MOTOR TRUCK INFORMATION

Packard

MOTOR TRUCKS

SPECIFICATIONS PACKARD MODEL E TRUCKS

SIZE—BC, DE and FG

Number 5. *Issued July, 1920*

Property of

Packard Motor Car Company

Detroit, Michigan

Condensed Specifications
Model E, Size "BC" Chassis

Axles — Issued July, 1920

- Front ..... 2¼" x 3⅛"
- Rear (Driving Axle minimum diameter) ..... 1 11/16"

Bearings—Motor

- Connecting Rod Bearings—measured on crankshaft 2⅛" x 2¼"
- Total projected area in square in. 19.125
- Crank Shaft Bearings (4)—measured on crank shaft
  - Front ..... 2⅛" x 2 11/16"
  - Front Center ..... 2⅛" x 2⅝"
  - Rear Center ..... 2⅛" x 2⅝"
  - Rear ..... 2⅛" x 3⅛"
  - Total projected area in square in 24.3
- Cam Shaft Bearings (4)—measured on cam shaft
  - Front ..... 2" x 2 11/16"
  - Front and Rear Center ..... 2" x 1¼"
  - Rear ..... 1½" x 1½"
  - Projected area in square in. 12.8
- Piston Pin Bearings ..... 1⅛" x 2"
  - Total projected area in square in. 9
- Crank Shaft—Diameter ..... 2½"
- Frame—Depth of channel ..... 6"
  - Width of flange ..... 1 13/16"
  - Weight of channel per foot ..... 8 lbs.

Gear Ratios and Nominal Speeds

	Standard with 15 M. P. H. Axle Gears				
	High	3rd	2nd	Low	Rev.
Gear Ratio	7.25	10.76	18.65	33.3	43.7
Miles per Hour	15.0	9.9	5.8	3.2	2.5

Also a special gear ratio can be furnished at an extra charge when truck is to be used for heavy service.

	Special with 13.5 M. P. H. Axle Gears				
	High	3rd	2nd	Low	Rev.
Gear Ratio	8.00	11.8	20.57	36.7	48.2
Miles per Hour	13.5	9.1	5.2	2.9	2.2

NOTE—Figures indicate number of revolutions of motor to one revolution of rear wheels.

Reservoir Capacities—in Gallons

- Gasoline 16½
- Water 6¾
- Oil 2

Motor—Bore 4 1/16". Stroke 5½"

Horse Power—S. A. E. Rating 23.10

Road Clearance—Center of rear axle to ground ..... 9¾"

Springs—Front ..... 2½" x 41"

- Rear ..... 2½" x 46"
- Bolts ..... ¾"
- All Clips ..... ⅝"

Tires—Front—Single (solid) Std. ..... 36" x 3½"

Rear—Single (solid) Std. ..... 36" x 6"

When truck is to be used for heavy service 36x4 single front tires and 36x7 single rear tires must be specified. These will be furnished at an extra charge.

Tread—Center to Center of Front Wheels ..... 58½"

Center to Center of Rear Wheels ..... 55½"

Turning Radius—Without reversing

- 10'-9" ..... 24'
- 12'-0" ..... 25'
- 14'-0" ..... 27'

Wheels (Wood)—Front, Number of Spokes 12

Rear, Number of Spokes 12

Wheel Base

- Short ..... 10'-9"
- Standard ..... 12'-0"
- Long ..... 14'-0"

Size "BC" Chassis Dimensions and Specifications

Wheel Base	Lengths: Back of Driver: Standard	Lengths: Back of Driver: Min.	Lengths: Back of Driver: Max.	Lengths: Overall: Standard	Lengths: Overall: Min.	Lengths: Overall: Max.	Widths: Chassis Overall	Widths: Frame Overall	Heights: Not Loaded: Overall	Heights: Not Loaded: Rear
10' 9"	9-1	7-10	9-1	16-5	15-2	16-5	6-2⅜	2-7¼	5-8½	2-9
12' 0"	11-0	9-1	12-6	18-4	16-5	19-10				
14' 0"	14-0	12-6	16-0	21-4	19-10	23-4				

Estimated Weights
Includes Tools, Full Supply Gasoline, Oil and Water

Different Tire Equipment Affects Total Weights

Wheel Base 10'9" / Frame B.O.D. 9'1"	Total Weight lbs.	Wt. on Front Wheels lbs.	Wt. on Rear Wheels lbs.
Chassis only	5050	2640	2410
With max. body	6550	2790	3760
With max. body and 2-ton load	10550	3190	7360

Wheel Base 12'0" / Frame B.O.D. 11'0"	Total Weight lbs.	Wt. on Front Wheels lbs.	Wt. on Rear Wheels lbs.
Chassis only	5100	2640	2460
With max. body	6600	2790	3810
With max. body and 2-ton load	10600	3190	7410

Wheel Base 14'0" / Frame B.O.D. 14'0"	Total Weight lbs.	Wt. on Front Wheels lbs.	Wt. on Rear Wheels lbs.
Chassis only	5175	2640	2535
With max. body	6675	2790	3885
With max. body and 2-ton load	10675	3190	7485

NOTE: If equipped with Packard-Bijur electric starting and lighting equipment, add 150 lbs.

