GOLDSMITH

THE PYRENEES HERITAGE PRESERVATION MAGAZINE

Edition 165/166 Feb & April 2023 Lake Goldsmith Steam Preservation Association Inc.

1234 Carngham Lake Goldsmith Rd. Lake Goldsmith 3373

AN INVITATION TO THE LAKE GOLDSMITH 2023 AUTUMN HOWARD RALLY

100 YEARS OF HOWARD IN AUSTRALIA

THE 121ST RALLY IS SUPPORTED BY PFG AUSTRALIA &

HOWARD AUSTRALIA — THE GREAT SURVIVOR

AN ANNIVERSARY TO CELEBRATE

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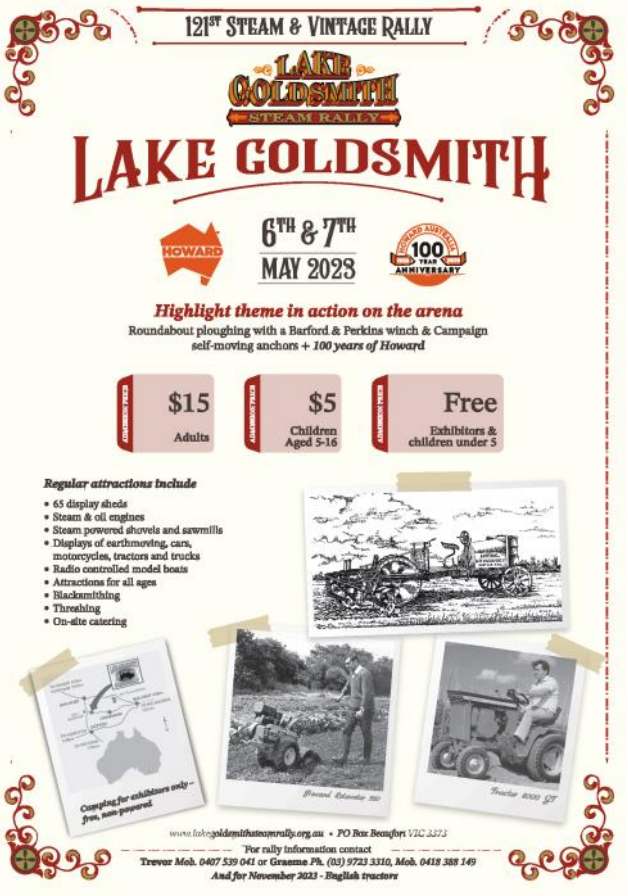

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HOWARD

Our Mission Statement

To foster, nurture, encourage and demonstrate technical, agricultural and life skills

associated with the Industrial Era.

To provide a quality environment where these skills may be used to educate and entertain members and visitors.

To run two weekend rallies each year, and be available at convenient time for other interested groups or individuals.

To conserve and develop a heritage collection.

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William Adams CAT

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Lake Goldsmith Steam Preservation Association Inc.

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COVID NOTE

Covid has beome something that we have learned to live with. Please be cautious.

Visitors to the 121th rally on May6 & 7 2022 can check for any last minute changes before leaving home.

Welcome to Goldsmith Edition 165/6 Feb & April 2023

La Nina made 2022 a wet year in Eastern Australia, and the Lake Goldsmith rally grounds were not spared when the Mt Emu creek rose on October 22 and inundated the grounds and many sheds. Whilst the damage was minimal when compared with January 2011 its severity and timing forced the Cancellation of the 120th Rally.

The La Nina effect has eased, resulting in a mild summer, and in turn we expect good weather for the 121st Rally on May 6 & 7 2023.

Covid restrictions have eased, although it is still around and causing grief to many. Common sense says that current guide lines for minimising the spread should be followed when moving in close proximity to exhibitors and visitors on the site

100 YEARS OF HOWARD

Australia has had many manufacturers of agricultural and cultivating equipment, but few can match the success of Howard which started in NSW in 1923, and is still in business in a big way in the same market, quite an achievement, hard earned against competition from overseas global manufacturers.

We last touched on Howard in this magazine (no 126) in 2014 The rally theme was Australian made tractors, and page 20 gave some background. The list of Australian manufacturers that became a part of History is quite long , making Howards survival an outstanding success story. It has a continuous history and is still based in Australia as part of PFG Australia. PFG is a part of a New Zealand based parent Power Farming Holdings, which is expanding into the northern hemisphere as Cliff Howard did in 1938 when he set up in England prior to WW2 .

Over the past 100 years Howard has manufactured agricultural machinery in various factories around the world, including Australia, and has sold it in over 120 countries through its own outlets and agencies. Howard Australia is independent of any companies in Europe or elsewhere who still use the Howard name.

PFG Australia is based in Melbourne and has its own design department, which includes part of Howard's original Northmead team ensuring that the high standard of Howard implements is continued into the future. PFG/Howard controls manufacturing standards via its associated companies.

For the 121st rally PFG Australia will have a display of Howard machinery, past and present in the Quadrangle opposite the founders building. This display will include machinery from private collectors who have registered with Howard Australia.

All of this should make a great display of Australian ingenuity and survival.

Enjoy the day, it is not one to miss. Ed.

MORE PLOUGHING WITH STEAM

Following up on the previous story "Ploughing with Steam" (edition 164 on our website). This feature follows on with some of the machinery from the early 1800's which attempted to replace the Horse and Ox, particularly in the UK .

This was an interesting era, and the various theories on how to avoid soil compaction was to get the horse out of the field where it had drawn ploughs for generations, and at the other extreme to cultivate areas where the ground could not support horse or man, were as much the drivers of power farming as the potential economy of using steam power generated by wood or coal as an alternative to draft animals eating a significant percentage of the crops that they helped to produce. The engraving, above right, shows a portable "Horse Works" attached to a winch pulling a drainage plough, getting back for the next row is left to the imagination.

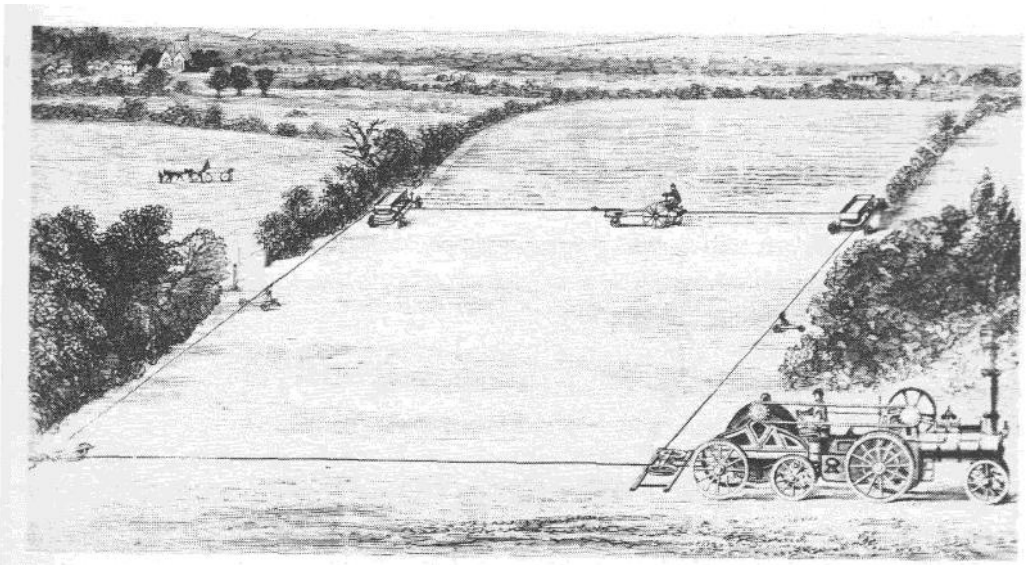
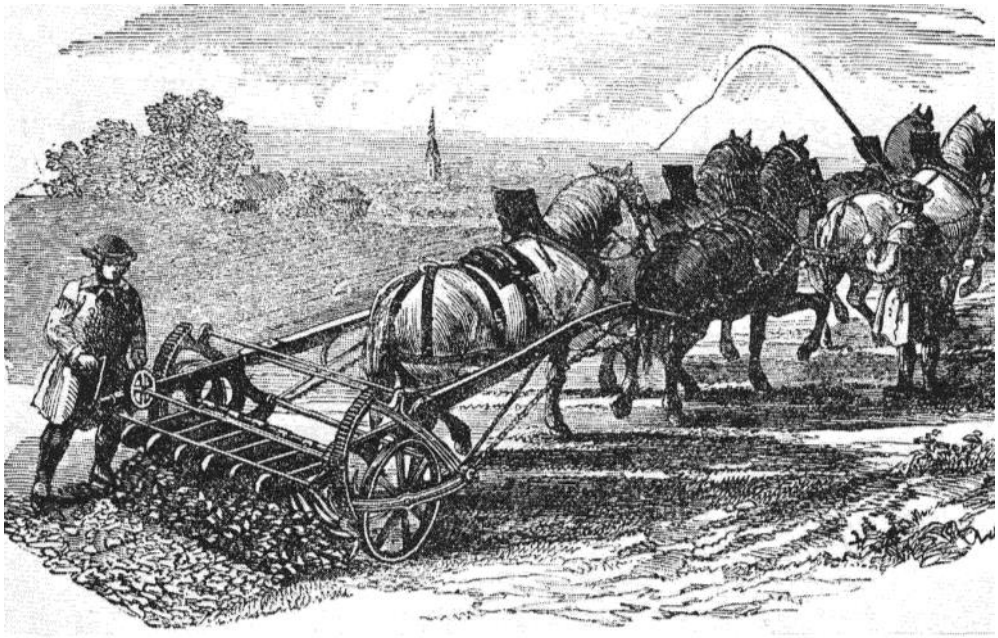


Fig. 158. Barford and Perkins' traction engine and windlass system of 1900

The arrival of steel wire rope in the late 1930's made roundabout cable ploughing which will be demonstrated at the Rally, a practical and successful method for keeping draft animals of the land to be cultivated and leave the ground compacting power source outside the paddock as well. Heavy machinery could compact ground as well as the draft animals, which until self propelled engines arrived were still need to move the portable steam engine and winch, and then cart the produce to market. The portable steam engine had other uses on the farm, and it could be used to to pull implements other than ploughs as may be required when planting or harvesting.

The plough itself was under challenge in some quarters particularly where hand digging by labourers using spades or forks were traditionally used to take

advantage of the improved crop yields that were produced. Alternative means of cultivating at the time involved rotary cultivators and as labour became scarce, and more expensive, machines which simulated the manual action of digging with forks or spades were tried.



g. 88. Samuelson's forking or digging machine of 1854. Forerunner of ste powered diggers (*Courtesy of British Museum*)

Typically farmers were very conservative and were reluctant to try new ideas until they were well proved in their area. At the other extreme some enterprising farmers developed their own machinery to overcome scarcity and cost of farm labour to provide a more consistent depth and crop yield over the cultivated area. As time went on reliable digging machines were developed for operation in rock free areas of friable soil to avoid machine damage from rocks and blocking from clay.

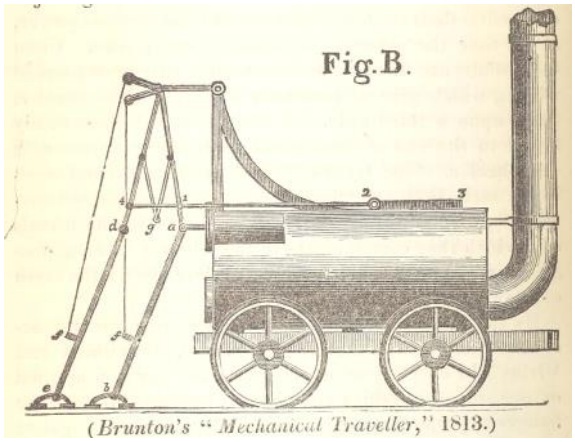
Steam seems to have made its debut in agriculture in 1799 where it was used for threshing grain. Power farming for ground work was a bit more difficult, the portable engine had to arrive to get power in the field, and steel cables had to be invented as a workable alternative to hemp rope or chain available at the time.

Direct ploughing using steam power, which was done traditionally by draft animals had to remain in the future until traction engines were developed, and the horse remained in harness until internal combustion engines and Pneumatic tyres dominated the scene after World War 2. Whilst steam was used for direct ploughing, it also was the power source for cable ploughing where the heavy weight of the machines made double engine ploughing popular, particularly where the paddock sizes suited the system and their ability to plough deeply helped cultivation.

Ultimately the need for skilled operators and high capital outlay could be amortised by contractors who worked over many farms.

But that is not how it started, prior to the early 1800's wheels had been been something that rolled along the ground or on a rail underneath a cart that was drawn by a draft animal or person. The wheel did not supply the tractive effort from a power source on the vehicle, and it usually had a smooth iron tyre.

Friction does not seem to have been well understood, and there was doubt that a smooth iron tyre would not spin on the ground or rail if it tried to push a load up a hill, or pulling a plough through the ground.



(Brunton's "Mechanical Traveller," 1813.)

Vehicles drawn by draft animals were made as light as possible to avoid getting bogged and to maximise the payload, To use smooth iron tyres on smooth rails increasing the weight helped and trains worked well, but an early attempt to replace horses used a steam locomotive with legs to grip to rails. In 1813 Brunton's "Mechanical Traveller" appears to have worked well, but ultimately wheels and controlled gently gradients provided a practical solution.

In 1814 Tindall proposed asteam powered slasher plough which was to be pushed along by four pushers rods at the rear. The rods seem a bit sharp to work in soft ground, but the idea was there. I have no idea if this machine was ever built, but it does demonstrate that they were aware that traction was a potential problem,

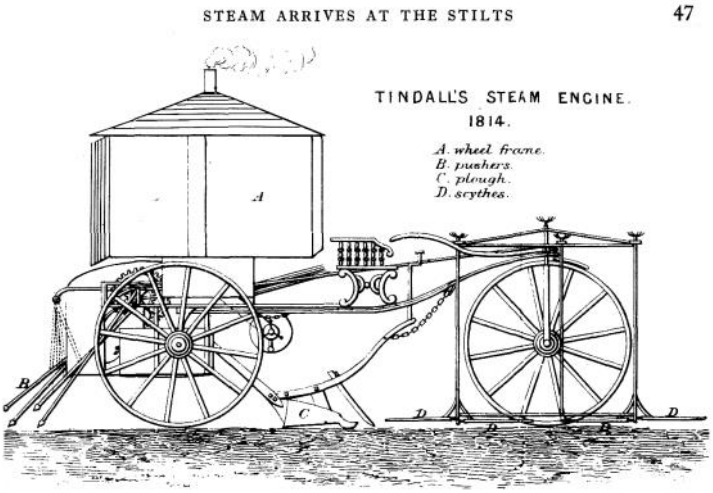


Fig. 23. Thomas Tindall's steam engine of 1814. Moved by four pushers (B) the modified horse plough (C) between the wheels was preceded by rotating scythes (D)

In 1810 Major Pratt proposed a system where Mattock like spikes were attached to a belt or rope which was driven from an engine on the vehicle.

