Specifications of

The OWEN MAGNETIC CAR

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New Series with our Powerful Valve in Head Engine

Engine

Six cylinders. Bore, 4 inches; stroke, 5½ inches. Piston displacement, 414 cubic inches. Brake horse power, 80.

The cylinders are cast in two blocks of three each. The overhead valve construction is carried on a single detachable head which fits to both sections.

The design is clear cut in appearance. The parts are extremely accessible for all necessary adjustments and care.

The large crank shaft and the careful manner in which it is supported, together with other details of design, has resulted in a very smooth performing engine, free from all crank shaft "whip" or "periods" at any engine speed.

The materials used are the best which it is possible to obtain for the requirements, ensuring in connection with the design and the high grade of workmanship employed, a very dependable, long-lived engine, fully in keeping with the high ideals of Owen Magnetic cars.

Crank Case

Both upper and lower sections are aluminum castings. The latter is readily removable without disturbing the adjacent parts and serves as a large oil reservoir including proper oil strainer. The upper section is strongly ribbed for stiffness and to support the main crank shaft bearings.

Crank Shaft

The crank shaft is a drop forging, heat treated, accurately ground to size and in perfect running balance before installation. Crank shaft is drilled throughout its length for oil leads to all bearings through which oil is forced under pressure.

This exceptionally large crank shaft, in addition to improving the performance of the engine, perfectly supports the revolving member of the magnetic clutch, forming a part of the transmission which acts in place of the conventional fly wheel.

All universal joints and couplings between the engine and the power transmitting parts are thus eliminated and the resulting construction is free from maintenance expense, is compact, simple and accessible.

The engine and magnetic transmission are thus combined in a complete unit which operates in perfect harmony, without vibration.

Cam Shaft

The drop-forged, heat-treated cam shaft is carried on large plain bearings in the crank case with adequate provision for lubrication. The construction used permits the withdrawal of the cam shaft from the forward end of the engine.

Front End Drive

Three wide-faced, spiral metal gears, positively lubricated and mounted on the crank shaft, cam shaft, and the large shaft driving the water pump and magneto constitute the front end driving construction. The size of the wearing surfaces, design, and method of lubrication result in quiet operation. These gears are enclosed by an aluminum cover which is readily removable, without taking the engine from the chassis.

Valves and Valve Mechanism

Tungsten steel valves, 1⅞ inches in diameter, are used in connection with the overhead valve construction carried in the detachable cylinder head. They are operated by drop-forged rocker arms and push rods entirely enclosed by cover plates. These rods are accessible for adjustments by removing the single aluminum top cover running the full length of the detachable head. All valve operating parts have large wearing surfaces and operate in an oil mist from the crank case.

This overhead valve arrangement adds greatly to its quietness, freedom from the necessity of adjustment and wearing qualities. The detachable cylinder head affords ready accessibility to parts for removal of carbon deposits, valve seating or other examination of the engine interior.

Pistons and Connecting Rods

The pistons are ground and lapped into the cylinders and provided with high compression rings.

Connecting rods are drop forged, oval section. All reciprocating parts are as light as consistent with practical results, and great care is taken to ensure perfect alignment, fit and balance of parts, necessary to smoothness of performance, maximum power and long life.

The crank shaft and crank case are so designed that the pistons and connecting rods are readily removable through the bottom of the engine without disturbing the adjacent parts.

Exhaust and Inlet Manifolds

The right hand side of the engine is remarkably clean in appearance. The one-piece cast exhaust manifold is carefully proportioned and eliminates back pressure and joins both cylinder blocks to the large exhaust pipe leading to the muffler.

This pipe connects to the exhaust manifold at the forward end and gracefully curves downward, running back to the muffler along the pressed steel engine pan, joining the crank case to the chassis frame, preventing excessive heat from collecting under the body cowl.

The intake passages are carefully arranged, integral with the cylinder head to give the best thermal efficiency. The single connection from these intake passages to the carburetor is cast integral with the exhaust manifold, and passing through it, thus ensuring perfect vaporization.

Greater efficiency in the use of low-grade fuel has been attained from this careful arrangement of gas passages and utilization of heat of the exhaust gases.

