

# **DODGE TRUCK**

## **B-4 SERIES**

# **SHOP MANUAL**

**MODELS: B-4-B, B-4-C, B-4-D, B-4-PW, B-4-DU, B-4-EU, B-4-F,  
B-4-G, B-4-GA, B-4-H, B-4-HA, B-4-HM, B-4-HMA, B-4-J, B-4-JA,  
B-4-JM, B-4-JMA, B-4-K, B-4-KA, B-4-KMA, B-4-R, B-4-RA, B-4-T,  
B-4-TA, B-4-V, B-4-VA, B-4-Y, B-4-YA, B-4-YX**

**SECTION 1**

## **AXLE, FRONT**

**DODGE DIVISION  
CHRYSLER CORPORATION  
DETROIT 31, MICHIGAN**

**CONTENTS****SERVICE INFORMATION  
AXLE, FRONT (EXCEPT B-4-PW)**

	<i>Page</i>	<i>Par.</i>
Service Standards .....	4	—
Tightening Reference .....	4	—
Removal, Installation and Maintenance (Except B-4-PW).....	3	—
Removal and Installation of Hub, Drum and Bearings.....	3	1
Adjusting Front Wheel Hub Bearings.....	5	2
Removal and Installation of Drag Link and Tie Rod (Except C.O.E. and Power Wagon Models).....	6	3
Removal and Installation of Drag Link and Tie Rod (C.O.E. and Power Wagon Models) .....	7	4
Removal and Installation of Steering Knuckle and Bushings (Wheel and Hub Removed) .....	8	5
Servicing the Axle I-Beam.....	9	6
Front Wheel Alignment.....	9	—
King Pin Inclination.....	10	7
Checking King Pin Inclination.....	10	8
Camber .....	11	9
Checking Camber .....	11	10
Caster .....	12	11
Checking Caster .....	12	12
Toe-In .....	13	13
Checking Toe-In .....	13	14
Adjusting Toe-In (Except B-4-PW).....	14	15
Toe-Out .....	14	16
Checking Toe-Out On Turns.....	15	17

**SERVICE DIAGNOSIS**

Wheel Bounce .....	15	18
Excessive Tire Wear.....	15	19
Front End Noisy.....	17	20

**MAINTENANCE**

Preparation and Installation of Oil Seals.....	19	21
Checking for Worn King Pin Bushings (Except B-4-PW).....	19	22

**AXLE, FRONT, GEAR-DRIVEN (B-4-PW)****SERVICE INFORMATION**

Removal, Installation and Maintenance.....	19	—
Removal and Installation of Front Axle Assembly.....	19	23
Disassembly of Front Axle.....	19	24
Inspection .....	21	25
Assembly of Front Axle.....	22	26
Front Wheel Alignment.....	23	—
Adjusting Toe-In (B-4-PW).....	23	27
Checking Turning Radius (B-4-PW).....	23	28

**SERVICE DIAGNOSIS**

Differential Lubricant in Front Axle Universal Joint Housing.....	24	29
Lubricant Leaking Into Drums.....	24	30
Lubricant Leaking from Steering Knuckle Flange Assembly.....	25	31
Backlash Between Propeller Shaft and Road Wheels.....	25	32

# AXLE, FRONT

## REMOVAL, INSTALLATION AND MAINTENANCE (EXCEPT B-4-PW)

For service information covering B-4-PW truck, refer to Paragraph 4 and also to Axle, Front, Gear-Driven section, page 19.

### 1. REMOVAL AND INSTALLATION OF HUB, DRUM AND BEARINGS

- (1) Raise the front end of the truck with a jack until the wheel clears the floor or ground and remove the hub cap. Pry off the cap (Fig. 1), or unscrew the hub cap (Figs. 2, 3 and 4).

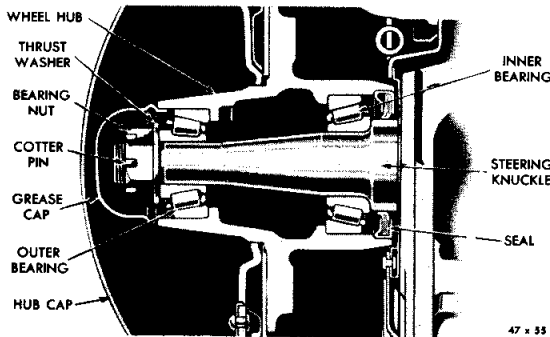


Fig. 1—Sectional View of Typical Front Wheel Assembly (B-4-B, B-4-C, B-4-DU)

- (2) Remove the cotter pin, front wheel bearing adjusting nut and thrust washer.
- (3) Remove the outer bearing cone and rollers and pull the wheel, hub and brake drum off the steering knuckle.

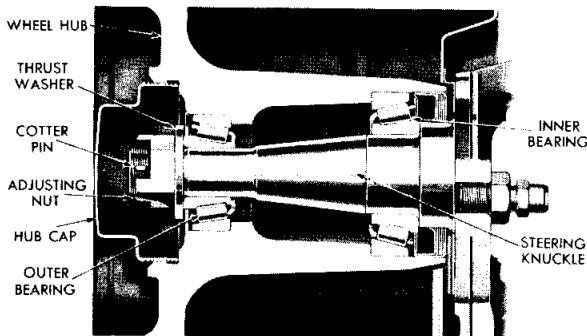


Fig. 2—Sectional View of Typical Front Wheel Assembly (B-4-D, B-4-EU)

- (4) Remove hub dust seal and inspect seal for wear and possible damage.
- (5) Remove inner bearing cone and rollers.
- (6) Remove inner and outer bearing cups with a suitable puller or drive them out with a drift.

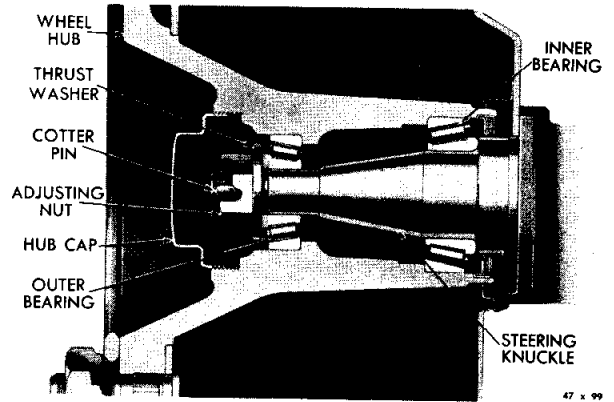


Fig. 3—Sectional View of Typical Front Wheel Assembly (B-4-F, B-4-G, B-4-GA, B-4-H, B-4-HA, B-4-HM, B-4-HMA, B-4-J, B-4-JA, B-4-K, B-4-KA, B-4-JM, B-4-JMA, B-4-KMA)

Before assembling the bearings in the front wheel hub, make sure all old lubricant is removed and the various parts are clean and in good condition. Then, install the inner and outer bearing cups, driving them into place with a drift. Make sure the cups are correctly installed with the thick edge toward the center of the

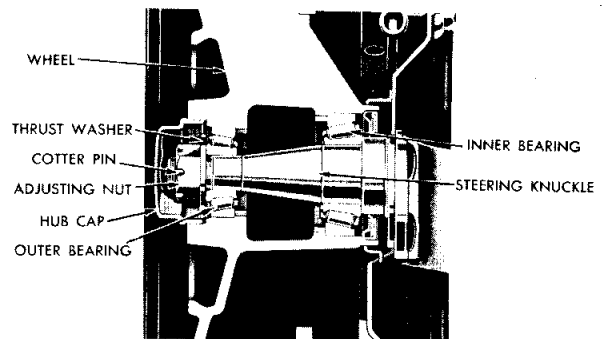


Fig. 4—Sectional View of Typical Front Wheel Assembly (B-4-R, B-4-RA, B-4-T, B-4-TA, B-4-V, B-4-VA, B-4-Y, B-4-YA, B-4-YX)



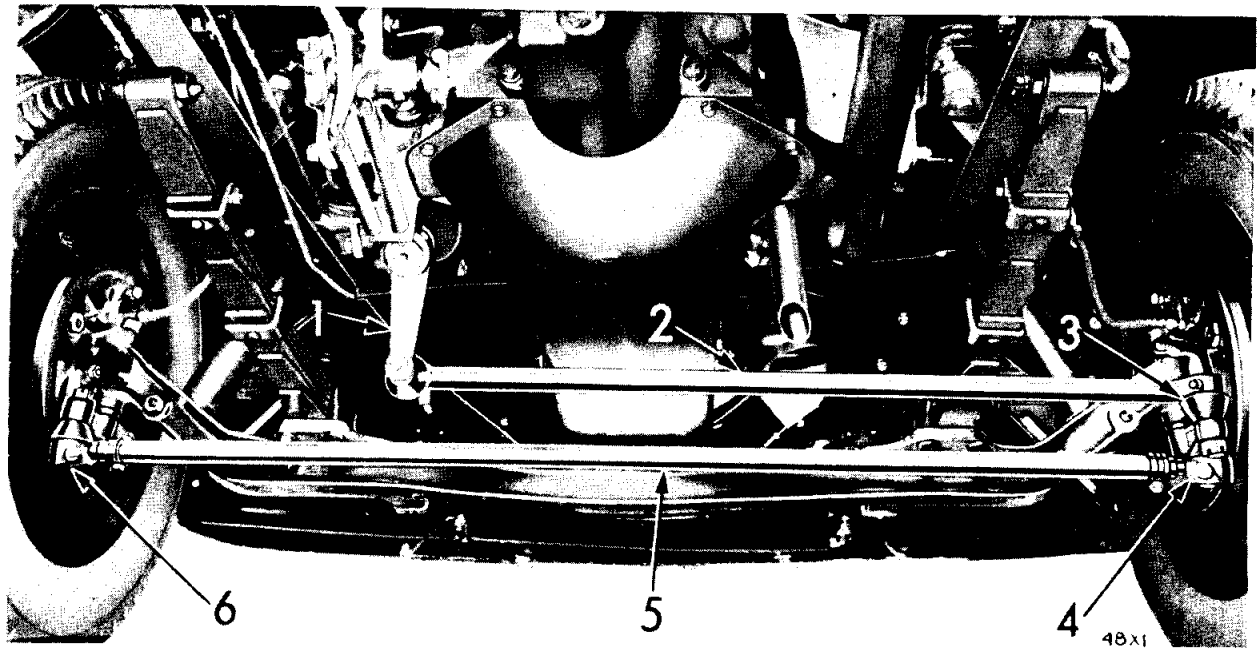


Fig. 5—Assembled View of Tie Rod and Drag Link Assembly (B-4-B, B-4-C, B-4-D)

- |                        |                       |
|------------------------|-----------------------|
| 1 — Steering gear arm  | 4 — Tie rod end—right |
| 2 — Drag link          | 5 — Tie rod           |
| 3 — Drag link end stud | 6 — Tie rod end—left  |

wheel hub and that they are tight against the seat. Next, coat the inner bearing cone and rollers with Short Fiber Wheel Bearing Grease and assemble in the inner cup. Then, install the dust seal and place some wheel bearing lubricant in the hub between the bearing cones (do not fill the space). See Lubrication section for correct amount of lubricant to use.

Before installing the wheel and hub, inspect the surface of the steering knuckle (where it contacts the hub dust seal) to make certain it is smooth. Roughness of this surface will cause rapid wear of the seal and result in grease leakage. Use care when sliding the hub onto the steering knuckle. Keep it straight with the knuckle so that the seal will not be damaged.

With the wheel and hub in position, coat the outer bearing cone and rollers with Short Fiber Wheel Bearing Grease and install them in the hub. Next, install the bearing thrust washer and bearing adjustment nut. Adjust the hub bearings, as outlined in Paragraph 2. Then, install cotter pin and grease cap.

