Issue 656 Sept 2025

A Wisp of STEAM SUPREME

Extracts from the Melbourne Steam Traction Engine Club Newsletter

QUICK REVERSING ENGINES

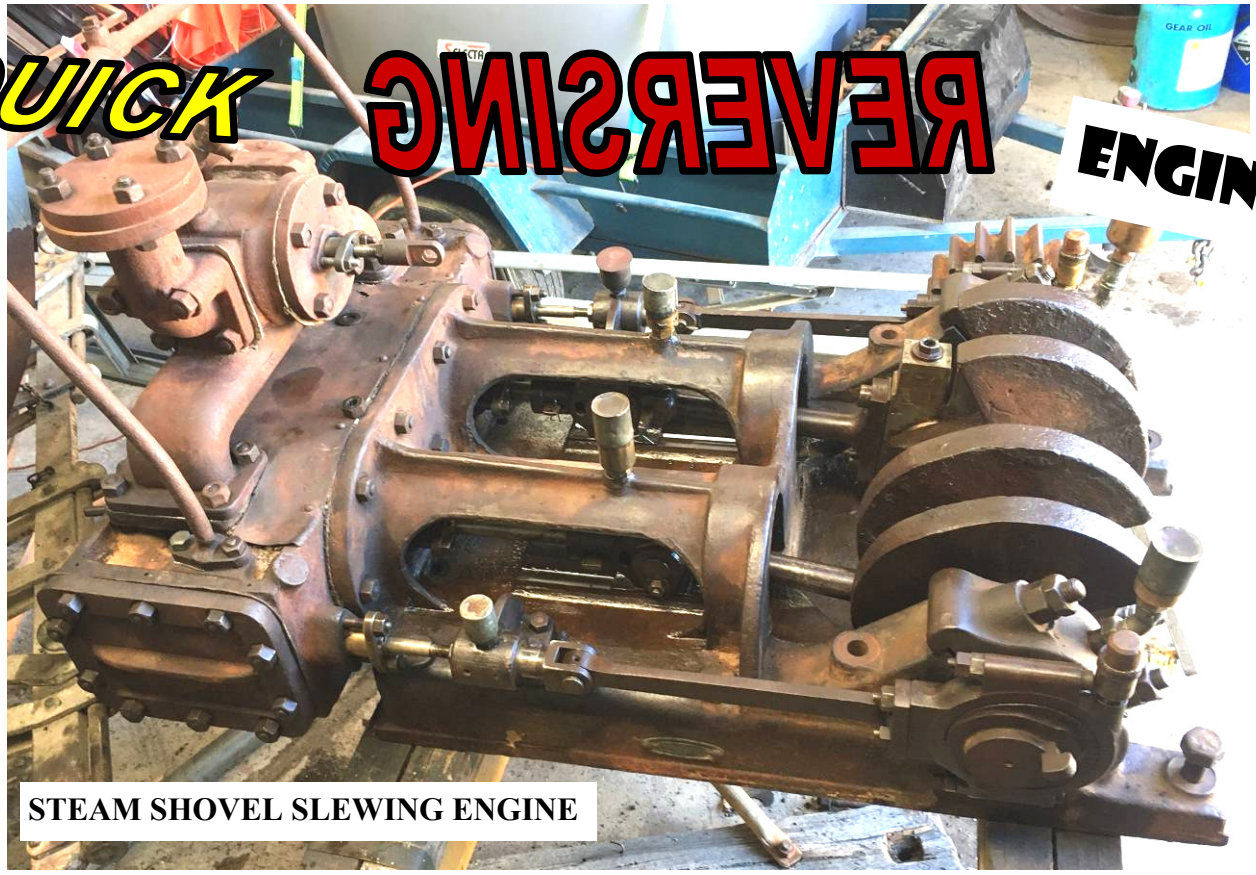
Ray Bedford spraying the finished collar

Quick Reversing Engines

E1 Tank restoration part 2

200 Steam Supremes 14 years work

QUICK REVERSING ENGINES



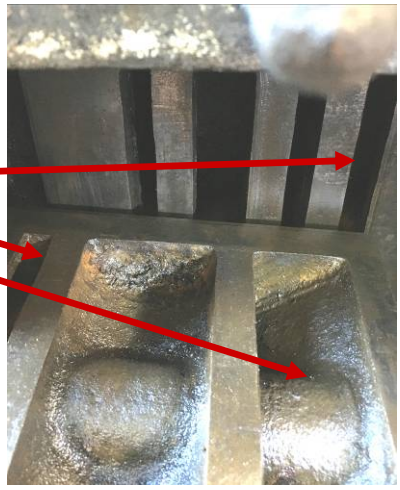
STEAM SHOVEL SLEWING ENGINE

Part of our Steam Shovel restoration required refurbishing the Slewing Engine . This is a twin cylinder double acting steam engine that enables the digger to swing Rapidly from side to side with great Force. At first it looked a rather simple but sturdy engine but that all changed on removing the steam chest cover revealing a most elaborate valve gear of a type not seen by us before.

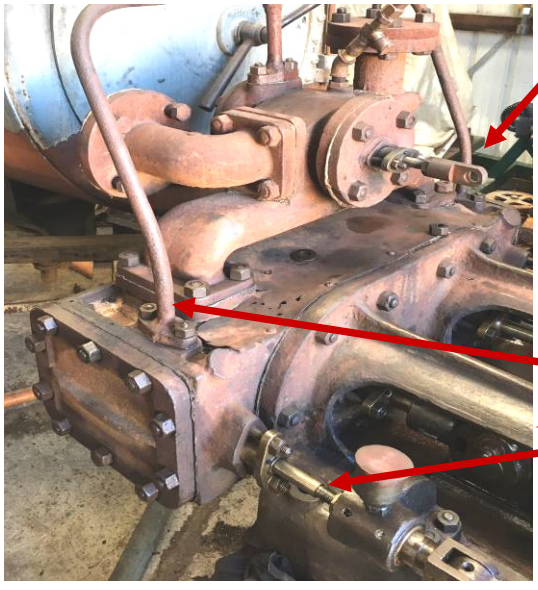
In order to get our head around all the extra ports and plumbing an interweb search was done on Quick Reversing Steam Engines.

