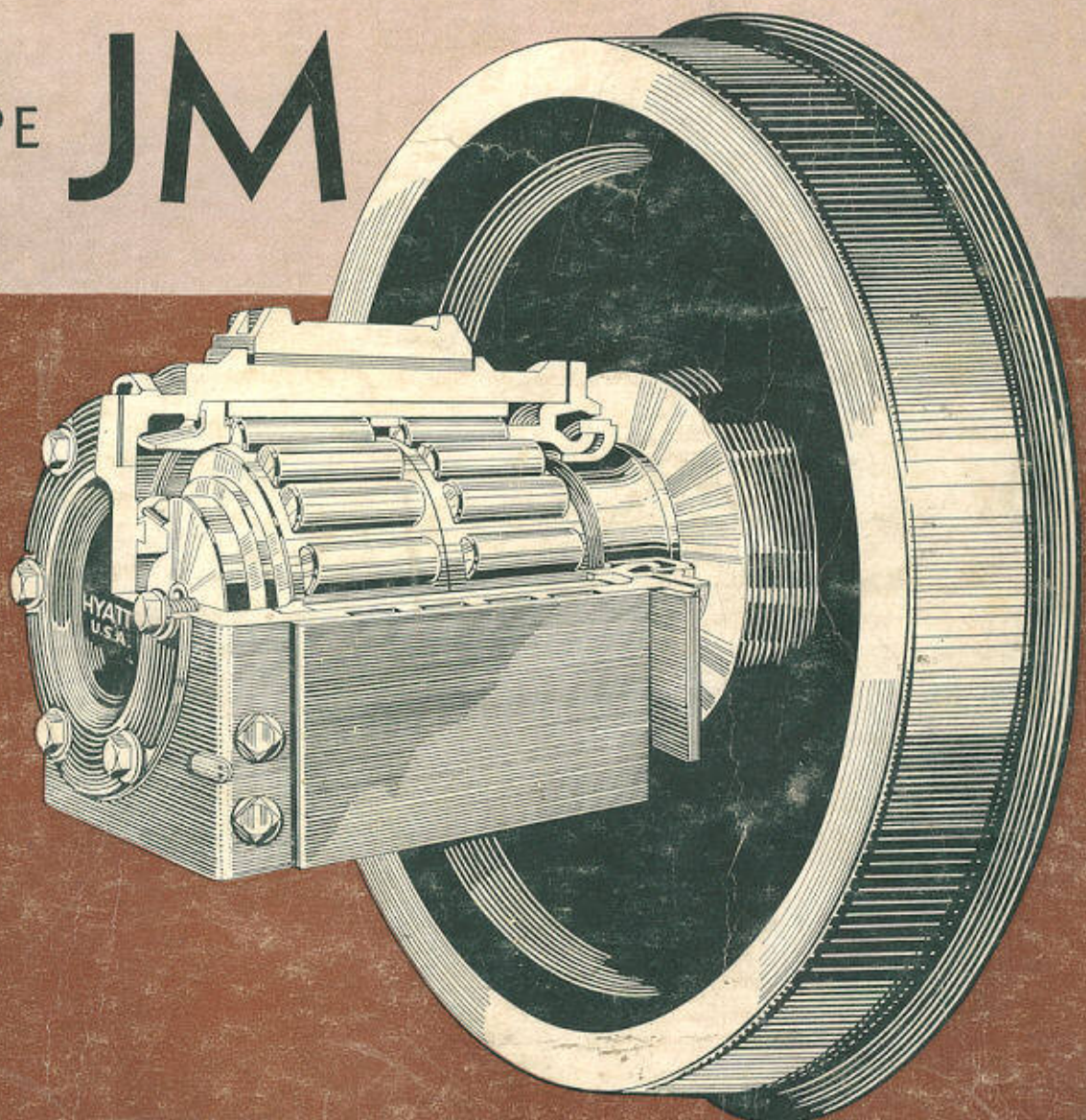
HYATT ROLLER BEARING

RAILROAD JOURNAL BOXES

TYPE JM



INSTALLATION AND MAINTENANCE INSTRUCTIONS

HYATT ROLLER BEARING
—TYPE JM—
RAILROAD JOURNAL BOXES
INSTALLATION AND MAINTENANCE INSTRUCTIONS

FOREWORD

Dependability and easy accessibility are the two factors of first importance in the design of roller bearings and journal boxes for railroad journal applications. These qualities are essential to obtain satisfactory operation and minimum maintenance costs. Hyatt Railroad Bearings and Journal Boxes provide for both to a maximum degree.

Dependability results from the use of large capacity bearings capable of safely carrying loads up to the limit of axle capacity. Journal boxes are designed with but a few simple parts of rugged construction for long life.

Accessibility is provided by a design in which all parts of both bearing and box can be quickly and completely disassembled for cleaning and inspection.

The journal boxes can be removed from the axle and replaced by hand without the use of a hydraulic press, special pullers or other slow and cumbersome tools.

The turning or replacing of wheels is accomplished in exactly the same manner as for plain bearings and without any added expense.

Shop costs for maintenance of roller bearings and boxes are considerably lower with Hyatt equipment.

The following pages contain a description of the Hyatt Type JM Roller Bearing Journal Boxes together with complete instructions for service and maintenance. These instructions outline methods which we consider will give the best operating results, recognizing that deviations therefrom may, at times, be necessary or desirable to suit individual conditions.

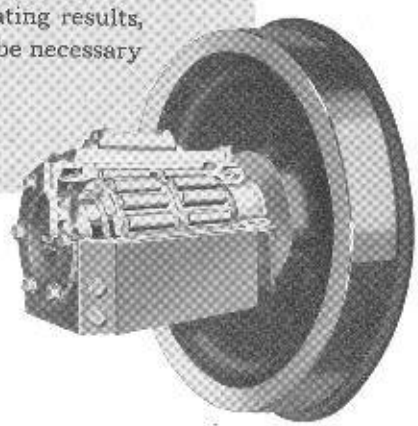
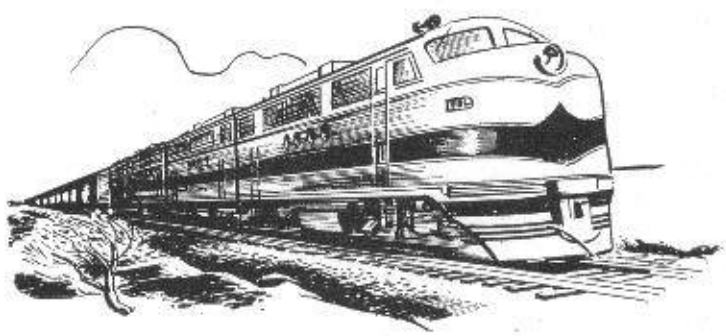


TABLE OF CONTENTS

	Pages
HYATT RAILROAD ROLLER BEARINGS AND TYPE JM JOURNAL BOXES	5
Description of Bearings	5
Description of Journal Boxes	9
Interchangeability	12
INSPECTION AND MAINTENANCE	13
Procedure for Wheel Removal	14
Removing Inner Races	16
Mounting Inner Races	17
Lateral Clearance	18
Lubrication	19
General Inspection	20
REPLACEMENT OF PARTS	23
General Information for Ordering Parts	23
Replacements	24
Storage of Spare Parts	24



DESCRIPTION OF HYATT RAILROAD BEARINGS AND TYPE JM JOURNAL BOXES

Description of Hyatt Railroad Bearings

The **Hyatt Bearing** used in Type JM Journal Boxes consists of heavy cylindrical inner and outer races and two rows of large diameter solid rollers operating in heavy one-piece bronze cages as shown in Figures 1 and 3.

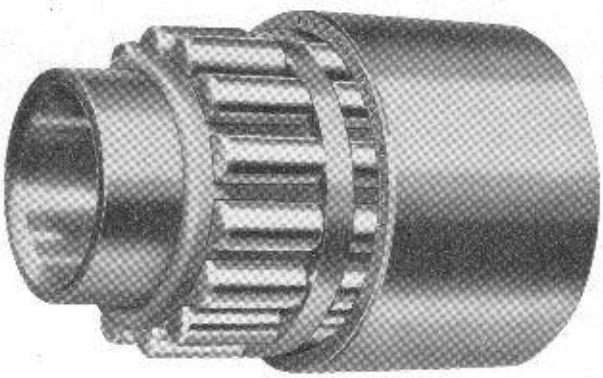


Fig. 1. Hyatt railroad roller bearing partially disassembled.

Races and Rollers are of specially selected alloy steel. Scientific heat treatment, using the most modern equipment available, assures proper hardness for maximum load carrying capacity combined with long fatigue life and great resistance to wear. Both the rollers and races are ground to close limits to provide the proper fits and operating clearance.

The **Inner Race** is cylindrical and is shrunk on the journal portion of the axle. After it is in place it forms a permanent part of the axle. All wheel work may be done without disturbing the race, inasmuch as the wheel seat diameter is large enough to allow the wheel to pass over the inner race. This feature of Hyatt bearings greatly facilitates ease and economy of handling when replacing wheels.

The inner end of the inner race is designed with a patented feature which prevents stress concentration at the termination of the shrink fit. This is accomplished by tapering the inner end of the race bore for the amount of the shrink fit allowance, which allows the shrink fit pressure to die out gradually (See Fig. 2). This prevents an abrupt change in the surface stress of the axle and thereby removes a possibility of progressive fracture. This is especially important when it is considered that the rapidly rotating journal is subjected to stress reversals and severe impacts.

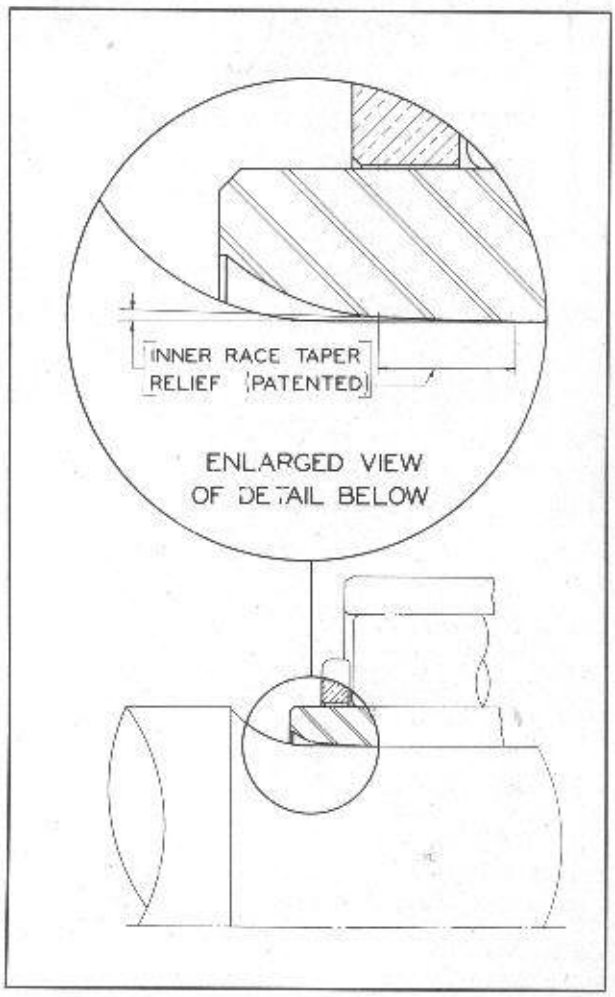


Fig. 2. Patented taper relief at the fillet end of the inner race. (U. S. Patent #2,082,379)

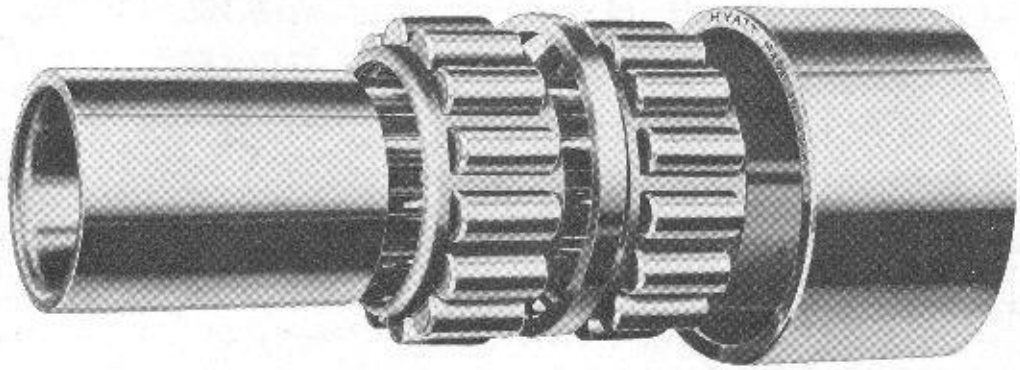


Fig. 3. Hyatt railroad roller bearing completely disassembled.

