

Issue 661 February 2026

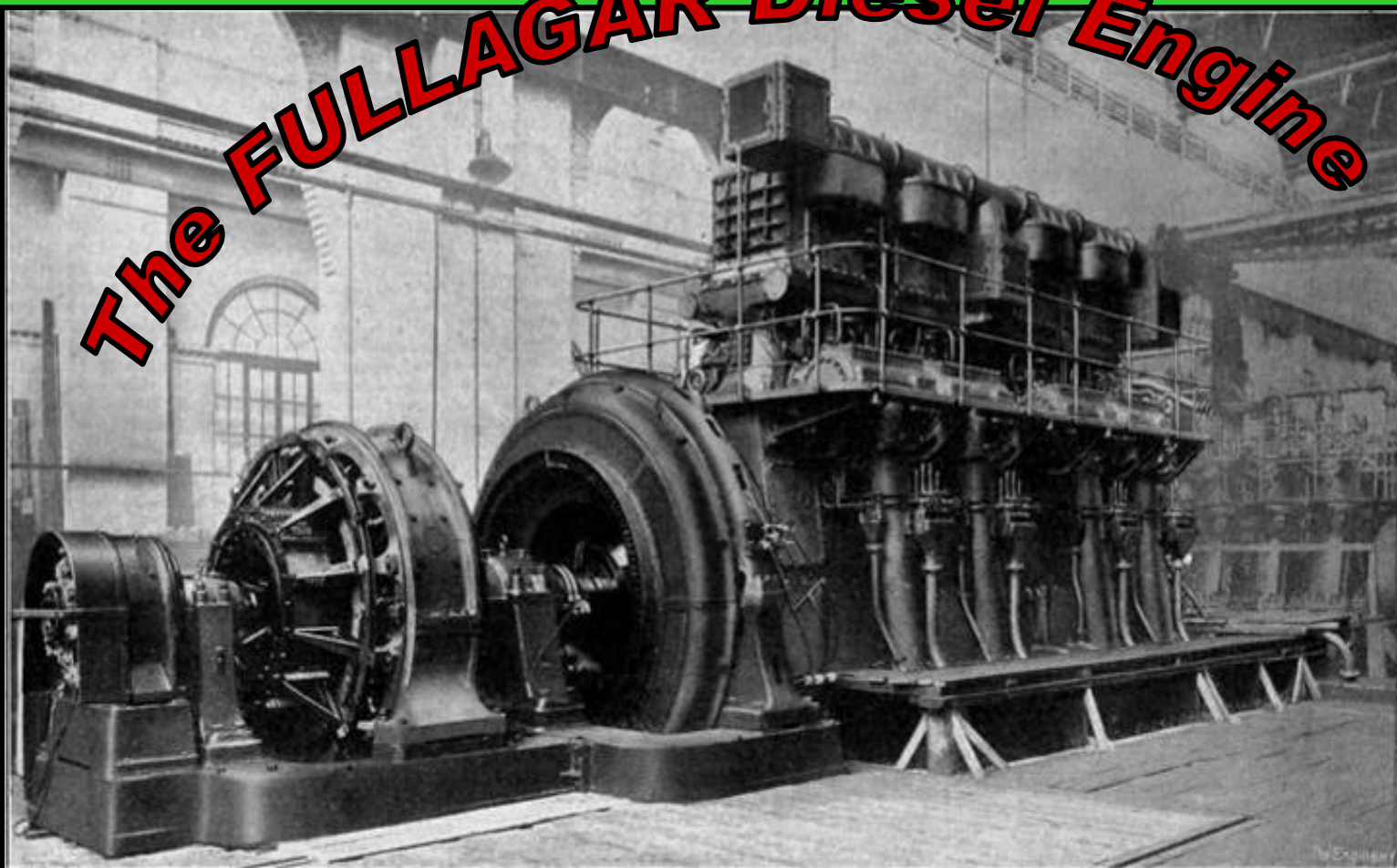
# A Wisp of



Extracts from the Melbourne  
Steam Traction Engine Club's  
Newsletter

## STEAM SUPREME

### The FULLAGAR Diesel Engine



1500 HP Fullagar Engine and Generator on test at the English Electric Rugby Factory around 1928 .  
The engine in the background looks like a 3 cylinder Willans Diesel which could just be ours as they were both built in the same works . Image found on Graces Guide web site



Trams Making a  
Comeback



Victoria Miniature  
Railway off to a  
Challenging start



Sandown Revival  
Motoring Festival

## Saving the Willans Diesel Engine

Rohan Lamb

Forty-seven years in the making a moment almost passed unrecognised for its significance on the Sunday of the 2024 rally. The event was Ray Gillett witnessing for the first time the Willans engine running under its own power. It was his intervention which resulted in the preservation of this rare example of an air-blast diesel engine in Australia, and the only known surviving multi-cylinder example of a Willans & Robinson engine design worldwide.