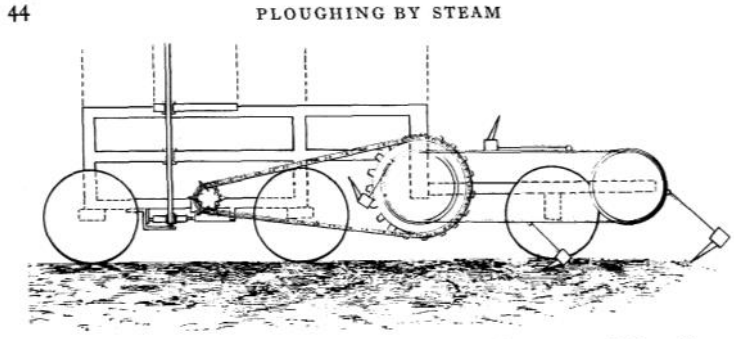


Fig. 21. Major Pratt's machine hauled itself along by means of the spikes or mattocks which were attached to a moving belt. Proposed in 1810, there were no steam power units at this time to put the idea into practice

The mattocks were expected to be swung out at the front to lodge in the earth and pull the machine and presumably a plough along.

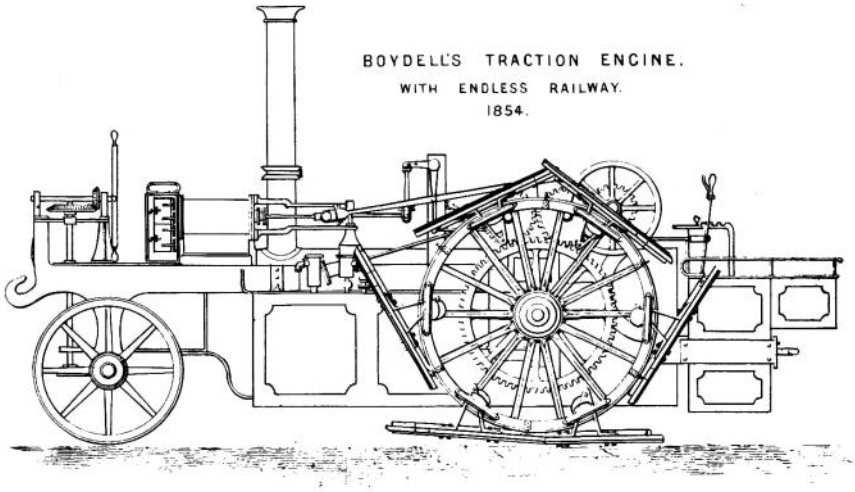


Fig. 46. Burrell-Boydell heavy haulage and direct traction ploughing engine of 1854

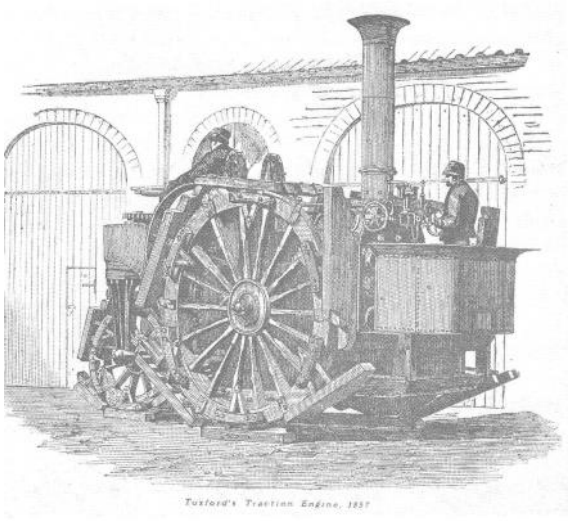


Fig. 58. Tuxford's traction engine 1857

The other problem with road wheels at the time was that they were relatively narrow and prone to bogging down in soft or wet ground. To make things worse, a steam engine and boiler were heavy. To improve the load bearing of the artillery style wheels in use at the time Burrell & Tuxford, among others used Boydell's patent plates attached to the rims to lay a wooden road under the wheels. Under ideal conditions these attachments helped, but they did not take well to stony areas or sharp turns which tended to break the timber plates. Wide wheels, improved roads, and cable ploughing eventually became the norm.

For working on very soft ground which could not bear the weight of a horse, John Heathcoat proposed a steam ploughing engine with a very low load bearing which cold run on a flat prepared roadway and pull ploughs sideways via a winch

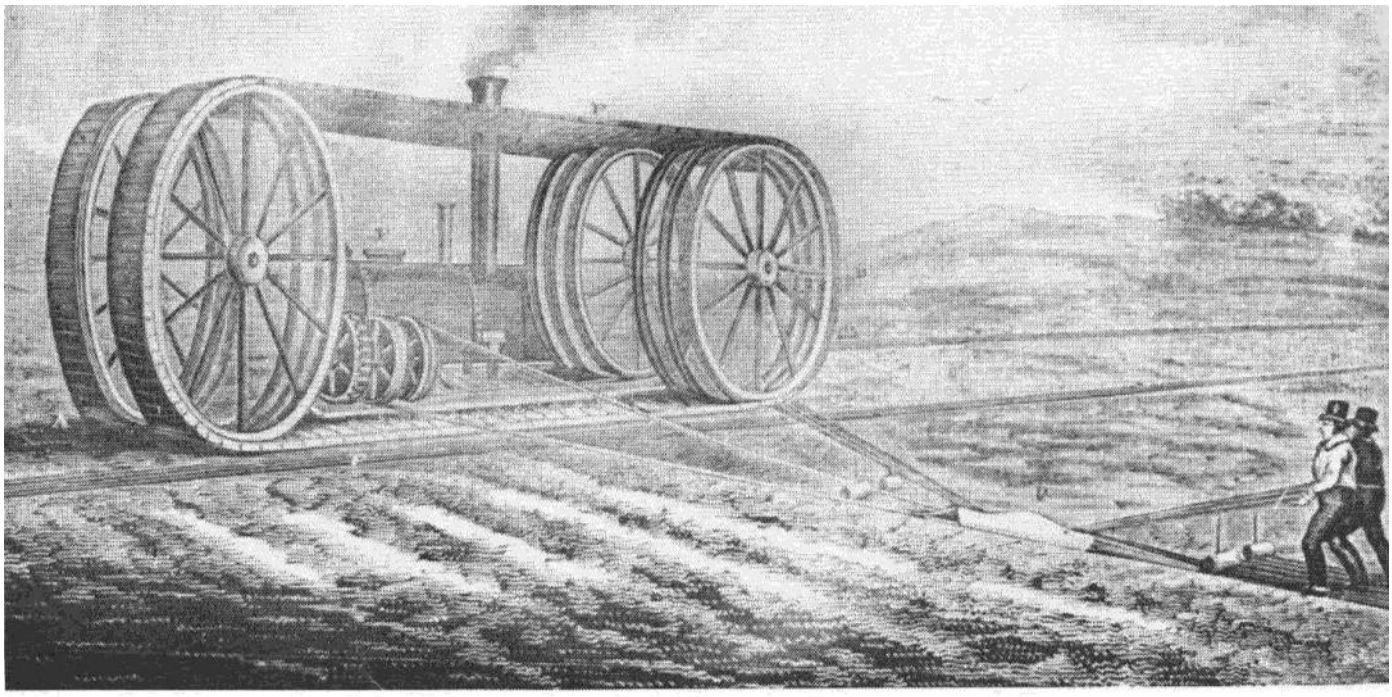


Fig. 25. John Heathcoat's ploughing engine. The pre-rolled "road" can be seen. Only two top hatted ploughmen are shown, but drawings of the plough have six handles each end of the stilts

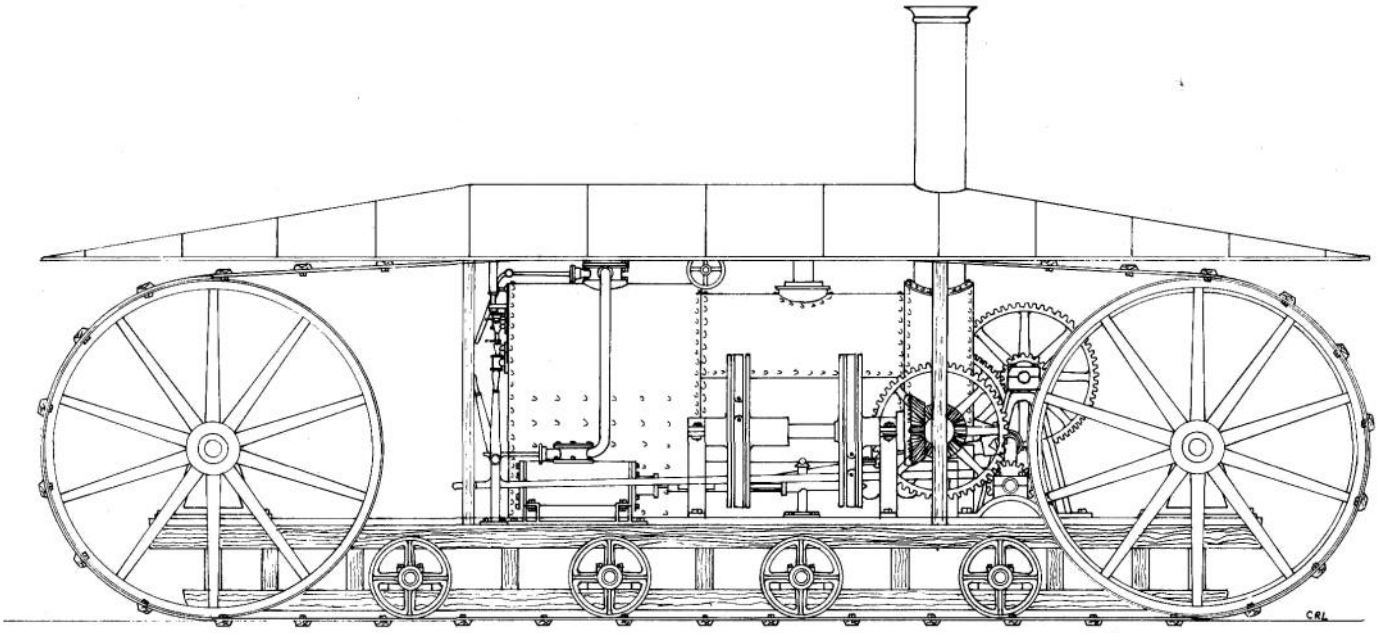
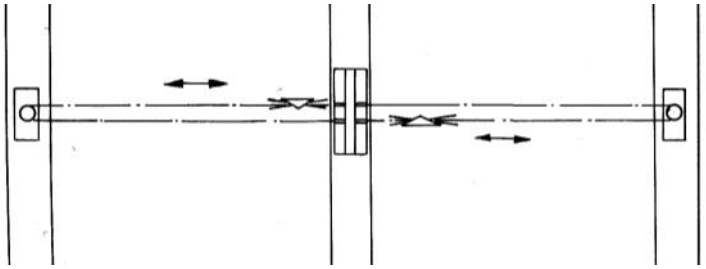


Fig. 24. John Heathcoat's ploughing engine of 1837 (*Christopher Lord*)

mounted with the centrally located engine. The tracks were made of Canvas over timber frames and were about 7' wide running over 8' diameter wheels with smaller track



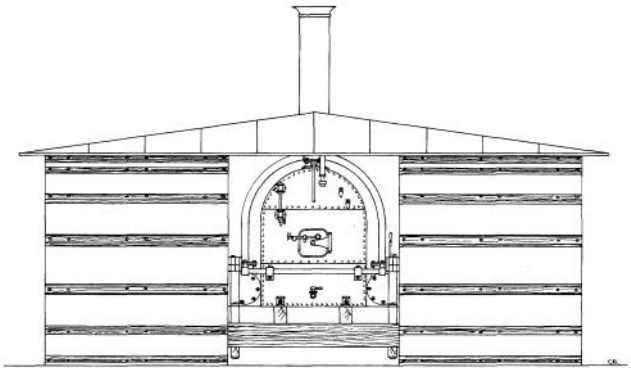


Fig. 24A. End elevation of Heathcoat's ploughing engine showing the great width (*Christopher Lord*)

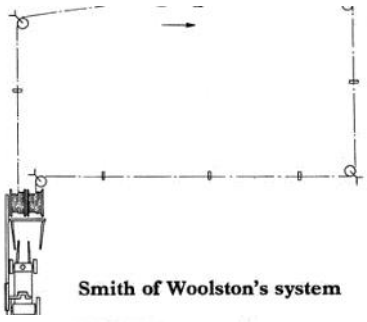
rollers. In use, 3 roads were built up to carry the machine in the centre and one at each side of the area being cultivated for the return anchoer pulleys.

The ploughs were drawnback and forth between the machine and the anchors. Unfortunatly the machine was built before Steel wire rope arrived which meant that a thin segmented "belt of short steel strips" with a crossection of one eighth of a square inch was used. This belt gave trouble, but the failure of the system was that nutrients had been leeched out of the wet soil making it useless for crops, which meant that the bogs had to be drained before they could be used.

This machine was quite advanced for the 1830's and had many features that would be developed and used later by others.

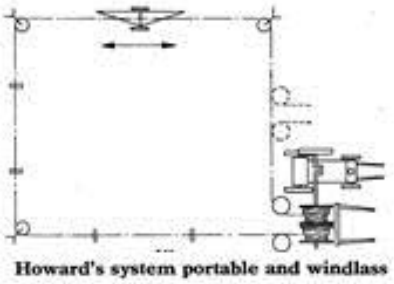
By 1855 William Smith developed a system of cable ploughing using steel wire rope (right) on his farm in Buckinghamshire in England.

Smith was a believer in keeping horses of the area being cultivated and his roundabout cable system made this practical as can be seen on the schematic plan at the right. Smith licenced various manufactures to make and sell variations of his tackle to suit their systems.

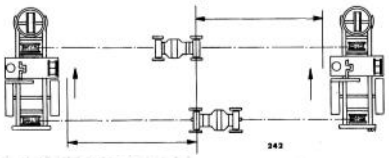


Smith of Woolston's system

By the mid 1850's J & F Howard of Bedford were offering ploughing systems for sale. They continued improving their tackle over the years and produced some specialised equipment. The portable belt and Carden Shaft driven Windlass are shown on the right. The Balanced plough was first developed bt Fisken in 1855



Howard's system portable and windlass



J & F Howard went on to make various double drum ploughing systems and later developing special traction

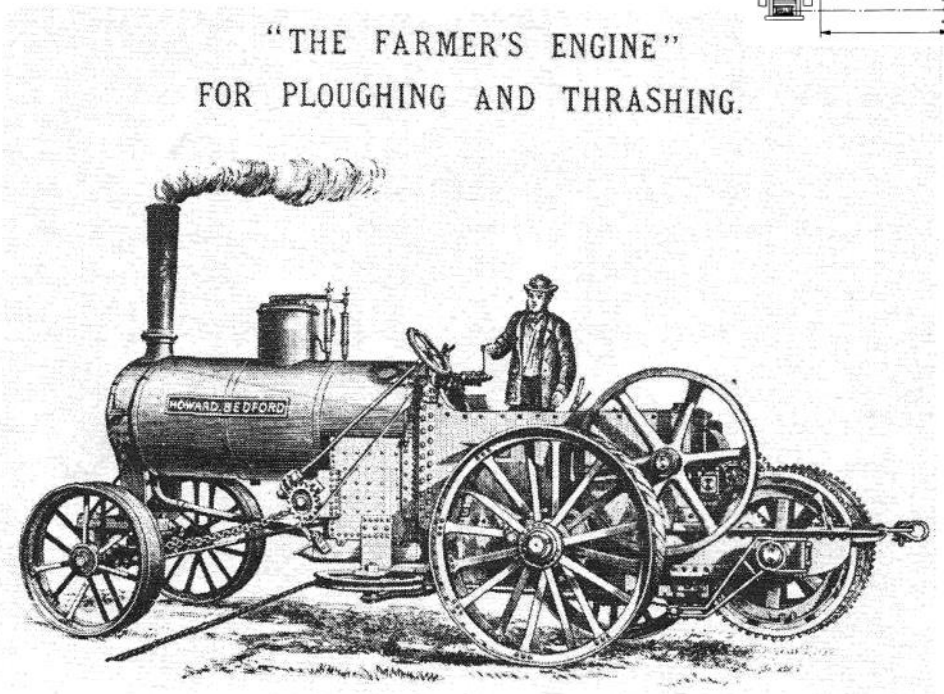
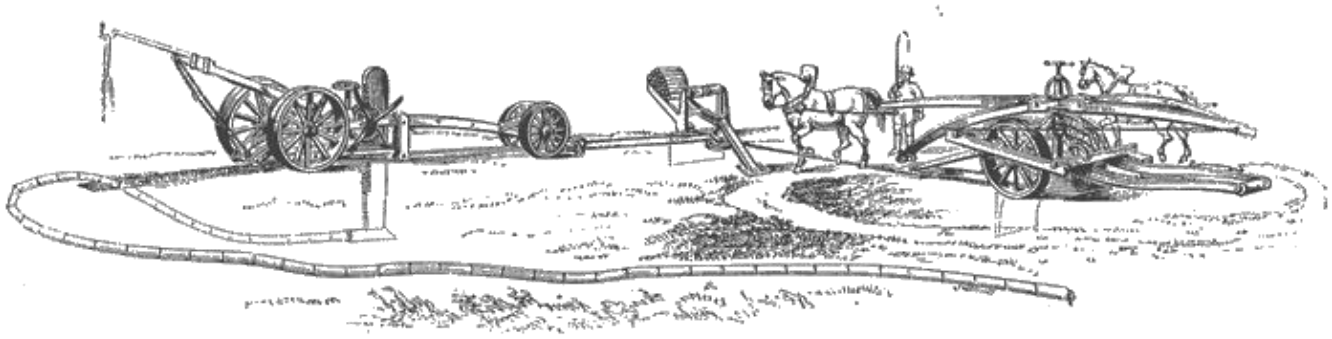


Fig. 143. Howard "Farmer's Engine" of 1879. With double drum for single-engine working, the drums could be removed and the engine used for road haulage or thrashing

engines with a removable a double windlass at the rear.