The **Outer Race** is cylindrical. It forms the outer path on which the rollers travel. The outer race is usually a drive fit in the housing but under some conditions may be slightly looser.

The **Rollers** are plain straight solid cylinders and are flat on the ends. They are ground to close limits to secure uniformity of diameter, length and end squareness. There are two similar rows of rollers in each bearing. The rollers carry radial loads only, therefore none of their capacity is sacrificed for the carrying of thrust loads.

The **Cages** or **Separators,** of which there are two per bearing, one for each row of rollers, are of a special bronze developed for maximum resistance to wear and fatigue. They are cast entirely in one piece with no joints of any kind. Liberal cross-sectional areas provide great strength.

The cage bars being integral with the end rings at both ends, in effect, make the cage a cylindrical ladder. Experience has shown that no other type of cage can compare with this design for long life and overall efficiency.

In operation the cages are centered on the inner race, thereby eliminating the possibility of eccentricity at any speed. They serve only to separate the rollers and keep them in proper alignment with the races. The cages do not come in contact with each other or with any of the box parts. The cage is expected to have a life equivalent to the other bearing parts, so that it will not normally be necessary to make cage replacements before the entire bearing has run out its life. Heretofore the cage of a roller bearing has been its critical operating factor. Hyatt has eliminated this objectionable point by providing cages that will stand up with the rest of the bearing.

The Spacer Ring, which separates the two rows of rollers longitudinally in each bearing, is of hardened and ground alloy steel. It is a floating ring, which is centered in the bore of the outer race and directly contacts the roller ends. This spacer is of sufficient width to prevent the cages from being pinched at the center of the bearing.

The term **Roller Assembly** designates one cage with the rollers which belong with it. Thus, in each complete bearing there is one outer race, one inner race, two roller assemblies and one spacer ring.

The entire bearing can be completely disassembled. The rollers are retained in the cages when the roller assemblies are in place in the outer races. When the roller assemblies are withdrawn from the outer races, all the rollers are removable from the cages. This is of great assistance in cleaning and inspection.

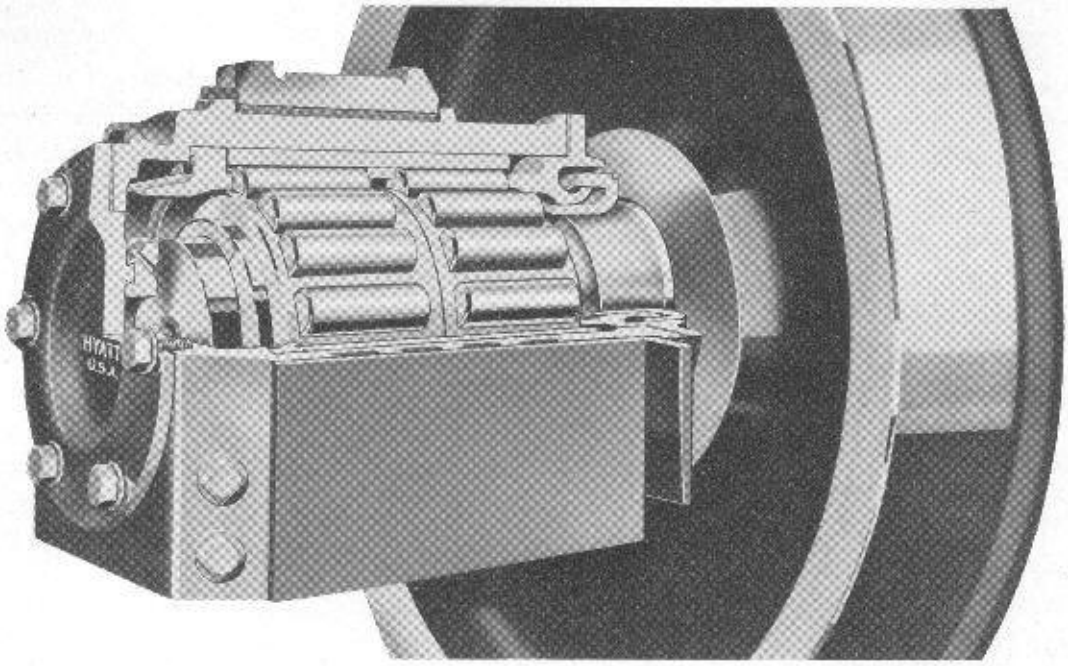


Fig. 4. Type JM Hyatt Roller Bearing Railroad Journal Box.

When roller assemblies are removed for cleaning, or inspection, each cage should be tagged with the serial number of the journal box, and position, whether front or rear.

Rollers should be kept with the cages to which they belong. It will be observed that each roller is marked on one end. This marked end should always be placed toward the center spacer ring for the purpose of future identification. If the above procedure is followed, it will prevent bearing parts from becoming mixed and will insure that each part is reassembled in the position in which it belongs. It makes no difference into which pocket of a cage a roller is put.

When assembling the rollers into the cage, first place a heavy rubber band around the circumference of the cage. The rollers can then be inserted into the cage windows and will be held from falling out by the rubber band. When all the rollers are in place in the cage, it can be lowered vertically into the outer race, sliding the rubber band off as the rollers enter the race. The roller assembly can best be handled by extending both hands through the cage and lifting it from the bottom.

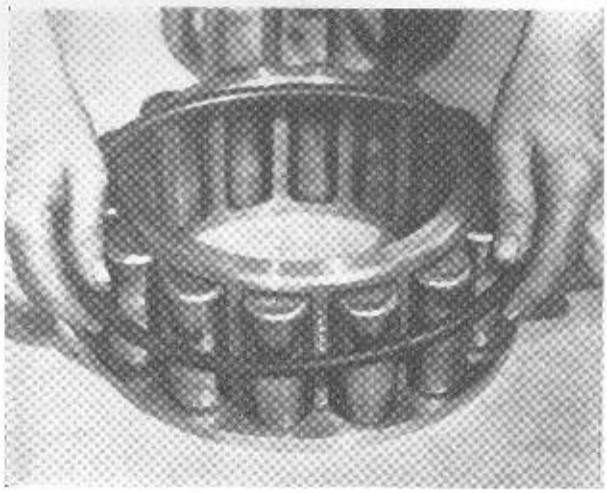


Fig. 5. Placing rubber ring around rollers to hold them in place in the cage.

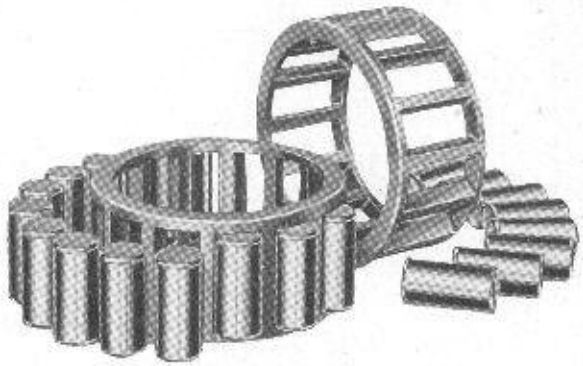


Fig. 6. Cages and rollers completely dismantled to show construction.

When there are a number of roller assemblies to be assembled, it is well to have wire hoops to replace the rubber bands after all the rollers are in place, because they are less subject to wear.

When removing a roller assembly from a journal box, always place the wire hoop over the rollers before they are completely withdrawn from the race to prevent the rollers from falling out of the cage.

The rollers are retained in proper longitudinal position in the bearing by hardened retainment surfaces on the retainment ring and on the rear end cap as shown in Figure 7. These retainment surfaces contact the ends of the rollers outside of the cages and do not come in contact with the cage.

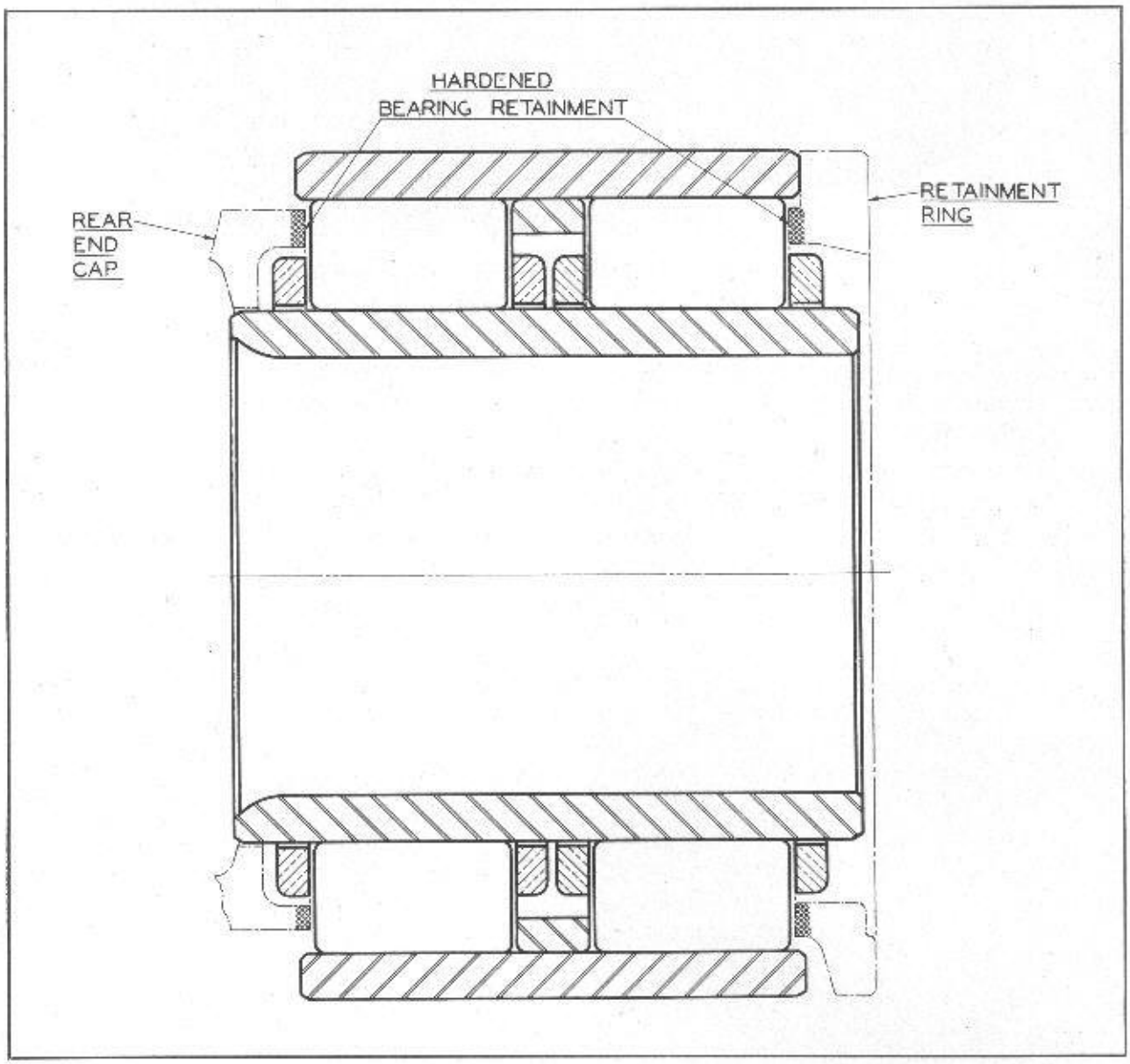


Fig. 7. Front and rear roller retainment showing hardened surfaces adjacent to roller ends.

