PONTIAC SIXES-V-EIGHTS
Chief of Values

...TICAL GUIDES TO ...TTER SELLING

Book No. 3

QUESTIONS *and* ANSWERS

ACKNOWLEDGMENT

IT IS always the policy of Oakland Motor Car Company to discuss its plans with members of the selling organization and get the benefit of their ideas and experiences.

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From these men came many practical suggestions and methods which will prove valuable to all Pontiac dealers and salesmen.

1932 Pontiac 6
Questions and Answers

ENGINE

1. Q. *What type of engine is used?*

   A. A large, smooth and quiet L-head, six-cylinder engine with two-section cylinder head which can be removed without disturbing the engine timing.

2. Q. *What is the brake horsepower?*

   A. 65 horsepower at 3200 R.P.M.

3. Q. *What time is required to accelerate from 10 to 25 m.p.h.?*

   A. 6-8/10 seconds.

4. Q. *What is the compression ratio?*

   A. 5.1 to 1.

5. Q. *What is the S. A. E. rated horsepower?*

   A. 26.3 H.P.

6. Q. *What is the difference between S. A. E. and brake horsepower?*

   A. S. A. E. horsepower is determined from a formula for tax and license purposes. Brake horsepower is that actually developed by the engine.

7. Q. *What is the bore and stroke?*

   A. Bore is $3\frac{5}{16}$ inches, stroke is $3\frac{7}{8}$ inches.

8. Q. *What is the piston displacement?*

   A. 200 cubic inches.

9. Q. *What is the piston travel?*

   A. The piston travel is only 2140 feet per mile of car travel. This low piston travel means added life to the pistons.

10. Q. *How is the engine mounted?*

    A. Four flexible rubber mountings add to engine smoothness and give quiet operation.

11. Q. *Name at least four of the many engine features which make it possible to drive the Pontiac at maximum speed for long distances?*

    A. 1. The Pontiac 6 engine is a moderate speed type, developing its maximum of 65 horsepower at 3200 R.P.M.
    2. Full pressure lubrication.
    3. Efficient pressure-suction crankcase ventilation.
    4. Cross-flow radiator and exceptionally large water passages around cylinders and valves.
    5. Air cleaner and silencer.
    6. Counterweighted crankshaft with harmonic balancer.
    7. Fine balance of rotating and reciprocating parts.

CYLINDER BLOCK AND CRANKCASE

12. Q. *What makes the cylinder block and crankcase so rigid and strong?*

    A. The cylinder block and crankcase are cast in one solid, well ribbed unit. The crankcase extends $2\frac{5}{8}$ inches below center of crankshaft.

13. Q. *Name one of the principal changes in the engine which has increased the horsepower from 60 to 65?*

A. The improved G. M. R. (General Motors Research) anti-knock cylinder head; higher compression ratio; new camshaft and valve timing.

CRANKSHAFT

14. Q. *What two improvements have been made in the crankshaft?*

A. It is 8 pounds heavier (weight 61 pounds) and the counterweights are now an integral part of the crankshaft.

15. Q. *Why is the crankshaft counterweighted?*

A. Bearing pressures are reduced and equalized by centrifugal force of the counterweights, resulting in longer bearing life.

16. Q. *Is the crankshaft balanced?*

A. The crankshaft runs practically without vibration at all speeds because it is balanced both statically (stationary) and dynamically (running).

17. Q. *How does the harmonic balancer add to engine smoothness?*

A. The harmonic balancer makes the engine unusually smooth by neutralizing torsional vibration in the crankshaft at all speeds. This balancer sets up counter vibrations to offset and counteract vibration in the crankshaft caused by the explosions of the fuel in the cylinders. There are no adjustments needed in the harmonic balancer and it is effective at all speeds.

18. Q. *How many main bearings are used?*

A. Three large precision type, interchangeable, steel backed, babbitt bearings, lubricated under pressure.

19. Q. *Is the flywheel and crankshaft assembly balanced?*

A. Each flywheel is accurately balanced alone, and after being attached to the crankshaft, the assembly is put in perfect running balance to assure smooth operation of the engine at all speeds.

20. Q. *How are the flywheel, starting motor and clutch housed?*

A. The strong, cast iron flywheel housing fully encloses and protects the flywheel, clutch and starting motor from road splash. It also maintains rigid engine and transmission alignment.

CONNECTING RODS

21. Q. *What is done to insure proper balance of connecting rods?*

A. Connecting rods have their center of gravity at the same point and they are held within $\frac{1}{8}$ ounce weight limits—about the weight of a penny.

22. Q. *Are the connecting rods drilled for pressure lubrication to piston pins?*

A. All connecting rods are rifle drilled from crankshaft bearing to piston pin so that piston pin has full pressure lubrication.

PISTONS AND RINGS

23. Q. *What is the advantage of electro-plated cast iron pistons?*

A. Pontiac pistons are plated with a low friction metal which makes possible a very close fit of the piston in the cylinder. This process prolongs life of pistons and reduces time required to break in engine.

24. Q. *What is the diameter of the piston pins and how are they fitted?*

A. They are 1⅛ inch diameter pins giving extremely large bearing surface. A press fit is used at one end of piston pin, the pin being held in place by a locking screw. The opposite end of the pin is slotted and has a light press fit, allowing unrestrained movement of piston on the pin while retaining tight fit.

25. Q. *How many piston rings are used on each piston and what is their position in relation to the piston pin?*

A. There are two ⅛ inch plain compression rings and one $\frac{3}{16}$ inch oil control ring. All rings are located above the piston pin. This maintains power due to perfect compression seal, and keeps oil consumption at a minimum, while permitting full lubrication of piston skirt.