Truck and Standard Body Dimensions

Wheel Base		Lengths: Standard	Lengths: Min.	Lengths: Max.	Widths: Chassis Overall	Widths: Body Overall	Widths: Body Clear	Heights (not loaded): Truck Overall	Heights (not loaded): With Cab	Body Floor at Rear
10-9	Body Clear	8-8½	7-5½	8-8½	6-2⅜	5-7⅛	5-0	5-9	8-2	3-9
	Back of Seat	9-1	7-10	9-1						
	Truck Overall	16-7½	15-4½	16-7½						
12-0	Body Clear	10-7½	8-8½	12-1½						
	Back of Seat	11-0	9-1	12-6						
	Truck Overall	18-6½	16-7½	20-0½						
14-0	Body Clear	13-7½	12-1½	15-7½						
	Back of Seat	14-0	12-6	16-0						
	Truck Overall	21-6½	20-0½	23-6½						

Condensed Specifications
Model E, Size "DE" Chassis

Issued July, 1920

Axles
- Front ..... 2½" x 3½"
- Rear (Driving Axle, minimum diameter) ..... 1¾"

Bearings—(Motor)
- Connecting Rod Bearings measured on crank shaft. 2¼" x 2½"
- Total projected area in square in 22.5
- Crank Shaft Bearings (4), measured on crank shaft
  - Front ..... 2¼" x 3"
  - Front Center ..... 2¼" x 3 5/16"
  - Rear Center ..... 2¼" x 3 5/16"
  - Rear ..... 2¼" x 3½"
  - Total projected area in square in 29
- Cam Shaft Bearings (4), measured on cam shaft
  - Front ..... 2 1/16" x 2 11/16"
  - Front and Rear Center ..... 2 1/16" x 1½"
  - Rear ..... 1½" x 1 5/8"
  - Total projected area in square in 16.55
- Piston Pin Bearings ..... 1¼" x 2 1/16"
  - Total projected area in square in 11.56

Crank Shaft—Diameter ..... 2¼"

Frame—Depth of channel ..... 6"
- Width of flange ..... 2 11/16"
- Weight of channel per foot ..... 13 lbs.

Gear Ratios and Nominal Speeds

	Standard with 12 M. P. H. Axle Gears				
	High	3rd	2nd	Low	Rev.
Gear Ratio	9.0	13.36	23.1	41.3	54.2
Miles per Hour	12.0	8.1	4.7	2.0	2.0

NOTE—Figures indicate number of revolutions of motor to one revolution of rear wheels.

Reservoir Capacities—in Gallons
- Gasoline 21
- Water 9¼
- Oil 3¼

Motor—Bore 4½". Stroke 5½"

Horse Power—S. A. E. Rating 32.4

Road Clearance—Center of rear axle to ground ..... 9¾"

Springs—Front ..... 3" x 42⅜" Clips ..... ⅝"
- Rear ..... 3" x 46" Clips ..... ⅞"
- Bolts ..... ⅞"

Tires—Front—Single (solid) Std. ..... 36" x 5"
- Rear—Dual (solid) Std. ..... 36" x 5"

When truck is used for heavy service 36x6 DUAL rear tires must be specified. These will be furnished at an extra charge.

Tread—Center to Center of Front Wheels ..... 69⅞"
- Center to Center of Rear Wheels ..... 66"
- Centre to Center Outside Rear Tires (Variable) 71½

Turning Radius—Without reversing (varies with tire equipment)
- 13' Wheelbase ..... 28'
- 15' 6" Wheelbase ..... 33'

*Wheels—Wood or Metal
- Wood—Front—No. of spokes 12
  - Rear—No. of spokes 14
- Metal—Front—No. of spokes 8
  - Rear—No. of spokes 8

Wheelbase—Standard ..... 13'-0"
- Long ..... 15'-6"

*Manufacturer's option.

