TM10-1287

MAINTENANCE MANUAL

CHEVROLET

CHEVROLET

¾-TON (LC) 4 x 2 TRUCK

Pick up

Built for

UNITED STATES ARMY

Model 3605

CONTRACT NUMBER
W-398-QM-10921

U.S.A. Registration Numbers
W-243622 TO W-243665

Chevrolet Motor Division
General Motors Sales Corporation
Detroit, Michigan

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WAR DEPARTMENT

Washington, November 15, 1941

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By order of the Secretary of War:

G. C. MARSHALL,
Chief of Staff

Official:
E. S. ADAMS,
Major General
The Adjutant General

TM10-1287

MAINTENANCE MANUAL

CHEVROLET ¾-TON 4 x 2 TRUCK

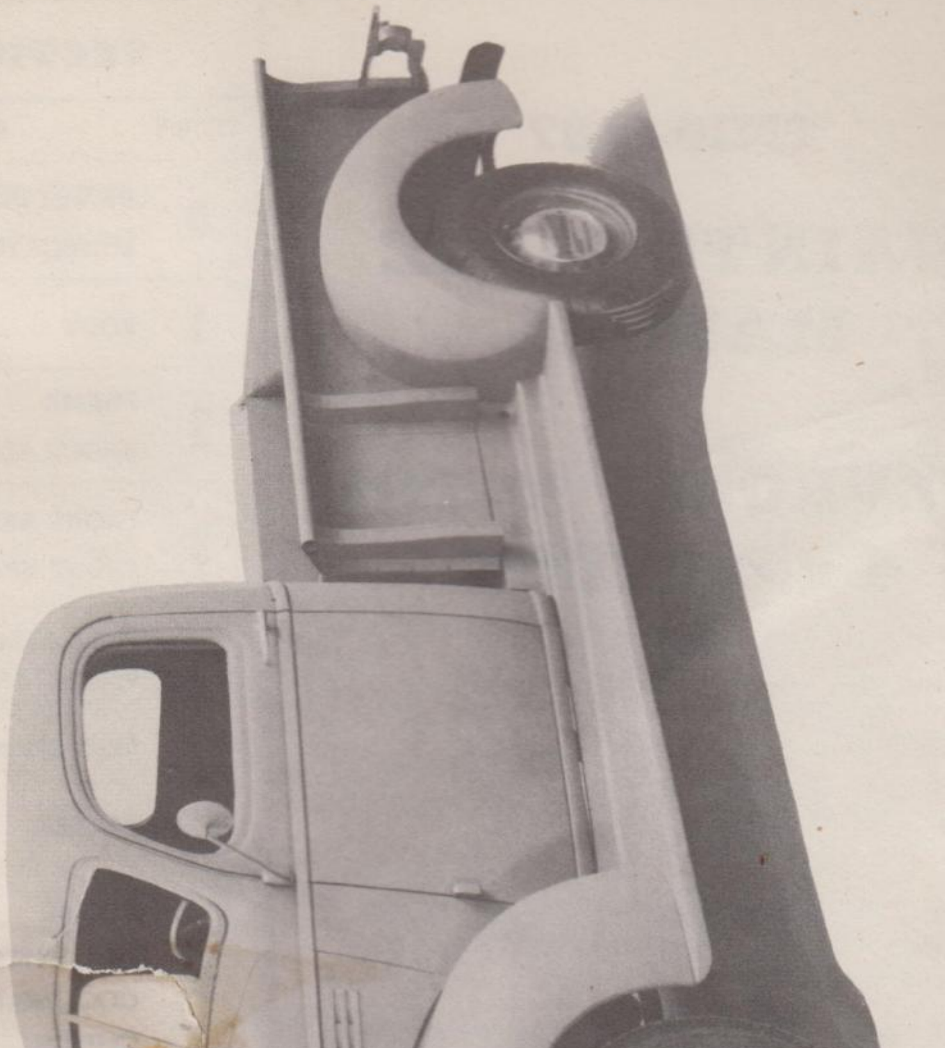
FOREWORD

This manual contains information covering the Operation, Maintenance and Repair of Chevrolet ¾-Ton — 4 x 2 Trucks.

For the convenience of the user it is arranged in sections. All information pertaining to a given unit will be found in the section devoted to that unit. The manual is written for the guidance of the operator and repair men who are responsible for the vehicle. Keep it handy and refer to it often.

CHEVROLET MOTOR DIVISION
General Motors Sales Corporation
DETROIT, MICHIGAN

SECTION INDEX



Section 0

DRIVER INSTRUCTIONS

It is of definite importance that the driver of one of these vehicles be thoroughly familiar with the various controls and instruments and their proper use. Even the experienced driver should study the controls before attempting to start the engine or move the vehicle.

Fig. 1 illustrates the controls and instruments; in the following paragraphs dealing with the purpose and use of the instruments and controls we will refer to the key number of the instrument or control being discussed, so the reader may easily follow the instructions. Starting with Fig. 1 we find the following:

IGNITION SWITCH No. 1 is operated by the ignition key; turning the switch to the right turns on the ignition and turning the switch to the left turns the ignition off.

HAND THROTTLE No. 2 is located on the instrument panel to the right of the ignition switch; pulling this button opens the throttle. This control may be used when starting or, if it is desired, to run the engine at a constant speed.

CARBURETOR CHOKE No. 3 is used when starting a cold engine. Pulling out this control button shuts off the air to the carburetor, providing a rich mixture for easy starting. The choke button should be pushed in when the engine starts. If the engine is warm, the use of the choke should be unnecessary.

FUEL GAUGE No. 4 registers the amount of fuel in the tank when the ignition switch is turned on. The dial has graduations for empty, half full and full.

TEMPERATURE INDICATOR No. 5 indicates the temperature of the liquid in the cooling system at all times. The driver should watch this instrument closely. A red band at the right of the dial is used to indicate excessive temperature. Whenever the indicator hand enters this band, the driver should immediately investigate the cause of the excessive temperature. Continuing to drive an overheated engine may cause permanent damage to its working parts.

AMMETER No. 6 is used to indicate whether the battery is being charged or discharged when the vehicle is in operation. If the ammeter shows discharge at all times, the cause should be investigated and corrected, otherwise the battery will be discharged.

OIL GAUGE No. 7 indicates the oil pressure. The dial has three divisions showing 0, 15 and 30. The driver should watch this instrument closely and, if the indicator hand drops below zero, the engine should be stopped immediately and the cause of the oil pressure failure investigated and corrected before continuing to run the engine.

SPEEDOMETER No. 8 indicates the speed at which the vehicle is being driven. The odometer registers the total number of miles the vehicle has been driven.

LIGHTING SWITCH No. 9 controls the lighting circuits. When the switch button is pulled out to the first position, it turns on the parking lights and tail light. Pulling the switch button all the way out turns on the headlights; the tail lamp is also turned on in this position.

WINDSHIELD WIPER SWITCH No. 10 is used to turn the windshield wiper on or off, by turning the button alongside the switch.

WINDSHIELD QUADRANT ADJUSTING SCREWS No. 11 are used to lock the windshield at various degrees of opening.

GLOVE COMPARTMENT LOCK No. 12. Pressing downward on the glove compartment lock cylinder opens the glove compartment door. A key is provided to lock this compartment.

ASH RECEIVER No. 13 is for the convenience of the driver; pulling the receiver outward uncovers the tray. The tray may be lifted out to empty the ashes.

VENTILATOR CONTROL LEVER No. 14 is used to open and close the cowl ventilator.

CLUTCH PEDAL No. 15 is used to disengage the engine from the transmission when shifting gears. The clutch pedal should never be engaged quickly when the vehicle is in gear. Driving with foot on pedal will cause wear of clutch facings and throw-out bearing. There should be one to one-and-a-quarter inches of free travel of the clutch pedal before the clutch starts to disengage.

BRAKE PEDAL No. 16. Pressing down on the brake pedal applies the hydraulic brakes at all four wheels. Avoid driving with foot on brake pedal, as brakes will be partially applied and cause rapid wear of lining.

HEADLIGHT DIMMER SWITCH No. 17 is a foot switch used to select the headlight beam (upper or lower) desired after the headlights are turned on, by pressing down on the switch button with the foot. When the upper beam is turned on, the headlight beam indicator is automatically turned on. This is a small red light located below the 50-mile graduation on the speedometer scale. When the lower beam is in use, the beam indicator is turned off. Always use the lower beam when passing approaching vehicles. This is an important highway safety rule in night driving.

INSTRUMENT LIGHT SWITCH No. 18 is used to turn on the instrument and ignition switch light. Moving the switch handle to the right turns on the ignition switch light, while moving it to the left turns on the instrument lights.

ACCELERATOR No. 19 is used in driving to control the speed of the engine.

STARTER SWITCH PEDAL No. 20. Pressing down on pedal with foot engages the starter and flywheel gears and also closes the starter switch, com-

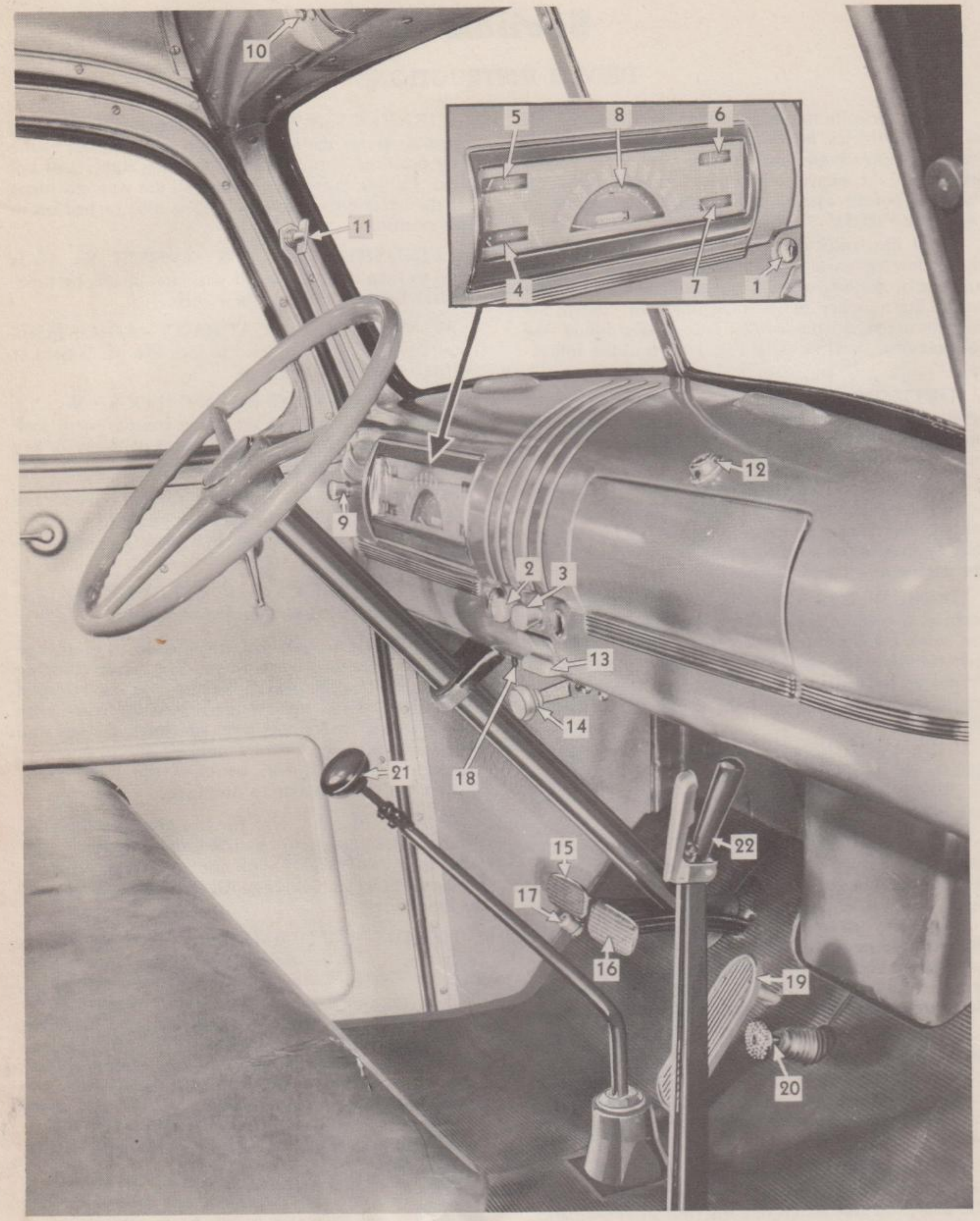


Fig. 1—Interior of Cab showing Location of Instruments and Controls

1—Ignition Switch
2—Hand Throttle
3—Carburetor Choke
4—Fuel Gauge
5—Temperature Indicator
6—Ammeter
7—Oil Gauge
8—Speedometer
9—Lighting Switch
10—Windshield Wiper Switch
11—Windshield Control Handle
12—Glove Compartment Lock
13—Ash Receiver
14—Ventilator Control Lever
15—Clutch Pedal
16—Brake Pedal
17—Headlight Dimmer Switch
18—Instrument Light Switch
19—Accelerator
20—Starter Switch Pedal
21—Transmission Gearshift Lever
22—Hand Brake Lever

pleting the electrical circuit between battery and starter. Rotation of the starter armature through the gears cranks the engine. When the engine starts, foot should be removed from pedal immediately.

TRANSMISSION GEARSHIFT LEVER No. 21 is used to select various gear ratios provided in the transmission. There are four speeds forward and one reverse. Reverse gear can only be engaged when latch on gearshift lever is raised. Lever positions for various gears are shown on the shifting diagram, Fig. 2.

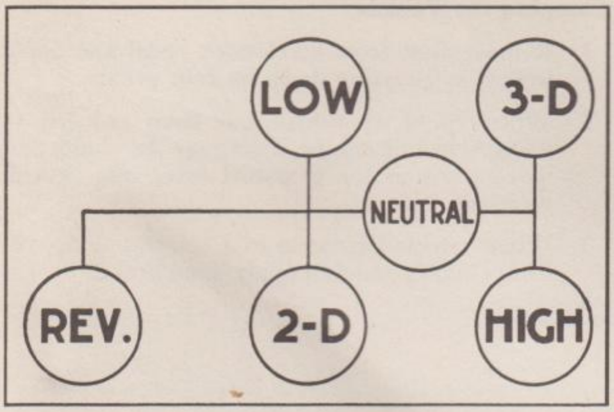


Fig. 2—Four-Speed Transmission Gearshifting Diagram

Half-ton Trucks are equipped with a three-speed transmission having three speeds forward and one reverse. Fig. 3, shifting diagram, shows the gearshift lever positions for the various speeds.

HAND BRAKE LEVER No. 22 operates the brakes on the rear wheels mechanically. Whenever the vehicle is parked, the lever should be pulled toward the rear as far as possible. Before moving the vehicle, lever should be in released position.

OPERATING INSTRUCTIONS

Each day the following inspections should be made before starting the vehicle:

1. Check the oil level on the dip stick. If oil is down to the low mark, add oil.
2. Check the water in the radiator, and fill if necessary. Check hose connections for leaks. Check fan belt for looseness.
3. Note condition of tires and see that they are properly inflated.

Starting the Engine

1. Transmission gearshift lever must be in neutral position. See shifting diagram.
2. Pull out hand throttle about ⅜ inch. This is not necessary if engine is warm.
3. Pull out choke button to obtain proper fuel and air mixture for starting. If the engine is warm, choking will be unnecessary.

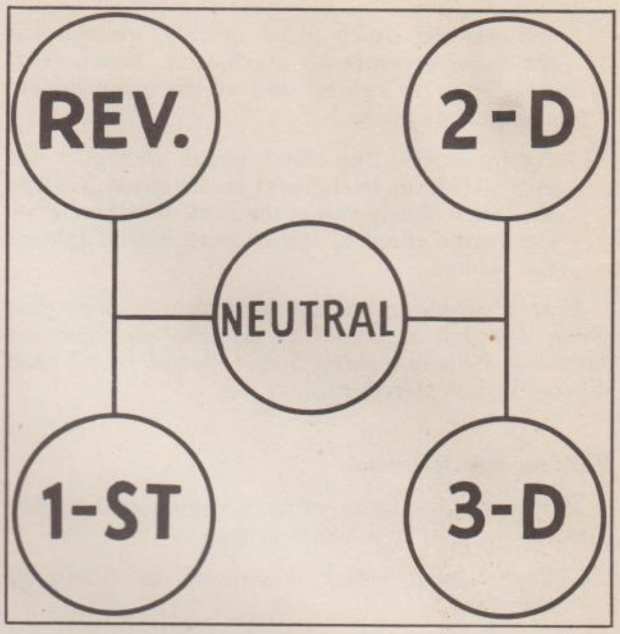


Fig. 3—Three-Speed Transmission Gearshifting Diagram

4. Insert key in ignition switch and turn switch to "On" position.
5. Step on starter pedal to crank the engine. Release pedal as soon as engine starts.
6. Push in on choke button and adjust hand throttle to obtain even idling. When engine is cold, it should be run several minutes before attempting to move the vehicle.

