February 2012
No 375

THE GENERATOR

Newsletter of THE PALMERSTON NORTH MODEL ENGINEERING CLUB INC
Managers of the **"MARRINER RESERVE RAILWAY"**
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TRACK RUNNING

This is held on the FIRST and THIRD Sunday of each month, from 1 pm to 4 pm Summer and 1 pm to 3 pm during the Winter. All club members are welcome to attend and help out with loco coaling, watering and passenger marshalling - none of the tasks being at all

Visiting club members are always welcome at the track, at the monthly meeting, or if just visiting and wishing to make contact with members, please phone one of the above office bearers.

Sender:- PNMEC
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Place stamp here

This Months Featured Model

Report on the January Meeting. The Presidents BBQ

A large number of members, wives and partners all gathered at Murray and Janice Bold's home for the Presidents BBQ.

The rain held off but a strong cold wind made its presence felt, to the extent that the gas-fired BBQ had to be moved around to a more sheltered site. Murray had spent a lot of time setting up his garden gauge railway and Janice had the garden looking immaculate.

Members spent a lot of time examining the 5" gauge compressed air device which won the Les Moore trophy at the recent Whangarei Convention in January.

Graeme Hall had his Atkinson Differential engine with him and during the evening it was run. A very complex engine designed to by-pass Otto's four stroke patent.

The delights brought along for the puddings were probably not good for Neil, Murray and I, all diabetics and I fear that we were tempted into a few dietary indiscretions.

An enjoyable evening, a good chance to catch up after the holiday break and thanks very much to our hosts, Murray and Janice.

New MEANZ President

Our own Palmerston North club president was elected President of the Model Engineering Association of New Zealand at the recent meeting in Whangarei. I am quite sure that Richard will work hard for the benefit of model engineers in New Zealand.

February Club Night

7:30pm, Thursday 23 February 2012
Hearing Association Rooms
Church Street, Palmerston North

Members are invited to bring along the project they were working on over the holiday break and explain how much further towards completion they are.

Notice

It is with regret that I have to tell you that Jean Curtis and Alex Dickson both passed away early in December 2011.

COMING EVENTS

Track running at Marriner Reserve Railway

March 3rd & 4th from 10am to 4pm
March 18th from 1pm to 4pm
April 1st from 1pm to 4pm

Open Weekends

LOCOMOTION PNMEC
March 3rd & 4th from 10am to 4pm

Havelock North (Easter)
6 - 9 April 10am - 4pm

Letter from England

By Stan Compton

Full marks to Ian Stephens, his half-beam engine looks like a first class piece of work. When I read how he had fabricated the flywheel from ½" thick steel plate 11 ½" in diameter I was most impressed, especially as it was too large to fit in his lathe. This reminded me of foolishly tackling a 4" scale traction engine. The flywheel was 18" in diameter so I made a pattern and turned it on a boss mounted into my "Little John" lathe mandrel next to the change-gear train, the same method was used for the final drive gear pattern. When I took the pattern for this item to the Lower Hutt firm who cast S.G. iron the manager said, "I would love to mould this up, but I cannot afford the time. I have one man who can do this job." He did a first class job and I have always regretted that I forgot to send him a photo of the completed engine. They used to make malleable iron trailer hitches many years ago. Incidentally that gear had 100 teeth up to a shroud to gain more strength only seen in the agricultural world. I was lucky to be able to use an old Scottish-made flat- belt drive lathe with a large face plate to machine these two items.

Have I ever told you why the 'Little John' lathe had a name change to 'Raglan'? I learnt that the

The closing date for the next issue of The Generator is Friday 9th March

Nottingham firm who built the “Little John” lathe found that sales in the USA were very poor. It was not due to the weak mandrel, a hefty cut would make the chuck lift up!! No it was due to the name chosen, ‘Little John’ was the name of one of Robin Hood’s merry men a tradition in the UK. But not in the USA where the ‘John’ is known for quite a different purpose!!! With the new name sales improved. It is such a pity we have lost ‘Myford Lathes’, but we can’t compete with the far-east and their low labour costs. I know the ML 7 will only take 9/16” in the spindle bore but years ago a 3 ½” gauge locomotive was all a man could afford to build. I am using an ML 7 for my clock-making and am finding it superior to the ‘Smart and Brown lathe when I am cutting gears. The saddle is lighter in weight and easier to slide along the bed. I now bolt the mandrel that carries the dividing plate, right through the spindle after finding that the expanded mandrel had moved while I was cutting gears.

