

15 CLIFF HOWARD, THE TRACTOR BUILDER

[Howard's] DH22 tractor, designed in 1927 to work with rotary hoes, initiated the first large-scale production of tractors in Australia.

— Australian Dictionary of Biography, Vol. 9, 1983

Cliff Howard is world-renowned for his rotary hoeing machine, the Rotavator, which was his brainchild. Less well known is the fact that he was the pioneer of production-line manufacture of tractors in Australia. There is a reasonable association: tractors are essential for rotary hoes. Cliff Howard knew this, and when there was a faltering in the supply of Fordsons prior to 1928 he decided the time had come to really get serious about the business of serial production of his own tractors to carry Rotavators.

But to go back a few years. Cliff Howard was just 16 when he built his first powered rotary cultivator. This took place on his father's farm at Gilgandra in 1912. After many experiments, he felt that he had a design worth marketing, a rotary cultivator with L-shaped blades:

'I put my motorcycle engine on our crude prototype to demonstrate its ability but there was little or no interest in a small machine as market gardening was nearly all done by Chinamen who had no money or ambition to use anything but a hand hoe.

'The only people I was acquainted with who showed any interest in my new method of tillage were the big wheat farmers and obviously small outfits were of no use to them. They were used to working with horse teams of 8–12 and anything less in working capacity held no interest, so we set ourselves the task of designing a machine that would cultivate the land fast enough to match or better these big horse teams, having a seed drill incorporated so that seed sowing could be carried out at the same time and the chassis of the machine so constructed that the rotary hoe could easily be detached and a combined reaper and thrasher mounted in its place — a complete wheat farmer's outfit.

'However, the work I was engaged in with the firm where we were employed [McCleary's of Moss Vale] kept me very busy and as it was chiefly away from the home town our progress with preparation for our ambitions was slow.

'By the middle of 1914 we [Cliff with brother Albert and a fellow apprentice] had the first part of our scheme just about ready but, about this time the 1914–18 war broke out and our firm went straight into war work. We decided to postpone our venture and volunteered for the air force. Whilst awaiting call-up I had a motorcycle accident which resulted in my being turned down



Arthur Clifford Howard (1893–1971).

so I later went to England and worked on munitions and aeroplane engines until the end of the war' (Cliff Howard's reminiscences with J.P. Richards).

In 1919, when his contract had run its course, Howard returned from England. He had not found any backers over there for his ideas, in spite of having contacted many British agricultural firms. Early in 1921 he formed a small syndicate in New South Wales to finance a rotary hoe venture. The prime mover for the wheat cultivating machine was a Halford lorry-engine of 40 HP. Encouraged by the way this machine performed, Cliff Howard imported a US-built 60 HP Buda engine to power a 15-foot wide rotary hoe, made of five sets of rotary hoe gangs, each three feet wide.

Howard's First Tractors

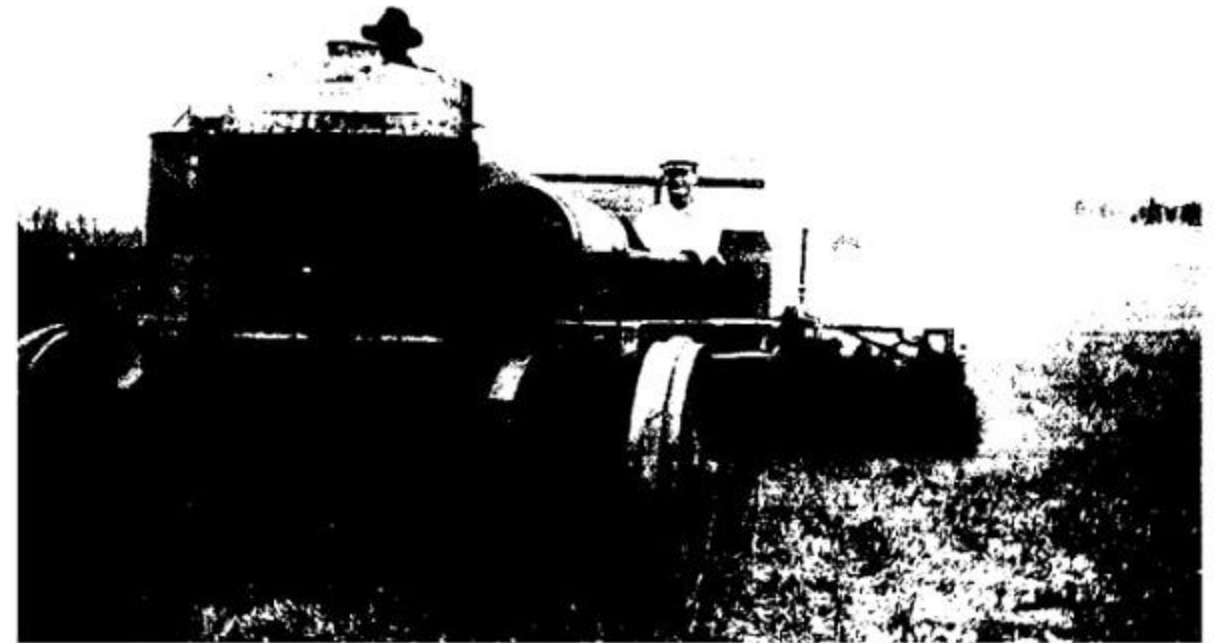
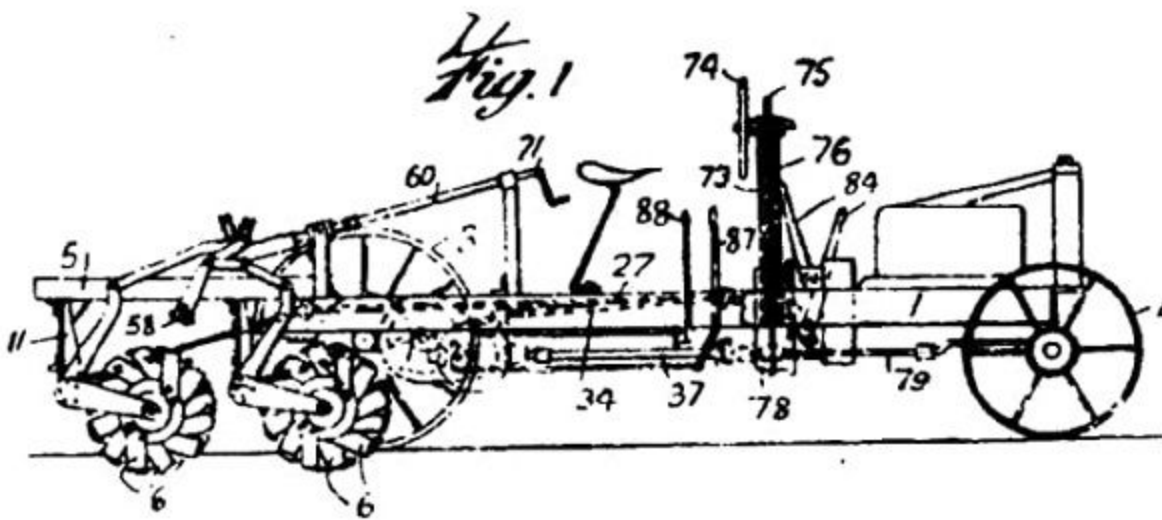
Howard had originally planned a universal machine. It was to cultivate and sow seed, with the truck-type chassis layout designed so that the rotary hoe rig could be removed and a reaper-thresher mounted in its place. The 60 HP machine plowed 3½ acres in 1922 and, as a result of orders coming in from demonstrations on New South Wales wheat farms, plans were made to