**Ian Malcolm and Ray Gillett discuss operating the engine (Rohan Lamb)**

installed at the Victoria Brewery, Victoria Parade, East Melbourne. It was scrapped in the early 1950s. The Carlton Brewery engine was given a second life when installed in 1953 at CUB's new malt works after the conversion of the old Yorkshire brewery. The site was then known as Yorkshire Maltings at Wellington Street, Collingwood, and operated until it was closed in 1984.

Fortunately, another club member, Wally Vears, worked for CUB as a chemist and kept an eye on machinery around the different brewery sites. He first brought the Willans engine at the malting works to the attention of the club in 1970. Wally made an attempt to secure the engine for MSTEC, and a start was made on removing small parts at which point CUB management decided not to let the engine be removed. In

1977, Ray Gillett, another MSTEC member with a keen interest in diesel engines asked CUB about the engine and they were now open to offers. Having confirmed with the club the MSTEC, Ray purchased the Willans engine for \$50 in April 1977.

The size of the engine, and its location in the Salvage Store building necessitated its complete disassembly to be moved. The building also housed a large Ruston & Hornsby 8-cylinder diesel engine and alternator. This engine had replaced the Willans for standby power, and it was later to be preserved at the Puls Bros museum. Wally Vears's internal knowledge of CUB greatly assisted Ray. Wally was able to save related documents such as the logbooks and drawings. Wally also identified many spare parts including new injectors for the engine held in CUB's store and had these placed with the engine for Ray to recover.

**Willans engine prior to disassembly showing the round and rectangular nameplates on the A-frame. These have since been misplaced when the engine was in the ownership of Museum Victoria (Ray Gillett)**



**The Willans running that weekend to a capacity audience (Warwick Bryce)**

Ray purchased the engine in 1977 and worked almost single-handedly until the end of 1982 to remove the engine from the Yorkshire Malting Works in Collingwood. Ray had kept a keen eye on the installation of the engine at MSTEC and had previously seen it turn using compressed air. At the rally, once it was realised Ray was at the fence looking at the static engine, Ian and Kerry quickly decided to make an unscheduled start of the engine.

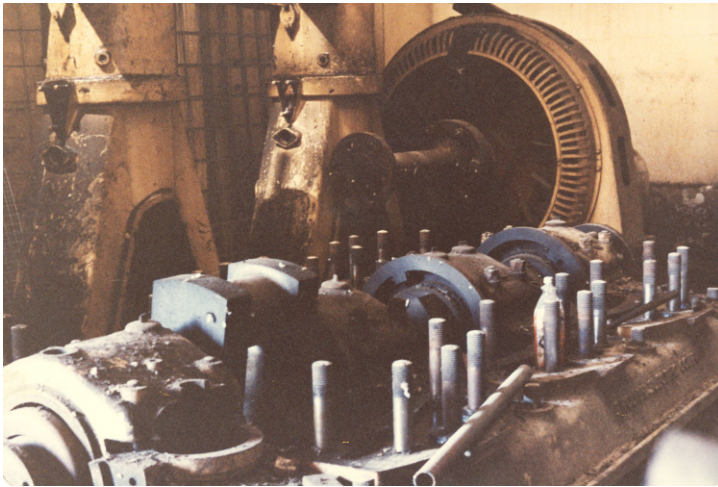
Two air-blast diesel engines made by the English Electric Company (who had taken over Willans & Robinson in 1919) were purchased by Carlton & United Breweries (CUB) in 1927 as standby electricity generators. This engine, no. ID219 was installed at the Carlton Brewery, Bouverie Street, Carlton driving a DC generator and was converted to an AC alternator in the mid-1930s. It became redundant in the early 1950s and was removed from the Carlton Brewery and stored on vacant land at the Abbotsford brewery. The other engine, no.ID218, driving an alternator was

installed at the Victoria Brewery, Victoria Parade, East Melbourne. It was scrapped in the early 1950s. The Carlton Brewery engine was given a second life when installed in 1953 at CUB's new malt works after the conversion of the old Yorkshire brewery. The site was then known as Yorkshire Maltings at Wellington Street, Collingwood, and operated until it was closed in 1984.

