Bolsover Steam Car Components

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Nestling House
Sleights, Yorks.

THE CONVERSION OF PETROL CARS TO STEAM POWER

A WAR-TIME MEASURE OF NATIONAL ECONOMY, SHOWING HOW HOME-PRODUCED FUEL CAN HELP MOTORISTS TO KEEP THEIR CARS IN COMMISSION DURING THE PERIOD OF PETROL RATIONING BY USING A HOME-PRODUCED FUEL.

THE CONVERSION OF PETROL CARS TO STEAM POWER

In introducing our product to the motoring public, we do not wish to make any exaggerated claim that these steam sets are everybody's notion of the ideal peace-time luxury steam car—far from it. Nor do we intend to imply that those who build these steam units into their cars will not have to use a certain amount of labour and ingenuity in doing so. However, the Bolsover Steam Power Plant has but 20 working parts, and it can be installed in any light chassis, new or old, in a few hours, with the help of any good mechanic.

Owing to the simplicity in construction, an owner can quickly learn everything that is necessary to make his own adjustments or minor repairs. If the working instructions and drawings are carefully carried out, a very successful steam car will result, and, moreover, one which will give a remarkable mileage (180) per cwt. of coke nuts burned.

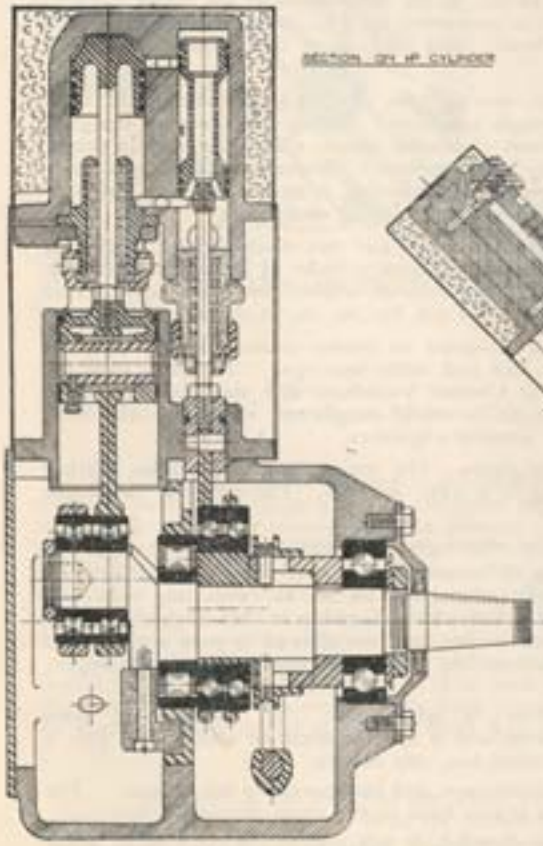


Figure1. —Longitudinal Section.

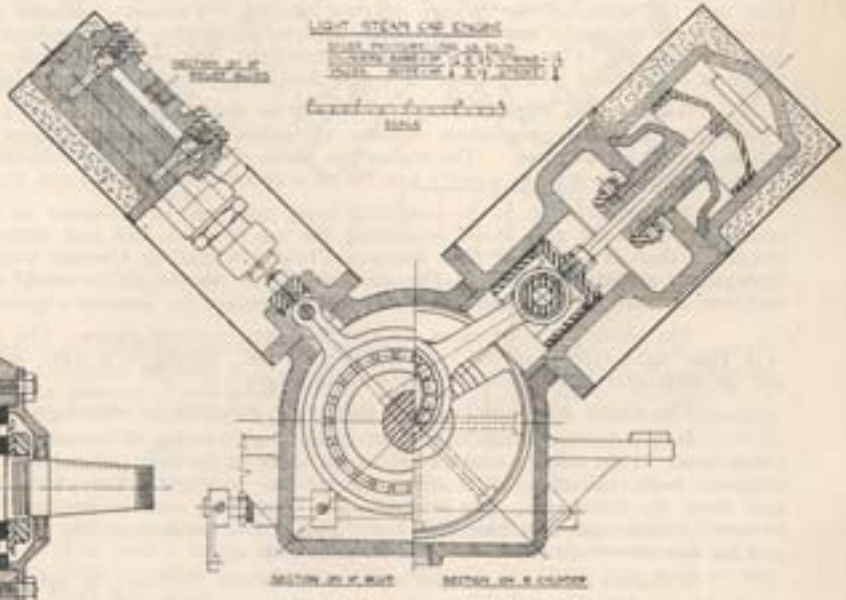


Figure 2.—Cross Section.

