPENDIX 2

DWH.	DR 04
REV.	

MOTORIZZAZIONE ANTERIORE
FRONT DRIVING UNIT

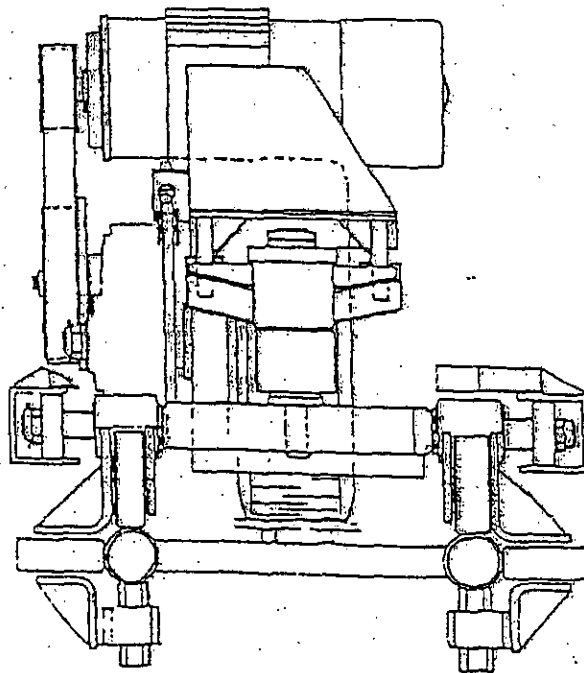
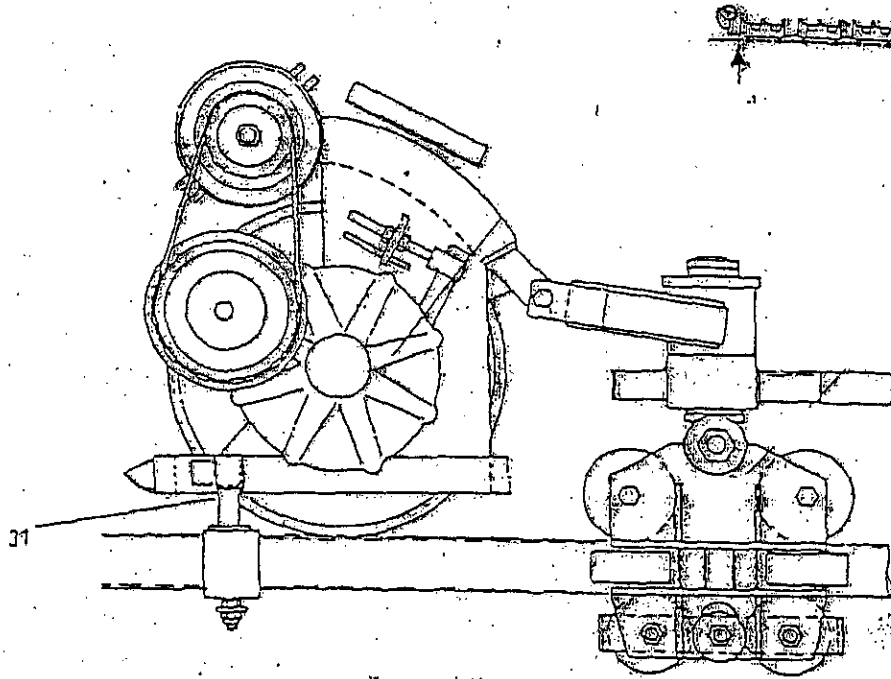


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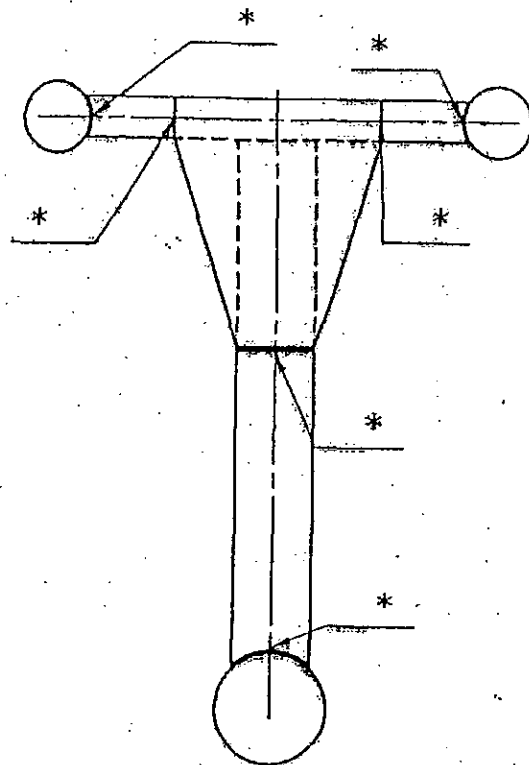
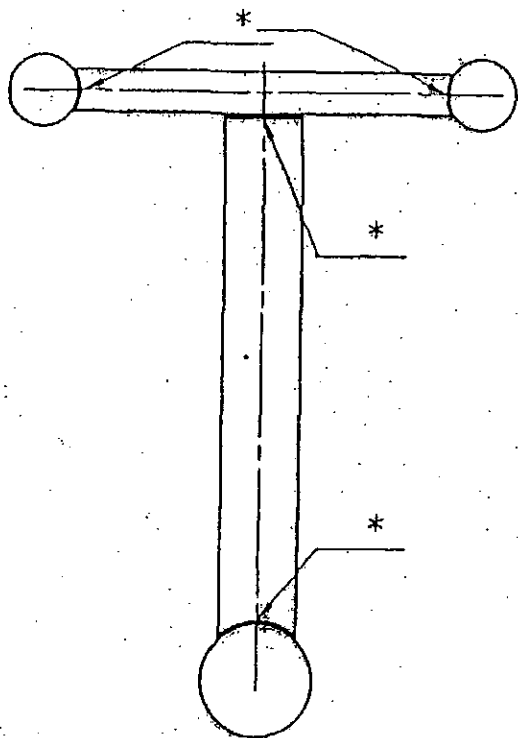
PART. DIR. 05
LAV.

MOTORIZZAZIONE POSTERIORE
REAR DRIVING UNIT

ZAMPERLA
AMUSEMENT RIDES MANUFACTURERS



TRACK SECTION (DR 6)



65

APPENDIX 2