## 2. ADJUSTING FRONT WHEEL HUB BEARINGS

(1) Remove the hub cap (if so equipped) or

grease cap (if so equipped). Remove the cotter pin from the bearing adjustment nut. Take up adjusting nut, revolving

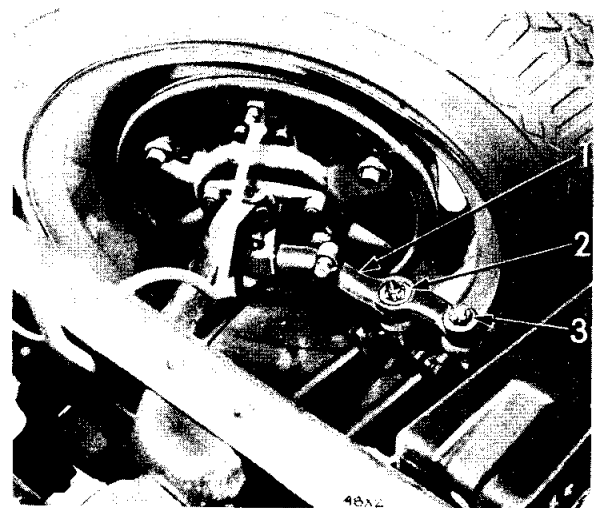


Fig. 6—Right Side Axle Steering Arm, Drag Link and Tie Rod Assembled (B-4-F, B-4-G, B-4-H, B-4-J, B-4-K, B-4-R, B-4-T, B-4-V)

- |                                |
|--------------------------------|
| 1 — Steering knuckle arm—right |
| 2 — Drag link end stud         |
| 3 — Tie rod end stud           |

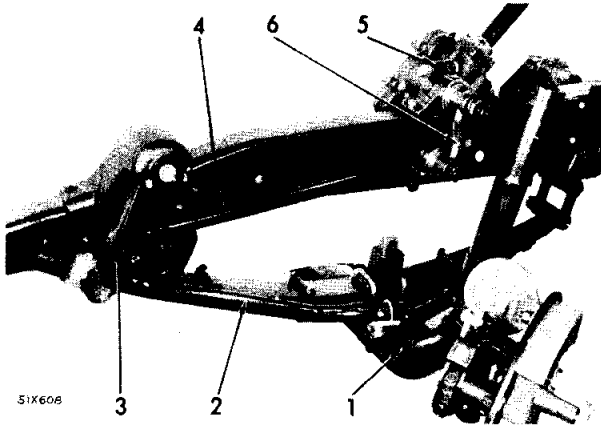


Fig. 7—Steering Linkage (B-4-Y)

- |                          |                     |
|--------------------------|---------------------|
| 1 — Steering knuckle arm | 4 — Upper drag link |
| 2 — Lower drag link      | 5 — Steering gear   |
| 3 — Idler arm            | 6 — Pitman arm      |

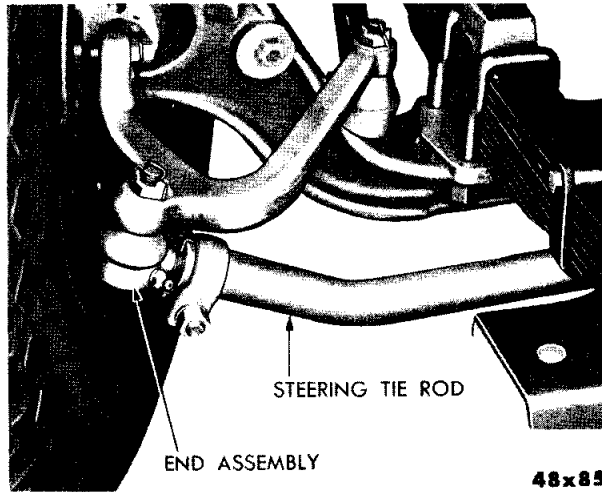


Fig. 9—Bent Tie Rod on B-4-EU

wheel until it binds slightly. Then, back off the adjusting nut so that the nearest slot indexes with the cotter pin hole in the spindle. Then lock the nut. Never back off the adjusting nut less than one-half the distance from one slot to the next slot. *Wheel must rotate freely.*

**CAUTION**

*Do not mistake possible play in the king pin bushings for looseness in the wheel bearings. There should be no looseness in the wheel bearings. This is sometimes difficult to detect when*

*adjusting front wheel bearings because of the weight of the wheel.*

- (2) After locking the nut with cotter pin, check adjustment by shaking wheel on the bearings and rolling the wheel to make certain that there is no more than a slight drag.
- (3) Install grease cap or hub cap (if so equipped).

**3. REMOVAL AND INSTALLATION OF DRAG LINK AND TIE ROD (EXCEPT C. O. E. AND POWER WAGON MODELS)**

The drag link runs parallel to the front axle and is attached to the steering arm, as shown in

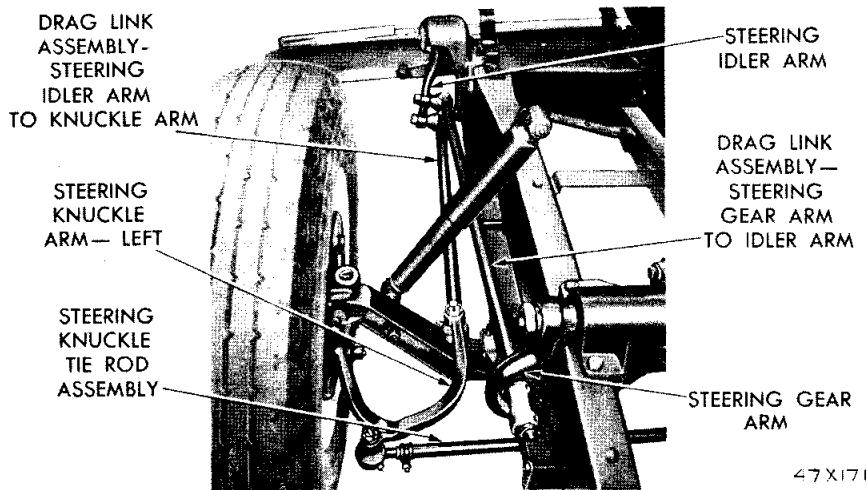


Fig. 8—Route Van Tie Rod Assembly (B-4-DU)

Figures 5 and 6. It can be removed by removing the retainer nut and pushing the tie rod end out of the steering knuckle arm. Refer to Figure 7—B-4-Y.

The drag link (2, Fig. 5) is attached to the rear of the axle steering arm. The drag link (Fig. 6) is attached to the steering arm between the tie rod and the steering knuckle.

When assembling the drag link (2, Fig. 5), insert the drag link end stud through the steering arm from the top. When assembling the drag link (Fig. 6), insert the drag link end stud through from the bottom. Tie rods in both cases are assembled from the bottom.

Route Van Models are similar in construction and are serviced in the same manner. Refer to Figures 8 and 9.

**4. REMOVAL AND INSTALLATION OF DRAG LINK AND TIE ROD (C.O.E. AND POWER WAGON MODELS ONLY)**

Remove the drag link as follows:

- (1) Remove dust covers and cotter pins. Unscrew the plugs from both ends of the drag link tube.
- (2) Remove the drag link from the steering arm and remove the bearings, springs and bumpers from the drag link tube. Inspect

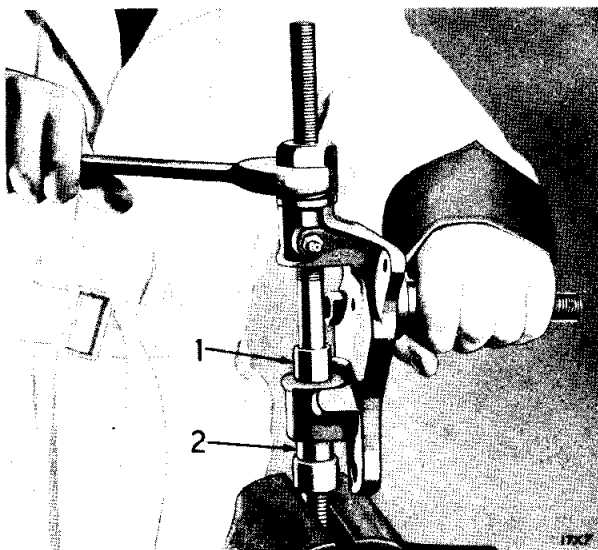


Fig. 10—Removing King Pin Bushing (Reverse Elliott Type Axle)

1 — King pin bushing      2 — Tool C-328-A

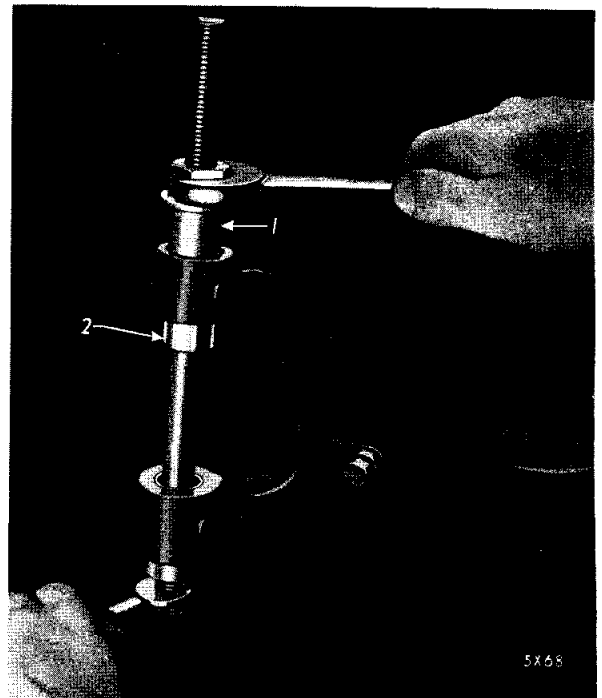


Fig. 11—Removing King Pin Bushing (Elliott Type Axle)

1 — Tool C-328-A      2 — King pin bushing

the bearings and springs and replace worn or damaged parts.

When assembling, coat the two bearings with the proper lubricant and place them in the rear end of the drag link tube. Place the end of the

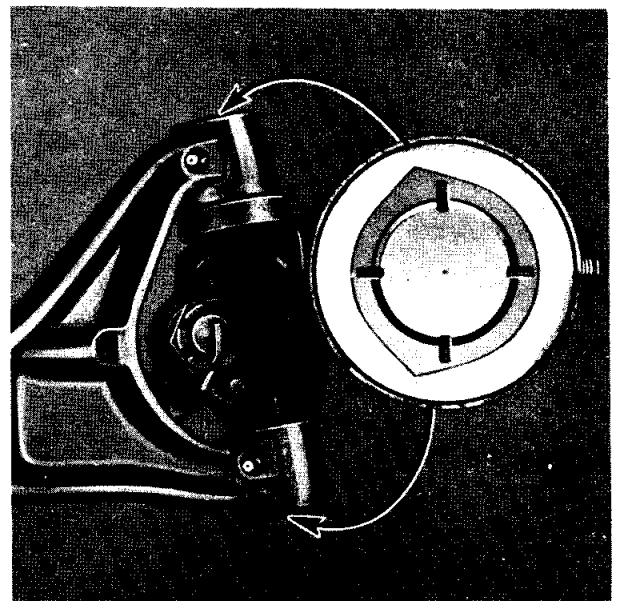


Fig. 12—Staking Lubricant Seal Plugs

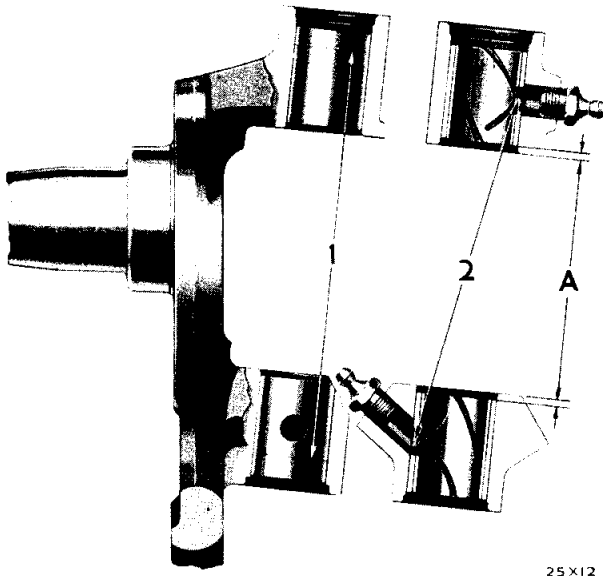


Fig. 13—King Pin Bushings Installed (Reverse Elliott Type Axle) (B-4-B, B-4-C, B-4-D, B-4-DU)

1 — Identification lines  
2 — Lubrication holes  
A — 1/6 in.

drag link on the steering arm with the ball of the arm between the bearings. Install the spring, bumper and plug. Screw the plug up tight, back it off to the next cotter pin hole and install cotter pin and dust cover.