Starting the Vehicle

1. Push clutch pedal downward to disengage the clutch.
2. On four-speed transmissions, move transmission gearshift lever to the left and forward into first gear position; on three-speed transmissions, move the gearshift lever to the left and backward into first gear position—see shifting diagram.
3. Release the hand brake lever.
4. Step down on accelerator pedal to speed up the engine. Release clutch pedal slowly and push accelerator pedal down as necessary to pick up the load and prevent stalling the engine as the vehicle starts to move.
5. As vehicle speed increases, release accelerator pedal, depress the clutch, move gearshift lever to neutral and then to next higher speed. Step down on accelerator and engage clutch as explained above. Repeat this operation until transmission is in high gear.

Shifting to Lower Speed in Transmission

The transmission should always be shifted to the next lower speed before engine begins to labor or before vehicle speed is reduced appreciably. Shifting to lower speed is accomplished as follows:

1. Depress the clutch pedal quickly, maintaining the same pressure on accelerator. Move gearshift lever to neutral and at the same instant engage the clutch.
2. Again depress the clutch pedal and move the gearshift lever to the next lower speed. Engage the clutch slowly and at the same time accelerate the engine speed to synchronize it with that of the vehicle.

It is advisable to use the same transmission gear going downhill as would be required to climb the same hill. This is a safety rule followed by all good drivers in hilly territory.

Shifting into Reverse

Before attempting to shift into reverse, the truck must be brought to a complete stop.

1. Push clutch pedal downward to disengage clutch.
2. On four-speed transmissions, raise latch on gearshift lever and move lever to left as far as possible, then toward the rear; on three-speed transmissions, move the gearshift lever to left, then forward into reverse—see shifting diagram.
3. Engage clutch and accelerate the engine in the same manner as previously explained under the heading "Starting the Vehicle."

Stopping the Vehicle

1. Remove foot from accelerator pedal and apply brakes by pressing down on foot pedal.
2. When speed of vehicle has been reduced to idling speed of engine, disengage the clutch and move transmission gearshift lever into neutral position.
3. When vehicle has come to a complete stop, release clutch pedal and apply hand brake.

GENERAL LUBRICATION

Lubrication of a truck is important to prevent damage to moving parts due to friction, heat or foreign material. As all moving parts are not subjected to the same type of operating conditions the lubricant to be used is that which most nearly meets the requirements of the part involved. In some places excessive heat or cold is the problem to overcome, in others it is extreme pressure, water, sand or grit. The type of operating surface must also be taken into consideration as certain parts rotate or oscillate on bronze bushings, roller bearings, ball bearings or cast iron bearings. Each of the above conditions or constructions make necessary the application of a specialized lubricant.

Lubricants are much cheaper than repair bills and should be applied regularly to secure a maximum of useful service from a truck. Consequently, it is of equal importance that not only the proper grade of lubricant be used but that it be applied in accordance with a definite schedule.

The chart at the end of this section should be referred to for instructions on the mileage of application and the grade and quantity of lubricant required for all parts of the truck. A more detailed account of certain phases of lubrication is given in the following paragraphs.

ENGINE

Oil Gauge

When starting a cold engine, it will be noted that the oil gauge on the instrument panel will register a high oil pressure. As the engine warms up, the pressure will drop until it reaches a point where changes to higher speeds will raise the pressure very little, if at all.

If the oil pressure registers abnormally high after the engine is thoroughly warmed up, an inspection should be made to ascertain if the oil lines and passages are "plugged."

Lubrication
First 500 Miles

Proper selection of the oil to be used will add much to the performance, reliability, economy and long life of an engine.

It is important that the recommended light oils be used in the engine during the "breaking-in" period as they assure ease of starting the engine; prompt flow of a sufficient quantity of oil to the bearings; less friction between moving parts; less wear of moving parts, etc.

The crankcase of the engine, as delivered from the factory, is filled with 10-W oil. This should be left in during the first 500 miles and then the crankcase should be drained (while hot) and refilled to the proper level.

After 500 Miles

After the first 500 miles the crankcase oil should be selected to give the best performance for the climatic and driving conditions under which the truck is being operated.

Climatic Conditions

During the colder months of the year, an oil which will permit easy starting at the lowest atmospheric temperature likely to be encountered should be used.

When the crankcase is drained and refilled, the crankcase oil should be selected not on the basis of the existing temperature at the time of the change, but on the lowest temperature anticipated for the period during which the oil is to be used.

If oil is selected for existing temperatures, starting trouble may be encountered due to slower cranking speeds caused by too heavy an oil.

The viscosity grade of crankcase oil will, therefore, depend upon the climatic conditions under which the truck is operated.

Fall — Winter — Spring

The viscosity grade best suited for use in the engine at the various temperatures is given under reference Note 5 at the end of this section. Use the grade indicated for the lowest temperature expected. Always use the lighter grade oil when in doubt.

10-W oil plus 10% kerosene is recommended only for those territories where the temperature falls below 10 degrees below zero for protracted periods.

Summer

The use of 20-W or SAE 20 oils during the summer months will permit better all around performance than will the heavier body oils, with no appreciable increase in oil consumption.

If SAE 20 or 20-W oil is not available, SAE 30 oil may be used if it is expected that the average prevailing daylight temperature will consistently be above 90° F.

Maintaining Oil Level

The Oil Gauge Rod (Fig. 1) is marked "Full" or "Add Oil." These notations have broad arrows pointing to the level lines.

The oil level should be maintained between the two lines; neither going above the "Full" line nor under the "Add Oil" line.

Check the oil level frequently and add oil when necessary. Always be sure the crankcase is full before starting on a long drive.

Fig. 1—Oil Gauge Rod

When to Change Crankcase Oil

Some oils have been greatly improved, driving conditions have changed, and improvements in engines. such as the crankcase ventilating svstem, have greatlv lengthened the life of good lubricating oils. However, to insure continuation of best performance, low maintenance cost and long engine life, it is necessarv to change the crankcase oil whenever it becomes contaminated with harmful foreign materials. Under normal driving conditions draining the crankcase and replacing with fresh oil every 2000 or 3000 miles is recommended. Under the adverse driving conditions described in the following paragraphs, it may become necessary to drain the crankcase oil more frequently.

Driving over dusty roads or through dust storms introduces abrasive material into the engine. Carburetor Air Cleaners decrease the amount of dust that may enter the crankcase. The frequency of draining depends upon severity of dust conditions and no definite draining periods can be recommended.

Short runs in cold weather, such as city driving, do not permit thorough warming up of the engine and water may accumulate in the crankcase from condensation of moisture produced by the burning of the fuel. Water in the crankcase may freeze and interfere with proper oil circulation. It also promotes rusting and may cause clogging of oil screens and passages. Under normal driving conditions this water is removed by the crankcase ventilator. But if water accumulates it should be removed by draining the crankcase as frequently as may be required.

It is always advisable to let the engine reach normal operating temperature before draining the crankcase. The benefit of draining is, to a large extent, lost if the crankcase is drained when the engine is cold as some of the suspended foreign material will cling to the sides of the oil pan and will not drain out readily with the slower moving oil.

Crankcase Dilution

Probably the most serious phase of engine oil deterioration is that of crankcase dilution, which is the thinning of the oil by fuel vapors leaking by the pistons and rings and mixing with the oil.

Leakage of fuel, or fuel vapors, into the oil pan occurs mostly during the "warming-up" period, when the fuel is not thoroughly vaporized and burned.

Automatic Control

The Chevrolet engine is equipped with automatic devices which aid greatly in minimizing the danger of crankcase dilution.

Rapid warming up of the engine is aided by the thermostatic water temperature control, which automatically prevents circulation of the water in the cooling system until it reaches a predetermined temperature.

Thermostatic heat control on the exhaust manifold, during the "warming-up" period, automatically directs the hot exhaust gases against the center of the intake manifold, greatly aiding the proper vaporization of the fuel.

The down-draft carburetor is an aid to easy starting, thereby minimizing the use of the choke. Sparing use of the choke reduces danger of raw, or unvaporized, fuel entering the combustion chamber and leaking into the oil reservoir.

An efficient crankcase ventilating system drives off fuel vapors and aids in the evaporization of the raw fuel and water which may find its way into the oil reservoir.

Control by Truck Operator

Ordinarily the above automatic control devices will minimize, or eliminate, the danger of crankcase dilution.

However, there are abnormal conditions of service when the truck operator must aid in the control of crankcase dilution.

Short runs in cold weather, such as city driving, do not permit the thorough warming up of the engine nor the efficient operation of automatic control devices. It is recommended that the oil be changed more often when the truck is subject to this type of operation.

Poor mechanical condition of the engine, such as scored cylinders, poor ring fit, "sloppy" or loose pistons, faulty valves, poor ignition, will increase crankcase dilution. Keep the truck in good mechanical condition.

Poor fuels which contain portions hard to ignite and slow to burn will increase crankcase dilution. Use good fuel.

Water in Crankcase

Serious lubrication troubles may result in cold weather by an accumulation of water in the oil pan. This condition is, as a rule, little understood by the truck operator. To demonstrate the chief cause of water in the oil pan, hold a piece of cold metal near the end of the exhaust pipe of the engine and note the rapid condensation and collection of drops of water on it. The exhaust gases are charged with water vapor and the moment these gases strike a cold surface, they will condense, forming drops of water.

A slight amount of these gases pass the pistons and rings, even under the most favorable conditions, and cause the formation of water in the oil pan, in a greater or less degree, until the engine becomes warm. When the engine becomes thoroughly warm, the crankcase will no longer act as a condenser and all of these gases will pass out through the crankcase ventilator system.

Short runs in cold weather, such as city driving, will aggravate this condensing action.

Corrosion

Practically all present-day engine fuel contains a small amount of sulphur which, in the state in which it is found, is harmless; but this sulphur on burning, forms certain gases, a small portion of which is likely to leak past the pistons and rings and reacting with water, when present in the crankcase, form very corrosive acids. The more sulphur in the fuel, the greater the danger from this type of corrosion. This is a condition which we cannot wholly avoid, but it may be reduced to a minimum by proper care of the engine.

As long as the gases and the internal walls of the crankcase are hot enough to keep water vapor from condensing, no harm will result; but when an engine is run in low temperatures, moisture will collect and unite with the gases formed by combustion; thus, acid will be formed and is likely to cause serious etching or pitting. This etching, pitting or corrosion, when using fuel containing considerable sulphur, manifests itself in excessively rapid wear on piston pins, camshaft bearings and other moving parts of the engine, oftentimes causing the owner to blame the truck manufacturer or the lubricating oil when in reality the trouble may be traced back to the character of fuel used, or a condition of the engine, such as excessive blow-bys or improper carburetor adjustment.

SAE Viscosity Numbers

The viscosity of a lubricant is simply a measure of its body or fluidity. The oils with the lower SAE numbers are lighter and flow more readily than do the oils with the higher numbers.

The SAE viscosity numbers constitute a classification of lubricants in terms of viscosity or fluidity, but with no reference to any other characteristics or properties.

The refiner or marketer supplying the oil is responsible for the quality of its product. His reputation is your best indication of quality.

The SAE viscosity numbers have been adopted by practically all oil companies, and no difficulty should be experienced in obtaining the proper grade of lubricant to meet seasonal requirements.

REAR AXLE AND TRANSMISSION

The rear axle and transmission case are filled with SAE 90 Universal Gear lubricant at the factory—this being satisfactory for "year around" use.

Although SAE 90 grades of lubricants are recommended for "year around" service, whenever extremely low or high temperatures are encountered for protracted periods, or when the truck is excessively overloaded or subject to other severe service conditions, the recommendations given in reference notes 1 and 2 at the end of this section should be followed.

"All Purpose" or "Universal" Gear Lubricants

Due to the increase in the number of truck manufacturers using Hypoid Rear Axles, "All Purpose" or "Universal" Gear Lubricants have been developed.

These lubricants can be satisfactorily used in truck rear axles, transmissions, steering gears, and universal joints requiring a fluid lubricant.

"All Purpose" or "Universal" Gear Lubricants must be manufactured under carefully-controlled conditions and the lubricant manufacturer must be responsible for the satisfactory performance of his product. His reputation is your best indication of quality.

Lubricant Additions

The lubricant level in these units should be checked periodically.

It is recommended that any additions required to bring up the lubricant level be made, using the same type of lubricant as in the housing.

Lubricant Changes

While seasonal changes of the lubricant are not required, it is recommended that the housing be drained and refilled with the recommended lubricant at least twice a year, or every 6,000 to 10,000 miles.

It may be necessary and desirable to drain rear axles and transmissions in trucks subject to severe service more frequently than recommended above.

CAUTION—Use a light flushing oil to flush out the housings when draining. DO NOT use water, steam, kerosene, gasoline, alcohol, etc.

OIL FILTER

The drain plug on the bottom of the oil filter should be removed periodically to drain off any water or sludge deposit trapped in the filter. The filter element should be replaced every 8,000 to 10,000 miles, or when the oil gauge rod shows the oil to be dark.

OIL BATH AIR CLEANER

About once every 2,000 miles or oftener if the truck is being operated where an unusual amount of dust and dirt is in the air, remove the oil bath air cleaner and empty out the old oil and accumulated dirt. Wash out with clean gasoline and wipe dry. Wash the filter element by slushing up and down in clean gasoline. Dry thoroughly and fill the body with SAE 50 viscosity oil according to instructions given on the cleaner. Air cleaner oil capacities vary, and it is extremely important that the correct amount of oil be installed for satisfactory performance. SAE 50 viscosity oil is satisfactory for summer or winter use, however, in certain localities where exceptionally cold weather is encountered for protracted periods of time, an oil of lower viscosity should be used.

SHOCK ABSORBERS

The shock absorbers should be kept filled with a low viscosity (light body) shock absorber fluid that has a pour test not higher than 30° below zero.

The same fluid is used both summer and winter and will have similar operating characteristics the year around.

The shock insulation fluid recommended should have a viscosity of from 70 to 80 seconds at 100° F. (Sayboldt Universal) and should not exceed 975 to 1,000 seconds at 20° F. This type of fluid is carried by all Chevrolet Dealers.

NOTE—Do not, under any circumstances, use a shock insulation fluid heavier in viscosity, or body, than that recommended above. Heavy body fluids are detrimental to the proper functioning at the unit.

STEERING GEAR LUBRICATION

The steering gear is filled at the factory with an all-season gear lubricant. Seasonal change of this lubricant is unnecessary and the housing should not be drained. Whenever required, additions should be made using steering gear lubricants marketed by many oil companies, "All Purpose" or "Universal" gear lubricants or chassis lubricants.

A pipe plug is installed at this point to prevent over-lubrication, generally occasioned by the use of a pressure gun.

Over-lubrication of this unit might result in forcing lubricant up the steering gear tube to the horn button and steering wheel.

PERMANENTLY LUBRICATED PARTS

Water Pump

The water pump bearing is of the permanently sealed and lubricated type and requires no lubrication throughout its life.

Clutch Throwout Bearing

The clutch throwout bearing is packed with lubricant at the time of assembly and requires no further attention. Upon removal for clutch overhaul, however, the recess in the throwout bearing collar should be cleaned and repacked with a high-melting-point lubricant.

Clutch Pilot Bearing

No lubrication of the clutch pilot bearing is necessary unless the clutch is being overhauled, at which time it should be removed from the crankshaft, cleaned, inspected and repacked with a small amount of high-melting-point lubricant.

CHASSIS LUBRICATION

For complete chassis lubrication consult the lubrication charts and Figs. 2 and 3 to which the "Key" numbers refer. These charts indicate the location of the units to be lubricated, capacity, type of lubricant, grade and mileage of lubrication or change.

The term "Chassis Lubricant" as used in this manual, describes a semi-fluid lubricant designed for application by commercial pressure gun equipment. For its composition refer to specification note "B" at the end of the lubrication chart.

Wheel Bearings

To lubricate the front wheel bearings, remove the drive flange and wheel hub according to instructions given in Section 3 of this Manual. Wash all old grease from the bearings and hub. Hand pack the bearings with Marfak lubricant or its equivalent, using No. 2 in Summer and No. 1 in Winter. In addition, distribute one pint of lubricant in the space between the bearings in the wheel hub. Reassemble wheel hub and adjust bearings according to instructions given in Section 3 of this Manual.

To lubricate the rear wheel bearings, remove the rear axle shaft and wheel hub according to instructions in Section 4 of this Manual. Wash out the old lubricant and hand pack the bearings with Marfak lubricant or its equivalent, using No. 2 in Summer and No. 1 in Winter. In addition, distribute one pint of lubricant in space between the bearings in the wheel hub.

Lubrication Charts showing the location of lubrication points and also the kind and quantity of lubricant to use will be found on the following pages.