A few years ago we were able to take a coach-trip to Switzerland, this included a package offered by Swiss Railways to travel on a rack railway (Achensee Bahn?) perhaps, but I do recall the exhaust barking as we climbed up the mountain. Then there was a trip on a restored electric powered train, the worn gears let us know their age, then on to ‘Reichenbach Falls’ used in the fictional Sherlock Holmes story, I must give credit to Swiss Railways on how well run they are.
I had never really thought about it but learnt that The only natural resource the country has is water!!! Lots of it. Such a clean place, we heard that the rubbish arrives with the visitors, so grand-dad and the children clear it of the roadsides by baling it up with the grass made into hay.

Our daughter sent us photographs of the container ship ‘Rena’ on the reef near Tauranga, what a job to unload that vessel in such conditions, trying to stand on top of a sloping container hooking up the sling!
I gather the ship got wrecked due to poor seamanship, not by bad weather I gather, I do hope that any fuel oil spillage is minimal.
We have all read about the sinking of the ‘Titanic’ in 1912 and wonder why the vessel was steaming at near full-speed in an area known to have icebergs. I am reading a book on the subject ‘The Other Side of the Night’ by Daniel Allen Butler (casemate) 2009.
This publication explains that in that era even experienced seamen, as Captain Smith was, tended to “She’ll be right” and that mast ships masters considered that keeping up to speed so that arrival times could be met was their priority. It was just good luck that a similar disaster had not occurred previously.
The Captain of the ‘Californian’, the small vessel that was later known to be stationary in an ice field ten miles away from the ‘Titanic’ was a bully and a coward. He ignored the reports that his officers gave him when they saw plain white distress rockets in the sky on that cold, clear night. He would not risk investigating further in case he risked his own ship. Just the opposite was Captain Rostron of the ‘Carpanthia’ who was further away from the scene but made every attempt by conning his ship through the ice field to arrive in time to rescue 750 people from the lifeboats.

I was so impressed with the article by the late Jim Curtis on his first attempt at locomotive construction that I offered it to the editor of the Hereford newsletter and he gladly put it in the next copy of their newsletter. It really showed the determination required to complete a 5” gauge tender locomotive.

We hear so much about kitset locomotives, but not about all the problems that occur during construction. I helped one of our members a few years ago to sort out a problem; he had spent three days trying to connect the main steam line. The threaded bushes in the boiler were out of line, this required a 5/8” rod threaded 26 TPI to bend the tube plate and backhead to line up the steam pipe to the throttle!!

