GARDNER

Spring/Summer 2002 Issue

Gardner Engine Forum Philosophy

"The aims of the Forum are to promote and foster interest in all Gardner Engines"

Subscription

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*(Front cover photograph– Gardner Head Office building at Patricroft, taken by Colin Paillin on a factory visit in 1990)

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Chairman's Jottings

We hope you enjoyed reading the first newsletter from the Forum, it has been very difficult to start up but now it will seem easier to continue with.

On a sad note, we hear that one of our rally stalwarts Mr Martin Barnecutt passed away, on October 25 aged 58. Martin was always keen to bring his Robinson Hot Air Engine to the rallies and he will be sadly missed. Naturally, our thoughts go out to his family and friends.

With regard to the running of the Forum, we are still looking for someone out there from the Forum to join us and help spread the workload. Please come forward, we need a Secretary.

To assist the funding and development of the Forum, we would like to be able to have adverts from engine related companies running in each issue. A full page advertisement will run at £45, whilst a half page advertisement would be £25 in colour or B/W, running for two issues.

The GEF membership is now running at 234 and still rising. Our interest is expanding into the Russell Newbury Register with comments that help us foster the interest in older engines. Our members - Mr & Mrs Geoff Butcher - attended their Rally in London last year with their boat "Amos" and were made to feel very welcome.

Our first AGM was held on 20th April 2002 at the MIRA Vehicle Testing Centre on the A5 near Nuneaton, Warks at 2.00 pm.

For ease of administration, we have made arrangements for you to renew your subs by standing order, this will save John time in chasing your subs, so please take advantage of this facility, remember photocopies will be accepted.

Liquid Engineering has given us a flyer for your interest if you find a black fuel filter.

Gardner Rally 9/10th June 2001
Walsall, West Midlands - Rally Review

The aerial photograph below was taken from the top of the adjacent Museum late on the Sunday afternoon, with at least three boats making there way home down the arm. The rally attracted some 86 entries in total, with road, marine and stationary exhibits being well represented over the weekend. Luck was on our side with the weather holding up for us, although with respect to the Met office, it could have been a little warmer in June!!!

This was the fourth rally to be held, following similar events in Nottingham, Manchester and Gloucester, with the accent of the events firmly being to let the Gardner engines entertain us. Personally, I do believe that the intrusion of traders and non-Gardner entrants etc will spoil the event.

Visitor attendance was better than expected although not surprising considering the proximity of the Rally to the town centre. Banter was plentiful, friendship was first class and hospitality was....well...some of the engine owners gathered together on the Saturday evening in the warehouse with their own drinks and entertainment. Enough said!!

I am currently making plans for the next Gardner Rally for the year 2003, in Nottingham, however, I must pass on my personal thanks to all at Gardner Parts for their help and support in making the 2001 Rally such a success.

Colin Paillin
Chairman

"GARDNER OF PATRICROFT 1868 - 1968"

(permission granted by Gardner Parts Ltd)

Barton Hall Engine Works in 1908

Before the Gardner 1902 M-type engine series, the choice for boats lay between sail and steam. But the M-series opened up more than the marine market. As fast as these first vertical Gardner engines could be made, more applications were thought up for them. They turned dynamos, lit theatres, powered wireless sets, pumped water, compressed air and drove ships. Their range was wide, from the single-cylinder model producing 5 bhp to a six-cylinder version producing 220 bhp, of which the War Office, the Admiralty, and the India Office could not obtain enough to make electricity. M-series engines were water cooled and could be made to burn petrol, paraffin, both with magneto ignition, oil or gas. Each of the upright cylinders was cast separately and, in multicylinder types, bolted to its neighbour. It was much higher-revving than the horizontal engines but the fourstroke principle remained the same. What made the M-type so successful at sea was the Gardner-designed close-governing, which prevented the propeller from thrashing wildly when it surfaced above the pitching sea, and the Gardner-designed reverse gear , which allowed the engine to run continuously, at full power, for long periods, to drive the boat astern. This was the first of the engine series that were to become so popular with fishermen that mention was made of their preference for Gardner products in the House of Commons, half a century later. It is not difficult to see why. Of five boats fitted with three-cylinder versions in 1908, three were still being renewed with Gardner parts twenty years and more after the engines were built.

One of them, the smack *Vineyard*, was supplied with spares twenty eight years after her 55 bhp engine, with the KM designation, was installed.

The series served well in larger vessels. Three of the six-cylinder engines, designated JM, were fitted in the Royal Mail motor vessel *Lochinuar*, a 200-ton boat, and ran in her for twenty years before they were replaced by more up-to-date Gardner engines.

In 1903, a year after the introduction of the M-series, the V -type engines came into production. Relatively slow-speed single-vertical-cylinder petrol-paraffin engines, these produced between $1\frac{3}{4}$ and 10 bhp for the small power user. They could be mounted on four-wheel carts to become a portable power unit for farm work, and were popular for air compressors and pumps. There was a marine version for small boats and barges.

To meet the demand for the Patricroft-designed series, and for the earlier horizontal engines, building at Barton Hall was almost continuous. Five more acres were bought in 1904, and the workshops extended to cover three acres. By 1910 factory space had become inadequate and a further five acres were added. Within another two years, the works covered eight acres out of a total provision of eighteen.

In 1910, three more engine series were introduced. The first was the F -type, a horizontal stationary petrol engine, on the lines of the old gas engine. It introduced high tension magneto ignition, instead of hot-tube, to the horizontals and produced between $\frac{3}{4}$ and 14 bhp, principally for electric lighting, and for driving compressors in high-pressure gas systems. One was installed at Buckingham Palace, and several were used in lighting London bridges.