CAMSHAFT

26. Q. *What type of camshaft drive is used and how is it lubricated?*

A. Silent chain running in oil bath and requiring no adjustment.

27. Q. *How many bearings does the camshaft have?*

A. Three bearing shaft.

28. Q. *What type of camshaft bushings are used and how are they lubricated?*

A. Quiet, steel backed, babbitt lined, replaceable camshaft bushings, lubricated by oil pressure the same as main crankshaft bearings.

VALVES

29. Q. *What improvements have been made in valve design?*

A. 1-13/32 inch intake valves are of nickel alloy steel with 30-degree seat angle. The new seat angle permits more gas to pass into the cylinders in a given time thus increasing the engine power. 1-11/32 inch exhaust valves are No. 1 silicon chromium steel with 45-degree seat angle. Patented valve spring dampeners prevent spring chatter and breakage.

30. Q. *How many intake ports does the Pontiac Six have and what principal advantage is gained by this design?*

A. Three ports give equal distribution of gas to all cylinders.

31. Q. *How many exhaust ports does the Pontiac Six have and what principal advantage is gained by this design?*

A. Six ports allow a better distribution of water around the exhaust valves resulting in even engine temperature and better cooling of valves.

ENGINE LUBRICATION SYSTEM

32. Q. *What type of lubrication is used in the engine?*

A. Full pressure lubrication to main, connecting rod, front and rear camshaft bearings and piston pins. Streams of oil under pressure lubricate center camshaft bearing, distributor drive and timing chain.

33. Q. *What is the normal oil capacity of the crankcase?*

A. Six quarts.

34. Q. *What provision is made to maintain the correct pressure in the lubricating system?*

A. A relief valve in lubricating system can be adjusted to provide the correct pressure.

35. Q. *What type of oil pump is used?*

A. Ample supply of oil at all speeds is assured by a gear type pump located below the oil level, which circulates over 175 gallons of oil per hour at 25 m.p.h.

CRANKCASE VENTILATION

36. Q. *What prevents excessive oil dilution in the crankcase?*

A. Pressure-suction type of crankcase ventilation.

37. Q. *Explain pressure-suction type of crankcase ventilation.*

A. Air under pressure of the cooling fan passes through a special air cleaner into crankcase where it picks up water vapor and is pulled out of the crankcase by suction. This prevents dilution of oil by water and the forming of acids which would cause wear due to corrosion.

FUEL SYSTEM

38. Q. *What items make up the fuel system?*

A. A large 15-gallon gasoline tank located in the rear, mechanical fuel pump, gasoline filter, fuel gauge and carburetor.

39. Q. *What is the advantage of fuel pump over other types of gasoline feed?*

A. Positive and uniform supply of filtered fuel. Fire hazard is reduced because the only gasoline near the engine is in the carburetor and fuel filter.

40. Q. *Is it necessary to prime the fuel pump if the gasoline tank runs dry?*

A. No. It is self-priming.

41. Q. *What are the features of the carburetor?*

A. A new 1¼-inch three-jet carburetor having accelerating pump and economizer. It is easily adjusted, provides maximum power, acceleration and easy starting in cold weather. Provides the same fuel economy with more horsepower.

42. Q. *What heat control adjustment is provided?*

A. Economy is improved by a new automatic heat control valve located in exhaust manifold with seasonal control at the carburetor.

AIR CLEANER AND INTAKE SILENCER

43. Q. *What is the function of the air cleaner and intake silencer?*

A. It cleans the air entering the engine and also reduces engine roar caused by the vibration of air currents in the intake manifold. It gives a new feeling of smoothness in engine operation.

COOLING SYSTEM

44. Q. *Why is the cross-flow radiator the most efficient?*

A. The hot water containing steam bubbles must flow across the radiator core and the steam bubbles are condensed before reaching the vent pipe at the top. This eliminates loss of water or anti-freeze in the form of vapor, common to down-flow radiators.

45. Q. *How does the thermostatic temperature control operate?*

A. The thermostat is located in the water outlet elbow of the engine and prevents water circulation through the radiator during the warming up period and until the engine reaches the most efficient operating temperature, thus reducing the use of the choke, giving greater economy and improving operation.

ELECTRICAL SYSTEM

46. Q. *What type and make of starting, lighting and ignition system is used?*

A. Six volt, three-unit system, built by Delco-Remy.

47. Q. *What are the advantages of the semi-automatic starter?*

A. Before the electric circuit is closed to turn the starter the gears are in mesh. This eliminates any chance of sticking and damaging the teeth of the starting gear or teeth on the flywheel.

48. Q. *What are the advantages of the full automatic spark advance?*

A. Insures best engine operation at all speeds without attention from driver.

49. Q. *What type of spark plugs are used?*

A. New 14 millimeter metric spark plugs designed by AC. These reach the proper temperature quickly but do not overheat and cause pre-ignition.

50. Q *What is the capacity of the storage battery?*

A. 13-plate, 86 ampere hour.

CLUTCH AND TRANSMISSION

51. Q *What type clutch is used?*

A A dry disc, single plate, self-adjusting clutch with adjustable release levers and moulded friction facing of 43 sq. in. area. Only a very light pedal pressure is required to operate it.

52. Q. *What type of transmission is used?*

A. A new Syncro-Mesh transmission is used. It permits rapid shifting either up or down. between second and high at any car speed. You can accelerate up to 45 miles per hour in second gear, and also shift quickly from high to second gear for extra acceleration on hills or for braking effect in descending hills.