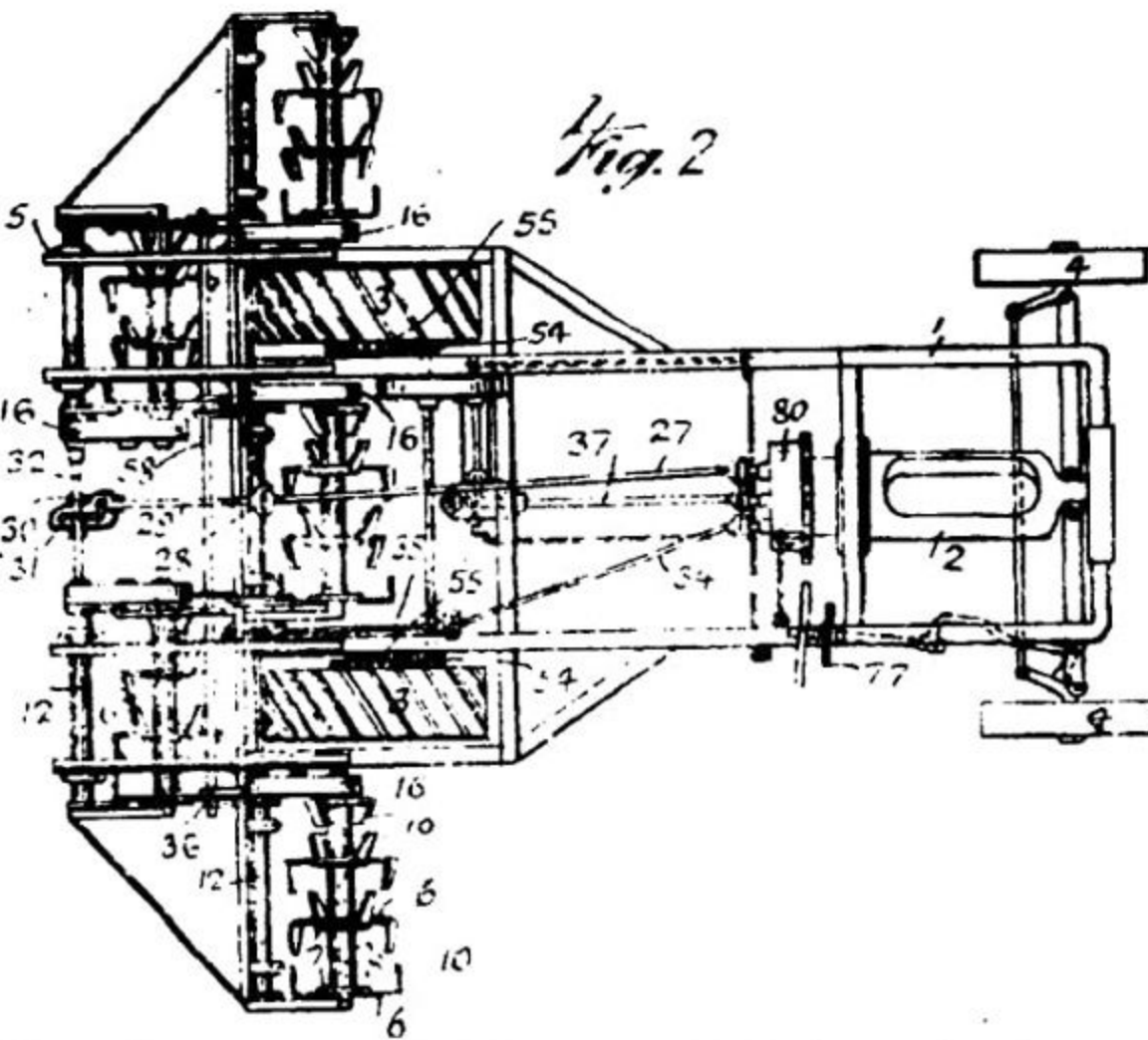
One of the early Howard tractors, c. 1922. The five rotary hoe gangs could cultivate a 15-foot swath. The tractor was powered by a 60 HP Buda engine. There were six travel speeds and three rotor speeds.

been located and is restored at Moss Vale.

In January 1923 Howard registered the business name Austral Auto Cultivators Ltd, and set about selling shares in the enterprise. His shareholders consisted of farmers, businessmen and friends from far and near. Of particular note is entry number 82 in the company's original share registry, which shows that the Hon. W.M. Hughes, barrister-at-law, took 1000 shares worth £1 each in the company. This was



Early photo of one of the six original tractors, with its five gangs of Rotavators. The Howard brothers, Cliff and Albert, are on board.



Howard's 1920 Patent (No. 18,137/20) shows the three-way power splitter from the engine to drive the rear axle and cultivator gangs, each drive having its own clutch.

build six of these tractors. The 1920 Australian patent awarded to A.C. Howard on this tractor concept reveals a splitter transmission dropbox mounted on the engine bellhousing to give three power outlets to drive the tractor rear axle and the outrigger rotary hoes. Each outlet had its own clutch. One of these machines has

none other than Billy Hughes, who later became Prime Minister of Australia, pushed for conscription through the years of the Great War and led the country for several years after.

With this share capital, Howard acquired the old Moss Vale factory where he had once been apprenticed. Selling each tractor and cultivator rig was mandatory in order to pay for the construction of the next one, and collecting dues was no mean task:

'On one occasion my man and I arrived at a farm to deliver a machine after having driven it 50 miles from the nearby railway station, chiefly over unmade roads in rainy weather with many creeks in flood. We got bogged so many times it took two days to do the journey and an arrival found the farmer in a very bad mood as the machine was a month late. He had missed all the good ploughing weather. He thought it was too late to do any good with his crop that season and wanted to get out of taking the machine, after seeing a five-acre patch tilled in 1½ hours he agreed to take delivery and pay for the unit if my man and I stayed on the job and ploughed all the land he had ready to crop — which amounted to

about 1000 acres! It was most inconvenient as I had other urgent jobs to attend to, but we had to have that money to keep going, so we started in right away and kept the machine going continuously, stopping only for oiling and refreshments for 15 days till the job was done.

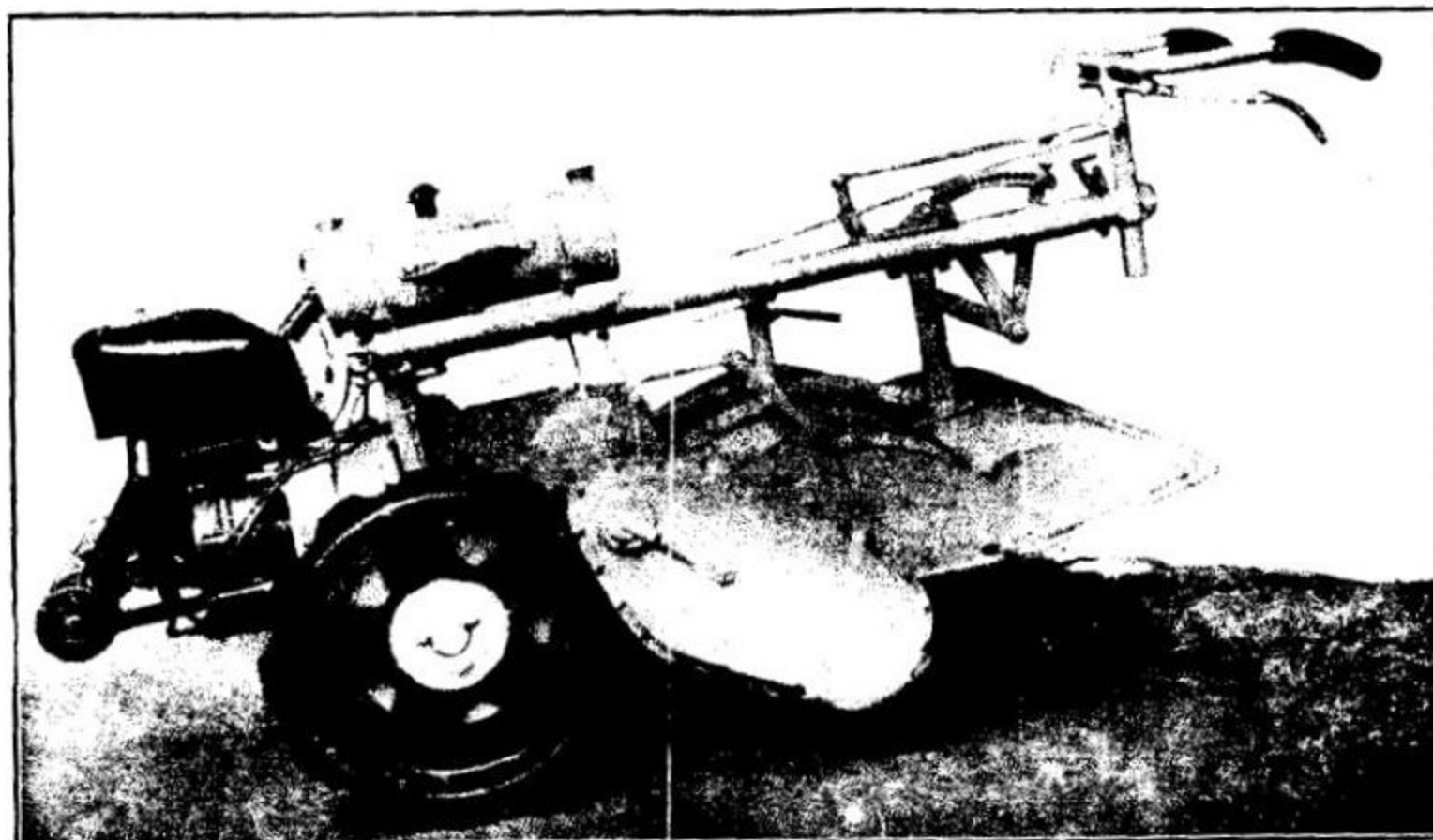
Another time a noted doctor expressed interest in our company and arranged to see a demonstration. He motored 100 miles to where the machine was working and was greatly impressed. I had made out an application for 1000 shares ready for him to sign, then he thought his wife might also like to take some shares so he went to the car and spoke to her about it. She got out of the car to take a closer look at the work but her Pekingese lap dog, which she was carrying, seeing the blades revolving then disappearing into the ground, jumped out of her arms and made a grab at a blade. He was, however, not quick enough and the next blade caught him, cutting his head clean off. The poor lady was so distressed she collapsed with grief and nervous prostration and had to be carried back to the car and taken home at once. I never saw the doctor or his wife again and with sad hearts we buried the Pekingese' (Cliff Howard's reminiscences with J.P. Richards).

