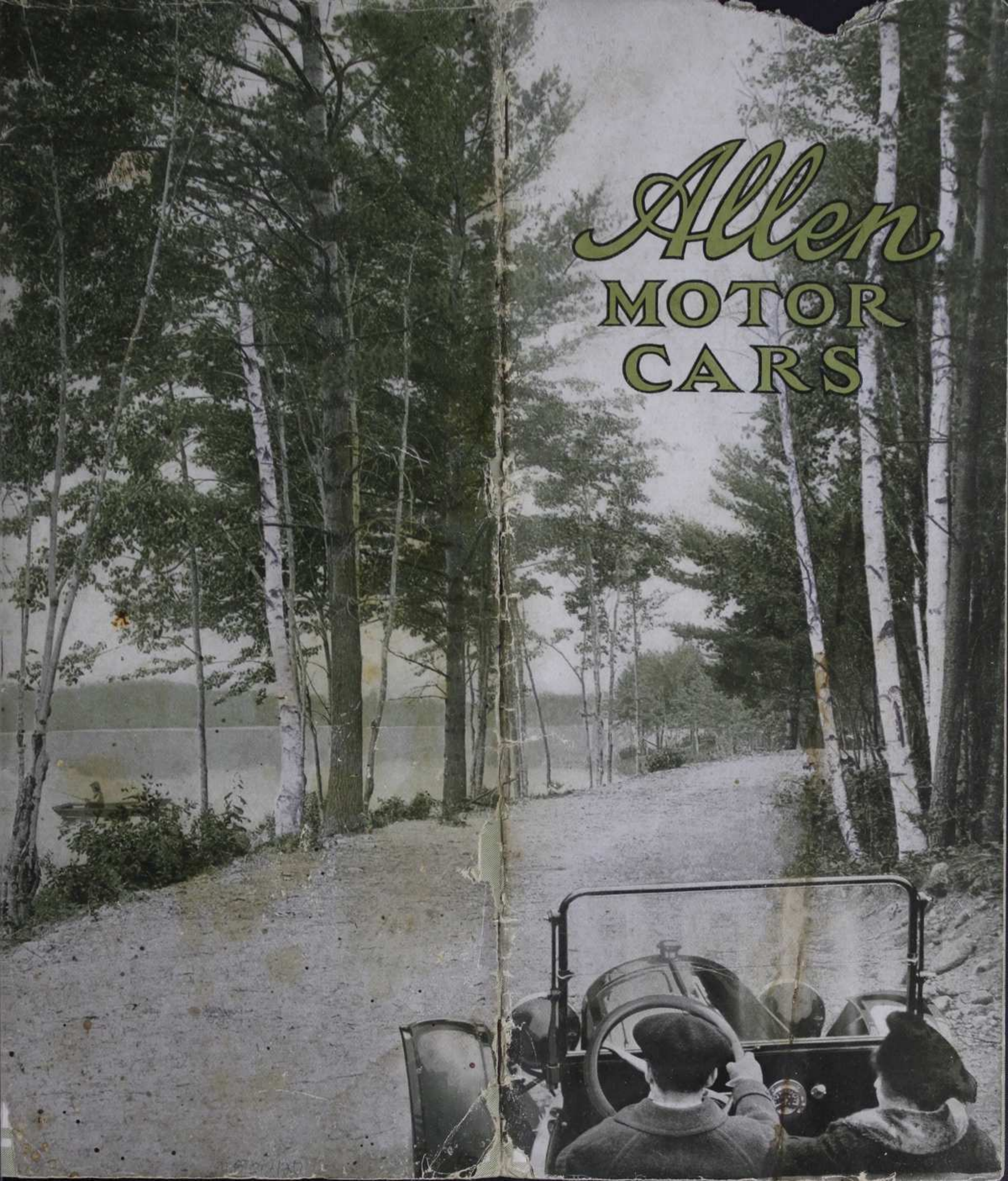


"BUILT
'ON THE
SQUARE'
WITH
POWER TO
SPARE"

Allen
MOTOR
CARS



Allen
MOTOR
CARS





W. O. ALLEN
Treasurer and Gen.
Manager of The
Allen Motor
Co.

*From a
Commercial
Standpoint*

THE essential facts that commend our product to the live dealer and the keen buyer are these:

Cars that give every buyer his full money's worth and afford the maximum of motoring pleasure.

Backed by a reliable Company, permanently established and financially strong.

Whose policies are broad and liberal—uniformly honest dealing with the public and all business associates.

Eliminating all extravagance and unnecessary overhead expenses enables us to keep the quality up—the prices down—and still make a small, well-earned profit, with which we are content.

For twenty-five years, the Allen policy of building integrity into its product has won success for manufacturer and dealer and satisfaction for the consumer. We propose to hold our present patronage and add to it by a continuance of this same policy.

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- Pages 10 to 11.
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Models 38 and 40.



L. A. SOMMER
Mechanical Engineer
and Gen. Factory
Manager

*From a
Mechanical
Standpoint*

ALLEN CARS are built for ultimate economy and satisfaction. They are not designed simply to reduce first cost, or to comply with any sensational fad of today. They are built to stand the "acid test" of actual use—to do their work satisfactorily, year after year, with least cost of operation and maintenance.

We aim to produce a common-sense car—a car that will remain free from trouble—a car that will make its owner glad that he decided upon an Allen.

The Allen chassis is mechanically right—it is designed on sound mechanical principles—as light as is consistent for safe conveyance of five passengers over rough roads, yet strong enough to travel at maximum speeds, or negotiate any road condition without fear of overstraining the working parts.

Power, in proportion to weight, is considerably above the average and ample to take care of all emergencies.

The balance of the car—that which is seen from the outside—bodies, tops, upholstery, finish, etc., is far above the ordinary, being done by men who have become experts through many years of training.

For details of mechanical construction, study the following pages. While space does not permit complete descriptions, an accurate idea may be obtained as a basis for comparison of the essential points with those of other cars.

Your decision being in favor of the Allen, you may depend upon it that the factory will stand right behind your car and will always be ready to assist you to obtain maximum satisfaction from its use.

Reasons for Allen Superiority

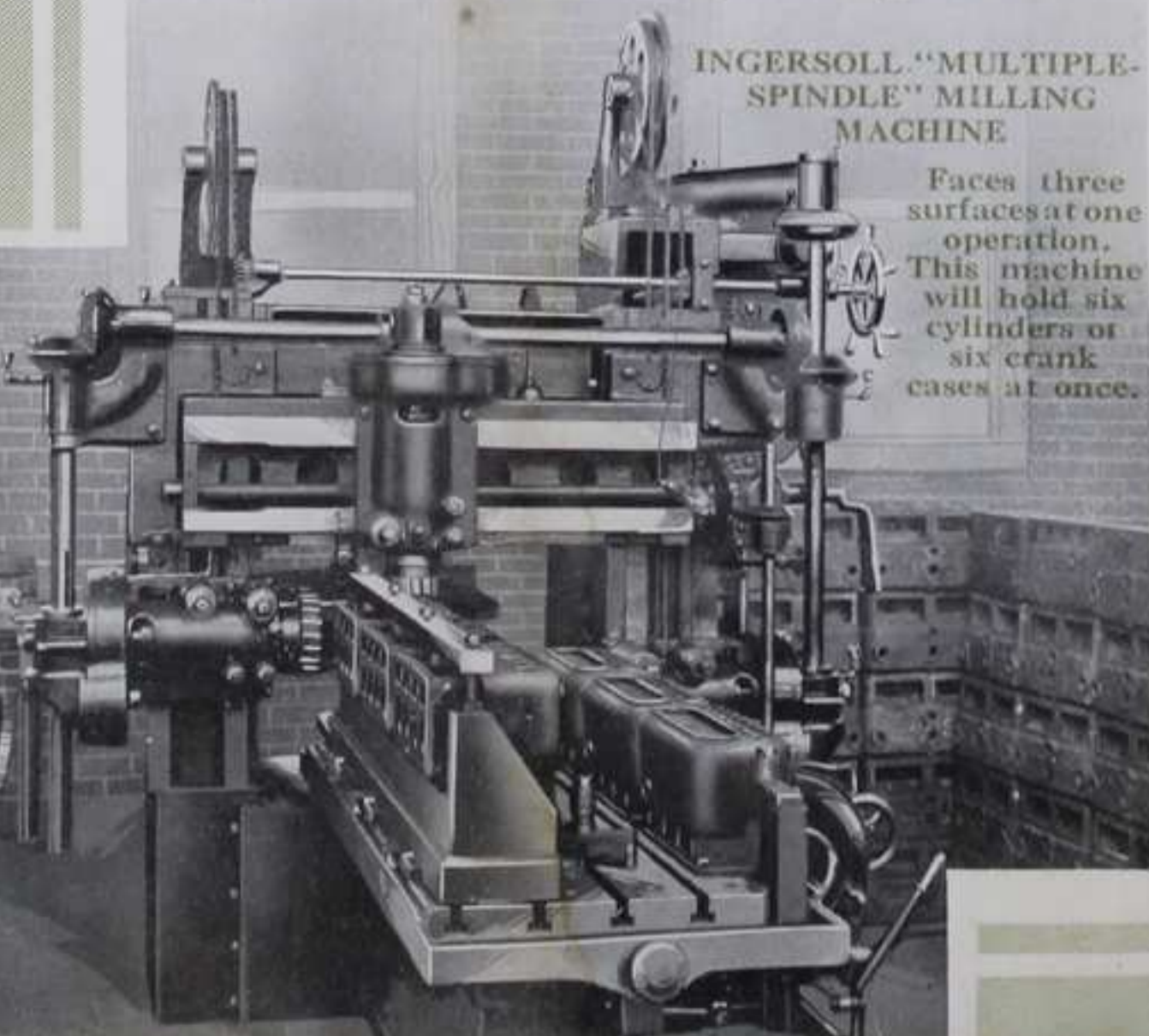
HAVING spoken of Allen policies and touched upon the ability behind the mechanical construction of Allen cars, it remains to tell the prospective buyer what he should know about the materials used, methods of manufacture and details of design.

Materials

The proper selection of materials is of prime importance in modern automobile construction. Realizing this, the Allen Purchasing and Engineering Departments work in close co-operation, the sole idea being to obtain the best for each purpose and not what can be bought cheapest.

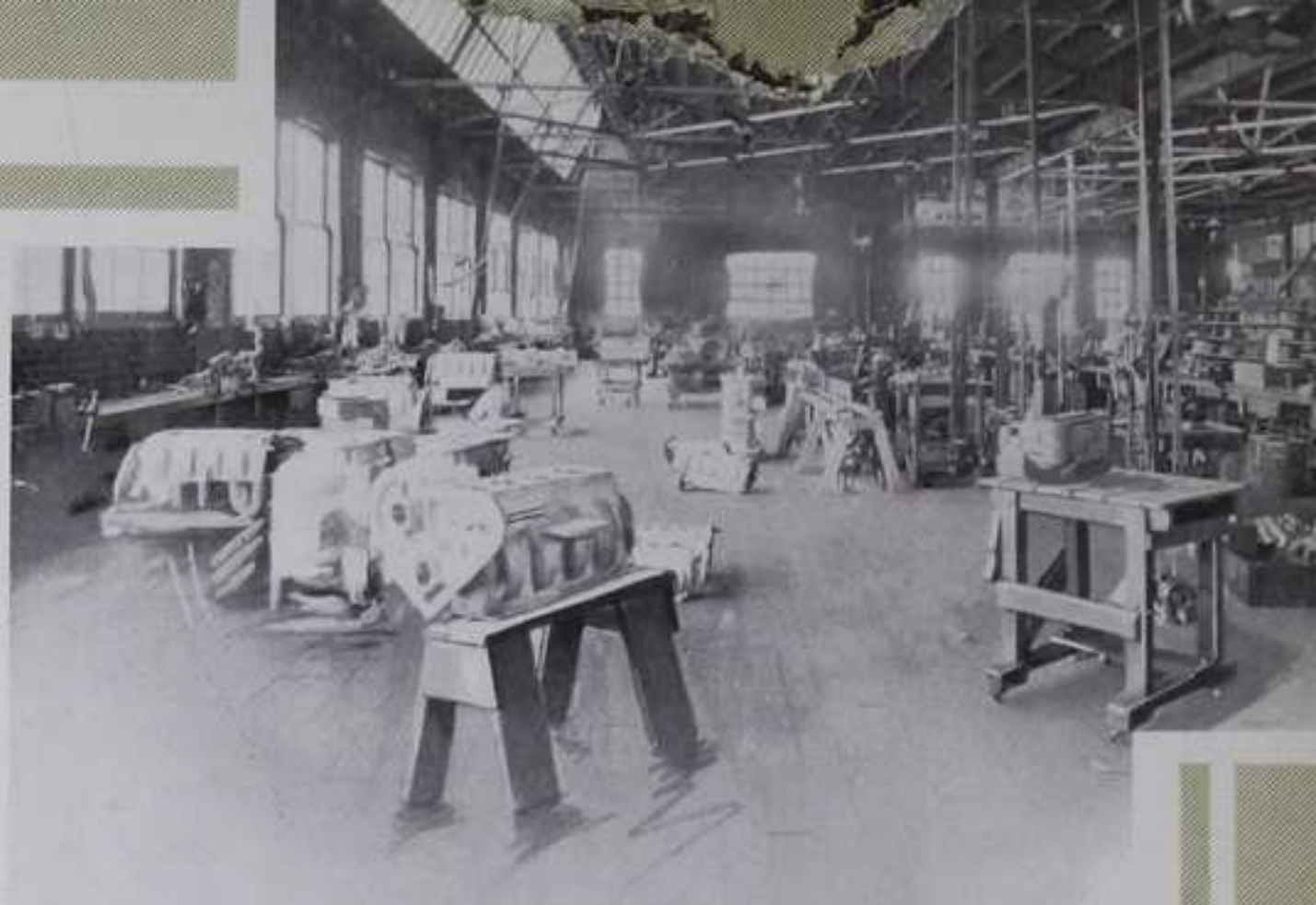
In line with the modern "Safety First" idea, our determination is to make the Allen car as nearly indestructible as possible. With this end in view, we use a large number of drop forgings and pressed-steel parts. It is a well known fact that these materials have the greatest strain-resisting qualities in proportion to weight. Cheaper built cars substitute steel and iron castings, which cost less but are not reliable.