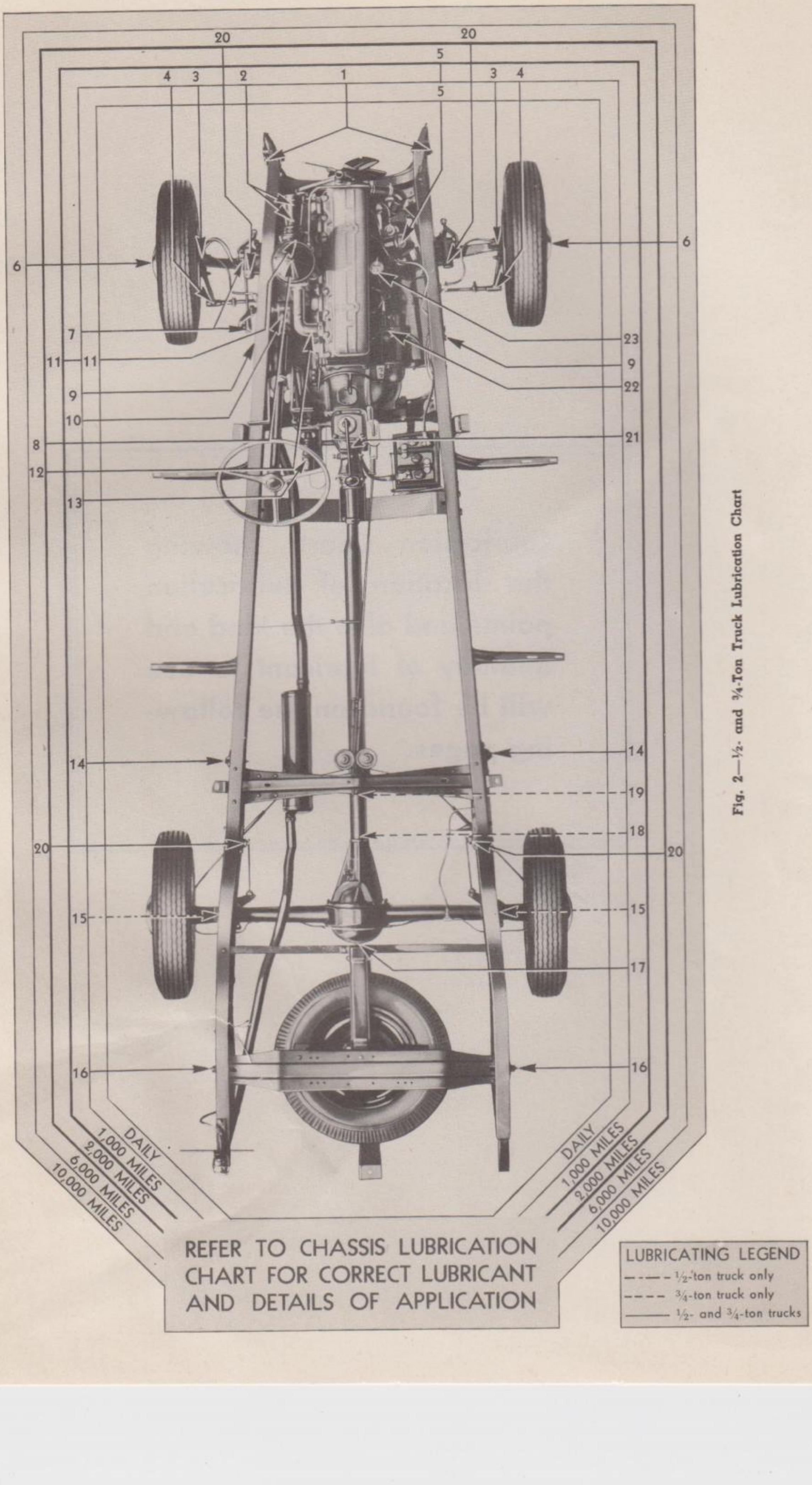


Fig. 2—½- and ¾-Ton Truck Lubrication Chart

CHASSIS LUBRICATION CHART — ½ AND ¾ TON TRUCKS

Key	Location	How Applied	Capacity	Lubricant	Type (See Specification Notes)	Grade Recommended Summer	Grade Recommended Winter	See Ref. Note	Miles
1	Front Spring Shackles	2 Fittings each side	—	Chassis	B	No. 2	No. 1	—	1,000
2	Generator	1 Oil Cup each end	—	Engine Oil	—	S.A.E. 30	S.A.E. 10	5	1,000
3	King Pin	2 Fittings— top and bottom	—	Chassis	B	No. 2	No. 1	—	1,000
4	Tie Rod	1 Fitting each end	—	Chassis	B	No. 2	No. 1	—	1,000
5	Crankcase	Filler Neck— Right Side	5 qts. (when filter is drained 6½ qts.)	Engine Oil	—	—	—	5	Change 2,000-3,000 Miles (Check Daily—Keep Up Level)
6	Front Wheel Bearings	Hand Pack	—	Marfak or equivalent	B	No. 2	No. 1	—	10,000
7	Steering Connecting Rod	1 Fitting each end	—	Chassis	B	No. 2	No. 1	—	1,000
8	Carburetor Pump Arm Shaft	Remove Dust Cover, Saturate Felt Ring	—	Engine Oil	—	S.A.E. 30	S.A.E. 10	5	6,000
9	Front Spring Rear Eye Bolt	1 Fitting each side	—	Chassis	B	No. 2	No. 1	—	1,000
10	Steering Gear	Filler Hole— Top of Housing	—	Universal Gear	A	S.A.E. 90	S.A.E. 90	4	Check every 1,000 miles and add lubricant if required
11	Air Cleaner	Remove Cover	(See Instructions on Cleaner Body)	Engine Oil	—	S.A.E. 50	S.A.E. 50	6	2,000 (Check every day under extreme dust conditions)
12	Throttle Bell Crank	At Bell Crank Shaft	—	Engine Oil	—	S.A.E. 30	S.A.E. 10	5	6,000
13	Brake Master Cylinder	Filler Hole—Top of Master Cylinder	1 pt.	Hydraulic Brake Fluid	—	—	—	—	1,000 mile inspection
14	Rear Spring Front Eye Bolt	1 Fitting each side	—	Chassis	B	No. 2	No. 1	—	1,000
15	Rear Spring Seat (½ Ton Trucks only)	1 Fitting each seat	—	Chassis	B	No. 2	No. 1	—	1,000
16	Rear Spring Shackles	2 Fittings each side	—	Chassis	B	No. 2	No. 1	—	1,000
17	Rear Axle Housing	Filler Hole in Differential Cover	4½ pts.	Universal Gear	A	S.A.E. 90	S.A.E. 90	1	Change 6,000-10,000 miles (Check every 1,000 miles and add lubricant if required)
18	Rear Universal Joint and Propeller Shaft Slip Joint (¾ Ton Trucks only)	1 Fitting each joint and slip joint	—	Transmission or Universal Gear	A	S.A.E. 90	S.A.E. 90	3	1,000

CHASSIS LUBRICATION CHART—(Cont.)

Key	Location	How Applied	Capacity	Lubricant	Type (See Specification Notes)	Grade Recommended		See Ref. Note	Miles
						Summer	Winter		
19	Intermediate Universal Joint and Propeller Shaft Slip Joint (¾ Ton Trucks only)	1 Fitting each joint and slip joint	—	Transmission or Universal Gear	A	S.A.E. 90	S.A.E. 90	3	1,000
20	Shock Absorbers	Filler Hole— Top of Housing	—	Shock Absorber Fluid	—	—	—	—	6,000 miles or 6 months
21	Transmission 3-Speed 4-Speed	Filler Hole Filler Hole	1½ pts. 5½ pts.	Navy No. optional 3080-3100-1100 or Universal Gear	A	S.A.E. 90	S.A.E. 90	2	Change 6,000-10,000 (Check every 1,000 miles and add lubricant if required)
22	Starting Motor	1 Oil Cup	—	Engine Oil	—	S.A.E. 30	S.A.E. 10	5	1,000
23	Ignition Distributor	1 Grease Cup— Fill and turn down	—	Marfak or Petrolatum	C A	No. 2	No. 1	—	1,000

LUBRICATION SPECIFICATION AND REFERENCE NOTES

The following "Specification Notes" and "Reference Notes" apply to the ½ and ¾-Ton Truck Lubrication Chart shown on pages 0-106 and 0-107; they also apply to the 1½-Ton Truck Lubrication Chart shown on pages 0-111 and 0-112.

SPECIFICATION NOTES

A. See Federal Stock Catalogue or General Schedule of Supplies, 14-L-188, also circular letter No. 78.

B. See Contract Bulletin No. 123, Subject—Q.M.C. Contract for Greases Lubricating, Mineral (for Automotive Use) Office Q.M. General. Sept. 14, 1940.

C. See U. S. Army Specifications No. 2-67 or Federal Stock Catalogue No. 51-P-364.

REFERENCE NOTES

1. For Rear Axle Housing—For extremely low temperatures Class 1 Universal Gear Lubricant may be used.

2. For Transmission—**Summer**—When temperatures are very high or for severe service conditions S.A.E. 140, Navy No. 1150—3120—1120—5150 may be used or Class 3 Universal Gear Lubricant.

   For Transmission—**Winter**—Extremely low temperatures—S.A.E. 80, Navy No. 3065—1080 or S.A.E. 90 to which has been added 10% to 20% transformer oil Navy No. 9045 may be used or Class 1 Universal Gear Lubricant.

3. Propeller Shaft Universal Joints—**Summer**—When temperatures are very high S.A.E. 140, Navy No. 1150—3120—1120—5150 may be used or Class 3 Universal Gear Lubricant.

4. Steering Gear—When temperatures are very high, Class 3 Universal Gear Lubricant may be used.

5. Engine Crankcase—Use Navy No. or S.A.E. No oil for temperatures indicated in the following chart.

Atmospheric Temperatures	Navy No.	S.A.E. No.
Above 90° F.	3065	30
32° to 90° F.	3050	20 or 20W
10° to 32° F.	3050	20W
Plus 10° F. to Minus 10° F.	2110	10W
Below Minus 10° F.	2110 plus 10% No. 9045	10W plus 10% kerosene

6. Oil Bath Air Cleaner—When exceptionally cold temperatures are encountered use S.A.E. 30 Navy No. 3065 or S.A.E. 20 Navy No. 3050.

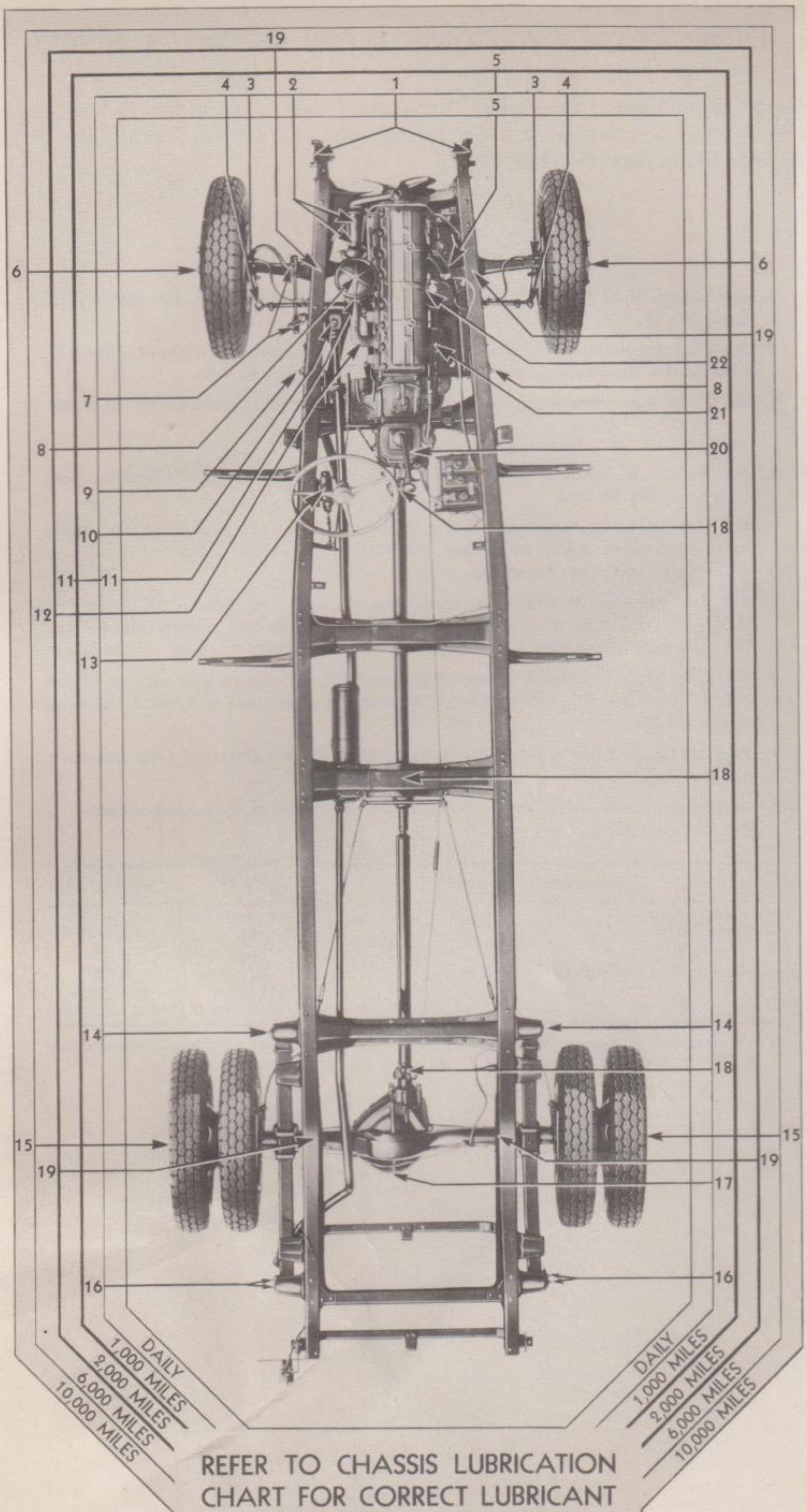


Fig. 3—1½-Ton Truck Lubrication Chart

CHASSIS LUBRICATION CHART—1½ TON TRUCKS

Key	Location	How Applied	Capacity	Lubricant	Type (See Specification Notes)	Grade Recommended		See Ref. Note	Miles
						Summer	Winter		
1	Front Spring Shackles	2 Fittings each side	——	Chassis	B	No. 2	No. 1	—	1,000
2	Generator	1 Oil Cup each end	——	Engine Oil	—	S.A.E. 30	S.A.E. 10	5	1,000
3	King Pin	2 Fittings—top and bottom	——	Chassis	B	No. 2	No. 1	—	1,000
4	Tie Rod	1 Fitting each end	——	Chassis	B	No. 2	No. 1	—	1,000
5	Crankcase	Filler Neck—Right Side	5 qts. (when filter is drained 6½ qts.)	Engine Oil	—	——	——	5	Change 2,000-3,000 Miles (Check Daily—Keep Up Level)
6	Front Wheel Bearings	Hand Pack	——	Marfak or equivalent	B	No. 2	No. 1	—	10,000
7	Steering Connecting Rod	1 Fitting each end	——	Chassis	B	No. 2	No. 1	—	1,000
8	Carburetor Pump Arm Shaft	Remove Dust Cover, Saturate Felt Ring	——	Engine Oil	—	S.A.E. 30	S.A.E. 10	5	6,000
9	Front Spring Rear Eye Bolt	1 Fitting each side	——	Chassis	B	No. 2	No. 1	—	1,000
10	Steering Gear	Filler Hole—Top of Housing	——	Universal Gear	A	S.A.E. 90	S.A.E. 90	4	Check every 1,000 miles and add lubricant if required
11	Air Cleaner	Remove Cover	1 pt.	Engine Oil	—	S.A.E. 50	S.A.E. 50	6	2,000 (Check daily under extreme dust conditions)
12	Throttle Bell Crank	At Bell Crank Shaft	——	Engine Oil	—	S.A.E. 30	S.A.E. 10	5	6,000
13	Brake Master Cylinder	Filler Hole—Top of Master Cylinder	1 pt.	Hydraulic Brake Fluid	—	——	——	—	1,000 mile inspection
14	Rear Spring Front Eye Bolt	1 Fitting each side	——	Chassis	B	No. 2	No. 1	—	1,000
15	Rear Wheel Bearings	Hand Pack	——	Marfak or equivalent	B	No. 2	No. 1	—	10,000
16	Rear Spring Shackles	2 Fittings each side	——	Chassis	B	No. 2	No. 1	—	1,000
17	Rear Axle Housing	Filler Hole in Differential Cover	11 pts.	Universal Gear	A	S.A.E. 90	S.A.E. 90	1	Change 6,000-10,000 miles (Check every 1,000 miles and add lubricant if required)
18	Universal Joint and Propeller Shaft Slip	1 Fitting each joint and slip joint	——	Transmission or Universal Gear	A	S.A.E. 90	S.A.E. 90	3	1,000

CHASSIS LUBRICATION CHART—(Cont.)

Key	Location	How Applied	Capacity	Lubricant	Type (See Specification Notes)	Grade Recommended		See Ref. Note	Miles
						Summer	Winter		
19	Shock Absorbers	Filler Hole—Top of Housing	——	Shock Absorber Fluid	—	——	——	—	6,000 miles or 6 months
20	Transmission	Filler Hole—Right Rear Side	5½ pts.	Navy No. optional 3080-3100-1100 or Universal Gear	A	S.A.E. 90	S.A.E. 90	2	Change 6,000-10,000 miles (Check every 1,000 miles and add lubricant if required)
21	Starting Motor	1 Oil Cup	——	Engine Oil	—	S.A.E. 30	S.A.E. 10	5	1,000
22	Ignition Distributor	1 Grease Cup—Fill and turn down	——	Marfak or Petrolatum	C A	No. 2	No. 1	—	1,000

Section 1

BODY

TRUCK CAB ATTACHMENT TO FRAME

The Chevrolet truck cab is all-steel construction with mountings that provide a secure, yet flexible, attachment to the chassis frame.