Gasoline Tank and Equipment

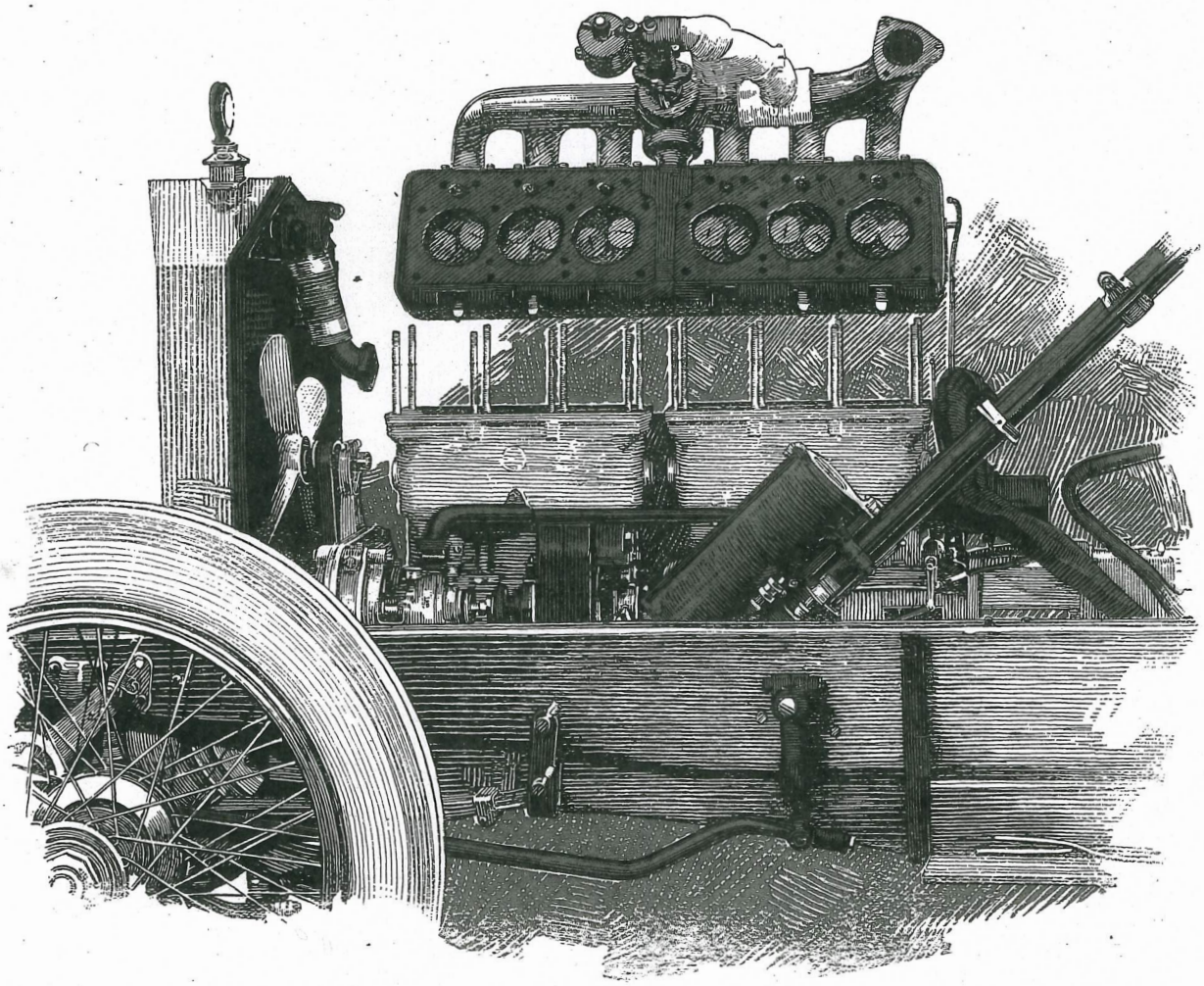
The gasoline tank supported at three points—is located at the rear end of the chassis and fully protected from collision by the construction of the surrounding parts. It has a capacity of 30 gallons, including a reserve of 3 gallons. A tank gauge is mounted on the tank where it can be readily inspected. A large filler cap is fitted to its support by a bayonet lock. This cap cannot jar loose or become jammed, and is instantly removable by hand.