As will be noted from the specifications, a large percentage of the steel parts used on Allen cars are made from alloy steels, especially 3½% Nickel Steel, Chrome Nickel Steel and Chrome Vanadium Steel. These alloys have proven to be the toughest and most impervious to wear for gears, shafts, bolts, etc., which are subject to great strain.



INGERSOLL "MULTIPLE-SPINDLE" MILLING MACHINE

Faces three surfaces at one operation. This machine will hold six cylinders or six crank cases at once.



PORTION OF MOTOR ASSEMBLY DEPARTMENT
Well lighted and roomy

All steel parts are most carefully heat treated, greatly increasing their strength.

The same minute care and studious attention is given to the selection of all other materials, both raw and finished, entering into the construction of Allen cars.

It would take a volume to cover the details of this subject, but suffice it to say that Allen Officials and Engineers are "cranks" on having things right.

Every piece of material is most rigidly inspected in a roomy, well-lighted, inspection room, not by boys, or ordinary mechanics, but by technically educated men who are well paid for being critical. Metals are analyzed, steels are tested and nothing is passed to the stock room that will not uphold the high standard of Allen quality.

Manufacturing Policies

The question is frequently asked whether we "make" the Allen car or "assemble" it. We do not go to an extreme on either policy, although we probably manufacture a larger proportion of the car than the average automobile factory.

The experience of many other manufacturers, however, has proven the folly of attempting to manufacture the complete car. Even the largest, oldest, and most successful manufacturers buy their axles, steering gears, starting, lighting and ignition equipment, etc. Such parts, which have been standardized within the last few years, are now manufactured on an enormous scale by specialists, producing them cheaper and better than an individual automobile manufacturer can possibly do. Such parts we buy and assemble.

On the other hand, these principles do not apply to some of the other parts,

especially the power plant, which is the heart of any automobile. We, therefore, manufacture this unit in our large, modern machine shop at Bucyrus, Ohio. This shop has been years in developing to its present fine equipment and efficient organization under the able leadership of Mr. L. A. Sommer.

The taking over of The Sommer Motor Co. by The Allen Motor Co. was effected to obtain the exclusive use of this wonderful motor on Allen cars. Mr. Sommer has made a life study of internal combustion engines, and has been many years in bringing this motor to its present state of perfection. There is not a plant in the country producing a better motor, all things considered.

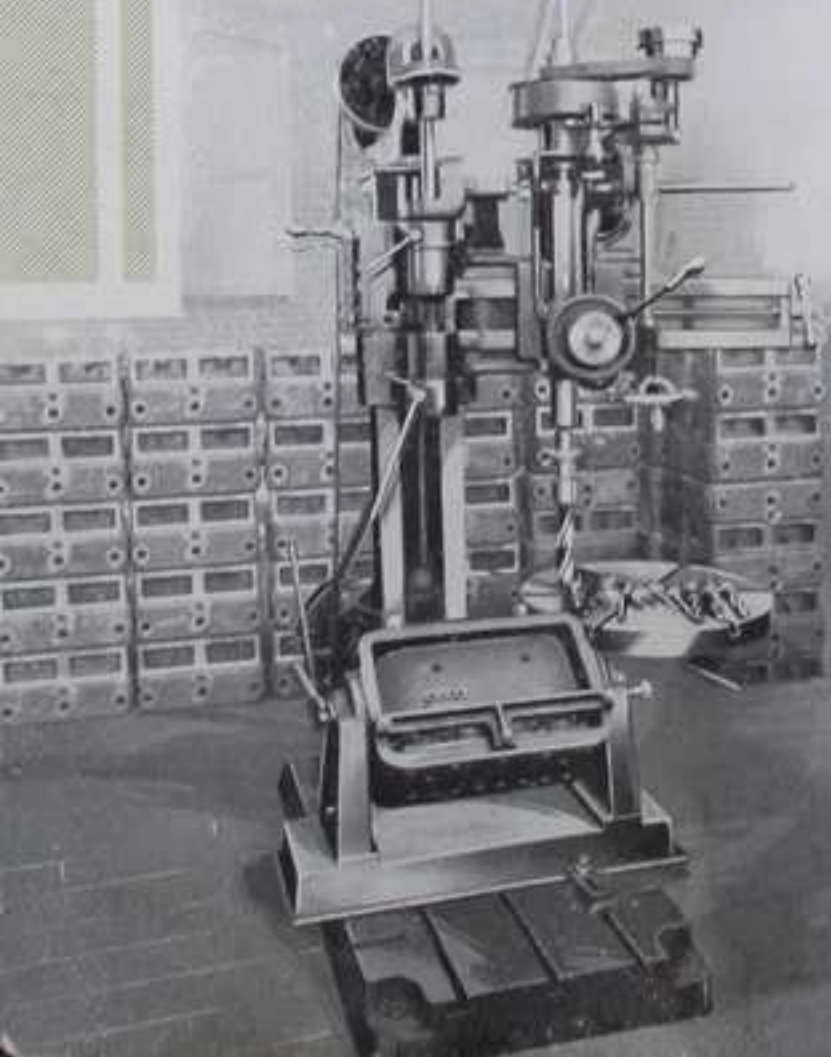
Manufacturing Methods

All machining operations on parts for Allen cars are done with special tools and jigs. Such special equipment is, by all means, the most important element entering into automobile manufacture. The design of the special machining fixtures, tools and gauges, is where one mechanical engineer can outstrip the efforts of another. The accuracy and interchangeability of parts, as well as economy of manufacture, are dependent almost wholly upon the ingenuity and efficiency of this equipment.

A trip through the Allen factories would be a revelation to the average man. There are a few who realize the extensive facilities required, and the extreme care which is taken, by the use of accurate limit gauges and micrometers, to have every part where accuracy is essential, absolutely perfect to a thousandth of an inch.

Special attention is given to the scientific heat treating of steels used in Allen cars. This is done with minute care,

under the able supervision of Mechanical Engineers with special training for this line of work. Every appliance for heat



DRILLING FIXTURE, DRILLING ALL HOLES IN CYLINDERS
This method of machining is a guarantee of absolute interchangeability.

RADIAL DRILL, DRILLING CRANK CASE BY USE OF JIG
All holes are drilled in casting before removed from jig, insuring uniformity of parts and economy of manufacture.



treating and hardening is installed in a special department. There are few who fully realize the great benefits derived by applying modern methods to this work. The tensile strength of most steels can be doubled by proper heat treating, and the grain of the metal is rendered extremely tough, enabling it to withstand heavy strains without fracture, whereas, the same piece of steel in its original state might have given out under half the load.

The illustrations in the corners of these pages will give a slight suggestion of the machinery and equipment in the Allen factories, but the various processes must really be seen to be fully appreciated.

The Motor

The Allen motor is made in two sizes. The 3⁵/₈ x 5 motor is used in Models 33, 34 and 35, and the 4¹/₈ x 5 in Models 38 and 40. Both sizes are practically the same design and constructed on the same principles, the diameter of the bore being the chief difference. In general terms, they can be described as being—

- | | | |
|-----------|------------|-----------------|
| Compact | Accessible | Silent |
| Sturdy | Simple | Durable |
| Efficient | Powerful | Clean in design |

After studying the construction of nearly every automobile motor built in this country and abroad, we unhesitatingly and positively claim that we know of no one motor which combines the above merits in so large a measure as the present Allen motor. A strong statement, but nevertheless it is fully borne out by the facts and the perfect satisfaction the motors continuously give.

We have practically no claims for replacements of motor parts, and the few part orders are in nearly every case occasioned by accident, or some cause not the

fault of the motor—a record of which we feel justly proud. All Allen dealers and owners are very enthusiastic over the extreme satisfaction these motors are giving in every way.

Motor Design

The long vertical design of the motor has many advantages. It permits not only a long stroke, but also allows room for long pistons, cylinders and connecting rods. This construction greatly increases wearing surface on pistons and cylinder walls and reduces side thrust. The remarkable power and durability of Allen motors is due in a large measure to this design.

Cylinders

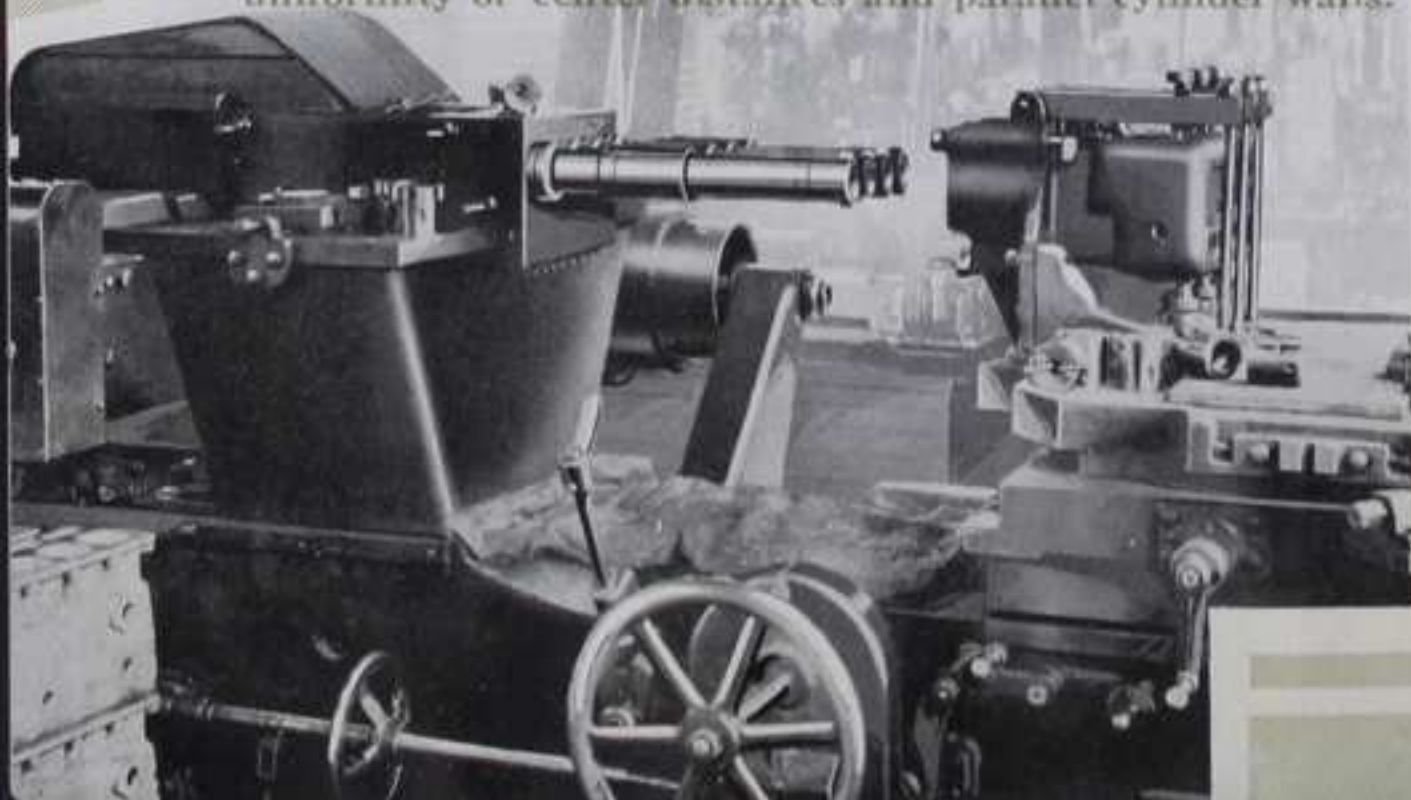
The four cylinders are cast in one piece, including water jackets and gas passages, from highest grade of "semi-steel." The water space is larger than usual in capacity and cored around the cylinders and ports in such a way as to allow free circulation, cooling the cylinders and exhaust ports and at the same time warming the incoming gas on its way to the combustion chamber. The intake passages are free from abrupt bends and are tapered toward the cylinders permitting greater velocity of gas travel.

Pistons

The pistons are $4\frac{3}{4}$ " long, having three rings above the center. Both cylinder walls and pistons are ground accurately to size, with proper allowance for expansion. Pistons are machined with special fixtures of ingenious design making possible thin walls of uniform thickness. Grinding fixture holds casting in a manner which avoids distortion, so that the piston is perfectly round when complete. Light, perfect-fitting pistons greatly assist the balance, power and fuel economy of the motor. The use of oil grooves and return ducts in pistons compel

BEAMAN AND SMITH "MULTIPLE-SPINDLE"
CYLINDER BORING MACHINE

This massive machine takes the roughing and finishing cuts of all four cylinders at one operation, insuring absolute uniformity of center distances and parallel cylinder walls.