The SMOKSTAK site advised

Control of these engines is by a single lever for starting , stopping and speed regulation through a spool valve with very little effort required and it stays put in that position with none of the kicking and bucking of conventional reversing levers.



The slide valve had many more ports than usual



The spool valve spindle is slid in and out to control the engine

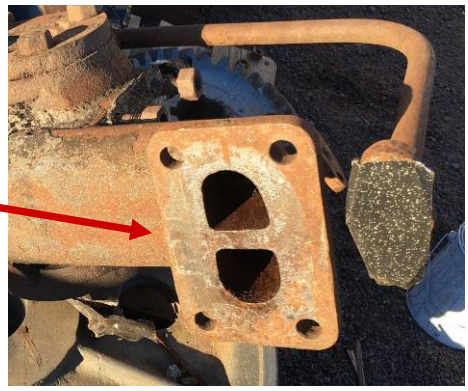
These engines are typically 2 cylinder double acting with only 1 valve eccentric per cylinder not the twin eccentrics as found on Stephenson's reversing gear .

Note small pipe pressurising steam chest

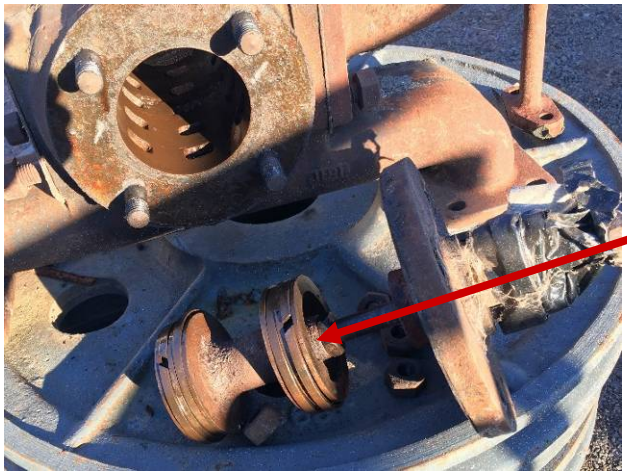
The only valve adjustment is by screwing the valve rod in or out to give the same opening points when rotating in either direction

Our engine's single eccentrics per cylinder is keyed onto the crankshaft with no adjustement for timing or throw

Attention then turned to the spool valve which was mounted above the engine . It had a sizeable steam main feeding into it and an even larger pipe exhausting to the feed water head exchanger. A manifold of oval cross section had separate branches running down to each cylinder . Further investigation shows the manifold actually consists of 2 passages. ***Manifold removed from the steam engine shows double passages***

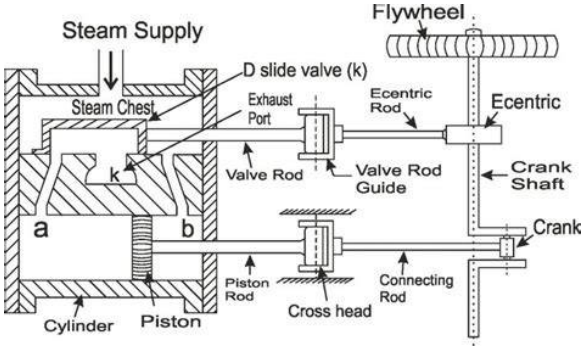


That is the secret then ! Each passage can alternatively function as either inlet or exhaust depending on the position of the spool valve **. Change of engine direction is simply achieved by swapping the direction of flow .** This can be liked to the action of the hydraulic control valve on our wood splitter .



The control valve opened up . Different combination of ports leading to the cylinders are brought into play depending on the position of the pair of pistons on the control rod.
Note their dual piston rings that do not rely on pressure to seal

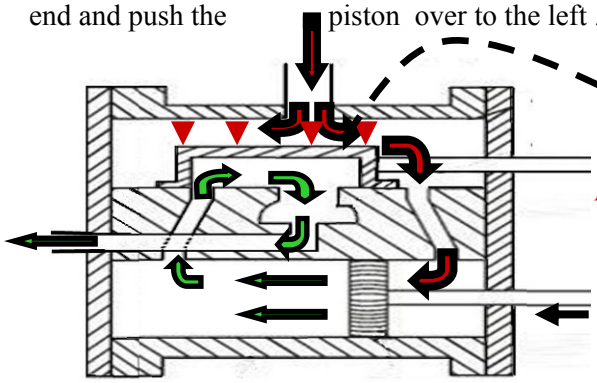
So what about the slide valve then ? Taking off the valve chest cover revealed a cylinder and D valve with all sorts of extra ports whose function was not immediately obvious . There had to be more to just swapping inlet and exhaust connections to reverse a D valve engine otherwise everyone would do it . We needed to get our head around it to time it properly before putting it back together.



To help the understanding a cartoon of a conventional single cylinder double acting D slide valve engine was found on the internet showing the key parts.

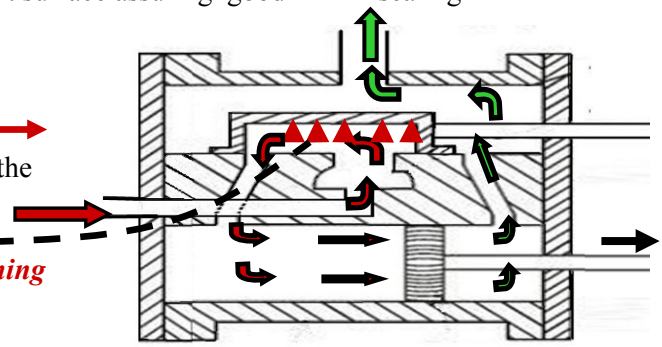
The Paths of Steam Flow represented by the arrows for forward and reversed steam connections were added to enlarged cartoons of the cylinders below to help fathom things out

Standard Connections (below) Seam under pressure is continuously supplied directly to the valve chest . (Red Arrows) . In this position the D valve has moved to the left uncovering the passage allowing this steam to enter the right hand end and push the piston over to the left . At the same time the left end of the D valve has uncovered the left cylinder port allowing low pressure exhaust steam (Green arrows) to exit via the transfer cavity in the underside of the D valve and leave the engine .