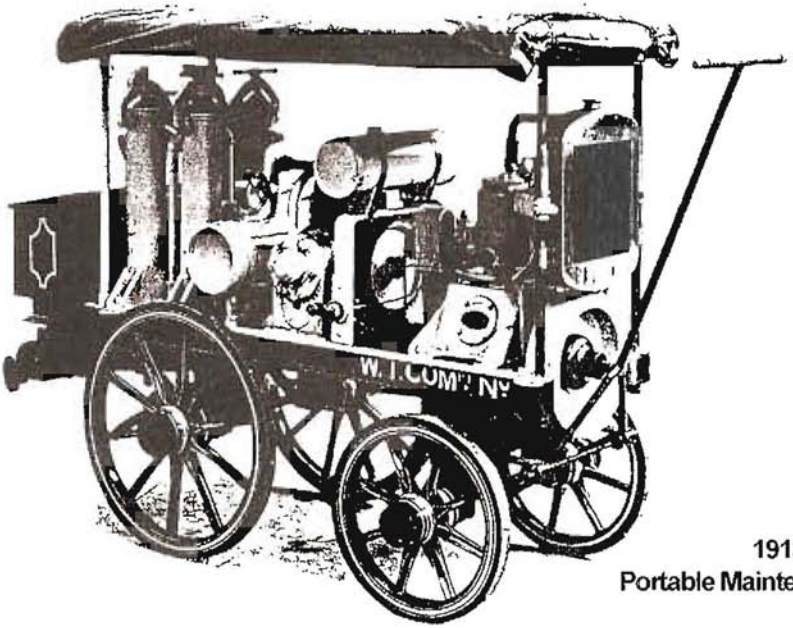
The second new engine series was the H-type, an updated horizontal oil engine in the power range 13 to 50 bhp, incorporating detachable cylinder linings and white metal bearings. The old pressure lamp, which had to be hand-pumped every six hours, was replaced by inducted heat from the engine, once it was warm. Starting was by compressed air, the last few strokes of the piston after the fuel had been turned off, serving to charge an air bottle which stored the compressed air for the next engine start.

The third new type was the CR-series, a higher-speed petrol engine for launches, cutters and pleasure craft. Roomy water jackets to allow sea water to be used for cooling without deposits building up were cast in one piece with the cylinders, which remained separate, like those in the M-series.

This engine, too, was to prove long-lasting. A four cylinder CR engine installed in a 32-ft private launch named *Mascot*, built by Borwick & Sons of Windermere in 1908, was used on the lake by her owner until she was sold to a firm in 1921. Her new owners renamed her *Duchess,* and used her for hire work on the lake until 1961. Half a century of satisfactory service from a single engine !

By this time, 1912, the company had factors all over the world to distribute engines it was making at the rate of one every working hour. The Norris & Henty agency had grown with the sales; the Gardner business had far outstripped other lines, and it was decided to create an L. Gardner & Sons marketing subsidiary of it. A new company, Norris, Henty & Gardners Ltd, was formed with a capital of £31,000. Mr Norris, who had been a member of the Gardner board since 1903, was chairman, and the other board members were Captain Henty, Mr T. H. Gardner, and Mr Harry Grove, a Norris & Henty employee. In the same year a new foundry was built at Barton Hall Engine Works and this addition made the company virtually self-sufficient, from raw metal to finished engines, with control over quality at every stage. Moulders and coremakers brought the number of workpeople close to the thousand mark. For their leisure, the spare land held for further expansion was laid out for sport. There was a cricket-field, soccer and lacrosse pitches, tennis courts, a bowling-green and rifle-range. Indoors there was a reading-room and social clubroom where orchestral and dramatic societies met.

The company had expanded far beyond the Gardner family circle yet a family feeling remained. When Sir Kenneth Crossley wrote and asked the company to join the Industrial Welfare Society, he explained what it was substituting for :



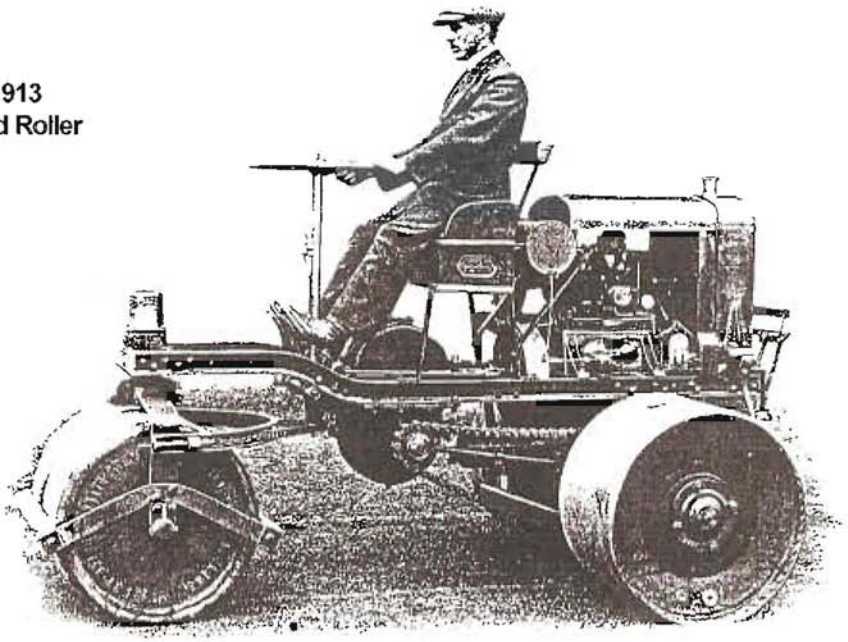
1913
Portable Maintenance Truck

n the good old days, when businesses were small and employers were, often as not, to be found working side by side with mployees, there was a friendly, even a family feeling throughout industry .'