**The receipt from CUB for the purchase of the engine (MSTEC Archives)**

|                                                      |          |                                  |            |
|------------------------------------------------------|----------|----------------------------------|------------|
| No 25155                                             |          | 2014/1977                        |            |
| Carlton and United Breweries Limited                 |          |                                  |            |
| Registered Office: 16 Bouverie Street, Carlton, 3053 |          |                                  |            |
| Received from R. GILLET                              |          | by Cash                          |            |
| of RINGWOOD                                          |          | Cheque                           |            |
| the sum of FIFTY                                     |          | dollars                          |            |
| being 1 DIESEL GENERATOR                             |          | cents                            |            |
| Net Amount                                           | \$ 50.00 | for                              |            |
| Exchange                                             | \$ :     | Carlton and United Breweries Ltd | Duty Stamp |
| Total                                                | \$50.00  |                                  |            |

At the time Ray worked a nine-day fortnight with Telecom, so with only one day off a fortnight to work on the engine, no site access on weekends, and the malting works only open between 7am and 4pm it took six years to move the engine. Before dismantling the engine, the starting air bottles were still full, so Ray turned the engine slowly on air to empty them which provided an opportunity to at least see the engine turn. The engine had a defective bearing noted in the logbook and the knock of the failed big end was evident but with it running so slowly the risk of further damage was minimal.



Easing the engine bed through the doorway using Bill Sides's crane truck (Peter Zerbe)

Ray took the small parts to an empty shed he rented at a chicken farm in Rowville. Freeing the engine bed from the concrete base was slow work. The overhead crane above the Willans made disassembly much easier. By late 1982 only the heavy parts remained to be moved.

← Stripped down to the engine bed, the A frames and alternator are in the background (Ray Gillett)



. The engine however was some distance from the doorway necessitating dragging the heaviest parts to the door using a crane outside the building. . Ray was assisted by MSTEC member Bill Sides who loaned a crane truck and flatbed truck from his drilling business. Eddie Bedwell and Andrew Jackson also helped at this time.

← Working at the limits of the available crane it was more of a case of sliding the engine bed onto the truck, fortunately there was a small platform outside the door which reduced the lift height (Peter Zerbe)



Eddie Bedwell guiding the engine bed onto the truck (Peter Zerbe)



← A relieved Ray Gillett with the engine bed loaded (Peter Zerbe)



Loading the 7 tonne flywheel on the truck with Ray Gillett guiding (Ray Gillett)

The next challenge was the flywheel . Standing taller than the door height, the flywheel had to be eased out diagonally (Ray Gillett)

← Crane truck loaned by member Bill Sides, with Andrew Jackson operating the crane (Ray Gillett)



The main engine parts loosely reassembled at MSTEC Wantirna. The Ruston & Hornsby engine from the AMP building is in the background, c.1983 (Ray Gillett)

Over the Christmas period of 1982 the flywheel, engine bed, and A-frame castings were moved and re-erected at MSTEC's site at Wantirna. The last item removed was the Johns & Waygood overhead crane.



A close inspection at the time showed details of the pin stripping on one of the main bearing caps, and the original red colour. Most of the engine had been repainted in a cream colour by the brewery (Ray Gillett)

← Ray Gillett checking cylinder temperatures with the engine running very nicely 47 years later at the MSTEC National Steam Center (Rohan Lamb)

Ray always considered the project to return the engine to operating condition to be too big for one person to complete, so for Ray it was satisfying to see the realisation of his vision of an operational air-blast diesel engine thanks to the efforts of MSTEC's members.



# Trams back on track



*Dubai tram using the Alstom third rail system*

***New technology allowing trams to operate without overhead wiring is leading a revival of this well proven mode of urban transport.***

**by Peter Lynch**

Electricity trams took over from horse, cable and steam driven versions around 1930 but one disadvantage of electric power is the unsightly appearance of overhead catenary systems. This was particularly unwelcome in the historic precincts of Europe however two new systems to overcome this are now operating reliably.

