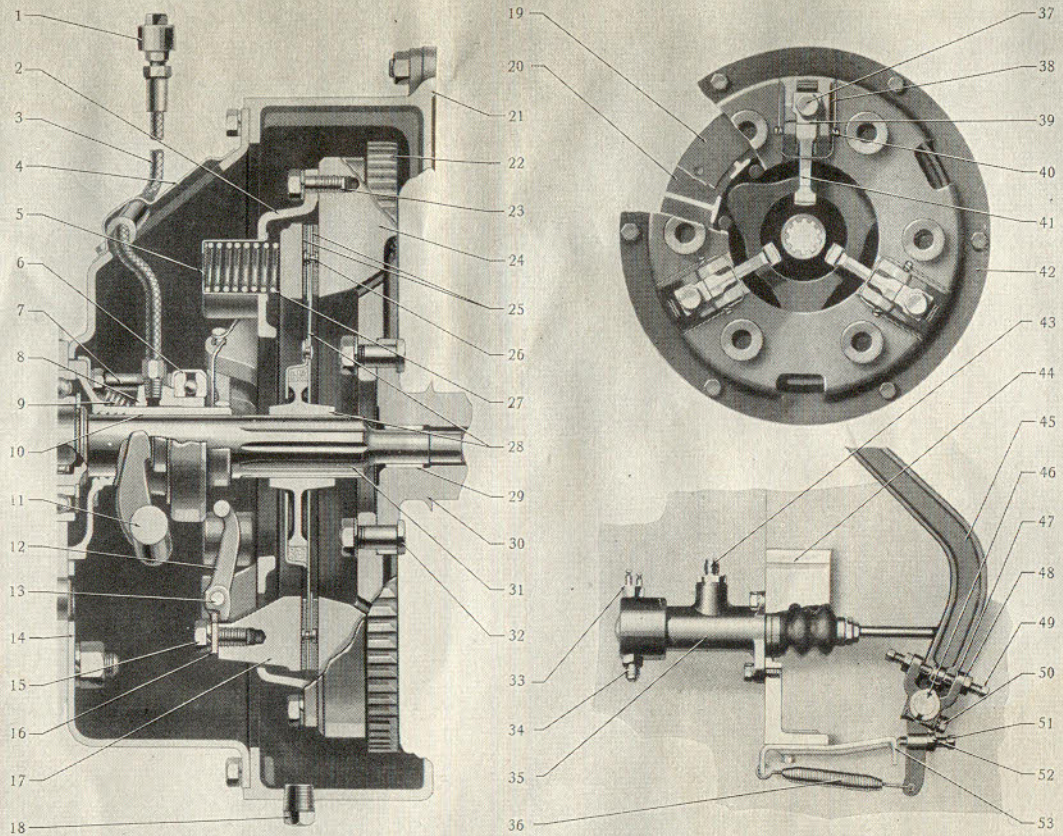


Fig. 15—Clutch and Pedal Adjustments

Power Transmission System

Clutch

The clutch is of the single dry plate type, comprising a pressure plate assembly having six pressure springs, three release levers and a drop-forged hardened steel splined hub. A rubber-cushioned driven disc, having composition facing riveted to each side, drives the splined steel hub and shaft.

A stationary sleeve carries the clutch release bearing. This bearing is lubricated by a grease cup on the right arm of the engine rear support. This grease cup should be kept full of cup grease and given one turn every 500 miles. Care must be exercised to not over-lubricate this bearing because excess lubricant is liable to find its way to the clutch driving disc and cause clutch slippage.

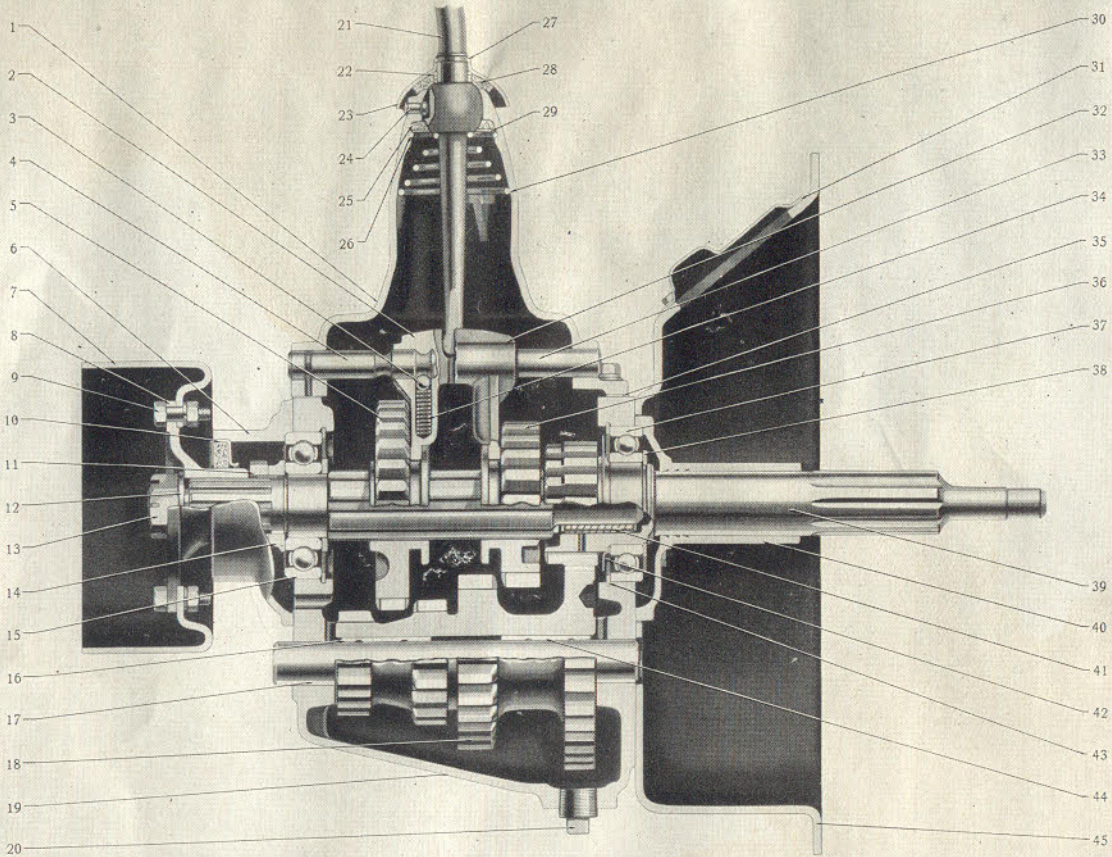
The clutch must be operated dry. A hole is drilled in the bottom of the housing to permit any small leakage of oil, from the rear crankshaft bearing, clutch release bearing, or transmission, to drain off.