he Gardners turned down the invitation. 'We flatter ourselves that in this firm, although the employers no longer work side by de with their people, the family feeling is nearly as strong as ever. This is to a large extent due to the fact that no outsiders have ver been imported either into the directorate or the staff. The directors are the proprietors of the business and the staff have all sen from the ranks after years of service.' In 1911, William had come of an age to take up shares and his seat on the board so e family directorate of six was complete. Thomas, Edward and Joseph shared between them the design of these early engines nd the commercial administration of the business. Lawrence had a physical handicap and was the least active of the brothers. ut he was a fine precision engineer, and many of the prototype parts his brothers' designs needed were made with his hands in home workshop. It was most often to Ernest that managers turned first in matters of day-to-day works administration, and he as aided by William. Joseph, who was later to design the enormously successful compression ignition engines, was getting the on foundry into production at this time with the assistance of H. E. Hunter, the works manager.

lanaging director, commercial director, works director, chief designer: these are today's labels. The Gardners used none. They ere 'the firm '. Their decisions, and their designs, were those of 'the firm', without distinction. Thomas, as head of the family, was hairman of the company but it was the only title. There was not even a deputy chairman until after his death. The growth of rofessional management in industry has blurred the distinctions between ownership and administration. Nowadays, everybody om foreman to chief executive is a 'member of the management'. The Gardners were not even 'senior management', another ey phrase of today. They were the proprietors of the business.

1913
Road Roller



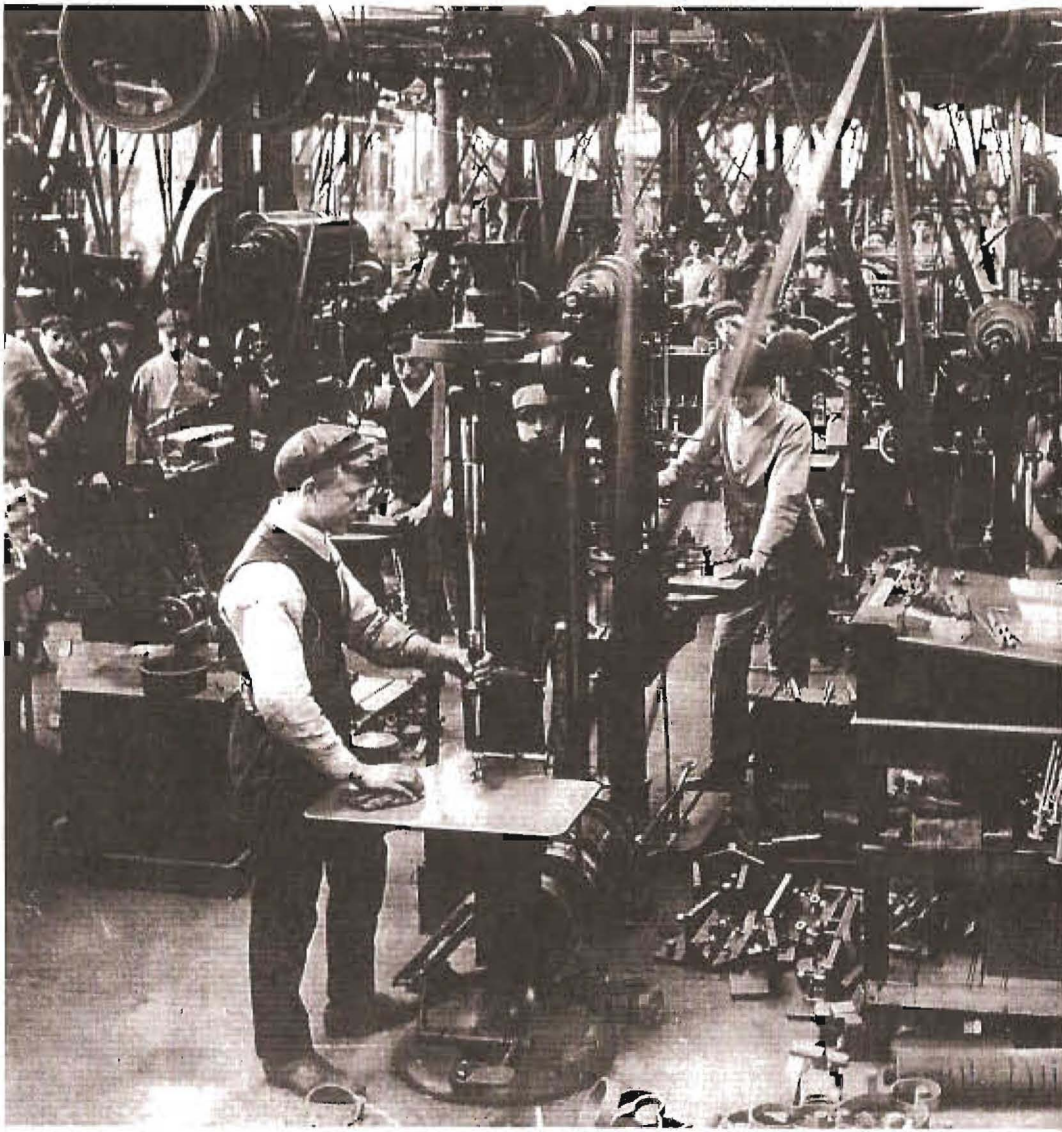
But they had a management and were well served by it. Men like H. E. Hunter, works manager, and his successors W. E. Bradshaw, W. G. Thompstone, and E. A. Todd, all of whom were to become directors but not, significantly, until the next generation of Gardners were in office.

Staff tended to increase, not gradually, but by leaps and bounds. When the first clerk of the foundry left it was found necessary not only to replace him with two men but also to promise them assistants. 'The last man's scheme of work,' Mr Hunter noted, 'depended to a large extent on the fact that the job had grown with him, so that he knew it thoroughly, and that he had a very good memory.'