During the 1850's & sixties many manufacturers developed self propelled traction engines that could move the ploughing plant to the field to be ploughed , power the ploughing tackle and return home. Larger engines and more power meant that larger ploughs could be used.

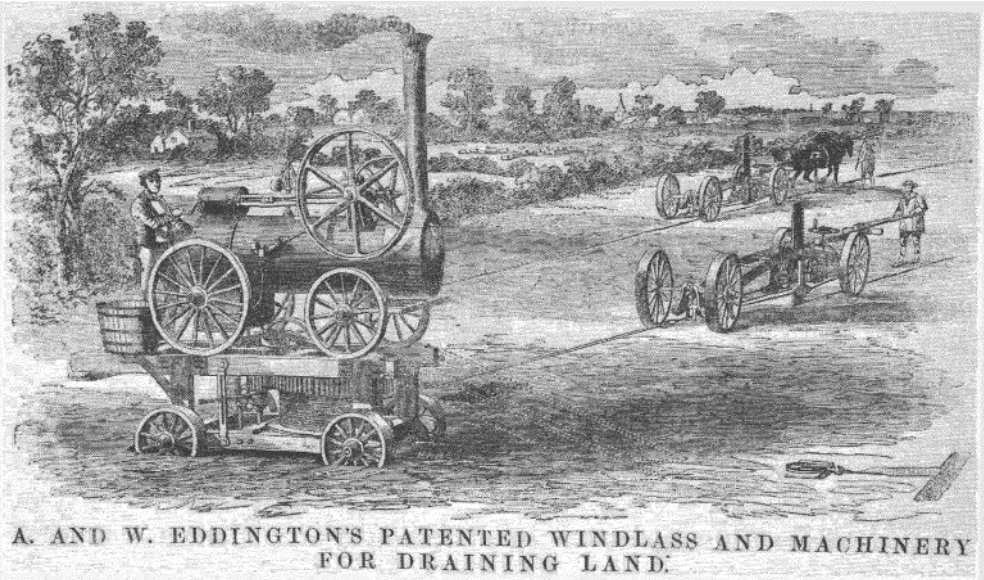
John Fowler saw an opportunity to improve the way wet boggy areas could be drained. Traditionally this was done by dragging a steel "mole" through the ground at a distance below the surface to open a trench in which a pipe could be



CL. IX., 28A.—FOWLER'S DRAINING PLOUGH.

laid. Using draft animals pulling the mole plough directly work was very limited. Fowler developed a system where tractive effort of the horse could be increased by using a Horse power Capstain to pull the plough with a rope or cable. Above, the "Horse Works" is on the right and the plough with the mole and trailing string of pipes is on the left. This system was able to pull the mole through clay at a depth of 2' 6" which gain it a Silver Medal at the Great Exhibition in 1851.

Fowler developed a portable steam engine with a winch on the front and a mole plough at the back. The rope was payed out and tied to an anchor block and the winch pulled the engine and plough across a field embedding the drainpipe behind it. The engraving on the left shows Fowlers mole ploughs being powered by an Eddington portable steam engine mounted over the windlass in 1859



A. AND W. EDDINGTON'S PATENTED WINDLASS AND MACHINERY FOR DRAINING LAND.

Fig. 60. A. & W. Eddingtons' portable engine and windlass of 1859 hauling Fowler draining ploughs as used in Hainault Forest. Tackle could be purchased or hired (*Courtesy of British Museum*)

Fowler soon realised that drawing ploughs was much lighter work than pulling a mole plough, so he had Ransome and Simms built an engine with a double winch set up pulling his own design of a balanced plough.

By 1863 Fowler had developed his double ploughing engine system which went on to dominated cable ploughing

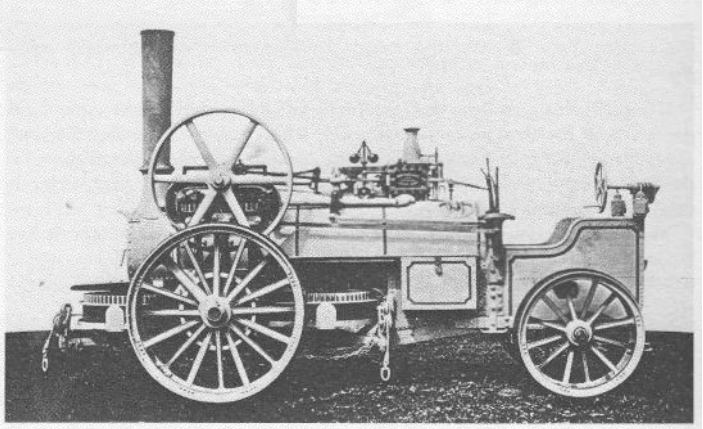


Fig. 69. Fowler single-cylinder double-drum engine No. 814 of 1867. Progress of the engine was bunker first

This system worked well as there were only 3 major items, two ploughing engines and a plough which at a pinch could be operated with 3 people as there were no anchors needed, the ploughing engines had enough weight to be stable.

Well back to the 1850's . There were other schemes afoot. On the left is James Usher's rear mounted cultivator built in Edinburgh in1849 Evidently it worked well on good soil, and it was capable of cultivating 6.5acres in 12 hours. It was rated at 10NHP and the final model could adjust the cut depth to a maximum of 9.5" with a 4' 2" wide cut. The rotor turned at 30 rpm.

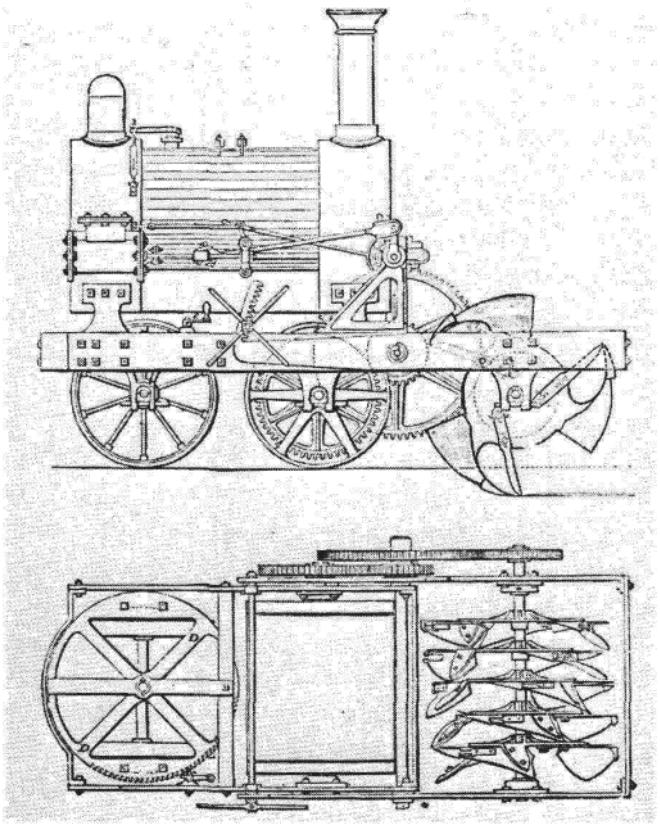


Fig. 82. Usher's rotary cultivator

The machine performed poorly at a trial on soil which was not suitable, and to add insult to injury it became bogged and it was difficult to retrieve The machine had a travelling gear, but it relied an thrust from the rotor for forward motion when working.

Evidently the cut was rough and it needed to drag a harrow behind.

The operator walked beside the machine to keep it close to the previous pass. Only 3 were built and it was not a commercial success.

Usher was not alone in trying to use rotary motion to cultivate the soil.

In 1852 John Bethell's cultivator was able to plough 4 or 5 acres a day. The boiler ran at 45 psi. Forward motion was by horse. The rotor threw earth high in the air. A later model was attached to a traction engine fitted with Boydell elephants feet plates. This does not seem to have been produced commercially.

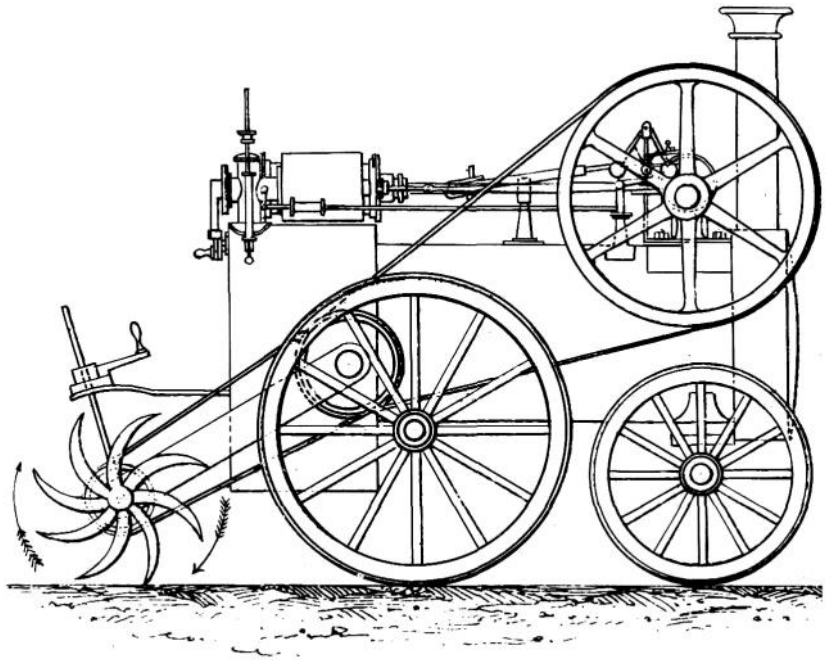


Fig. 83. John Bethell's rotary cultivator of 1852. The engine relied on forward movement by the action of the cultivator

Rotary Cultivation had a few devotee's. Robert Romaines 1855 cultivator was another which started of as a horse drawn model. Later (below right) improvements made it self propelled and it was fitted with a trailing wheel to comtrol cut depth, again it could cultivate 4 to 7 acres a day with a rotor speed of 40 to 50 rpm and work at about 1 mile per hour, and the rotor being wider than the wheel track, it reduced soil compaction.

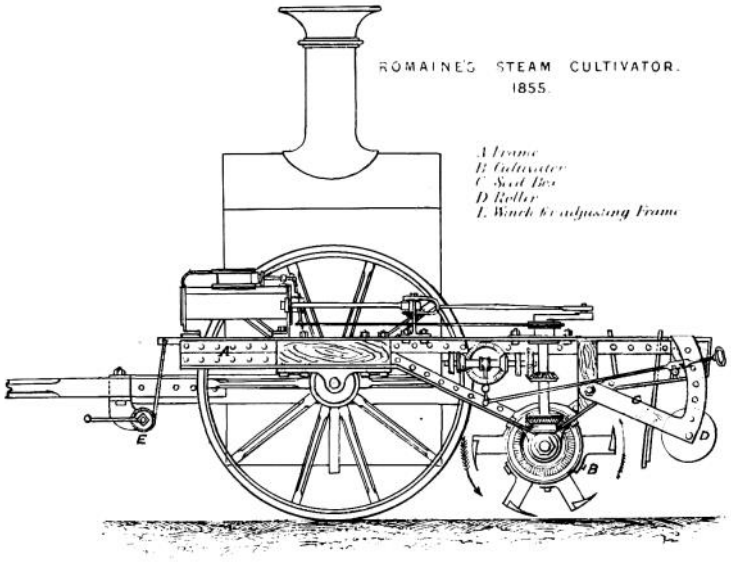
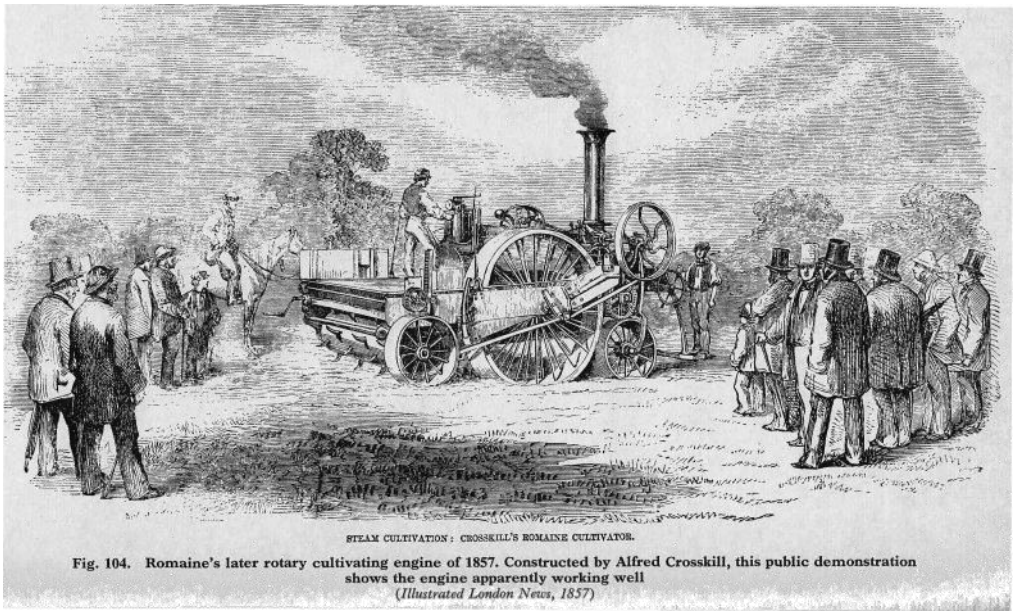


Fig. 84. Robert Romaine's horse-drawn cultivator of 1855

At £800 it was expensive due to its complexity.