Gasoline Feed

The vacuum system of gasoline feed is employed. The large capacity vacuum tank is located on the right-hand side of the engine on the dash and feeds by gravity to the carburetor located midway between the cylinder blocks. The very large capacity vacuum tank used permits continued open throttle performance in mountain work.

Constant gasoline feed is ensured without hand pump or other complications incidental to pressure feed system or liability of insufficient feeding of gasoline under extreme conditions sometimes encountered where smaller sizes of vacuum tanks are used.

The carburetor has 1½-inch diameter gas outlet—is equipped with hot-air stoves mounted on the exhaust manifold. All fuel lines are ⅜-inch heavy gauge, copper tubing with large compression couplings. These large lines, carefully mounted, eliminate the danger of clogging and leaking.



Ignition System

Magneto

A Bosch DU6 high tension magneto with integral distributor is mounted on the left-hand side of the engine and driven through flexible couplings from the water pump shaft. It is positive in operation, fully protected from dirt and water, and accessible.

Engine Lubrication

From the oil reservoir in the lower section of the crank case, a gear pump positively driven by spiral gears from the cam shaft supplies oil to all crank-shaft bearings under a 20 to 30-pound pressure at normal running, the pressure increasing with the power requirements.

Cam shaft, rocker arm bearings and other moving parts, including the front end drive, are supplied with oil under pressure. Piston pin bearings and cylinder walls are lubricated by spray from connecting rod lower bearings.

Cooling System

A large capacity centrifugal pump is located on the left-hand side of the engine and positively driven from the same shaft as the magneto.

A Sylphon thermostat is located at the upper tank of the radiator ensuring quick warming of the engine.

A "V" type honeycomb radiator with ample cooling capacity for extreme working conditions is used.

Cast aluminum fan aeroplane type, belt driven.

Magnetic Transmission

Accessibility

The magnetic transmission consists primarily of two direct current machines combined into a single unit, enclosed in an aluminum cradle. The forward end of this cradle is supported by the engine bell housing and the rear end by two substantial supports resting on frame boxes. This brings the location of the magnetic transmission directly under the removable footboards of the driver's compartment. All magnetic transmission parts requiring even the simplest adjustment or attention are readily accessible by the removal of a sheet-metal cover secured to the top of the aluminum cradle. Even the interior parts of the magnetic transmission may be readily removed through the rear end of the cradle without removing the transmission assembly from the car, the work involved being comparable to that of removing the pistons and connecting rods from the lower part of the engine.

Clutch Generator

The front half of the magnetic transmission, although forming a part of the transmission proper, is known as the clutch generator on account of the various functions it performs in the operation of the car.

It consists simply of a revolving generator field secured by dowel bolts to the crank-shaft flange of the engine, serves perfectly as the engine fly wheel, this part always revolving at engine speed.

The armature of the clutch generator is secured to a large tubular shaft connected at its rear end through universal joints to the rear axle, this part always revolving at car speed.

Starting Motor

With car and engine stationary, a movement of the control lever on the steering wheel permits current to flow from the battery to the clutch generator which for the moment acts as a starting motor, its armature being held stationary by reason of the car being at rest.

Its field, attached to the engine crank shaft turns and silently spins the engine, acting for this purpose as a very large starting motor.

There are no gears to mesh or make a noise as the cranking power is applied electrically without the use of gears.

Emergency Charger

As an auxiliary function, the clutch generator acts as a generator for charging the storage battery when the car is at rest and engine idling and controller lever placed in special charging position.

This is not the regular method of charging, described later, but only an emergency method and eliminates the necessity of ever removing the battery from the car for charging.

Magnetic Clutch

In the running positions determined by movement of the controller lever on the steering wheel, the clutch generator has two functions.

The first is that of a slipping magnetic clutch. The amount of slippage being varied by movement of the controller lever in the different running positions.

The second function is that of a generator. The slippage of the clutch generating electric current which is conducted to the electric motor and changed by it into mechanical power, which assists in driving the car, *i. e.*, a part of the engine torque is transmitted directly through to the rear axle of the car by means of the magnetic clutch, but the very act of slipping of this clutch generates electrical power which the motor likewise applies to the rear axle of the car.

Electric Motor

The rear half of the magnetic transmission is the electric motor, the field which is always stationary and which is attached to the aluminum cradle, thus enclosing the rear end of the transmission.