Size "DE" Chassis Dimensions and Specifications

Wheel Base	Lengths: Back of Driver: Standard	Lengths: Back of Driver: Min.	Lengths: Back of Driver: Max.	Lengths: Overall: Standard	Lengths: Overall: Min.	Lengths: Overall: Max.	Widths: Chassis Overall	Widths: Frame Overall	Heights: Not Loaded: Overall	Heights: Not Loaded: Rear
13' 0"	12-0	10-0	13-6	19-8	17-8	21-2	7-4	3-3	5-10¾	2-10
15' 6"	16-0	13-6	18-6	23-8	21-2	26-2				

Estimated Weights
Includes Tools, Full Supply Gasoline, Oil and Water

Different Tire Equipment Affects Total Weights.

Wheel Base / Frame B. O. D.	Total Weight lbs.	Weight on Front Wheels lbs.	Weight on Rear Wheels lbs.	Wheel Base 15'0" / Frame B. O. D. 16'0"	Total Weight lbs.	Weight on Front Wheels lbs.	Weight on Rear Wheels lbs.
13'0" / 12'0"							
Chassis only	7000	3350	3650	Chassis only	7110	3350	3760
With maximum body	9000	3550	5460	With maximum body	9110	3550	5560
With max. body and 3-ton load	15000	4150	10850	With max. body and 3-ton load	15110	4150	10960

NOTE: If equipped with Packard-Bijur electrical starting and lighting equipment, add 130 lbs.

Truck and Standard Body Dimensions

Wheel Base		Lengths: Standard	Lengths: Min.	Lengths: Max.	Widths: Chassis Overall	Widths: Body Overall	Widths: Body Clear	Heights (not loaded): Truck Overall	Heights (not loaded): With Cab	Body Floor at Rear
13-0	Body Clear	11- 7¼	9- 7½	13-1½	7-4	6-7⅝	6-0	5-10¼	8-3	3-9¼
	Back of Seat	12- 0	10- 0	13-6						
	Truck Overall	19-10½	17-10½	21-4½						
15-6	Body Clear	15- 7½	13- 1½	18-1½						
	Back of Seat	16- 0	13- 6	18-6						
	Truck Overall	23-10½	21- 4½	26-4½						

Condensed Specifications
Model E, Size "FG" Chassis

Issued July, 1920

Axles
- Front ..... 2½" x 4"
- Rear (Driving Axle, minimum diameter) ..... 2⅜"

Bearings—Motor (Measured in each case on journal)
- Connecting rod bearings ..... 2¼" x 2½"
- Total projected area, square inches 22.5
- Crank shaft bearings (4)
  - Front ..... 2¼" x 3"
  - Front, center ..... 2¼" x 3⅛"
  - Rear, center ..... 2¼" x 3⅛"
  - Rear ..... 2¼" x 3¾"
  - Total projected area, square inches 29
- Cam Shaft Bearings (4)
  - Front ..... 2 1/16" x 2 1/16"
  - Front and rear center ..... 2 1/16" x 1½"
  - Rear ..... 1½" x 1⅜"
  - Total projected area, square inches 16.55
- Piston pin bearings ..... 1⅛" x 2 11/16"
  - Total projected area, square inches 12.1

Crank Shaft—Diameter ..... 2¼"

Frame—Depth of channel ..... 7"
- Width of flange ..... 3"
- Weight of channel, per foot ..... 15.6 lbs.

Gear Ratios and Nominal Speeds

	Standard 11-Mile Axle				
	High	3rd	2nd	Low	Rev.
Gear Ratio	10.66	15.84	27.4	49.0	64.3
Miles per Hour	11.0	7.4	4.3	2.4	1.8

NOTE—Figures indicate number of revolutions of motor to one revolution of rear wheels.

Reservoir Capacities—in Gallons
- Gasoline 27
- Water 9¾
- Oil 3¼

Motor—Bore 5." Stroke 5½"

Horse Power—S. A. E. Rating 40

Road Clearance—Center of rear axle to ground ..... 9½"

Springs—Front ..... 42⅜" x 3" Clips ..... ¾"
Rear ..... 54" x 3½" Clips ..... 1"
Bolts—Front ..... ⅞" Rear ..... 1"

Tires—Front—Single (solid) Std. ..... 36" x 6"
Rear—Dual (solid) Std. ..... 40" x 6"
When truck is used for heavy service 40x7 dual tires must be specified. These will be furnished at an extra charge.

Tread—Center to center of front wheels ..... 60⅞"
Center to center rear wheels ..... 69½"
Center to center of outside rear tires (variable) ..... 76"

Turning radius without reversing (varies with tire equipment)
- 13' 0" Wheelbase ..... 31'
- 15' 6" Wheelbase ..... 36'

•Wheels—Wood or Metal

Wheelbase—Standard ..... 13' 0"
Long ..... 15' 6"

•Manufacturer's option.