***Trams work in narrow European streets. An old single truck car negotiates a section of gauntlet track in Lisbon, Portugal.***

The Alstom APS system uses a third electrified rail, set between the two running rails to supply 750 volts DC to the tram, where it is returned via the tram wheels and running rails. To avoid electrocuting pedestrians or being shorted out the third rail is divided into 11 metre segments with only those directly under the tram being activated by radio as required. The APS system is now operating in Bordeaux, Barcelona, Tours, Rio de Janeiro, [Sydney](#), Istanbul and Dubai where a tropical version was needed to deal with

temperatures up to 55C. It can be used for all or part of routes in conjunction with pantographs or on board storage batteries.

An alternative system from CAF (Construcciones Auxiliary de Ferrocarriles) of Spain uses a huge supercapacitor on each tram which is recharged from overhead wiring or contacts in the road surface at each tram stop and provides up to 3km of wire free running.

← ***Newcastle (NSW) tram using the CAF system.***  
***Mike Cornwell photo***



The supercapacitor is larger than an equivalent battery but allows for much faster recharging and discharging. This system is used in Seville, Luxembourg and [Newcastle](#) (NSW). Such technology also has potential for recharging rubber tyred vehicles such as electric buses.

MSTEC members will never see the return of steam haulage but urban tramways are alive and well. One costly lesson from this revival is that it is better to plan transport systems before building new suburbs and having to dig them up again.

**Old engine house in North Melbourne still exists where steam engines once drove Melbourne cable trams .** →

The cables run in slots under the road and strategically placed engine houses drew the cable around a subterranean system of pulleys through out the network . A lever mounted inside the tram passed down through the slot in the road and gripped the cable . At intersections the gip had to be released and lifted up to avoid catching on the pulleys meaning the tram had to have sufficient speed to coast around the corner or the passengers had to get out and push . Note the unsightly overhead wiring at the intersection for the current electric trams which were considered a great improvement at the time .Ed.



**PREVIOUS EFFORTS** There have been various earlier efforts to run electric trams and trains without overhead wiring.

The Drumm battery rail cars operated services between Dublin and Bray in Ireland from 1931 to 1949. They used large 460 volt Nickel Zinc batteries that were recharged via a pantograph and overhead wiring at each terminus. Some railways, such as the London tube network, use an additional electrified third rail at ground level to provide power. This is hazardous and unsuitable for urban tramways where people are constantly crossing the tracks. The “Budapest System” used two live wires in an underground conduit between the tram tracks but proved unreliable due to snow and mud accumulating in the cavity. Peter Lynch

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**Steam Shovel** Very pleasing progress has been made on fitting the cabin wall sheets with only 2 left to go up , thanks to material arriving when needed and assistance with folding and shearing from Rob Jones .

Next is the roof , we have had the material for some time but expert help is needed putting it up because of the height .

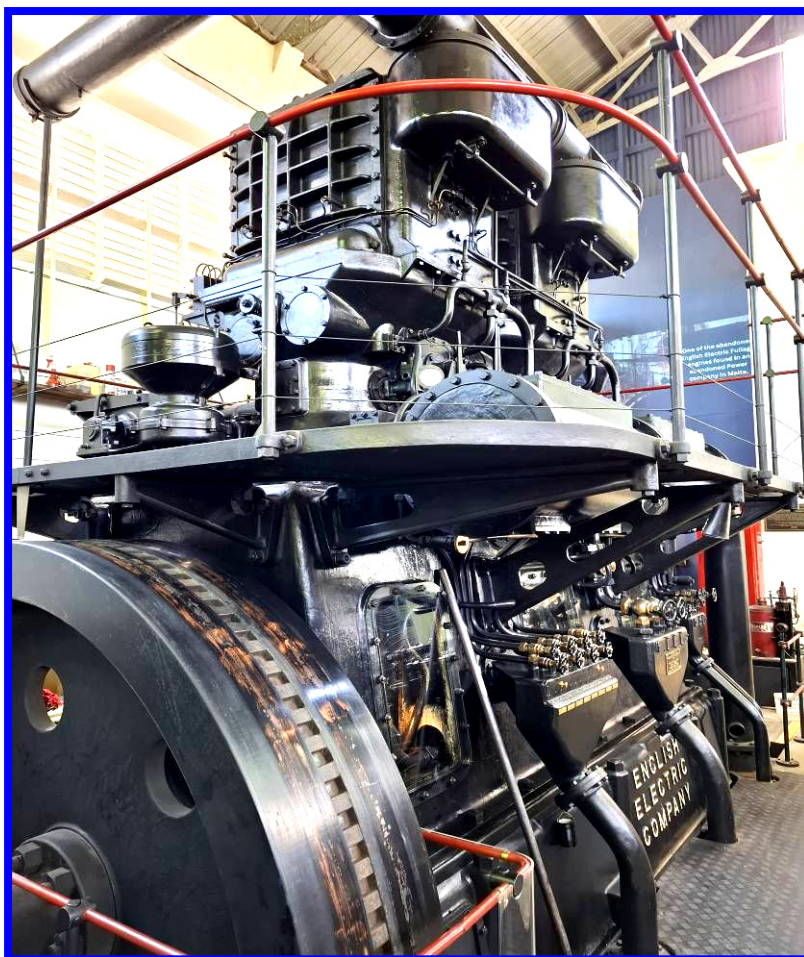
The racking engine is well on the way thanks to Laurie Hall , Ray Bedford is making a new reversing valve spindle