Description of the Hyatt Type JM Journal Box

The **Type JM Journal Box** is composed of only a few major parts of rugged construction, which are so designed that they can only be assembled in the right way. These principal parts are the housing, rear end cap, retainment ring, front cover and thrust block, sub-equalizer and water guard. The latter is not specifically a journal box part as it is attached to the axle. The sub-equalizer is also sometimes omitted in favor of a seat cast integral with the housing. In addition there are a few minor parts such as gaskets, sub-equalizer pads, studs, cap screws, etc.

Each journal box has a separate and distinct Hyatt serial number which is stamped on the front of the box near the inspection cover.

Referring to Figures 8 and 9, it will be observed that the journal boxes are made with two different front end arrangements. Figure 8 shows a plain journal box without any provision for attaching auxiliary train or brake control devices, speedometers, etc. Figure 9 shows the combination box in which the front is modified to provide the A.A.R. mounting for any of these auxiliary devices. It will be observed that only the front cover is changed to accomplish this. Either type of cover may be used interchangeably. When an auxiliary device is not used with a combination box the front opening is closed by a closure plate and gasket as shown in broken lines. These two items are not furnished as standard equipment with all combination boxes but must be ordered as extras when they are required.

The **Housing** is an electric carbon steel casting. The interior is bored out to receive the retainment ring and outer race and to center the rear end cover. The lower part of the housing forms an oil reservoir and sump into which any foreign matter will settle away from the bearing operating surfaces.

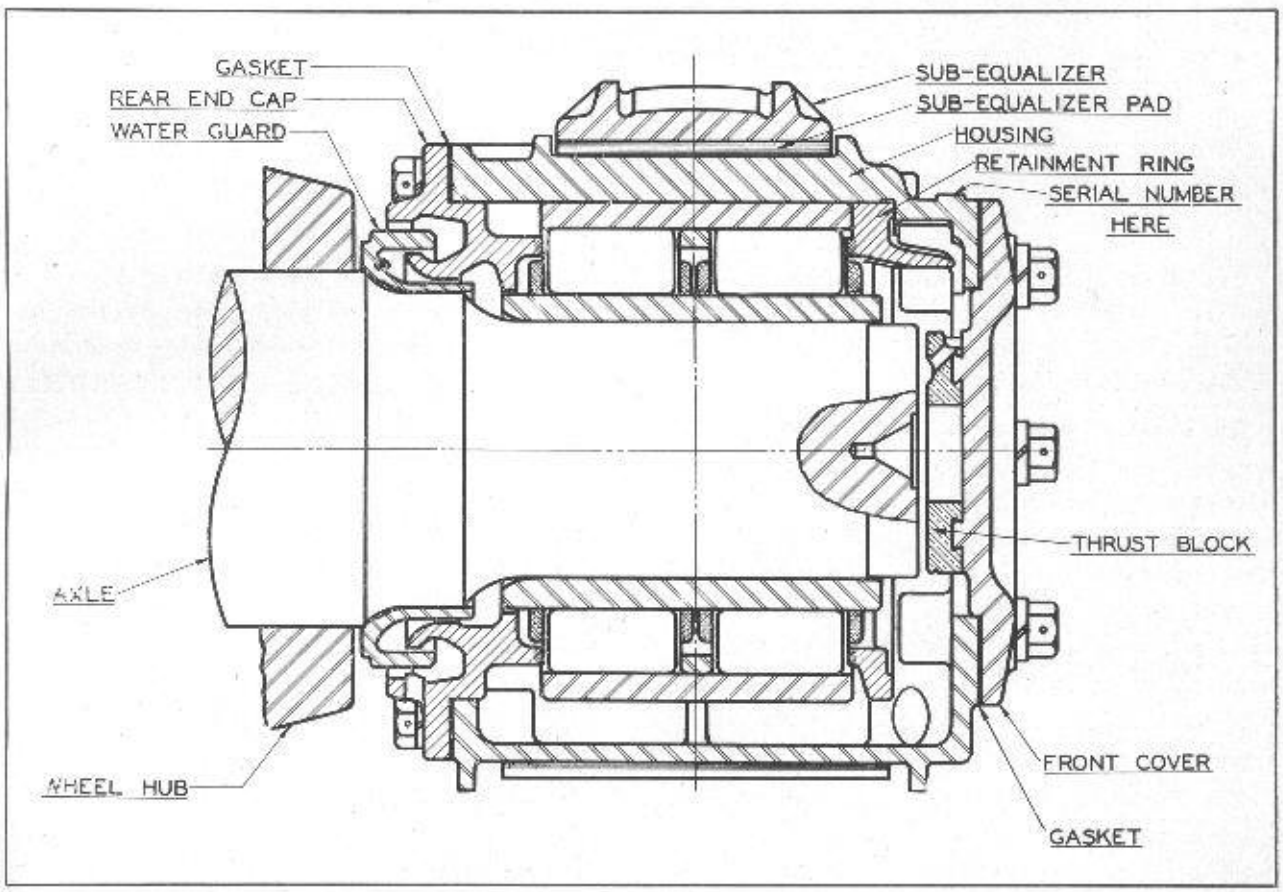


Fig. 8. Cross section of the type JM Hyatt Roller Bearing Journal Box (plain).

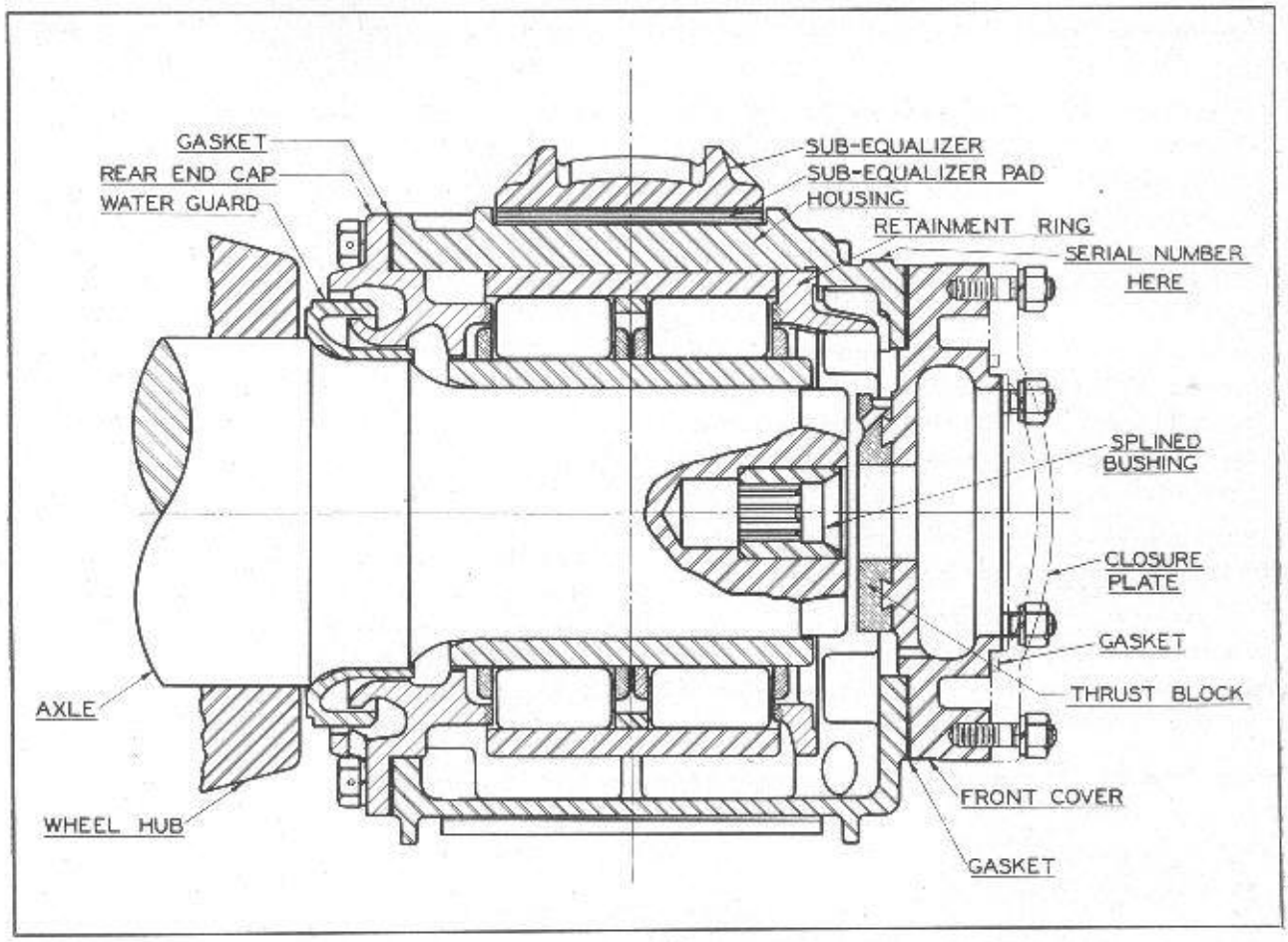


Fig. 9. Cross section of the type JM Hyatt Roller Bearing Journal Box (Combination).

The oil filling hole and drain hole open directly into the oil reservoir. The oil filling hole is so placed that the oil will overflow when the maximum desirable level is reached.

The **Pedestal Ways** on the outside of the housing are lined with renewable heat-treated steel liners. The liners are welded to the box. See instructions under "General Inspection" for limits of liner wear. The top of the housing forms a seat for the sub-equalizer where one is used. Suitable machined faces are provided for receiving the rear end cap and front cover. Provisions are also made for application of heat indicators of the odor type, the smoke type, or the electric alarm type where desired.

The **Retainment Ring** is a high strength iron casting. The outside of the ring is turned to fit the bore of the housing. It is positioned between the end of the outer race and a shoulder at the end of the housing bore and is prevented from rotation by engagement of the oil port spout with suitable bosses cast in the inside of the housing. The retainment ring carries the hardened retainment surface for the outer ends of the rollers. The retainment ring also serves to feed lubricant from the roller bearing operating space to the thrust block. As the roller assembly revolves, the oil which is carried around with it tends to be forced outward at the ends of the bearing. A groove is provided adjacent to the hardened retainment face, which collects this oil and allows it to flow through suitable ports to the thrust block face. This circulation will provide sufficient oil for thrust block lubrication.

The **Thrust Block** is of cast bronze of an analysis selected for its excellent bearing qualities. It provides a separate and adequate means for absorbing lateral thrust. Therefore, the roller bearing is not

robbed of any of its radial load carrying capacity in order to provide for lateral thrust loads. The bronze thrust block is carried on a circular steel backing plate which also serves as the **Front Cover** for the journal box. It is thus apparent that the thrust unit may be removed for inspection at any time without disturbing any of the other journal box or bearing parts, or draining the oil.