Size "FG" Chassis Dimensions and Specifications

Wheel Base	Lengths: Back of Driver: Standard	Lengths: Back of Driver: Min.	Lengths: Back of Driver: Max.	Lengths: Overall: Standard	Lengths: Overall: Min.	Lengths: Overall: Max.	Widths: Chassis Overall	Widths: Frame Overall	Heights: Not Loaded Overall	Heights: Not Loaded Rear
13' 0"	12-0	10-3	13-6	19-8	17-11	21-2	7-4⅜	8-3	6-1¼	3-1¾
15' 6"	16-0	13-6	18-6	22-8	21- 2	26-2				

Estimated Weights
Includes Tools. Full Supply Gasoline, Oil and Water

Different Tire Equipment Affects Total Weights.

Wheel Base 13'0" Frame B. O. D. 12'0"	Total Weight lbs.	Weight on Front Wheels lbs.	Weight on Rear Wheels lbs.
Chassis only	8650	3700	4950
With maximum body	11150	3950	7200
With max. body and 6-ton load	21150	4950	16200

Wheel Base 15'6" Frame B. O.D. 16'0"	Total Weight lbs.	Weight on Front Wheels lbs.	Weight on Rear Wheels lbs.
Chassis only	8780	3700	5080
With maximum body	11280	3950	7330
With max. body and 6-ton load	21280	4950	16330

Note: If equipped with Packard-Bijur electrical starting and lighting equipment add 150 lbs.

Truck and Standard Body Dimensions

Wheel Base		Lengths: Standard	Lengths: Min.	Lengths: Max.	Widths: Chassis Overall	Widths: Body Overall	Widths: Body Clear	Heights (not loaded): Truck Overall	Heights (not loaded): With Cab	Body Floor at Rear
13-0	Body Clear	11- 7½	9-10½	13-1½	7-4⅜	7-4½	6-9	6-2	8-7	4-2
	Back of Seat	12- 0	10- 3	13-6						
	Truck Overall	19-10½	18- 1½	21-4½						
15-6	Body Clear	15- 7½	13- 1½	18-1½						
	Back of Seat	16- 0	13- 6	18-6						
	Truck Overall	23-10½	21- 4½	26-4½						

Details of Construction Packard Model "E" Trucks

Size—BC, DE and FG

Axles

Front—Drop forged, I-beam of large cross section. Steering knuckles are of the inverted yoke type. Provision is made to prevent water from entering the wheel bearings. Made in the Packard factory.

Rear—A built-up structure of our own make. The weight of the truck is carried on heavy steel tubes which are forced by hydraulic pressure into a strong and rigid central cast steel housing. The worm, which is above the worm wheel, together with the worm wheel and differential, is mounted as a unit in a cast steel carrier which is bolted in place in the center housing of the axle. This construction permits of quick and easy assembling or disassembling of the worm, worm wheel and differential, which may be removed without taking the axle from under the truck.*

The worm is of steel, hardened and machine-ground after hardening. The worm wheel is of high-grade alloy bronze. Spur gears of the differential are of drop forged high-grade alloy steel. The differential ends of the axles contain ten integral splines, closely fitted into keyways in the differential gear hubs. Forged integral with the exterior ends of the axle shafts are large flanges with four tongues. These tongues engage corresponding slots in steel plates which are keyed and bolted to flanges on the outer ends of the wheel hubs in order to obtain a flexible connection between the axle shafts and the wheels.*

This is exclusively Packard.

The axle drive shafts transmit torque only, and do not carry any of the load, the roller bearings for the wheels being mounted on the steel load carrying tubes. Both the worm amd worm wheel are mounted on annular ball bearings, with large separate bearings to take end thrust loads.*

The lower part of the axle housing forms an oil reservoir, with an oil level and filler plug, which automatically prevents over-filling. The oil is carried by the worm wheel to the worm, which throws it by centrifugal force into an oil trough. From the oil trough it is carried to the worm thrust bearing and returned by gravity to the oil reservoir. This method furnishes constant

*Important Feature

lubrication for the worm, worm wheel and all their bearings.* A forged steel torque arm is hinged to the front of the axle housing by a heavy vertical pin, bearing on renewable steel bushings. This pin is a taper fit in the axle housing, eliminating any possibility of wear at this point, which takes place when a straight-fitting pin is used.* This is an exclusive Packard idea. The front end of the torque arm is supported by a tubular cross member.

Tubular radius rods of sturdy construction remove all driving strains from the springs. These rods are provided with renewable bushings at each end, and provision is made for lubrication.

