ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION • LA GRANGE, ILLINOIS, U. S. A.

HYATT JOURNAL BOXES

GENERAL DESCRIPTION

Hyatt roller bearing journal boxes, Figs. 1 and 2, are used on passenger, freight and 2700 HP transfer locomotives. The journal boxes operate in guides or pedestals on the truck frame.

The journal box is composed of only a few major parts: the housing, bearing assembly, rear end cap, retainment ring, thrust bearing, thrust bearing springs, spring bushings; spring bushing covers, and inspection cover, Fig. 3. In addition there are a few minor parts such as gaskets, studs, cap-screws, etc. The journal boxes are made in two types known as plain boxes and combination boxes. The combination boxes are similar to the plain boxes except that the outer end is modified to receive the application of speedometers, speed recorders and train control devices. Usually one or two boxes on each truck have this arrangement. Each journal box has a serial number stamped on the front of the box near the inspection cover.

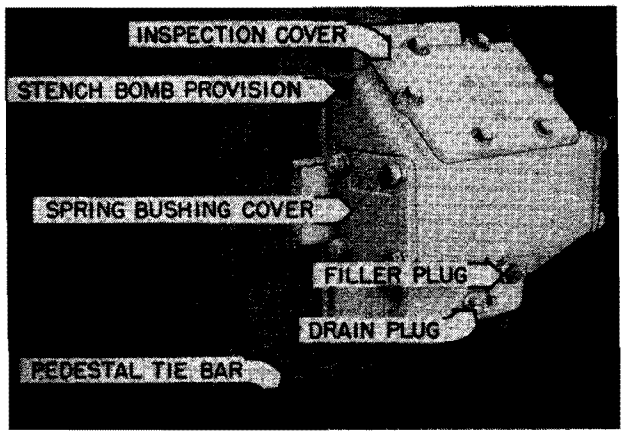


Fig. 1 - Hyatt Journal Box - Plain

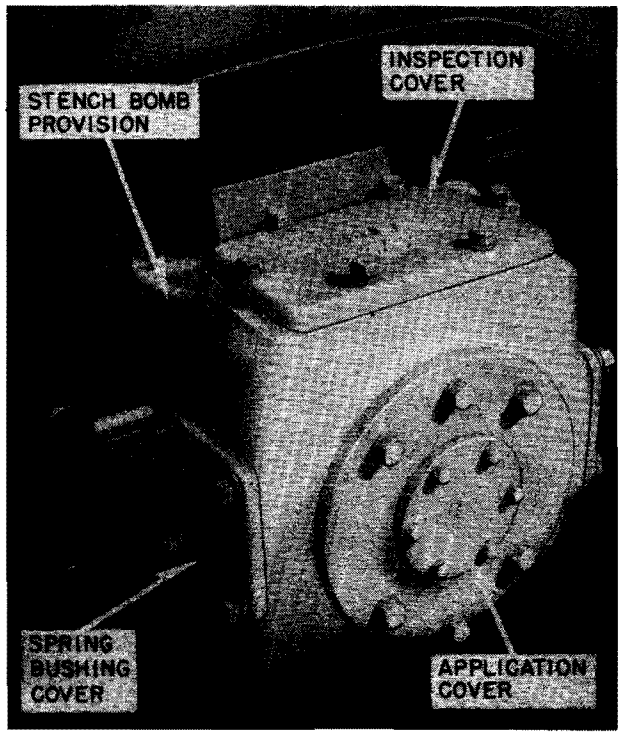


Fig. 2 - Hyatt Journal Box - Combination

Housing

The housing is an electric carbon steel casting. The housing is cast with flanges which engage both sides of the pedestals of the truck frame and allow the box to move freely in a vertical direction under coil-spring action.

The lower part of the housing forms an oil reservoir and sump in which any foreign matter will settle away from the bearing operating surfaces. The oil filling hole, Fig. 1, opens directly into the oil reservoir and is so placed that

*This issue supersedes and cancels all previous issues of M.I. 1209 Rev. D.

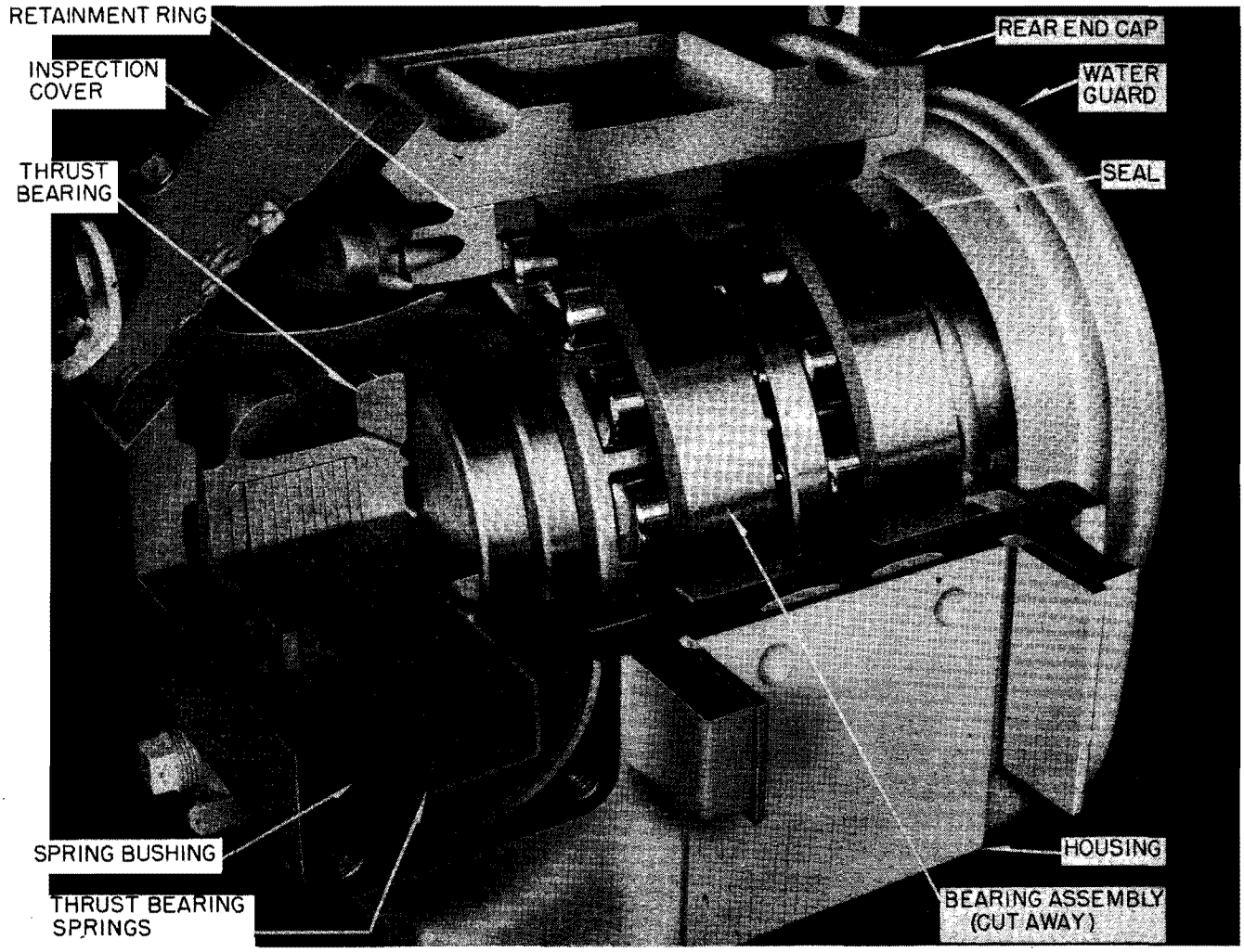


Fig. 3 - Cut-Away View - Plain Hyatt Journal Box

the oil will overflow when the maximum desirable level is reached. A drain hole is provided immediately below the filling hole by means of which a box can be completely drained of lubricant. On the combination boxes these filling and draining holes are located on the right side of the box under the spring bushing covers.