To reduced the cost a modified machine was produced by



STEAM CULTIVATION: CROSSKILL'S ROMAINE CULTIVATOR.

Fig. 104. Romaine's later rotary cultivating engine of 1857. Constructed by Alfred Crosskill, this public demonstration shows the engine apparently working well
(*Illustrated London News, 1857*)

Nash in 1856. At 12 tons and 18' long it was a big machine with an 8' wide cut with 33 cutters 53" diameter at the tips. It could work at 0.75 mph to complete 7 acres in a day. Cutting 10 to 12 inches deep, and the rotor could be lifted hydraulically. The machine cost £700.

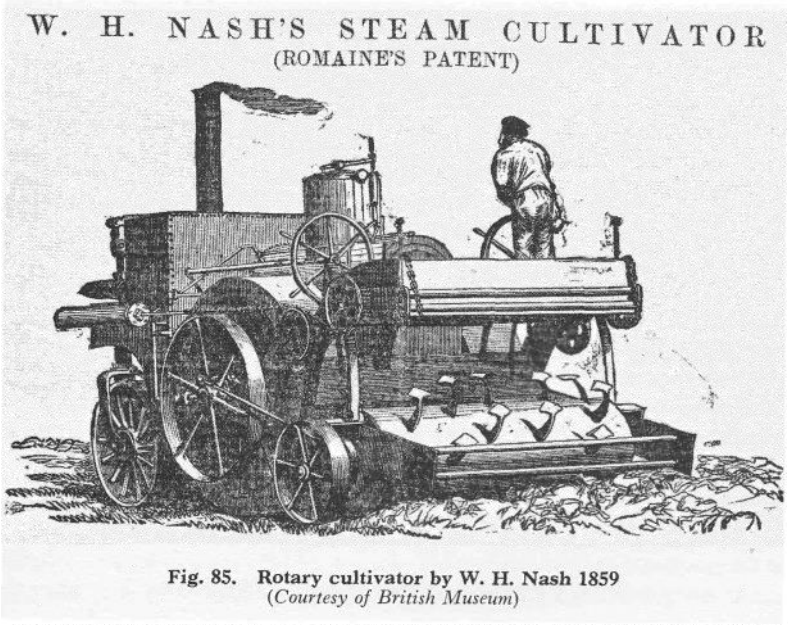


Fig. 85. Rotary cultivator by W. H. Nash 1859
(*Courtesy of British Museum*)

There were a lot of variations on the rotary cultivator theme in the 1850's.

Some original thinking by Thomas Rickett resulted this novel cuktivator in 1857. (right).The general layout was in the style of the traction engies of the time with the steersmen (yes there were 3 men needed to turn the tiller) at the front. The two steam cylinders were embedded in the smokebox and the chain driven cultivator drum was driven from the traction gear set. The really unique feature of this cultivator was that the rotor drum rotated "backwards", undercutting the soil and lifting it up and throwing it behind the machine in a well broken up form.

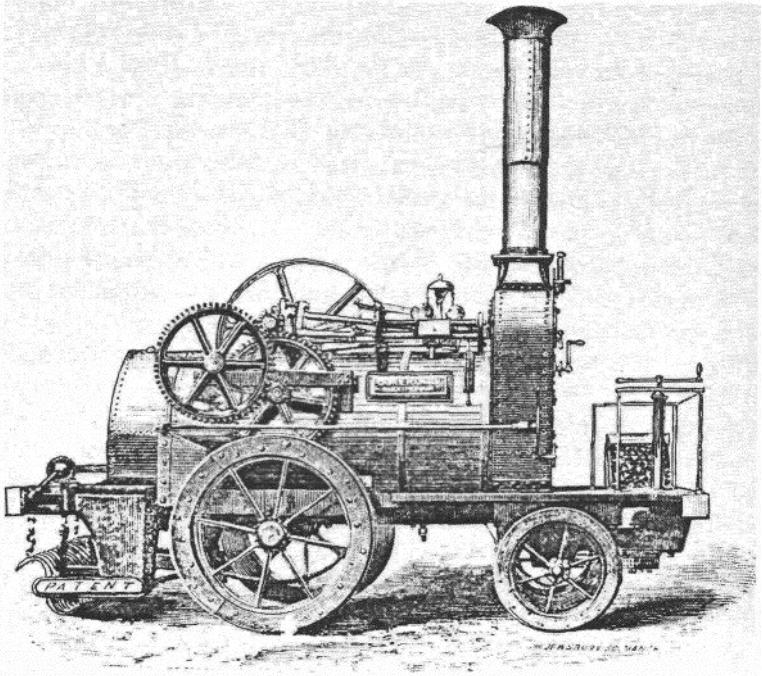


Fig. 86. Rickett's rotary cultivator of 1858

The drive did not have a gear box as such, but different gear sets could be changed to alter the ground speed and hence the cut of the rotor which was 6" deep and 7' wide allowing it to work about 6 acres per day. Field trial Judges gave it a favourable rating and felt that rotary cultivation was a practical addition to the mechanics of agriculture.

For all the good results rotary Cultivation does not seem to have taken off commercially. To a farmer not skilled as a mechanic or an operator of steam engines these heavy complex machines may have appeared a high risk investment.

If they broke down at a key time or became bogged they could cause long delays which meant that a back up system had to be available. Without a friendly

mechanic and recovery vehicle nearby, as we have today, you could be on your own for a long time.

The Crimean War which ran from 1853 to 1856 created a demand for food and a rise in prices, which may have been some incentive to develop improvements in agricultural production at that time. Unfortunately the end of the war reduced the demand and brought about a drop in prices, which may well have influenced the drop in demand for these mechanically successful machins. Sadly there are a lot of ways to kill a good idea.

Rotary cultivation was not the only alternative to ploughing that was tried at the time. Back on page 6 digging machines were mentioned.

We have to move forward to the 1860's by which time the Industrial revolution was getting under way and people were moving to factories or emigrating overseas for new opportunities. Either way farm labour was scarce and more expensive. Hand digging with a spade or fork was known to give better crop yields and some areas were not suitable for ploughing with draft animals or steam power.

Attempts to cultivate without ploughs were recorded from Trevethick's Tormentor in 1816 to Barrats Mattock cultivator in 1847, but they do not appearto have seen commercial use.

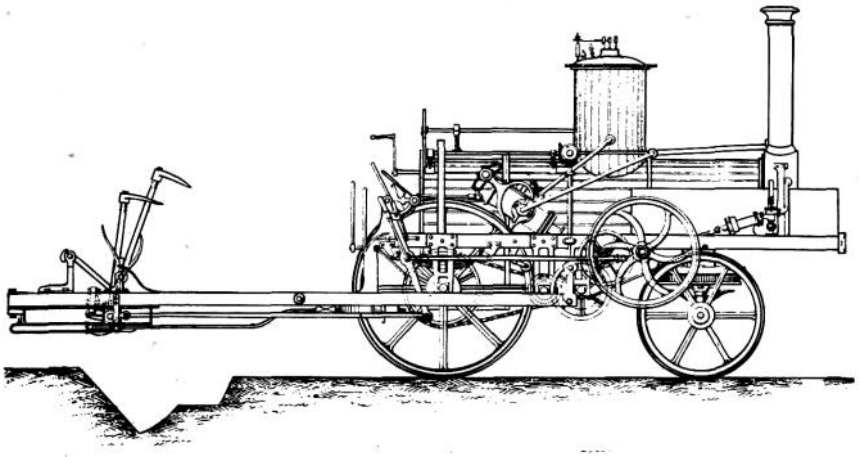


Fig. 90. Mattocks hacked the soil in Pierre Barrat's cultivator of 1847

An attempt to retain the advantage of digging using mechanised forks was first patented in 1862 by J Morris, but little record remains of its existence.

John Knight patented a hop digging machine in 1877.

This digging machine was powered by a portable steam engine driving light rope at high speed (? 3000 feet per minute would you

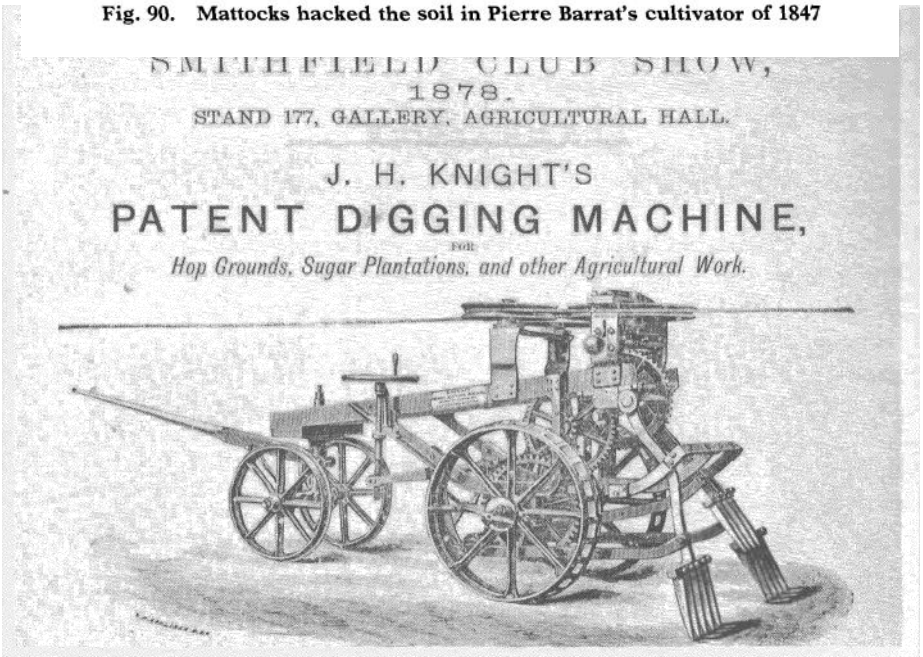


Fig. 89. John Knight's leaflet heading 1878 and his hop digging machine of 1877, as entered in the Smithfield Club Show

believe?) and the machine moved along at 100 feet per minute, which is about 1 MPH, Cost was £125-£145 and it could dig about 4 Acres per day.

The rope drove the digging forks and propelled the machine via ground wheel drive. I guess that one had to tread with care when checking the forks and keeping you head away from the cable.

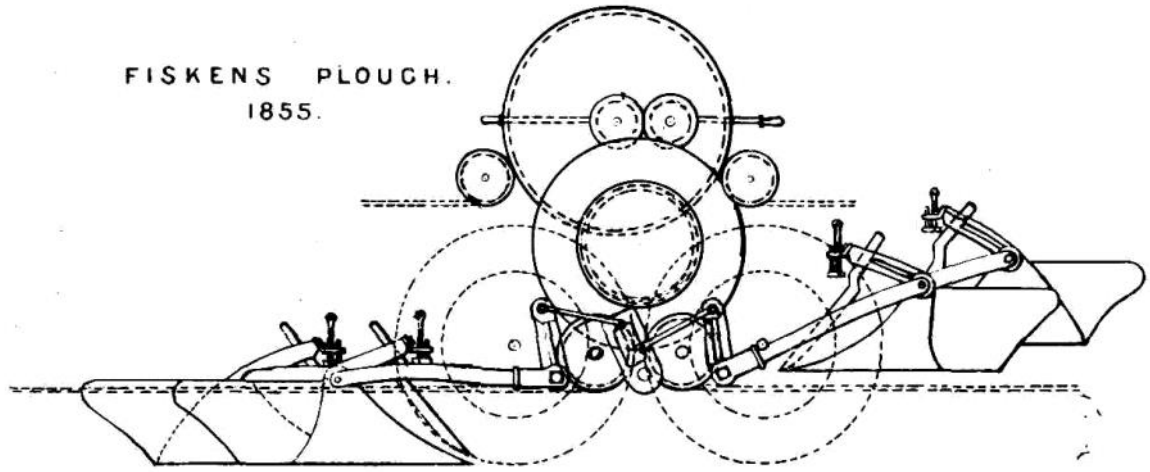


Fig. 55. Fisken's highly complicated plough of 1855. Later versions were of balance plough type

Fisken had used a similar high speed rope to drive his reversible plough (both the complex original (above)and the later balanced plough which he invented and used before John Fowler.

1877 saw the introduction of a massive 9 Ton walking digging machine , Darby's Pedestrian Digger (right) which walked on 6 legs. This was the first of a series of "Broadside Diggers" which travelled sideways across a field while it was cultivated by a set of mechanised forks along one side, or travelled "Narrow Side" along a narrow road.

Walking across rough ground while driving a set of forks into the ground gave a very rough ride which led to the introduction of some stabilising

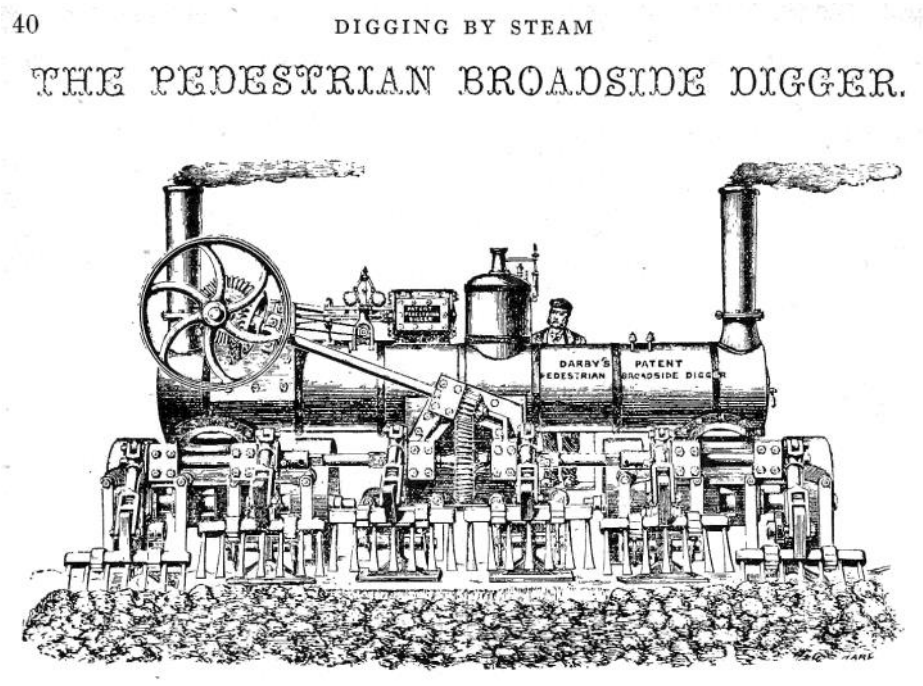


Fig. 15. Darby's Pedestrian Digger in its final form as shown at Kilburn in 1879. Subsequent engines were completely wheeled
(M.E.R.L.)