The six tractors with their 15-foot cultivators were sold by the end of 1923, although the seed drill and harvester attachments were never built, due to lack of finance.

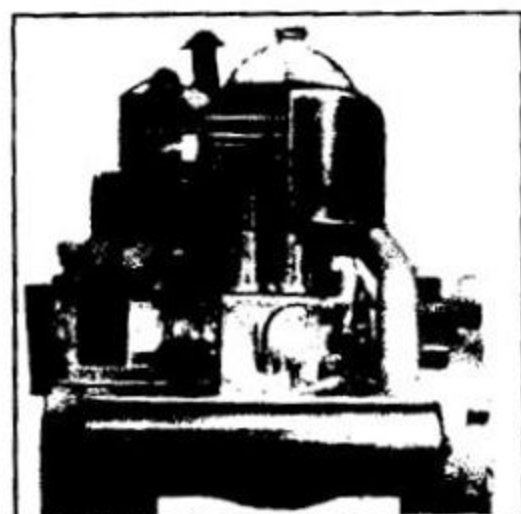
Fordson Fling

Cash-flow problems forced Howard to look to alternatives. The Fordson tractor was rapidly rising in popularity at the time, and it looked attractive for rotary hoe work, although a low-speed or creeper gear was unavailable. With astute and extensive marketing of his

TURN WEEDS AND UNWANTED PLANT LIFE INTO VALUABLE HUMUS

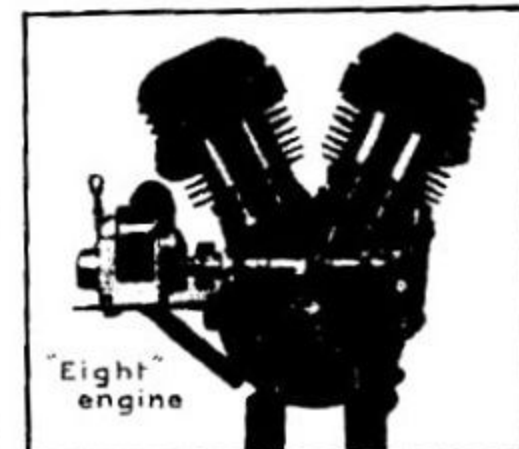


HOWARD
ROTARY
HOE
"JUNIOR"
for
Small
Orchards
Nurseries
Poultry Farms
Market
Gardens
Glass Houses
etc.



POWER UNIT.

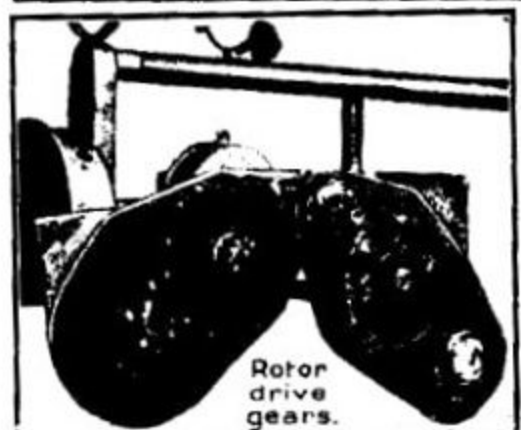
High grade, heavy duty 5 h.p. Howard side valve, single cylinder, four cycle Engine.
For fuller details please see page 5.



Eight engine

WIDTHS OF CUT.

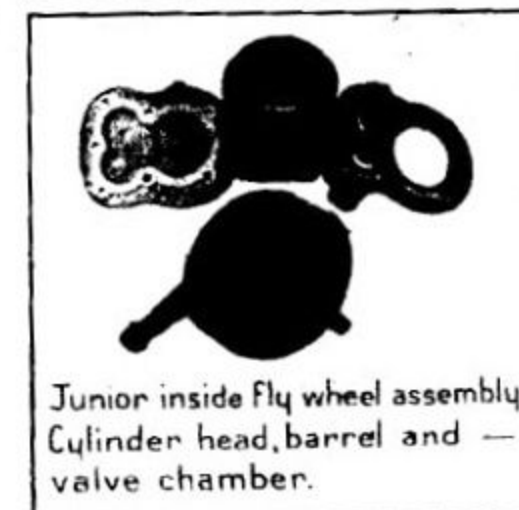
Standard 18in., also 20in. and 24in. if required—the latter for light work only.



Rotor drive gears.

DIMENSIONS of 18in.

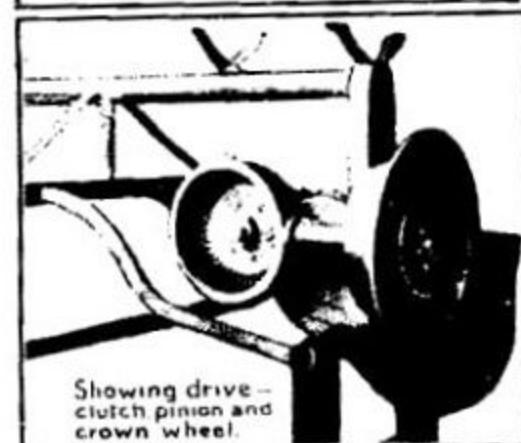
Greatest width overall, 21in.
Height, 34in.
Length, 5ft. 8in.
Ground clearance, 8½in.



Junior inside fly wheel assembly
Cylinder head, barrel and —
valve chamber.

WEIGHT.

Approx. 4½ cwt.

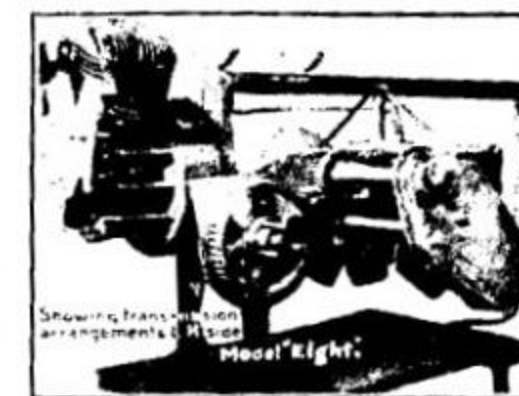


Showing drive —
clutch pinion and
crown wheel.

TILLAGE CAPACITY.

Low gear: To ¼ acre per hour.
Second gear: To ½ acre per hour.
Top gear: To ¾ acre per hour.
Depth: Up to a maximum of 7in.

Please Turn to Page 5 for More Complete Details.



Showing transmission
arrangements of Model Eight.