53. Q. *Is second gear quiet in operation?*

A. Yes, second speed gears have helical teeth, are in constant mesh and operate silently.

FREE WHEELING

54. Q. *What type of free wheeling is used?*

A. Selective built-in roller type.

55. Q. *How does free wheeling operate?*

A. When you take foot off accelerator pedal the engine idles and the car coasts. Step on accelerator and the engine speeds up and drives car. Coasting and driving when in free wheeling position are automatic without using clutch or shifting gears.

56. Q. *How do you change from free wheeling to conventional gear?*

A. Change from free wheeling to conventional gear is controlled by a button on the instrument panel.

57. Q. *When free-wheeling unit is engaged, is it necessary to use the clutch in shifting gears?*

A. When free wheeling is operating, gears can be shifted up or down to any forward speed, by simply lifting foot from accelerator and then making the shift.

58. Q. *Does free wheeling prolong engine life?*

A. Yes. By permitting the engine to idle while the car coasts, the number of miles the engine works is reduced.

RUBBER CUSHIONING

59. Q. *What are the advantages of rubber cushioned drive?*

A. Smooth power flow and minimum vibration are due to the rubber cushioned driving hub which also insulates the rear axle from the power plant.

60. Q. *What are the advantages of Inlox rubber bushed shackles?*

A. Inlox rubber bushed spring shackles absorb all of the shackle action, cushioning the car against road shocks, reducing noise from tires, springs and axles. Lubrication at 12 points is eliminated as well as squeaks, rattles, and adjustments.

61. Q. *At how many points on the chassis is rubber used for cushioning?*

A. There are 47 points of rubber cushioning on the Pontiac 6 chassis, including the following: engine mountings 4; spring shackles 12; rear axle pads 4; transmission hub 1; axle rebound bumpers 2; shock absorber bushings 12; body pads 10; radiator 2. There are also many points of rubber cushioning in the body.

FRONT AND REAR AXLES

62. Q. *What type of front axle is used?*

A. Reverse Elliott type with sturdy I-beam and inclined king pins. Weight of front end of car is taken on ball thrust bearings between I-beam and knuckles. Steps forged on I-beam for car jack.

63. Q. *What type of rear axle is used?*

A. Semi-floating type with spiral bevel drive gears. A heavy ribbed differential carrier housing gives rigid ring gear and pinion support, reducing deflection, wear and consequent noise. Ball and roller bearings are used on the pinion shaft, the roller bearing next to the pinion gear.

SPRINGS

64. Q. *What type of springs are used?*

A. The springs are of the semi-elliptical type, mounted directly under the frame side members to prevent twisting, bending or side sway and cushioned against heavy road shocks by deep rubber bumpers.

65. Q. *How is rear axle insulated from each rear spring?*

A. By two moulded rubber pads; one placed between axle pad and spring and the other between spring and "U" bolt.

66. Q. *Are spring covers standard equipment at no additional cost?*

A. Yes. Spring covers which retain lubricant and keep out dirt and water are standard on all models at no extra cost.

67. Q. *What are spring dimensions?*

A. Front 2″ x 36″.
Rear 2″ x 54″.

RIDE CONTROL

68. Q. *What is Ride Control?*

A. Ride Control enables the driver to adjust shock absorber tension to suit road and load conditions.

69. Q. *How is Ride Control adjustment accomplished?*

A. By means of a push-pull button located conveniently on the instrument panel.

70. Q. *Is the ride control adjustment limited to two or three positions?*

A. No. It can be adjusted to any riding condition desired by the driver.

71. Q. *How does the Ride Control operate?*

A. The Control button operates a system of pull rods running along the frame and connected to levers on each of the four shock absorbers. Equal adjustment of all shock absorbers is assured. Each shock absorber is equipped with an adjustable valve which increases or restricts the flow of oil from one chamber to another thus softening or stiffening the shock absorber action.

72. Q. *Is Ride Control standard equipment on all models at no extra cost?*

A. Yes. Ride Control is standard on all models.

BRAKES

73. Q. *What improvements have been made in the brakes?*

A. Greater safety due to Bendix duo servo weather proof, 12-inch four-wheel brakes with parking brake connected to all four wheels. Brake drums are carefully and accurately machined. Brake linings are moulded. Hence Pontiac brakes are positive, quiet and require but light pedal pressure.

WHEELBASE

74. Q. *What is length of the wheelbase?*

A. 114-inch wheelbase gives greater riding comfort. It is two inches longer than in 1931.

FRAME

75. Q. *What is the size of the frame?*

A. Body weave and noises are eliminated by a strong heavy frame 5 x $2\frac{3}{16}$ x $\frac{5}{32}$ with six cross members securely braced and riveted to the sides.

STEERING

76. Q. *What type of steering gear is used?*

A. Worm and sector type. Pontiac's steering is made easy, positive and restful because of a 14 to 1 steering gear ratio.

77. Q. *What size is the steering wheel?*

A. Convenience of a three-spoke, 17-inch steering wheel with a slender moulded rubber rim with steel core.

CHASSIS LUBRICATION

78. Q. *What type of chassis lubrication is used?*

A. High pressure oil fittings. Oil is forced into points requiring lubrication by use of high pressure gun.

BODIES

79. Q. *Who builds Pontiac bodies?*

A. Fisher Body Corporation.

80. Q. *What type body construction is used?*

A. Composite type of hardwood and steel construction.

81. Q. *What advantages has the composite body over all steel?*

A. Greater strength because steel panels are reinforced with hardwood frame; more safety, long life, and freedom from drumming noises.