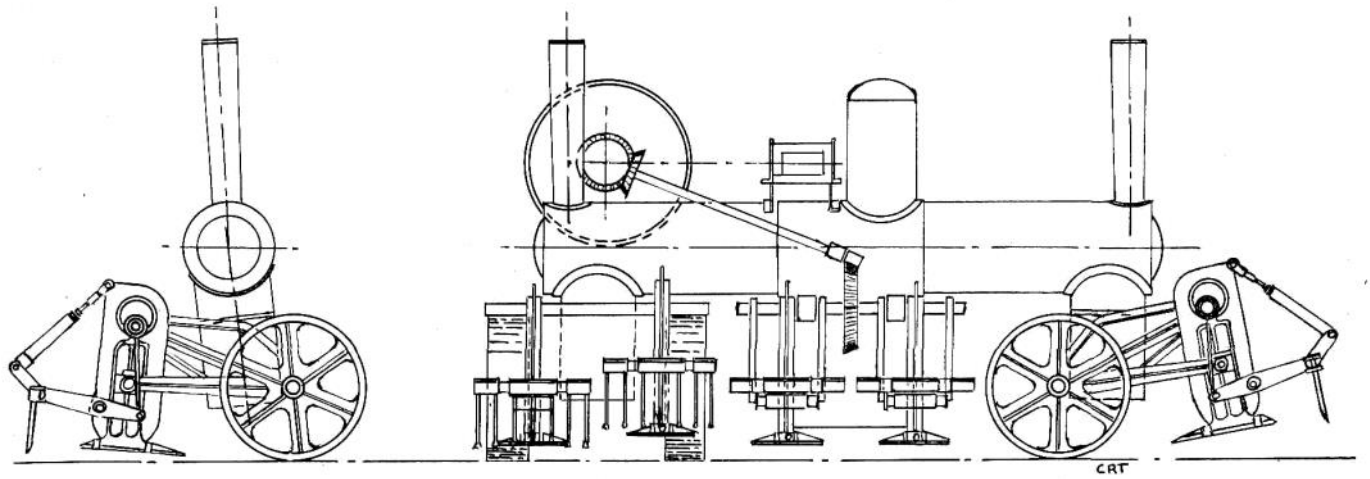


Fig. 17. A later specification of 1879 shows an engine which bears strong resemblance to the fourth engine exhibited at Kilburn
(*Patent Office*)

wheels, each of which could be rotated 90° to allow road or field travel.

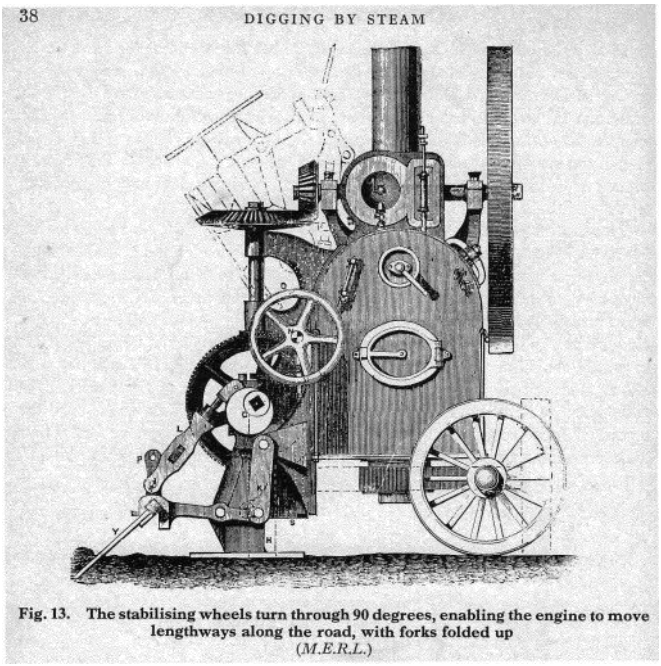


Fig. 13. The stabilising wheels turn through 90 degrees, enabling the engine to move lengthways along the road, with forks folded up
(*M.E.R.L.*)

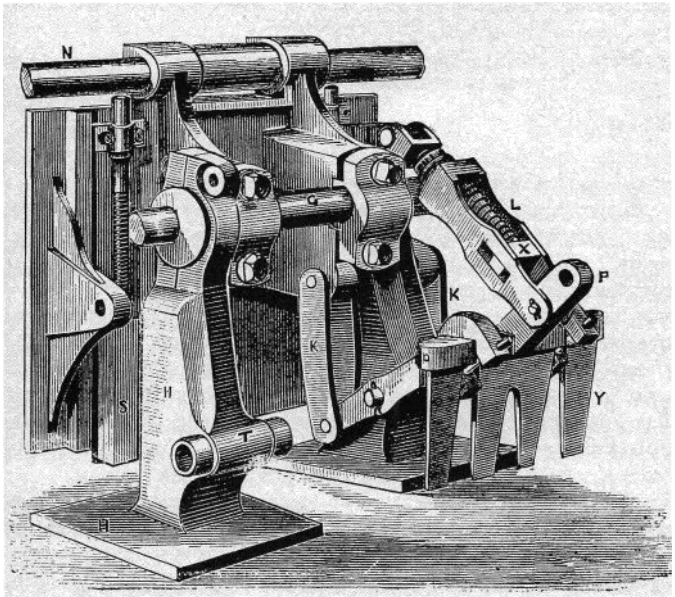


Fig. 14. Mechanism of the "feet" and forks of the 1878 walking digger
(*M.E.R.L.*)

Darby's 10 HP Pedestrian Digger was 19'6" wide when working broadside. The 4*12" wide wheels were out front and the feet were behind in front of the oscillating forks. It moved forward at about half a mile per hour to cover about 10acres per day operated by I person.

Darby had his own well equipped workshop on his farm, but much work

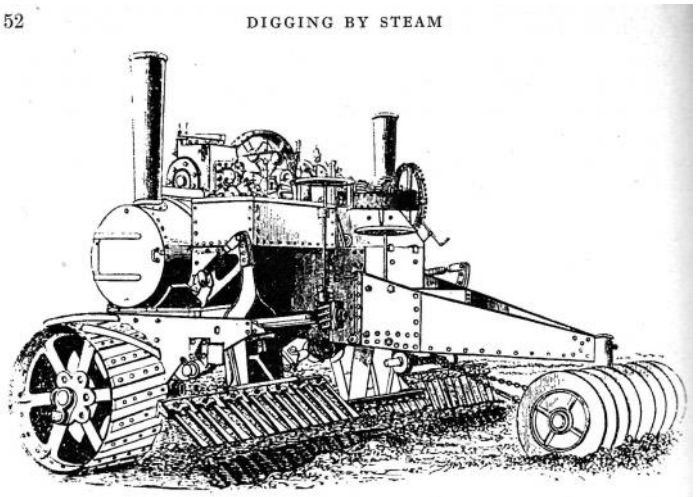


Fig. 23. Probably the only engine to possess forks on the outrigger side of the boiler, this modified broadsider possessed worm and chain steering, traction engine style. Made by J. & H. McLaren
(*M.E.R.L.*)

was done off site or made by contractors such as McLaren. Darby built 4 pedestrian diggers, ending up with the double ended central firebox boiler shown above

This machine would have been an impressive sight on the road or operating in a paddock, turning, on the road or in a paddock for the next run would have been more impressive, as one foot marked time while the rest did s military style right or left wheel. It would still be an impressive sight. Apparently none have survived to modern times. The machines were not popular with the farm labourers that they replaced. The mechanical complexity and cost and the need for skilled operators did not encourage farmers to by them but they willingly hired them. The cost was reasonable and the risk was carried by Darby. About 9000 acres were tilled annually by the diggers in the local area of Chelmsford Essex. About 20 machines are thought to have been built, only 5 or 6 were sold. There does not seem to have been any major attempt to promote the machines outside the local area. Improved crop yields were the major factor that led to its success. It could till 12" deep and unlike steam ploughing could work to the edges and corners of a field without needing horse teams to finish up.

The feet gradually gave way to wheels which led to more practical movement on the road and in fields.

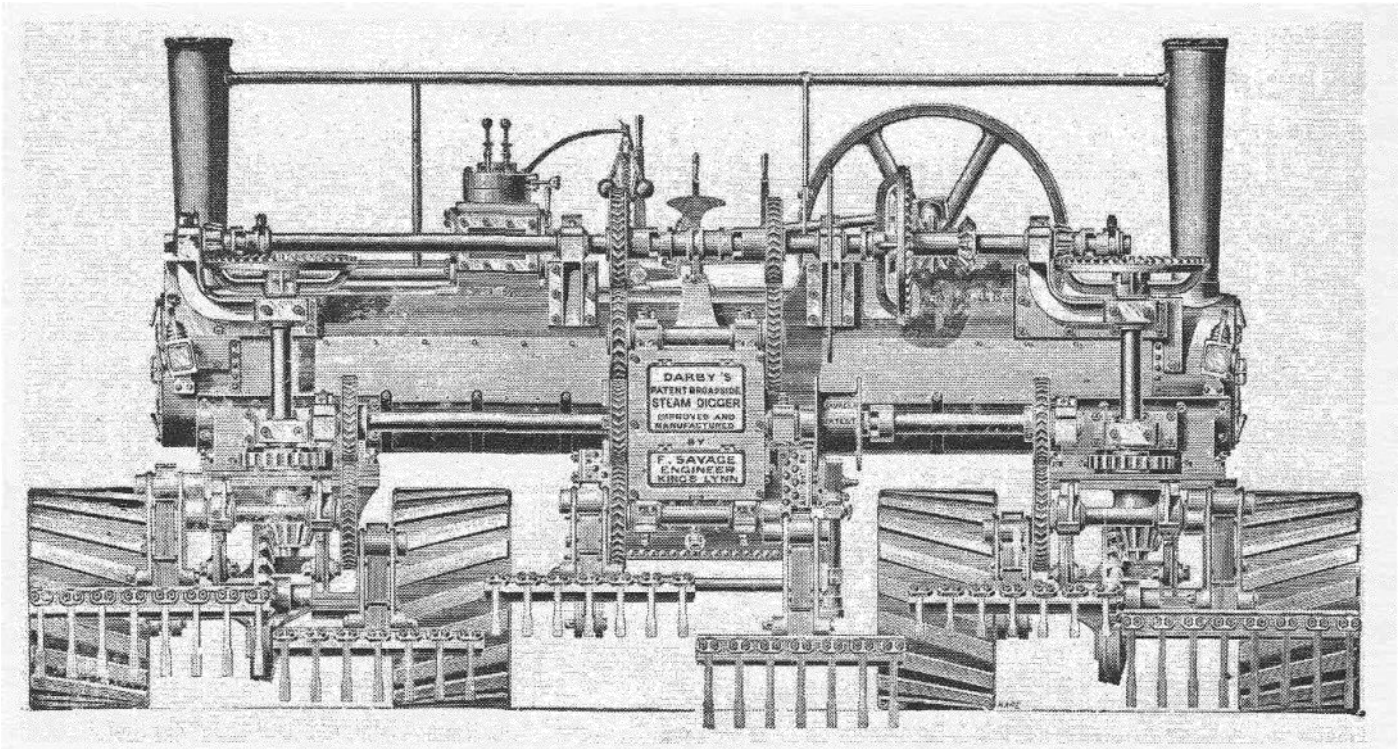


Fig. 92. Savage 8 H.P. Darby broadside digger of 1888

This progressed in stages until the Darby Savage Broadside digger appeared in 1888. This " Enterprise " class was was an 8 NHP machine with 24 Indicated Horse Power. It had a 21' fork frontage and dug 9" deep. The boiler worked ar

120 PSI and the engine ran at 150 rpm, It cultivated 1.2 acres per hour.

The drive was through a series of bevel and chevron gears, all cast and sandlapped as was the custom of the day. One of these machines had a working life of over 30 years and improved soil fertility by being able to break up the compacted pan caused by successive years of ploughing "converting sour soil into a fertile tilth never known before". It was working in areas of the Fens.

Savage also produced a 6 NHP machine with a 13' width. After this " Tender " diggers started to appear. These diggers were attached to the rear of Traction Engines as can be seen on the right where this machine produced by Coopers can be seen in operation. As an aside Coopers went on to develop the split shell roller bearing for use on insitu shafts. These are still sold as Cooper bearings, although from memory the company is now owned by SKF.

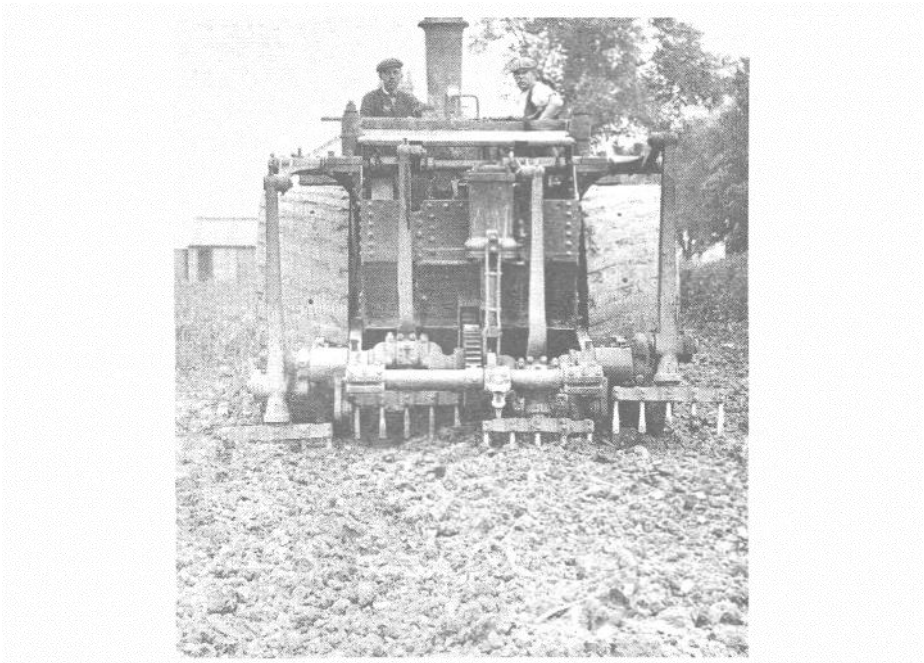


Fig. 96. A fine view of the digging mechanism of a Cooper tender digging engine. The fine tilth produced by the forks is shown in the foreground

Coopers were a late comer to steam traction and they came out with a variety of models with entirely different layouts as con be seen on the right and the next page.

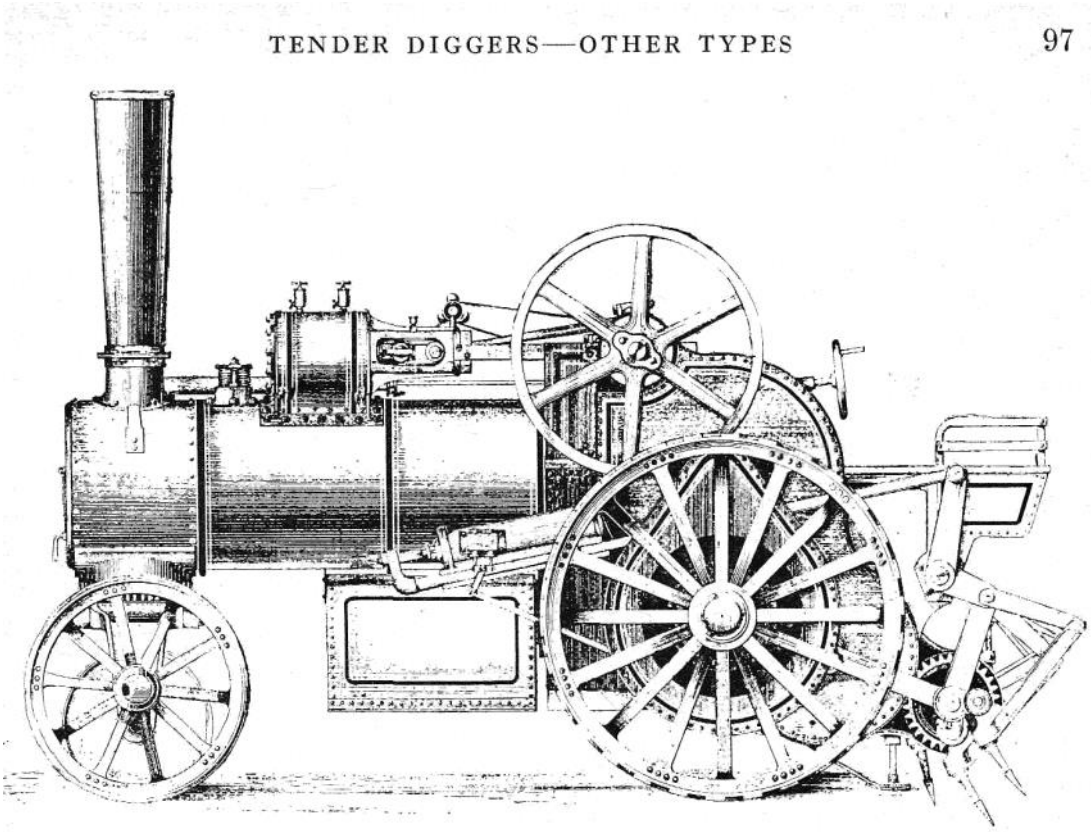


Fig. 54. The handsome single cylinder Cooper digger as developed by 1894
(The Engineer Vol. 77)
(M.E.R.L.)