Considering forces exerted by the steam pressures acting on the D valve it will be apparent that the large top surface is subject to high pressure while the small cavity in the underside is only acted on by low exhaust pressure
The unbalance of pressure and area will keep the D valve face firmly pressed against the cylinder port surface assuring good sealing

Reversed Steam Flow (right)



High pressure steam applied to the exhaust will enter the cylinder via the cavity in the under side of the D valve while exhaust steam at low pressure escapes out through the valve chest . ***This unbalanced of pressure will lift the valve off its seat preventing the engine from running***

The Solution is *Sooo simple*

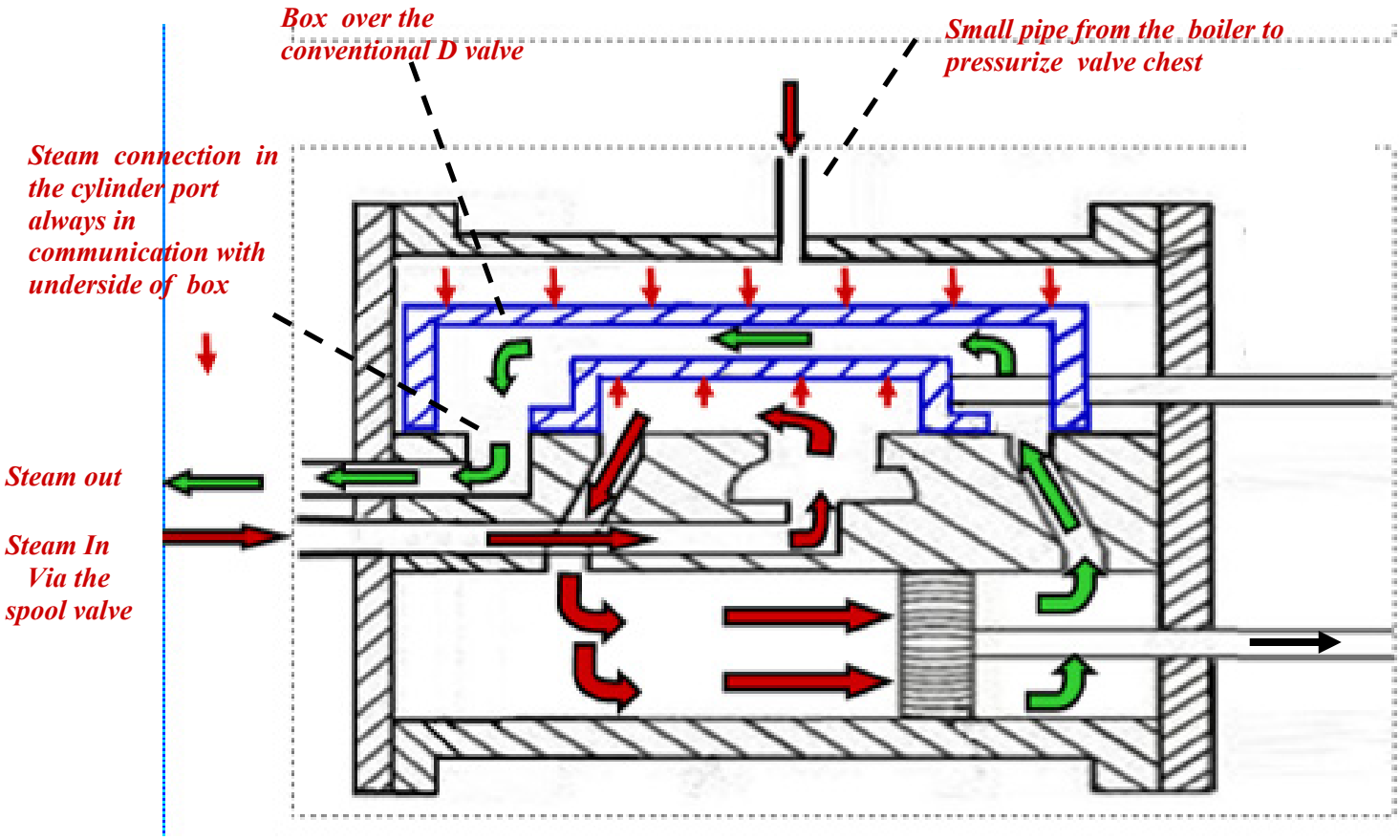
Put a **box** over the D valve and add a small steam line , at boiler pressure to the valve chest to **always keep the box and it's valve down** .

At the same time the conventional steam inlet needs to be moved to an additional port in the cylinder valve face that is always in communication with the **underside of the box .**

It's built in D valve then supplies steam to each end of the cylinder in the normal way .

See diagram over page

Rearranged Ports **showing how D valve is still held down even with steam flow reversed by spool valve**



What it looks like

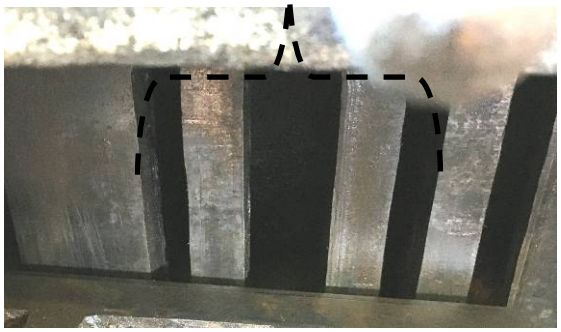
Slide Valve underside .