82. Q. *What improvements have been made in the fenders?*

A. Beautiful deep $4\frac{3}{4}$-inch crown instead of $3\frac{3}{4}$ inch.

83. Q. *How is the body ventilated?*

A. Pleasing indirect ventilation with a new cowl ventilator and direct ventilation through the Fisher VV windshield.

84. Q. *What type of sun visor is used?*

A. Safe and comfortable driving due to an inside sun visor adjustable to any position.

85. Q. *How is the driver's seat adjusted?*

A. Comfortable, adjustable driver's seat, moved forward or backward by merely lifting convenient catch on left of seat and sliding seat to desired position.

86. Q. *Name five of the interior features of Pontiac 6 Fisher Bodies?*

A. Recessed instrument panel, sloping non-glare VV type windshield, cowl ventilator, adjustable driver's seat, adjustable inside sun visor, specially designed hardware, ash receiver in all but convertible coupe, automatic windshield wiper, rear view mirror, window shades, door pockets, ply wood floor boards and insulated dash mats. *All* doors may be locked from inside. Complete insulation against heat, cold, drafts and noise.

87. Q. *How has the driving compartment been insulated to keep out drafts?*

A. Special care has been directed toward closing the openings around pedals and controls in toe and floor boards and other openings. Heavy felt backed carpets are used in front compartment of custom sedan and sport coupes. Other models have felt backed rubber mats. The dash is lined with insulating material. All of these improvements effectively muffle engine and road noises and prevent unwanted hot or cold air from entering the front compartment.

88. Q. *What kind of upholstery is used?*

A. Quality upholstery is used on all models. A beautiful, long wearing and attractive mohair in the standard models; highest quality mohair or whipcord in the Custom models. Leather is used in the Convertible Coupe. Rumble seats in Sport and Convertible Coupes are upholstered with rain proof fabrikoid.

89. Q. *What kind of windshield is used?*

A. Non-glare, ten-degree sloping Fisher VV windshield.

90. Q. *What are the advantages of Fisher VV windshield?*

A. Safeguards the driver from the reflected glare of the headlamps of other cars, street lights, electric signs, etc.

91. Q. *What is the improvement made on the hood fasteners?*

A. Convenient, single control hood fasteners with improved chromed operating handle.

92. Q. *What are the features of the running boards?*

A. Steel running boards with ribbed rubber mats permanently secured are bound with rustless steel moulding crimped on the edge. No attaching screws are visible on running boards or moulding. This metal running board fits the rear fender neatly and securely.

93. Q. *How is ample foot room and neat appearance secured at running boards?*

A. A concave running board apron following the contour of body adds to the beauty of the car and gives more foot room in entering the car.

94. Q. *How has the appearance of the rear splash apron been improved?*

A. The rear splash apron extends from fender to fender and curves down to completely conceal gasoline tank and running gear. This adds to the appearance of the car from the rear.

95. Q. *What type headlamps are used?*

A. New chromed streamline headlamps with crowned lenses and double filament bulbs are used on all models.

96. Q. *How are the headlamps mounted?*

A. New pedestal type chromed headlamp brackets mounted on fender supports enclose all wiring.

97. Q. *How are the headlights operated?*

A. By foot control which affords safety and convenience while driving. Fender lights indicate to the driver the position of headlight beam.

98. Q. *Is a fender tie bar used?*

A. Elimination of a fender tie bar brings out the graceful combination of full crowned fenders, chromed radiator shell and grille, giving an unobstructed front view of the car.

99. Q. *What are the advantages of the fender indicator lamps?*

A. Chromed indicator lamps mounted on the front fenders provide added beauty and increased safety in night driving. They outline the car from both sides and front for approaching drivers. They also indicate the position of headlight beam.

100. Q. *How are the body mouldings formed?*

A. All body mouldings are narrow and are pressed in the body panels. The drip moulding is also pressed in the roof panels.

101. Q. *What is the advantage of the type of body mouldings used?*

A. It eliminates rust, squeaks and cracked paint which is common at the edges of the attached type of moulding.

INSTRUMENT PANEL

102. Q. *What type of instrument panel is used?*

A. Recessed instrument panel finished to harmonize with the interior fittings.

103. Q. *What type instruments are used?*

A. Newly designed pointer type instruments including —speedometer, gasoline gauge, ammeter, oil and temperature gauge.

104. Q. *How is the instrument panel illuminated?*

A. Both direct and indirect lighting of the instrument panel is provided.

EQUIPMENT

105. Q. *What is the Standard Wheel Equipment?*

A. Five wire wheels with 40 sturdy spokes and 6⅞-inch chromed hub caps which conceal wheel attaching bolts.

106. Q. *What size tires are used?*

A. Large, easy riding 18 x 5.25 inch tires.

107. Q. *What optional wheel equipment is available at extra cost?*

A. Five demountable wood wheels with 12 massive spokes and large chromed hub cap which conceals wheel hub and attaching bolts are available at extra cost. Painted finish on Standard Models only $7.50. Natural Wood finish on Sport Models only $10.00.

Six Wire Wheels or Six Wood Wheels with spare wheels in front fender wells are also available at additional cost.

108. Q. *What is the standard horn equipment?*

A. On the Custom Sedan, Sport Coupe and Convertible Coupe twin full chromed trumpet-type horns are mounted one under each headlight. On 4-door sedan, 2-door sedan and Standard Coupe, an improved horn is mounted under hood.