The pedestal ways on the outside of the housing are provided with renewable heat treated steel liners. The driving face liners and front flange liners are welded to the box. Stainless steel welding rod should always be used as it has been found to hold exceptionally well. Provisions are made for application of an electric heat indicator and a "stench bomb" where either is desired.

Bearing Assembly

The bearing used in the Hyatt journal box consists of heavy cylindrical inner and outer races and two separate rows of large diameter solid rollers operating in two heavy one piece bronze cages separated by a spacer ring as shown in Fig. 4. Races, spacer ring, and rollers are of specially selected alloy steel. Both rollers and races are ground to close limits to provide proper fit and operating clearances. The inner race, Fig. 5, is shrunk on the journal portion of the axle. After it is in place, it forms a permanent part of the axle. All wheel

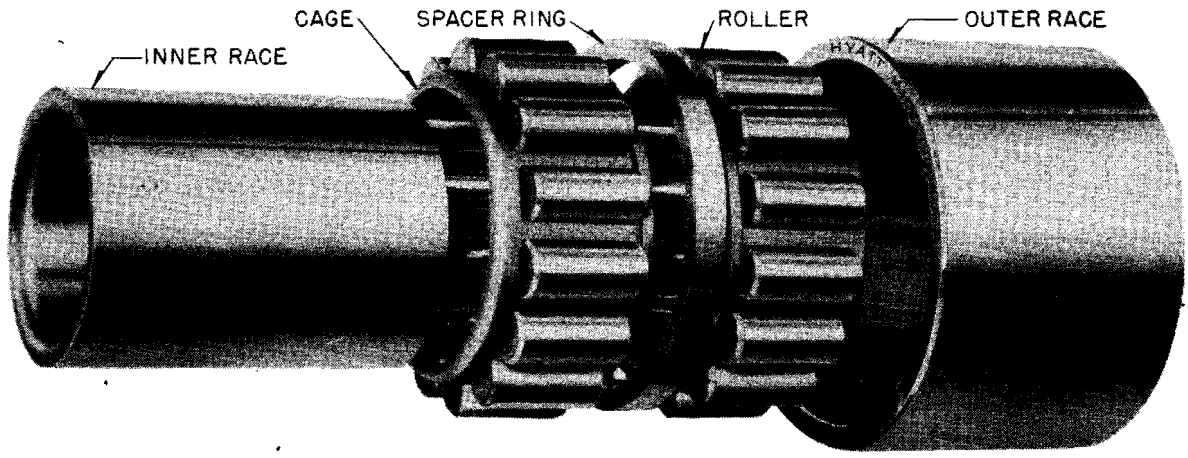


Fig. 4 - Hyatt Journal Bearing

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. 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, Fig. 6, for the amount of shrink fit allowance, which allows the shrink fit pressure to die out gradually. This prevents an abrupt change in the surface stress of the axle and thereby removes the 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. The outer race, Fig. 4, is a tap or slight press fit in the housing and forms the outer path on which the rollers travel. The rollers are plain straight solid cylinders and are flat on the ends. They are ground to close limits to secure uniformity of diameters, length

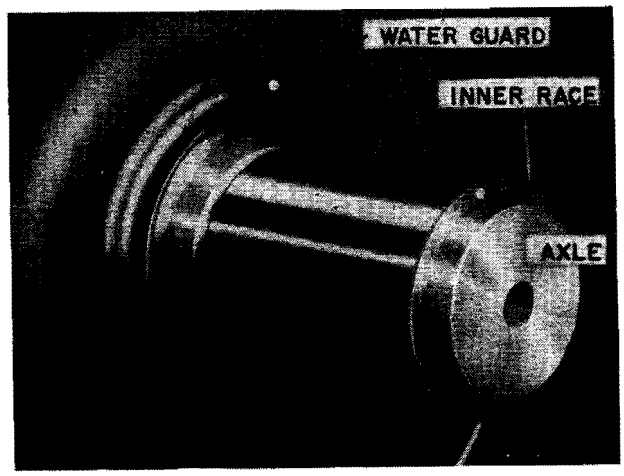


Fig. 5 - Inner Race And Water Guard

and end squareness. There are two identical rows of rollers in each bearing. The rollers carry radial loads only.

Cages Or Separators

The cages or separators, Fig. 4, of which there are two per bearing, are

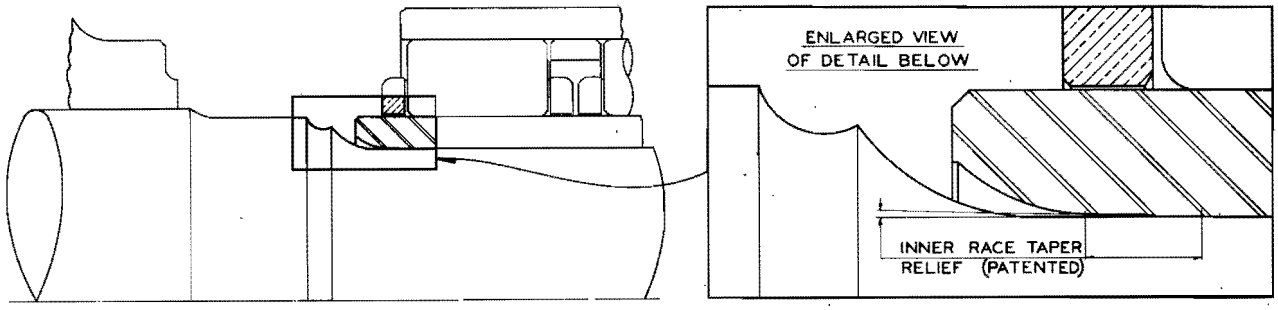


Fig. 6 - Inner Race Taper Relief

made entirely of one piece with no joints. The cage bars are integral with the end rings at both ends, so that the cage is similar to a cylindrical ladder.

In operation the cages are centered on the inner race, thereby eliminating any possibility of eccentricity at any speed. The only purpose the cages serve is 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, so that it will not normally be necessary to make cage replacements before the entire bearing has run out its life. The spacer ring, Fig. 4, 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. The spacer is of sufficient width to prevent the cages from touching at the center of the bearing. The rollers are retained in proper longitudinal position in the bearing by the hardened retainment surfaces on the retainment ring and on the rear end cap. These retainment surfaces contact the ends of the rollers outside of the cages and do not come in contact with the cages.

Rear End Cap

The rear end cap is of cast iron and serves as a rear closure. It embodies a hardened retainment surface for endwise retainment of the rollers, an oil seal, and with the water guard, a means for excluding foreign matter. 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 end of the inner race with small clearance. Oil which passes this flange is flung outward by centrifugal force. An annular space is provided in the end cover 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 parts 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. Heavy graphited gaskets, 1/16" thick, are provided for the rear end cap, the inspection cover and the spring bushing covers.