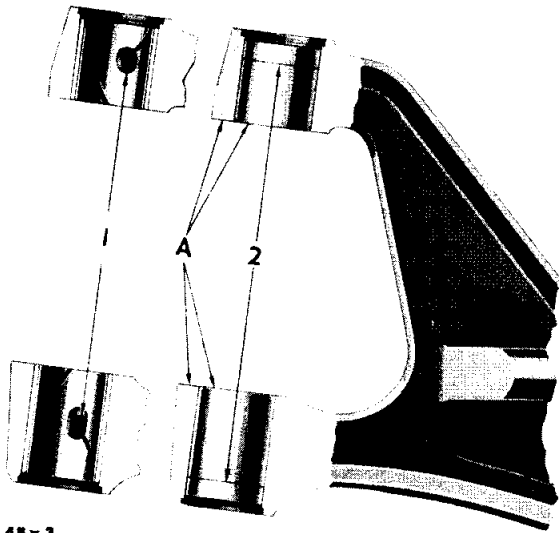


Fig. 14—King Pin Bushings Installed (Elliott Type Axle) (B-4-F, B-4-G)

1 — Identification lines  
2 — Lubrication holes  
A — 1/6 inch

Install the bumper and spring in the front end of the drag link tube. Coat the other two bearings with proper lubricant and place the bearings against the spring. Position the drag link over the steering knuckle arm, with the ball on the arm between the bearings, and install the plug. Tighten the plug up tight, back it off to the next cotter pin hole and install cotter pin and dust cover. Fill both ends of the drag link with the proper lubricant. Refer to Lubrication section.

The tie rod is serviced in the manner described in Paragraph 3.

#### 5. REMOVAL AND INSTALLATION OF STEERING KNUCKLE AND BUSHINGS (WHEEL AND HUB REMOVED)

- (1) Block brake pedal so it cannot be depressed.
- (2) Remove the cap screws which fasten the brake support to the steering knuckle. (On B-4-B, B-4-C and B-4-D, the brake shoe anchor bolt nuts must also be removed.)
- (3) Lift the complete brake support and brake shoe assembly off the steering knuckle without disconnecting the brake hose.

#### CAUTION

*Brake shoes must not be allowed to spread or open up. Do not allow the brake support and shoe assembly to be supported by the flexible hose.*

- (4) On all models (except B-4-B, B-4-C and B-4-D), remove the steering knuckle arm from the steering knuckle.
- (5) Remove king pin locking screw or pin (there are two locking screws on some models).
- (6) Remove king pin oil seal plug (steel disc) by driving a punch down into it and prying the seal up and out of the steering knuckle (on all models except B-4-T and B-4-V). On those trucks, the king pin oil seal plug (steel disc) is removed by removing the lock ring and lifting out the oil seal.
- (7) Drive king pin downward, forcing out the lower oil seal plug. A soft drift should be used for driving against the top end of the king pin.



- (8) Remove king pin bushings. See Figures 10 and 11.

When assembling, the king pin oil seal (steel disc) should be staked in place, as shown in Figure 12.

The bushings should be installed from the top and bottom of the steering knuckle or axle I-beam. (The oil hole in each bushing should line up with the oil hole in the steering knuckle or I-beam (Figs. 13, 14, 15 and 16).

The bushings should be line-reamed with a suitable reamer. The king pins should be a free slip fit in the bushings.

### 6. SERVICING THE AXLE I-BEAM

The replacement of the axle I-beam is considered a major operation and can be performed in various ways, depending upon the model of the truck on which the work is being done, or upon the number of axle components to be replaced.

The operation described herein is a suggested removal method:

- (1) Remove front wheels, hubs and tie rod.
- (2) Disconnect brake hoses and remove steering knuckles.
- (3) Remove nuts from spring clips which hold the chassis springs to the axle center, and disconnect shock absorber (if so equipped) and remove axle.

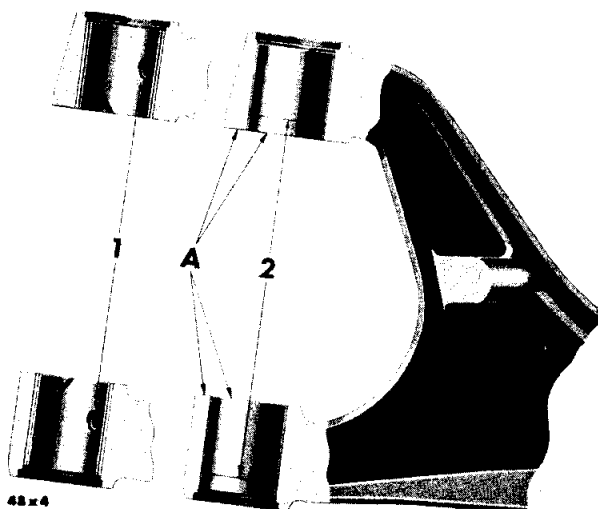


Fig. 15—King Pin Bushings Installed (Elliott Type Axle)  
(B-4-EU, B-4-H, B-4-J, B-4-K, B-4-R)

1 — Lubricant holes      2 — Identification lines      A — Flush

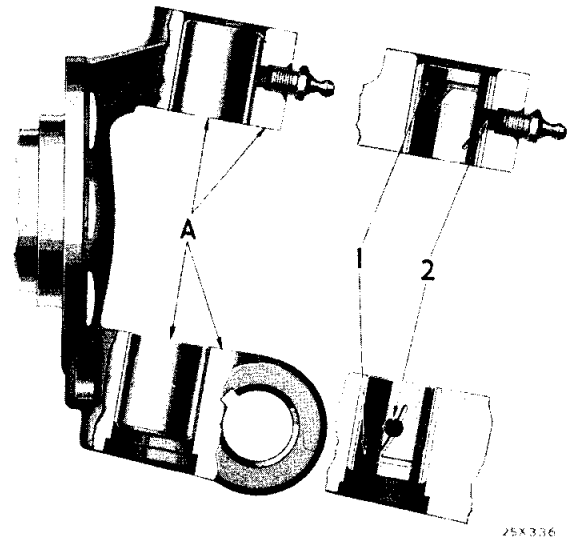


Fig. 16—King Pin Bushings Installed (Reverse Elliott Type Axle) (B-4-T, B-4-V, B-4-Y)

1 — Lubricant grooves  
2 — Lubricant holes  
A — Flush

## FRONT WHEEL ALIGNMENT

All the factors of front wheel alignment are interrelated; but each angle has a specific purpose. Four different angles are used in positioning the front wheels for easiest steering under varying conditions of weight and speed.

Should one of the four angles get out of position, the harmonious relationship of all of them is destroyed. Each angle depends upon the proper setting of the others, if the front wheels are to lead properly.

In making corrections to front wheel alignment, or installing new front axle parts, all four angles in both front wheels should be checked in the following order:

- (1) King pin inclination.
- (2) Camber.
- (3) Caster.
- (4) Toe-in and toe-out.

(This checking sequence is not the same as on Dodge passenger cars, because of the difference in front wheel suspension.)

The instructions in this manual for checking front wheel alignment are based on the use of DD-428 Gauge and DD-435 Turntables. There

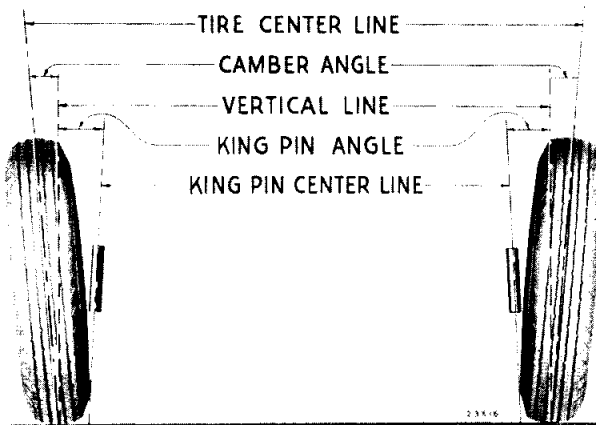


Fig. 17 — Camber Angle and King Pin Angle  
(Inclination)

are many other types of checking equipment in use that accomplish the same purpose, although the method of using the equipment may differ from the instructions in this manual. Regardless of the make or type of equipment used, however, the checking and adjusting operations should be done in the sequence outlined herein.

Before checking the alignment of the front wheels, the following operations should be performed in the order listed. A successful alignment job cannot be accomplished unless these inspection operations are performed. Should inspection reveal the necessity for removing, in-

stalling or adjusting any part of the front axle or steering, before aligning the front wheels, complete instructions on the necessary operations will be found in the respective sections of this manual.

- (1) Inflate all tires to recommended pressure.
- (2) Check condition of tires (blow-out patches, thin treads, vulcanizing, etc.). Tire rotation at the proper intervals is recommended. See Wheels and Tires section in this manual.
- (3) Check wheel and tire run-out (wobble) and eccentricity.
- (4) Check brakes for dragging.
- (5) Check wheels for proper balance.
- (6) Check front wheel bearing adjustment.
- (7) Check king pin bushing clearance.
- (8) Check front springs.
- (9) Check rear springs and U-bolts.
- (10) Check steering connections for lost motion.
- (11) Check steering gear adjustments.
- (12) Check shock absorber control (if truck is so equipped).

When checking front wheel alignment, the truck should be placed on a level floor.

Misalignment of the Power Wagon (B-4-PW) front axle indicates worn or damaged parts. Replace parts if necessary. Except for toe-in, no adjustments are provided for alignment of this axle. For Front Wheel Alignment, B-4-PW, refer to page 23.

## 7. KING PIN INCLINATION

King pin inclination is the amount in degrees that the top of the king pin inclines away from the vertical, toward the center of the truck, as viewed from the front of the truck (Fig. 17). Inclined king pins are closer together at the top than at the bottom.

## 8. CHECKING KING PIN INCLINATION

- (1) Inflate all tires to recommended pressure.
- (2) Place front wheels on locked turntables in the straight-ahead position. Be certain that the wheels are in the center of the turntables.

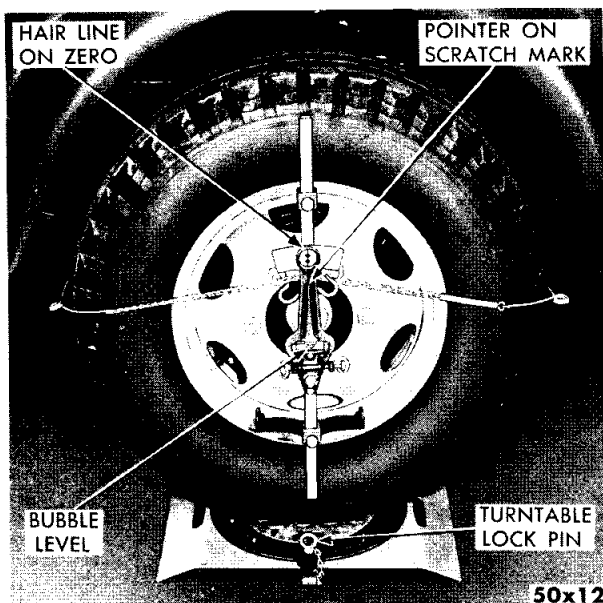


Fig. 18—Gauge Installed on Right Front Wheel

- |                             |                        |
|-----------------------------|------------------------|
| 1 — Hair line on zero       | 3 — Bubble level       |
| 2 — Pointer or scratch mark | 4 — Turntable lock pin |

**NOTE**

Set the foot brakes so that the front wheels can not rotate.