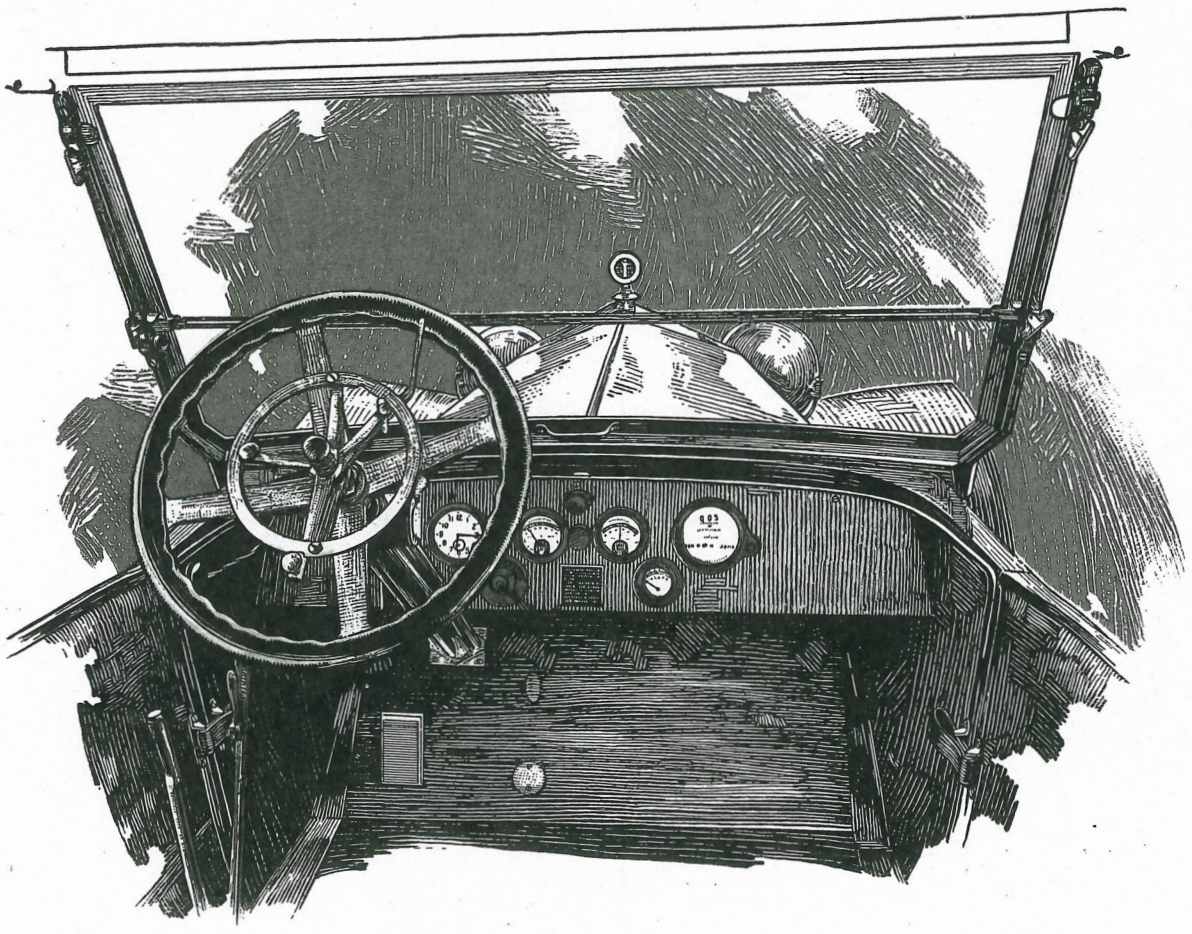
The motor armature is mounted on the same large tubular shaft which supports the armature of the clutch generator. It therefore always revolves at car speed.

The primary function of the motor is to transform the electric current generated by the slipping magnetic clutch into mechanical power and apply it to the driving of the car. The motor does its maximum work on the lowest driving speed or when the greatest slippage occurs in the magnetic clutch the work of the motor gradually decreases, as the magnetic clutch tightens and less slippage occurs, until it ceases all driving functions in the high speed positions where the magnetic clutch then transmits all the engine power directly to the rear axle of the car.