The steam power plant can be constructed with the tools found in the average model engineer's workshop, the details of design have all been directed to that end. A six-inch lathe is a great advantage, but various methods of contrivance will enable the ingenious worker to get along with a smaller sized machine.

An oxy-welding plant is essential, or access to one. Good quality welding is very necessary in the boiler construction, and the amateur is strongly advised to have the boiler welding done by a professional welder.

Two designs of engine are available, viz.:—That shown in Figures 1 and 2, which is a two-cylinder, double-acting, 90 degree V compound engine, suitable for cars not exceeding the 10-h.p. rating. A more powerful engine is that illustrated in Figures 3 and 4; it is a four-cylinder, single-acting radial, which has been specially produced to replace the petrol engine, in cars up to 15-h.p. rating.

Complete sets of engineering detail working blue-prints for constructing both the above engines, together with working drawings of the steam feed pump (which supplies feedwater to the boiler), can be supplied for £2 5s. per set for each respective engine.

Unmachined castings, smoothly and cleanly cast in high grade iron, for the engine shown in Figure 1, cost £4 17s. 6d., which price includes all the necessary castings to build the engine and the steam feed pump.

A full set of castings to construct the engine illustrated in Figure 3, including the necessary castings to build the steam feed pump, is available for £5 10s.

Engine, Figure 1, can be supplied finished complete, with steam pump, ready to instal in a car, built to individual order only, for £59 10s. Engine, Figure 3, finished complete with steam pump, built to order, and ready for steam, £46.

Both these engines are high-speed ones, designed to rev. at the same speed as the petrol engines, whose places they take. Such engines are indispensable for converting an I.C. car to steam propulsion, as slow-running steam engines would be too large and heavy, and the use of them would, moreover, necessitate the rebuilding of the rear axle.

The engines we offer, are both small in overall size, and light in weight, thus allowing the car's existing gearbox, shaft drive, and rear axle gear ratio to remain unaltered. Both engines are so designed that they bolt direct to the change gearbox housing (by means of adapter plates, which may vary in shape, according to the make and model of the cars to which they may be fitted). Numerous advantages arise from utilizing the I.C. gearbox; e.g., the reverse gear, the means of obtaining a neutral or free engine—which is most useful in any steam car—and the choice of the lower gears for an emergency.

Referring to Figures 1 and 2, it will be seen that the engine has two double-acting compound cylinders, with the high-pressure cylinder 1¼ inches bore, the low-pressure cylinder 2¼ inches bore, and the stroke of each is 1¾ inches. The engine has inside admission piston valves worked by eccentrics. This engine develops 30 h.p. at 2,000 r.p.m., with a steam pressure of 1,500 lbs./sq. in. at the inlet.

The crank shaft is the overhung type, and was so designed to render construction as easy as possible. It is the only shape permitting the use of stock ball and roller bearings. The steel used for the crank shaft is a piece of 2½in. diameter Chrome Nickel, or Chrome Vanadium axle steel, with a tensile strength of at least 60 tons. The steel should be bought in a ready toughened condition, and thus requires no further heat treatment; a great advantage for amateur engineers.

The crank pin roller races are 1in. light type without cages. The main crank shaft roller bearing is a 1⅝in. light type, and the rear crank shaft ball bearing is a 1¼in. medium. The eccentric ball races are 50 millimeter light narrow type, without cages.

The crank pin is drilled for lightening purposes as shown on the drawing.

It will be noted that the main crank shaft bearing is mounted in a steel ring, pressed into the crank case. This feature enables the crank shaft to be fully assembled, as far as connecting rods and eccentric rods, including all bearings except the rear one. The whole assembly is then slipped into the case from the front end. The eccentric and connecting rods project, and are allowed to pass into position by way of slots cast into the case top. These slots break into the cross head and valve rod passages, and for this reason should be as small as permissible.

A feature of the crank case is its one-piece construction; a split crank case would cause more machining, and be less oil tight. The cover plate on the front end is an aluminium or steel plate, with a gasket of cork or like material, and held down by eight 3/16in. hex. cap screws.

The rear end cover plate holds the ball bearing's outer race, and incorporates a felt oil seal. The oil thrower washer deposits oil on the chamber walls, which drains back to the sump through a hole.

If the filler plug is set at the height indicated in the drawing, it will govern the oil level by overflowing. Its position can be fixed for convenient access at any point on the crank case wall, so long as the height is the same.