Blacksmiths have nearly finished the coal bunker .

The critical item is now the boiler we have got people ready to help but I feel we need a ruling from the Boiler Inspector before starting welding and grinding .

**Grounds Clean Up** Rich on his Cat excavator loading the last of the scrap on the arena into the skip . Some other items , for example the Thompsons multi stage centrifugal pump donated by Link Pumps has been moved to the apron outside bay 2 where it compliments the display of Cerberus pumps already there . This leave the arena free of clutter that was impeding mobile exhibits last rally .





# Willans Fullagar Airblast Diesel

**Napier NZ** by Richard Keir

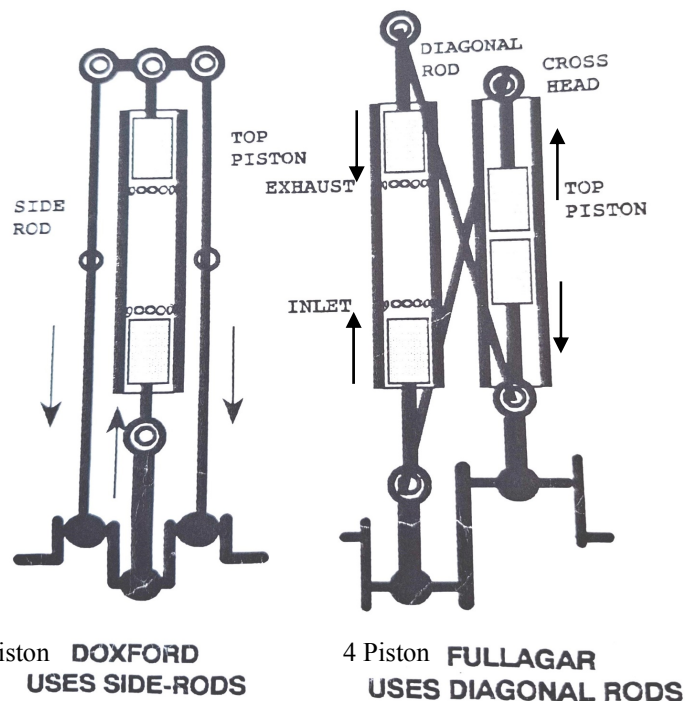
*This very interesting email came in from recent MSTEC member Richard Keir about a most unusual large Diesel engine and he thought he would tell us about it in case it has not been written about before. Well it definitely has not and I think it might be the start of something new to us as more information sees the light of day!*

Richard writes I came across a very interesting Willans Fullagar opposed piston, air blast diesel generator, while travelling in New Zealand recently. It resides in the Faraday Museum in Napier on the east coast in the North Island and the building is actually the old power house where the engine has spent its entire life, since 1925.

What I found most interesting is the way the opposed pistons are operated; each pair of cylinders (the engine is 4 cylinder so 2 pairs, 8 pistons) has the lower pistons with "normal" connecting rods, and the upper pistons are connected to the conrod next door via a diagonal con rod, **so that as one piston goes up, it takes the piston in the top of the adjoining cylinder up as well, and as it comes down, it brings the adjoining piston down again.**



They have the engine set up with Perspex crankcase doors and if you ask nicely, they will "run" it for you, well, turn it over via an electric motor driving a rubber tyre against the massive flywheel, I did try to get a video of the diagonal con rods but they are not easy to see.