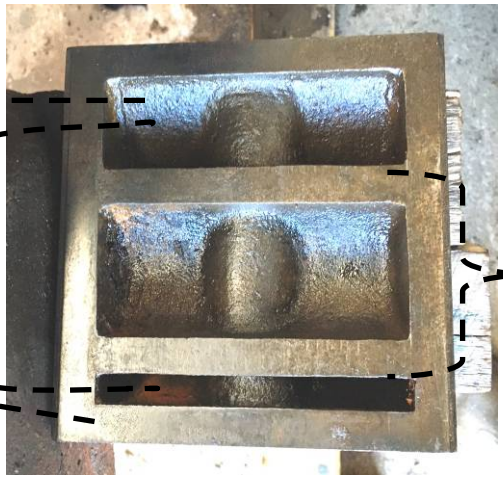
The ports that control the engine are identical to a conventional D valve engine

Port Face of Cylinder block

From here to here is identical to a conventional engine

Note machined port edges make it easy to time

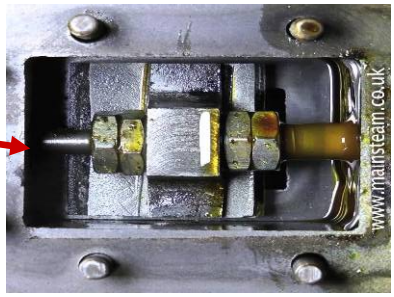




Valve Rod

New ones typical to this have been made thanks to Ray Bedford . Internet pic

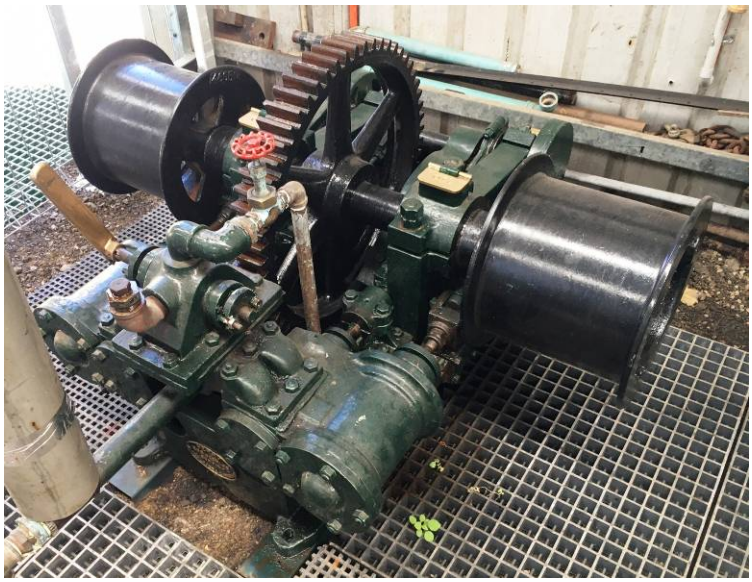
Timing is set by screwing rod in or our of eccentric sheath. No need to remove valve cover and undo 4 lock nuts



Other Reversing Engines

While on a reversing engine high the internet mentioned they were also used on winches and steering engine so a visit was quickly made to the Lyttelton area who display all this type of thing .

The first was the winching engine obtained from the Swan Hill pioneer Museum which is believed to have come from a paddle steamer .



Sure enough it has the swappable over inlet and exhaust ports controlled by a single lever acting on a valve above the cylinders. This valve appears to be a rotary valve rather than a sliding or spool valve . It was also noticed the engine had piston valves rather than the D valves of our engines and lacks the double eccentrics of Stephenson's reversing gear.
Also obvious are the reduction driven flat winching drums presumably for ropes.

The engine looks very attractive compared to the rusty relic it arrived as . The brass plaque reads :- Perry Engineering Co Adelaide & Gawler S. A.

The next engine shown to me by Bill McRobb was → the Lyttelton anchor winch something us landlubbers are not too familiar with . Built by Clark Chapman and company Gateshead on Tyne , Durham England it is a double acting twin cylinder of 7" x 10 " with piston valves .

Most of the controls (painted white) are involved in controlling it's 2 reduction driven anchor chain drums that can be independently locked or brought into play by dog clutches and brakes.

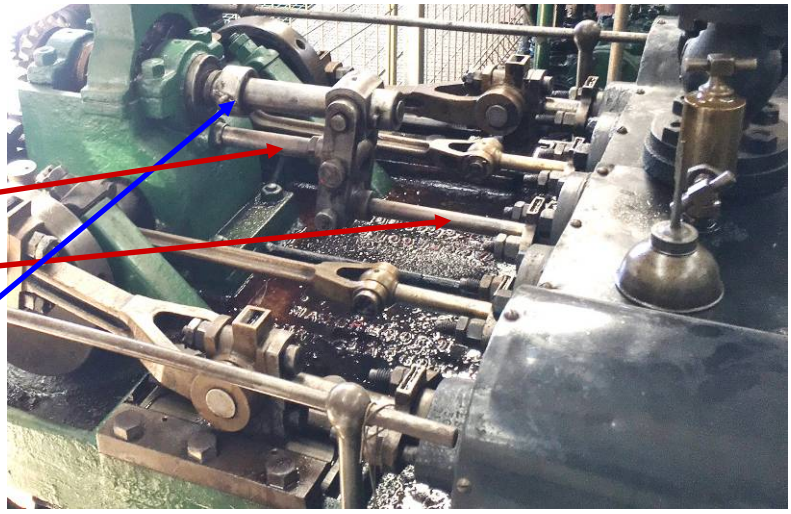
← ***Valve actuation needs a bit more investigation but quick reversing is obviously obtained by swapping inlet and exhaust by a quarter turn either way of the central vertical handle bars quaintly marked HEAVE and VEER .*** Heave is obvious but Wiktionary suggests Veer is a very old Norse word for "calamity, sudden danger, peril, so presumably this position drops the anchor.

Now for Steering Engines We have got a couple of these too . Bill showed me how the one from the Lyttelton worked and its ingenious mechanism for automatically controlling the spool valve

It is also a double acting twin cylinder with piston valves and → a central spool valve for swapping over the inlets and exhaust . With the rudder in the desired position both valves are closed stopping the engine

The spool valve is controlled by the captain turning the helm (ships wheel) which winds the horizontal shaft either in or out offsetting the valve so the engine starts moving the rudder in the required direction . Each turn of the rudder chain drum winds the valve shaft back towards it's closed position . As this is reached the engine stops and the rudder will have automatically moved to the required angle thanks to the .

Feedback Mechanism →



This shaft is moved in or out in proportion to which way and how far the Captain turns his wheel .

This offsets the spool valve and starts the engine moving the rudder in the appropriate direction

As the engine's crankshaft continues to turns it slowly winds this support pillar in the opposite direction .