Mounting lugs, or arms, are cast on the crank case sides. The span of these depends on the chassis. Their span, if too short to straddle the chassis frame, should be made up by welding steel supports to the chassis. The lugs should be approximately 4in. wide, with two bolt holes in each.

The valve setting data for the engine is as follows:—

Exhaust closes 45 degs. before top dead centre.
Steam open 3 degs. before top dead centre.
Cut off 93 degs. after top dead centre.
Exhaust open 135 degs. after top dead centre.
Exhaust lap nil.
Steam lap .25in.
Angle of advance 45 degs.
Cut off 58 per cent. on down stroke.
Cut off 48 per cent. on up stroke.

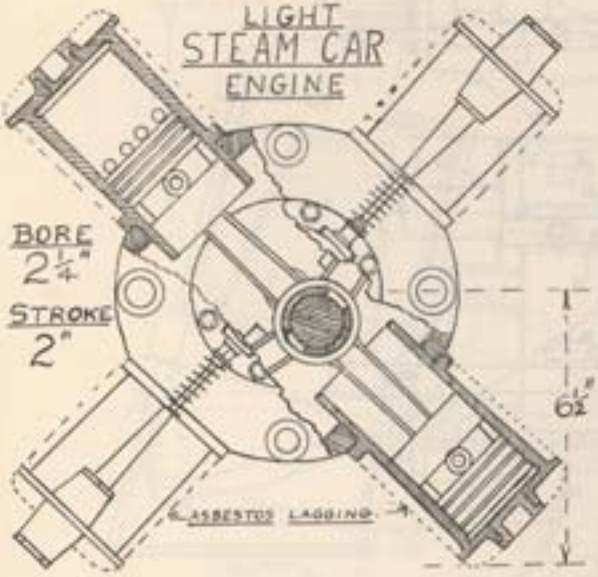


Figure 3.
Sectional View of the Radial-Simplex Engine.

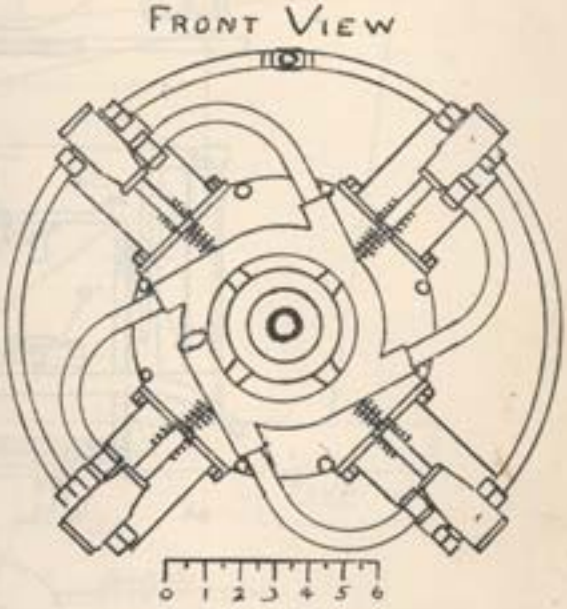


Figure 4.
View of the Engine showing Steam and Exhaust Manifolds.

The Radial-Simplex engine is intended for installing in cars up to 15 h.p. rating. It is capable of being worked up to 40 h.p. As its name implies, it is a very simple engine to build, being perfectly balanced it runs very quietly, with an absence of vibration. The illustrations are self-explanatory to a large extent, but we may here state that the engine is a four-cylinder, single-acting one, utilizing standard automobile trunk pistons, and gudgeons. The connecting rod big ends are of special design, incorporating one master rod with three articulating rods. Steam and exhaust valves to each cylinder are of the poppet type, actuated by two cams on the crankshaft, the cam working the steam inlet valves is slideable longitudinally to give varying degrees of cut-off.

The bore of the cylinders is 2¼ inches, and the stroke 2 inches. If desired, this engine may be used in cars of the 8 h.p. rating, but if it is so used a larger boiler than that required for the compound engine (Figures 1 and 2) is necessary. We have provided an oversize boiler specially for those who wish to use the Radial-Simplex engine in cars of the 8 h.p. class.

BOILER.

The boiler is the result of our many years' experience in the design and construction of steam generators for automobiles. It is of the Monotube forced-circulation type, built of the best seamless steel tubing, with the various sections welded reliably together by experts who have specialised in this class of work. After the coiled tube assembly has been finished and welded, it is rigorously tested to 2,500 lbs. hydraulic pressure, and it is not passed out until it is " bone-dry " at that pressure.

The coiled tube assembly is our own special design, and the arrangement of the heating surface is such that the boiler can be used either for burning coke or for oil burning. The control of the steam production and the temperature at which the steam output is delivered to the engine, is effected by two simple automatic regulators—which are also of our own exclusive design.