Adjustments

Figure 15 illustrates the parts of the clutch assembly and should be referred to in connection with these instructions. The release bearing and pedal must be in their proper positions. No adjustment is required to compensate for wear of the driving disc facings but a clearance of $\frac{3}{16}$" should be maintained between the release levers and the release bearing. This is accomplished by turning the pedal stop screw. The release fork should be adjusted to locate the pedal as high as possible without interference with the floor board after the release bearing and pedal are in proper relation and engaged position. The clutch pedal should have $1\frac{1}{4}$" to $1\frac{3}{8}$" free movement before any resistance can be felt.

Fig. 15—Clutch and Pedal Adjustments

1—Clutch release bearing grease cup
2—Clutch back plate
3—Clutch release bearing grease tube
4—Clutch hand hole cover
5—Clutch spring cup
6—Clutch release bearing
7—Clutch release bearing sleeve guide
8—Clutch release bearing sleeve
9—Clutch release bearing pull-back spring
10—Transmission drive pinion bearing retainer
11—Clutch release fork and shaft (integral)
12—Clutch release lever
13—Clutch release lever pivot pin
14—Clutch housing
15—Clutch pressure plate release pad screw
16—Clutch pressure plate release pad
17—Clutch pressure plate
18—Drain plug
19—Clutch driving disc facing
20—Clutch driving disc
21—Flywheel housing (engine rear support)
22—Flywheel starting ring gear
23—Clutch back plate screw
24—Flywheel
25—Clutch driving disc facing
26—Facing rivet
27—Clutch spring
28—Clutch driving disc and hub
29—Clutch shaft (transmission drive pinion) pilot bushing
30—Crankshaft
31—Clutch shaft (transmission drive pinion)
32—Flywheel bolt
33—Signal lamp switch
34—Brake master cylinder outlet connection
35—Brake master cylinder
36—Pedal pull-back spring
37—Clutch pressure plate release pad screw
38—Clutch release lever spring
39—Clutch pressure plate release pad
40—Clutch release lever pivot pin
41—Clutch release lever
42—Clutch back plate
43—Brake master cylinder inlet connection
44—Engine rear support (flywheel housing)
45—Clutch pedal
46—Clutch release fork and shaft (integral)
47—Clutch pedal adjusting collar
48—Adjusting collar set screw lock nut
49—Adjusting collar set screw
50—Adjusting collar clamp screw
51—Pedal stop screw
52—Pedal stop screw lock nut
53—Pedal stop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THE PEDAL ADJUSTMENT SET SCREWS HAVE NO CONNECTION WITH THE FREE MOVEMENT OF THE CLUTCH PEDAL, BUT ARE ONLY PROVIDED FOR ADJUSTMENT OF THE CLEARANCE AT TOE BOARD BY CHANGING THE ANGLE OF THE PEDAL.

The pedal stop screw controls the amount of free play of the pedal. It is imperative, therefore, *to distinguish the difference between these two adjustments.*

The clutch springs should measure $1\frac{11}{16}''$ when compressed to 180 lbs. to 190 lbs. pressure.

The practice of continuously resting the foot on the clutch pedal, while driving, is harmful to the throwout bearing and should be avoided. The weight of the foot holds the clutch throwout yoke against the release bearing with consequent rapid wear and noise; reduces tension of the clutch springs, causing slippage and loss of power; causes rapid wear of the facings, producing sluggish clutch action, rattles and knocks, besides necessitating more frequent lubrication of the bearing.

The clutch shaft bearing in the crankshaft is self-lubricating and requires no attention except that it is good practice to pack it with vaseline whenever the clutch is removed from the car. The ball bearing at the rear of the clutch shaft receives its lubrication from the transmission.

To Install Clutch

A teaspoonful of vaseline should be packed into the drive pinion pilot bearing, No. 29, Fig. 15, and the clutch assembly bolted to the flywheel. The drive pinion (clutch shaft), No. 39, Fig. 16, should be placed through the hub of the driving disc, No. 28, Fig. 15, and into the drive pinion pilot bearing, No. 29, in the crankshaft, and the bolts tightened which hold the clutch case to the flywheel. These bolts should be tightened one full turn each in progression until they are all tight. This will avoid the possibility of causing misalignment of the clutch parts. The main drive pinion is used as a guide for the clutch parts so as to obtain perfect align-

Fig. 16—Transmission

1—Transmission case cover (gear shift housing)
2—Gear shift fork
3—Gear shift shaft selector ball
4—Gear shift shaft—low and reverse
5—Sliding gear—low and reverse
6—Transmission brake support
7—Transmission brake drum
8—Mainshaft universal joint flange
9—Universal joint flange bolt
10—Mainshaft rear bearing oil washer
11—Speedometer drive gear
12—Mainshaft flange washer
13—Mainshaft flange nut
14—Speedometer drive gear spacer
15—Mainshaft rear bearing
16—Countershaft gear bushing
17—Countershaft
18—Countershaft gear set
19—Transmission case
20—Transmission case drain plug
21—Gear shift lever
22—Gear shift lever dust cover spring
23—Gear shift lever dust cover
24—Gear shift lever locating pin
25—Gear shift lever oil washer
26—Gear shift lever oil washer retainer snap ring
27—Gear shift lever dust cover snap ring
28—Gear shift lever dust cover felt
29—Gear shift lever oil washer retainer
30—Gear shift lever spring
31—Clutch hand hole cover
32—Gear shift fork
33—Gear shift shaft—high and second
34—Gear shift shaft selector ball spring
35—Transmission case cover gasket
36—Sliding gear—high and second
37—Transmission drive pinion bearing
38—Transmission drive pinion bearing retainer snap ring
39—Transmission drive pinion and clutch shaft (integral)
40—Transmission drive pinion bearing retainer
41—Mainshaft front pilot bearing
42—Transmission drive pinion bearing oil thrower
43—Transmission drive pinion bearing retainer ring
44—Countershaft gear bushing
45—Clutch housing

ment. Preferably an extra drive pinion shaft should be used if available, but, if not, the shaft may be removed from the transmission for this purpose. The main drive pinion may next be removed from the driving disc.