SERVICE WARRANTY

109. Q. *What Service Warranty is given with the 1932 Pontiac?*

A. The Service Warranty provides that any part which proves defective in material or workmanship before 4,000 miles or 90 days, whichever occurs first, will be replaced without charge for either labor or material. This Service Policy is effective in the United States or Canada.

1932 Pontiac V-8
Questions and Answers

ENGINE

1. Q. *What type engine is used?*

   A. A powerful, V-type, eight-cylinder engine.

2. Q. *Name four major advantages of the V-type engine over other types.*

   A. A shorter engine gives more room on the chassis for the body; low center of gravity; remarkable smoothness due to a short, rigid crankshaft and crankcase; large valves with plenty of water space around valves and cylinders; ideal fuel distribution due to 100 per cent down draft carburetion; and the best arrangement of firing order of cylinders.

3. Q. *What is the bore and stroke?*

   A. Bore, $3\frac{7}{16}$ inches; stroke $3\frac{3}{8}$ inches.

4. Q. *What is the piston displacement?*

   A. 251 cubic inches.

5. Q. *What is the piston travel?*

   A. The piston travel is only 1690 feet per mile of car travel. This very low piston travel means long life to pistons.

6. Q. *What is the S. A. E. rated horsepower?*

   A. 37.8 horsepower.

7. Q. *What is the brake horsepower?*

   A. Smooth, 85 horsepower at 3200 R.P.M.

8. Q. *What is the difference between S. A. E. and brake horsepower?*

   A. S. A. E. horsepower is determined from a formula for tax and license purposes. Brake horsepower is that actually developed by the engine.

9. Q. *What time is required to accelerate from 10 to 25 miles per hour?*

   A. 5-6/10 seconds.

10. Q. *How is the engine mounted on the frame?*

    A. Vibration and torque reaction are practically eliminated by two leaf spring mountings at the front and two rubber mountings at the rear of the engine.

11. Q. *How is the movement of the engine on its flexible mountings controlled?*

    A. A patented synchronizer restricts the engine's movement to the proper limits for greater smoothness. This consists of a horizontal arm with one end fastened to the left side of the frame and the other, which is wedge shape resting in a notch in a vertical arm inside the timing chain cover. This vertical arm is pivoted at the lower end while the upper end has a roller which rides on a four-lobe cam on the front end of the camshaft.

12. Q. *Name at least six outstanding features of the engine?*

A. 1. V-type construction, eight cylinder, moderate speed type, 85 H.P.
2. 100 per cent down draft carburetion.
3. Short, rigid counterweighted crankshaft.
4. Synchronizer.
5. Full pressure lubrication.
6. Crankcase ventilation.
7. Exceptionally large water passages around cylinders and valves.
8. Air cleaner and silencer.
9. Automatic heat control.
10. Horizontal valves—combining advantages of "L" head and overhead engines.

CYLINDER BLOCK AND CRANKCASE

13. Q. *What are the advantages of the V-8 cylinder head construction?*

A. Cylinder heads are completely water jacketed and contain 100 per cent of the combustion space.

14. Q. *What is the advantage of the type construction used in the cylinder block?*

A. In the Pontiac V-8 block the two cylinder groups are made in a single casting with integral crankcase extending 2¼ inches below center of crankshaft. It is a short, rigid block, amply water jacketed; horizontal valves are exceptionally accessible.

CRANKSHAFT

15. Q. *What is the weight of the crankshaft?*

A. The crankshaft weighs 58½ pounds.

16. Q. *Is the crankshaft balanced?*

A. The crankshaft runs practically without vibration at all speeds because it is so rigid and carefully balanced both statically (stationary) and dynamically (running). Elimination of vibration increases the life of the engine and reduces operating costs.

17. Q. *Name three reasons for the unusual smoothness of the V-8 engine?*

A. Eight-cylinder power flow, flexible engine mountings, patented synchronizer, counterweighted crankshaft, careful balancing of reciprocating and rotating units, and alignment of operating parts.

18. Q. *Why is the crankshaft counterweighted?*

A. Bearing pressures are reduced and equalized by centrifugal force of the counterweights.

19. Q. *How many main bearings are used?*

A. Three large precision type interchangeable bronze backed babbitt bearings.

FLYWHEEL

20. Q. *Is the flywheel and crankshaft assembly balanced?*

A. Each flywheel is accurately balanced alone and after being attached to the crankshaft the assembly is put in perfect running balance to insure smooth operation of the engine at all speeds.

CONNECTING RODS

21. Q. *What care is taken to insure proper operation of connecting rods?*

A. All eight rods are carefully selected for total weight and center of gravity. The selection of rod and piston assembly is held within very close weight limits to insure engine smoothness. The variation in weight between any two rods or pistons does not exceed the weight of a penny.

22. Q. *Are the connecting rods drilled for pressure lubrication to piston pins?*

A. All connecting rods are rifle drilled from crankshaft bearing to piston pin so that piston pin has full pressure lubrication.

PISTONS AND RINGS

23. Q. *What are the advantages of electro-plated grey iron pistons?*

A. Electro-plating of pistons with low friction metal permits fitting with very small clearance, resulting in more power, longer life and quicker breaking in of car.

24. Q. *What is the diameter of the piston pins and how are they fitted?*

A. They are large $1\frac{1}{16}$ inch diameter pins. A press fit is used at one end of piston pin, the pin being held in place by a locking screw. The opposite end of the pin is slotted and has a light press fit, allowing unrestrained movement of piston while retaining tight fit.