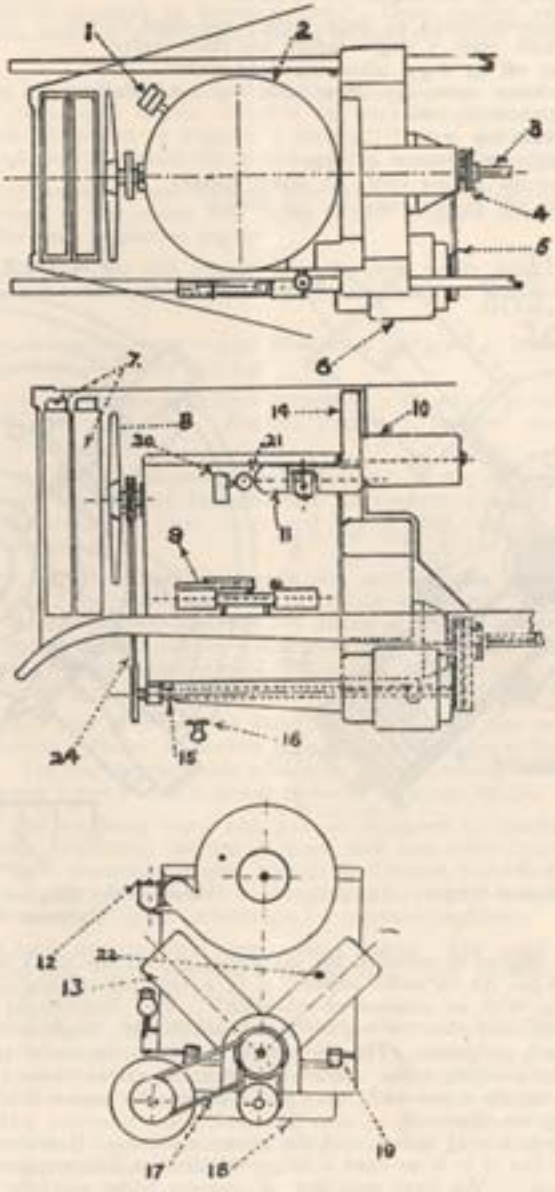


Figure 5.

The Steam Power Plant, as assembled in a Morris 8 h.p. car. The illustration shows the boiler arranged for oil-firing.

For coke-firing, see the arrangement illustrated in Figure 6.

The boiler is very compact, and its bulk is not too great to permit of its being located under the bonnet in the case of an oil-fired application (see Figure 5), or, when coke is used, it can conveniently be placed in an inclined position forward of the front axle (see Figure 6). In some cases, it may be found more convenient to place the boiler right at the rear of the car.

The coke-fired boiler possesses equal automaticity with its oil-fired brother, the coke fuel being fed as required to the fire-grate from the specially-shaped hopper, without any attention on the part of the driver.