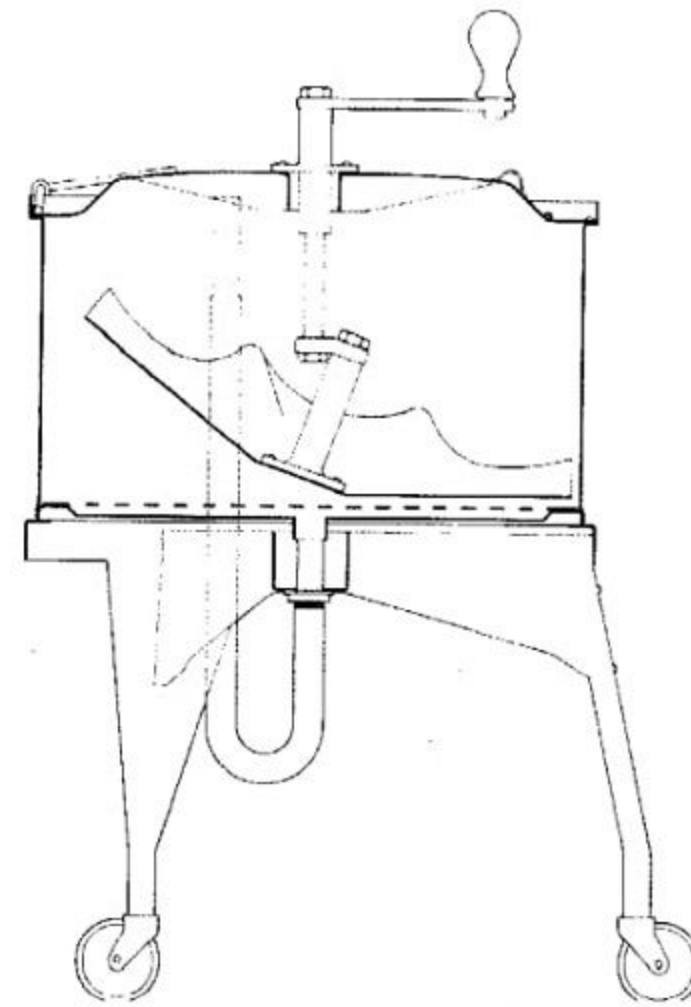
Howard's early experience with motorcycles proved invaluable when he started to make small air-cooled engines for walk-behind rotary hoes in 1930. Smallest of the Howard product line in the latter part of the 1920s was the Junior with Howard 5 HP four-stroke engine. This single-axle tractor had three forward speeds. Initially engines were imported from England, but problems with reliability and spares motivated Howard's engine ventures.

attachments for Fordsons, especially to orchardists and canegrowers, Howard's business grew to the stage that in 1927 it required a move to a bigger factory, nearer to raw material suppliers. Northmead near Parramatta was chosen and a new factory was built there by the energetic inventor.

The Fordson tractor application proved most lucrative for rotary hoes, but Howard diversified into small single-axle or walk-behind rotary hoe tractors. These were the Junior (5 HP), the Eight and the Twelve, powered by air-cooled engines initially imported from England. There was also the Rolling Dolly hand-operated washing machine (only 40 built). In 1928 Howard Cultivators Ltd

was licensed in England to handle export orders outside Australia and New Zealand to match the growing interest and demand that was developing offshore. In that same year the first Howard cane harvester was built, along with a helical mouldboard plough, and a three-wheeled tractor. The three-wheeled tractor, known as the Auto Rotary Hoe 16, was powered by a 16 HP Morris engine and carried a mid-mounted three-foot Rotavator. Later in 1928 came a setback for the company: the Fordson tractor was suddenly withdrawn from the market.

During the next two years, while Fordsons were unavailable, there was practically no market for Fordson attachments. Howard had introduced creeper gears and power take-offs as well as rotary hoes for the Fordson. So the push was on to market the single-axle tractors. A variety of engines was tested, each having its shortcomings for rotary hoe work, and there were also problems obtaining spare parts. Cliff Howard decided to design and build his own engines. Air-cooled engines were produced first for the Junior and Eight.



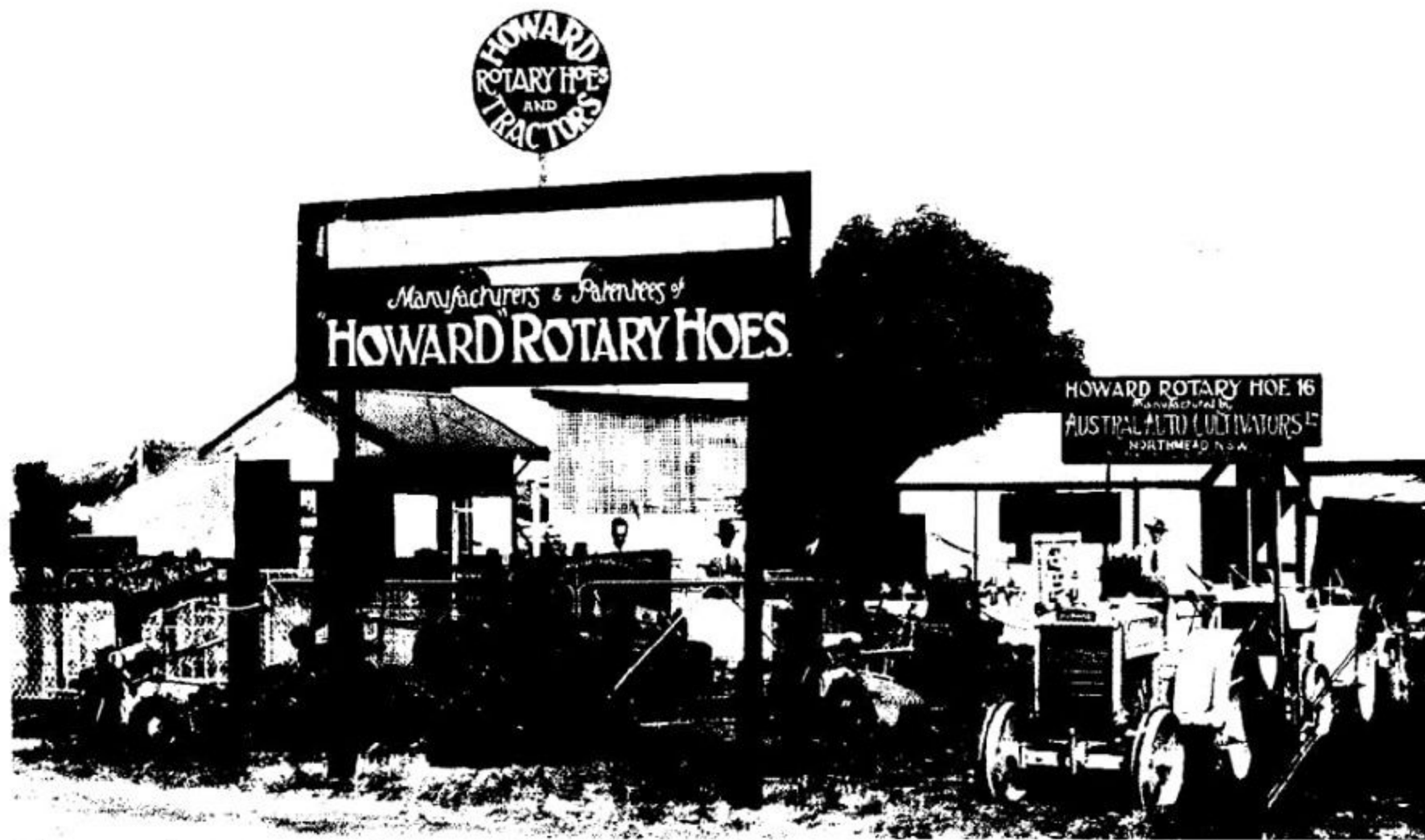
Rolling Dolly — Howard's washing machine, c. 1928. Only 40 were built.

For the Twelve, the Sixteen, and a new four-wheel tractor, the DH22, a series of water-cooled engines was developed. The first models of the DH22 (the prefix stood for Daisy Howard, the designer's wife) were fitted with Morris Commercial engines of 22 HP. To establish a foundry for engines, more land was acquired at Northmead, and the company name changed to Howard Auto Cultivators Ltd as part of a push to raise more capital.

The DH22 tractor, launched around 1930, became the company's tractor line-leader and was manufactured for the next 30 years.