25. Q. *How many piston rings are used on each piston and what is their position in relation to the piston pin?*

A. Four rings are used. Three compression rings above piston pin and one oil control ring below. This arrangement gives a perfect compression seal with undiminished power and keeps oil consumption at a minimum.

CAMSHAFT

26. Q. *What type camshaft drive is used and how is it lubricated?*

A. Non-adjustable silent chain, running in oil bath.

27. Q. *What type of camshaft bushings are used and how lubricated?*

A. Quiet, steel backed, babbitt lined, replaceable camshaft bushings lubricated by full oil pressure, the same as main crankshaft bearings.

VALVES

28. Q. *What valve construction is used?*

A. Intake valves are of nickel alloy steel. Exhaust valves are of heat resisting No. 1 silicon chromium steel. The horizontal position of the valves permits a simple arrangement of camshaft, valve rocker arms and rocker arm shaft. Roller type followers are used on valve rocker arms to insure quiet operation.

29. Q. *What are the principal advantages of the horizontal valve arrangement?*

A. Quietness throughout the entire driving range. Easily accessible for adjustment and inspection of valve mechanism. Patented valve spring dampeners prevent spring chatter and breakage.

ENGINE LUBRICATION SYSTEM

30. Q. *What type of lubrication is used in the engine?*

    A. Full pressure feed to all main, connecting rod and camshaft bearings, piston pins and rocker arm bushings; with oil stream over timing chain.

31. Q. *What is the oil capacity of the crankcase?*

    A. Seven quarts.

32. Q. *What provision is made to maintain correct pressure in the lubrication system?*

    A. A self-cleaning oil pressure regulator easily adjusted.

33. Q. *What type of oil pump is used?*

    A. Gear type. It is located below oil level and circulates over 175 gallons of oil per hour at 25 m. p. h.

CRANKCASE VENTILATION

34. Q. *What prevents excessive oil dilution?*

    A. Pressure-suction type of crankcase ventilation.

35. Q. *Explain pressure-suction type of crankcase ventilation.*

    A. Air under pressure of the cooling fan passes through a special air cleaner into crankcase where it picks up water vapor and is pulled out of the crankcase by suction. This prevents dilution of oil and the forming of acids which would cause wear due to corrosion.

FUEL SYSTEM

36. Q. *What items make up the fuel system?*

    A. A large 20-gallon gasoline tank located in the rear, mechanical fuel pump, fuel strainer, special down draft carburetor and fuel gauge.

37. Q. *What is the advantage of the fuel pump over other types of gasoline feed?*

    A. Positive and uniform supply of filtered fuel. Fire hazard is reduced because the only gasoline near the engine is in the carburetor and fuel filter.

38. Q. *Is it necessary to prime fuel pump if the gasoline tank runs dry?*

    A. No. It is self-priming.

39. Q. *What are the advantages of the down draft carburetor?*

    A. It is specially designed to meet the requirements of the Pontiac V-8 engine. Being located in the most central position on top of the motor, it distributes the gas mixture to the cylinders by the shortest possible path without interfering friction of bends and sharp edges. It is a 100 per cent down draft type, 1¾-inch three-jet carburetor having accelerator pump and economizer. It is easily adjusted, and provides quick starting in cold weather.

40. Q. *What has been done to avoid "vapor-lock" in the fuel system?*

    A. Fuel line from gas tank to engine is located outside of frame instead of inside. This prevents vaporizing of the gasoline in the line.

41. Q. *What Heat Control Adjustment is provided?*

A. Economy is provided by a heat control valve located in the exhaust manifold directly below the carburetor which operates automatically with the throttle and also has a seasonal adjustment.

AIR SILENCER AND AIR CLEANER

42. Q. *What is the function of the air cleaner and intake silencer?*

A. It cleans the air entering the engine and also reduces engine roar caused by the vibration of air columns in the intake manifold. It gives a new feeling of smoothness in engine operation.

COOLING SYSTEM

43. Q. *What does the cooling system include?*

A. Exclusive cross-flow radiator, built-in thermostatic temperature control, fan and centrifugal water pump.

44. Q. *Why is the Cross-flow Radiator the most efficient type?*

A. The hot water containing steam bubbles must flow across the radiator core and the steam bubbles are condensed before reaching the vent pipe at the top. This eliminates loss of water or anti-freeze in the form of vapor, common to down-flow radiators.

45. Q. *How do the water temperature control thermostat and recirculation operate?*

A. The thermostat is located in the water outlet elbow and confines water circulation during the warming up period to the cylinder block. Until the most efficient operating temperature is reached, water is circulated in the block only. When the engine reaches the desired temperature the thermostat valve opens, allowing water from radiator to enter engine.

ELECTRICAL SYSTEM

46. Q. *What type and make of starting, lighting and ignition system is used?*

A. Six volt, three unit system, built by Delco-Remy.

47. Q. *What are the advantages of the semi-automatic starter?*

A. Before the electric circuit is closed to turn the starter the gears are in mesh. This eliminates any chance of sticking and damaging the teeth of the starting gear or flywheel teeth.

48. Q. *What type of spark plugs are used?*

A. New 14 millimeter metric spark plugs designed by AC. This type plug reaches its proper temperature quickly but does not overheat and cause pre-ignition.

49. Q. *What is the capacity of the storage battery?*

A. 15-plate, 100 ampere hour.

CLUTCH AND TRANSMISSION

50. Q. *What type clutch is used?*

A. A dry disc, single plate, self-adjusting clutch with adjustable release levers and moulded friction facing of 54 sq. in. area. Only a very light pedal pressure is required to operate it.