**COMPARISON OF TWO TYPES  
OF OPPOSED-PISTON ENGINES**

As I understand it, the engine was built in 1923, and delivered in 1925, but not fully commissioned until 1927, the same year that the nearby Mangahao hydro plant commenced operation so it was mainly used for stand by and peak shaving, although when Napier was all but wiped out by an earthquake in 1931, the Fullagar was regarded as the saviour of the town. It is believed to be one of only two of these engines ever built, the other was retained by English Electric at their Rugby works until 1950, when it was placed on display on the lawn. It was scrapped in the 1980s. ( Much to Frank Gough's discus. Happily several more have subsequently turned up ) Ed



Richard's photo of the engines plate leaves no doubt that this engine was manufactured in the same factory as our Willans Diesel and at about the same time but you will note this is an OIL ENGINE as the D word could not be uttered even though it operates on his Air Blast principle .

This engine , designed by Englishman Hugh Francis Fullagar is considerably bigger than our Willans being 600 hp at 200 rpm compared to 250 hp despite very similar bore and stroke. The difference being effectively 8 pistons instead of 3 plus a 2 stroke effectively fires twice as often . Ed

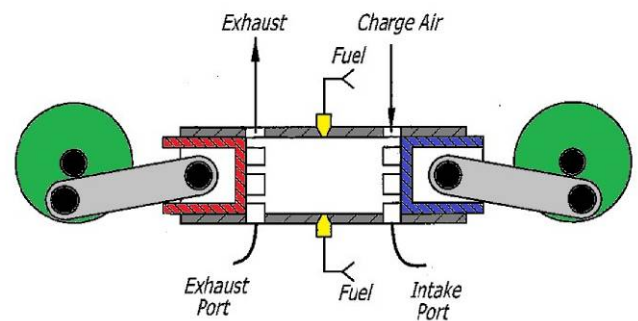
The Fullagar engine continued in regular, standby service until February 1970, when the windings of the alternator failed and were deemed too expensive to repair. They say the windings were compromised due to being used to start the engine when cold, by connecting the mains and running it as a motor, and the fact that the pit in which the bottom third of the winding sit, used to fill up with water. Richard Keir

## Opposed Piston Diesel Engines

These are a breed in themselves as they have a pair of pistons for each cylinder that is open at each end. A special linkage is arranged so that as the pistons approach each other they trap the intake air between themselves bringing it to a highly compressed state which greatly increasing it's temperature . At the critical moment fuel is injected into this space and it ignites. The subsequent rise in pressure forces the pistons apart producing great power . The trick is then getting the exhaust out and fresh air in ready for another go .

This is where the double ended cylinders and its opposed piston bit comes in . As the pistons near the end of their outermost travel they uncover slots in outer ends of the cylinder . Those at one end connect to the exhaust pipe and open slightly ahead of the inlet ones allowing the high pressure gases to rush out making that glorious supersonic blow down 2 stroke scream ! Slightly later the intake slots at the other end are uncovered and low pressure air is pumped in sweeping any remaining exhaust gas before it and refilling the cylinder with fresh air ready for another go .

This is the principle of all opposed piston 2 stroke engines . The real differences between manufactures is how they arrange their linkage to move the pistons in unison and supply the scavenge air . This is what makes Fullagar interesting as they came up with a rather oddball but effective arrangement !



Cartoon showing inlet and exhaust arrangement of opposed piston Diesel and the use of 2 separate crankshafts geared together her .. Dieselbob from the internet .

The main difference is in the arrangement of the linkages to get the required piston motion .

We will look at a few such as Junkers , Doxford , Commer TS2 , Napier next time plus some recently discovered Fullagars

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## Geelong Classic Truck & Machinery Show

Just a few things that caught my attention , I did not get to see it all as I was exhibiting .

The big Southern Cross Windmill of the Geelong Vintage Machineries Group certainly caught my eye , but what interested me was the safety fence around the base .

Closer inspection showed it to be of the type used around backyard swimming pools . These are usually a camouflage colour with closely spaced vertical members and minimum of horizontal bars still making it hard to climb but with much less visual impact than the traditional cyclone fence with its galvanized posts and nasty barbed wire.