More uses for Howard engines were found: engine power packs were advertised for fitting to harvesters to increase capacity, and as universal power units for other work around the farm. Ever fascinated by engines, Howard even attempted a Ricardo-type diesel in 1932 but was distracted by business hassles from persisting with this development. During the

1930s Howard devoted a considerable effort to capture the sugarcane machinery market with his hoes, tractors,



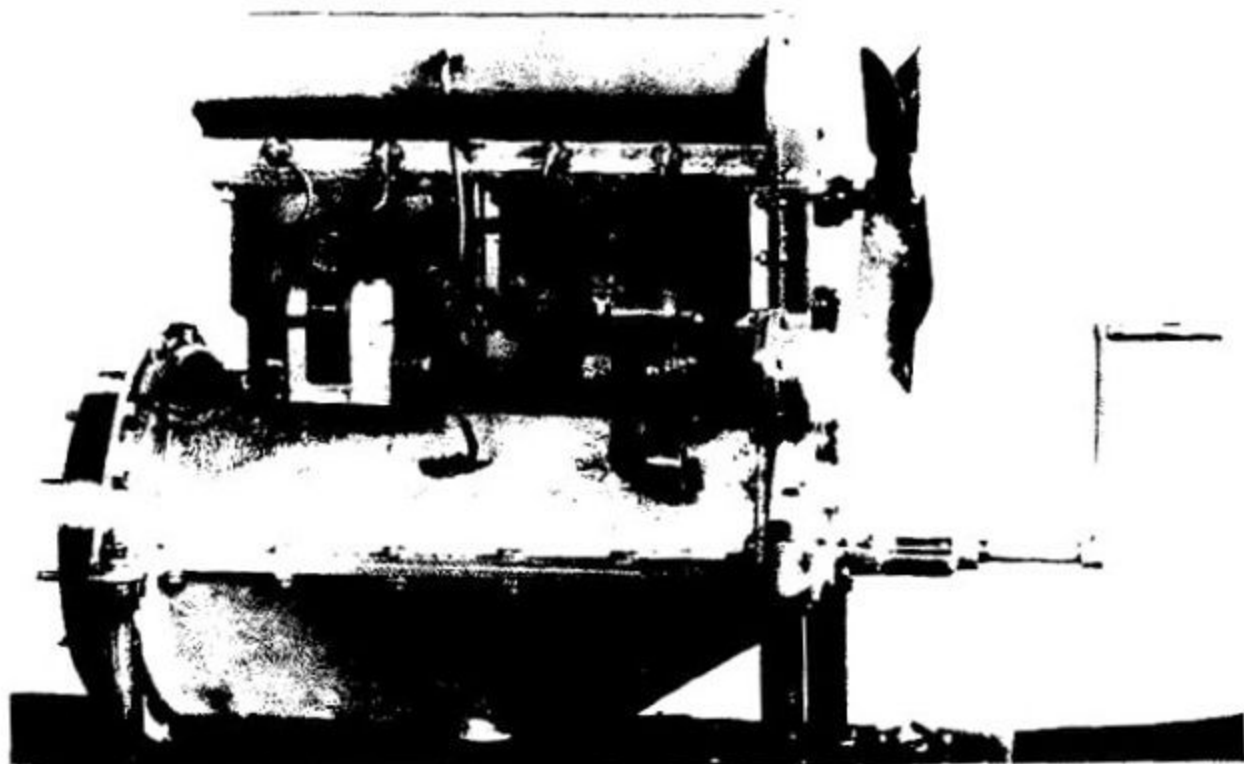
This was the Howard exhibit at the Royal Agricultural Show, Sydney, in 1932.



The DH22 tractor became Howard's tractor line-leader for 30 years after it was launched around 1930. The earliest version was powered by a Morris 22 HP engine from England. Later the company produced their own water-cooled engine for the DH22. The Howards often conducted tests at Hawkesbury Agricultural College, where this photo was taken before World War II.



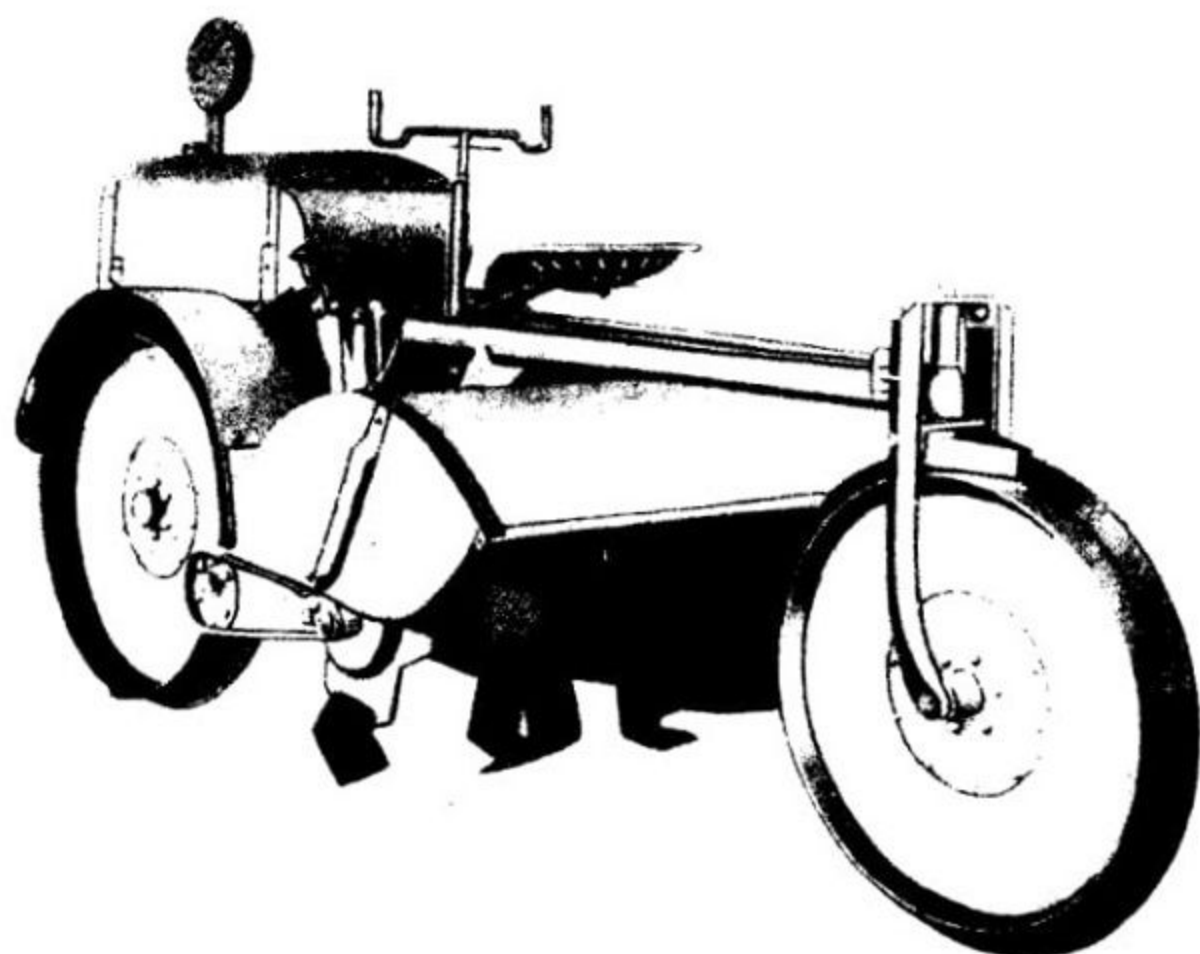
At the Buenos Aires farm machinery show c. 1929, Howard representatives displayed the Sugarcane Special three-wheeler Rotavator, the Sixteen, and a Fordson-equipped helical plough, or 'rotary mouldboard'. Howard patented this helical plough in 1928 (Australian patent No. 11,648/28).



Howard's locally built four-cylinder spark-ignited engine of 22 HP, for the DH22 tractor. It was reportedly the first overhead-valve engine manufactured in Australia. All basic components were manufactured at Northmead, except for the imported magneto and ball bearings.



D16 Morris-engined canefield model with side shields was used to drive a 3.1-foot Rotavator, the Auto Rotary Hoe 16.



This three-wheeled Howard tractor with 16 HP Morris engine was built primarily to carry the mid-mounted Rotavator. It was manufactured between 1926 and 1930. The patent (15,351/28) was issued in 1928. There were actually three models: orchard, sugarcane and field.