It will be observed that on the combination box the front cover is of the adaptor type and is provided with an outer bolting face for attaching auxiliary control or indicating devices. Also, there is an opening through the center to permit the drive shaft of the device to pass through to engage the splined drive bushing in the end of the axle.

The front covers are attached to the front of the box by large cap screws which can be wired together to prevent loosening.

Lateral clearance is provided between the end of the axle and the thrust block. This allows the axle to float laterally in the truck, which is highly desirable to improve the riding qualities of the equipment and increase wheel flange life.

A lateral clearance of $\frac{3}{16}$" to $\frac{1}{4}$" per box has generally been found to give the best riding qualities.

The thrust block is not subject to rapid wear. Many instances of over one million miles service life are proof of its effectiveness in handling thrust loads. However, a witness groove is provided to show when $\frac{1}{8}$" wear has accumulated, at which time the original thickness can be restored by applying hard babbitt and re-machining. Instructions for this will be furnished on request.

The **Rear End Cap** is of high test cast iron. It serves as a rear closure and embodies a hardened retainment surface for endwise retainment of the rollers, an oil seal and, with the water guard, an effective means for excluding foreign matter.

The oil seal is the result of considerable development work and has proven very effective. There is nothing in connection with this seal which touches the axle, and, therefore, no wear will occur. An inwardly extending flange surrounds the inner race with small clearance. Oil which passes this flange is flung outwardly by centrifugal force.

An annular space is provided in the end cap to catch this oil and drain it back into the oil reservoir. The object is to prevent any oil from collecting at the underside of the axle and this is accomplished by the shape and form of the annular recess and the location of the ports leading to the reservoir. A baffle is also provided against upward surge of the oil from the reservoir itself. The inside diameter of the end cap fits with close running clearance.

Referring again to Figure 9, it will be observed that an outwardly flared flange on the rear end cap fits with close clearance into the inside diameter of the water guard and a second flange surrounds the outside of the water guard. This combination forms a seal against entrance of foreign matter or water. The rear end cap is fastened in position with cap screws which are secured with lock washers and also wired together.

Heavy graphited **Gaskets**, $\frac{1}{16}$" thick, are provided for both the rear end cap and the front cover.

The **Water Guard** is a machined steel forging and is shrunk on the dust guard portion of the axle, as shown in Figures 8 and 9.

The water guard remains in place for the life of the wheel. When new wheels are applied, the water guards can be removed after being heated with a torch sufficiently to release the shrink fit. The same water guard can be re-used with the new wheels. When heating the water guards, prior to removal, always protect the inner races and the axles from heat. A heavy asbestos sleeve will be found suitable for this purpose. Be sure the water guard is correctly positioned when shrinking it in place.

The **Sub-equalizer** serves as a seat for the equalizers. It has no other purpose. It is made of cast or forged steel and can be rapidly replaced when worn. In some designs the equalizer seat is cast integral with the housing.

A semi-resilient pad is placed between the Sub-equalizer and the journal box. This serves as a noise and vibration deadener and helps to distribute the load over the top of the box.

INTERCHANGEABILITY

All parts of both the journal box and the bearing are interchangeable when new. This interchangeability is maintained for the entire life of the installation for all parts *except* the *rollers* and the *outer races*. Rollers and outer races should be treated as a unit and kept together. However, should replacements become necessary a new outer race may be mated with used rollers, but new rollers should never be mated with a worn outer race surface. This can be avoided by turning a worn outer race 180° in the housing so as to present an unused surface for the load zone, providing the race has not previously been turned. If the race has previously been turned, a new outer race should be applied with the new rollers.

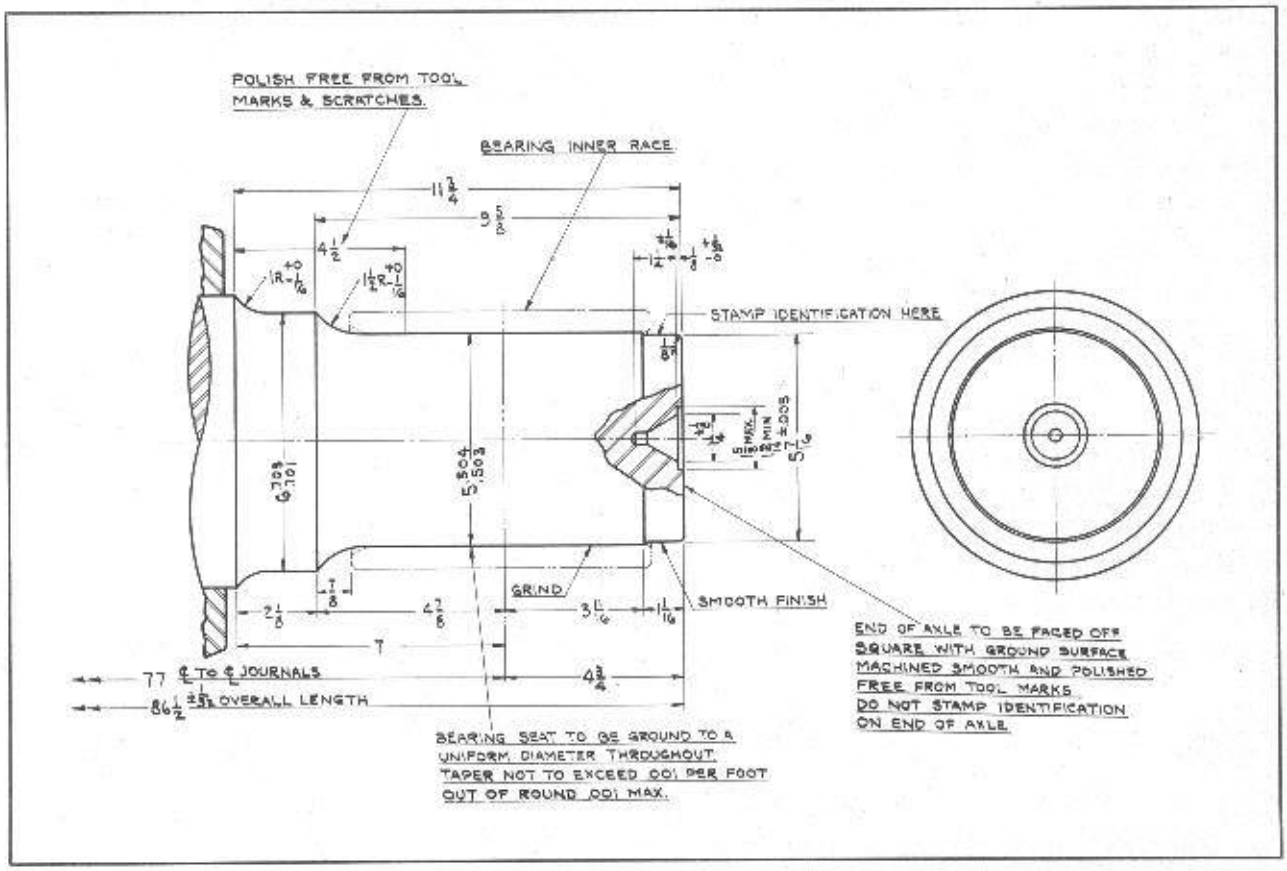


Fig. 10. Representative axle detail drawing for type JM Journal Box.

INSPECTION AND MAINTENANCE

The simplicity of design of Hyatt boxes and the fact that they are removable by hand from the journals greatly facilitates ease of handling and reduces inspection and maintenance costs to a minimum.

In taking care of roller bearings the first consideration is cleanliness. It is imperative that the bearing and the inside of the box be kept, as nearly as possible, free from outside grit and dirt. Do not handle the bearings with dirty hands. Use clean cloths for wiping the various parts. The use of waste is not recommended because the lint will adhere to the metal surfaces.

When machining new axles, be sure to maintain the dimensions and instructions given on the Hyatt axle detail drawing. For the first few axles machined it will be advisable to have a Hyatt representative present for supervision, advice and instruction. Subsequently, this will not be necessary. See figures 10 and 11 for representative axle designs.

It is imperative to hold the journal diameter within the limits specified. Inasmuch as there is only .003 to .005 shrink fit interference between the race bore and the journal diameter, it will be seen that no liberties can be taken with the journal diameters if the correct shrink fit is to be obtained. In order to insure correct measurements the micrometers used should be checked against a known standard and the axles should always be measured when they are cold and never when they are warm from machining. All the fillets and the axle ends must be polished free from tool marks. The axle ends must be flat and square with the cylindrical journal. Remove all burrs around the center holes to avoid cutting the thrust block. This should be done every time wheels are turned. Each axle should be stamped, in the position indicated on the axle drawing, with the axle identification.

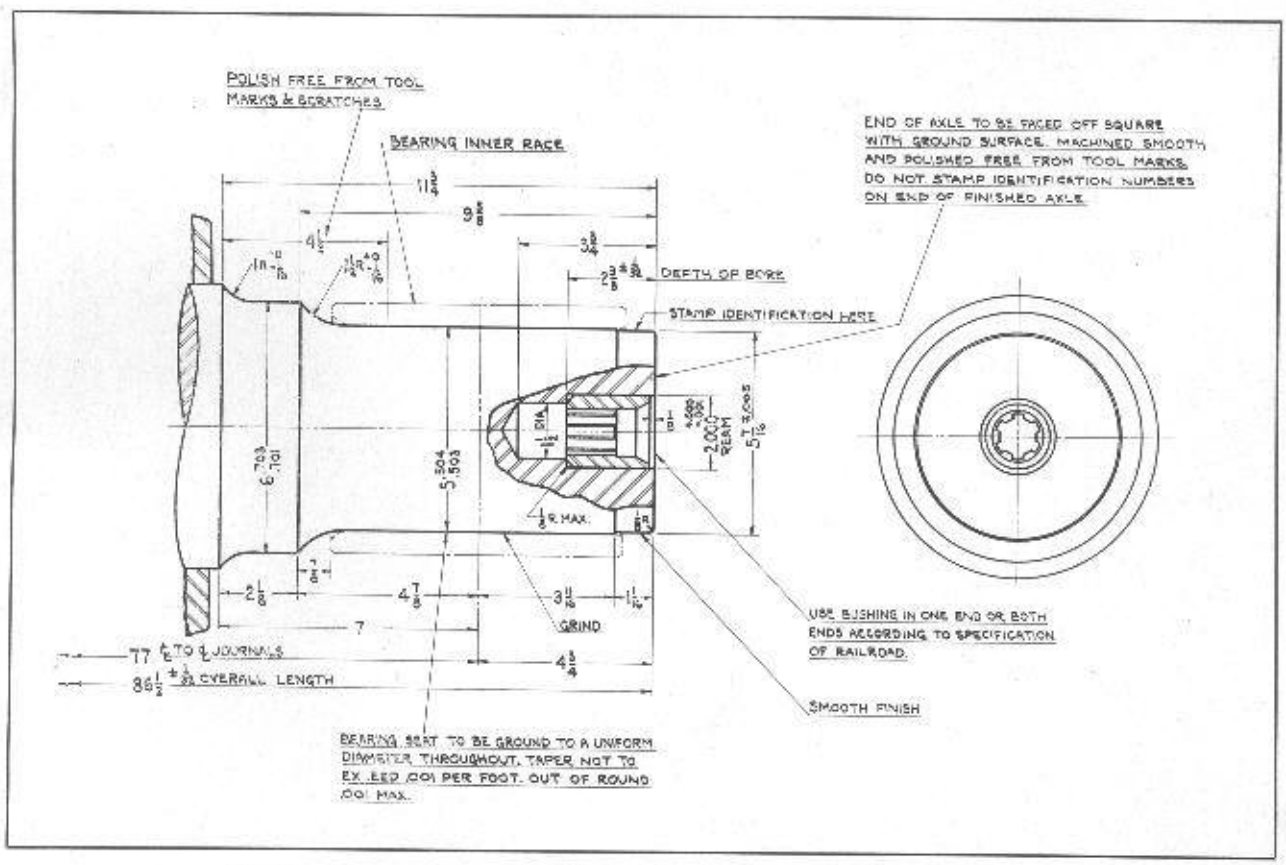


Fig. 11. Representative axle detail drawing, for the type JM Journal Box, with the splined bushing in place.