Then it occurred to me we have got just such a fence . A scout around turned up 8 panels which have now been labelled and quarantined with our windmill parts beside the railway cutting . Please do not remove them .



**Wood Sawing** Very comprehensive display featuring dragsaws, swing saws, saw benches, some of local manufacture cutting up firewood no doubt for the boiler in the machinery pavilion.



## Meccano



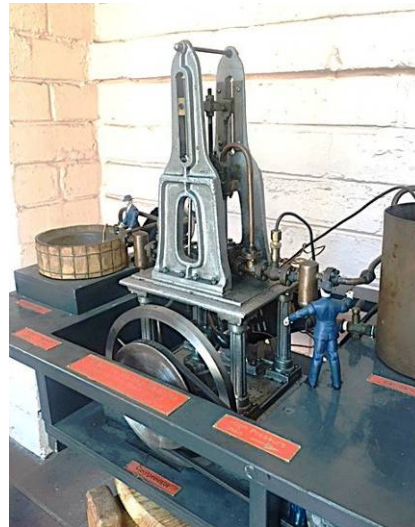
Meccano model of Harrison / Seibe first commercially successful Ice making machine.

Geelong is very proud of James Harrison's pioneering work on refrigeration so not surprising the Meccano people, sharing the Pioneer pavilion with the rapidly developing Refrigeration Display, had to be in on the game as well.

This historic scale model of the original commercial machine recently donated to the Harrison display by the Australian Institute of Refrigeration, Airconditioning and Heating was the inspiration.



Warwick's working scale model of the same thing also put in an appearance on the Saturday



Displayed for the first time was this Audiffren refrigeration apparatus patented 1895. It had everyone mesmerized as it had 2 balls on an axle like a dumbbell the red one dipping in water in the square tank, and the blue one in the ice chest. As it gracefully rotated the blue one frosted up and the red one got hot. Clearly a heat pump of some sort. Actually it had the compressor and expansion devices as per Harrison invention, while the balls formed the heat exchangers as per Harrison's 1858 patent, just physically arranged differently. No black magic at all!

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## VICTORIA MINATURE

**RAILWAY** For the January Social Meeting Ian Malcolm showed a video of the opening of the Victorian Miniature Railway at Harcourt. Billed as the largest of its type in the state this was something of a surprise to most of us so a bit of background was called for.

The main station building is a scaled down version of the lavish Marybough Station even to the extent of the 4 faced clock tower. Internet picture





**VMR Continued** The official opening day was December 6 2025 with it's 2.7 km of track bed located on a 65 acre site on the outskirts of Harcourt about 25 minutes before you get to Bendigo . Bordered on one side by the busy Bendigo railway and on the other side Mt Alexander it is ideally located just out of town in a district traditionally know for its apple growing and granite quarries . Today it has become a tourist centre with a name for wine and cider production and appealing accommodation and bush walks .

Actually the railway story goes back more than a decade when life long train enthusiast Andrew Mierisch, and a group of friends shipped their model locos to the USA for a tour of tracks over there. It was during 6 hours of continuous steaming on Train Mountain's 500 km of track at Portland

Oregon that the incurable bug was caught. Model trains seem to have always been in the blood of Andrew's family with his father Colin , a toolmaker by trade , being heavily involved in the Diamond Valley miniature railway at Eltham .

The outcome of this seems to have been the formation of the Victorian Miniature Railway club at Harcourt were more than 50 members all dedicating their passion, skill and time to creating a miniature railway . With a diverse range of skills covering track construction , building and landscaping over 10 years they transformed the old Harcourt paddock into an amazing railway . A high priority has been getting everything right with the scale of 1/4 full size being strictly adhered to .

By all accounts the opening was a great success with the 15 minute ride around the 2.7 km track taking in embankments , cuttings, bridges , multi platform covered stations , good sheds and a most lavish station and a real restored signal box doubling as club rooms . With huge crowds and tickets priced at just \$5 for the 15 minute ride everyone was elated but not for long !



**STATE OF DISASTER** Incredibly only 2 days after we learnt of the existence of the VMR disaster struck Harcourt with over 60 houses destroyed in the town , we all feared for the worst . I think this message from the railway says it all . Editor .