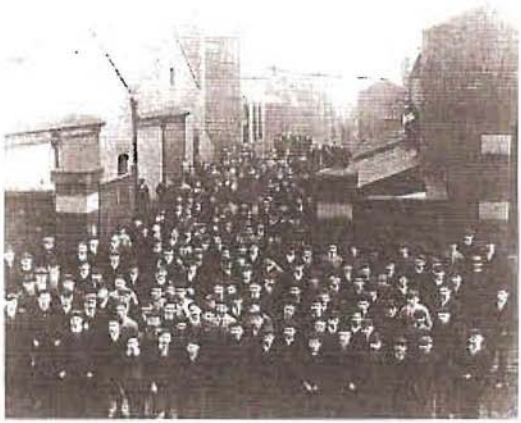
Titles become necessary on the shop floor, in negotiating wage differentials. Between the craftsman and the department manager, Mr Hunter noted, there would be 'the chargehand, who is in charge of more work than he produces himself, but is limited to one or two men or apprentices; the instructor, who is in charge of a squad of men or apprentices and is responsible for their conduct, and the quantity and quality of their output; the foreman, who is in charge of a section of the department; and the specialist, who inquires into cases of faulty work and suggests means of remedy, who watches all processes in fitting, polishing and fitters' machine-shops and who suggests newer and quicker methods when possible.' The year 1912 was also the last before the third generation of engines and, in preparation, Thomas Gardner gave up the public work for which he had spared time. He had served on Eccles Town Council since 1906, and helped develop the Corporation's electricity department. Second generation vertical engines had followed first generation horizontals and the third generation proved to be, not the diesel engine that Gardners had developed experimentally, but a range of two-stroke semi-diesels, thought to be more commercially viable.

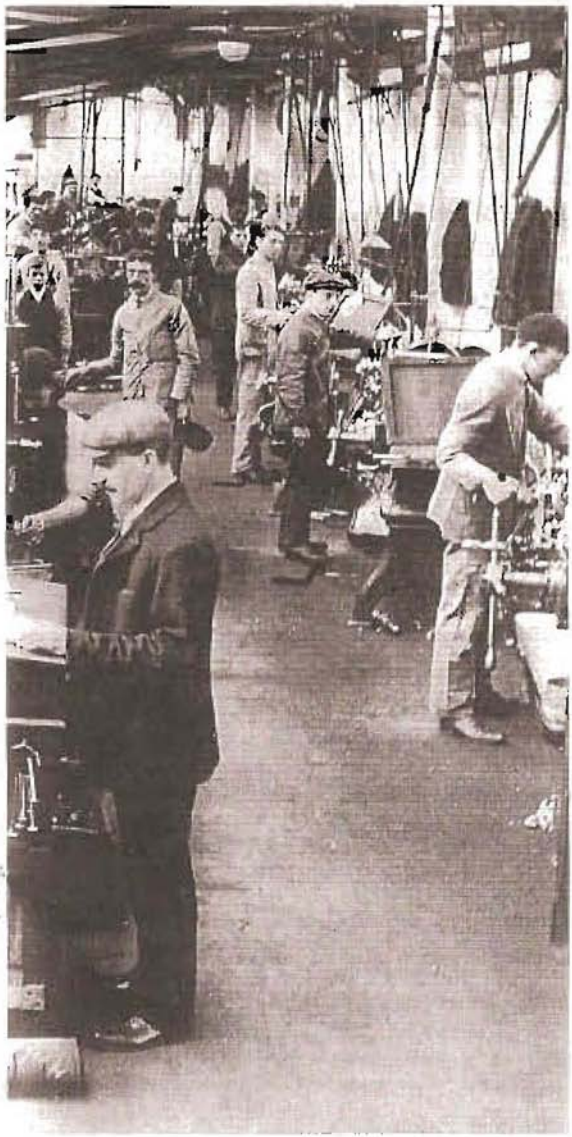
Neither at this time nor later were Gardner engines derived from the designs of Dr Rudolf Diesel. They were first cousins only.Theirs was the British ancestory of Herbert Ackroyd Stuart.In .1890, .Ackroyd Stuart

Photographs of the Barton Hall works in 1908



Photographs of the Gorton Street entrance (right) and the canteen (below right.)





had patented an engine in which the fuel was injected into air compressed in the cylinder by a stroke of the piston, thus achieving the high compression that had only resulted in premature ignition, instead of heat saving, if applied to the fuel and air mix in a petrol engine. Theoretically in 1892 and practically in 1897, Dr Diesel had gone the logical step further and created the compression ignition engine by so compressing the air that it became hotter than the ignition temperature of the fuel. In his engines, for many years, fuel was forced into the cylinder head by an air blast but Gardner engines, then and in the future, used mechanical injection.

For their 1913 T- and VT-range of semi-diesels, which were fired by a combination of the heat generated by compression, and the warmth of a cylinder head ante-chamber to which engine

eat was ducted, Gardners invented and patented an injector which cured the principal failing of this type of 'hot bulb' engine. Earlier ersions, by other makers, stalled when left to tick over , because fewer revolutions meant that the engine lost heat and, with it, alf the means of ignition. The Gardner invention was a rotating sprayer which could be altered to direct the fuel on to a hotter art of the cylinder head when the engine was set to idle.

he result was a very simple and therefore reliable engine. There were no valves and a relatively high powerto-weight ratio, as it as a two-stroke, and no magneto ; good sales points in the marine market. And the marine engines with three or four cylinders ad another big advantage. They had no need of a reversing gear. The two-stroke cycle could be stopped and restarted to turn i the reverse direction, almost as fast as shifting gear .

he VT was the single-cylinder version, and the T was the designation for the two-, three-, four-, five- and six-cylinder engines, ie largest of which - the 6T9 - produced up to 300 bhp at a crankshaft speed of 290 rpm. To start them, of course, the cylinder ead antechamber had to be preheated but ships' engineers used to stoking boilers did not begrudge four minutes with a blow imp. Later, a glow-plug (the familiar wire coil heated to redness with an electric current) was provided and the description of how iis was developed, in a supplement to the T-type engine catalogue, gives a rare glimpse of the difficulties met in turning a prototype ito a production model. It could as well have been applied to the whole engine series.

