

The "Johnson" Steam Auto-Car Carriage

The Johnson Auto Service Co., of Milwaukee, Wis., desire to sell motor-driven vehicles to people of refinement who are accustomed to, and who appreciate elegance. They therefore put out a power-driven vehicle having a body designed for luxurious comfort and perfect convenience, and a power outfit which they claim to be the acme of simplicity and efficiency, the whole assemblage of power and carriage elements being the embodiment of their ideal of a road conveyance requiring

for opening and can be used closed, fully open or partly open, as desired, so that just the proper temperature can be maintained inside. In these windows they use a German beveled crystal plate glass which is only $\frac{1}{8}$ in. thick and while having the appearance of thick glass, is of light weight, making the raising and lowering of the windows an easy matter. Plenty of leg room is left in front of the rear seat, and satchels, suit cases, etc., may be carried without discomfort. Spring-



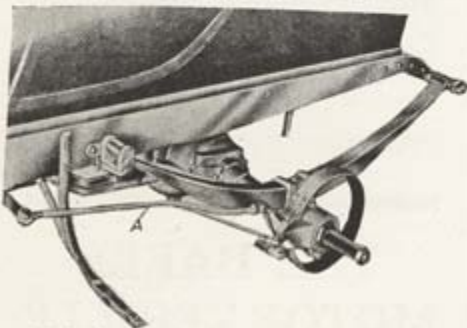
The Johnson Steam "Auto-Carriage," 30 H. P., single acting steam motor placed forward; bore $3\frac{1}{2}$ in., stroke 4 in., semi-flash boiler $20 \times 20 \times 17$ in., burner 20×20 in., tread 56 in., wheel base 108 in., wheels 38×4 in., weight 3250 pounds; passenger capacity 5 to 7; price \$3500, with all accessories.

the minimum of attention and giving the maximum of usefulness, pleasure and comfort. They therefore call their motor vehicle the "Auto-Carriage," it being in every sense of the word an elegantly-built carriage, self-driven.

The Johnson Auto-Carriage is not limited in its usefulness or comfortableness by weather conditions, rain, cold, hot weather, mud and dust having no effect on its occupants, who can wear the finest clothing without danger of its being soiled, while their personal comfort is not lessened by extremely cold weather, as the interior of the car may be heated. On the other hand, the users of this car are protected also from the sun's rays in hot weather.

The body is of the very best carriage construction, and so designed as to give the occupants a wide range of vision in order that the beauties of the landscape may be enjoyed. Properly designed springs absorb road shocks and the weight of the vehicle is sufficient to give steady riding, avoiding sudden changes of position and body inclination. Spring seat cushions are used and the best hair is used as a filling in seats and backs. The upholstering is in broadcloth or leather. The rear seat, which is amply wide for two large people, is provided with two wide, cushioned arm rests. The front seat is also wide and comfortable. All windows lower

roll, silk shades are provided in the interior of the vehicle and leather curtains are provided at the sides of the front seat to be drawn in rainy or severe weather. A front, movable window is also fitted for the protection of the front seat occupants. Provision



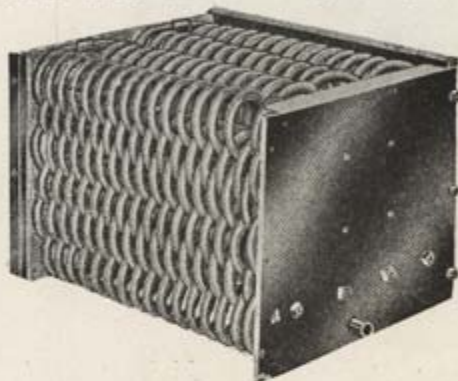
Spring Suspension of the Johnson Auto-Carriage and Band Brake operated by rod A.

is made for securing hot water at any time, and arrangements are also provided for making tea or coffee during transit.

The semi-elliptic springs are made of the finest Swedish steel. Band brakes act on the rear wheels, being operated by a compensating rod that insures uniform application of each brake. This rod is shown at A in the illustration. The price of the Johnson Steam

Auto-Carriage is \$5000, which includes all accessories and necessary fittings.

Although the Auto-Carriage is a high-priced vehicle it is really an economical one, being designed for continued use year after year and not intended to be superseded by new styles. The manufacturers have used what seems to them the very best carriage design and to them there seems no reason for periodical changes. The construction and finish are the same as in the best horse drawn carriages and it will last as long or longer.