Retainment Ring

The retainment ring, Fig. 3, is a high strength iron casting. It is prevented from rotation by two studs or pins which engage holes in the flanges. It carries the hardened retainment surface for the outer end of the rollers. The ring also serves the purpose of feeding lubricant from the roller operating space to the thrust bearing. As the roller assembly revolves, the oil which is carried around with it is forced outward at the ends of the bearing. A groove is provided adjacent to the hardened outer retainment face, which collects this oil and allows it to flow through suitable ports to a small pan or lip cast on the inner side of the inspection cover, whence it drains directly to the thrust bearing. This circulation will provide sufficient oil for thrust bearing lubrication. The inspection cover serves to close the opening at the front of the box and as previously explained, assists in conducting oil to the thrust bearing. The inspection cover is made of cast steel.

Thrust Bearing

The thrust bearing provides a means for absorbing lateral thrust. The thrust bearing comprises a steel casting on which is cast a thrust face of bronze. In the combination box, Fig. 7, a hole is provided through the center of the thrust bearing (and through the springs), to admit the central drive shaft which

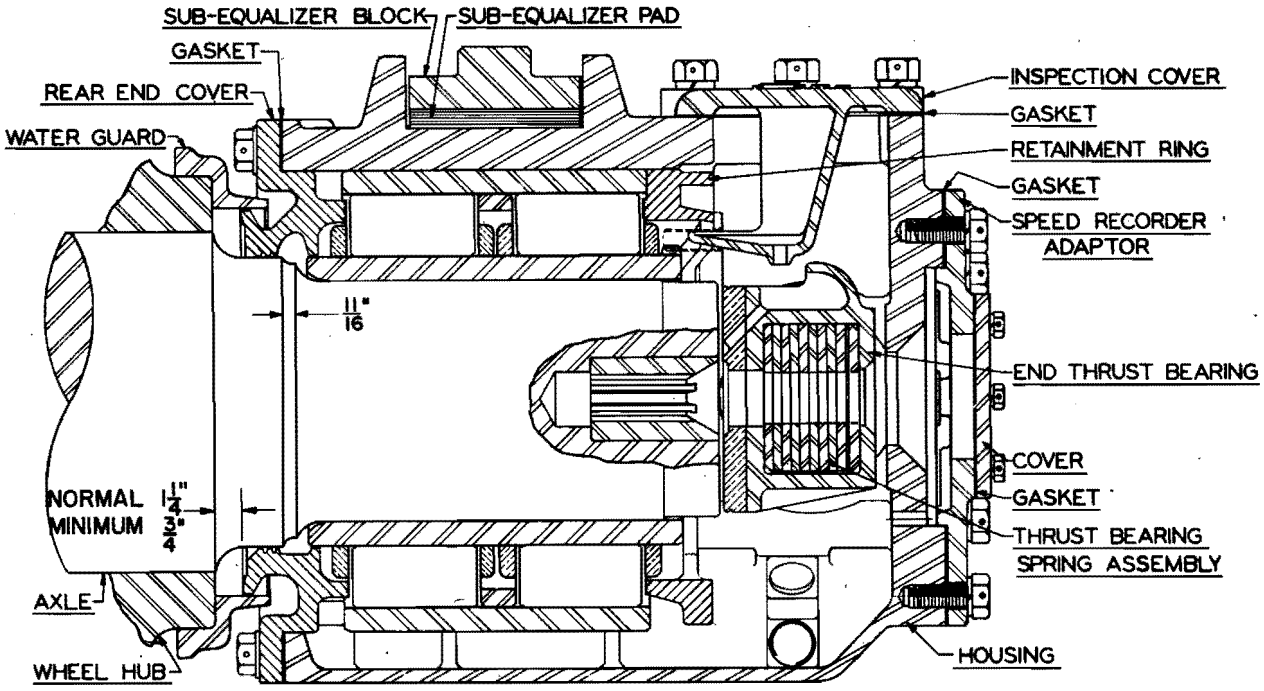


Fig. 7 - Cross-Section Of Combination Journal Box .

engages the splined hole in the center of the axle and drives the speedometer or other drive devices mounted on the journal box.

Water Guard

The water guard, Fig. 5, is a circular steel member machined on the inside diameter and shrunk on a turned portion of the outer end of the wheel hub. It has an extended annular lip which enters the annular recess in the rear end cap. The water guard remains in place for the life of the wheel, and can be re-used with other wheels.

MAINTENANCE

Interchangeability

All parts of both the journal box and the bearings 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 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.

If replacement should become necessary for either boxes or bearings, proceed according to instructions given hereafter under "Replacement of Parts."

Inspection

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 wiping towels to wipe the various parts. The use of waste or rags is not recommended because the lint will adhere to the metal surfaces.

With the inspection cover and spring bushing covers removed, the spring bushings, thrust bearings, and springs can be withdrawn for inspection without disturbing any other part of the box. If the end of the axle happens to be pressing against the axle block, it will, of course, be necessary to relieve the pressure before attempting to withdraw the thrust bearing springs.

The journal boxes and bearings should be completely disassembled, inspected and cleaned at intervals specified in the Scheduled Maintenance Program.

Kerosene or some suitable solvent 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 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 for Hyatt or Electro-Motive representatives to be present during inspection of Hyatt locomotive journal boxes. If this cannot be arranged, it is requested that a report of the condition found be furnished to Electro-Motive Division with an extra copy for Hyatt Bearing Division, General Motors.

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

1. Provide a good supply of clean wiping towels with brushes 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.

2. Check lateral clearances and make note of any necessary corrections.

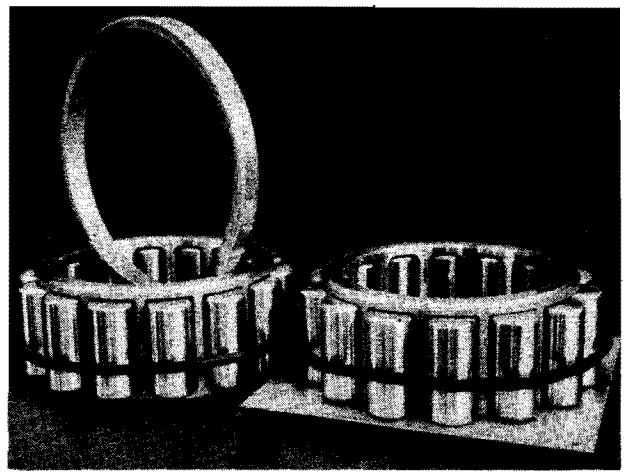


Fig. 8 - Assembling Roller Bearings

3. Drain the oil and remove the boxes from the journals and set them down on the closed ends.

4. Inspect inner races for signs of denting, scoring or pitting, and protect the exposed journal.

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

6. Remove roller assemblies, using upper liner seal (part #8025847) around the rollers while handling them, Fig. 8. When removing a roller assembly from the journal box, always place the seal over the rollers before they are completely withdrawn from the race to prevent the rollers from falling out of the cage. Tag cages to show journal box serial number and position in the box, whether front or rear. Rollers should be kept with the cage to which they belong.

7. Turn boxes on open end over shallow pans to drain.

8. Remove inspection covers and spring bushing covers. Withdraw thrust bearing, springs, and spring bushings. Outer races and retainment ring need not necessarily be removed for cleaning, but can be if desired. To remove outer race and retainment ring, use a threaded puller as shown in Fig. 9.