PORTION OF MILLING MACHINE DEPARTMENT,
Motor Plant, Bucyrus, O.

lubrication of cylinder walls and prevent oil from passing by to the combustion chamber. This feature eliminates trouble from foul spark plugs and excessive carbon in top of cylinders, heretofore a source of continual annoyance, especially to new drivers.

Connecting Rods

I-beam section, steel drop forgings, scientifically designed for lightness and strength, $10\frac{1}{2}$ " long. Piston pin is hollow, hardened and ground, oscillates in piston bosses, thus doubling wearing surface. Extra large crank pin bearing, $1\frac{7}{8}$ " dia. by 2" long.

Crank Shaft

Drop-forged from special high-carbon steel, heat treated to relieve strains and toughen. The tensile strength of the crank shaft steel, after being heat treated, is 110,000 pounds to each square inch of cross sectional area. The Scleroscope test for hardness registers 36 points which insures long wear at bearings, a very important requirement. The crank shaft is designed with very husky proportions. The heavy webs and large-diameter bearings make springing and fracture from crystallization impossible. Machining and grinding is done with extreme care. Corners of bearings are filleted to obviate localization of strain.

Especial attention is given to the subject of balancing the crank shaft, as well as the reciprocating parts, connecting rods, pistons, and piston pins. The usual practice of employing the "standing balance" method is not sufficient. Every Allen crank shaft is balanced on a Norton "running balance" machine, this method being technically termed the "Dynamic Balance." The delicate mechanism of this scientific instrument will detect and locate a small fraction of an ounce, if the crank shaft is the least bit out of balance. The same care also taken with the fly wheel and clutch makes possible the smooth-running qualities of Allen motors.

(Descriptions continued on Page 16)

Mechanical Specifications

(Condensed)

Covering Models 33 and 34, illustrated
on pages 12 and 13

Model "34" Touring Car, \$895

Unit Power Plant includes motor, clutch, transmission, generator, starting motor and all controlling pedals and levers, three-point suspension.

Motor. Allen, long stroke, four cylinders cast en bloc, $3\frac{5}{8}$ x 5, piston displacement 207". Aluminum crank case. Silent and powerful, developing 37 H. P. by dynamometer test.

(For details of motor construction, see text and illustrations on page 16.)

Starting, Lighting and Ignition. Westinghouse system, consists of engine speed generator, with automatic control. L. B. A. storage battery, heavy duty type, 80 Amp. hr. capacity. Separate starting motor geared to fly wheel rim. Spins motor 150 R. P. M. Bendix automatic gear control.

Carburetor. Stromberg. Hot auxiliary air connection. Air control for cold weather starting on instrument board.

Valves. Enclosed, cast-iron heads. Valves interchangeable, adjustable tappets.

Cooling. Thermo-syphon, $4\frac{1}{2}$ -gallon water capacity, 14" fan, tubular radiator.

Lubrication. Combination, force pump feed and constant level splash system. Six-quart reservoir with float gauge. Plunger pump maintains constant level.

Clutch. Cone type, pressed steel, leather faced, $13\frac{3}{4}$ " diameter, $2\frac{3}{8}$ " wide. Engages on inner surface of fly wheel, standard $12\frac{1}{2}$ " taper. Springs in face making gradual contact, adjustable tension, no grabbing or slipping.

Transmission. Selective sliding gear type, three forward speeds and reverse. Imported S. K. F. annular, self-aligning, double-row ball bearings. Chrome nickel steel, drop-forged gears, chrome vanadium steel shafts. Four splines on sliding gear shaft. Aluminum case. Ratio on low, 12 to 1. Second, $6\frac{3}{4}$ to 1. Direct on high, 4 to 1. Reverse, 14 to 1.

Control. Entirely from driver's seat, left-side steer, center control. Clutch pedal operated by left foot; service brake pedal, accelerator and starting switch with right. Spark advance and hand throttle control levers on top of steering column, with friction contact on segment.

Universal Joint. Heavy drop-forged yokes, hardened and ground pins, enclosed in pressed steel, grease-tight housing of ball and socket type. Square center hole for end of propeller shaft.

Steering Gear. Worm and full gear type, made by Warner Gear Co. Irreversible. Worm mounted on ball thrust bearings, eccentric adjustment accessible from exterior. 17" walnut steering wheel. Fore and aft reach rod with adjustable ball and socket spring joint on each end.

Rear Axle. Weston-Mott, semi-floating type, 4 to 1 ratio, $1\frac{3}{8}$ " diameter, nickel steel tapered shafts. "Hyatt Quiet," flexible roller bearings, three and one-half per cent nickel steel driving gear and pinion, five-pitch teeth, $1\frac{5}{8}$ " face. Bevel gear differential.

Brakes. Service brake $12\frac{1}{2}$ " x 2" external contracting, left-foot control. Emergency brake 12" internal expanding, right-hand lever control. Oil shedders prevent oil getting on braking surface. Springs on brake bands prevent dragging. Turn-buckle brake adjustment.

Front Axle. Weston-Mott, one-piece I-beam drop-forged carbon steel. $2\frac{1}{4}$ " x $1\frac{1}{2}$ " section. $1\frac{3}{8}$ " spindles. Extra large dust-proof nickel steel ball bearings in front hubs.

Frame. Pressed steel, $3\frac{1}{2}$ " x $1\frac{1}{2}$ " channel section, $\frac{5}{8}$ " thick. Four cross members rigidly braced, hot riveted.

Springs. $1\frac{3}{4}$ " wide, high carbon spring steel, triple oil tempered. Front, 34" long, semi-elliptic, seven leaves, eyes bushed. Rear, 46" long, three-quarter elliptic, seven leaves. Ground bolts with oil grooves and grease cups.

Fuel Tank. Eleven-gallon capacity, double-seamed and soldered, sediment chamber at outlet, located under front seat.

Wheels. 32" artillery type. Kiln-dried, second growth, straight-grained, $1\frac{3}{8}$ " hickory spokes and felloes. Hub-cluster, 7" in diameter. Demountable rims.

Tires. 32 x $3\frac{1}{2}$, straight side, Q. D. Best standard makes. 33 x 4 fit same rims.

Road Contact. 110" wheel base. Width of tread, 56". Road clearance, $10\frac{1}{2}$ ", center of front axle, lowest point.

Body. Five-passenger. Handsome stream line design. Roomy and comfortable. Extra wide doors with concealed hinges; deep, luxurious "Mule-skin" upholstery, diamond pattern tufting. Fitted with robe rail. Linoleum-covered floor boards, aluminum bound. (See cut on page 14 for dimensions.)

Instrument Board. Contains speedometer, switches for ignition, lighting and starting, volt meter and air control lever, all mounted flush.

Fenders, etc. Crowned fenders, with ample wheel clearance. All sheet metal parts pressed from three-pass, double-pickled, cold-rolled automobile steel. Fenders and steps rigidly braced. Hood has concealed side hinges and rubber body protectors on corners.

Finish. Black. Sheet metal parts, japanned three coats, baked at 350°. Body, deep gloss finish with fine gold stripe. Nickel and aluminum trimmings.

Standard Equipment. Electric self-starter, electric headlights with dimming switch. Electric tail light provided with license bracket. Electric horn. Speedometer with trip and season odometer. Rear tire irons. Extra demountable rim. Rain vision, ventilating, plate-glass windshield. Standard type mohair top with side curtains and slip cover. Robe rail. Full set of tools in canvas case. Tire repair kit. Compound pump. Lifting jack.

Weight. 2,300 pounds.

Price and Terms. \$895, f. o. b. Fostoria, Ohio. Crating or boxing for ocean shipment extra. Terms: Deposit with order; balance payable sight draft with bill of lading attached.

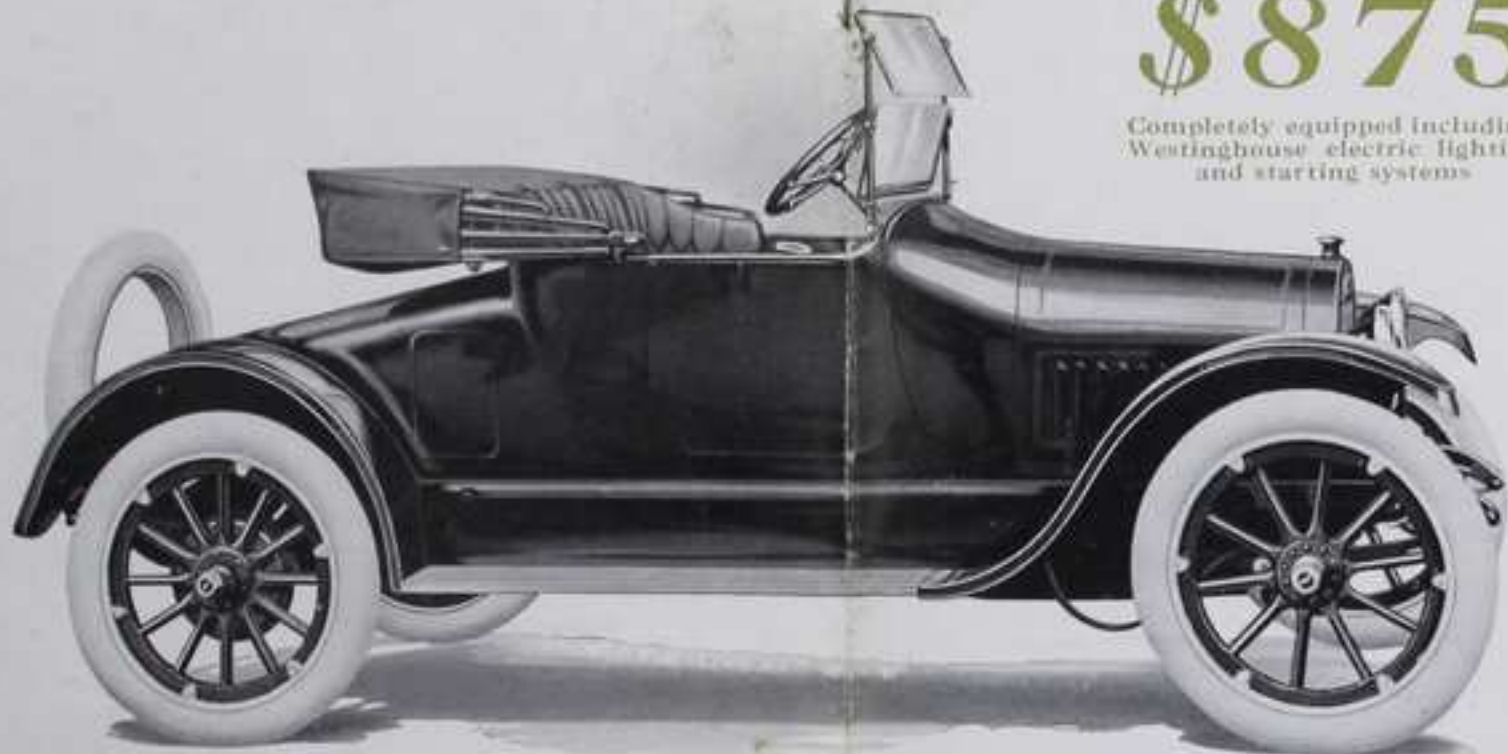
Model 33. Same specifications as above (Model 34) except roadster body, of handsome design. Large rear compartment, accessible from both sides and rear. Price of Roadster, \$875.



Model 33, Roadster

\$875

Completely equipped including Westinghouse electric lighting and starting systems



The Roadster makes an ideal car for the business or professional man—a roomy and convenient body, with ample storage space. Stylish in appearance, easy riding and speedy.

The Touring Car is truly a pleasure car in the full sense of the word—comfortable, reliable and durable. As a family car this model has no superior.

Both Models are powerful, economical to operate and so simple to control that the women, as well as the men, can drive conveniently and safely.