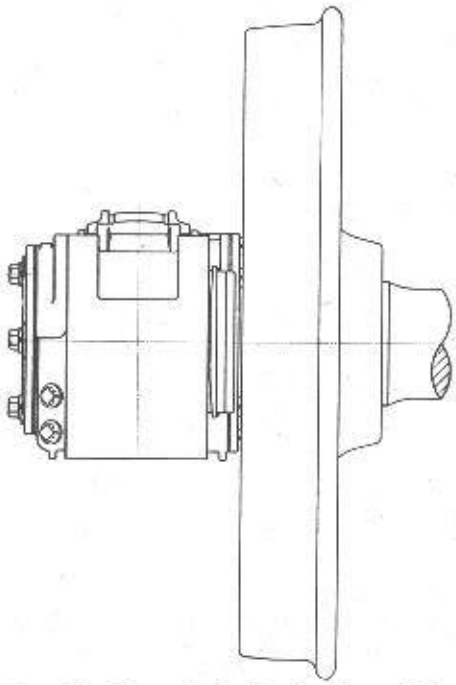


Fig. 12A. Hyatt Roller Bearing Journal Box assembled on the journal.

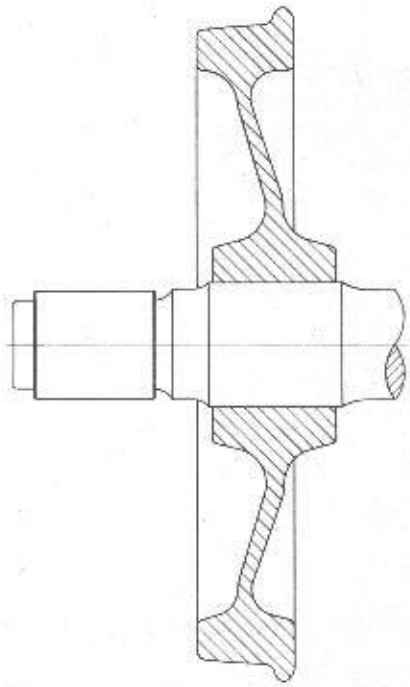


Fig. 12B. Hyatt Journal Box removed from the journal. Bearing inner race is still in place.

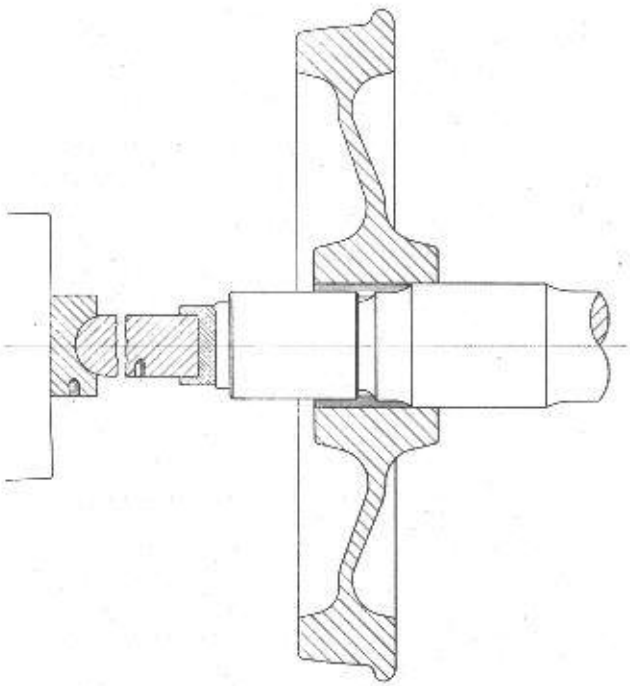


Fig. 12C. Wheel partly pressed off the axle. Note that the bearing inner race is not disturbed. Note also the design of the self-aligning cap and block shown in the section under the press ram.

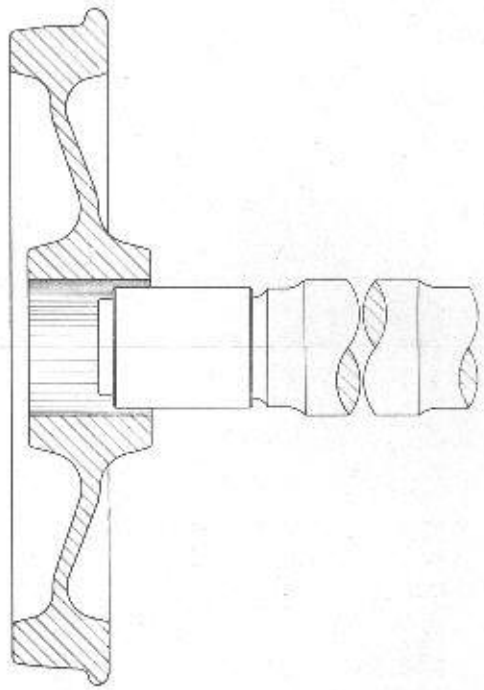


Fig. 12D. Wheel completely removed. The bearing inner race remains on the journal.

Wheels must be carefully mated on each axle and, at the high speeds at which modern trains operate, the roundness of the wheels is extremely important. This requires particular vigilance if the wheels are turned in an ordinary wheel lathe, particularly if it has seen long service. The standards heretofore acceptable for passenger and freight service will not be found suitable for high-speed operation of lightweight trains.

The wheels should be mounted so that they are evenly spaced with regard to the axle center line. When wheels are pressed on or off, particularly the latter, be careful to apply the pressure uniformly over the end of the axle to avoid upsetting it. Always interpose soft brass or copper between the end of the axle and the ram of the press.

An upset condition of the axle end will cause the journal to swell locally at the outer end, which would be transferred to the outside of the inner race as a high spot on the operating surface. This would not only invite early failure of the race, but might even interfere with the assembly of the box over the journal. Figures 12c and 14 show self-aligning pressure blocks for use in the wheel press for mounting and dismounting wheels or for removing inner races. These are inexpensive and will help insure good results. Their use is strongly recommended.

All wheel work may be done without disturbing the inner races. They should, however, be protected against damage by applying sheet copper or brass sleeves over them while wheel work is in process.

When journal boxes are removed from an axle for wheel work all loose dirt should be wiped from the rear cover before the box is completely removed. After the box is removed, it should have a careful visual inspection inside and out. The interior should be protected by tying a clean cloth over the rear opening until ready to put the box back on the journal.

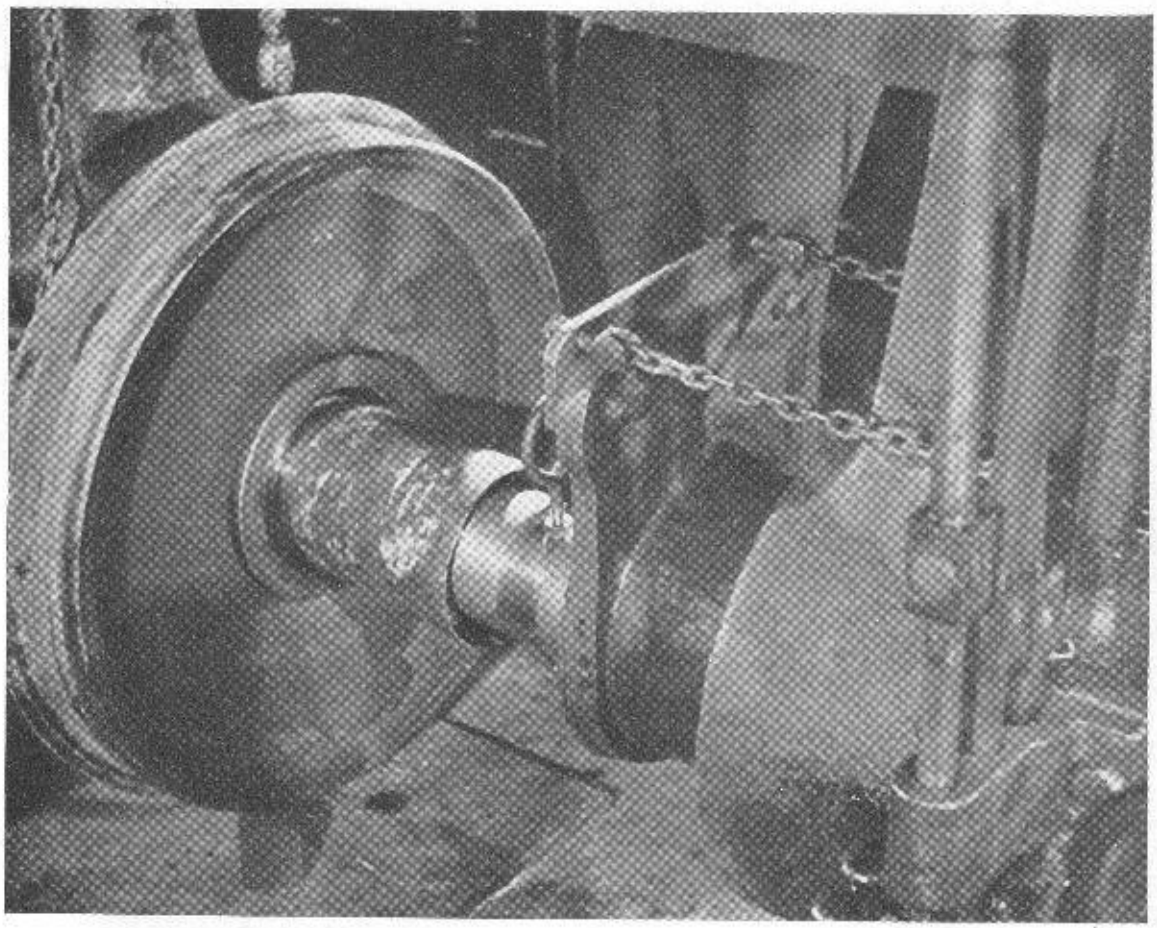


Fig. 13. Car wheel being removed from the journal in a wheel press, without disturbing the bearing inner race. The inner race has been covered with a sheet steel cylinder for protection.

Removing Inner Races

If it should become necessary to remove an inner race, the race can be removed from the journal by pressing it off with the wheel. The latter is done by interposing a split collar between the race and the wheel hub. See Fig. 14.