- (3) Assemble gauge, as shown in Figure 18, so that the quadrant is parallel with the wheel.
- (4) Attach the gauge to the right wheel (using chain) in a vertical position so that the bubble is level, the hair line is on zero and the pointer is on the scratch mark.
- (5) Remove turntable lock pins and turn wheels to the left 20 degrees, as indicated on turntable scale. Adjust secondary screw (this controls short pointer) until the bubble levels (Fig. 19).

**NOTE**

Turn wheels past 20 degrees and back to relieve any bind that might occur. Brakes must be applied during this entire operation.

- (6) Turn the wheels to the right until the right wheel has been turned 20 degrees past the straight-ahead position. Adjust the primary screw which controls the hair line until the bubble levels. The reading on the 40 degree scale will be the king pin angle (Fig. 19).
- (7) To check the left wheel, follow the same procedure. However, the wheel should be turned to the right 20 degrees at the start of operation.

When the king pin inclination is incorrect, check for a bent axle center. Correction should be made by replacing damaged parts.

**9. CAMBER**

Camber is the amount in degrees that the wheel inclines away from the vertical at the top, as viewed from the front of the truck (Fig. 17).

Wheels with positive camber are farther apart at the top than at the bottom. Wheels with negative camber are farther apart at the bottom than at the top.

The amount of camber used depends on the amount in degrees the king pin is inclined. An incorrect camber angle causes a scuffing action between the tire and the road, resulting in ab-

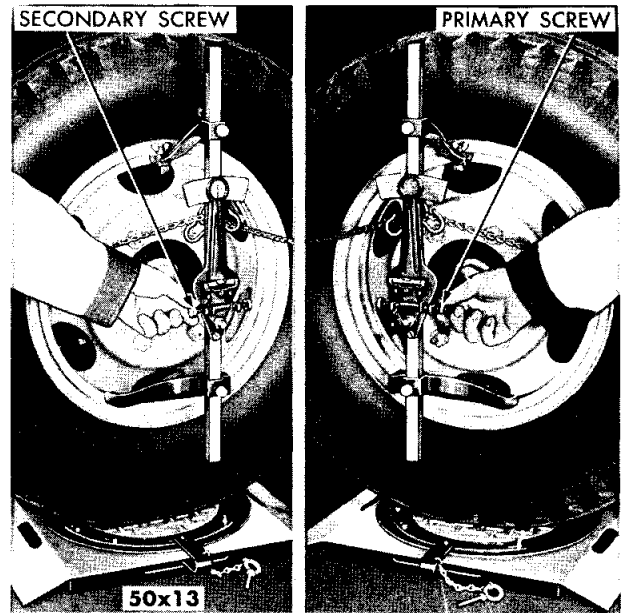


Fig. 19—Checking King Pin Inclination

normal tire wear. Unequal camber in the front wheels may cause the truck to lead to the right or left.

**10. CHECKING CAMBER**

Camber should be checked after the king pin inclination has been checked. If the king pin inclination is incorrect, it should be corrected before attempting to check camber.

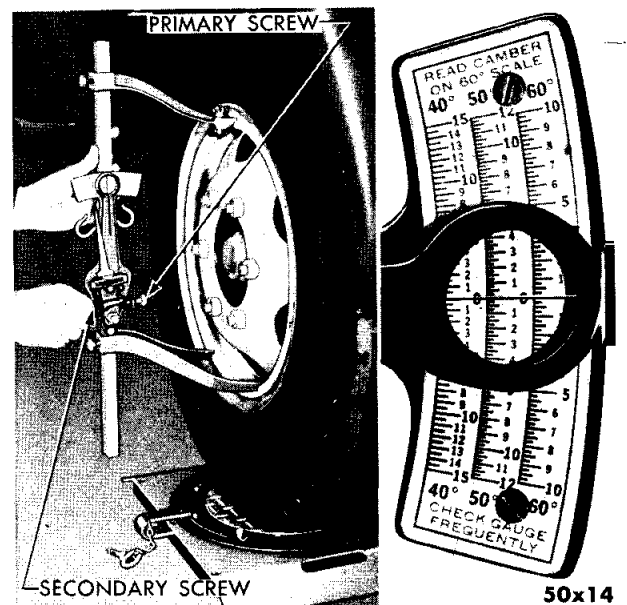


Fig. 20—Checking Camber

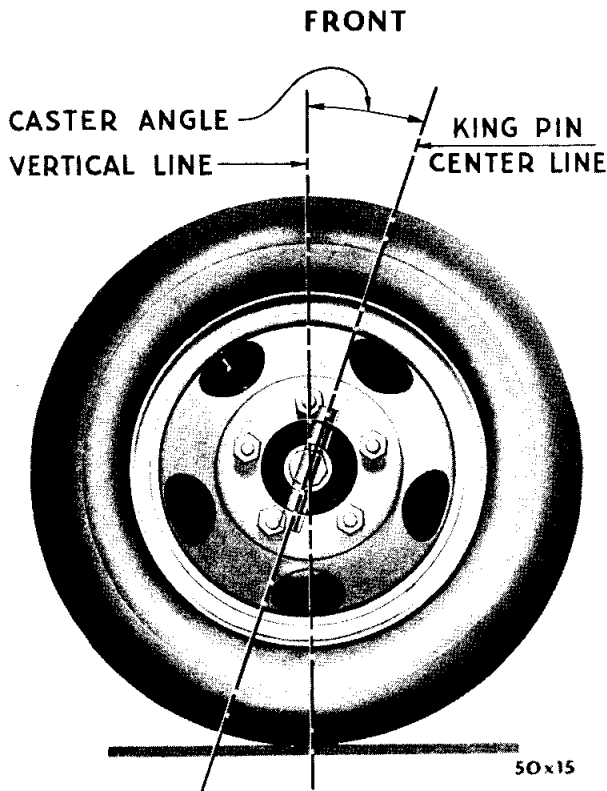


Fig. 21—Positive Caster Angle

- (1) Place the wheels in the straight-ahead position, with the weight of the truck on the wheels and the front end of the truck level.
- (2) Assemble the gauge so that the quadrant is at right angles to the wheel, as shown in Figure 20.
- (3) Adjust the secondary screw so that the pointer lines up with the scratch mark.
- (4) Adjust the primary screw so that the spirit level bubble is centered.
- (5) Take the camber reading in degrees on the scale. *Always use the 60 degree section of the quadrant for checking camber.* If the wheel is not true, turn it 180 degrees and take another reading. Compute an average of the two readings to obtain correct camber angle.
- (6) Readings from zero towards the wheel indicate camber. Readings away from the wheel indicate reverse camber.
- (7) Check the camber of the opposite wheel in the same manner.

No adjustment is provided for camber. If

the camber is not within limits, the axle center or steering knuckle is bent and should be replaced.

## 11. CASTER

Caster is the amount in degrees the top of the king pin is inclined toward the front or rear of the truck, as viewed from the side of the truck.

Positive caster (Fig. 21) is the tilting of the top of the king pin toward the rear of the truck, while negative or reverse caster is the tilting of the top of the king pin toward the front of the truck

Positive caster imparts a trailing action to the front wheels, while negative or reverse causes a leading action. The correct amount of caster helps to keep the front wheels in the straight-ahead position. When turning a curve, caster acts as a lever, assisting the driver in returning the front wheels to the straight-ahead position.

## 12. CHECKING CASTER

Caster should be checked after the king pin inclination and camber have been checked. If either of these angles is incorrect, the condition should be corrected before attempting to adjust the caster.

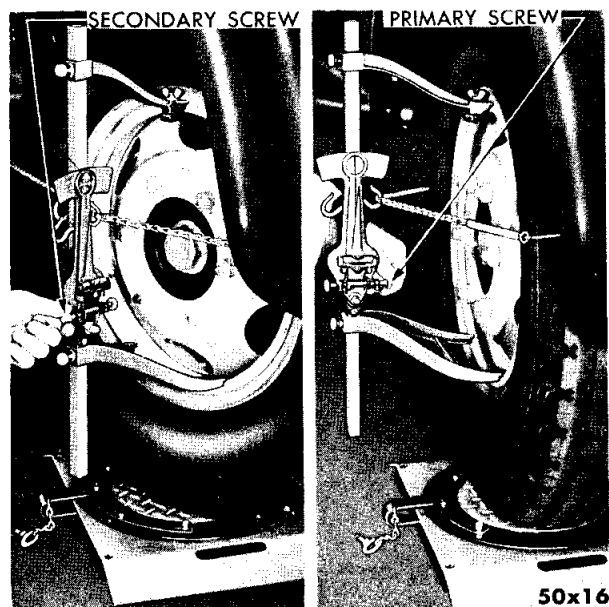


Fig. 22—Checking Caster—Gauge on Right Wheel

**IMPORTANT**

Keep the foot brake applied during the following operation.

- (1) With the front wheels in the center of the turntables and in the straight-ahead position, attach the gauge (using the chain) to right wheel as shown in Figure 22.
- (2) Turn the front wheels to the left 20 degrees, as indicated on the turntable scale.
- (3) Adjust the secondary screw until the bubble is centered. *Do not disturb this setting.*
- (4) Turn the front wheels to the right until the right wheel is 20 degrees past the straight-ahead position.
- (5) Adjust the primary screw until the bubble is centered. The reading on the 40 degree scale of the quadrant is the caster angle. Readings from zero away from the wheel indicate reverse caster. Readings from zero towards the wheel indicate positive caster.
- (6) Check the left wheel in the same manner, but start by turning the front wheels to the right.

Caster adjustment is made by inserting a wedge between the spring and axle. (Fig. 23). To increase caster, insert the wedge so the thick part faces the rear of the truck. To decrease the caster, place the wedge so that the

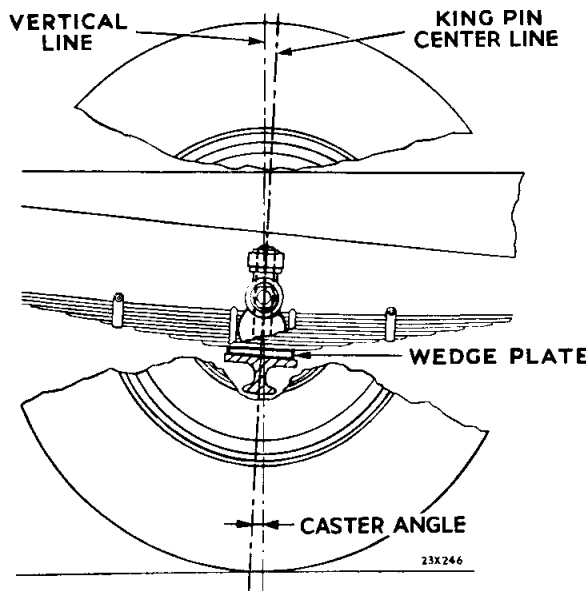


Fig. 23—Caster Angle Adjustment

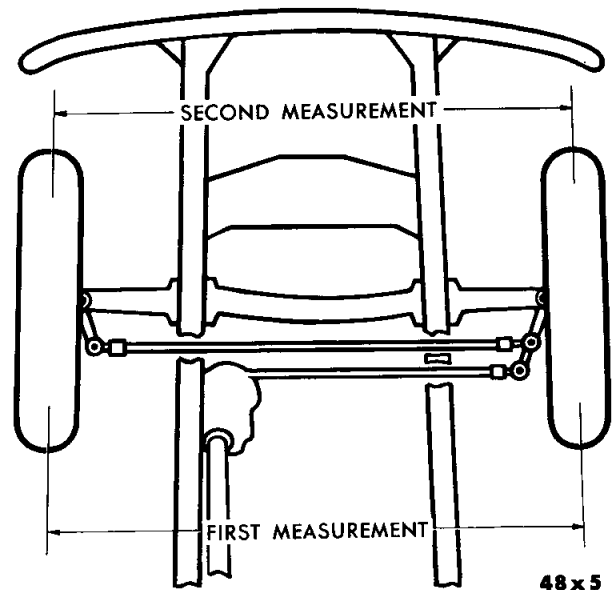


Fig. 24—Actual Front Wheel Toe-In Measurements

thick end is toward the front of the truck. If an excessively thick wedge is required for a truck that has high mileage, check the contour of the springs and replace if necessary.