Considered as a laboratory experiment, the system is extremely simple and now belongs to ancient history, but to convert it into really reliable system for use in everyday life is a vastly different problem.

The task has been particularly arduous, demanding much time and patience, not to speak of cost, for the cogent reason that there i no other way of making tests for endurance and effectiveness other than that of putting the igniters to work under actual working onditions in engines running at full load all day long for weeks and months on end. It is only by such tests as these that we are ble to recommend the system with such confidence.

The two-stroke ignition system was applied to the horizontals to produce the economical HC-type and the first engine in this range as tested on 27 August 1913. However, the market for the new engine types scarcely had a chance to develop. In twelve months, ie country was at war.

A 1907 staff photograph showing: back row: Messrs E. Simpson, Davies, J.H.Simpson, Buck, Bennet, E.Tyson, James; front row: Messrs Ogden, H.Tyson, Holland, Hunter, Flint. Bargwaneth and Pitt.

Comments from Dion Houghton

(former Technical Director at L Gardner & Sons Ltd)

"The Gardner Centenary Book is inaccurate, and has the following mistakes.

•The first Gardner design internal combustion engine was a gas engine tested on 5th May 1894, Dion has the original test book

•The statement on page 12 that a gas engine was sold for £12.10s in 1893 is wrong. Production did not start until 1897, the smallest engine was a 3/4 hp not 1/2hp.

•The placing of a boiler in the cellar of their house was unlikely, the only fuel would have been coal. Where was it stored? Where did the smoke go. What about the ash, and the residents?

•The lathes were about 3 1/2 " treddled, the works threw them out in 1910 and my father bought one – it is still around.

•Page 14 M series "What does oilier-gas mean?

•Gardner cylinders were never "bolted to its neighbour" they were bolted to a common crankcase. Kelvin's bolted cylinders together.

•Page 15 Henry Grove was an alcoholic and was asked to resign.

•Page 20 They never made horizontal two strokes and the VT was only made in one or two cylinders.

•All engines development was done in "Research" not in the new Laboratory; this was only used for testing fuels, oils and metals."

"My father had a 4LK in a Wolsely 25 in 1936 in which I was taken to school and eventually I use to drive it from a communal garage to our flat. Parking it one day, a man came up to me and asked whether the car was all right. I replied that it was and was in excellent condition. "Oh good" he said "My car makes a noise like yours and I thought there was something wrong with it."

Twenty years later I was taking my son to school in a later version of the same car, with the same engine and I pulled up in a car park and an AA man came over saying "Excuse me sir I don't think you should drive that car very far. Would you mind starting it up again." On starting the car, he shook his head and said that he thought I had a problem, so could he look under the bonnet. I opened the bonnet and when he recovered from the shock he said, "I am sorry sir, I have never seen one of those before!"

The largest engine ever made by Gardner was the 8J9, rated at 400 bhp and four were installed in to vehicle ferries operating in Hong Kong. In 1941 they were both sunk in the harbour to prevent the Japanese getting them. At the end of the war, four years later, there were raised off the seabed, cleaned up and ran successfully for another 20 years.

Dion Houghton

18 Normill Terrace
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HP22 5AG

March 12th 2002

Dear Editor,

Good as we know Gardner Engines are, they can't go on running for ever, and do get a little tired and worn with age. Unfortunately, one also has at times comes across ones that have suffered from neglect and bodgery. In this connection I have come across a couple of things that are worth checking on older engineers.

Firstly, on L3 engines, it has been found on an 8L3 of 1953 and a 6L3 of 1940, that the fuel injection pump drive shafts (referred to in the spare parts lists as "fuel pump camshaft assembly - gear half') that the coupling to the damper has a tendency to work loose on the shaft. This causes wear on the shaft itself, the bore the coupling and wear to the key and keyway. In the case of the 8L3 this has resulted in the fuel injection being retarded by some 10" relative to the valve camshaft. I am given to understand that the other half of the coupling on the pump camshaft itself is also prone to this problem, but fortunately not so in this particular engine. While attending to this I have heard of yet another 8L3 with the same problem, so this obviously is an item that is a bit of a weak point in these engines. Incidentally, all these engines are installed in railway locomotives.

Turning now to road vehicles with LW and LX engineers, I have come across several cases where water has found it's way into the lubricating oil system. In every case the drain slot on the water pump has been blocked up with grease so that if the spring retaining the impellor against the carbon gland or seal breaks, the water leaking past can't get out of the drain slot and carried on and gets into the sump. So if it is suspected that this is happening, it is well worth checking that the drain slot is clear.

Yours sincerely,

Richard Nixon

Extract from article

"How transport engineers have improved the breeds"

(published by the IRTE)

The man who led the formation of the IRTE in 1944, Gordon Mackenzie Junner, told of how it stemmed from overwhelming response to a 1943 series of articles in his weekly magazine "Commercial Motor" under the banner "Let the operator advise the maker". A catalyst between manufacturers and operators was wanted. Hence one of the prime aims declared the by IRTE has always been "To promote improvements in design and construction". This has been the root of the go-getting reputation of transport engineers, and the following pages provide a reminder of their improvements of the breeds of commercial vehicles, beginning with the recollections of one of the early members of the IRTE, Reg Rogers, who was a great breed improver when he was chief engineer of Bulwark Transport, in Wiltshire.