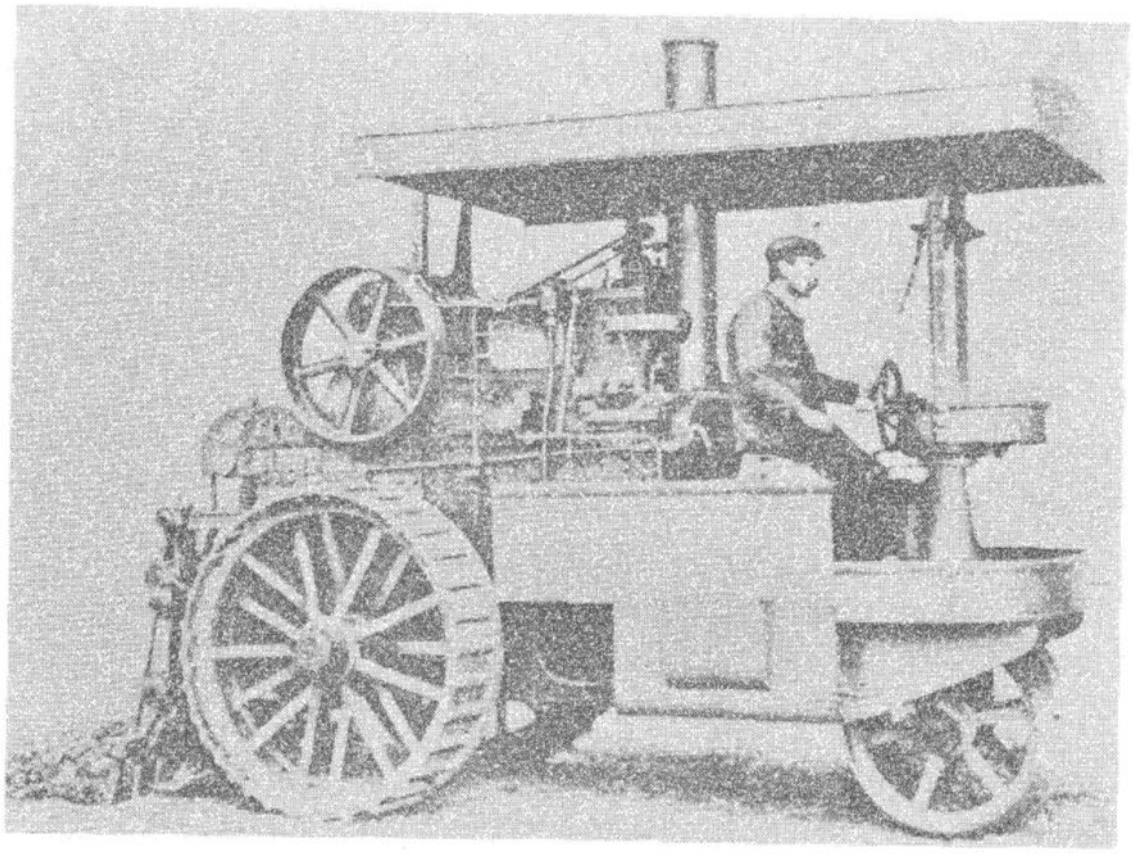


Fig. 62. Cooper No. 5 engine of 1903 equipped for digging. Alternative attachments included steam ploughing cable gear

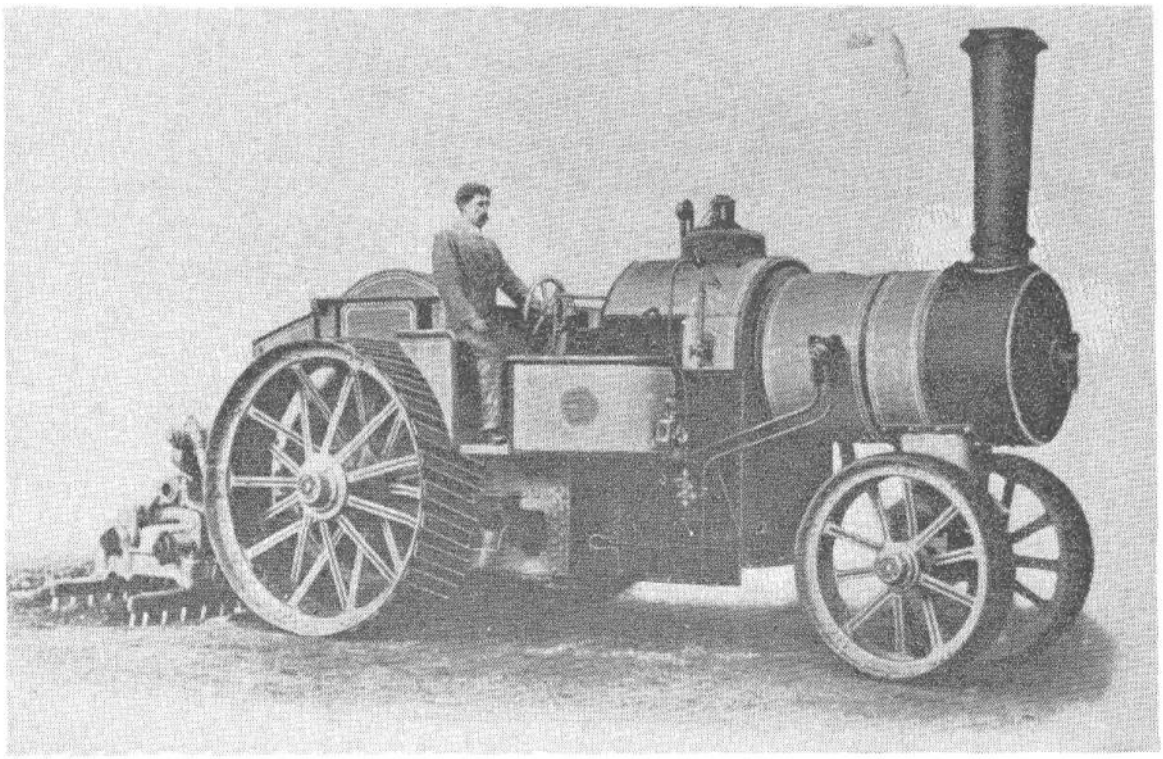


Fig. 60. Cooper undertype engined digger, typifying the smooth and uncluttered designs of this Company
(*Cooper Roller Bearings Co. Ltd.*)

Their No 5 digger and the undertype above combine function and form.

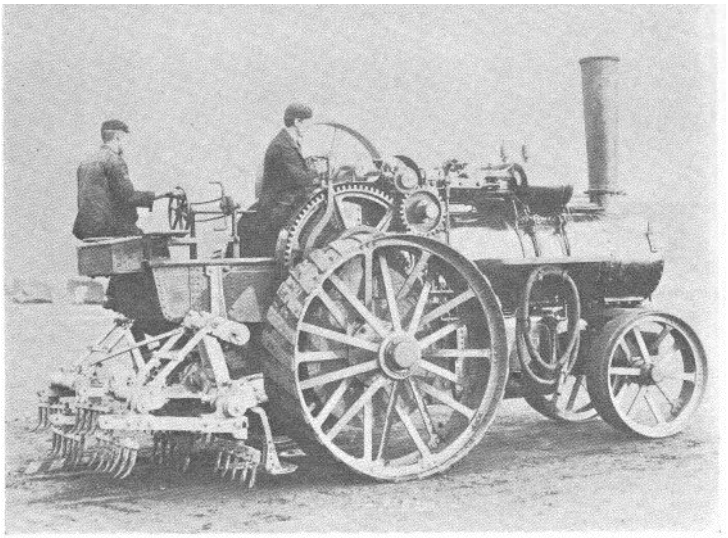


Fig. 55. Fowler built Cooper digger of 1899
(*M.E.R.L.*)

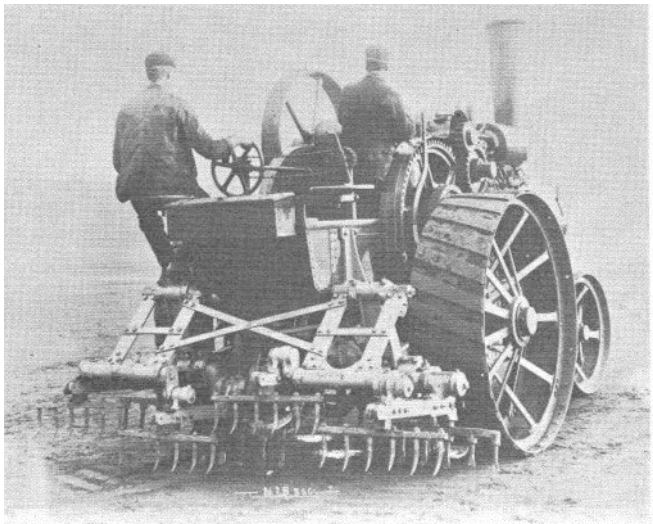


Fig. 56. Rear view of the Fowler-Cooper digger. The double steering chain enabled a clear view from both sides of the engine
(*M.E.R.L.*)

Fowler also produced Cooper diggers amongst the enormous variety of ploughing and cultivating equipment that they produced dominated the market with

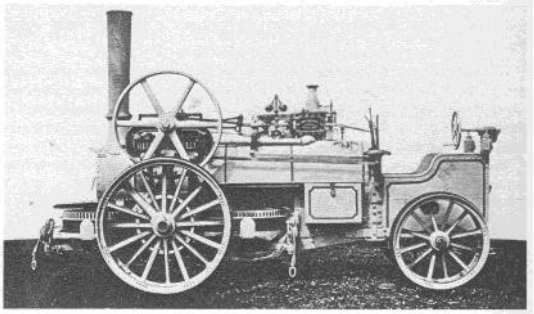


Fig. 69. Fowler single-cylinder double-drum engine No. 814 of 1867. Progress of the engine was bunker first

Fig. 76. Fowler BB ploughing engine entering field to commence work.

their double engined balanced cable plough until the end of the steam era and by a quirky coincidence, an association Howard for a brief period in 1946 and 7

So much for this brief review of the evolution of powered farming from the dawn of rotary steam power to the arrival of the internal combustion. The Steam era had done wonders for humankind, bringing peasants into a new world, and providing the prosperity that would eventually be shared by all in some way.

For all the good that steam did for us, its weight, cost and need for skilled maintenance became a limitation on it, so it shared time with the horse until the internal combustion engine became a lightweight economic power source.

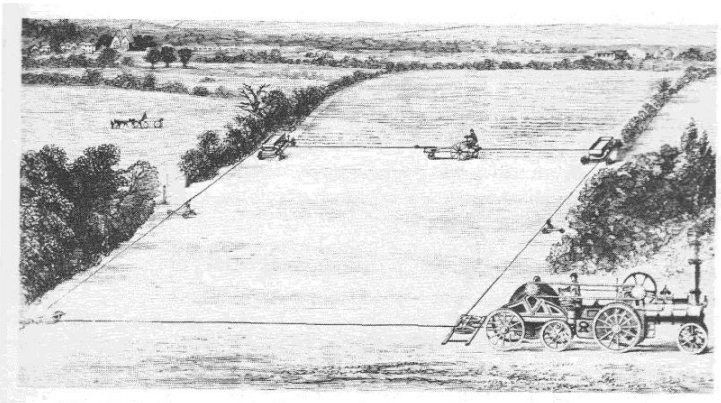


Fig. 158. Barford and Perkins' traction engine and windlass system of 1900

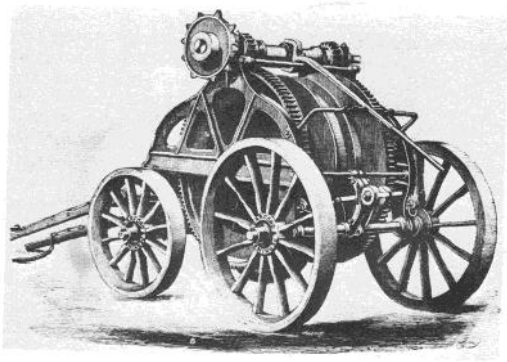


Fig. 160. Windlass of 1900 by Barford and Perkins

The evolution of mechanical cultivation by mechanised forks and rotary cultivation tools introduced in the age of steam offered some advantages for crop yields, but their use was limited to large properties or ploughing contractors.

THE HOWARD STORY BEGINS

The chance to develop a workable universal rotary form of cultivation came with the internal combustion engine, and light weight tractors. This happened in New South Wales when Arthur Clifford (Cliff) Howard invented the Rotary Hoe. Cliff was born near Crookwell, North west of Goulburn in New South Wales in 1893. Aged 16 he built his first powered Rotary Hoe at his fathers farm near Gilgandra North East of Dubbo in New South Wales where he went on his holidays. This machine was powered by his father's Buffalo Pitts Traction Engine. Cliff experimented with various blades and eventually developed the L shaped steel "Hoe" blade which was, in quantity, bolted to discs on the rotor shaft.

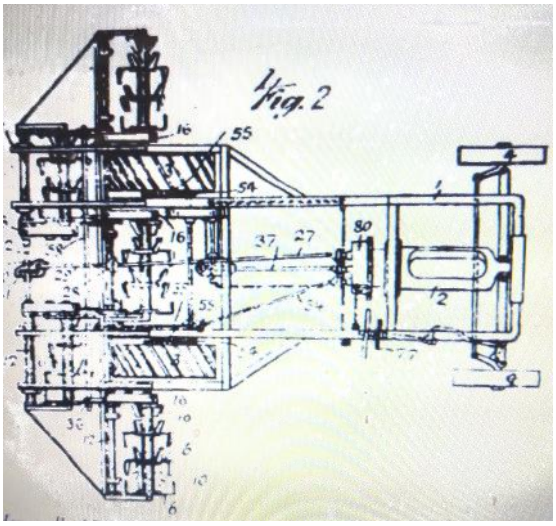
Cliff went to school in Moss Vale, North East of Goulburn, where he and his siblings lived with his aunty following the death of his mother in 1896. He studied Civil Engineering by correspondence and served an apprenticeship as a mechanic at McCleary's in Moss Vale with friend and early business partner Everard McCleary. Their first small machine powered by a motor bike engine was too small to bring worthwhile sales and they, with Cliff's brother Albert, began work on a larger model just as World War One started

McCleary, who had joined the air force, died in action in 1918, and Cliff, who was unfit for service following a motorbike accident was one of 5000 volunteers who went to England under a scheme promoted by Australian Engineer Sir Henry Barraclough to work on munitions and aircraft engines. Cliff was fortunate to work on experimental Aeroplane engines at Napier. The knowledge gained, combined with his apprenticeship was to be put to good use in the future. He returned to Moss Vale in 1919 and continued developing his rotary hoe. In 1919 he patented his first IC powered rotary hoe. In 1922 he formed a company Austral Auto Cultivators Pty Ltd which later became Howard Auto Cultivators.