**13. TOE-IN**

Toe-in is the amount (in fractions of an inch) that the front wheels are closer together at the front than they are at the back, as viewed from the top of the truck (Fig. 24).

The amount of toe-in required depends on the amount of camber or caster in the front wheels.

Excessive or insufficient toe-in causes lateral slipping or scuffing between the tire and the road. This results in abnormal tire wear, depending on the relationship between camber, caster and toe-in.

**14. CHECKING TOE-IN**

When checking for causes of excessive tire wear, king pin inclination, camber and caster should first be checked and corrected in the order named. No change should be made in toe-in until the other factors of front wheel alignment are known to be within specifications.

- (1) Turn the front wheels to exactly the straight-ahead position.
- (2) Check the toe-in of front wheels after rolling the truck ahead one full revolution of

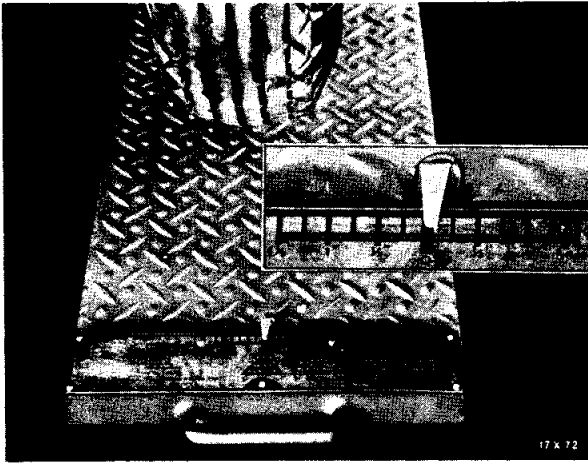


Fig. 25—Front Wheel Toe-In—Wee-Gee Board—  
Tool DD-399

the wheels (with only the weight of the truck on the tires).

- (3) Actual toe-in measurements should be taken at hub-height, between two points on the center of the tread at the rear of the tires (Fig. 24).

*Mark the point.* Roll the truck ahead so that the points are in front at hub height and then measure the distance between the same two points on the tire treads. The difference in the

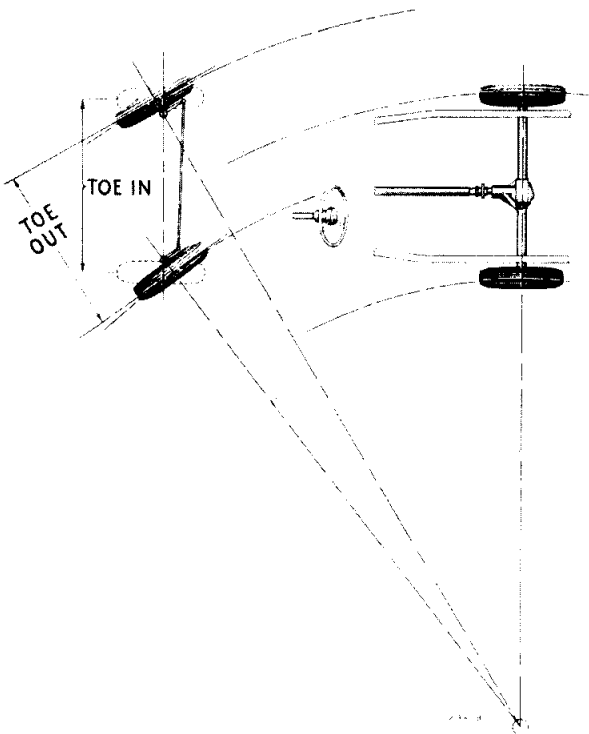


Fig. 26—Steering Geometry on Turns

two measurements is the actual toe-in or toe-out.

Toe-in when measured with a Wee-Gee Board (Fig. 25) should be zero. See Service Standards for toe-in specifications for all models.

#### 15. ADJUSTING TOE-IN (EXCEPT B-4-PW)

- (1) Turn the steering wheel so that gear is in the mid-position.
- (2) Loosen the clamping bolts on both ends of the tie rod and turn the tie rod the direction necessary to bring the toe-in within the specified limits (see Service Standards). The B-4-EU tie rod is bent up at each end and has a low middle portion for front spring clearance, as shown in Figure 9. Therefore, one tie rod must be removed from the steering knuckle arm for toe-in adjustment.
- (3) Tighten the clamping bolts on the tie rod ends.
- (4) Check the toe-in again to make certain that it is correct. If a Wee-Gee Board (truck type), or similar wheel aligning equipment is used to measure toe-in, it is only necessary to put the wheels in the straight-ahead position and pull the truck forward onto the device.

#### 16. TOE-OUT

When the wheels are turned to the right or left, they actually toe-out farther apart at the front than at the rear (Fig. 26).

The design of the steering knuckle arms regulates the amount of toe-out, depending on the wheelbase of the truck and the distance between the steering knuckles. To be in correct relative alignment, when negotiating a turn, both front and rear wheels must travel in circles having a common center. The inside front wheel travels in a circle having a smaller radius than the circle traveled by the outside front wheel. Therefore, the wheels will be farther apart at the front than at the back when turned off the straight-ahead position. The amount the front wheels toe-out on turns depends on how far the front wheels are turned.

A bent steering knuckle arm will cause excessive tire wear, even though the amount of

toe-in is correct for the straight-ahead position of the front wheels. Tire wear occurs because when the front wheels are turned to the right or left, the error in toe-out, due to the bent steering knuckle arm, would cause excessive scuffing action between the tire and the road. It is, therefore, extremely important to check toe-out as well as toe-in whenever the front wheels are aligned.

### 17. CHECKING TOE-OUT ON TURNS

Before checking toe-out (wheel alignment on turns), all other factors of front wheel alignment should be checked in their proper sequence:

- (1) King Pin Inclination
- (2) Camber
- (3) Caster
- (4) Toe-in

Checking devices, such as a Wee-Gee Board (truck type) and similar devices that measure the amount of slippage between the tire and the road, may be used to check alignment of front wheels on turns. Such a check will determine the amount of slippage between the tire and the road when the wheels are turned to the right or left. To check the amount of toe-out on turns

using a truck-type wheel aligning board, proceed as follows:

- (1) Turn the front wheels to the left until the left wheel is 20 degrees from the straight-ahead position.
- (2) Place the aligning board in front of the right wheel. Drive the truck onto the aligning board so that the right wheel travels the length of the board.

If the pointer on the board moves more than  $\frac{1}{2}$  inch after the wheel has traveled the length of the board, the toe-out is incorrect, indicating a bent steering knuckle on the left side.

- (3) Repeat the foregoing operations on the right wheel, turning the wheels 20 degrees to the right and placing the aligning board under the left wheel. If the pointer moves more than  $\frac{1}{2}$  inch, it would indicate a bent steering knuckle arm on the right side.

When using an aligning board to check toe-in or toe-out, the direction of movement of the pointer indicates whether the condition is excessive toe-in or excessive toe-out. Movement of the pointer toward the center of the truck indicates toe-out.

Movement of the pointer in the opposite direction (away from the center of the truck) indicates toe-in.

---

## SERVICE DIAGNOSIS

### CONDITIONS — POSSIBLE CAUSES — REMEDIES

#### 18. WHEEL BOUNCE

##### *Possible Causes*

- a. Unequal tire pressure.
- b. Unbalanced wheels or tires.
- c. Weak front spring.
- d. Inoperative shock absorber.

##### *Remedies*

- a. Inflate tires to proper pressure.
- b. Refer to Wheel Balancing, Wheels and Tires section.

- c. Check front spring as outlined in the Springs section. Shim as necessary or replace spring.

- d. If shock absorbers are serviceable, remove, inspect, and replace parts as necessary. See the Shock Absorbers section. If shock absorbers are not serviceable, replace.

#### 19. EXCESSIVE TIRE WEAR

##### *Possible Causes*

- a. Failure to rotate tires.
  - b. Incorrect camber.
  - c. Incorrect toe-in or toe-out.
-

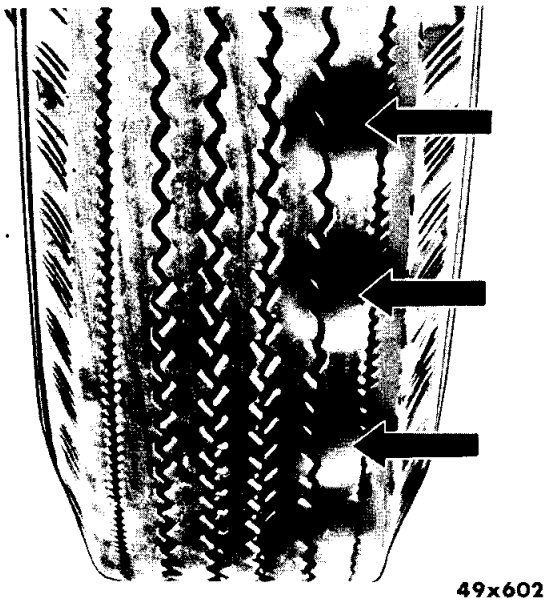


Fig. 27—Spotty Wear

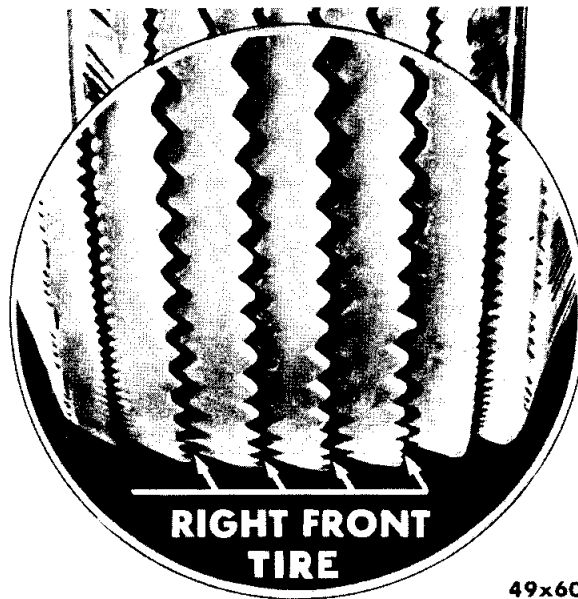


Fig. 29—Toe-In Wear

- d. Improper tire inflation.
- e. Turning corners too fast.
- f. Wheel wobble.
- g. Worn king pins.
- h. Harsh or unequal brakes.
- i. Sustained high-speed driving.

#### Remedies

- a. Spotty wear occurs on front wheels, as

shown in Figure 27. This condition does not progress to any great extent prior to 2,500 miles. This type of wear is the natural result of free rolling wheels and tires. Wheel alignment or front wheel balancing will NOT correct this condition. The only known method to control the formation of spotty wear is to rotate tires every 2,500 to 3,000 miles.