After the clutch is installed as outlined, installation of the transmission may be made and care must be taken while mounting in order to avoid springing of the driving disc and injury to the clutch shaft pilot bearing. The detailed instructions for clutch adjustment should be followed carefully after assembling a clutch and transmission.

Transmission

The transmission driving gear is an integral part of the clutch shaft. The high-speed gear is of internal tooth type, and the countershaft assembly is in constant mesh. The main shaft operates on a ball bearing in the rear and a roller bearing in the front (mounted in the main drive gear), and the countershaft gears are fitted with bronze bearings and revolve on a stationary countershaft. There are three forward speeds, one reverse. The gear shift is conventional.

The transmission should be filled to the level of the filler plug on the left side with fluid gear lubricant. This level should be inspected each month or every 2000 miles. In winter, in very cold climates, the lubricant should be thinned by diluting with one-half pint of colorless kerosene. Each spring and fall, or every 5000 miles, the case should be drained, washed with kerosene, and refilled with fresh lubricant.

If it should be necessary to remove the transmission assembly, care should be taken to keep it in perfect alignment with the engine while removing and installing in order to avoid springing of the driving disc, which is manufactured with great precision, also to avoid injury to the clutch shaft pilot bearing. This can be accomplished by supporting the transmission on blocks exactly in alignment with the engine or by installing two pilot studs, one on each side of the transmission case, in place of two of the cap screws holding the transmission case to the clutch housing. These studs will carry the weight while the transmission is being removed or installed. The transmission is removable without disturbing the clutch except that it is necessary to remove the clutch release bearing pull-back spring.

If it becomes necessary to remove the clutch, the transmission should first be removed. The clutch should be removed and installed independently of the transmission; that is, removed after the transmission and installed before the transmission. It is not necessary to remove the engine rear support to perform any operation on the transmission, clutch or flywheel.

Universal Joints and Propeller Shaft

Universal joints are used at each end of the propeller shaft connecting the transmission to the rear axle. The universal joints transmit the power of the engine and at the same time allow the rear axle to rise and fall with the irregularities of the road.

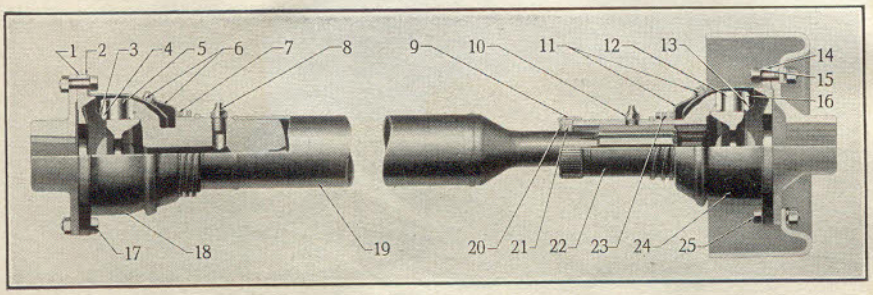


Fig. 17—Propeller Shaft and Universal Joints

1—Universal joint flanged yoke
2—Universal joint housing gasket
3—Universal joint cross bushing retaining ring
4—Universal joint cross bushing
5—Universal joint cross
6—Rear universal joint dust cover and packing
7—Rear universal joint dust cover spring
8—Universal joint grease nipple
9—Front universal joint felt washer retainer cap
10—Universal joint grease nipple
11—Front universal joint dust cover and packing
12—Universal joint cross
13—Universal joint cross bushing retaining ring
14—Universal joint flanged yoke
15—Universal joint housing gasket
16—Universal joint cross bushing
17—Universal joint to pinion shaft flange bolt
18—Universal joint housing
19—Propeller shaft
20—Front universal joint felt retaining washer
21—Front universal joint felt washer
22—Front universal joint splined yoke
23—Universal joint dust cover spring
24—Universal joint body
25—Universal joint to mainshaft flange bolt

The front yoke of the front universal joint is fastened to the transmission main shaft and its rear yoke has a splined hole into which slips the splined front end of the propeller shaft, leaving the shaft free to slide backward and forward. A felt washer with retainer holds the lubricant and prevents the entrance of road dirt around the spline. The two yokes are joined by a cross, the ends of which turn in bushings carried by the yokes.

The construction of the rear universal joint is similar to that of the front, the front yoke being integral with the propeller shaft, while the rear yoke is fitted to the drive pinion shaft of the rear axle.

The universal joints and propeller shaft are carefully balanced to prevent vibration. The yokes and shafts are marked and should they ever be disassembled should be reassembled in their original positions.

Lubrication

The universal joints transmit the whole power of the engine. The parts oscillate through a small angle carrying very high unit pressures. To withstand these pressures a special lubricant is necessary. Suitable lubricants are marketed by several reputable companies under the name of "Special Universal Joint Grease" or fibre grease.

Every 2000 miles about one ounce of this special lubricant should be injected into the joint through the connector, on the rear yoke of the front joint and on the propeller shaft for the rear. The front lubricator also lubricates the spline. Do not over-lubricate as any excess of lubricant will be thrown out of the casing. When assembling after cleaning add a small quantity of gear lubricant to serve until the heavy grease has reached the bearing surfaces.

Never put cup grease in the universal joints.

