

the lowest part of the boiler, there to be removed by the blow-off valve. The vehicle can travel from 30 to 60 miles on one charge of water.

As will be seen from the drawings the engine is a Vee type tandem compound. Two pairs of high and low-pressure cylinders operate the same crank at an angle of 90 deg., giving, it is claimed, a very even torque as well as good balance, and securing smoothness of running and absence of vibration at speeds up to 1500 revolutions per minute. The high-pressure cylinders are 3in. diameter, the low-pressure cylinders are 5in. diameter, and the stroke is 3in.

The engine is enclosed and self-lubricating. There are two systems of lubrication, one for cylinder lubrication, and a second for general lubrication. For cylinder lubrication a trigger pump is provided which is immersed in a bath of cylinder oil, and which forces a drop of oil into the steam pipe every 100 revolutions, and maintains a film of lubricant on the

ders, and flat valves on the low pressure. The operation of all the valves on both lines of cylinders is effected by a single eccentric.

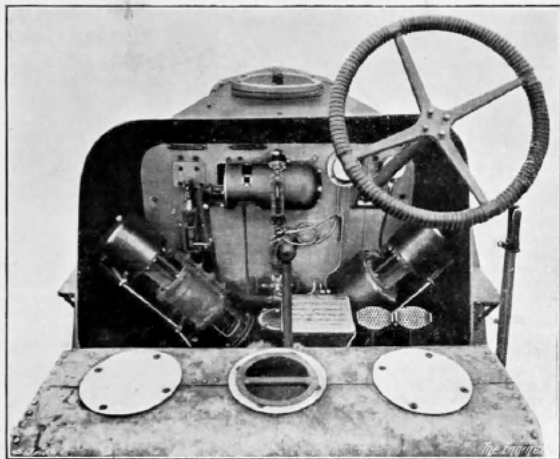
The engine is mounted on the chassis frame by two extending arms which terminate in bearings, these bearings embracing trunnions, which are securely bolted to the side members of the frame. At the rear of the engine a cross member of the frame carries a pin which fits into a hole on the pump case of the engine. The engine is thus carried upon three cylindrical supports, and it is free to slide upon them. There is thus no unnecessary constraint imposed upon the engine, and it has a wide basis of support to resist torque and to carry the weight of the engine direct to the frame without the employment of a sub-frame.

The condenser is situated in the place usually occupied by the radiator, and consists of a top and bottom header united by radiating tubes. As trouble has been experienced in the past in keeping condensers

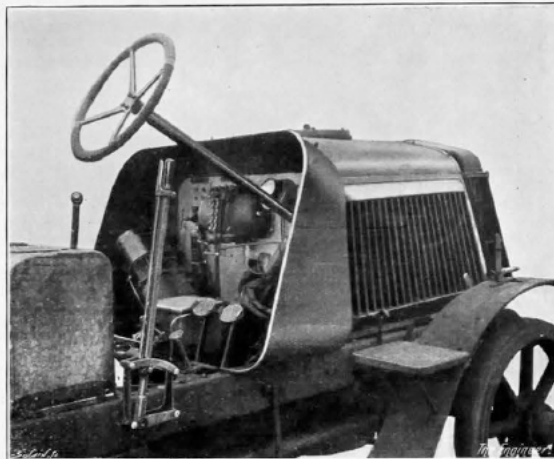
per hour have shown that the 3-ton lorry can be worked on a consumption of 5 lb. of coke per mile, and that when running light the consumption is often down to 3.5 lb. per mile—which, taking the price of coke at 35s. per ton, and petrol at 2s. 8d. per gallon, gives respective fuel cost of 1 to 4 in favour of coke fuel.

BRITISH SCIENTIFIC PRODUCTS EXHIBITION.

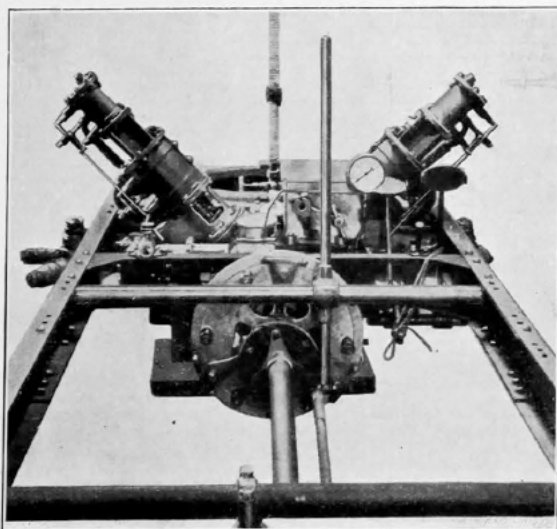
As already announced, the British Science Guild, with the assent of the Ministry of Munitions, and the approval of the Board of Trade, is arranging for an exhibition to be held at King's College, Strand, London—by kind permission of the College authorities—for four weeks during this month and next, of products and appliances of scientific and industrial interest, which, prior to the war, were obtained chiefly from enemy countries, but are now pro-