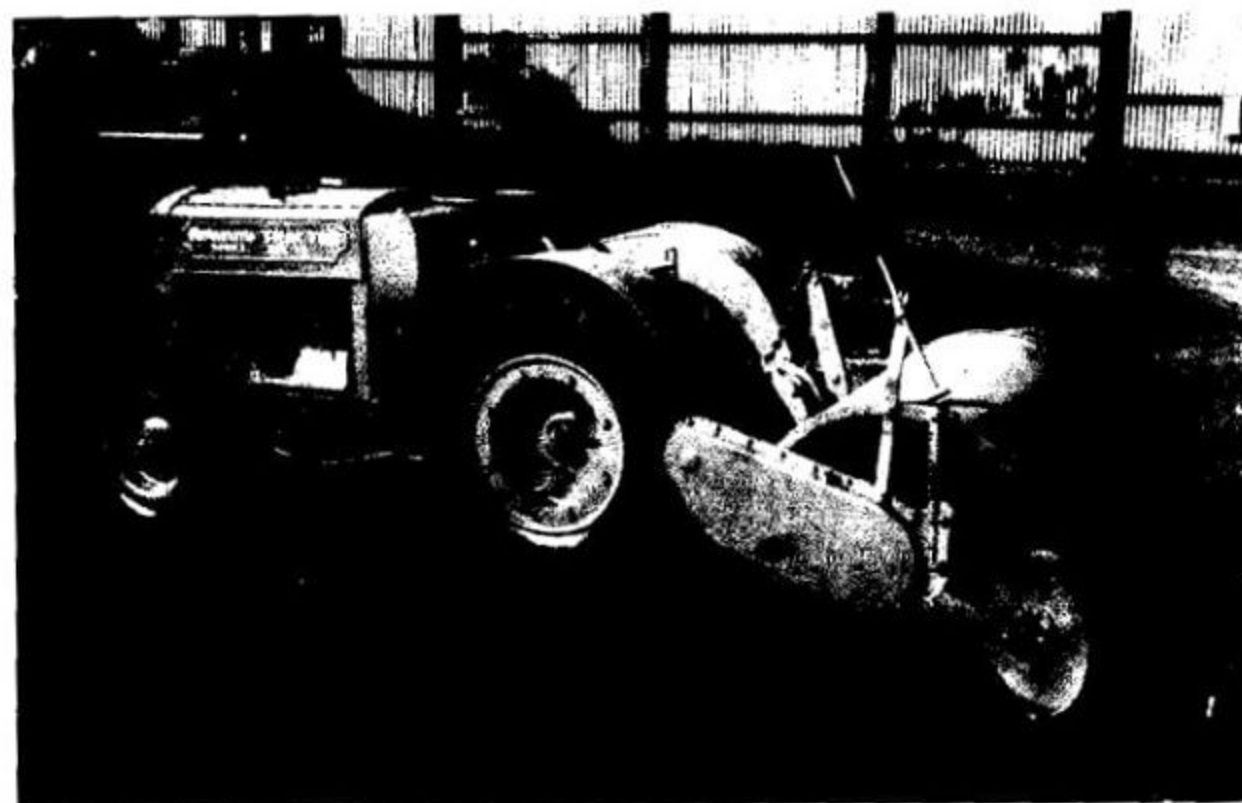
Special DH22, modified at the factory to carry the Howard producer-gas generator, around 1937.

engines and a self-propelled cane harvester.

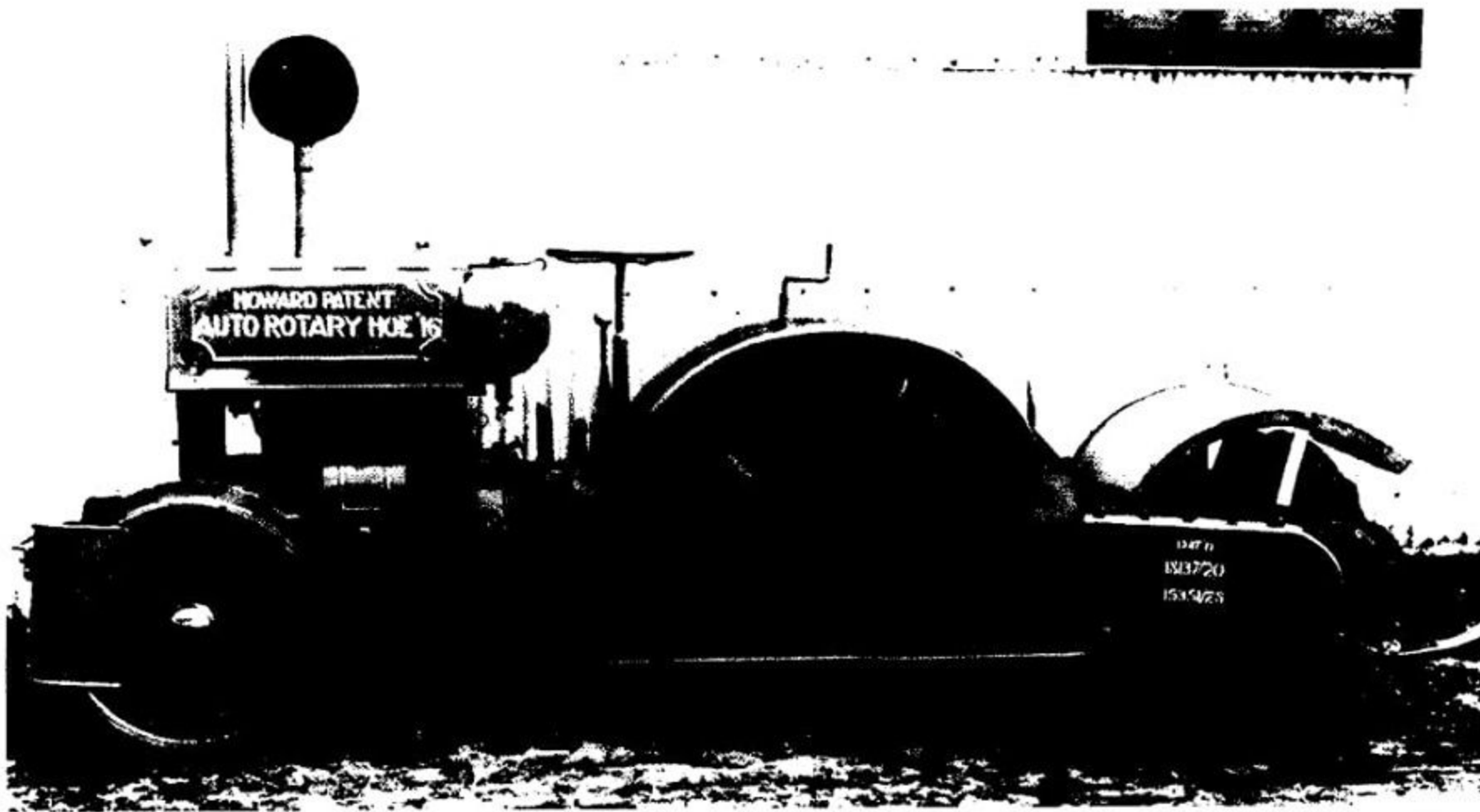
By 1934 the Northmead works boasted a staff of 140 and, despite the growth of the business, A.C. Howard still could be found at the workbench on new inventions. During the lean period of the 1930s farmers were attracted by any production method that might save money, and producer gas was a much cheaper fuel than liquid fuels. Howard tested producer-gas generators and built a 40 HP tractor prototype with an engine specially modified for producer gas, but with the capability to run on kerosene if required. It was first tested on 600 acres of wheatland at Gilgandra, then sold to a Bundaberg cane farmer.

In 1936 a number of DH22s with slightly modified engines were fitted with producer-gas generators to find out how they would perform in the hands of farmers. Most purchasers started off well but they soon tired of the constant attention the gas producers required. Many decided to convert back to kerosene even though the fuel cost per acre was over four times that of producer gas. After that, no more tractors were sold with gas producers but experiments continued to improve on the design.