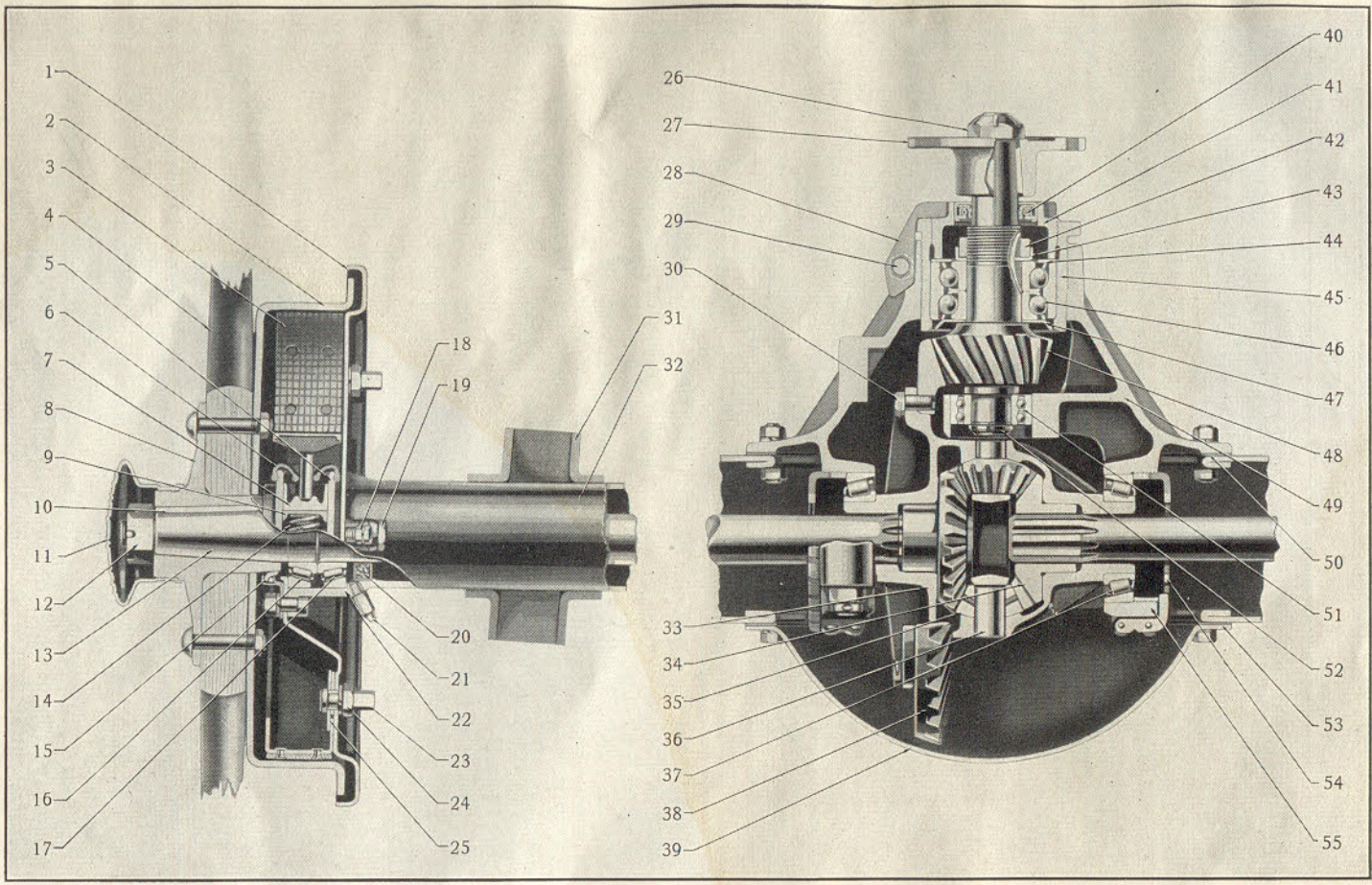


Fig. 18—Rear Axle

Rear Axle

The rear axle is of the semi-floating type with the differential and pinion assembly mounted in a detachable carrier on the front side of the pressed steel axle housing. The rear side of the axle housing is provided with a cover, easily removed for inspection of the differential assembly.

The drive pinion and shaft are integral, supported by ball bearings straddle mounted on either side of the pinion. The differential is fitted with adjustable tapered roller bearings mounted in the differential carrier on each side of the differential case. The bearings on the outer ends of the axle shafts are likewise adjustable.

Drive Pinion Adjustment

The drive pinion shaft and its bearings are carried as an assembly in the differential carrier. The bearing retainer, which carries the complete assembly, is threaded into the carrier and locked in position by a tongue lock and clamp bolt. To adjust the mesh of the pinion and drive gear, remove the clamp bolt and lock, then turn the retainer in or out of the carrier until the correct adjustment is obtained. There should be .007″ or .008″ backlash between the pinion and drive gear. Replace the lock and clamp bolt. This adjustment is correctly made at the factory and ordinarily need never be disturbed unless new parts are installed.

Pinion Bearings

The pinion bearings are non-adjustable ball bearings. The inner bearing is retained on the shaft by a snap ring. The outer bearing is locked against the pinion by a nut on the pinion shaft, with tongue lock washer. The pinion and bearing assembly is carried in the bearing retainer, held by an adjusting nut which is locked by the same tongue lock which holds the bearing retainer. The assembly of the shaft with its bearings is removed by dropping the propeller shaft and turning the bearing retainer out of the carrier, after removing the clamp bolt and lock.

Fig. 18—Rear Axle

1—Rear wheel brake support assembly
2—Rear wheel brake drum
3—Brake shoe facing
4—Rear wheel
5—Rear wheel brake cylinder (body)
6—Wheel brake cylinder boot
7—Wheel brake cylinder piston
8—Rear wheel hub
9—Wheel brake cylinder piston cup
10—Axle shaft key
11—Hub cap
12—Axle shaft nut
13—Axle shaft
14—Wheel cylinder piston cup spring
15—Axle shaft bearing oil seal assembly
16—Axle shaft bearing cone and roller assembly
17—Axle shaft bearing cone and roller assembly
18—Wheel brake cylinder bleeder screw
19—Wheel brake cylinder inlet connection bolt
20—Axle shaft oil washer
21—Axle shaft bearing oil nipple
22—Axle shaft bearing cup
23—Brake shoe adjusting screw
24—Brake shoe adjusting screw nut
25—Brake shoe adjusting cam
26—Rear axle drive pinion shaft flange nut
27—Rear axle drive pinion shaft flange
28—Drive pinion adjusting nut lock
29—Adjusting nut lock screw
30—Rear axle drive gear retaining screw
31—Rear spring seat (axle housing)
32—Rear axle housing
33—Differential case
34—Differential side gear
35—Differential pinion
36—Differential cross
37—Differential bearing cone and roller assembly
38—Rear axle drive gear
39—Rear axle housing cover
40—Drive pinion oil seal assembly
41—Drive pinion adjusting nut
42—Drive pinion front bearing nut
43—Drive pinion front bearing nut lock
44—Drive pinion front bearing
45—Drive pinion front bearing retainer
46—Drive pinion front bearing
47—Drive pinion front bearing oil baffle
48—Rear axle drive pinion
49—Differential carrier
50—Differential carrier gasket (housing gasket)
51—Drive pinion rear bearing
52—Drive pinion rear bearing retainer ring
53—Rear axle housing cover gasket (housing gasket)
54—Differential bearing adjusting ring
55—Differential bearing cap (differential carrier)