The combination of these 2 opposing actions slowly returns the spool valve its neutral position and the engine stops with the rudder now at the new required direction .

A More Modern Quick Reversing Engine

This one recently came from the Navy and from its instruction plaque I gather it drove a winch below decks via the bevel gear visible on the end of the crankshaft . Obviously purposely designed not an adaption of an existing engine the steam cylinders , piston valves and reversing spool valve are all combined in one . Obviously a complicated cored casting but eliminating much machining and many high pressure steam joints .

SUMMING UP

Of all the Quick reversing engines looked at the steam Shovel is the only one to use flat D valves. Every thing else has piston valves. When you think about it if you draw a flat valve on a sheet of paper and roll it up you have a piston valve without the need for the extra complication to keep the valve on its seat .

Maybe the shovel engines was just the first of the breed or there were restrictive patents ?

REFLECTING

What started out as a bit of head scratching over the Steam Shovel valve mechanisms has made it obvious what a wonderful and diverse range of engines we have on display at the Melbourne … Steam Museum ! Lets not forget it is one of the best around . Warwick Bryce photos and words

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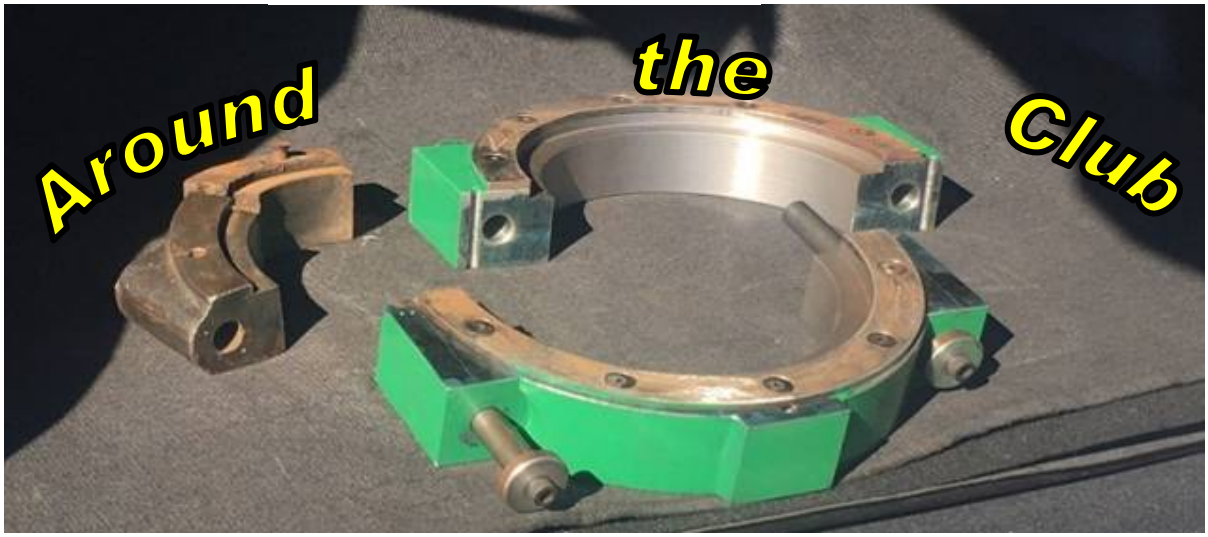
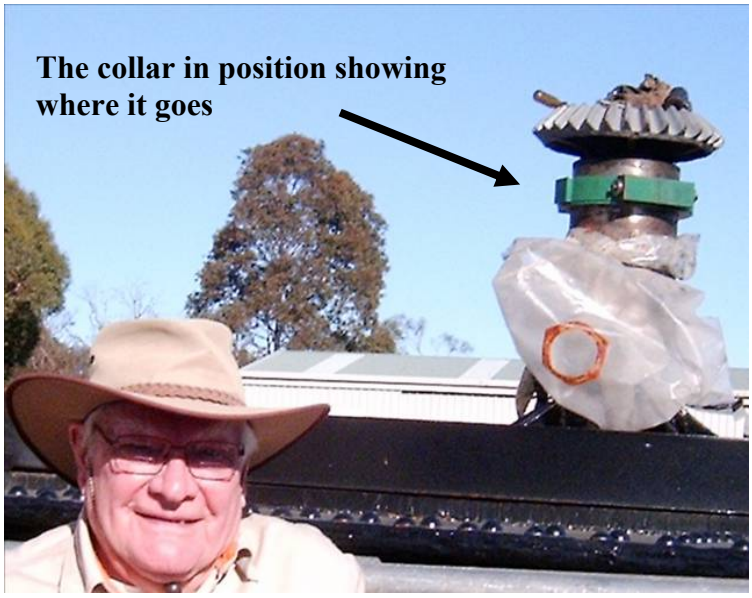


King Pin Clamp

We do not get to see long standing member Ray Bedford down at the club that often these days but that does not mean he is not pulling his weight . Ray is very proud of this home workshop and turns out some fantastic work for many club projects particularly the railway . This time he has excelled himself with making a locking collar for the steam shovel . It is a 2 pieces ring about 200 mm ID that clamps in a groove at the top of the king pin , in the center of the base to stop the machinery deck jumping off . Although we had the original it was shattered into a number of segments and the removable wear strip was mangled. Ray set about making a replacement from profile cut 2 " mild steel plate . He arrived the other day with his master piece in the back of his car ready for a trial fit . Our hearts sank as at first it would not fit but inspection showed the groove in the post had a few dings and layers of 100 year old congealed oil . A bit of cleaning soon had the 2 halves of the ring seating in the groove with a resounding clunk , the unmistakeable sound of a perfect fit . Ray has excelled himself again and saved the club a few thousand dollars if we had to have one made outside.

Thanks Ray



Steam Whistle

The Lyttelton crew has a new toy . They noticed a battered steam whistle in amongst the silages at the back of bay 5 . Roger Pierson and Co soon had it straightened out and polished up and after finding a suitable stop cock where busting to try it out . The Lyttelton boiler was fired up and as soon as about 20 lb was registering they gave it a go . At first it spluttered and water spurted out but as the pipes dried out it started peeping. Soon it was tooting away quite loudly with a pleasant tone .