51. Q. *What type of transmission is used?*

A. A new Syncro-Mesh transmission is used. It permits rapid shifting either up or down, between second and high at any car speed. You can accelerate up to 45 miles per hour in second gear, and also shift quickly from high to second gear for extra acceleration on hills or for braking effect in descending hills.

52. Q. *Is second gear quiet in operation?*

A. Yes, second speed gears have helical teeth, are in constant mesh and operate silently.

FREE WHEELING

53. Q. *What type of free wheeling is used?*

A. Selective built-in roller type.

54. Q. *How does free wheeling operate?*

A. When you take foot off accelerator pedal the engine idles and the car coasts. Step on accelerator and the engine speeds up and drives car. Coasting and driving when in free wheeling position are automatic without using clutch or shifting gears.

55. Q. *How do you change from free wheeling to conventional gear?*

A. Change from free wheeling to conventional gear is controlled by a button on the instrument panel.

56. Q. *When free-wheeling unit is engaged, is it necessary to use the clutch when shifting gears?*

A. When free wheeling is operating, gears can be shifted up or down to any forward speed by simply lifting foot from accelerator and then making the shift.

57. Q. *Does free wheeling prolong engine life?*

A. Yes. By permitting the engine to idle while the car coasts the number of miles the engine works is reduced.

RUBBER CUSHIONING

58. Q. *What are the advantages of rubber cushioned drive?*

A. Smooth power flow and minimum vibration are due to the rubber cushioned driving hub which also insulates the rear axle from the power plant.

59. Q. *What are the advantages of Inlox rubber bushed shackles?*

A. Inlox rubber bushed spring shackles absorb all the shackle action, cushioning the car against road shocks and reducing noise from tires, springs and axles. Lubrication at 12 points is eliminated as well as squeaks, rattles and adjustments.

60. Q. *At how many points on the chassis is rubber used for insulating purposes?*

A. There are 47 points of rubber insulation on the Pontiac V-8 chassis, including the following: Engine mounting 2; spring shackles 12; rear axle pads 4; transmission hub 1; axle rebound bumpers 4; shock absorber bushings 12; body shims 10; radiator 2. There are also many points of rubber cushioning in the body.

FRONT AND REAR AXLES

61. Q. *What type of front axle is used?*

A. Reverse Elliott type with sturdy I-beam and inclined king pins. Weight of front end of car taken on ball thrust bearing between "I" beam and knuckles.

62. Q. *What type of rear axle is used?*

A. Semi-floating type with quiet spiral bevel drive gears. A heavy ribbed differential carrier housing gives rigid ring gear and pinion support, reducing deflection, wear and consequent noise. Ball and roller bearings are used on the pinion shaft, the roller bearing next to the pinion gear.

63. Q. *What is the rear axle gear ratio?*

A. 4.22 to 1.

SPRINGS

64. Q. *What type of springs are used?*

A. The springs are of the semi-elliptical type, mounted directly under the frame side members to prevent twisting, bending or side sway, and cushioned against heavy road shocks by deep rubber bumpers.

65. Q. *What are spring dimensions?*

A. Front 2″ x 36″
Rear 2″ x 54½″.

66 Q. *Are spring covers standard equipment at no additional cost?*

A. Yes. Spring covers which retain lubricant and keep out dirt and water are standard on all models at no extra cost.

67. Q. *How is rear axle insulated from each rear spring?*

A. By two moulded rubber pads; one placed between axle pad and spring and the other between spring and "U" bolt.

RIDE CONTROL

68. Q. *What is Ride Control?*

A. Ride control enables the driver to adjust shock absorber tension to suit road and load conditions.

69. Q. *How is Ride Control adjustment accomplished?*

A. By means of a push-pull button located conveniently on the instrument panel.

70. Q. *Is the ride control adjustment limited to two or three positions?*

A. No. It can be adjusted to any riding condition desired by the driver.

71. Q. *How does the Ride Control operate?*

A. The control button operates a system of pull rods and is connected to a lever on each of the four shock absorbers. Equal adjustment of all shock absorbers is assured. Each shock absorber is equipped with an adjustable valve which increases or restricts the flow of oil from one chamber to another, thus softening or stiffening the shock absorber action.

72. Q. *Is Ride Control standard equipment on all models at no extra cost?*

A. Yes. Ride Control is standard on all models.

BRAKES

73. Q. *What improvements have been made in the brakes?*

A. Greater safety due to Bendix duo servo weatherproof, 13-inch, four-wheel brakes with parking brakes connected to all four wheels. Brake drums are carefully and accurately machined. Linings are moulded. Brakes are positive, quiet and require but light pedal pressure.

WHEELBASE

74. Q. *What is the length of the Pontiac V-8 wheelbase?*

A. The wheelbase is 117 inches. This gives ample body room and an overall length of car which can be easily handled in traffic.

FRAME

75. Q. *What is the size of the frame?*

A. Body weave and noises are eliminated by a strong heavy frame 5½ x 2⅛ x $\frac{3}{32}$ inches with 6 cross members securely braced and riveted to side members.

STEERING GEAR

76. Q. *What type of steering gear is used?*

A. Worm and sector type. Steering is made easy, positive and restful because of an 18 to 1 steering gear ratio.

77. Q. *What size is the steering wheel?*

A. Convenience of a three-spoke 18-inch steering wheel with slender moulded rubber rims with steel core.

CHASSIS LUBRICATION

78. Q. *What type of chassis lubrication is used?*

A. High pressure oil fittings. Oil is forced into points requiring lubrication by use of high pressure gun.

BODIES

79. Q. *Who builds Pontiac bodies?*

A. Fisher Body Corporation.

80. Q. *What type body construction is used?*

A. Composite type of hardwood and steel construction.

81. Q. *What advantage has the composite body over all steel?*

A. Greater strength because steel panels are reinforced with hardwood frame; more safety, long life, and freedom from drumming noises.