Differential Bearing Adjustment

The differential bearings are assembled to the hubs of each side of the differential case and rest in suitable supports in the differential carrier. Caps over each of these bearings are held in place by means of studs with nuts and cotter pins. Bearing adjusting nuts are threaded into the bearing supports and caps which press against the outer faces of the bearing cups. These adjusting nuts are made with notches into which the tongued ends of the adjusting nut locks are assembled, which prevent the adjusting nuts from turning. The locks are held in place by cotter pins.

Considerable care must be taken when adjustment of these bearings is being made so as to avoid changing the adjustment of the main drive gear and drive pinion. The best practice is to adjust both bearings exactly the same amount but when proper adjustment is once made it is seldom necessary to change it. However, if adjustment is ever necessary, the adjusting nuts should be turned so as to cause a slight drag in the bearing and then the adjusting nuts should be backed off one notch.

Axle Shaft Bearing Adjustment

The axle shaft is mounted on two adjustable tapered roller bearings at the outer end of the shaft. The cup of the inner bearing is pressed into the end of the axle housing. The cone and roller assembly is fitted onto the shaft from the inner end and pressed against the shoulder on the shaft. The cone and roller assembly of the outer bearing is fitted onto the shaft from the outer end and pressed against the cone of the inner bearing. The shaft and bearings are then put into the housing and the cup of the outer bearing is pressed into the end of the housing. The entire assembly is held in place by the brake support assembly. The same bolts which hold the brake support assembly to the axle housing hold an oil seal in place to prevent leakage of oil into the brake drum.

Between the cup of the inner axle shaft bearing and the shoulder in the end of the axle housing is a series of shims. These shims provide means of adjustment of the axle shaft bearings. These bearings should be so adjusted by adding or removing shims that the end play in the axle shaft is from .002″ to .003″. It is necessary that each shaft have its bearings adjusted for the proper end play as the two shafts are entirely independent of one another. In order to make this adjustment it is necessary to remove the axle shaft and bearings, including the cup of the inner bearing. The shims may then be removed.

To Remove Axle Shaft

The wheel should be removed from the axle shaft first and then the bolts which hold the outer oil seal and the brake support assembly in place. Before removing the brake support and wheel cylinder assembly it will be necessary to disconnect the brake tube from the wheel cylinder. The outer oil seal and brake support assembly can then be removed. The axle shaft and its bearing can then be withdrawn from the housing. If the cup of the outer bearing binds too tightly in the axle housing to withdraw the assembly by hand, a suitable puller should be used on the axle shaft to avoid damage to the bearing races and rollers.

Lubrication

The differential and pinion bearings, as well as all axle gears, should be lubricated with fluid gear lubricant. In temperatures below 0° Fahrenheit this lubricant should be diluted with one-half pint of colorless kerosene. Lubricant should be poured into the differential housing through the filler hole in the rear of the cover. This hole is located so as to serve as a guide in determining the proper amount to be put into the housing. Lubricant should be level with the bottom of this hole. (Page 19.)

The axle shaft bearings should be lubricated with fluid gear lubricant every 5000 miles by means of the high-pressure gun.

Front Axle

The front axle center is a heavy steel forging of I section, with spring saddles forged integrally; the steering arms and steering knuckles are heavy drop forgings.

It is of vital importance in the safe operation of a motor car that the front axle tie rod and wheels be kept well lubricated and properly adjusted. They should be inspected regularly as designated on Pages 19 and 59.

Front Wheel Alignment and Tie Rod Adjustment

Correct alignment of front wheels must be maintained to assure continuous easy steering and long tire mileage. The wheel bearings should be properly adjusted and tire pressures equal before taking measurements. The distance between the wheels when measured in front at the felloe, approximately 9 inches above the floor, and in rear from the same points should be equal or not greater at the rear than $\frac{1}{8}$ inch. Measurements should be taken in front, the felloe marked, and the car moved forward just far enough to measure from exactly the same points on the felloe bands in the rear, and at the same height from the floor. It is important to follow these instructions to get an accurate setting.

To change or adjust wheel alignment, loosen the clamp bolts which lock the cross tube to the end forgings. Adjust length of cross tie rod by revolving the cross tube similar to adjusting a turnbuckle, then securely lock clamp bolts.

The lubricant nipples in the tie rod ends face toward the rear of the car and should receive fluid gear lubricant from the high-pressure lubricant gun every 500 miles. The pivot pins should be lubricated every 500 miles with fluid gear lubricant by means of the high-pressure lubricant gun and the nipples provided in the steering knuckle toward the front of the car.

Wheels

Each front wheel is supported by two adjustable tapered roller bearings. The adjustment is made by first jacking up the axle until one wheel just clears the floor. The hub cap should then be removed as well as the spindle nut cotter pin. The wheel should then be spun slowly and the spindle nut turned tighter only until the bearings begin to bind slightly; then the nut should be backed off one notch. The cotter pin and hub cap should then be reinstalled. A two-ounce weight, at any one of the rim clamp nuts, should bring that part to a stop at the bottom of the wheel. The front wheel bearings must be free and have very slight end shake.