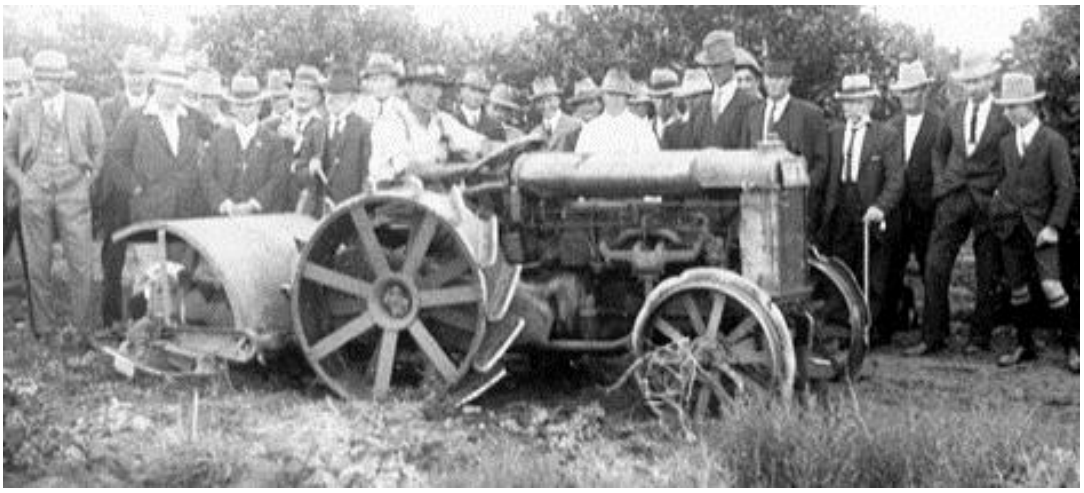
Mr. A. C. Howard (left) the Australian inventor of the Howard rotary hoe, and his brother, Mr. A. G. Howard (right), Managing Director and Technical Director of the Australian Company Clifford Howard Pty. Ltd.

Working capital was raised and the McCleary building where Cliff had done his apprenticeship was purchased and work began on a 60HP Buda powered cultivator (next page) fitted with a gang of 5

by 3 foot wide rotary hoes to give a 15' wide pass and cover 65 acres per day. (see front cover). Interestingly, this is 10 fold improvement on the area that could be cultivated by the steam powered ma-

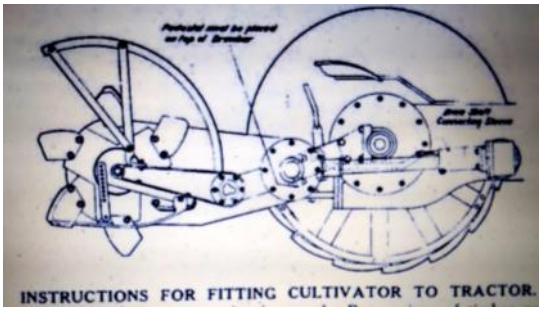


chines of the 1860's. these machines were hard to sell and he had to sell each machine before they could build the next, so only half a dozen or so were built and sold by 1923 . They had 6 forward speeds and 3 rotor speeds for the hoe. It appears that one of these machines survived and is restored at Moss Vale.



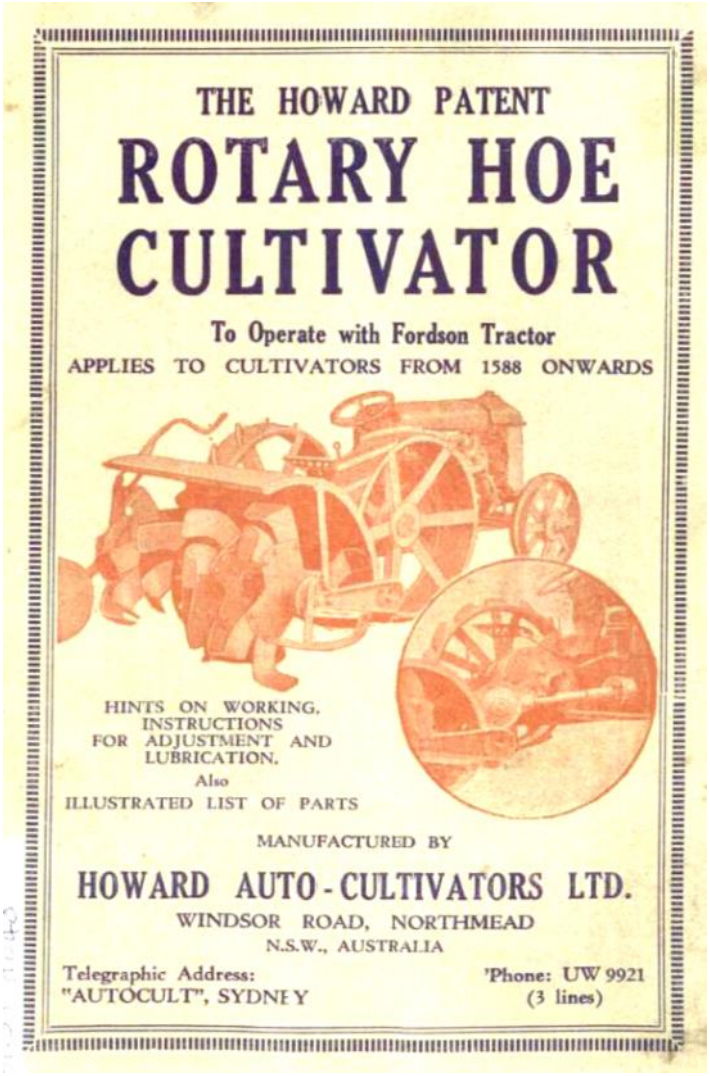
The Fordson Model F tractor stared off in 1917 and was becoming popular here by 1922 It offered an opportunity to power a rotary hoe. It lacked a creeper gear needed to operate the hoe so some changes were needed.

The first version drove the hoe via a chain driven from the belt pto shaft in front of the drivers right foot. The chain was encased in a steel case and went under and over the back axle to drive the transfer/pivot shaft of the hoe. The chain case can be seen on the above picture which is in the Library of South Australia. Later models used a shaft with bevel gears at both ends to connect the Belt pulley shaft to the rotary hoe as can be seen on the drawing on the right. The above picture was supplied by Mal Brinkman who has restored both of these Howard Hoes attached to Model F Fordsons.



The Howard conversion also included slow speed gear sets to reduce speed.

The Fordson F production line in USA was



stopped in 1927 which caused a problem for Howard. Fordson's were also produced in Cork in Ireland from 1919-1923 & 1928-1933 and later (1933-1964) production moved to Dagenham in England. Howard decided to produce his own 4 wheel 4 cylinder tractor optimised for rotary hoeing.

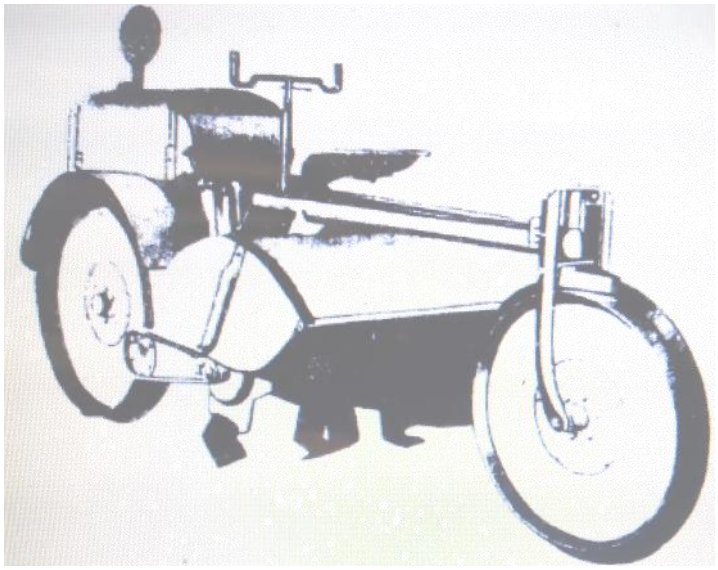
By 1927 the Moss Vale factory was too small for the company's increased orders, and the cost of transporting materials and products was becoming an impost. In that year a property was purchased in Northmead, a suburb of Sydney and a new factory was built. Production moved to Northmead, although noisy forging seems to have been carried on at Moss Vale.

With the sudden loss of the USA production in 1928 Howard had to review its product line. Retrofits to existing tractors and a small Junior single cylinder 5HP & 8HP V twin cylinder walk behind rotary hoes were introduced, initially fitted with engines imported from the UK, made up for the lost sales and created a new market. Howard soon designed and built his own air cooled engines for the 5HP Junior and the 8, while water cooled engines were built for the 12hp twin and 16hp 3 wheeler. The new Tractor, the long lived DH22 started of in 1930 with a Morris Commercial truck engine. This engine was soon replaced by Howards own 4 Cylinder overhead cam 22HP engine. The DH

prefix cam from his wife Daisey's initials

HOWARD DH22 AT LAKE GOLDSMITH

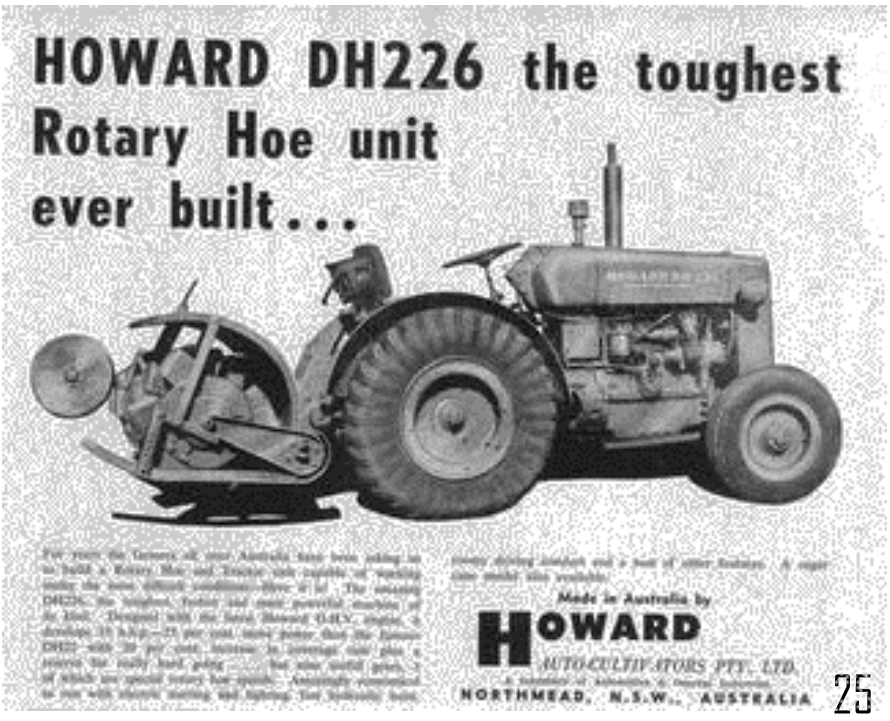
The smaller model 16HP Auto Rotary Hoe 3wheel tractor initially used a Morris car engine in 1928. It was produced in 3 versions, for Orchards, Sugar Cane and field cultivation It was produced until 1930. Cane Harvesting equipment was also developed in 1928. as were powerpacks using Howard engines.



The DH22 had a long production run. It was introduced with steel wheels. Pneumatic tyres came later (1937) and later a Hydraulic lift was introduced for the Hoe. The tractor had 10 speeds, which was ideal for hoeing. In 1952 it was fitted with an American made Le Roi engine which produced 35 HP. which in turn allowed a longer Hoe to be fitted to cultivate a wider bed.. The model was renamed the DH 226 which stayed in production until 1964.

The tractor's extremely long production run, demonstrated a sound and reliable basic design. When the hoe is in use it provides a lot of the forward motion which in turn puts less demand on the drive wheels allowing good traction in poor and wet conditions with its small 20" Ø drive wheels.

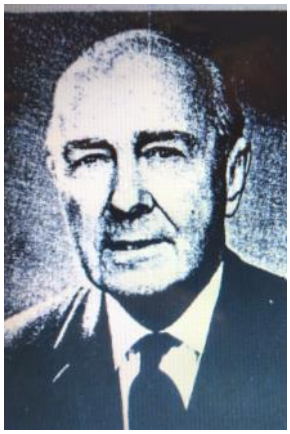
Let's move back to 1930 or thereabouts. In spite of the depression Howards production was improving to meet demand. The rotary hoe offered savings in cultivation here and overseas. Production costs in Australia were high, and whilst tariffs gave an advantage against imports, they did not help exports.



In 1928 Howard licenced a British firm, Howard Cultivators Ltd. to manufacture and sell their machinery to all countries outside of Australia and New Zealand. The arrangement did not work out well legally and Howard was forced to cancel the arrangement in 1937.

New opportunities arose in the UK and Cliff Howard removed himself from the Australian operations and his brother Albert took over the management.

Howard teamed up with Capt. E N Griffith (right) at West Horndon in Essex in England in 1938 to form Rotary Hoes Ltd. A new factory was built with Griffith as Chairman and Cliff Howard as managing director. Griffith was a farmer in Essex and had spent 20 years in shipping prior to his teaming up with Howard. He was as firm a believer in the future of rotary hoes as Howard. By 1939 the first Gem rotary hoes was in production and a rotary hoe kit for tractors was ready for production.



1939 also saw the start of world War 2, and both the Australian and UK factories swung over to war work. In Australia work got under way producing ammunition, H.A.C. Revolvers, pumps and generators using Howard engines.

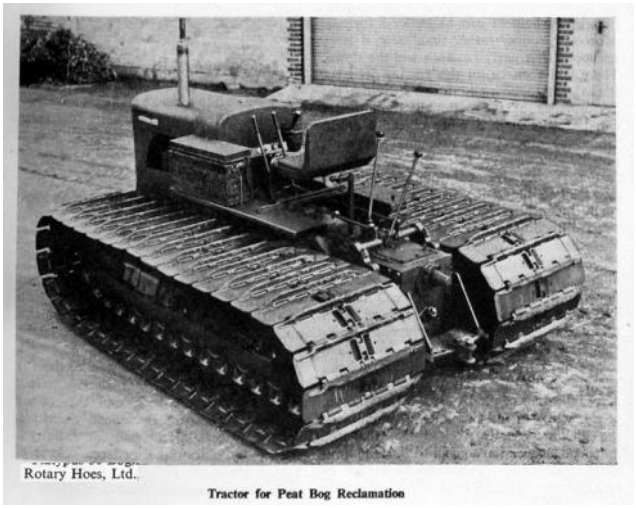
In the UK Howard tooled up for producing various munitions. Over 500 000 Mortar Bombs, were produced. The Government ordered Howard to produce agricultural machinery to help the War effort, which must have helped recovery when the war ended. It seems that both factories produced industrial Toe jacks. A search on the net will reveal a large variety of jacks, which I guess also stayed in production after the war.

After the War, sales drives were made to various countries. Cliff Howard went to the USA and carried a Gem Hoe around in a station wagon. They concentrated on areas where sugar cane, rice , cotton and coffee to optimise new designs and ensure a market beyond orchards and market gardens which had been the backbone of business pre-war.