Bearings (Motor)

Connecting Rod—Bronze backings, babbitt lined, giving ample bearing surface.

Crank Shaft—Bronze backings, babbitt lined, of large size. Four bearings are used, instead of the customary three, in order to obtain longer life and increased rigidity.*

Piston Pin—Hard bronze bushings.

Cam Shaft—Hard bronze bearings of large diameter.

Brakes

Service brake consists of two contracting shoes, lined with wire-woven asbestos, operating on a single drum at the rear of the transmission. The mounting is such that braking strains are taken on a frame cross member instead of on the transmission case.* Provision is made for quick and easy adjustment when necessary. This brake is applied by a foot pedal and is powerful enough to lock the rear wheels with a full load under normal conditions.

Two emergency brakes, consisting of internal expanding segments, lined with wire-woven asbestos, act on pressed steel drums on the rear wheels and are operated by a hand lever located at the left of the driver. Cams operating the emergency brakes give a constant leverage, lessening the necessity of adjustments due to wear on the brake lining, and insuring a maximum brake efficiency at all times. Adjustments are made by means of two wing nuts on the outside connecting rods.

*Important Feature

Bushings

All wearing parts are fitted with renewable bushings of the type best suited to the purpose. For example, the steering knuckle pins are fitted with bronze collar bushings, and the hand brake cam shafts are fitted with plain bronze bushings.

Cam Shaft

Steel forging, of large diameter, with integrally-forged cams. All cams are hardened and accurately ground. Shaft is drilled and acts as a main oil manifold for the oiling system. Large diameter cam shaft bearings permit withdrawal of the shaft without disturbing the bearing bushings.

Carburetor

Located on the left side of the motor. Exclusively Packard in design and manufacture. Automatic and requires minimum attention. The design combines a float feed, a large cylindrical mixing chamber directly above the spray nozzle, and automatic mixture regulation for all motor speeds. The carburetor is fitted with a spring controlled automatic auxiliary air valve. The adjustment of the air valve springs can be altered by a hand lever on the centralized control to give a proper mixture for starting or for varying atmospheric conditions. Primary and auxiliary air intakes are both equipped with shut-offs to facilitate starting in cold weather.*

Housing around the auxiliary air intake protects the air valve from mud and water.

The main intake of the carburetor draws heated air from the exhaust manifold and the entire intake passage from spray plug to valve chambers is surrounded by hot water. This, in conjunction with the high mounting of the carburetor, insures proper carburetion of low grades of gasoline and maximum fuel economy.* The throttle valve is actuated by a hand lever on the centralized control, or by an accelerator pedal in the floor board, which, for the sake of convenient operation, is at the right of the foot brake pedal.

Thermostat

*Placed in water line so that until cylinder block becomes warmed up, pump circulates cooling water from cylinder block through a by-pass and back into the block. In other words, the radiator

*Important Feature

is partially or wholly cut out of the system until the water in the cylinder rises in temperature to a point where the added cooling effect of the radiator is required. The thermostat regulates the proportion of cool water drawn from the radiator according to the temperature of the water in the cylinder block, so that a very constant motor temperature is secured.*

Cooling System

Positive water circulation is insured by a gear-driven centrifugal pump on the left side of the motor.

The cylinder water outlet header is a single casting, requiring one flexible connection only. A spreader is fitted in the top tank of the radiator to insure equal distribution of water over the entire width of radiator. Air is drawn through radiator by a large diameter fan with a rim outside blades. The fan is driven by a "V" belt with an eccentric for quick adjustment of belt tension. The sides of the hood are louvred, permitting a free outlet of heated air from the radiator and motor.

Clutch

Packard dry plate, inclosed in a separate housing, which is rigidly bolted to a flange of the crank case at the rear of the fly-wheel housing. This construction insures perfect alignment of clutch and crank shaft, and gives protection from dirt and water. Clutch unit easily removable, if necessary, without disturbing steering gear or motor.*

The driving plates are lined with special friction material and the driven plates are of steel, hardened and ground. No adjustment is necessary, as a heavy clutch spring automatically compensates for wear. Not running in oil, the clutch is not affected by atmospheric conditions and requires a minimum amount of attention; it engages gradually but positively, and without grabbing.

A disc faced with special friction material, mounted at the rear of the clutch, coming in contact with a metal disc when the clutch is disengaged, acts as a brake to lessen the spinning of the propeller shaft, thus assisting in quiet and rapid gear shifting.

The Packard clutch construction is an assurance of maximum service.

*Important Feature

Connecting Rods

I-beam section, drop forged and heat treated.