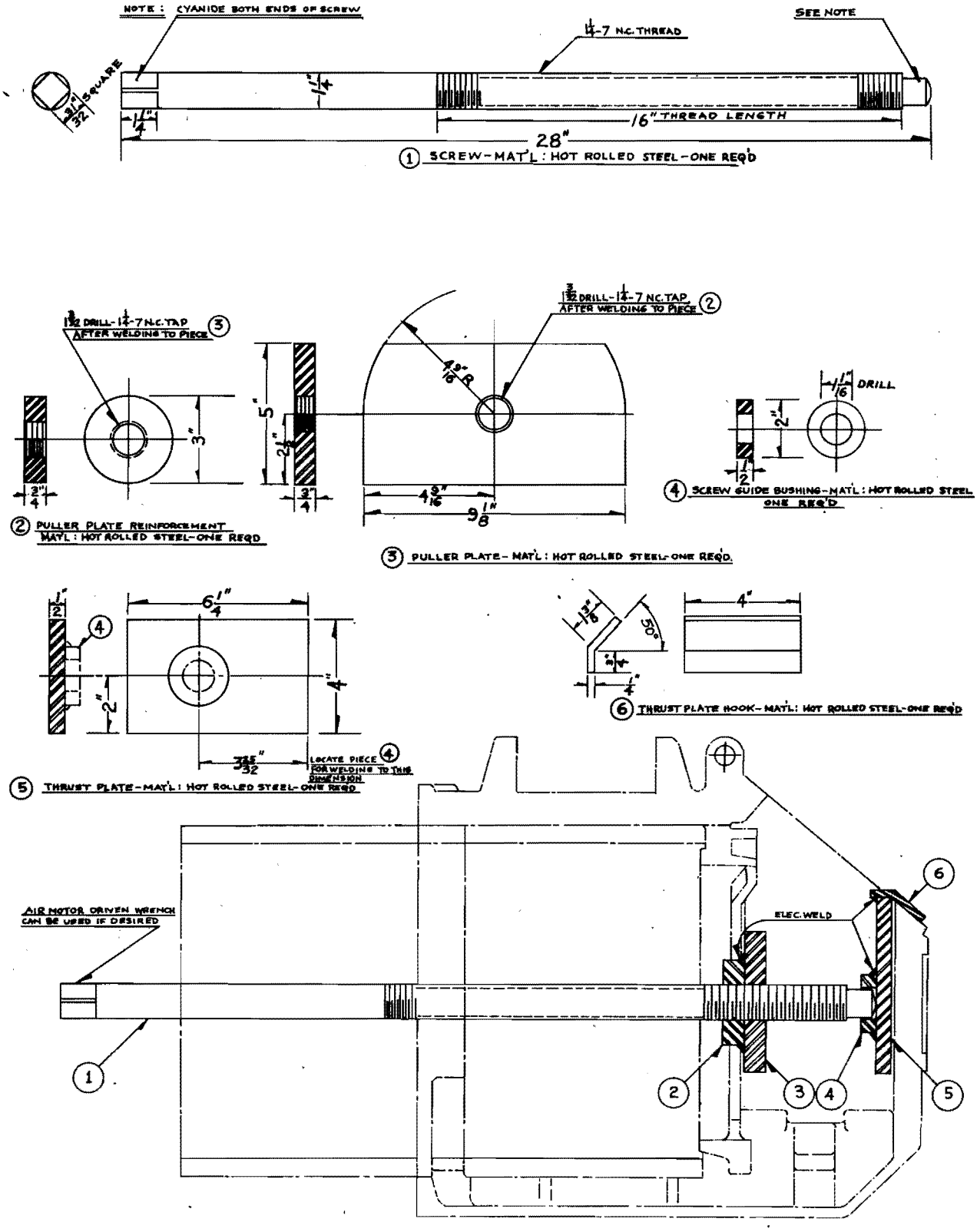


Fig. 9 - Puller For Removing Outer Race And Retainment Ring

Place the thrust plate in position against the inner front face of the box. Then, while holding the puller plate in position against the retainment ring, as shown in Fig. 9, thread the screw through the puller plate until it contacts the thrust plate. Then continued rotation of the screw will remove both the outer race and retainment ring from the housing. If the screw is rotated with an air motor, considerable time and effort will be saved.

9. Scrape the accumulation of dirt off the outside of the journal box housing. Wash inside thoroughly with clean kerosene and blow out with compressed air. If desired, the entire housing can be immersed in hot alkaline cleaning solution. If this is done, it should be subsequently washed on the inside with kerosene and blown out with air. (Do not immerse stench or smoke bombs in the hot solution as they may be discharged. Wash end caps, inspection covers, axle blocks and shims all over. Wash rollers and cages, and rinse in clean kerosene before drying. A small stiff brush will be necessary to clean the various parts — especially the bearing cages. Any of the patented non-corrosive cleaning solutions may be used providing the parts are subsequently washed and oiled.