The cab mounting of the 1½-ton truck is illustrated in Fig. 1. The mounting consists of four through-bolts on each side with fabric rubber insulation between the cab sill and the top of the frame side member to absorb shock. In order to prevent wrenching of the cab as the truck moves over uneven terrain or road, the two rear mounting bolts on each side of the cab are spring-loaded, as shown in Fig. 1. The cab is further insulated at each rear mounting bolt by a hard rubber bumper encased in a metal retainer. The mounting bolt passes through the center of the rubber bumper and retainer, and a heavy cushioning coil spring is placed between the bolt head and cab sill. The lower end of the bolt passes through the top channel of the frame side rail and terminates in a castellated nut, locked with a cotter pin.

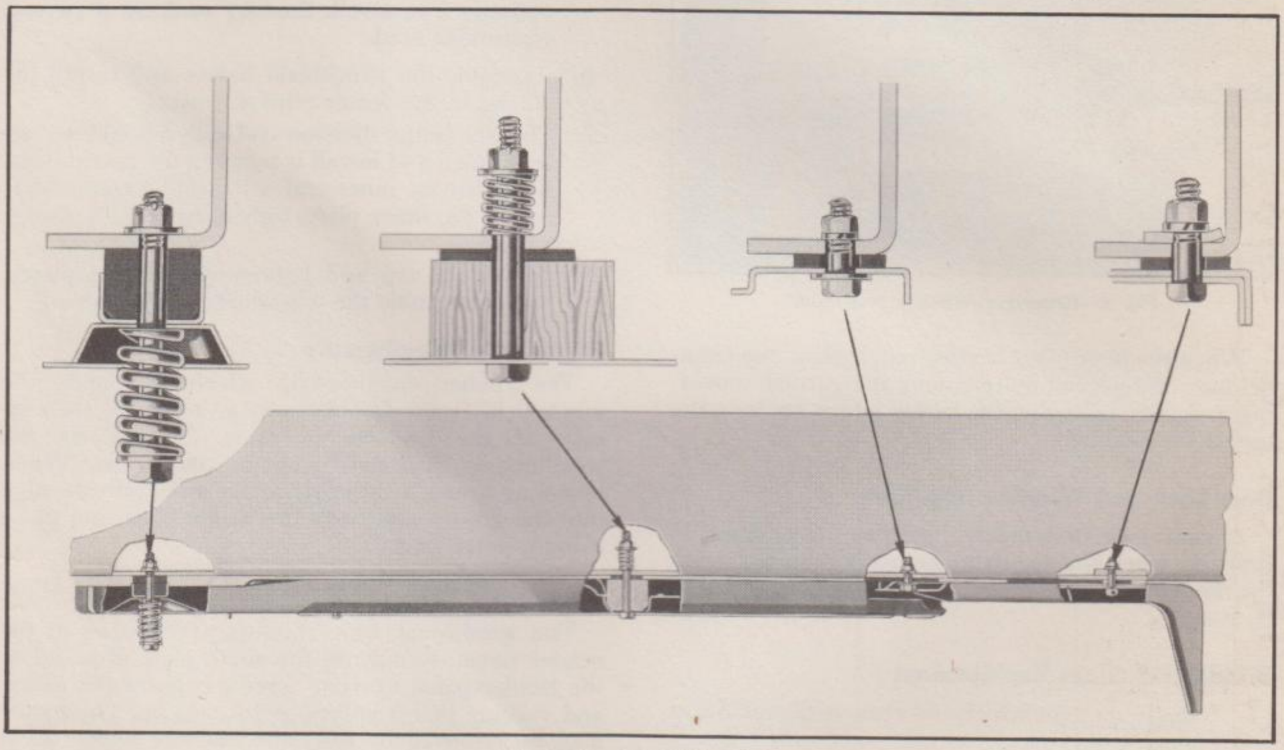


Fig. 1—Truck Cab Mounting

The position of the rear center cab mounting bolt is reversed from that of the rear bolt in that the cushioning spring is placed below the top channel of the frame side rail and between it and the castellated retaining nut. The other two mounting bolts are not spring-cushioned but fabric rubber insulators are used between the cab sill and frame upper channel at each of these bolt positions.

The cushion spring method of mounting is designed to permit the truck frame to weave under certain conditions without placing undue strain on the cab structure. The cushion mounting bolt retaining nuts should only be tightened to a point where it is most possible to insert the cotter pin and no further. Greater tightening would compress the springs to such an extent that flexibility would be destroyed.

Door Glass

A metal frame is mounted on the door glass with the conventional rubber filler strip; this frame reinforces the glass and at the same time provides freedom from looseness and rattles. Procedure for installation of a door glass is as follows:

1. Remove door lock handle, window regulator and remote control handles.
2. Remove the door inner panel screws and remove the panel.
3. Remove the screws which mount the regulator board, and tip the regulator board away from the door. This disengages the regulator from the cam channel, as shown in Fig. 4.
4. Raise the glass and remove the glass run channel from its retainers on the lock pillar side, then remove the glass.
5. To install the metal channels, place a length of rubber filler strip over the edge of the glass, then

tap the channel over the glass and filler strip; trim the filler flush with the channel using a sharp knife or safety razor blade.

6. Install the glass in the door opening, lubricate the cam channel with graphite grease, connect the regulator to the cam channel, as shown in Fig. 2. Reassemble the regulator board, door inner panel, and control handles.

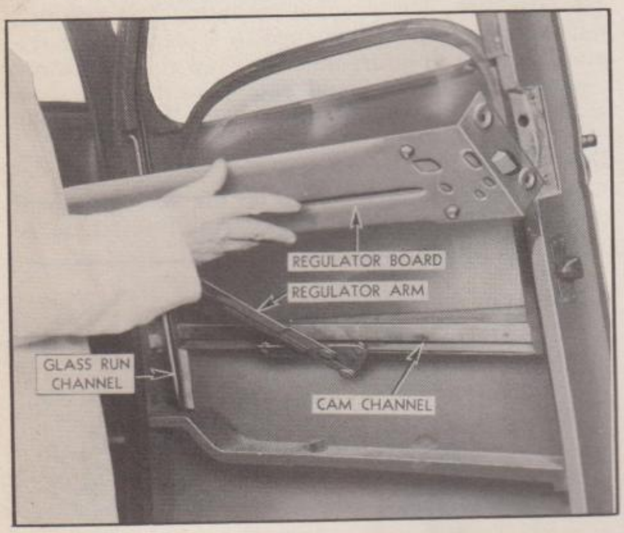


Fig. 2—Removing Window Regulator

When the door glass is removed, a glass run channel may be replaced by removing the garnish moulding and then removing the screw which anchors the top of the channel.

Door Lock and Window Regulator

A door lock or window regulator may be easily replaced when the regulator board is removed from the door, as they are mounted on the regulator board by screws.

Windshield Glass Replacement

1. Release the center lock and remove the quadrant adjusting screws.
2. Remove the two screws and sleeve nuts from each windshield hinge.
3. Remove the three screws from the top and bottom reinforcing plates, then remove the four screws from the center division channel and remove the inner and outer channels with their seals.
4. Remove the screws which attach the top and bottom channels to the frame reinforcement on one side of the center division channel. Then pull the two halves of the windshield apart at the center, as shown in Fig. 3.
5. When replacing a windshield glass, place a strip of Everseal filler channel over the edge of the glass, with the soap-stoned side out. Brush the inside of the windshield channel with light lubricant oil. Push the glass with the channel filler into the windshield channel by hand.

   NOTE—The oil acts on the channel filler, causing it to swell, thereby making a perfect watertight seal.

6. Assemble the windshield halves and install the screws in the center reinforcement.
7. Coat the center division seal with FS-638 sealing compound and install it between the two glasses, then coat the inner seal with sealing compound; install the inner plate, tightening the screws securely.
8. Install the top and bottom reinforcing plates, and reassemble the windshield in its opening.

Windshield Weatherstrip

The rubber weatherstrip which surrounds the windshield frame fits into a groove around the outside of the windshield frame. To remove the weatherstrip, just pull it out of the groove. When installing a new weatherstrip, place the outside edge into the groove and push the inside edge into place using a putty knife.

Windshield Wiper

The windshield wiper motors are located in the header panel. Removing the small plate attached to the header panel by four screws exposes the motor and vacuum line connections for service. The motor may be removed by disconnecting the wiper blade and removing the mounting nut on the front of the header panel.

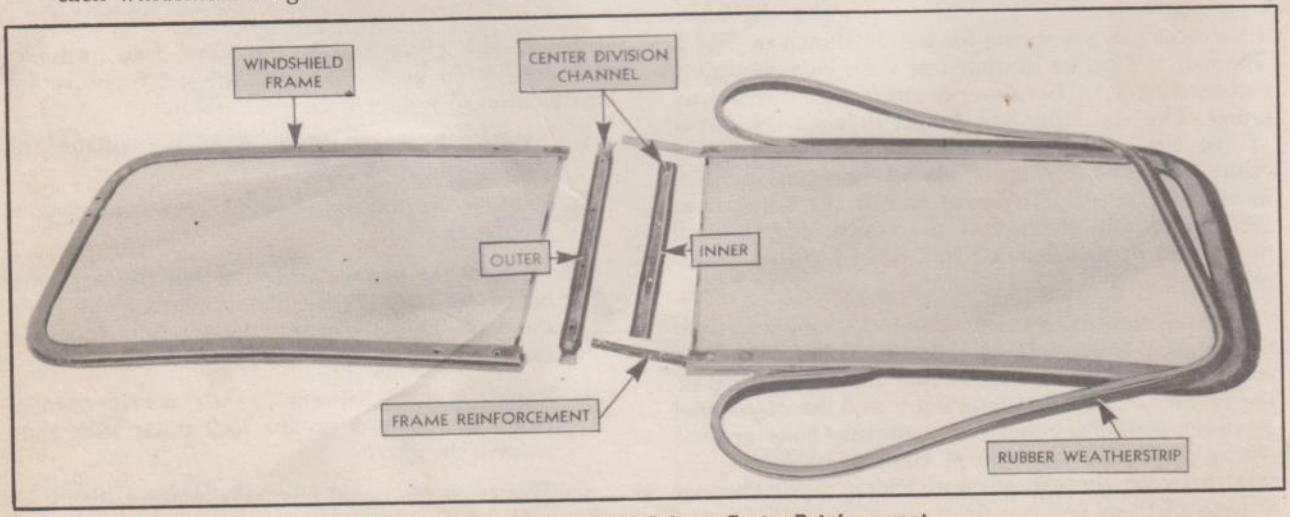


Fig. 3—Showing Windshield Split at Center Reinforcement

Section 2

FRAME

½ Ton Truck

The ½ ton truck frame is a five cross member frame with a flat kick-up over the rear axle. At the rear of the kick-up, the side members continue at the same level as the portion ahead of the kick-up. This provides a very satisfactory surface upon which to mount bodies. The cross members are very rigid being of a flanged "U" and box section construction.

The engine rear support is a flanged inverted "U" member. This member is secured to the side members by means of a construction known as "alligator jaw" attachment.

The second cross member is of box member construction for its entire width. Bolt attachment to the side members provides easy removal for the servicing of the transmission.

The third cross member, also a flanged inverted "U" section, supports the hand brake cable pulleys and the pulley bracket forms a box section with the cross member.

A single rear cross member is used. This member is formed upward at the center for spare wheel mounting.

¾ Ton Truck

The ¾ ton truck frame incorporates in its design many of the construction features of the ½ and 1½ ton truck frames.

The frame tapers from the front end to the second cross member, beyond which it forms a straight section. This arrangement supplies an excellent mounting for the bodies, as the straight section extends under the entire length of the load platform.

The side members are formed in a deep channel section from thick sheets of steel. The top flange is uniform in width over its entire length, but the lower flange is wider for a short distance at the front and rear to provide greater strength for the attachment of the cross members. Each side member is reinforced at the rear hanger of the front spring by a special channel. There is a small kick-up over the rear axle for clearance.

Cross members are of the flanged "U" and box-section construction—the type of design most suitable for truck service. Since the front end is similar to the ½ ton design, the rugged front cross member and engine rear support member of

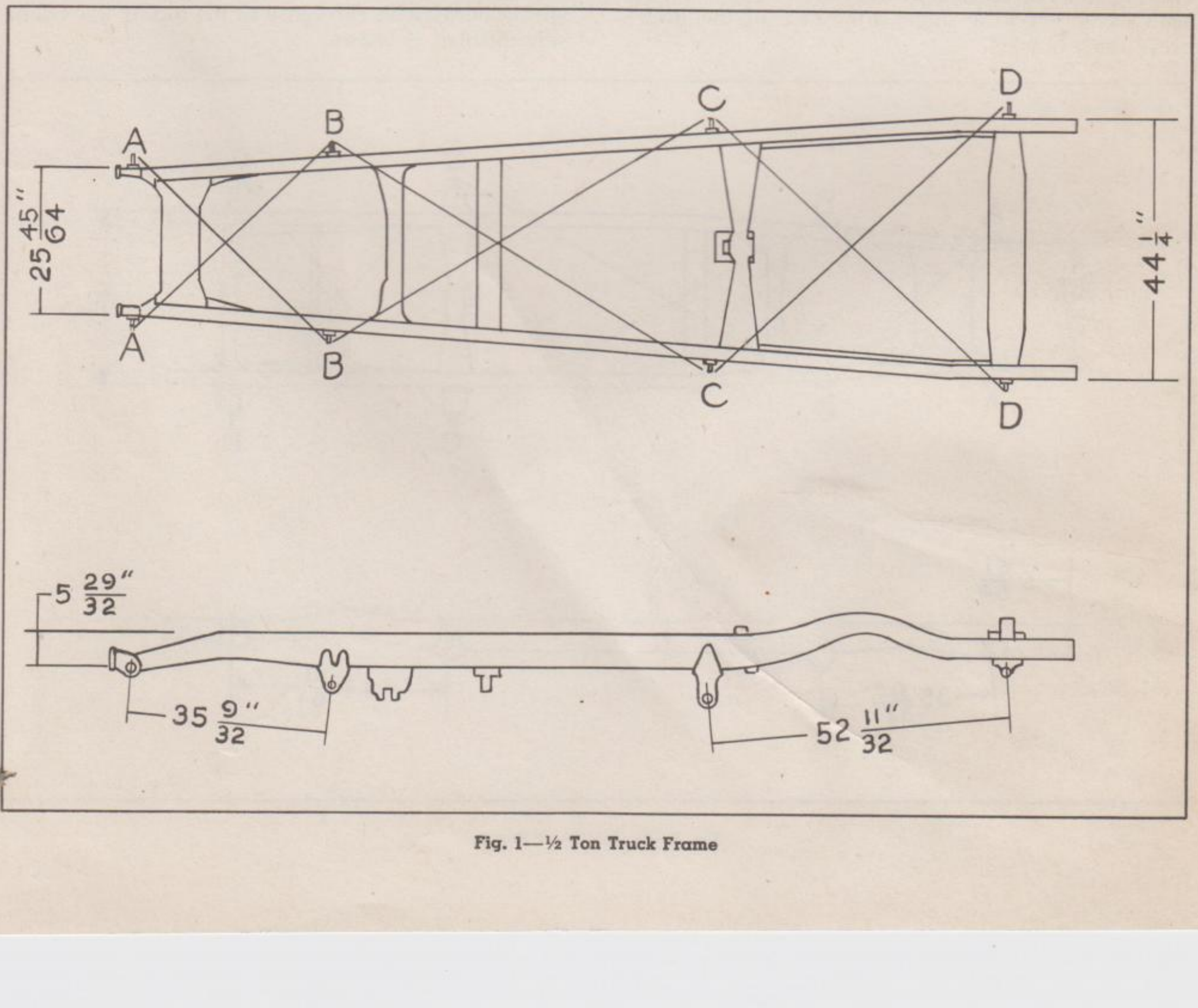


Fig. 1—½ Ton Truck Frame

that frame are utilized in this unit. In addition to supporting the rear of the power plant, the rear support also functions as a cross member.

The second cross member of box-section construction is identical to the ½ ton member, including the holes at the center section for attaching the universal joint support bracket. The plate of this support doubly ties together the flanges of the cross member in a reinforced box section, greatly increasing its strength over the entire center section. The side members and rear universal joint support are bolted to this cross member so that the transmission can be removed for servicing without disturbing the rear axle.

The third cross member is similar in design to the corresponding member in the ½ ton frame. It is of the inverted flange "U" type with alligator jaw attachment to the side members.

The rear cross member is identical to the one on the 1½ ton frame. It is a strong panel rigidly riveted at each end to the flanges of the side members. This member continues to be located at the rear bracket of the rear spring, and in addition to being riveted to the lower flanges of the side members, it is reinforced at each end by a gusset that joins the upper flange of the member and side member in a sturdy connection. The gusset is the same part as used on the 1½ ton truck.

134½" W.B. 1½ Ton Trucks

The 134½" wheelbase 1½ ton truck frame has five cross members. It is similar to the ¾ ton truck frame with exception to a slight difference in the brake cross shaft bracket.

1½ Ton 160" W.B. Trucks

Six cross members are used on the 160" wheelbase 1½ ton truck. Its frame is similar in construction to the ¾ ton truck frame with exception to a slight difference in the brake cross shaft bracket.

STRAIGHTENING THE FRAME

In the case of a collision or accident where the bending or twisting of the frame is not excessive, it is permissible to straighten the frame. This must be done cold, as heat applied to the frame will change the structure of the metal and weaken the frame at the point where heat is applied.

Checking Frame Alignment

When checking a frame for misalignment in case of damage, the most efficient method is "X" checking with a tram from given points on each side rail.