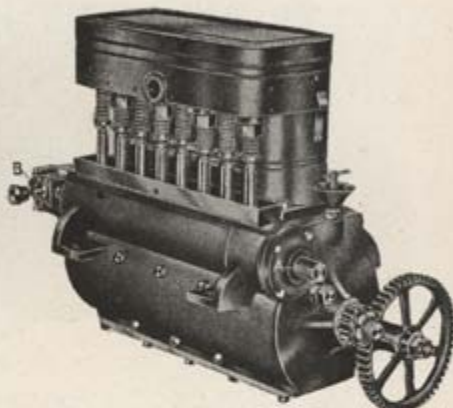
Nested-tube, semi-flash boiler used on the Johnson Auto-Carriage; dimensions 20x20 in. on the bottom and 17 in. high. Each coil consists of a single length of cold drawn seamless tubing made in Scotland and each will withstand a pressure of 6000 pounds to the square inch. Right and left couplings connect the coils at the ends. Water is forced into the top of the boiler and steam comes out at the bottom, becoming superheated as it passes through the coils directly over the fire. The rectangular form of this generator causes it to fit into the frame without lost space. Can evaporate 500 pounds of water per hour.

Therefore it is in the long run really an inexpensive vehicle when its price is compared to the service it renders.

Although great care has been taken to provide an extremely luxurious body, equal attention has been paid to devising a compact, neat, simple and efficient power system.

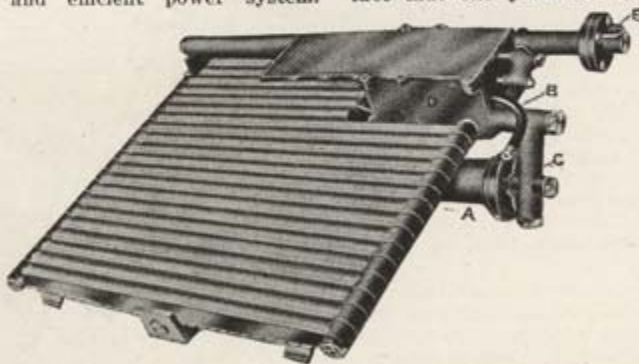
themselves are made of seamless, cold drawn, steel tubing made in Scotland especially for the Johnson Company and imported direct, each tube consisting of a single length of tubing and being able to withstand a pressure of 6000 pounds per square inch. The coils are connected in series and altogether form a continuous tube 400 feet long.

Water enters this boiler at the top and is heated as it descends through the various layers of tubing. By the time it has reached



The Johnson steam engine; 4 cylinders $3\frac{1}{4}$ in.; single acting; piston of trunk pattern; poppet valves; develops 30 horse power; resembles in appearance a gasoline engine; has three sets of cams to give 2-3 or 1-3 cut-off or reverse as desired, which is accomplished by moving the cam shaft longitudinally by a device attached at B.

the bottom tier it has formed into steam and is superheated in the bottom tier, which is directly over the burner. The absorption of heat by this boiler is so great that the gases emerge from the top at a temperature of only 300 deg. and the economy of this system of steam generation may be imagined from the fact that one pound of fuel evaporates 15

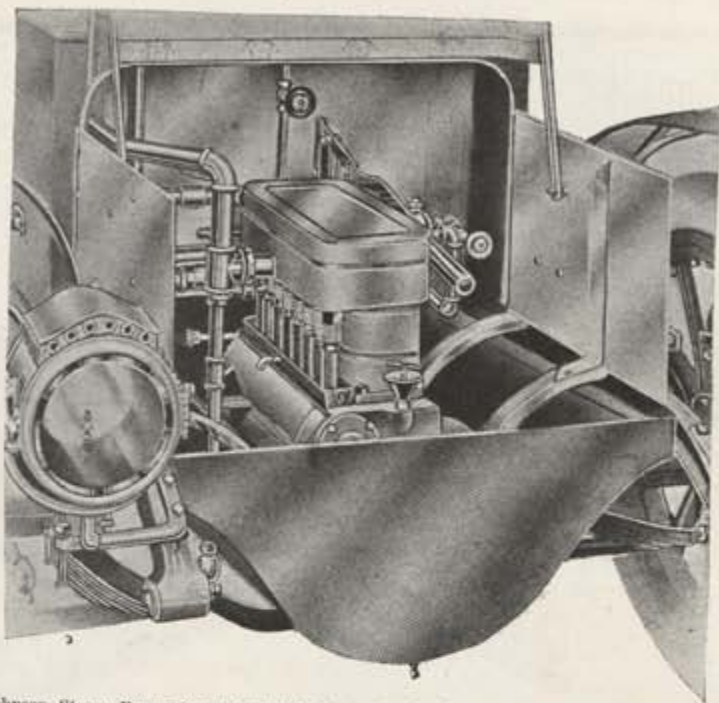


Kerosene burner used in the Johnson Auto-Carriage. A, air intake; B, generator; C, gas fuel pipe; D, generator box; E, fuel intake.