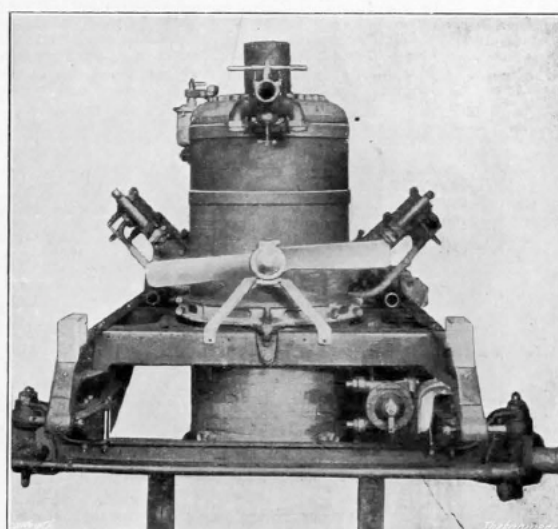
VIEW OF CONTROL GEAR FROM BEHIND DRIVER'S SEAT



SIDE VIEW SHOWING CONTROL LEVERS, PEDALS, ETC.



ENGINE MOUNTED ON CHASSIS, SHOWING CLUTCH AND GEAR-BOX



VIEW OF BOILER AND OTHER MECHANISM DURING ERECTION

inner surfaces. For general lubrication a gear pump is provided, and being drowned in the lowest part of the crank case is not subjected to air locks. The oil is conveyed under pressure from this pump to all the working parts of the engine, including the three journals on the crank shaft, crank pin, eccentric and crosshead guides.

The crossheads are made of steel, case-hardened and ground with about $\frac{3}{1000}$ ths of an inch clearance in a ground cylindrical crosshead guide. At the point of mid-stroke oil is introduced through the crosshead guide on to the working face of the crosshead, and as the length of the crosshead is in excess of the length of the stroke, it follows that the hole supplying the lubricant is never uncovered by the crosshead. By suitable channelling in the face of the crosshead and holes leading therefrom to the gudgeon pin, it also is placed in communication with the oil pressure feed, an arrangement that has been found to work with complete satisfaction.

Piston valves are used on the high-pressure cylinders,

and flat valves on the low pressure. The stresses introduced by the expansion of the radiating tubes due to the passage of steam through them, an improvement has been made in this condenser by allowing the lower tube plate to move up and down within guides to such an extent as may be necessitated by changes of temperature in the radiating tubes. The lower header is actually hung upon the tubes, and is kept in position within the beforementioned guides by four short stiff springs. The back of the condenser is shrouded and furnished with a powerful fan for ventilation. The fan is driven by a belt from a short lay-shaft running along the side of the chassis from the engine. At the forward end of the lay-shaft is a rotary pump which drains the lower header of the condenser and returns the water of condensation to the tank through a filter in which the cylinder oil is extracted.

On the all-important question of the cost of operation no extravagant figures are put forward. Tests made at speeds ranging up to between 20 and 30 miles

per hour have shown that the 3-ton lorry can be worked on a consumption of 5 lb. of coke per mile, and that when running light the consumption is often down to 3.5 lb. per mile—which, taking the price of coke at 35s. per ton, and petrol at 2s. 8d. per gallon, gives respective fuel cost of 1 to 4 in favour of coke fuel.

With the object of ensuring an intelligent interest in the several exhibits, the committee has arranged for attendants to give such explanation of their character and purpose as occasion may demand, and from time to time short lectures and addresses dealing with important departments and features of the exhibition, with the special aim of directing public attention to the vital necessity of developing the scientific industries, and of applying the results of scientific research, will be given.

A PROJECTED ship canal from Doncaster to Goole, or from Sheffield to Goole, and so on to the sea is creating some interest in the southern part of Yorkshire.