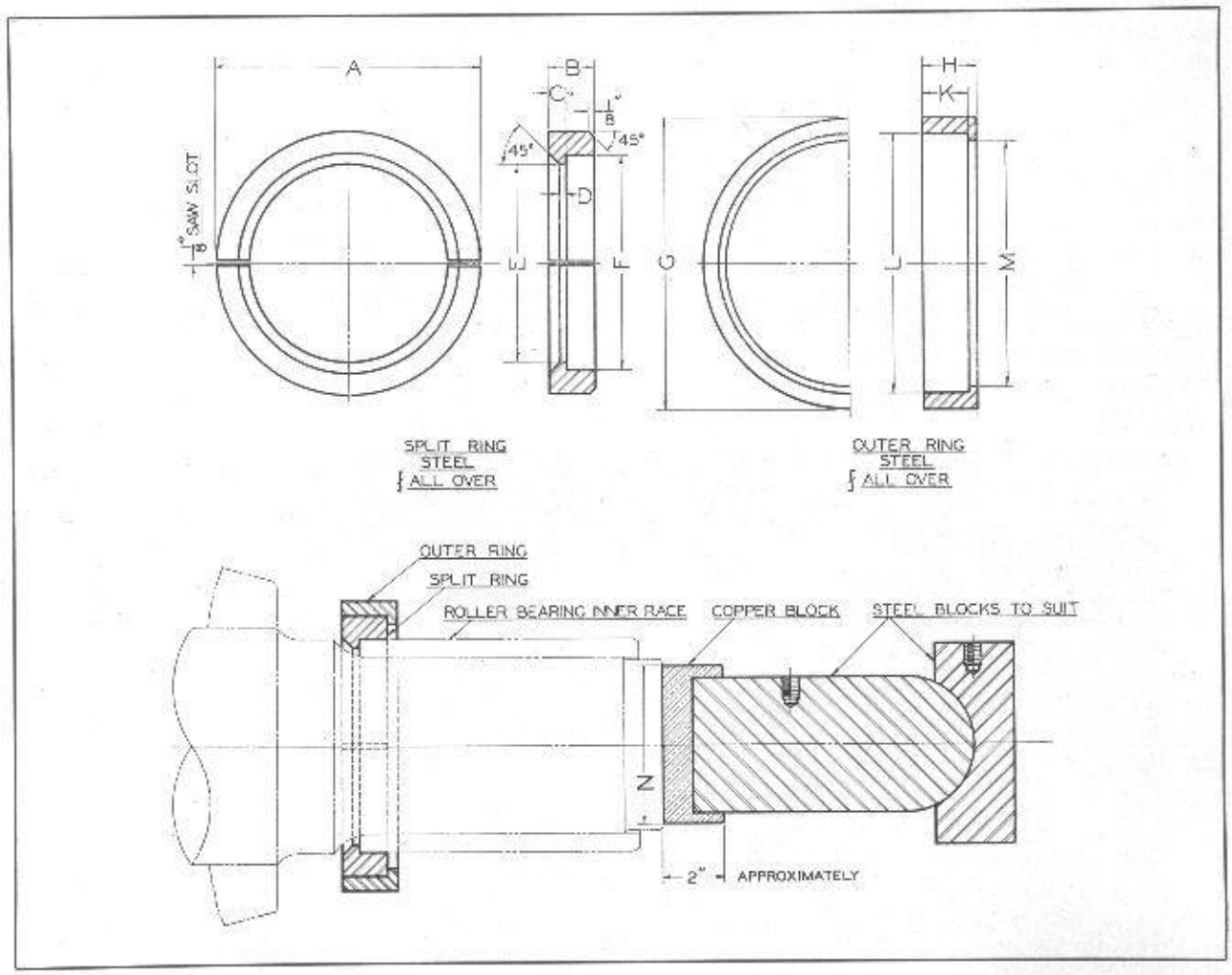


Fig. 14. Detail of split ring for pressing inner races off the axles. The self-aligning pressure block insures uniform pressure over the end of the axle and prevents damage.

Journal Diameter	Bearing Number	SPLIT RING						OUTER RING					
		A	B	C	D	E	F	G	H	K	L	M	N
5 x 9	D-85002	$7^{21}/_{32}$	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$5^{11}/_{16}$	$6^{7}/_{32}$	$9\frac{1}{4}$	2	$1\frac{1}{2}$	$7^{11}/_{16}$	$6^{15}/_{16}$	$4\frac{1}{2}$
$5\frac{1}{2}$ x 10	D-85504	$8^{7}/_{32}$	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$6^{5}/_{16}$	$6^{23}/_{32}$	$9\frac{3}{4}$	2	$1\frac{1}{2}$	$8\frac{1}{4}$	$7\frac{1}{2}$	5
6 x 11	D-86003	$8^{27}/_{32}$	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$6^{11}/_{16}$	$7^{3}/_{16}$	$10\frac{3}{8}$	2	$1\frac{1}{2}$	$8\frac{7}{8}$	$8\frac{1}{8}$	$5\frac{1}{2}$
$6\frac{1}{2}$ x 12	D-86503	$9^{29}/_{32}$	$1\frac{1}{2}$	$\frac{5}{16}$	$\frac{5}{16}$	$7\frac{3}{8}$	$7^{15}/_{16}$	$11\frac{1}{2}$	2	$1\frac{1}{2}$	$9^{15}/_{16}$	$9\frac{3}{16}$	6
7 x 13	D-87001	$10^{15}/_{32}$	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$7\frac{3}{4}$	$8\frac{1}{32}$	12	2	$1\frac{1}{2}$	$10^{7}/_{16}$	$9^{11}/_{16}$	$6\frac{1}{2}$

Mounting Inner Races

After removing an inner race, always inspect the journal for defects, size, etc. before applying a new race.

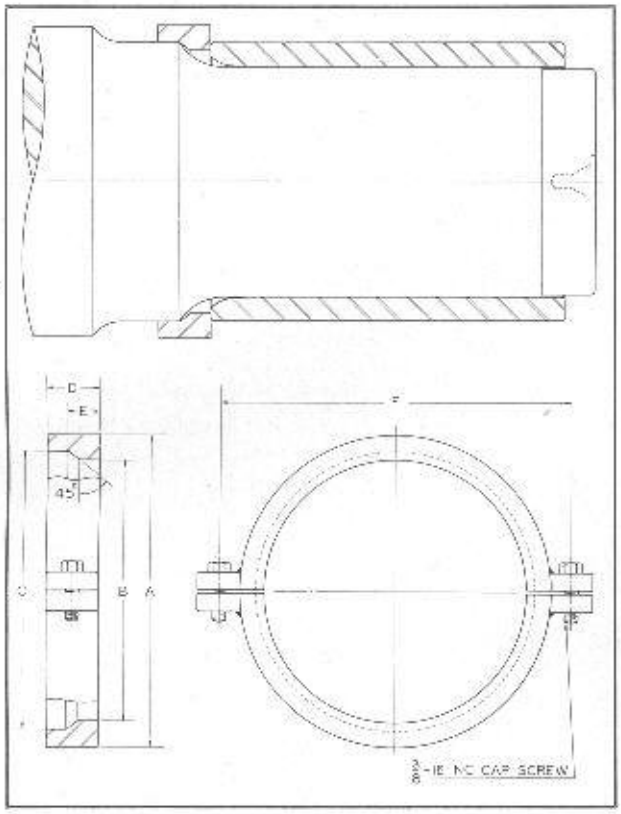


Fig. 15. Design of split collar for properly locating the bearing inner race on the journal. Table of dimensions is shown below.

TABLE OF DIMENSIONS FOR DIFFERENT JOURNAL SIZES

Nominal Axle Size	Bearing No.	A	B	C	D	E	F
5½ x 10	D-85504	7¾	6 7/16	6 11/16	1¼	⅞	8⅞
6 x 11	D-86003	8 3/16	6⅞	7 11/64	1¼	⅞	9 1/16
6½ x 12	D-86303	8⅞	7⅜	7 51/64	1	11/16	10
5 x 9	D-85002	7¼	5 9/16	6 15/64	1⅜	1	8⅜
7 x 13	D-87001	9¼	7 9/16	8 17/64	1⅜	1 1/16	10 3/8

The new race is applied by heating it in oil or by induction to a maximum of 300°F. and shrinking it in place. When heated, the race can be put in place by hand, taking care not to get it cocked and stuck fast out of proper position. A split collar, shown in Fig. 15 clamped around the journal will space the race the proper distance from the journal

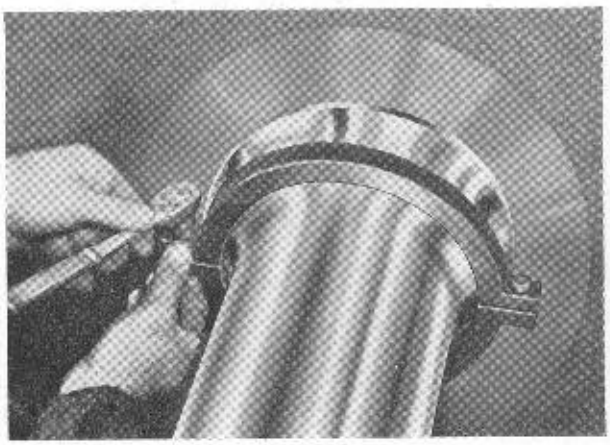


Fig. 16. A split collar being clamped around the journal to properly locate the inner race with relation to the journal fillet.

fillet. Due to slight variations in axle length, it is preferable to locate the race from the fillet rather than from the end of the axle. Under no conditions should the shrink fit of the race encroach upon the journal fillet.

When proper electrical equipment is available the inner races may be heated for removal or application by induction. Due to the special equipment required this method will not be discussed here but detailed information will be furnished on request.

Lateral Clearance

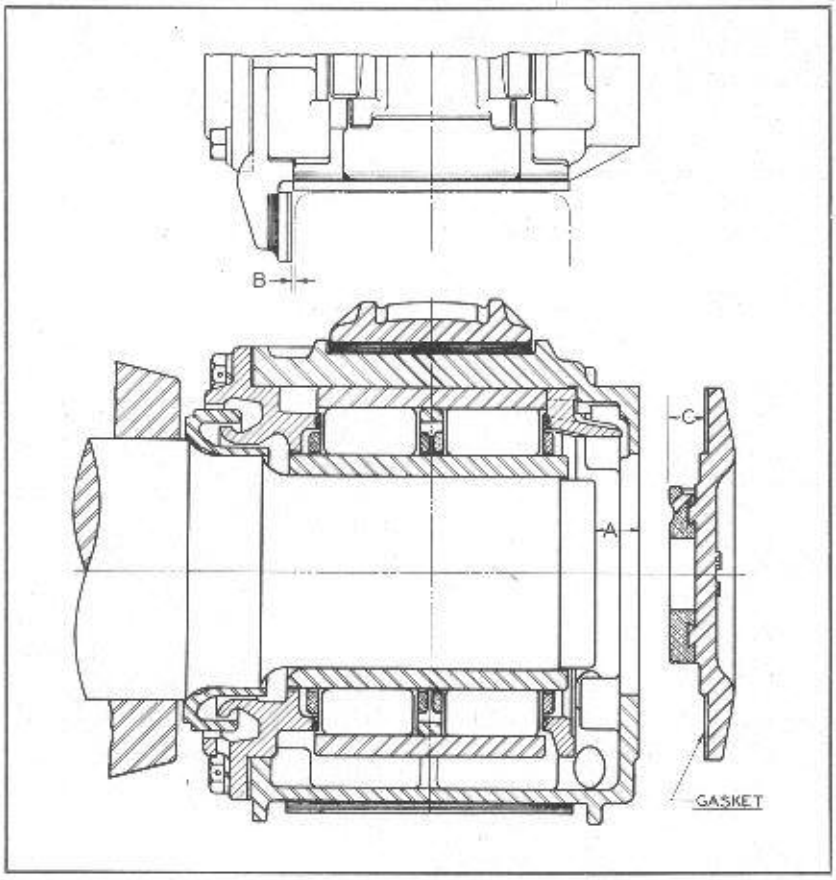


Fig. 17. Method for checking the lateral clearance between the axle end and the thrust block.

There is provided in each Type JM journal box a nominal lateral clearance of ⅛" between the end of the axle and the thrust block. An additional 1/16" lateral clearance is provided between the rear pedestal way flange on the journal box and the truck pedestal. This makes ¼" lateral per axle inside the journal boxes and ⅛" outside, making a total lateral per axle of ⅜".

The lateral can readily be checked when desired by removing both front covers on an axle and making a few scale measurements, as follows:

1. Measure the distance on both ends of the axle from the axle end to the housing bolting face for the front cover, *not including the gasket*. This is Dimension "A" in Fig. 17. Add these two measurements together. Also add any clearance between the journal box flanges and the truck pedestals as indicated by dimension "B".