- b. Excessive positive camber will develop noticeable wear on the outer ribs of tires, as shown in Figure 28. Excessive negative cam-

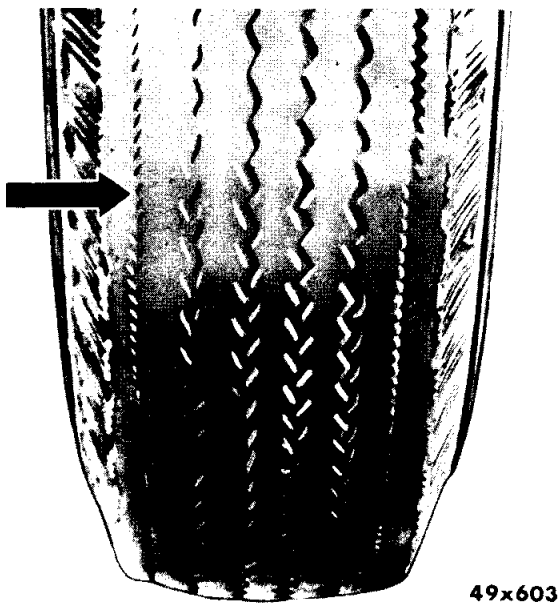


Fig. 28—Camber Wear

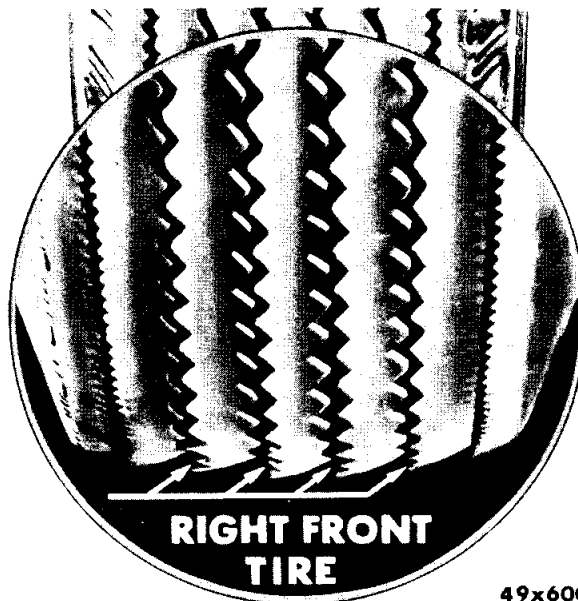


Fig. 30—Toe-Out Wear



ber will develop noticeable wear on the inside ribs of tires. Camber should be adjusted **ONLY** if this type of wear is evident. Refer to Front Wheel Alignment in this section.

- c. The amount of front wheel toe-in or toe-out affects the rate of tire wear more than any other single cause. See Figure 29 for toe-in wear and Figure 30 for toe-out wear. Refer to Front Wheel Alignment in this section.
- d. Refer to the Tire Pressures Chart in the Wheels and Tires section. Tires are subject to under-inflation wear, as shown in Figure 31. This type of wear is characterized by excessive wear on the two tread ribs adjacent to the inner and outer shoulder ribs. When a condition of this kind develops, it is an indication that the tire has been run at a lower operating pressure than that for which it is designed. Over-inflation of the tire will result in excessive wear at the center of the tread.
- e. Excessive speed on turns will cause a scuffing action on the tires, resulting in rapid wear.
- f. Straighten the wheel or replace the wheel and tire assembly as required.
- g. Replace worn king pins and bushings.
- h. Refer to Brakes section.
- i. If tire economy is desired, prolong tire life by driving at moderate speeds.

## 20. FRONT END NOISY

### *Possible Causes*

- a. Improper lubrication.
- b. Loose tie rod ends.
- c. Front shock absorber noisy.

### *Remedies*

- a. Refer to Lubrication section.
- b. Check tie rod ends for looseness and replace as necessary.
- c. The rubber bushings, on which the shock absorbers are mounted to the anchor studs, may be worn, allowing metal to contact metal. In which case, replace the bushings.

If the serviceable type shock absorber is

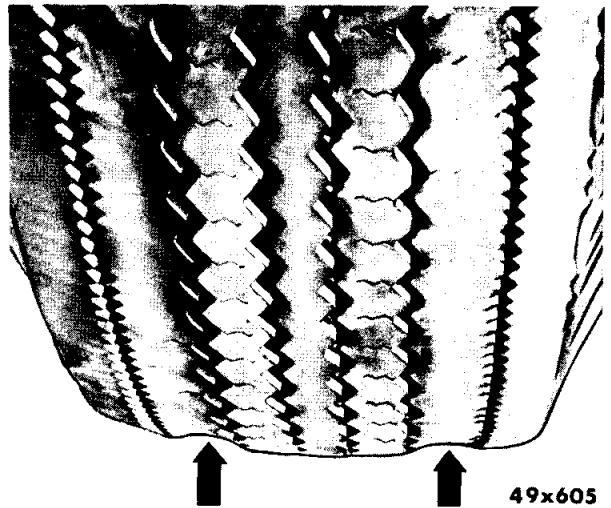


Fig. 31—Under-Inflation Wear

noisy, remove, inspect and repair as necessary. Refer to Shock Absorbers section. If the noisy shock absorber is not of the serviceable type, replace the complete unit.

### *NOTE*

*The rubber bushings on the springs and shock absorbers must not be lubricated or allowed to come in contact with any form of mineral oil. Mineral base oils will cause rapid deterioration of the rubber.*

## MAINTENANCE

The axle, steering knuckles and arms are heat-treated to obtain the inherent characteristics



Fig. 32—Rolling Leather Oil Seal

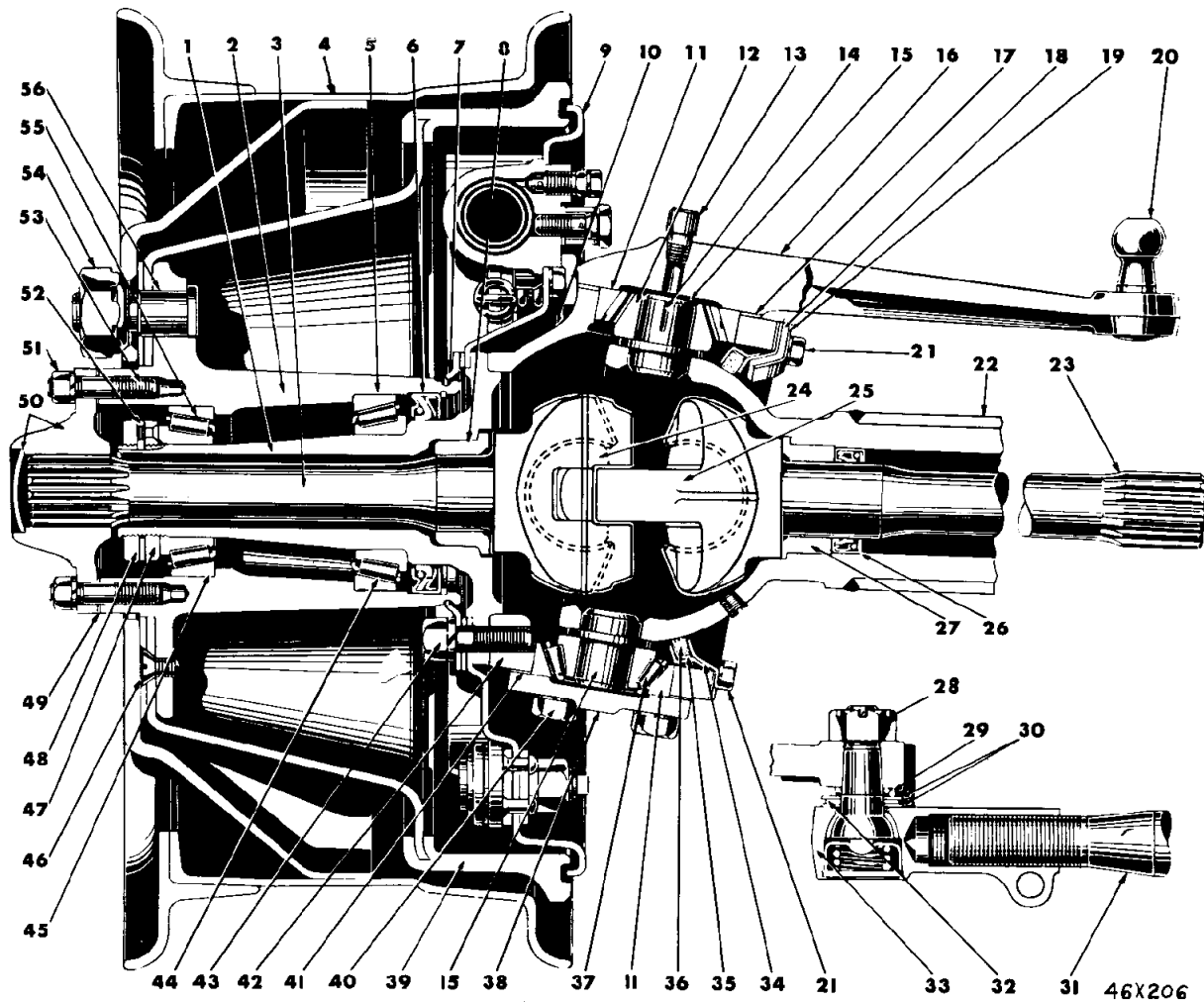


Fig. 33—Front Axle (B-4-PW)

- |   |  |
|---|--|
| 1 — Steering knuckle assembly                             | 29 — Tie rod end dust cover spring                         |
| 2 — Hub assembly  | 30 — Tie rod end dust cover washer                         |
| 3 — Outer drive shaft                                     | 31 — Tie rod   |
| 4 — Wheel assembly  | 32 — Tie rod end dust cover                                |
| 5 — Wheel hub inner bearing cup                           | 33 — Tie rod end assembly                                  |
| 6 — Outer oil seal assembly                               | 34 — Steering knuckle flange oil seal retainer             |
| 7 — Oil slinger   | 35 — Steering knuckle flange oil seal felt pressure spring |
| 8 — Outer steering knuckle bushing                        | 36 — Steering knuckle flange oil seal felt                 |
| 9 — Brake support assembly                                | 37 — Steering knuckle flange lower bearing cone assembly   |
| 10 — Steering knuckle outer flange assembly               | 38 — Steering knuckle flange bearing cap                   |
| 11 — Steering knuckle flange bearing cup                  | 39 — Brake drum assembly                                   |
| 12 — Steering knuckle flange upper bearing cone           | 40 — Steering knuckle flange lower bearing cap bolt        |
| 13 — Steering knuckle flange upper bearing grease elbow   | 41 — Steering knuckle flange lower bearing cap gasket      |
| 14 — Steering knuckle flange upper bearing cone key       | 42 — Steering knuckle flange assembly                      |
| 15 — Steering knuckle flange upper bearing pin            | 43 — Steering knuckle to flange bolt                       |
| 16 — Steering knuckle arm assembly                        | 44 — Wheel hub inner bearing cone assembly                 |
| 17 — Steering knuckle upper bearing cap shim              | 45 — Wheel hub outer bearing cup                           |
| 18 — Steering knuckle flange joint oil seal felt          | 46 — Brake drum to flange retaining screw                  |
| 19 — Steering knuckle flange joint oil seal felt retainer | 47 — Wheel bearing adjusting nut assembly                  |
| 20 — Steering knuckle arm ball                            | 48 — Wheel bearing adjusting outer lock nut                |
| 21 — Steering knuckle flange oil seal felt retainer bolt  | 49 — Drive flange gasket                                   |
| 22 — Axle housing assembly                                | 50 — Drive flange assembly                                 |
| 23 — Inner drive shaft                                    | 51 — Drive flange retaining nut                            |
| 24 — Male universal drive joint                           | 52 — Wheel bearing adjusting nut lock                      |
| 25 — Female universal drive joint                         | 53 — Drive flange stud                                     |
| 26 — Inner oil seal assembly                              | 54 — Wheel hub stud nut                                    |
| 27 — Inner drive shaft bushing                            | 55 — Wheel hub outer bearing cone assembly                 |
| 28 — Tie rod end nut                                      | 56 — Wheel hub stud  |

required for front axle construction. Should any of these parts become bent, they should be replaced. Heating these parts for straightening or correction of an irregularity will make them unfit for use because this additional heating destroys the results of the initial heat treatment.