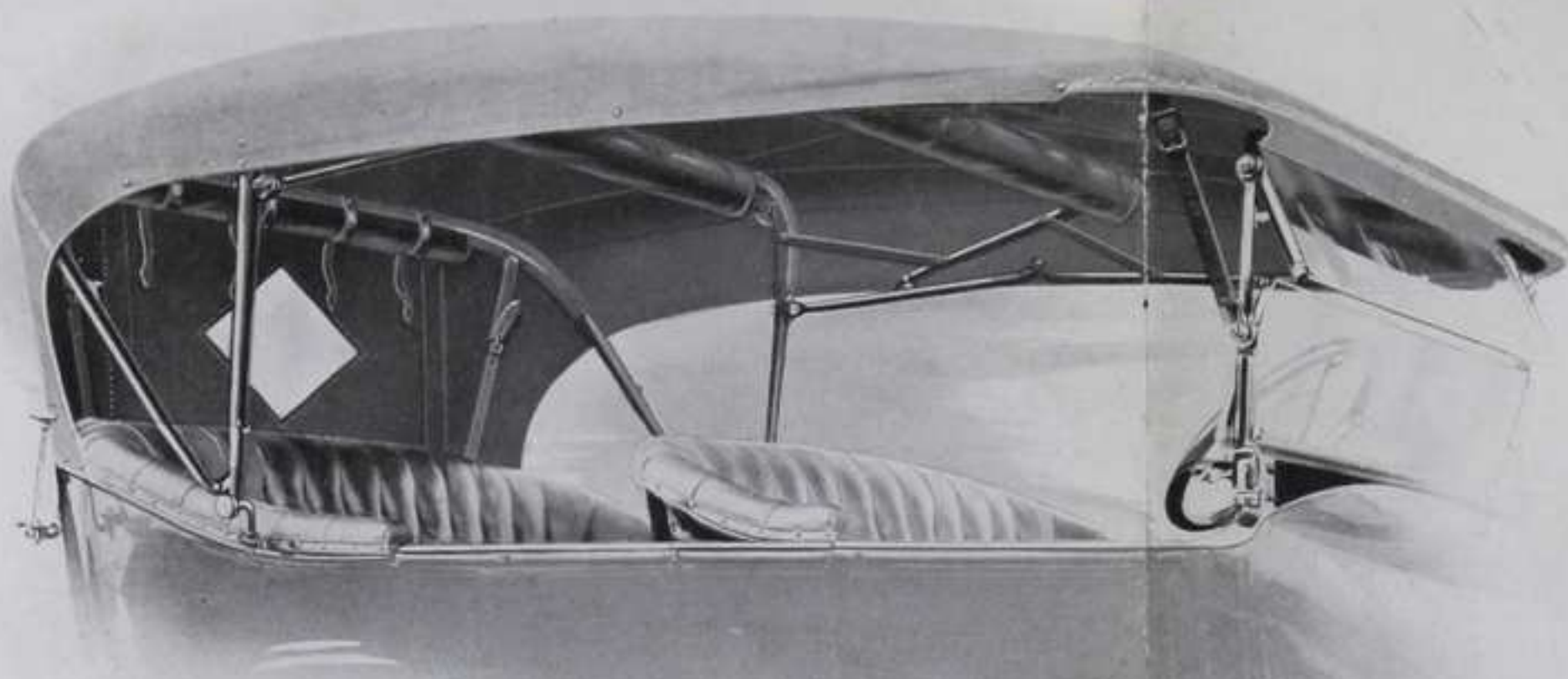
(For condensed specifications, see pages 10 and 11.)

Model 34, Touring Car

\$895

Completely equipped including Westinghouse electric lighting and starting systems





SHOWING METHOD OF CURTAIN STORAGE

Rolls hung at the three top bows by straps convenient for quick attachment in case of sudden rain, without disturbing passengers.

Mechanical Specifications

(Condensed)

Model "35" Touring Car, \$1095

Motor. Allen, long stroke, four cylinders cast en bloc, $3\frac{5}{8} \times 5$, piston displacement, 207 cubic inches. Aluminum crank case. Silent and powerful, developing 37 H. P. by dynamometer test.

(For details of construction, see pages 6 to 9; and page 16).

Starting, Lighting and Ignition. Auto-Lite two-unit system, consists of engine speed generator with Connecticut automatic control. Separate starting motor geared to fly wheel rim. Spins motor 150 R. P. M. Bendix automatic gear shift. Willard six-volt storage battery, heavy duty type, 80 ampere hour capacity.

(Auto-Lite Generator and Motor illustrated on page 20 on Model "40" motor).

Carburetor. Stromberg. Hot-air intake connection. Air control for cold-weather starting on instrument board.

Lubrication. Combination, force pump feed and constant level splash system. Six-quart reservoir, with float gauge. Plunger pump maintains constant oil level in splash troughs.

Clutch. Cone type, $13\frac{3}{4}$ " diameter, pressed steel, leather faced, $2\frac{3}{8}$ " wide. Engages on inner surface of fly wheel, $12\frac{1}{2}^\circ$ taper. Springs in face making gradual contact, adjustable compression, no grabbing or slipping.

Transmission. Selective sliding-gear type, three forward speeds and reverse. Imported S. K. F. annular, self-aligning, double-row ball bearings. Chrome nickel steel, drop-forged gears, Chrome vanadium steel shafts. Four splines on sliding gear shaft. Aluminum case. Ratio on low, 12 to 1. Second, $6\frac{3}{4}$ to 1. Direct on high, 4 to 1. Reverse, 14 to 1.

Control. Entirely from driver's seat, left-side steer, center control. Clutch pedal operated by left foot; service brake pedal, accelerator and starting switch with right foot. Spark advance and hand throttle control levers on top of steering column with friction contact on segment.

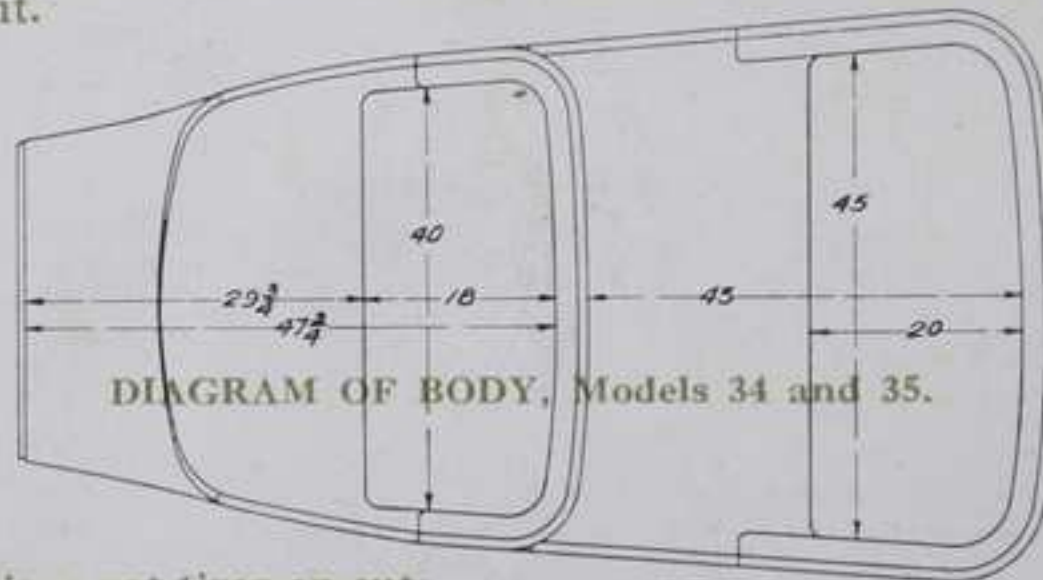


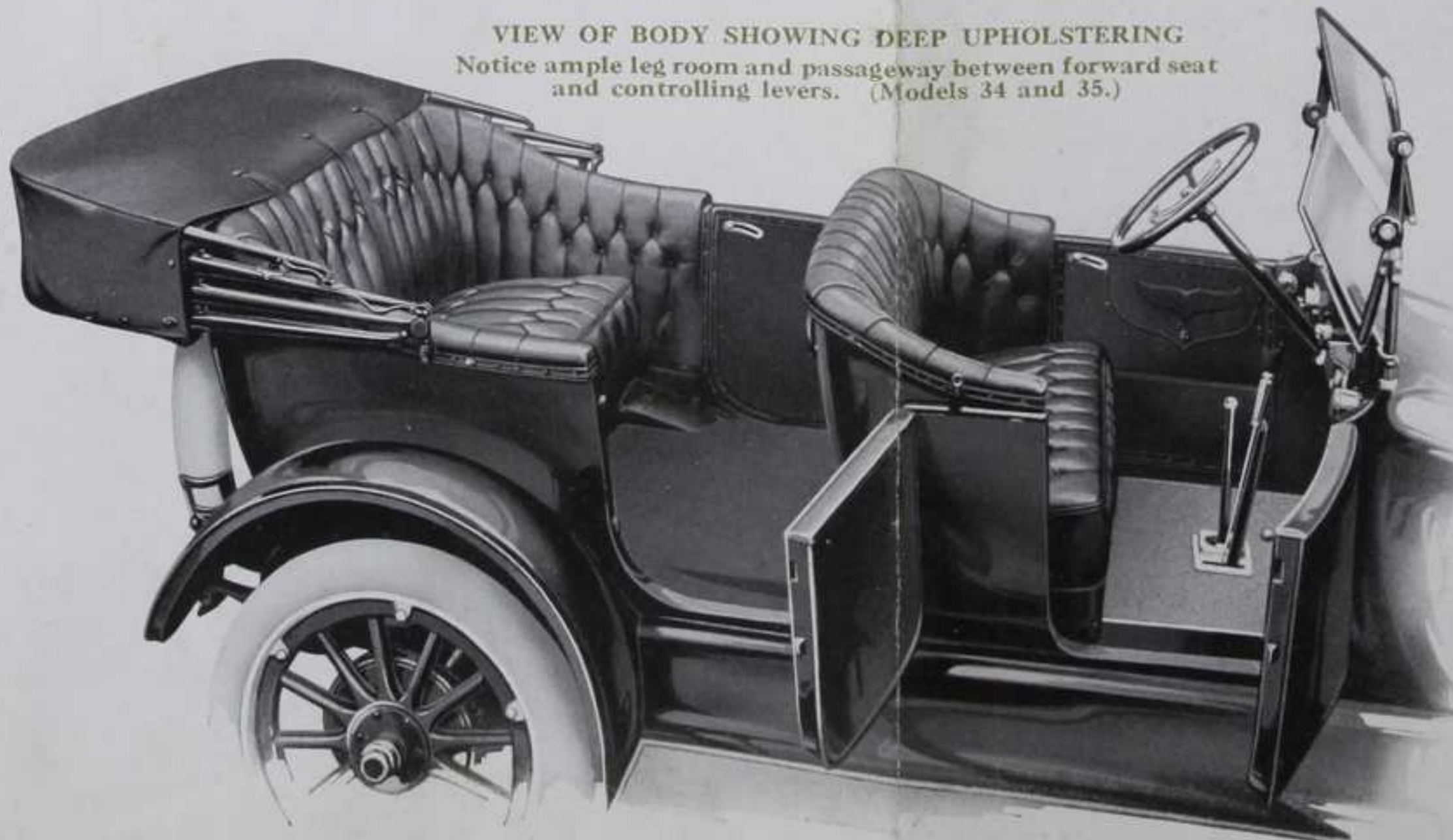
DIAGRAM OF BODY, Models 34 and 35.

Dimensions not given on cut:—

Height of Front seat from floor, $13\frac{1}{2}$ ". Height of Front seat back, 19". Height of Rear seat from floor, $14\frac{1}{2}$ ". Height of Rear seat back, 20". Distance, top of front cushion to steering wheel, 10". Distance, back of front seat to steering wheel, $15\frac{1}{2}$ ".

VIEW OF BODY SHOWING DEEP UPHOLSTERING

Notice ample leg room and passageway between forward seat and controlling levers. (Models 34 and 35.)



Steering Gear. Warner Gear Co. worm and full gear type. Irreversible. Worm mounted on ball thrust bearings, eccentric adjustment for worm gear, accessible from exterior. 17" walnut steering wheel. Fore and aft reach rod, adjustable ball and socket spring joint on each end.

Rear Axle. Weston-Mott, semi-floating type, 4 to 1 ratio, $1\frac{3}{8}$ " diameter, nickel steel tapered shafts. "Hyatt Quiet," flexible roller bearings, $3\frac{1}{2}\%$ nickel steel driving gear and pinion, five-pitch teeth, $1\frac{5}{16}$ " face. Bevel gear differential.

Brakes. Service brake 12½" x 2" external contracting, right-foot control. Emergency brake 12" internal expanding, right-hand lever control. Oil shedders prevent oil getting on braking surface. Springs on brake bands prevent dragging. Turn-buckle brake adjustment.

Springs. 1¾" wide, high carbon spring steel, triple oil tempered. Front, 34" long, semi-elliptic, seven leaves, eyes bushed. Rear, 46" long, three-quarter elliptic, seven leaves. Ground bolts with oil grooves and grease cups.

Fuel System. Stewart-Warner Vacuum Gasoline Feed. Thirteen-gallon cylindrical tank hung at rear. Auxiliary tank mounted on dash.

Wheels. 32" artillery type. Kiln-dried, second-growth, straight-grained, 1¼" hickory spokes and felloes. Hub cluster 7" in diameter. Demountable rims.

Tires. 33 x 4, straight side, Q. D. Best standard makes.

Road Contact. 110" wheelbase. Width of tread, 56". Road clearance, 11" lowest point, center of front axle.

Body. Five-passenger. Handsome stream line design. Roomy and comfortable. Extra wide doors with concealed hinges; deep, luxurious upholstery of extra fine quality, genuine curled hair and strictly No. 1 machine-buffed leather, diamond pattern tufting. Fitted with robe rail and foot rail. Linoleum-covered floor boards, aluminum bound.

Instrument Board. Contains speedometer, switches for ignition, lighting and starting, volt meter and air control lever, all mounted flush, also dash light and sight oil feed gauge.

Finish. Body and wheels beautifully finished in "Brilliant Wine," black and gold striping. Sheet-metal parts, black japanned with three coats, baked at 350° F. Nickel and aluminum trimmings. The whole effect makes a very striking and handsome finish.