When I, Reg Rogers, joined the Institute of Road Transport Engineers in 1946. I was 30, looking after the bus and coach fleet of Red and White Motor Services, in the Forest of Dean - under the tutelage of brothers John and Arthur Watts, steeped in transport pioneering (even designing their own diesel engine in 1929, selling the manufacturing rights to Leyland and Albion). The Watts brothers believed that engineering was fundamental to their commercial-vehicle trading and operating business, so my training was sweet and my morale high. Enterprise was encouraged was stimulated still more by the meeting of like minds at Institute meetings, which in my Western region were held at Cardiff in those early years. That post-war period brought socialist politics that included deep changes to Britain's transport industry. Businesses carrying passengers and freight were taken over by the State, with the exception of private-hire passenger transport companies and specialised haulage companies such as bulk liquid carriers and the fleets of companies devoted to their own goods. It led to my being transferred in 1949 from buses to trucks, as chief engineer of Bulwark Transport running a big fleet of tankers from headquarters in Chippenham. As a result my focal point of IRTE involvement moved from Cardiff to Bristol, where within 12 months I became a member of that centre's committee. I helped Western's energetic secretary Norman Sims (who was the fleet engineer of United Dairies) to form more IRTE centres. At that time Institute members from south Gloucestershire, Wiltshire, Somerset, Devon and Cornwall all had to travel to Bristol. We arranged meetings of members at Taunton, Exeter and Plymouth to sound out the possibility of setting up centres in those areas. There was great enthusiasm for the idea. It soon led to nine West Country centres. It engendered excellent comradeship between transport engineers. I personally found the fellowship and the papers presented at IRTE meetings a great help when my life changed from buses to trucks. The period from the early 1950s to the late 1960's was a lively time in commercial transport. The wartime restrictions were slowly being lifted and vehicle manufacturers were beginning once again to build vehicles to suit the transport industries' requirements. Many transport companies were building new premises, including vehicle maintenance workshops, which transport engineers designed.

Technology advanced rapidly, and operating engineers encouraged it. For example; until the late '50s, all electrical equipment was powered by direct-current dynamos. One day I was invited to visit Simms Motor Units in London. During that visit I was shown a new electrical generating system set out on a big fascia board. It featured an alternator generating current that passed through an air-cooled transformer and .then through a regulator which gave the 24-volt direct current required. It was at this point that the reason for the invitation became clear - the Simms technician in charge said they were looking for a commercial-vehicle operator who would be willing to test a prototype in normal operating conditions. I volunteered immediately. The equipment was fitted to an eight--wheeled tanker. . The alternator fitment was straight forward, merely straight into position where the dynamo had been mounted, but the rectifier was a unit 2ft high by 18 in wide by 6 in deep with an air-to-air cooler that meant mounting on the chassis behind the cab to get a clear air flow. The regulator and the other equipment was fitted inside the cab. This alternator charge system worked quite satisfactorily and remained in service for several years - during which time the development of the present

alternator took place,doing away with the large transformer. Now alternators are universal.

Not yet universal, though, are clutchless epicyclic transmissions on trucks, despite their abundance on buses. I felt that truck installations were worth encouraging. So for Bulwark I had semi-automatic Self-Changing Gears epicycle boxes fitted by Leyland, Atkinson and Seddon and so did several of my IRTE colleagues. All the Bulwark semi-automatic vehicles, rigid eight-wheelers and articulated tractor units, were successful. The ability to hot shift into a higher gear when climbing brought 0 4 m.p.g. better fuel consumption. They considerably reduced transmission troubles and the fluid flywheel completely did away with clutch problems. However, with the increase to 32 tons gross vehicle weight and the advent of motorways affording much faster travel, a greater range of gear ratios became necessary. Also, more powerful engines were needed, and the epicyclic gearbox ran short of torque capacity.

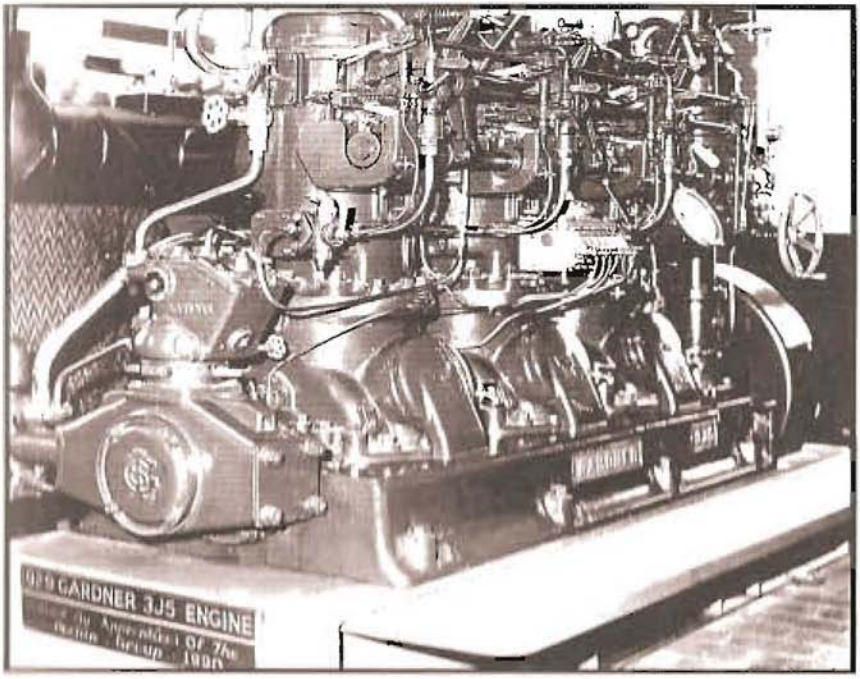
Our IRTE contacts with the Ministry of Transport led to my being asked to do a six months test of reflective number plates. The arrangement was that six sets of plates would be supplied to replace those already fitted to vehicles and, at the end of six months, after normal wear and tear, the plates would be returned to the Ministry. Seeing that the plates kept in good condition; there was seen to be no practical objection to their being made a legal requirement. The 1964 increase in gross train weight to 32 tons brought the problem that although existing vehicles would quite satisfactorily meet the Ministry's safety requirements, the engines were rather underpowered. The majority of Bulwark's tankers were in the 32 tons gross class, powered by 150 h.p. Gardner 6LX diesels. More power was needed, I decided, to suit the era of greater payloads and faster schedules into which the existing vehicles were projected. Rear-axle gearing could be altered to provide hill climbing ability, but this would have brought about a lower top speed and engines running maximum r.p.m. for long periods. Turbocharging engines seemed to be the cost-effective approach.