2. With the gaskets in position on the front covers measure both covers from the thrust block face to the gasket against the bolting flange. This is shown as Dimension "C" in Fig. 17. Add the two "C" measurements together.

3. Subtract the sum of the "C" measurements from the sum of the "A" and "B" measurements and the remainder will be the total lateral clearance for that particular axle.

It should be understood that wear on pedestal way flange liners, pedestal liners and on thrust blocks will be reflected as increased lateral clearance. Wear on thrust blocks will be very slow and easily discernible. Hence when the lateral increases beyond ⅝" total the liners should be checked for wear. This can be done without dropping the axle. (See Paragraph under General Inspection for limits of wear on these parts.) Worn liners must be replaced to maintain good riding qualities.

The journal boxes should be lubricated with straight mineral oil. Oil containing fillers, graphite, etc. should not be used in Hyatt boxes.

It is important that the oil used be fluid at all operating temperatures. We have, therefore, adopted the following specifications for general guidance in selecting lubricants:

Straight Mineral Oil without Fillers, Graphite, etc.

Minimum Viscosity @ 100°F.
300 seconds Saybolt Universal
Minimum Viscosity @ 210°F.
50 seconds Saybolt Universal
Minimum Flash Cleveland Open Cup 325°F.
Maximum Pour Point 10°F.
Neutralization .20 mg. KOH per gram maximum

Many users prefer to make seasonal changes to "winter" or "summer" oils, and such a practice is satisfactory. In general, however, a lubricant having a viscosity from 500 to 700 seconds at 100°F. and 10°F. maximum pour point, should be found satisfactory for all year operation at all atmospheric temperatures.

In filling the boxes the car should be on level track and each box should be filled until it overflows at the filler hole except where special oil gauges and filling arrangements are provided. Be sure the oil plug is replaced securely and wired. Always use clean containers and cans for roller bearing oil. Do not use oil that has been left standing in an open pail. It may be dirty.

The length of time between oil level inspections will vary according to daily mileages and speeds. In general, however, intervals of approximately one month should not be exceeded. It is best to check the oil levels after each trip for a time until sufficient experience has been established to indicate the proper oil inspection intervals. Always wipe the dust and dirt away from the oil plug before it is removed.

The regular oil gauge as supplied by Hyatt may generally be used in checking oil levels. (See Fig. 18.) The allowable drop in oil level varies for different sizes of boxes, due to the different roller diameters. The Hyatt gauge will measure the amount in inches that the oil level has lowered below maximum. Minimum oil levels will be reached at the following oil gauge readings:

Hyatt Type JM Journal Boxes

Nominal Journal Size	Bearing Number	Minimum Level Oil Gauge Reading
5 x 9	D85002	5/8
5½ x 10	D85504	11/16
6 x 11	D86003	3/4
6½ x 12	D86503	13/16
7 x 13	D87001	13/16

If oil level is at or near minimum, the boxes should be filled before releasing the car.

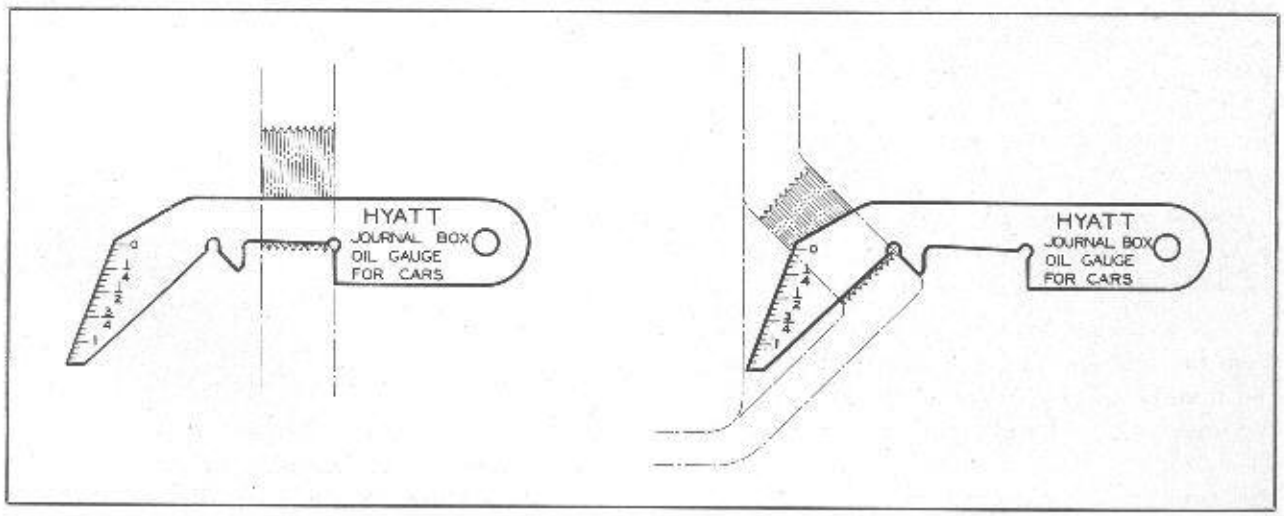


Fig. 18. Hyatt Railroad Journal Box oil gauge—showing use with different types of journal boxes.

General Inspection

At intervals of approximately one year it is recommended that the boxes and bearings be completely disassembled for thorough cleaning and detailed inspection of all parts. This inspection can be made at a regular shopping period of the car or at a wheel changing period to avoid extra lost time. Kerosene or some suitable substitute should be used as a cleaning medium.

After the parts are washed and inspected, they must be kept clean until they are reassembled. Clean wiping cloths and clean hands are essential. Do not put cleaned bearing and box parts on a dirty bench. Use clean paper under them and cover them up until needed. If they are to remain for any length of time they should be oiled to prevent rust and washed again before being reassembled for service.

It is desirable that a Hyatt representative be present during the first inspection of Hyatt journal boxes. If this cannot be arranged, it is requested that Hyatt be furnished with a report of the conditions found.

For an inspection of journal boxes and bearings, the following procedure is suggested:

1. Provide a good supply of clean cloths with brushes (both wire and bristle) and suitable shallow washing pans for the kerosene or other cleaning fluid. Provide a supply of clean paper to cover benches and to cover the parts after they are cleaned.

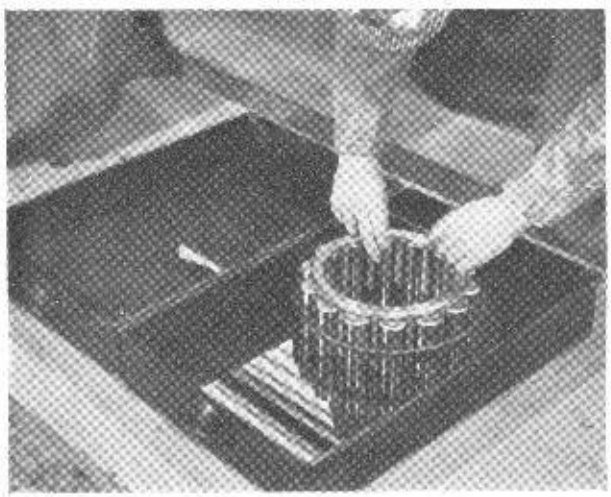


Fig. 19. Bearing roller assembly being placed in shallow pan preparatory to cleaning.

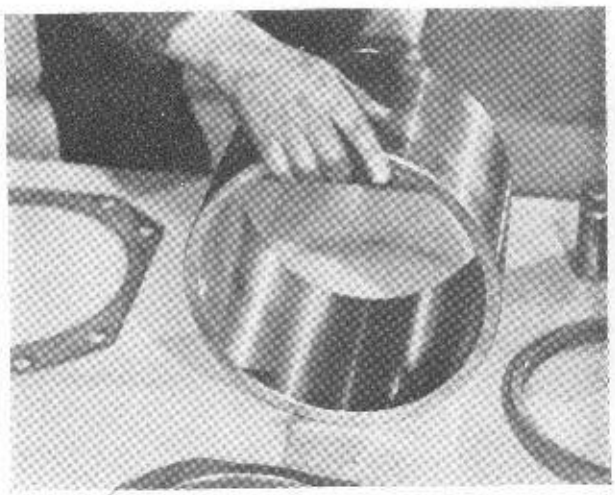


Fig. 20. Inspecting the bearing outer race.

2. Drain the oil from the boxes. Remove them from the journals and set them down with open end up.

3. Remove rear end caps. Take care not to tear gaskets.

4. Remove roller assemblies and spacer ring. Place a wire hoop around the rollers before they are completely withdrawn from the outer race, so they will not fall out of the separator while handling. Tag cages to show box serial number and position in the box, whether front or rear. Rollers should always be returned to the same roller assembly from which they were removed.

5. Turn boxes on open end in shallow pans to drain.

6. Remove front covers and thrust blocks, taking care not to damage the gasket.

7. Outer races and retainment rings should be pressed out together or withdrawn with a threaded puller.* Do not drive them out.

8. Scrape the accumulation of dirt off the outside of the journal box housing. Housing can then be immersed in hot alkaline cleaning solution after

*Specifications furnished upon request.

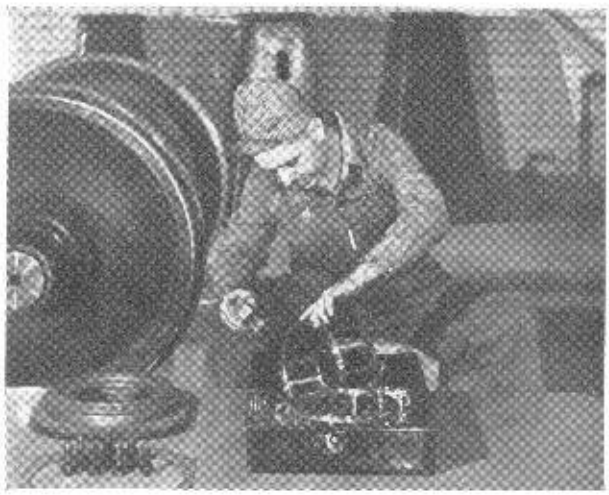


Fig. 21. Cleaning the bearing separators.

which it should be rinsed in hot water and allowed to dry. Note specially that stench bombs or smoke bombs should not be immersed in the hot solution. If they cannot be readily removed they should be kept out of the solution. The housing should then be visually inspected and if any foreign matter is still present in the interior it should be washed out with kerosene or suitable substitute and blown out with air. All other parts of box and bearing should be washed in kerosene or suitable substitute. They should be wiped dry with clean cloths. A small stiff brush, either wire or bristle, will be found useful in cleaning the various parts, especially the cages. If the carbonized oil on the cages is difficult to remove the cages may be immersed in any non-corrosive cleaning solution, but if this is done the cages must be subsequently washed thoroughly in kerosene or substitute.

9. Thoroughly inspect all parts and make notes of condition, using name of part, box serial number, car number and, if available, location of box in car as identification references. It is suggested that particular attention be paid to those parts likely to be subjected to the heaviest duty. These will include journal box liners, truck pedestal liners, thrust blocks, roller retainment surfaces, and all bearing parts. Thrust block wear should accumulate very slowly under normal conditions, but when it reaches $\frac{1}{8}$" the original dimension should be restored by replacing the thrust block or applying Babbitt. Hyatt will furnish a drawing on request, showing how this should be done. Truck pedestal liners and journal box pedestal way liners should be replaced after they have worn $\frac{3}{32}$" on any surface. Roller retainment surfaces and bearing surfaces may be continued in service as long as they are free from fatigue, undue wear and rust. Fatigue is usually characterized by the appearance of pitting or shelling of the operating surface. Roller bearings should not fail due to premature wear. If wear accumulates fast enough to shorten bearing life, it is evidence of defective material or foreign matter in the bearing. If any parts require replacement for any reason make special note of them in the inspection record and segregate them for possible further examination and shipment back to Hyatt, if necessary. When replacing pedestal way liners they should be firmly clamped in position before welding.