Control

The controls for motor, carburetor and electrical system are centralized on a control board. The control board is located independently and in front of the steering column below the steering wheel, where the controls can be easily reached by the operator.

On the top of the control board are three levers working in saw tooth sectors which control the carburetor, the spark timing, and the throttle. On the left side of the control board is mounted the spark coil.

When electric lighting and starting equipment is attached, the light switches are mounted on the right side of the board and a button on the top of the board closes the main and auxiliary air intakes to facilitate starting in cold weather.

Brake lever at left, and selective gear shifting lever at right of driver.

Motor Cylinder Compression

Sixty to sixty-five pounds per square inch, which has been found to give the best general results in fuel economy, carburetion and flexibility.

Crank Shaft

Packard design. Drop forged of large diameter; high carbon steel carefully heat treated. Mounted in four bearings* of liberal dimensions, insuring absolute freedom from distortion.* Bearings are mounted in upper section of crank case.

Crank Case

Made in the Packard factory. Two-part crank case with crank shaft main bearings carried in upper section. Cast webs on upper section carry motor accessories and furnish protection from mud and water.

The lower section of the crank case is an oil reservoir of large capacity. This section may be removed without disturbing the crank shaft bearings, front cover or clutch.*

A separate housing bolted to a flange on the crank case, back of the fly-wheel housing, forms the clutch housing and supports the clutch shaft rear bearings and clutch shifter bearings.

*Important Feature

The crank case is designed to allow the attachment of the Packard-Bijur starting and lighting units.

Electric Starting and Lighting Equipment

Special Equipment

Packard-Bijur 6-volt system, designed especially to be used in connection with Packard motor.

Starting Motor—Located on left side of engine just in front of the fly-wheel housing and operated by heel button. Has ample power to crank motor fast enough under average conditions to start on magneto.

Generator—A direct-driven generator, located forward on the left side of motor, charges the battery. The current output of the generator is controlled by means of the third brush method of regulation. This method of regulation is positive and needs but little attention. Generator brushes are accessible, and with proper care should last indefinitely. A simplified two-wire system is used.

Ammeter—Located on dash and serves as an indicator to show that the generator is operating properly.

Wiring—Arranged in a unit assembly, fully protected by tubes and conduits. Taper connections at terminals on battery, starting motor and switch. Fuse box for lighting circuits mounted on dash. Visible fuses in glass tubes.

Battery—Three 2-volt cells connected in series having a capacity of approximately 120 ampere hours, at a pressure of six volts. Heavy copper reinforced connections to starting motor without fuses in the line.

Cut-out Relay—Located in a box on top of generator.

Starting Switch—Located on bracket on frame at left side, and engages automatically on pressure of heel button.

Heel Button—Located in floor board back of steering column and used for starting motor. Can be operated by either foot.

Dash Lamps—4 C. P., 7-volt; Gauge Lamp—4 C. P., 7-volt; Tail Light—2 C. P., 7-volt.

Either generator or storage battery will carry all lights in emergencies.

Frame

Of rolled steel, channel section with channel steel, pressed steel, and tubular cross members at suitable intervals. Rear joints secured by angle sections and reinforced by gusset plates. Frame assembly made in Packard factory.

Gasoline System

Gasoline is carried in a steel cylindrical tank under the driver's seat. Pressure is maintained by an automatic 2-cycle pump driven by the motor, to give an adequate supply of gasoline to the carburetor on the steepest grades. Air is taken from under the hood, insuring clean air free from oil. A hand pressure pump is attached to the dash for initial pressure after filling tank.

Governor

Exclusive Packard design and manufacture. Motor speed is controlled by an automatic centrifugal governor, mounted on the front end of the water pump shaft. Governor motion is transmitted by a connecting rod passing through the hollow water pump shaft and thence by means of an enclosed linkage to the carburetor, where it actuates the governor throttle, which is independent of the main throttle. The entire mechanism is enclosed and sealed to prevent tampering by unauthorized persons.

Hood

Made of sheet steel and equipped with heavy all-steel hinges. No riveted mouldings are used, all edges being rolled over a heavy wire.

Ignition

High tension magneto. The high-tension circuit and spark plugs are common to both battery and magneto ignition.

All secondary wires from the magneto lead directly to the spark plugs through a T-shaped tubular conduit located on the right side of the motor. All primary wires are inclosed in metal conduits.

Ignition switch is conveniently located on the centralized control. The timing of ignition is controlled by a hand lever also located on the centralized control. A 35-ampere hour 6-volt ignition battery is rigidly mounted in an accessible location at the left of the driver's seat.