Having heard that CAV had recently developed a turbocharger, I contacted them and they immediately sent the engineer in charge of the development of turbocharging. The unit he brought was small and compact - exactly what I had in mind. A turbocharger was delivered within three days and 1 set about designing a way in which it could be fitted to a vehicle. The guinea pig was a Seddon tractor unit working at 32 tons train and fitted with a 6LX Gardner. The turbocharger was fitted to a bracket attached to the righthand side of the engine, the complete exhaust system was removed (a silencer was no longer required) and all the exhaust pressure was passed through a piped system connecting the exhaust manifold directly to the turbocharger. The fuel injection was recalibrated, the timing altered and the injector pressures raised. The power was lifted to 190 h.p. Further piping arrangements were made to fit between the blower side of the unit and the induction manifold. After an uneventful month of unaccustomed power, others were fitted with CAV turbochargers. Besides the extra power, the fuel consumption improved by 7 per cent.

Some time later, the news that Gardner engines had been fitted with turbochargers reached the Gardner boss, Hugh Gardner, who was quite miffed and threatened 'to refuse to supply anyone with engines if they were intending to fit turbochargers. This also caused serious disagreement between Gardner and CAV, which felt obliged to stop production of turbochargers. Indeed, by 1980 Gardner had introduced turbo charging itself. At least we proved that

the engine was perfectly capable of supercharge. We never had an engine or turbocharger failure. Bulk liquids haulage brings a strong incentive to cut unladen weight: the densities of the products carried vary so much. Also, though, safety is paramount, and I was always seeking better braking. The Seddon designers co-operated with us in devising a light specification of two-axle tractor that weighed only 5.23 tonnes. It had a tubular, instead of pressed channel, crossmember between the first hangers of the rear springs; that stiffened chassis and made the handling more precise.

The automatic lubrication pump was put on the tail of the chassis to make it more accessible. The braking stability and distribution at different states of load were made more reassuring by incorporating rear-axle load-sensing valve in the air-brake system. These two-axle tractors were coupled to tri-axle trailers and produced excellent economics operationally. Nevertheless, for stability and good braking a three-axle tractor would be attractive, I thought and it could work at maximum weight with tandem-axle as well as tri-axle trailers. What goes against three-axle tractors, though, is their weight. We could make good use of a light three-axle tractor. This time Leyland co-operated. The result was seen at the 1966 commercial-vehicle show at Earls Court. It was a lightweight Leyland Steer, with Albion front axles on 7.50-20 tyres and some weight taken out of the Ergomatic cab. It weighed only 5.74 tonnes despite having a Pneumocyclic transmission.Keeping the wheelbase short (10ft) meant that the fifth-wheel coupling was in nearly the same place as it would be on a two-axle tractor so that made sure of interchangeability between four-and five-axle artics. I have been retired for 16 years now, but I notice that this tradition of pushing for safer and more productive machinery is still being maintained by transport engineers, notwithstanding their other responsibilities for building construction, staff control, roadside accident investigations and keeping abreast of technical legal matters. And never must a transport engineer put costs before the safety of vehicles.

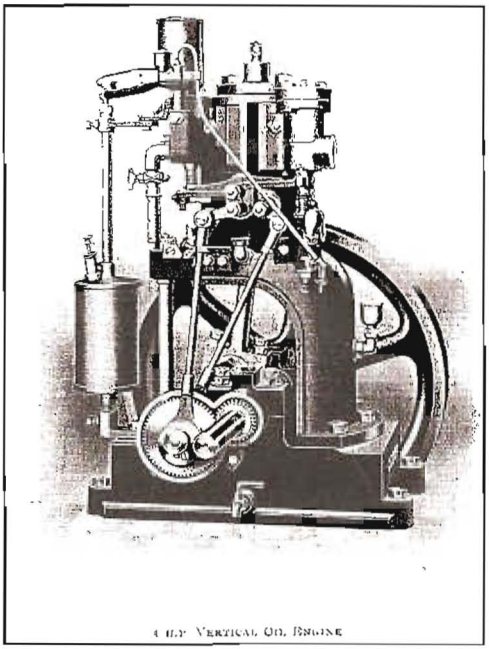


RECOGNISE THIS ENGINE?

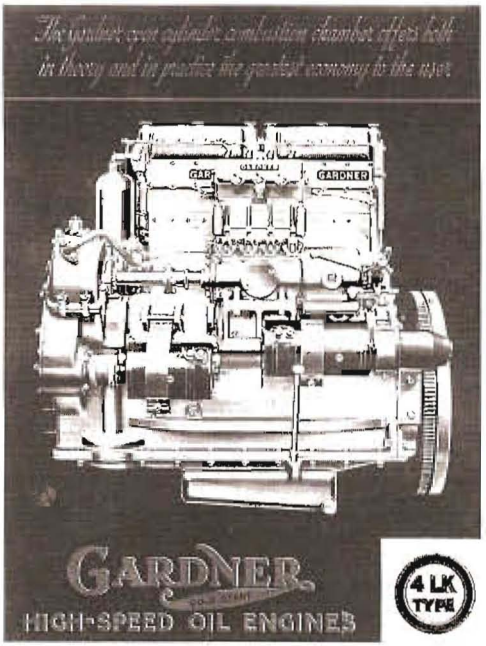
1929 Gardner 3J5 engine, restored by the apprentices of the Pochin Group in 1980 at the Ellesmere Port Boat Museum

Gardner Picture Board

Gardner main drawing office in 1908

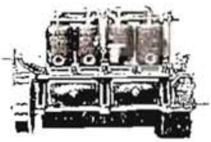


4 H.P. Vertical Oil Engine



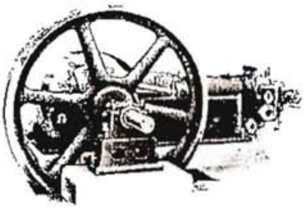
Some other Types of "Gardner" Engines.