10. Reassemble all parts. The retainment ring and outer race should be assembled first after which the outer race should be oiled. Then the front roller assembly should be inserted. Follow with the spacer ring, rear roller assembly and rear end cap and gasket.

Be sure the rear end cap gasket is in good condition and that the screws are tight and securely wired. Always put the marked end of the rollers

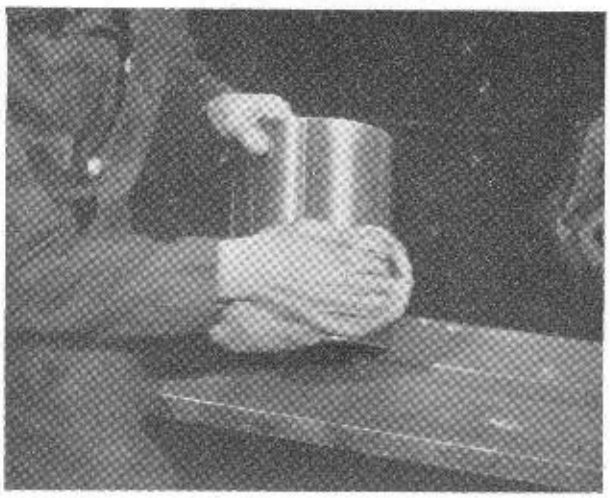


Fig. 22. Cleaning the bearing inner race.

toward the center spacer ring and in the right position, front or rear, of the bearing. When finished tie a clean cloth over the rear opening to protect the interior until the box is put back on the axle. Next assemble the front cover and thrust block. Replace heat indicator, if it has previously been removed.

Wash the journals, including the water guard, before boxes are put back on the axle. After washing the inner race, it should be oiled. Rotate the boxes after they are on the journals to distribute the oil.

12. Fill boxes with oil.

Each time the trucks are shopped they should be trammed and checked for alignment. Cross corner tramming should be within plus or minus $\frac{1}{8}$". Longitudinal and lateral tramming between pedestals should be within $\frac{1}{16}$" plus or minus. The width of the pedestal openings should not vary more than plus $\frac{1}{16}$, minus nothing. The width of the pedestal driving faces should be the same for both legs of the same pedestal but may vary from one pedestal to another.

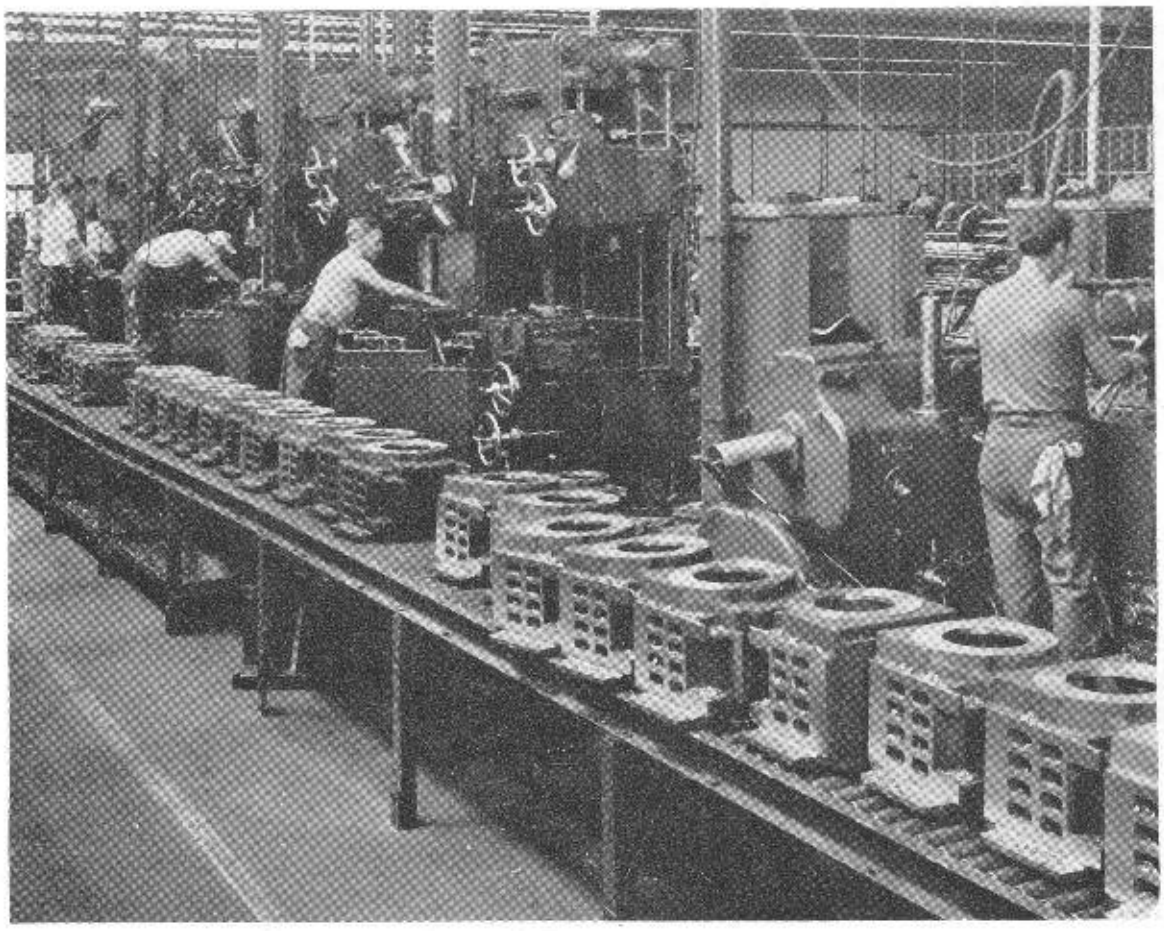


Fig. 23. View of the Hyatt plant showing Railroad Journal Boxes in the process of manufacture.

REPLACEMENT OF PARTS

General Information for Ordering Parts

If for any reason it should become necessary to replace bearing parts or journal box parts, the following information will serve as a guide to the proper procedure to be followed.

Replacement parts should be ordered from Hyatt Bearings Division, General Motors Corporation, Harrison, N. J. or Chicago, Illinois. When ordering, always include letter with complete information as to the reason for the replacements. In the case of defective parts the defect should be clearly described, and the parts removed from service should be held for Hyatt disposition so that they can be examined if desired.

All bearing parts are identified with a piece number and, with the exception of rollers and center rings, each part has its piece number stamped upon it. The following is a typical example:—

Bearing D-85504 for 5½ x 10 journal includes

1 Outer Race	DOR-85504
1 Inner Race	DIR-85504
28 Rollers	K-85504
	(Not stamped on roller)
2 Separators	F-85504
1 Center Ring	E-85504
	(Not stamped on ring)

Always order bearing parts by name and number with the proper letter prefix before the number. The same letter prefixes apply to similar parts for all sizes of bearings. Bearing number is shown on assembly drawing and Bill of Material.

Each individual journal box part has a piece number which is a complete identification for that part. These piece numbers are listed in the Bill of Material and are illustrated on the assembly drawing in proper position.

Also each journal box has a Hyatt serial number stamped on it. This serial number is a complete identification of the journal box. The location of the serial number is indicated on the assembly drawing.

When ordering replacement journal boxes or parts for same, the order should specify the serial number of the worn box, if a complete box is required, or the name and piece number of the individual parts required. The following will serve as an example:—

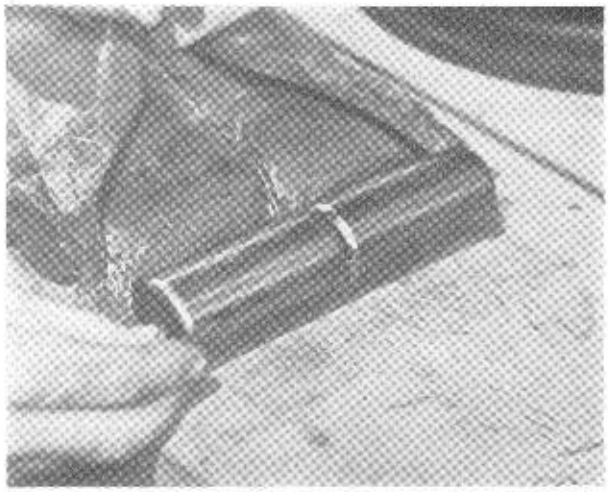


Fig. 24. Rollers being removed from their protective wrapping.

1 Complete Journal Box—Duplicate of Hyatt Serial No.——
or 1 Rear End Cap—Hyatt piece No.——

1 Housing—Hyatt piece No.——

All questions as to proper procedure in ordering or installing replacement parts should be referred to the Hyatt Bearings Division for advice.

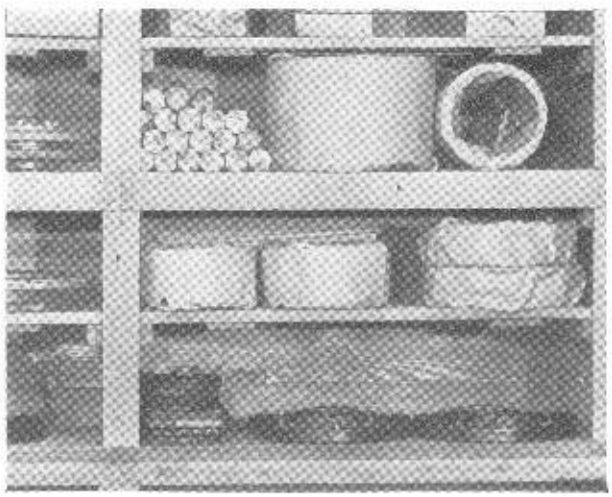


Fig. 25. Spare railroad bearing parts properly wrapped for storage.

Replacements

There are two basic rules which apply to the replacement of Hyatt roller bearing and journal box parts for railway journals. These can be stated quite briefly and simply as follows:—

Rule #1—Any journal box part or any bearing part *except the rollers* may be replaced at any time without affecting the operation of adjacent parts.

Rule #2—When roller replacements are necessary the new rollers should never be mated with a worn outer race surface. Either turn the outer race 180° in the bore to present a fresh surface, or, if this has previously been done, the outer race should be replaced with the rollers.

Storage of Spare Parts

With the exception of bronze cages, all bearing parts and all machined surfaces of journal box parts should be kept greased to prevent rusting while in storage. Occasional inspection of parts in storage is also recommended. Bearings should not be stored in an assembled condition. Rollers, races and cages should be kept separate. Always store material in a dry place. Dampness may ruin it in a short time.

Spare axles in storage should be carefully protected by a heavy coating of rust preventive grease applied over the entire portion outside the wheel hub.

When parts are drawn from stores for service, they should be thoroughly washed before being applied.

It is the practice on some roads to store a few spare axles in current use with their journal boxes mounted on them. While this procedure may seem to contradict some of the instructions given above, it can be successfully used, if proper attention is given to prevent corrosion.

Each journal box must be fully lubricated and must be pushed on the axle to its proper position. Each box should be spun around a few times at relatively frequent intervals so as to re-lubricate the bearing and to prevent the parts from remaining in the same position for any appreciable length of time. If the boxes are installed in spare trucks, they should be fully lubricated and the trucks should be moved frequently enough to re-lubricate the bearings, so as to eliminate the danger of corrosion.

If a roller bearing is allowed to remain stationary for a long period of time, it may be ruined by corrosion on all contacting surfaces due to galvanic action and condensation from atmospheric temperature changes. Therefore, parts not in current use it is recommended that they be disassembled and stored separately.

Fig. 26. Two views of the Hyatt plant showing journal boxes being built and awaiting shipment.