The magneto is driven by inclosed gears. A quick detachable coupling and the magneto support construction allow the magneto to be easily removed. The magneto and carburetor are located on the opposite sides of the motor, minimizing fire risk.

Lubrication (Motor)

Embodies the most advanced practice, and insures the maximum mileage per gallon.

Gear-driven pump, located in the crank case lower section and driven from the cam shaft by spiral gears, supplies oil under pressure to all motor bearings.*

The lower section of the crank case forms an oil reservoir of ample capacity, the bottom sloping toward the oil pump. Oil from the reservoir is drawn through a screen by the pump and is delivered to a second screen which is mounted in conjunction with an automatic by-pass, mounted on the top of the crank case at the front end. From this point oil under pressure is carried to the cam shaft and distributed through its bearings and tubes in the crank case webs to each of the crank shaft main bearings. The oil then continues under pressure through the drilled crank shaft to the crank pin bearings. The pistons, piston pins and cylinder walls are lubricated by spray from the crank pin bearings.

All front end gears are lubricated by surplus oil from the by-pass.

A gauge on the dashboard connected directly with the oiling system registers the oil pressure.

Oil pump and strainer screens are easily removable. Provision is made to prevent any oil leakage from the motor.

Motor

Strictly Packard in design and manufacture and is provided with liberal bearing surfaces. The motor is compact, smooth running, and carefully balanced, reducing vibration to a minimum.

*Four cylinders, "L" head type, cast en bloc, with four port exhaust. Cylinders are of close-grained

*Important Feature

gray iron. Pistons are ground to smaller size at top and are equipped with rings to minimize leakage. Three-point suspension of motor eliminates possibility of any distortion due to weaving of frame.

The complete motor unit may be removed in minimum time without hoisting by removing the radiator and front bumper and detaching intervening motor connections.

Radiator

Of the vertical tube and fin type flexibly supported on the frame side members. Radiator is tied by a stay rod to the dash.

This mounting not only eliminates any possibility of straining the radiator by frame weave, but also gives a flexible support to prevent transmission of road shocks to the radiator unit.*

Speed (Road)

Speed is automatically governed. Special high speed, subject to freight transportation department approval, based on a detailed report as to road conditions, nature of service and tire equipment.

Standard speed of solid-tired trucks from 11 to 15 miles per hour; equipped with Sewell cushion wheels, from 13 to 17 miles per hour. Pneumatic-tired trucks from 24 to 28 miles per hour. The speeds vary with the different capacities of trucks.

Springs

Semi-elliptic. Front springs are mounted under the frame and the rear springs outside the frame, resulting in lowest chassis frame possible with given wheel diameter.* Spring eyes are fitted with renewable steel bushings. All spring and spring shackle pins are lubricated through dust-proof cups. Spring bolts are hardened and ground, and are clamped in position to eliminate wear in the shackles.

Driving or braking strains are not transmitted to the rear springs, as they are mounted on seats which are trunnioned on the axle housing.*

Steering

Steering is of the worm and wheel type. Design is such that adjustments for wear can be made

*Important Feature

without removing the steering assembly from the frame. All steering connections are hardened and ground steel sockets held by springs in close contact with hardened and ground steel balls. None of the steering connections are suspended on the balls and the construction is such that, should a socket spring break, the steering connection will not drop apart.*

All steering gear bearings and connections are directly lubricated by either grease or oil cups.

Steering connection levers, with the exception of the steering knuckle connecting rod lever which is forged integral with the knuckles, are I-beam heat-treated drop forgings attached to the knuckles by means of keyed taper fits.

The steering knuckle pin is a taper fit in the axle, precluding any possibility of wear on the axle end.* It is fitted with renewable bushings in the steering knuckle upper and lower ends. Provision is made for the lubrication of upper and lower steering knuckle bearings from a single cup. The wheel spindles are slightly inclined to give easy steering.

Timing Gears

Consist of a helical spur train with ample bearing surface, insuring quiet running and long life.

Transmission

Packard design and manufacture. The transmission is centrally located and is supported at three points by two pressed steel cross members. The mounting precludes strains arising from frame weaves on rough roads.

The gear set is of the four-speed selective type, the gears being shifted by a lever at the driver's right, i. e., in the center of the compartment. The high speed is direct.

All gears are of alloy steel, heat-treated in the Packard factory, and the shafts are mounted on ball bearings.

Provision is made to prevent any oil leaking from the transmission.

Connection between the clutch and transmission is made by means of a shaft with two fabric disc type universal joints. These universal joints are silent and flexible in action.