In the high speed position, where the motor is no longer assisting in driving the car, it acts as a very large capacity generator for charging the storage battery floating on the lines.

Electric Brake

A third function of the motor is that of an electric brake. When the car is coasting, the armature of the motor is driven



by the car movement and with proper connections made through the controller lever on the steering wheel, the motor becomes a remarkably soft acting electric brake. If more retardation is required, a small foot switch is provided under the toe board of the car, operated by a toe button adjacent to the accelerator pedal, which permits a second step of the electric brake to be applied and resulting in a very powerful electric brake.

Magnetic Transmission Bearings

There are two revolving units in the magnetic transmission. The first is the revolving field of the clutch generator together with its attendant parts, all of which are supported by the engine crank shaft. The second revolving unit is that of the large tubular armature shaft carrying the clutch generator and motor armature. This shaft runs in large annular ball bearings, the front bearing being mounted on the end of the engine crank shaft, the center bearing in an extension of the revolving clutch generator field and the rear bearing mounted in the stationary field frame of the motor. These bearings require no adjustment or attention other than occasional lubrication for which adequate means are provided.

Power Wiring and Connections

All wiring for the power system is assembled in a single unit properly mounted and secured against mechanical strains and protected against mud, oil or water. All terminals are numbered and mechanically fastened in addition to provisions for proper electric conductivity. All of these power connections are accessible and simple.

Controller

The controller is a very compact, simple, drum type, enclosed in an aluminum casing and mounted on the steering mast under the engine hood.

The controller drum is revolved to give the desired electric connection by means of simple gearing operated by a tube inside the steering mast assembly. This tube has a small control lever mounted on its upper end which is readily moved into the proper positions marked on the gas and throttle control dial on the steering wheel. The electric circuits thus controlled are so arranged that no arcing or pitting of control contacts occurs and the entire controller is very simple and free from all possibilities of trouble.

Simplicity of Control

The operation of the various functions of electric transmissions are all controlled by a small hand control lever mounted on top of the steering wheel in connection with the gas and throttle control quadrant.

This small lever without the use of a foot clutch or gear shift lever or other auxiliaries of any kind, permits the engine to be started, the storage battery to be charged when the car is standing still, the electric brake to be applied when the car

is coasting, the storage battery to be charged when the car is running in high position, and in addition determines six different speed ratios or driving positions. The fuel mixture control and control of lights are mounted in a small box on the steering mast underneath the steering wheel.

The running switch, torque ammeter showing action of electric transmission, battery ammeter, Waltham clock, speedometer, oil gauge, instrument board lamp and cowl ventilator control are conveniently arranged on the instrument board forming a part of the body.

On the toe board is located, convenient to the operator at the left of the steering mast, the service brake pedal; at the right of the steering mast is the accelerator pedal and adjacent to it, the pedal button operating the second step of the electric brake.

Brakes

The foot pedal above mentioned applies the service brake which is an external brake acting on 16-inch drums secured to the driving wheels. The internal brakes in these drums form the emergency brake operated by the hand lever at the left of the operator.

Both sets of brake shoes are lined with asbestos fabric for durability and quietness. Provision is made for adjustment for wear and to avoid rattling.

Steering Gear

The steering gear is the worm and worm wheel type, specially designed to permit the proper operation of the controller operating parts. Adjustment is provided against wear between the worm and gear, and the tubes are carefully mounted to eliminate all tendency toward rattling. Ample provision is made for lubrication of all steering gear parts.

Exposed small parts such as gas and throttle levers, controller dial, etc., are made of a special alloy of white metal to ensure the permanent silver color without recourse to plating with its attendant liability of wearing through.

The location of the steering wheel is convenient to the operator. All controller levers are stationary and do not turn with the steering wheel.

Chassis Construction

Frame

The chassis frame is of pressed steel channel section, 8 inches deep and well provided with stiffening cross members and gussets. Large bushed bearings for the attachment of spring shackles and bolts are provided.

Wheelbase

142 inches. Turning radius, 24 feet.

Springs

The rear springs are 3 inches wide, 61 inches long, underslung and take care of the driving and braking strains without the use of a separate torque rod construction. Front springs are 2½ inches wide and 40 inches long. All springs are made of alloy steel and are very carefully designed in reference to the weight and balance of the car, and result in exceptionally easy riding qualities.