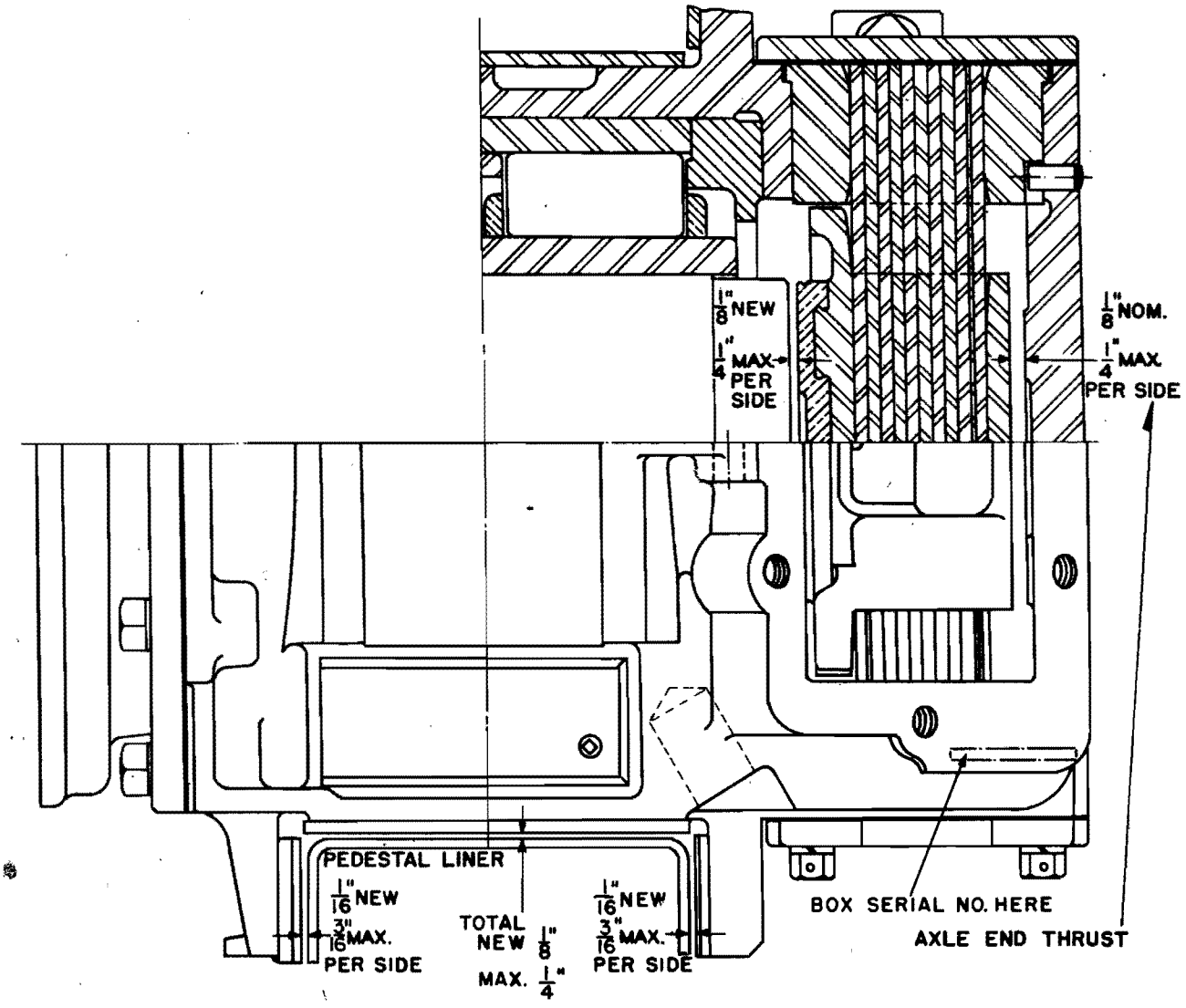


Fig. 10 - Plan View Of Plain Journal Box

10. Thoroughly inspect all parts and make notes of conditions, using serial number of the journal box and axle, and location of box on locomotive as 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 bearings, roller retainment surfaces and all bearing parts. Thrust bearing wear should accumulate very slowly under normal conditions. The combined wear of liners and thrust bearing should not be allowed to accumulate beyond an amount at which proper lateral clearances can be maintained. See Fig. 10. Roller retainment surfaces and bearing surfaces may be continued in use as long as they are free from fatigue and rust. Fatigue is usually recognized by the appearance of pitting or shelling on the operating surface. If any parts require replacement for any reason, make special note of them in the record and segragate them for further examination and shipment back to Electro-Motive if necessary. When replacing pedestal way liners, they should be firmly clamped in position before welding. Strip liners are electric welded at top, bottom and 4" on the side. Always use stainless steel welding rod. Driving face liners are welded directly to the housing at top and bottom and at the four holes in the central portion of the liner.

11. Reassemble all parts. The retainment ring and outer race should be assembled first, if they have been removed from the housing. Then follow with roller assemblies, rear end caps, thrust bearings, springs, spring bushings, spring bushing covers and inspection covers. With thrust bearing held in position through inspection opening, the spring leaves and spring shims may be inserted through the opposite side and driven into the spring bushing already assembled. The cambered and chamfered spring leaf should be placed adjacent to the front of the box. The flat chamfered spring leaf should be placed toward the inside. The shim should be placed between two spring leaves for ease of assembly and protection of the shim from distortion. The outer race should be oiled before inserting the roller assemblies. Always put the marked end of the rollers toward the center spacer ring and in the proper position, front or rear, in the bearing.

    When reassembling the rollers into the cage, first place an upper liner seal (part #8025847) around the circumference of the cage as shown in Fig. 8. The rollers can then be inserted into the cage windows and will be held from falling out by the seal. When all the rollers are in place in the cage, it can be lowered vertically into the outer race, sliding the seal 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.

    When the box is assembled, tie a clean cloth over the rear opening to protect the interior until it is put back on the axle. Be sure rear cover screws and spring bushing cover screws are tight and securely wired. The inspection cover screws need only be hand tightened at this time.

12. Wash the axle 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. Truck frames may be lowered over the boxes after placing equalizer pads and equalizer plates in position on top of box.

13. After boxes and axles are re-installed in the truck, check lateral clearance as outlined in paragraph on "Clear-

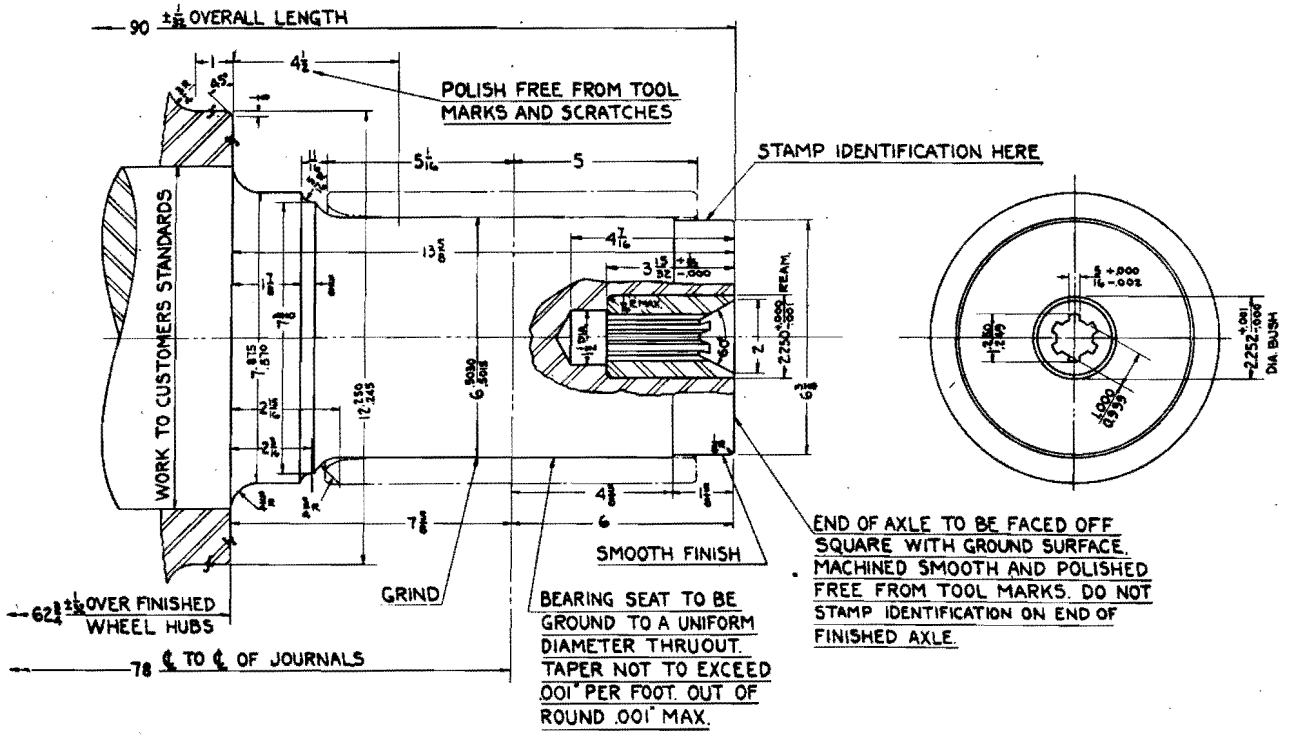


Fig. 11 - Axle - Combination Type

ances and Wear Limits" and tighten and wire the inspection cover screws.

14. Fill boxes with oil to overflow level at filler plug. A box holds approximately 9 pints.

Axles

Fig. 11 shows the axle design used with combination boxes, which is the same as the axle used with plain boxes except for end details. The combination type axle can be used with either plain or combination boxes, and is the only type furnished for service. In order to insure accurate axle measurements, the micrometers used should be checked against a known standard and the axles should always be measured when they are cold; never when they are warm from the machining. All the fillets and the axle ends must be polished free from tool marks and each time wheels are turned, all burrs or other irregularities should be polished off the axle ends.