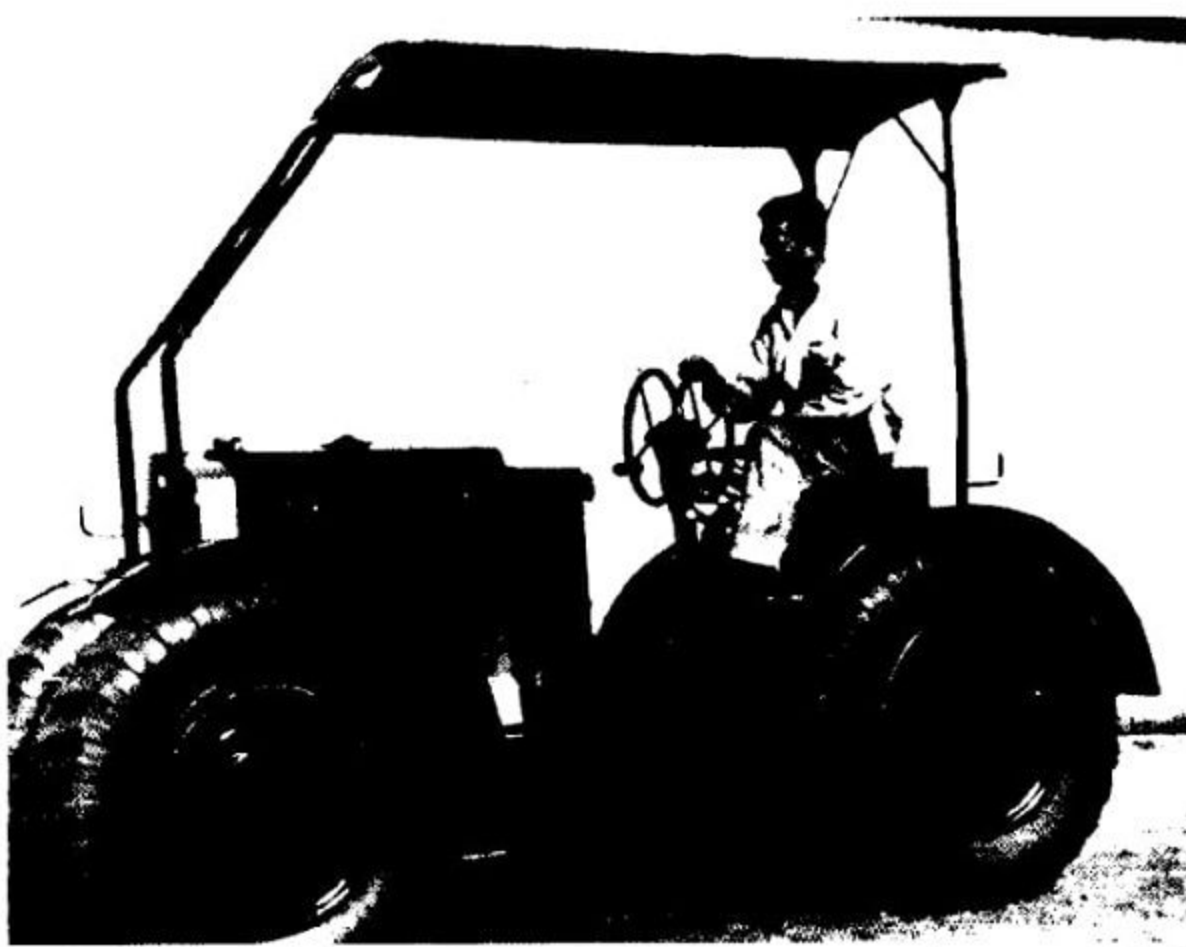
In 1937 the DH22 was offered with pneumatic tyres. In that same year (the year *Power Farming's Technical Annual* was launched) Howard's offered a four-wheel-drive industrial tractor, the FWDH22. It was designed with two steering wheels so it could be operated in either direction if the operator switched position. There were four speeds forward and four reverse gears. For shunting



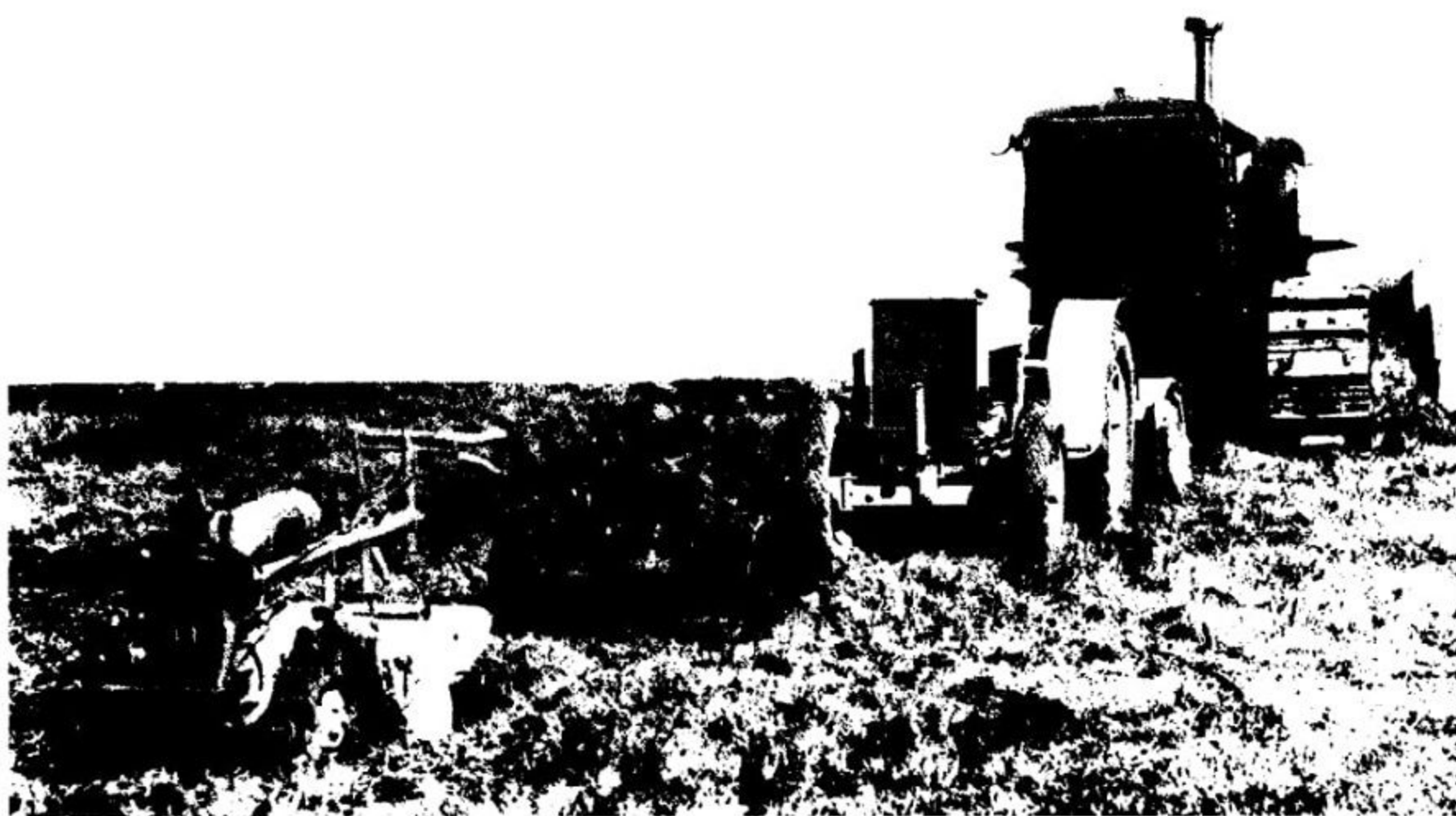
Howard Auto Rotary Hoe 22 with Howard engine and rubber tyres, c. 1937. The tractor had 10 forward speeds, starting at 0.9 mph creeper speed for rotary hoeing. Hydraulic hoe lift was featured in 1935.



The D16 four-wheeled tractor replaced the three-wheeler, c. 1929, but still used the 16 HP Morris engine.



A four-wheel-drive model, the FWDH22, using the same 22 HP power unit as the DH22, was offered in 1937.



A Howard lineup around 1937 — four sizes of rotary hoes and three Howard tractors. The 5 HP Junior, 9 HP, the DH22, and the Caterpillar 75 with the 8.5-foot wide Howard rotary hoe which could cut to a depth of two feet in North Queensland canefields.

rail wagons, this arrangement saved turning the whole tractor around. There are hints of the French Latil tractor here.

Troubles developed in England in 1934, when the British subsidiary decided that they would take out patents in their own name. Cliff Howard went over in October 1936 to sort matters out, then again in 1937, but during his absence while working out the legal issues, management troubles caused a rift in the Australian enterprise. As it happened the British episode turned in Howard's favour and he

formed a new company in England, at the same time divesting himself of any involvement with the Australian management. Rotary Hoe Cultivators Ltd, England, was registered in 1938. For Cliff, it was pioneering all over again. He pitched in to level the site for the works at Horndon, Essex, and even personally laid bricks for the new factory. Not long after, however, a financial downturn plagued the British company and it was barely salvaged by the outbreak of World War II, when the works was devoted to producing munitions and military equipment.