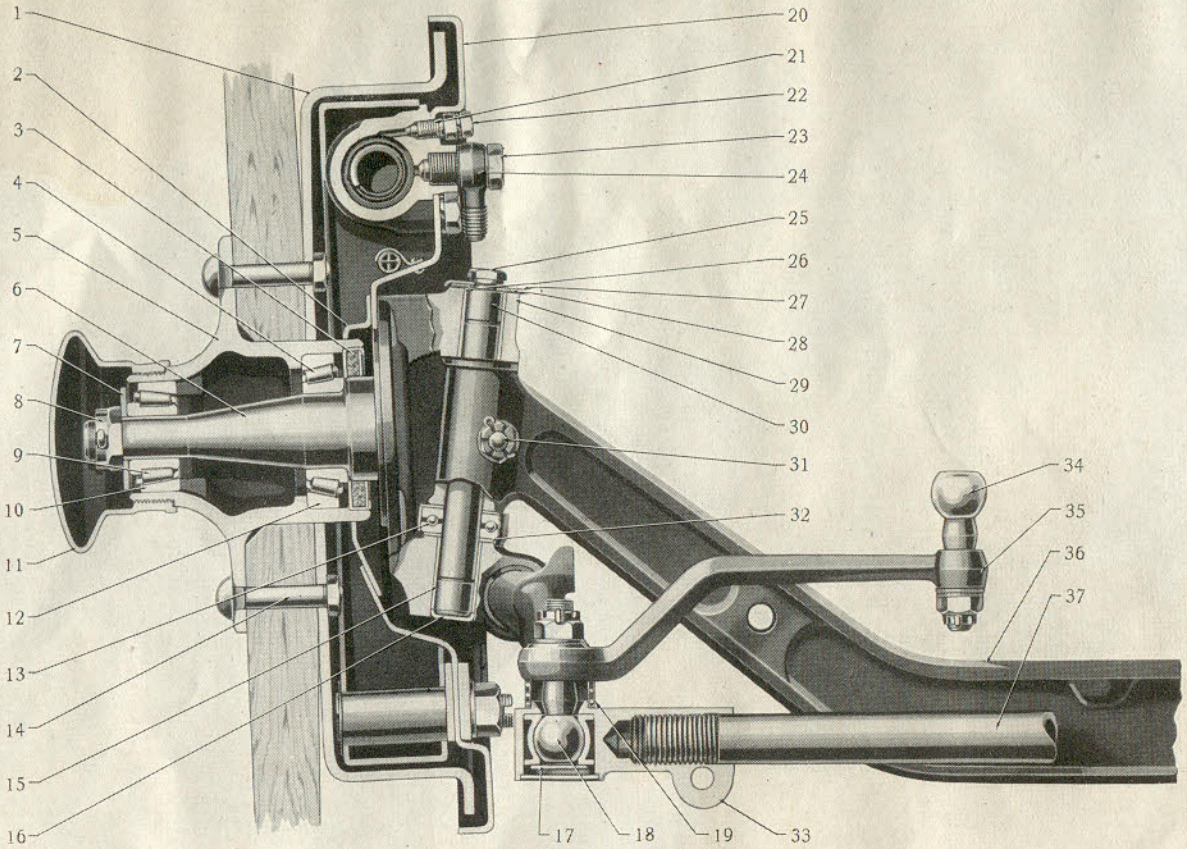


Fig. 19—Front Axle

The wheel bearings should be cleaned and packed with medium cup grease every 5000 miles.

IMPORTANT: Because of the speed attained by this car it is of vital importance that the front wheels (complete with tires) be as near perfectly balanced at all times as is possible in order to avoid so-called "tramping" of front wheels at high speeds. The rapid revolutions of the wheels develop gyroscopic forces, which, combined with unbalanced wheel forces, will cause severe wobble and bounding motion of the front wheels. These forces reverse their direction very rapidly, and, because of this fact, heavy strains are developed in the steering mechanism. For similar reasons it is equally important to maintain uniform tire pressures. Unequal and low pressure in the two front tires will cause much annoyance when driving at high speeds.

The same condition is true with the rear wheels, as the strains are transmitted to the axle shafts and their bearings, but are not so apparent. Excessive tire wear also results from poorly balanced wheels when driven at high speeds.

Irregularities in wheel and tire balance caused by the weight of the tire valve stem and dust cap are offset by the manufacturer's method of tire construction. On the side wall of each tire near the bead is a red dot marked on the rubber. When mounting the tire on the rim, the valve stem should be located at a point immediately adjacent to the red dot, thus permitting the distribution of weight in the tire to compensate for the weight of the valve stem and dust cap.