In the Figures 1, 2 and 3, reference points are indicated—"A," "B," "C" and "D" on each frame side member.

When making checks, the tram points should be set at the center of the lubrication fittings.

When "X" checking any section of the frame, the measurements should agree within 5/16". If the measurements do not agree within the above limit, it means that corrections will have to be made between those measurement points that are not equal.

The minimum dimensions between the spring hangers both front and rear are also shown on the illustrations. In addition the height of the front spring horns with reference to the top of the frame side member is shown.

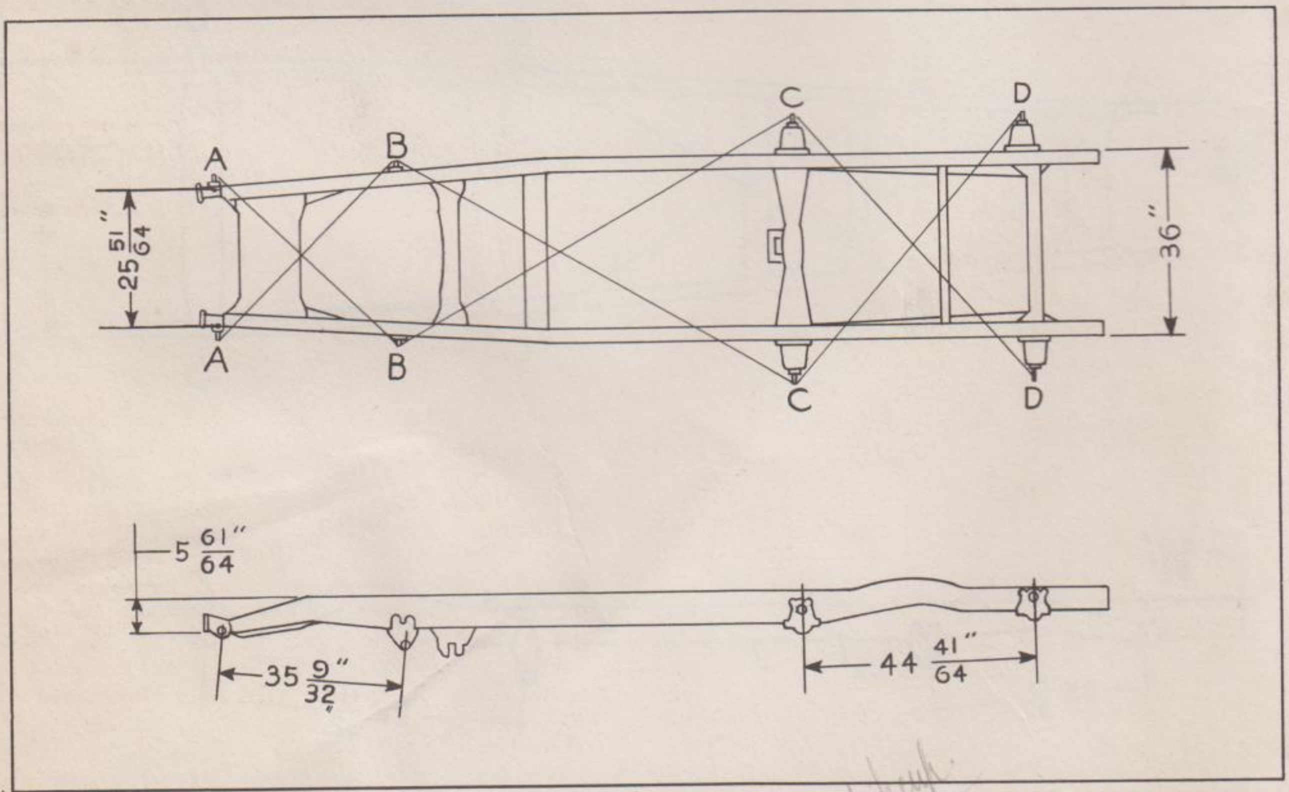


Fig. 2—¾ Ton Truck Frame

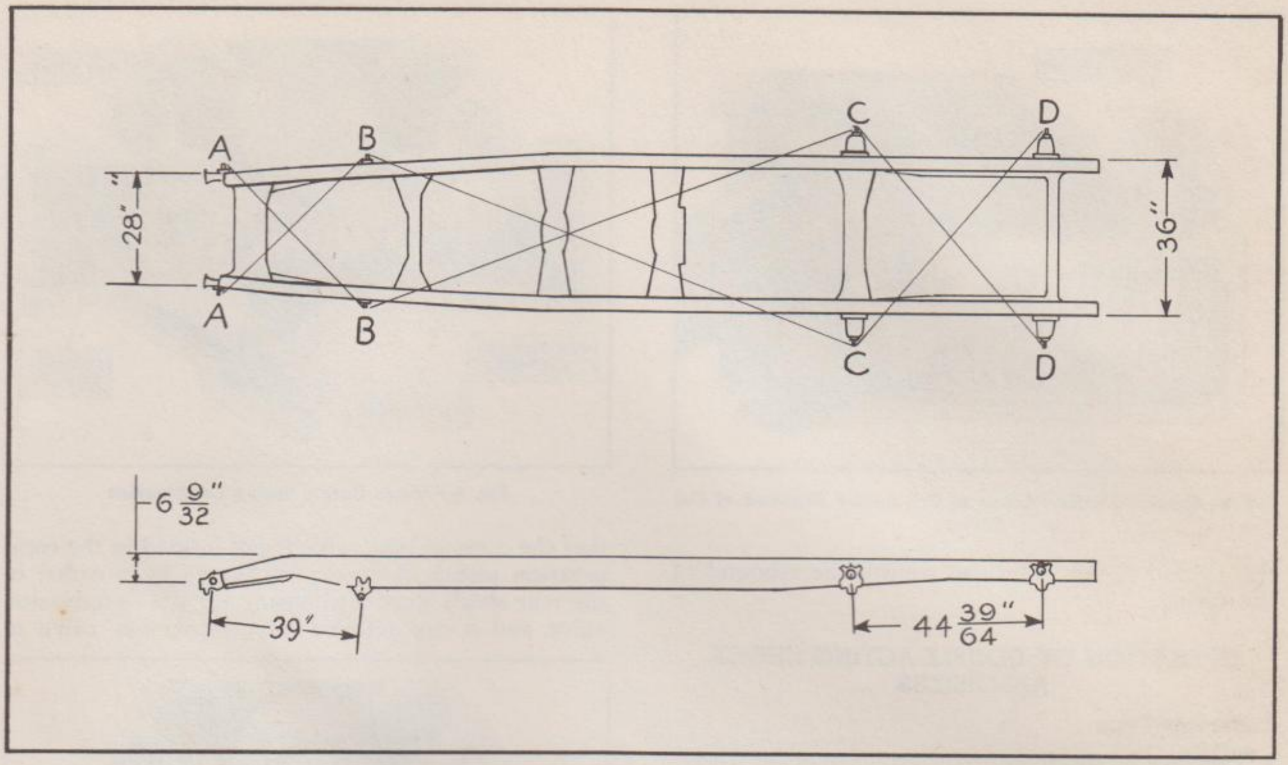


Fig. 3—1½ Ton Truck Frame

SHOCK ABSORBERS

Shock absorbers provide a smoother ride for the occupants by dampening the spring vibrations as the truck passes over irregularities in the road. There are two types of shock absorbers: single-acting, and double-acting. The single-acting shock absorbers control the speed of REBOUND of the truck springs. Double-acting shock absorbers control the speed of both REBOUND and COMPRESSION of the truck springs.

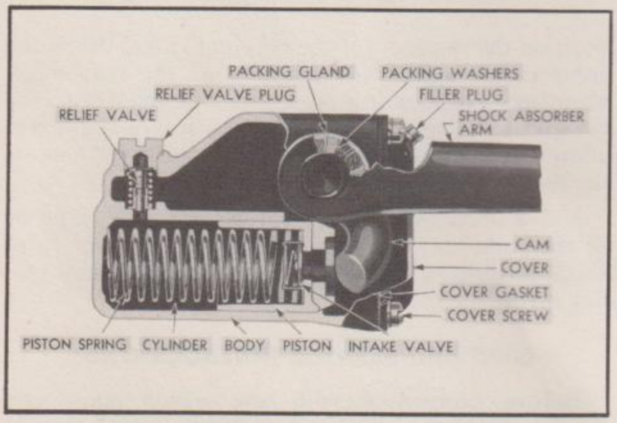


Fig. 4—Single-Acting Shock Absorber

OPERATION OF SINGLE-ACTING SHOCK ABSORBERS

The construction of the single-acting shock absorber is shown in the cross section view, Fig. 4.

When the wheels strike a bump, the car springs compress and the car frame moves downward, carrying the shock absorber with it. This causes the shock absorber arm to move upward, relieving the cam pressure on the piston. Relieving this pressure allows the piston spring to force the piston outward, creating a vacuum behind the piston. The vacuum causes the intake valve under the head of the piston to open, permitting the fluid to flow under the piston head and fill the piston chamber, Fig. 5.

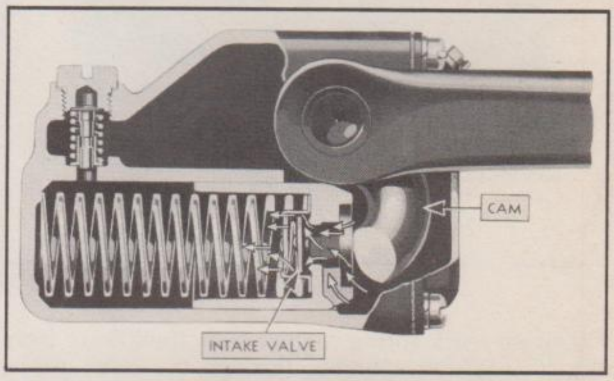


Fig. 5—Shock Absorber Action When Car Strikes a Bump

As the wheels pass over the bump, the car springs rebound and the car frame moves upward, carrying the shock absorber with it. This causes the shock absorber arm to move downward, applying cam pressure on the piston. The cam forces the piston into the cylinder, closing the intake valve. The oil, trapped in the cylinder, forces the relief valve off its seat and passes slowly into the reservoir. This action, Fig. 6, slows up the rebound of the truck springs.

The type of single-acting shock absorber shown in Fig. 4, with a separately mounted intake valve and relief valve, is used on the front and rear of

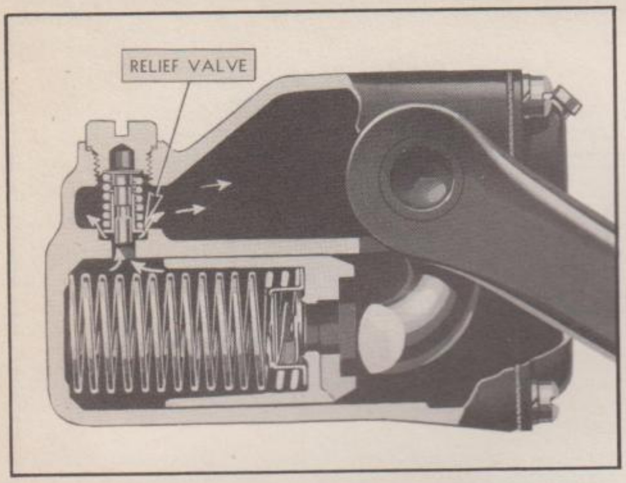


Fig. 6—Shock Absorber Action in Controlling Rebound of Car Spring

the ½ and ¾ ton trucks to control the rebound of the springs.

OPERATION OF DOUBLE-ACTING SHOCK ABSORBERS

Reservoir Type

This type of shock absorber, available on all trucks, has both pistons contained in one housing. A cross section view of the double-acting shock absorber is shown in Fig. 7.

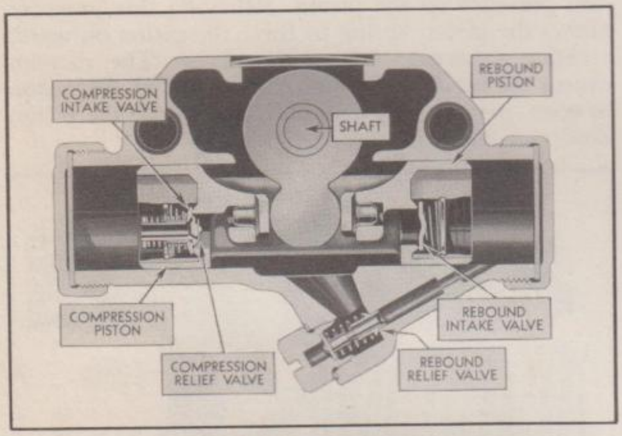


Fig. 7—Front Shock Absorber

During truck spring compression, fluid flows from the compression cylinder, through the relief valve, into the reservoir, and thus dampens the spring compression. At the same time, fluid enters the rebound cylinder through the intake valve. This action is shown in Fig. 8.

During truck spring rebound, fluid flows from the rebound cylinder, through the relief valve, into the reservoir, thereby dampening the spring rebound. At the same time, fluid flows into the compression cylinder through the intake valve. This sequence of events may be followed by referring to Fig. 9.

The cross-section views shown, Figs. 7, 8, 9, illustrate the type of shock absorber used at the front of the truck, but the operating principles of the rear shock absorbers are quite similar, the exception being

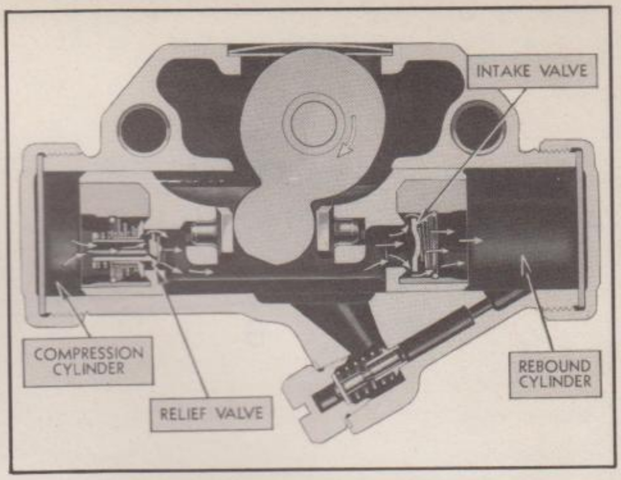


Fig. 8—Action During Spring Compression

that the compression valve is not located in the compression piston. A separate passage is provided in the rear shock absorber housing for the compression valve and a cap retains the compression valve in

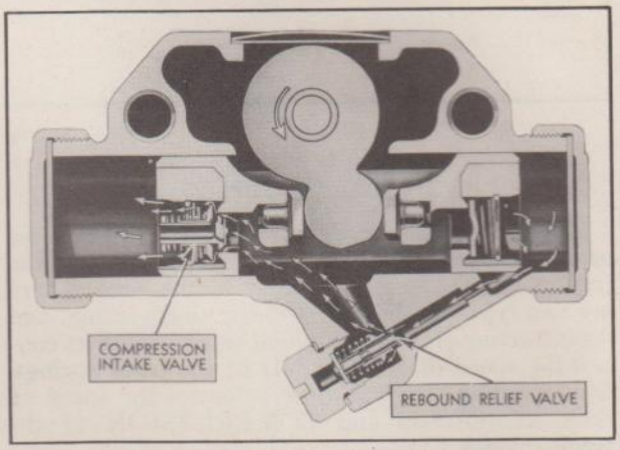


Fig. 9—Action During Spring Rebound

position the same as for the rebound valve. While the compression and rebound valves of the rear shock absorbers are identical with those of the front, the design of the rear shock absorbers differs slightly to allow for increased load distribution at the rear of the unit.

Valve markings are located on the valve caps or in the case of the compression valve on the front shock absorbers, on the end of the compression piston cover.

GENERAL SERVICE INSTRUCTIONS

Before proceeding with any repair operations on the shock absorbers, lubricate the truck springs and shackles and check the air pressure in the tires to see that it does not exceed the recommended pressure. In order to obtain a smooth ride, shackles must act freely and the tires must not be over-inflated.

After these preliminary operations have been completed, disconnect the link from the axle and pull the shock absorber arm down. If the arm comes down easily, part way, then comes to a stop and moves down slowly the rest of the way, there is not enough fluid in the shock absorber.

Clean the shock absorber thoroughly, then remove the filler plug. With fluid injector, KMO-1026, fill the shock absorber with shock insulating fluid, to a level with the filler plug hole.

NOTE—This method of filling applies to all shock absorbers.

Replace the filler plug and move the arm up and down vigorously several times to work the oil into the piston cylinder.

After the arm has been moved up and down to fill the cylinder, insert additional fluid to fill the reservoir. Allow the fluid to escape down to the bottom edge of the filler plug hole before replacing the plug. This provides the necessary air space in the shock absorber.

Leaks at the cover or at the valve plug can be corrected by installing a new cover gasket or filler plug lead gasket washer.

On double-acting shock absorbers, leaks at the end caps, valve plug, or filler plug can be eliminated by installing new end cap fibre gaskets, or valve and filler plug lead gaskets.

Packing washers on shock absorbers which have been operating with oil below the proper level, are apt to become worn, causing oil leaks around the shaft. Such leaks can only be corrected by replacing the shock absorbers.

SERVICE OPERATIONS—SINGLE-ACTING SHOCK ABSORBERS

Disassembly

Remove the shock absorber from the truck and place in an assembly fixture as shown in Fig. 10.