Meanwhile the Australian firm's attention was also shifted to the provision of war materiel and the Northmead factory made ammunitions and even a revolver, known as the H.A.C. revolver. It was the only Australian-made handgun of the war. Back in Britain towards the end of the war, the government directed the Howard factory to resume agricultural production to help with the war effort.

Postwar Recovery

Immediately after the war, Cliff Howard worked aggressively at establishing a US market, selling products from his British company, Rotary Hoes Limited. In 1959 Howard returned to Australia to buy back the Australian company. A lightweight four-wheel tractor, the Model 2000, with 12 HP L-Series engine, was launched in 1962.



One of the 20 FWDH22s purchased by the NSW State Rail Authority.

machines apart from the Rotavator. Especially notable were a giant square hay baler (one-tonne bales) and the slant-leg Paraplow. So the Howard name survives, although under different organisational structures on each continent.

[The assistance of J.P. (Pen) Richards, Killara, with textual notes and the many photos he lent for this segment is gratefully acknowledged. Material was also provided by Peter Milne, of Howard Australia (1985) Pty Ltd.]

Platypus Tractors

There was also an interlude in England with crawlers when the Platypus Tractor Co. was established to make Platypus crawler tractors, between around 1950 and 1958, at Basildon, Essex. The most popular model in the series was the Platypus 30 with the Perkins P4 31 HP diesel engine. The tractor had six forward speeds and two reverse, and maximum drawbar pull was three tons. A special version, the Platypus Bogmaster, with extended track, exerted a ground pressure of less than 1.3 psi (a man's footprint exerts 5-7 psi) but only a few had been built by the time the British Howard group pulled out of the crawler market in 1958.

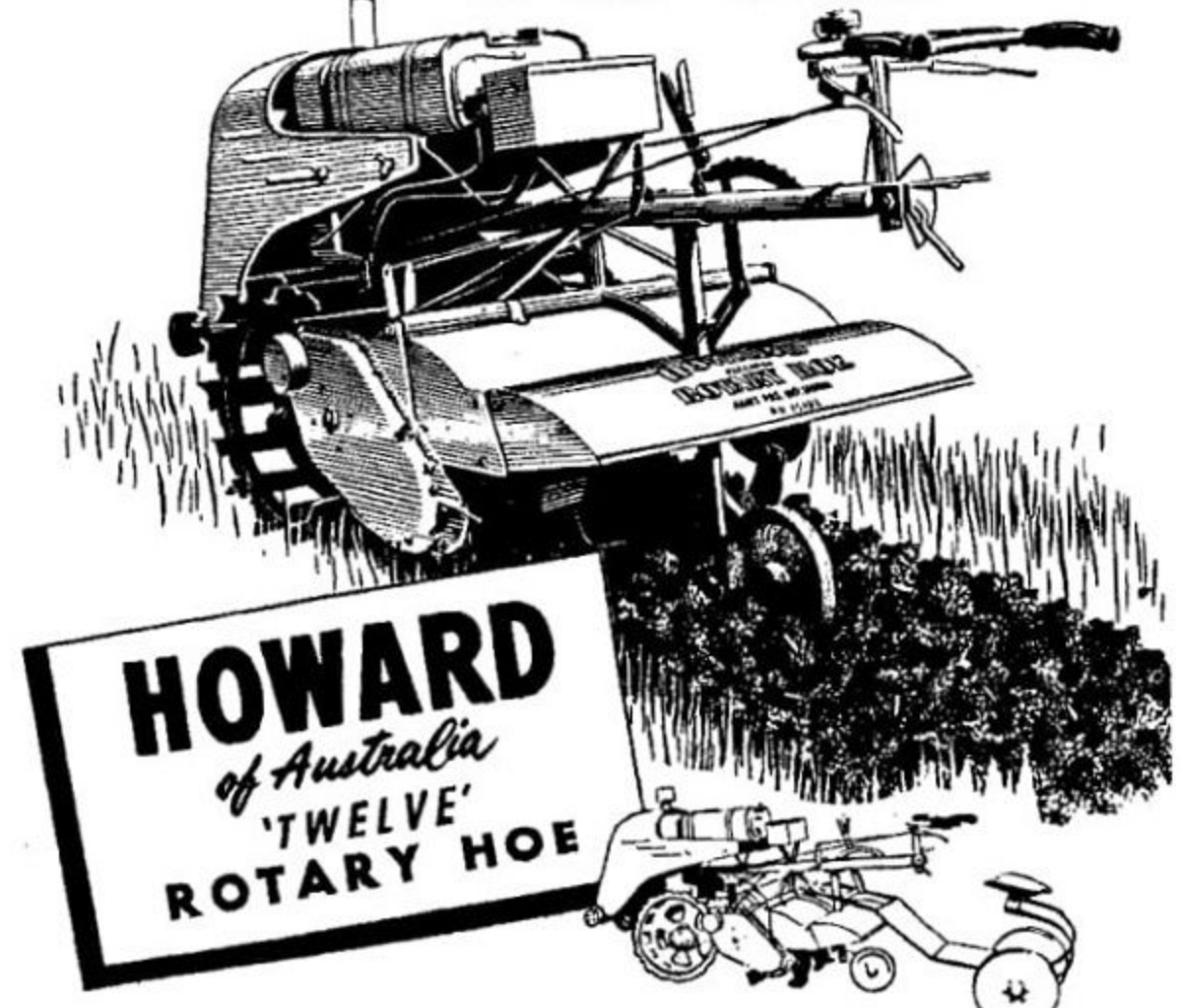
Cliff Howard was in England as managing director in 1970 when he was awarded the CBE for 'services rendered to agriculture' from the Queen, but not many months afterwards he died, in January 1971. Howard had earned a worldwide reputation. He had founded many production facilities and established an immovable place for the rotavator principle in world agriculture.

Company in Trouble, but Name Survives

The Australian company, Howard Rotavator Pty Ltd, suffered some severe reverses with the downturn of the farm equipment industry in the 1980s. In July 1985 Howard Rotavator Pty Ltd at Northmead was wound up, after having produced more than 100,000 Rotavators. Local production of tractors ended. New management and a move to Seven Hills saw another company, Howard Australia (1985) Pty Ltd emerge. This company became the Australian outlet to handle equipment manufactured overseas.

Even after the passing of its founder, the famous Howard name appeared on a range of important

**The only rotary hoe of its kind
in the world!**



The Howard Twelve tractor and hoe, 1952.



The Howard Platypus crawler tractor.



Here it is! The fastest, toughest, most powerful tractor-rotary hoe unit ever built! Produced by an inspired partnership between the famous Le Roi Company of Milwaukee, U.S.A. and HOWARD AUTO-CULTIVATORS LTD. of Australia! Powered with a husky OHV engine that develops a full 35 BHP and gives 25% more power than the famous DH22, with 20% increased coverage rate plus a reserve for really hard going. Equipped with every wanted feature including electric starting, fast hydraulic hoist; wide sponge rubber driving seat, etc! Combines with 4'6" rotary hoe for quick coverage. Australian-built to suit Australian conditions. Write to-day for full details.

Powerful Howard/Le Roi Engine!

OHV engine specially built under license to the Le Roi Company of Milwaukee, U.S.A. Includes all features a modern engine should have — automatic ignition advance, auto-valve temperature control for extremely rapid warming up, replaceable steel-bowl bearings, over-head valves, etc.

Fast Hydraulic Hoist!

Fast hydraulic hoist operated from gear pump driven direct from engine. The hoist can be operated with the hoe stationary by merely depressing clutch — there is no need to move gear into neutral. Lifts from right down to right up in 2-1/2 seconds.

• Wide range of special attachments available!

HOWARD AUTO-CULTIVATORS LTD.

Direct to the Field of Defense Tillage

WINDSOR ROAD, NORTHMEAD, N.S.W.



In 1970 Cliff Howard was awarded the CBE. Cliff and Daisy Howard after the Award Ceremony.

The Howard DH226 was offered in 1952, with a US-built LeRoi engine of 35 HP which enabled the tractor to work a 4 foot 6 inch hoe. The LeRoi engine was also made available in the FWD tractor.



Cliff Howard in England. He drove this restored DH22 at a 25-year company commemorative event in 1962.



The Howard 2000 compact tractor was first offered in 1962. The 12 HP ride-on garden tractor was a popular machine and had a range of locally built implements to match.