*Message from VMR - Victorian Miniature Railway at Harcourt*  
*Notice of Temporary Closure*

*The Victorian Miniature Railway located in Harcourt, Central Victoria, is located in a Government Area designated as a 'State Of Disaster' Friday, 9th January, saw the Harcourt Township devastated by bushfires. To our understanding, no lives have been lost, but destruction to property, businesses and animals is intense.*

*The VMR was in the line of destruction. Members fought alongside our valued CFA brigades, and with our fire preparations and huge holdings of tank water, we managed to save the VMRs' infrastructure.*

*Many other parts of the site have been devastated, and it's unclear in the early hours to what extent.*



*The VMR will be closed until further notice until we assess and help the Harcourt Community to the best of our ability.*

*Please share this far and wide.*

*Our hearts go out to our amazing Harcourt Community. With strength and resilience we will rebuild. Fires are still active on Mount*

*Leangnook, so the risk is far from over.*



**Sandown Revival** A new event for motoring nuts was the Sandown Revival a Motoring Festival billed as a celebration of motoring culture and racing . It certainly had a diverse range of machines on display , it seemed if it had 4 wheels or more and an engine it was welcome . The result ranging from famous racing cars and their drivers followed by sprint races and regularity trials for those wanting to reinforce memories of the good old days . For others there were cult vehicles from the Mad Max movies a tractor pull tractor even motor bike stunt riders. Ofcourse there was no shortage of trade stalls , motoring sport accessorise venders and plenty of “food” “ trucks” .

Here are a couple of blasts from the past that caught my attention . **Home Brewed Racing Cars** were very much the thing of the 50' . With money short , industry in tatters from being run into the ground during the war years if you wanted to compete you had to make do with whatever was at hand. The Chamberlain brothers were masters at this and Daren Vissor innovator and Master mechanic extraordinaire likes to perpetuate this by recreating machinery from this era when the originals have not survived. To this end he brought along 3 of his creations .

**Top Left of pic.** What is a Chamberlain tractor doing on a car race track ?Chamberlains were a bit of showmen and one of their tractors innovative features was a high road top gear so it did not take all day to get to the bottom of the far paddock .



To push the point they tried to enter their tractor in the coming up Round Australia RedEx ( Petrol Additive ) trial . While it did not qualify they were welcome to come along as the sweep vehicle retrieving broken down competitors. Well Darren has built a replica and then and now the crowds eyes nearly pop out of their heads when it flies past at up to 54 Miles per Hour !

**Top Right** is his very accurate reproduction of Eldred Norman's Double 8 Grand Prix racing car cobbled together with 2 Ford V8 Blitz engines and Dodge Weapons carrier running gear . The crowd was enthralled by its V16 burble.

**Bottom Right** Chamberlain racing car powered by a big Vee twin motor bike engine . It certainly had that burble around the track . The original of which car went on to morph into the “Beetle” that had their innovative opposed piston 2 stroke engine , covered in earlier Steam Supremes .

Well I thought I had seen it all until I came across this Type 3 1961 to 1973 Volkswagen with something strange in the front boot , actually a battery pack. It turns out to be the only VW —Tesla powered E V in the country . The work was carried out by “ Electric Dream Machine “ using a Tesla model S drive unit delivering 357 hp and can do 0 –100 in 3.4 seconds . ( truly startling performance Ed ) with it's 74 kW lithium ion battery giving a range of 400 + km . These conversions of classic cars could well become more common .

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## **Engines etc for Sale.**

**Mstec club member moving house.& downsizing.**

**2 - Ronaldson Tippet,**

**1 - Cooper (re-badged R&T)**

**1 - Tom Thumb,**

**Several belt driven pumps, Forge blower,**

**Blacksmith vyce, Several drum pumps.**

**Post/wall mount drill (power feed type),**

**Post/wall mount drill (power feed type)**

**Belt driven gold crusher (rotary type, not hammer mill),**

**Location Lakes Entrance area.**

**For further information, contact Bob Evans, Ph 0427 267 652, or email [rje395@bigpond.com](mailto:rje395@bigpond.com).**

**COMING EVENTS**

**Social Meeting**  
**Wednesday 4 Febuary**

**Regular Events :-** MSTEC Social meetings, 8 pm Scoresby. First Wednesday of each month .

Museum open every **Thursday, Saturday and Sunday** . Miniature Train running every Sunday 11 am to 4 pm

Museum Machinery in action. Last Sunday of each month **Except end of year December.**