FRONT
QUARTER VIEW
OF MODEL 35

Notice crown
fenders and
rounded radiator

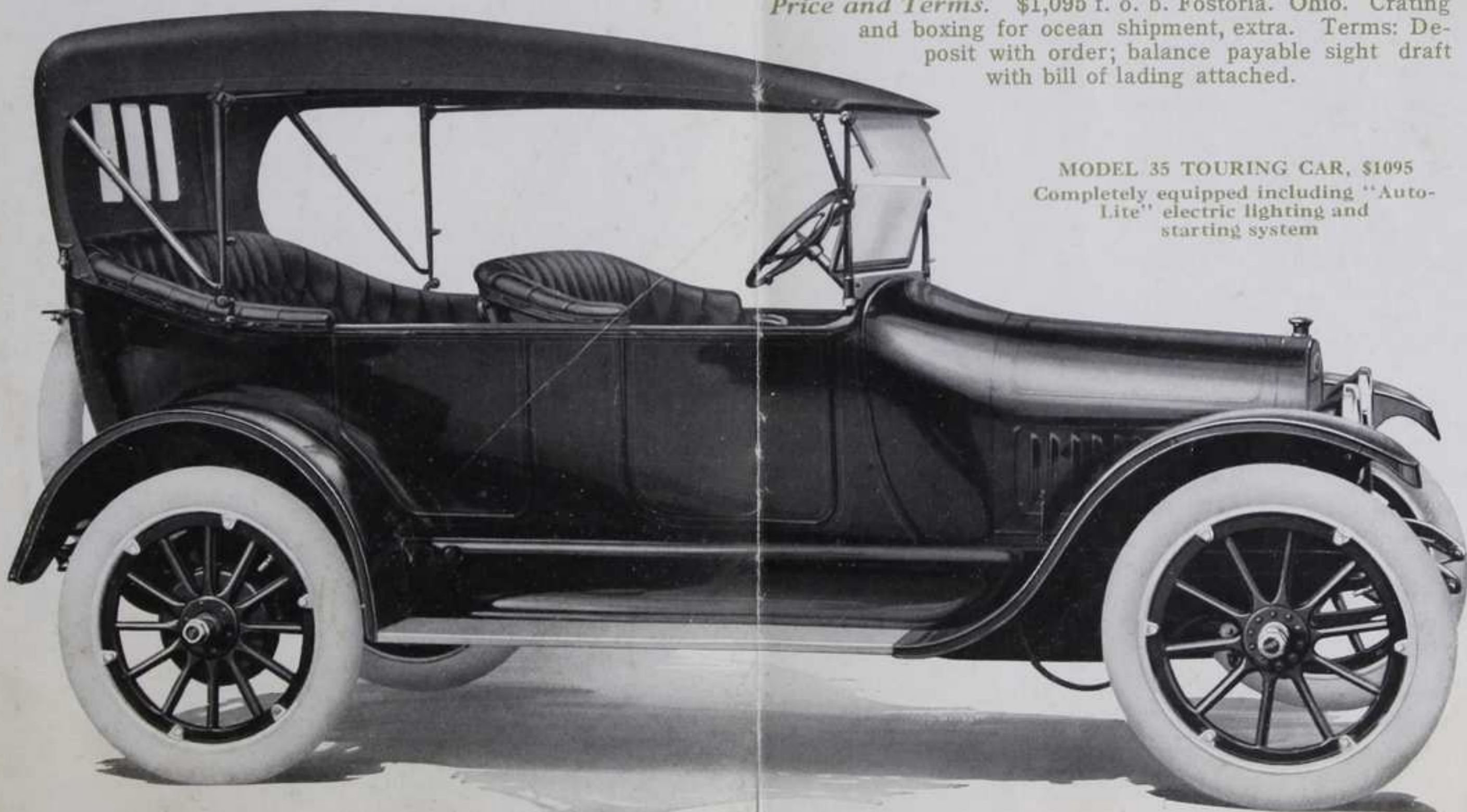


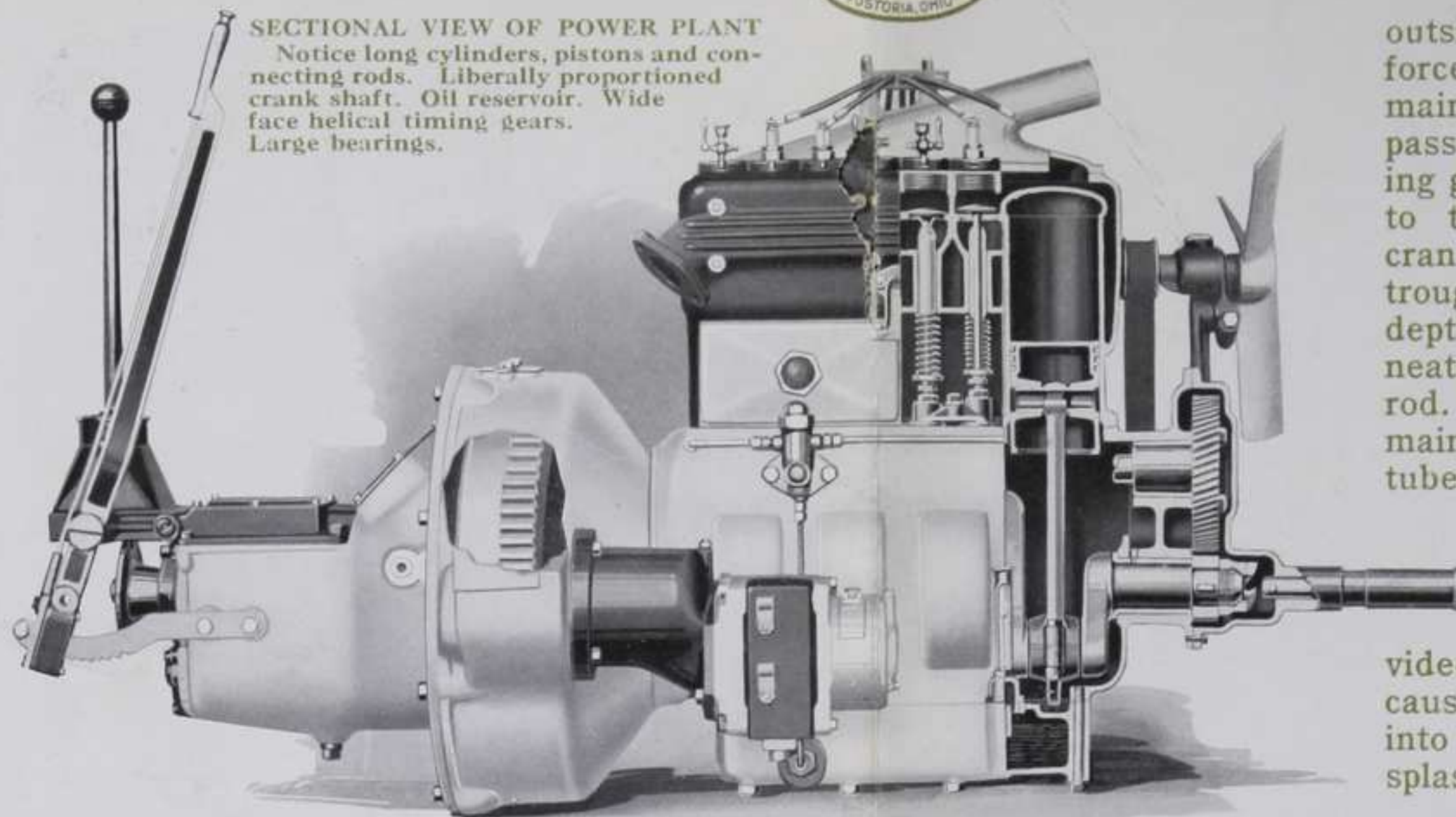
Standard Equipment. Electric self-starter, electric head lights with dimming switch. Tail light provided with license bracket. Electric horn, speedometer with trip and season odometer. Rear tire irons. Extra demountable rim. Rain vision, ventilating plate-glass windshield. One-man silk mohair top, with side curtains and slip cover. Robe rail, foot rail, full set of tools in canvas case. Tire repair kit. Compound pump. Lifting jack.

Weight. 2,300 pounds. Boxed for foreign shipment approximately 3,200 pounds.

Price and Terms. \$1,095 f. o. b. Fostoria, Ohio. Crating and boxing for ocean shipment, extra. Terms: Deposit with order; balance payable sight draft with bill of lading attached.

MODEL 35 TOURING CAR, \$1095
Completely equipped including "Auto-
Lite" electric lighting and
starting system





SECTIONAL VIEW OF POWER PLANT
Notice long cylinders, pistons and connecting rods. Liberally proportioned crank shaft. Oil reservoir. Wide face helical timing gears. Large bearings.

outside of the crank case, forces the oil to the front main bearing, it then passes through the timing gears and overflows to the bottom of the crank case, where four troughs give the proper depth of oil directly beneath each connecting rod. A constant level is maintained by overflow tubes, which run the surplus back to the reservoir. Each crank pin bearing is provided with a scoop which causes the oil to flow into the bearing and splashes it to all moving

Cam Shaft

Drop-forged in one piece, $1\frac{1}{8}$ " diameter, three bearings. This makes a very stiff shaft which will not chatter, also enabling positive and quiet valve action. Shape of cam is so designed that maximum speed and power can be obtained, at the same time permitting quiet valve action.

Bearings

Are over-size. Bushings die cast from S. A. E. formula Babbitt. Rear main bearing $4\frac{1}{2}$ " long; front main bearing $3\frac{1}{2}$ " long; crank pin bearings 2" long; all being $1\frac{7}{8}$ " diameter. It will be noted that the rear main bearing, which supports the weight of the fly wheel, one of the most important bearings in any automobile, has 26 square inches of surface, which is exceptional for this size of motor.

Valves

Large diameter, cast iron heads, nickel steel stems, electric welded. Push rods, square, running in Babbitt-lined, cast-iron sleeves. Adjusting screw and lock nut at top of each push rod makes possible easy and exact adjustment of space at bottom of valve stems, a most important factor to proper valve action.

Oiling System

The lubrication of Allen motors requires little or no attention outside of keeping the reservoir supplied with a good grade of motor oil. The oil pump, on the

parts of the motor. Oil level in reservoir is indicated by float gauge.

Timing Gears

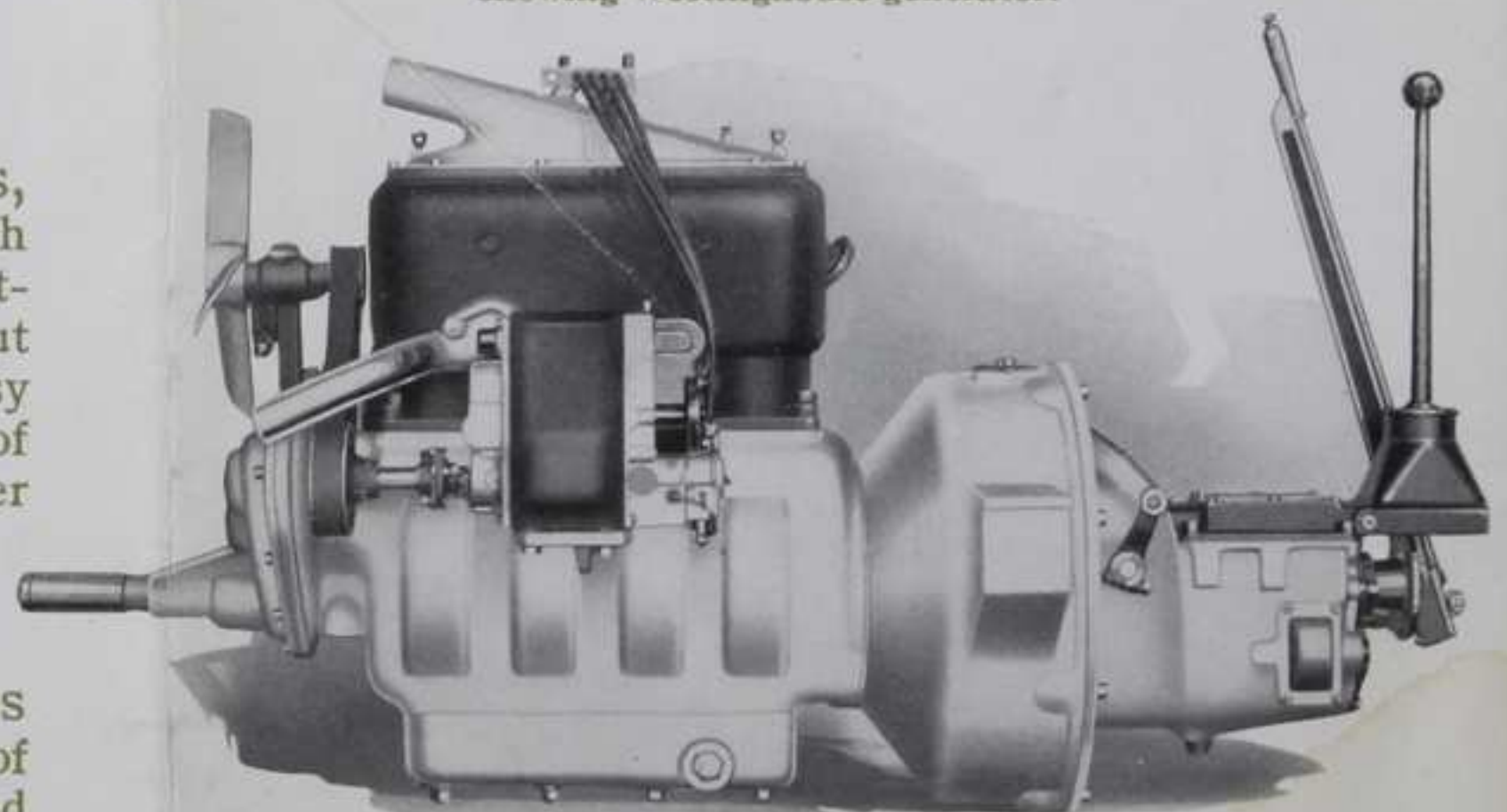
The four gears contained in front housing have one-inch wide face with helical shaped teeth making them quiet in operation. This construction is far superior to the silent chain of spur tooth gear.