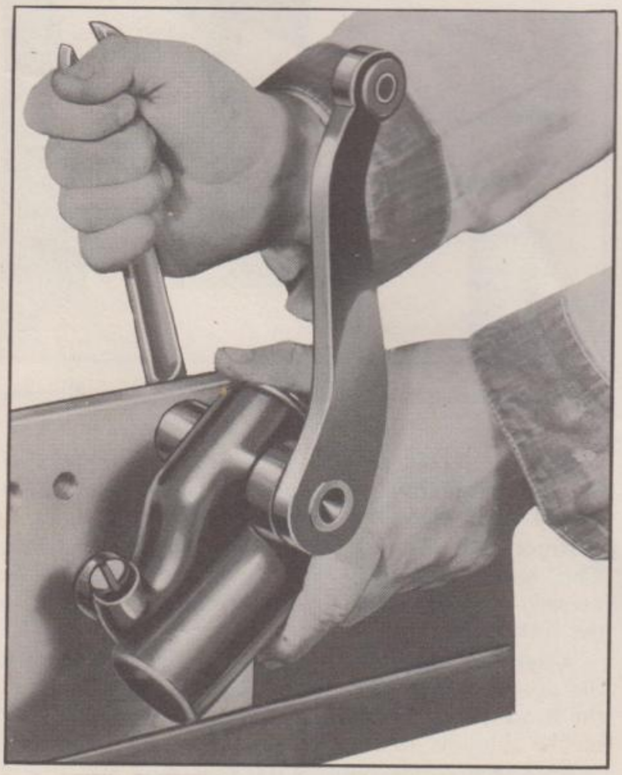


Fig. 10—Shock Absorber Holding Fixture

CAUTION—Do not clamp the shock absorber in a vise as pressure on the cylinder will bind the piston.

Remove the valve plug, relief valve, and cover from the shock absorber. Remove the piston, intake valve, and the piston spring. DO NOT attempt to remove the shock absorber arm, shaft, or cam, as these parts are assembled under 24,000 pounds pressure and are NOT to be removed.

If the bearings show excessive wear the shock absorber should be replaced.

Wash all parts in kerosene; inspect the piston, cylinder bore, valves, and springs before reassembling. Replace any worn or broken parts.

Reassembly

Assemble the intake valve onto the spring and place the piston over the spring and valve. Insert the assembly into the cylinder.

Push the piston into place and pull the shock absorber arm over until the cam holds the piston in the cylinder, then assemble the cover to the shock absorber, using a NEW gasket.

Fill the shock absorber with shock insulating fluid and install the relief valve and plug, using a NEW lead washer under the plug. Install the shock absorber on the truck.

SERVICE OPERATIONS—DOUBLE-ACTING SHOCK ABSORBERS

Reservoir Type—Disassembly

Remove the shock absorber from the truck and place it in the assembly fixture. Remove the filler plug and valve and drain the fluid from the shock absorber, working the arm back and forth until completely drained. Remove both end caps, using special serrated wrench, J-766, Fig. 11.

Remove the valve retaining snap rings and valves from both pistons. Clean and inspect all parts.

Reassembly

Install valves and snap ring, using special tool, J-896-A, Fig. 12.

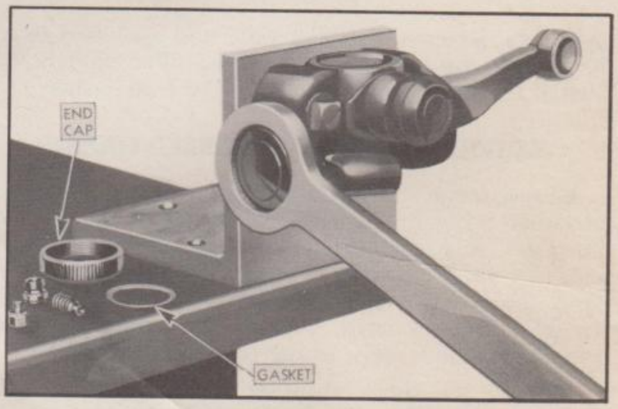


Fig. 11—Removing End Caps from Double-Acting Shock Absorbers

CAUTION—Be sure to install the inlet valve in the piston, located at the same end as the separately mounted relief valve.

The open side of the snap ring should be installed as shown in Fig. 13. If it is installed in any other position it is very difficult to remove.

After the valves have been installed, flip the valve with a screwdriver to make sure that the valve and spring are free.

Reassemble the end caps, using NEW lead gaskets under the plugs.

Fill the shock absorber with shock insulating fluid. Install the filler plug and move the arm up and down vigorously several times to insure filling the

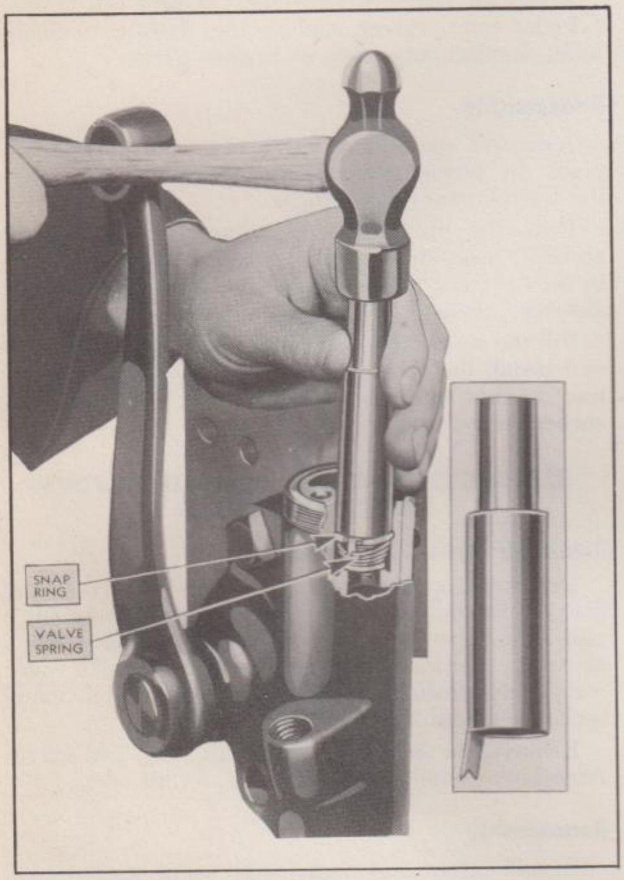


Fig. 12—Installing Valve and Snap Ring

cylinders. Remove the filler plug and add fluid to a level with the bottom edge of the filler plug hole. Install the filler plug, using a NEW lead gasket.

SERVICING SHOCK ABSORBER LINKS

Unsatisfactory shock absorber action and shock absorber noise are usually due to worn links, link bushings, and grommets. To determine if one or more of these conditions exist, disconnect the link from the axle and check for lost motion at both ends. If wear has occurred, replace the grommets and bushings at both ends, in the following manner.

Remove the shock absorber from the truck and disconnect the link. Press the worn bushings and grommet from the shock absorber arm, using the bushing remover and support, J-903, in an arbor press, as shown in Fig. 14.

Coat a new rubber grommet with liquid soap, for easy installation, and press it into the shock

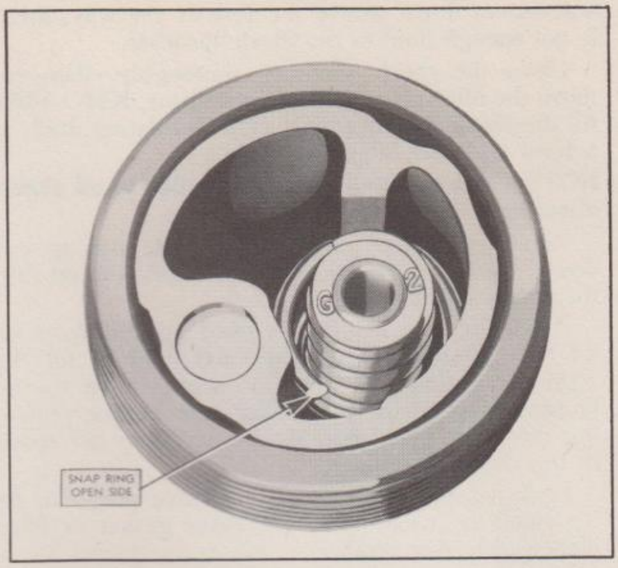


Fig. 13—Correct Position of Snap Ring

absorber arm, using tool, J-901, to insure proper seating of the grommet.

Place a new bronze bushing on the pilot of the bushing replacer and press the bushing into the grommet, Fig. 15. The replacing tool, J-899, expands the grommet and should be used for this operation to prevent damaging the grommet.

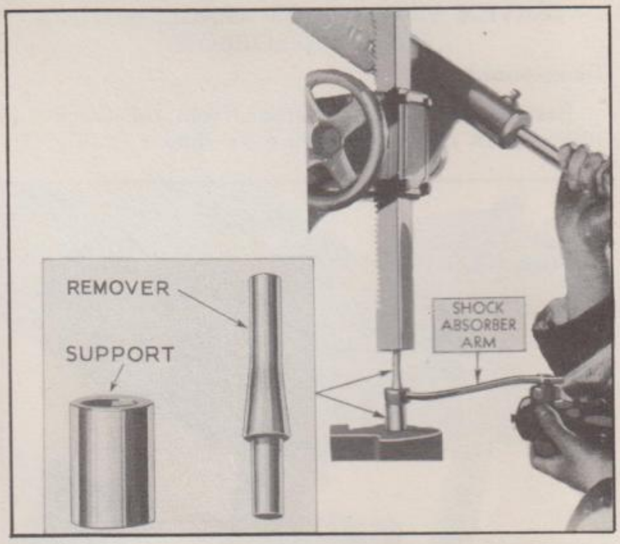


Fig. 14—Removing Bushing and Grommet from Shock Absorber Arms

The pin holes at the ends of the link are of different diameters and the knurled end of the pin should be inserted through the large hole.

Press the pin into the link, using tool, J-902. This tool limits the depth that the pin can be pressed through the link, preventing damage to the link holes.

After the pin is installed, strike the link against the press plate of the arbor press. A sharp blow on the head of the pin will properly seat the large hole on the shoulder of the pin.

Assemble cotter pins to the link pins and install the shock absorber on the truck.

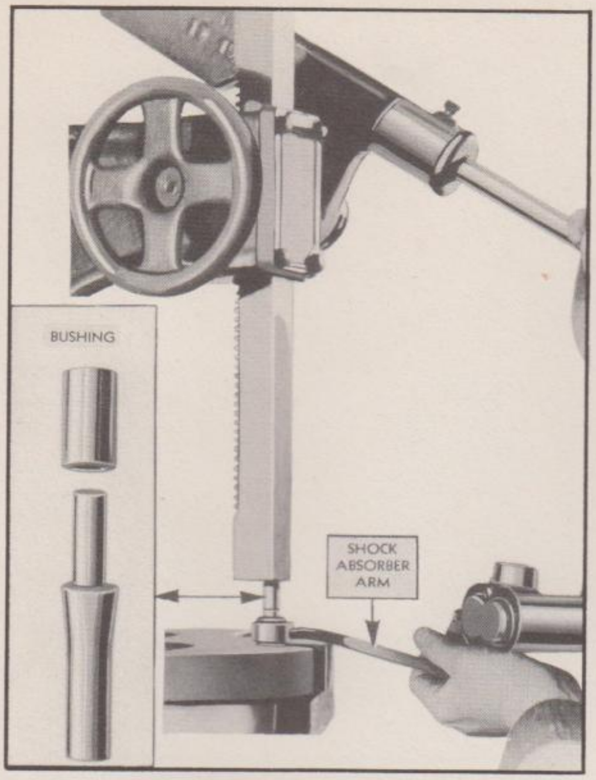


Fig. 15—Installing Bronze Bushing in the Grommet in the Shock Absorber Arm

TOOLS REQUIRED

The following tools manufactured by the Kent-Moore Organization or their equivalent are recommended for use when overhauling shock absorbers:

Tool Number	Description
KMO-1026	Fluid Gun
J-766	Knurled End Cap Wrench
J-896-A	Valve Installing Tool
J-899	Link Bushing Driver, Small
J-902	Link Pin Setting Tool
J-901	Rubber Bushing Depth Spacer
J-903	Link Bushing Remover Support

SHOCK ABSORBER SPECIFICATIONS

	½ and ¾-Ton	½-Ton	¾-Ton
	Front	Rear	Rear
Model Number	1430CA-DA	1430LA-MA	1431X-Y
Type	Reservoir	Reservoir	Reservoir
Make	Delco-Hydraulic	Delco-Hydraulic	Delco-Hydraulic
Action	Single	Single	Single
Valve Markings:			
Rebound	4CG	3CG	3CG
Compression	—	—	—

	½, All ¾ and 1½-Ton	½-Ton	All ¾-Ton	1½-Ton
	Front	Rear	Rear	Rear
Model Number	1731-C-D	1731-T-U	1732-N-P	2000-V-W
Type	Reservoir	Reservoir	Reservoir	Reservoir
Make	Delco-Hydraulic	Delco-Hydraulic	Delco-Hydraulic	Delco-Hydraulic
Action	Double	Double	Double	Double
Valve Markings:				
Rebound	2-J	2-G	1-J	1-J
Compression	G-2	G-2	G-0	G-0

Section 3

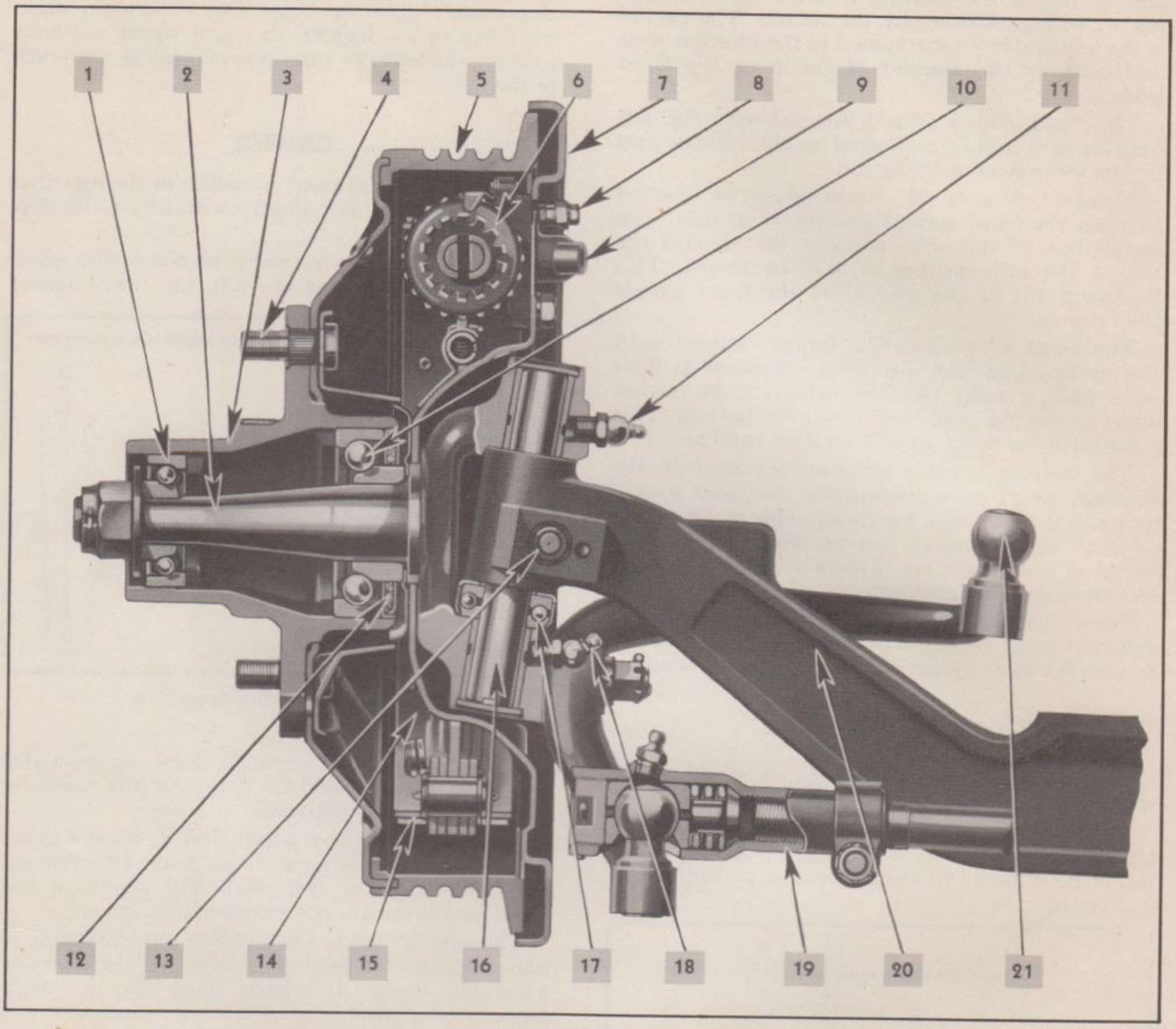


Fig. 1—Front Axle Assembly—½, ¾, 1½-Ton Trucks

1—Outer Wheel Bearing
2—Wheel Spindle
3—Wheel Hub
4—Wheel Hub Bolt
5—Brake Drum
6—Brake Wheel Cylinder
7—Brake Flange Plate
8—Brake Bleeder Valve and Screw
9—Brake Wheel Cylinder Hose Connection
10—Inner Wheel Bearing
11—Lubrication Fitting
12—Inner Bearing Oil Seal
13—Kingpin Lock Pin
14—Brake Shoe
15—Brake Lining
16—Kingpin
17—Kingpin Thrust Bearing
18—Lubrication Fitting
19—Tie Rod End
20—Axle I-Beam
21—Steering and Third Arm

FRONT AXLE

½, ¾ AND 1½-TON TRUCKS

CONSTRUCTION

The front axle used in the ½, ¾ and 1½-ton trucks is known as the reverse Elliot type. It is a steel dropforging with the spring seats forged integral with the "I" beam. The "I" beam is heat-treated for extreme toughness and is machined to very close limits.