## 21. PREPARATION AND INSTALLATION OF OIL SEALS

### Leather Oil Seals

When installing new leather oil seals, care must be taken to make certain that the leather is soaked in thin oil for about 30 minutes before assembling on the truck. Then, "work" the leather by rolling it with a smooth bar (Fig. 32). The leather should be soft and pliable and the edges should be in good condition, in order to obtain a good tight seal and prevent oil leakage. Inspect the surface of the steering knuckle, where it contacts the oil seal, to make certain

that it is smooth. Roughness will cause rapid wear of the seal and oil leakage.

### Synthetic Oil Seals

No preparation of this type of seal is necessary. The same care used in leather seal installation should be exercised.

## 22. CHECKING FOR WORN KING PIN BUSHINGS (EXCEPT B-4-PW)

Excessive play between king pins and bushings may be determined as follows:

- (1) Remove hub cap, grease cap and cotter pin from front wheel bearing adjusting nut.
- (2) Tighten wheel bearing adjusting nut to remove play in wheel bearing.
- (3) Holding the tire at the extreme top and bottom sides, move the wheel in and out. There should be no more than  $\frac{1}{8}$  inch shake in the wheel, measured at the top of the tire tread.

# AXLE, FRONT, GEAR—DRIVEN

(B-4-PW) (FIG. 33)

## REMOVAL, INSTALLATION AND MAINTENANCE

The front axle of the Dodge Power Wagon (4-wheel drive truck), like the rear axle, is a driving unit. Power is transmitted to the wheels through axle shafts incorporating constant velocity universal joints at the steering knuckles.

### 23. REMOVAL AND INSTALLATION OF FRONT AXLE ASSEMBLY

- (1) Raise front end of truck with a hoist or with jacks placed under the frame at the rear end of the front springs. In every case, support the frame with blocking or stands as a safety measure.
- (2) Disconnect the front propeller shaft at differential pinion yoke.
- (3) Disconnect the steering mechanism by re-

moving the steering arm from left flange assembly.

- (4) Disconnect the shock absorbers.
- (5) Disconnect the brake tube from the "tee" on top of the axle housing.
- (6) Remove the nuts from the spring hold-down bolts and remove the axle assembly from under the truck.

Installation of the front axle assembly is accomplished in the reverse order of its removal. In addition, it is necessary to bleed the brake lines after the brake connections are made.

### 24. DISASSEMBLY OF FRONT AXLE

The following instructions are provided for disassembling the front axle (Fig. 33) without removing the housing from the truck:

- (1) Raise front end of truck and remove wheel and tire assemblies.

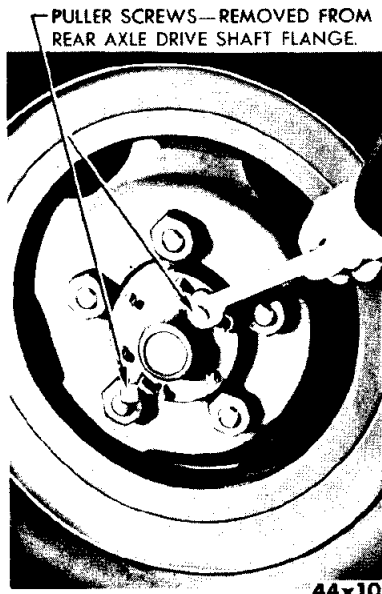


Fig. 34 — Removal of Drive Shaft Flange

- (2) Brake drums can, if desired, be removed without disturbing the hubs. This simplifies certain repairs, such as relining of brake shoes. The brake drum is held firmly in place on the hub flange by the wheel; flat-head, slotted screws are provided to retain the drum in position when the wheel is detached from the hub.

To remove a drum, insert a blunt chisel in each of the screw slots and strike the chisel a few sharp blows with a medium-size hammer to loosen the screws. The screws can be removed

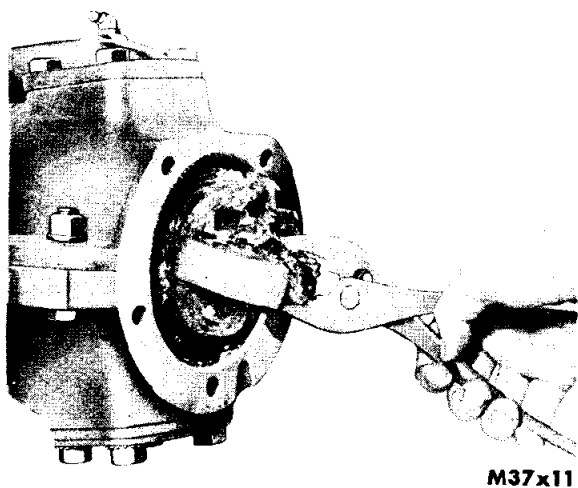


Fig. 35 — Removing Male Drive Joint

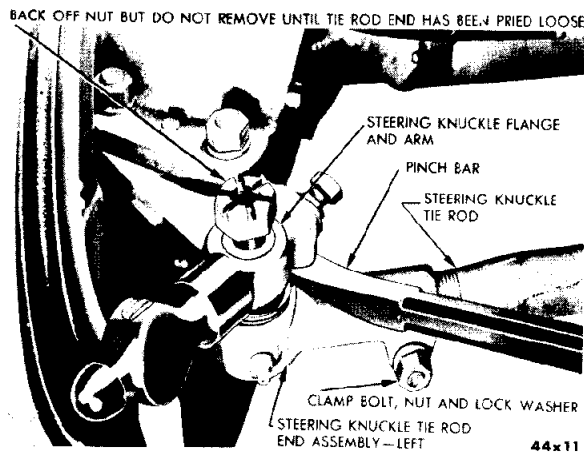


Fig. 36 — Removing Steering Knuckle Tie Rod End

with a large screw driver. Then, install three  $\frac{3}{8}$  inch cap screws in the puller screw holes of the drum and pull the drum from the hub by tightening the screws. If the drum is rusted to the hub flange, shock the puller screws with a hammer as they are tightened. This will facilitate the removal of the drum.

- (3) Punch mark the drive flange and hub. The flange must be installed on the hub in the same position when the parts are re-assembled. Remove the nuts and lock washers and install puller screws in the two threaded holes of the flange (Fig. 34). Pull the flange from the hub studs by tightening the two screws.
- (4) Remove the hub and bearings.
- (5) Remove the attaching cap screws and pull

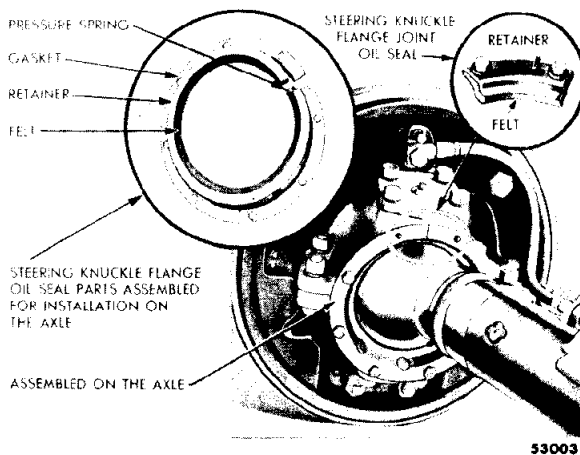


Fig. 37 — Steering Knuckle Flange Oil Seal Assembly

the brake supports from the steering knuckle assemblies, attaching them to the front springs with a piece of wire or heavy string. If this is done, it will not be necessary to disconnect the brake lines.

- (6) Tap the steering knuckles with a lead, plastic, or copper hammer to remove them from the flange assemblies.
- (7) Pull the short outer shafts and female section of the universal drive assemblies from the front axle housing. The male sections of the universal drive assemblies (Fig. 35), and long inner shafts, can then be withdrawn.
- (8) Disconnect the steering tie rod from the steering knuckle flange arm (Fig. 36).
- (9) Remove steering knuckle flange oil seal assembly. Refer to Figure 37.
- (10) If the left side is disassembled, it will be necessary to disconnect the drag link from the steering arm.
- (11) The upper and lower sections of the steering knuckle flange are machined as an assembly and must be assembled as such. Under the circumstances, the upper or lower sections of the steering knuckles are not interchangeable with like parts of any other assembly. To facilitate correct assembly, it is recommended that the two sections be marked before they are disassembled. Remove the dowel pins and bolts (Fig. 38). This will permit the removal of the two sections of the steering knuckle flange assembly from the axle housing.
- (12) If replacement is necessary, remove the bearing cones from the front axle housing trunnion pins.
- (13) Remove the steering arm from the left steering knuckle flange assembly, or the upper bearing cap from the right side.
- (14) Fasten the steering knuckle flange bearing shims for each knuckle assembly to either the steering arm or bearing cap, in order to facilitate adjustment of the bearings at the time of assembly.
- (15) Remove the flange lower bearing cap and gasket.

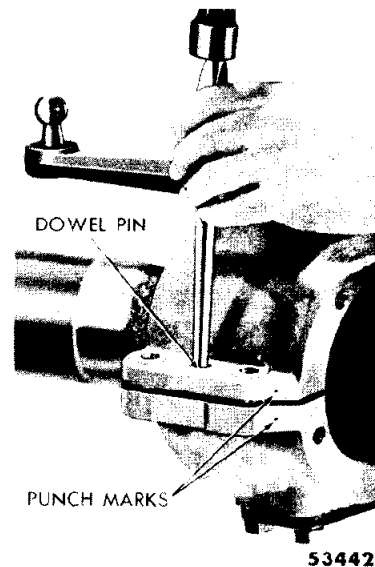


Fig. 38 — Removing Steering Knuckle Flange

- (16) Remove bushing and oil seal from the end of the front axle housing. Wash all parts in cleaning solvent and dry thoroughly so that they can be properly inspected.
- (17) Remove the differential carrier assembly, if necessary. This unit can be removed and serviced in the same manner as the rear axle. Refer to the Rear Axle section for detailed information.

## 25. INSPECTION

Inspect the trunnion sockets, or ball ends of the front axle housing, for damage or roughness. Remove roughness or rust with abrasive cloth.

Check the steering knuckle trunnion bearings and replace cups and cones if there is evidence of wear, flat spots, chips or cracks.

Check bronze bushings (8 and 27, Fig. 33) in the steering knuckle and axle housing for worn or scored flange surfaces. These bushings control the end play in the axle shaft universal joints and must be in good condition. Replace if condition of bushing is questionable. If the steering knuckle bushing bore is badly worn or scored, the front wheel bearings are too loose.

Inspect wheel bearings, cups and oil seals and make all replacements necessary.

Inspect universal drive shaft joints for wear, scores, cracks and chipped spots and replace if parts are in questionable condition. If it is nec-

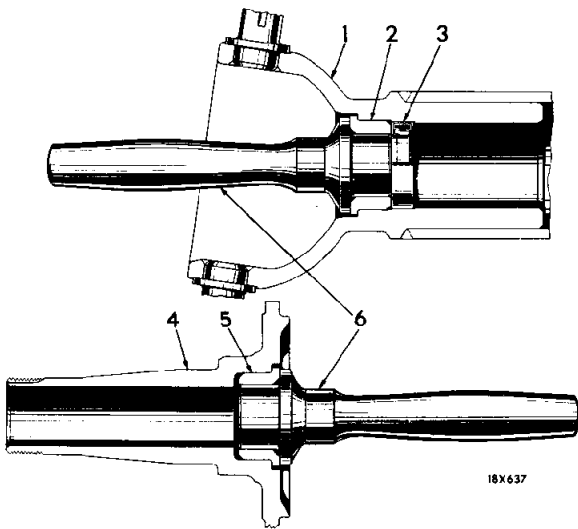


Fig. 39 — Installing Oil Seal and Bushing — Tool DD-843

1 — Housing assembly	4 — Steering knuckle
2 — Trunnion socket bushing	5 — Steering knuckle bushing
3 — Shaft oil seal	6 — Drift

essary to check front axle housing alignment, refer to Figure 40.