CATALOGUE
B C R



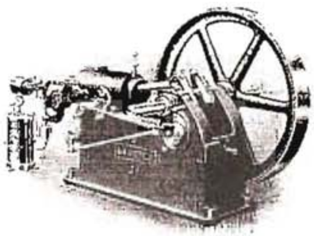
B C R TYPE
[illegible] and [illegible]-cylinder Engines
SPIRIT and OIL
[illegible] Sizes

CATALOGUE
H & H O



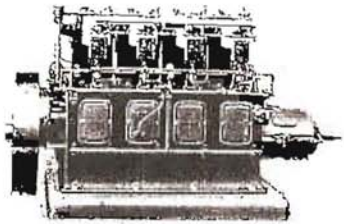
HORIZONTAL
SINGLE CYLINDER ENGINES
OIL GAS SPIRIT and SUCTION GAS
Seven Sizes

CATALOGUES
V F



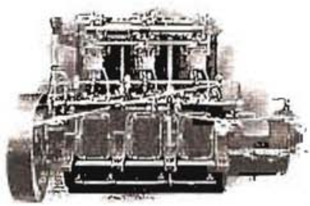
HORIZONTAL OIL ENGINES
Nine Sizes

CATALOGUE
Vertical High-Speed



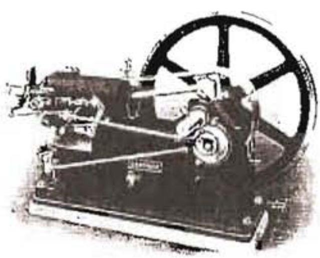
M TYPE VERTICAL
Single and Multi-Cylinder Engines
OIL, GAS, SPIRIT and SUCTION GAS
Twenty-six Sizes.

CATALOGUE
M



MARINE ENGINE
Eighteen Sizes

CATALOGUE
F T



F TYPE
HORIZONTAL ENGINE
GAS and SPIRIT
Nine Sizes

We shall be pleased to forward Catalogues and Particulars of auy of these Engines on receipt of your enquiry.

Gardner Quiz

If you recall in the last issue, there were 5 questions asked relating to Gardner. A very disappointing response with NO replies from any of the 250 strong membership, either with answers or in fact, new questions to be asked. Unperturbed, lets try again.

The 5 questions for this issue are as follows:

1. In which year was the first oil engine produced?
2. How much did it cost to buy?
3. What was its serial number?
4. Why this number?
5. What happened in 1896?

Remember, you can submit Q's & A's for publication.

Tony Redshaw

All replies/new questions should be sent to:
Tony Redshaw, 5 School Street, Hillmorton, Rugby CV21 4BW)

Engine Dating Service

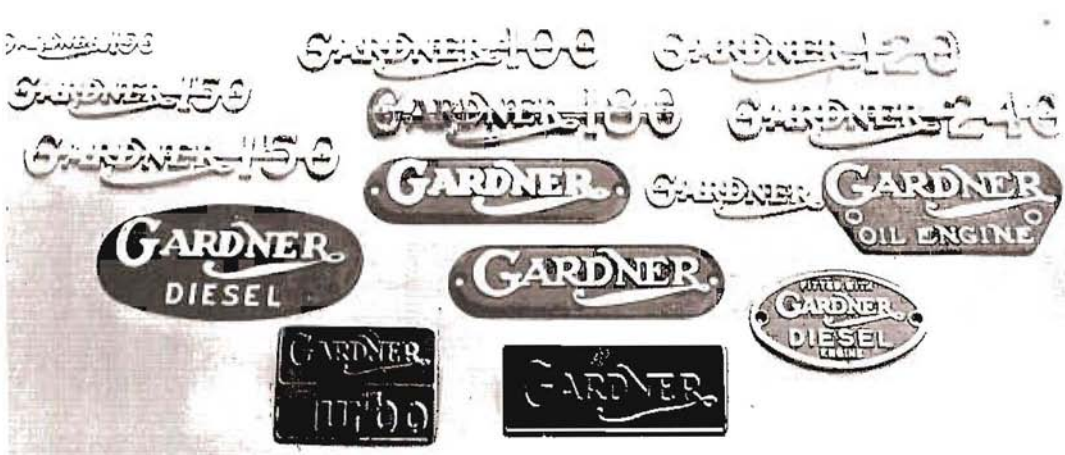
Mr G Challinor is offering to date Gardner engines when they left the works and to whom the customer was. Please enclose £10.00 with the engine number to:
G Challinor, 1 Somerford View, Holmes Chapel Road,

Gardner Marine Pennants

We are pleased to offer for sale Direct from Gardner Parts, the official Gardner Marine Pennants at a price of £18.00 plus post and packing. Please send your cheque, made payable to "Gardner Engine Forum", direct to Colin Paillin (at the address on Page 2)

Impressive Collection

The photo below was sent in by Leo Pratt, showing his impressive collection of Gardner engine badges over the years....can anyone match this collection?



For Sale

Item	Contact
Simms Magneto No 188057	Tel: 01749 880375
1968 Atkinson flatbed lorry with excellent 6LXB engine. Vehicle was exhibited at Gardner Rally in Walsall. Still in everyday use.....£3500	Tel/fax: 01395 832142

Wanted

6LX and 8LX, any condition, cash waiting	Jason Hebbron on Tel: 07802 439567
Cambox for 2L2, cash waiting	Tel: 01788 571355
Small Gardner generating set, must be in good working order, cash waiting	Adrian Hall-Carpenter – Member No 239, Tel: 01362 820850

THE 1st VERTICAL ENGINE FROM GARDNER