The kingpin is recessed and held in position by a tapered pin drawn tightly into the recess by a lock washer and nut. The holes at each end of the "I" beam are bored at a slight angle to permit the kingpin to tilt inward at the top. This inward tilt is called kingpin inclination.

The steering knuckle is mounted to the front axle by means of this kingpin, and rides on a ball bearing which makes steering easy.

The brake flange plate is securely bolted to the steering knuckle and carries the brake shoes and wheel cylinders. The steering knuckle arms are also bolted to the steering knuckle and are connected with each other by the tie rod. The tie rod is the adjustable type attached to the knuckle arms and controls the amount of toe-in of the front wheels.

The third arm is forged integral with the left knuckle arm and is connected to the pitman arm by the steering connecting rod.

A caster shim or "I" beam spacer is inserted between the front springs and the front axle. The installation of this shim controls the amount the top of the axle inclines or tilts backward. This backward tilt of the axle gives the front wheels their caster.

The front wheel spindles, forged integral with the steering knuckles, are tilted downward at their outer ends, causing the front wheels to be farther apart at the top than they are at the bottom. This position of the front wheels is called camber.

The steering knuckle arms are installed on the knuckles at an angle, permitting the front wheels to toe-out when making turns. This is necessary so that when turning curves, each wheel may travel in a different arc. This toe-out on curves is known as steering geometry.

These five front end factors are built into the axle and must be in proper relation to each other to prevent steering faults and excessive tire wear.

CASTER

Caster is the amount in degrees of the backward tilt of the axle and kingpin. See Fig. 2.

A truck without caster would lack steering stability, would tend to wander over the road and would be difficult to straighten out at the end of a curve or turn.

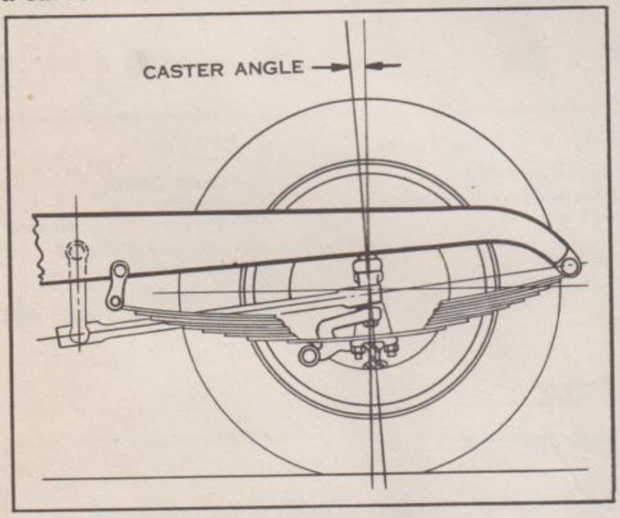


Fig. 2—Caster Angle

Unequal caster shows itself in the tendency of the truck to pull to the right or left This condition comes about through the axle having been twisted so that there is a greater amount of caster in one kingpin than in the other. The direction in which the truck will tend to pull is towards the side with less caster. Suppose that an accident has put a twist into the front axle so that the left side is zero caster, while the right side is castered backward five or six degrees, the right wheel will have a strong tendency to turn inward, pulling the truck to the left.

CAMBER

Camber is the amount in inches or degrees that the front wheels are tilted outward at the top. See Fig. 3.

When a wheel has *too much camber*, or the wheel is tilted too far out at the top, the tire is forced

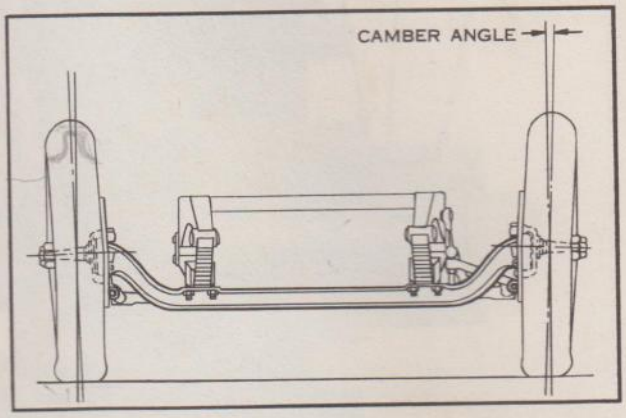


Fig. 3—Camber Angle

by road contact into a conical shape, on its under side. The result would be excessive tire wear on the outer edges of the tread.

Reverse camber, or a wheel that is tilted too far in at the top, would result in excessive tire wear on the inner edges of the tread. The center of the tread would remain comparatively unworn.

The rule is that if wheels have the maximum of allowable camber they must have the maximum of allowable toe-in. If wheels have the minimum amount of allowable camber they must have the minimum amount of allowable toe-in.

Kingpin inclination is the amount in degrees that the tops of the kingpins are inclined toward the center of the truck. See Fig. 4.

Kingpin inclination tends to keep the wheel spindles pointed outward, in line with the axle,

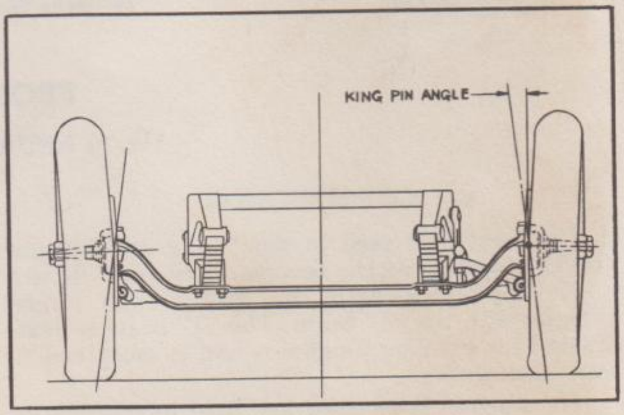


Fig. 4—Kingpin Inclination

just as caster tends to keep the wheels of an automobile pointed straight ahead. The effect is the same, since if the spindles are kept pointing out at right angles of the truck, the wheels will, as a result be kept pointing ahead. It makes the truck steer easier.

We have already referred to the close relationship between the factors that enter into the front axle assembly. It is a point that cannot be overstressed. One must keep this close interrelation constantly in mind to gain a full and true understanding of this cleverly designed mechanism. In order to correct any wrong adjustment, it is necessary to realize what effect a change in one element of the mechanism may have on the operation of the other parts.

TOE-IN

Toe-in is the amount in inches that the wheels toe-in, that is, the distance between the wheels at the front "A," is less than it is at the rear "B." See Fig. 5.

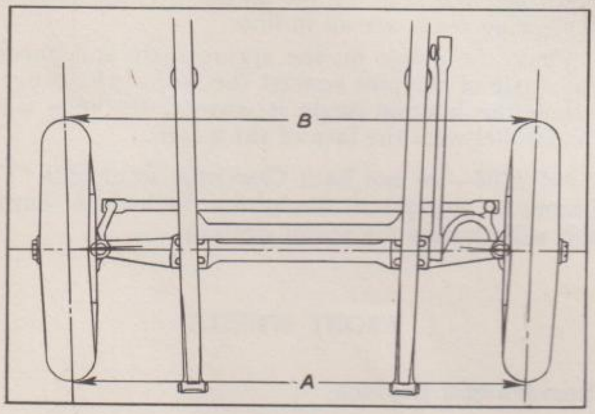


Fig. 5—Toe-In

Cambering the wheels out at the top makes it necessary to draw them in at the front.

Toe-in is a necessity growing out of camber and directly related to it. It might seem that since the wheels are headed inward toward the center of the road, while actually traveling a parallel course, there must be a constant grinding of their surfaces on the road surface. As a matter of fact, it is to avoid this tire-wearing surface grind that toe-in is employed.

Just as the purpose of camber is to give the wheel a setting so it will be in nearly a balanced free-running position as possible, so with toe-in, the purpose is to set the wheel in a position to reduce to a minimum the road friction on the tire.

STEERING GEOMETRY

Steering geometry is the mechanics of keeping the front wheels in proper relative alignment as the wheels are turned left or right. Fig. 6.

The front wheels, when the truck is making a turn, are not on the same radius line, drawn from the center around which the truck is turning, and because of this, it is necessary for the front wheels to assume a toed-out position when rounding curves. This position is governed by the angle of the steering arms.

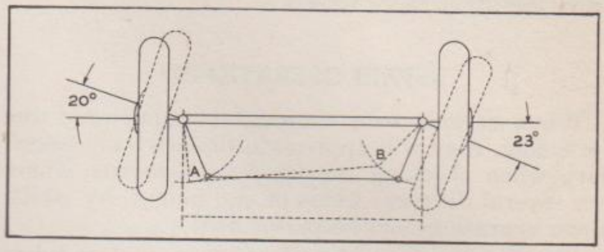


Fig. 6—Steering Geometry

The accuracy of the steering geometry is governed by the condition of the steering arms. For example, suppose a steering arm has been bent by bumping against a curb in such a way as to cause the right wheel to toe-in excessively when the car was turned around a corner. This tire would drag, causing rapid wear of that tire. The condition accounts for the cars and trucks we see once in a while that wear out one front tire twice as fast as the other, although, by usual tests, it is perfectly set for straight ahead driving.

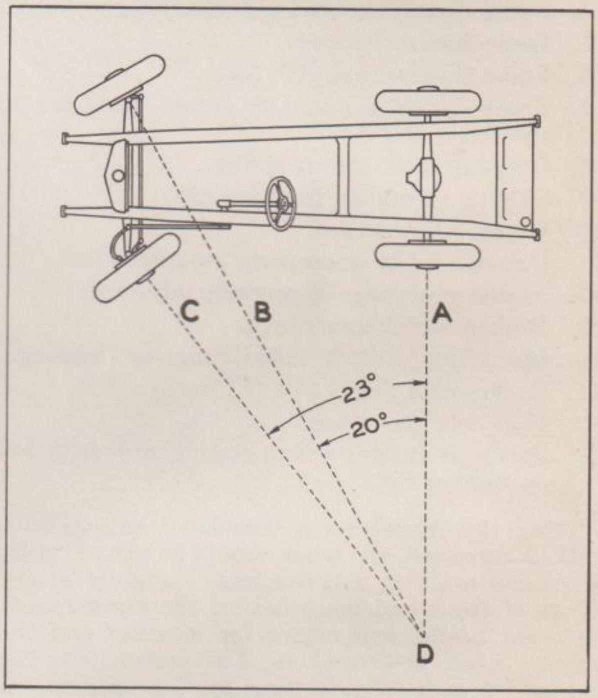


Fig. 7—Toe-Out on Curves

The wheel of any vehicle, if properly set on the curves, will be at a right angle to the radius line from the center or point around which the vehicle is turning.

Fig. 7 is a diagram of a truck making a left turn. The right wheel is set at an angle of twenty degrees —the angle being exaggerated to bring out the principles more clearly. A line "A" drawn through the rear axle and both rear wheels and a line "B" drawn through the spindle of the right wheel meet at "D," which is the center around which the car is turning. Therefore, the left or inside wheel must be at right angles to the radius line "C" which passes through the spindle and strikes the lines from the other three wheels at "D."

REPAIR OPERATIONS

When service men thoroughly understand the foregoing, they will appreciate the accuracy necessary when checking the front end system. There are several different kinds of equipment, by which these operations can be performed.

It must be remembered that no matter what kind of equipment is used, that all of these checks must be made with the truck level, with the weight of the truck on the wheels and with no pay load.

Bad steering performance may be due to some cause not connected with front wheel alignment. Therefore, check to see that none of the following conditions are present before placing the car on the front end machine:

1. Loose or improperly adjusted steering gear.
2. Steering housing loose at frame.
3. Play or excessive wear in kingpins or bushings.
4. Loose tie rod or steering connections.
5. Loose spring shackles.
6. Loose front spring "U" bolts.
7. Front spring slipped on spring seat due to sheared center bolt.
8. Over-lubricated front springs.
9. Sagging or broken front springs.
10. Under-inflated tires.
11. Unbalanced or improperly mounted tires.
12. Motor mountings improperly adjusted.
13. Broken motor mountings.
14. Motor not properly tuned, rough or "missing."
15. Brakes dragging.
16. Hub bolt nuts loose.
17. Shock absorbers not operating properly, low on fluid or dry.

After this inspection is completed and the conditions corrected, the truck should be placed on the front end machine and checked. There are several types of front end machines on the market using different mechanical means for locating and correcting front end troubles. The instructions furnished by each manufacturer for the operation of his particular machine should be followed.

STRAIGHTENING FRONT AXLE "I" BEAM

When it is necessary to straighten the front axle "I" beam out of the truck, the gauge J-1185 illustrated in Fig. 8, should be used. The gauge consists of two pins that fit in the kingpin holes. These pins are tapered so that they properly fit and center in the axle.

The first operation in straightening "I" beams, is to properly level the spring seats either on an arbor press or with a bending bar. Assemble the kingpin pins into the holes in the end of the beam. Place a cord on each pin and slide a square on the spring seat until it touches the cord. Check from the square to center of the spring tie bolt hole.

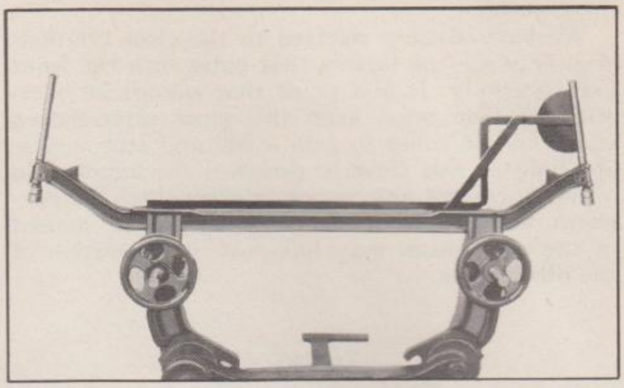


Fig. 8—Front Axle "I" Beam Gauge

When the axle is in proper alignment the kingpin holes and the hole for the spring tie bolt holes in the spring seats, are all in line.

Place the gauge on the spring seats and check the angle of the pins against the face of the gauge. When the kingpin angle is correct, the pins will be parallel with the face of the gauge.

CAUTION—Do not heat Chevrolet front axle "I" beams to straighten. Straighten them cold—heating will change the metal strength.

FRONT WHEELS

Remove and Replace

Lift the wheel from the ground with a jack under the front axle "I" beam. Remove hub cap. Pull out cotter pin locking the spindle nut. Remove the spindle nut and spindle washer. Remove front wheel.

The outer cone and balls and the inner cone are loose and may be easily removed. The inner balls may be removed by prying out the inner bearing felt retainer. If this is done, a new felt retainer assembly should be used when reassembling. The ball cups are pressed into the hubs and can be driven out by inserting a bar through the hub so that one end rests against the cup. By tapping lightly at several points around the circumference of the cup, through notches in shoulder inside of hub, it can be removed without damage. It is well to remember that the cups are very hard, therefore, extreme care should be used in removing not to crack them.

In replacing the cups, be sure that they are pressed into the hubs evenly and as far as they will go, that is, that their backs are against the shoulder in the bottom of the hole.

Before installing the separator and ball assemblies in the hub they should be packed with Marfak lubricant or its equivalent, using No. 2 in summer and No. 1 in winter.

When replacing the front wheel be sure the inner oil deflector is in its proper place between the inner bearing cone and the shoulder on the knuckle spindle. As the wheel is pushed onto the spindle it should be made certain that the inner oil deflector has passed inside of the outer oil deflector.

Be sure that the nuts which hold the wheel to the wheel hub are put on with the taper side to the wheel hub.

Adjustment

After the wheel has been replaced on the steering knuckle spindle, with the bearings and felt retainer in their proper location, install the spindle washer against the cone of the outer bearing then adjust the bearings as follows:—

1. Using an 8″ wrench (never larger) and applying a steady force with one hand, pull up the adjusting nut until the wheel is somewhat hard to turn by hand. At the same time rotate the wheel to be sure that all parts are correctly seated.
2. Back off the adjusting nut one-half castellation or one-twelfth turn.
3. If the slot in the nut and the cotter pin hole line up, insert the cotter pin. If not, back the nut off until the slot and the hole are in line and then insert the cotter pin.

NOTE—In order to provide for close bearing adjustment, the cotter pin hole is drilled in the spindle in both the vertical and horizontal plane.

With the bearing inner cup an easy-push fit in the hub and the nut a free-running fit on the spindle threads, this will give an adjustment toward the tight side, which will allow for settling and working-in of the parts in service.

Front wheel bearings should never be set up on the loose side, as such an adjustment does not bring the balls and races into proper contact.