Sales grew rapidly and they were soon able to establish businesses overseas, starting with South Africa in 1948, USA in 1949, New Zealand in 1950, France in 1951, Germany in 1959, Italy in 1962, and Spain in 1968, Malaysia and Brazil.

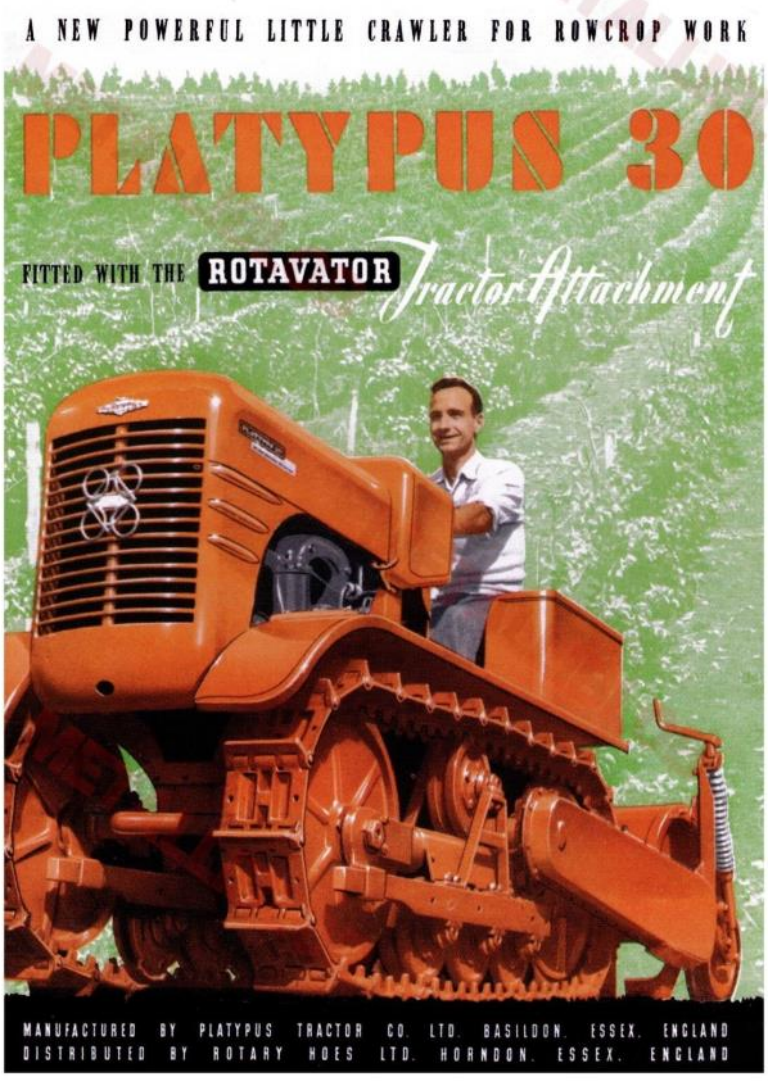
Two new factories were built in England, at Harleston Norfolk in 1961 and Halesworth in Suffolk in 1968.

In 1951 Howard established the Platypus Tractor Co in Basildon Essex to produce crawler tractors. Various models were produced to 50 HP but the most popular was the 30hp model (below) fitted with a Perkins engine The very low ground pressure Bogmaster had lengthened and widened tracks but was only produced in low numbers. Competition was tough in the Crawler market and the production ceased in 1958.


Rotary Hoes, Ltd.

Tractor for Peat Bog Reclamation

In 1959 Howard's Australian company was acquired and became part of Rotary Hoes Ltd.



There were three factories outside of England, Australia, Germany and France producing Rotovators and machines were being sold in 154 countries. The product line had expanded from rotary hoes to include spreaders, hay and grass cutting, potato planters and machines for working with slurry and soil stabilising. Silos and wine presses were also on the list. Introduction of the three point linkage (next page) was a boon for the Rotavator attachment. At one point the company had 1500 employees.

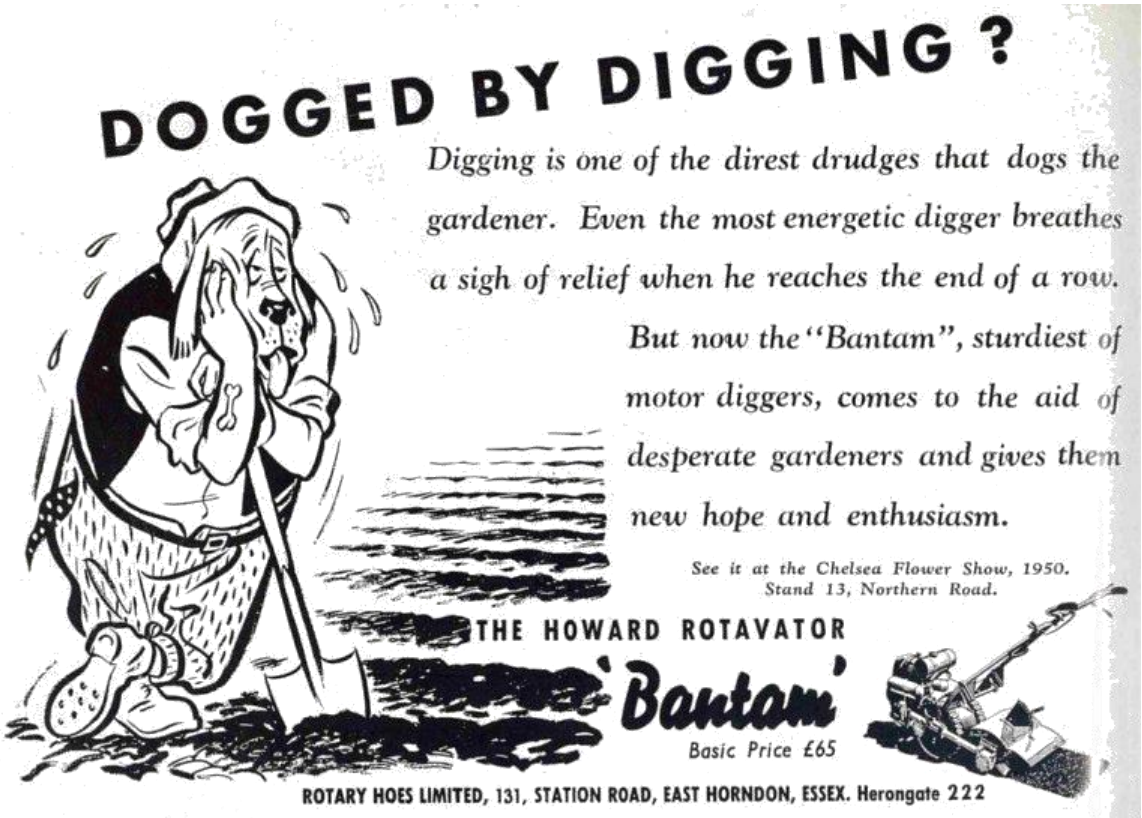
Cliff Howard looked after the design and manufacturing while Griffiths had outside roles included being President of the Agricultural Engineers Association, President of the British Engineers Association and he was involved in various trade and investment delegations around the world where he was a constant advocate for the Rotavator and Rotary Hoes Ltd. It seems that both men were able to attract competent loyal people to their team to ensure its prosperity. The company received the Queens Award to Industry in 1966 and Howard received a

CBE in 1971 for services to Agriculture. Cliff Howard passed away in 1971 and his son John became manage of the Australian branch.

In 1985 the Danish group Thrige acquired most of the Howard Group. After having produced over 100 000 Rotavators, Howard Rotavators P/L at Northmead was wound up in 1985. A new company Howard Australia (1985) Pty. Ltd ws formed at Seven Hills, another suburb of Sydney, to assemble and sell imported machinery. Thrige Agro Group acquired this company in 1997. In Dec 2000 the Howard Group became part of Kongskilde of Soroe Denmark.

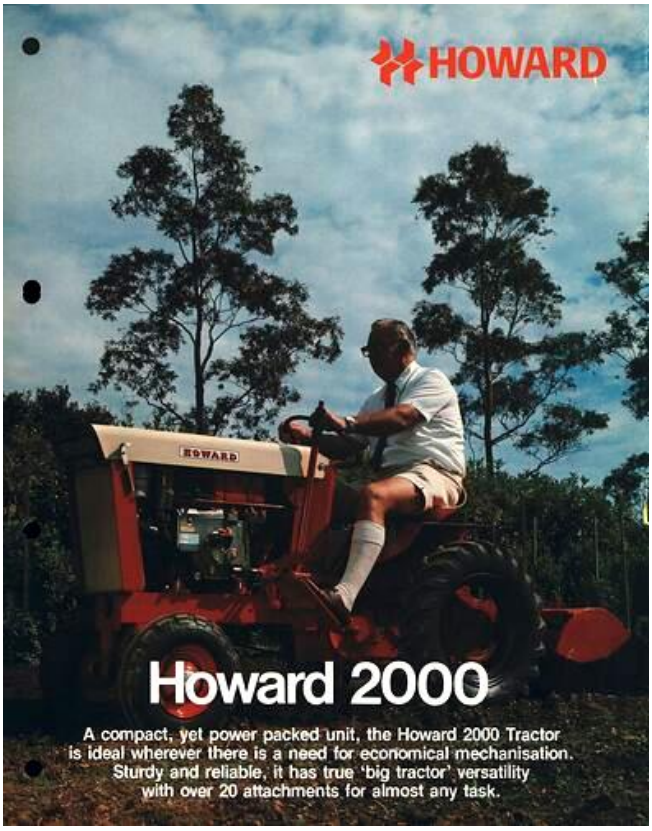
A look around the net will reveal that Howard branded products are available overseas. Howard Australia is independent and has designed and sold a lot of innovative machinery in Australia. When Tariff protection was removed it became almost impossible to compete with overseas manufactures so warehouses replaced factories. This very brief outline of some Howard history in manufacturing has been built up from many sources. The preceding steam cultivation history arrived from many sources on the net and in particular from 2 books by Colin Tyler on Steam Ploughing and Steam Cultivation. Much of the following was provide by Elliot Cartledge of PFG, the current New Zealand owners of Howard Australia.

Howard produced some machinery not mentioned. An industrial four wheel drive version of the DH22 & DH226 drive. A massive Rotavator was built for a Caterpillar 75



which was 8' 6" wide and cut 2 feet deep and for 1962 the Howard 2000 line of garden tractors arrived.

All being well we hope to see a wide variety of Howards past and present in May.



PFG (for Power Farming Group) has its origin in New Zealand where it is a privately owned company which distributes Agricultural machinery and tractors through an extensive dealer network.

It stated in 1948 in Morrinsville N.Z. by Laurie Mabor as Mabor Motors. Power Farming was started by Laurie's son Geoff in 1978. PFG started in Australia in 2000 distributing a rang of products and after buying Howard Australia started PFG Australia in 2005. Howard was integrated into PFG in Australia in 2013.

PFG Australia is based at Derrimut, a Melbourne suburb in Victoria and employs120 people around Australia. PFG has a North American branch in Dacula Georgia USA.

PFG are agents for Deutz-Fahr, Kioti and Versatile tractors, Howard and Quicke Loaders, and Howard cultivators amongst other lines.

See www.howard-australia.com.au for details

Howard Australia are supporting the 120th rally at Lake Goldsmith on May 6 & 7 2023, and hopefully will have some of their current models on display Howard machinery is popular at our rally's, so there should be some vintage Howards on display. Of particular interest to some will be a Platypus Crawler based in Tasmania.

Help us all enjoy 100 years of Howard History, an Australian survivor

Below is a piece of Steam Magic from the past. ***Enjoy the rally in May. Ed.***

Lockington Vintage Rally

25th Annual 2023

Photo by... Vin Jarrod, Noomlight Media

Corner Pannoo Road & Market Street, Lockington, Victoria

ANZAC Weekend
Saturday 22 & Sunday 23 April

9am to 4pm daily
Entry $10 *

* Includes entry to Living Heritage Complex
Free entry to Exhibitors & Primary School aged children when accompanied by an adult

Vintage & Steam Engines

Tractors & Farm Machinery

Trucks, Cars and Motorcycles

Collectibles

Garden Art Display
Make and bring your Garden Art made of over 25 year old materials.
The creator can be younger ☺

O'CONNORS

"100 Years Of Farmall"

FARMALL AMERICAN HERITAGE

SHANNONS SHARE THE PASSION

Show N Shine
1pm to 3pm Saturday

People's Choice & Shannons Choice Trophies

Also in town...

Scarecrow Competition

Town Garage Sales

Art Show

Food ❁ Drinks ❁ EFTPOS

ENQUIRIES :
General : Lindsay Govett 0419 527 661
Stallholders : Beryl Marshall 0428 862 353
Camping : Travellers Rest 0447 787 581

Sponsored by...

Campaspe Shire Council

Bendigo Bank

Published by... Locky News
(Lockington's Priceless Paper)

121ST STEAM & VINTAGE RALLY

LAKE GOLDSMITH STEAM RALLY

LAKE GOLDSMITH

HOWARD

6TH & 7TH MAY 2023

HOWARD AUSTRALIA 100 YEAR ANNIVERSARY 1923 2023

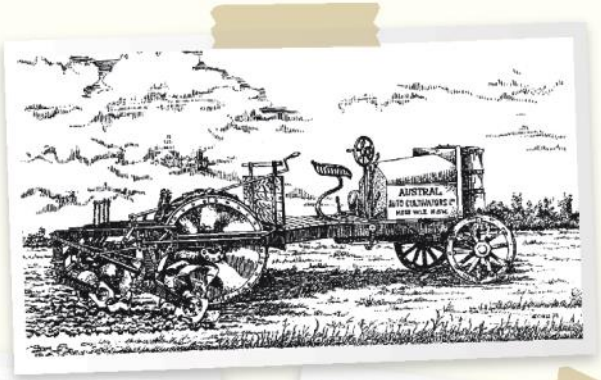
Highlight theme in action on the arena

Roundabout ploughing with a Barford & Perkins winch & Campaign self-moving anchors + *100 years of Howard*

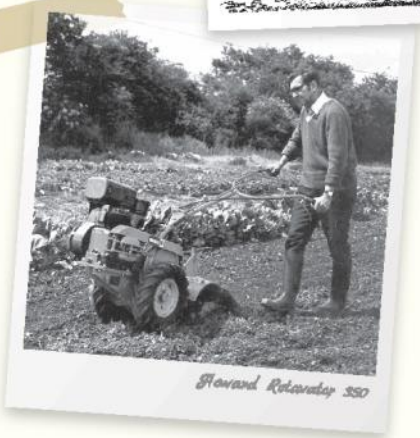
ADMISSION PRICE	ADMISSION PRICE	ADMISSION PRICE
$15 Adults	**$5** Children Aged 5-16	**Free** Exhibitors & children under 5

Regular attractions include

- 65 display sheds
- Steam & oil engines
- Steam powered shovels and sawmills
- Displays of earthmoving, cars, motorcycles, tractors and trucks
- Radio controlled model boats
- Attractions for all ages
- Blacksmithing
- Threshing
- On-site catering



Camping for exhibitors only – free, non-powered



Howard Rotavator 350

Tractor 2000 GT

www.lakegoldsmithsteamrally.org.au • *PO Box Beaufort VIC 3373*

For rally information contact

Trevor *Mob. 0407 539 041* or **Graeme** *Ph. (03) 9723 3310, Mob. 0418 388 149*

And for November 2023 - English tractors