CONE CLUTCH
Diameter $13\frac{3}{4}$ ". Face $2\frac{3}{8}$ ". Used on models 33, 34 and 35



UNIT POWER PLANT

Left hand side. Notice simplicity of construction. Also showing Westinghouse generator.





Aluminum Crank Case

On the smaller sized motor, the barrel design is employed, accessible at bottom by removing oil reservoir, which is 8" wide, allowing free access to connecting rod bearings for adjustment.

Clutch

Is a leather-faced, pressed-steel cone, extremely light. Spring pressure is adjustable. Flat springs inserted under leather facing avoids tendency to grab. Clutch spinning is avoided by a



S. K. F. BALL BEARINGS

Outside diameter, $3\frac{3}{8}$ ". Diameter of balls, $\frac{1}{4}$ ". Used in transmissions. Double row, self-aligning type, imported. Inner surface of outer ball race ground spherical, allowing for shaft alignment variation in any direction.



fibre clutch brake, which acts automatically as clutch is thrown out and thereby facilitates easy gear shifting.

Clutch release mechanism is exceptionally sturdy, consisting of a drop-forged yoke actuated by foot pedal. This presses against clutch hub flange through a large ball thrust bearing. All visible and accessible through cover plate on housing.

Clutch bearing is oiled from gear chamber through hole central in driving gear shaft. With this



FRONT AXLE
Used on Models 33, 34 and 35.
Neat and substantial design

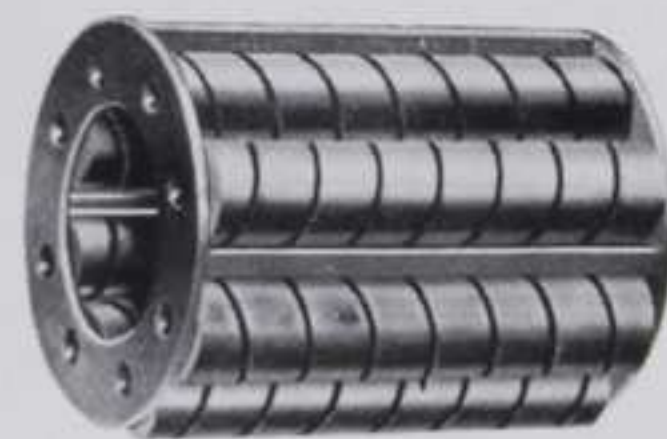
construction all transmission and clutch troubles are eliminated.

Rear Axle

Weston-Mott, semi-floating, $1\frac{3}{8}$ ", nickel steel shafts, tapered from the outer bearing to the inner end, which tend to distribute the strain over entire length of the shaft and avoid the strain concentrating at the rear wheel bearing, where road shock is greatest.



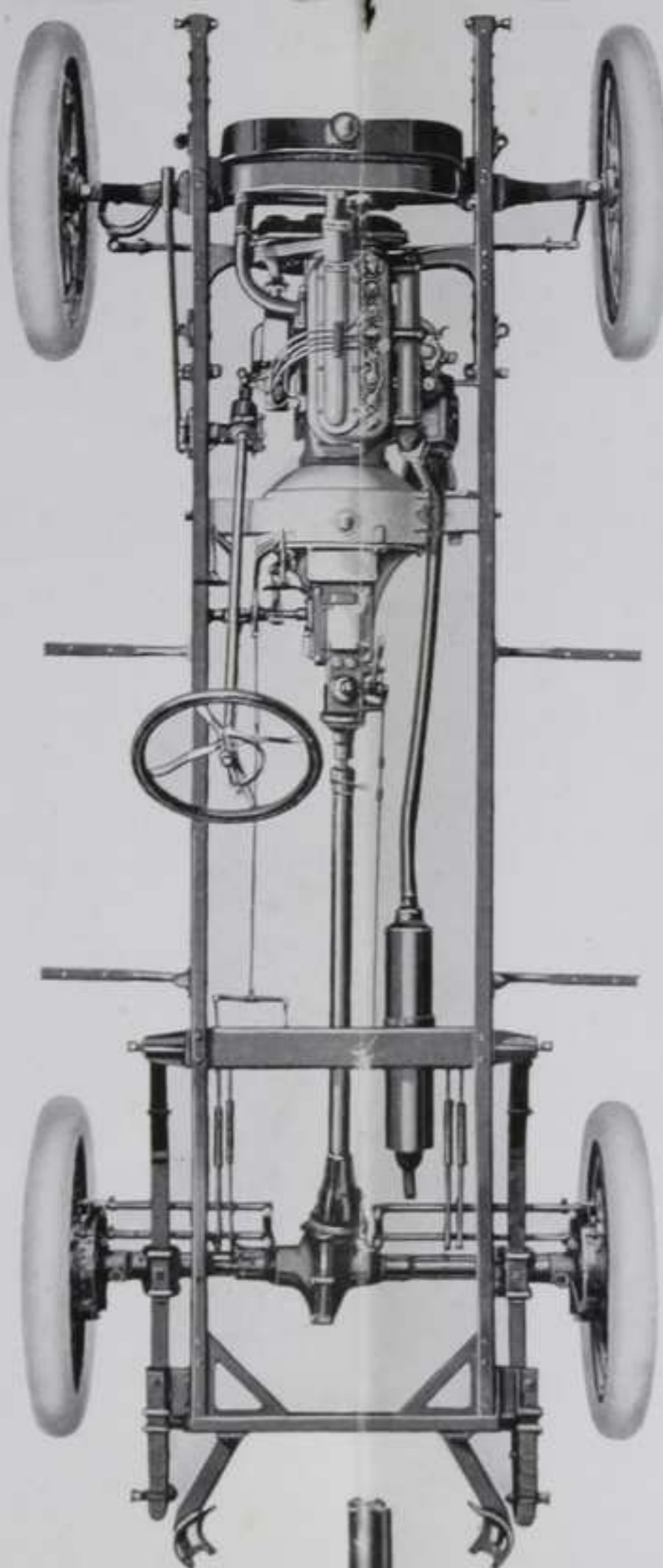
NEW DEPARTURE DOUBLE-ROW ANNULAR BALL BEARING
Outside Diameter, $3\frac{3}{8}$ ". Diameter of balls, $\frac{1}{2}$ ". Used directly back of main driving pinion in rear axle.



"HYATT QUIET" FLEXIBLE ROLLER BEARINGS
Outside diameter, $2\frac{1}{4}$ ". Length, 4". Diameter of rolls, $\frac{1}{4}$ ". Used in rear hubs, Hyatt bearings also used on each side of differential and on propeller shaft. One of the finest axle bearings made.

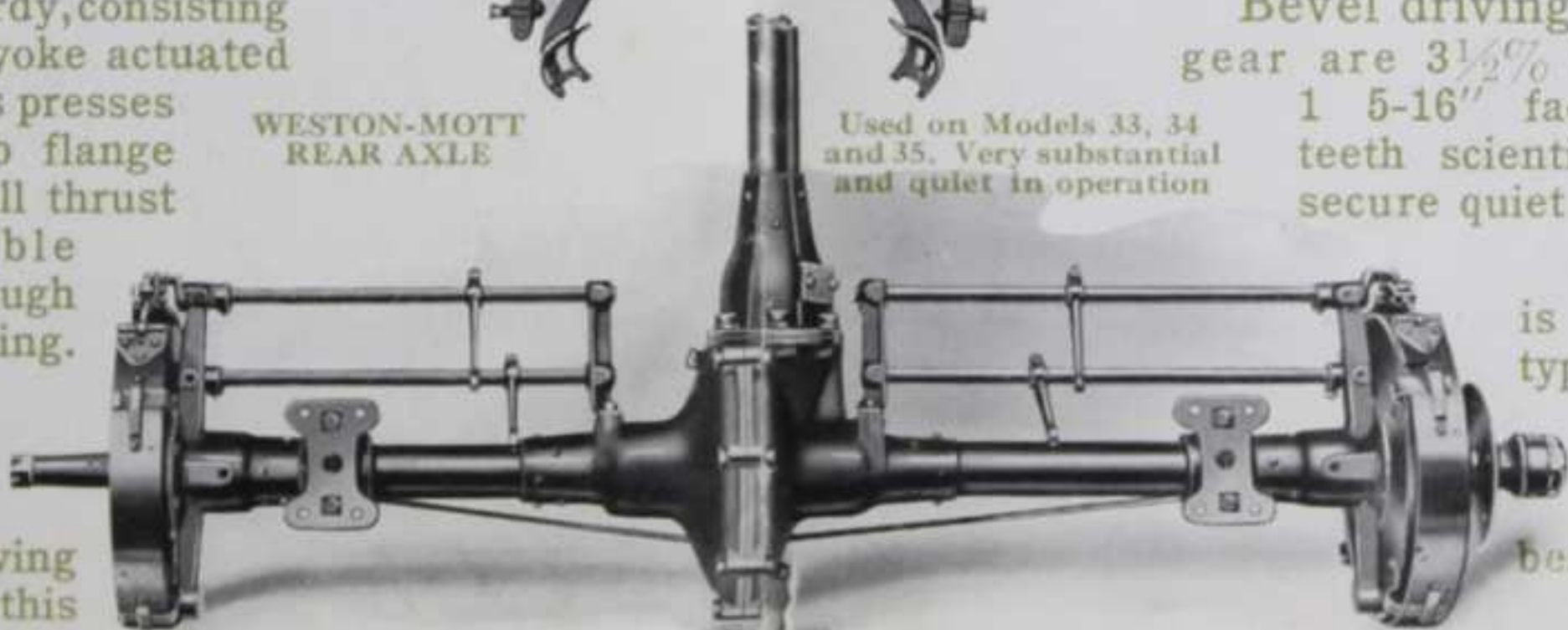
Bevel driving pinion and gear are $3\frac{1}{2}\%$ nickel steel, 1 5-16" face, five-pitch teeth scientifically cut to secure quiet action.

Differential is bevel gear type mounted on large-sized Hyatt flexible roller bearings.



WESTON-MOTT REAR AXLE

Used on Models 33, 34 and 35. Very substantial and quiet in operation





MODEL 38 ROADSTER, \$1375.

Fully equipped including "Auto-Lite" electric lighting and starting system. Notice symmetrical stream-line body and large rear compartment, accessible from either side rear. Ideal car for the doctor or business man.



Mechanical Specifications

(Condensed)

Covering Models 38 and 40

Model "40" Touring Car, \$1395

Unit Power Plant includes motor, clutch, transmission, generator, starting motor, controlling pedals and levers, three-point suspension.

Motor. Allen, four-cylinders, en bloc, "L" head type, $4\frac{1}{8}$ " bore, 5" stroke. Rated at 40 H. P., piston displacement, 268". Aluminum crank case and housings. Silent and powerful.

Ignition. Splitdorf Dual Magneto, separate from starting system.

Starting. "Auto-Lite" system, consisting of engine speed generator, running from magneto shaft. L. B. A. 6-volt, 100 amp. hour storage battery and electric starting motor geared to rim of fly wheel. Cranks motor 150 revolutions per minute.

Carburetor. Schebler, model "R" $1\frac{1}{4}$ " size. Steering column control of auxiliary air for cold-weather starting. Hot-air connection to exhaust manifold.

Valves. Two-inch diameter, cast-iron heads, interchangeable. Valves enclosed. Adjustable tappets.

Cooling. Thermo-syphon. Water capacity, $6\frac{1}{2}$ gallons. Cellular radiator, $3\frac{1}{2}$ " core.

Lubrication. Combination force feed pump and constant level splash system. Oil reservoir holding six quarts. Float gauge.

Clutch. Multiple disc type. Friction between Raybestos and ground steel discs. Engages with gradual, yet positive action.

Transmission. Selective sliding gear type, three forward speeds and reverse. Imported, annular ball bearings. Three and one-half percent. nickel steel gears and chrome nickel shafts. Aluminum case. Ratio on low, $13\frac{1}{2}$ to 1. Second, $6\frac{1}{2}$ to 1. Direct on high, 4 to 1. Reverse, $17\frac{1}{4}$ to 1.

Control. Entirely from driver's seat, left-side steer, levers in center. Clutch pedal operated by left foot; service brake pedal, accelerator and starter with right. Spark advance and hand throttle control levers on top of steering column, with friction contact on segment.

Universal Joints. Heavy drop-forged toggles, hardened and ground pins, enclosed in ball and socket, grease-tight housing.

Steering Gear. Worm and full gear type. Irreversible. Worm mounted on ball thrust bearings, eccentric adjustment accessible from exterior. 18" corrugated walnut steering wheel, aluminum spider.

Rear Axle. Full-floating, pressed-steel housing and inspection plate. Large annular ball bearings. Shaft $1\frac{3}{8}$ " diameter nickel steel, heat-treated. Brown-Lipe bevel gear differential. Adjustment of gears accessible through inspection plate. Gear ratio, 4 to 1. Pinion, twelve teeth. Large gear, forty-eight teeth, five-pitch.