Ken MacIntyre’s Tesla Turbine

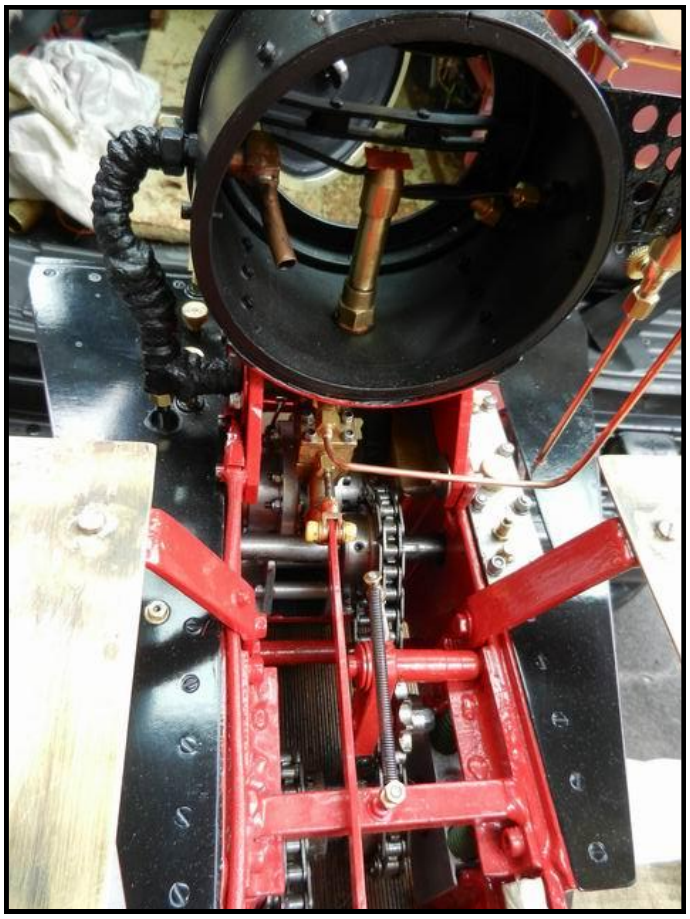
By Doug Chambers

I recently had a phone call from Brian Leslie who said that he had Ken MacIntyre staying with him. Ken was breaking his journey home from the Whangarei Convention and Brian thought that I might be interested to see the turbine powered locomotive that Ken is building.

Mike and Grace Barnes arrived at Brian’s shortly after me and after morning tea we read some of the literature that Ken provided on the ‘Tesla’ turbine. Ken and Brian pulled the locomotive out onto a plank so that it could be

examined.

The locomotive is based on a ‘Sweet Pea’ chassis and the turbine which is a half size

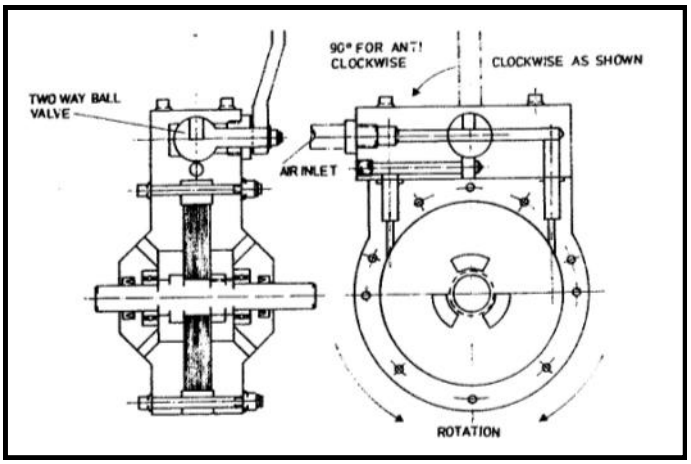


version of the original 1909 ‘Tesla’ unit (rotor diameter only 65mm) easily fits between the frames.
The unit has a no load rpm of up to 50,000 and normal under load rpm of 8,000 to 20,000. Power is transmitted through a gearbox and chain drives, the gearbox reduction is 50:1 and the chain drives by 1.2:1. The weight of the locomotive is 45kg. There is still a boiler and water tanks to be made and fitted. The unit has been tested on compressed air and a speed of 8-12 kph and a reasonable torque was achieved. All the work done is to Ken’s very high standard and I will be very interested to hear of the unit’s performance under steam. Ken said that he built the turbine as an exercise but then decided to see if it could be put to a useful purpose.
Both Mike and I were greatly astonished at the relatively small size of the turbine. It is only about 75mm x 75mm. We expected it to be about 175mm x 150mm.

Some Notes on the ‘Tesla’ turbine.

The Croatian born inventor and engineer Nikola Tesla is best known for his invention of the coil and induction motor. However in 1910 a dual patent was filed under British Patent 24001, for a rotary disc type air compressor and turbine engine.
These machines were similar in principle, and comprise a series of thin discs set close together but separated by spacing washers mounted on a shaft to form a rotor. This shaft is mounted in a housing, or stator, in the form of a tube, and provided with end plates which contain the bearings. The compressor differs from the engine in that the stator takes the form of a spiral volute, whereas that of the engine is circular in profile. The direction of flow of the media, air or gas also differs.