*Important Feature

Power is delivered from the transmission to the rear axle through a tubular shaft and two grease-packed oil-tight universal joints. The design is such that when the truck is loaded the drive is practically "straight line," insuring minimum wear on universal joints.*

Valves

Mechanically-operated and of special alloy steel, which withstands high temperatures, giving maximum service without regrinding. Valve springs and push rods are located in oil-tight compartments on the right side of motor. Dust-proof, removable covers held in place by self-retaining knurled nuts permit easy access to valve springs and push rod adjustments.

Standard Body

Removable slatted gates, either 24" standard, 30", 36" or 42" optional in height. Number of slats in standard gate, three; optional, two or four. Wide board may be substituted for two lower slats.

Special Design

Body-builders' prints, showing dimensions of chassis, will be supplied to purchasers who wish to have bodies made by local builders.

Finish

Standard Paint—Entire truck chassis will be painted in two coats of prime, glaze finish, except seat iron rails, floor boards, dash board, heel board, steering column, brake and clutch lever, control lever and housing, with switch board housing, dash lamp brackets, running board brackets, and running boards, battery and tool boxes, battery box board, inside of brake drum, shoes, brake blocks, iron rims, radiator core, dash and tail lamps, which will be painted black. The above painting, known as Standard Paint, will be "no charge."

There is an extra charge for painting chassis only any other color than standard, also for painting 138 type body any color.

There is also an extra charge for painting dump body only, any color.

Signs—Signboards, painting and lettering, extra.

*Important Feature

Packard Distributers' Service Policy

New Trucks

Packard service is organized for the purpose of assisting owners and drivers of Packard Trucks to receive from their trucks the excellent results they are capable of giving.

Packard service includes the following:

1. If the truck is delivered to our Service Department at stated times, we will, during the first year, regularly inspect it monthly and make any minor adjustments that may be found necessary and which can be completed within three hours, without charge to the owner.

2. If the truck cannot be delivered to our Service Department, then after the first month following delivery, with the owner's permission, or at his request, we will during the first year inspect it monthly and make any minor adjustments that may be found necessary and which can be completed within three hours. For such service we will make a standardized charge, based on the distance of the truck, at the time of inspection, from our Service Department, as follows:

If within a ten-mile radius, $1.50 per inspection.

If within a twenty-mile radius, $2.50 per inspection.

If within a thirty-mile radius, $3.00 per inspection.

If outside the thirty-mile radius a special arrangement is to be made, based upon the distance from our Service Department.

After the completion of the inspection, which may take from one to three hours, if any repair work ordered by the customer is done, a charge is to be made for labor and material required, based upon our regular rates.

3. We will make all necessary adjustments for one month after delivery of the truck, provided it is brought to our Service Department for that purpose, and has not been tampered with, or injured through accident, over-loading, or over-speeding. After that time all work will be done in a careful and workmanlike manner at our regular charge for such work, except as noted in Clause 4.

4. We will install at our Service Station, without expense to an owner either for parts, labor or transportation, any parts that may be adjudged as defective by the Packard Motor Car Company or ourselves under

the warranty which is printed below, for a period of ninety days after delivery of truck to the purchaser.

5. All gratis work under the Packard warranty is to be done at our Service Station, and in the event an owner requests warranty work to be done at a distance from our Service Station, the expenses of the workman for transportation, board and lodging, if any, will be charged to the customer.

6. After the first year following delivery of the truck, we will inspect it, adjust it and give it necessary attention at our regular standardized charges for labor and material necessary.

After each inspection we agree to send to the owner of the truck and the Packard Motor Car Company a report covering the results of the inspection, the report to be submitted in a standardized form which is furnished by the factory.

7. It is understood that inspections and instructions concerning the operation and care of Packard vehicles though made by our employees are in fact maade on behalf of the owner and that the inspector or instructor is acting for him. The owner, therefore, waives all claims arising out of any fault or omission in connection therewith.

It is our intention to give each and every purchaser of a Packard Truck fair and business-like treatment. Should anyone not receive such treatment, we ask in good faith to be so advised.

WARRANTY

PACKARD MOTOR CAR COMPANY, DETROIT

We fully guarantee new Packard motor carriages and trucks to be free from defects in material and workmanship for ninety days from date of delivery to purchaser.

We will replace free of charge any part claimed to be defective within ninety days from delivery of vehicle to purchaser, which shall be returned to us for credit or replacement, and which upon examination we shall find to be defective. The free replacement of a part or parts does not include transportation charge to and from the Packard factory, nor the cost of installing the new part.

Tires, rims, batteries, speed instruments and other accessories are not covered by this warranty, they being subject to warranties of their respective manufacturers.