82. Q. *Name five of the interior features of the Fisher Bodies?*

A. Recessed instrument panel, sloping non-glare VV type windshield, cowl ventilator, adjustable driver's seats, adjustable inside sun visor, specially designed hardware, ash receiver in all but convertible coupe model, twin automatic windshield wipers, rear view mirror, window shades, door pockets, ply wood floor boards and insulated dash mats. *All* doors may be locked from the inside. Folding center arm rest in Custom Sedan.

83. Q. *What kind of upholstery is used?*

A. Quality upholstery is used on all models. Beautiful long life, attractive mohair in the standard models. Highest quality mohair or whipcord in the custom models. Leather is used in the Convertible Coupe. Rumble seats on Sport and Convertible Coupes are upholstered with rainproof fabrikoid.

84. Q. *How has the driving compartment been insulated to keep out drafts?*

A. Special care has been directed toward closing the openings around pedals and controls in toe and floor boards and other openings. Heavy carpet is used in front compartment on Custom Sedan and Sport Coupe. Felt backed rubber mat in other models. The dashes are lined with insulating material. All of these improvements effectively muffle engine and road noises and prevent unwanted hot or cold air from entering the front compartment.

85. Q. *How is the body ventilated?*

A. Pleasing indirect ventilation with a new cowl ventilator and direct ventilation through the Fisher VV windshield.

86. Q. *What kind of windshield is used?*

A. Non-glare ten-degree sloping Fisher VV windshield.

87. Q. *What are the advantages of Fisher VV windshield?*

A. Safeguards the driver from the reflected glare of the headlamps of other cars, street lights, electric signs, etc.

88. Q. *What type of sun visor is used?*

A. Safe and comfortable driving due to an inside sun visor, adjustable to any position.

89. Q. *What are the features of the running boards?*

A. Steel running boards with ribbed rubber mats permanently secured are bound with rustless steel moulding crimped on the edge. No attaching screws are visible on running boards or moulding. This metal running board fits the rear fender neatly and securely.

90. Q. *How is ample foot room and neat appearance secured at running board?*

A. A concave running board apron following the contour of the body adds to the beauty of the car and gives more foot room in entering the car.

91. Q. *What improvement has been made on the hood fasteners?*

A. Convenient single control hood fasteners with improved chromed operating handle.

92. Q. *How has the appearance of the rear splash apron been improved?*

A. The rear splash apron extends from fender to fender and curves down to completely conceal gasoline tank and running gear. This adds to the appearance of the car from the rear.

93. Q. *What type headlamps are used?*

A. New chromed streamline headlamps with crowned lenses and double filament bulbs are used on all models.

94. Q. *How are the headlamps mounted?*

A. New pedestal type chromed headlamp brackets mounted on fender supports. All wiring is enclosed.

95. Q. *Is a fender tie bar used?*

A. Elimination of a fender tie bar brings out the graceful combination of full crowned fenders, chromed radiator shell and grille, headlamps and horns giving an unobstructed front view of the car.

96. Q. *How are the headlights operated?*

A. By foot control which affords safety and convenience while driving. Fender lights indicate to the driver the position of headlight beam.

97. Q. *What are the advantages of the fender indicator lamps?*

A. Chromed indicator lamps mounted on the front fenders provide added beauty and increased safety in night driving. They outline the car from both sides and front for approaching drivers. They also indicate the position of the headlight beam.

98. Q. *How are the body mouldings formed?*

A. All body mouldings are narrow and are pressed in the body panels. The drip moulding is also pressed in the roof panels.

99. Q. *What is the advantage of the type of body moulding used?*

A. It eliminates rust, squeaks and cracked paint which is common at the edges of the attached type of moulding.

INSTRUMENT PANEL

100. Q. *What type of instrument panel is used?*

A. Recessed instrument panel finished to harmonize with the interior fittings.

101. Q. *What type instruments are used?*

A. Newly designed, large pointer type instruments including: speedometer, gasoline gauge, ammeter, oil and temperature gauge.

102. Q. *How is the instrument panel illuminated?*

A. Both direct and indirect lighting of the instrument panel is provided.

EQUIPMENT

103. Q. *What is Standard Wheel Equipment?*

A. Five wire wheels with 40 sturdy spokes and 7¾-inch chromed hub caps which conceal wheel attaching bolts.

104. Q. *What size tires are used?*

A. Large, easy riding 17 x 6.00 inch tires.

105. Q. *What optional wheel equipment is available at extra cost?*

A. Five demountable wood wheels with 12 massive spokes and large chromed hub cover which conceals attaching bolts are available at extra cost. Painted finish on Standard Models only $7.50. Natural Wood finish on Sport Models only $10.00.

Six Wire Wheels or Six Wood Wheels with spare wheels in front fender wells are also available at additional cost.

106. Q. *What is the standard horn equipment?*

A. On all models twin full chromed trumpet-type horns are mounted one under each headlight.

SERVICE WARRANTY

107. *What Service Warranty is given with the 1932 Pontiac?*

A. The Service Warranty provides that any part which proves defective in material or workmanship before 4,000 miles or 90 days, whichever occurs first, will be replaced without charge for either labor or material. This service policy is effective in the United States or Canada.