It is the engine (turbine) that we are interested in. The first experimental engine was built to prove the principle. It was small and consisted of a stack of discs measuring 6 inches in diameter and 1/32” thick with spacing washers of the same thickness but of a smaller diameter. These washers were formed in the shape of a cross, with a central hole to match that in the disc. There were eight discs forming a total width of ½” .
Following the results obtained with this unit, a larger machine was constructed, giving an output of over 100 horsepower using steam as the medium, whereas the experimental unit utilised compressed air. An even larger unit was constructed with a rotor of 18” diameter and it developed 200hp again using steam as the medium. This weighed 400lbs and occupied an area of 2 ft x 2 ft x 3 ft long.
The largest machine made was of 500kw and was made by Allis Chalmers Company of Milwaukee, USA. With whom Tesla had a working agreement.
The drawings on the following page may help you to understand that the plates forming the stator are flat and **DO NOT** have buckets or blades as in other turbines. It is simply the friction of the steam or air passing between the plates, which gives drive to the rotor.



TE HAU TERE (THE RUSHING WIND)

By Richard Lockett

Te Hau Tere is the name given to our entry in this year's Les Moore Memorial Challenge, held during the Model Engineering convention at Whangarei last month. It lived up to its name and rush it did, travelling 400 metres to take out the coveted trophy. The first time for the PNMEC since the model engineering challenge was started at Modex in 2002.

A good team effort started when discussing engine options with Merv George. He produced a toy aeroplane called an Air Hog from a forgotten corner of one of his many sheds.

I had never seen one of these toys before, which consists of a blow moulded fuselage which screws into an engine and prop assembly. Wings are held on with rubber bands and it comes with a hand pump. The engine unit is all made from clear moulded plastic so you can see it all working when turning it over by hand.

Straight away we decided that the designer of this device had probably gone to great efforts to get the maximum from the limited air supply re the engines bore, stroke and inlet valve capacity, so we decided to use this engine as the basis for our entry.

The crankcase bearings were never going to suffice for driving anything other than a prop, so a new aluminium crankcase and crankshaft were made, with miniature ball bearings supplied by our local squirrel Chris Morton.

A manifold was fitted between the engine and the challenge specified 1.5 litre drink bottle and blow valve, so that extras could be easily attached at a later date for trial, pressure regulators etc.

The basic principal with these engines, tappers or Co2 engines is that when the piston reaches top dead centre, it opens a valve to let the charged air or gas into the cylinder, which then pushes the piston back down towards bottom dead centre were the exhaust ports are uncovered in the cylinder walls. The problem being that when the piston starts returning towards top dead centre it compresses the air in the cylinder and needs a large prop or flywheel to overcome this. When the compressive force in the engine equalises with the stored air supply the engine stops, which in our case with a little plastic flywheel, was about 25 psi of air pressure left in the bottle. This was no good as we needed to be able to drain the bottle and we didn't want to waste energy spinning a heavy flywheel.

While this engine development was happening Merv was busy machining up four 70mm dia aluminium flanged wheels, two to be free wheeling on miniature ball bearings and two with bosses as driving wheels.