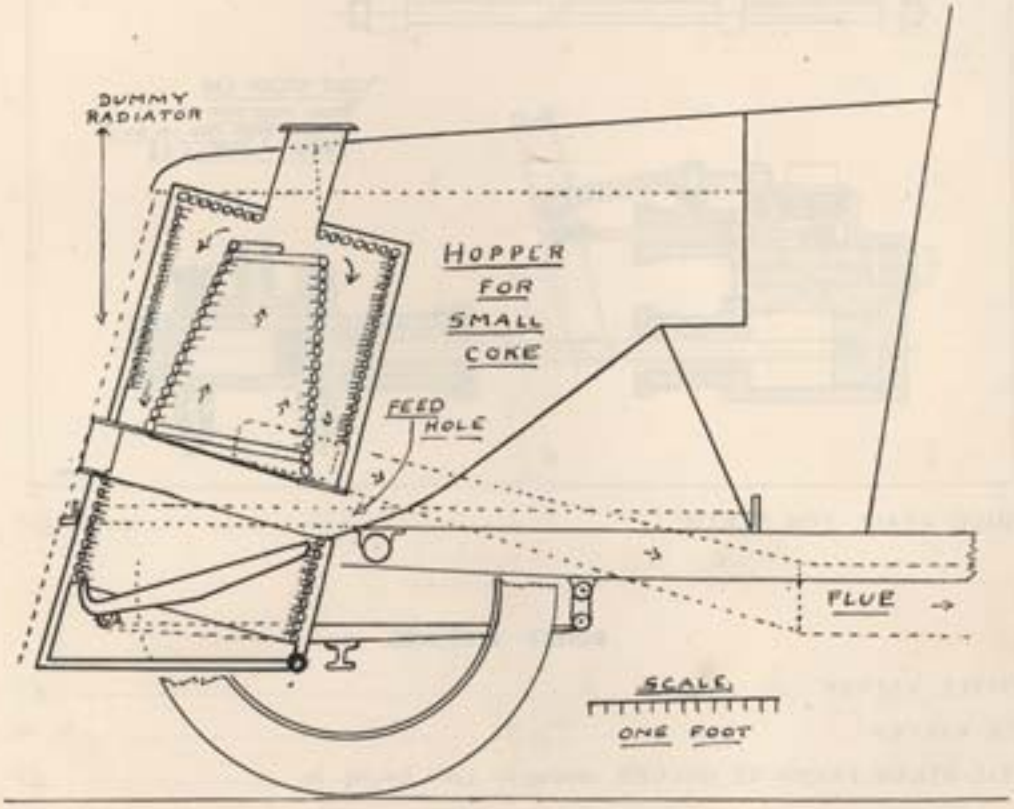


Figure 6.

BOILER PRICES.

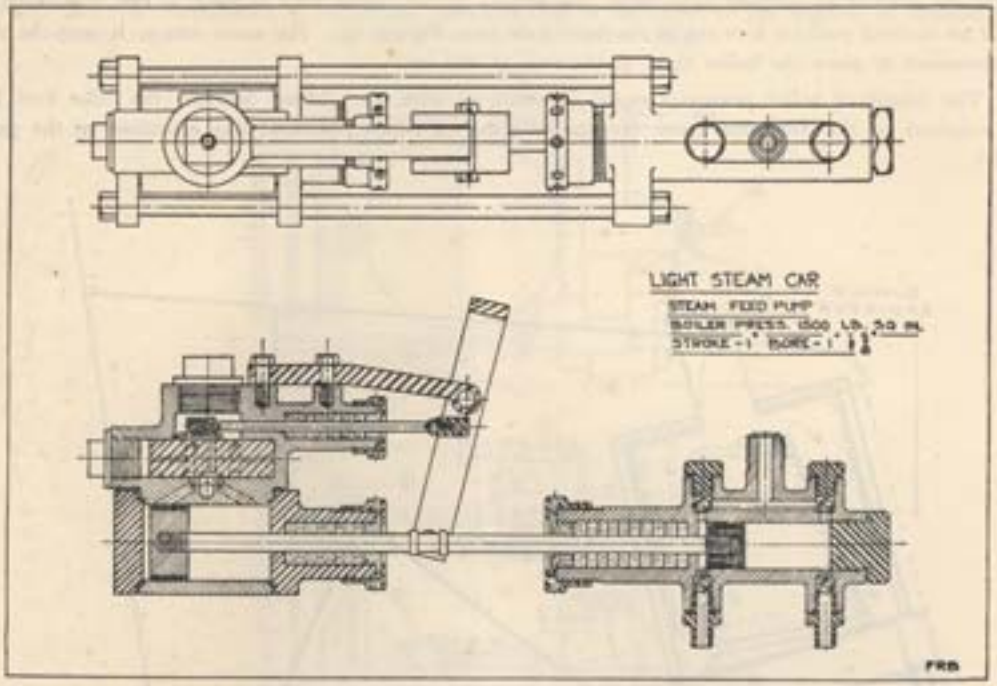
For Cars in the 8 h.p. Class.

OIL-FIRED, 14 inches diameter by 15 inches high	£38 0 0
COKE-FIRED, 15 inches diameter by 28 inches high	£42 0 0
OVERSIZE COKE-FIRED, to suit Radial-Simplex Engine, 16ins. by 30ins.	£45 0 0

For Cars up to 15 h.p. Rating.

COKE-FIRED, 16 inches diameter by 32 inches high	£49 0 0
COKE-FIRED, 18 inches diameter by 34 inches high	£53 0 0

STEAM BOILER FEED PUMP.



FINISHED READY FOR STEAM £15 0 0

BOILER FITTINGS.

THROTTLE VALVES £1 7 6

CHECK VALVES ..... 8s. 0d. each

SPECIAL STEAM PRESSURE GAUGES, reading to 2,000 lbs./sq. in. £2 5 0

ALL PRICES ARE SUBJECT TO ALTERATION WITHOUT NOTICE.

It may interest you to know that a comprehensive Magazine is published on the Steam Car and Steam Aviation, monthly, 1/-.

Horne & Son, Whitby.