→

There is thoughts if a quick acting valve can be found and a string fitted it would be a real hit with younger visitors of all ages.

It is not obvious what the whistle is off but if it is from an engine we have at least it is now safe and known where it can be found when needed .

Another new member Phil Lin has recently joined the Blacksmiths team . He is highly interested in all aspects of metal working and who better than being mentored by Stephen Nichol and Ron King .

Retired Civil Engineer Doug is very interested in the role our machinery such as the Steam Face shovel and Drag line played in relation to the process of mining coal and limestone for cement manufacture and power generation . When you see him around have a chat . He also knows a bit about soil and foundations. Which is always handy

New members . We have had quite a few lately . Pictured here is Gary King marvelling as Bill McRobb operates the Lyttelton Feed water pumps while Roger Pierson explains how they can pump an incredible 22, 000 lbs of water per hour (11 IBC tanks) .
This is recovered from the condensers and pumped back into the boilers against full pressure . Ships have to recover their steam as it is very bad to use salt water in any boiler.

Train Shed Door For years when our only serviceable locomotive was the diminutive Diesel outline shunter Joy , swapping around carriages was pretty easy . Now with the regular operation of our big steamer CLIVE and mainstay now the big P11 REG and a couple of other locos in limbo, shunting has become quite a chore. Some relief was got by putting a 3 rd track in the shed but getting onto this track was still quite a rigmarole. The real answer was running this track to an extra set of points in the yard but this meant going through the wall . The existing sliding door could not be widened because a column was in the way. A number of options for a door was considered with the best being to fit a couple of roller doors that can be independently open and do not block the other when open Last Thursday the roller door specialist arrived and did a very nice job of their installation . Chris Glassock photos

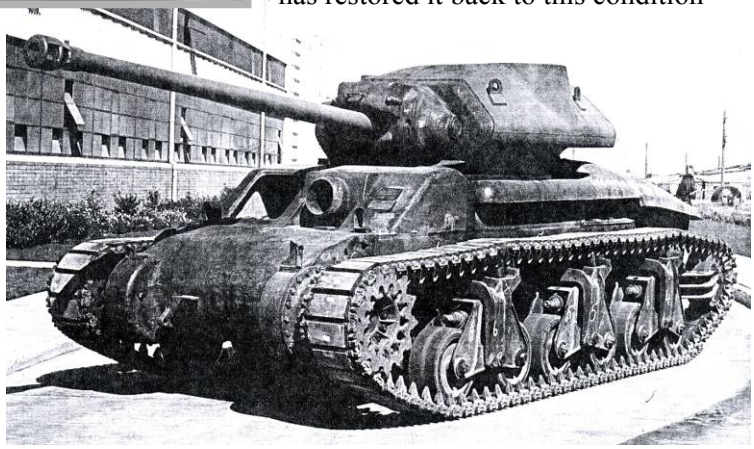
SAVING E1 Part 11

By John Belfield

After successfully restoring the Hull (pt 1) John Belfield tells how he was determined to complete the restoration of this important part of Australian military history .

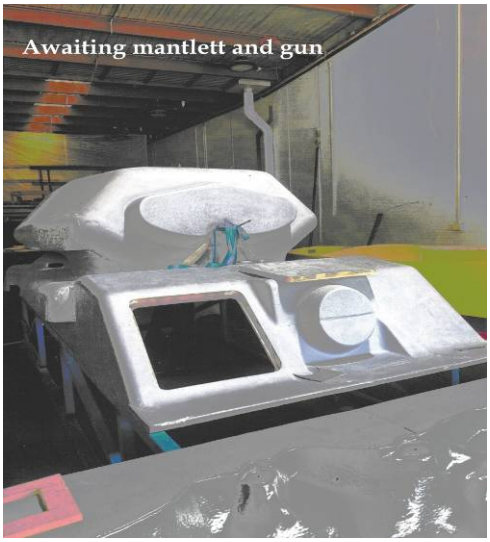
John gives great credit to the Australia Engineers who were able to build this tank in under 2 year. It was later used as the test platform for the Allies best anti tank gun, the 17 pounder . Despite passing all gunnery trials it did not go ahead for other reasons but as the AC 4 it would have been equal to any other Allied tank

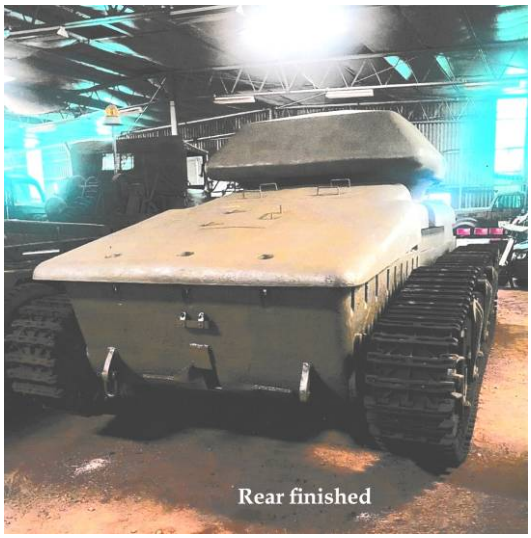
John's E 1 tank as it was when being used for 17 pounder gunnery trials . He has restored it back to this condition

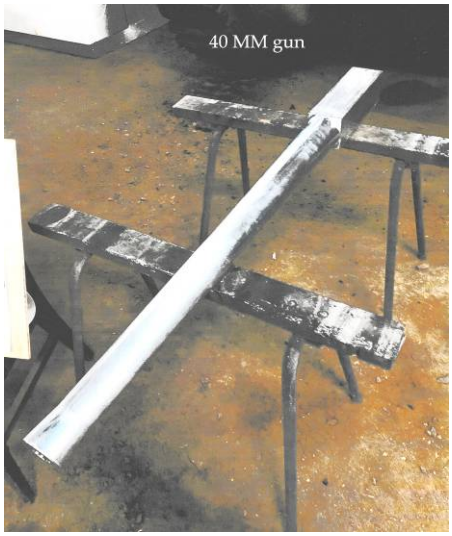


For more details I recommend Mike Cecil's book " Australian Cruiser Tank --Sentinel - The tank that nearly was.