Wheel Work

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 acceptable in the past for passenger and freight service will not be found suitable for high-speed operation. 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 use a self-aligning pressure block 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

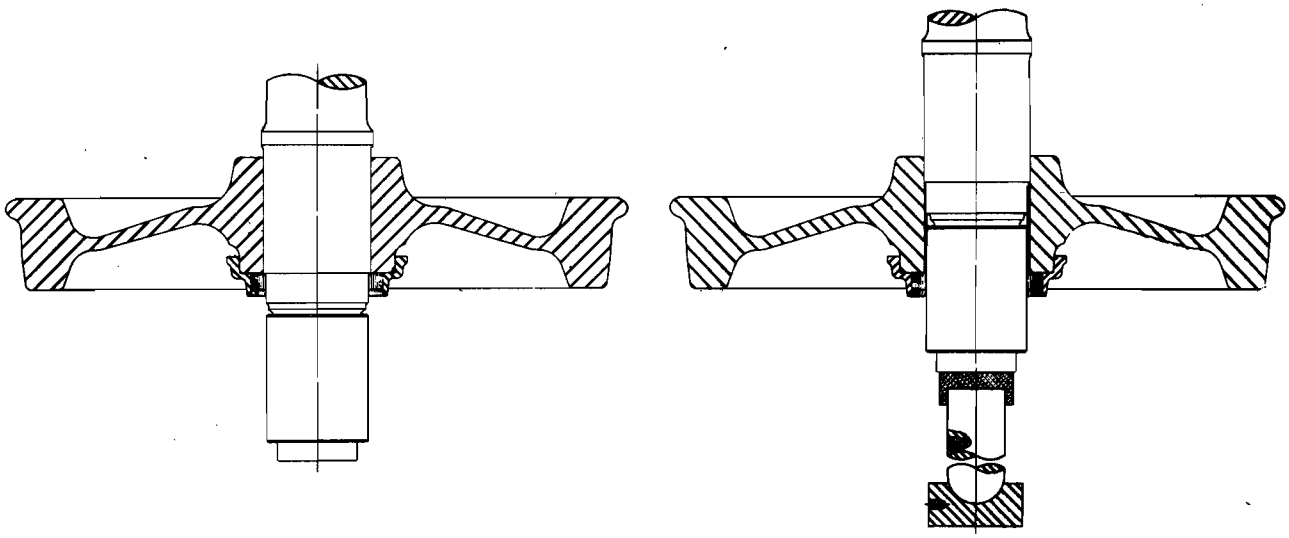


Fig. 12 - Procedure For Wheel Removal

of the box over the journal. Self-aligning pressure blocks for use in the wheel press for mounting and dismounting wheels or for removing inner races are inexpensive and will help insure good results. Their use is 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, Fig. 12.

The water guard remains in place for the life of the wheel. When new wheels are applied the water guards can be pried off after being heated sufficiently with a torch to release the shrink fit. The same water guards can be re-used on the new wheels. Remove the water guard from the wheel hub after the wheel has been removed from the axle. Be sure the water guard is correctly positioned when shrinking it in place. To mount water guards, heat them in an open flame or by torch to a black heat at 500° F. to 700° F. and shrink them in place on the wheel hub. They should be pushed tightly against end of wheel hub.

Procedure For Wheel Removal

When journal boxes are removed from an axle for wheel work, all loose dirt should be removed from the rear cover before the box is completely removed. After the box is removed, it should be carefully inspected 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.

Mounting Inner Race

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. This is done by interposing a split collar between the race and the wheel hub, see Fig. 13.

NOTE: When removing an inner race by pressing it off with the wheel, a careful examination of the inner race should be made to determine whether or not it is in suitable condition to be re-applied.

After removing an inner race always inspect the journal for defects, size, etc. before applying a new race. The new race is applied by heating it in oil to a maximum of 300° F. and shrinking it in place. When heated, the race can be slid into place, taking care not to get it cocked and stuck fast out of proper posi-

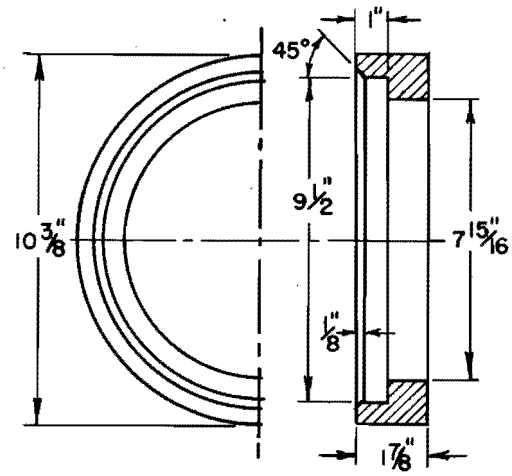


FIG. A FILLER RING
8048303
(NOT SPLIT)

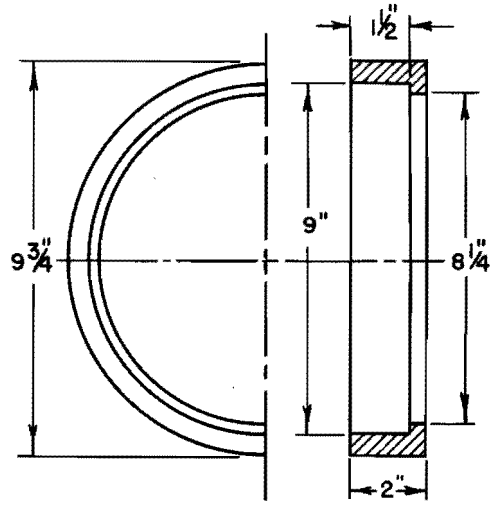


FIG. B OUTER RING
8048301
(NOT SPLIT)

GROUP OF FIGS. A, B, C
PART NO. 8048299

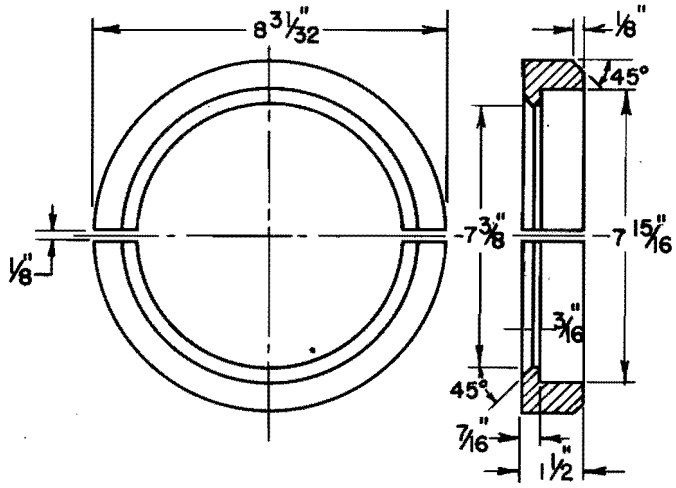
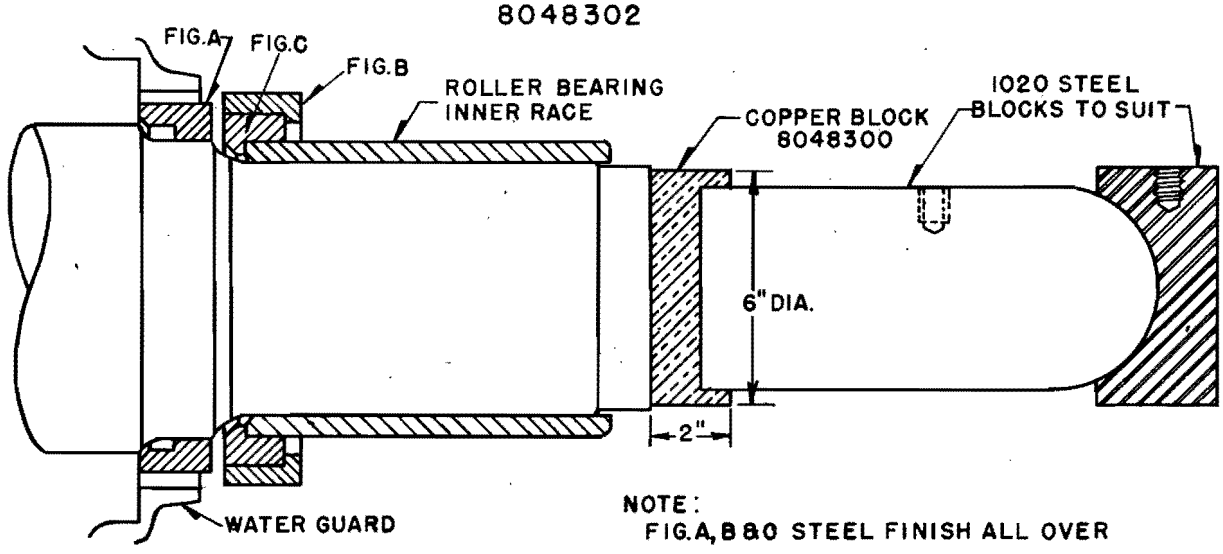


FIG. C SPLIT RING
8048302

FIGS. A, B, C MAY BE MADE OF 1020 STEEL OR ANY SIMILAR AVAILABLE STEEL.