Standard car equipment consists of four Hartford shock absorbers attached in such a way as to eliminate wear and tendency to rattle.

Front Axles

Front axle bed, knuckles and lever parts are made of alloy steel forgings properly heat treated. Ball thrust bearings are provided with the knuckle heads to insure easy steering. Bock taper roller bearings are used in the wheels.

Rear Axles

Gears are spiral bevel, of heavy construction. Bock taper roller bearings are used throughout. A total of eight bearings in the complete axle. Full-floating type of construction is employed, the load on the axle being carried by specially drawn, nickeled steel tubes enclosing the axle shafts and bolted to the cast-steel center housing. Axle shafts, differential gears and other power transmission parts are made of alloy steel, carefully heat treated. Adequate adjustment and lubrication is provided wherever necessary.

Wheels, Rims and Tires

Standard equipment, wood wheels. Rudge-Whitworth wire wheels are offered as optional wheel equipment. The standard rim equipment is Firestone straight side; and standard tire equipment is 35 x 5-inch Cord tires with ribbed fronts and non-skid in rear.

Propeller Shaft

Connection from the power plant to the rear axle is made through two universal joints and propeller shaft. These parts are sturdy in construction and all moving members employed, protected against dirt and are grease packed with provision for renewal of lubricant.

Lighting

The starting and lighting battery is 12-cell Willard, carried in a pressed-steel cradle on the left-hand side of the car. This battery has a metal cover readily removable.

The battery is accessible for flushing, is securely held in place yet is readily removable from the car without disturbing the running boards or other parts.

The lighting equipment for the standard chassis consists of two head lights and two dimmer lights carried in the front lamp equipment, a tail light and instrument board light. All these lights are 24–28 volt of proper candle power to suit the requirements. Head lamps are equipped with non-glare lenses.

General Equipment

Instruments

(Mounted on instrument board and steering mast, and included in complete chassis equipment.)
Fuel mixture control.
Light control.
Running switch.
Torque ammeter.
Battery ammeter.
Waltham clock.
Speedometer.
Oil gauge.
Instrument board lamp.
Cowl ventilator control.

Tools and Spare Parts Included in Chassis

Small tool kit carried on locked compartment on forward doors.
Jack and heavy tools, in suitable containers, carried in enclosure compartment.
Power tire pump mounted on reverse gear.
Electric signal horn mounted under engine hood.
Oil can mounted under engine hood.
One set of extra lamp bulbs.
Two extra spark plugs and gaskets.
One set extra fuses.
One battery syringe.
One trouble lamp cord.
One tire pump air hose.
All carried in suitable containers in tool compartments.

Open Car Equipment

One-man folding top and curtains—glass window in rear.
Heavy, pleated leather upholstery.
Flexible leather robe rail to match upholstery.
Disappearing auxiliary seats.
Bar foot rests.
Tonneau lamp.
Two-piece adjustable windshield.

Closed Car Equipment

Cloth or leather upholstery, selected from samples.
Rain visor windshield.
Flexible robe rail to match upholstery.
Bar foot rest.
One dome lamp—two corner lamps—two floor lamps.
Adjustable windows—perfection lifts.
Silk window shades.
Dictaphone.
Vanity case with clock.
Smoking set.
Silvered hardware.

Three Models

Seven-passenger Touring Car	~~$[illegible]~~	5780.00
Seven-passenger Sedan	~~6[illegible]~~	6820.00
Seven-passenger Limousine	~~6[illegible]~~	6820.00
Complete Chassis	~~4[illegible]~~	4950.00
Stripped Chassis	~~4325.00~~	

F. O. B. Cleveland

These three types of bodies are readily interchangeable on the standard complete chassis.

The complete chassis, as above listed, includes engine hood, front fenders, enclosures, running boards, tire carriers, head and tail lamps with brackets, a temporary instrument board fitted with equipment as furnished in the complete car, extra demountable rim or wire wheel, and painted in lead priming ready for mounting of body.

A stripped chassis, as listed above, includes the same equipment as that comprising a complete chassis with the exception of the following items which are omitted—head and tail lamps with brackets, front fenders, enclosures, running boards and tire carrier.

Complete bodies when furnished separately include the rear fenders and all interior fittings, and painted ready for the final coats of finish, to be applied by purchaser after body is mounted on chassis.