Tire Pressures

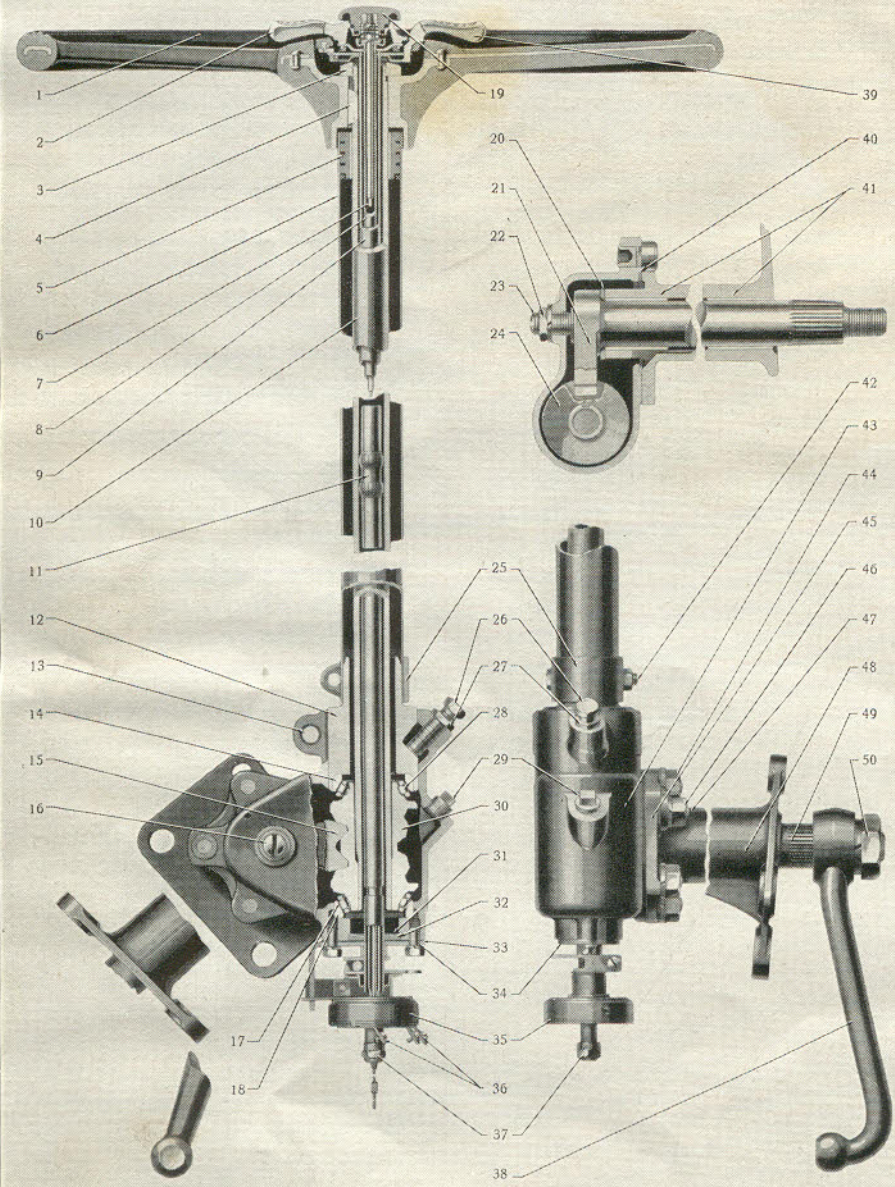
To insure smooth and steady steering operation at normal speeds, the air pressure, in both front and rear tires, should be 35 pounds as measured with an accurate gauge for balloon tires and checked at least once each week. The air pressure in the front tires should be 40 pounds for fast driving.

Drag Link

The drag link (Fig. 21) connects the steering gear with the front axle. In each end of the drag link tube are two heavy springs for cushioning the road shocks of the front wheels which otherwise would be transmitted to the steering gear. The springs are adjusted by means of round slotted plugs threaded into each end of the drag link tube. Cotter pins are inserted

Fig. 19—Front Axle

1—Front wheel brake drum
2—Front wheel brake oil drain
3—Front wheel hub dust washer
4—Front wheel inner bearing cone and roller
5—Front wheel hub
6—Steering knuckle or spindle—left
7—Front wheel bearing thrust washer
8—Steering knuckle nut
9—Front wheel outer bearing cone and rollers
10—Front wheel outer bearing cup
11—Hub cap
12—Front wheel inner bearing cup
13—Steering knuckle thrust bearing
14—Hub bolt
15—Steering knuckle pivot pin bushing
16—Steering knuckle bottom plug
17—Steering knuckle tie rod socket spring
18—Steering knuckle tie rod ball
19—Steering knuckle tie rod oil retainer
20—Front wheel brake support
21—Wheel brake cylinder bleeder screw
22—Wheel brake cylinder bleeder screw cap screw
23—Wheel brake cylinder inlet connection bolt
24—Wheel brake cylinder inlet connection
25—Steering knuckle pivot pin dust cover screw
26—Steering knuckle pivot pin bushing
27—Steering knuckle pivot pin dust cover
28—Steering knuckle pivot pin dust washer
29—Steering knuckle yoke (integral with knuckle)
30—Steering knuckle pivot pin, king pin or bolt
31—Steering knuckle pivot pin key or lock bolt
32—Steering knuckle thrust bearing shim
33—Steering knuckle tie rod end—left
34—Steering knuckle arm ball
35—Steering knuckle arm—left
36—Front axle center, "I" beam or bed
37—Steering knuckle tie rod body or tube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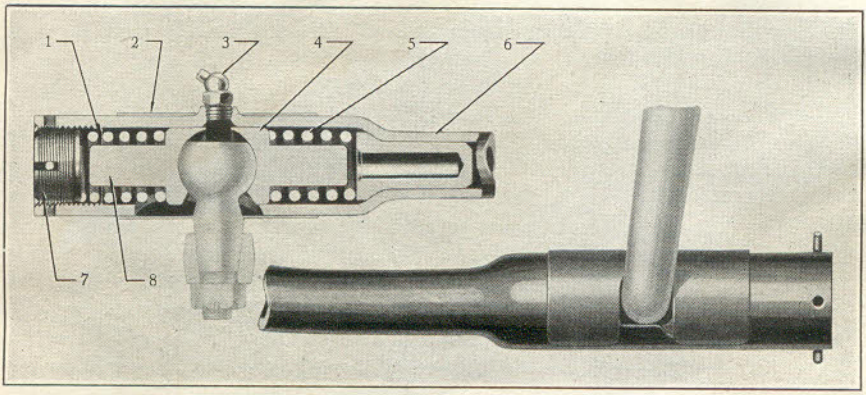

Fig. 21—Drag Link

1—Drag link ball seat spring
2—Drag link dust shield—front
3—Drag link oil nipple
4—Drag link ball seat or bearing
5—Drag link ball seat spring
6—Drag link body or shell
7—Drag link threaded plug
8—Drag link ball seat or bearing

through the ends of the tube, and slots in the outer ends of the round plugs, to prevent the plugs changing their adjustment.