## 26. ASSEMBLY OF FRONT AXLE

- (1) Install the front axle drive shaft oil seal and bushings in the housing. The oil seal should always be replaced whenever the axle is disassembled. The bushings should be replaced if they show signs of wear. Drive the oil seal and bushings into the housing, as shown in Figure 39. Make certain the oil seal is installed with the lip or edge of the leather towards the differential.

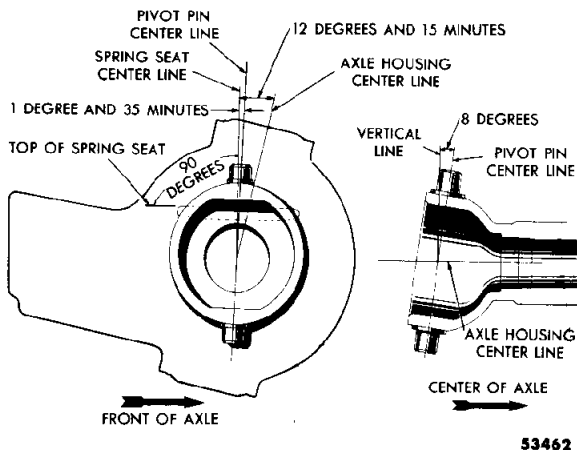


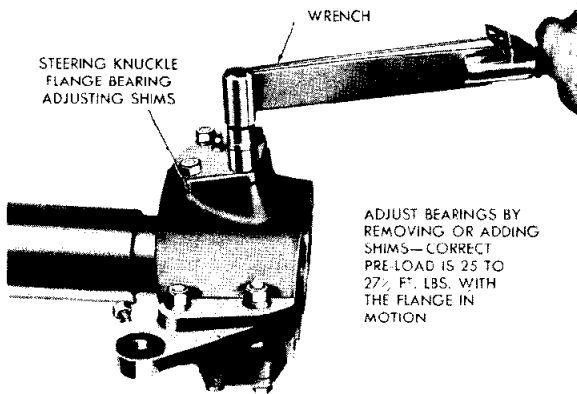
Fig. 40 — Front Axle Housing Alignment

- (2) Install the Woodruff key in the front axle housing upper trunnion pins. Coat the bearing cones with lubricant and install the bronze cone on the upper trunnion pin and the roller bearing on the lower trunnion pin.
- (3) Place the upper and lower sections of the steering knuckle flanges in their original position on the front axle housing and install the bolts, washers and nuts. Do not tighten the nuts until the dowel pins are installed. Install the dowel pins and tighten the nuts.
- (4) Install the flange lower bearing caps and gaskets.
- (5) Place the bearing adjusting shims on the top of the steering knuckle flange assemblies. Attach the steering arm to the left side and attach the bearing cap to the right side.
- (6) Adjust the steering knuckle flange bearings. This should always be done with universal drive assembly (axle shaft) and the steering knuckle flange oil seal assembly removed. Check the adjustment with a foot-pound torque wrench (Fig. 41) on one of the bearing caps or steering arm cap screws. Move the steering knuckle flange back and forth with the torque wrench until the bearings roll smoothly. Note the reading while the flange is in motion. The reading should be from 25 to 27½ foot-pounds. This can be obtained by adding or removing shims until the correct adjustment is made. Shims of .005 inch, .007 inch and .020 inch thickness are available.
- (7) Install steering knuckle flange oil seal assemblies (Fig. 37), using new felt seals and gaskets. Assemble parts so that the open ends are at the top. Clean the sealing surfaces to remove all traces of previous gasket. Install pressure spring in the oil retainer end. After saturating the oil seal felt in oil, assemble it in the retainer with the ends even with the retainer ends.
- (8) Assemble tie rod to steering knuckle flange arms and connect the drag link to the left steering arm.

(9) With the differential carrier assembly in position, assemble the universal drive assemblies (axle shafts). These consist of the short or outer shaft, the long or inner shaft, the male or lug section of the universal joint and the female or grooved section of the universal joint (Fig. 42). The male or lug section of the universal joint is assembled on the long shaft and the female section on the short shaft. Both the male and female sections have etched mating numbers 1, 2, 3 and 4, and are usually matched as two 1's, 2's, 3's or 4's. This matching should be observed if both steering knuckle assemblies are disassembled at the same time. There may be occasions when the numbers of the two sections do not match. However, this is not necessarily detrimental if the parts operate freely.

Assemble the complete shaft assemblies and pack the universal joints with chassis lubricant before the assemblies are inserted in the axle housing. Then, start the long shaft carefully through the oil seal and insert the entire assembly as a unit into the housing.

- (10) Position the steering knuckles and brake supports on the steering knuckle flanges and install the cap screws and lock washers.
- (11) Pack the wheel bearings, coat the inside of the hubs with lubricant and install the hub assembly. Adjust the wheel bearings by turning the inner adjusting nut up



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Fig. 41 — Adjusting Steering Knuckle Flange Bearing — Tool C-524

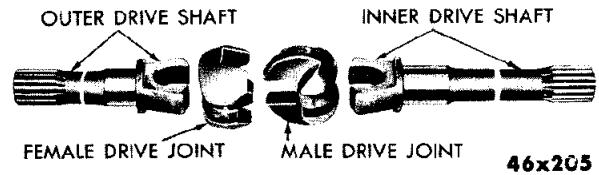


Fig. 42 — Universal Drive Assembly (Disassembled)

tight and backing it off  $\frac{1}{8}$  of a turn. Install the adjusting nut lock, making certain that the dowel pin in the inner nut enters one of the holes in the lock. It may be necessary to reverse the lock or turn the inner adjusting nut slightly to permit the dowel pin to engage with the lock. Install outer nut and tighten it securely.

- (12) Install the drive flanges in their original location with new gaskets.
- (13) Before installing the brake drums, coat the contact surfaces of the wheel nut flange of both the drum and hub with water pump grease to facilitate future removal.
- (14) Install the wheel and tire assemblies.

## FRONT WHEEL ALIGNMENT

The service procedure in the following paragraphs concerns only the B-4-PW. For additional Front Wheel Alignment information, refer to page 9 in this section.

### 27. ADJUSTING TOE-IN (B-4-PW)

To adjust the toe-in, disconnect the left tie-rod end from the steering knuckle, and turn the end assembly in the direction necessary to obtain correct toe-in. To remove the tie rod end from the steering arm, remove the cotter pin from the tie rod end nut and remove the nut. Insert a pinch bar between the tie rod end and the steering arm and strike the arm on the side at the end with a medium-sized hammer. This should dislodge the tapered stud of the tie rod end. *Do not, under any circumstances, strike the threaded end of the tie rod with a hammer.*

### 28. CHECKING TURNING RADIUS (B-4-PW)

To check the turning radius with the checking gauge, remove steering knuckle flange oil seal

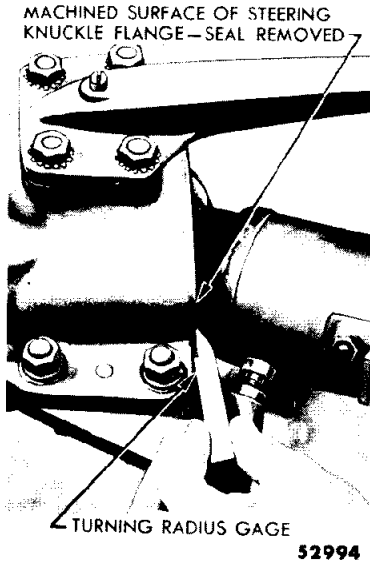


Fig. 43 — Checking Turning Radius — Tool DD-847

retainer and clean the front axle housing where the gauge will contact it. Position the gauge so that the recessed portion will bear against the machined surface of the steering knuckle flange, as indicated in Figure 43.

Turn the steering knuckle flange assembly until the gauge is locked between the axle

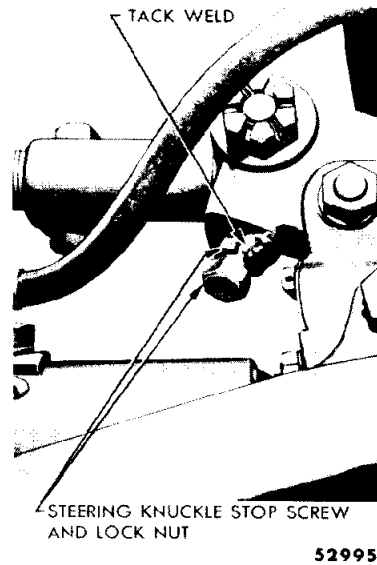


Fig. 44 — Steering Knuckle Stop Screw

housing and the steering knuckle flange. Then, adjust the stop screw, if necessary, until it just contacts the axle housing. Tack weld the screw and lock nut to the steering arm, as indicated in Figure 44.

The adjustment procedure of the screw will be the same if floating tables are used with each inside wheel at an angle of 28 degrees.

## SERVICE DIAGNOSIS

### CONDITIONS — POSSIBLE CAUSES — REMEDIES

#### 29. DIFFERENTIAL LUBRICANT IN FRONT AXLE UNIVERSAL JOINT HOUSING

##### *Possible Causes*

- a. Differential lubricant level too high.
- b. Axle housing vent clogged.
- c. Universal drive shaft oil seal worn or damaged.
- d. Steering knuckle flange bearings loose.

##### *Remedies*

- a. Drain until lubricant is at proper level.
- b. Check vent for clogging and clean out as necessary.

- c. Replace oil sea. Refer to Assembly of Front Axle, Paragraph 26.

- d. Refer to Assembly of Front Axle, Paragraph 26.

#### 30. LUBRICANT LEAKING INTO DRUMS

##### *Possible Causes*

- a. Outer oil seal defective.
- b. Wheel bearings packed with excess or improper lubricant.
- c. Differential lubricant in hub.
- d. Wheel bearing oil slinger drain passage clogged.
- e. Steering knuckle outer flange cracked.



- f. Steering knuckle flange oil seal (upper or lower) defective.
- g. Excessive lubricant in universal joint housing.

*Remedies*

- a. Replace defective outer oil seal.
- b. Inspect bearings. Clean and repack with correct amount of proper lubricant. Refer to Lubrication section.
- c. Disassemble, inspect oil seals and replace as necessary.
- d. Remove wheel and clean out drain passage. Repack bearings if necessary.
- e. Replace with new flange assembly.
- f. Replace defective oil seal.
- g. Remove excessive lubricant. Refer to Lubrication section for correct lubricant, capacity of unit and procedure.

**31. LUBRICANT LEAKING FROM STEERING KNUCKLE FLANGE ASSEMBLY**

*Possible Causes*

- a. Worn or damaged flange oil seal felt.
- b. Loose steering knuckle flange bearings.
- c. Excess lubricant in ball end of axle housing.

*Remedies*

- a. Remove and inspect seal. Replace seal if worn or damaged.
- b. For corrective measure, refer to Assembly of Front Axle, Paragraph 26.
- c. Disassemble axle shaft universal joint. Remove excess lubricant and repack, if necessary.

**32. BACKLASH BETWEEN PROPELLER SHAFT AND ROAD WHEELS**

*Possible Causes*

- a. Propeller shaft universal joints worn or damaged.
- b. Axle shaft universal joint worn or damaged.
- c. Worn or damaged parts in differential.

*Remedies*

- a. Disassemble universal joints and inspect. Replace worn or damaged parts, as necessary. Refer to Universal Joints and Propeller Shaft section.
- b. Disassemble and inspect. Replace parts as necessary. Refer to Paragraph 26 in this section.
- c. Disassemble and inspect. Replace parts as necessary.