Steam is generated in a system of spiral tube-coils arranged in rectilinear form so as to conveniently fit in the car frame with no waste of space. This semi-flash generator is 20x20 ins. on the lower side and 17 ins. high. The coils are connected at the ends by right and left couplings turned from solid steel. The flames from the burner do not come in contact with these end joints. The tubes

pounds of water. Long-fibre, pure asbestos, imported from England, is used to thoroughly insulate the boiler. The burner is rectangular 20x20 inches and burns kerosene. The main features of this burner are shown in the accompanying cut, in which A is the air intake, B the generator, C the gas fuel pipe, D the generator box and E the fuel intake.

The engine is worthy of special attention,

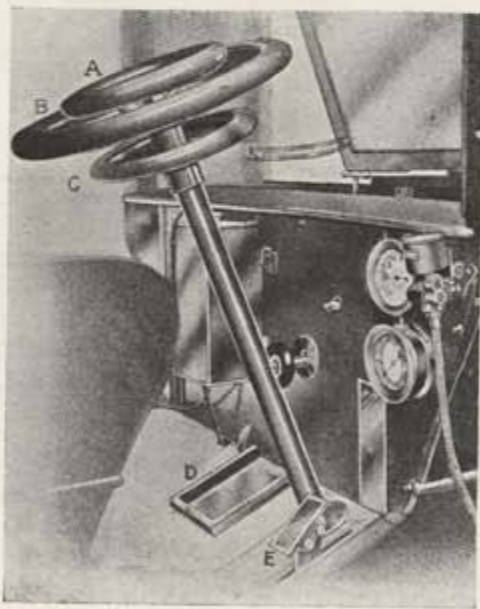


The Johnson Steam Power Plant installed, front view, hood raised. Its simplicity is apparent, the whole outfit including but four parts: Engine, water pump, water reducing valve and diaphragm valve. representing some radical departures from accepted steam engine practice. Cross head and slide valves are not employed, but poppet valves are used and they are operated by cams as in gasoline engines. In fact on first sight one would be inclined to think it was a water-cooled gasoline engine, of the vertical type. The four cylinders are fitted with single acting pistons of the trunk pattern, perfectly ringed. The valves are all on one side and the valves push rods are all operated from the same cam shaft. Three sets of cams are provided to give 2-3 cut off, 1-3 cut off or reverse, this being accomplished by shifting the cam shaft longitudinally by means of a device attached at B and worked from the seat. No packed boxes are used in this engine. The connecting rods are of phosphor bronze and the crank shaft of forged steel. The crank case is enclosed and lubrication of the engine is accomplished by merely pouring one pint of oil into the crank case when starting. No other attention to lubrication is required. The cylinders are $3\frac{3}{4} \times 4$ ins., and develop easily 30 horse power by actual test on the brake.

One of the cuts herewith shows the power plant installed illustrating its extreme neatness and compactness. Ready access is had by raising the hood. The square boiler is placed directly behind the engine.

The control of this car is as simple as other operative features. On the steering column are three hand wheels, the middle or largest being for steering. It is marked B in the illustration herewith. The top wheel, A, operates the stroke cut-offs and the reverse, while the lower one, C, is the throttle wheel. The pedal E, operates the rear wheel brake. D is a glass inserted in the foot board. Beneath this glass is placed a mirror in which is re-

flected the pilot light and burner, so that the operator can at all times see how things are going beneath the boiler. Two gauges are shown on the dash, but only one is used in practice. There is no lubricator, no water gauge glass, no safety valve, although the



Control of the Johnson Steam Auto-Carriage. A, Wheel operating cut-off and reverse; B, steering wheel; C, throttle wheel; D, glass in footboard under which is a mirror in which pilot light and burner operation can be seen at all times; E, rear wheel brake pedal.

steam pressure is properly governed, and no air pump; nor is there any open filler for either fuel or water.