Brakes. Both service and emergency brakes are internal expanding, 14" brake drums with 4" face, dust-proof, adjustable on exterior.

Front Axle. I-beam, drop-forged steel, heat-treated. $1\frac{1}{2}$ " diameter spindles. Heavy duty ball bearings in front hubs.

Frame. Pressed steel. Side member channel, $14\frac{1}{16}$ " deep, $2\frac{3}{4}$ " wide, $\frac{3}{8}$ " thick. Rear kick-up, $3\frac{1}{2}$ ". Four cross members rigidly braced, hot-riveted.

Springs. Special alloy spring steel. Triple oil tempered. Front springs semi-elliptic, 2" wide, 36" long. Rear springs, three-quarter elliptic, 2 1/4" wide, 50" long, underhung.

Fuel Tank. Located in shroud. Capacity, thirteen gallons. Gravity feed. Filler and gasoline gauge on instrument board.

Wheels. Artillery type, 1 1/2" kiln-dried, second growth hickory spokes and felloes. Demountable rims.

Tires. 4 1/2 x 35, straight side, Q. D. Rear tires, safety tread.

Road Contact. Wheel base, 118". Tread, 56". Road clearance, 11" at lowest point, center of front axle.

Body. Seven-passenger capacity, of handsome stream line design, curved in boat-shape at bottom. Large and roomy, four wide doors, concealed hinges, luxuriously upholstered. Ten-inch cushions.
(See cut on page 22 for dimensions.)

Instrument Board. Contains speedometer, switches for ignition, lighting and starting, volt meter, air control lever, and gasoline gauge, all mounted flush.

Fenders, etc. Sheet metal parts pressed from four-pass, double-pickled, cold-rolled automobile steel. Fenders and steps rigidly braced. Hood has concealed side hinges and rubber body protectors on corners.

Finish. Running gear, fenders and hood, black japanned. Body painted handsome shade of brilliant wine, striped with gold; nickel and aluminum trimmings. Special finish in "London Smoke" brown, with brown Spanish leather upholstery, black moldings and beads, striped with gold, \$30 extra. A beautiful and practical finish.

Regular Equipment. Auto-Lite electric starter. 13" electric headlights, controlled by switch with dimmer. Dash and tail lights. Large electric horn, exhaust cut-out, speedometer, rear tire-irons, extra demountable rim. Rain vision, clear vision windshield, French plate glass. Robe rail and foot rail. Genuine mohair top, with side curtains, and slip cover. Full set of tools. Jack. Pump. Tire repair kit.

Weight. 2,900 pounds.

MODEL 40, 7-PASSENGER TOURING CAR, \$1395

A large, dignified, aristocratic car with exceptionally pleasing lines, yet comparatively light and economical on tires and fuel. In a class with \$2,000 and \$2,500 cars.



INSTRUMENT BOARD AND CONTROLLING LEVERS.

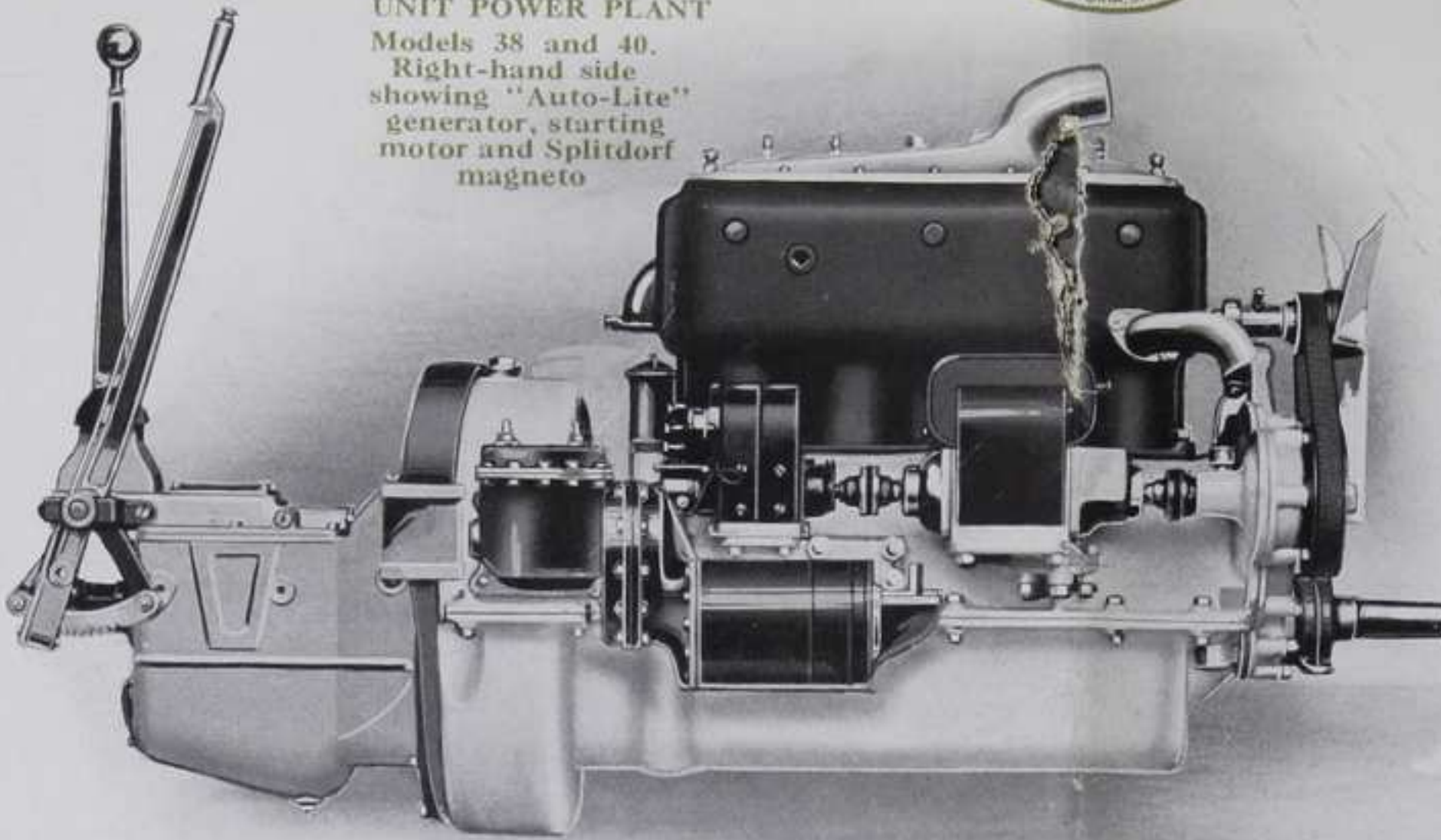
Used on Models 38 and 40. Notice neat appearance and convenient arrangement. All Allen cars controlled entirely from driver's seat.

Price and Terms. \$1,395 regularly equipped, f. o. b. Fostoria, Ohio. Crating or boxing for ocean shipment, extra. Terms: Deposit with order; balance payable sight draft, bill of lading attached.

Model 38. Same as above in every way, except Roadster body of handsome design. Large rear compartment accessible from door in top. Front compartment accessible through doors on either side. Price, \$1375.



UNIT POWER PLANT
Models 38 and 40.
Right-hand side
showing "Auto-Lite"
generator, starting
motor and Splitdorf
magneto



Transmission

Three speeds, selective type, center control, aluminum gear case with pressed steel cover, chrome nickel steel gears, drop forged, mounted on chrome vanadium shafts. The main shaft has four splines upon which the gears slide, holding sliding gears rigidly in position when enmeshed. Both main and counter shafts are mounted on S. K. F. imported annular ball bearings of the double row, self-aligning type. Gear shifting mechanism with levers removable from transmission as one unit. Possesses the unique feature of locking gears in and out of mesh.

Power Plant Supports

Front support is directly beneath the forward main bearing, motor resting on pressed steel cross member. Supported at rear by arms on each side of fly wheel housing, bearing on frame side members. Three-point suspension relieves power plant from all twisting strains when driving over uneven roads.

On the larger sized motor, crank case and fly wheel housing are made in two parts. Upper half carries the bearings. Lower half contains the oil reservoir and can be removed without interfering with the rest of the motor.

Power and Flexibility

The action of the Allen motor is most pleasing to the

experienced motorist. The soft purr of the exhaust when the motor is started, indicates perfect action, and the responsiveness of the motor when throttle is opened, shows reserve power. In proportion to weight, Allen cars have more than ordinary motor capacity, plenty of power at all times, instantly available for hill climbing, or driving through deep sand, mud or other difficult road conditions. The flexibility of Allen motors leaves nothing to be desired. While they are capable of high speeds without excessive vibration, they will also travel at very slow speeds on high gear. It is a source of great satisfaction to every automobile owner to have a car that will run smoothly at five or

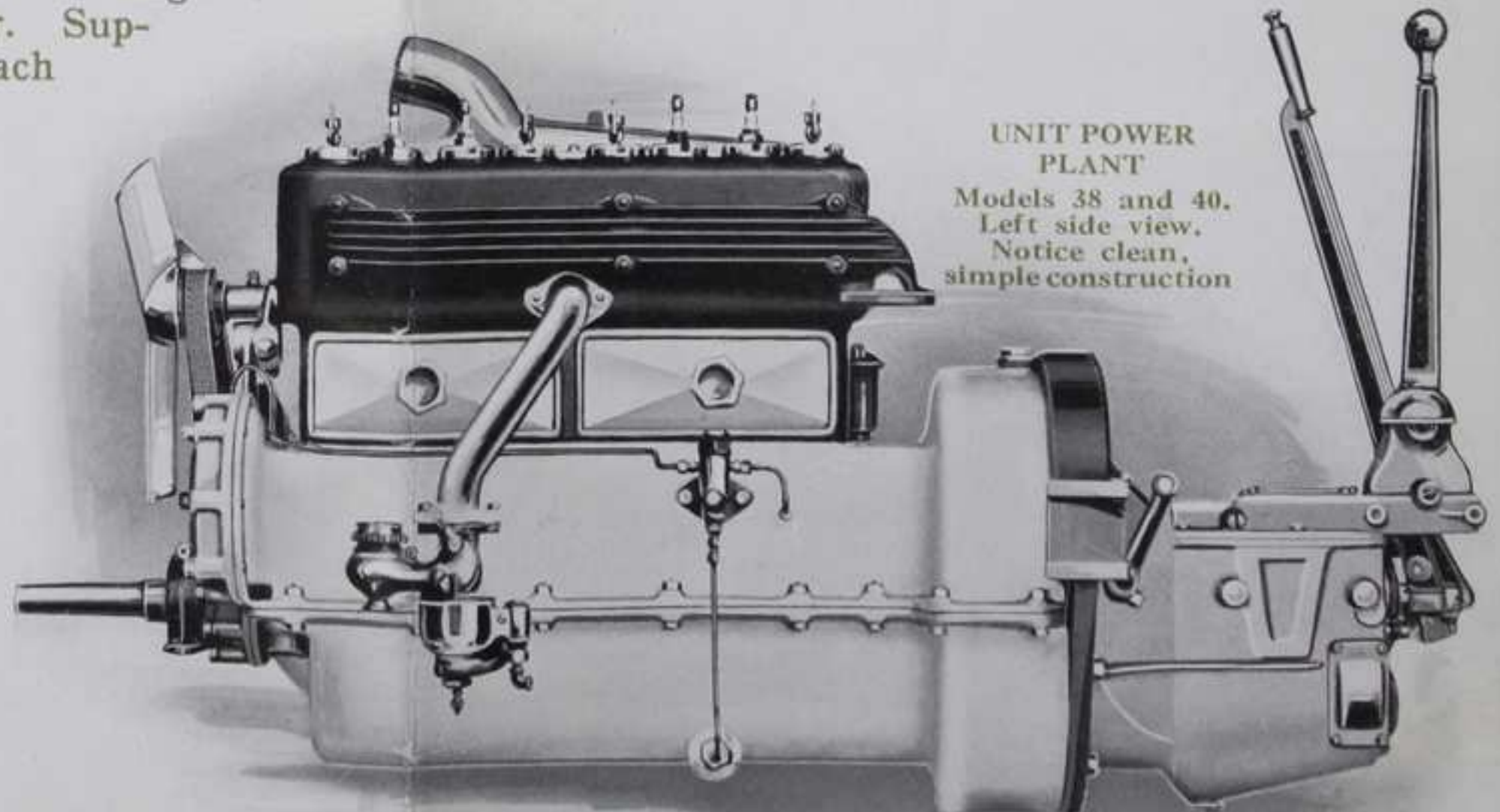
six miles an hour on high gear when required.

Clutch

Multiple disc type. Driving discs faced with Raybestos friction material, driven discs, steel, with ground faces. Clutch engages with gradual yet positive action; does not grab or slip. We recommend that this clutch be run in oil, but it does not harm if it runs dry.



MULTIPLE DISC
CLUTCH
Used on Models
38 and 40



UNIT POWER
PLANT
Models 38 and 40.
Left side view.
Notice clean,
simple construction

Economy of Motor

The average efficiency of Allen motors is far above the ordinary motor of like size and power.

The long stroke is one of the many reasons for the development of maximum power in proportion to fuel consumption.

Loss of lubricating oil is minimized by reason of tight joints between housings, oil-tight bearings and properly-fitted pistons which do not allow excessive quantity of oil to reach explosion chambers. (See "Pistons.")