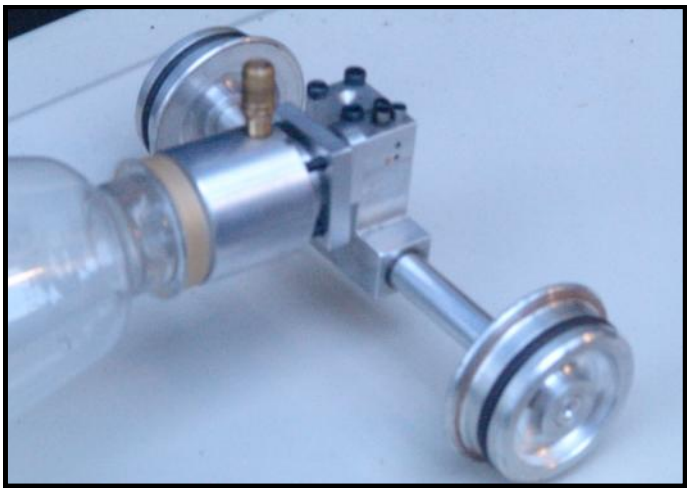
About this time Graeme Hall and Dave Newstead produced magazine articles from their archives dealing with Co2 motors and engines for pneumatic model aeroplanes. This kept the brain cells ticking over nicely while our ultimate design progressed.

We came to the conclusion that an old fashioned decompression valve should be incorporated in the engine to overcome the compression problem as the piston returns to top dead centre. This would necessitate a cam fixed to the crankshaft with push rods to open the valves as well as the inlet. The valves on the Airhog motor were 2.3mm dia rubber balls, a non return valve for the pump and an inlet in the cylinder head which we incorporated in the new design, being very careful not to drop them on the workshop floor.

A design was produced from my drawing board in 4x full size using the airhog piston and conrod, an aluminium cylinder block with integral crankcase and a cylinder head with the valves and porting. Bruce Geange was able to supply some miniature compression springs to sit above the rubber balls.

After machining and assembly the finished motor was hooked up to the bottle and charged with 50 psi of air and the flywheel flicked and wow nothing happened, it didn't want to go at all. There was no going back to the Airhog motor as I had wrecked part of it getting this far. A few days later in desperation a drop of

light oil down the cylinder brought the motor into life, which reinvigorated the project no end. With a working motor attention turned back to the vehicle itself which was to run on the 5 inch gauge rail track. We decided to have the flanged wheels mounted directly on the crank shaft and to gear it by having different diameter wheels and to utilise the bottle as the chassis, with the front wheel assembly attached to the bottle with rubber bands, as per the Airhog and its wings. Track testing then took place over several Sundays after rail operations at Mariner Reserve had finished. As we learnt about the how and why it all worked the distance travelled each time increased to such an extent that those present were constantly amazed at its performance. During trials we found that it was impossible to get a consistent performance from the vehicle. The first run was always the best which got us thinking about stuff to do with the temperature of the ingredients. To get the best run on the day we used this knowledge to our advantage. In the Spirit of Burt Munro "one good run" was all that was needed.



A good team effort and a good result. Thanks guys and to Cynthia Cooper for conveying Te Hau Tere up to Whangarei and back.

MEANZ Convention, Whangarei, January 2012 by John Tweedie

This was my first MEANZ convention and I enjoyed it a great deal. Lots of locomotives to look at and friendly folk with similar interests to discuss them with. The Whangarei Model Engineers track is about 6 km from the centre of the city at Heritage Park, Maunu. The park is set in a very pleasant semi-rural location and is shared by a number of organisations.

In addition to the Model Engineers the site is shared by the Whangarei Museum, the Kiwi House, Vintage Car and Machinery Clubs and a group that operates a restored 3'6" gauge Peckett steam locomotive originally from the Cement works at Portland, near Whangarei.

There were plenty of things to do and look at! Upon arrival late on Thursday I unloaded my loco at the very convenient traverser and lift facility, which had been built in anticipation of the large number of locos, anticipated (over 50). The convention proper started on the Friday and Richard and I arrived early in order to fit a vacuum regulator to my driving trolley and also to give me a bit of practice on the unfamiliar track. I immediately discovered a fairly major problem. The wheels on my driving car have quite narrow flanges as they were from an old passenger car. The rear bogie was derailing about 2-3 times per circuit

of the track. The car has no problems on our home track at Marriner Reserve but the Whangarei track has a different point design and also has two crossovers, one of which was particularly troublesome. After two or three frustrating circuits I realised that I would have to be a spectator for the rest of the convention and #51 sat rather forlornly on a siding for the next three days.

To be continued next month.