NOTE:
FIG. A, B & C STEEL FINISH ALL OVER

Fig. 13 - Device For Pressing Off Inner Races

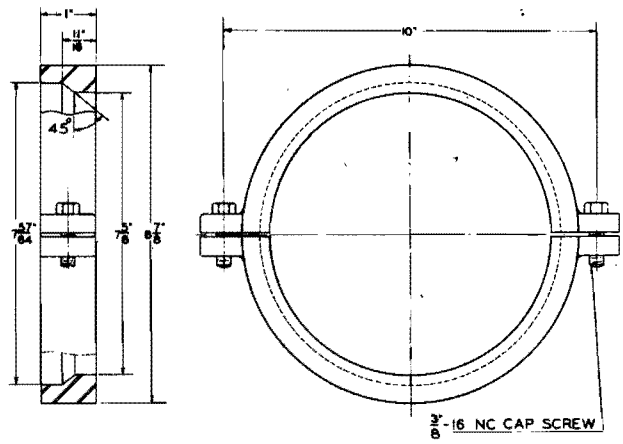


Fig. 14 - Split Collar

tion. The use of burlap or a piece of carpet is recommended for handling the hot race. A split collar, shown in Fig. 14, clamped around the journal will space the race the proper distance from the journal 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. See Fig. 15, for dimension of inner race to fillet.

Lubrication

The journal boxes should be lubricated with straight mineral oil. Oil containing fillers, graphite, etc., should not be used. In filling the boxes, the locomotive should be on level track and each box should be filled until it overflows at the filler hole. Be sure the oil plug is replaced securely. Always use clean containers and cans for roller bearing oil.

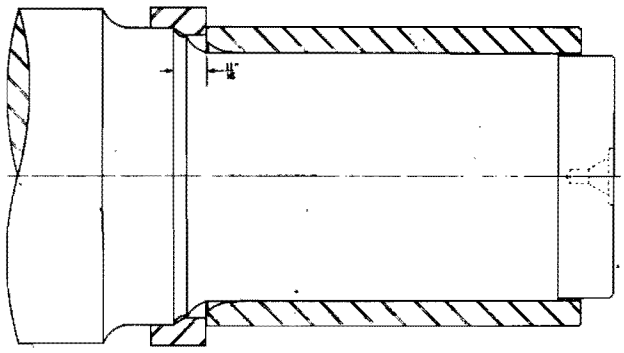


Fig. 15 - Locating Inner Race

CAUTION: 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. It is best to add oil after each trip for a time until sufficient experience has been established to indicate the proper oiling intervals. Always wipe the dust and dirt away from the oil plug before it is removed.

It is important that the oil used be fluid at all operating temperatures. The following specification is for general guidance in selecting lubricants.

Straight Mineral Oil

Viscosity at 100° F.	400-1000 sec. Saybolt
Viscosity at 210° F.	50-75 sec. Saybolt
Flash	325° F. Min.
Pour Point	0° - 10° F.
Neutralization Value	.20 mg. Potassium Hydroxide per gram-max.

Use the lower viscosity oils for cold climates and high viscosity oils for warm climates. It will be found in general, however, that an oil with a viscosity of 500-700 seconds at 100° F. and a pour test of 0° - 5° F. will be satisfactory for average all-year operation in either warm or cold climate.

NOTE: Any oil from a reputable manufacturer that meets with the above specifications may be used.

Checking Oil Levels

Remove filler plug and insert oil

gauge through hole, Fig. 16, making sure that gauge is horizontal with hole. If oil marking on gauge reads 1/2" or more, oil should be added. Minimum low oil level is 13/16" on gauge, Fig. 17.

Replacements

All questions as to proper procedure in ordering in installing replacement parts should be referred to Electro-Motive Division for advice.

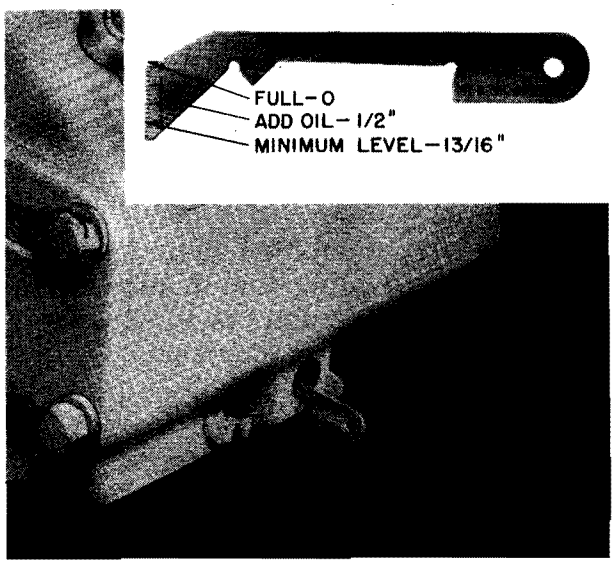


Fig. 16 - Inserting Oil Gauge

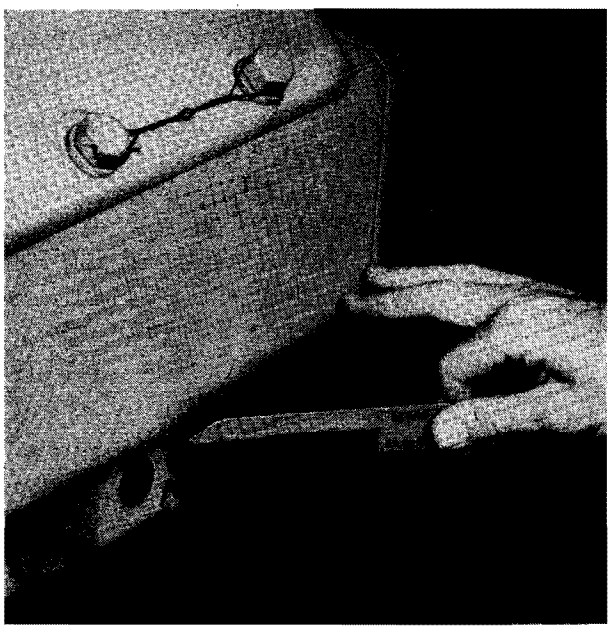


Fig. 17 - Checking Oil Level

There are two basic rules which apply to the replacement of Hyatt roller bearing and journal box parts for railway journals.

Rule #1 - New inner races, outer races, separators (cages), center rings or any journal box parts can be applied either individually or collectively at any time without affecting the operation of the bearing to which they are applied.

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, a new outer race should be installed with the new rollers.

Storage Of Spare Parts

With the exception of bronze cages and axle block, 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 the 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. Care should be taken to prevent "finger rust" or rust on finished surfaces due to moisture of hands and fingers while handling.