In fact, every possible precaution is taken to make the Allen Motor extremely economical from every standpoint.

Steering Gear

The Warner Gear Company have reached perfection in their latest-designed steering gear as used on Allen cars. The worm and full gear type has many advantages. It is irreversible and practically indestructible. The use of the full gear makes it possible to turn the gear a quarter turn when necessary, which brings new teeth into contact with the worm. Adjustment is also provided to control the pressure of worm against the gear by means of an eccentric bushing around the worm shaft. All adjustments are accessible from the outside. Easy action is secured by use of ball thrust bearings at both ends of the worm shaft. All wearing parts are hardened steel, insuring long life.

The steering wheel is black walnut. Spark and throttle levers are polished aluminum die castings, mounted on top of steering column. Friction contact on segment permitting very easy action and fine graduation of speeds.

Car Economy

In its broadest sense, automobile economy means more than the initial cost of the car, or the cost of fuel and oil consumption—the wear on tires, repairs, refinishing and depreciation should also be considered. These matters have all had our close study. There are many reasons why one car will wear out tires faster than another, or require more repairing than another. Close observation of the one hundred Allen cars in use in Fostoria warrants us in stating that we believe the cost per mile, during the total life of the car, is less than

any other car in the same class. Equal satisfaction is also reported by all dealers and users wherever Allen cars are sold.

Testing

The road test of the automobile chassis has been dispensed with by most manufacturers of medium- and low-priced cars, especially those turning out large quantities. We still stick to the old-fashioned method, however, and give every Allen chassis a thorough test over a route which includes hard road conditions. Every adjustment is gone over thoroughly during this test and every part is thoroughly inspected. When the chassis is delivered to the final assembly, there is no doubt about its being in perfect running order.

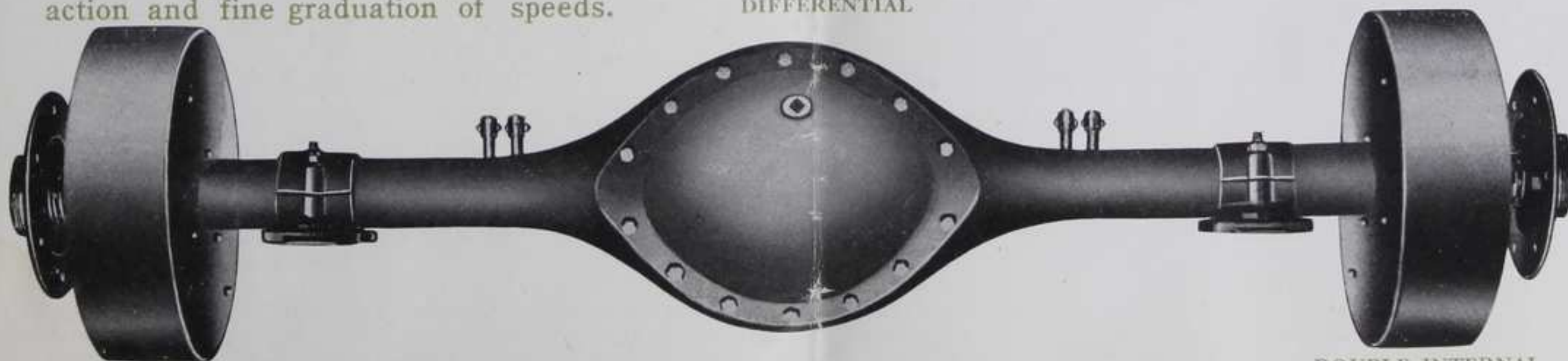


STEERING GEAR AND WHEEL

Used on all models. Showing bevel gears operating spark and throttle control

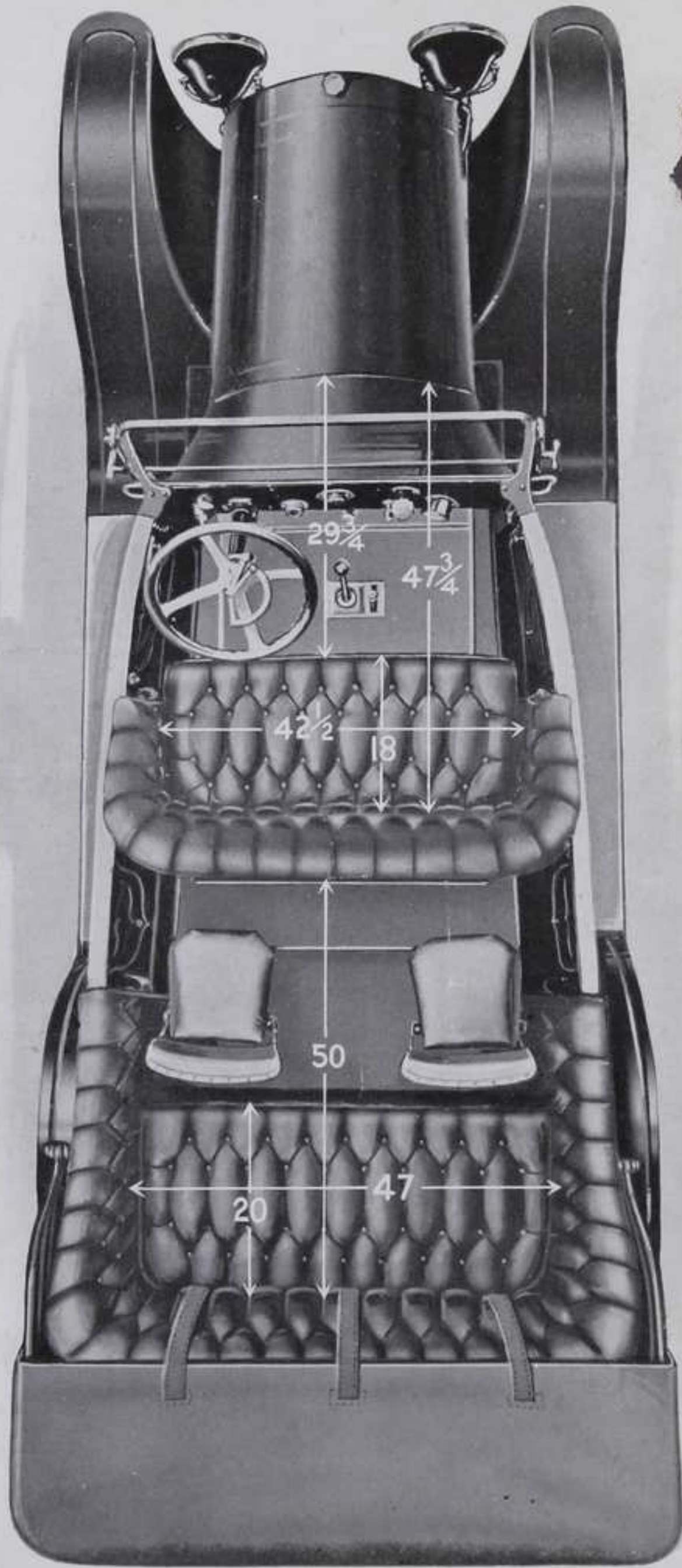


BROWN-LIPE DIFFERENTIAL



FULL FLOATING REAR AXLE—Used on Models 38 and 40

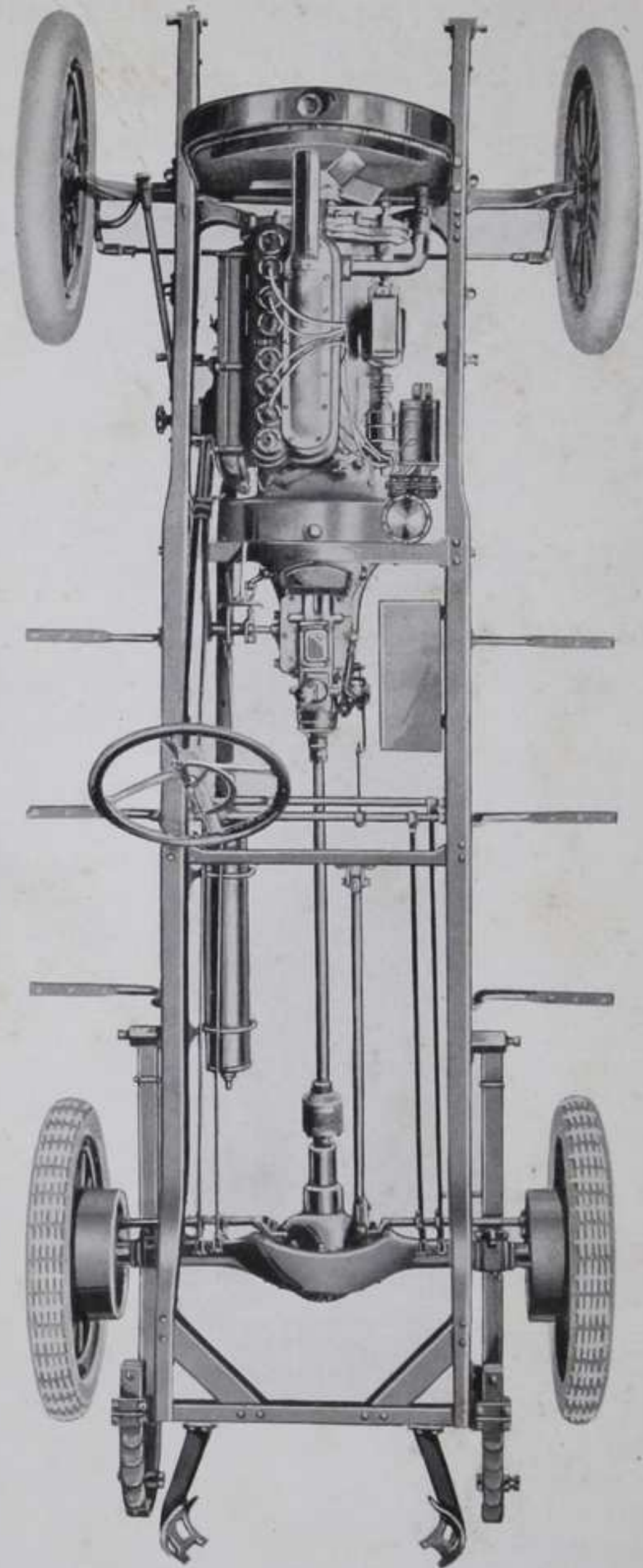
DOUBLE INTERNAL EXPANDING BRAKES



Showing "40" Seating Capacity

Inspection

In addition to the various inspections of material, parts and units, during the manufacture of the car, there is also a final inspection, before the car is shipped, to make sure that every detail is perfect and that the car, with all its equipments, is complete in every respect; in fact, we could take no more pains to see that the car reached its destination complete and perfect, if we received twice the price.



Chassis, Models 38 and 40

Finish

There is a remarkable difference in the finish of automobiles and this is a point where the average buyer is easily misled. Nearly all cars look good when new. A high-grade car looks good even after long, constant use—the same is true of the Allen. By the use of high-grade painting materials, a superior quality of varnish, and great care in applying same, a finish is obtained which always looks good and protects the metal in the best possible manner.



Location

Fostoria is an ideal location for a motor industry, from every standpoint. Shipping facilities are unexcelled. Six railroads running into Fostoria from all directions of the compass and connecting with every railroad system in the country. Real estate values are not inflated, which fact is an important item in reducing the overhead expense. Large, roomy factories, well arranged for economical production, are available, without the prohibitive expense found in large cities.

Labor conditions are also most satisfactory. Fostoria being located right between the two largest automobile centers in the world—Cleveland and Detroit—and within a few miles of Toledo, plenty of skilled automobile mechanics are always available.

The Allen Guarantee

The Allen Motor Co. guarantees each new Allen car to be free from defects in material and workmanship. We will make good at our factory, free of charge, any part or parts thereof which shall, within twelve (12) months after delivery to the original purchaser, prove defective.

In order to avoid any misunderstanding, we desire our patrons to observe the following conditions governing this guarantee:

1. Old parts must be returned to us with transportation charges prepaid.
2. Parts claimed to be defective are subject to our inspection and decision as to whether or not they rightfully come under this guarantee for free replacement.
3. Labor and other expenses of installing new parts in cars to be charged for.
4. This guarantee does not cover replacement of parts which break in consequence of repairing or altering done outside of our factory, nor which has been subject to misuse, negligence or accident.
5. We do not assume any contingent liability.
6. We reserve the right to make changes in design or add any improvements without incurring any obligation to install same on cars previously purchased.
7. This guarantee does not cover tires, rims, ignition apparatus, signaling devices, starting and lighting equipment, speedometers or other trade accessories, inasmuch as they are guaranteed separately by their respective manufacturers.
8. We do not authorize any other person to assume for us any other liability in connection with the sale of Allen cars.

The Allen Motor Co., Fostoria, Ohio

A vintage, sepia-toned photograph of a lakeside scene. The foreground is a sandy bank with several trees of varying heights and thicknesses. In the middle ground, a calm lake reflects the sky, with a small boat visible on the water. The background shows a dense forest of trees. A large, dark green leaf-shaped graphic is overlaid on the left side of the image, containing white text. The text reads: "BUILT 'ON THE SQUARE' WITH POWER TO SPARE". The photograph shows signs of age, including a vertical tear or crease down the center and some discoloration.

"BUILT
'ON THE
SQUARE'
WITH
POWER TO
SPARE"