After a few enquiries as to who and where and how I could achieve this nearly impossible task, I was lucky enough to find a local magician through my good friend from the VMVC Ewan. He explained that this professional fibre glass boat builder and all round military vehicle enthusiast JP Marine was happy and enthusiastic to take on the restoration .







The restoration would involve making the top half of E-1 which would involve fabricating the drivers compartment , turret ring support and the engine deck . Also the complete turret had to be fabricated together with the mantlet and the 40 mm gun . Although it would be built out of fibre glass and heavy ply and lots of bolts , the finish needed to look like a very rough casting , as these were the first large tank castings ever to be made in Australia .

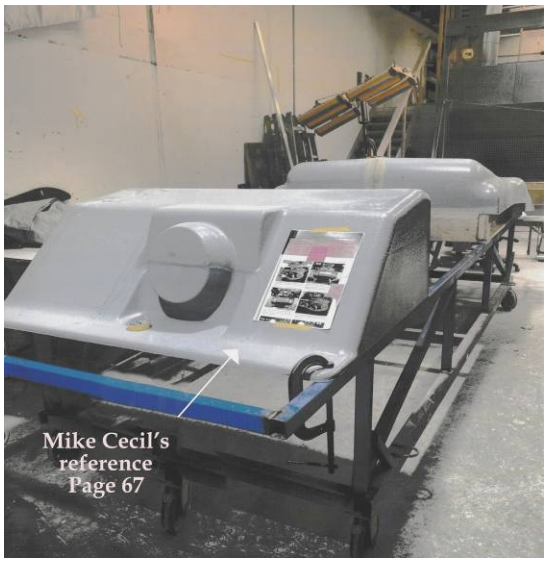
After the successful casting of the original 6 pieces of the original hull by Bradford Kendal in mid 1941 , they were then sufficiently confident to cast the complete hull in one piece in Oct 1941 . This was a worldwide first and Australian engineering was way ahead of the rest of the world .

Both the American and English tank makers were still using armour plate and rivets and later welding to make their tanks .

Next stop on our E 1 restoration was for JP (actually Jean-Pierre Macquet) to do lots of 3-D scanning from Mike Cecil's Sentinel book to try and get good enough measurements so that he could find a huge factory that made giant dinosaurs and rocket ships in order to make the necessary moulds to cast up the fibre glass hull and turret .


Turret mould

I do not understand the modern 3 D stuff I did my turning and fitting learning in 1949 and I guess it has helped me to be able to restore enough military vehicles to start the Melbourne Tank Museum in 1993 . So into the modern way . About 15 blocks varying from 2 to 3 metre long and nearly a metre thick were put into these huge machines which are basically small end mills set to run automatically night and day to make up moulds the same as drawings and photos in Mike's book . Just absolutely magic—the modern way.



The moulds eventually arrived at JP Shipwrights and JP and his crew did their magic and laid matting and glue and more matting (all layman descriptions) and created the top half of the E1 tank .

Next challenge was to turn the smooth finished outer skin of the tank top into something that looked like a very early and rough cast steel hull. JP enlisted the help of a very skilled lady from the giant dinosaur factory , and she was able to do a fabulous job of aging the hull back to a 1941 look !


Turret with new rough texture ready for gun

JP was able to assemble all the parts onto a temporary frame and transport it on a car trailer in peak traffic all the way to the Melbourne Tank Museum . It would have made an interesting spectacle amongst the suburban traffic .

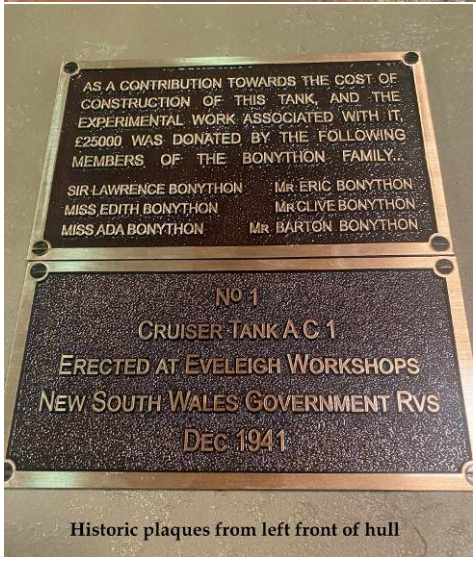
Most parts were light enough to lift onto the E 1 hull . The turret was bolted to the turret ring assembly and a 2 pounder 40 mm gun made of aluminium was added.


Top half ready for delivery the 3 magicians - JP on left

The 3 upper hull sections were bolted to the original cast hull with about 30 bolts 3/4 " dia . It was just great to see this historic piece of Australian military history come back to life after 83 years . I am not sure what will happen to this historic piece . For the time being I am just happy to display it in my museum building.

The important thing is that it has been saved and restored to static display to represent a magnificent effort by Australian engineers at a time of extreme national emergency when the Japanese threat was there . We knew we had to defend ourselves . Peal Harbour had been bombed and the Japanese bombing of Darwin occurred on 19 February 1942 which resulted in great loss of life.

At 93 years old I finally had success of saving the first aussie built tank, which was finished as the bombing was taking place in Pearl Harbour



Historic plaques from left front of hull

John has attached plaques to the front of the hull identifying it as the original No 1 and acknowledging the generosity of the Bonython family for donating 25 ,000 pounds towards its construction and subsequent experimental work in 1941

Profile

John Belfield-93 years- 0400 900 193
26b years-Sergeant Recovery Mechanic
4th/19 th Prince of Wales's Light Horse Armoured Regiment

Creator of Melbourne tank museum
456 Belgrave –Hallam rd
Narre Warren North Vic 3804

View Sentinel E-1 on You Tube https //. Youtube.com/watch?y=PMW2agfV8cA

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200 th Issue Reflections

It is incredible to think this is my 200 th Edition of Steam Supreme particularly when you consider writing does not come easily nor dus speling . In fact it took me 3 attempts , spread over a number of years, to pass year 12 English . I only got 56 % , enough to belatedly get my qualifications but who cared ?