When adjustment is being made of the drag link bearings and springs, all of the parts should be cleaned and oiled as well as the adjusting plugs and threads inside of the drag link tube. Standard springs should be used to replace any that do not measure from $1\frac{3}{16}''$ to $1\frac{1}{4}''$ free length. Any other worn parts should be replaced. When the parts are being assembled the adjusting plugs should be screwed "in" until the springs are compressed solid, then the plugs should be unscrewed two or two and one-half turns. A large screwdriver should be used for adjusting the plugs so as to overcome any binding in the threads. When the plugs are adjusted properly the position of their outside faces should be flush with the ends of the tube or slightly "in", *but must not protrude.*

Fig. 20—Steering Gear

1—Steering wheel
2—Lighting switch control lever
3—Steering wheel nut
4—Steering wheel key
5—Steering main tube bushing
6—Steering column jacket
7—Horn push button wire
8—Lighting switch control tube
9—Throttle control tube
10—Steering main tube
11—Throttle tube anti-rattle
12—Steering worm adjuster
13—Steering gear housing clamp bolt
14—Steering worm thrust bearing cup
15—Steering worm sector
16—Steering worm sector adjusting screw
17—Steering worm thrust bearing cage and rollers
18—Steering worm thrust bearing cup
19—Horn push button
20—Steering worm sector thrust washer
21—Steering worm sector and shaft (integral)
22—Steering worm sector adjusting screw lock nut
23—Steering worm sector adjusting screw
24—Steering worm
25—Steering column jacket clamp
26—Steering worm adjuster adjusting screw
27—Adjusting screw lock nut
28—Steering worm thrust bearing cage and rollers
29—Steering gear grease plug
30—Steering worm
31—Steering gear housing oil retainer washer
32—Steering gear housing oil retainer
33—Steering gear housing lower end cover gasket
34—Steering gear housing lower end cover
35—Lighting switch
36—Lighting switch terminals
37—Lighting switch retainer nut
38—Steering gear arm (pitman arm)
39—Throttle control upper lever
40—Steering gear housing bracket gasket
41—Steering worm sector bushing
42—Steering column jacket clamp bolt
43—Steering gear housing or case
44—Steering gear housing bracket stud nut
45—Steering gear housing bracket
46—Steering worm sector adjusting bushing stud nut
47—Steering worm sector adjusting bushing stud
48—Steering gear housing bracket or cover
49—Steering worm sector shaft (integral with sector)
50—Steering gear arm nut

The steering arm balls of the front axle and the steering gear arm in the drag link ends should be lubricated with fluid gear lubricant through the grease nipples at intervals of every 500 miles.

Springs

The chassis springs are attached to the frame by means of hardened and ground steel bolts passed through bronze bushings in the spring eyes and hangers.

The spring hanger bolts must be adjusted so as to not cause binding on the sides of the springs. They should be drawn tight and backed off one-half turn, then locked by cotter pins through the nuts on the ends of the bolts.

Spring breakage at or near the center is caused, in practically every instance, by loose spring clips (holding the springs to the axles), which throw the entire stress on the center of the springs. The nuts on the spring clips should be tightened at least three times during the first month and about once every month for the succeeding six months.

Steering Gear

The steering gear is of the semi-irreversible worm and sector type; the angle of the worm is great enough to allow the front wheels to follow slight deviations in the road, but does not permit jerking or turning of the wheels. There are three points of adjustment for excessive backlash of the steering wheel, namely: end play of steering arm (sector) shaft, end play of worm thrust bearing, and mesh of worm and sector teeth.

Adjustments

The front wheels should be raised so that they will turn freely, clear of the floor, and the drag link removed, before making any adjustments.

Adjustment of the steering arm (sector) shaft for end play is accomplished by loosening the worm wheel adjusting screw nut No. 22, Fig. 20, and turning the screw No. 23 clockwise as tightly as possible with a screwdriver and then it should be turned back until the tension or pressure is relieved slightly. The lock nut should then be securely tightened.

The worm thrust bearings are adjusted by means of the thrust bearing adjusting screw No. 26. Before this screw is turned, the clamping bolt No. 13 and nut should be loosened as well as clamping bolt No. 42. The adjusting screw No. 26 should then be turned clockwise to reduce end play at the thrust bearings. Care must be taken when making this adjustment to not bind the bearings, which will cause rapid wear and stiff steering. If the adjusting screw is turned too far and causes binding of the thrust bearings, the adjusting screw should be turned back one half turn; then the steering wheel should be rotated from one extreme to the other two or three times. This will develop excessive play in the thrust bearings and then the adjusting screw should be turned clockwise for proper adjustment. The clamping bolts and nuts should all be securely tightened as soon as this adjustment has been completed.

Play between the teeth of the sector (worm arm) and the worm is adjusted by movement of the housing cover assembly, which is accomplished by rotating the housing cover adjusting sleeve. First, nuts on the bolts

holding the steering gear to the frame should be loosened, then the three lowest nuts on the housing cover studs should be loosened one-quarter turn and the housing cover adjusting stud nut No. 46 one-half turn. The head of the adjusting sleeve is just under the jam nut No. 46. Next, the adjusting sleeve should be turned clockwise (to remove play) as much as possible without causing stiffness in the action of the steering wheel when turned from one extreme to the other. If the adjusting sleeve is turned clockwise too far so as to make the adjustment too tight, the sleeve should be turned back (counter-clockwise) at least one-quarter turn and then turned clockwise to proper adjustment. Much care should be taken, after this adjustment has been completed, to tighten the jam nut on the adjusting sleeve as well as the nuts on the studs holding the housing cover, also those holding the steering gear to the frame.

Lubrication

Special heavy steering gear lubricant should be used for this steering gear. This lubricant should be diluted with engine oil in extremely low temperatures, if necessary. The housing should be filled with this lubricant by means of the high-pressure gun through the nipple in the top of the housing at intervals of every 5000 miles. Never use cup grease, or any oil or grease containing graphite, in the steering gear.

Dodge Brothers Hydraulic Four-Wheel Brakes

The Dodge Brothers hydraulic four-wheel brakes are self-equalizing and their adjustment is simple. There are no operating rods or cross shafts, and, consequently, nothing to rattle and no joints to lubricate. Simple in construction, the brakes depend only upon the fundamental displacement principle of hydraulics for their operation and equalization, and when treated with a reasonable amount of consideration will need but little attention.

Operation

Connected to the brake pedal is a piston which operates in a master cylinder, bolted to the left side of the flywheel housing. Leading from this master cylinder to cylinders at each of the four brake drums are metal tubes and heavy non-expanding hose. In each wheel cylinder are two pistons, each of which presses against the upper end of the brake shoe. The whole system (that is, all cylinders and lines) is full of liquid, all air having been expelled in the process of filling. There is no pressure in the system when the brakes are not in operation and the brake shoe facings are held clear of the drums by the brake return springs.

When the brake pedal is depressed, the piston in the master cylinder moves forward, expelling into the lines sufficient liquid to force out the pistons in each of the brake drum cylinders until the brake shoe facings come in contact with the drums.