Spare axles in storage should be carefully protected by a heavy coating of rust preventative applied over the entire machined portion.

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

It is the practice on some roads

to store 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, particularly for short periods of time, 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. Inasmuch as the top of the journal box is heavier than the bottom or sump portion, it may tend to rotate to an inverted position. This should be prevented by blocks or other suitable means because it will result in the loss of a large part of the oil. Each box should be spun around a few times every few days so as to lubricate the bearing and to prevent the parts from remaining in the same position for any appreciable length of time. 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 due to atmospheric temperature changes. Therefore, parts not in current use should be disassembled and stored separately.

Bearings, journal boxes and all associated parts are patented. Therefore, it is not advisable to purchase other than genuine parts. The use of substitute material can cause serious failures.

Previously some journal boxes were manufactured with a wear plate fitted to a beveled pedestal flange on the box and welded to a separate strip as indicated on Fig. 18. Not being directly fastened to the lug, a looseness would develop and the lug itself would wear rather than the liner. To overcome this objection the boxes are now manufactured with a straight surface on the lug to which is welded a 3/8" beveled liner.

Should the old style liner show any looseness, it is recommended that the lug be machined to take the 3/8" liner as indicated on Fig. 18.

Clearance And Wear Limits

In each journal box there is initial provision for a lateral clearance of 1/8" between the end of the axle and the thrust bearing and 1/16" between the inner pedestal way flange and the pedestal. In addition, the thrust bearing springs can be deflected 1/4" under pressure on the thrust bearing from the axle end. Thus, there is a total available lateral movement of 7/16" per box, Fig. 10.

When inspecting lateral clearance, the inside pedestal way flange of the journal boxes should be in contact with the truck pedestals. Remove the small inspection covers at the front of the journal boxes. The lateral clearance between the end of the axle and the thrust bearing face may then be inspected. This clearance should be measured at both ends of the axle and the average of the two measurements should never exceed 7/16".

Each time the trucks are shopped, they should be trammed and checked for alignment. Cross corner (diagonal) tramming should be within plus or minus 1/8". Longitudinal and lateral tramming between pedestals should be within plus or minus 1/16". The width of the pedestal openings should not vary more than plus 1/16", minus nothing.

The allowable limits of wear are 1/16" on each pedestal and journal box liner and 1/8" wear on the face of the thrust bearing. Wear should not be allowed to accumulate in excess of the limits.

When thrust bearing surface is worn to the witness groove or 1/8" deep, it should be replaced with a new thrust bearing. No lateral adjustment for wear by means of shims is required.

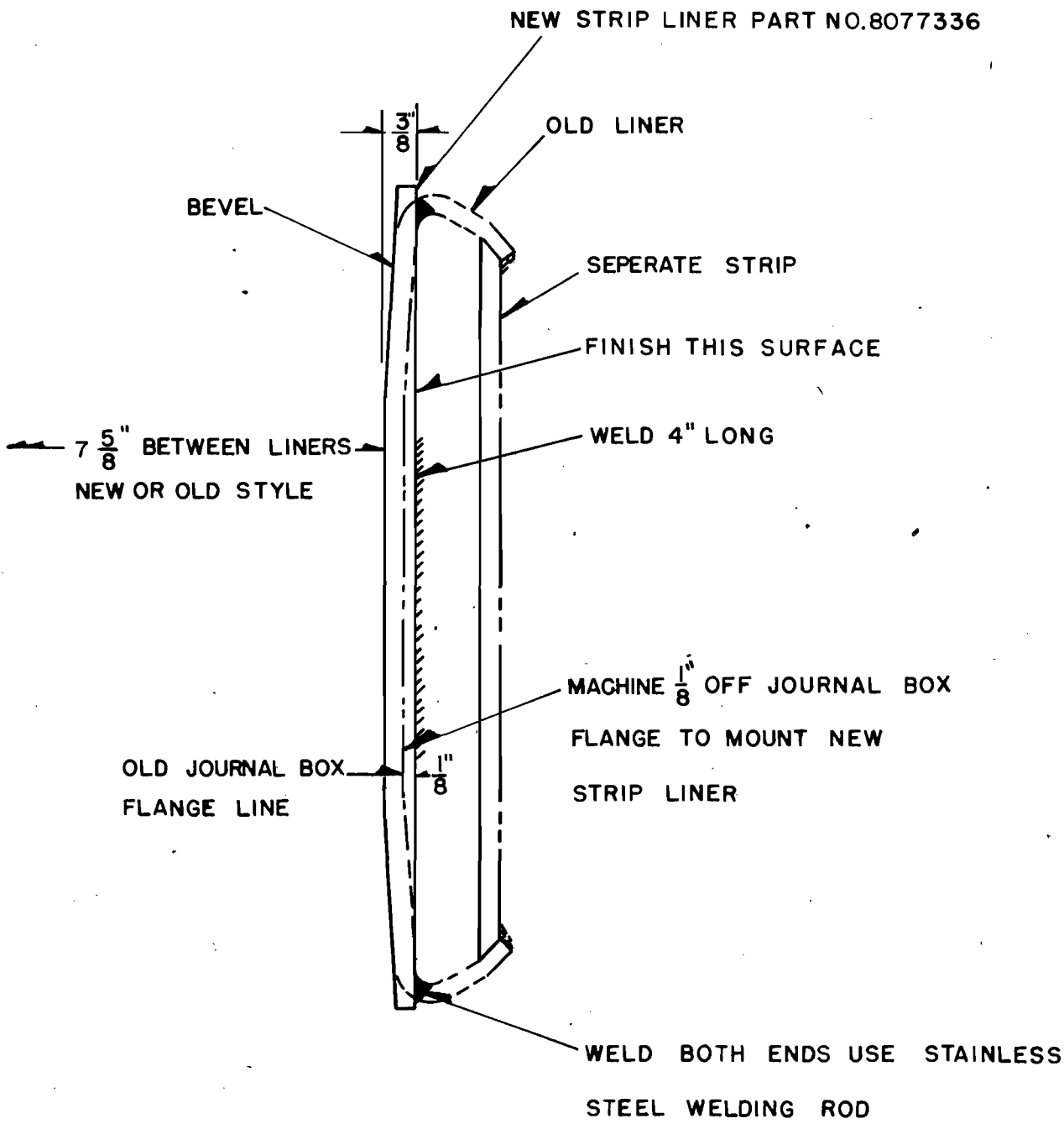


Fig. 18 - Journal Box Strip Liner Replacement

MAINTENANCE DATA

Nominal drawing dimensions provide the following clearances:

	NEW	LIMIT
Total Lateral Pedestal Clearance	1/8"	3/8"
Total Longitudinal Pedestal Way Clearance	1/8"	1/4"
Clearance-Axle End To Thrust Spring	1/8"	1/4" per side
Deflection Of Thrust Spring	1/4"	1/4"
Clearance-Wheel Hub To Rear Cover	1-1/4"	3/4"

EQUIPMENT LIST

Devices for Pressing off Inner Race		
Filler Ring	(not split)	#8048303
Outer Ring	(not split)	#8048301
Split Ring	(split)	#8048302
Self Aligning Pressure Blocks		* #8107834
Outer Race Puller (Tool Assembly)		#8062137
Inner Race Locater - Refer To Figs. 15 and 16		
Speedometer Drive Bushing Extractor		#8032710
Adapter - Axle Center (To protect speedometer drive bushing when turning wheels)		#8064859
Oil Gauge		#8084927
Roller Retaining Seal (used when removing bearing)		#8025847

* This number is Drawing Number only, furnished on request.