It is really thanks to Jo Lloyd that I became your Editor . She had done over 100 editions and changed circumstances such as no longer being on the committee meant it was time to hand over to someone else . But the turning point for Steam Supreme goes back a few years earlier than Jo when Harry Simmons (Mr Rosebery) came to its rescue from the rat bag brigade who delighted in creating controversy and negative gossip . Harry brought a new level of respectability and quality to the news letter with his objective reporting while I admired him for his ability to type the whole thing by hand with no errors . The task eventually became too much for him being quite elderly so Jo took over and continued the good work doing it on the computer for the first time.

On reflection her setting it up on Publisher was what made it possible for me to take it on when the time came . With out it's cut and paste , spelling correction function and ability to manipulate imagers it would have been beyond me . Actually she gave me her computer and software which I am still using as I write this . It never goes on line and is never used for anything other than Steam Supreme so has given no trouble.


STEAM SUPREME
newsletter from the
National Steam Center - Melbourne

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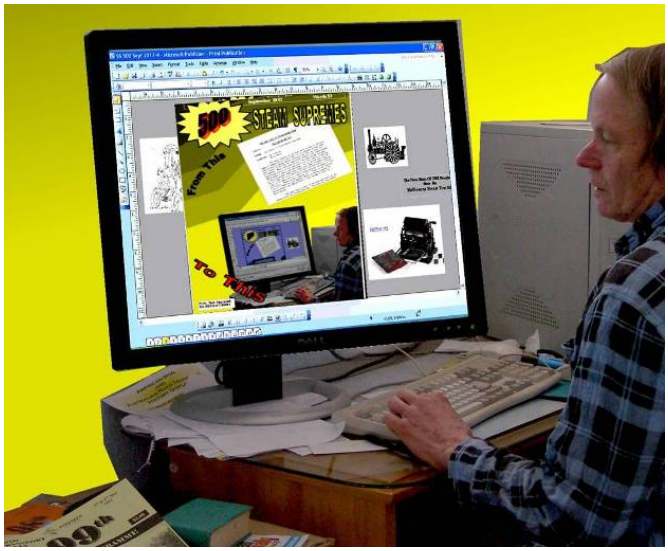
Issue 456 January 2009 Price $3

A great start for the New Year
The clubs latest acquisition a 109 year old Horsfby - Akroyed Oil engine. A very significant addition to our extensive Internal combustion display. See inside for the story of the engine

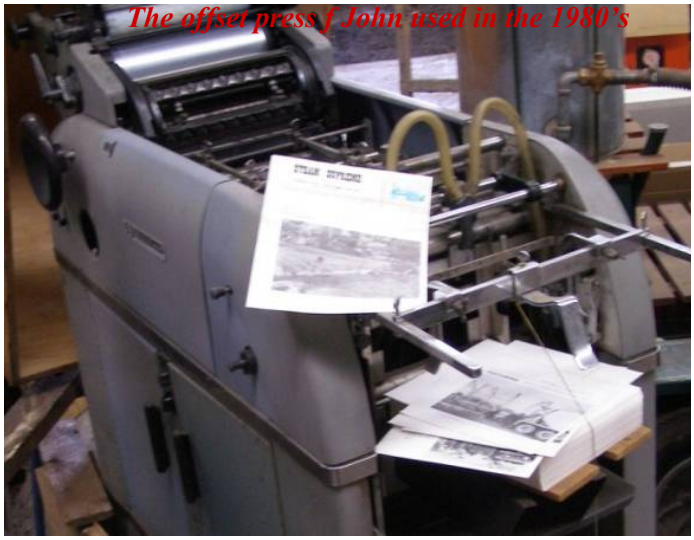
My first attempt issue 456 January 2009

Below doing Issue 500 using Jo's computer



Others did not make it easy for me in particular was the late John Davies. While not being the Editor in my time, over the years he put a huge amount into the production of our newsletter. Not only compiling but getting the bromide plates made to be able to print photographs, a 3 week process .

He then did the printing on his beloved Offset press which he could not bear to part with long after it was redundant. I think he meant well and set himself very high standards but often picked fault with my efforts with SS . One night he stood up at the social meeting and declared that my spelling was only the standard of an 8 year old, which I found hurtful . Next issue I mentioned John Davies 3 times and deliberately spelt his name incorrectly 3 times, each in a different way so he would twig it was not a mistake. I never had any more trouble.



The offset press f John used in the 1980's

With the digital copies it became apparent that SS was being widely circulated outside the club so it was thought it would be an advantage to make it downloadable from our web site . To this end I introduced a special version called A Wisp of Steam Supreme , introduced in 2016 it had the private club matters left out .

Another challenge for us all was the Covid lockdowns . With no access to the club for going on 2 years I felt SS became increasingly important as it was all that was holding us together and in fact quite a few clubs did not survive. The challenge for me was to find enough material . All I could do was write about my own experiences and home projects but it gave the chance to get down on paper things like the Chamberlain Engine . Not steam but I think I got away with it . At this time a great help was stories from other members particularly Phil Randall with his around Australia and motorbike adventures.

It is probably not appreciated that each issue takes me about 30 hours when you count gathering information and taking photographs as well as the writing. I am extremely grateful to the contribution by other MSTEC members be it stories , photographs , full articles or just general going ons. I do not think any other Newsletter Editor gets this type of support , it has been a great help and has kept me going a number of times.

We have done very well with local and overseas magazines including TOMM and Old Glory publishing stories from Steam Supreme . Couple this with outside distribution of the newsletter and a good web site we have become widely known and highly regarded in our field both at home and abroad. This has resulted in us often being the preferred receiver when large artefacts become available while local and overseas .travellers are increasingly putting us on their to see list. All this has paid off for me too making many friends , opening doors to private collections here and overseas while others have been very kind to me in various ways .

Thankyou to all it has been a great help and makes it feel all worthwhile. Warwick Bryce

Many of Steam Supreme's major stories have been published in local or overseas magazines

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Coming Events

SOCIAL MEETING
First Wednesdays

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.**