It is well to note that the slight friction of a new snugly fitting felt retainer assembly will temporarily produce a slight drag on the wheel, but this is easily recognized and should not be confused with adjustment of the bearing. Spin the wheel, making sure that all parts are in correct position, then clinch cotter pin securely.

FRONT AXLE TIE ROD

The front axle tie rod is of the ball, seat and spring type, similar to the steering connecting rod construction.

Refer to Fig. 9, and note how parts are assembled. The parts on both ends are assembled in the same manner. First the spring seat, then the spring and ball seat, then the ball and ball seat, and then the plug. Ball seats should be assembled so that notches line up with ball neck.

To properly adjust the front axle tie rod:

1. Remove cotter pins.
2. Screw plugs in tight until springs are compressed solid and back off to first cotter pin hole.
3. Insert and clinch cotter pins.
4. Lubricate both ends of tie rod.

To remove the tie rod from the front axle, remove the cotter pin, end plug and ball seat. Screw end plug back into the end of the tie rod until the ball is in the center of the opening. A light tap with a soft hammer will remove the tie rod from the ball.

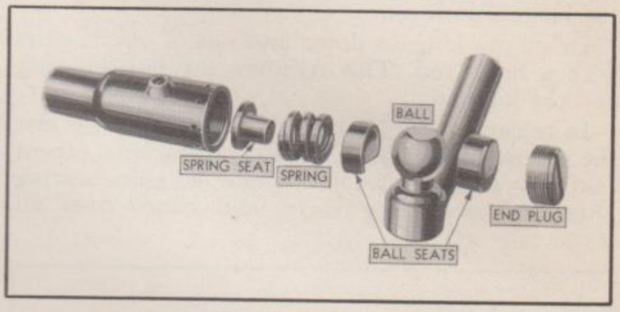


Fig. 9—Front Axle Tie Rod

Toe-In Adjustment

Front wheel toe-in can be adjusted by loosening the clamp bolts at each end of the tie rod and turning the tie rod to increase or decrease its length until a toe-in of 5/64″ to 1/8″ is secured, then tighten the clamp bolts securely.

½-TON PANEL TRUCK STABILIZER

A ride stabilizer is used at the front of the ½-Ton Panel Truck to prevent excessive side sway on turns.

To remove the stabilizer from the truck, first remove the spring "U" bolts attaching it to the top of the spring and then remove the large bolt at the upper end of the two-piece bracket which extends through the bracket, spacer, and frame side rail. The stabilizer assembly can then be removed. To remove the bracket from the bar it is necessary to remove the bolts holding the two-piece bracket together so as to relieve the pressure on the rubber bushings. The bracket and bushing can then be slipped off over the end of the bar.

Replacing the stabilizer on the truck is the reverse of the above, except that the bolts which clamp the two parts of the bracket together should not be tightened until after the stabilizer is in place on the truck, and the weight of the truck with no pay load on its wheels. This is important so that the rubber bushings will grip the bar in proper relation to the frame and axle, and prevent excessive up and down movement of one front wheel relative to the other.

CAUTION—Do not attempt to adjust the stabilizer by tightening the bolts in the bracket when there is a load in the truck. This would destroy its effectiveness.

All commercial frame front cross members are punched for the adaptation of this assembly if desired.

KINGPIN

Remove and Replace

To remove and replace the kingpin, jack up the front of the truck and remove the front wheel. Remove the nuts which attach the brake flange plate to the steering knuckle. Remove the brake flange plate. Remove the top kingpin bearing plug. This can be done with a sharp prick punch. Remove the kingpin lock pin.

Drive the kingpin down and out of the bottom with a brass rod. This removes the bottom plug and the kingpin.

In replacing the kingpin the operations are just the reverse of the above removal operations, except that you should always use new kingpin bearing plugs and new lockwashers, and clinch over all cotter pins securely.

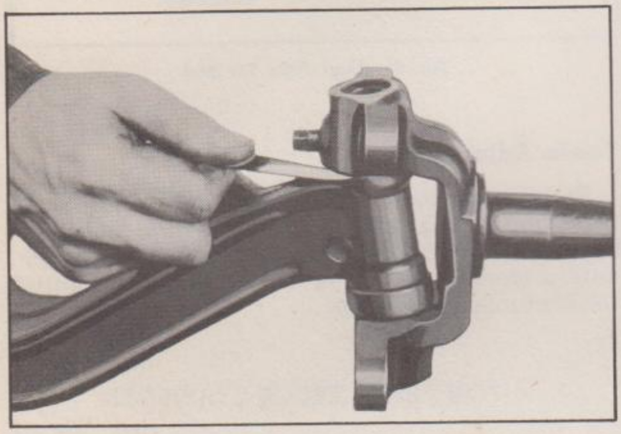


Fig. 10—Clearance Between Steering Knuckle and "I" Beam

The kingpin bearing plugs on all trucks have no "expansion" feature, and must be staked in place by peening or staking over the ends of the steering knuckle to hold the plugs securely in place.

Drive in the kingpin with a soft head hammer. After the kingpin is installed with the thrust bearing assembled at the bottom of the kingpin with the dust shield side at the top, check the clearance between the steering knuckle and axle "I" beam. See Fig. 10. If this clearance is more than .006" install a steel shim between the steering knuckle and the "I" beam at the top of the kingpin.

In installing this shim, start the kingpin in at the top of the knuckle and place the shim over the kingpin. Mount the knuckle over the end of the "I" beam and drive the kingpin part way through the "I" beam. Insert bearing between the "I" beam and the knuckle and drive the kingpin into position.

Trucks that have been operated for a period of time with loose kingpin bushings, in many cases, tend to "bell mouth" the kingpin holes in the ends of the "I" beam. As a means of making a satisfactory repair and prevent future kingpin breakage due to the kingpins being loose in the "I" beam, .010" and .020" oversize kingpins and bushings are available for 1½-Ton Trucks.

Special reamers are available on the market for reaming the holes in the "I" beam ends for oversize kingpins.

KINGPIN FLOATING BUSHINGS

½ AND ¾-TON TRUCKS

On the ½ and ¾-ton trucks the kingpin bushings are bronze bushings of the "floating" type. When replacing these bushings it is not necessary to ream them to size, as service bushings are machined to finished dimensions. However, when replacing floating bushings care should be used to make sure that the oil groove in the bushing lines up with the lubrication fitting in the steering knuckle. These bushings should be free on the kingpin, but may be somewhat snug in the steering knuckle.

After the kingpin bushings have been installed, the front end alignment should be checked to make sure that all of the factors of front end alignment are within the specified limits.

REMOVE AND INSTALL STEERING KNUCKLE BUSHINGS, 1½-TON TRUCKS

A bushing puller should be used in removing steering knuckle bushings. If a tool of this kind is not available, an ordinary coarse threaded tap of

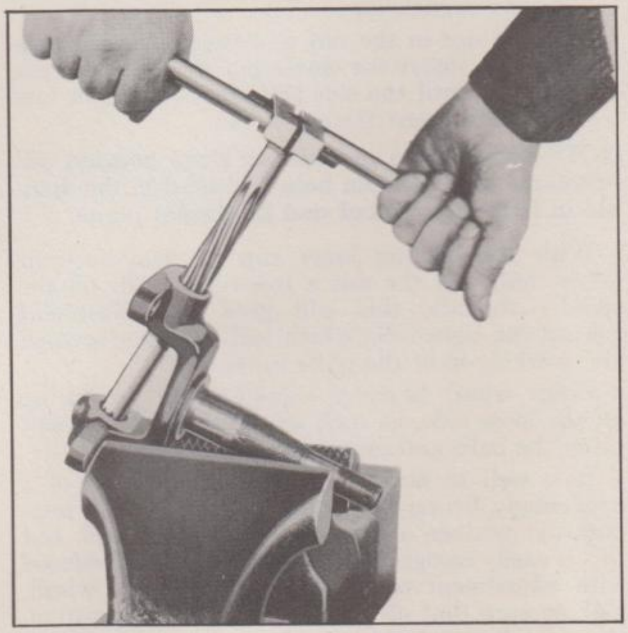


Fig. 11—Reaming Steering Knuckle Bushings

the proper size can be threaded into the bushing, and with a bar whose diameter is slightly less than the diameter of the hole and 1 inch longer than the distance through the steering knuckle, drive out the tap and bushing.

To install new bushing, round edges with a file; place in proper position with respect to knuckle to align oil holes, noting that the oil hole is nearer one end than the other. Press into place with a vise or arbor press, taking care to start bushing straight into the hole. Do not hammer on bushing or otherwise deform it.

After the bushings are in place, they should be carefully reamed to size, using a reamer long enough to reach through both bushings at once, or preferably a reamer having a long pilot bar which will just pass through the opposite bushing while one is being reamed, the cutting flutes also being long enough to finish the bushings together. Fig. 11.

NOTE—When oversize kingpins are installed, it is necessary to ream the steering knuckle bushings first with the reamer used for fitting a standard size kingpin, and then with the special oversize reamer to fit the .010" or .020" oversize kingpin, to provide .002" clearance between the kingpin and bushing.

FRONT SPRINGS

½-TON TRUCK

The front springs on the ½-ton truck are flat under load, contributing to improved steering geometry by reducing to a minimum the fore and aft movement of the front axle and attaching parts. The rear eye of the front spring is of the "Berlin" type, meaning that the horizontal center is approximately level with the main leaf center.

¾-TON TRUCK

The front springs of the ¾-ton truck are "two-stage" type, or in other words the spring rate with the truck light is considerably lower than when loaded. The advantage of this type spring is that the rebound or "throw" is much less when the truck is light and the resistance to "bumping through" is greater when the truck is loaded. The change in spring rate from the low to the higher rate takes place at or near the rated load capacity of the truck.

1½-TON TRUCK

The front spring on the 1½-ton truck is a low camber spring of high load carrying capacity. The rear eye is also of the "Berlin" type, with a second leaf which partially wraps the main eye for additional safety.

Front spring data will be found under the heading "Spring Specifications" at the end of this section.

THREADED SHACKLE

A threaded type spring shackle is used at the front of the front spring on the ½, ¾ and 1½-ton truck models.

In this design threaded bushings are pressed into the spring hanger and into the eye of the spring. Threaded pins with tapered ends are screwed into the bushings with each end projecting the same distance. The shackles are plain, heavy gauge steel stampings with tapered holes which fit tightly on the tapered ends of the pins. A draw bolt, having a square shoulder under its rounded head, engages each outer shackle. A nut at the inner side of each inner shackle serves to draw both inner and outer shackle members up snugly on the pins. See Fig. 12.

The pins are drilled from their outer ends to the center where a cross hole connects it with the threaded portion. Lubrication fittings are assembled in the end of each central hole to provide for lubrication of the threads. Cork washers are assembled at each end between the shackle and the hanger and between the shackle and the spring, to retain the lubricant in the threaded portion.

In action, this shackle, being tight on the tapered pin end, oscillates the pin in the threaded portion. This design uses all of the relatively large threaded surface for a bearing, reducing wear to a minimum and insuring long bearing life to these members.

If it becomes necessary to remove these bushings from either the spring eye or the spring hanger, Tool No. J-553 is required. Remove the draw bolt and the shackles. Screw tapered pins from the bushing and thread the end of the tool into the bushing. Turning the pull nut with a wrench will remove the bushing.

To install a new bushing, insert the threaded end of the tool through the spring eye or spring hanger and screw on a new bushing, until it is centered up with the hole in the spring eye or spring hanger. Turning on the pull nut will press this bushing into place.

Inspect the pin that was removed from the bushing and if it is worn, replace. Screw it into the

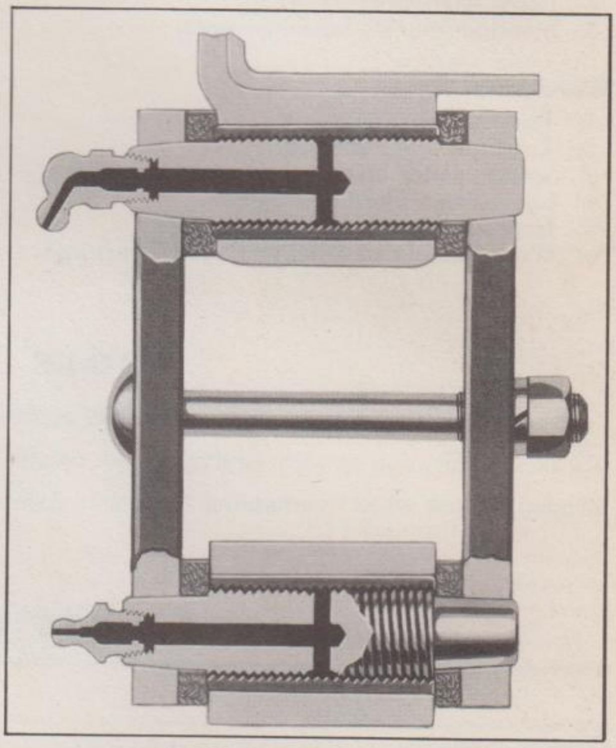


Fig. 12—Threaded Type Spring Shackle

bushing until each end projects 21/32" from the end of the bushing on either side. Place the four cork washers over the ends of the pins and assemble the shackle plates. Insert the draw bolt and draw the nut up snugly. Strike each end of each shackle a sharp blow with a hammer to insure seating of the tapers and retighten the shackle draw bolt.

Examine the lubrication fittings for damage, replacing when necessary and fill the pins completely full with chassis lubricant.

PLAIN BUSHING

A plain bushing type spring eye bolt is used at the rear of the front springs on the ½, ¾, and 1½-ton truck models. The construction and method of removing and replacing this type of eye bolt is the same as for the eye bolt in the plain bushed shackle, as described under "Rear Springs" in Section 4 of this Manual.

FRONT AXLE TROUBLES AND REMEDIES

Symptom	Probable Remedy
Hard Steering	
1. Lack of lubrication.	1. Lubricate the following points—tie rod ends, steering gear and steering connecting rod.
2. Tight steering gear.	2. Adjust steering gear according to instructions in Section 9 of this manual.
3. Improper toe-in.	3. Adjust toe-in.
4. Tires improperly inflated.	4. Inflate tires according to specifications given in Section 10 of this manual.
Front Wheel Shimmy	
1. Improper tire inflation.	1. Inflate tires to recommended pressure.
2. Wheels loose on hubs.	2. Tighten wheel hub bolts.
3. Improper toe-in.	3. Adjust toe-in.
4. Loose front wheel bearings.	4. Adjust front wheel bearings.
5. Steering knuckle bushings worn.	5. Replace bushings.
Wandering	
1. Tight steering gear.	1. Adjust steering gear.
2. Tires unevenly inflated.	2. Inflate tires.
3. Spring center bolt sheared and axle shifted.	3. Replace center bolt and relocate in spring seat.
4. Loose front wheel bearings.	4. Adjust front wheel bearings.
5. Improper toe-in.	5. Adjust toe-in.
6. Worn kingpin or steering knuckle bushings.	6. Replace worn parts.

TOOLS REQUIRED

The following tools manufactured by the Kent-Moore Organization or their equivalent are recommended for use when overhauling the Front Axle:

Tool Number	Description
J-1185	Axle Aligner Gauge
J-553	Shackle Bushing Tool
.923″	Steering Knuckle Bushing Reamer—1½-Ton Models

FRONT AXLE SPECIFICATIONS

	½ and ¾-Ton Trucks	1½-Ton Trucks
Caster—Degrees	1¾ ± ½	2¾ ± ½
Camber—Degrees	1 ± ½	1 ± ½
Kingpin Inclination—Degrees	7° 10′ ± 1°	7° 10′ ± 1°
Toe-In—Inches	5/64 to ⅛	5/64 to ⅛
Steering Geometry (Toe-Out on Turns);		
Outside Wheel—Degrees	20	20
Inside Wheel—Degrees	23 ± 2	23 ± 2

KINGPIN DIAMETER

½ and ¾-Ton Trucks	.866″ to .8665″
1½-Ton Trucks	.921″ to .9214″

THRUST BEARING (KINGPIN)

½ and ¾-Ton Trucks	Matthews Mfg. Co., No. 8261-TA4
1½-Ton Trucks	Matthews Mfg. Co., No. 7801-TA2

WHEEL BEARINGS

½ and ¾-Ton Inner	
Inner Race	ND-909502
Separator and Balls	ND-909702
Outer Race	ND-909602
½ and ¾-Ton Outer	
Inner Race	ND-909501
Separator and Balls	ND-909701
Outer Race	ND-909601
1½-Ton Inner	
Inner Race	ND-909526
Separator and Balls	ND-909726
Outer Race	ND-909626
1½-Ton Outer	
Inner Race	ND-909525
Separator and Balls	ND-909725
Outer Race	ND-909625

SPRING SPECIFICATIONS

	½-Ton	¾-Ton	1½-Ton 134½ & 160"
Length	36"	36"	40"
Leaf Width	1¾"	1¾"	2"
Stage	Single	Two	Single
Rate—Lbs. per Inch	260	(275) (365)	475
No. of Leaves	7	8	7
Leaf Thickness			
Nos. 1, 2	.237	.237	.297
No. 3	.237	.214	.297
Nos. 4, 5	.194	.214	.297
Nos. 6, 7	.194	.262	.297
No. 8	—	.262	—
No. 9	—	—	—
Total Thickness	1.487	1.902	2.037
Spring Clip Type			
No. 1	Clinch	Clinch	Bolt
No. 2	—	—	—
No. 3	Clinch	Bolt	Bolt
No. 4	Clinch	Clinch	Bolt